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XVZ13TFL XVZ13TFLC

SERVICE MANUAL

EAS00001

**XVZ13TFL/XVZ13TFLC
SERVICE MANUAL**

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U.S.A.**

First edition, November 1998

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NOTICE

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

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

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

NOTE:

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

IMPORTANT INFORMATION

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



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



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



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

NOTE:

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

HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and inspection procedures are laid out with the individual steps in sequential order.

① The manual is divided into chapters. An abbreviation and symbol in the upper right corner of each page indicate the current chapter. Refer to “SYMBOLS” on the following page.

② Each chapter is divided into sections. The current section title is shown at the top of each page, except in Chapter 3 (“Periodic Inspections and Adjustments”), where the sub-section title(-s) appear.

(In Chapter 3, “Periodic Inspection and Adjustments”, the sub-section title appears at the top of each page, instead of the section title.)

③ Sub-section titles appear in smaller print than the section title.

④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

⑥ Symbols indicate parts to be lubricated or replaced (see “SYMBOLS”).

⑦ A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

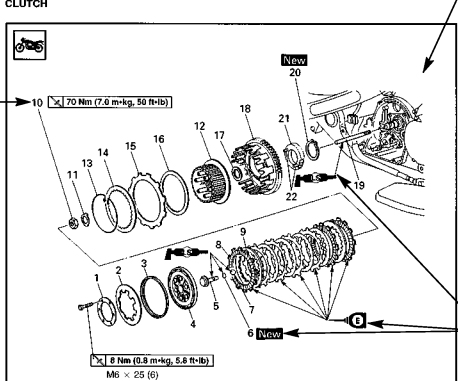
⑧ Jobs requiring more information (such as special tools and technical data) are described sequentially.

② ① ④

CLUTCH ENG 

CLUTCH ENG 

CLUTCH



⑤

⑦

Order	Job/Part	Qty	Remarks
1	Removing the clutch		
2	Clutch spring plate	1	Remove the parts in the order listed. Refer to “REMOVAL”.
3	Clutch spring	1	
4	Clutch spring seat	1	
5	Pressure plate	1	
6	Push rod #2	1	
7	O-ring	1	
8	Ball	1	
9	Friction plates	7	
10	Clutch plates	6	
11	Nut	1	
12	Lock washer	1	
13	Clutch boss	1	
14	Retaining wire	1	
15	Clutch plate	1	

REMOVING THE CLUTCH

1. Straighten the lock washer tab.
2. Loosen:
 - clutch boss nut ①

NOTE:
While holding the clutch boss ② with the universal clutch holder ③, loosen the clutch boss nut.

 **Universal clutch holder**
YM-91042, 90890-04086

CHECKING THE FRICTION PLATES
The following procedure applies to all of the friction plates.

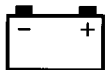
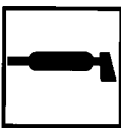
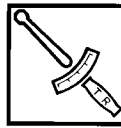
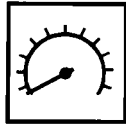
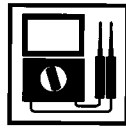
1. Check:
 - friction plate
 Damage/wear → Replace the friction plates as a set.
2. Measure:
 - friction plate thickness
 Out of specification → Replace the friction plates as a set.

NOTE:
Measure the friction plate at four places.

 **Friction plate thickness**
2.9 ~ 3.1 mm (0.114 ~ 0.122 in)
Limits: 2.8 mm (0.11 in)

4-47

4-49

① GEN INFO 	② SPEC 	
③ CHK ADJ 	④ ENG 	
⑤ COOL 	⑥ CARB 	
⑦ CHAS 	⑧ ELEC 	
⑨ TRBL SHTG 	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	⑰ 
⑱ 	⑲ 	⑳ 
㉑ 	㉒ 	㉓ 
㉔ 	㉕ New	

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SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic inspections and adjustments
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetor(-s)
- ⑦ Chassis
- ⑧ Electrical system
- ⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

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

Symbols ⑱ to ㉓ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑱ Engine oil
- ⑲ Gear oil
- ⑳ Molybdenum disulfide oil
- ㉑ Wheel bearing grease
- ㉒ Lithium soap base grease
- ㉓ Molybdenum disulfide grease

Symbols ㉔ to ㉕ in the exploded diagrams indicate the following:

- ㉔ Apply locking agent (LOCTITE®)
- ㉕ Replace the part

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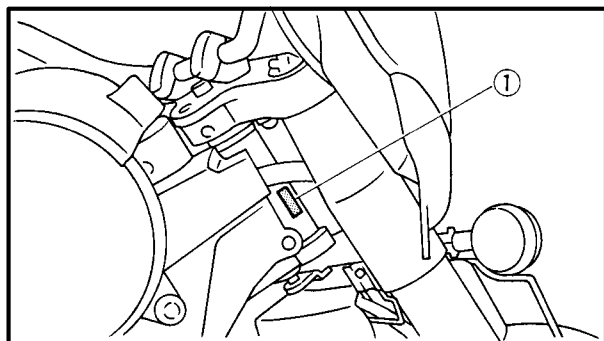
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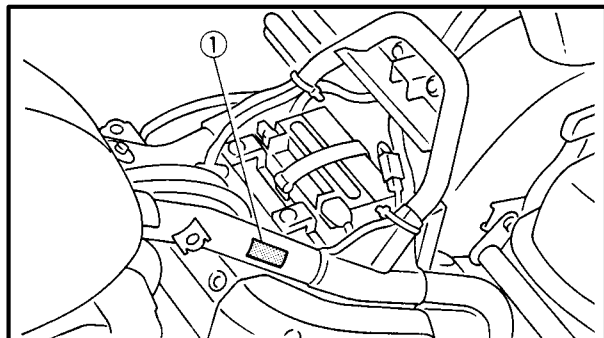
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GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the right side of the steering head.



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MODEL CODE

The model code label ① is affixed to the frame. This information will be needed to order spare parts.



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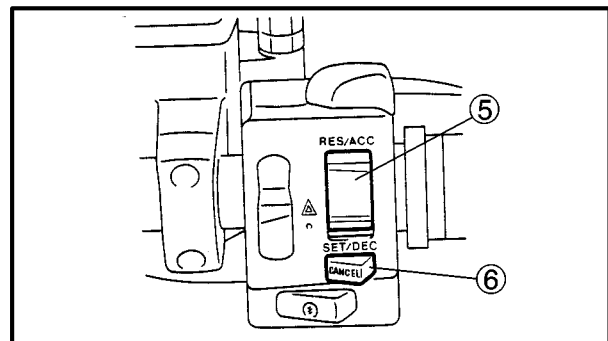
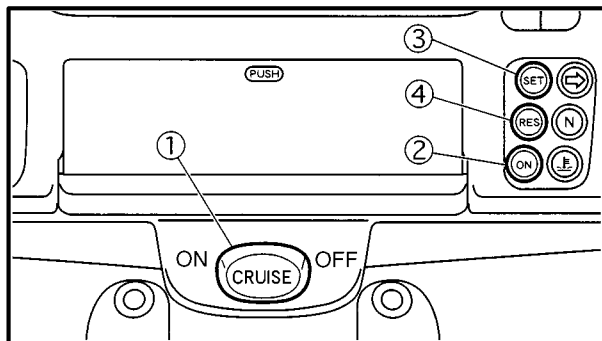
FEATURES

CRUISE CONTROL

This motorcycle is equipped with cruise control which designed to maintain a set speed.

CAUTION:

- Giving a severe load like using as a trailer/tractor or driving on a steep slope could remove the cruise control.
- Do not set the cruise control while idling the rear tires for the preparation.
- Do not disassemble the vacuum pump.
- Never remove the cruise control actuator rubber cover. When putting it back, bolts or other parts will be caught and the cruise control wire can be locked.
- Do not remove the air cleaner cover of the vacuum pump in order not to cause a malfunction in cancellation of the cruise control by dirt, trash etc.
- Do not drive without holding the steering wheel whether the cruise control is ON or OFF.



Cruise control switch functions

- ① “CRUISE” switch
- ② “ON” indicator light
- ③ “SET” indicator light
- ④ “RES” indicator light
- ⑤ Cruise control switch
- ⑥ “CANCEL” switch
- ① “CRUISE” switch

Push this switch to “ON” when the cruise control system is preset. The “ON” indicator light will come on. Once the switch is released it will return to the center (Hold) position.

To cancel the cruise control system, push the switch to “OFF” or main switch to the “OFF” position.

- ② “ON” indicator light

This indicator light comes on when the cruise control systems preset (when “ON” is selected by the “CRUISE” switch).

- ③ “SET” indicator light

This indicator light comes on when the motorcycle is operating at a set speed.

- ④ “RES” indicator light

This light comes on when the set speed, which is cancelled by any steps, is memorized and when the operating speed is in the range of approx. 50-130 km/h (30-80mi/h).

If the resume system is operated while this light is on, it continues flashing until the speed returns to that memorized.

- ⑤ Cruise control switch

This switch is capable of the following controls.

Refer to the “Operation chart” for details.

Set speed ride

Minute adjustment of set speed

Consecutive adjustment of set speed

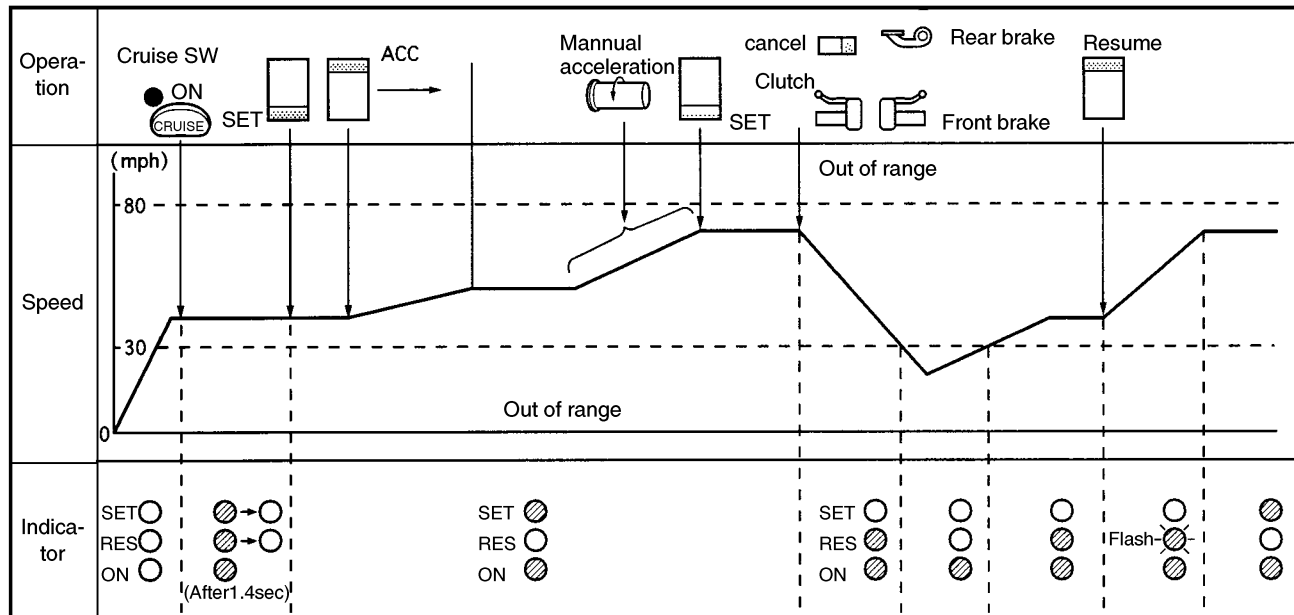
“RESUME” system

- ⑥ “CANCEL” switch

Push this switch to cancel the set speed ride in the cruise control system.



Operation chart



Cruise control function

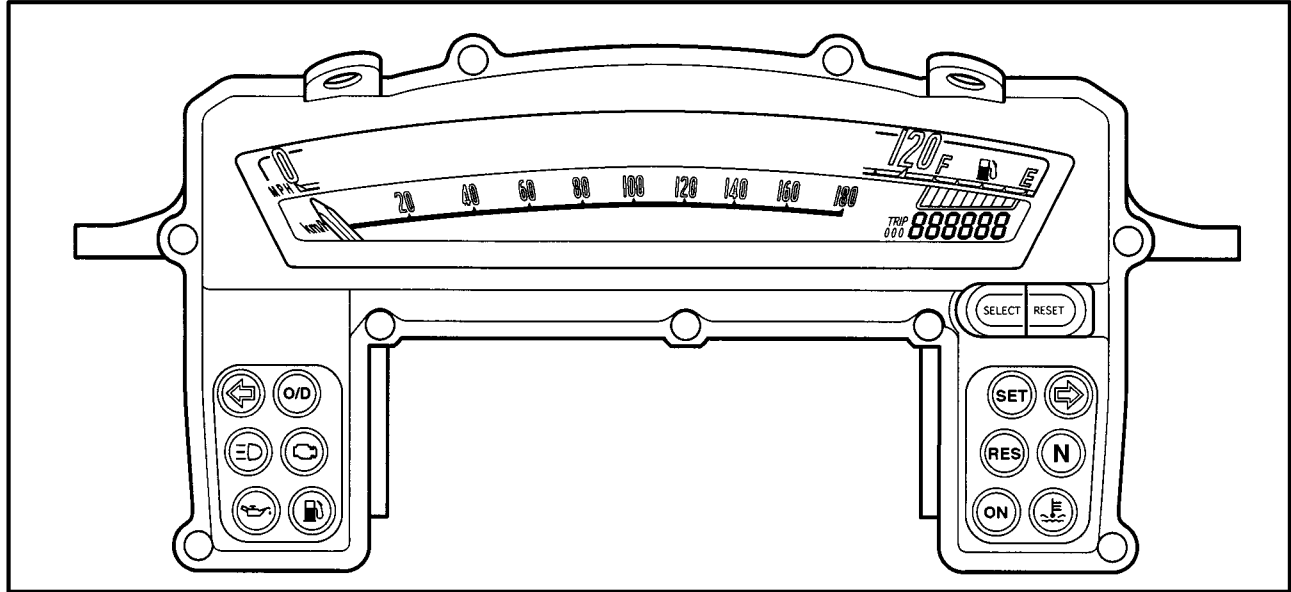
- 1) The cruise control can only be activated when riding in 4th, 5th gear and traveling between the speed of 50 and 130 km/h (30 and 80 mi/h).
- 2) To operate the system, the "CRUISE" switch should be turned "ON".
- 3) When push the cruise control switch to "SET", the cruise control system will be set the set speed.
- 4) By pushing (in shorter than 0.5 seconds), the control switch in the direction of either "ACC" or "DEC", the set speed can be changed in increments or decrements of approximately 1.6 km/h (1 mi/h).
- 5) If the control switch is held in the "ACC" or "DEC" position (longer than 0.5 seconds), the speed can be successively increased or decreased slowly.
- 6) The cruise control will be deactivated if the front or rear brake is applied or if the clutch is disengaged or if the "CANCEL" switch is pushed.
- 7) After canceling, the speed is returned to the one set before the cancellation by pushing the control switch once in the "RES" direction.
- 8) Auto cruise function is canceled;
 - a. In case of current speed drops 8 km/h (5 mi/h) less than the originally set speed.
 - b. In case of gear position is moved to gears other than of 4th, 5th.
 - c. In case of systems fines any faulty signal in the following systems.
 - Control unit
 - Actuator cable
 - Logical error in cut off signal
 - Error signal in speed sensor signal
 - Error signal in engine revolution
 - Cruise control switch lead ("SET"/"RES")
- 9) When main switch is cut off once, "resume" is canceled.



DIGITAL SPEEDOMETER

This speedometer is equipped with:

- An odometer
- Two trip odometers
- A fuel reserve trip meter
- A clock



Odometer and trip meter modes

1) Selecting a mode

Push the “SELECT” button to change between the odometer mode “ODO” and the trip odometer modes “TRIP 1” and “TRIP 2” in the following order.

“ODO” → “TRIP 1” → “TRIP 2” → “ODO”

If the fuel level indicator light comes on, the odometer display will automatically change to the fuel reserve trip meter mode “TRIP F” and start counting the distance traveled from that point.

Push the “SELECT” button to change between the fuel reserve trip meter, trip odometer and odometer modes in the following order:

“TRIP F” → “TRIP 1” → “TRIP 2” → “ODO” → “TRIP F”

2) Resetting a meter

To reset a trip odometer to 0.0, select it by pushing the “SELECT” button and push the “RESET” button.

To reset the fuel reserve trip meter, select it by pushing the “SELECT” button and push the “RESET” button. The display will return to prior mode (“ODO”, “TRIP 1” or “TRIP 2”).

If you do not reset the fuel reserve trip meter manually, it will automatically reset and return to “TRIP 1” after refueling and the motorcycle has traveled both 5km.

NOTE:

- If the fuel reserve trip meter appears, and a different mode was NOT selected prior to resetting the fuel reserve trip meter, the display always returns to the “TRIP 1” mode.
- If the fuel reserve trip meter appears, and a different mode was selected prior to resetting the fuel reserve trip meter, the display automatically returns to the prior mode.

**Clock mode**

To change the display to the clock mode, push both the “SELECT” and “RESET” buttons.

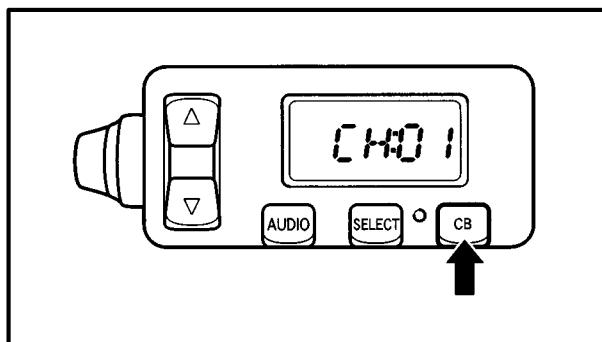
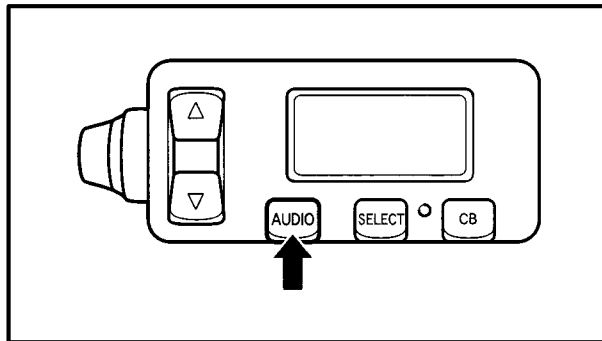
To change the display back to odometer mode, push the “RESET” button.

1) To set the clock

- a. Push both the “SELECT” and “RESET” buttons for at least two seconds.
- b. When the hour digits start flashing, push the “RESET” button to set the hours.
- c. Push the “SELECT” button and the minute digits will start flashing.
- d. Push the “RESET” button to set the minutes.
- e. Push the “SELECT” button to start the clock.

NOTE:

After setting the clock, be sure to push the “SELECT” button before turning the main switch to “OFF”, otherwise the clock will not be set.

**AUDIO SYSTEM AND CB RADIO****1. POWERING ON/OFF THE AUDIO AND CB RADIO SYSTEM****Turning on/off the audio system**

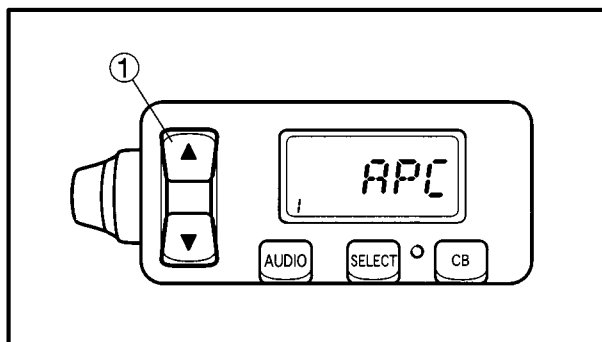
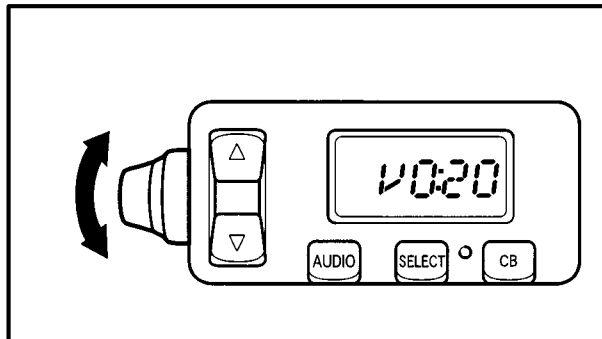
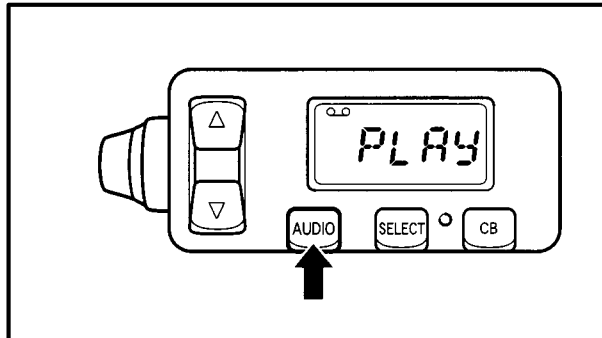
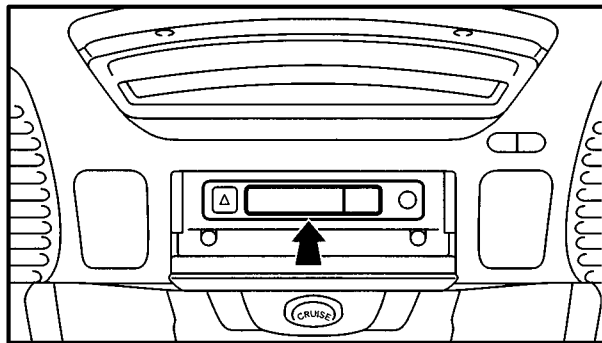
Turn the main switch to the “ACC” or “ON” position.

- To turn on the power for the audio system, push the audio button “AUDIO”.
- To turn off the audio system, push the audio button “AUDIO” continuously for 1 second or more.

Turning on/off the CB radio system

Turn the main switch to the “ACC” or “ON” position.

- To turn the power for the CB radio system, push the “CB” button. The “CB” indicator light will come on.
- To turn off the power for the CB radio system, push the “CB” button continuously for 1 second or more. The “CB” indicator light will go off.



2. CASSETTE DECK OPERATION

The cassette tape deck has the following functions.

- Song search
 - Change tape play direction
 - Dolby noise reduction
 - Blank tape skip
- a. Turn the main switch to the "ACC" or "ON" position and push the "AUDIO" button to turn on the power.
 - b. Insert a cassette tape into the cassette deck.
 - c. If a tape is already loaded in the cassette deck, push the "AUDIO" button until "PLAY" appears. The tape will start playing.
 - d. Turn the volume control knob to set the volume level. The volume level can be set from 0 to 30.

Track searching

To search for a song on the tape, push the up-down switch ① for less than one second. The "APC" (auto program control) indicator will appear in the display.

Push the switch once for each song to be skipped. Pushing the switch in direction "Δ" will search in the forward direction.

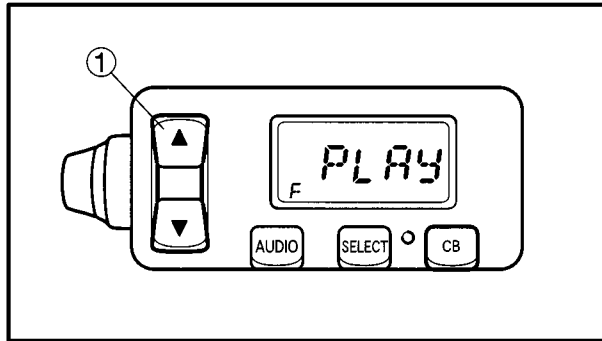
Pushing the switch in direction "▽" will search in the reverse direction.

When searching in the forward direction, the number of song that are being skipped will appear. (i.e., "1", meaning one track is being skipped)

When searching the reverse direction, the number of song that are being skipped will appear along with a minus sign before the number. (i.e., "-1", meaning one song is being skipped)

The maximum number of songs that can be skipped in either direction is 9.

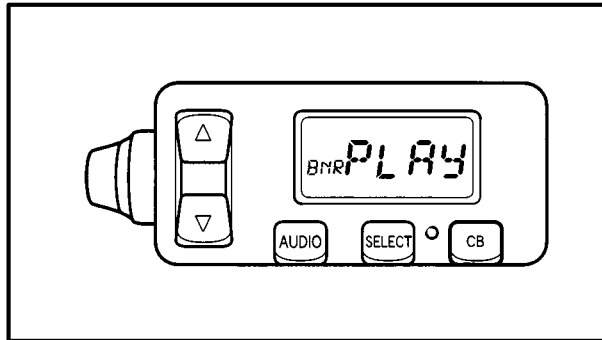
To stop a searching operation, push the up-down button in the opposite direction that it was originally pushed.



Reserving tape play direction

Push the up-down button ① in either direction for more than one second to reverse tape play. When the tape is playing the forward direction, the “F” indicator will appear.

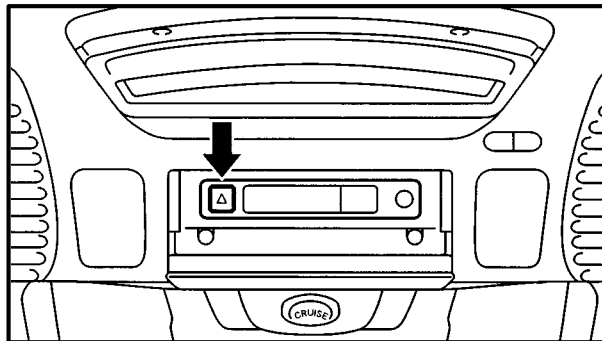
When the tape is playing in the reverse direction, the “R” indicator will appear.



Dolby noise reduction

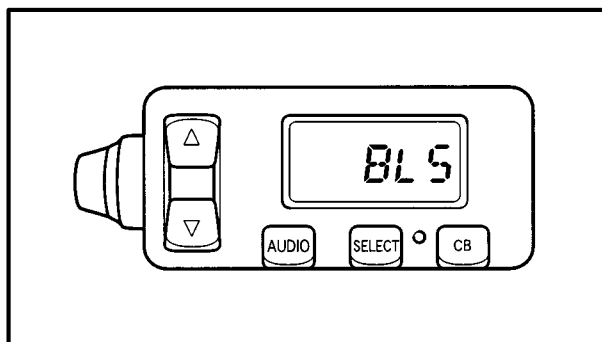
The Dolby noise reduction can be turned on or off by pushing the “EJECT” button for at least two seconds.

When the noise reduction is on, the “BNR” indicator appears in the display.



Ejecting the cassette tape

Push the “EJECT” button to eject the tape from the cassette deck.



Blank skipping

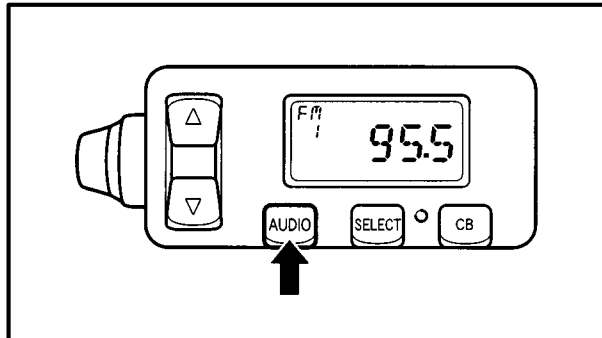
When there is a blank portion on the cassette tape the “BLS” indicator light will come on and the cassette deck automatically fast forwards the tape to the next track.



3. RADIO OPERATION

The radio has the following functions.

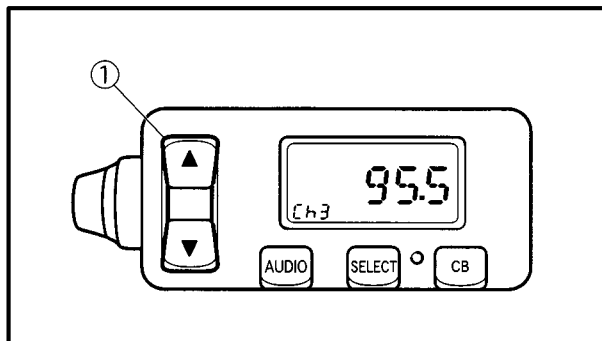
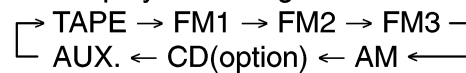
- Switching the receiving band
- Switching the receiving station
- Automatic tuning (Seek)
- Manual tuning
- Programing preset stations in memory
- Automatic writing of stations in memory (Auto store operation)



Switching the receiving bands

This radio system has 3 bands for FM and 1 band for AM. Select a band by pushing the “AUDIO” button for less than 1 second.

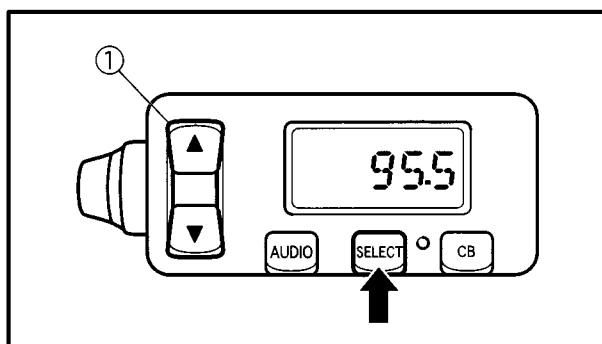
The display will change as follows.



Automatic tuning (Seek operation)

Push the up-down switch ① in either direction and hold it for as least 1 second.

The tuner will automatically stop at the first station that has a strong enough radio wave.

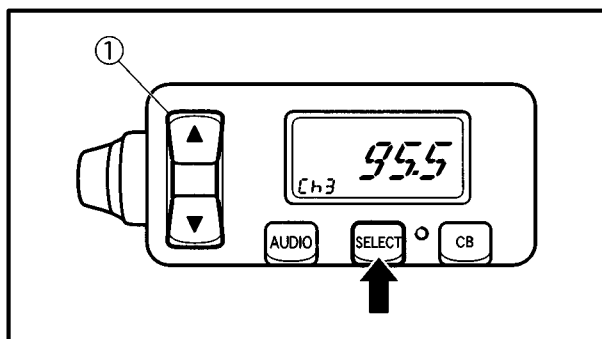


Manually turning

When a radio wave is too weak to be picked up automatically, it can be selected manually as follows.

Push the “SELECT” button until “RADIO” station appears.

Push the up-down switch ① for less than 1 second in either direction and the ferequency will change in 0.2 MHz steps for FM and in 10 kHz for AM.



Presetting station in memory

Station can be preset either automatically or manually. 6 stations can be set for each band. Preset station either manually or automatically by the following procedure.

- Select the station desired to be preset.
- Push the “SELECT” button for as least 2 seconds untl the radio frequency and the channel “Ch” start flashing.



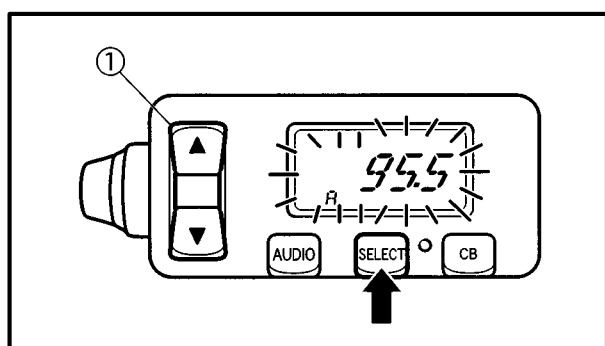
- c. Push the up-down switch ① in either direction to select the channel number to be set for the current station. (Ch1, Ch2, Ch3, Ch4, Ch5 and Ch6)

- d. Press the “SELECT” button to program the channel in memory.

Repeat this procedure for the remaining stations desired to be preset in the memory.

Stations can also be automatically preset by the following procedure.

- a. Push the “SELECT” button until the radio frequency and the channel “Ch” start flashing.
- b. Push the up-down button in either direction for at least 1 second to automatically tune in a station.
- c. When the desired station is found, push the up-down switch for less than one second to select the channel number to be set for that station.
- d. Push the “SELECT” button to program the channels in memory.
- e. Repeat this procedure for the remaining stations desired to be preset in memory.



Programing preset stations in memory automatically

Setting up to 6 channels can be made by the following procedure.

NOTE:

Stations will be starting from the station preset at channel 6.

It is recommended to use this function only in areas with strong radio frequencies.

- a. Push the “SELECT” button until the radio frequency and the channel “Ch” start flashing.
- b. Push the up-down switch ① in either direction to select channel “A”.
- c. Press the “SELECT” button to start the random channel selection and the tuner will automatically write the channels in memory.



4. CB RADIO OPERATION

This CB radio will operate on any of the 40 frequencies designated as Citizens band channels by the Federal Communications Commission (F.C.C.).

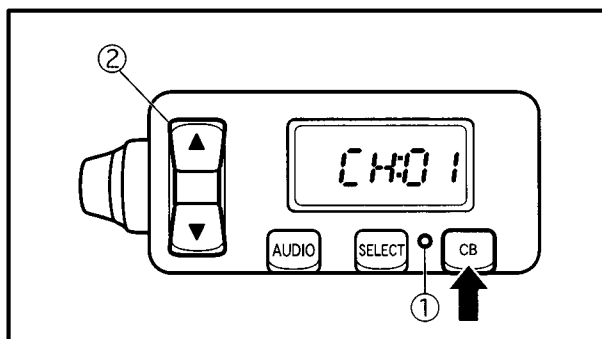
This model features a frequency synthesizing circuit with PHASE LOCK LOOP techniques to assure ultraprecise frequency control. This radio has been Type Accepted and Type Certified by the F.C.C.

The Citizens band Radio Service is under the jurisdiction of the Federal Communications Commission (F.C.C.). Any adjustments or modifications which would alter the performance of the transceiver's original F.C.C. Type Acceptance or which would change the frequency determining method are strictly prohibited.

Replacement or substitution of Crystals, Transistors, IC, Regulator, Diodes or any other part of unique nature, with parts other than those recommended may cause violation of the technical regulation of Part 95 of the F.C.C. Rules or Violation of Type Acceptance requirements of Part 2 of the Rules.

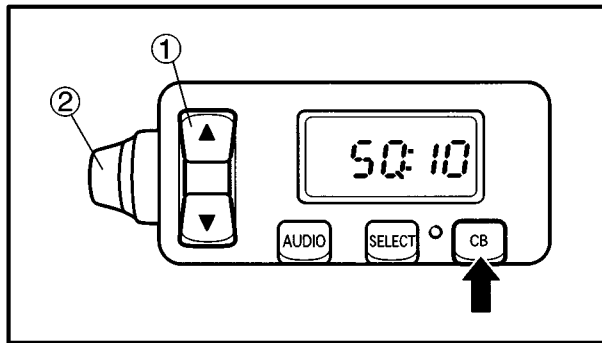
The CB radio is capable of the following functions

- Changing the transmitting of the receiving channel
- Adjusting the squelch level
- Adjusting the receiving volume level
- Transmitting and receiving



Changing the transmitting and receiving channel

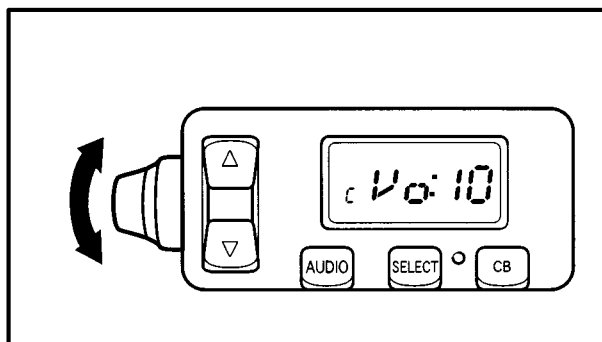
- Push the "CB" button to turn on the power. The "CB" indicator light ① will come on and the current channel will appear in the display.
- Push the up-down switch ② in either direction to change channels. The channels available are from "Ch:01" to "Ch:40".



Alternating the squelch level

This squelch control is adjusted to cut off or eliminate received background noise in the absence of an incoming signal. For maximum receive sensitivity, it is recommended that the control be set the point where the receive background noise or ambient background noise is eliminated. Turn the control knob fully counter-clockwise, then slowly clockwise (or push the up-down switch in either direction) until the receive noise disappears. In order to be heard, any signal must now be slightly stronger than the average received noise. Further clockwise setting will increase the threshold level which a signal must overcome in order to be heard. Only strong signals will be heard at the maximum setting.

- Push the "CB" button for less than one second to switch to squelch. The squelch level will appear in the display. (i. e. , SQ :10)
The squelch level can be set from 1 to 20.
- Push the up-down switch ① in either direction or use the volume control knob ② to change the squelch level. After setting the level (5 seconds), the display will automatically change back to the "CB" mode and the channel will appear.



Changing the receive volume for the CB radio

Turn the volume control knob to change the receiving volume level for the CB radio. After setting the level, the display will automatically change back to the "CB" mode and the channel will appear.

The volume level can be set from 0 to 20.



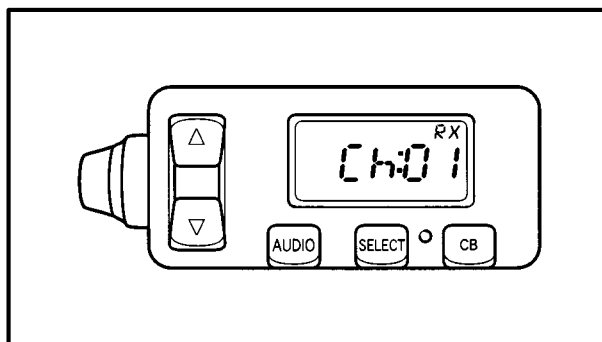
Channel information

Channel	Channel Frequency in MHz	Channel	Channel Frequency in MHz
1	26.965	21	27.215
2	26.975	22	27.225
3	36.985	23	27.235
4	27.005	24	27.245
5	27.015	25	27.255
6	27.025	26	27.265
7	27.035	27	27.275
8	27.055	28	27.285
9	27.065	29	27.295
10	27.075	30	27.305
11	27.085	31	27.315
12	27.105	32	27.325
13	27.115	33	27.335
14	27.125	34	27.345
15	27.135	35	27.355
16	27.155	36	27.365
17	27.165	37	27.375
18	27.175	38	27.385
19	27.185	39	27.395
20	27.205	40	27.405

NOTE:

This radio has been designed for operation in the 11 meter Citizens Radio Service. It uses a frequency synthesizing circuit with Phase Locked Loop (PLL) techniques to provide crystal controlled transmit and receive operation on all 40 channels.

The PLL circuitry assures ultraprecise frequency control. It is designed to meet the Federal Communications Commission requirements applicable to equipment operating in the Citizens Radio Service. and is not to be used for any other purpose.



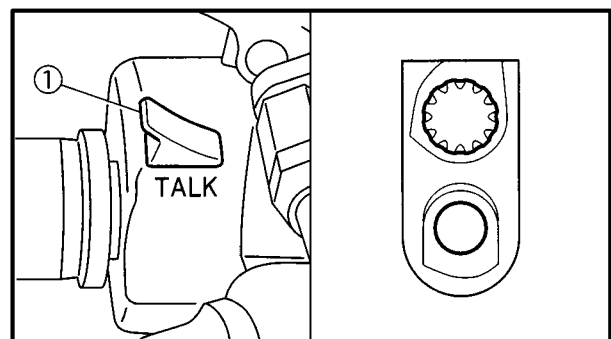
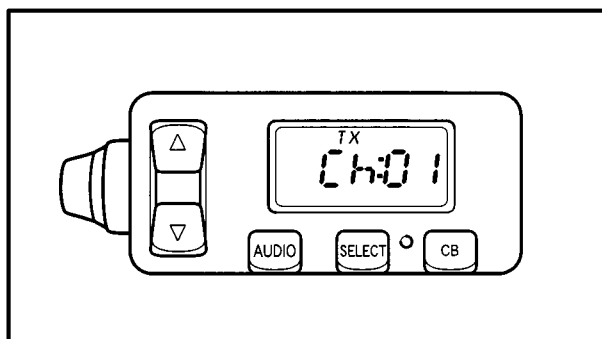
Receiving/transmitting

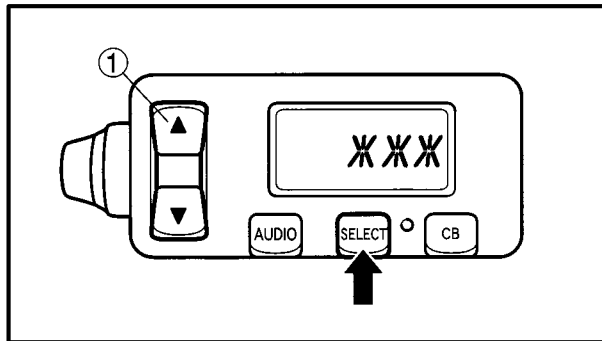
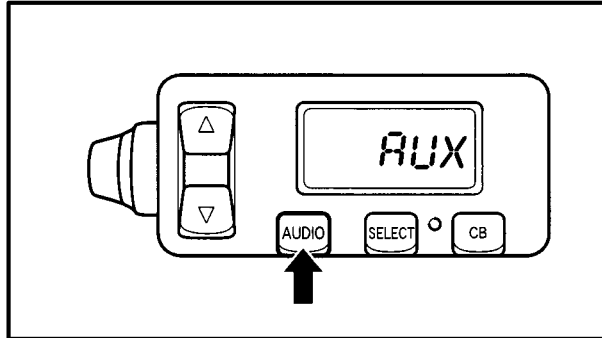
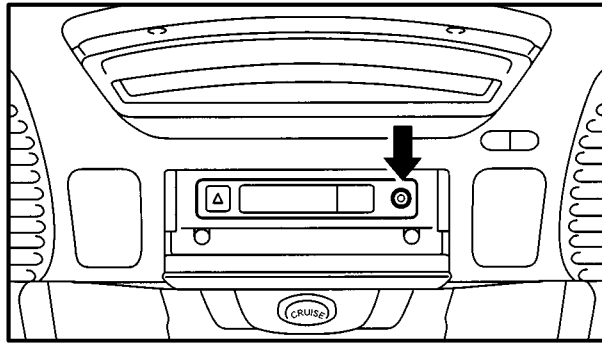
1) Receiving

If the CB radio is receiving a signal, the "RX" indicator appears in the display.

2) Transmitting

Press the TALK switch ① on the left handlebar switch to transmit. The "TX" indicator will appear in the display.





“AUX” (Auxiliary) operation

Auxiliary audio equipment can be used to play through the audio system.

- Insert the output plug of the auxiliary equipment into the jack located at the right side of the cassette deck.
- Push the “AUDIO” button until “AUX” appears and the auxiliary equipment can be used to play through the audio system.

→ TAPE → FM1 → FM2 → FM3
 → AUX. ← CD(option) ← AM ←

5. BASIC SETTINGS

AUDIO system

The following settings can be made in the audio system.

Selecting output between speakers and a head-set assembly

Controlling bass level

Controlling treble level

Controlling fader (balance between the front and the rear speakers)

Controlling intercom volume level

Changing auto volume level

CB radio system

Selecting output between speakers and a head-set assembly

Controlling intercom volume level

Turning the roger beep sound on and off

Setting procedure

The following setting procedures apply to the audio system, CB radio, auxiliary mode and CD Changer.

- Select the desired setting mode by pushing the “SELECT” button. On each press of the button, the mode changes as follows.

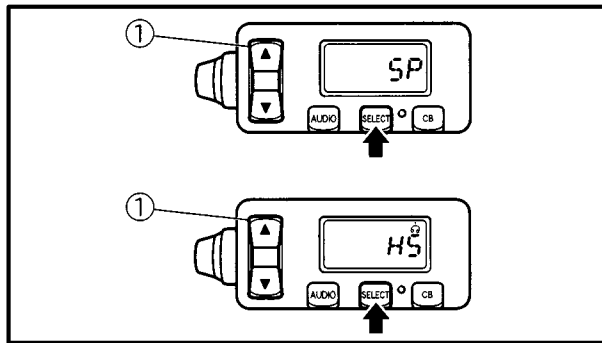
Audio system

→ OUTPUT → BASS → TREB → FADE
 → RADIO station → AVC → INT.VOL ←

CB radio

→ OUTPUT → INT.VOL
 → ROGER BEEP SOUND ←

- Push the up-down switch ① in either direction to change the setting for any mode.

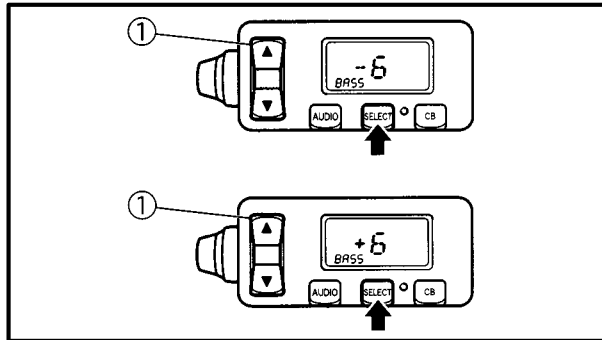


Selecting the output for speaker or headset (optional)

To select the output for speaker or headset, push the “SELECT” button and the “SP” (speaker) or “HS” (headset) indicator will appear. To change between speaker and headset, push the up-down switch ① in either direction.

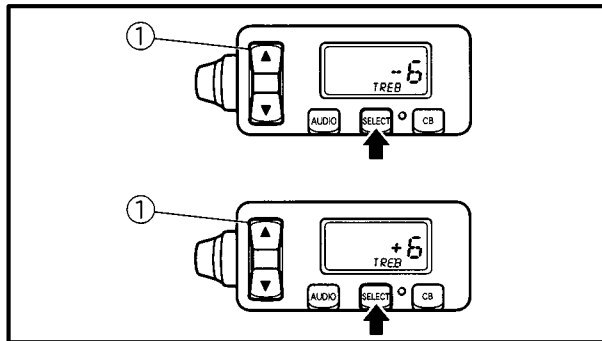
NOTE:

The speaker and headset cannot be used the same time.



Controlling the bass level

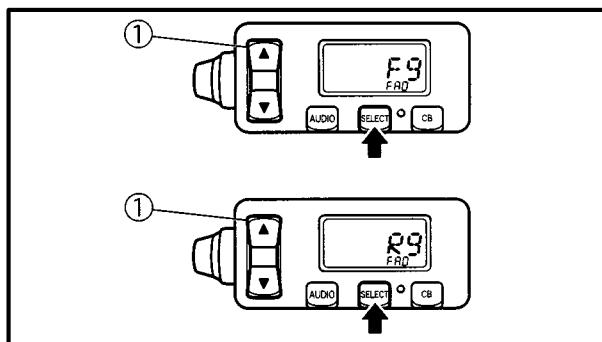
- To control the bass level, push the “SELECT” button until the “BASS” indicator appears.
- Push the up-down switch ① in either direction to change the level.



Controlling the treble level

- To control the treble level, push the “SELECT” button until the “TREB” indicator appears.
- Push the up-down switch ① in either direction to change the level.

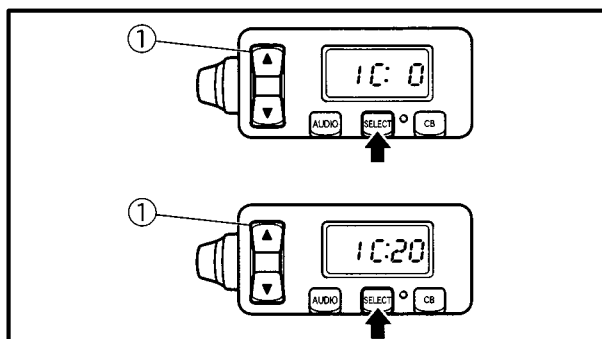
The treble level can be set from –6 to +6.



Controlling the fader (balance between front and rear speakers)

- To control the fader, push the “SELECT” button until the “FAD” indicator appears.
- Push the up-down switch ① in either direction to change the balance.

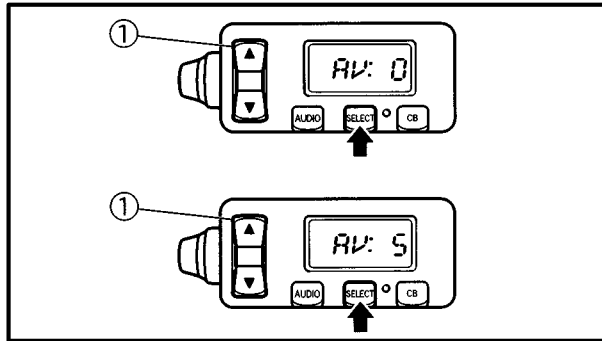
The fader level can be adjusted from F9 to R9.



Controlling the intercom volume level

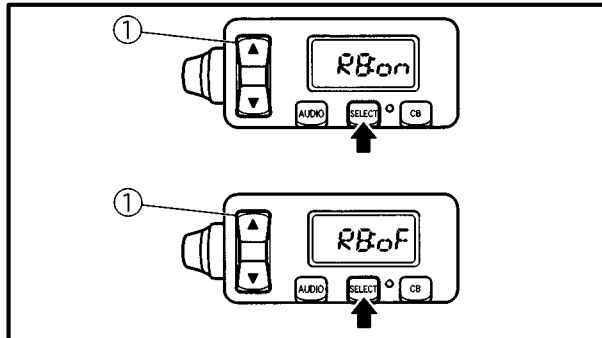
- To control the intercom volume level, push the “SELECT” button until the “IC:” indicator appears.
- Push the up-down switch ① in either direction to change the volume level.

The intercom volume level can be set from 0 to 20.



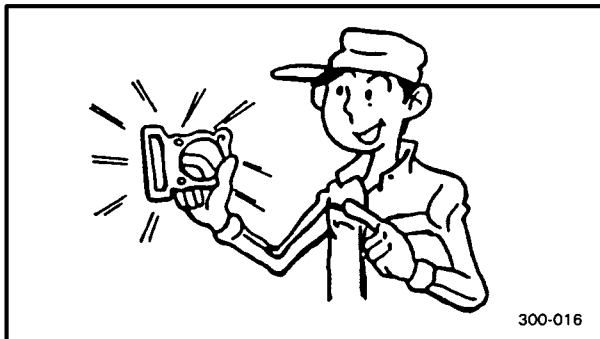
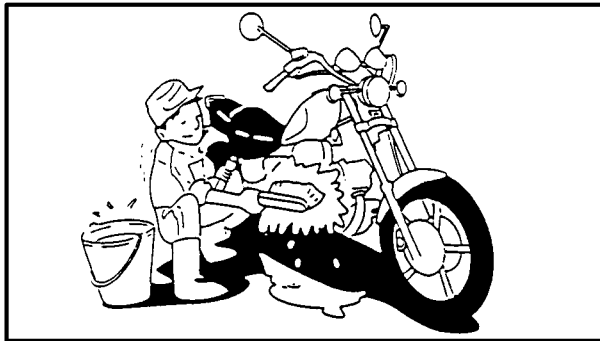
Changing the level for auto volume control system

- To control the level for the auto volume control system, push the “SELECT” button until the “AV:” indicator appears.
- Push the up-down switch ① in either direction to change the volume level.
The auto volume control rate of compensation can be adjusted from 0 to 5.



Turning the beep sound on or off for the roger in the CB radio system

- To turn the beep sound on, push the “SELECT” button until the “RB: on” indicator appears. Then, push the up-down button in either direction.
- To turn the beep sound off, push the “SELECT” button until the “RB: of” indicator appears. Then, push the up-down button in either direction.



EAS00020

IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DIS- ASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.
2. Use only the proper tools and cleaning equipment.
Refer to the "SPECIAL TOOLS" section.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear.
Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS00021

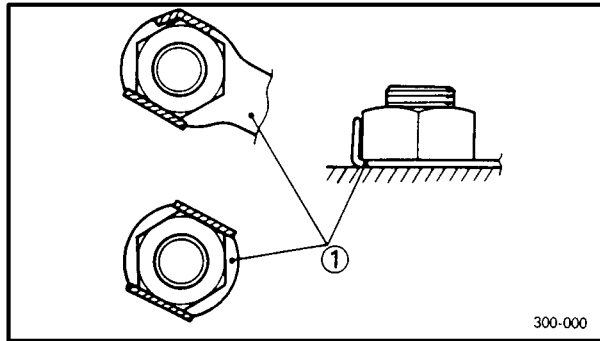
REPLACEMENT PARTS

1. Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in-function and appearance, but inferior in quality.

EAS00022

GASKETS, OIL SEALS AND O-RINGS

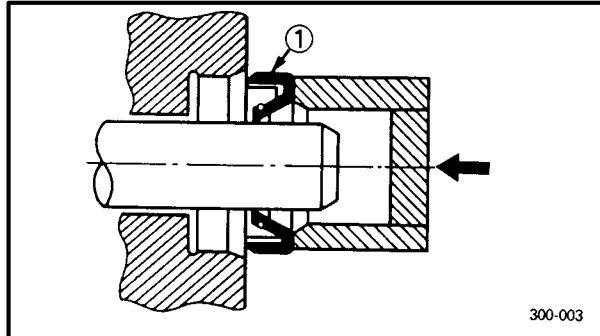
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and apply grease onto the oil seal lips.



EAS00023

LOCK WASHERS/PLATES AND COTTER PINS

1. After removal, replace all lock washers/plates① and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



EAS00024

BEARINGS AND OIL SEALS

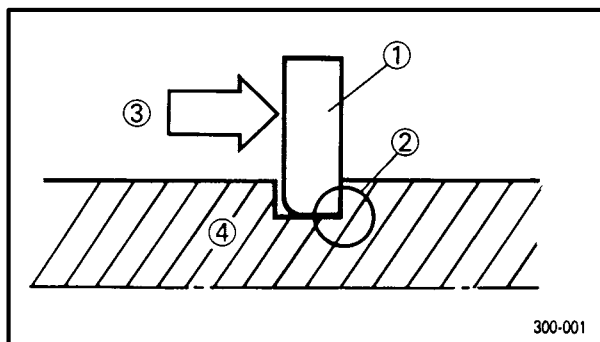
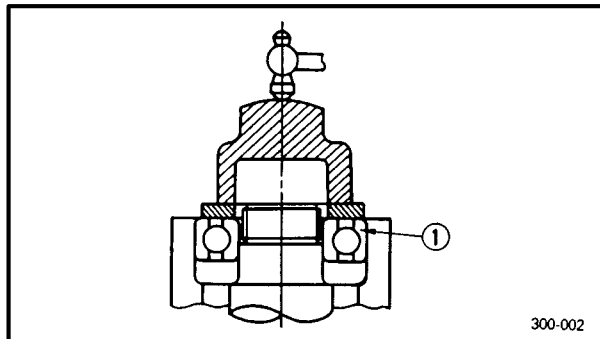
1. Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, apply a light coat of lithium soap base grease onto the oil seal lips. Oil bearings liberally when installing, if appropriate.

- ① Oil seal

CAUTION:

Do not spin the bearing with compressed air because this will damage the bearing surfaces.

- ① Bearing

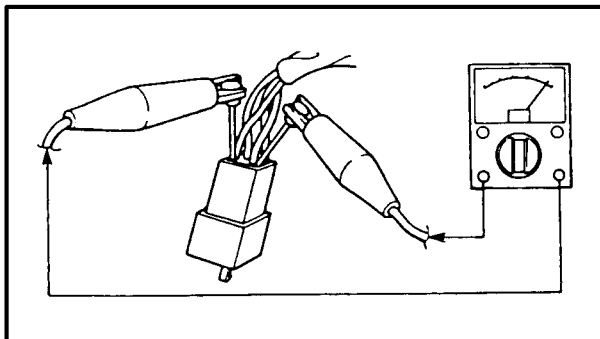
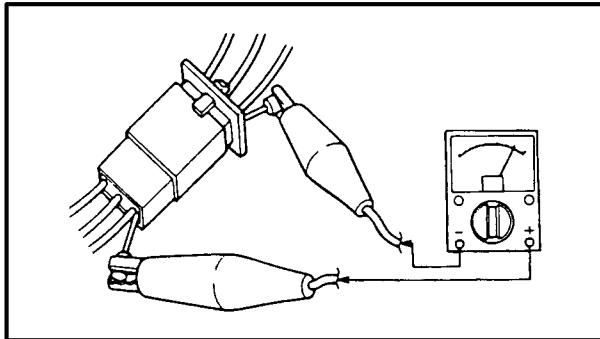
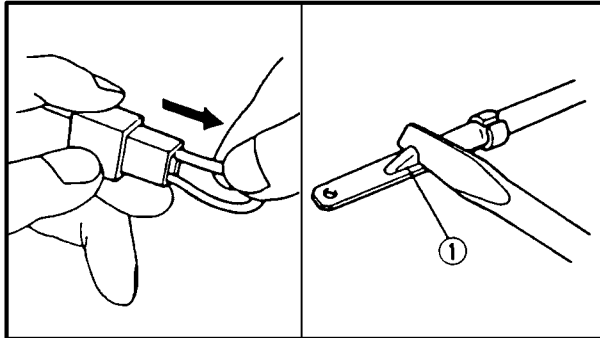
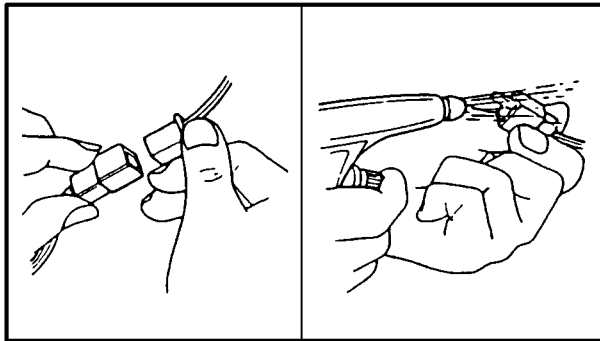


EAS00025

CIRCLIPS

1. Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

- ④ Shaft



EAS00026

CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:

- lead
- coupler
- connector

2. Check:

- lead
- coupler
- connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

3. Check:

- all connections

Loose connection → Connect properly.

NOTE:

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

4. Connect:

- lead
- coupler
- connector

NOTE:

Make sure that all connections are tight.

5. Check:

- continuity
(with a pocket tester)



Pocket tester

YU-03112,90890-03112

NOTE:

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps 1 to 3.
- As a quick remedy, use a contact revitalizer available at most part stores.



EAS00027

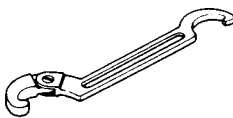
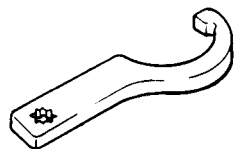
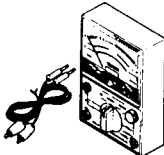
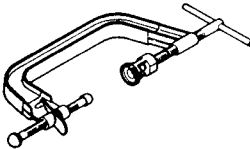
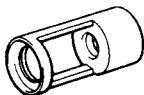
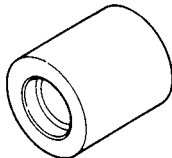
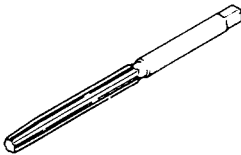
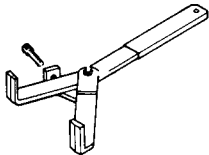
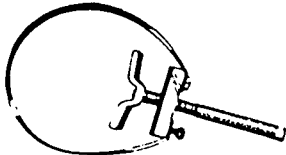
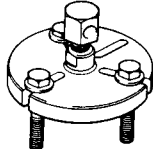
SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

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

Tool No.	Tool name/Usage	Illustration
YM-33961 90890-04105	Tappet adjusting tool This tool is needed to rotate the camshaft for access to the valve lifter and valve pad	
YU-08030-A 90890-03094	Vacuum gauge This gauge is needed for carburetor synchronization.	
YU-08036-A 90890-03113	Engine tachometer This tool is needed for observing engine rpm.	
YU-33277-A 90890-03141	Timing light This tool is necessary for checking ignition timing.	
YU-33223 90890-03081	Compression gauge/Set These tools are needed to measure engine compression.	
YU-38411 90890-01426	Oil filter wrench This tool is needed to remove and install the oil filter.	
Gauge 90890-03153 Adapter 90890-03124	Pressure gauge/adapter These tools are needed to measure engine oil pressure.	



Tool No.	Tool name/Usage	Illustration	
YU-01268 90890-01268 YU-33975 90890-01403	Ring nut wrench This tool is needed to loosen and tighten the steering stem ring nut.		
YU-03112 90890-03112	Pocket tester This instrument is needed for checking the electrical system.		
Compressor YM-04019 90890-04019 Adapter YM-01253-1 90890-04114	Valve spring compressor/adaptor These tools are needed to remove and install the valve assemblies.		
YM-4064-A 90890-04064	Valve guide remover (6.0 mm) This tool is needed to remove and install the valve guide.		
YM-04065-A 90890-04065	Vale guide installer (6.0 mm) This tool is needed to install the valve guide.		
YM-04066 90890-04066	Valve guide reamer (6.0 mm) This tool is needed to rebores the new valve guide.		
YM-91042 90890-04085	Universal clutch holder This tool is needed to hold the clutch when removing or installing the clutch boss nut.		
YS-01880 90890-01701	Sheave holder This tool is needed to hold the rotor when removing or installing the rotor bolt.		
Puller YU-33270 90890-01362 Adapter YM-33282 90890-04089	Flywheel puller/adaptor These tools are needed to remove the rotor.		



Tool No.	Tool name/Usage	Illustration
ACC-1100-15-01 90890-85505	Quick gasket® Yamaha Bond No.1215 This sealant (bond) is used on crankcase mating surfaces, etc.	
YU-01304 90890-01304	Piston pin puller This tool is used to remove the piston pin.	
YM-8037 90890-05158	Piston ring compressor This tool is used to compress the piston rings when installing the piston into the cylinder.	
YM-33286 90890-04090	Damper spring compressor This tool is needed when removing or installing the damper spring.	
YM-33222	Middle drive gear holder This tool is needed to remove and install the middle drive pinion gear. This tool is also used for the gear backlash adjustment.	
90890-04080	Middle drive gear holder This tool is needed for the gear backlash adjustment.	
YM-04054 90890-04054	Offset wrench (55 mm) This tool is needed when removing or installing the middle drive gear nut.	
YM-04062 90890-04062	Universal joint holder This tool is needed when removing or installing the driven pinion gear nut.	
YU-03097 90890-03097	Dial gauge This tool is used to measure the middle gear backlash.	



Tool No.	Tool name/Usage	Illustration
Tester YU-24460-01 90890-01325 Adapter YU-33984	Radiator cap tester/adapter This tester and its adapter are needed for checking the cooling system.	
YM-01312-A 90890-01312	Fuel level gauge This gauge is used to measure the fuel level in the float chamber.	
Rod holder YM-01300-1 90890-01294 T-handle YM-01326 90890-01326	Damper rod holder/T-handle These tools are needed to loosen and tighten the damper rod holding bolt.	
Weight YM-33963 90890-01367 Adapter YM-8020 90890-01374	Fork seal driver weight/adapter These tools are needed when installing the slide metal, oil seal and dust seal into the fork.	
YM-01230 90890-01230	Final gear backlash band This tool is needed when measuring final gear backlash.	
YM-01229 90890-01229	Coupling gear/middle shaft tool This tool is needed when removing or installing the coupling gear nut.	
YM-04050 90890-04050	Bearing retainer wrench This tool is needed when removing or installing the final drive shaft bearing.	
YM-34487 90890-06754	Dynamic spark tester Ignition checker	
YU-03009	Micrometer (75 ~ 100 mm) This tool is used to measure the piston skirt diameter.	
YU-03017	Cylinder bore gauge (50 ~ 100 mm) This tool is used to measure the cylinder bore.	



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SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard
Model code:	XVZ13TFL: 4XY1 (For USA) 4XY3 (For Canada) XVZ13TFLC: 4XY2 (For California)
Dimensions:	
Overall length	2,655 mm (104.5 in)
Overall width	900 mm (35.4 in)
Overall height	1,565 mm (61.6 in)
Seat height	750 mm (29.5 in)
Wheelbase	1,705 mm (67.1 in)
Minimum ground clearance	155 mm (6.1 in)
Minimum turning radius	3,500 mm (137.8 in)
Basic weight:	
Dri weight	366 kg (807 lb)
With oil and a full fuel tank	394 kg (869 lb)
Engine:	
Engine type	Liquid cooled 4-stroke, DOHC
Cylinder arrangement	V-type 4-cylinder
Displacement	1,294 cm ³
Bore × stroke	79 × 66 mm (3.11 × 2.60 in)
Compression ratio	10 : 1
Compression pressure (STD)	1,520 kPa (15.2 kg/cm ² , 216 psi) at 175 r/min
Starting system	Electric starter
Lubrication system:	Wet sump
Oil type or grade:	
Engine oil	Yamalube 4 (20W40) or SAE20W40 type SE motor oil (5°C (60°F) or higher) Yamalube 4 (10W30) or SAE10W30 type SE motor oil (-10°C (10°F) or higher) SAE80API "GL-4" Hypoid Gear Oil
Final gear oil:	
Engine oil	
Periodic oil change	3.5 L (3.1 Imp qt, 3.7 US qt)
With oil filter replacement	3.7 L (3.3 Imp qt, 3.9 US qt)
Total amount	4.3 L (3.8 Imp qt, 4.6 US qt)
Final gear case oil	
Total amount	0.2 L (0.18 Imp qt, 0.21 US qt)
Radiator capacity (including all routes):	3.5 L (2.64 Imp qt, 3.70 US qt)
Air filter:	Dry type element
Fuel:	
Type	Unleaded gasoline
Fuel tank capacity	22.5 L (4.9 Imp gal, 6.0 US gal)
Fuel reserve amount	3.5 L (0.8 Imp gal, 0.9 US gal)

GENERAL SPECIFICATIONS

SPEC



Item		Standard
Carburetor:		
Type/quantity		BDS32/4
Manufacturer		MIKUNI
Spark plug:		
Type		DPR8EA-9/X24EPR-U9
Manufacturer		NGK/NIPPONDENSO
Spark plug gap		0.8 ~ 0.9 mm (0.031 ~ 0.035 in)
Clutch type:		Wet, multiple-disc
Transmission:		
Primary reduction system		Spur gear
Primary reduction ratio		87/49 (1.776)
Secondary reduction system		Shaft drive
Secondary reduction ratio		21/27 × 33/10 (2.567)
Transmission type		Constant mesh 5-speed
Operation		Left foot operation
Gear ratio	1st	43/17 (2.529)
	2nd	31/19 (1.632)
	3rd	30/25 (1.200)
	4th	24/25 (0.960)
	5th	22/28 (0.786)
Chassis:		
Frame type		Double cradle
Caster angle		29.10°
Trail		152 mm (6.0 in)
Tire:		
Type		Tubeless
Size	front	150/80B16 71H
	rear	150/90B15M/C 74H
Manufacturer	front	BRIDGESTONE/DUNLOP
	rear	BRIDGESTONE/DUNLOP
Type	front	G705/D404F
	rear	G702/D404
Tire pressure (cold tire):		
0 ~ 90 kg (0 ~ 198 lb) load*	front	250 kPa (2.50 kg/cm ² , 36 psi)
	rear	250 kPa (2.50 kg/cm ² , 36psi)
90 ~ 190 kg (198 lb) load*	front	250 kPa (2.50 kg/cm ² , 36 psi)
	rear	280 kPa (2.80 kg/cm ² , 41 psi)
		* Load is the total weight of the cargo, rider, passenger and accessories.
Brake:		
Front brake	type	Dual disc brake
	operation	Right hand operation
Rear brake	type	Single disc brake
	operation	Right foot operation
Suspension:		
Front suspension		Telescopic fork
Rear suspension		Swingarm (link suspension)

GENERAL SPECIFICATIONS

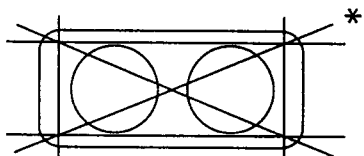
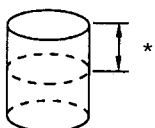
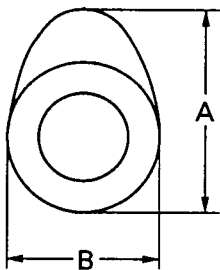
SPEC



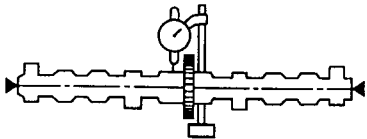
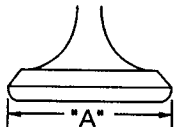
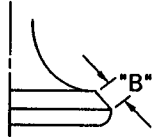
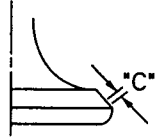
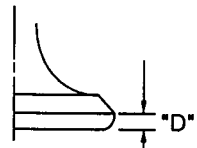
Item	Standard
Shock absorber: Front shock absorber Rear shock absorber	Coil-air spring/Oil damper Coil-air spring/Oil damper
Wheel travel: Front wheel travel Rear wheel travel	140 mm (5.5 in) 105 mm (3.7 in)
Electrical: Ignition system Generator system Battery type Battery capacity	T.C.I. (Digital) A.C. magneto YTX20L-BS 12 V 18 AH
Headlight type:	Halogen bulb
Bulb wattage × quantity: Headlight Tail/brake light Front flasher light Rear flasher light Indicator light Neutral indicator light Turn indicator light High beam indicator light Fuel indicator light Oil level indicator light Water temperature indicator light Engine trouble indicator light Over drive indicator right “SET” indicator light “RES” indicator light “ON” indicator light	12 V 60 W /55 W × 1 12 V 27 W/8 W × 1 12 V 27 W/8 W × 2 12 V 27 W × 2 12 V 1.7 W × 1 12 V 1.7 W × 2 12 V 1.7 W × 1 14 V 3.0 W × 1 12 V 1.7 W × 1 12 V 1.7 W × 1 12 V 1.7 W × 1 12V1.7W x 1 12V1.7W x 1 12V1.7W x 1 12V1.7W x 1



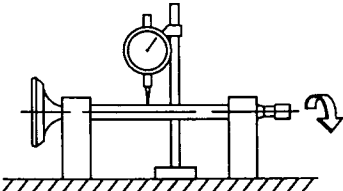
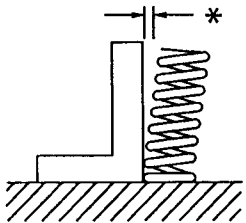
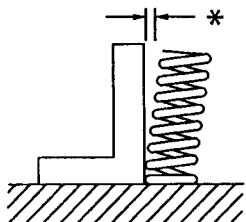
MAINTENANCE SPECIFICATIONS ENGINE

Item	Standard	Limit
Cylinder head: Warp limit 	...	0.03 mm (0.0012 in)
Cylinder: Bore size Measuring point*  Out of round limit	78.967 ~ 79.016 mm (3.1089 ~ 3.1109 in) 40 mm (1.57 in) ...	 0.05 mm (0.0020 in)
Camshaft: Drive method Cam cap inside diameter Camshaft outside diameter Shaft-to-cap clearance Cam dimensions 	Chain drive (Center) 25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in) 24.967 ~ 24.980 mm (0.9830 ~ 0.9835 in) 0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)	
Intake	“A”	35.75 ~ 35.85 mm (1.408 ~ 1.411 in)
	“B”	27.95 ~ 28.05 mm (1.100 ~ 1.104 in)
Exhaust	“A”	35.75 ~ 35.85 mm (1.407 ~ 1.411 in)
	“B”	27.95 ~ 28.05 mm (1.100 ~ 1.104 in)

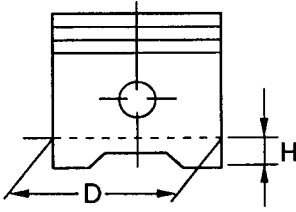
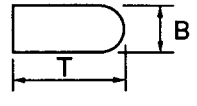
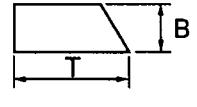
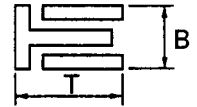


Item	Standard	Limit
Camshaft runout limit 	...	0.03 mm (0.0012 in)
Cam chain: Cam chain type/No. of links Cam chain adjustment method	BF05M/118 Automatic	
Valve, valve seat, valve guide: Valve clearance (cold) IN EX Valve dimensions:	0.11 ~ 0.15 mm (0.004 ~ 0.006 in) 0.16 ~ 0.20 mm (0.006 ~ 0.008 in)	
 Head Dia  Face Width  Seat Width  Margin Thickness		
"A" head diameter	IN EX	28.9 ~ 29.1 mm (1.138 ~ 1.146 in) 23.9 ~ 24.1 mm (0.941 ~ 0.949 in)
"B" face width	IN EX	1.3 ~ 3.2 mm (0.051 ~ 0.128 in) 1.6 ~ 2.9 mm (0.064 ~ 0.116 in)
"C" seat width	IN EX	0.9 ~ 1.1 mm (0.035 ~ 0.043 in) 0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
"D" margin thickness	IN EX	0.8 ~ 1.2 mm (0.032 ~ 0.048 in) 0.8 ~ 1.2 mm (0.032 ~ 0.048 in)
Stem outside diameter	IN EX	5.975 ~ 5.990 mm (0.2352 ~ 0.2358 in) 5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in)
Guide inside diameter	IN EX	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in) 6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)
Stem-to-guide clearance	IN EX	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in) 0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)

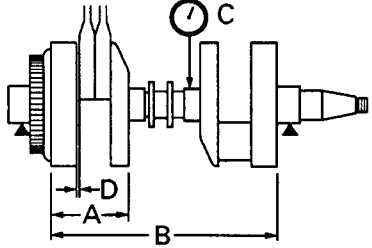


Item		Standard	Limit
Stem runout limit 		...	0.01 mm (0.0004 in)
Valve spring: Inner:			
Free length	IN	37.3 mm (1.47 in)	35.3 mm (1.39 in)
	EX	37.3 mm (1.47 in)	35.3 mm (1.39 in)
Set length (valve closed)	IN	31.8 mm (1.25 in)	...
	EX	31.8 mm (1.25 in)	...
Compressed pressure (installed)	IN	4.57 ~ 5.37 kg (10.08 ~ 11.84 lb)	...
	EX	4.57 ~ 5.37 kg (10.08 ~ 11.84 lb)	...
Tilt limit*	IN	...	2.5 / 1.6 mm
	EX	...	2.5 / 1.6 mm
			
Direction of winding (top view)	IN	Counter clockwise	...
	EX	Counter clockwise	...
Valve spring: Outer:			
Free length	IN	39.45 mm (1.55 in)	37.25 mm (1.47 in)
	EX	39.45 mm (1.55 in)	37.25 mm (1.47 in)
Set length (valve closed)	IN	33.8 mm (1.33 in)	...
	EX	33.8 mm (1.33 in)	...
Compressed pressure (installed)	IN	10.1 ~ 11.9 kg (22.27 ~ 26.24 lb)	...
	EX	10.1 ~ 11.9 kg (22.27 ~ 26.24 lb)	...
Tilt limit*	IN	...	2.5 / 1.7 mm
	EX	...	2.5 / 1.7 mm
			
Direction of winding (top view)	IN	Clockwise	...
	EX	Clockwise	...



Item	Standard	Limit
Piston: Piston to cylinder clearance Piston size "D"  Measuring point "H" Piston off-set Piston pin bore inside diameter Piston pin outside diameter	0.055 ~ 0.069 mm (0.0022 ~ 0.0027 in) 78.926 ~ 78.933 mm (3.107 ~ 3.108 in) 4 mm (0.157 in) 0 mm (0.00 in) 19.004 ~ 19.015 mm (0.7482 ~ 0.7486 in) 18.991 ~ 19.000 mm (0.7477 ~ 0.7480 in)	0.15 mm (0.0059 in) 19.045 mm (0.7618 in) 18.975 mm (0.759 in)
Piston rings: Top ring:  Type Dimensions (B × T) End gap (installed) Side clearance (installed) 2nd ring:  Type Dimensions (B × T) End gap (installed) Side clearance Oil ring:  Dimensions (B × T) End gap (installed)	Barrel 3.1 × 1,0 mm (0.122 × 0.039 in) 0.20 ~ 0.35 mm (0.008 ~ 0.0014 in) 0.03 ~ 0.07 mm (0.001 ~ 0.003 in) Taper 3.1 × 1.2 mm (0.122 × 0.047 in) 0.35 ~ 0.50 mm (0.014 ~ 0.020 in) 0.02 ~ 0.06 mm (0.001 ~ 0.002 in)	 0.55 mm (0.022 in) 0.12 mm (0.005 in) 0.8 mm (0.031 in) 0.12 mm (0.005 in)



Item	Standard	Limit
Connecting rod: Oil clearance Color code (corresponding size)	0.021 ~ 0.039 mm (0.001 ~ 0.002 in) ① Blue ② Black ③ Brown ④ Green ⑤ Yellow ⑥ Pink	0.09 mm (0.0036 in) ...
Crankshaft:  Crank width "A" Assembly width "B" Runout limit "C" Big end side clearance "D" Big end radial clearance Journal oil clearance Color code (corresponding size)	83.92 ~ 83.97 mm (3.304 ~ 3.306 in) 242.72 ~ 243.17 mm (9.556 ~ 9.574 in) ... 0.160 ~ 0.264 mm (0.006 ~ 0.010 in) 0.021 ~ 0.039 mm (0.0008 ~ 0.0015 in) 0.020 ~ 0.038 mm (0.0008 ~ 0.0015 in) ① Blue ② Black ③ Brown ④ Green ⑤ Yellow ⑥ Pink ⑦ Red	 0.03 mm (0.0012 in) 0.1 mm (0.004 in) ...
Ballancer: Ballancer drive method	Gear	
Clutch: Friction plate thickness Quantity Friction plate wear limit Clutch plate thickness Quantity Warp limit Clutch spring free length Quantity Minimum length Clutch housing thrust clearance Clutch housing radial clearance Clutch release method Push rod bending limit	2.9 ~ 3.1 mm (0.114 ~ 0.122 in) 8 ... 2.2 ~ 2.4 mm (0.087 ~ 0.094 in) 7 ... 7 mm (0.28 in) 1 ... 0.10 ~ 0.37 mm (0.004 ~ 0.015 in) 0.017 ~ 0.053 mm (0.0007 ~ 0.0021 in) Hydraulic inner push ...	 2.8 mm (0.11 in) 0.2 mm (0.008 in) 6.5 mm (0.26 in) 0.5 mm (0.020 in)

MAINTENANCE SPECIFICATIONS

SPEC



Item	Standard	Limit
Transmission: Main axle runout limit Drive axle runout limit		0.08 mm (0.003 in) 0.08 mm (0.003 in)
Shifter: Shifter type Guide bar bending limit	Guide bar ...	... 0.025 mm (0.001 in)
Carburetor: I.D.mark Main jet (M.J) Main air jet (M.A.J) Jet needle (J.N) Needle jet (N.J) Pilot air jet (P.A.J.1) Pilot outlet (P.O) Pilot jet (P.J) Bypass 1 (B.P.1) Bypass 2 (B.P.2) Bypass 3 (B.P.3) Valve seat size (V.S) Starter jet (G.S.1) Starter jet (G.S.2) Throttle valve size (Th. V) Fuel level (F.L) Engine idle speed Intake vacuum	4XY1 00, 4XY2 00 (for california) #1, 2 : #122.5 #3 : #117.5 #4 : #120 #110 5DL 38-54 P-0 #85 1.1 #15 0.8 0.8 0.8 1.5 #35 0.5 #110 17 mm (1.02 ~ 1.06 in) 950 ~ 1,050 r/min 37 kPa (280 mmHg)	
Fuel pump: Type Model/manufacture Consumption amperage <max> Output pressure	Electrical type 4NK/MITSUBISHI 1 A 15 ~ 20 kPa (0.2 kg/cm ² , 3 psi)	
Lubrication system: Oil filter type Oil pump type Inner rotor to outer rotor clearance Outer rotor to oil pump housing clearance Bypass valve setting pressure Relief valve operating pressure Oil pressure (hot)	Paper type Trochoid type 0 ~ 0.12 mm (0.000 ~ 0.005 in) 0.03 ~ 0.08 mm (0.001 ~ 0.003 in) 80 ~ 120 kPa (0.8 ~ 1.2 kg/cm ² , 11.15 ~ 16.72 psi) 440 ~ 560 kPa (4.4 ~ 5.6 kg/cm ² , 61.3 ~ 78.1 psi) 44 kPa (0.45 kg/cm ²) at 1,000 r/min	 0.17 mm (0.007 in) 0.08 mm (0.003 in)

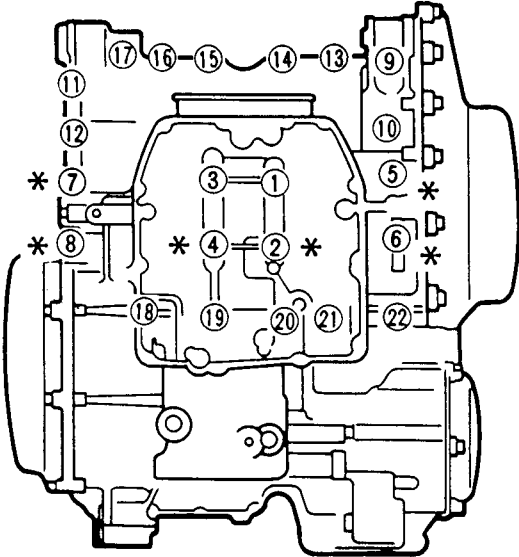
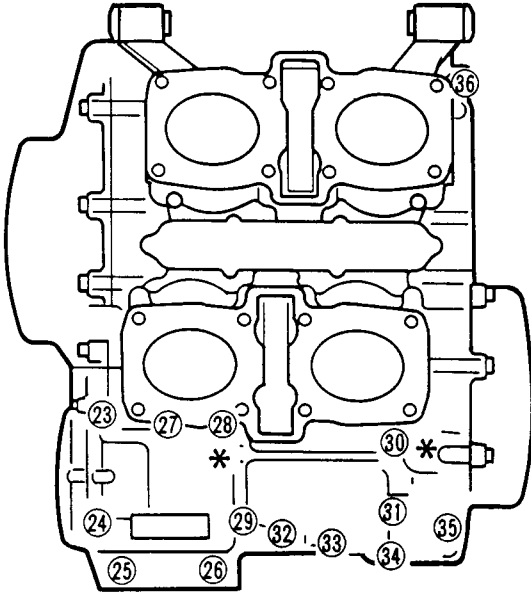
MAINTENANCE SPECIFICATIONS

SPEC



Cooling system:		
Radiator core size		
Width	257.4 mm (10.3 in)	...
Height	360 mm (14.17 in)	...
Thickness	27 mm (1.08 in)	...
Radiator cap opening pressure	95 ~ 125 kPa (0.95 ~ 1.25 kg/cm ² , 13.8 ~ 18.1 psi)	...
Reservoir tank capacity	0.84 L (0.74 Imp qt, 0.89 US qt)	...
<From low to full level>	<0.25 L (0.22 Imp qt, 0.26 US qt)>	...
Water pump		
Type	Single suction centrifugal pump	...
Reduction ratio	31/21 (1.476)	...
Shaft drive:		
Middle gear backlash	0.05 ~ 0.12 mm (0.002 ~ 0.005 in)	...
Final gear backlash	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)	...



Item	Standard
Crankcase tightening sequence:	
Lower Case  Upper Case  ※: With washer	



Tightening torques

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Camshaft cap	Bolt	M6 × 1.0	32	10	1.0	7.2	
Blind plug	Plug	M18 × 1.5	6	55	5.5	40	
Exhaust pipe	Stand bolt	M8 × 1.25	8	15	1.5	11	
Spark plug		M12 × 1.25	4	18	1.8	13	
Cylinder head	Nut	M10 × 1.25	16	43	4.3	31	
Cylinder head cover	Bolt	M6 × 1.0	16	10	1.0	7.2	
Chrome cover	Bolt	M6 × 1.0	16	10	1.0	7.2	
Connecting rod	Nut	M8 × 0.75	8	36	3.6	25	
AC magneto	Bolt	M12 × 1.25	1	130	13.0	94	
Camshaft sprocket	Bolt	M7 × 1.0	8	20	2.0	14	
Timing chain damper bracket	Bolt	M8 × 1.25	1	24	2.4	17	
Timing chain tensioner	Bolt	M6 × 1.0	4	12	1.2	8.7	
Cap bolt (tensioner)	Bolt	M16	2	20	2.0	14	
Water pump drain plug	Plug	M14	1	43	4.3	31	
Radiator	Bolt	M6 × 1.0	2	7	0.7	5.1	
Radiator side cover	Bolt	M6 × 1.0	4	10	1.0	7.2	
Radiator cap pipe	Bolt	M6 × 1.0	2	10	1.0	7.2	
Oil filter mounting bolt	Union bolt	M20 × 1.5	1	50	5.0	36	
Oil gallery pipe	Bolt	M6 × 1.0	2	12	1.2	8.7	
Oil drain plug	Plug	M14	1	43	4.3	31	
Oil baffle plate	Bolt	M6 × 1.0	2	12	1.2	8.7	
Oil gallery bolt	Screw	M5 × 0.8	1	5	0.5	3.6	
Oil delivery pipe (head)	Union bolt	M8 × 1.25	2	18	1.8	13	
Oil delivery pipe (cover)	Union bolt	M10 × 1.25	1	20	2.0	14	
Oil pipe	Union bolt	M8 × 1.25	1	18	1.8	13	
Stay 1	Bolt	M6 × 1.0	1	12	1.2	8.7	
Oil filter		M20 × 1.5	1	17	1.7	12	
Clamp bolt (clutch hose)	Bolt	M5 × 0.8	1	4	0.4	2.9	
Carburetor joint	Screw	M4 × 0.8	4	3	0.3	2.2	
Air filter joint	Screw	M4 × 0.8	4	3	0.3	2.2	
Air filter assembly	Screw	M5 x 0.8	2	3	0.3	2.2	
Air filter case cover	Screw	M5	14	3	0.3	2.2	
Clamp bolt (exhaust pipe)	Bolt	M8 × 1.25	2	25	2.5	18	
Clamp bolt (muffer)	Bolt	M8 × 1.25	2	20	2.0	14	
Exhaust pipe	Nut	M8 × 1.25	8	20	2.0	14	
Cylinder	Stud bolt	M10 × 1.25	16	9	0.9	6.5	
Main gallery blind plug	Plug	M20	1	12	1.2	8.7	
Crankcase	Bolt	M10 × 1.25	8	40	4.0	29	
Middle gear bearing retainer	Screw	M8 × 1.25	4	25	2.5	18	
Main axle bearing retainer	Screw	M6 × 1.0	3	7	0.7	5.1	
Crankcase cover plate	Screw	M6 × 1.0	2	7	0.7	5.1	

MAINTENANCE SPECIFICATIONS

SPEC



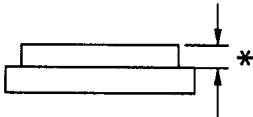
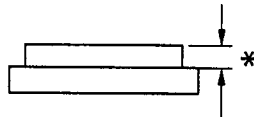
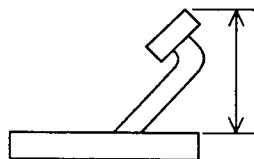
Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Oil drain plug (crankcase)	Bolt	M12 × 1.25	1	38	3.8	27	
Starter clutch	Bolt	M8 × 1.25	6	24	2.4	17	
Clutch spring plate	Bolt	M6 × 1.0	6	8	0.8	5.8	
Clutch boss	Nut	M20 × 1.0	1	70	7.0	50	
Clutch release cylinder	Bolt	M6 × 1.0	2	12	1.2	8.7	
Air bleed screw	Screw	M8 × 1.25	1	6	0.6	4.3	
Clutch pipe	Union bolt	M10 × 1.25	1	25	2.5	18	
Middle drive pinion gear	Nut	M44 × 1.5	1	110	11.0	80	
Middle driven pinion gear	Nut	M16 × 1.5	1	90	9.0	65	
Middle driven gear housing	Bolt	M8 × 1.25	3	30	3.0	22	
Shift cam segment	Torx	M6 × 1.0	1	12	1.2	8.7	
Shift cam plate	Screw	M5 × 0.8	1	4	0.4	2.9	
Shift cam retainer	Screw	M6 × 1.0	3	7	0.7	5.1	
Shift shaft spring stopper	Bolt	M8 × 1.25	1	22	2.2	16	
Stopper lever	Bolt	M6 × 1.0	1	10	1.0	7.2	
Shift pedal bracket	Screw	M6 × 1.0	1	7	0.7	5.1	
Shift arm	Bolt	M6 × 1.0	1	10	1.0	7.2	
Shift rod	Nut	M6 × 1.0	1	10	1.0	7.2	
Shift rod	Nut	M6 × 1.0	1	10	1.0	7.2	Left hand thread
Shift pedal link	Bolt	M6 × 1.0	1	10	1.0	7.2	
Shift lever assembly	Bolt	M6 × 1.0	1	18	1.8	13	
Final gear case (rear arm)	Stud bolt	M10 × 1.25	4	18	1.8	13	
Final gear case (bearing housing)	Stud bolt	M8 × 1.25	6	9	0.9	6.5	
Coupling gear	Nut	M16 × 1.25	1	110	11.0	80	
Bearing housing	Nut	M8 × 1.25	6	23	2.3	17	
	Bolt	M10 × 1.25	2	40	4.0	29	
Drain plug (final gear case)	Plug	M14 × 1.25	1	23	2.3	17	
Filler plug (final gear case)	Plug	M14 × 1.25	1	23	2.3	17	
Stator coil	Screw	M6 × 1.0	3	7	0.7	5.1	
Starter motor	Bolt	M6 × 1.0	2	10	1.0	7.2	
Neutral switch	Screw	M5 × 0.8	3	4	0.4	2.9	
Oil level switch	Bolt	M6 × 1.0	2	10	1.0	7.2	
Thermo unit		M10 × 1.25	1	8	0.8	5.8	
Thermo switch		M18 × 1.5	1	23	2.3	17	
Ignition coil assembly	Bolt	M5 × 0.8	8	4	0.4		
Ignitor unit assembly	Nut	M6 × 1.0	2	7	0.7		



CHASSIS

Item	Standard	Limit
Steering system: Steering bearing type	Taper roller bearing	...
Front suspension: Front fork travel Fork spring free length Collar length Spring rate (K1) Stroke (K1) Optional spring Oil capacity Oil level Oil grade Endosed gas/air pressure (STD) (Min ~ Max)	140 mm (5.51 in) 573 mm (22.56 in) 50 mm (2.0 in) 8.83 N/mm (0.9 kg/mm 50.4 lb/in) 0 ~ 140 mm (0.00 ~ 5.51 in) No 553 cm ³ (19.5 Imp oz, 18.7 US oz) 117 mm (4.61 in) Yamaha fork oil 5WT 0 kPa (0 kg/cm ² , 0 psi) 0 ~ 5 kPa (0 ~ 0.5 kg/cm ² , 0 ~ 7.1 psi)	... 568 mm (22.4 in)
Rear suspension: Shock absorber travel Spring free length Fitting length Spring rate (K1) Stroke (K1) Optional spring Enclosed gas/air pressure (STD) (Min ~ Max)	45 mm (1.77 in) 186.5 mm (7.34 in) 165.5 mm (6.52 in) 147 N/mm (14.7 kg/mm 839 lb/in) 0 ~ 45 mm (0.00 ~ 1.97 in) No 0 kPa (0 kg/cm ² , 0 psi) 0 ~ 40 kPa (0 ~ 4.0 kg/cm ² , 0 ~ 57 psi)	... 181 mm (7.12 in)
Swingarm: Free play limit end side		0 mm (0.00 in) 0 mm (0.00 in)
Front wheel: Type Rim size Rim material Rim runout limit radial lateral	Cast wheel 16 × MT3.50 Aluminum	 1 mm (0.04 in) 0.5 mm (0.02 in)
Rear wheel: Type Rim size Rim material Rim runout radial lateral	Cast wheel 15M/C × MT4.00 Aluminum	 1 mm (0.04 in) 0.5 mm (0.02 in)



Item	Standard	Limit
Front disc brake: Type Disc outside diameter × thickness Pad thickness inner Pad thickness outer  Master cylinder inside diameter Caliper cylinder inside diameter Caliper cylinder inside diameter Brake fluid type	Dual 298 × 5 mm (11.7 × 0.20 in) 6 mm (0.24 in) 6 mm (0.24 in)	 0.5 mm (0.02 in) 0.5 mm (0.02 in)
Rear disc brake: Type Disc outside diameter × thickness Pad thickness inner Pad thickness outer  Master cylinder inside diameter Caliper cylinder inside diameter Caliper cylinder inside diameter Brake fluid type	Single 320 × 7 mm (12.6 × 0.28 in) 7.5 mm (0.30 in) 7.5 mm (0.30 in)	 0.5 mm (0.02 in) 0.5 mm (0.02 in)
Brake lever & brake pedal: Brake lever free play (at lever end) Brake pedal position  Brake pedal free play	2 ~ 5 mm (0.08 ~ 0.02 in) 100 mm (3.9 in)	
	0 mm (0.0 in)	...



Tightening torques

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m•kg	ft•lb	
Upper bracket and inner tube	M6	10	1.0	7.2	See NOTE
Upper bracket and steering shaft	M22	130	13.0	94	
Handlebar holder (lower) and handlebar holder (upper)	M8	28	2.8	20	
Ring nut (steering shaft)	M25	3	0.3	2.2	
Brake hose joint and lower bracket	M6	7	0.7	5.1	
Front master cylinder cap (brake and clutch)	M4	2	0.2	1.4	
Handlebar holder (lower)	M12	32	3.2	23	
Front master cylinder (brake and clutch)	M6	10	1.0	7.2	
Union bolt (brake hose)	M10	30	3.0	22	
Clutch hose and clutch pipe	M10	19	1.9	13	
Engine mounting:					
Mounting bolt (engine and front frame)	M10	40	4.0	29	
Mounting bolt (engine and rear frame)	M12	78	7.8	56	
Frame and down tube	M10	45	4.5	32	
Cylinder head stay and frame	M10	64	6.4	46.1	
Frame and rear fender stay (rear frame)	M10	48	4.8	35	
Muffler stay and muffler	M10	30	3.0	22	
Ignitor unit	M6	7	0.7	5.1	
Ignition coil	M5	4	0.4	2.9	
Ignition bracket	M6	7	0.7	5.1	
Swingarm pivot shaft (left)	M25	100	10.0	72	
Swingarm pivot shaft (right)	M25	7	0.7	5.1	
Swingarm pivot shaft locknut (right)	M25	100	10.0	72	
Relay arm and frame	M10	48	4.8	35	
Relay arm and connecting rod	M12	50	5.0	36	
Connecting rod and swingarm	M12	50	5.0	36	
Rear shock absorber and frame	M12	59	5.9	43	
Rear shock absorber and connecting rod	M12	59	5.9	43	
Fuel petcock and fuel tank	M6	7	0.7	5.1	
Fuel sender and fuel tank	M5	4	0.4	2.9	
Fuel tank (front) and frame	M6	7	0.7	5.1	
Fuel tank (rear) and frame	M8	16	1.6	11.6	
Fuel pump bracket and bridge plate	M6	7	0.7	5.1	
Cover and fuel tank	M6	7	0.7	5.1	
Canister and frame (XVZ13)	M6	7	0.7	5.1	
Rider seat and frame	M6	7	0.7	5.1	
Passenger seat and frame	M6	7	0.7	5.1	
Starter relay and battery positive lead	M6	7	0.7	5.1	
Starter relay and starter motor lead	M6	7	0.7	5.1	



Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m•kg	ft•lb	
Rear fender side mold and rear fender stay	M8	23	2.3	17	
Main switch and frame	M8	30	3.0	22	
Sidestand bolt and nut	M12	122	12.2	88	
Footrest bracket and frame	M10	52	5.2	37	
Rear footrest and frame	M8	23	2.3	17	
Rear master cylinder and rear brake bracket	M8	23	2.3	17	
Rear master cylinder and brake hose joint	M10	30	3.0	22	
Brake hose joint and brake hose	M10	26	2.6	19	
Rear brake reservoir tank	M6	4	0.4	2.9	
Union bolt (rear brake hose)	M10	30	3.0	22	
Footrest bracket and rear brake bracket	M8	23	2.3	17	
Footrest bracket and shift rod bracket	M8	23	2.3	17	
Front wheel axle	M18	78	7.8	56	
Front wheel axle pinch bolt	M8	19	1.9	13	
Rear wheel axle nut	M18	150	15.0	110	
Front brake caliper	M10	40	4.0	29	
Rear brake caliper	M10	40	4.0	29	
Brake disc and wheel	M8	23	2.3	17	
Caliper bleed screw	M8	6	0.6	4.3	

NOTE:

1. First, tighten the ring nut approximately 52 Nm (5.2 m•kg, 37 ft•lb) by using the torque wrench, then loosen the ring nut completely.
2. Retighten the ring nut to specification.



ELECTRICAL

Item	Standard	Limit
Voltage:	12 V	...
Ignition system:		
Ignition timing (B.T.D.C.)	5 at 1,000 r/min	...
Advanced timing (B.T.D.C.)	45 at 5,000 r/min	...
T.C.I.:		
Pickup coil resistance/color	189 ~ 231 Ω at 20 C (68 F)/Gray/Black	...
T.C.I. unit model/manufacture	J4T104/MITSUBISHI	...
Ignition coil:		
Model/manufacture	F6T541/MITSUBISHI	...
Minimum spark gap	6 mm (0.24 in)	...
Primary winding resistance	3.57 ~ 4.83 Ω at 20 C (68 F)	...
Secondary winding resistance	10.71 ~ 14.49 k Ω at 20 C (68 F)	...
Spark plug cap:		
Type	Resin type	...
Resistance	10 k Ω	...
Charging system:		
Type	A.C. magneto generator	...
Model/manufacture	F4T655/MITSUBISHI	...
Nominal output	14 V 30 A at 5,000 r/min	...
Stator coil resistance/color	0.279 ~ 0.341 Ω at 20 C (68 F)/White – White	...
Rectifier/regulator:		
Type	Semi-conductor, short-circuit type	...
Model/manufacture	SH678-11/SHINDENGEN	...
No load regulated voltage	14.1 ~ 14.9	...
Capacity	30 A	...
Withstand voltage	200 V	...

MAINTENANCE SPECIFICATIONS

SPEC



Item	Standard	Limit
Battery: Specific gravity	1.320	...
Electric starter system: Type	Constant mesh type	...
Starter motor: Model/manufacture	SM-13/MITSUBA	...
I.D. number	SM-13	...
Output	0.8 kW	...
Brush overall length	10 mm (0.4 in)	5 mm (0.20 in)
Commutator diameter	28 mm (1.10 in)	27 mm (1.06 in)
Mica undercut	0.7 mm (0.03 in)	...
Starter relay: Model/manufacture	MS5F-441/JIDECO	...
Amperage rating	180 A	...
Coil winding resistance	4.18 ~ 4.62 Ω at 20 C (68 F)	...
Horn: Type	Eddy type	...
Quantity	2	...
Model/manufacture	YML-12/NIKKO	...
Maximum amperage	4 A	...
Flasher relay: Type	Semi transistor type	...
Model/manufacture	FB257H/DENSO	...
Self cancelling device	Yes	...
Flasher frequency	75 ~ 95 cycle/min	...
Wattage	27 W $\times$ 2 + 3.4 W	...
Oil level switch: Model/manufacture	4XY/DENSO	...
Fuel sensor: Model/manufacture	4XY/NIPPON SEIKI	...
Sidestand relay: Model/manufacture	G8R-30Y-B/OMRON	...
Coil winding resistance	202.5 ~ 247.5 Ω	...
Diode	Yes	...
Fuel pump relay: Model/manufacture	G8R-30Y/OMRON	...
Electric fan: Model/manufacture	4XY/DENSO	...

MAINTENANCE SPECIFICATIONS

SPEC



Item	Standard	Limit
Thermo switch: Model/manufacturer	5EB/NIPPON THERMOSTAT	...
Thermo unit: Model/manufacturer	3YX/NIPPON SEIKI	...
Vacume actuator:	4XY/MITSUBISHI	...
Vacume pump:	4XY/MITSUBISHI	...
Circuit breaker:		
Type	Fuse	...
Amperage for individual circuit		
MAIN	30 A × 1	...
HEAD	15 A × 1	...
SIGNAL	15 A × 1	...
IGNITION	10 A × 1	...
FAN	10 A × 1	...
Back up (odometer)	10 A × 1	...
Cruse control	10 A × 1	...
Carburetor	10 A × 1	...
Audio	10 A × 1	...
DC outlet	5 A × 2	...
Reserve	10 A × 2	...
Reserve	15 A × 1	...
Reserve	30 A × 1	...
Reserve	5 A × 1	...



AUDIO SYSTEM AND C.B. RADIO SPECIFICATIONS

Item	Standard
AM/FM Radio: Tuning Range: AM FM Intermediate Frequency: AM FM	530 ~ 1,710 KHz 87.75, 87.9 ~ 107.9 MHz 450 KHz 10.7 MHz
Bass Treb	$\pm 10\text{dB}/100\text{ HZ}$ $\pm 10\text{dB}/10\text{KHz}$
Amplifier: Output Power Auto-Vol. Range Output Impedance: Speaker Headset	14W x 4 (SP)/1W x 2 (HS) 5 steps 4 Ω 8 Ω ~ 16 Ω
Deck: Circuit System Tape Speed Tape	4-track. 2-channel, Stereo for reproduction 4.75 cm/sec. Normal and Metal
C.B. Radio: Channels Frequency Range Frequency Tolerance Antenna Impedance	40 26.965 ~ 27.405 MHz +0.005 % 50 Ω
Transmitter: Power Output Frequency Response Receiver: Sensitivity (S + N/N: 10 dB) Squelch Sensitivity Frequency Response	4 W 400 ~ 3,000 Hz 6 dB Threshold: 8dB Tight: 25 dB 400 ~ 3,000 Hz

CONVERSION TABLE/ GENERAL TIGHTENING TORQUE SPECIFICATIONS

SPEC



EAS00028

CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC		MULTIPLIER		IMPERIAL
** mm	×	0.03937	=	** in
2 mm	×	0.03937	=	0.08 in

CONVERSION TABLE

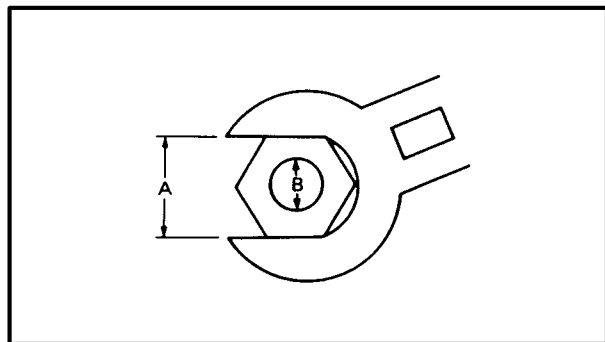
METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening torque	m•kg	7.233	ft•lb
	m•kg	86.794	in•lb
	cm•kg	0.0723	ft•lb
	cm•kg	0.8679	in•lb
Weight	kg	2.205	lb
	g	0.03527	oz
Speed	km/hr	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume/Capacity	cc (cm ³)	0.03527	oz (IMP liq.)
	cc (cm ³)	0.06102	cu•in
	lt (liter)	0.8799	qt (IMP liq.)
	lt (liter)	0.2199	gal (IMP liq.)
Misc.	kg/mm	55.997	lb/in
	kg/cm ²	14.2234	psi (lb/in ²)
	Centigrade	9/5 (C) + 32	Fahrenheit (F)

EAS00030

GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached.

Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A: Distance between flats
B: Outside thread diameter

A (nut)	B (bolt)	General torque specifications		
		Nm	m•kg	ft•lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



EAS00031

LUBRICATION POINTS AND LUBRICANT TYPES ENGINE

Lubrication Point	Symbol
Oil seal lips	
O-ring	
Bearing	
Connecting rod bolt/nut	
Connecting rod small end and big end	
Crankshaft pin	
Crankshaft journal/big end	
Piston surface	
Piston pin	
Camshaft cam lobe/journal	
Timing chain tensioner	
Valve stem (IN, EX)	
Valve stem end (IN, EX)	
Valve lifter	
Water pump impeller shaft	
Oil pump rotor (inner/outer), housing	
Oil strainer assembly	
Idle gear surface	
Starter idle gear	
Starter idle gear shaft	
Starter clutch (outer/roller)	
Push rod ball	
Pressure plate bearing	
Transmission gear (wheel/pinion)	
Shift cam	
Shift fork/guide bar	
Shift shaft assembly	
Shift pedal	
Shift lever joint	
Middle drive shaft (drive damper cam/driven damper cam)	



EAS00032

CHASSIS

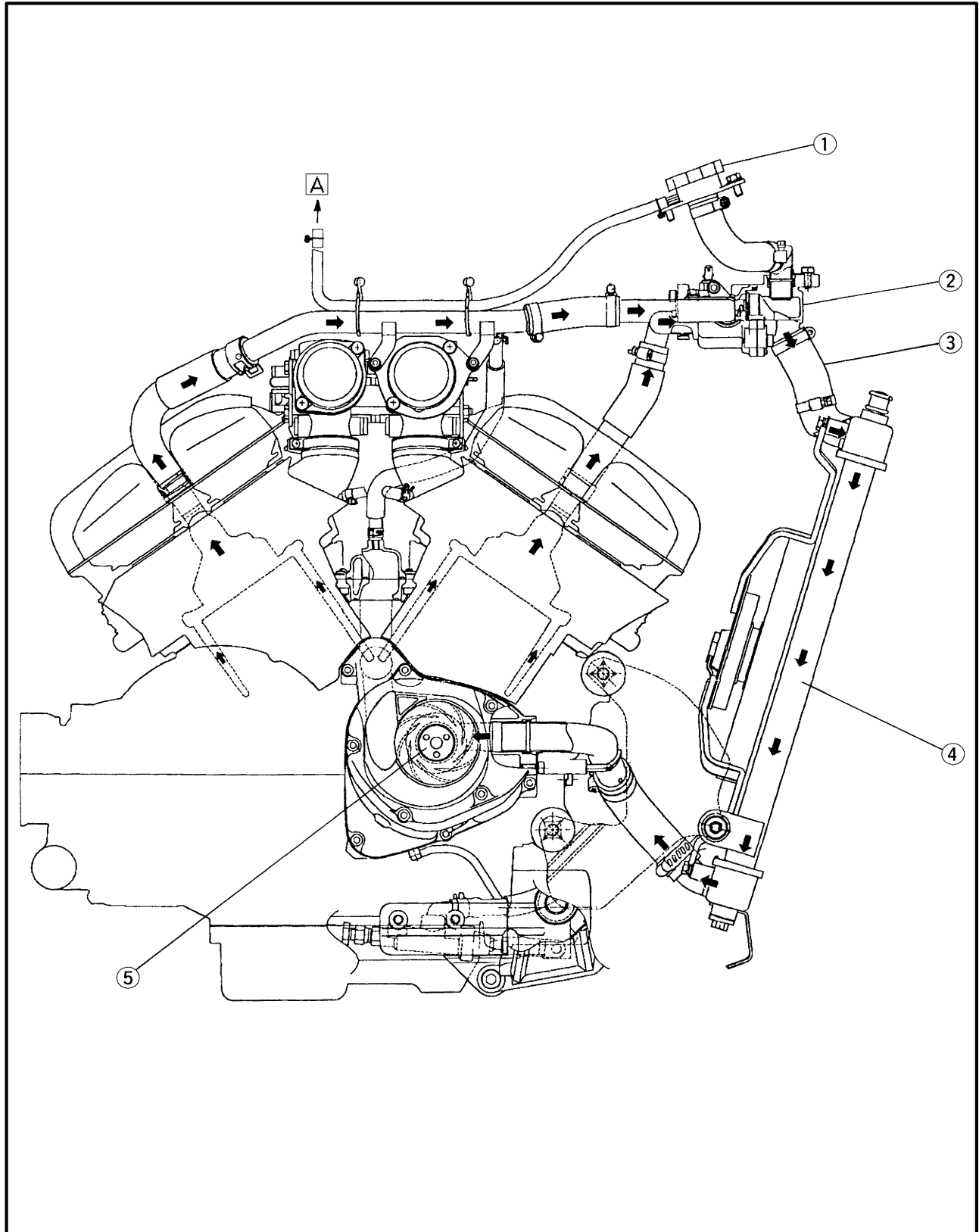
Lubrication Point	Symbol
Steering bearing (upper/lower)	
Steering bearing cover	
Steering lock	
Steering head pipe lower oil seal	
Front wheel oil seal (right/left)	
Rear wheel oil seal	
Clutch hub fitting area	
Rear brake pedal shaft	
Shift pedal	
Front footrest pivot	
Rear footrest pivot	
Sidestand sliding surface	
Tube guide (throttle grip) inner surface	
Brake lever pivot bolt, contact surface	
Clutch lever bolt, contact surface	
Swingarm pivot shaft	
Swingarm pivot bearing	
Swingarm pivot oil seal	
Relay arm bearing (inner)	
Rear shock absorber bearing (inner)	
Connecting rod bearing (inner)	



EAS00033

COOLING SYSTEM DIAGRAMS

- ① Radiator cap
 - ② Thermostatic valve housing
 - ③ Radiator hose
 - ④ Radiator
 - ⑤ Water pump
- [A] To coolant reservoir tank.

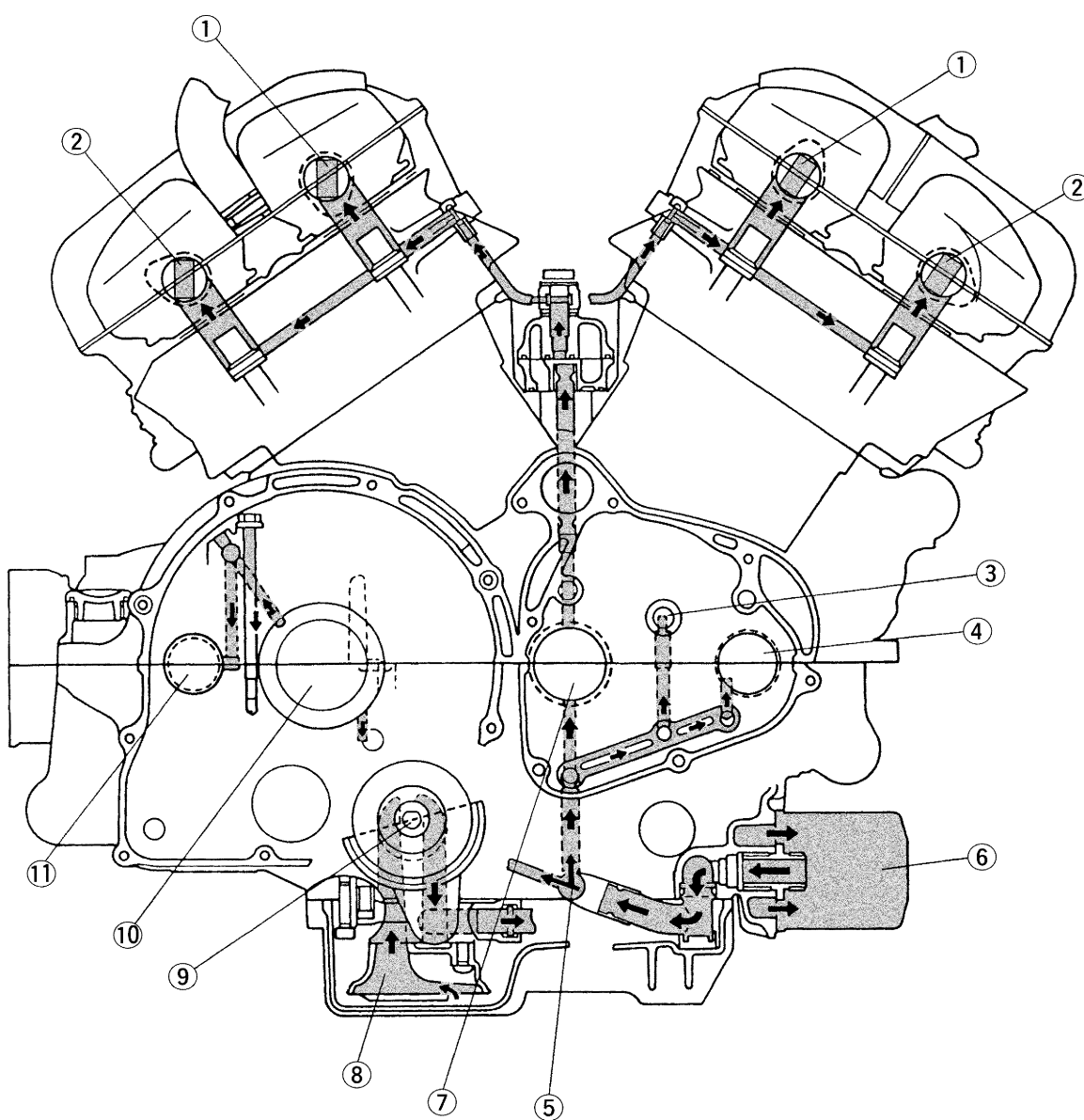




EAS00034

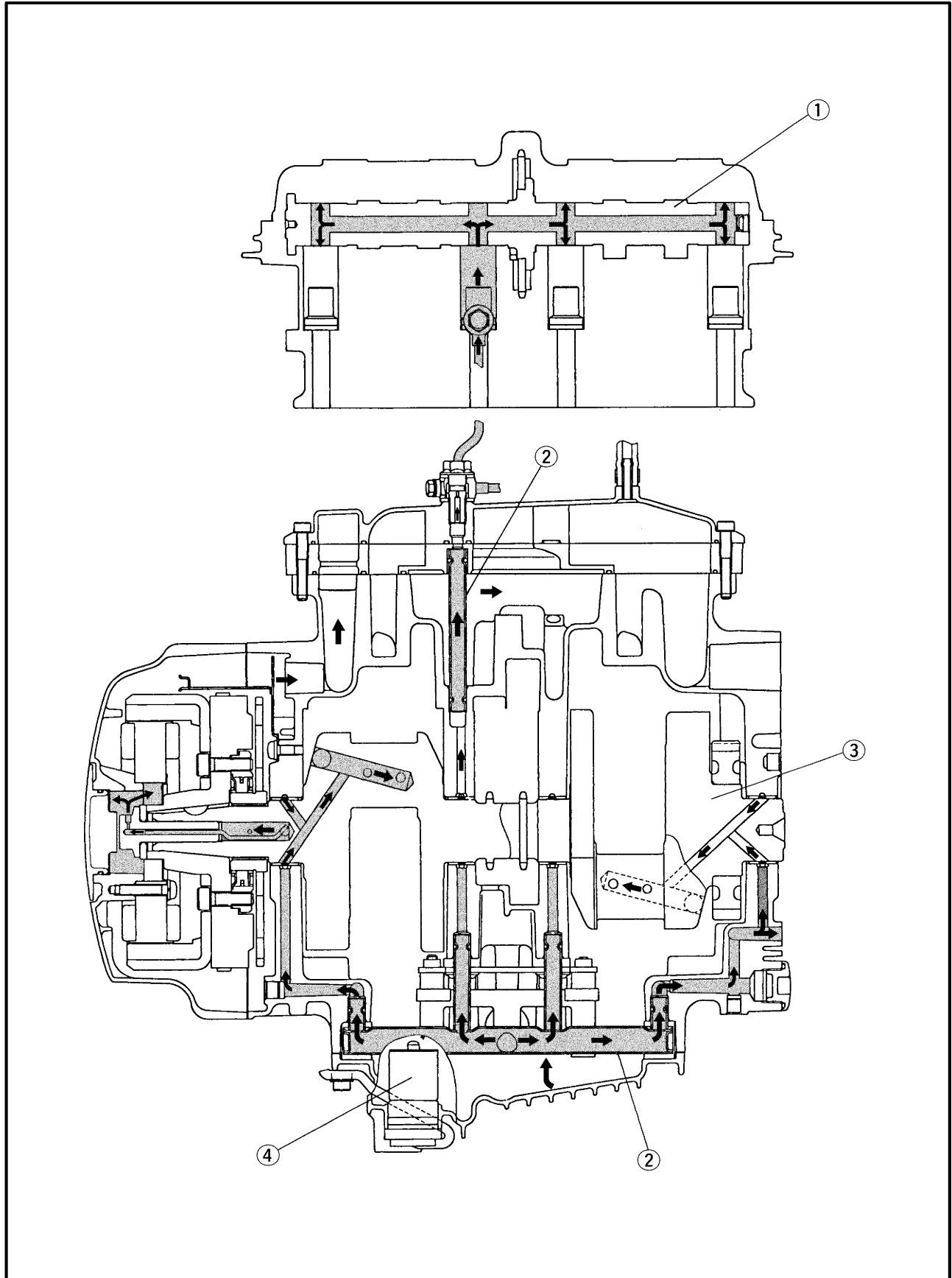
LUBRICATION DIAGRAMS

- ① Camshaft (intake)
- ② Camshaft (exhaust)
- ③ Water pump impeller shaft
- ④ Water pump drive gear
- ⑤ Main gallery
- ⑥ Oil filter
- ⑦ Crankshaft
- ⑧ Oil strainer
- ⑨ Oil pump
- ⑩ Main axle
- ⑪ Drive axle



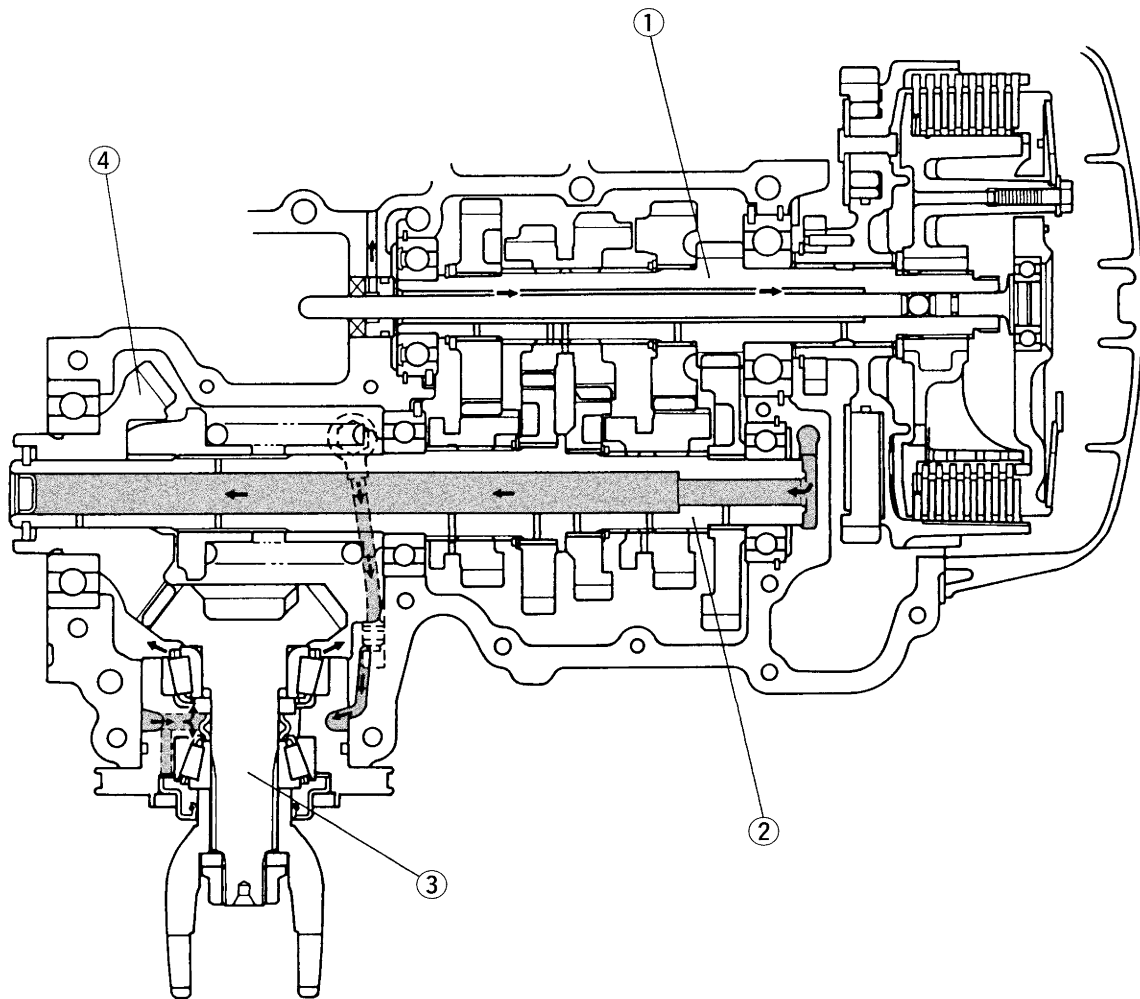


- ① Camshaft
- ② Main gallery
- ③ Crankshaft
- ④ Oil level switch



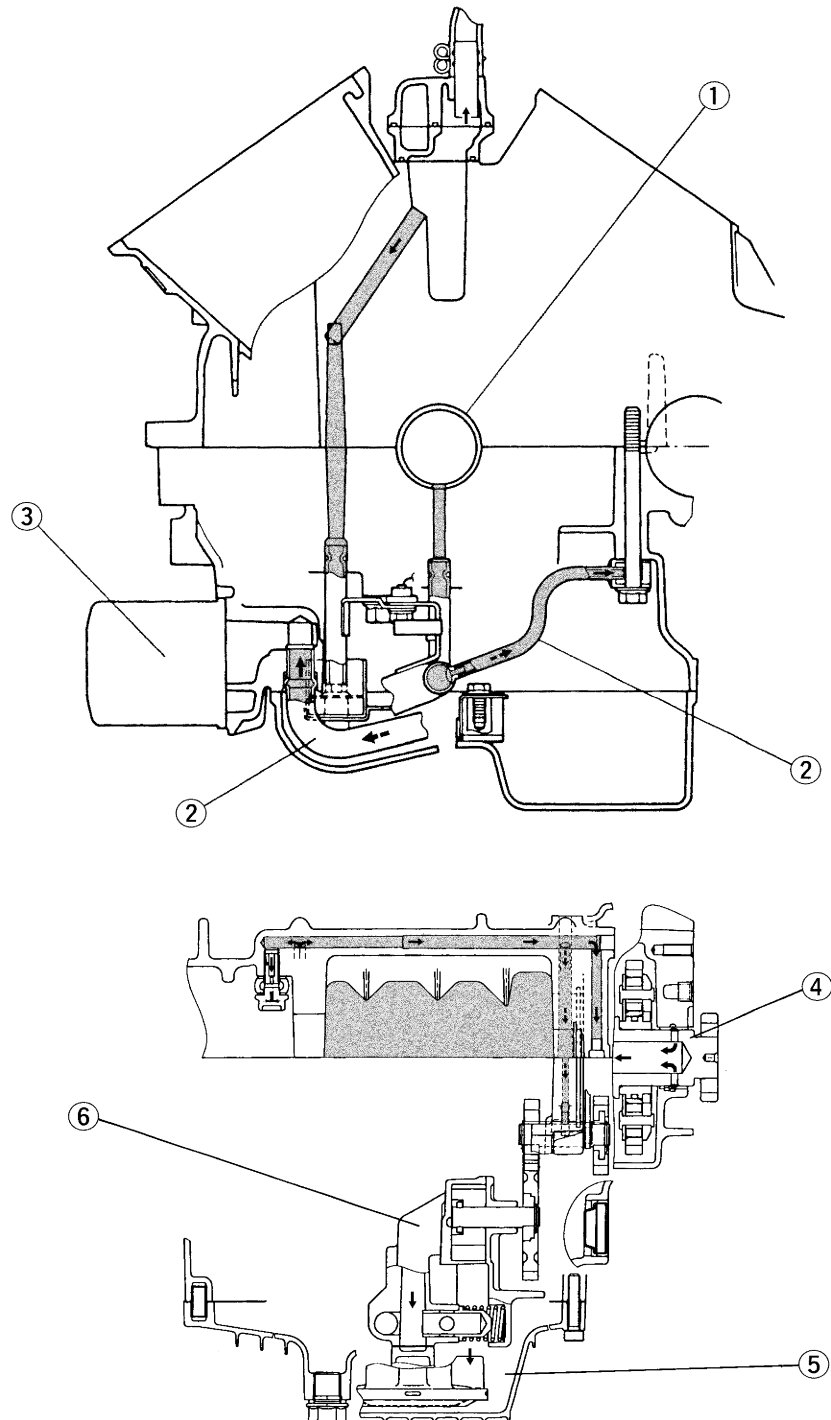


- ① Main axle
- ② Drive axle
- ③ Middle driven pinion gear
- ④ Middle drive pinion gear





- ① Crankshaft
- ② Oil pipe
- ③ Oil filter
- ④ Water pump drive gear
- ⑤ Oil strainer
- ⑥ Oil pump



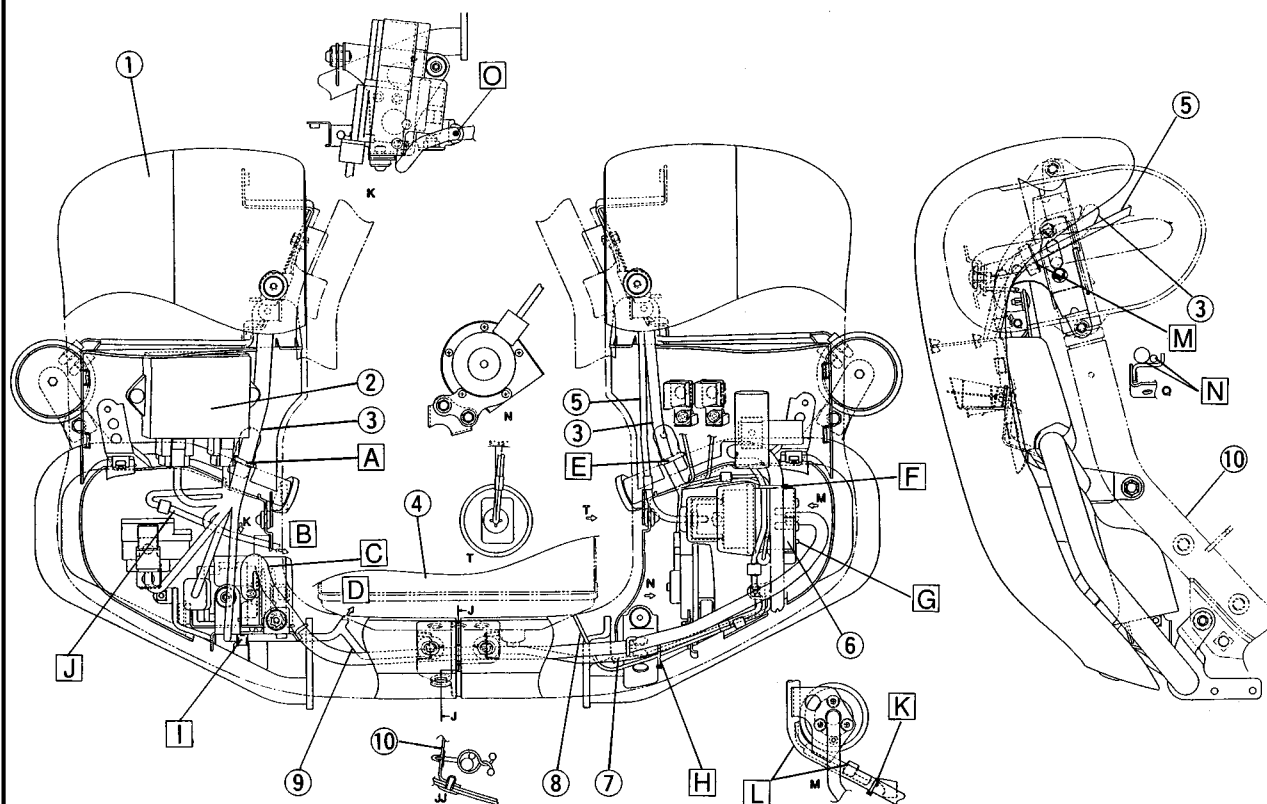


EAS00035

CABLE ROUTING

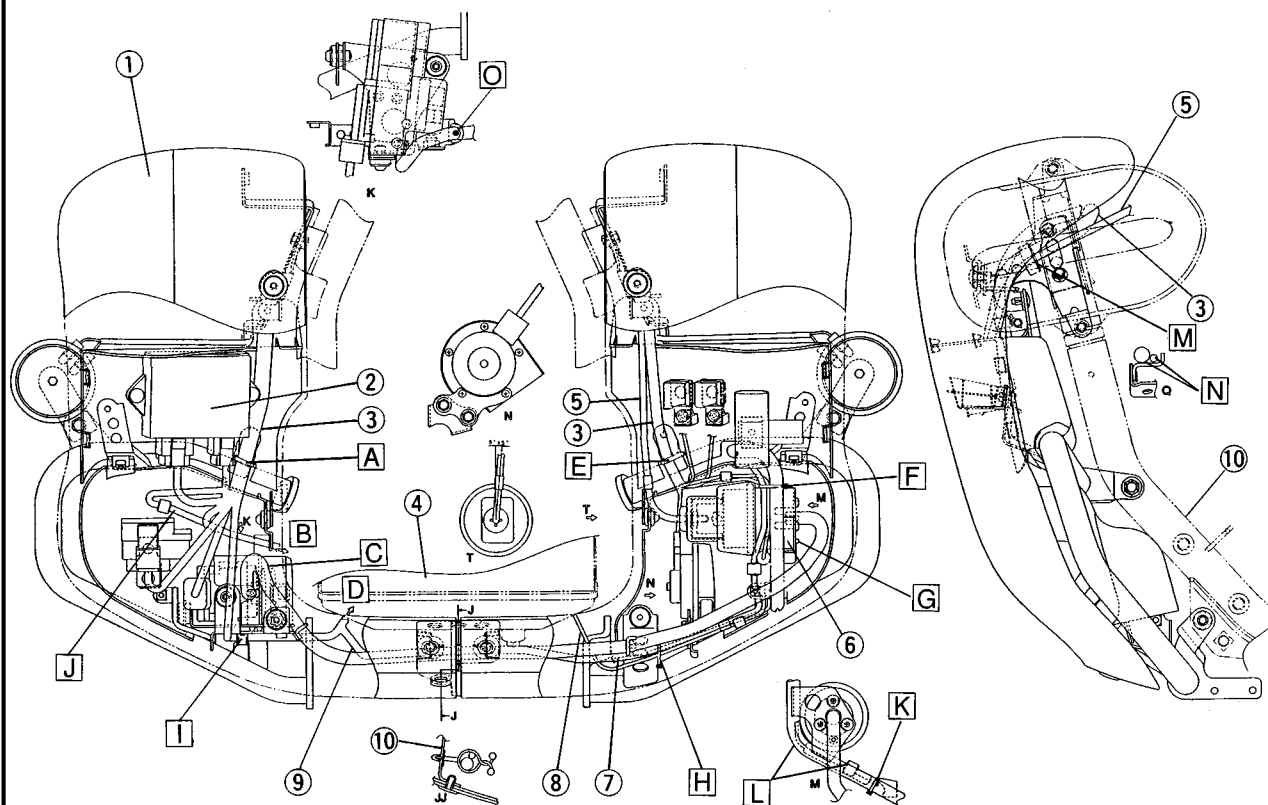
- ① Under cover (right)
- ② Cruise control unit
- ③ Wire harness
- ④ Radiator assembly
- ⑤ Cruise control cable
- ⑥ Vacuum actuator
- ⑦ Sidestand switch lead
- ⑧ Fan motor lead
- ⑨ Noise filter lead
- ⑩ Frame complete

- A Fasten the wire harness with a plastic clamp.
- B To rear brake switch
- C Position the vacuum hose as shown.
- D To regulator
- E Fasten the wire harness with a plastic clamp.
- F Fasten the side stand switch lead, fan motor lead and noise filter lead with a plastic clamp.
- G Align the projection downward.
- H Fasten the side stand switch lead, fan motor lead and noise filter lead with a plastic clamp.



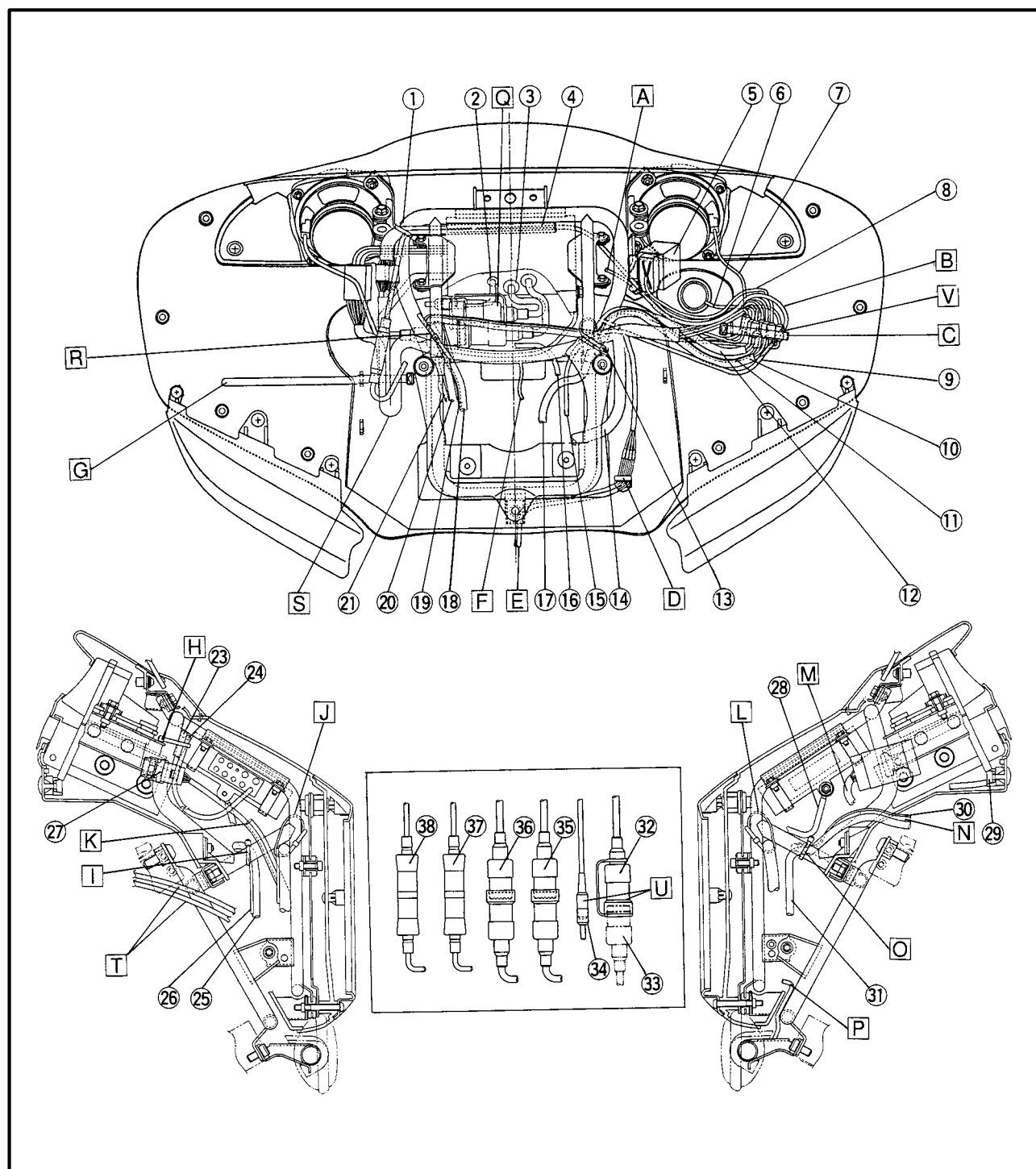


- I** Fasten the regulator lead with a steel clamp.
 - J** Route the rear brake switch lead between the wire harness and cover.
 - K** Fasten the side stand switch lead, fan motor lead and noise filter lead with a plastic clamp.
 - L** Route the side stand switch lead, fan motor lead and noise filter lead inside the pipe.
Make sure that the leads are not come out of the pipe.
 - M** Fasten the cruise control cable and wire harness with a plastic clamp.
 - N** Route the cruise control cable and wire harness outside of the steel clamp.
- O** Align the white mark on the rear brake switch lead with the metal clamp.



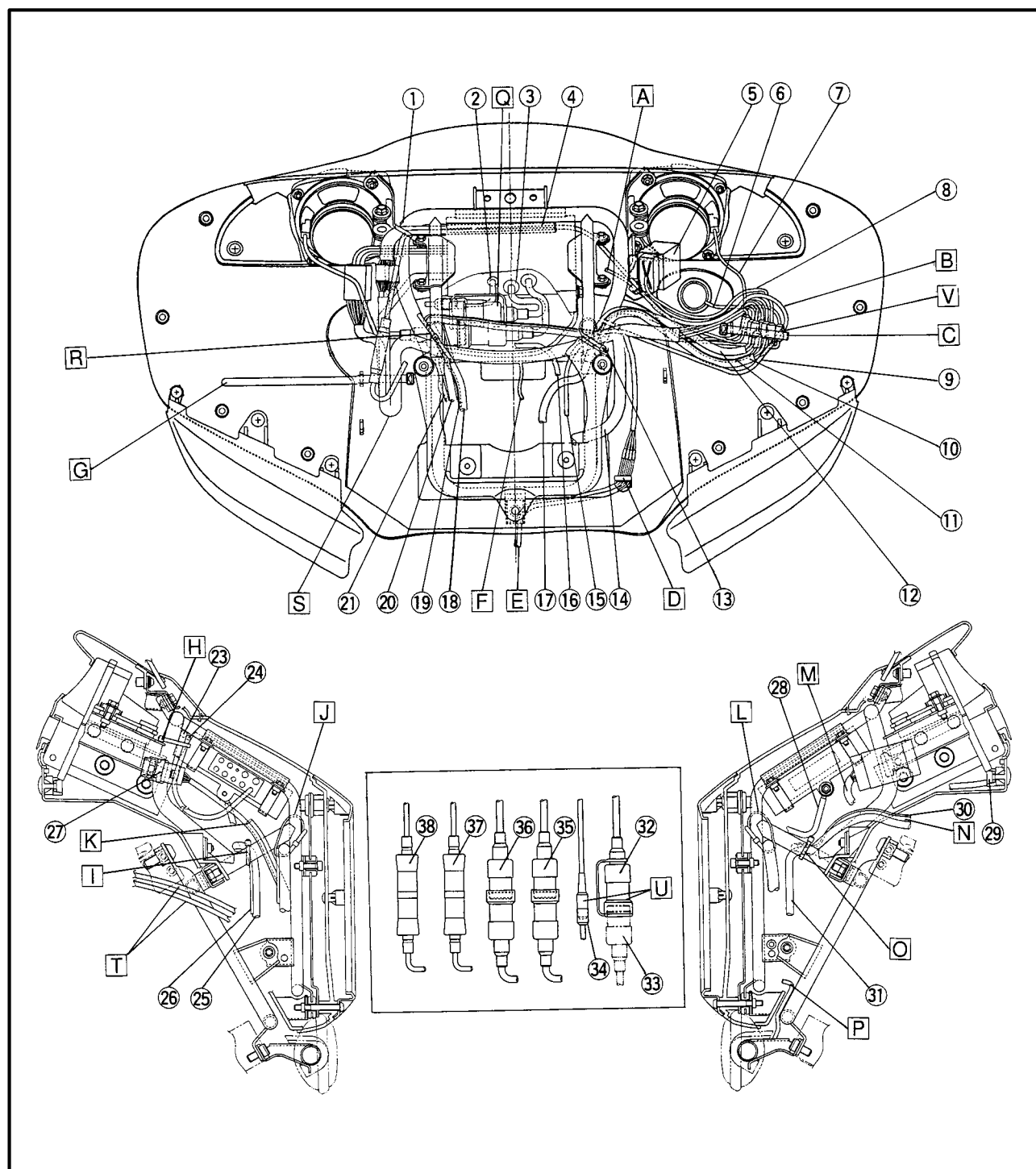


- | | | |
|---------------------------------|---------------------------------|--------------------------------------|
| ① Antenna lead (with cover) | ⑭ Headlight harness | ⑳ Flasher relay |
| ② Auxiliary terminal | ⑮ Antenna lead | ㉑ Ground lead |
| ③ CD code | ⑯ Front head set lead | ㉒ "CRUISE" switch lead |
| ④ Meter lead | ⑰ Handlebar switch lead (left) | ㉓ Front brake switch lead |
| ⑤ Hazard relay | ⑱ Handlebar switch lead (right) | ㉔ Handlebar switch lead (left) |
| ⑥ DC outlet lead | ⑲ Front brake switch lead | ㉕ CD cord 13P (green) |
| ⑦ Speaker lead | ⑳ Wire harness sub lead (right) | ㉖ CD cord (option) |
| ⑧ Hazard relay lead | ㉑ Ground lead | ㉗ Auxiliary terminal lead |
| ⑨ Antenna lead | ㉒ Headlight harness | ㉘ Front remote controller 13P (blue) |
| ⑩ Handlebar switch lead (right) | ㉓ Meter lead | ㉙ CB cord 13P (yellow) |
| ⑪ Front brake switch lead | ㉔ Antenna lead (with cover) | ㉚ EXT lead 5P (white) |
| ⑫ Handlebar switch lead (left) | ㉕ Handlebar switch lead (right) | ㉛ Head set lead 5P (red) |
| ⑬ Plastic clamp | ㉖ Front brake switch lead | |



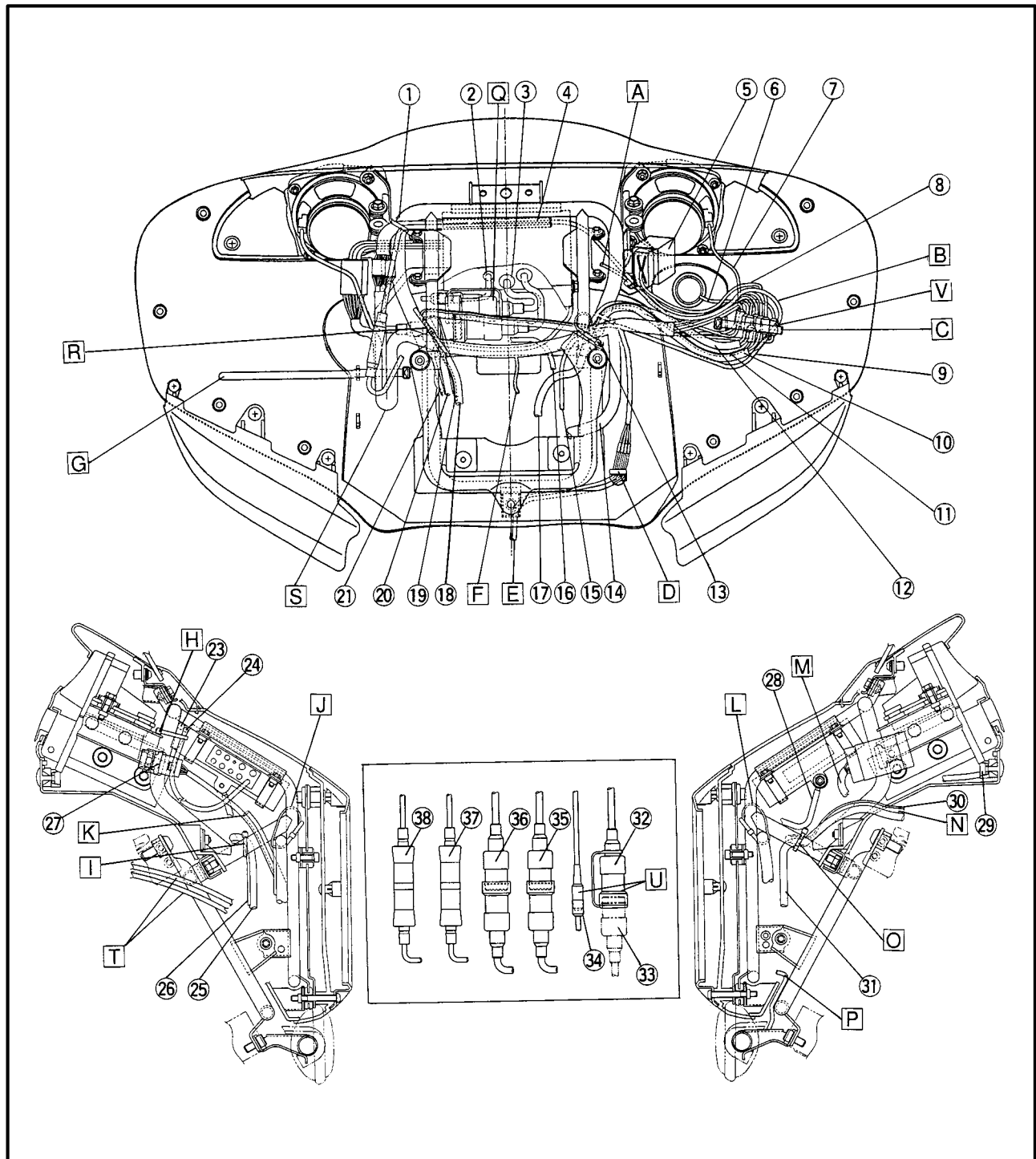


- A** To the "CRUISE" switch.
- B** Connect the couplers with same color.
- C** Fasten the headlight harness and handlebar switch (left and right) lead with a plastic clamp.
- D** Fasten the turn signal lead with a plastic clamp.
- E** To the turn signal light.
- F** To headlight.
- G** Fasten the audio coupler and headlight harness with a plastic clamp.
- H** Fasten the meter lead and antenna harness with a plastic clamp.
- I** Fasten the handlebar switch lead (right) and front brake switch lead with a plastic clamp.
- J** Fasten the headlight harness to the pipe with plastic clamp.
- K** To the speedometer.
- L** Fasten the headlight harness to the pipe with a plastic clamp.
- M** To the headlight (harness).
- N** Connect the handlebar switch lead (right) with the headlight harness.
- O** Fasten the handlebar switch lead (left and right) and front brake switch lead with a plastic clamp.
- P** To the headlight harness.
- Q** Put the plug for CD cord under the cassette deck.





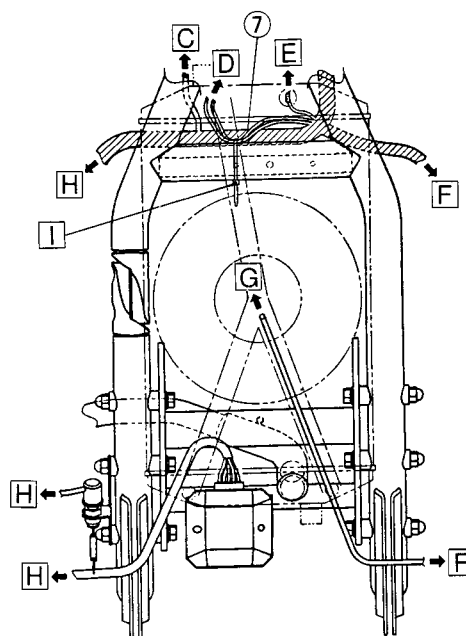
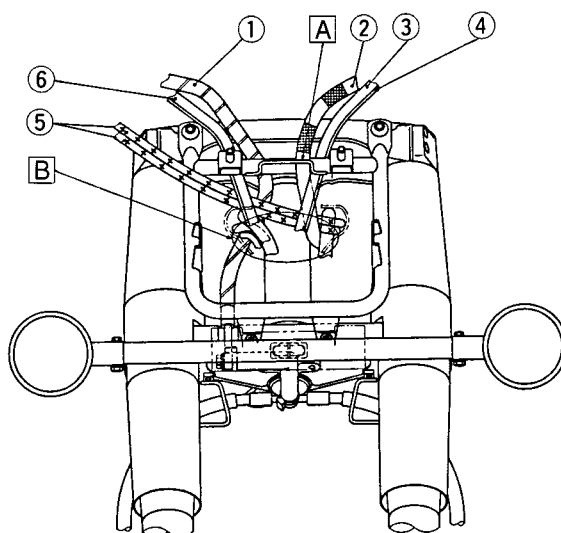
- R** Align the ground lead paint mark and main harness sub lead with a plastic clamp.
- S** Clamp the head light harness (right). Route the head light harness so that DIN cable set comes upper side.
- T** For installing the stay, do not catch the throttle cable.
- U** Put it under the cassette deck sideways. Not clamped.
- V** At the white tape on the antenna lead attach a plastic clamp.





- ① Brake hose
- ② Clutch hose
- ③ Handlebar switch lead (left)
- ④ Remote controller lead
- ⑤ Throttle cable
- ⑥ Handlebar switch lead (right)
- ⑦ Wire harness assembly

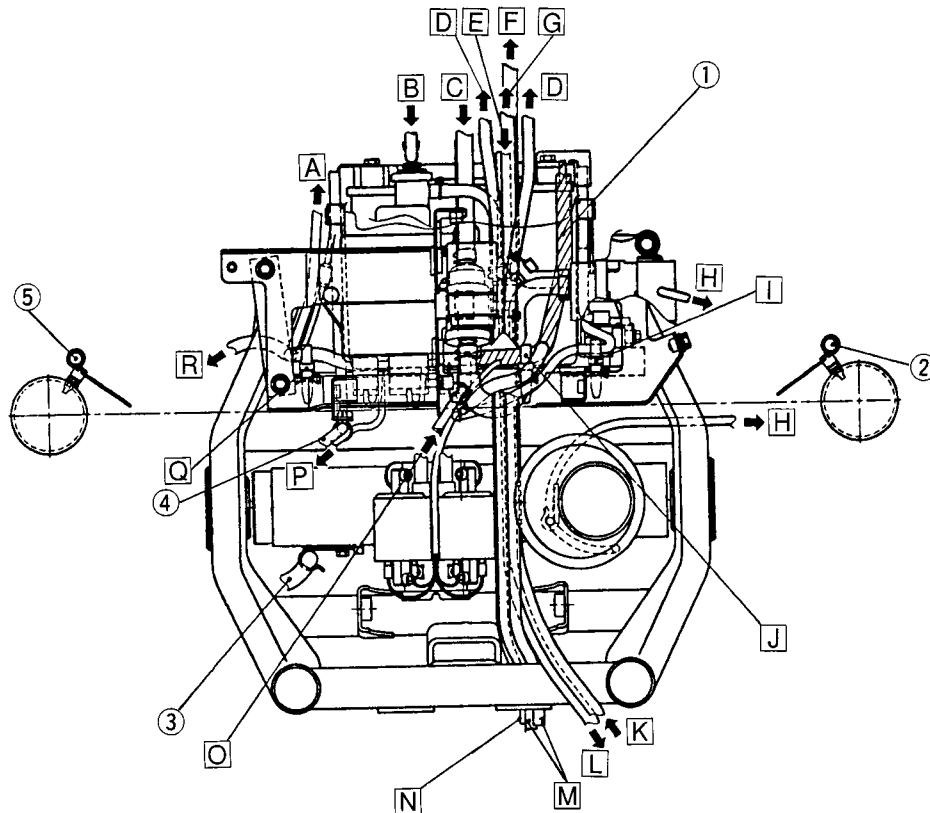
- A Pass the clutch hose through the guide.
- B To the upper cowling.
- C To the engine stop switch.
- D To the ignition coil #2.
- E To the thermo switch.
- F To the left under cowling.
- G To the fan motor.
- H To the right under cowling.
- I Fasten the ignition coil lead with a plastic clamp (with the end towards the under side of the motorcycle).





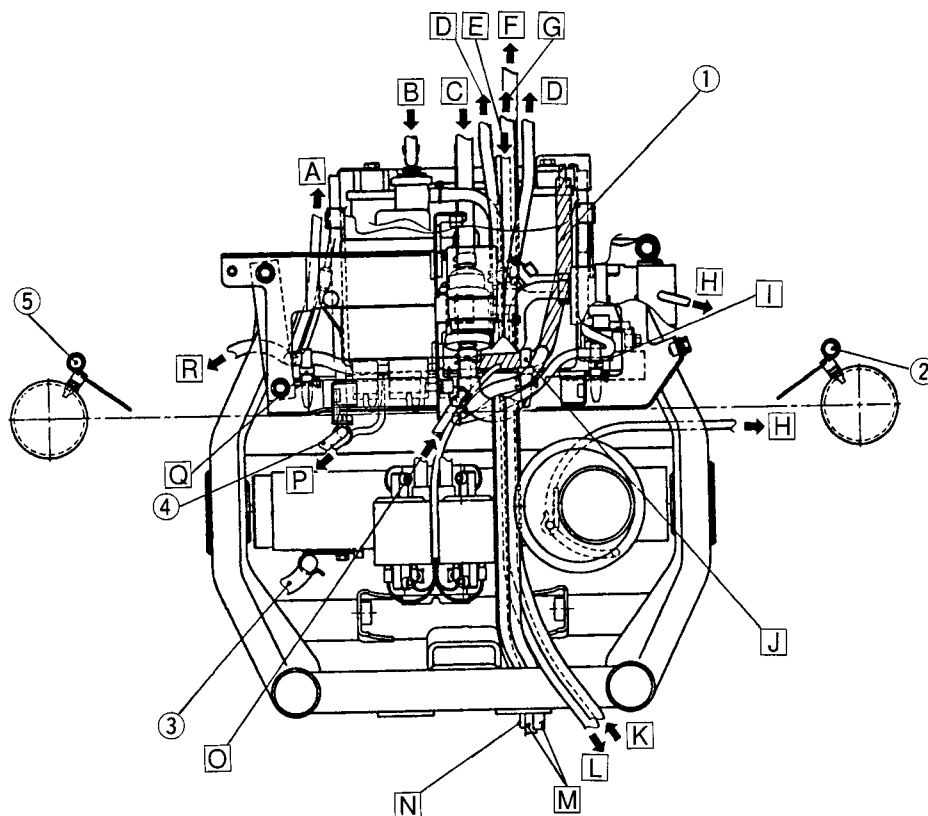
- ① Wire harness
- ② Starter lead
- ③ Brake hose
- ④ Battery negative lead
- ⑤ Wire harness

- A To the rear fender.
- B From the radiator (breather hose).
- C From the fuel tank.
- D To the air cleaner.
- E From the fuel tank (breather hose).
- F To the carburetor.
- G To the carburetor (for California).
- H To the wire harness.
- I Fasten the starter lead with a plastic clamp (with the end towards the front side of the motorcycle).
- J Align the white mark on the wire harness with the plastic clamp (with the end towards the front side of the motor cycle).
- K From the canister (for California).





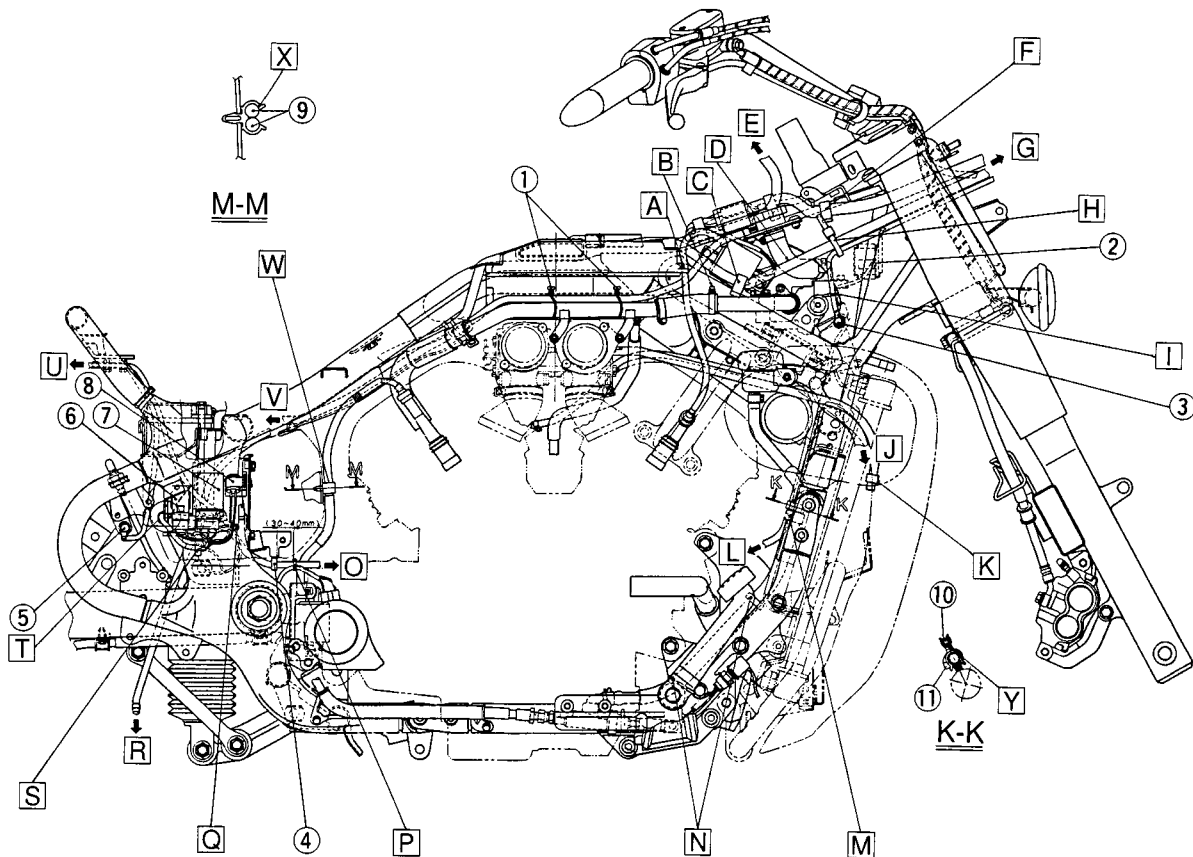
- L** To the canister (for California). Without California, same route with air cleaner drain hose.
- M** Front the air cleaner.
- N** From the coolant reservoir tank.
- O** From the engine.
- P** To the horn.
- Q** Fasten the wire harness with a plastic clamp (with the end towards the front side of the motor-cycle).
- R** To the relay.





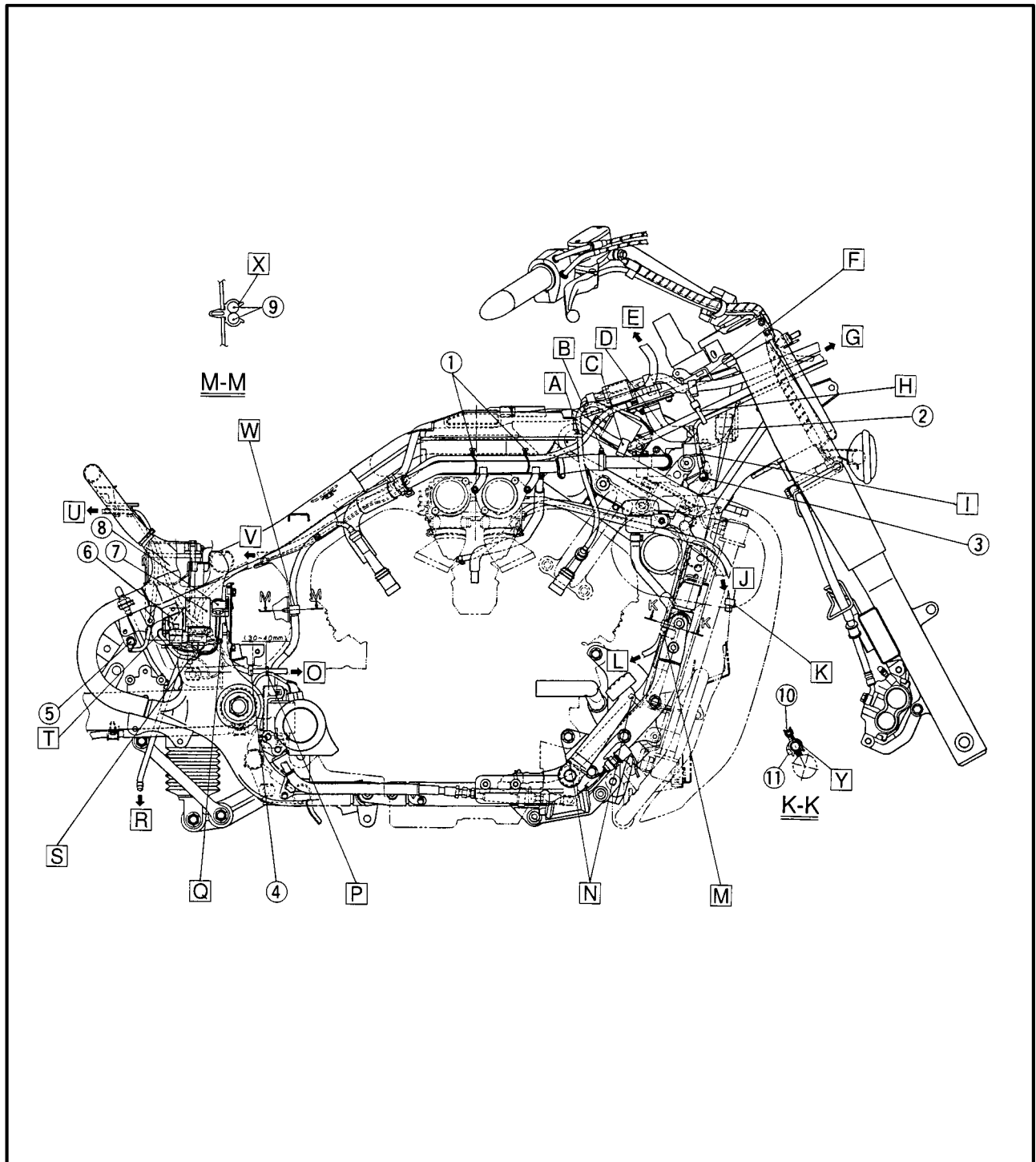
- ① Plastic clamp
- ② Emergency stop switch
- ③ Bolt (ground)
- ④ Plastic clamp
- ⑤ Bolt (ground)
- ⑥ Carburetor heater relay
- ⑦ Flasher relay
- ⑧ Thermo switch
- ⑨ High tension code
- ⑩ AIS hose
- ⑪ Coolant reservoir hose

- [A] Route the high tension cord through the guide on the air induction box.
- [B] Clamp the coolant hose inside of the motorcycle with hose clamp.
- [C] Fasten the audio lead and CD lead (option) with a plastic clamp.
- [D] Route the audio lead tensely.
- [E] To the fuel tank.
- [F] Fasten the wire harness sub lead with a plastic clamp.
- [G] To the upper cowl.
- [H] Fasten the audio lead, CD lead (option) and ground lead with a plastic clamp.
- [I] Fasten the ground lead and engine stop switch lead.
- [J] To the under cowl.
- [K] Insert the hose through the metal clip.
- [L] To the AIS.





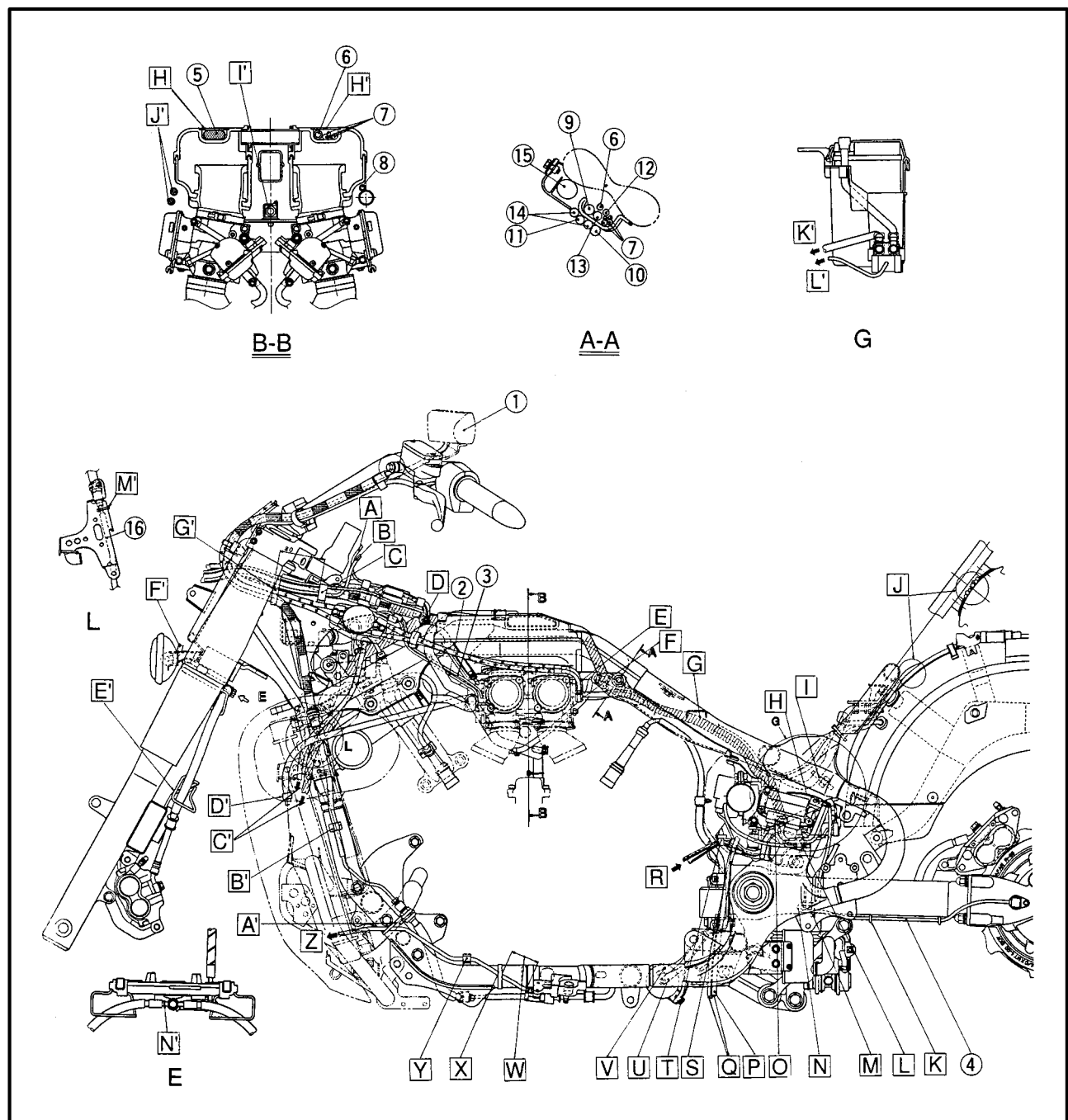
- M** Position the end of clamp to the rear side of the motorcycle.
- N** Position the end of clamp to the rear side of the motorcycle.
- O** To the engine.
- P** Clamp the horn lead white mark and ground lead.
- Q** Route the battery negative lead between the wire harness and pipe.
- R** To the AIS.
- S** Fasten the wire harness, flasher relay and thermo switch lead with a plastic clamp.
- T** Fasten the wire harness with a plastic clamp.
- U** To the rear fender.
- V** To the coolant reservoir tank cap.
- W** Fasten the high tension cord #1 and #3 with a plastic clamp.
- X** Align the cover on the high tension cord with the clamp.
- Y** Clamp the AIS hose as far as possible from the frame.





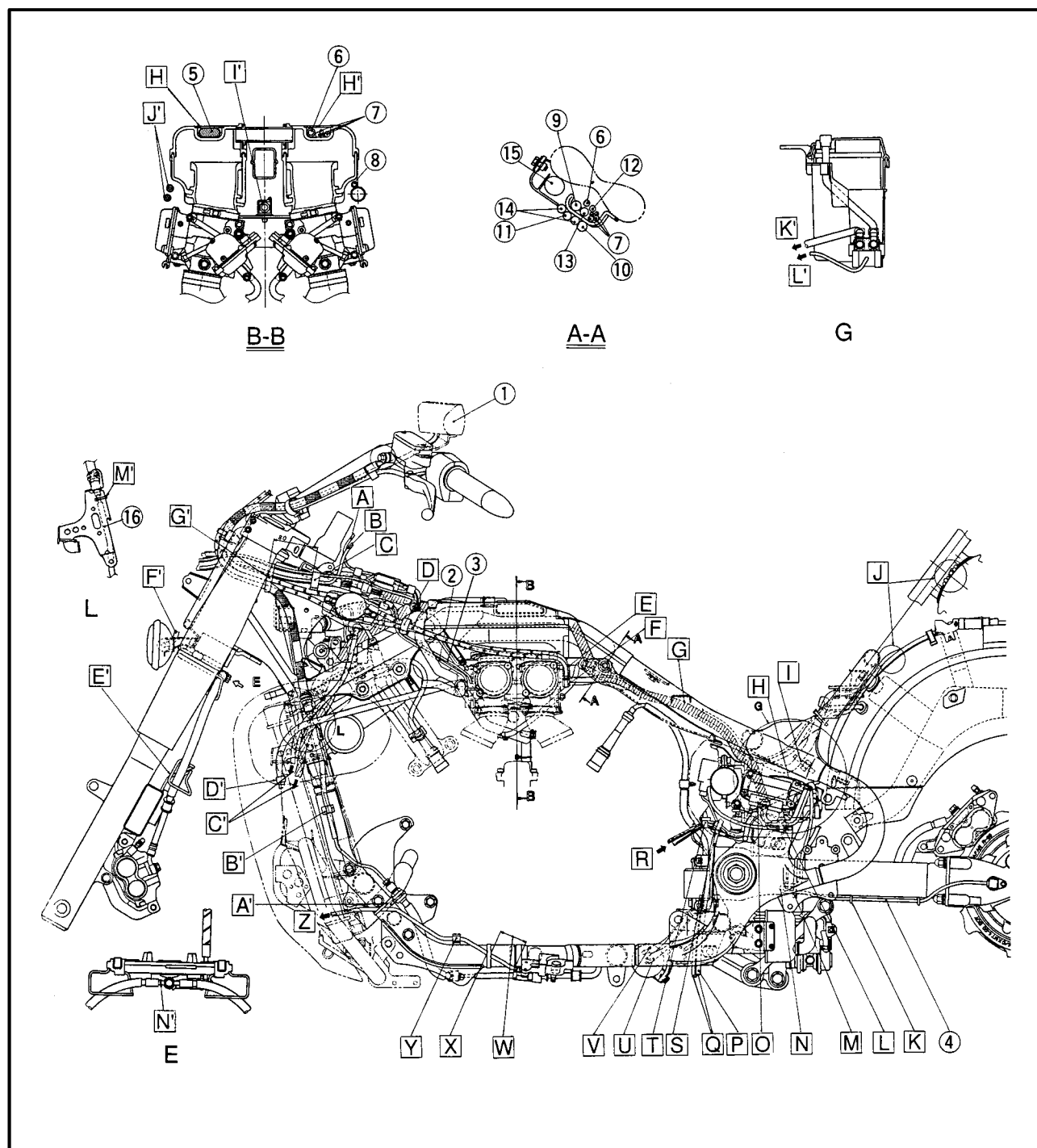
- ① Front remote controller
- ② TPS lead
- ③ Carburetor heater lead
- ④ Speed sensor lead
- ⑤ Main harness
- ⑥ Fuel tank breather hose
- ⑦ Audio lead
- ⑧ Coolant reservoir hose
- ⑨ Fuel hose (from fuel tank)
- ⑩ Fuel hose (from fuel pump)
- ⑪ Canister purge hose
- ⑫ AIS hose
- ⑬ Breather hose
- ⑭ Air cleaner case drain hose
- ⑮ Wire harness
- ⑯ Support stay

- A Connect the fuel sender lead on the fuel tank.
- B Route the head set lead to the switch cover on the fuel tank.
- C Fasten the wire harness sub lead, antenna lead and head set lead with a plastic clamp. Align the wire harness sub lead and mark on the head set lead with the clamp. At the cover on the antenna lead attach a clamp.
- D Fasten the throttle cable with a plastic clamp.
- E Position the throttle cable (return side) at inside of the cable holder.
- F Position the throttle cable (pull side) at outside of the cable holder.
- G Route the wire harness with the frame guide (T-bar).
- H Fasten the speed sensor lead and wire harness.
- I Align the marking tape on the head set lead, CD cord (option), antenna lead and CB cord and fasten them, tail lead and DC outlet lead with a plastic clamp.
- J Position the lead wires on the rear fender as shown.
- K Clamp the speed sensor lead in the clip on the rear arms.





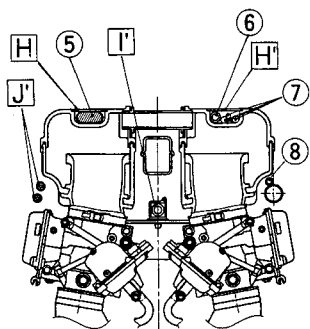
- L** Fasten the speed sensor lead, fuel pump lead and fuse box lead with a plastic clamp.
- M** Fasten the speed sensor lead with a plastic clamp.
- N** Turn the lead wire to clamp on the rear arm section.
- O** Route the wire harness behind the igniter unit.
- P** From coolant reservoir tank.
- Q** From air cleaner case.
- R** From engine.
- S** Route the hoses on the left side of the engine leads.
- T** Fasten the starter lead, pick up lead, AC magneto lead, neutral switch lead, ignition coil sub lead and oil level gauge lead with a plastic clamp.
- U** From roll over valve (for California).
- V** To carburetor (for California).
- W** Make sure that the sidestand switch lead has no loosening.



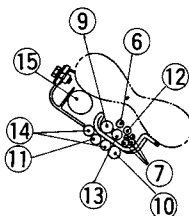


- [X] Fasten the side stand switch lead with a plastic clamp.
- [Y] Fasten the side stand switch lead with a plastic clamp.
- [Z] To under cowling.
- [A'] Fasten the sidestand switch lead with a metal band.
- [B'] Fasten the clutch pipe with a plastic clamp.
- [C'] To under cowling
- [D'] Insert the hose through the metal clip.
- [E'] Through the brake hose in the guide wire.

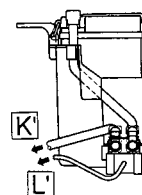
- [F'] To upper cowling.
- [G'] Fasten the wire harness sub lead, throttle cable, head set lead and clutch hose with a plastic clamp.
- [H'] Insert the wire harness into the air induction box guide and hold it with clamp.
- [I'] Fasten the fuel hose on the carburetor with a plastic clamp.
- [J'] Position the throttle cables do not outside of the carburetors.
- [K'] To plastic clamp on the cross pipe.
- [L'] To wire harness assembly.



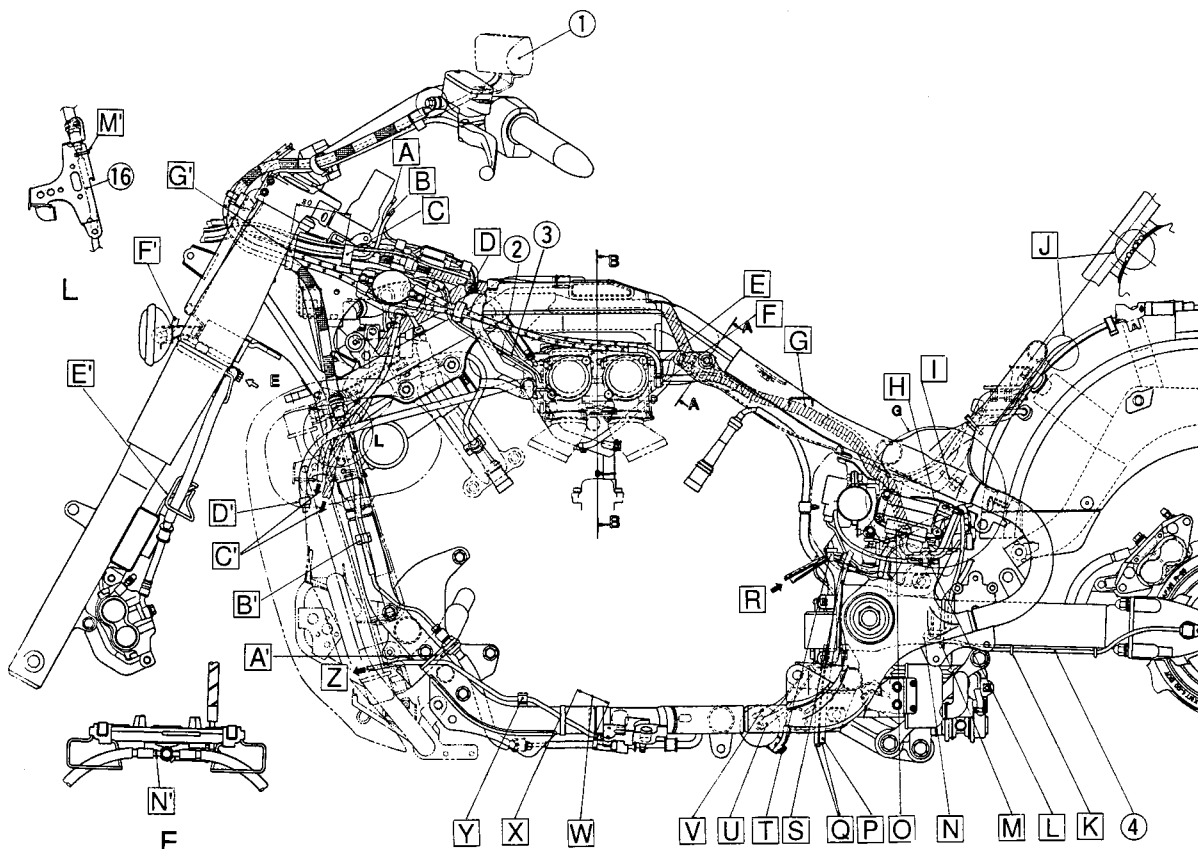
B-B



A-A



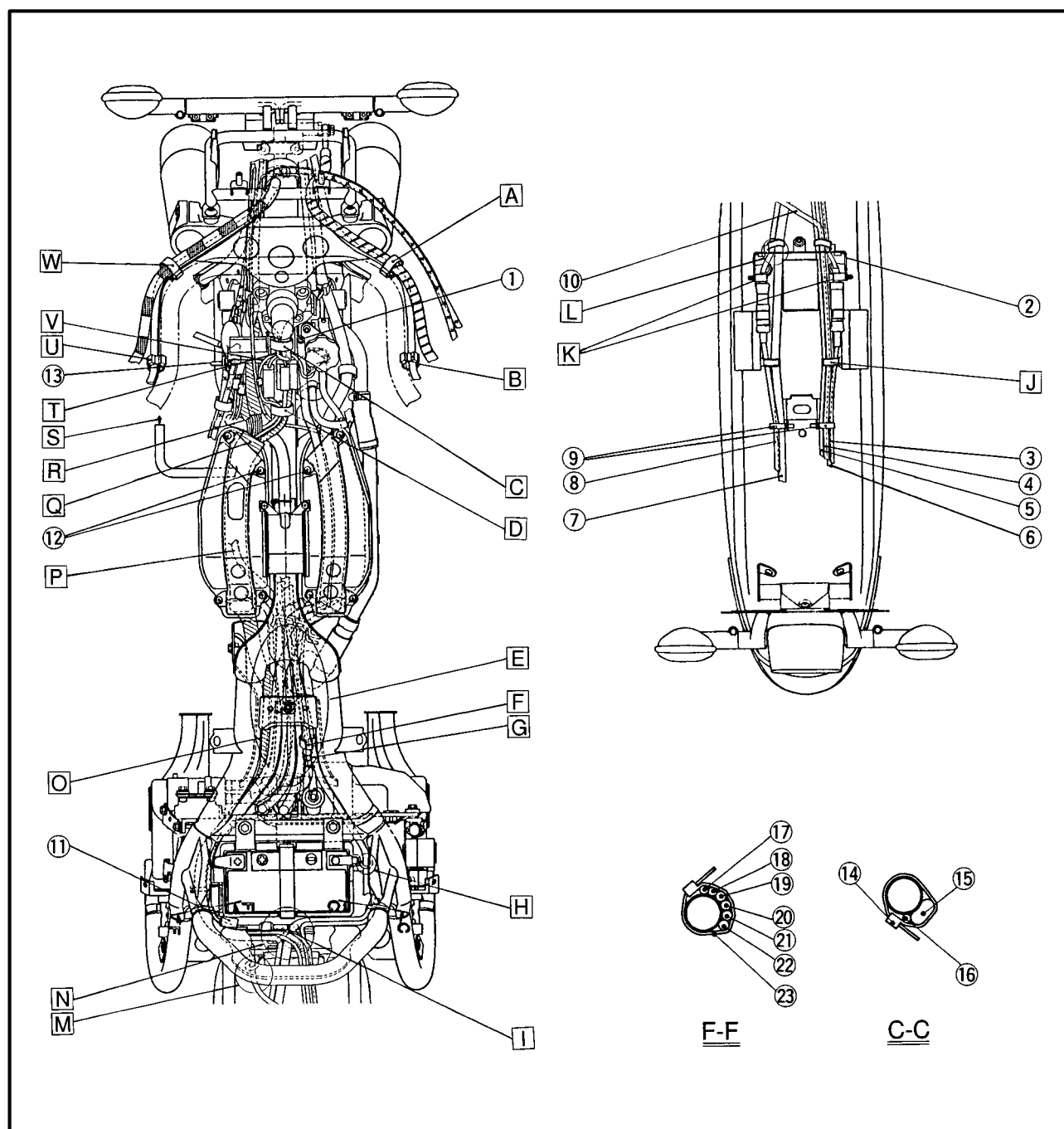
G





- | | |
|---------------------------|--------------------------|
| ① Fuel tank breather hose | ①⑦ DC outlet |
| ② Bracket | ①⑧ Tail/brake light lead |
| ③ Head set lead | ①⑨ Head set lead |
| ④ CD code (option) | ①⑩ CD cord (option) |
| ⑤ Antenna lead | ①⑪ CB cord |
| ⑥ Ground lead | ①⑫ Antenna lead |
| ⑦ Wire harness | ①⑬ Plastic clamp |
| ⑧ CB code | |
| ⑨ Plastic clamp | |
| ⑩ CD cord (option) | |
| ⑪ DC outlet | |
| ⑫ Screw | |
| ⑬ Fuel sender lead | |
| ⑭ Plastic clamp | |
| ⑮ Wire harness | |
| ⑯ Ground lead | |

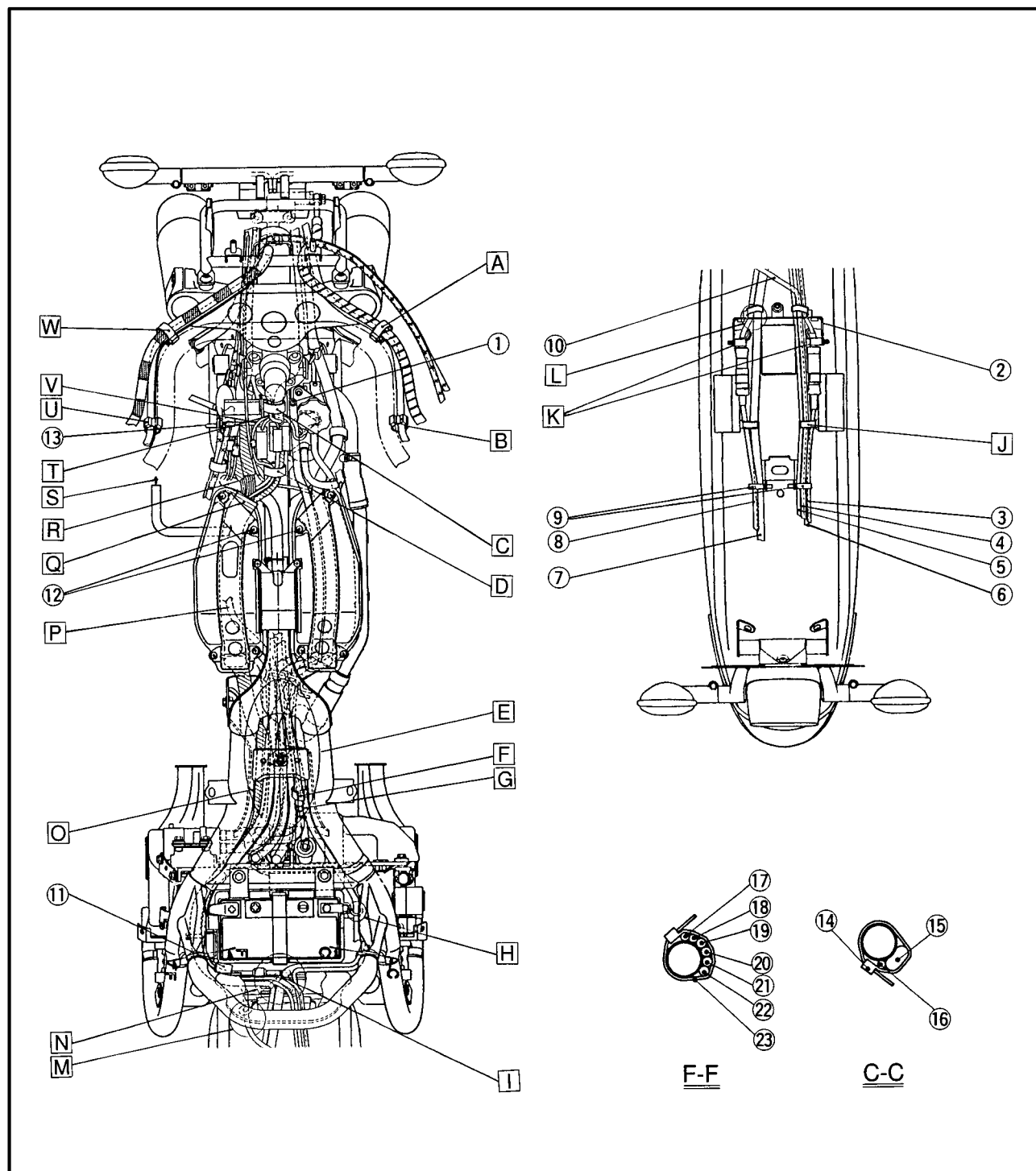
- | | |
|----------|---|
| A | Fasten the handlebar switch lead (right) and clutch hose with a plastic clamp. |
| B | Fasten the handlebar switch lead (right) with a plastic clamp. |
| C | Fasten the wire harness, main switch lead and fuel sender lead with a plastic clamp. |
| D | Fasten the wire harness, main switch lead and ignition coil #4 lead with a plastic clamp. |
| E | Be sure not to squeeze each leads. |
| F | Fasten the carburetor parse hose with a plastic clamp (for California). |





- G** Positon the clip end at upper.
- H** Route the AIS hose through the clip.
- I** Route the tail/brake light lead through the hole in the cover at the back of the frame.
- J** After routing the leads, fasten them with clamp.
- K** Fix the connector with a clamp as shwon.
- L** Route the CB cord and wireharness between bracket and rear fender.
- M** Route the CD cord (option) outside the rear frame into the hole on the cover.
- N** Make sure if the lead wires go to the left or right side.

- O** Route the wire harness with the guide (T-bar).
- P** Route the AIS hose between the carburetor joints.
- Q** The protector section must be exposed.
- R** Route the antenna lead at the left side.
- S** To the fuel cock.
- T** Fasten the wire harness with a plastic clamp.
- U** Fasten the handlebar switch lead and remote controller lead with a plastic clamp.
- V** Route the ignition coil lead downward the main harness.
- W** Fasten the handlebar switch lead (left), clutch hose and remote controler lead with a plastic clamp.



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PERIODIC MAINTENANCE CHART FOR EMISSION CONTROL SYSTEM

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PERIODIC MAINTENANCE CHART FOR EMISSION CONTROL SYSTEM

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS					
				600 mi (1,000 km) or 1 month	4,000 mi (7,000 km) or 6 months	8,000 mi (13,000 km) or 12 months	12,000 mi (19,000 km) or 18 months	16,000 mi (25,000 km) or 24 months	20,000 mi (31,000 km) or 30 months	
1	*	Valve clearance	• Check and adjust valve clearance when when is cold.	Every 26,600 mi (42,000 km)						
2		Spark plug	• Check condition. • Adjust gap and clean. • Replace at 8,000 mi (13,000 km) or 12 months and thereafter every 8,000 mi (13,000 km) or 12 months.		√	Replace	√	Replace	√	
3	*	Crankcase ventilation system	• Check ventilation hose for cracks or damage. • Replace if necessary.		√	√	√	√	√	
4	*	Fuel line	• Check fuel hose for cracks or damage. • Replace if necessary.		√	√	√	√	√	
5	*	Fuel filter	• Replace initial 20,000 mi (31,000 km) and thereafter every 20,000 mi (31,000 km)						Replace	
6	*	Exhaust system	• Check for leakage. • Retighten if necessary. • Replace gasket(s) if necessary.		√	√	√	√	√	
7	*	Carburetor synchronization	• Adjust synchronization of carburetors.	√	√	√	√	√	√	
8	*	Idle speed	• Check and adjust engine idle speed. • Adjust cable free play.	√	√	√	√	√	√	
9	*	Evaporative emission control system (For California only)	• Check control system for damage. • Replace if necessary.				√		√	

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

GENERAL MAINTENANCE AND LUBRICATION CHART

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GENERAL MAINTENANCE AND LUBRICATION CHART

No.	ITEM	ROUTINE	TYPE	INITIAL	ODOMETER READINGS					
				600 mi (1,000 km) or 1 month	4,000 mi (7,000 km) or 6 months	8,000 mi (13,000 km) or 12 months	12,000 mi (19,000 km) or 18 months	16,000 mi (25,000 km) or 24 months	20,000 mi (31,000 km) or 30 months	
1		Engine oil	• Replace	See page	✓		✓		✓	
2	*	Oil filter	• Replace	—	✓		✓		✓	
3	*	Air filter (See NOTE.)	• Clean with compressed air. • Replace if necessary.	—		✓	✓	✓	✓	✓
4	*	Cooling system	• Check hoses for cracks or damage, replace if necessary.	—		✓	✓	✓	✓	✓
			• Replace coolant every 24 months.	Ethylene glycol antifreeze coolant				Replace		
5	*	Brake system	• Adjust free play. • Check and replace pads if necessary. • Check operation and fluid leakage. (see NOTE)	—	✓	✓	✓	✓	Replace brake fluid	✓
6	*	Clutch	• Check operation and fluid leakage. (see NOTE) • Correct if necessary.	—	✓	✓	✓	✓	✓	✓
7	*	Final gear oil	• Check for leakage. • Replace every 16,000 mi (25,000 km) or 24 months.	SAE 80 API “GL-4” hypoid gear oil	Replace		Check		Replace	
8	*	Control cable	• Apply chain lube thoroughly.	Yamaha chain and cable lube or SAE 10W30 motor oil	✓	✓	✓	✓	✓	✓
9	*	Rear arm pivot bearing	• Check bearing assembly for looseness. • Moderately repack every 16,000 mi (25,000 km).	Medium weight wheel bearing grease			✓		Repack	
10		Brake / Clutch lever pivot shaft	• Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil		✓	✓	✓	✓	✓
11		Brake pedal and shift pedal shaft	• Lubricate • Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil		✓	✓	✓	✓	✓
12	*	Sidestand pivot	• Check operation and lubricate. • Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil		✓	✓	✓	✓	✓
13	*	Sidestand switch	• Check and clean or replace if necessary.	—	✓	✓	✓	✓	✓	✓
14	*	Front fork	• Check operation and for leakage.	—		✓	✓	✓	✓	✓
15	*	Steering bearings	• Check bearing assembly for looseness. • Moderately repack every 16,000 mi (25,000 km).	Medium weight wheel bearing grease.		✓	✓	✓	Repack	✓
16	*	Wheel bearings	• Check bearings for smooth rotation.	—		✓	✓	✓	✓	✓
17	*	Rear suspension link pivots	• Apply grease lightly.	Molybdenum disulfide grease					✓	

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

**NOTE:**

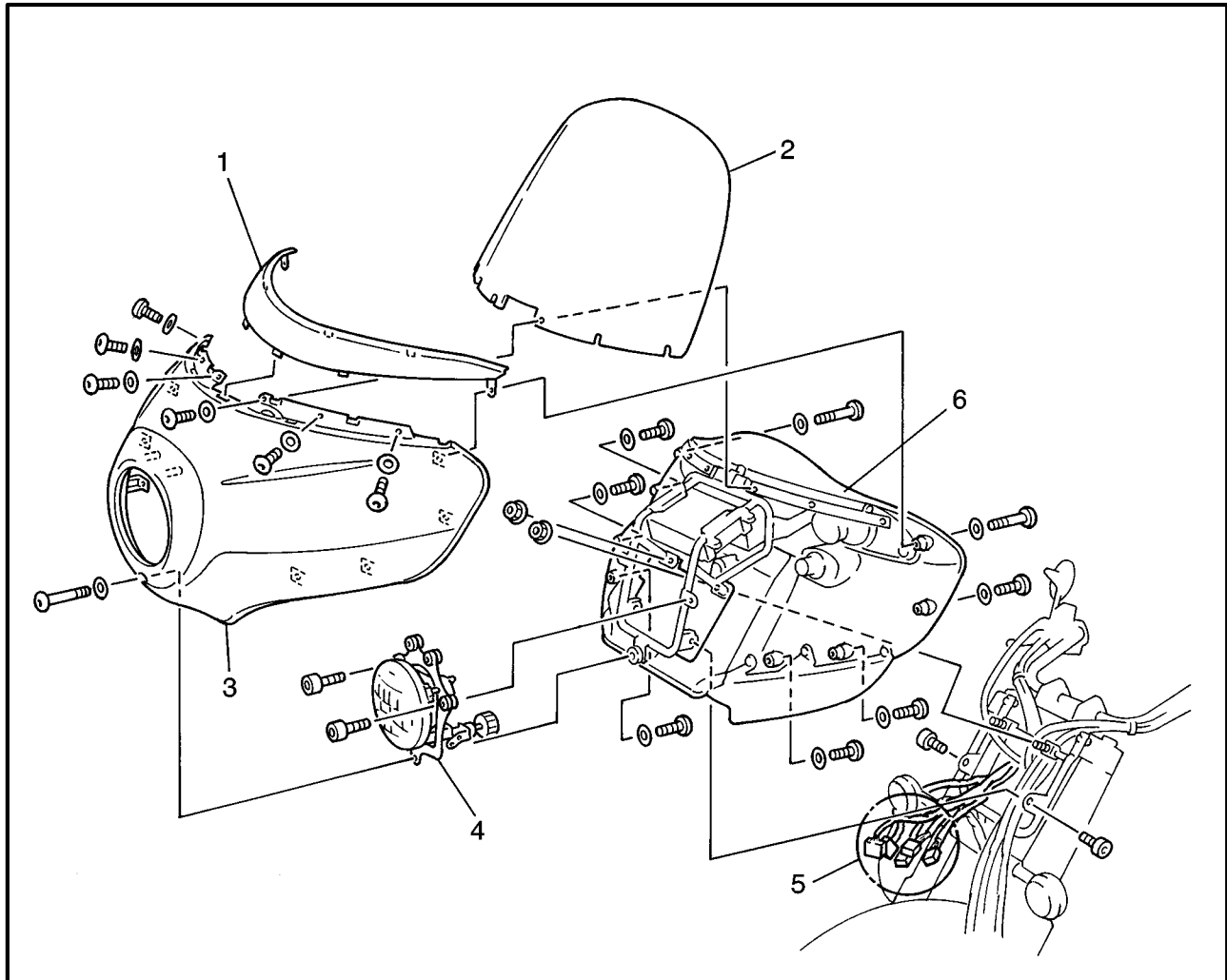
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
 - Hydraulic brake and clutch systems
 - After disassembling the master cylinder, caliper cylinder or clutch release cylinder, always replace the brake fluid.
Check the brake fluid level of the master cylinder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

NOTE:

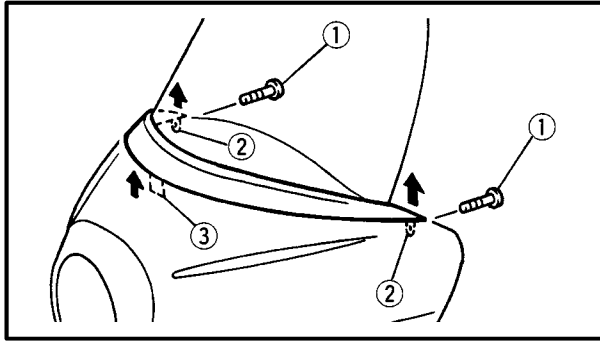
For odometer readings or time periods higher than 20,000 mi (31,000 km) or 30 months, repeat the same maintenance as listed in the table from the 4,000 mi (7,000 km) or 6 months interval.



FRONT COWLING



Order	Job/Part	Q'ty	Remarks
1	Removing the front cowling Front cowling chrome cover	1	Remove the parts in the order listed. Refer to "REMOVING/INSTALLING THE FRONT COWLING COVER."
2	Wind shield	1	
3	Front cowling	1	
4	Headlight unit	1	
5	MCU lead/speedometer lead/ headlight lead	1/1/1	Disconnect
6	Front pannel	1	For installation, reverse the removal procedure.



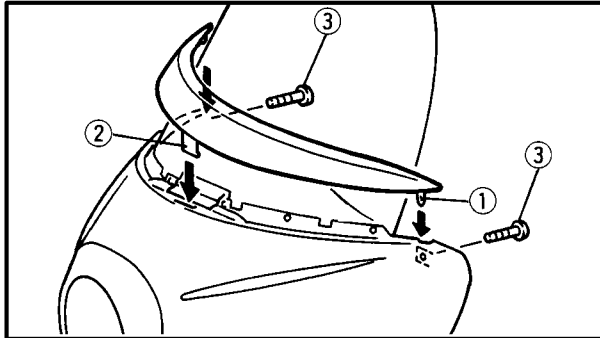
REMOVING THE FRONT COWLING COVER

1. Remove

- front cowl cover



- Loosen the bolt ①
- First, lift up each side of the cowl cover ②.
- Then, push the center portion of the cover ③ inward and lift the entire cover upward.



INSTALLING THE FRONT COWLING COVER

1. Install

- front cowl cover

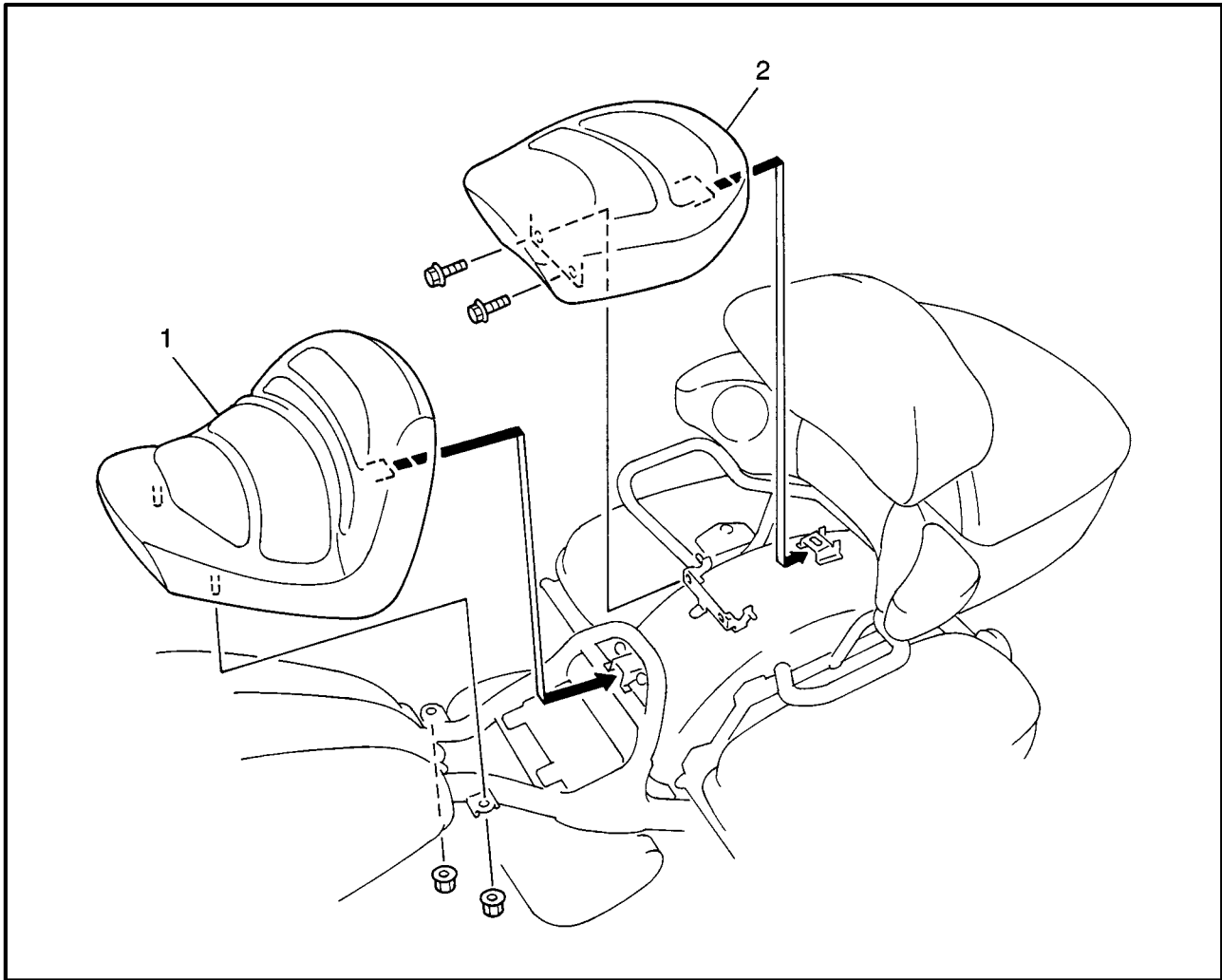


- First, insert each side of the cowl cover ① into the cowl.
- While pushing the center portion of the cowl cover ② inward, push downward to install.
- Tighten the bolts ③.



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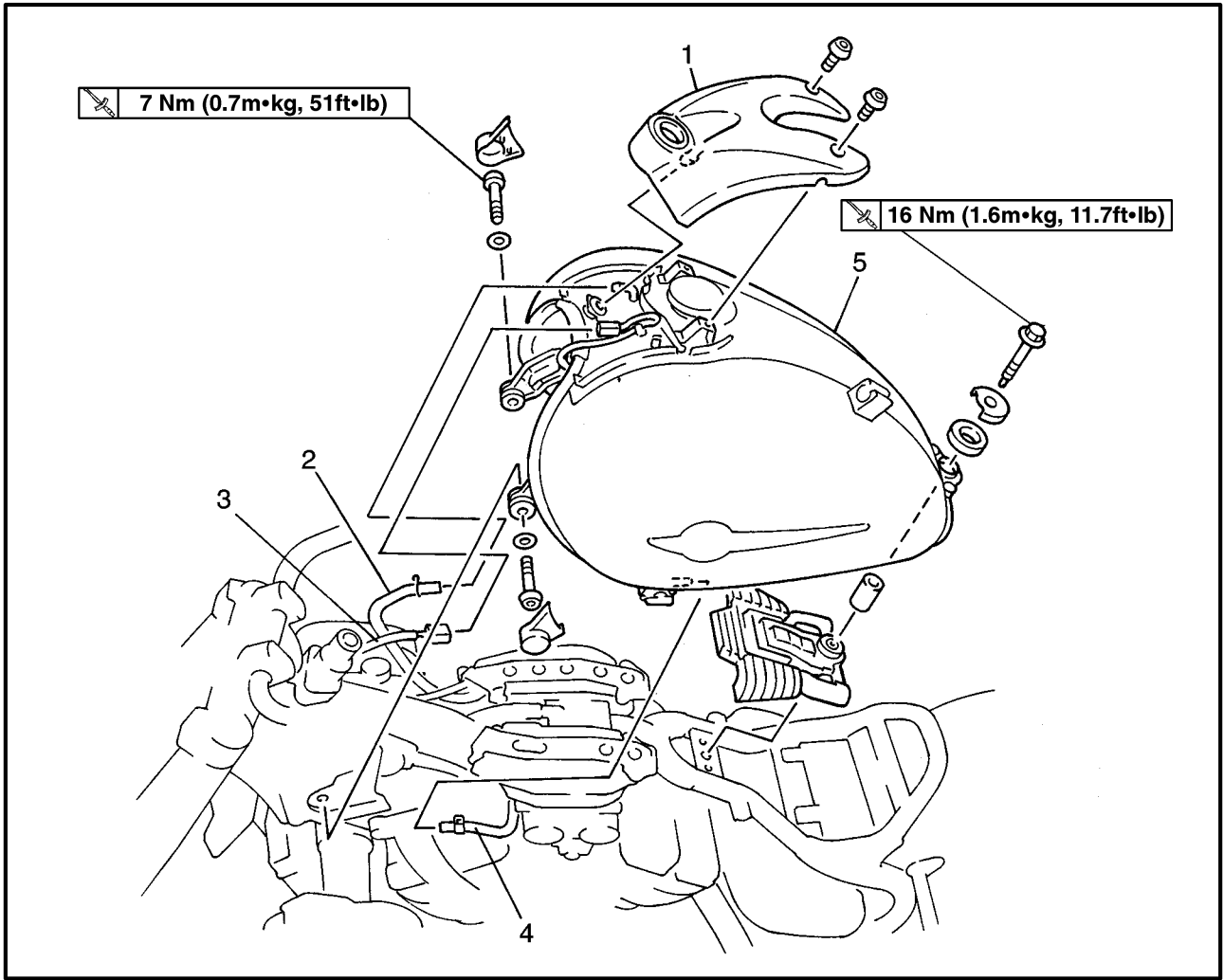
RIDER AND PASSENGER SEATS



Order	Job/Part	Q'ty	Remarks
1	Removing the rider and passenger seats	1	Remove the parts in the order listed.
2	Rider seat	1	
	Passenger seat		For installation, reverse the removal procedure.

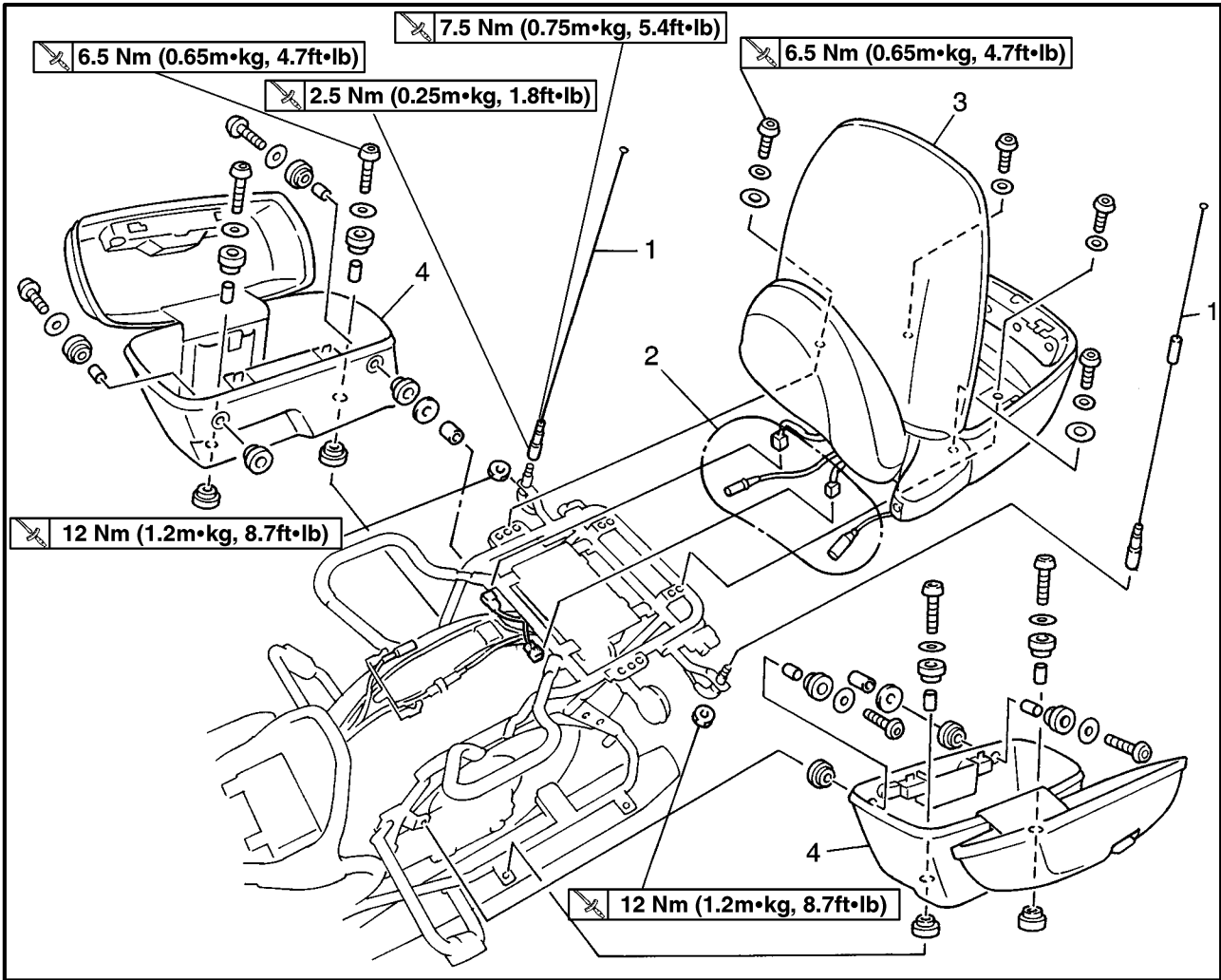
EB302002

FUEL TANK



Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank Rider seat		Remove the parts in the order listed. Refer to "RIDER AND PASSENGER SEATS".
1	Top cover	1	
2	Fuel tank breather hose	1	
3	Fuel sender lead coupler	1	Disconnect
4	Fuel hose	1	Disconnect
5	Fuel tank	1	NOTE: Before disconnecting the hose, turn the fuel cock "OFF". For installation, reverse the removal procedure.

SADDLEBAGS



Order	Job/Part	Q'ty	Remarks
	Removing the trunk and saddlebags		
1	Antenna	2	Remove the parts in the order listed.
2	Antenna/trunk/wire harness lead	2/1/1	Disconnect
3	Trunk	1	
4	Saddlebags	2	For installation, reverse the removal procedure.



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ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

NOTE:

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:

- rider seat
- fuel tank

Refer to "RIDER AND PASSENGER SEATS" and "FUEL TANK".

- air induction box
- carburetor assembly

Refer to "CARBURETOR" in CHAPTER 6.

- cylinder head stay
- under cowl

2. Drain:

- coolant

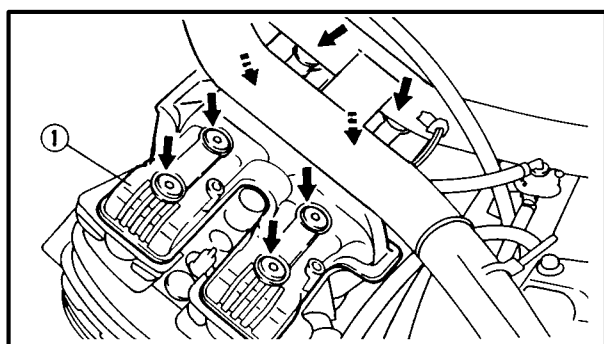
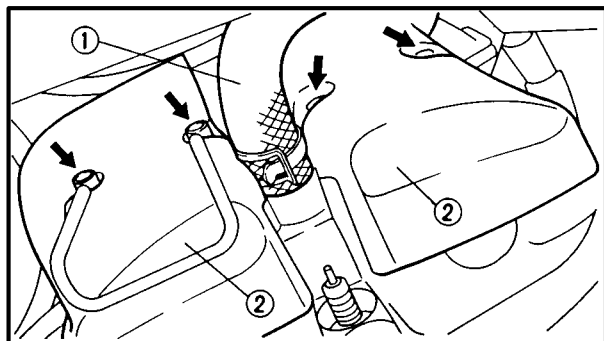
Refer to "CHANGING THE COOLANT".

3. Disconnect:

- spark plug leads
- coolant hose ①

4. Remove:

- chrome cylinder head covers ②



5. Remove:

- spark plugs
- cylinder head cover ①

6. Measure:

- valve clearance

Out of specification → Adjust.



Valve clearance (cold):

Intake valve:

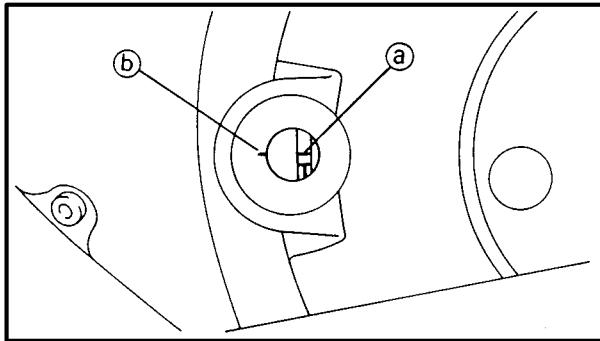
0.11 ~ 0.15 mm
(0.004 ~ 0.006 in)

Exhaust valve:

0.16 ~ 0.20 mm
(0.006 ~ 0.008 in)

ADJUSTING THE VALVE CLEARANCE

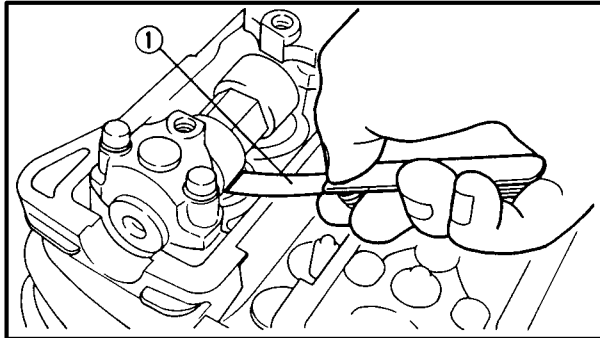
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- a. Turn the crankshaft counterclockwise.
- b. When piston #1 is at TDC on the compression stroke, align the TDC mark (a) on the generator rotor with the mark (b) on the crankcase cover.

NOTE:

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



- c. Measure the valve clearance with a thickness gauge (1).

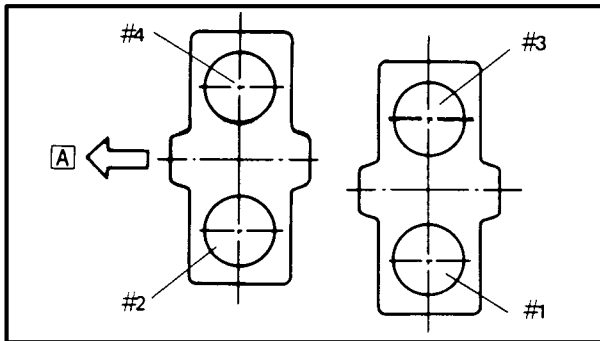
NOTE:

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence Cylinder #1 → #3 → #2 → #4

A Front

- d. For each cylinder, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.



B →		0°	180°	360°	540°	720°	900°
				70°			
C	#1	D				D	
	#2			D			
	#3		D				
	#4				D		

B Degrees that the crankshaft is turned counterclockwise

C Cylinder

D Combustion cycle

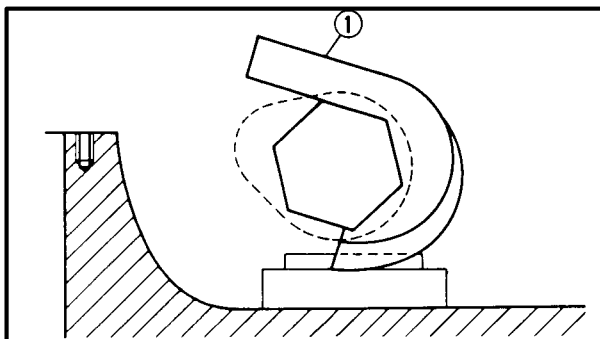
#3 Cylinder	180°
#2 Cylinder	430°
#4 Cylinder	610°

7. Adjust:

- valve clearance

- a. Align the intake and exhaust valve lifter slots with each other.

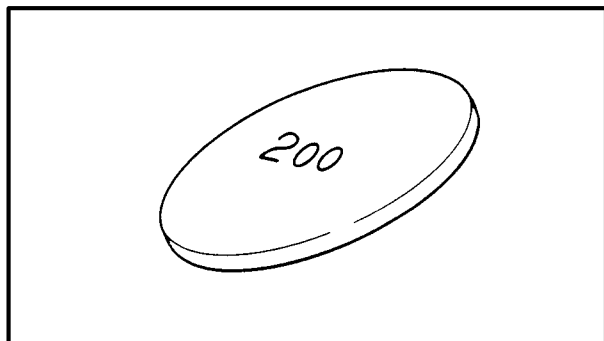
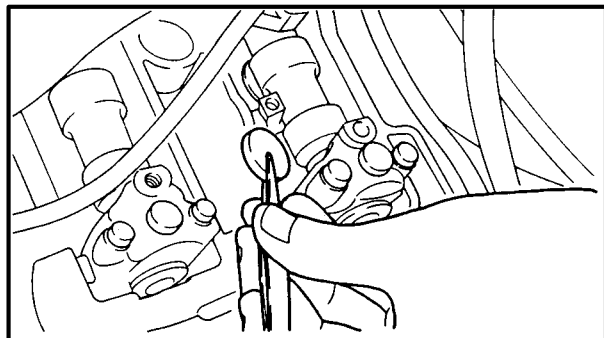
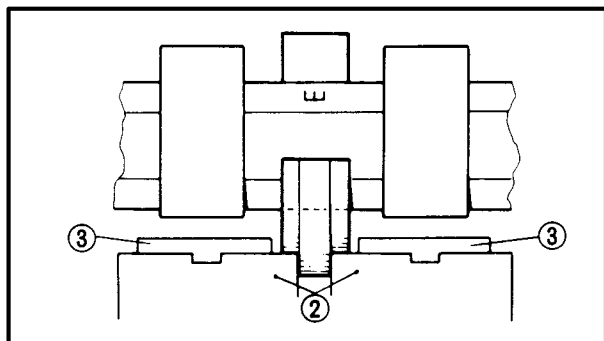
- b. Position the tappet adjusting tool (1) between the camshaft and the valve lifter.



Tappet adjusting tool:
YM-33961, 90890-04105

ADJUSTING THE VALVE CLEARANCE

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NOTE:

Make sure that the tappet adjusting tool touches only the valve lifter ②, not the valve pad ③.

- Slowly turn the tappet adjusting tool so that the valve pad can be removed.
- Remove the valve pad from the valve lifter with a small screwdriver and a pair of tweezers. Make a note of the position of each valve pad and valve pad number so they can be installed in the correct place.
- Select the proper valve pad from the following table.

Valve pad thickness range		Available valve pads
No.200 ~ 320	2.00 ~ 3.20 mm	25 thickness in 0.05 mm increments

NOTE:

- The thickness of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter (not the camshaft).
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.



INTAKE

MEASURED CLEARANCE	INSTALLED PAD NUMBER																											
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.00 ~ 0.05			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.06 ~ 0.10		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.11 ~ 0.15	STANDARD CLEARANCE																											
0.16 ~ 0.20	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.21 ~ 0.25	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.26 ~ 0.30	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.31 ~ 0.35	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.36 ~ 0.40	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.41 ~ 0.45	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.46 ~ 0.50	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.51 ~ 0.55	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.56 ~ 0.60	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.61 ~ 0.65	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320													
0.66 ~ 0.70	255	260	265	270	275	280	285	290	295	300	305	310	315	320														
0.71 ~ 0.75	260	265	270	275	280	285	290	295	300	305	310	315	320															
0.76 ~ 0.80	265	270	275	280	285	290	295	300	305	310	315	320																
0.81 ~ 0.85	270	275	280	285	290	295	300	305	310	315	320																	
0.86 ~ 0.90	275	280	285	290	295	300	305	310	315	320																		
0.91 ~ 0.95	280	285	290	295	300	305	310	315	320																			
0.96 ~ 1.00	285	290	295	300	305	310	315	320																				
1.01 ~ 1.05	290	295	300	305	310	315	320																					
1.06 ~ 1.10	295	300	305	310	315	320																						
1.11 ~ 1.15	300	305	310	315	320																							
1.16 ~ 1.20	305	310	315	320																								
1.21 ~ 1.25	310	315	320																									
1.26 ~ 1.30	315	320																										
1.31 ~ 1.35	320																											

VALVE CLEARANCE (cold):
0.11 ~ 0.15 mm
Example: Installed is pad 250
Measured clearance is 0.23 mm
Replace pad 250 with pad 260
Pad number: (example)
Pad No. 250 = 2.50 mm
Pad No. 260 = 2.60 mm
Always install pad with number down.

VALVE CLEARANCE (cold):
0.11 ~ 0.15 mm
Example: Installed is pad 250
Measured clearance is 0.23 mm
Replace pad 250 with pad 260
Pad number: (example)
Pad No. 250 = 2.50 mm
Pad No. 260 = 2.60 mm
Always install pad with number down.

EXHAUST

MEASURED CLEARANCE	INSTALLED PAD NUMBER																															
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.00 ~ 0.05				200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.06 ~ 0.10			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.11 ~ 0.15		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.16 ~ 0.20	STANDARD CLEARANCE																															
0.21 ~ 0.25	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.26 ~ 0.30	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.31 ~ 0.35	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.36 ~ 0.40	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.41 ~ 0.45	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.46 ~ 0.50	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320													
0.51 ~ 0.55	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320														
0.56 ~ 0.60	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320															
0.61 ~ 0.65	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320																
0.66 ~ 0.70	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320																	
0.71 ~ 0.75	255	260	265	270	275	280	285	290	295	300	305	310	315	320																		
0.76 ~ 0.80	260	265	270	275	280	285	290	295	300	305	310	315	320																			
0.81 ~ 0.86	265	270	275	280	285	290	295	300	305	310	315	320																				
0.86 ~ 0.90	270	275	280	285	290	295	300	305	310	315	320																					
0.91 ~ 0.95	275	280	285	290	295	300	305	310	315	320																						
0.96 ~ 1.00	280	285	290	295	300	305	310	315	320																							
1.01 ~ 1.05	285	290	295	300	305	310	315	320																								
1.06 ~ 1.10	290	295	300	305	310	315	320																									
1.11 ~ 1.15	295	300	305	310	315	320																										
1.16 ~ 1.20	300	305	310	315	320																											
1.21 ~ 1.25	305	310	315	320																												
1.26 ~ 1.30	310	315	320																													
1.31 ~ 1.35	315	320																														
1.36 ~ 1.40	320																															

VALVE CLEARANCE (cold):

0.16 ~ 0.20 mm

Example: Installed is pad 250

Measured clearance is 0.32 mm

Replace pad 250 with pad 265

Pad number: (example)

Pad No. 250 = 2.50 mm

Pad No. 265 = 2.65 mm

Always install pad with number down.

VALVE CLEARANCE (cold):
0.16 ~ 0.20 mm
Example: Installed is pad 250
Measured clearance is 0.32 mm
Replace pad 250 with pad 265
Pad number: (example)
Pad No. 250 = 2.50 mm
Pad No. 265 = 2.65 mm
Always install pad with number down.

- | Last digit | Rounded value |
|------------|---------------|
| 0 or 2 | 0 |
| 5 | 5 |
| 8 | 10 |

- rider seat



EAS00050

SYNCHRONIZING THE CARBURETORS

NOTE:

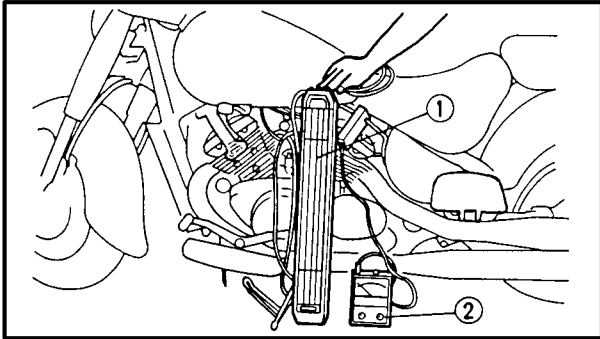
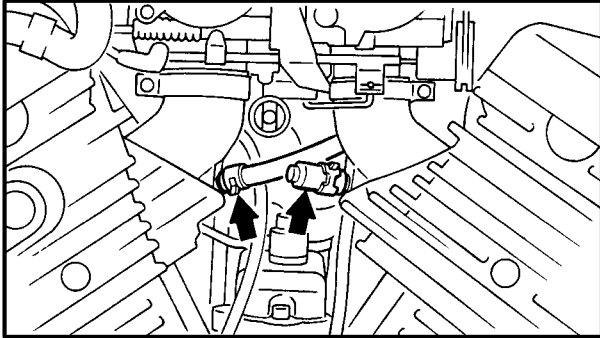
Prior to synchronizing the carburetors, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

1. Stand the motorcycle on a level surface.

NOTE:

Place the motorcycle on a suitable stand.

2. Remove:
- vacuum plugs



- ### 3. Install:
- adapters
 - vacuum gauge ①
 - engine tachometer ②
(to the spark plug lead of cyl. #1)



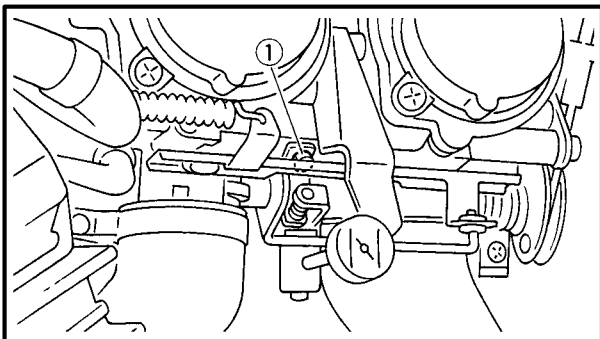
Vacuum gauge
YU-08030-A, 90890-03094

Engine tachometer
YU-08036-A, 90890-03113

4. Start the engine and let it warm up for several minutes.
5. Check:
 - engine idling speedOut of specification → Adjust.
Refer to “ADJUSTING THE ENGINE IDLING SPEED”.



Engine idling speed
950 ~ 1,050 r/min



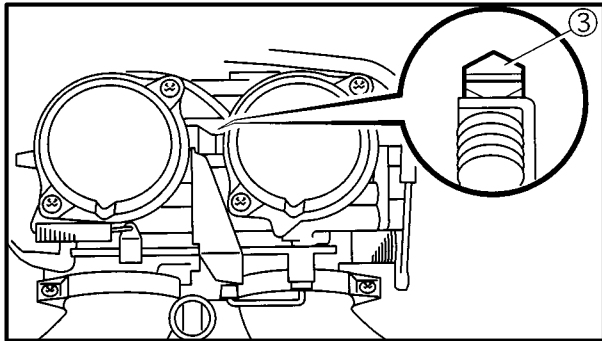
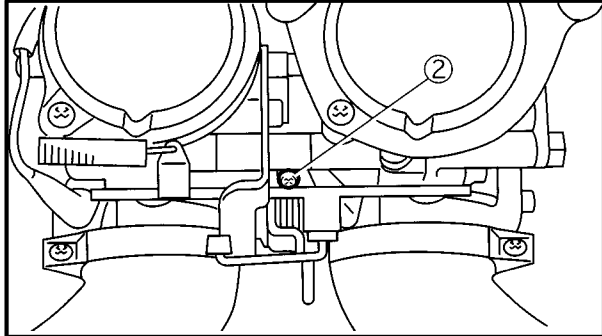
- 6. Adjust:
 - carburetor synchronization

- a. Synchronize carburetor #1 to carburetor #2 by turning the synchronizing screw ① in either direction until both gauges read the same.



NOTE:

After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.



- b. Synchronize carburetor #4 to carburetor #3 by turning the synchronizing screw ② in either direction until both gauges read the same.
- c. Synchronize carburetor #2 to carburetor #3 by turning the synchronizing screw ③ in either direction until both gauges read the same.



Vacuum pressure at engine idling speed
37 kPa (280 mmHg)

NOTE:

The difference in vacuum pressure between two carburetors should not exceed 1.33 kPa (10.0 mmHg, 0.4 inHg).



7. Check:
 - engine idling speed
Out of specification → Adjust.
8. Stop the engine and remove the measuring equipment.
9. Adjust:
 - throttle cable free play
Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY”.



Throttle cable free play (at the flange of the throttle grip)
4 ~ 6 mm (0.16 ~ 0.24 in)

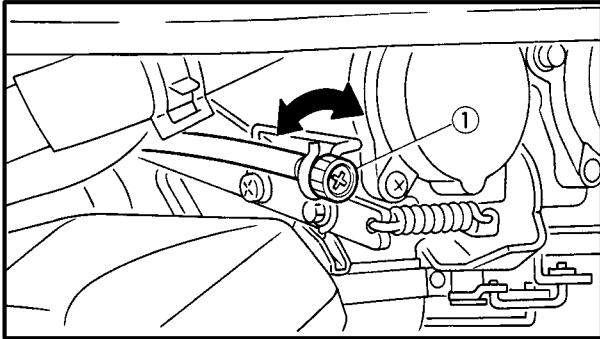
10. Install:
 - vacuum plugs

CHK

ADJ



NOTE:



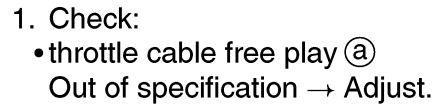
- 



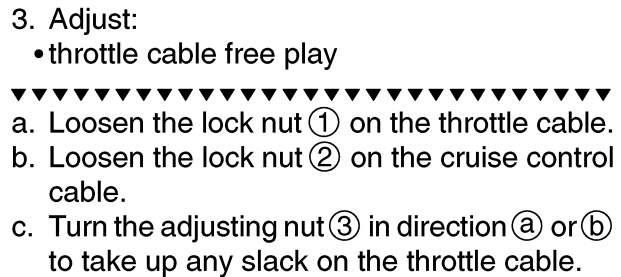
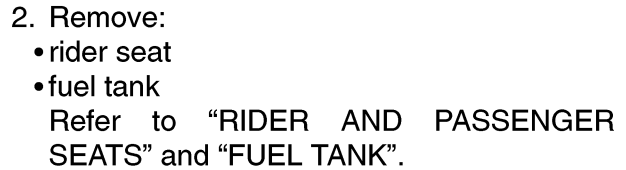
NOTE:

3-16

CHK
ADJ



Throttle cable free play (at the flange of the throttle grip)
4 ~ 6 mm (0.16 ~ 0.24 in)



Direction (a) → Throttle cable free play is increased.

Direction (b) → Throttle cable free play is decreased.

- d. Tighten the lock nut ①.
- e. Turn the adjusting nut ④ in direction ③ or ④ to take up any slack on the cruise control cable.

Direction ③ → Cruise control cable free play is increased.

Direction (d) → Cruise control cable free play is decreased.



Cruise control cable free play
1 ~ 2mm (0.04 ~ 0.08in)

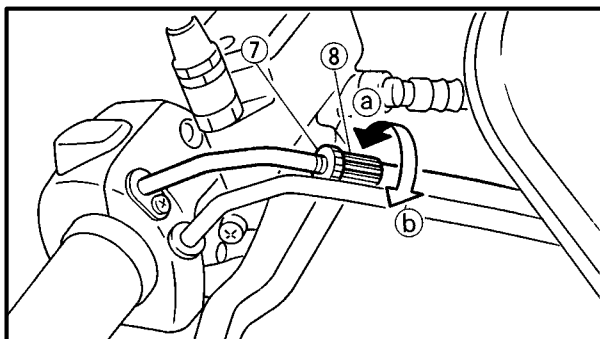
f. Tighten the lock nut ②.

⚠ WARNING

Adjusting only on the carburetor side cannot obtain the specified throttle cable free. So the adjustment on the handlebar side also has to be done.

Handlebar side

- a. Loosen the locknut ⑦.
- b. Turn the adjuster ⑧ in direction ① or ② until the specified throttle cable free play is obtained.





Direction Ⓐ → Throttle cable free play is increased.

Direction (b) → Throttle cable free play is decreased.

c. Tighten the locknut.

⚠ WARNING

After adjusting the throttle cable free play, turn the handlebar to the right and to the left to ensure that this does not cause the engine idling speed to change.

⚠ WARNING

Pay attention to the mark on throttle cable (1) and throttle rotor (2), when installing. Refer to "HANDLEBAR" in chapter 7.



4. Check:

- throttle grip movement

Stroke the cruise control wire, when throttle grip movement.

5. Install:

- fuel tank
- rider seat

Refer to "FUEL TANK" and "RIDER AND PASSENGER SEATS".

EAS00059

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Disconnect:

- spark plug cap
2. Remove:
- spark plug

CAUTION:

Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

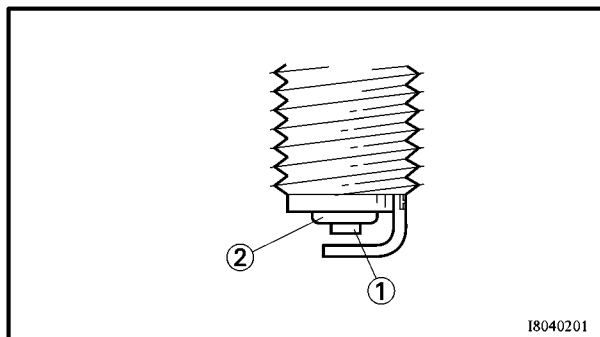
3. Check:

- spark plug type
Incorrect → Change.

Spark plug type (manufacturer)
DPR8EA-9 (NGK)
X24EPR-U9 (DENSO)

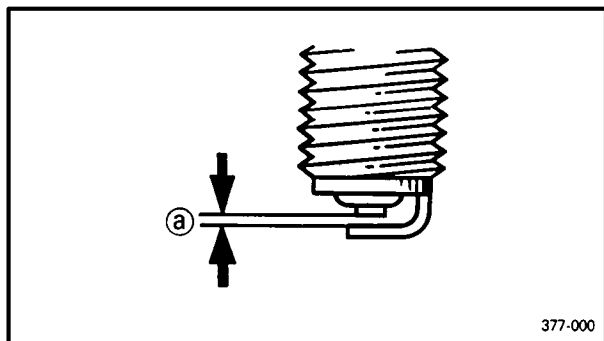
4. Check:

- electrode ①
Damage/wear → Replace the spark plug.
- insulator ②
Abnormal color → Replace the spark plug.
Normal color is a medium-to-light tan color.



CHECKING THE SPARK PLUGS/ CHECKING THE IGNITION TIMING

CHK
ADJ



5. Clean:
 - spark plug
(with a spark plug cleaner or wire brush)
6. Measure:
 - spark plug gap ①
(with a wire gauge)
Out of specification → Regap.



Spark plug gap
0.8 ~ 0.9 mm
(0.031 ~ 0.035 in)

7. Install:
 - spark plug

 **18 Nm (1.8 m•kg, 13 ft•lb)**

NOTE:

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

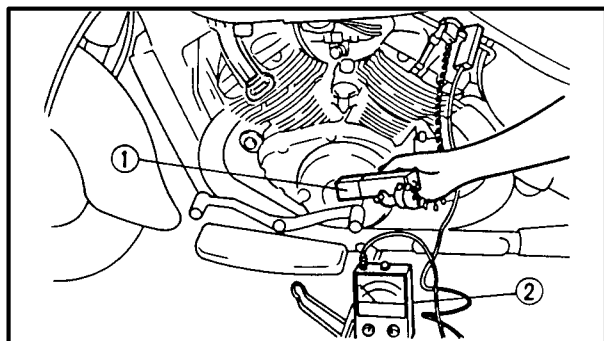
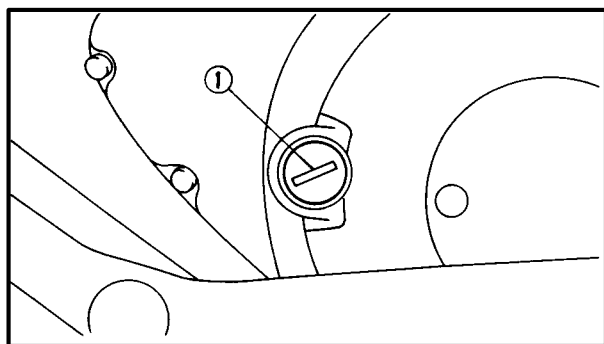
8. Connect:
 - spark plug cap

EAS00064

CHECKING THE IGNITION TIMING

NOTE:

Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure that all connections are tight and free of corrosion.



1. Remove:
 - timing plug ①

2. Install:
 - timing light ①
 - engine tachometer ②
(to the spark plug lead of cyl. #1)



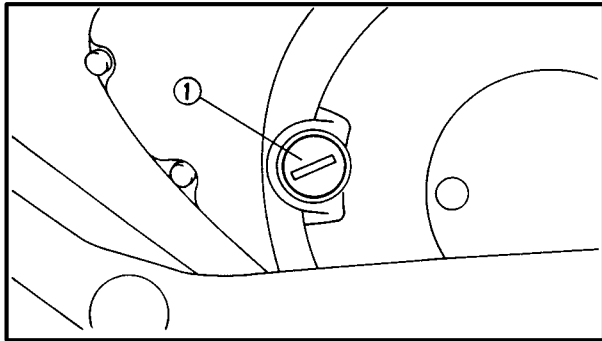
Timing light
YU-33277-A, 90890-03141
Engine tachometer
YU-08036-A, 90890-03113

CHK	
ADJ	

- a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.



- NOTE:** _____
The ignition timing is not adjustable.



- EAS00065

The following procedure applies to all of the cylinders.

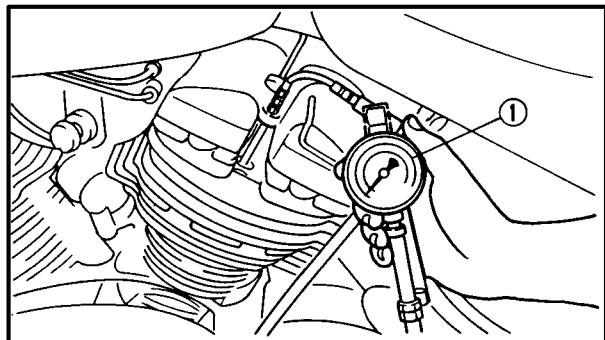
1. Check:
 - valve clearanceOut of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE”.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Disconnect:
 - spark plug cap



4. Remove:
 - spark plug

CAUTION:

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.



5. Install:
 - compression gauge ①



Compression gauge
YU-33223, 90890-03081

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

Compression pressure (with oil applied in the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston wear or damage → Repair.
Same as without oil	Piston ring(-s), valves, cylinder head gasket or piston possibly defective → Repair.



Compression pressure (at sea level)

Standard:

1,520 kPa (15,2 kg/cm²,
216 psi)

Minimum:

1,300 kPa (13,0 kg/cm²,
185 psi)

Maximum:

1,700 kPa (17,0 kg/cm²,
242 psi)

MEASURING THE COMPRESSION PRESSURE/ CHECKING THE ENGINE OIL LEVEL

CHK
ADJ



- a. Turn the main switch to "ON".
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

⚠ WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

NOTE:

The difference in compression pressure between cylinders should not exceed 100 kPa

7. Install:

- spark plug

18 Nm (1,8 m•kg, 13 ft•lb)

8. Connect:

- spark plug cap

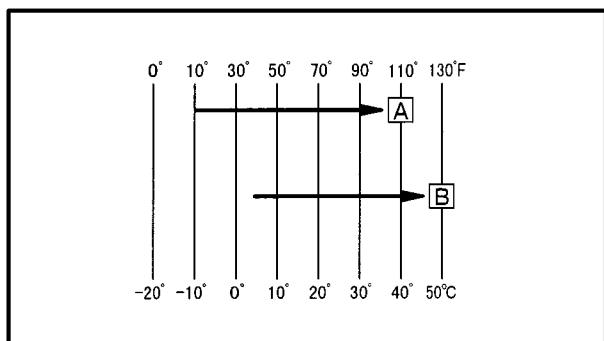
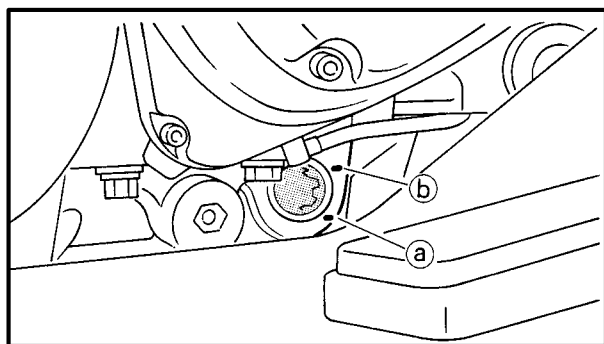
EAS00071

CHECKING THE ENGINE OIL LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.



2. Check:

- engine oil level

The engine oil level should be between the minimum level marks (a) and maximum level marks (b).

Below the minimum level mark → Add the recommended engine oil to the proper level.



Recommended oil:

At -10°C (10°F) or higher [A]:

Yamalube 4 (10W-30) or SAE
10W-30 type SE motor oil

At 5°C (40°F) or higher [B]:

Yamalube 4 (20W-40) or SAE
20W-40 type SE motor oil

- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives.
- Do not allow foreign materials to enter the crankcase.

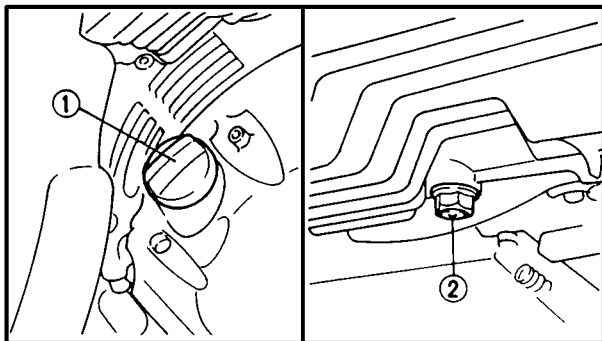
API Service “SE”, “SF” and “SG” type or equivalent (e.g., “SF-SE”, “SF-SE-CC”, “SF-SE-SD”)

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

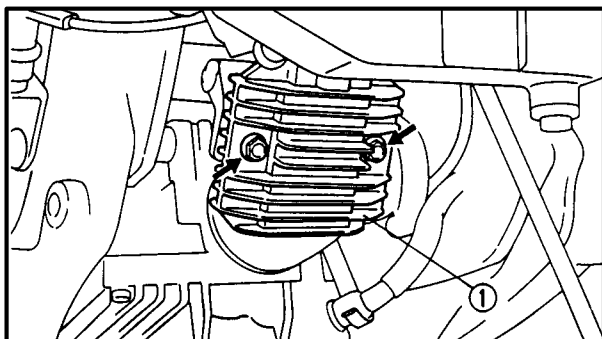
Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS00073

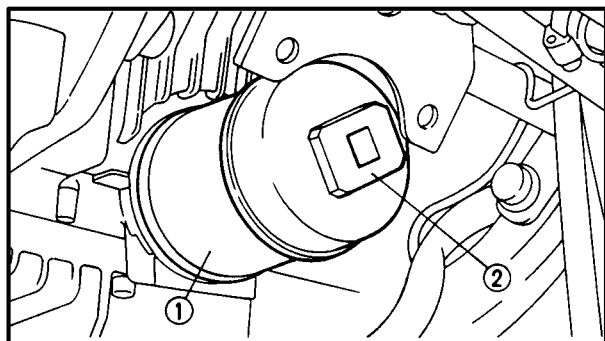
1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.



3. Remove:
 - engine oil filler cap ①
 - engine oil drain bolt ②
4. Drain:
 - engine oil
(completely from the crankcase)
5. If the oil filter cartridge is also to be replaced, perform the following procedure.



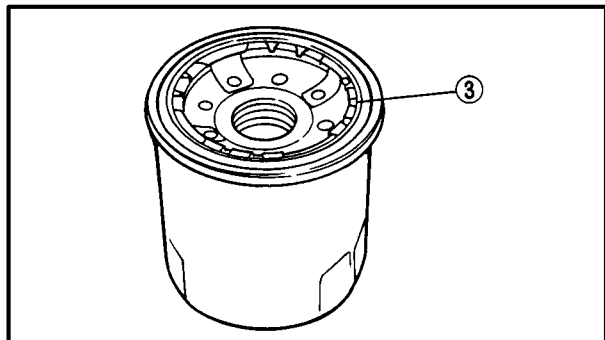
- a. Remove the rectifier/regulator①



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



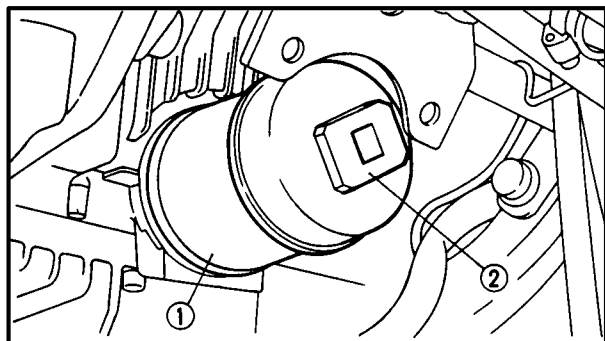
Oil filter wrench
YU-38411, 90890-01426



- b. Apply a thin coat of engine oil onto the O-ring ③ of the new oil filter cartridge.

CAUTION:

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



- c. Tighten the new oil filter cartridge ① to specification with an oil filter wrench ②.



Oil filter cartridge
17 Nm (1.7 m•kg, 12 ft•lb)

▲ ▲

6. Check:
- engine oil drain bolt gasket
Damage → Replace.

7. Install:
- engine oil drain bolt

 **43 Nm (4.3 m•kg, 31 ft•lb)**

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



Quantity

Total amount

4.3 L (3.8 Imp qt, 4.5 US qt)

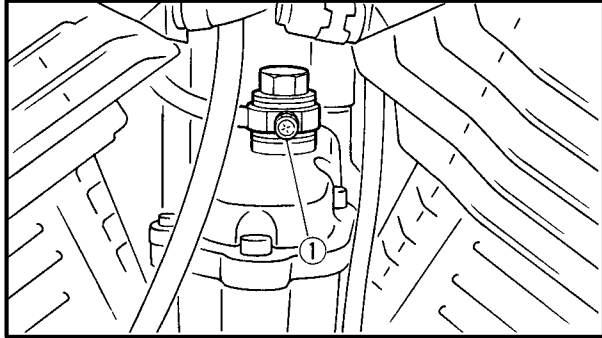
Without oil filter cartridge replacement

3.5 L (3.1 Imp qt, 3.7 US qt)

With oil filter cartridge replacement

3.7 L (3.3 Imp qt, 3.9 US qt)

9. Install:
- engine oil filler cap



- a. Slightly loosen the oil gallery bolt ①.
- b. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
- c. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to “CHECKING THE OIL PUMP” in chapter 4.
- d. Start the engine after solving the problem(-s) and check the engine oil pressure again.
- e. Tighten the oil gallery bolt to specification.



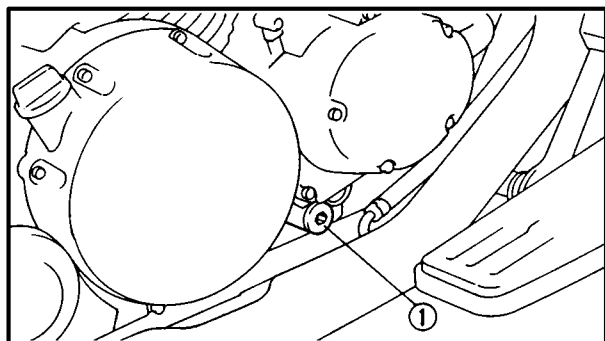
EAS00077

1. Check:
 - engine oil level
Below the minimum level mark → Add the recommended engine oil to the proper level.
2. Start the engine, warm it up for several minutes, and then turn it off.

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

MEASURING THE ENGINE OIL PRESSURE

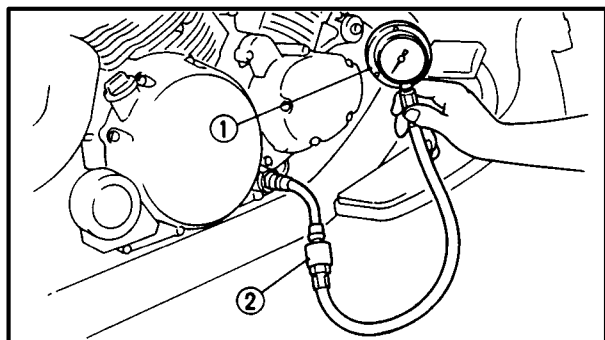
CHK
ADJ



3. Remove:
- main gallery bolt ①

⚠ WARNING

The engine, muffler and engine oil are extremely hot.



4. Install:
- oil pressure gauge ①
 - adapter ②



Oil pressure gauge
90890-03153
Adapter
90890-03124

5. Measure:
- engine oil pressure
(at the following conditions)



Engine oil pressure
250 ~ 350 kPa
(2.5 ~ 3.5 kg/cm², 36 ~ 50 psi)
Engine speed
Approx. 5,000 r/min
Engine oil temperature
100°C (212°F)

Out of specification → Adjust.

Engine oil pressure	Possible causes
Below specification	Faulty oil pump Clogged oil filter Leaking oil passage Broken or damaged oil seal
Above specification	Leaking oil passage Faulty oil filter Oil viscosity too high

6. Install:
- main gallery bolt

12 Nm (1.2 m•kg, 8.7 ft•lb)



EAS00083

CHECKING THE CLUTCH FLUID LEVEL

1. Stand the motorcycle on a level surface.

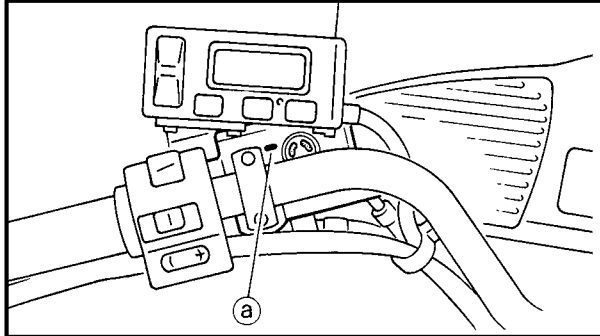
NOTE:

Place the motorcycle on a suitable stand.

2. Check:

- clutch fluid level

Below the minimum level mark (a) → Add the recommended clutch fluid to the proper level.



Recommended clutch fluid
Brake fluid DOT 4

⚠ WARNING

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

CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE:

In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.



EAS00084

BLEEDING THE HYDRAULIC CLUTCH SYSTEM

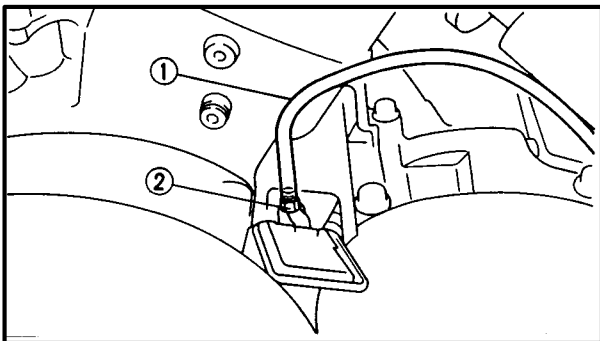
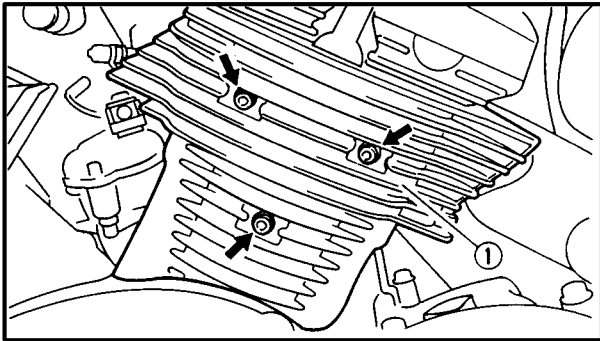


Bleed the hydraulic clutch system whenever:

- the system was disassembled,
- a clutch hose was loosened or removed,
- the clutch fluid level is very low,
- clutch operation is faulty.

NOTE:

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



- [illegible]



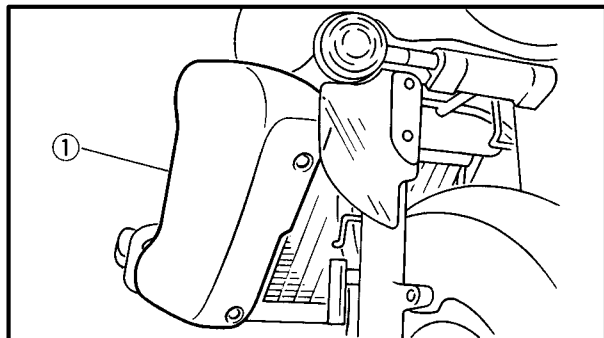
Bleed screw
6 Nm (0.6 m•kg, 4.3 ft•lb)

- k. Add the recommended clutch fluid to the proper level.
Refer to "CHECKING THE CLUTCH FLUID LEVEL".



⚠ WARNING

After bleeding the hydraulic clutch system,
check the clutch operation.

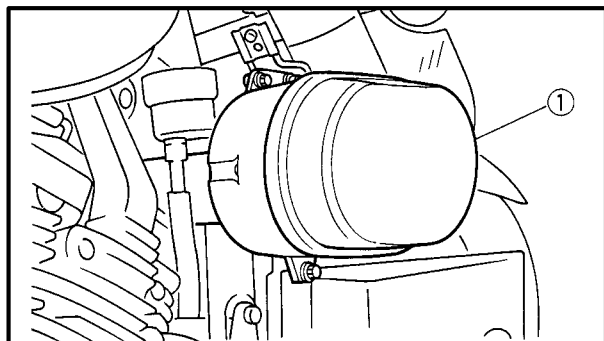


EAS00086

CLEANING THE AIR FILTER ELEMENT

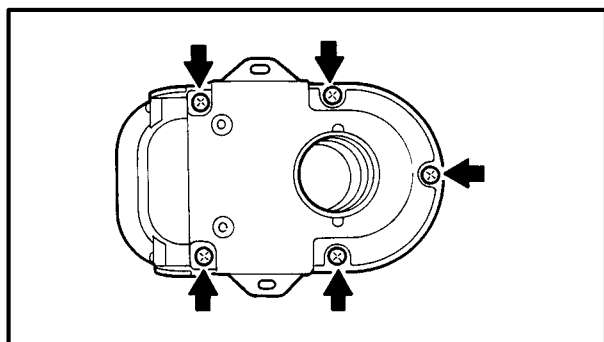
1. Remove:

- under cover ①



2. Remove:

- air filter case ①

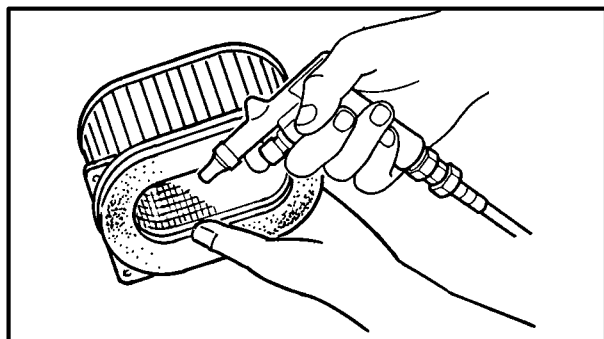


3. Remove:

- air filter case cover

4. Remove:

- air filter element



5. Clean:

- air filter element

Apply compressed air to the inner surface of
the air filter element.

6. Check:

- air filter element

Damage → Replace.



7. Install:
- air filter element
 - air filter case cover

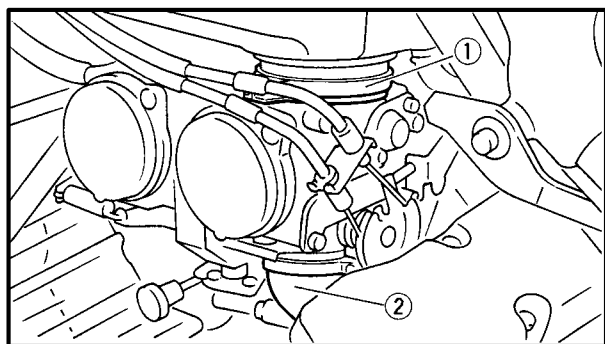
CAUTION:

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the carburetor tuning, leading to poor engine performance and possible overheating.

NOTE:

- Make sure that the air filter element is properly installed in the air filter case.
- Make sure that the air filter is installed with its mesh side facing towards the rear of the motorcycle.

8. Install:
- air filter case
9. Connect:
- breather hoses



EAS00095

CHECKING THE CARBURETOR JOINTS AND INTAKE MANIFOLDS

The following procedure applies to all of the carburetor joints and intake manifolds.

1. Check:
- carburetor joint ①
 - intake manifold ②
- Cracks/damage → Replace.
Refer to “CARBURETOR” in CHAPTER 6.



EAS090097

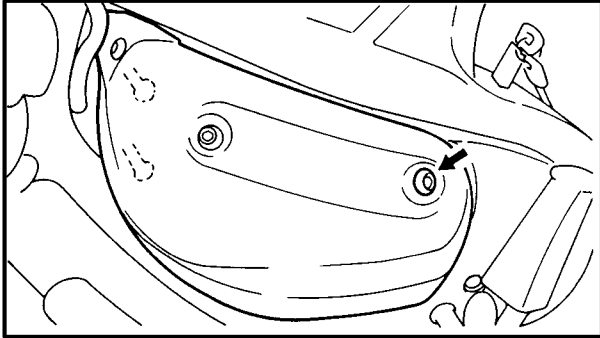
CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

1. Remove:

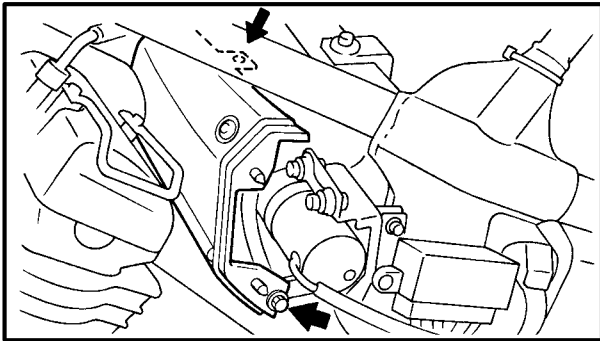
- rider seat
- fuel tank

Refer to “RIDER AND PASSENGER SEATS” and “FUEL TANK”.



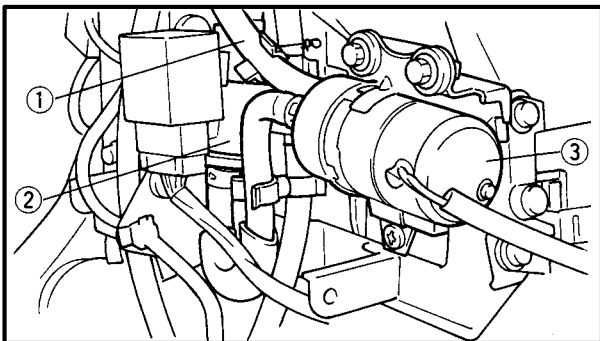
2. Remove:

- left side cover
- right side cover



3. Remove:

- rear inner cover

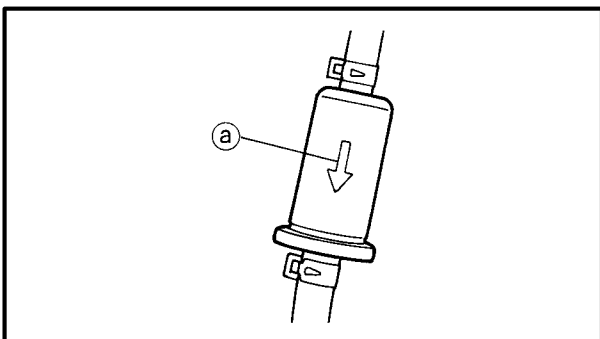


4. Check:

- fuel hose ①
Cracks/damage → Replace.
- fuel filter ②
Damage/dirt → Replace.

NOTE:

- Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
- The arrow mark (a) on the fuel filter should face to the side of the fuel pump (3).



5. Install:

- rear inner cover

6. Install:

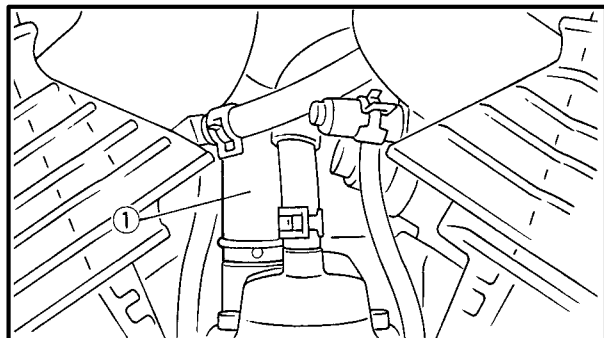
- left side cover
- right side cover



7. Install:

- fuel tank
- rider seat

Refer to “FUEL TANK” and “RIDER AND PASSENGER SEAT”.



EAS00098

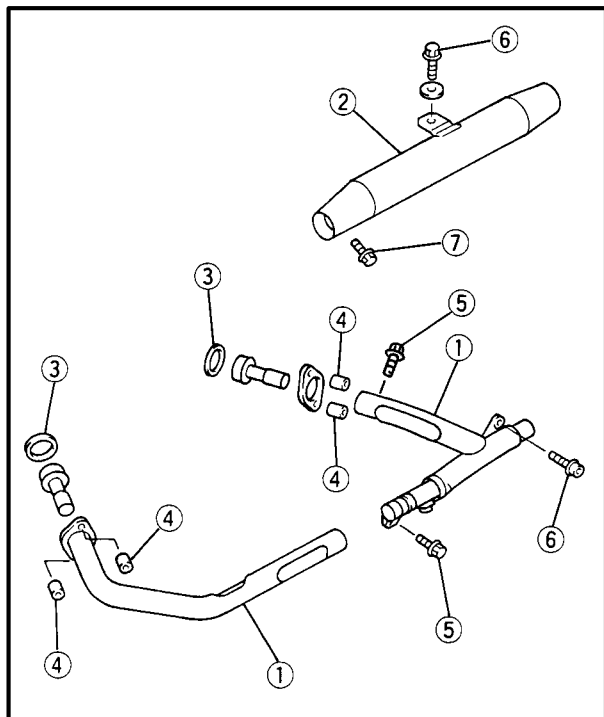
CHECKING THE CRANKCASE BREATHER HOSE

1. Check:

- crankcase breather hose ①
- Cracks/damage → Replace.
Loose connection → Connect properly.

CAUTION:

Make sure that the crankcase breather hose is routed correctly.



EAS00100

CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the exhaust pipes, mufflers and gaskets.

1. Check:

- exhaust pipe ①
 - muffler ②
- Cracks/damage → Replace.
- gasket ③
- Exhaust gas leaks → Replace.

2. Check:

- tightening torque



Exhaust pipe nut ④

20 Nm (2.0 m•kg, 14 ft•lb)

Exhaust pipe bolt ⑤

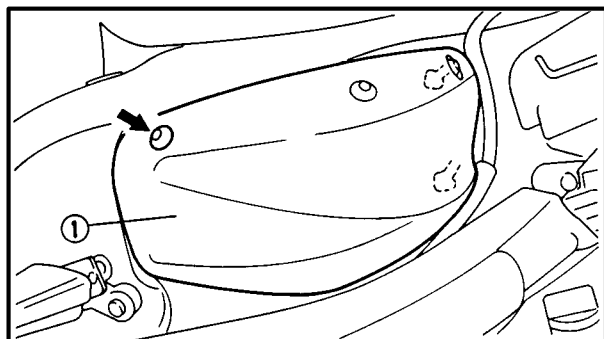
25 Nm (2.5 m•kg, 18 ft•lb)

Muffler and muffler bracket bolt ⑥

30 Nm (3.0 m•kg, 22 ft•lb)

Muffler bolt ⑦

20 Nm (2.0 m•kg, 14 ft•lb)



EAS00102

CHECKING THE COOLANT LEVEL

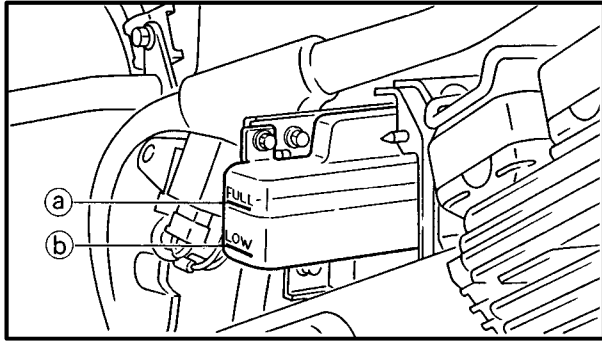
1. Stand the motorcycle on a level surface.

NOTE:

- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.

2. Remove:

- side cover right ①



3. Check:

- coolant level

The coolant level should be between the maximum level mark ① and minimum level marks ②.

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

CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check and correct the antifreeze concentration of the coolant.
- Use only distilled water. Soft water may be used if distilled water is not available.

4. Start the engine, warm it up for several minutes, and then turn it off.

5. Check:

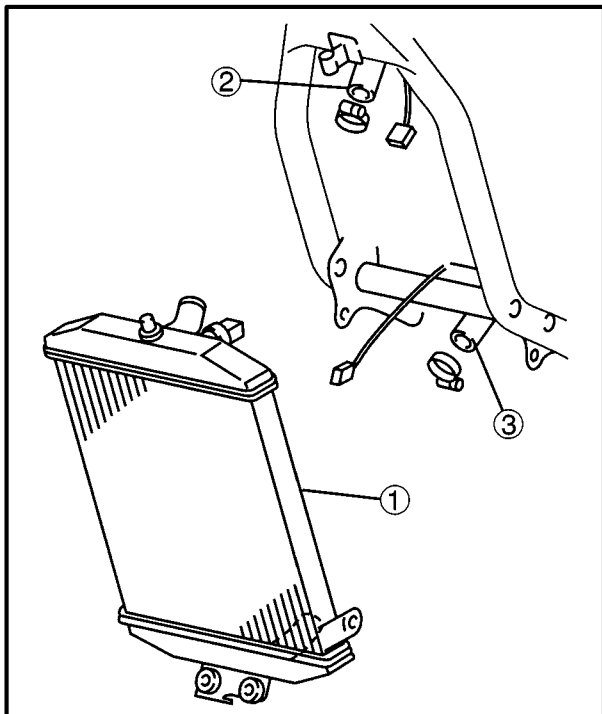
- coolant level

NOTE:

Before checking the coolant level, wait a few minutes until it settles.

6. Install:

- side cover right



EAS00104

CHECKING THE COOLING SYSTEM

1. Remove:

- rider seat
- fuel tank

Refer to “SEATS” and “FUEL TANK”.

- under cowl.

2. Check:

- radiator ①
- radiator inlet hose ②
- radiator outlet hose ③

Cracks/damage → Replace.

Refer to “COOLING SYSTEM” in CHAPTER 5.

3. Install:

- under cowl
- fuel tank
- rider seat

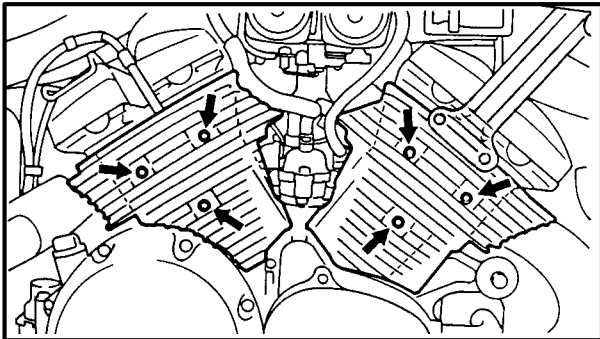
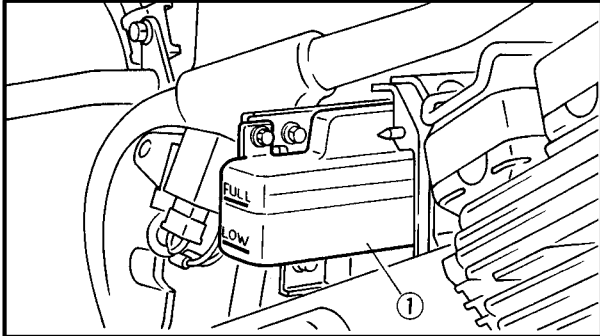
Refer to “FUEL TANK” and “RIDER AND PASSENGER SEATS”.



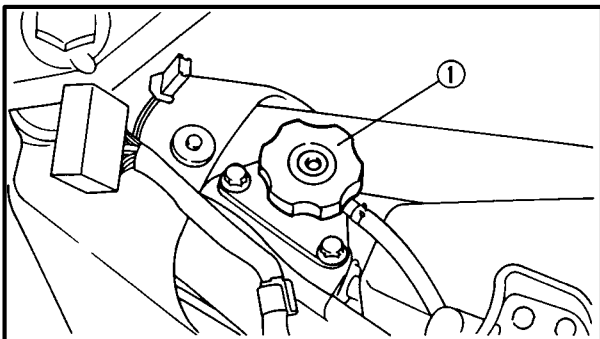
EAS00105

CHANGING THE COOLANT

1. Remove:
 - rider seat
 - fuel tank
 Refer to “RIDER AND PASSENGER SEATS” and “FUEL TANK”.
2. Remove:
 - left side cover
 - right side cover
 - rear inner cover
3. Remove:
 - reservoir tank ①
 Drain the reservoir tank of its coolant.



4. Remove:
 - cylinder side covers



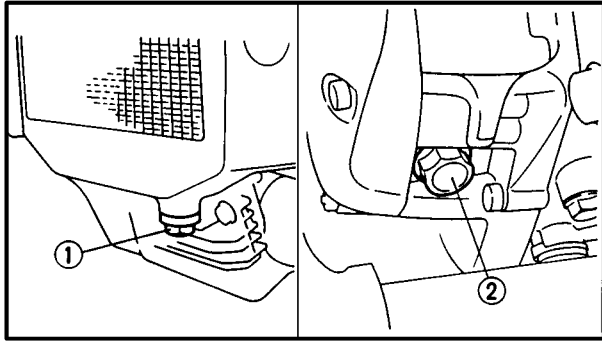
5. Remove:
 - radiator cap ①

⚠ WARNING

A hot radiator is under pressure. Therefore, do-not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

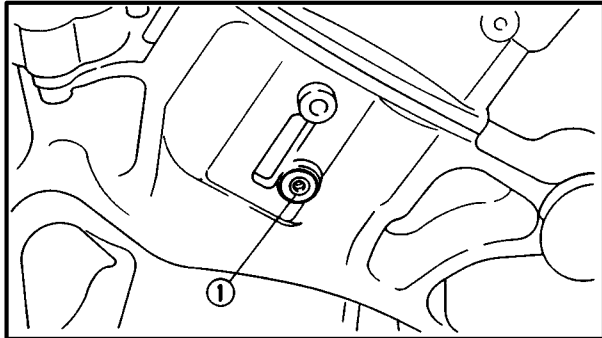
Place a thick rag or a towel over the radiator cap and slowly rotate the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap, while still pressing down turn it counterclockwise, and then remove it.

The following procedure applies to all of the coolant drain bolts and copper washers.



6. Remove:

- coolant drain bolt (radiator) ①
(along with the copper washer)
- coolant drain bolt (water pump) ②
(along with the copper washer)

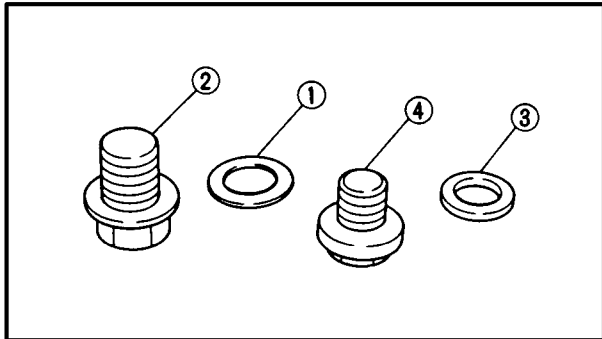


7. Remove:

- drain plugs (cylinders) ①
Drain the coolant.

NOTE:

To remove the drain plug (cylinder) screw a spark plug into the threaded hole and pull on the spark plug.



8. Drain:

- coolant
(from the engine and radiator)

9. Check:

- rubber washer ① (coolant drain bolt-radiator ②)
- copper washer ③ (coolant drain bolt-water pump ④)
Damage → Replace.

10. Install:

- drain plugs (cylinders)
- coolant drain bolt (radiator)

25 Nm (0.25m•kg, 1.80 ft•lb)

- coolant drain bolt (water pump)

43 Nm (4.3 m•kg, 31 ft•lb)

11. Fill:

- cooling system
(with the specified amount of the recommended coolant)

Recommended antifreeze

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

Mix ratio

50 % antifreeze/50 % water



Quantity

Total amount

3.5 L (2.64 Imp qt, 3.70 US qt)

Coolant reservoir capacity

0.84 L (0.74 Imp qt, 0.89 US qt)

From minimum to maximum
level mark

0.25 L (0.22 Imp qt, 0.26 US qt)

Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

WARNING

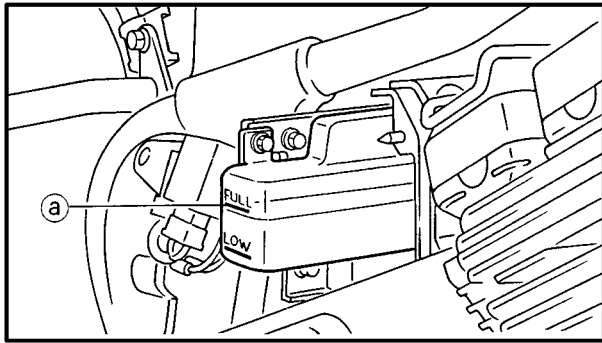
- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

CAUTION:

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

12. Install:

- radiator cap



13. Fill:
 - coolant reservoir
(with the recommended coolant to the maximum level mark ①)
14. Install:
 - coolant reservoir cap
15. Start the engine, warm it up for several minutes, and then turn it off.
16. Check:
 - coolant level
Refer to “CHECKING THE COOLANT LEVEL”.

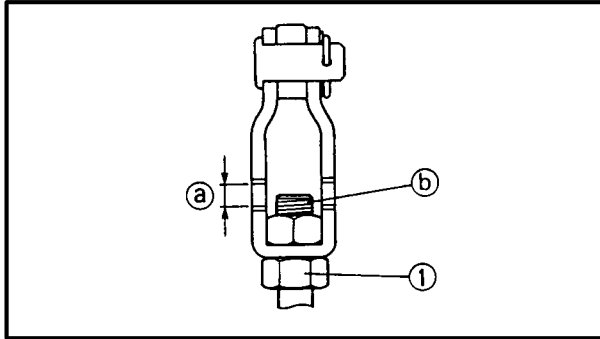
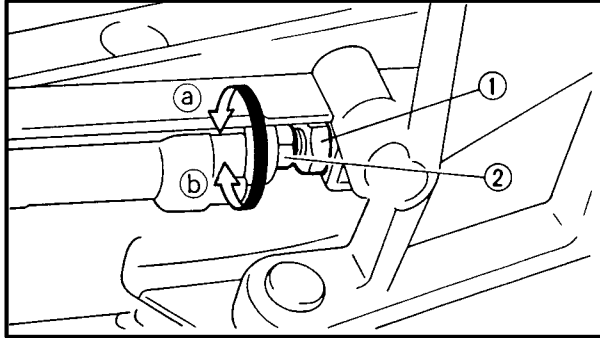
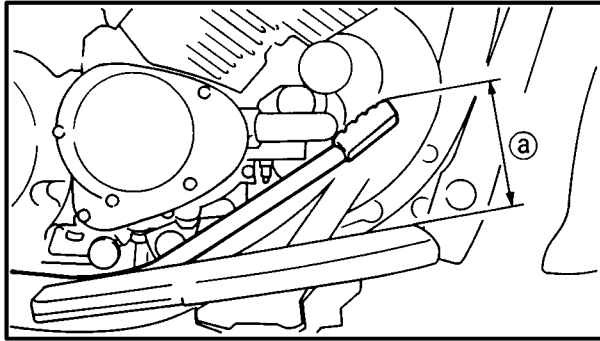
NOTE:

Before checking the coolant level, wait a few minutes until it settles.

17. Install:
 - rear inner cover
 - right side cover
 - left side cover
18. Install:
 - fuel tank
 - rider seat
Refer to “FUEL TANK” and “RIDER AND PASSENGER SEATS”.
19. Start the engine and let it warm up for several minutes.
20. Turn off the engine and inspect the coolant level.
Refer to “CHECKING THE COOLANT LEVEL”.

NOTE:

Before inspecting the coolant level, wait a few minutes until the coolant has settled.



EAS00111

CHASSIS

ADJUSTING THE REAR BRAKE

1. Check:

- brake pedal position
(distance @ from the top of the rider footrest to the top of the brake pedal)

Out of specification $\rightarrow$ Adjust.



Brake pedal position (below the top of the rider footrest)
100 mm (3.9 in)

2. Adjust:

- brake pedal position

[illegible]

- a. Loosen the locknut ①.
- b. Turn the adjusting bolt ② in direction ③ or ④ until the specified brake pedal position is obtained.

Direction (a) → Brake pedal is raised.

Direction (b) → Brake pedal is lowered.

⚠ WARNING

After adjusting the brake pedal height, check that the adjuster end (b) is in the center of the projections (a).

- c. Tighten the locknut ① to specification.



Locknut
26 Nm (2.6 m•kg, 19 ft•lb)

⚠ WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance and could result in loss of control and possibly an accident. Therefore, inspect and, if necessary, bleed the brake system.

CAUTION:

After adjusting the brake pedal position, make sure that there is no brake drag.

[illegible]

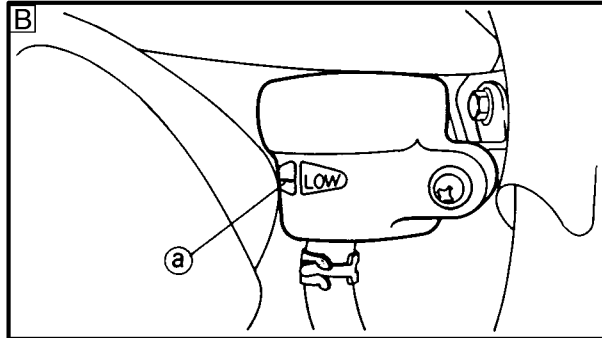
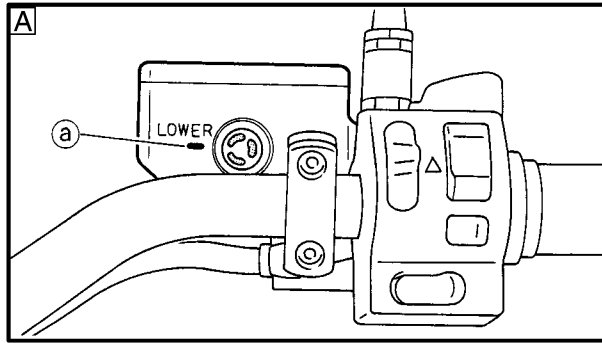
3. Adjust:

- rear brake light switch

Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH".

CHECKING THE BRAKE FLUID LEVEL/ CHECKING THE BRAKE PADS

CHK
ADJ



EAS00115

CHECKING THE BRAKE FLUID LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.

2. Check:

- brake fluid level

Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.



**Recommended brake fluid
DOT 4**

[A] Front brake

[B] Rear brake

⚠ WARNING

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

CAUTION:

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

NOTE:

In order to ensure a correct reading of the brake fluid level, make sure that the top of the reservoir is horizontal.

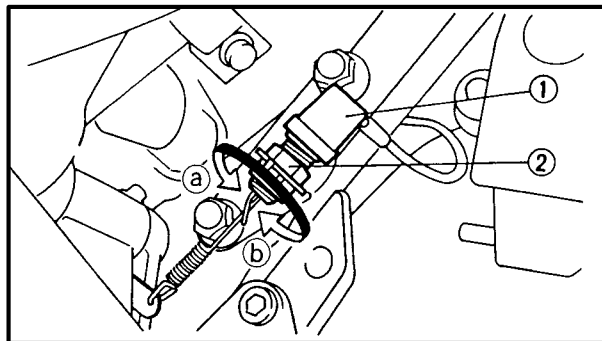
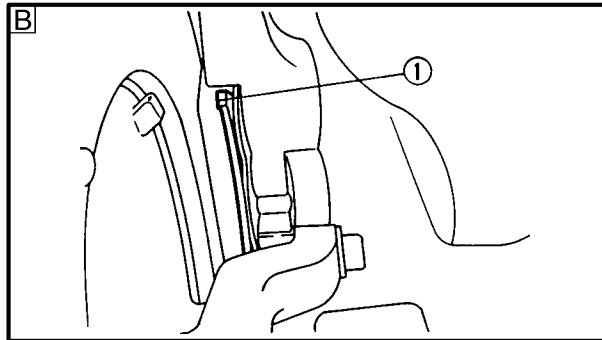
EAS00118

CHECKING THE BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.

CHK	
ADJ	



- B** Rear brake

Adjustment is correct when the brake light comes on by depressing the brake pedal less than 3 ~ 8 mm (0.12 ~ 0.32 in.).

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

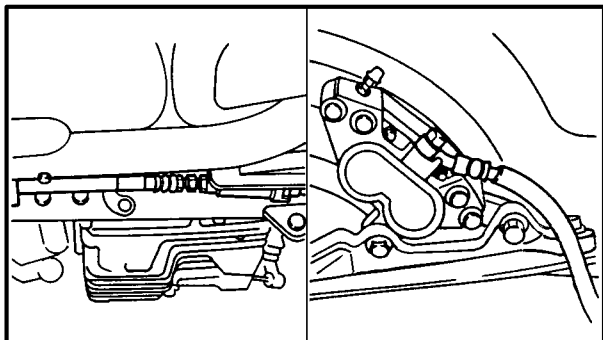
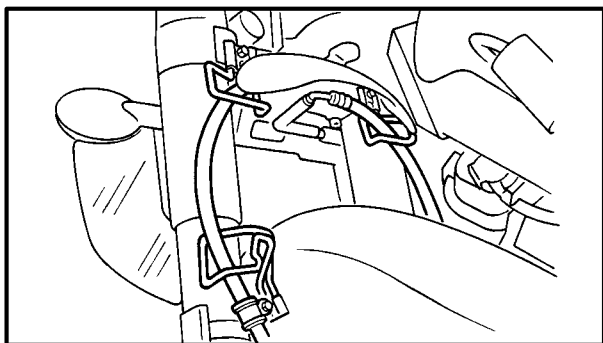
Brake light comes on sooner.

Brake light comes on later.

3-40

CHECKING THE BRAKE HOSES/ BLEEDING THE HYDRAULIC BRAKE SYSTEM

CHK
ADJ



EAS00131

CHECKING THE BRAKE HOSES

The following procedure applies to all of the brake hoses and clamps.

1. Check:
 - brake hose
Cracks/damage/wear → Replace.
2. Check:
 - brake hose clamp
Loose connection → Tighten.
3. Hold the motorcycle upright and apply the brake.
4. Check:
 - brake hose
Activate the brake several times.
Brake fluid leakage → Replace the damaged hose.
Refer to “FRONT AND REAR BRAKES” in CHAPTER 7.

EAS00134

BLEEDING THE HYDRAULIC BRAKE SYSTEM

WARNING

Bleed the hydraulic brake system whenever:

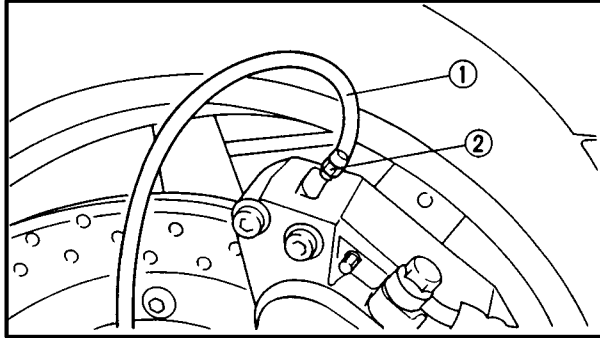
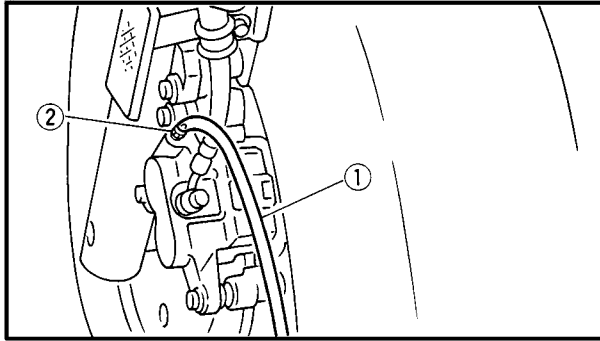
- the system was disassembled,
- a brake hose was loosened or removed,
- the brake fluid level is very low,
- brake operation is faulty.

NOTE:

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

BLEEDING THE HYDRAULIC BRAKE SYSTEM/ ADJUSTING THE SHIFT PEDAL

CHK
ADJ



2. Bleed:

- hydraulic brake system



- Add the recommended brake fluid to the proper level.
- Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
- Connect a clear plastic hose (1) tightly to the bleed screw (2).

[A] Front

[B] Rear

- Place the other end of the hose into a container.
- Slowly apply the brake several times.
- Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
- Loosen the bleed screw.
This will release the tension and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.
- Tighten the bleed screw and then release the brake lever or brake pedal.
- Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- Tighten the bleed screw to specification.



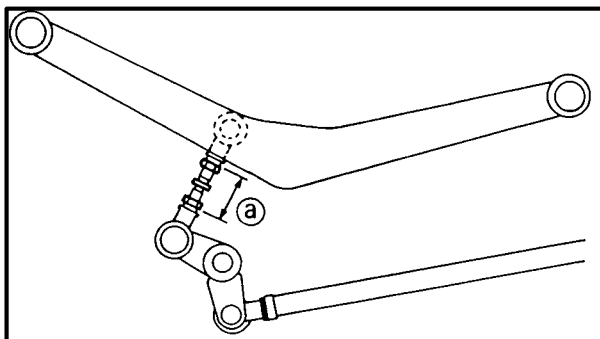
Bleed screw

6 Nm (0.6 m•kg, 4.3 ft•lb)

- Fill the reservoir to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL".

⚠ WARNING

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



EAS00136

ADJUSTING THE SHIFT PEDAL

1. Check:

- shift pedal position
Check the shift pedal rod length (a).
If the position is incorrect → Adjust.

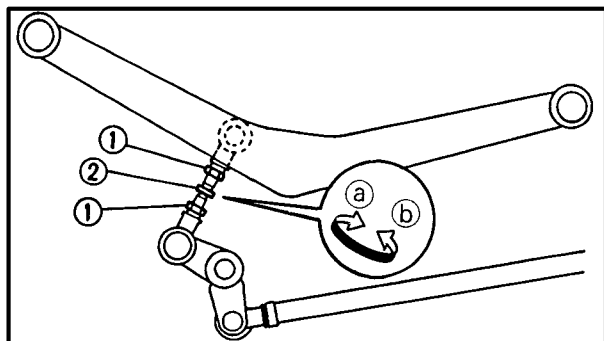


Shift pedal rod length:

26.8 mm (1.06 in)

ADJUSTING THE SHIFT PEDAL/CHECKING THE FINAL DRIVE OIL LEVEL/CHANGING THE FINAL DRIVE OIL

**CHK
ADJ**



2. Adjust:
 - shift pedal position



- a. Loosen both locknuts (1).
- b. Turn the shift rod (2) in direction (a) or (b) to obtain the correct shift pedal position.

Direction (a) → Shift pedal is raised.

Direction (b) → Shift pedal is lowered.

- Tighten both locknuts.



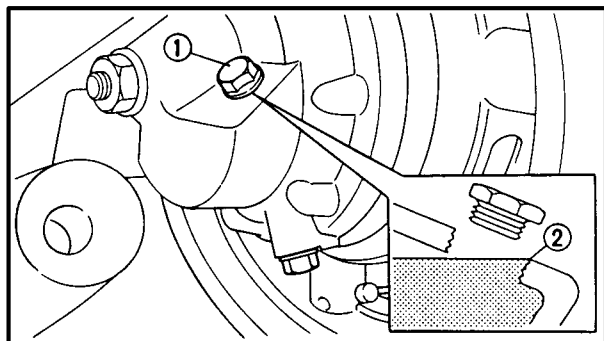
EAS00144

CHECKING THE FINAL DRIVE OIL LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.



2. Remove:
 - final drive housing oil filler bolt (1)

3. Check:

- final drive oil level

The final drive oil level should be to the bottom brim (2) of the filler hole.

Below the bottom brim → Add the recommended final drive oil to the proper level.



Recommended final drive oil
SAE 80 hypoid gear oil graded
“GL-4”, “GL-5” or “GL-6”
or
multi-purpose SAE 80W 90
hypoid gear oil

4. Install:
 - final drive housing oil filler bolt

23 Nm (2.3 m•kg, 17 ft•lb)

EAS00145

CHANGING THE FINAL DRIVE OIL

1. Place a container under the final drive housing.

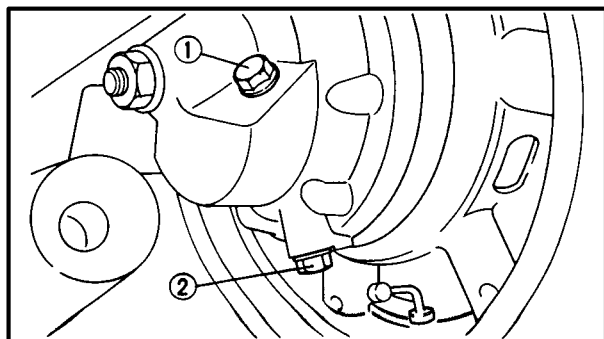
2. Remove:

- final drive housing oil filler bolt (1)
- final drive housing oil drain bolt (2)

Completely drain the final drive housing of its oil.

3. Check:

- final drive housing oil drain bolt gasket
- Damage → Replace.





4. Install:

- final drive housing oil drain bolt

23 Nm (2.3 m•kg, 17 ft•lb)

5. Fill:

- final drive housing
(with the specified amount of the recommended final drive oil)



Quantity
0.2 L (0.18 Imp, 17 ft•lb)

Refer to “CHECKING THE FINAL DRIVE OIL LEVEL”.

EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

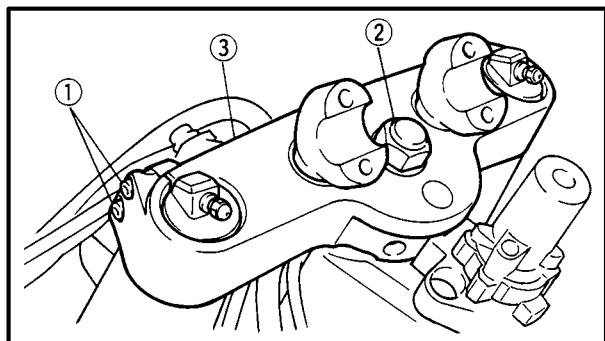
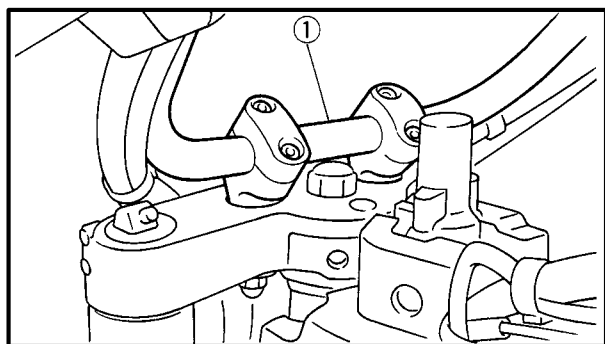
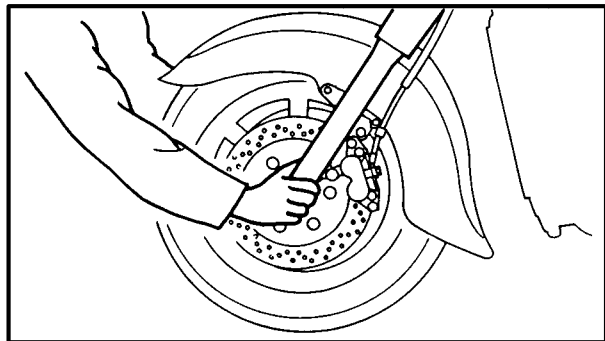
1. Stand the motorcycle on a level surface.

WARNING

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

NOTE:

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



2. Check:

- steering head

Grasp the bottom of the front fork legs and gently rock the front fork.

Looseness or binding → Adjust the steering head.

3. Remove:

- front cowlings

Refer to “FRONT COWLING”.

4. Remove:

- handlebar ①

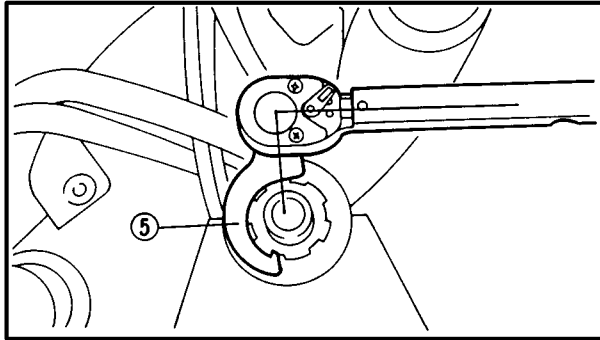
5. Loosen

- upper bracket pinch bolts ①

6. Remove

- steering stem nut ②
- upper bracket ③

CHK
ADJ



⚠ WARNING



	130 Nm (13.0 m•kg, 94 ft•lb)
---	------------------------------



9. Install:

- front cowling

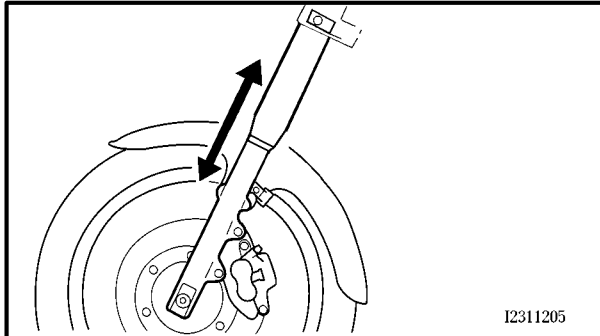
EAS00149

CHECKING THE FRONT FORK

1. Stand the motorcycle on a level surface.

WARNING

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



2. Check:

- inner tube
Damage/scratches → Replace.
- oil seal
Oil leakage → Replace.

3. Hold the motorcycle upright and apply the front brake.

4. Check:

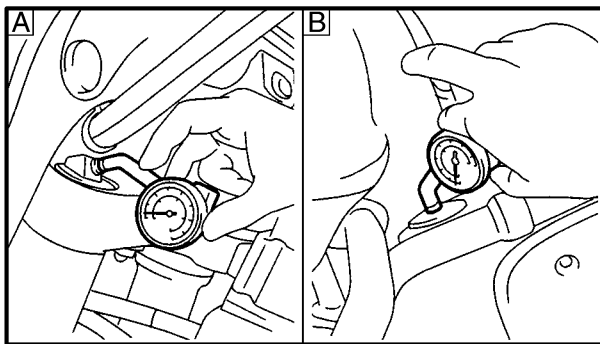
- operation
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
Unsmooth operation → Repair.
Refer to "FRONT FORK" in CHAPTER 7.

EAS00156

ADJUSTING THE FRONT AND REAR SHOCK ABSORBER ASSEMBLY

WARNING

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



1. Check:

- shock absorber air pressure

☐ A Front

☐ B Rear

Out of specification → Adjust



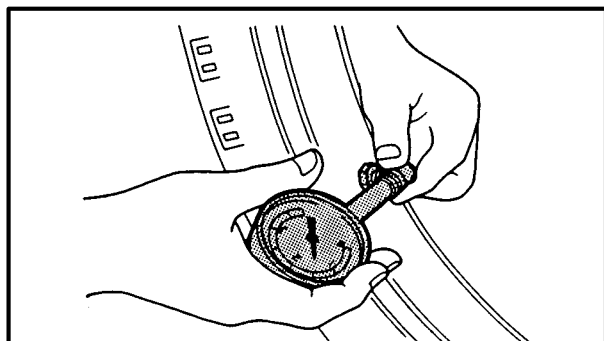
Air pressure

Front

0 ~ 50 Kpa
(0 ~ 0.5 Kgf/cm, 0 ~ 0.07psi)

Rear

0 ~ 400 Kpa
(0 ~ 4 Kgf/cm, 0 ~ 0.06 psi)



EAS00166

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Measure:
 - tire pressure
 Out of specification → Regulate.

⚠ WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded motorcycle could cause tire damage, an accident or an injury.

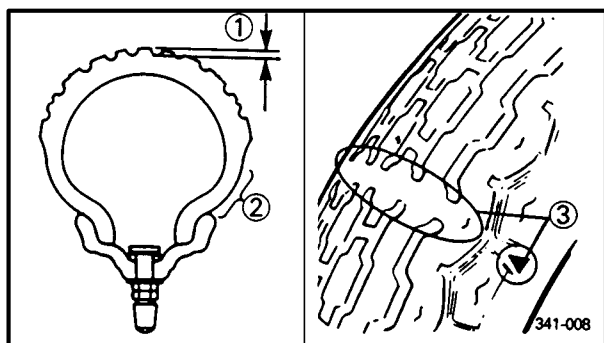
NEVER OVERLOAD THE MOTORCYCLE.

Basic weight (with oil and full fuel tank)	366 kg (806.9 lb)	
Maximum load*	179 kg (394.6 lb)	
Cold tire pressure	Front tire	Rear tire
Up to 90 kg load*	250 kPa (2.50 kgf/ cm ² , 36 psi)	250 kPa (2.50 kgf/ cm ² , 36 psi)
90 kg ~ maximum load*	250 kPa (2.50 kgf/ cm ² , 36 psi)	280 kPa (2.80 kgf/ cm ² , 41 psi)
High speed riding	250 kPa (2.50 kgf/ cm ² , 36 psi)	280 kPa (2.80 kgf/ cm ² , 41 psi)

*: total of cargo, rider, passenger and accessories

⚠ WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.



2. Check:

- tire surfaces

Damage/wear → Replace the tire.

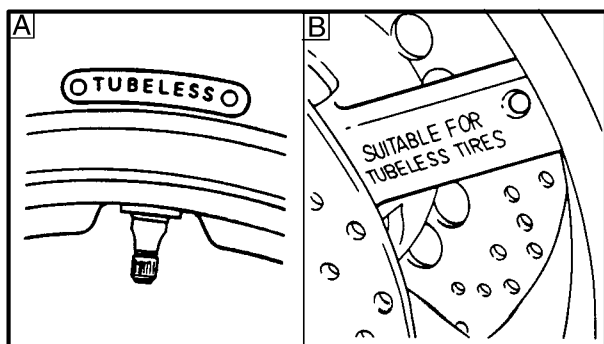


Minimum tire tread depth
1.0 mm (0.04 in)

- ① Tire tread depth
- ② Side wall
- ③ Wear indicator

⚠ WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using tube tires, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.
- To avoid pinching the tube, make sure that the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.



A Tire

B Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

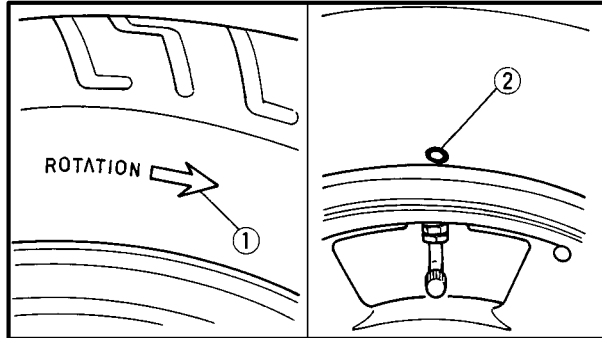
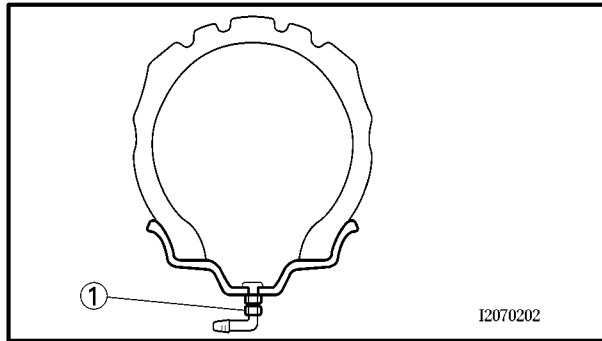
- After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this motorcycle.

FRONT TIRE:

Manufacturer	Size	Type
BRIDGESTONE	150/80-16 71H	G705
DUNLOP*	150/80-16 71H	D404F

REAR TIRE:

Manufacturer	Size	Type
BRIDGESTONE	150/90B15M/C 74H	G702
DUNLOP*	150/90B15M/C 74H	D404



⚠ WARNING

- After mounting a new tire, ride conservatively for a while to become accustomed to the “feel” of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.
- After a tire has been repaired or replaced, be sure to tighten the tire valve stem locknut ① to specification.

NOTE:

For tires with a direction of rotation mark ①:

- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark ② with the valve installation point.



Tire valve stem locknut
1.6 Nm (0.16 m•kg, 1.16 ft•lb)

EAS00168

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

1. Check:
 - wheel
 Damage/out-of-round → Replace.

⚠ WARNING

Never attempt to make any repairs to the wheel.

NOTE:

After a tire or wheel has been changed or replaced, always balance the wheel.

EAS00170

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the cable sheaths and cables.

WARNING

Damaged cable sheaths may cause the cable to corrode and interfere with its movement. Replace damaged cable sheaths and cables as soon as possible.

1. Check:
 - cable sheath
Damage → Replace.
2. Check:
 - cable operation
Unsmooth operation → Lubricate.



Recommended lubricant
Engine oil or a suitable cable lubricant

NOTE:

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubing device.

EAS00171

LUBRICATING THE LEVERS AND PEDALS

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



Recommended lubricant
Engine oil

EAS00172

LUBRICATING THE SIDESTAND

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



Recommended lubricant
Engine oil

EAS00174

LUBRICATING THE REAR SUSPENSION

Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.



Recommended lubricant
Molybdenum disulfide grease

EAS00178

ELECTRICAL SYSTEM

CHECKING AND CHARGING THE BATTERY

⚠ WARNING

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

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

First aid in case of bodily contact:

External

- SKIN – Wash with water.
- EYES – Flush with water for 15 minutes and get immediate medical attention.

Internal

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

CAUTION:

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
 - Charging time, charging amperage and charging voltage for a MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.
-



CHECKING AND CHARGING THE BATTERY

NOTE:

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

1. Remove:
 - rider seat
Refer to “RIDER SEATS”.
2. Disconnect:
 - battery leads
(from the battery terminals)

CAUTION:

First, disconnect the negative lead ①, then the positive lead ②.

3. Remove:
 - battery
4. Check:
 - battery charge

- Connect a pocket tester to the battery terminals.

Tester positive lead → battery positive terminal

**Tester negative lead →
battery negative terminal**

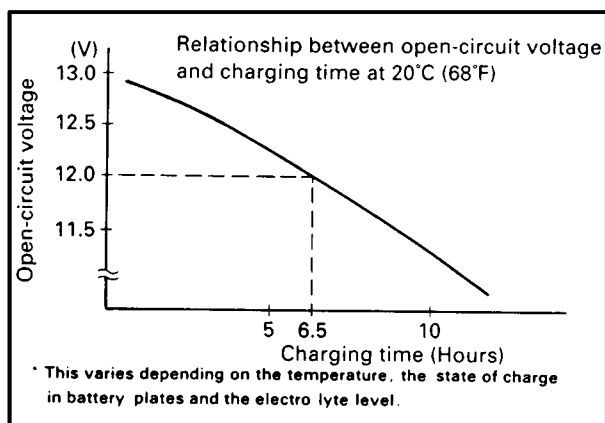
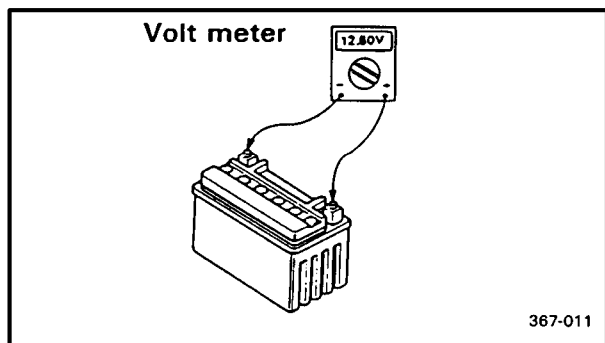
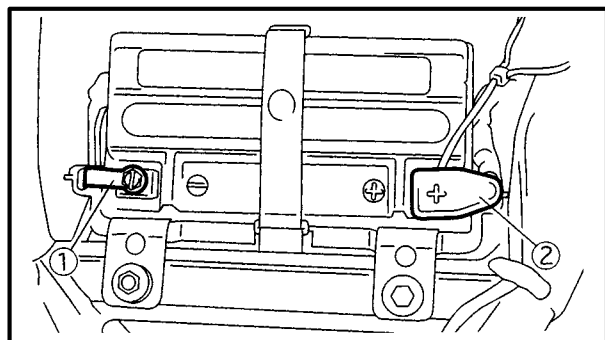
NOTE:

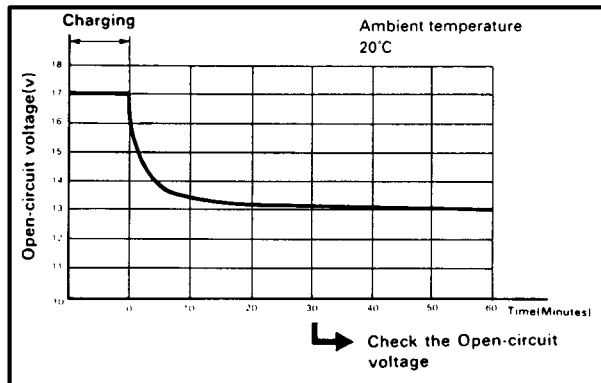
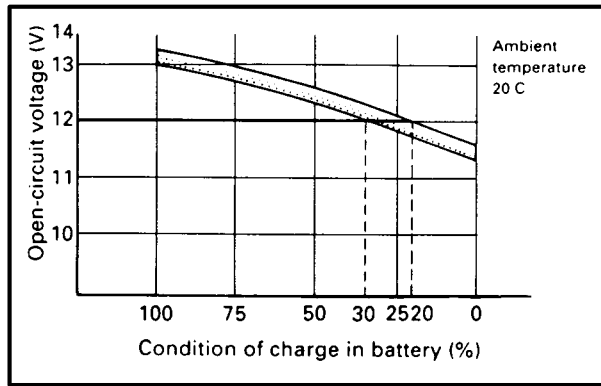
- The charge state of a MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

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

Example

- c. Open-circuit voltage = 12.0 V
- d. Charging time = 6.5 hours
- e. Charge of the battery = 20 ~ 30 %





5. Charge:

- battery

(refer to the appropriate charging method illustration)

⚠ WARNING

Do not quick charge a battery.

CAUTION:

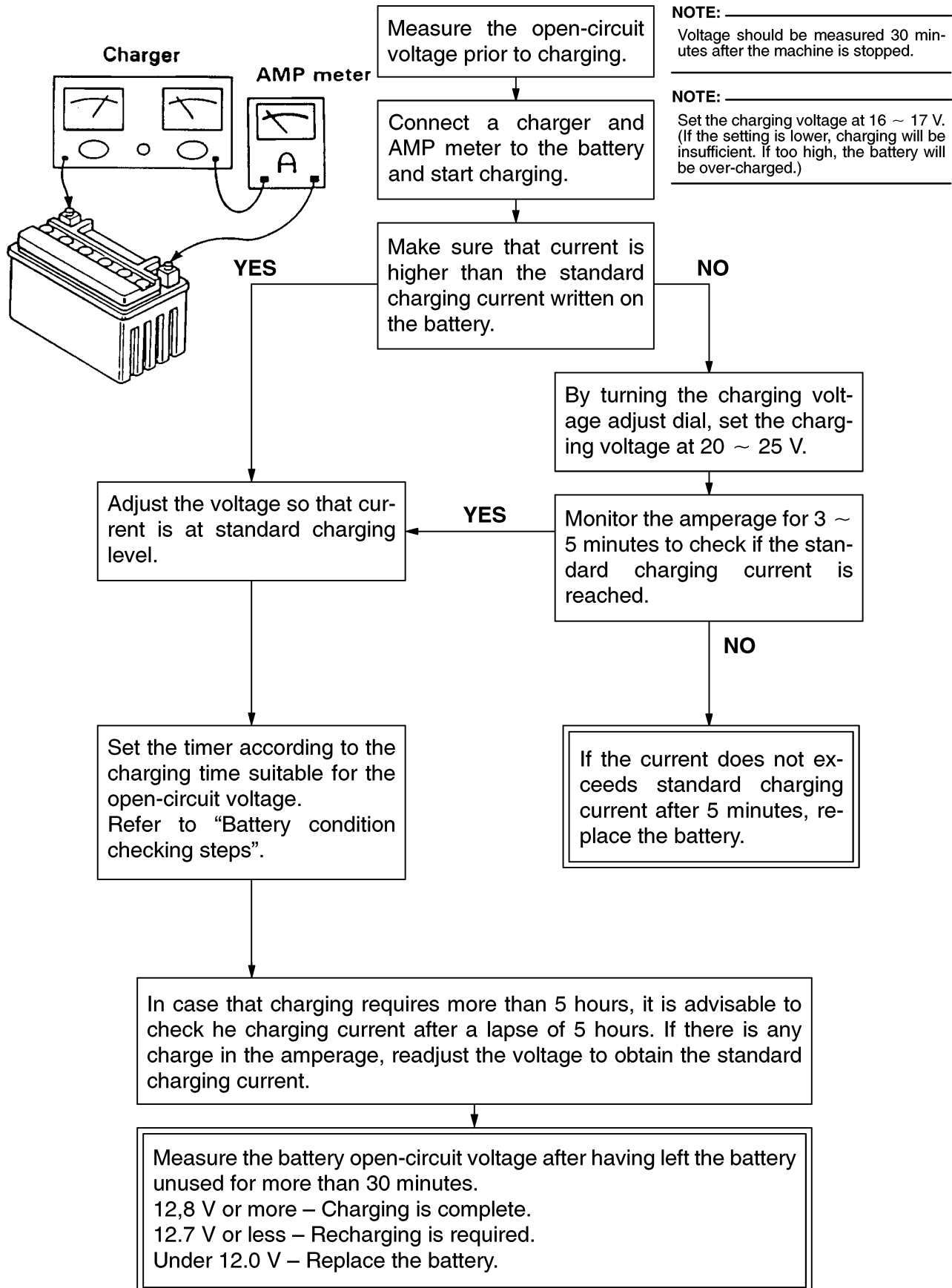
- Make sure that the battery breather hose and battery vent are free of obstructions.
- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative 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 that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corrected 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 a MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.

CHECKING AND CHARGING THE BATTERY

CHK
ADJ

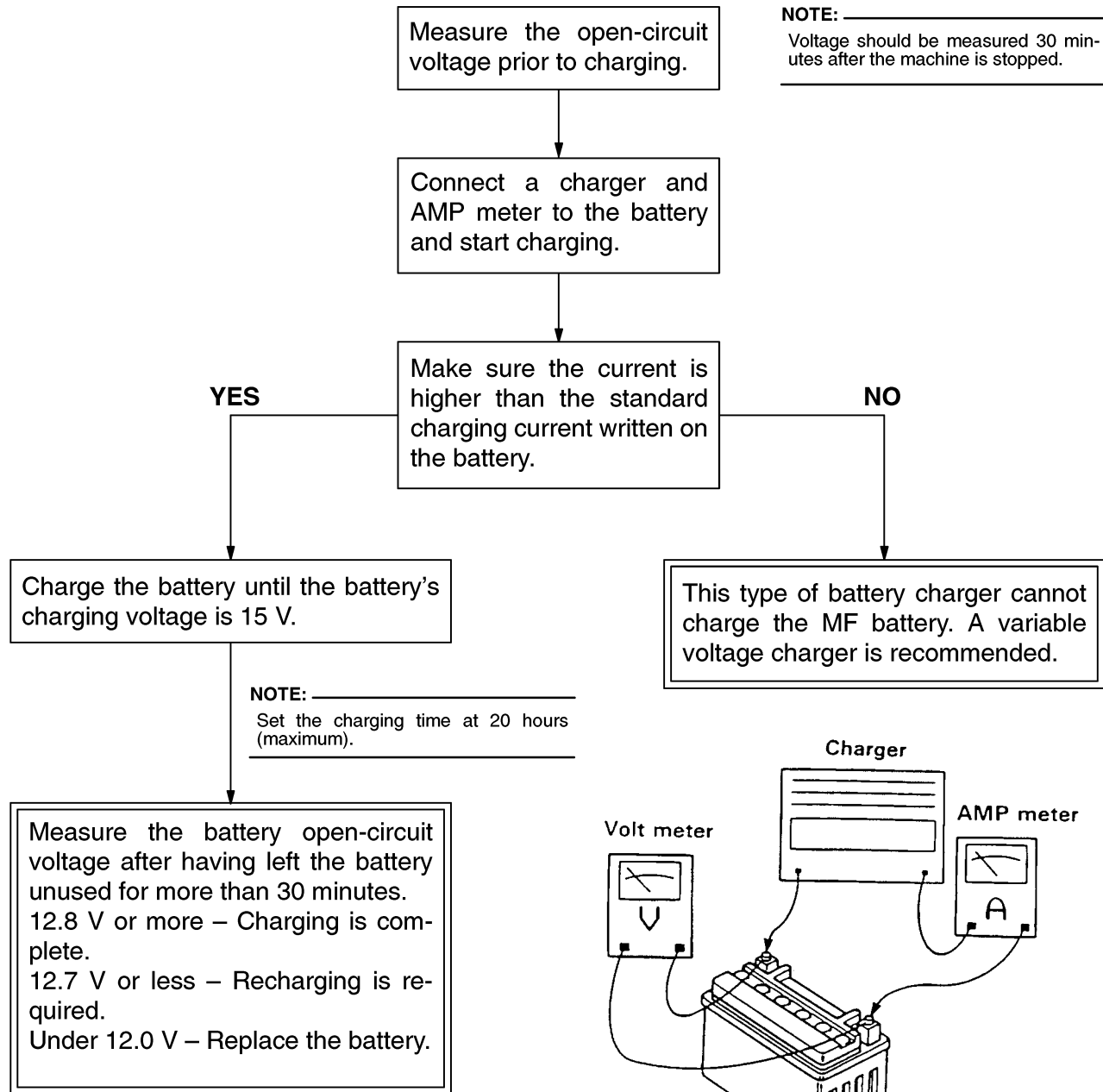


Charging method using a variable-current (voltage) type charger





Charging method using a constant-voltage type charger



Charging method using a constant-current type charger

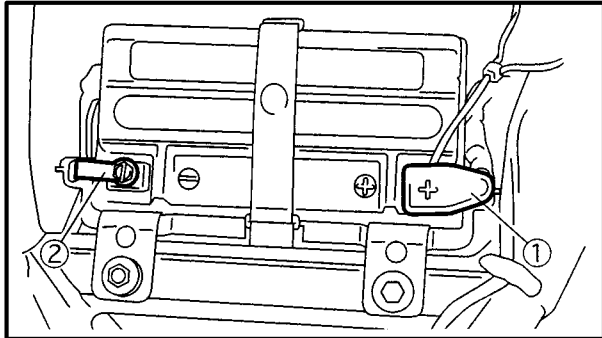
This type of battery charger cannot charge the MF battery.

CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES

CHK
ADJ



6. Check:
 - battery.
Damage → Replace.
7. Install:
 - battery



8. Connect:
 - battery leads
(to the battery terminals)

CAUTION:

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

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



Recommended lubricant
Dielectric grease

11. Install:
 - rider seat
Refer to “RIDER AND PASSENGER SEAT”.

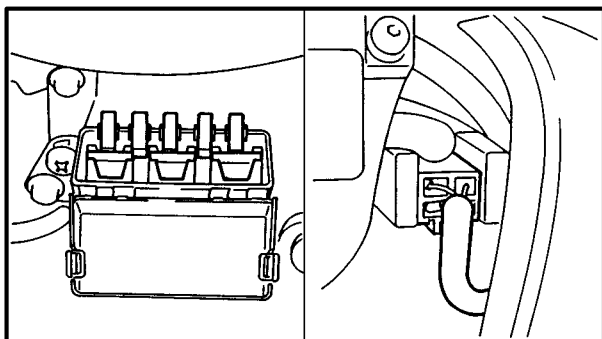
EAS00181

CHECKING THE FUSES

The following procedure applies to all of the fuses.

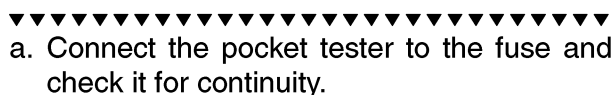
CAUTION:

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



1. Remove:
 - side cover left
2. Check:
 - fuse

CHK
ADJ



	Pocket tester YU-03112, 90890-03112
---	--

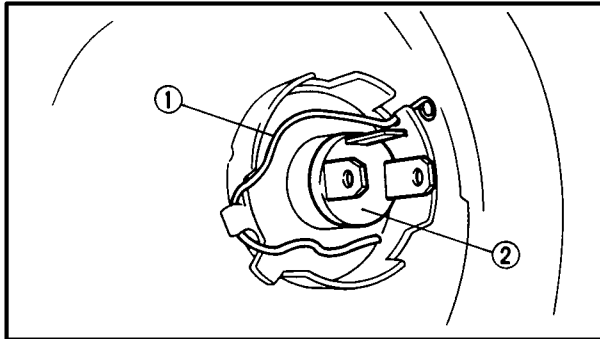
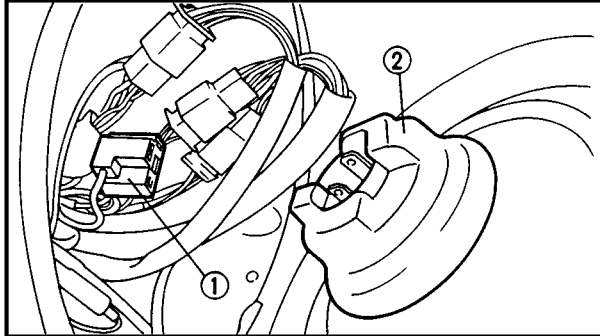
3. Replace:
- blown fuse

- | Fuses | Amperage rating | Quantity |
|-----------------------|-----------------|----------|
| Main fuse | 30 A | 1 |
| Headlight fuse | 15 A | 1 |
| Signaling system fuse | 15 A | 1 |
| Ignition fuse | 10 A | 1 |
| Digital clock fuse | 10 A | 1 |
| Radiator fan fuse | 10 A | 1 |
| Reserve fuse | 30 A | 1 |
| | 15 A | 1 |
| | 10A | 2 |
| | 5 A | 1 |

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



4. Install:
 - side cover left



EAS00182

REPLACING THE HEADLIGHT BULB

1. Remove:
 - headlight unit
2. Disconnect:
 - headlight leads ①
3. Remove:
 - bulb cover ②

4. Remove:
 - headlight bulb holder ①
5. Remove:
 - headlight bulb ②

⚠ WARNING

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

6. Install:
 - headlight bulb (New)
Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

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

CHK	
ADJ	

-

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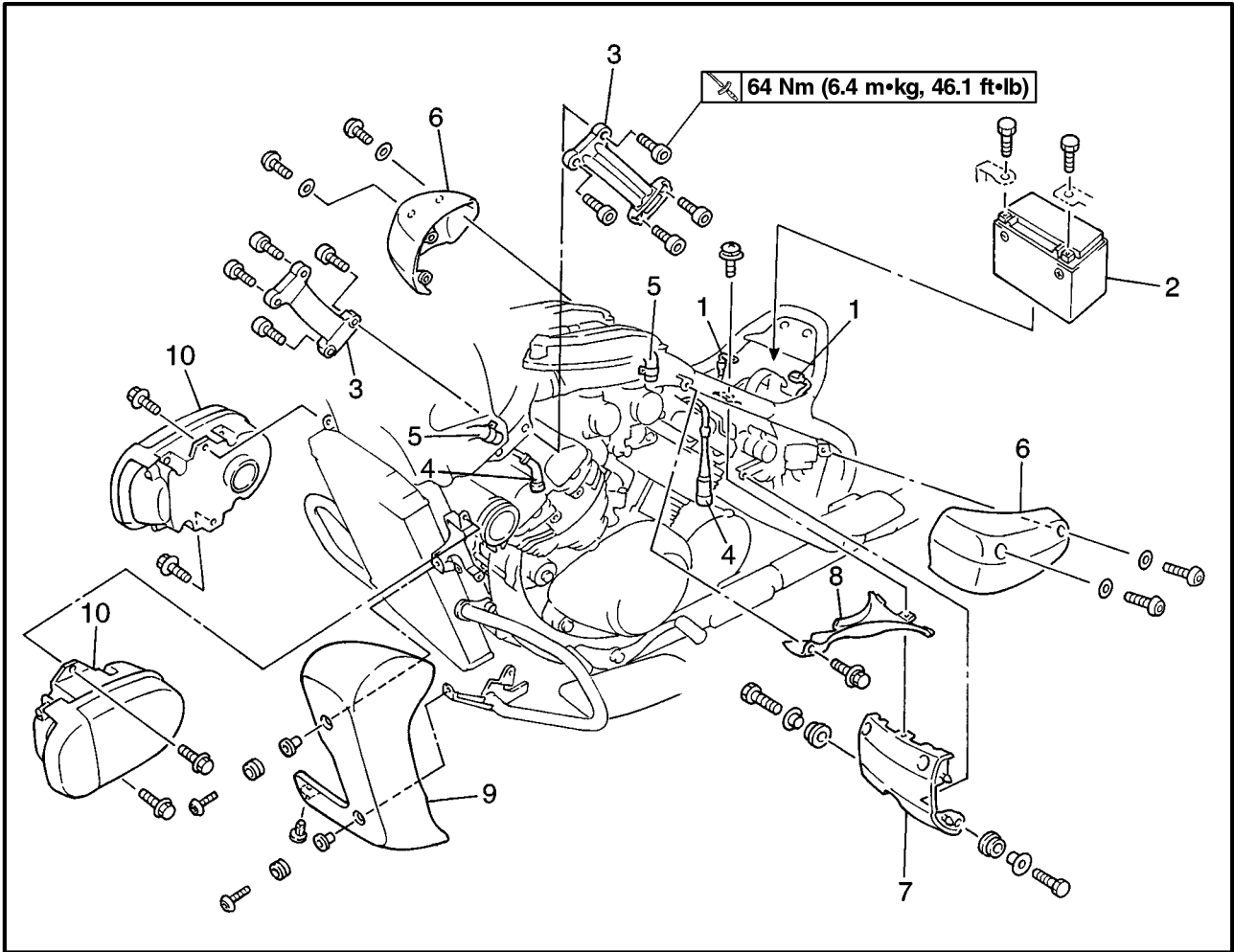
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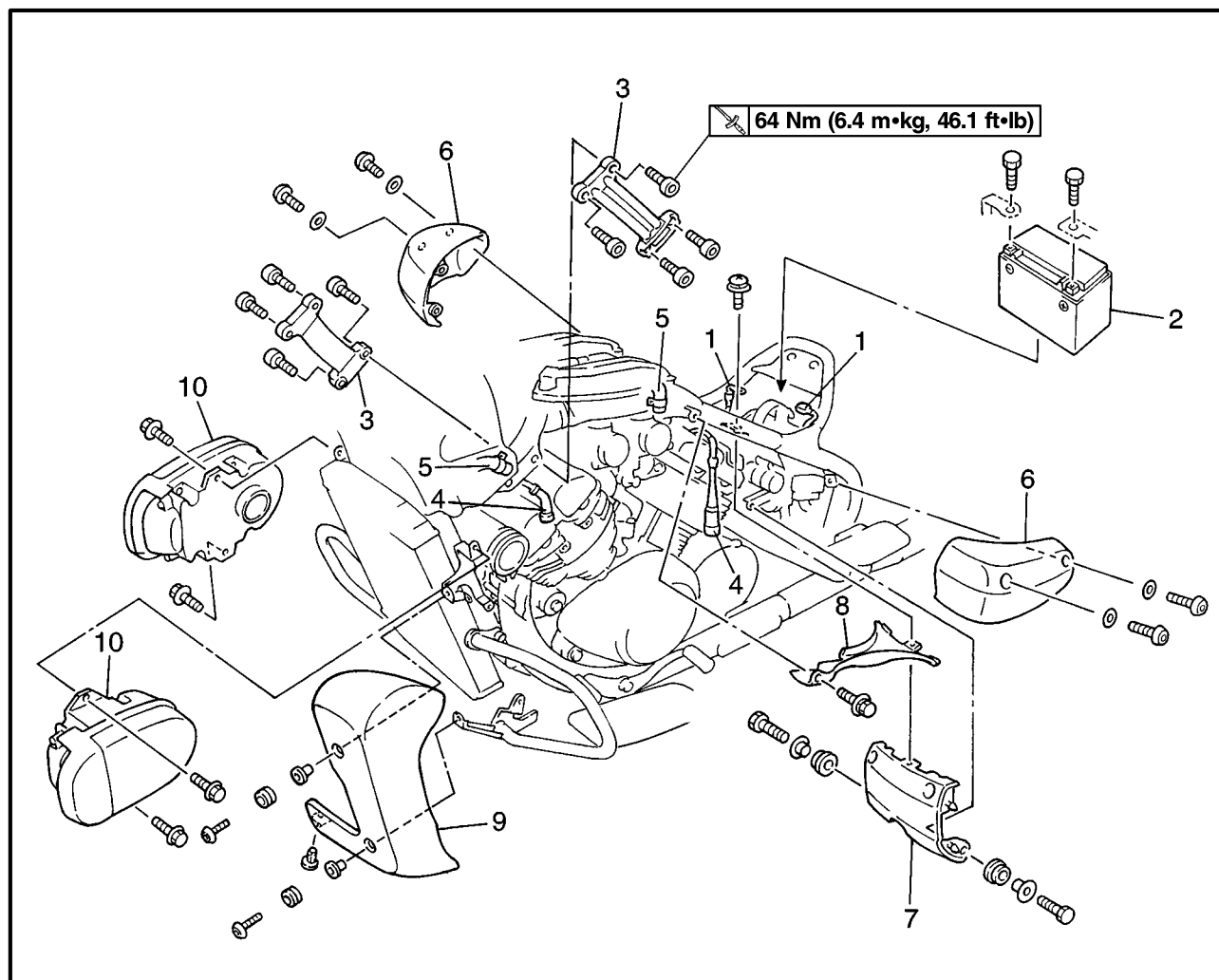
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ENGINE

ENGINE REMOVAL
LEADS, CABLES AND HOSES

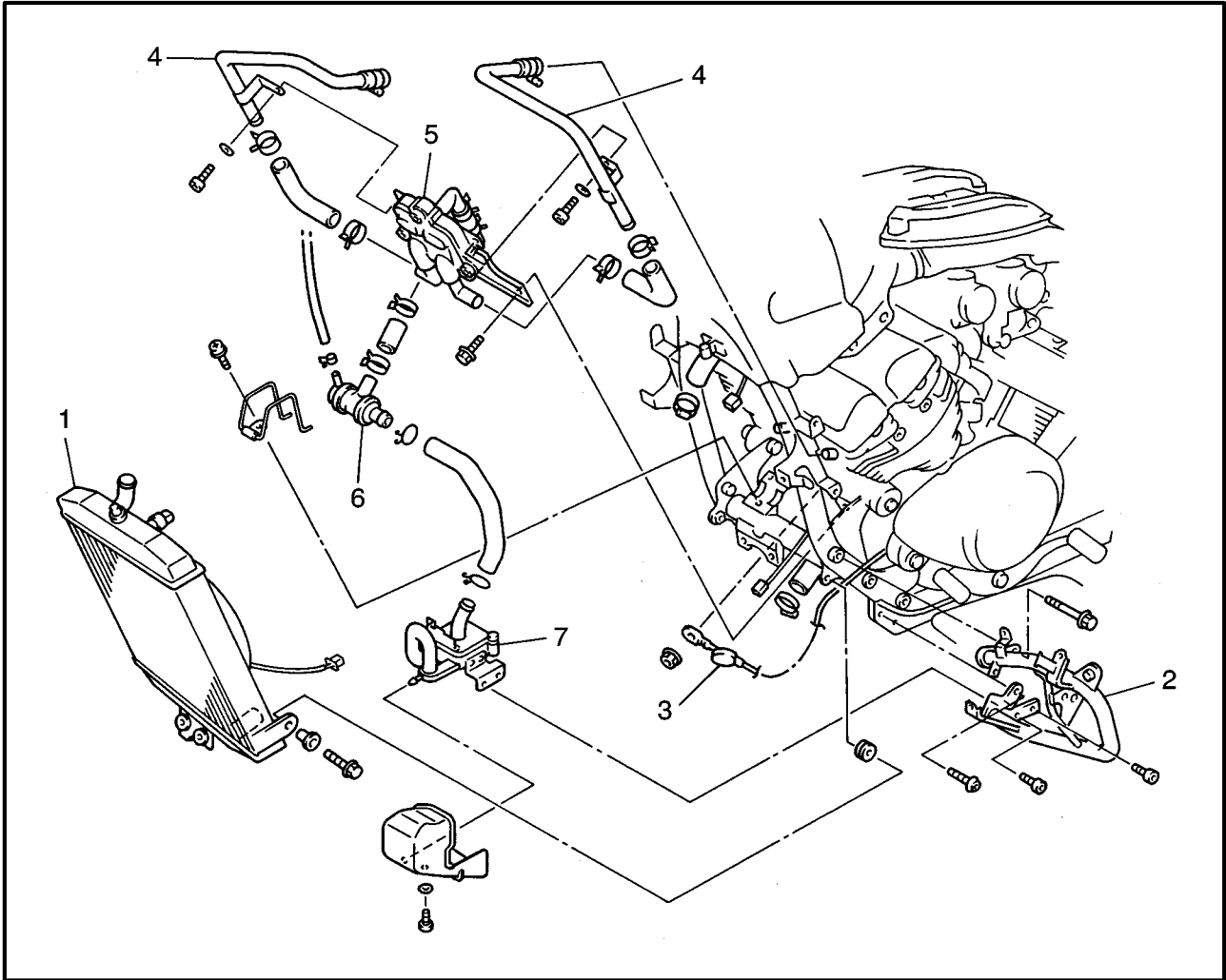


Order	Job/Part	Q'ty	Remarks
	Disconnecting the leads, cables and hoses		Disconnecting the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so there is no danger of it falling over.
	Engine oil		Drain Refer to "CHARGING THE ENGINE OIL" in CHAPTER 3.
	Coolant		Drain Refer to "CHARGING THE COOLANT" in CHAPTER 3.
	Clutch fluid		Drain
	Rider seat, fuel tank		Refer to "RIDER AND PASSENGER SEATS" and "FUEL TANK" in CHAPTER 3.



Order	Job/Part	Q'ty	Remarks
1	Battery leads	2	Disconnect NOTE: First, disconnect the negative lead, then the positive lead.
2	Battery	1	Disconnect
3	Cylinder head stays	2	Disconnect
4	Spark plug leads	4	Disconnect
5	Hoses (coolant)	2	
6	Side covers (left and right)	2	
7	Rear inner cover	1	Disconnect
8	Plastic shroud	1	
9	Under covers	2	
10	Air cleaner box	2	For connecting, reverse the disconnection procedure.

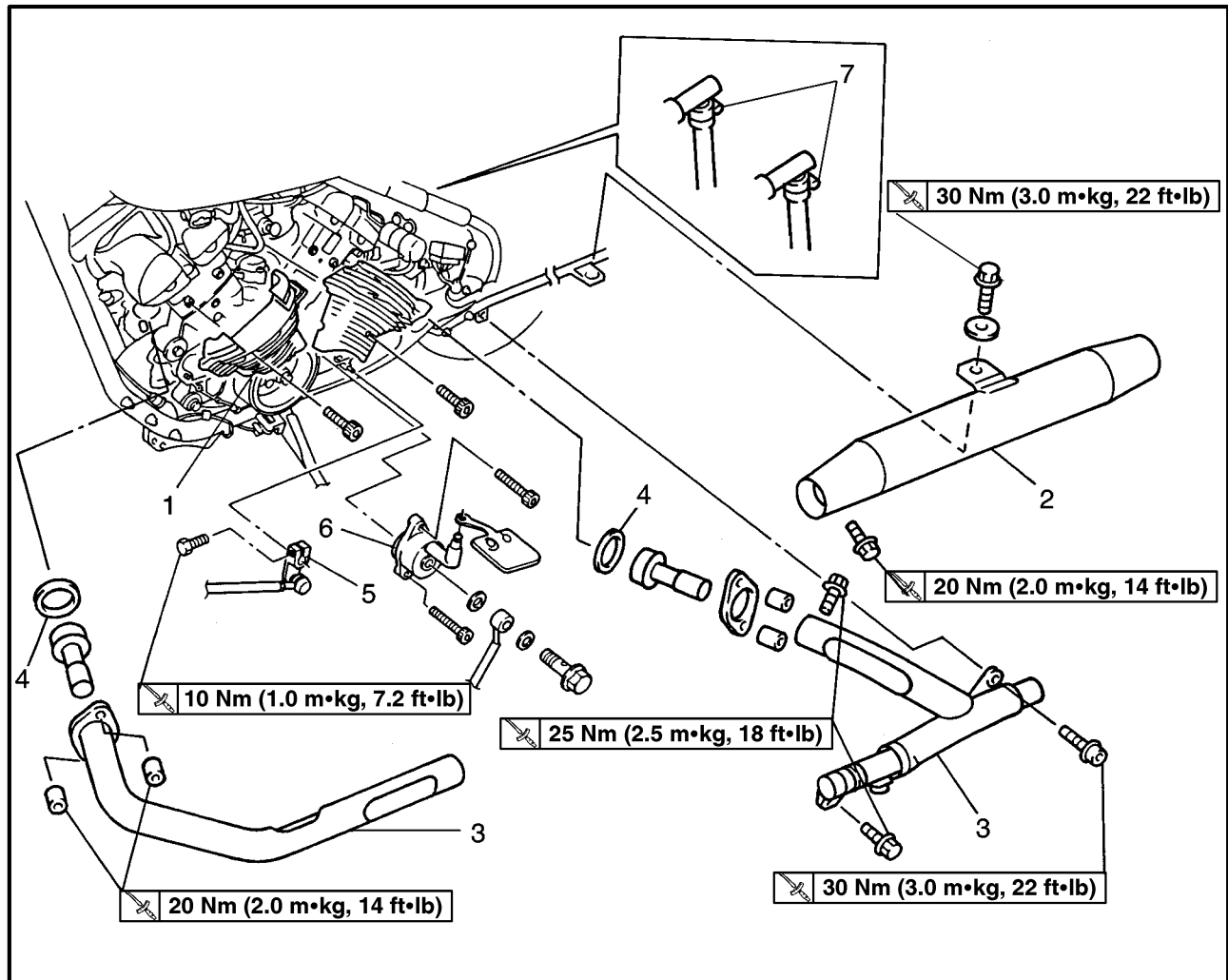
RADIATOR AND AIS



Order	Job/Part	Q'ty	Remarks
	Removing the radiator and AIS		
1	Radiator	1	Remove the parts in the order listed. Refer to "RADIATOR" in CHAPTER 5
2	Engine guards (left and right)	2	
3	Starter lead	1	
4	AIS pipe	2	
5	Reed valve	1	
6	Air cutoff valve	1	
7	Air cleaner	1	For installation, reverse the removal procedure

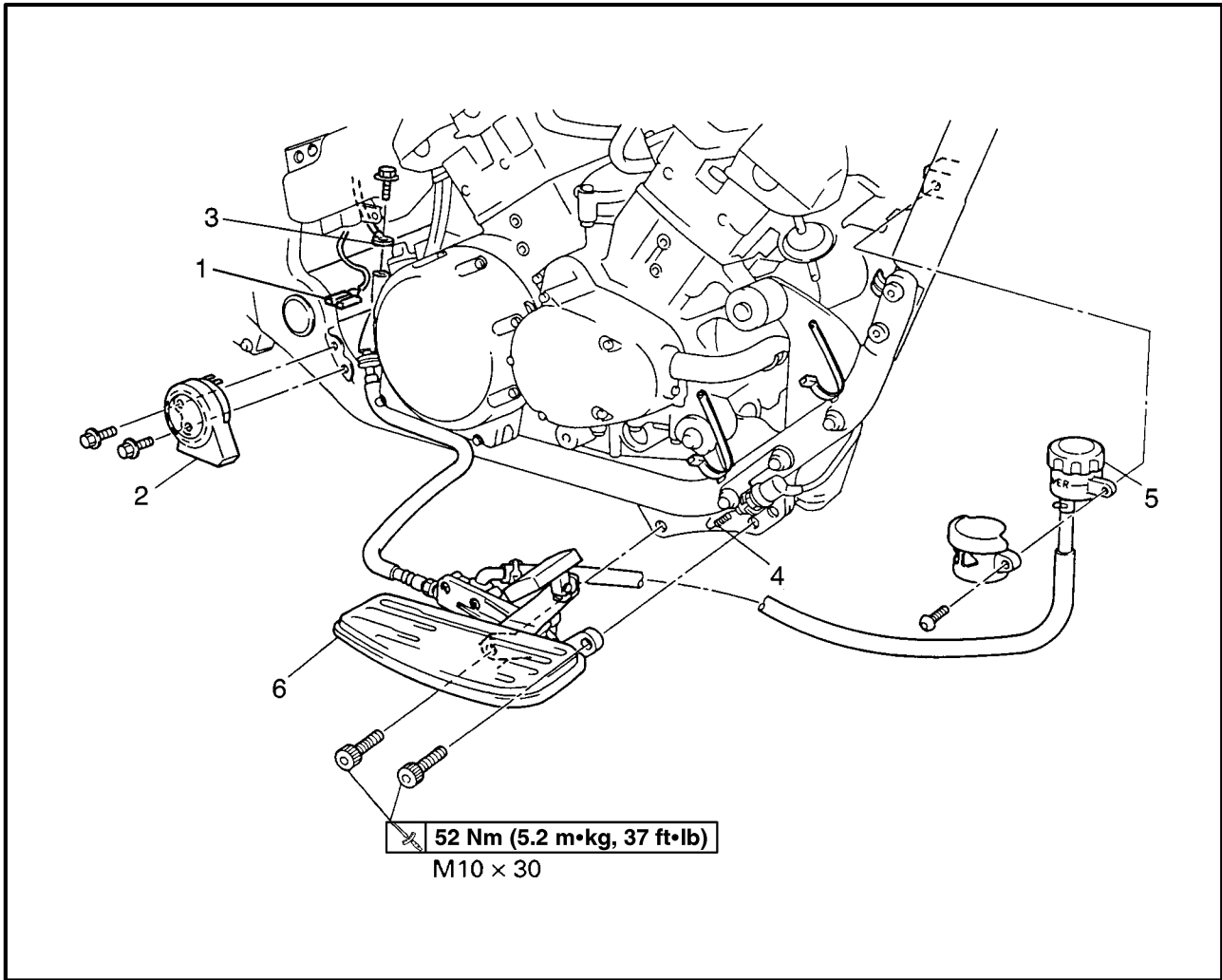


MUFFLERS AND EXHAUSTS



Order	Job/Part	Q'ty	Remarks
	Removing the mufflers and exhausts		
	Carburetors		Remove the parts in the order listed. Refer to "CARBURETORS" in CHAPTER 6.
	Air induction box		
1	Cylinder side covers	4	
2	Muffler assemblies	2	
3	Exhaust pipes	4	
4	Copper gaskets	4	
5	Shift pedal link	1	Disconnect
6	Clutch release cylinder	1	Refer to "CLUTCH RELEASE CYLINDER".
7	AIS pipe	2	For installation, reverse the removal procedure.

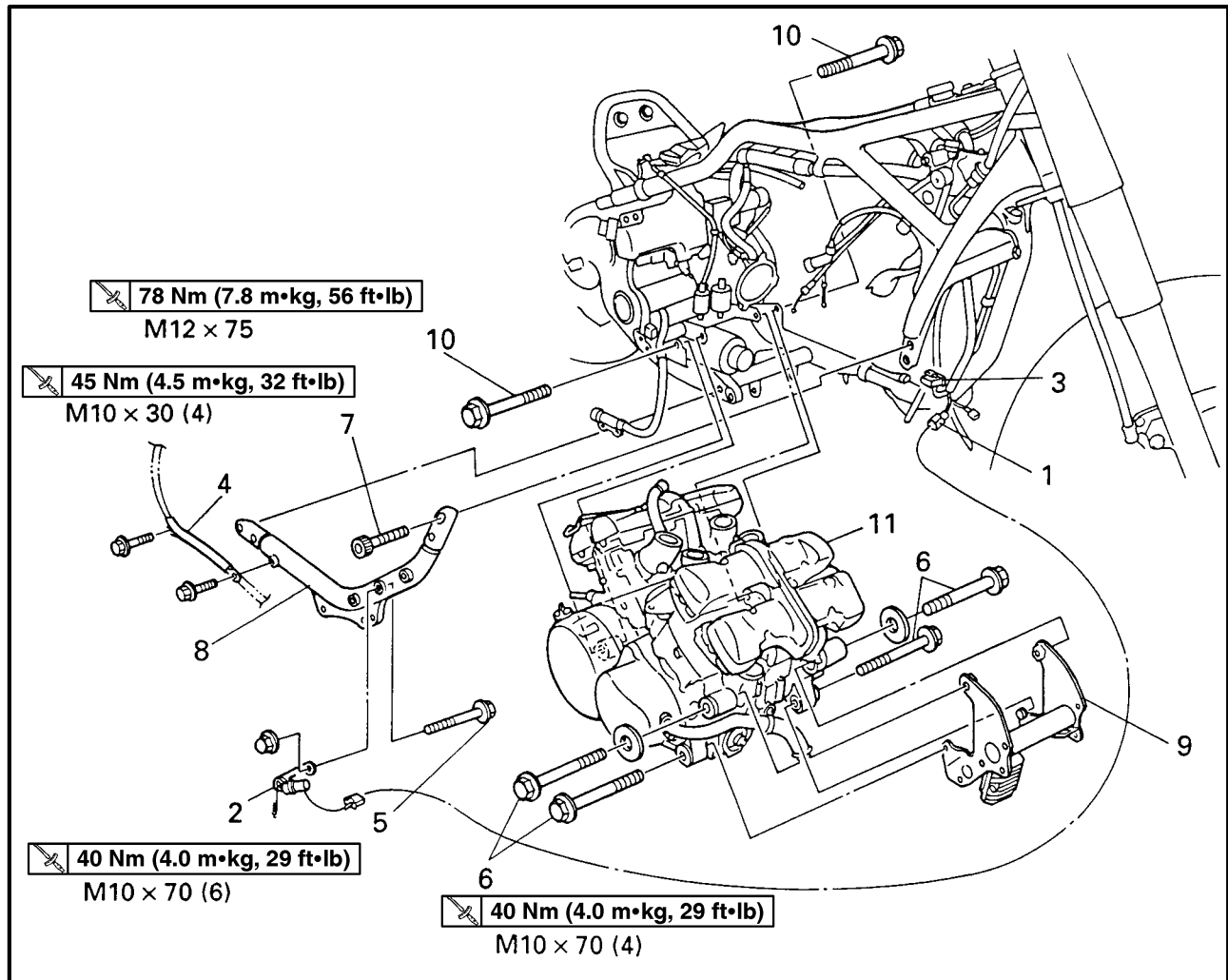
HORN AND BRAKE PEDAL



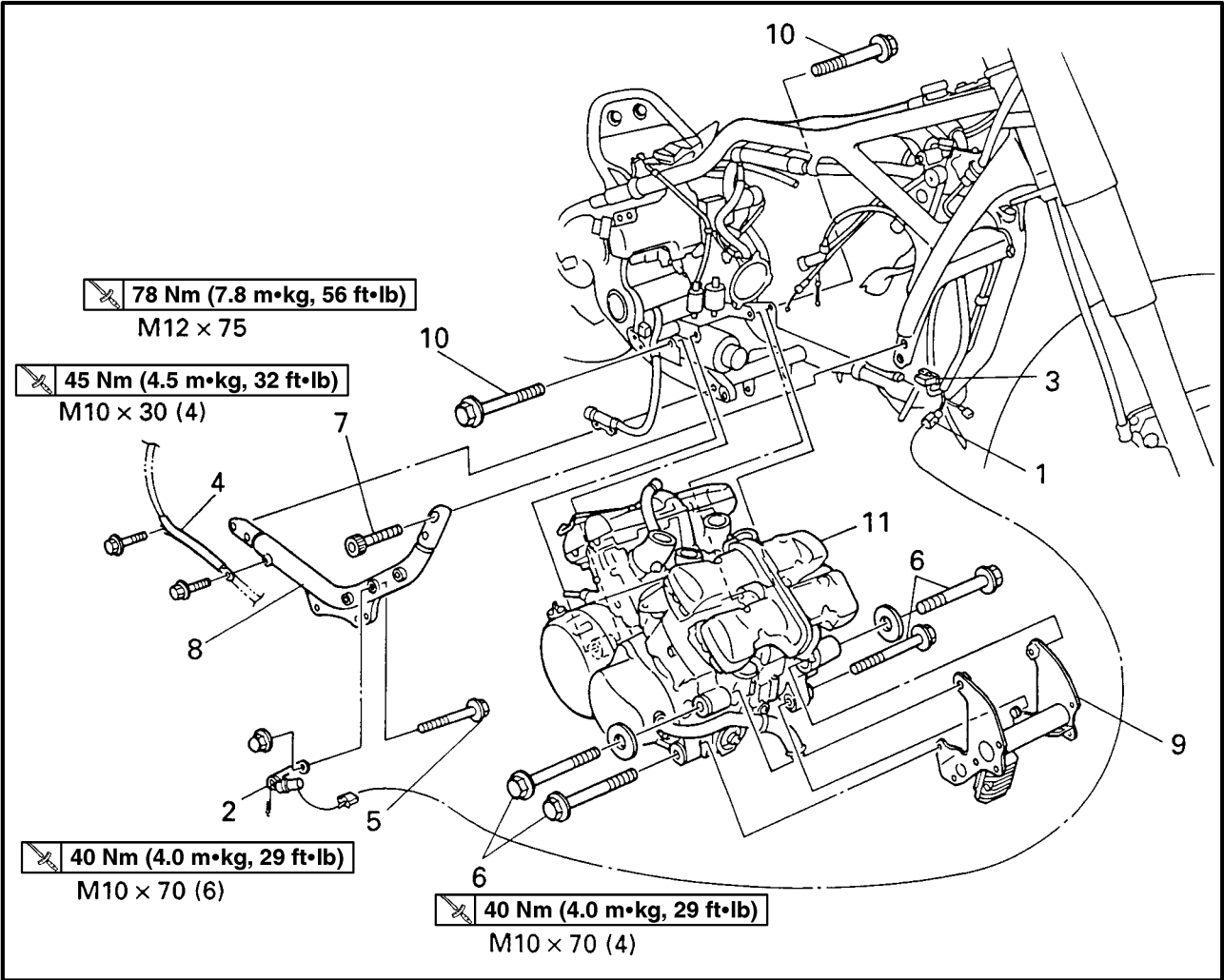
Order	Job/Part	Q'ty	Remarks
	Removing the Horn and brake pedal		
1	Horn leads	2	Remove the parts in the order listed.
2	Horn	1	Disconnect
3	Ground lead	1	
4	Spring (rear brake switch)	1	Disconnect
5	Reservoir tank (rear brake)	1	
6	Brake pedal assembly	1	Refer to "FRONT AND REAR BRAKES" in CHAPTER 7. For installation, reverse the removal procedure.



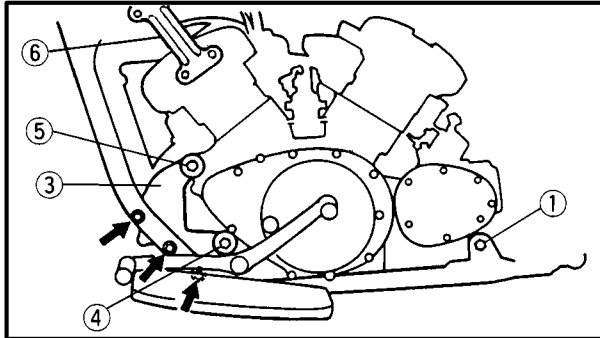
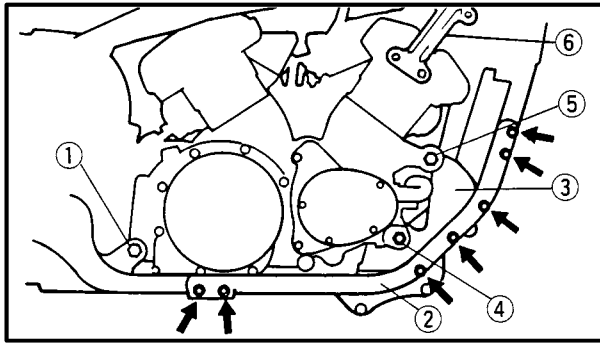
ENGINE



Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed. NOTE: _____ Place a suitable stand under the frame and engine. ⚠ WARNING _____ Securely support the motorcycle so there is no danger of it falling over.
1	Rear brake switch leads	2	Disconnect
2	Rear brake switch	1	
3	Rectifier/regulator coupler	1	Disconnect
4	Rear brake hose protector	1	
5	Bolts (engine bracket)	6	Refer to "INSTALLING THE ENGINE".
6	Bolts (front-lower/upper)	4	
7	Bolts (down tube)	4	
8	Down tube (right side)	1	



Order	Job/Part	Q'ty	Remarks
9	Engine bracket	1	Refer to "INSTALLING THE ENGINE".
10	Bolts (rear)	2	
11	Engine assembly	1	
			NOTE: Remove the engine assembly from the right side of the motorcycle.
			For installation, reverse the removal procedure.



EAS00192

INSTALLING THE ENGINE

1. Install:
 - engine assembly
(from the right side of the motorcycle)
2. Install:
 - bolts (rear) ①
 - down tube (right) ②
 - engine bracket ③
 - rear brake switch
 - bolts (front-lower) ④
 - bolts (front-upper) ⑤
 - cylinder head stay ⑥

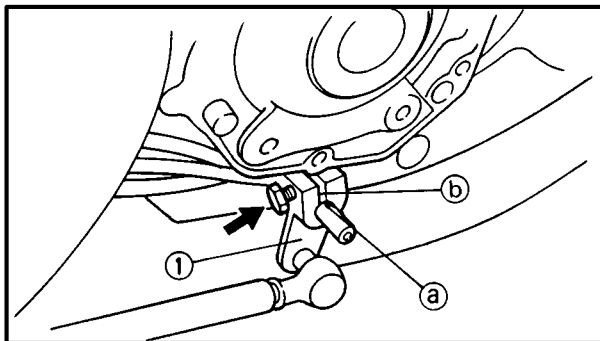
NOTE:

Do not fully tighten the bolts

3. Tighten the bolts in the following order.



1. Bolts (rear) ①
78 Nm (7.8 m•kg, 56 ft•lb)
2. Down tube (right) ②
45 Nm (4.5 m•kg, 32 ft•lb)
3. Engine bracket ③
40 Nm (4.0 m•kg, 29 ft•lb)
4. Bolts (front-lower) ④
40 Nm (4.0 m•kg, 29 ft•lb)
5. Bolts (front-upper) ⑤
40 Nm (4.0 m•kg, 29 ft•lb)
6. Bolts (cylinder head stay) ⑥
64 Nm (6.4 m•kg, 46.1 ft•lb)



4. Install:

- shift arm ①  10 Nm (1.0 m•kg, 7.2 ft•lb)

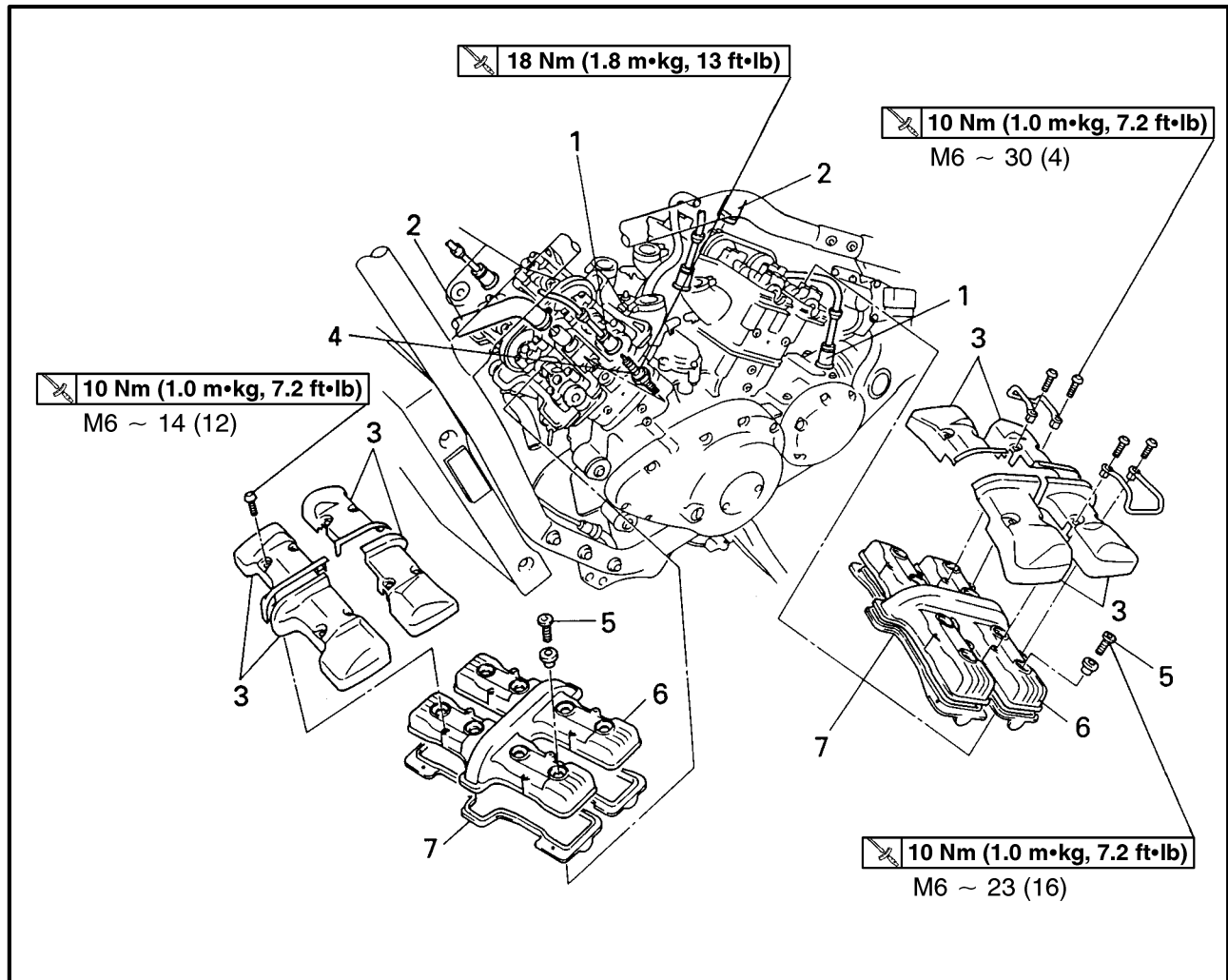
NOTE:

- Align the punch mark (a) in the shift shaft with the slot (b) in the shift arm.
- Align the bottom edge of the shift pedal with the mark on the frame-to-swingarm bracket.

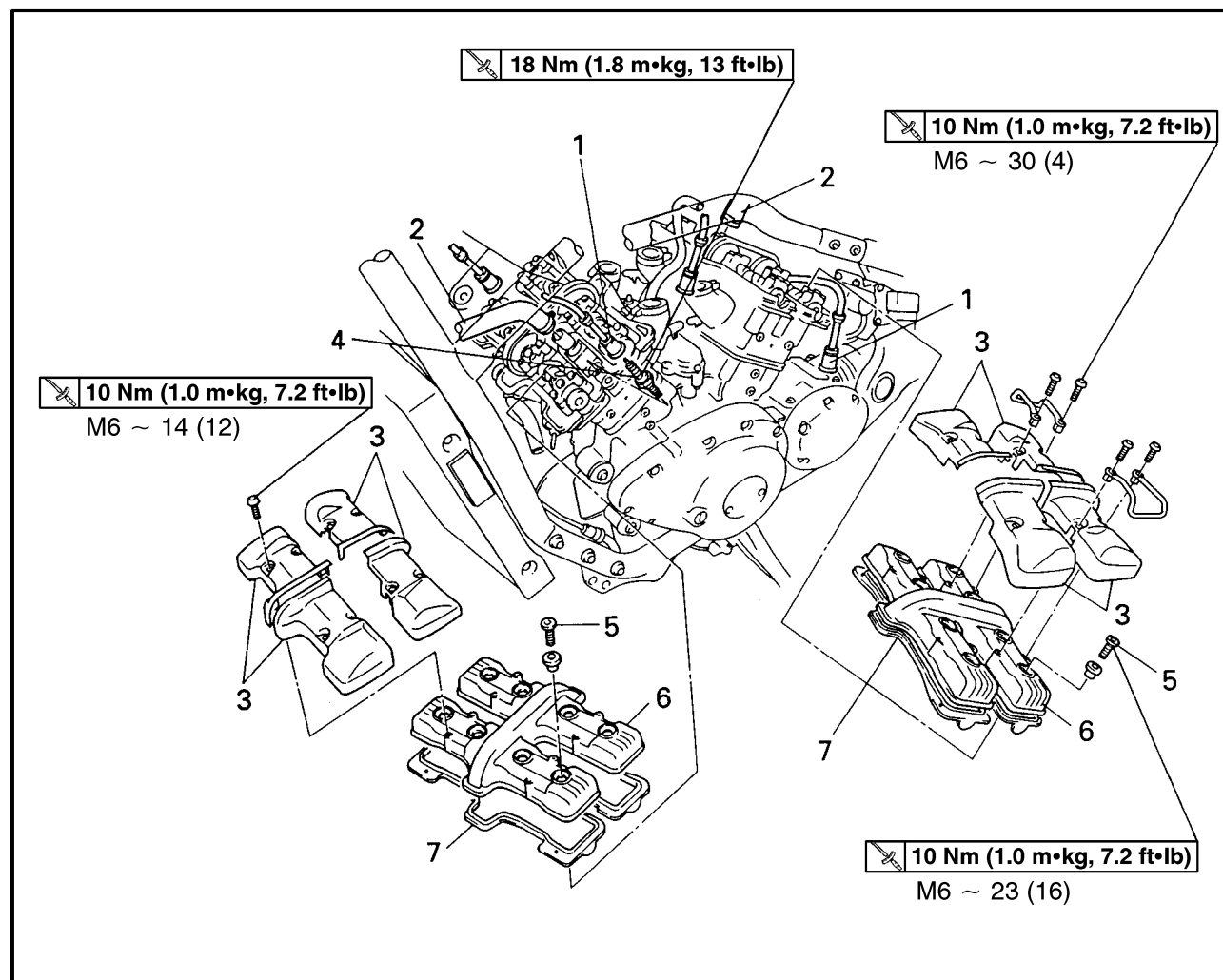


CAMSHAFTS

CYLINDER HEAD COVERS



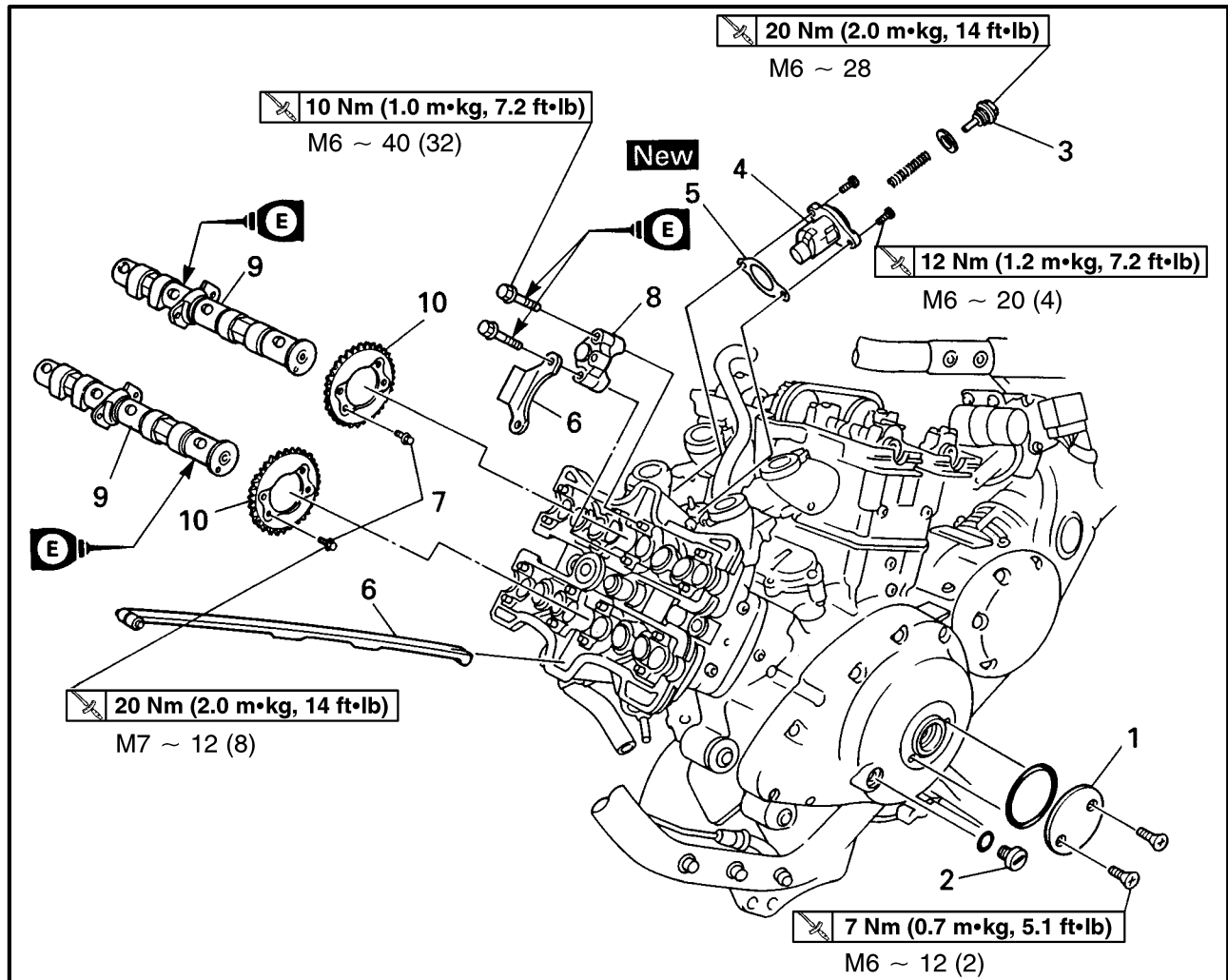
Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head covers		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so there is no danger of it falling over. Refer to "RIDER AND PASSENGER SEATS" and "FUEL TANK" in CHAPTER 3. Refer to "CLEANING THE AIR FILTER" in CHAPTER 3. Refer to "CARBURETORS" in CHAPTER 6. Drain Refer to "CHANGING THE COOLANT" in CHAPTER 3.
	Rider seat and fuel tank		
	Air filter case		
	Carburetors		
	Cylinder head stay		
	Coolant		



Order	Job/Part	Q'ty	Remarks
1	Spark plug caps	4	Disconnect
2	Coolant hoses (to cylinder head)	2	Disconnect
3	Chrome cylinder head covers	8	
4	Spark plugs	4	
5	Bolts (cylinder head covers)	16	
6	Cylinder head covers	2	
7	Gaskets (cylinder head covers)	2	
			For installation, reverse the removal procedure.



CAMSHAFTS



Order	Job/Part	Q'ty	Remarks
	Removing the camshafts		
	Cylinder head covers		Remove the parts in the order listed. Refer to "CYLINDER HEAD COVERS".
1	Crankcase cover plate	1	Refer to "REMOVING/INSTALLING THE CAMSHAFTS".
2	Timing plug	1	
3	Cap bolts (tensioners)	2	
4	Timing chain tensioners	2	
5	Gaskets	2	
6	Timing chain guides (metal and rubber)	4	
7	Bolts (camshaft sprockets)	8	
8	Camshaft caps	16	
9	Camshafts (intake and exhaust)	4	
10	Camshaft sprockets	4	
			For installation, reverse the removal procedure.



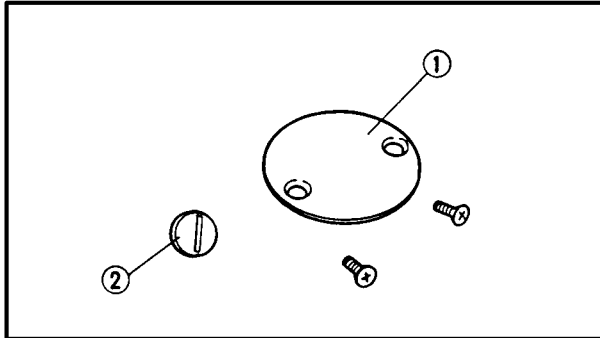
EAS00201

REMOVING THE CAMSHAFTS**Rear cylinder head****1. Remove:**

- spark plugs
- cylinder head cover
- gasket (cylinder head cover)

NOTE:

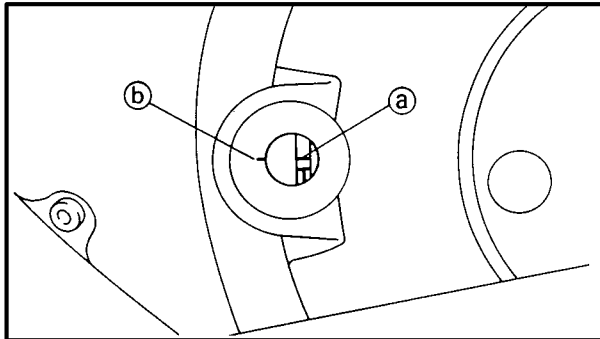
Loosen each bolt 1/4 of a turn in a crisscross pattern. After all the bolts are loosened, remove them.

**2. Remove:**

- crankcase cover plate (1)
- timing plug (2)

3. Align:

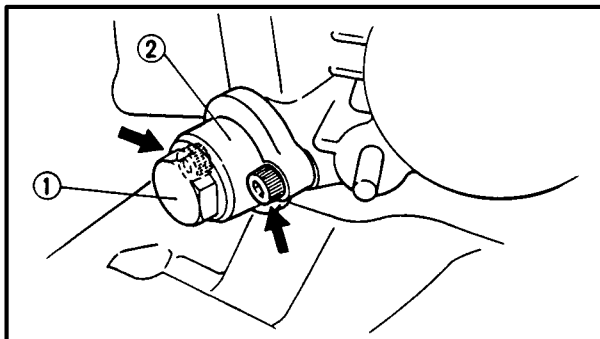
- “-” and “I” marks on the generator rotor (with the stationary pointer on the crankcase cover)

**a. Turn the crankshaft counterclockwise.**

- b. When piston #1 is at TDC on the compression stroke, align the “-” and “I” marks (a) with the stationary pointer (b).

NOTE:

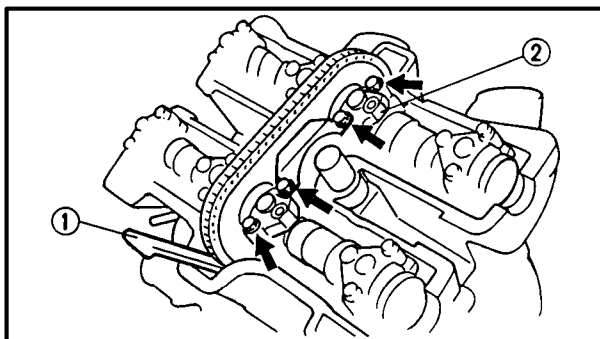
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

**4. Loosen:**

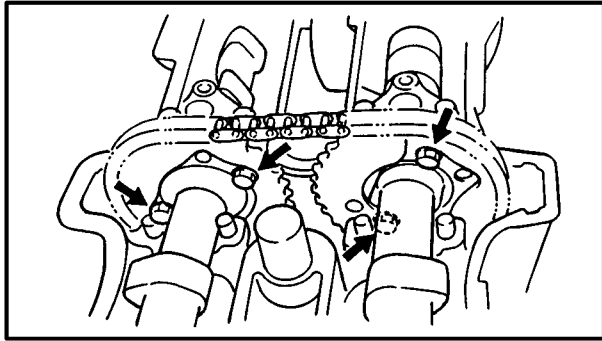
- cap bolt (1)

5. Remove:

- timing chain tensioner (2)
- gasket

**6. Remove:**

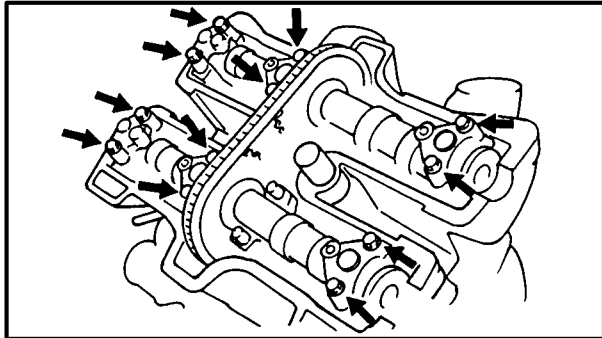
- timing chain guide (exhaust side) (1)
- camshaft caps (#2) (2)



7. Remove:

- camshaft sprocket bolts

Hold the camshaft with a 22 mm wrench.



8. Remove:

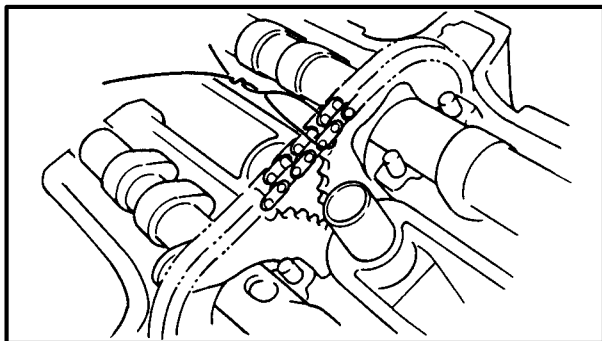
- camshaft caps

CAUTION:

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.

NOTE:

When loosening the camshaft cap bolts, make sure that the camshaft lobes do not touch the valve lifters.



9. Remove:

- intake camshaft
- exhaust camshaft

NOTE:

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

10. Remove:

- camshaft sprockets



Front cylinder head

NOTE:

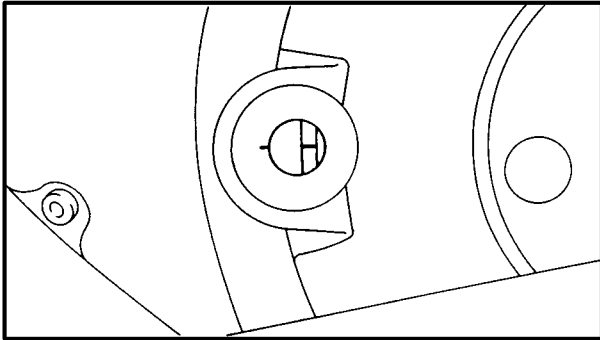
When removing the front cylinder camshafts, repeat the rear cylinder camshaft removal procedure. However, note the following points.

1. Turn:

- crankshaft

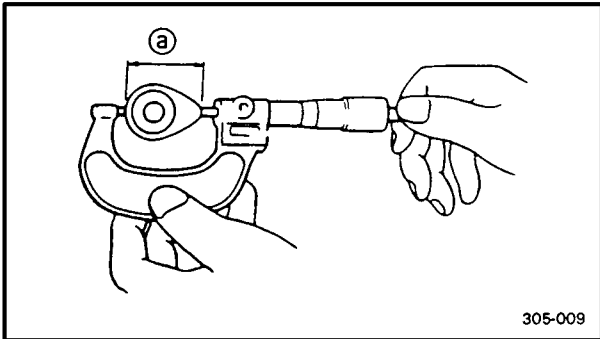
NOTE:

From the “-” and “I” marks, turn the crankshaft counterclockwise 430° (i.e., 360° plus an additional 70°).

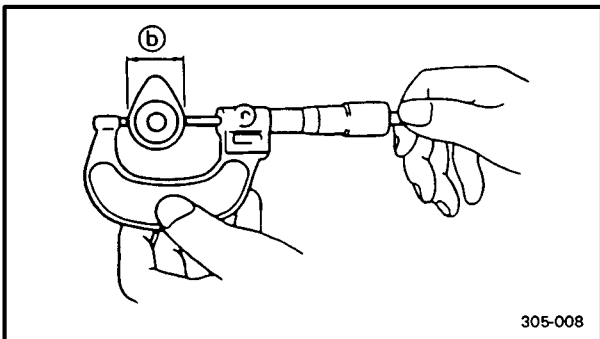


2. Align:

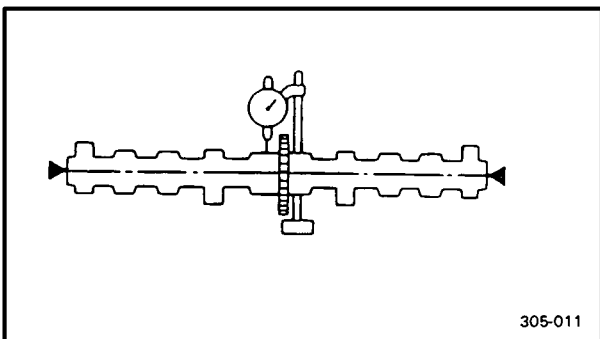
- “-” mark
(with the stationary pointer)



305-009



305-008



305-011

EB401401

CHECKING THE CAMSHAFTS

1. Check:

- camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.

2. Measure:

- camshaft lobe dimensions (a) and (b)
Out of specification → Replace the camshaft.



Camshaft lobe dimension limit

Intake

- (a) 35.65 mm (1.404 in)
- (b) 27.85 mm (1.096 in)

Exhaust

- (a) 35.65 mm (1.404 in)
- (b) 27.85 mm (1.096 in)

3. Measure:

- camshaft runout
Out of specification → Replace.



Camshaft runout

Less than 0.03 mm (0.0012 in)



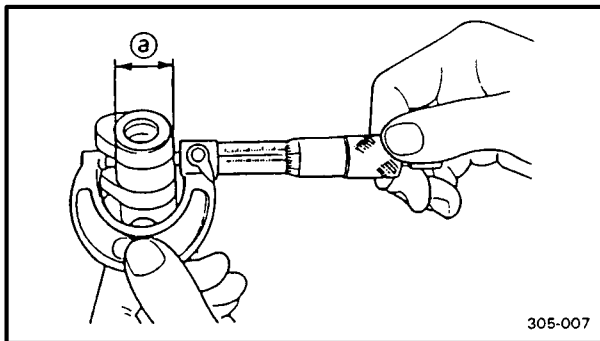
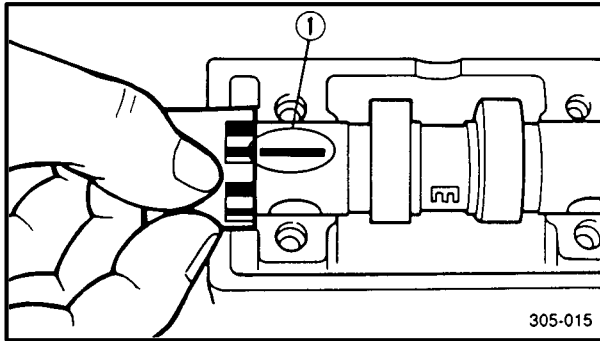
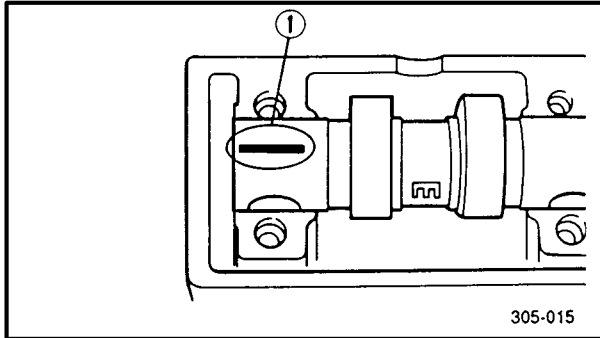
4. Measure:

- camshaft-journal-to-camshaft-cap clearance
Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaft-cap clearance

0.020 ~ 0.054 mm
(0.0008 ~ 0.0021 in)



- Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- Position a strip of Plastigauge® ① onto the camshaft journal as shown.
- Install the dowel pins and camshaft caps.

NOTE:

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



Camshaft cap bolt

10 Nm (1.0 m•kg, 7.2 ft•lb)

- d. Remove the camshaft caps and then measure the width of the Plastigauge® ①.

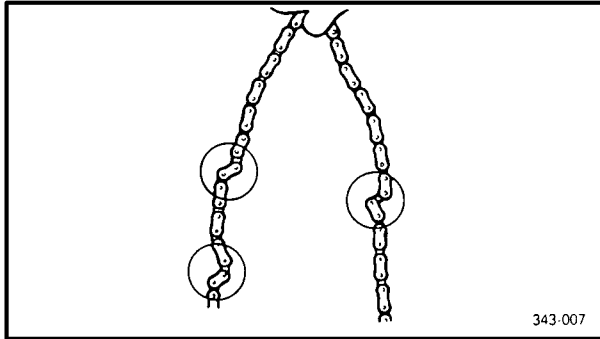
5. Measure:

- camshaft journal diameter (a)
 Out of specification → Replace the camshaft.
 Within specification → Replace the cylinder head and the camshaft caps as a set.



Camshaft journal diameter

24.967 ~ 24.980 mm
(0.9830 ~ 0.9835 in)



EAS00209

CHECKING THE TIMING CHAINS, CAM-SHAFT SPROCKETS, AND TIMING CHAIN GUIDES

The following procedure applies to all of the timing chains, camshaft sprockets, and timing chain guides.

1. Check:

- timing chain ①

Damage/stiffness → Replace the timing chain and its respective camshaft sprockets as a set.

2. Check:

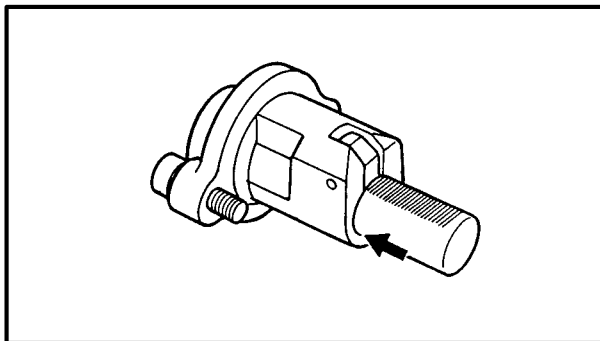
- camshaft sprocket

Damage/wear → Replace the respective camshaft sprockets and the respective timing chain as a set.

3. Check:

- timing chain guide (exhaust side)
- timing chain guide (intake side)
- timing chain guide (top side)

Damage/wear → Replace the defective part(-s).



EAS00211

CHECKING THE TIMING CHAIN TENSIONERS

The following procedure applies to both of the timing chain tensioners.

1. Check:

- timing chain tensioner

Cracks/damage → Replace.

2. Check:

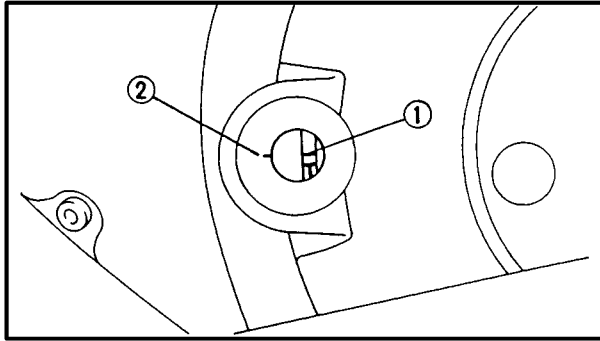
- one-way cam operation

Rough movement → Replace the timing chain tensioner housing.

3. Check:

- cap bolt
- copper washer
- spring
- one-way cam
- gasket
- timing chain tensioner rod

Damage/wear → Replace the defective part(-s).



EAS00218

INSTALLING THE CAMSHAFTS**1. Align:**

- “-” and “I” marks on the generator rotor (with the crankcase edge)



- Turn the crankshaft counterclockwise.
- When piston #1 is at TDC on the compression stroke, align the “-” and “I” marks (1) on the generator rotor with the crankcase edge (2).

CAUTION:

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

NOTE:

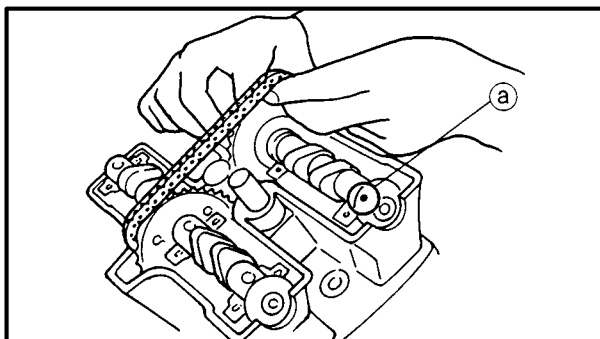
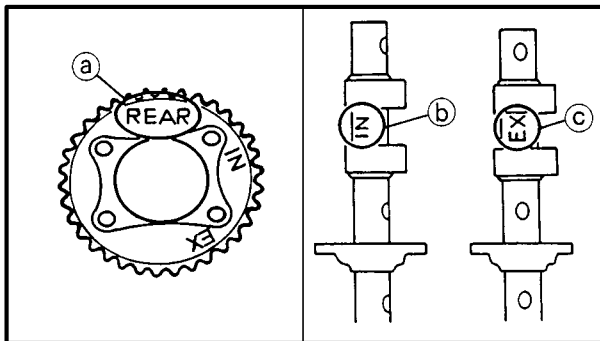
First, install the rear cylinder camshafts, camshaft sprockets, timing chain, and timing chain tensioner. Then, install the front cylinder camshafts and related parts.

**Rear cylinder****1. Install:**

- intake camshaft
- exhaust camshaft

CAUTION:

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



- Install the camshaft sprockets onto the camshafts.

Refer to the camshaft sprocket installation steps below.

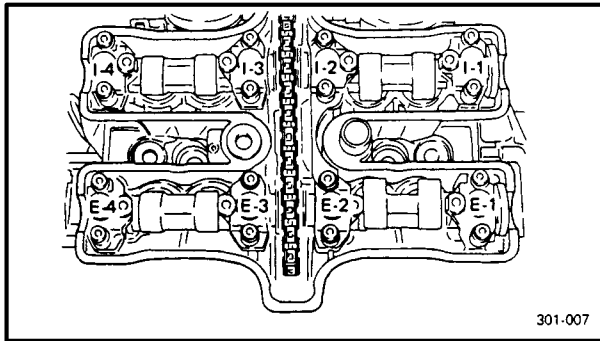
NOTE:

Make sure that the “REAR” marks (a) on the camshaft sprockets face away from the “IN” (b) and “EX” marks (c) on the camshafts.

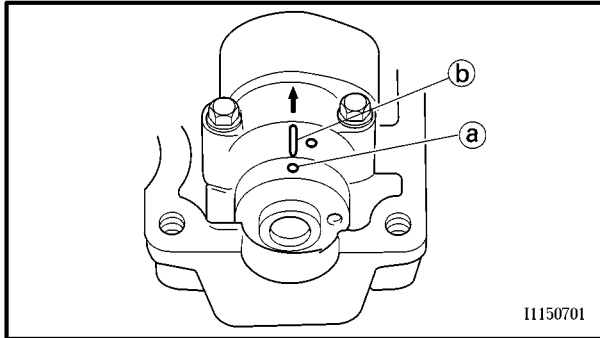
- First, install the exhaust camshaft, then the intake camshaft.

NOTE:

- Be sure to install the camshafts in the correct place as shown.
- “IN” mark = intake camshaft
- “EX” mark = exhaust camshaft.
- Make sure that the timing marks (a) (o: small hole) in the camshaft face up.



301-007



11150701

- Be sure to keep the timing chain as tight as possible on the exhaust side.
- Remove the wire from the timing chain.

CAUTION:

Do not turn the camshaft, as damage could occur to the pistons and valves.

- c. Install intake and exhaust camshaft caps #1, #3, and finally #4.

NOTE:

At this point, do not install intake camshaft cap #2, exhaust camshaft cap #2, and the timing chain guide (top side).

- d. Align the mark ① on the camshaft with the mark ② camshaft cap.

NOTE:

Cylinder #1 is at TDC when the small hole in the camshaft is aligned with the camshaft cap mark.

- e. Apply engine oil onto the threads of the camshaft cap bolts.
f. Tighten the camshaft cap bolts.

NOTE:

- The camshaft caps are numbered from right to left.
- First, tighten intake and exhaust camshaft cap bolts #3, #1, and finally #4.
- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

CAUTION:

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



Camshaft cap bolt
10 Nm (1.0 m•kg, 7.2 ft•lb)

- g. Apply engine oil onto the camshaft bearing surfaces, camshaft lobes, and camshaft journals.

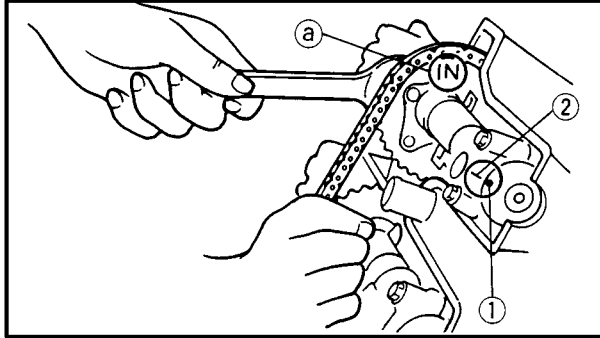
2. Install:

- intake camshaft sprocket
- exhaust camshaft sprocket (onto the camshafts)



CAUTION:

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



- Place the timing chain onto the intake sprocket.
- Install the intake camshaft sprocket with the "REAR" mark facing out, and then finger tighten the camshaft sprocket bolts.

NOTE:

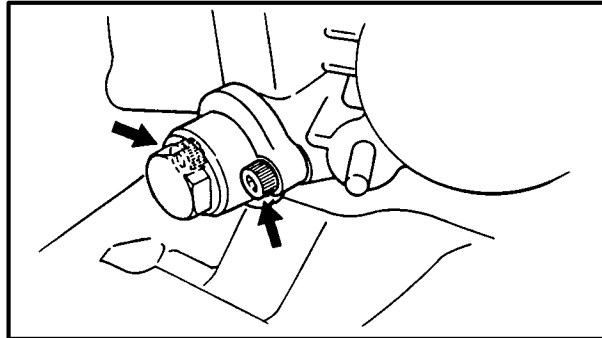
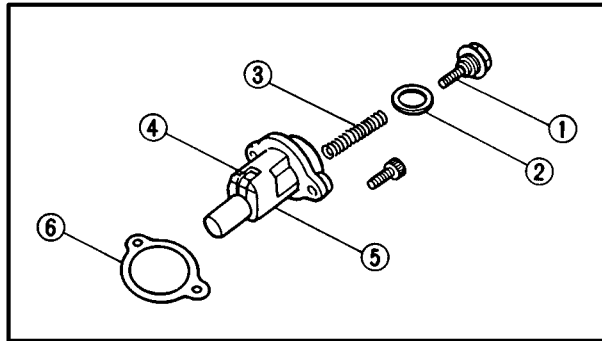
Align the "IN" mark (a) hole in the intake camshaft sprocket with the thread hole in the camshaft.

- c. Turn the intake camshaft so that the camshaft timing mark ① (o: small hole) is aligned with the camshaft cap mark ②.
- d. To remove the timing chain slack, force the intake camshaft counterclockwise.
- e. Place the timing chain onto the exhaust camshaft sprocket.
- f. Install the exhaust camshaft sprocket with the "REAR" mark facing out, and then finger tighten the camshaft sprocket bolts.

NOTE:

Align the “EX” mark hole in the exhaust camshaft sprocket with the thread hole in the camshaft.

- g. Turn the exhaust camshaft so that the mark (o: small hole) on the camshaft is aligned with the mark on the camshaft cap.
- h. To remove the timing chain slack, force the exhaust camshaft clockwise.
- i. Insert your finger into the timing chain tensioner hole and push the timing chain guide (intake side) in.
- j. When pushing the timing chain guide (intake side), make sure that the camshaft cap marks and camshaft timing marks stay aligned.
- k. If the camshaft cap marks and camshaft timing marks are not aligned, change the meshing position of the camshaft sprockets and timing chain.



3. Install:
- timing chain tensioner

- Remove the cap bolt ①, washer ② and spring ③.
- Release the timing chain tensioner one-way cam ④.

- c. Install the timing chain tensioner ⑤ and gasket ⑥ onto the cylinder block.

⚠ WARNING

Always use a new gasket.

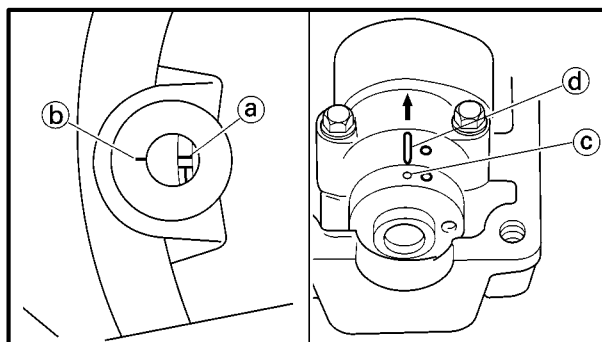


Timing chain tensioner bolt
12 Nm (1.2 m•kg, 8.7 ft•lb)

- d. Install the spring ③, washer ②, and cap bolt ①.



Cap bolt
20 Nm (2.0 m•kg, 140 ft•lb)



4. Turn:
- crankshaft
(several turns counterclockwise)

5. Check:
 - TDC mark (a)
Make sure that the TDC mark on the generator rotor is aligned with the crankcase edge (b).
 - camshaft timing punch mark (c) (o: small hole)
Make sure that the punch marks in the camshafts are aligned with the marks (d) on the camshaft caps.
Out of alignment → Adjust.
Refer to the camshaft installation steps above.

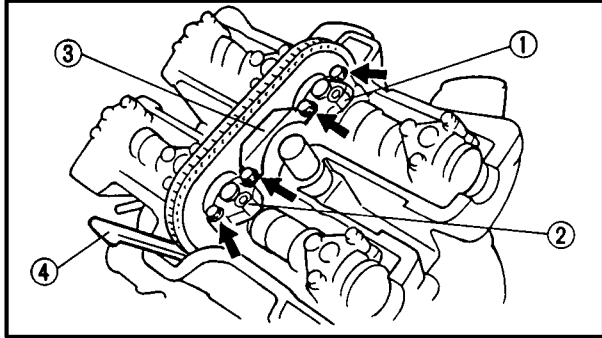


- camshaft sprocket bolts

 **20 Nm (2.0 m•kg, 14 ft•lb)**

CAUTION:

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.



7. Install:
- camshaft caps “I-2” ①
 - camshaft caps “E-2” ②
 - timing chain guide (top side) ③
 - timing chain guide (exhaust side) ④

- timing chain
- camshaft sprockets
- camshafts
- valve pads



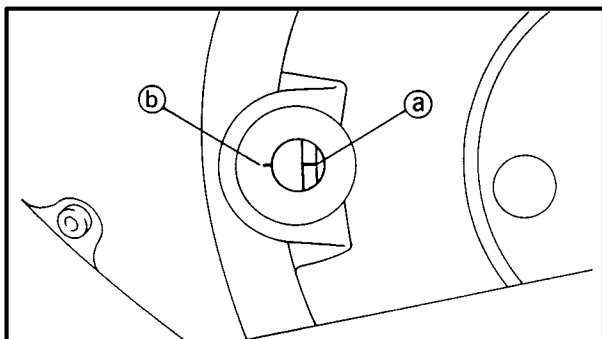
Recommended lubricant
Engine oil

Front cylinder

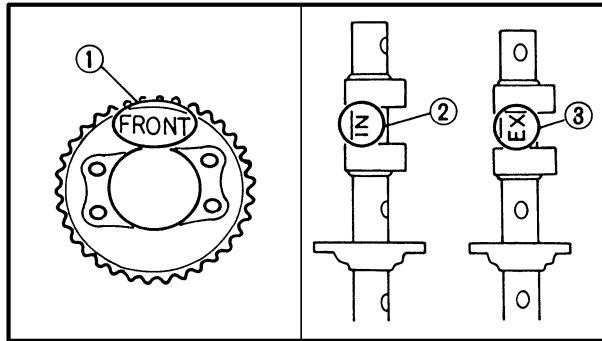
NOTE:

When installing the front cylinder camshafts, repeat the rear cylinder camshaft installation procedure. However, note the following points.

1. Install:
 - exhaust camshaft
 - intake camshaft



- From the “-” and “I” marks, turn the crankshaft counterclockwise 430° (i.e., 360° plus an additional 70°).
- When piston #2 is at TDC on the compression stroke, align the “-” mark (a) with the crankcase edge (b).



c. Install the camshaft sprockets onto the camshafts.

Refer to the camshaft sprocket installation steps below.

NOTE:

Make sure that the “FRONT” marks (1) on the camshaft sprockets face away from the “IN” (2) and “EX” marks (3) on the camshafts.

d. Turn the camshafts by hand so that the camshaft timing marks (o: big hole) face up.



2. Install:

- intake camshaft sprocket
- exhaust camshaft sprocket (onto the camshafts)



For frame serial number

VP04E – 002283 and previous (U49):

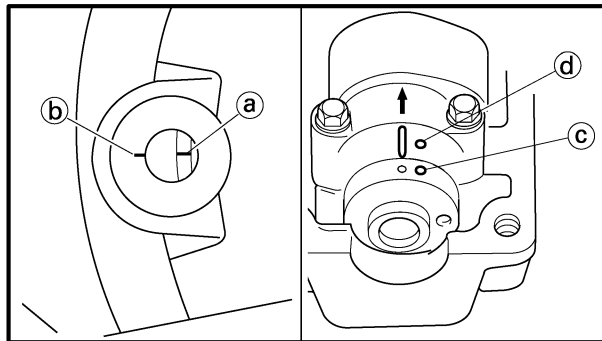
VP04Y – 000208 and previous (CAL):

(Front exhaust camshaft only)

a. Align the “–” mark (a) on the generator rotor with the crankcase edge (b).

b. Install the camshaft sprocket with the “FRONT” mark facing out, and then finger tighten the camshaft sprocket bolts.

c. Turn the intake and exhaust camshafts and align the camshaft timing marks (c: o: big hole) with the camshaft cap alignment mark (d).



For frame serial number

VP04E – 002284 and later (U49):

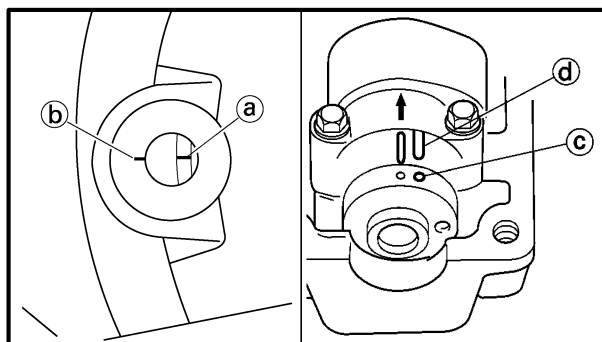
VP04Y – 000209 and later (CAL):

(Front exhaust camshaft only)

a. Align the “–” mark (a) on the generator rotor with the crankcase edge (b).

b. Install the camshaft sprocket with the “FRONT” mark facing out, and then finger tighten the camshaft sprocket bolts.

c. Turn the intake and exhaust camshafts and align the camshaft timing marks (c: o: big hole) with the camshaft cap alignment mark (d).



3. Measure:

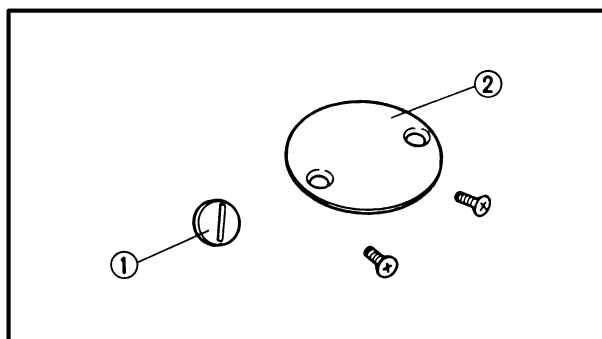
- valve clearance

Out of specification → Adjust.

Refer to “ADJUSTING THE VALVE CLEARANCE” in CHAPTER 3.

4. Install:

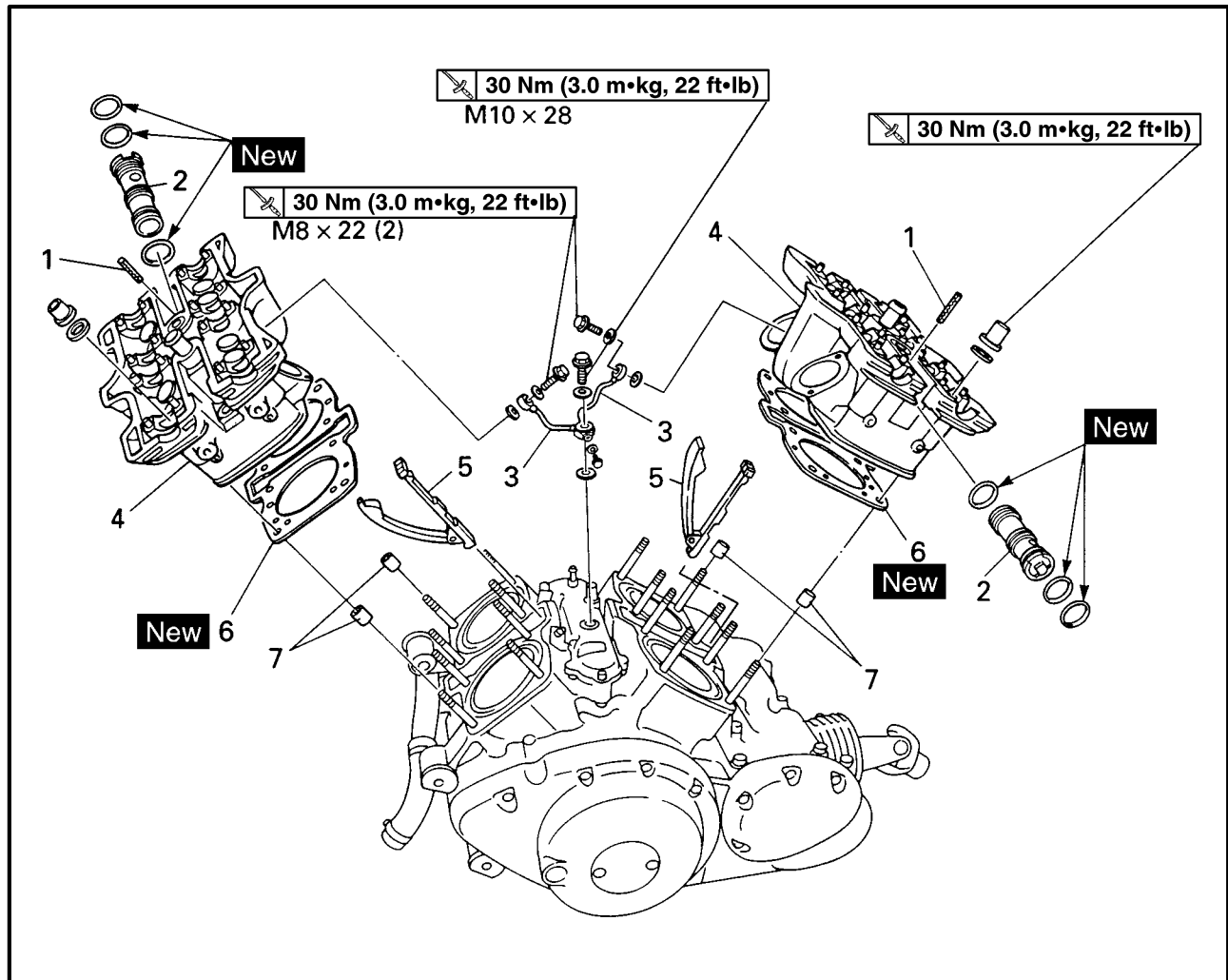
- timing mark accessing screw (1)
- crankshaft end cover (2)



7 Nm (0.7 m•kg, 5.1 ft•lb)



CYLINDER HEADS



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder heads		
	Engine assembly		Remove the parts in the order listed. Refer to "ENGINE REMOVAL".
	Cylinder head covers		
	Camshafts		Refer to "CAMSHAFTS".
1	Lock pins	2	
2	Water jacket joints	2	
3	Oil delivery pipes	2	
4	Cylinder heads	2	
5	Timing chain dampers	2	Refer to "INSTALLING THE CYLINDER HEADS".
6	Gaskets (cylinder heads)	2	
7	Dowel pins	4	For installation, reverse the removal procedure.



EAS00230

CHECKING THE CYLINDER HEADS

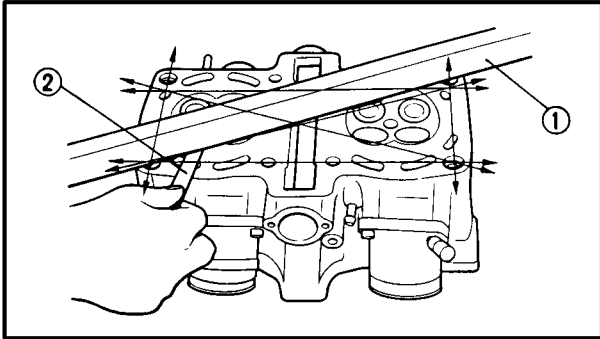
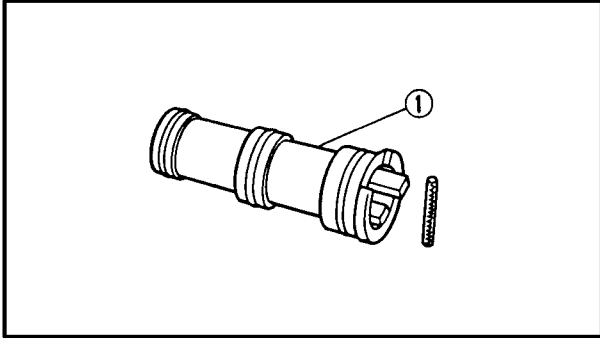
The following procedure applies to all of the cylinder heads.

1. Eliminate:
 - carbon deposits
(from the combustion chambers with a rounded scraper)

NOTE:

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

- spark plug threads
- valve seats

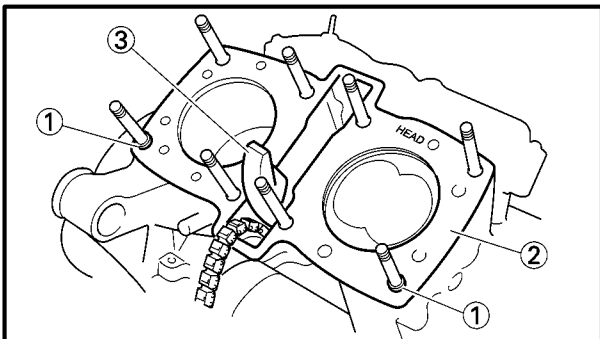


Cylinder head warpage
Less than 0.03 mm (0.0012 in)

- 
- a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
 - b. Measure the warpage.
 - c. If the limit is exceeded, resurface the cylinder head as follows.
 - d. Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

NOTE:

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

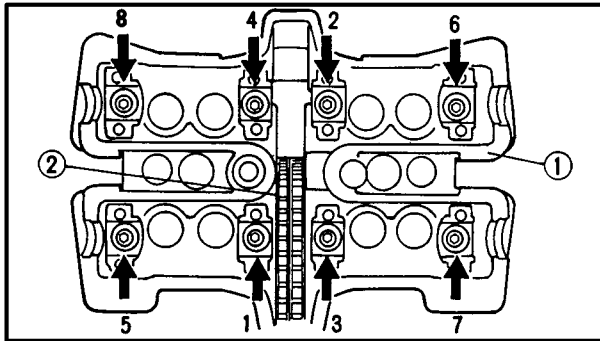


EAS00235

INSTALLING THE CYLINDER HEADS

Rear cylinder

1. Install:
 - dowel pins ①
 - gasket (New) ②
 - timing chain guide (exhaust side) ③



2. Install:

- cylinder head ①

43 Nm (4.3 m•kg, 31 ft•lb)

- washers

NOTE: _____

- To prevent the timing chain ② from falling into the crankcase, fasten it with a wire.
- Tighten the cylinder head nuts and bolts in two stages and in a crisscross pattern.
- Install the timing chain guide (intake side) into the timing chain guide slot in the cylinder head.

Front cylinder

NOTE: _____

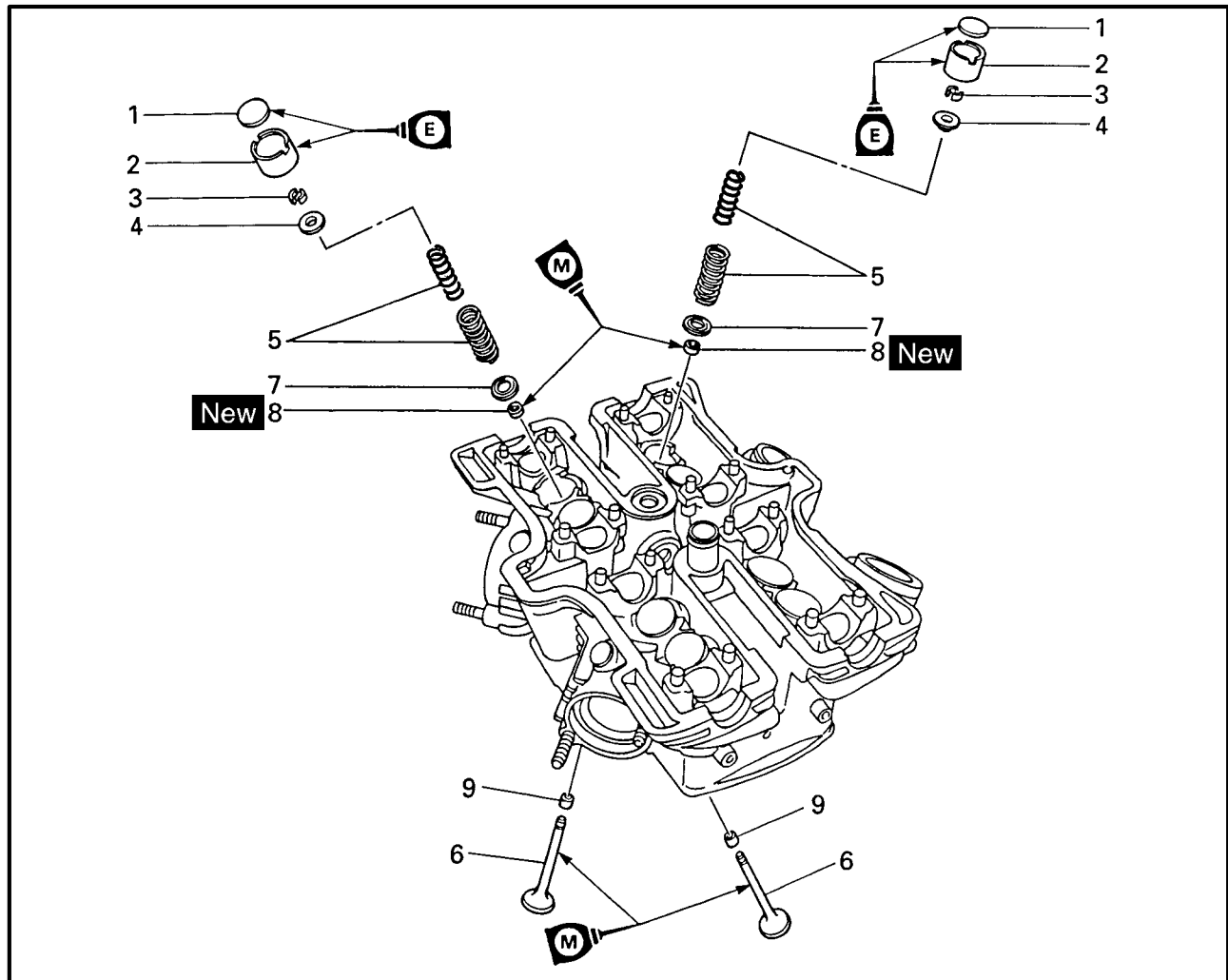
When installing the front cylinder head, repeat the rear cylinder head installation procedure. However, note the following points.

1. Install:

- cylinders nuts



VALVES AND VALVE SPRINGS



Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Engine assembly		Refer to "ENGINE REMOVAL".
	Camshafts		Refer to "CAMSHAFTS".
	Cylinder heads		Refer to "CYLINDER HEADS".
1	Valve pads	16	Refer to "REMOVING/INSTALLING THE VALVES".
2	Valve lifters	16	
3	Valve cotters	32	
4	Valve spring retainers	16	
5	Valve springs (inner/outer)	16/16	
6	Valves (intake/exhaust)	8/8	
7	Valve spring seats	16	
8	Oil seals	16	
9	Valve guides	16	For installation, reverse the removal procedure.



EAS00237

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

NOTE:

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves properly seal.

1. Remove:
 - valve pad ①
 - valve lifter ②

NOTE:

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

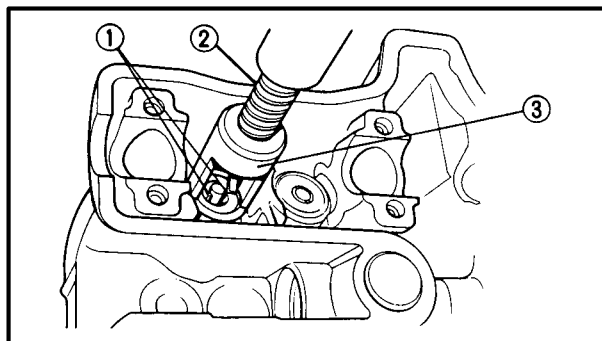
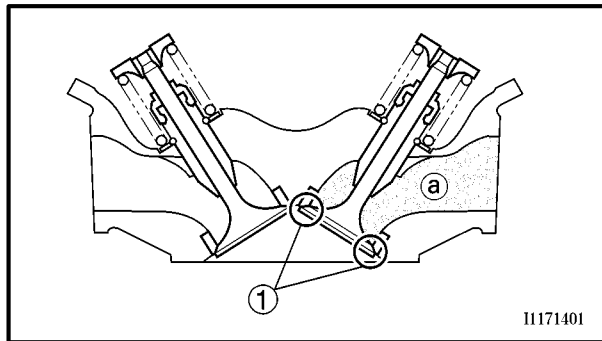
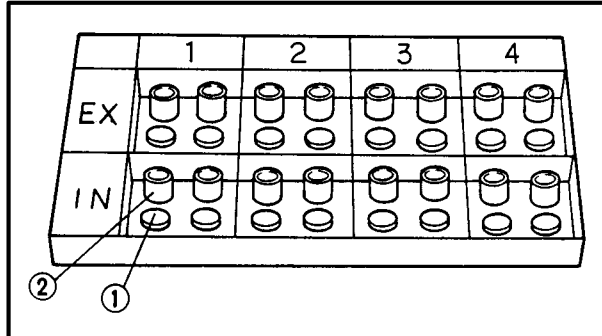
2. Check:
- valve sealing
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
Refer to “CHECKING THE VALVE SEATS”.

- a. Pour a clean solvent ① into the intake and exhaust ports.
- b. Check that the valves properly seal.
There should be no leakage at the valve seat ①.

3. Remove:
- valve cotters ①

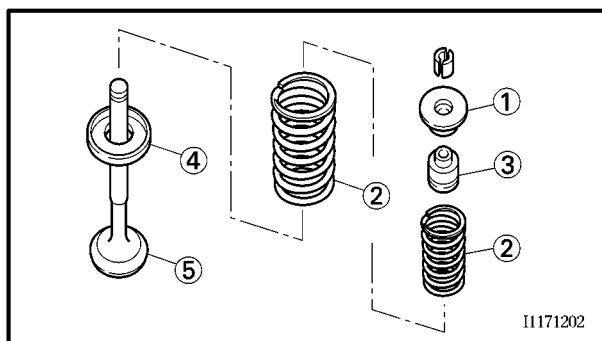
NOTE:

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



Valve spring compressor
YM-04019, 90890-04019

Attachment
YM-01253-1, 90890-04114

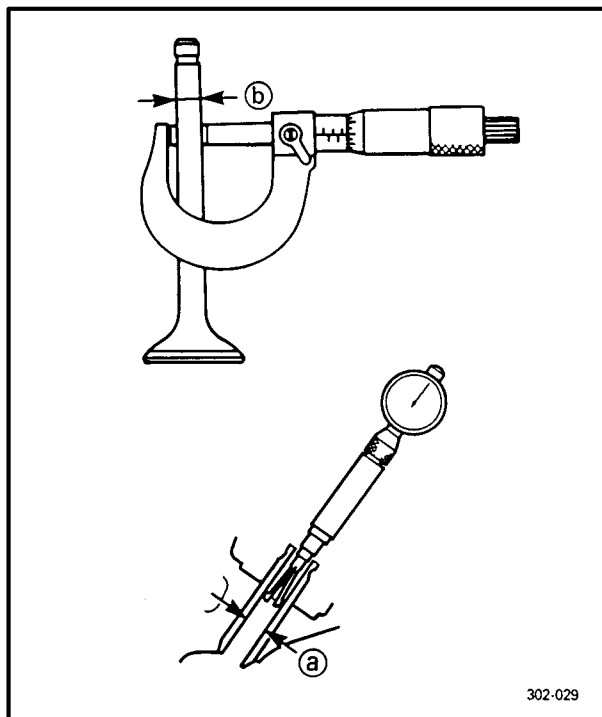


4. Remove:

- upper spring seat ①
- valve springs ②
- oil seal ③
- lower spring seat ④
- valve ⑤

NOTE:

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



EAS00239

CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:

- valve-stem-to-valve-guide clearance

$$\text{Valve-stem-to-valve-guide clearance} = \text{Valve guide inside diameter (a)} - \text{Valve stem diameter (b)}$$

Out of specification → Replace the valve guide.



Valve-stem-to-valve-guide clearance

Intake

0.010 ~ 0.037 mm
(0.0004 ~ 0.0015 in)
Limit: 0.08 mm (0.003 in)

Exhaust

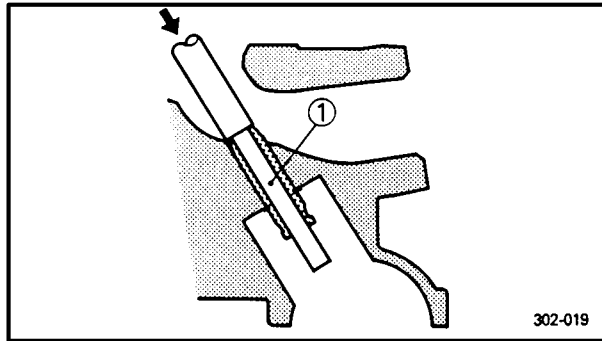
0.025 ~ 0.052 mm
(0.0010 ~ 0.0020 in)
Limit: 0.1 mm (0.004 in)

2. Replace:

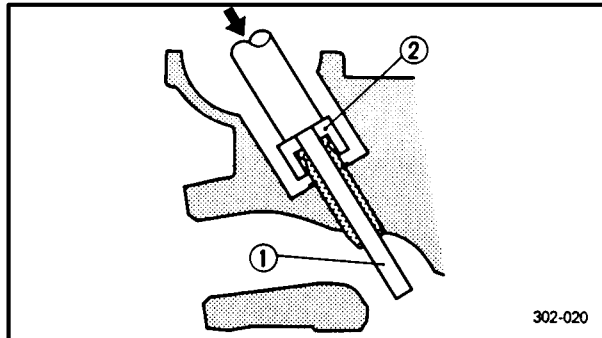
- valve guide

NOTE:

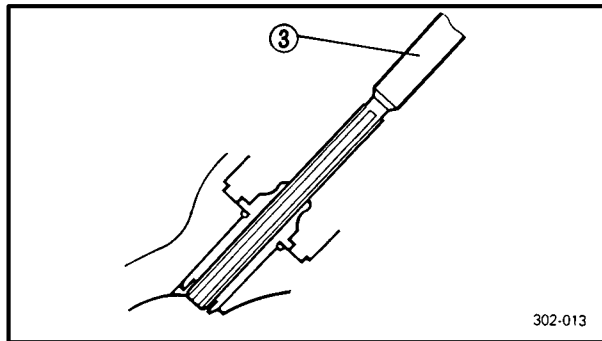
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C (212°F) in an oven.



a. Remove the valve guide with a valve guide remover ①.



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



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

NOTE:

After replacing the valve guide, reface the valve seat.



Valve guide remover (6.0 mm):
YM-4064-A, 90890-04064

Valve guide installer (6.0 mm):
YM-04065-A, 90890-04065

Valve guide reamer (6.0 mm):
YM-04066, 90890-04066

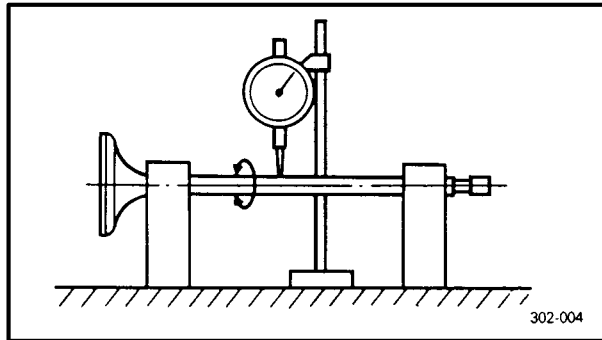
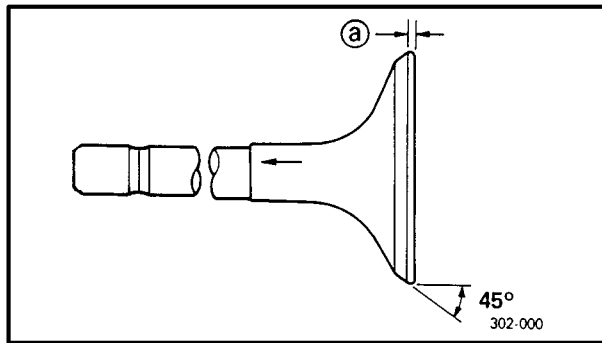
3. Eliminate:

- carbon deposits
(from the valve face and valve seat)

4. Check:

- valve face
Pitting/wear → Grind the valve face.

- valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.



5. Measure:

- valve margin thickness (a)

Out of specification → Replace the valve.



Valve margin thickness

1.15 ~ 1.45 mm

(0.046 ~ 0.058 in)

<Limit>: 0.7 mm (0.028 in)

6. Measure:

- valve stem runout

Out of specification → Replace the valve.

NOTE:

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



Valve stem runout

<Limit>: 0.01 mm (0.0004 in)

EAS00240

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:

- carbon deposits
(from the valve face and valve seat)

2. Check:

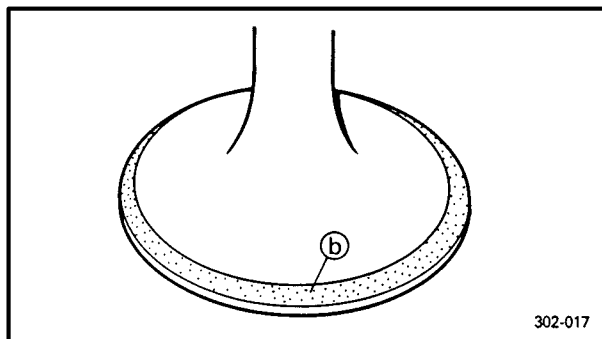
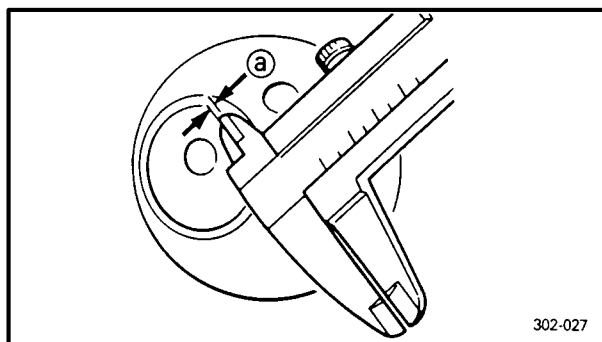
- valve seat

Pitting/wear → Replace the cylinder head.

3. Measure:

- valve seat width (a)

Out of specification → Replace the cylinder head.



Valve seat width

Intake: 0.9 ~ 1.1 mm

(0.035 ~ 0.043 in)

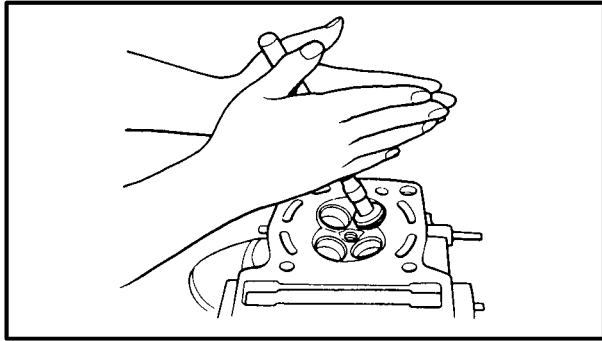
<Limit>: 1.4 mm (0.06 in)

Exhaust: 0.9 ~ 1.1 mm

(0.035 ~ 0.043 in)

<Limit>: 1.4 mm (0.06 in)

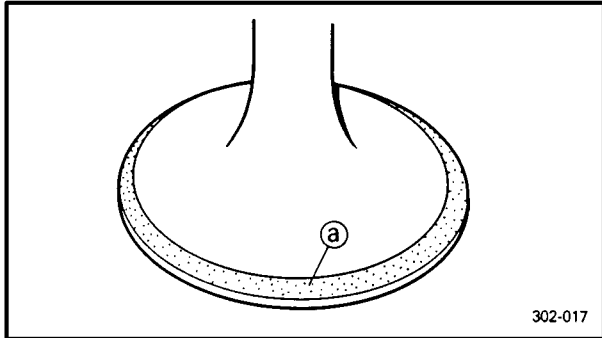
- Apply Mechanic's blueing dye (Dykem)  onto the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Where the valve seat and valve face contacted one another, the blueing will have been removed.



4. Lap:
- valve face
 - valve seat

NOTE:

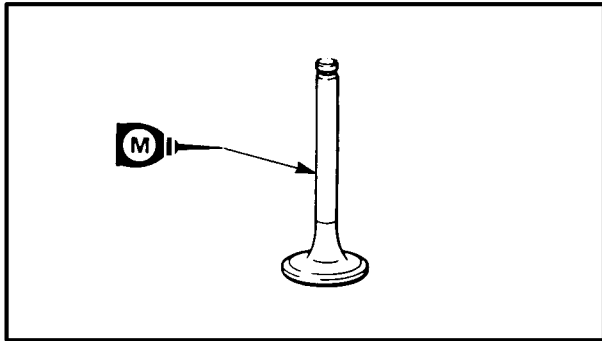
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.



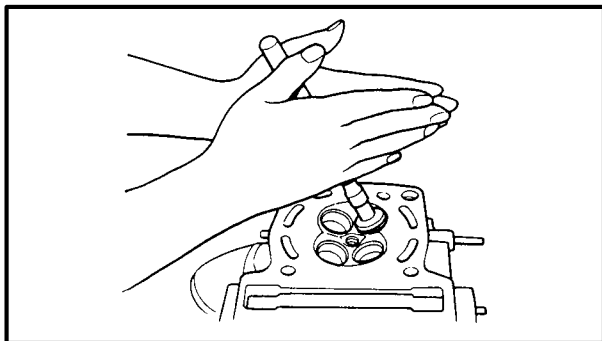
- a. Apply a coarse lapping compound (a) to the valve face.

CAUTION:

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



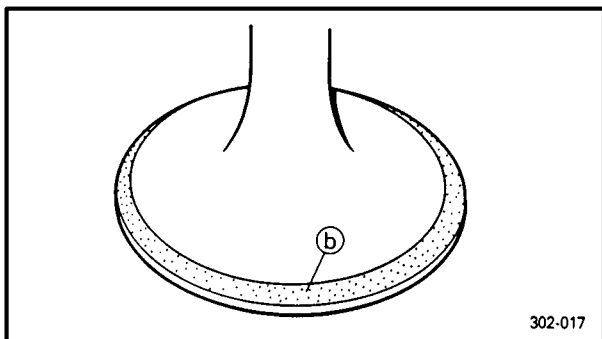
- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.



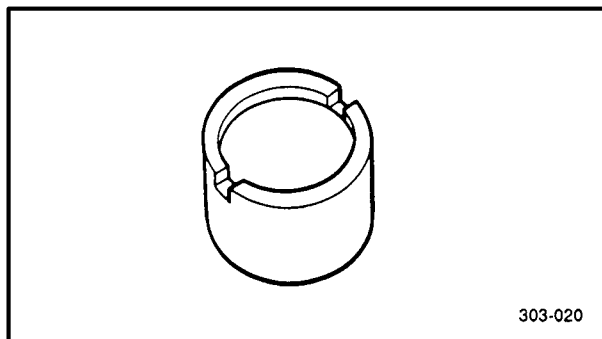
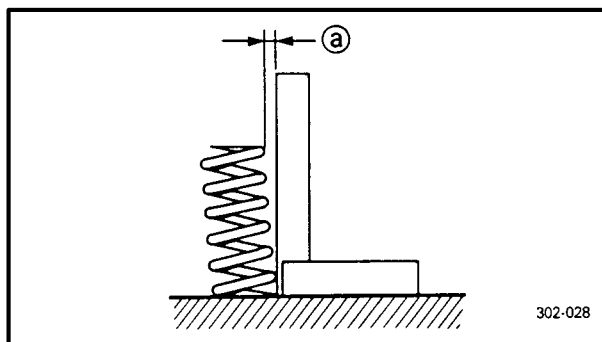
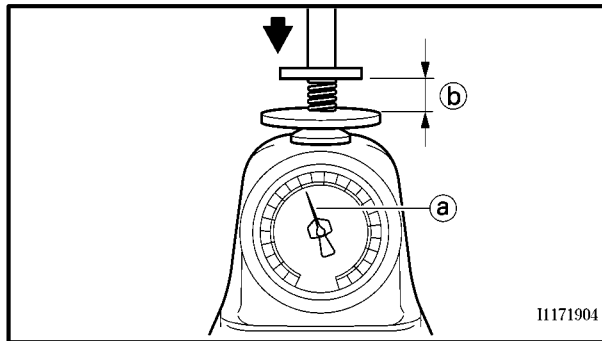
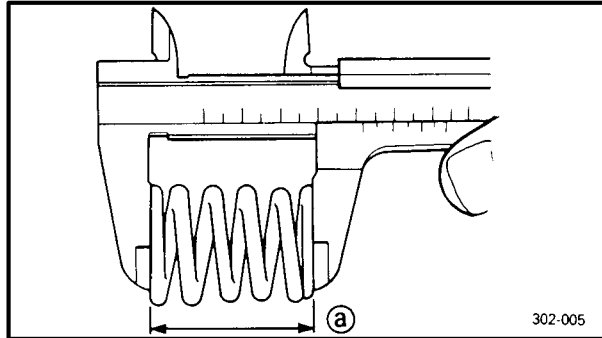
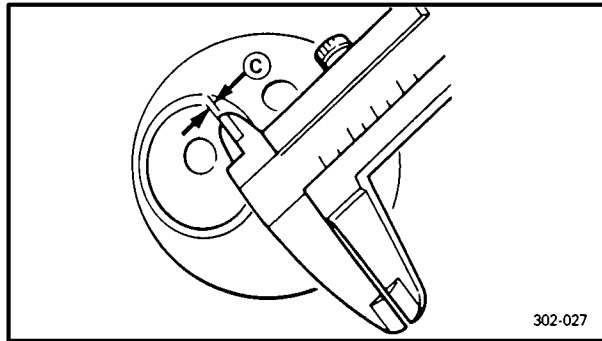
- d. Turn the valve unit the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

NOTE:

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



- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) ② onto the valve face.
- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.



- j. Measure the valve seat width ③ again. If the valve seat width is out of specification, reface and lap the valve seat.

▲▲▲

EAS00241

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:

- valve spring free length (a)

Out of specification → Replace the valve spring.



Valve spring free length

inner (IN, EX) 37.3 mm (1.47 in)

<Limit>: 35.3 mm (1.39 in)

**outer (IN, EX) 39.45 mm
(1.55 in)**

<Limit>: 37.25 mm (1.47 in)

- ## 2. Measure:

- compressed spring force (a)

Out of specification → Replace the valve spring.

② Installed length



**Compressed spring force
(installed)**

**inner (IN, EX) 4.57 ~ 5.37 kg
(10.08 ~ 11.84 lb)**

**outer (IN, EX) 10.1 ~ 11.9 kg
(22.27 ~ 26.24 lb)**

- ### 3. Measure:

- valve spring tilt (a)

Out of specification → Replace the valve spring.



Spring tilt limit

inner (IN, EX) 2.5 /1.6 mm

outer (IN, EX) 2.5 /1.7 mm

EAS00242

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:

- valve lifter

Damage/scratches → Replace the valve lifters and cylinder head.



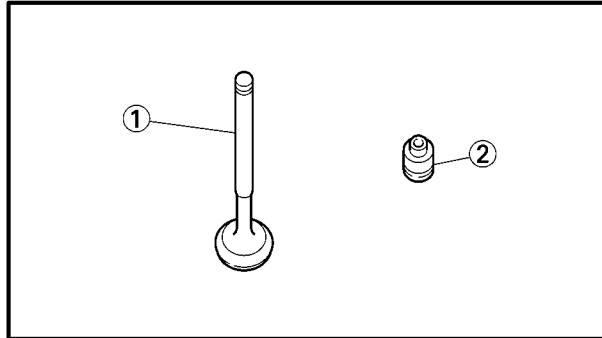
EAS00245

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:

- valve stem end
(with an oil stone)

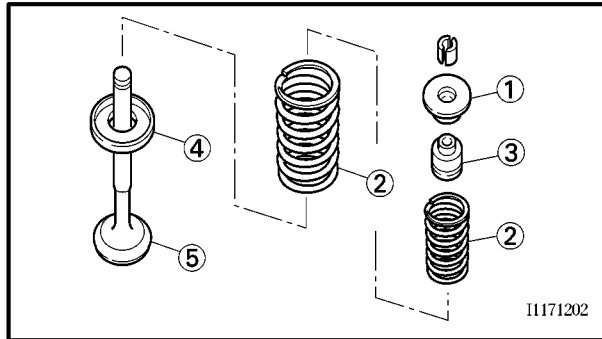


2. Lubricate:

- valve stem ①
- oil seal ② **New**
(with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide oil



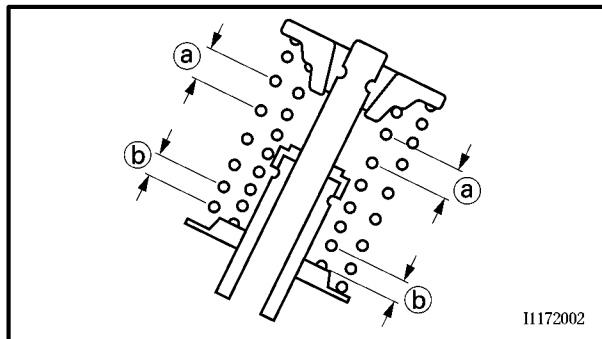
3. Install:

- valve ①
- lower spring seat ②
- oil seal ③ **New**
- valve spring ④
- upper spring seat ⑤
(into the cylinder head)

NOTE:

Install the valve spring with the larger pitch (a) facing up.

(b) Smaller pitch

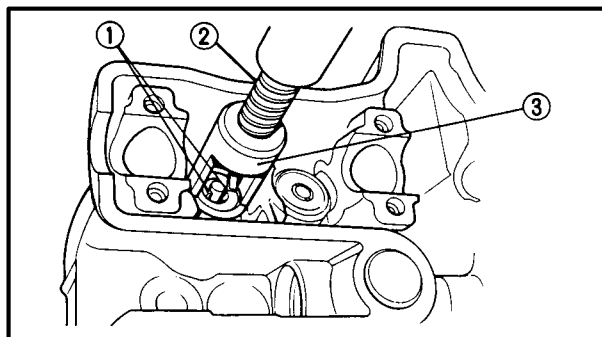


4. Install:

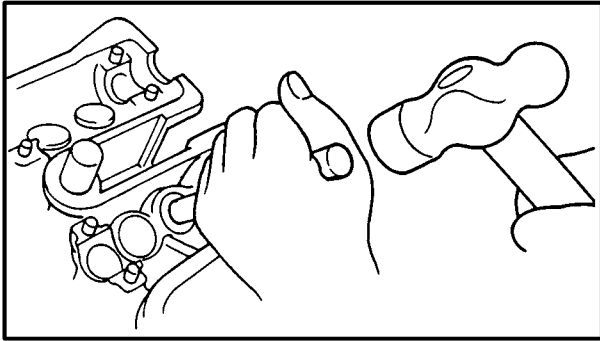
- valve cotters ①

NOTE:

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



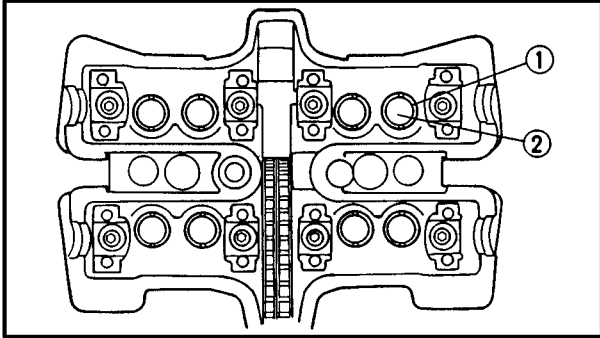
Valve spring compressor
YM-04019, 90890-04019
Attachment
YM-01253-1, 90890-04114



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

CAUTION:

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



6. Install:

- valve lifter ①
- valve pad ②

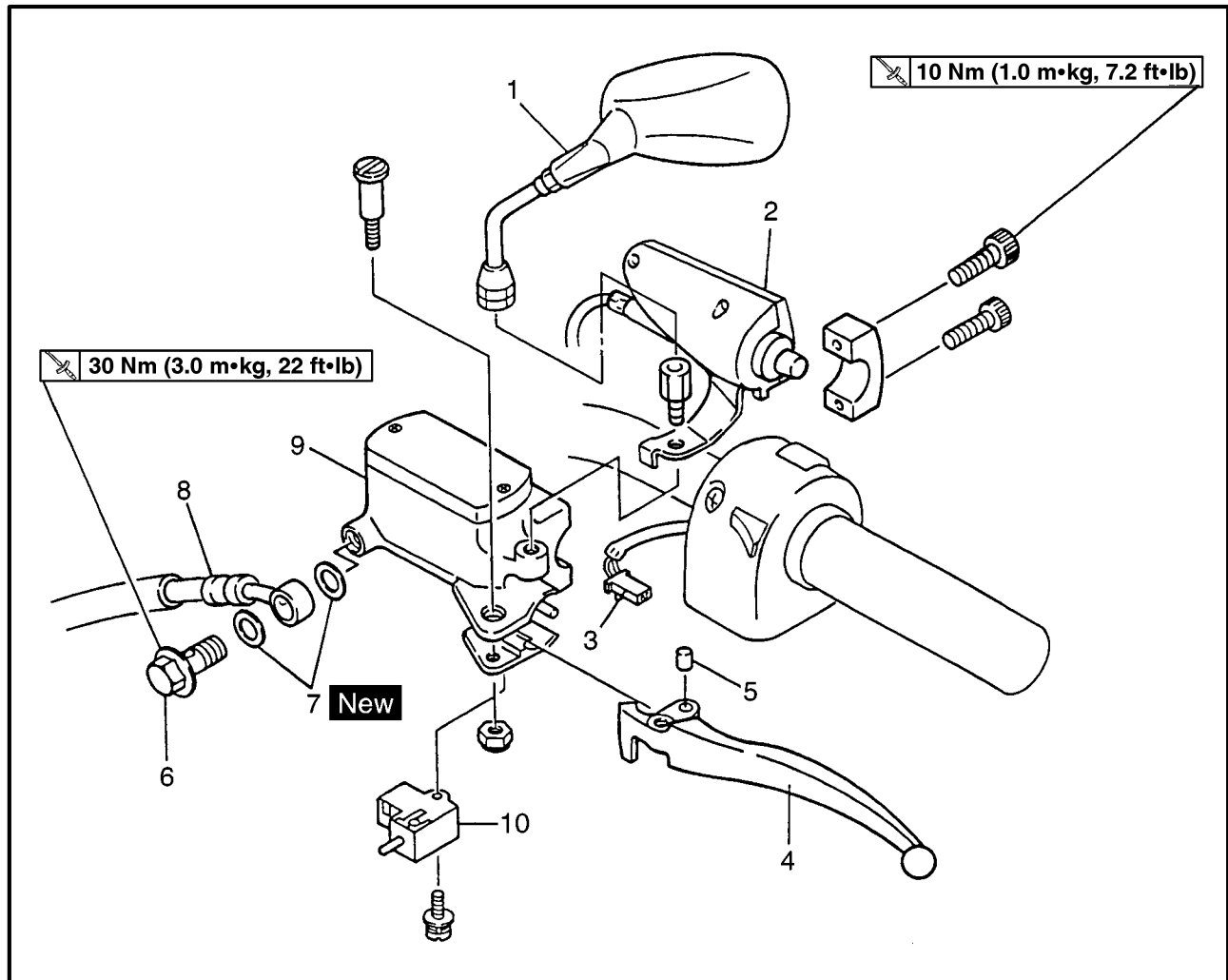
NOTE:

- Apply molybdenum disulfide oil onto the valve lifter and valve pad.
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

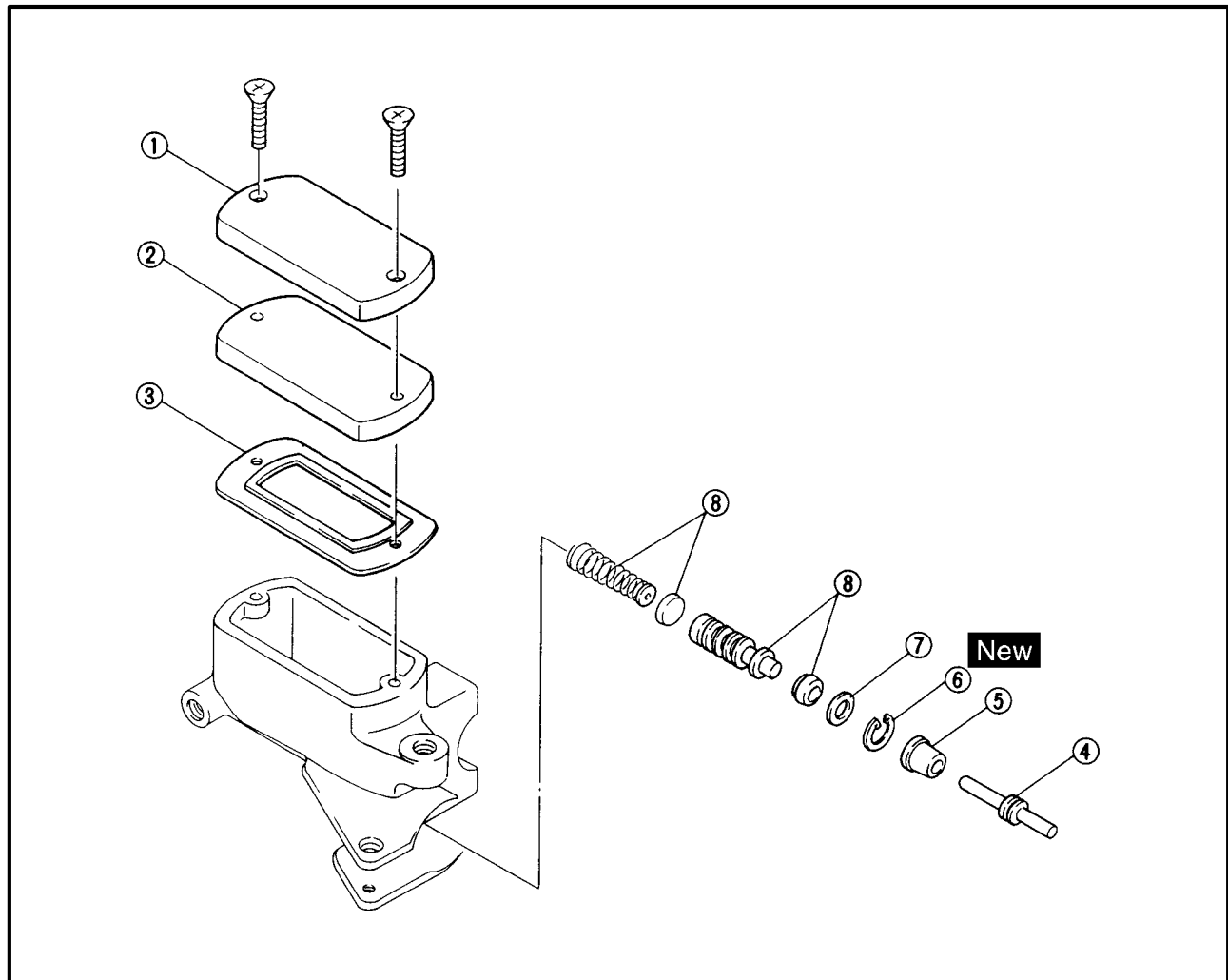


CLUTCH

CLUTCH MASTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the clutch master cylinder		Remove the parts in the order listed. NOTE: Before removing the master cylinder, drain the clutch fluid from the entire clutch system.
1	Rear view mirror	1	Disconnect
2	Front remote controller	1	
3	Coupler (clutch switch)	1	
4	Clutch lever	1	
5	Holder (push rod)	1	
6	Union bolt	1	Refer to "INSTALLING THE CLUTCH MASTER CYLINDER".
7	Copper washers	2	
8	Clutch hose	1	
9	Master cylinder	1	
10	Clutch switch	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the clutch master cylinder		Disassemble the parts in the order listed.
①	Master cylinder cap	1	
②	Holder (diaphragm)	1	
③	Diaphragm	1	
④	Push rod	1	
⑤	Dust boot	1	
⑥	Circlip	1	
⑦	Washer	1	
⑧	Master cylinder kit	1	
			For assembly, reverse the disassembly procedure.



EAS00307

CAUTION:

Clutch components rarely require disassembly.

Therefore, always follow these preventive measures:

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

First aid for clutch fluid entering the eyes:

- Flush with water for 15 minutes and get immediate medical attention.

EAS00308

CHECKING THE CLUTCH MASTER CYLINDER

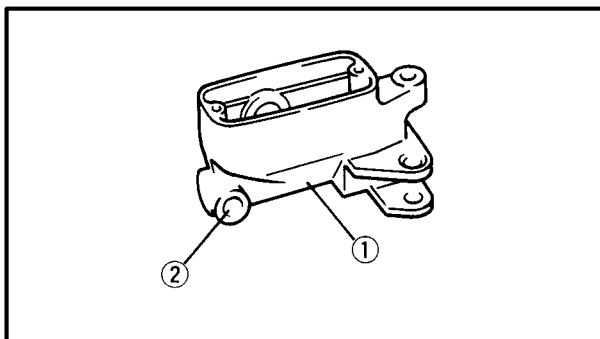
Recommended clutch component replacement schedule	
Piston seals	Every two years
Clutch hose	Every four years
Clutch fluid	Every two years and whenever the clutch is disassembled

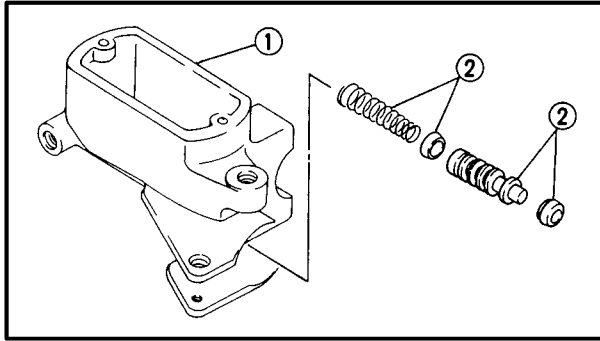
1. Check:

- clutch master cylinder body ①
Cracks/damage → Replace the clutch master cylinder.
- clutch fluid delivery passage ②
(clutch master cylinder body)
Obstruction → Blow out with compressed air.

⚠ WARNING

Whenever a clutch master cylinder is disassembled, replace the piston seals.





2. Check:

- clutch master cylinder ①
- clutch master cylinder kit ②

Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.

- clutch hose

Cracks/damage/wear → Replace.

EAS00309

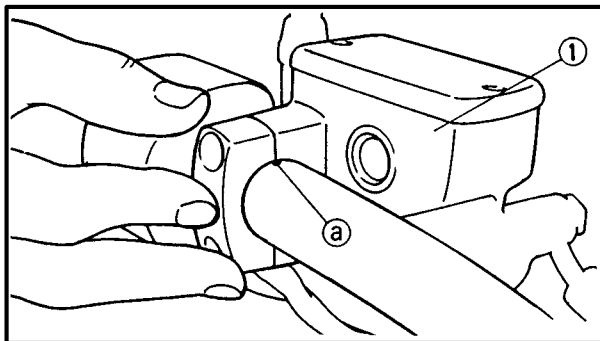
ASSEMBLING THE CLUTCH MASTER CYLINDER

⚠ WARNING

- Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.
- Never use solvents on internal clutch components as they will cause the piston seals to swell and distort.
- Whenever a clutch master cylinder is disassembled, replace the piston seals.



Recommended clutch fluid
Brake fluid DOT 4



EAS00310

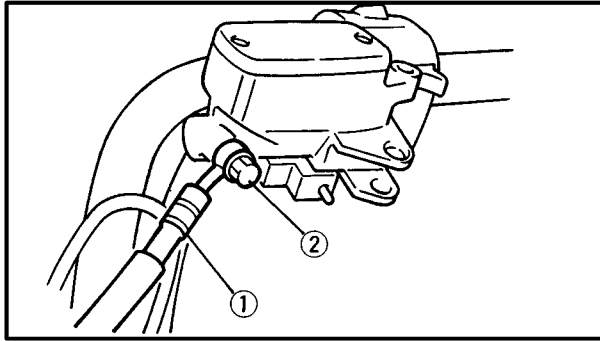
INSTALLING THE CLUTCH MASTER CYLINDER

1. Install:

- clutch master cylinder ①

⚠ WARNING

- Install the clutch lever holder with the “UP” mark facing up.
- Align the end of the clutch lever holder with the punch mark (a) in the handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:

- copper washers (New)
- clutch hose ①
- union bolt ②

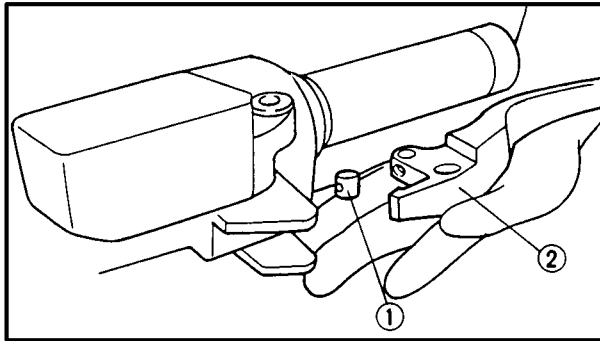
30 Nm (3.0 m•kg, 22 ft•lb)

⚠ WARNING

Proper clutch hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

NOTE:

While holding the clutch hose, tighten the union bolt.



3. Install:

- clutch push rod holder ①
- clutch lever ②

NOTE:

Lubricate the clutch lever pivot bolt with lithium soap base grease.

4. Fill:

- clutch master cylinder reservoir
(with the specified amount of the recommended clutch fluid)



Recommended clutch fluid
Brake fluid DOT 4

⚠ WARNING

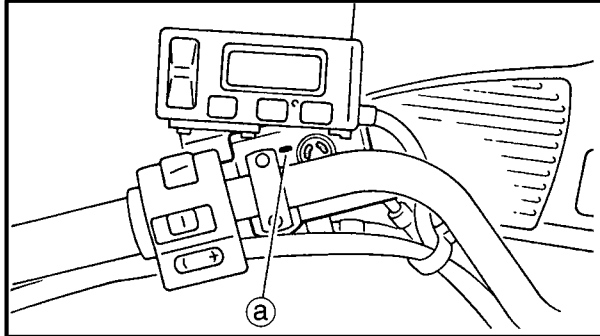
- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor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

**CAUTION:**

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE:

In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.



5. Bleed:

- clutch system

Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in CHAPTER 3.

6. Check:

- clutch fluid level

Below the minimum level mark (a) → Add the recommended clutch fluid to the proper level. Refer to “CHECKING THE CLUTCH FLUID LEVEL” in CHAPTER 3.

7. Check:

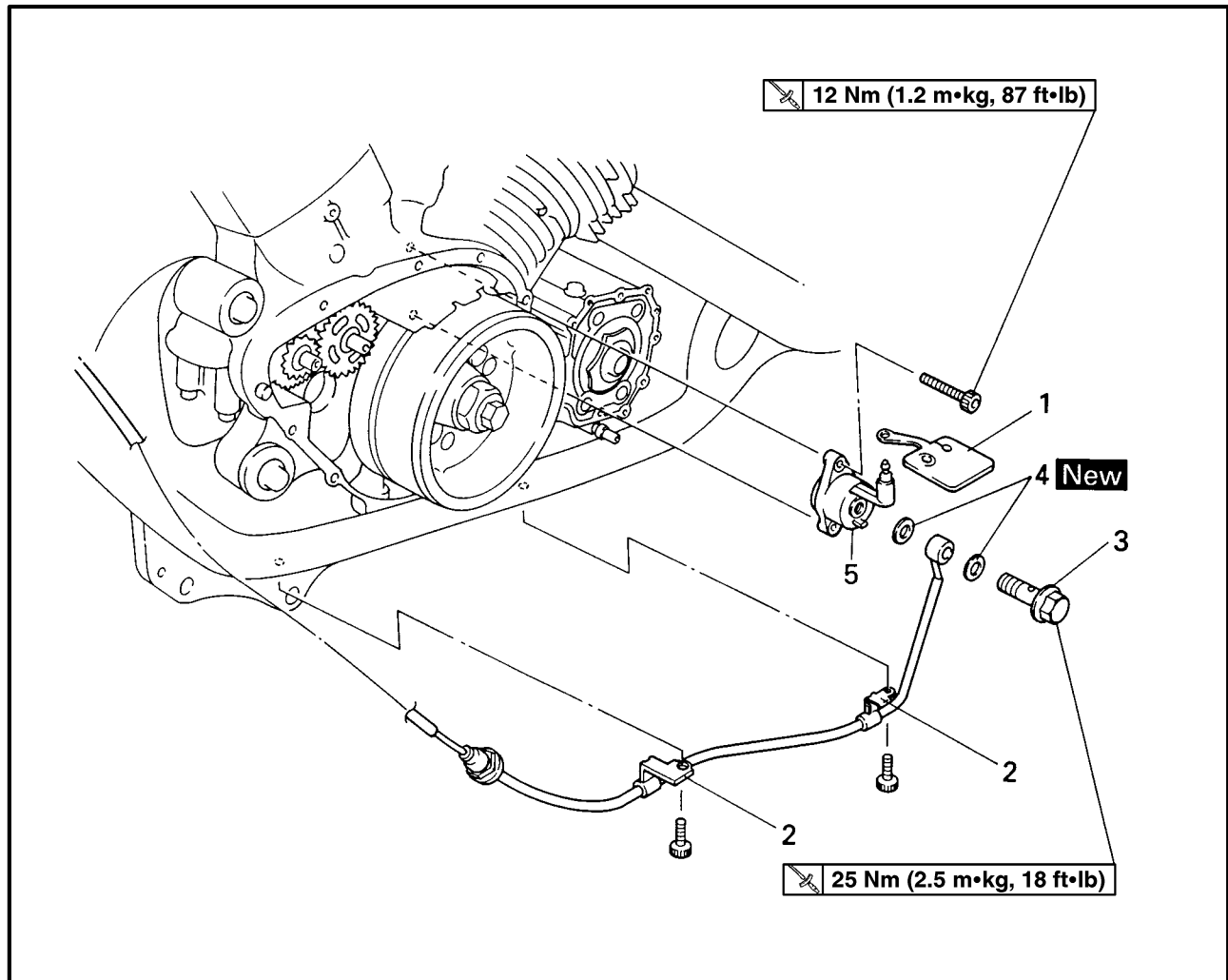
- clutch lever operation

Soft spongy feeling → Bleed the clutch system.

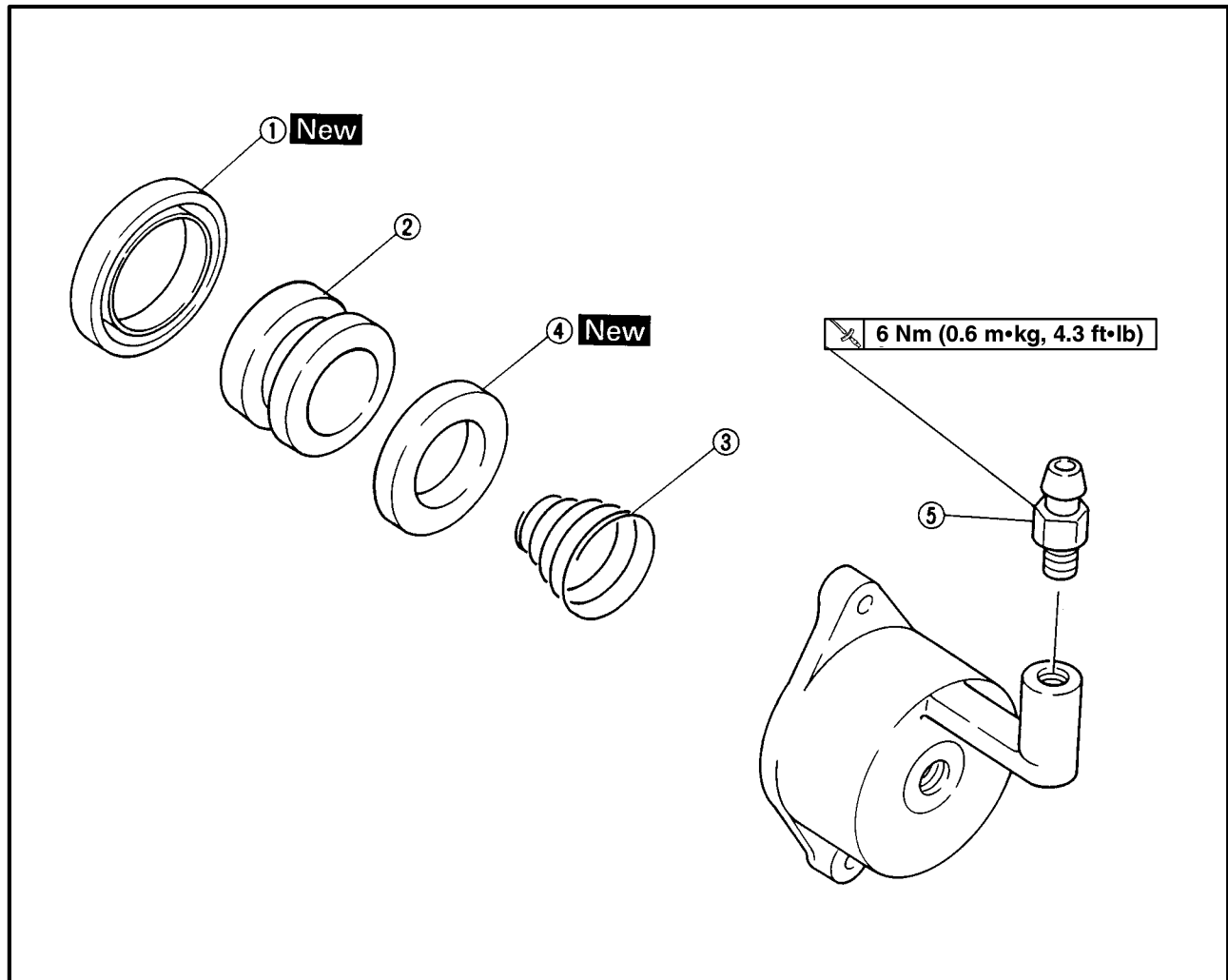
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in CHAPTER 3.



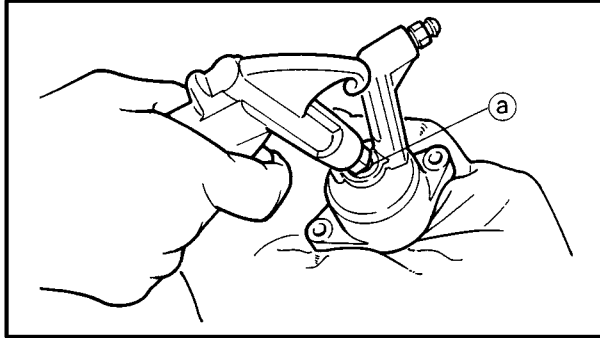
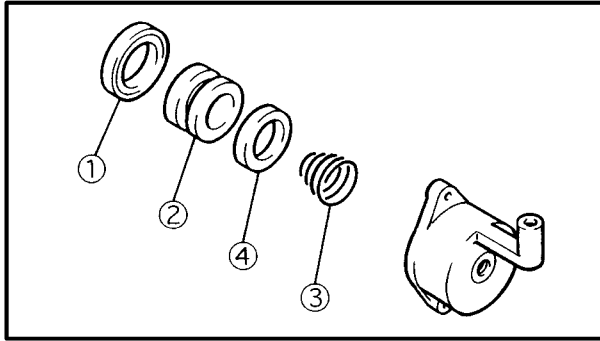
CLUTCH RELEASE CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the clutch release cylinder		Remove the parts in the order listed. NOTE: Before removing the clutch release cylinder or the master cylinder, drain the clutch fluid from the entire clutch system.
	Engine oil		Refer to "CHANGING THE ENGINE OIL" in CHAPTER 3.
	Middle gear case cover, shift pedal assembly, crankcase cover (left side)		Refer to "STARTER CLUTCH AND GENERATOR".
1	Rubber cover	1	Refer to "INSTALLING THE CLUTCH RELEASE CYLINDER".
2	Clutch pipe clamps	2	
3	Union bolt	1	
4	Copper washers	2	
5	Clutch release cylinder	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
①	Disassembling the clutch release cylinder	1	Disassemble the parts in the order listed.
②	Oil seal	1	Refer to "DISASSEMBLING THE CLUTCH RELEASE CYLINDER".
③	Piston (release cylinder)	1	
④	Spring	1	
⑤	Piston seal	1	CAUTION: _____ Never attempt to pry out the piston.
⑤	Air bleed screw	1	
			For assembly, reverse the disassembly procedure.



EAS00313

DISASSEMBLING THE CLUTCH RELEASE CYLINDER

1. Remove:

- oil seal ①
- clutch release cylinder piston ②
- spring ③
- piston seal ④

a. Blow compressed air into the clutch hose joint opening ② to force out the piston from the clutch release cylinder.

⚠ WARNING

- **Cover the clutch release cylinder with a rag. Be careful not to get injured when the piston is expelled from the clutch release cylinder.**
- **Never try to pry out the clutch release cylinder piston.**

b. Remove the clutch release cylinder piston seals.

EAS00314

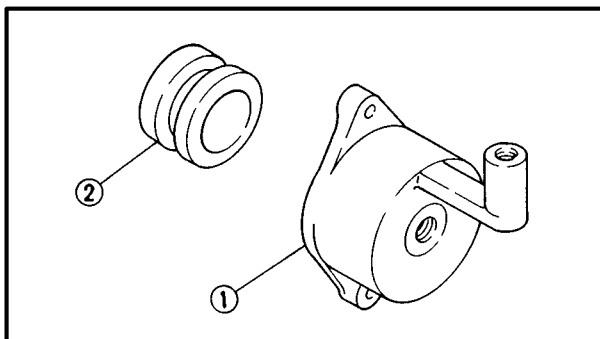
CHECKING THE CLUTCH RELEASE CYLINDER

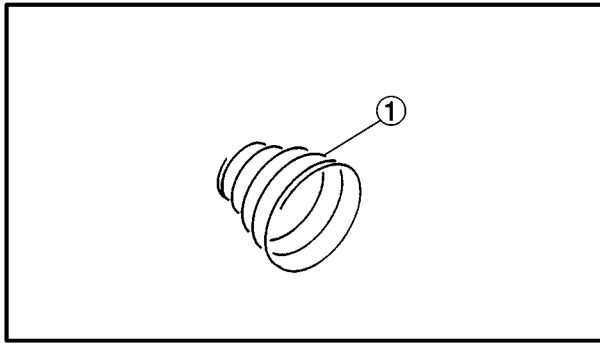
Recommended clutch component replacement schedule	
Piston seals	Every two years
Clutch hose	Every two years
Clutch fluid	Every two years and whenever the clutch is disassembled.

2. Check:

- clutch release cylinder ①
- clutch release cylinder piston ②

Rust/scratches/wear → Replace the clutch release cylinder and clutch release cylinder piston as a set.





3. Check:

- spring ①

Wear/rust → Replace the clutch release cylinder assembly.

ASSEMBLING THE CLUTCH RELEASE CYLINDER

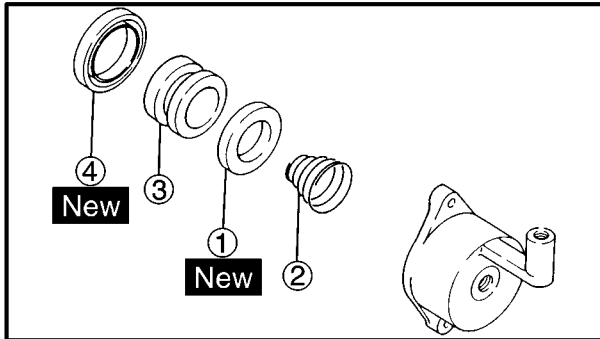
⚠ WARNING

- All internal parts should be cleaned in new fluid only.
- During installation internal parts should be lubricated with new fluid.



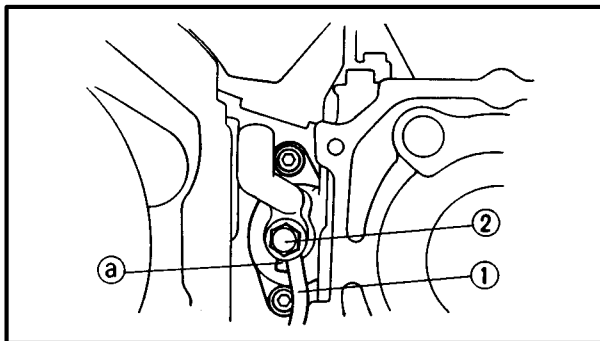
Recommended brake fluid:
DOT #4

- Replace the piston seal and oil seal whenever the clutch release and master cylinder are disassembled.



1. Install:

- piston seal ① **New**
- spring ②
- piston (release cylinder) ③
- oil seal ④ **New**



EAS00315

INSTALLING THE CLUTCH RELEASE CYLINDER

1. Install:

- copper washers (New)
- clutch hose ①
- union bolt ②

25 Nm (2.5 m•kg, 18 ft•lb)

⚠ WARNING

Proper clutch hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".

CAUTION:

When installing the clutch hose onto the clutch release cylinder, make sure that the pipe touches the projection ①.



2. Fill:

- clutch master cylinder reservoir
(with the specified amount of the recommended clutch fluid)



Recommended clutch fluid
Brake fluid DOT 4

⚠ WARNING

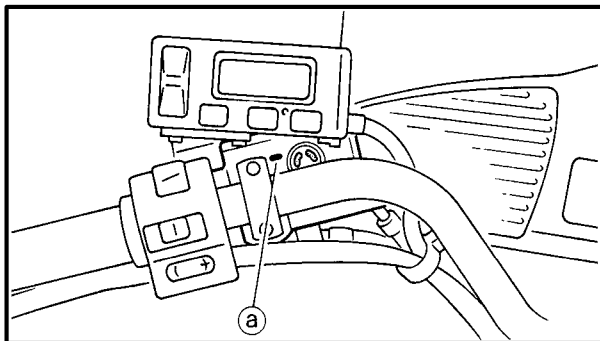
- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor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

CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE:

In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.



3. Bleed:

- clutch system
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in CHAPTER 3.

4. Check:

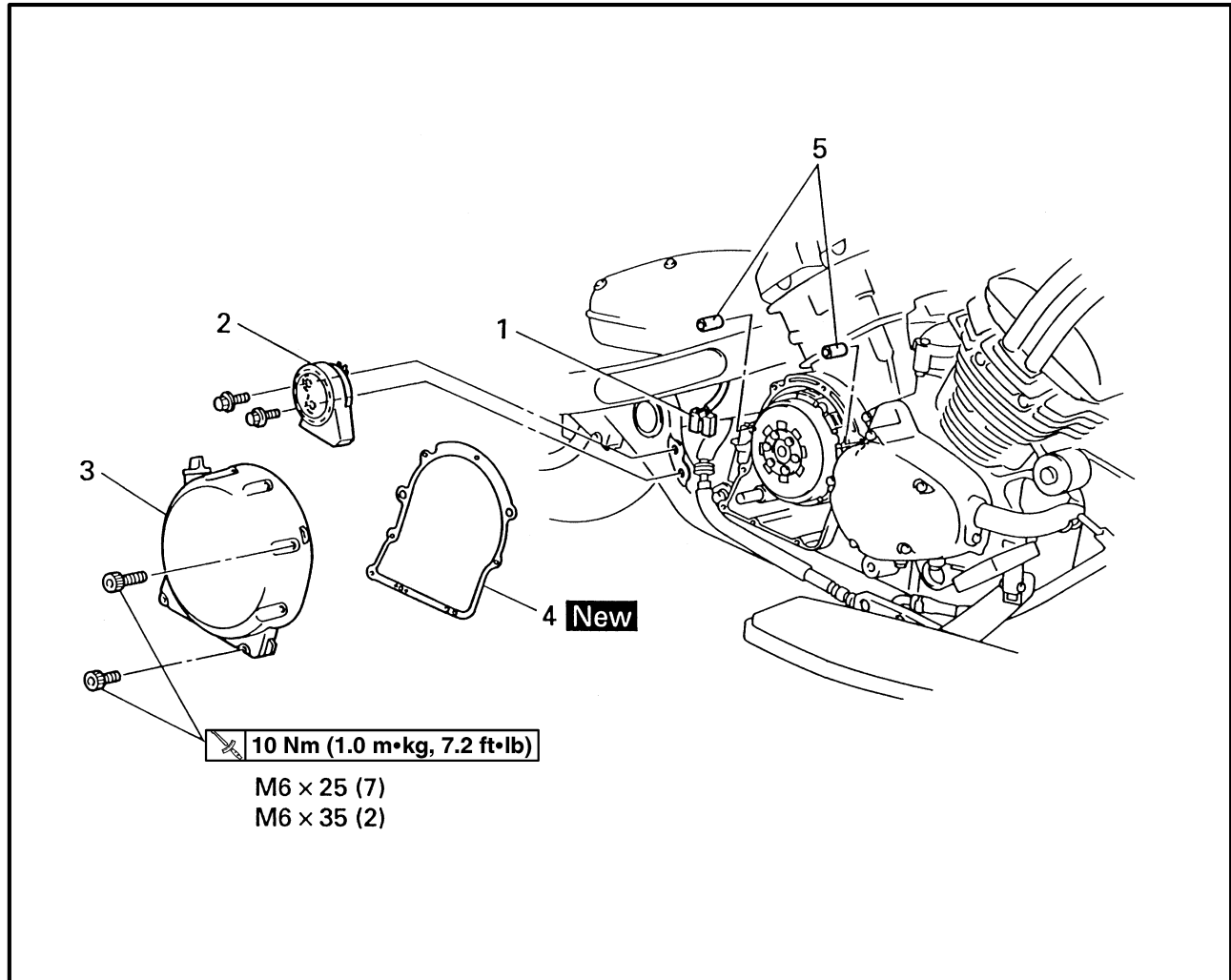
- clutch fluid level
Below the minimum level mark (a) → Add the recommended clutch fluid to the proper level.
Refer to “CHECKING THE CLUTCH FLUID LEVEL” in CHAPTER 3.

5. Check:

- clutch lever operation
Soft or spongy feeling → Bleed the clutch system.
Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in CHAPTER 3.



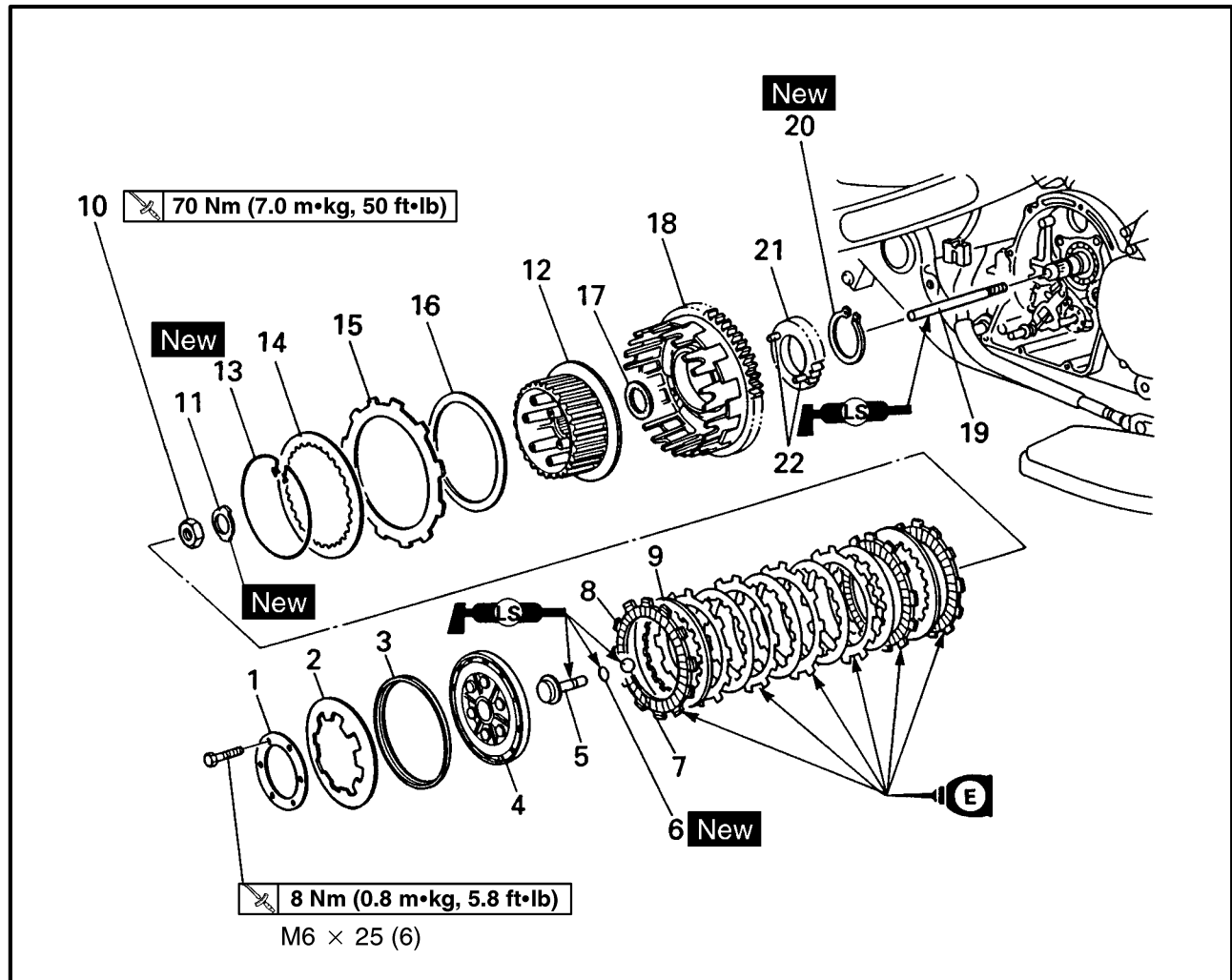
CLUTCH COVER



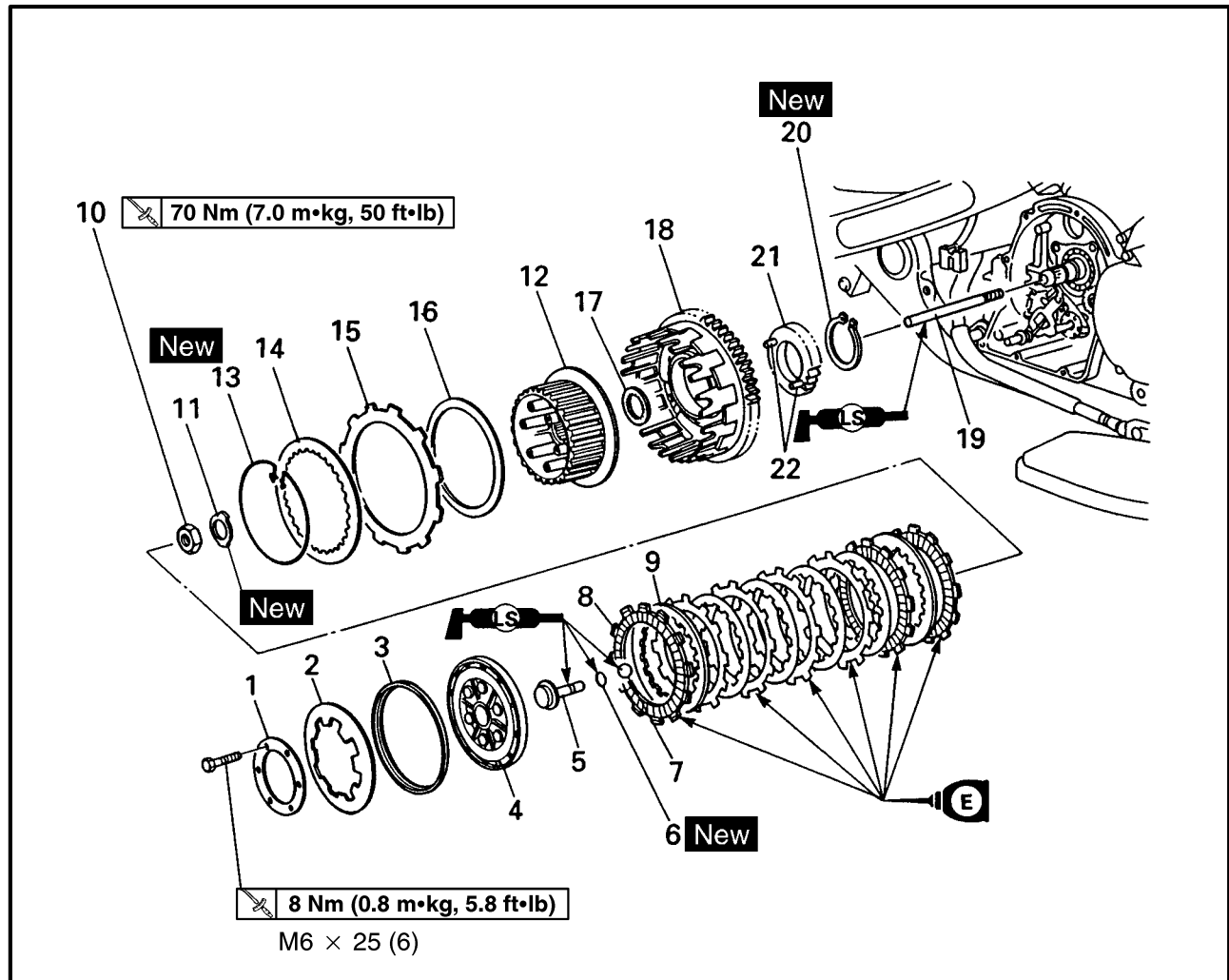
Order	Job/Part	Q'ty	Remarks
	Removing the clutch cover		Remove the parts in the order listed. Stand the motorcycle on a level surface
			⚠ WARNING
			Securely support the motorcycle so there is no danger of it falling over.
	Engine oil		Refer to "CHANGING THE ENGINE OIL" in CHAPTER 3.
	Muffler assembly (right side), exhaust pipe (#4 cylinder)		Refer to "ENGINE REMOVAL".
1	Horn leads	2	Disconnect
2	Horn	1	
3	Crankcase cover (right side)	1	Refer to "INSTALLING THE CLUTCH".
4	Gasket	1	
5	Dowel pins	2	
			For installation, reverse the removal procedure.



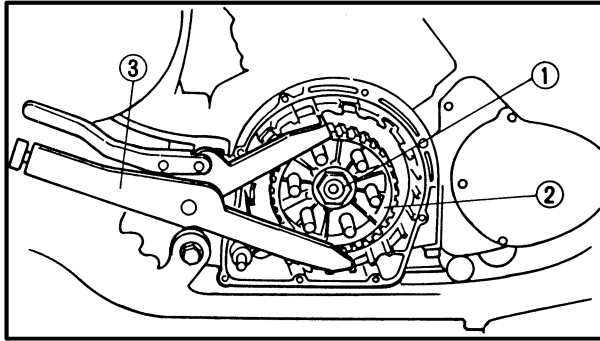
CLUTCH



Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Clutch spring plate	1	
2	Clutch spring	1	
3	Clutch spring seat	1	
4	Pressure plate	1	
5	Push rod #2	1	Refer to "INSTALLING THE CLUTCH".
6	O-ring	1	
7	Ball	1	
8	Friction plates	7	
9	Clutch plates	6	Refer to "REMOVING/INSTALLING THE CLUTCH".
10	Nut	1	
11	Lock washer	1	
12	Clutch boss	1	
13	Retaining wire	1	Refer to "INSTALLING THE CLUTCH".
14	Clutch plate	1	



Order	Job/Part	Q'ty	Remarks
15	Friction plate	1	Refer to "INSTALLING THE CLUTCH".
16	Spring plate	1	
17	Washer	1	
18	Clutch housing	1	
19	Push rod #1	1	
20	Circlip	1	
21	Oil pump drive gear	1	
22	Dowel pins	2	For installation, reverse the removal procedure.



EAS00275

REMOVING THE CLUTCH

1. Straighten the lock washer tab.
2. Loosen:
 - clutch boss nut ①

NOTE:

While holding the clutch boss ② with the universal clutch holder ③, loosen the clutch boss nut.



Universal clutch holder
YM-91042, 90890-04086

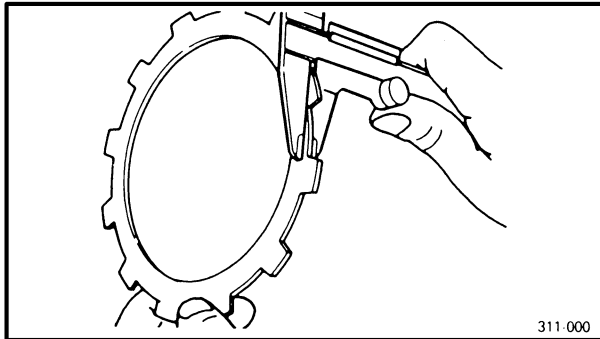
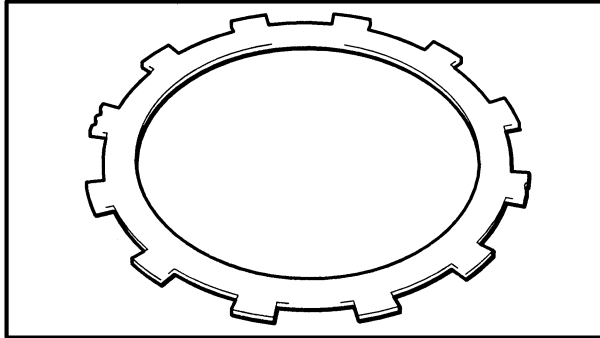
EAS00280

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:
 - friction plate

Damage/wear → Replace the friction plates as a set.



311-000

2. Measure:

- friction plate thickness
- Out of specification → Replace the friction plates as a set.

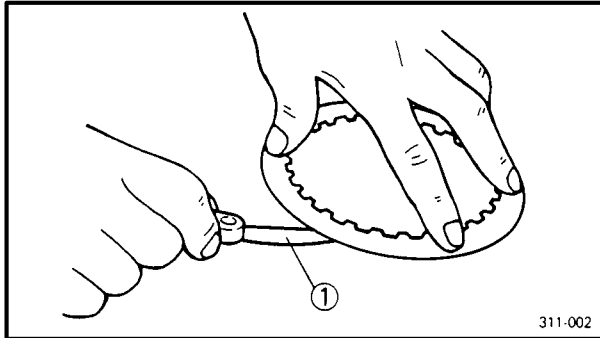
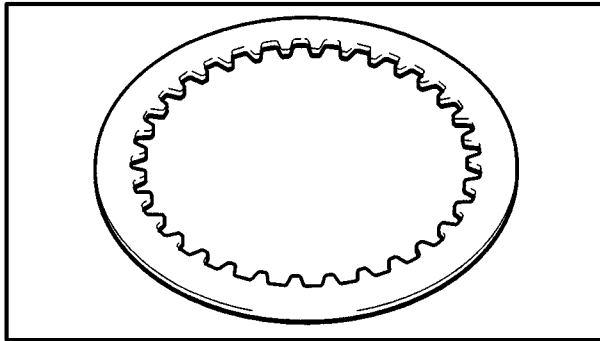
NOTE:

Measure the friction plate at four places.

**Friction plate thickness**

2.9 ~ 3.1 mm (0.114 ~ 0.122 in)

<Limit>: 2.8 mm (0.11 in)



311-002

EAS00281

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:

- clutch plate

Damage → Replace the clutch plates as a set.

2. Measure:

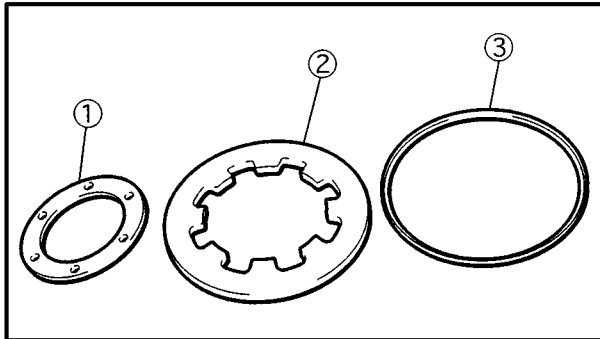
- clutch plate warpage

(with a surface plate and thickness gauge ①)

Out of specification → Replace the clutch plates as a set.



Clutch plate warpage limit
Less than 0.2 mm (0.008 in)



EAS00283

CHECKING THE CLUTCH SPRING PLATE

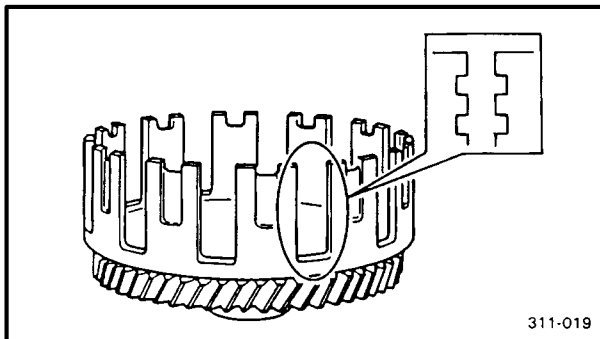
1. Check:

- clutch spring plate ①.

Damage → Replace.

- clutch spring ②.

- clutch spring plate seat ③



311-019

EAS00284

CHECKING THE CLUTCH HOUSING

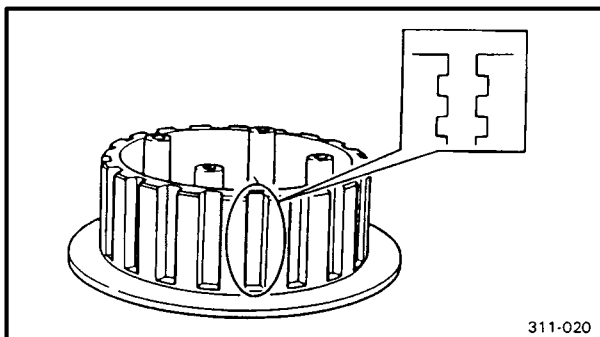
1. Check:

- clutch housing dogs

Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE:

Pitting on the clutch housing dogs will cause erratic clutch operation.



311-020

EAS00285

CHECKING THE CLUTCH BOSS

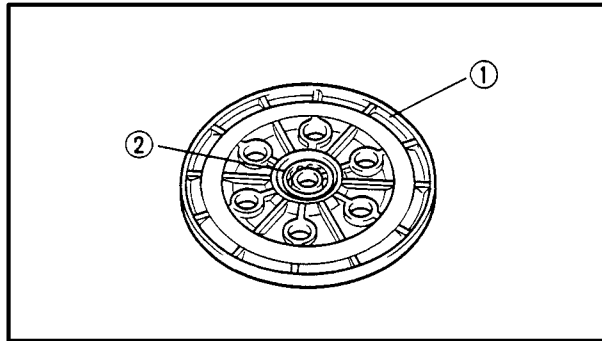
1. Check:

- clutch boss splines

Damage/pitting/wear → Replace the clutch boss.

NOTE:

Pitting on the clutch boss splines will cause erratic clutch operation.

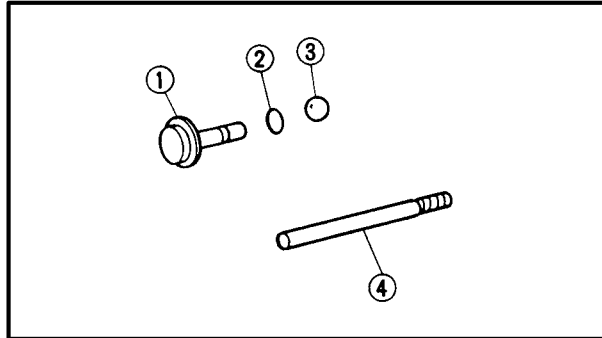


EAS00286

CHECKING THE PRESSURE PLATE

1. Check:

- pressure plate ①
Cracks/damage → Replace.
- bearing ②
Damage/wear → Replace.

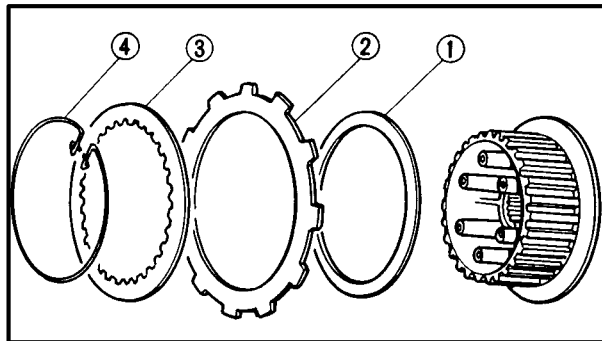


EAS00288

CHECKING THE CLUTCH PUSH RODS

1. Check:

- short clutch push rod ①
- O-ring ②
- ball ③
- long clutch push rod ④
Cracks/damage/wear → Replace the defective part(-s).



EAS00300

INSTALLING THE CLUTCH

1. Install:

- clutch spring plate ①
- friction plate ②
- clutch plate ③
- wire circlip (New) ④

NOTE:

Install the clutch spring plate with the “OUT-SIDE” mark facing towards the clutch cover.

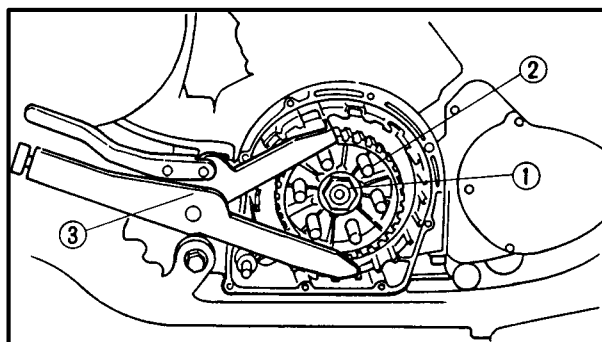
2. Tighten:

- clutch boss nut ①

70 Nm (7.0 m•kg, 50 ft•lb)

NOTE:

While holding the clutch boss ② with the universal clutch holder ③, tighten the clutch boss nut.



Universal clutch holder
YM-91042, 90890-04086

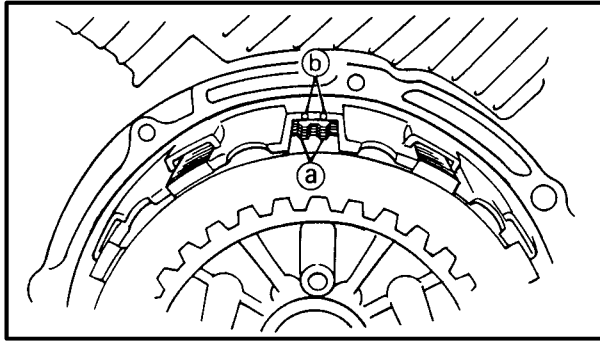
3. Bend the lock washer tab along a flat side of the nut.

4. Lubricate:

- friction plates
- clutch plates
(with the recommended lubricant)



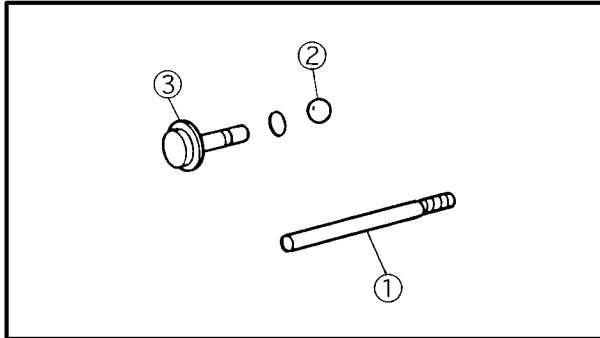
Recommended lubricant
Engine oil



5. Install:
- friction plates
 - clutch plates

NOTE:

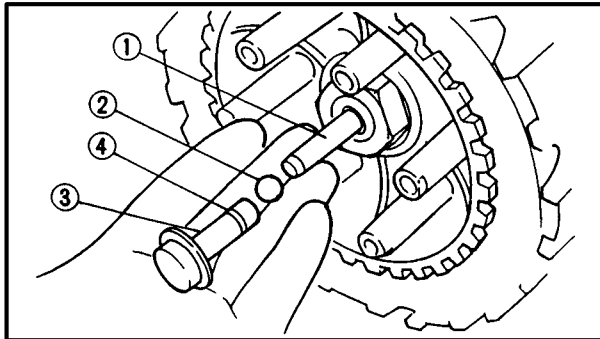
- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Align the two slots (a) in the friction plates with the two punch marks (b) in the clutch housing.



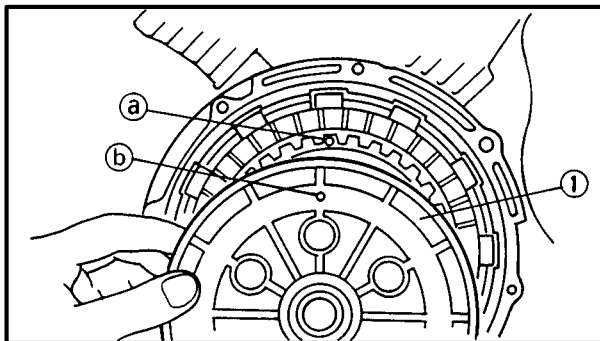
6. Lubricate:
- long clutch push rod (1)
 - ball (2)
 - short clutch push rod (3)
(with the recommended lubricant)



Recommended lubricant
Lithium soap base grease



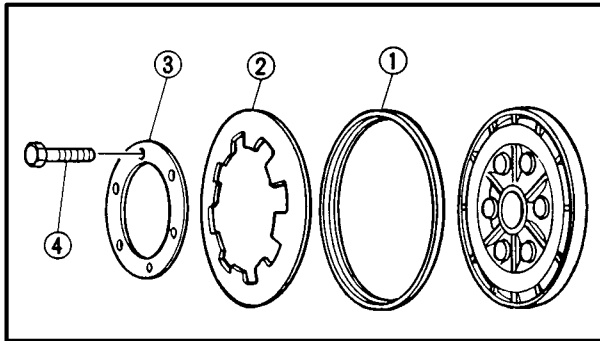
7. Install:
- long clutch push rod (1)
 - ball (2)
 - short clutch push rod (3)
(along with a new O-ring (4))



8. Install:
- pressure plate (1)

NOTE:

Align the punch mark (a) in the clutch boss with the punch mark (b) in the pressure plate.



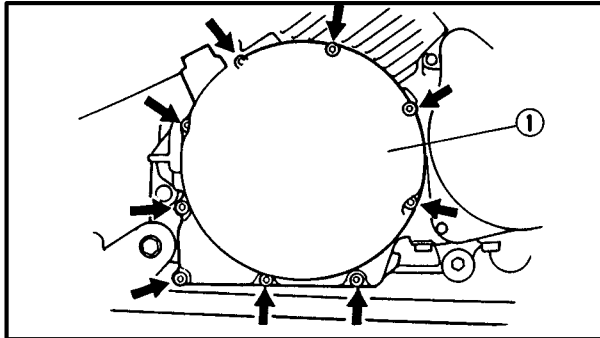
9. Install:

- clutch spring plate seat ①
- clutch spring plate ②
- clutch spring plate retainer ③
- clutch spring plate bolts ④

 **8 Nm (0.8 m•kg, 5.8 ft•lb)**

NOTE:

Tighten the clutch spring plate bolts in stages and in a crisscross pattern.



10. Install:

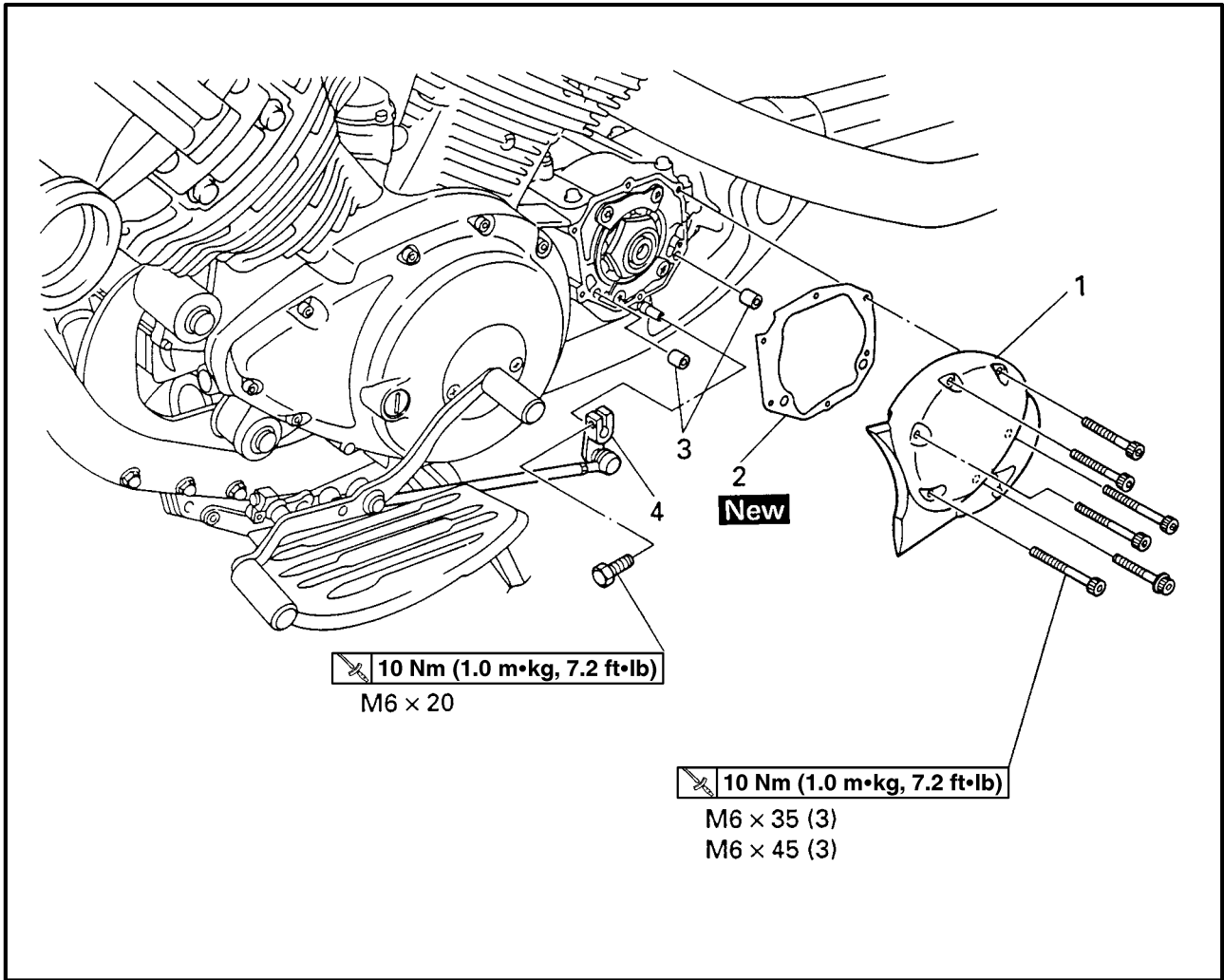
- clutch cover ①

 **10 Nm (1.0 m•kg, 7.2 ft•lb)**

NOTE:

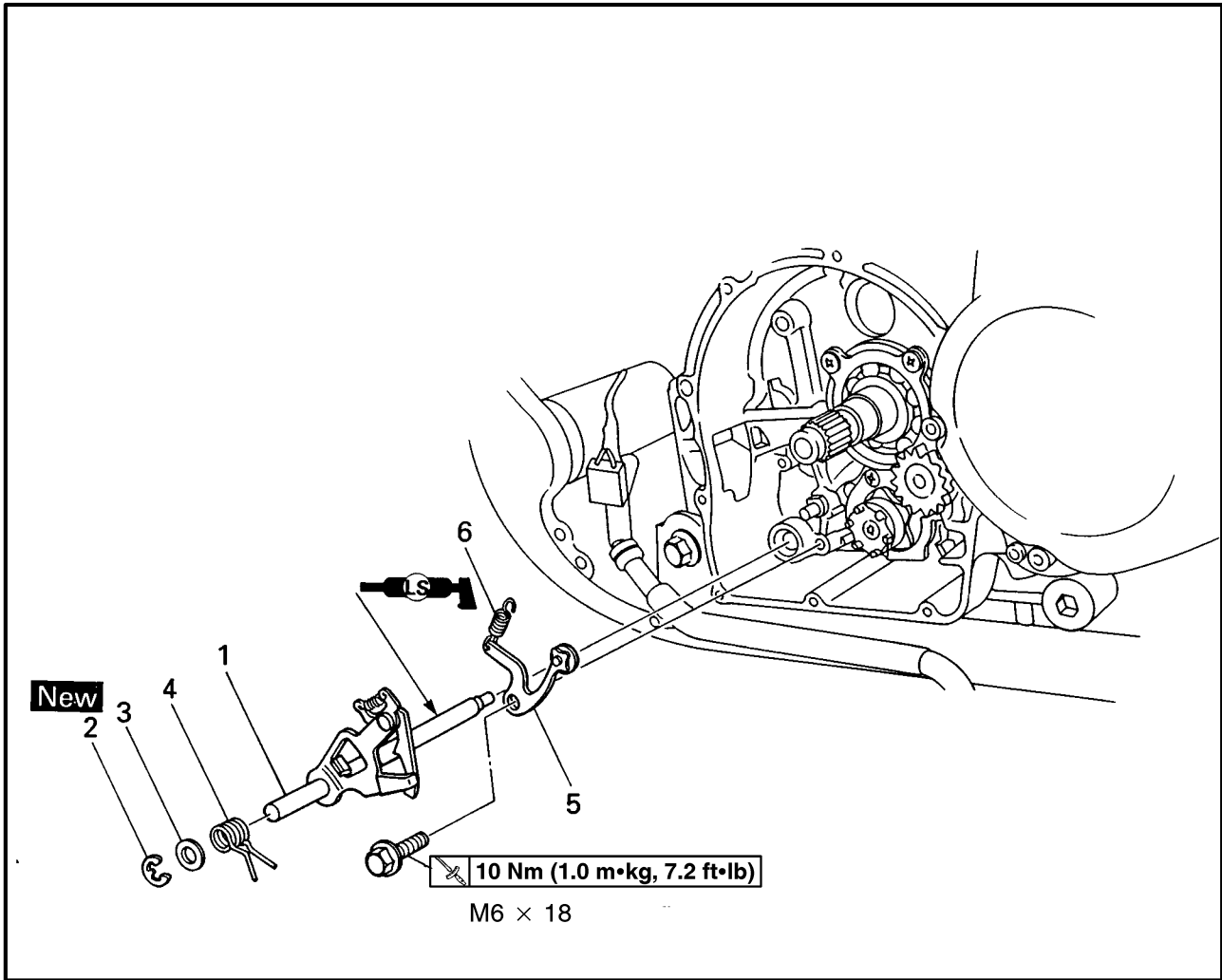
Tighten the clutch cover bolts in stages and in a crisscross pattern.

SHIFT SHAFT
SHIFT ARM

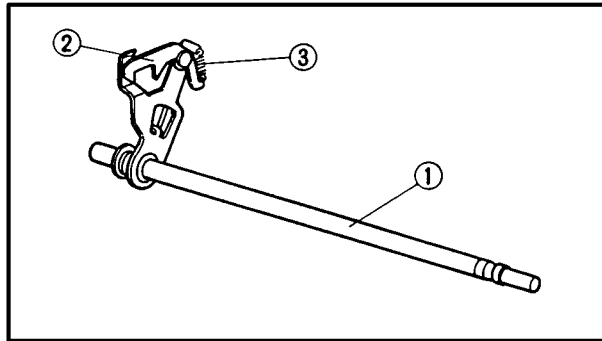


Order	Job/Part	Q'ty	Remarks
1	Removing the shift arm Engine oil Muffler assembly (left side), exhaust pipe (#2 cylinder) Middle gear case cover	1	Remove the parts in the order listed. Refer to "CHANGING THE ENGINE OIL" in CHAPTER 3. Refer to "ENGINE REMOVAL". NOTE: _____ Loosen the bolts in a crisscross pattern.
2	Gasket	1	
3	Dowel pins	2	
4	Shift pedal link	1	Disconnect For installation, reverse the removal procedure.

SHIFT SHAFT AND STOPPER LEVER



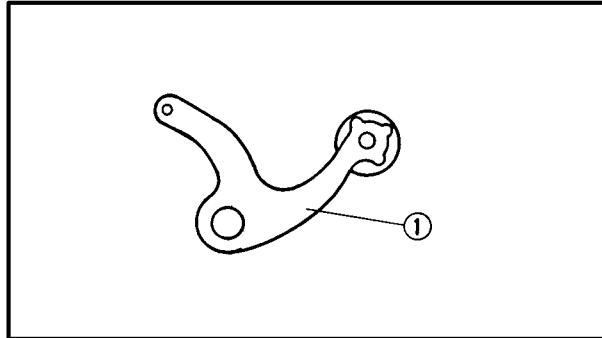
Order	Job/Part	Q'ty	Remarks
	Removing the shift shaft and stopper lever (B)		Remove the parts in the order listed.
1	Shift shaft assembly	1	Refer to "INSTALLING THE SHIFT SHAFT".
2	Circlip	1	
3	Washer	1	
4	Torsion spring	1	
5	Stopper lever	1	
6	Return spring	1	
			For installation, reverse the removal procedure.



EAS00328

CHECKING THE SHIFT SHAFT

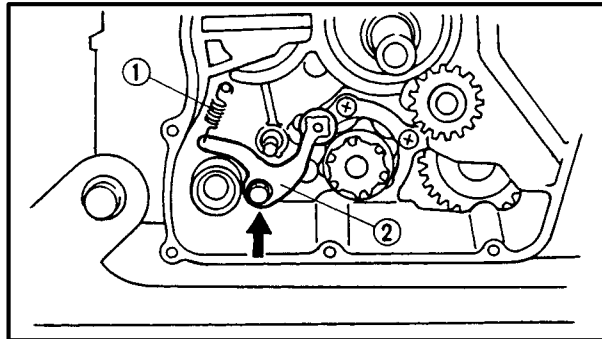
1. Check:
 - shift shaft ①
 - shift lever ②
 - Bends/damage/wear → Replace.
 - shift lever spring ③
 - Damage/wear → Replace.



EAS00330

CHECKING THE STOPPER LEVER

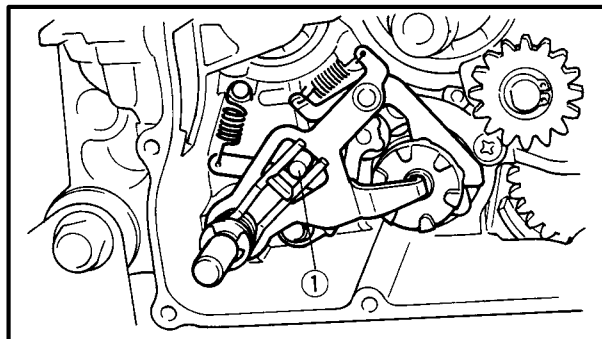
1. Check:
 - stopper lever ①
 - Bends/damage → Replace.
 - Roller turns roughly → Replace the stopper lever.



EAS00333

INSTALLING THE SHIFT SHAFT

1. Install:
 - stopper lever spring ①
 - stopper lever ②



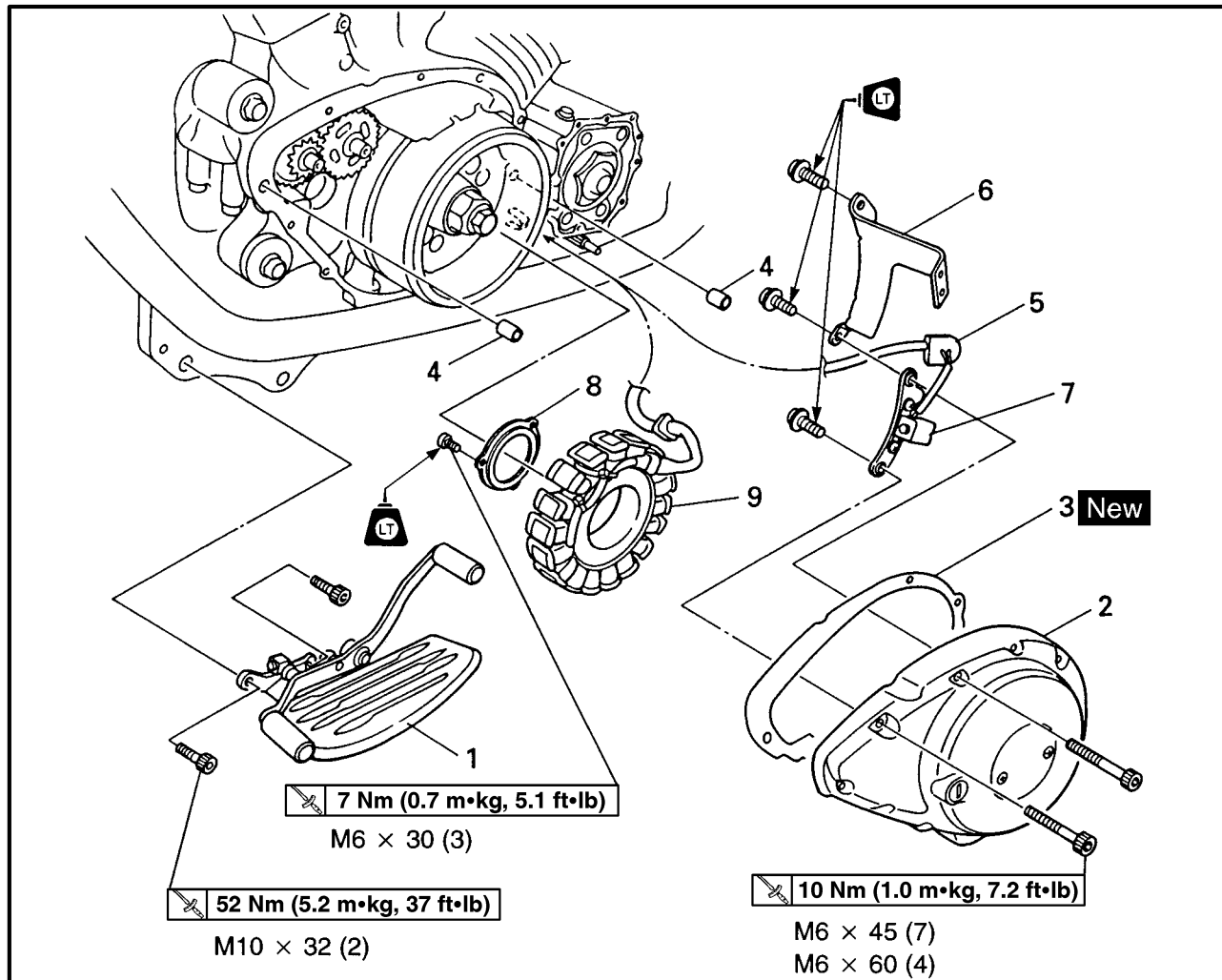
2. Install:
 - shift shaft

NOTE:

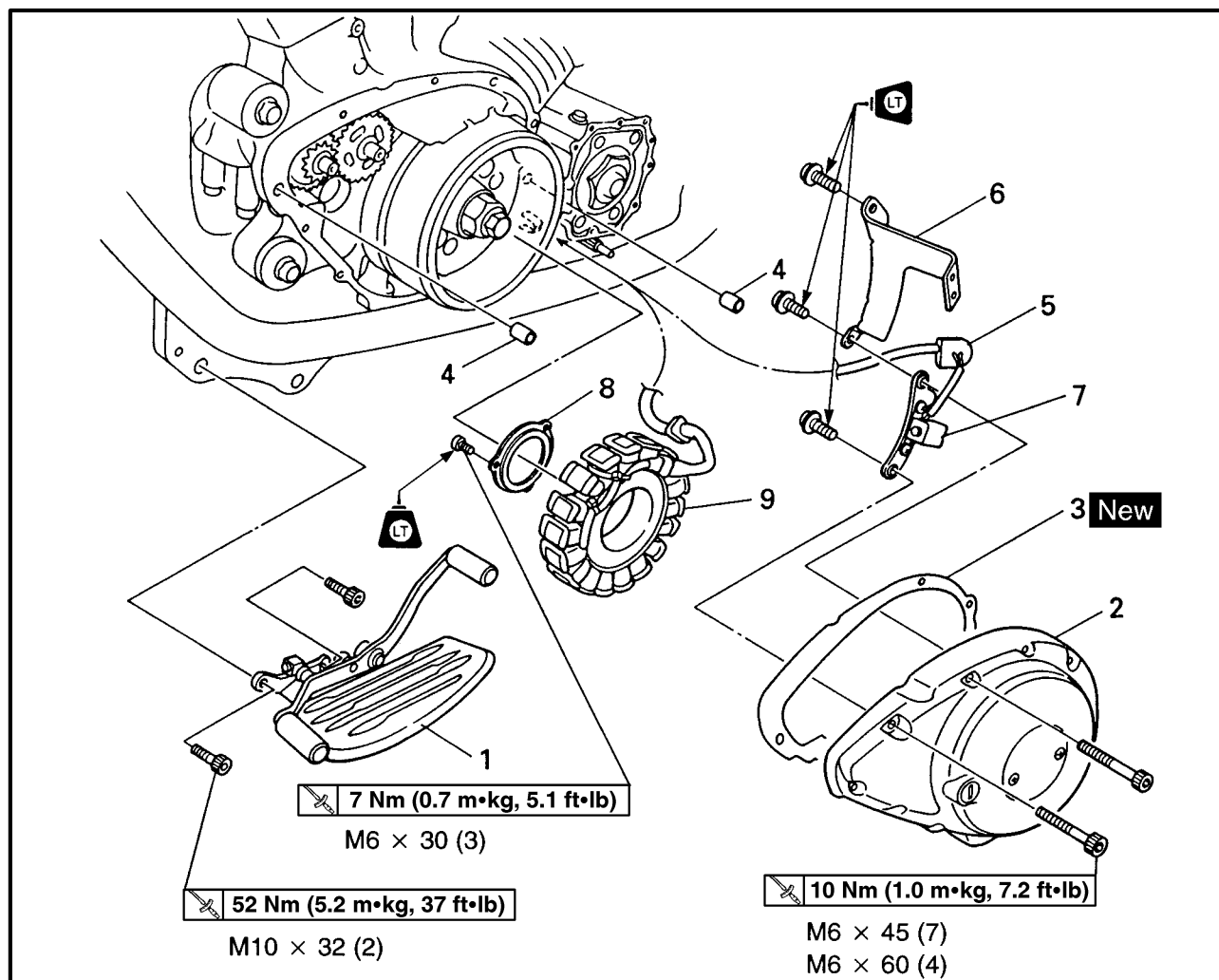
- Install the stopper lever spring and stopper lever as shown.
- Hook the end of the shift lever spring onto the shift lever spring stopper ①.



STARTER CLUTCH AND GENERATOR STARTOR COIL



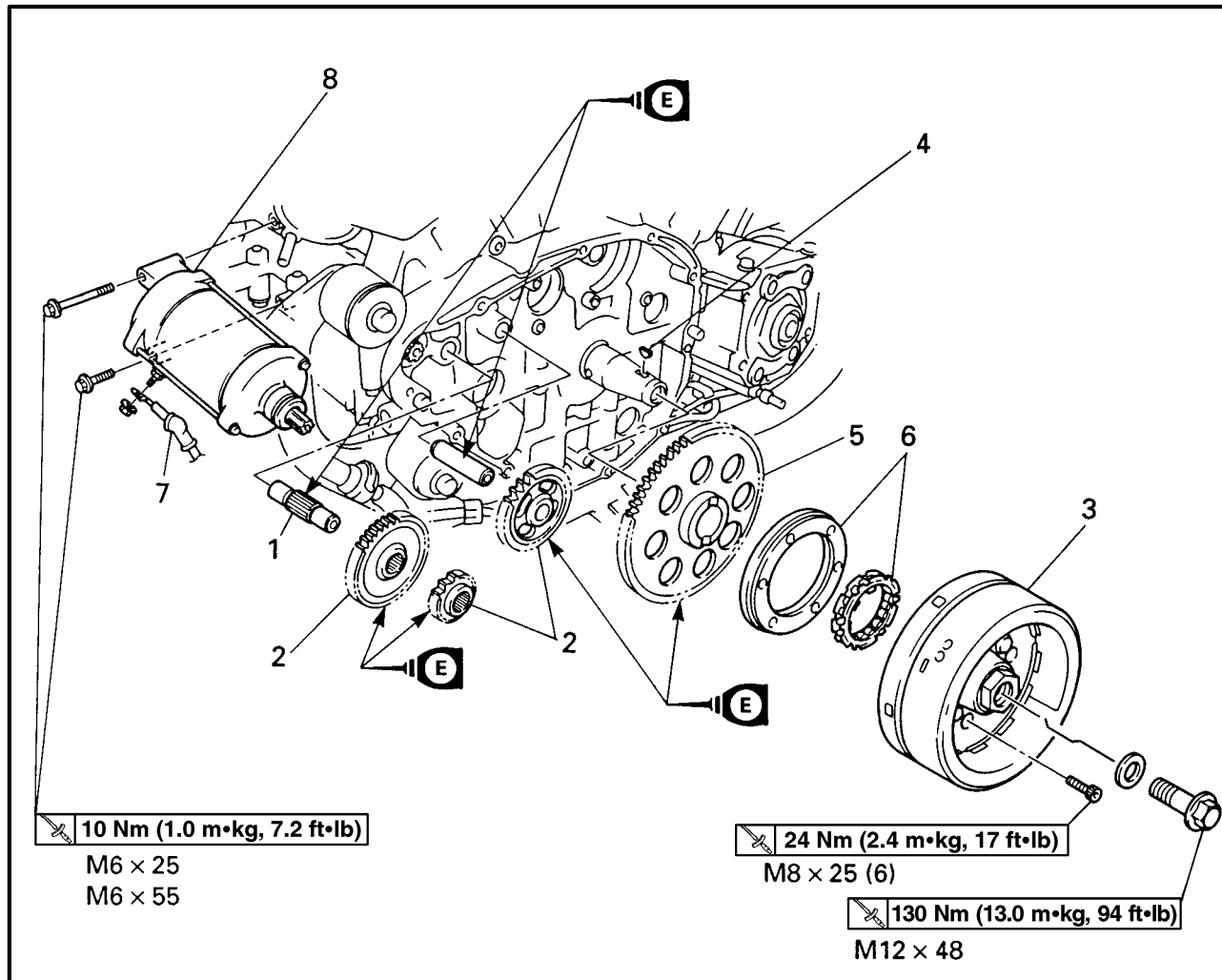
Order	Job/Part	Q'ty	Remarks
	Removing the stator coil		
	Engine oil		Remove the parts in the order listed. Refer to "CHANGING THE ENGINE OIL" in CHAPTER 3.
	Muffler assembly (left side), exhaust pipe (#2 cylinder)		Refer to "ENGINE REMOVAL".
	Middle gear case cover, shift pedal link		Refer to "SHIFT SHAFT".
1	Shift pedal assembly	1	
2	Crankcase cover (left side)	1	Refer to "CRANKCASE COVER (LEFT SIDE)".
3	Gasket	1	
4	Dowel pins	2	Remove from the cable clamp.
5	Pickup coil lead, stator coil lead	1/1	
6	Cable holder	1	
7	Pickup coil	1	



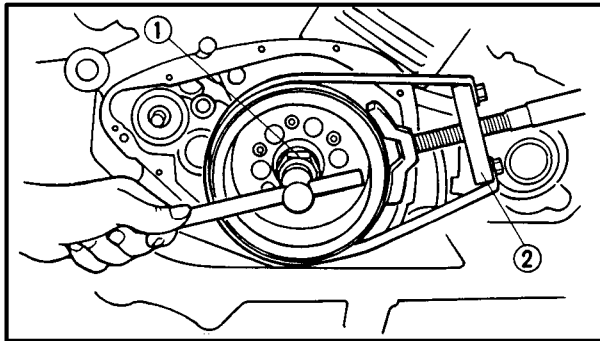
Order	Job/Part	Q'ty	Remarks
8	Plate (stater coil)	1	For installation, reverse the removal procedure.
9	Stater coil	1	



STARTER CLUTCH AND GENERATOR



Order	Job/Part	Q'ty	Remarks
	Removing the stater clutch and generator rotor		Remove the parts in the order listed.
1	Shafts	2	
2	Starter idler gears	3	
3	Rotor	1	Refer to "REMOVING/INSTALLING THE GENERATOR".
4	Woodruff key	1	Refer to "INSTALLING THE GENERATOR".
5	Starter wheel gear	1	
6	Starter clutch assembly	1	
7	Starter motor lead	1	Disconnect
8	Starter motor	1	For installation, reverse the removal procedure.



EAS00346

REMOVING THE GENERATOR

1. Remove:

- generator rotor bolt ①
- washer

NOTE:

- While holding the generator rotor with the sheave holder ②, loosen the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.



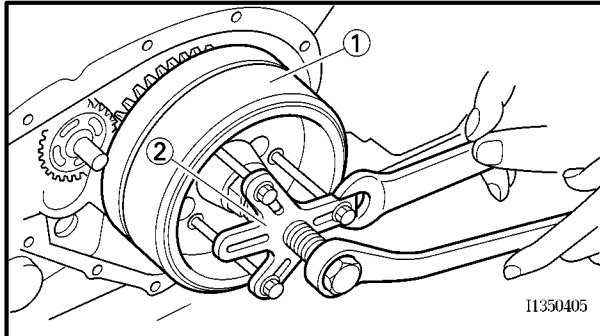
Sheave holder
YS-01880, 90890-01701

2. Remove:

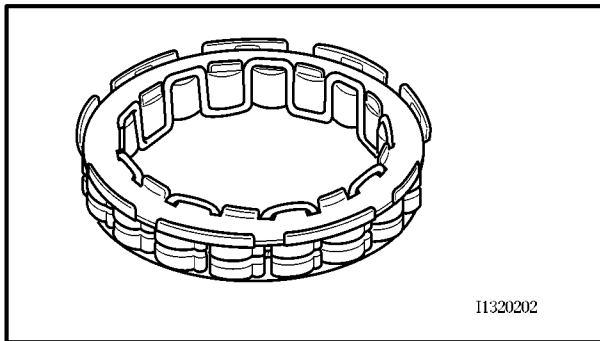
- generator rotor ①
(with the flywheel puller set ②)
- woodruff key



Flywheel puller set
YU-33270, 90890-01362
Adopter
YM-33282, 90890-04089



I1350405



I1320202

EAS00350

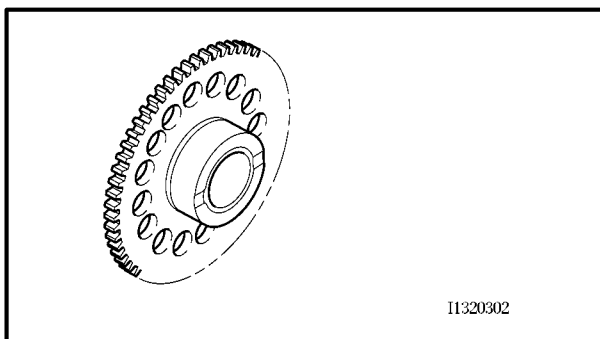
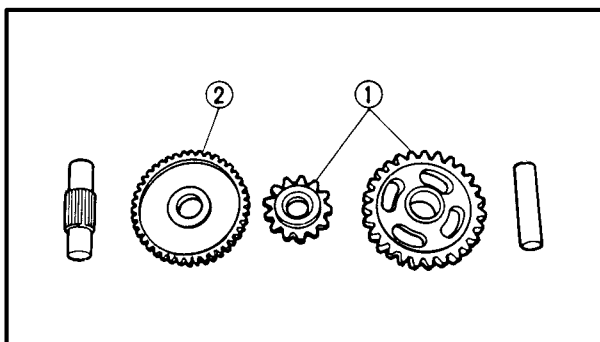
CHECKING THE STARTER CLUTCH

1. Check:

- starter clutch rollers ①
Damage/wear → Replace.

2. Check:

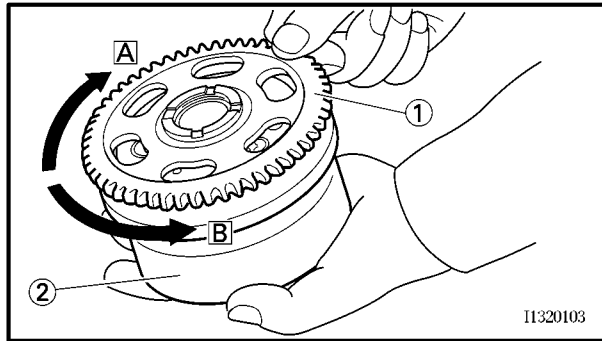
- starter clutch idler gear ①
- starter clutch drive gear ②
- starter clutch gear
Burr/chips/roughness/wear → Replace the defective part(-s).



I1320302

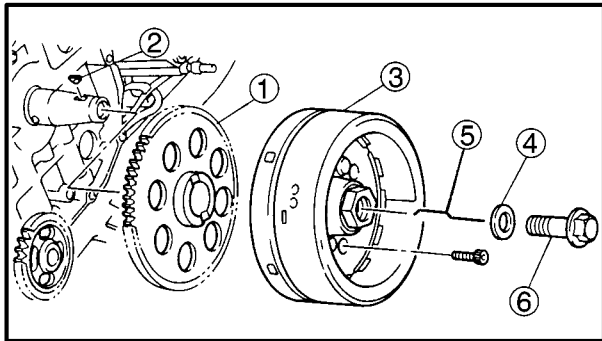
3. Check:

- starter clutch gear's contacting surfaces
Damage/pitting/wear → Replace the starter clutch gear.



4. Check:
- starter clutch operation

- a. Install the starter clutch ① onto the generator rotor ② and hold the starter clutch.
- b. When turning the starter clutch drive gear clockwise **[A]**, 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 counterclockwise **[B]**, it should turn freely. If the starter clutch drive gear does not turn freely, the starter clutch is faulty and must be replaced.



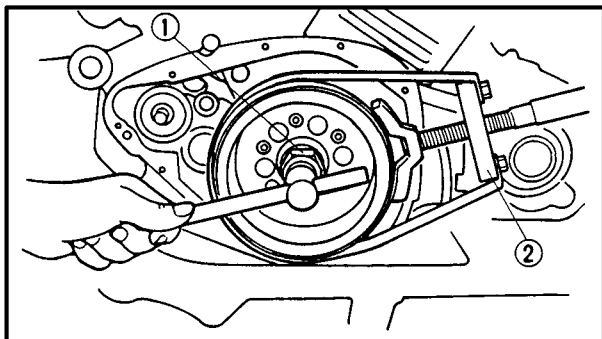
EAS00354

INSTALLING THE GENERATOR

1. Install:
 - starter wheel gear ①
 - woodruff key ②
 - generator rotor ③
 - washer ④
 - pin ⑤
 - generator rotor bolt ⑥

NOTE:

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.



2. Tighten:
- generator rotor bolt ①

 **130 Nm (13.0 m•kg, 94 ft•lb)**

NOTE:

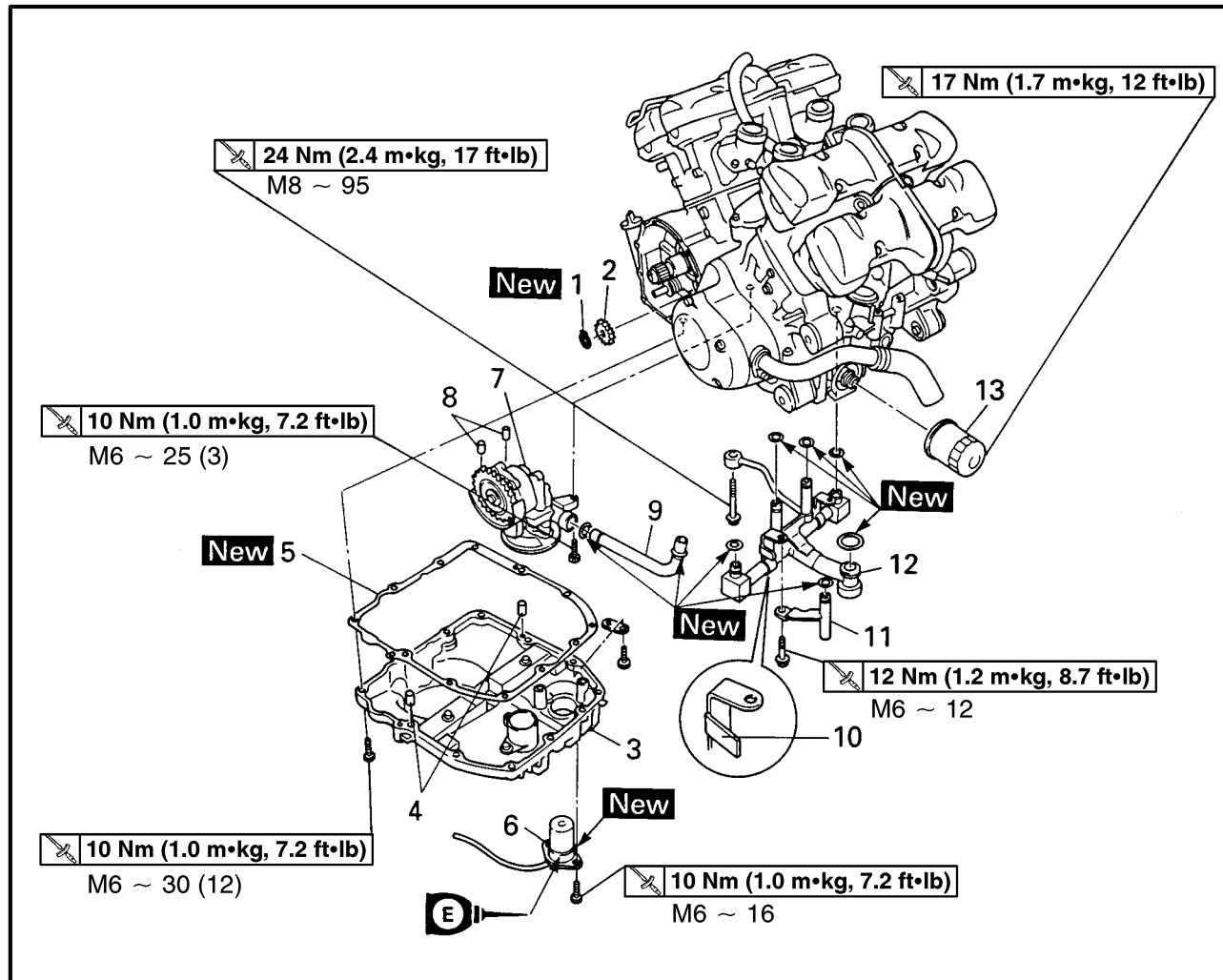
- While holding the generator rotor with the sheave holder ②, tighten the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.



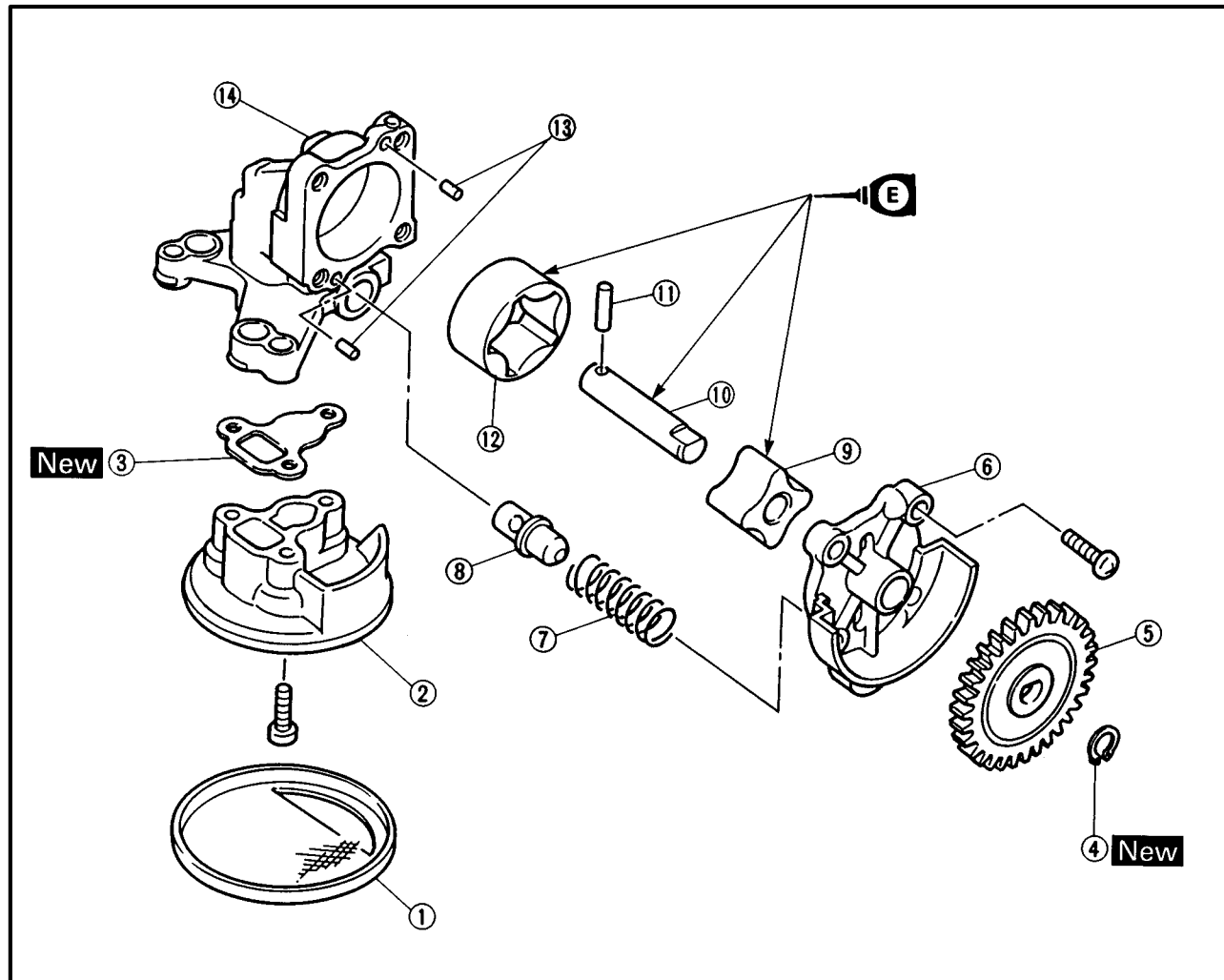
Sheave holder
YS-01880, 90890-01701



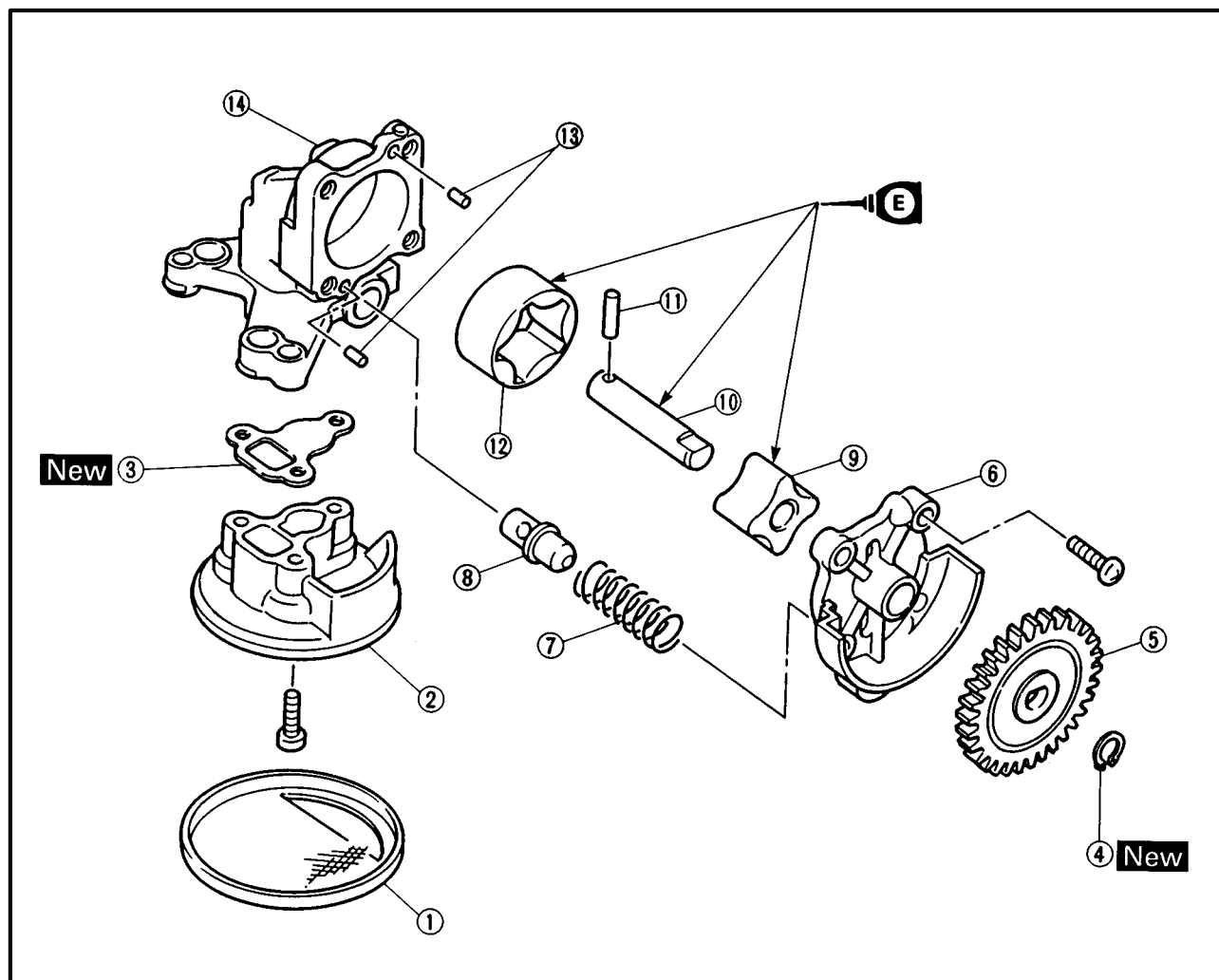
OIL PAN AND OIL PUMP



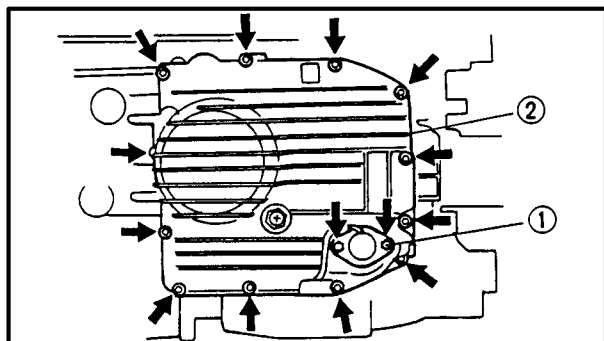
Order	Job/Part	Q'ty	Remarks
	Removing the oil pan and oil pump		
	Engine assembly		Remove the parts in the order listed.
	Clutch assembly		Refer to "ENGINE REMOVAL".
1	Circlip	1	Refer to "CLUTCH".
2	Idle ear (oil pump)	1	
3	Oil pan	1	Refer to "REMOVING/INSTALLING THE OIL PAN".
4	Dowel pins	2	
5	Gasket	1	
6	Oil level switch	1	
7	Oil pump assembly	1	Refer to "INSTALLING THE OIL PUMP".
8	Dowel pins	2	
9	Oil pump pipe	1	
10	Bracket tabs	2	Straighten
11	Oil pipe	1	
12	Oil gallery pipe	1	
13	Oil filter	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Disassemble the parts in the order listed.
①	Oil strainer	1	Refer to "ASSEMBLING THE OIL PUMP".
②	Oil strainer housing	1	
③	Gasket	1	
④	Circlip	1	
⑤	Driven gear (oil pump)	1	
⑥	Gear housing	1	
⑦	Spring	1	
⑧	Relief valve	1	
⑨	Inner rotor	1	
⑩	Shaft	1	
⑪	Pin	1	
⑫	Outer rotor	1	



Order	Job/Part	Q'ty	Remarks
⑬	Dowel pins	2	Refer to "ASSEMBLING THE OIL PUMP". For assembly, reverse the disassembly procedure.
⑭	Oil pump housing	1	



EAS00362

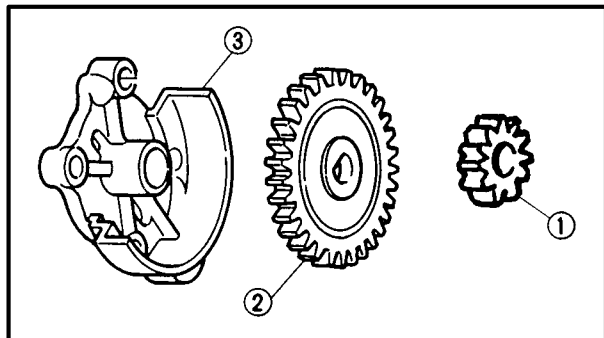
REMOVING THE OIL PAN

1. Remove:

- oil lever switch ①
- oil pan ②
- gasket
- dowel pins

NOTE:

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



EAS00364

CHECKING THE OIL PUMP

1. Check:

- oil pump driver gear ①
- oil pump driven gear ②
- oil pump housing ③
- oil pump housing cover

Cracks/damage/wear → Replace the defective part(-s).

2. Measure:

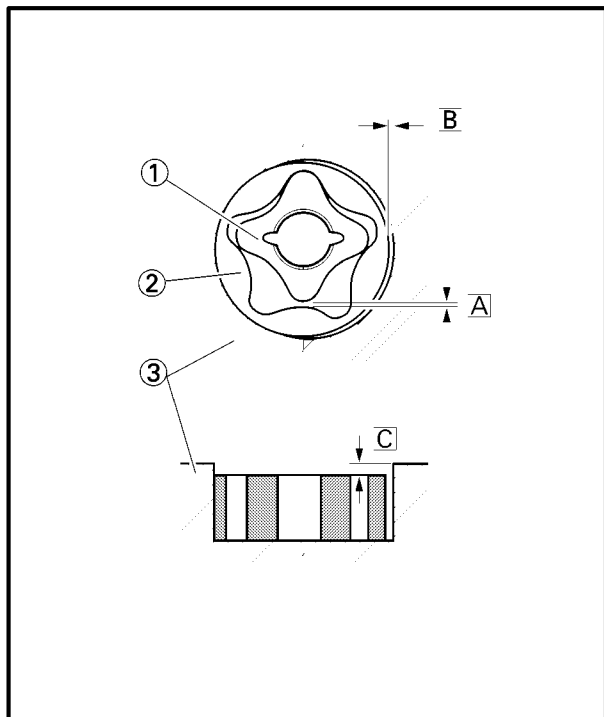
- inner-rotor-to-outer-rotor-tip clearance **A**
- outer-rotor-to-oil-pump-housing clearance **B**
- oil-pump-housing-to-inner-rotor-and-outer-rotor clearance **C**

Out of specification → Replace the oil pump.

① Inner rotor

② Outer rotor

③ Oil pump housing

**Inner-rotor-to-outer-rotor-tip clearance**

0 ~ 0.12 mm (0.000 ~ 0.005 in)

<Limit>: 0.17 mm (0.007 in)

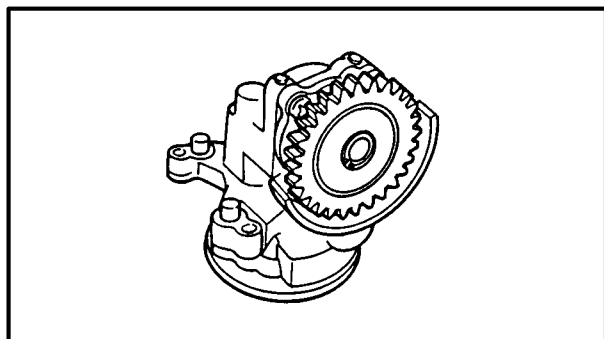
Outer-rotor-to-oil-pump-housing clearance

0.03 ~ 0.08 mm (0.001 ~ 0.003 in)

<Limit>: 0.08 mm (0.003 in)

Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance

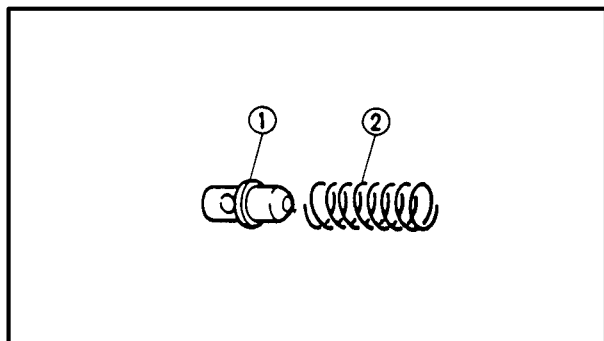
0.03 ~ 0.08 mm (0.0012 ~ 0.003 in)



3. Check:

- oil pump operation

Unsmooth → Repeat steps (1) and (2) or replace the defective part(-s).



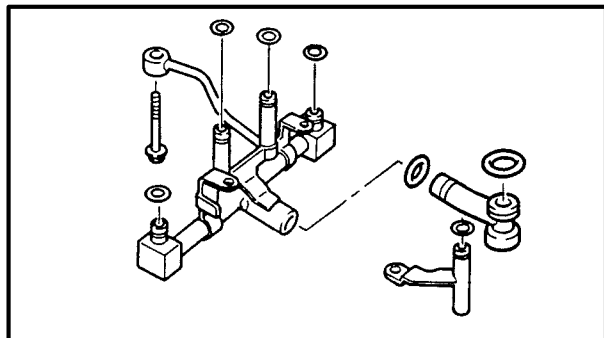
EAS00365

CHECKING THE RELIEF VALVE

1. Check:

- relief valve body
- relief valve ①
- spring ②

Damage/wear → Replace the defective part(-s).



EAS00367

CHECKING THE OIL GALLERY PIPES

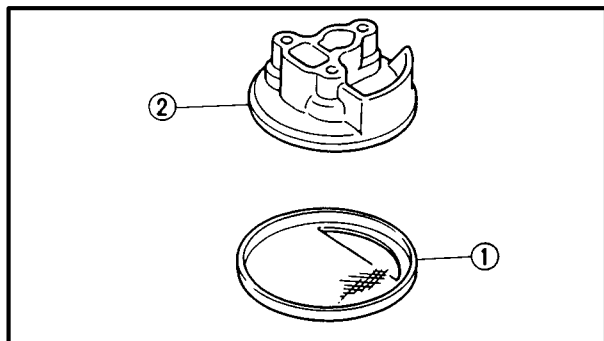
The following procedure applies to all of the oil gallery pipes.

1. Check:

- oil gallery pipe ①

Damage → Replace.

Obstruction → Wash and blow out with compressed air.



EAS00368

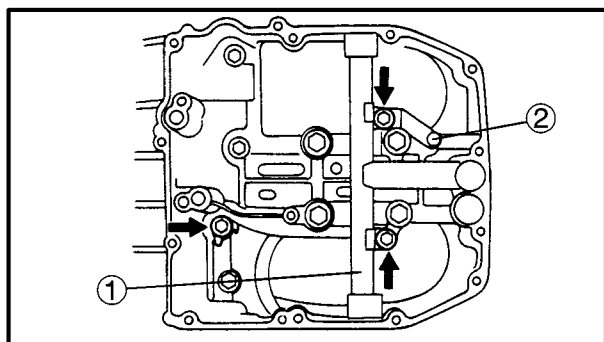
CHECKING THE OIL STRAINER

1. Check:

- oil strainer ①
- oil strainer housing ②

Damage → Replace.

Contaminants → Clean with engine oil.



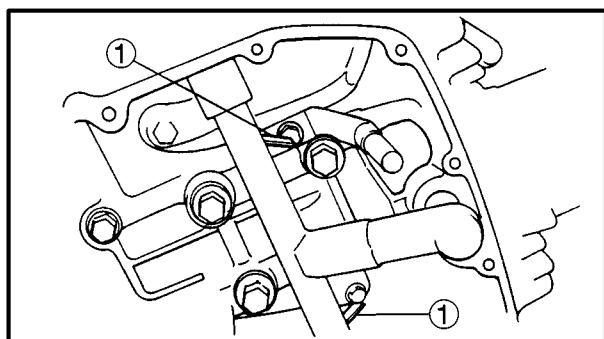
INSTALLING THE OIL GALLERY PIPES

1. Install:

- oil gallery pipe ①
- oil pipe ②

⚠ WARNING

Always use new O-rings.



2. Bend:

- bracket tabs ①



EAS00375

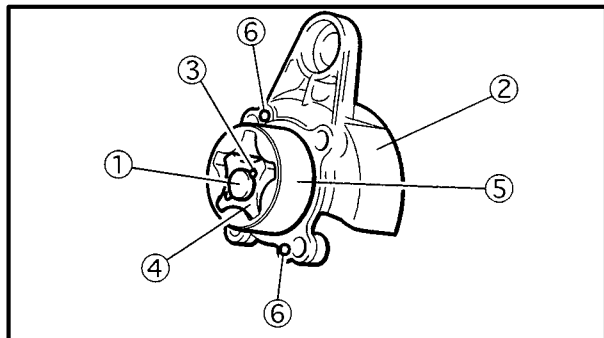
ASSEMBLING THE OIL PUMP

1. Lubricate:

- inner rotor
- outer rotor
- oil pump shaft
(with the recommended lubricant)

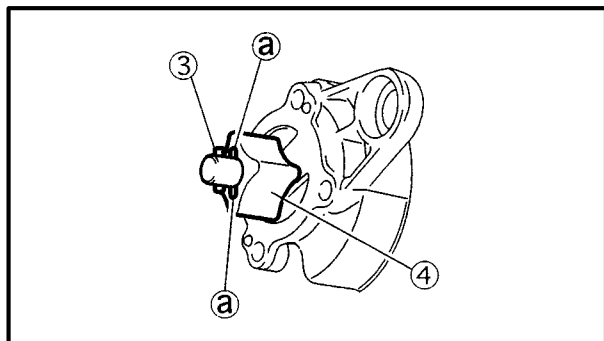


Recommended lubricant
Engine oil



2. Install:

- oil pump shaft ①
(to the oil pump cover ②)
- pin ③
- inner rotor ④
- outer rotor ⑤
- pin ⑥
- oil pump housing
- screw

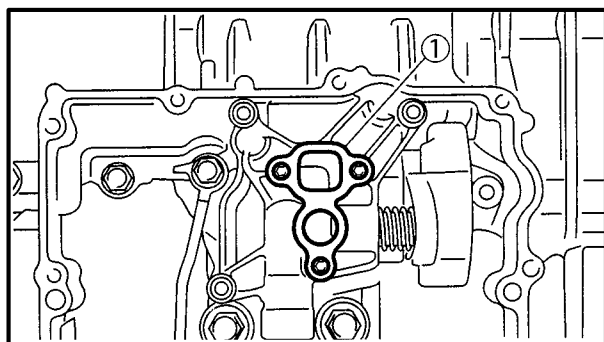


NOTE:

When installing the inner rotor, align the pin ③ in the oil pump shaft with the groove ③ on the inner rotor ④.

3. Check:

- oil pump operation
- Refer to "CHECKING THE OIL PUMP".



EAS00376

INSTALLING THE OIL PUMP

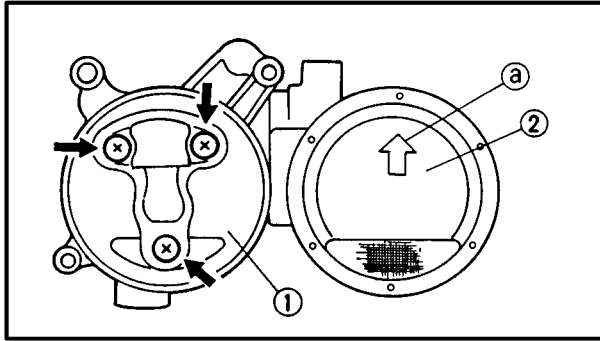
1. Install:

- oil pump ①

10 Nm (1.0 m•kg, 7.2 ft•lb)

CAUTION:

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



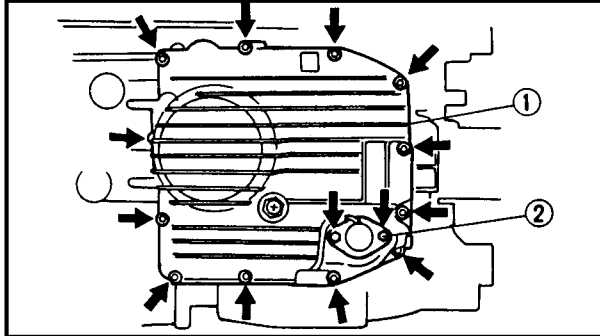
EAS00378

INSTALLING THE OIL STRAINER

1. Install:
 - oil strainer housing ①
2. Install:
 - oil strainer cover ②
 - relief valve

NOTE:

The arrow ② on the oil strainer cover must point towards the rear of the engine.



EAS00380

INSTALLING THE OIL PAN

1. Install:
 - dowel pins
 - gasket (New)
 - oil pan ①
 - oil level switch ②
 - engine oil drain bolt

10 Nm (1.0 m•kg, 7.2 ft•lb)

10 Nm (1.0 m•kg, 7.2 ft•lb)

WARNING

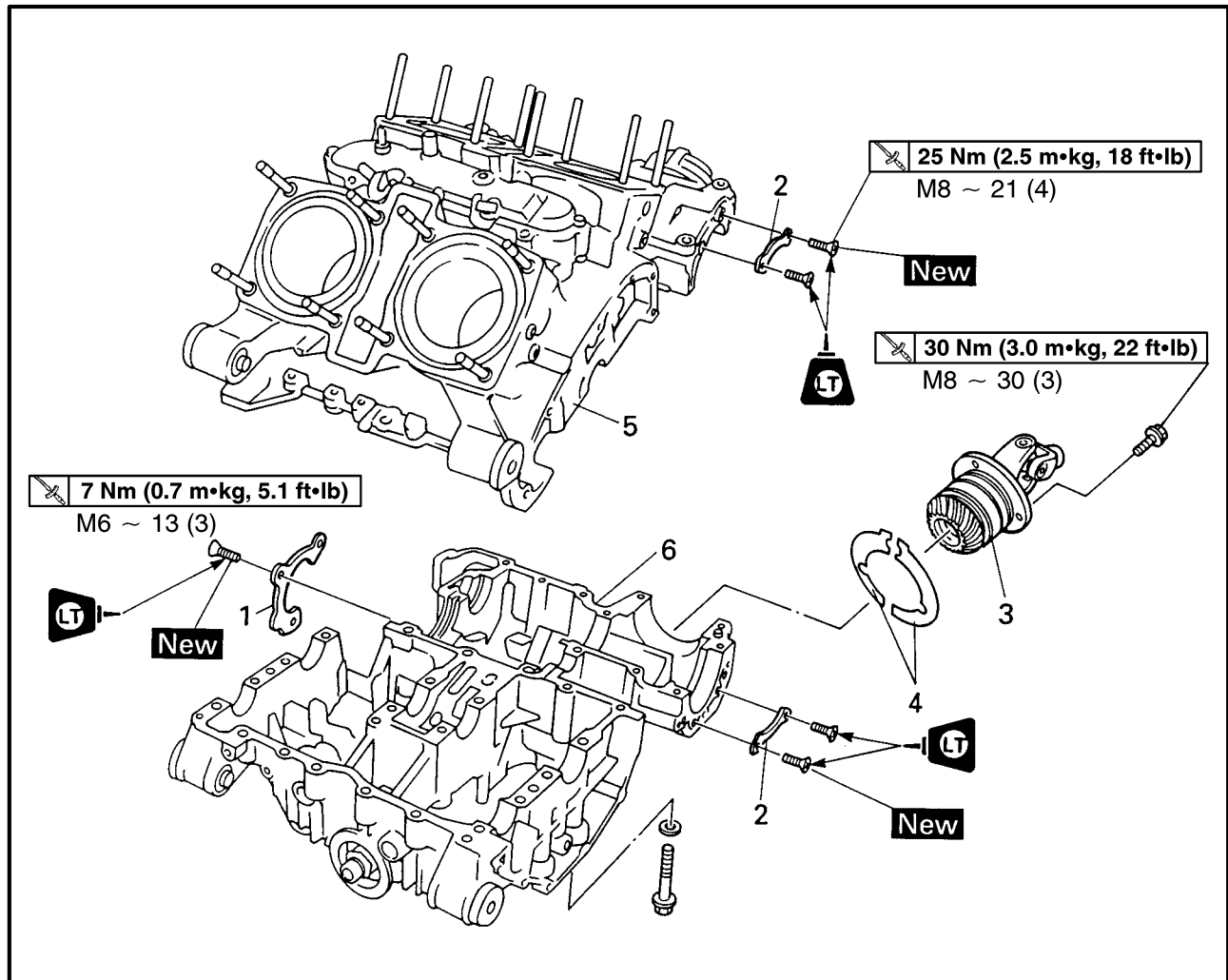
Always use new copper washers.

NOTE:

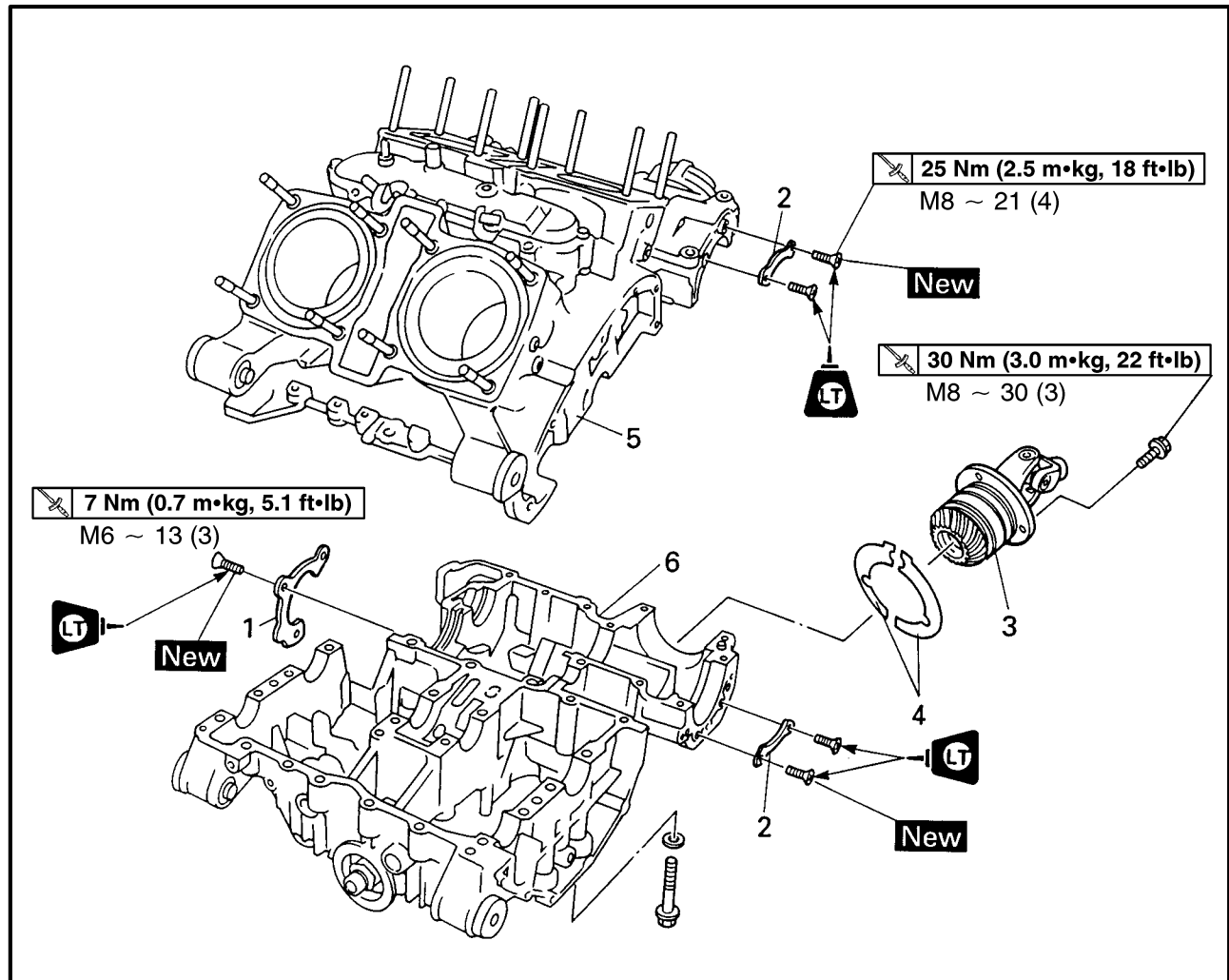
- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch's O-ring with engine oil.



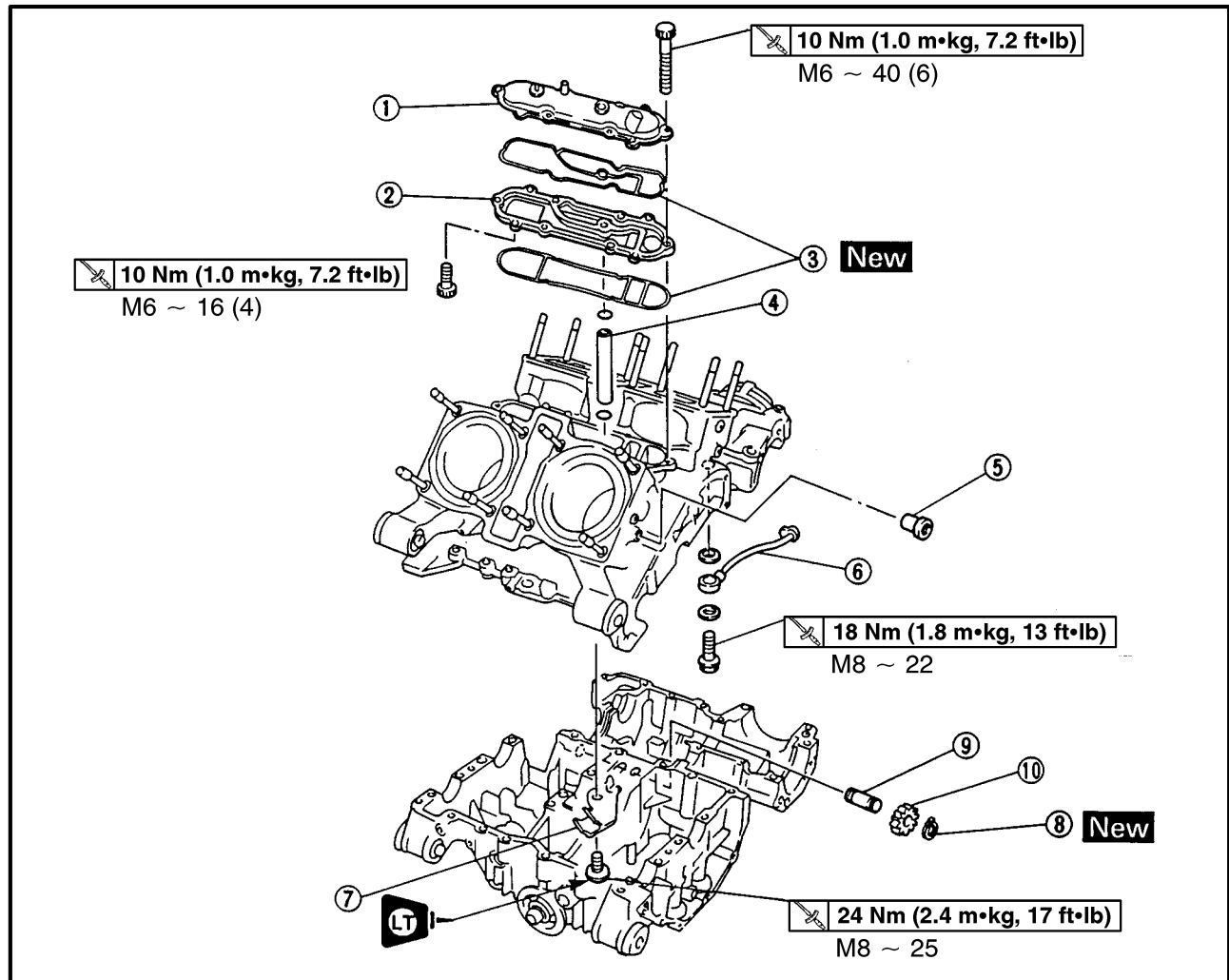
CRANKCASE



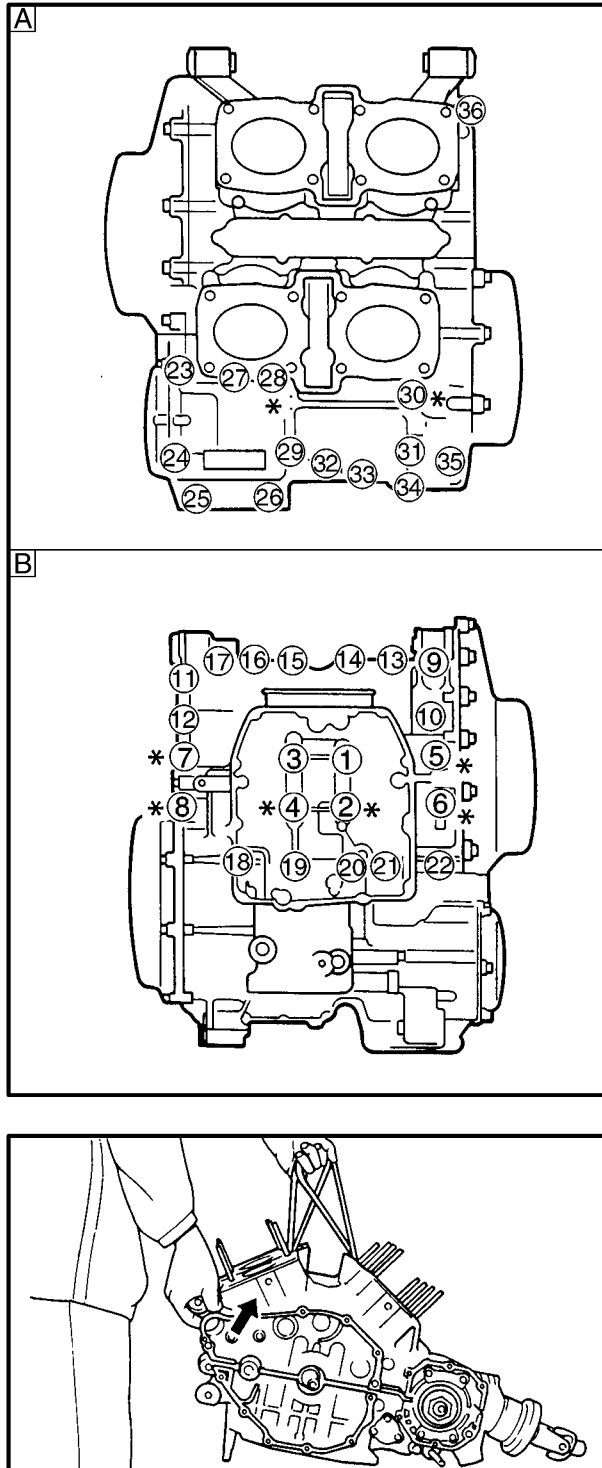
Order	Job/Part	Q'ty	Remarks
	Crankcase separation		Remove the parts in the order listed.
	Engine assembly		Refer to "ENGINE REMOVAL".
	Cylinder head		Refer to "CYLINDER HEADS".
	Water pump		Refer to "WATER PUMP" in CHAPTER 5.
	Clutch assembly		Refer to "CLUTCH".
	Shift shaft, stopper lever		Refer to "SHIFT SHAFT AND STOPPER LEVER".
	Clutch release cylinder		Refer to "CLUTCH RELEASE CYLINDER".
	AC Magneto		Refer to "STARTER CLUTCH AND GENERATOR".
	Oil pan and oil pump assembly		Refer to "OIL PAN AND OIL PUMP".



Order	Job/Part	Q'ty	Remarks
1	Retainer (main axle bearing)	1	Refer to "ASSEMBLING THE CRANKCASE".
2	Retainers (middle gear bearing)	2	
3	Middle driven gear assembly	1	
4	Shims	2/4	
5	Crankcase (upper)	1	Refer to "DISASSEMBLING/ ASSEMBLING THE CRANKCASE". For installation, reverse the removal procedure.
6	Crankcase (lower)	1	



Order	Job/Part	Q'ty	Remarks
	Disassembling the crankcase		Disassemble the parts in the order listed.
①	Crankcase breather cover	1	
②	Crankcase breather spacer	1	
③	Rubber gaskets	2	
④	Oil pipe	1	
⑤	Drain plugs (cylinders)	4	
⑥	Oil pipe	1	
⑦	Bracket (timing chain damper)	1	
⑧	Circlip	1	
⑨	Oil pump drive shaft	1	
⑩	Idler gear (oil pump)	1	
			For assembly, reverse the disassembly procedure.



EAS00384

DISASSEMBLING THE CRANKCASE

1. Remove:

- crankcase bolts

A Upper crankcase

B Lower crankcase

NOTE:

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

2. Remove:

- upper crankcase

CAUTION:

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.

3. Remove:

- dowel pins
- O-ring

4. Remove:

- crankshaft journal lower bearing (from the lower crankcase)

NOTE:

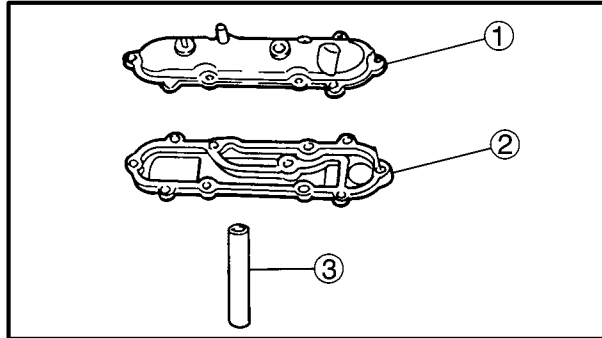
Identify the position of each crankshaft journal lower bearing so that it can be reinstalled in its original place.



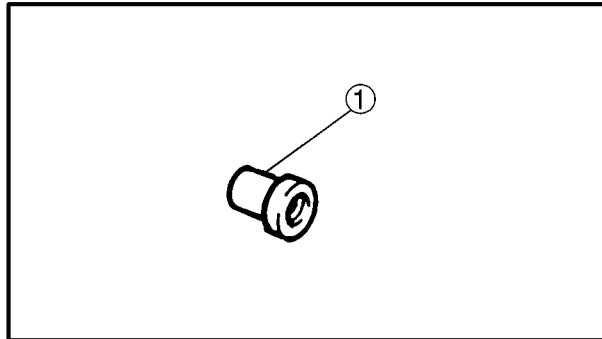
EAS00399

CHECKING THE CRANKCASE

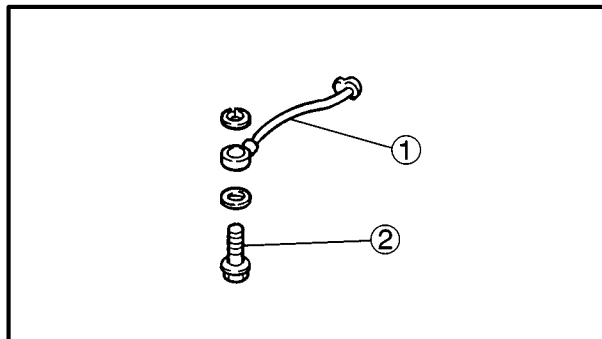
1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
 - crankcase
Cracks/damage → Replace.
 - oil delivery passages
Obstruction → Blow out with compressed air.



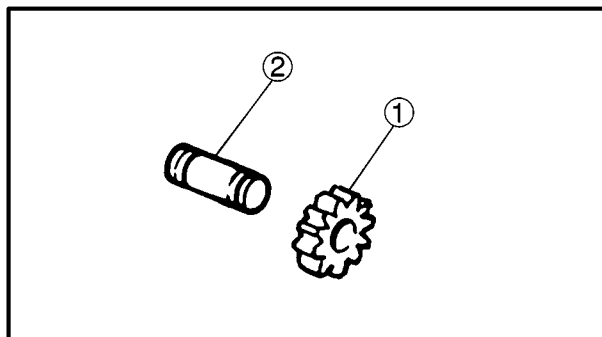
4. Check:
 - crankcase breather cover ①
 - crankcase breather spacer ②
Cracks damage → Replace.
 - oil pipe (crankcase breather) ③
Blockage → Blow out the passages with compressed air.



5. Check:
 - drain plugs (cylinders) ①
Cracks/wear/damage → Replace.



6. Check:
 - oil pipe ①
Blockage → Blow out the passages with compressed air.
 - union bolt ②
Blockage → Blow out the passages with compressed air.



7. Check:
 - idler gear (oil pump) ①
 - shaft ②
Bends/wear/damage → Replace.

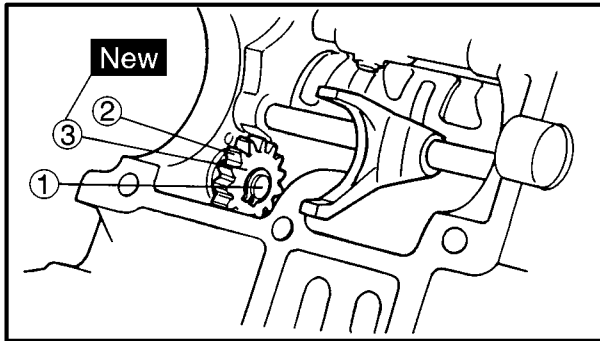


EAS00417

ASSEMBLING THE CRANKCASE

1. Install:

- shaft ①
- Idler gear (oil pump) ②
- circlip ③ **New**



2. Install:

- bracket (timing chain damper) ①

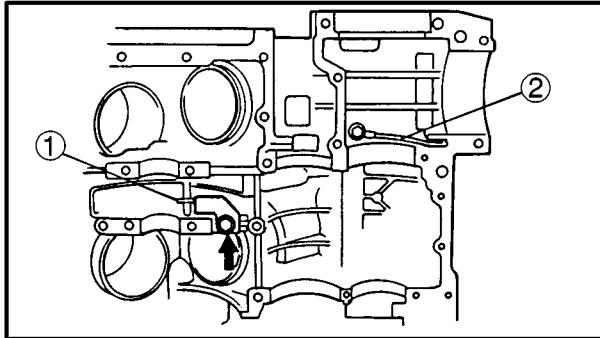
24 Nm (2.4 m•kg, 17 ft•lb)

- oil pipe ②

18 Nm (1.8 m•kg, 13 ft•lb)

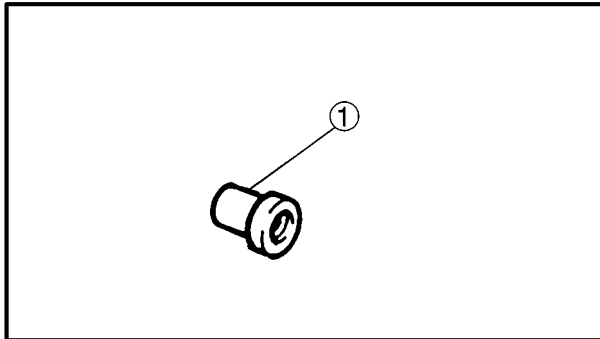
NOTE:

Apply LOCTITE® to the bracket bolt.



3. Install:

- drain plugs (cylinders) ②

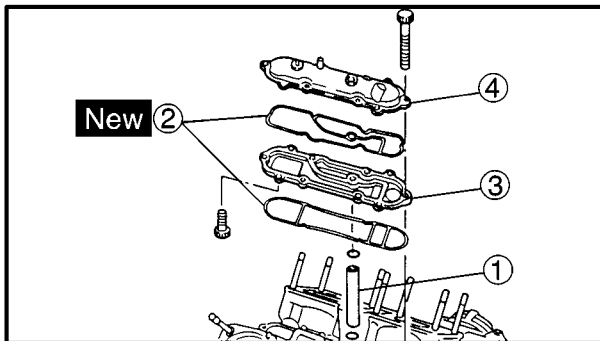


4. Install:

- oil pipe ①
- rubber gaskets ② **New**
- crankcase breather spacer ③
- crankcase breather cover ④

⚠ WARNING

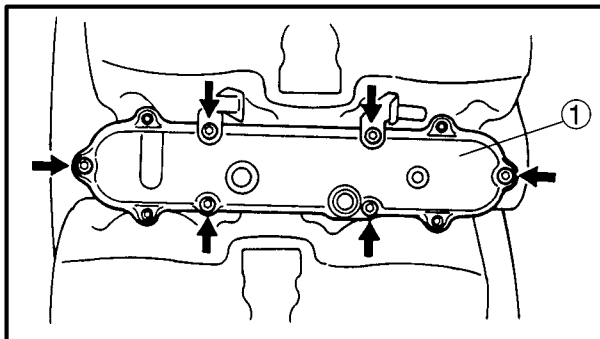
Always use new O-rings.



5. Install:

- crankcase breather assembly ④

10 Nm (1.0 m•kg, 7.2 ft•lb)





6. Lubricate:
- crankshaft journal bearings
(with the recommended lubricant)



Recommended lubricant
Engine oil

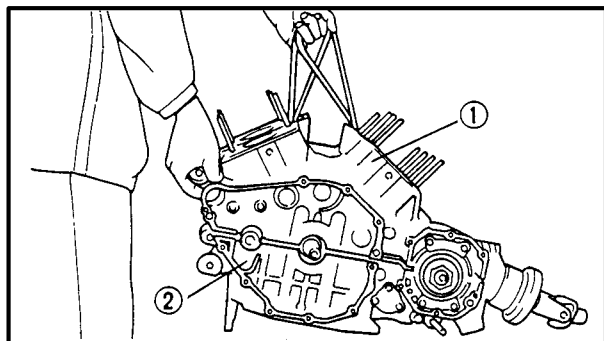
7. Apply:
- sealant
(onto the crankcase mating surfaces)



Yamaha bond No. 1215
90890-85505
Quick Gasket®
ACC-11001-15-01

NOTE:

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2 ~ 3 mm of the crankshaft journal bearings.



8. Install:
- upper crankcase ①
(onto the lower crankcase ②)

CAUTION:

Before tightening the crankcase bolts, make sure that the transmission gears shift correctly when the shift drum assembly is turned by hand.

9. Install:
- final drive assembly
Refer to "MIDDLE GEAR".

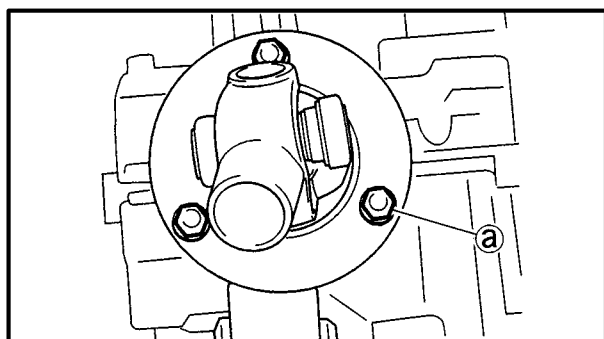
NOTE:

The arrow on the final drive assembly must point towards the upper crankcase.

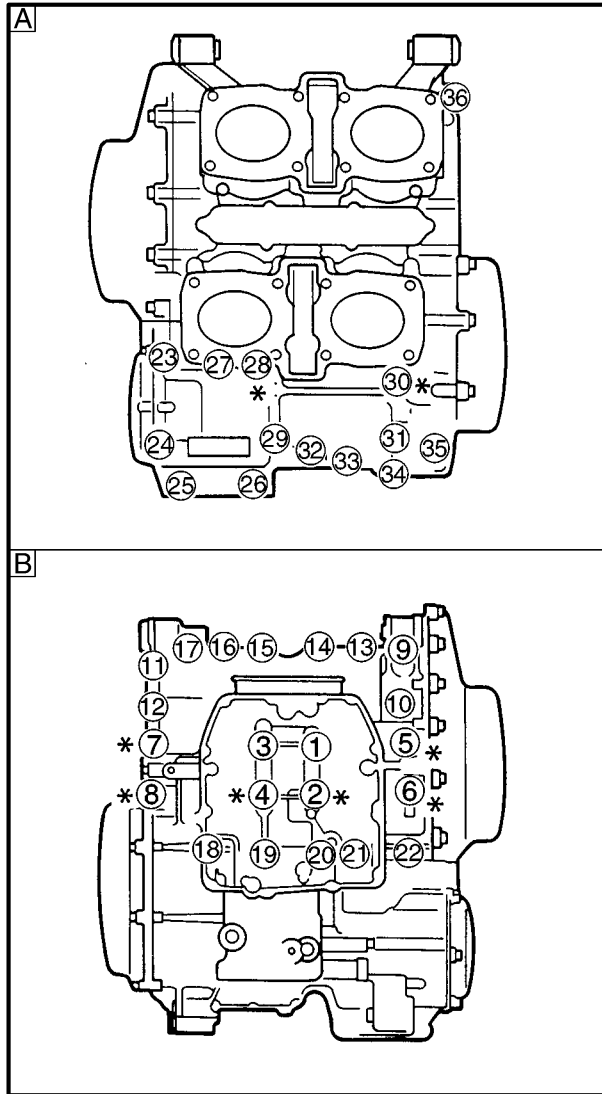
10. Install:
- middle driven shaft bearing housing bolts

NOTE:

The bolt with the washer goes in the lower right hole ① of the middle driven shaft bearing housing.



Middle driven shaft bearing
housing bolt
30 Nm (3.0 m•kg, 22 ft•lb)



11. Tighten:

- upper crankcase bolts
- lower crankcase bolts

⚠ WARNING

Always use new copper washers.

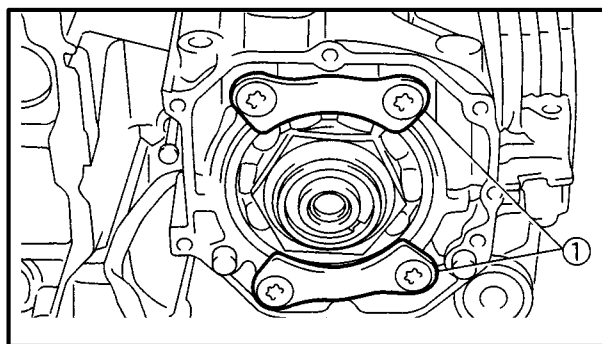
NOTE:

- Tighten the bolts in the tightening sequence cast on the crankcase.
- Install copper washers on bolts ②⑧ and ③⑩.
- Install the cable holder on bolts ②② and ③②.
- Install the washers on bolts ② and ④ ~ ⑧.

A Upper crankcase

B Lower crankcase

	M10 bolt
	40 Nm (4.0 m•kg, 29 ft•lb)
	M8 bolt
	24 Nm (2.4 m•kg, 17 ft•lb)
	M6 bolt
	12 Nm (1.2 m•kg, 8.7 ft•lb)



12. Install:

- middle driven shaft bearing housing retainers ①
- main axle bearing retainer ②

25 Nm (2.5 m•kg, 18 ft•lb)

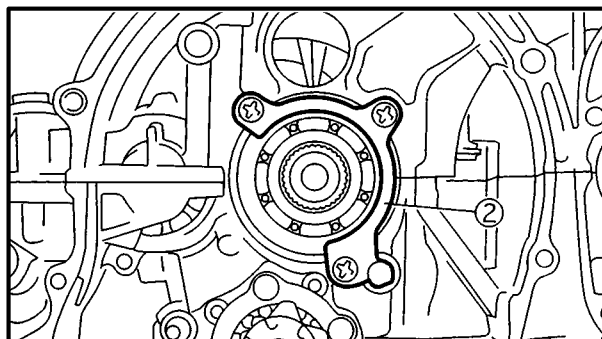
7 Nm (0.7 m•kg, 5.1 ft•lb)

⚠ WARNING

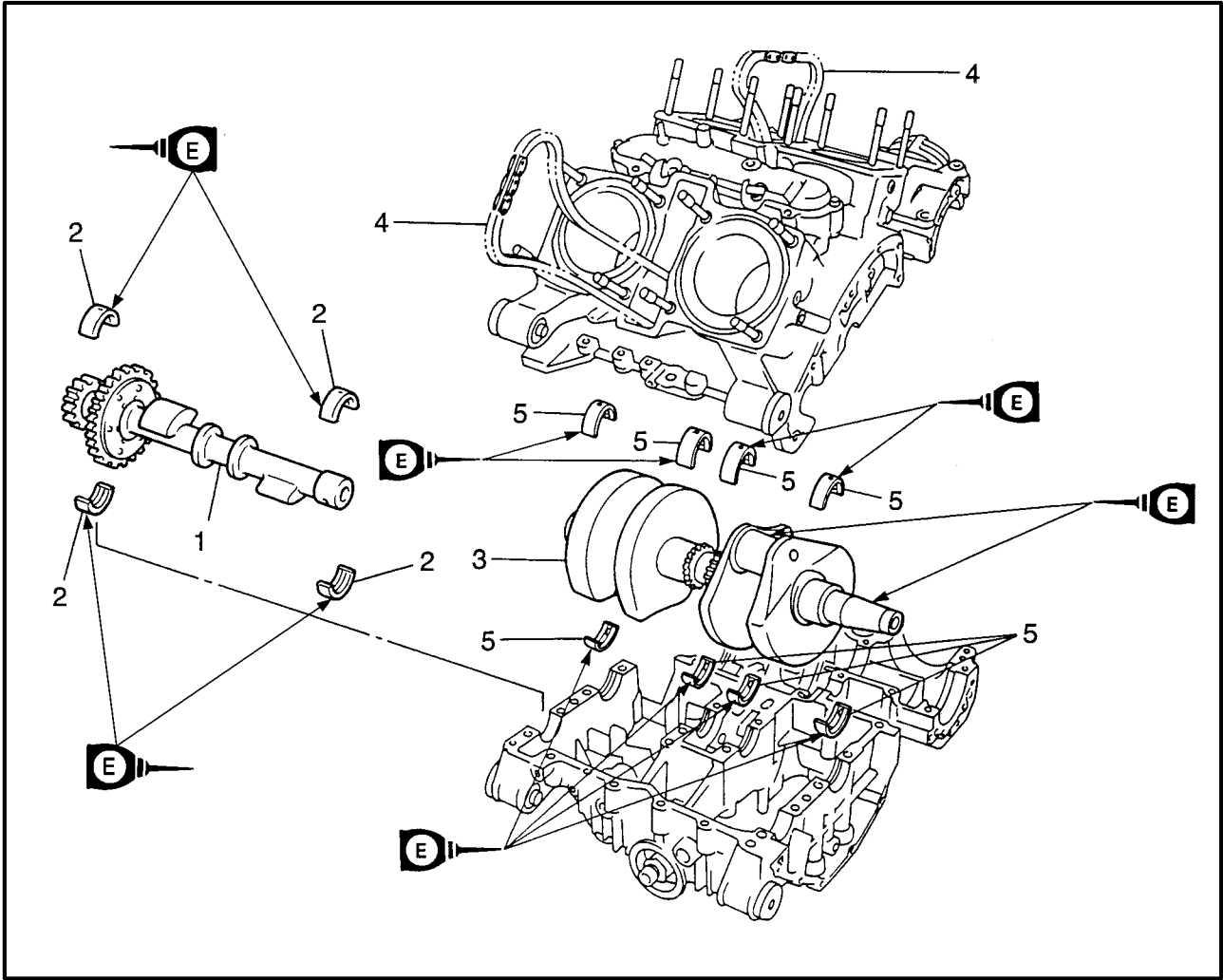
Always use new screws.

CAUTION:

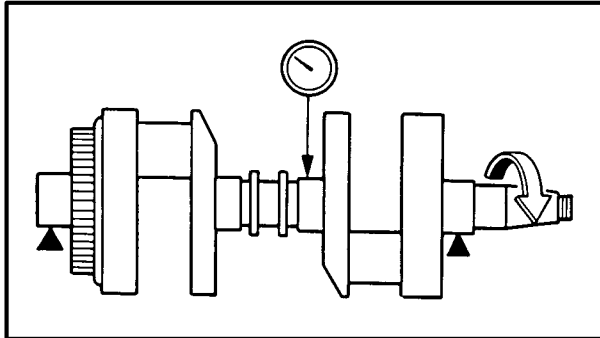
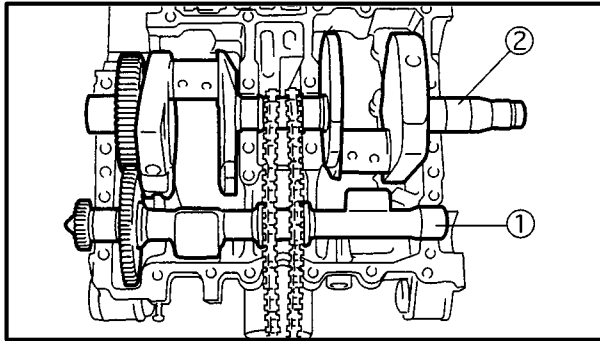
- Apply LOCTITE® on to the retainer screws.
- After tightening the middle driven shaft bearing housing retainer screws, be sure to stake them with a center punch.



CRANKSHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft assembly		
	Crankcase separation		Remove the parts in the order listed. Refer to "CRANKCASE".
1	Balancer shaft	1	Refer to "REMOVING/INSTALLING THE CRANKSHAFT".
2	Balancer shaft bearings	4	
3	Crankshaft	1	
4	Timing chains	2	
5	Main journal bearings	8	
			For installation, reverse the removal procedure.



EAS00387

REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:

- balancer shaft ①
- crankshaft assembly ②
- crankshaft journal upper bearings (from the upper crankcase)

NOTE:

Identify the position of each crankshaft journal upper bearing so that it can be reinstalled in its original place.

EAS00395

CHECKING THE CRANKSHAFT

1. Measure:

- crankshaft runout
- Out of specification → Replace the crankshaft.



Crankshaft runout
Less than 0.03 mm (0.0012 in)

2. Check:

- crankshaft journal surfaces
 - crankshaft pin surfaces
 - bearing surfaces
- Scratches/wear → Replace the crankshaft.

3. Measure:

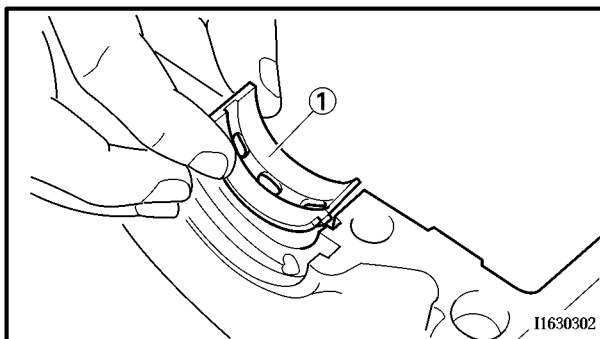
- crankshaft-journal-to-crankshaft-journal-bearing clearance
- Out of specification → Replace the crankshaft journal bearings.



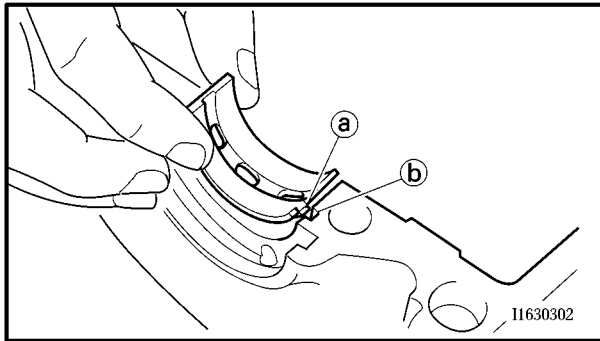
Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.020 ~ 0.038 mm
(0.0008 ~ 0.015 in)
<Limit>: 0.1 mm (0.004 in)

CAUTION:

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

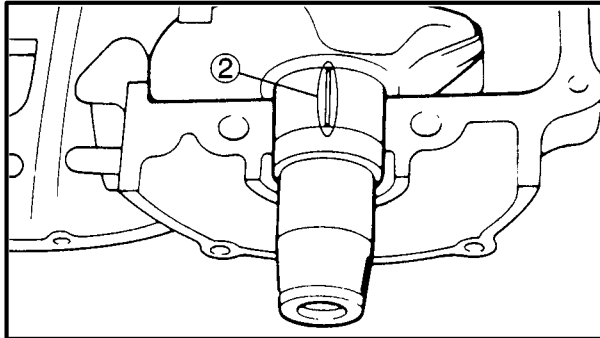


- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a bench.
- c. Install the crankshaft journal upper bearings ① and the crankshaft into the upper crankcase.



NOTE:

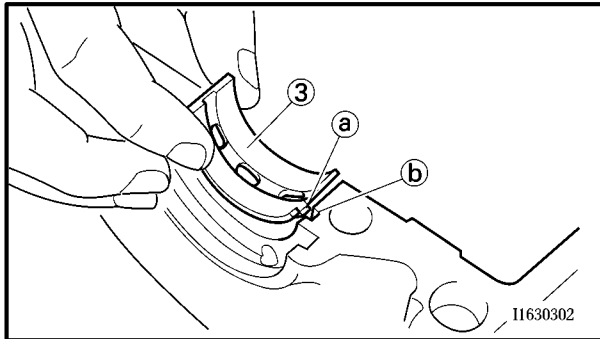
Align the projections (a) of the crankshaft journal upper bearings with the notches (b) in the crankcase.



- d. Put a piece of Plastigauge® (2) on each crankshaft journal.

NOTE:

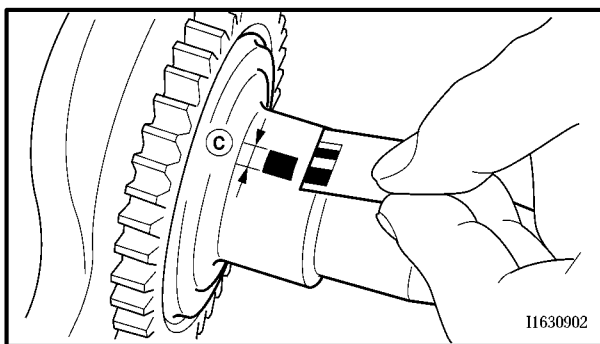
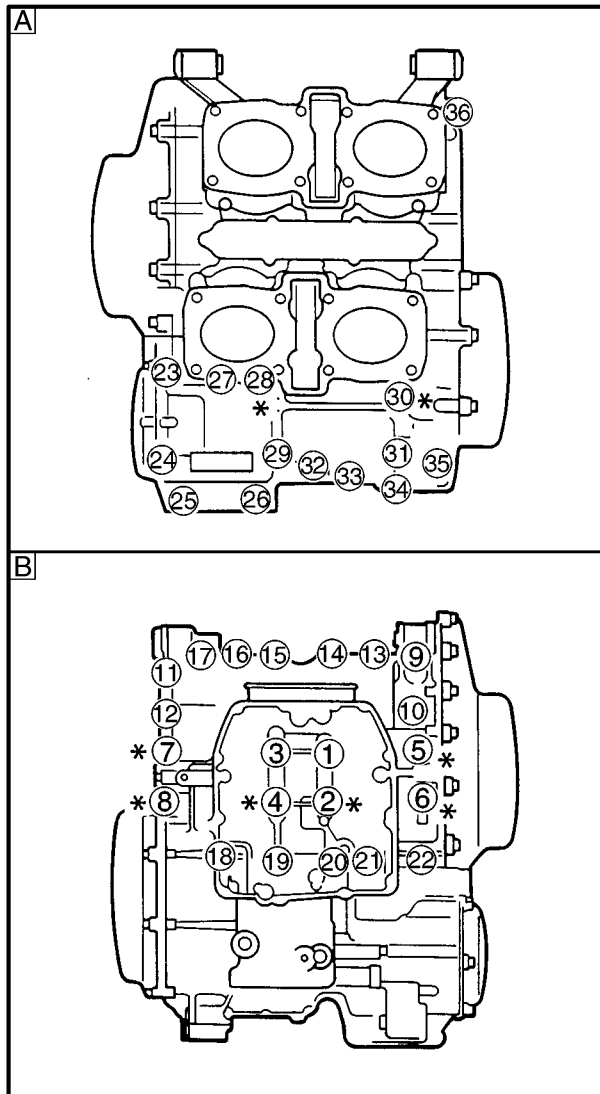
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



- e. Install the crankshaft journal lower bearings (3) into the lower crankcase and assemble the crankcase halves.

NOTE:

- Align the projections (a) of the crankshaft journal lower bearings with the notches (b) in the crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.

NOTE:

- Install copper washers on bolts ⑳ and ㉓.
- Install the coble holder on bolts ㉒ and ㉔.
- Install the washers on bolts ㉑ and ㉕ ~ ㉗.

A Upper crankcase

B Lower crankcase



M 10 bolt

40 Nm (4.0 m•kg, 29 ft•lb)

M 8 bolt

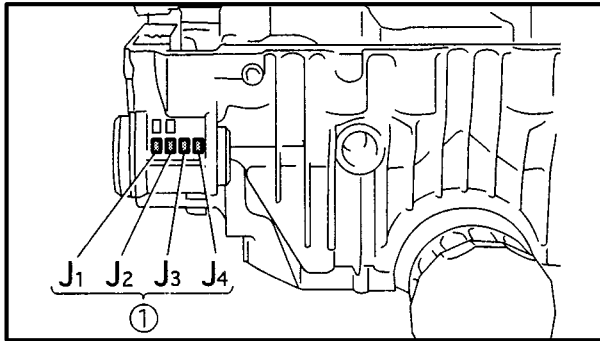
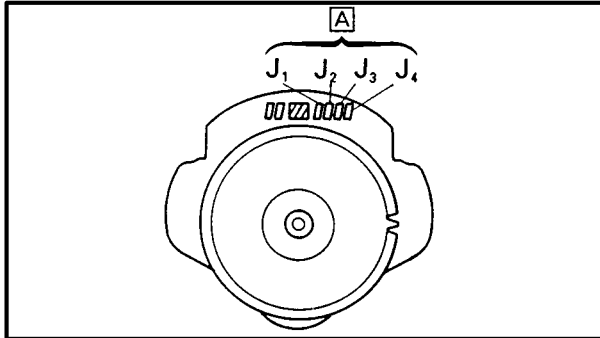
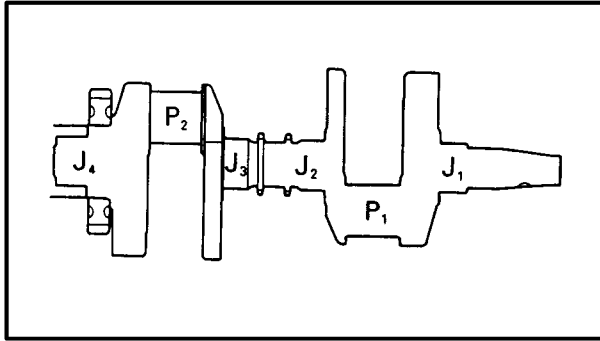
24 Nm (2.4 m•kg, 17 ft•lb)

M 6 bolt

12 Nm (1.2 m•kg, 8.7 ft•lb)

- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width © on each crankshaft journal.
If the clearance is out of specification, select replacement crankshaft journal bearings.





4. Select:

- crankshaft journal bearings ($J_1 \sim J_4$)

NOTE:

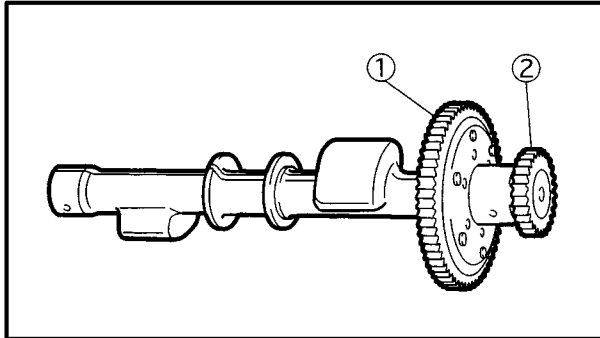
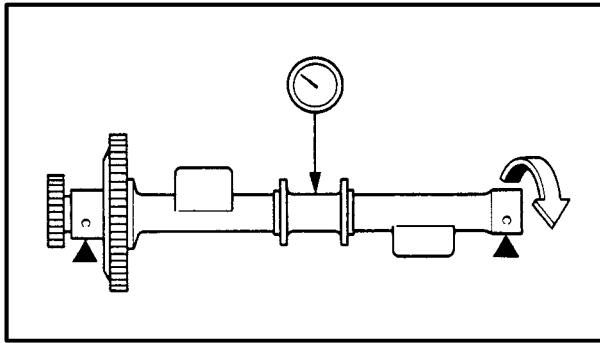
- The numbers **A** stamped into the crankshaft web and the numbers **①** stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- “J₁ ~ J₄” refer to the bearings shown in the crankshaft illustration.
- If “J₁ ~ J₄” are the same, use the same size for all of the bearings.

For example, if the crankcase “J” and crankshaft web “J₁” numbers are “6” and “2” respectively, then the bearing size for “J₁” is:

Bearing size for J_1 :

J_1 (crankcase) – J_1 (crankshaft web) =
 $6 - 2 = 4$ (green)

CRANKSHAFT JOURNAL BEARING COLOR CODE	
1	blue
2	black
3	brown
4	green
5	yellow
6	pink
7	red



CHECKING THE BALANCER SHAFT

1. Measure

- balancer shaft runout
out of specification → Replace the balancer shaft



Balancer shaft runout
Less than 0.03 mm (0.0012 in)

2. Check:

- balancer shaft journal surfaces
 - bearing surface
 - balancer shaft driven gear ①
 - water pump drive gear ②
- Scratches/wear → Replace the balancer shaft

3. Measure

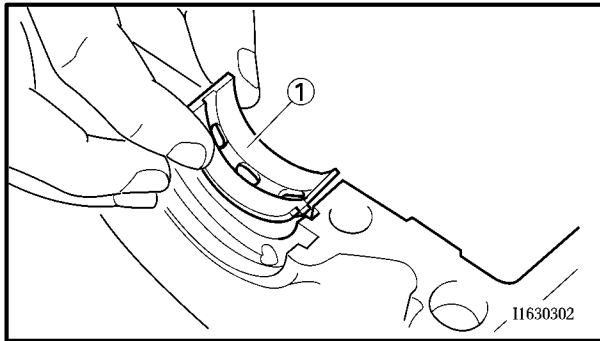
- balancer shaft journal-to-balancer shaft journal bearing clearance
Out of specification → Replace the balancer shaft journal bearings.



Balancer shaft journal-to-balancer shaft bearing clearance
0.020 ~ 0.048 mm (0.0008 ~ 0.0019 in)

CAUTION:

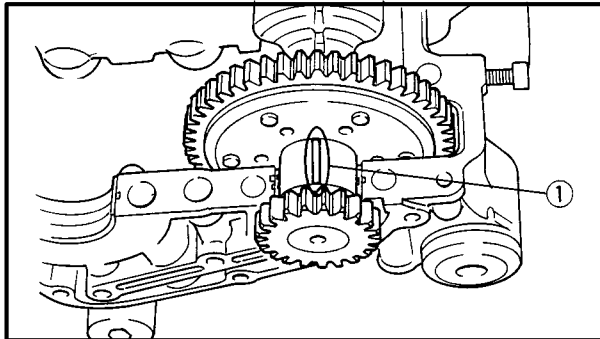
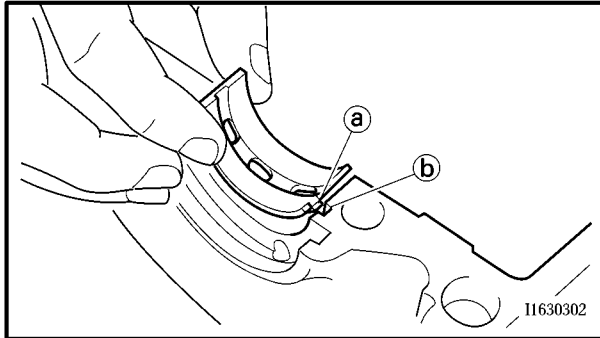
- Do not interchange the balancer shaft bearings
- To obtain the correct balancer shaft journal-to-balancer shaft journal bearing clearance and prevent engine damage, the balancer shaft journal bearings must be installed in their original positions.



- a. Clean the balancer shaft journal bearings, balancer shaft journals, and bearing portions of the crankcas.
- b. Place the upper crankcase upside down on a bench.
- c. Install the balancer shaft journal upper bearings ① and the balancer shaft into the upper crankcase.

NOTE:

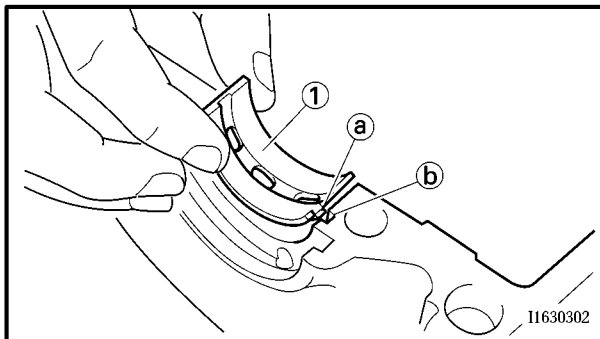
Align the projections (a) of the balancer shaft journal upper bearings with the notches (b) in the crankcase.



- d. Put a piece of Plastigauge® ① on each balancer shaft journal.

NOTE:

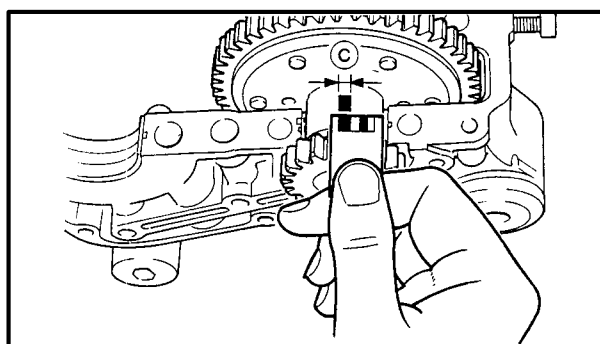
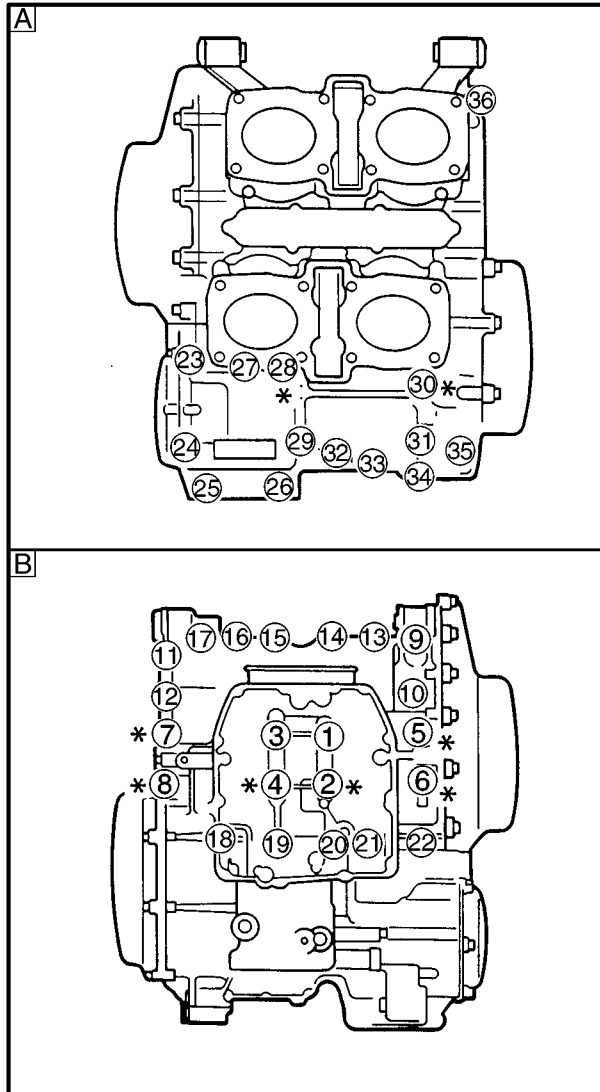
Do not put the Plastigauge® over the oil hole in the balancer shaft journal.



- e. Install the balancer shaft journal lower bearings ① into the lower crankcase and assemble the crankcase halves.

NOTE:

- Align the projections (a) of the balancer shaft journal lower bearings with the notches (b) in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.

NOTE:

- Install copper washers on bolts 28 and 30.
- Install the cable holder on bolts 22 and 32.
- Install the washers on bolts 2 and 4 ~ 8.

A Upper crankcase

B Lower crankcase



M 10 bolt

40 Nm (4.0 m•kg, 29 ft•lb)

M 8 bolt

24 Nm (2.4 m•kg, 17 ft•lb)

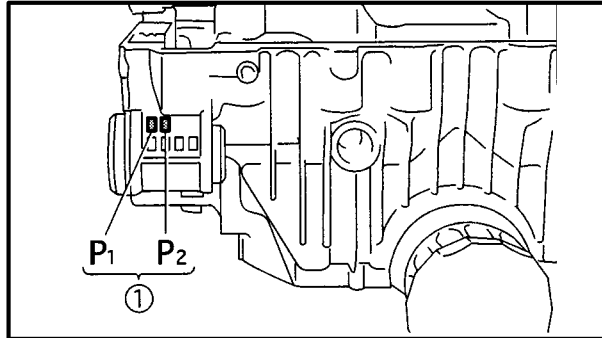
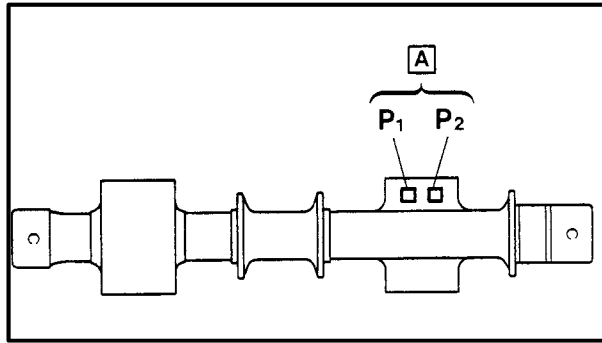
M 6 bolt

12 Nm (1.2 m•kg, 8.7 ft•lb)

g. Remove the lower crankcase and the balancer shaft journal lower bearings.

h. Measure the compressed Plastigauge® width © on each balancer shaft journal. If the clearance is out of specification, select replacement balancer shaft journal bearings.





4. Select:
- Balancer shaft journal bearings ($P_1 \sim P_2$)

NOTE:

The numbers **A** stamped into the balancer weight and the numbers **①** stamped into the lower crankcase are used to determine the replacement balancer shaft journal bearing sizes. “P₁ P₂” refer to the bearings shown in the balancer shaft illustration.

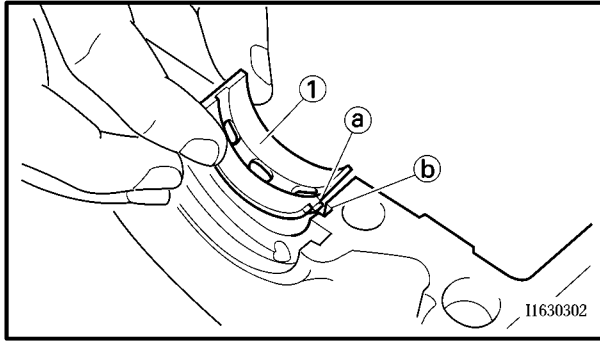
If "P₁ P₂" are the same, use the same size for all of the bearings.

For example, if the crankcase “P₁” and balancer weight “P₁” numbers are “6” and “2” respectively, then the bearing size for “P₁” is:

Bearing size for P_1 :

**P_1 (crankcase) – P_1 (balancer weight) =
6 – 2 = 4 (green)**

BALANCER SHAFT JOURNAL BEARING COLOR CODE	
1	blue
2	black
3	brown
4	green
5	yellow
6	pink
7	red



EAS00407

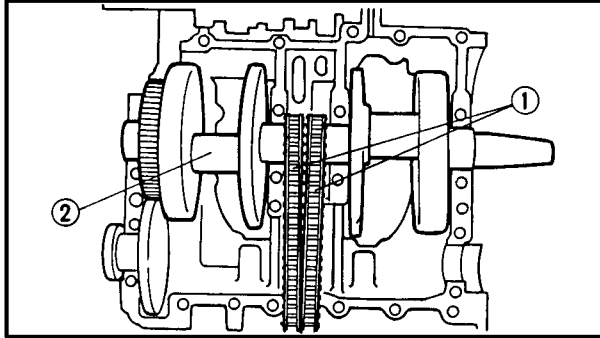
INSTALLING THE CRANKSHAFT

1. Install:

- crankshaft journal upper bearings (1)
(into the upper crankcase)

NOTE:

- Align the projections (a) on the crankshaft journal upper bearings with the notches (b) in the crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.

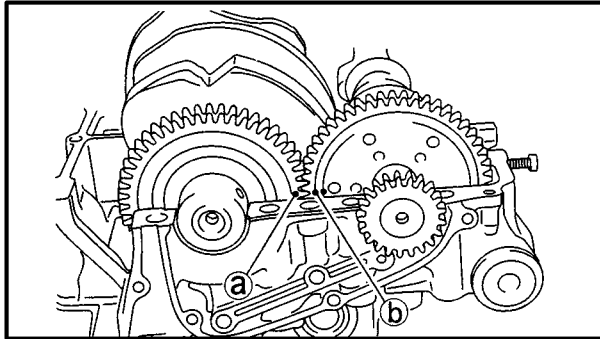


2. Install:

- timing chain (1)
(onto the crankshaft sprocket)
- crankshaft assembly (2)

NOTE:

- Pass the timing chain through the timing chain cavity.
- To prevent the timing chain from falling into the crankcase, fasten it with a wire.



EAS00410

INSTALLING THE BALANCER SHAFT

1. Install:

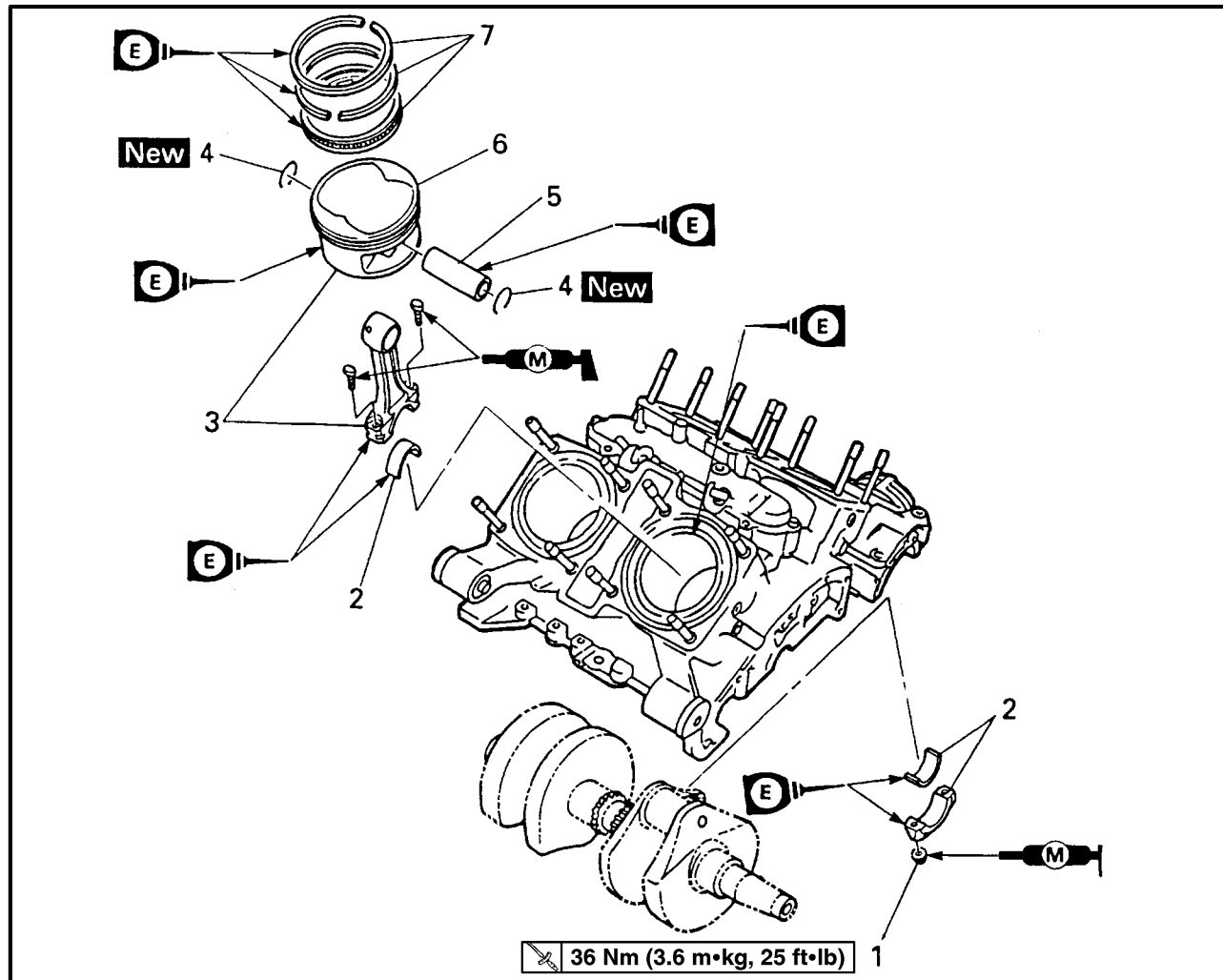
- balancer shaft

NOTE:

Align the punch mark (a) in the balancer shaft drive gear with the punch mark (b) in the balancer shaft driven gear.



CONNECTING RODS AND PISTONS



Order	Job/Part	Q'ty	Remarks
	Connecting rod and piston removal		
	Crankcase separation		Remove th parts in the order listed. Refer to "CRANKCASE".
1	Nuts (connecting rod caps)	8	Refer to "INSTALLING THE PISTONS AND CONNECTING RODS".
2	Connecting rod caps/plain bearings	4/8	
3	Connecting rods/pistons	4/4	Refer to "REMOVING/INSTALLING THE CONNECTING RODS AND PISTONS".
4	Piston pin clips	8	
5	Piston pins	4	
6	Pistons	4	
7	Piston rings	12	For installation, reverse the removal procedure.



EAS00393

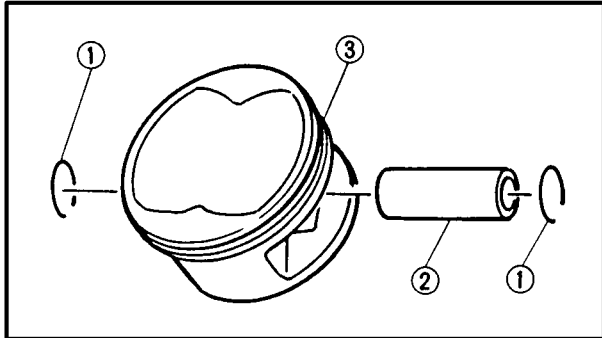
REMOVING THE CONNECTING RODS AND PISTONS

1. Remove:

- connecting rod bearings

NOTE:

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



The following procedure applies to all of the cylinders and pistons.

2. Remove:

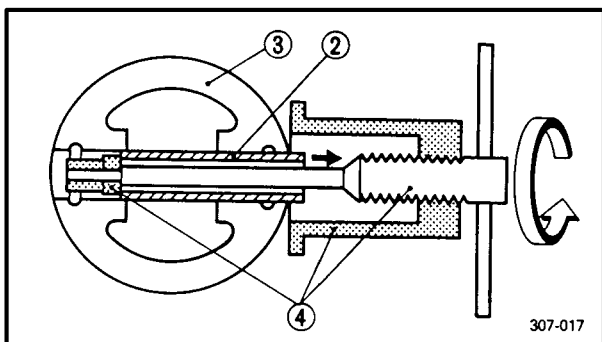
- piston pin clip (1)
- piston pin (2)
- piston (3)

CAUTION:

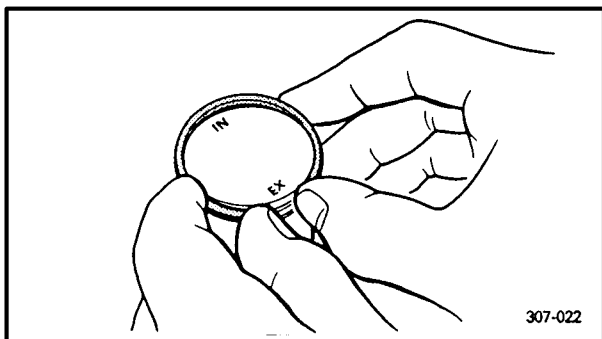
Do not use a hammer to drive the piston pin out.

NOTE:

- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip's groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller (4).



Piston pin puller
YU-01304, 90890-01304



3. Remove:

- top ring
- 2nd ring
- oil ring

NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS00260

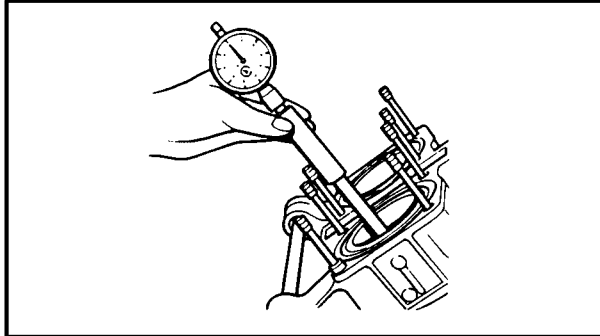
CHECKING THE CYLINDERS AND PISTONS

The following procedure applies to all of the cylinders and pistons.

1. Check:

- piston wall
- cylinder wall

Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.



2. Measure:

- piston-to-cylinder clearance

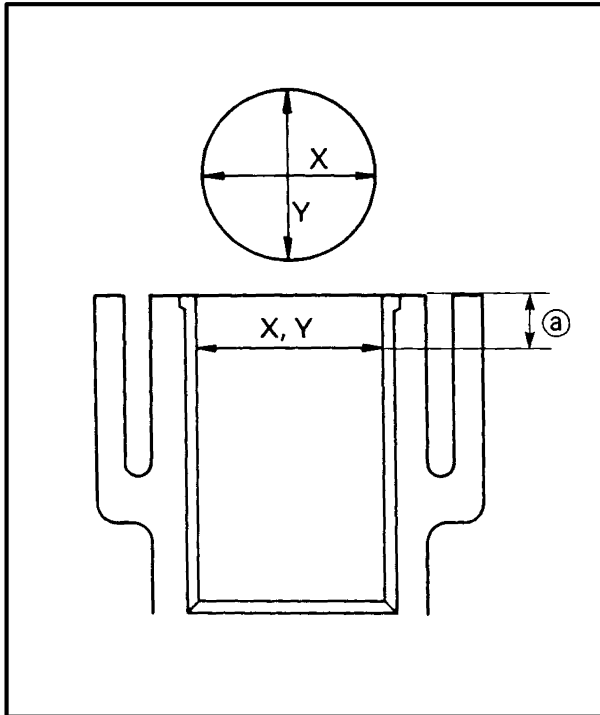


a. Measure cylinder bore “C” with the cylinder bore gauge.

① 40 mm (1.57 in) from the top of the cylinder

NOTE:

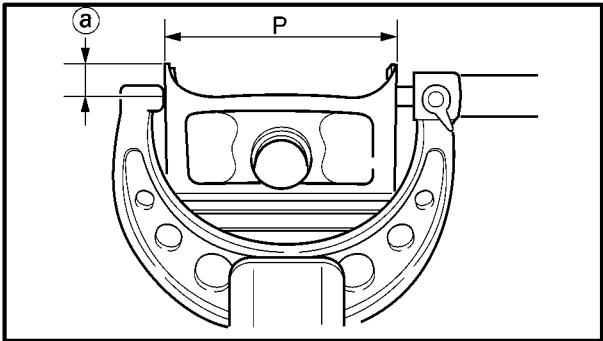
Measure cylinder bore “C” by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.



Cylinder bore gauge YU-03017

	Standard	Wear limit
Cylinder bore C	78.967 ~ 79.016 mm (3.1089 ~ 3.1109 in)	79.1 mm (3.114 in)
$C = \frac{X + Y}{2}$		

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



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



Micrometer
YU-03009

b) 4 mm (0.157 in) from the bottom edge of the piston.

	Piston size P
Standard	78.926 ~ 78.933 mm (3.107 ~ 3.108 in)
Oversize 2	79.25 mm (3.120 in)
Oversize 4	79.50 mm (3.130 in)

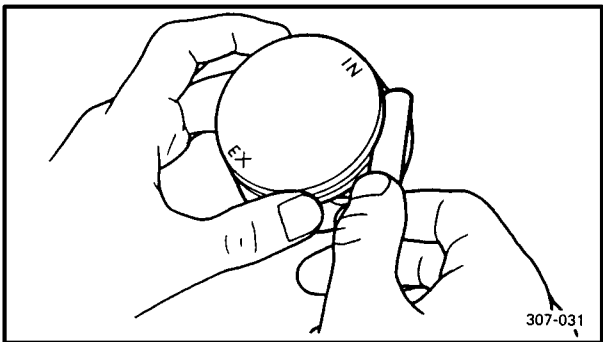
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore “C” –
Piston skirt diameter “P”



Piston-to-cylinder clearance
0.055 ~ 0.069 mm
(0.002 ~ 0.0027 in)
<Limit>: 0.15 mm (0.0059 in)

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



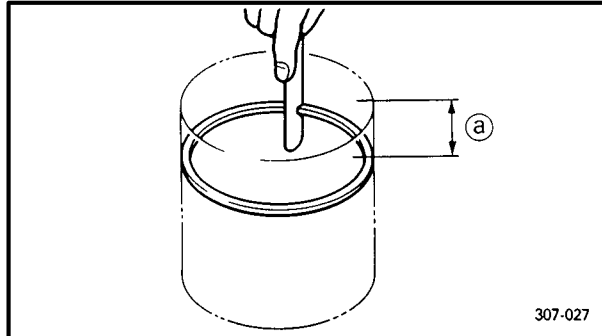
EAS00264

CHECKING THE PISTON RINGS

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

NOTE: _____

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

**Piston ring side clearance****Top ring**

0.03 ~ 0.07 mm

(0.001 ~ 0.003 in)

<Limit>: 0.12 mm (0.005 in)

2nd ring

0.02 ~ 0.06 mm

(0.001 ~ 0.002 in)

<Limit>: 0.12 mm (0.005 in)

2. Install:

- piston ring
(into the cylinder)

NOTE:

Level the piston ring into the cylinder with the piston crown as shown.

Ⓐ 40 mm (1.57 in)

3. Measure:

- piston ring end gap
Out of specification → Replace the piston ring.

NOTE:

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

**Piston ring end gap****Top ring**

0.20 ~ 0.35 mm

(0.008 ~ 0.014 in)

<Limit>: 0.55 mm (0.022 in)

2nd ring

0.35 ~ 0.50 mm

(0.014 ~ 0.020 in)

<Limit>: 0.8 mm (0.031 in)

Oil ring

0.3 ~ 0.9 mm (0.012 ~

0.035 in)

Piston ring oversize

- Top and 2nd piston rings

The size of the top and 2nd oversize piston rings is stamped on the top of each ring.

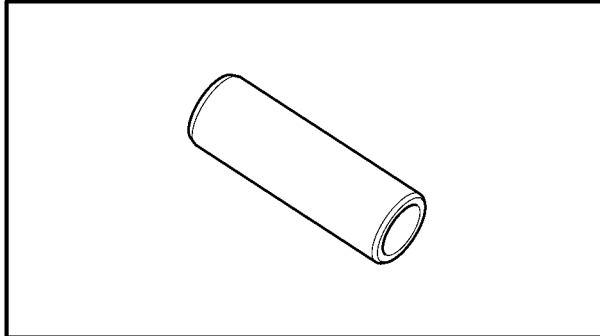
Oversize 2	0.25 mm (0.0098 in)
Oversize 4	0.50 mm (0.0197 in)



• Oil ring

The expander spacer of the oil ring is color-coded for size identification.

Size	Color
Oversize 2	Blue
Oversize 4	Red



EAS00266

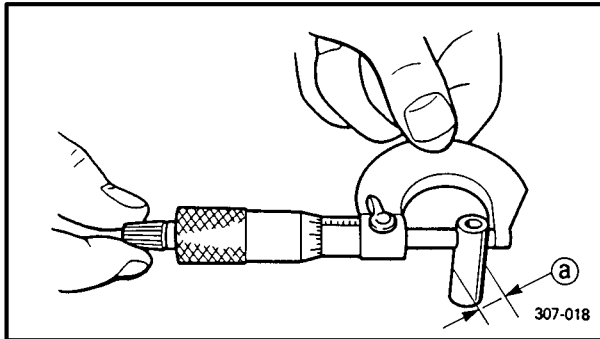
CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

1. Check:

• piston pin

Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.



2. Measure:

• piston pin outside diameter (a)

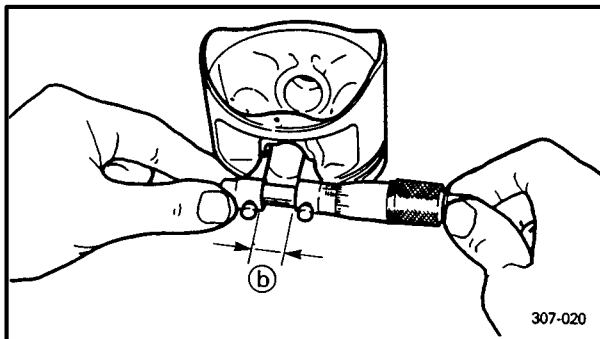
Out of specification → Replace the piston pin.



Piston pin outside diameter

18.991 ~ 19.000 mm

(0.7477 ~ 0.7480 in)



3. Calculate:

• piston-pin-to-piston clearance

Out of specification → Replace the piston pin.

Piston-pin-to-piston clearance =

Piston pin bore size (b) –

Piston pin outside diameter (a)



Piston-pin-to-piston clearance

0.004 ~ 0.0024 mm

(0.00016 ~ 0.0009 in)

<Limit>: 0.007 mm (0.0028 in)



EAS00395

CHECKING THE CRANKSHAFT AND CONNECTING RODS

1. Measure:

- crankshaft-pin-to-big-end-bearing clearance
Out of specification → Replace the big end bearings.



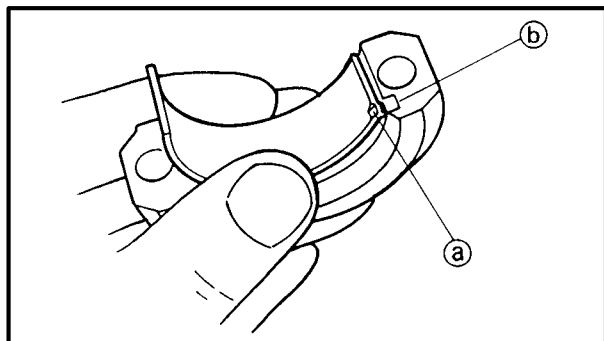
Crankshaft-pin-to-big-end-bearing clearance

0.021 ~ 0.039 mm
(0.0008 ~ 0.0015 in)

The following procedure applies to all of the connecting rods.

CAUTION:

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.



- Clean the big end bearings, crankshaft pins, and bearing portions of the connecting rods.
- Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

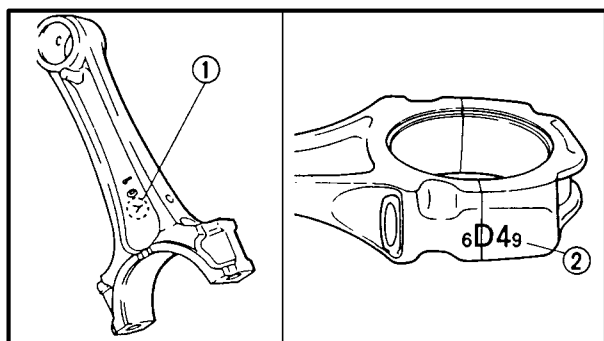
NOTE:

Align the projections (a) on the big end bearings with the notches (b) in the connecting rod and connecting rod cap.

- Put a piece of Plastigauge® on the crankshaft pin.
- Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nut seats.
- Make sure that the “Y” mark (1) on the connecting rod faces towards the left side of the crankshaft at #1, #3 cylinder.
- Make sure that the “Y” mark (1) on the connecting rod faces towards the right side of the crankshaft at #2, #4 cylinder.
- Make sure that the characters (2) on both the connecting rod and connecting rod cap are aligned.





e. Tighten the connecting rod nuts.

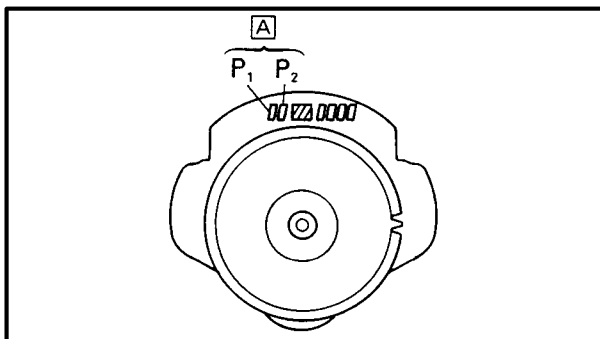
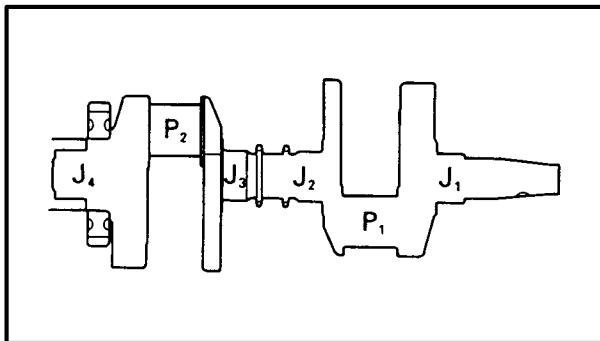
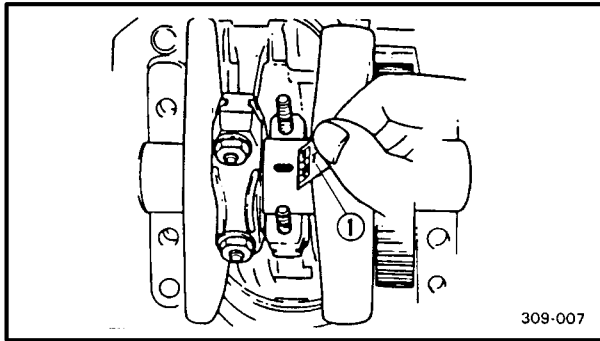
CAUTION:

- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- Without pausing, tighten the connecting rod nuts to the specified torque. Apply continuous torque between 3.0 and 3.6 m•kg (** and ** ft•lb). Once you reach 3.0 m•kg (** ft•lb), DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 3.0 and 3.6 m•kg (*: and *: ft•lb), loosen the connecting rod nut to less than 3.0 m•kg (** ft•lb) and start again.

Refer to “INSTALLING THE CONNECTING RODS”.



Connecting rod nut
36 Nm (3.6 m•kg, 25 ft•lb)



- f. Remove the connecting rod and big end bearings.
Refer to “REMOVING THE CONNECTING RODS”.
- g. Measure the compressed Plastigauge® width ① on the crankshaft pin.
If the clearance is out of specification, select replacement big end bearings.

2. Select:

- big end bearings ($P_1 \sim P_2$)

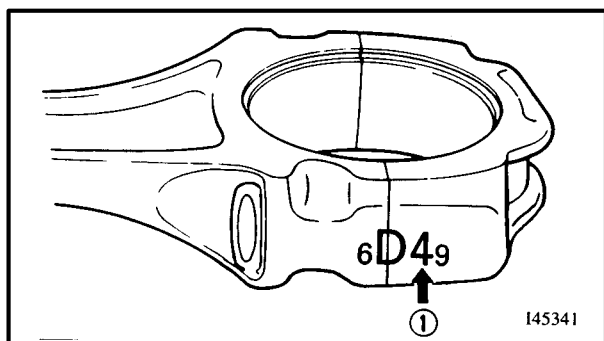
NOTE:

- The numbers **A** stamped into the crankshaft web and the numbers ① on the connecting rods are used to determine the replacement big end bearing sizes.
- “P₁” ~ “P₂” refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod “P₁” and the crankshaft web “P₁” numbers are “4” and “1” respectively, then the bearing size for “P₁” is:

Bearing size for “P₁”:

**“P₁” (connecting rod) – “P₁” (crankshaft)=
4 – 1 = 3 (brown)**



BIG END BEARING COLOR CODE

1	blue
2	black
3	brown
4	green



EAS00267

INSTALLING THE PISTONS AND CONNECTING RODS

1. Install:

- top ring ①
- 2nd ring ②
- lower oil ring rail ③
- upper oil ring rail ④
- oil ring expander ⑤

NOTE:

Be sure to install the piston rings so that the manufacturer's marks or numbers ① face up.

2. Install:

- piston ①
- piston pin ②
- piston pin clip (New) ③

NOTE:

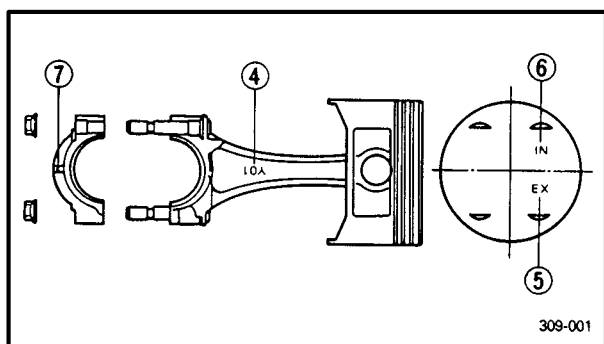
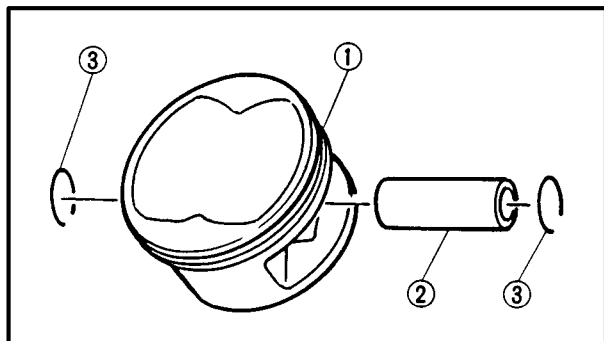
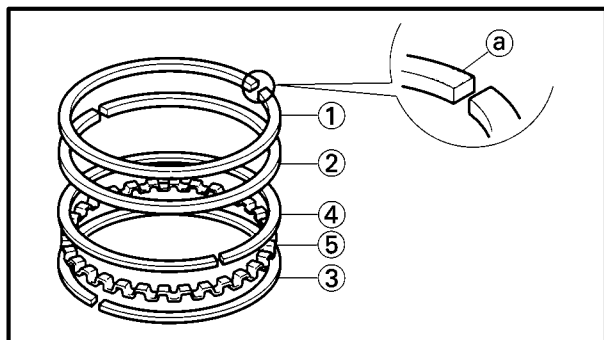
- Apply engine oil onto the piston pin.

④ "Y" mark

⑤ "EX" exhaust side

⑥ "IN" intake side

⑦ Projection

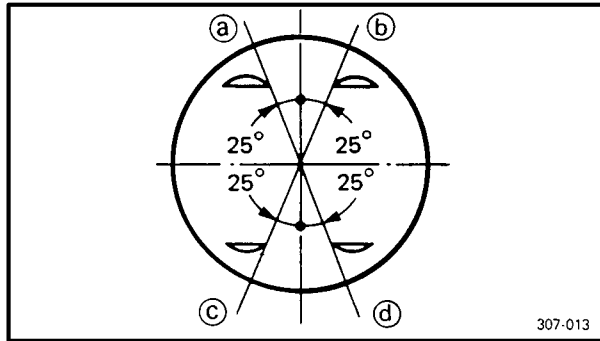


3. Lubricate:

- piston
 - piston rings
 - cylinder
- (with the recommended lubricant)

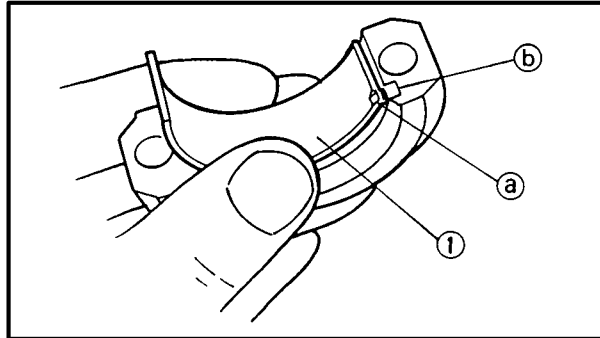


Recommended lubricant
Engine oil



4. Offset:
- piston ring end gaps

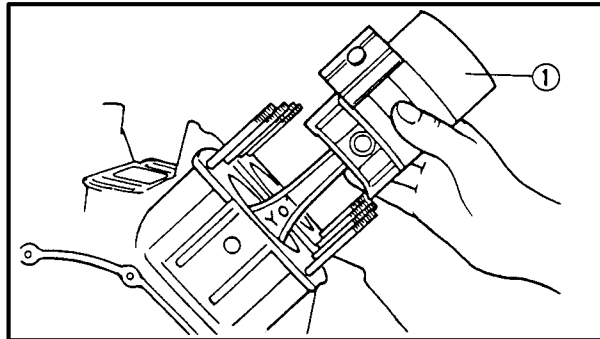
- (a) Top ring
- (b) Lower oil ring rail
- (c) Upper oil ring rail
- (d) 2nd ring



5. Install:
- plain bearings (1)

NOTE:

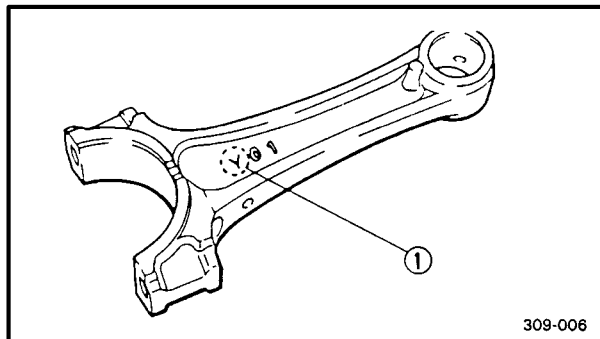
- Align the projection (a) of the bearings with the notches (b) in the connecting rod cap.
- Install each bearing in its original place.



6. Install:
- Piston ring compressor (1)



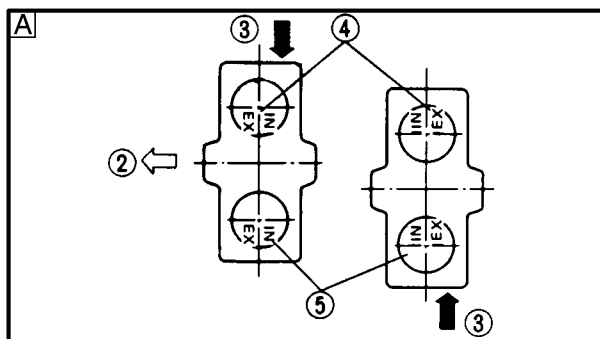
Piston ring compressor:
YM-8037, 90890-05158



7. Install:
- connecting rod and piston assembly

NOTE:

- The stamped "Y" mark (1) on the No.2 and No.4 connecting rods should face towards the right side of the crankcase.
- The stamped "Y" mark (1) on the No.1 and No.3 connecting rods should face towards the left side of the crankcase.



A Top view

2 Front

3 "Y" mark facing direction

4 Piston exhaust mark

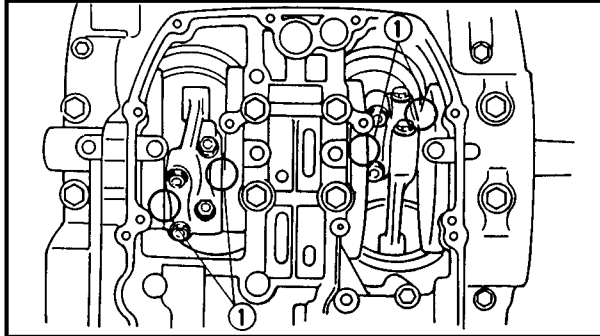
5 Piston intake mark



8. Install:
- connecting rod cap

NOTE: _____

Be sure that the characters on the side of the cap and connecting rod are aligned.



9. Tighten:
- nuts (connecting rod cap)

 **36 Nm (3.6 m•kg, 25 ft•lb)**

NOTE: _____

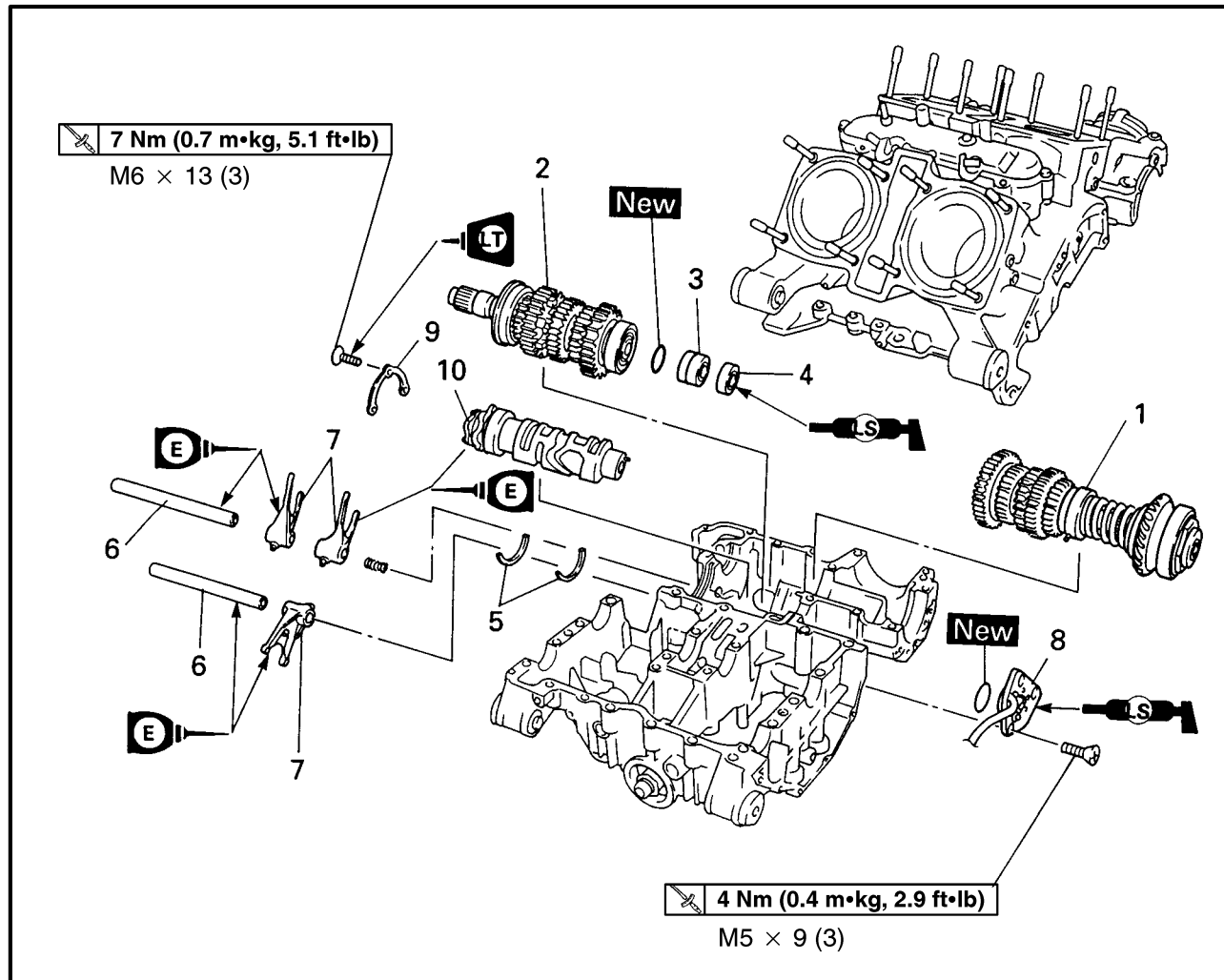
- Apply Molybdenum disulfide grease to the rod cap bolt threads and nut surfaces.
 - The projection ① on the connecting rod cap should face toward the crankshaft web.
- _____

CAUTION: _____

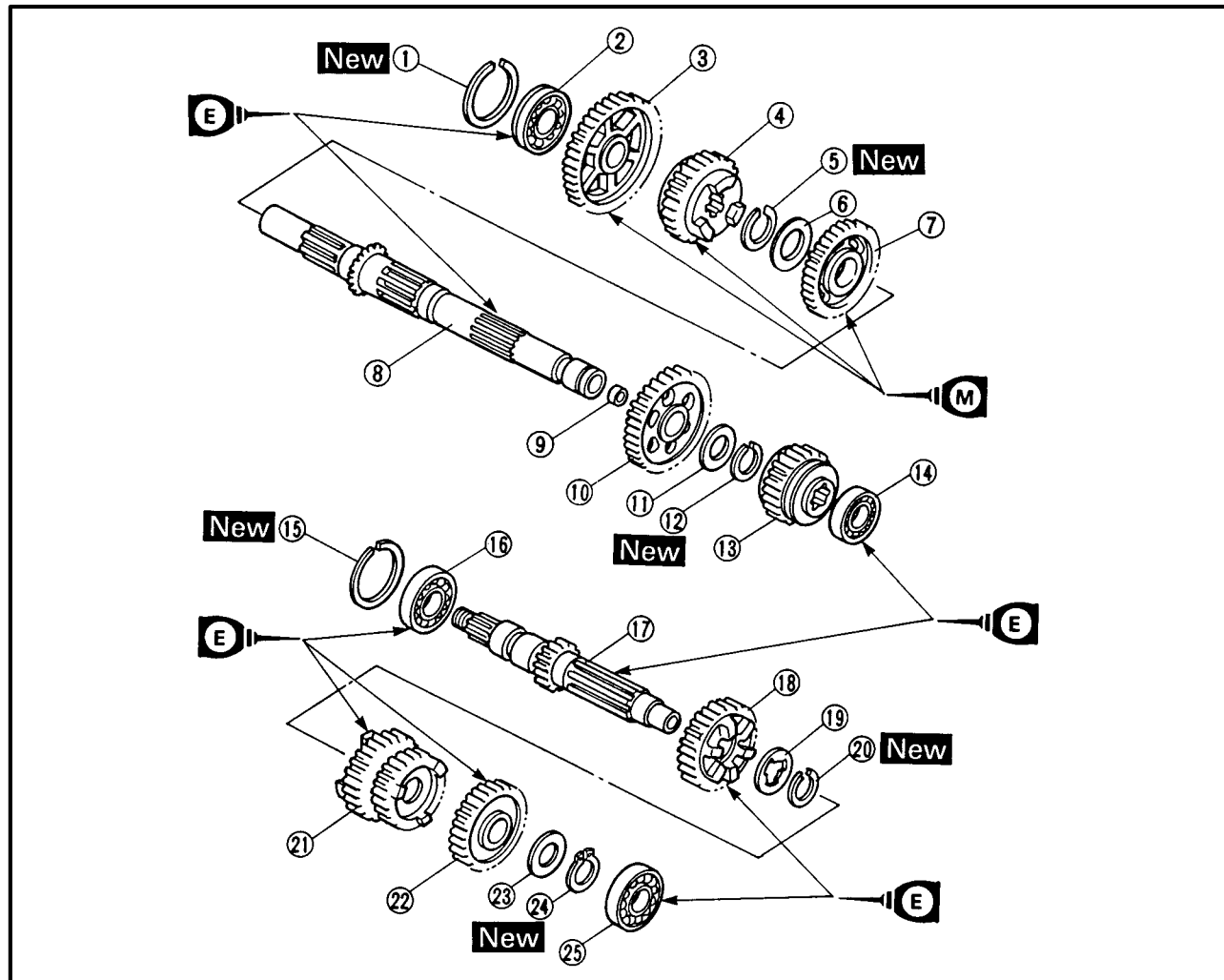
- When tightening the nuts be sure to use an F-type torque wrench.
 - Without pausing tighten to full torque specification. Apply continuous torque between 3.0 and 3.6 m•kg. Once you reach 3.0 m•kg **DO NOT STOP TIGHTENING** until final torque is reached. If the tightening is interrupted between 3.0 and 3.6 m•kg, loosen the nut to less than 3.0 m•kg and start again.
- _____



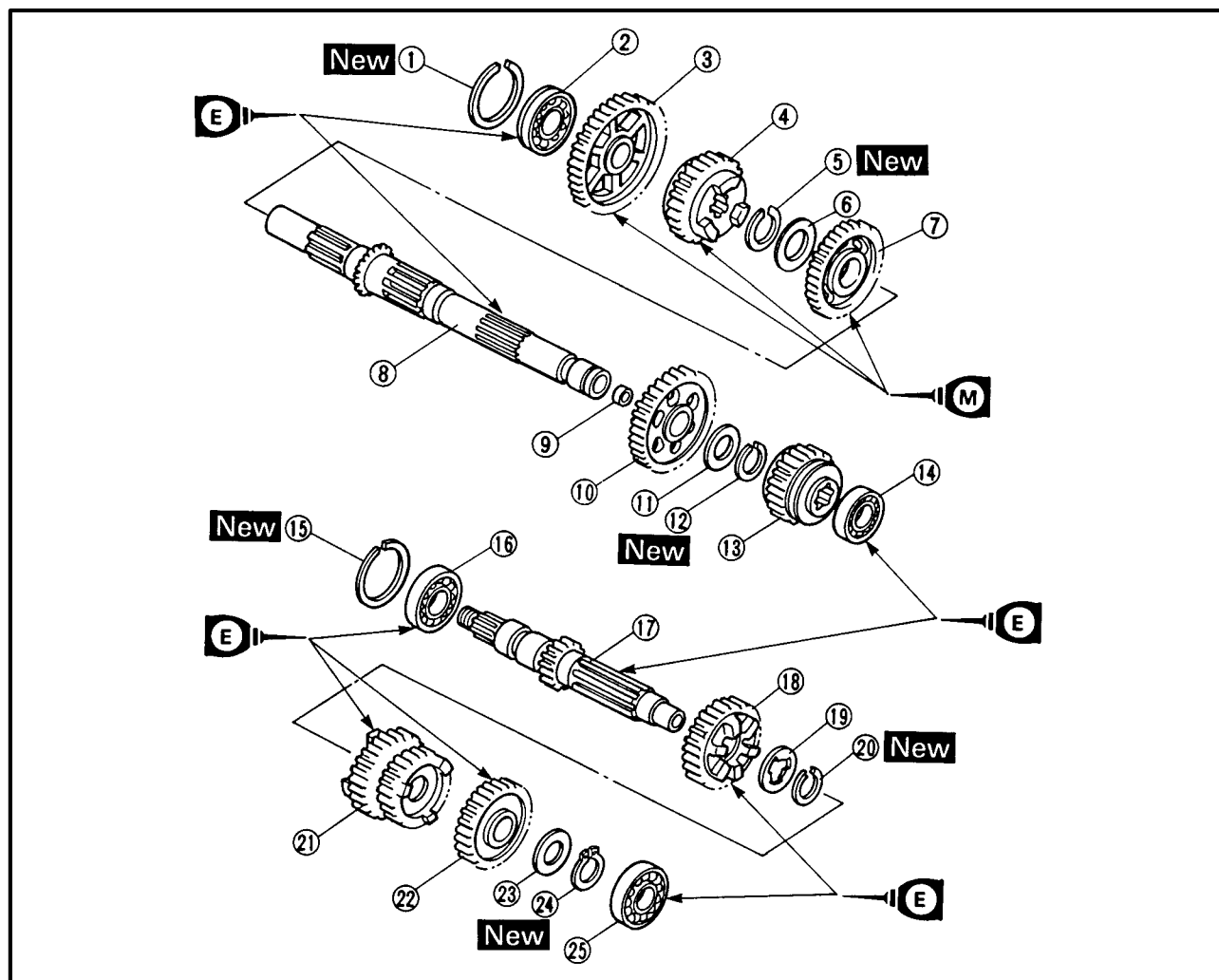
TRANSMISSION



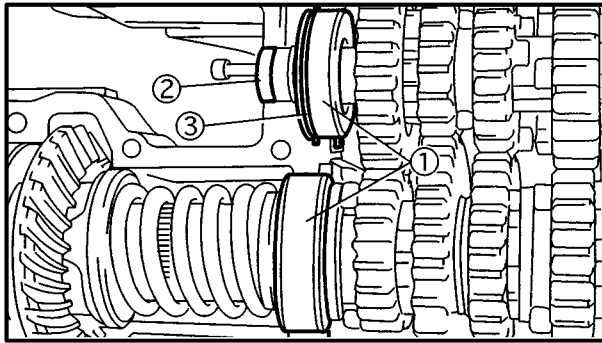
Order	Job/Part	Q'ty	Remarks
	Removing the transmission		
	Crankcase separation		Remove the parts in the order listed. Refer to "CRANKCASE".
1	Drive axle assembly	1	Refer to "INSTALLING THE TRANSMISSION".
2	Main axle assembly	1	
3	Push rod support bearing	1	
4	Oil seal	1	
5	Bearing circlips	2	Refer to "INSTALLING THE SHIFT FORKS",
6	Guide bars	2	
7	Shift forks	3	
8	Neutral switch	1	For installation, reverse the removal procedure.
9	Shift cam retainer	1	
10	Shift cam	1	



Order	Job/Part	Q'ty	Remarks
	Disassembling the transmission		
	Middle drive pinion gear assembly		Remove the parts in the order listed. Refer to "MIDDLE GEAR".
①	Circlip	1	
②	Bearing	1	
③	1st wheel gear	1	
④	4th wheel gear	1	
⑤	Circlip	1	
⑥	Washer	1	
⑦	3rd wheel gear	1	
⑧	Drive axle	1	
⑨	Plug	1	
⑩	2nd wheel gear	1	
⑪	Washer	1	
⑫	Circlip	1	



Order	Job/Part	Q'ty	Remarks
⑬	5th wheel gear	1	For installation, reverse the disassembly procedure.
⑭	Bearing	1	
⑮	Circlip	1	
⑯	Bearing	1	
⑰	Main axle	1	
⑱	4th pinion gear	1	
⑲	Washer	1	
⑳	Circlip	1	
㉑	2nd, 3rd pinion gear	1	
㉒	5th pinion gear	1	
㉓	Washer	1	
㉔	Circlip	1	
㉕	Bearing	1	



EAS00401

CHECKING THE BEARINGS AND OIL SEALS

1. Check:

- bearings ①

Clean and lubricate the bearings, then rotate the inner race with your finger.

Rough movement → Replace.

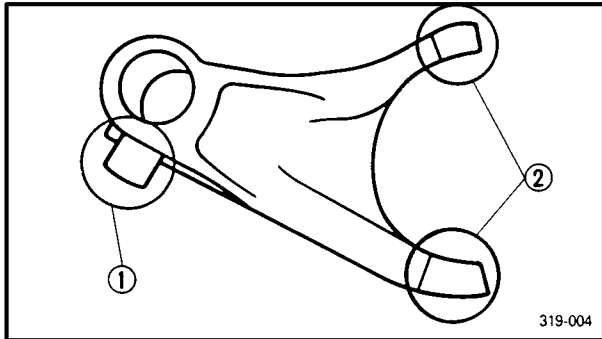
2. Check:

- oil seals ②

Damage/wear → Replace.

- circlips ③

Bends/damage/looseness → Replace.

EAS00402
EAS00421

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks and related components.

1. Check:

- shift fork cam follower ①

- shift fork pawl ②

Bends/damage/scoring/wear → Replace the shift fork.

2. Check:

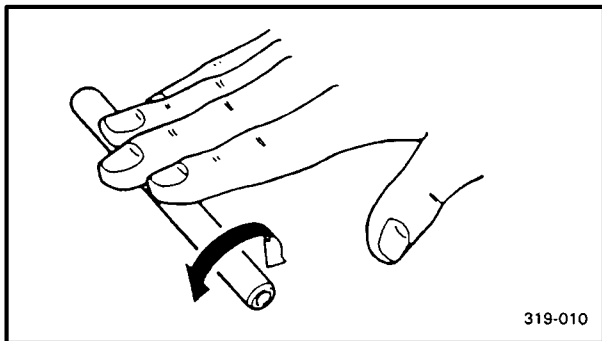
- shift fork guide bar

Roll the shift fork guide bar on a flat surface.

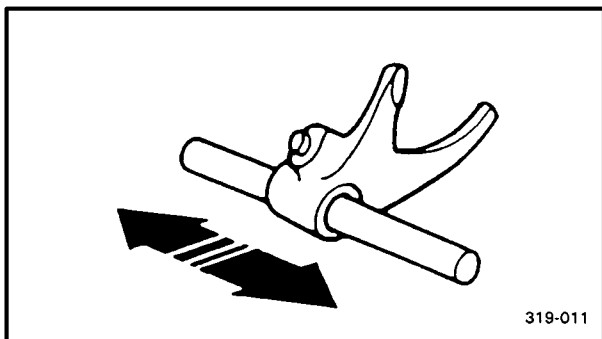
Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



319-010



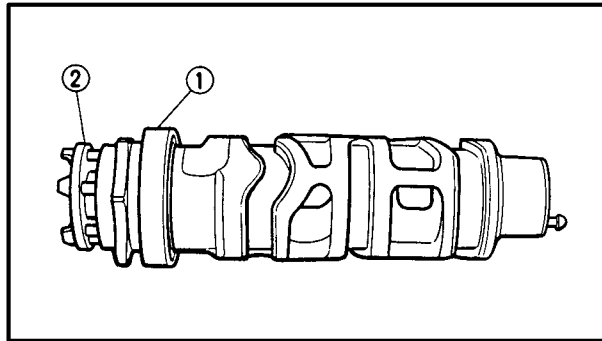
319-011

3. Check:

- shift fork movement

(on the shift fork guide bar)

Rough movement → Replace the shift forks and shift fork guide bar as a set.

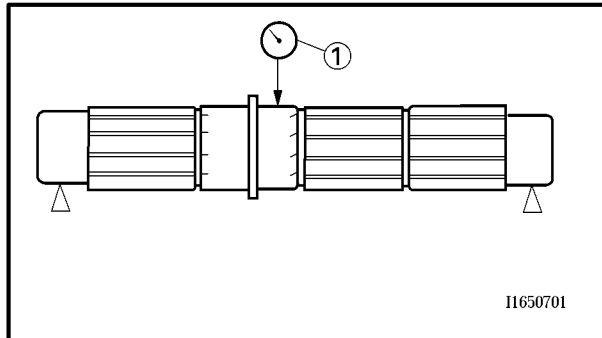


EAS00422

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- shift drum grooves
Damage/scratches/wear → Replace the shift drum.
- shift drum bearing ①
Damage/pitting → Replace.
- shift drum segment ②
Damage/wear → Replace.



I1650701

EAS00425

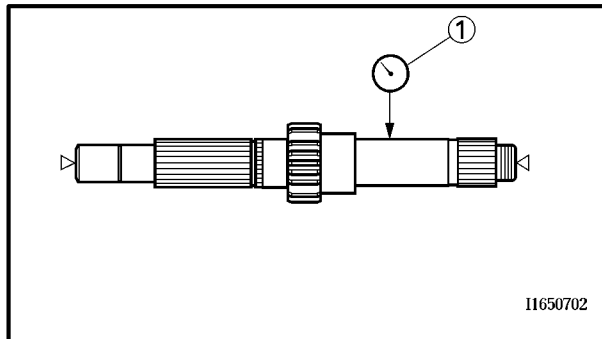
CHECKING THE TRANSMISSION

1. Measure:

- main axle runout
(with a centering device and dial gauge ①)
Out of specification → Replace the main axle.



Main axle runout limit
0.08 mm (0.003 in)



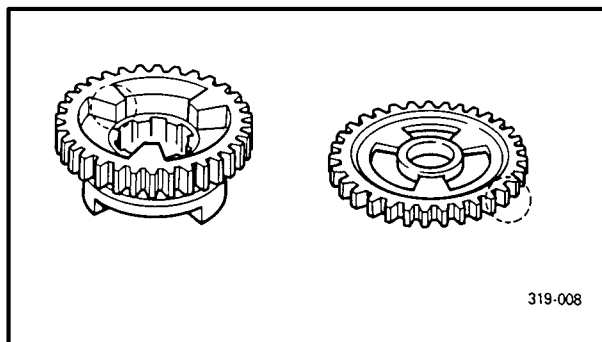
I1650702

2. Measure:

- drive axle runout
(with a centering device and dial gauge ①)
Out of specification → Replace the drive axle.



Drive axle runout limit
0.08 mm (0.003 in)



319-008

3. Check:

- transmission gears
Blue discoloration/pitting/wear → Replace the defective gear(-s).
- transmission gear dogs
Cracks/damage/rounded edges → Replace the defective gear(-s).

4. Check:

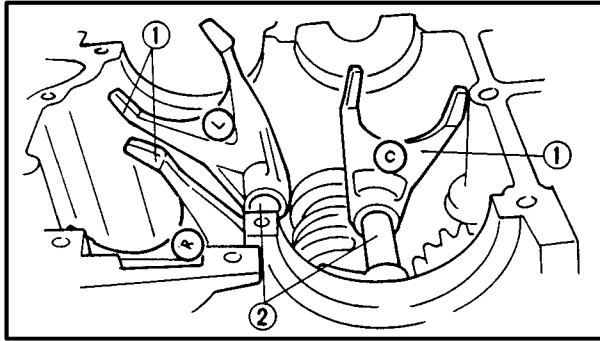
- transmission gear engagement
(each pinion gear to its respective wheel gear)
Incorrect → Reassemble the transmission axle assemblies.

5. Check:

- transmission gear movement
Rough movement → Replace the defective part(-s).

6. Check:

- circlips
Damage/bends/looseness → Replace.



EAS00426

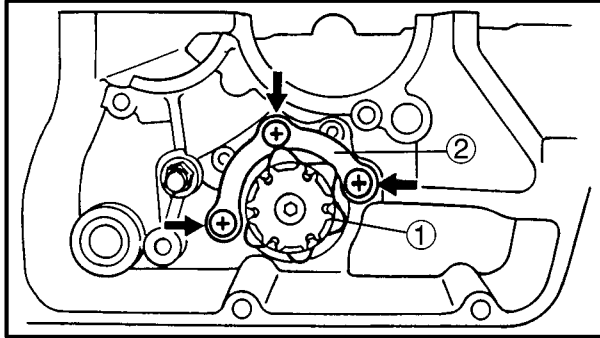
INSTALLING THE SHIFT FORKS

1. Install:

- shift forks ①
- shift fork guide bars ②

NOTE:

The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".



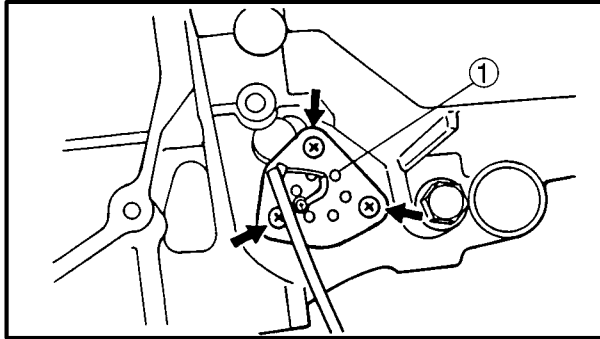
2. Install:

- shift cam ①
- shift cam retainer ②

7 Nm (0.7 m•kg, 5.1 ft•ld)

NOTE:

- Apply LOCTITE® #648 to the shift cam retainer screws.
- Rotate the shift cam to the neutral position.



3. Install:

- neutral switch ①

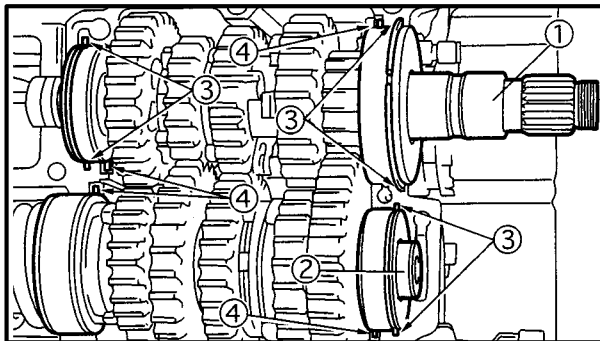
4 Nm (0.4 m•kg, 2.9 ft•ld)

NOTE:

Apply grease to the neutral switch.

⚠ WARNING

Always use a new O-ring.



EAS00428

INSTALLING THE TRANSMISSION

1. Install:

- main axle assembly ①
- drive axle assembly ②

NOTE:

- Make sure that the bearing circlips ③ are inserted into the grooves in the lower crankcase.
- The bearing pin ④ are inserted into the grooves in the lower crankcase.

2. Check:

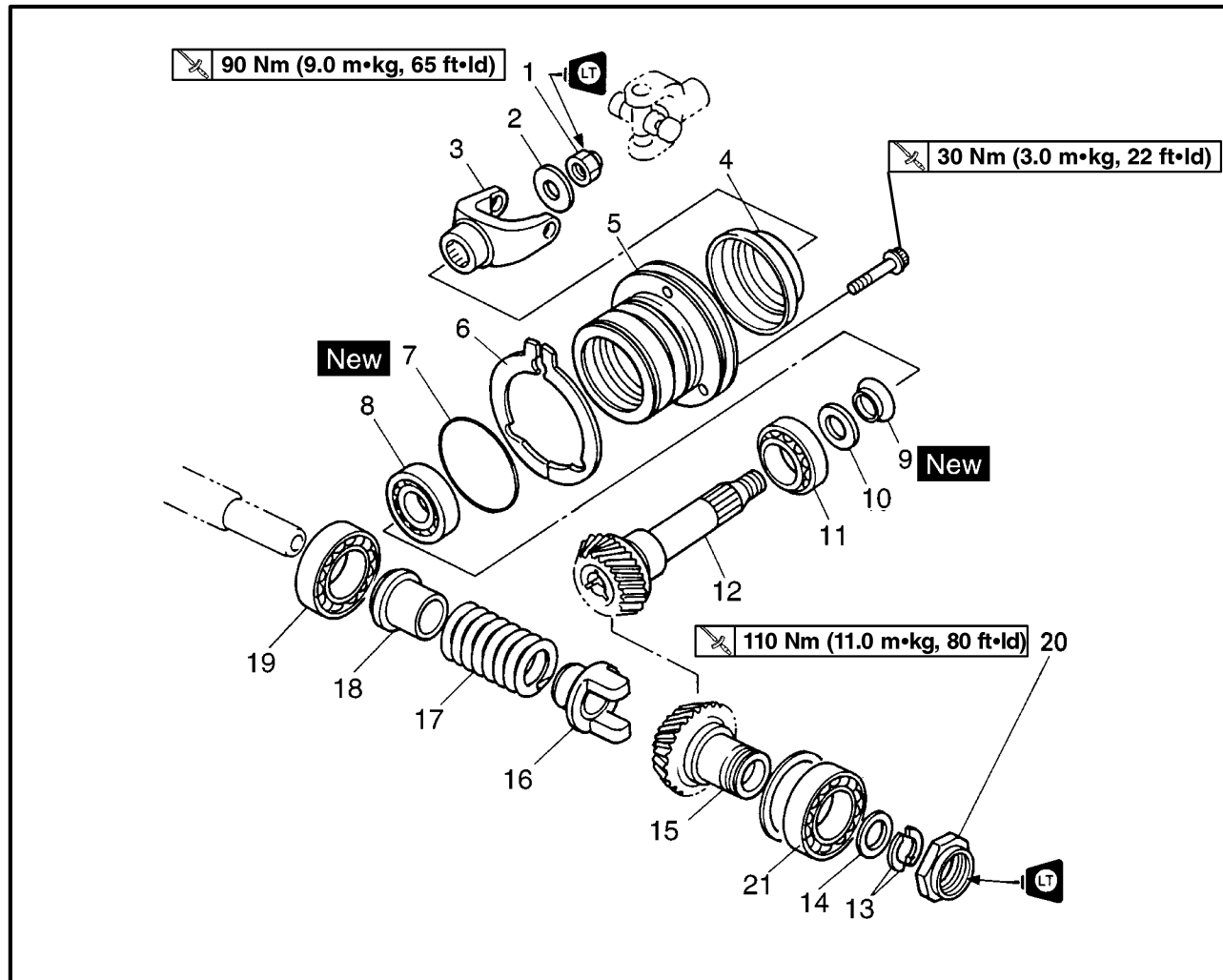
- transmission
Rough movement → Repair.

NOTE:

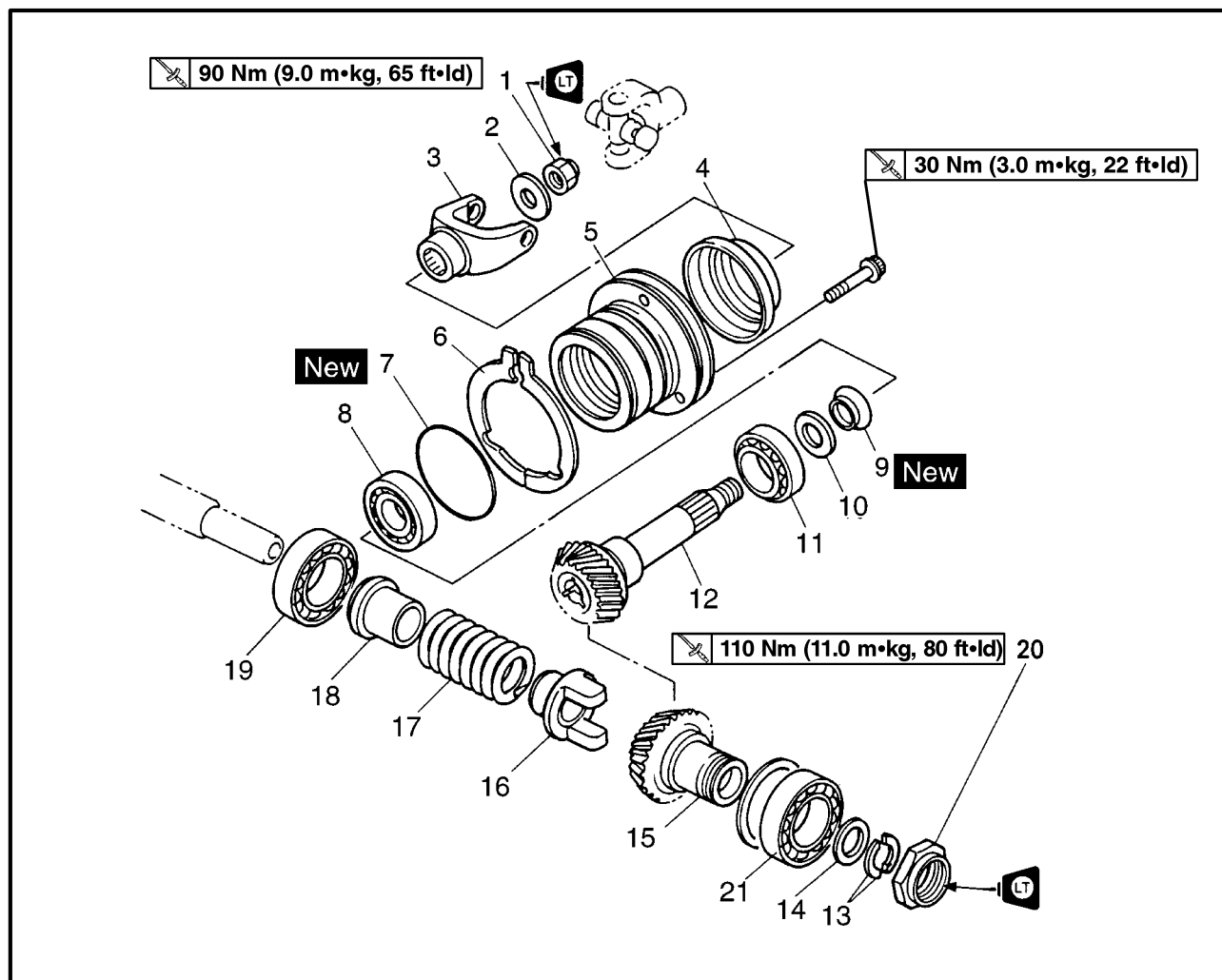
Oil each gear, shaft, and bearing thoroughly.



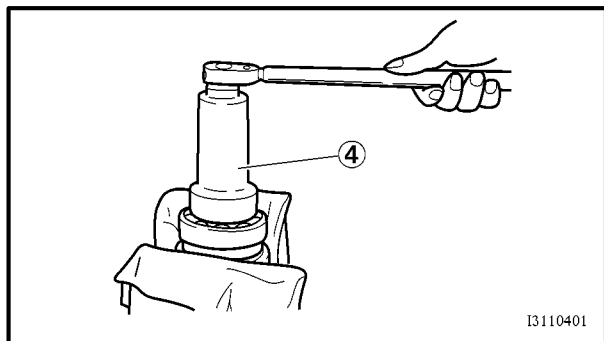
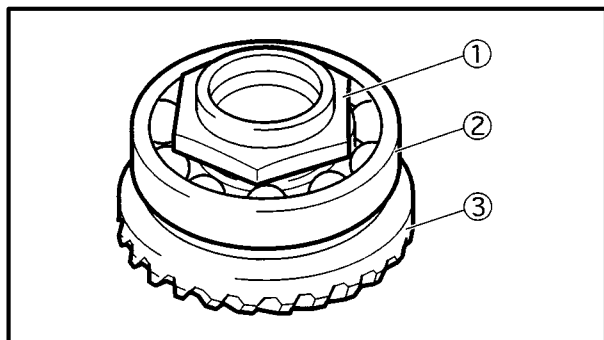
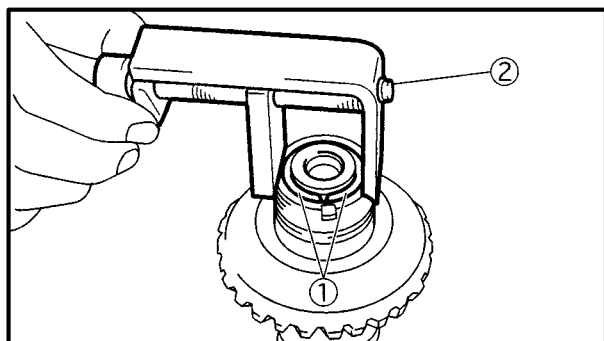
MIDDLE GEAR



Order	Job/Part	Q'ty	Remarks
	Removing the middle gear		
	Crankcase separation		Remove the parts in the order listed.
	Drive axle assembly		Refer to "CRANKCASE".
1	Nut	1	Refer to "TRANSMISSION".
2	Washer	1	Refer to "DISASSEMBLING/ ASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY".
3	Universal joint (yoke)	1	
4	Dust seal	1	
5	Middle driven gear housing	1	
6	Shims	2	
7	O-ring	1	
8	Bearing	1	
9	Collapsible collar	1	
10	Spacer	1	
11	Bearing	1	
12	Middle drive shaft	1	
13	Retainer	1	Refer to "DISASSEMBLING/ ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY".



Order	Job/Part	Q'ty	Remarks
14	Thrust washer	1	Refer to "DISASSEMBLING/ ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY". For installation, reverse the removal procedure.
15	Middle drive pinion gear	1	
16	Damper cam	1	
17	Damper spring	1	
18	Spring seat	1	
19	Bearing	1	
20	Nut	1	
21	Bearing	1	



EAS00434

DISASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Remove:
 - spring retainers ①

NOTE:

While compressing the spring with a damper spring compressor ②, remove the spring retainers.



Damper spring compressor
YM-33286, 90890-04090

2. Straighten the stake.
3. Remove:
 - middle drive shaft nut ①
 - bearing ②
 - middle drive shaft ③

a .Secure the middle drive shaft holder in a vice.

- b. Loosen the middle drive shaft nut with the middle drive shaft nut wrench (4).



Middle drive shaft nut wrench
YM-04054, 90890-04054

- c. Remove the middle drive shaft nut and bearing.



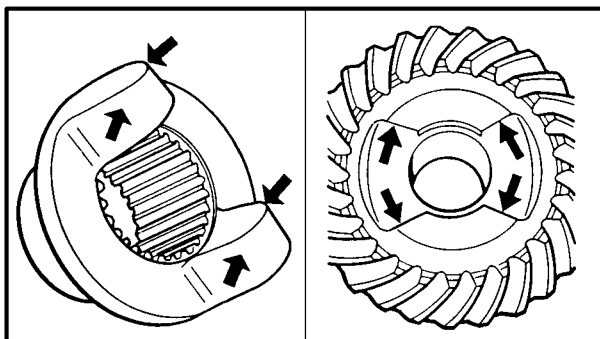
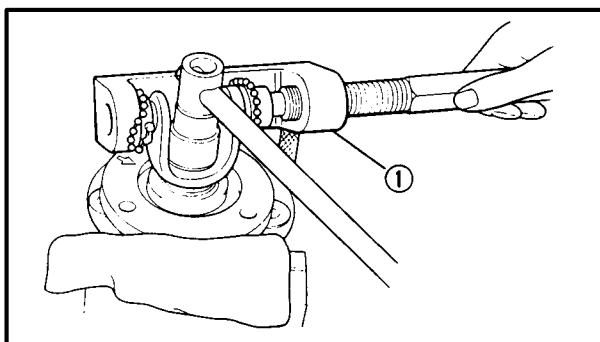
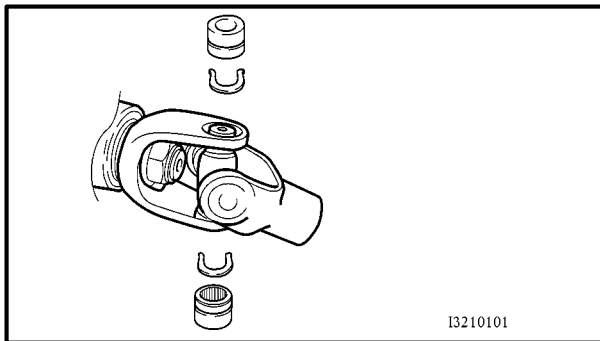
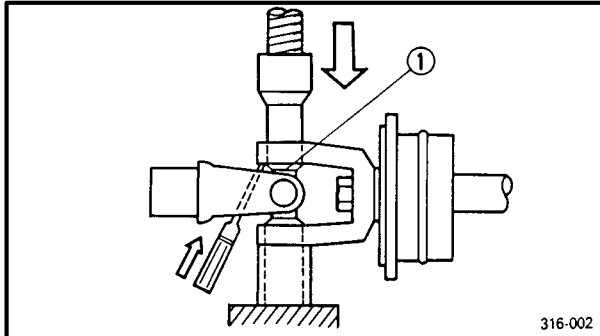
EAS00437

DISASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

NOTE:

The following procedure should only be performed if the middle drive gear or middle driven shaft bearing(-s) has to be replaced.

1. Remove:
 - universal joint



- Remove the circlips ①.
- Place the universal joint in a press.
- With a pipe of the proper diameter positioned beneath the universal joint driven yoke as shown, press the bearing into the pipe.

NOTE:

It may be necessary to lightly tap the universal joint driven yoke with a center punch.

- d. Repeat the above steps to remove the opposite side's bearing.
- e. Separate the universal joint yokes.

- middle driven shaft nut

NOTE:

While holding the universal joint driven yoke with the universal joint holder ①, loosen the middle driven shaft nut.

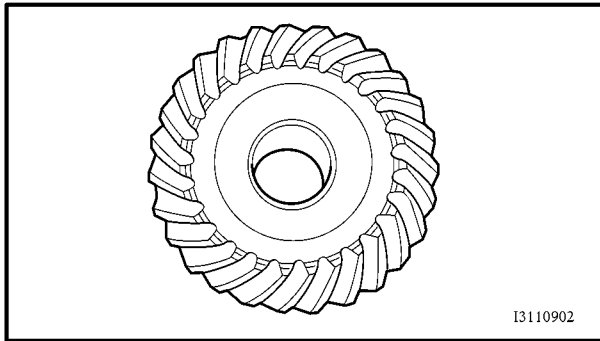


Universal joint holder
YM-04062, 90890-04062

EB414400

CHECKING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Check:
 - damper cam surface
Scratches/wear → Replace the damper cam.
2. Check:
 - spring
Cracks/damage → Replace.



EAS00439

CHECKING THE MIDDLE DRIVEN SHAFT ASSEMBLY

1. Check:

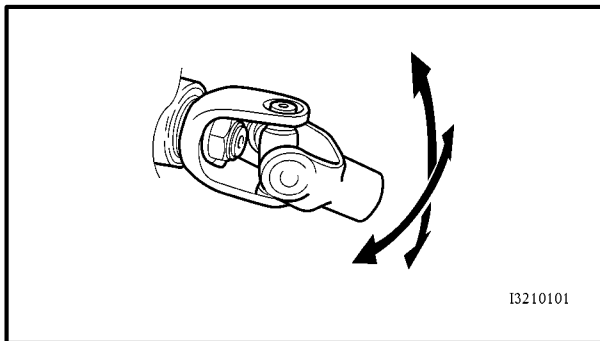
- middle driven gear
Galling/pitting/wear → Replace the middle driven shaft assembly.

2. Check:

- bearings
Damage/pitting → Replace the middle drive shaft bearing housing assembly.

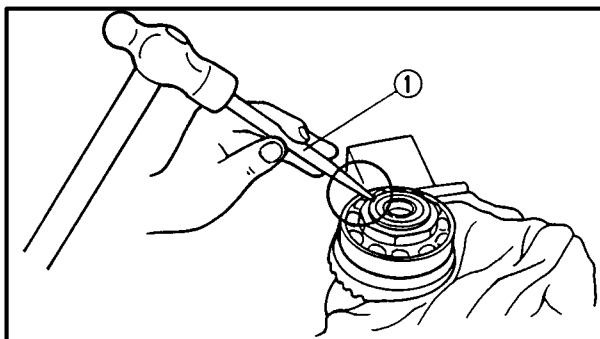
3. Check:

- O-ring
- oil seal
Damage → Replace the defective part(-s).



4. Check:

- universal joint movement
Rough movement → Replace the universal joint.



EAS00441

ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

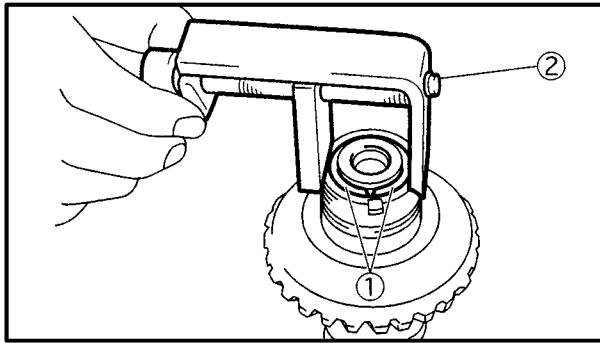
1. Tighten:

- middle drive shaft nut

110 Nm (11 m•kg, 80 ft•lb)

NOTE:

Lock the threads on the middle drive shaft nut by staking them with a center punch ①.



2. Install:
- spring retainers ①

NOTE:

While compressing the spring with a damper spring compressor ②, and then install the spring retainers.



Damper spring compressor
YM-33286, 90890-04090

EAS00443

ASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY**NOTE:**

The following points are critical when assembling the middle gears:

- The collapsible collar must be replaced whenever the middle driven shaft assembly is removed from the middle driven shaft bearing housing.
- When performing this procedure for the first time, be sure to have at least one extra collapsible collar on hand.
- If there is insufficient preload on the bearings, the middle driven shaft can move slightly, allowing oil to leak past the seal. In addition to torquing the middle driven shaft nut to specification, you must also check the spinning torque (bearing preload).

1. Install:
- bearing outer race
(into the middle driven shaft bearing housing)

⚠ WARNING

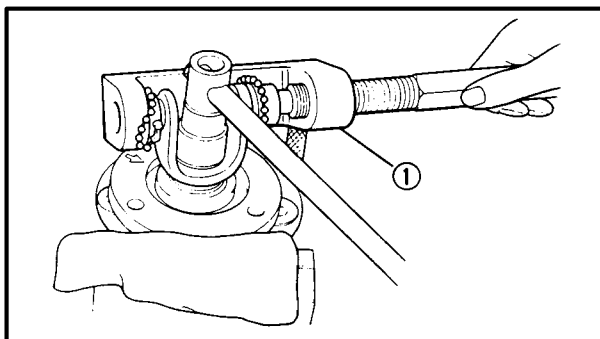
Do not press the bearing outer race. During installation, always press the bearing inner race carefully.

2. Tighten:
- middle driven shaft nut

90 Nm (9.0 m•kg, 65 ft•lb)

CAUTION:

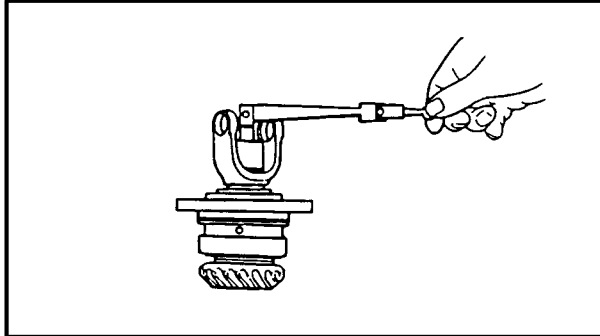
Apply LOCTITE® on to the middle driven shaft nut.



While holding the universal joint driven yoke with the universal joint holder ①, tighten the middle driven shaft nut.

**CAUTION:**

Tighten the middle driven shaft nut in small increments, checking the torque it takes to keep the middle driven gear turning in the middle driven shaft bearing housing – not the torque it takes to start it turning.



Universal joint holder
YM-04062, 90890-04062

3. Measure:

- middle driven gear spinning torque (with the beam-type torque wrench)
Under specification → Repeat steps (2) and (3).

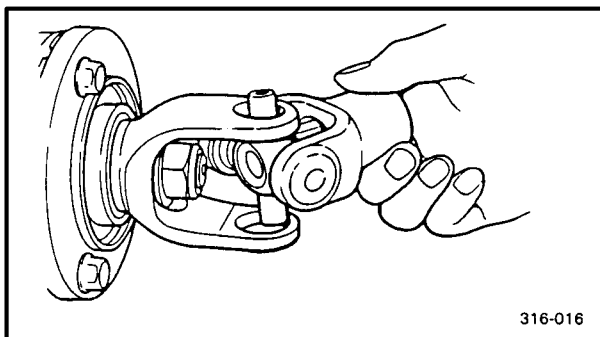
CAUTION:

- Never exceed the standard spinning torque.
- If the spinning torque is not high enough, tighten the middle driven shaft nut slightly and check the spinning torque again. Repeat these steps until the proper spinning torque is obtained.

If the spinning torque specification is exceeded, remove the middle driven shaft assembly, install a new collapsible collar, and repeat steps (1) – (3).



Middle driven gear spinning torque
0.4 ~ 0.5 Nm (0.04 ~ 0.05 m•kg,
0.29 ~ 0.36 ft•lb)



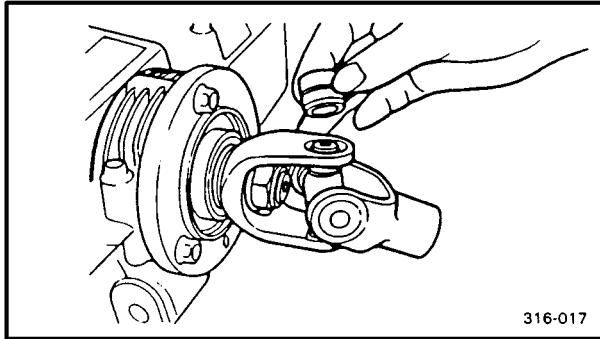
316-016

4. Install:

- universal joint driven yoke/cross joint (into the universal joint drive yoke)

CAUTION:

Do not hammer the universal joint drive yoke or the collapsible collar may be distorted. This will result in a change in the standard spinning torque, requiring replacement of the collapsible collar and reassembly of the middle driven shaft assembly.



5. Install:

- bearings
(onto the universal joint driven yoke/cross joint)

CAUTION:

Then needles can easily fall out of their races, so check each bearing carefully. Slide the universal joint driven yok assembly back and forth on the bearings. If a needle is out of place, the yoke will not go all the way onto the bearings.

6. Press each bearing into the universal joint driven yoke assembly with a socket of the proper size.

NOTE:

The bearings must be inserted far enough into the universal joint driven yoke assembly so that circlips can be installed.

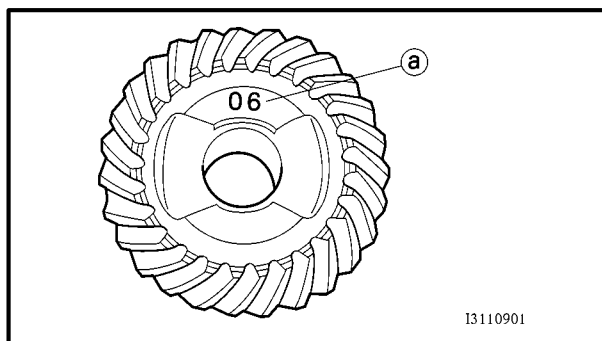
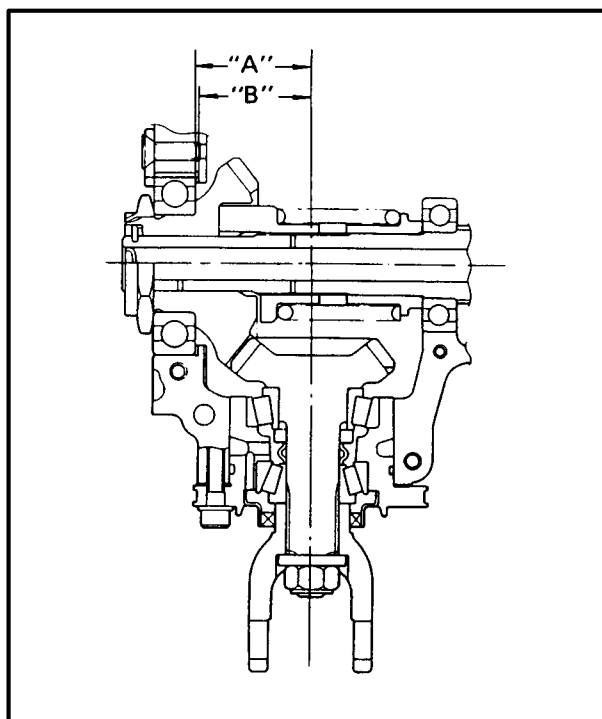
ALIGNING THE MIDDLE GEAR

1. Select:

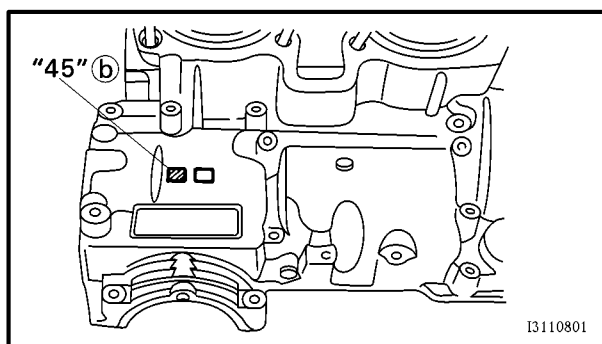
- middle drive gear shim(-s)

NOTE:

Select the proper middle drive gear shim(-s) whenever the crankcase or the middle gears are replaced.



13110901



13110801

Example**Shim thickness =****Distance "A" – Distance "B"**

$$A = 43 + \textcircled{a}$$

$$B = 42 + \textcircled{b}$$

- a. If the middle drive gear is stamped "06" (Ⓐ positive number (+ 06) is implied since only the negative (–) designations are stamped alongside the numbers), then:

$$\text{"A"} = 43 + 0.06$$

$$= 43.06$$

NOTE:

All stamped numbers are in hundredths of a millimeter.

- b. If the left crankcase is stamped "45", then:

$$\text{"B"} = 42 + 0.45$$

$$= 42.45$$

Therefore:

$$T = A - B$$

$$= 43.06 - 42.45$$

$$= 0.61 \text{ mm}$$

- c. Then calculated shim thickness is 0.61 mm. Shims can only be selected in 0.05 mm increments, therefore round off to the hundredths digit of the calculated thickness and select the appropriate shim(-s) with the following chart.

Hundredths digit	Rounded value
0, 1, 2	0
3, 4, 5, 6	5
7, 8, 9	10

- d. Using the above example, the calculated shim thickness of 0.61 mm is rounded off to 0.60 mm. Therefore, you may choose either four 0.15 mm shims, two 0.30 mm shims or one 0.30 mm and two 0.15 mm shims as selected from the shim thickness chart below. Shim sizes are supplied in the following thicknesses:

**Middle drive pinion shim**

Thickness (mm)	0.15 0.30 0.50
----------------	----------------



EAS00450

ADJUSTING THE MIDDLE GEAR BACKLASH

1. Install:

- middle gear backlash tool

**Middle gear backlash tool
90890-04080**

2. Loosen:

- middle driven shaft bearing housing bolts

3. Remove:

- shim(-s)

4. Tighten:

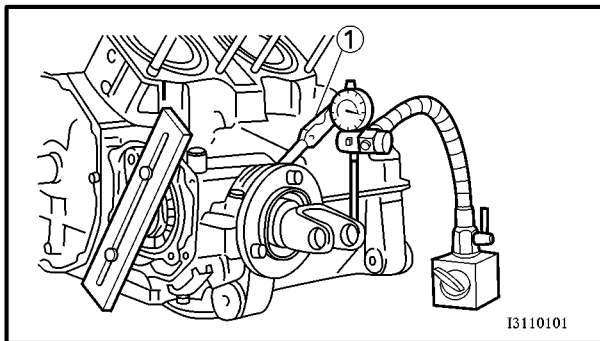
- middle driven shaft bearing housing bolts

CAUTION:

Do not overtighten the middle driven shaft bearing housing bolts or you may obtain too little middle gear backlash and damage the middle gears. If the bolts are overtightened, loosen them until the crankcase-to-middle-driven-shaft-bearing-housing clearance is within specification, as stated below. Then, repeat all of the previous steps.

NOTE:

- Tighten the middle driven shaft bearing housing bolts carefully, one thread turn at a time only. Push in the middle driven shaft bearing housing and then tighten the bolts to specification.
- Clearance between the crankcase and the middle driven shaft bearing housing should be approximately 2 mm (0.08 in), when measured with a thickness gauge ①.



5. Turn:

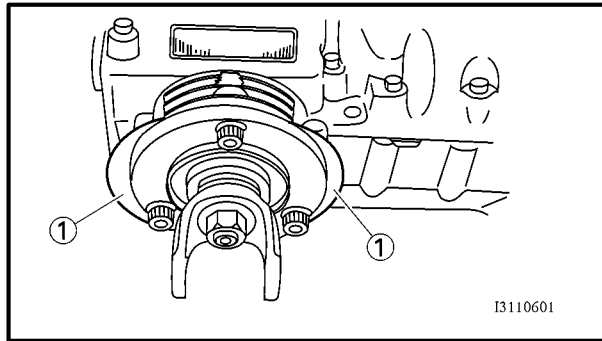
- universal joint drive yoke

NOTE:

While carefully tightening the middle driven shaft bearing housing bolts in stages and in a crisscross pattern, turn the universal joint drive yoke back and forth until the dial gauge reads 0.05 ~ 0.12 mm (0.002 ~ 0.005 in).

6. Measure:

- crankcase-to-middle-driven-shaft-bearing-housing clearance
(with a thickness gauge)



7. Select:
- shim(-s) ①

- Shims can only be selected in 0.05 mm increments, therefore round off to the hundredths digit of the calculated thickness and select the appropriate shim(-s) with the following chart.
- For example, the clearance between the crankcase and the middle driven shaft bearing housing is 0.42 mm. Therefore, the chart instructs you to round off the 2 to 0. Thus, you should use one 0.40 mm shim.

Hundredths	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

Shims are supplied in the following thicknesses.



Middle drive gear shim

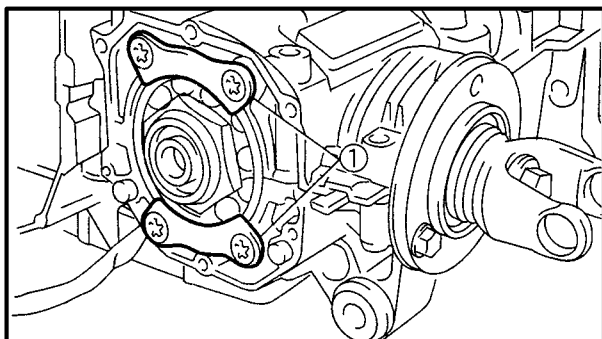
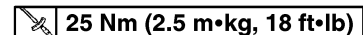
Thickness (mm)	0.10, 0.15, 0.20, 0.30, 0.40, 0.50
----------------	---------------------------------------

8. Loosen:
 - middle driven shaft bearing housing bolts
9. Install:
 - shim(-s)®
10. Tighten:
 - middle driven shaft bearing housing bolts

 **30 Nm (3 m•kg, 21.7 ft•lb)**
11. Measure:
 - middle gear backlash

Out of specification → Refer to “MEASURING THE MIDDLE GEAR BACKLASH”.

12. Install:
- bearing retainers ①



⚠ WARNING

Always use new screws.

CAUTION:

- Apply LOCTITE® on to the retainer screws.
- After tightening the bearing retainer screws, stake them with a center punch.



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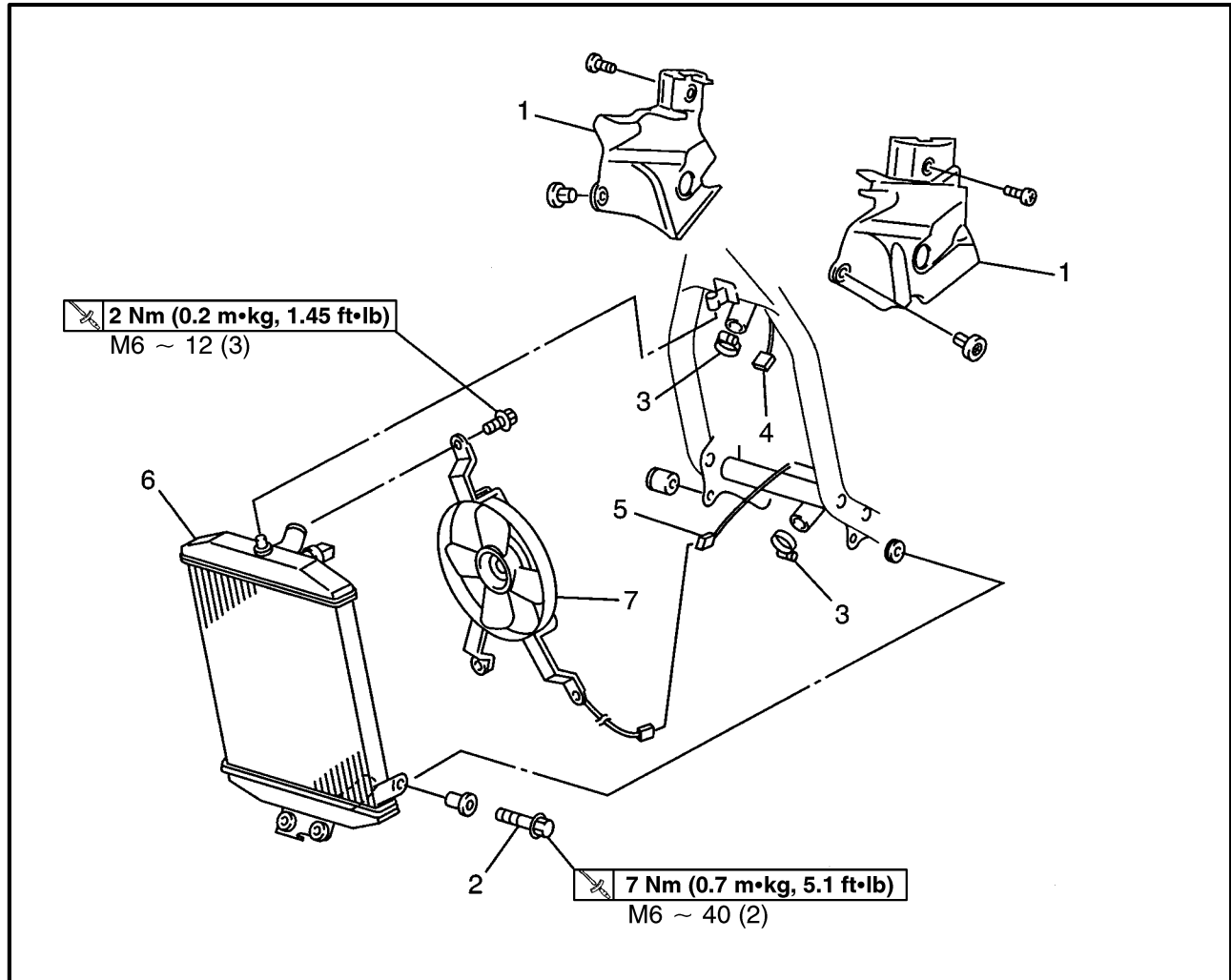
COOLING SYSTEM

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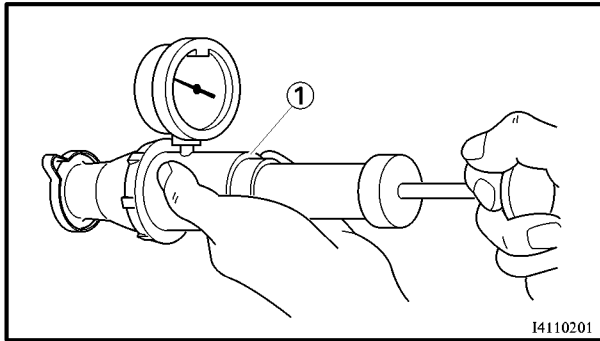
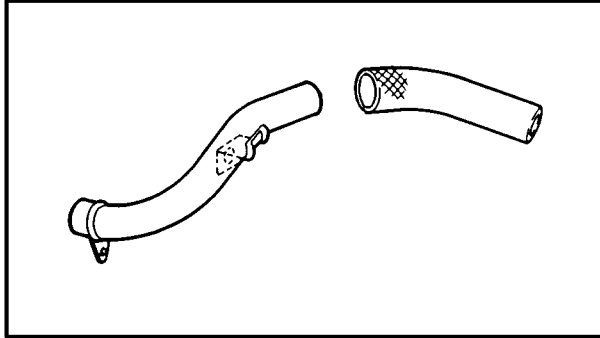
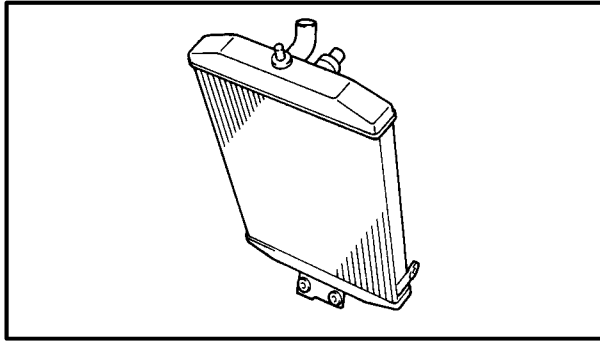


COOLING SYSTEM

RADIATOR



Order	Job/Part	Q'ty	Remarks
	Removing the radiator Rider seat, fuel tank		Remove the parts in the order listed. Refer to "RIDER AND PASSENGER SEATS" and "FUEL TANK" in CHAPTER 3.
	Coolant		Refer to "CHANGING THE COOLANT" in CHAPTER 3.
1	Steering head side covers	2	
2	Lower radiator bolts	2	
3	Radiator hose clamps (upper and lower)	2	Loosen
4	Thermo unit lead	1	Disconnect
5	Fan lead	1	Disconnect
6	Radiator	1	
7	Fan motor	1	
			For installation, reverse the removal procedure.



EAS00455

CHECKING THE RADIATOR

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

NOTE:

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

- 2. Check:
 - radiator hoses
 - radiator pipesCracks/damage → Replace.

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



Radiator cap opening pressure

95 ~ 125 kPa

**(0.95 ~ 1.25kg/cm²,
13.8 ~ 18.1 psi)**

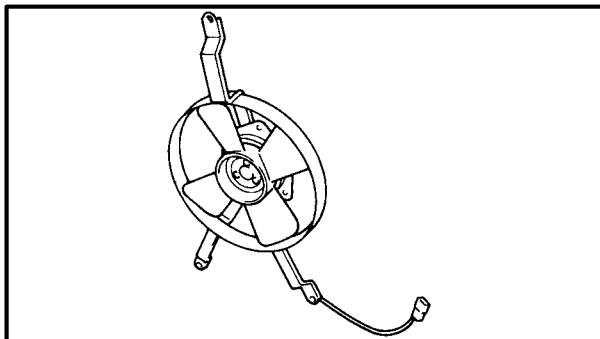
- a. Install the radiator cap tester ① to the radiator cap.



Radiator cap tester

**YU-24460-01,
90890-01325**

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



- #### 4. Check
- radiator fan
- Damage → Replace.
Malfunction → Check and repair.
Refer to “COOLING SYSTEM” in chapter 8.



EAS00456

INSTALLING THE RADIATOR

1. Fill:

- cooling system

(with the specified amount of the recommended coolant)

Refer to “CHANGING THE COOLANT” in CHAPTER 3.

2. Check:

- cooling system

Leaks → Repair or replace any faulty part.

3. Measure:

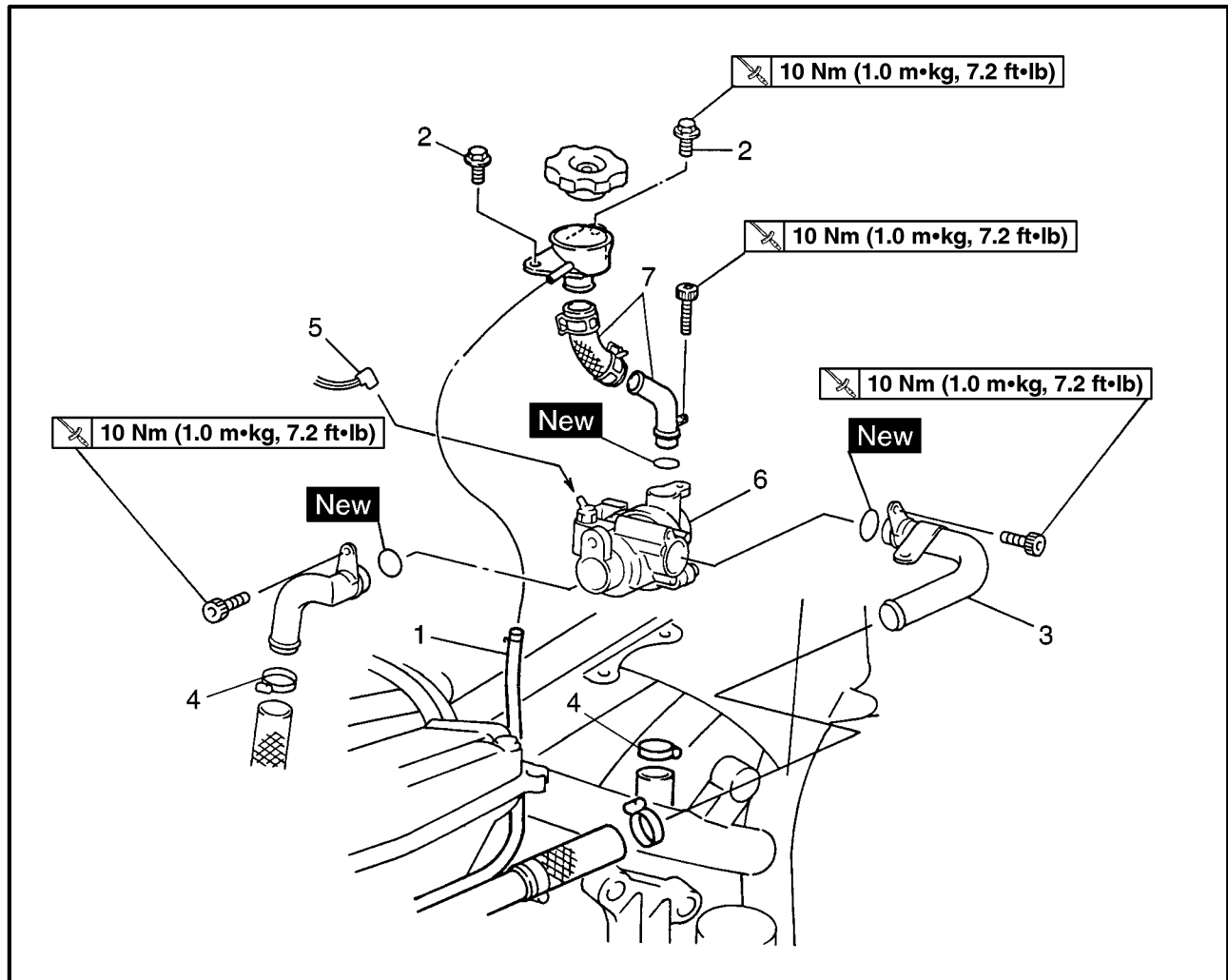
- radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.

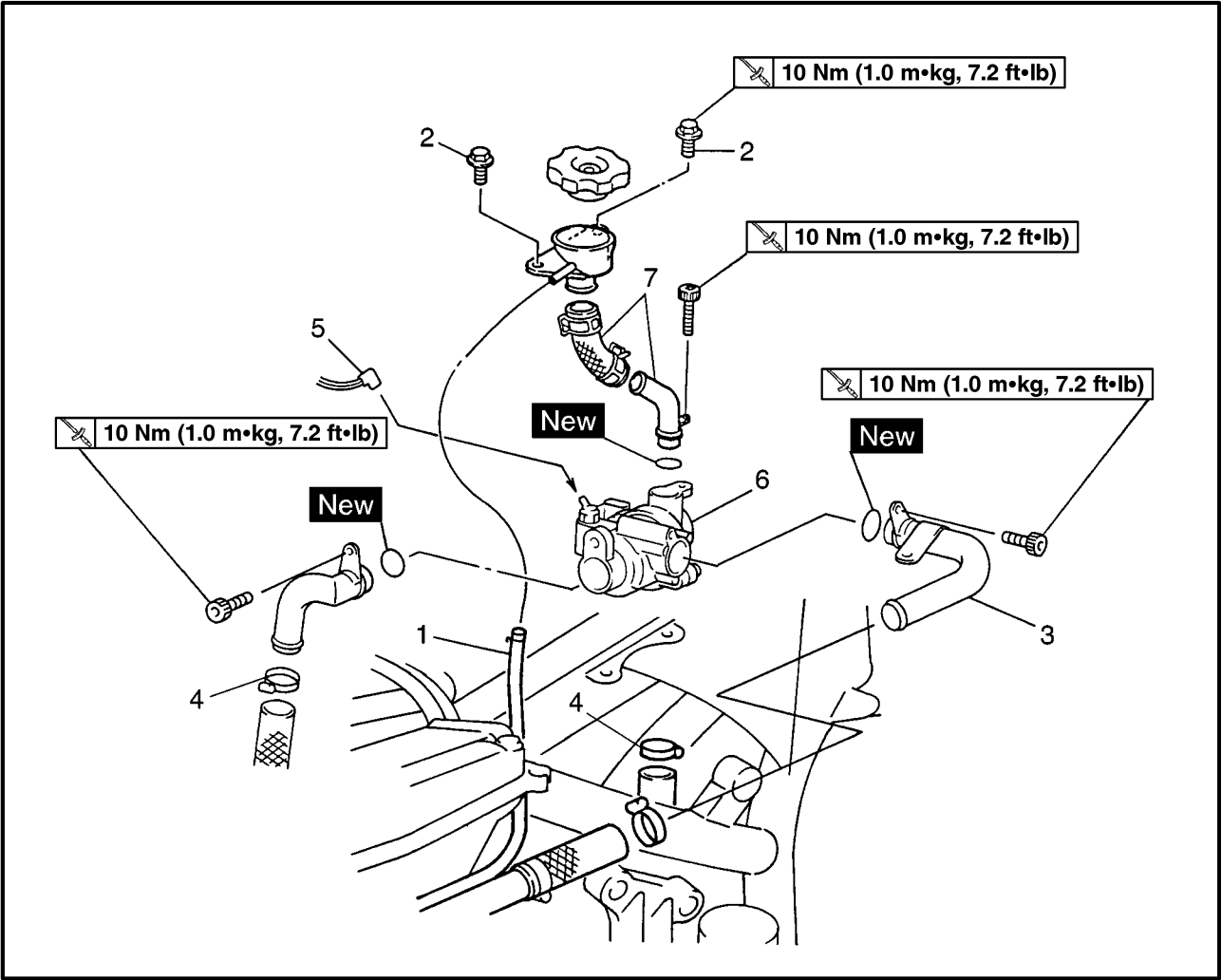
Refer to “CHECKING THE RADIATOR”.



THERMOSTAT



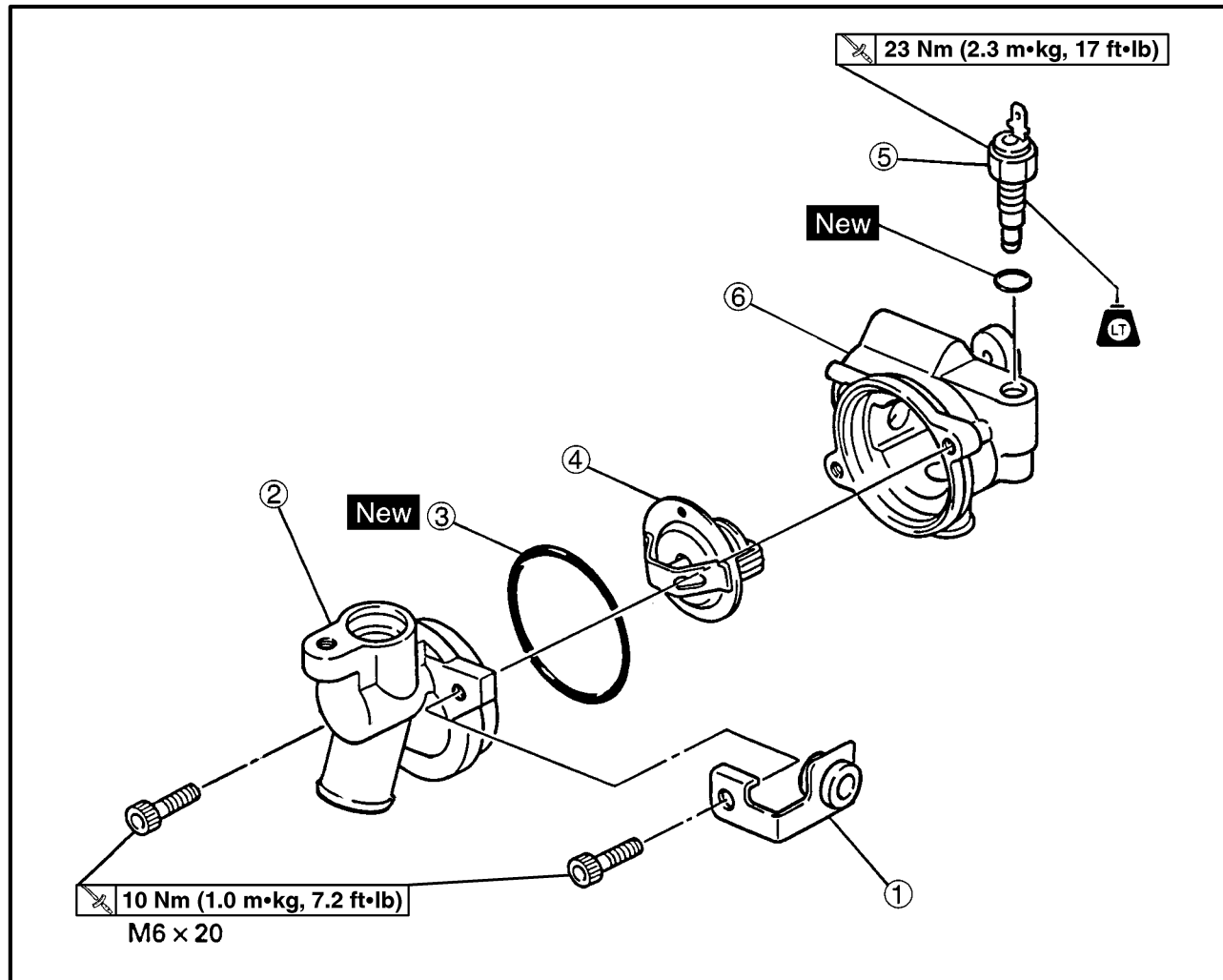
Order	Job/Part	Q'ty	Remarks
	Removing the thermostat		
	Rider seat, fuel tank		Remove the parts in the order listed. Refer to "SEATS" and "FUEL TANK" in CHAPTER 3.
	Coolant		Refer to "CHANGING THE COOLANT" in CHAPTER 3.
	Air filter case		Refer to "CLEANING THE AIR FILTER" in CHAPTER 3.
	Steering head side covers		Refer to "REMOVING THE RADIATOR".
1	Overflow hose	1	Disconnect
2	Bolts (radiator cap assembly)	2	
3	Coolant pipe (right)	1	
4	Thermostatic hose clamp (lower)	2	Loosen
5	Thermo switch lead	1	Disconnect
6	Thermostat	1	



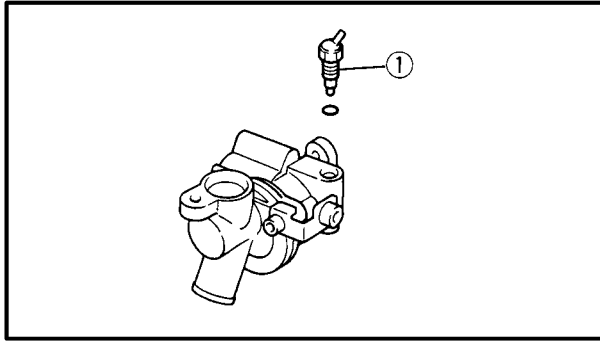
Order	Job/Part	Q'ty	Remarks
7	Radiator cap pipe	1	For installation, reverse the removal procedure.



THERMOSTAT HOUSING



Order	Job/Part	Q'ty	Remarks
	Disassembling the thermostat		
①	Thermostat stay	1	Disassemble the parts in the order listed. Refer to "ASSEMBLING THE THERMOSTAT". For assembly, reverse the disassembly procedure.
②	Thermostat housing cover	1	
③	O-ring (housing cover)	1	
④	Thermostatic valve	1	
⑤	Thermo switch	1	
⑥	Thermostat housing	1	



2. Install:

- thermo switch ①

 75Nm (0.75 m•kg, 5.44 ft•lb)

CAUTION:

Use extreme care when handling the thermo switch and temperature sender. Replace any part that was dropped or subjected to a strong impact.

EAS00466

INSTALLING THE THERMOSTAT

1. Fill:

- cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” in CHAPTER 3.

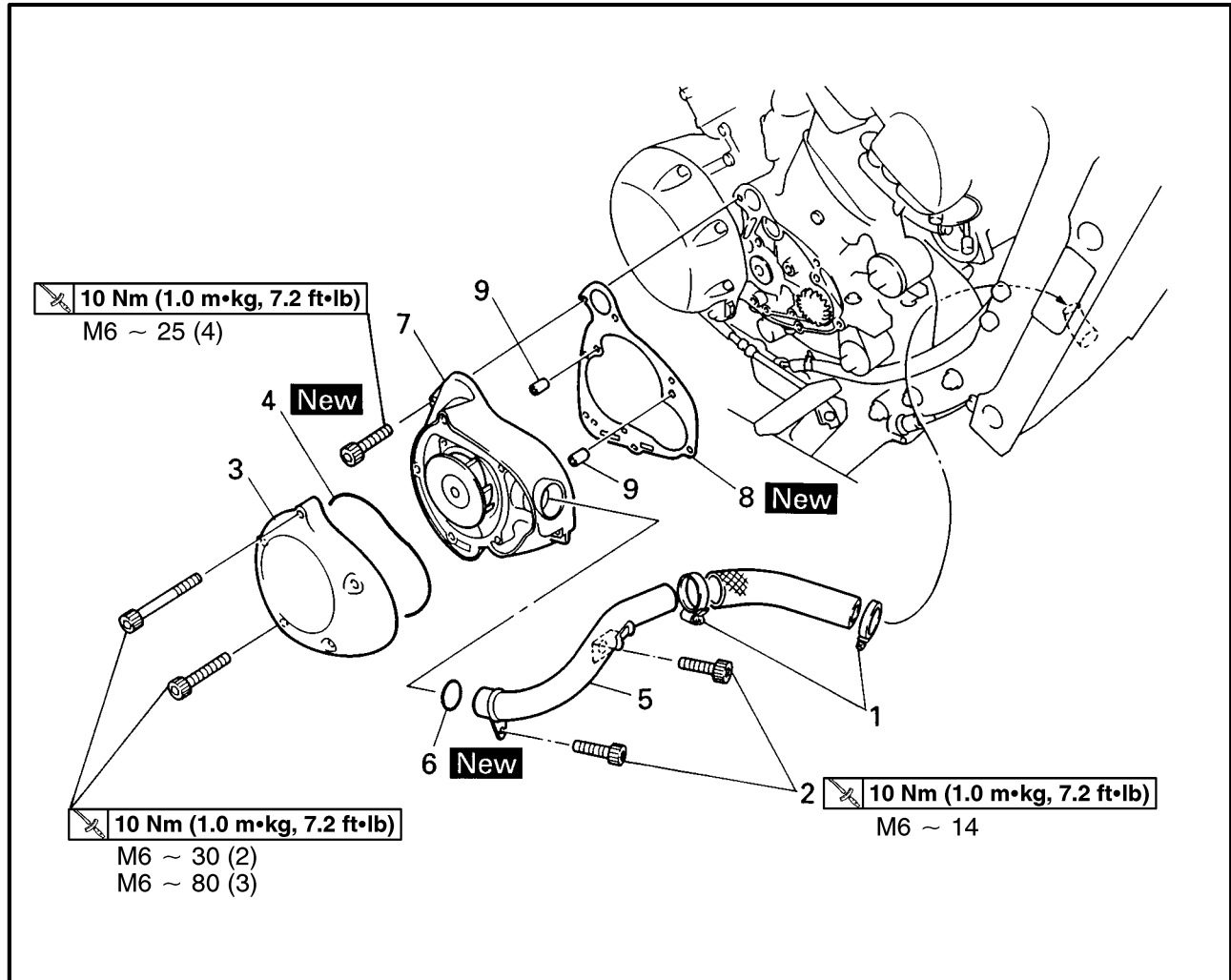
2. Check:

- cooling system
Leaks → Repair or replace any faulty part.

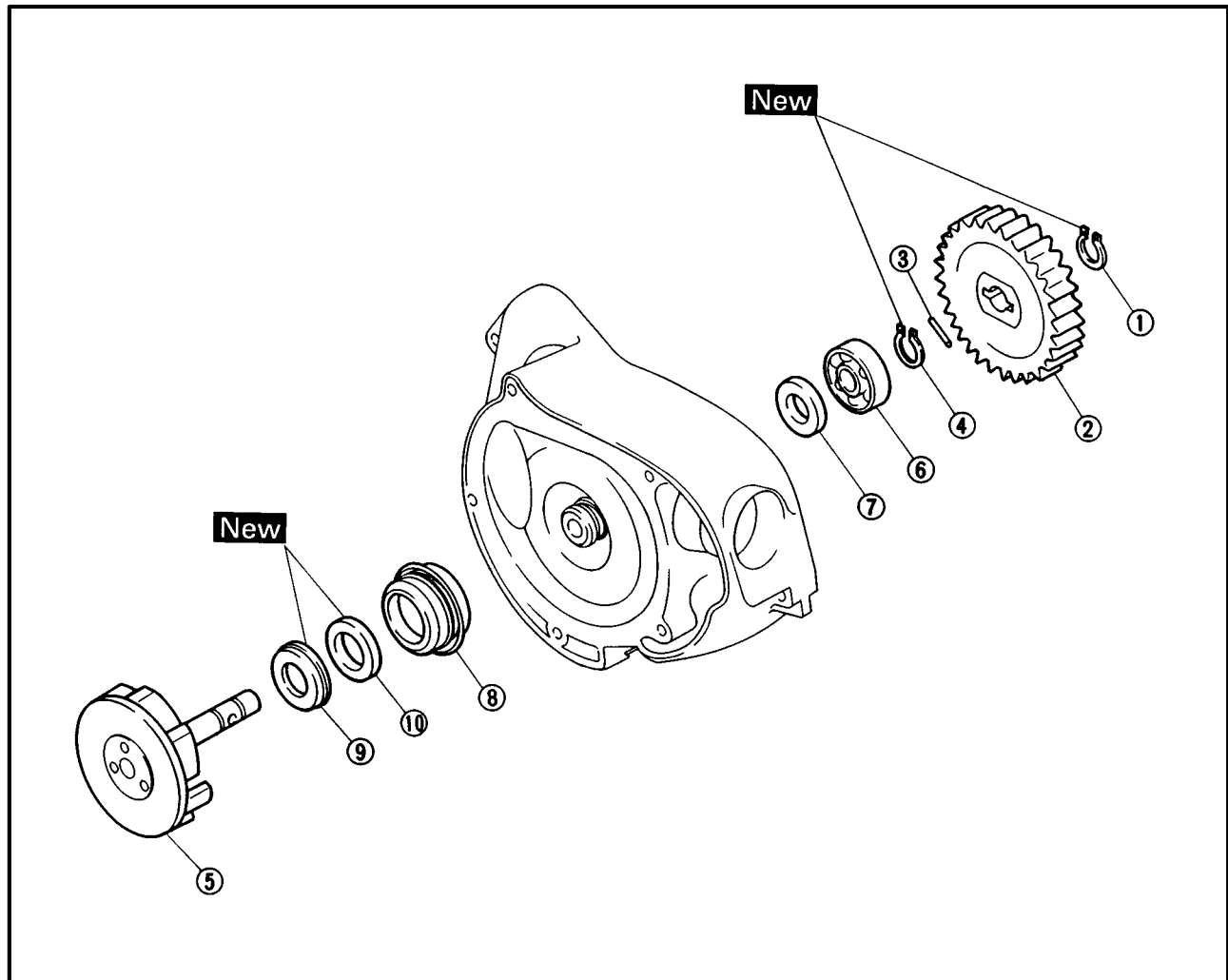
3. Measure:

- radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR”.

WATER PUMP



Order	Job/Part	Q'ty	Remarks
	Removing the water pump Coolant		Remove the parts in the order listed. Refer to "CHANGING THE COOLANT" in CHAPTER 3.
1	Radiator hose clamp (lower)	1	Loosen
2	Bolts (water pump inlet pipe)	2	
3	Water pump cover	1	
4	O-ring	1	
5	Water pump inlet pipe	1	Refer to "INSTALLING THE WATER PUMP".
6	O-ring	1	
7	Water pump housing	1	
8	Gasket	1	
9	Dowel pins	2	For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the water pump		
①	Circlip	1	Disassemble the parts in the order listed.
②	Driven gear	1	
③	Gear stopper pin	1	
④	Circlip	1	
⑤	Impeller	1	Refer to "ASSEMBLING THE WATER PUMP".
⑥	Bearing	1	
⑦	Oil seal	1	
⑧	Water pump seal	1	
⑨	Damper rubber	1	Refer to "DISASSEMBLING/ ASSEMBLING THE WATER PUMP".
⑩	Slip ring	1	
			For assembly, reverse the disassembly procedure.



EAS00470

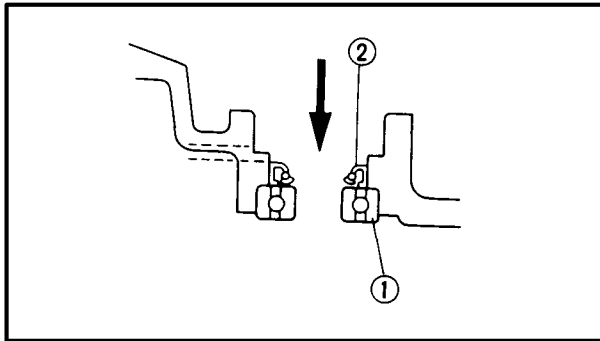
DISASSEMBLING THE WATER PUMP

1. Remove:

- bearing ①
- oil seal ②

NOTE:

Tap out the bearing and oil seal from the outside of the water pump housing.

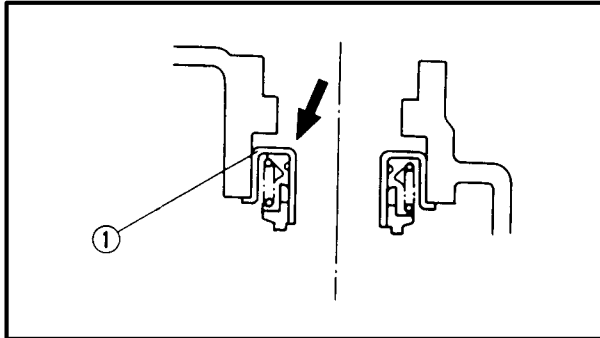


2. Remove:

- water pump seal ①

NOTE:

Tap out the water pump seal from the inside of the water pump housing.

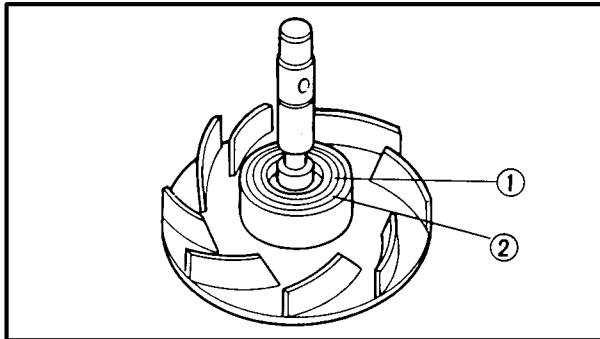


3. Remove:

- rubber damper holder ①
- rubber damper ②
(from the impeller, with a thin, flat-head screwdriver)

NOTE:

Do not scratch the impeller shaft.

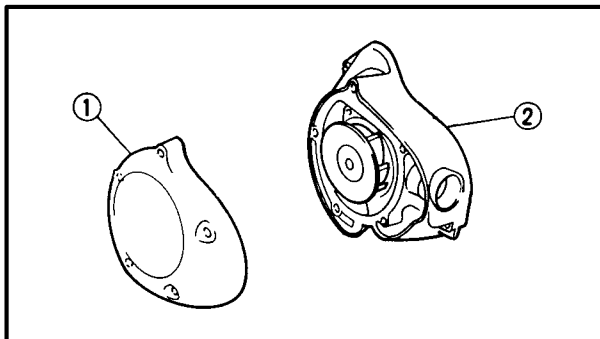


EAS00474

CHECKING THE WATER PUMP

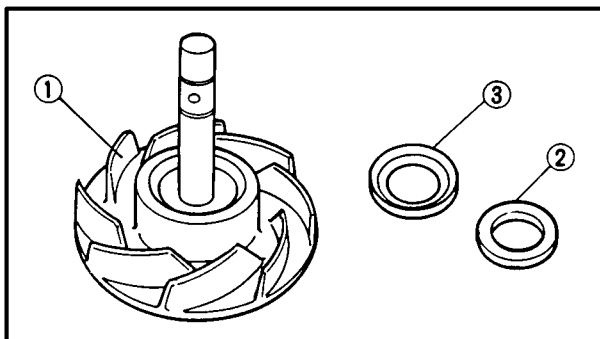
1. Check

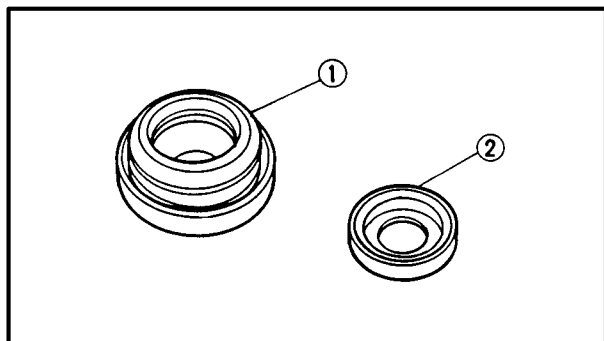
- water pump housing cover ①
- water pump housing ②



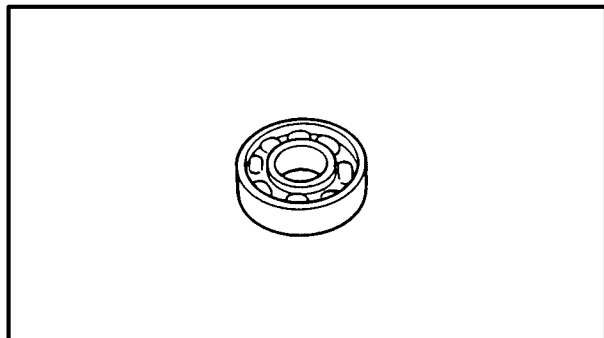
2. Check

- impeller ①
 - rubber damper ②
 - rubber damper holder ③
- Cracks/damage/wear → Replace.

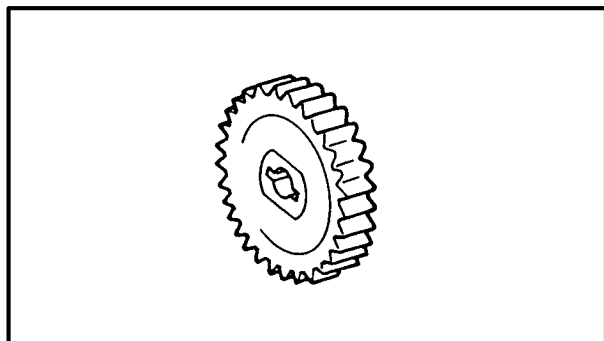




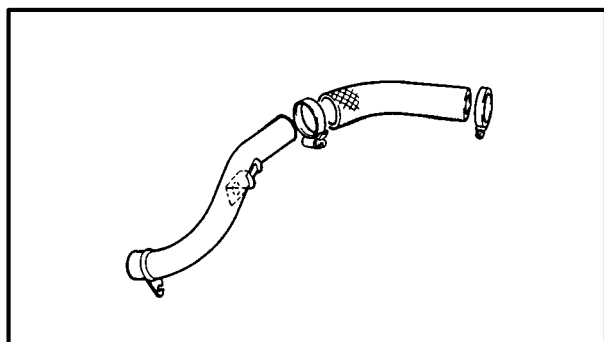
3. Check:
- water pump seal ①
 - oil seal ②
- Cracks/damage/wear → Replace.



4. Check:
- bearing
- Roughness → Replace.



5. Check:
- water pump driven gear
- Pitting/wear → Replace.



7. Check:
- water pump inlet pipe
 - radiator outlet hose
- Cracks/damage/wear → Replace.



EAS00476

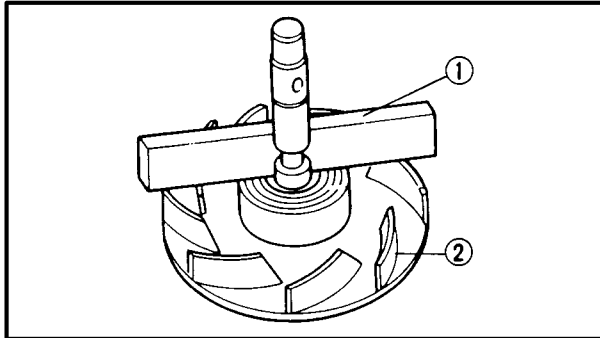
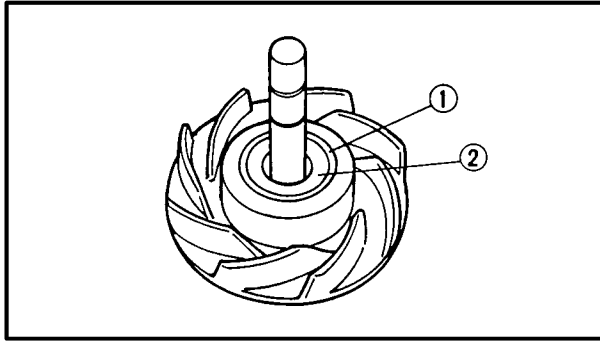
ASSEMBLING THE WATER PUMP

1. Install:

- rubber damper ①
- rubber damper holder ②

NOTE:

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



2. Measure:

- tilt
- Out of specification → Repeat step 1.

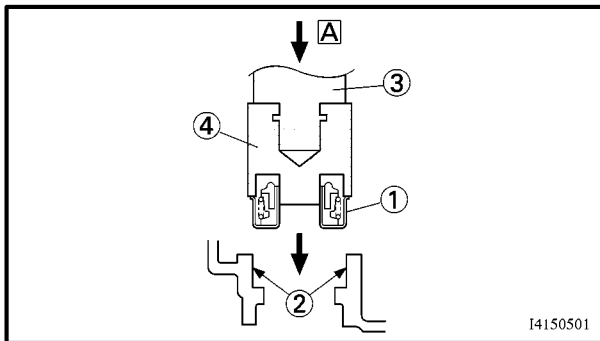
CAUTION:

Make sure that the rubber damper and rubber damper holder are flush with the impeller.



Tilt limit
0.15 mm (0.006 in)

- ① Straightedge
- ② Impeller



3. Install:

- water pump seal ① **New**

CAUTION:

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

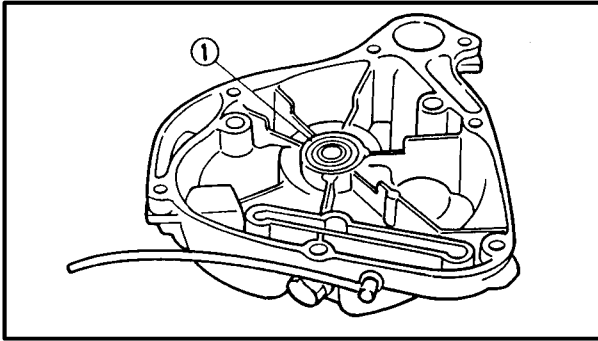
NOTE:

- Install the water pump seal from the special tools.
- Before installing the water pump seal, apply Yamaha bond No. 1215 to the water pump housing ②.



Mechanical seal installer ③
90890-04078
Middle driven shaft bearing driver ④
90890-04058
Yamaha bond No. 1215
90890-85505

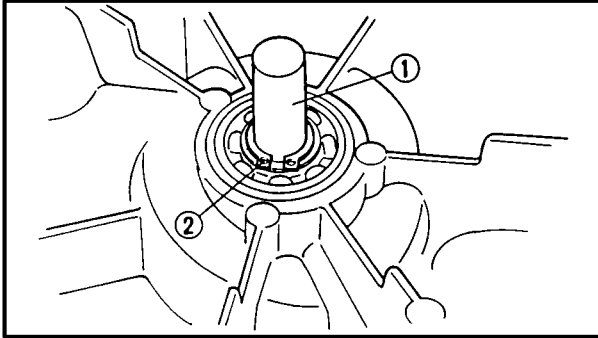
A push down.



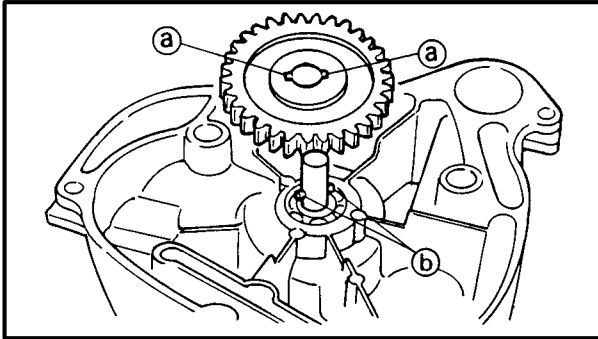
4. Install:
- oil seal
 - bearing ①

NOTE:

- Install the oil seal and bearing from the inside of the water pump housing.
- Make sure that the side of the bearing with the number faces up.
- Gently tap the bearing into place until it is flush with the water pump housing.



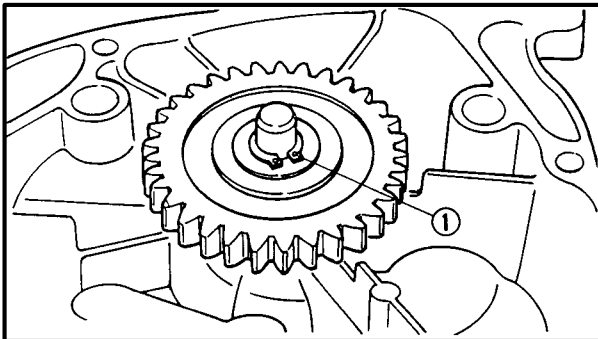
5. Install:
- impeller ①
 - circlip ②



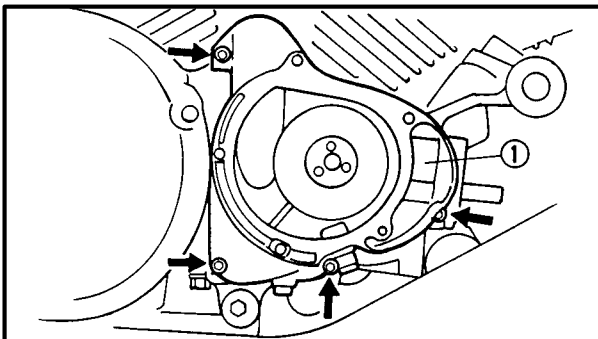
6. Install:
- key
 - water pump driven gear

NOTE:

Align the slot (a) in the water pump driven gear with the pin (b).



7. Install:
- circlip ①



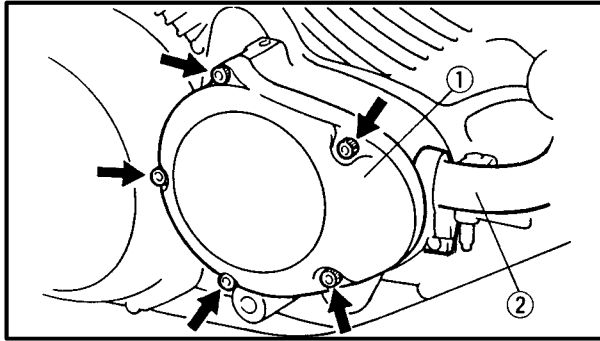
EAS00478

INSTALLING THE WATER PUMP

1. Install:
- water pump housing ①

⚠ WARNING

Always use a new gasket.



2. Install:

- O-ring (New)
- water pump housing cover ①

10 Nm (1.0 m•kg, 7.2 ft•lb)

- O-ring (New)
- water pump inlet hose ②

WARNING

Always use a new O-ring.

NOTE:

Before installing the water pump inlet pipe ②, apply a thin coat of lithium soap base grease onto the O-rings.

3. Fill:

- cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” in CHAPTER 3.

4. Check:

- cooling system
Leaks → Repair or replace the faulty part.

5. Measure:

- radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR”.



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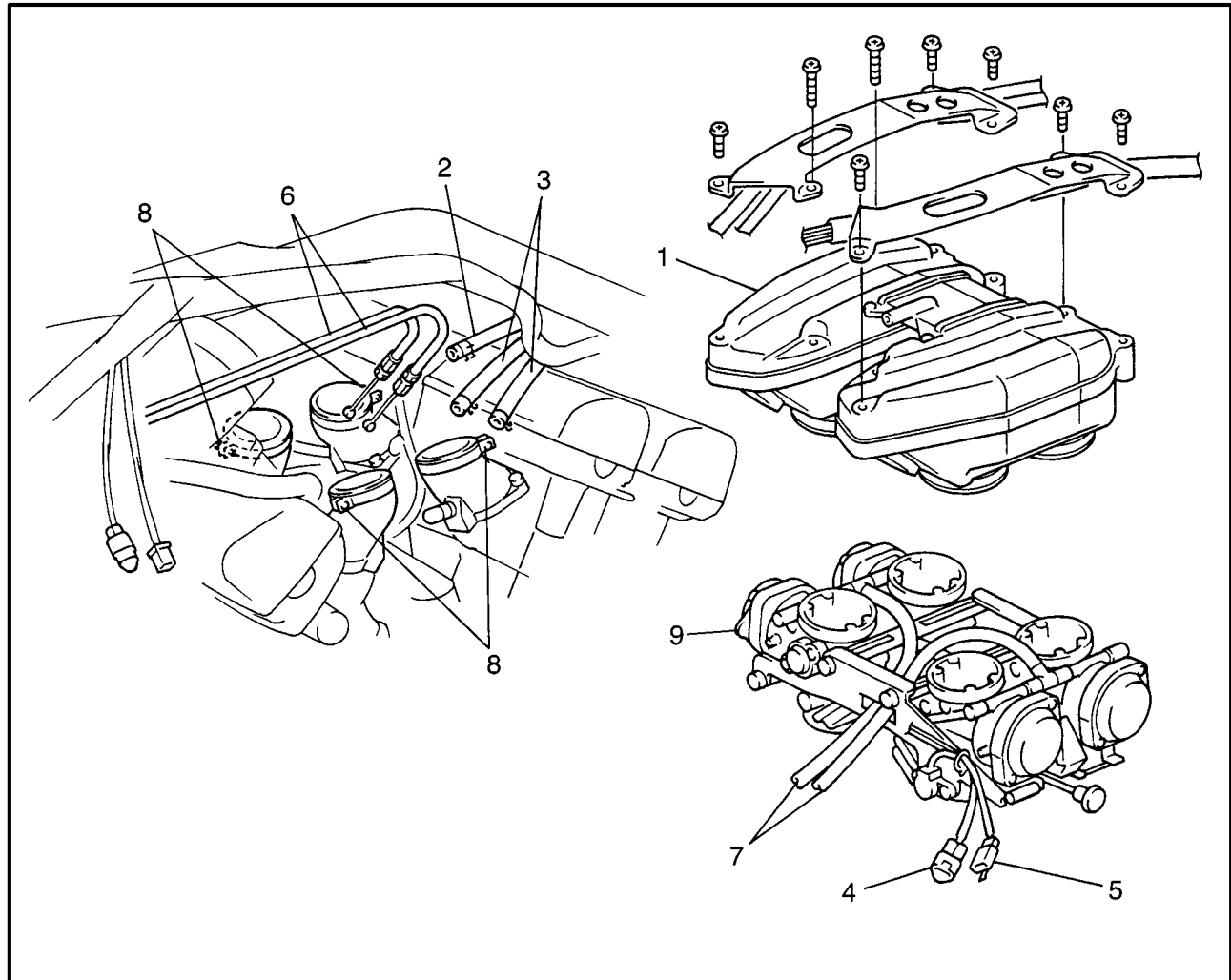
CARBURETORS

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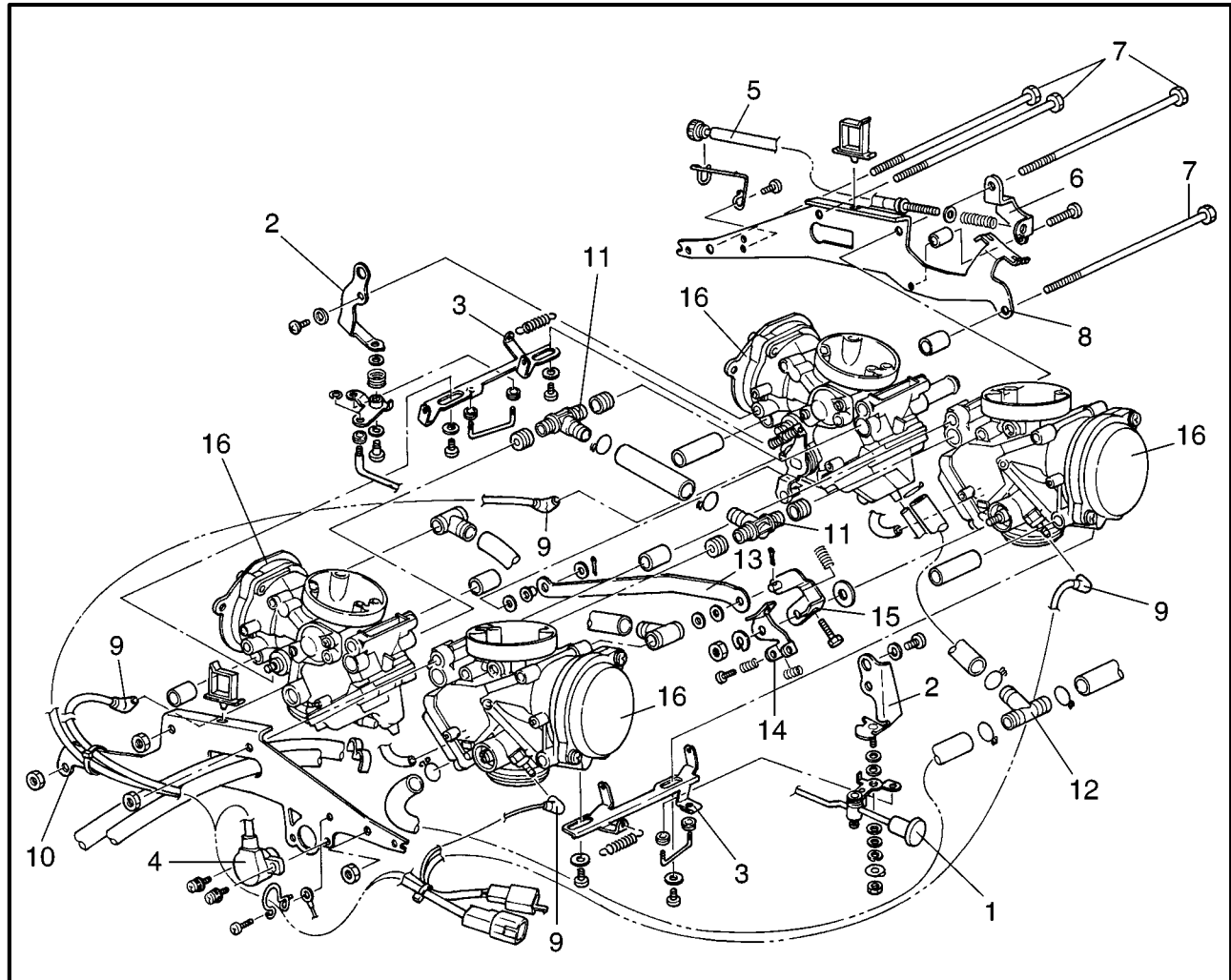


CARBURETORS

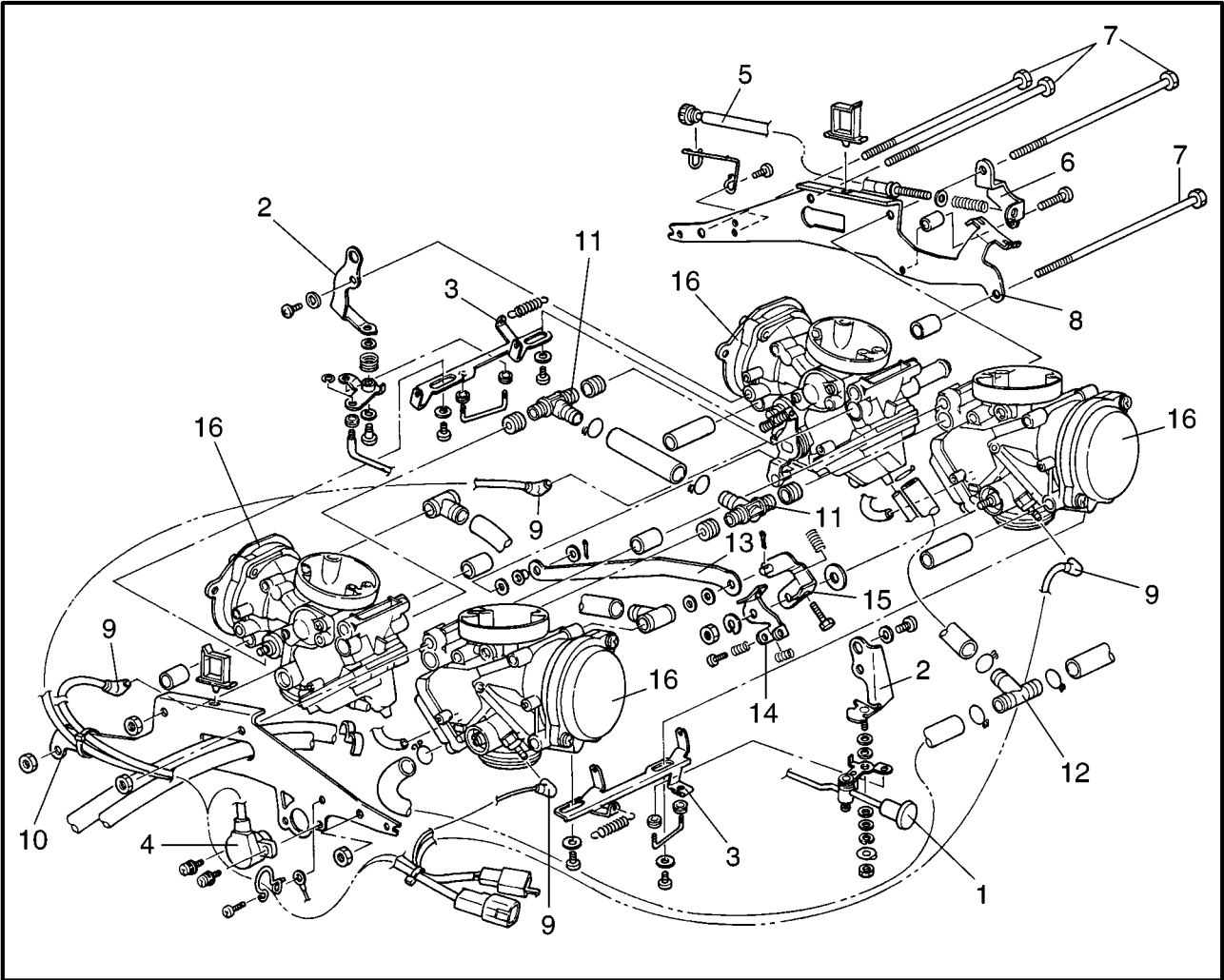
CARBURETORS



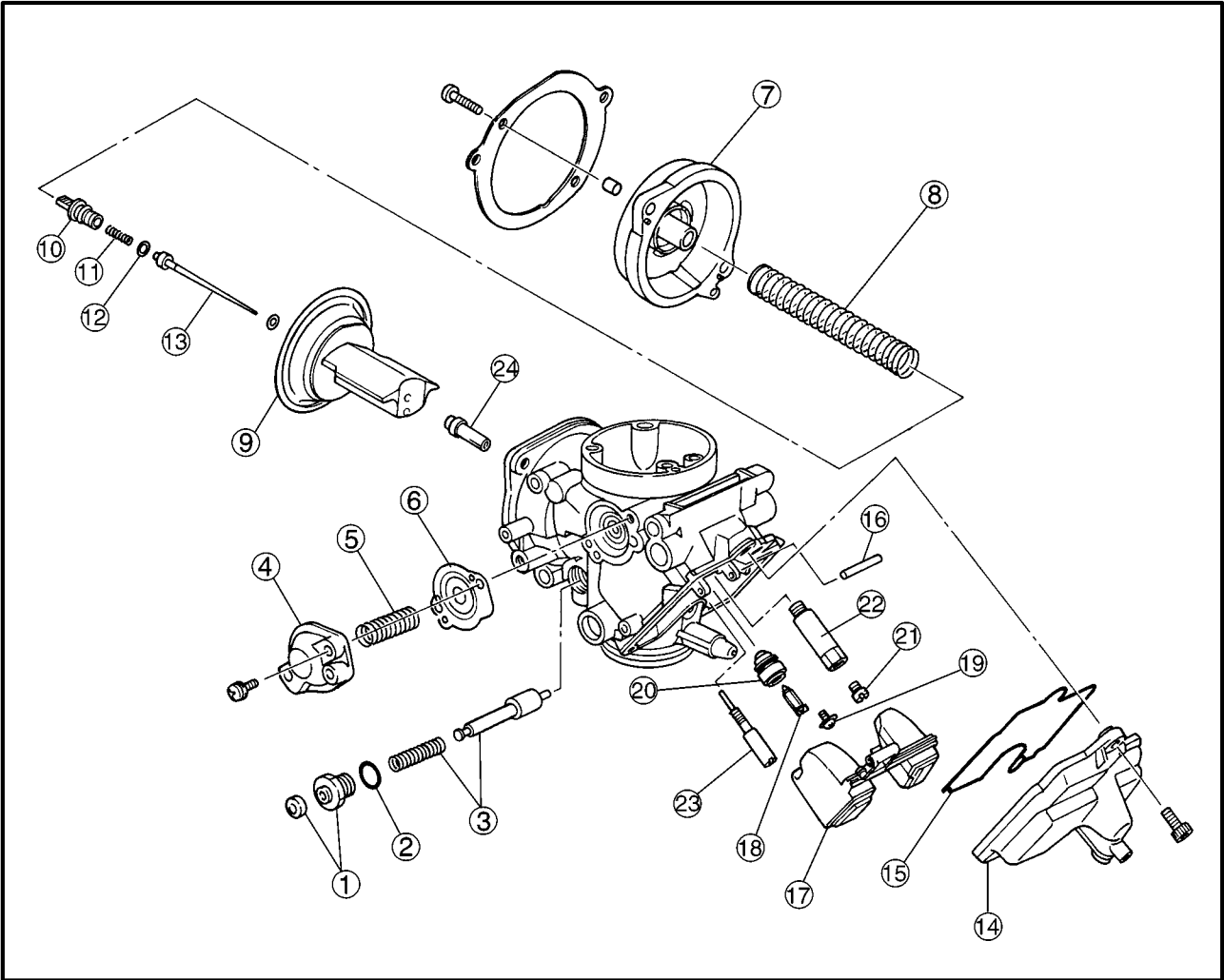
Order	Job/Part	Q'ty	Remarks
	Removing the carburetors Rider seat, fuel tank		Remove the parts in the order listed. Refer to "RIDER AND PASSENGER SEATS" and "FUEL TANK" in CHAPTER 3.
1	Air induction box	1	
2	Fuel hose	1	Disconnect
3	Drain hose	2	Disconnect
4	Throttle position sensor lead	1	Disconnect
5	Carburetor heater lead	1	Disconnect
6	Throttle cables	2	
7	Air vent hoses	2	Loosen
8	Clamps (carburetor joints)	4	
9	Carburetor assembly	1	
			For installation, reverse the removal procedure.



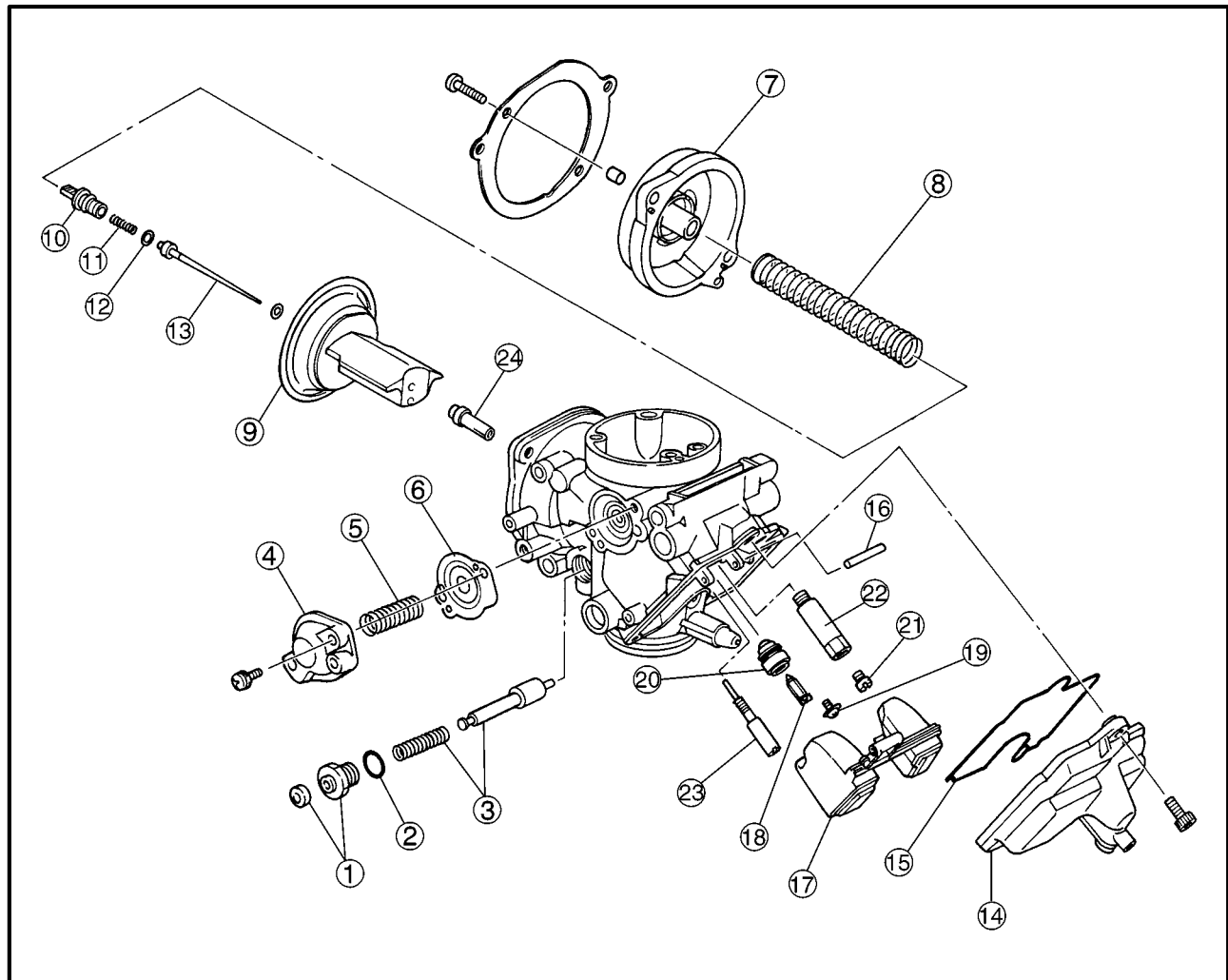
Order	Job/Part	Q'ty	Remarks
	Separating the carburetors		Remove the parts in the order listed.
1	Choke knob	1	
2	Choke knob bracket	2	
3	Choke lever	2	
4	TPS	1	
5	Throttle stop screw	1	
6	Bracket	1	
7	Connecting bolt	4	
8	Bracket	1	
9	Carburetor heater	4	
10	Bracket	1	
11	Fuel feed pipe	2	
12	Breather hose	1	
13	Synchronization rod	1	
14	Bracket	1	



Order	Job/Part	Q'ty	Remarks
15	Bracket	1	For assembly, reverse the disassembly procedure.
16	Carburetors	4	



Order	Job/Part	Q'ty	Remarks
	Disassembling the carburetor		Disassemble the parts in the order listed. NOTE: _____ The remaining steps should be followed for all four of the carburetors. _____
①	Starter plunger holder	1	Refer to "ASSEMBLING THE CARBURETORS".
②	O-ring	1	
③	Starter plunger assembly	1	
④	Coasting enrichment cover	1	
⑤	Spring	1	
⑥	Diaphragm	1	
⑦	Vacuum chamber cover	1	
⑧	Spring	1	
⑨	Vacuum piston	1	
⑩	Plastic screw	1	
⑪	Spring	1	
⑫	Plastic bushing	1	



Order	Job/Part	Q'ty	Remarks
⑬	Jet needle	1	
⑭	Float chamber cover	1	
⑮	Gasket	1	
⑯	Float pin	1	
⑰	Float	1	
⑱	Needle valve	1	
⑲	Holding screw (valve seat)	1	
⑳	Valve seat	1	
㉑	Main jet	1	
㉒	Main jet holder	1	
㉓	Pilot jet	1	For assembly, reverse the disassembly procedure.
㉔	Needle jet	1	

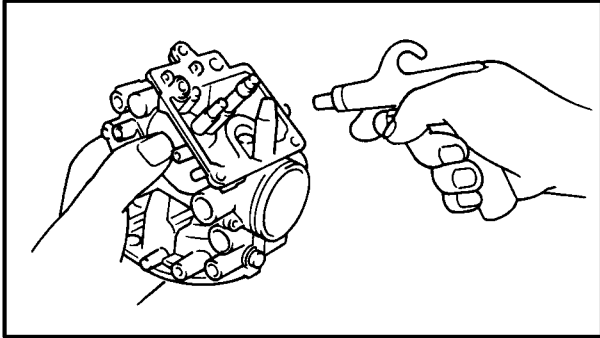


EAS00486

CHECKING THE CARBURETORS

The following procedure applies to all of the carburetors.

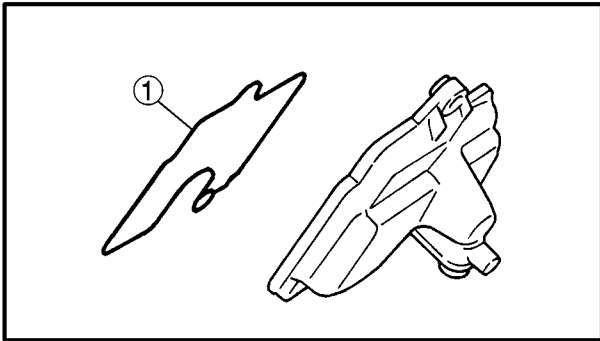
1. Check:
 - carburetor body
 - float chamber
 - jet housingCracks/damage → Replace.



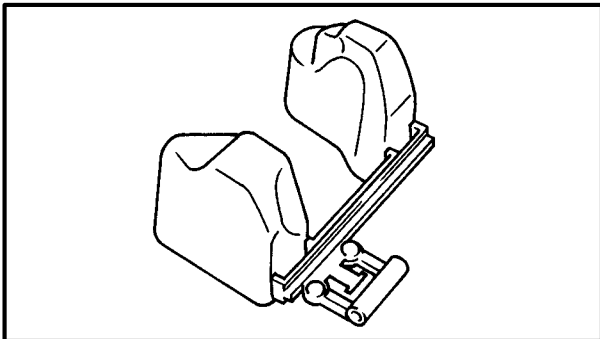
2. Check:
- fuel passages
Obstruction → Clean.

a. Wash the carburetor in a petroleum-based solvent. Do not use any caustic-carburetor-cleaning solution.

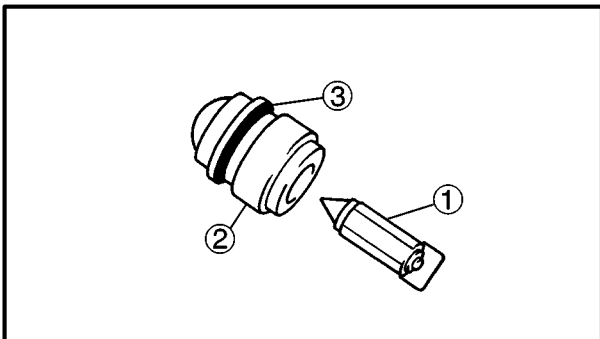
- b. Blow out all of the passages and jets with compressed air.



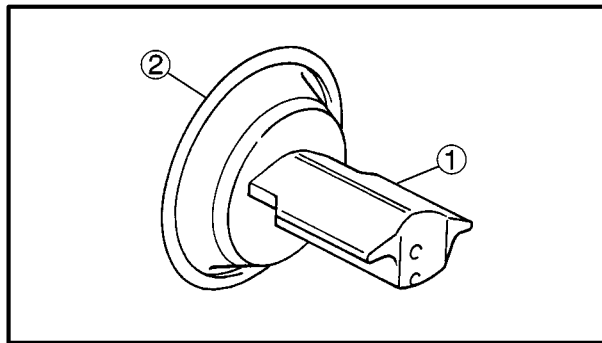
3. Check:
 - float chamber body
Dirt → Clean.
4. Check
 - float chamber rubber gasket ①
Cracks/damage/wear → Replace.



5. Check:
•float
Damage → Replace.

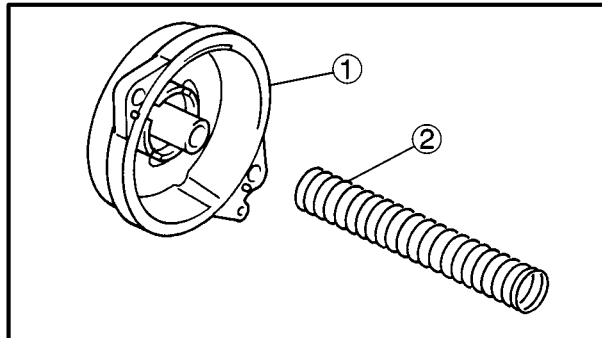


6. Check:
 - needle valve ①
 - needle valve seat ②Damage/obstruction/wear → Replace the needle valve, needle valve seat and O-ring as a set.
7. Check:
 - O-ring ③Damage/wear → replace the needle valve, needle valve seat and O-ring as a set.



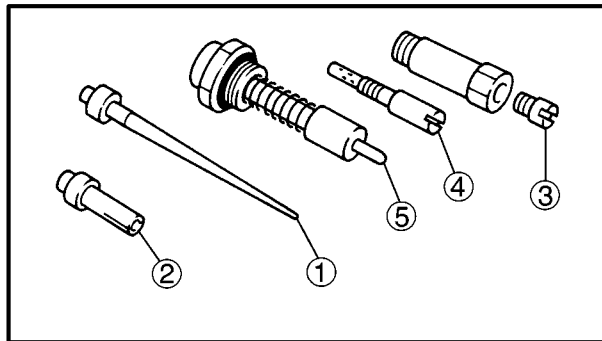
8. Check:

- piston valve ①
Damage/scratches/wear → Replace.
- rubber diaphragm ②
Cracks/tears → Replace.



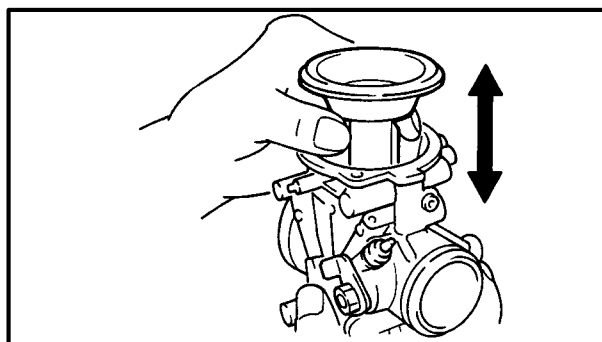
9. Check:

- vacuum chamber cover ①
- piston valve spring ②
- jet needle holder
- Cracks/damage → Replace.



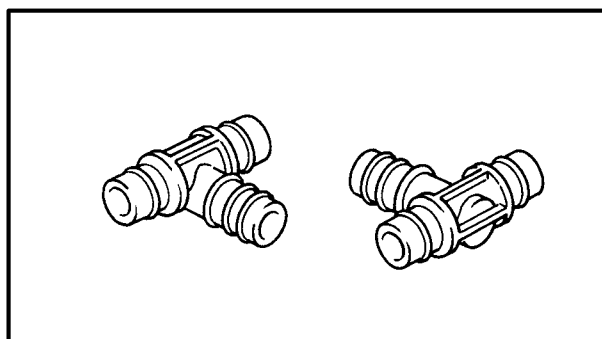
10. Check:

- jet needle kit ①
- needle jet ②
- main jet ③
- pilot jet ④
- pilot screw ⑤
- Bends/damage/wear → Replace.
- Obstruction → Clean.
- Blow out the jets with compressed air.



11. Check:

- piston valve movement
Insert the piston valve into the carburetor body and move it up and down.
- Tightness → Replace the piston valve.



12. Check:

- fuel feed pipes
- hose joint
- Cracks/damage → Replace.
- Obstruction → Clean.
- Blow out the pipes with compressed air.



13. Check:

- fuel feed hoses
 - fuel hoses
- Cracks/damage/wear → Replace.
Obstruction → Clean.
Blow out the hoses with compressed air.

EAS00489

ASSEMBLING THE CARBURETORS

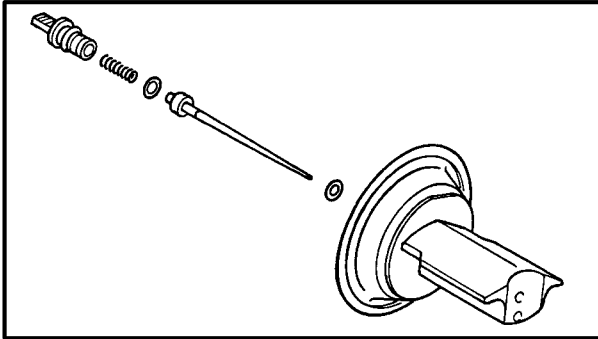
The following procedure applies to both of the carburetors.

CAUTION:

- Before assembling the carburetors, wash all of the parts in a petroleum-based solvent.
- Always use a new gasket.

1. Install:

- piston valve holder

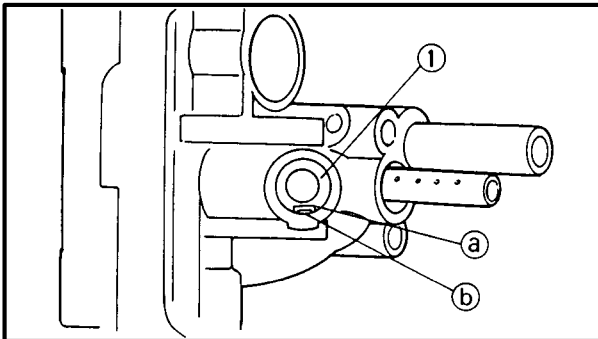


2. Install:

- needle jet ①
- pilot jet
- main jet

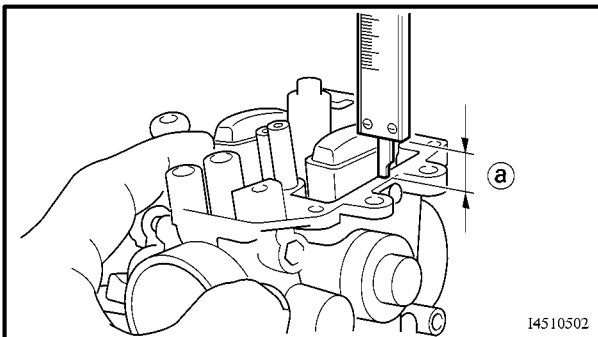
NOTE:

Align the slot ② on the needle jet with the projection ③ on the carburetor body.



3. Measure:

- float height ④
- Out of specification → Adjust.

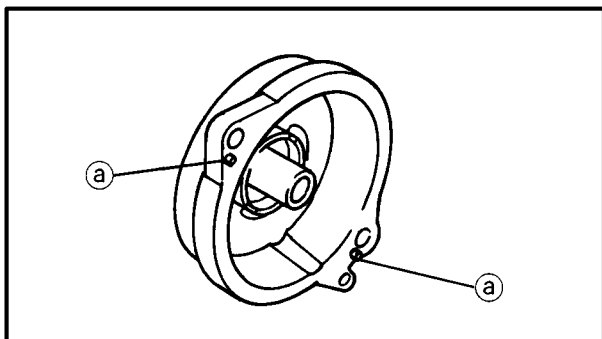
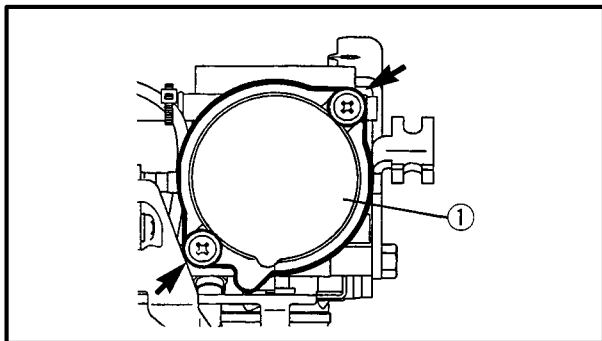
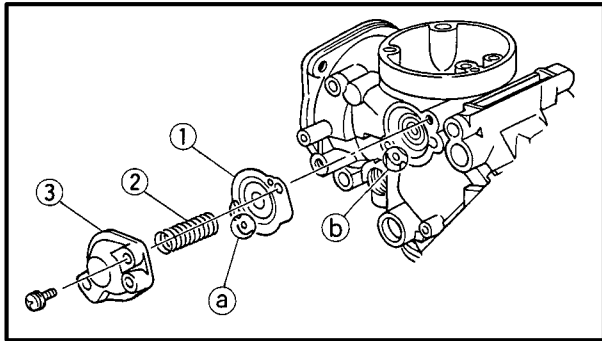
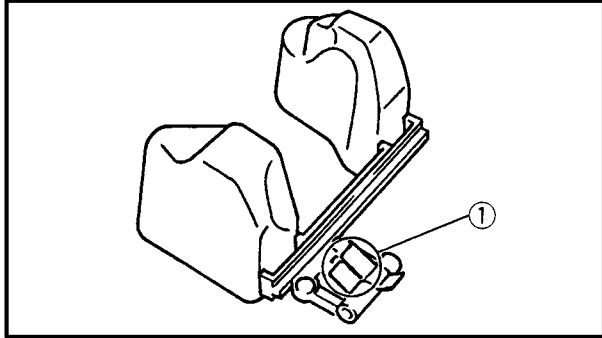


I4510502



Float height

8.0 ~ 9.0 mm (0.32 ~ 0.36 in)



- a. Hold the carburetor upside down.
- b. Measure the distance from the mating surface of the float chamber (with the gasket removed) to the top of the float.

NOTE:

The float arm should rest on the needle valve without depressing it.

- c. If the float height is not within specification, inspect the needle valve seat and needle valve.
- d. If either the needle valve seat or needle valve is worn, replace them both.
- e. If both the needle valve seat and needle valve are fine, adjust the float height by bending the float tang ①.
- f. Check the float height again.

4. Install:
- coasting enricher diaphragm ①
 - coasting enricher spring ②
 - coasting enricher cover ③

NOTE:

Align the tab (a) on the coasting enricher diaphragm with the recess (b) in the carburetor body.

5. Install:
- piston valve
 - piston valve spring
 - vacuum chamber cover ①

NOTE:

Align the tab (a) on the vacuum chamber cover with the recess in the carburetor body.

6. Install:
- connecting bracket

NOTE:

After installing the connecting bracket check that the throttle cable lever and starter plunger link operate smoothly.



EAS00493

INSTALLING THE CARBURETORS

1. Adjust:
 - carburetor synchronizationRefer to “SYNCHRONIZING THE CARBURETORS” in CHAPTER 3.
2. Adjust:
 - engine idling speed



Engine idling speed
950 ~ 1,050 r/min

Refer to “ADJUSTING THE ENGINE IDLING SPEED” in CHAPTER 3.

- throttle cable free play



Throttle cable free play (at the flange of the throttle grip)
4 ~ 6 mm (0.16 ~ 0.24 in)

Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in CHAPTER 3.

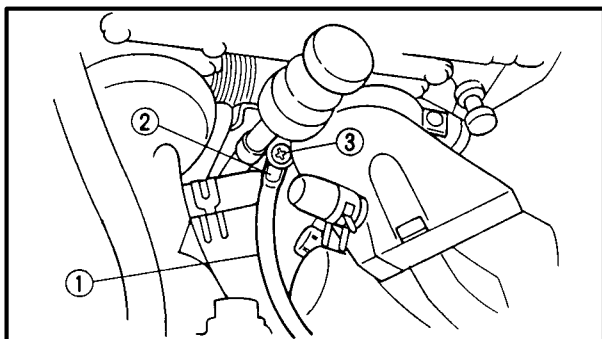
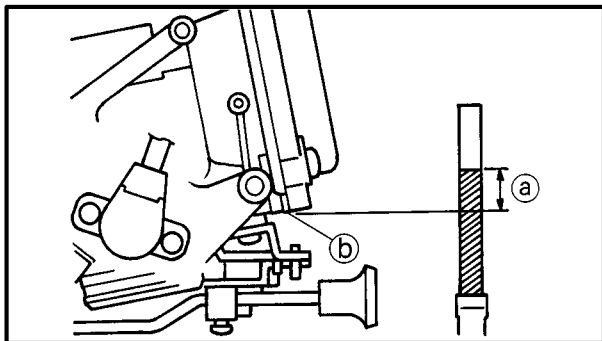
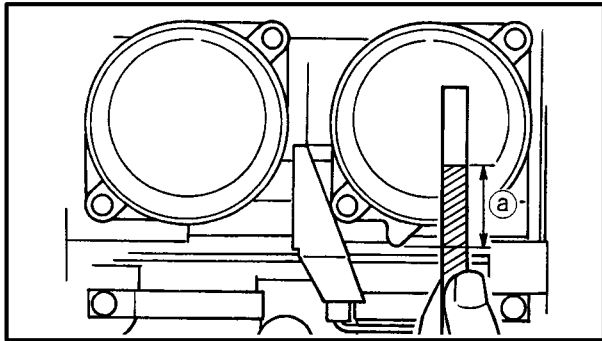
EAS00495

MEASURING AND ADJUSTING THE FUEL LEVEL

1. Measure:
• fuel level (a)
Out of specification → Adjust.



Fuel level (above the edge of body ⑥)
13.0 ~ 14.0 mm (0.52 ~ 0.56 in)

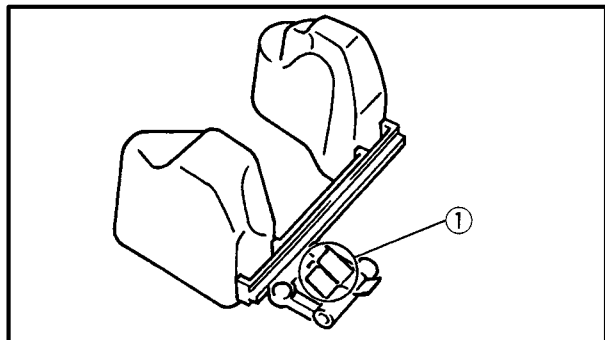
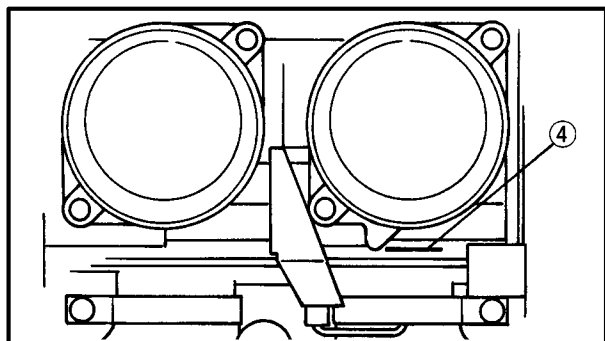


- Stand the motorcycle on a level surface.
- Place the motorcycle on a suitable stand to ensure that the motorcycle is standing straight up.
- Install the fuel level gauge ① to the fuel drain pipe ②.



Fuel level gauge
YM-01312-A, 90890-01312

- d. Loosen the fuel drain screw ③.



- e. Hold the fuel level gauge vertically next to the edge of body (4).
- f. Measure the fuel level on both sides of the carburetor assembly.

NOTE:

The fuel level readings should be equal on both sides.

2. Adjust:

- fuel level

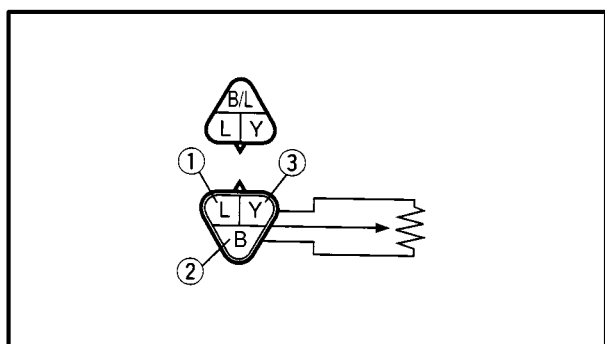
- a. Remove the carburetor assembly.
- b. Check the needle valve seat and needle valve.
- c. If either is worn, replace them as a set.
- d. If both are fine, adjust the float level by slightly bending the float tang (1).
- e. Install the carburetor assembly.
- f. Measure the fuel level again.
- g. Repeat steps (a) to (f) until the fuel level is within specification.

EAS00502

CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE:

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.



1. Check:

- throttle position sensor
(with it installed on the carburetor)

- a. Disconnect the throttle position sensor coupler.
- b. Connect the pocket tester ($\Omega \times 1 \text{ k}$) to the throttle position sensor.

Tester positive lead → Blue (1)
Tester negative lead → Black (2)

- c. Check the throttle position sensor maximum resistance.
Out of specification → Replace the throttle position sensor.



**Throttle position sensor
maximum resistance**

**4 ~ 6 k Ω at 20°C (68°F)
(Blue ~ Black)**



- d. Connect the pocket tester ($\Omega \times 1 \text{ k}$) to the throttle position sensor.

Tester positive lead → Yellow ③
Tester negative lead → Black ②

- e. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.

NOTE:

Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.

Out of specification or the resistance changes abruptly → Go to step 2.



Throttle position sensor resistance

0.6 ~ 5.7 k Ω at 20°C (68°F)
 (Yellow ~ Black)

2. Check:

- throttle position sensor
 (with it removed from the carburetor)

- a. Disconnect the throttle position sensor coupler.
 b. Remove the throttle position sensor from the carburetor.
 c. Connect the pocket tester ($\Omega \times 1 \text{ k}$) to the throttle position sensor.

Tester positive lead → Blue ①
Tester negative lead → Black ②

- d. Check the throttle position sensor maximum resistance.

Out of specification → Replace the throttle position sensor.



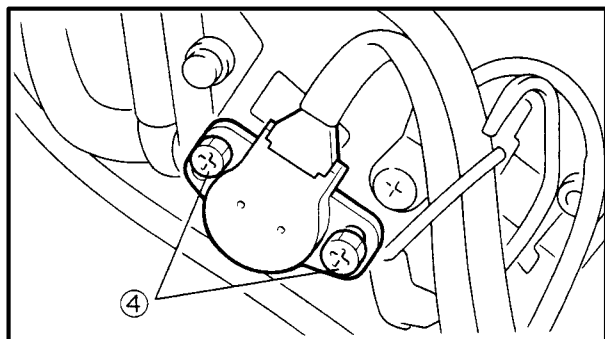
Throttle position sensor maximum resistance

4 ~ 6 k Ω at 20°C (68°F)
 (Blue ~ Black)

- e. Connect the pocket tester ($\Omega \times 1 \text{ k}$) to the throttle position sensor's coupler.

Tester positive lead → Yellow ③
Tester negative lead → Blue ①

- f. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.
 The resistance does not change or it changes abruptly → Replace the throttle position sensor.
 The slot is worn or broken ④ → Replace the throttle position sensor.





NOTE:

Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.



Throttle position sensor resistance

0.6 ~ 5.7 k Ω at 20°C (68°F)
(Yellow ~ Blue)

3. Adjust:

- throttle position sensor angle

- Disconnect the throttle position sensor coupler.
- Connect the pocket tester ($\Omega \times 1 \text{ k}$) to the throttle position sensor.

Tester positive lead → Blue ①
Tester negative lead → Black ②

- Measure the throttle position sensor maximum resistance.
- Calculate the throttle position sensor maximum resistance when the throttle is fully closed.

Throttle position sensor maximum resistance (throttle is fully closed) =
Maximum resistance $\times$ (0.13 – 0.15)

Example

If the maximum resistance = 5 k Ω , then the throttle position sensor's maximum resistance when the throttle is fully closed should be:

5 k $\Omega \times$ (0.13 – 0.15) = 650 – 750 Ω

- Lift the carburetor assembly slightly out of the intake manifolds.
- Loosen the throttle position sensor screws ④
- Connect the pocket tester ($\Omega \times 100$) to the throttle position sensor.

Tester positive lead → Yellow ③
Tester negative lead → Blue ①

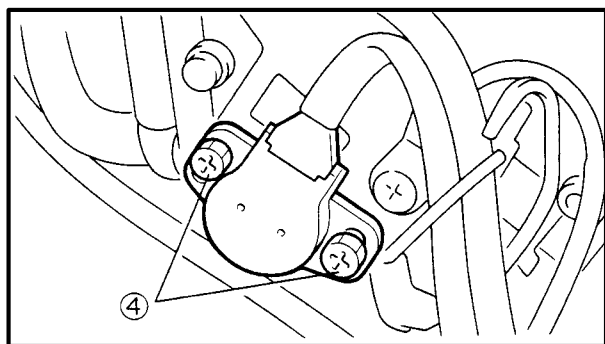
- Adjust the throttle position sensor angle so that the measured resistance is within the specified range.

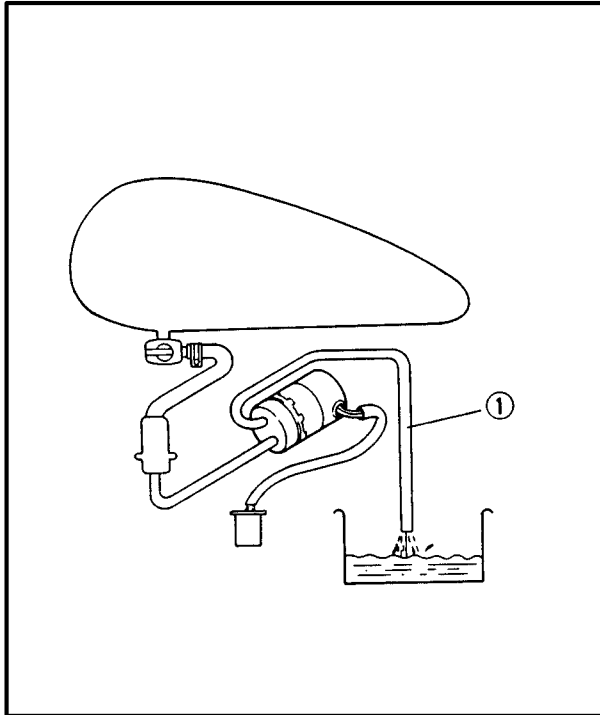


Throttle position sensor resistance

583 ~ 875 Ω
(Yellow ~ Blue)

- After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.





EAS00504

CHECKING THE FUEL PUMP

1. Check:

- fuel pump

▼ ▼

- Place a container under the end of the fuel hose.
- Start the engine and check if fuel flows from the fuel hose ①.

Fuel flows → Fuel pump is OK

Fuel does not flow →

Replace the fuel pump

- c. Stop the engine and check if the fuel stops flowing from the fuel hose ①.

Fuel stops flowing → Fuel pump is OK

Fuel flows → Replace the fuel pump

[illegible]

⚠ WARNING

- **Gasoline and its vapors are highly flammable and explosive. Therefore, keep gasoline away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **Failure to check for gasoline leaks may result in fire or explosion.**



EAS00505

CHECKING THE FUEL COCK

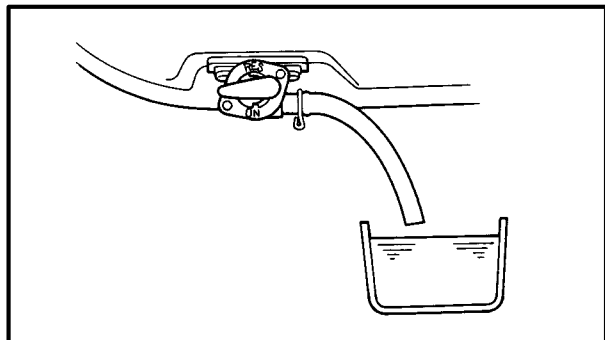
1. Check:
 - fuel lock
 - Cracks/damage/wear → Replace.

EAS00506

CHECKING THE FUEL COCK OPERATION

NOTE:

After installing the fuel cock, check its operation.



1. Check that the fuel cock lever is positioned to “ON” or “RES”.
2. Place a container under the end of the fuel hose.
3. Check:
 - fuel cock operation

- a. Suck on the end of the vacuum hose.

Fuel flows → Fuel cock is OK

Fuel does not flow → Replace the fuel cock
--



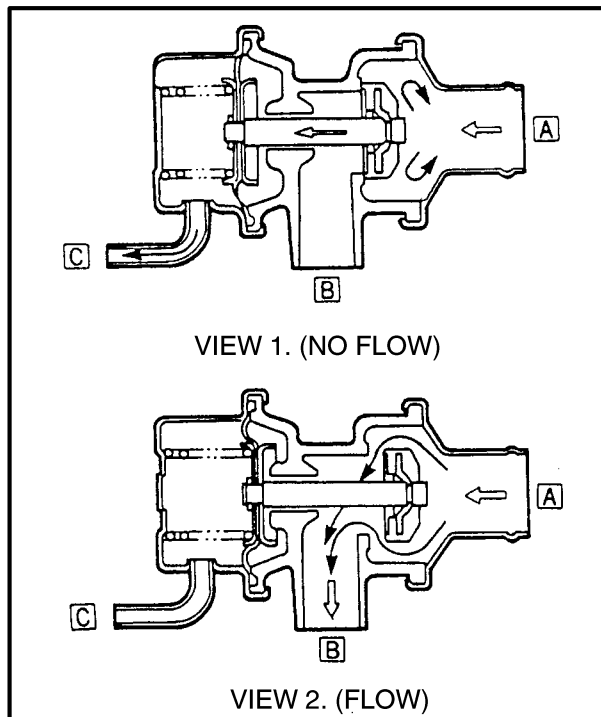
EB601000

AIR INDUCTION SYSTEM(AIS) AIR INJECTION

This system burns the unburned exhaust gases by injecting fresh air (secondary air) at the exhaust port. This is to reduce the output of the hydrocarbons.

When there is negative pressure around the exhaust port, the reed valve opens and the secondary air flows into the exhaust port.

The required temperature for burning the unburned exhaust gases is approximately 600° to 700°C.



AIR CUT-OFF VALVE

The air cut-off valve is operated by intake gas pressure through the diaphragm. Normally, this valve is opened in order to allow fresh air to flow into the exhaust port.

When the throttle is rapidly closed, negative pressure is generated and the valve closes in order to prevent after-burning.

VIEW 1. (NO FLOW)

When decelerating (the throttle closes), the valve will close.

VIEW 2. (FLOW)

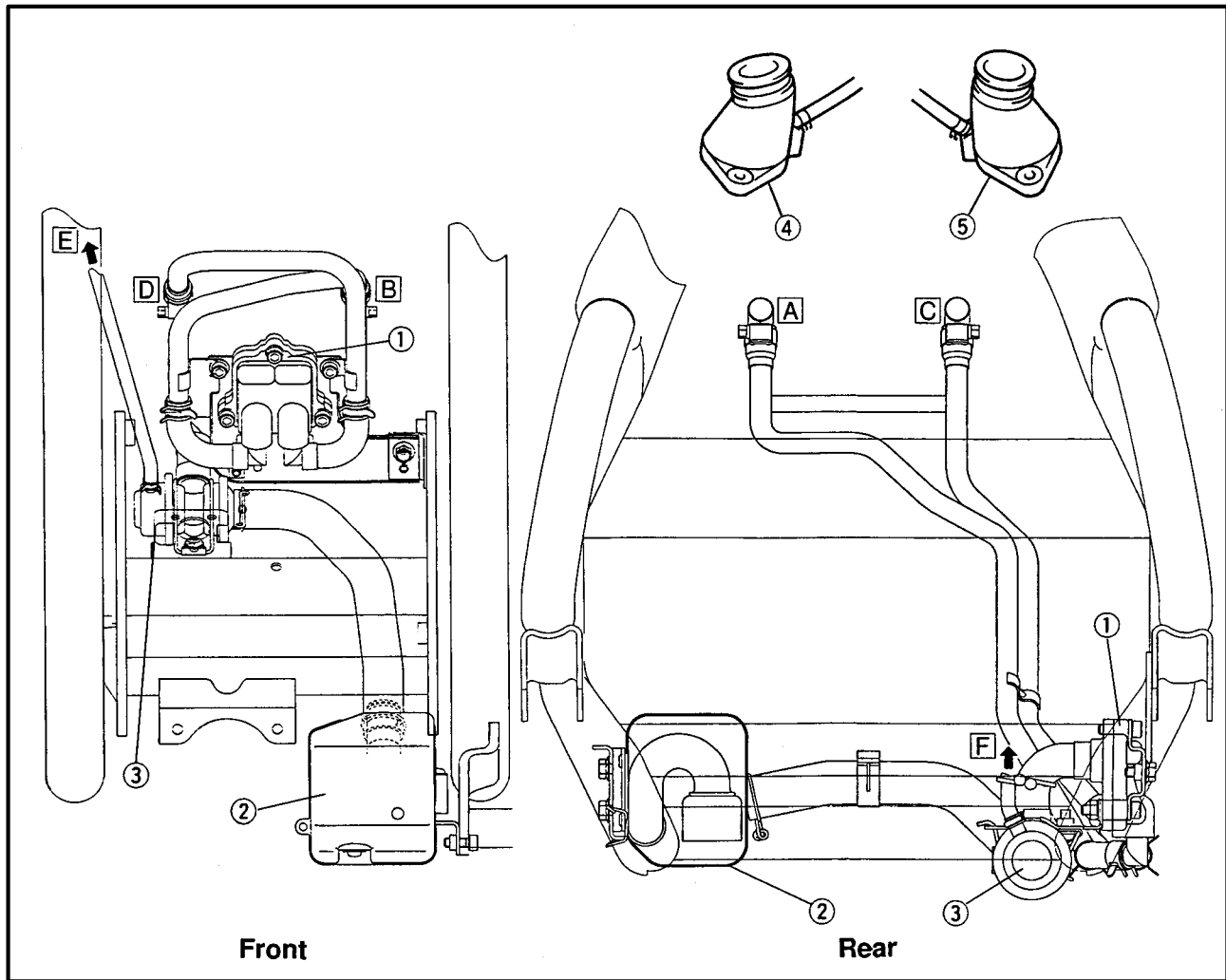
During normal operation the valve is open.

A From the air filter

B To the reed valve

C To the carburetor joint

AIR INDUCTION SYSTEM DIAGRAMS



- ① Reed valve
- ② Air cleaner
- ③ Air cutoff valve
- ④ Carburetor joint (cylinder #2)
- ⑤ Carburetor joint (cylinder #4)

- ☐ A To cylinder #1
- ☐ B To cylinder #2
- ☐ C To cylinder #3
- ☐ D To cylinder #4
- ☐ E To carburetor joint (#2)
- ☐ F To carburetor joint (#4)

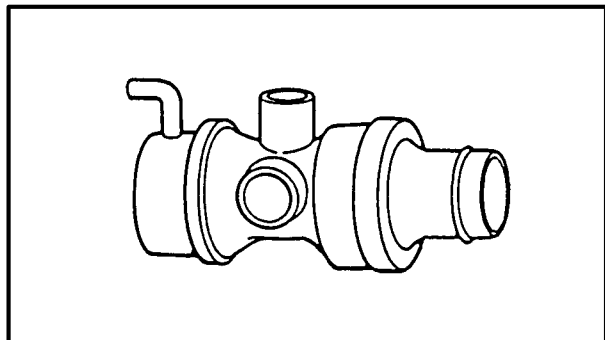


EAS00510

CHECKING THE AIR INDUCTION SYSTEM

1. Check:

- hoses
Loose connection → Connect properly.
Cracks/damage → Replace.
- pipes
Cracks/damage → Replace.



2. Check:

- air cutoff valve
Cracks/damage → Replace.



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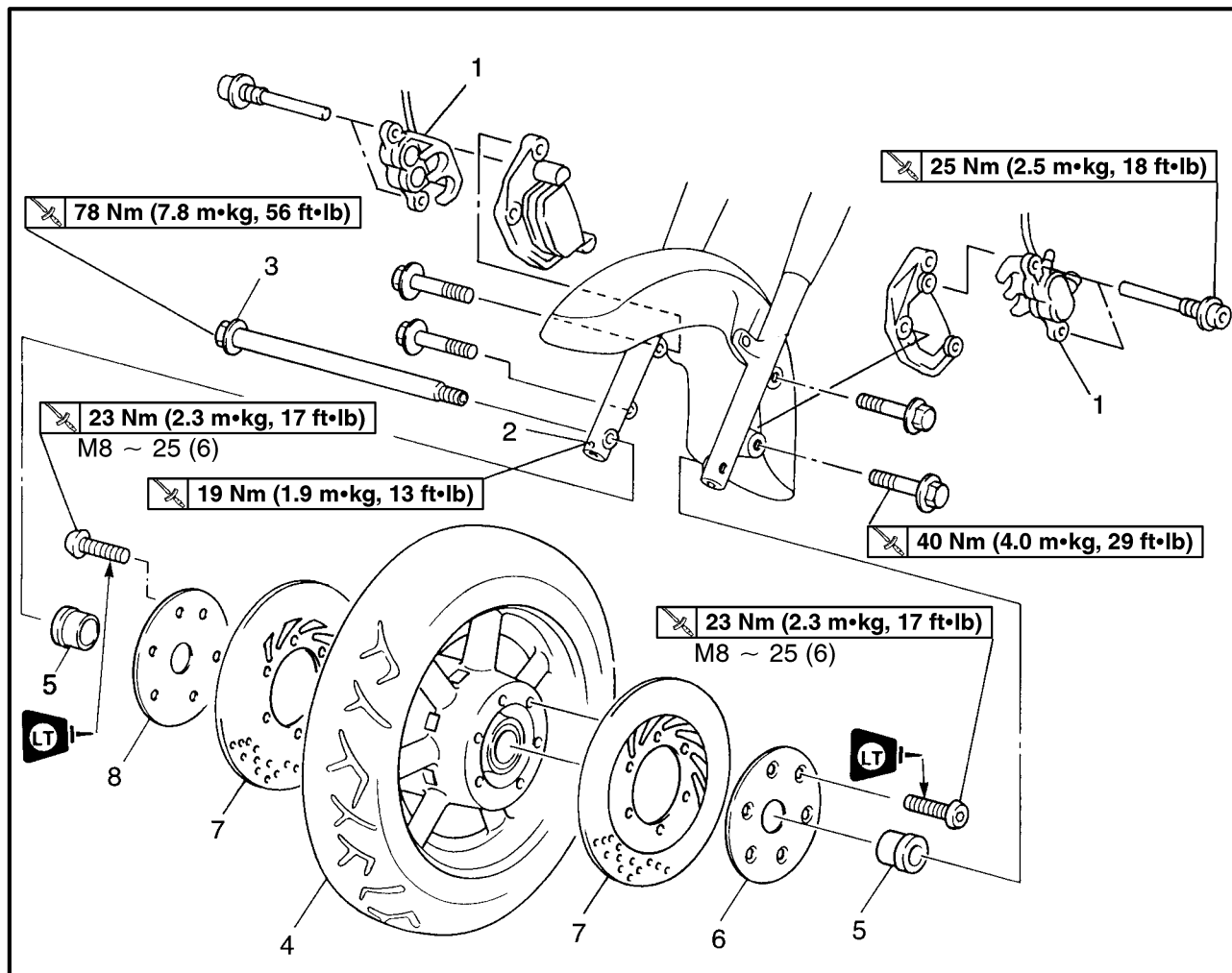
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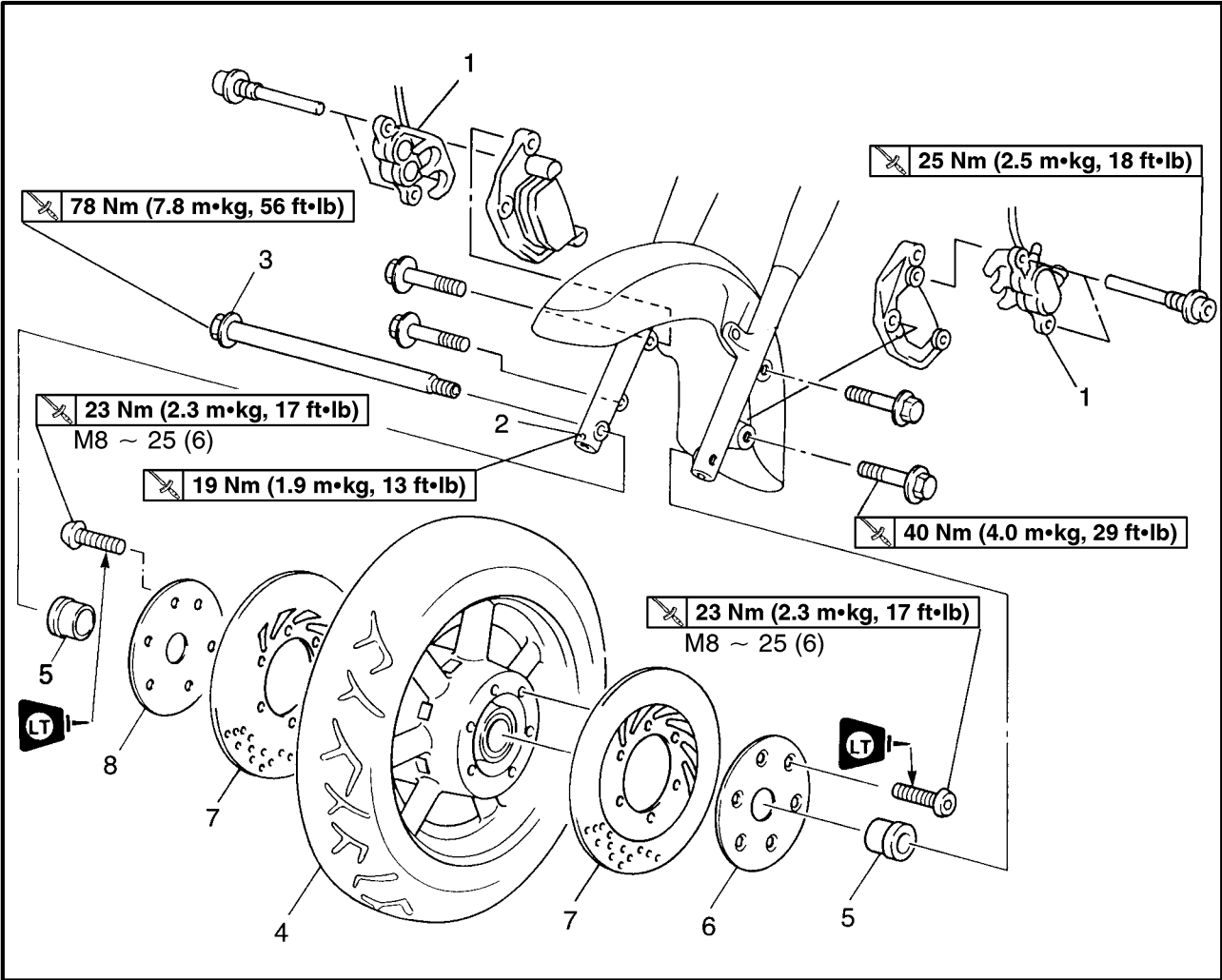
EAS00514

CHASSIS

FRONT WHEEL AND BRAKE DISCS



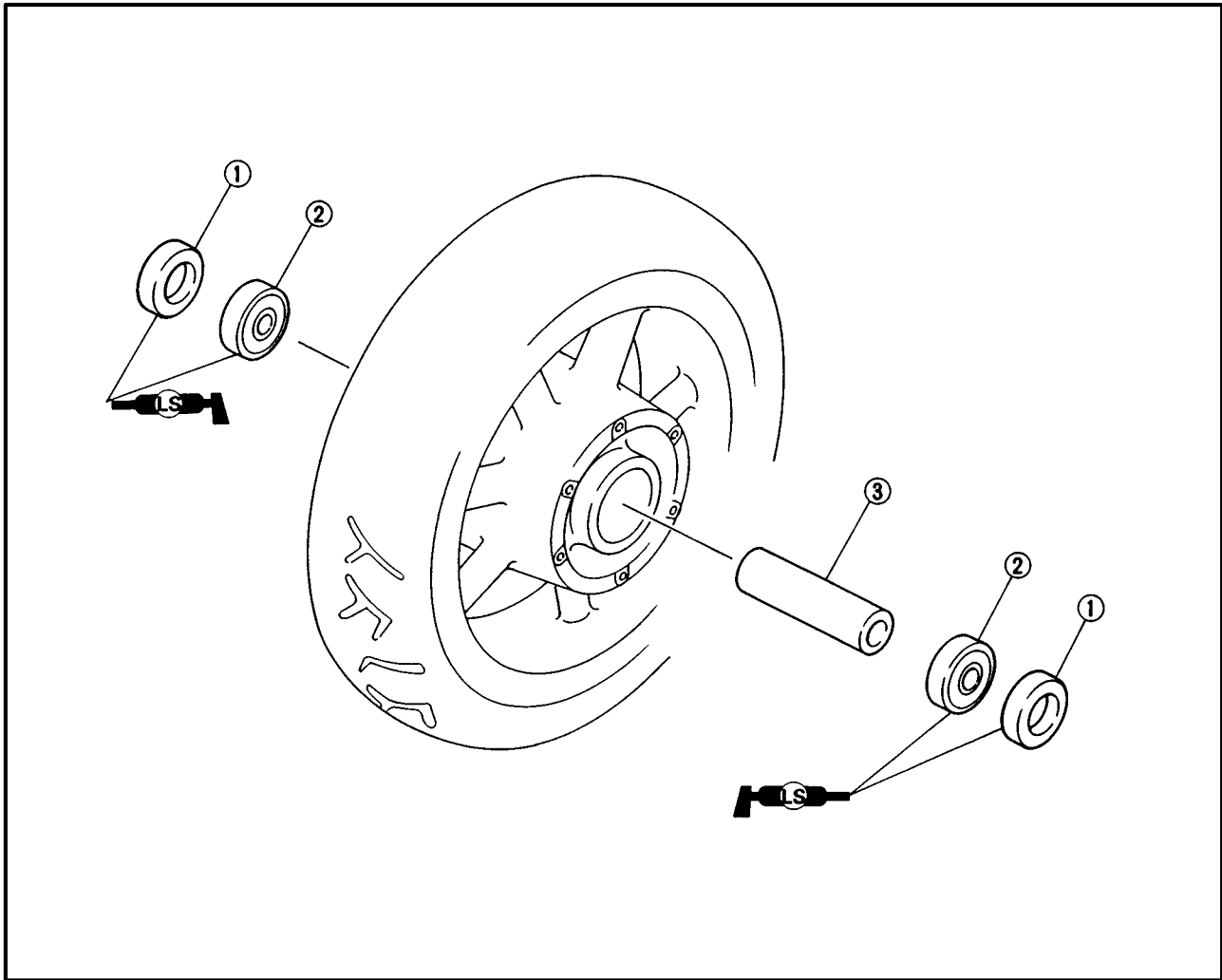
Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake discs		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING _____ Securely support the motorcycle so there is no danger of it falling over.
1	Front brake calipers/brackets (left and right)	2/2	NOTE: _____ Do not depress the brake lever when the wheel is off of the motorcycle as the brake pads will be forced shut.
2	Pinch bolt(front wheel axle)	1	Loosen
3	Front wheel axle	1	Elevate the front wheel. Place a suitable stand under the engine.
4	Front wheel	1	



Order	Job/Part	Q'ty	Remarks
5	Collars	2	Refer to "INSTALLING THE FRONT WHEEL". For installation, reverse the removal procedure.
6	Brake disc cover (left)	1	
7	Brake discs	2	
8	Brake disc cover (right-with weight)	1	

EAS00518

FRONT WHEEL



Order	Job/Part	Q'ty	Remarks
	Disassembling the front wheel		
①	Oil seals	2	Disassemble the parts in the order listed.
②	Bearings	2	
③	Spacer	1	
			For assembly, reverse the disassembly procedure.



EAS00521

REMOVING THE FRONT WHEEL

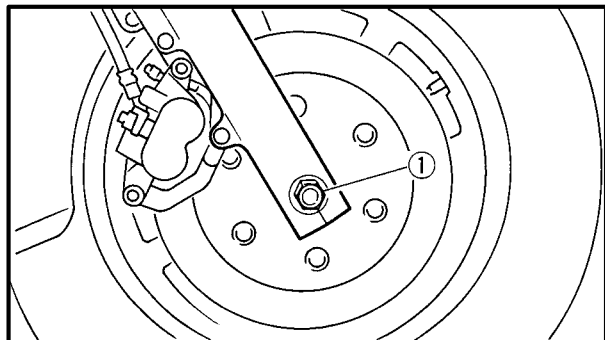
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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



2. Loosen
 - front wheel axle ①.
3. Remove:
 - brake caliper
 - brake caliper bracket

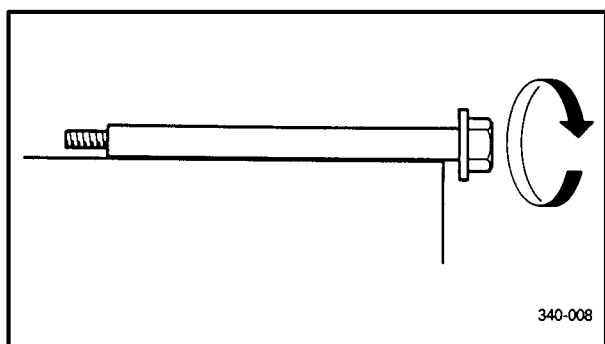
NOTE:

Do not squeeze the brake lever when removing the brake calipers.

4. Elevate:
 - front wheel

NOTE:

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



EAS00525

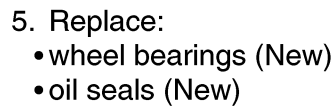
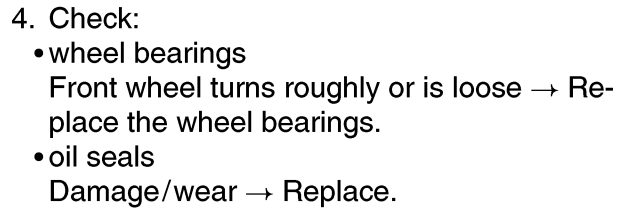
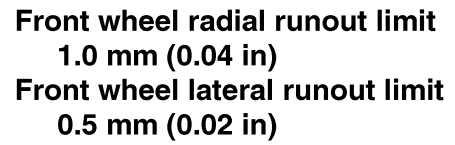
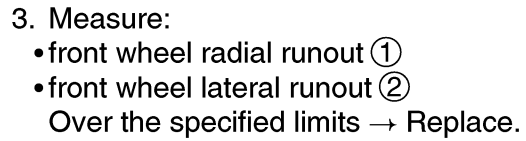
CHECKING THE FRONT WHEEL

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

⚠ WARNING

Do not attempt to straighten a bent wheel axle.

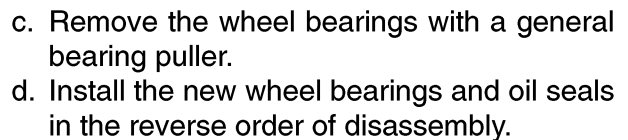
2. Check:
 - tire
 - front wheel
 - Damage/wear → Replace.
 - Refer to “CHECKING THE TIRES” and “CHECKING THE WHEELS” in chapter 3.



a. Clean the outside of the front wheel hub.

b. Remove the oil seals ① with a flat-head screwdriver.

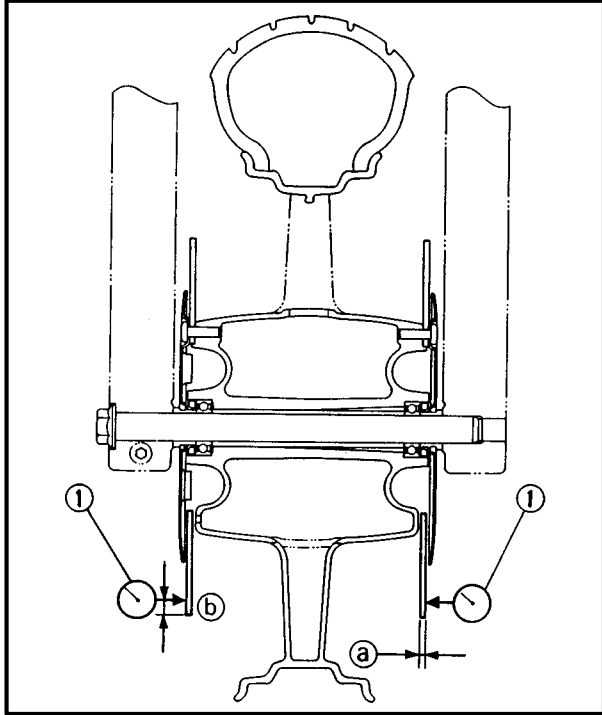
To prevent damaging the wheel, place a rag ② between the screwdriver and the wheel surface.



Use a socket ① that matches the diameter of the wheel bearing outer race and oil seal.

Do not contact the wheel bearing center race ② or balls ③. Contact should be made only with the outer race ④.







Brake disc bolt
23 Nm (2.3 m•kg, 17 ft•lb)
LOCTITE®

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

EAS00544

INSTALLING THE FRONT WHEEL

The following procedure applies to both brake discs.

1. Lubricate:
 - wheel axle
 - oil seal lips

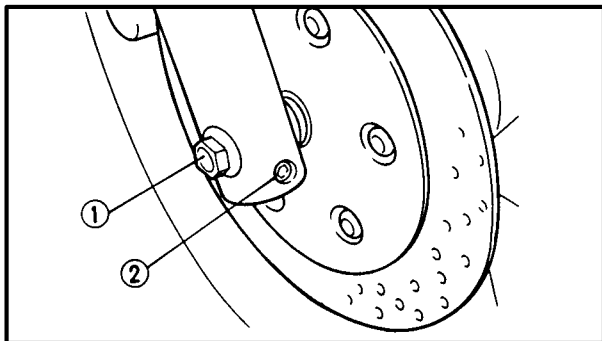
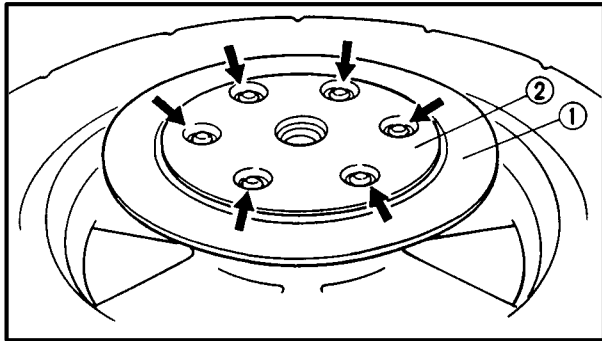


Recommended lubricant
Lithium soap base grease

2. Install:
 - brake disc ①
 - brake disc cover ②

NOTE:

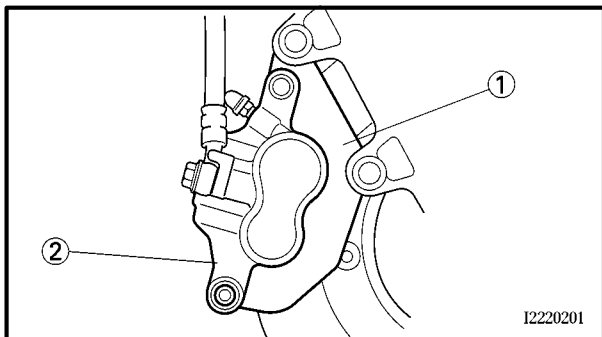
- Apply LOCTITE® 648 to the threads of the brake disc bolts.
- Tighten the brake disc bolts in stages and in a crisscross pattern.



3. Tighten:
 - wheel axle ① **78 Nm (7.8 m•kg, 56 ft•lb)**
 - wheel axle pinch bolt ② **19 Nm (1.9 m•kg, 13 ft•lb)**

CAUTION:

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



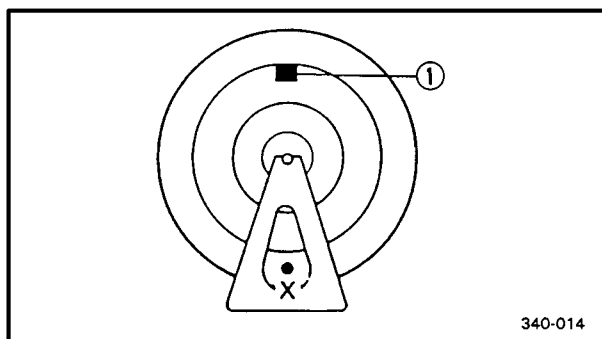
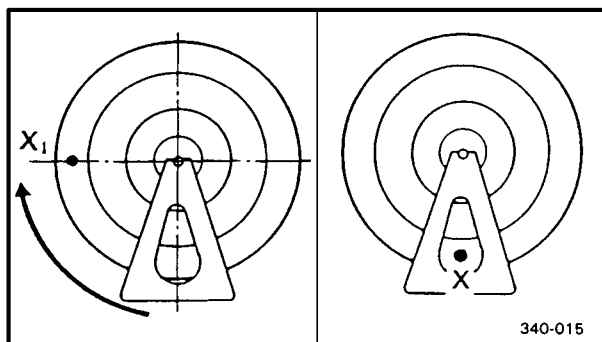
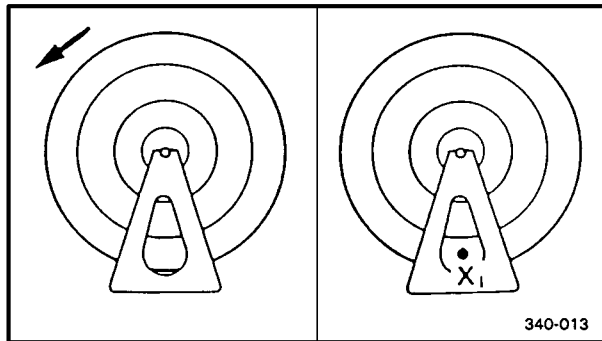
12220201

4. Install:
 - brake caliper bracket ① **40 Nm (4.0 m•kg, 29 ft•lb)**
 - brake caliper ② **25 Nm (2.5 m•kg, 18 ft•lb)**

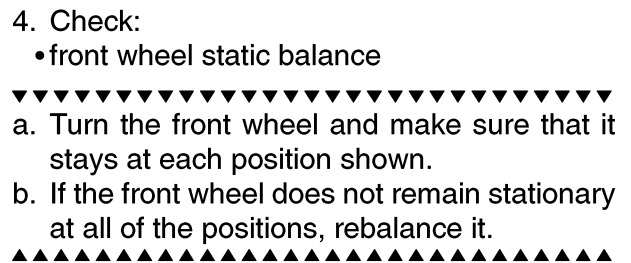
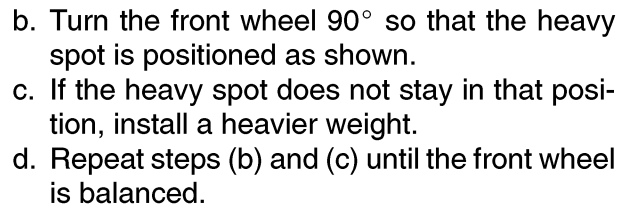
⚠ WARNING

Make sure that the brake hose is routed properly.

- Place the front wheel on a suitable balancing stand.

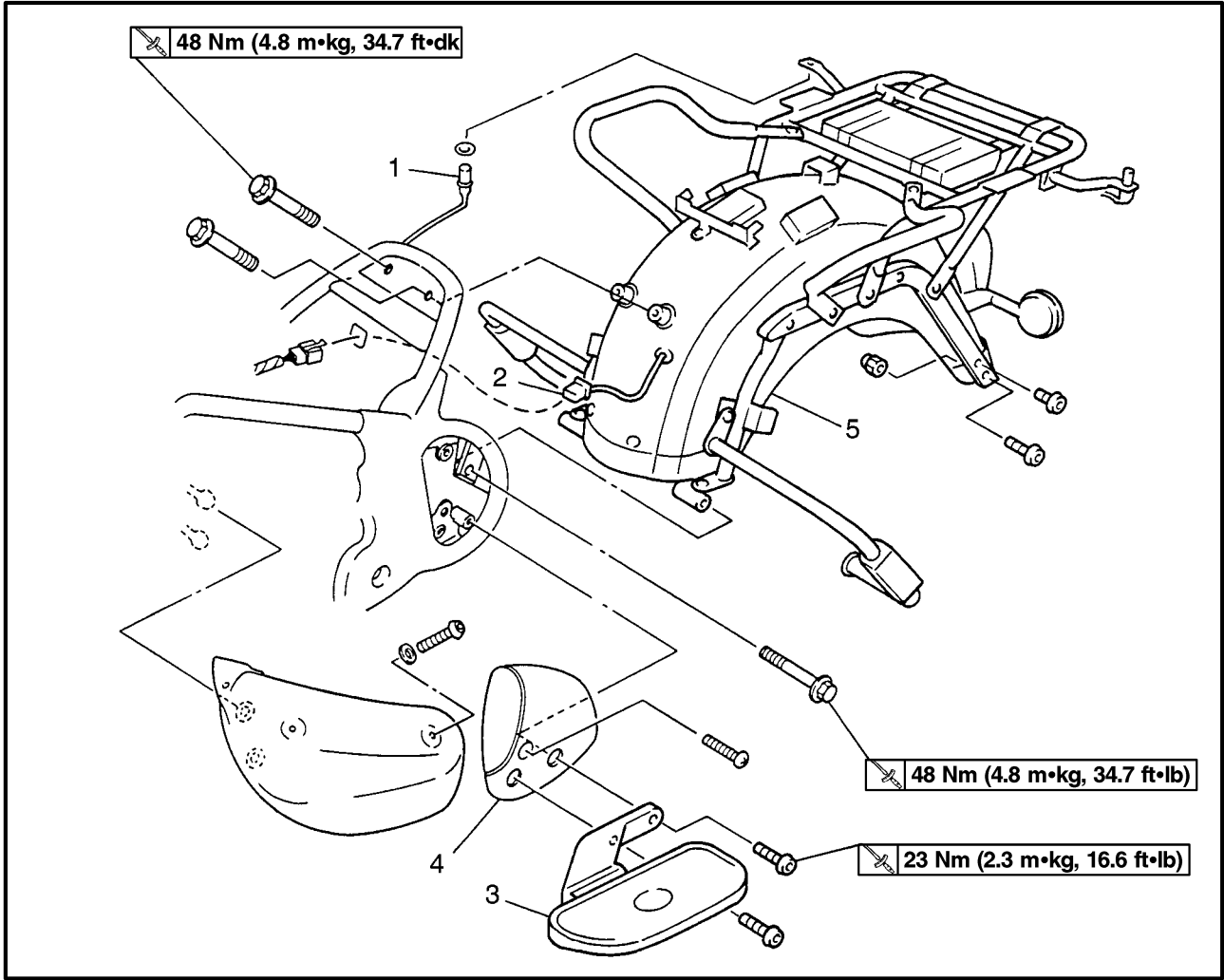


- Start with the lightest weight.



EAS00551

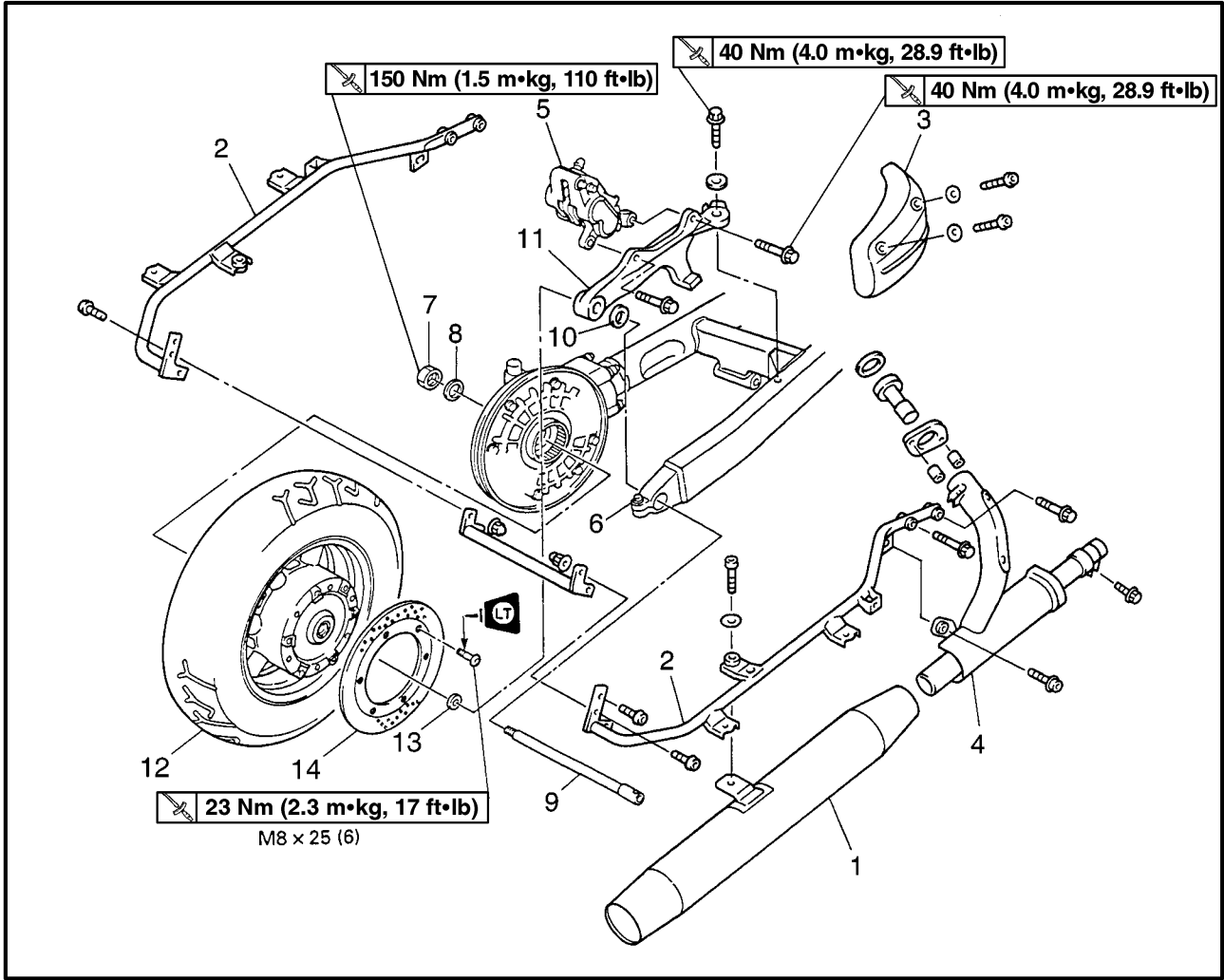
REAR WHEEL AND BRAKE DISC
REAR FENDER



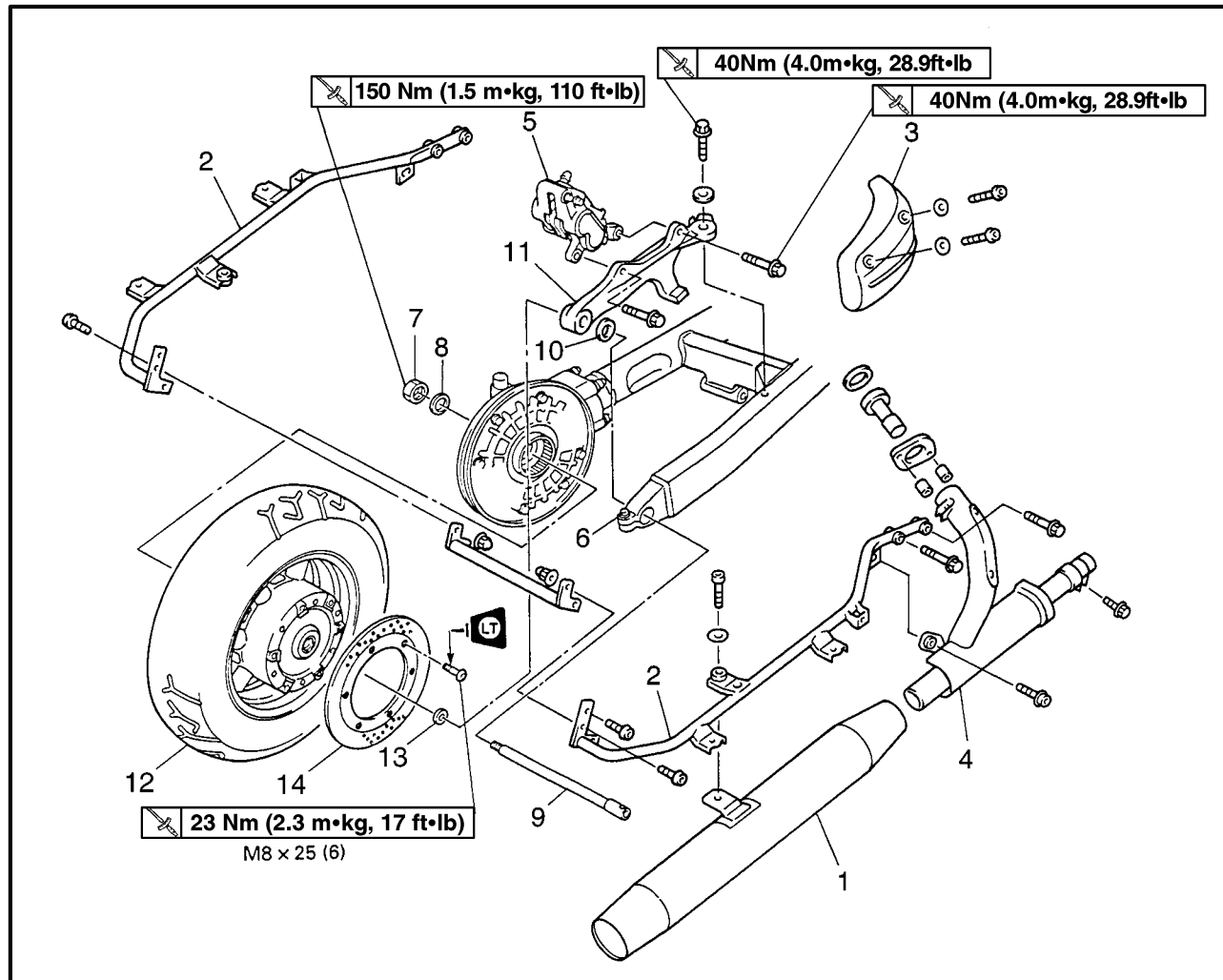
Order	Job/Part	Q'ty	Remarks
	Removing the rear fender		Remove the parts in the order listed. Stand the motorcycle on a level surface.
			⚠ WARNING Securely support the motorcycle so there is no danger of it falling over.
	Ride seat		Refer to "RIDER AND PASSENGER SEATS" in CHAPTER 3. Refer to "SADDLEBAGS" in CHAPTER 3.
1	Antenna, trunk and saddlebags	1	
2	Antenna lead	1	
3	Tail/brake and flasher lights lead coupler	2	
4	Passenger footrests (left and right)	2	Disconnect
5	Side covers (left and right)	1	For installation, reverse the removal procedure.
	Rear fender assembly		

EAS00560

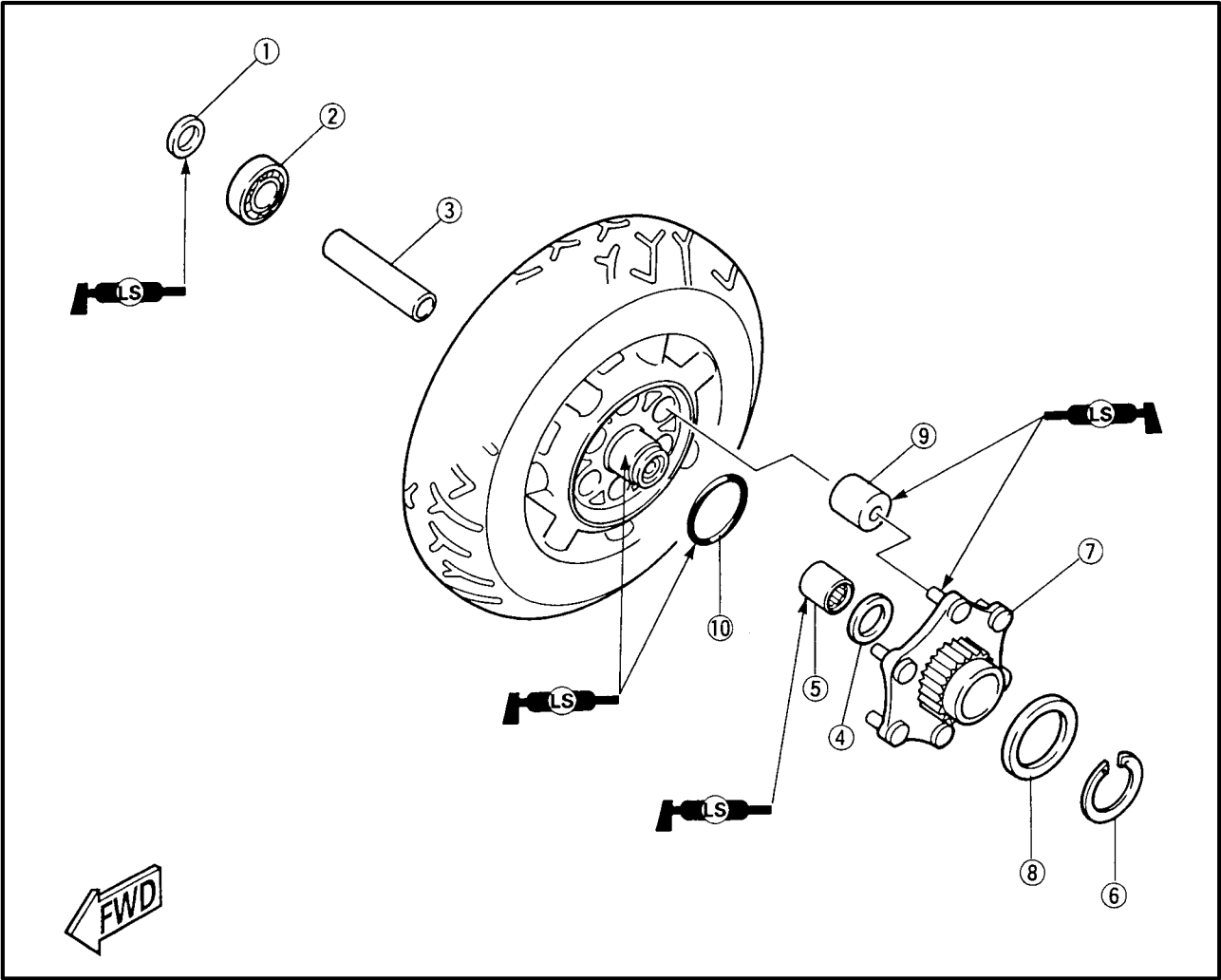
REAR WHEEL AND BRAKE DISC



Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel and brake disc		Remove the parts in the order listed.
1	Muffler (right)	1	NOTE: _____ Do not depress the brake pedal when removing the rear brake caliper.
2	Saddlebag guide bar (left and right)	1	
3	Side cover (right)	1	
4	Exhaust pipe	1	
5	Rear brake caliper	1	
6	Pinch bolt	1	Loosen
7	Rear wheel axle nut	1	
8	Washer	1	



Order	Job/Part	Q'ty	Remarks
9	Rear wheel axle	1	NOTE: _____ • Elevate the rear wheel. Place a suitable stand under the engine. • Move the wheel to the right to separate it from the final gear case.
10	Washer	1	
11	Rear brake caliper bracket	1	
12	Rear wheel	1	
13	Collar	1	
14	Brake disc	1	For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear wheel		Disassemble the parts in the order listed.
①	Oil seal	1	
②	Bearing	1	
③	Collar	1	
④	Oil seal	1	
⑤	Bearing	1	
⑥	Circlip	1	
⑦	Clutch hub	1	
⑧	Hub dust seal	1	
⑨	Damper	6	
⑩	O-ring	1	For assembly, reverse the disassembly procedure.



EAS00562

REMOVING THE REAR WHEEL

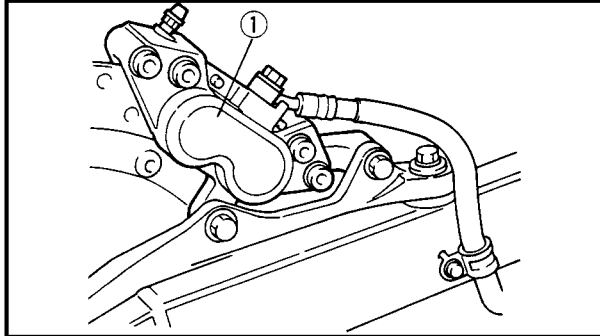
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

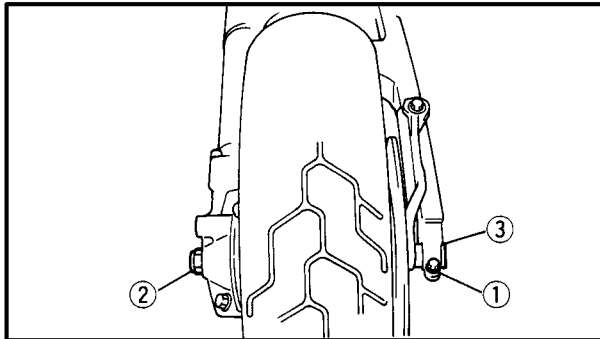
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
 - brake caliper (1)

NOTE:

Do not depress the brake pedal when removing the brake caliper.



3. Loosen:
 - pinch bolt (1)
4. Remove:
 - wheel axle nut (2)
 - washer
 - wheel axle (3)

Move the rear wheel to the right to separate it from the final drive housing.

5. Remove:
 - rear wheel

EAS00565

CHECKING THE REAR WHEEL

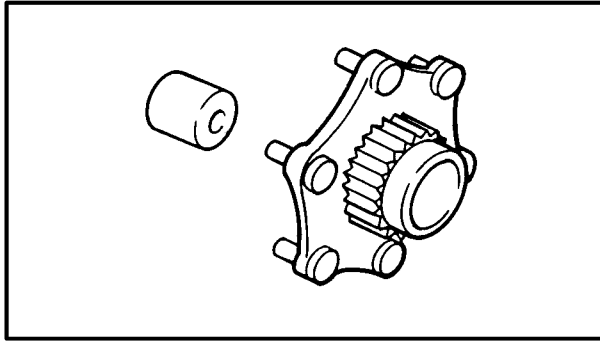
1. Check:
 - wheel axle
 - rear wheel
 - wheel bearings
 - oil seals

Refer to "FRONT WHEEL AND BRAKE DISCS".
2. Check:
 - tire
 - rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in CHAPTER 3.
3. Measure:
 - rear wheel radial runout
 - rear wheel lateral runout

Refer to "FRONT WHEEL AND BRAKE DISCS".



EAS00567

CHECKING THE REAR WHEEL DRIVE HUB

1. Check:

- rear wheel drive hub
Cracks/damage → Replace.
- rear wheel drive hub dampers
Damage/wear → Replace.

EAS00572

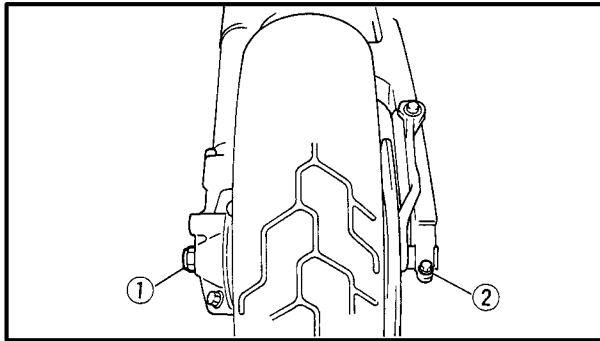
INSTALLING THE REAR WHEEL

1. Lubricate:

- wheel axle
- wheel bearings
- oil seal lips



Recommended lubricant
Lithium soap base grease



2. Tighten:

- wheel axle nut 150 Nm (15.0 m•kg, 110 lb•ft)
- pinch bolt 23 Nm (2.3 m•kg, 16.6 ft•lb)
- brake caliper bolts 40 Nm (4.0 m•kg, 29lb•ft)

EAS00575

ADJUSTING THE REAR WHEEL STATIC BALANCE

NOTE:

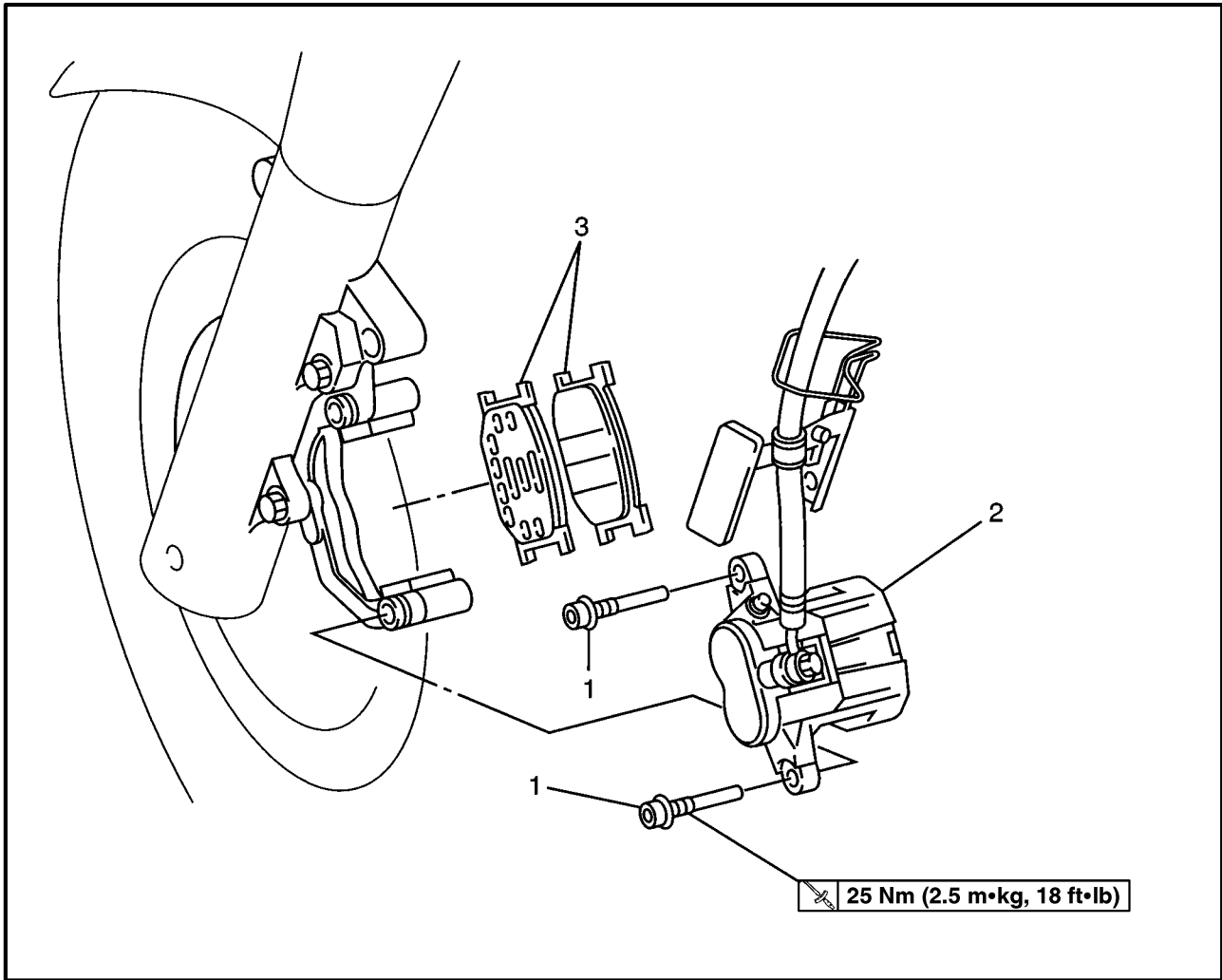
- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:

- rear wheel static balance
Refer to “FRONT WHEEL AND BRAKE DISCS”.

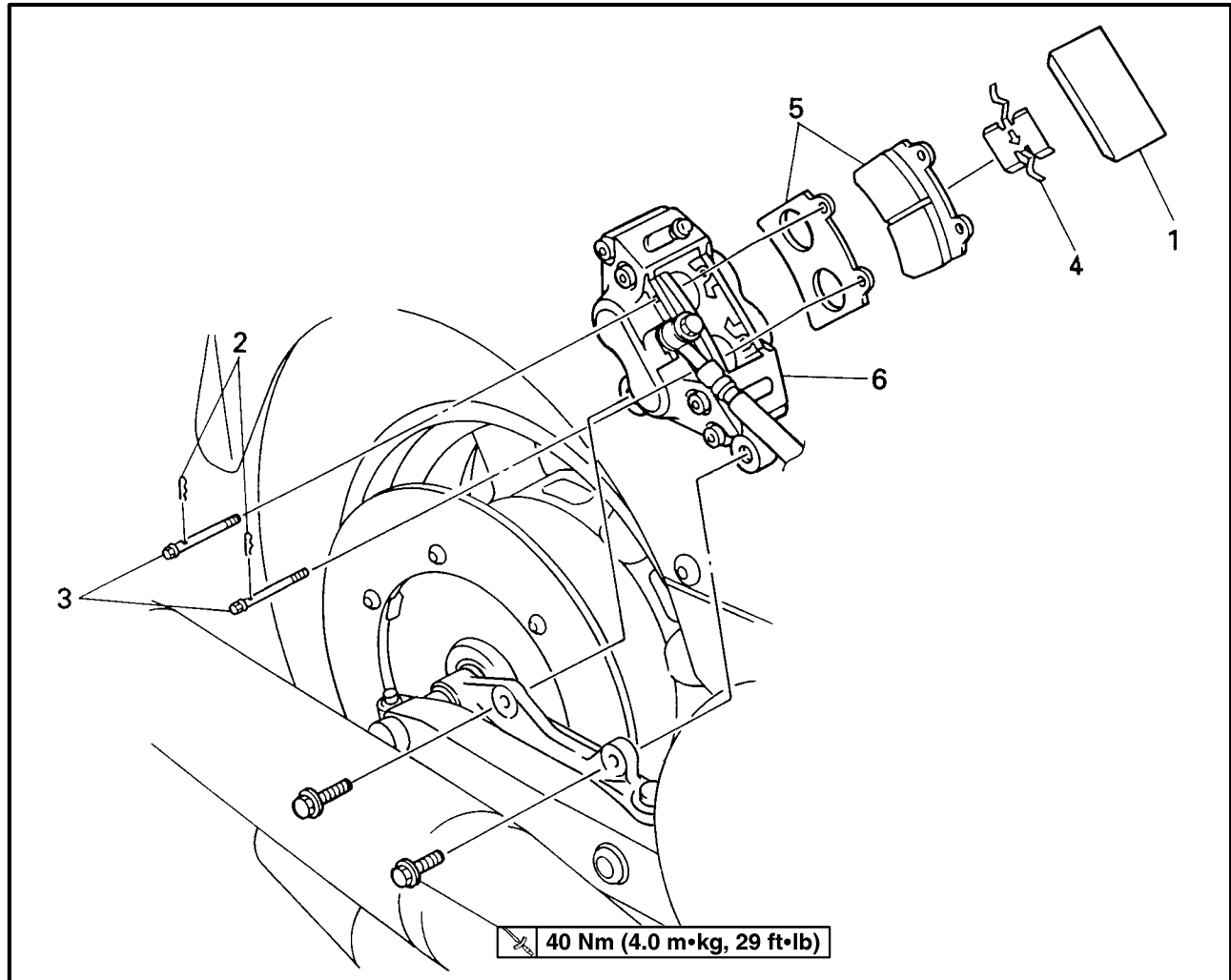
EAS00577

FRONT AND REAR BRAKES
FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake pads		
1	Brake caliper retaining bolts	2	Remove the parts in the order listed Refer to "REPLACING THE FRONT BRAKE PADS". For installation, reverse the removal procedure.
2	Brake caliper	1	
3	Brake pads	2	

REAR BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake pad		
1	Brake pad cover	1	Remove the parts in the order listed. Refer to "REPLACING THE REAR BRAKE PADS". NOTE: - When the brake pads have to be replaced install a new brake pad spring. - Replace the brake pads as a set if either is found to be worn to the wear limit.
2	Retaining clips	2	
3	Retaining pins	2	
4	Brake pad spring	1	
5	Brake pads	2	
6	Brake caliper	1	For installation, reverse the removal procedure.



EAS00579

CAUTION:

Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

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

First aid for brake fluid entering the eyes:

- Flush with water for 15 minutes and get immediate medical attention.

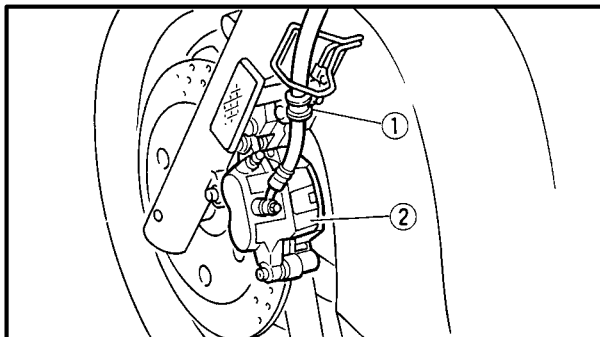
EAS00582

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

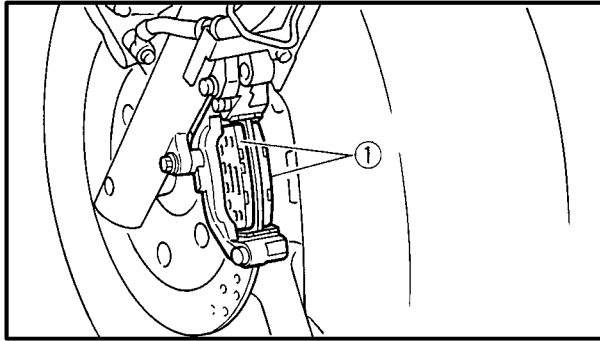
NOTE:

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

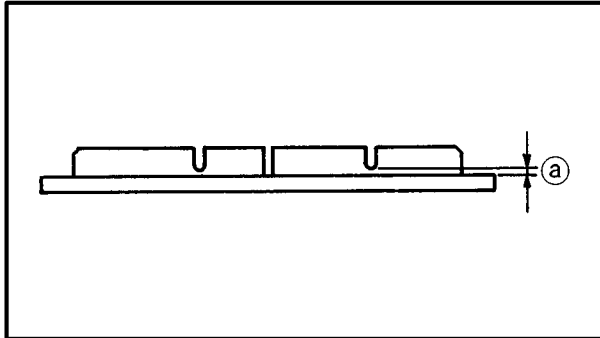


1. Remove:

- brake hose holder ①
- brake caliper ②



2. Remove:
 - brake pads ①
(along with the brake pad shims)



3. Measure:
 - brake pad wear limit ②
Out of specification → Replace the brake pads as a set.

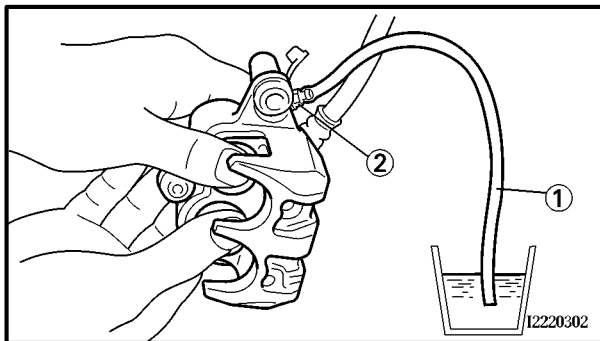


Brake pad wear limit
0.6 mm (0.02 in)

4. Install:
 - brake pad shims
(onto the brake pads)
 - brake pads

NOTE:

Always install new brake pads, brake pad shims, and a brake pad spring as a set.



- a. Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.

- c. Tighten the bleed screw.

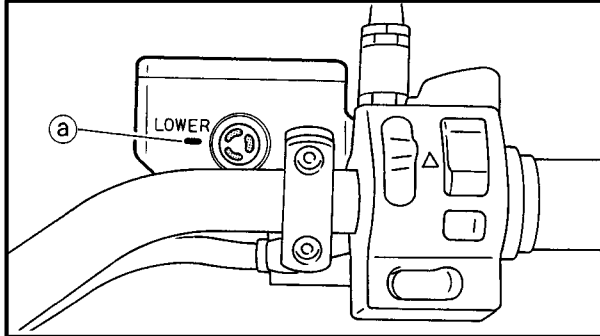


Bleed screw
6 Nm (0.6 m•kg, 4.3 ft•lb)

- d. Install new brake pad shims onto the new brake pads.
- e. Install new brake pads.

5. Install:
 - brake caliper retaining bolt

 **25 Nm (2.5 m•kg, 18 ft•lb)**



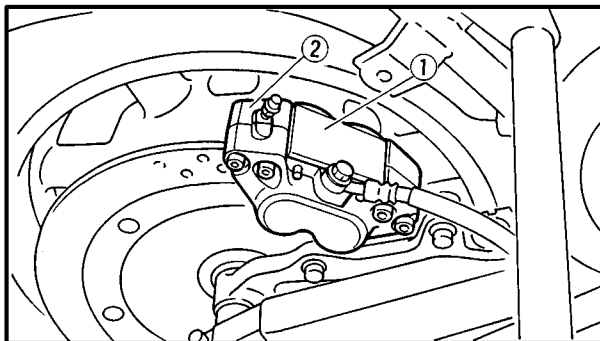
6. Check:
 - brake fluid level
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” in CHAPTER 3.
7. Check:
 - brake lever operation
Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

EAS00583

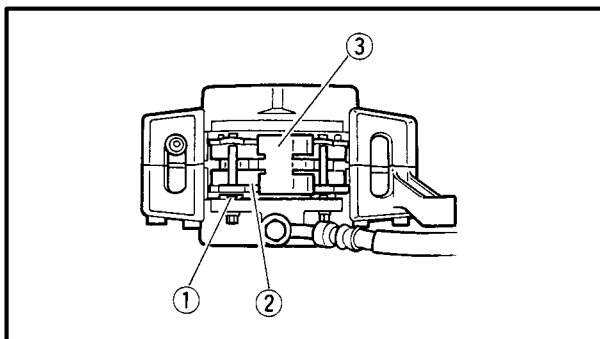
REPLACING THE REAR BRAKE PADS

NOTE:

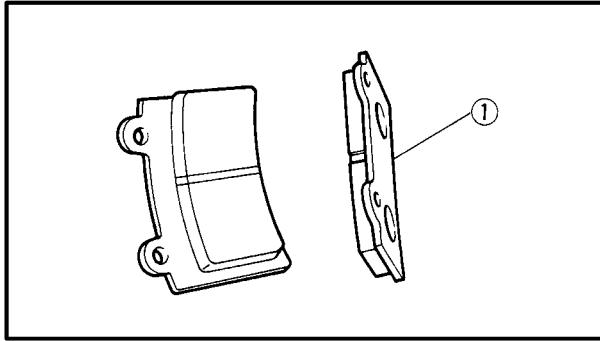
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



1. Remove:
 - brake pad cover ①
 - brake caliper ②

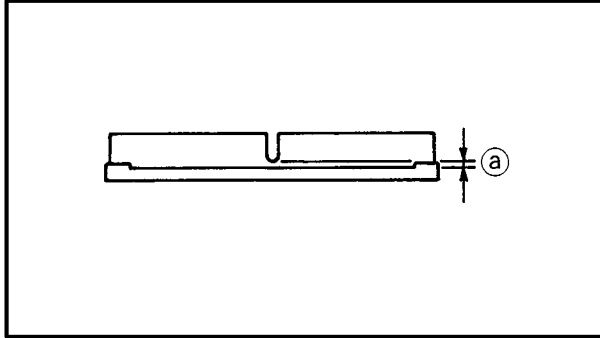


2. Remove:
 - brake pad clips ①
 - brake pad pins ②
 - brake pad spring ③



3. Remove:

- brake pads ①



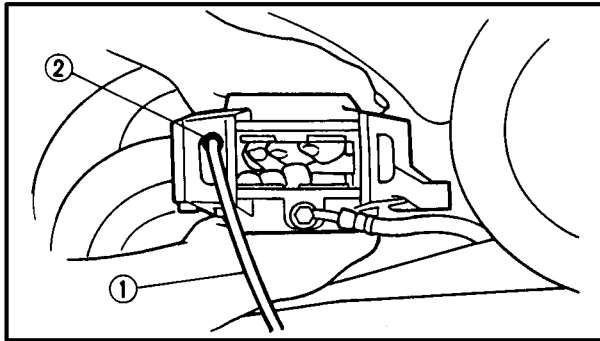
4. Measure:

- brake pad wear limit (a)

Out of specification → Replace the brake pads as a set.



Brake pad wear limit
0.5 mm (0.02 in)



5. Install:

- brake pad shims
(onto the brake pads)
- brake pads
- brake pad spring

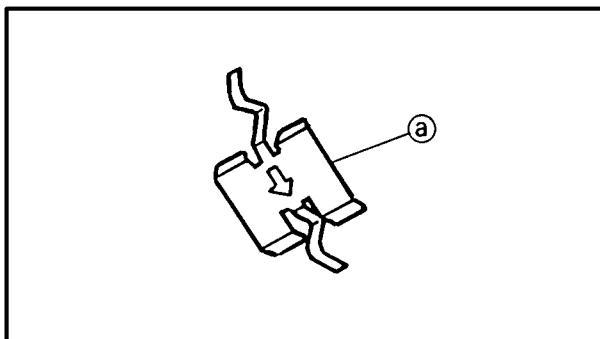
NOTE:

Always install new brake pads and a brake pad spring as a set.

- Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.
- Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- Tighten the bleed screw.



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



- e. Install new brake pads and a new brake pad spring.

NOTE:

The arrow mark Ⓐ of the brake pad spring must point in the direction of disc rotation.

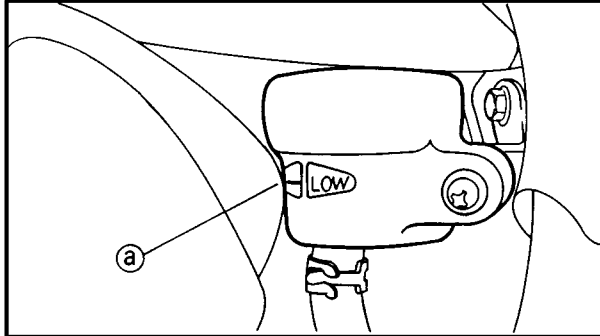


6. Install:

- brake pad pins
- brake pad clips
- brake pad cover
- brake caliper



Brake caliper bolt
40 Nm (4.0 m•kg, 29 ft•lb)



7. Check:

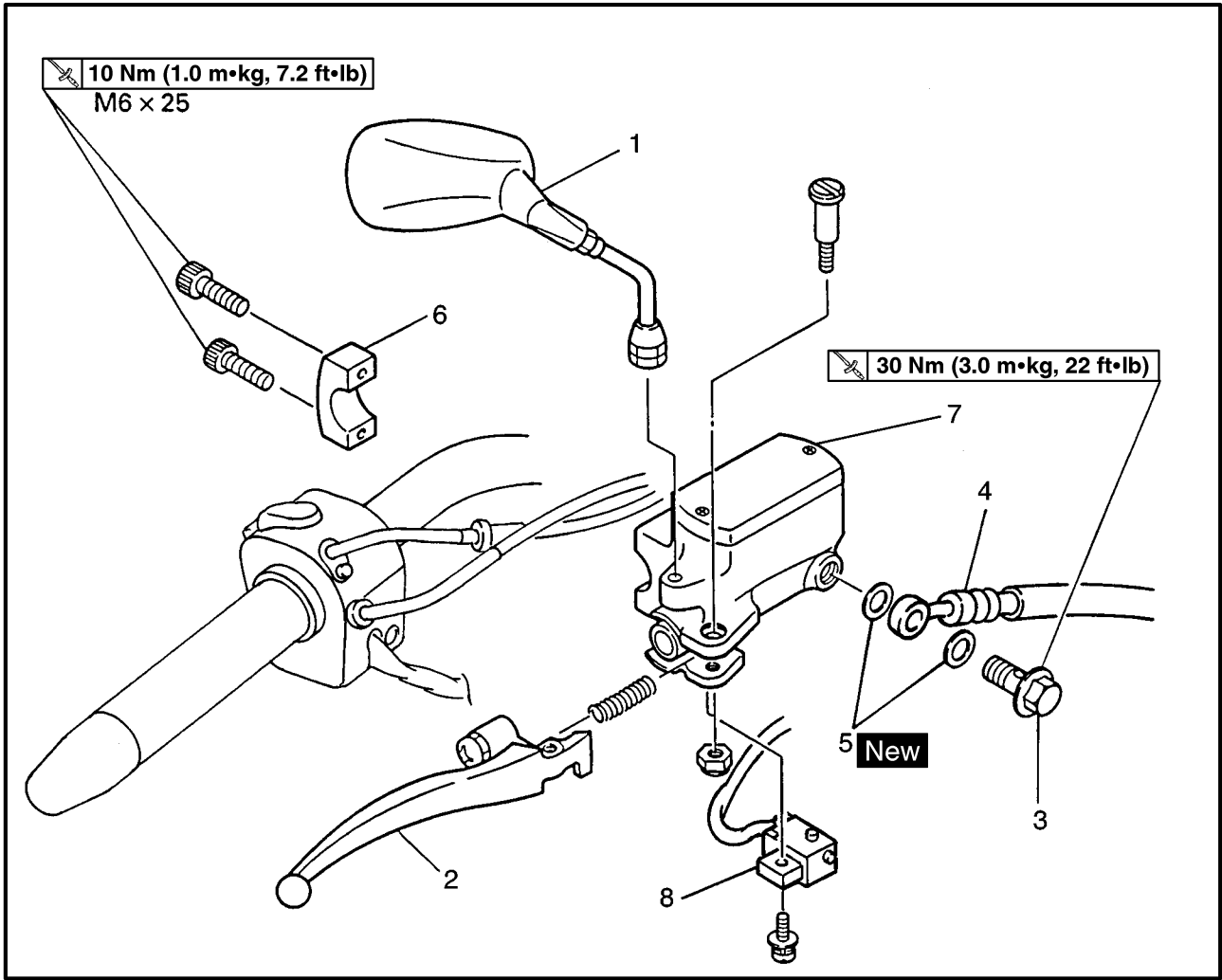
- brake fluid level
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” in CHAPTER 3.

8. Check:

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

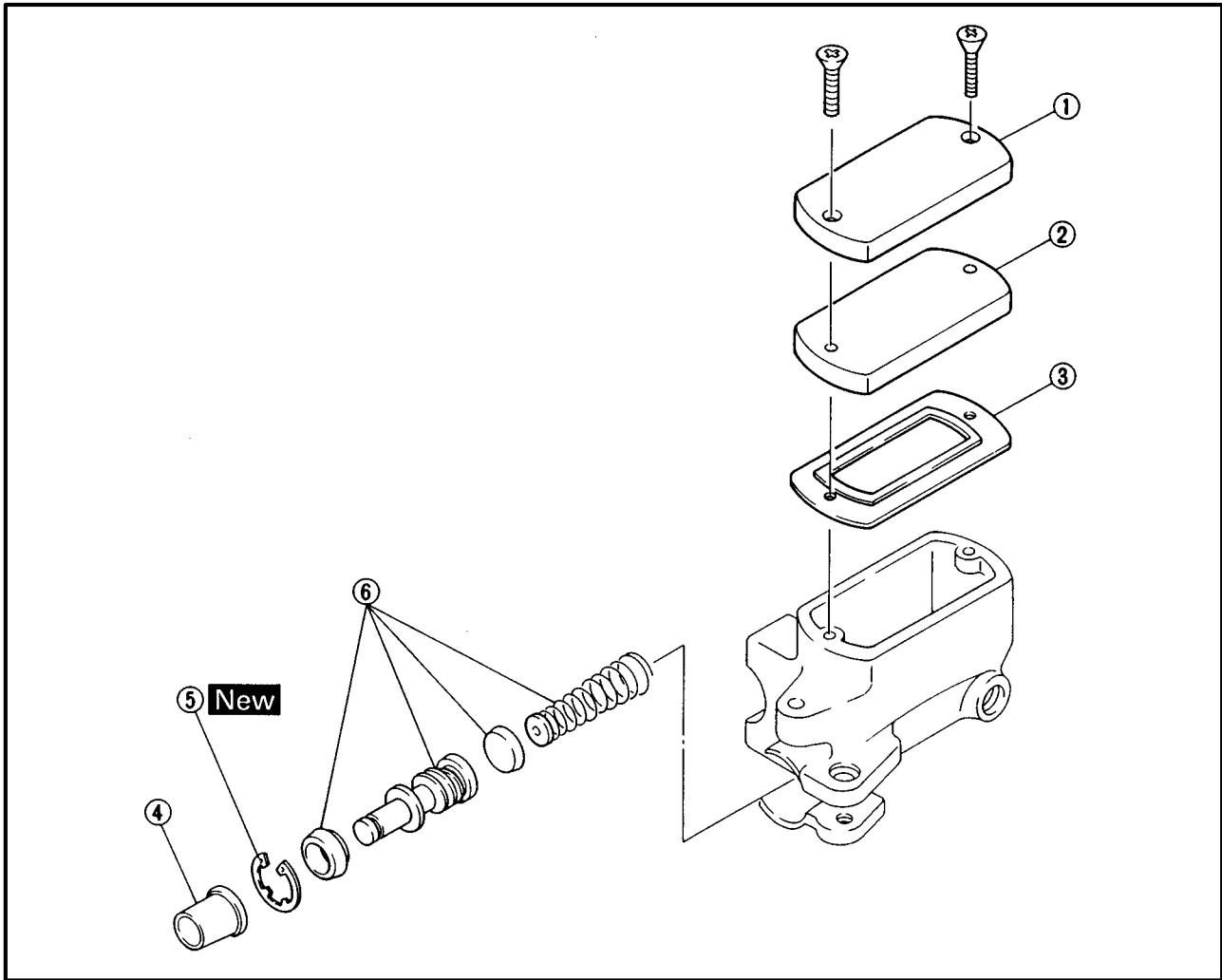
EAS00584

FRONT BRAKE MASTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order below. NOTE: Before removing the master cylinder, drain the brake fluid from the entire brake system.
1	Rear view mirror	1	Refer to "REMOVING/INSTALLING THE FRONT BRAKE MASTER CYLINDER".
2	Brake lever	1	
3	Union bolt	1	
4	Brake hose	1	
5	Copper washers	1	
6	Master cylinder bracket	2	
7	Master cylinder	1	
8	Front brake switch	1	
			For installation, reverse the removal procedure.

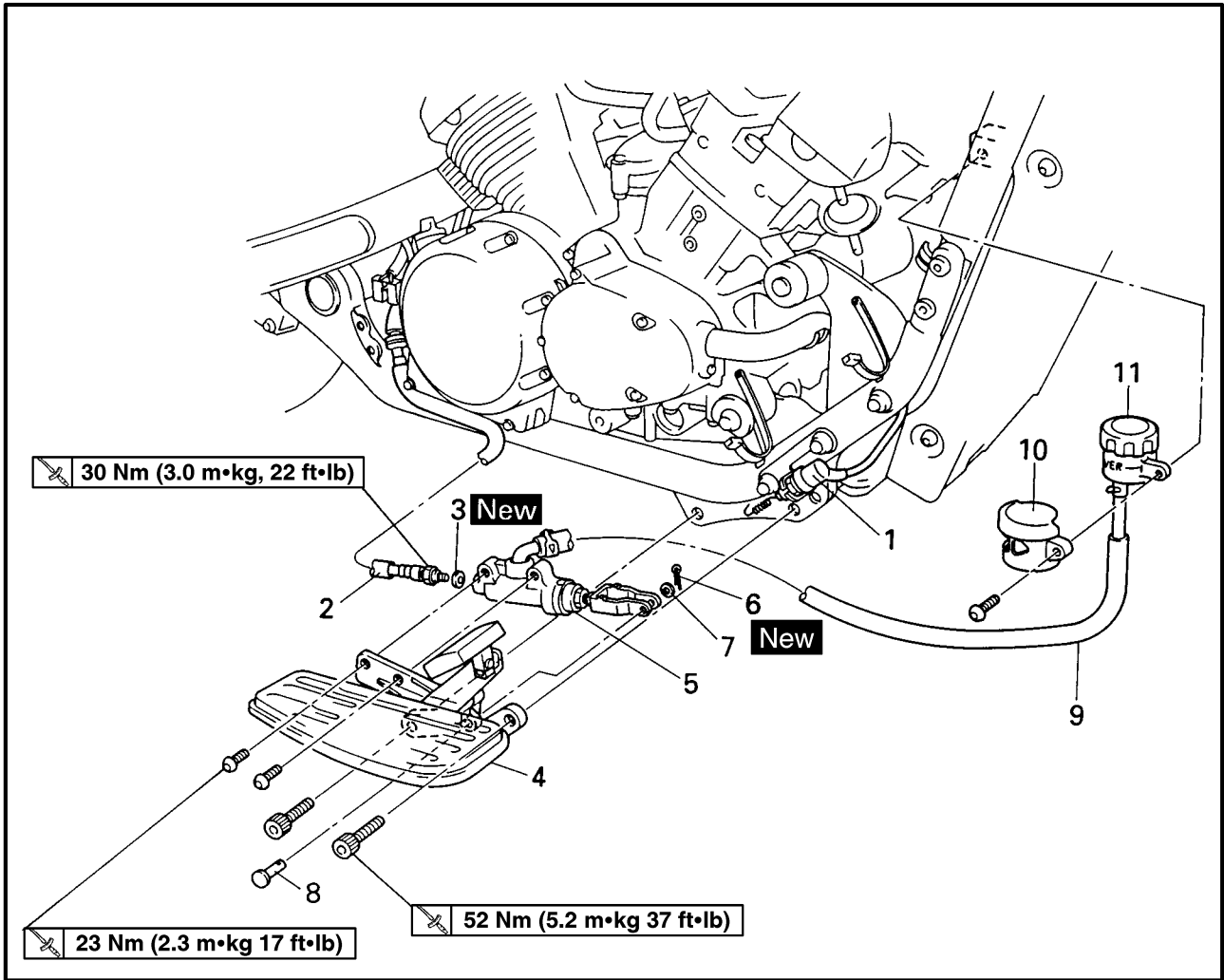
EAS00585



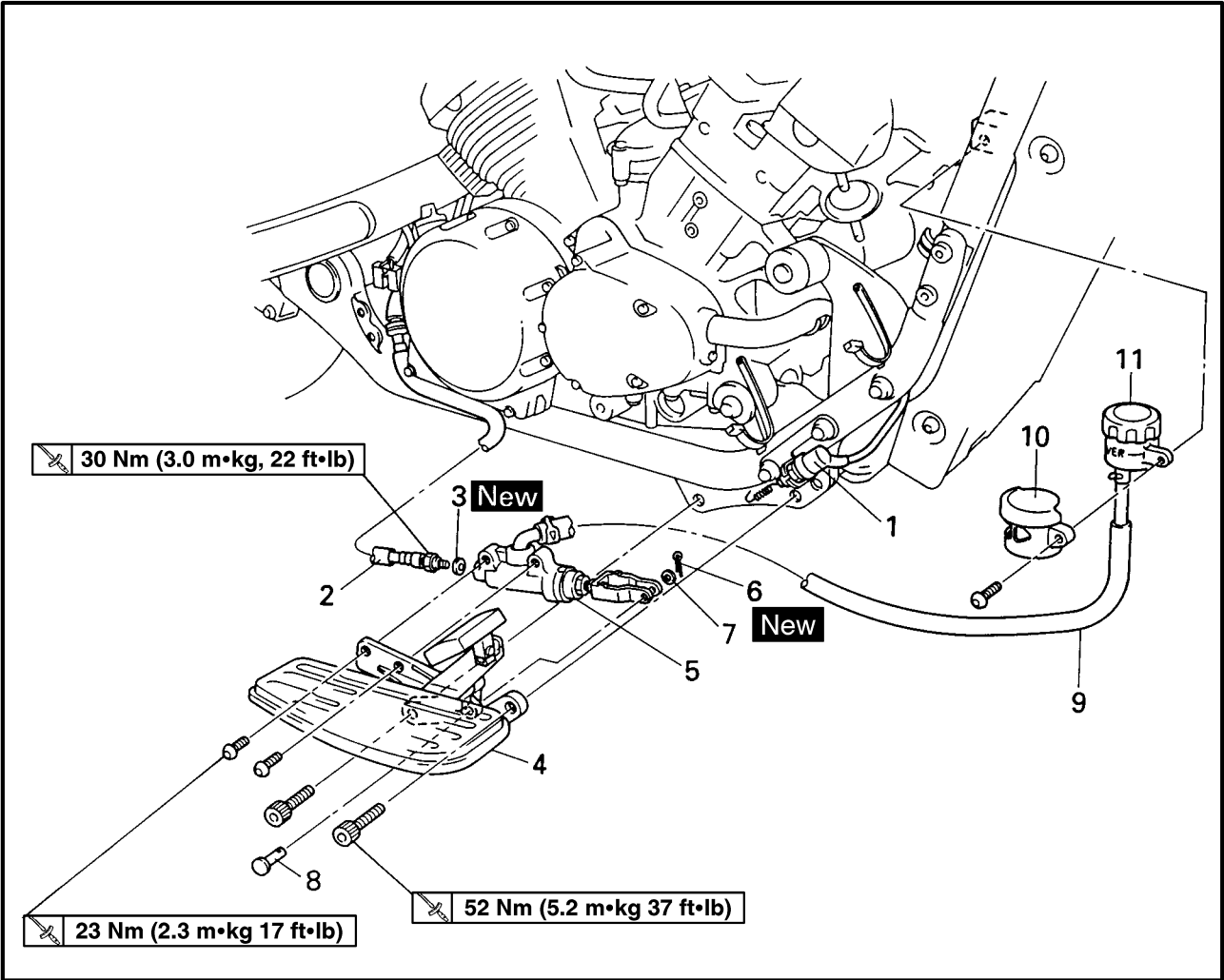
Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake master cylinder		Disassemble the parts in the order listed.
①	Master cylinder cap	1	
②	Holder (diaphragm)	1	
③	Master cylinder diaphragm	1	
④	Dust boot	1	
⑤	Circlip	1	
⑥	Master cylinder kit	1	For assembly, reverse the disassembly procedure.

EAS00586

REAR BRAKE MASTER CYLINDER

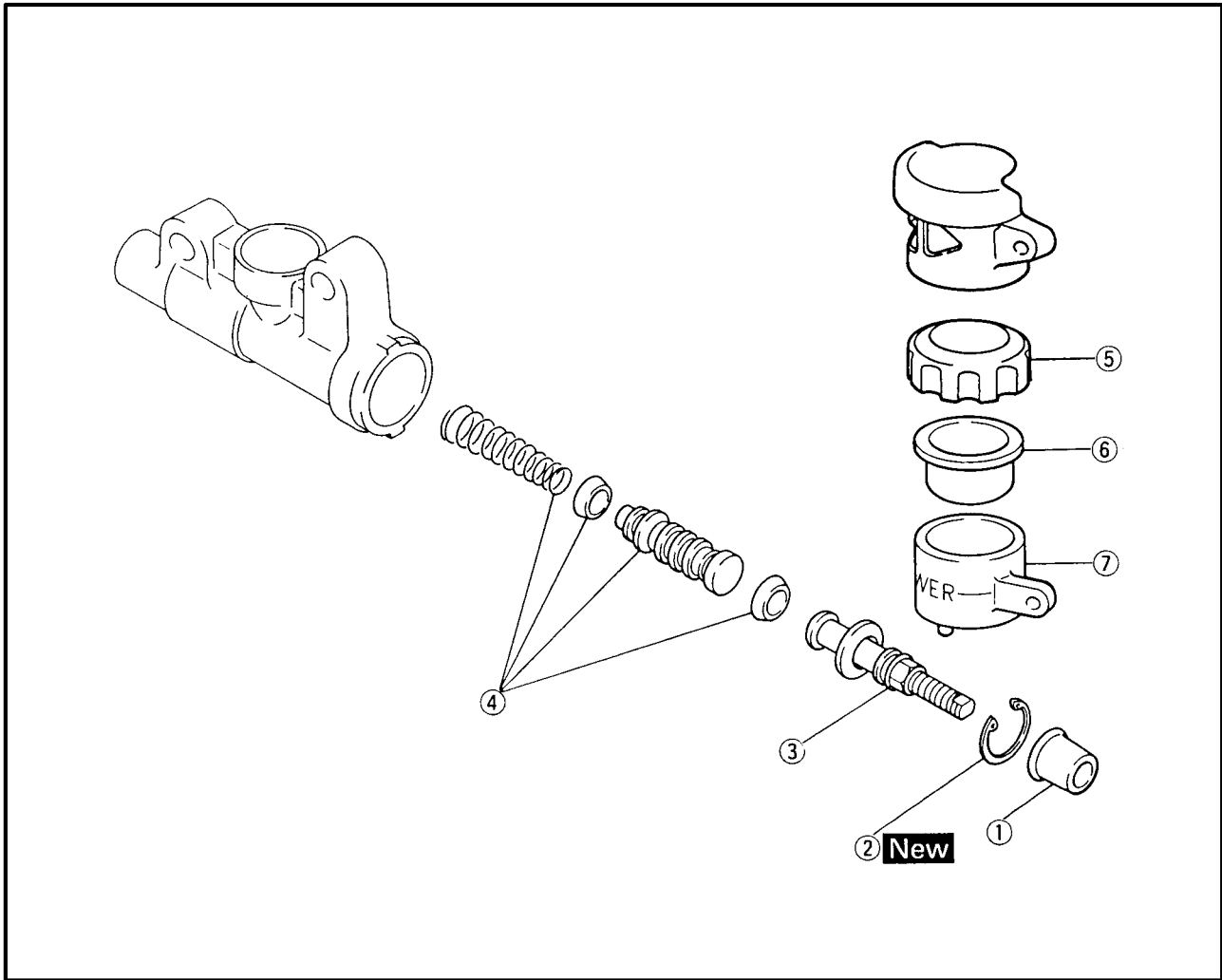


Order	Job/Part	Q'ty	Remarks
	Removing the rear brake master cylinder		Remove the parts in the order listed. NOTE: Before removing the master cylinder, drain the brake fluid from the entire brake system.
1	Rear brake switch	1	Disconnect Disconnect Refer to "REMOVING/INSTALLING THE REAR BRAKE MASTER CYLINDER".
2	Brake hose	1	
3	Copper washer	1	
4	Brake pedal assembly	1	
5	Master cylinder	1	
6	Cotter pin	1	
7	Washer	1	

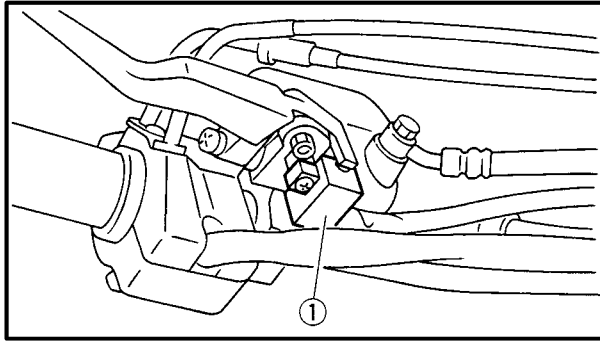


Order	Job/Part	Q'ty	Remarks
8	Clevis pin	1	Unhook from the clamps.
9	Reservoir hose	1	
10	Reservoir tank cover	1	
11	Reservoir tank	1	
			For installation, reverse the removal procedure.

EAS00587



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake master cylinder		Disassemble the parts in the order listed.
①	Dust boot	1	
②	Circlip	1	
③	Brake pedal push rod	1	
④	Master cylinder kit	1	
⑤	Cap (reservoir tank)	1	
⑥	Diaphragm	1	
⑦	Reservoir tank	1	
			For assembly, reverse the disassembly procedure.



EAS00588

REMOVING THE FRONT BRAKE MASTER CYLINDER

NOTE:

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

1. Remove:

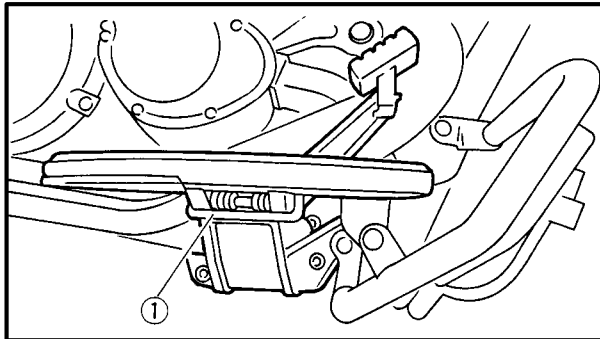
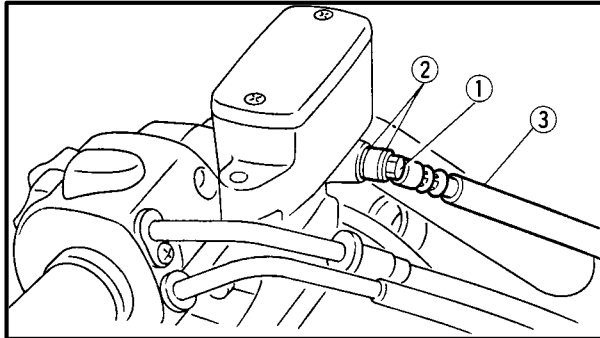
- brake switch ①

2. Remove:

- union bolt ①
- copper washers ②
- brake hoses ③

NOTE:

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



EAS00589

REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:

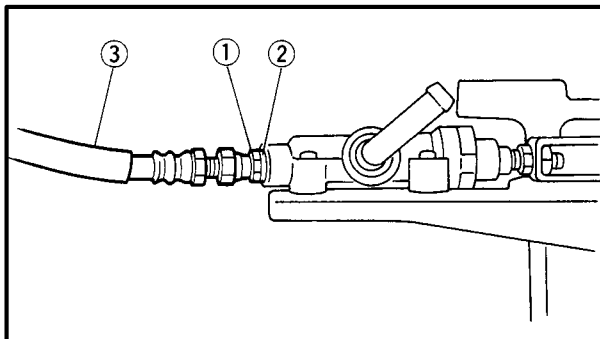
- brake pedal assembly ①

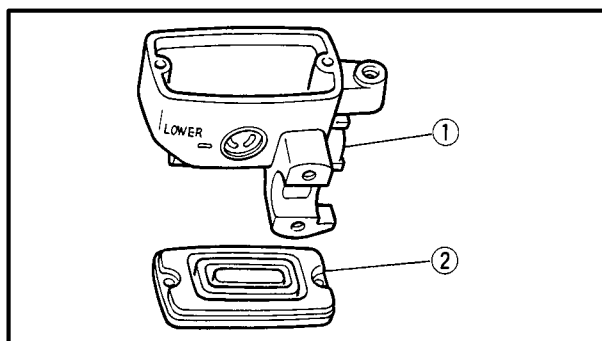
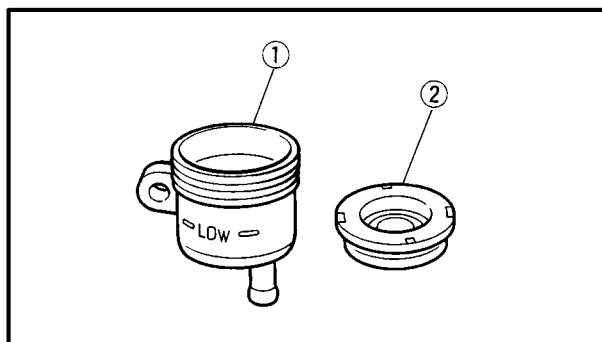
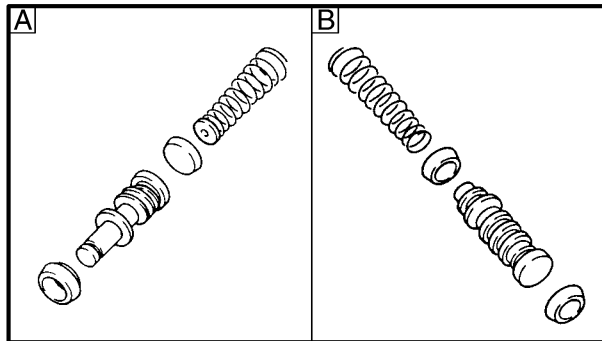
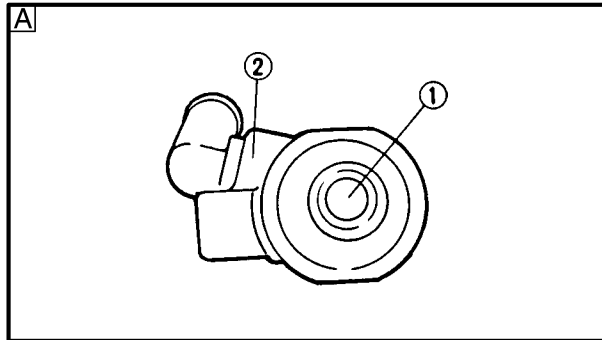
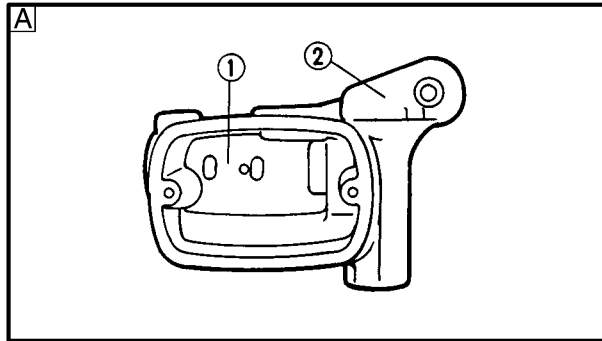
2. Remove:

- joint bolt ①
- copper washers ②
- brake hose ③

NOTE:

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





EAS00592

CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

The following procedure applies to the both of the brake master cylinders.

1. Check:

- brake master cylinder ①
Damage/scratches/wear → Replace.
- brake fluid delivery passages ②
(brake master cylinder body)
Obstruction → Blow out with compressed air.

A Front

B Rear

2. Check:

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

A Front

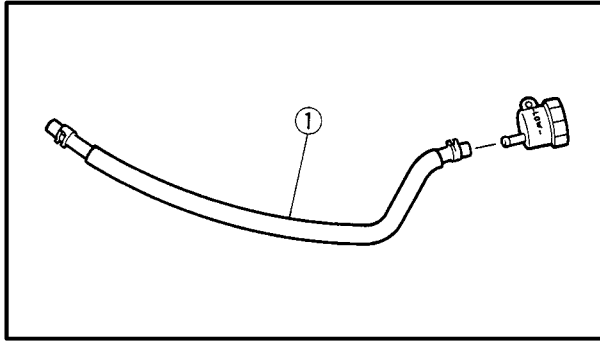
B Rear

3. Check:

- rear brake fluid reservoir ①
Cracks/damage → Replace.
- rear brake fluid reservoir diaphragm ②
Cracks/damage → Replace.

4. Check:

- front brake master cylinder reservoir ①
Cracks/damage → Replace.
- front brake master cylinder reservoir diaphragm ②
Damage/wear → Replace.



5. Check:

- brake reservoir hose ①
- Cracks/damage/wear → Replace.

EAS00598

INSTALLING THE FRONT BRAKE MASTER CYLINDER

⚠ WARNING

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



**Recommended brake fluid
DOT 4**

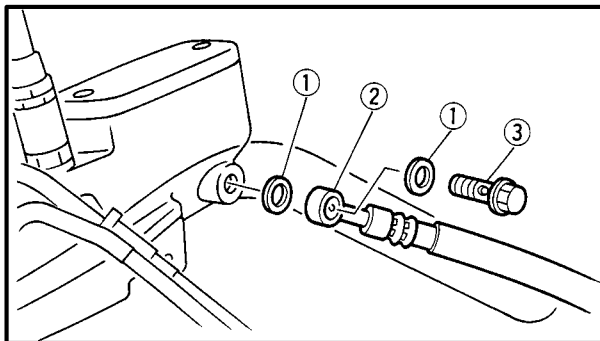
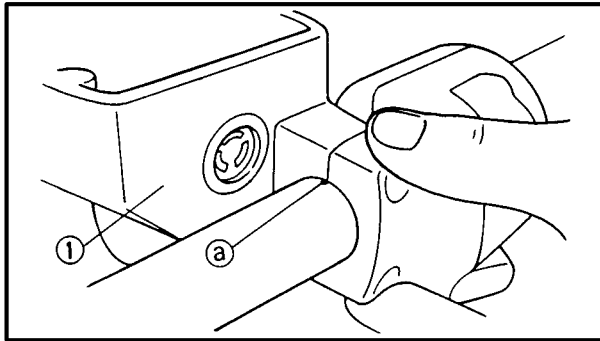
1. Install:

- brake master cylinder ①

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

- Install the brake master cylinder holder with the “UP” mark facing up.
- Align the end of the brake master cylinder holder with the punch mark (a) on the handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:

- copper washers ① (New)
- brake hose ②
- union bolt ③

30 Nm (3.0 m•kg, 22 ft•lb)

⚠ WARNING

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

NOTE:

Turn the handlebar to the left and to the right to make sure that the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:

- brake master cylinder reservoir
(with the specified amount of the recommended brake fluid)



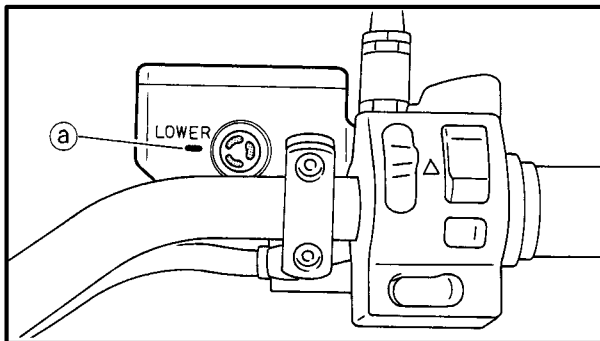
**Recommended brake fluid
DOT 4**

⚠ WARNING

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

CAUTION:

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



4. Bleed:

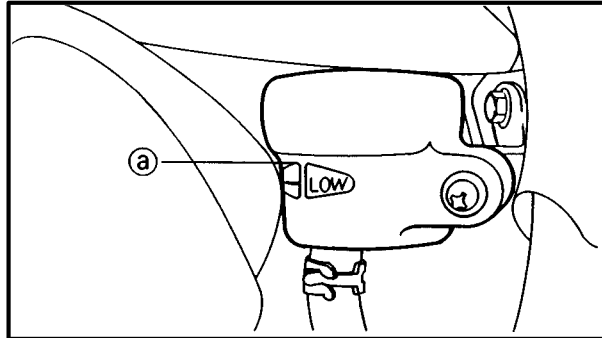
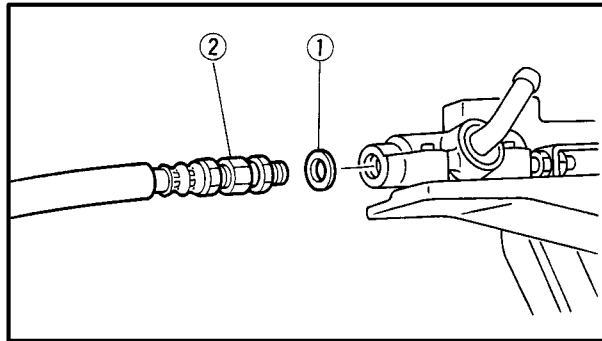
- brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

5. Check:

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

6. Check:

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



EAS00610

INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:

- copper washers ① (New)
- brake hose ② 30 Nm (3.0 m•kg, 22 ft•lb)

⚠ WARNING

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

2. Fill:

- brake fluid reservoir (to the maximum level mark (a))



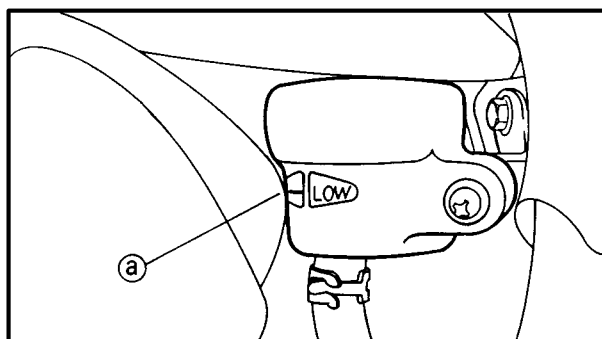
Recommended brake fluid
DOT 4

⚠ WARNING

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

CAUTION:

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

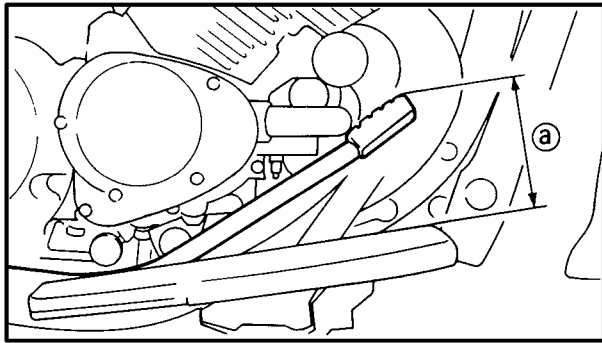


3. Bleed:

- brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

4. Check:

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



5. Adjust:

- brake pedal position ①

Refer to “ADJUSTING THE REAR BRAKE” in CHAPTER 3.



**Brake pedal position (below
the top of the rider footrest)
100 mm (3.9in)**

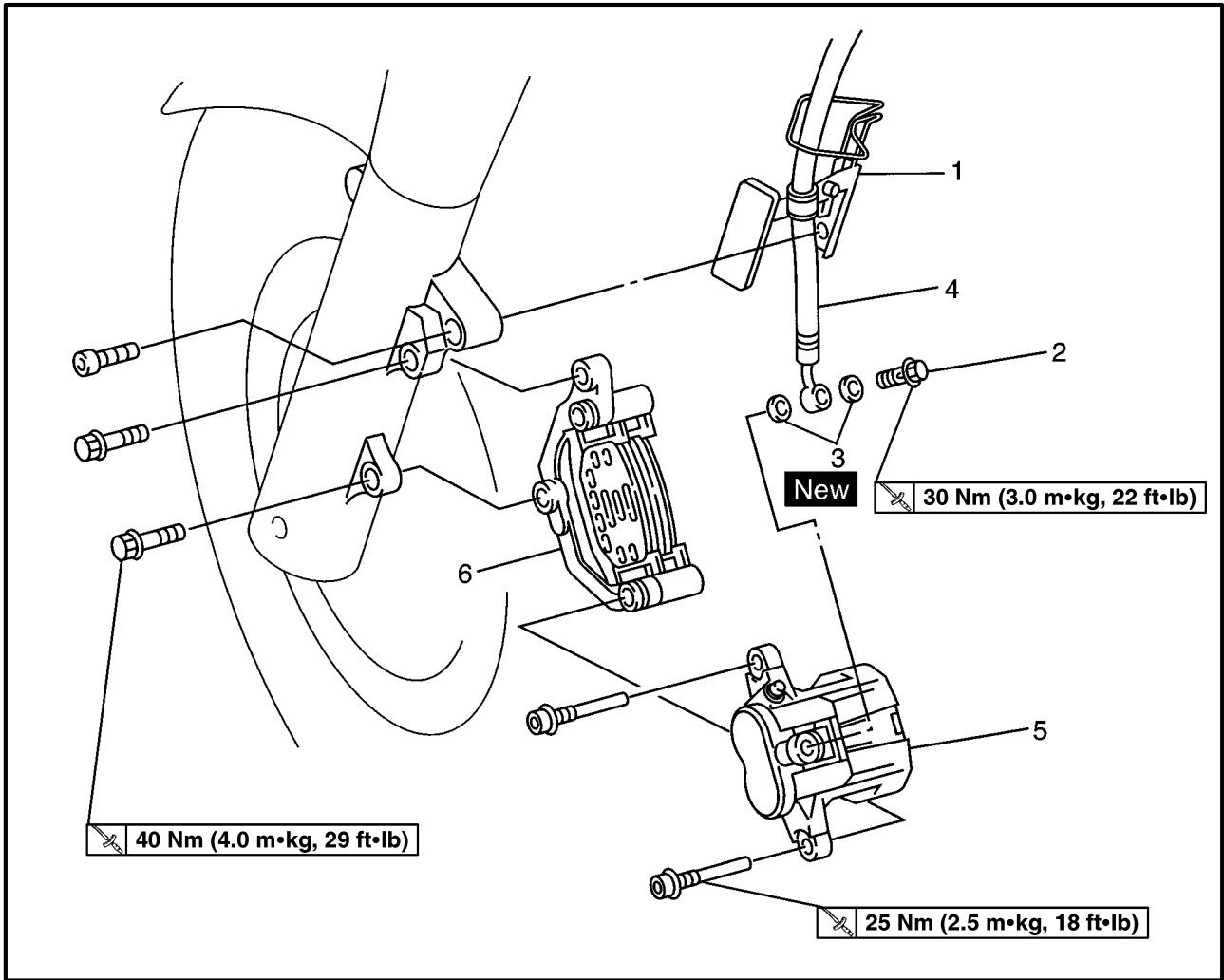
6. Adjust:

- rear brake light operation timing

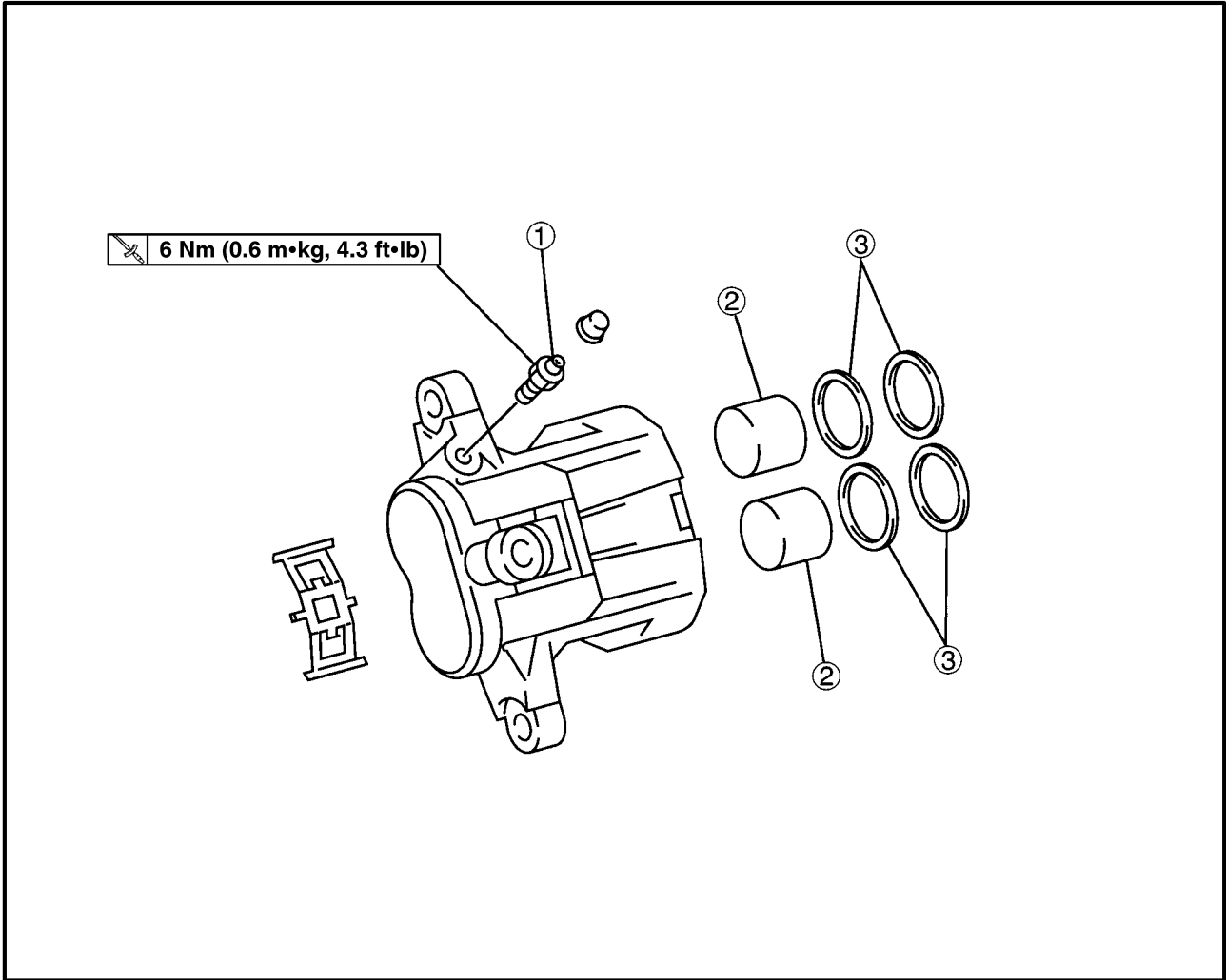
Refer to “ADJUSTING THE REAR BRAKE
LIGHT SWITCH” in CHAPTER 3.

EAS00613

FRONT BRAKE CALIPERS



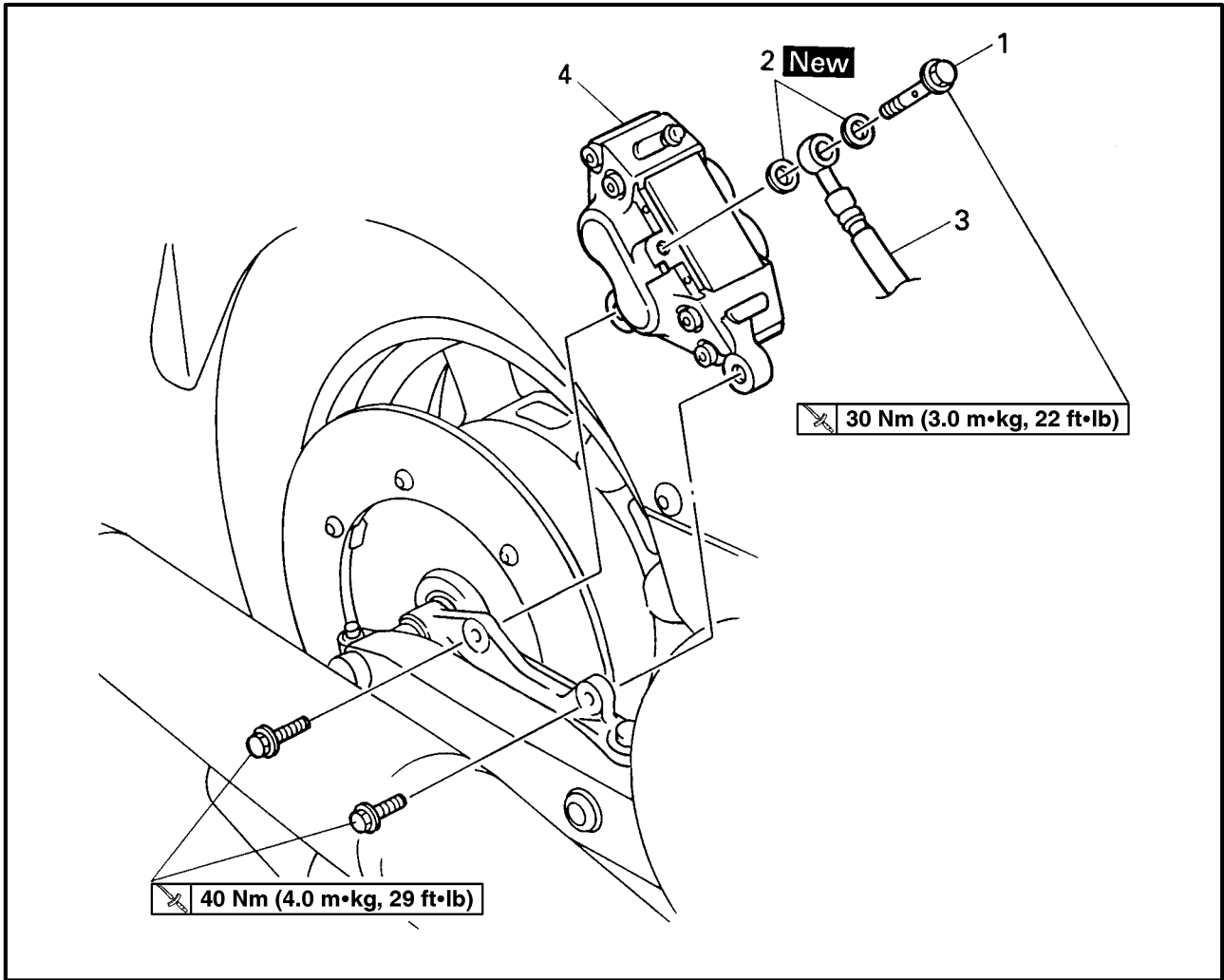
Order	Job/Part	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed. NOTE: Before removing the brake caliper, drain the brake fluid from the entire brake system.
1	Brake hose holders	2	Refer to "INSTALLING THE FRONT BRAKE CALIPERS". NOTE: Put the brake hose end into a container and pump out the brake fluid carefully.
2	Union bolts	2	
3	Copper washers	4	
4	Brake hoses	2	
5	Front brake calipers	2	For installation, reverse the removal procedure.
6	Brake caliper brackets	2	



Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake caliper		Disassemble the parts in the order listed.
①	Air bleed screw	1	Refer to "DISASSEMBLING THE FRONT BRAKE CALIPERS" For assembly, reverse the disassembly procedure.
②	Caliper pistons	8	
③	Caliper piston seals	4	

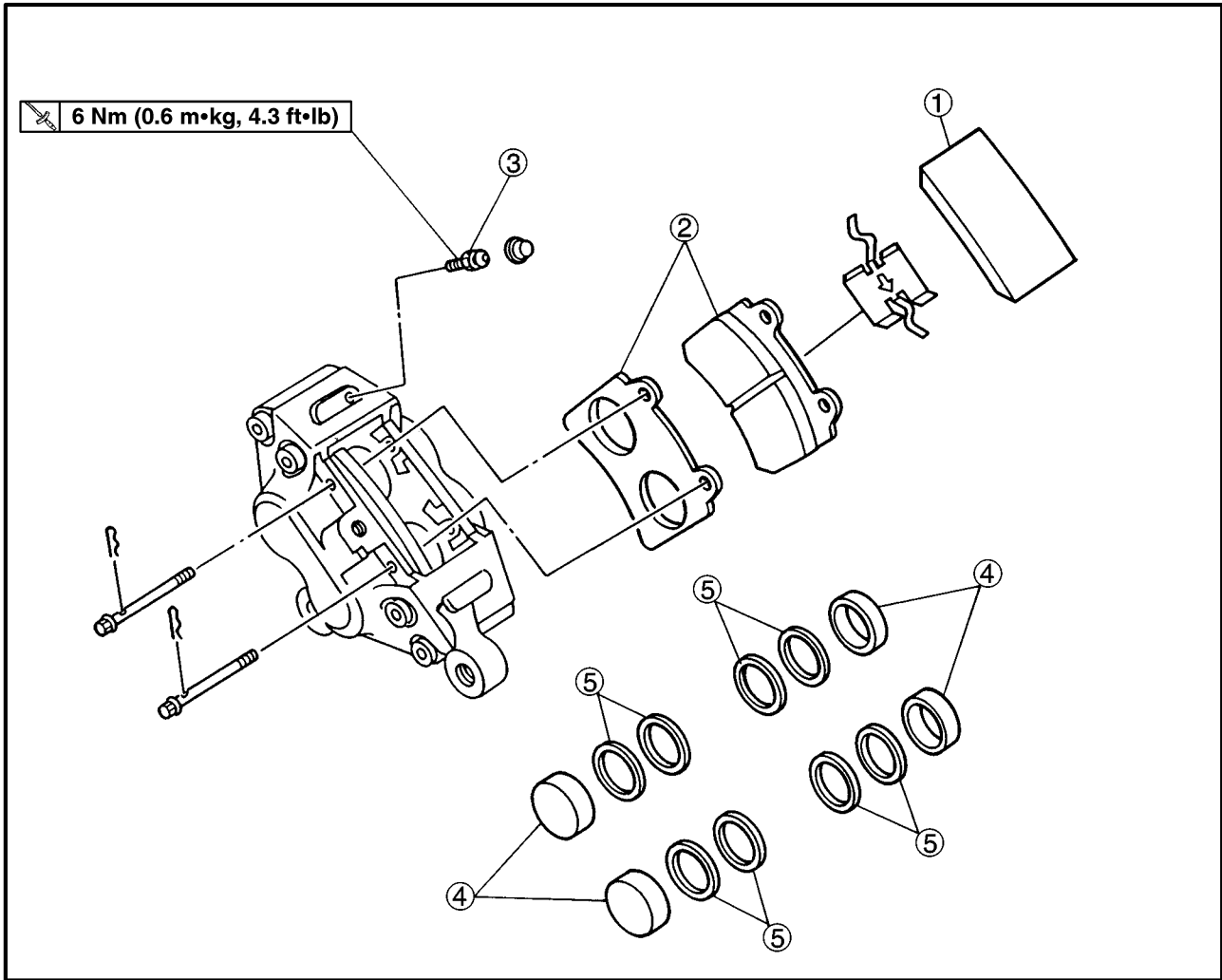
EAS00616

REAR BRAKE CALIPER



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order listed. NOTE: Before removing the master cylinder, drain the brake fluid from the entire brake system.
1	Union bolt	1	Refer to "INSTALLING THE REAR BRAKE CALIPER". NOTE: Put the brake hose end into a container and pump out the brake fluid carefully.
2	Copper washers	2	
3	Brake hose	1	
4	Rear brake caliper	1	For installation, reverse the removal procedure.

EAS00617



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake caliper		Disassemble the parts in the order listed.
①	Brake pads cover	1	Refer to "REAR BRAKE PADS".
②	Brake pads	2	
③	Air bleed screw	1	Refer to "DISASSEMBLING THE REAR BRAKE CALIPER". For assembly, reverse the disassembly procedure.
④	Caliper pistons	4	
⑤	Caliper piston seals	8	



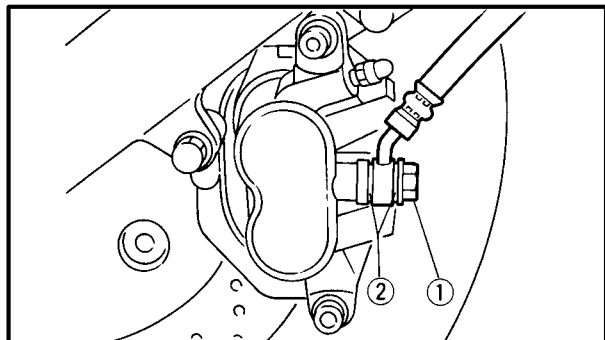
EAS00625

DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

NOTE:

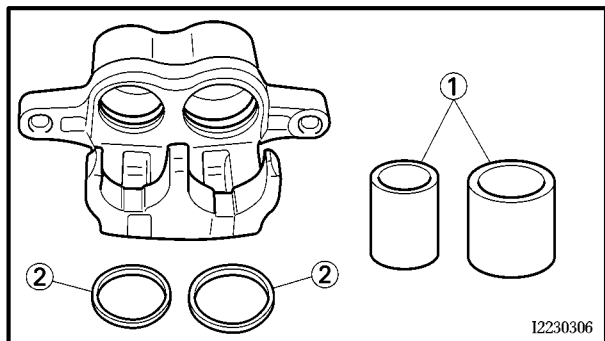
Before disassembling either brake caliper, drain the brake fluid from the entire brake system.



1. Remove:
 - union bolt ①
 - copper washers ②
 - brake hose

NOTE:

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

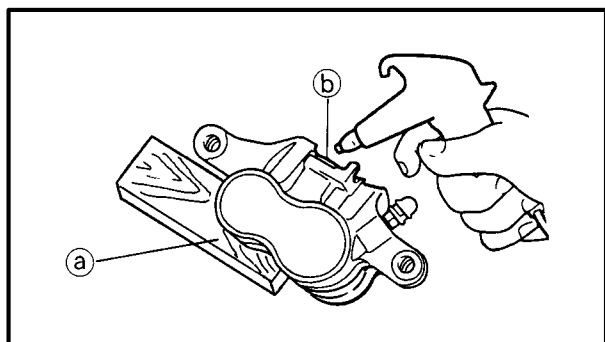


2. Remove:
- brake caliper pistons ①
 - brake caliper piston seals ②

- a. Secure the one brake caliper piston with a piece of wood (a)
- b. Blow compressed air into the brake hose joint opening (b) to force out the left side pistons from the brake caliper.

⚠ WARNING

Never try to pry out the brake caliper pistons.



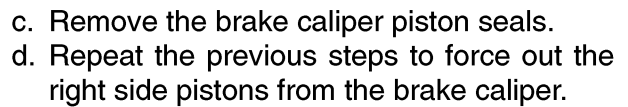
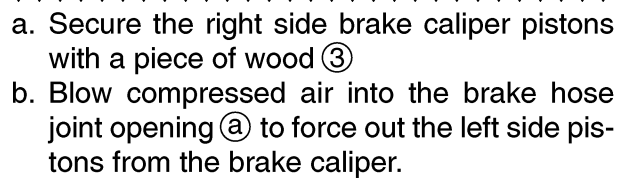
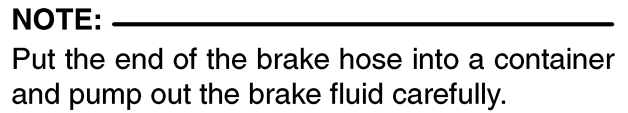
- c. Remove the brake caliper piston seals.
- d. Repeat the previous steps to force out the other side pistons from the brake caliper.

EAS00629

DISASSEMBLING THE REAR BRAKE CALIPER

NOTE:

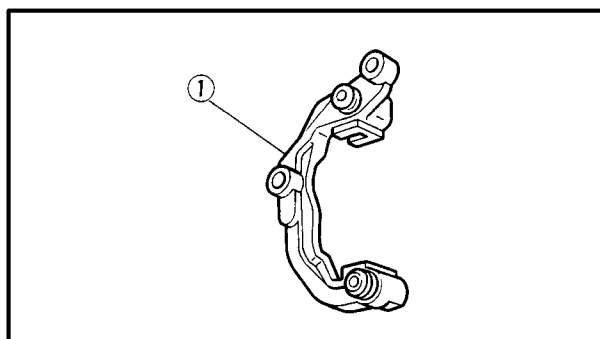
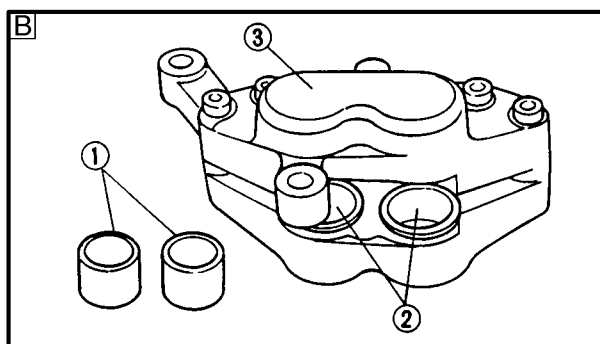
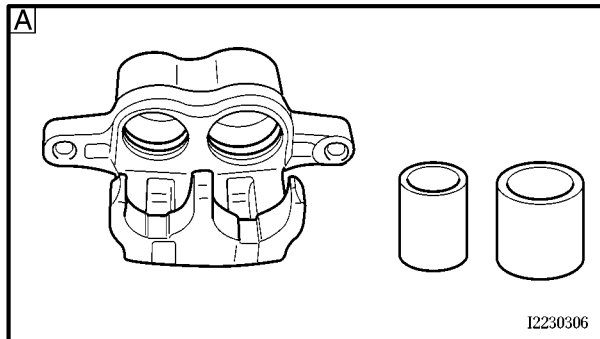
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



EAS00632

CHECKING THE FRONT AND REAR BRAKE CALIPERS

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Brake hoses	Every two years
Brake fluid	Every two years and whenever the brake is disassembled



1. Check:

- brake caliper pistons ①
Rust/scratches/wear → Replace the brake caliper.
- brake caliper cylinders ②
Scratches/wear → Replace the brake caliper.
- brake calipers ③
Cracks/damage → Replace.
- brake fluid delivery passages (brake caliper body)
Obstruction → Blow out with compressed air.

⚠ WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

- A** Front
- B** Rear

2. Check:

- brake caliper brackets ①
Cracks/damage → Replace.



EAS00638

INSTALLING THE FRONT BRAKE CALIPERS

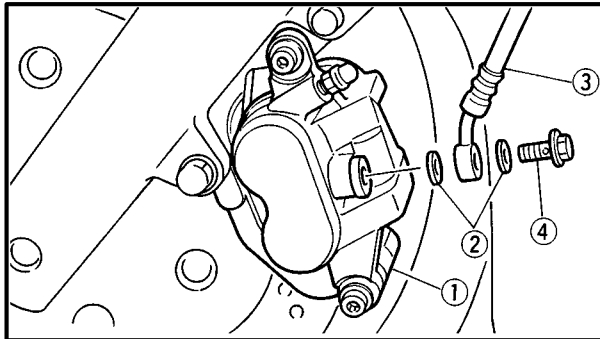
The following procedure applies to both of the brake calipers.

⚠ WARNING

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



**Recommended brake fluid
DOT 4**



1. Install:

- brake caliper bracket

40 Nm (40 m•kg, 29 ft•lb)

- brake caliper ① (temporarily)
- copper washers (New)
- brake hose ②
- union bolt ③

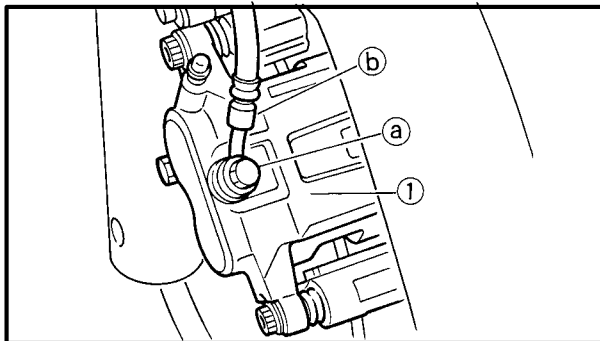
30 Nm (30 m•kg, 22 ft•lb)

⚠ WARNING

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

CAUTION:

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ① touches the projection ② on the brake caliper.



2. Remove:

- brake caliper



3. Install:

- brake pads
- brake pad shim
- brake caliper

25 Nm (2.5 m•kg, 18 ft•lb)

Refer to “REPLACING THE BRAKE PADS”.

4. Fill:

- brake master cylinder reservoir
(with the specified amount of the recommended brake fluid)



**Recommended brake fluid
DOT 4**

WARNING

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

CAUTION:

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

5. Bleed:

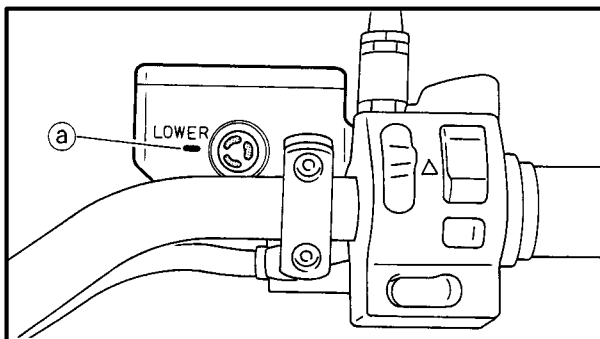
- brake system

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

6. Check:

- brake fluid level

Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” in CHAPTER 3.





7. Check:

- brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

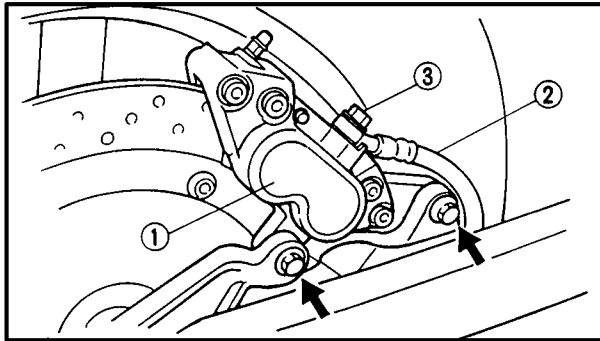
INSTALLING THE REAR BRAKE CALIPER

⚠ WARNING

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



**Recommended brake fluid
DOT 4**



1. Install:

- brake caliper ① (temporarily)
- copper washers (New)
- brake hose ②
- union bolt ③

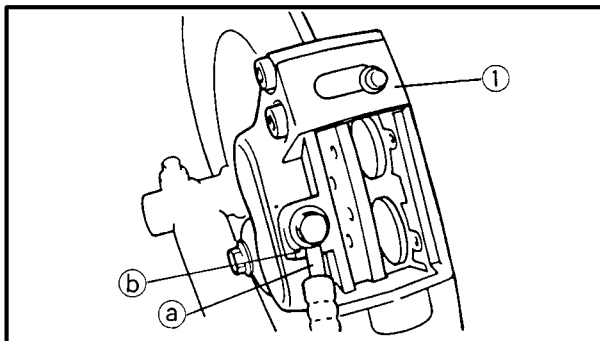
30 Nm (3.0 m•kg, 22 ft•lb)

⚠ WARNING

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

CAUTION:

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ① touches the projection ② on the brake caliper.



2. Remove:

- brake caliper



3. Install:

- brake pads
- brake pad springs
- brake pins
- retaining clips
- brake caliper

40 Nm (4.0 m•kg, 29 ft•lb)

Refer to “REPLACING THE BRAKE PADS”.

4. Fill:

- brake fluid reservoir
(with the specified amount of the recommended brake fluid)



Recommended brake fluid
DOT 4

WARNING

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

CAUTION:

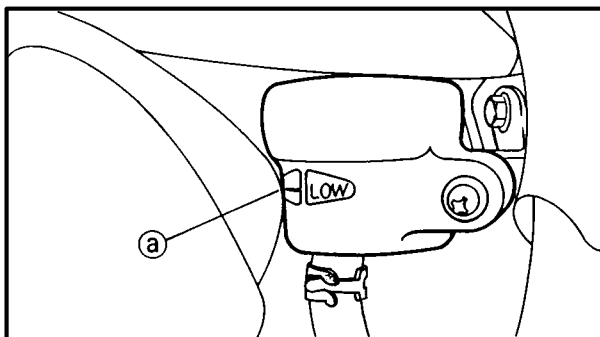
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:

- brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

6. Check:

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





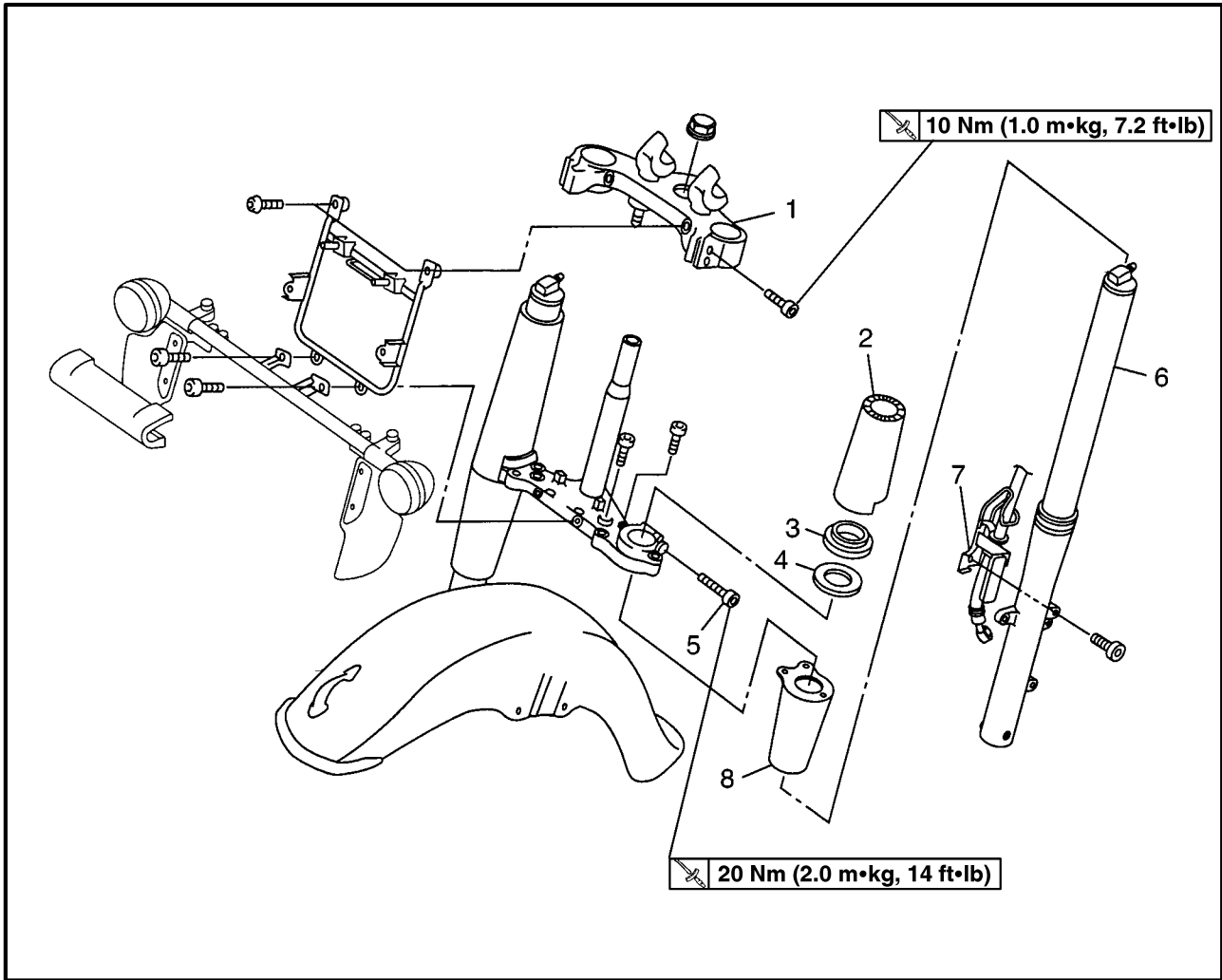
7. Check:

- brake pedal operation

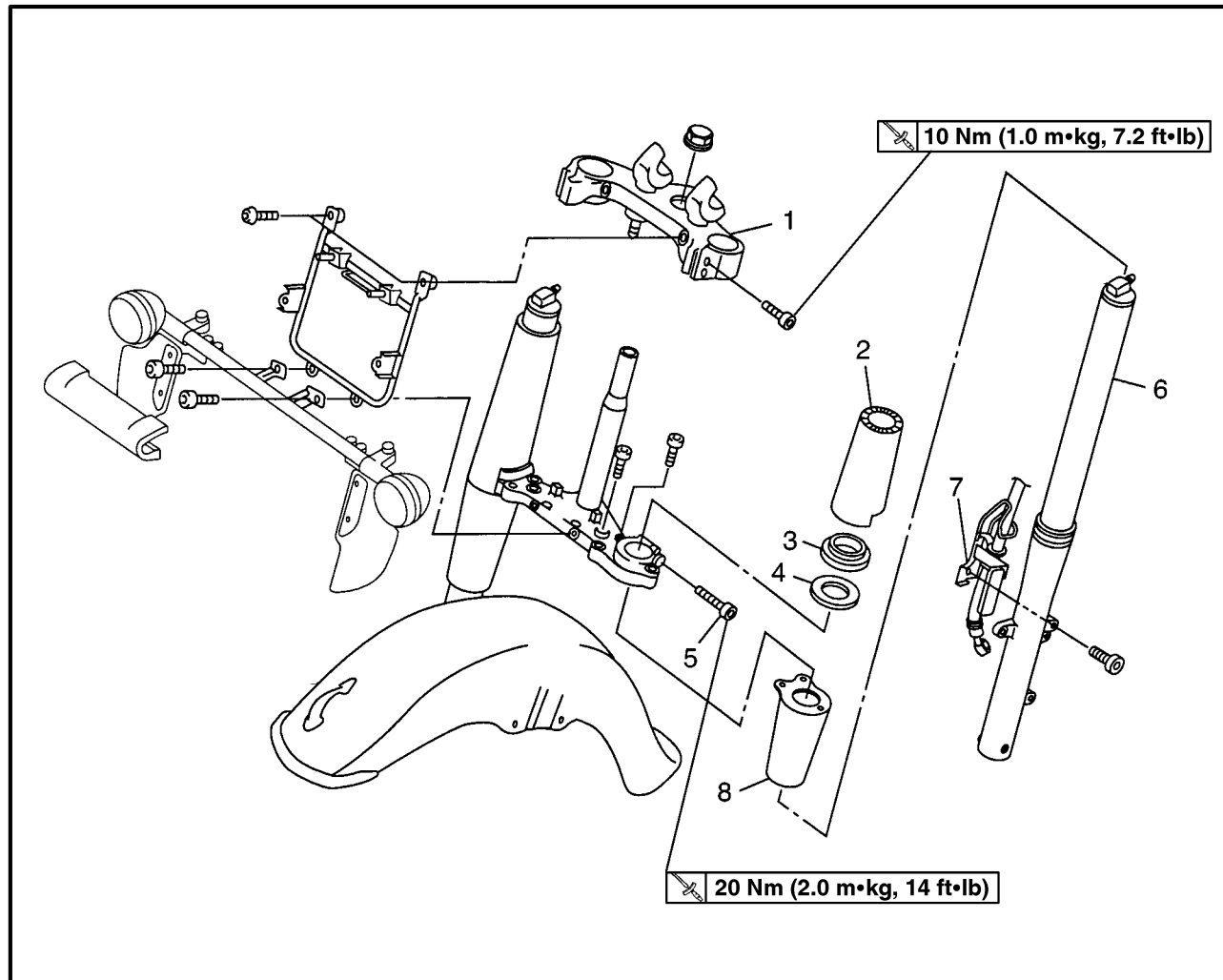
Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in CHAPTER 3.

EAS00647
FRONT FORK



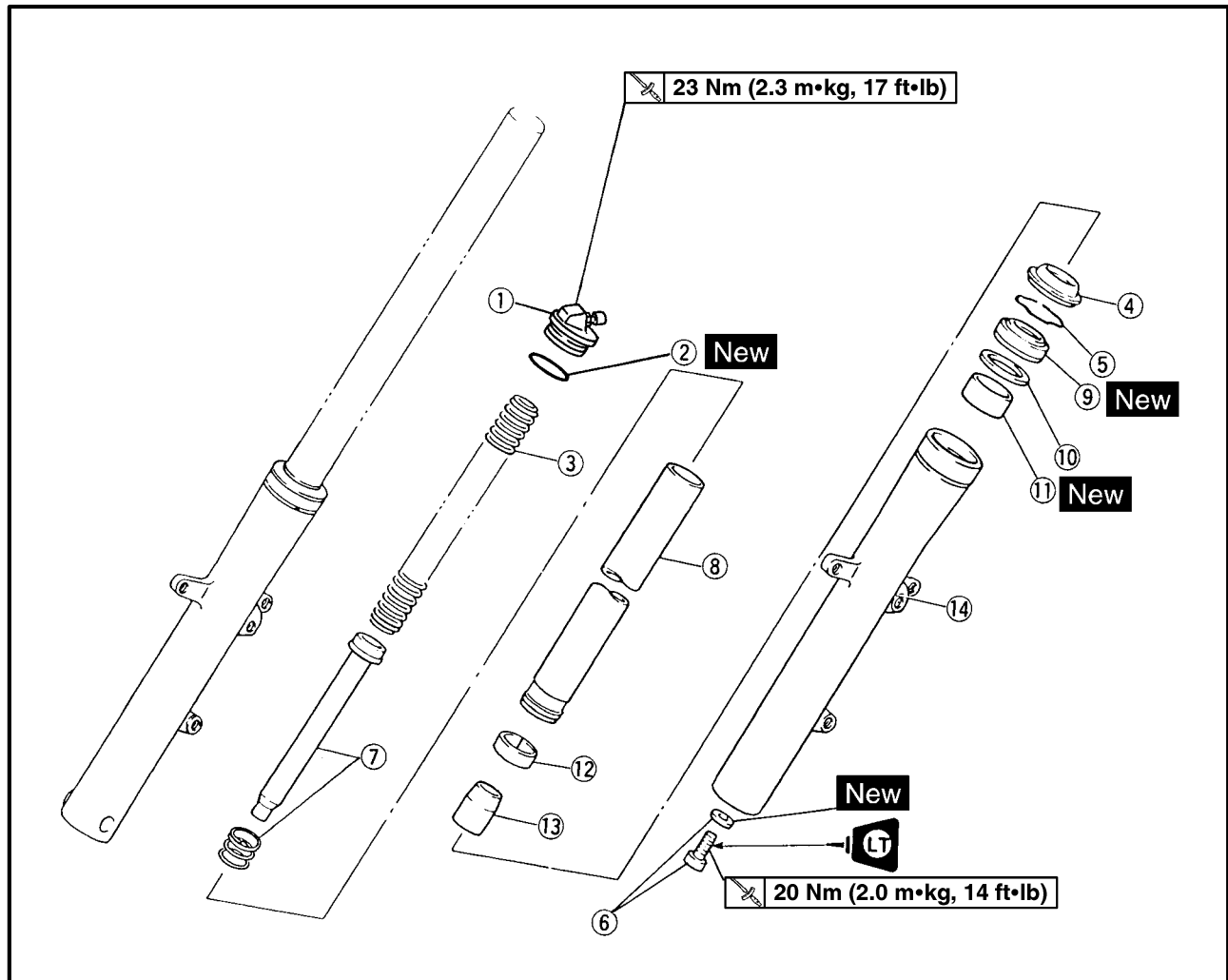
Order	Job/Part	Q'ty	Remarks
	Removing the front fork		Remove the parts in the order listed. Stand the motorcycle on a level surface.
	Front brake calipers (left and right) Front wheel Front cowling Handlebar		⚠ WARNING Securely support the motorcycle so there is no danger of it falling over. Refer to "FRONT AND REAR BRAKES". Refer to "FRONT WHEEL". Refer to "FRONT COWLING" in CHAPTER 3. Refer to "HANDLEBAR".



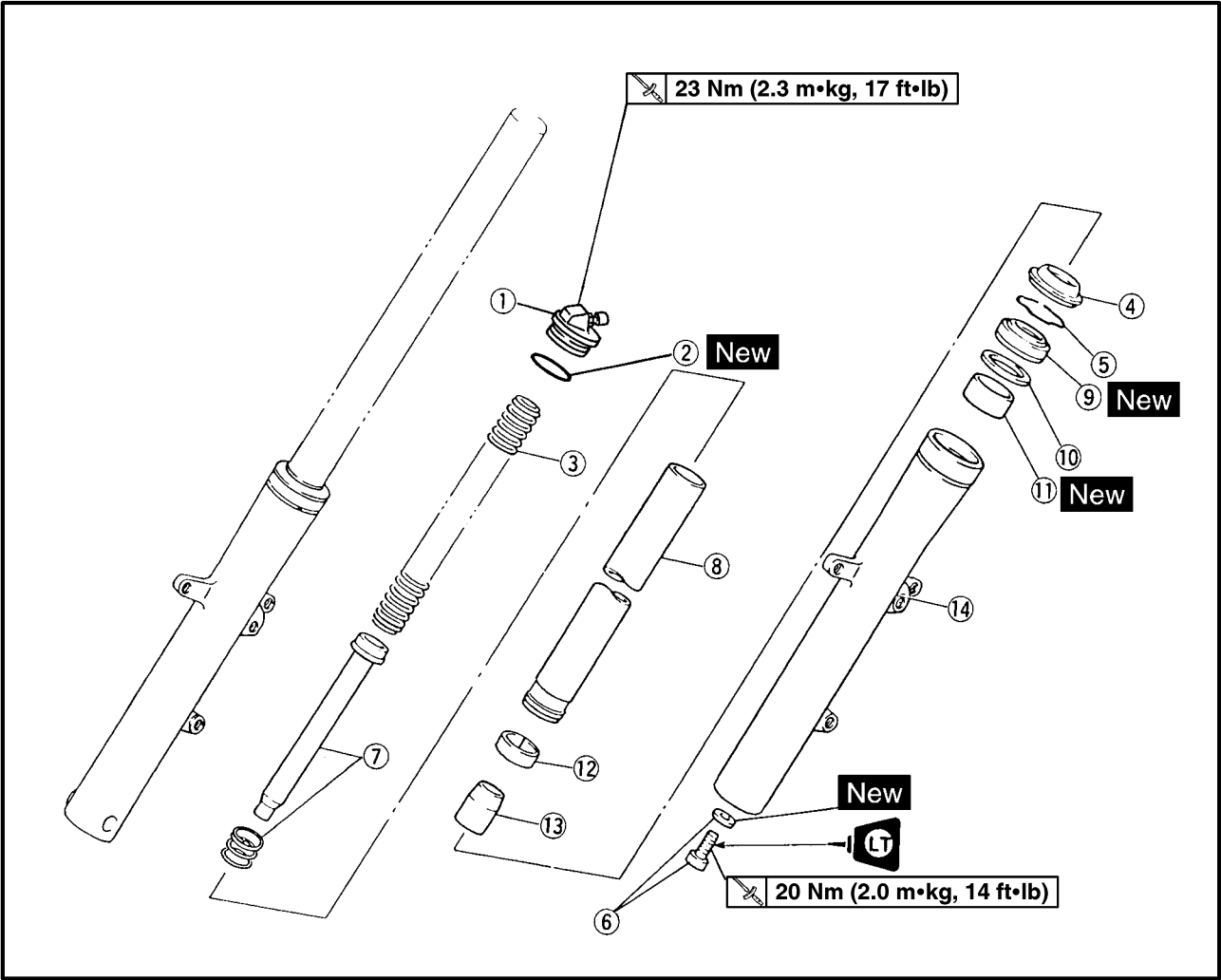
Order	Job/Part	Q'ty	Remarks
1	Upper bracket	1	Refer to "CHECKING THE STEERING HEAD" in CHAPTER 3.
2	Upper fork covers	2	Refer to "REMOVING/INSTALLING THE FRONT FORK LEGS". Loosen.
3	Upper fork cover spacers	2	
4	Upper fork cover washers	2	
5	Front fork pinch bolts (lower)	4	
6	Front fork legs	2	
7	Brake hose guides	2	For installation, reverse the removal procedure.
8	Lower fork covers	2	



EAS00648



Order	Job/Part	Q'ty	Remarks
	Disassembling the front fork		
①	Cap bolt	1	Disassemble the parts in the order listed.
②	O-ring	1	
③	Fork spring	1	
④	Dust seal	1	Drain the fork oil. Pump the fork tube several times to remove the fork oil.
⑤	Retaining clip	1	
⑥	Bolt/gasket	1/1	
⑦	Damper rod/rebound spring	1/1	Refer to "DISASSEMBLING/ ASSEMBLING THE FRONT FORK LEGS".
⑧	Inner tube	1	
⑨	Oil seal	1	
⑩	Seal spacer	1	



Order	Job/Part	Q'ty	Remarks
⑪	Outer tube bushing	1	Refer to "DISASSEMBLING/ ASSEMBLING THE FRONT FORK LEGS". For assembly, reverse the disassembly procedure.
⑫	Inner tube bushing	1	
⑬	Oil flow stopper	1	
⑭	Outer tube	1	



EAS00649

REMOVING THE FRONT FORK LEGS

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

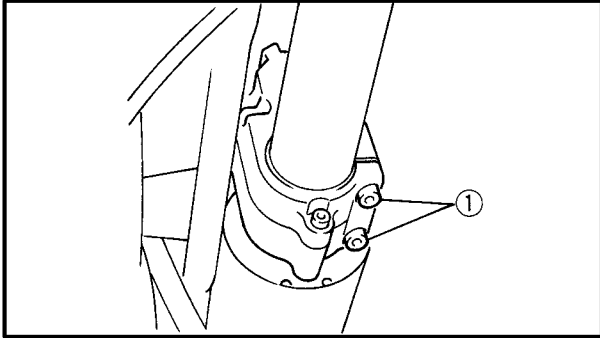
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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



2. Remove:

- upper bracket
Refer to "STEERING HEAD"

3. Loosen:

- lower bracket pinch bolt ①

⚠ WARNING

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

4. Remove:

- front fork leg

EAS00652

DISASSEMBLING THE FRONT FORK LEGS

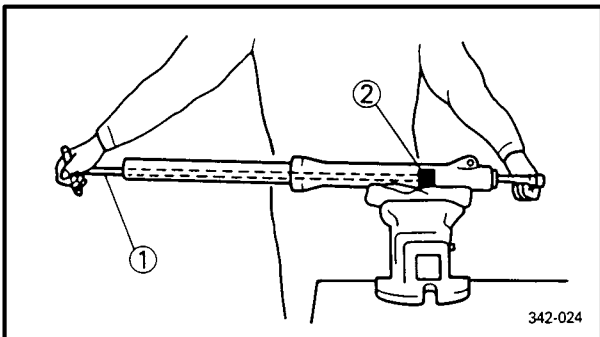
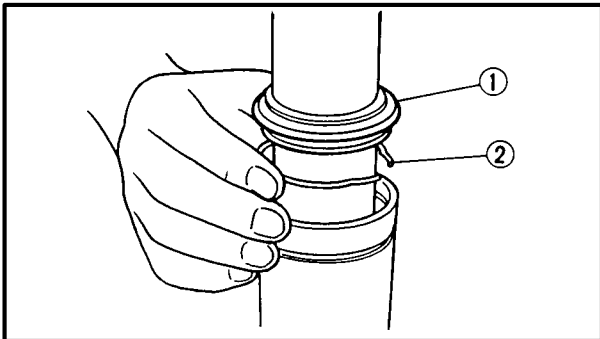
The following procedure applies to both of the front fork legs.

1. Remove:

- dust seal ①
- oil seal clip ②
(with a flat-head screwdriver)

CAUTION:

Do not scratch the inner tube.



2. Remove:

- damper rod bolt

NOTE:

While holding the damper rod with the damper rod holder ① and T-handle ②, loosen the damper rod bolt.



Damper rod holder

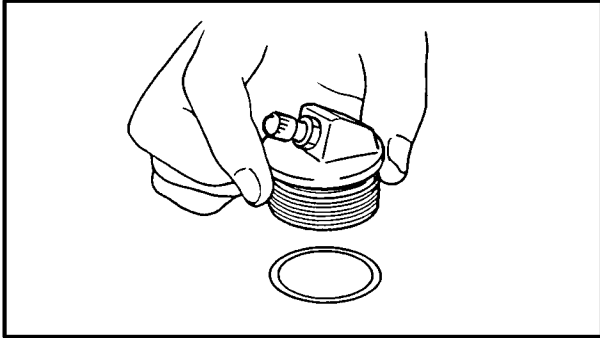
YM-01300-1, 90890-01294

T-Handle

YM-01326, 90890-01326

**CAUTION:**

- The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.



4. Check:

- cap bolt O-ring
Damage/wear → Replace.

EAS00658

ASSEMBLING THE FRONT FORK LEGS

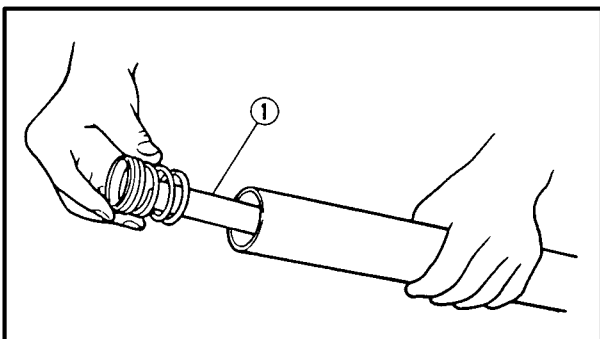
The following procedure applies to both of the front fork legs.

⚠ WARNING

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

NOTE:

- When assembling the front fork leg, be sure to replace the following parts:
 - inner tube bushing
 - outer tube bushing
 - oil seal
 - dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.



1. Install:

- damper rod ①

CAUTION:

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

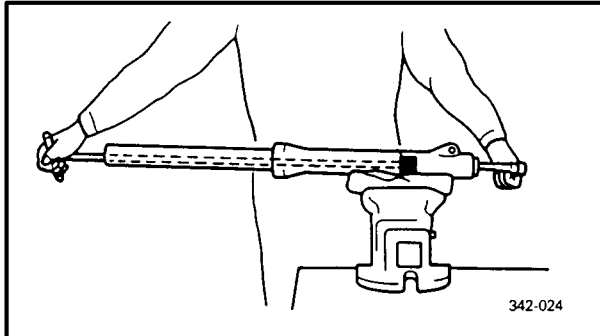


2. Lubricate:

- inner tube's outer surface



Recommended lubricant
Yamaha fork and shock oil 5W
or equivalent



3. Tighten:

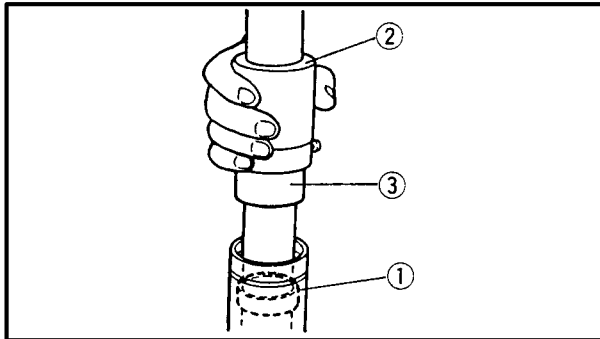
- damper rod bolt **20 Nm (2.0 m•kg, 14 ft•lb)**
LOCTITE® 204

NOTE:

While holding the damper rod with the damper rod holder and T-handle, tighten the damper rod bolt.



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

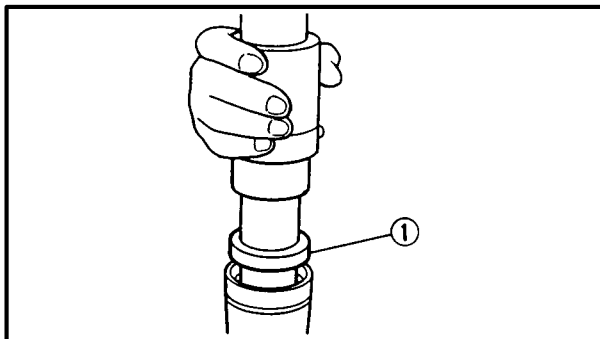


4. Install:

- outer tube bushing ①
(with the fork seal driver weight ② and adapter ③)



Fork seal driver weight
YM-33963, 90890-01367
Adapter
YM-8020, 90890-01374



5. Install:

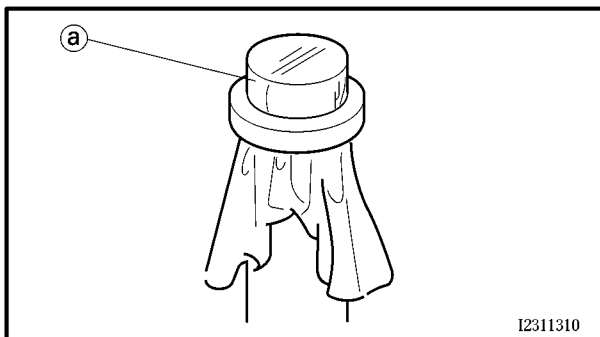
- washer
- oil seal ①
(with the fork seal driver weight and adapter)

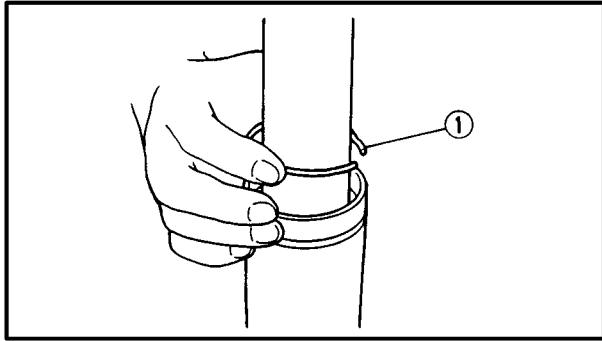
CAUTION:

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

NOTE:

- Before installing the oil seal, apply lithium soap base grease onto its lips.
- Apply fork oil onto the outer surface of the inner tube.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag (a) to protect the oil seal during installation.



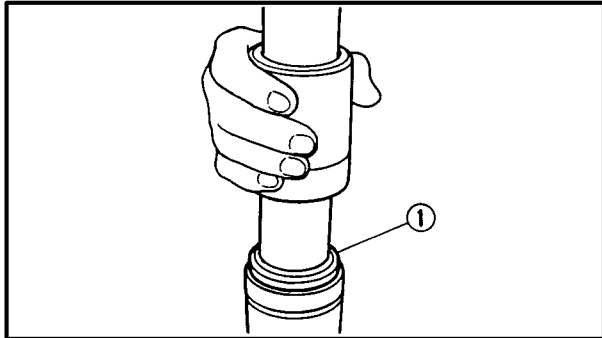


6. Install:

- oil seal clip ①

NOTE:

Adjust the oil seal clip so that it fits into the outer tube groove.



7. Install:

- dust seal ①
(with the fork seal driver weight)

8. Fill:

- front fork leg
(with the specified amount of the recommended fork oil)



Quantity (each front fork leg)

0.553 L (19.5 Imp qt, 18.7 US qt)

Front fork leg oil level (from the top of the inner tube, with the inner tube fully compressed, and without the fork spring)

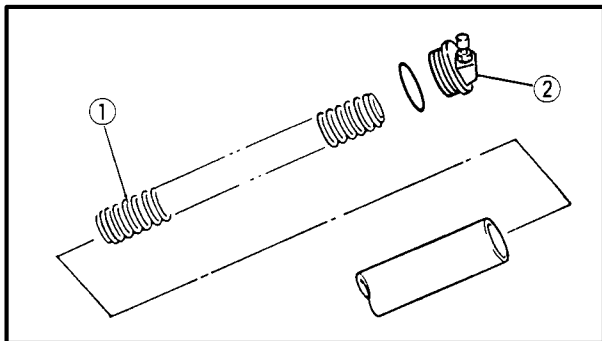
117 mm (4.61 in)

Recommended oil

Yamaha fork and shock oil 5W or equivalent

NOTE:

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



9. Install:

- spring ①
- cap bolt ②

NOTE:

- Install the spring with the smaller pitch facing down.
- Before installing the cap bolt, apply grease onto the O-ring.
- Temporarily tighten the cap bolt.



EAS00662

INSTALLING THE FRONT FORK LEGS

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

1. Install:

- front fork leg

Temporarily tighten the lower bracket pinch bolts.

NOTE:

Make sure that the inner fork tube is flush with the top of the handlebar holder.

2. Install:

- upper bracket

Temporarily tighten the steering stem nut.

3. Tighten

- lower bracket pinch bolt

20 Nm (2.0 m•kg, 14 ft•lb)

4. remove

- upper bracket

5. Install

- upper fork cover ①

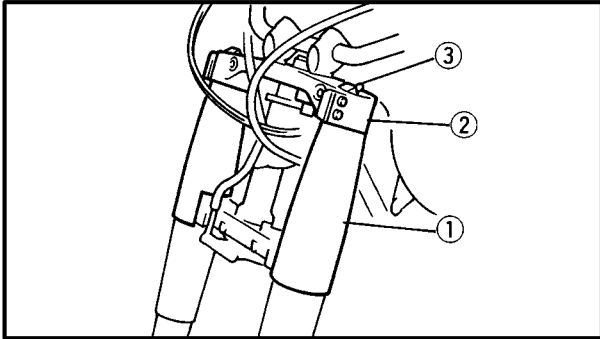
- upper bracket ②

10 Nm (1.0 m•kg, 7.2 ft•lb)

6. Tighten

- cap bolt ③

23 Nm (2.3 m•kg, 17 ft•lb)

**⚠ WARNING**

Make sure that the brake hoses are routed properly.

7. Adjust:

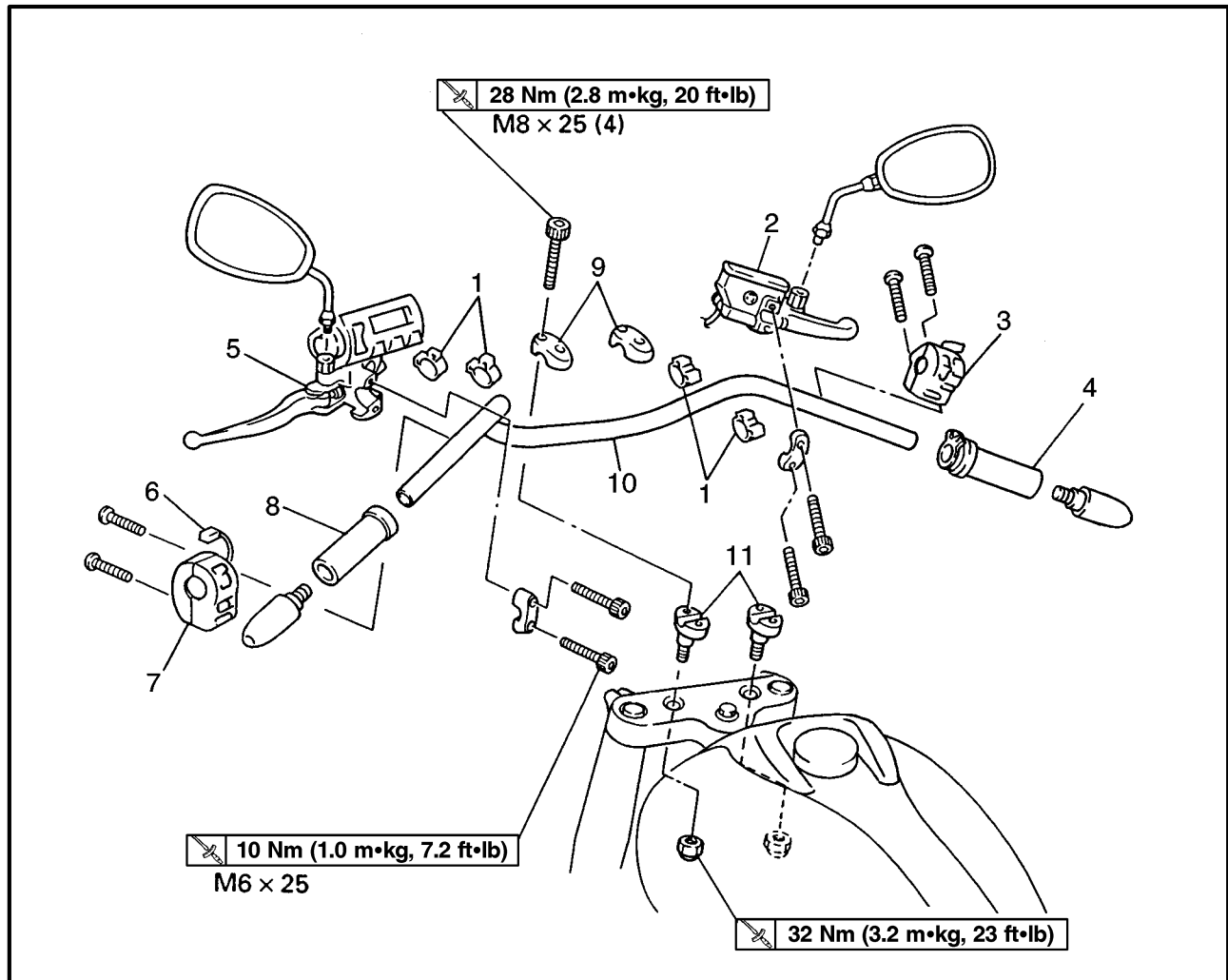
- spring preload

Refer “ADJUSTING THE FRONT FORK” in CHAPTER 3.

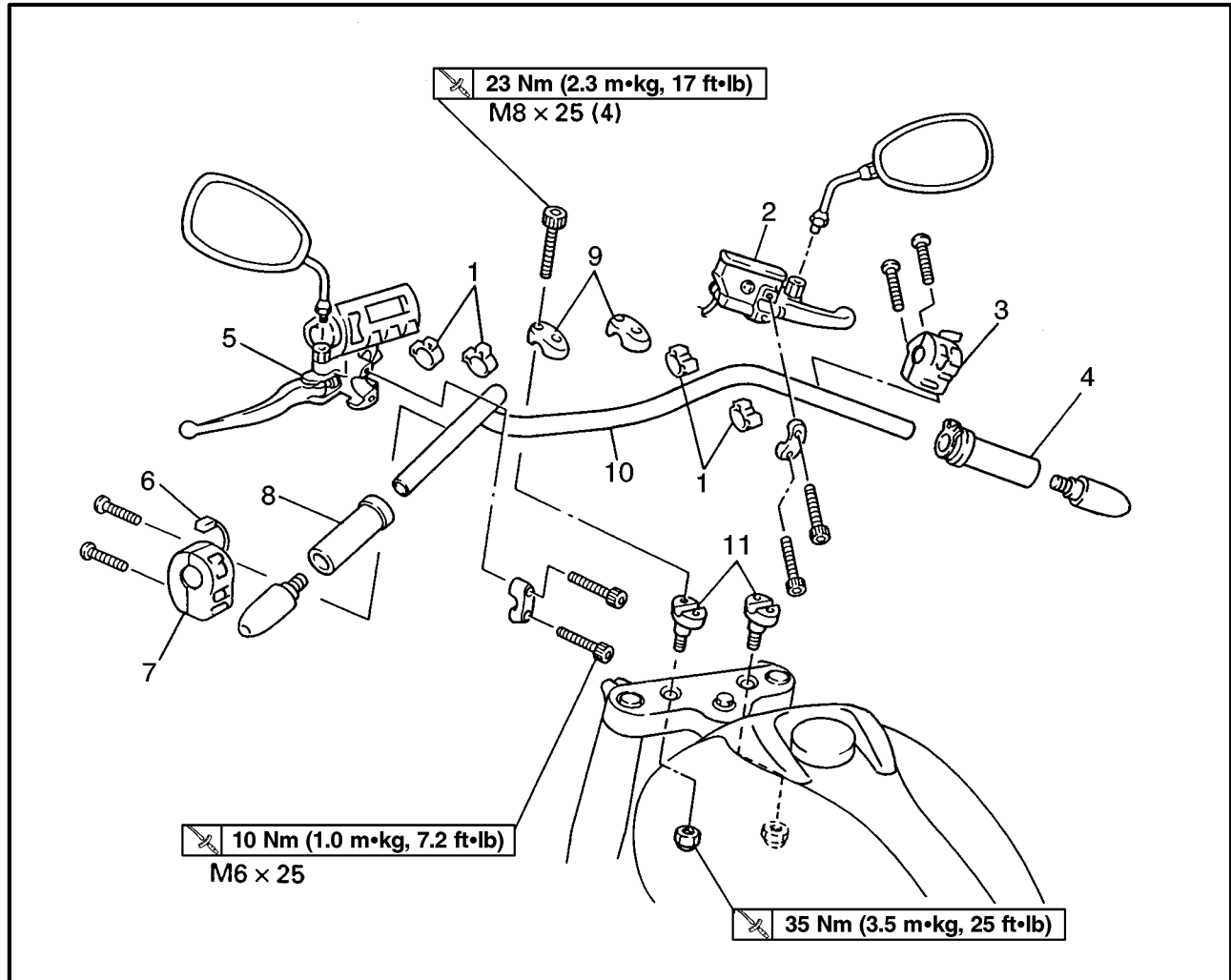


EAS00664

HANDLEBAR



Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed . Stand the motorcycle on a level surface.
			⚠ WARNING
			Securely support the motorcycle so that there is no danger of it falling over.
1	Plastic locking ties	4	
2	Front brake master cylinder	1	Refer to "FRONT AND REAR BRAKES".
3	Handlebar switch (right)	1	
4	Throttle grip	1	Refer to "INSTALLING THE HANDLEBAR".



Order	Job/Part	Q'ty	Remarks
5	Clutch master cylinder	1	Refer to "CLUTCH" in CHAPTER 4.
6	Clutch switch coupler	1	Disconnect
7	Handlebar switches (left)	1	Refer to "INSTALLING THE HANDLEBAR".
8	Grip (left)	1	
9	Handlebar bracket (upper)	2	
10	Handlebar	1	
11	Handlebar bracket (lower)	2	For installation, reverse the removal procedure.



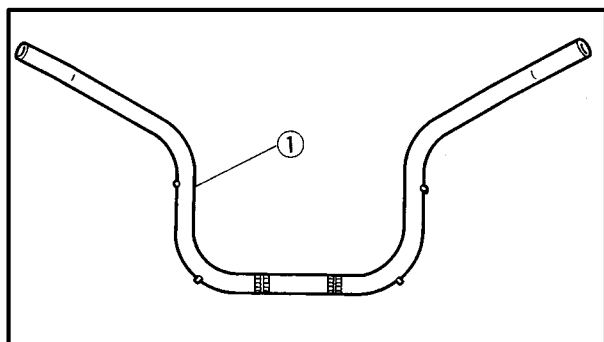
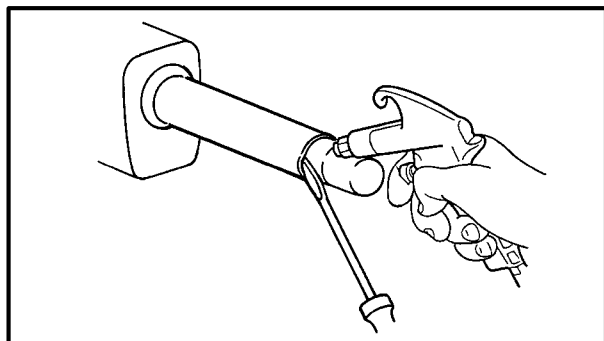
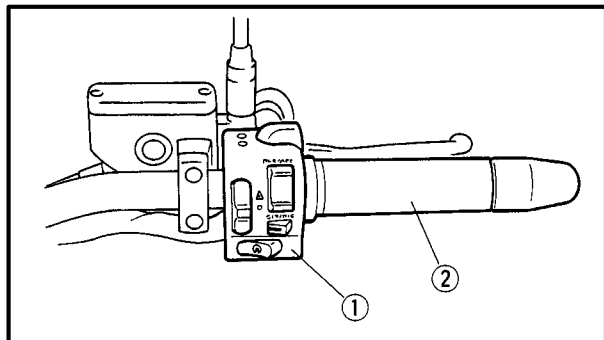
EAS00666

REMOVING THE HANDLEBAR

1. Stand the motorcycle on a level surface.



Securely support the motorcycle so that there is not danger of it falling over.



2. Remove:
- throttle cable housing ①
 - throttle grip ②

3. Remove:
- left handlebar grip ①

NOTE:

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

EAS00668

CHECKING THE HANDLEBAR

1. Stand the motorcycle on a level surface.



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

2. Check:
- handlebar ①
- Bends/cracks/damage → Replace.



Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

3. Install:
- handlebar grip

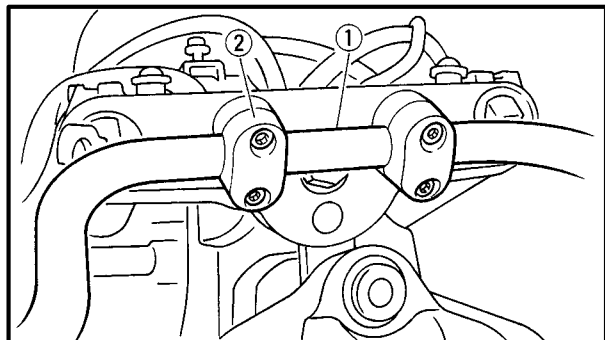
- Apply a light coat of rubber adhesive onto the left end of the handlebar.
- Slide the handlebar grip over the left end of the handlebar.



- c. Wipe off any excess rubber adhesive with a clean rag.

⚠ WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.



EAS00672

INSTALLING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

2. Install:
- handlebar ①
 - upper handlebar holders ②

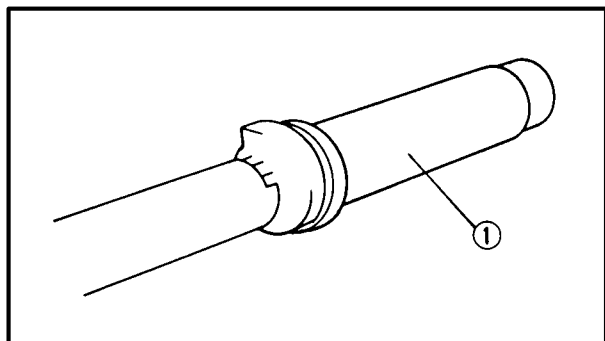
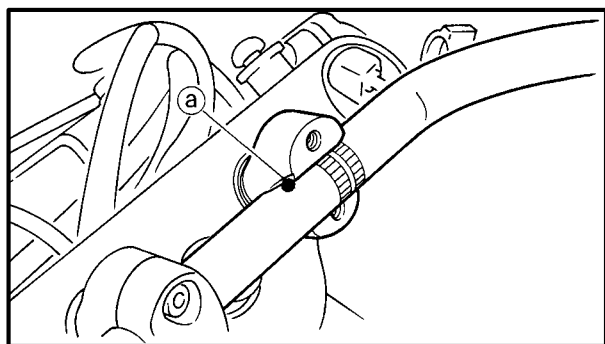
 28 Nm (2.8 m•kg, 20 ft•lb)

CAUTION:

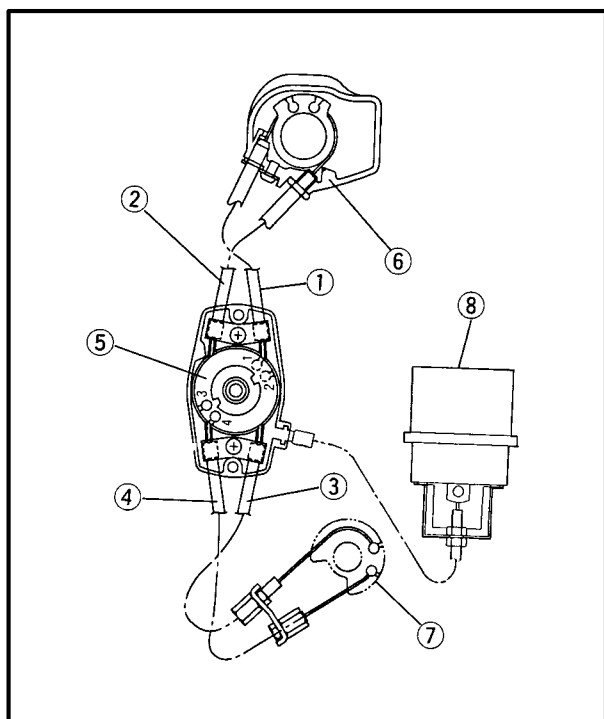
- **First, tighten the bolts on the front side of the handlebar holder, then on the rear side.**
- **Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.**

NOTE:

Align the match marks (a) on the handlebar with the upper surface of the lower handlebar holders.



3. Install:
- throttle grip ①
 - throttle cables

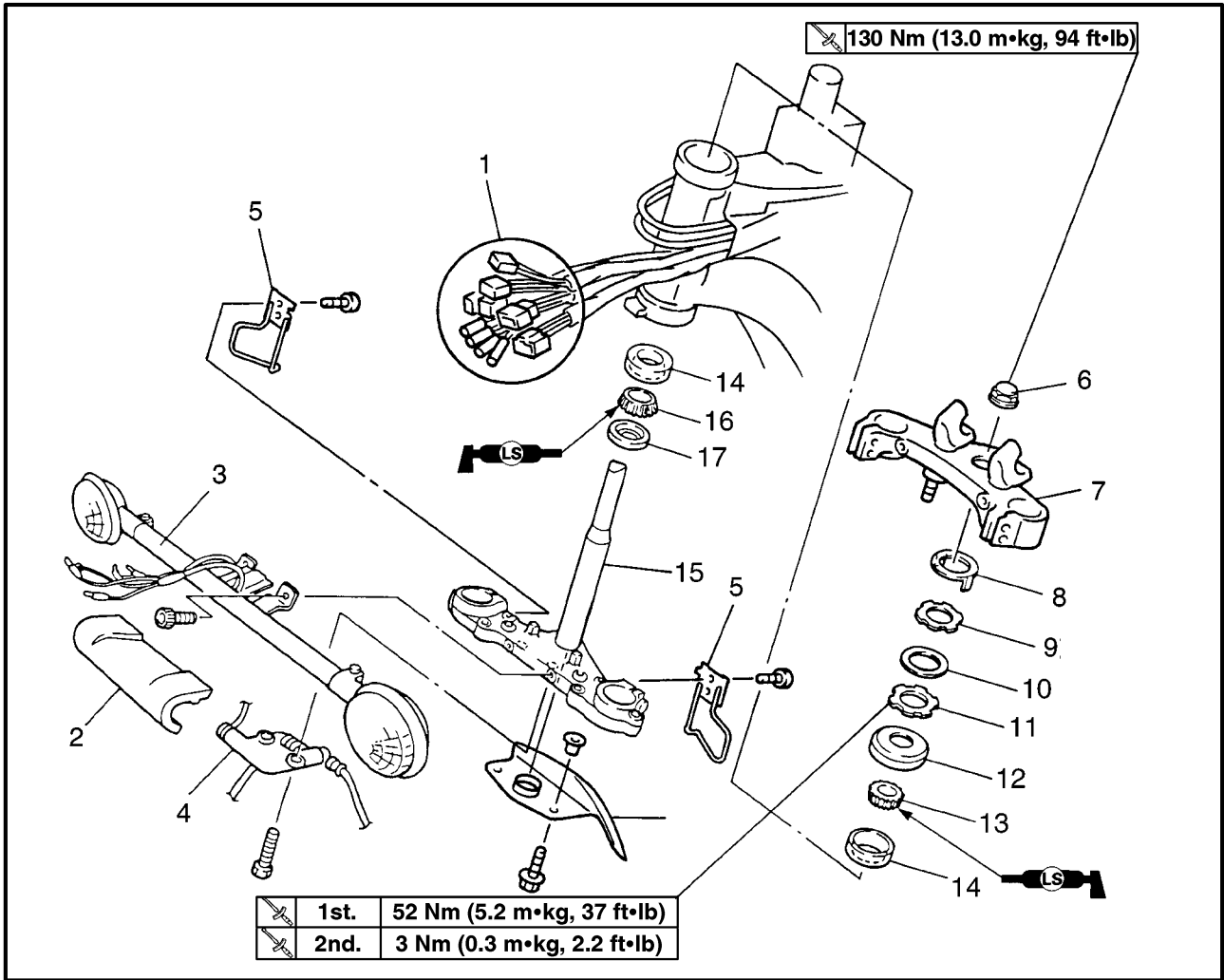


Throttle cable free play
(at the flange of the throttle grip)
4 ~ 6 mm (0.16 ~ 0.24 in)

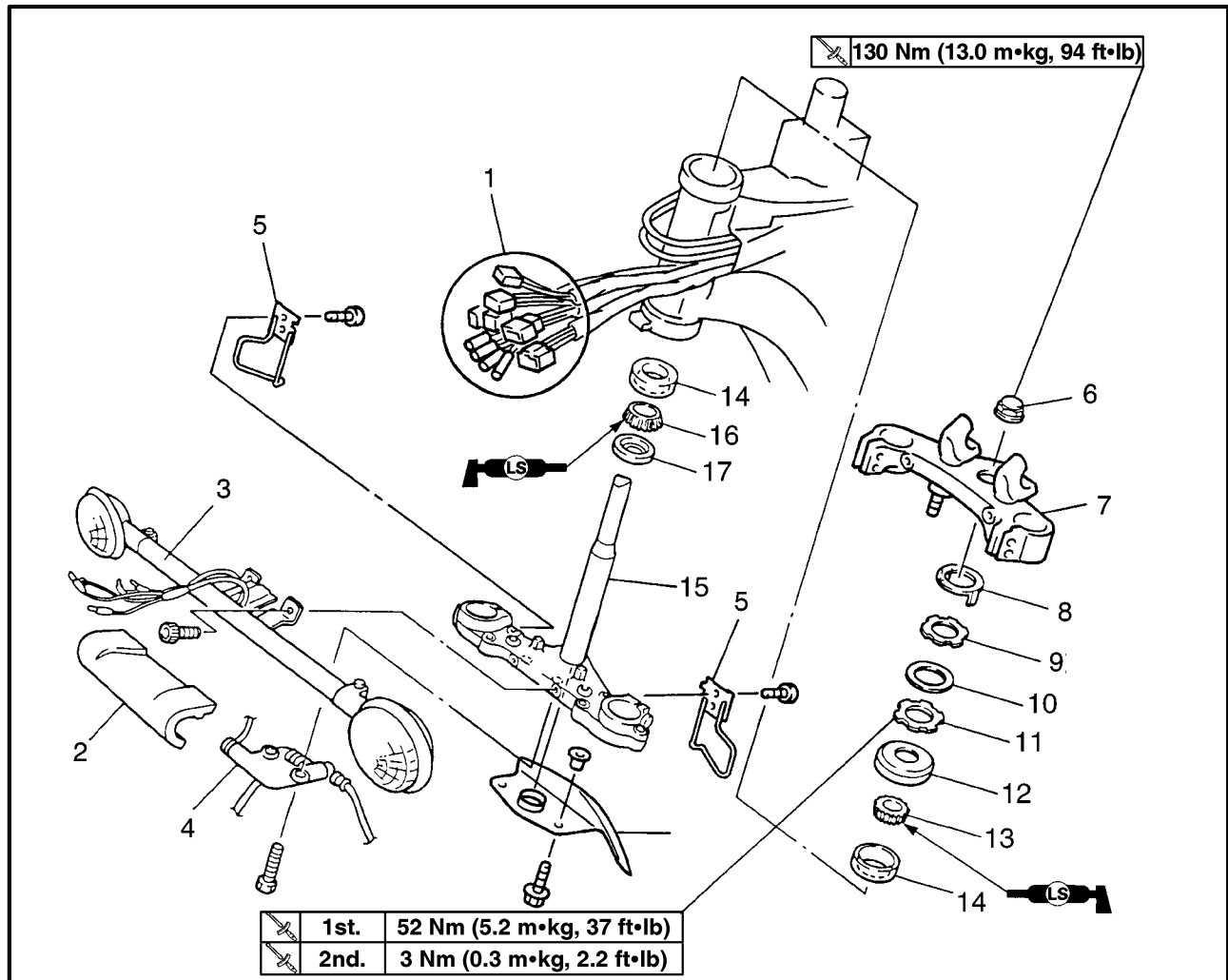
Cruise control cable free play
1 ~ 2 mm (0.04 ~ 0.08 in)

EAS00676

STEERING HEAD



Order	Job/Part	Q'ty	Remarks
	Removing the steering head		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so that there is no danger of it falling over.
	Rider seat, fuel tank		Refer to "RIDER AND PASSENGER SEATS" and "FUEL TANK" in CHAPTER 3.
	Handlebar		Refer to "HANDLEBAR".
	Front cowling		Refer "FRONT COWLING" in CHAPTER 3.
	Front wheel, front forks		Refer to "FRONT FORK".
1	Leads (to the front cowling body)	1	Disconnect
2	Chrome flasher bracket cover		



Order	Job/Part	Q'ty	Remarks
3	Flasher light bracket assembly	1	Refer to "REMOVING THE LOWER BRACKET/INSTALLING THE STEERING HAND".
4	Brake hose joint	1	
5	Brake hose guide	2	
6	Steering stem nut	1	
7	Upper bracket	1	
8	Lock washer	1	
9	Upper ring nut	1	
10	Rubber washer	1	
11	Lower ring nut	1	
12	Bearing cover	1	
13	Bearing (upper)	1	
14	Bearing races	2	
15	Lower bracket	1	
16	Bearing (lower)	1	
17	Rubber seal	1	
			For installation, reverse the removal procedure.



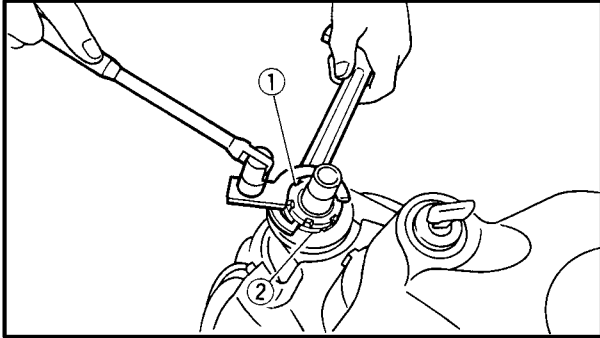
EAS00679

REMOVING THE LOWER BRACKET

1. Stand the motorcycle on a level surface.

⚠ WARNING

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



2. Remove:

- upper ring nut ①
- lower ring nut ②

NOTE:

Hold the lower ring nut with the exhaust and steering nut wrench, then remove the upper ring nut with the ring nut wrench.



Exhaust and steering nut wrench
90890-01268

Ring nut wrench
YU-33975, 90890-01403

⚠ WARNING

Securely support the lower bracket so that there is no danger of it falling.

EAS00682

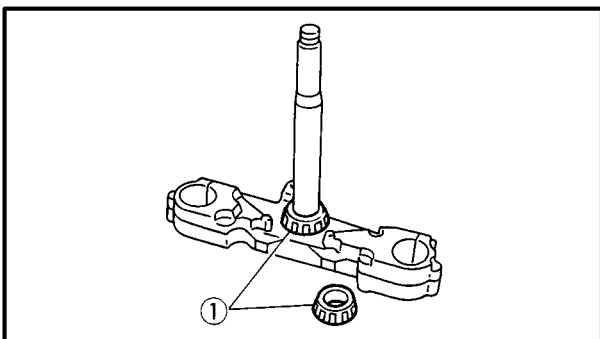
CHECKING THE STEERING HEAD

1. Wash:

- bearing

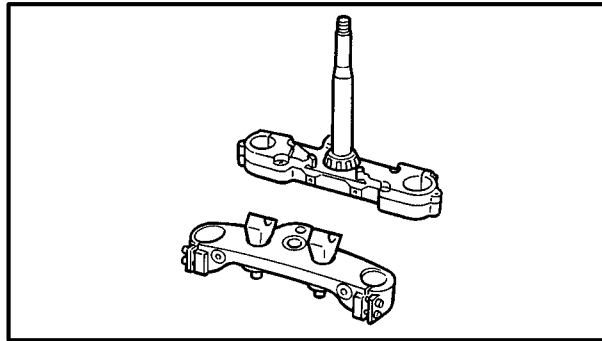
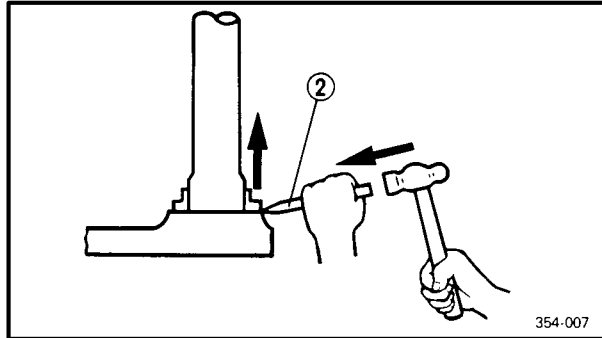
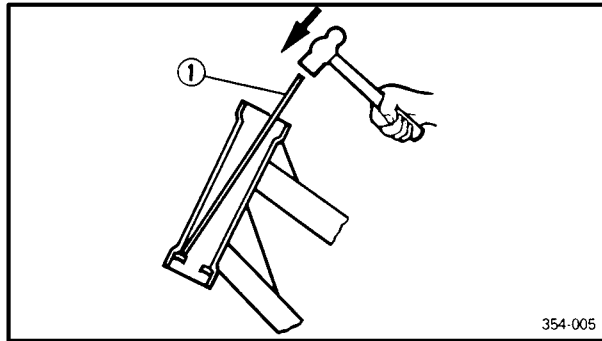


Recommended cleaning solvent
Kerosine



2. Check:

- bearing ①
 - bearing races
- Damage/pitting → Replace.



- bearing balls
- bearing races

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

CAUTION:

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

NOTE:

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

4. Check:
- upper bracket
 - lower bracket
- (along with the steering stem)
Bends/cracks/damage → Replace.

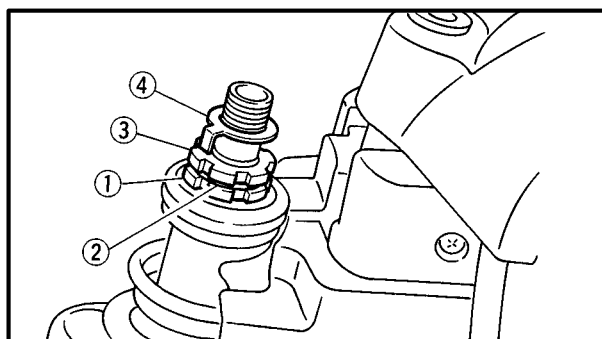
EAS00683

INSTALLING THE STEERING HEAD

1. Lubricate:
 - upper bearing
 - lower bearing
 - bearing races



Recommended lubricant
Lithium soap base grease



2. Install:
- lower ring nut ①
 - rubber washer ②
 - upper ring nut ③
 - lock washer ④
- Refer to “INSPECTING THE STEERING HEAD” in chapter 3.



3. Install:

- upper bracket
- steering stem nut

NOTE: _____

Temporarily tighten the steering stem nut.

4. Install:

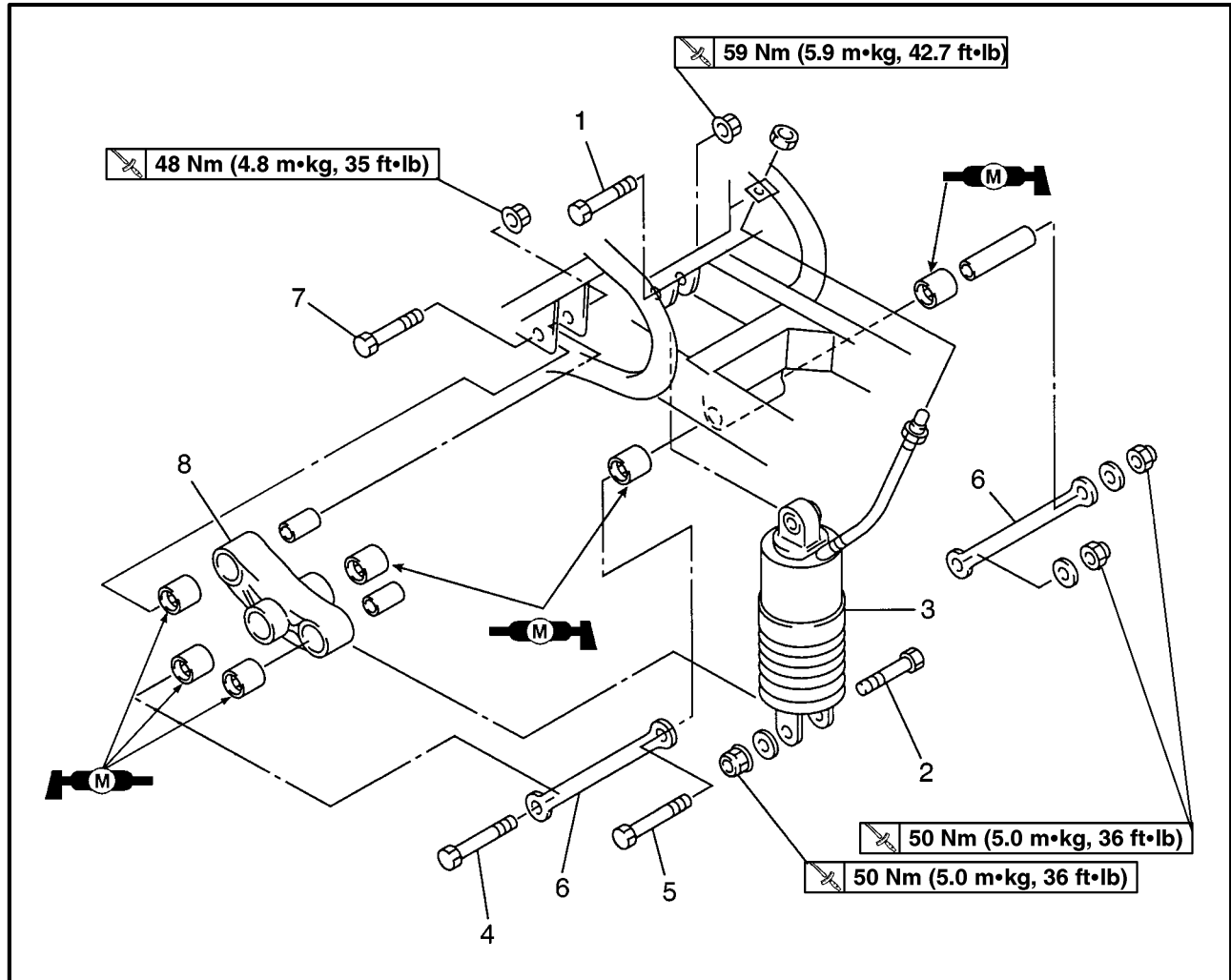
- front fork legs
- Refer to “FRONT FORK”.

NOTE: _____

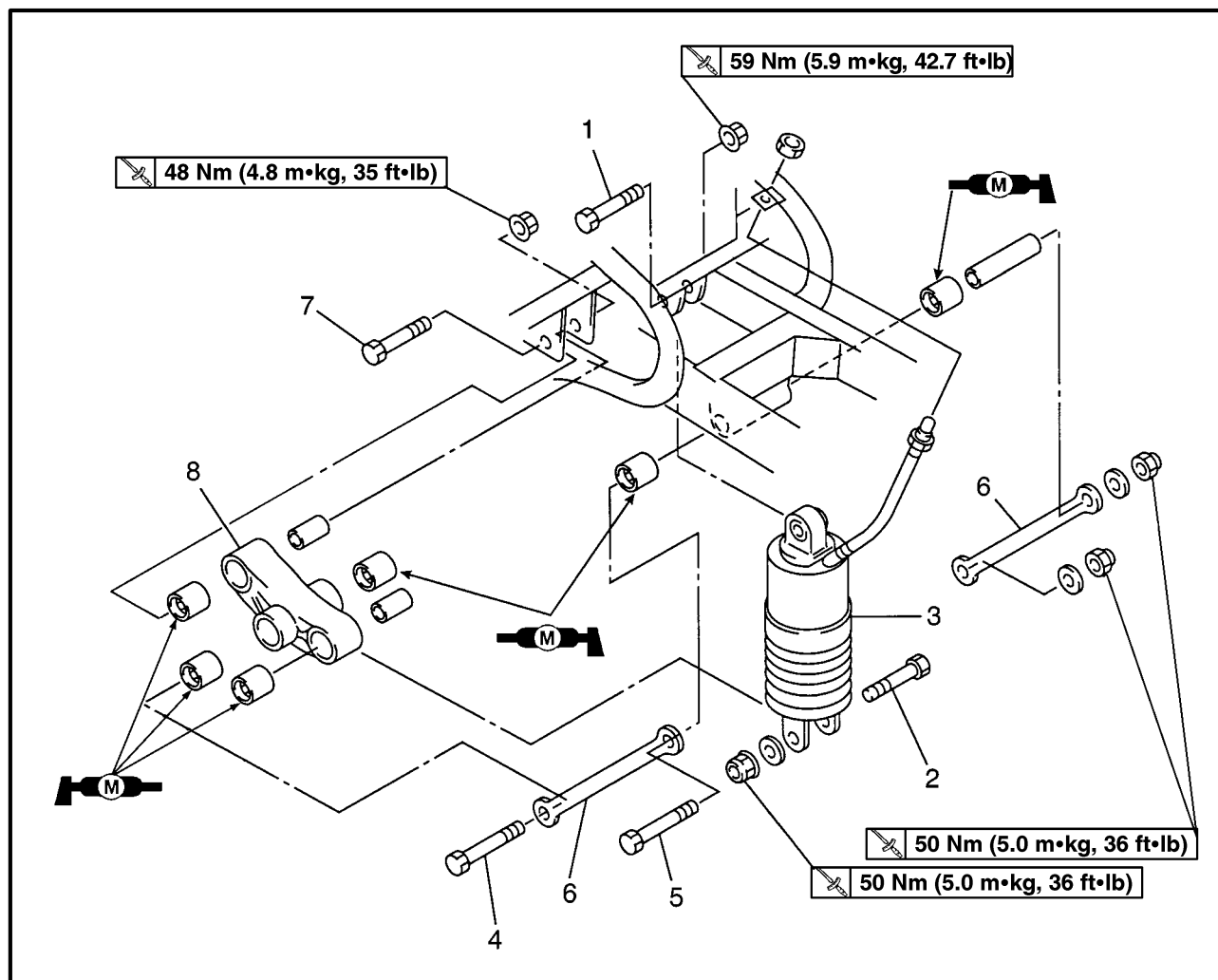
Temporarily tighten the upper and lower bracket pinch bolts.

EAS00685

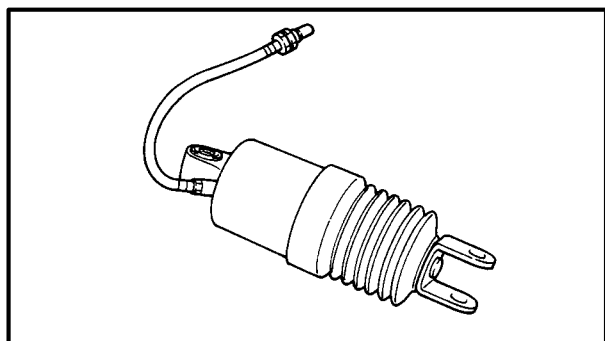
REAR SHOCK ABSORBER ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber assembly		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so there is no danger of it falling over.
	Rear fender and rear wheel		Refer to "REAR WHEEL AND BRAKE DISC".
	Muffler		Refer to "ENGINE REMOVAL" in CHAPTER 4.
1	Bolt (shock absorber-frame)	1	Refer to "REAR SHOCK ABSORBER ASSEMBLY".
2	Bolt (shock absorber-relay arm)	1	
3	Rear shock absorber	1	
4	Bolt (connecting arm-relay arm)	1	
5	Bolt (connecting arm-swingarm)	1	



Order	Job/Part	Q'ty	Remarks
6	Connecting arms	2	For installation, reverse the removal procedure.
7	Bolt (relay arm -frame)	1	
8	Relay arm	1	



EAS00690

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:

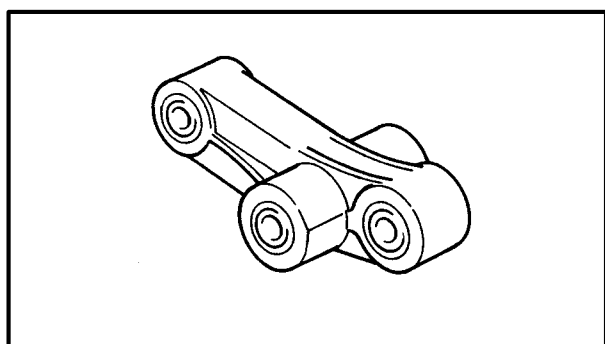
- rear shock absorber assembly

EAS00695

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND RELAY ARM

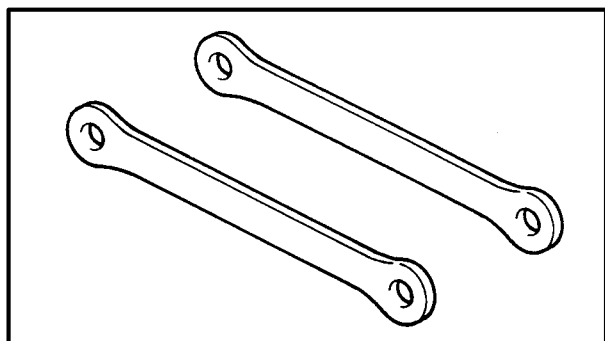
1. Check:

- rear shock absorber
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- bushings
Damage/wear → Replace.
- bolts
Bends/damage/wear → Replace.



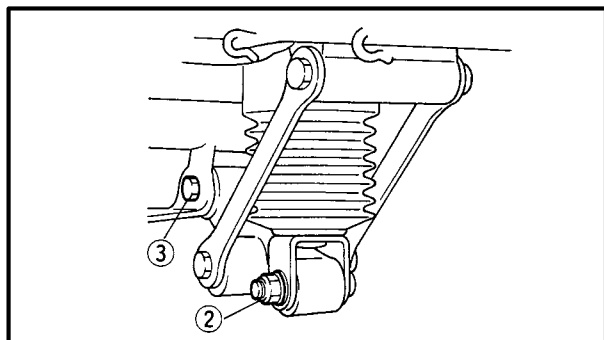
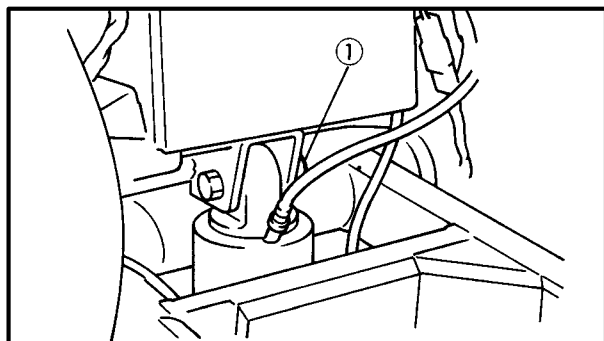
2. Check:

- relay arm
Cracks/damage → Replace.



3. Check:

- connecting arms
Cracks/damage → Replace.



EAS00698

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:

- spacers
- bearings



Recommended lubricant
Molybdenum disulfide grease

2. Install:

- rear shock absorber assembly



Rear shock absorber assembly
upper nut ①

59 Nm (5.9 m•kg, 43 ft•lb)

Rear shock absorber assembly
lower nut ②

50 Nm (5.0 m•kg, 36 ft•lb)

Relay-arm-to-frame-nut ③

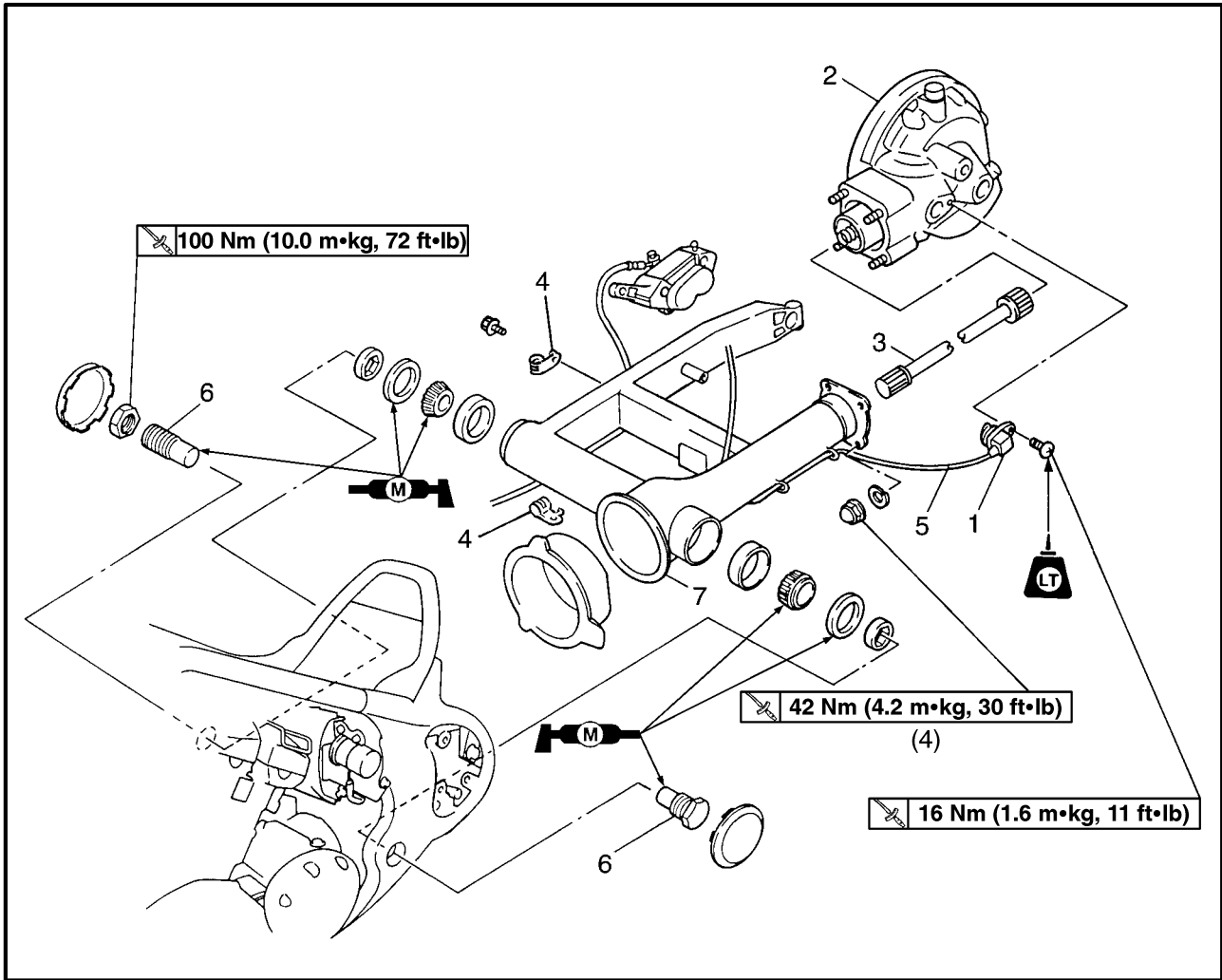
50 Nm (5.0 m•kg, 36 ft•lb)

NOTE:

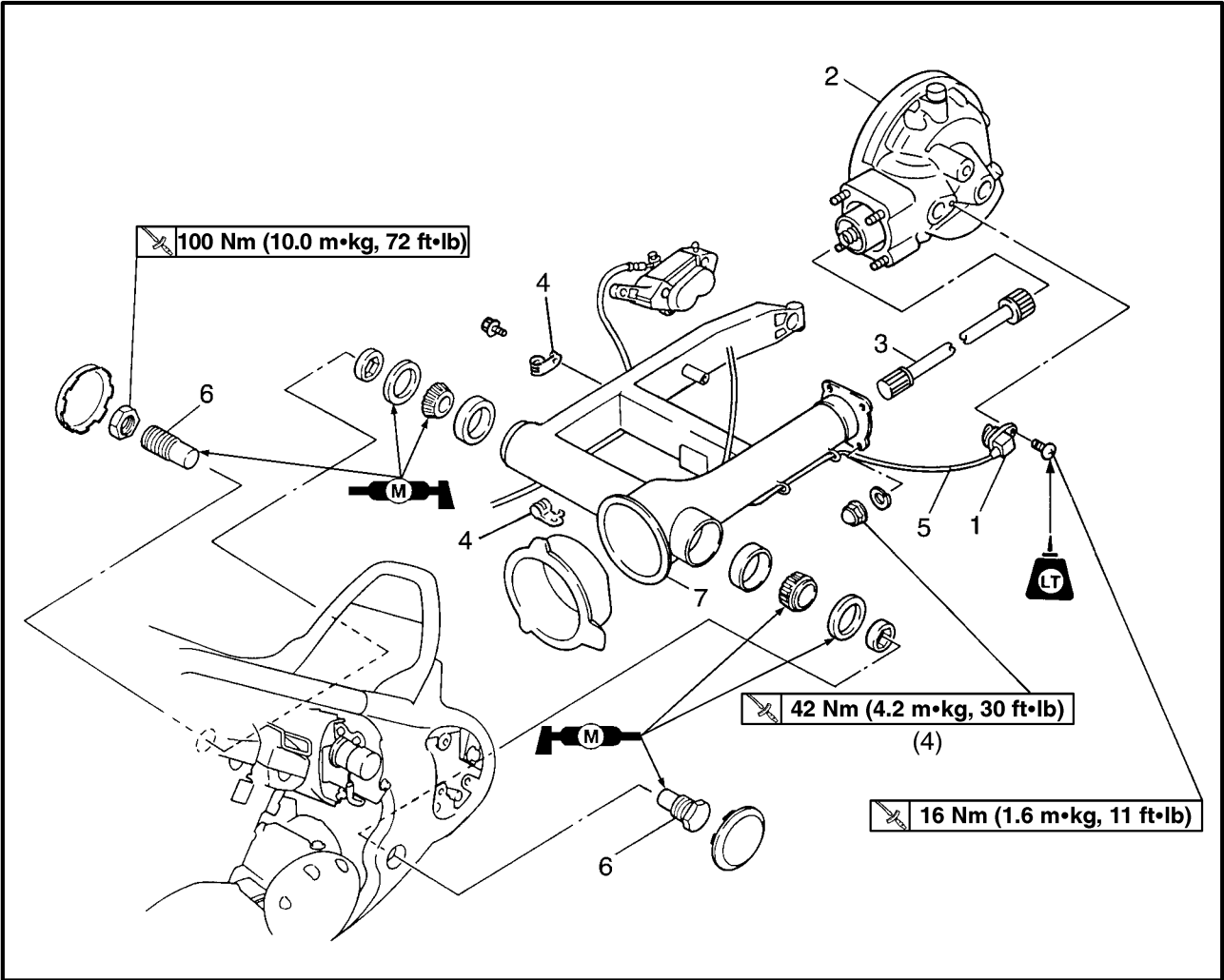
- When installing the rear shock absorber assembly, lift up the swingarm.
- Install the connecting arm front bolt from the right.

EAS00701

SWINGARM
SWINGARM



Order	Job/Part	Q'ty	Remarks
	Removing the swingarm		Remove the parts in the order listed. Stand the motorcycle on a level surface.
			⚠ WARNING
			Securely support the motorcycle so there is no danger of it falling over.
	Rear fender and rear wheel		Refer to "REAR WHEEL AND BRAKE DISC".
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY".
1	Speedometer sensor	1	
2	Final gear case	1	
3	Drive shaft	1	
4	Brake hose holder	3	
5	Speedometer sensor leads	1	Unhook from the cable guide.



Order	Job/Part	Q'ty	Remarks
6	Pivot shafts (right and left)	2	Refer to "REMOVING THE SWINGARM". For installation, reverse the removal procedure.
7	Swingarm	1	



EAS00702

REMOVING THE SWINGARM

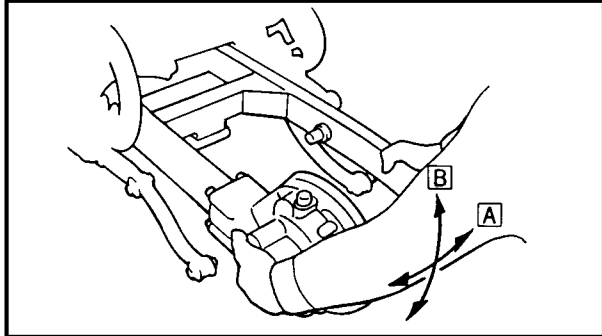
1. Stand the motorcycle on a level surface.

WARNING

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

NOTE:

Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Check:

- swingarm side play [A]
- swingarm vertical movement [B]

- a. Check the tightening torque of the swingarm pivot bolts and locknut.



Locknut

100 Nm (10.0 m•kg, 72 ft•lb)

Left pivot bolt

100 Nm (10.0 m•kg, 72 ft•lb)

Right pivot bolt

7 Nm (0.7 m•kg, 51 ft•lb)

- b. Check the swingarm side play [A] by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers and bearings.

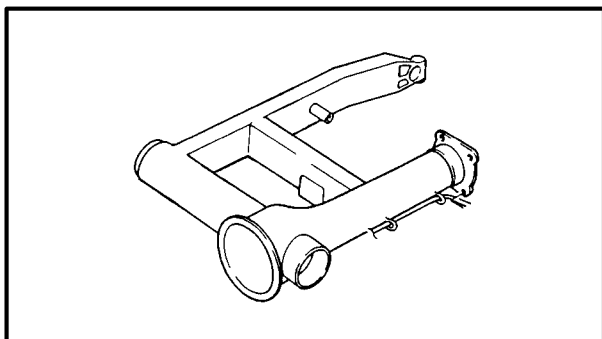


Swingarm side play

(at the end of the swingarm)

0 mm (0 in)

- d. Check the swingarm vertical movement [B] by moving the swingarm up and down.
If swingarm vertical movement is not smooth or if there is binding, check the spacers and bearings.

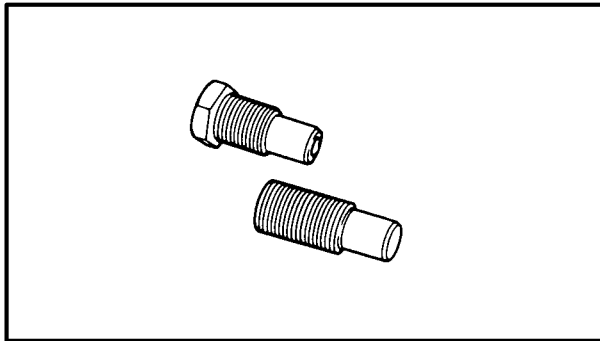


EAS00708

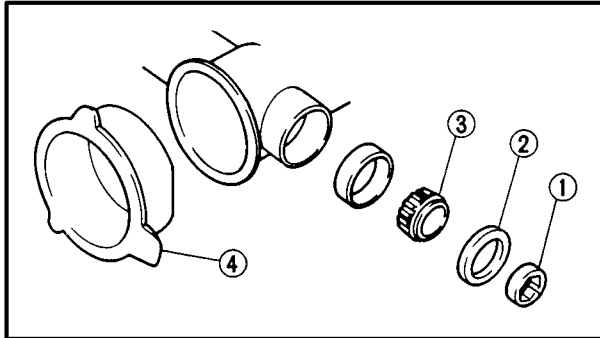
CHECKING THE SWINGARM

1. Check:

- swingarm
Bends/cracks/damage → Replace.



2. Check:
- left pivot bolt
 - right pivot bolt
- Damage/wear → Replace.



3. Check:
- spacers ①
 - oil seals ②
 - bearings ③
 - universal joint boot ④
- Damage/wear → Replace.

EAS00712

INSTALLING THE SWINGARM

1. Lubricate:
- drive shaft splines



Recommended lubricant
Lithium soap base grease

2. Lubricate:
- bearings
 - spacers
 - oil seals



Recommended lubricant
Molybdenum disulfide grease



SHAFT DRIVE TROUBLESHOOTING

The following conditions may indicate damaged shaft drive components:

A	Symptoms	B	Possible Causes
	1. A Pronounced hesitation of jerky movement during acceleration, deceleration, or sustained speeds (This must not be confused with engine surging or transmission-related movements.) 2. A rolling “rumble” noticeable at low speeds, a high-pitched whine, or a “clunk” from a shaft drive component or area 3. A locked-up condition of the shaft drive mechanism or no power transmitted from the engine to the rear wheel		A. Bearing damage B. Improper gear lash C. Damaged gear teeth D. Broken drive shaft E. Broken gear teeth F. Seizure due to lack of lubrication G. Small foreign objects lodged between moving parts

NOTE:

Causes A, B and C may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal operating noises. If there is reason to believe these components are damaged, remove them for individual inspection.

[illegible]

⚠ WARNING

▲ ▲

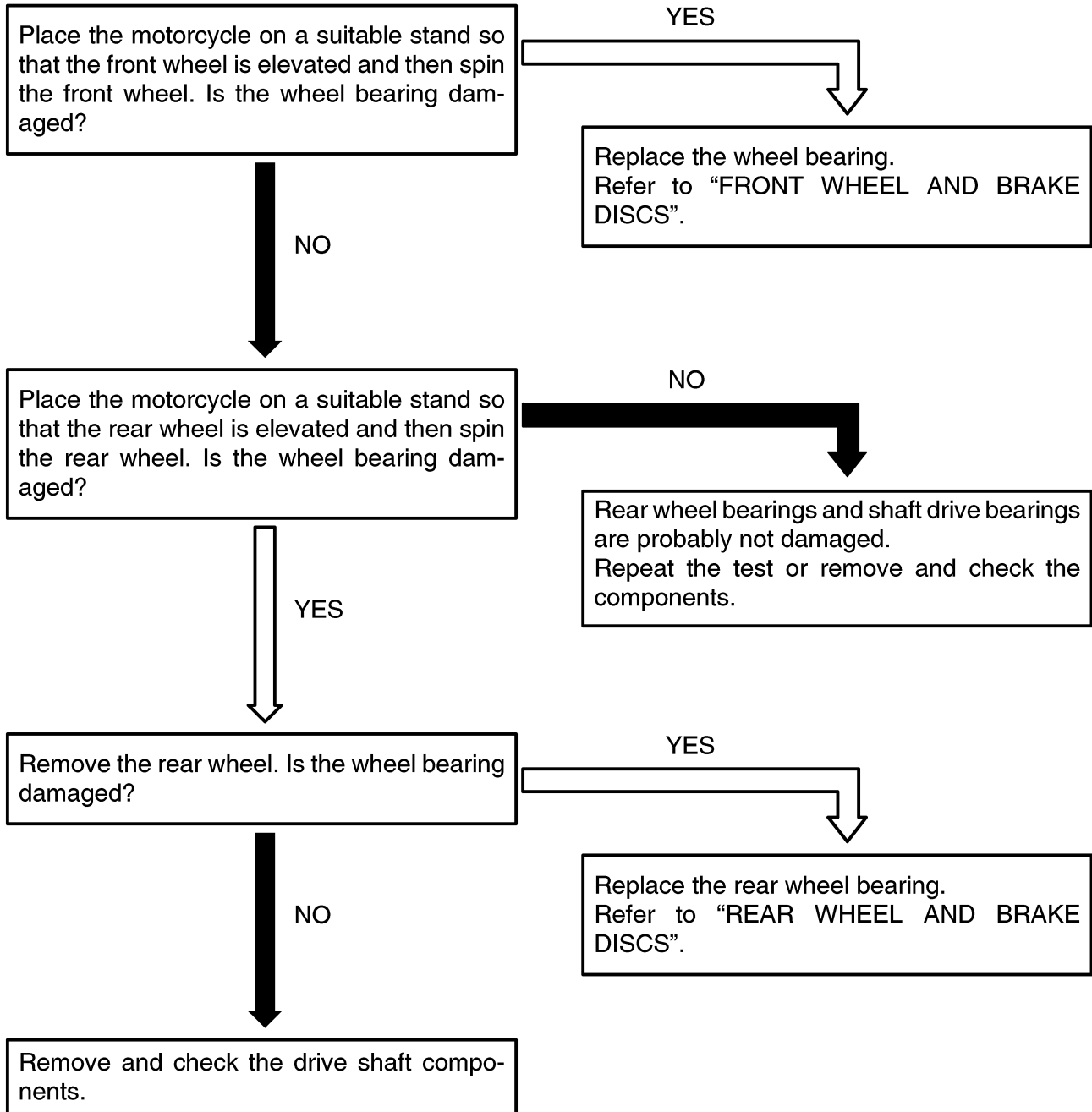
- 7-75



EAS00716

Troubleshooting chart

When causes (A) or (B) shown in the table at the beginning of the “TROUBLESHOOTING” section exist, check following points.





EAS00717

CHECKING THE FINAL DRIVE OIL FOR CONTAMINATION AND INSPECTING THE SHAFT DRIVE FOR LEAKS

1. Drain:
 - final drive oil
(from the final drive housing)
Refer to “CHANGING THE FINAL DRIVE OIL” in CHAPTER 3.
2. Check:
 - final drive oil
Large amount of metal particles → Check for bearing seizure.

NOTE:

A small amount of metal particles in the final drive oil is normal.

3. Check:
- shaft drive housing (for oil leaks)

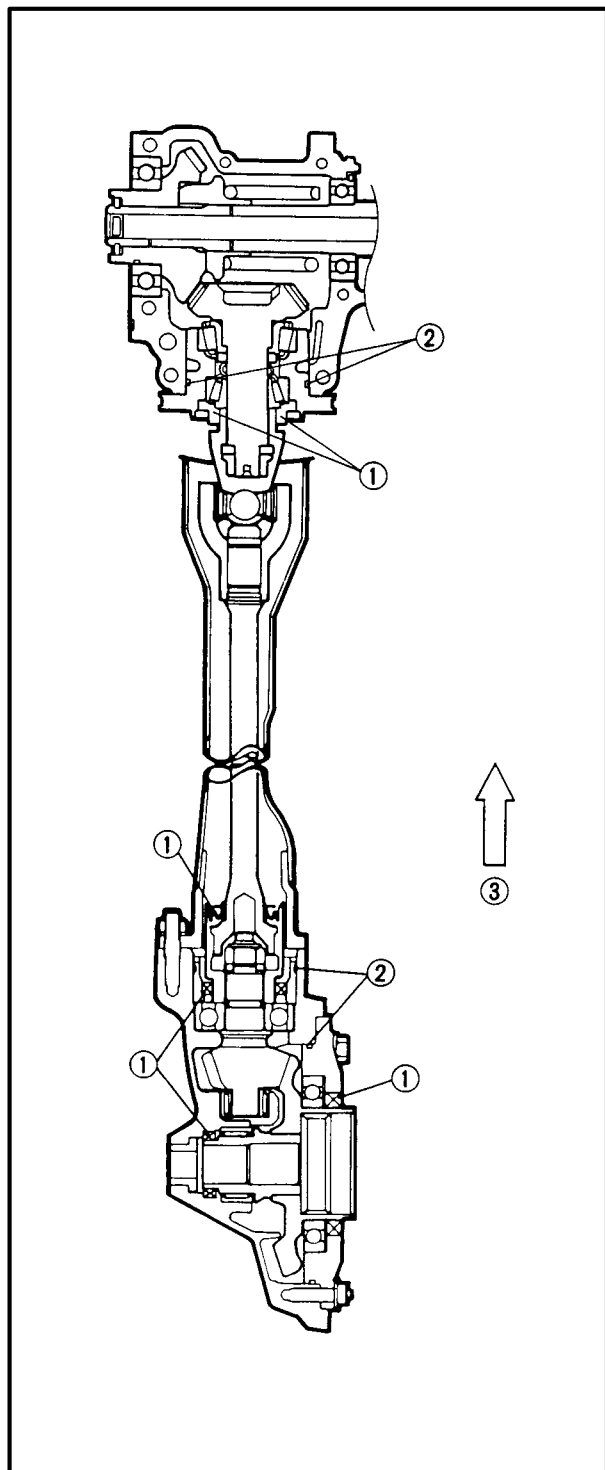


- Thoroughly clean the entire motorcycle and then completely dry it.
 - Apply a leak-locating compound or dry powder spray to the shaft drive.
 - Test ride the motorcycle long enough to locate a leak.
- Oil leak → Repair or replace the faulty part(-s).

- ① Oil seal
- ② O-ring
- ③ Forward

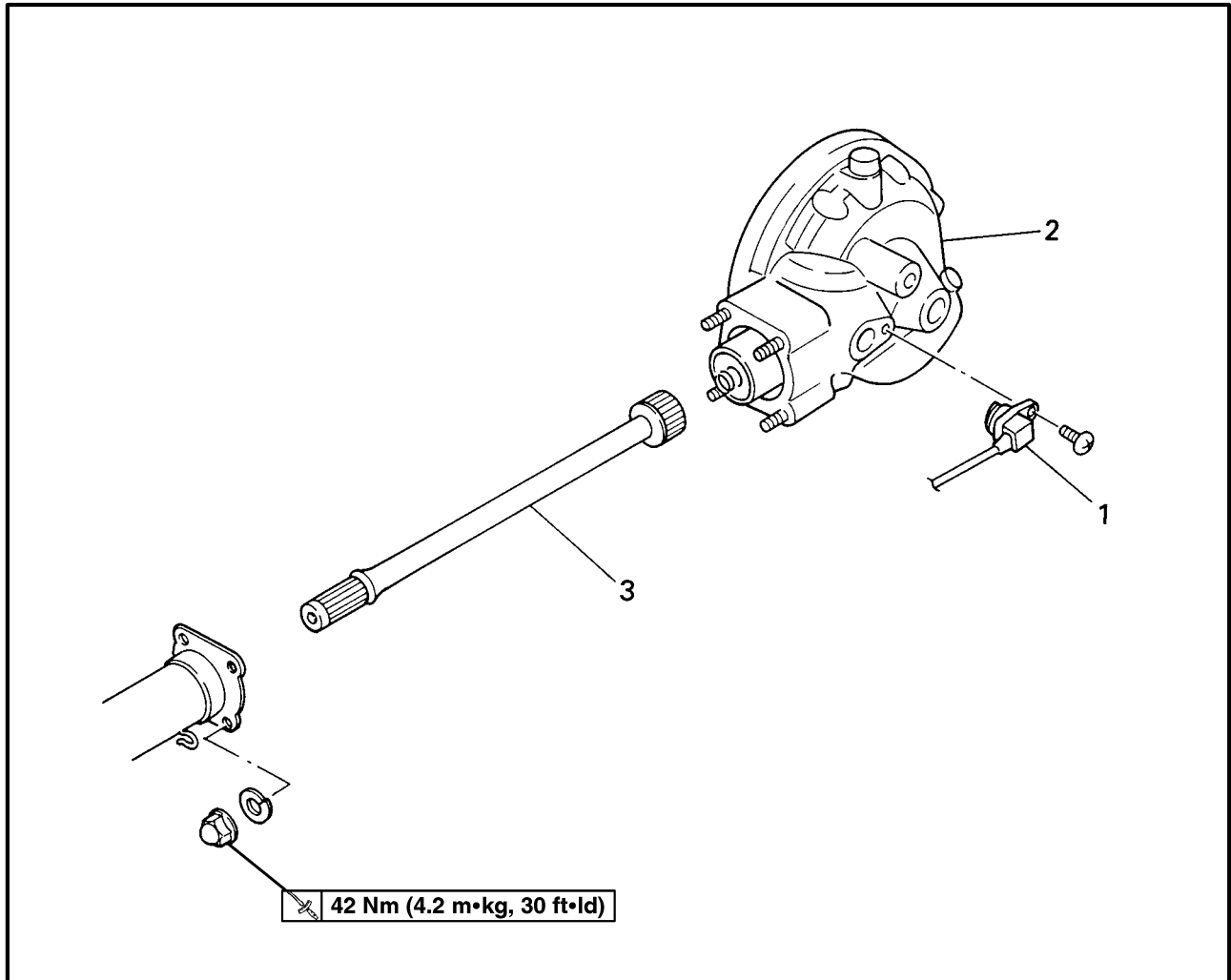
NOTE:

- What may appear to be an oil leak on a new or fairly new motorcycle, may result from the application of a rust preventive coating or excessive seal lubrication.
- Always clean the motorcycle and recheck the area where the leak is thought to originate from.



EAS00718

FINAL DRIVE ASSEMBLY AND DRIVE SHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the final drive assembly and drive shaft		Remove the parts in the order listed. Stand the motorcycle on a level surface.
			⚠ WARNING
			Securely support the motorcycle so there is no danger of it falling over.
	Rear fender and rear wheel		Refer to "REAR WHEEL AND BRAKE DISC".
1	Speedometer sensor	1	
2	Final gear assembly	1	
3	Drive shaft	1	
			For installation, reverse the removal procedure.



EAS00719

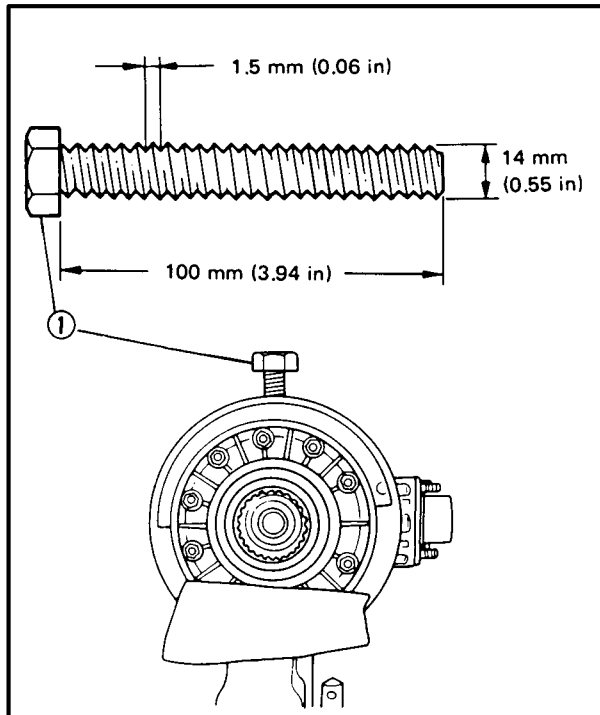
MEASURING THE RING GEAR BACKLASH

1. Secure the final drive assembly in a vise.
2. Remove:
 - final drive oil drain bolt
3. Drain:
 - final drive oil
(from the final drive assembly)
4. Measure:
 - ring gear backlash
Out of specification → Adjust.



Ring gear backlash

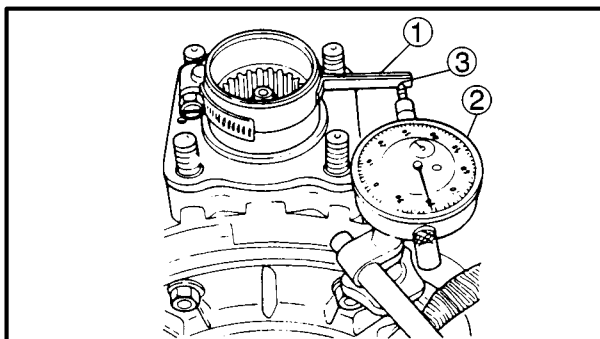
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)



- a. Install a bolt ① of the specified size, into the final drive oil filler hole.
- b. Finger tighten the bolt until it stops the ring gear from moving.

NOTE:

Do not overtighten the bolt.



- c. Install the special tool ② and dial gauge ③.

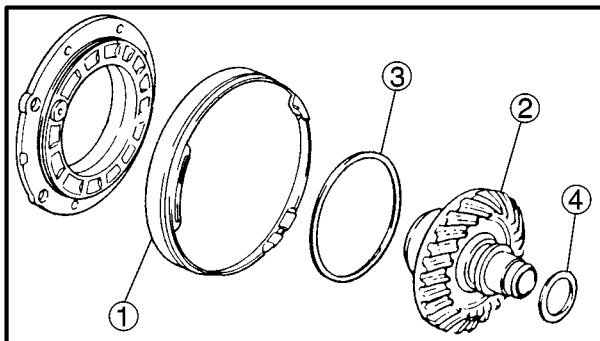


Final gear backlash band
YM-01230, 90890-01230

- ③ Dial-gauge-plunger contact point
- d. Gently rotate the gear coupling from engagement to engagement.
- e. Record the reading on the dial gauge.
- f. Remove the dial gauge, special tool, and bolt.

- ▲**

Working in a crisscross pattern, loosen each nut 1/4 of a turn. After all of the nuts are fully loosened, remove them and the bolts.



- Ring gear backlash is decreased.**



- b. If it is necessary to increase the ring gear backlash by more than 0.2 mm, reduce the thrust washer thickness by 0.2 mm for every 0.2 mm increase of ring gear shim thickness.
- c. If it is necessary to reduce the ring gear backlash by more than 0.2 mm, increase the thrust washer thickness by 0.2 mm for every 0.2 mm decrease of ring gear shim thickness.

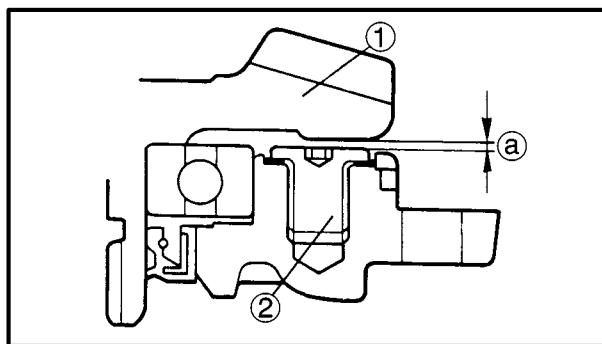
 Ring gear shims	
Thickness (mm)	0.30, 0.40, 0.50

 Thrust washers	
Thickness (mm)	1.2, 1.4, 1.6, 1.8, 2.0

EAS00721

MEASURING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE

1. Remove:
 - ring gear bearing housing (along with the ring gear)
 Refer to "ADJUSTING THE RING GEAR BACKLASH".



2. Measure:
 - ring-gear-to-stopper-bolt clearance (a)
 Out of specification → Adjust.

 Ring-gear to stopper-bolt clearance	
0.3 ~ 0.6 mm (0.012 ~ 0.024 in)	

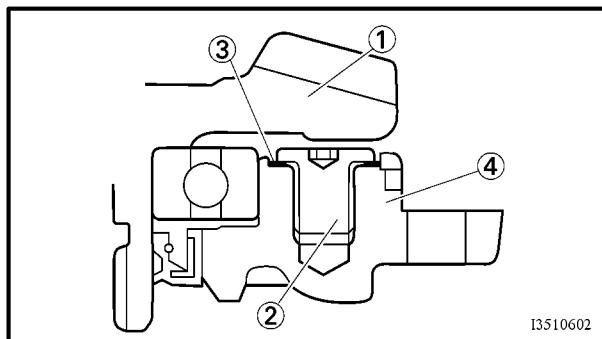
- ① Ring gear
- ② Stopper bolt

3. Install:
 - ring gear bearing housing (along with the ring gear)

EAS00722

ADJUSTING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE

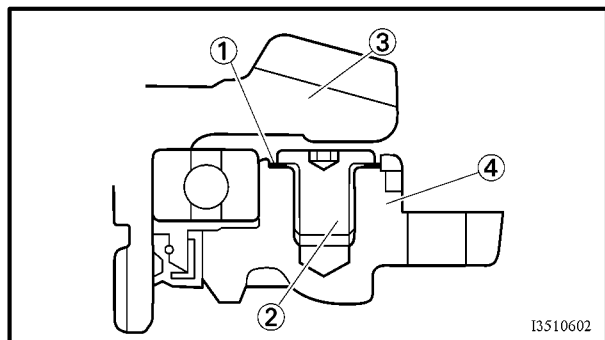
- 1 Remove:
 - ring gear ①
 - stopper bolt ②
 - stopper bolt shim(-s) ③
- ④ ring gear bearing housing



I3510602



Select:
 stopper bolt shim(-s)
 Stopper bolt shims
 thickness (mm) 0.10, 0.15, 0.20, 0.30,
 0.30, 0.40, 0.50



2. Install:
- stopper bolt shim(-s) ①
 - stopper bolt ②  9 Nm (0.9 m•kg, 6.5 ft•lb)
 - ring gear ③
 - ④ Ring gear bearing housing

CAUTION:

Apply LOCTITE® onto the stopper bolt.

3. Measure:
- ring-gear-to-stopper-bolt clearance

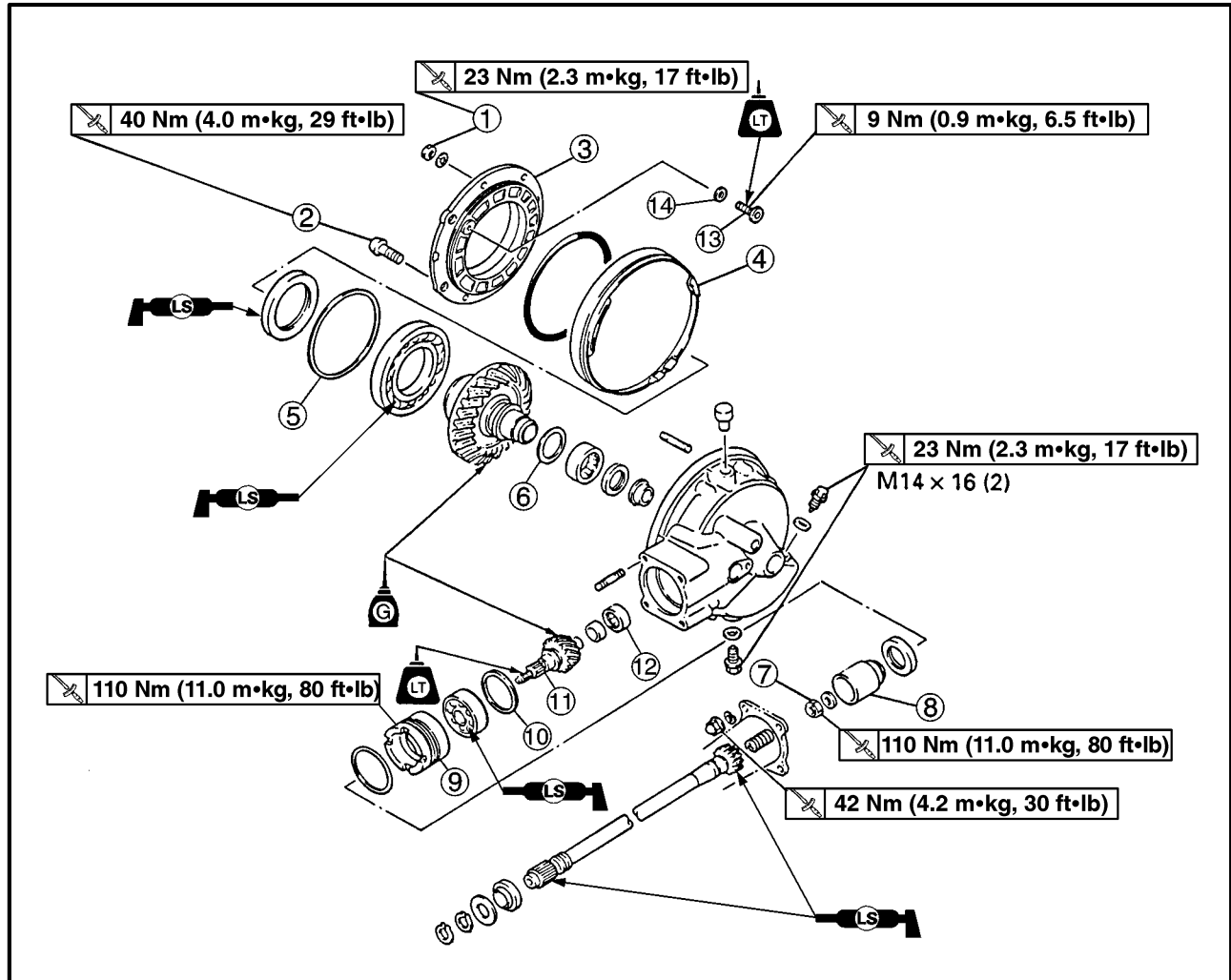
NOTE:

If the ring-gear-to-stopper-bolt clearance is out of specification, repeat the above procedure.

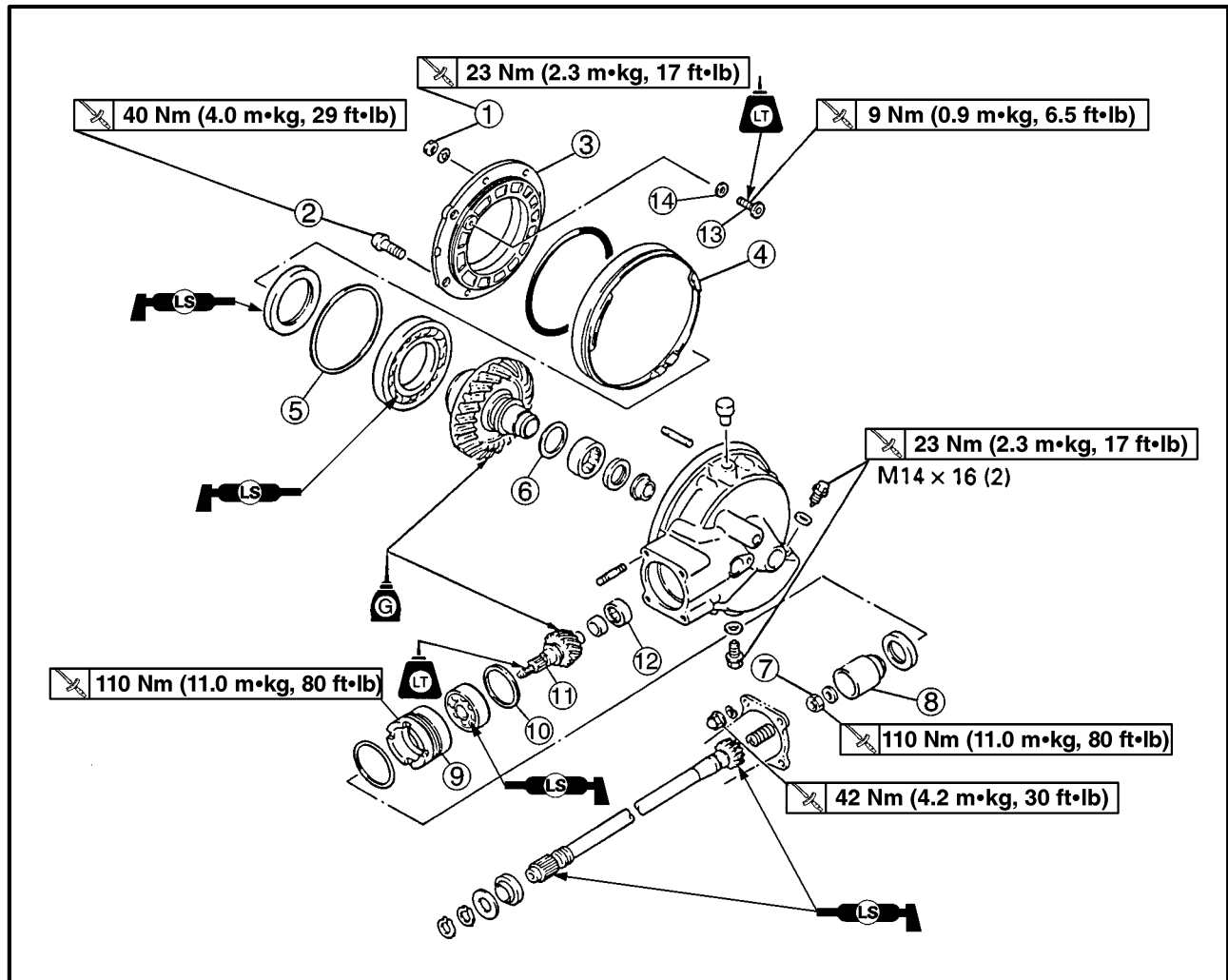


EAS00723

FINAL DRIVE ASSEMBLY



Order	Job/Part	Q'ty	Remarks
①	Disassembling the final drive assembly		Disassemble the parts in the order listed
②	Nuts (bearing housing)		NOTE: Working in a crisscross pattern, loosen each bolt 1/4 of a turn. After all the bolts are loosened, remove them.
	Bolts (bearing housing)		
③	Bearing housing	1	Refer to "DISASSEMBLING THE FINAL DRIVE ASSEMBLY/ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR".
④	Dust cover	1	
⑤	Shim(s)		
⑥	Thrust washer	1	
⑦	Self-locking nut (gear coupling)	1	
⑧	Gear coupling	1	
⑨	Bearing retainer (final drive shaft)	1	



Order	Job/Part	Q'ty	Remarks
⑩	Shim(s)	1	Refer to "REMOVING AND INSTALLING THE RING GEAR BEARINGS".
⑪	Final drive shaft assembly	1	
⑫	Final drive shaft roller bearing	1	
⑬	Ring gear stopper	1	For assembly, reverse the disassembly procedure.
⑭	Shim(s)		



EAS00724

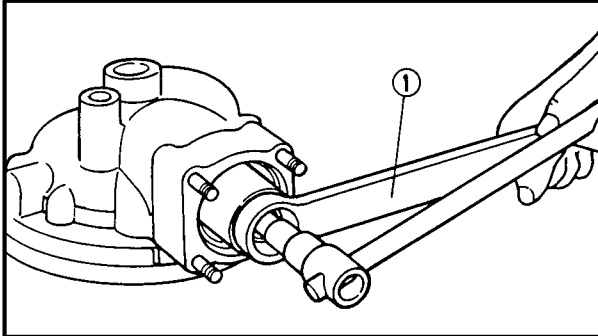
DISASSEMBLING THE FINAL DRIVE ASSEMBLY

1. Remove:

- ring gear bearing housing nuts
- ring gear bearing housing bolts

NOTE:

Working in a crisscross pattern, loosen each nut 1/4 of a turn. After all of the nuts are fully loosened, remove them and the bolts.

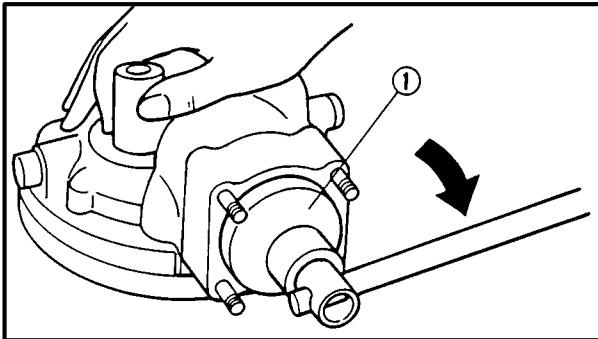


2. Remove:

- self-locking nut
- gear coupling (with the special tool ①)



Final drive shaft holder
YM-01229, 90890-01229



3. Remove:

- bearing retainer (with the special tool ①)



Final drive shaft bearing retainer wrench
YM-04050, 90890-04050

CAUTION:

The bearing retainer has left-hand threads. To loosen the bearing retainer, turn it clockwise.

4. Remove:

- final drive pinion gear

⚠ WARNING

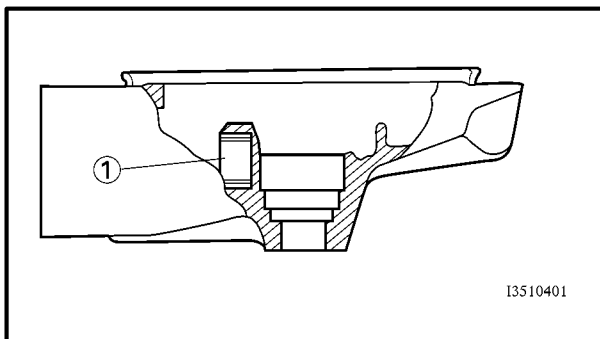
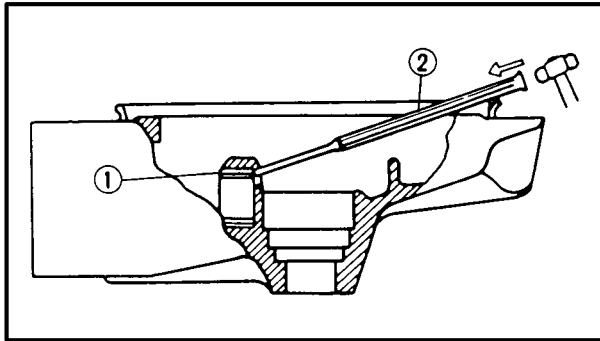
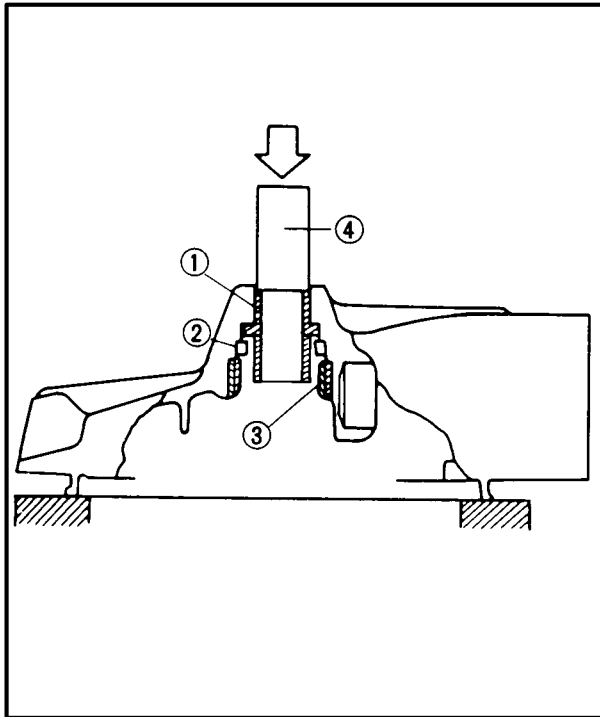
Always use new bearings.

CAUTION:

The final drive pinion gear should only be removed if ring gear replacement is necessary.

NOTE:

Lightly tap on the end of the final drive pinion gear with a soft hammer.



EAS00725

REMOVING AND INSTALLING THE RING GEAR BEARINGS

1. Remove:
 - collar ①
 - oil seal ②
 - bearing ③(With an appropriate press tool ④ and an appropriate support for the final drive housing)
2. Check:
 - bearingDamage → Replace.

3. Remove:
- bearing ①

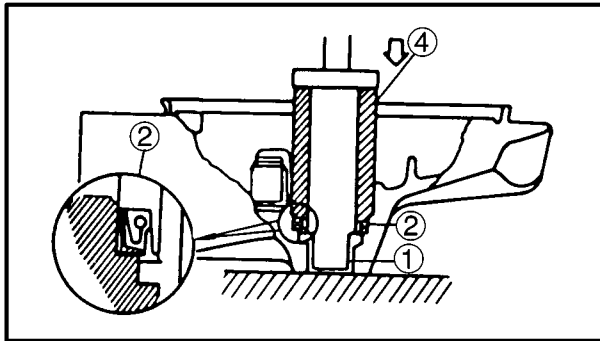
- Heat the final gear case to approximately 150°C (302°F).
- Remove the bearing outer races with an appropriately shaped punch ②.
- Remove the inner race from the final drive pinion gear.

NOTE:

The removal of the final drive pinion gear bearing is a difficult procedure and is rarely necessary.

4. Install:
- bearing (New) ①

- Heat the final gear case to approximately 150°C (302°F).
- Install the bearing outer races with a socket or appropriate tool that matches the diameter of the races.
- Install the inner race onto the final drive pinion gear.



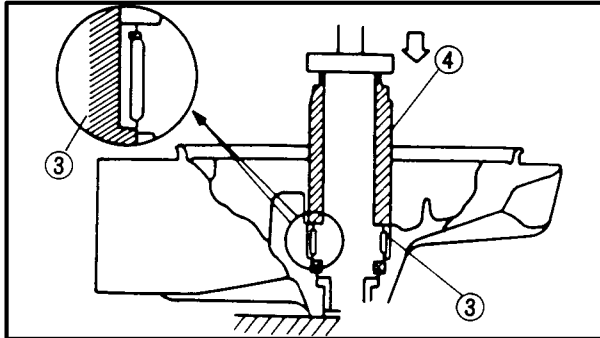
5. Install:

- collar ①
- oil seal ② (New)
- bearing ③

(with an appropriate press tool ④ and press)

NOTE:

The bearing can be reused, but Yamaha recommends installing a new one.



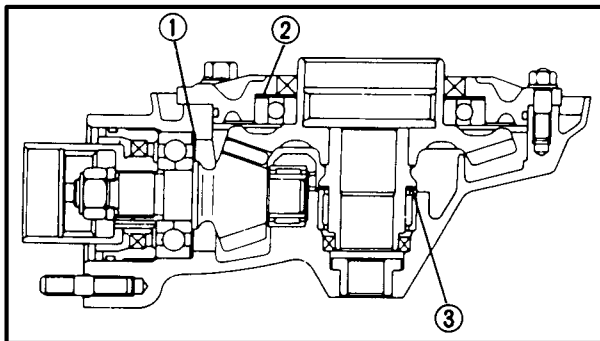
EAS00726

ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR

NOTE:

Aligning the final drive pinion gear and ring gear is necessary when any of the following parts are replaced:

- final drive housing
- any bearing



1. Select:

- final drive pinion gear shim(-s) ①
- ring gear shim(-s) ②

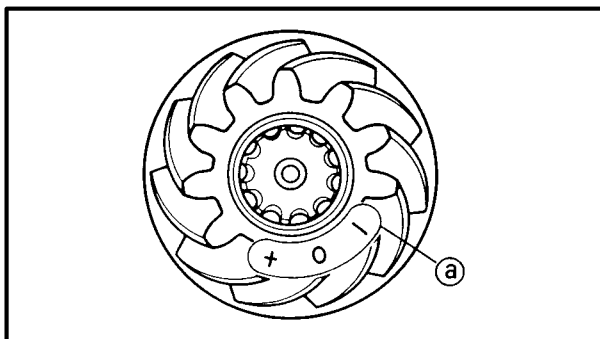
a. Position the final drive pinion gear and the ring gear with shims ① and ②. Calculate the respective thicknesses from information marked on the final drive housing and the drive pinion gear.

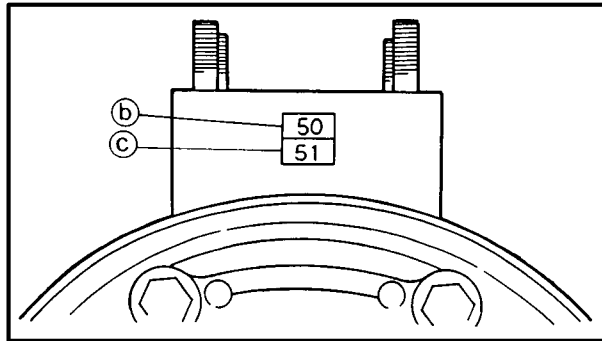
- ① Final drive pinion gear shim
- ② Ring gear shim
- ③ Thrust washer

b. To find final drive pinion gear shim thickness "A", use the following formula:

Final drive pinion gear shim thickness

$$A = (87 + \textcircled{a}/100) - (86 + \textcircled{b}/100)$$





Where:

Ⓐ = a numeral (positive or negative) on the ring gear, to be divided by 100 and added to “87”

Ⓑ = a numeral on the final drive housing, to be divided by 100 and added to “86”

Example:

If the final drive pinion gear is marked “+01” and the final drive housing is marked “50”:

$$\begin{aligned} A &= (87 + 1/100) - (86 + 50/100) \\ &= (87 + 0.01) - (86 + 0.05) \\ &= 87.01 - 86.50 \\ &= 0.51 \end{aligned}$$

Therefore, the calculated final drive pinion gear shim thickness is 0.51 mm.

Shim sizes are supplied in the following thicknesses.



Final drive pinion gear shims

Thickness (mm)

0.30, 0.40 0.50

Since the final drive pinion gear shims are only available in 0.10-mm increments, round off to the hundredths digit.

Hundredths	Rounded value
0, 1, 2, 3, 4	0
5, 6, 7, 8, 9	10

In the example above, the calculated final drive pinion gear shim thickness is 0.51 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50-mm final drive pinion gear shim.

c. To find ring gear shim thickness “B”, use the following formula:

Ring gear shim thickness

$$B = (45 + \text{Ⓒ}/100) + (3 + \text{Ⓓ}/100) - [(35.40 + \text{Ⓔ}/100) + \text{Ⓕ}]$$

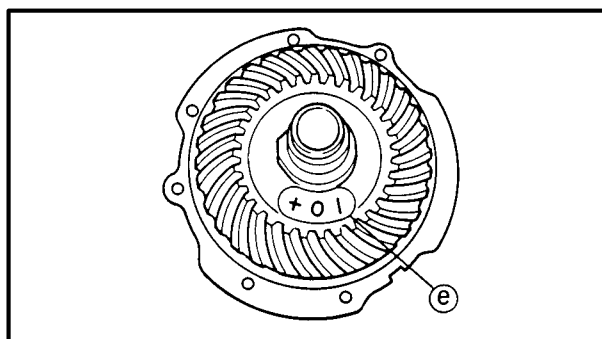
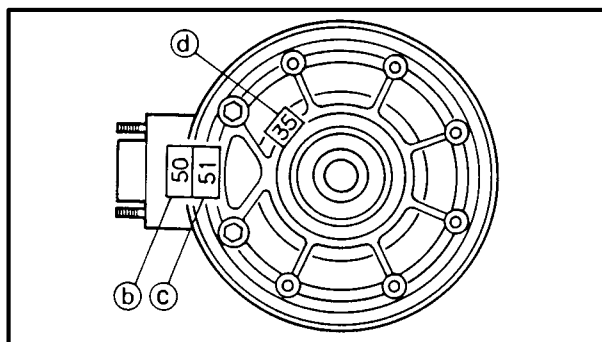
Where:

Ⓒ = a numeral on the final drive housing, to be divided by 100 and added to 45

Ⓓ = a numeral usually on the outside of the ring gear bearing housing, to be divided by 100 and added to 3

Ⓔ = a numeral (positive or negative) on the inside of the ring gear, to be divided by 100 and added to “35.40”.

Ⓕ = the ring gear bearing thickness constant





Ring gear bearing thickness “f”
13 mm (0.51 in)

Example:

If the final drive housing is marked “51” the ring gear bearing housing is marked “35”, the ring gear is marked “-05”, and “f” is 13.00:

$$\begin{aligned}
 B &= (45 + 51/100) + (3 + 35/100) - [35.40 - 5/100) + 13] \\
 &= (45 + 0.51) + (3 + 0.35) - [(35.40 - 0.05) + 13] \\
 &= 45.51 + 3.35 - [(35.40 - 0.05) + 13] \\
 &= 48.86 - [35.35 + 13] \\
 &= 48.86 - 48.35 \\
 &= 0.51
 \end{aligned}$$

Therefore, the calculated ring gear shim thickness is 0.51 mm.

Shim sizes are supplied in the following thicknesses.



Ring gear shims

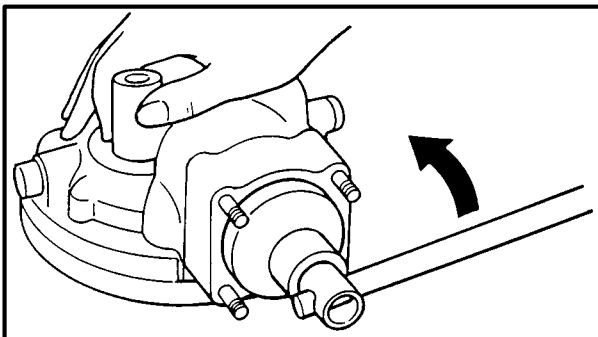
Thickness (mm)

0.30, 0.40, 0.50

Since the ring gear shims are only available in 0.10-mm increments, round off the hundredths digit.

Hundredths	Rounded value
0, 1, 2, 3, 4	0
5, 6, 7, 8, 9	10

In the example above, the calculated ring gear shim thickness is 0.51-mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50-mm ring gear shim.



2. Install:

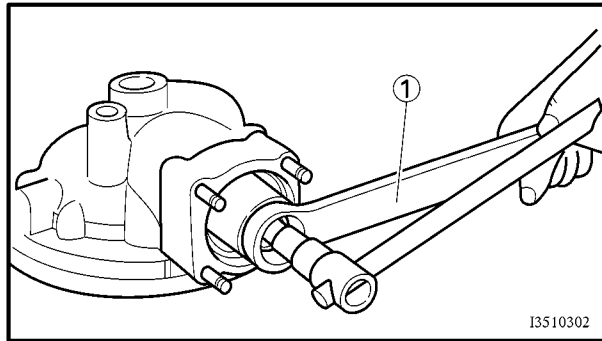
- shims (as calculated)
- final drive pinion gear
- bearing retainer **110 Nm (11.0 m•kg, 80 ft•lb)**
(with the bearing retainer wrench)

CAUTION:

The bearing retainer has left-hand threads. To tighten the bearing retainer, turn it counterclockwise.



Bearing retainer wrench
YM-04050, 90890-04050



3. Install:
- gear coupling
 - self-locking nut  **110 Nm (11.0 m•kg, 80 ft•lb)**
(with the special tool ①)



Coupling gear/middle shaft tool
YM-01229, 90890-01229

CAUTION:

Apply LOCTITE® to the self-locking nut.

4. Install:
 - ring gear bearing housing
(along with the ring gear, but without the thrust washer)
5. Adjust:
 - ring gear backlash
Refer to “MEASURING THE RING GEAR BACKLASH” and “ADJUSTING THE RING GEAR BACKLASH”.
6. Measure:
 - ring-gear-to-thrust-washer clearance

- Remove the ring gear bearing housing (along with the ring gear).
- Place four pieces of Plastigauge® between the original thrust washer and the ring gear.
- Install the ring gear bearing housing and tighten the bolts and nuts to specification.



Ring gear housing bolt
40 Nm (4.0 m•kg, 29 ft•lb)
Ring gear bearing housing nut
23 Nm (2.3 m•kg, 17 ft•lb)

NOTE:

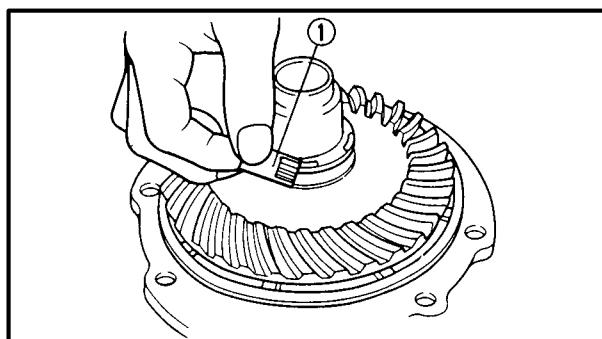
Do not turn the final drive pinion gear and ring gear while measuring the ring-gear-to-thrust-washer clearance with Plastigauge®.

- d. Remove the ring gear bearing housing.
- e. Measure the width of the flattened Plastigage[®] ①.



Ring-gear-to-thrust-washer clearance
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

- f. If the ring-gear-to-thrust-washer clearance is within specification, install the ring gear bearing housing (along with the ring gear).



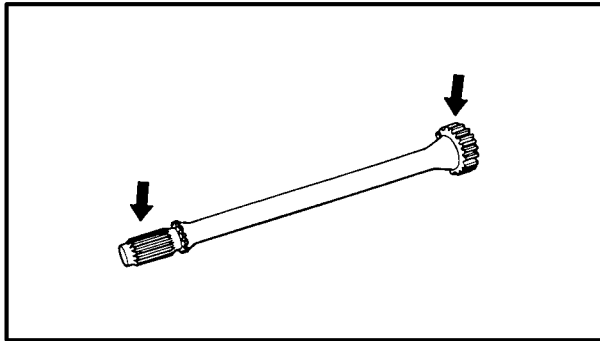


- g. If the ring-gear-to-thrust-washer clearance is out of specification, select the correct thrust washer as follows.
- h. Select the suitable thrust washer from the following chart.

	Thrust washers	
Thickness (mm)	1.2, 1.4, 1.6, 1.8, 20	

- Repeat the measurement steps until the ring-gear-to-thrust-washer clearance is within the specified limits.

	Ring-gear-to-thrust-washer clearance 0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
---	--



EAS00727

CHECKING THE DRIVE SHAFT

1. Check:
 - drive shaft splines
Damage/wear → Replace the drive shaft.

EAS00728

INSTALLING THE DRIVE SHAFT

1. Lubricate:
 - drive shaft splines

	Recommended lubricant Molybdenum disulfide grease
---	--

2. Apply:
 - sealant
(onto both final drive housing mating surfaces)

 **Quickgasket®**
ACC-11001-15-01
Yamaha bond No.1215
90890-85505

3. Install:
- drive shaft
(to the final drive pinion gear)



4. Install:
 - drive shaft

NOTE: _____

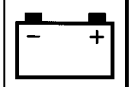
Align the drive shaft splines with the driven yoke to the universal joint.

5. Tighten:
 - final bearing housing nuts

 **42 Nm (4.2 m•kg, 30 ft•lb)**

6. Install:
 - rear wheel

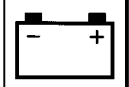
Refer to “REAR WHEEL AND BRAKE DISC”.



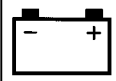
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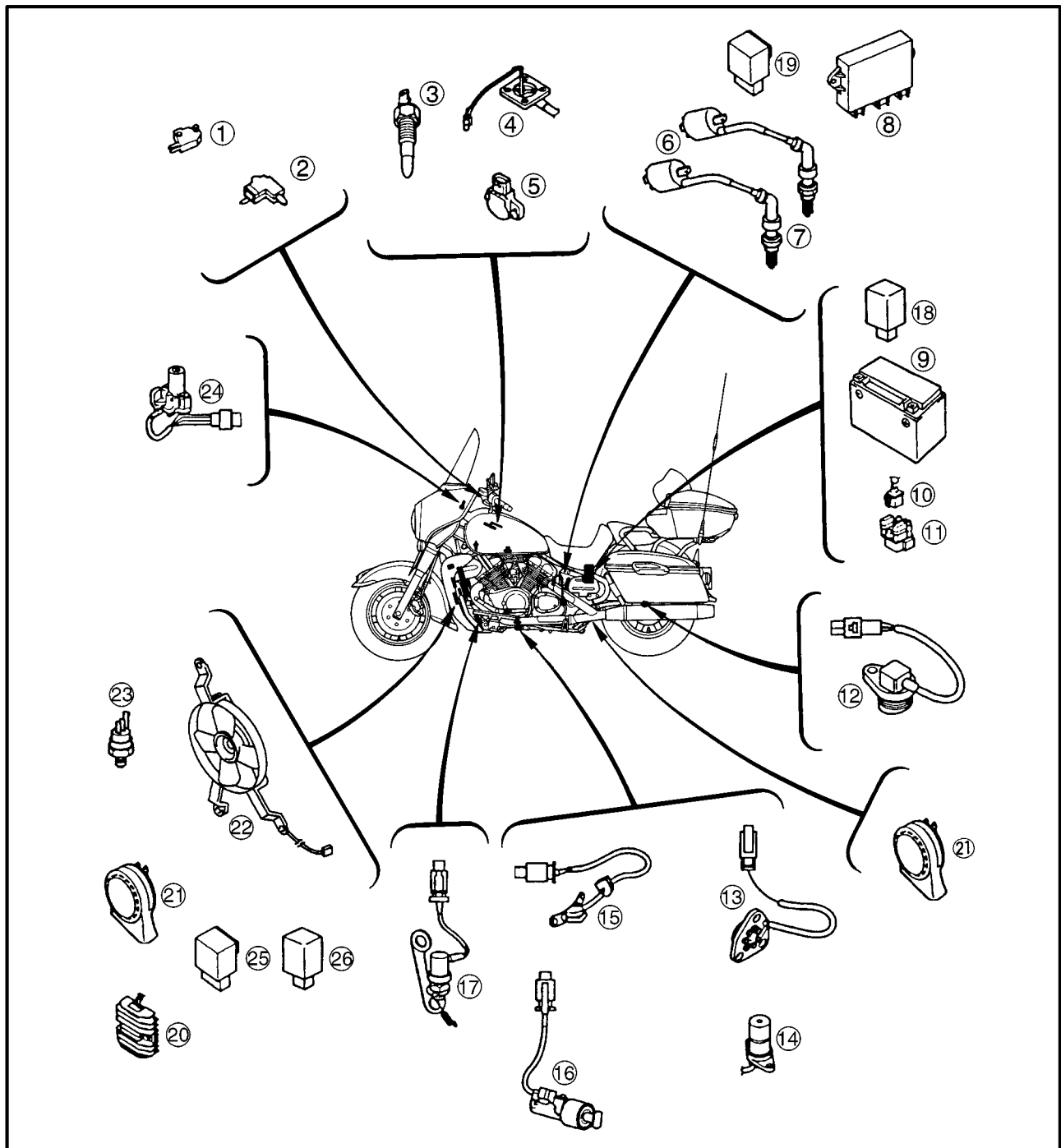


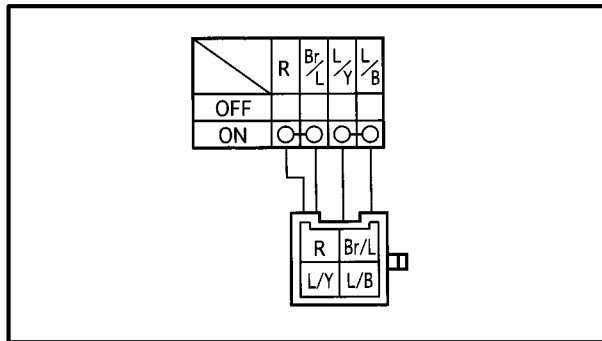
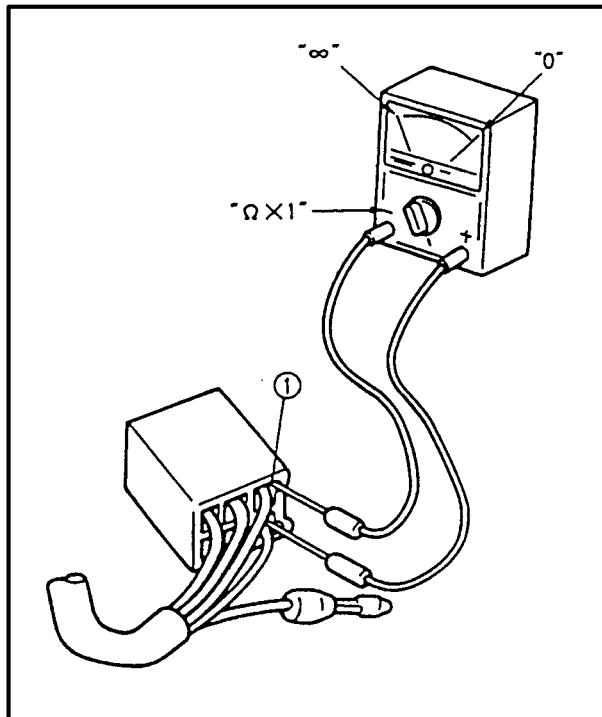
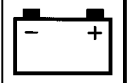
EAS00729

ELECTRICAL

ELECTRICAL COMPONENTS

- | | | |
|----------------------------------|--------------------|----------------------------------|
| ① Front brake switch | ⑨ Battery | ⑬ Rear brake switch |
| ② Clutch switch | ⑩ Fuse (main) | ⑭ Flasher relay |
| ③ Thermo unit | ⑪ Starter relay | ⑮ Starting circuit cut-off relay |
| ④ Fuel sender | ⑫ Speed sensor | ⑯ Rectifier/regulator |
| ⑤ TPS (throttle position sensor) | ⑬ Neutral switch | ⑰ Horn ~ 2 |
| ⑥ Ignition coil | ⑭ Oil level switch | ⑱ Fan motor |
| ⑦ Spark plug | ⑮ Pickup coil | ⑲ Thermo switch |
| ⑧ Ignitor unit | ⑯ Sidestand switch | ⑳ Main switch |
| | | ㉑ Brake light relay (blue) |
| | | ㉒ Cruise control relay (white) |





EAS00730

SWITCHES

CHECKING SWITCH CONTINUITY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

CAUTION:

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



Pocket tester
90890-03112

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \sim 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.

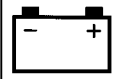
The switch positions ① are shown in the far left column and the switch lead colors ② are shown in the top row in the switch illustration.

NOTE:

"○—○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:

There is continuity, between brown/blue and red, and between blue/yellow and blue/black when the switch is set to "ON".



EAS00731

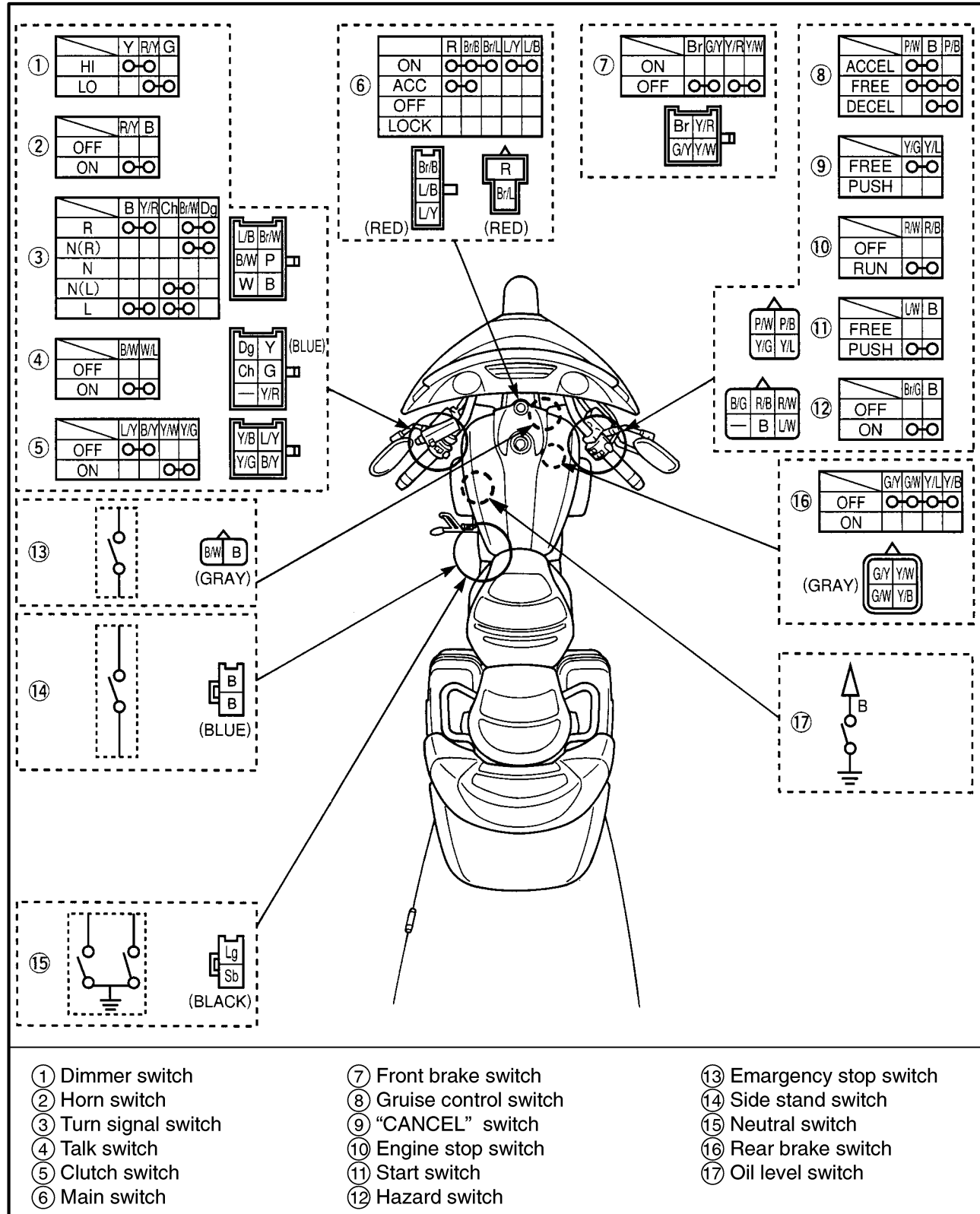
SWITCH CONTINUITY INSPECTION

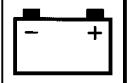
Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to "CHECKING SWITCH CONTINUITY".

Damage/wear → Repair or replace the switch.

Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.





EAS00732

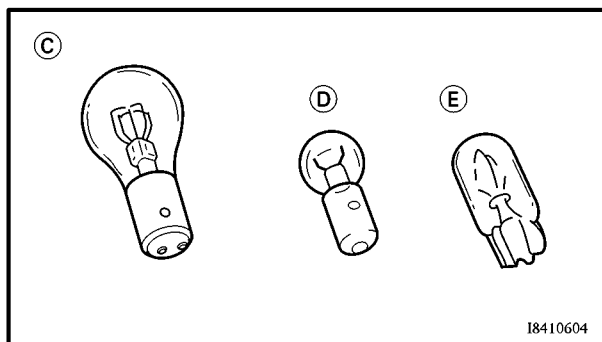
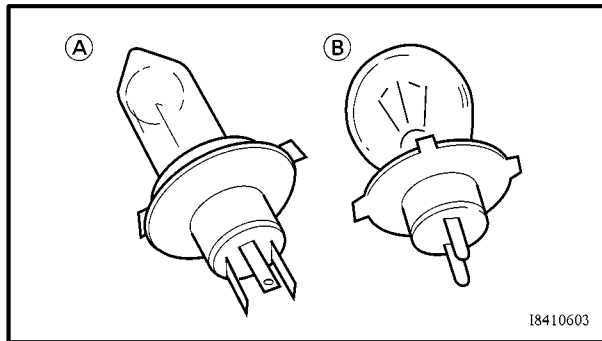
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

Improperly connected → Properly connect.

Incorrect continuity reading → Repair or replace the bulb, bulb socket or both.



TYPES OF BULBS

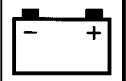
The bulbs used on this motorcycle are shown in the illustration on the left.

- Bulbs ① and ② are used for headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb ③ is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs ④ and ⑤ are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:
 - bulb



CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:

- bulb socket (for continuity)
(with the pocket tester)
No continuity → Replace.

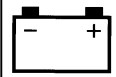


Pocket tester
90890-03112

NOTE: _____

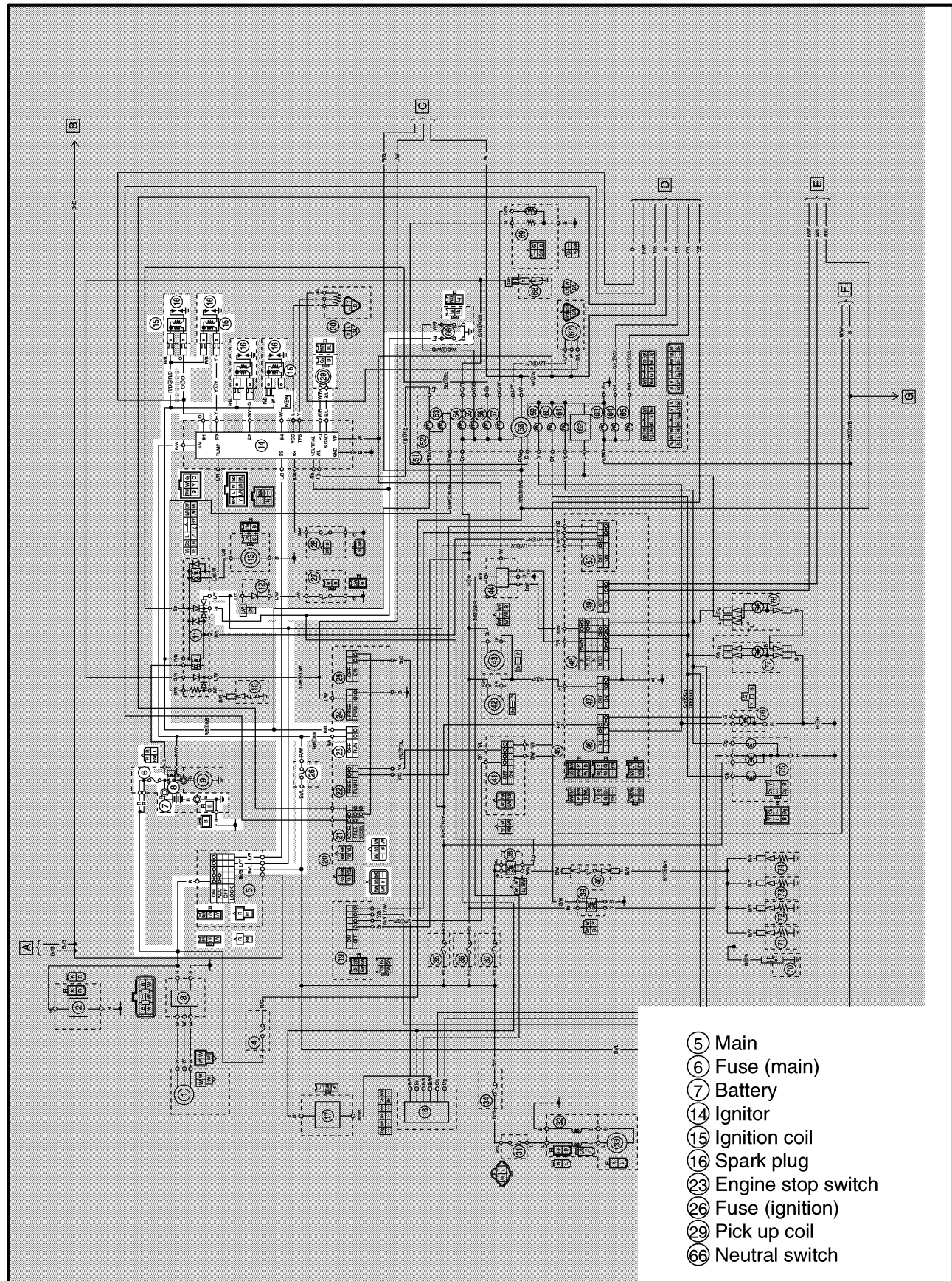
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity.
If any of the readings indicate no continuity,
replace the bulb socket.



DAS00734

IGNITION SYSTEM CIRCUIT DIAGRAM





EAS00737

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:

1. Main and ignition fuses
2. Battery
3. Spark plugs
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Pickup coil resistance
8. Main switch
9. Engine stop switch
10. Neutral switch
11. Starting circuit cut-off relay (diode)
12. Wiring connections
(of the entire ignition system)

NOTE:

Before troubleshooting, remove the following part(-s):

- 1) Rider and passenger seats
 - 2) Side cover (left and right)
 - 3) Front cowling
- Troubleshoot with the following special tool(-s).



Dynamic spark tester

YM-34487

Ignition checker

90890-60754

Pocket tester

YU-03112, 90890-03112

EAS00738

1. Main and ignition fuses

- Check the main and ignition fuses for continuity.
Refer to “CHECKING THE FUSES” in CHAPTER 3.
- Are the main and ignition fuses OK?



YES



NO

Replace the fuse(-s).

EAS00739

2. Battery

- Check the condition of the battery.
Refer to “CHECKING THE BATTERY” in CHAPTER 3.



Open-circuit voltage

12.8 V or more at 20°C (68°C)

- Is the battery OK?



YES



NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00741

3. Spark plugs

- The following procedure applies to all of the spark plugs.
- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
Refer to “CHECKING THE SPARK PLUGS” in CHAPTER 3.



Standard spark plug

DPR8EA-9 (NGK)

X24EPR-U9 (NIPPONDENSO)

Spark plug gap

0.8 ~ 0.9 mm (0.031 ~ 0.035 in)

- Is the spark plug in good condition, it is of the correct type, and its gap within specification?

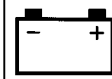


YES



NO

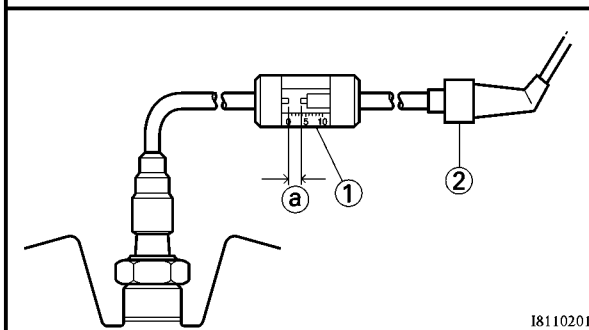
Re-gap or replace the spark plug.



EAS00743

4. Ignition spark gap

- The following procedure applies to all of the spark plugs.
- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker/dynamic spark tester ① as shown.
- ② Spark plug cap
- Set the main switch to "ON".
- Measure the ignition spark gap ③.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.



I8110201



Minimum ignition spark gap
0.8 mm (0.031 in)

- Is there a spark and is the spark gap within specification?

YES

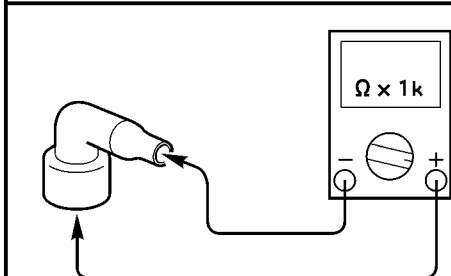
NO

The ignition system is OK.

EAS00745

5. Spark plug cap resistance

- The following procedure applies to all of the spark plug caps.
- Remove the spark plug cap.
- Connect the pocket tester ($\Omega \sim 1k$ range) to the spark plug cap as shown.
- Measure the spark plug cap resistance.



I8040101



Spark plug cap resistance
10 k Ω at 20°C (68°F)

- Is the spark plug cap OK?

YES

NO

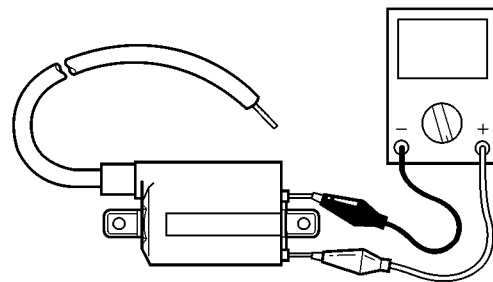
Replace the spark plug cap.

EAS00747

6. Ignition coil resistance

- The following procedure applies to all of the ignition coils.
- Disconnect the ignition coil leads from the wire harness.
- Connect the pocket tester ($\Omega \sim 1$) to the ignition coil as shown.

Tester positive probe → red/black
Tester negative probe → orange (gray)



I8110104

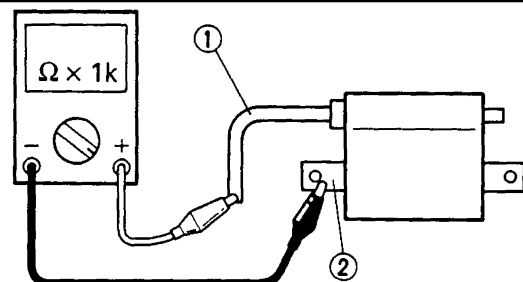
- Measure the primary coil resistance.



Primary coil resistance
3.57 ~ 4.83 Ω at 20°C (68°F)

- Connect the pocket tester ($\Omega \sim 1k$) to the ignition coil as shown.
- Measure the secondary coil for the specified resistance.

Tester positive probe → spark plug lead ①
Tester negative probe → ignition oil base ②



373-017



Secondary coil resistance
10.71 ~ 14.49 kΩ at 20°C (68°F)

• Is the ignition coil OK?



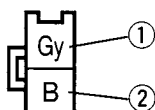
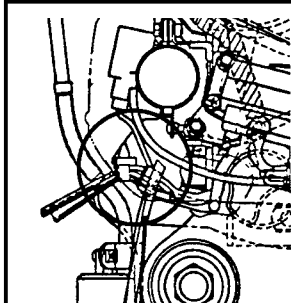
Replace the ignition coil.

EAS00748

7. Pickup coil resistance

- Disconnect the pickup coil coupler from the wire harness.
- Connect the pocket tester ($\Omega \sim 100$) to the pickup coil terminal as shown.

Tester positive probe – green/yellow ①
Tester negative probe – black ②



- Measure the pickup coil resistance.

Pickup coil resistance
189 ~ 231 Ω at 20°C (68°F)
(between gray and black)

- Is the pickup coil OK?



Replace the pickup coil.

EAS00749

8. Main switch

- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?



Replace the main switch.

EAS00750

9. Engine stop switch

- Check the engine stop switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the engine stop switch OK?



Replace the right handlebar switch.

EAS00751

10. Neutral switch

- Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the neutral switch OK?



Replace the neutral switch.

EAS00753

12. Starting circuit cut-off relay (diode)

- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \sim 1$) to the starting circuit cut-off relay coupler as shown.
- Check the starting circuit cut-off relay for continuity.

Tester positive probe → blue/yellow①	No continuity
Tester positive probe → light green②	

Tester positive probe → light green①	Continuity
Tester positive probe → blue/yellow②	

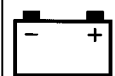
NOTE:

When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

- Are the tester readings correct?



Replace the starting circuit cut-off relay.



EAS00754

13. Wiring

- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?



NO



YES

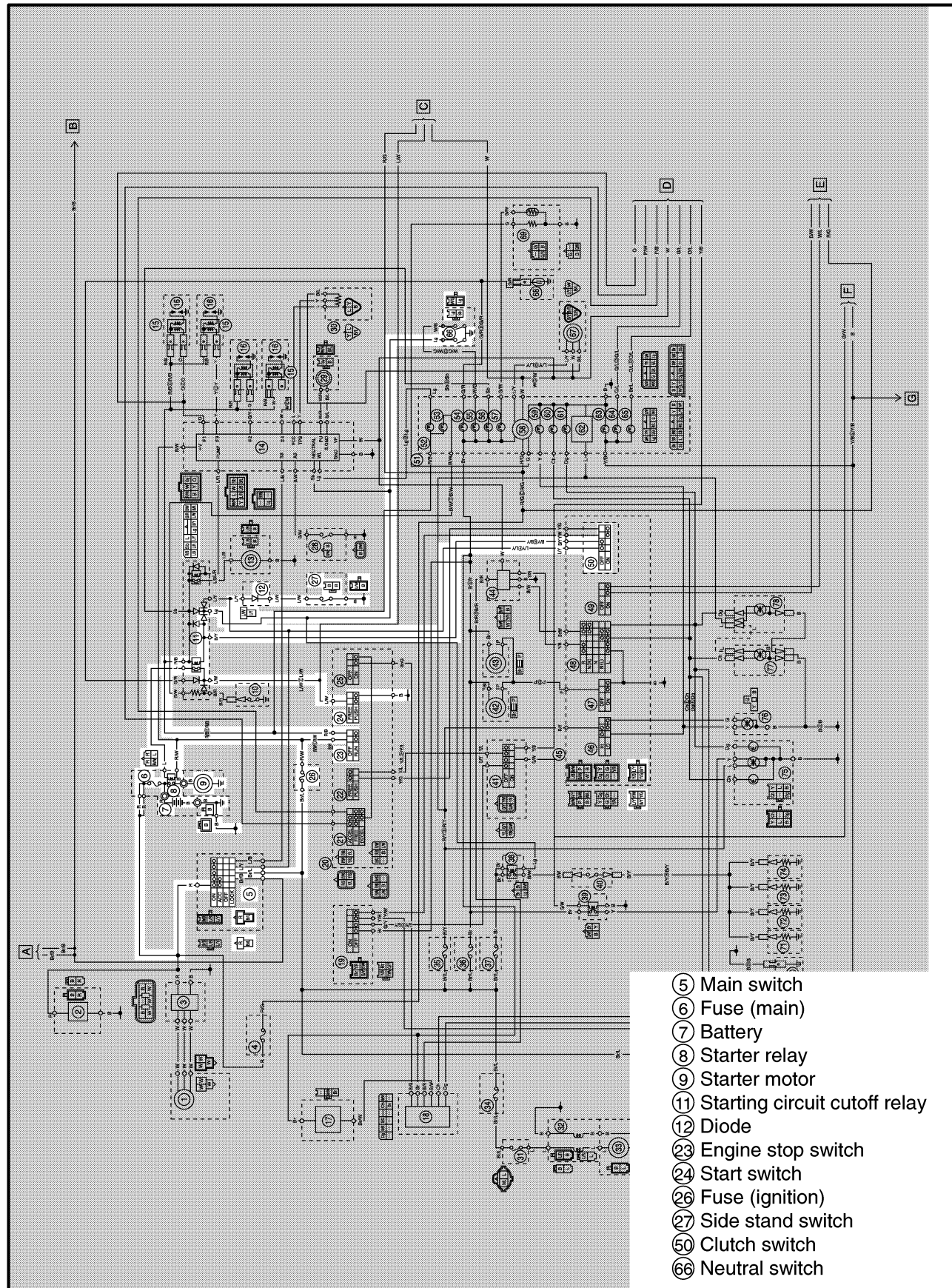
Properly connect or repair the ignition system's wiring.

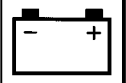
Replace the ignitor unit.



EAS00755

ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM





EAS00756

STARTING CIRCUIT CUTOFF SYSTEM OPERATION

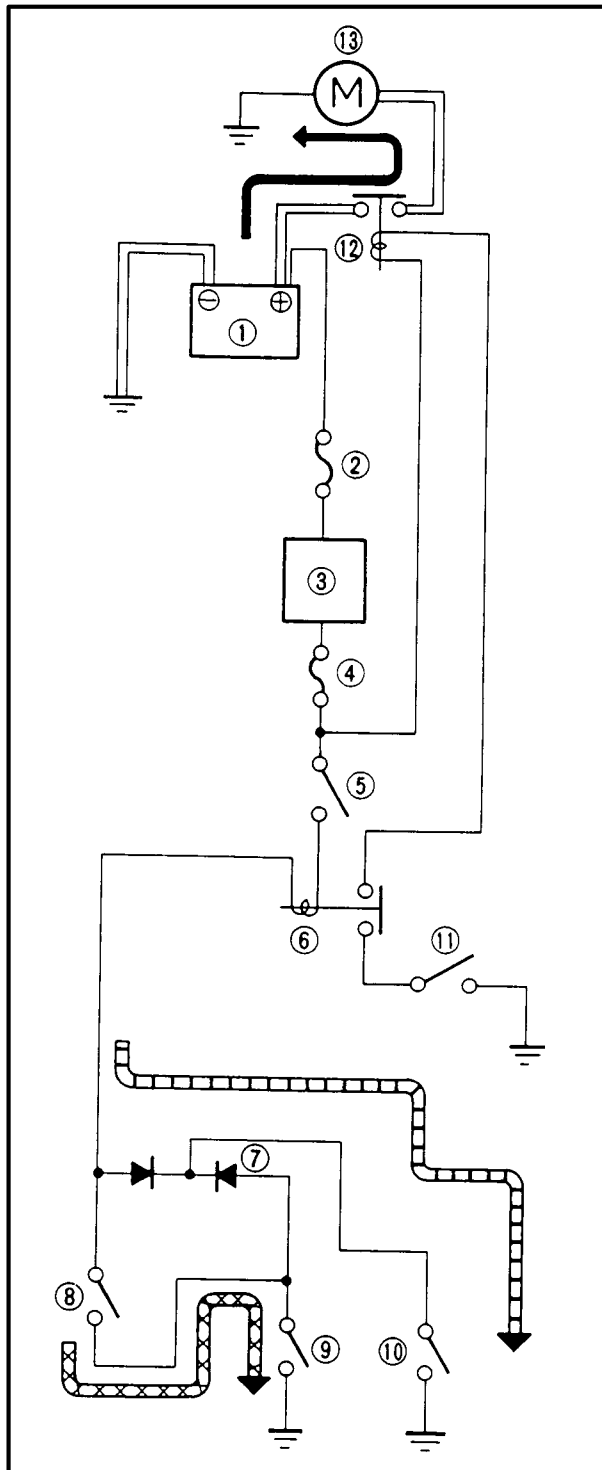
If the engine stop switch is set to “○” and the main switch is set to “ON” (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

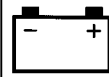
The neutral relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the neutral relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the neutral relay is closed and the engine can be started by pressing the start switch.

← WHEN THE TRANSMISSION IS IN NEUTRAL

← WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR



- ① Battery
- ② Fuse (main)
- ③ Main switch
- ④ Fuse (ignition)
- ⑤ Engine stop switch
- ⑥ Starting circuit cut-off relay
- ⑦ Diode
- ⑧ Clutch switch
- ⑨ Sidestand switch
- ⑩ Neutral switch
- ⑪ Start switch
- ⑫ Starter relay
- ⑬ Starter motor



EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:

1. Main and ignition fuses
2. Battery
3. Starter motor
4. Starting circuit cut-off relay
5. Starter relay
6. Main switch
7. Engine stop switch
8. Neutral switch
9. Sidestand switch
10. Clutch switch
11. Start switch
12. Wiring connections
(of the entire starting system)

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) Rider and passenger seats
 - 2) Fuel tank
 - 3) Front cowlings
- Troubleshoot with the following special tool(-s).



Pocket tester
YU-03112, 90890-03112

EAS00738

1. Main and ignition fuses

- Check the main and ignition fuses for continuity.
Refer to “CHECKING THE FUSES” in CHAPTER 3.
- Are the main and ignition fuses OK?

YES

NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery.
Refer to “CHECKING THE BATTERY” in CHAPTER 3.



Open-circuit voltage
12.8 V or more at 20°C (68°C)

- Is the battery OK?

YES

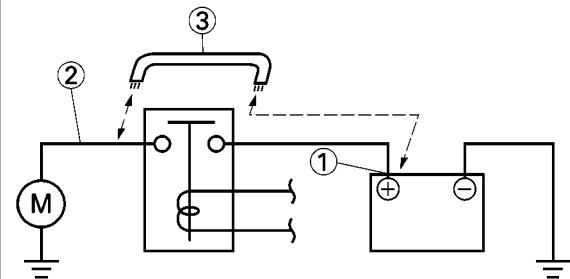
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00758

3. Starter motor

- Connect the battery positive terminal ① and starter motor lead ② with a jumper lead ③.



⚠ WARNING

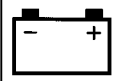
- A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure that no flammable gas or fluid is in the vicinity.

- Does the starter motor turn?

YES

NO

Repair or replace the starter motor.



EAS00759

4. Starting circuit cut-off relay

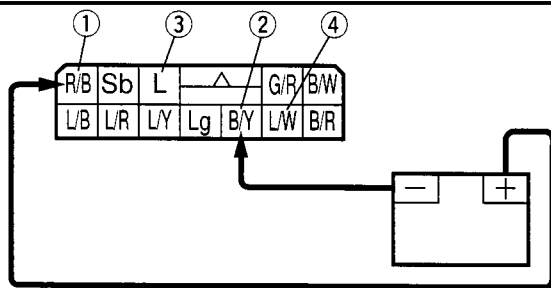
- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \sim 1$) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Battery positive terminal → red/black ①

Battery negative terminal → black/yellow ②

Tester positive probe → blue ③

Tester negative probe → blue/white ④



- Does the starting circuit cut-off relay have continuity between blue and blue/white?

YES

NO

Replace the starting circuit cut-off relay.

EAS00761

5. Starter relay

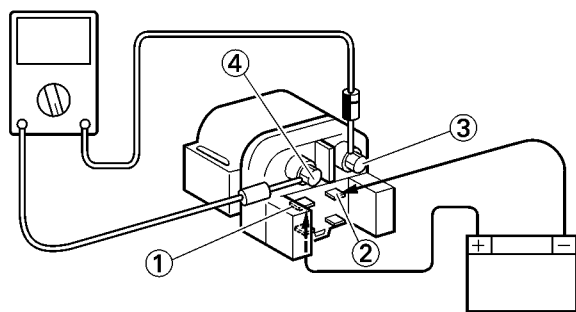
- Disconnect the starter relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \sim 1$) and battery (12 V) to the starter relay coupler as shown.

Battery positive terminal → blue ①

Battery negative terminal → red/white ②

Tester positive probe → red ③

Tester negative probe → black ④



18211002

- Does the starter relay have continuity between red and black?

YES

NO

Replace the starter relay.

EAS00749

6. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the main switch OK?

YES

NO

Replace the main switch.

EAS00750

7. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the engine stop switch OK?

YES

NO

Replace the right handlebar switch.

EAS00751

8. Neutral switch

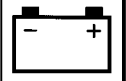
- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the neutral switch OK?

YES

NO

Replace the neutral switch.



EAS00752

9. Sidestand switch
• Check the sidestand switch for continuity. Refer to "CHECKING THE SWITCHES".
• Is the sidestand switch OK?



Replace the side-stand switch.

EAS00763

10. Clutch switch
• Check the clutch switch for continuity. Refer to "CHECKING THE SWITCHES".
• Is the clutch switch OK?



Replace the clutch switch.

EAS00764

11. Start switch
• Check the start switch for continuity. Refer to "CHECKING THE SWITCHES".
• Is the start switch OK?



Replace the right handlebar switch.

EAS00766

12. Wiring
• Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM".
• Is the starting system's wiring properly connected and without defects?

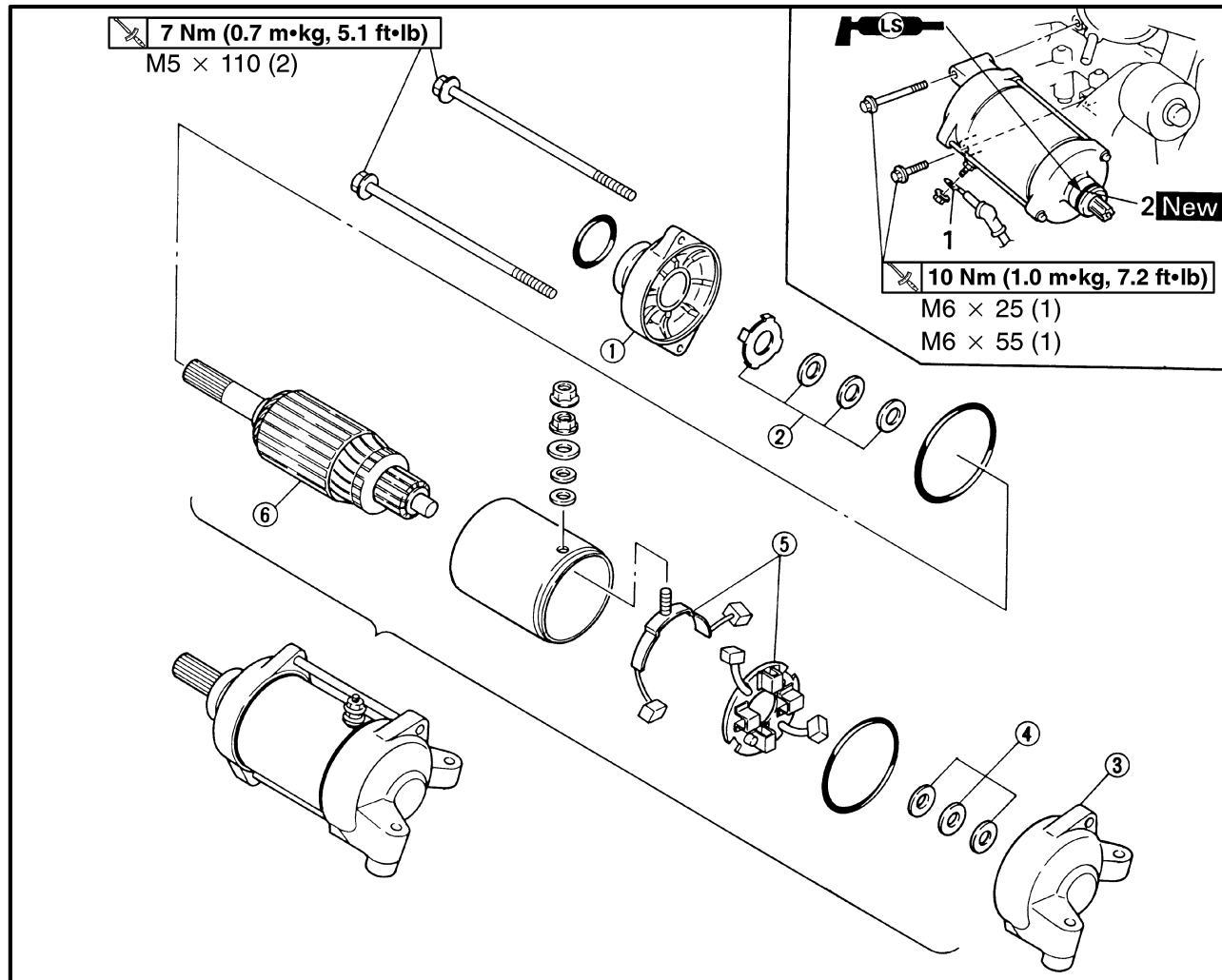


The starting system circuit is OK?

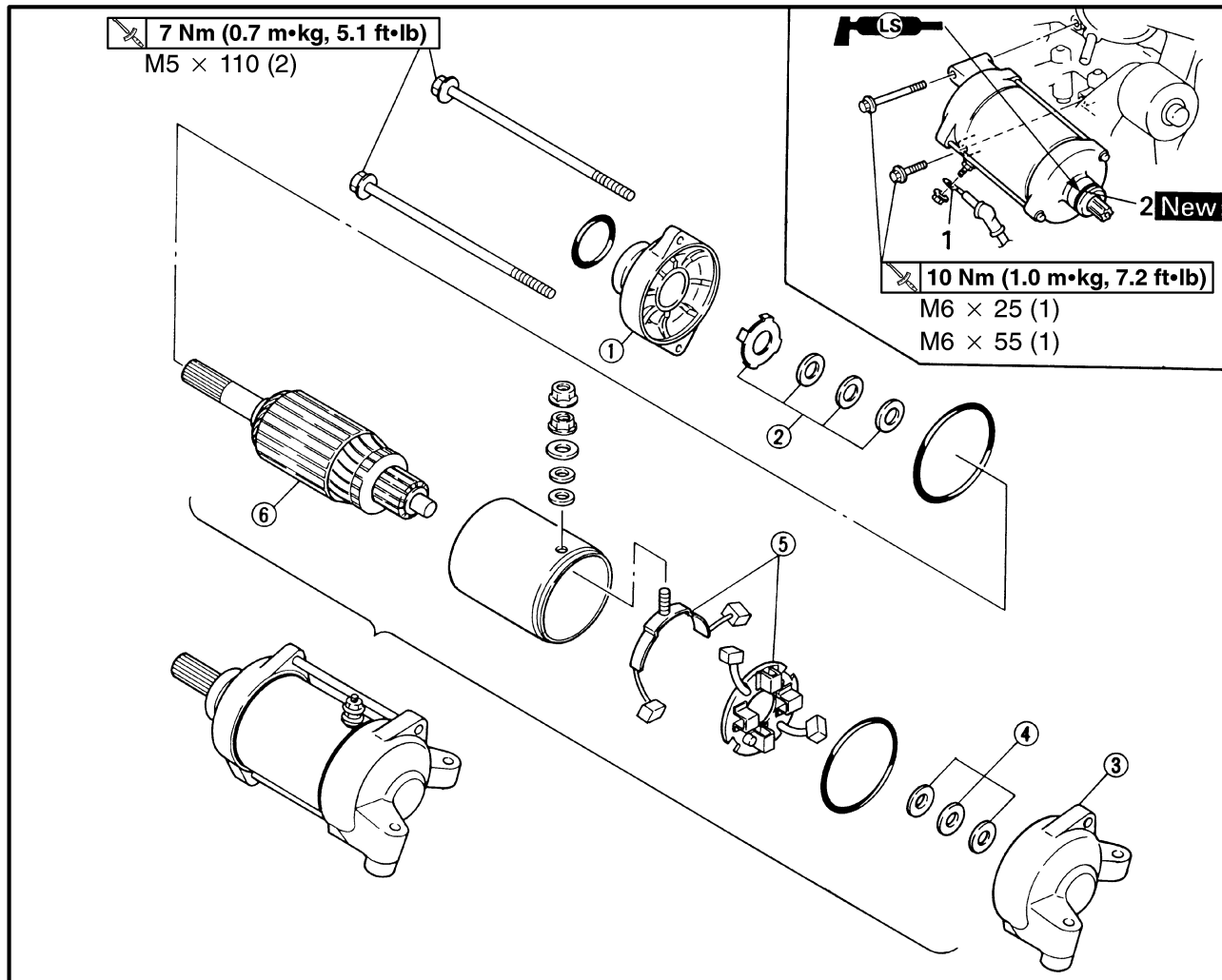
Properly connect or repair the starting system's wiring.



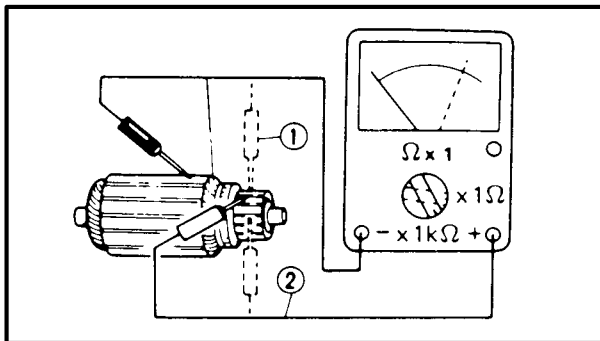
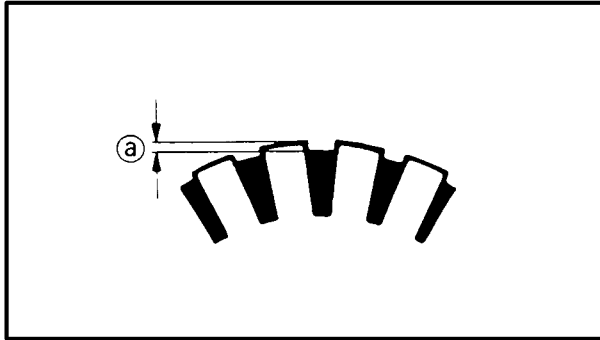
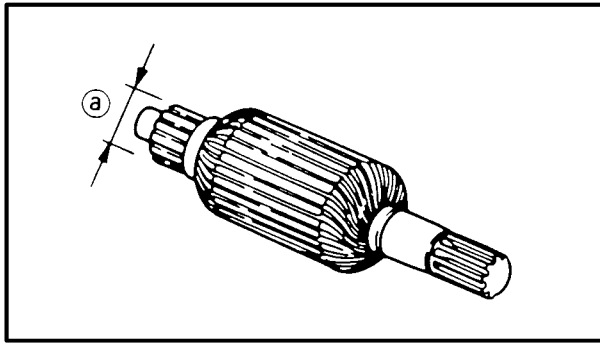
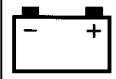
STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter motor Exhaust pipe assembly		Remove the parts in the order listed. Refer to "REMOVING THE ENGINE" in CHAPTER 4.
1	Starter motor lead	1	
2	Starter motor/O-ring	1/1	For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the starter motor		Disassemble the parts in the order listed.
①	Front bracket	1	Refer to "ASSEMBLING THE STARTER MOTOR".
②	Washer kit	1	
③	Rear bracket	2	
④	Washer kit	1	
⑤	Brush seat/Brush #1	1/1	
			NOTE: _____ Be sure to remove the installation nut on brush #1 first.
⑥	Armature coil	1	For assembly reverse the disassembly procedure.



EAS00770

CHECKING THE STARTER MOTOR

1. Check:
 - commutator
Dirt → Clean with 600 grit sandpaper.
2. Measure:
 - commutator diameter (a)
Out of specification → Replace the starter motor.



Commutator wear limit
27 mm (1.06 in)

- ### 3. Measure:
- mica (insulation) undercut (a)
Out of specification → Scrape the mica (insulation) to the proper measurement with a hacksaw blade which has been grounded to fit the commutator.



**Mica (insulation) undercut
0.7 mm (0.03 in)**

NOTE:

The mica (insulation) of the commutator must be undercut to ensure proper operation of the commutator.

4. Measure:
- armature coil resistances (continuity and insulation)
- Out of specification → Replace the starter motor.

- a. Check the continuity resistance ① and mica (insulation) resistances ② with a pocket tester.



Pocket tester
YU-03112, 90890-03112

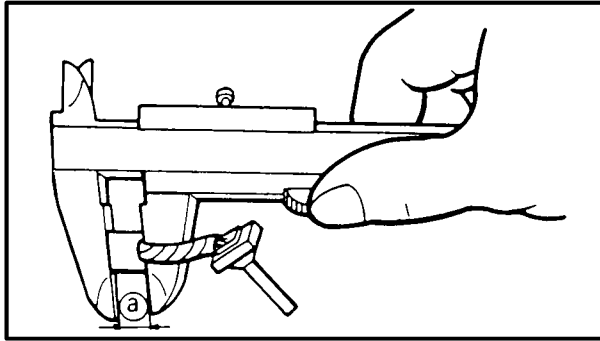
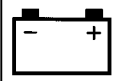
- b. Measure the armature coil resistances.



Armature coil continuity resistance
0.015 ~ 0.025 W at 20°C (68°F)

Armature coil insulation resistance
Above 1MΩ at 20°C (68°F)

- c. If any resistance is out of specification, replace the starter motor.



5. Measure:

- brush length ①

Out of specification → Replace the brushes as a set.



Brush length wear limit
5 mm (0.20 in)

6. Measure:

- brush spring force

Fatigue/out of specification → Replace the brush springs as a set.



Brush spring force
570 ~ 920 N (20.1 ~ 32.5 gf)

7. Check:

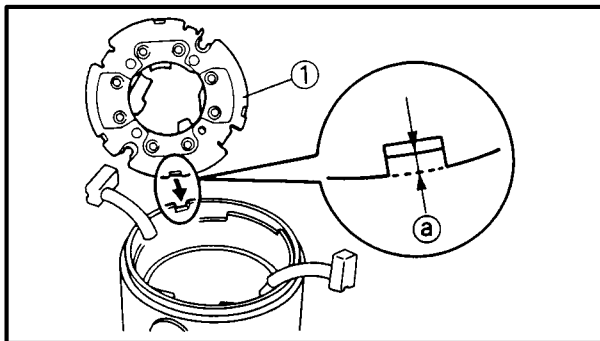
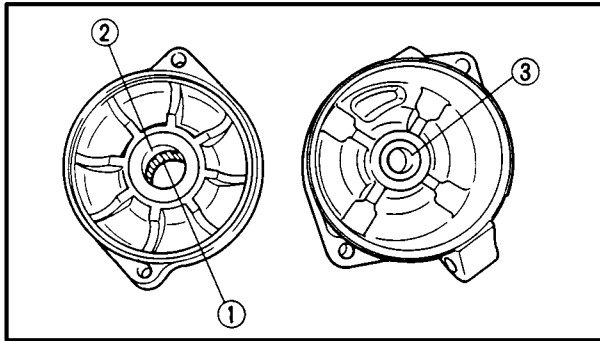
- gear teeth

Damage/wear → Replace the gear.

8. Check:

- bearing ①
- oil seal ②
- bushing ③

Damage/wear → Replace the defective part(-s).



EAS00772

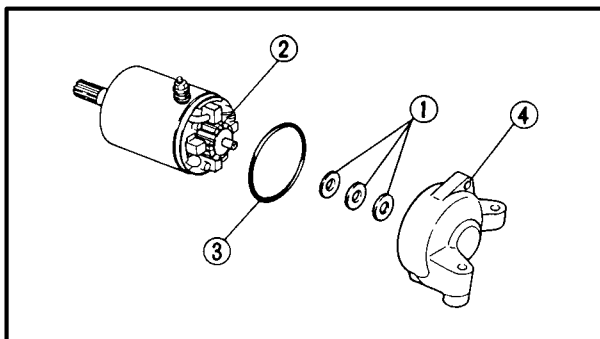
ASSEMBLING THE STARTER MOTOR

1. Install:

- brush seat ①

NOTE:

Align the tab ① on the brush seat with the slot ② in the rear cover.

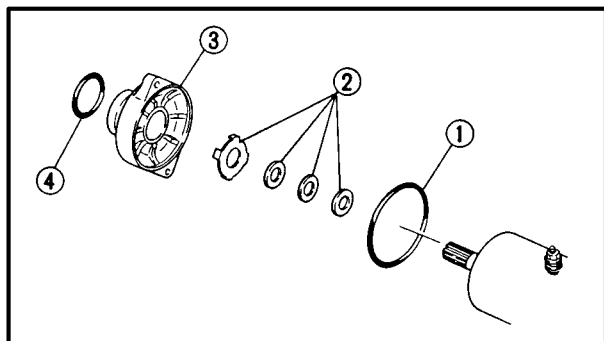


2. Install:

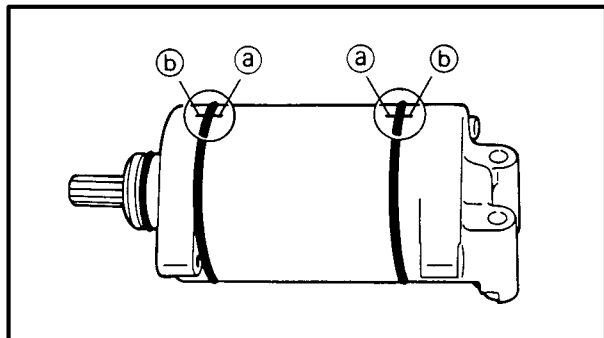
- washers ①
- armature coil ②
- o-ring ③
- rear bracket ④

NOTE:

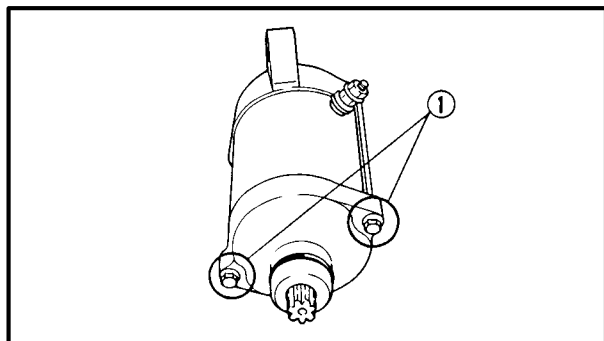
To prevent damaging the brushes during installation push down on the brush springs.



3. Install:
- o-ring ① **New**
 - washers ②
 - front bracket ③
 - o-ring ④ **New**

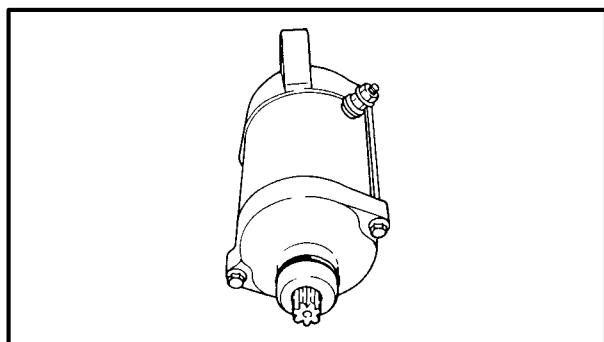


NOTE: _____
Align the match marks (a) on the yoke with the match marks (b) on the brackets.



4. Install:
- bolts ①

7 Nm (0.7 m•kg, 5.1 ft•lb)

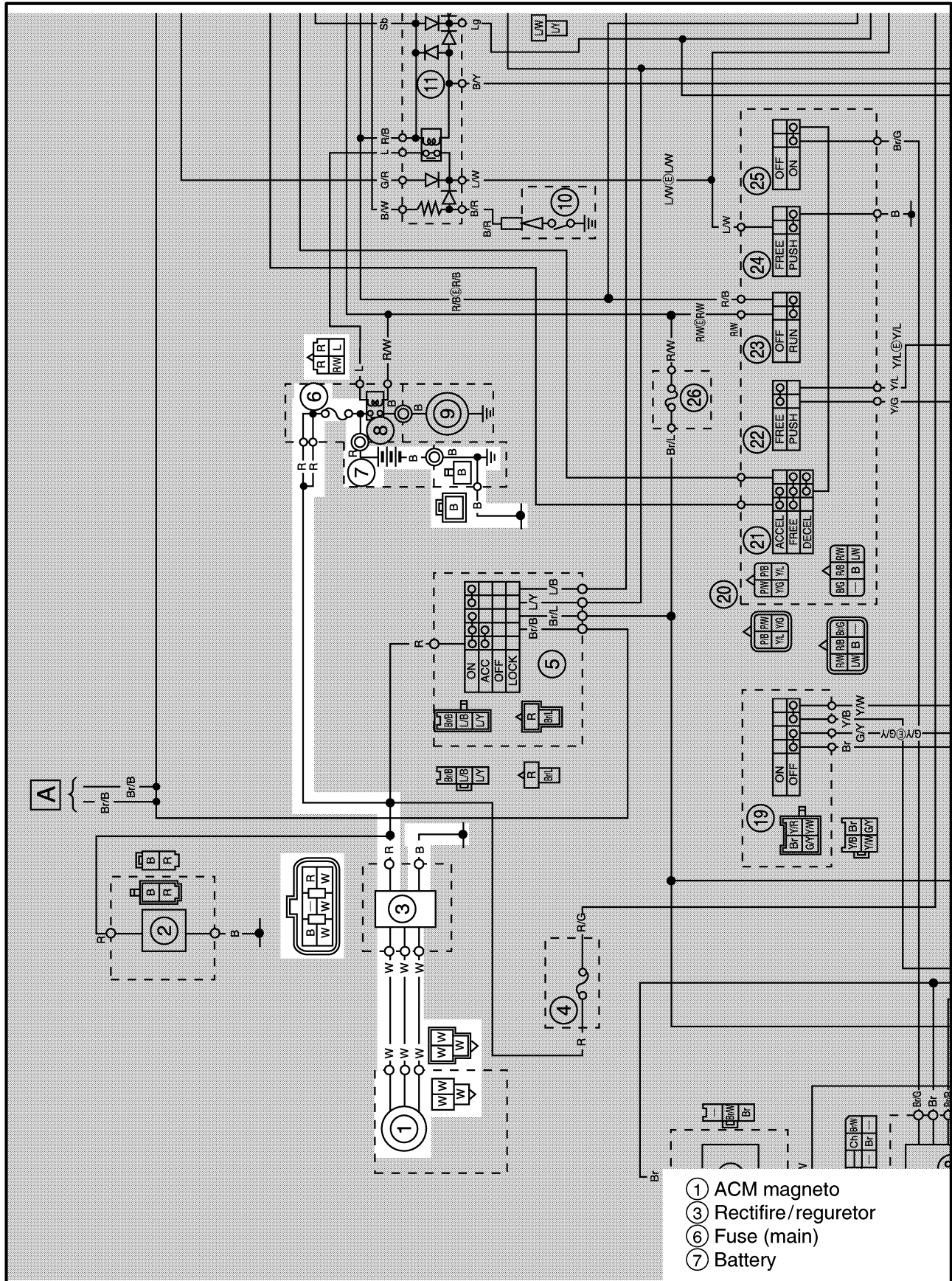


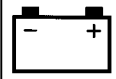
INSTALLATION

1. Install:
- starter motor 10 Nm (1.0 m•kg, 7.2 ft•lb)
- Refer to “AC MAGNETO AND STARTER CLUTCH” in CHAPTER 4.

YP804000

CHARGING SYSTEM CIRCUIT DIAGRAM





EAS00774

TROUBLESHOOTING

The battery is not being charged.

Check:

1. Main fuse
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connections
(of the entire charging system)

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) Rider and passenger seats
 - 2) Side cover (left)
- Troubleshoot with the following special tool(-s).

**Engine tachometer****YU-08036-A, 90890-03113****Pocket tester****YU-03112, 90890-03112**

EAS00738

1. Main fuses

- Check the fuses for continuity.
Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the fuses OK?



YES



NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery.
Refer to "CHECKING THE BATTERY" in CHAPTER 3.

**Open-circuit voltage****12.8 V or more at 20°C (68°C)**

- Is the battery OK?



YES



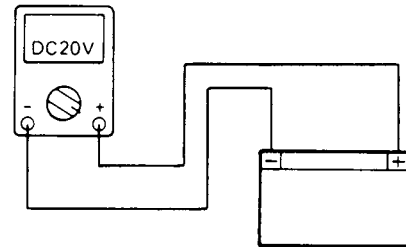
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00775

3. Charging voltage

- Connect the engine tachometer to the spark plug lead of cylinder #1.
- Connect the pocket tester (20 V DC) to the battery as shown.

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

- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.

**Charging voltage****14 V at 5,000 r/min****NOTE:**

Make sure that the battery is fully charged.

- Is the charging voltage within specification?



YES



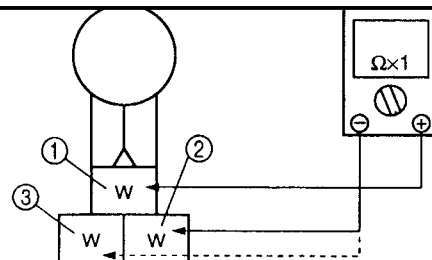
NO

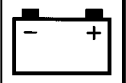
The charging circuit is OK.

EAS00776

4. Stator coil resistance

- Remove the generator cover.
- Connect the pocket tester ($\Omega \sim 1$) to the stator coils as shown.

Tester positive probe → white ①**Tester negative probe → white ②****Tester positive probe → white ③****Tester negative probe → white ④**



- Measure the stator coil resistances.

**Stator coil resistance****0.279 ~ 0.341 Ω at 20°C (68°F)**

- Is the stator coil OK?



YES



NO

Replace the stator
coil assembly.

EAS00779

5. Wiring

- Check the wiring connections of the entire charging system.
Refer to "CIRCUIT DIAGRAM".
- Is the charging system's wiring properly connected and without defects?



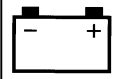
YES



NO

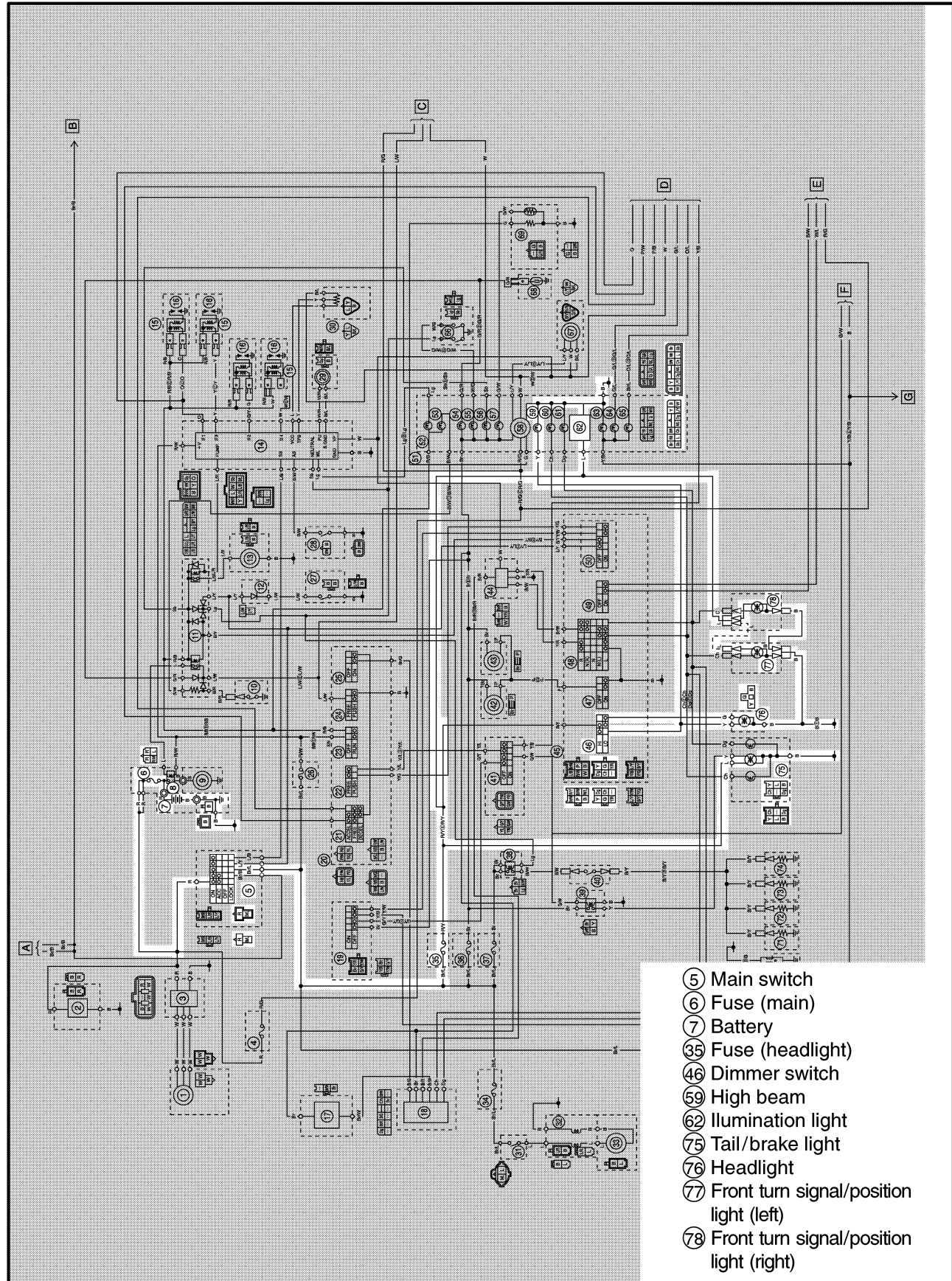
Replace the rectifi-
er/regulator.

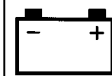
Properly connect or
repair the charging
system's wiring.



EB804000

LIGHTING SYSTEM CIRCUIT DIAGRAM





EAS00782

TROUBLESHOOTING

Any of the following fail to come on: headlight, high beam indicator light, taillight, and meter light.

Check:

1. Main and headlight fuses
2. Battery
3. Main switch
4. Light/dimmer switch
5. Wiring connections
(of the entire charging system)

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) Rider and passenger seats
 - 2) Side cover (left and right)
 - 3) Front cowl
- Troubleshoot with the following special tool(-s).



Pocket tester
YU-03112, 90890-03112

EAS00738

1. Main and headlight fuses

- Check the main and headlight fuses for continuity. Refer to “CHECKING THE FUSES” in CHAPTER 3.
- Are the main and headlight fuses OK?

YES

NO

Replace the fuse (-s).

WAS00739

2. Battery

- Check the condition of the battery. Refer to “CHECKING THE BATTERY” in CHAPTER 3.



Open-circuit voltage
12.8 V or more at 20°C (68°C)

- Is the battery OK?

YES

NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00739

3. Main switch

- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

YES

NO

Replace the main switch.

EAS00785

4. Light/dimmer switch

- Check the light/dimmer switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the light/dimmer switch OK?

YES

NO

The light/dimmer switch is faulty. Replace the left handle-bar switch.

EAS00787

5. Wiring

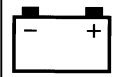
- Check entire lighting system's wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the lighting system's wiring properly connected and without defects?

YES

NO

Check the condition of each of the lighting system's circuits. Refer to “CHECKING THE LIGHTING SYSTEM”.

Properly connect or repair the lighting system's wiring.



EAS00788

CHECKING THE LIGHTING SYSTEM

1. The headlight and the high beam indicator light fail to come on.

1. Headlight bulb and socket

- Check the headlight bulb and socket for continuity.
- Are the headlight bulb and socket OK?

YES

NO

Replace the headlight bulb, socket or both

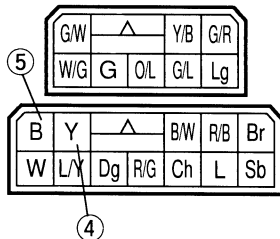
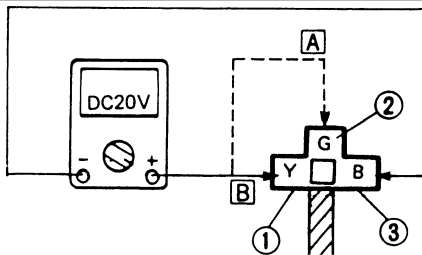
2. Voltage

- Connect the pocket tester (20 V DC) to the headlight and high beam indicator light couplers as shown.

- A** When the dimmer switch is set to "☰".
B When the dimmer switch is set to "☷".

Headlight coupler (headlight side)

- Headlight**
 Tester positive probe → yellow ① or green ②
 Tester negative probe → black ③
High beam indicator light
 Tester positive probe → yellow ④
 Tester negative probe → black ⑤



Meter light coupler (wire harness side)

- Set the main switch to "ON".
- Set the dimmer switch to "☷" or "☰".
- Measure the voltage (12 V) of green ② on the headlight coupler (headlight side). ②
- Is the voltage within specification?

YES

NO

This circuit is OK.

The wiring circuit from the main switch to the headlight coupler (wire harness side) is faulty and must be repaired.

EAS00789

2. The meter light fails to come on.

1. Meter light bulb and socket

- Check the meter light bulb and socket for continuity.
- Are the meter light bulb and socket OK?

YES

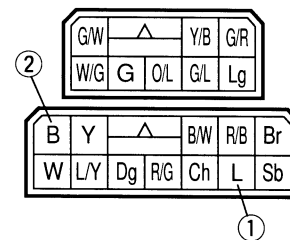
NO

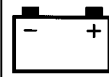
Replace the meter light bulb, socket of both.

2. Voltage

- Connect the pocket tester (20 V) to the meter light coupler (wire harness side) as shown.

- Tester positive probe** → blue ①
Tester negative probe → black ②





- Set the main switch to “ON”.
- Measure the voltage (12 V) of blue ① on the meter light coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the meter light coupler (wire harness side) is faulty and must be repaired.

EAS00790

3. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket

- Check the tail/brake light bulb and socket for continuity.
- Are the tail/brake light bulb and socket OK?

YES

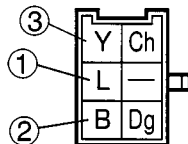
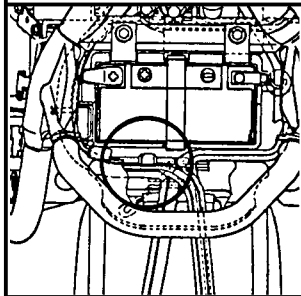
NO

Replace the tail/brake light bulb, socket or both

2. Voltage

- Connect the pocket tester (20 V DC) to the tail/brake light coupler (wire harness side) as shown.

Tester positive probe → blue ①, yellow ③
Tester negative probe → black ②



- Set the main switch to “ON”.
- Measure the voltage (12 V) of blue ①, yellow ③ on the tail/brake light coupler (tail/brake light side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the tail/brake light coupler (tail/brake light side) is faulty and must be repaired.

EAS00791

4. The turn signal/position light fails to come on.

1. Turn signal/position light bulb and socket

- Check the turn signal/position light bulb and socket for continuity.
- Are the turn signal/position light bulb and socket OK?

YES

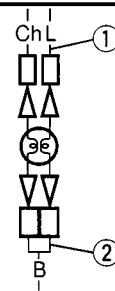
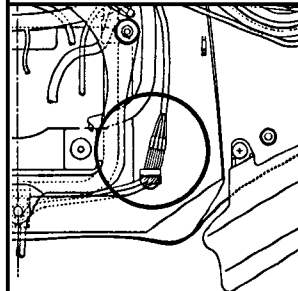
NO

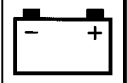
Replace the turn signal/position light bulb, socket or both.

2. Voltage

- Connect the pocket tester (20 V DC) to the auxiliary light connectors (turn signal/position light side) as shown.

Tester positive probe → blue ①
Tester negative probe → black ②





- Set the main switch to “ON”.
- Measure the voltage (12 V) of blue① on the auxiliary light connectors (auxiliary light side).
- Is the voltage within specification?



YES

This circuit is OK.



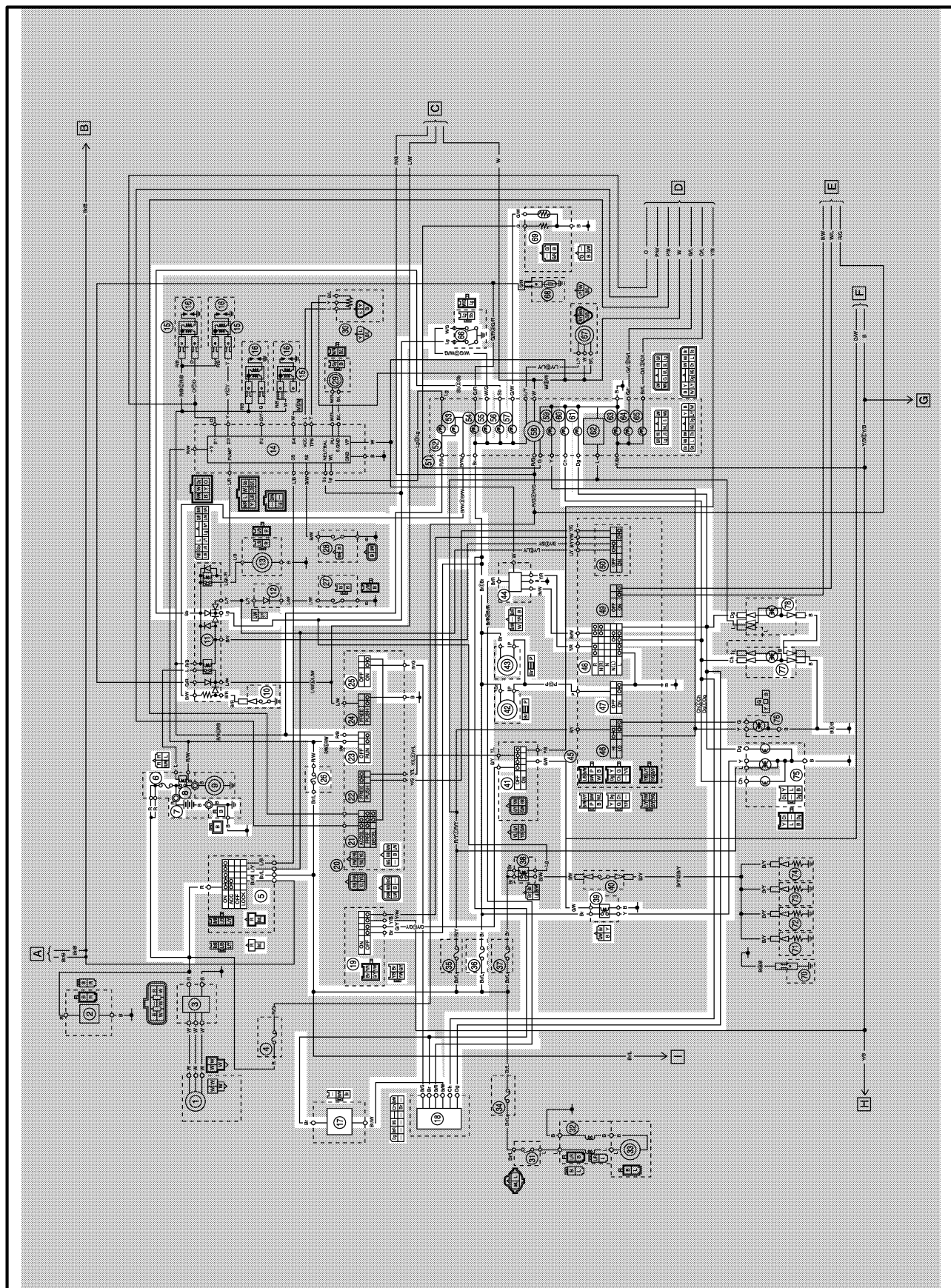
NO

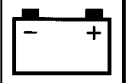
The wiring circuit from the main switch to the turn signal/position light connectors (turn signal/position light side) is faulty and must be repaired.

EB806000

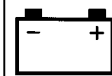
EB806000

SIGNAL SYSTEM CIRCUIT DIAGRAM





- ⑤ Main switch
- ⑥ Fuse (main)
- ⑦ Battery
- ⑩ Oil level switch
- ⑪ Starting circuit cutoff relay
- ⑰ Flasher relay (hazard)
- ⑱ Hazard relay
- ⑲ Front brake switch
- ⑳ Engine stop switch
- ㉕ Hazard switch
- ㉖ Fuse (ignition)
- ㉞ Fuse (signal)
- ㉟ Brake light relay
- ④① Rear brake switch
- ④② Horn 2
- ④③ Horn 1
- ④④ Flasher relay
- ④⑦ Horn switch
- ④⑧ Turn signal switch
- ⑤③ Oil warning indicator light
- ⑤⑤ Over drive indicator light
- ⑤⑥ Neutral indicator light
- ⑤⑦ Fuel indicator light
- ⑥① Turn signal indicator light (left)
- ⑥② Turn signal indicator light (right)
- ⑥⑥ Neutral switch
- ⑥⑨ Fuel sender unit
- ⑦⑤ Tail/brake light
- ⑦⑦ Front turn signal/position light (left)
- ⑦⑧ Front turn signal/position light (right)



EAS00794

TROUBLESHOOTING

- Any of the following fail to come on: turn signal light, brake light or indicator light.
- The horn fails to sound.

Check:

1. Main, signal and ignition fuses
2. Battery
3. Main switch
4. Wiring connections
(of the entire signaling system)

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) Rider seat
 - 2) Side covers (left and right)
 - 3) Fuel tank
 - 4) Front upper cowling
- Troubleshoot with the following special tool(-s).



Pocket tester
YU-03112, 90890-03112

EAS00738

1. Main, signal and ignition fuses

- Check the main, signal and ignition fuses for continuity.
Refer to “CHECKING THE FUSES” in CHAPTER 3.
- Are the main, signal and ignition fuses OK?

↓ YES

↓ NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery.
Refer to “CHECKING THE BATTERY” in CHAPTER 3.



Open-circuit voltage
12.8 V or more at 20°C (68°F)

- Is the battery OK?

↓ YES

↓ NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EAS00795

4. Wiring

- Check the entire signal system's wiring.
Refer to “CIRCUIT DIAGRAM”.
- Is the signaling system's wiring properly connected and without defects?

↓ YES

↓ NO

Check the condition of each of the signaling system's circuits.
Refer to “CHECKING THE SIGNALING SYSTEM”.

Properly connect or repair the signaling system's wiring.

EAS00796

CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

1. Horn switch

Refer to “CHECKING THE SWITCHES”.

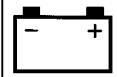
↓ YES

↓ NO

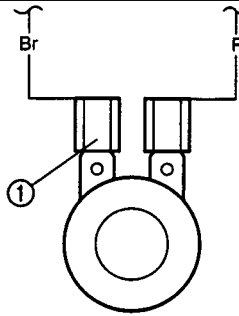
Replace the left handlebar switch.

2. Voltage

- Connect the pocket tester (20 V DC) to the horn lead (at the horn terminal) as shown.



Tester positive probe → brown ①
Tester negative probe → ground



- Set the main switch to “ON”.
- Measure the voltage (12 V) of the brown connector at the horn terminal.
- Is the voltage within specification?

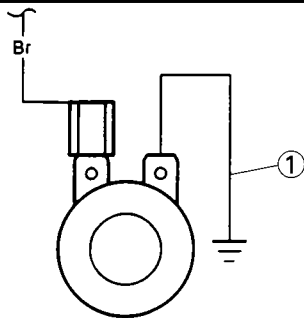
↓ YES

↓ NO

The wiring circuit from the main switch to the horn terminal is faulty and must be repaired.

3. Horn

- Disconnect the black connector at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Set the main switch to “ON”.
- Does the horn sound?



↓ YES

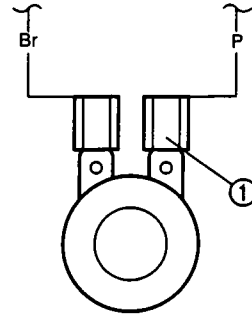
↓ NO

Replace the horn.

4. Voltage

- Connect the pocket tester (20 V DC) to the horn at the black terminal as shown.

Tester positive probe → pink ①
Tester negative probe → ground



- Set the main switch to “ON”.
- Measure the voltage (12 V) of pink ① at the horn terminal.
- Is the voltage within specification?

↓ YES

↓ NO

Repair or adjust the horn.

Replace the horn.

EAS00797

2. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket.

- Check the tail/brake light bulb and socket for continuity.
- Are the tail/brake light bulb and socket OK?

↓ YES

↓ NO

Replace the tail/brake light bulb, socket or both.

2. Brake switch

- Check the brake switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the brake switch OK?

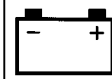
↓ YES

↓ NO

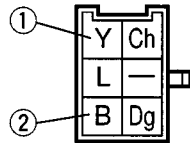
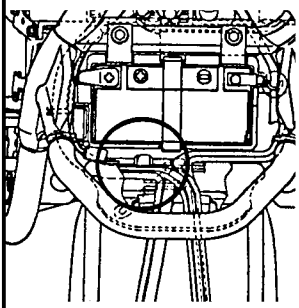
Replace the brake switch.

3. Voltage

- Connect the pocket tester (20 V DC) to the tail/brake light coupler (wire harness side) as shown.



Tester positive probe → yellow ①
Tester negative probe → black ②



- Set the main switch to "ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (12 V) of yellow ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the tail/brake light coupler (wire harness side) is faulty and must be repaired.

EAS00799

3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light bulb and socket

- Check the turn signal light bulb and socket for continuity.
- Are the turn signal light bulbs and socket OK?

YES

NO

Replace the turn signal light bulb, socket or both.

2. Turn signal switch

- Check the turn signal switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the turn signal switch OK?

YES

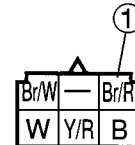
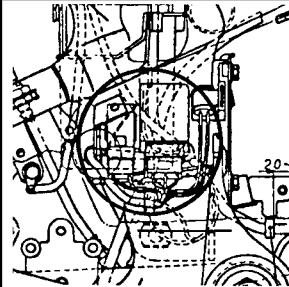
NO

Replace the left handlebar switch.

3. Voltage

- Connect the pocket tester (20 V DC) to the flasher relay coupler (flasher relay side) as shown.
- Set the hazard switch "OFF".

Tester positive probe → brown/red ①
Tester negative probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown/red ① at the flasher relay coupler (wire harness side).
- Is the voltage within specification?

YES

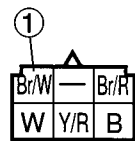
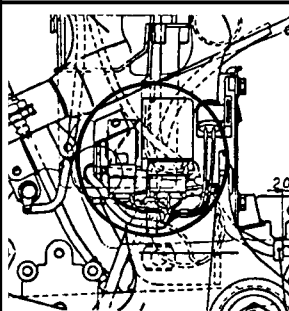
NO

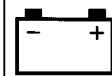
The wiring circuit from the main switch to the flasher relay coupler (wire harness side) is faulty and must be repaired.

4. Voltage

- Connect the pocket tester (20 V DC) to the flasher relay coupler (wire harness side) as shown.

Tester positive probe → brown/white ①
Tester negative probe → ground





- Set the main switch to “ON”.
- Measure the voltage (12 V) on brown/white ① at the flasher relay coupler (wire harness side).
- Is the voltage within specification?

YES

NO

The flasher relay is faulty and must be replaced.

5. Voltage (rear)

- Connect the pocket tester (20 V DC) to the turn signal light connector (wire harness side) as shown.

- A** Rear turn signal light
- B** Turn signal indicator light

Left turn signal light

Tester positive probe → chocolate ①

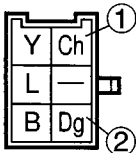
Tester negative probe → ground

Right turn signal light

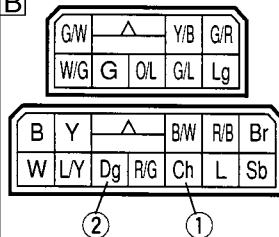
Tester positive probe → dark green ②

Tester negative probe → ground

A



B



- Set the main switch to “ON”.
- Set the turn switch to “↗” or “↖”.
- Measure the voltage (12 V) of the chocolate ① or dark green ② on the turn signal light connector (wire harness side).
- Is the voltage within specification?

YES

NO

This circuit is OK.

The wiring circuit from the turn signal switch to the turn signal light connector (wire harness side) is faulty and must be repaired.

EAS00800

4. The neutral indicator light fails to come on.

1. Neutral indicator light bulb and socket

- Check the neutral indicator light bulb and socket for continuity.
- Are the neutral indicator light bulb and socket OK?

YES

NO

Replace the neutral indicator light bulb, socket or both.

2. Neutral switch

- Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the neutral switch OK?

YES

NO

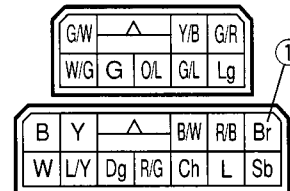
Replace the neutral switch.

3. Voltage

- Connect the pocket tester (20 V DC) to the meter light bulb coupler (wire harness side) as shown.

Tester positive probe → brown ①

Tester negative probe → ground

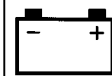


- Set the main switch to “ON”.
- Measure the voltage (12 V).
- Is the voltage within specification?

YES

NO

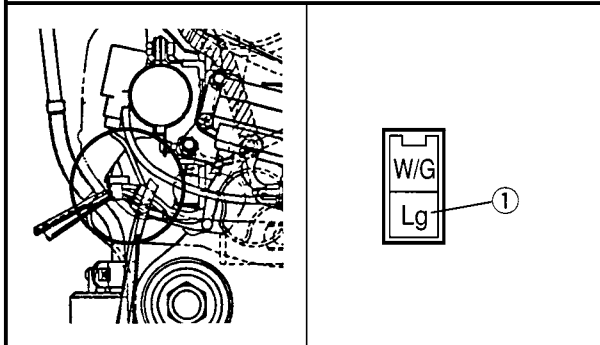
The wiring circuit from the main switch to the meter light bulb coupler (wire harness side) is faulty and must be repaired.



4. Voltage

- Connect the pocket tester (20 V DC) to the neutral switch coupler (wire harness side) as shown.

Tester positive probe → light green ①
Tester negative probe → ground



- Set the main switch to "ON".
- Set the transmission without neutral.
- Measure the voltage (12 V).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the neutral switch to neutral switch coupler (wire harness side) is faulty and must be repaired.

EAS00802

5. The oil level warning light fails to come on.

1. Oil level warning light bulb and socket

- Check the oil level warning light bulb and socket for continuity.
- Are the oil level warning light bulb and socket OK?

YES

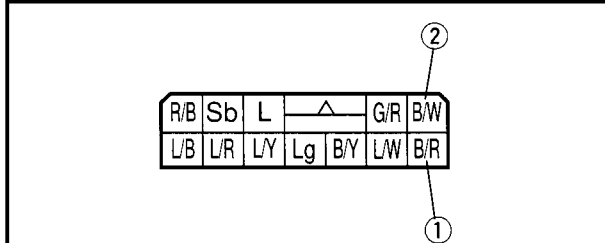
Replace the oil level warning light bulb, socket or both.

NO

2. Starting circuit cut-off relay

- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the starting circuit cut-off relay coupler (wire harness side) as shown.
- Measure the resistor for the specified resistance.

Tester positive terminal → black/red ①
Tester negative terminal → black/white ②



6.4 – 9.6 Ω at 20°C (68°F)

- Is the resistor resistance within specification?

YES

NO

Replace the starting circuit cut-off relay.

3. Engine oil level switch

- Drain the engine oil and remove the engine oil level switch from the oil pan.
- Check the engine oil level switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine oil level switch OK?

YES

NO

Replace the engine oil level switch.

EAS00750

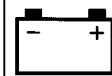
4. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?

YES

NO

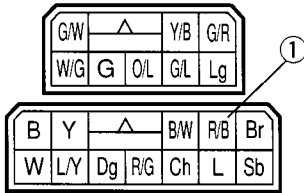
Replace the right handlebar switch.



5. Voltage

- Connect the pocket tester (20 V DC) to the meter light coupler (wire harness side) as shown.

Tester positive probe → red/brack ①
Tester negative probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V).
- Is the voltage within specification?



This circuit is OK.



The wiring circuit from the main switch to the meter light coupler (wire harness side) is faulty and must be repaired.

EAS00803

6. The fuel level indicator light fails to come on.

1. Fuel level indicator light bulb and socket

- Check: Do the fuel level indicator light bulb and socket have continuity?



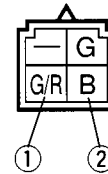
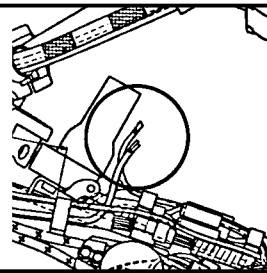
Replace the fuel level indicator light bulb, socket of both.



2. Fuel sender

- Drain the fuel from the fuel tank and remove the fuel sender from the fuel tank.
- Disconnect the fuel sender coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the fuel sender as shown.

Tester positive probe → green/red ①
Tester negative probe → black ②



- Check: Does the fuel sender have continuity?

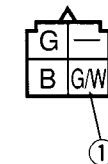
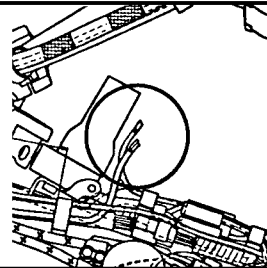


Replace the fuel sender.

3. Voltage

- Connect the pocket tester (20 V DC) to the fuel sender coupler (wire harness side) as shown.

Tester positive probe → green/white ①
Tester negative probe → ground

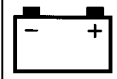


- Set the main switch to "ON".
- Measure the voltage (12 V).
- Is the voltage within specification?



This circuit is OK.

The wiring circuit from the main switch to the fuel sender coupler (wire harness side) is faulty and must be repaired.



7. The over drive indicator light fails to come on.

1. Over drive indicator light bulb and socket

- Check the over drive indicator light bulb and socket for continuity.

- Are the over drive indicator light bulb and socket OK?

YES

NO

Replace the over drive indicator light bulb, socket or both.

2. Neutral switch

- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the neutral switch OK?

YES

NO

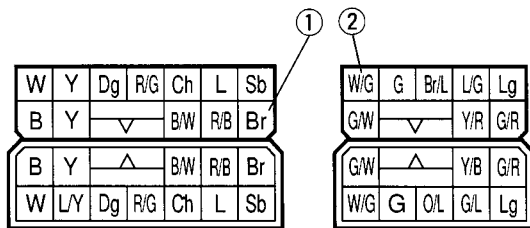
Replace the neutral switch.

3. Voltage

- Connect the pocket tester (20 V DC) to the meter light bulb coupler (wire harness side) as shown.

Tester positive probe → brown ①

Tester negative probe → white/green ②



- Set the main switch to "ON".
- Set the transmission 5th gear.
- Measure the voltage (12 V).

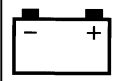
- Is the voltage within specification?

YES

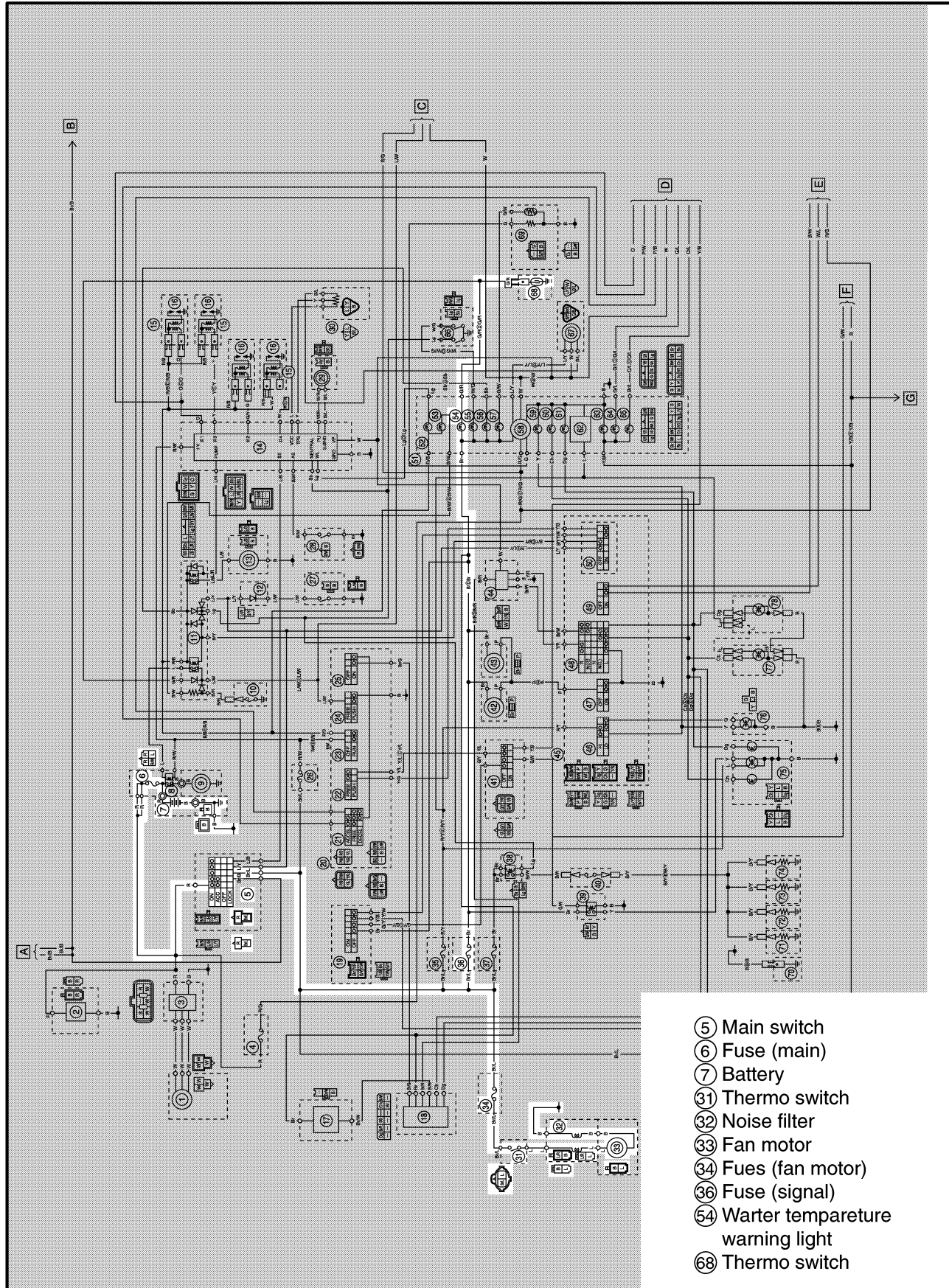
NO

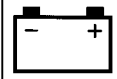
This circuit is OK.

The wiring circuit from the main switch to the meter light coupler (wire harness side) and meter light coupler to over drive switch are faulty and must be repaired.



COOLING SYSTEM CIRCUIT DIAGRAM





EAS00808

TROUBLESHOOTING

- The radiator fan motor fails to turn.
- The water temperature warning light fails to come on when the engine is hot.

Check:

1. Main, turn signal, and radiator fan motor fuses
2. Battery
3. Main switch
4. Radiator fan motor
5. Thermo switch
6. Thermo unit
7. Water temperature warning light bulb and socket
8. Wiring connections (the entire cooling system)

NOTE:

- Before troubleshooting, remove the following part(-s).
 - 1) Rider and passenger seats
 - 2) Side covers (left and right)
 - 3) Fuel tank
- Troubleshoot with the following special tool(-s).



Pocket tester

YU-03112, 90890-03112

EAS00738

1. Main, signal, and radiator fan motor fuses

- Check the main, signal, and radiator fan motor fuses for continuity. Refer to “CHECKING THE FUSES” in CHAPTER 3.

- Are the main, turn signal, and radiator fan motor fuses OK?

YES

NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery. Refer to “CHECKING THE BATTERY” in CHAPTER 3.



Open-circuit voltage

12.8 V or more at 20°C (68°C)

- Is the battery OK?



YES



NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.

- Is the main switch OK?



YES



NO

Replace the main switch.

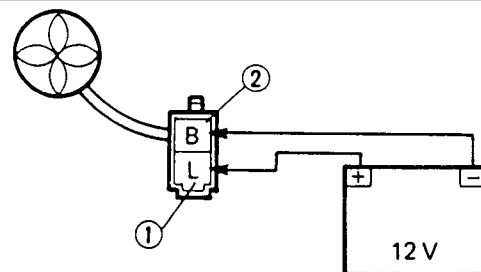
EAS00809

4. Radiator fan motor

- Disconnect the radiator fan motor coupler (wire harness side).
- Connect the battery (12 V) as shown.

Battery positive lead → blue ①

Battery negative lead → black ②



- Does the radiator fan motor turn?



YES

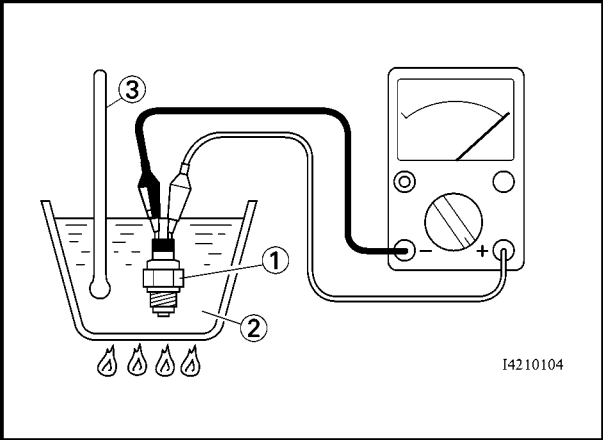


NO

The radiator fan motor is faulty and must be replaced.

EAS00811

5. Thermo switch
- Remove the thermo switch from the thermo-stat housing.
 - Connect the pocket tester ($\Omega \times 1$) to the thermo switch ① as shown.



- Immerse the thermo switch in a container filled with coolant ②.
- Place a thermometer ③ in the coolant.
- Slowly heat the coolant, then let it cool down to the specified temperature.
- Check the thermo switch for continuity at the temperatures indicated below.

Test step	Coolant temperature	Continuity
	Thermo switch	
1	0 – 98 °C (32 – 208.4 °F)	NO
2	More than 105 ± 3 °C (221.0 ± 5.4 °F)	YES
3*	105 to 98 °C (221.0 to 208.4 °F)	YES
4*	Less than 98 °C (208.4 °F)	NO

Steps 1 & 2: Heating phase
Steps 3* & 4*: Cooling phase

⚠ WARNING

- Handle the thermo switch with special care.
 - Never subject the thermo switch to strong shocks.
- If the thermo switch is dropped, replace it.



Thermo switch
8 Nm (0.8 m•kg, 5.8 ft•lb)
Three bond sealock® 10

- Thermo switch circuit open, radiator fan off
 - Thermo switch circuit closed, radiator fan on
 - Does the thermo switch operate properly as described above?
- Does the radiator fan motor turn?



YES



NO

Replace the thermo switch.

6. Water temperature warning light bulb and socket

- Check the water temperature warning light bulb and socket for continuity.
- Are the water temperature warning light bulb and socket OK?



YES



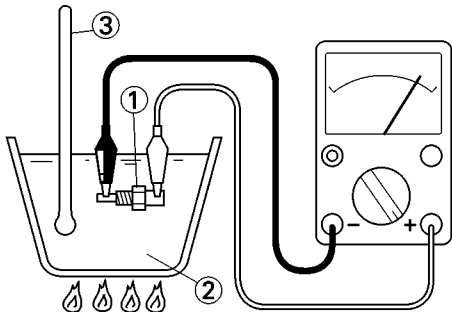
NO

Replace the water temperature warning light bulb, socket or both.

EAS00812

7. Thermo unit

- Remove the thermo unit sender from the radiator.
- Connect the pocket tester ($\Omega \times 10$) to the thermo unit ① as shown.
- Immerse the temperature sender in a container filled with coolant ②.
- Place a thermometer ③ in the coolant.
- Slowly heat the coolant. Check the thermo unit sender for continuity at the temperatures indicated below.



I4210103



Temperature sender resistance
80° C (170° F): 47 – 53 Ω
100° C (212° F): 26 – 30 Ω

⚠ WARNING

- Handle the temperature sender with special care.
- Never subject the temperature sender to strong shocks. If the temperature sender is dropped, replace it.



Temperature sender
23 Nm (2.3 m•kg, 17 ft•lb)
Three bond sealock® 10

- Does the thermo unit operate properly?

YES

NO

Replace the thermo unit sender.

EAS00813

8. Wiring

- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?



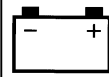
YES

This circuit is OK.

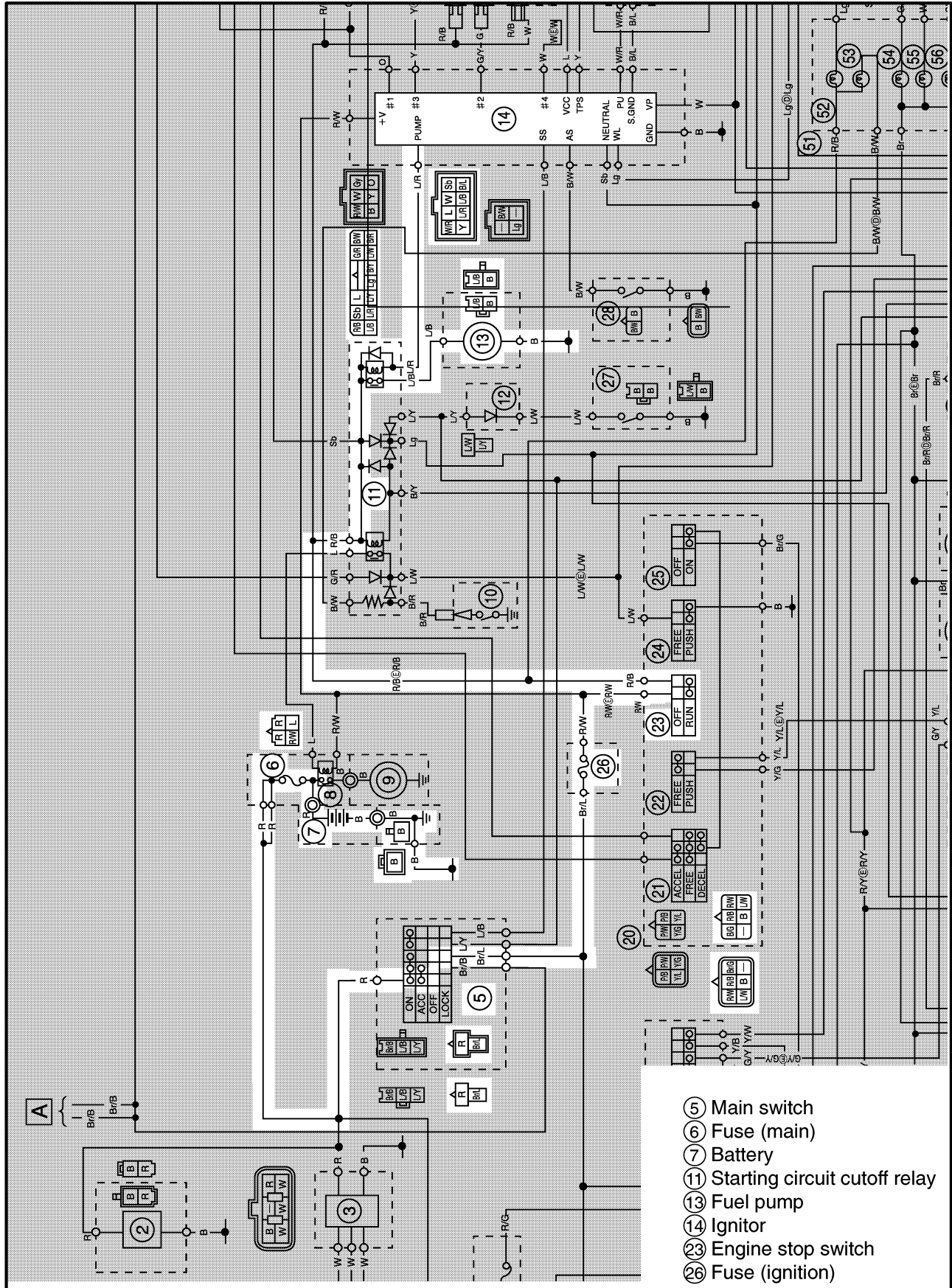


NO

Properly connect or repair the cooling system's wiring.



FUEL PUMP SYSTEM CIRCUIT DIAGRAM





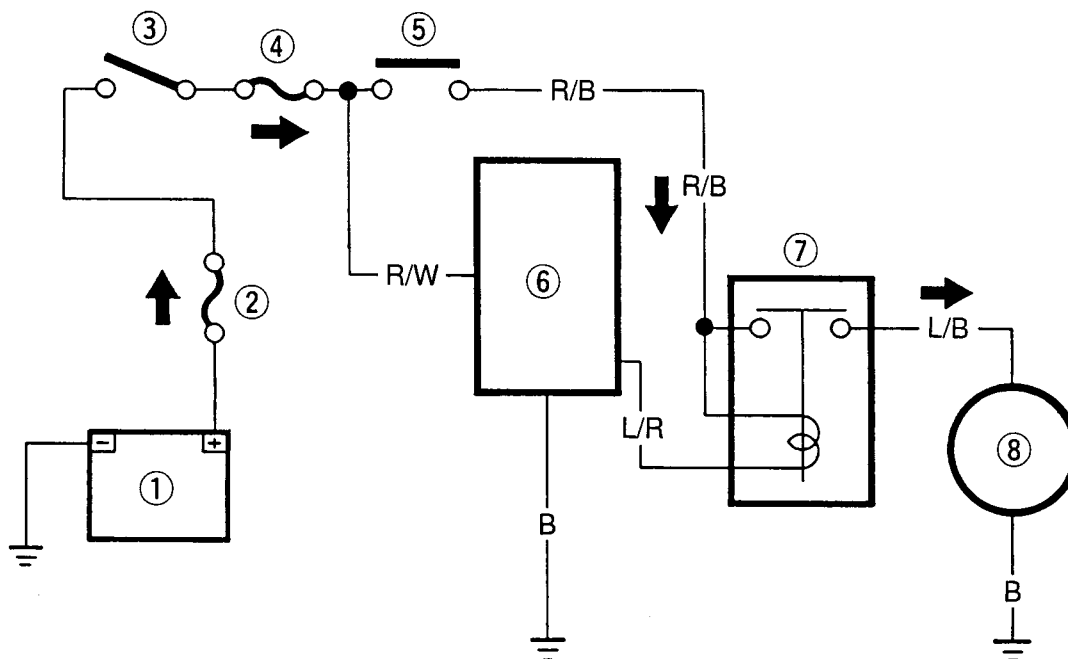
EB808010

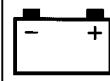
FUEL PUMP CIRCUIT OPERATION

The fuel pump circuit consists of the fuel pump relay, fuel pump, engine stop switch and ignitor unit.

The ignitor unit includes the control unit for the fuel pump.

- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Ignition fuse
- ⑤ Engine stop switch
- ⑥ Ignitor unit
- ⑦ Fuel pump relay
- ⑧ Fuel pump





EAS00816

TROUBLESHOOTING

If the fuel pump fails to operate:

Check:

1. Main and ignition fuses
2. Battery
3. Main switch
4. Engine stop switch
5. Starting circuit cut-off relay (the fuel pump relay)
6. Fuel pump
7. Wiring connections (the entire fuel system)

NOTE:

- Before troubleshooting, remove the following part(-s):

- 1) Rider seat
- 2) Side cover (left)
- 3) Fuel tank

Troubleshoot with the following special tool(-s).



Pocket tester

YU-03112, 90890-03112

EAS00738

1. Main, and ignition fuses

- Check the main and ignition fuses for continuity. Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main and ignition fuses OK?

YES

NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery. Refer to "CHECKING THE BATTERY" in CHAPTER 3.



Open-circuit voltage

12.8 V or more at 20°C (68°F)

- Is the battery OK?

YES

NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the main switch OK?

YES

NO

Replace the main switch.

EAS00750

4. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the engine stop switch OK?

YES

NO

Replace the right handlebar switch.

EAS00759

5. Starting circuit cut-off relay

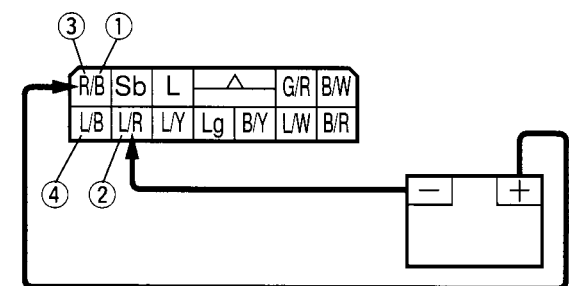
- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Battery positive terminal → red/black ①

Battery negative terminal → blue/red ②

Tester positive probe → red/black ③

Tester negative probe → blue/black ④

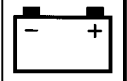


- Does the starting circuit cut-off relay have continuity between red/black and blue/black?

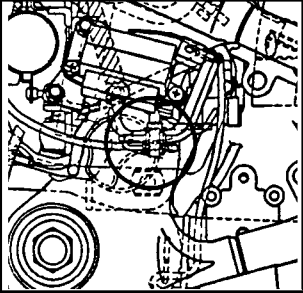
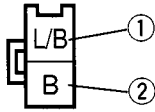
YES

NO

Replace the starting circuit cut-off relay.



EAS00817

6. Fuel pump resistance	
• Disconnect the fuel pump coupler from the wire harness. • Connect the pocket tester ($\Omega \times 1$) to the fuel pump coupler as shown.	
Tester positive probe → blue/black ① Tester negative probe → black ②	
	
• Measure the fuel pump resistance.	
	Fuel pump resistance 4 – 30 Ω at 20°C (68°F)
• Is the fuel pump OK?	



YES

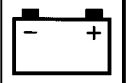


NO

Replace the fuel pump.

EAS00818

7. Wiring	
• Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM". • Is the fuel system's wiring properly connected and without defects?	
	
YES	NO
Replace the ignitor unit.	Properly connect or repair the fuel system's wiring.

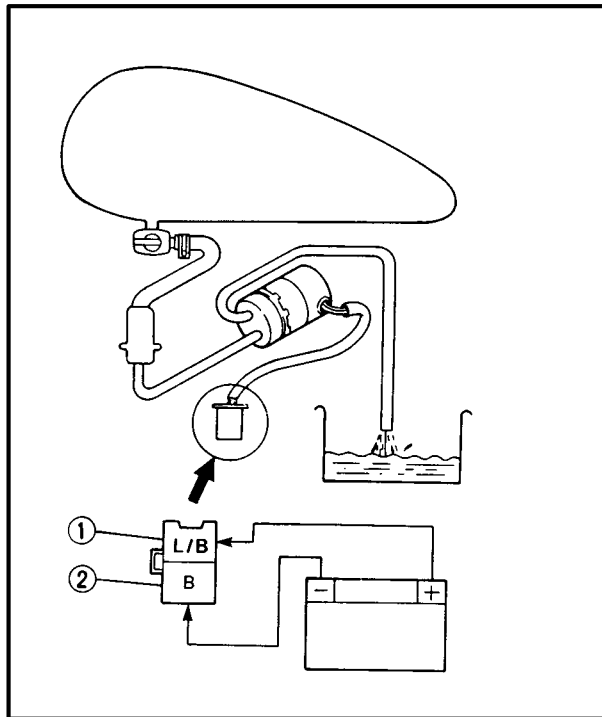


CHECKING THE FUEL PUMP

⚠ WARNING

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or fire. Be extremely careful and note the following points:

- **Stop the engine before refuelling.**
- **Do not smoke, and keep away from open flames, sparks, or any other source of fire.**
- **If you do accidentally spill gasoline, wipe it up immediately with dry rags.**
- **If gasoline touches the engine when it is not, a fire may occur. Therefore, make sure that the engine is completely cool before performing the following test.**



1. Check:
 - fuel pump operation

▼ ▼

- Fill the fuel tank.
- Put the end of the fuel hose into an open container.
- Connect the battery (12 V) to the fuel pump coupler as shown.

Battery positive lead → blue/black ①

Battery negative lead → black ②

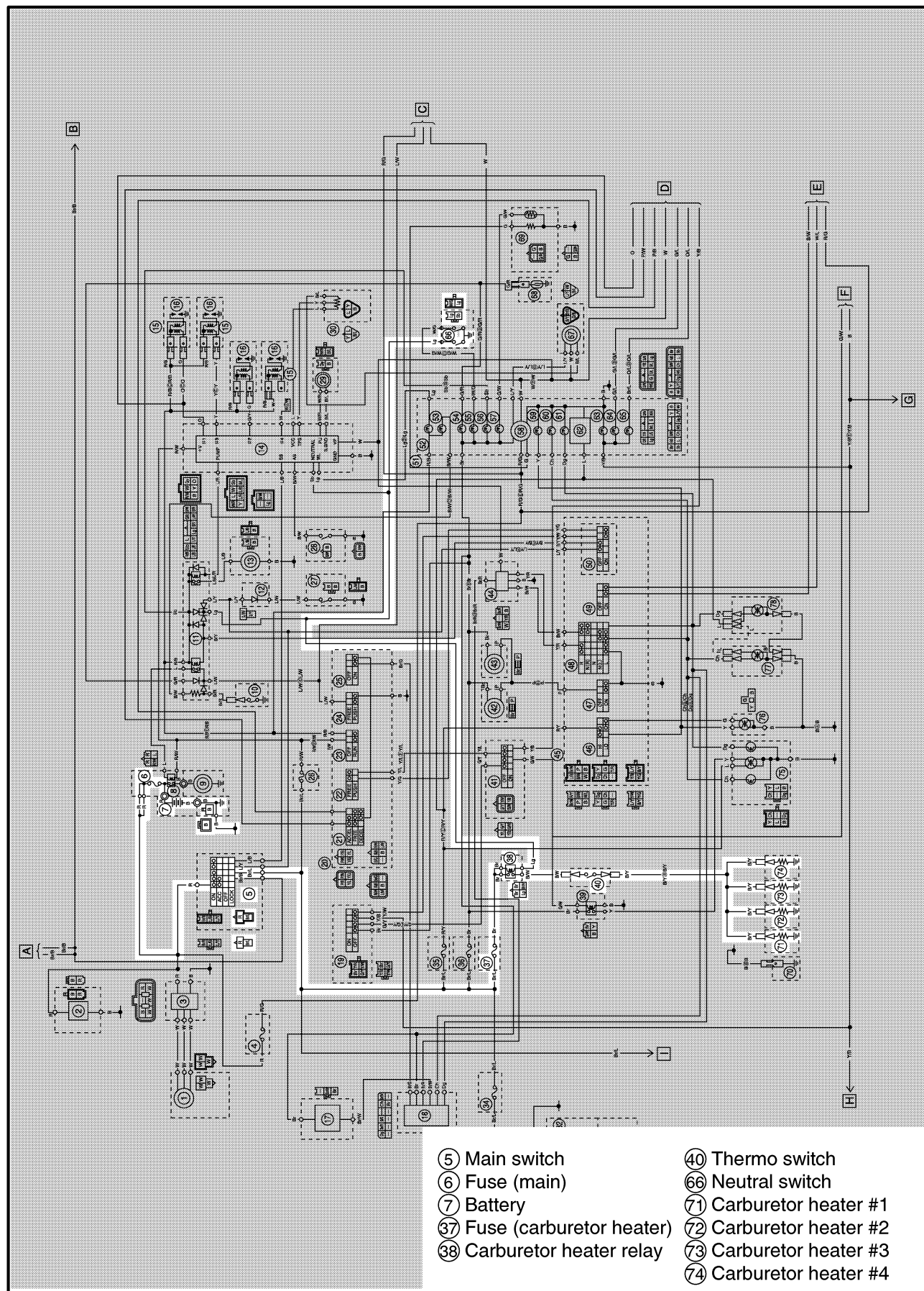
- d. If fuel flows out of the fuel hose, the fuel pump is OK.

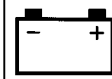
If fuel does not flow, replace the fuel pump.

[illegible]



CABURETOR HEATING SYSTEM





EAS00821

TROUBLESHOOTING

The carburetor heating system fails to operate.

Check:

1. Main and carburetor heater fuses
2. Battery
3. Main switch
4. Neutral switch
5. Carburetor heater relay
6. Thermo switch
7. Carburetor heater
8. Wiring connections
(of the entire carburetor heating system)

NOTE:

Before troubleshooting, remove the following part(-s):

- 1) Rider and passenger seats
- 2) Fuel tank

Troubleshoot with the following special tool(-s).



Pocket tester

YU-03112, 90890-03112

EAS00738

1. Main, and carburetor heater fuses

- Check the main and carburetor heater fuses for continuity.
Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the main and carburetor heater fuses OK?



YES



NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery.
Refer to "CHECKING THE BATTERY" in CHAPTER 3.



Open-circuit voltage

12.8 V or more at 20°C (68°C)

- Is the battery OK?



YES



NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



YES



NO

Replace the main switch.

EAS00751

4. Neutral switch

- Check the neutral switch for continuity.
Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



YES



NO

Replace the neutral switch.

EAS00822

5. Carburetor heater relay

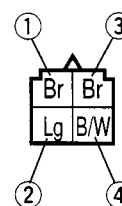
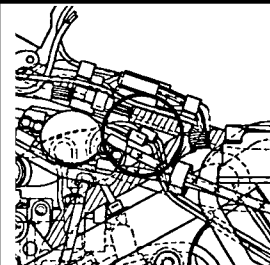
- Disconnect the carburetor heater relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the carburetor heater relay coupler as shown.

Battery positive terminal → brown ①

Battery negative terminal → light green ②

Tester positive probe → brown ③

Tester negative probe → black/white ④



- Check the carburetor heater relay for no continuity.
- Is the carburetor heater relay OK?



YES



NO

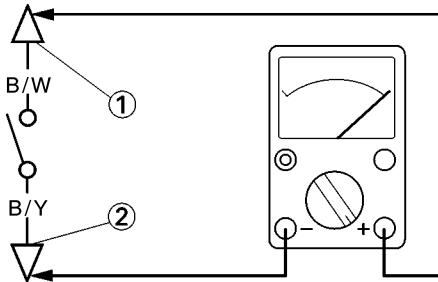
Replace the carburetor heater relay.



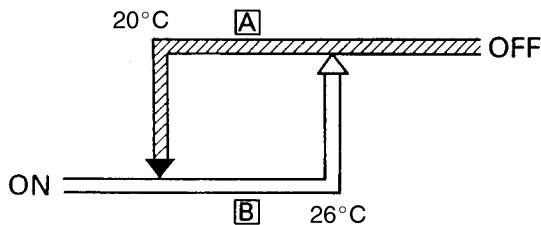
6. Thermo switch

- Remove the thermo switch from the thermo switch plate.
- Connect the pocket tester to the ($\Omega \times 1$) to the thermo switch as shown.

Tester positive probe → brack/white ①
Tester negative probe → brack/yellow ②



- Check the thermo switch for continuity at the temperatures indicated below.



A COOL DOWN

B HEAT UP

- Does the thermo switch operated properly?

YES

NO

Replace the thermo switch.

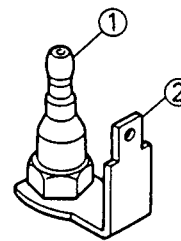
EAS00825

The following procedure applies to all of the carburetor heating elements.

7. Carburetor heater

- Remove the carburetor heating element from the carburetor.
- Connect the pocket tester to the carburetor heating element as shown.

Tester positive probe → heating element ①
Tester negative probe → heating element body ②



- Measure the carburetor heater resistance.



Carburetor heating element resistance

6 ~ 12 Ω at 20°C (68°F)

- Is the carburetor heating element OK?

YES

NO

Replace the carburetor heating element.

EAS00826

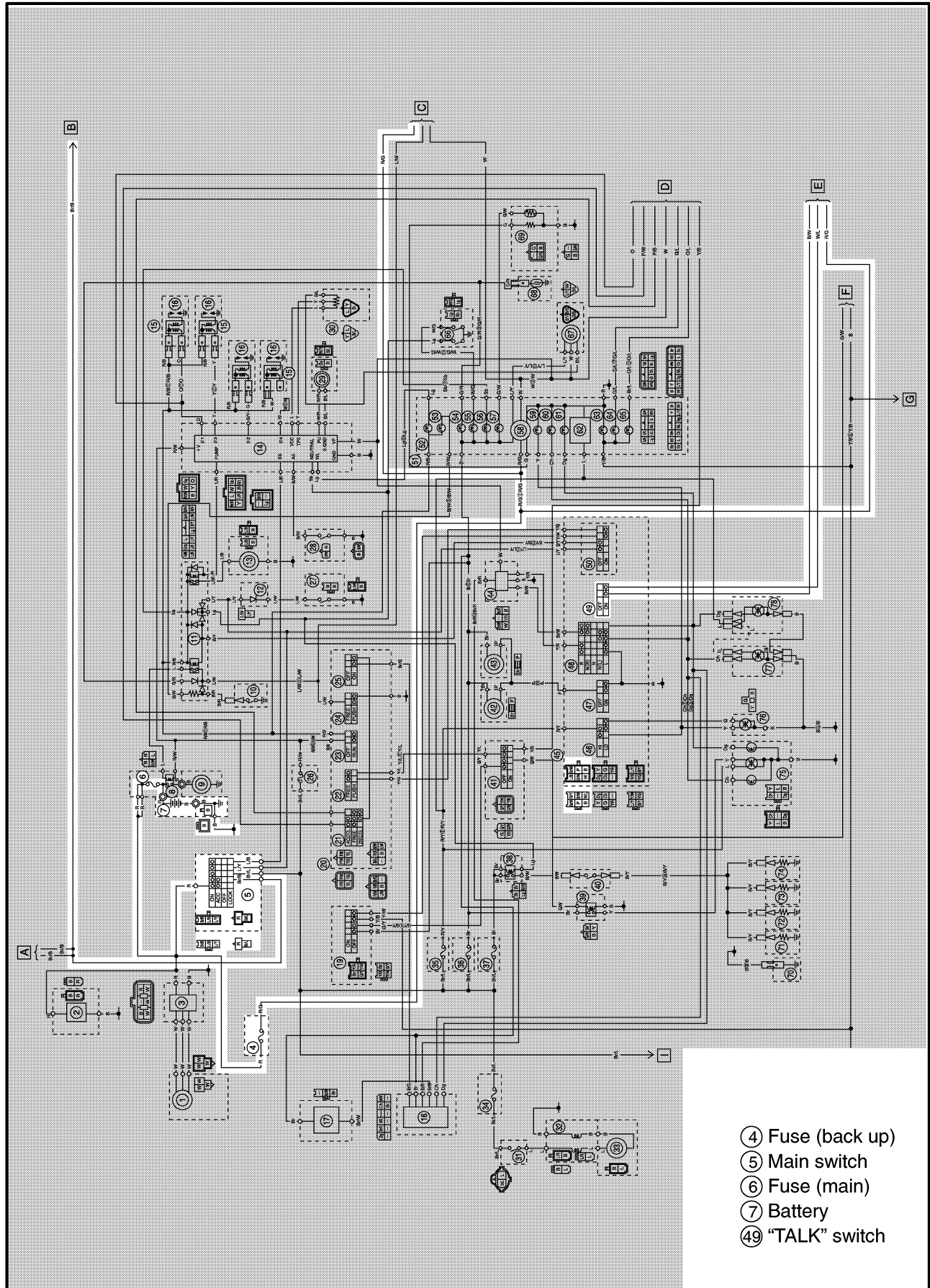
8. Wiring

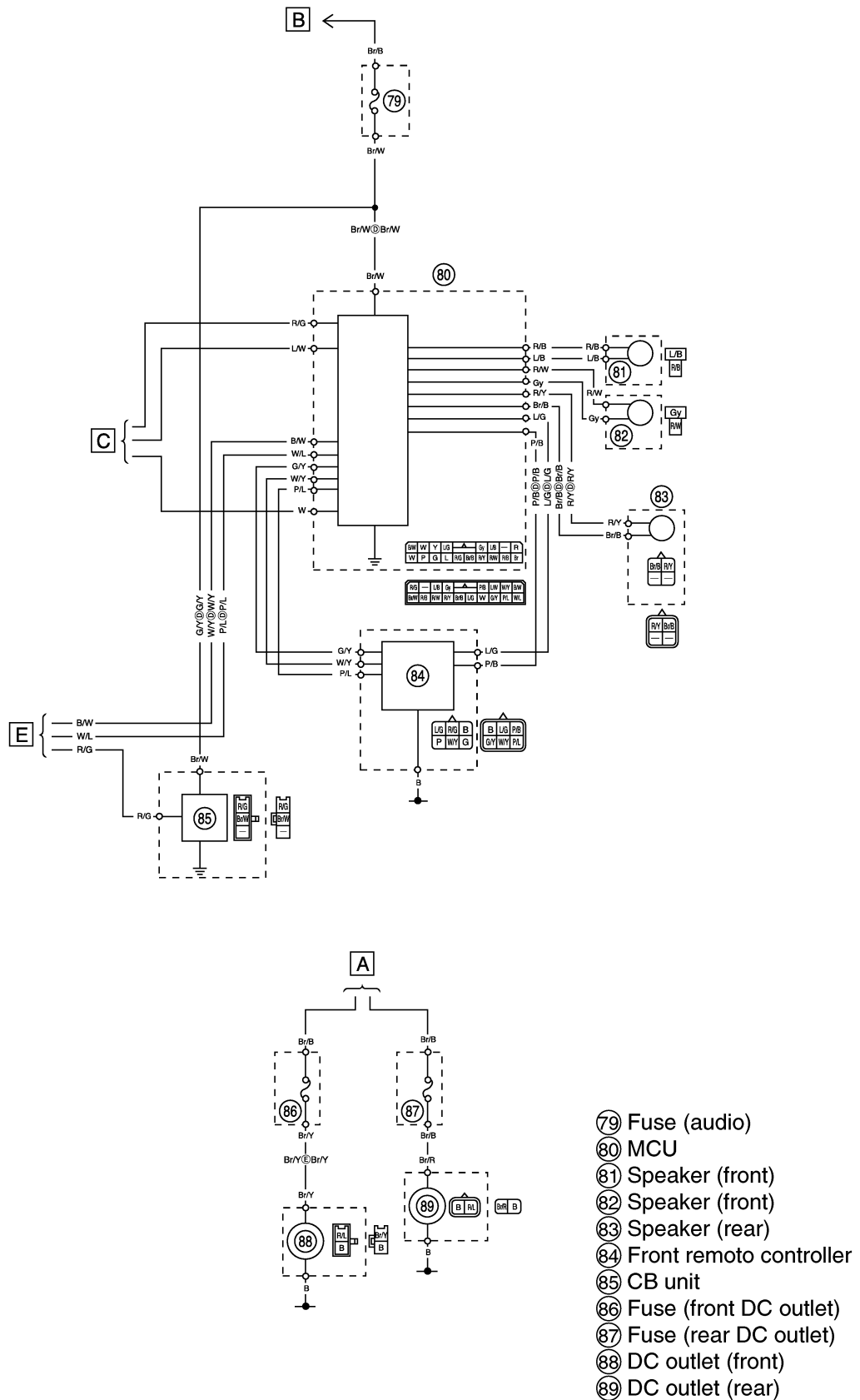
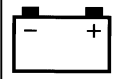
- Check the entire carburetor heating system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the carburetor heating system's wiring properly connected and without defects?

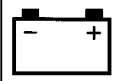
NO

Properly connect or repair the carburetor heating system's wiring.

AUDIO SYSTEM



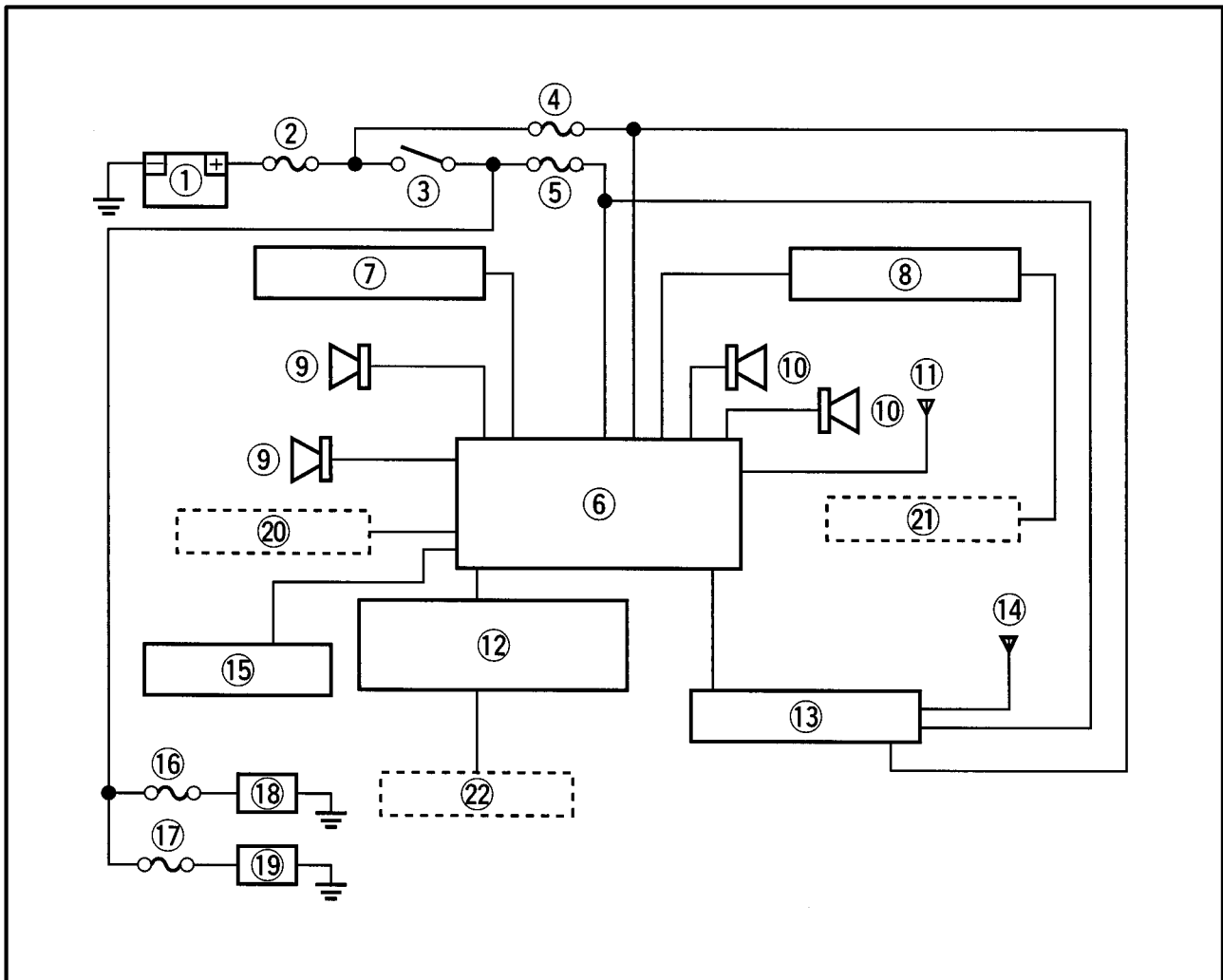
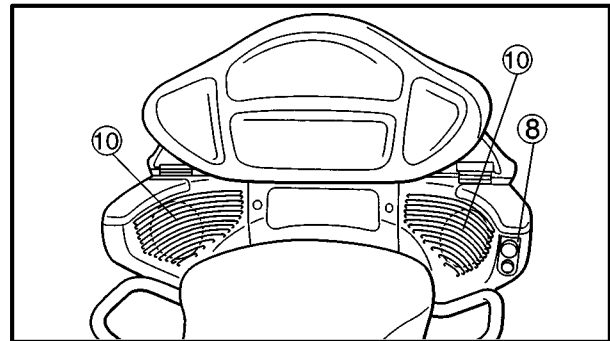
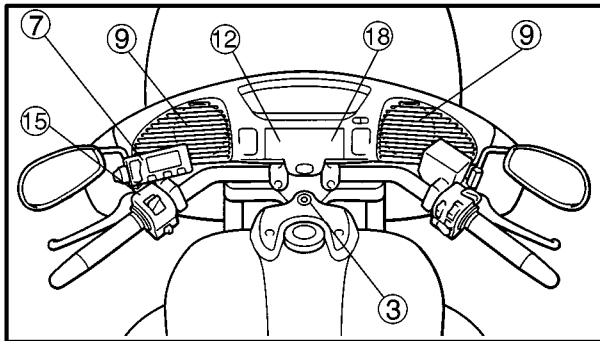


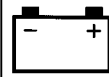


AUDIO SYSTEM CIRCUIT OPERATION

The audio system circuit consists of the front/rear remote controllers, front/rear speakers, tape deck, CB unit, antennas, TALK switch and main control unit (MCU).

- | | |
|---------------------------|--------------------------|
| ① Battery | ⑪ FM/AM antenna |
| ② Fuse (main) | ⑫ Tape deck |
| ③ Main switch | ⑬ CB unit |
| ④ Fuse (back up) | ⑭ CB antenna |
| ⑤ Fuse (audio) | ⑮ "TALK" switch |
| ⑥ Main control unit | ⑯ Fuse (front DC outlet) |
| ⑦ Front remoto controller | ⑰ Fuse (rear DC outlet) |
| ⑧ Rear remoto controller | ⑱ DC outlet (front) |
| ⑨ Front speakers | ⑲ DC outlet (rear) |
| ⑩ Rear speakers | ⑳ Front headset (option) |
| | ㉑ Rear headset (option) |
| | ㉒ CD changer (option) |





AUDIO SYSTEM does not operation

Check:

1. Fuses
2. Ground
3. MCU
4. Wiring connections
(of the entire audio system)

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) Front cowling
 - 2) Trunk
- Troubleshoot with the following special tool(-s).



Pocket tester
YU-03112, 90890-03112

1. All AUDIO system does not operation.

1. Fuse

- Check the main back up and audio fuse for continuity.
Refer to “CHECKING THE FUSES” in CHAPTER 3.
- Is the main back up and audio fuse OK?

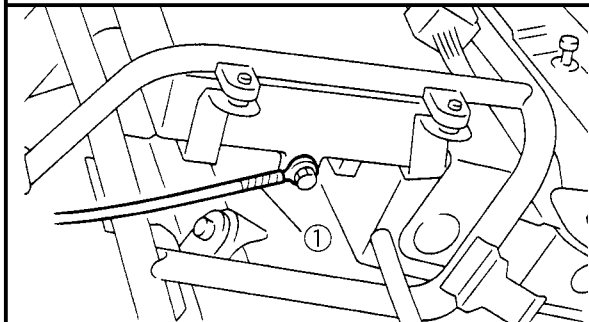
YES

NO

Replace the fuses.

2. Ground lead

- Check the ground lead ①.
- Check the wiring.
- Check the ground.



- Is the ground lead OK?

YES

NO

Correct the ground lead.

3. MCU coupler

- Check the connection of MCU 18P connector.
Refer to “checking the connection”.
- Is the MCU connector OK?

YES

NO

Correct the MCU connector.

4. MCU back up

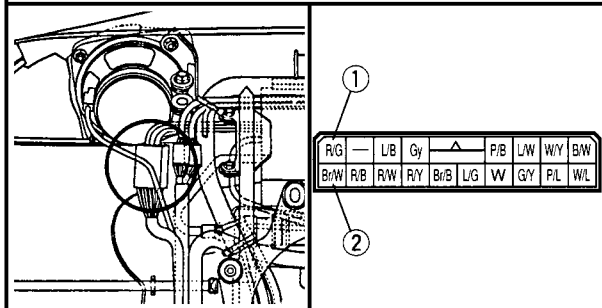
- Disconnect the MCU 18P connector from the wire harness.
- Connect the pocket tester (20 V DC) to the MCU 18P connector as shown.

Back up

Tester positive probe → red/green ①
Tester negative probe → ground

Audio

Tester positive probe → brown/white ②
Tester negative probe → ground



- Measure the voltage (12 V) on the MCU 18P connector.
- Is the voltage within specification?

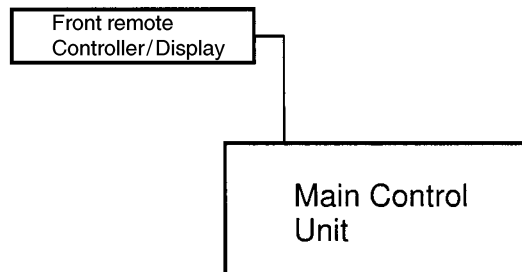
YES

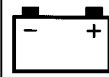
NO

Correct the wiring.

5. Wiring connections

- Check the wiring (blue/green) of MCU ~ front remote controller.





• Is the MCU ~ front remote controller wiring properly connected and without defects?



Replace the MCU.

Correct the MCU ~ front remote controller wiring.

• Is the MCU ~ cassette deck 13P wiring properly connected and without defects?



Replace the MCU.

Correct the MCU ~ cassette deck 13P wiring.

2. Radio does not sound.

1. Wiring connections

• Check the wiring of MCU ~ antenna (right).

• Is the MCU ~ antenna wiring properly connected and without defects?



Replace the MCU.

Correct the MCU ~ antenna wiring.

3. Cassette deck does not sound.

1. Cassette deck

• Check the cassette deck operation.

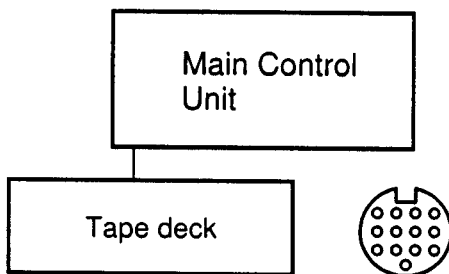
• Is the cassette deck moved?

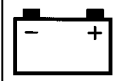


Replace the cassette deck.

2. Wiring connections

• Check the wiring (gray) of MCU ~ cassette deck 13P DIN wiring.





Speaker does not sound

Check:

1. Out put mode
2. Speaker
3. Wiring connections
(of the entire audio system)

NOTE:

- Before troubleshooting, remove the following part(-s).
 - 1) Front cowling
 - 2) Trunk
- Troubleshoot with the following special tool(-s).

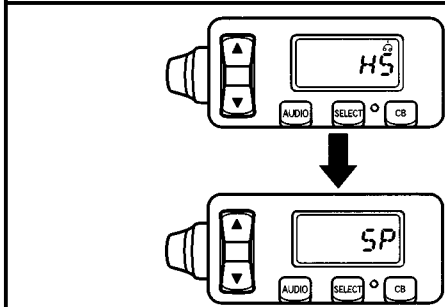


Pocket tester

YU-03112, 90890-03112

1. Out put mode.

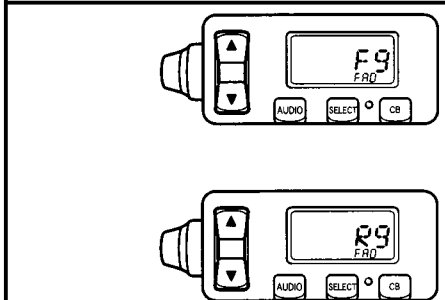
- Change the out put mode “HS” → “SP”.



2. Front or rear speaker does not sound.

1. “FADE” switch

- “FADE” switch set up near front or rear.



- “FADE” switch set up OK?



YES



NO

Replace the MCU.

Set up the “FADE” switch.

3. Does not sound of the speaker.

1. Speaker

- Remove the speaker.
- Connect the pocket tester ($\Omega \times 1$) to the speaker as shown.

Front left

Tester positive probe → gray ①

Tester negative probe → red/white ②

Front right

Tester positive probe → red/black ①

Tester negative probe → blue/black ②

Rear left

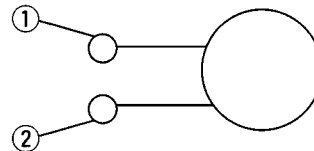
Tester positive probe → blue ①

Tester negative probe → pink/black ②

Rear right

Tester positive probe → red/yellow ①

Tester negative probe → brown/black ②



- Measure the speaker resistance.



Speaker resistance

3.4 ~ 4.6 Ω at 20°C

- Is the speaker resistance with in specification?

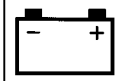


YES



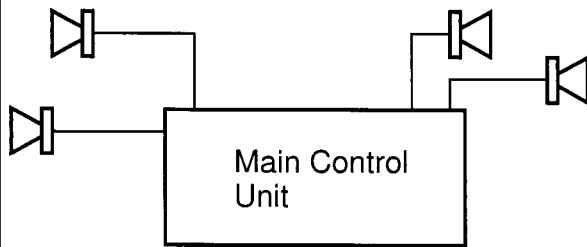
NO

Replace the speaker.



2. Wiring connections

- Check the wiring of MCU ~ wire harness ~ speaker wiring.



- Is the MCU ~ wire harness ~ speaker wiring properly connected and without detected?



YES

Replace the MCU.



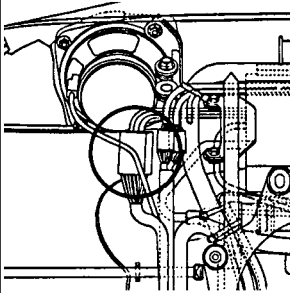
NO

Correct the MCU ~ wire harness ~ speaker wiring.

4. All speaker does not sound

1. MCU 18P connector

- Check the MCU 18P connector. Refer to "CHECKING THE CONNECTION".



R/G	—	L/B	Gy	△	P/B	L/W	W/Y	B/W
Br/W	R/B	R/W	R/Y	Br/B	L/G	W	G/Y	P/L
								W/L

- Is the MCU 18P connector OK?



YES

Replace the MCU.



NO

Correct the MCU 18P connector.

Headset does not sound

Check:

1. Out put mode
2. Front head set
3. Rear head set
4. Wiring connections (of the entire audio system)

NOTE:

- Before troubleshooting, remove the following part(-s).
 - 1) Front cowl
 - 2) Trunk
- Troubleshoot with the following special tool(-s).

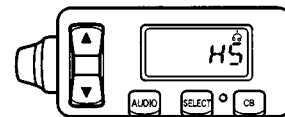
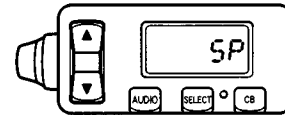


Pocket tester

YU-03112, 90890-03112

1. Out put mode.

- Change the out put mode "SP" → "HS".



2. Front head set does not sound

1. Wiring connections

- Check the wining of head set.
- Check the pocket tester ($\Omega \times 1$) to the head set wiring as shown.

Left

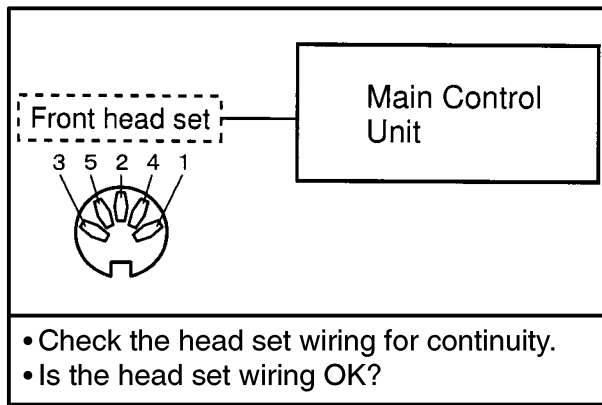
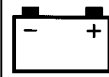
Tester positive prove → 3

Tester negative prove → 2

Right

Tester positive prove → 5

Tester negative prove → 2

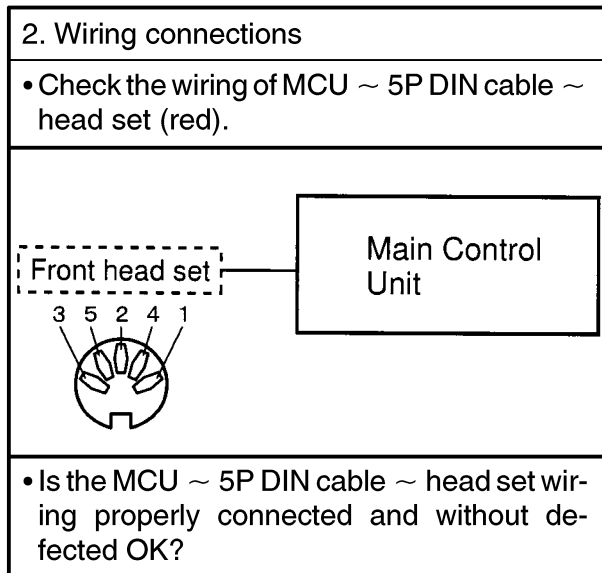


YES



NO

Correct the head set wiring.



YES



NO

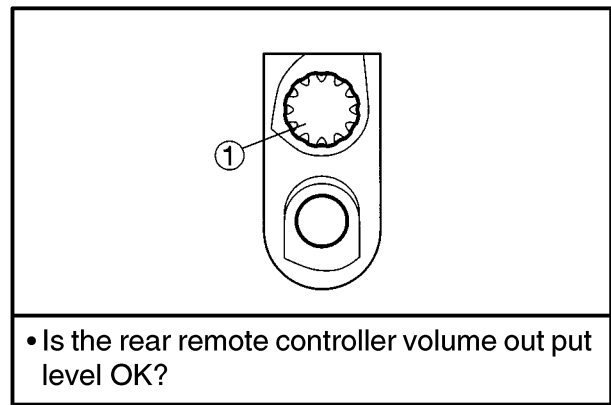
Replace the MCU.

Correct the MCU ~ 5P DIN cable ~ head set wiring.

3. Rear head set does not sound

1. Rear remote controller volume

- Check the rear remote controller volume ① out put level.

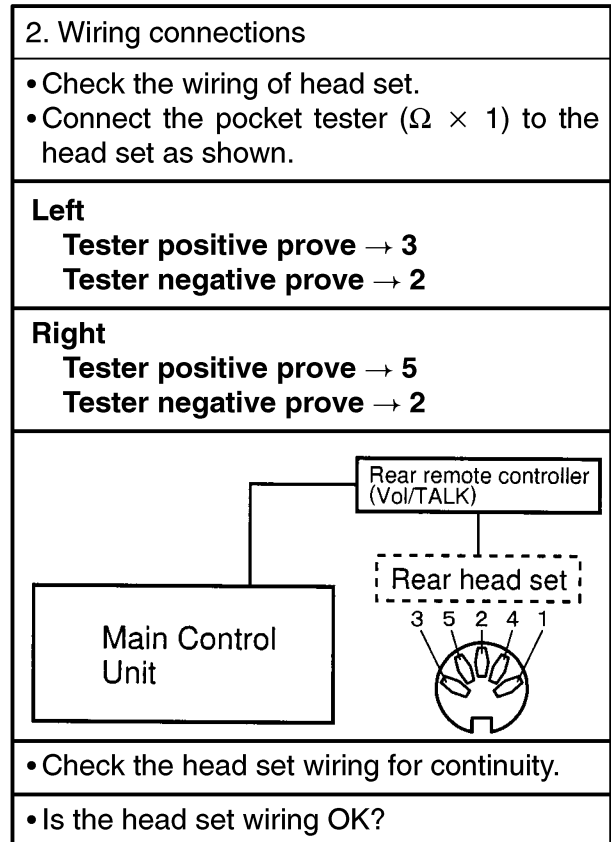


YES



NO

Adjust the rear remote controller volume out put level.



YES



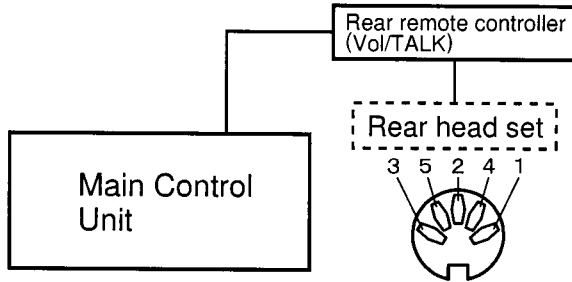
NO

Correct the head set wiring.



2. Wiring connections

- Check the wiring of MCU ~ 5P DIN cable ~ head set (white).



- Is the MCU ~ 5P DIN cable ~ head set wiring properly connected and without defected?

YES

Replace the MCU.

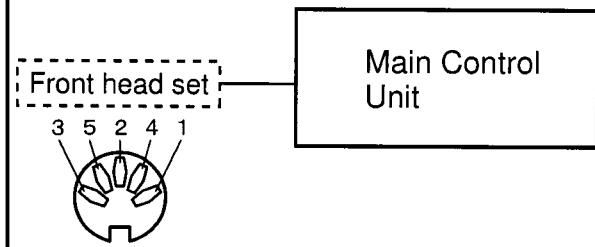
NO

Correct the MCU ~ 5P DIN cable ~ head set wiring.

Mike

Tester positive probe → 1

Tester negative probe → 4



- Check the head set wiring for continuity.
- Is the head set wiring OK?

YES

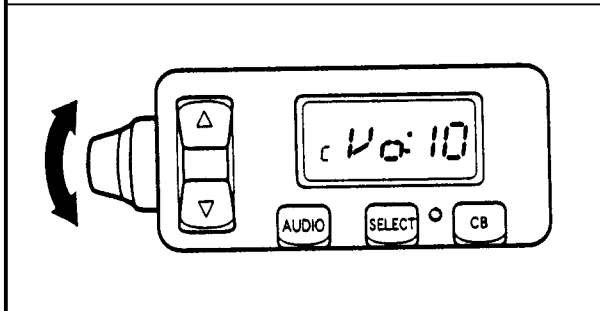
Replace the MCU.

NO

Correct the head set wiring.

4. Intercom does not used

1. Intercom volume out put level



YES

NO

Adjust the Intercom volume out put level.

2. Wiring connections

- Check the head set wiring.
- Connect the pocket tester ($\Omega \times 1$) to the head set wiring as shown.

Left

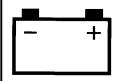
Tester positive probe → 3

Tester negative probe → 2

Right

Tester positive probe → 5

Tester negative probe → 2



Front remote controller does not operation

Check:

1. Wiring connections
(of the entire audio system)

NOTE:

- Before troubleshooting, remove the following part(-s):
1) Front cowling
2) Trunk
- Troubleshoot with the following special tool(-s).



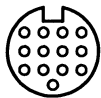
Pocket tester

YU-03112, 90890-03112

1. Wiring connections

- Check the MCU ~ front remote controller 13P wiring (blue).

Front remote controller



Main Control Unit

- Is the MCU ~ front remote controller 13P wiring properly connected and without de-fected?



YES



NO

Repalce MCU or front remoto control-ler

Correct the MCU ~ front remote control-ler 13P wiring.

Rear remote controller does not operation

Check:

1. Wiring connections
(of the entire audio system)

NOTE:

- Before troubleshooting, remove the follow-ing part(-s):
1) Front cowling
2) Trunk
- Troubleshoot with the following special tool(-s).

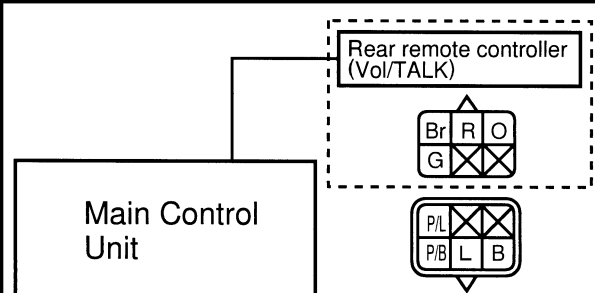


Pocket tester

YU-03112, 90890-03112

1. Wiring connections

- Check the wire harness ~ rear remote controller wiring.



- Is the wire hamess ~ rear remote controller wiring properly connected and without de-fected?



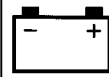
YES



NO

Replace MCU or rear remoto controller.

Correct the Wire har-ness ~ rear remote controller wiring.



CB unit does not operation

Check:

1. Wiring connections
(of the entire audio system)
2. Voltage
3. Talk switch

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) Front cowling
 - 2) Trunk
- Troubleshoot with the following special tool(-s).



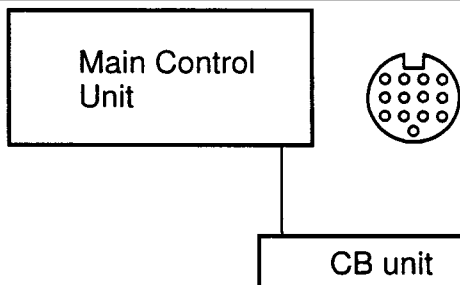
Pocket tester

YU-03112, 90890-03112

1. CB unit does not operation

1. Wiring connections

- Check the MCU ~ 13P DIN cable ~ CB unit wiring (yellow).



- Is the MCU ~ 13P DIN cable ~ CB unit wiring properly connected and without defected?

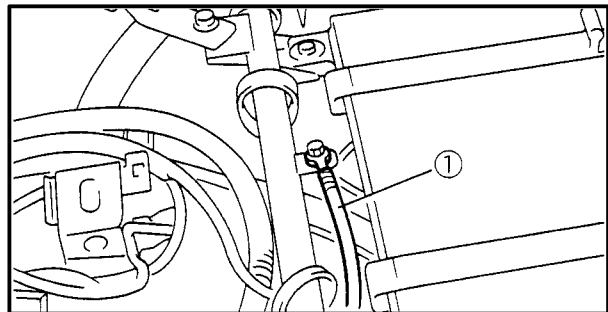
YES

NO

Correct the MCU ~ 13P DIN cable ~ CB unit wiring.

2. Ground lead

- Check the ground lead ①
- Check the wiring.
- Check the ground.



- Is the ground lead OK?

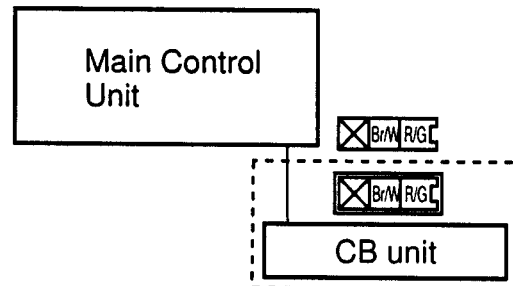
YES

NO

Correct the ground lead.

3. Wiring connections

- Check the CB unit ~ wire harness 3P wiring.



- Is the CB unit ~ wire harness 3P wiring properly connected and without defected?

YES

NO

Correct the CB unit ~ wire harness 3P wiring.

4. Voltage

- Connect the pocket tester (20 V DC) to the CB unit coupler as shown.

Back up

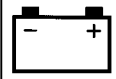
Tester positive prove → red/green ①

Tester negative prove → ground

Audio

Tester positive prove → brown/white ②

Tester negative prove → ground



- Measure the CB unit voltage

CB unit voltage
12 V

- Is the CB unit voltage within specification?



YES



NO

Replace the CB unit.

Correct the wiring.

2. Does not transmitting and receiving the CB radio.

1. Wiring connection

- Check the CB unit ~ antenna wiring.

- Is the CB unit ~ antenna wiring properly connected and without defected?



YES



NO

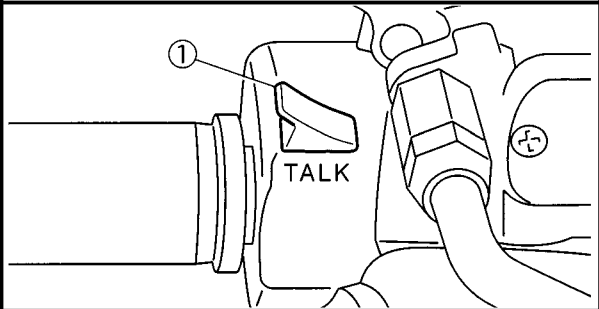
Replace the CB unit.

Correct the CB unit ~ antenna wiring.

3. Does not transmitting the CB radio

1. TALK switch

- Check the TALK switch for continuity. Refer to “CHECKING THE SWITCHES”



- Is the switch OK?



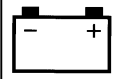
YES



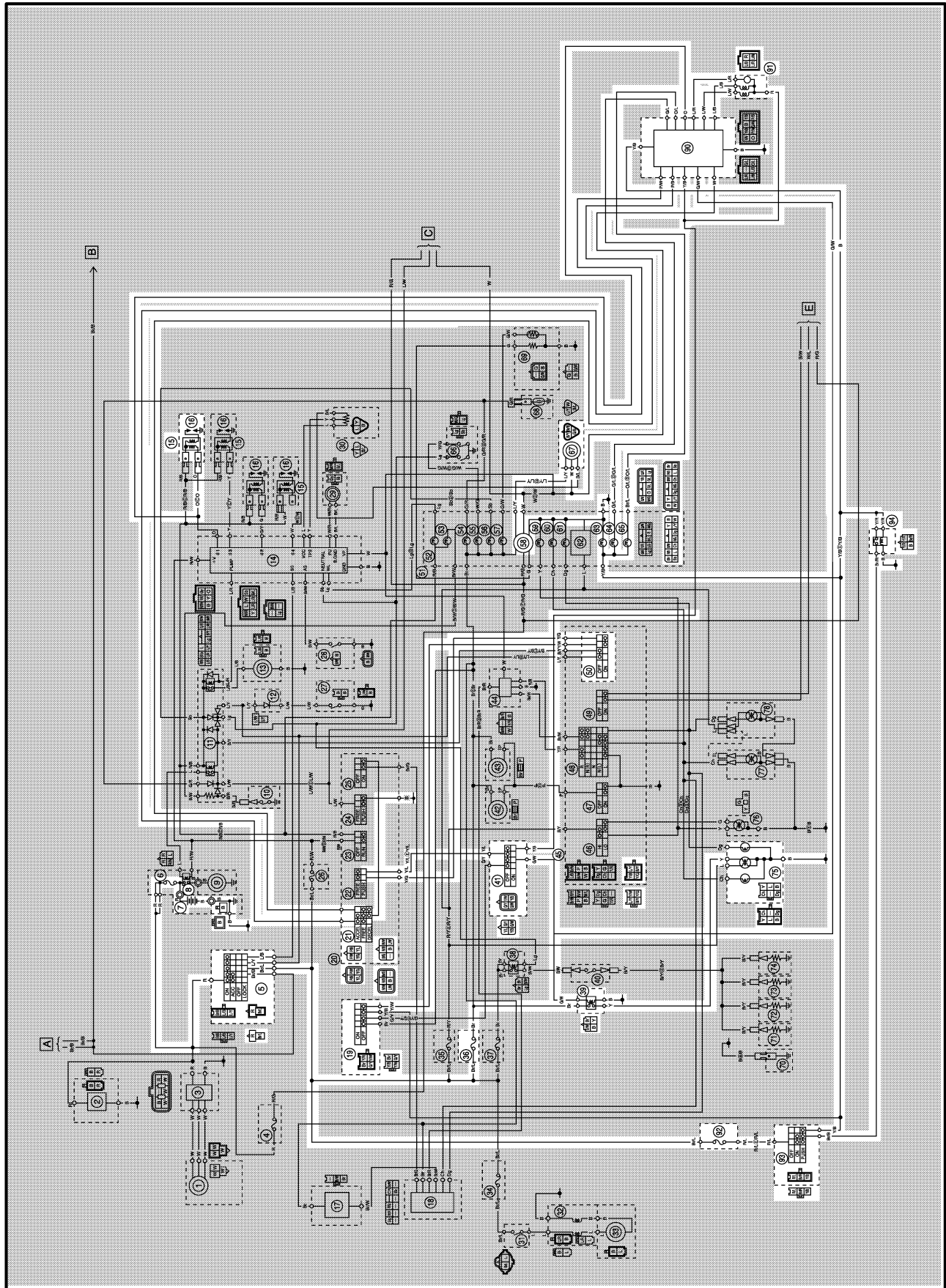
NO

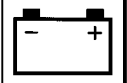
Replace the CB unit.

Correct the “TALK” switch.

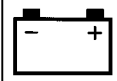


CRUISE CONTROL SYSTEM CIRCUIT DIAGRAM



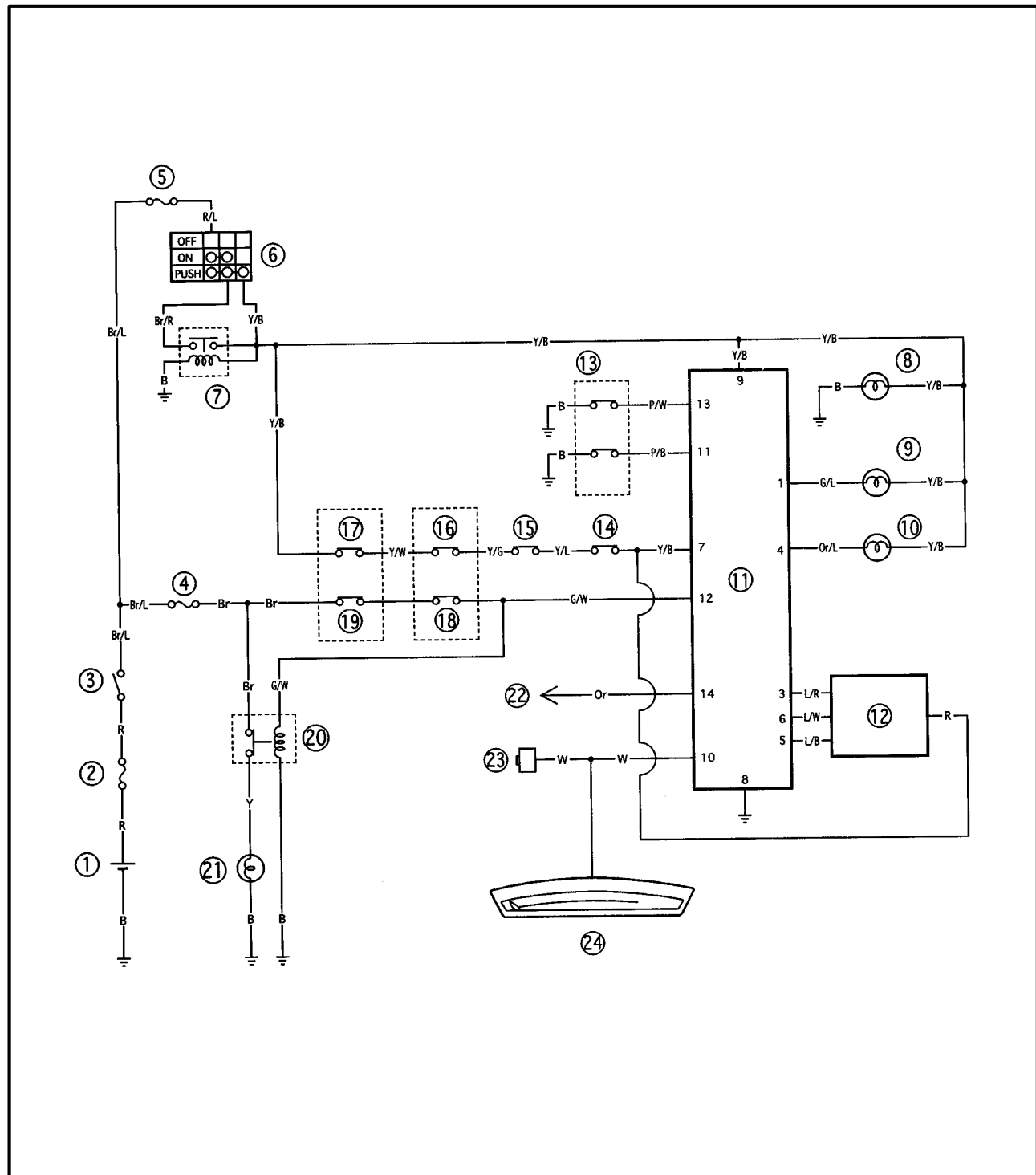


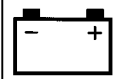
- ⑤ Main switch
- ⑥ Fuse (main)
- ⑦ Battery
- ⑮ Ignition coil
- ⑲ Front brake switch
- ⑳ Cruise control switch
- ㉑ Cruise control cancel switch
- ㉓ Clutch switch
- ㉔ Fuse (turn signal)
- ㉕ Brake light relay
- ㉖ Rear brake switch
- ㉗ Clutch switch
- ㉘ Engine warning light
- ㉙ Cruise control light (MAIN)
- ㉚ Cruise control light (SET)
- ㉛ Cruise control light (RES)
- ㉜ Speed sensor
- ㉝ Tail/brake light
- ㉞ Cruise control unit
- ㉟ Vacuum pump
- ㊱ Fuse (cruise control)
- ㊲ P/W switch
- ㊳ Cruise control relay



CRUISE CONTROL CIRCUIT OPERATION

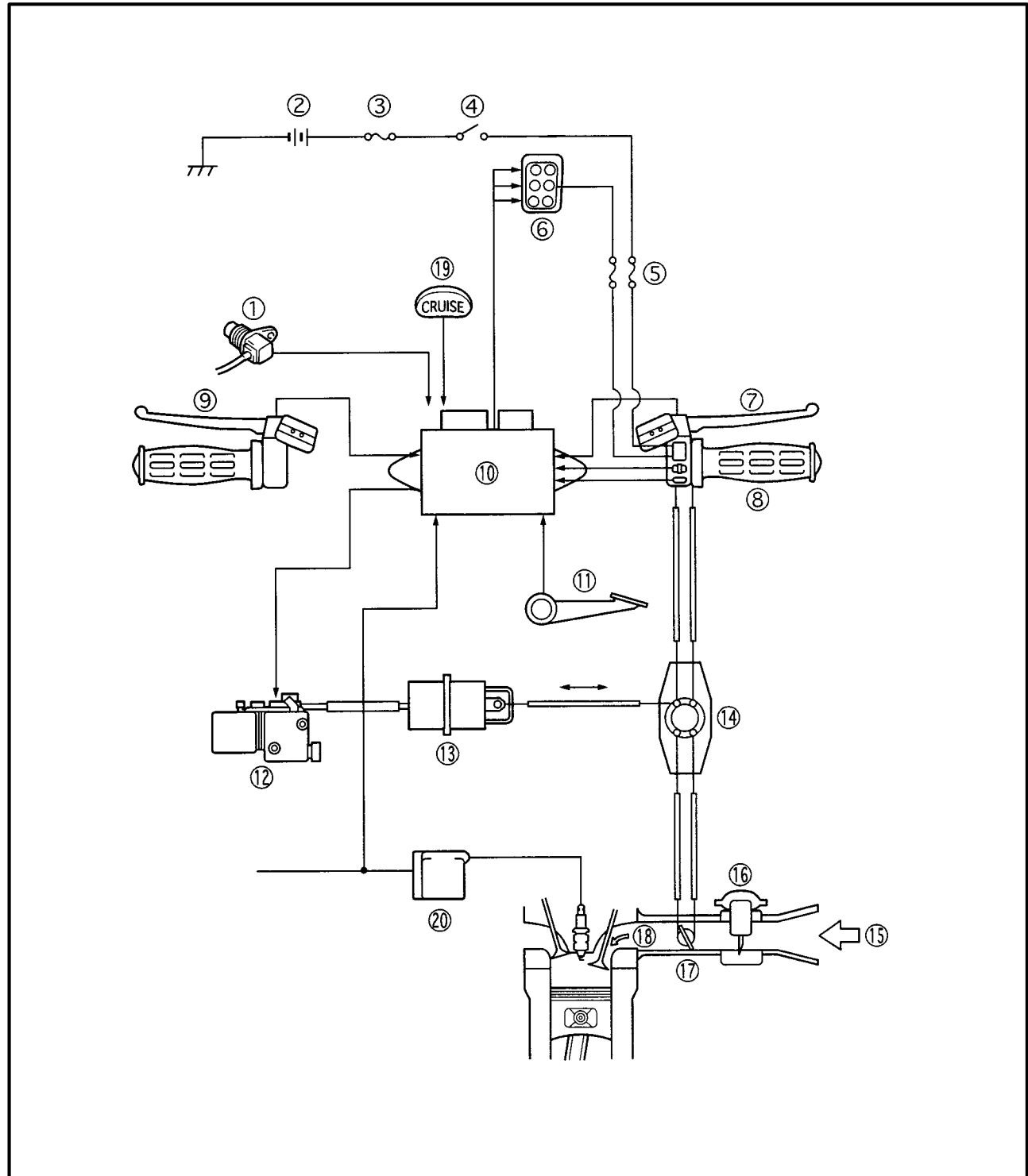
- | | | |
|-------------------------|----------------------------|--------------------|
| ① Battery | ⑪ Cruise contrl unit | ⑳ Brake lamp relay |
| ② Main fuse | ⑫ Vacuum pump | |
| ③ Main switch | ⑬ Cruise contrl switch | ㉑ Brake light |
| ④ Signal fuse | ⑭ Rear brake switch | ㉒ To ignition coil |
| ⑤ Cruise control fuse | ⑮ Cancel switch | ㉓ Speed sensor |
| ⑥ "CRUISE" switch | ⑯ Clutch switch | ㉔ Speedometer |
| ⑦ Cruise contrl relay | ⑰ Front brake switch | |
| ⑧ "ON" indicator light | ⑱ Rear brake light switch | |
| ⑨ "SET" indicator light | ㉒ Front brake light switch | |
| ⑩ "RES" indicator light | | |

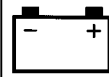




CRUISE CONTROL SYSTEM COMPONENTS

- | | | |
|----------------|---------------------------------------|--------------------|
| ① Speed sensor | ⑦ Front brake switch | ⑮ Air |
| ② Battery | ⑧ Cruise control switch/cancel switch | ⑯ Carburetor (s) |
| ③ Fuse | ⑨ Clutch switch | ⑰ Throttle valve |
| ④ Main switch | ⑩ Cruise control unit | ⑱ Air/Fuel mixture |
| ⑤ Fuse | ⑪ Rear brake switch | ⑲ "CRUISE" switch |
| ⑥ Indicators | ⑫ Vacuum pump | ⑳ Ignition coil |
| | ⑬ Vacuum autuator | |
| | ⑭ Throttle cable joint | |





EAS00781

TROUBLESHOOTING

Check:

1. main, signal and cruise control
2. battery
3. main switch
4. "CRUISE" switch
5. cruise control relay
6. wiring
(of the entire charging system)

NOTE:

- Before troubleshooting, remove the following part (-s):
 - 1) seat
 - 2) under cowl (left and right)
 - 3) upper cowl
- Troubleshoot with the following special tool (-s).



Pocket tester
90890-03112

EAS00738

1. Main, signal, and cruise control fuses

- Check the control fuses for continuity. Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the control fuses OK?



YES



NO

Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in CHAPTER 3.



Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?



YES



NO

- Clean the battery terminals
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



YES



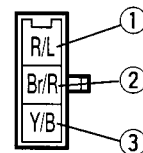
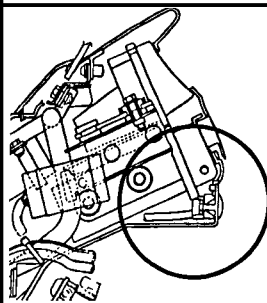
NO

Replace the main switch.

4. "CRUISE" switch

- Disconnect the "CRUISE" switch connector.
- Check the "CRUISE" switch for continuity.

Tester positive probe → red/blue ①
Tester negative probe → brown/red ② or yellow/black ③



- Is the "CRUISE" switch OK?

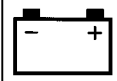


YES



NO

Replace the "CRUISE" switch.

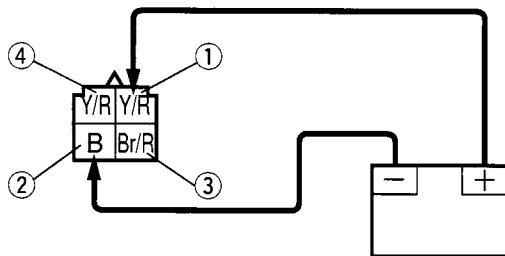


5. Cruise control relay.

- Disconnect the relay from the connector.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay unit terminal as shown.

Battery positive terminal → yellow/red ①
Battery negative terminal → black ②

Tester positive probe → brown/red ③
Tester negative probe → yellow/red ④



- Does the cruise control relay have continuity between brown/red and yellow/red?

YES

NO

Replace the relay unit.

6. Wiring

- Check the entire cruise control system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cruise control system's wiring properly connected and without defects?

YES

NO

Check the condition of each of the cruise control system's circuits. Refer to "CHECKING THE CRUISE CONTROL SYSTEM".

Properly connect or repair the cruise control system's wiring.

CHECKING THE CRUISE CONTROL SYSTEM Detecting an abnormality with the motor-cycle stopped

1. The cruise control indicator light fail to come on.

1. Cruise control indicator light bulb and socket

- Check the cruise control indicator light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the cruise control indicator light bulb and socket OK?

YES

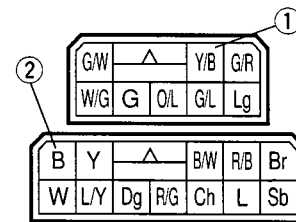
NO

Replace the cruise control indicator light bulb, socket or both.

2. Voltage

- Connect the pocket tester (20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → yellow/black ①
Tester negative probe → black ②



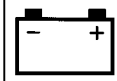
- Set the main switch to "ON".
- Set the cruise switch to "ON".
- Measure the voltage (12V) of blue 1 on the meter assembly coupler (wire harness side).
- Is the voltage within specification?

YES

NO

This circuit is OK.

The wiring circuit from the cruise control relay to the meter assembly coupler is faulty and must be repaired.



2. The "SET"/"RES" indicator light will show any an abnormality of the cruise control system.

1. "SET"/"RES" indicator light bulb and socket

- Check the "SET"/"RES" indicator light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the "SET"/"RES" indicator light bulb and socket OK?



YES



NO

Replace the "SET"/"RES" indicator light bulb, socket or both.

2. Voltage

- Connect the pocket tester (DC 20 V) to the "SET"/"RES" indicator light couplers (wire harness side) as shown.

"SET" indicator light

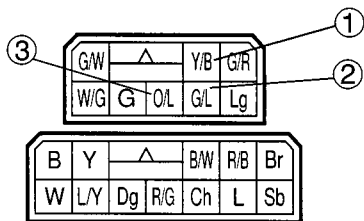
Tester positive probe → yellow/black ①

Tester negative probe → green/blue ②

"RES" indicator light

Tester positive probe → yellow/black ①

Tester negative probe → orange/blue ③



- Set the main switch to "ON".
- Set the "CRUISE" switch to "ON".
- Measure the voltage (12 V) of yellow/black ① on the meter assembly couplers (wire harness side).
- Is the voltage within specification?



YES



NO

The wiring circuit from the cruise control relay to the meter light connectors is faulty and must be repaired.

3. Check

- Set the main switch to "ON" and the "CRUISE" switch to "ON".
- The cruise control, "SET" and "RES" indicator lights come on.
- The "SET", "RES" and "ON" indicator lights go out after approximately 1.4 second (to check for a burned bulb). The "ON" indicator light stays on.
- Is it correct?



YES



NO

This circuit is OK.

The "SET" and "RES" indicator light(s) flashes. Refer to "SELF-DIAGNOSIS".

Detecting and abnormality during operation

1. The cruise control system can not be set.

(The "SET" indicator light does not come on)

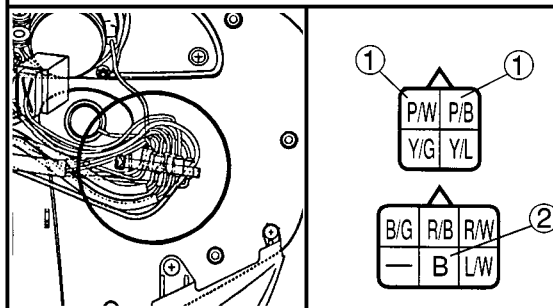
1. Cruise control switch

- Disconnect the connector from the cruise control unit.
- Connect the pocket tester ($\Omega \times 1$) to the connector.

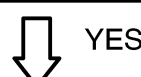
Tester positive probe →

pink/white on pink/black ①

Tester negative probe → black ②



- When set the cruise control switch to "SET. DEC", the resistance reading 0Ω to $\infty \Omega$.
- Is the resistance with specification?



YES



NO

The cruise control switch is faulty. Replace the right handlebar switch.



2. Speed sensor

- Check the following items.
 - 1) Speedometer is faulty operation
 - a. Engine warning light is flashing (Fault code 4)
Refer to "SELF-DIAGNOSIS".
 - b. "SET" and/or "RES" indicator light is flashing (Fault code 4)
Refer to "SELF-DIAGNOSIS".
- Is the speed sensor OK?



YES (Faulty)



NO (Normal)

Replace the speed sensor.

Replace the cruise control unit.

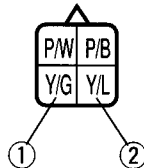
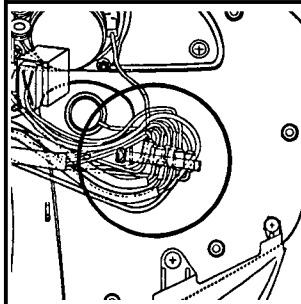
2. Set speed can not be cancelled by cancel switches ("CANCEL", front brake, rear brake and/or clutch switches)

1. "CANCEL" switch

- Disconnect the right handlebar switch from the connector.
- Check the "CANCEL" switch for continuity.

Tester positive probe → yellow/green ①

Tester negative probe → yellow/blue ②



- Is the "CANCEL" switch OK?



YES



NO

The "CANCEL" switch is faulty. Replace the right handlebar switch.

2. Front brake, rear brake and clutch switch.

- Check the switches for continuity.
Refer to "CHECKING THE SWITCHES".
- Are the switches OK?



YES



NO

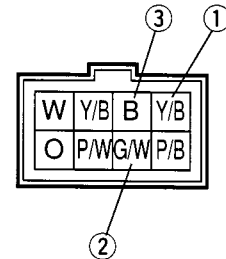
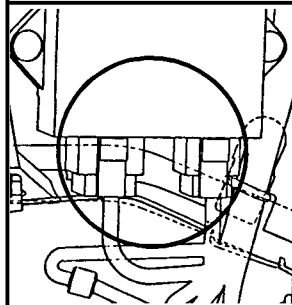
Replace the faulty switch(es).

3. Cruise control unit

- Disconnect the cruise control unit from the connector.
- Connect the pocket tester (DC20V) to the connector.

Tester positive probe → yellow/black ① or green/white ②

Tester negative probe → black ③



- Set the main switch to "ON" and the "CRUISE" switch to "ON".
- When operating the cancel switches ("CANCEL," front brake, rear brake or clutch switches), the voltage reading is 12 V to 0 V.
- Is the voltage with specification?



YES

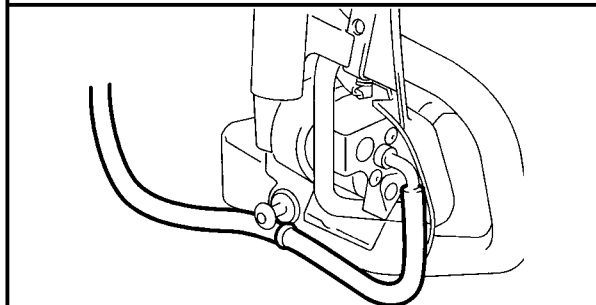


NO

The wiring circuit is faulty and must be repaired.

4. Vacuum hose

- Check the vacuum hose for clogging and/or damage.



- Is the vacuum hose OK?

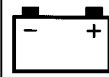


YES



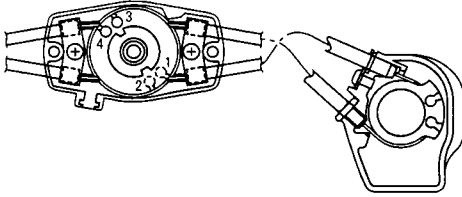
NO

Repair or replace the vacuum hose.



5. Throttle cables

- Check the throttle cables and throttle housing condition.



- Is the throttle cables OK?



YES



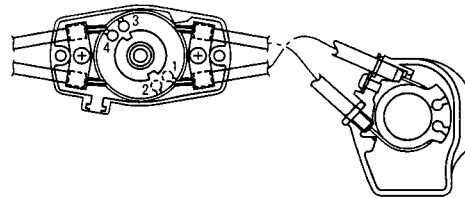
NO

Replace the cruise control unit.

Repair or replace the throttle cables.

2. Throttle cable joint

- Check the throttle cable joint operation by operating the actuator manually, and check if the throttle valve opens.



- Is the throttle cable joint OK?



YES



NO

Repair or replace the throttle cable joint.

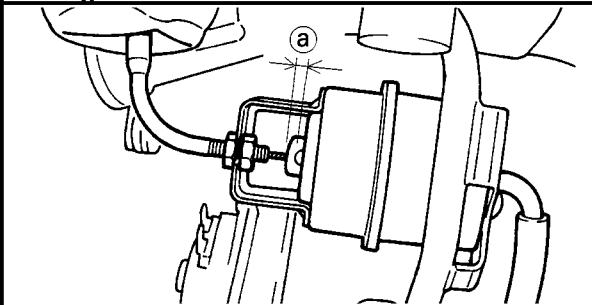
3. Cruise control system can not be set ("SET" indicator light come on)

1. Throttle cable free play

- Check the throttle cable free play (a).



Free Play (a) :
1 ~ 2 mm (0.04 ~ 0.08 in)



- Is the throttle cable free play OK?



YES

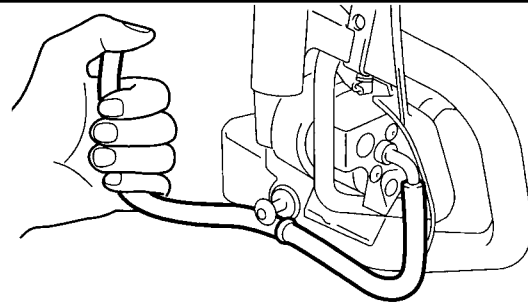


NO

Adjust the free play. Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in CHAPTER 3.

3. Vacuum actuator

- Disconnect the vacuum hose at the vacuum pump and operate the actuator manually and play the open end of the hose by a finger.



- Is the actuator diaphragm staying?

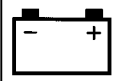


YES



NO

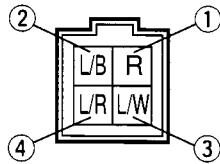
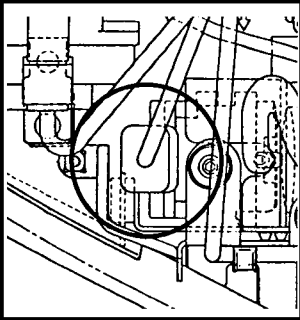
Actuator diaphragm and/or vacuum hose are faulty. Replace as required.



4. Vacuum pump 1

- Reconnect the vacuum hose and disconnect the vacuum pump connector.
- Connect the battery (12 V) as shown.

Battery positive terminal → red ①
Battery negative terminal → blue/black ②
 blue/white ③
 blue/red ④



- Is the actuator operating?

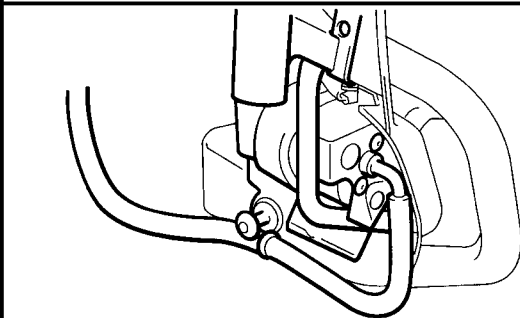
↓ YES

↓ NO

Replace the vacuum pump.

5. Vacuum pump 2

- After operating the actuator, stop the vacuum pump by disconnecting the battery lead from the 4 terminals. In this condition, leave it approximately 5 seconds and check if the actuator diaphragm stays or returns.



- Is the actuator diaphragm staying?

↓ YES

↓ NO

Replace the cruise control unit.

Replace the vacuum pump.

4. Vehicle speed fluctuate during the cruising

1. Speed sensor

- Check the following items.
 - 1) Speedometer is faulty operation.
 - a. Engine warning light is flashing (Fault code 4)
Refer to "SELF-DIAGNOSIS".
 - b. "SET" and/or "RES" indicator light is flashing (Fault code 4)
Refer to "SELF-DIAGNOSIS".
- Is the speed sensor OK?

↓ YES
(Faulty)

↓ NO
(Normal)

Replace the speed sensor.

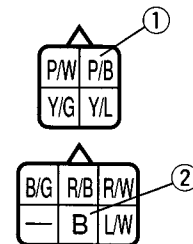
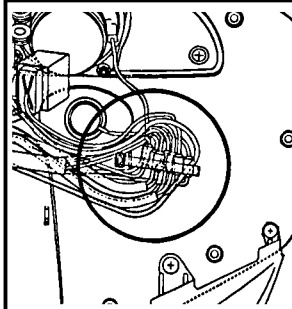
Replace the cruise control unit.

5. Cruising speed can not be increased or resume can not be operated by cruise control switch.

1. Cruise control switch

- Disconnect the right handlebar switch connector from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the connector.

Tester positive probe → pink/black ①
Tester negative probe → black ②



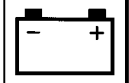
- When set the cruise control switch to "RES. ACC", the resistance reading 0Ω to $\infty \Omega$.
- Is the resistance with specification?

↓ YES

↓ NO

Replace the cruise control unit.

The cruise control switch is faulty. Replace the right handlebar switch.



SELF DIAGNOSIS FUNCTION OF THE CRUISE CONTROL SYSTEM

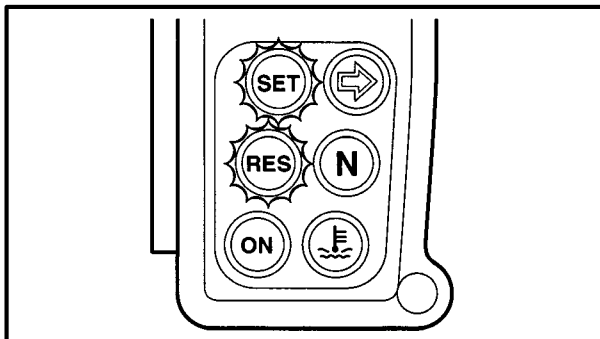
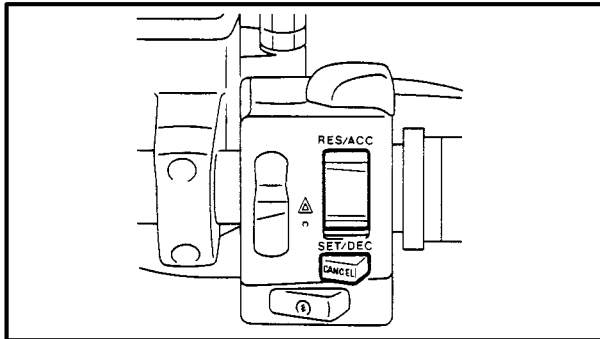
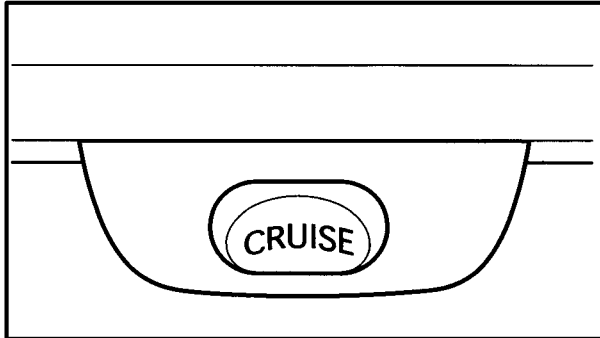
The cruise control system has a self diagnosis function.

Use of the function allows the self diagnosis about the following:

1. Trouble diagnosis of the cancel switch signal.
2. Trouble diagnosis of the brake light signal.
3. Trouble diagnosis of the throttle drive system.

Operating procedure for the self diagnosis mode

- 1) Turn on the main switch.
- 2) Set the "CRUISE" switch to the "ON" position.



- 3) Start the engine.
- 4) Use the engine stop switch and stop the engine.
- 5) Wait for 10 seconds.
- 6) Push the cruise control switch to the "SET" and "RES" alternatively three times (total of 6 times) within 2 seconds while pressing the cancel switch.

Then the indicator light will be lit and the cruise control system will enter the self diagnosis mode.

- 1) The "SET" and "RES" indicator lights will then blink alternatively three times.

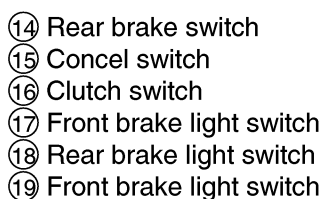
NOTE:

When the cruise control system is not failure, the "SET" and "RES" indicator lights will be remained on.

Exiting the self diagnosis mode

Perform any one of the four steps shown below. The system will then exit the self diagnosis mode.

- 1) Start the engine.
- 2) Turn the rear wheels.
- 3) Turn off the main switch.
- 4) Push the "CRUISE" switch to "OFF".

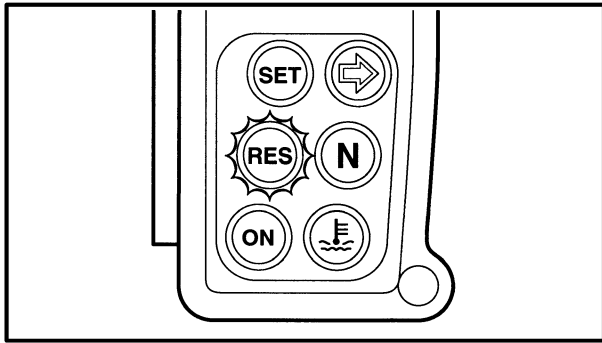
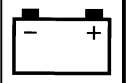


- 1) The "SET" indicator light is lit.
- 2) Operate the cancel, front brake, rear brake, and clutch switches.

Example:

If the cancel switch is operated and the “SET” indicator light is not extinguished, it means that the cancel switch is in failure.





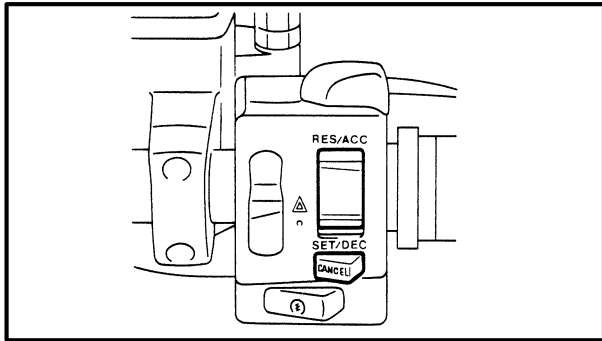
2. Trouble diagnosis of the brake light signal

- 1) The "RES" indicator light is lit.
- 2) Operate the following front brake and rear switches.

If the RES indicator light is not extinguished after either of these switches is operated, it means that the relevant switch is in failure.

Example:

If the front brake switch is operated and the "RES" indicator light is not extinguished, it means that the front brake switch is in failure.

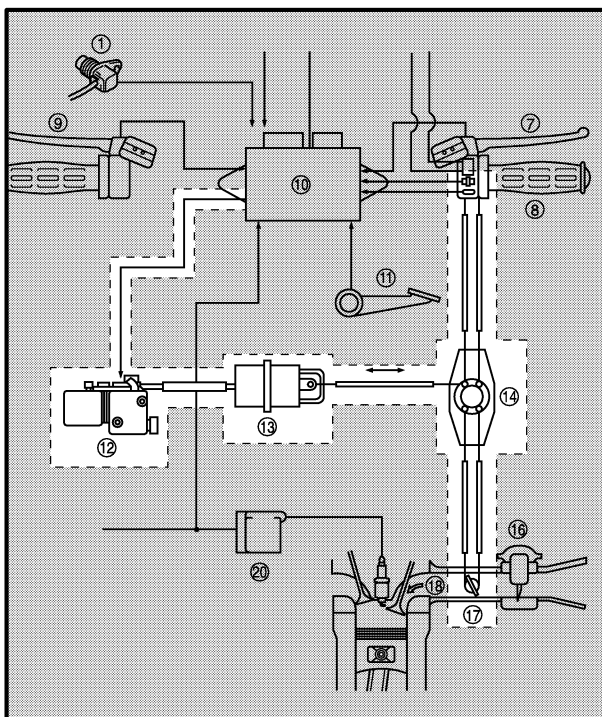


3. Trouble diagnosis of the throttle drive

- 1) Push the cruise control switch to "RES".
The throttle will be then opened fully in approx. 2.5 seconds and kept fully open for 3 seconds.

The throttle will be fully closed approx. 2.5 seconds later.

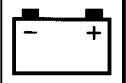
Check the closing throttle for noises and operation.



If noise is heard from the vacuum pump but the throttle is not operating, it means that the throttle cable is in failure.

If no noises are heard from the vacuum pump, it means that the vacuum pump is in failure.

- ⑫ Vacuum pump
- ⑬ Vacuum actuator
- ⑭ Throttle cable joint
- ⑰ Throttle valve



SELF-DIAGNOSIS

The XVZ13LT features a self-diagnosing system for following displays.

1. Engine warning light
2. Fuel meter
3. "SET"/"RES" indicator light

1. ENGINE WARNING LIGHT

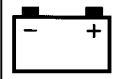
When the main switch is turned to "ON", the following items are monitored and the condition codes are displayed on the engine warning light (irrespective of whether the engine is running or not).

NOTE:

The XVZ13LT features a self-diagnosing system.

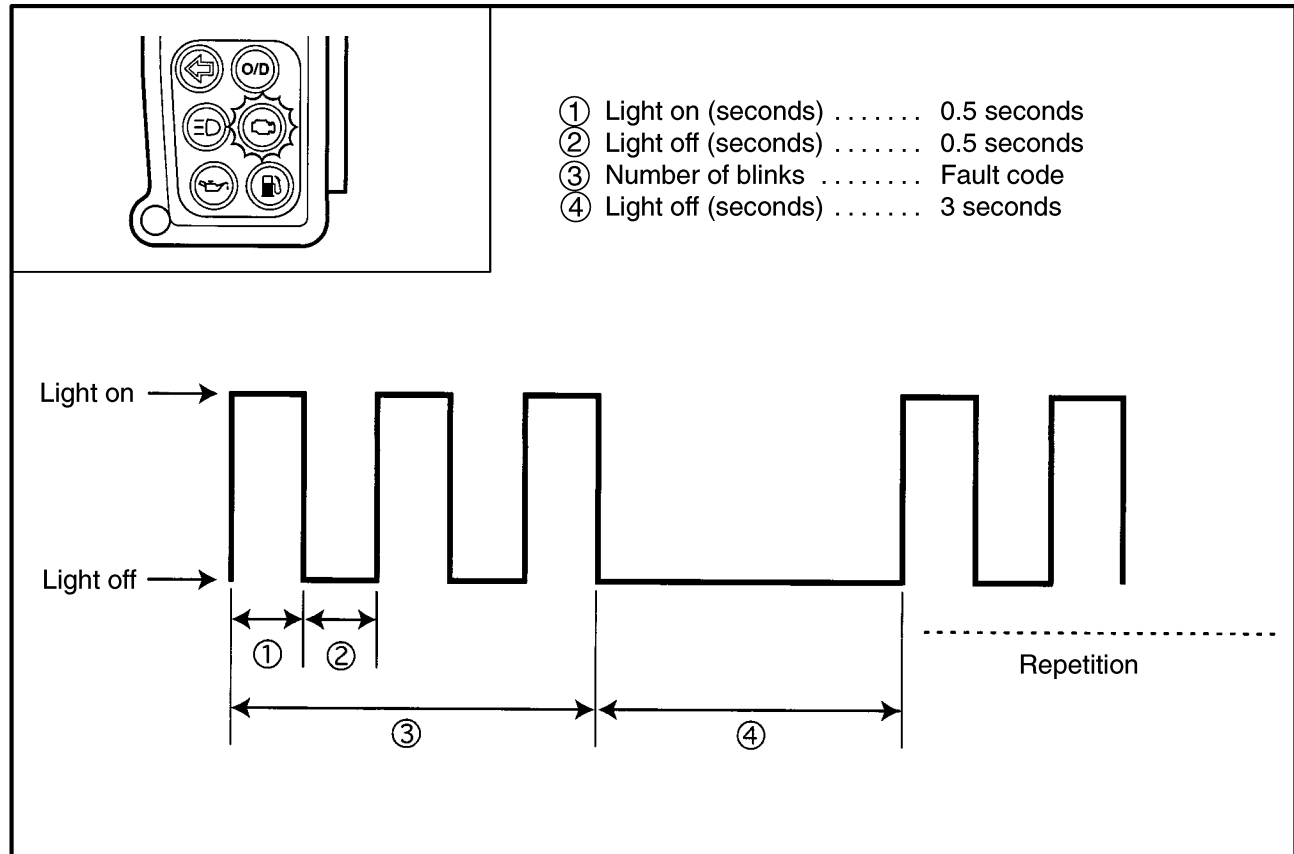
In the EVZ13LT, when the main switch is turned on the "Engine indicator light" in the speedometer comes on for 1.4 seconds then goes off. However, if there is a malfunction, it comes on for 1.4 seconds, goes off and then begins flashing. (However, it is on while the engine is running.)

Item	Condition	Response	Display condition code	
			When engine is stationary	When engine is running
Throttle position sensor (TPS)	Disconnected Short-circuit Locked	- Enables the motorcycle to run so that the ignition timing is fixed when the throttle is fully opened. - Displays the condition code on the engine indicator light.	Blinks in Fault code [3]	Light on
Speed sensor	Illegality pulse Disconnected Short-circuit	Operate the speed limiter (5,000 r/min)	Blinks in Fault code [4]	Light on
Emergency stop switch	Disconnected	—	Blinks in Fault code [9]	Light on

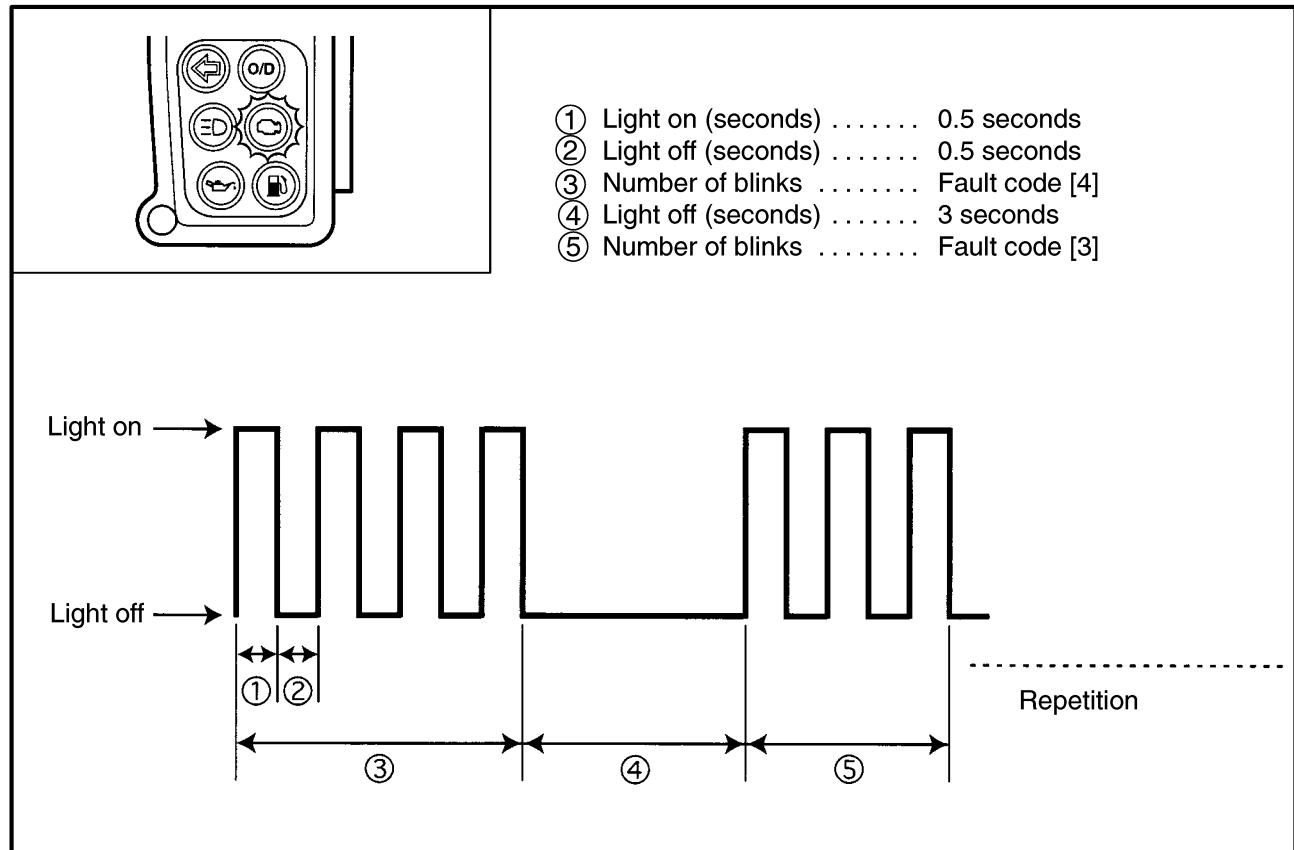


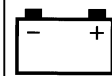
Display order on the engine warning light

When one item being monitored



When more than one item is being monitored





EAS00835

TROUBLESHOOTING

The tachometer starts to display the self-diagnosis sequence.

Check:

1. throttle position sensor
2. speed sensor
3. emergency stop switch

NOTE:

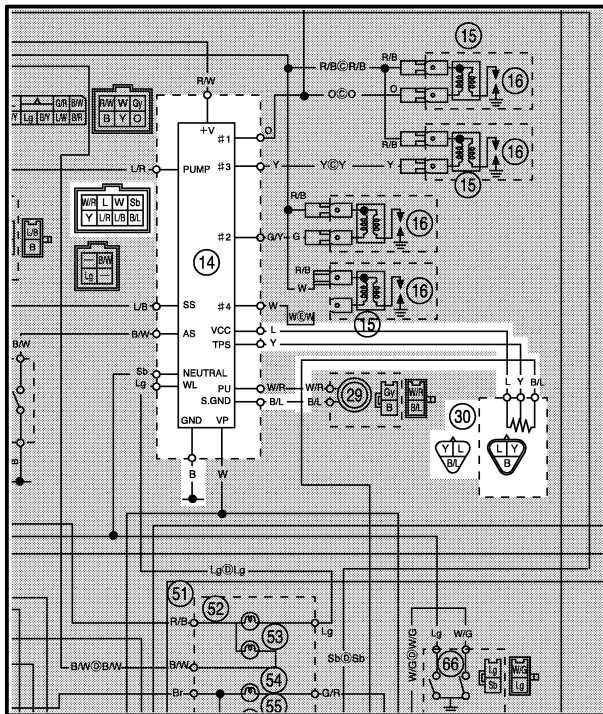
- Before troubleshooting, remove the following part(-s):
 - 1) rider seat
 - 2) fuel tank
 - 3) air filter case
- Troubleshoot with the following special tool(-s).



Pocket tester
90890-03112

EAS00836

1. Throttle position sensor CIRCUIT DIAGRAM



⑭ Ignitor unit

③① Throttle position sensor

1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

EB812401

2. Throttle position sensor

- Check the throttle position sensor for continuity. Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR" in chapter 6.
- Is the throttle position sensor OK?



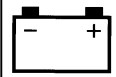
YES



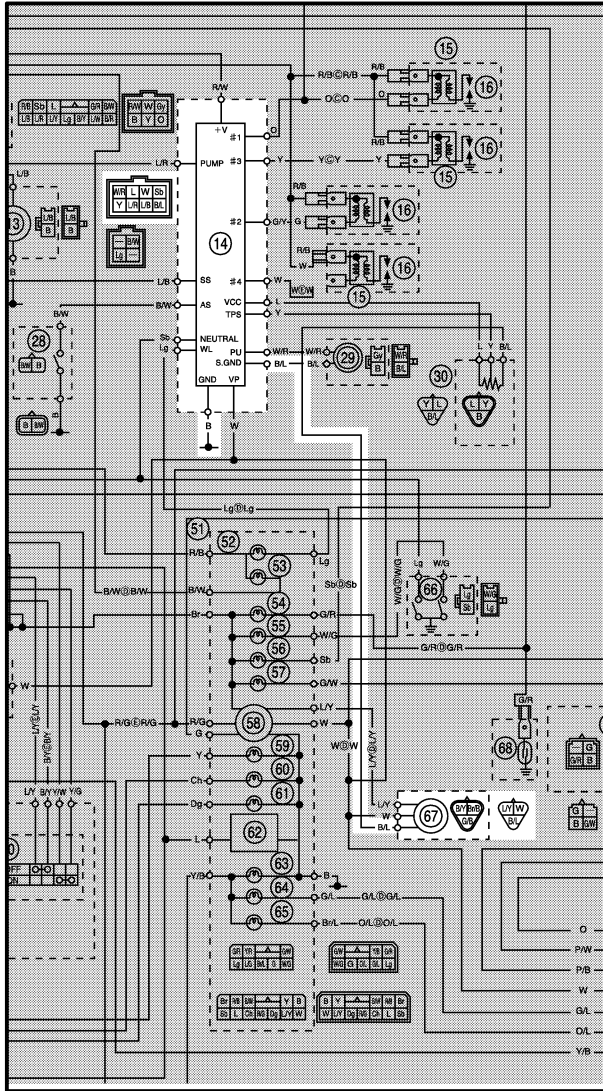
NO

Replace the ignitor unit.

Replace the throttle position sensor.



2. Speed sensor CIRCUIT DIAGRAM



- ⑭ Ignitor unit
- ⑥⑦ Speed sensor

1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?

↓ YES

↓ NO

Repair or replace the wire harness.

EB812401

2. Speedometer

- Check the speedometer operation.
- Is the speedometer OK?

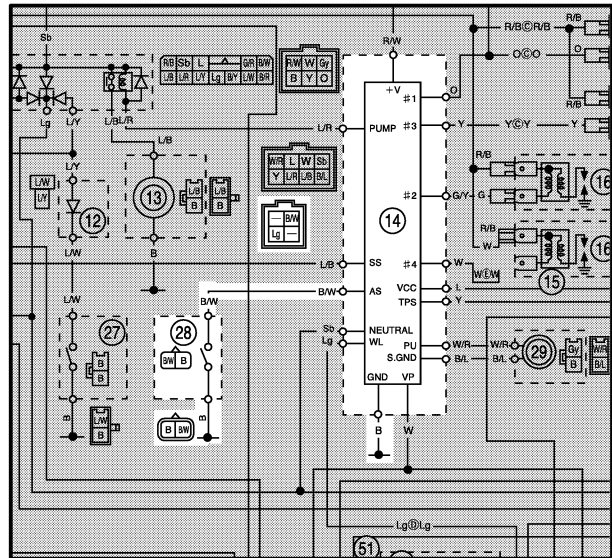
↓ YES

↓ NO

Replace the ignitor unit.

Replace the speed sensor.

3. Emergency stop switch CIRCUIT DIAGRAM



- ⑭ Ignitor unit
- ②⑧ Emergency stop switch

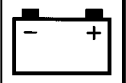
1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?

↓ YES

↓ NO

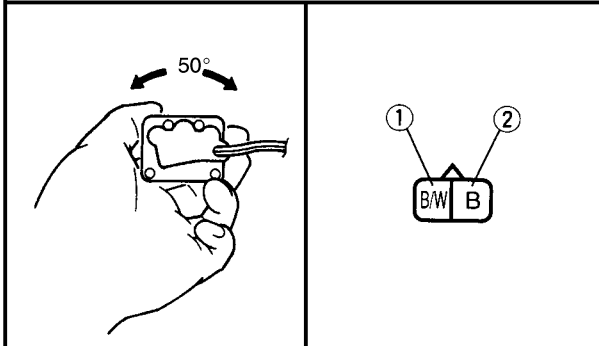
Repair or replace the wire harness.



EB812401

2. Emergency stop switch

- Remove the emergency stop switch.
- Connect the pocket tester ($\Omega \times 1$) to the emergency stop switch connector as shown.

Tester positive probe → black/white ①**Tester negative probe → black ②**

- When turn the emergency stop switch approx. 50° , the resistance reading is 0Ω to $\infty \Omega$.
- Is the emergency stop switch OK?



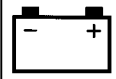
YES

Replace the ignitor unit.



NO

Replace the emergency stop switch.



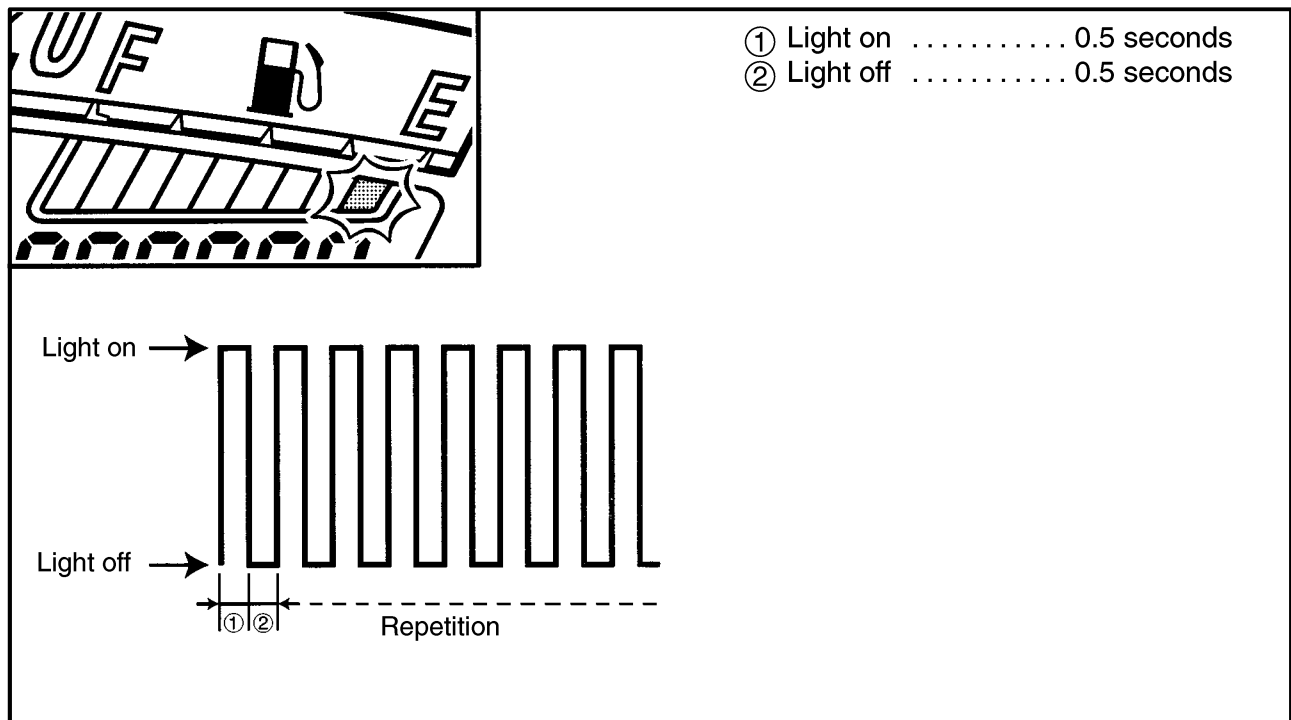
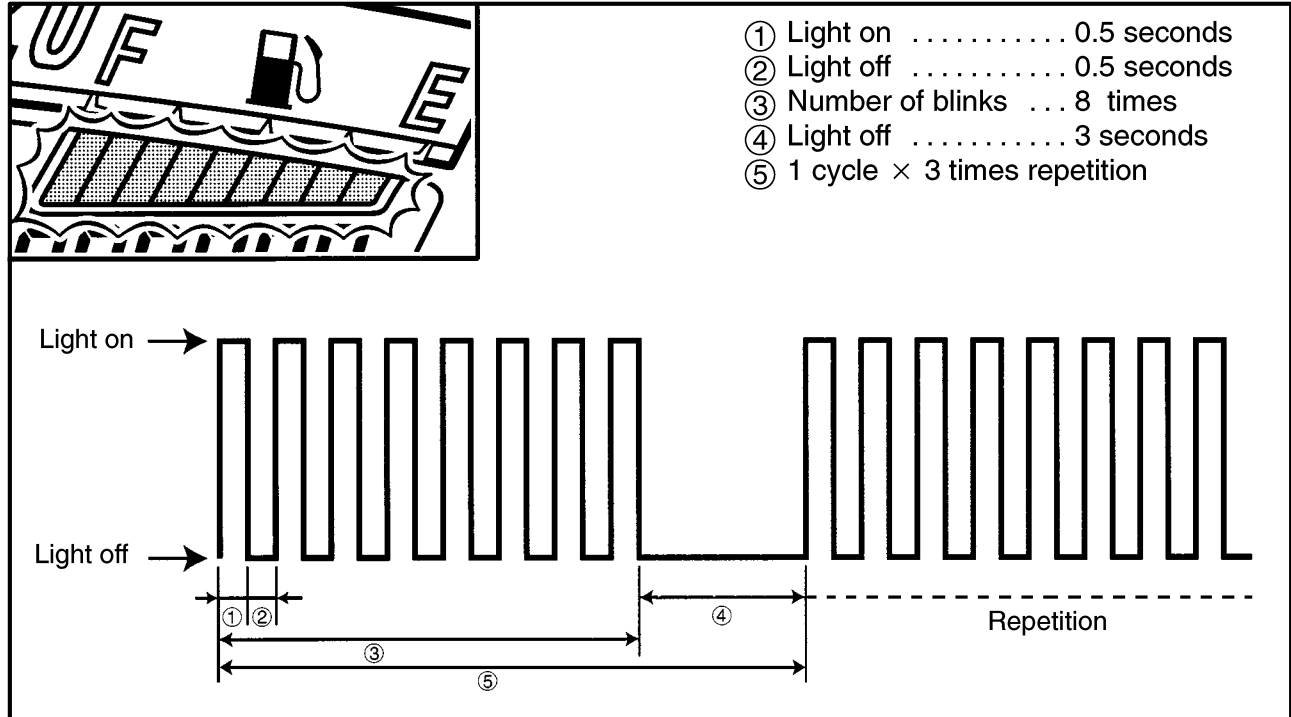
2. FUEL METER

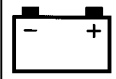
The fuel meter is indicated the fault displays as follows

- Fuel sender
- Fuel thermistor

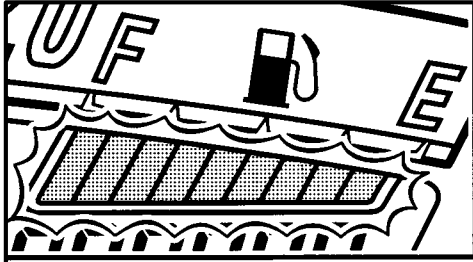
Fuel meter display sequence

Fuel sender

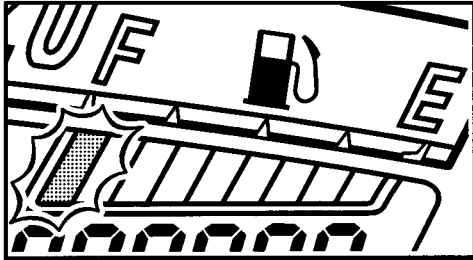
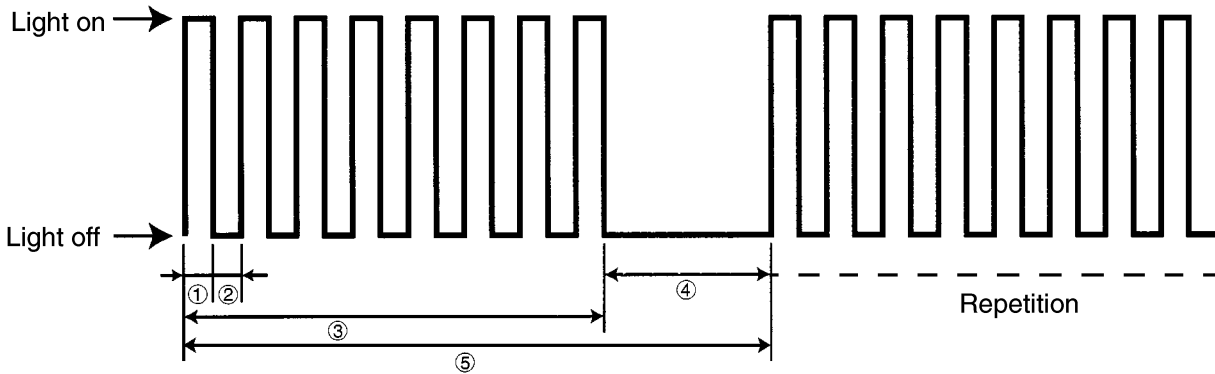




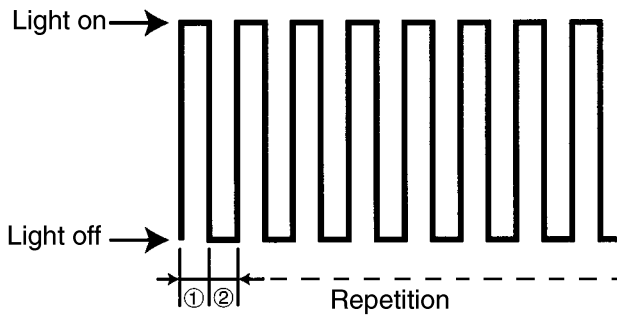
Fuel thermistor

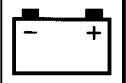


- ① Light on 0.5 seconds
- ② Light off 0.5 seconds
- ③ Number of blinks ... 8 times
- ④ Light off 3 seconds
- ⑤ 1 cycle × 3 times repetition



- ① Light on 0.5 seconds
- ② Light off 0.5 seconds



**1. Wire harness**

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

EB812401

2. Fuel thermistor

- Check the fuel thermistor operation.
- When set the main switch to on, the fuel level indicator light comes on.
- After 1.4 second, the fuel level indicator light goes off.
- Is the fuel thermistor OK?



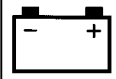
YES



NO

Replace the fuel meter.

The fuel thermistor is faulty. Replace the fuel sender unit.

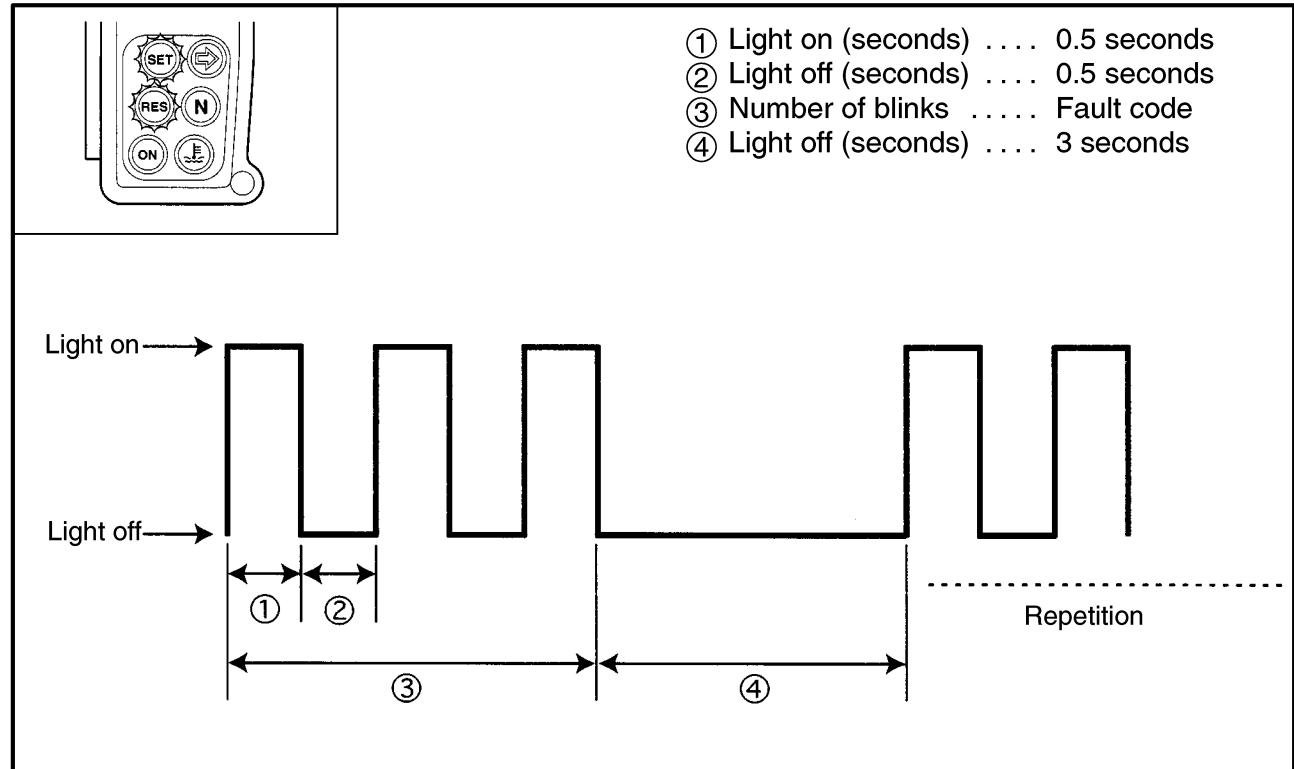


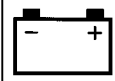
3. “SET”/“RES” INDICATOR LIGHT

When the main switch is turned to “ON”, the following items are monitored and the condition codes are displayed on the “SET”/“RES” indicator light at same time (irrespective of whether the engine is running or not).

Item	Condition	Display condition		
		When engines is stationary	When engine is running	Fault code
Cruise control unit	Disconnected Short-circuit	Blinks in	Blinks in	1
Vacuum pump	Disconnected Short-circuit	Blinks in	Blinks in	2
Concel switch, Front brake switch, Rear brake switch or Clutch switch	Disconnected Short-circuit	Blinks in	Blinks in	3
Speed sensor	Il legality pulse	Blinks in	Blinks in	4
Ignition coil	Il legality pulse Disconnected Short-circuit	Blinks in	Blinks in	5
Cruise control switch	Disconnected	Blinks in	Blinks in	6

Display order on the “SET”/“RES” indicator light





Fault code	
1	
2	
3	
4	
5	
6	

① 0.5 seconds

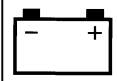
② 0.5 seconds

③ Number of blinks Fault code

④ 3 seconds

A Light on

B Light off



EAS00835

TROUBLESHOOTING

The “SET”/“RES” indicator light starts to display the self-diagnosis sequence.

Check:

1. cruise control unit
2. vacuum pump
3. cancel switch, front brake switch, rear brake switch or clutch switch
4. speed sensor
5. ignition coil
6. cruise control switch

NOTE:

- Before troubleshooting, remove the following part (-s):
 - 1) rider seat
 - 2) fuel tank
 - 3) air filter case
- Troubleshoot with the following special tool (-s):



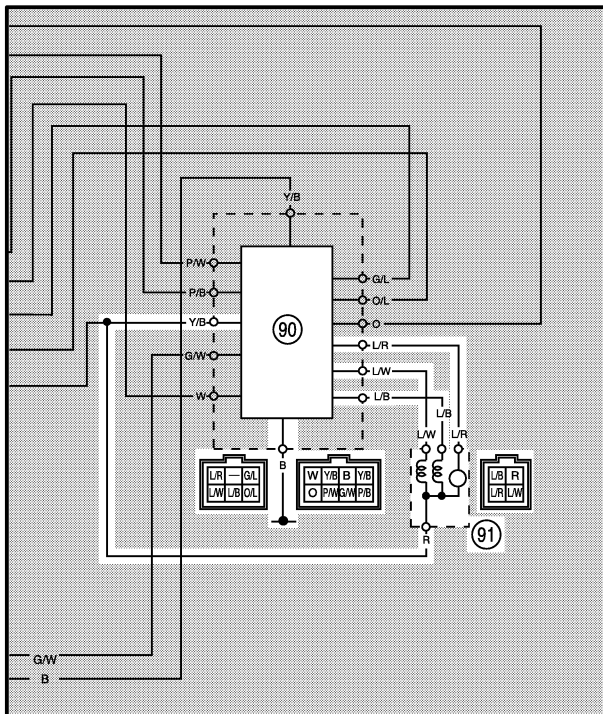
Pocket tester
90890-03112

1. Cruise control unit

Replace the cruise control unit.

2. Vacuum pump

CIRCUIT DIAGRAM



⑨① Cruise control unit

⑨② Vacuum pump

1. Wire harness

- Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.
- Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

EB812401

2. Vacuum pump

- Check the vacuum pump for continuity. Refer to “CRUISE CONTROL SYSTEM”.
- Is the vacuum pump OK?



YES



NO

Replace the cruise control.

Replace the vacuum pump.

3. Cancen switch, front brake switch rear brake switch or clutch switch

1. Wire harness

- Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.
- Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

2. Cancel switch, front brake switch, rear brake switch and clutch switch

- Check the switches for continuity. Refer to “CRUISE CONTROL SYSTEM”.
- Are the switches OK?



YES



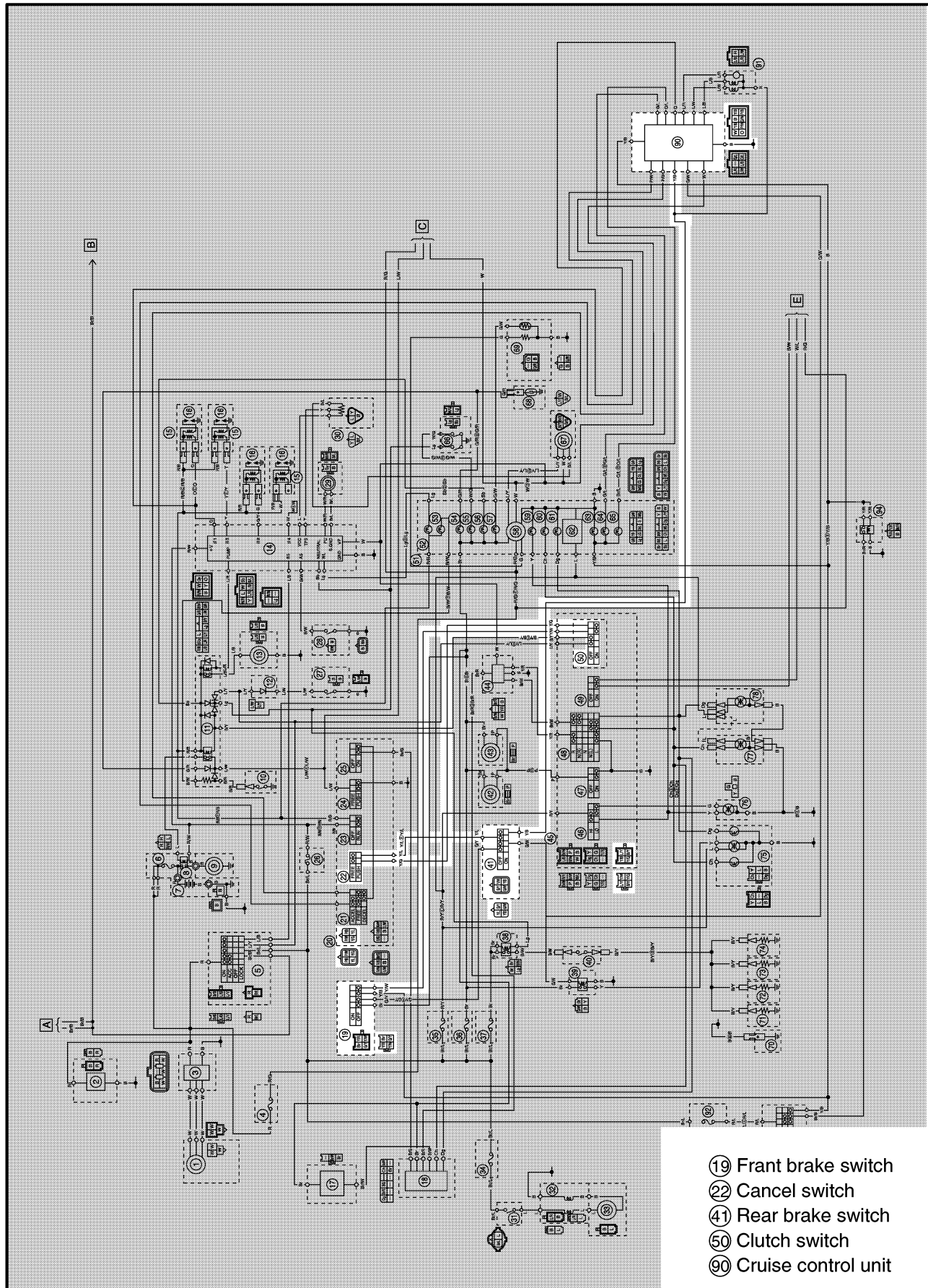
NO

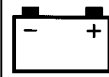
Replace the cruise control unit.

Repair or replace the faulty switch (es).



CIRCUIT DIAGRAM





1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

2. Engine condition

- Start the engine and check the engine condition from the idling to full opening the throttle.
- Is the engine condition OK?



YES



NO

Replace the cruise control unit.

Replace the ignition coil.

6. Cruise control switch

1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



YES



NO

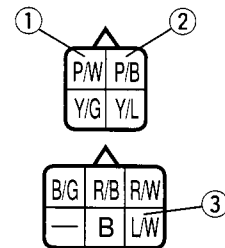
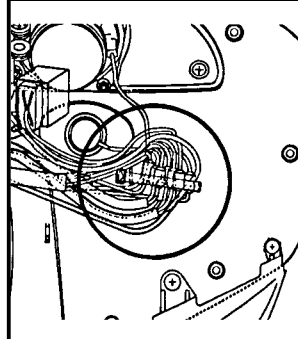
Repair or replace the wire harness.

2. Cruise control switch

- Disconnect the handlebar switch
- Connect the pocket tester ($\Omega \times 1$) to the handlebar switch connector.

Tester positive prove → pink/white ①
pink/black ②

Tester negative prove → black ③



- Check the cruise control switch for continuity.
- Is the cruise control switch OK?



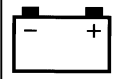
YES



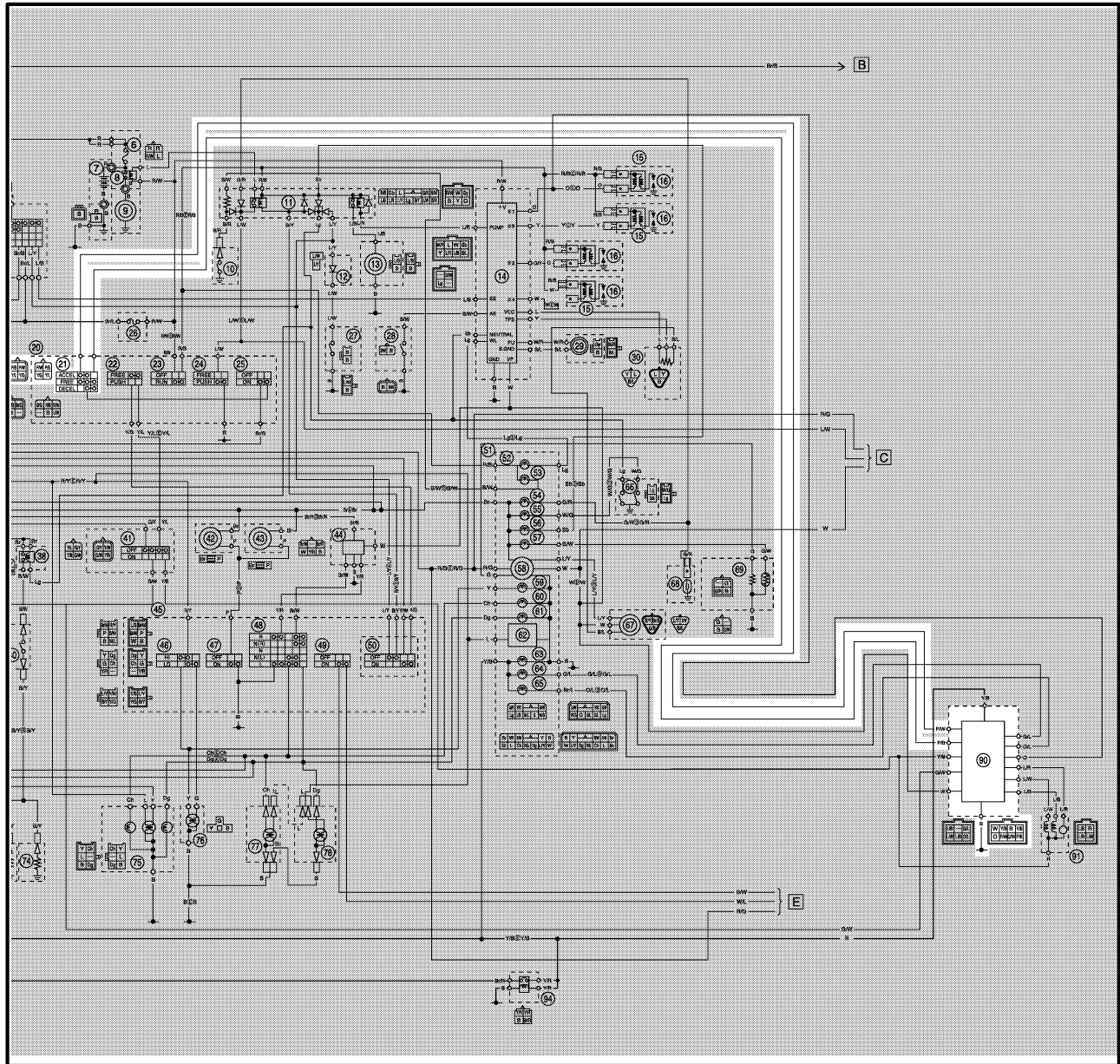
NO

Replace the cruise control unit.

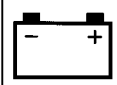
The cruise control switch is faulty. Replace the right handlebar switch.



CIRCUIT DIAGRAM



ELEC



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TROUBLESHOOTING

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

STARTING PROBLEMS

ENGINE

Cylinder(-s) and cylinder head (-s)

- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve
- Piston(-s) and piston ring(-s)
- Improperly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter

- Improperly installed air filter
- Clogged air filter element
- Crankcase and crankshaft
- Improperly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank

- Empty fuel tank
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel tank drain hose
- Clogged rollover valve
- Clogged rollover valve hose
- Deteriorated or contaminated fuel

Fuel pump

- Faulty fuel pump
- Faulty fuel pump relay

Fuel cock

- Clogged or damaged fuel hose

Carburetor(-s)

- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Improperly installed needle valve seat
- Incorrect fuel level
- Improperly installed pilot jet
- Clogged starter jet
- Faulty starter plunger
- Improperly adjusted starter cable

ELECTRICAL SYSTEMS**Battery**

- Improperly charged battery
- Faulty battery

Fuse(-s)

- Blown, damaged or incorrect fuse
- Improperly installed fuse

Spark plug(-s)

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Starting system

- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cut-off relay
- Faulty starter clutch

Ignition system

- Faulty ignitor unit
- Faulty pickup coil
- Broken generator rotor woodruff key
- Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty sidestand switch
- Faulty clutch switch
- Improperly grounded circuit
- Loose connections

Ignition coil(-s)

- Cracked or broken ignition coil
- Broken or shorted primary or secondary coils
- Faulty spark plug lead

EAS00846

**INCORRECT ENGINE IDLING SPEED
ENGINE****Cylinder(-s) and cylinder head(-s)**

- Incorrect valve clearance
- Damaged valve train components

Air filter

- Clogged air filter element

FUEL SYSTEM**Carburetor(-s)**

- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Improperly synchronized carburetors
- Improperly adjusted engine idling speed (throttle stop screw)
- Improper throttle cable free play (at the flange of the throttle grip)
- Flooded carburetor
- Faulty air induction system

ELECTRICAL SYSTEMS**Battery**

- Improperly charged battery
- Faulty battery
- Spark plug(-s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil(s)

- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Cracked or broken ignition coil

Ignition system

- Faulty ignitor unit
- Faulty pickup coil
- Broken generator rotor woodruff key

EAS00849

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING PROBLEMS".

ENGINE**Air filter**

- Clogged air filter element
- Air intake system
- Bent, clogged or disconnected carburetor air vent hose
- Clogged or leaking air duct

FUEL SYSTEM**Carburetor(-s)**

- Faulty diaphragm
- Incorrect fuel level
- Loose or clogged main jet

Fuel pump

- Faulty fuel pump

EAS00850

FAULTY GEAR SHIFTING**SHIFTING IS DIFFICULT**

Refer to "CLUTCH DRAGS".

SHIFT PEDAL DOES NOT MOVE

- Shift shaft
- Improperly adjusted shift rod
- Bent shift shaft.
- Shift drum and shift fork(-s)
- Foreign object in the shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

JUMPS OUT OF GEAR**Shift shaft**

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift fork(-s)

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS00852

FAULTY CLUTCH**CLUTCH SLIPS**

- Clutch
- Improperly assembled clutch
- Improperly assembled clutch master cylinder
- Improperly assembled clutch release cylinder
- Incorrect clutch fluid level
- Damage clutch hose
- Loose or fatigued clutch spring
- Loose union bolt
- Worn friction plate
- Worn clutch plate
- Damage clutch release cylinder

Engine oil

- Incorrect oil level
- Incorrect viscosity (low)
- Deteriorated oil

CLUTCH DRAGS

- Clutch Air in hydraulic clutch system
- Unevenly tensioned clutch springs
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch push rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Damaged clutch release cylinder
- Match marks not aligned

Engine oil

- Incorrect oil level
- Incorrect viscosity (high)
- Deteriorated oil

EAS00855

OVERHEATING**ENGINE**

- Clogged coolant passages Cylinder head(-s) and piston(-s)
- Heavy carbon buildup

Engine oil

- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

FUEL SYSTEM**Carburetor(-s)**

- Incorrect main jet setting
- Incorrect fuel level
- Air leak at carburetor joint

Air filter

- Clogged air filter element

ELECTRICAL SYSTEMS**Spark plug(-s)**

- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system

- Faulty ignitor unit

COOLING SYSTEM**Coolant**

- Low coolant level

Radiator

- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fins

Water pump

- Damaged or defective water pump

Thermostat

- Thermostat stays closed

Oil cooler

- Clogged or damaged oil cooler hose(-s) and pipe(-s)
- Damaged hose
- Improperly connected hose
- Damaged pipe
- Improperly connected pipe

CHASSIS**Brake(-s)**

- Dragging brake

EAS00856

OVERCOOLING**COOLING SYSTEM****Thermostat**

- Thermostat stays open

EAS00857

POOR BRAKING PERFORMANCE**Disc brake**

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit

- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil grease on the brake pad
- Incorrect brake fluid level

EAS00861

FAULTY FRONT FORK LEGS**LEAKING OIL**

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod bolt
- Damaged damper rod bolt copper washer
- Cracked or damaged cap bolt O-ring

EAS00862

UNSTABLE HANDLING**Handlebar**

- Bent or improperly installed handlebar

Steering

- Improperly installed upper bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Tire(-s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Swingarm

- Worn bearing or bushing
- Bent or damaged swingarm
- Rear shock absorber assembly(-ies)
- Faulty rear shock absorber spring
- Leaking oil or gas

MALFUNCTION

- Bent, deformed or damaged inner tube
- Bent, deformed or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

Front fork leg(-s)

- Uneven oil levels (both front fork legs)
- Uneven fork spring tension (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Wheel(-s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS00866

FAULTY SIGNALING SYSTEM**HEADLIGHT DOES NOT LIGHT**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrect ground
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

TURN SIGNAL DOES NOT LIGHT

- Faulty turn signal switch
- Faulty flasher relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or defective wire harness
- Incorrect ground
- Discharged battery
- Blown, damaged or incorrect fuse

HORN DOES NOT SOUND

- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

HEADLIGHT BULB BURNT OUT

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrect ground
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TURN SIGNAL BLINKS SLOWLY

- Faulty flasher relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

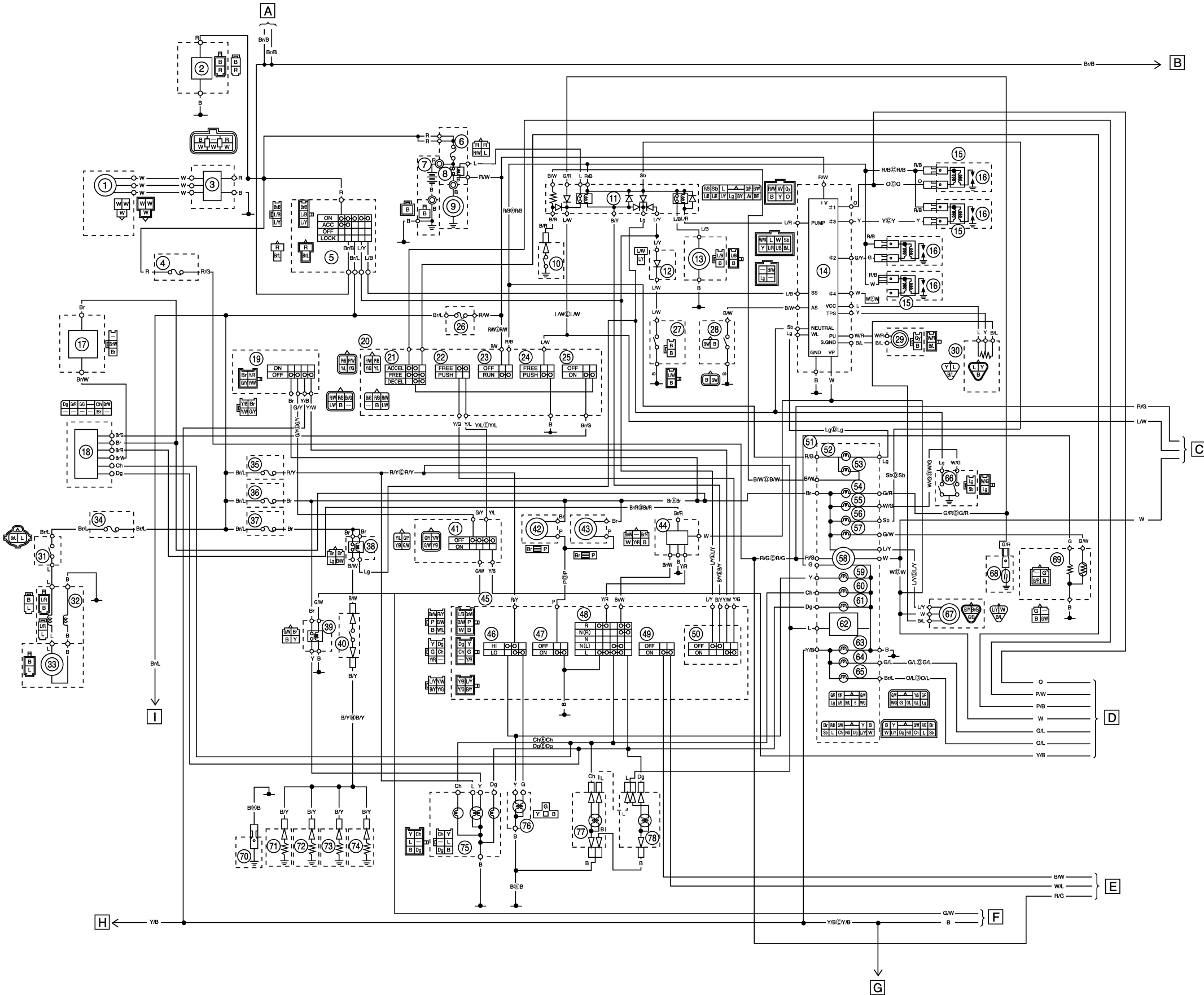
TURN SIGNAL REMAINS LIT

- Faulty flasher relay
- Burnt-out turn signal bulb

TURN SIGNAL BLINKS QUICKLY

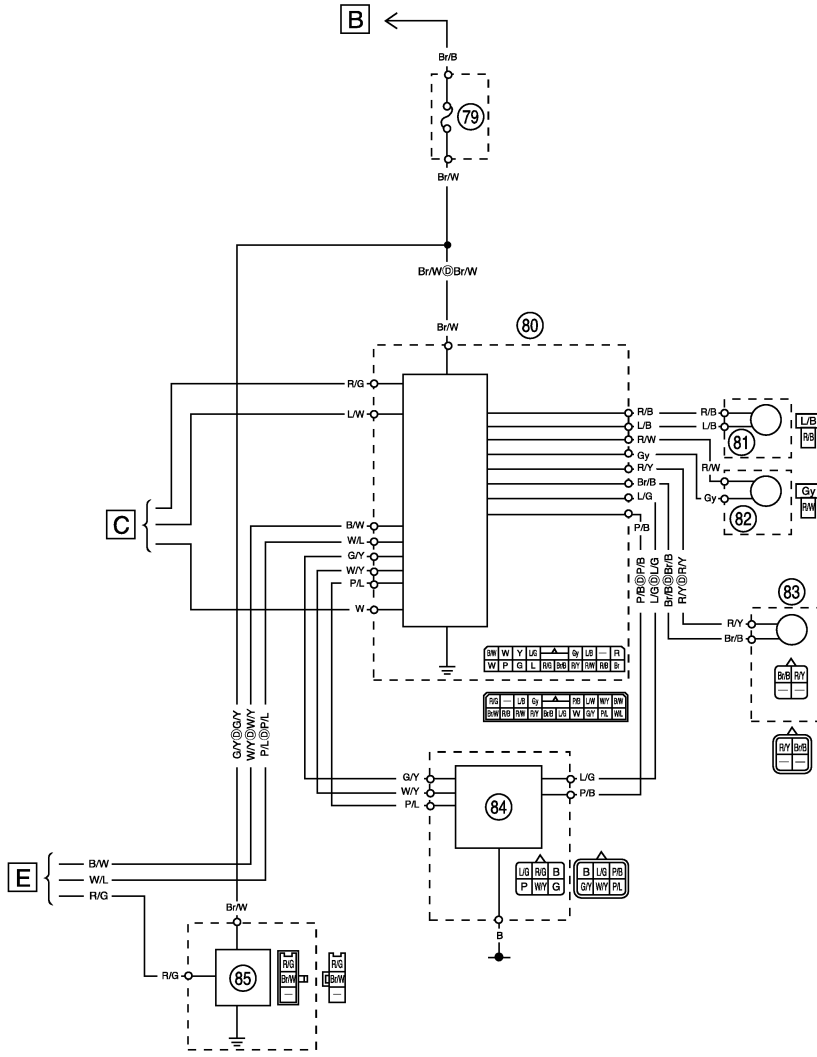
- Incorrect turn signal bulb
- Faulty flasher relay
- Burnt-out turn signal bulb

XVZ13TFL/XVZ13TFLC WIRING DIAGRAM

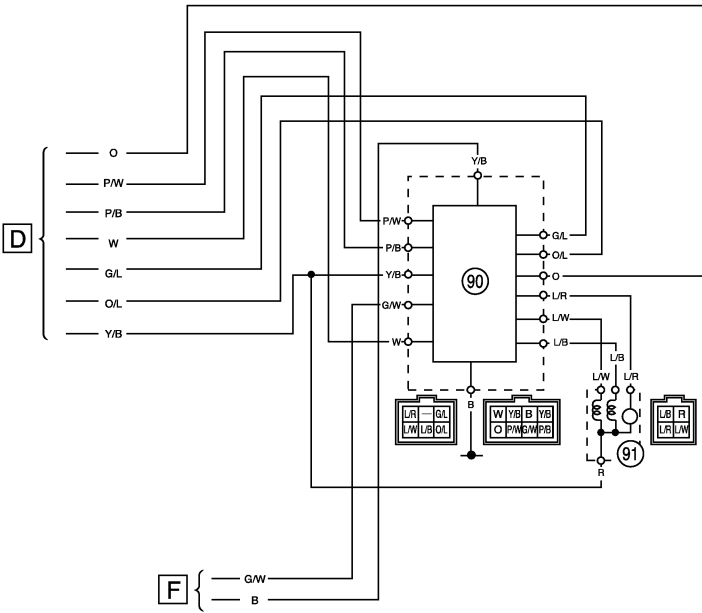


- | | |
|----------------------------------|---|
| 1 AC magneto | 40 Thermo switch |
| 2 Condenser | 41 Rear brake switch |
| 3 Rectifire/reguretor | 42 Horn 2 |
| 4 Fuse (back up) | 43 Horn 1 |
| 5 Main switch | 44 Flasher relay |
| 6 Fuse (main) | 45 Handlebar switches (left) |
| 7 Battery | 46 Dimmer switch |
| 8 Starter relay | 47 Horn switch |
| 9 Starter motor | 48 Turn signal switch |
| 10 Oil level switch | 49 "TALK" switch |
| 11 Starting circuit cutoff relay | 50 Clutch switch |
| 12 Diode | 51 Meter assembly |
| 13 Fuel pump | 52 Engine warning light |
| 14 Ignitor | 53 Oil warning light |
| 15 Ignition coil | 54 Warter tempareture warning light |
| 16 Spark plug | 55 Over drive indicator light |
| 17 Flasher relay | 56 Neutral indicater light |
| 18 Hazard relay | 57 Fuel meter light |
| 19 Front brake switch | 58 Fuel meter |
| 20 Handlebar switches (right) | 59 High beam indicator light |
| 21 Cruise control switch | 60 Turn signal indicator light (left) |
| 22 "CANCEL" switch | 61 Turn signal indicator light (right) |
| 23 Engine stop switch | 62 Illumination light |
| 24 Start switch | 63 "ON" indicator light (MAIN) |
| 25 Hazard switch | 64 "SET" indicator light (SET) |
| 26 Fuse (ignition) | 65 "RES" indicator light (RES) |
| 27 Side stand switch | 66 Neutral switch |
| 28 Emargency stop switch | 67 Speed sensor |
| 29 Pick up coil | 68 Thermo switch |
| 30 Throttle position sensor | 69 Fuel sender unit |
| 31 Thermo switch | 70 Carburetor heater ground |
| 32 Noise filter | 71 Carburetor heater #1 |
| 33 Fan motor | 72 Carburetor heater #2 |
| 34 Fuse (fan motor) | 73 Carburetor heater #3 |
| 35 Fuse (head light) | 74 Carburetor heater #4 |
| 36 Fuse (signal) | 75 Tail/brake light |
| 37 Fuse (carburetor heater) | 76 Headlight |
| 38 Carburetor heater relay | 77 Front turn signal/position light (left) |
| 39 Brake light relay | 78 Front turn signal/position light (right) |

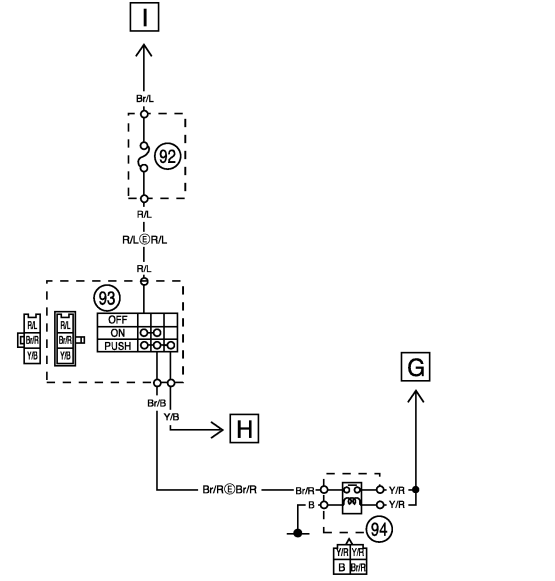
MCU



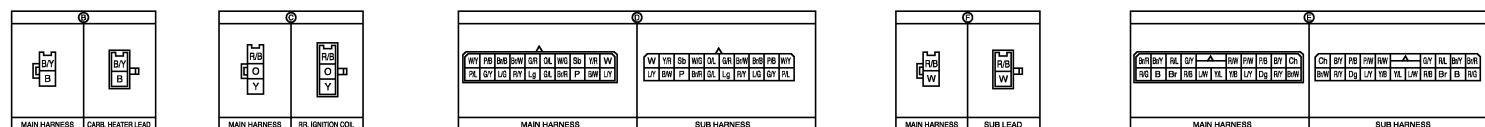
CUISE CONTROL UNIT



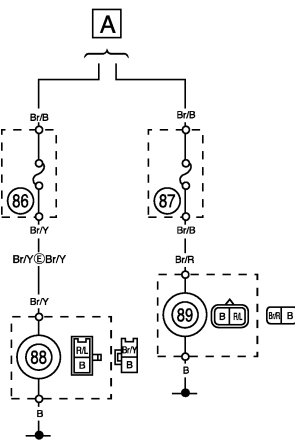
“CRUISE” SWITCH



- 79 Fuse (audio)
- 80 MCU
- 81 Speaker (front)
- 82 Speaker (front)
- 83 Speaker (rear)
- 84 Cord (remocon)
- 85 CB unit
- 86 Fuse (front DC outlet)
- 87 Fuse (rear DC outlet)
- 88 DC outlet (front)
- 89 DC outlet (rear)
- 90 Cruise control unit
- 91 Vacuum pump
- 92 Fuse (cruise control)
- 93 “CRUISE” switch
- 94 Cruise control relay



D.C OUTLET



COLOR CODE

B	Black	P	Pink	Br/B ..	Brown/Black	G/W ..	Green/White	P/L ...	Pink/Blue	W/R ..	White/Red
Br	Brown	R	Red	Br/G ..	Brown/Green	G/Y ..	Green/Yellow	P/W ..	Pink/White	W/Y ..	White/Yellow
Ch ...	Chocolate	Sb	Sky blue	Br/L ..	Brown/Blue	L/B ...	Blue/Black	R/B...	Red/Black	Y/B ...	Yellow/Black
Dg ...	Dark green	W	White	Br/R ..	Brown/Red	L/G ...	Blue/Green	R/G ..	Red/Green	Y/G ..	Yellow/Green
G	Green	Y	Yellow	Br/W .	Brown/White	L/R ...	Blue/Red	R/L ...	Red/Blue	Y/L ...	Yellow/Blue
Gy ...	Gray	B/L ...	Black/Blue	Br/Y ..	Brown/Yellow	L/W ..	Blue/White	R/W ..	Red/White	Y/R ...	Yellow/Red
L	Blue	B/R... ..	Black/Red	G/B ..	Green/Black	L/Y ...	Blue/Yellow	R/Y...	Red/Yellow	Y/W ..	Yellow/White
Lg	Light green	B/W ..	Black/White	G/L ...	Green/Blue	O/L ...	Orange/Blue	W/G ..	White/Green		
O	Orange	B/Y... ..	Black/Yellow	G/R ..	Green/Red	P/B...	Pink/Black	W/L ..	White/Blue		



YAMAHA

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