Il convient de lire attentivement ce manuel avant la première utilisation du véhicule.

Bitte lesen Sie diese Bedienungsanleitung sorgfältig durch, bevor Sie das Fahrzeug in Betrieb nehmen.

Leggere attentamente questo manuale prima di utilizzare questo veicolo.

OWNER’S SERVICE MANUAL
MANUEL D’ATELIER DU PROPRIÉTARIEN
FAHRER- UND WARTUNGSHANDBUCH
MANUALE DI SERVIZIO DEL PROPRIETARIO

YZ250F(A)
17D-28199-31
Read this manual carefully before operating this vehicle. This manual should stay with this vehicle if it is sold.

Il convient de lire attentivement ce manuel avant la première utilisation du véhicule. Le manuel doit être remis avec le véhicule en cas de vente de ce dernier.

Bitte lesen Sie diese Bedienungsanleitung sorgfältig durch, bevor Sie das Fahrzeug in Betrieb nehmen. Diese Bedienungsanleitung muss, wenn das Fahrzeug verkauft wird, beim Fahrzeug verbleiben.

Leggere attentamente questo manuale prima di utilizzare il veicolo. Questo manuale dovrebbe accompagnare il veicolo se viene venduto.
⚠️ Read this manual carefully before operating this vehicle. This manual should stay with this vehicle if it is sold.
FOREWORD
INTRODUCTION
Congratulations on your purchase of a Yamaha YZ series. This model is the culmination of Yamaha’s vast experience in the production of pacesetting racing machines. It represents the highest grade of craftsmanship and reliability that have made Yamaha a leader. This manual explains operation, inspection, basic maintenance and tuning of your machine. If you have any questions about this manual or your machine, please contact your Yamaha dealer.

TIP
Yamaha continually seeks advancements in product design and quality. Therefore, while this manual contains the most current product information available at the time of printing, there may be minor discrepancies between your machine and this manual. If you have any questions concerning this manual, please consult your Yamaha dealer.

WARNING
PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY BEFORE OPERATING THIS MACHINE. DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE ATTAINED A SATISFACTORY KNOWLEDGE OF ITS CONTROLS AND OPERATING FEATURES AND UNTIL YOU HAVE BEEN TRAINED IN SAFE AND PROPER RIDING TECHNIQUES. REGULAR INSPECTIONS AND CAREFUL MAINTENANCE, ALONG WITH GOOD RIDING SKILLS, WILL ENSURE THAT YOU SAFETY ENJOY THE CAPABILITIES AND THE RELIABILITY OF THIS MACHINE.

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

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

WARNING
A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE
A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.

TIP
A TIP provides key information to make procedures easier or clearer.

SAFETY INFORMATION
THIS MACHINE IS DESIGNED STRICTLY FOR COMPETITION USE. ONLY ON A CLOSED COURSE. It is illegal for this machine to be operated on any public street, road, or highway. Off-road use on public lands may also be illegal. Please check local regulations before riding.

• THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY.
• PARK THE MACHINE CAREFULLY; TURN OFF THE ENGINE. Always turn off the engine if you are going to leave the machine. Do not park the machine on a slope or soft ground as it may fall over.
• THE ENGINE, EXHAUST PIPE, MUFFLER, AND OIL TANK WILL BE VERY HOT AFTER THE ENGINE HAS BEEN RUN. Be careful not to touch them or to allow any clothing item to contact them during inspection or repair.
• PROPERLY SECURE THE MACHINE BEFORE TRANSPORTING IT. When transporting the machine in another vehicle, always be sure it is properly secured and in an upright position and that the fuel cock is in the "OFF" position. Otherwise, fuel may leak out of the carburetor or fuel tank.

• GASOLINE IS HIGHLY FLAMMABLE. Always turn off the engine while refueling. Take care to not spill any gasoline on the engine or exhaust system. Never refuel in the vicinity of an open flame, or while smoking.
• GASOLINE CAN CAUSE INJURY. If you should swallow some gasoline, inhale excess gasoline vapors, or allow any gasoline to get into your eyes, contact a doctor immediately. If any gasoline spills onto your skin or clothing, immediately wash skin areas with soap and water, and change your clothes.
• ONLY OPERATE THE MACHINE IN AN AREA WITH ADEQUATE VENTILATION. Never start the engine or let it run for any length of time in an enclosed area. Exhaust fumes are poisonous. These fumes contain carbon monoxide, which by itself is odorless and colorless. Carbon monoxide is a dangerous gas which can cause unconsciousness or can be lethal.

• THE ENGINE, EXHAUST PIPE, MUFFLER, AND OIL TANK WILL BE VERY HOT AFTER THE ENGINE HAS BEEN RUN. Be careful not to touch them or to allow any clothing item to contact them during inspection or repair.
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HOW TO USE THIS MANUAL

FINDING THE REQUIRED PAGE
1. This manual consists of seven chapters; "General Information", "Specifications", "Regular inspection and adjustments", "Engine", "Chassis", "Electrical" and "Tuning"
2. The table of contents is at the beginning of the manual. Look over the general layout of the book before finding the required chapter and item.
   Bend the book at its edge, as shown, to find the required fore edge symbol mark and go to a page for required item and description.

MANUAL FORMAT
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,
- Bearings
  Pitting/damage → Replace.
HOW TO READ DESCRIPTIONS
To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

1. An easy-to-see exploded diagram "1" is provided for removal and disassembly jobs.

2. Numbers "2" are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.

3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks "3". The meanings of the symbol marks are given on the next page.

4. A job instruction chart "4" accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

5. For jobs requiring more information, the step-by-step format supplements "5" are given in addition to the exploded diagram and job instruction chart.

ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols "1" to "7" are used to identify the specifications appearing in the text.
1. With engine mounted
2. Filling fluid
3. Lubricant
4. Special tool
5. Tightening
6. Specified value, Service limit
7. Resistance (Ω), Voltage (V), Electric current (A)

Illustrated symbols "8" to "13" in the exploded diagrams indicate grade of lubricant and location of lubrication point.
8. Apply engine oil
9. Apply molybdenum disulfide oil
10. Apply brake fluid
11. Apply lightweight lithium-soap base grease
12. Apply molybdenum disulfide grease
13. Apply silicone grease
Illustrated symbols "14" to "15" in the exploded diagrams indicate where to apply a locking agent and where to install new parts.
14. Apply locking agent (LOC- TITE®)
15. Use new one
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GENERAL INFORMATION
LOCATION OF IMPORTANT LABELS
Please read the following important labels carefully before operating this vehicle.

**CANADA**

1. Premium unleaded gasoline only.

2. Essence super sans plomb seulement.

3. This vehicle is a competition motorcycle and is for use exclusively in closed course competition and is not intended for use on public highways.

4. MFD. BY YAMAHA MOTOR CO., LTD. MM / YY MADE IN JAPAN

5. This spark ignition system meets all requirements of the Canadian Interference Causing Equipment Regulations.

6. CE VEHICULE EST UNE MOTORCYCLETTE DE COMPETITION DONT L’USAGE EST RESERVE AUX COMPETITIONS SUR CIRCUITS FERMES ET NON DESTINE AUX VOIES PUBLIQUES.

7. WARNING
This unit contains high pressure nitrogen gas. Mishandling can cause explosion.
- Read owner’s manual for instructions.
- Do not incinerate, puncture or open.

8. AVERTISSEMENT
Cette unité contient de l'azote à haute pression. Une mauvaise manipulation peut entraîner d'explosion.
- Voir le manuel d'utilisateur pour les instructions.
- Ne pas brûler ni perforer ni ouvrir.
LOCATION OF IMPORTANT LABELS

10

WARNING
- BEFORE YOU OPERATE THIS VEHICLE, READ THE OWNER'S MANUAL AND ALL LABELS.
- NEVER CARRY A PASSENGER. You increase your risk of losing control if you carry a passenger.
- NEVER OPERATE THIS VEHICLE ON PUBLIC ROADS. You can collide with another vehicle if you operate this vehicle on a public road.
- ALWAYS WEAR AN APPROVED MOTORCYCLE HELMET, eye protection, and protective clothing.
- EXPERIENCED RIDER ONLY.

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AVERTISSEMENT
- LIRE LE MANUEL DU PROPRIÉTAIRE ET TOUTES LES ÉTIQUETTES AVANT D'UTILISER CE VÉHICULE.
- NE JAMAIS TRANSPORTER DE PASSAGER. La conduite avec un passager augmente les risques de perte de contrôle.
- NE JAMAIS ROULER SUR DES CHEMINS PUBLICS. Vous pourriez entrer en collision avec un autre véhicule.
- TOUJOURS PORTER UN CASQUE DE MOTOCYCLISTE APPROUVÉ, des lunettes et des vêtements de protection.
- EXCLUSIVEMENT POUR L’USAGE D’UN CONDUCTEUR EXPERIMENTÉ.

12

13

TIRE INFORMATION
Cold tire normal pressure should be set as follows:
FRONT: 100kPa, (1.000kgf/cm²), 15psi
REAR: 100kPa, (1.000kgf/cm²), 15psi

14

INFORMATION SUR LES PNEUS
La pression des pneus à froid doit normalement être réglée comme suit.
AVANT: 100kPa, (1.000kgf/cm²), 15psi
ARRIÈRE: 100kPa, (1.000kgf/cm²), 15psi

EUROPE

7

YAMAHA MOTOR CO., LTD.
SHIZUOKA JAPAN

9

100 kPa
1.00 kgf/cm²
15 psi

100 kPa
1.00 kgf/cm²
15 psi
AUS, NZ, ZA

9

LOCATION OF IMPORTANT LABELS

13

TIRE INFORMATION
Cold tire normal pressure should be set as follows:
FRONT: 100kPa, (1.00kgf/cm²), 15psi
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WARNING
- BEFORE YOU OPERATE THIS VEHICLE, READ THE OWNER’S MANUAL AND ALL LABELS.
- NEVER CARRY A PASSENGER. You increase your risk of losing control if you carry a passenger.
- NEVER OPERATE THIS VEHICLE ON PUBLIC ROADS. You can collide with another vehicle if you operate this vehicle on a public road.
- ALWAYS WEAR AN APPROVED MOTORCYCLE HELMET, eye protection, and protective clothing.
- EXPERIENCED RIDER ONLY.
### LOCATION OF IMPORTANT LABELS

Familiarize yourself with the following pictograms and read the explanatory text.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Book Icon]</td>
<td>Read Owner’s service manual.</td>
</tr>
<tr>
<td>![Warning Icon]</td>
<td>This unit contains high-pressure nitrogen gas. Mishandling can cause explosion. Do not incinerate, puncture or open.</td>
</tr>
<tr>
<td>![Power Off Icon]</td>
<td>Turn off the main switch after riding to avoid draining the battery.</td>
</tr>
<tr>
<td>![Fuel Icon]</td>
<td>Use unleaded gasoline only.</td>
</tr>
<tr>
<td>![Measurement Icon]</td>
<td>Measure tire pressure when tires are cold.</td>
</tr>
<tr>
<td>![Adjust Icon]</td>
<td>Adjust tire pressure. Improper tire pressure can cause loss of control. Loss of control can result in severe injury or death.</td>
</tr>
</tbody>
</table>
The machine you have purchased may differ slightly from those shown in the following.

Designs and specifications are subject to change without notice.
CONSUMER INFORMATION

There are two significant reasons for knowing the serial number of your machine:

1. When ordering parts, you can give the number to your Yamaha dealer for positive identification of the model you own.
2. If your machine is stolen, the authorities will need the number to search for and identify your machine.

VEHICLE IDENTIFICATION NUMBER
The vehicle identification number "1" is stamped on the right of the steering head pipe.

ENGINE SERIAL NUMBER
The engine serial number "1" is stamped into the elevated part of the right-side of the engine.

MODEL LABEL
The model label "1" is affixed to the frame under the rider's seat. This information will be needed to order spare parts.

INCLUDED PARTS
DETACHABLE SIDESTAND
This sidestand "1" is used to support only the machine when standing or transporting it.

WARNING
- Never apply additional force to the sidestand.
- Remove this sidestand before starting out.

VALVE JOINT
This valve joint "1" prevents fuel from flowing out and is installed to the fuel tank breather hose.

NOTICE
In this installation, make sure the arrow faces the fuel tank and also downward.

SPARK PLUG WRENCH
This spark plug wrench "1" is used to remove and install the spark plug.

NIPPLE WRENCH
This nipple wrench "1" is used to tighten the spoke.

JET NEEDLE PULL-UP TOOL
The jet needle pull-up tool "1" is used to pull the jet needle out of the carburetor.

HANDLEBAR PROTECTOR
Install the handlebar protector "1" so that the mark "a" face forward.

IMPORTANT INFORMATION
PREPARATION FOR REMOVAL AND DISASSEMBLY
1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
   - When washing the machine with high pressured water, cover the parts follows.
     Silencer exhaust port
     Side cover air intake port
     Water pump housing hole at the bottom
     Drain hole on the cylinder head (right side)

2. Use proper tools and cleaning equipment. Refer to "SPECIAL TOOLS" section.

3. When disassembling the machine, keep mated parts together. They include gears, cylinders, pistons, and other mated parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machine 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. We recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

GASKETS, OIL SEALS AND O-RINGS
1. All gaskets, oil 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 "1" 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) "1" and oil seal(s) "2" 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 lightweight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

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

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.

BEARINGS AND OIL SEALS
1. Install the bearing(s) "1" and oil seal(s) "2" 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 lightweight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

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.

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.

CHECKING OF CONNECTION
Dealing with stains, rust, moisture, etc. on the connector.
1. Disconnect:

• Connector
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. The shape and part number used for the special tool differ by country, so two types are provided. Refer to the list provided to avoid errors when placing an order.

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

<table>
<thead>
<tr>
<th>Tool name/Part number</th>
<th>How to use</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crankcase separating tool</td>
<td>These tool is used to remove the crankshaft from either case.</td>
<td></td>
</tr>
<tr>
<td>YU-1135-A, 90890-01135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flywheel puller</td>
<td>This tool is used to remove the flywheel magneto.</td>
<td></td>
</tr>
<tr>
<td>YM-1189, 90890-01189</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor holding tool</td>
<td>This tool is used when loosening or tightening the flywheel magneto secur-</td>
<td></td>
</tr>
<tr>
<td>YU-1235, 90890-01235</td>
<td>ing nut.</td>
<td></td>
</tr>
<tr>
<td>Dial gauge and stand</td>
<td>These tools are used to check each part for runout or bent.</td>
<td></td>
</tr>
<tr>
<td>YU-3097, 90890-01252</td>
<td>Stand YU-1256</td>
<td></td>
</tr>
<tr>
<td>Crankshaft installing tool</td>
<td>These tools are used to install the crankshaft.</td>
<td></td>
</tr>
<tr>
<td>Crankshaft installing pot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YU-90050, 90890-01274</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crankshaft installing bolt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YU-90050, 90890-01275</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacer (crankshaft installer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YU-91044, 90890-04081</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapter (M12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YU-90063, 90890-01278</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston pin puller set</td>
<td>This tool is used to remove the piston pin.</td>
<td></td>
</tr>
<tr>
<td>YU-1304, 90890-01304</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool name/Part number</td>
<td>How to use</td>
<td>Illustration</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Radiator cap tester&lt;br&gt;YU-24460-01, 90890-01325&lt;br&gt;Radiator cap tester adapter&lt;br&gt;YU-33984, 90890-01352</td>
<td>These tools are used for checking the cooling system.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Steering nut wrench&lt;br&gt;YU-33975, 90890-01403</td>
<td>This tool is used when tighten the steering ring nut to specification.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Cap bolt wrench&lt;br&gt;YM-01500, 90890-01500</td>
<td>This tool is used to loosen or tighten the base valve.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Cap bolt ring wrench&lt;br&gt;YM-01501, 90890-01501</td>
<td>This tool is used to loosen or tighten the damper assembly.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Fork seal driver&lt;br&gt;YM-A0948, 90890-01502</td>
<td>This tool is used when install the fork oil seal.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Spoke nipple wrench&lt;br&gt;YM-01521, 90890-01521</td>
<td>This tool is used to tighten the spoke.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Pocket tester&lt;br&gt;YU-3112-C, 90890-03112</td>
<td>Use this tool to inspect the coil resistance, output voltage and amperage.</td>
<td>![Image]</td>
</tr>
<tr>
<td>Tool name/Part number</td>
<td>How to use</td>
<td>Illustration</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Timing light&lt;br&gt;YM-33277-A, 90890-03141</td>
<td>This tool is necessary for checking ignition timing.</td>
<td><img src="image1" alt="Timing light" /></td>
</tr>
<tr>
<td>Valve spring compressor&lt;br&gt;YM-4019, 90890-04019</td>
<td>This tool is needed to remove and install the valve assemblies.</td>
<td><img src="image2" alt="Valve spring compressor" /></td>
</tr>
<tr>
<td>Clutch holding tool&lt;br&gt;YM-91042, 90890-04086</td>
<td>This tool is used to hold the clutch when removing or installing the clutch boss securing nut.</td>
<td><img src="image3" alt="Clutch holding tool" /></td>
</tr>
<tr>
<td>Valve guide remover&lt;br&gt;Intake 4.0 mm (0.16 in)&lt;br&gt;Exhaust 4.5 mm (0.18 in)&lt;br&gt;YM-4111, 90890-04111&lt;br&gt;YM-4116, 90890-04116</td>
<td>This tool is needed to remove and install the valve guide.</td>
<td><img src="image4" alt="Valve guide remover" /></td>
</tr>
<tr>
<td>Valve guide installer&lt;br&gt;Intake 4.0 mm (0.16 in)&lt;br&gt;Exhaust 4.5 mm (0.18 in)&lt;br&gt;YM-4112, 90890-04112&lt;br&gt;YM-4117, 90890-04117</td>
<td>This tool is needed to install the valve guide.</td>
<td><img src="image5" alt="Valve guide installer" /></td>
</tr>
<tr>
<td>Valve guide reamer&lt;br&gt;Intake 4.0 mm (0.16 in)&lt;br&gt;Exhaust 4.5 mm (0.18 in)&lt;br&gt;YM-4113, 90890-04113&lt;br&gt;YM-4118, 90890-04118</td>
<td>This tool is needed to rebore the new valve guide.</td>
<td><img src="image6" alt="Valve guide reamer" /></td>
</tr>
<tr>
<td>Tool name/Part number</td>
<td>How to use</td>
<td>Illustration</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>Dynamic spark tester</strong>&lt;br&gt;YM-34487&lt;br&gt;Ignition checker&lt;br&gt;90890-06754</td>
<td>This instrument is necessary for checking the ignition system components.</td>
<td><img src="image" alt="Dynamic Spark Tester" /></td>
</tr>
<tr>
<td><strong>Digital tachometer</strong>&lt;br&gt;YU-39951-B, 90890-06760</td>
<td>This tool is needed for observing engine rpm.</td>
<td><img src="image" alt="Digital Tachometer" /></td>
</tr>
<tr>
<td><strong>YAMAHA Bond No. 1215 (Three-Bond® No. 1215)</strong>&lt;br&gt;90890-85505</td>
<td>This sealant (Bond) is used for crankcase mating surface, etc.</td>
<td><img src="image" alt="YAMAHA Bond No. 1215" /></td>
</tr>
</tbody>
</table>
CONTROL FUNCTIONS

ENGINE STOP SWITCH
The engine stop switch "1" is located on the left handlebar. Continue pushing the engine stop switch till the engine comes to a stop.

CLUTCH LEVER
The clutch lever "1" is located on the left handlebar; it disengages or engages the clutch. Pull the clutch lever to the handlebar to disengage the clutch, and release the lever to engage the clutch. The lever should be pulled rapidly and released slowly for smooth starts.

SHIFT PEDAL
The gear ratios of the constant-mesh 5 speed transmission are ideally spaced. The gears can be shifted by using the shift pedal "1" on the left side of the engine.

KICKSTARTER CRANK
Rotate the kickstarter crank "1" away from the engine. Push the starter down lightly with your foot until the gears engage, then kick smoothly and forcefully to start the engine. This model has a primary kickstarter crank so the engine can be started in any gear if the clutch is disengaged. In normal practices, however, shift to neutral before starting.

THROTTLE GRIP
The throttle grip "1" is located on the right handlebar; it accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.

FRONT BRAKE LEVER
The front brake lever "1" is located on the right handlebar. Pull it toward the handlebar to activate the front brake.

REAR BRAKE PEDAL
The rear brake pedal "1" is located on the right side of the machine. Press down on the brake pedal to activate the rear brake.

FUEL COCK
The fuel cock supplies fuel from the tank to carburetor and also filters the fuel. The fuel cock has the two positions:
OFF: With the lever in this position, fuel will not flow. Always return the lever to this position when the engine is not running.
ON: With the lever in this position, fuel flows to the carburetor. Normal riding is done with the lever in this position.

COLD STARTER KNOB
When cold, the engine requires a richer air-fuel mixture for starting. A separate starter circuit, which is controlled by the cold starter knob "1", supplies this mixture. Pull the cold starter knob out to open the circuit for starting. When the engine has warmed up, push it in to close the circuit.

HOT STARTER LEVER
The hot starter lever "1" is used when starting a warm engine. Use the hot starter lever when starting the engine again immediately after it was stopped (the engine is still warm). Pulling the hot starter lever injects secondary air to thin the air-fuel mixture temporarily, allowing the engine to be started more easily.
STARTING AND BREAK-IN

FUEL
Always use the recommended fuel as stated below. Also, be sure to use new gasoline the day of a race.

Recommended fuel:
Premium unleaded gasoline only with a research octane number of 95 or higher.

NOTICE
Use only unleaded gasoline. The use of leaded gasoline will cause severe damage to the engine internal parts such as valves, piston rings, and exhaust system, etc.

TIP
If knocking or pinging occurs, use a different brand of gasoline or higher octane grade.

WARNING
• For refueling, be sure to stop the engine and use enough care not to spill any fuel. Also, be sure to avoid refueling close to a fire.
• Refuel after the engine, exhaust pipe, etc. have cooled off.

HANDLING NOTE

WARNING
Never start or run the engine in a closed area. The exhaust fumes are poisonous; they can cause loss of consciousness and death in a very short time. Always operate the machine in a well-ventilated area.

NOTICE
• The carburetor on this machine has a built-in accelerator pump. Therefore, when starting the engine, do not operate the throttle or the spark plug will foul.
• Unlike a two-stroke engine, this engine cannot be kick started when the throttle is open because the kickstarter may kick back. Also, if the throttle is open the air/fuel mixture may be too lean for the engine to start.
• Before starting the machine, perform the checks in the pre-operation check list.

AIR FILTER MAINTENANCE
According to "CLEANING THE AIR FILTER ELEMENT" section in the CHAPTER 3, apply the foam-air-filter oil or its equivalent to the element. (Excess oil in the element may adversely affect engine starting.)

STARTING A COLD ENGINE
1. Inspect the coolant level.
2. Turn the fuel cock to "ON".
3. Shift the transmission into neutral.
4. Fully open the cold starter knob "1".
5. Kick the kickstarter crank.

WARNING
Do not open the throttle while kicking the kickstarter crank. Otherwise, the kickstarter crank may kick back.

6. Return the cold starter knob to its original position and run the engine at 3,000–5,000 r/min for 1 or 2 minutes.

TIP
Since this model is equipped with an accelerator pump, if the engine is raced (the throttle opened and closed), the air/fuel mixture will be too rich and the engine may stall. Also unlike a two-stroke engine, this model can idle.

NOTICE
Do not warm up the engine for extended periods of time.

STARTING A WARM ENGINE
Do not operate the cold starter knob and throttle. Pull the hot starter lever and start the engine by kicking the kickstarter crank forcefully with a firm stroke. As soon as the engine starts, release the hot starter lever to close the air passage.

Restarting an engine after a fall
Pull the hot starter lever and start the engine. As soon as the engine starts, release the hot starter lever to close the air passage.

The engine fails to start
Pull the hot starter lever all the way out and while holding the lever, kick the kickstarter crank 10 to 20 times to clear the engine. Then, restart the engine. Refer to "Restarting an engine after a fall".

<table>
<thead>
<tr>
<th>Air temperature</th>
<th>Throttle grip operation</th>
<th>Cold starter knob</th>
<th>Hot starter lever</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air temperature = less than 5 °C (41 °F)</td>
<td>Open 3 or 4 times</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Air temperature = more than 5 °C (41 °F)</td>
<td>None</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Air temperature (normal temperature) = between 5 °C (41 °F) and 25 °C (77 °F)</td>
<td>None</td>
<td>ON/ OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Air temperature = more than 25 °C (77 °F)</td>
<td>None</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

STARTING an engine after a long period of time
None | ON | OFF |

Restarting a warm engine
None | OFF | ON |

Restarting an engine after a fall
None | OFF | ON |

* Operate the throttle grip before kick starting.

NOTICE
Observe the following break-in procedures during initial operation to ensure optimum performance and avoid engine damage.
BREAK-IN PROCEDURES
1. Before starting the engine, fill the fuel tank with the fuel.
2. Perform the pre-operation checks on the machine.
3. Start and warm up the engine. Check the idle speed, and check the operation of the controls and the engine stop switch. Then, restart the engine and check its operation within no more than 5 minutes after it is restarted.
4. Operate the machine in the lower gears at moderate throttle openings for five to eight minutes.
5. Check how the engine runs when the machine is ridden with the throttle 1/4 to 1/2 open (low to medium speed) for about one hour.
6. Restart the engine and check the operation of the machine throughout its entire operating range. Restart the machine and operate it for about 10 to 15 more minutes. The machine will now be ready to race.

**NOTICE**

- After the break-in or before each race, you must check the entire machine for loose fittings and fasteners as per "TORQUE-CHECK POINTS". Tighten all such fasteners as required.
- When any of the following parts have been replaced, they must be broken in.

**CYLINDER AND CRANKSHAFT:**
About one hour of break-in operation is necessary.

**PISTON, RING, VALVES, CAMSHAFTS AND GEARS:**
These parts require about 30 minutes of break-in operation at half-throttle or less. Observe the condition of the engine carefully during operation.
### TORQUE-CHECK POINTS

<table>
<thead>
<tr>
<th>Frame construction</th>
<th>Frame to rear frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined seat and fuel tank</td>
<td>Fuel tank to frame</td>
</tr>
<tr>
<td>Exhaust system</td>
<td>Silencer to rear frame</td>
</tr>
<tr>
<td>Engine mounting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frame to engine</td>
</tr>
<tr>
<td></td>
<td>Engine bracket to engine</td>
</tr>
<tr>
<td></td>
<td>Engine bracket to frame</td>
</tr>
<tr>
<td>Steering</td>
<td></td>
</tr>
<tr>
<td>Steering stem to handlebar</td>
<td>Steering stem to frame</td>
</tr>
<tr>
<td></td>
<td>Steering stem to upper bracket</td>
</tr>
<tr>
<td></td>
<td>Upper bracket to handlebar</td>
</tr>
<tr>
<td>Suspension</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>Steering stem to front fork</td>
</tr>
<tr>
<td></td>
<td>Front fork to upper bracket</td>
</tr>
<tr>
<td></td>
<td>Front fork to lower bracket</td>
</tr>
<tr>
<td>Rear</td>
<td>For link type</td>
</tr>
<tr>
<td></td>
<td>Assembly of links</td>
</tr>
<tr>
<td></td>
<td>Link to frame</td>
</tr>
<tr>
<td></td>
<td>Link to rear shock absorber</td>
</tr>
<tr>
<td></td>
<td>Link to swingarm</td>
</tr>
<tr>
<td>Installation of rear shock absorber</td>
<td>Rear shock absorber to frame</td>
</tr>
<tr>
<td>Installation of swingarm</td>
<td>Tightening of pivot shaft</td>
</tr>
<tr>
<td>Wheel</td>
<td></td>
</tr>
<tr>
<td>Installation of wheel</td>
<td>Front</td>
</tr>
<tr>
<td></td>
<td>Tightening of wheel axle</td>
</tr>
<tr>
<td></td>
<td>Tightening of axle holder</td>
</tr>
<tr>
<td>Rear</td>
<td>Rear</td>
</tr>
<tr>
<td></td>
<td>Tightening of wheel axle</td>
</tr>
<tr>
<td></td>
<td>Wheel to rear wheel sprocket</td>
</tr>
<tr>
<td>Brake</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>Brake caliper to front fork</td>
</tr>
<tr>
<td></td>
<td>Brake disc to wheel</td>
</tr>
<tr>
<td></td>
<td>Tightening of union bolt</td>
</tr>
<tr>
<td></td>
<td>Brake master cylinder to handlebar</td>
</tr>
<tr>
<td></td>
<td>Tightening of bleed screw</td>
</tr>
<tr>
<td></td>
<td>Tightening of brake hose holder</td>
</tr>
<tr>
<td>Rear</td>
<td>Brake pedal to frame</td>
</tr>
<tr>
<td></td>
<td>Brake disc to wheel</td>
</tr>
<tr>
<td></td>
<td>Tightening of union bolt</td>
</tr>
<tr>
<td></td>
<td>Brake master cylinder to frame</td>
</tr>
<tr>
<td></td>
<td>Tightening of bleed screw</td>
</tr>
<tr>
<td></td>
<td>Tightening of brake hose holder</td>
</tr>
<tr>
<td>Fuel system</td>
<td>Fuel tank to fuel cock</td>
</tr>
<tr>
<td>Lubrication system</td>
<td>Tightening of oil hose clamp</td>
</tr>
</tbody>
</table>

**TIP**

Concerning the tightening torque, refer to "TIGHTENING TORQUES" section in the CHAPTER 2.
CLEANING AND STORAGE

CLEANING
Frequent cleaning of your machine will enhance its appearance, maintain good overall performance, and extend the life of many components.

1. Before washing the machine, block off the end of the exhaust pipe to prevent water from entering. A plastic bag secured with a rubber band may be used for this purpose.

2. If the engine is excessively greasy, apply some degreaser to it with a paint brush. Do not apply degreaser to the chain, sprockets, or wheel axles.

3. Rinse the dirt and degreaser off with a garden hose; use only enough pressure to do the job.

4. After the majority of the dirt has been hosed off, wash all surfaces with warm water and a mild detergent. Use an old toothbrush to clean hard-to-reach places.

5. Rinse the machine off immediately with clean water, and dry all surfaces with a soft towel or cloth.

6. Immediately after washing, remove excess water from the chain with a paper towel and lubricate the chain to prevent rust.

7. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.

8. Automotive wax may be applied to all painted or chromed surfaces. Avoid combination cleaner-waxes, as they may contain abrasives.

9. After completing the above, start the engine and allow it to idle for several minutes.

NOTICE
Do not use high-pressure washers or steam-jet cleaners since they cause water seepage and deterioration seals.

STORAGE
If your machine is to be stored for 60 days or more, some preventive measures must be taken to avoid deterioration. After cleaning the machine thoroughly, prepare it for storage as follows:

1. Drain the fuel tank, fuel lines, and the carburetor float bowl.

2. Remove the spark plug, pour a tablespoon of SAE 10W-40 motor oil in the spark plug hole, and reinstall the plug. With the engine stop switch pushed in, kick the engine over several times to coat the cylinder walls with oil.

3. Remove the drive chain, clean it thoroughly with solvent, and lubricate it. Reinstall the chain or store it in a plastic bag tied to the frame.

4. Lubricate all control cables.

5. Block the frame up to raise the wheels off the ground.

6. Tie a plastic bag over the exhaust pipe outlet to prevent moisture from entering.

7. If the machine is to be stored in a humid or salt-air environment, coat all exposed metal surfaces with a film of light oil. Do not apply oil to rubber parts or the seat cover.

TIP
Make any necessary repairs before the machine is stored.
## SPECIFICATIONS

### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model name:</th>
<th>YZ250FA (USA, CDN, AUS, NZ)</th>
<th>YZ250F (EUROPE, ZA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model code number:</td>
<td>17DD (USA, CDN)</td>
<td>17DE (EUROPE)</td>
</tr>
<tr>
<td></td>
<td>17DG (AUS, NZ, ZA)</td>
<td></td>
</tr>
</tbody>
</table>

### General Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>USA, CDN</th>
<th>EUROPE</th>
<th>AUS, NZ, ZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall length</td>
<td>2,159 mm (85.00 in)</td>
<td>2,168 mm (85.35 in)</td>
<td>2,166 mm (85.28 in)</td>
</tr>
<tr>
<td>Overall width</td>
<td>825 mm (32.48 in)</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Overall height</td>
<td>1,303 mm (51.30 in)</td>
<td>1,304 mm (51.34 in)</td>
<td>←</td>
</tr>
<tr>
<td>Seat height</td>
<td>988 mm (38.90 in)</td>
<td>991 mm (39.02 in)</td>
<td>990 mm (38.98 in)</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1,466 mm (57.72 in)</td>
<td>1,473 mm (57.99 in)</td>
<td>←</td>
</tr>
<tr>
<td>Minimum ground clearance</td>
<td>375 mm (14.76 in)</td>
<td>377 mm (14.84 in)</td>
<td>376 mm (14.80 in)</td>
</tr>
</tbody>
</table>

### Weight:

- With oil and fuel: 102 kg (225 lb)

### Engine:

- **Engine type**: Liquid cooled 4-stroke, DOHC
- **Cylinder arrangement**: Single cylinder, forward inclined
- **Displacement**: 250 cm³ (8.80 Imp oz, 8.45 US oz)
- **Bore × stroke**: 77.0 × 53.6 mm (3.03 × 2.11 in)
- **Compression ratio**: 13.5 : 1
- **Starting system**: Kickstarter

### Lubrication system:
- **Dry sump**

### Oil type or grade:

- **Engine oil**
  - Recommended brand: YAMALUBE
  - SAE10W-30, SAE10W-40, SAE10W-50
  - SAE15W-40, SAE20W-40 or SAE20W-50
  - API service SG type or higher, JASO standard MA

### Oil capacity:

- **Engine oil**
  - Periodic oil change: 0.95 L (0.84 Imp qt, 1.00 US qt)
  - With oil filter replacement: 1.05 L (0.92 Imp qt, 1.11 US qt)
  - Total amount: 1.20 L (1.06 Imp qt, 1.27 US qt)

### Coolant capacity (including all routes):
- 1.00 L (0.88 Imp qt, 1.06 US qt)

### Air filter:
- Wet type element

### Fuel:
- **Type**: Premium unleaded gasoline only with a research octane number of 95 or higher.
- **Tank capacity**: 6.4 L (1.4 Imp gal, 1.69 US gal)
<table>
<thead>
<tr>
<th><strong>General Specifications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carburetor:</strong></td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Manufacturer</td>
</tr>
<tr>
<td><strong>Spark Plug:</strong></td>
</tr>
<tr>
<td>Type/manufacturer</td>
</tr>
<tr>
<td>Gap</td>
</tr>
<tr>
<td><strong>Clutch type:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Transmission:</strong></td>
</tr>
<tr>
<td>Primary reduction system</td>
</tr>
<tr>
<td>Primary reduction ratio</td>
</tr>
<tr>
<td>Secondary reduction system</td>
</tr>
<tr>
<td>Secondary reduction ratio</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Transmission type</td>
</tr>
<tr>
<td>Operation</td>
</tr>
<tr>
<td>Gear ratio:</td>
</tr>
<tr>
<td>1st</td>
</tr>
<tr>
<td>2nd</td>
</tr>
<tr>
<td>3rd</td>
</tr>
<tr>
<td>4th</td>
</tr>
<tr>
<td>5th</td>
</tr>
<tr>
<td><strong>Chassis:</strong></td>
</tr>
<tr>
<td>Frame type</td>
</tr>
<tr>
<td>Caster angle</td>
</tr>
<tr>
<td>Trail</td>
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<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Tire:</strong></td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Size (front)</td>
</tr>
<tr>
<td>Size (rear)</td>
</tr>
<tr>
<td>Tire pressure (front and rear)</td>
</tr>
<tr>
<td><strong>Brake:</strong></td>
</tr>
<tr>
<td>Front brake type</td>
</tr>
<tr>
<td>Operation</td>
</tr>
<tr>
<td>Rear brake type</td>
</tr>
<tr>
<td>Operation</td>
</tr>
<tr>
<td><strong>Suspension:</strong></td>
</tr>
<tr>
<td>Front suspension</td>
</tr>
<tr>
<td>Rear suspension</td>
</tr>
<tr>
<td><strong>Shock absorber:</strong></td>
</tr>
<tr>
<td>Front shock absorber</td>
</tr>
<tr>
<td>Rear shock absorber</td>
</tr>
<tr>
<td><strong>Wheel travel:</strong></td>
</tr>
<tr>
<td>Front wheel travel</td>
</tr>
<tr>
<td>Rear wheel travel</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Electrical:</strong></td>
</tr>
<tr>
<td>Ignition system</td>
</tr>
</tbody>
</table>
## MAINTENANCE SPECIFICATIONS
### ENGINE

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder head:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warp limit</td>
<td>----</td>
<td>0.05 mm (0.002 in)</td>
</tr>
<tr>
<td>Cylinder:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bore size</td>
<td>77.00–77.01 mm (3.0315–3.0319 in)</td>
<td>----</td>
</tr>
<tr>
<td>Out of round limit</td>
<td>----</td>
<td>0.05 mm (0.002 in)</td>
</tr>
<tr>
<td>Camshaft:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive method</td>
<td>Chain drive (Left)</td>
<td>----</td>
</tr>
<tr>
<td>Camshaft cap inside diameter</td>
<td>22.000–22.021 mm (0.8661–0.8670 in)</td>
<td>----</td>
</tr>
<tr>
<td>Camshaft outside diameter</td>
<td>21.959–21.972 mm (0.8645–0.8650 in)</td>
<td>----</td>
</tr>
<tr>
<td>Shaft-to-cap clearance</td>
<td>0.028–0.062 mm (0.0011–0.0024 in)</td>
<td>0.08 mm (0.003 in)</td>
</tr>
</tbody>
</table>

**Cam dimensions**

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake &quot;A&quot;</td>
<td>30.330–30.430 mm (1.1941–1.1980 in)</td>
<td>30.230 mm (1.1902 in)</td>
</tr>
<tr>
<td>Intake &quot;B&quot;</td>
<td>22.45–22.55 mm (0.8839–0.8878 in)</td>
<td>22.35 mm (0.8799 in)</td>
</tr>
<tr>
<td>Exhaust &quot;A&quot;</td>
<td>30.399–30.499 mm (1.1968–1.2007 in)</td>
<td>30.299 mm (1.1929 in)</td>
</tr>
<tr>
<td>Exhaust &quot;B&quot;</td>
<td>22.45–22.55 mm (0.8839–0.8878 in)</td>
<td>22.35 mm (0.8799 in)</td>
</tr>
<tr>
<td>Camshaft runout limit</td>
<td>----</td>
<td>0.03 mm (0.0012 in)</td>
</tr>
</tbody>
</table>

**Timing chain:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timing chain type/No. of links</td>
<td>92RH2010-114M/114</td>
<td>----</td>
</tr>
<tr>
<td>Timing chain adjustment method</td>
<td>Automatic</td>
<td>----</td>
</tr>
</tbody>
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### MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve, valve seat, valve guide:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve clearance (cold)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>0.12–0.17 mm (0.0047–0.0067 in)</td>
<td>----</td>
</tr>
<tr>
<td>EX</td>
<td>0.17–0.22 mm (0.0067–0.0087 in)</td>
<td>----</td>
</tr>
<tr>
<td>Valve dimensions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;A&quot; head diameter (IN)</td>
<td>22.9–23.1 mm (0.9016–0.9094 in)</td>
<td>----</td>
</tr>
<tr>
<td>&quot;A&quot; head diameter (EX)</td>
<td>24.4–24.6 mm (0.9606–0.9685 in)</td>
<td>----</td>
</tr>
<tr>
<td>&quot;B&quot; face width (IN)</td>
<td>2.26 mm (0.089 in)</td>
<td>----</td>
</tr>
<tr>
<td>&quot;B&quot; face width (EX)</td>
<td>2.26 mm (0.089 in)</td>
<td>----</td>
</tr>
<tr>
<td>&quot;C&quot; seat width (IN)</td>
<td>0.9–1.1 mm (0.0354–0.0433 in)</td>
<td>1.6 mm (0.0630 in)</td>
</tr>
<tr>
<td>&quot;C&quot; seat width (EX)</td>
<td>0.9–1.1 mm (0.0354–0.0433 in)</td>
<td>1.6 mm (0.0630 in)</td>
</tr>
<tr>
<td>&quot;D&quot; margin thickness (IN)</td>
<td>0.8 mm (0.0315 in)</td>
<td>----</td>
</tr>
<tr>
<td>&quot;D&quot; margin thickness (EX)</td>
<td>0.7 mm (0.0276 in)</td>
<td>----</td>
</tr>
<tr>
<td>Stem outside diameter (IN)</td>
<td>3.975–3.990 mm (0.1565–0.1571 in)</td>
<td>3.945 mm (0.1553 in)</td>
</tr>
<tr>
<td>Stem outside diameter (EX)</td>
<td>4.460–4.475 mm (0.1756–0.1762 in)</td>
<td>4.430 mm (0.1744 in)</td>
</tr>
<tr>
<td>Guide inside diameter (IN)</td>
<td>4.000–4.012 mm (0.1575–0.1580 in)</td>
<td>4.050 mm (0.1594 in)</td>
</tr>
<tr>
<td>Guide inside diameter (EX)</td>
<td>4.500–4.512 mm (0.1772–0.1776 in)</td>
<td>4.550 mm (0.1791 in)</td>
</tr>
<tr>
<td>Stem-to-guide clearance (IN)</td>
<td>0.010–0.037 mm (0.0004–0.0015 in)</td>
<td>0.08 mm (0.003 in)</td>
</tr>
<tr>
<td>Stem-to-guide clearance (EX)</td>
<td>0.025–0.052 mm (0.0010–0.0020 in)</td>
<td>0.10 mm (0.004 in)</td>
</tr>
</tbody>
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## MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem runout limit</td>
<td>----</td>
<td>0.01 mm (0.0004 in)</td>
</tr>
<tr>
<td>Valve seat width (IN)</td>
<td>0.9–1.1 mm (0.0354–0.0433 in)</td>
<td>1.6 mm (0.0630 in)</td>
</tr>
<tr>
<td>Valve seat width (EX)</td>
<td>0.9–1.1 mm (0.0354–0.0433 in)</td>
<td>1.6 mm (0.0630 in)</td>
</tr>
<tr>
<td>Valve spring:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free length (IN)</td>
<td>39.76 mm (1.57 in)</td>
<td>38.76 mm (1.53 in)</td>
</tr>
<tr>
<td>Free length (EX)</td>
<td>37.78 mm (1.49 in)</td>
<td>36.78 mm (1.45 in)</td>
</tr>
<tr>
<td>Set length (valve closed) (IN)</td>
<td>28.98 mm (1.14 in)</td>
<td>----</td>
</tr>
<tr>
<td>Set length (valve closed) (EX)</td>
<td>28.30 mm (1.11 in)</td>
<td>----</td>
</tr>
<tr>
<td>Compressed force (installed) (IN)</td>
<td>99–114 N at 28.98 mm (9.9–11.4 kg at 28.98 mm, 22.27–25.57 lb at 1.14 in)</td>
<td>----</td>
</tr>
<tr>
<td>Compressed force (installed) (EX)</td>
<td>126–145 N at 28.30 mm (12.6–14.5 kg at 28.30 mm, 28.44–31.97 lb at 1.11 in)</td>
<td>----</td>
</tr>
<tr>
<td>Tilt limit* (IN)</td>
<td>----</td>
<td>2.5°/1.7 mm (2.5°/0.067 in)</td>
</tr>
<tr>
<td>Tilt limit* (EX)</td>
<td>----</td>
<td>2.5°/1.6 mm (2.5°/0.063 in)</td>
</tr>
<tr>
<td>Direction of winding (top view) (IN)</td>
<td>Clockwise</td>
<td>----</td>
</tr>
<tr>
<td>Direction of winding (top view) (EX)</td>
<td>Clockwise</td>
<td>----</td>
</tr>
<tr>
<td>Piston:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston to cylinder clearance</td>
<td>0.030–0.055 mm (0.0012–0.0022 in)</td>
<td>0.1 mm (0.004 in)</td>
</tr>
<tr>
<td>Piston size &quot;D&quot;</td>
<td>76.955–76.970 mm (3.0297–3.0303 in)</td>
<td>----</td>
</tr>
<tr>
<td>Measuring point &quot;H&quot;</td>
<td>8 mm (0.31 in)</td>
<td>----</td>
</tr>
<tr>
<td>Piston off-set</td>
<td>0.5 mm (0.020 in)/IN-side</td>
<td>----</td>
</tr>
</tbody>
</table>
## Maintenance Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piston pin bore inside diameter</td>
<td>16.002–16.013 mm (0.6300–0.6304 in)</td>
<td>16.043 mm (0.6316 in)</td>
</tr>
<tr>
<td>Piston pin outside diameter</td>
<td>15.991–16.000 mm (0.6296–0.6299 in)</td>
<td>15.971 mm (0.6288 in)</td>
</tr>
<tr>
<td>Piston rings:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Barrel</td>
<td>----</td>
</tr>
<tr>
<td>Dimensions (B x T)</td>
<td>0.90 x 2.75 mm (0.04 x 0.11 in)</td>
<td>----</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.15–0.25 mm (0.006–0.010 in)</td>
<td>0.50 mm (0.020 in)</td>
</tr>
<tr>
<td>Side clearance (installed)</td>
<td>0.030–0.065 mm (0.0012–0.0026 in)</td>
<td>0.12 mm (0.005 in)</td>
</tr>
<tr>
<td>2nd ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Taper</td>
<td>----</td>
</tr>
<tr>
<td>Dimensions (B x T)</td>
<td>0.80 x 2.75 mm (0.03 x 0.11 in)</td>
<td>----</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.30–0.45 mm (0.012–0.018 in)</td>
<td>0.80 mm (0.031 in)</td>
</tr>
<tr>
<td>Side clearance</td>
<td>0.020–0.055 mm (0.0008–0.0022 in)</td>
<td>0.12 mm (0.005 in)</td>
</tr>
<tr>
<td>Oil ring</td>
<td></td>
<td></td>
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<tr>
<td>Dimensions (B x T)</td>
<td>1.50 x 2.25 mm (0.06 x 0.09 in)</td>
<td>----</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.10–0.40 mm (0.004–0.016 in)</td>
<td>----</td>
</tr>
<tr>
<td>Crankshaft:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crank width &quot;A&quot;</td>
<td>55.95–56.00 mm (2.203–2.205 in)</td>
<td>----</td>
</tr>
<tr>
<td>Runout limit &quot;C&quot;</td>
<td>0.03 mm (0.0012 in)</td>
<td>0.05 mm (0.002 in)</td>
</tr>
<tr>
<td>Big end side clearance &quot;D&quot;</td>
<td>0.15–0.45 mm (0.0059–0.0177 in)</td>
<td>0.50 mm (0.02 in)</td>
</tr>
<tr>
<td>Small end free play &quot;F&quot;</td>
<td>0.4–1.0 mm (0.016–0.039 in)</td>
<td>2.0 mm (0.08 in)</td>
</tr>
</tbody>
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## MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clutch:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friction plate thickness</td>
<td>2.9–3.1 mm (0.114–0.122 in)</td>
<td>2.8 mm (0.110 in)</td>
</tr>
<tr>
<td>Quantity</td>
<td>9</td>
<td>0.1 mm (0.004 in)</td>
</tr>
<tr>
<td>Clutch plate thickness</td>
<td>1.1–1.3 mm (0.043–0.051 in)</td>
<td>0.1 mm (0.004 in)</td>
</tr>
<tr>
<td>Quantity</td>
<td>8</td>
<td>0.1 mm (0.004 in)</td>
</tr>
<tr>
<td>Warp limit</td>
<td>0.1 mm (0.004 in)</td>
<td>0.1 mm (0.004 in)</td>
</tr>
<tr>
<td>Clutch spring free length</td>
<td>35.7 mm (1.41 in)</td>
<td>34.7 mm (1.37 in)</td>
</tr>
<tr>
<td>Quantity</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Clutch housing thrust clearance</td>
<td>0.050–0.300 mm (0.002–0.0118 in)</td>
<td>0.050–0.300 mm (0.002–0.0118 in)</td>
</tr>
<tr>
<td>Clutch housing radial clearance</td>
<td>0.010–0.044 mm (0.0004–0.0017 in)</td>
<td></td>
</tr>
<tr>
<td>Clutch release method</td>
<td>Inner push, cam push</td>
<td></td>
</tr>
<tr>
<td><strong>Shifter:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shifter type</td>
<td>Cam drum and guide bar</td>
<td></td>
</tr>
<tr>
<td>Guide bar bending limit</td>
<td>0.05 mm (0.002 in)</td>
<td>0.05 mm (0.002 in)</td>
</tr>
<tr>
<td><strong>Kickstarter:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Type</td>
<td>Kick and ratchet type</td>
<td></td>
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<tr>
<td><strong>Carburetor:</strong></td>
<td>USA, CDN</td>
<td>EUROPE, AUS, NZ, ZA</td>
</tr>
<tr>
<td>Type/manufacturer</td>
<td>FCR-MX37/KEIHIN</td>
<td></td>
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<tr>
<td>I. D. mark</td>
<td>17D5 50</td>
<td>17D6 60</td>
</tr>
<tr>
<td>Main jet (M.J)</td>
<td>#180</td>
<td>#180</td>
</tr>
<tr>
<td>Main air jet (M.A.J)</td>
<td>ø2.0</td>
<td>ø2.0</td>
</tr>
<tr>
<td>Jet needle-clip position (J.N)</td>
<td>NDJR-4</td>
<td>NHKR-4</td>
</tr>
<tr>
<td>Cutaway (C.A)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Pilot jet (P.J)</td>
<td>#45</td>
<td>#42</td>
</tr>
<tr>
<td>Pilot air jet (P.A.J)</td>
<td>#105</td>
<td>#105</td>
</tr>
<tr>
<td>Pilot outlet (P.O)</td>
<td>ø0.9</td>
<td>ø0.9</td>
</tr>
<tr>
<td>Pilot screw (example) (P.S)</td>
<td>1-3/4</td>
<td>1-3/4</td>
</tr>
<tr>
<td>Bypass (B.P)</td>
<td>ø1.0</td>
<td>ø1.0</td>
</tr>
<tr>
<td>Valve seat size (V.S)</td>
<td>ø3.8</td>
<td>ø3.8</td>
</tr>
<tr>
<td>Starter jet (G.S)</td>
<td>#72</td>
<td>#72</td>
</tr>
<tr>
<td>Leak jet (Acc.P)</td>
<td>#70</td>
<td>#110</td>
</tr>
<tr>
<td>Float height (F.H)</td>
<td>8 mm (0.31 in)</td>
<td>8 mm (0.31 in)</td>
</tr>
<tr>
<td>Engine idle speed</td>
<td>1,900–2,100 r/min</td>
<td>1,900–2,100 r/min</td>
</tr>
<tr>
<td>Intake vacuum</td>
<td>29.3–34.7 kPa (220–260 mmHg, 8.7–10.2 inHg)</td>
<td>29.3–34.7 kPa (220–260 mmHg, 8.7–10.2 inHg)</td>
</tr>
<tr>
<td>Hot starter lever free play</td>
<td>3–6 mm (0.12–0.24 in)</td>
<td>3–6 mm (0.12–0.24 in)</td>
</tr>
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</table>
## MAINTENANCE SPECIFICATIONS

### CHASSIS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubrication system:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil filter type</td>
<td>Paper type</td>
<td></td>
</tr>
<tr>
<td>Oil pump type</td>
<td>Trochoid type</td>
<td></td>
</tr>
<tr>
<td>Tip clearance</td>
<td>0.12 mm or less (0.0047 in or less)</td>
<td>0.20 mm (0.008 in)</td>
</tr>
<tr>
<td>Side clearance</td>
<td>0.09–0.17 mm (0.0035–0.0067 in)</td>
<td>0.24 mm (0.009 in)</td>
</tr>
<tr>
<td>Housing and rotor clearance</td>
<td>0.03–0.10 mm (0.0012–0.0039 in)</td>
<td>0.17 mm (0.0067 in)</td>
</tr>
<tr>
<td>Cooling:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiator core size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>121.4 mm (4.8 in)</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>235 mm (9.3 in)</td>
<td></td>
</tr>
<tr>
<td>Thickness</td>
<td>28 mm (1.1 in)</td>
<td></td>
</tr>
<tr>
<td>Radiator cap opening pressure</td>
<td>110 kPa (1.1 kg/cm², 15.6 psi)</td>
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</tr>
<tr>
<td>Radiator capacity (total)</td>
<td>0.64 L (0.56 Imp qt, 0.68 US qt)</td>
<td></td>
</tr>
<tr>
<td>Water pump</td>
<td>Single-suction centrifugal pump</td>
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### Steering system:

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td>Steering bearing type</td>
<td>Taper roller bearing</td>
<td></td>
</tr>
<tr>
<td>Front suspension:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front fork travel</td>
<td>300 mm (11.8 in)</td>
<td></td>
</tr>
<tr>
<td>Fork spring free length</td>
<td>454 mm (17.9 in)</td>
<td></td>
</tr>
<tr>
<td>Spring rate, STD</td>
<td>K = 4.4 N/mm (0.449 kg/mm, 25.1 lb/in)</td>
<td>K = 4.5 N/mm (0.459 kg/mm, 25.7 lb/in)</td>
</tr>
<tr>
<td>Optional spring</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Oil capacity</td>
<td>541 cm³ (19.0 Imp oz, 18.3 US oz)</td>
<td>528 cm³ (18.6 Imp oz, 17.9 US oz)</td>
</tr>
<tr>
<td>Oil grade</td>
<td>Suspension oil <em>S1</em></td>
<td></td>
</tr>
<tr>
<td>Inner tube outer diameter</td>
<td>48 mm (1.89 in)</td>
<td></td>
</tr>
<tr>
<td>Front fork top end</td>
<td>5 mm (0.20 in)</td>
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</tr>
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</table>

### Rear suspension:

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock absorber travel</td>
<td>131.5 mm (5.18 in)</td>
<td></td>
</tr>
<tr>
<td>Spring free length</td>
<td>260 mm (10.24 in)</td>
<td></td>
</tr>
<tr>
<td>Fitting length</td>
<td>250 mm (9.84 in)</td>
<td></td>
</tr>
<tr>
<td>Preload length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring rate, STD</td>
<td>K = 52.0 N/mm (5.30 kg/mm, 296.8 lb/in)</td>
<td></td>
</tr>
<tr>
<td>Optional spring</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Enclosed gas pressure</td>
<td>1,000 kPa (10 kg/cm², 142 psi)</td>
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## MAINTENANCE SPECIFICATIONS

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<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td><strong>Swingarm:</strong></td>
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<td></td>
</tr>
<tr>
<td>Swingarm free play limit</td>
<td></td>
<td>1.0 mm (0.04 in)</td>
</tr>
<tr>
<td>End</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td><strong>Wheel:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front wheel type</td>
<td>Spoke wheel</td>
<td>----</td>
</tr>
<tr>
<td>Rear wheel type</td>
<td>Spoke wheel</td>
<td>----</td>
</tr>
<tr>
<td>Front rim size/material</td>
<td>21 × 1.60/Aluminum</td>
<td>----</td>
</tr>
<tr>
<td>Rear rim size/material</td>
<td>19 × 1.85/Aluminum</td>
<td>----</td>
</tr>
<tr>
<td>Rim runout limit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radial</td>
<td>----</td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>Lateral</td>
<td>----</td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td><strong>Drive chain:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type/manufacturer</td>
<td>USA, CDN</td>
<td>EUROPE, AUS, NZ, ZA</td>
</tr>
<tr>
<td>DID520DMA2 SDH/DAIDO</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Number of links</td>
<td>111 links + joint</td>
<td>113 links + joint</td>
</tr>
<tr>
<td>Chain slack</td>
<td>50–60 mm (2.0–2.4 in)</td>
<td>----</td>
</tr>
<tr>
<td>Chain length (15 links)</td>
<td>----</td>
<td>242.9 mm (9.563 in)</td>
</tr>
<tr>
<td><strong>Front disc brake:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc outside dia.×Thickness</td>
<td>250 × 3.0 mm (9.84 × 0.12 in)</td>
<td>250 × 2.5 mm (9.84 × 0.10 in)</td>
</tr>
<tr>
<td>Pad thickness</td>
<td>4.4 mm (0.17 in)</td>
<td>1.0 mm (0.04 in)</td>
</tr>
<tr>
<td>Master cylinder inside dia.</td>
<td>9.52 mm (0.375 in)</td>
<td>----</td>
</tr>
<tr>
<td>Caliper cylinder inside dia.</td>
<td>22.65 mm (0.892 in) × 2</td>
<td>----</td>
</tr>
<tr>
<td>Brake fluid type</td>
<td>DOT #4</td>
<td>----</td>
</tr>
<tr>
<td><strong>Rear disc brake:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc outside dia.×Thickness</td>
<td>245 × 4.0 mm (9.65 × 0.16 in)</td>
<td>245 × 3.5 mm (9.65 × 0.14 in)</td>
</tr>
<tr>
<td>Deflection limit</td>
<td>----</td>
<td>0.15 mm (0.006 in)</td>
</tr>
<tr>
<td>Pad thickness</td>
<td>6.4 mm (0.25 in)</td>
<td>1.0 mm (0.04 in)</td>
</tr>
<tr>
<td>Master cylinder inside dia.</td>
<td>11.0 mm (0.433 in)</td>
<td>----</td>
</tr>
<tr>
<td>Caliper cylinder inside dia.</td>
<td>25.4 mm (1.000 in) × 1</td>
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<tr>
<td>Brake fluid type</td>
<td>DOT #4</td>
<td>----</td>
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<tr>
<td><strong>Brake lever and brake pedal:</strong></td>
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</tr>
<tr>
<td>Brake lever position</td>
<td>95 mm (3.74 in)</td>
<td>----</td>
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<tr>
<td>Brake pedal height (vertical height above footrest top)</td>
<td>Zero mm (Zero in)</td>
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<tr>
<td>Clutch lever free play (lever end)</td>
<td>7–12 mm (0.28–0.47 in)</td>
<td>----</td>
</tr>
<tr>
<td>Throttle grip free play</td>
<td>3–5 mm (0.12–0.20 in)</td>
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### ELECTRICAL

<table>
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<tr>
<th>Item</th>
<th>Standard Limit</th>
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<td>Ignition system:</td>
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<td>Advancer type</td>
<td>Electrical</td>
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<td>CDI:</td>
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<tr>
<td>Magneto-model (stator)/manufacturer</td>
<td>17D-50/YAMAHA</td>
</tr>
<tr>
<td>Charging coil 1 resistance (color)</td>
<td>720–1,080 Ω at 20 °C (68 °F) (Green–Brown)</td>
</tr>
<tr>
<td>Charging coil 2 resistance (color)</td>
<td>44–66 Ω at 20 °C (68 °F) (Black–Pink)</td>
</tr>
<tr>
<td>Pickup coil resistance (color)</td>
<td>248–372 Ω at 20 °C (68 °F) (White–Red)</td>
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<tr>
<td>CDI unit-model/manufacturer</td>
<td>17D-50/YAMAHA (For USA and CDN)</td>
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<td></td>
<td>17D-60/YAMAHA (Except for USA and CDN)</td>
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<tr>
<td>Ignition coil:</td>
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</tr>
<tr>
<td>Model/manufacturer</td>
<td>5UL-20/DENSO</td>
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<tr>
<td>Minimum spark gap</td>
<td>6 mm (0.24 in)</td>
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<tr>
<td>Primary coil resistance</td>
<td>0.08–0.10 Ω at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Secondary coil resistance</td>
<td>4.6–6.8 k Ω at 20 °C (68 °F)</td>
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### TIGHTENING TORQUES

#### ENGINE

**TIP**

- marked portion shall be checked for torque tightening after break-in or before each race.

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Q’ty</th>
<th>Tightening torque</th>
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<tbody>
<tr>
<td></td>
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<td>Nm</td>
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<tr>
<td>Spark plug</td>
<td>M10×S × 1.0</td>
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<td>Camshaft cap</td>
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<td>Cylinder head blind plug screw</td>
<td>M12 × 1.0</td>
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<td>28</td>
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<td>Cylinder head (stud bolt)</td>
<td>M6 × 1.0</td>
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<td>7</td>
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<tr>
<td>Cylinder head (stud bolt)</td>
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<td>15</td>
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<td>Cylinder head (bolt)</td>
<td>M9 × 1.25</td>
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<td>Cylinder head (nut)</td>
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<td>Cylinder head cover</td>
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<td>Cylinder</td>
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<td>Balancer weight</td>
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<td>Balancer shaft driven gear</td>
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<td>Timing chain guide (intake side)</td>
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<td>Timing chain tensioner</td>
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<td>Timing chain tensioner cap bolt</td>
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<td>Radiator hose clamp</td>
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<td>Coolant drain bolt</td>
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<td>Radiator pipe</td>
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<tr>
<td>Part to be tightened</td>
<td>Thread size</td>
<td>Q'ty</td>
<td>Tightening torque</td>
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<td>-------------</td>
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<tr>
<td></td>
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<td>Nm</td>
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<td>Oil filter element cover</td>
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<td>Oil strainer (crankcase)</td>
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<td>Oil delivery pipe 1 (M10)</td>
<td>M10 x 1.25</td>
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<td>Oil delivery pipe 1 (M8)</td>
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<td>Oil hose</td>
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<td>Oil hose clamp</td>
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<td>Oil strainer (oil tank)</td>
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<td>Oil tank drain bolt</td>
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<td>Carburetor joint clamp</td>
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<td>Air filter joint clamp</td>
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<td>Throttle cable adjust bolt and locknut</td>
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<td>Throttle cable (pull)</td>
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<td>Throttle cable (return)</td>
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<td>Throttle cable cover</td>
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<td>Hot starter plunger</td>
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<td>Hot starter cable adjust bolt and locknut</td>
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<td>Air filter case</td>
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<td>Air filter joint and air filter case</td>
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<td>Air filter element</td>
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<td>Exhaust pipe</td>
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<td>Exhaust pipe protector</td>
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<td>Silencer</td>
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<td>Silencer clamp</td>
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<td>Crankcase</td>
<td>M6 x 1.0</td>
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<td>14</td>
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<td>Crankcase bearing stopper</td>
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<td>10</td>
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<td>Crankcase bearing stopper (crankshaft)</td>
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<tr>
<td>Left crankcase cover</td>
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<td>Right crankcase cover</td>
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<td>Clutch cover</td>
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<td>Crankcase oil drain bolt</td>
<td>M10 x 1.25</td>
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<tr>
<td>Crankshaft end accessing screw</td>
<td>M32 x 1.5</td>
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<td>Timing mark accessing screw</td>
<td>M14 x 1.5</td>
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<tr>
<td>Drive chain sprocket cover</td>
<td>M6 x 1.0</td>
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<td>7</td>
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<tr>
<td>Kick shaft ratchet wheel guide</td>
<td>M6 x 1.0</td>
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<td>12</td>
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<td>Kickstarter crank</td>
<td>M8 x 1.25</td>
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<tr>
<td>Primary drive gear</td>
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<td>Clutch spring</td>
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<tr>
<td>Clutch boss</td>
<td>M16 x 1.0</td>
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<td>Clutch cable locknut</td>
<td>M8 x 1.25</td>
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<td>7</td>
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<td>Clutch cable adjust bolt and locknut</td>
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<tr>
<td>Push lever shaft</td>
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<td>10</td>
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</table>
# TIGHTENING TORQUES

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Q'ty</th>
<th>Tightening torque</th>
<th>m•kg</th>
<th>ft•lb</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td>Nm</td>
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<td>Drive sprocket</td>
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<td>75</td>
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<td>Drive axle oil seal stopper</td>
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<td>10</td>
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<td>3.0</td>
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<tr>
<td>Shift guide</td>
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<td>Stopper lever</td>
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<td>Shift pedal</td>
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<td>12</td>
<td>1.2</td>
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</tbody>
</table>

## CHASSIS

### TIP

Δ - marked portion shall be checked for torque tightening after break-in or before each race.

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Q’ty</th>
<th>Tightening torque</th>
<th>m•kg</th>
<th>ft•lb</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nm</td>
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<td></td>
</tr>
<tr>
<td>Δ Upper bracket and outer tube</td>
<td>M8 × 1.25</td>
<td>4</td>
<td>21</td>
<td>2.1</td>
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<tr>
<td>Δ Lower bracket and outer tube</td>
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<td>21</td>
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<tr>
<td>Δ Upper bracket and steering stem</td>
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<td>Δ Handlebar upper holder and handlebar lower holder</td>
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<td>28</td>
<td>2.8</td>
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<tr>
<td>Δ Handlebar lower holder and upper bracket</td>
<td>M10 × 1.25</td>
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<td>34</td>
<td>3.4</td>
<td>25</td>
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<tr>
<td>Δ Steering stem and steering ring nut</td>
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<td>Refer to TIP.</td>
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<td>Front fork and damper assembly</td>
<td>M51 × 1.5</td>
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<td>Front fork and adjuster</td>
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<td>Damper assembly and base valve</td>
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<td>Adjuster and damper assembly</td>
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<td>29</td>
<td>2.9</td>
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<td>Front fork bleed screw and base valve</td>
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<td>0.1</td>
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<td>Δ Front fork and front fork protector</td>
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<td>6.5</td>
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<td>Δ Throttle grip cap</td>
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<td>0.9</td>
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<td>Brake lever mounting bolt</td>
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<td>Brake lever mounting nut</td>
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<td>5</td>
<td>0.5</td>
<td>3.6</td>
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<td>Clutch lever mounting nut</td>
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<td>0.5</td>
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<td>Hot starter lever holder</td>
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<td>0.4</td>
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<td>2</td>
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<tr>
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<td>M10 × 1.25</td>
<td>2</td>
<td>30</td>
<td>3.0</td>
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</tr>
<tr>
<td>Δ Front brake caliper</td>
<td>M8 × 1.25</td>
<td>2</td>
<td>28</td>
<td>2.8</td>
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<tr>
<td>Pad pin plug</td>
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<tr>
<td>Δ Front brake caliper and pad pin</td>
<td>M10 × 1.0</td>
<td>1</td>
<td>18</td>
<td>1.8</td>
<td>13</td>
</tr>
<tr>
<td>Δ Rear brake caliper and pad pin</td>
<td>M10 × 1.0</td>
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<td>18</td>
<td>1.8</td>
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<tr>
<td>Δ Brake caliper and bleed screw</td>
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<td>Thread size</td>
<td>Q’ty</td>
<td>Tightening torque</td>
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<tr>
<td></td>
<td></td>
<td>Nm</td>
<td>m•kg ft•lb</td>
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<td>Front brake disc</td>
<td>M6 x 1.0</td>
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<td>12 1.2 8.7</td>
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<tr>
<td>Footrest bracket and frame</td>
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<td>2 0.2 1.4</td>
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<tr>
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<td>M10 x 1.25</td>
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<td>30 3.0 22</td>
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<td>34 3.4 25</td>
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<td>Rear shock absorber and frame</td>
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<td>53 5.3 38</td>
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<td>Rear frame (upper)</td>
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<td>Rear frame (lower)</td>
<td>M8 x 1.25</td>
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<td>32 3.2 23</td>
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<td>Swingarm and brake hose holder</td>
<td>M5 x 0.8</td>
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<td>3 0.3 2.2</td>
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<td>Upper drive chain tensioner</td>
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<tr>
<td>Lower drive chain tensioner</td>
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<td>16 1.6 11</td>
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<td>Drive chain support</td>
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<td>Seal guard and swingarm</td>
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<td>6 0.6 4.3</td>
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<td>4 0.4 2.9</td>
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<td>Seat set bracket and fuel tank</td>
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<td>7 0.7 5.1</td>
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<td>Fuel tank bracket and fuel tank</td>
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<td>7 0.7 5.1</td>
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<td>Side cover set bracket and fuel tank</td>
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<td>Fitting band set screw and fuel tank</td>
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<td></td>
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<tr>
<td>Air scoop and fuel tank</td>
<td>M6 x 1.0</td>
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<td>7 0.7 5.1</td>
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<tr>
<td>Air scoop and radiator guard</td>
<td>M6 x 1.0</td>
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<td>7 0.7 5.1</td>
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<tr>
<td>Air scoop and frame</td>
<td>M6 x 1.0</td>
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<td>7 0.7 5.1</td>
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## TIGHTENING TORQUES

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Q’ty</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiator mounting boss and frame</td>
<td>M10 x 1.25</td>
<td>2</td>
<td>20 Nm, 2.0 m•kg, 14 ft•lb</td>
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<tr>
<td>△ Front fender</td>
<td>M6 x 1.0</td>
<td>4</td>
<td>10 Nm, 1.0 m•kg, 7.2 ft•lb</td>
</tr>
<tr>
<td>△ Rear fender (front)</td>
<td>M6 x 1.0</td>
<td>2</td>
<td>7 Nm, 0.7 m•kg, 5.1 ft•lb</td>
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<tr>
<td>△ Rear fender (rear)</td>
<td>M6 x 1.0</td>
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<td>16 Nm, 1.6 m•kg, 11 ft•lb</td>
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<tr>
<td>△ Side cover</td>
<td>M6 x 1.0</td>
<td>2</td>
<td>7 Nm, 0.7 m•kg, 5.1 ft•lb</td>
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<tr>
<td>△ Seat</td>
<td>M8 x 1.25</td>
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<td>23 Nm, 2.3 m•kg, 17 ft•lb</td>
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<td>△ Number plate</td>
<td>M6 x 1.0</td>
<td>1</td>
<td>7 Nm, 0.7 m•kg, 5.1 ft•lb</td>
</tr>
</tbody>
</table>

**TIP**

1. First, tighten the steering ring nut approximately 38 Nm (3.8 m•kg, 27 ft•lb) by using the steering nut wrench, then loosen the steering ring nut one turn.
2. Retighten the steering ring nut 7 Nm (0.7 m•kg, 5.1 ft•lb).

## ELECTRICAL

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Q’ty</th>
<th>Tightening torque</th>
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</thead>
<tbody>
<tr>
<td>Stator</td>
<td>M6 x 1.0</td>
<td>3</td>
<td>10 Nm, 1.0 m•kg, 7.2 ft•lb</td>
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<tr>
<td>Rotor</td>
<td>M12 x 1.25</td>
<td>1</td>
<td>56 Nm, 5.6 m•kg, 40 ft•lb</td>
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<tr>
<td>Neutral switch</td>
<td>M5 x 0.8</td>
<td>2</td>
<td>4 Nm, 0.4 m•kg, 2.9 ft•lb</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.

A. Distance between flats
B. Outside thread diameter

DEFINITION OF UNITS

<table>
<thead>
<tr>
<th>Unit</th>
<th>Read</th>
<th>Definition</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>millimeter</td>
<td>10⁻³ meter</td>
<td>Length</td>
</tr>
<tr>
<td>cm</td>
<td>centimeter</td>
<td>10⁻² meter</td>
<td>Length</td>
</tr>
<tr>
<td>kg</td>
<td>kilogram</td>
<td>10⁻³ gram</td>
<td>Weight</td>
</tr>
<tr>
<td>N</td>
<td>Newton</td>
<td>1 kg × m/sec²</td>
<td>Force</td>
</tr>
<tr>
<td>Nm</td>
<td>Newton meter</td>
<td>N × m</td>
<td>Torque</td>
</tr>
<tr>
<td>m•kg</td>
<td>Meter kilogram</td>
<td>m × kg</td>
<td>Torque</td>
</tr>
<tr>
<td>Pa</td>
<td>Pascal</td>
<td>N/m²</td>
<td>Pressure</td>
</tr>
<tr>
<td>N/mm</td>
<td>Newton per millimeter</td>
<td>N/mm</td>
<td>Spring rate</td>
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<tr>
<td>L</td>
<td>Liter</td>
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<td>Volume or capacity</td>
</tr>
<tr>
<td>cm³</td>
<td>Cubic centimeter</td>
<td>—</td>
<td>Volume or capacity</td>
</tr>
<tr>
<td>r/min</td>
<td>Revolution per minute</td>
<td>—</td>
<td>Engine speed</td>
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</table>
1. Oil filter element
2. Oil pump
3. Drive axle
4. Main axle
5. Intake camshaft
6. Exhaust camshaft
7. Oil tank
8. Oil delivery pipe
A. To oil tank
1. Crankshaft
2. Oil filter element
3. Oil tank
4. Oil hose
A. From oil pump
1. Fuel tank breather hose
2. Radiator hose 1
3. Cylinder head breather hose
4. Radiator hose 3
5. Clutch cable
6. Throttle position sensor lead
7. Hot starter cable
8. Fuel hose
9. Carburetor breather hose

10. Carburetor overflow hose
11. Throttle position sensor lead protector
12. Throttle position sensor cover

A. Insert the end of the fuel tank breather hose into the hole in the steering stem.
B. Align the paint mark on the cylinder head breather hose with the front end of the hose guide.
C. Pass the cylinder head breather hose on the outside of front engine bracket.

D. Pass the cylinder head breather hose between the radiator and radiator hose 3.

E. Pass the fuel hose on the outside of throttle position sensor lead.

F. Pass the carburetor breather hoses and overflow hose so that all these hoses do not contact the rear shock absorber.

G. Insert the throttle position sensor lead protector into the throttle position sensor cover.
1. Sub-wire harness
2. Hot starter cable
3. Oil hose
4. Neutral switch lead
5. Radiator hose 2
6. Clamp
7. Ignition coil lead
8. CDI magneto lead
9. Neutral switch lead coupler
10. CDI unit lead coupler

11. Radiator breather hose
12. Hot starter cable protector
13. Rubber cap
14. Throttle position sensor lead
15. Cylinder head breather hose
16. Throttle position sensor lead coupler
17. Tension pipe
18. Radiator mounting boss
19. Cylinder head breather hose
20. Throttle position sensor tube clamp
A. Pass the hot starter cable over the radiator mounting boss.
B. Pass the throttle position sensor lead under the hot starter cable.
C. Fasten the throttle position sensor lead and the hot starter cable.
D. Locate the clamp between the hot starter cable protector and rubber cap.
E. Fasten the neutral switch lead below the oil hose, and pass the neutral switch lead on the inside of the oil hose.
F. Pass the neutral switch lead on the inside of the oil hose.
G. Fasten the neutral switch lead, CDI magneto lead, and radiator breather hose onto the frame. They should all be clamped above the engine bracket to the left of the downtube of the frame. The clamp ends should face backward and the rest outside of the frame.
H. Pass the clutch cable through the cable guide.
I. Pass the neutral switch lead and CDI magneto lead behind the frame.
J. Pass the hot starter cable on the inside of the cylinder head breather hose.
K. Fit the coupler projection into the hole in the cover.
L. Fasten the sub-wire harness on the CDI unit bracket.
M. Fasten the sub-wire harness at the position-taped portion.
N. Pass each lead under the clamp. Locate the CDI magneto lead on the outside of the ignition coil lead. Locate the throttle position sensor lead, neutral switch lead, CDI magneto lead and ignition coil lead so that they do not lie one on another.
O. Fasten the sub-wire harness to the CDI unit bracket with the clamp ends located under the bracket.
P. Fasten the neutral switch lead, throttle position sensor lead, CDI magneto lead and ignition coil lead. Fasten them around the periphery of the recess between the tension pipe and radiator mounting boss on the frame.
Q. Locate the clamp ends within the arrowed range. Assure that the clamp end does not contact the cylinder head breather hose.
R. Pass the radiator breather hose on the outside of the CDI magneto lead and neutral switch lead.
S. Fasten the throttle position sensor lead and hot starter cable. Fasten them between the cylinder head breather hose and throttle position sensor tube clamp. Fasten the clamp with its ends toward the right-side of the frame and cut off the other end with 3 to 5 clamp holes left in it.
T. Locate the radiator breather hose end above the down tube and between the oil hose and engine guard.
U. Fasten the neutral switch lead above the oil hose, and pass the neutral switch lead on the inside of the oil hose.
1. Radiator hose 2
2. Radiator breather hose
3. Ignition coil
4. Throttle cable (pull)
5. Throttle cable (return)
6. Engine stop switch lead

A. Put a cover over the ignition coil.
B. Pass the throttle cables through the cable guide.
C. Pass the throttle cable over the radiator mounting boss. Cross the throttle cable behind the radiator.
D. Pass the throttle cables on the outside of the ignition coil.
E. Insert the engine stop switch lead into the CDI unit band. Align the coupler lower end with the band lower end.
F. Fit the hole in the CDI unit band over the CDI unit bracket.
1. Brake master cylinder
2. Brake hose holder
3. Brake hose

A. Install the brake hose so that its pipe portion directs as shown and lightly touches the projection on the brake caliper.
B. Pass the brake hose into the brake hose holders.
C. If the brake hose contacts the spring (rear shock absorber), correct its twist.
D. Install the brake hose so that its pipe portion directs as shown and lightly touches the projection on the brake master cylinder.
1. Throttle cable  
2. Clamp  
3. Hot starter cable  
4. Clutch cable  
5. Engine stop switch lead  
6. Cable guide  
7. Brake hose  
8. Hose guide

A. Fasten the engine stop switch lead to the handlebar.  
B. Pass the clutch cable and hot starter cable through the cable guide.  
C. Pass the engine stop switch lead behind the CDI unit.  
D. Pass the brake hose in front of the number plate.  
E. Pass the throttle cables through the cable guide.  
F. Pass the clutch cable and hot starter cable through the cable guide on the number plate.  
G. Pass the engine stop switch lead over the number plate mounting location.
**REGULAR INSPECTION AND ADJUSTMENTS**

**MAINTENANCE INTERVALS**

**TIP**
- The following schedule is intended as a general guide to maintenance and lubrication. Bear in mind that such factors as weather, terrain, geographical location, and individual usage will alter the required maintenance and lubrication intervals.
- If you are in doubt as to what intervals to follow in maintaining and lubricating your machine, consult your Yamaha dealer.
- Periodic inspection is essential in making full use of the machine performance. The service life of the parts varies substantially according to the environment in which the machine runs (e.g., rain, dirt, etc.). Therefore, earlier inspection is required by reference to the list below.

<table>
<thead>
<tr>
<th>Item</th>
<th>After break-in</th>
<th>Every race (about 2.5 hours)</th>
<th>Every third (about 7.5 hours)</th>
<th>Every fifth (about 12.5 hours)</th>
<th>As required</th>
<th>Remarks</th>
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<td>The engine must be cold. Check the valve seats and valve stems for wear.</td>
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<td>Check the free length and the tilt.</td>
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<td>Inspect the camshaft surface.</td>
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<td>Inspect carbon deposits and eliminate them.</td>
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<td>It is recommended that the piston pin and ring are also replaced at the same time.</td>
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## MAINTENANCE INTERVALS

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<th>After break-in</th>
<th>Every race (about 2.5 hours)</th>
<th>Every third (about 7.5 hours)</th>
<th>Every fifth (about 12.5 hours)</th>
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<th>Remarks</th>
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<tr>
<td>Replace bearings</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubricate</td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td>Lithium base grease</td>
</tr>
<tr>
<td>THROTTLE, CONTROL CABLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check routing and connection</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td>Yamaha cable lube or SAE 10W-40 motor</td>
</tr>
<tr>
<td>Lubricate</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td>oil</td>
</tr>
<tr>
<td>Inspect and clean (throttle cable)</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td>Inspect dirt and wear on the throttle</td>
</tr>
<tr>
<td>HOT STARTER, CLUTCH LEVER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
<td>cable on the carburetor side.</td>
</tr>
</tbody>
</table>
PRE-OPERATION INSPECTION AND MAINTENANCE

Before riding for break-in operation, practice or a race, make sure the machine is in good operating condition.
Before using this machine, check the following points.

GENERAL INSPECTION AND MAINTENANCE

<table>
<thead>
<tr>
<th>Item</th>
<th>Routine</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant</td>
<td>Check that coolant is filled up to the radiator cap. Check the cooling system for leakage.</td>
<td>P.3-6 – 7</td>
</tr>
<tr>
<td>Fuel</td>
<td>Check that a fresh gasoline is filled in the fuel tank. Check the fuel line for leakage.</td>
<td>P.1-13</td>
</tr>
<tr>
<td>Engine oil</td>
<td>Check that the oil level is correct. Check the crankcase and oil line for leakage.</td>
<td>P.3-9 – 10</td>
</tr>
<tr>
<td>Gear shifter and clutch</td>
<td>Check that gears can be shifted correctly in order and that the clutch operates smoothly.</td>
<td>P.3-7</td>
</tr>
<tr>
<td>Throttle grip/Housing</td>
<td>Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and housing, if necessary.</td>
<td>P.3-7 – 8</td>
</tr>
<tr>
<td>Brakes</td>
<td>Check the play of front brake and effect of front and rear brake.</td>
<td>P.3-14 – 16</td>
</tr>
<tr>
<td>Drive chain</td>
<td>Check drive chain slack and alignment. Check that the drive chain is lubricated properly.</td>
<td>P.3-17 – 18</td>
</tr>
<tr>
<td>Wheels</td>
<td>Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play.</td>
<td>P.3-20 – 21</td>
</tr>
<tr>
<td>Steering</td>
<td>Check that the handlebar can be turned smoothly and have no excessive play.</td>
<td>P.3-21 – 22</td>
</tr>
<tr>
<td>Front forks and rear shock absorber</td>
<td>Check that they operate smoothly and there is no oil leakage.</td>
<td>P.3-18 – 20</td>
</tr>
<tr>
<td>Cables (wires)</td>
<td>Check that the clutch and throttle cables move smoothly. Check that they are not caught when the handlebars are turned or when the front forks travel up and down.</td>
<td>—</td>
</tr>
<tr>
<td>Exhaust pipe</td>
<td>Check that the exhaust pipe is tightly mounted and has no cracks.</td>
<td>P.4-3 – 4</td>
</tr>
<tr>
<td>Rear wheel sprocket</td>
<td>Check that the rear wheel sprocket tightening bolt is not loose.</td>
<td>P.3-17</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Check for smooth operation. Lubricate if necessary.</td>
<td>P.3-23</td>
</tr>
<tr>
<td>Bolts and nuts</td>
<td>Check the chassis and engine for loose bolts and nuts.</td>
<td>P.1-15</td>
</tr>
<tr>
<td>Lead connectors</td>
<td>Check that the CDI magneto, CDI unit, and ignition coil are connected tightly.</td>
<td>P.1-7</td>
</tr>
<tr>
<td>Settings</td>
<td>Is the machine set suitably for the condition of the racing course and weather or by taking into account the results of test runs before racing? Are inspection and maintenance completely done?</td>
<td>P.7-1 – 10</td>
</tr>
</tbody>
</table>
ENGINE

CHECKING THE COOLANT LEVEL

**WARNING**
Do not remove the radiator cap "1", drain bolt and hoses when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, place a thick towel over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

**NOTICE**
Hard water or salt water is harmful to the engine parts. You may use distilled water, if you can't get soft water.

1. Place a container under the engine.
2. Remove:
   - Coolant drain bolt "1"
3. Remove:
   - Radiator cap
   - Drain the coolant completely.
4. Clean:
   - Cooling system
   - Thoroughly flush the cooling system with clean tap water.
5. Install:
   - Copper washer
   - Coolant drain bolt
6. Fill:
   - Radiator
   - Engine
   - To specified level.

**Recommended coolant:**
High quality ethylene glycol anti-freeze containing anti-corrosion for aluminum engine

- Coolant "1" and water (soft water) "2" mixing ratio:
  - 50%/50%
- Coolant capacity:
  - 1.00 L (0.88 Imp qt, 1.06 US qt)

**NOTE**
Do not mix more than one type of ethylene glycol antifreeze containing corrosion inhibitors for aluminum engine.
- Do not use water containing impurities or oil.

**Handling notes of coolant:**
The coolant is harmful so it should be handled with special care.

**WARNING**
- When coolant splashes to your eye.
  - Thoroughly wash your eye with water and see your doctor.
- When coolant splashes to your clothes.
  - Quickly wash it away with water and then with soap.
- When coolant is swallowed.
  - Quickly make him vomit and take him to a doctor.

**CHECKING THE RADIATOR CAP**

1. Inspect:
   - Seal (radiator cap) "1"
   - Valve and valve seat "2"
   - Crack/damage → Replace.
   - Exist fur deposits "3" → Clean or replace.

**CHECKING THE RADIATOR CAP OPENING PRESSURE**

1. Attach:
   - Radiator cap tester "1" and adapter "2"

**TIP**
Apply water on the radiator cap seal.
3. Radiator cap
2. Apply the specified pressure.

Radiator cap opening pressure:
110 kPa (1.1 kg/cm², 15.6 psi)

3. Inspect:
• Pressure
  Impossible to maintain the specified pressure for 10 seconds → Replace.

CHECKING THE COOLING SYSTEM
1. Inspect:
• Coolant level
2. Attach:
  • Radiator cap tester "1" and adapter "2"
3. Apply the specified pressure.

Radiator cap tester:
YU-24460-01/90890-01325
Radiator cap tester adapter:
YU-33984/90890-01352

TIP
• Do not apply pressure more than specified pressure.
• Radiator should be filled fully.

4. Inspect:
• Pressure
  Impossible to maintain the specified pressure for 10 seconds → Repair.
• Radiator "1"
• Radiator hose joint "2"
  Coolant leakage → Repair or replace.
• Radiator hose "3"
  Swelling → Replace.

ADJUSTING THE CLUTCH LEVER POSITION
1. Adjust:
• Clutch lever position

Clutch lever position adjustment steps:
  a. Loosen the locknuts "1".
  b. Turn the adjusting bolt "2" until the clutch lever position "a" is in the desired position.
  c. Tighten the locknuts.

ADJUSTING THE CLUTCH CABLE FREE PLAY
1. Check:
• Clutch lever free play "a"
  Out of specification → Adjust.

Throttle grip free play "a":
3–5 mm (0.12–0.20 in)

TIP
• Before adjustment, expose the adjuster by moving the boot "3" and cap "4" away.
• Make minute adjustment on the lever side using the adjuster "5".
• After adjustment, check proper operation of clutch lever.

Radiator cap tester:
YU-24460-01/90890-01325
Radiator cap tester adapter:
YU-33984/90890-01352

Standard pressure:
180 kPa (1.8 kg/cm², 25.6 psi)

TIP
• Before adjustment, expose the adjuster by moving the boot "3" and cap "4" away.
• Make minute adjustment on the lever side using the adjuster "5".
• After adjustment, check proper operation of clutch lever.

ADJUSTING THE THROTTLE CABLE FREE PLAY
1. Check:
• Throttle grip free play "a"
  Out of specification → Adjust.
2. Adjust:
   • Throttle grip free play

Throttle grip free play adjustment steps:
   a. Slide the adjuster cover.
   b. Loosen the locknut "1".
   c. Turn the adjuster "2" until the specified free play is obtained.
   d. Tighten the locknut.

TIP
Before adjusting the throttle cable free play, the engine idle speed should be adjusted.

WARNING
After adjusting the throttle cable free play, start the engine and turn the handlebar to right and left and make sure that the engine idling does not run faster.

LUBRICATING THE THROTTLE
1. Remove:
   • Cover (throttle cable cap) "1"
   • Cover (grip cap) "2"
   • Throttle grip cap "3"

2. Apply:
   • Lithium soap base grease
     On the throttle cable end "a".

3. Install:
   • Throttle grip cap
   • Screw (throttle grip cap)

Screw (throttle grip cap):
4 Nm (0.4 m•kg, 2.9 ft•lb)

   • Cover (grip cap)
   • Cover (throttle cable cap)

ADJUSTING THE HOT STARTER LEVER FREE PLAY
1. Check:
   • Hot starter lever free play "a"
     Out of specification → Adjust.

Hot starter lever free play "a":
3–6 mm (0.12–0.24 in)

2. Adjust:
   • Hot starter lever free play

Hot starter lever free play adjustment steps:
   a. Loosen the locknut "1".
   b. Turn the adjuster "2" until free play "a" is within the specified limits.
   c. Tighten the locknut.

TIP
After adjustment, check proper operation of hot starter.

CLEANING THE AIR FILTER ELEMENT
1. Remove:
   • Seat
   • Fitting bolt "1"
   • Washer "2"
   • Air filter element "3"
   • Air filter guide "4"

2. Clean:
   • Air filter element
     Clean them with solvent.

TIP
After cleaning, remove the remaining solvent by squeezing the element.

NOTICE
   • Do not twist the element when squeezing the element.
   • Leaving too much of solvent in the element may result in poor starting.

3. Inspect:
   • Air filter element
     Damage → Replace.

4. Apply:
   • Foam-air-filter oil or equivalent oil to the element

TIP
Squeeze out the excess oil. Element should be wet but not dripping.

5. Install:
   • Air filter guide "1"

   TIP
   Align the projection "a" on filter guide with the hole "b" in air filter element.
6. Apply:
- Lithium soap base grease
  On the matching surface "a" on air filter element.

7. Install:
- Air filter element "1"
- Washer
- Fitting bolt

**Fitting bolt:**
2 Nm (0.2 m•kg, 1.4 ft•lb)

**TIP**
Align the projection "a" on filter guide with the hole "b" in air filter case.

---

**CHECKING THE ENGINE OIL LEVEL**

1. Start the engine, warm it up for several minutes, and then turn off the engine and wait for five minutes.
2. Place the machine on a level place and hold it up on upright position by placing the suitable stand under the engine.
3. Inspect:
   - Oil level
   The engine oil level should be between the minimum level mark "a" and maximum level mark "b". Below the minimum level mark → Add the recommended engine oil to the proper level.

**NOTICE**
- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD or higher and do not use oils labeled “ENERGY CONSERVING II”.
- Do not allow foreign materials to enter the crankcase.

4. Install:
- Oil tank cap

---

**CHANGING THE ENGINE OIL**

1. Start the engine and warm it up for several minutes, and then turn off the engine and wait for five minutes.
2. Place the machine on a level place and hold it up on upright position by placing the suitable stand under the engine.
3. Place a suitable container under the engine.
4. Remove:
   - Lower engine guard "1"
   - Bolt (oil tank) "2"
   - Washer "3"
   - Oil filler cap "4"
   - Oil tank drain bolt "5"
   - Crankcase oil drain bolt "6"
   - Oil filter element drain bolt "7"

Drain the crankcase and oil tank of its oil.

5. Remove:
   - Oil hose clamp "1"
   - Bolt (oil hose)
   - Oil hose "2"
   - Oil strainer "3"

6. Inspect:
   - Oil strainer
   Clogged → Blow.

7. If the oil filter is to be replaced during this oil change, remove the following parts and reinstall them.
ENGINE

Replacement steps:
a. Remove the oil filter element cover "1" and oil filter element "2".
b. Check the O-rings "3", if cracked or damaged, replace them with a new one.
c. Install the oil filter element and oil filter element cover.

8. Install:
   • O-ring "1"  
   • Oil strainer "2"  

Oil strainer:  
9 Nm (0.9 m•kg, 6.5 ft•lb)

Bolt (oil hose):  
8 Nm (0.8 m•kg, 5.8 ft•lb)

Oil hose clamp:  
2 Nm (0.2 m•kg, 1.4 ft•lb)

9. Install:
   • Copper washer  
   • Oil filter element drain bolt

Oil filter element drain bolt:  
10 Nm (1.0 m•kg, 7.2 ft•lb)

Bolt (oil tank):  
4 Nm (0.4 m•kg, 2.9 ft•lb)

10. Fill:
   • Engine oil

Oil quantity:
   Periodic oil change:  
   0.95 L (0.84 Imp qt, 1.00 US qt)  
   With oil filter replacement:  
   1.05 L (0.92 Imp qt, 1.11 US qt)  
   Total amount:  
   1.20 L (1.06 Imp qt, 1.27 US qt)

11. Check:
   • Oil leakage

12. Install:
   • Oil filter cap  
   • Washer (oil tank)  
   • Bolt (oil tank)

ADJUSTING THE PILOT SCREW
1. Adjust:
   • Pilot screw "1"

Adjustment steps:
TIP  
To optimize the fuel flow at a smaller throttle opening, each machine's pilot screw has been individually set at the factory. Before adjusting the pilot screw, turn it in fully and count the number of turns. Record this number as the factory-set number of turns out.

a. Turn in the pilot screw until it is lightly seated.
b. Turn out the pilot screw by the factory-set number of turns.

Pilot screw (example):  
1-3/4 turns out

ADJUSTING THE ENGINE IDLING SPEED
1. Start the engine and thoroughly warm it up.
2. Adjust:
   • Engine idling speed

Adjustment steps:
a. Adjust the pilot screw.
   Refer to "ADJUSTING THE PILOT SCREW" section.
b. Turn the throttle stop screw “1” until the specified engine idling speed.

**TIP**

Using a digital engine tachometer for idle speed adjustment, detect the engine idling speed by bringing the sensing element “c” of the engine tachometer close to the ignition coil “2”.

To increase idle speed → Turn the throttle stop screw “1” in "a".
To decrease idle speed → Turn the throttle stop screw "1" out "b".

**Engine idling speed:**

1,900–2,100 r/min

---

### ADJUSTING THE VALVE CLEARANCE

**TIP**

- This section is intended for those who have basic knowledge and skill concerning the servicing of Yamaha motorcycles (e.g., Yamaha dealers, service engineers, etc.) Those who have little knowledge and skill concerning servicing are requested not to undertake inspection, adjustment, disassembly, or reassembly only by reference to this manual. It may lead to servicing trouble and mechanical damage.
- The valve clearance should be adjusted when the engine is cool to the touch.
- The piston must be at Top Dead Center (T.D.C.) on compression stroke to check or adjust the valve clearance.

1. Remove:
   - Seat
   - Fuel tank
   Refer to “SEAT, FUEL TANK AND SIDE COVERS” section in the CHAPTER 4.

2. Remove:
   - Spark plug
   - Cylinder head cover
   Refer to “CAMSHAFTS” section in the CHAPTER 4.

3. Remove:
   - Timing mark accessing screw “1”
   - Crankshaft end accessing screw “2”
   - O-ring

4. Check:
   - Valve clearance
     Out of specification → Adjust.

   **Valve clearance (cold):**
   - Intake valve:
     0.12–0.17 mm
     (0.0047–0.0067 in)
   - Exhaust valve:
     0.17–0.22 mm
     (0.0067–0.0087 in)

5. Adjust:
   - Valve clearance

**TIP**

- Place a rag in the timing chain space to prevent pads from falling into the crankcase.
- Identify each valve lifter and pad position very carefully so that they can be reinstalled in their original place.

---

**Checking steps:**

a. Turn the crankshaft counterclockwise with a wrench.
   - Align the T.D.C. mark “a” on the rotor with the align mark “b” on the crankcase cover when piston is at T.D.C. on compression stroke.

b. **TIP**
   - In order to be sure that the piston is at Top Dead Center, the punch mark “c” on the exhaust camshaft and the punch mark “d” on the intake camshaft must align with the cylinder head surface, as shown in the illustration.

---

**To increase idle speed** → Turn the throttle stop screw “1” in "a".
**To decrease idle speed** → Turn the throttle stop screw "1" out "b".
c. Select the proper pad using the pad selecting table.

<table>
<thead>
<tr>
<th>Pad range</th>
<th>Pad Availability: 25 increments</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 120–N o. 240</td>
<td>1.20 mm–2.40 mm Pads are available in 0.05 mm increments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Last digit of pad number</th>
<th>Rounded valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1 or 2</td>
<td>0</td>
</tr>
<tr>
<td>4, 5 or 6</td>
<td>5</td>
</tr>
<tr>
<td>8 or 9</td>
<td>10</td>
</tr>
</tbody>
</table>

**EXAMPLE:**
Installed pad number = 148
Rounded off value = 150

**TIP**
Pads can only be selected in 0.05 mm increments.

d. Round off the last digit of the installed pad number to the nearest increment.

f. Install the new pads “3” and the valve lifters “4”.

**TIP**
- Apply the engine oil on the valve lifters.
- Apply the molybdenum disulfide oil on the valve stem ends.
- Valve lifter must turn smoothly when rotated with a finger.
- Be careful to reinstall valve lifters and pads in their original place.

g. Install the camshafts (exhaust and intake).
Refer to “CAMSHAFTS” section in the CHAPTER 4.
### EXHAUST

<table>
<thead>
<tr>
<th>MEASURED CLEARANCE</th>
<th>INSTALLED PAD NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 - 0.04</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.05 - 0.09</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.10 - 0.16</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.17 - 0.22</td>
<td>125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
</tbody>
</table>

### INTAKE

<table>
<thead>
<tr>
<th>MEASURED CLEARANCE</th>
<th>INSTALLED PAD NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 - 0.01</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.02 - 0.06</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.07 - 0.11</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
</tbody>
</table>

### STANDARD CLEARANCE

<table>
<thead>
<tr>
<th>VALVE CLEARANCE (cold):</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 - 0.17 mm</td>
</tr>
<tr>
<td>Example: Installed is 175</td>
</tr>
<tr>
<td>Measured clearance is 0.23 mm</td>
</tr>
<tr>
<td>Replace 175 pad with 185 pad</td>
</tr>
<tr>
<td>Pad number: (example)</td>
</tr>
<tr>
<td>Pad No. 175 = 1.75 mm</td>
</tr>
<tr>
<td>Pad No. 185 = 1.85 mm</td>
</tr>
</tbody>
</table>
BLEEDING THE 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 dangerous loss of braking performance may occur if the brake system is not properly bled.

1. Remove:
   - Brake master cylinder cap
   - Diaphragm
   - Reservoir float (front brake)
   - Protector (rear brake)

2. Bleed:
   - Brake fluid

Air bleeding steps:
- Add proper brake fluid to the reservoir.
- Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
- Connect the clear plastic tube "2" tightly to the caliper bleed screw "1".
- Place the other end of the tube into a container.
- Slowly apply the brake lever or pedal several times.
- Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
- Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.
- Repeat steps (e) to (h) until the air bubbles have been removed from the system.
- Add brake fluid to the level line on the reservoir.

**WARNING**

Check the operation of the brake after bleeding the brake system.

### ADJUSTING THE FRONT BRAKE

1. Check:
   - Brake lever position "a"

<table>
<thead>
<tr>
<th>Brake lever position &quot;a&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard position</td>
</tr>
<tr>
<td>95 mm (3.74 in)</td>
</tr>
</tbody>
</table>

2. Remove:
   - Brake lever cover
3. Adjust:
   - Brake lever position

**WARNING**

Be sure to tighten the locknut, as it will cause poor brake performance.

### ADJUSTING THE REAR BRAKE

1. Check:
   - Brake pedal height "a"

<table>
<thead>
<tr>
<th>Brake pedal height &quot;a&quot;:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero mm (Zero in)</td>
</tr>
</tbody>
</table>

2. Adjust:
   - Brake pedal height

Pedal height adjustment steps:
- Loosen the locknut "1".
- Turn the adjusting bolt "2" until the lever position "a" is within specified position.
- Tighten the locknut.

**WARNING**

- Adjust the pedal height between the maximum "A" and the minimum "B" as shown. (In this adjustment, the bolt "3" end "b" should protrude out of the threaded portion "4" but not be less than 2 mm (0.08 in) "c" away from the brake pedal "5").
- After the pedal height adjustment, make sure that the rear brake does not drag.
CHECKING AND REPLACING THE FRONT BRAKE PADS

1. Inspect:
   • Brake pad thickness "a"
     Out of specification → Replace as a set.

2. Replace:
   • Brake pad

**Brake pad thickness:**
4.4 mm (0.17 in)
<Limit>: 1.0 mm (0.04 in)

**Brake pad replacement steps:**
- a. Remove the pad pin plug "1".
- b. Loosen the pad pin "2".
- c. Remove the brake caliper "3" from the front fork.
- d. Remove the pad pin and brake pads "4".
- e. Connect the transparent hose "5" to the bleed screw "6" and place the suitable container under its end.
- f. Loosen the bleed screw and push the brake caliper piston in.
- g. Tighten the bleed screw.

**WARNING**
Do not reuse the drained brake fluid.

- h. Install the brake pads "7" and pad pin.

**TIP**
- Install the brake pads with their projections "a" into the brake caliper recesses "b".
- Temporarily tighten the pad pin at this point.
- i. Install the brake caliper "8" and tighten the pad pin "9".

- j. Install the pad pin plug "10".

3. Inspect:
   • Brake fluid level
     Refer to "CHECKING THE BRAKE FLUID LEVEL" section.

4. Check:
   • Brake lever operation
     A softy or spongy feeling → Bleed brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" section.

CHECKING AND REPLACING THE REAR BRAKE PADS

1. Inspect:
   • Brake pad thickness "a"
     Out of specification → Replace as a set.

**Brake pad thickness:**
6.4 mm (0.25 in)
<Limit>: 1.0 mm (0.04 in)

**Bolt (brake caliper):**
28 Nm (2.8 m•kg, 20 ft•lb)
Pad pin:
18 Nm (1.8 m•kg, 13 ft•lb)
2. Replace:
- Brake pad

Brake pad replacement steps:

a. Remove the protector "1" and pad pin plug "2".

b. Loosen the pad pin "3".

c. Remove the rear wheel "4" and brake caliper "5". Refer to "FRONT WHEEL AND REAR WHEEL" section in the CHAPTER 5.

d. Remove the pad pin "6" and brake pads "7".

e. Connect the transparent hose "8" to the bleed screw "9" and place the suitable container under its end.

f. Loosen the bleed screw and push the brake caliper piston in.

**WARNING**
Do not reuse the drained brake fluid.

g. Tighten the bleed screw.

**Bleed screw:**
6 Nm (0.6 m•kg, 4.3 ft•lb)

h. Install the brake pad "10" and pad pin "11".

**TIP**
- Install the brake pads with their projections "a" into the brake caliper recesses "b".
- Temporarily tighten the pad pin at this point.

i. Install the brake caliper "12" and rear wheel "13". Refer to "FRONT WHEEL AND REAR WHEEL" section in the CHAPTER 5.

j. Tighten the pad pin "14".

k. Install the pad pin plug "15" and protector "16".

**Pad pin plug:**
3 Nm (0.3 m•kg, 2.2 ft•lb)

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

3. Inspect:
- Brake fluid level
  Refer to "CHECKING THE BRAKE FLUID LEVEL" section.

4. Check:
- Brake pedal operation
  A softy or spongy feeling → Bleed brake system.
  Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" section.

**CHECKING THE REAR BRAKE PAD INSULATOR**

1. Remove:
- Brake pad
  Refer to "CHECKING AND REPLACING THE REAR BRAKE PADS" section.

2. Inspect:
- Rear brake pad insulator "1" Damage → Replace.

**CHECKING THE BRAKE FLUID LEVEL**

1. Place the brake master cylinder so that its top is in a horizontal position.

2. Inspect:
- Brake fluid level
  Fluid at lower level → Fill up.

**Recommended brake fluid:**
DOT #4

**WARNING**
- Use only designated quality brake fluid to avoid poor brake performance.
- Refill with same type and brand of brake fluid; mixing fluids could result in poor brake performance.
- Be sure that water or other contaminants do not enter master cylinder when refilling.
- Clean up spilled fluid immediately to avoid erosion of painted surfaces or plastic parts.

**a. Lower level**
A. Front
B. Rear
CHECKING THE SPROCKET
1. Inspect:
   • Sprocket teeth "a"
     Excessive wear → Replace.

TIP
Replace the drive sprocket, rear wheel sprocket and drive chain as a set.

2. Clean:
   • Drive chain
     Place it in kerosene, and brush off as much dirt as possible. Then remove the drive chain from the kerosene and dry the drive chain.

3. Check:
   • Drive chain stiffness "a"
     Clean and oil the drive chain and hold as illustrated.
     Stiff → Replace the drive chain.

4. Check:
   • Drive chain slack "a"

   Be sure to install the master link clip to the direction as shown.

5. Install:
   • Drive chain "1"
   • Joint "2"
   • Master link clip "3"

   Be sure to install the master link clip to the direction as shown.

6. Lubricate:
   • Drive chain

   Drive chain lubricant:
   SAE 10W-40 motor oil or suitable chain lubricants

ADJUSTING THE DRIVE CHAIN SLACK
1. Elevate the rear wheel by placing the suitable stand under the engine.

2. Check:
   • Drive chain slack "a"
     Above the seal guard installation bolt.
     Out of specification → Adjust.

   Drive chain slack:
   50–60 mm (2.0–2.4 in)

TIP
Before checking and/or adjusting, rotate the rear wheel through several revolutions and check the slack several times to find the tightest point. Check and/or adjust the drive chain slack with the rear wheel in this "tight chain" position.

3. Adjust:
   • Drive chain slack

   Drive chain slack adjustment steps:
   a. Loosen the axle nut "1" and lock-nuts "2".
   b. Adjust the drive chain slack by turning the adjusters "3".

   To tighten → Turn the adjuster "3" counterclockwise.
   To loosen → Turn the adjuster "3" clockwise and push wheel forward.
   c. Turn each adjuster exactly the same amount to maintain correct axle alignment. (There are marks "a" on each side of the drive chain puller alignment.) NOTICE: Improper drive chain slack will overload the engine as well as other vital parts of the motorcycle and can lead to chain slippage or breakage. To prevent this from occurring, keep the drive chain slack within the specified limits.
A. Right
B. Left

**TIP**
Turn the adjuster so that the drive chain is in line with the sprocket, as viewed from the rear.

d. Tighten the axle nut while pushing down the drive chain.

e. Tighten the locknuts.

### Axle nut:
135 Nm (13.5 m•kg, 98 ft•lb)

### Locknut:
21 Nm (2.1 m•kg, 15 ft•lb)

---

### CHECKING THE FRONT FORK
1. Inspect:
   - Front fork smooth action
     Operate the front brake and stroke the front fork.
     Unsmooth action/oil leakage → Repair or replace.

### CHECKING THE FRONT FORK PROTECTOR GUIDE
1. Inspect:
   - Protector guide "1"
     Out of specification → Replace.

**TIP**
The protector guide reaches the limit of its use when it is worn down to the same height "a" as of the outer tube circumference.

### CLEANING THE FRONT FORK OIL SEAL AND DUST SEAL
1. Remove:
   - Protector
   - Dust seal "1"

**TIP**
Use a thin screwdriver, and be careful not to damage the inner tube and dust seal.

2. Clean:
   - Dust seal "a"
   - Oil seal "b"

**TIP**
- Clean the dust seal and oil seal after every run.
- Apply the lithium soap base grease on the inner tube.

### RELIEVING THE FRONT FORK INTERNAL PRESSURE
1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove the air bleed screw "1" and release the internal pressure from the front fork.
3. Install:
   - Air bleed screw

**Air bleed screw:**
1 Nm (0.1 m•kg, 0.7 ft•lb)

### ADJUSTING THE FRONT FORK REBOUND DAMPING FORCE
1. Adjust:
   - Rebound damping force
     By turning the adjuster "1".

**Stiffer "a" → Increase the rebound damping force.** (Turn the adjuster "1" in.)

**Softer "b" → Decrease the rebound damping force.** (Turn the adjuster "1" out.)

### Extent of adjustment:

<table>
<thead>
<tr>
<th>Extent of adjustment:</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully turned in position</td>
<td>20 clicks out</td>
<td>(from maximum position)</td>
</tr>
</tbody>
</table>

**STANDARD POSITION:**
This is the position which is back by the specific number of clicks from the fully turned-in position.

| Standard position: | 10 clicks out | * 9 clicks out |

* Except for USA and CDN

### NOTICE
Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.

### WARNING
Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.
ADJUSTING THE FRONT FORK

**COMPRESSION DAMPING FORCE**

2. Adjust:

- **Compression damping force**
  By turning the adjuster "1".

<table>
<thead>
<tr>
<th>Extent of adjustment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Fully turned in position</td>
</tr>
</tbody>
</table>

- **STANDARD POSITION:**
  This is the position which is back by the specific number of clicks from the fully turned-in position.

<table>
<thead>
<tr>
<th>Standard position:</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 clicks out</td>
</tr>
<tr>
<td>* 6 clicks out</td>
</tr>
</tbody>
</table>

* Except for USA and CDN

**NOTICE**

Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.

**WARNING**

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

CHECKING THE REAR SHOCK ABSORBER

1. Inspect:

- Swingarm smooth action
- Abnormal noise/unsmooth action → Grease the pivoting points or repair the pivoting points.
- Damage/oil leakage → Replace.

ADJUSTING THE REAR SHOCK ABSORBER SPRING PRELOAD

1. Elevate the rear wheel by placing the suitable stand under the engine.
2. Remove:
   - Rear frame
3. Measure:
   - Spring fitting length

<table>
<thead>
<tr>
<th>Standard fitting length:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.D. MARK/Q'TY</td>
</tr>
<tr>
<td>Yellow/1</td>
</tr>
</tbody>
</table>

**TIP**

- Be sure to remove all dirt and mud from around the locknut and adjuster before adjustment.
- The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjuster.

**NOTICE**

Never attempt to turn the adjuster beyond the maximum or minimum setting.

e. Tighten the locknut.

**ADJUSTING THE REAR SHOCK ABSORBER REBOUND DAMPING FORCE**

1. Adjust:

- **Rebound damping force**
  By turning the adjuster "1".

<table>
<thead>
<tr>
<th>Extent of adjustment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Position in which the spring is turned in 20 mm (0.79 in) from its free length.</td>
</tr>
</tbody>
</table>

**TIP**

- Stiffer "a" → Increase the rebound damping force. (Turn the adjuster "1" in.)
- Softer "b" → Decrease the rebound damping force. (Turn the adjuster "1" out.)
Extent of adjustment:

<table>
<thead>
<tr>
<th></th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully turned in position</td>
<td>20 clicks out</td>
<td>(from maximum position)</td>
</tr>
</tbody>
</table>

- **STANDARD POSITION:**
  This is the position which is back by the specific number of clicks from the fully turned-in position. (Which align the punch mark “a” on the adjuster with the punch mark “b” on the bracket.)

Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.

ADJUSTING THE REAR SHOCK ABSORBER LOW COMPRESSION DAMPING FORCE

1. Adjust:
   - Low compression damping force
     By turning the adjuster “1”.
     - Stiffer “a” → Increase the low compression damping force.
       (Turn the adjuster “1” in.)
       - Softer “b” → Decrease the low compression damping force.
         (Turn the adjuster “1” out.)

Extent of adjustment:

<table>
<thead>
<tr>
<th></th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully turned in position</td>
<td>20 clicks out</td>
<td>(from maximum position)</td>
</tr>
</tbody>
</table>

ADJUSTING THE REAR SHOCK ABSORBER HIGH COMPRESSION DAMPING FORCE

1. Adjust:
   - High compression damping force
     By turning the adjuster “1”.
     - Stiffer “a” → Increase the high compression damping force.
       (Turn the adjuster “1” in.)
       - Softer “b” → Decrease the high compression damping force.
         (Turn the adjuster “1” out.)

Extent of adjustment:

<table>
<thead>
<tr>
<th></th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully turned in position</td>
<td>2 turns out</td>
<td>(from maximum position)</td>
</tr>
</tbody>
</table>

Standard position: About 9 clicks out
* About 11 clicks out

* Except for USA and CDN

NOTICE
Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.

CHECKING THE TIRE PRESSURE

1. Measure:
   - Tire pressure
     Out of specification → Adjust.

Standard tire pressure: 100 kPa (1.0 kgf/cm², 15 psi)

TIP
- Check the tire while it is cold.
- Loose bead stoppers allow the tire to slide off its position on the rim when the tire pressure is low.
- A tilted tire valve stem indicates that the tire slips off its position on the rim.
- If the tire valve stem is found tilted, the tire is considered to be slipping off its position. Correct the tire position.
CHECKING AND TIGHTENING THE SPOKES
The following procedure applies to all of the spokes.
1. Check:
   • Spokes
     Bend/damage → Replace.
     Loose spoke → Retighten.
     Tap the spokes with a screwdriver.

2. Inspect:
   • Bearing free play
     Exist play → Replace.

TIP
A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

2. Tighten:
   • Spokes (with a spoke nipple wrench "1")

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

CHECKING THE WHEELS
1. Inspect:
   • Wheel runout
     Elevate the wheel and turn it.
     Abnormal runout → Replace.

2. Check:
   • Steering stem
     Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     Free play → Adjust steering head.

3. Check:
   • Steering smooth action
     Turn the handlebar lock to lock.
     Unsmooth action → Adjust steering ring nut.

4. Adjust:
   • Steering ring nut

   Steering ring nut adjustment steps:
   a. Remove the number plate.
   b. Remove the handlebar and upper bracket.

   c. Loosen the steering ring nut "1" using the steering nut wrench "2".

   d. Tighten the steering ring nut "3" using steering nut wrench "4".

   e. Loosen the steering ring nut one turn.
   f. Retighten the steering ring nut using the steering nut wrench.

   g. 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.

   TIP
   • Apply the lithium soap base grease on the thread of the steering stem.
   • Set the torque wrench to the steering nut wrench so that they form a right angle.

   WARNING
   Avoid over-tightening.
h. Install the washer "5", upper bracket "6", steering stem nut "7", handlebar "8", handlebar upper holder "9" and number plate "10".

**TIP**
- Apply the lithium soap base grease on the contact surface of the steering stem nut when installing.
- The handlebar upper holder should be installed with the punched mark "a" forward.
- Install the handlebar so that the marks "b" are in place on both sides.
- Install the handlebar so that the projection "c" of the handlebar upper holder is positioned at the mark on the handlebar as shown.
- Insert the end of the fuel breather hose "11" into the hole in the steering stem.

**NOTICE**

First tighten the bolts on the front side of the handlebar upper holder, and then tighten the bolts on the rear side.

<table>
<thead>
<tr>
<th>Component</th>
<th>Torque Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering stem nut</td>
<td>145 Nm (14.5 m•kg, 105 ft•lb)</td>
</tr>
<tr>
<td>Handlebar upper holder</td>
<td>28 Nm (2.8 m•kg, 20 ft•lb)</td>
</tr>
<tr>
<td>Pinch bolt (upper bracket)</td>
<td>21 Nm (2.1 m•kg, 15 ft•lb)</td>
</tr>
<tr>
<td>Number plate</td>
<td>7 Nm (0.7 m•kg, 5.1 ft•lb)</td>
</tr>
</tbody>
</table>
To ensure smooth operation of all components, lubricate your machine during setup, after break-in, and after every race.

1. All control cable
2. Clutch lever pivot
3. Shift pedal pivot
4. Footrest pivot
5. Throttle-to-handlebar contact
6. Drive chain
7. Tube guide cable winding portion
8. Throttle cable end
9. Clutch cable end
10. Hot starter cable end

A. Use Yamaha cable lube or equivalent on these areas.
B. Use SAE 10W-40 motor oil or suitable chain lubricants.
C. Lubricate the following areas with high quality, lightweight lithium-soap base grease.

⚠️ WARNING
Wipe off any excess grease, and avoid getting grease on the brake discs.
ELECTRICAL

CHECKING THE SPARK PLUG

1. Remove:
   • Spark plug

2. Inspect:
   • Electrode "1"
     Wear/damage → Replace.
   • Insulator color "2"
     Normal condition is a medium to light tan color.
     Distinctly different color → Check the engine condition.

TIP
When the engine runs for many hours at low speeds, the spark plug insulator will become sooty, even if the engine and carburetor are in good operating condition.

3. Measure:
   • Plug gap "a"
     Use a wire gauge or thickness gauge.
     Out of specification → Regap.

4. Clean the plug with a spark plug cleaner if necessary.

5. Tighten:
   • Spark plug

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

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

TIP
• Before installing a spark plug, clean the gasket surface and plug surface.
• Finger-tighten "a" the spark plug before torquing to specification "b".

CHECKING THE IGNITION TIMING

1. Remove:
   • Timing mark accessing screw "1"

2. Attach:
   • Timing light
   • Digital tachometer
     To the ignition coil lead (orange lead "1").

Timing light:
YM-3277-A/90890-03141

3. Adjust:
   • Engine idling speed
     Refer to "ADJUSTING THE ENGINE IDLING SPEED" section.

4. Check:
   • Ignition timing
     Visually check the stationary pointer "a" is within the firing range "b" on the rotor.
     Incorrect firing range → Check rotor and pickup assembly.

5. Install:
   • Timing mark accessing screw
SEAT, FUEL TANK AND SIDE COVERS

REMOVING THE SEAT, FUEL TANK AND SIDE COVERS

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Air scoop (left and right)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bolt (fuel tank)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Fitting band</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuel tank</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Left side cover</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>7</td>
<td>Right side cover</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>8</td>
<td>Number plate</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
REMOVING THE SIDE COVER
1. Remove:
   • Bolt (side cover)
   • Left side cover "1"
   • Right side cover "2"

TIP
Draw the side cover downward to remove it because its claws "a" are inserted in the air filter case.

REMOVING THE NUMBER PLATE
1. Remove:
   • Bolt (number plate)
   • Number plate "1"

TIP
- The projection "a" is inserted into the band of the number plate. Pull the band off the projection before removal.
- Remove the hot starter cable "2" and clutch cable "3" from the cable guide "b" on the number plate.
- The projection "c" on the lower bracket is inserted into the number plate. Remove the number plate by pulling it off the projection.
# EXHAUST PIPE AND SILENCER

## REMOVING THE EXHAUST PIPE AND SILENCER

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Except for USA and CDN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Right side cover</td>
<td>1</td>
<td>Refer to &quot;SEAT, FUEL TANK AND SIDE COVERS&quot; section.</td>
</tr>
<tr>
<td>2</td>
<td>Bolt (silencer clamp)</td>
<td>1</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>3</td>
<td>Bolt [silencer (front)]</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bolt [silencer (rear)]</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Silencer clamp</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Silencer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Nut (exhaust pipe)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Exhaust pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Gasket</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Wave washer</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

![Diagram](attachment:image.jpg)
EXHAUST PIPE AND SILENCER

CHECKING THE SILENCER AND EXHAUST PIPE
1. Inspect:
   • Gasket "1" 
     Damage → Replace.

CHANGING THE SILENCER FIBER
1. Remove:
   • Rivet (front) "1" 
   • Inner pipe "2"

   NOTICE
   Take care not to damage the rivet fitting holes (ø4.9 mm) "a" in re- moval.

   TIP
   Pull out the inner pipe while lightly tapping the stay "b" on the silencer using a soft hammer.

2. Replace:
   • Fiber "1"

3. Install:
   • Inner pipe "1" 
   • Rivet (front) "2"

   TIP
   • Apply heat resistant sealant along the plate edge "a" on the inside of the silencer and also along the silencer edge "b" as shown.
   • Take care not to allow the fiber out of place when installing the inner pipe.

INSTALLING THE SILENCER AND EXHAUST PIPE
1. Install:
   • Gasket New 
   • Exhaust pipe "1" 
   • Nut (exhaust pipe) "2"

   TIP
   First temporarily tighten both nuts to 13 Nm (1.3 m•kg, 9.4 ft•lb). Then re-tighten the same nut to 20 Nm (2.0 m•kg, 14 ft•lb).

   Nut (exhaust pipe):
   20 Nm (2.0 m•kg, 14 ft•lb)

2. Install:
   • Silencer clamp "1" 
   • Gasket "2" New 
   • Silencer "3" 
   • Washer "4" 
   • Bolt (silencer) "5"

   TIP
   • Install the gasket with its meshed area "a" toward the exhaust pipe side.
   • The gasket should be installed according to the dimension shown.

   Silencer clamp:
   14 Nm (1.4 m•kg, 10 ft•lb)

   Bolt (silencer):
   30 Nm (3.0 m•kg, 22 ft•lb)
### RADIATOR

#### REMOVING THE RADIATOR

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drain the coolant.</td>
<td></td>
<td>Refer to &quot;CHANGING THE COOLANT&quot; section in the CHAPTER 3.</td>
</tr>
<tr>
<td>Seat and fuel tank</td>
<td>Refer to &quot;SEAT, FUEL TANK AND SIDE COVERS&quot; section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Radiator guard</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Radiator hose clamp</td>
<td>10</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>3</td>
<td>Clutch cable holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Radiator hose 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Left radiator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Radiator hose 4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Radiator hose 5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Right radiator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Radiator hose 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Radiator hose 3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Radiator breather hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Radiator pipe 1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
RADIATOR

HANDLING NOTE

**WARNING**

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure:
Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

CHECKING THE RADIATOR

1. Inspect:
   - Radiator core "1"
     Obstruction → Blow out with compressed air through rear of the radiator.
     Bent fin → Repair/replace.

2. Install:
   - Radiator breather hose "1"
   - Radiator hose 2 "2"
   - Radiator hose 4 "3"
   - Pipe "4"
   - Radiator hose 5 "5"
   - Radiator hose 3 "6"
   To right radiator "7".

3. Install:
   - Right radiator "1"
   - Bolt (right radiator) "2"

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

   - Radiator hose 5 "3"

   Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

4. Install:
   - Left radiator "1"
   - Bolt (left radiator) "2"

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

   - Radiator hose 1 "3"

   Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

5. Tighten:
   - Radiator hose clamp "4"

   Radiator hose clamp: 2 Nm (0.2 m•kg, 1.4 ft•lb)

6. Install:
   - Radiator guard "1"

**TIP**

First fit the inner hook portion "a" and then the outer one "b" onto the radiator.

INSTALLING THE RADIATOR

1. Install:
   - O-ring "1" New
   - Radiator pipe 1 "2"
   - Bolt (radiator pipe) "3"

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

2. Install:
   - Radiator breather hose "1"
   - Radiator hose 2 "2"
   - Radiator hose 4 "3"
   - Pipe "4"
   - Radiator hose 5 "5"
   - Radiator hose 3 "6"
   To right radiator "7".

3. Install:
   - Right radiator "1"
   - Bolt (right radiator) "2"

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

   - Radiator hose 5 "3"

   Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

4. Install:
   - Left radiator "1"
   - Bolt (left radiator) "2"

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

   - Radiator hose 1 "3"

   Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

5. Tighten:
   - Radiator hose clamp "4"

   Radiator hose clamp: 2 Nm (0.2 m•kg, 1.4 ft•lb)

6. Install:
   - Radiator guard "1"

**TIP**

First fit the inner hook portion "a" and then the outer one "b" onto the radiator.

**Bolt (radiator pipe):**

- 10 Nm (1.0 m•kg, 7.2 ft•lb)
- 2 Nm (0.2 m•kg, 1.4 ft•lb)
- 2 Nm (0.2 m•kg, 1.4 ft•lb)

4-6
# CARBURETOR

## REMOVING THE CARBURETOR

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clamp</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Throttle position sensor lead coupler</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Throttle cable cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Throttle cable</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Clamp (air filter joint)</td>
<td>1</td>
<td>Loosen the screw (air filter joint).</td>
</tr>
<tr>
<td>6</td>
<td>Clamp (carburetor joint)</td>
<td>1</td>
<td>Loosen the screws (carburetor joint).</td>
</tr>
<tr>
<td>7</td>
<td>Hot starter plunger</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Carburetor assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Carburetor joint</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Refer to "SEAT, FUEL TANK AND SIDE COVERS" section.
DISASSEMBLING THE CARBURETOR

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carburetor breather hose</td>
<td>4</td>
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</tr>
<tr>
<td>2</td>
<td>Valve lever housing cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Screw (throttle shaft)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Throttle valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Needle holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Jet needle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Accelerator pump cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Diaphragm (accelerator pump)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Float chamber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Leak jet</td>
<td>1</td>
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<tr>
<td>12</td>
<td>Pilot screw</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>13</td>
<td>Float pin</td>
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</tr>
<tr>
<td>14</td>
<td>Float</td>
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<tr>
<td>15</td>
<td>Needle valve</td>
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</tr>
<tr>
<td>16</td>
<td>Main jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Needle jet</td>
<td>1</td>
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</tr>
<tr>
<td>18</td>
<td>Spacer</td>
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<tr>
<td>Order</td>
<td>Part name</td>
<td>Q'ty</td>
<td>Remarks</td>
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<tr>
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<td>-------------------------------</td>
<td>------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>19</td>
<td>Pilot jet</td>
<td>1</td>
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</tr>
<tr>
<td>20</td>
<td>Starter jet</td>
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<tr>
<td>21</td>
<td>Push rod</td>
<td>1</td>
<td>Pull the push rod.</td>
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<tr>
<td>22</td>
<td>Throttle shaft assembly</td>
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<tr>
<td>23</td>
<td>Push rod link lever assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Pilot air jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Cold starter plunger</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
HANDLING NOTE

**NOTICE**
Do not loosen the screw (throttle position sensor) "1" except when changing the throttle position sensor due to failure because it will cause a drop in engine performance.

REMOVING THE PILOT SCREW
1. Remove:
   - Pilot screw "1"

**TIP**
To optimize the fuel flow at a small throttle opening, each machine's pilot screw has been individually set at the factory. Before removing the pilot screw, turn it in fully and count the number of turns. Record this number as the factory-set number of turns out.

CHECKING THE CARBURETOR
1. Inspect:
   - Carburetor body
   - Contamination → Clean.

**TIP**
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.

CHECKING THE PILOT SCREW
1. Remove:
   - Pilot screw "1"

**TIP**
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.

2. Inspect:
   - Main jet "1"
   - Pilot jet "2"
   - Needle jet "3"
   - Starter jet "4"
   - Pilot air jet "5"
   - Leak jet "6"
   - Damage → Replace.
   - Contamination → Clean.

**TIP**
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.

CHECKING THE JET NEEDLE
1. Inspect:
   - Needle valve "1"
   - Valve seat "2"
   - Grooved wear "a" → Replace.
   - Dust "b" → Clean.
   - Filter "c"
   - Clogged → Clean.

CHECKING THE NEEDLE VALVE
1. Inspect:
   - Needle valve "1"
   - Valve seat "2"
   - Grooved wear "a" → Replace.
   - Dust "b" → Clean.
   - Filter "c"
   - Clogged → Clean.

CHECKING THE THROTTLE VALVE
1. Check:
   - Free movement
   - Stick → Repair or replace.

**TIP**
Insert the throttle valve "1" into the carburetor body, and check for free movement.

CHECKING THE THROTTLE VALVE
1. Check:
   - Free movement
   - Stick → Repair or replace.

**TIP**
- Slowly tilt the carburetor in the opposite direction, then take the measurement when the needle valve aligns with the float arm.
- If the carburetor is level, the weight of the float will push in the needle valve, resulting in an incorrect measurement.

b. Measure the distance between the mating surface of the float chamber and top of the float using a vernier calipers.

**TIP**
The float arm should be resting on the needle valve, but not compressing the needle valve.

**CHECKING THE JET NEEDLE**
1. Inspect:
   - Jet needle "1"
   - Bends/wear → Replace.
   - Clip groove
   - Free play exists/wear → Replace.
   - Clip position

**CHECKING THE FLOAT HEIGHT**
1. Measure:
   - Float height "a"
   - Out of specification → Adjust.

**Measurement and adjustment steps:**
a. Hold the carburetor in an upside down position.

**TIP**
- Slowly tilt the carburetor in the opposite direction, then take the measurement when the needle valve aligns with the float arm.
- If the carburetor is level, the weight of the float will push in the needle valve, resulting in an incorrect measurement.

b. Measure the distance between the mating surface of the float chamber and top of the float using a vernier calipers.

**TIP**
The float arm should be resting on the needle valve, but not compressing the needle valve.

**Standard clip position: No.4 Groove**

**Float height:**

- 8.0 mm (0.31 in)
c. If the float height is not within specification, inspect the valve seat and needle valve.

d. If either is worn, replace them both.

e. If both are fine, adjust the float height by bending the float tab "b" on the float.

f. Recheck the float height.

Checking the Float

1. Inspect:
   - Float "1"
     Damage → Replace.

Checking the Starter Plunger

1. Inspect:
   - Cold starter plunger "1"
   - Hot starter plunger "2"
     Wear/damage → Replace.

Checking the Accelerator Pump

1. Inspect:
   - Diaphragm (accelerator pump) "1"
   - Spring (accelerator pump) "2"
   - Accelerator pump cover "3"
   - O-ring "4"
   - Push rod "5"
     Tears (diaphragm)/damage → Replace.
     Dirt → Clean.

Assembling the Carburetor

1. Install:
   - Cold starter plunger "1"

2. Inspect:
   - Throttle shaft "1"
   - Spring "2"
   - Lever 1 "3"
   - Spring 1 "4"
   - Lever 2 "5"
   - Spring 2 "6"
     Dirt → Clean.

3. Install:
   - Spring 1 "1"
   - Lever 1 "2"
   - Lever 2 "3".

TIP
   Make sure the spring 1 fits on the stopper "a" of the lever 2.

4. Install:
   - Spring 2 "1"
     To lever 2 "2".

5. Install:
   - Push rod link lever assembly "1"

TIP
   Make sure the stopper "a" of the spring 2 fits into the recess "b" in the carburetor.

6. Install:
   - Washer "1"
   - Circlip "2"

7. Install:
   - Spring "1"
     To throttle shaft "2".

TIP
   Install the bigger hook "a" of the spring fits on the stopper "b" of the throttle shaft pulley.

8. Install:
   - Throttle shaft assembly "1"
   - Washer (metal) "2"
   - Washer (resin) "3"
   - Valve lever "4"
**TIP**

- Apply the fluorochemical grease on the bearings.
- Fit the projection "a" on the throttle shaft assembly into the slot "b" in the throttle position sensor.
- Make sure the stopper "c" of the spring fits into the recess in the carburetor.
- Turn the throttle shaft assembly left while holding down the lever 1 "5" and fit the throttle stop screw tip "d" to the stopper "e" of the throttle shaft assembly pulley.

9. Install:
- Push rod "1"

**TIP**

While holding down the lever 1 "2", insert the push rod farthest into the carburetor.

10. Install:
- Starter jet "1"
- Pilot jet "2"
- Spacer "3"
- Needle jet "4"
- Main jet "5"

11. Install:
- Needle valve "1"
- Float "2"
- Float pin "3"

**TIP**

- After installing the needle valve to the float, install them to the carburetor.
- Check the float for smooth movement.

12. Install:
- Pilot screw "1"
- Spring "2"
- Washer "3"
- O-ring "4"

**Note the following installation points:**

a. Turn in the pilot screw until it is lightly seated.

b. Turn out the pilot screw by the number of turns recorded before removing.

**Pilot screw (example):**

1-3/4 turns out

13. Install:
- O-ring
- Leak jet "1"
- Float chamber "2"
- Bolt (float chamber) "3"
- Cable holder (throttle stop screw cable) "4"
- Hose holder (carburetor breather hose) "5"

14. Install:
- Diaphragm (accelerator pump) "1"
- Spring "2"
- O-ring "3"
- Accelerator pump cover "4"
- Hose holder (drain hose) "5"
- Screw (accelerator pump cover) "6"

**TIP**

Install the diaphragm (accelerator pump) with its mark "a" facing the spring.

15. Install:
- Jet needle "1"
- Collar "2"
- Spring "3"
- Needle holder "4"
- Throttle valve plate "5"
- To throttle valve "6".

16. Install:
- Throttle valve assembly "1"
- Screw (throttle shaft) "2"

**TIP**

Install the valve lever rollers "3" into the slits "a" of the throttle valve.
17. Install:
- O-ring "1"
- Valve lever housing cover "2"
- Bolt (valve lever housing cover) "3"

18. Install:
- Carburetor breather hose "1"

**TIP**
Install the carburetor breather hoses to the carburetor so that the hoses do not bend near where they are installed.

---

**ADJUSTING THE ACCELERATOR PUMP TIMING**

**WARNING**

Adjustment steps:

**TIP**
In order for the throttle valve height "a" to achieve the specified value, tuck under the throttle valve plate "1" the rod "2" etc. with the same outer diameter as the specified value.

**Throttle valve height:**
0.8 mm (0.031 in)

---

a. Fully turn in the accelerator pump adjusting screw "3".
b. Check that the link lever "4" has free play "b" by pushing lightly on it.
c. Gradually turn out the adjusting screw while moving the link lever until it has no more free play.

---

**INSTALLING THE CARBURETOR**

1. Install:
   - Carburetor joint "1"
   - Carburetor breather hose "1"

   **Carburetor joint:**
   10 Nm (1.0 m•kg, 7.2 ft•lb)

2. Install:
   - Carburetor "1"
   - Carburetor breather hose "1" *Note: Mentioned in the previous step again*

3. Install:
   - Hot starter plunger "1"

   **Hot starter plunger:**
   2 Nm (0.2 m•kg, 1.4 ft•lb)

4. Tighten:
   - Bolt (carburetor joint) "1"

   **Bolt (carburetor joint):**
   3 Nm (0.3 m•kg, 2.2 ft•lb)

   - Bolt (air filter joint) "2"

   **Bolt (air filter joint):**
   3 Nm (0.3 m•kg, 2.2 ft•lb)

5. Install:
   - Throttle cable (pull) "1"
   - Throttle cable (return) "2"

   **Throttle cable (pull):**
   4 Nm (0.4 m•kg, 2.9 ft•lb)

   **Throttle cable (return):**
   11 Nm (1.1 m•kg, 8.0 ft•lb)

6. Adjust:
   - Throttle grip free play
   - Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" section in the CHAPTER 3.

7. Install:
   - Throttle cable cover "1"
   - Bolt (throttle cable cover) "2"

   **Bolt (throttle cable cover):**
   4 Nm (0.4 m•kg, 2.9 ft•lb)

8. Install:
   - Throttle position sensor lead coupler "1"
   - Clamp "2"
   - Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.
# CAMSHAFTS

## REMOVING THE CYLINDER HEAD COVER

**Part Names and Quantities**

<table>
<thead>
<tr>
<th>Order</th>
<th>Part Name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Seat and fuel tank</td>
<td>1</td>
<td>Refer to &quot;SEAT, FUEL TANK AND SIDE COVERS&quot; section.</td>
</tr>
<tr>
<td>2</td>
<td>Spark plug</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cylinder head breather hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bolt (cylinder head cover)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cylinder head cover gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Timing chain guide (top side)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **Torque Specifications**
  - 13 Nm (1.3 m·kg, 9.4 ft·lb)
  - 10 Nm (1.0 m·kg, 7.2 ft·lb)
REMOVING THE CAMSHAFTS

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Timing mark accessing screw</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>2</td>
<td>Crankshaft end accessing screw</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>3</td>
<td>Timing chain tensioner cap bolt</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>4</td>
<td>Timing chain tensioner</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Camshaft cap</td>
<td>2</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Clip</td>
<td>2</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>7</td>
<td>Exhaust camshaft</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>8</td>
<td>Intake camshaft</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>

**Note:**

- **10 Nm (1.0 m·kg, 7.2 ft·lb)**
- **7 Nm (0.7 m·kg, 5.1 ft·lb)**
REMOVING THE CAMSHAFT
1. Remove:
   • Timing mark accessing screw "1"
   • Crankshaft end accessing screw "2"

2. Align:
   • T.D.C. mark
   With align mark.

Checking steps:
   a. Turn the crankshaft counterclockwise with a wrench.
   b. Align the T.D.C. mark "a" on the rotor with the align mark "b" on the crankcase cover when piston is at T.D.C. on compression stroke.

TIP
In order to be sure that the piston is at Top Dead Center, the punch mark "c" on the exhaust camshaft and the punch mark "d" on the intake camshaft must align with the cylinder head surface, as shown in the illustration.

3. Remove:
   • Timing chain tensioner cap bolt "1"
   • Timing chain tensioner "2"
   • Gasket

4. Remove:
   • Bolt (camshaft cap) "1"
   • Camshaft cap "2"
   • Clip

TIP
Remove the bolts (camshaft cap) in a crisscross pattern, working from the outside in.

NOTICE
The bolts (camshaft cap) must be removed evenly to prevent damage to the cylinder head, camshafts or camshaft caps.

5. Remove:
   • Exhaust camshaft "1"
   • Intake camshaft "2"

TIP
Attach a wire "3" to the timing chain to prevent it from falling into the crankcase.

CHECKING THE CAMSHAFT
1. Inspect:
   • Cam lobe
   Pitting/scratches/blue discoloration → Replace.

2. Measure:
   • Cam lobe length "a" and "b"
Out of specification → Replace.

Cam lobes length:
   Intake "a":
   30.330–30.430 mm
   (1.1941–1.1980 in)
   <Limit>:
   30.230 mm (1.1902 in)
   Intake "b":
   22.45–22.55 mm
   (0.8839–0.8878 in)
   <Limit>:
   22.35 mm (0.8799 in)

   Exhaust "a":
   30.399–30.499 mm
   (1.1966–1.2007 in)
   <Limit>:
   30.299 mm (1.1929 in)
   Exhaust "b":
   22.45–22.55 mm
   (0.8839–0.8878 in)
   <Limit>:
   22.35 mm (0.8799 in)

   Runout (camshaft):
   Less than 0.03 mm
   (0.0012 in)
4. Measure:
   • Camshaft-to-cap clearance
     Out of specification → Measure camshaft outside diameter.

   **Camshaft-to-cap clearance:**
   0.028–0.062 mm
   (0.0011–0.0024 in)
   <Limit>: 0.08 mm (0.003 in)

   Measurement steps:
   a. Install the camshaft onto the cylinder head.
   b. Position a strip of Plastigauge® "1" onto the camshaft.
   c. Install the clip, dowel pins and camshaft caps.

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

   **TIP**
   • Tighten the bolts (camshaft cap) in a crisscross pattern from innermost to outer caps.
   • Do not turn the camshaft when measuring clearance with the Plastigauge®.
   d. Remove the camshaft caps and measure the width of the Plastigauge® "1".

   **CHECKING THE CAMSHAFT SPROCKET**
   1. Inspect:
      • Camshaft sprocket "1"
        Wear/damage → Replace the camshaft assembly and timing chain as a set.

   **CHECKING THE DECOMPRESSION SYSTEM**
   1. Check:
      • Decompression system

   Checking steps:
   a. Check that the decompression mechanism cam "1" moves smoothly.
   b. Check that the decompression mechanism cam lever pin "2" projects from the camshaft.

   **CHECKING THE TIMING CHAIN TENSIONER**
   1. Check:
      • 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.

   **Camshaft outside diameter:**
   21.959–21.972 mm
   (0.8645–0.8650 in)

   **INSTALLING THE CAMSHAFT**
   1. Install:
      • Exhaust camshaft "1"
      • Intake camshaft "2"

   **TIP**
   • Apply the molybdenum disulfide oil on the camshafts.
   • Apply the engine oil on the decompression system.
   • Squeezing the decompression lever allows the crankshaft to be turned easily.

   b. Align the T.D.C. mark "a" on the rotor with the align mark "b" on the crankcase cover when piston is at T.D.C. on compression stroke.
c. Fit the timing chain "3" onto both camshaft sprockets and install the camshafts on the cylinder head.

**TIP**
The camshafts should be installed onto the cylinder head so that the punch mark "c" on the exhaust camshaft and the punch mark "d" on the intake camshaft must align with the cylinder head surface, as shown in the illustration.

**NOTICE**
Do not turn the crankshaft during the camshaft installation. Damage or improper valve timing will result.

d. Install the clips, camshaft caps "4" and bolts (camshaft cap) "5".

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

**TIP**
- Before installing the clips, cover the cylinder head with a clean rag to prevent the clips from into the cylinder head cavity.
- Apply the molybdenum disulfide oil on the thread of the bolts (camshaft cap).
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

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

2. Install:

- Timing chain tensioner

**Installation steps:**

- **a.** While pressing the tensioner rod lightly with fingers, use a thin screwdriver and wind the tensioner rod up fully clockwise.

- **b.** With the rod fully wound and the chain tensioner UP mark "a" facing upward, install the gasket "1" and the timing chain tensioner "2", and tighten the bolt "3" to the specified torque.

- **c.** Release the screwdriver, check the tensioner rod to come out and tighten the gasket "4" and the cap bolt "5" to the specified torque.

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

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

3. Turn:

- **Crankshaft** Counterclockwise several turns.

4. Check:

- **Rotor T.D.C. mark** Align with the crankcase align mark.
- **Camshaft match marks** Align with the cylinder head surface.
- Out of alignment → Adjust.

5. Install:

- **Timing mark accessing screw "1"**
- **Crankshaft end accessing screw "2"**

6. Install:

- **Timing chain guide (top side) "1"**
- **Cylinder head cover gasket "2"**
- **Cylinder head cover "3"**
- **Bolt (cylinder head cover) "4"**

7. Install:

- **Cylinder head breather hose**
- **Spark plug**

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

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

**TIP**
Apply the sealant on the cylinder head cover gasket.

**YAMAHA Bond No. 1215**
(ThreeBond® No. 1215): 90890-85505
### CYLINDER HEAD

#### REMOVING THE CYLINDER HEAD

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seat and fuel tank</td>
<td>1</td>
<td>Refer to &quot;SEAT, FUEL TANK AND SIDE COVERS&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Exhaust pipe and silencer</td>
<td>1</td>
<td>Refer to &quot;EXHAUST PIPE AND SILENCER&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Radiator hose 1</td>
<td>1</td>
<td>Disconnect at cylinder head side.</td>
</tr>
<tr>
<td></td>
<td>Carburetor</td>
<td>1</td>
<td>Refer to &quot;CARBURETOR&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Camshaft</td>
<td>1</td>
<td>Refer to &quot;CAMSHAFTS&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Upper engine bracket</td>
<td>1</td>
<td>Refer to &quot;ENGINE REMOVAL&quot; section.</td>
</tr>
<tr>
<td>1</td>
<td>Radiator pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Oil delivery pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Nut</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bolt [L = 135 mm (5.31 in)]</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Bolt [L = 145 mm (5.71 in)]</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Cylinder head</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Timing chain guard (exhaust side)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
CHECKING THE CYLINDER HEAD
1. Eliminate:
   • Carbon deposits (from the combustion chambers)
     Use a rounded scraper.
   TIP
   Do not use a sharp instrument to avoid damaging or scratching:
   • Spark plug threads
   • Valve seats

2. Inspect:
   • Cylinder head
     Scratches/damage → Replace.
   TIP
   Replace the titanium valves with the cylinder head.

   Refer to “CHECKING THE VALVE”.

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

   Cylinder head warpage:
   Less than 0.05 mm (0.002 in)

   Warpage measurement and resurfacing steps:
   a. Place a straightedge and a feeler gauge across the cylinder head.
   b. Use a feeler gauge to measure the warpage.
   c. If the warpage is out of specification, resurface the cylinder head.
   d. Place a 400–600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.
   TIP
   To ensure an even surface rotate the cylinder head several times.

INSTALLING THE CYLINDER HEAD
1. Install:
   • Dowel pin “1”
   • Cylinder head gasket “2” New
   • Timing chain guide (exhaust side) “3”
   • Cylinder head “4”

   TIP
   While pulling up the timing chain, install the timing chain guide (exhaust side) and cylinder head.

2. Install:
   • Washer “1”
   • Cable guide “2”
   • Bolts [L = 145 mm (5.71 in)] “3”
   • Bolts [L = 135 mm (5.31 in)] “4”
   • Nuts “5”

   Apply the molybdenum disulfide grease on the thread and contact surface of the bolts.

   Follow the numerical order shown in the illustration. Tighten the bolts and nuts in two stages.

   Bolts [L = 145 mm (5.71 in)]:
   38 Nm (3.8 m•kg, 27 ft•lb)

   Bolts [L = 135 mm (5.31 in)]:
   38 Nm (3.8 m•kg, 27 ft•lb)

   Nuts “5”
   10 Nm (1.0 m•kg, 7.2 ft•lb)

3. Install:
   • Copper washer “1” New
   • Oil delivery pipe “2”
   • Union bolt (M8) “3”

   Union bolt (M8):
   18 Nm (1.8 m•kg, 13 ft•lb)

   • Union bolt (M10) “4”

   Union bolt (M10):
   20 Nm (2.0 m•kg, 14 ft•lb)

   TIP
   First tighten the union bolts temporarily. Then retighten them with the width “a” across flats of the oil delivery pipe held tight with a spanner.

4. Install:
   • Radiator pipe “1”
   • Bolt (radiator pipe) “2”

   Bolt (radiator pipe):
   10 Nm (1.0 m•kg, 7.2 ft•lb)
### VALVES AND VALVE SPRINGS

#### REMOVING THE VALVES AND VALVE SPRINGS

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Cylinder head</td>
<td></td>
<td>Refer to &quot;CYLINDER HEAD&quot; section.</td>
</tr>
<tr>
<td>1</td>
<td>Valve lifter</td>
<td>5</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>2</td>
<td>Adjusting pad</td>
<td>5</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>3</td>
<td>Valve cotter</td>
<td>10</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>4</td>
<td>Valve spring retainer</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Valve spring</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Valve stem seal</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Valve spring seat</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Exhaust valve</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Intake valve</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
REMOVING THE VALVE LIFTER AND VALVE COTTER

1. Remove:
   • Valve lifter "1"
   • Pad "2"

TIP
Identify each lifter "1" and pad "2" position very carefully so that they can be reinstalled in their original place.

2. Check:
   • Valve sealing
     Leakage at the valve seat → Inspect the valve face, valve seat and valve seat width.

CHECKING THE VALVE

1. Measure:
   • Stem-to-guide clearance

Stem-to-guide clearance = valve guide inside diameter "a" - valve stem diameter "b"

OUT OF SPECIFICATION—Replace the valve guide.

2. Replace:
   • Valve guide

Replacement steps:

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

a. Remove the valve guide using a valve guide remover "1".

Valve spring compressor:
YM-4019/90890-04019

Valve guide installation height "a":
   Intake: 11.8–12.2 mm (0.46–0.48 in)
   Exhaust: 11.3–11.7 mm (0.44–0.46 in)

b. Install the new valve guide using a valve guide installer "2".

Valve guide remover:
   Intake: 4.0 mm (0.16 in)
   YM-4111/90890-04111
   Exhaust: 4.5 mm (0.18 in)
   YM-4116/90890-04116

Valve guide installer:
   Intake: 4.0 mm (0.16 in)
   YM-4112/90890-04112
   Exhaust: 4.5 mm (0.18 in)
   YM-4117/90890-04117

Valve guide reamer:
   Intake: 4.0 mm (0.16 in)
   YM-4113/90890-04113
   Exhaust: 4.5 mm (0.18 in)
   YM-4118/90890-04118

TIP
After replacing the valve guide reface the valve seat.
3. Inspect:
• Valve face
  Pitting/wear → Grind the face.
• Valve stem end
  Mushroom shape or diameter larger than the body of the stem → Replace.
4. Measure:
• Margin thickness "a"
  Out of specification → Replace.

<table>
<thead>
<tr>
<th>Margin thickness:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake: 0.8 mm (0.0315 in)</td>
</tr>
<tr>
<td>Exhaust: 0.7 mm (0.0276 in)</td>
</tr>
</tbody>
</table>

5. Measure:
• Runout (valve stem)
  Out of specification → Replace.

<table>
<thead>
<tr>
<th>Runout limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01 mm (0.0004 in)</td>
</tr>
</tbody>
</table>

**TIP**
• When installing a new valve always replace the guide.
• If the valve is removed or replaced always replace the oil seal.

6. Eliminate:
• Carbon deposits (from the valve face and valve seat)
7. Inspect:
• Valve seat
  Pitting/wear → Reface the valve seat.
8. Measure:
• Valve seat width "a"
  Out of specification → Reface the valve seat.

<table>
<thead>
<tr>
<th>Valve seat width:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake: 0.9–1.1 mm (0.0354–0.0433 in)</td>
</tr>
<tr>
<td>Exhaust: 0.9–1.1 mm (0.0354–0.0433 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 1.6 mm (0.0630 in)</td>
</tr>
</tbody>
</table>

**TIP**
• When replacing the valves or valve guides, use new valves to lap the valve seats, and then replace them with new valves.

**LAPPING**

**Lapping steps:**

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

**NOTICE**
Do not let the compound enter the gap between the valve stem and the guide.

b. Apply molybdenum disulfide oil to the valve stem.

c. Install the valve into the cylinder head.

d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the compound.

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

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

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

f. Apply Mechanic's blueing dye (Dykem) to the valve face.

g. Install the valve into the cylinder head.

**NOTICE**
This model uses titanium intake and exhaust valves. Titanium valves that have been used to lap the valve seats must not be used. Always replace lapped valves with new valves.

**TIP**
• When replacing the cylinder head, replace the valves without lapping the valve seats and valve faces.
h. Press the valve through the valve guide and onto the valve seat to make a clear pattern.

i. Measure the valve seat width again. If the valve seat width is out of specification, reface and relap the valve seat.

CHECKING THE VALVE SPRINGS

1. Measure:
   • Valve spring free length "a"
     Out of specification → Replace.

2. Measure:
   • Compressed spring force "a"
     Out of specification → Replace.

3. Measure:
   • Spring tilt "a"
     Out of specification → Replace.

CHECKING THE VALVE LIFTERS

1. Inspect:
   • Valve lifter
     Scratches/damage → Replace both lifters and cylinder head.

2. Install:
   • Valve "1"
   • Valve spring seat "2"
   • Valve stem seal "3"
   • Valve spring "4"
   • Valve spring retainer "5"
     To cylinder head.

   To secure the valve cotters onto the valve stem, lightly tap the valve tip with a piece of wood.

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

   • Adjusting pad "1"
   • Valve lifter "2"

TIP

While compressing the valve spring with a valve spring compressor "1" install the valve cotters.

Valve spring compressor:
YM-4019/90890-04019

INSTALLING THE VALVES

1. Apply:
   • Molybdenum disulfide oil
     Onto the valve stem and valve stem seal.

2. Install:
   • Valve "1"
   • Valve spring seat "2"
   • Valve stem seal "3"
   • Valve spring "4"
   • Valve spring retainer "5"
     To cylinder head.

   • Make sure that each valve is installed in its original place, also referring to the painted color as follows.
   • Intake (middle) "a": Sky blue
   • Intake (right/left) "b": not paint
   • Exhaust "c": Purple
   • Install the valve springs with the larger pitch "d" facing upward.

   • Apply the molybdenum disulfide oil on the valve stem end.
   • Apply the engine oil on the valve lifters.
   • Valve lifter must turn smoothly when rotated with a finger.
   • Be careful to reinstall valve lifters and pads in their original place.
## CYLINDER AND PISTON
### REMOVING THE CYLINDER AND PISTON

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cylinder head</td>
<td></td>
<td>Refer to “CYLINDER HEAD” section.</td>
</tr>
<tr>
<td>2</td>
<td>Bolt (cylinder)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cylinder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Piston pin clip</td>
<td>2</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Piston pin</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Piston ring set</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>

[Diagram of cylinder and piston components]

10 Nm (1.0 m·kg, 7.2 ft·lb)
REMOVING THE PISTON AND PISTON RING

1. Remove:
   - Piston pin clip "1"
   - Piston pin "2"
   - Piston "3"

   **TIP**
   - Put identification marks on each piston head for reference during reinstallation.
   - Before removing each piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller set "4".

   ![Piston pin puller set: YU-1304/90890-01304](image)

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

2. Remove:
   - Piston ring "1"

   **TIP**
   Spread the end gaps apart while at the same time lifting the piston ring over the top of the piston crown, as shown in the illustration.

CHECKING THE CYLINDER AND PISTON

1. Inspect:
   - Cylinder and piston walls
     Vertical scratches → Replace cylinder and piston.

2. Measure:
   - Piston-to-cylinder clearance

   **Measurement steps:**
   a. Measure the cylinder bore "C" with a cylinder bore gauge.
   b. Measure the piston skirt diameter "P" with a micrometer.

   ![Cylinder bore "C"](image)

   ![Piston size "P"](image)

   **TIP**
   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" - Piston skirt diameter "P"](image)

   **Piston-to-cylinder clearance = Cylinder bore "C" - Piston skirt diameter "P"**

   ![Piston-to-cylinder clearance](image)

   **CHECKING THE PISTON RING**

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

      **TIP**
      Clean carbon from the piston ring grooves and rings before measuring the side clearance.

   ![Side clearance](image)
2. Position:
   • Piston ring (in cylinder)

**TIP**
Insert a ring into the cylinder and push it approximately 10 mm (0.39 in) into the cylinder. Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.

a. 10 mm (0.39 in)

3. Measure:
   • Ring end gap
   Out of specification → Replace.

**TIP**
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.

---

### End gap:

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>≤ Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top ring</strong></td>
<td>0.15–0.25 mm (0.006–0.010 in)</td>
<td>0.50 mm (0.020 in)</td>
</tr>
<tr>
<td><strong>2nd ring</strong></td>
<td>0.30–0.45 mm (0.012–0.018 in)</td>
<td>0.80 mm (0.031 in)</td>
</tr>
<tr>
<td><strong>Oil ring</strong></td>
<td>0.10–0.40 mm (0.004–0.016 in)</td>
<td>—</td>
</tr>
</tbody>
</table>

### Checking the Piston Pin

1. Inspect:
   • Piston pin
   Blue discoloration/grooves → Replace, then inspect the lubrication system.

2. Measure:
   • Piston pin-to-piston clearance

**Measurement steps:**

a. Measure the outside diameter (piston pin) “a”.
   If out of specification, replace the piston pin.

**Outside diameter (piston pin):**

15.991–16.000 mm (0.6296–0.6299 in)

---

### Installing the Piston Ring and Piston

1. Install:
   • Piston ring
   Onto the piston.

**TIP**

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

---

### Piston Pin-to-piston clearance

Inside diameter (piston) =

16.002–16.013 mm (0.6300–0.6304 in)

b. Measure the inside diameter (piston) “b”.

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

Piston pin-to-piston clearance = Inside diameter (piston) “b” - Outside diameter (piston pin) “a”

d. If out of specification, replace the piston.

**Piston pin-to-piston clearance:**

0.002–0.022 mm (0.0001–0.0009 in)

< Limit: 0.07 mm (0.003 in)

---

3. Install:
   • Top ring end
   • 2nd ring end
   • Oil ring end (upper)
   • Oil ring
   • Oil ring end (lower)
INSTALLING THE CYLINDER

1. Lubricate:
   • Piston
   • Piston ring
   • Cylinder

   **TIP**
   Apply a liberal coating of engine oil.

2. Install:
   • Dowel pin "1"
   • O-ring "2" New

   **TIP**
   Apply the lithium soap base grease on the O-ring.

3. Install:
   • Cylinder gasket "1" New
   • Cylinder "2"

   **TIP**
   Install the cylinder with one hand while compressing the piston rings with the other hand.

   **NOTICE**
   • Pass the timing chain "3" through the timing chain cavity.
   • Be careful not to damage the timing chain guide "4" during installation.

4. Install:
   • Bolt (cylinder) "5"

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

**REMOVING THE CLUTCH**

Drain the engine oil. Refer to "CHANGING THE ENGINE OIL" section in the CHAPTER 3.

Brake pedal Refer to "ENGINE REMOVAL" section.

Clutch cable Disconnect at engine side.

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clutch cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Clutch spring</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pressure plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Push rod 1</td>
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</tr>
<tr>
<td>5</td>
<td>Circlip</td>
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</tr>
<tr>
<td>6</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Bearing</td>
<td>1</td>
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</tr>
<tr>
<td>8</td>
<td>Ball</td>
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<tr>
<td>9</td>
<td>Push rod 2</td>
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</tr>
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<td>10</td>
<td>Friction plate</td>
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<td>11</td>
<td>Clutch plate</td>
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<tr>
<td>12</td>
<td>Nut (clutch boss)</td>
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<td>Refer to removal section.</td>
</tr>
<tr>
<td>13</td>
<td>Lock washer</td>
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<td>Refer to removal section.</td>
</tr>
<tr>
<td>Order</td>
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<td>Q'ty</td>
<td>Remarks</td>
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<tr>
<td>14</td>
<td>Clutch boss</td>
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<td>15</td>
<td>Thrust washer</td>
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<tr>
<td>16</td>
<td>Primary driven gear</td>
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</tr>
<tr>
<td>17</td>
<td>Spacer</td>
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</tr>
<tr>
<td>18</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Push lever shaft</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

---

Diagram notes:
- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 75 Nm (7.5 m·kg, 54 ft·lb)
REMOVING THE CLUTCH BOSS
1. Remove:
   • Nut "1"
   • Lock washer "2"
   • Clutch boss "3"

TIP
Straighten the lock washer tab and use the clutch holding tool "4" to hold the clutch boss.

CHECKING THE CLUTCH SPRINGS
1. Measure:
   • Clutch spring free length "a"

   Clutch spring free length:
   35.7 mm (1.41 in)
   <Limit>: 34.7 mm (1.37 in)

CHECKING THE PRIMARY DRIVEN GEAR
1. Check:
   • Circumferential play
     Free play exists → Replace.
   • Gear teeth "a"
     Wear/damage → Replace.

CHECKING THE CLUTCH HOUSING AND BOSS
1. Inspect:
   • Clutch housing "1"
     Cracks/wear/damage → Replace.
   • Clutch boss "2"
     Scoring/wear/damage → Replace.

CHECKING THE FRICTION PLATES
1. Measure:
   • Friction plate thickness
     Out of specification → Replace friction plate as a set.
     Measure at all four points.

   Friction plate thickness:
   2.9–3.1 mm (0.114–0.122 in)
   <Limit>: 2.8 mm (0.110 in)

CHECKING THE CLUTCH PLATES
1. Measure:
   • Clutch plate warpage
     Out of specification → Replace clutch plate as a set.
     Use a surface plate "1" and thickness gauge "2".

   Warp limit:
   0.1 mm (0.004 in)

CHECKING THE PULL LEVER SHAFT
1. Inspect:
   • Push lever shaft "1"
     Wear/damage → Replace.

CHECKING THE PULL ROD
1. Inspect:
   • Push rod 1 "1"
   • Bearing "2"
   • Washer "3"
   • Push rod 2 "4"
   • Ball "5"
     Wear/damage/bend → Replace.

INSTALLING THE PULL LEVER SHAFT
1. Install:
   • Push lever shaft "1"
   • Bolt (push lever shaft) "2"

   Bolt (push lever shaft): 10 Nm (1.0 m•kg, 7.2 ft•lb)

TIP
• Apply the lithium soap base grease on the oil seal lip.
• Apply the engine oil on the push lever shaft.
• Fit the seat plate "3" in the groove "a" of the push lever shaft and tighten the bolt (seat plate).
INSTALLING THE CLUTCH

1. Install:
   - Washer "1"
   - Spacer "2"
   - Primary driven gear "3"
   - Thrust washer "4"
   - Clutch boss "5"

   **TIP**
   Apply the engine oil on the primary driven gear inner circumference.

2. Install:
   - Lock washer "1" ❯ New
   - Nut (clutch boss) "2"

   **Nut (clutch boss):**
   75 Nm (7.5 m·kg, 54 ft·lb)

   **TIP**
   Use the clutch holding tool "3" to hold the clutch boss.

3. Bend the lock washer "1" tab.

4. Install:
   - Friction plate "1"
   - Clutch plate 1 "2"

   **TIP**
   Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.
   - Apply the engine oil on the friction plates and clutch plates.

5. Install:
   - Bearing "1"
   - Washer "2"
   - Circlip "3" ❯ New
   - To push rod 1 "4".

   **TIP**
   Apply the engine oil on the bearing and washer.

6. Install:
   - Push rod 2 "1"
   - Ball "2"
   - Push rod 1 "3"

   **TIP**
   Apply the engine oil on the push rod 1, 2 and ball.

7. Install:
   - Pressure plate "1"

8. Install:
   - Clutch spring "1"
   - Bolt (clutch spring) "2"

   **Bolt (clutch spring):**
   10 Nm (1.0 m·kg, 7.2 ft·lb)

   **TIP**
   Tighten the bolts in stage, using a crisscross pattern.

9. Install:
   - Dowel pin "1"
   - Gasket (clutch cover) "2" ❯ New

10. Install:
    - Clutch cover "1"
    - Bolt (clutch cover)

    **Bolt (clutch cover):**
    10 Nm (1.0 m·kg, 7.2 ft·lb)

    **TIP**
    Tighten the bolts in stage, using a crisscross pattern.

A. For USA and CDN
B. Except for USA and CDN
3. Bend the lock washer "1" tab.
OIL FILTER ELEMENT AND WATER PUMP

REMOVING THE OIL FILTER ELEMENT AND WATER PUMP

Drain the engine oil. Refer to "CHANGING THE ENGINE OIL" section in the CHAPTER 3.

Drain the coolant. Refer to "CHANGING THE COOLANT" section in the CHAPTER 3.

Radiator hose 3 Disconnect at water pump side.

Exhaust pipe Refer to "EXHAUST PIPE AND SILENCER" section.

Brake pedal Refer to "ENGINE REMOVAL" section.

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oil filter element cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Oil filter element</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Water pump housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oil delivery pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Bolt (oil hose)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kickstarter crank</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Right crankcase cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Impeller</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
## OIL FILTER ELEMENT AND WATER PUMP

### Order | Part name | Q'ty | Remarks
--- | --- | --- | ---
9 | Washer | 1 | Refer to removal section.
10 | Impeller shaft | 1 | Refer to removal section.
11 | Oil seal | 2 | Refer to removal section.
12 | Bearing | 1 | Refer to removal section.
REMOVING THE IMPELLER SHAFT
1. Remove:
   • Impeller "1"
   • Washer "2"
   • Impeller shaft "3"

TIP
Hold the impeller shaft on its width across the flats "a" with spanners, etc. and remove the impeller.

CHECKING THE OIL DELIVERY PIPE
1. Inspect:
   • Oil delivery pipe "1"
     Bend/damage → Replace.
     Clogged → Blow.

CHECKING THE IMPELLER SHAFT
1. Inspect:
   • Impeller shaft "1"
     Bend/wear/damage → Replace.
     Fur deposits → Clean.

CHECKING THE OIL SEAL
1. Inspect:
   • Oil seal "1"
     Wear/damage → Replace.

TIP
• Apply the lithium soap base grease on the oil seal lip.
• Install the oil seal with its manufacturer's marks or numbers facing the right crankcase cover "2".

INSTALLING THE OIL SEAL
1. Install:
   • Oil seal "1" New

2. Install:
   • Bearing "1"
   Install the bearing by pressing its outer race parallel.

CHECKING THE IMPELLER SHAFT GEAR
1. Inspect:
   • Gear teeth "a"
     Wear/damage → Replace.

CHECKING THE BEARING
1. Inspect:
   • Bearing
     Rotate inner race with a finger.
     Rough spot/seizure → Replace.
INSTALLING THE IMPELLER SHAFT
1. Install:
   • Impeller shaft "1"
   • Washer "2"
   • Impeller "3"

   **Impeller:**
   14 Nm (1.4 m•kg, 10 ft•lb)

   **TIP**
   • Take care so that the oil seal lip is not damaged or the spring does not slip off its position.
   • When installing the impeller shaft, apply the lithium soap base grease on the oil seal lip and impeller shaft. And install the shaft while turning it.
   • Hold the impeller shaft on its width across the flats "a" with spanners, etc. and install the impeller.

2. Install:
   • Right crankcase cover "1"
   • Bolt (right crankcase cover) "2"

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

   **TIP**
   • Apply the engine oil on the impeller shaft end.
   • Mesh the impeller shaft gear "3" with primary drive gear "4".
   • Tighten the bolts in stage, using a crisscross pattern.

INSTALLING THE RIGHT CRANKCASE COVER
1. Install:
   • Dowel pin "1"
   • O-ring "2"
   • Collar "3" New
   • Gasket "4" New

   **TIP**
   Apply the lithium soap base grease on the O-ring.

2. Install:
   • Oil hose "1"
   • Bolt (oil hose) "2"

   **Bolt (oil hose):**
   8 Nm (0.8 m•kg, 5.8 ft•lb)

3. Install:
   • Copper washer "1" New
   • Oil delivery pipe "2"
   • Union bolt (M8) "3"

   **Union bolt (M8):**
   18 Nm (1.8 m•kg, 13 ft•lb)

   **Union bolt (M10):**
   20 Nm (2.0 m•kg, 14 ft•lb)

   **TIP**
   First tighten the union bolts temporarily. Then retighten them with the width "a" across flats of the oil delivery pipe held tight with a spanner.

INSTALLING THE KICKSTARTER CRANK
1. Install:
   • Kickstarter crank "1"
   • Washer
   • Bolt (kickstarter crank)

   **Bolt (kickstarter crank):**
   33 Nm (3.3 m•kg, 24 ft•lb)

   **TIP**
   Install so that the clearance "a" between the kickstarter crank and engine bracket mounting bolt is 8 mm (0.31 in) or more and that the kickstarter crank does not contact the right crankcase cover when it is pulled out.
INSTALLING THE WATER PUMP HOUSING
1. Install:
   • Dowel pin "1"
   • O-ring "2" [New]

   TIP
   Apply the lithium soap base grease on the O-ring.

2. Install:
   • Water pump housing "1"
   • Bolt (water pump housing) "2"

   Bolt (water pump housing):
   10 Nm (1.0 m•kg, 7.2 ft•lb)

INSTALLING THE OIL FILTER ELEMENT
1. Install:
   • Oil filter element "1"
   • O-ring "2" [New]
   • Oil filter element cover "3"
   • Bolt (oil filter element cover)

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

   TIP
   Apply the lithium soap base grease on the O-ring.
### Removing the Balancer

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nut (primary drive gear)</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>2</td>
<td>Nut (balancer shaft driven gear)</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>3</td>
<td>Lock washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Primary drive gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Balancer shaft drive gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Lock washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Balancer shaft driven gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Balancer shaft</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>

- **75 Nm (7.5 m·kg, 54 ft·lb)**
- **10 Nm (1.0 m·kg, 7.2 ft·lb)**
- **50 Nm (5.0 m·kg, 36 ft·lb)**
REMOVING THE BALANCER
1. Straighten the lock washer tab.
2. Loosen:
   • Nut (primary drive gear) “1”
   • Nut (balancer shaft driven gear) “2”

TIP
Place an aluminum plate “a” between the teeth of the balancer shaft drive gear “3” and driven gear “4”.

3. Remove:
   • Balancer shaft “1”

TIP
When removing the balancer shaft, align the center “a” of the balancer shaft weight along the line connecting the centers of the crankshaft and balancer shaft.

CHECKING THE PRIMARY DRIVE GEAR, BALANCER SHAFT DRIVE GEAR AND BALANCER SHAFT DRIVEN GEAR
1. Inspect:
   • Primary drive gear “1”
   • Balancer shaft drive gear “2”
   • Balancer shaft driven gear “3”
   Wear/damage → Replace.

2. Install:
   • Balancer shaft driven gear “1”

TIP
Install the balancer shaft driven gear onto the balancer shaft while aligning the punch mark “a” on the balancer shaft driven gear with the lower spline “b” on the balancer shaft end.

3. Install:
   • Balancer shaft drive gear “1”

TIP
• Align the punched mark “a” on the balancer shaft drive gear with the punched mark “b” on the balancer shaft driven gear “2”.
• Align the punched mark “c” on the balancer shaft drive gear with the lower spline “d” on the crankshaft end.

INSTALLING THE BALANCER
1. Install:
   • Balancer shaft “1”

TIP
• Apply the engine oil on the bearing.
• When installing the balancer shaft, align the center “a” of the balancer shaft weight along the line connecting the centers of the crankshaft and balancer shaft.

2. Install:
   • Balancer shaft driven gear “1”

Install the balancer shaft driven gear onto the balancer shaft while aligning the punch mark “a” on the balancer shaft driven gear with the lower spline “b” on the balancer shaft end.

3. Install:
   • Primary drive gear “3”
   • Lock washer “4”
   • Nut (primary drive gear) “5”

Nut (primary drive gear): 75 Nm (7.5 m•kg, 54 ft•lb)

4. Install:
   • Lock washer “1”
   • Nut (balancer shaft driven gear) “2”

Nut (balancer shaft driven gear): 50 Nm (5.0 m•kg, 36 ft•lb)

5. Bend the lock washer tab.
# OIL PUMP

## REMOVING THE OIL PUMP

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Oil pump drive gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oil pump assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Outer rotor 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Inner rotor 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Dowel pin</td>
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<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil pump cover</td>
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</tr>
<tr>
<td>10</td>
<td>Outer rotor 1</td>
<td>1</td>
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</tr>
<tr>
<td>11</td>
<td>Inner rotor 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Dowel pin</td>
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<td></td>
</tr>
<tr>
<td>13</td>
<td>Washer</td>
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<td></td>
</tr>
<tr>
<td>14</td>
<td>Oil pump drive shaft</td>
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</tr>
<tr>
<td>15</td>
<td>Rotor housing</td>
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<td></td>
</tr>
</tbody>
</table>

Note: 
- Primary driven gear: Refer to "CLUTCH" section.
- Right crankcase cover: Refer to "OIL FILTER ELEMENT AND WATER PUMP" section.

**Torque Specifications:**
- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 1.7 Nm (0.17 m·kg, 1.2 ft·lb)
### Removing the Oil Tank

Drain the engine oil. Refer to "Changing the Engine Oil" section in the CHAPTER 3.

<table>
<thead>
<tr>
<th>Order</th>
<th>Part Name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oil hose 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Oil hose 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oil tank breather hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Oil tank</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oil strainer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Torque Specifications**

- 8 Nm (0.8 m·kg, 5.8 ft·lb)
- 8 Nm (0.8 m·kg, 5.8 ft·lb)
- 8 Nm (0.8 m·kg, 5.8 ft·lb)
- 8 Nm (0.8 m·kg, 5.8 ft·lb)
- 9 Nm (0.9 m·kg, 6.5 ft·lb)
- 16 Nm (1.8 m·kg, 13 ft·lb)
- 9 Nm (0.9 m·kg, 6.5 ft·lb)
- 2 Nm (0.2 m·kg, 1.4 ft·lb)
CHECKING THE OIL PUMP
1. Inspect:
   • Oil pump drive gear "1"
   • Oil pump drive shaft "2"
   • Rotor housing "3"
   • Oil pump cover "4"
   
   Cracks/wear/damage → Replace.

2. Measure:
   • Tip clearance "a"  
     (between the inner rotor "1" and outer rotor "2")
   • Side clearance "b"  
     (between the outer rotor "2" and rotor housing "3")
   • Housing and rotor clearance "c"  
     (between the rotor housing "3" and rotors "1" "2")  
     Out of specification → Replace the oil pump assembly.

Check:
• Unsmooth—Repeat steps #1 and #2 or replace the defective parts.

INSTALLING THE OIL PUMP
1. Install:
   • Oil pump drive shaft "1"
   • Washer "2"
   • Dowel pin "3"
   • Inner rotor 1 "4"

TIP
• Apply the engine oil on the oil pump drive shaft and inner rotor 1.
• Fit the dowel pin into the groove in the inner rotor 1.

2. Install:
   • Outer rotor 1 "1"

TIP
• Apply the engine oil on the outer rotor.

3. Install:
   • Oil pump cover "1"
   • Screw (oil pump cover) "2"

TIP
• Apply the engine oil on the inner rotor.
• Fit the dowel pin into the groove in the inner rotor 2.

4. Install:
   • Outer rotor 2 "1"
   • Dowel pin "2"
   • Oil pump assembly "3"
   • Bolt (oil pump assembly)  
     [L = 25 mm (0.94 in)] "4"

   Bolt (oil pump assembly):
   - 10 Nm (1.0 m•kg, 7.2 ft•lb)

   Bolt (oil pump assembly)  
   [L = 30 mm (1.18 in)] "5"

   Bolt (oil pump assembly):
   - 10 Nm (1.0 m•kg, 7.2 ft•lb)

TIP
Apply the engine oil on the outer rotor 2.

5. Install:
   • Oil pump drive gear "1"
   • Washer "2"
   • Circlip "3" New

TIP
Apply the engine oil on the oil pump drive gear inner circumference.

Screw (oil pump cover):
- 1.7 Nm (0.17 m•kg, 1.2 ft•lb)

• Dowel pin "3"
• Inner rotor 2 "4"
• Circlip "5" New

TIP
• Apply the engine oil on the inner rotor 2.
• Fit the dowel pin into the groove in the inner rotor 2.
INSTALLING THE OIL TANK BREATHER HOSE

1. Install:
   - Oil tank “1”
   - Oil tank breather hose “2”
   - Clamp “3”

   **NOTICE**
   Install the clamp so that it does not contact the oil tank.

   **TIP**
   - Insert the oil tank breather hose so that its end “a” comes where the oil tank pipe begins to bend.
   - Install the clamp 3 mm (0.12 in) away from the oil tank breather hose end “a”.

   **Clamp:**
   2 Nm (0.2 m•kg, 1.4 ft•lb)
## KICK SHAFT AND SHIFT SHAFT

**REMOVING THE KICK SHAFT AND SHIFT SHAFT**

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kick idle gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Kick shaft assembly</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>3</td>
<td>Spring guide</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Torsion spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ratchet wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kick gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Kick shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Shift pedal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Shift shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Torsion spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Roller</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Shift guide</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>15</td>
<td>Shift lever assembly</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>16</td>
<td>Shift lever</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
## KICK SHAFT AND SHIFT SHAFT

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Pawl</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Pawl pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Spring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Bolt (stopper lever)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Stopper lever</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Torsion spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Segment</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>

**Torque Specifications:**
- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 12 Nm (1.2 m·kg, 8.7 ft·lb)
- 30 Nm (3.0 m·kg, 22 ft·lb)
KICK SHAFT AND SHIFT SHAFT

REMOVING THE KICK SHAFT ASSEMBLY
1. Remove:
   • Kick shaft assembly “1”

TIP
Unhook the torsion spring “2” from the hole “a” in the crankcase.

REMOVING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY
1. Remove:
   • Bolt (shift guide)
   • Shift guide “1”
   • Shift lever assembly “2”

TIP
The shift lever assembly is disassembled at the same time as the shift guide.

REMOVING THE SEGMENT
1. Remove:
   • Bolt (segment) “1”
   • Segment “2”

TIP
Turn the segment counterclockwise until it stops and loosen the bolt.

NOTICE
If the segment gets an impact, it may be damaged. Take care not to give an impact to the segment when removing the bolt.

CHECKING THE KICK SHAFT AND RATCHET WHEEL
1. Check:
   • Ratchet wheel “1” smooth movement
     Unsmooth movement → Replace.
   • Kick shaft “2”
     Wear/damage → Replace.
   • Spring “3”
     Broken → Replace.

CHECKING THE KICK GEAR, KICK IDLE GEAR AND RATCHET WHEEL
1. Inspect:
   • Kick gear “1”
   • Kick idle gear “2”
   • Ratchet wheel “3”
   • Gear teeth “a”
   • Ratchet teeth “b”
     Wear/damage → Replace.

CHECKING THE SHIFT SHAFT
1. Inspect:
   • Shift shaft “1”
     Bend/damage → Replace.
   • Spring “2”
     Broken → Replace.

CHECKING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY
1. Inspect:
   • Shift guide “1”
   • Shift lever “2”
   • Pawl “3”
   • Pawl pin “4”
   • Spring “5”
     Wear/damage → Replace.

CHECKING THE STOPPER LEVER
1. Inspect:
   • Stopper lever “1”
     Wear/damage → Replace.
   • Torsion spring “2”
     Broken → Replace.

INSTALLING THE SEGMENT
1. Install:
   • Segment “1”
   • Bolt (segment)

Bolt (segment): 30 Nm (3.0 m•kg, 22 ft•lb)

TIP
Align the notch “a” on the segment with the pin “b” on the shift cam.

NOTICE
If the segment gets an impact, it may be damaged. Take care not to give an impact to the segment when tightening the bolt.
**KICK SHAFT AND SHIFT SHAFT**

### INSTALLING THE STOPPER LEVER
1. Install:
   - Torsion spring "1"
   - Stopper lever "2"
   - Bolt (stopper lever) "3"

   **Bolt (stopper lever):**
   10 Nm (1.0 m•kg, 7.2 ft•lb)

**TIP**
Align the stopper lever roller with the slot on segment.

### INSTALLING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY
1. Install:
   - Spring "1"
   - Pawl pin "2"
   - Pawl "3"
   To shift lever "4".

**TIP**
Apply the engine oil on the spring, pawl pin and pawl.

2. Install:
   - Shift lever assembly "1"
   To shift guide "2".

3. Install:
   - Shift lever assembly "1"
   - Shift guide "2"

   **TIP**
   - The shift lever assembly is installed at the same time as the shift guide.
   - Apply the engine oil on the bolt (segment) shaft.

### INSTALLING THE SHIFT SHAFT
1. Install:
   - Roller "1"
   - Collar "2"
   - Torsion spring "3"
   - Shift shaft "4"

**TIP**
Apply the engine oil on the roller and shift shaft.

2. Install:
   - Shift pedal "1"
   - Bolt (shift pedal) "2"

   **Bolt (shift pedal):**
   12 Nm (1.2 m•kg, 8.7 ft•lb)

**TIP**
Install with the punch mark "a" on the shift pedal in alignment with the punch mark "b" on the shift shaft.

### INSTALLING THE KICK SHAFT ASSEMBLY
1. Install:
   - Kick gear "1"
   - Washer "2"
   - Circlip "3" New
   - Ratchet wheel "4"
   - Spring "5"
   - Washer "6"
   - Circlip "7" New
   To kick shaft "8".

**TIP**
   - Apply the molybdenum disulfide oil on the inner circumferences of the kick gear and ratchet wheel.
   - Align the punch mark "a" on the ratchet wheel with the punch mark "b" on the kick shaft.

2. Install:
   - Torsion spring "1"
   To kick shaft "2".

   **TIP**
   Make sure the stopper "a" of the torsion spring fits into the hole "b" on the kick shaft.

3. Install:
   - Spring guide "1"

   **TIP**
   Slide the spring guide into the kick shaft, make sure the groove "a" in the spring guide fits on the stopper of the torsion spring.
4. Install:
   • Kick shaft assembly “1”
   • Washer “2”

   **TIP**
   • Apply the molybdenum disulfide grease on the contacting surfaces of the kick shaft stopper “a” and kick shaft ratchet wheel guide “3”.
   • Apply the engine oil on the kick shaft.
   • Slide the kick shaft assembly into the crankcase and make sure the kick shaft stopper “a” fits into the kick shaft ratchet wheel guide.

5. Hook:
   • Torsion spring “1”

   **TIP**
   Turn the torsion spring clockwise and hook into the proper hole “a” in the crankcase.

---

**INSTALLING THE KICK IDLE GEAR**

1. Install:
   • Kick idle gear “1”
   • Washer “2”
   • Circlip “3”

   **TIP**
   • Apply the engine oil on the kick idle gear inner circumference.
   • Install the kick idle gear with its depressed side “a” toward you.
# CDI MAGNETO

## REMOVING THE CDI MAGNETO

![Diagram of CDI Magneto Removal](image)

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left crankcase cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Nut (rotor)</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>3</td>
<td>Rotor</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>4</td>
<td>Stator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Woodruff key</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Order Part name Q'ty Remarks**

<table>
<thead>
<tr>
<th>Seat and fuel tank</th>
<th>Refer to &quot;SEAT, FUEL TANK AND SIDE COVERS&quot; section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disconnect the CDI magneto lead.</td>
<td></td>
</tr>
<tr>
<td>Shift pedal</td>
<td>Refer to &quot;KICK SHAFT AND SHIFT SHAFT&quot; section.</td>
</tr>
</tbody>
</table>

- **10 Nm (1.0 m • kg, 7.2 ft • lb)**
- **56 Nm (5.6 m • kg, 40 ft • lb)**
- **10 Nm (1.0 m • kg, 7.2 ft • lb)**
CDI MAGNETO

REMOVING THE ROTOR
1. Remove:
   • Nut (rotor) "1"
   • Washer "2"
   Use the rotor holding tool "3".

   **Rotor holding tool:**
   YU-1235/90890-01235

2. Remove:
   • Rotor "1"
   Use the flywheel puller "2".

   **Flywheel puller:**
   YM-1189/90890-01189

   **TIP**
   When installing the flywheel puller, turn it counterclockwise.

CHECKING THE WOODRUFF KEY
1. Inspect:
   • Woodruff key "1"
   Damage → Replace.

   **Nut (rotor):**
   56 Nm (5.6 m•kg, 40 ft•lb)

   Use the rotor holding tool "3".

   **Rotor holding tool:**
   YU-1235/90890-01235

INSTALLING THE CDI MAGNETO
1. Install:
   • Stator "1"
   • Screw (stator) "2"
   **Screw (stator):**
   10 Nm (1.0 m•kg, 7.2ft•lb)

   **TIP**
   • Apply the sealant on the grommet of the CDI magneto lead.
   • Tighten the screws using the T30 bit.

   **YAMAHA Bond No. 1215**
   (ThreeBond® No. 1215): 90890-85505

2. Install:
   • Woodruff key "1"
   • Rotor "2"
   **TIP**
   • Clean the tapered portions of the crankshaft and rotor.
   • When installing the woodruff key, make sure that its flat surface "a" is in parallel with the crankshaft center line "b".
   • When installing the rotor, align the keyway "c" of the rotor with the woodruff key.

3. Install:
   • Washer "1"
   • Nut (rotor) "2"

   **Nut (rotor):**
   56 Nm (5.6 m•kg, 40 ft•lb)

4. Connect:
   • CDI magneto lead
   Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

5. Install:
   • Dowel pin
   • Gasket (left crankcase cover)
   • Left crankcase cover "1"
   • Hose guide (cylinder head breather hose) "2"
   • Bolt (left crankcase cover)
   **Bolt (left crankcase cover):**
   10 Nm (1.0 m•kg, 7.2 ft•lb)

   **TIP**
   Tighten the bolts in stage, using a crisscross pattern.

CHECKING THE CDI MAGNETO
1. Inspect:
   • Rotor inner surface "a"
   • Stator outer surface "b"
   Damage → Inspect the crankshaft runout and crankshaft bearing. If necessary, replace CDI magneto and/or stator.

   **Yamaha Bond No. 1215**
   (ThreeBond® No. 1215): 90890-85505

2. Install:
   • Woodruff key "1"
   • Rotor "2"

   **TIP**
   • Check the tapered portions of the crankshaft and rotor.
   • When installing the woodruff key, make sure that its flat surface "a" is in parallel with the crankshaft center line "b".
   • When installing the rotor, align the keyway "c" of the rotor with the woodruff key.

3. Install:
   • Washer "1"
   • Nut (rotor) "2"

   **Nut (rotor):**
   56 Nm (5.6 m•kg, 40 ft•lb)

   Use the rotor holding tool "3".

   **Rotor holding tool:**
   YU-1235/90890-01235

4. Connect:
   • CDI magneto lead
   Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

5. Install:
   • Dowel pin
   • Gasket (left crankcase cover)
   • Left crankcase cover "1"
   • Hose guide (cylinder head breather hose) "2"
   • Bolt (left crankcase cover)
   **Bolt (left crankcase cover):**
   10 Nm (1.0 m•kg, 7.2 ft•lb)

   **TIP**
   Tighten the bolts in stage, using a crisscross pattern.
### ENGINE REMOVAL

#### REMOVING THE ENGINE

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hold the machine by placing the suitable stand under the frame.</td>
<td></td>
<td>Refer to &quot;HANDLING NOTE&quot;.</td>
</tr>
<tr>
<td>1</td>
<td>Seat and fuel tank</td>
<td>1</td>
<td>Refer to &quot;SEAT, FUEL TANK AND SIDE COVERS&quot; section.</td>
</tr>
<tr>
<td>2</td>
<td>Carburetor</td>
<td>1</td>
<td>Refer to &quot;CARBURETOR&quot; section.</td>
</tr>
<tr>
<td>3</td>
<td>Exhaust pipe and silencer</td>
<td>1</td>
<td>Refer to &quot;EXHAUST PIPE AND SILENCER&quot; section.</td>
</tr>
<tr>
<td>4</td>
<td>Clutch cable</td>
<td>1</td>
<td>Disconnect at the engine side.</td>
</tr>
<tr>
<td>5</td>
<td>Radiator</td>
<td>1</td>
<td>Refer to &quot;RADIATOR&quot; section.</td>
</tr>
<tr>
<td>6</td>
<td>Shift pedal</td>
<td>1</td>
<td>Refer to &quot;KICK SHAFT AND SHIFT SHAFT&quot; section.</td>
</tr>
<tr>
<td>7</td>
<td>Cylinder head breather hose</td>
<td>1</td>
<td>Refer to &quot;CAMSHAFTS&quot; section.</td>
</tr>
<tr>
<td>8</td>
<td>Drain the engine oil.</td>
<td>1</td>
<td>Refer to &quot;CHANGING THE ENGINE OIL&quot; section in the CHAPTER 3.</td>
</tr>
<tr>
<td>9</td>
<td>Oil hose and oil tank breather hose</td>
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<td>Refer to &quot;OIL PUMP&quot; section.</td>
</tr>
<tr>
<td>10</td>
<td>Ignition coil</td>
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</tr>
<tr>
<td>11</td>
<td>Disconnect the CDI magneto lead.</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### Table of Torque Values

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower engine guard</td>
<td>26 Nm (2.6 m·kg, 19 ft·lb)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>34 Nm (3.4 m·kg, 24 ft·lb)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>45 Nm (4.5 m·kg, 32 ft·lb)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>75 Nm (7.5 m·kg, 54 ft·lb)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>65 Nm (8.5 m·kg, 61 ft·lb)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>45 Nm (4.5 m·kg, 32 ft·lb)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>34 Nm (3.4 m·kg, 25 ft·lb)</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>53 Nm (5.3 m·kg, 38 ft·lb)</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>10 Nm (1.0 m·kg, 7.2 ft·lb)</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>4 Nm (0.4 m·kg, 2.9 ft·lb)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>45 Nm (4.5 m·kg, 32 ft·lb)</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>34 Nm (3.4 m·kg, 25 ft·lb)</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>10 Nm (1.0 m·kg, 7.2 ft·lb)</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>7 Nm (0.7 m·kg, 5.1 ft·lb)</td>
</tr>
</tbody>
</table>
## Engine Removal

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Neutral switch</td>
<td>1</td>
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</tr>
<tr>
<td>3</td>
<td>Drive chain sprocket cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Nut (drive sprocket)</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Lock washer</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Drive sprocket</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>7</td>
<td>Clip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bolt (brake pedal)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Brake pedal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Upper engine bracket</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Front engine bracket</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Engine mounting bolt</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Pivot shaft</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>14</td>
<td>Engine</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>

- $26 \text{Nm (2.6 m-kg, 19 ft-lb)}$  
- $34 \text{Nm (3.4 m-kg, 24 ft-lb)}$  
- $45 \text{Nm (4.5 m-kg, 32 ft-lb)}$  
- $75 \text{Nm (7.5 m-kg, 54 ft-lb)}$  
- $85 \text{Nm (8.5 m-kg, 61 ft-lb)}$  
- $53 \text{Nm (5.3 m-kg, 38 ft-lb)}$  
- $34 \text{Nm (3.4 m-kg, 25 ft-lb)}$  
- $10 \text{Nm (1.0 m-kg, 7.2 ft-lb)}$  
- $4 \text{Nm (0.4 m-kg, 2.9 ft-lb)}$  
- $34 \text{Nm (3.4 m-kg, 25 ft-lb)}$  
- $7 \text{Nm (0.7 m-kg, 5.1 ft-lb)}$
ENGINE REMOVAL

HANDLING NOTE

**WARNING**
Support the machine securely so there is no danger of it falling over.

**REMOVING THE DRIVE SPROCKET**
1. Remove:
   - Nut (drive sprocket) "1"
   - Lock washer "2"

**TIP**
- Straighten the lock washer tab.
- Loosen the nut while applying the rear brake.

2. Remove:
   - Drive sprocket "1"
   - Drive chain "2"

**TIP**
Remove the drive sprocket together with the drive chain.

**REMOVING THE ENGINE**
1. Remove:
   - Pivot shaft "1"

**TIP**
If the pivot shaft is pulled all the way out, the swingarm will come loose. If possible, insert a shaft of similar diameter into the other side of the swingarm to support it.

2. Remove:
   - Engine "1"
   - Pivot shaft "2"

**TIP**
Make sure that the couplers, hoses and cables are disconnected.

**INSTALLING THE ENGINE**
1. Install:
   - Engine "1"
   - Pivot shaft "2"
   - Engine mounting bolt (lower) "3"
   - Front engine bracket "4"
   - Bolt (front engine bracket) "5"
   - Patch "6"
   - Engine mounting bolt (front) "7"
   - Engine mounting bolt (front) "8"
   - Bolt (upper engine bracket) "9"
   - Engine mounting bolt (upper) "10"
   - Engine mounting bolt (upper) "11"
   - Bolt (lower engine guard) "12"

**INSTALLING THE BRAKE PEDAL**
1. Install:
   - Spring "1"
   - Brake pedal "2"
   - O-ring "3"
   - Bolt (brake pedal) "4"
   - Clip "5"

**TIP**
- Apply the molybdenum disulfide grease on the pivot shaft.
- Install the patch with the claw "a" facing outside the chassis.

**Pivot shaft:**
- 85 Nm (8.5 m•kg, 61 ft•lb)

**Engine mounting bolt (lower):**
- 53 Nm (5.3 m•kg, 38 ft•lb)

**Front engine bracket:**
- 34 Nm (3.4 m•kg, 24 ft•lb)

**O-ring:**
- New

**Bolt (brake pedal):**
- 26 Nm (2.6 m•kg, 19 ft•lb)

**Bolt (brake pedal) **
- 34 Nm (3.4 m•kg, 24 ft•lb)

**Bolt (upper engine bracket) **
- 34 Nm (3.4 m•kg, 24 ft•lb)

**Bolt (lower engine guard):**
- 10 Nm (1.0 m•kg, 7.2 ft•lb)

**Bolt (brake pedal):**
- 26 Nm (2.6 m•kg, 19 ft•lb)

**Bolt (brake pedal):**
- 34 Nm (3.4 m•kg, 24 ft•lb)

**Bolt (upper engine bracket):**
- 34 Nm (3.4 m•kg, 24 ft•lb)

**Bolt (upper engine bracket):**
- 34 Nm (3.4 m•kg, 24 ft•lb)

**Bolt (lower engine guard):**
- 10 Nm (1.0 m•kg, 7.2 ft•lb)

**Bolt (brake pedal):**
- 26 Nm (2.6 m•kg, 19 ft•lb)
INSTALLING THE DRIVE SPROCKET
1. Install:
   • Drive sprocket "1"
   • Drive chain "2"

TIP
Install the drive sprocket together with the drive chain.

2. Install:
   • Lock washer "1" New
   • Nut (drive sprocket) "2"

Nut (drive sprocket): 75 Nm (7.5 m•kg, 54 ft•lb)

TIP
Tighten the nut while applying the rear brake.

3. Bend the lock washer tab to lock the nut.

4. Install:
   • Drive chain sprocket guide "1"
   • Drive chain sprocket cover "2"
   • Bolt (drive chain sprocket cover) "3"

Bolt (drive chain sprocket cover): 7 Nm (0.7 m•kg, 5.1 ft•lb)

INSTALLING THE NEUTRAL SWITCH
1. Install:
   • Spring "1"
   • Pin "2"
   • O-ring "3" New
   • Neutral switch "4"
   • Screw (neutral switch) "5"

TIP
Apply the lithium soap base grease on the O-ring.

Screw (neutral switch): 4 Nm (0.4 m•kg, 2.9 ft•lb)

2. Install:
   • Hose guide (cylinder head breather hose) "1"
   • Bolt (hose guide) "2"

Bolt (hose guide): 10 Nm (1.0 m•kg, 7.2 ft•lb)
CRANKCASE AND CRANKSHAFT

REMOVING THE CRANKSHAFT

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Engine</td>
<td></td>
<td>Refer to &quot;ENGINE REMOVAL&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Piston</td>
<td></td>
<td>Refer to &quot;CYLINDER AND PISTON&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Kick shaft assembly</td>
<td></td>
<td>Refer to &quot;KICK SHAFT AND SHIFT SHAFT&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Segment</td>
<td></td>
<td>Refer to &quot;KICK SHAFT AND SHIFT SHAFT&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Stator</td>
<td></td>
<td>Refer to &quot;CDI MAGNETO&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Balancer shaft</td>
<td></td>
<td>Refer to &quot;BALANCER&quot; section.</td>
</tr>
<tr>
<td>1</td>
<td>Timing chain guide (intake side)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Timing chain</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Oil delivery pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bolt [L = 45 mm (1.77 in)]</td>
<td>6</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Bolt [L = 55 mm (2.17 in)]</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Bolt [L = 70 mm (2.76 in)]</td>
<td>4</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>7</td>
<td>Hose guide</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>8</td>
<td>Clutch cable holder</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>9</td>
<td>Right crankcase</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
CRANKCASE AND CRANKSHAFT

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Left crankcase</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>11</td>
<td>Oil strainer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Crankshaft</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
REMOVING THE CRANKCASE BEARING

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transmission</td>
<td></td>
<td>Refer to &quot;TRANSMISSION, SHIFT CAM AND SHIFT FORK&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Shift cam and shift fork</td>
<td></td>
<td>Refer to &quot;TRANSMISSION, SHIFT CAM AND SHIFT FORK&quot; section.</td>
</tr>
<tr>
<td>1</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bearing</td>
<td>10</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
DISASSEMBLING THE CRANKCASE
1. Separate:
   • Right crankcase
   • Left crankcase

Separation steps:
   a. Remove the crankcase bolts "1", hose guide "2" and clutch cable holder "3".
   b. Loosen each bolt 1/4 of a turn at a time and after all the bolts are loosened, remove them.
   c. Remove the right crankcase "4".

TIP
Loosen each bolt 1/4 of a turn at a time and after all the bolts are loosened, remove them.

TIP
Place the crankcase with its left half downward and split the right half apart while lifting it horizontally by lightly tapping the projection "a" on it using a soft hammer.
   • When splitting it, leave the crankshaft and transmission with the left half.

NOTICE
Use soft hammer to tap on the case half. Tap only on reinforced portions of case. Do not tap on gasket mating surface. Work slowly and carefully. Make sure the case halves separate evenly. If the cases do not separate, check for a remaining case bolt or fitting. Do not force.

c. Remove the dowel pins and O-ring.

REMOVING THE CRANKSHAFT
1. Remove:
   • Crankshaft "1"
   Use the crankcase separating tool "2".

   ![Crankcase separating tool: YU-1135-A/90890-01135]

   NOTICE
   Do not use a hammer to drive out the crankshaft.

REMOVING THE CRANKCASE BEARING
1. Remove:
   • Bearing "1"

   TIP
   • Remove the bearing from the crankcase by pressing its inner race.
   • Do not use the removed bearing.

CHECKING THE TIMING CHAIN AND TIMING CHAIN GUIDE
1. Inspect:
   • Timing chain
     Cracks/stiff ➔ Replace the timing chain and camshaft sprocket as a set.

   2. Inspect:
      • Timing chain guide
        Wear/damage ➔ Replace.

CHECKING THE CRANKCASE
1. Inspect:
   • Contacting surface "a"
     Scratches ➔ Replace.
   • Engine mounting boss "b", crankcase
     Cracks/damage ➔ Replace.

   2. Inspect:
      • Bearing
        Rotate inner race with a finger.
        Rough spot/seizure ➔ Replace.

   3. Inspect:
      • Oil seal
        Damage ➔ Replace.

CHECKING THE CRANKSHAFT
1. Measure:
   • Runout limit "a"
     Standard <Limit>
     Runout limit:
     0.03 mm (0.0012 in) 0.05 mm (0.002 in)
   • Small end free play limit "b"
     Standard <Limit>
     Small end free play:
     0.4–1.0 mm (0.016–0.039 in) 2.0 mm (0.08 in)
   • Connecting rod big end side clearance "c"
     Standard <Limit>
     Side clearance:
     0.15–0.45 mm (0.0059–0.0177 in) 0.50 mm (0.02 in)
   • Crank width "d"
     Standard <Limit>
     Crank width:
     55.95–56.00 mm (2.203–2.205 in) —

   Dial gauge and stand:
   YU-3097/90890-01252
CRANKCASE AND CRANKSHAFT

CHECKING THE OIL STRAINER
1. Inspect:
   • Oil strainer
     Damage → Replace.

CHECKING THE OIL DELIVERY PIPE 2
1. Inspect:
   • Oil delivery pipe 2 "1"
   • O-ring "2"
     Damage → Replace.
   • Oil orifice "a"
     Clogged → Blow.

INSTALLING THE CRANKCASE BEARING
1. Install:
   • Bearing [New]
   • Bearing stopper
   • Bolt (bearing stopper)

Screw (bearing stopper):
10 Nm (1.0 m•kg, 7.2 ft•lb)

Screw (bearing stopper) "1"

Screw [bearing stopper (crankshaft)]:
14 Nm (1.4 m•kg, 10 ft•lb)
To left and right crankcase.

TIP
• Install the bearing by pressing its outer race parallel.
• To prevent the screw [bearing stopper (crankshaft)] from becoming loose, crush the screw head periphery "a" into the concave "b" using a punch etc. In so doing, take care not to damage the screwdriver receiving hole in the screw head.

TIPS
A. For USA and CDN
B. Except for USA and CDN
2. Check:
   • Shifter operation
   • Transmission operation
     Unsmooth operation → Repair.

3. Install:
   • Oil strainer "1"
   • Bolt (oil strainer) "2"

4. Apply:
   • Sealant
     On the right crankcase.

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

YAMAHA Bond No.1215
(ThreeBond® No.1215): 90890-85505

TIP
Clean the contacting surface of left and right crankcase before applying the sealant.

INSTALLING THE CRANKSHAFT
1. Install:
   • Crankshaft "1"
     Use the crankshaft installing tool "2", "3", "4" and "5".

Crankshaft installing pot "2":
YU-90050/90890-01274
Crankshaft installing bolt "3":
YU-90050/90890-01275
Adapter (M12) "4":
YU-90063/90890-01278
Spacer (crankshaft installer) "5":
YU-91044/90890-04081

TIP
• 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.
• Before installing the crankshaft, clean the contacting surface of crankcase.

NOTICE
Do not use a hammer to drive in the crankshaft.
5. Install:
- Dowel pin "1"
- O-ring "2"
- Right crankcase
  To left crankcase.

TIP
- Apply the lithium soap base grease on the O-rings.
- Fit the right crankcase onto the left crankcase. Tap lightly on the case with soft hammer.
- When installing the crankcase, the connecting rod should be positioned at TDC (top dead center).

6. Tighten:
- Hose guide "1"
- Clutch cable holder "2"
- Bolt (crankcase) "3"

TIP
Tighten the crankcase tightening bolts in stage, using a crisscross pattern.

7. Install:
- Oil delivery pipe 2 "1"
- O-ring "2"
- Bolt (oil delivery pipe 2) "3"

Bolt (oil delivery pipe 2):
10 Nm (1.0 m•kg, 7.2 ft•lb)

8. Install:
- Timing chain "1"
- Timing chain guide (intake side) "2"
- Bolt (timing chain guide) "3"

Bolt (timing chain guide):
10 Nm (1.0 m•kg, 7.2 ft•lb)

9. Remove:
- Sealant
  Forced out on the cylinder mating surface.

10. Apply:
- Engine oil
  To the crank pin, bearing and oil delivery hole.

11. Check:
- Crankshaft and transmission operation.
  Unsmooth operation → Repair.
## TRANSMISSION, SHIFT CAM AND SHIFT FORK

### REMOVING THE TRANSMISSION, SHIFT CAM AND SHIFT FORK

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Engine</td>
<td></td>
<td>Refer to &quot;ENGINE REMOVAL&quot; section.</td>
</tr>
<tr>
<td></td>
<td>Separate the crankcase.</td>
<td></td>
<td>Refer to &quot;CRANKCASE AND CRANK-SHAFT&quot; section.</td>
</tr>
<tr>
<td>1</td>
<td>Main axle</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>2</td>
<td>Drive axle</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>3</td>
<td>Shift cam</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>4</td>
<td>Shift fork 3</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Shift fork 2</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Shift fork 1</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>7</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
TRANSMISSION, SHIFT CAM AND SHIFT FORK

REMOVING THE TRANSMISSION
1. Remove:
   • Main axle "1"
   • Drive axle "2"
   • Shift cam
   • Shift fork 3
   • Shift fork 2
   • Shift fork 1
   • Remove assembly with the collar "3" installed to the crankcase.
   • Remove assembly carefully. Note the position of each part. Pay particu-
     lar attention to the location and di-
     rection of shift forks.
   • Remove the main axle, drive axle,
     shift cam and shift fork all together
     by tapping lightly on the transmis-
     sion drive axle with a soft hammer.

TIP
• Remove assembly with the collar
  "3" installed to the crankcase.
• Remove assembly carefully. Note
  the position of each part. Pay partic-
  ular attention to the location and di-
  rection of shift forks.
• Remove the main axle, drive axle,
  shift cam and shift fork all together
  by tapping lightly on the transmis-
  sion drive axle with a soft hammer.

CHECKING THE BEARING
1. Inspect:
   • Bearing "1"
     Rotate inner race with a finger.
     Rough spot/seizure → Replace.

CHECKING THE SHIFT FORK,
SHIFT CAM AND SEGMENT
1. Inspect:
   • Shift fork "1"
     Wear/damage/scratches → Re-
     place.

2. Inspect:
   • Shift cam "1"
     Segment "2"
     Wear/damage → Replace.

3. Check:
   • Shift fork movement
     Unsmooth operation → Replace
     shift fork.

TIP
• For a malfunctioning shift fork, re-
  place not only the shift fork itself but
  the two gears each adjacent to the
  shift fork.

CHECKING THE GEARS
1. Inspect:
   • Matching dog "a"
   • Gear teeth "b"
   • Shift fork groove "c"
     Wear/damage → Replace.

2. Inspect:
   • O-ring "1"
     Damage → Replace.

3. Check:
   • Gears movement
     Unsmooth movement → Repair or
     replace.

INSTALLING THE TRANSMISSION
1. Install:
   • 5th pinion gear (24T) "1"
   • 3rd pinion gear (18T) "2"
   • Collar "3"
   • 4th pinion gear (18T) "4"
   • 2nd pinion gear (16T) "5"
     To main axle "6".

TIP
Apply the molybdenum disulfide oil
on the inner and end surface of the
idler gear and on the inner surface
of the sliding gear, then install.

2. Install:
   • 2nd wheel gear (28T) "1"
   • 4th wheel gear (22T) "2"
   • 3rd wheel gear (26T) "3"
   • 5th wheel gear (25T) "4"
   • 1st wheel gear (30T) "5"
   • O-ring "6" New
     To drive axle "7".

TIP
• Apply the molybdenum disulfide oil
  on the inner and end surface of the
  idler gear and on the inner surface
  of the sliding gear, then install.
• Apply the lithium soap base grease
  on the O-ring.
3. Install:
- Washer “1”
- Circlip “2” [New]

TIP
- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the washer and gear “b”.
- Install the circlip with its ends “c” settled evenly on the spline crests.

4. Install:
- Collar “1”

TIP
- Apply the lithium soap base grease on the oil seal lip.
- When installing the collar into the crankcase, pay careful attention to the crankcase oil seal lip.

5. Install:
- Shift fork 1 (L) “1”
- Shift fork 2 (C) “2”
- Shift fork 3 (R) “3”
- Shift cam “4”
  To main axle and drive axle.

TIP
- Apply the engine oil on the shift fork grooves.
- Mesh the shift fork #1 (L) with the 4th wheel gear “5” and #3 (R) with the 5th wheel gear “7” on the drive axle.
- Mesh the shift fork #2 (C) with the 3rd pinion gear “6” on the main axle.

6. Install:
- Transmission assembly “1”
  To left crankcase “2”.

TIP
- Apply the engine oil on the bearings and guide bars.

7. Check:
- Shifter operation
- Transmission operation
  Unsmooth operation → Repair.
TIP
This section is intended for those who have basic knowledge and skill concerning the servicing of Yamaha motorcycles (e.g., Yamaha dealers, service engineers, etc.) Those who have little knowledge and skill concerning servicing are request-ed not to undertake inspection, adjustment, disassembly, or reassembly only by reference to this manual. It may lead to servicing trouble and mechanical damage.

FRONT WHEEL AND REAR WHEEL
REMOVING THE FRONT WHEEL

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bolt (axle holder)</td>
<td>4</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>2</td>
<td>Nut (front wheel axle)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Front wheel axle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Front wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Collar</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Bearing</td>
<td>2</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>8</td>
<td>Brake disc</td>
<td>1</td>
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</table>
## REMOVING THE REAR WHEEL

### List of Parts

<table>
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<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nut (rear wheel axle)</td>
<td>1</td>
<td>Refer to “HANDLING NOTE”.</td>
</tr>
<tr>
<td>2</td>
<td>Rear wheel axle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Drive chain puller</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rear wheel</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Collar</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rear wheel sprocket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bearing</td>
<td>3</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>10</td>
<td>Brake disc</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### Torque Specifications

- **135 Nm (13.5 m·kg, 98 ft·lb)**
- **21 Nm (2.1 m·kg, 15 ft·lb)**
- **42 Nm (4.2 m·kg, 30 ft·lb)**

1. Hold the machine by placing the suitable stand under the engine.
FRONT WHEEL AND REAR WHEEL

HANDLING NOTE

**WARNING**
Support the machine securely so there is no danger of it falling over.

REMOVING THE REAR WHEEL

1. Remove:
   • Wheel "1"

**TIP**
Push the wheel forward and remove the drive chain "2".

REMOVING THE WHEEL BEARING

1. Remove:
   • Bearing "1"

**TIP**
Remove the bearing using a general bearing puller "2".

CHECKING THE WHEEL

1. Measure:
   • Wheel runout
     Out of limit → Repair/replace.

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

2. Inspect:
   • Bearing
     Rotate inner race with a finger.
     Rough spot/seizure → Replace.

**TIP**
Replace the bearings, oil seal and wheel collar as a set.

CHECKING THE WHEEL AXLE

1. Measure:
   • Wheel axle bends
     Out of specification → Replace.
     Use the dial gauge "1".

**Wheel axle bending limit:**
0.5 mm (0.020 in)

**TIP**
The bending value is shown by one half of the dial gauge reading.

CHECKING THE BRAKE DISC

1. Measure:
   • Brake disc deflection (only rear brake disc)
     Use the dial gauge "1".
     Out of specification → Inspect wheel runout.
     If wheel runout is in good condition, replace the brake disc.

**Brake disc deflection limit:**
   Rear: 0.15 mm (0.006 in)

2. Measure:
   • Brake disc thickness "a"
     Out of limit → Replace.

**Brake disc thickness:**
   Front: 3.0 mm (0.12 in)
   <Limit>: 2.5 mm (0.10 in)
   Rear: 4.0 mm (0.16 in)
   <Limit>: 3.5 mm (0.14 in)

INSTALLING THE FRONT WHEEL

1. Install:
   • Bearing (left) "1"
   • Spacer "2"
   • Bearing (right) "3"
   • Oil seal "4" New

**TIP**
• Apply the lithium soap base grease on the bearing and oil seal lip when installing.
• Use a socket that matches the outside diameter of the race of the bearing.
• Left side of bearing shall be installed first.
• Install the oil seal with its manufacturer’s marks or numbers facing outward.

**NOTICE**
Do not strike the inner race of the bearing. Contact should be made only with the outer race.

Wheel runout limit:
   Radial "1": 2.0 mm (0.08 in)
   Lateral "2": 2.0 mm (0.08 in)

Wheel axle bending limit:
0.5 mm (0.020 in)
FRONT WHEEL AND REAR WHEEL

2. Install:
   • Brake disc "1"
   • Bolt (brake disc) "2" ★★★
   
   **Bolt (brake disc):**
   12 Nm (1.2 m•kg, 8.7 ft•lb)

3. Install:
   • Collar "1"
   • Apply the lithium soap base grease on the oil seal lip.
   • Install the collars with their projections "a" facing the wheel.

4. Install:
   • Wheel
   
   **TIP**
   Install the brake disc "1" between the brake pads "2" correctly.

5. Install:
   • Wheel axle "1"
   
   **TIP**
   Apply the lithium soap base grease on the wheel axle.

6. Install:
   • Nut (wheel axle) "1"
   
   **Nut (wheel axle):**
   105 Nm (10.5 m•kg, 75 ft•lb)

7. Tighten:
   • Bolt (axle holder) "1"
   
   **Bolt (axle holder):**
   21 Nm (2.1 m•kg, 15 ft•lb)

**TIP**
Before tightening the bolt, fit the wheel axle to the axle holder by stroking the front fork several times with the front brake applied.

**NOTICE**
Do not strike the inner race of the bearing. Contact should be made only with the outer race.

**TIP**
Tighten the bolts in stage, using a crisscross pattern.

INSTALLING THE REAR WHEEL

1. Install:
   • Bearing (right) "1"
   • Circlip "2" ★★★
   • Spacer "3"
   • Bearing (left) "4"
   • Oil seal "5" ★★★
   
   **TIP**
   Apply the lithium soap base grease on the bearing and oil seal lip when installing.
   • Install the bearing with seal facing outward.
   • Use a socket that matches the outside diameter of the race of the bearing.
   • Right side of bearing shall be installed first.
   • Install the oil seal with its manufacturer's marks or numbers facing outward.

2. Install:
   • Brake disc "1"
   • Bolt (brake disc) "2" ★★★
   
   **Bolt (brake disc):**
   14 Nm (1.4 m•kg, 10 ft•lb)

3. Install:
   • Rear wheel sprocket "1"
   • Bolt (rear wheel sprocket) "2"
   • Washer (rear wheel sprocket) "3"
   • Nut (rear wheel sprocket) "4"
   
   **Nut (rear wheel sprocket):**
   42 Nm (4.2 m•kg, 30 ft•lb)

**TIP**
Tighten the nuts in stage, using a crisscross pattern.

Bolt (brake disc): 14 Nm (1.4 m•kg, 10 ft•lb)
4. Install:
• Collar "1"

**TIP**
Apply the lithium soap base grease on the oil seal lip.

5. Install:
• Wheel

**TIP**
Install the brake disc "1" between the brake pads "2" correctly.

6. Install:
• Drive chain "1"

**TIP**
Push the wheel "2" forward and install the drive chain.

7. Install:
• Left drive chain puller "1"
• Wheel axle "2"

**TIP**
• Install the left drive chain puller, and insert the wheel axle from left side.
• Apply the lithium soap base grease on the wheel axle.

8. Install:
• Right drive chain puller "1"
• Washer "2"
• Nut (wheel axle) "3"

**TIP**
Temporarily tighten the nut (wheel axle) at this point.

9. Adjust:
• Drive chain slack "a"

**Drive chain slack:**
50–60 mm (2.0–2.4 in)

Refer to “ADJUSTING THE DRIVE CHAIN SLACK” section in the CHAPTER 3.

10. Tighten:
• Nut (wheel axle) "1"
• Locknut "2"

**Nut (wheel axle):**
135 Nm (13.5 m·kg, 98 ft·lb)

**Locknut:**
21 Nm (2.1 m·kg, 15 ft·lb)
## FRONT BRAKE AND REAR BRAKE

### REMOVING THE FRONT BRAKE

**Order** | **Part name** | **Q'ty** | **Remarks**
---|---|---|---
Hold the machine by placing the suitable stand under the engine. | | | Refer to "HANDLING NOTE".
Drain the brake fluid. | | | Refer to removal section.
1 | Brake hose holder (protector) | 2 |  
2 | Union bolt | 2 |  
3 | Brake hose | 1 |  
4 | Pad pin plug | 1 | Remove when loosening the pad pin.
5 | Pad pin | 1 | Loosen when disassembling the brake caliper.
6 | Brake caliper | 1 |  
7 | Brake lever | 1 |  
8 | Brake master cylinder bracket | 1 |  
9 | Brake master cylinder | 1 |  

- **6 Nm (0.6 m·kg, 4.3 ft·lb)**
- **9 Nm (0.9 m·kg, 6.5 ft·lb)**
- **30 Nm (3.0 m·kg, 22 ft·lb)**
- **18 Nm (1.8 m·kg, 13 ft·lb)**
- **28 Nm (2.8 m·kg, 20 ft·lb)**
- **3 Nm (0.3 m·kg, 2.2 ft·lb)**
REMOVING THE REAR BRAKE

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold the machine by placing the suitable stand under the engine.</td>
<td>Refer to &quot;HANDLING NOTE&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear wheel</td>
<td>Refer to &quot;FRONT WHEEL AND REAR WHEEL&quot; section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain the brake fluid.</td>
<td>Refer to removal section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Brake pedal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brake master cylinder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Brake hose holder</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Union bolt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pad pin plug</td>
<td>1</td>
<td>Remove when loosening the pad pin.</td>
</tr>
<tr>
<td>7</td>
<td>Pad pin</td>
<td>1</td>
<td>Loosen when disassembling the brake caliper.</td>
</tr>
<tr>
<td>8</td>
<td>Brake caliper</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
## DISASSEMBLING THE BRAKE CALIPER

### Screw Specifications
- **3 Nm (0.3 m·kg, 2.2 ft·lb)**
- **18 Nm (1.8 m·kg, 13 ft·lb)**
- **6 Nm (0.6 m·kg, 4.3 ft·lb)**

### Parts List

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A. Front B. Rear</td>
</tr>
<tr>
<td>1</td>
<td>Pad pin</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Brake pad</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Pad support</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Brake caliper piston</td>
<td>2</td>
<td>1 Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Brake caliper piston dust seal</td>
<td>2</td>
<td>1 Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Brake caliper piston seal</td>
<td>2</td>
<td>1 Refer to removal section.</td>
</tr>
</tbody>
</table>

---

5-8
### DISASSEMBLING THE BRAKE MASTER CYLINDER

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake master cylinder cap</td>
<td>1</td>
<td>A. Front</td>
</tr>
<tr>
<td>2</td>
<td>Diaphragm</td>
<td>1</td>
<td>B. Rear</td>
</tr>
<tr>
<td>3</td>
<td>Reservoir float</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Push rod (Front)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake master cylinder boot</td>
<td>1</td>
<td>Use a long nose circlip pliers.</td>
</tr>
<tr>
<td>6</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Push rod (Rear)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Brake master cylinder kit</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
FRONT BRAKE AND REAR BRAKE

HANDLING NOTE

**WARNING**
Support the machine securely so there is no danger of it falling over.

DRAINING THE BRAKE FLUID

1. Remove:
   - Brake master cylinder cap "1"
   - Protector (rear brake)

**TIP**
Do not remove the diaphragm.

2. Connect the transparent hose "2" to the bleed screw "1" and place a suitable container under its end.

3. Loosen the bleed screw and drain the brake fluid while pulling the lever in or pushing down on the pedal.

**WARNING**
- Do not reuse the drained brake fluid.
- Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

REMOVING THE BRAKE CALIPER PISTON

1. Remove:
   - Brake caliper piston
   - Use compressed air and proceed carefully.

**WARNING**
- Cover piston with rag and use extreme caution when expelling piston from cylinder.
- Never attempt to pry out piston.

Caliper piston removal steps:

a. Insert a piece of rag into the brake caliper to lock one brake caliper.

b. Carefully force the piston out of the brake caliper cylinder with compressed air.

A. Front
B. Rear

REMOVING THE BRAKE CALIPER PISTON SEAL KIT

1. Remove:
   - Brake caliper piston dust seal "1"
   - Brake caliper piston seal "2"

**TIP**
Remove the brake caliper piston seals and brake caliper piston dust seals by pushing them with a finger.

**NOTICE**
Never attempt to pry out brake caliper piston seals and brake caliper piston dust seals.

A. Front
B. Rear

CHECKING THE BRAKE MASTER CYLINDER

1. Inspect:
   - Brake master cylinder inner surface "a"
   - Wear/scratches → Replace master cylinder assembly.
   - Stains → Clean.

2. Inspect:
   - Diaphragm "1"
   - Crack/damage → Replace.

A. Front
B. Rear

Use only new brake fluid.

**WARNING**
Replace the brake caliper piston seals and brake caliper piston dust seals whenever a caliper is disassembled.
3. Inspect: (front brake only)
   • Reservoir float "1"
     Damage → Replace.
   • Brake master cylinder piston "1"
     Wear/damage/score marks → Replace brake master cylinder kit.

4. Inspect:
   • Brake master cylinder cup "2"
   Wear/damage/score marks → Replace brake master cylinder kit.

CHECKING THE BRAKE CALIPER
1. Inspect:
   • Brake caliper cylinder inner surface "a"
     Wear/score marks → Replace brake caliper assembly.

   A. Front
   B. Rear

2. Inspect:
   • Brake caliper piston "1"
     Wear/score marks → Replace brake caliper piston assembly.

   WARNING

Replace the brake caliper piston seals and brake caliper piston dust seals "2" whenever a caliper is disassembled.

HANDLING NOTE

• All internal parts should be cleaned in new brake fluid only.
• Internal parts should be lubricated with brake fluid when installed.
• Replace the brake caliper piston seals and brake caliper piston dust seals whenever a caliper is disassembled.

INSTALLING THE BRAKE CALIPER PISTON
1. Clean:
   • Brake caliper
   • Brake caliper piston seal
   • Brake caliper piston dust seal
   • Brake caliper piston
     Clean them with brake fluid.

2. Install:
   • Brake caliper piston seal "1"
   • Brake caliper piston dust seal "2"
   Always use new brake caliper piston seals and brake caliper piston dust seals.

   WARNING

Always use new brake caliper piston seals and brake caliper piston dust seals.

TIP

• Apply the brake fluid on the brake caliper piston seal.
• Apply the silicone grease on the brake caliper piston dust seal.
• Fit the brake caliper piston seals and brake caliper piston dust seals onto the slot on brake caliper correctly.

A. Front
B. Rear

INSTALLING THE FRONT BRAKE CALIPER
1. Install:
   • Pad support "1"
   • Brake pad "2"
   • Pad pin "3"
   • Install the brake pads with their projections "a" into the brake caliper recesses "b".
   • Temporarily tighten the pad pin at this point.
FRONT BRAKE AND REAR BRAKE

2. Install:
   • Brake caliper "1"
   • Bolt (brake caliper) "2"

   Bolt (brake caliper):
   28 Nm (2.8 m•kg, 20 ft•lb)

3. Tighten:
   • Pad pin "3"

   Pad pin:
   18 Nm (1.8 m•kg, 13 ft•lb)

4. Install:
   • Pad pin plug "4"

   Pad pin plug:
   3 Nm (0.3 m•kg, 2.2 ft•lb)

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   • Pad support "1"
   • Brake pad "2"
   • Pad pin "3"

   TIP
   • Install the brake pads with their projections "a" into the brake caliper recesses "b".
   • Temporarily tighten the pad pin at this point.

3. Install:
   • Brake caliper "1"
   • Rear wheel "2"
   Refer to "FRONT WHEEL AND REAR WHEEL" section.

4. Tighten:
   • Pad pin "3"

   Pad pin:
   18 Nm (1.8 m•kg, 13 ft•lb)

5. Install:
   • Pad pin plug "4"

   Pad pin plug:
   3 Nm (0.3 m•kg, 2.2 ft•lb)

INSTALLING THE BRAKE MASTER CYLINDER KIT

1. Clean:
   • Brake master cylinder
   • Brake master cylinder kit
   Clean them with brake fluid.

2. Install:
   • Brake master cylinder cup (primary) "1"
   • Brake master cylinder cup (secondary) "2"
   • To brake master cylinder piston "3".

   TIP
   Apply the brake fluid on the brake master cylinder cup.

   WARNING
   After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.

3. Install:
   • Spring "1"
   To brake master cylinder piston "2".

   TIP
   Install the spring at the smaller dia. side.

4. Install:
   • Brake master cylinder kit "1"
   • Washer (front brake) "2"
   • Push rod (rear brake) "2"
   • Circlip "3"
   • Brake master cylinder boot "4"
   • Push rod (front brake) "5"
   To brake master cylinder.

   TIP
   • Apply the brake fluid on the brake master cylinder kit.
   • Apply the silicone grease on the tip of the push rod.
   • When installing the circlip, use a long nose circlip pliers.

Bolt (brake disc cover):
10 Nm (1.0 m•kg, 7.2 ft•lb)

5-12
FRONT BRAKE AND REAR BRAKE

INSTALLING THE FRONT BRAKE MASTER CYLINDER
1. Install:
   - Brake master cylinder "1"
   - Brake master cylinder bracket "2"
   - Bolt (brake master cylinder bracket) "3"

   Bolt (brake master cylinder bracket):
   9 Nm (0.9 m•kg, 6.5 ft•lb)

   TIP
   - Install the bracket so that the arrow mark "a" face upward.
   - First tighten the bolts on the upper side of the brake master cylinder bracket, and then tighten the bolts on the lower side.

2. Install:
   - Brake lever "1"
   - Bolt (brake lever) "2"
   - Nut (brake lever) "3"

   Apply the silicone grease on the brake lever sliding surface, bolt and tip of the push rod.

   Bolt (brake lever):
   6 Nm (0.6 m•kg, 4.3 ft•lb)

   Nut (brake lever):
   6 Nm (0.6 m•kg, 4.3 ft•lb)

   TIP
   - Install the brake lever so that its pipe portion "a" directs as shown and lightly touches the projection "b" on the brake master cylinder.

   NOTICE
   Install the brake hose so that its pipe portion "a" directs as shown and lightly touches the projection "b" on the brake master cylinder.

   Bolt (brake master cylinder):
   10 Nm (1.0 m•kg, 7.2 ft•lb)

   3. Install:
   - Spring "1"
   - Brake pedal "2"
   - O-ring "3" New
   - Bolt (brake pedal) "4"

   Union bolt:
   30 Nm (3.0 m•kg, 22 ft•lb)

   Bolt (brake pedal):
   26 Nm (2.6 m•kg, 19 ft•lb)

   • Clip "5"

   TIP
   Apply the lithium soap base grease on the bolt, O-ring and brake pedal bracket.

4. Install:
   - Pin "1"
   - Washer "2"
   - Cotter pin "3" New

   After installing, check the brake pedal height. Refer to "ADJUSTING THE REAR BRAKE" section in the CHAPTER 3.

TESTING THE REAR BRAKE MASTER CYLINDER
1. Install:
   - Copper washer "1"
   - Brake hose "2"
   - Union bolt "3"

   Bolt (brake master cylinder):
   10 Nm (1.0 m•kg, 7.2 ft•lb)

   TIP
   Always use new copper washers.

2. Install:
   - Brake master cylinder "1"
   - Bolt (brake master cylinder) "2"

   Bolt (brake master cylinder):
   10 Nm (1.0 m•kg, 7.2 ft•lb)

   TIP
   Always use new copper washers.

INSTALLING THE FRONT BRAKE HOSE
1. Install:
   - Copper washer "1" New
   - Brake hose "2"
   - Union bolt "3"

   Union bolt:
   30 Nm (3.0 m•kg, 22 ft•lb)
FRONT BRAKE AND REAR BRAKE

**NOTICE**
Install the brake hose so that its pipe portion "a" directs as shown and lightly touches the projection "b" on the brake caliper.

2. Install:
   • Brake hose holder "1"
   • Bolt (brake hose holder) "2"

**TIP**
Align the top "a" of the brake hose holder with the paint "b" of the brake hose.

3. Pass the brake hose through the cable guide "1".

4. Install:
   • Copper washer "1"  
   • Brake hose "2"  
   • Union bolt "3"

Always use new copper washers.

**INSTALLING THE REAR BRAKE HOSE**
1. Install:
   • Copper washer "1" New  
   • Brake hose "2"  
   • Union bolt "3"

Union bolt:
30 Nm (3.0 m•kg, 22 ft•lb)

**WARNING**
Always use new copper washers.

2. Install:
   • Brake hose holder "1"  
   • Screw (brake hose holder) "2" New

Screw (brake hose holder):
3 Nm (0.3 m•kg, 2.2 ft•lb)

**WARNING**
Always use new copper washers.

3. Install the brake hose so that its pipe portion "a" directs as shown and lightly touches the projection "b" on the brake caliper.

**FILLING THE BRAKE FLUID**
1. Fill:
   • Brake fluid
   • 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.

Recommended brake fluid:
DOT #4

**WARNING**
Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

Bolt (brake hose holder):
8 Nm (0.8 m•kg, 5.8 ft•lb)

Union bolt:
30 Nm (3.0 m•kg, 22 ft•lb)

Screw (brake hose holder):
3 Nm (0.3 m•kg, 2.2 ft•lb)
A. Front
B. Rear

2. Air bleed:
   • Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" section in the CHAPTER 3.

3. Inspect:
   • Brake fluid level
     Fluid at lower level → Fill up.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" section in the CHAPTER 3.

4. Install:
   • Reservoir float (front brake)
   • Diaphragm
   • Brake master cylinder cap "1"
   • Screw (brake master cylinder cap) "2"

   **WARNING**
   After installation, while pulling the brake lever in or pushing down on the brake pedal, check whether there is any brake fluid leaking where the union bolts are installed respectively at the brake master cylinder and brake caliper.

5. Install: (rear brake only)
   • Protector "1"
   • Bolt (protector) "2"

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

   **Screw (bolt) (brake master cylinder cap):**
   2 Nm (0.2 m•kg, 1.4 ft•lb)
**FRONT FORK**

**REMOVING THE FRONT FORK**

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Protector</td>
<td>1</td>
<td>Hold the machine by placing the suitable stand under the engine. Refer to &quot;HANDLING NOTE&quot;.</td>
</tr>
<tr>
<td>2</td>
<td>Pinch bolt (upper bracket)</td>
<td>2</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>3</td>
<td>Damper assembly</td>
<td>1</td>
<td>Loosen when disassembling the front fork. Refer to removal section.</td>
</tr>
<tr>
<td>4</td>
<td>Pinch bolt (lower bracket)</td>
<td>2</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>5</td>
<td>Front fork</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Diagram Notes:**
- 21 Nm (2.1 m·kg, 15 ft·lb)
- 8 Nm (0.8 m·kg, 5.8 ft·lb)
- 5 Nm (0.5 m·kg, 3.6 ft·lb)
DISASSEMBLING THE FRONT FORK

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adjuster</td>
<td>1</td>
<td>Drain the fork oil. Refer to removal section.</td>
</tr>
<tr>
<td>2</td>
<td>Fork spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dust seal</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>4</td>
<td>Stopper ring</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>5</td>
<td>Inner tube</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Outer tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Piston metal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Slide metal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil seal washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Base valve</td>
<td>1</td>
<td>Drain the fork oil. Refer to removal section.</td>
</tr>
<tr>
<td>12</td>
<td>Damper assembly</td>
<td>1</td>
<td>Drain the fork oil. Refer to removal section.</td>
</tr>
</tbody>
</table>

- 30 Nm (3.0 m·kg, 22 ft·lb)
- 29 Nm (2.9 m·kg, 21 ft·lb)
- 29 Nm (2.9 m·kg, 21 ft·lb)
- 55 Nm (5.5 m·kg, 40 ft·lb)
- 1 Nm (0.1 m·kg, 0.7 ft·lb)
HANDLING NOTE

**WARNING**
Support the machine securely so there is no danger of it falling over.

**TIP**
The front fork requires careful attention. So it is recommended that the front fork be maintained at the dealers.

**NOTICE**
To prevent an accidental explosion of air, the following instructions should be observed:
- The front fork with a built-in piston rod has a very sophisticated internal construction and is particularly sensitive to foreign material. Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.
- Before removing the base valves or front forks, be sure to extract the air from the air chamber completely.

REMOVING THE DAMPER ASSEMBLY
1. Loosen:
   • Damper assembly "1"

**TIP**
Before removing the front fork from the machine, loosen the damper assembly with the cap bolt ring wrench "2".

Cap bolt ring wrench:
YM-01501/90890-01501

REMOVING THE ADJUSTER
1. Drain the outer tube of its front fork oil at its top.
2. Loosen:
   • Adjuster "1"

3. Remove:
   • Adjuster "1"

**TIP**
- While compressing the inner tube "2", set the cap bolt ring wrench "4" between the inner tube and locknut "3".
- Hold the locknut and remove the adjuster.

**NOTICE**
Do not remove the locknut as the damper rod may go into the damper assembly and not be taken out.

REMOVING THE INNER TUBE
1. Remove:
   • Dust seal "1"
   • Stopper ring "2"
   Using slotted-head screwdriver.

**NOTICE**
Take care not to scratch the inner tube.

REMOVING THE BASE VALVE
1. Remove:
   • Base valve "1"
   From damper assembly "2".

**TIP**
Hold the damper assembly with the cap bolt ring wrench "3" and use the cap bolt wrench "4" to remove the base valve.

Cap bolt wrench:
YM-01500/90890-01500
Cap bolt ring wrench:
YM-01501/90890-01501
CHECKING THE DAMPER ASSEMBLY
1. Inspect:
   • Damper assembly "1"
     Bend/damage → Replace.
   • O-ring "2"
     Wear/damage → Replace.

**NOTICE**
The front fork with a built-in piston rod has a very sophisticated internal construction and is particularly sensitive to foreign material. Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and re-assembled.

CHECKING THE BASE VALVE
1. Inspect:
   • Base valve "1"
     Wear/damage → Replace.
   • O-ring "2"
     Wear/damage → Replace.
   • Piston metal "3"
     Wear/damage → Replace.
   • Spring "4"
     Damage/fatigue → Replace base valve.
   • Air bleed screw "5"
     Wear/damage → Replace.

CHECKING THE FORK SPRING
1. Measure:
   • Fork spring free length "a"
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Fork spring free length:</th>
</tr>
</thead>
<tbody>
<tr>
<td>454 mm (17.9 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 449 mm (17.7 in)</td>
</tr>
</tbody>
</table>

CHECKING THE INNER TUBE
1. Inspect:
   • Inner tube surface "a"
     Score marks → Repair or replace.
     Use #1,000 grit wet sandpaper.
     Damaged oil lock piece → Replace.
   • Inner tube bends
     Out of specification → Replace.
     Use the dial gauge "1".

<table>
<thead>
<tr>
<th>Inner tube bending limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 mm (0.008 in)</td>
</tr>
</tbody>
</table>

**TIP**
The bending value is shown by one half of the dial gauge reading.

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

CHECKING THE OUTER TUBE
1. Inspect:
   • Outer tube "1"
     Score marks/wear/damage → Replace.

**TIP**
Be careful not to excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps 2 to 4.

CHECKING THE ADJUSTER
1. Inspect:
   • Adjuster "1"
   • O-ring "2"
     Wear/damage → Replace.

ASSEMBLING THE FRONT FORK
1. Wash the all parts in a clean solvent.
2. Stretch the damper assembly fully.
3. Fill:
   • Front fork oil "1"
     To damper assembly.

**NOTICE**
Be sure to use recommended fork oil. If other oils are used, they may have an excessively adverse effect on the front fork performance.

Never allow foreign materials to enter the front fork.

4. After filling, pump the damper assembly "1" slowly up and down (about 200 mm (7.9 in) stroke) several times to bleed the damper assembly of air.

**TIP**
Be careful not to excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps 2 to 4.

---

Recommended oil: Suspension oil "S1"
Oil capacity: 199 cm$^3$ (7.00 Imp oz, 6.73 US oz)
5. Measure:
- Oil level (left and right) "a"
  Out of specification → Adjust.

   ![Standard oil level diagram]

   | Standard oil level: |
   | 145-148 mm (5.71-5.83 in) |
   | From top of fully stretched damper assembly. |

6. Tighten:
- Locknut "1"

   **TIP**
   Fully finger tighten the locknut onto the damper assembly.

7. Loosen:
- Compression damping adjuster "1"

   **TIP**
   - Loosen the compression damping adjuster finger tight.
   - Record the set position of the adjuster (the amount of turning out the fully turned in position).

8. Install:
- Base valve "1"
  To damper assembly "2".

   **TIP**
   First bring the damper rod pressure to a maximum. Then install the base valve while releasing the damper rod pressure.

9. Check:
- Damper assembly
  Not fully stretched → Repeat the steps 2 to 8

10. Tighten:
- Base valve "1"

   **Base valve:**
   29 Nm (2.9 m•kg, 21 ft•lb)

   **TIP**
   Hold the damper assembly with the cap bolt ring wrench "2" and use the cap bolt wrench "3" to tighten the base valve with specified torque.

   **Cap bolt wrench:** YM-01500/90890-01500
   **Cap bolt ring wrench:** YM-01501/90890-01501

11. After filling, pump the damper assembly "1" slowly up and down more than 10 times to distribute the fork oil.

12. While protecting the damper assembly "1" with a rag and compressing fully, allow excessive oil to overflow on the base valve side.

   **NOTICE**
   Take care not to damage the damper assembly.

13. Allow the overflowing oil to escape at the hole "a" in the damper assembly.

14. Check:
- Damper assembly smooth movement
  Tightness/binding/rough spots → Repeat the steps 2 to 13.

15. Install:
- Dust seal "1"
- Stopper ring "2"
- Oil seal "3"
- Oil seal washer "4"
- Slide metal "5"
  To inner tube "6".

   **TIP**
   - Apply the fork oil on the inner tube.
   - When installing the oil seal, use vinyl seal "a" with fork oil applied to protect the oil seal lip.
   - Install the oil seal with its manufacturer’s marks or number facing the axle holder side.

---

**Standard oil level:**
145-148 mm (5.71-5.83 in)
From top of fully stretched damper assembly.

**Base valve:**
29 Nm (2.9 m•kg, 21 ft•lb)

**Cap bolt wrench:** YM-01500/90890-01500
**Cap bolt ring wrench:** YM-01501/90890-01501

---

5-20
16. Install:
- Piston metal "1" New

TIP
Install the piston metal onto the slot on inner tube.

17. Install:
- Outer tube "1" New
  To inner tube "2".

18. Install:
- Slide metal "1" New
  - Oil seal washer "2" New
  To outer tube slot.

TIP
Press the slide metal into the outer tube with fork seal driver "3".

19. Install:
- Oil seal "1"

TIP
Press the oil seal into the outer tube with fork seal driver "2".

20. Install:
- Stopper ring "1"

TIP
Fit the stopper ring correctly in the groove in the outer tube.

21. Install:
- Dust seal "1"

TIP
Apply the lithium soap base grease on the inner tube.

22. Check:
- Inner tube smooth movement
  Tightness/binding/rough spots → Repeat the steps 15 to 21.

23. Measure:
- Distance "a"
  Out of specification → Turn into the locknut.

Distance "a":
16 mm (0.63 in) or more
Between the damper assembly "1" bottom and locknut "2" bottom.

24. Install:
- Collar "1" New
- Fork spring "2" New
  To damper assembly "3".

TIP
Install the collar with its larger dia. end "a" facing the fork spring.

25. Install:
- Damper assembly "1" New
  To inner tube "2".

NOTICE
To install the damper assembly into the inner tube, hold the inner tube aslant. If the inner tube is held vertically, the damper assembly may fall into it, damaging the valve inside.
26. Loosen:
- Rebound damping adjuster "1"

**TIP**
- Loosen the rebound damping adjuster finger tight.
- Record the set position of the adjuster (the amount of turning out the fully turned in position).

27. Install:
- Push rod "1"
- Copper washer "2" New
- Adjuster "3" To damper assembly "4".

**TIP**
- While compressing the inner tube "5", set the cap bolt ring wrench "7" between the inner tube and locknut "6".
- Fully finger tighten the adjuster onto the damper assembly.

**Cap bolt ring wrench:**
YM-01501/50890-01501

28. Inspect:
- Gap "a" between the adjuster "1" and locknut "2".
- Out of specification → Retighten and readjust the locknut.

**Gap "a" between the adjuster and locknut:**
0.5–1.0 mm (0.02–0.04 in)

**TIP**
If the adjuster is installed out of specification, proper damping force cannot be obtained.

29. Tighten:
- Adjuster (locknut) "1"

**TIP**
Hold the locknut "2" and tighten the adjuster with specified torque.

**Adjuster (locknut):**
29 Nm (2.9 m•kg, 21 ft•lb)

30. Install:
- Adjuster "1" To inner tube.

**Adjuster:**
55 Nm (5.5 m•kg, 40 ft•lb)

31. Fill:
- Front fork oil "1"
- From outer tube top.

**Recommended oil:**
- Suspension oil "S1"
- Standard oil amount:
  - 350 cm³ (12.3 Imp oz, 11.8 US oz)
  - 337 cm³ (11.9 Imp oz, 11.4 US oz)

**Extent of adjustment:**
300–375 cm³
(10.6–13.2 Imp oz, 10.1–12.7 US oz)

* Except for USA & CDN

32. Install:
- Damper assembly "1" To outer tube.

**TIP**
Temporarily tighten the damper assembly.

33. Install:
- Protector guide "1"
INSTALLING THE FRONT FORK

1. Install:
   • Front fork “1”

   **TIP**
   - Temporarily tighten the pinch bolts (lower bracket).
   - Do not tighten the pinch bolts (upper bracket) yet.

2. Tighten:
   • Damper assembly “1”

   **TIP**
   Use the cap bolt ring wrench “2” to tighten the damper assembly with specified torque.

3. Adjust:
   • Front fork top end “a”

4. Tighten:
   • Pinch bolt (upper bracket) “1”

   **TIP**
   Use the cap bolt ring wrench “2” to tighten the damper assembly with specified torque.

   **WARNING**
   Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.

5. Install:
   • Protector “1”
   • Bolt (protector) “2”

6. Adjust:
   • Rebound damping force

   **TIP**
   Turn in the damping adjuster “1” finger-tight and then turn out to the originally set position.

7. Adjust:
   • Compression damping force

   **TIP**
   Turn in the damping adjuster “1” finger-tight and then turn out to the originally set position.
## REMOVING THE HANDLEBAR

### Order | Part name | Q'ty | Remarks
--- | --- | --- | ---
1 | Number plate | Remove the band only. |
2 | Hot starter cable | 1 | Disconnect at the lever side. |
3 | Hot starter lever holder | 1 |
4 | Clutch cable | 1 | Disconnect at the lever side. |
5 | Clutch lever holder | 1 |
6 | Engine stop switch | 1 |
7 | Brake master cylinder | 1 | Refer to removal section. |
8 | Throttle cable cap | 1 |
9 | Throttle cable #1 (pulled) | 1 | Disconnect at the throttle side. |
10 | Throttle cable #2 (pushed) | 1 | Disconnect at the throttle side. |
11 | Right grip | 1 | Refer to removal section. |
12 | Tube guide | 1 |
13 | Collar | 1 |
14 | Left grip | 1 | Refer to removal section. |
15 | Handlebar upper holder | 2 |
16 | Handlebar | 1 |
17 | Handlebar lower holder | 2 |
**REMOVING THE BRAKE MASTER CYLINDER**

1. Remove:
   - Brake master cylinder bracket "1"
   - Brake master cylinder "2"

**NOTICE**

- Do not let the brake master cylinder hang on the brake hose.
- Keep the brake master cylinder cap side horizontal to prevent air from coming in.

**REMOVING THE GRIP**

1. Remove:
   - Grip "1"

**TIP**

Blow in air between the handlebar or tube guide and the grip. Then remove the grip which has become loose.

**CHECKING THE HANDLEBAR**

1. Inspect:
   - Handlebar "1"
     - Bends/cracks/damage → Replace.

**WARNING**

Do not attempt to straighten a bent handlebar as this may dangerously weaken the handlebar.

**INSTALLING THE HANDLEBAR**

1. Install:
   - Handlebar lower holder "1"
   - Washer "2"
   - Nut (handlebar lower holder) "3"

**TIP**

- Be sure the side of the handlebar lower holder having the greater distance "a" from the mounting bolt center faces forward. And install it in the hole "b" in the rear of the upper bracket.
- Apply the lithium soap base grease on the thread of the handlebar lower holder.
- Change in the direction back to front and installing position of the handlebar lower holder allows the front-to-rear offset amount of the handlebar position to be changed.
- Do not tighten the nut yet.

**INSTALLING THE HANDLEBAR**

2. Install:
   - Handlebar "1"
   - Handlebar upper holder "2"
   - Bolt (handlebar upper holder) "3"

**TIP**

- The handlebar upper holder should be installed with the punched mark "a" forward.
- Install the handlebar so that the marks "b" are in place on both sides.
- Install the handlebar so that the projection "c" of the handlebar upper holder is positioned at the mark on the handlebar as shown.
- First tighten the bolts on the front side of the handlebar upper holder, and then tighten the bolts on the rear side.

| Bolt (handlebar upper holder): | 28 Nm (2.8 m•kg, 20 ft•lb) |
3. Tighten:
   • Nut (handlebar lower holder) "1"

   **TIP**
   - Nut (handlebar lower holder):
     34 Nm (3.4 m•kg, 24 ft•lb)

4. Install:
   • Left grip "1"
     Apply the adhesive to the handlebar "2".
   **TIP**
   - Before applying the adhesive, wipe off grease or oil on the handlebar surface "a" with a lacquer thinner.
   - Install the left grip to the handlebar so that the line "b" between the two arrow marks faces straight upward.

5. Install:
   • Right grip "1"
   • Collar "2"
     Apply the adhesive on the tube guide "3".
   **TIP**
   - Before applying the adhesive, wipe off grease or oil on the tube guide surface "a" with a lacquer thinner.
   - Install the grip to the tube guide so that the grip match mark "b" and tube guide slot "c" form the angle as shown.

6. Install:
   • Collar "1"
   • Grip cap cover "2"
   • Throttle grip "3"

   **TIP**
   - Apply the adhesive to the handlebar "2".

7. Install:
   • Throttle cables "1"
     To tube guide "2".
   **TIP**
   - Apply the lithium soap base grease on the throttle grip sliding surface.

8. Install:
   • Throttle cable cap "1"
   • Screw (throttle cable cap) "2"

   **TIP**
   - Apply the lithium soap base grease on the throttle cable end and tube guide cable winding portion.

9. Install:
   • Grip cap cover "1"
   • Cover (throttle cable cap) "2"

10. Install:
    • Brake master cylinder "1"
    • Brake master cylinder bracket "2"
    • Bolt (brake master cylinder bracket) "3"
    **TIP**
    - Install the bracket so that the arrow mark "a" faces upward.
    - First tighten the bolt on the upper side of the brake master cylinder bracket, and then tighten the bolt on the lower side.

11. Install:
    • Engine stop switch "1"
    • Clutch lever holder "2"
    • Bolt (clutch lever holder) "3"
    • Hot starter lever holder "4"
    • Bolt (hot starter lever holder) "5"
    **TIP**
    - First tighten the bolt on the upper side of the hot starter lever holder, and then tighten the bolt on the lower side.

   **WARNING**
   - After tightening the screws, check that the throttle grip "3" moves smoothly. If it does not, retighten the bolts for adjustment.
• Clamp "6"

**TIP**
- The engine stop switch, clutch lever holder and clamp should be installed according to the dimensions shown.
- Pass the engine stop switch lead in the middle of the clutch lever holder.

12. Install:
- Clutch cable "1"
- Hot starter cable "2"

**TIP**
Apply the lithium soap base grease on the clutch cable end and hot starter cable end.

13. Adjust:
- Clutch lever free play
  Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" section in the CHAPTER 3.
- Hot starter lever free play
  Refer to "ADJUSTING THE HOT STARTER LEVER FREE PLAY" section in the CHAPTER 3.
**STEERING**

**REMOVING THE STEERING**

**TIGHTENING STEPS:**
- Tighten ring nut. 38 Nm (3.8 m·kg, 27 ft·lb)
- Loosen it one turn.
- Retighten it. 7 Nm (0.7 m·kg, 5.1 ft·lb)

Hold the machine by placing the suitable stand under the engine.

Refer to "HANDLING NOTE".

Refer to "SEAT, FUEL TANK AND SIDE COVERS" section in the CHAPTER 4.

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front fender</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Steering stem nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Front fork</td>
<td>2</td>
<td>Refer to &quot;FRONT FORK&quot; section.</td>
</tr>
<tr>
<td>4</td>
<td>Upper bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Steering ring nut</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>6</td>
<td>Lower bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Bearing race cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Upper bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lower bearing</td>
<td>1</td>
<td>Refer to removal section.</td>
</tr>
<tr>
<td>10</td>
<td>Bearing race</td>
<td>2</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
HANDLING NOTE

**WARNING**
Support the machine securely so there is no danger of it falling over.

REMOVING THE STEERING RING NUT
1. Remove:
   - Steering ring nut "1"
   - Use the steering nut wrench "2".

**WARNING**
Support the steering stem so that it may not fall down.

REMOVING THE STEERING STEM
1. Inspect:
   - Steering stem "1"
     Bend/damage → Replace.

CHECKING THE BEARING AND BEARING RACE
1. Wash the bearings and bearing races with a solvent.
2. Inspect:
   - Bearing "1"
   - Bearing race
     Pitting/damage → Replace bearings and bearing races as a set. Install the bearing in the bearing races. Spin the bearings by hand. If the bearings hang up or are not smooth in their operation in the bearing races, replace bearings and bearing races as a set.

INSTALLING THE LOWER BRACKET
1. Install:
   - Lower bearing "1"
   - Apply the lithium soap base grease on the dust seal lip and bearing inner circumference.

TIP
Apply the lithium soap base grease on the bearing and bearing race cover lip.

REMOVING THE LOWER BEARING
1. Remove:
   - Lower bearing "1"
   - Use the floor chisel "2".

NOTICE
Take care not to damage the steering shaft thread.

REMOVING THE BEARING RACE
1. Remove:
   - Bearing race "1"
   - Remove the bearing race using long rod "2" and the hammer.

TIP
Apply the lithium soap base grease on the dust seal lip and bearing inner circumference.

INSTALLING THE LOWER BRACKET
1. Install:
   - Lower bearing "1"

TIP
Apply the lithium soap base grease on the bearing, the portion "a" and thread of the steering stem.

4. Install:
   - Steering ring nut "1"

TIP
Install the steering nut with its stepped side "a" facing downward.

**WARNING**
Steering nut wrench:
YU-33975/90890-01403

**WARNING**
Steering ring nut:
7 Nm (0.7 m•kg, 5.1 ft•lb)

**WARNING**
CHECKING AND ADJUSTING THE STEERING HEAD section in the CHAPTER 3.
5. 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.

6. Install:
   • Washer “1”

7. Install:
   • Front fork “1”
   • Upper bracket “2”

**TIP**
• Temporarily tighten the pinch bolts (lower bracket).
• Do not tighten the pinch bolts (upper bracket) yet.

8. Install:
   • Steering stem nut “1”

   **Steering stem nut:**
   145 Nm (14.5 m•kg, 105 ft•lb)

   **TIP**
   Apply the lithium soap base grease on the contact surface of the steering stem nut when installing.

9. After tightening the nut, check the steering for smooth movement. If not, adjust the steering by loosening the steering ring nut little by little.

10. Adjust:
    • Front fork top end “a”

   **Front fork top end (standard) “a”:**
   5 mm (0.20 in)

11. Tighten:
    • Pinch bolt (upper bracket) “1”

   **Pinch bolt (upper bracket):**
   21 Nm (2.1 m•kg, 15 ft•lb)

   • Pinch bolt (lower bracket) “2”

   **Pinch bolt (lower bracket):**
   21 Nm (2.1 m•kg, 15 ft•lb)

**WARNING**
Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.

---

5-30
# SWINGARM

## REMOVING THE SWINGARM

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold the machine by placing the suitable stand under the engine.</td>
<td>Refer to &quot;HANDLING NOTE&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake hose holder</td>
<td>Refer to &quot;FRONT BRAKE AND REAR BRAKE&quot; section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear brake caliper</td>
<td>Refer to &quot;FRONT BRAKE AND REAR BRAKE&quot; section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolt (brake pedal)</td>
<td>Shift the brake pedal backward.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive chain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Drive chain support</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Lower chain tensioner</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Bolt (rear shock absorber-relay arm)</td>
<td>1</td>
<td>Hold the swingarm.</td>
<td></td>
</tr>
<tr>
<td>4 Bolt (connecting rod)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Pivot shaft</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Swingarm</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

53 Nm (5.3 m·kg, 38 ft·lb)

16 Nm (1.6 m·kg, 11 ft·lb)

7 Nm (0.7 m·kg, 5.1 ft·lb)

85 Nm (8.5 m·kg, 61 ft·lb)

80 Nm (8.0 m·kg, 58 ft·lb)
DISASSEMBLING THE SWINGARM

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Qty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relay arm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Connecting rod</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Collar</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Thrust bearing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Bushing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil seal</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bearing</td>
<td>10</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>
HANDLING NOTE

**WARNING**

Support the machine securely so there is no danger of it falling over.

**REMOVING THE BEARING**

1. Remove:
   - Bearing "1"

**TIP**

Remove the bearing by pressing its outer race.

2. Inspect:
   - Bearing "1"
   - Collar "2"

   Free play exists/unsmooth revolution/rust → Replace bearing and collar as a set.

3. Inspect:
   - Oil seal "3"
   - Damage → Replace.

**CHECKING THE SWINGARM**

1. Inspect:
   - Bearing "1"
   - Bushing "2"

   Free play exists/unsmooth revolution/rust → Replace bearing and bushing as a set.

2. Inspect:
   - Oil seal "3"
   - Damage → Replace.

**CHECKING THE RELAY ARM**

1. Inspect:
   - Bearing "1"
   - Collar "2"

   Free play exists/unsmooth revolution/rust → Replace bearing and collar as a set.

2. Inspect:
   - Oil seal "3"
   - Damage → Replace.

**INSTALLING THE BEARING AND OIL SEAL**

1. Install:
   - Bearing "1"
   - Oil seal "2"

   To swingarm.

**TIP**

- Apply the molybdenum disulfide grease on the bearing when installing.
- Install the bearing by pressing it on the side having the manufacture's marks or numbers.
- Apply the molybdenum disulfide grease on the washer.

2. Install:
   - Bearing "1"
   - Washer "2"
   - Oil seal "3"

   To relay arm.

**TIP**

- Apply the molybdenum disulfide grease on the bearing when installing.
- Install the bearing by pressing it on the side having the manufacture's marks or numbers.
- Apply the molybdenum disulfide grease on the washer.

---

**Installed depth of bearings: Outer "a": Zero mm (Zero in)**

**Installed depth of bearings: Inner "b": 6.5 mm (0.26 in)**

---

**Installed depth of bearings: "a": Zero mm (Zero in)**

**Installed depth of bearings: "a": Zero mm (Zero in)**
INSTALLING THE SWINGARM

1. Install:
   - Bushing "1"
   - Thrust bearing "2"
   - Oil seal "3"
   - Collar "4"
   To swingarm "5".

   **TIP**
   Apply the molybdenum disulfide grease on the bushings, thrust bearings, oil seal lips and contact surfaces of the collar and thrust bearing.

2. Install:
   - Collar "1"
   - Washer "2"
   To relay arm "3".

   **TIP**
   Apply the molybdenum disulfide grease on the collars and oil seal lips.

3. Install:
   - Collar "1"
   To connecting rod "2".

   **TIP**
   Apply the molybdenum disulfide grease on the collar and oil seal lips.

4. Install:
   - Connecting rod "1"
   - Bolt (connecting rod) "2"
   - Washer "3"
   - Nut (connecting rod) "4"
   To relay arm "5".

   **TIP**
   Apply the molybdenum disulfide grease on the bolt.

5. Install:
   - Relay arm "1"
   - Bolt (relay arm) "2"
   - Washer "3"
   - Nut (relay arm) "4"
   To swingarm.

   **TIP**
   Apply the molybdenum disulfide grease on the bolt circumference and threaded portion.
   - Do not tighten the nut yet.

6. Install:
   - Swingarm "1"
   - Pivot shaft "2"

   **TIP**
   Apply the molybdenum disulfide grease on the pivot shaft.
   - Insert the pivot shaft from right side.

   **TIP**
   Apply the molybdenum disulfide grease on the bolt.

7. Check:
   - Swingarm side play "a"
     Free play exists → Replace thrust bearing.
   - Swingarm up and down movement "b"
     Unsmooth movement/binding/rough spots → Grease or replace bearings, bushings and collars.

8. Install:
   - Bolt (connecting rod) "1"
   - Washer "2"
   - Nut (connecting rod) "3"

   **TIP**
   Apply the molybdenum disulfide grease on the bolt.
   - Do not tighten the nut yet.

9. Install:
   - Bolt (rear shock absorber-relay arm) "1"
   - Nut (rear shock absorber-relay arm) "2"

   **Nut (rear shock absorber-relay arm):**
   53 Nm (5.3 m•kg, 38 ft•lb)

   **TIP**
   Apply the molybdenum disulfide grease on the bolt.

10. Tighten:
    - Nut (connecting rod) "1"

    **Nut (connecting rod):**
    80 Nm (8.0 m•kg, 58 ft•lb)
11. Tighten:
- Nut (relay arm) "1"

<table>
<thead>
<tr>
<th>Nut (relay arm):</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 Nm (7.0 m·kg, 50 ft·lb)</td>
</tr>
</tbody>
</table>

12. Install:
- Bolt (lower chain tensioner) "1"
- Washer "2"
- Collar "3"
- Lower chain tensioner "4"
- Nut (lower chain tensioner) "5"

<table>
<thead>
<tr>
<th>Nut (lower chain tensioner):</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Nm (1.6 m·kg, 11 ft·lb)</td>
</tr>
</tbody>
</table>

13. Install:
- Drive chain support "1"
- Drive chain support cover "2"
- Bolt [drive chain support \(L = 50\) mm (1.97 in)] "3"
- Nut (drive chain support) "4"

<table>
<thead>
<tr>
<th>Nut (drive chain support):</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Nm (0.7 m·kg, 5.1 ft·lb)</td>
</tr>
</tbody>
</table>

- Bolt [drive chain support cover \(L = 10\) mm (0.39 in)] "5"

<table>
<thead>
<tr>
<th>Bolt (drive chain support cover):</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Nm (0.7 m·kg, 5.1 ft·lb)</td>
</tr>
</tbody>
</table>

**REAR SHOCK ABSORBER**

**REMOVING THE REAR SHOCK ABSORBER**

<table>
<thead>
<tr>
<th>Order</th>
<th>Part name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clamp (air filter joint)</td>
<td>1</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>2</td>
<td>Rear frame</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bolt (rear shock absorber-relay arm)</td>
<td>1</td>
<td>Hold the swingarm.</td>
</tr>
<tr>
<td>4</td>
<td>Bolt (rear shock absorber-frame)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rear shock absorber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Locknut</td>
<td>1</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>7</td>
<td>Adjuster</td>
<td>1</td>
<td>Only loosening.</td>
</tr>
<tr>
<td>8</td>
<td>Lower spring guide</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Upper spring guide</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Spring (rear shock absorber)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Bearing</td>
<td>2</td>
<td>Refer to removal section.</td>
</tr>
</tbody>
</table>

Refer to "HANDLING NOTE".

Refer to "SEAT, FUEL TANK AND SIDE COVERS" section in the CHAPTER 4.

Refer to "EXHAUST PIPE AND SILENCER" section in the CHAPTER 4.
HANDLING NOTE

**WARNING**

- Support the machine securely so there is no danger of it falling over.
- This rear shock absorber is provided with a separate type tank filled with high-pressure nitrogen gas. To prevent the danger of explosion, 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.
- Never tamper or attempt to disassemble the cylinder or the tank.
- Never throw the rear shock absorber into an open flame or other high heat. The rear shock absorber may explode as a result of nitrogen gas expansion and/or damage to the hose.
- Be careful not to damage any part of the gas tank. A damaged gas tank will impair the damping performance or cause a malfunction.
- Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.
- Never attempt to remove the plug at the bottom of the nitrogen gas tank. It is very dangerous to remove the plug.
- When scrapping the rear shock absorber, follow the instructions on disposal.

**NOTES ON DISPOSAL (YAMAHA DEALERS ONLY)**

Before disposing the rear shock absorber, be sure to extract the nitrogen gas from valve "1". Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

**WARNING**

To dispose of a damaged or worn-out rear shock absorber, take the unit to your Yamaha dealer for this disposal procedure.

**REMOVING THE BEARING**

1. Remove:
   - Stopper ring (upper bearing) "1"
   **TIP**
   Press in the bearing while pressing its outer race and remove the stopper ring.

2. Remove:
   - Upper bearing "1"
   **TIP**
   Remove the bearing by pressing its outer race.

3. Remove:
   - Lower bearing "1"
   **TIP**
   Remove the bearing by pressing its outer race.

**CHECKING THE REAR SHOCK ABSORBER**

1. Inspect:
   - Damper rod "1"
     Bends/damage → Replace rear shock absorber assembly.
   - Shock absorber "2"
     Oil leaks → Replace rear shock absorber assembly.
     Gas leaks → Replace rear shock absorber assembly.
   - Spring "3"
     Damage → Replace spring.
     Fatigue → Replace spring.
     Move spring up and down.
   - Spring guide "4"
     Wear/damage → Replace spring guide.
   - Bearing "5"
     Free play exists/unsmooth revolution/rust → Replace.
REAR SHOCK ABSORBER

INSTALLING THE BEARING
1. Install:
   • Upper bearing "1"

   **TIP**
   Install the bearing parallel until the stopper ring groove appears by pressing its outer race.

2. Install:
   • Stopper ring (upper bearing) "1"

   **TIP**
   After installing the stopper ring, push back the bearing until it contacts the stopper ring.

3. Install:
   • Lower bearing "1"

   **TIP**
   Install the bearing by pressing it on the side having the manufacturer's marks or numbers.

   **Installed depth of the bearing “a”:**
   4 mm (0.16 in)

INSTALLING THE SPRING (REAR SHOCK ABSORBER)
1. Install:
   • Spring "1"
   • Upper spring guide "2"
   • Lower spring guide "3"

2. Tighten:
   • Adjuster "1"

3. Adjust:
   • Spring length (installed)

   **TIP**
   Refer to "ADJUSTING THE REAR SHOCK ABSORBER SPRING PRELOAD" section in the CHAPTER 3.

4. Tighten:
   • Locknut "1"

INSTALLING THE REAR SHOCK ABSORBER
1. Install:
   • Dust seal "1"
   • O-ring "2"
   • Collar "3"

   **TIP**
   Apply the molybdenum disulfide grease on the dust seal lips and collars.
   Apply the lithium soap base grease on the O-rings.

2. Install:
   • Bushing "1"
   • Collar "2"
   • Dust seal "3"

   **TIP**
   Apply the molybdenum disulfide grease on the bearing and dust seal lips.
   Install the dust seals with their lips facing inward.

3. Install:
   • Rear shock absorber

4. Install:
   • Bolt (rear shock absorber-frame) "1"
   • Washer "2"
   • Nut (rear shock absorber-frame) "3"

   **Nut (rear shock absorber-frame):**
   56 Nm (5.6 m•kg, 40 ft•lb)

   **TIP**
   Apply the molybdenum disulfide grease on the bolt.

5. Install:
   • Bolt (rear shock absorber-relay arm) "1"
   • Nut (rear shock absorber-relay arm) "2"

   **Nut (rear shock absorber-relay arm):**
   53 Nm (5.3 m•kg, 38 ft•lb)

   **TIP**
   Apply the molybdenum disulfide grease on the bolt.
6. Install:
   • Rear frame "1"
   • Bolt [rear frame (upper)] "2"

   Bolt [rear frame (upper)]:
   32 Nm (3.2 m•kg, 23 ft•lb)

   • Bolt [rear frame (lower)] "3"

   Bolt [rear frame (lower)]:
   32 Nm (3.2 m•kg, 23 ft•lb)

7. Tighten:
   • Bolt (air filter joint) "1"

   Bolt (air filter joint):
   3 Nm (0.3 m•kg, 2.2 ft•lb)
ELECTRICAL

TIP
This section is intended for those who have basic knowledge and skill concerning the servicing of Yamaha motorcycles (e.g., Yamaha dealers, service engineers, etc.) Those who have little knowledge and skill concerning servicing are requested not to undertake inspection, adjustment, disassembly, or reassembly only by reference to this manual. It may lead to servicing trouble and mechanical damage.
ELECTRICAL COMPONENTS AND WIRING DIAGRAM

ELECTRICAL COMPONENTS

1. Engine stop switch
2. Throttle position sensor
3. Neutral switch
4. CDI magneto
5. Ignition coil
6. Spark plug
7. CDI unit

WIRING DIAGRAM

COLOR CODE

B  Black
Br  Brown
G  Green
L  Blue
O  Orange
P  Pink
R  Red
Sb  Sky blue
W  White
Y  Yellow

B/L  Black/Blue
B/W  Black/White
B/Y  Black/Yellow
G/B  Green/Black
L/W  Blue/White
R/W  Red/White
IGNITION SYSTEM

INSPECTION STEPS
Use the following steps for checking the possibility of the malfunctioning engine being attributable to ignition system failure and for checking the spark plug which will not spark.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spark gap test</td>
<td>No spark →</td>
</tr>
<tr>
<td>No good →</td>
<td>Repair or replace.</td>
</tr>
</tbody>
</table>

Check entire ignition system for connection. (couplers, leads and ignition coil)

<table>
<thead>
<tr>
<th>Action</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK ↓</td>
<td>No good → Repair or replace.</td>
</tr>
<tr>
<td>Check engine stop switch.</td>
<td>No good → Replace.</td>
</tr>
<tr>
<td>Check ignition coil. (primary coil and secondary coil)</td>
<td>No good → Replace.</td>
</tr>
<tr>
<td>OK ↓</td>
<td>No good → Replace.</td>
</tr>
<tr>
<td>Check CDI magneto. (pickup coil and charging coil)</td>
<td>OK ↓</td>
</tr>
<tr>
<td>No good → Replace.</td>
<td></td>
</tr>
<tr>
<td>Check neutral switch.</td>
<td>OK ↓</td>
</tr>
<tr>
<td>No good → Repair or replace.</td>
<td></td>
</tr>
<tr>
<td>Replace CDI unit.</td>
<td></td>
</tr>
</tbody>
</table>

*marked: Only when the ignition checker is used.

TIP
- Remove the following parts before inspection.
  1. Seat
  2. Fuel tank
- Use the following special tools in this inspection.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic spark tester:</td>
<td>YM-34487</td>
</tr>
<tr>
<td>Ignition checker:</td>
<td>90890-06754</td>
</tr>
<tr>
<td>Pocket tester:</td>
<td>YU-3112-C/90890-03112</td>
</tr>
</tbody>
</table>
IGNITION SYSTEM

SPARK GAP TEST
1. Disconnect the ignition coil from spark plug.
2. Remove the ignition coil cap.
3. Connect the dynamic spark tester “1” (ignition checker “2”) as shown.
   • Ignition coil “3”
   • Spark plug “4”

A. For USA and CDN
B. Except for USA and CDN
4. Kick the kickstarter crank.
5. Check the ignition spark gap.
6. Start engine, and increase spark gap until misfire occurs. (for USA and CDN only)

Minimum spark gap: 6.0 mm (0.24 in)

CHECKING THE COUPLERS, LEADS AND IGNITION COIL CONNECTION
1. Check:
   • Couplers and leads connection
     Rust/dust/looseness/short-circuit → Repair or replace.
   • Ignition coil and spark plug as they are fitted
     Push in the ignition coil until it closely contacts the spark plug hole in the cylinder head cover.

CHECKING THE ENGINE STOP SWITCH
1. Inspect:
   • Engine stop switch conduction

<table>
<thead>
<tr>
<th>Tester (+) lead</th>
<th>Tester (-) lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/White lead “1”</td>
<td>Black lead “2”</td>
</tr>
</tbody>
</table>

Result
Conductive (while the engine stop switch is pushed)
Not conductive while it is pushed → Replace.
Conductive while it is freed → Replace.

TIP
Set the tester selection position to “Ω x 1”.

CHECKING THE IGNITION COIL
1. Remove the ignition coil cap.
2. Inspect:
   • Primary coil resistance
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Tester (+) lead</th>
<th>Tester (-) lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange lead “1”</td>
<td>Black lead “2”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tester selector position</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Ω x 1”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tester selector position</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Ω x 1”</td>
</tr>
</tbody>
</table>

CHECKING THE CDI MAGNETO
1. Inspect:
   • Pickup coil resistance
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Tester (+) lead</th>
<th>Tester (-) lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red lead “1”</td>
<td>White lead “2”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tester selector position</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Ω x 100”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tester selector position</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Ω x 100”</td>
</tr>
</tbody>
</table>

Minimum spark gap: 6.0 mm (0.24 in)
IGNITION SYSTEM

2. Inspect:
   - Charging coil 1 resistance
     Out of specification → Replace.
     
     | Tester (+) lead | Brown lead "1" |
     |-----------------|--------------|
     | Tester (-) lead | Green lead "2" |
     | Charging coil 1 resistance | Tester selection position |
     | 720-1,080 Ω at 20 °C (68 °F) | Ω ×100 |

3. Inspect:
   - Charging coil 2 resistance
     Out of specification → Replace.
     
     | Tester (+) lead | Pink lead "1" |
     |-----------------|--------------|
     | Tester (-) lead | Black lead "2" |
     | Charging coil 2 resistance | Tester selection position |
     | 44-66 Ω at 20 °C (68 °F) | Ω ×10 |

CHECKING THE NEUTRAL SWITCH
1. Inspect:
   - Neutral switch conduction

     | Tester (+) lead | Sky blue lead "1" |
     |-----------------|------------------|
     | Tester (-) lead | Ground "2" |
     | Result | Conductive (while gear is in neutral) |

Not conductive while it is in neutral → Replace.
Conductive while it is engaged → Replace.

TIP
Set the tester selection position to "Ω × 1".

CHECKING THE CDI UNIT
Check all electrical components. If no fault is found, replace the CDI unit.
Then check the electrical components again.
### THROTTLE POSITION SENSOR SYSTEM

**INSPECTION STEPS**

If the throttle position sensor will not operate, use the following inspection steps.

<table>
<thead>
<tr>
<th>Inspection Step</th>
<th>Check Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check entire ignition system for connection.</td>
<td>OK ↓</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td>Check throttle position sensor. (Throttle position sensor coil)</td>
<td>No good →</td>
<td>Replace.</td>
</tr>
<tr>
<td>*Check CDI magneto. (Charging coil)</td>
<td>No good →</td>
<td>Replace.</td>
</tr>
<tr>
<td>Check CDI unit. (Throttle position sensor input voltage)</td>
<td>No good →</td>
<td>Replace.</td>
</tr>
</tbody>
</table>

*marked: Refer to "IGNITION SYSTEM" section.

**TIP**

Use the following special tools in this inspection.

Pocket tester: YU-3112-C/90890-03112
HANDLING NOTE

**NOTICE**

Do not loosen the screw (throttle position sensor) “1” except when changing the throttle position sensor due to failure because it will cause a drop in engine performance.

CHECKING THE COUPLERS AND LEADS CONNECTION

1. Check:
   - Couplers and leads connection
     Rust/dust/looseness/short-circuit → Repair or replace.

CHECKING THE THROTTLE POSITION SENSOR COIL

1. Inspect:
   - Throttle position sensor coil resistance
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Tester (+) lead → Yellow lead “1”</th>
<th>Tester (-) lead → Black lead “2”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Tester selector position</td>
<td>Throttle position sensor coil variable resistance</td>
</tr>
<tr>
<td></td>
<td>Full closed</td>
</tr>
<tr>
<td>Tester selector position</td>
<td>kΩ x1</td>
</tr>
<tr>
<td></td>
<td>Zero – 3 kΩ at 20°C (68 °F)</td>
</tr>
</tbody>
</table>

2. Loosen:
   - Throttle stop screw “1”

TIP

Turn out the throttle stop screw until the throttle shaft is in the full close position.

3. Inspect:
   - Throttle position sensor coil variable resistance
     Check that the resistance in increased as the throttle grip is moved from the full close position to the full open position.
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Tester (+) lead → Yellow lead “1”</th>
<th>Tester (-) lead → Black lead “2”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Tester selector position</td>
<td>Throttle position sensor coil variable resistance</td>
</tr>
<tr>
<td></td>
<td>Full closed</td>
</tr>
<tr>
<td>Tester selector position</td>
<td>kΩ x1</td>
</tr>
<tr>
<td></td>
<td>Zero – 3 kΩ at 20°C (68 °F)</td>
</tr>
</tbody>
</table>

4. Install:
   - Throttle position sensor “1”
   - Screw (throttle position sensor) “2”

TIP

- Align the slot “a” in the throttle position sensor with the projection “b” on the carburetor.
- Temporarily tighten the screw (throttle position sensor).

CHANGING AND ADJUSTING THE THROTTLE POSITION SENSOR

1. Remove:
   - Throttle position sensor coupler
   - Carburetor

2. Remove:
   - Screw (throttle position sensor) “1”
   - Throttle position sensor “2”

3. Replace:
   - Throttle position sensor

5. Install:
   - Carburetor
   - Throttle position sensor coupler

6. Adjust:
   - Engine idling speed
     Refer to "ADJUSTING THE ENGINE IDLING SPEED" section in the CHAPTER 3.

7. Insert the thin electric conductors “2” (lead) into the throttle position sensor coupler “1”, as shown, and connect the tester to them.

<table>
<thead>
<tr>
<th>Tester (+) lead → Yellow lead “3”</th>
<th>Tester (-) lead → Black lead “4”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Tester selector position</td>
<td>Throttle position sensor coil variable resistance</td>
</tr>
<tr>
<td></td>
<td>Full closed</td>
</tr>
<tr>
<td>Tester selector position</td>
<td>kΩ x1</td>
</tr>
<tr>
<td></td>
<td>Zero – 3 kΩ at 20°C (68 °F)</td>
</tr>
</tbody>
</table>

TIP

- Do not insert the electric conductors more than required because it may reduce the waterproof function of the coupler.
- Make sure that a short-circuit does not develop between the terminals because it may cause damage to electrical components.
8. Start the engine.
9. Adjust:
   • Throttle position sensor output voltage

Adjustment steps:
a. Adjust the installation angle of the throttle position sensor "1" to obtain the specified output voltage.

TIP
Measure the output voltage accurately with a digital electronic voltmeter that gives an easy reading of a small voltage.

10. Put the aligning marks "a" on the throttle position sensor and carburetor.

11. Stop the engine.
12. Remove the carburetor.
13. Tighten:
   • Screw (throttle position sensor) "1"
   
   Tighten the screw (throttle position sensor) using the T25 bit.


CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE
1. Disconnect the throttle position sensor coupler.
2. Start the engine.
3. Inspect:
   • Throttle position sensor input voltage
   Out of specification → Replace the CDI unit.

| Tester (+) lead → Blue lead "1" | Tester (-) lead → Black/Blue lead "2"
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Throttle position sensor input voltage</td>
<td>Tester selector position</td>
</tr>
<tr>
<td>4–6 V</td>
<td>DCV-20</td>
</tr>
</tbody>
</table>

Throttle position sensor output voltage

<table>
<thead>
<tr>
<th>Throttle position sensor output voltage</th>
<th>Tester selector position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.58–0.78 V</td>
<td>DCV</td>
</tr>
</tbody>
</table>
ENGINE

TUNING

ENGINE

CARBURETOR SETTING

• The air/fuel mixture will vary depending on atmospheric conditions. Therefore, it is necessary to take into consideration the air pressure, ambient temperature, humidity, etc., when adjusting the carburetor.
• Perform a test run to check for proper engine performance (e.g., throttle response) and spark plug(s) discoloration or fouling. Use these readings to determine the best possible carburetor setting.

TIP

It is recommended to keep a record of all carburetor settings and external conditions (e.g., atmospheric conditions, track/surface conditions, lap times) to make future carburetor setting easier.

WARNING

• The carburetor is a part of the fuel line. Therefore, be sure to install it in a wellventilated area, away from flammable objects and any sources of fire.
• Never look into the carburetor intake. Flames may shoot out from the pipe if the engine backfires while it is being started. Gasoline may be discharged from the accelerator pump nozzle when the carburetor has been removed.

NOTICE

• The carburetor is extremely sensitive to foreign matter (dirt, sand, water, etc.). During installation, do not allow foreign matter to get into the carburetor.
• Always handle the carburetor and its components carefully. Even slight scratches, bends or damage to carburetor parts may prevent the carburetor from functioning correctly. Carefully perform all servicing with the appropriate tools and without applying excessive force.
• When the engine is stopped or when riding at no load, do not open and close the throttle unnecessarily. Otherwise, too much fuel may be discharged, starting may become difficult or the engine may not run well.

Atmospheric Conditions and Carburetor Settings

<table>
<thead>
<tr>
<th>Air temp.</th>
<th>Humidity</th>
<th>Air pressure (altitude)</th>
<th>Mixture</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>Low (high)</td>
<td>Richer</td>
<td>Leaner</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>High (low)</td>
<td>Leaner</td>
<td>Richer</td>
</tr>
</tbody>
</table>

TIP

The air density (i.e., concentration of oxygen in the air) determines the richness or leanness of the air/fuel mixture.
• Higher temperature expands the air with its resultant reduced density.
• Higher humidity reduces the amount of oxygen in the air by so much of the water vapor in the same air.
• Lower atmospheric pressure (at a high altitude) reduces the density of the air.

EFFECT OF SETTING PARTS IN RELATION TO THROTTLE VALVE OPENING

<table>
<thead>
<tr>
<th>1/4</th>
<th>1/2</th>
<th>3/4</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

A. Closed
B. Fully open
1. Pilot screw/pilot jet
2. Throttle valve cutaway
3. Jet needle
4. Main jet

ADJUSTING THE MAIN JET

The richness of the air-fuel mixture at full throttle can be set by changing the main jet “1”.

Standard main jet #180

If the air-fuel mixture is too rich or too lean, the engine power will drop, resulting in poor acceleration.

Effects of changing the main jet (reference)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>#180</td>
<td>#178</td>
</tr>
</tbody>
</table>

A. Idle
B. Fully open
1. #180
2. #178
3. #182
ADJUSTING THE PILOT SCREW
The richness of the air-fuel mixture with the throttle fully closed to 1/4 open can be set by turning the pilot screw "1". Turning in the pilot screw will make the mixture lean at low speeds, and turning it out will enrich it.

TIP
• If the engine idling speed fluctuates, turn the pilot screw only 1/2 of a turn in either direction.
• To optimize the fuel flow at a smaller throttle opening, each machine's pilot screw has been individually set at the factory. Before adjusting the pilot screw, turn it in fully and count the number of turns. Record this number as the factory-set number of turns out.

Effects of adjusting the pilot screw (reference)

A. Idle
B. Fully open
1. 2-1/4 turns out
2. 1-1/4 turns out
3. 1-3/4 turns out

ADJUSTING THE PILOT JET
The richness of the air-fuel mixture with the throttle open 1/4 or less can be set by adjusting the pilot jet "1".

Effects of adjusting the pilot jet (reference)

A. Idle
B. Fully open
1. #48
2. #42
3. #45

ADJUSTING THE JET NEEDLE GROOVE POSITION
Adjusting the jet needle "1" position affects the acceleration when the throttle is 1/8 to 3/4 open.
1. Too rich at intermediate speeds
   • Rough engine operation is felt and the engine will not pick up speed smoothly.
   Step up the jet needle clip by one groove and move down the needle to lean out the mixture.
2. Too lean at intermediate speeds
   • The engine breathes hard and will not pick up speed quickly.
   Step down the jet needle clip by one groove and move up the needle to enrich the mixture.

Effects of changing the jet needle groove position (reference)

A. Idle
B. Fully open
1. No.5 groove
2. No.3 groove
3. No.4 groove

ADJUSTING THE JET NEEDLE
The jet needle is adjusted by changing it.

Effects of changing the jet needle (reference)

A. Idle
B. Fully open
1. Diameter of the straight portion
2. Reference needle
3. 0.5 richer

Changing from NDJR-4 to NCVR-4 has the same effect as a lowering of 0.5 clip position.

RELATIONSHIP WITH THROTTLE OPENING
The flow of the fuel through the carburetor main system is controlled by the main jet and then, it is further regulated by the area between the main nozzle and the jet needle.

The fuel flow relates to the diameter of the straight portion of the jet needle with the throttle 1/8 to 1/4 open and relates to the clip position with the throttle 1/8 to 3/4 open.

Therefore, the fuel flow is balanced at each stage of throttle opening by the combination of the jet needle straight portion diameter and clip position.

Standard pilot screw position (example) 1-3/4

Standard pilot jet #45 * #42

* Except for USA and CDN

Standard jet needle NDJR * NHKR

* Except for USA and CDN
ADJUSTING THE LEAK JET
(ADJUSTING THE ACCELERATOR PUMP)
The leak jet “1” is a setting part that adjusts the flow of fuel discharged by the accelerator pump. Since the accelerator pump operates only when throttle is open, the leak jet is used to adjust a fuel mixture ratio for quick throttle opening and is therefore different from other setting parts that adjust a fuel mixture for each throttle opening (each engine speed).

1. When the engine breathes hard in quick throttle opening, select a leak jet having lower calibrating No. than standard to enrich the mixture. <Example> #70 → #60
2. When rough engine operation is felt in quick throttle opening, select a leak jet having higher calibrating No. than standard to lean out the mixture. <Example> #70 → #80

CARBURETOR SETTING PARTS

<table>
<thead>
<tr>
<th>Main jet</th>
<th>Size</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rich</td>
<td>#190</td>
<td>4MX-14943-45</td>
</tr>
<tr>
<td></td>
<td>#188</td>
<td>4MX-14943-95</td>
</tr>
<tr>
<td></td>
<td>#185</td>
<td>4MX-14943-44</td>
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<td></td>
<td>#182</td>
<td>4MX-14943-94</td>
</tr>
<tr>
<td>(STD)</td>
<td>#180</td>
<td>4MX-14943-43</td>
</tr>
<tr>
<td></td>
<td>#178</td>
<td>4MX-14943-93</td>
</tr>
<tr>
<td></td>
<td>#175</td>
<td>4MX-14943-42</td>
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<tr>
<td>Lean</td>
<td>#172</td>
<td>4MX-14943-92</td>
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<td></td>
<td>#170</td>
<td>4MX-14943-41</td>
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<table>
<thead>
<tr>
<th>Pilot jet</th>
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<tbody>
<tr>
<td>Rich</td>
<td>#50</td>
<td>4MX-14948-07</td>
</tr>
<tr>
<td></td>
<td>#48</td>
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</tr>
<tr>
<td></td>
<td>#45</td>
<td>4MX-14948-05</td>
</tr>
<tr>
<td>*(STD)</td>
<td>#42</td>
<td>4MX-14948-04</td>
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<tr>
<td></td>
<td>#40</td>
<td>4MX-14948-03</td>
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<tr>
<td>Lean</td>
<td>#38</td>
<td>4MX-14948-02</td>
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<table>
<thead>
<tr>
<th>Jet needle</th>
<th>Size</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rich</td>
<td>NDJN</td>
<td>5TA-14916-JN</td>
</tr>
<tr>
<td></td>
<td>NDJP</td>
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<tr>
<td></td>
<td>NDJQ</td>
<td>5TA-14916-J1</td>
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<tr>
<td></td>
<td>NDJS</td>
<td>5TA-14916-JS</td>
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<tr>
<td></td>
<td>NDJT</td>
<td>5TA-14916-JT</td>
</tr>
<tr>
<td>Lean</td>
<td>NDJU</td>
<td>5TA-14916-JU</td>
</tr>
<tr>
<td>Rich</td>
<td>NCVN</td>
<td>5TA-14916-VN</td>
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<tr>
<td></td>
<td>NCVP</td>
<td>5TA-14916-VP</td>
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<tr>
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<td>NCVQ</td>
<td>5TA-14916-V1</td>
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<tr>
<td></td>
<td>NCVR</td>
<td>5TA-14916-VR</td>
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<tr>
<td></td>
<td>NCVS</td>
<td>5TA-14916-VS</td>
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<td></td>
<td>NCVT</td>
<td>5TA-14916-VT</td>
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<tr>
<td>Lean</td>
<td>NCUV</td>
<td>5TA-14916-VU</td>
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<tr>
<td>Rich</td>
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<td>5TA-14916-LN</td>
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<td></td>
<td>NFLP</td>
<td>5TA-14916-LP</td>
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<tr>
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<td>NHKR</td>
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<tr>
<td></td>
<td>NFLS</td>
<td>5TA-14916-LS</td>
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<tr>
<td></td>
<td>NFLT</td>
<td>5TA-14916-LT</td>
</tr>
<tr>
<td>Lean</td>
<td>NFLU</td>
<td>5TA-14916-LU</td>
</tr>
<tr>
<td>Rich</td>
<td>NFPN</td>
<td>5TA-14916-PN</td>
</tr>
<tr>
<td></td>
<td>NFPP</td>
<td>5TA-14916-PP</td>
</tr>
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<td>NFPO</td>
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<tr>
<td></td>
<td>NFPU</td>
<td>5TA-14916-PU</td>
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<tr>
<td>Leak jet</td>
<td>Size</td>
<td>Part number</td>
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<td>#50</td>
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<td>#90</td>
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<td>#100</td>
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<td></td>
<td>#130</td>
<td>4JT-1494F-33</td>
</tr>
<tr>
<td>Lean</td>
<td>#140</td>
<td>4JT-1494F-35</td>
</tr>
</tbody>
</table>

* Except for USA and CDN
### SPECIFICATIONS OF JET NEEDLE

For USA and CDN

<table>
<thead>
<tr>
<th>Diameter of straight portion</th>
<th>Rich</th>
<th>Lean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>P</td>
<td>Q</td>
</tr>
<tr>
<td>1 richer</td>
<td>NDJN-5</td>
<td>NDJP-5</td>
</tr>
<tr>
<td>0.5 richer</td>
<td>NCVN-4</td>
<td>NCVP-4</td>
</tr>
<tr>
<td>STD</td>
<td>NDJN-4</td>
<td>NDJP-4</td>
</tr>
<tr>
<td>0.5 leaner</td>
<td>NCVN-3</td>
<td>NCVP-3</td>
</tr>
<tr>
<td>1 leaner</td>
<td>NDJN-3</td>
<td>NDJP-3</td>
</tr>
</tbody>
</table>

Except for USA and CDN

<table>
<thead>
<tr>
<th>Diameter of straight portion</th>
<th>Rich</th>
<th>Lean</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>P</td>
<td>Q</td>
</tr>
<tr>
<td>1 richer</td>
<td>NFLN-7</td>
<td>NFLP-7</td>
</tr>
<tr>
<td>0.5 richer</td>
<td>NFPN-6</td>
<td>NFPP-6</td>
</tr>
<tr>
<td>STD</td>
<td>NFLN-6</td>
<td>NFLP-6</td>
</tr>
<tr>
<td>0.5 leaner</td>
<td>NFPN-5</td>
<td>NFPP-5</td>
</tr>
<tr>
<td>1 leaner</td>
<td>NFLN-5</td>
<td>NFLP-5</td>
</tr>
</tbody>
</table>

### EXAMPLES OF CARBURETOR SETTING DEPENDING ON SYMPTOM

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Setting</th>
<th>Checking</th>
</tr>
</thead>
</table>
| At full throttle  
Hard breathing  
Shearing noise  
Whitish spark plug  
Lean mixture | Increase main jet calibration no. (Gradually) | Discoloration of spark plug → If tan color, it is in good condition.  
If cannot be corrected:  
Clogged float valve seat  
Clogged fuel hose  
Clogged fuel cock  
Check that the accelerator pump operates smoothly. |
| At full throttle  
Speed pick-up stops  
Slow speed pick-up  
Slow response  
Sooty spark plug  
Rich mixture | Decrease main jet calibration no. (Gradually) | Discoloration of spark plug → If tan color, it is in good condition.  
If cannot be corrected:  
Clogged air filter  
Fuel overflow from carburetor |
| Lean mixture | Lower jet needle clip position. (1 groove down) | |
| Rich mixture | Raise jet needle clip position. (1 groove up) | |
| 1/4–3/4 throttle  
Hard breathing  
Lack of speed | Lower jet needle clip position. (1 groove down) | |
| 1/4–1/2 throttle  
Slow speed pick-up  
Poor acceleration | Raise jet needle clip position. (1 groove up) | |
### Symptom Setting Checking

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Setting</th>
<th>Checking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed to 1/4 throttle</td>
<td>Use jet needle with a smaller diameter.</td>
<td>Slow-speed-circuit passage</td>
</tr>
<tr>
<td>Hard breathing</td>
<td></td>
<td>Clogged → Clean</td>
</tr>
<tr>
<td>Speed down</td>
<td></td>
<td>Overflow from carburetor</td>
</tr>
<tr>
<td>Closed to 1/4 throttle</td>
<td>Use jet needle with a larger diameter.</td>
<td></td>
</tr>
<tr>
<td>Poor acceleration</td>
<td>Raise jet needle clip position. (1 groove up)</td>
<td></td>
</tr>
<tr>
<td>Poor response in the low to intermediate speeds</td>
<td>Raise jet needle clip position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If this has no effect, lower the jet needle clip position.</td>
<td></td>
</tr>
<tr>
<td>Poor response when throttle is opened quickly</td>
<td>Check overall settings. Use main jet with a lower calibration no. Raise jet needle clip position. (1 groove up) If these have no effect, use a main jet with a higher calibration no. and lower the jet needle clip position.</td>
<td>Check air filter for fouling. Check that the accelerator pump operates smoothly.</td>
</tr>
</tbody>
</table>

#### TIP

This should be taken simply for an example. It is necessary to set the carburetor while checking the operating conditions of the engine.


CHASSIS

SELECTION OF THE SECONDARY REDUCTION RATIO (SPROCKET)

Secondary reduction ratio = Number of rear wheel sprocket teeth/Number of drive sprocket teeth

| Standard secondary reduction ratio | 49/13 (3.769) | * 51/13 (3.923) |

<Requirement for selection of secondary gear reduction ratio>

- It is generally said that the secondary gear ratio should be reduced for a longer straight portion of a speed course and should be increased for a course with many corners. Actually, however, as the speed depends on the ground condition of the day of the race, be sure to run through the circuit to set the machine suitable for the entire course.

- In actuality, it is very difficult to achieve settings suitable for the entire course and some settings may be sacrificed. Thus, the settings should be matched to the portion of the course that has the greatest effect on the race result. In such a case, run through the entire course while making notes of lap times to find the best balance; then, determine the secondary reduction ratio.

- If a course has a long straight portion where a machine can run at maximum speed, the machine is generally set such that it can develop its maximum revolutions toward the end of the straight line, with care taken to avoid the engine over-revving.

TIP

Riding technique varies from rider to rider and the performance of a machine also vary from machine to machine. Therefore, do not imitate other rider's settings from the beginning but choose your own setting according to the level of your riding technique.

DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS

<table>
<thead>
<tr>
<th>Part name</th>
<th>Size</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive sprocket &quot;1&quot; (STD)</td>
<td>13T</td>
<td>9383B-13218</td>
</tr>
<tr>
<td>Rear wheel sprocket &quot;2&quot; (STD)</td>
<td>47T</td>
<td>17D-25447-50</td>
</tr>
<tr>
<td></td>
<td>48T</td>
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<td></td>
<td>52T</td>
<td>17D-25452-50</td>
</tr>
</tbody>
</table>

* Except for USA and CDN

TIRE PRESSURE

Tire pressure should be adjust to suit the road surface condition of the circuit.

- Standard tire pressure: 100 kPa (1.0 kgf/cm², 15 psi)
- Under a rainy, muddy, sandy, or slippery condition, the tire pressure should be lower for a larger area of contact with the road surface.

- Extent of adjustment: 60–80 kPa (0.6–0.8 kgf/cm², 9.0–12 psi)
- Under a stony or hard road condition, the tire pressure should be higher to prevent a flat tire.

- Standard oil amount: 350 cm³ (12.3 Imp oz, 11.8 US oz)
- * 337 cm³ (11.9 Imp oz, 11.4 US oz)
- Extent of adjustment: 300–375 cm³ (10.6–13.2 Imp oz, 10.1–12.7 US oz)

* Except for USA and CDN

FRONT FORK SETTING

The front fork setting should be made depending on the rider's feeling of an actual run and the circuit conditions. The front fork setting includes the following three factors:

1. Setting of air spring characteristics
   - Change the fork oil amount.
2. Setting of spring preload
   - Change the spring.
3. Setting of damping force
   - Change the compression damping.
   - Change the rebound damping.
   The spring acts on the load and the damping force acts on the cushion travel speed.

CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL

Damping characteristic near the final stroke can be changed by changing the fork oil amount.

WARNING

Adjust the oil amount in 5 cm³ (0.2 Imp oz, 0.2 US oz) increments or decrements. Too small oil amount causes the front fork to produce a noise at full rebound or the rider to feel some pressure on his hands or body. Alternatively, too large oil amount will cause the air spring characteristics to have a tendency to be stiffer with the consequent deteriorated performance and characteristics. Therefore, adjust the front fork within the specified range.

- Standard oil amount: 350 cm³ (12.3 Imp oz, 11.8 US oz)
- * 337 cm³ (11.9 Imp oz, 11.4 US oz)
- Extent of adjustment: 300–375 cm³ (10.6–13.2 Imp oz, 10.1–12.7 US oz)
A. Air spring characteristics in relation to oil amount change
B. Load
C. Stroke
1. Max. oil amount
2. Standard oil amount
3. Min. oil amount

SETTING OF SPRING AFTER REPLACEMENT
As the front fork setting can be easily affected by rear suspension, take care so that the machine front and rear are balanced (in position, etc.) when setting the front fork.

1. Use of soft spring
   - Change the rebound damping.
     Turn out one or two clicks.
   - Change the compression damping.
     Turn in one or two clicks.

2. Use of stiff spring
   - Change the rebound damping.
     Turn in one or two clicks.
   - Change the compression damping.
     Turn out one or two clicks.

TIP
Generally a soft spring gives a soft riding feeling. Rebound damping tends to become stronger and the front fork may sink deeply over a series of gaps.

TIP
Generally a stiff spring gives a stiff riding feeling. Rebound damping tends to become weaker, resulting in lack of a sense of contact with the road surface or in a vibrating handlebar.

FRONT FORK SETTING PARTS
- Front fork spring “1”

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SPRING RATE</th>
<th>SPRING PART NUMBER</th>
<th>I.D. MARK (slits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOFT</td>
<td>0.398</td>
<td>1C3-23141-A1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.408</td>
<td>1C3-23141-B1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.418</td>
<td>1C3-23141-C1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.428</td>
<td>1C3-23141-D1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.438</td>
<td>1C3-23141-E1</td>
<td></td>
</tr>
<tr>
<td>STD</td>
<td>0.449</td>
<td>5XC-23141-N0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.459</td>
<td>1C3-23141-G1</td>
<td></td>
</tr>
<tr>
<td>STIFF</td>
<td>0.469</td>
<td>1C3-23141-H1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.479</td>
<td>1C3-23141-J1</td>
<td></td>
</tr>
</tbody>
</table>

*Except for USA and CDN

TIP
The I.D. mark (slits) “a” is proved on the end of the spring.

REAR SUSPENSION SETTING
The rear suspension setting should be made depending on the rider’s feeling of an actual run and the circuit conditions. The rear suspension setting includes the following two factors:
1. Setting of spring preload
   - Change the set length of the spring.
   - Change the spring.
2. Setting of damping force
   - Change the rebound damping.
   - Change the compression damping.

CHOOSING SET LENGTH
1. Place a stand or block under the engine to put the rear wheel above the floor, and measure the length “a” between the rear wheel axle center and the rear fender holding bolt.
2. Remove the stand or block from the engine and with a rider astride the seat, measure the sunken length “b” between the rear wheel axle center and the rear fender holding bolt.
3. Loosen the locknut “1” and make adjustment by turning the spring adjuster “2” to achieve the standard figure from the subtraction of the length “b” from the length “a”.

TIP
- If the machine is new and after it is broken in, the same set length of the spring may change because of the initial fatigue, etc. of the spring. Therefore, be sure to make reevaluation.
- If the standard figure cannot be achieved by adjusting the spring adjuster and changing the spring set length, replace the spring with an optional one and make readjustment.
SETTING OF SPRING AFTER REPLACEMENT

After replacement, be sure to adjust the spring to the set length [sunken length 90–100 mm (3.5–3.9 in)] and set it.

1. Use of soft spring
   • Set the soft spring for less rebound damping to compensate for its less spring load. Run with the rebound damping adjuster one or two clicks on the softer side and readjust it to suit your preference.

2. Use of stiff spring
   • Set the soft spring for more rebound damping to compensate for its greater spring load. Run with the rebound damping adjuster one or two clicks on the stiffer side and readjust it to suit your preference.

   **TIP**

   Adjusting the rebound damping will be followed more or less by a change in the compression damping. For correction, turn the low compression damping adjuster on the softer side.

   **WARNING**

   When using a rear shock absorber other than currently installed, use the one whose overall length “a” does not exceed the standard as it may result in faulty performance. Never use one whose overall length is greater than standard.

   Length “a” of standard shock: 490 mm (19.29 in)

---

### REAR SHOCK ABSORBER SETTING PARTS

- Rear shock spring *"1"*
  [Equal-pitch steel spring]

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SPRING RATE</th>
<th>SPRING PART NUMBER (-22212-)</th>
<th>I.D. MARK/ Q'TY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOFT</td>
<td>4.3</td>
<td>5UN-00</td>
<td>Brown/1</td>
</tr>
<tr>
<td></td>
<td>4.5</td>
<td>5UN-10</td>
<td>Green/1</td>
</tr>
<tr>
<td></td>
<td>4.7</td>
<td>5UN-20</td>
<td>Red/1</td>
</tr>
<tr>
<td></td>
<td>4.9</td>
<td>5UN-30</td>
<td>Black/1</td>
</tr>
<tr>
<td></td>
<td>5.1</td>
<td>5UN-40</td>
<td>Blue/1</td>
</tr>
<tr>
<td>STD</td>
<td>5.3</td>
<td>5UN-50 (5UN-K0) (5UN-L0)</td>
<td>Yellow/1</td>
</tr>
<tr>
<td>STIFF</td>
<td>5.5</td>
<td>5UN-60</td>
<td>Pink/1</td>
</tr>
<tr>
<td></td>
<td>5.7</td>
<td>5UN-70</td>
<td>White/1</td>
</tr>
</tbody>
</table>

**TIP**

- The I.D. mark “a” is marked at the end of the spring.
- Spring specification varies according to the color and quantity of I.D. marks.

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### SPRING PART NUMBER (-22212-)

| Position in which the spring is turned in 18 mm (0.71 in) from its free length. |
| Position in which the spring is turned in 1.5 mm (0.06 in) from its free length. |
| Maximum | Minimum |
| 5UN-00  | 5UN-10  |
| 5UN-20  | 5UN-30  |
| 5UN-40  | 5UN-50  |
| 5UN-50  | 5UN-L0  |
| 5UN-60  | 5UN-70  |

**TIP**

- For the spring preload adjustment, refer to "ADJUSTING THE REAR SHOCK ABSORBER SPRING PRELOAD" in the CHAPTER 3.

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7-8
### SUSPENSION SETTING (FRONT FORK)

**TIP**
- If any of the following symptoms is experienced with the standard position as the base, make resetting by reference to the adjustment procedure given in the same chart.
- Before any change, set the rear shock absorber sunken length to the standard figure 90–100 mm (3.5–3.9 in).

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Section</th>
<th>Check</th>
<th>Adjust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stiff over entire range</td>
<td>Jump</td>
<td>Compression damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td>Large gap</td>
<td>Oil amount</td>
<td>Decrease oil amount by about 5–10 cm³ (0.2–0.4 Imp oz, 0.2–0.3 US oz).</td>
</tr>
<tr>
<td></td>
<td>Medium gap</td>
<td>Spring</td>
<td>Replace with soft spring.</td>
</tr>
<tr>
<td></td>
<td>Small gap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor initial movement</td>
<td></td>
<td>Rebound damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil seal</td>
<td>Apply grease in oil seal wall.</td>
</tr>
<tr>
<td>Soft over entire range, bottoming out</td>
<td></td>
<td>Compression damping</td>
<td>Turn adjuster clockwise (about 2 clicks) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil amount</td>
<td>Increase oil amount by about 5–10 cm³ (0.2–0.4 Imp oz, 0.2–0.3 US oz).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with stiff spring.</td>
</tr>
<tr>
<td>Stiff toward stroke end</td>
<td></td>
<td>Oil amount</td>
<td>Decrease oil amount by about 5 cm³ (0.2 Imp oz, 0.2 US oz).</td>
</tr>
<tr>
<td>Soft toward stroke end, bottoming out</td>
<td></td>
<td>Oil amount</td>
<td>Increase oil amount by about 5 cm³ (0.2 Imp oz, 0.2 US oz).</td>
</tr>
<tr>
<td>Stiff initial movement</td>
<td></td>
<td>Compression damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td>Low front, tending to lower front posture</td>
<td></td>
<td>Compression damping</td>
<td>Turn adjuster clockwise (about 2 clicks) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rebound damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Balance with rear end</td>
<td>Set sunken length for 95–100 mm (3.7–3.9 in) when one passenger is astride seat (lower rear posture).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil amount</td>
<td>Increase oil amount by about 5 cm³ (0.2 Imp oz, 0.2 US oz).</td>
</tr>
<tr>
<td>&quot;Obtrusive&quot; front, tending to upper front posture</td>
<td></td>
<td>Compression damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Balance with rear end</td>
<td>Set sunken length for 90–95 mm (3.5–3.7 in) when one passenger is astride seat (upper rear posture).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with soft spring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil amount</td>
<td>Decrease oil amount by about 5–10 cm³ (0.2–0.4 Imp oz, 0.2–0.3 US oz).</td>
</tr>
</tbody>
</table>
### SUSPENSION SETTING (REAR SHOCK ABSORBER)

**TIP**
- If any of the following symptoms is experienced with the standard position as the base, make resetting by reference to the adjustment procedure given in the same chart.
- Adjust the rebound damping in 2-click increments or decrements.
- Adjust the low compression damping in 1-click increments or decrements.
- Adjust the high compression damping in 1/6 turn increments or decrements.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Jump</th>
<th>Large gap</th>
<th>Medium gap</th>
<th>Small gap</th>
<th>Check</th>
<th>Adjust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stiff, tending to sink</td>
<td>O</td>
<td></td>
<td></td>
<td>o</td>
<td>Rebound damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring set length</td>
<td>Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.</td>
</tr>
<tr>
<td>Spongy and unstable</td>
<td>O</td>
<td></td>
<td></td>
<td>o</td>
<td>Rebound damping</td>
<td>Turn adjuster clockwise (about 2 clicks) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low compression damping</td>
<td>Turn adjuster clockwise (about 1 click) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with stiff spring.</td>
</tr>
<tr>
<td>Heavy and dragging</td>
<td>O</td>
<td></td>
<td></td>
<td>o</td>
<td>Rebound damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring set length</td>
<td>Replace with soft spring.</td>
</tr>
<tr>
<td>Poor road gripping</td>
<td>O</td>
<td></td>
<td></td>
<td>o</td>
<td>Rebound damping</td>
<td>Turn adjuster counterclockwise (about 2 clicks) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low compression damping</td>
<td>Turn adjuster clockwise (about 1 click) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High compression damping</td>
<td>Turn adjuster clockwise (about 1/6 turn) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring set length</td>
<td>Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with soft spring.</td>
</tr>
<tr>
<td>Bottoming out</td>
<td>O</td>
<td>o</td>
<td></td>
<td></td>
<td>High compression damping</td>
<td>Turn adjuster clockwise (about 1/6 turn) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring set length</td>
<td>Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with stiff spring.</td>
</tr>
<tr>
<td>Bouncing</td>
<td>O</td>
<td>o</td>
<td></td>
<td></td>
<td>Rebound damping</td>
<td>Turn adjuster clockwise (about 2 clicks) to increase damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with soft spring.</td>
</tr>
<tr>
<td>Stiff travel</td>
<td>O</td>
<td>o</td>
<td></td>
<td></td>
<td>High compression damping</td>
<td>Turn adjuster counterclockwise (about 1/6 turn) to decrease damping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring set length</td>
<td>Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring</td>
<td>Replace with soft spring.</td>
</tr>
</tbody>
</table>