

2008

OWNER'S SERVICE MANUAL

WR450F(X)

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WR450F (X)
OWNER'S SERVICE MANUAL
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FOREWORD INTRODUCTION

Congratulations on your purchase of a Yamaha WR 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.

NOTE:

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 MA-**CHINE. DO NOT ATTEMPT TO OP-**ERATE THIS MACHINE UNTIL YOU** HAVE ATTAINED A SATISFACTO-RY KNOWLEDGE OF ITS CON-**TROLS 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 CAPABILI-TIES AND THE RELIABILITY OF THIS MACHINE.

PARTICULARLY IMPORTANT INFORMATION

The Safety Alert Symbol means AT-TENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE: A NOTE provides key information to make procedures easier or clearer. **IMPORTANT NOTICE**

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 be illegal. Please check local regulations before riding.

♠ SAFETY INFORMATION

- 1. THIS MACHINE IS TO BE OP-**ERATED BY AN EXPERI-ENCED RIDER ONLY.** Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.
- 2. THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OP-**ERATOR ONLY.** Do not carry passengers on this machine.
- 3. ALWAYS WEAR PROTEC-TIVE APPAREL. When operating this machine, always wear an approved helmet with goggles or a face shield. Also wear heavy boots, gloves, and protective clothing. Always wear proper fitting clothing that will not be caught in any of the moving parts or controls of the machine.
- 4. ALWAYS MAINTAIN YOUR **MACHINE IN PROPER** WORKING ORDER. For safety and reliability, the machine must be properly maintained. Always perform the pre-operation checks indicated in this manual. Correcting a mechanical problem before you ride may prevent an accident.

5. GASOLINE IS HIGHLY FLAM-MABLE. 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.

6. GASOLINE CAN CAUSE IN-

- JURY 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.
- 7. ONLY OPERATE THE MA-**CHINE IN AN AREA WITH AD-EQUATE 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.
- 8. PARK THE MACHINE CARE-**FULLY: TURN OFF THE EN-**GINE. 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.
- 9. 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.

10. PROPERLY SECURE THE MACHINE BEFORE TRANS-PORTING 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.

TO THE NEW OWNER

This manual will provide you with a good basic understanding of features, operation, and basic maintenance and inspection items of this machine. Please read this manual carefully and completely before operating your new machine. If you have any questions regarding the operation or maintenance of your machine, please consult your Yamaha dealer.

NOTE

This manual should be considered a permanent part of this machine and should remain with it even if the machine is subsequently sold.

NOTICE

Some data in this manual may become outdated due to improvements made to this model in the future. If there is any question you have regarding this manual or your machine, please consult your Yamaha dealer.

F.I.M. MACHINE WEIGHTS

Weights of machines without fuel
The minimum weights for motocross

The minimum weights for motocross machines are:

for the class 125 cc: minimum 88 kg (194 lb)

for the class 250 cc: minimum 98 kg (216 lb)

for the class 500 cc: minimum 102 kg (225 lb)

In modifying your machine (e.g., for weight reduction), take note of the above limits of weight.

HOW TO USE THIS MANUAL

FINDING THE REQUIRED PAGE

 This manual consists of seven chapters; "General Information", "Specifications", "Regular inspection and adjustments", "Tuning", "Engine", "Chassis" and "Electrical". The table of contents is at the beginning of the manual. Look over the general layout of the book before finding then 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 complied to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations

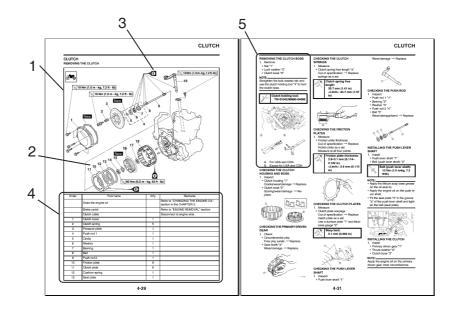
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

Bearings
 Pitting/damage → Replace.

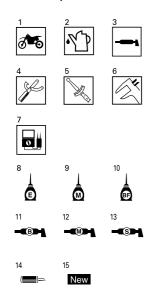
HOW TO READ DESCRIPTIONS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

- An easy-to-see exploded diagram "1" is provided for removal and disassembly jobs.
- 2. Numbers "2" are given in the or-
- der of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
- 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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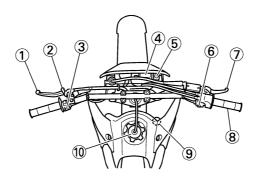
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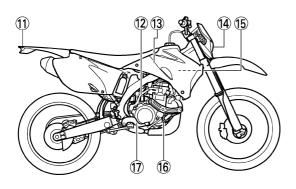
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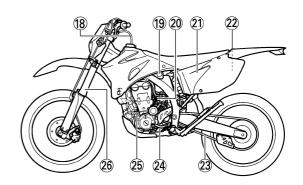
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STARTER CLUTCH5-46 ENGINE REMOVAL5-51

GENERAL INFORMATION DESCRIPTION







- 1. Clutch lever
- 2. Hot starter lever
- 3. Engine stop switch
- 4. Multi-function display
- 5. Main switch
- 6. Start switch
- 7. Front brake lever
- 8. Throttle grip
- 9. Radiator cap
- 10. Fuel tank cap
- 11. Taillight
- 12. Kickstarter crank
- 13. Fuel tank

- 14. Headlight
- 15. Radiator
- 16. Coolant drain bolt
- 17. Rear brake pedal
- 18. Valve joint
- 19. Fuel cock
- 20. Cold starter knob
- 21. Air cleaner
- 22. Catch tank
- 23. Drive chain
- 24. Shift pedal
- 25. Oil dipstick
- 26. Front fork

NOTE:

- The machine you have purchased may differ slightly from those shown in the following.
- Designs and specifications are subject to change without notice.

MACHINE IDENTIFICATION

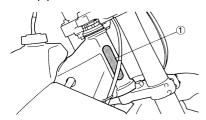
MACHINE IDENTIFICATION

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

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

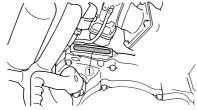
VEHICLE IDENTIFICATION NUMBER

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



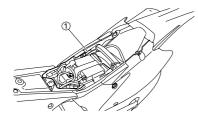
ENGINE SERIAL NUMBER

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.



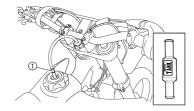
INCLUDED PARTS

VALVE JOINT

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

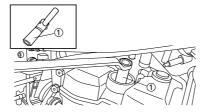
CAUTION:

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



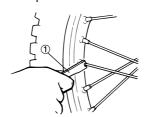
SPARK PLUG WRENCH

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



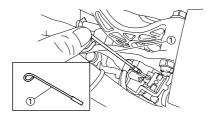
NIPPLE WRENCH

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.



IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DISASSEMBLY

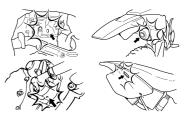
- Remove all dirt, mud, dust, and foreign material before removal and disassembly.
 - When washing the machine with high pressured water, cover the parts follows.

Silencer exhaust port Side cover air intake port Water pump housing hole at the bottom

Drain hole on the cylinder head (right side)

All electrical components





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



 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.



 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.

CHECKING OF CONNECTION

ALL REPLACEMENT PARTS

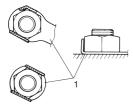
 We recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

GASKETS, OIL SEALS AND ORINGS

- 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

 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.

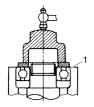


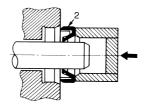
BEARINGS AND OIL SEALS

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.

CAUTION:

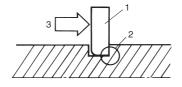
Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.





CIRCLIPS

 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.



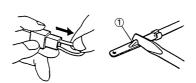
CHECKING OF CONNECTION

Dealing with stains, rust, moisture, etc. on the connector.

- 1. Disconnect:
- Connector
- 2. Dry each terminal with an air blower.



- 3. Connect and disconnect the connector two or three times.
- 4. Pull the lead to check that it will not come off.
- 5. If the terminal comes off, bend up the pin "1" and reinsert the terminal into the connector.



- 6. Connect:
 - Connector

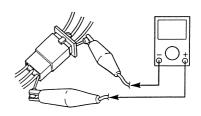
NOTE:

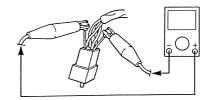
The two connectors "click" together.

7. Check for continuity with a tester.

NOTE

- If there in no continuity, clean the terminals.
- Be sure to perform the steps 1 to 7 listed above when checking the wire harness.
- For a field remedy, use a contact revitalizer available on the market.
- Use the tester on the connector as shown.





SPECIAL TOOLS

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

NOTE:

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

| Tool name/Part number | How to use | Illustration |
|---|--|--------------|
| Dial gauge and stand YU-3097, 90890-01252 Stand YU-1256 | These tools are used to check each part for runout or bent. | |
| Crankshaft installing tool Crankshaft installing pot YU-90050, 90890-01274 Crankshaft installing bolt YU-90050, 90890-01275 Spacer (crankshaft installer) YM-91044, 90890-04081 Adapter (M12) YU-90063, 90890-01278 | These tools are used to install the crankshaft. | |
| Piston pin puller set YU-1304, 90890-01304 | This tool is used to remove the piston pin. | |
| Radiator cap tester YU-24460-01, 90890-01325 Radiator cap tester adapter YU-33984, 90890-01352 | These tools are used for checking the cooling system. | |
| Steering nut wrench YU-33975, 90890-01403 | This tool is used when tighten the steering ring nut to specification. | |

| Tool name/Part number | How to use | Illustration |
|---|---|--------------|
| Damper rod holder YM-01494, 90890-01494 | Use this tool to remove and install the damper rod. | |
| Fork seal driver YM-A0948, 90890-01502 | This tool is used when install the fork oil seal. | |
| | | |
| Sheave holder YS-1880-A, 90890-01701 | This tool is used for when loosening or tightening the flywheel magneto securing nut. | |
| | | |
| Pocket tester YU-3112-C, 90890-03112 | Use this tool to inspect the coil resistance, output voltage and amperage. | |
| Timing light YM-33277-A, 90890-03141 | This tool is necessary for checking ignition timing. | |
| | | |
| Valve spring compressor YM-4019, 90890-04019 | This tool is needed to remove and install the valve assemblies. | |

| Tool name/Part number | How to use | Illustration |
|--|--|--------------|
| Clutch holding tool YM-91042, 90890-04086 | This tool is used to hold the clutch when removing or installing the clutch boss securing nut. | |
| Valve guide remover Intake 4.5 mm (0.18 in) Exhaust 5.0 mm (0.20 in) YM-4116, 90890-04116 YM-4097, 90890-04097 | This tool is needed to remove and install the valve guide. | |
| Valve guide installer Intake 4.5 mm (0.18 in) Exhaust 5.0 mm (0.20 in) YM-4117, 90890-04117 YM-4098, 90890-04098 | This tool is needed to install the valve guide. | |
| Valve guide reamer Intake 4.5 mm (0.18 in) Exhaust 5.0 mm (0.20 in) YM-4118, 90890-04118 YM-4099, 90890-04099 | This tool is needed to rebore the new valve guide. | |
| Rotor puller YM-4142, 90890-04142 | This tool is used to remove the flywheel magneto. | |
| Crankcase separating tool YU-A9642 90890-04152 | These tool is used to remove the crankshaft from either case. | |
| | | |

| Tool name/Part number | How to use | Illustration |
|---|---|---|
| Dynamic spark tester YM-34487 Ignition checker 90890-06754 | This instrument is necessary for checking the ignition system components. | |
| Vacuum/pressure pump gauge set YB-35956-A, 90890-06756 | This tool is used to check the air induction system. | Opposition of the contract of |
| Digital tachometer YU-39951-B, 90890-06760 | This tool is needed for observing engine rpm. | |
| YAMAHA Bond No. 1215 (ThreeBond® No. 1215) 90890-85505 | This sealant (Bond) is used for crankcase mating surface, etc. | |

CONTROL FUNCTIONS

CONTROL FUNCTIONS

MAIN SWITCH

Functions of the respective switch positions are as follows:

ON:

The engine can be started only at this position.

OFF:

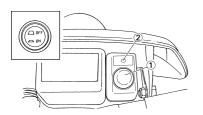
All electrical circuits are switched off. **Main switch indicator light**

The main switch "1" is equipped with an indicator light "2" to avoid forgetting to turn it off. This light functions as follows.

- It lights up with the main switch "ON".
- It goes out when the engine increases its speed after being started.
- It lights up again when the engine is stopped.

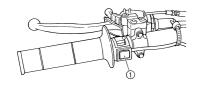
NOTE:

If the indicator light will not light up with the main switch "ON", it shows a lack of the battery voltage. Recharge the battery.



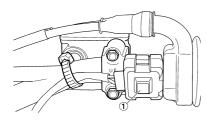
ENGINE STOP SWITCH

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



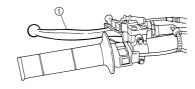
START SWITCH

The start switch "1" is located on the right handlebar. Push this switch to crank the engine with the starter.



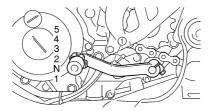
CLUTCH LEVER

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.



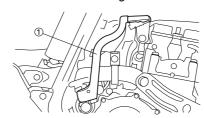
SHIFT PEDAL

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.



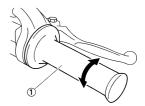
KICKSTARTER CRANK

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.



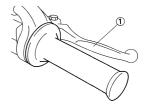
THROTTLE GRIP

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 three positions:

OFF:

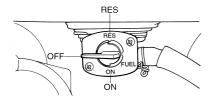
With the lever in this position, fuel will not flow. Always return the lever to this position when the engine is not running.

ON:

With the lever in this position, fuel flows to the carburetor. Normal riding is done with the lever in this position.

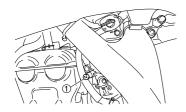
With the lever in this position fuel flows to the carburetor from the reserve section of the fuel tank after the main supply of the fuel has been depleted. Normal riding is possible with the lever is in this position, but it is recommended to add fuel as soon as possible.

MULTI-FUNCTION DISPLAY



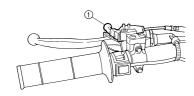
COLD STARTER KNOB

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.

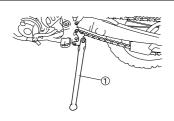


SIDESTAND

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

WARNING

- Never apply additional force to the sidestand.
- Hold up the sidestand before starting out.



MULTI-FUNCTION DISPLAY

WARNING

Be sure to stop the machine before making any setting changes to the multi-function display.

The multi-function display is equipped with the following: BASIC MODE:

- Speedometer
- Clock
- Two tripmeters (which shows the distance that has been traveled since it was last set to zero)

RACE MODE:

- Timer (which shows the time that has been accumulated since the start of timer measurement)
- Tripmeter (which shows the accumulated travel distance in timer measurement)
- Change tripmeter digits (capable of change to any given ones)

DESCRIPTIONOperation buttons:

- 1. Select button "SLCT 1"
- 2. Select button "SLCT 2"
- Reset button "RST"

Screen display:

- 4. Tripmeter indicator
- 5. Tripmeter indicator
- 6. Timer indicator
- 7. Clock/Timer
- 8. Speedometer
- 9. Odometer/Tripmeter

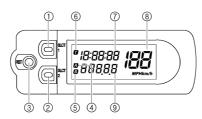
NOTE:

The operation buttons can be pushed in the following two manners:

Short push: Push the button. (

)

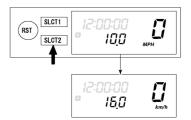
Long push: Push the button for 2 seconds or more.



BASIC MODE Changing speedometer display (for U.K.)

 Push the "SLCT2" button for 2 seconds or more to change the speedometer units. The speedometer display will change in the following order:

 $MPH \rightarrow km/h \rightarrow MPH$.



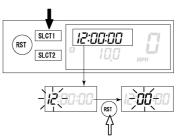
Setting the time

- Push the "SLCT1" button for 2 seconds or more to enter the time setting mode.
- Push the "RST" button to change the display for time indication. The display will change in the following order:

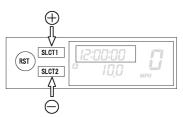
Hour → Minute → Second → Hour.

NOTE:

The digits capable of setting go on flashing.



 Push the "SLCT1" button (plus) or "SLCT2" button (minus) and change the time. A long push on the button will fast-forward the time.



 To end the setting, push the "RST" button for 2 seconds or more.

NOTE:

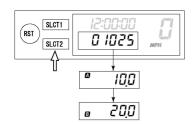
- In a 30-second absence of button operation, the setting will come to an end with the indicated time.
- To reset the seconds, push the "SLCT1" button or "SLCT2" button.

Changing odometer and tripmeter A/B (TRIP A/B)

 Push the "SLCT2" button to change the tripmeter display. The display will change in the following order:

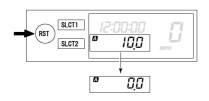
Odometer \rightarrow TRIP A \rightarrow TRIP B \rightarrow TRIP A \rightarrow Odometer.

MULTI-FUNCTION DISPLAY



NOTE:

To reset the digits, select the tripmeter involved and push the "RST" button for 2 seconds or more.



CHANGEOVER TO BASIC MODE/ RACE MODE

NOTE:

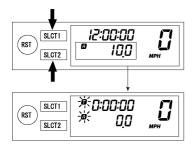
- Measurement using the timer function can be made in RACE MODE.
- Indicator will light up as an identifier that shows RACE MODE has been selected.
- RACE MODE cannot display the functions as in BASIC MODE.
- Changeover to RACE MODE forces the digits for tripmeter A (TRIP A) in BASIC MODE to be reset.

Changeover from BASIC MODE to RACE MODE

 Push the "SLCT1" button and "SLCT2" button for 2 seconds or more at the same time to change over to RACE MODE.

NOTE:

Changeover to RACE MODE will put manual start measurement on standby causing and to flash. (For manual start, refer to "Putting measurement on standby" in "RACE MODE".)

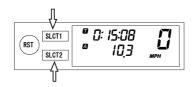


Returning to BASIC MODE from RACE MODE

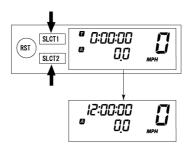
NOTE:

It is possible to return to BASIC MODE with timer measurement at a stop.

Check that the timer is not in operation. If the timer is in operation, stop the timer by pushing the
"SLCT1" button and "SLCT2" button at the same time.



 Push the "SLCT1" button and "SLCT2" button for 2 seconds or more at the same time to change over to BASIC MODE.



RACE MODE Putting measurement on standby

NOTE:

Starting measurement consists of the following two starts, either of which can be selected.

Manual start

Starting measurement by the rider himself operating the button. (A long push on the "SLCT2" button will put measurement on standby.)

Auto start

Starting timer measurement automatically on detection of the movement of the machine. (A long push on the "SLCT1" button will put measurement on standby.)

Manual start

NOTE:

Initial setting at changeover to RACE MODE will remain for manual start.

 Check that changeover to RACE MODE has been made. (Refer to "Changeover from BASIC MODE to RACE MODE".) NOTE:

When the machine is made ready for a run by manual start, and will start flashing.

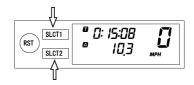
2. Start timer measurement by pushing the "RST" button.



 When stopping timer measurement, pushing the "SLCT1" button and "SLCT2" button at the same time.

NOTE:

If the machine is run while timer measurement is not made, no change will occur to the digit in tripmeter A (TRIP A).



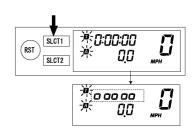
 To resume the measurement, again push the "SLCT1" button and "SLCT2" button at the same time.

Auto start

- Check that changeover has been made to RACE MODE. (Refer to "Changeover from BASIC MODE to RACE MODE".)
- Make the machine ready for a run by pushing the "SLCT1" button for 2 seconds or more.

NOTE:

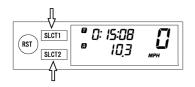
When the measurement is made ready for a run by auto start, and will start flashing. Timer display will turn on scrolling from left to right.



- Run the machine and start timer measurement.
- To stop timer measurement, pushing the "SLCT1" button and "SLCT2" button at the same time.

NOTE:

If the machine is run while timer measurement is not made, no change will occur to the digit in tripmeter A (TRIP A).



5. To resume the measurement, again pushing the "SLCT1" button and "SLCT2" button at the same time.

Resetting measurement data

NOTE:

Resetting can be made in the following two manners.

Resetting is possible while timer measurement is made:

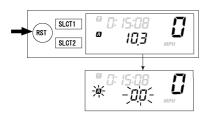
- Reset tripmeter A.
 Resetting is possible while timer measurement is not made:
- · Reset tripmeter A and timer.

Resetting tripmeter A (TRIP A)

- Check that the timer is in operation. If the timer is not in operation, start the timer by pushing the "SLCT1" button and "SLCT2" button at the same time.
- Reset tripmeter A (TRIP A) display by pushing the "RST" button for 2 seconds or more.

NOTE:

If reset, **A** and travel distance display will go on flashing for four seconds.



Resetting tripmeter A (TRIP A) and timer

- Check that the timer is not in operation. If the timer is in operation, stop it by pushing the "SLCT1" button and "SLCT2" button at the same time.
- 2. Reset all measured data by pushing the "RST" button for 2 seconds or more.

NOTE:

- Resetting will reset the timer display and travel distance display and put measurement on standby.
- Auto start attempt will put measurement on standby as such. Likewise, manual start attempt will put measurement on standby as such.

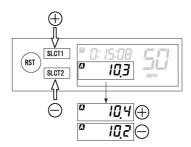


Correcting tripmeter A (TRIP A)

 Change the travel distance display by pushing the "SLCT1" button (plus) or "SLCT2" button (minus). A long push on the button will fast-forward the change.

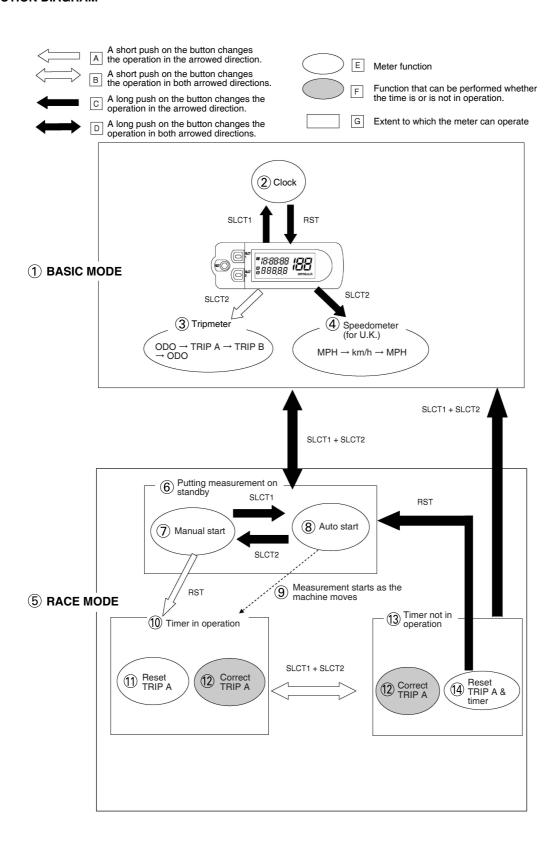
NOTE:

Change can be made any time while timer measurement is or is not being made.



MULTI-FUNCTION DISPLAY

FUNCTION DIAGRAM



MULTI-FUNCTION DISPLAY

| N | 10 | ١т | _ | |
|----|----|-----|---|--|
| ı١ | | , , | | |

The following diagram illustrates the multi-function display regarding the direction and operation condition involved in each of its functions.

- A short push on the button changes the operation in the arrowed direction.
- B. A short push on the button changes the operation in both arrowed directions.
- C. A long push on the button changes the operation in the arrowed direction.
- A long push on the button changes the operation in both arrowed directions.
- E. Meter function
- F. Function that can be performed whether the time is or is not in operation.
- G. Extent to which the meter can operate
- 1. BASIC MODE
- 2. Clock
- 3. Trip meter
- 4. Speedometer (for U.K.)
- 5. RACE MODE
- 6. Putting measurement on standby
- 7. Manual start
- 8. Auto start
- 9. Measurement starts as the machine moves
- 10. Timer in operation
- 11. Reset TRIP A
- 12. Correct TRIP A
- 13. Timer not in operation
- 14. Reset TRIP A & timer

STARTING AND BREAK-IN

STARTING AND BREAK-IN

FUFI

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

CAUTION:

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.

of 95 or higher.

NOTE:

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.

CAUTION:

- 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

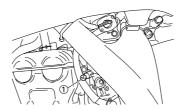
According to "CLEANING THE AIR FILTER ELEMENT" section in the CHAPTER 3, apply the foam-air-filter oil or its equivalent to the element. (Excess oil in the element may adversely affect engine starting.)

STARTING A COLD ENGINE

NOTE:

This model is equipped with an ignition circuit cut-off system. The engine can be started under the following conditions.

- · When the transmission is in neutral.
- When the clutch is disengaged with the transmission in any position.
 However, it is recommended to shift into neutral before starting the engine.
- 1. Inspect the coolant level.
- 2. Turn the fuel cock to "ON".
- 3. Push on the main switch to "ON".
- 4. Shift the transmission into neutral.
- 5. Fully open the cold starter knob "1".



Start the engine by pushing the start switch or by kicking the kickstarter crank.

NOTE:

If the engine fails to start by pushing the start switch, release the switch, wait a few seconds, and then try again. Each starting attempt should be as short as possible to preserve the battery. Do not crank the engine more than 10 seconds on any one attempt. If the engine does not start with the starter motor, try using the kickstarter crank.

WARNING

- If the starter motor will not turn when pushing the start switch, stop pushing it immediately and kick start the engine in order to avoid the load on the motor.
- Do not open the throttle while kicking the kickstarter crank.
 Otherwise, the kickstarter crank may kick back.

7. 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.

NOTE:

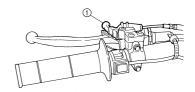
Since this model is equipped with an accelerator pump, if the engine is raced (the throttle opened and closed), the air/fuel mixture will be too rich and the engine may stall. Also unlike a two-stroke engine, this model can idle.

CAUTION:

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 "1" and start the engine by pushing the start switch or 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.

STARTING AND BREAK-IN

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".

| anc | i a iaii . | | | |
|--|---|--|------------------------------|--------------------------------|
| | | Thro ttle grip op- era- tion* | Cold start- er knob | Hot start- er le- ver |
| St | Air tempera- ture = less than 5 °C (41 °F) | Ope n 3 or 4 time s | ON | OFF |
| ti n g a | Air temperature = more than 5 °C (41 °F) | Non e | ON | OFF |
| c ol d e n gi n | Air tempera- ture (normal temperature) = between 5 °C (41 °F) and 25 °C (77 °F) | Non e | ON/ OFF | OFF |
| е | Air tempera- ture = more than 25 °C (77 °F) | Non e | OFF | OFF |
| Starting an engine after a long period of time | | Non e | ON | OFF |
| | starting a rm engine | Non e | OFF | ON |
| | starting an en- e after a fall | Non e | OFF | ON |

^{*} Operate the throttle grip before kick starting.

CAUTION:

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.
- 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.

- 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.
- 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.

CAUTION:

- 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

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

TORQUE-CHECK POINTS

| Frame construc | ction | | | Frame to rear frame |
|-----------------|-----------------------------|-------------------------------------|--------------------------|------------------------------------|
| | Combined seat and fuel tank | | Fuel tank to frame | |
| Exhaust system | า | | | Silencer to rear frame |
| Engine mounting | ng | | | Frame to engine |
| | | Engine bracket to engine | | |
| | | | | Engine bracket to frame |
| Steering | | Steering stem to handlebar | | Steering stem to frame |
| | | | | Steering stem to upper bracket |
| | | | | Upper bracket to handlebar |
| Suspension | Front | Steering stem to front fork | | Front fork to upper bracket |
| | | | | Front fork to lower bracket |
| | Rear | For link type | | Assembly of links |
| | | | | Link to frame |
| | | | | Link to rear shock absorber |
| | | | | Link to swingarm |
| | | Installation of rear shock absorber | | Rear shock absorber to frame |
| | | Installation of swingarm | | Tightening of pivot shaft |
| Wheel | | Installation of wheel | Front | Tightening of wheel axle |
| | | | | Tightening of axle holder |
| | | | Rear | Tightening of wheel axle |
| | | | | Wheel to rear wheel sprocket |
| Brake | | | Front | Brake caliper to front fork |
| | | | | Brake disc to wheel |
| | | | | Tightening of union bolt |
| | | | | Brake master cylinder to handlebar |
| | | | | Tightening of bleed screw |
| | | | | Tightening of brake hose holder |
| | | | Rear | Brake pedal to frame |
| | | | | Brake disc to wheel |
| | | | Tightening of union bolt | |
| | | | | Brake master cylinder to frame |
| | | | | Tightening of bleed screw |
| | | | | Tightening of brake hose holder |
| Fuel system | | | • | Fuel tank to fuel cock |
| Lubrication sys | tem | | | Tightening of oil hose clamp |

NOTE: -

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.

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

CAUTION:

Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brakes and transmission seals. Many expensive repair bills have resulted from improper high pressure detergent applications such as those available in coin-operated car washers.

- 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.
- 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.
- Automotive wax may be applied to all painted or chromed surfaces. Avoid combination cleanerwaxes, as they may contain abrasives.
- After completing the above, start the engine and allow it to idle for several minutes.

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.
- Remove the spark plug, pour a tablespoon of SAE 10W-30 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.
- 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.
- 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

Make any necessary repairs before the machine is stored.

SPECIFICATIONS GENERAL SPECIFICATIONS

| Model name: | WR450FX (CDN, AUS, NZ) | | |
|------------------------------------|--|---------------------|--|
| | WR450F (ZA) | | |
| Model code number: | 5TJK (CDN) | | |
| | 5TJM (AUS, NZ, ZA) | | |
| Dimensions: | CDN, ZA | AUS, NZ | |
| Overall length | 2,175 mm (85.63 in) | 2,190 mm (86.22 in) | |
| Overall width | 825 mm (32.48 in) | ← | |
| Overall height | 1,295 mm (50.98 in) | 1,300 mm (51.18 in) | |
| Seat height | 980 mm (38.58 in) | 990 mm (38.98 in) | |
| Wheelbase | 1,485 mm (58.46in) | ← | |
| Minimum ground clearance | 365 mm (14.37 in) | 370 mm (14.57 in) | |
| Dry weight: | | | |
| Without oil and fuel | 112.5 kg (248.0 lb) | | |
| Engine: | | | |
| Engine type | Liquid cooled 4-stroke, DOH | C | |
| Cylinder arrangement | Single cylinder, forward inclir | ned | |
| Displacement | 449 cm ³ (15.8 lmp oz, 15.2 l | JS oz) | |
| Bore × stroke | 95.0 × 63.4 mm (3.74 × 2.50 | in) | |
| Compression ratio | 12.3 : 1 | | |
| Starting system | Kick and electric starter | | |
| Lubrication system: Dry sump | | | |
| Oil type or grade: | | | |
| Engine oil | (For CDN) | | |
| | Yamalube 4, SAE10W30 or SAE20W40 | | |
| 0 10 30 50 70 90 110 130 °F | Yamalube 4-R, SAE10W50 | | |
| YAMALUBE 4(10W-30) or SAE 10W-30 | API service SG type or higher, | | |
| | JASO standard MA | | |
| YAMALUBE 4(20W-40) or SAE 20W-40 | | | |
| | | | |
| YAMALUBE 4-R(10W-50) or SAE 10W-50 | | | |
| -20 -10 0 10 20 30 40 50 °C | | | |
| -20 -10 0 10 20 30 40 30 0 | | | |
| | (Except for CDN) | | |
| | SAE10W30, SAE10W40, SAE15W40, | | |
| -20 -10 0 10 20 30 40 50 °C | SAE20W40 or SAE20W50 | | |
| SAE 10W-30 | API service SG type or higher, | | |
| | JASO standard MA | | |
| SAE 10W-40 | | | |
| SAE 15W-40 | | | |
| SAE 20W-40 | | | |
| SAE 20W-50 | | | |
| | | | |
| | 1 | | |

GENERAL SPECIFICATIONS

| Oil and a training | Ι | |
|--|---|-----------------------------|
| Oil capacity: | | |
| Engine oil | | |
| Periodic oil change | 0.95 L (0.84 Imp qt, 1.00 US qt) | |
| With oil filter replacement | 1.0 L (0.88 Imp qt, 1.06 US q | • |
| Total amount | 1.2 L (1.06 Imp qt, 1.27 US q | |
| Coolant capacity (including all routes): | 1.0 L (0.88 Imp qt, 1.06 US q | t) |
| Air filter: | Wet type element | |
| Fuel: | | |
| Туре | Premium unleaded gasoline on number of 95 or higher. | only with a research octane |
| Tank capacity | 8.0 L (1.76 Imp gal, 2.11 US | gal) |
| Reserve | 1.1 L (0.24 Imp gal, 0.29 US | gal) |
| Carburetor: | | |
| Туре | FCR-MX39 | |
| Manufacturer | KEIHIN | |
| Spark plug: | | |
| Type/manufacturer | CR8E/NGK (resistance type) | |
| Gap | 0.7-0.8 mm (0.028-0.031 in) | |
| Clutch type: | Wet, multiple-disc | |
| Transmission: | | |
| Primary reduction system | Gear | |
| Primary reduction ratio | 61/23 (2.652) | |
| Secondary reduction system | Chain drive | |
| Secondary reduction ratio | 50/13 (3.846) | |
| Transmission type | Constant mesh, 5-speed | |
| Operation | Left foot operation | |
| Gear ratio: | 78.7.7 | |
| 1st | 29/12 (2.417) | |
| 2nd | 26/15 (1.733) | |
| 3rd | 21/16 (1.313) | |
| 4th | 21/20 (1.050) | |
| 5th | 21/25 (0.840) | |
| Chassis: | CDN, ZA | AUS, NZ |
| Frame type | Semi double cradle | ← |
| Caster angle | 27.3 ° | 27.0 ° |
| Trail | 117 mm (4.61 in) | 116 mm (4.57 in) |
| Tire: | . , | · |
| Туре | With tube | |
| Size (front) | 80/100-21 51M (CDN, ZA) | |
| | 90/90-21 54R (AUS, NZ) | |
| Size (rear) | 110/100-18 64M (CDN, ZA) | |
| | 130/90-18 69R (AUS, NZ) | |
| Tire pressure (front and rear) | 130/90-16 69H (AUS, NZ) 100 kPa (1.0 kgf/cm ² , 15 psi) | |
| | 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - | |

| Brake: | |
|--------------------------|---|
| Front brake type | Single disc brake |
| Operation | Right hand operation |
| Rear brake type | Single disc brake |
| Operation | Right foot operation |
| Suspension: | 3 |
| Front suspension | Telescopic fork |
| Rear suspension | Swingarm (link type monocross suspension) |
| Shock absorber: | - ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' |
| Front shock absorber | Coil spring/oil damper |
| Rear shock absorber | Coil spring/gas, oil damper |
| Wheel travel: | |
| Front wheel travel | 300 mm (11.8 in) |
| Rear wheel travel | 305 mm (12.0 in) |
| Electrical: | |
| Ignition system | CDI |
| Generator system | AC magneto |
| Battery type | YTZ7S (F) |
| Battery voltage/capacity | 12V/6 AH |
| Specific gravity | 1.310 |
| Headlight type: | Quartz bulb (halogen) |
| Bulb wattage × quantity: | |
| Headlight | 12 V 35/36.5 W × 1 |
| Taillight | 12 V 1.6/0.3 W × 1 |

MAINTENANCE SPECIFICATIONS ENGINE

| Item | Standard | Limit |
|--------------------|-----------------------------------|-----------------------|
| Cylinder head: | | |
| Warp limit | | 0.05 mm (0.002 in) |
| * | | |
| Cylinder: | | |
| Bore size | 95.00–95.01 mm (3.7402–3.7406 in) | |
| Out of round limit | | 0.05 mm (0.002 in) |

| Item | Standard | Limit |
|---------------------------------|-------------------------------------|--------------------------|
| Camshaft: | | |
| Drive method | Chain drive (Left) | |
| Camshaft cap inside diameter | 22.000–22.021 mm (0.8661–0.8670 in) | |
| Camshaft outside diameter | 21.959–21.972 mm (0.8645–0.8650 in) | |
| Shaft-to-cap clearance | 0.028–0.062 mm (0.0011–0.0024 in) | 0.08 mm (0.003 in) |
| Cam dimensions | | |
| A | | |
| Intake "A" | 30.100–30.200 mm (1.1850–1.1890 in) | 30.000 mm (1.1811 in) |
| Intake "B" | 22.450–22.550 mm (0.8839–0.8878 in) | 22.350 mm (0.8799 in) |
| Exhaust "A" | 30.200–30.300 mm (1.1890–1.1929 in) | 30.100 mm (1.1850 in) |
| Exhaust "B" | 22.450–22.550 mm (0.8839–0.8878 in) | 22.350 mm (0.8799 in) |
| Camshaft runout limit | | 0.03 mm (0.0012 in) |
| | | |
| Timing chain: | | |
| Timing chain type/No. of links | 98XRH2010-118M/118 | |
| Timing chain adjustment method | Automatic | |
| Valve, valve seat, valve guide: | | |
| Valve clearance (cold) | | |
| IN | 0.10–0.15 mm (0.0039–0.0059 in) | |
| EX | 0.20-0.25 mm (0.0079-0.0098 in) | |
| Valve dimensions: | | |
| "A" head diameter (IN) | 26.9–27.1 mm (1.0591–1.0669 in) | |
| "A" head diameter (EX) | 27.9–28.1 mm (1.0984–1.1063 in) | |
| A | | |

| Item | Standard | Limit |
|------------------------------|-----------------------------------|-------------------------|
| "B" face width (IN) | 2.26 mm (0.089 in) | |
| "B" face width (EX) | 2.26 mm (0.089 in) | |
| В | | |
| "C" seat width (IN) | 0.9–1.1 mm (0.0354–0.0433 in) | 1.6 mm (0.0630 in) |
| "C" seat width (EX) | 0.9–1.1 mm (0.0354–0.0433 in) | 1.6 mm (0.0630 in) |
| C | | |
| "D" margin thickness (IN) | 1 mm (0.0394 in) | 0.85 mm (0.033 in) |
| "D" margin thickness (EX) | 1 mm (0.0394 in) | 0.85 mm (0.033 in) |
| D | | |
| Stem outside diameter (IN) | 4.475–4.490 mm (0.1762–0.1768 in) | 4.445 mm (0.1750 in) |
| Stem outside diameter (EX) | 4.965–4.980 mm (0.1955–0.1961 in) | 4.935 mm (0.1943 in) |
| Guide inside diameter (IN) | 4.500–4.512 mm (0.1772–0.1776 in) | 4.550 mm (0.1791 in) |
| Guide inside diameter (EX) | 5.000–5.012 mm (0.1969–0.1973 in) | 5.050 mm (0.1988 in) |
| Stem-to-guide clearance (IN) | 0.010–0.037 mm (0.0004–0.0015 in) | 0.08 mm (0.003 in) |
| Stem-to-guide clearance (EX) | 0.020–0.047 mm (0.0008–0.0019 in) | 0.10 mm (0.004 in) |
| Stem runout limit | | 0.01 mm (0.0004 in) |
| | | |

| Item | Standard | Limit |
|--------------------------------------|---|--------------------------------|
| Valve spring: | | |
| Free length (IN) | 39.46 mm (1.55 in) | 38.46 mm (1.51 in) |
| Free length (EX) | 37.61 mm (1.48 in) | 36.61 mm (1.44 in) |
| Set length (valve closed) (IN) | 27.87 mm (1.10 in) | |
| Set length (valve closed) (EX) | 28.38 mm (1.12 in) | |
| Compressed force (installed) (IN) | 130.2–149.8 N at 27.87 mm (13.28–15.28 kg at 27.87 mm, 29.27–33.68 lb at 1.10 in) | |
| Compressed force (installed) (EX) | 123.1–141.7 N at 28.38 mm (12.55–14.45 kg at 28.38 mm, 27.67–31.85 lb at 1.12 in) | |
| Tilt limit* (IN) | | 2.5°/1.7 mm (2.5°/0.067 in) |
| Tilt limit* (EX) | | 2.5°/1.6 mm (2.5°/0.063 in) |
| | | |
| Direction of winding (top view) (IN) | Clockwise | |
| Direction of winding (top view) (EX) | Clockwise | |
| Piston: | | |
| Piston to cylinder clearance | 0.020-0.045 mm (0.0008-0.0018 in) | 0.1 mm (0.004 in) |
| Piston size "D" | 94.965–94.980 mm (3.7388–3.7394 in) | |
| H | | |
| Measuring point "H" | 8 mm (0.315 in) | |
| Piston off-set | 1 mm (0.0394 in) | |
| Piston pin bore inside diameter | 18.004–18.015 mm (0.7088–0.7093 in) | 18.045 mm (0.7104 in) |
| Piston pin outside diameter | 17.991–18.000 mm (0.7083–0.7087 in) | 17.971 mm (0.7075 in) |

| Item | Standard | Limit |
|---------------------------------------|---------------------------------------|-----------------------|
| Piston rings: | | |
| Top ring: | | |
| B T + | | |
| Туре | Barrel | |
| Dimensions (B × T) | 1.2 × 3.5 mm (0.05 × 0.14 in) | |
| End gap (installed) | 0.20–0.30 mm (0.008–0.012 in) | 0.55 mm (0.022 in) |
| Side clearance (installed) | 0.030–0.065 mm (0.0012–0.0026 in) | 0.12 mm (0.005 in) |
| 2nd ring: | | |
| □ T → B | | |
| Туре | Taper | |
| Dimensions (B × T) | 1.00 × 3.35 mm (0.04 × 0.13 in) | |
| End gap (installed) | 0.35–0.50 mm (0.014–0.020 in) | 0.85 mm (0.033 in) |
| Side clearance | 0.020-0.055 mm (0.0008-0.0022 in) | 0.12 mm (0.005 in) |
| Oil ring: | | |
| B | | |
| Dimensions (B × T) | 2.0 × 2.9 mm (0.08 × 0.11 in) | |
| End gap (installed) | 0.2-0.5 mm (0.01-0.02 in) | |
| Crankshaft: | | |
| Crank width "A" | 61.95–62.00 mm (2.439–2.441 in) | |
| Runout limit "C" | 0.03 mm (0.0012 in) | 0.05 mm (0.002 in) |
| Big end side clearance "D" | 0.15–0.45 mm (0.0059–0.0177 in) | 0.50 mm (0.02 in) |
| Small end free play "F" | 0.4–1.0 mm (0.02–0.04 in) | 2.0 mm (0.08 in) |
| C C C C C C C C C C C C C C C C C C C | | |
| Balancer: | | |
| Balancer drive method | Gear | |
| Air filter oil grade: | Foam-air-filter oil or equivalent oil | |

| Item | Standard | Limit |
|---------------------------------|--|-----------------------|
| Clutch: | | |
| Friction plate thickness | 2.92–3.08 mm (0.115–0.121 in) | 2.8 mm (0.110 in) |
| Quantity | 8 | |
| Clutch plate 1 thickness | 1.9–2.1 mm (0.075–0.083 in) | |
| Quantity | 4 | |
| Warp limit | | 0.1 mm (0.004 in) |
| Clutch plate 2 thickness | 1.5–1.7 mm (0.059–0.067 in) | |
| Quantity | 3 | |
| Warp limit | | 0.1 mm (0.004 in) |
| Clutch spring free length | 50.0 mm (1.97 in) | 49.0 mm (1.93 in) |
| Quantity | 6 | |
| Clutch housing thrust clearance | 0.10-0.35 mm (0.0039-0.0138 in) | |
| Clutch housing radial clearance | 0.010-0.044 mm (0.0004-0.0017 in) | |
| Clutch release method | Inner push, cam push | |
| Shifter: | | |
| Shifter type | Cam drum and guide bar | |
| Guide bar bending limit | | 0.05 mm (0.002 in) |
| Kickstarter: | | |
| Туре | Ratchet type | |
| Carburetor: | | |
| I. D. mark | 5TJE E0 | |
| Main jet (M.J) | #162 | |
| Main air jet (M.A.J) | ø2.0 | |
| Jet needle (J.N) | NFNT | |
| Cutaway (C.A) | 1.5 | |
| Pilot jet (P.J) | #45 | |
| Pilot air jet (P.A.J) | #70 | |
| Pilot outlet (P.O) | ø0.9 | |
| Bypass (B.P) | ø1.0 | |
| Valve seat size (V.S) | ø3.8 | |
| Starter jet (G.S) | #65 | |
| Leak jet (Acc.P) | #60 | |
| Float height (F.H) | 8 mm (0.31 in) | |
| Engine idle speed | 1,750–1,950 r/min | |
| Intake vacuum | 34.8–40.1 kPa (261–301 mmHg, 10.28–11.85 inHg) | |
| Hot starter lever free play | 3–6 mm (0.12–0.24 in) | |

| Item | Standard | Limit |
|-------------------------------|---|------------------------|
| Lubrication system: | | |
| Oil filter type | Paper type | |
| Oil pump type | Trochoid type | |
| Tip clearance | 0.12 mm or less (0.0047 in or less) | 0.20 mm (0.008 in) |
| Side clearance | 0.09–0.17 mm (0.0035–0.0067 in) | 0.24 mm (0.009 in) |
| Housing and rotor clearance | 0.03–0.10 mm (0.0012–0.0039 in) | 0.17 mm (0.0067 in) |
| Bypass valve setting pressure | 40-80 kPa (0.4-0.8 kg/cm ² , 5.69-11.38 psi) | |
| Cooling: | | |
| Radiator core size | | |
| Width | 120.2 mm (4.73 in) | |
| Height (Left/Right) | 260 mm (10.24 in)/240 mm (9.45 in) | |
| Thickness | 22 mm (0.87 in) | |
| Radiator cap opening pressure | 110 kPa (1.1 kg/cm ² , 15.6 psi) | |
| Radiator capacity (total) | 0.57 L (0.50 Imp qt, 0.60 US qt) | |
| Water pump | | |
| Type | Single-suction centrifugal pump | |

CHASSIS

| Item | Stan | dard | Limit |
|--|--|---|------------------|
| Steering system: | | | |
| Steering bearing type | Taper roller bearing | | |
| Front suspension: | CDN | AUS, NZ, ZA | |
| Front fork travel | 300 mm (11.8 in) | ← | |
| Fork spring free length | 460 mm (18.1 in) | ← | 455 mm (17.9 in) |
| Spring rate, STD | K = 4.5 N/mm (0.459 kg/ mm, 25.7 lb/in) | ← | |
| Optional spring/spacer | Yes | ← | |
| Oil capacity | 648 cm ³ (22.8 lmp oz, 21.9 US oz) | 655 cm ³ (23.1 lmp oz, 22.1 US oz) | |
| Oil level | 132 mm (5.20 in) | 125 mm (4.92 in) | |
| <min.–max.> (From top of outer tube with inner tube and damper rod fully compressed without spring.)</min.–max.> | 95–150 mm (3.74–5.91 in) | ← | |
| Oil grade | Suspension oil "S1" | ← | |
| Inner tube outer diameter | 48 mm (1.89 in) | ← | |
| Front fork top end | Zero mm (Zero in) | ← | |
| Rear suspension: | | | |
| Shock absorber travel | 130 mm (5.12 in) | | |
| Spring free length | 260 mm (10.24 in) | | |
| Fitting length | 252.5 mm (9.94 in) | | |
| <minmax.></minmax.> | 238.5–258.5 mm (9.39–10.18 in) | | |
| Spring rate, STD | K = 54.0 N/mm (5.50 kg/mm, 308.0 lb/in) | | |
| Optional spring | Yes | | |
| Enclosed gas pressure | 1,000 kPa (10 kg/cm ² , 14 | 12 psi) | |

| Item | Standard | Limit |
|---|-------------------------------|----------------------------------|
| Swingarm: | | |
| Swingarm free play limit | | |
| End | | 1.0 mm (0.04 |
| | | in) |
| Wheel: | | |
| Front wheel type | Spoke wheel | |
| Rear wheel type | Spoke wheel | |
| Front rim size/material | 21 × 1.60/Aluminum | |
| Rear rim size/material | 18 × 2.15/Aluminum | |
| Rim runout limit: | | |
| Radial | | 2.0 mm (0.08 in) |
| Lateral | | 2.0 mm (0.08 in) |
| Drive chain: | | - |
| Type/manufacturer | DID520VM/DAIDO | |
| Number of links | 113 links + joint | |
| Chain slack | 48–58 mm (1.9–2.3 in) | |
| Chain length (15 links) | | 239.3 mm (9.42 in) |
| Front disc brake: | | (01.12) |
| Disc outside dia. × Thickness | 250 × 3.0 mm (9.84 × 0.12 in) | 250 × 2.5 mm (9.84 × 0.10 in) |
| Pad thickness | 4.4 mm (0.17 in) | 1.0 mm (0.04 in) |
| Master cylinder inside dia. | 11.0 mm (0.433 in) | |
| Caliper cylinder inside dia. | 27.0 mm (1.063 in) × 2 | |
| Brake fluid type | DOT #4 | |
| Rear disc brake: | | |
| Disc outside dia. × Thickness | 245 × 4.0 mm (9.65 × 0.16 in) | 245 × 3.5 mm (9.65 × 0.14 in) |
| Deflection limit | | 0.15 mm (0.006 in) |
| Pad thickness | 6.4 mm (0.25 in) | 1.0 mm (0.04 in) |
| Master cylinder inside dia. | 11.0 mm (0.433 in) | |
| Caliper cylinder inside dia. | 25.4 mm (1.000 in) × 1 | |
| Brake fluid type | DOT #4 | |
| Brake lever and brake pedal: | | |
| Brake lever position | 95 mm (3.74 in) | |
| Brake pedal height (vertical height above footrest top) | 10 mm (0.39 in) | |
| Clutch lever free play (lever end) | 8–13 mm (0.31–0.51 in) | |
| Throttle grip free play | 3–5 mm (0.12–0.20 in) | |
| | 1 | |

ELECTRICAL

| Item | Standard | Limit |
|----------------------------------|---|---------------------|
| Ignition system: | | |
| Advancer type | Electrical | |
| CDI: | | |
| Pickup coil resistance (color) | 248–372 Ω at 20 °C (68 °F) (White–Red) | |
| CDI unit-model/manufacturer | 5TJ-F0 | |
| Ignition coil: | | |
| Model/manufacturer | 5TA-10/DENSO | |
| Minimum spark gap | 6 mm (0.24 in) | |
| Primary coil resistance | 0.08–0.10 Ω at 20 °C (68 °F) | |
| Secondary coil resistance | 4.6–6.8 k Ω at 20 °C (68 °F) | |
| Charging system: | | |
| System type | AC magneto | |
| Model (stator)/manufacturer | 5TJ 50/YAMAHA | |
| Normal output | 14 V/120 W at 5,000 r/min | |
| Charging coil resistance (color) | 0.288–0.432 Ω at 20 °C (68 °F) (White–Ground) | |
| Lighting coil resistance (color) | 0.224–0.336 Ω at 20 °C (68 °F) (Yellow–Ground) | |
| Rectifier/regulator: | | |
| Regulator type | Semiconductor short circuit | |
| Model/manufacturer | SH770AA/SHINDENGEN | |
| Regulated voltage (AC) | 12.5–13.5 V | |
| Regulated voltage (DC) | 14.0–15.0 V | |
| Rectifier capacity (AC) | 12 A | |
| Rectifier capacity (DC) | 8 A | |
| Electric starting system: | | |
| Туре | Constant mesh | |
| Starter motor: | | |
| Model/manufacturer | 5UM20/YAMAHA | |
| Operation voltage | 12 V | |
| Output | 0.48 kW | |
| Armature coil resistance | 0.0117-0.0143 Ω at 20 °C (68 °F) | |
| Brush overall length | 7 mm (0.28 in) | 3.5 mm (0.14 in) |
| Brush quantity | 2 pcs. | |
| Spring force | 3.92–5.88 N (400–600 g, 14.1–21.2 oz) | |
| Commutator diameter | 17.6 mm (0.69 in) | 16.6 mm (0.65 in) |
| Mica undercut (depth) | 1.5 mm (0.06 in) | |
| Starter relay: | | |
| Model/manufacturer | 2768090-A/JIDECO | |
| Amperage rating | 180 A | |
| | 4.2–4.6 Ω at 20 °C (68 °F) | Ī |

| Item | Standard | Limit |
|---------------------------------|---------------------------------------|-------|
| Starting circuit cut-off relay: | | |
| Model/manufacturer | ACM33221 M06/MATSUSHITA | |
| Coil winding resistance | 75.69–92.51 Ω at 20 °C (68 °F) | |
| Fuse (amperage×quantity): | | |
| Main fuse | 10 A × 1 | |
| Reserve fuse | 10 A × 1 | |
| | | |

TIGHTENING TORQUES

ENGINE

NOTE:

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

^{*1:} Tighten the cylinder head bolts to 30 Nm (3.0 m•kg, 22 ft•lb) in the proper tightening sequence, remove and retighten the cylinder head bolts to 20 Nm (2.0 m•kg, 14 ft•lb) in the proper tightening sequence, and then tighten the cylinder head bolts further to reach the specified angle 180° in the proper tightening sequence.

| Part to be tightened | Throad size | Oltri | Tightening torque | | |
|--|-------------|-------|-------------------|-------------|-------|
| Part to be lightened | Thread size | Q'ty | Nm | m•kg | ft•lb |
| Spark plug | M10S × 1.0 | 1 | 13 | 1.3 | 9.4 |
| Camshaft cap | M6 × 1.0 | 10 | 10 | 1.0 | 7.2 |
| Cylinder head blind plug screw | M12 × 1.0 | 1 | 28 | 2.8 | 20 |
| Cylinder head (stud bolt) | M8 × 1.25 | 1 | 15 | 1.5 | 11 |
| Cylinder head (bolt) | M10 × 1.25 | 4 | Ref | fer to NOTE | E.*1 |
| Cylinder head (bolt) | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Cylinder head cover | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Cylinder | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Timing chain tensioner | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Timing chain tensioner cap bolt | M6 × 1.0 | 1 | 7 | 0.7 | 5.1 |
| Timing chain guide (intake side) | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Exhaust pipe (nut) | M8 × 1.25 | 1 | 20 | 2.0 | 14 |
| Exhaust pipe (bolt) | M8 × 1.25 | 1 | 20 | 2.0 | 14 |
| Silencer | M8 × 1.25 | 2 | 30 | 3.0 | 22 |
| Silencer clamp | M8 × 1.25 | 1 | 16 | 1.6 | 11 |
| Exhaust pipe protector | M6 × 1.0 | 3 | 10 | 1.0 | 7.2 |
| Spark arrester | M5 × 0.8 | 4 | 7 | 0.7 | 5.1 |
| Silencer cap | M5 × 0.8 | 6 | 5 | 0.5 | 3.6 |
| Air induction pipe | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Air cut-off valve assembly and bracket | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Bracket (air cut-off valve) and frame | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 |
| Carburetor joint | M6 × 1.0 | 3 | 10 | 1.0 | 7.2 |
| Carburetor joint clamp | M4 × 0.7 | 1 | 3 | 0.3 | 2.2 |
| Air filter case | M6 × 1.0 | 2 | 8 | 0.8 | 5.8 |
| Air filter joint clamp | M6 × 1.0 | 1 | 3 | 0.3 | 2.2 |
| Air filter joint and air filter case | M5 × 0.8 | 1 | 4 | 0.4 | 2.9 |
| Throttle cable adjust bolt and locknut | M6 × 0.75 | 1 | 4 | 0.4 | 2.9 |
| Throttle cable (pull) | M6 × 1.0 | 1 | 4 | 0.4 | 2.9 |
| Throttle cable (return) | M12 × 1.0 | 1 | 11 | 1.1 | 8.0 |

| Part to be tightened | Thread size | Q'ty | | htening tor | - |
|---|--------------|------|-----|-------------|-------|
| | 1111000 0120 | ς ., | Nm | m•kg | ft•lb |
| Throttle cable cover | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 |
| Hot starter plunger | M12 × 1.0 | 1 | 2 | 0.2 | 1.4 |
| Hot starter cable adjust bolt and locknut | M6 × 0.75 | 1 | 4 | 0.4 | 2.9 |
| Air filter element | M6 × 1.0 | 1 | 2 | 0.2 | 1.4 |
| Radiator stay | M6 × 1.0 | 6 | 7 | 0.7 | 5.1 |
| Radiator | M6 × 1.0 | 4 | 10 | 1.0 | 7.2 |
| Radiator hose clamp | M6 × 1.0 | 8 | 2 | 0.2 | 1.4 |
| Radiator pipe 1, 2 | M10 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Impeller | M8 × 1.25 | 1 | 14 | 1.4 | 10 |
| Water pump housing cover | M6 × 1.0 | 3 | 10 | 1.0 | 7.2 |
| Coolant drain bolt | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Oil pump cover | M4 × 0.7 | 1 | 2 | 0.2 | 1.4 |
| Oil pump | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Oil pump drive gear shaft | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Engine oil drain bolt (oil filter) | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Oil filter cover | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Oil check bolt (cylinder head) | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Oil hose clamp | _ | 2 | 2 | 0.2 | 1.4 |
| Crankshaft end accessing screw | M27 × 1.5 | 1 | 10 | 1.0 | 7.2 |
| Timing mark accessing screw | M14 × 1.5 | 1 | 6 | 0.6 | 4.3 |
| Clutch cover | M6 × 1.0 | 7 | 10 | 1.0 | 7.2 |
| Crankcase cover (right) | M6 × 1.0 | 8 | 10 | 1.0 | 7.2 |
| Crankcase cover (right) | M6 × 1.0 | 2 | 12 | 1.2 | 8.7 |
| Crankcase cover (left) | M6 × 1.0 | 8 | 10 | 1.0 | 7.2 |
| Idle gear cover (starter motor) | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Crankcase | M6 × 1.0 | 12 | 12 | 1.2 | 8.7 |
| Clutch cable holder | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Oil drain bolt (crankcase right) | M6 × 1.25 | 1 | 20 | 2.0 | 14 |
| Oil drain bolt (crankcase left) | M6 × 1.0 | 1 | 20 | 2.0 | 14 |
| Oil check bolt (crankcase) | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Oil strainer | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Crankcase bearing stopper | M6 × 1.0 | 4 | 14 | 1.4 | 10 |
| Crankcase bearing stopper | M6 × 1.0 | 8 | 10 | 1.0 | 7.2 |
| Drive axle oil seal stopper | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Ratchet wheel guide | M6 × 1.0 | 2 | 12 | 1.2 | 8.7 |
| Kickstarter crank | M8 × 1.25 | 1 | 33 | 3.3 | 24 |
| Screw (kickstarter crank) | M6 × 1.0 | 1 | 7 | 0.7 | 5.1 |
| Starter clutch | M6 × 1.0 | 6 | 16 | 1.6 | 11 |
| Primary drive gear | M20 × 1.0 | 1 | 110 | 11.0 | 80 |
| Clutch boss | M20 × 1.0 | 1 | 75 | 7.5 | 54 |
| Clutch cable adjust bolt and locknut | M8 × 1.0 | 1 | 4 | 0.4 | 2.9 |
| Clutch spring | M6 × 1.0 | 6 | 10 | 1.0 | 7.2 |
| Balancer | M10 × 1.0 | 1 | 45 | 4.5 | 32 |
| Balancer driven gear | M14 × 1.0 | 1 | 50 | 5.0 | 36 |

2-13

Δ

| Part to be tightened | Thread size | O'th. | Tightening torque | | |
|----------------------------|--------------|-------|-------------------|------|-------|
| Fait to be lightened | Tilleau Size | Q'ty | Nm | m•kg | ft•lb |
| Balancer weight plate | M6 × 1.0 | 3 | 10 | 1.0 | 7.2 |
| Drive sprocket | M20 × 1.0 | 1 | 75 | 7.5 | 54 |
| Drive chain sprocket cover | M6 × 1.0 | 2 | 8 | 0.8 | 5.8 |
| Shift pedal | M6 × 1.0 | 1 | 12 | 1.2 | 8.7 |
| Shift guide | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Stopper lever | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 |
| Segment | M8 × 1.25 | 1 | 30 | 3.0 | 22 |

CHASSIS

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

| | Part to be tightened | Thread size | Q'ty | Tightening torque | | | |
|---|--|-------------|------|-------------------|-------------|-------|--|
| | Part to be lightened | | | Nm | m•kg | ft∙lb | |
| Δ | Upper bracket and outer tube | M8 × 1.25 | 4 | 21 | 2.1 | 15 | |
| Δ | Lower bracket and outer tube | M8 × 1.25 | 4 | 21 | 2.1 | 15 | |
| Δ | Upper bracket and steering stem | M24 × 1.0 | 1 | 145 | 14.5 | 105 | |
| Δ | Handlebar holder (upper) | M8 × 1.25 | 4 | 28 | 2.8 | 20 | |
| Δ | Handlebar holder (lower) | M12 × 1.25 | 2 | 34 | 3.4 | 24 | |
| Δ | Steering ring nut | M28 × 1.0 | 1 | Re | efer to NOT | E. | |
| | Front fork and cap bolt | M51 × 1.5 | 2 | 30 | 3.0 | 22 | |
| | Front fork and base valve | M30 × 1.0 | 2 | 55 | 5.5 | 40 | |
| | Cap bolt and damper rod (front fork) | M12 × 1.25 | 2 | 29 | 2.9 | 21 | |
| | Bleed screw (front fork) and cap bolt | M5 × 0.8 | 2 | 1 | 0.1 | 0.7 | |
| Δ | Front fork and protector | M6 × 1.0 | 6 | 7 | 0.7 | 5.1 | |
| Δ | Front fork protector and brake hose holder | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 | |
| | Throttle cable cap | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 | |
| | Clutch lever holder mounting | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 | |
| | Clutch lever mounting | M6 × 1.0 | 1 | 4 | 0.4 | 2.9 | |
| | Hot starter lever holder mounting | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 | |
| | Hot starter lever mounting | M5 × 0.8 | 1 | 2 | 0.2 | 1.4 | |
| Δ | Front brake master cylinder and bracket | M6 × 1.0 | 2 | 9 | 0.9 | 6.5 | |
| | Front brake master cylinder cap | M4 × 0.7 | 2 | 2 | 0.2 | 1.4 | |
| | Brake lever mounting (bolt) | M6 × 1.0 | 1 | 6 | 0.6 | 4.3 | |
| | Brake lever mounting (nut) | M6 × 1.0 | 1 | 6 | 0.6 | 4.3 | |
| | Brake lever position locknut | M6 × 1.0 | 1 | 5 | 0.5 | 3.6 | |
| Δ | Hose guide (front brake hose) and hose guide bracket | M5 × 0.8 | 1 | 4 | 0.4 | 2.9 | |
| Δ | Hose guide (front brake hose) and under bracket | M6 ×1.0 | 1 | 4 | 0.4 | 2.9 | |
| Δ | Front brake hose union bolt (master cylinder) | M10 × 1.25 | 1 | 30 | 3.0 | 22 | |
| Δ | Front brake hose union bolt (caliper) | M10 × 1.25 | 1 | 30 | 3.0 | 22 | |
| Δ | Front brake caliper and front fork | M8 × 1.25 | 2 | 23 | 2.3 | 17 | |
| Δ | Front brake caliper and brake hose holder | M6 × 1.0 | 1 | 10 | 1.0 | 7.2 | |
| Δ | Brake caliper (front and rear) and pad pin plug | M10 × 1.0 | 2 | 3 | 0.3 | 2.2 | |
| Δ | Brake caliper (front and rear) and pad pin | M10 × 1.0 | 2 | 18 | 1.8 | 13 | |
| Δ | Brake caliper (front and rear) and bleed screw | M8 × 1.25 | 2 | 6 | 0.6 | 4.3 | |
| Δ | Front wheel axle and nut | M16 × 1.5 | 1 | 90 | 9.0 | 65 | |

| | Part to be tightened | Thread size | | Tightening torque | | | |
|---|--|--------------|------|-------------------|------|-------|--|
| | Part to be tightened | Tilleau size | Q'ty | Nm | m•kg | ft•lb | |
| Δ | Front wheel axle holder | M8 × 1.25 | 4 | 21 | 2.1 | 15 | |
| Δ | Front brake disc and wheel hub | M6 × 1.0 | 6 | 12 | 1.2 | 8.7 | |
| Δ | Rear brake disc and wheel hub | M6 × 1.0 | 6 | 14 | 1.4 | 10 | |
| Δ | Brake pedal mounting | M8 × 1.25 | 1 | 26 | 2.6 | 19 | |
| Δ | Rear brake master cylinder and frame | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 | |
| | Rear brake master cylinder cap | M4 × 0.7 | 2 | 2 | 0.2 | 1.4 | |
| Δ | Rear brake hose union bolt (caliper) | M10 × 1.25 | 1 | 30 | 3.0 | 22 | |
| Δ | Rear brake hose union bolt (master cylinder) | M10 × 1.25 | 1 | 30 | 3.0 | 22 | |
| Δ | Rear wheel axle and nut | M20 × 1.5 | 1 | 125 | 12.5 | 90 | |
| Δ | Driven sprocket and wheel hub | M8 × 1.25 | 6 | 50 | 5.0 | 36 | |
| Δ | Nipple (spoke) | _ | 72 | 3 | 0.3 | 2.2 | |
| Δ | Disc cover and rear brake caliper | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 | |
| Δ | Protector and rear brake caliper | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 | |
| | Chain puller adjust bolt and locknut | M8 × 1.25 | 2 | 19 | 1.9 | 13 | |
| | Engine mounting: | | | | | | |
| Δ | Engine upper bracket and frame | M10 × 1.25 | 4 | 55 | 5.5 | 40 | |
| Δ | Engine lower bracket and frame | M8 × 1.25 | 4 | 34 | 3.4 | 24 | |
| Δ | Engine and engine bracket (lower) | M10 × 1.25 | 1 | 53 | 5.3 | 38 | |
| Δ | Engine and engine bracket (upper) | M10 × 1.25 | 1 | 55 | 5.5 | 40 | |
| Δ | Engine and frame (lower) | M10 × 1.25 | 1 | 53 | 5.3 | 38 | |
| Δ | Engine guard | M6 × 1.0 | 3 | 7 | 0.7 | 5.1 | |
| | Regulator mounting | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 | |
| Δ | Pivot shaft and nut | M16 × 1.5 | 1 | 85 | 8.5 | 61 | |
| Δ | Relay arm and swingarm | M14 × 1.5 | 1 | 70 | 7.0 | 50 | |
| Δ | Relay arm and connecting rod | M14 × 1.5 | 1 | 80 | 8.0 | 58 | |
| Δ | Connecting rod and frame | M14 × 1.5 | 1 | 80 | 8.0 | 58 | |
| Δ | Rear shock absorber and frame | M10 × 1.25 | 1 | 56 | 5.6 | 40 | |
| Δ | Rear shock absorber and relay arm | M10 × 1.25 | 1 | 53 | 5.3 | 38 | |
| Δ | Rear frame and frame (upper) | M8 × 1.25 | 1 | 38 | 3.8 | 27 | |
| Δ | Rear frame and frame (lower) | M8 × 1.25 | 2 | 32 | 3.2 | 23 | |
| Δ | Swingarm and brake hose holder | M5 × 0.8 | 4 | 2 | 0.2 | 1.4 | |
| | Swingarm and patch | M4 × 0.7 | 4 | 2 | 0.2 | 1.4 | |
| | Drive chain tensioner mounting (upper) | M8 × 1.25 | 1 | 16 | 1.6 | 11 | |
| | Drive chain tensioner mounting (lower) | M8 × 1.25 | 1 | 16 | 1.6 | 11 | |
| | Chain support and swingarm | M6 × 1.0 | 3 | 7 | 0.7 | 5.1 | |
| | Seal guard and swingarm | M5 × 0.8 | 4 | 6 | 0.6 | 4.3 | |
| Δ | Fuel tank mounting | M6 × 1.0 | 2 | 9 | 0.9 | 6.5 | |
| Δ | Fuel tank and fuel cock | M6 × 1.0 | 2 | 4 | 0.4 | 2.9 | |
| | Fuel tank and seat set bracket | M6 × 1.0 | 1 | 7 | 0.7 | 5.1 | |
| | Fuel tank and fuel tank bracket | M6 × 1.0 | 4 | 7 | 0.7 | 5.1 | |
| Δ | Seat mounting | M8 × 1.25 | 2 | 23 | 2.3 | 17 | |
| Δ | Side cover mounting | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 | |
| Δ | Air scoop and fuel tank | M6 × 1.0 | 6 | 7 | 0.7 | 5.1 | |
| Δ | Air scoop and radiator panel (lower) | M6 × 1.0 | 2 | 6 | 0.6 | 4.3 | |

| | Part to be tightened | Thread size | Q'ty | Tightening torque | | |
|---|--|------------------------|------|-------------------|------|-------|
| | Part to be tightened | tightened I nread size | | Nm | m•kg | ft•lb |
| Δ | Front fender mounting | M6 × 1.0 | 4 | 7 | 0.7 | 5.1 |
| Δ | Rear fender mounting(front) | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 |
| Δ | Rear fender mounting (rear) | M6 × 1.0 | 2 | 11 | 1.1 | 8.0 |
| | Multi-function display bracket mounting | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 |
| | Multi-function display mounting | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 |
| | Plate 1 and protector | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 |
| | Plate 2 and protector | _ | 2 | 0.5 | 0.05 | 0.36 |
| | Speed sensor lead holder and under bracket | M6 × 1.0 | 1 | 13 | 1.3 | 9.4 |
| | Headlight body and headlight unit | _ | 2 | 1 | 0.1 | 0.7 |
| Δ | Headlight mounting (left and right) | M6 × 1.0 | 2 | 7 | 0.7 | 5.1 |
| | Taillight mounting | _ | 3 | 1 | 0.1 | 0.7 |
| | Taillight lead clamp and rear fender | _ | 3 | 0.5 | 0.05 | 0.36 |
| Δ | Catch tank (upper) | M6 × 1.0 | 1 | 16 | 1.6 | 11 |
| Δ | Catch tank (lower) | M6 × 1.0 | 1 | 7 | 0.7 | 5.1 |
| Δ | Footrest bracket and frame | M10 × 1.25 | 4 | 55 | 5.5 | 40 |
| | Sidestand mounting | M10 × 1.25 | 1 | 25 | 2.5 | 18 |

NOTE:

ELECTRICAL

| Part to be tightened | Thread size | Q'ty | Tightening torque | | |
|--------------------------|--------------|------|-------------------|------|-------|
| T art to be lighteried | Tillead Size | Q ty | Nm | m•kg | ft•lb |
| Stator | M5 × 0.8 | 2 | 7 | 0.7 | 5.1 |
| Holder (AC magneto lead) | M5× 0.8 | 2 | 10 | 1.0 | 7.2 |
| Rotor | M12 × 1.25 | 1 | Refer to NOTE. | | E. |
| Neutral switch | M5 × 0.8 | 2 | 4 | 0.4 | 2.9 |
| Starter motor | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |
| Starter relay terminal | M6 × 1.0 | 2 | 4 | 0.4 | 2.9 |
| Pickup coil | M6 × 1.0 | 2 | 10 | 1.0 | 7.2 |

NOTE:

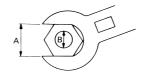
Tighten the rotor nut to 65 Nm (6.5 m•kg, 47 ft•lb), loosen and retighten the rotor nut to 65 Nm (6.5 m •kg, 47 ft•lb).

^{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).

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

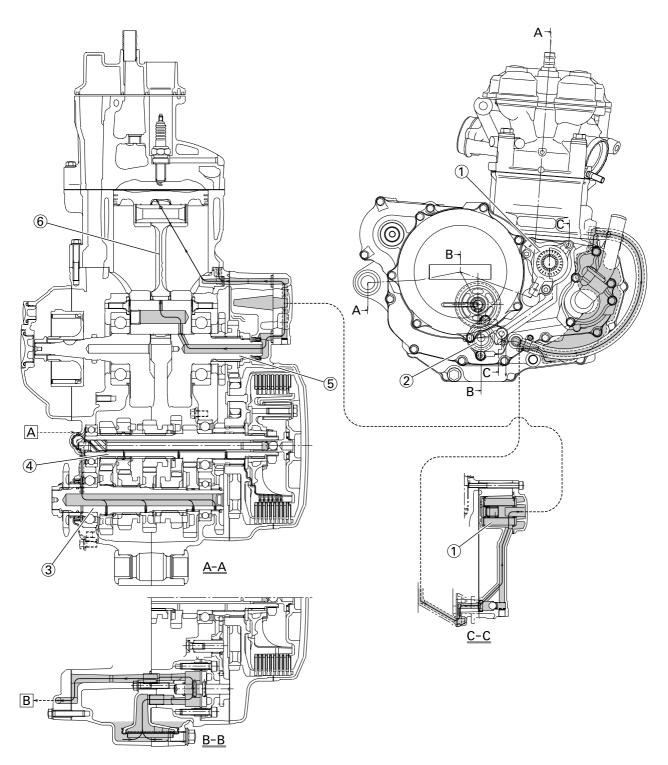
| A (Nut) | B (Bolt | TORQUE SPECIFICATION | | | | |
|------------|------------|----------------------|------|------------|--|--|
| (ivat) |) | Nm | m•kg | ft•lb | | |
| 10 mm | 6 mm | 6 | 0.6 | 4.3 | | |
| 12 mm | 8 mm | 15 | 1.5 | 11 | | |
| 14 | 10 | 30 | 3.0 | 22 | | |
| mm | mm | | | | | |
| 17 | 12 | 55 | 5.5 | 40 | | |
| mm | mm | 33 | 0.0 | 40 | | |
| 19 | 14 | 85 | 8.5 | 61 | | |
| mm | mm | 00 | 0.5 | 01 | | |
| 22 | 16 | 130 | 13 | 94 | | |
| mm | mm | .50 | .0 | 3 4 | | |

DEFINITION OF UNITS

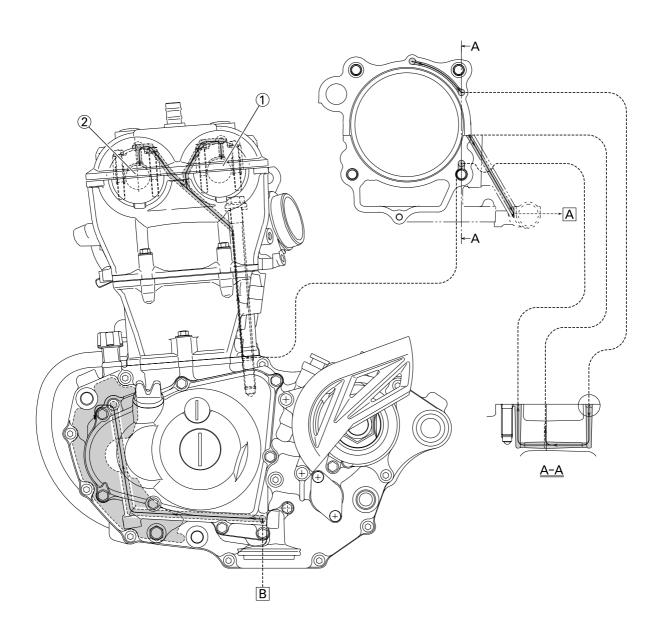
| Unit | Read | Definition | Measure |
|-----------------|-----------------------|---------------------------|--------------------|
| mm | millimeter | 10 ⁻³ meter | Length |
| cm | centimeter | 10 ⁻² meter | Length |
| kg | kilogram | 10 ³ gram | Weight |
| N | Newton | 1 kg × m/sec ² | Force |
| Nm | Newton meter | N × m | Torque |
| m•kg | Meter kilogram | m × kg | Torque |
| Pa | Pascal | N/m ² | Pressure |
| N/mm | Newton per millimeter | N/mm | Spring rate |
| L | Liter | _ | Volume or capacity |
| cm ³ | Cubic centimeter | _ | Volume or capacity |
| r/min | Revolution per minute | _ | Engine speed |

LUBRICATION DIAGRAMS

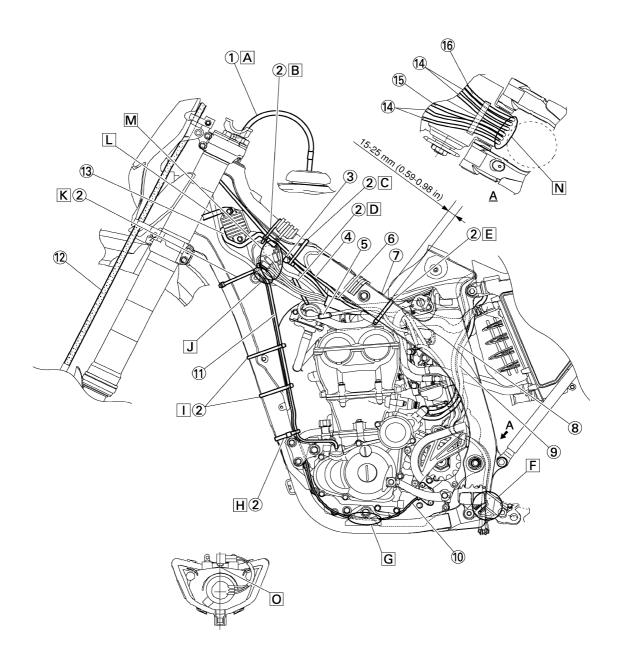
LUBRICATION DIAGRAMS



- 1. Oil filter element
- 2. Oil pump
- 3. Drive axle
- 4. Main axle
- 5. Crankshaft
- 6. Connecting rod
- A. From cylinder
- B. To oil tank



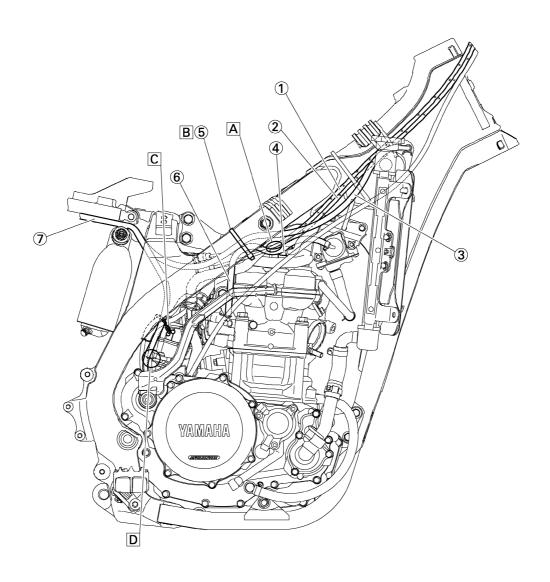
- 1. Intake camshaft
- 2. Exhaust camshaft
- A. To main axle
- B. From oil pump



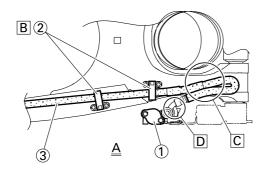
- 1. Fuel tank breather hose
- 2. Clamp
- 3. Diode
- 4. Hot starter cable
- 5. Throttle position sensor lead
- 6. Wire harness
- 7. Hump (frame)
- 8. Negative battery lead
- 9. Starter motor lead

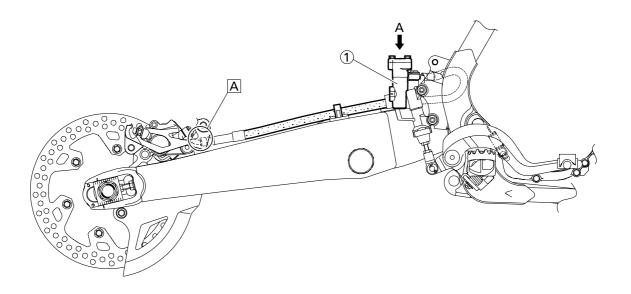
- 10. Neutral switch lead
- 11. AC magneto lead
- 12. Brake hose
- 13. Rectifier/regulator lead
- 14. Carburetor breather hose
- 15. Carburetor overflow hose
- 16. Catch tank breather hose
- A. Insert the end of the fuel tank breather hose into the hole in the steering stem.
- B. Fasten the throttle cable, hot starter cable and rectifier/regulator lead onto the frame. Locate the clamp end facing the lower side of the hot starter cable and cut off the tie end.

- C. Fasten the diode (at the marking), throttle cable and hot starter cable onto the frame. Locate the clamp end facing toward the lower right of the frame and with the tie end facing downward.
- D. Fasten the wire harness, throttle position sensor lead and clutch cable onto the frame. Pass the clamp through the hole in the stay (air cut-off valve). Locate the clamp end facing toward the lower side of the frame and cut off the tie end.
- E. Fasten the throttle position sensor lead onto the frame. Locate the clamp end facing toward the lower side of the frame and cut off the tie end.
- F. Pass the carburetor breather hoses, carburetor overflow hose and catch tank breather hose between the connecting rod and cross tube (frame).
- G. Pass the neutral switch lead on the inside of the engine bracket.
- H. Fasten the neutral switch lead and AC magneto lead onto the frame. Locate the clamp end facing toward the outside of the frame and tie end facing toward the rear of the frame.
- Fasten the AC magneto lead and neutral switch lead onto the frame. Locate the clamp end facing toward the rear of the frame and cut off the tie end.
- J. Pass the neutral switch lead and AC magneto lead on the inside of the wire harness.
- K. Fasten the AC magneto lead and neutral switch lead onto the frame.
- L. Pass the wire harness through the cable guide.
- M. Locate the couplers in the frame recess.
- N. Pass the carburetor breather hoses, carburetor overflow hose and catch tank breather hose so that the hoses do not contact the rear shock absorber.
- Secure the coupler by pushing it into the hole in the headlight unit.

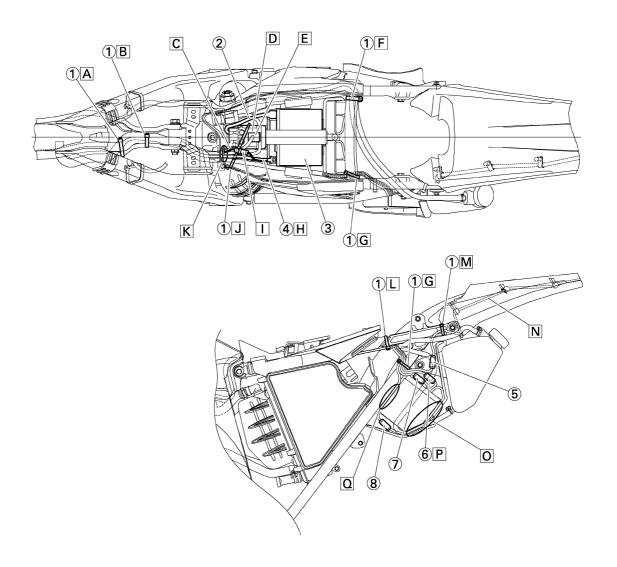


- 1. Throttle cable (pull)
- 2. Throttle cable (return)
- 3. Catch tank hose
- 4. Ignition coil
- 5. Clamp
- 6. Air induction hose (air cut-off valve rear of cylinder head)
- 7. Catch tank breather hose
- A. Cross the pull and push throttle cables.
- B. Fasten the catch tank hose and air induction hose (air cut-off valve-rear of cylinder head) onto the frame. Locate the clamp end facing toward the lower side of the frame and cut off the tie end.
- C. Fasten the catch tank breather hose and carburetor breather hoses together.
- D. Pass the carburetor breather hose (of the throttle cable cover) through the hose holder.



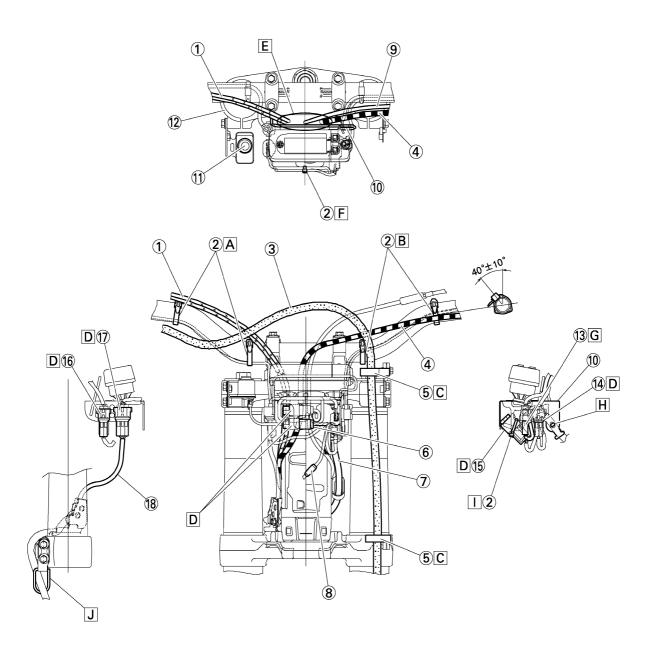


- 1. Brake master cylinder
- 2. Brake hose holder
- 3. Brake hose
- A. Install the brake hose so that its pipe portion directs as shown and lightly touches the projection on the brake caliper.
- B. Pass the brake hose into the brake hose holders.
- C. If the brake hose contacts the spring (rear shock 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. Clamp
- 2. Positive battery lead
- 3. Battery
- 4. Negative battery lead
- 5. Taillight coupler
- 6. CDI unit coupler (6-pin)
- 7. CDI unit coupler (3-pin)
- 8. CDI unit coupler (6-pin)
- A. Fasten the wire harness to the upper engine bracket (left side). Locate the clamp end facing toward the upper side of the frame with the tie end cut off on the inside of the frame.
- B. Fasten the wire harness to the upper engine bracket (left side). Locate the clamp end facing toward the upper side of the frame with the tie end cut off on the inside of the frame. Clamp the wire harness at the marking.
- C. Pass the starter motor lead through the hole in the relay holder.
- D. Fit the cover securely.

- E. Connect the wire harness to the starter relay.
- F. Fasten the catch tank breather hose and catch tank hose to the rear frame. Clamp them close to where they are joined to the frame. Fasten the pipe tightly enough not to crush it. Locate the clamp end facing toward the rear of the frame with the tie end facing downward.
- G. Fasten the (three) CDI unit leads and taillight lead to the rear frame. Locate the clamp end facing toward the upper side of the frame and cut off the tie end.
- Connect the negative battery lead to the battery negative terminal.
- I. Connect the negative battery lead to the wire harness.
- J. Fasten the wire harness to the rear frame. Locate the clamp end facing toward the upper side of the frame and the tie end toward the inside of the frame. Clamp the wire harness at the marking.
- K. Pass the wire harness, starter relay lead, starting circuit cut-off relay lead and negative battery lead through the hole in the relay holder.
- L. Fasten the (three) CDI unit leads and taillight lead to the rear frame. Locate the clamp end facing toward the lower side of the frame and cut off the tie end.
- M. Fasten the taillight lead to the rear frame. Locate the clamp end facing toward the upper side of the frame and cut off the tie end.
- N. Do not allow the taillight lead to slacken.
- Locate the CDI unit lead between the CDI unit and rear fender.
- P. Locate the CDI unit coupler in the clearance between the upper side of the CDI unit and lower side of the catch tank stay.
- Q. Locate the CDI unit lead between the CDI unit and rear frame.



- 1. Throttle cable
- 2. Clamp
- 3. Brake hose
- 4. Clutch cable
- 5. Hose guide
- 6. Main switch coupler
- 7. Wire harness
- 8. Headlight coupler
- 9. Hot starter cable
- 10. Multi-function display bracket
- 11. Main switch

- 12. Upper bracket
- 13. Clutch switch coupler
- 14. Engine stop switch coupler
- 15. Multi-function display coupler
- 16. Start switch coupler
- 17. Speed sensor coupler
- 18. Speed sensor lead
- A. Fasten the start switch lead to the handlebar with the plastic bands.
- B. Fasten the engine stop switch lead and clutch switch lead to the handlebar with the plastic bands.
- C. Pass the brake hose through the hose guides.
- Secure the coupler by inserting it into the multi-function display bracket.

- E. Pass the throttle cables, clutch cable and hot starter cable between the upper bracket and multi-function display bracket.
- F. Fasten the multi-function display leads to the bracket. Cut off the tie end.
- G. Secure the coupler by pushing it into the hole in the multi-function display bracket.
- H. Secure the wire harness clip by pushing it into the hole in the multi-function display bracket on the inside.
- Fasten the main switch lead (wire harness side) to the multifunction display bracket. Locate the clamp end facing toward the lower side of the frame and cut off the tie end.
- J. Pass the speed sensor lead through the guide on the outside of the front fork.

REGULAR INSPECTION AND ADJUSTMENTS MAINTENANCE INTERVALS

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 a doubt as to what intervals to follow in maintaining and lubricating your machine, consult your Yamaha dealer.

| Item | | | | | | | |
|--|----------------------------|--------|---|------------------|--------------------|---|-------------------------------------|
| Replace VALVES Check the valve clearances Inspect Replace VALVE SPRINGS Inspect Replace VALVE SPRINGS Inspect Replace VALVE LIFTERS Inspect Replace VALVE LIFTERS Inspect Replace VALVE LIFTERS Inspect Replace VALVE LIFTERS Inspect Replace CAMSHAFTS Inspect Replace CAMSHAFTS Inspect Replace CAMSHAFT SPROCKETS Inspect Replace PISTON Inspect Replace PISTON Inspect Replace PISTON RING Inspect Replace PISTON RING Inspect Replace PISTON PIN Inspect Replace CYLINDER HEAD Inspect carbon deposits and eliminate them. Change gasket. CYLINDER Inspect and clean CYLINDER Inspect and clean Inspect acarbon deposits and eliminate them. Change gasket. | Item | break- | - | third (or 500 | fifth (or 1,000 | | Remarks |
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| CYLINDER Inspect and clean Inspect score marks. | Inspect and clean | | | | • | | Change gasket. |
| | CYLINDER | | | | | | |
| | Inspect and clean | | | | • | | Inspect score marks. |
| | Replace | | | | | • | Inspect wear. |

MAINTENANCE INTERVALS

| ltem | After break- in | Every race | Every third (or 500 km) | Every fifth (or 1,000 km) | As re- quired | Remarks |
|---------------------------------|-----------------------|------------|----------------------------------|------------------------------------|------------------|--|
| CLUTCH Inspect and adjust | • | • | | | | Inspect housing, friction plate, clutch plate and spring. |
| Replace | | | | | | |
| TRANSMISSION | | | | | | |
| Inspect | | | | | | |
| Replace bearing | | | | | | |
| SHIFT FORK, SHIFT CAM, | | | | | | |
| GUIDE BAR | | | | | | |
| Inspect | | | | | • | Inspect wear. |
| ROTOR NUT | | | | | | |
| Retighten | • | | | • | | |
| MUFFLER | | | | | | |
| Inspect and retighten | • | | | | | |
| Clean | | | | • | | |
| Replace | | | | | • | |
| CRANK | | | | | | |
| Inspect and clean | | | | • | • | |
| CARBURETOR | | | | | | |
| Inspect, adjust and clean | • | | | | | |
| AIR INDUCTION SYSTEM | | _ | | | _ | |
| Inspect and clean | • | • | | • | • | |
| SPARK PLUG | | | | | | |
| Inspect and clean | • | | | | _ | |
| Replace | | | | | | |
| DRIVE CHAIN | _ | _ | | | | Use chain lube. |
| Lubricate, slack, alignment | • | • | | | | Chain slack: 48–58 mm (1.9–2.3 in) |
| Replace | | | | | | |
| COOLING SYSTEM | | | | | | |
| Check coolant level and leakage | • | • | | | | |
| Check radiator cap operation | | | | | | |
| Replace coolant | | | | | | Every two years |
| Inspect hoses | | • | | | | |
| OUTSIDE NUTS AND BOLTS | | | | | | |
| Retighten | • | | | | | Refer to "STARTING AND BREAK-IN" section in the CHAPTER 1. |
| AIR FILTER | | | | | | |
| Clean and lubricate | • | | | | | Use foam air-filter oil or equivalent oil. |
| Replace | | | <u>L</u> | | | |
| OIL FILTER | | | | | | |
| Replace | | | | • | | |
| FRAME | | | | | | |
| Clean and inspect | • | | <u> </u> | | | |

MAINTENANCE INTERVALS

| Item After break-in Preak-in P |
|--|
| Clean and inspect BRAKES Adjust lever position and pedal height Lubricate pivot point Check brake disc surface Check fluid level and leakage Retighten brake disc bolts, caliper bolts, master cylinder bolts and union bolts Replace pads Replace pads Replace brake fluid FRONT FORKS Inspect and adjust Replace oil seal FRONT FORK OIL SEAL AND DUST SEAL Clean and lube PROTECTOR GUIDE Replace REAR SHOCK ABSORBER Inspect and adjust REAR SHOCK ABSORBER Inspect and adjust Replace REAR SHOCK ABSORBER Inspect and adjust |
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| REAR SHOCK ABSORBER Inspect and adjust |
| Inspect and adjust |
| |
| (After |
| 1 |
| rain |
| Lube ride) ● Molybdenum disulfide grease |
| Retighten • • • • • • • • • • • • • • • • • • • |
| DRIVE CHAIN GUIDE AND ROLLERS |
| Inspect |
| SWINGARM |
| Inspect, lube and retighten Molybdenum disulfide grease |
| RELAY ARM, CONNECTING ROD |
| Inspect, lube and retighten Molybdenum disulfide grease |
| SIDESTAND |
| Lubricate Lithium base grease |
| STEERING HEAD |
| Inspect free play and retighten |
| Clean and lube Lithium base grease |
| Replace bearing |

MAINTENANCE INTERVALS

| Item | After break- in | Every race | Every third (or 500 km) | Every fifth (or 1,000 km) | As re- quired | Remarks |
|---|-----------------------|---------------|----------------------------------|------------------------------------|------------------|---|
| TIRE, WHEELS | | | | | | |
| Inspect air pressure, wheel run- out, tire wear and spoke loose- ness | • | • | | | | |
| Retighten sprocket bolt | • | | | | | |
| Inspect bearings | | | • | | | |
| Replace bearings | | | | | • | |
| Lubricate | | | • | | | Lithium base grease |
| THROTTLE, CONTROL CABLE | | | | | | |
| Check routing and connection | • | | | | | |
| Lubricate | • | • | | | | Yamaha cable lube or SAE 10W-30 motor oil |
| HOT STARTER, CLUTCH LEVER | | | | | | |
| Inspect free play | | | | | • | |
| BATTERY | | | | | | |
| Check terminal for looseness and corrosion | | | | | • | |

PRE-OPERATION INSPECTION AND MAINTENANCE

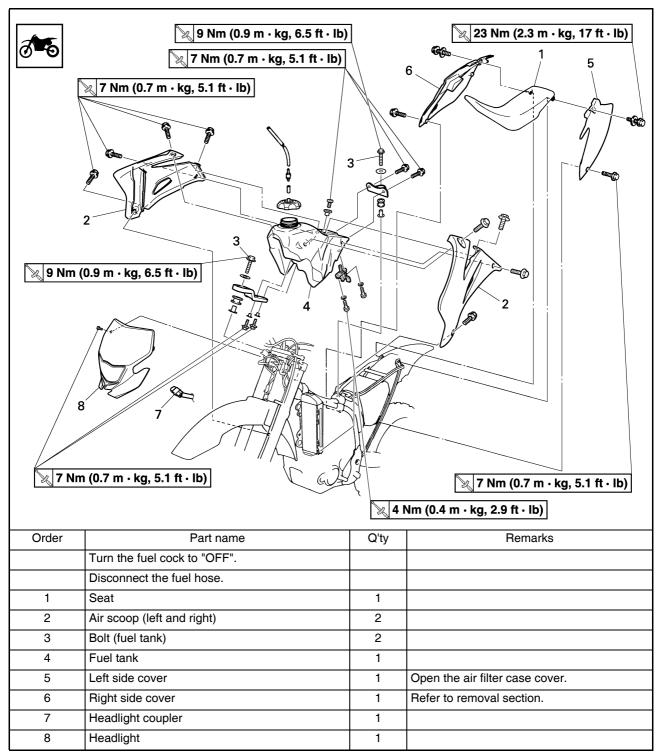
PRE-OPERATION INSPECTION AND MAINTENANCE

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

GENERAL INSPECTION AND MAINTENANCE

| Item | Routine | Page | | | | | |
|-------------------------------------|--|-------------|--|--|--|--|--|
| Coolant | Check that coolant is filled up to the radiator cap. Check the cooling system for leakage. | P.3-9 – 10 | | | | | |
| Fuel | Check that a fresh gasoline is filled in the fuel tank. Check the fuel line for leakage. | P.1-14 | | | | | |
| Engine oil | Check that the oil level is correct. Check the crankcase and oil line for leakage. | P.3-12 – 13 | | | | | |
| Gear shifter and clutch | clutch operates smoothly. | | | | | | |
| Throttle grip/Housing | adjusted. Lubricate the throttle grip and nousing, it necessary. | | | | | | |
| Brakes | Check the play of front brake and effect of front and rear brake. | P.3-17 – 20 | | | | | |
| Drive chain | Check drive chain slack and alignment. Check that the drive chain is lubricated properly. | P.3-20 – 21 | | | | | |
| Wheels | Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play. | P.3-24 | | | | | |
| Steering | Check that the handlebar can be turned smoothly and have no excessive play. | P.3-24 – 25 | | | | | |
| Front forks and rear shock absorber | Check that they operate smoothly and there is no oil leakage. | P.3-21 – 23 | | | | | |
| Cables (wires) | 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. | _ | | | | | |
| Exhaust pipe | Check that the exhaust pipe is tightly mounted and has no cracks. | P.3-8 – 9 | | | | | |
| Rear wheel sprocket | Check that the rear wheel sprocket tightening bolt is not loose. | P.3-20 | | | | | |
| Lubrication | Check for smooth operation. Lubricate if necessary. | P.3-26 | | | | | |
| Bolts and nuts | Check the chassis and engine for loose bolts and nuts. | P.1-16 | | | | | |
| Lead connectors | Check that the AC magneto, CDI unit, and ignition coil are connected tightly. | P.1-3 | | | | | |
| Settings | 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? | P.4-1 – 9 | | | | | |

ENGINEREMOVING THE SEAT, FUEL TANK AND SIDE COVERS

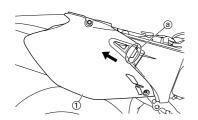


REMOVING THE SIDE COVER

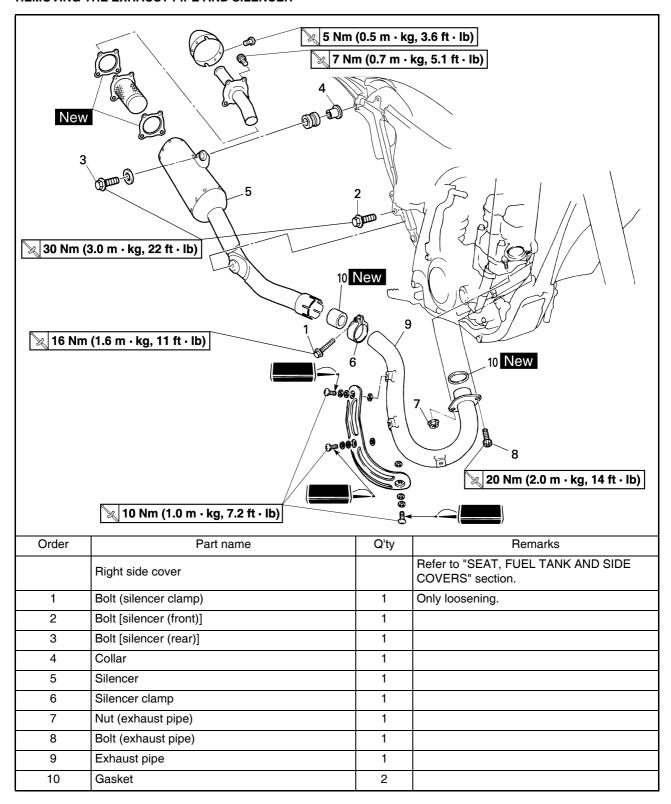
- 1. Remove:
 - Bolt (side cover)
 - Right side cover "1"

NOTE

Draw the side cover backward to remove it because its claw "a" is inserted in the air filter case.

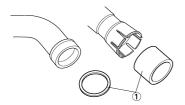


REMOVING THE EXHAUST PIPE AND SILENCER



CHECKING THE SILENCER AND EXHAUST PIPE

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



INSTALLING THE SILENCER AND EXHAUST PIPE

- 1. Install:
 - Gasket New
 - Exhaust pipe "1"
 - Nut (exhaust pipe) "2"



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

· Bolt (exhaust pipe) "3"



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

NOTE:

First, temporarily tighten the nut (exhaust pipe), then tighten the bolt (exhaust pipe) 13 Nm (1.3 m•kg, 9.4 ft•lb). After that, retighten the nut (exhaust pipe) 20 Nm (2.0 m•kg, 14 ft•lb) and then the bolt (exhaust pipe) 20 Nm (2.0 m•kg, 14 ft•lb).



- 2. Install:
 - · Silencer clamp "1"



Silencer clamp: 16 Nm (1.6 m•kg, 11 ft•lb)

- Gasket "2" New
- Silencer
- Washer "4"
- Bolt (silencer) "5"



Bolt (silencer):

30 Nm (3.0 m•kg, 22 ft•lb)



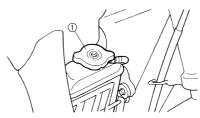
CHECKING THE COOLANT LEVEL

WARNING

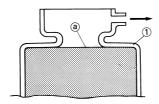
Do not remove the radiator cap "1", drain bolt and hoses when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, place a thick towel over the radiator cap, slowly rotate the cap counterclockwise 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.

CAUTION:

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



- Place the machine on a level place, and hold it in an upright position.
- 2. Remove:
- Radiator cap
- 3. Check:
 - Coolant level "a"
 Coolant level low → Add coolant.



1. Radiator

CHANGING THE COOLANT

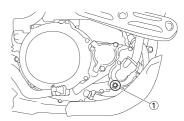
WARNING

Do not remove the radiator cap when the engine is hot.

CAUTION:

Take care so that coolant does not splash on painted surfaces. If it splashes, wash it away with water.

- Place a container under the engine.
- 2. Remove:
- Seat
- · Left side cover
- Remove the catch tank hose from the catch tank and drain the tank of its coolant.
- 4. Remove:
- Coolant drain bolt "1"



- 5. Remove:
 - Radiator cap
 Drain the coolant completely.
- 6. Clean:
 - Cooling system
 Thoroughly flush the cooling system with clean tap water.
- 7 Install:
 - Copper washer New
 - · Coolant drain bolt



Coolant drain bolt: 10 Nm (1.0 m•kg, 7.2 ft•lb)

- 8. 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:
1.0 L (0.88 Imp qt, 1.06

CAUTION:

 Do not mix more than one type of ethylene glycol antifreeze containing corrosion inhibitors for aluminum engine.

US qt)

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 eve.

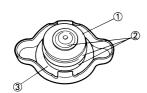
Thoroughly wash your eye with water and see your doctor.

- 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.

- 9. Install:
 - Radiator cap Start the engine and warm it up for a several minutes.
- 10. Check:
 - Coolant level Coolant level low → Add coolant.

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

adapter:

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



Radiator cap tester: YU-24460-01/90890-01325 Radiator cap tester

YU-33984/90890-01352

NOTE:

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 maint

Impossible to maintain the specified pressure for 10 seconds \rightarrow Replace.

CHECKING THE COOLING SYSTEM

- 1. Inspect:
 - · Coolant level
- 2. Attach:
 - Radiator cap tester "1" and adapter "2"



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

YU-33984/90890-01352



3. Apply the specified pressure.



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

NOTE:

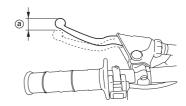
- Do not apply pressure more than specified pressure.
- · Radiator should be filled fully.
- 4. Inspect:
 - Pressure Impossible to maintain the specified pressure for 10 seconds → Repair.
 - Radiator
 - · Radiator hose joint

- Coolant leakage → Repair or replace.
- Radiator hose Swelling → Replace.

ADJUSTING THE CLUTCH CABLE FREE PLAY

- 1. Check:
 - Clutch lever free play "a"
 Out of specification → Adjust.





- 2. Adjust:
- Clutch lever free play

Clutch lever free play adjustment steps:

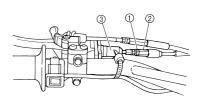
- a. Loosen the locknuts "1".
- Turn the adjuster "2" until free play "a" is within the specified limits..
- c. Tighten the locknuts.



Locknut: 4 Nm (0.4 m•kg, 2.9

NOTF:

- Make minute adjustment on the lever side using the adjuster "3".
- After adjustment, check proper operation of clutch lever.



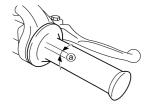
ADJUSTING THE THROTTLE CABLE FREE PLAY

- 1. Check:
- Throttle grip free play "a"
 Out of specification → Adjust.



Throttle grip free play

3-5 mm (0.12-0.20 in)



- 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.



Locknut:

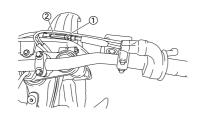
4 Nm (0.4 m•kg, 2.9 ft•lb)

NOTE:

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

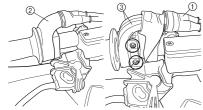
WARNING

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

3-6 mm (0.12-0.24 in)

- Adjust:
 - · Hot starter lever free play

Hot starter lever free play adjustment steps:

- a. Loosen the locknut "1".
- Turn the adjuster "2" until free play "a" is within the specified limits
- c. Tighten the locknut.

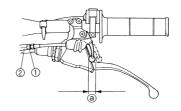


Locknut:

4 Nm (0.4 m•kg, 2.9 ft•lb)

NOTE:

After adjustment, check proper operation of hot starter.



CLEANING THE AIR FILTER ELEMENT

NOTE:

Proper air filter maintenance is the biggest key to preventing premature engine wear and damage.

CAUTION:

Never run the engine without the air filter element in place; this would allow dirt and dust to enter the engine and cause rapid wear and possible engine damage.

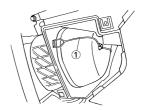
1. Open the air filter case cover "1"

NOTE:

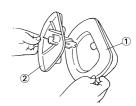
Loosen the quick screw "2" and pull on it to open the air filter case cover.



- 2. Unhook:
 - Binder "1"



- 3. Remove:
 - Air filter element "1"
 - Air filter guide "2"



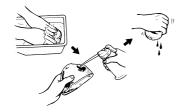
- 4. Clean:
 - Air filter element Clean them with solvent.

NOTE:

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

CAUTION:

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



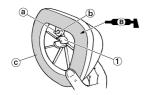
- 5. Inspect:
 - Air filter element Damage → Replace.
- 6. Apply
 - Foam-air-filter oil or equivalent oil to the element

NOTE:

- Squeeze out the excess oil. Element should be wet but not dripping.
- Wipe off the oil left on the element surface using a clean dry cloth. (Excess oil in the element may adversely affect engine starting.)
- 7. Install:
 - Air filter guide "1"

NOTE:

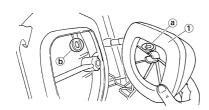
- Align the projection "a" on filter guide with the hole "b" in air filter element.
- Apply the lithium soap base grease on the matching surface "c" on air filter element.



- 8. Install:
 - · Air filter element "1"

NOTE:

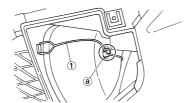
Align the projection "a" on filter guide with the hole "b" in air filter case.



- 9. Hook:
 - Binder "1"

NOTE:

Hook the binder "1" so that it contacts the filter guide projections "a".



CHECKING THE ENGINE OIL LEVEL

1. Stand the machine on a level surface.

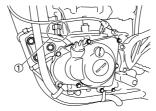
NOTE:

- When checking the oil level make sure that the machine is upright.
- Place the machine on a suitable stand.

WARNING

Never remove the oil tank cap just after high speed operation. The heated oil could spurt out. causing danger. Wait until the oil cools down to approximately 70°C (158°F).

- Idle the engine more than 3 minutes while keeping the machine upright. Then stop the engine and inspect the oil level.
- 3. Remove:
 - Oil tank cap 1



- 4. Inspect:
 - Oil level

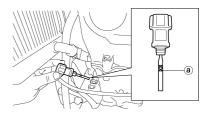
Check that the engine oil is above the level mark "a" and that the oil does not come out when the check bolt "1" is removed.

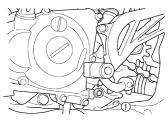
Below the level mark "a"→Add oil through the filler cap hole until it is above the level mark "a".

Oil comes out at the check bolt → Drain the oil until it stops coming out.

NOTE:

When inspecting the oil level, do not screw the oil level gauge into the oil tank. Insert the gauge lightly.





(For CDN)

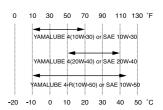


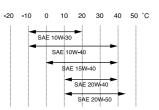
Recommended oil: Yamalube 4,

SAE10W30 or SAE20W40 Yamalube 4-R, SAE10W50 API service SG type or higher, JASO standard

CAUTION:

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





(Except for CDN)



Recommended oil:
SAE10W30,
SAE10W40,
SAE15W40, SAE20W40
or SAE20W50
API service SG type or
higher, JASO standard
MA

CAUTION:

- Do not add any chemical additives or use oils with a grade of CD "a" or higher.
- Do not use oils labeled "ENERGY CONSERVING II" "b" or higher.
 Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.



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

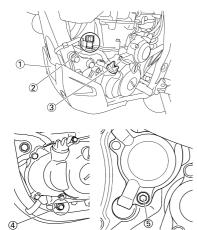
CAUTION:

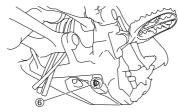
When the oil tank is empty, never start the engine.

- Idle the engine more than 10 seconds while keeping the machine upright. Then stop the engine and add the oil to the maximum level.
- 7. Install:
 - · Oil tank cap

CHANGING THE ENGINE OIL

- 1. Start the engine and let it warm up for several minutes.
- 2. Stop the engine and place an oil pan under the drain bolt.
- 3. Remove:
 - Engine guard "1"
 - Oil tank plug "2"
 - Oil filler cap "3"
 - · Drain bolt (with gasket) "4"
 - Oil filter drain bolt (O-ring) "5"
 - Drain bolt (with gasket) "6"
 Drain the crankcase and oil tank of its oil.





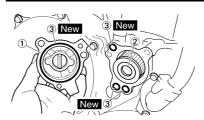
4. If the oil filter is to be replaced during this oil change, remove the following parts and reinstall them.

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.



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



- 5. Install:
 - Gaskets New
 - · Oil filter drain bolt



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

• Drain bolt (right crankcase)



Drain bolt (right crank-case):

20 Nm (2.0 m•kg, 14 ft•lb)

• Drain bolt (left crankcase)



Drain bolt (left crank-case):

20 Nm (2.0 m•kg, 14 ft•lb)

6. Fill:

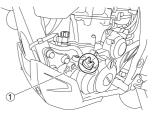
· Engine oil



Oil quantity:
Periodic oil change:
0.95 L (0.84 Imp qt,
1.00 US qt)
With oil filter replacement:
1.0 L (0.88 Imp qt, 1.06
US qt)
Total amount:

US qt)
Total amount:
1.2 L (1.06 Imp qt, 1.27
US qt)

- 7. Install:
 - · Oil filler cap "1"



- 8. Inspect:
- Engine (for oil leaks)
- Oil level
 Refer to "CHECKING THE ENGINE OIL LEVEL".

CHECKING THE OIL PRESSURE

- 1. Check:
- Oil pressure

Checking steps:

- a. Slightly loosen the oil pressure check bolt "1".
- Start the engine and keep it idling until oil starts to seep from the oil pressure check bolt. If no oil comes out after one minute, turn the engine off so it will not seize.
- c. Check oil passages and oil pump for damage or leakage.
- d. Start the engine after solving the problem(s) and recheck the oil pressure.
- e. Tighten the oil pressure check bolt.



Oil pressure check bolt: 10 Nm (1.0 m•kg, 7.2 ft•lb)



ADJUSTING THE ENGINE IDLING SPEED

- 1. Start the engine and thoroughly warm it up.
- 2. Adjust:
 - · Engine idling speed

Adjustment steps:

 a. Turn the throttle stop screw "1" until the specified engine idling speed.

NOTE:

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".

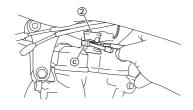
To increase idle speed→Turn the throttle stop screw "1" in "a".

To decrease idle speed → Turn the throttle stop screw "1" out "b".



Engine idling speed: 1,750–1,950 r/min





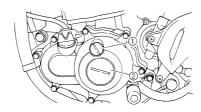
ADJUSTING THE VALVE CLEARANCE

NOTE:

- 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.
- 2. Remove:
 - · Air cut-off valve assembly

Refer to "AIR INDUCTION SYSTEM" section in the CHAPTER 5.

- Spark plug
- · Engine upper bracket
- Cylinder head cover Refer to "CAMSHAFTS" section in the CHAPTER 5.
- 3. Remove:
 - Timing mark accessing screw "1"
 - Crankshaft end accessing screw "2"
 - · O-ring



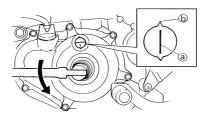
- 4. Check:
- Valve clearance
 Out of specification → Adjust.



Valve clearance (cold): Intake valve: 0.10-0.15 mm (0.0039-0.0059 in) Exhaust valve: 0.20-0.25 mm (0.0079-0.0098 in)

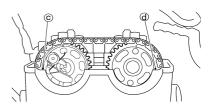
Checking steps:

- 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.



NOTE

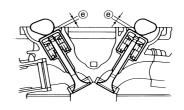
In order to be sure that the piston is at Top Dead Center, the punch mark "c" on the exhaust camshaft and the punch mark "d" on the intake camshaft must align with the cylinder head surface, as shown in the illustration.



 Measure the valve clearance "e" using a feeler gauge "1".

NOTE:

Record the measured reading if the clearance is incorrect.





- 5. Adjust:
- Valve clearance

Adjustment steps:

- a. Remove the camshaft (intake and exhaust).
 Refer to "CAMSHAFTS" section
- b. Remove the valve lifters "1" and the pads "2".

in the CHAPTER 5.

NOTE:

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





c. Select the proper pad using the pad selecting table.

| Pad r | ange | Pad Availabili- ty: 25 incre- ments |
|---------------------------|---------------------------|--|
| No. 120– No. 240 | 1.20 mm– 2.40 mm | Pads are avail- able in 0.05 mm increments |

NOTE:

The thickness "a" of each pad is indicated in hundredths of millimeters on the pad upper surface.



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

| Last digit of pad number | Rounded valve |
|--------------------------|---------------|
| 0, 1 or 2 | 0 |
| 4, 5 or 6 | 5 |
| 8 or 9 | 10 |

EXAMPLE:

Installed pad number = 148 Rounded off value = 150

NOTE:

Pads can only be selected in 0.05 mm increments.

e. Locate the rounded-off value and the measured valve clearance in the chart "PAD SELECTION TA-BLE". The field where these two coordinates intersect shows the new pad number to use.

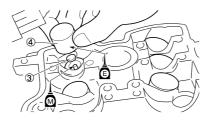
NOTE:

Use the new pad number only as a guide when verifying the valve clearance adjustment.

f. Install the new pads "3" and the valve lifters "4".

NOTE:

- 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 5.



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

 Install the timing chain tensioner.
 Refer to "CAMSHAFTS" section in the CHAPTER 5.

NOTE:

Turn the crankshaft counterclockwise several turns so that the installed parts settle into the right position.

- i. Recheck the valve clearance.
- If the clearance is still incorrect, repeat all the clearance adjustment steps until the specified clearance is obtained.

- 6. Install:
 - · All removed parts

NOTE

Install all removed parts in reversed order of their removal.

INTAKE

| MEASURED | | | | | | | | | | IN | ISTA | LLEC |) PAI | D NU | JMBE | R | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-------|------|------|-------|------|------|-------|----------|------------|-----|-----|-----|-----|
| CLEARANCE | 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 |
| 0.00 ~ 0.04 | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 |
| 0.05 ~ 0.09 | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 |
| 0.10 ~ 0.15 | | | | | | | | | | S | TAN | DAR | D CL | EAR | ANC | E | | | | | | | | | |
| 0.16 ~ 0.20 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | |
| 0.21 ~ 0.25 | 130 | | | | | | | | | | | | | | | | | | | | 230 | | | | |
| 0.26 ~ 0.30 | 135 | | | | | | | | | | | | | | | | | | | | 235 | 240 | | | |
| 0.31 ~ 0.35 | 140 | | | | | 165 | | | | | | | | | | | | | | | | | | | |
| 0.36 ~ 0.40 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | |
| 0.41 ~ 0.45 | 150 | | | | | 175 | | | | | | | | | | | | | | | | | | | |
| 0.46 ~ 0.50 | 155 | | | | | 180 | | | | | | | | | | | | 240 | | | | | | | |
| 0.51 ~ 0.55 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | |
| 0.56 ~ 0.60 | 165 | | | | | 190 | | | | | | | | | | | | | | | | | | | |
| 0.61 ~ 0.65 | 170 | | | | | 195 | | | | | | | | | | | | | | | | | | | |
| 0.66 ~ 0.70 | 175 | | | | | 200 | | | | | | | | | | | | | | | | | | | |
| 0.71 ~ 0.75 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | |
| 0.76 ~ 0.80 | 185 | | | | | 210 | | | | | | | | | VΔI | ٧F | CL F | -AR | ANG | CF (| (colc | ۱۰. | | | |
| 0.81 ~ 0.85 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | |).10 | | | | <u> </u> | (0010 | ٠,٠ | | | |
| 0.86 ~ 0.90 | | | | | | 220 | | | | | | | | | | | | | | | - - | | | | |
| 0.91 ~ 0.95 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | mpl | | | | | | | | | |
| 0.96 ~ 1.00 | | | | | | 230 | | | | | | | | | | | | | | | | | mm |) | |
| 1.01 ~ 1.05 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | Rep | olace | e 17 | 5 pa | ad w | /ith | 185 | pad | | | |
| 1.06 ~ 1.10 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | F | Pad | num | ber | : (e) | kam | ple) | | | | |
| 1.11 ~ 1.15 | | | 230 | | | | | | | | | | | | | | | | • | | mm | | | | |
| 1.16 ~ 1.20 | 225 | 230 | 235 | 240 |] | | | | | | | | | | | | | | | | mm | | | | |
| 1.21 ~ 1.25 | | | 240 | | | | | | | | | | | | • | au | | .00 | _ ' | .00 | | | | | |
| 1.26 ~ 1.30 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | | | |
| 1.31 ~ 1.35 | 240 | | | | | | | | | | | | | | | | | | | | | | | | |

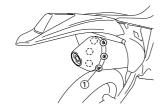
EXHAUST

| MEASURED | | | | | | | | | | IN | ISTA | LLEC | PAI | D NU | JMBE | R | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|------|------|-------|----------|-------|------|----------|------|-----|-----|-----|-----|
| CLEARANCE | 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 |
| 0.00 ~ 0.04 | | | | | | | | | | | | | | | | | | | | | 200 | | | | |
| 0.05 ~ 0.09 | | | | | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 |
| 0.10 ~ 0.14 | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 |
| 0.15 ~ 0.19 | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 |
| 0.20 ~ 0.25 | | | | | | | | | | | | DAR | | | | | | | | | | | | | |
| 0.26 ~ 0.30 | 125 | | | | | | | | | | | | | | | | | | | | | | | 240 | |
| 0.31 ~ 0.35 | 130 | | | | | | | | | | | | | | | | | | | | | | 240 | | |
| 0.36 ~ 0.40 | | | | | | | | | | | | | | | | | | | | | 235 | 240 | | | |
| 0.41 ~ 0.45 | | | | | 160 | | | | | | | | | | | | | | | | 240 | | | | |
| 0.46 ~ 0.50 | 145 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.51 ~ 0.55 | | | | | 170 | | | | | | | | | | | | | | 240 | | | | | | |
| 0.56 ~ 0.60 | | | | | 175 | | | | | | | | | | | | | 240 | | | | | | | |
| 0.61 ~ 0.65 | 160 | | | | | | | | | | | | | | | | 240 | | | | | | | | |
| 0.66 ~ 0.70 | | | | | 185 | | | | | | | | | | | | | | | | | | | | |
| 0.71 ~ 0.75 | 170 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.76 ~ 0.80 | 175 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.81 ~ 0.85 | | | | | 200 | | | | | | | | 240 | | | | <u> </u> | | | <u> </u> | | | | | |
| 0.86 ~ 0.90 | | | | | 205 | | | | | | | | | | | | | | | JE (| colc | l): | | | |
| 0.91 ~ 0.95 | 190 | | | | | | | | | | 240 | | | | (|).20 | ~ 0. | .25 ı | mm | | | | | | |
| 0.96 ~ 1.00 | 195 | | | | | | | | | 240 | | | | | Exa | ımpl | e: Ir | nstal | led | is 1 | 75 | | | | |
| 1.01 ~ 1.05 | 200 | | | | | | | | 240 | | | | | | N | /lea | sure | d cl | eara | ance | is (| 32 | mm | 1 | |
| 1.06 ~ 1.10 | 205 | | | | | | | 240 | | | | | | | Ren | olace | e 17 | 5 pa | ad w | ith · | 185 | pad | | | |
| 1.11 ~ 1.15 | 210 | | | | | | 240 | | | | | | | | | Pad | | | | | | | | | |
| 1.16 ~ 1.20 | 215 | | | | | 240 | | | | | | | | | | | | | | | mm | | | | |
| 1.21 ~ 1.25 | 220 | | | | 240 | | | | | | | | | | | | | | | | | | | | |
| 1.26 ~ 1.30 | 225 | | | 240 | | | | | | | | | | | , | -ad | 110. | 185 | = 1 | .85 | mm | | | | |
| 1.31 ~ 1.35 | 230 | | 240 | | | | | | | | | | | | | | | | | | | | | | |
| 1.36 ~ 1.40 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | | | |
| 1.41 ~ 1.45 | 240 | | | | | | | | | | | | | | | | | | | | | | | | |

CLEANING THE SPARK ARRESTER (For USA)

WARNING

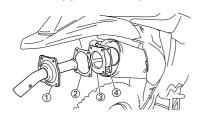
- Be sure the exhaust pipe and silencer are cool before cleaning the spark arrester.
- Do not start the engine when cleaning the exhaust system.
- 1. Remove:
 - Screw (silencer cap) "1"



- 2. Remove:
 - · Bolt (spark arrester) "1"



- 3. Remove:
 - Tail pipe "1"
 - · Gasket (tail pipe) "2"
 - Spark arrester "3"
 Pull the spark arrester out of the silencer.
 - · Gasket (spark arrester) "4"



- 4. Clean:
 - Spark arrester
 Tap the spark arrester lightly,
 then use a wire brush to remove
 any carbon deposits.
- 5. Install:
 - Gasket (spark arrester)
 - Spark arrester
 Insert the spark arrester into the silencer and align the bolt holes.
 - · Gasket (tail pipe)
 - · Bolt (spark arrester)



Bolt (spark arrester): 7 Nm (0.7 m•kg, 5.1 ft•lb)

6. Install:

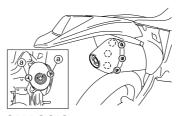
Silencer cap



Silencer cap: 5 Nm (0.5 m•kg, 3.6 ft•lb)

NOTE:

First tighten the two screws "a" located horizontally apart, and then tighten the others.



CHASSIS

BLEEDING THE HYDRAULIC BRAKE SYSTEM

WARNING

Bleed the brake system if:

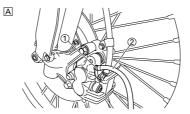
- The system has been disassembled.
- A brake hose has been loosened or removed.
- · The brake fluid is very low.
- · The brake operation is faulty.

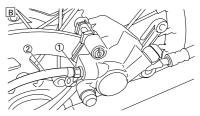
A dangerous loss of braking performance may occur if the brake system is not properly bled.

- 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.
- c. Connect the clear plastic tube "2" tightly to the caliper bleed screw "1"





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



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

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

NOTE:

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

 Add brake fluid to the level line on the reservoir.

WARNING

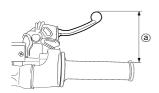
Check the operation of the brake after bleeding the brake system.

- 3. Install:
 - Protector (rear brake)
- Reservoir float (front brake)
- Diaphragm
- · Brake master cylinder cap

ADJUSTING THE FRONT BRAKE

- 1. Check:
 - Brake lever position "a"

| | Brake le | ver position "a": | | | | | | |
|-------|----------------|----------------------------|--|--|--|--|--|--|
| | rd posi- on | Extent of ad- justment | | | | | | |
| 95 mm | (3.74 in) | 76–97 mm (2.99–3.82 in) | | | | | | |



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

Brake lever position adjusument steps:

- a. Loosen the locknut "1".
- b. Turn the adjusting bolt "2" until the lever position "a" is within specified position.



c. Tighten the locknut.



Locknut:

5 Nm (0.5 m •kg, 3.6 ft•lb)

CAUTION:

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

- 4. Install:
 - · Brake lever cover

ADJUSTING THE REAR BRAKE

- 1. Check:
 - Brake pedal height "a"
 Out of specification → Adjust.



Brake pedal height "a": 10 mm (0.39 in)



- 2. Adjust:
 - · Brake pedal height

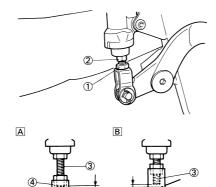
Pedal height adjustment steps:

a. Loosen the locknut "1".

- Turn the adjusting nut "2" until the pedal height "a" is within specified height.
- c. 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.

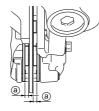


CHECKING AND REPLACING THE FRONT BRAKE PADS

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



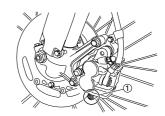
Brake pad thickness: 4.4 mm (0.17 in) <Limit>: 1.0 mm (0.04



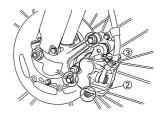
- 2. Replace:
- Brake pad

Brake pad replacement steps:

a. Remove the pad pin plug "1".



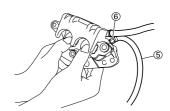
- b. Loosen the pad pin "2".
- c. Remove the brake caliper "3" from the front fork.



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



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

CAUTION:

Do not reuse the drained brake fluid.

g. Tighten the bleed screw.



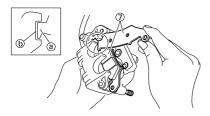
Bleed screw:

6 Nm (0.6 m•kg, 4.3 ft•lb)

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

NOTE:

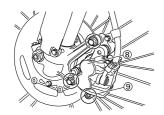
- Install the brake pads with their projections "a" into the brake caliper recesses "b".
- Temporarily tighten the pad pin at this point.



i. Install the brake caliper "8" and tighten the pad pin "9".



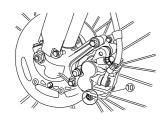
Bolt (brake caliper): 23 Nm (2.3 m•kg, 17 ft•lb) Pad pin: 18 Nm (1.8 m•kg, 13



j. Install the pad pin plug "10".



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



3. Inspect:

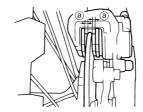
- Brake fluid level
 Refer to "CHECKING THE
 BRAKE FLUID LEVEL" section.
- 4. Check:
 - Brake lever operation
 A softy or spongy feeling → Bleed
 brake system.
 Refer to "BLEEDING THE HY DRAULIC BRAKE SYSTEM" section.

CHECKING AND REPLACING THE REAR BRAKE PADS

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



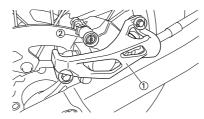
Brake pad thickness: 6.4 mm (0.25 in) <Limit>: 1.0 mm (0.04 in)



- 2. Replace:
 - · Brake pad

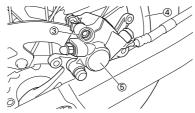
Brake pad replacement steps:

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

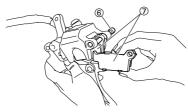


- b. Loosen the pad pin "3".
- c. Remove the rear wheel "4" and brake caliper "5".
 Refer to "FRONT WHEEL AND

Refer to "FRONT WHEEL AND REAR WHEEL" section in the CHAPTER 6.



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.

CAUTION:

Do not reuse the drained brake fluid.

g. Tighten the bleed screw.

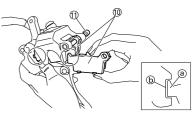


Bleed screw: 6 Nm (0.6 m•kg, 4.3 ft•lb)

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

NOTE:

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

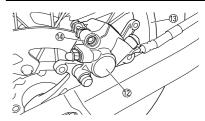


- i. Install the brake caliper "12" and rear wheel "13".
 Refer to "FRONT WHEEL AND REAR WHEEL" section in the CHAPTER 6.
- j. Tighten the pad pin "14".



Pad pin:

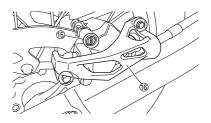
18 Nm (1.8 m•kg, 13 ft•lb)



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



- 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 HY DRAULIC BRAKE SYSTEM" section.

CHECKING THE REAR BRAKE PAD INSULATOR

- 1. Remove:
 - Brake pad
 Refer to "CHECKING AND RE PLACING THE REAR BRAKE
 PADS" section.
- 2. Inspect:
 - Rear brake pad insulator "1" Damage → Replace.



CHECKING THE BRAKE FLUID

- 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.

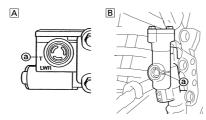


Recommended brake fluid:

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.



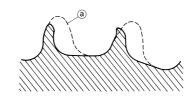
- a. Lower level
- A. Front
- B. Rear

CHECKING THE SPROCKET

- 1. Inspect:
 - Sprocket teeth "a"
 Excessive wear → Replace.

NOTF:

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



CHECKING THE DRIVE CHAIN

- 1. Measure:
 - Drive chain length (15 links) "a"
 Out of specification → Replace.

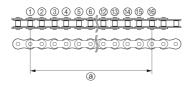


Drive chain length (15 links):

<Limit>: 239.3 mm (9.42 in)

NOTE:

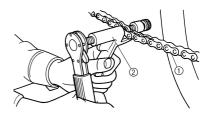
- While measuring the drive chain length, push down on the drive chain to increase its tension.
- Measure the length between drive chain roller "1" and "16" as shown.
- Perform this measurement at two or three different places.



- 2. Remove:
- Drive chain "1"

NOTE:

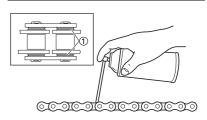
Remove the drive chain using a drive chain cutter "2".



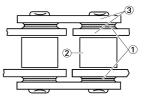
- 3. Clean:
 - Drive chain
 Brush off as much dirt as possible. Then clean the drive chain using the chain cleaner.

CAUTION:

This machine has a drive chain with small rubber O-rings "1" between the side plates. Steam cleaning, high-pressure washes, certain solvent and kerosene can damage these O-rings.



- 4. Inspect:
 - O-ring "1" (drive chain)
 Damage → Replace the drive chain.
 - Roller "2"
 - Side plate "3"
 Damage/wear → Replace the drive chain.



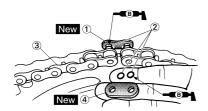
- 5. Check:
 - Drive chain stiffness "a"
 Clean and oil the drive chain and hold as illustrated.
 Stiff → Replace the drive chain.



- 6. Install:
 - Chain joint "1" New
 - O-ring "2"
 - Drive chain "3"
 - Link plate "4" New

NOTE:

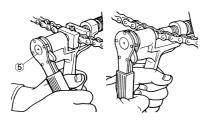
When installing the drive chain, apply the lithium soap base grease on the chain joint and O-rings.



- 7. Install:
 - · Link plate

NOTE

- Press the link plate onto the chain joint using a drive chain riveter "5".
- Rivet the end of the chain joint using a drive chain riveter.
- After riveting the chain joint, make sure its movement is smooth.



- 8. Lubricate:
 - · Drive chain



Drive chain lubricant: SAE 10W-30 motor oil or suitable chain lubricants



ADJUSTING THE DRIVE CHAIN SLACK

- Elevate the rear wheel by placing the suitable stand under the engine.
- 2. Check:
 - Drive chain slack "a"
 Above the seal guard installation bolt.

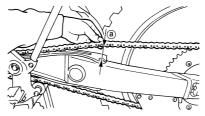
Out of specification → Adjust.

Drive chain slack:

48–58 mm (1.9–2.3 in)

NOTE:

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

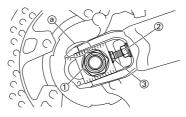
Drive chain slack adjustment steps:

- a. Loosen the axle nut "1" and locknuts "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.)



NOTE:

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

CAUTION:

Too small drive chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

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



Axle nut:

125 Nm (12.5 m•kg, 90 ft•lb)

e. Tighten the locknuts.



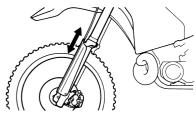
Locknut:

19 Nm (1.9 m•kg, 13 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.



CLEANING THE FRONT FORK OIL SEAL AND DUST SEAL

- 1. Remove:
- Protector
- Dust seal "1"

NOTE:

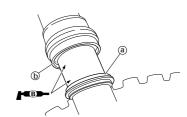
Use a thin screw driver, and be careful not to damage the inner fork tube and dust seal.



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

NOTE:

- 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

NOTE:

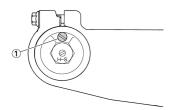
If the front fork initial movement feels stiff during a run, relieve the front fork internal pressure.

- 1. Elevate the front wheel by placing a suitable stand under the engine.
- 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)



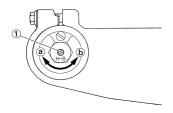
ADJUSTING THE FRONT FORK REBOUND DAMPING FORCE

- 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: | | |
|--------------------------|-----------------------|---------------------------------------|--|
| Max | imum Minimum | | |
| Fully turned in position | | 20 clicks out (from maximum position) | |



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



Standard position: 8 clicks out

CAUTION:

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

WARNING

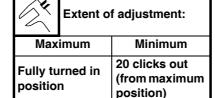
Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

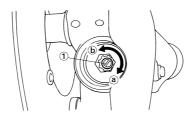
ADJUSTING THE FRONT FORK COMPRESSION DAMPING FORCE

- 1. Remove:
- Rubber cap
- 2. Adjust:
- Compression damping force By turning the adjuster "1".

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

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





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



Standard position: 9 clicks out

CAUTION:

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.

- 3. Install:
- Rubber cap

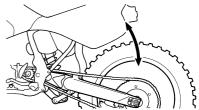
CHECKING THE REAR SHOCK ABSORBER

- 1. Inspect:
- Swingarm smooth action

Abnormal noise/unsmooth action

→ Grease the pivoting points or repair the pivoting points.

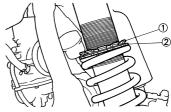
Damage/oil leakage → Replace.



ADJUSTING THE REAR SHOCK ABSORBER SPRING PRELOAD

- Elevate the rear wheel by placing the suitable stand under the engine.
- 2. Remove:
 - · Rear frame
- 3. Loosen:
 - Locknut "1"
- 4. Adjust:
 - Spring preload
 By turning the adjuster "2".

Stiffer → Increase the spring preload. (Turn the adjuster "2" in.) Softer → Decrease the spring preload. (Turn the adjuster "2" out.)



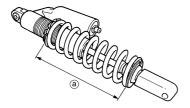
| | Spring length (installed) "a": | |
|-----------------------|--------------------------------|--------------------------------------|
| | ndard ngth | Extent of ad- justment |
| 252.5 mm (9.94 in) | | 238.5–258.5 mm (9.39–10.18 in) |

NOTE:

- 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.

CAUTION:

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



- 5. Tighten:
- Locknut
- 6. Install:
 - · Rear frame (upper)



Rear frame (upper): 38 Nm (3.8 m•kg, 27 ft•lb)

· Rear frame (lower)



Rear frame (lower): 32 Nm (3.2 m•kg, 23 ft•lb)

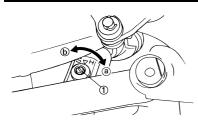
ADJUSTING THE REAR SHOCK ABSORBER REBOUND DAMPING FORCE

- 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 re-

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

| X | Extent of adjustment: | |
|--------------------------|-----------------------|---------------------------------------|
| Max | dimum Minimum | |
| Fully turned in position | | 20 clicks out (from maximum position) |



• STANDARD POSITION:

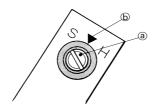
This is the position which is back by the specific number of clicks from the fully turned-in position. (Which align the punch mark "a" on the adjuster with the punch mark "b" on the bracket.)



Standard position:
About 11 clicks out

CAUTION:

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

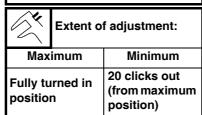


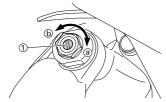
ADJUSTING THE REAR SHOCK ABSORBER LOW COMPRESSION DAMPING FORCE

- 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.)





• 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 high compression damping adjuster.)

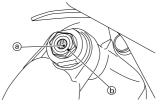


Standard position:
About 8 clicks out
* About 9 clicks out

* For AUS, NZ and ZA

CAUTION:

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



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: | |
|--------------------------|-----------------------|---|
| Max | imum Minimum | |
| Fully turned in position | | 2 turns out (from maximum position) |



STANDARD POSITION:

This is the position which is back by the specific number of turns from the fully turned-in position. (Which align the punch mark "a" on the adjuster with the punch mark "b" on the adjuster body.)



Standard position:
About 1-1/8 turns out

* About 1-1/4 turns out

* For AUS. NZ and ZA

CAUTION:

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)

NOTE:

- · Check the tire while it is cold.
- Loose bead stoppers allow the tire to slip 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

- 1. Inspect:
 - Spokes "1"
 Bend/damage → Replace.

 Loose spoke → Retighten.
- 2. Tighten:
 - · Spokes

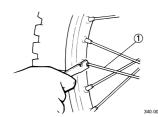


Spokes:

3 Nm (0.3 m•kg, 2.2 ft•lb)

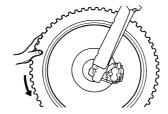
NOTE:

Be sure to retighten these spokes before and after break-in. After a practice or a race check spokes for looseness.

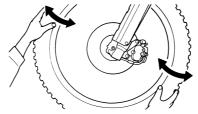


CHECKING THE WHEELS

- 1. Inspect:
 - Wheel runout
 Elevate the wheel and turn it.
 Abnormal runout → Replace.



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



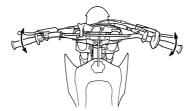
CHECKING AND ADJUSTING THE STEERING HEAD

- 1. Elevate the front wheel by placing a suitable stand under the engine.
- 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.



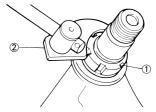
- 4. Adjust:
- Steering ring nut

Steering ring nut adjustment steps:

- a. Remove the headlight.
- b. Remove the handlebar and upper bracket.
- c. Loosen the steering ring nut "1" using the steering nut wrench "2".



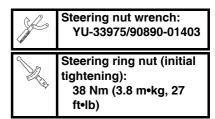
Steering nut wrench: YU-33975/90890-01403

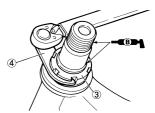


d. Tighten the steering ring nut "3" using steering nut wrench "4".

NOTE:

- 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.





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

WARNING

Avoid over-tightening.

ft•lb)



Steering ring nut (final tightening): 7 Nm (0.7 m•kg, 5.1

- 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.
- h. Install the washer "5", upper bracket "6", washer "7", steering stem nut "8", handlebar "9", handlebar upper holder "10" and headlight "11".

NOTE

- 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 "12" into the hole in the steering stem.

CAUTION:

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



Steering stem nut: 145 Nm (14.5 m•kg, 105

ft•lb)

Handlebar upper holder: 28 Nm (2.8 m•kg, 20 ft•lb)

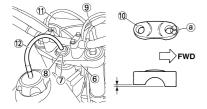
Pinch bolt (upper bracket):

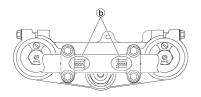
21 Nm (2.1 m•kg, 15 ft•lb)

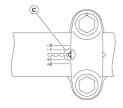
Headlight:

7 Nm (0.7 m•kg, 5.1 ft•lb)

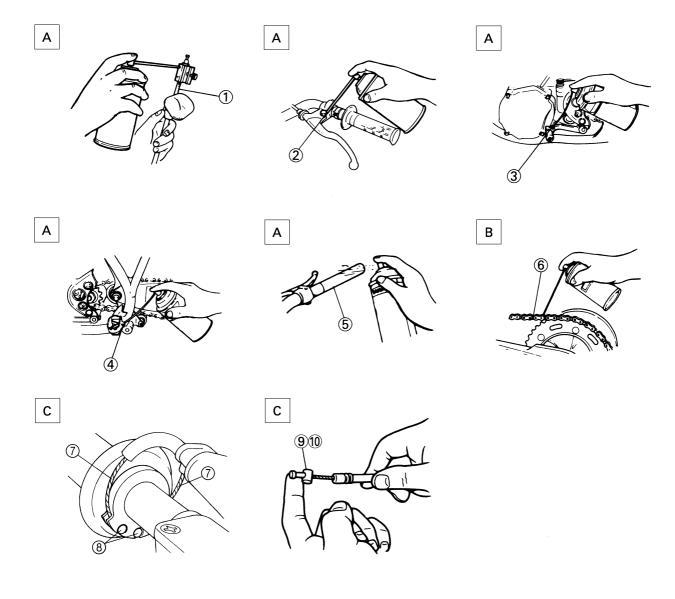








LUBRICATION



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
- Use Yamaha cable lube or equivalent on these areas.

- B. Use SAE 10W-30 motor oil or suitable chain lubricants.
- C. Lubricate the following areas with high quality, lightweight lith-ium-soap base grease.

CAUTION:

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

ELECTRICAL

CHECKING THE SPARK PLUG

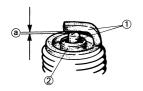
- 1. Remove:
 - · Spark plug
- 2. Inspect:
 - Electrode "1"
 Wear/damage → Replace.

the engine condition.

Insulator color "2"
 Normal condition is a medium to light tan color.
 Distinctly different color → Check

NOTE:

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 \rightarrow Regap.



Spark plug gap:

0.7–0.8 mm (0.028– 0.031 in)

- 4. Clean the plug with a spark plug cleaner if necessary.
- 5. Tighten:
 - · Spark plug

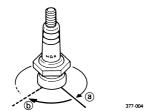


Spark plug:

13 Nm (1.3 m•kg, 9.4 ft•lb)

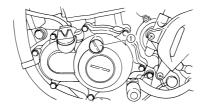
NOTE:

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



CHECKING THE IGNITION TIMING

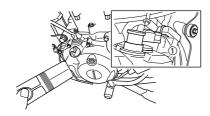
- 1. Remove:
 - Timing mark accessing screw "1"



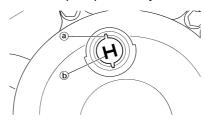
- 2. Attach:
- Timing light
- Inductive tachometer
 To the ignition coil lead (orange lead"1").



Timing light: YM-33277-A/90890-03141



- 3. Adjust:
 - Engine idling speed Refer to "ADJUSTING THE EN-GINE 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

CHECKING AND CHARGING THE BATTERY

WARNING

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

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.

- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELEC-TROLYTE OUT OF REACH OF CHILDREN.
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.
 FIRST AID IN CASE OF BODILY CONTACT:

EXTERNAL

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

INTERNAL

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

CAUTION:

Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

NOTE:

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

- 1. Remove:
- Seat
- 2. Disconnect:
 - Battery leads (from the battery terminals)

CAUTION:

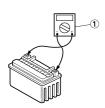
First, disconnect the negative battery lead "1", and then the positive battery lead "2".



- 3. Remove:
 - · Battery band
 - Battery
- 4. Measure:
- Battery charge

Measurement steps:

 a. Connect a pocket tester "1" to the battery terminals.



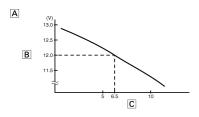
Tester positive probe → battery positive terminal
Tester negative probe → battery negative terminal

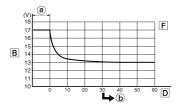
NOTE:

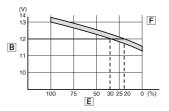
- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- No charging is necessary when the opencircuit voltage equals or exceeds 12.8 V.
- b. Check the charge of the battery, as shown in the charts and the following example.

Example

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







- A. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F) (These values vary with the temperature, the condition of the battery plates, and the electrolyte level.)
- B. Open-circuit voltage
- C. Charging time (hours)
- D. Time (minutes)
- E. Charging condition of the battery
- F. Ambient temperature 20 °C (68 °F)
- a. Charging
- b. Check the open-circuit voltage
- 5. Charge:
 - Battery (refer to the appropriate charging method illustration)

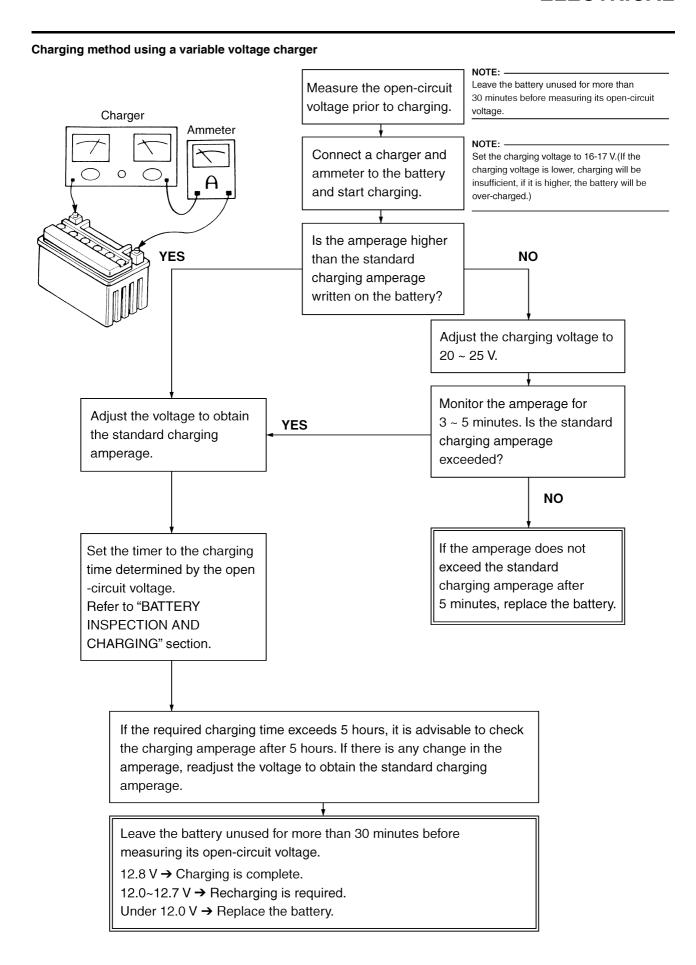
WARNING

Do not quick charge a battery.

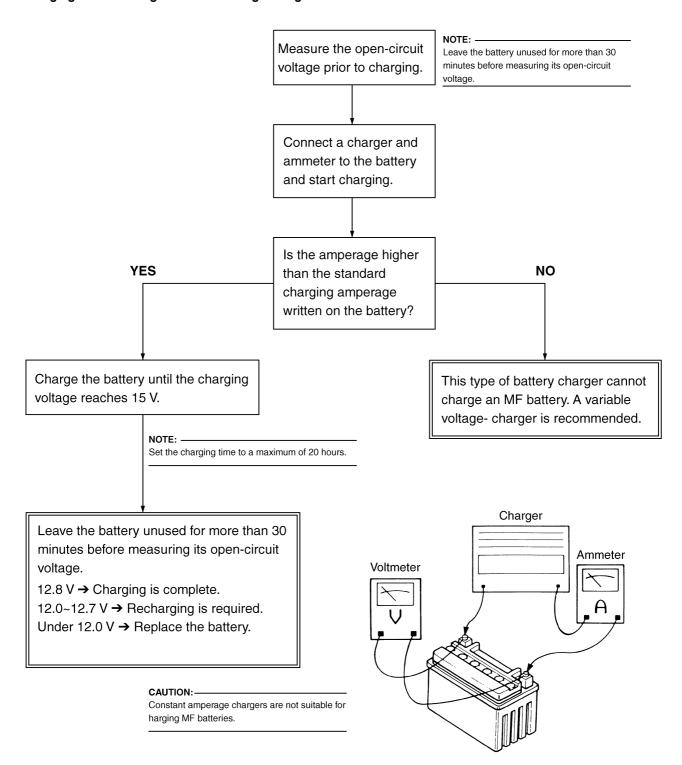
CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a highamperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the machine. (If charging has to be done with the battery mounted on the machine, disconnect the negative battery lead from the battery terminal.)

- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



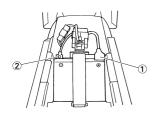
Charging method using a constant voltage charger



- 6. Install:
 - · Battery
 - · Battery band
- 7. Connect:
 - Battery leads (to the battery terminals)

CAUTION:

First, connect the positive lead "1", then the negative lead "2".



- 8. Check:
 - Battery terminals
 Dirt → Clean with a wire brush.

 Loose connection → Connect properly.
- 9. Lubricate:
 - · Battery terminal



10. Install:

Seat

CHECKING THE FUSE

CAUTION:

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

- 1. Remove:
 - Seat
 - Fuse cover
- 2. Check:
 - · Continuity

Checking steps:

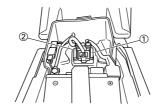
- a. Remove the fuse "1".
- b. Connect the pocket tester to the fuse and check the continuity.

NOTE: .

Set the pocket tester selector to " $\Omega \times$ 1".



Pocket tester: YU-3112-C/90890-03112



- 2. Reserve fuse
- c. If the pocket tester indicates "∞", replace the fuse.

- 3. Replace:
- Blown fuse

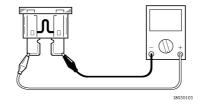
Replacement steps:

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

| Items | Amperage rating | Q'ty |
|-----------|-----------------|------|
| Main fuse | 10 A | 1 |

WARNING

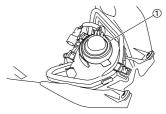
Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the starting and ignition systems to malfunction and could possibly cause a fire.



- 4 Install:
 - Fuse cover
 - Seat

REPLACING THE HEADLIGHT BULBS

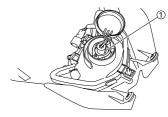
- 1. Remove:
 - Headlight Refer to "SEAT, FUEL TANK AND SIDE COVERS" section.
- 2. Remove:
 - Headlight bulb holder cover "1"



- 3. Remove:
 - · Headlight bulb holder "1"

NOTE:

Remove the headlight bulb holder by pushing it in and turning it counterclockwise.



- 4. Remove:
- Headlight bulb

WARNING

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

- 5. Install:
 - Headlight bulb New

CAUTION:

Avoid touching the glass part of the headlight bulb to keep it free form oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

- 6. Install:
- · Headlight bulb holder
- 7. Install:
 - · Headlight bulb holder cover
- 8. Install:
 - Headlight



Headlight:

7 Nm (0.7 m•kg, 5.1 ft•lb)

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

ADJUSTING THE HEADLIGHT BEAMS

- 1. Adjust:
- Headlight beam (vertically)

Adjusting steps:

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

| Direction "a" | Headlight beam is raised. |
|---------------|----------------------------|
| | Headlight beam is lowered. |



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.

NOTE

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.

CAUTION:

- 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.

 After installing the carburetor, check that the throttle operates correctly and opens and closes smoothly.

ATMOSPHERIC CONDITIONS AND CARBURETOR SETTINGS

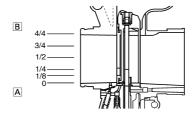
| Air tem p. | Hu- midi- ty | Air pres- sure (alti- tude) | Mix- ture | Set- ting |
|------------------|--------------------|---|--------------|--------------|
| High | High | Low (high) | Rich- er | Lean- er |
| Low | Low | High (low) | Lean- er | Rich- er |

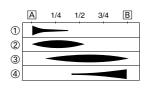
NOTE:

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

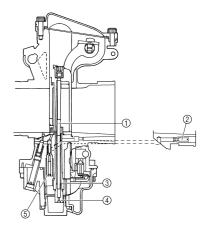




- A. Closed
- B. Fully open
- 1. Pilot jet
- 2. Throttle valve cutaway
- 3. Jet needle
- 4. Main jet

CONSTRUCTION OF CARBURETOR AND SETTING PARTS

The FLATCR carburetor has a primary main jet. This type of main jet is perfect for racing machines since it supplies an even flow of fuel, even at full load. Use the main jet and the jet needle to set the carburetor.



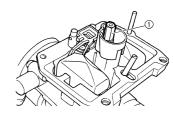
- 1. Jet needle
- 2. Pilot air jet
- 3. Needle jet
- 4. Main jet
- Pilot jet

ADJUSTING THE MAIN JET

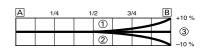
The richness of the air-fuel mixture at full throttle can be set by changing the main jet "1".

| Standard main jet | #162 |
|-------------------|------|

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)



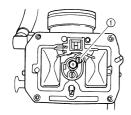
- A. Idle
- B. Fully open
- 1. #165
- 2. #160
- 3. #162

ADJUSTING THE PILOT JET

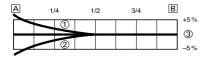
The richness of the air-fuel mixture with the throttle open 1/4 or less can be set by adjusting the pilot jet "1".

Standard pilot jet

#45



Effects of adjusting the pilot jet (reference)



- A. Idle
- B. Fully open
- 1. #48
- 2. #42
- 3. #45

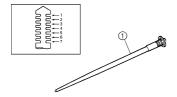
ADJUSTING THE JET NEEDLE GROOVE POSITION

NOTE:

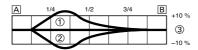
For setting adjustment, replace the standard jet needle with the one designed for setting.

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

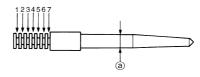
ADJUSTING THE JET NEEDLE

The jet needle is adjusted by changing it.

| Supplied | jet needle | GDDSQ |
|----------|------------|-------|

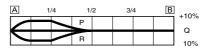
The jet needle setting parts, having the same taper angle, are available in different straight portion diameters.

a. Diameter of the straight portion



Effects of changing the jet needle (reference)

(Diameter of the straight portion) Changing the diameter of the straight portion adjusts the air-fuel mixture when the throttle is 1/8 to 1/4 open.



- A. Idle
- B. Fully open

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.

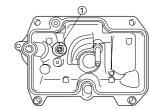
Therefore, the fuel flow is balanced at each stage of throttle opening by the combination of the jet needle straight portion diameter and clip position.

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).

- When the engine breathes hard in quick throttle opening, select a leak jet having lower calibrating No. than standard to enrich the mixture. <Example> #60 → #55
- 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> #60 → #65

Standard leak jet #60



CARBURETOR SETTING PARTS

| Main jet | Size | Part number | |
|------------|-------|----------------|--|
| iviani jet | Oize | (-14943-) | |
| Rich | #185 | 4MX-44 | |
| | #182 | 4MX-94 | |
| | #180 | 4MX-43 | |
| | #178 | 4MX-93 | |
| | #175 | 4MX-42 | |
| | #172 | 4MX-92 | |
| | #170 | 4MX-41 | |
| | #168 | 4MX-91 | |
| | #165 | 4MX-40 | |
| (STD) Lean | #162 | 4MX-90 | |
| | | Part | |
| Pilot jet | Size | number | |
| | | (-14948-) | |
| Rich | #55 | 4MX-09 | |
| | #52 | 4MX-08 | |
| | #50 | 4MX-07 | |
| | #48 | 4MX-06 | |
| (STD) Lean | #45 | 4MX-05 | |
| Jet needle | Size | Part number | |
| Jet needle | Size | (-14916-) | |
| Rich | GDDUM | 5TJ-9M | |
| | GDDUN | 5TJ-9N | |
| | GDDUP | 5TJ-9P | |
| | GDDUQ | 5TJ-91 | |
| | GDDUR | 5TJ-9R | |
| | GDDUS | 5TJ-9S | |
| Lean | GDDUT | 5TJ-9T | |
| Rich | GDDSM | 5TJ-AM | |
| 111011 | GDDSN | 5TJ-AN | |
| | GDDSP | 5TJ-AP | |
| | | | |
| | GDDSQ | 5TJ-A1 | |
| | GDDSR | 5TJ-AR | |
| | GDDSS | 5TJ-AS | |
| Lean | GDDST | 5TJ-AT | |
| Leak jet | Size | Part number | |
| Lean jei | SIZE | (-1494F-) | |
| Rich | #35 | 4JT-01 | |
| | #40 | 4JT-03 | |
| | #45 | 4JT-05 | |
| | #50 | 4JT-07 | |
| | #55 | 4JT-09 | |
| (STD) | #60 | 4JT-11 | |
| Lean | #65 | 4JT-13 | |
| Lean | 1100 | 701-10 | |

EXAMPLES OF CARBURETOR SETTING DEPENDING ON SYMPTOM

| Symptom | Setting | Checking |
|---|---|---|
| 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) | Groove 1 Groove 2 Groove 3 Groove 4 |
| Rich mixture 1/4–3/4 throttle Hard breathing Lack of speed 1/4–1/2 throttle | Raise jet needle clip position. (1 groove up) Lower jet needle clip position. (1 groove down) Raise jet needle clip position. (1 groove up) | Groove 5 Groove 5 Groove 7 |
| Slow speed pick-up Poor acceleration | | The clip position is the jet needle groove on which the clip is installed. The positions are numbered from the top. Check that the accelerator pump operates smoothly. (except for rich mixture symptom). |
| Closed to 1/4 throttle Hard breathing Speed down | Use jet needle with a smaller diameter. | Slow-speed-circuit passage Clogged → Clean. Overflow from carburetor |
| Closed to 1/4 throttle Poor acceleration | Use jet needle with a larger diameter. Raise jet needle clip position. (1 groove up) | |
| Poor response in the low to intermediate speeds | Raise jet needle clip position. If this has no effect, lower the jet needle clip position. | |
| Poor response when throttle is opened quickly | 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. | Check air filter for fouling. Check that the accelerator pump operates smoothly. |

NOTE: ______
* 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 | (3.846) |

- <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-reving.

NOTE:

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.

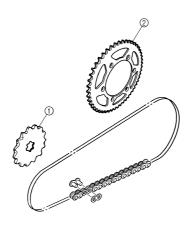
DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS

| Part name | Size | Part number |
|-----------|-------|-------------|
| Drive | | |
| sprocket | | |
| "1" | | |
| (STD) | 13T | 9383E-13233 |
| | * 14T | 9383E-14215 |

^{*} For AUS and NZ

| Part name | Size | Part number |
|-------------------------|-------|--------------|
| Rear wheel sprocket "2" | | |
| | 48T | 5GS-25448-50 |
| | * 48T | 1C3-25448-00 |
| | * 49T | 1C3-25449-00 |
| (STD) | 50T | 5TJ-25450-80 |
| * (STD) | * 50T | 1C3-25450-00 |
| | * 51T | 1C3-25451-00 |
| | 52T | 5TJ-25452-80 |
| | * 52T | 1C3-25452-00 |

* For AUS and NZ



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.



Extent of adjustment: 100-120 kPa (1.0-1.2 kgf/cm², 15-18 psi)

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:

- Setting of air spring characteristics
- · Change the fork oil level.
- 2. Setting of spring preload
 - · Change the spring.
 - · Install the adjustment washer.
- 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 LEVEL AND CHARACTERISTICS OF FORK OIL

Damping characteristic near the final stroke can be changed by changing the fork oil amount.

CAUTION:

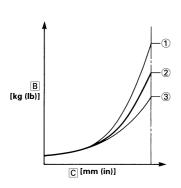
Adjust the oil level in 5 mm (0.2 in) increments or decrements. Too low oil level causes the front fork to produce a noise at full rebound or the rider to feel some pressure on his hands or body. Alternatively, too high oil level will develop unexpectedly early oil lock with the consequent shorter front fork travel and deteriorated performance and characteristics. Therefore, adjust the front fork within the specified range.



Standard oil level:
132 mm (5.20 in)
*125 mm (4.92 in)
Extent of adjustment:
95–150 mm (3.74–5.91 in)
From top of outer tube with inner tube and damper rod fully compressed without spring.

* For AUS, NZ and ZA

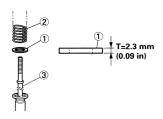
Α



- A. Air spring characteristics in relation to oil level change
- B. Load
- C. Stroke
- 1. Max. oil level
- 2. Standard oil level
- 3. Min. oil level

ADJUSTING THE SPRING PRELOAD

The spring preload is adjusted by installing the adjustment washer "1" between the fork spring "2" and damper rod "3".



CAUTION:

Do not install three or more adjustment washers for each front fork.

WARNING

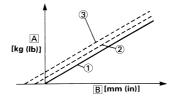
Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



Standard washer quanti-

Zero adjustment washers

Extent of adjustment: Zero-2 adjustment washers



- A. Load
- B. Fork stroke
- Without adjustment washer (standard)
- 2. 1 adjustment washer
- 3. 2 adjustment washers

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.

NOTE:

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.

- 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.

NOTE:

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

· Adjustment washer "1"

| TYPE (thick- ness) | PART NUMBER |
|-------------------------|--------------|
| T = 2.3 mm (0.09 in) | 5XE-23364-00 |

• Front fork spring "2"

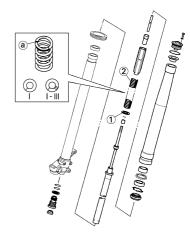
| TYPE | SPRI NG RATE | SPRING PART NUMBER (-23141-) | I.D. MARK (slits) |
|-------|--------------------|---------------------------------------|-------------------------|
| | 0.408 | 5TJ-00 | I |
| | 0.418 | 5TJ-10 | II |
| SOFT | 0.428 | 5TJ-20 | Ш |
| | 0.438 | 5TJ-30 | IIII |
| | 0.449 | 5TJ-40 | IIIII |
| STD | 0.459 | 5TJ-L0 | _ |
| STIFF | 0.469 | 5TJ-60 | - |

NOTE:

The I.D. mark (slits) "a" is proved on the end of the spring.

CAUTION:

When using a spring with a spring rate of 0.469 kg/mm, do not install two or more adjustment washers for each front fork.



REAR SUSPENSION SETTING

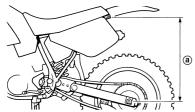
The rear suspension setting should be made depending on the rider's feeling of an actual run and the circuit conditions.

The rear suspension setting includes the following two factors:

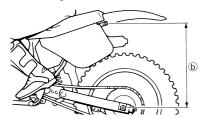
- Setting of spring preload
- Change the set length of the spring.
- · Change the spring.
- 2. Setting of damping force
- Change the rebound damping.
- Change the compression damping

CHOOSING SET LENGTH

 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.



 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.



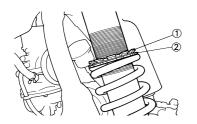
 Loosen the locknut "1" and make adjustment by turning the spring adjuster "2" to achieve the standard figure from the subtraction of the length "b" from the length "a".



Standard figure: 90–100 mm (3.5–3.9 in)

NOTE:

- 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 re-adjustment.



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.

NOTE:

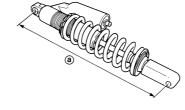
Adjusting the rebound damping will be followed more or less by a change in the compression damping. For correction, turn the low compression damping adjuster on the softer side.

CAUTION:

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: 488.5 mm (19.23 in)



REAR SHOCK ABSORBER SETTING PARTS

• Rear shock spring "1"

| TY PE | SPR ING RAT E | SPRIN G PART NUM- BER (- 22212-) | I.D. COLOR/ POINT | SPRI NG FRE E LEN GTH |
|-----------|------------------------|---|-------------------------|--------------------------------------|
| | 4.3 | 5UN-00 | Brown/1 | 260 |
| | 4.5 | 5UN-10 | Green/1 | 260 |
| so | 4.7 | 5UN-20 | Red/1 | 260 |
| FT | 4.9 | 5UN-30 | Black/1 | 260 |
| | 5.1 | 5UN-40 | Blue/1 | 260 |
| | 5.3 | 5UN-50 | Yellow/ 1 | 260 |
| ST D | 5.5 | 5UN-60 | Pink/1 | 260 |
| STI FF | 5.7 | 5UN-70 | White/1 | 260 |

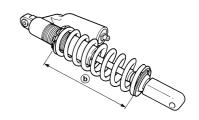
NOTE:

The I.D. color "a" is marked at the end of the spring.



Extent of adjustment (spring length)

| SPRING FREE | EXTENT OF AD- |
|----------------------|--------------------------------------|
| LENGTH | JUSTMENT "b" |
| 260 mm (10.24 in) | 238.5–258.5 mm (9.39–10.18 in) |



SUSPENSION SETTING (FRONT FORK)

NOTE:

- 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).

| | Section | | | | | |
|---|---------|--------------|--------------------|--------------|--------------------------------------|---|
| Symptom | Jump | Large gap | Medi- um gap | Small gap | Check | Adjust |
| Stiff over entire | | | | | Compression damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| range | 0 | 0 | 0 | | Oil level (oil amount) | Decrease oil level by about 5-10 mm (0.2-0.4 in). |
| | | | | | Spring | Replace with soft spring. |
| Unsmooth move- | | | | | Outer tube | Check for any bends, dents, and other noticeable scars, etc. If any, replace affected parts. |
| ment over entire | 0 | 0 | 0 | 0 | Inner tube | |
| range | | | | | Under bracket tighten- ing torque | Retighten to specified torque. |
| Poor initial move- | | | | 0 | Rebound damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| ment | | | | | Oil seal | Apply grease in oil seal wall. |
| Soft over entire | | | | | Compression damping | Turn adjuster clockwise (about 2 clicks) to increase damping. |
| range, bottoming out | O | 0 | | | Oil level (oil amount) | Increase oil level by about 5–10 mm (0.2–0.4 in). |
| | | | | | Spring | Replace with stiff spring. |
| Stiff toward stroke end | 0 | | | | Oil level (oil amount) | Decrease oil level by about 5 mm (0.2 in). |
| Soft toward stroke end, bottoming out | 0 | | | | Oil level (oil amount) | Increase oil level by about 5 mm (0.2 in). |
| Stiff initial move- ment | 0 | 0 | 0 | 0 | Compression damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| | | | | | Compression damping | Turn adjuster clockwise (about 2 clicks) to increase damping. |
| Low front, tending to | | | 0 | 0 | Rebound damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| lower front posture | | | | | Balance with rear end | Set sunken length for 95–100 mm (3.7–3.9 in) when one passenger is astride seat (lower rear posture). |
| | | | | | Oil level (oil amount) | Increase oil level by about 5 mm (0.2 in). |
| | | | | | Compression damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| "Obtrusive" front, tending to upper front posture | | | 0 | 0 | Balance with rear end | Set sunken length for 90–95 mm (3.5–3.7 in) when one passenger is astride seat (upper rear posture). |
| | | | | | Spring | Replace with soft spring. |
| | | | | | Oil level (oil amount) | Decrease oil level by about 5-10 mm (0.2-0.4 in). |

SUSPENSION SETTING (REAR SHOCK ABSORBER)

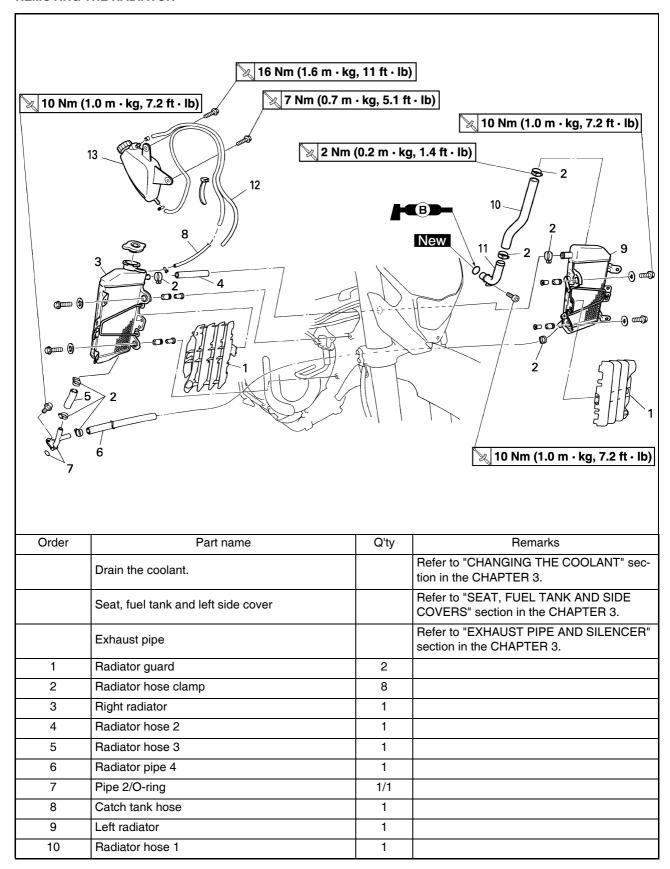
NOTE:

- 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.

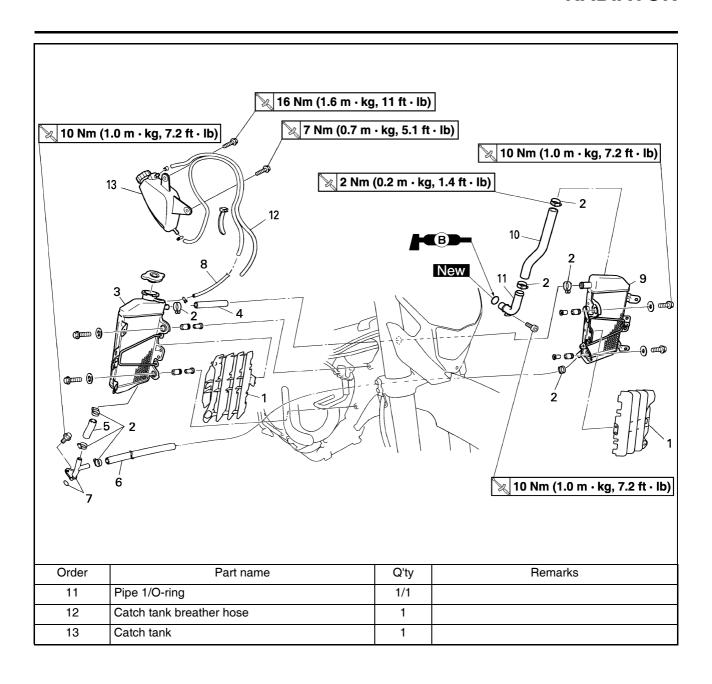
| | | Sec | tion | | | |
|--------------------------|------|--------------|--------------------|--------------|--------------------------|--|
| Symptom | Jump | Large gap | Medi- um gap | Small gap | Check | Adjust |
| Califf to adjust to sink | | | 0 | 0 | Rebound damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| Stiff, tending to sink | | | | | Spring set length | Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat. |
| | | | | | Rebound damping | Turn adjuster clockwise (about 2 clicks) to increase damping. |
| Spongy and unsta- ble | | | 0 | 0 | Low compression damping | Turn adjuster clockwise (about 1 click) to increase damping. |
| | | | | | Spring | Replace with stiff spring. |
| Heavy and dragging | | | 0 | 0 | Rebound damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| | | | | | Spring | Replace with soft spring. |
| | | | | | Rebound damping | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| | | | | | Low compression damping | Turn adjuster clockwise (about 1 clicks) to increase damping. |
| Poor road gripping | | | | 0 | High compression damping | Turn adjuster clockwise (about 1/6 clicks) to increase damping. |
| | | | | | Spring set length | Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat. |
| | | | | | Spring | Replace with soft spring. |
| | | | | | High compression damping | Turn adjuster clockwise (about 1/6 turn) to increase damping. |
| Bottoming out | 0 | 0 | | | Spring set length | Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger in astride seat. |
| | | | | | Spring | Replace with stiff spring. |
| Bouncing | 0 | 0 | | | Rebound damping | Turn adjuster clockwise (about 2 clicks) to increase damping. |
| | | | | | Spring | Replace with soft spring. |
| | | | | | High compression damping | Turn adjuster counterclockwise (about 1/6 turn) to decrease damping. |
| Stiff travel | 0 | 0 | | | Spring set length | Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat. |
| | | | | | Spring | Replace with soft spring. |

ENGINE RADIATOR

REMOVING THE RADIATOR



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:

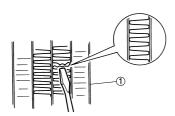
Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it

CHECKING THE RADIATOR

- 1. Inspect:
- Radiator core "1"

Obstruction \rightarrow Blow out with compressed air through rear of the radiator.

Bent fin → Repair/replace.



INSTALLING THE RADIATOR

- 1. Install:
 - Pipe 1 "1"



Pipe 1: 10 Nm (1.0 m•kg, 7.2 ft•lb)

Radiator hose 1 "2"



Radiator hose 1: 2 Nm (0.2 m•kg, 1.4 ft•lb)

Pipe 2 "3"



Pipe 2:

10 Nm (1.0 m•kg, 7.2 ft•lb)

· Radiator hose 3 "4"

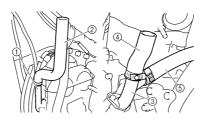


Radiator hose 3: 2 Nm (0.2 m•kg, 1.4 ft•lb)

· Radiator hose 4 "5"



Radiator hose 4: 2 Nm (0.2 m•kg, 1.4 ft•lb)



- 2. Install:
- · Radiator hose 2 "1"

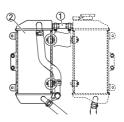


Radiator hose 2: 2 Nm (0.2 m•kg, 1.4 ft•lb)

· Left radiator "2"



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

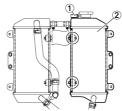


- 3. Install:
 - Catch tank hose "1"
 - · Right radiator "2"



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

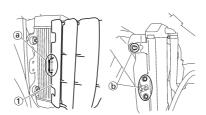
Refer to "CABLE ROUTING DIA-GRAM" section in the CHAPTER 2



- 4. Install:
 - · Radiator guard "1"

NOTE:

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



- 5. Install:
 - · Catch tank "1"

· Bolt (catch tank) "2"



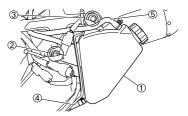
Bolt (catch tank): 7 Nm (0.7 m•kg, 5.1 ft•lb)

· Bolt (catch tank) "3"



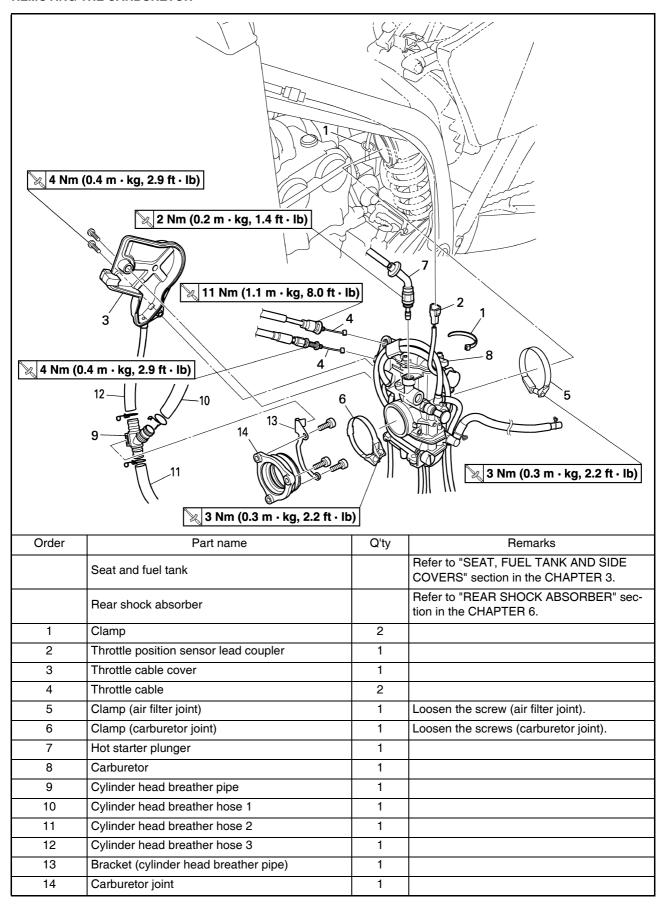
Bolt (catch tank): 16 Nm (1.6 m•kg, 11 ft•lb)

- · Catch tank hose "4"
- Catch tank breather hose "5" Refer to "CABLE ROUTING DIA-GRAM" section in the CHAPTER

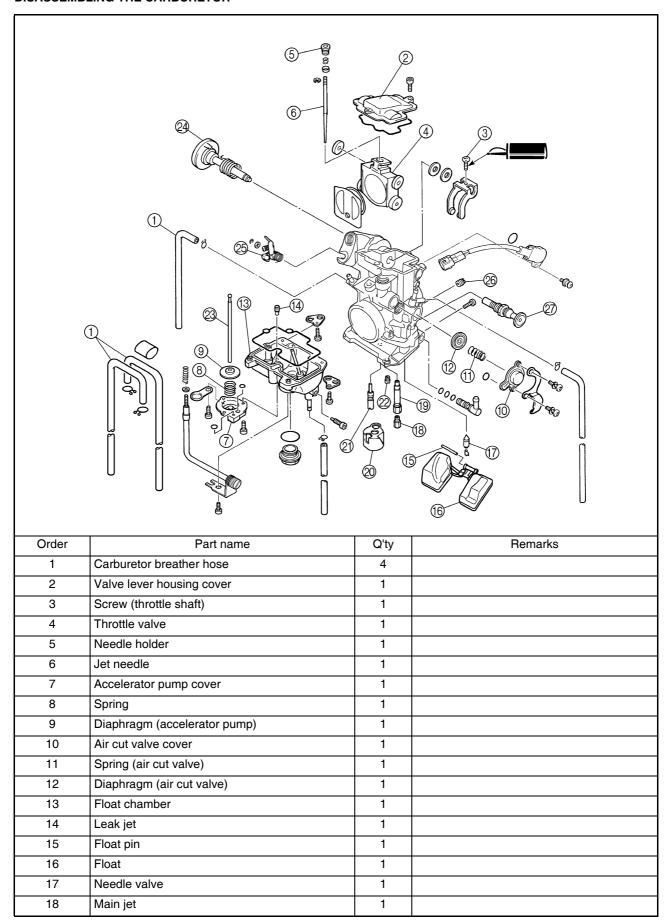


CARBURETOR

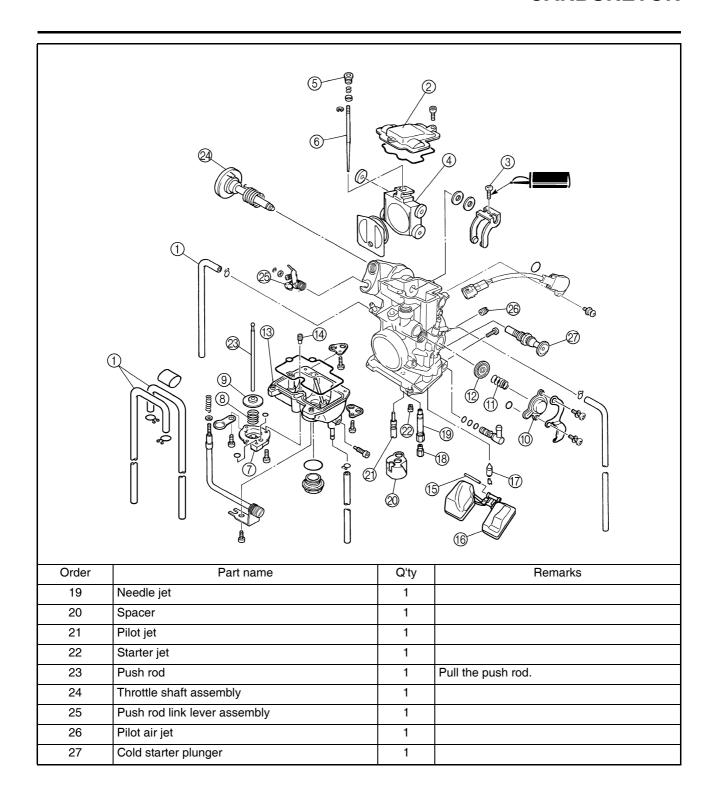
REMOVING THE CARBURETOR



DISASSEMBLING THE CARBURETOR



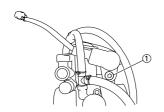
CARBURETOR



HANDLING NOTE

CAUTION:

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.

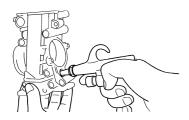


CHECKING THE CARBURETOR

- 1. Inspect:
 - Carburetor body
 Contamination → Clean.

NOTE:

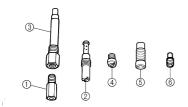
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- · Never use a wire.



- 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.

NOTE

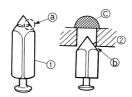
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- · Never use a wire.



CHECKING THE NEEDLE VALVE

- 1. Inspect:
- Needle valve "1"
- Valve seat "2"
 Grooved wear "a" → Replace.

- Dust "b" \rightarrow Clean.
- Filter "c"
 Clogged → Clean.

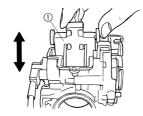


CHECKING THE THROTTLE VALVE

- 1. Check:
 - Free movement Stick → Repair or replace.

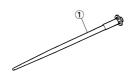
NOTE

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



CHECKING THE JET NEEDLE

- 1. Inspect:
- Jet needle "1"
 Bends/wear → Replace.
- Clip groove
 Free play exists/wear → Replace.

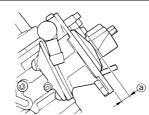


MEASURING AND ADJUSTING THE FLOAT HEIGHT

- 1. Measure:
- Float height "a"
 Out of specification → Adjust.



Float height: 8.0 mm (0.31 in)



Measurement and adjustment steps:

a. Hold the carburetor in an upside down position.

NOTE:

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

NOTE:

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

- 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.

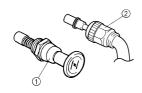
CHECKING THE FLOAT

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



CHECKING THE STARTER PLUNGER

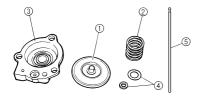
- 1. Inspect:
- Cold starter plunger "1"
- Hot starter plunger "2"
 Wear/damage → Replace.



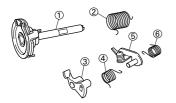
CHECKING THE ACCELERATOR PUMP

- 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 \rightarrow Clean.



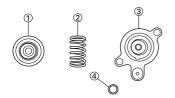
- 2. Inspect:
 - Throttle shaft "1"
 - · Spring "2"
 - Lever 1 "3"
 - Spring 1 "4"
 - Lever 2 "5"
 - Spring 2 "6"
 Dirt → Clean.



CHECKING THE AIR CUT VALVE

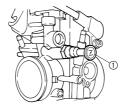
- 1. Inspect:
 - · Diaphragm (air cut valve) "1"
 - Spring (air cut valve) "2"
 - Air cut valve cover "3"
 - O-ring "4"

Tears (diaphragm)/damage → Replace.

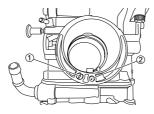


ASSEMBLING THE CARBURETOR

- 1. Install:
 - Cold starter plunger "1"



- 2. Install:
- Pilot air jet "1"



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

NOTE:

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



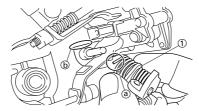
- 4. Install:
- Spring 2 "1"
 To lever 2 "2".



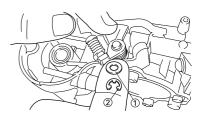
- 5. Install:
- Push rod link lever assembly "1"

NOTE:

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



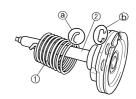
- 6. Install:
- Washer "1"
- · Circlip "2"



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

NOTE

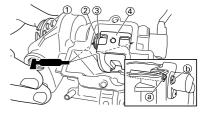
Install the bigger hook "a" of the spring fits on the stopper "b" of the throttle shaft pulley.



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

NOTE:

- 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.





CARBURETOR

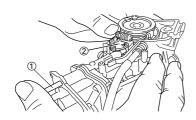


9. Install:

• Push rod "1"

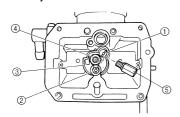
NOTE:

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



10. Install:

- Starter jet "1"
- · Pilot iet "2"
- · Spacer "3"
- · Needle jet "4"
- · Main jet "5"

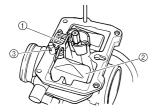


11. Install:

- Needle valve "1"
- Float "2"
- Float pin "3"

NOTE:

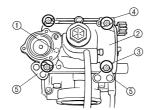
- After installing the needle valve to the float, install them to the carburetor.
- Check the float for smooth movement.



12. Install:

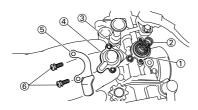
- O-ring
- Leak jet "1"
- Float chamber "2"
- Bolt (float chamber) "3"
- Cable holder (throttle stop screw cable) "4"

 Hose holder (carburetor breather hose) "5"



13. Install:

- Diaphragm (air cut valve) "1"
- Spring (air cut valve) "2"
- O-ring "3"
- Air cut valve cover "4"
- Holder (cylinder head breather hose) "5"
- Screw (air cut valve cover) "6"

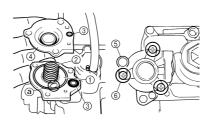


14. Install:

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

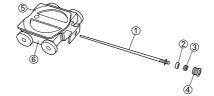
NOTE:

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".



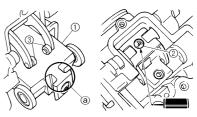
16. Install:

- Throttle valve assembly "1"
- Screw (throttle shaft) "2"



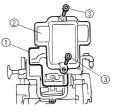
NOTE

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"

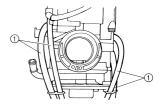


18. Install:

 Carburetor breather hose "1" Refer to "CABLE ROUTING DIA-GRAM" section in the CHAPTER 2.

NOTE:

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

Adjustment steps:

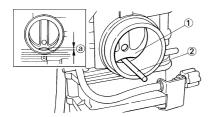
NOTE:

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: 3.1 mm (0.122 in)

CARBURETOR



- 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.



 Gradually turn out the adjusting screw while moving the link lever until it has no more free play.

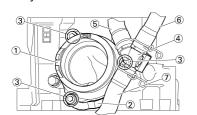
INSTALLING THE CARBURETOR

- 1. Install:
 - · Carburetor joint "1"
 - Bracket (cylinder head breather pipe) "2"
 - · Bolt (carburetor joint) "3"



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

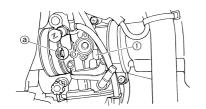
- Cylinder head breather pipe "4"
- Cylinder head breather hose 1 "5"
- Cylinder head breather hose 2 "6"
- Cylinder head breather hose 3 "7"



- 2. Install:
 - Carburetor "1"

NOTE:

Install the projection "a" between the carburetor joint slots.

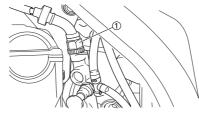


3. Install:

• Hot starter plunger "1"



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



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

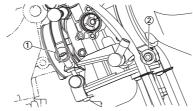


Bolt (carburetor joint): 3 Nm (0.3 m•kg, 2.2 ft•lb)

• 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"

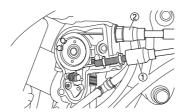


Throttle cable (pull): 4 Nm (0.4 m•kg, 2.9 ft•lb)

• Throttle cable (return) "2"



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

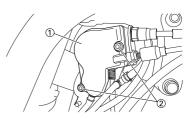


- 6. Adjust:
- Throttle grip free play
 Refer to "ADJUSTING THE
 THROTTLE CABLE FREE PLAY"
 section in the CHAPTER 3.
- 7. Install:
- Throttle cable cover "1"
- Bolt (throttle cable cover) "2"

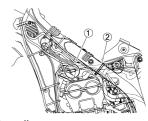


Bolt (throttle cable cover):

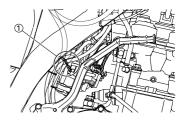
4 Nm (0.4 m•kg, 2.9 ft•lb)



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

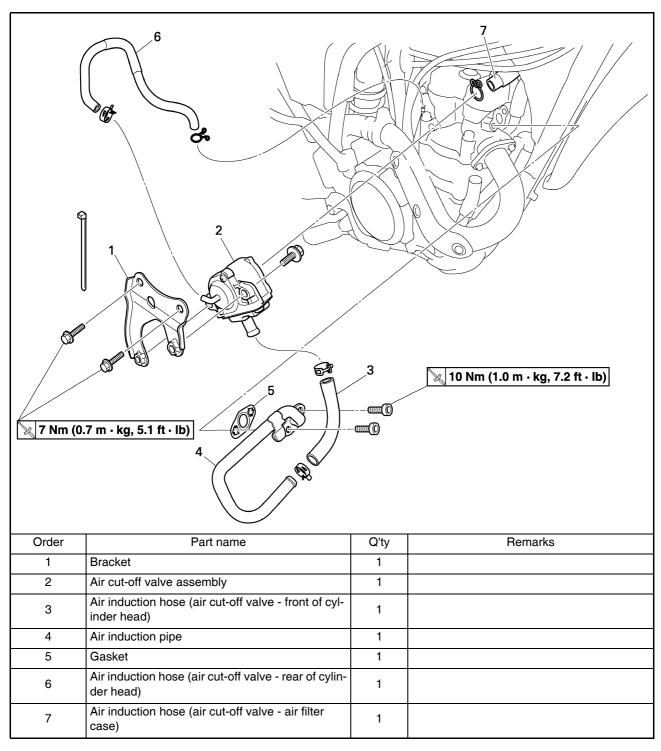


- 9. Install:
- Clamp "1"
 Refer to "CABLE ROUTING DIA-GRAM" section in the CHAPTER
 2.



AIR INDICTOIN SYSTEM

AIR INDICTOIN SYSTEM REMOVING THE AIR INDUCTION SYSTEM



CHECKING THE AIR INDUCTION SYSTEM

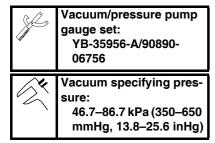
- 1. Inspect:
 - Air induction hose Crack/damage → Replace.
 - Air induction pipe Crack/damage → Replace.
- 2. Check:
 - Operation of air cut valve
 Pass air through the pipe and
 check the air cut valve for operation.

Does not meet the following condition \rightarrow Replace the air cut valve assembly.

| "a" to "b" | Air passes. |
|------------|--|
| "b" to "a" | Air does not pass. |
| "a" to "b" | Air does not pass when specified pressure is on "c". |

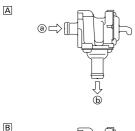
NOTE:

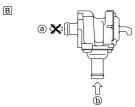
- Blow in air to check for operation.
- When using vacuum, check by the use of the vacuum/pressure pump gauge set "1".

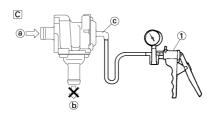


CAUTION:

When using vacuum on the pipe "c", take care not to exceed the specified value.



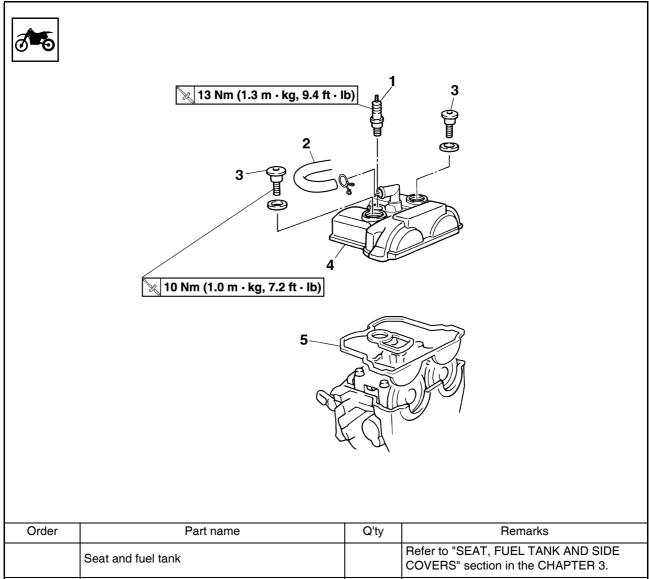




- a. From air filter
- b. To cylinder head (exhaust port)
- c. From cylinder head (intake port)
- A. Check for induction from air filter.
- B. Check for prevention of backflow into air filter.
- C. Check for prevention of afterburn. (When throttle is closed at sudden deceleration)

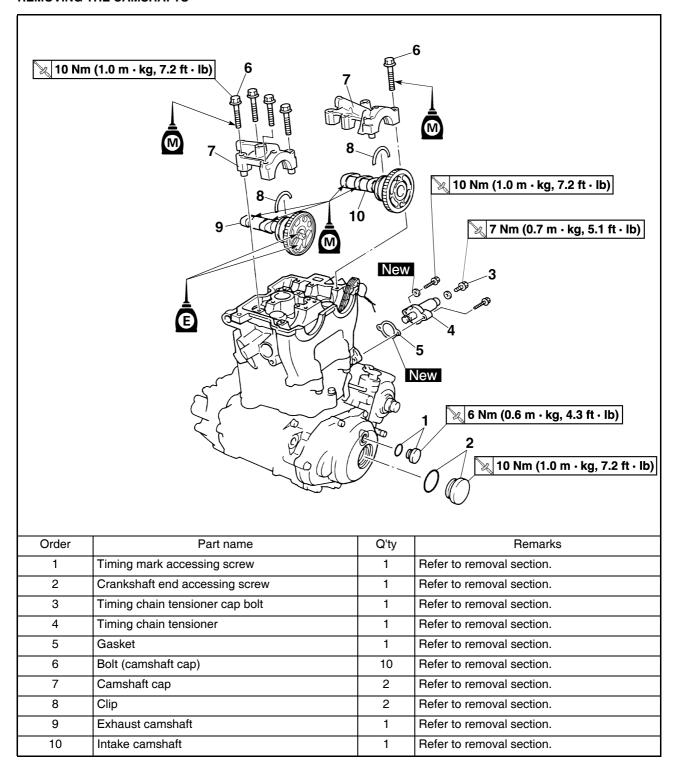
CAMSHAFTS

REMOVING THE CYLINDER HEAD COVER



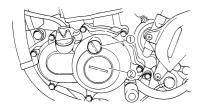
| Order | Part name | Q'ty | Remarks |
|-------|------------------------------|------|--|
| | Seat and fuel tank | | Refer to "SEAT, FUEL TANK AND SIDE COVERS" section in the CHAPTER 3. |
| | Air cut-off valve assembly | | Refer to "AIR INDUCTION SYSTEM" section. |
| | Engine upper bracket (right) | | Refer to "ENGINE REMOVAL" section. |
| | Engine upper bracket (left) | | |
| 1 | Spark plug | 1 | |
| 2 | Cylinder head breather hose | 1 | |
| 3 | Bolt (cylinder head cover) | 2 | |
| 4 | Cylinder head cover | 1 | |
| 5 | Cylinder head cover gasket | 1 | |

REMOVING THE CAMSHAFTS



REMOVING THE CAMSHAFT

- 1. Remove:
 - Timing mark accessing screw "1"
 - Crankshaft end accessing screw "2"



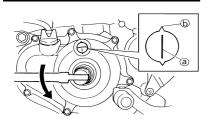
- 2. Align:
 - T.D.C. mark
 With align mark.

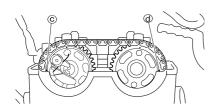
Checking steps:

- 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.

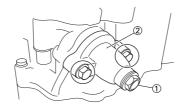
NOTE:

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



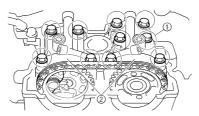
- 4. Remove:
 - Bolt (camshaft cap) "1"
 - · Camshaft cap "2"
 - Clip

NOTE:

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

CAUTION:

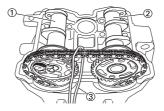
The bolts (camshaft cap) must be removed evenly to prevent damage to the cylinder head, camshafts or camshaft caps.



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

NOTE:

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 \rightarrow Replace.



Cam lobes length:

Intake "a":

30.100-30.200 mm (1.1850-1.1890 in)

<Limit>:

30.000 mm (1.1811 in)

Intake "b":

22.450-22.550 mm (0.8839-0.8878 in)

<Limit>:

22.350 mm (0.8799 in)

Exhaust "a":

30.200-30.300 mm (1.1890-1.1929 in)

<Limit>:

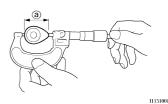
30.100 mm (1.1850 in)

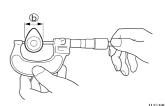
Exhaust "b":

22.450-22.550 mm (0.8839-0.8878 in)

<Limit>:

22.350 mm (0.8799 in)



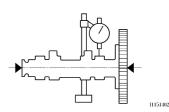


3. Measure:

Runout (camshaft)
 Out of specification → Replace.



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



4. Measure:

Camshaft-to-cap clearance
 Out of specification → Measure camshaft outside diameter.

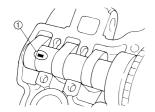


Camshaft-to-cap clearance:

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.



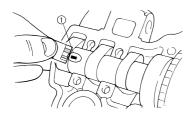
c. Install the clip, dowel pins and camshaft caps.



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

NOTE:

- 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".



5. Measure:

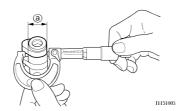
Camshaft outside diameter "a"
 Out of specification → Replace the camshaft.

Within specification → Replace camshaft case and camshaft caps as a set.



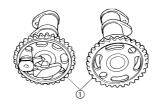
Camshaft outside diameter:

21.959–21.972 mm (0.8645–0.8650 in)



CHECKING THE CAMSHAFT SPROCKET

- 1. Inspect:
 - Camshaft sprocket "1"
 Wear/damage → Replace the
 camshaft assembly and timing
 chain as a set.

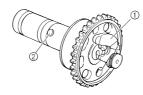


CHECKING THE DECOMPRESSION SYSTEM

- 1. Check:
- Decompression system

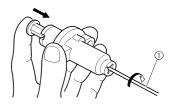
Checking steps:

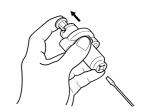
- a. Check that the decompression mechanism cam "1" moves smoothly.
- b. Check that the decompression mechanism cam lever pin "2" projects from the camshaft.



CHECKING THE TIMING CHAIN TENSIONER

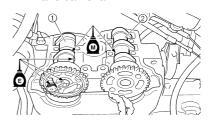
- 1. Check:
 - While pressing the tensioner rod lightly with fingers, use a thin screwdriver "1" and wind the tensioner rod up fully clockwise.
 - When releasing the screwdriver by pressing lightly with fingers, make sure that the tensioner rod will come out smoothly.
 - If not, replace the tensioner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





INSTALLING THE CAMSHAFT

- 1. Install:
 - Exhaust camshaft "1"
 - Intake camshaft "2"



Installation steps:

 Turn the crankshaft counterclockwise with a wrench.

NOTE:

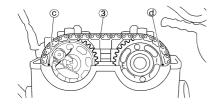
- Apply the molybdenum disulfide oil on the camshafts.
- Apply the engine oil on the decompression system.
- Align the T.D.C. mark "a" on the rotor with the align mark "b" on the crankcase cover when piston is at T.D.C. on compression stroke.



c. Fit the timing chain "3" onto both camshaft sprockets and install the camshafts on the cylinder head.

NOTE:

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.



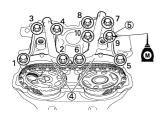
CAUTION:

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)



NOTE:

- Before removing 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.

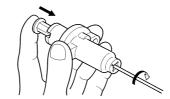
CAUTION:

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:

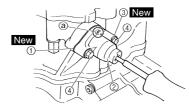
 a. While pressing the tensioner rod lightly with fingers, use a thin screwdriver and wind the tensioner rod up fully clockwise.



b. With the rod fully wound and the chain tensioner UP mark "a" facing upward, install the gasket "1", the timing chain tensioner "2", and the gasket "3", and tighten the bolt "4" to the specified torque.



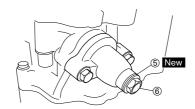
Bolt (timing chain tensioner): 10 Nm (1.0 m•kg, 7.2 ft•lb)



c. Release the screwdriver, check the tensioner rod to come out and tighten the gasket "5" and the cap bolt "6" to the specified torque.



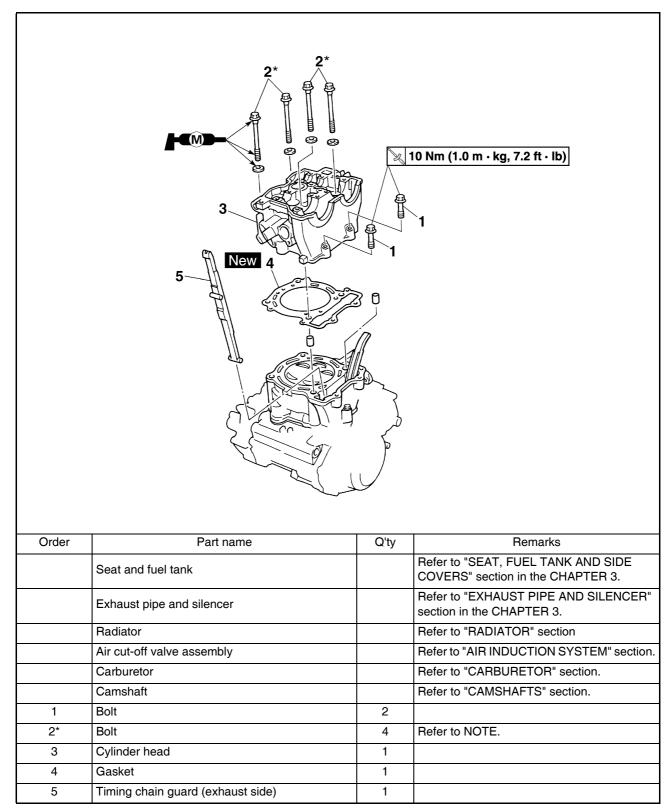
Tensioner cap bolt: 7 Nm (0.7 m•kg, 5.1 ft•lb)



- 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.

CYLINDER HEAD REMOVING THE CYLINDER HEAD



NOTE:

Tighten the cylinder head bolts to 30 Nm (3.0 m•kg, 22 ft•b) in the proper tightening sequence, remove and retighten the cylinder head bolts to 20 Nm (2.0 m•kg, 14 ft•lb) in the proper tightening sequence, and then tighten the cylinder head bolts further to reach the specified angle 180° in the proper tightening sequence.

CHECKING THE CYLINDER HEAD

- 1. Eliminate:
 - Carbon deposits (from the combustion chambers)
 Use a rounded scraper.

NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- · Spark plug threads
- · Valve seats



- 2. Inspect:
 - Cylinder head Scratches/damage → Replace.
- 3. Measure:
 - Cylinder head warpage
 Out of specification → Resurface.



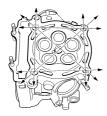
Cylinder head warpage: Less than 0.05 mm (0.002 in)

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 figureeight sanding pattern.

NOTE:

To ensure an even surface rotate the cylinder head several times.



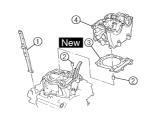
INSTALLING THE CYLINDER HEAD

- 1. Install:
- Timing chain guide (exhaust side)
 "1"
- Dowel pin "2"
- Cylinder head gasket "3" New

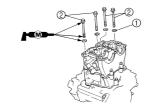
· Cylinder head "4"

NOTE:

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



- 2. Install:
 - Washer "1"
 - Bolts "2"



Installation steps:

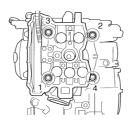
CAUTION:

Tighten the cylinder head using the rotation angle procedure to obtain uniform tightening torque.

- Wash the threads and contact surfaces of the bolts, the contact surfaces of the plain washers, the contact surface of the cylinder head, and the threads of the crankcase.
- Apply the molybdenum disulfide grease on the threads and contact surfaces of the bolts and on both contact surfaces of the plain washers.
- c. Install the plain washers and holts
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.



Bolts (cylinder head): 1st: 30 Nm (3.0 m•kg, 22 ft•lb)



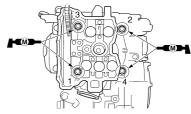
- e. Remove the bolts.
- f. Again apply the molybdenum disulfide grease on the threads and contact surfaces of the bolts and on both contact surfaces of the plain washers.
- g. Retighten the bolts.

NOTE:

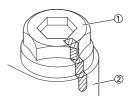
Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.



Bolts (cylinder head): 2nd: 20 Nm (2.0 m•kg, 14 ft•lb)



h. Put a mark on the corner "1" of the bolt (cylinder head) and the cylinder head "2" as shown.

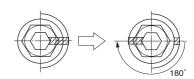


IOTE:

Tighten the bolts 90° in each of the two steps to reach the specified angle of 180° in the proper tightening sequence as shown.



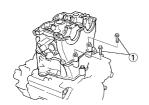
Bolts (cylinder head): Final: Specified angle 180°



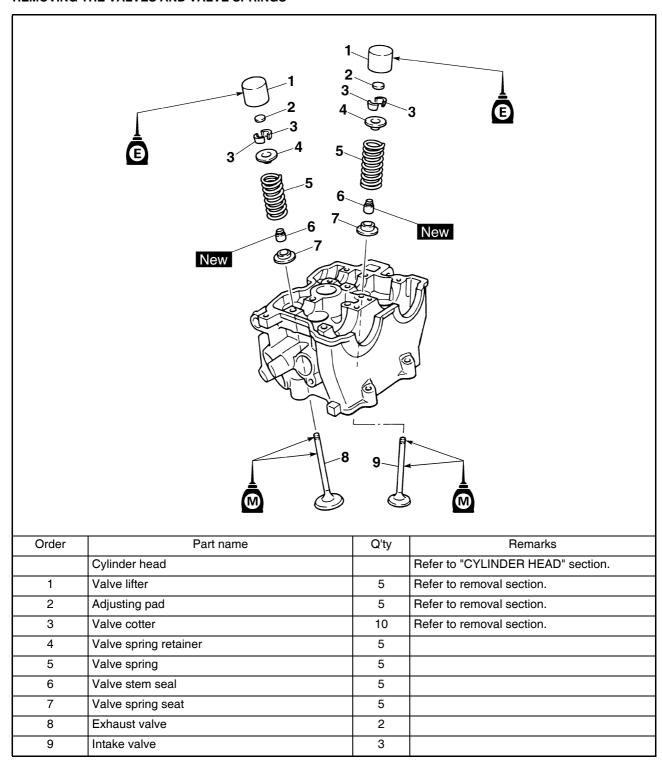
- 3. Install:
 - Bolt (cylinder head) "1"



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



VALVES AND VALVE SPRINGS REMOVING THE VALVES AND VALVE SPRINGS

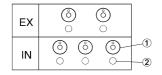


REMOVING THE VALVE LIFTER AND VALVE COTTER

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

NOTE:

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

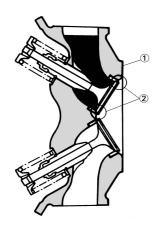


- 2. Check:
 - · Valve sealing Leakage at the valve seat → Inspect the valve face, valve seat and valve seat width.

Checking steps:

- a. Pour a clean solvent "1" into the intake and exhaust ports.
- b. Check that the valve seals prop-

There should be no leakage at the valve seat "2".



- 3. Remove:
 - · Valve cotter

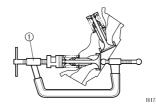
NOTE:

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



Valve spring compres-

YM-4019/90890-04019



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.

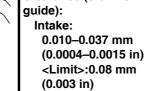


Clearance (stem to

0.010-0.037 mm <Limit>:0.08 mm (0.003 in)Exhaust:

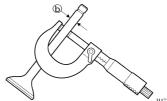
0.020-0.047 mm (0.0008-0.0019 in)

(0.004 in)



<Limit>:0.10 mm



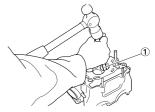


- 2. Replace:
- Valve guide

Replacement steps:

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

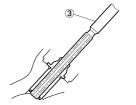
a. Remove the valve guide using a valve guide remover "1".



b. Install the new valve guide using a valve guide remover "1" and valve guide installer "2".



c. After installing the valve guide, bore the valve guide using a valve guide reamer "3" to obtain proper stem-to-guide clearance.





Valve guide remover:

Intake:4.5 mm (0.18 in) YM-4116/90890-04116 Exhaust:5.0 mm (0.20

11170601

YM-4097/90890-04097 Valve guide installer: Intake:

YM-4117/90890-04117 **Exhaust:**

YM-4098/90890-04098 Valve guide reamer:

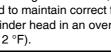
Intake:4.5 mm (0.18 in) YM-4118/90890-04118 Exhaust:5.0 mm (0.20

YM-4099/90890-04099

NOTE:

After replacing the valve guide reface the valve seat.

- 3. Inspect:
 - Valve face Pitting/wear \rightarrow 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 \rightarrow Replace.



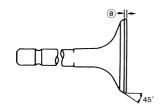
Margin thickness:

Intake:

1.0 mm (0.039 in) <Limit>:0.85 mm (0.033 in)

Exhaust:

1.0 mm (0.039 in) <Limit>:0.85 mm (0.033 in)



5. Measure:

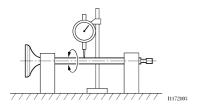
Runout (valve stem)
 Out of specification → Replace.



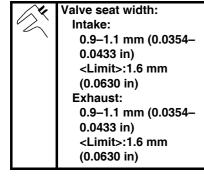
Runout limit: 0.01 mm (0.0004 in)

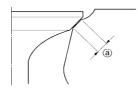
NOTE:

- When installing a new valve always replace the guide.
- If the valve is removed or replaced always replace the 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.





Measurement steps:

a. Apply Mechanic's blueing dye (Dykem) "b" to the valve face.



- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- d. Measure the valve seat width. Where the valve seat and valve face made contact, blueing will have been removed.
- e. If the valve seat is too wide, too narrow, or the seat is not centered, the valve seat must be refaced

l an·

- 9. Lap:
 - Valve face
 - Valve seat

NOTE:

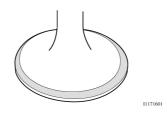
After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.

Lapping steps:

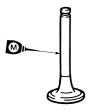
a. Apply a coarse lapping compound to the valve face.

CAUTION:

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



 Apply molybdenum disulfide oil to the valve stem.



- Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the compound.

NOTE:

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



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

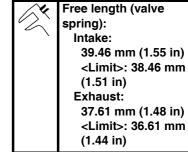
NOTE:

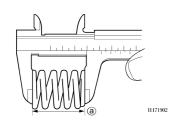
After every lapping operation be sure to clean off all of the compound from the valve face and valve seat.

- f. Apply Mechanic's blueing dye (Dykem) to the valve face.
- g. Install the valve into the cylinder head.
- h. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- 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.



Compressed spring force:

Intake:

130.2–149.8 N at 27.87 mm (13.28–15.28 kg at 27.87 mm, 29.27– 33.68 lb at 1.10 in) Exhaust:

123.1–141.7 N at 28.38 mm (12.55–14.45 kg at 28.38 mm, 27.67–31.85 lb at 1.12 in)



- b. Installed length
- 3. Measure:
 - Spring tilt "a"
 Out of specification → Replace.

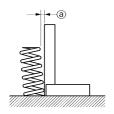


Spring tilt limit:

Intake:

2.5°/1.7 mm (0.067 in) Exhaust:

2.5°/1.6 mm (0.063 in)



CHECKING THE VALVE LIFTERS

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



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INSTALLING THE VALVES

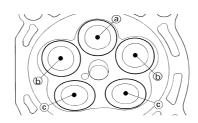
- 1. Apply:
- Molybdenum disulfide oil
 Onto the valve stem and valve stem seal.
- 2. Install:
- Valves "1"
- · Valve spring seats "2"
- Valve stem seals "3" New
- · Valve springs "4"
- Valve spring retainers "5"

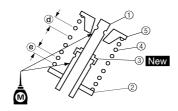
NOTE:

 Make sure that each valve is installed in its original place, also referring to the painted color as follows.

Intake (middle) "a": blue Intake (right/left) "b": gray Exhaust "c": brown

• Install the valve springs with the larger pitch "d" facing upward.





- e. Smaller pitch
- 3. Install:
- Valve cotters

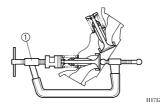
NOTE:

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



Valve spring compressor:

YM-4019/90890-04019



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

CAUTION:

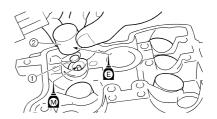
Hitting the valve tip with excessive force could damage the valve.



- 5. Install:
 - · Adjusting pad "1"
- Valve lifter "2"

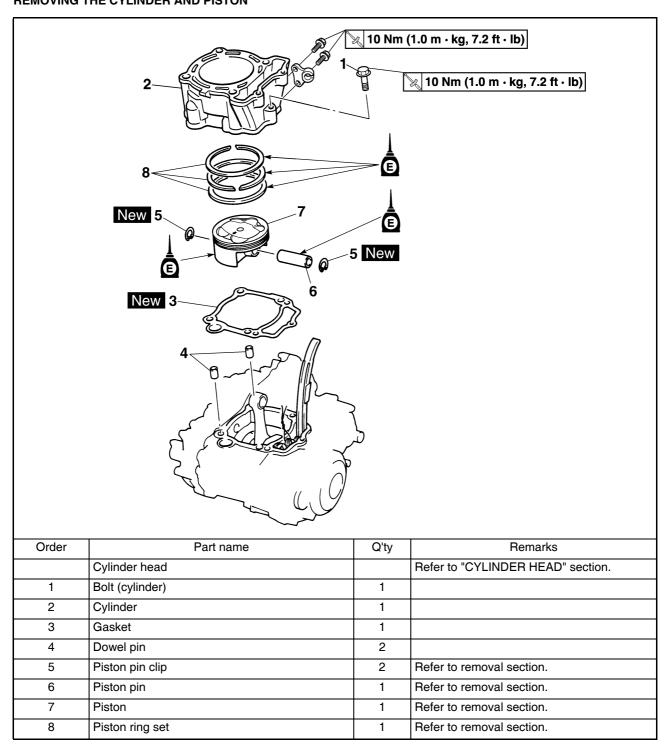
NOTE:

- 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

CYLINDER AND PISTON REMOVING THE CYLINDER AND PISTON



CYLINDER AND PISTON

REMOVING THE PISTON AND PISTON RING

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

NOTE:

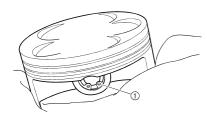
- Put identification marks on each piston head for reference during reinstallation.
- Before removing each piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller set "4".

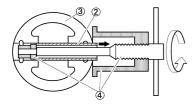


Piston pin puller set: YU-1304/90890-01304

CAUTION:

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

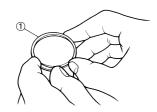




- 2. Remove:
 - Piston ring "1"

NOTE:

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:

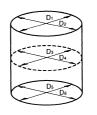
 Measure the cylinder bore "C" with a cylinder bore gauge.

NOTE:

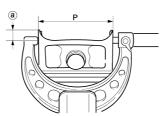
Measure the cylinder bore "C" in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.

| Cylinder bore "C" | 95.00–95.01 mm (3.7402–3.7406 in) |
|----------------------|--------------------------------------|
| Taper limit "T" | 0.05 mm (0.002 in) |
| Out of round "R" | 0.05 mm (0.002 in) |

| "C" = Maximum D |
|---|
| "T" = (Maximum D_1 or D_2) - (Maximum D_5 or D_6) |
| "R" = (Maximum D_1 , D_3 or D_5) - (Minimum D_2 , D_4 or D_6) |



- If out of specification, replace the cylinder, and replace the piston and piston rings as set.
- Measure the piston skirt diameter
 "P" with a micrometer.



a. 8 mm (0.31 in) from the piston bottom edge

| | Piston size "P" |
|----------|--|
| Standard | 94.965–94.980 mm (3.7388–3.7394 in) |

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

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



Piston-to-cylinder clearance:

0.020-0.045 mm (0.0008-0.0018 in) <Limit>:0.1 mm (0.004 in)

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

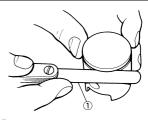
CHECKING THE PISTON RING

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

NOTE:

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

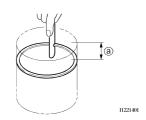
| / 4 | Side clearance: | |
|-------------|---|-----------------------|
| | Standard | <limit></limit> |
| Top ring | 0.030-0.065 mm (0.0012- 0.0026 in) | 0.12 mm (0.005 in) |
| 2nd ring | 0.020-0.055 mm (0.0008- 0.0022 in) | 0.12 mm (0.005 in) |



- 2. Position:
 - Piston ring (in cylinder)

NOTE:

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.

NOTE:

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

| /4 | End gap: | End gap: | |
|-------------|--------------------------------------|-----------------------|--|
| | Standard | <limit></limit> | |
| Top ring | 0.20-0.30 mm (0.008- 0.012 in) | 0.55 mm (0.022 in) | |
| 2nd ring | 0.35-0.50 mm (0.014- 0.020 in) | 0.85 mm (0.033 in) | |
| Oil ring | 0.20-0.50 mm (0.01- 0.02 in) | _ | |

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:

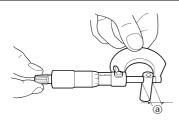
a. Measure the outside diameter (piston pin) "a".

If out of specification, replace the piston pin.



Outside diameter (piston pin):

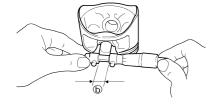
17.991–18.000 mm (0.7083–0.7087 in)



b. Measure the inside diameter (piston) "b".



Inside diameter (piston): 18.004–18.015 mm (0.7088–0.7093 in)



 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:

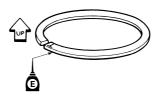
0.004–0.024 mm (0.00016–0.00094 in) <Limit>:0.07 mm (0.003 in)

INSTALLING THE PISTON RING AND PISTON

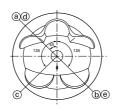
- 1. Install:
- Piston ring
 Onto the piston.

NOTE:

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



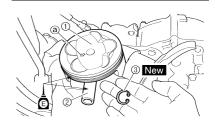
- 2. Position:
 - Top ring
 - · 2nd ring
 - Oil ring
 Offset the piston ring end gaps as
 shown.

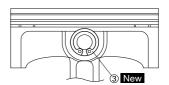


- a. Top ring end
- b. 2nd ring end
- c. Oil ring end (upper)
- d. Oil ring
- e. Oil ring end (lower)
- 3. Install:
 - Piston "1"
 - Piston pin "2"
 - Piston pin clip "3" New

NOTE

- Apply engine oil onto the piston pin and piston.
- Be sure that the arrow mark "a" on the piston points to the exhaust side of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean rag to prevent the piston pin clip from falling into the crankcase.
- Install the piston pin clips with their ends facing downward.





INSTALLING THE CYLINDER

- 1. Install:
 - Dowel pins
 - Cylinder gasket "1" New
 - · Cylinder "2"

NOTE:

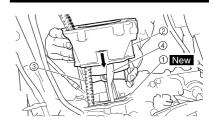
Install the cylinder with one hand while compressing the piston rings with the other hand.

CAUTION:

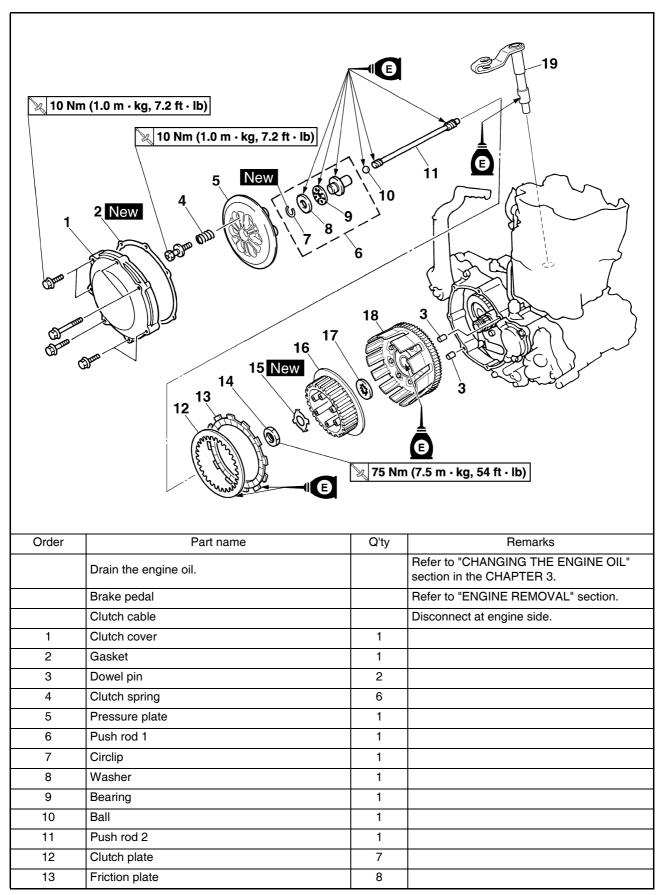
- Pass the timing chain "3" through the timing chain cavity.
- Be careful not to damage the timing chain guide "4" during installation.
- 2. Install:
- Bolt (cylinder)



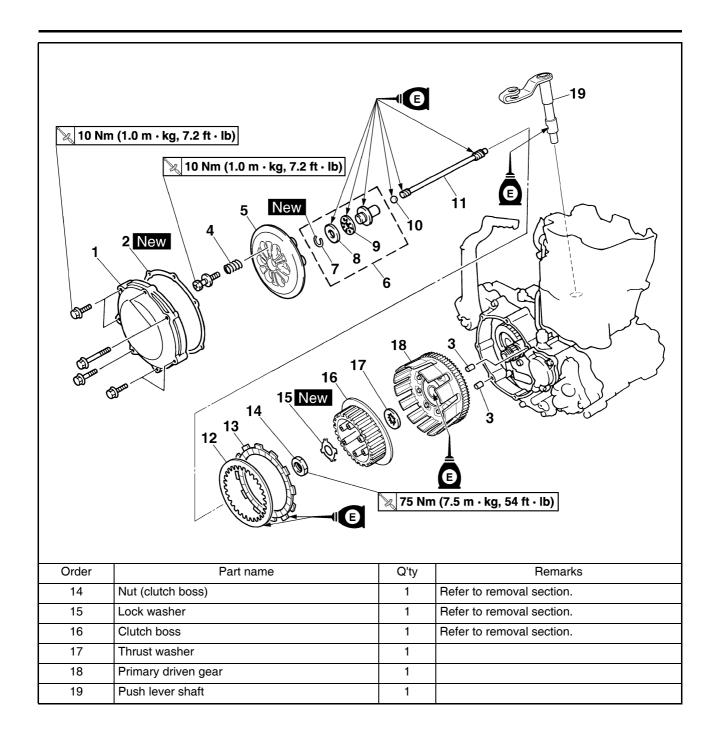
Bolt (cylinder): 10 Nm (1.0 m•kg, 7.2 ft•lb)



CLUTCHREMOVING THE CLUTCH



CLUTCH



REMOVING THE CLUTCH BOSS

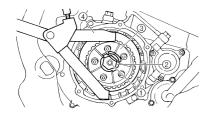
- 1. Remove:
 - Nut "1"
 - Lock washer "2"
 - Clutch boss "3"

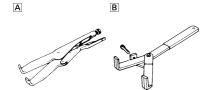
NOTE:

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



Clutch holding tool: YM-91042/90890-04086

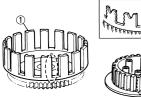


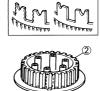


- A. For USA and CDN
- B. Except for USA and CDN

CHECKING THE CLUTCH HOUSING AND BOSS

- 1. Inspect:
 - Clutch housing "1"
 Cracks/wear/damage → Replace.
 - Clutch boss "2" Scoring/wear/damage → Replace.





CHECKING THE PRIMARY DRIVEN GEAR

- 1. Check:
 - Circumferential play
 Free play exists → Replace.
 - Gear teeth "a"
 Wear/damage → Replace.



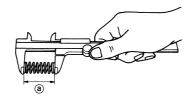
CHECKING THE CLUTCH SPRINGS

- 1. Measure:
- Clutch spring free length "a"
 Out of specification → Replace springs as a set.



Clutch spring free length:

50.0 mm (1.97 in) <Limit>: 49.0 mm (1.93 in)



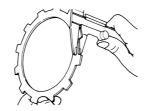
CHECKING THE FRICTION PLATES

in)

- 1. Measure:
- Friction plate thickness
 Out of specification → Replace
 friction plate as a set.
 Measure at all four points.



Friction plate thickness: 2.92–3.08 mm (0.115– 0.121 in) <Limit>: 2.8 mm (0.110

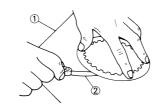


CHECKING THE CLUTCH PLATES

- 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 PUSH LEVER SHAFT

- 1. Inspect:
 - Push lever shaft "1"

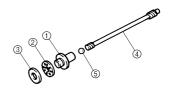
Wear/damage → Replace.



CHECKING THE PUSH ROD

- 1. Inspect:
 - Push rod 1 "1"
 - Bearing "2"
 - Washer "3"
 - Push rod 2 "4"
 - Ball "5"

Wear/damage/bend → Replace.

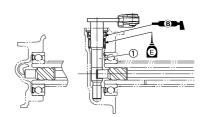


INSTALLING THE PUSH LEVER SHAFT

- 1. Install:
 - Push lever shaft "1"

NOTE:

- Apply the lithium soap base grease on the oil seal lip.
- Apply the engine oil on the push lever shaft.

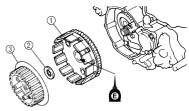


INSTALLING THE CLUTCH

- 1. Install:
- Primary driven gear "1"
- Thrust washer "2"
- · Clutch boss "3"

NOTE:

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)

CAUTION:

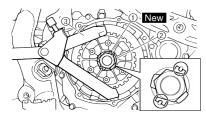
Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.

NOTE:

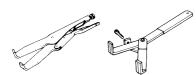
- Install the lock washer with its concaves fitted over the convexes of the clutch boss.
- Use the clutch holding tool "3" to hold the clutch boss.



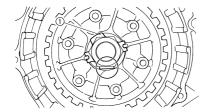
Clutch holding tool: YM-91042/90890-04086



АВ



- A. For USA and CDN
- B. Except for USA and CDN
- 3. Bend the lock washer "1" tab.

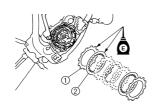


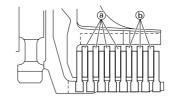
- 4. Install:
 - · Friction plate "1"
 - Clutch plate 1 [t=2.0 mm (0.079 in)] "2"
 - Clutch plate 2 [t=1.6 mm (0.063 in)] "3"

NOTE:

- 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.

 Check the clutch plate for thickness and install 4 thicker ones "a" on the engine side and 3 thinner ones "b" on the outside.

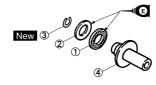




- 5. Install:
 - Bearing "1"
 - Washer "2"
- Circlip "3" New To push rod 1 "4".

NOTE:

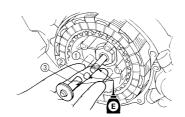
Apply the engine oil on the bearing and washer.



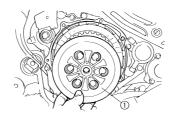
- 6. Install:
 - Push rod 2 "1"
 - Ball "2"
- Push rod 1 "3"

NOTE

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



- 7. Install:
- Pressure plate "1"



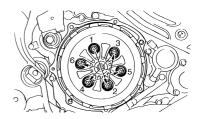
- 8. Install:
 - · Clutch spring
 - · Bolt (clutch spring)



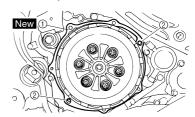
Bolt (clutch spring): 10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

Tighten the bolts in stage, using a crisscross pattern.



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



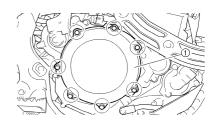
- 10. Install:
 - Clutch cover "1"
 - · Bolt (clutch cover)



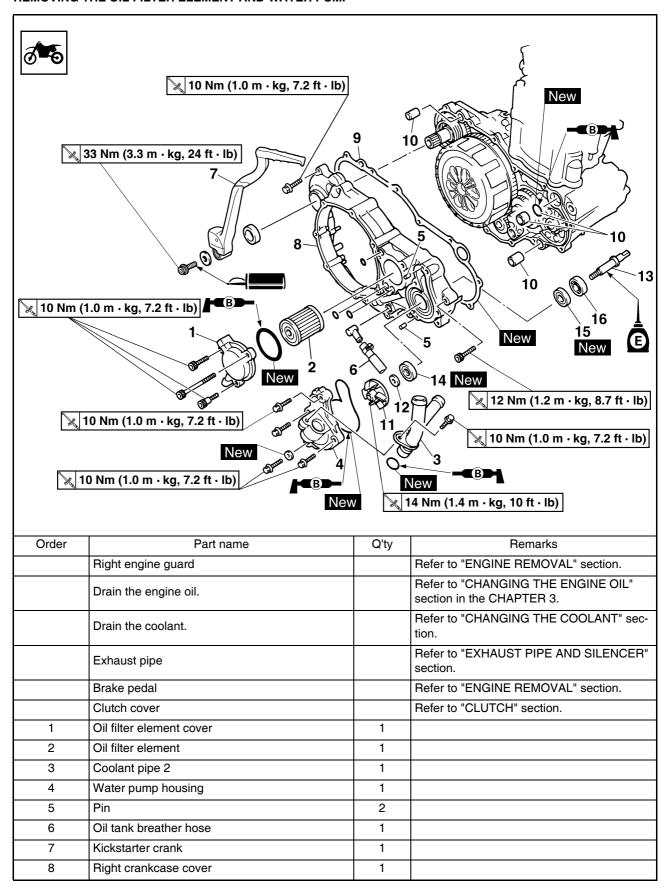
Bolt (clutch cover): 10 Nm (1.0 m•kg, 7.2 ft•lb)

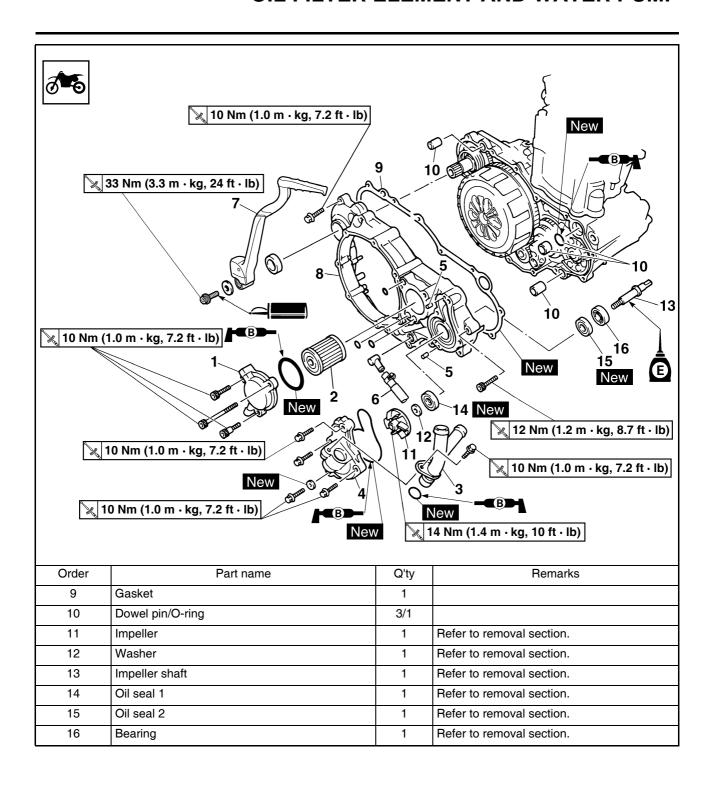
NOTE:

Tighten the bolts in stage, using a crisscross pattern.



OIL FILTER ELEMENT AND WATER PUMP REMOVING THE OIL FILTER ELEMENT AND WATER PUMP



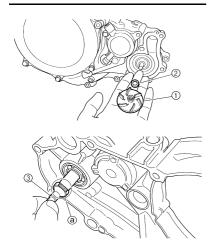


REMOVING THE IMPELLER SHAFT

- 1. Remove:
 - Impeller "1"
 - Washer "2"
 - · Impeller shaft "3"

NOTE:

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

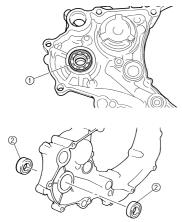


REMOVING THE OIL SEAL

NOTE:

It is not necessary to disassemble the water pump, unless there is an abnormality such as excessive change in coolant level, discoloration of coolant, or milky transmission oil.

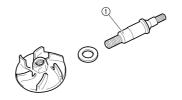
- 1. Remove:
 - Bearing "1"
 - · Oil seal "2"



CHECKING THE IMPELLER SHAFT

- 1. Inspect:
 - Impeller shaft "1"
 Bend/wear/damage → Replace.

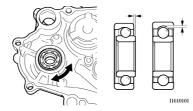
 Fur deposits → Clean.



CHECKING THE BEARING

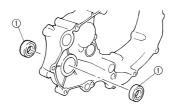
- 1. Inspect:
 - Bearing

Rotate inner race with a finger. Rough spot/seizure → Replace.



CHECKING THE OIL SEAL

- 1. Inspect:
- Oil seal "1"
 Wear/damage → Replace.

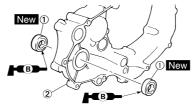


INSTALLING THE OIL SEAL

- 1. Install:
 - Oil seal "1" New

NOTE:

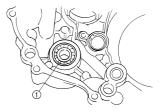
- Apply the lithium soap base grease on the oil seal lip.
- Install the oil seal with its manufacture's marks or numbers facing the right crankcase cover "2".



- 2. Install:
- Bearing "1"

NOTE:

Install the bearing by pressing its outer race parallel.



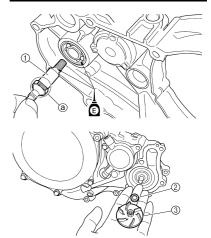
INSTALLING THE IMPELLER SHAFT

- 1. Install:
 - Impeller shaft "1"
 - Washer "2"
 - Impeller "3"



NOTE: .

- 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 engine oil on the oil seal lip, bearing 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.

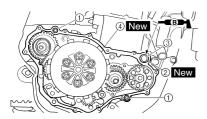


INSTALLING THE RIGHT CRANKCASE COVER

- 1. Install:
- Dowel pin "1"
- O-ring "2" New
- Collar "3"
- Gasket "4" New

NOTE

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



- 2. Install:
 - · Right crankcase cover "1"
 - Bolt "2"



Bolt:

12 Nm (1.2 m•kg, 8.7 ft•lb)

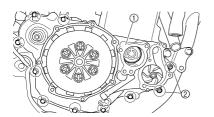
Bolt

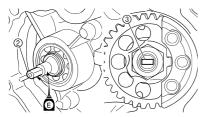


Bolt: 10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

- Apply the engine oil on the impeller shaft end.
- When installing the crankcase cover onto the crankcase, be sure that
 the impeller shaft end "2" aligns
 with the balancer end slot "3".
- Tighten the bolts in stage, using a crisscross pattern.





INSTALLING THE KICKSTARTER CRANK

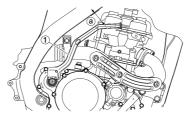
- 1. Install:
 - · Kickstarter crank "1"
 - Washer
 - Bolt (kickstarter crank)



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

NOTE:

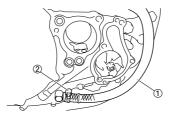
Install so that there is a clearance "a" of 8 mm (0.31 in) or more between the kickstarter and frame and that the kickstarter does not contact the crankcase cover when it is pulled.



- 2. Install:
 - Oil tank breather hose "1"
 - · Clamp "2"



Clamp: 2 Nm (0.2 m•kg, 1.4 ft•lb)

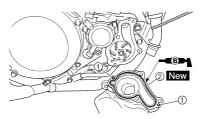


INSTALLING THE WATER PUMP HOUSING

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

NOTE:

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



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



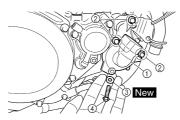
Bolt (water pump housing):

10 Nm (1.0 m•kg, 7.2 ft•lb)

- Washer "3" New
- · Coolant drain bolt "4"



Coolant drain bolt: 10 Nm (1.0 m•kg, 7.2 ft•lb)



3. Install:

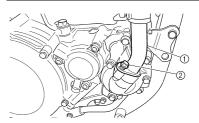
- O-ring "3" New
- · Coolant pipe "1"
- Bolt (coolant pipe) "2"



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

NOTE: .

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



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)

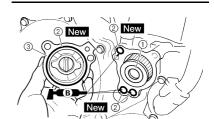


Bolt (oil filter element cover):

10 Nm (1.0 m•kg, 7.2 ft•lb)

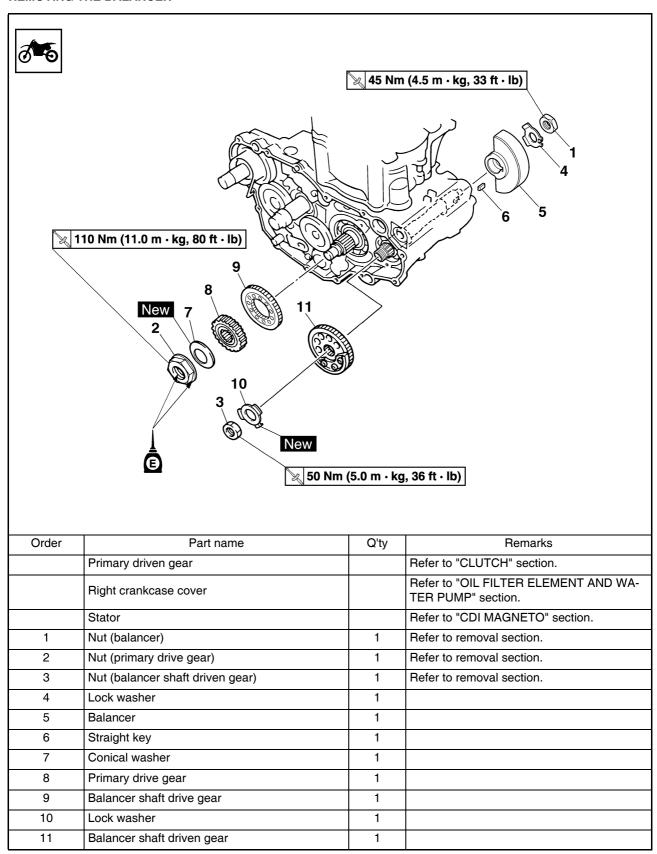
NOTE:

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



BALANCER

REMOVING THE BALANCER

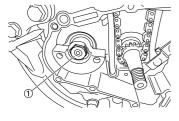


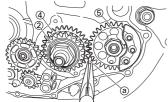
REMOVING THE BALANCER

- 1. Straighten the lock washer tab.
- 2. Loosen:
 - · Nut (balancer) "1"
 - Nut (primary drive gear) "2"
 - Nut (balancer shaft driven gear)

NOTE:

Place an aluminum plate "a" between the teeth of the balancer shaft drive gear "4" and driven gear "5".







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.



CHECKING THE BALANCER

- 1. Inspect:
 - Balancer
 Cracks/damage → Replace.

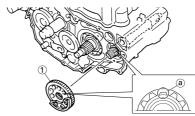


INSTALLING THE BALANCER

- 1. Install:
 - · Balancer shaft driven gear "1"

NOTE:

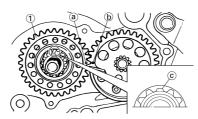
Install the balancer shaft driven gear and balancer shaft with their lower splines "a" aligning with each other.



- 2. Install:
 - · Balancer shaft driven gear "1"

NOTE

- Align the punched mark "a" on the balancer shaft drive gear with the punched mark "b" on the balancer shaft driven gear.
- Install the balancer shaft driven gear and crankshaft with the lower splines "c" aligning with each other.



- 3. Install:
 - · Lock washer "1"
 - Nut (balancer shaft driven gear)
 "2"



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

- Primary drive gear "3"
- · Conical washer "4"
- Nut (primary drive gear) "5"



Nut (primary drive gear): 110 Nm (11.0 m•kg, 80 ft•lb)

- · Straight key "6"
- Balancer "7"
- Lock washer "8"

· Nut (balancer) "9"

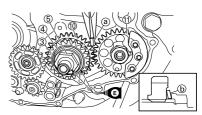


Nut (balancer): 45 Nm (4.5 m•kg, 33 ft•lb)

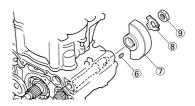
NOTE:

- Apply engine oil to the contact surface and threaded portion of the nut (primary drive gear).
- Place an aluminum plate "a" between the teeth of the balancer shaft drive gear "10" and balancer shaft driven gear "11".
- Install the conical washer with its convex surface "b" outward.



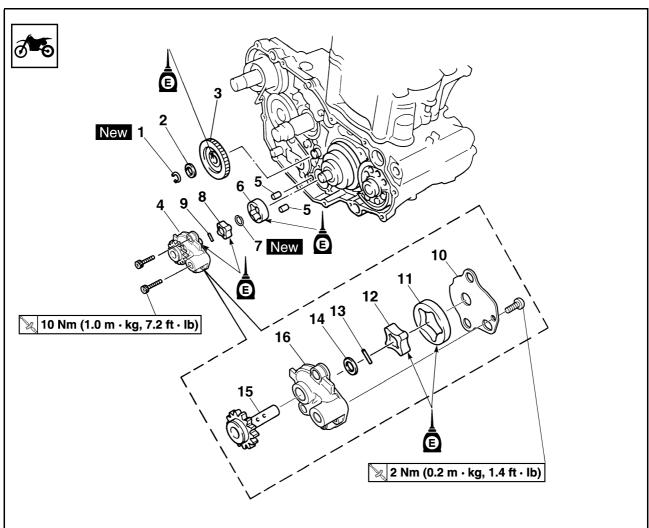


4. Bend the lock washer tab.



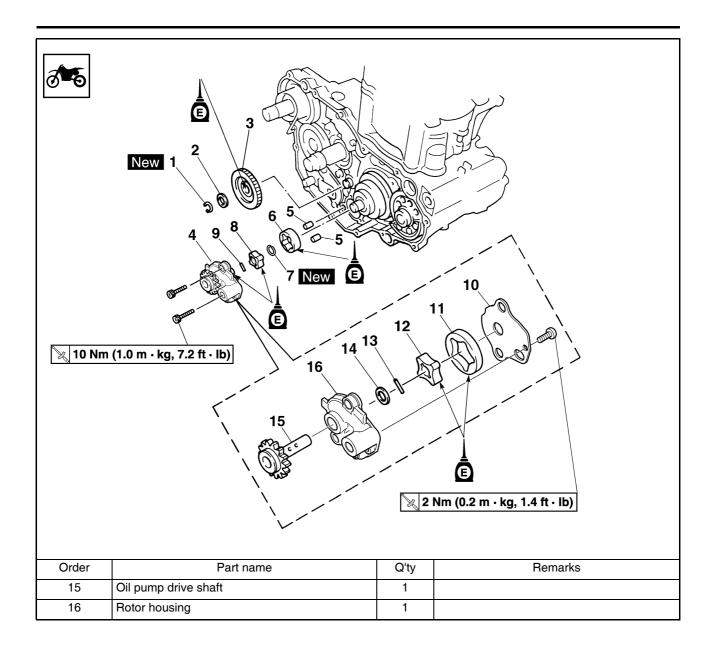
OIL PUMP

REMOVING THE OIL PUMP



| Order | Part name | Q'ty | Remarks |
|-------|-----------------------|------|---|
| | Primary driven gear | | Refer to "CLUTCH" section. |
| | Right crankcase cover | | Refer to "OIL FILTER ELEMENT AND WATER PUMP" section. |
| 1 | Circlip | 1 | |
| 2 | Washer | 1 | |
| 3 | Oil pump drive gear | 1 | |
| 4 | Oil pump assembly | 1 | |
| 5 | Dowel pin | 2 | |
| 6 | Outer rotor 2 | 1 | |
| 7 | Circlip | 1 | |
| 8 | Inner rotor 2 | 1 | |
| 9 | Dowel pin | 1 | |
| 10 | Oil pump cover | 1 | |
| 11 | Outer rotor 1 | 1 | |
| 12 | Inner rotor 1 | 1 | |
| 13 | Dowel pin | 1 | |
| 14 | Washer | 1 | |

OIL PUMP



CHECKING THE OIL PUMP

- 1. Inspect:
 - · Oil pump drive gear
 - · Oil pump drive shaft
 - · Rotor housing
 - Oil pump cover 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.



Tip clearance "a":

0.12 mm or less (0.0047 in or less)

<Limit>: 0.20 mm

(0.008 in)

Side clearance "b":

0.09-0.17 mm (0.0035-

0.0067 in)

<Limit>: 0.24 mm

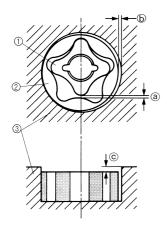
(0.009 in)

Housing and rotor clear-

ance "c":

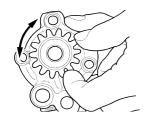
0.03-0.10 mm (0.0012-0.0039 in)

<Limit>: 0.17 mm (0.0067 in)



3. Check:

 Unsmooth→Repeat steps #1 and #2 or replace the defective parts.

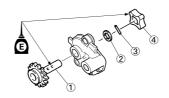


INSTALLING THE OIL PUMP

- 1. Install:
 - Oil pump drive shaft "1"
 - Washer "2"
 - Dowel pin "3"
- Inner rotor 1 "4"

NOTE:

- 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"

NOTE:

Apply the engine oil on the outer rotor

1.



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

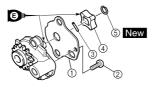


Screw (oil pump cover): 2 Nm (0.2 m•kg, 1.4 ft•lb)

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

NOTE:

- Apply the engine oil on the oil pump drive shaft end and inner rotor 2.
- 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) "4"

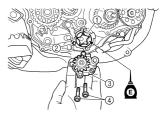


Bolt (oil pump assembly):

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

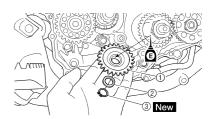
Apply the engine oil on the outer rotor



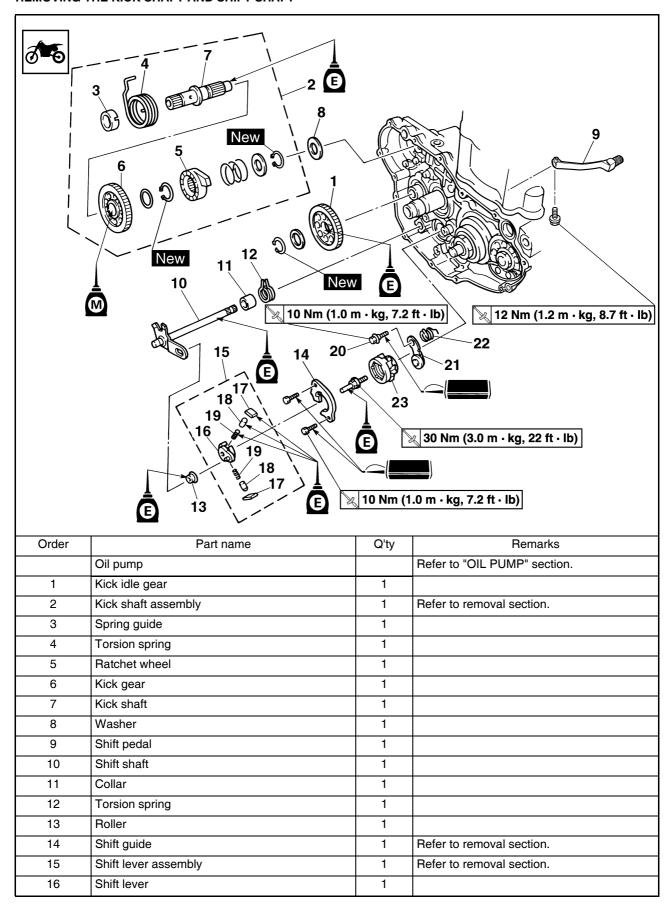
- 5. Install:
 - Oil pump drive gear "1"
 - Washer "2"
 - Circlip"3" New

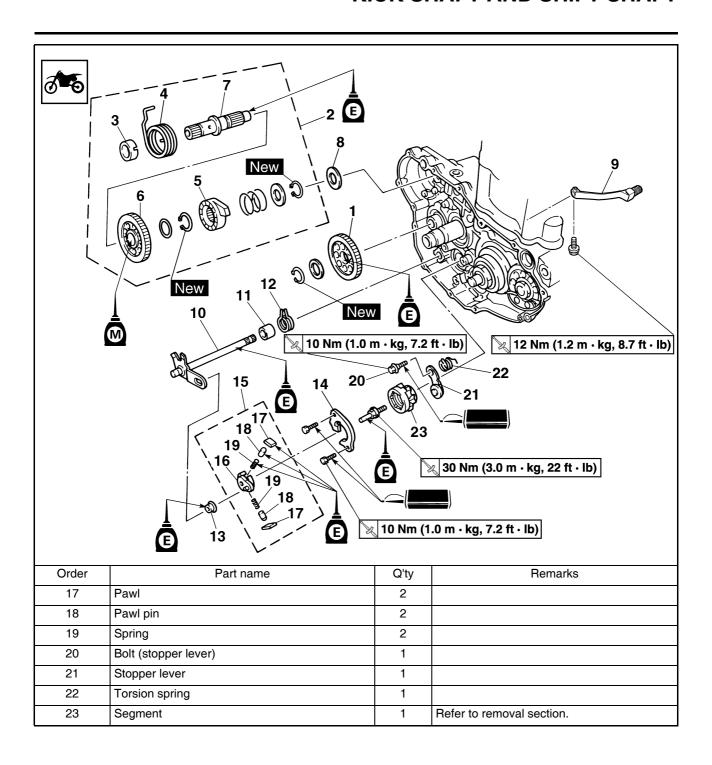
NOTE:

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



KICK SHAFT AND SHIFT SHAFT REMOVING THE KICK SHAFT AND SHIFT SHAFT





REMOVING THE KICK SHAFT ASSEMBLY

- 1. Remove:
 - · Kick shaft assembly "1"

NOTE:

Unhook the torsion spring "2" from the hole "a" in the crankcase.

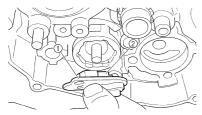


REMOVING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

- 1. Remove:
 - · Bolt (shift guide)
 - Shift guide "1"
 - · Shift lever assembly "2"

NOTE:

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



REMOVING THE SEGMENT

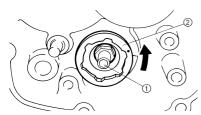
- 1. Remove:
- Bolt (segment) "1"
- · Segment "2"

NOTE

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

CAUTION:

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

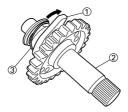


CHECKING THE KICK SHAFT AND RATCHET WHEEL

- 1. Check:
- Ratchet wheel "1" smooth movement

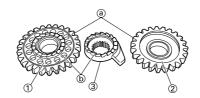
Unsmooth movement → Replace.

- Kick shaft "2"
 Wear/damage → Replace.
- Spring "3"
 Broken → Replace.



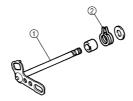
CHECKING THE KICK GEAR, KICK IDLE GEAR AND RATCHET WHEEL

- 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

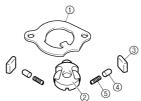
- 1. Inspect:
 - Shift shaft "1"
 Bend/damage → Replace.
- Spring "2"
 Broken → Replace.



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)



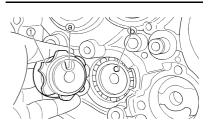
Bolt (segment): 30 Nm (3.0 m•kg, 22 ft•lb)

NOTE:

Align the notch "a" on the segment with the pin "b" on the shift cam.

CAUTION:

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



INSTALLING THE STOPPER LEVER

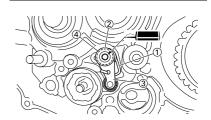
- 1. Install:
 - Torsion spring "1"
- Washer "2"
- Stopper lever "3"
- Bolt (stopper lever) "4"



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

NOTE:

Align the stopper lever roller with the slot on segment.

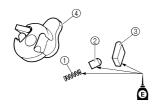


INSTALLING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

- 1. Install:
 - Spring "1"
 - Pawl pin "2"
 - Pawl "3" To shift lever "4".

NOTE:

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



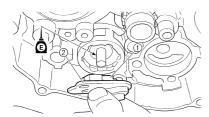
- 2. Install:
 - Shift lever assembly "1" To shift guide "2".



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

NOTE:

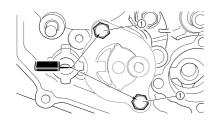
- The shift lever assembly is installed at the same time as the shift guide.
- Apply the engine oil on the bolt (segment) shaft.



- 4. Install:
- Bolt (shift guide) "1"



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



INSTALLING THE SHIFT SHAFT

- 1. Install:
- Roller "1"
- Collar "2"
- Torsion spring "3"
- Washer "4"
- Shift shaft "5"

NOTE:

Apply the engine oil on the roller and shift shaft.



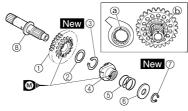
- 2. Install:
 - Shift pedal
 Refer to "AC MAGNETO AND STARTER CLUTCH" section.

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".

NOTE:

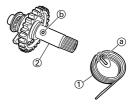
- Apply the molybdenum disulfide oil on the inner circumferences of the kick gear and ratchet wheel.
- Align the punch mark "a" on the ratchet wheel with the punch mark "b" on the kick shaft.



- 2. Install:
- Torsion spring "1"
 To kick shaft "2".

NOTE:

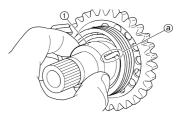
Make sure the stopper "a" of the torsion spring fits into the hole "b" on the kick shaft.



- 3. Install:
 - Spring guide "1"

NOTE:

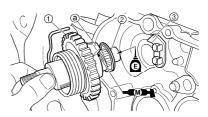
Slide the spring guide into the kick shaft, make sure the groove "a" in the spring guide fits on the stopper of the torsion spring.



- 4. Install:
 - Kick shaft assembly "1"
 - · Washer "2"

NOTE:

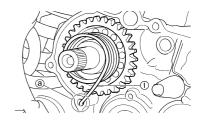
- Apply the molybdenum disulfide grease on the contacting surfaces of the kick shaft stopper "a" and kick shaft ratchet wheel guide "3".
- Apply the engine oil on the kick shaft.
- Slide the kick shaft assembly into the crankcase and make sure the kick shaft stopper "a" fits into the kick shaft ratchet wheel guide.



- 5. Hook:
 - Torsion spring "1"

NOTE:

Turn the torsion spring clockwise and hook into the proper hole "a" in the crankcase.

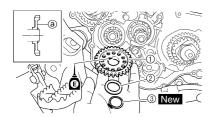


INSTALLING THE KICK IDLE GEAR

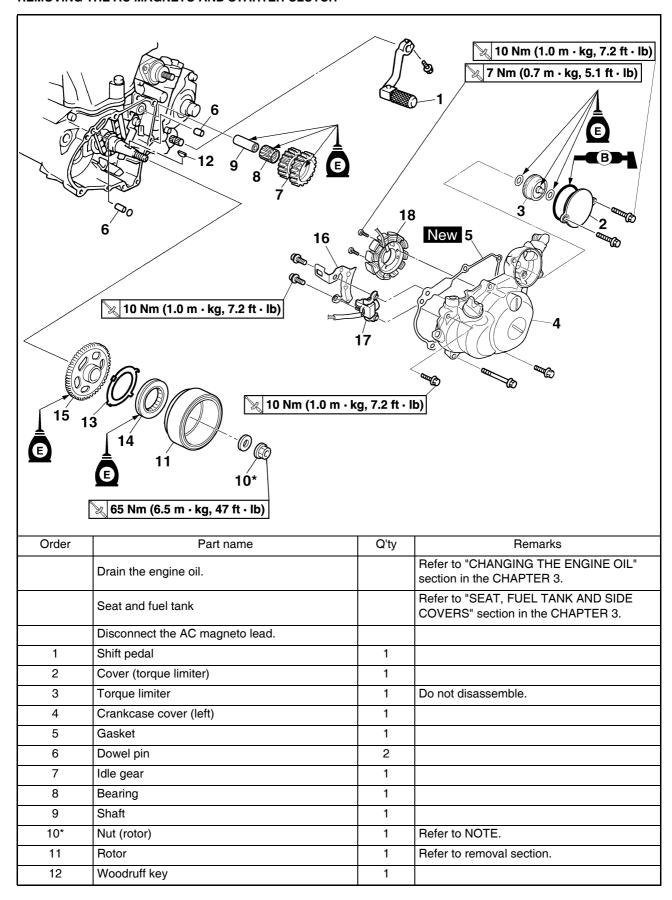
- 1. Install:
 - Kick idle gear "1"

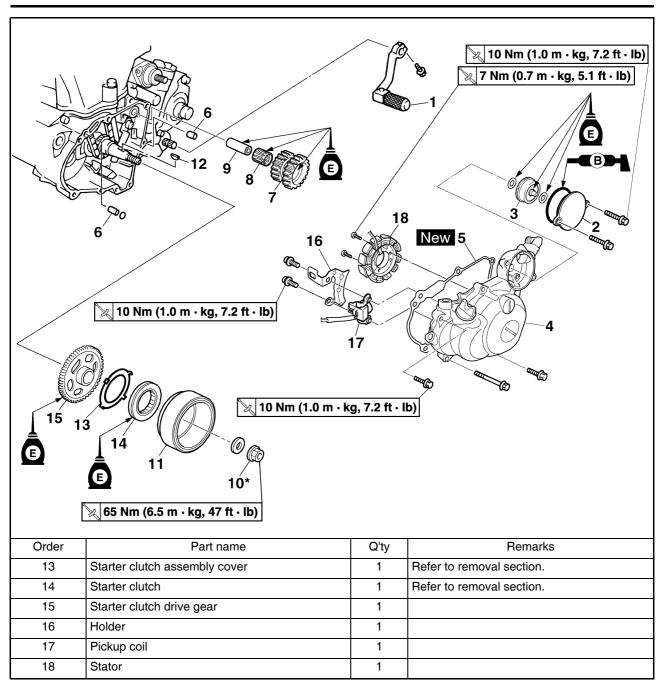
 - Washer "2"Circlip "3" New

- Apply the engine oil on the kick idle gear inner circumference.
- · Install the kick idle gear with its depressed side "a" toward you.



AC MAGNETO AND STARTER CLUTCH REMOVING THE AC MAGNETO AND STARTER CLUTCH





NOTE

Tighten the rotor nut to 65 Nm (6.5 mekg, 47 ftelb), loosen and retighten the rotor nut to 65 Nm (6.5 mekg, 47 ftelb).

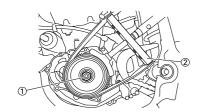
REMOVING THE ROTOR

- 1. Remove:
 - Nut (rotor) "1"
 - Washer

Use the sheave holder "2".



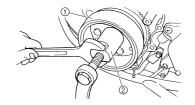
Sheave holder: YS-1880-A/90890-01701



- 2. Remove:
- Rotor "1"
 Use the rotor puller "2".



Rotor puller: YM-04142/90890-04142

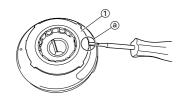


REMOVING THE STARTER CLUTCH

- 1. Remove:
 - Starter clutch assembly cover "1"

NOTE:

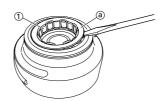
Insert a thin screwdriver or the like under the convexity "a" and remove the starter clutch assembly cover by prying it gently to void damage to the cover.



- 2. Remove:
 - Starter clutch "1"

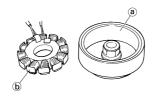
NOTE:

Using a thin screwdriver or the like, remove the plate "a" while prying it upward little by little.



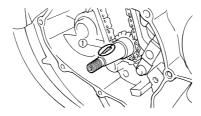
CHECKING THE AC MAGNETO

- 1. Inspect:
- · Rotor inner surface "a"
- Stator outer surface "b"
 Damage→Inspect the crankshaft runout and crankshaft bearing.
 If necessary, replace AC magneto and/or stator.



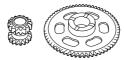
CHECKING THE WOODRUFF KEY

- 1. Inspect:
- Woodruff key "1"
 Damage → Replace.



CHECKING THE STARTER CLUTCH

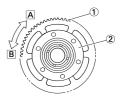
- 1. Check:
 - Starter clutch
 Damage/wear → Replace.
- 2. Check:
 - Idle gear
 - · Idle gear shaft



- 3. Check:
 - · Starter clutch operation

 a. Install the starter clutch drive gear "1" onto the starter clutch "2" and hold the starter clutch.

- b. When turning the starter clutch drive gear counterclockwise "B", the starter clutch and the starter clutch drive gear should engage. If the starter clutch drive gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.
- c. When turning the starter clutch drive gear clockwise "A", it should turn freely. If the starter clutch drive gear does not turn freely, the starter clutch is faulty and must be replaced.



CHECKING THE TORQUE LIMITER

- 1. Check:
 - Torque limiter
 Damage/wear → Replace.



INSTALLING THE AC MAGNETO AND STARTER CLUTCH

- 1. Install:
 - Stator "1"
 - · Bolt (stator) "2"



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

- Pickup coil "3"
- Holder "4"
- Bolt (pickup coil) "5"



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

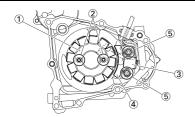
NOTE:

- Pass the AC magneto lead "5" under the pickup coil.
- Pass the AC magneto lead "4" under the holder as shown.
- Take care not to catch the AC magneto lead between crankcase cover ribs
- Tighten the bolt (stator) using the T25 bit.

 Apply the sealant to the grommet of the AC magneto lead.



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- 2. Install:
 - · Starter clutch drive gear "1"

NOTE:

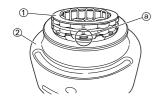
Apply the engine oil on the starter clutch drive gear inner circumference.



- 3. Install:
 - Starter clutch "1" To rotor "2".

NOTE:

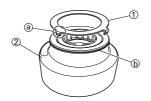
- Install the starter clutch with its plate side upward.
- While installing the starter clutch, push in the projections "a" one by one on the clutch circumference.
- Push in the starter clutch until it hits the rotor.



- 4. Install:
 - Starter clutch assembly cover "1" To rotor "2".

NOTE:

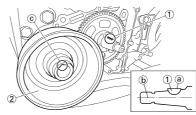
Install the starter clutch assembly cover by fitting its pawls "a" into the groove "b" in the rotor.



- 5. Install:
- Woodruff key "1"
- Rotor "2"

NOTE:

- Degrease the contact surfaces of 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.



- 6. Install:
 - · Washer (rotor)
 - Nut (rotor) "1"



Nut (rotor): 65 Nm (6.5 m•kg, 47 ft•lb)

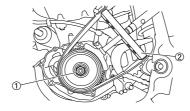
Use the sheave holder "2"

NOTE:

Tighten the rotor nut to 65 Nm (6.5 mekg, 47 ftelb), loosen and retighten the rotor nut to 65 Nm (6.5 mekg, 47 ftelb).



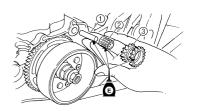
Sheave holder: YS-1880-A/90890-01701



- 7. Install:
 - Shaft "1"
 - Bearing "2"
 - Idle gear 2 "3"

NOTE:

Apply the engine oil on the shaft, bearing and idle gear inner circumference



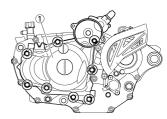
- 8. Install:
 - · Dowel pin
 - Gasket [crankcase cover (left)]
 New
 - Crankcase cover (left) "1"
 - Bolt [crankcase cover (left)]



Bolt [crankcase cover (left)]: 10 Nm (1.0 m•kg, 7.2

NOTE:

Tighten the bolts in stage, using a crisscross pattern.



- 9. Install:
 - Washer "1"
 - Torque limiter "2"
 - Washer

NOTE:

Apply the engine oil to the shaft and washers.



- 10. Install:
 - Cover (idle gear 1) "1"
- Bolt "2"

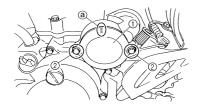


Bolt:

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

Install the cover (idle gear 1) with its mark "a" facing upward.



11. Connect:

AC magneto lead
 Refer to "CABLE ROUTING DIA-GRAM" section in the CHAPTER

 2.

12. Install:

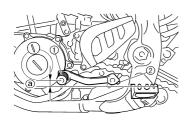
- Shift pedal "1"
- Bolt (shift pedal)



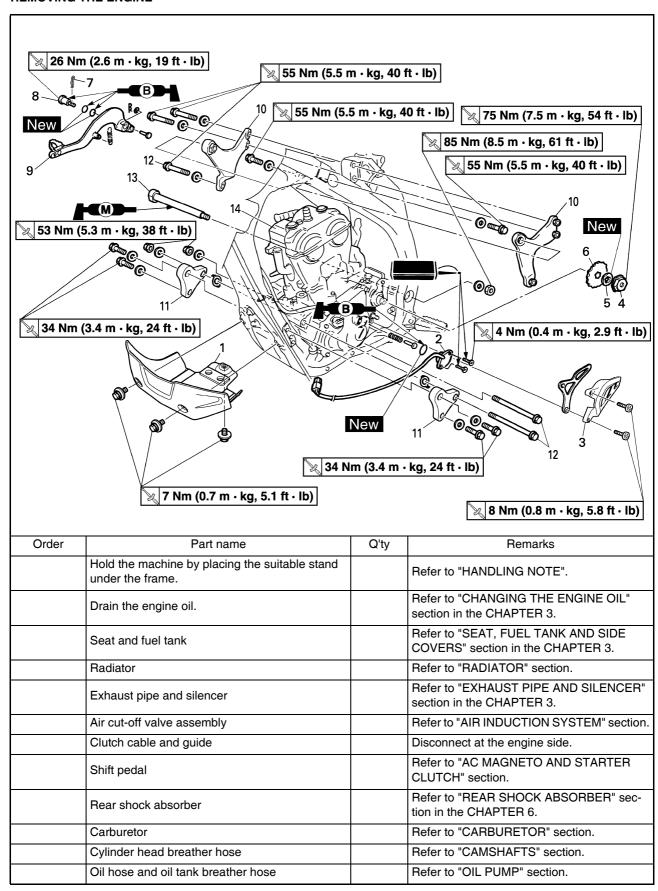
Bolt (shift pedal): 12 Nm (1.2 m•kg, 8.7 ft•lb)

NOTE:

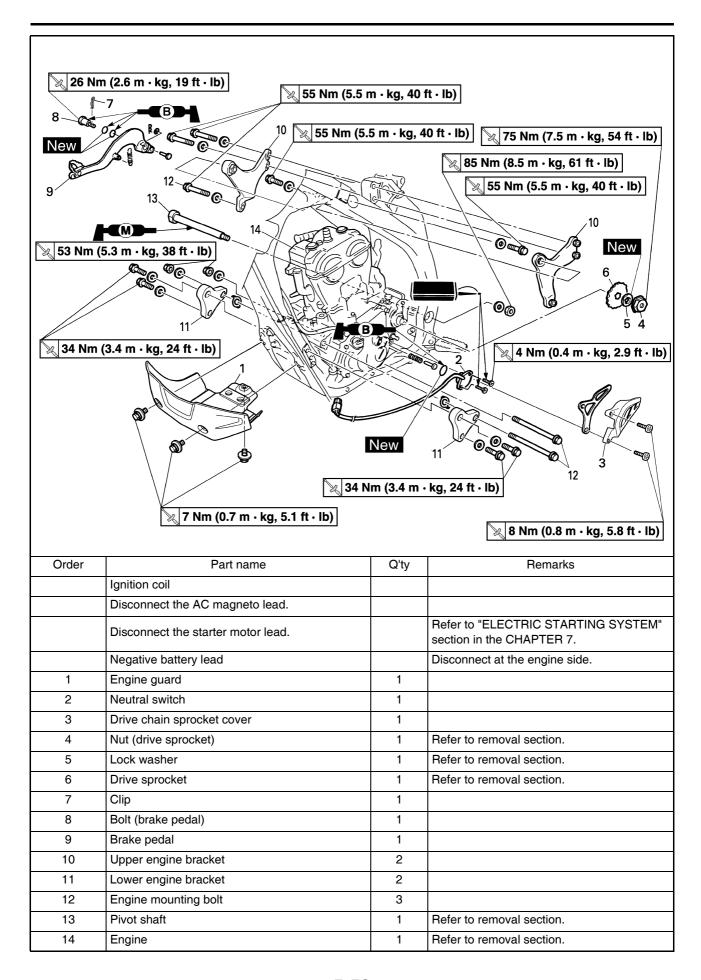
When installing the shift pedal onto the shift shaft, be sure that the center of the shift pedal is about 5.1 mm (0.2 in) "a" above the top of the footrest.



ENGINE REMOVAL REMOVING THE ENGINE



ENGINE REMOVAL



HANDLING NOTE

WARNING

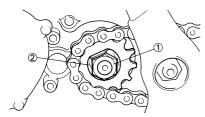
Support the machine securely so there is no danger of it falling over.

REMOVING THE DRIVE SPROCKET

- 1. Remove:
- Nut (drive sprocket) "1"
- · Lock washer "2"

NOTE:

- Straighten the lock washer tab.
- Loosen the nut while applying the rear brake.



- 2. Remove:
 - Drive sprocket "1"
 - · Drive chain "2"

NOTE:

Remove the drive sprocket together with the drive chain.

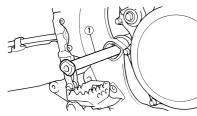


REMOVING THE ENGINE

- 1. Remove:
 - Pivot shaft "1"

NOTE:

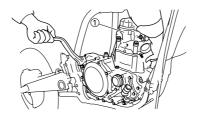
If the pivot shaft is pulled all the way out, the swingarm will come loose. If possible, insert a shaft of similar diameter into the other side of the swingarm to support it.



- 2. Remove:
 - Engine "1"
 From right side.

NOTE:

Make sure that the couplers, hoses and cables are disconnected.



INSTALLING THE ENGINE

- 1. Install:
- Engine "1" Install the engine from right side.
- · Pivot shaft "2"



Pivot shaft: 85 Nm (8.5 m•kg, 61 ft•lb)

• Engine mounting bolt (lower) "3"



Engine mounting bolt (lower):

53Nm (5.3 m•kg, 38 ft•lb)

- · Lower engine bracket "4"
- Bolt (lower engine bracket) "5"



Bolt (lower engine bracket):

34 Nm (3.4 m•kg, 24 ft•lb)

- Patch "6"
- · Engine mounting bolt (front) "7"



Engine mounting bolt (front):

53 Nm (5.3 m•kg, 38 ft•lb)

- Upper engine bracket "8"
- Bolt (upper engine bracket) "9"



Bolt (upper engine bracket):

55 Nm (5.5 m•kg, 40 ft•lb)

• Engine mounting bolt (upper) "10"

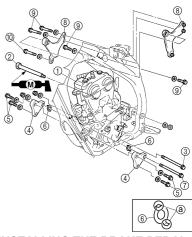


Engine mounting bolt (upper):

55 Nm (5.5 m•kg, 40 ft•lb)

NOTE:

- Apply the molybdenum disulfide grease on the pivot shaft.
- Install the patch with the claw "a" facing outside the chassis.



INSTALLING THE BRAKE PEDAL

- 1. Install:
 - Spring "1"
 - Brake pedal "2"
 - O-ring "3" New
 - · Bolt (brake pedal) "4"

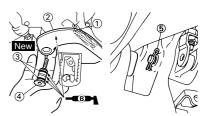


Bolt (brake pedal): 26 Nm (2.6 m•kg, 19 ft•lb)

• Clip "5"

NOTE:

Apply the lithium soap base grease on the bolt, O-rings and brake pedal bracket.

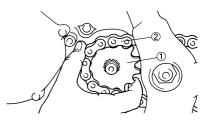


INSTALLING THE DRIVE SPROCKET

- 1. Install:
 - Drive sprocket "1"
- Drive chain "2"

NOTE:

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)

NOTE: _

Tighten the nut while applying the rear brake.

CAUTION:

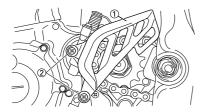
Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.



- Bend the lock washer tab to lock the nut.
- 4. Install:
 - · Drive chain sprocket guide
 - Drive chain sprocket cover "1"
 - Screw (drive chain sprocket cover) "2"



Screw (drive chain sprocket cover): 8 Nm (0.8 m•kg, 5.8 ft•lb)



INSTALLING THE NEUTRAL SWITCH

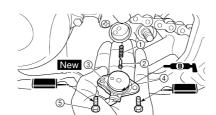
- 1. Install:
 - Spring "1"
 - Pin "2"
 - O-ring "3" New
 - Neutral switch "4"
 - Screw (neutral switch) "5"



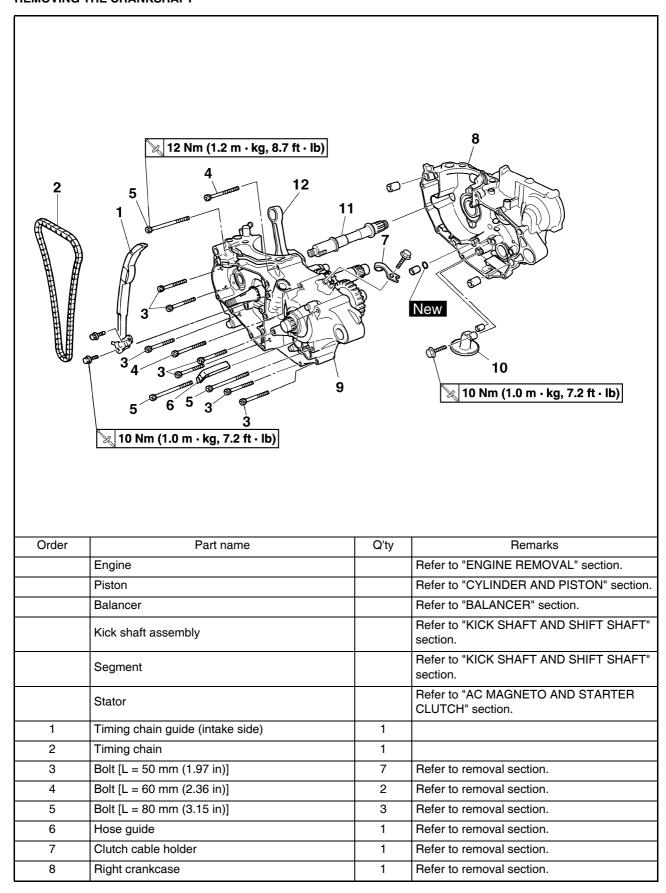
Screw (neutral switch): 4 Nm (0.4 m•kg, 2.9 ft•lb)

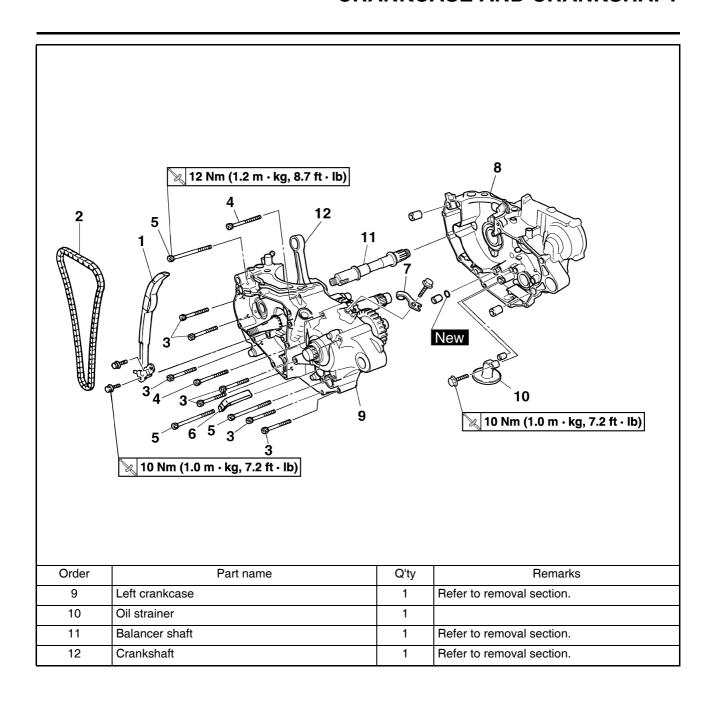
NOTE:

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

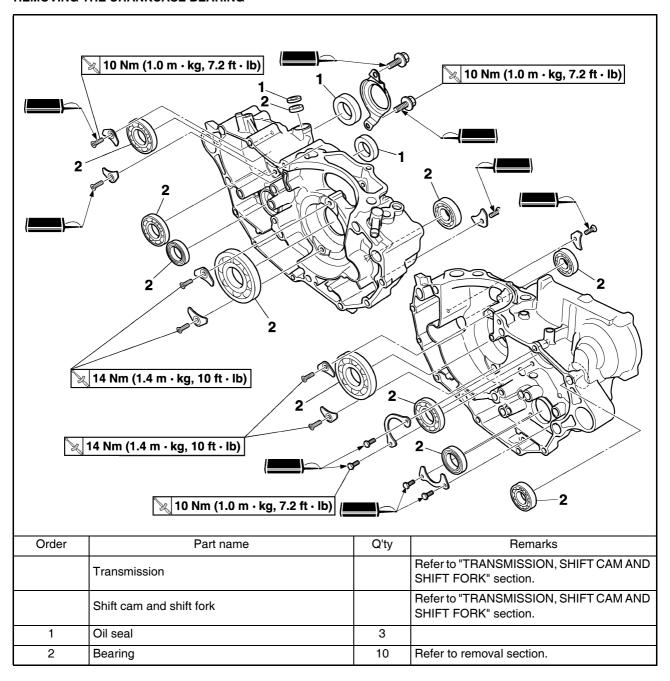


CRANKCASE AND CRANKSHAFT REMOVING THE CRANKSHAFT





REMOVING THE CRANKCASE BEARING



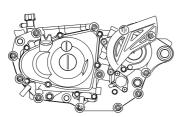
DISASSEMBLING THE CRANKCASE

- 1. Separate:
 - · Right crankcase

· Left crankcase

Separation steps:

 a. Remove the crankcase bolts, hose guide and clutch cable holder.



NOTE:

Loosen each bolt 1/4 of a turn at a time and after all the bolts are loosened, remove them.

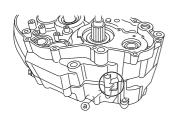
b. Remove the right crankcase.

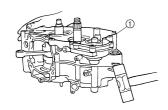
NOTE:

- Place the crankcase with its left side downward and split it by inserting a screwdriver tip into the splitting slit "a" in the crankcase.
- Lift the right crankcase horizontally while lightly patting the case splitting slit and engine mounting boss using a soft hammer, and leave the crankshaft and transmission with the left crankcase.

CAUTION:

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.





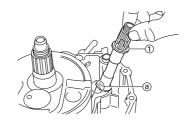
 Remove the dowel pins and Oring.

REMOVING THE BALANCER SHAFT

- 1. Remove:
 - Balancer shaft "1"

NOTE:

Remove the balancer shaft with its flat side "a" facing the crankshaft.



REMOVING THE CRANKSHAFT

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



Crankcase separating tool:

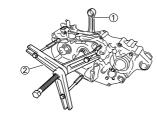
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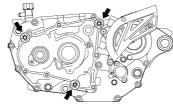
NOTE:

Install the crankcase separating tool as shown.

CAUTION:

Do not use a hammer to drive out the crankshaft.



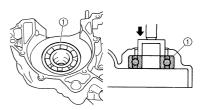


REMOVING THE CRANKCASE BEARING

- 1. Remove:
- Bearing "1"

NOTE:

- 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.

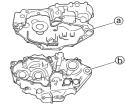


- 2. Inspect:
 - Timing chain guide Wear/damage → Replace.

CHECKING THE CRANKCASE

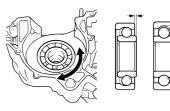
- 1. Inspect:
 - Contacting surface "a" Scratches → Replace.
 - Engine mounting boss "b", crankcase

Cracks/damage → Replace.



- 2. Inspect:
 - Bearing

Rotate inner race with a finger. Rough spot/seizure → Replace.



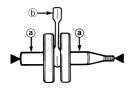
- 3. Inspect:
 - Oil seal
 Damage → Replace.

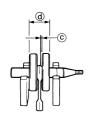
CHECKING THE CRANKSHAFT

- 1. Measure:
- Runout limit "a"
- Small end free play limit "b"
- Connecting rod big end side clearance "c"

· Crank width "d" Out of specification \rightarrow Replace. Use the dial gauge and a thickness gauge.

| | Dial gauge and stand: YU-3097/90890-01252 | |
|-------------------------------|--|-----------------------|
| | Standard | <limit></limit> |
| Runout limit: | 0.03 mm (0.0012 in) | 0.05 mm (0.002 in) |
| Small end free play: | 0.4–1.0 mm (0.016–0.039 in) | 2.0 mm (0.08 in) |
| Side clear- ance: | 0.15–0.45 mm (0.0059– 0.0177 in) | 0.50 mm (0.02 in) |
| Crack width: | 61.95–62.00 mm (2.439– 2.441 in) | _ |





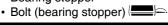
CHECKING THE OIL STRAINER

- 1. Inspect:
 - Oil strainer Damage → Replace.



INSTALLING THE CRANKCASE BEARING

- 1. Install:
 - Bearing New
 - · Bearing stopper





Bolt (bearing stopper): 10 Nm (1.0 m•kg, 7.2

Screw (bearing stopper)





Screw (bearing stopper): 10 Nm (1.0 m•kg, 7.2

· Screw [bearing stopper (crankshaft)] "1"

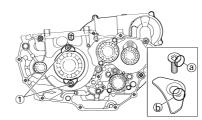


Screw [bearing stopper (crankshaft)]: 14 Nm (1.4 m•kg, 1.0 ft•lb)

To left and right crankcase.

NOTE:

- · 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.



INSTALLING THE CRANKSHAFT

- 1. Install:
 - Crankshaft "1" Use the crankshaft installing tool "2", "3", "4" and "5".



Crankshaft installing pot

YU-90050/90890-01274 Crankshaft installing bolt

YU-90050/90890-01275 Adapter (M12) "4": YU-90063/90890-01278 Spacer (crankshaft installer) "5":

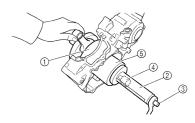
YM-91044/90890-04081

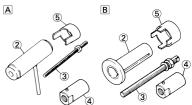
NOTE:

- · Hold the connecting rod at top dead center with one hand while turning the nut of the installing tool with the other. Operate the installing tool until the crankshaft bottoms against the bearing.
- Before installing the crankshaft, clean the contacting surface of crankcase.

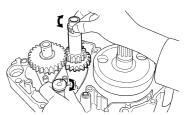
CAUTION:

Do not use a hammer to drive in the crankshaft.





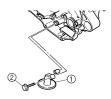
- A. For USA and CDN
- B. Except for USA and CDN
- 2. Check:
 - · Shifter operation
 - · Transmission operation Unsmooth operation \rightarrow Repair.



- 3. Install:
 - Oil strainer "1"
- · Bolt (oil strainer) "2"



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



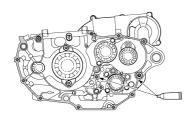
- 4. Apply:
 - Sealant On the right crankcase.



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NOTE:

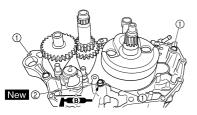
Clean the contacting surface of left and right crankcase before applying the sealant.



- 5. Install:
 - Dowel pin "1"
 - O-ring "2" New
 - Right crankcase
 To left crankcase.

NOTE:

- Apply the lithium soap base grease on the O-ring.
- 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 (clutch cable holder)



Bolt (clutch cable holder): 10 Nm (1.0 m•kg, 7.2 ft•lb)

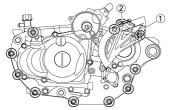
• Bolt (crankcase)



Bolt (crankcase): 12 Nm (1.2 m•kg, 8.7 ft•lb)

NOTE

Tighten the crankcase tightening bolts in stage, using a crisscross pattern.



7. Install:

- · Timing chain
- Timing chain guide (intake side)

· Bolt (timing chain guide)



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

8. Remove:

Sealant

Forced out on the cylinder mating surface.

9. Apply:

Engine oil
 To the crank pin, bearing and oil delivery hole.

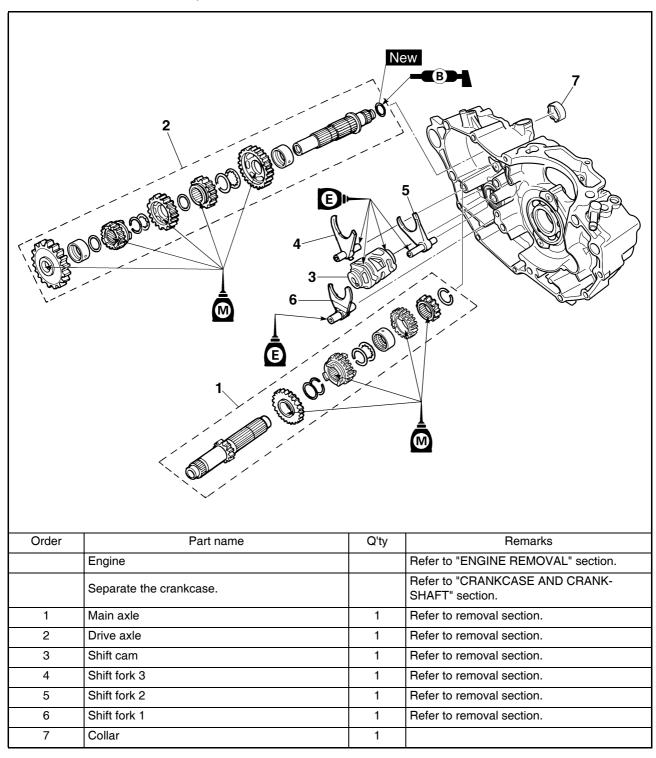
10. Check:

Crankshaft and transmission operation.

Unsmooth operation \rightarrow Repair.

TRANSMISSION, SHIFT CAM AND SHIFT FORK

TRANSMISSION, SHIFT CAM AND SHIFT FORK REMOVING THE TRANSMISSION, SHIFT CAM AND SHIFT FORK



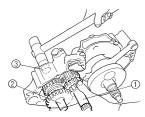
TRANSMISSION, SHIFT CAM AND SHIFT FORK

REMOVING THE TRANSMISSION

- 1. Remove:
 - Main axle "1"
 - Drive axle "2"
 - · Shift cam
 - · Shift fork 3
 - Shift fork 2
 - · Shift fork 1

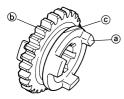
NOTE:

- Remove assembly with the collar "3" installed to the crankcase.
- Remove assembly carefully. Note the position of each part. Pay particular attention to the location and direction of shift forks.
- Remove the main axle, drive axle, shift cam and shift fork all together by tapping lightly on the transmission drive axle with a soft hammer.

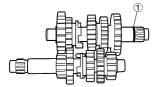


CHECKING THE GEARS

- 1. Inspect:
 - · Matching dog "a"
 - · Gear teeth "b'
 - Shift fork groove "c"
 Wear/damage → Replace.



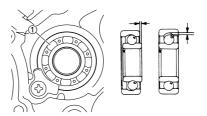
- 2. Inspect:
 - O-ring "1"
 Damage → Replace.



- 3. Check:
 - Gears movement
 Unsmooth movement
 →Repair or replace.

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

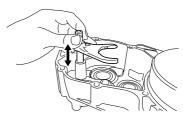
- 1. Inspect:
 - Shift fork "1"
 Wear/damage/scratches → Replace.



- 2. Inspect:
- Shift cam "1"
- Segment "2"
 Wear/damage → Replace.



- 3. Check:
- Shift fork movement Unsmooth operation → Replace shift fork.



NOTE:

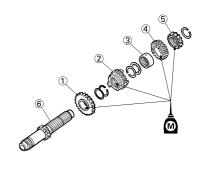
For a malfunctioning shift fork, replace not only the shift fork itself but the two gears each adjacent to the shift fork.

INSTALLING THE TRANSMISSION

- 1. Install:
- 5th pinion gear (25T) "1"
- 3rd pinion gear (16T) "2"
- Collar "3"
- 4th pinion gear (20T) "4"
- 2nd pinion gear (15T) "5" To main axle "6".



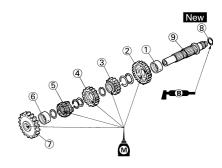
Apply the molybdenum disulfide oil on the inner and end surface of the idler gear and on the inner surface of the sliding gear, then install.



- 2. Install:
 - Collar "1"
 - 2nd wheel gear (26T) "2"
 - 4th wheel gear (21T) "3"
 - 3rd wheel gear (21T) "4"
 - 5th wheel gear (21T) "5"
 - Collar "6"
 - 1st wheel gear (29T) "7"
- O-ring "8" New To drive axle "9".

NOTE:

- 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.

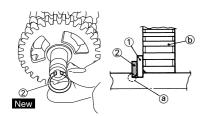


- 3. Install:
 - Washer "1"
 - Circlip "2" New

TRANSMISSION, SHIFT CAM AND SHIFT FORK

NOTE:

- 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.



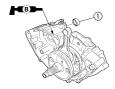


4. Install:

· Collar "1"

NOTE:

- 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.



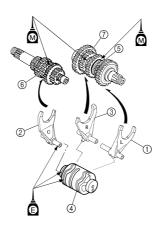
5. Install:

- Shift fork 1 (L) "1"
- Shift fork 2 (C) "2"
- Shift fork 3 (R) "3"
- Shift cam "4"

To main axle and drive axle.

NOTE

- Apply the molybdenum disulfide oil on the shift fork grooves.
- Apply engine oil to the shift cam groove, bearing contact surface and shift fork shaft.
- 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.

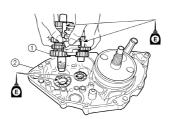


6. Install:

• Transmission assembly "1" To left crankcase "2".

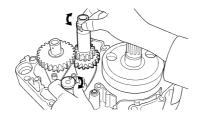
NOTE:

Apply the engine oil on the bearings and guide bars.



7. Check:

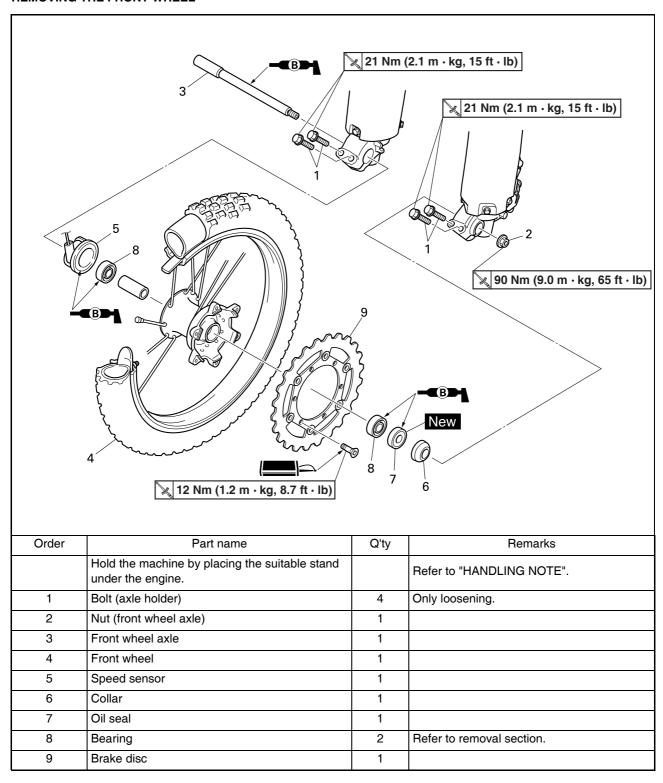
- · Shifter operation
- Transmission operation
 Unsmooth operation → Repair.



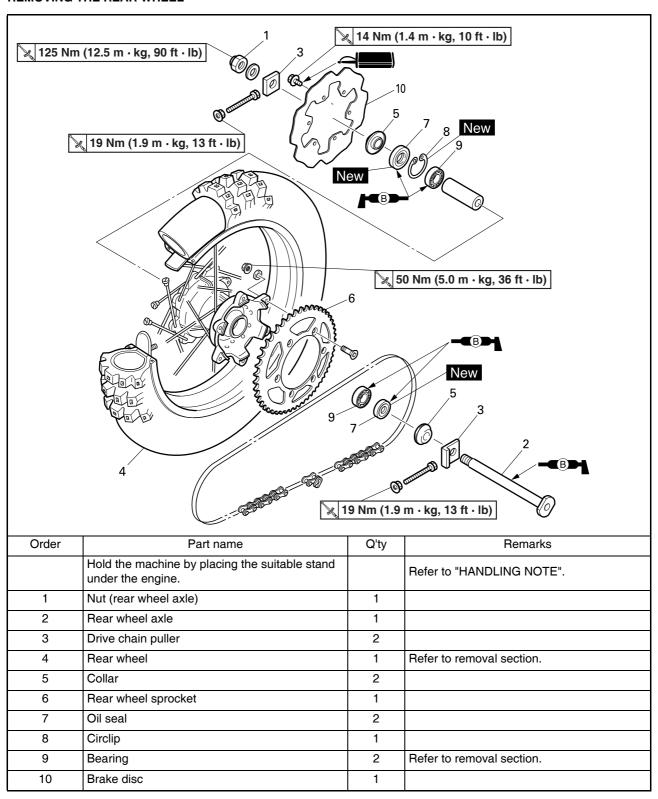
CHASSIS

FRONT WHEEL AND REAR WHEEL

REMOVING THE FRONT WHEEL



REMOVING THE REAR WHEEL



HANDLING NOTE

WARNING

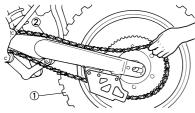
Support the machine securely so there is no danger of it falling over.

REMOVING THE REAR WHEEL

- 1. Remove:
 - Wheel "1"

NOTE:

Push the wheel forward and remove the drive chain "2".

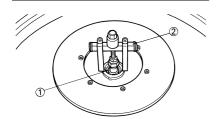


REMOVING THE WHEEL BEARING

- 1. Remove:
 - · Bearing "1"

NOTE:

Remove the bearing using a general bearing puller "2".



CHECKING THE WHEEL

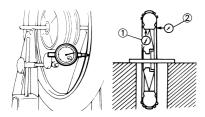
- 1. Measure:
 - Wheel runout
 Out of limit → Repair/replace.



Wheel runout limit: Radial "1": 2.0 mm

(0.08 in)

Lateral "2": 2.0 mm (0.08 in)



- 2. Inspect:
 - Bearing

Rotate inner race with a finger. Rough spot/seizure → Replace.

NOTE:

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)

NOTE:

The bending value is shown by one half of the dial gauge reading.

WARNING

Do not attempt to straighten a bent axle.



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.



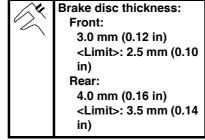
Brake disc deflection lim-

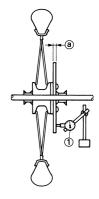
it:

Rear:

<Limit>: 0.15 mm (0.006 in)

- 2. Measure:
 - Brake disc thickness "a"
 Out of limit → Replace.





INSTALLING THE FRONT WHEEL

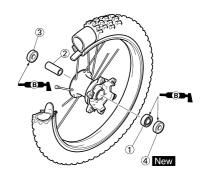
- 1. Install:
 - · Bearing (left) "1"
 - · Spacer "2"
- Bearing (right) "3"
- Oil seal "4" New

NOTE:

- 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 manufacture's marks or numbers facing outward.

CAUTION:

Do not strike the inner race of the bearing. Contact should be made only with the outer race.



- 2. Install:
 - Brake disc "1"

Bolt (brake disc) "2"

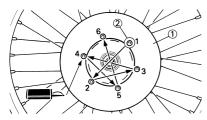




Bolt (brake disc): 12 Nm (1.2 m•kg, 8.7

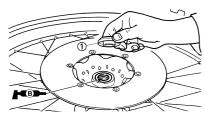
NOTE: .

Tighten the bolts in stage, using a crisscross pattern.



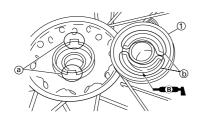
- 3. Install:
- · Collar "1"

Apply the lithium soap base grease on the oil seal lip.



- 4. Install:
 - · Speed sensor "1"

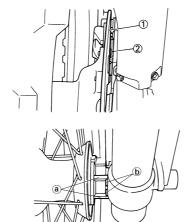
- · Apply the lithium soap base grease on the oil seal lip of the speed sen-
- · Make sure the two projections "a" in the wheel hub are meshed with the two slots "b" in the speed sensor.



- 5. Install:
 - Wheel

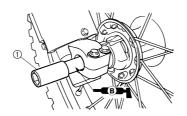
NOTE:

- Install the brake disc "1" between the brake pads "2" correctly.
- · Make sure that the projections "a" in the speed sensor fits over the stopper "b" on the front fork inner tube.



- 6. Install:
- · Wheel axle "1"

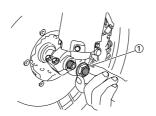
Apply the lithium soap base grease on the wheel axle.



- 7. Install:
 - · Nut (wheel axle) "1"



Nut (wheel axle): 90 Nm (9.0 m•kg, 65



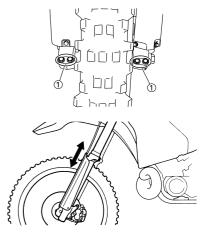
- 8. Tighten:
- Bolt (axle holder) "1"



Bolt (axle holder): 21 Nm (2.1 m•kg, 15 ft•lb)

NOTE:

Before tightening the bolt, fit the wheel axle to the axle holder by stroking the front fork several times with the front brake applied.



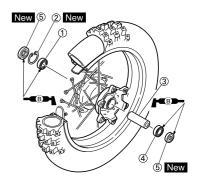
INSTALLING THE REAR WHEEL

- 1. Install:
- · Bearing (right) "1"
- Circlip "2" New
- Spacer "3"
- · Bearing (left) "4"
- Oil seal "5" New

- · 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 manufacture's marks or numbers facing outward.

CAUTION:

Do not strike the inner race of the bearing. Contact should be made only with the outer race.



- 2. Install:
 - · Brake disc "1"

Bolt (brake disc) "2"

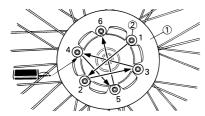




Bolt (brake disc): 14 Nm (1.4 m•kg, 10

NOTE: .

Tighten the bolts in stage, using a crisscross pattern.



- 3. Install:
 - Rear wheel sprocket "1"
 - · Bolt (rear wheel sprocket) "2"
 - · Washer (rear wheel sprocket) "3"
 - · Nut (rear wheel sprocket) "4"

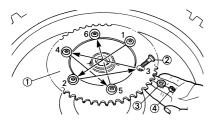


Nut (rear wheel sprocket):

50 Nm (5.0 m•kg, 36 ft•lb)

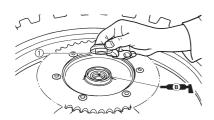
NOTE:

Tighten the nuts in stage, using a crisscross pattern.



- 4. Install:
 - Collar "1"

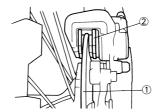
Apply the lithium soap base grease on the oil seal lip.



- 5. Install:
 - Wheel

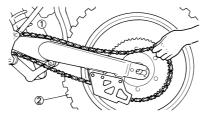
NOTE:

Install the brake disc "1" between the brake pads "2" correctly.



- 6. Install:
 - · Drive chain "1"

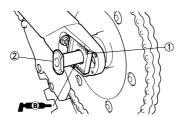
Push the wheel "2" forward and install the drive chain.



- 7. Install:
 - Left drive chain puller "1"
 - · Wheel axle "2"

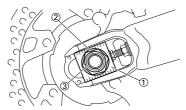
NOTE:

- · 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"

Temporarily tighten the nut (wheel axle) at this point.

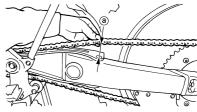


- 9. Adjust:
 - Drive chain slack "a"



Drive chain slack: 48-58 mm (1.9-2.3 in)

Refer to "ADJUSTING THE DRIVE CHAIN SLACK" section in the CHAPTER 3.



- 10. Tighten:
- · Nut (wheel axle) "1"

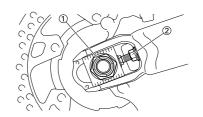


Nut (wheel axle): 125 Nm (12.5 m•kg, 90 ft•lb)

· Locknut "2"

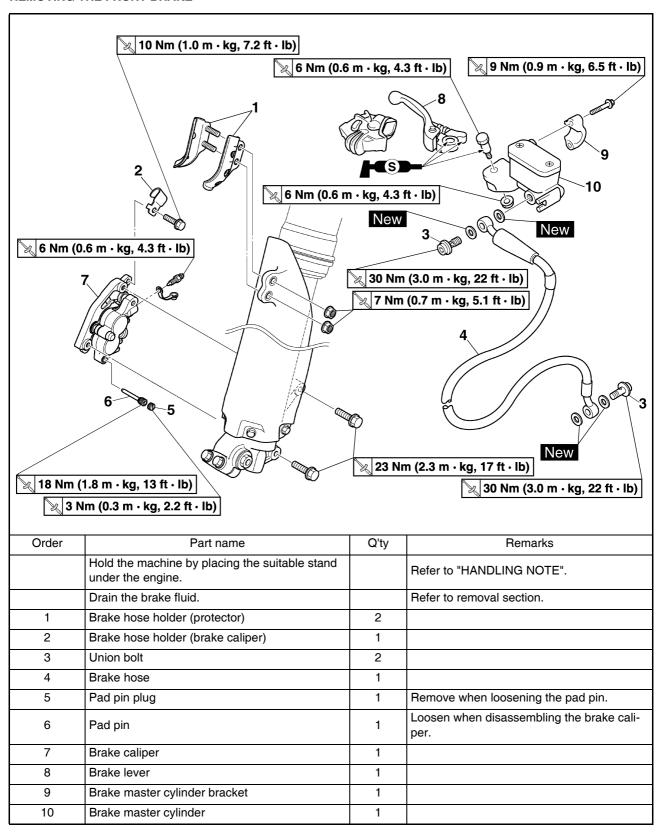


Locknut: 19 Nm (1.9 m•kg, 13 ft•lb)

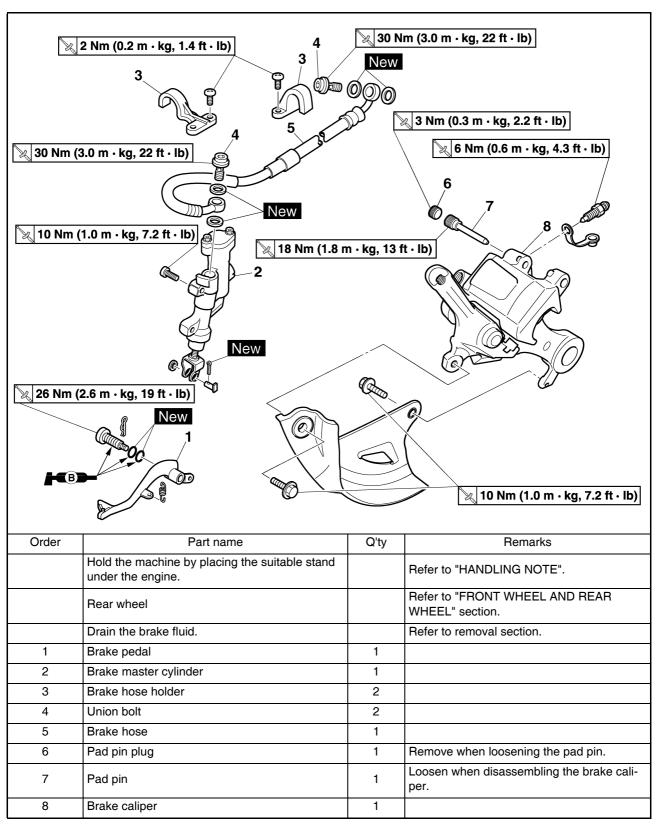


FRONT BRAKE AND REAR BRAKE

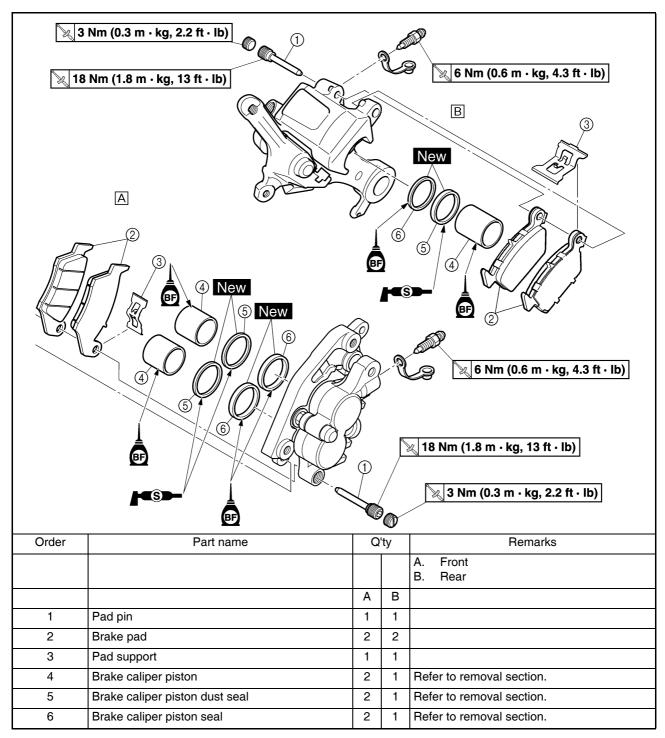
REMOVING THE FRONT BRAKE



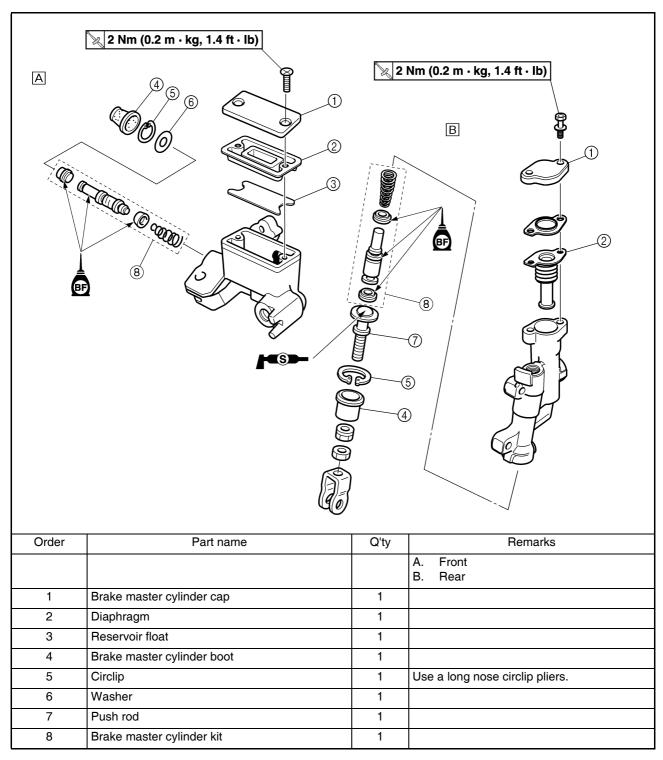
REMOVING THE REAR BRAKE



DISASSEMBLING THE BRAKE CALIPER



DISASSEMBLING THE BRAKE MASTER CYLINDER



HANDLING NOTE

WARNING

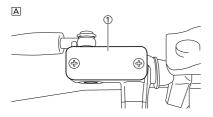
Support the machine securely so there is no danger of it falling over.

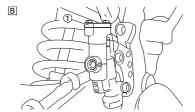
DRAINING THE BRAKE FLUID

- 1. Remove:
 - Brake master cylinder cap "1"
 - Protector (rear brake)

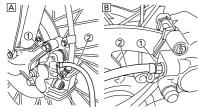
NOTE:

Do not remove the diaphragm.





- A. Front
- B. Rear
- Connect the transparent hose "2" to the bleed screw "1" and place a suitable container under its end.



- A. Front
- B. Rear
- Loosen the bleed screw and drain the brake fluid while pulling the lever in or pushing down on the pedal.

CAUTION:

- 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

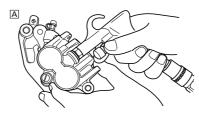
- 1. Remove:
 - Brake caliper piston
 Use compressed air and proceed
 carefully.

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"

NOTE:

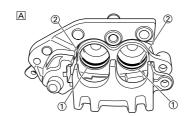
Remove the brake caliper piston seals and brake caliper piston dust seals by pushing them with a finger.

CAUTION:

Never attempt to pry out brake caliper piston seals and brake caliper piston dust seals.

WARNING

Replace the brake caliper piston seals and brake caliper piston dust seals whenever a caliper is disassembled.







- A. Front
- B. Rear

CHECKING THE BRAKE MASTER CYLINDER

- 1. Inspect:
 - Brake master cylinder inner surface "a"

Wear/scratches \rightarrow Replace master cylinder assembly. Stains \rightarrow Clean.

WARNING

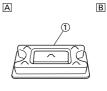
Use only new brake fluid.





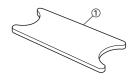


- A. Front
- B. Rear
- 2. Inspect:
 - Diaphragm "1"
 Crack/damage → Replace.

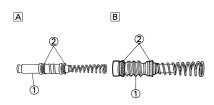




- A. Front
- B. Rear
- 3. Inspect: (front brake only)
- Reservoir float "1"
 Damage → Replace.



- 4. Inspect:
- Brake master cylinder piston "1"
- Brake master cylinder cup "2"
 Wear/damage/score marks→Replace brake master cylinder kit.

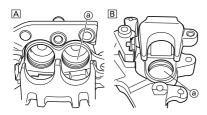


- A. Front
- B. Rear

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.

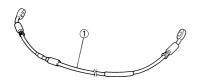
WARNING

Replace the brake caliper piston seals and brake caliper piston dust seals "2" whenever a caliper is disassembled.



CHECKING THE BRAKE HOSE

- 1. Inspect:
 - Brake hose "1"
 Crack/damage → Replace.



HANDLING NOTE

WARNING

 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"

New

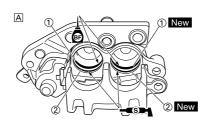
 Brake caliper piston dust seal "2" New

MARNING

Always use new brake caliper piston seals and brake caliper piston dust seals.

NOTE:

- 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.





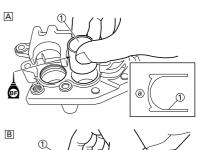
- A. Front
- B. Rear
- 3. Install:
 - Brake caliper piston "1"

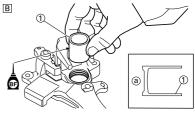
NOTE

Apply the brake fluid on the piston wall.

CAUTION:

- Install the piston with its shallow depressed side "a" facing the brake caliper.
- · Never force to insert.





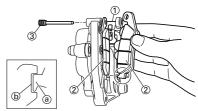
- A. Front
- B. Rear

INSTALLING THE FRONT BRAKE CALIPER

- 1. Install:
 - · Pad support "1"
 - · Brake pad "2"
 - Pad pin "3"

NOTE:

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



- 2. Install:
- Brake caliper "1"
- Bolt (brake caliper) "2"



Bolt (brake caliper): 23 Nm (2.3 m•kg, 17 ft•lb)

- 3. Tighten:
 - Pad pin "3"



Pad pin:

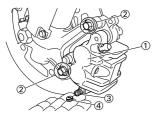
18 Nm (1.8 m•kg, 13 ft•lb)

4. Install:

· Pad pin plug "4"



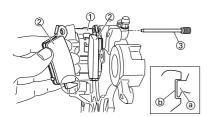
Pad pin plug: 3 Nm (0.3 m•kg, 2.2



INSTALLING THE REAR BRAKE CALIPER

- 1. Install:
 - Pad support "1"
 - · Brake pad "2"
 - Pad pin "3"

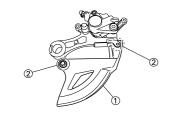
- · Install the brake pads with their projections "a" into the brake caliper recesses "b".
- · Temporarily tighten the pad pin at this point.



- 2. Install:
 - · Brake disc cover "1"
 - · Bolt (brake disc cover) "2"



Bolt (brake disc cover): 10 Nm (1.0 m•kg, 7.2 ft•lb)



- 3. Install:
 - Brake caliper "1"
 - · Rear wheel "2" Refer to "FRONT WHEEL AND REAR WHEEL" section.
- 4. Tighten:
 - Pad pin "3"



Pad pin:

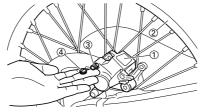
18 Nm (1.8 m•kg, 13

5. Install:

• Pad pin plug "4"



3 Nm (0.3 m•kg, 2.2



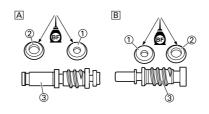
INSTALLING THE BRAKE MASTER CYLINDER KIT

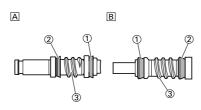
- 1. Clean:
- Brake master cylinder
- Brake master cylinder kit Clean them with brake fluid.
- 2. Install:
 - · Brake master cylinder cup (primary) "1"
 - · Brake master cylinder cup (secondary) "2"
 - To brake master cylinder piston "3"

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.





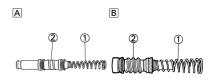
- A. Front
- B. Rear
- Install:

"2".

• Spring "1" To brake master cylinder piston

NOTE:

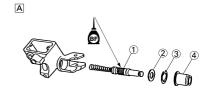
Install the spring at the smaller dia.

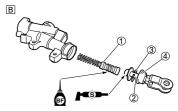


- Front A.
- Rear В
- 4. Install:
 - Brake master cylinder kit "1"
 - Washer (front brake) "2"
 - Push rod (rear brake) "2"
 - Circlip "3"
- Brake master cylinder boot "4" To brake master cylinder.

NOTE:

- 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.





- A. Front
- B. Rear

INSTALLING THE FRONT BRAKE MASTER CYLINDER

- 1. Install:
 - Brake master cylinder "1"
- Brake master cylinder bracket "2"
- · Bolt (brake master cylinder bracket) "3"

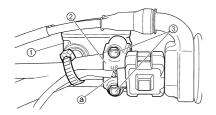


Bolt (brake master cylinder bracket):

9 Nm (0.9 m•kg, 6.5 ft•lb)

NOTE:

- · 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"



Bolt (brake lever): 6 Nm (0.6 m•kg, 4.3 ft•lb)

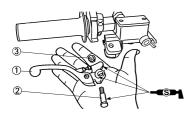
• Nut (brake lever) "3"



Nut (brake lever): 6 Nm (0.6 m•kg, 4.3 ft•lb)

NOTE:

Apply the silicone grease on the brake lever sliding surface, bolt and contacting surface of the brake master cylinder piston.



INSTALLING THE REAR BRAKE MASTER CYLINDER

- 1. Install:
 - Copper washer "1" New

ft•lb)

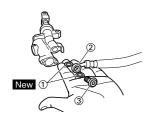
- Brake hose "2"
- Union bolt "3"



Union bolt: 30 Nm (3.0 m•kg, 22

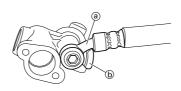
WARNING

Always use new copper washers.



CAUTION:

Install the brake hose so that its pipe portion "a" directs as shown and lightly touches the projection "b" on the brake master cylinder.

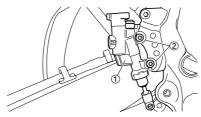


- 2. Install:
 - Brake master cylinder "1"
 - Bolt (brake master cylinder) "2"



Bolt (brake master cylinder):

10 Nm (1.0 m•kg, 7.2 ft•lb)



- 3. Install:
 - Spring "1"
 - Brake pedal "2"
 - O-ring "3" New
- Bolt (brake pedal) "4"

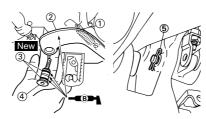


Bolt (brake pedal): 26 Nm (2.6 m•kg, 19 ft•lb)

• Clip "5"

NOTE:

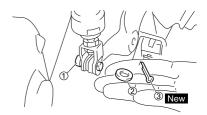
Apply the lithium soap base grease on the bolt, O-ring and brake pedal bracket.



- 4. Install:
 - Pin "1"
 - Washer "2"
 - Cotter pin "3" New

NOTE:

After installing, check the brake pedal height. Refer to "ADJUSTING THE REAR BRAKE" section in the CHAPTER 3.



INSTALLING THE FRONT BRAKE HOSE

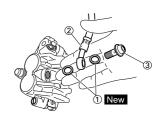
- 1. Install:
 - Copper washer "1" New
 - Brake hose "2"
- Union bolt "3"



Union bolt: 30 Nm (3.0 m•kg, 22 ft•lb)

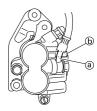
WARNING

Always use new copper washers.



CAUTION:

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"



Bolt (brake hose holder): 10 Nm (1.0 m•kg, 7.2 ft•lb)



- 3. Install:
 - Brake hose holder "1"

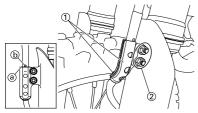
• Nut (brake hose holder) "2"



Nut (brake hose holder): 7 Nm (0.7 m•kg, 5.1 ft •lb)

NOTE:

Align the top "a" of the brake hose holder with the paint "b" of the brake hose.



4. Pass the brake hose through the front brake hose guides "1".



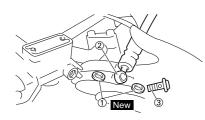
- 5. Install:
 - Copper washer "1" New
 - · Brake hose "2"
 - Union bolt "3"



Union bolt: 30 Nm (3.0 m•kg, 22 ft•lb)

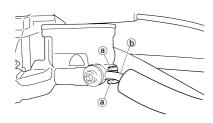
WARNING

Always use new copper washers.



CAUTION:

Install the brake hose so that it contacts the brake master cylinder projection "a" and that its bent portion "b" faces downward.



INSTALLING THE REAR BRAKE HOSE

- 1. Install:
- Copper washer "1" New
- Brake hose "2"
- Union bolt "3"

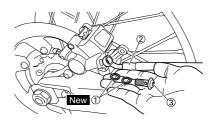


Union bolt:

30 Nm (3.0 m•kg, 22 ft•lb)

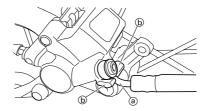
WARNING

Always use new copper washers.



CAUTION:

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"
 - Screw (brake hose holder) "2"

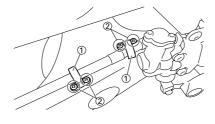


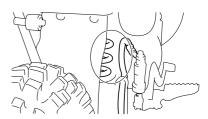
Screw (brake hose holder):

2 Nm (0.2 m•kg, 1.4 ft•lb)

CAUTION:

After installing the brake hose holders, make sure the brake hose does not contact the spring (rear shock absorber). If it does, correct its twist.





FILLING THE BRAKE FLUID

- 1. Fill:
 - Brake fluid
 Until the fluid level reaches
 "LOWER" level line "a".



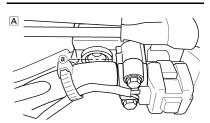
Recommended brake fluid: DOT #4

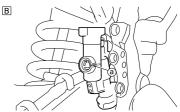
♠ WARNING

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

CAUTION:

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





- A. Front
- B. Rear
- 2. Air bleed:
- Brake system
 Refer to "BLEEDING THE HY-DRAULIC BRAKE SYSTEM" section in the CHAPTER 3.

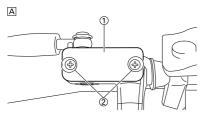
- 3. Inspect:
 - Brake fluid level
 Fluid at lower level → Fill up.
 Refer to "CHECKING THE
 BRAKE FLUID LEVEL" section in
 the CHAPTER 3.
- 4. Install:
 - Reservoir float (front brake)
 - · Diaphragm
 - Brake master cylinder cap "1"
 - Screw (bolt) {brake master cylinder cap} "2"

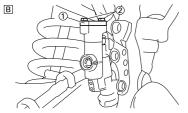


Screw (bolt) {brake master cylinder cap}:
2 Nm (0.2 m•kg, 1.4 ft•lb)

CAUTION:

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.

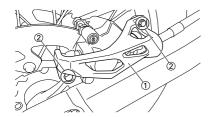




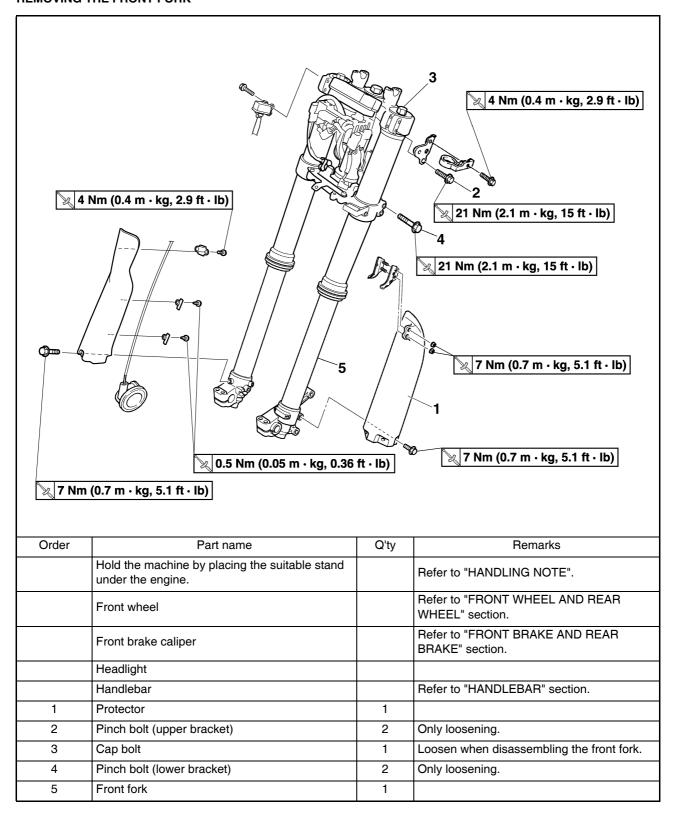
- A. Front
- B. Rear
- 5. Install: (rear brake only)
 - Protector "1"
 - Bolt (protector) "2"



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

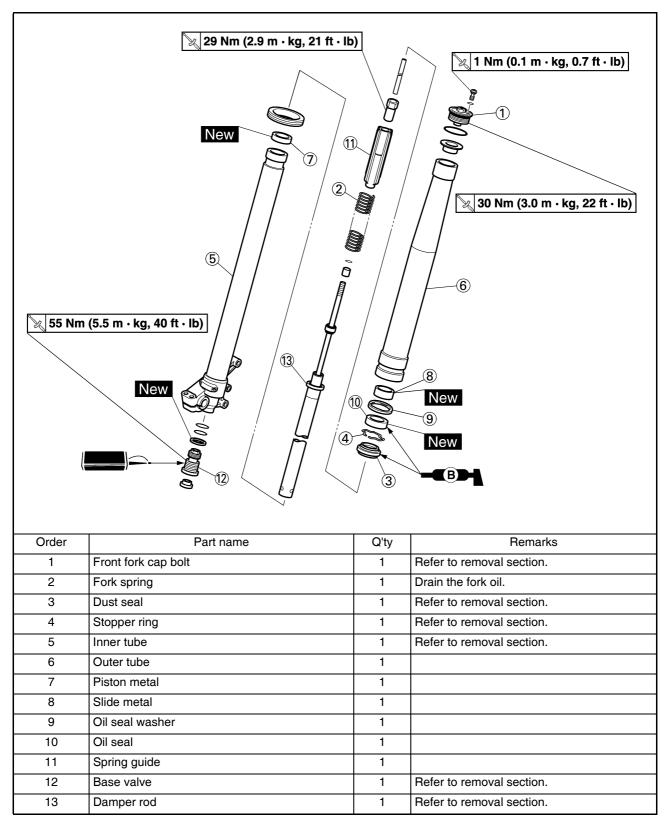


FRONT FORK REMOVING THE FRONT FORK



FRONT FORK

DISASSEMBLING THE FRONT FORK



HANDLING NOTE

WARNING

Support the machine securely so there is no danger of it falling over.

NOTE:

The front fork requires careful attention. So it is recommended that the front fork be maintained at the dealers.

CAUTION:

To prevent an accidental explosion of air, the following instructions should be observed:

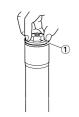
- The front fork with a built-in piston rod has a very sophisticated internal construction and is particularly sensitive to foreign material. Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.
- Before removing the cap bolts or front forks, be sure to extract the air from the air chamber completely.

REMOVING THE FRONT FORK CAP BOLT

- 1. Remove:
 - Front fork cap bolt "1" From the outer tube.

NOTE:

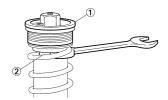
Before removing the front fork from the machine, loosen the front fork cap holt.



- 2. Remove:
 - Front fork cap bolt "1"

NOTE

Hold the locknut "2" and remove the front fork cap bolt.

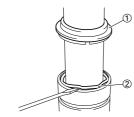


REMOVING THE INNER TUBE

- 1. Remove:
- Dust seal "1"
- Stopper ring "2"
 Using slotted-head screwdriver.

CAUTION:

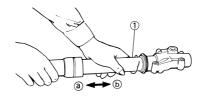
Take care not to scratch the inner tube.



- 2. Remove:
- Inner tube "1"

Oil seal removal steps:

- a. Push in slowly "a" the inner tube just before it bottoms out and then pull it back quickly "b".
- Repeat this step until the inner tube can be pulled out from the outer tube.



REMOVING THE DAMPER ROD

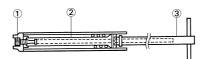
- 1. Remove:
- Base valve "1"
- · Damper rod "2"

NOTE:

Use a damper rod holder "3" to lock the damper rod.



Damper rod holder: YM-01494/90890-01494

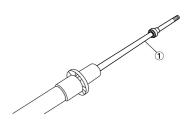


CHECKING THE DAMPER ROD

- 1. Inspect:
- Damper rod "1"
 Bend/damage→Replace damper rod.

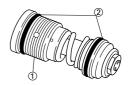
CAUTION:

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.



CHECKING THE BASE VALVE

- 1. Inspect:
 - Valve assembly "1"
 Wear/damage → Replace.
- O-ring "2"
 Damage → Replace.

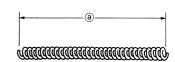


CHECKING THE FORK SPRING

- 1. Measure:
 - Fork spring free length "a"
 Out of specification → Replace.



Fork spring free length: 460 mm (18.1 in) <Limit>: 455 mm (17.9 in)



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".

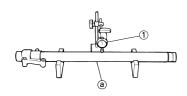


Inner tube bending limit: 0.2 mm (0.008 in)

The bending value is shown by one half of the dial gauge reading.

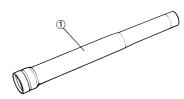
MARNING

Do not attempt to straighten a bent inner tube as this may dangerously weaken the tube.



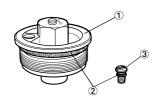
CHECKING THE OUTER TUBE

- 1. Inspect:
 - Outer tube "1" Score marks/wear/damage → Replace.



CHECKING THE FRONT FORK CAP BOLT

- 1. Inspect:
 - Front fork cap bolt "1"
 - O-ring "2"
- · Air bleed screw "3" Wear/damage → Replace.

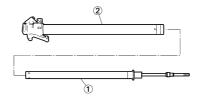


ASSEMBLING THE FRONT FORK

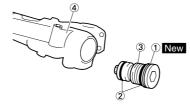
- 1. Wash the all parts in a clean solvent.
- 2. Install:
 - Damper rod "1" To inner tube "2".

CAUTION:

To install the damper rod into the inner tube, hold the inner tube aslant. If the inner tube is held vertically, the damper rod may fall into it, damaging the valve inside.



- 3. Install:
- Copper washer "1" New
- O-ring "2"
- · Base valve "3" To inner tube "4".



- 4. Tighten:
 - Base valve:

Base valve "1"

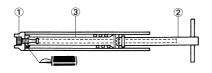


55 Nm (5.5 m•kg, 40 ft•lb)

- Use a damper rod holder "2" to lock the damper rod "3".
- Apply the $\mathsf{LOCTITE}^{\texttt{®}}$ on the base valve thread.



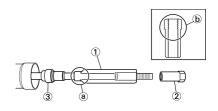
Damper rod holder: YM-01494/90890-01494



5. Install:

- · Spring guide "1"
- · Locknut "2" To damper rod "3".

- Install the spring guide with its smaller dia.end "a" facing downward.
- · With its thread "b" facing upward, fully finger tighten the locknut onto the damper rod.

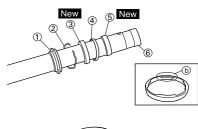


6. Install:

- Dust seal "1"
- · Stopper ring "2"
- Oil seal "3" New
- Oil seal washer "4"Slide metal "5" New To inner tube "6".

NOTE:

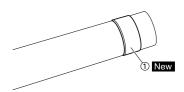
- Apply the fork oil on the inner tube.
- · When installing the oil seal, use vinyl seat "a" with fork oil applied to protect the oil seal lip.
- · Install the oil seal with its manufacture's marks or number facing the axle holder side.
- · Install the oil seal washer with its projections "b" facing upward.



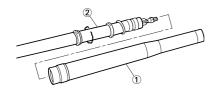


- 7. Install:
- Piston metal "1" New

Install the piston metal onto the slot on inner tube.



- 8. Install:
 - Outer tube "1" To inner tube "2".



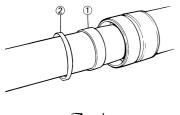
- 9. Install:
 - Slide metal "1"
 - Oil seal washer "2"
 To outer tube slot.

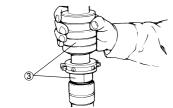
NOTE

Press the slide metal into the outer tube with fork seal driver "3".



Fork seal driver: YM-A0948/90890-01502





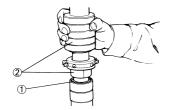
- 10. Install:
 - Oil seal "1"

NOTE:

Press the oil seal into the outer tube with fork seal driver "2".



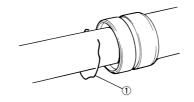
Fork seal driver: YM-A0948/90890-01502



- 11. Install:
 - · Stopper ring "1"

NOTE:

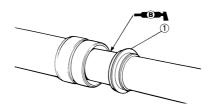
Fit the stopper ring correctly in the groove in the outer tube.



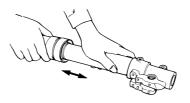
- 12. Install:
 - · Dust seal "1"

IOTE:

Apply the lithium soap base grease on the inner tube.



- 13. Check:
 - Inner tube smooth movement
 Tightness/binding/rough spots →
 Repeat the steps 2 to 12.



- 14. Compress the front fork fully.
- 15. Fill:
 - Front fork oil
 Until outer tube top surface with recommended fork oil "1".



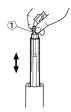
Recommended oil: Suspension oil "S1"

CAUTION:

- 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.



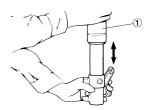
16. After filling, pump the damper rod "1" slowly up and down more than 10 times to distribute the fork oil.



- 17. Fill:
 - Front fork oil
 Until outer tube top surface with recom-mended fork oil once more.
- 18. After filling, pump the outer tube "1" slowly up and down (about 200 mm (7.9 in) stroke) to distribute the fork oil once more.

NOTE:

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 15 to 18.



19. Wait ten minutes until the air bubbles have been removed from the front fork, and the oil has dispense evenly in system before setting recommended oil level.

NOTE:

Fill with the fork oil up to the top end of the outer tube, or the fork oil will not spread over to every part of the front forks, thus making it impossible to obtain the correct level.

Be sure to fill with the fork oil up to the top of the outer tube and bleed the front forks.

20. Measure:

Oil level (left and right) "a"
 Out of specification → Adjust.



Standard oil level:
132 mm (5.20 in)
*125 mm (4.92 in)
Extent of adjustment:
95–150 mm (3.74–5.91 in)
From top of outer tube with inner tube and damper rod "1" fully compressed without spring.

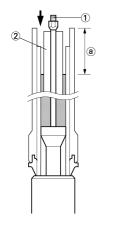
* For AUS, NZ and ZA

NOTE:

Be sure to install the spring guide "2" when checking the oil level.

M WARNING

Never fail to make the oil level adjustment between the maximum and minimum level and always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



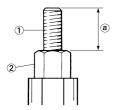
21. Measure:

Distance "a"
 Out of specification → Turn into the locknut.



Distance "a":

18 mm (0.71 in) or more Between damper rod "1" top and locknut "2" top.



22. Loosen:

• Rebound damping adjuster "1"

NOTE

- Loosen the rebound damping adjuster finger tight.
- Record the set position of the adjuster (the amount of turning out the fully turned in position).

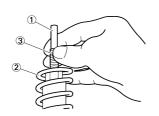


23. Install:

- Push rod "1"
- Fork spring "2"

NOTE:

- Install the fork spring with the damper rod "3" pulled up.
- After installing the fork spring, hold the damper rod end so that it will not go down.



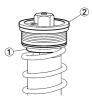
24. Install:

- · Spring seat "1"
- Front fork cap bolt "2"

NOTE:

311404

Fully finger tighten the front fork cap bolt onto the damper rod.



25. Tighten:

• Front fork cap bolt (locknut) "1"

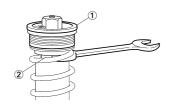
ft•lb)



Front fork cap bolt (locknut): 29 Nm (2.9 m•kg, 21

NOTE:

Hold the locknut "2" and tighten the front fork cap bolt with specified torque.



26. Install:

• Front fork cap bolt "1"

To outer tube.

NOTE:

Temporarily tighten the cap bolt.

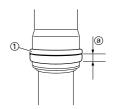


27. Install:

• Protector guide "1"

IOTE:

Install the protector guide with its wider side "a" facing downward.

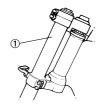


INSTALLING THE FRONT FORK

- 1. Install:
 - Front fork "1"

NOTE:

- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



- 2. Tighten:
 - · Front fork cap bolt

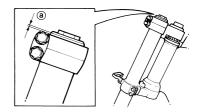


Front fork cap bolt: 30 Nm (3.0 m•kg, 22 ft•lb)

- 3. Adjust:
 - Front fork top end "a"



Front fork top end (standard) "a": Zero mm (Zero in)



4. Tighten:

• Pinch bolt (upper bracket) "1"



Pinch bolt (upper bracket): 21 Nm (2.1 m•kg, 15

• Pinch bolt (lower bracket) "2"

ft•lb)

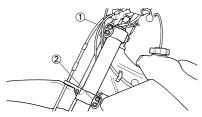


Pinch bolt (lower bracket):

21 Nm (2.1 m•kg, 15 ft•lb)

CAUTION:

Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



- 5. Install:
 - · Speed sensor lead "1"
 - Plate 1 "2"
 - Bolt (plate 1) "3"

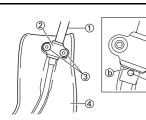


Bolt (plate 1): 4 Nm (0.4 m•kg, 2.9 ft • lb)

To right protector "4".

NOTE:

Install the speed sensor lead so that its paint "a" directs as shown and align the bottom "b" of the plate 1 with the same paint.



- 6. Install:
 - Speed sensor lead "1"
 - Plate 2 "2"
 - Screw (plate 2) "3"

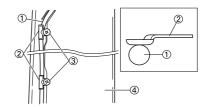


Screw (plate 2): 0.5 Nm (0.05 m•kg, 0.36 ft•lb)

To right protector "4".

NOTE:

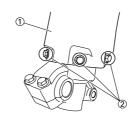
Install the plate 2 in the direction as shown.



- 7. Install:
 - Protector "1"
 - · Bolt (protector) "2"



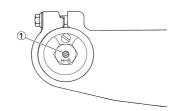
Bolt (protector): 7 Nm (0.7 m•kg, 5.1 ft•lb)



- 8. Adjust:
 - · Rebound damping force

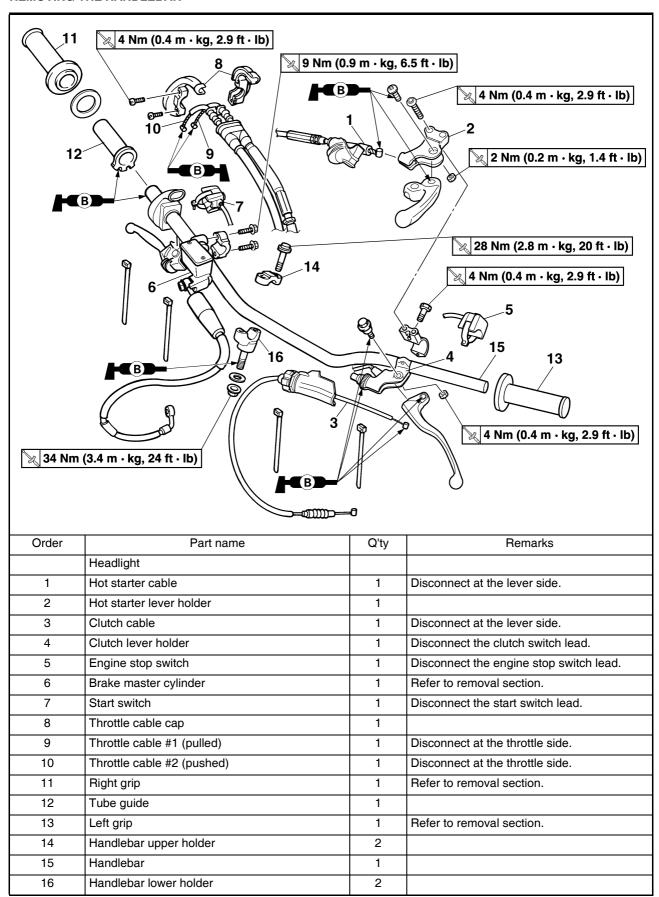
NOTE:

Turn in the damping adjuster "1" finger-tight and then turn out to the originally set position.



HANDLEBAR

REMOVING THE HANDLEBAR

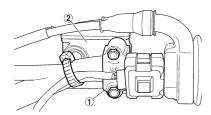


REMOVING THE BRAKE MASTER CYLINDER

- 1. Remove:
 - Brake master cylinder bracket "1"
 - Brake master cylinder "2"

CAUTION:

- 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.

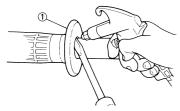


REMOVING THE GRIP

- 1. Remove:
 - Grip "1"

NOTE:

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.



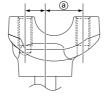
INSTALLING THE HANDLEBAR

- 1. Install:
 - Handlebar lower holder "1"
 - · Washer "2"
 - Nut (handlebar lower holder) "3"

NOTE:

- Install the handlebar lower holder with its side having the greater distance "a" from the mounting bolt center facing forward.
- Apply the lithium soap base grease on the thread of the handlebar lower holder.
- Installing the handlebar lower holder in the reverse direction allows the front-to-rear offset amount of the handlebar position to be changed.
- Do not tighten the nut yet.





2. Install:

- Handlebar "1"
- Handlebar upper holder "2"
- Bolt (handlebar upper holder) "3"

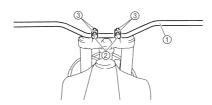


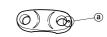
Bolt (handlebar upper holder):

28 Nm (2.8 m•kg, 20 ft•lb)

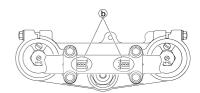
NOTE:

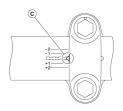
- The handlebar upper holder should be installed with the punched mark "a" forward.
- Install the handlebar so that the marks "b" are in place on both sides.
- Install the handlebar so that the projection "c" of the handlebar upper holder is positioned at the mark on the handlebar as shown.
- First tighten the bolts on the front side of the handlebar upper holder, and then tighten the bolts on the rear side.









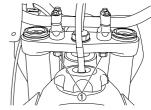


- 3. Tighten:
 - Nut (handlebar lower holder) "1"



Nut (handlebar lower holder):

34 Nm (3.4 m•kg, 24 ft•lb)



- 4. Install:
 - Left grip "1"
 Apply the adhesive to the handlehar "0"

NOTE:

- 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.

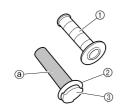


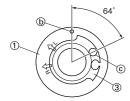
- 5. Install:
 - Right grip "1"
- · Collar "2"

Apply the adhesive on the tube guide "3".

NOTE:

- 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.



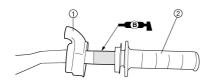


6. Install:

- Grip cap cover "1"
- · Throttle grip "2"

NOTE:

Apply the lithium soap base grease on the throttle grip sliding surface.

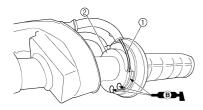


7. Install:

 Throttle cables "1" To tube guide "2".

NOTE:

Apply the lithium soap base grease on the throttle cable end and tube guide cable winding portion.



8. Install:

• Throttle cable cap "1"

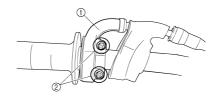
• Screw (throttle cable cap) "2"

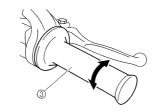


Screw (throttle cable cap):
4 Nm (0.4 m•kg, 2.9 ft•lb)

WARNING

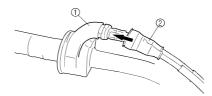
After tightening the screws, check that the throttle grip "3" moves smoothly. If it does not, retighten the bolts for adjustment.





9. Install:

- · Grip cap cover "1"
- · Cover (throttle cable cap) "2"



10. Install:

- Start switch "1"
- Brake master cylinder "2"
- Brake master cylinder bracket "3"
- Bolt (brake master cylinder bracket) "4"



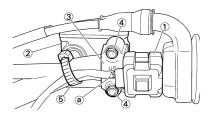
Bolt (brake master cylinder bracket):

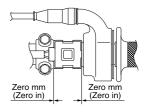
9 Nm (0.9 m•kg, 6.5 ft•lb)

• Clamp "5"

NOTE:

- The start switch and brake master cylinder bracket should be installed according to the dimensions shown.
- 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"



Bolt (clutch lever holder): 4 Nm (0.4 m•kg, 2.9 ft•lb)

- Hot starter lever holder "4"
- · Bolt (hot starter lever holder) "5"



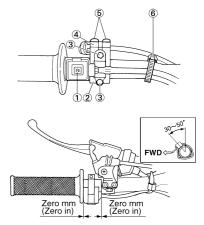
Bolt (hot starter lever holder):

4 Nm (0.4 m•kg, 2.9 ft•lb)

• Clamp "6"

NOTE:

- 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.

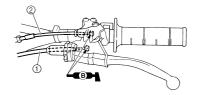


12. Install:

- Clutch cable "1"
- · Hot starter cable "2"

NOTE:

Apply the lithium soap base grease on the clutch cable end and hot starter cable end.

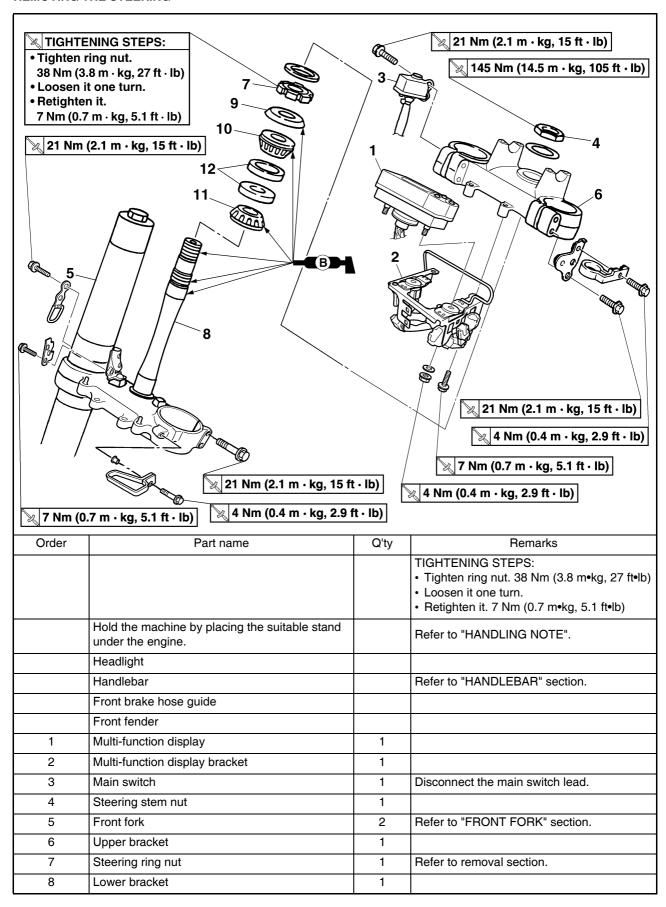


13. Adjust:

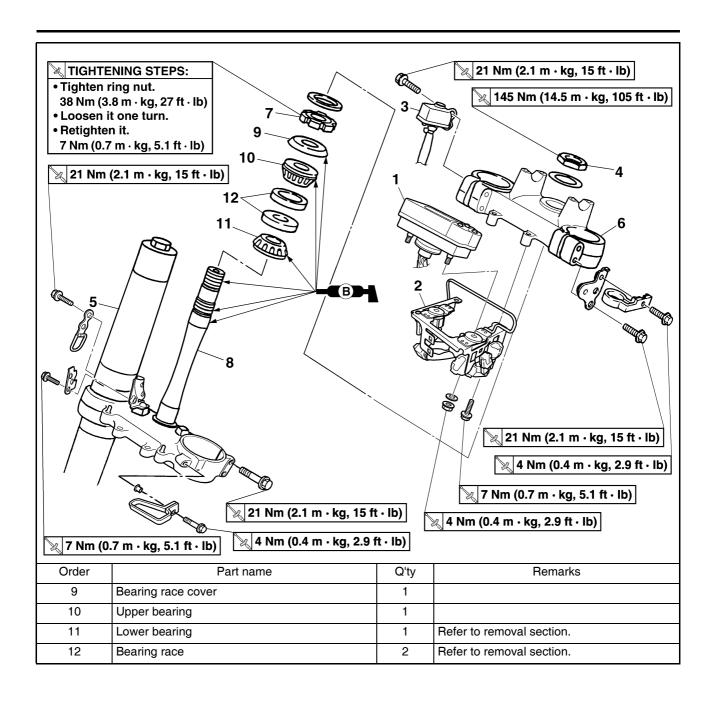
- Clutch lever free play Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" section in the CHAPTER 3.
- Hot starter lever free play Refer to "ADJUSTING THE HOT STARTER LEVER FREE PLAY" section in the CHAPTER 3.

STEERING

REMOVING THE STEERING



STEERING



HANDLING NOTE

WARNING

Support the machine securely so there is no danger of it falling over.

REMOVING THE STEERING RING NUT

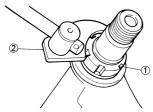
- 1. Remove:
 - Steering ring nut "1"
 Use the steering nut wrench "2".



Steering nut wrench: YU-33975/90890-01403

WARNING

Support the steering stem so that it may not fall down.

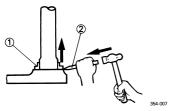


REMOVING THE LOWER BEARING

- 1. Remove:
 - Lower bearing "1"
 Use the floor chisel "2".

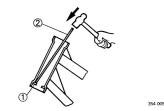
CAUTION:

Take care not to damage the steering shaft thread.



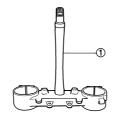
REMOVING THE BEARING RACE

- 1. Remove:
 - Bearing race "1"
 Remove the bearing race using long rod "2" and the hammer.



CHECKING 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"

NOTE:

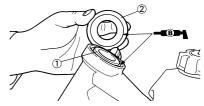
Apply the lithium soap base grease on the dust seal lip and bearing inner circumference.



- 2. Install:
 - Bearing race
 - Upper bearing "1"
 - Bearing race cover "2"

NOTE:

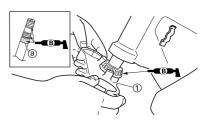
Apply the lithium soap base grease on the bearing and bearing race cover lip.



- 3. Install:
 - Lower bracket "1"

NOTE:

Apply the lithium soap base grease on the bearing, the portion "a" and thread of the steering stem.

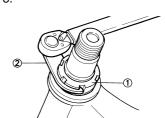


- 4. Install:
- Steering ring nut "1"



Steering ring nut: 7 Nm (0.7 m•kg, 5.1 ft•lb)

Tighten the steering ring nut using the steering nut wrench "2". Refer to "CHECKING AND AD-JUSTING THE STEERING HEAD" section in the CHAPTER



 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.



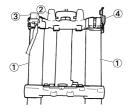
- 6. Install:
 - Washer "1"



- 7. Install:
 - Front fork "1"
 - · Upper bracket "2"
 - · Main switch "3"
 - Front brake hose guide bracket "4"

NOTE:

- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



- 8. Install:
 - Guide (speed sensor lead) "1"

NOTE:

After installing the guide as shown, pass the speed sensor lead through the guide.



- 9. Install:
 - Washer "1"
 - · Steering stem nut "2"



Steering stem nut: 145 Nm (14.5 m•kg, 105 ft•lb)



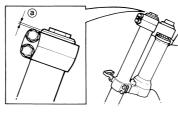
 After tightening the nut, check the steering for smooth movement. If not, adjust the steering by loosening the steering ring nut little by little.

11. Adjust:

• Front fork top end "a"



Front fork top end (standard) "a": Zero mm (Zero in)



12. Tighten:

• Pinch bolt (upper bracket) "1"



Pinch bolt (upper bracket):

21 Nm (2.1 m•kg, 15 ft•lb)

• Pinch bolt (lower bracket) "2"

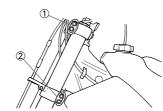


Pinch bolt (lower bracket):

21 Nm (2.1 m•kg, 15 ft•lb)

CAUTION:

Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



13. Install:

• Multi-function display bracket "1"



Multi-function display bracket:

7 Nm (0.7 m•kg, 5.1 ft•lb)

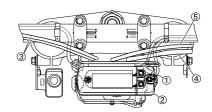
• Multi-function display "2"



Multi-function display: 4 Nm (0.4 m•kg, 2.9 ft•lb)

NOTE:

Pass the throttle cables "3", clutch cable "4" and hot starter cable "5" between the multi-function display bracket and upper bracket.



14. Install:

• Holder "1"



Holder:

13 Nm (1.3 m•kg, 9.4 ft•lb)

• Clamp "2"



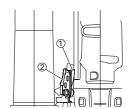
Clamp:

7 Nm (0.7 m•kg, 5.1 ft•lb)

NOTE:

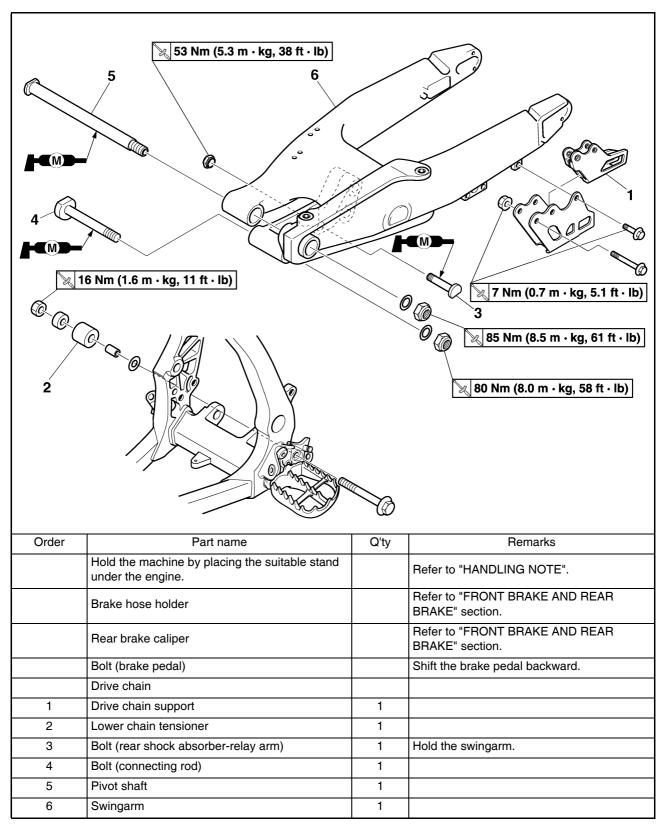
- Install so that the marking "a" on the speed sensor lead aligns with the holder edge.
- Fasten the speed sensor lead to the holder with the clamp.





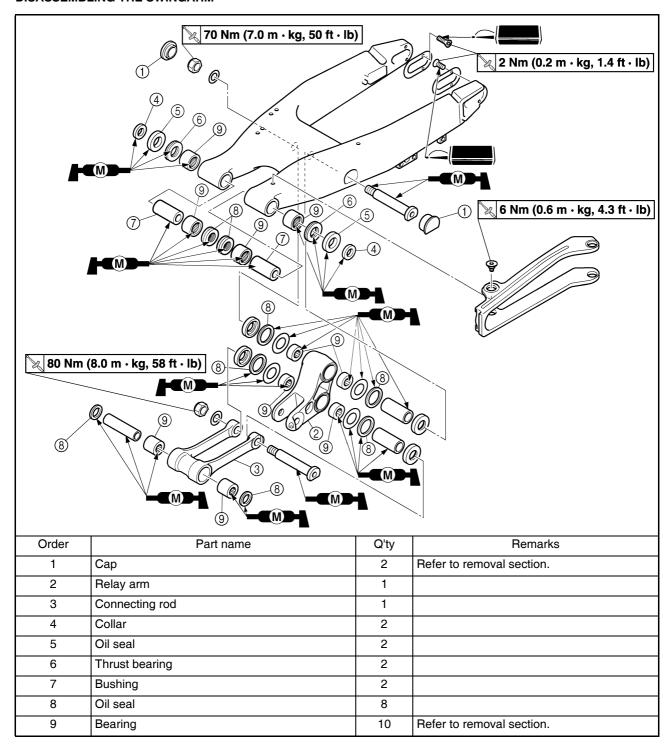
SWINGARM

REMOVING THE SWINGARM



SWINGARM

DISASSEMBLING THE SWINGARM



HANDLING NOTE

WARNING

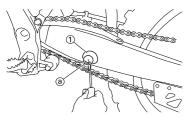
Support the machine securely so there is no danger of it falling over.

REMOVING THE CAP

- 1. Remove:
 - · Left cap "1"

NOTE

Remove with a slotted-head screwdriver inserted under the mark "a" on the left cap.

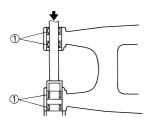


REMOVING THE BEARING

- 1. Remove:
 - · Bearing "1"

NOTE:

Remove the bearing by pressing its outer race.



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.



CHECKING THE CONNECTING ROD

- 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.

NOTE:

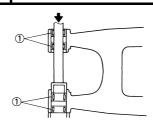
- Apply the molybdenum disulfide grease on the bearing when installing.
- Install the bearing by pressing it on the side having the manufacture's marks or numbers.
- First install the outer and then the inner bearings to a specified depth from inside.



Installed depth of bearings:

Outer "a": Zero mm (Zero in)

Inner "b": 6.5 mm (0.26 in)



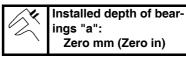


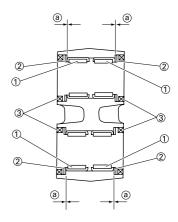


- 2. Install:
 - Bearing "1"
 - Washer "2"
 - Oil seal "3" To relay arm.

NOTE:

- 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.





- 3. Install:
 - Bearing "1"
 - Oil seal "2"
 To connecting rod.

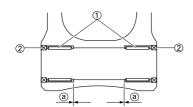
NOTE:

- 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.



Installed depth of bearings "a":

Zero mm (Zero in)

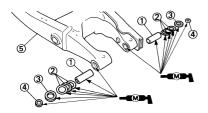


INSTALLING THE SWINGARM

- 1. Install:
- Bushing "1"
- · Thrust bearing "2"
- Oil seal "3"
- Collar "4" To swingarm "5"

NOTE:

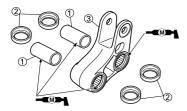
Apply the molybdenum disulfide grease on the bushings, thrust bearings, oil seal lips and contact surfaces of the collar and thrust bearing.



- 2. Install:
 - Collar "1"
 - Washer "2" To relay arm "3".

NOTE:

Apply the molybdenum disulfide grease on the collars and oil seal lips.



- 3. Install:
 - Collar "1"
 To connecting rod "2".

NOTE

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"



Nut (connecting rod): 80 Nm (8.0 m•kg, 58 ft•lb)

To relay arm "5".

NOTE:

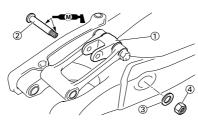
Apply the molybdenum disulfide grease on the bolt.



- 5. Install:
 - Relay arm"1"
 - · Bolt (relay arm) "2"
 - Washer "3"
 - Nut (relay arm) "4" To swingarm.

NOTE:

- Apply the molybdenum disulfide grease on the bolt circumference and threaded portion.
- · Do not tighten the nut yet.



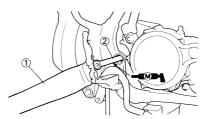
- 6. Install:
 - Swingarm "1"
- · Pivot shaft "2"



Pivot shaft: 85 Nm (8.5 m•kg, 61 ft•lb)

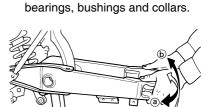
NOTE:

- Apply the molybdenum disulfide grease on the pivot shaft.
- Insert the pivot shaft from right side.



- 7. Check:
 - Swingarm side play "a"
 Free play exists → Replace thrust bearing.

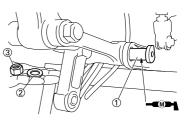
Swingarm up and down movement "b"
 Unsmooth movement/binding/rough spots → Grease or replace



- 8. Install:
 - Bolt (connecting rod) "1"
 - Washer "2"
 - Nut (connecting rod) "3"

NOTE

- Apply the molybdenum disulfide grease on the bolt.
- Do not tighten the nut yet.



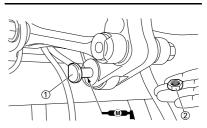
- 9. Install:
 - Bolt (rear shock absorber-relay arm) "1"
- Nut (rear shock absorber-relay arm) "2"



Nut (rear shock absorber-relay arm): 53 Nm (5.3 m•kg, 38 ft•lb)

NOTE:

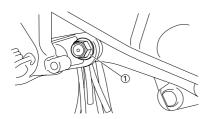
Apply the molybdenum disulfide grease on the bolt.



- 10. Tighten:
- Nut (connecting rod) "1"



Nut (connecting rod): 80 Nm (8.0 m•kg, 58 ft•lb)

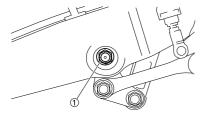


11. Tighten:

· Nut (relay arm) "1"



Nut (relay arm): 70 Nm (7.0 m•kg, 50 ft•lb)

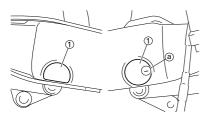


12. Install:

• Cap "1"

NOTE: _

Install the right cap with its mark "a" facing forward.

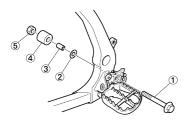


13. Install:

- Bolt (lower chain tensioner) "1"
- Washer "2"
- Collar "3"
- Lower chain tensioner "4"
- Nut (lower chain tensioner) "5"



Nut (lower chain tensioner): 16 Nm (1.6 m•kg, 11 ft•lb)



14. 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"



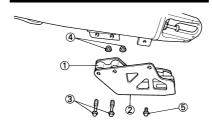
Nut (drive chain support): 7 Nm (0.7 m•kg, 5.1 ft•lb)

 Bolt {drive chain support cover[L = 10 mm (0.39 in)]} "5"

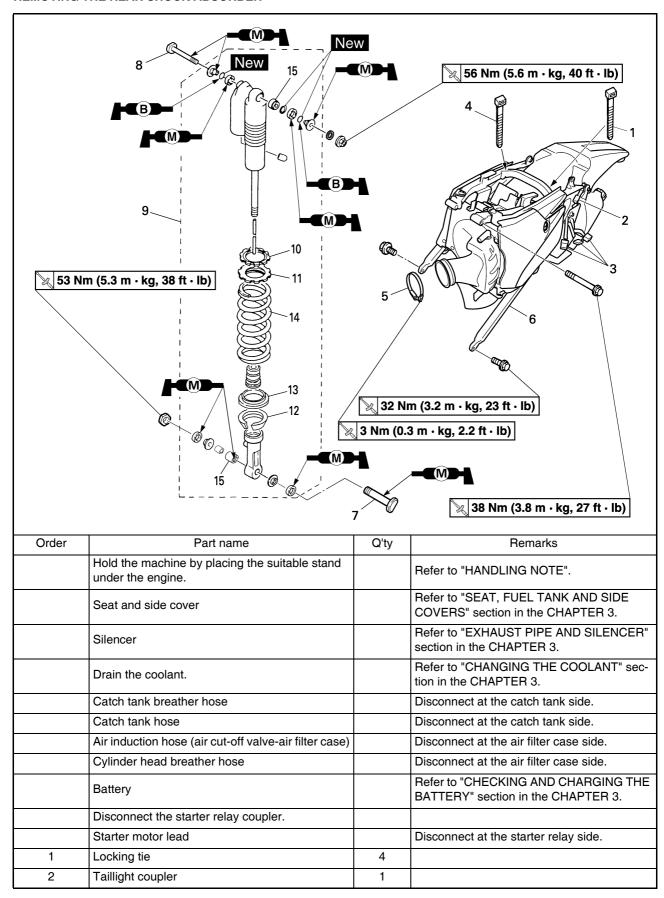


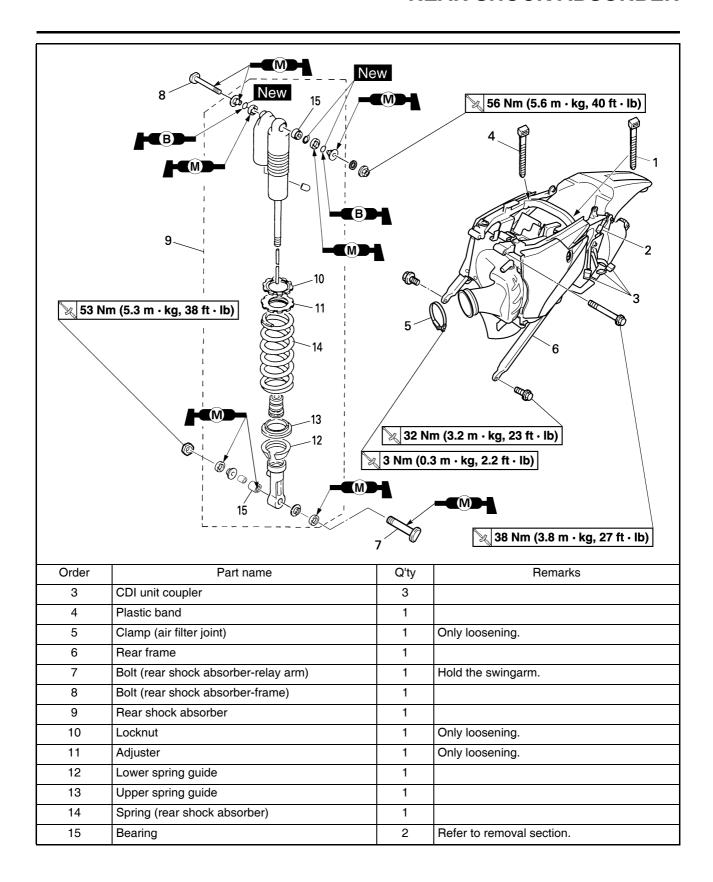
Bolt (drive chain support cover):

7 Nm (0.7 m•kg, 5.1 ft•lb)



REAR SHOCK ABSORBER REMOVING THE REAR SHOCK ABSORBER





HANDLING NOTE

WARNING

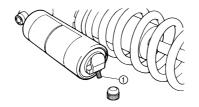
- Support the machine securely so there is no danger of it falling over
- This rear shock absorber is provided with a separate type tank filled with high-pressure nitrogen gas. To prevent the danger of explosion, read and understand the following information before handling the shock absorber. The manufacturer can not 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 wornout rear shock absorber, take the unit to your Yamaha dealer for this disposal procedure.

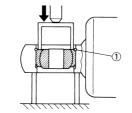


REMOVING THE BEARING

- 1. Remove:
- Stopper ring (upper bearing) "1"

NOTE:

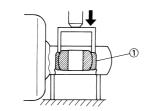
Press in the bearing while pressing its outer race and remove the stopper ring.



- 2. Remove:
- Upper bearing "1"

NOTE:

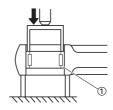
Remove the bearing by pressing its outer race.



- 3. Remove:
 - Lower bearing "1"

NOTE:

Remove the bearing by pressing its outer race.

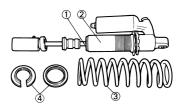


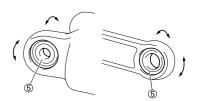
CHECKING THE REAR SHOCK ABSORBER

- 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.





INSTALLING THE BEARING

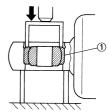
- 1. Install:
 - Upper bearing "1"

NOTE:

Install the bearing parallel until the stopper ring groove appears by pressing its outer race.

CAUTION:

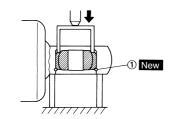
Do not apply the grease on the bearing outer race because it will wear the rear shock absorber surface on which the bearing is press fitted.



- 2. Install:
- Stopper ring (upper bearing) "1"
 New

NOTE:

After installing the stopper ring, push back the bearing until it contacts the stopper ring.



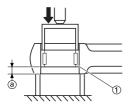
- 3. Install:
 - Lower bearing "1"

NOTE

Install the bearing by pressing it on the side having the manufacture's marks or numbers.



Installed depth of the bearing "a":
4 mm (0.16 in)

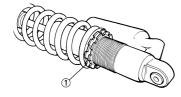


INSTALLING THE SPRING (REAR SHOCK ABSORBER)

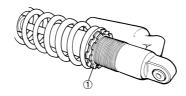
- 1. Install:
 - · Spring "1"
 - Upper spring guide "2"
 - · Lower spring guide "3"



- 2. Tighten:
 - Adjuster "1"



- 3. Adjust:
 - Spring length (installed)
 Refer to "ADJUSTING THE
 REAR SHOCK ABSORBER
 SPRING PRELOAD" section in
 the CHAPTER 3.
- 4. Tighten:
 - Locknut "1"

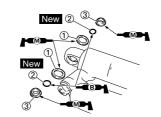


INSTALLING THE REAR SHOCK ABSORBER

- 1. Install:
- Dust seal "1"
- O-ring "2" New
- Collar "3"

NOTE:

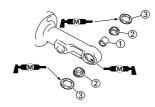
- Apply the molybdenum disulfide grease on the dust seal lips and collars.
- Apply the lithium soap base grease on the O-rings.



- 2. Install:
 - Bushing "1"
 - Collar "2"
 - Dust seal "3"

NOTE:

- Apply the molybdenum disulfide grease on the bearing and dust seal lips.
- Install the dust seals with their lips facing outward.



- 3. Install:
- · Rear shock absorber
- 4. Install:
- Bolt (rear shock absorber-frame)
- Washer "2"
- Nut (rear shock absorber-frame)
 "3"

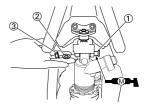


Nut (rear shock absorber-frame): 56 Nm (5.6 m•kg, 40

56 Nm (5.6 m•kg, 40 ft•lb)

NOTE:

Apply the molybdenum disulfide grease on the bolt.



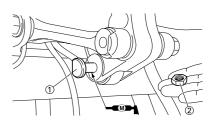
- 5. Install:
 - Bolt (rear shock absorber-relay arm)"1"
- Nut (rear shock absorber-relay arm) "2"



Nut (rear shock absorber-relay arm): 53 Nm (5.3 m•kg, 38 ft•lb)

NOTE: _

Apply the molybdenum disulfide grease on the bolt.



- 6. Install:
 - · Rear frame "1"
 - Bolt [rear frame (upper)] "2"

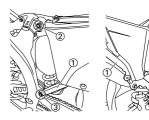


Bolt [rear frame (upper)]: 38 Nm (3.8 m•kg, 27 ft•lb)

• Bolt [rear frame (lower)] "3"



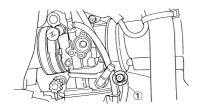
Bolt [rear frame (lower)]: 32 Nm (3.2 m•kg, 23 ft•lb)



- 7. Tighten:
 - Screw (air filter joint) "1"



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

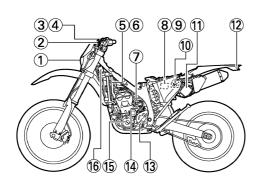


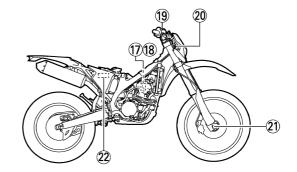
- 8. Install:

 - Plastic band
 Taillight coupler
 Locking tie

ELECTRICAL COMPONENTS AND WIRING DIAGRAM

ELECTRICAL ELECTRICAL COMPONENTS AND WIRING DIAGRAM ELECTRICAL COMPONENTS





- 1. Headlight
- 2. Multi-function display
- 3. Engine stop switch
- 4. Clutch switch
- 5. Diode
- 6. Starter relay diode
- 7. Throttle position sensor
- 8. Starter relay

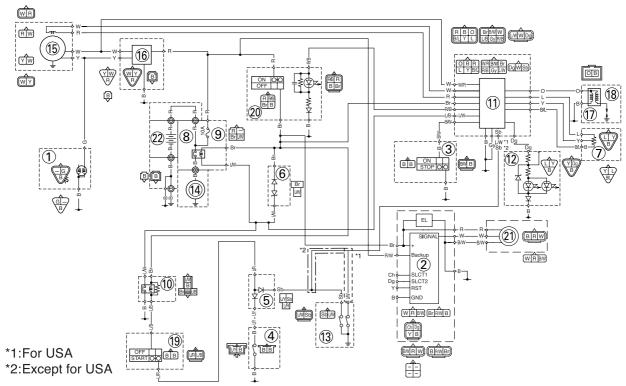
- 9. Fuse
- 10. Starting circuit cut-off relay
- 11. CDI unit
- 12. Taillight
- 13. Neutral switch
- 14. Starter motor
- 15. AC magneto
- 16. Rectifier/regulator

- 17. Ignition coil
- 18. Spark plug
- 19. Start switch
- 20. Main switch
- 21. Speed sensor
- 22. Battery

7

ELECTRICAL COMPONENTS AND WIRING DIAGRAM

WIRING DIAGRAM



| 1. | Headlight | С |
|-----|--------------------------------|----|
| 2. | Multi-function display | В |
| 3. | Engine stop switch | В |
| 4. | Clutch switch | C |
| 5. | Diode | D |
| 6. | Starter relay diode | G |
| 7. | Throttle position sensor | G |
| 8. | Starter relay | Ĺ |
| 9. | Fuse | Ċ |
| 10. | Starting circuit cut-off rela- | |
| 11. | CDI unit | S |
| 12. | Taillight | V |
| 13. | Neutral switch | Y |
| 14. | Starter motor | В |
| 15. | AC magneto | В |
| 16. | Rectifier/regulator | L, |
| 17. | Ignition coil | Ī. |
| 18. | Spark plug | Ĺ |
| 19. | Start switch | L |

20. Main switch

22. Battery

21. Speed sensor

COLOR CODE В Black Зr Brown Ch Chocolate Ͻg Dark green G Green Gy Gray Blue Orange 0 Red R Sky blue Sb N White Yellow 3/L Black/Blue Black/White 3/W Blue/Black JB Blue/Red _/R Blue/Yellow _/Y Blue/White L/W Red/Black R/B

Red/White

R/W

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.

| *1 Check fuse. | No good $ ightarrow$ | Replace fuse and check wire harness. |
|--|-----------------------|--------------------------------------|
| ок ↓ | • | |
| *2 Check battery. | No good \rightarrow | Recharge or replace. |
| ок ↓ | • | |
| Spark gap test | Spark \rightarrow | *3 Clean or replace spark plug. |
| No spark ↓ | • | |
| Check entire ignition system for connection. (couplers, leads and ignition coil) | No good → | Repair or replace. |
| ok ↓ | • | |
| Check engine stop switch. | No good \rightarrow | Replace. |
| ок ↓ | • | |
| Check main switch. | No good $ ightarrow$ | Replace. |
| ок ↓ | • | |
| Check ignition coil. (primary coil and secondary coil) | No good → | Replace. |
| ок ↓ | • | |
| Check AC magneto. (pickup coil) | No good \rightarrow | Replace. |
| ок ↓ | • | |
| Check neutral switch. | No good \rightarrow | Repair or replace. |
| ок ↓ | • | |
| Replace CDI unit. | | |

NOTE:

- Remove the following parts before inspection.
- 1. Seat
- 2. Fuel tank
- Use the following special tools in this inspection.



Dynamic spark tester:

YM-34487 Ignition checker:

90890-06754

Pocket tester:

YU-3112-C/90890-03112

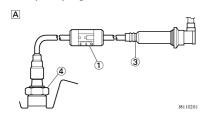
^{*1} marked: Refer to "CHECKING THE FUSE" section in the CHAPTER 3.

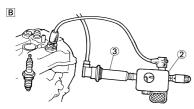
^{*2} marked: Refer to "CHECKING AND CHARGING THE BATTERY" section in the CHAPTER 3.

^{*3} marked: Only when the ignition checker is used.

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"





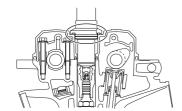
- A. For USA and CDN
- B. Except for USA and CDN
- 4. Kick the kickstarter crank.
- 5. Check the ignition spark gap.
- Start engine, and increase spark gap until misfire occurs. (for USA and CDN only)



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

Tester (+) lead → Black lead "1" Tester (-) lead → Black lead "2"



Result

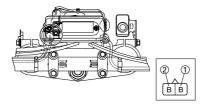
Conductive (while the engine stop switch is pushed)

Not conductive while it is pushed → Replace.

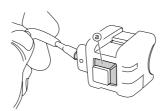
Conductive while it is freed \rightarrow Replace.

NOTE: _

Set the tester selection position to " $\Omega \times 1$ ".



- 2. Inspect:
 - Rubber part "a"
 Tears/damage → Replace.



CHECKING THE MAIN SWITCH

- 1. Inspect:
 - · Main switch conduction

Tester (+) lead → Red lead "1" Tester (-) lead → Brown lead "2"



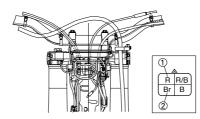
Result

Conductive (while the main switch is moved to "ON")

Not conductive while the main switch is moved to "ON" \rightarrow Replace. Conductive while the main switch is moved to "OFF" \rightarrow Replace.

NOTE:

Set the tester selection position to " $\Omega \times 1$ ".

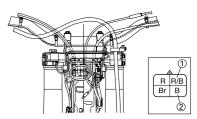


- 2. Inspect:
 - · Main switch indicator light

Use 12 V battery.

Battery (+) lead → Red/Black lead "1" Battery (-) lead → Black lead "2"

Indicator light does not come on \rightarrow Replace.



- 3. Inspect:
 - Rubber part "a"
 Tears/damage → Replace.

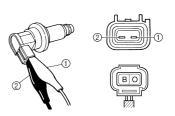


CHECKING THE IGNITION COIL

- 1. Remove the ignition coil cap.
- 2. Inspect:
 - Primary coil resistance
 Out of specification → Replace.

Tester (+) lead → Orange lead "1" Tester (-) lead → Black lead "2"

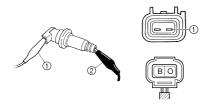
| 0 | Primary coil resis- tance | Tester se- lector posi- tion | |
|---|------------------------------------|------------------------------------|--|
| | 0.08–0.10 Ω at 20 °C (68 °F) | Ω × 1 | |



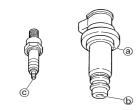
- 3. Inspect:
- Secondary coil resistance
 Out of specification → Replace.

Tester (+) lead → Orange lead "1" Tester (-) lead→Spark plug terminal "2"

| 0 | Secondary coil resis- tance | Tester se- lector posi- tion |
|---|-----------------------------------|------------------------------------|
| | 4.6–6.8 kΩ at 20 °C (68 °F) | kΩ × 1 |



- 4. Inspect:
 - · Sealed portion of ignition coil "a"
- · Spark plug terminal pin "b"
- Threaded portion of spark plug "c" Wear → Replace.

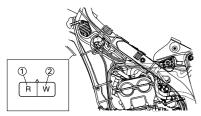


CHECKING THE AC MAGNETO

- 1. Inspect:
 - Pickup coil resistance
 Out of specification → Replace.

Tester (+) lead → Red lead "1" Tester (-) lead → White lead "2"

| 0 | Pickup coil resistance | Tester se- lector posi- tion |
|---|----------------------------------|------------------------------------|
| | 248–372 Ω at 20 °C (68 °F) | Ω × 100 |



CHECKING THE NEUTRAL SWITCH

- 1. Inspect:
 - · Neutral switch conduction

Tester (+) lead → Sky blue lead
"1"
Tester (-) lead → Ground "2"



" $\Omega \times 1$ ".

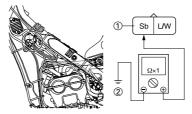
Result

Conductive (while gear is in neutral)

Not conductive while it is in neutral Replace.

Conductive while it is engaged \rightarrow Replace.

NOTE: _______
Set the tester selection position to



CHECKING THE CDI UNIT

Check all electrical components. If no fault is found, replace the CDI unit. Then check the electrical components again.

ELECTRIC STARTING SYSTEM

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is set to "ON", the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed). The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the

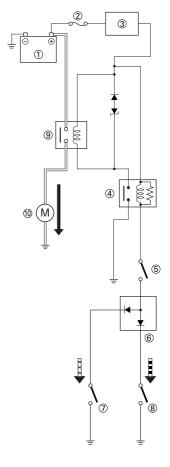


start switch.

WHEN THE TRANSMISSION IS IN NEUTRAL



WHEN THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR



- Battery
- 2. Main fuse
- 3. Main switch
- 4. Starting circuit cut-off relay
- 5. Start switch
- 6. Diode
- 7. Clutch switch
- 8. Neutral switch
- 9. Starter relay
- 10. Starter motor



Pocket tester:

YU-3112-C/90890-03112

CHECKING THE COUPLERS AND LEADS CONNECTION

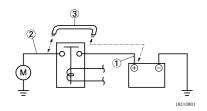
- 1. Check:
 - Couplers and leads connection Rust/dust/looseness/short-circuit
 → Repair or replace.

CHECKING THE STARTER MOTOR OPERATION

Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".
 Not operate → Repair or replace the starter motor.

WARNING

- A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.



CHECKING THE STARTING CIRCUIT CUT-OFF RELAY

- 1. Remove:
 - · Starting circuit cut-off relay
- 2. Inspect:
 - Starting circuit cut-off relay conduction

Use 12 V battery.

Battery (+) lead→Blue/Black lead "1"

Battery (-) lead → Brown lead "2"

Tester (+) lead → Blue/White lead "3"

Tester (-) lead → Black lead "4"



Result

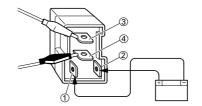
Conductive (while the battery is connected)

Not conductive while the battery is connected \rightarrow Replace.

Conductive while the battery is not connected \rightarrow Replace.

NOTE:

Set the tester selection position to " $\Omega \times 1$ ".



CHECKING THE STARTER RELAY

- 1. Remove:
- Starter relay
- 2. Inspect:
- Starter relay conduction Use 12 V battery.

Battery (+) lead → Starter relay terminal "1"

Battery (-) lead → Starter relay terminal "2"

Tester (+) lead → Starter relay terminal "3"

Tester (-) lead → Starter relay terminal "4"



Result

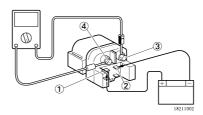
Conductive (while the battery is connected)

Not conductive while the battery is connected \rightarrow Replace.

Conductive while the battery is not connected \rightarrow Replace.

NOTE:

Set the tester selection position to " Ω \times 1".



CHECKING THE CLUTCH SWITCH

- 1. Inspect:
- · Clutch switch conduction

Tester (+) lead → Black lead "1" Tester (-) lead → Black lead "2"



Result

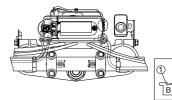
Conductive (while the clutch lever is pulled)

Not conductive while it is pulled→Replace.

Conductive while it is freed \rightarrow Replace.

NOTE:

Set the tester selection position to " Ω \times 1".

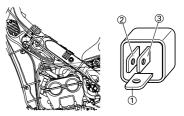


CHECKING THE DIODE

- Remove the diode from wire harness.
- 2. Inspect:
- Diode continuity Use pocket tester (tester selection position $\Omega \times 1$)

| Tester (+) → Blue/Red terminal "1" Tester (-) → Sky blue terminal "2" | Continu- ous |
|---|--------------------|
| Tester (+) → Blue/Red terminal "1" Tester (-) → Blue/Yel- low terminal "3" | Continu- ous |
| Tester (+) → Sky blue terminal "2" Tester (-) → Blue/Red terminal "1" | No con- tinuous |
| Tester (+) → Blue/Yellow terminal "3" Tester (-) → Blue/Red terminal "1" | No continuous |

Incorrect continuity \rightarrow Replace.



CHECKING THE START SWITCH

- 1. Inspect:
 - · Start switch conduction

Tester (+) lead → Black lead "1" Tester (-) lead → Black lead "2"



Result

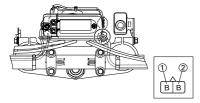
Conductive (while the start switch is pushed)

Not conductive while it is pushed \rightarrow Replace.

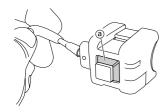
Conductive while it is freed \rightarrow Replace.

NOTE:

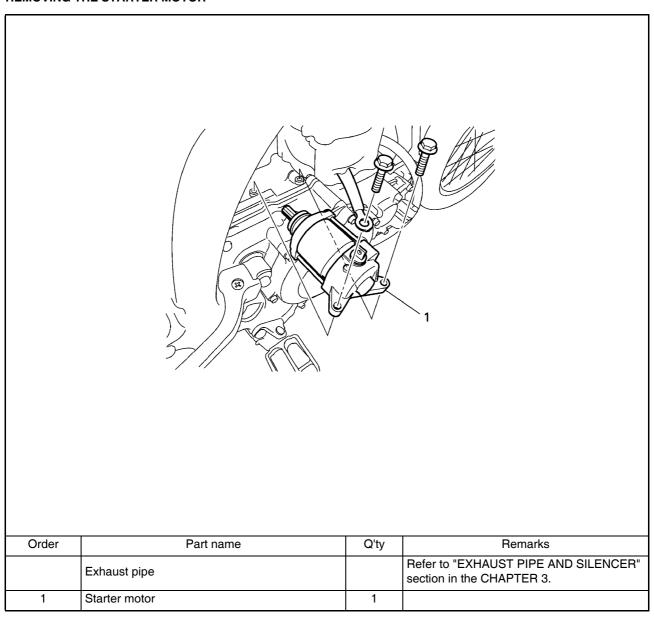
Set the tester selection position to " Ω \times 1".



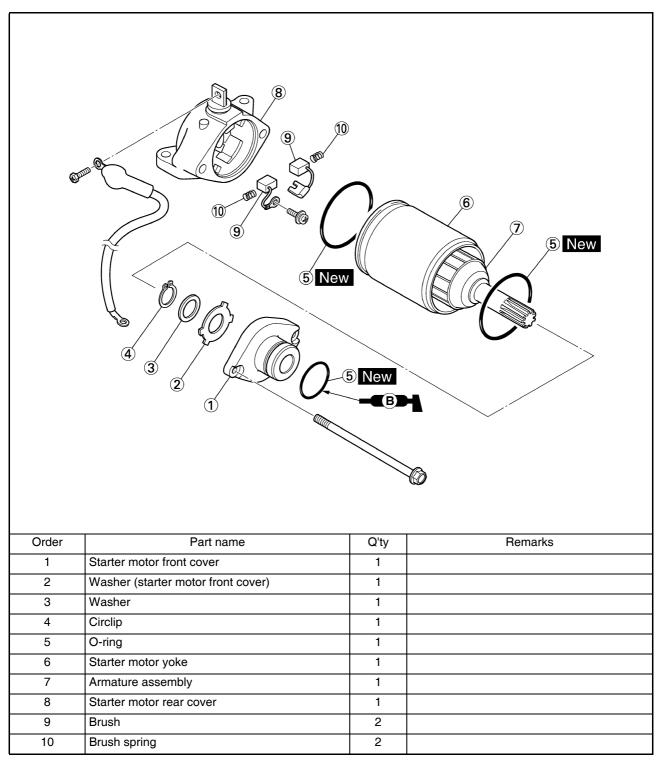
2. Inspect:
Rubber part "a"
Tears/damage → Replace.



REMOVING THE STARTER MOTOR



DISASSEMBLING THE STARTER MOTOR



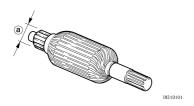
CHECKING AND REPAIRING THE STARTER MOTOR

- 1. Check:
 - Commutator Dirt → Clean with 600 grit sandpaper.
- 2. Measure:
 - Commutator diameter "a"
 Out of specification → Replace the starter motor.



Min. commutator diameter:

16.6 mm (0.65 in)



- 3. Measure:
 - Mica undercut "a"
 Out of specification → Scrape the mica to the proper measurement with a hacksaw blade which has been grounded to fit the commutator.



Mica undercut: 1.5 mm (0.06 in)

NOTE:

The mica must be undercut to ensure proper operation of the commutator.



4. Measure:

 Armature assembly resistances (commutator and insulation)
 Out of specification → Replace the starter motor.

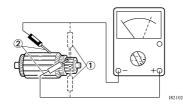
a. Measure the armature assembly resistances with the pocket tester.



Pocket tester: YU-3112-C/90890-03112



Armature assembly: Commutator resistance "1": 0.0117–0.0143 Ω at 20 °C (68 °F) Insulation resistance "2": Above 1 M Ω at 20 °C (68 °F)

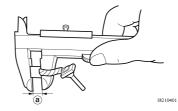


b. If any resistance is out of specification, replace the starter motor.

- 5. Measure:
 - Brush length "a"
 Out of specification → Replace
 the brushes as a set.



Min. brush length: 3.5 mm (0.14 in)



- 6. Measure:
- Brush spring force
 Out of specification → Replace
 the brush springs as a set.

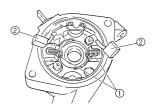


Brush spring force: 3.92–5.88 N (400–600 gf, 14.1–21.2 oz)



ASSEMBLING THE STARTER MOTOR

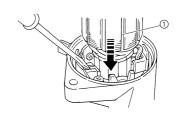
- 1. Install:
 - Brush spring "1"
- Brush "2"



- 2. Install:
 - Armature assembly "1" Install while holding down the brush using a thin screw driver.

CAUTION

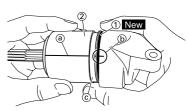
Be careful not to damage the brush during installation.



- 3. Install:
 - O-ring "1" New
 - Starter motor yoke "2"

NOTE:

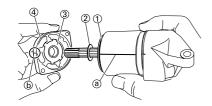
- Align the match mark "a" on the starter motor yoke with the match mark "b" on the starter motor rear cover.
- Install the starter motor yoke with its groove "c" facing rear cover.



- 4. Install:
 - O-ring "1" New
 - Circlip
 - Plain washer "2"
 - Washer (starter motor front cover)
 - Starter motor front cover "4"

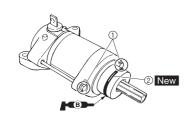
NOTE:

- For installation, align the projections on the washer with the slots in the front cover.
- Align the match mark "a" on the starter motor yoke with the match mark "b" on the starter motor front cover.



- 5. Install:
 Bolt "1"
- O-ring "2" New

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



CHARGING SYSTEM

| CHARGING SYSTEM | | |
|---|-----------------------|--------------------------------------|
| INSPECTION STEPS | | |
| If the battery is not charged, use the following insp | ection steps. | |
| *1 Check fuse. | No good \rightarrow | Replace fuse and check wire harness. |
| ок ↓ | • | |
| *2 Check battery. | No good \rightarrow | Recharge or replace. |
| ok ↓ | • | |
| Check each coupler and wire connection. | No good $ ightarrow$ | Repair or replace. |
| ok ↓ | • | |
| Check charging voltage. | $ok \rightarrow$ | Charging system is good. |
| No good ↓ | • | |
| Check AC magneto. (Charging coil) | No good $ ightarrow$ | Replace. |
| oк ↓ | • | |
| Replace rectifier/regulator. | | |
| *1 marked: Refer to "CHECKING THE FUSE" se | | |
| *2 marked: Refer to "CHECKING AND CHARGI | NG THE BATTE | ERY" section in the CHAPTER 3. |
| NOTE: | | |
| • Remove the following parts before inspection. | | |
| Seat Fuel tank | | |
| | | |
| Use the following special tools in this inspection. | | |
| > /2 Pocket tester: | | |

YU-3112-C/90890-03112

CHECKING THE COUPLERS AND LEADS CONNECTION

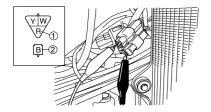
- 1. Check:
 - Couplers and leads connection Rust/dust/looseness/short-circuit
 → Repair or replace.

CHECKING THE CHARGING VOLTAGE

- 1. Start the engine.
- 2. Inspect:
 - Charging voltage
 Out of specification → If no failure
 is found in checking the source
 coil resistance, replace the rectifi er/regulator.

Tester (+) lead → Red lead "1" Tester (-) lead → Black lead "2"

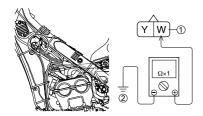
| 0 | Charging voltage | Tester se- lector posi- tion | |
|---|-----------------------------------|------------------------------------|--|
| | 14.0-15.0 V at 5,000 r/ min | DCV-20 | |



- 3. Inspect:
 - Charging coil resistance
 Out of specification → Replace.

Tester (+) lead → White lead "1" Tester (-) lead → Ground "2"

| 0 | Charging coil resis- tance | Tester se- lector posi- tion |
|---|--------------------------------------|------------------------------------|
| | 0.288-0.432 Ω at 20 °C (68 °F) | Ω × 1 |



THROTTLE POSITION SENSOR SYSTEM

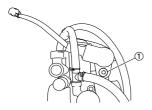
THROTTLE POSITION SENSOR SYSTEM **INSPECTION STEPS** If the throttle position sensor will not operate, use the following inspection steps. Check entire ignition system for connection. No good \rightarrow Repair or replace. ок↓ Check throttle position sensor.(Throttle position No good \rightarrow Replace. sensor coil) ок↓ Check CDI unit.(Throttle position sensor input No good \rightarrow Replace. voltage) Use the following special tools in this inspection. Pocket tester: YU-3112-C/90890-03112

THROTTLE POSITION SENSOR SYSTEM

HANDLING NOTE

CAUTION:

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.

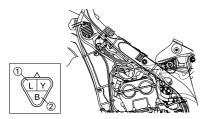
CHECKING THE THROTTLE POSITION SENSOR COIL

- 1. Inspect:
 - Throttle position sensor coil resistance

Out of specification \rightarrow Replace.

Tester (+) lead → Blue lead "1" Tester (-) lead → Black lead "2"

| Throttle po- sition sen- sor coil resistance | Tester se- lector posi- tion |
|---|------------------------------------|
| 4–6 kΩ at 20°C (68°F) | kΩ×1 |



- 2. Loosen:
 - Throttle stop screw "1"

NOTE

Turn out the throttle stop screw until the throttle shaft is in the full close position.



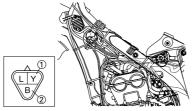
3. Inspect:

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.

Tester (+) lead → Yellow lead "1" Tester (-) lead → Black lead "2"

| 0 | Throttle position sensor coil variable resistance | | Tester selec- tor po- sition |
|---|---|---------------------------------|---------------------------------------|
| | Full closed | Full opened | |
| | Zero –2 k Ω at 20°C (68 °F) | 4–6 kΩat 20 °C (68 °F) | kΩ×1 |

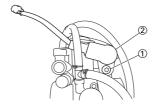


CHANGING AND ADJUSTING THE THROTTLE POSITION SENSOR

- 1. Remove:
- · Throttle position sensor coupler
- Carburetor
- 2. Remove:
 - Screw (throttle position sensor)
 - · Throttle position sensor "2"

NOTE:

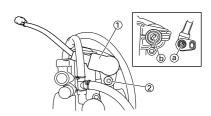
Loosen the screw (throttle position sensor) using the T25 bit.



- 3. Replace:
- · Throttle position sensor
- 4. Install:
- Throttle position sensor "1"
- Screw (throttle position sensor)
 "2"

NOTE:

- Align the slot "a" in the throttle position sensor with the projection "b" on the carburetor.
- Temporarily tighten the screw (throttle position sensor).

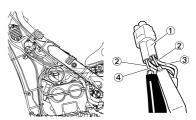


- 5. Install:
- Carburetor
- · Throttle position sensor coupler
- 6. Adjust:
 - Engine idling speed Refer to "ADJUSTING THE EN-GINE IDLING SPEED" section in the CHAPTER 3.
- 7. Insert the thin electric conductors "2" (lead) into the throttle position sensor coupler "1", as shown, and connect the tester to them.

Tester (+) lead → Yellow lead "3' Tester (-) lead → Black lead "4"

CAUTION:

- 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:

 Adjust the installation angle of the throttle position sensor "1" to obtain the specified output voltage.

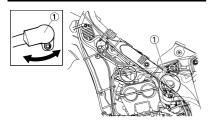
NOTE:

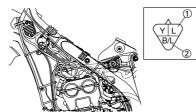
Measure the output voltage accurately with a digital electronic voltmeter that gives an easy reading of a small voltage.

THROTTLE POSITION SENSOR SYSTEM

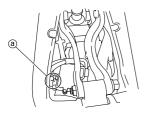
| 0 | Throttle po- sition sen- sor output voltage | Tester se- lector posi- tion |
|---|--|------------------------------------|
| | 0.58-0.78 V | DCV |

| 0 | Throttle po- sition sen- sor input voltage | Tester se- lector posi- tion |
|---|---|------------------------------------|
| | 4–6 V | DCV-20 |





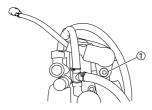
10. Put the aligning marks "a" on the throttle position sensor and carburetor.



- 11. Stop the engine.
- 12. Remove the carburetor.
- 13. Tighten:
 - Screw (throttle position sensor)
 "1"

NOTE:

Tighten the screw (throttle position sensor) using the T25 bit.



14. Install the carburetor.

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"

LIGHTING SYSTEM

LIGHTING SYSTEM **INSPECTION STEPS** Refer to the following flow chart when inspecting the lighting system for possible problems. Check the bulb and bulb socket. No good \rightarrow Replace the bulb and/or bulb socket. ок↓ Check the taillight (LEDs). No good \rightarrow Replace the taillight assembly. ок↓ Check the AC magneto. (Lighting coil) Replace. No good \rightarrow ок↓ Check the entire lighting system proper for con-Improperly Repair or replace. nections. connected \rightarrow ок↓ Check the rectifier/regulator. (Out-put voltage) No good \rightarrow Replace.

NOTE:

- · Remove the following parts before inspection.
- 1. Seat
- 2. Fuel tank
- 3. Left side cover
- Use the following special tools in this inspection.



Pocket tester:

YU-3112-C/90890-03112

CHECKING THE TAILLIGHT (LEDs)

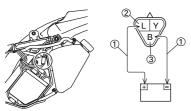
- 1. Disconnect the taillight coupler.
- Connect two jumper leads "1" from the battery terminals to the respective coupler terminal as shown.

Battery (+) terminal → Blue lead
"2"
Battery (-) terminal → Black lead
"3"

- 3. Check:
 - LED (for proper operation)
 Does not light → Replace the tail-light assembly.

WARNING

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.

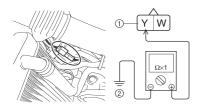


CHECKING THE AC MAGNETO

- 1. Inspect:
- Lighting coil resistance
 Out of specification → Replace.

Tester (+) lead → Yellow lead "1" Tester (-) lead → Ground "2"

| 0 | Light- ing coil resis- tance | Tester selector position |
|---|---|--------------------------|
| | 0.224– 0.336 Ω at 20 °C (68 °F) | Ω ×1 |



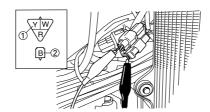
CHECKING THE RECTIFIER/ REGULATOR

- 1. Connect the battery leads.
- 2. Start the engine.

- 3. Turn on the headlight and taillight by turning on the light switch.
- 4. Inspect:
 - Out-put voltage
 Out of specification → Replace rectifier/regulator.

Tester (+) lead → Yellow lead "1"
Tester (-) lead → Black lead "2"

| 0 | Out-put voltage | Tester se- lector posi- tion |
|---|-----------------------------------|------------------------------------|
| | 12.5-13.5 V at 5,000 r/ min | ACV-20 |



SIGNALING SYSTEM

SIGNALING SYSTEM INSPECTION STEPS If the speedometer will not operate, use the following inspection steps. *1 Check battery. No good \rightarrow Recharge or replace. ок↓ Check each coupler and wire connection. No good \rightarrow Repair or replace. ок↓ Check multi-function display. (Input voltage) Replace wire harness. No good \rightarrow ок↓ Check multi-function display. (Output voltage) No good \rightarrow Replace multi-function display. ок↓ Check speed sensor. No good \rightarrow Replace. *1 marked: Refer to "CHECKING AND CHARGING THE BATTERY" section in the CHAPTER 3. • Remove the following parts before inspection. 1. Headlight • Use the following special tools in this inspection. Pocket tester:

YU-3112-C/90890-03112

CHECKING THE COUPLERS AND LEADS CONNECTION

- 1. Check:
 - Couplers and leads connection Rust/dust/looseness/short-circuit
 → Repair or replace.

CHECKING THE MULTI-FUNCTION DISPLAY INPUT VOLTAGE

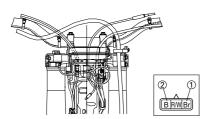
- Disconnect the multi-function display coupler.
- 2. Set the main switch to "ON".
- Measure:
 - Multi-function display input voltage
 - Out of specification \rightarrow Replace wire harness.

Tester (+) lead → Brown lead "1' Tester (-) lead → Black lead "2"

| 0 | Multi-func- tion dis- play input voltage | Tester se- lector posi- tion |
|---|---|------------------------------------|
| | 10 V or more | DCV-20 |

CAUTION:

Make sure that a short-circuit does not develop between the terminals because it may cause damage to electrical components.



CHECKING THE MULTI-FUNCTION DISPLAY OUTPUT VOLTAGE

- Disconnect the multi-function display coupler.
- 2. Set the main switch to "ON".
- 3. Measure:
 - Multi-function display output voltage

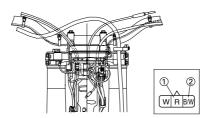
Out of specification \rightarrow Replace multi-function display.

Tester (+) lead → Red lead "1" Tester (-) lead→Black/White lead "2"

| 0 | Multi-func- tion dis- play output voltage | Tester se- lector posi- tion |
|---|--|------------------------------------|
| | 4.5 V or more | DCV-20 |

CAUTION:

Make sure that a short-circuit does not develop between the terminals because it may cause damage to electrical components.



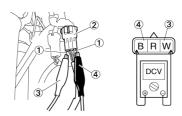
CHECKING THE SPEED SENSOR OUTPUT VOLTAGE

Insert the thin electric conductors
"1" (lead) into the speed sensor
coupler "2", as shown, and connect the tester to them.

Tester (+) lead → White lead "3" Tester (-) lead → Black lead "4"

CAUTION:

- 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.



- 2. Set the main switch to "ON".
- 3. Measure:
 - Speed sensor output voltage
 Output voltage not correct → Replace the speed sensor.

Measurement steps:

- a. Elevate the front wheel and slowly rotate it.
- Measure the voltage (DCV) of white lead and black lead. With each full rotation of the front wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

