

YZF-R1S YZF-R1SC

SERVICE MANUAL

LIT-11616-17-55 5VY-28197-10

EAS00010

YZF-R1S/YZF-R1SC
SERVICE MANUAL
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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 to federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all of 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.

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IMPORTANT MANUAL INFORMATION

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

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 checking or repairing the motorcycle.

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

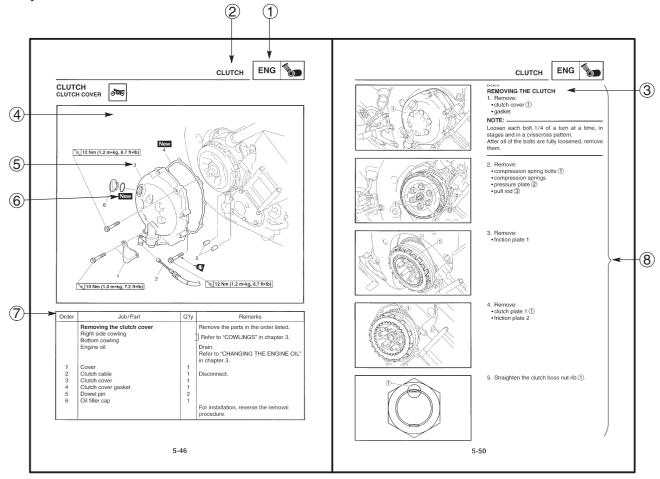
NOTE: A NOTE provides key information to make procedures easier or clearer.

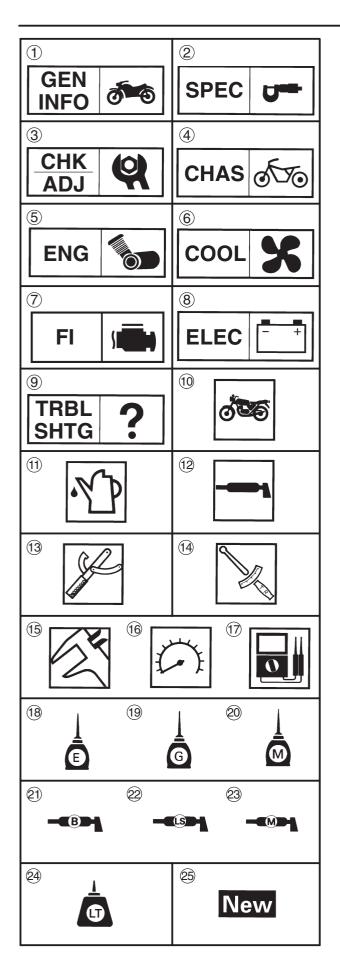
HOW TO USE THIS MANUAL

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 check 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".
- ② Each chapter is divided into sections. The current section title is shown at the top of each page, except in Chapter 3 ("PERIODIC CHECKS AND ADJUSTMENTS"), where the sub-section title(s) appears.
- 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. Refer to "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.





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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 checks and adjustments
- 4 Chassis
- (5) Engine
- 6 Cooling system
- 7 Fuel injection system
- (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- based 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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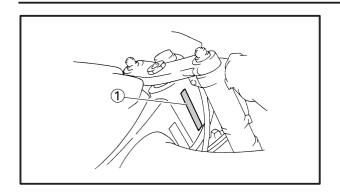
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MOTORCYCLE IDENTIFICATION





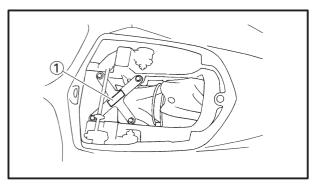
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GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

VEHICLE IDENTIFICATION NUMBER

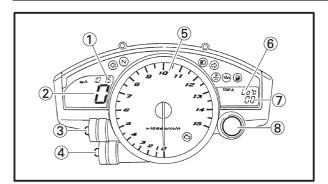
The vehicle identification number ① is stamped into the right side of the steering head pipe.



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MODEL LABEL

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



- (1) Clock
- 2 Speedometer
- ③ "SELECT" button
- 4 "RESET" button
- (5) Tachometer
- 6 Coolant temperature display/air intake temperature display
- Odometer/tripmeters/fuel reserve tripmeter/stopwatch
- 8 Shift timing indicator light

EAS00019

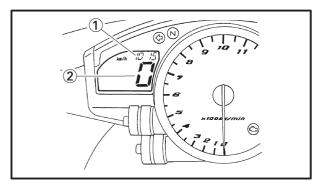
FEATURES INSTRUMENT FUNCTIONS Multi-function display

The multi-function meter unit is equipped with the following:

- a speedometer (which shows the riding speed)
- a tachometer (witch shows engine speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the fuel level warning light came on)
- a stopwatch
- a clock
- a coolant temperature display
- an air intake temperature display
- a self-diagnosis device
- a display brightness and shift timing indicator light control mode

NOTE: _

• Be sure to turn the key to "ON" before using the "SELECT" and "RESET" buttons.



- (1) Clock
- 2 Speedometer

Clock mode

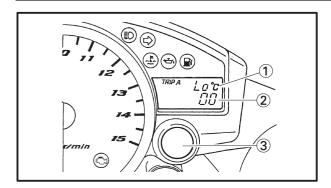
Turn the key to "ON".

To set the clock

- 1. Push the "SELECT" button and "RESET" button together for at least two seconds.
- 2. When the hour digits start flashing, push the "RESET" button to set the hours.
- 3. Push the "SELECT" button, and the minute digits will start flashing.
- 4. Push the "RESET" button to set the minutes.
- 5. Push the "SELECT" button and then release it to start the clock.

FEATURES





- ① Coolant temperature display/air intake temperature display
- ② Odometer/tripmeters/fuel reserve tripmeter/stopwatch
- (3) Shift timing indicator light

Odometer, tripmeter, and stopwatch modes Push the "SELECT" button to switch the display between the odometer mode "ODO", the tripmeter modes "TRIP A" and "TRIP B" and the stopwatch mode in the following order:

TRIP A \rightarrow TRIP B \rightarrow ODO \rightarrow Stopwatch \rightarrow TRIP A

If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode "F-TRIP" and start counting the distance traveled from that point. In that case, push the "SELECT" button to switch the display between the various tripmeter, odometer, and stopwatch modes in the following order:

F-TRIP \rightarrow Stopwatch \rightarrow TRIP A \rightarrow TRIP B \rightarrow ODO \rightarrow F-TRIP

To reset a tripmeter, select it by pushing the "SE-LECT" button, and then push the "RESET" button for at least one second. If you do not reset the fuel reserve tripmeter manually, it will reset itself automatically and the display will return to the prior mode after refueling and traveling 5 km (3 mi).

Stopwatch mode

Standard measurement

- 1. Push the "RESET" button to start the stopwatch.
- 2. Push the "SELECT" button to stop the stopwatch.
- 3. Push the "SELECT" button again to reset the stopwatch.

Split-time measurement

- 1. Push the "RESET" button to start the stopwatch.
- 2. Push the "RESET" button to measure split-times. (The colon ":" will start flashing.)
- 3. Push the "RESET" button to display the final split-time or push the "SELECT" button to stop the stopwatch and display total elapsed time.
- 4. Push the "SELECT" button to reset the stopwatch.

Coolant temperature display

The coolant temperature display indicates the temperature of the coolant. Push the "RESET" button to switch the coolant temperature display to the air intake temperature display.

NOTE:

When the coolant temperature display is selected, "C" is displayed before the coolant temperature.

Air intake temperature display

The air intake temperature display indicates the temperature of the air drawn into the air filter case. Push the "RESET" button to switch the coolant temperature display to the air intake temperature display.

NOTE: -

- Even if the air intake temperature is set to be displayed, the coolant temperature warning light comes on when the engine overheats.
- When the key is turned to "ON", the coolant temperature is automatically displayed, even if the air intake temperature was displayed prior to turning the key to "OFF".
- When the air intake temperature display is selected, "A" is displayed before the temperature.

FEATURES



Self-diagnosis devices

The model is equipped with a self-diagnosis device for various electrical circuits. If any of those circuits are defective, the engine trouble warning light will come on, and then the right display will indicate a two-digit error code (e.g.,11,12,13).

Display brightness and shift timing indicator light control mode

This mode cycles through five control functions, allowing you to make the following settings in the order listed below.

- Display brightness:
- This function allows you to adjust the brightness of the displays and tachometer to suit the outside lighting conditions.
- Shift timing indicator light activity:
- This function allows you to choose whether or not the indicator light should be activated and whether it should flash or stay on when activated.
- Shift timing indicator light activation:
- This function allows you to select the engine speed at which the indicator light will be activated.
- Shift timing indicator light deactivation:
- This function allows you to select the engine speed at which the indicator light will be deactivated.
- Shift timing indicator light brightness:
- This function allows you to adjust the brightness of the indicator light to suit your preference.

NOTE: -

- To make any settings in this mode, you have to cycle through all of its functions. However, if the key is turned to "OFF" or the engine is started before completing the procedure, only the settings made before the "SELECT" button was last pushed will be applied.
- In this mode, the right display shows the current setting for each function (except the shift timing indicator light activity function).

To adjust the brightness of the multifunction meter displays and tachometer

- 1. Turn the key to "OFF".
- 2. Push and hold the "SELECT" button.
- 3. Turn the key to "ON", and then release the "SELECT" button after five seconds.
- 4. Push the "RESET" button to select the desired brightness level.
- 5. Push the "SELECT" button to confirm the selected brightness level. The control mode changes to the shift timing indicator light activity function.

To set the shift timing indicator light activity function

- 1. Push the "RESET" button to select one of the following indicator light activity settings:
 - The indicator light will stay on when activated. (This setting is selected when the indicator light stays on.)
 - The indicator light will flash when activated. (This setting is selected when the indicator light flashes four times per second.)
 - The indicator light is deactivated; in other words, it will not come on or flash. (This setting is selected when the indicator light flashes once every two seconds.)
- 2. Push the "SELECT" button to confirm the selected indicator light activity. The control mode changes to the shift timing indicator light activation function.

FEATURES



To set the shift timing indicator light activation function

NOTE

The shift timing indicator light activation function can be set between 7000 r/min and 15000 r/m. From 7000 r/min to 12000 r/min, the indicator light can be set in increments of 500 r/min. From 12000 r/min to 15000 r/min, the indicator light can be set in increments of 200 r/min.

- 1. Push the "RESET" button to select the desired engine speed for activating the indicator light.
- 2. Push the "SELECT" button to confirm the selected engine speed. The control mode changes to the shift timing indicator light deactivation function.

To set the shift timing indicator light deactivation function

NOTE

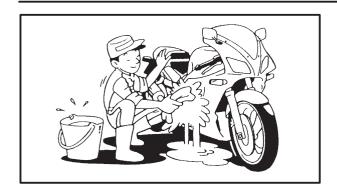
- The shift timing indicator light activation function can be set between 7000 r/min and 15000 r/min. From 7000 r/min to 12000 r/min, the indicator light can be set in increments of 500 r/min. From 12000 r/min to 15000 r/min, the indicator light can be set in increments of 200 r/min.
- Be sure to set the deactivation function to a higher engine speed than for the activation function, otherwise the shift timing indicator light will remain deactivated.
- 1. Push the "RESET" button to select the desired engine speed for deactivating the indicator light.
- 2. Push the "SELECT" button to confirm the selected engine speed. The control mode changes to the shift timing indicator light brightness function.

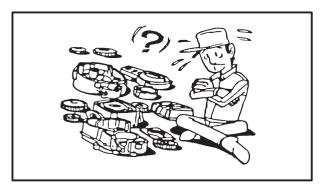
To adjust the shift timing indicator light brightness

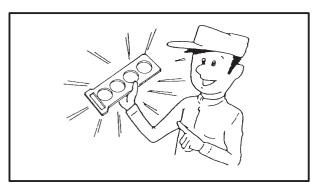
- 1. Push the "RESET" button to select the desired indicator light brightness level.
- 2. Push the "SELECT" button to confirm the selected indicator light brightness level. The right display will return to the odometer or tripmeter mode

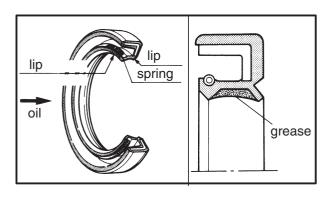
IMPORTANT INFORMATION











EAS0002

IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DISASSEMBLY

- 1. Before removal and disassembly, eliminate all dirt, mud, dust and foreign material.
- 2. Use only the proper tools and cleaning equipment.
 - Refer to the "SPECIAL TOOLS".
- 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

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.

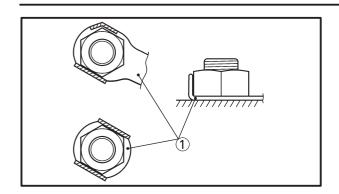
EAS00022

GASKETS, OIL SEALS AND O-RINGS

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

IMPORTANT INFORMATION

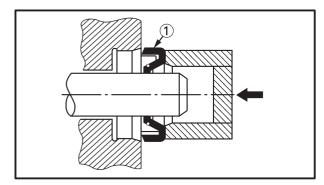




EAS00023

LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates
1 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.

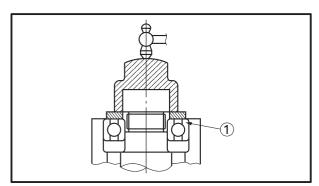


EASON024

BEARINGS AND OIL SEALS

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

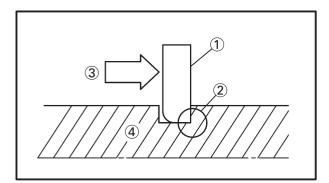
(1) Oil seal



CAUTION:

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

(1) Bearing



EAS00025

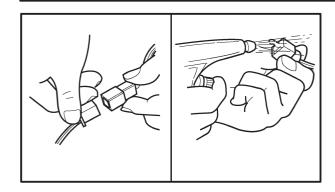
CIRCLIPS

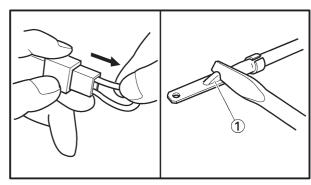
Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip ①, make sure the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

(4) Shaft

CHECKING THE CONNECTIONS







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 \rightarrow Connect and disconnect several times.

- 3. Check:
 - all connections
 Loose connection → Connect properly.

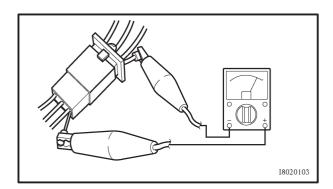
NOTE:

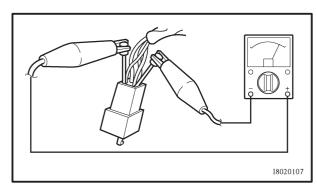
If the pin ① on the terminal is flattened, bend it up.

- 4. Connect:
 - lead
 - coupler
 - connector

NOTE: -

Make sure all connections are tight.





5. Check:

continuity (with the pocket tester)



Pocket tester 90890-03112, YU-3112

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.



FAS00027

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.

NOTE: -

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

Tool No.	Tool name/Function	Illustration
90890-01304 YU-01304	Piston pin puller	
	This tool is used to remove the piston pins.	00
Radiator cap tester 90890-01325 YU-24460-01 Adapter	Radiator cap tester Radiator cap tester adapter	
90890-01352 YU-33984	These tools are used to check the cooling system.	
	Steering nut wrench	9
90890-01403		
YU-33975	This tool is used to loosen or tighten the steering stem ring nuts.	(8)
	Damper rod holder	
90890-01423 YM-01423	This tool is used to hold the damper rod assembly when loosening or tightening the damper rod assembly bolt.	
	Oil filter wrench	
90890-01426 YU-38411	This tool is needed to loosen or tighten the oil filter cartridge.	
	Rod holder	
90890-01434 YM-01434	This tool is used to support the damper adjusting rod.	٥٠
Rod puller 90890-01437 YM-01437 Rod puller	Rod puller Rod puller attachment	
attachment 90890-01436 YM-01436	These tools are used to pull up the front fork damper rod.	5

Tool No.	Tool name/Function	Illustration
	Fork spring compressor	
90890-01441 YM-01441	This tool is used to disassemble or assemble the front fork legs.	
90890-01442 YM-01442	Fork seal driver This tool is used to install the front fork's oil seal and dust seal.	
90890-03094 YU-08030	Vacuum gauge This guide is used to synchronize the carburetors.	
Compression gauge 90890-03081 YU-33223 Adapter 90890-04136	Compression gauge Compression gauge adapter These tools are used to measure engine compression.	
Valve spring compressor 90890-04019 YM-04019 Attachment 90890-04108 YM-01253 90890-04114 YM-4114	Valve spring compressor Valve spring compressor attachment These tools are used to remove or install the valve assemblies.	
Middle driven shaft bearing driver 90890-04058 YM-4058 Mechanical seal installer 90890-04078 YM-33221	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
90890-04086 YM-91042	Clutch holding tool This tool is used to hold the clutch boss when removing or installing the clutch boss nut.	
90890-04111 90890-04116 YM-4116	Valve guide remover This tool is used to remove or install the valve guides.	The state of the s
90890-04112 90890-04117 YM-4117	Valve guide installer This tool is used to install the valve guides.	

Tool No.	Tool name/Function	Illustration
90890-04113 YM-04113 90890-04118 YM-4118	Valve guide reamer This tool is used to rebore the new valve guides.	
90890-06754 YM-34487	Ignition checker This tool is used to check the ignition system components.	
90890-85505 ACC-1109-0501	Yamaha bond No. 1215 This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	
90890-03174	Digital circuit tester This tool is used to check the electrical system.	
Pivot shaft wrench 90890-01471 YM-01471 Pivot shaft wrench adapter 90890-01476	Pivot shaft wrench Pivot shaft wrench adapter This tool is need to loosen or tighten the spacer bolt.	
90890-03132 YU-3112	Pocket tester This instrument is needed for checking the engine oil temperature.	
Oil pressure gauge 90890-03153 YU-03153 Adapter 90890-03139	Oil pressure gauge Adapter These tools are used to measure engine oil pressure.	
90890-06756	Vacuum/pressure pump gauge set This tool used to measure the vacuum pressure.	OCAGO!
90793-80009	Engine tachometer This tool is needed for observing engine rpm.	



Tool No.	Tool name/Function	Illustration
90890-04101	Valve lapper This tool is needed to remove and install the valve lifter.	
90890-03176 YM-03176	Fuel pressure adapter This tool is needed to measure fuel pressure.	
90890-03153 YU-03153	Pressure gauge This tool is used to measure fuel pressure.	The state of the s
90890-04143 YM-04143	Camshaft wrench This tool is used to hold and rotate the camshaft sprocket.	

GENERAL SPECIFICATIONS



SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard	Limit
Model code	5VY4 (USA), 5VY5 (CAL)	•••
Dimensions		
Overall length	2,065 mm (8.13 in)	•••
Overall width	720 mm (28.3 in)	•••
Overall height	1,105 mm (43.5 in)	•••
Seat height	835 mm (32.9 in)	•••
Wheelbase	1,395 mm (54.9 in)	•••
Minimum ground clearance	135 mm (5.31 in)	•••
Minimum turning radius	3,400 mm (133.9 in)	•••
Weight		
Wet (with oil and a full fuel tank)	193 kg (425 lb) (USA)	•••
,	194 kg (428 lb) (CAL)	
Maximum load (except motorcycle)	202 kg (445 lb) (USA)	•••
	201 kg (443 lb) (CAL)	



Item	Standard	Limit
Engine Engine type Displacement Cylinder arrangement Bore × stroke Compression ratio Engine idling speed Vacuum pressure at engine idling speed Standard compression pressure (at sea level)	Liquid-cooled, 4-stroke, DOHC 998 cm ³ (60.90 cu.in) Forward-inclined parallel 4-cylinder 77.0 × 53.6 mm (3.03 × 2.11 in) 12.4 : 1 1,150 ~ 1,250 r/min 22 kPa (165 mmHg, 6.5 inHg) 1,480 kPa (14.80 kg/cm ² ,14.80 bar, 210.5 psi) at 350 r/min	•••
Fuel Recommended fuel Fuel tank capacity Total (including reserve) Reserve only	Premium unleaded gasoline only 18 L (3.96 Imp gal, 4.76 US gal) 3.4 L (0.75 Imp gal, 0.90 US gal)	•••
Engine oil Lubrication system Recommended oil	Wet sump	•••
30 40 50 60°F 	At 5°C (40°F) or higher Yamalube 4 (20W40) or SAE 20W40 type SE motor oil At 15°C (60°F) or lower Yamalube 4 (10W30) or SAE 10W30 type SE motor oil	
Quantity Total amount Without oil filter cartridge replacement	3.8 L (3.35 Imp qt, 4.02 US qt) 2.9 L (2.55 Imp qt, 3.07 US qt)	•••
With oil filter cartridge replacement Oil pressure	3.1 L (2.73 Imp qt, 3.28 US qt) 230 kPa at 5,000 r/min (2.3 kg/cm ² at 5,000 r/min) (2.3 bar at 5,000 r/min) (32.7 psi at 5,000 r/min)	•••
Engine oil temperature Relief valve opening pressure	100°C (212°F) 600 ~ 680 kPa (6.0 ~ 6.8 kg/cm ² , 6.0 ~ 6.8 bar, 87.0 ~ 98.6 psi)	



Item	Standard	Limit
Oil filter Oil filter type Bypass valve opening pressure	Paper 80 ~ 120 kPa (0.8 ~ 1.2 kg/cm ² , 0.8 ~ 1.2 bar, 11.6 ~ 17.4 psi)	•••
Oil pump Oil pump type Inner-rotor-to-outer-rotor-tip clearance Outer-rotor-to-oil-pump-housing clearance	Trochoid 0.01 ~ 0.10 mm (0.0004 ~ 0.0039 in) 0.09 ~ 0.15 mm (0.00035 ~ 0.0059 in)	0.18 mm (0.0071 in) 0.22 mm (0.0087 in)
Cooling system Radiator capacity Radiator cap opening pressure	2.51 L (2.21 Imp qt, 2.65 US qt) 108 ~ 137 kPa (1.08 ~ 1.37 kg/cm ² , 1.0 ~ 1.3 bar, 15.6 ~ 19.9 psi)	•••
Radiator core Width Height Depth Coolant reservoir Capacity	380 mm (14.96 in) 258 mm (10.2 in) 24 mm (0.94 in) 0.25 L (0.22 Imp qt, 0.26 US qt)	•••
Water pump Water pump type Reduction ratio Max. impeller shaft tilt	Single suction centrifugal pump 65/43 × 25/32 (1.181)	0.15 mm (0.006 in)
Starting system type	Electric starter	
Spark plugs Model (manufacturer) × quantity Spark plug gap	CR9EK (NGK) \times 4 0.6 \sim 0.7 mm (0.0236 \sim 0.0276 in)	•••
Cylinder head Volume Max. warpage	12.3 \sim 12.9 cm ³ (0.75 \sim 0.79 cu.in)	0.10 mm (0.0039 in)

Item	Standard	Limit
Camshafts Drive system Camshaft cap inside diameter Camshaft journal diameter Camshaft-journal-to-camshaft- cap clearance Intake camshaft lobe dimensions	Chain drive (right) 22.500 ~ 22.521 mm (0.8858 ~ 0.8867 in) 22.459 ~ 22.472 mm (0.8842 ~ 0.8847 in) 0.028 ~ 0.062 mm (0.0011 ~ 0.0024 in)	•••
Measurement A Measurement B Exhaust camshaft lobe dimensions	32.85 ~ 32.95 mm (1.293 ~ 1.297 in) 25.14 ~ 25.24 mm (0.990 ~ 0.994 in)	32.75 mm (1.289 in) 25.04 mm (0.986 in)
Measurement A Measurement B Max. camshaft runout	30.75 ~ 30.85 mm (1.211 ~ 1.215 in) 23.09 ~ 23.19 mm (0.909 ~ 0.913 in)	30.65 mm (1.207 in) 22.99 mm (0.905 in) 0.03 mm (0.0012 in)



Item	Standard	Limit
Timing chain Model/number of links	RH2020/122	•••
Tensioning system	Automatic	•••
Valves, valve seats, valve guides		
Valve clearance (cold)		
Intake Exhaust	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in) 0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)	•••
Valve dimensions	0.21 0.23 11111 (0.0000 0.0000 111)	
A	B C	D
Head Diameter Face Wid	dth Seat Width M	Margin Thickness
Valve head diameter A Intake Exhaust Valve face width B	23.4 ~ 23.6 mm (0.9213 ~ 0.9291 in) 24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in)	•••
Intake Exhaust	1.76 ~ 2.90 mm (0.0693 ~ 0.1142 in) 1.76 ~ 2.90 mm (0.0693 ~ 0.1142 in)	•••
Valve seat width C	,	
Intake Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in) 0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in) 1.6 mm (0.06 in)
Valve margin thickness D	0.9 ~ 1.1 111111 (0.0354 ~ 0.0455 111)	1.0 11111 (0.00 111)
Intake	0.5 ~ 0.9 mm (0.0197 ~ 0.0354 in)	0.5 mm (0.02 in)
Exhaust Valve stem diameter	0.5 ~ 0.9 mm (0.0197 ~ 0.0354 in)	0.5 mm (0.02 in)
Intake	$3.975 \sim 3.990 \text{ mm} (0.1565 \sim 0.1571 \text{ in})$	3.945 mm (0.1553 in)
Exhaust	4.460 ~ 4.475 mm (0.1756 ~ 0.1762 in)	4.425 mm (0.1742 in)
Valve guide inside diameter Intake	4.000 ~ 4.012 mm (0.1575 ~ 0.1580 in)	4.050 mm
Exhaust	4.500 ~ 4.512 mm (0.1772 ~ 0.1776 in)	(0.1594 in) 4.550 mm (0.1791 in)
Valve-stem-to-valve-guide clearance Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm
Exhaust	$0.025 \sim 0.052 \text{ mm} \ (0.0010 \sim 0.0020 \text{ in})$	(0.0032 in) 0.10 mm
Valve stem runout	•••	(0.0039 in) 0.01 mm
Valva aget width		(0.0004 in)
Valve seat width Intake	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)



Item	Standard	Limit
Valve springs		
Free length		
Intake	39.3 mm (1.55 in)	37.3 mm (1.47 in)
Exhaust	39.3 mm (1.55 in)	37.3 mm (1.47 in)
Installed length (valve closed)		
Intake	32.7 mm (1.29 in)	•••
Exhaust	32.8 mm (1.29 in)	•••
Compressed spring force		
(installed)	445 0 405 0 144 00 45 40 1	
Intake	145.9 ~ 167.9 N (14.88 ~ 17.12 kg,	•••
Forbasset.	32.80 ~ 37.74 lb)	
Exhaust	164.1 ~ 188.9 N (16.73 ~ 19.26 kg,	•••
Coring tilt	36.89 ~ 42.46 lb)	
Spring tilt —→ → ★		
Intake	•••	2.5°/1.7 mm
		(0.07 in)
Exhaust	•••	2.5°/1.7 mm
		(0.07 in)
Winding direction (top view)		, ,
Intake	Clockwise	•••
Exhaust	Clockwise	•••
Cylinders		
Cylinder arrangement	Forward-inclined, parallel 4-cylinder	•••
Bore × stroke	77.0 mm × 53.6 mm (3.03 × 2.11 in)	•••
Compression ratio	12.4 : 1	•••
Bore	77.00 ~ 77.01 mm (3.0315 ~ 3.0319 in)	•••
Max. out-of-round	•••	0.05 mm
		(0.002 in)

Item	Standard	Limit
Piston Piston-to-cylinder clearance	0.010 ~ 0.035 mm (0.0004 ~ 0.0014 in)	0.120 mm
Diameter D	76.975 ~ 76.990 mm (3.0305 ~ 3.0311 in)	(0.0047 in)
H		
Height H Piston pin bore (in the piston)	5 mm (0.20 in)	•••
Diameter Offset Offset direction	17.002 ~ 17.013 mm (0.6694 ~ 0.6698 in) 0.5 mm (0.0197 in) Intake side	17.043 mm (0.6710 in)
Piston pins Outside diameter	16.991 ~ 17.000 mm	16.971 mm
Piston-pin-to-piston-pin-bore clearance Piston rings	(0.6689 ~ 0.6693 in) 0.002 ~ 0.022 mm (0.0001 ~ 0.0009 in)	(0.6682 in) 0.072 mm (0.0028 in)
Top ring B		
Ring type Dimensions (B \times T) End gap (installed)	Barrel 0.90 \times 2.75 mm (0.04 \times 0.11 in) 0.15 \sim 0.25 mm (0.0059 \sim 0.0098 in)	0.50 mm
Ring side clearance	0.030 ~ 0.065 mm (0.0012 ~ 0.0026 in)	(0.0197 in) 0.115 mm (0.0045 in)
2nd ring		, , , , , , , , , , , , , , , , , , , ,
Ring type Dimensions (B × T) End gap (installed)	Taper 0.80 \times 2.75 mm (0.03 \times 0.11 in) 0.30 \sim 0.45 mm (0.0118 \sim 0.0177 in)	0.80 mm (0.0315 in)
Ring side clearance	0.020 ~ 0.055 mm (0.0008 ~ 0.0022 in)	0.115 mm
Oil ring		(0.0045 in)
Dimensions (B $ imes$ T) End gap (installed)	1.50 × 2.25 mm (0.06 × 0.09 in) 0.10 ~ 0.40 mm (0.0039 ~ 0.0158 in)	•••

ENGINE SPECIFICATIONS



Item	Standard	Limit
Connecting rods Crankshaft-pin-to-big-end-bearing clearance Bearing color code	0.034 ~ 0.058 mm (0.0013 ~ 0.0023 in) 1 = Blue 2 = Black 3 = Brown 4 = Green	0.09 mm (0.0035 in)
Crankshaft		
B B		
Width A Width B Max. runout C	55.20 ~ 56.60 mm (2.17 ~ 2.23 in) 298.8 ~ 300.7 mm (11.76 ~ 11.84 in)	0.03 mm (0.0012 in)
Big end side clearance D Crankshaft-journal-to-crankshaft- journal-bearing clearance Bearing color code	0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in) 0.014 ~ 0.037 mm (0.0006 ~ 0.0015 in) 0 = White 1 = Blue 2 = Black 3 = Brown 4 = Green	0.10 mm (0.0039 in)

ENGINE SPECIFICATIONS



Item	Standard	Limit
Clutch		
Clutch type	•••	
Clutch release method	Outer pull, rack and pinion pull	•••
Clutch release method operation	Cable operation	•••
Operation	Left-hand operation	•••
Clutch cable free play (at the end	10 ~ 15 mm (0.39 ~ 0.59 in)	•••
of the clutch lever)		
Friction plates		
Color code	Purple	•••
Thickness	$2.9 \sim 3.1 \text{ mm} (0.114 \sim 0.122 \text{ in})$	2.8 mm
		(0.110 in)
Plate quantity	7	•••
Color code	Green	•••
Thickness	$2.9 \sim 3.1 \text{ mm} (0.114 \sim 0.112 \text{ in})$	2.8 mm
		(0.110 in)
Plate quantity	1	•••
Color code	-	•••
Thickness	$2.9 \sim 3.1 \text{ mm} (0.114 \sim 0.112 \text{ in})$	2.8 mm
		(0.110 in)
Plate quantity	1	•••
Clutch plates		
Thickness	$1.9 \sim 2.1 \text{ mm } (0.07 \sim 0.08 \text{ in})$	•••
Plate quantity	8	•••
Max. warpage	•••	0.1 mm
		(0.0039 in)
Clutch springs		1
Free length	52.5 mm (2.07 in)	49.9 mm
		(1.96 in)
Spring quantity	6	•••

ENGINE SPECIFICATIONS



Item	Standard	Limit
Transmission		
Transmission type	Constant mesh, 6-speed	•••
Primary reduction system	Spur gear	•••
Primary reduction ratio	65/43 (1.512)	•••
Secondary reduction system	Chain drive	•••
Secondary reduction ratio	45/17 (2.647)	•••
Operation	Left-foot operation	•••
Gear ratios	'	
1st gear	38/15 (2.533)	•••
2nd gear	33/16 (2.063)	•••
3rd gear	37/21 (1.762)	•••
4nd gear	35/23 (1.522)	•••
5th gear	30/22 (1.364)	•••
6th gear	33/26 (1.269)	•••
Max. main axle runout	•••	0.08 mm
		(0.0032 in)
Max. drive axle runout	•••	0.08 mm
		(0.0032 in)
Shifting mechanism		,
Shift mechanism type	Shift drum/Guide bar	•••
Max. shift fork guide bar bending	•••	0.10 mm
Wax. Shirt fork galac bar bending		(0.0039 in)
Air filter type	Oil coated paper element	•••
Fuel pump		
Pump type	Electrical	
Model (manufacturer)	5PW (DENSO)	•••
Output pressure	294 kPa (2.94 kg/cm ² , 2.94 bar, 42.6 psi)	•••
• •	20+ Ki & (2.5+ Kg/6iii , 2.5+ bai, +2.6 psi)	
Throttle position sensor	4.0 5.4 1/0 -4.0000 (0005)	
Resistance	$4.9 \sim 5.1$ kΩ at 20°C (68°F) 0.63 ~ 0.73 V	•••
Output voltage (at idle)	0.63 ~ 0.73 V	
Throttle bodies		
Model (manufacturer) $ imes$ quantity	45EIDW (MIKUNI) × 2	•••
Intake vacuum pressure	22 kPa (165 mmHg, 6.4966 inHg)	•••
Throttle cable free play (at the flange	$3 \sim 5 \text{ mm } (0.12 \sim 0.20 \text{ in})$	•••
of the throttle grip)		
ID mark	5VY1 00 (USA)	•••
	5VY5 10 (CAL)	
Throttle valve size	#100	•••



Item	Standard	Limit
Frame Frame type	Diamond	•••
Caster angle	24°	•••
Trail	97 mm (3.82 in)	•••
Front wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 M/C × MT3.50	•••
Material	Aluminum	•••
Wheel travel	120 mm (4.72 in)	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm (0.04 in)
Max. lateral wheel runout	•••	0.5 mm (0.02 in)
Rear wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 M/C × MT6.00	•••
Material	Aluminum	•••
Wheel travel	130 mm (5.12 in)	•••
Wheel runout		(0.04:)
Max. radial wheel runout	•••	1 mm (0.04 in)
Max. lateral wheel runout	•••	0.5 mm (0.02 in)
Front tire		
Tire type	Tubeless	•••
Size	120/70 ZR17 M/C (58W)	•••
Model (manufacturer)	Pilot POWER C (MICHELIN)	•••
T: /I-I\	D218FL (DUNLOP)	
Tire pressure (cold)	050 kDa (0.5 kmf/am² 0.5 hay 05.0 mai)	
$0 \sim 90 \text{ kg } (0 \sim 198 \text{ lb})$	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	•••
90 ~ 202 kg (198 ~ 445 lb) High-speed riding	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi) 250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	•••
Min. tire tread depth	250 KFa (2.5 kgi/ciii-, 2.5 bai, 55.6 psi)	1.6 mm (0.06 in)
·		1.0 11111 (0.00 111)
Rear tire	Tubeless	
Tire type Size	190/50 ZR17 M/C (73W)	
Model (manufacturer)	Pilot POWER G (MICHELIN)	
	D218L (DUNLOP)	
Tire pressure (cold)		
$0 \sim 90 \text{ kg } (0 \sim 198 \text{ lb})$	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)	•••
90 ~ 202 kg (198 ~ 445 lb)	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)	•••
High-speed riding	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)	•••
Min. tire tread depth	•••	1.6 mm (0.06 in)



Item	Standard	Limit
Front brakes Brake type Operation Recommended fluid Brake lever free play Brake discs Diameter × thickness Min. thickness Max. deflection Brake pad lining thickness (inner) Brake pad lining thickness (outer)	Dual disc brake Right hand operation DOT 4 $2.3 \sim 11.5 \text{ mm } (0.09 \sim 0.45 \text{ in})$ $320 \times 4.5 \text{ mm } (12.60 \times 0.18 \text{ in})$ ••• 4.5 mm (0.18 in) $4.5 \text{ mm } (0.18 \text{ in})$	4.0 mm (0.16 in) 0.1 mm (0.004 in) 0.5 mm (0.02 in) 0.5 mm
* Master cylinder inside diameter Caliper cylinder inside diameter	14 mm (0.55 in) 30.1 mm and 27 mm (1.19 in and 1.06 in)	(0.02 in)
Rear brake Brake type Operation Recommended fluid Brake pedal freeplay Brake discs Diameter × thickness Min. thickness Max. deflection	Single disc brake Right foot operation DOT 4 $4.3 \sim 9.3 \text{ mm } (0.17 \sim 0.37 \text{ in})$ $220 \times 5 \text{ mm } (8.66 \times 0.20 \text{ in})$	4.5 mm (0.18 in) 0.15 mm (0.006 in)
Brake pad lining thickness (inner) Brake pad lining thickness (outer) * Master cylinder inside diameter Caliper cylinder inside diameter	6.0 mm (0.24 in) 6.0 mm (0.24 in) 12.7 mm (0.5 in) 31.8 mm (1.25 in)	1.0 mm (0.04 in) 1.0 mm (0.04 in)



Item	Standard	Limit
Front suspension	Startage	Liiiit
Suspension type	Telescopic fork	
Front fork type	Coil spring/oil damper	
Front fork travel		
	120 mm (4.72 in)	•••
Spring	000 F mm (0.01 in)	001 0 222
Free length	236.5 mm (9.31 in)	231.8 mm
Cus a say law white	100 (0.007 :)	(9.13 in)
Spacer length	100 mm (3.937 in)	•••
Installed length	222.5 mm (8.76 in)	•••
Spring rate (K1)	8.83 N/mm (0.90 kg/mm, 50.42 lb/in)	•••
Spring stroke (K1)	$0 \sim 120 \text{ mm } (0 \sim 4.7244 \text{ in})$	•••
Inner tube outer diameter	43 mm (1.69 in)	•••
Inner tube bending limit	•••	0.2 mm
		(0.01 in)
Optional spring available	No	•••
Fork oil		
Recommended oil	Suspension oil "01"	•••
Quantity (each front fork leg)	0.53 L (0.47 Imp qt, 0.56 US qt)	•••
Level (from the top of the outer	76 mm (2.99 in)	•••
tube, with the outer tube fully		
compressed, and without the		
fork spring)		
Spring preload adjusting positions		
Minimum	8	•••
Standard	4.5	•••
Maximum	1	•••
Rebound damping adjusting		
positions		
Minimum*	26	•••
Standard*	10	•••
Maximum*	1	•••
Compression damping adjusting		
positions		
Minimum*	25	•••
Standard*	10	•••
Maximum*	1	•••
*from the fully turned-in position		



Item	Standard	Limit
Steering		
Steering bearing type	Angular bearing	•••
Lock to lock angle (left)	27°	•••
Lock to lock angle (right)	27°	•••
Rear suspension		
Suspension type	Swingarm (link suspension)	•••
Rear shock absorber assembly	Coil spring/gas-oil damper	•••
type		
Rear shock absorber assembly	65 mm (2.56 in)	•••
travel		
Spring		
Free length	173.5 mm (6.83 in)	•••
Installed length	163.5 mm (6.44 in)	•••
Spring rate (K1)	83.4 N/mm (8.50 kg/mm, 476.21 lb/in)	•••
Spring stroke (K1)	$0 \sim 65 \text{ mm} (0.00 \sim 2.56 \text{ in})$	•••
Optional spring available	No	•••
Standard spring preload gas/air	1,200 kPa (12 kg/cm ² , 12 bar, 171 psi)	•••
pressure		
Spring preload adjusting positions		
Minimum		•••
Standard	4	•••
Maximum	9	•••
Rebound damping adjusting		
positions	00	
Minimum* Standard*	20	•••
Maximum*	11	•••
Compression damping adjusting		
positions		
Minimum*	20	
Standard*	12	•••
Maximum*	1	•••
*from the fully turned-in position		
· '		
Swingarm Free play (at the end of the		
swingarm)		
Radial	•••	1.0 mm
i iauiai		(0.04 in)
Axial	•••	1.0 mm
, Mai		(0.04 in)
Drive chain		(0.07 111)
Drive chain	50\/A8 (DAIDO)	
Model (manufacturer)	50VA8 (DAIDO)	•••
Link quantity Drive chain slack	116	•••
	20 ~ 25 mm (0.79 ~ 0.98 in)	1
Maximum ten-link section		150.1 mm
		(5.91 in)

ELECTRICAL SPECIFICATIONS



ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	•••
Ignition system Ignition system type Ignition timing Crankshaft position sensor resistance/color T.C.I. unit model (manufacturer)	DC. T.C.I. 5° BTDC at 1,050 r/min 336 ~ 504 Ω at 20°C (68°F)/Gy-B F8T822 (MITSUBISHI) (USA) F8T823 (MITSUBISHI) (CAL)	•••
Ignition coils Model (manufacturer) Minimum ignition spark gap Primary coil resistance Secondary coil resistance	F6T558 (MITSUBISHI) 6 mm (0.24 in) 1.19 \sim 1.61 Ω at 20°C (68°F) 8.5 \sim 11.5 k Ω at 20°C (68°F)	•••
Charging system System type Model (manufacturer) Normal output Stator coil resistance/color	A.C. magneto F4T850 (MITSUBISHI) 14 V/560 W at 5,000 r/min 0.14 ~ 0.18 Ω at 20°C (68°F)/W-W	•••
Rectifier/regulator Regulator type Model (manufacture) No-load regulated voltage Rectifier capacity Withstand voltage	Semi conductor short circuit FH011AA (SHINDENGEN) 14.3 ~ 15.1 V 50 A 100 V	•••
Battery Battery type Battery voltage/capacity Specific gravity Manufacturer Ten hour rate amperage	YTZ10S 12 V/8.6 Ah 1.310 YUASA 0.8 A	•••
Headlight type	Halogen bulb	
Bulbs (voltage/wattage × quantity) Headlight Auxiliary light Tail/brake light Front turn signal light/position light Rear turn signal light Licence plate light Meter light	12 V 55 W × 4 12 V 5 W × 2 LED × 1 12 V 21 W/5 W × 2 12 V 21 W × 2 12 V 5 W × 1 LED × 1	•••

ELECTRICAL SPECIFICATIONS



Indicator light (voltage/wattage × quantity) Neutral indicator light High beam indicator light LED × 1 LED × 1 •••	
(voltage/wattage × quantity) Neutral indicator light LED × 1	
Neutral indicator light LED × 1	
High beam indicator light LED × 1	
Oil level warning light LED × 1	
Turn signal indicator light LED × 2	
Fuel level warning light LED × 1	
Coolant temparture indicator light LED × 1	
Engine trouble warning light LED × 1	
Shift timing indicator light LED × 1	
Electric starting system	
System type Constant mesh •••	
Starter motor	
Model (manufacturer) 5VY (YAMAHA) •••	
Power output 0.9 kW •••	
Brushes	
Overall length 10.8 mm (0.43 in) 3.6 r	
(0.14)	4 in)
Spring force 5.28 ~ 7.92 N (538 ~ 808 g,	
18.99 ~ 28.48 oz)	
Armature coil resistance $0.0090 \sim 0.0110 \Omega$ at 20°C (68°F)	
, ,	mm
(0.95)	3 in)
Mica undercut 1.5 mm (0.06 in) •••	
Starter relay	
Model (manufacturer) 2768079-A (JIDECO) •••	
Amperage 180 A •••	
Coil resistance $4.18 \sim 4.62 \Omega$ at 20° C (68° F)	
Horn	
Horn type Plane •••	
Model (manufacturer) × quantity	
Max. amperage 3 A	
Performance $105 \sim 113 \text{ db/2 m}$ •••	
Coil resistance $1.15 \sim 1.25 \Omega$ at 20° C (68°F)	
Turn signal relay	
Relay type Full transistor •••	
Model (manufacturer) FE218BH (DENSO) •••	
Self-cancelling device built-in No	
Turn signal blinking frequency $75 \sim 95$ cycles/min.	
Wattage 21 W × 2 + 3.4 W •••	
Oil level switch	
Model (manufacturer) 5VY (SOMIC ISHIKAWA) •••	
EXUP servo motor	
Model (manufacturer) 5VY (YAMAHA) •••	

ELECTRICAL SPECIFICATIONS



Item	Standard	Limit
Fuses (amperage × quantity)		
Main fuse	50 A × 1	•••
Fuel injection system fuse	15 A × 1	•••
Headlight fuse	25 A × 1	•••
Signaling system fuse	10 A × 1	•••
Ignition fuse	15 A × 1	•••
Radiator fan motor fuse	15 A × 2	•••
Backup fuse (odometer and clock)	10 A × 1	•••
Reserve fuse	25 A, 15 A, 10 A × 1	•••

CONVERSION TABLE/ GENERAL TIGHTENING TORQUE SPECIFICATIONS



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 \times 0.03937 = ** in

2 mm \times 0.03937 = 0.08 in

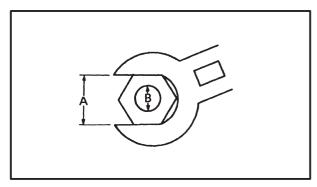
CONVERSION TABLE

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



TIGHTENING TORQUES ENGINE TIGHTENING TORQUES

lkana	Fastanav	Thread	04.	Tigh	tening to	Damarka	
Item	Fastener	size	Q'ty	Nm	m•kg	ft•lb	Remarks
Spark plugs	_	M10	4	13	1.3	9.4	
Cylinder head	Nut	M10	10	Se	e NOTE	—(E	
	Bolt	M6	2	12	1.2	8.7	
Camshaft caps	Bolt	M6	28	10	1.0	7.2	M
Cylinder head cover	Bolt	M6	6	12	1.2	8.7	
Cylinder head (exhaust pipe)	Stud bolt	M8	8	15	1.5	11	
Air indication system cap	Bolt	M6	4	10	1.0	7.2	- (G
Camshaft sprockets	Bolt	M7	4	24	2.4	17	
Cylinder head and throttle body	Clamp	M5	4	3	0.3	2.2	
Connecting rod caps	Bolt	M8	8	20+150°	2.0+150°	14+150°	
Generator rotor	Bolt	M10	1	60	6.0	43	— (€
Timing chain tensioner	Bolt	M6	2	10	1.0	7.2	
Water pump outlet pipe	Bolt	M6	1	10	1.0	7.2	- □
Water pump inlet pipe	Bolt	M6	1	10	1.0	7.2	- 6
(water pump side)							
Water pump inlet pipe (front side)	Bolt	M6	1	10	1.0	7.2	
Oil/water pump assembly	Bolt	M6	1	15	1.5	11	- (0)
sprocket							
Water pump	Bolt	M6	2	12	1.2	8.7	⊣©
Thermostat cover	Nut	M6	2	10	1.0	7.2	
Thermostat inlet pipe	Bolt	M6	1	10	1.0	7.2	
Oil cooler	Bolt	M20	1	63	6.3	46	⊸ (E)
Engine oil drain bolt	Bolt	M14	1	43	4.3	31	
Oil pipe	Bolt	M6	2	10	1.0	7.2	⊣ 0
Oil strainer	Bolt	M6	3	10	1.0	7.2	⊣©
Oil delivery pipe	Bolt	M6	3	10	1.0	7.2	
Oil filter union bolt	Bolt	M20	1	70	7.0	51	
Oil filter	_	M20	1	17	1.7	12	— (€
Oil pan	Bolt	M6	14	12	1.2	8.7	
Oil pan	Bolt	M6	1	12	1.2	8.7	- (0
Air filter case cover	Screw	M5	10	1.7	0.17	1.2	
Throttle body and throttle body	Clamp	M5	4	3	0.3	2.2	
joint							
Throttle body and funnel	Bolt	M5	6	4.2	0.42	3.0	
Throttle cable	Nut	M6	1	4.5	0.45	3.3	
Throttle cable adjuster	Bolt	M6	1	4.5	0.45	3.3	
Stator coil	Screw	M6	3	14	1.4	10	-0
Generator rotor cover and	Screw	M6	3	10	1.0	7.2	- □
bearing housing							
Pull lever cover	Bolt	M6	2	10	1.0	7.2	
Thermostat assembly stay	Bolt	M6	2	10	1.0	7.2	
Starter clutch idler gear	Bolt	M6	1	10	1.0	7.2	-0
Clutch boss	Nut	M20	1	95	9.5	69	Stake
Clutch spring	Bolt	M6	6	10	1.0	7.2	[
Drive sprocket	Nut	M22	1	85	8.5	61	Use a lock washer





Item	Fastener	Thread	Tigh		tening to	rque	Remarks
item	rasiener	size	Q'ty	Nm	m•kg	ft•lb	nemarks
Exhaust pipe and cylinder head	Nut	M8	8	20	2.0	14	
Catalyst pipe assembly and	Bolt	M8	2	20	2.0	14	
muffler							
Exhaust pipe and exhaust valve	Bolt	M6	5	10	1.0	7.2	
pipe assembly							
Exhaust valve pipe and housing	Bolt	M6	1	10	1.0	7.2	
Pulley and shaft arm	Nut	M6	1	7	0.7	5.0	
EXUP pulley bracket	Bolt	M6	1	10	1.0	7.2	
EXUP pulley cover	Bolt	M6	2	10	1.0	7.2	
Exhaust valve pipe and bracket	Bolt	M8	1	20	2.0	14	
EXUP cable nut	Nut	M6	2	6	0.6	4.3	
Catalyst pipe bracket and frame	Bolt	M8	1	20	2.0	14	
Catalyst pipe and catalyst pipe bracket	Bolt	M8	1	20	2.0	14	
Exhaust valve pipe and catalyst	Bolt	M8	1	20	2.0	14	
pipe	Don	IVIO	'		2.0	14	
EXUP servo motor	Bolt	M6	2	7	0.7	5.0	
Muffler and rear frame	Bolt	M8	2	23	2.3	17	
Muffler cover	Bolt	M6	2	10	1.0	7.2	
Crankcase	Stud bolt	M10	10	8	0.8	5.8	— (€
Crankcase (main journal)	Bolt	M9	10	Se	e NOTE	2	— €
Crankcase	Bolt	M6	10	12	1.2	8.7	— ■ (E)
Crankcase	Bolt	M8	1	24	2.4	17	-(B) -(U)
Crankcase	Bolt	M8	5	24	2.4	17	─ ■
Generator rotor cover	Bolt	M6	4	12	1.2	8.7	
Generator rotor cover	Bolt	M8	3	22	2.2	16	
Drive sprocket cover	Bolt	M6	2	10	1.0	7.2	
Drive sprocket cover	Bolt	M6	1	10	1.0	7.2	- (0
Crankcase cover (left)	Screw	M6	3	10	1.0	7.2	
Clutch cover	Bolt	M6	7	12	1.2	8.7	
Clutch cover	Bolt	M6	1	12	1.2	8.7	- (G
Pickup rotor cover	Bolt	M6	6	12	1.2	8.7	
Breather cover	Bolt	M6	4	12	1.2	8.7	
Breather plate	Bolt	M6	3	10	1.0	7.2	- ()
Plate	Bolt	M6	2	10	1.0	7.2	- (0)
Pickup rotor cover blind bolt	Bolt	M8	1	15	1.5	11	
Generator rotor cover plug	Plug	M20	1	8	0.8	5.8	
Main gallery plug (oil return)	Plug	M16	3	8	0.8	5.8	
Main gallery plug	Plug	M20	1	8	0.8	5.8	
Oil return pipe	Bolt	M6	2	10	1.0	7.2	- (0)
Oil return plug	Screw	M12	2	24	2.4	17	- (0)
Stator coil lead	Bolt	M6	1	10	1.0	7.2	- (0



Item	Fastener	Thread	Q'ty	Tigh	Remarks		
size dity	Nm	m•kg	ft•lb	Tiemarks			
Main axle bearing housing	Bolt	M6	3	12	1.2	8.7	-(0)
Shift fork shaft stopper	Bolt	M6	2	10	1.0	7.2	⊣ ©
Stopper screw	Screw	M8	1	22	2.2	16	⊣ ©
Shift rod lock nut (rear)	Nut	M6	1	7	0.7	5.0	Left thread
Shift rod lock nut (front)	Nut	M6	1	7	0.7	5.0	
Shift rod joint	Bolt	M6	1	10	1.0	7.2	⊣ ©
Shift arm	Bolt	M6	1	10	1.0	7.2	
E.C.U.	Screw	M6	2	7	0.7	5.0	
Neutral switch	_	M10	1	20	2.0	15	
EXUP servo motor cover	Screw	M5	2	2	0.2	1.5	
Coolant temperature sensor	_	M12	1	18	1.8	13	
Cylinder identification sensor	Bolt	M6	1	8	0.8	5.7	⊣ 0
Atmospheric pressure sensor	Screw	M5	2	7	0.7	5.0	
Crankshaft position sensor	Bolt	M6	1	10	1.0	7.2	⊣ 0
Oil level switch	Bolt	M6	2	10	1.0	7.2	

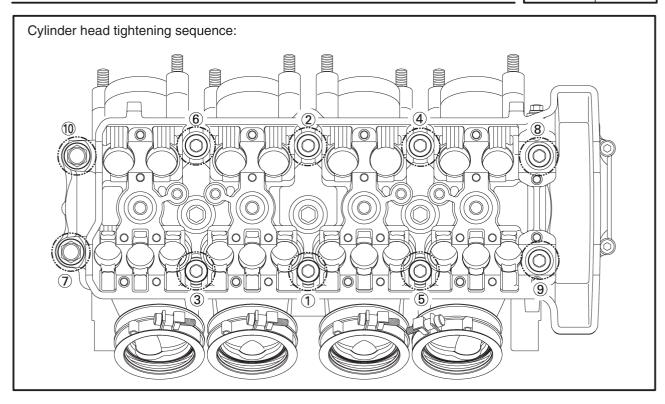
NOTE 1:

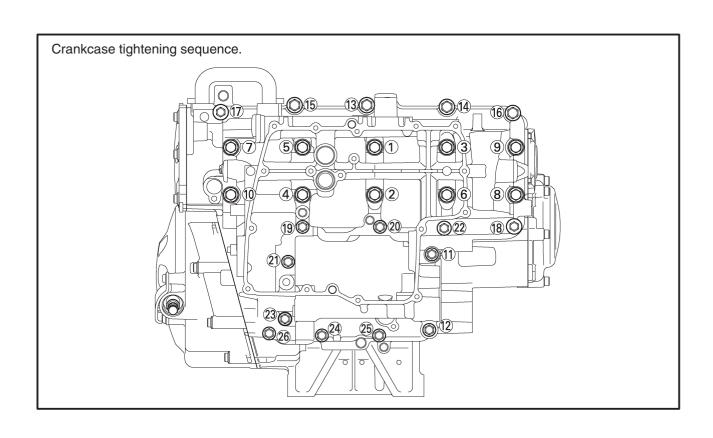
- 1. First, tighten the bolts to approximately 19 Nm (1.9 m•kg, 14 ft•lb) with a torque wrench following the tightening order.
- 2. Retighten the bolts 67 Nm (6.7 m•kg, 48 ft•lb) with a torque wrench.

NOTE 2: -

- 1. First, tighten the bolts to approximately 20 Nm (2.0 m•kg, 15 ft•lb) with a torque wrench following the tightening order.
- 2. Loosen the all bolts one by one following the tightening order and then tighten them to 20 Nm (2.7 m•kg, 15 ft•lb) again.
- 3. Retighten the bolts further to reach the specified angle (60°).









CHASSIS TIGHTENING TORQUES

Itom	Thread Tightening		g	Remarks	
Item	size	Nm	m•kg	ft•lb	Remarks
Upper bracket and outer tube	M8	26	2.6	19	
Upper bracket and steering stem nut	M28	113	11.3	82	
Handlebar and outer tube	M8	17	1.7	12	
Handlebar and upper bracket	M6	13	1.3	9	
Steering shaft and ring nut	M30	18	1.8	13	See NOTE 1
Outer tube and under bracket	M8	23	2.3	17	
Main switch and upper bracket	M8	26	2.6	19	
Front brake master cylinder cap stopper	M4	1.2	0.12	0.9	
Front brake hose union bolts	M10	30	3.0	22	
Front brake master cylinder and bracket	M6	13	1.3	9	
Meter assembly and front cowling stay	_	1.3	0.13	0.9	
Headlight and front cowling stay	_	0.8	0.08	0.6	
Front cowling and headlight assembly	l —	1.5	0.15	1.1	
Cover 7, 8 and frame	M6	5	0.5	3.6	
Under cowling and engine	M6	5	0.5	3.6	
Windshield and front cowling	M5	0.4	0.04	0.3	
Duct and console panel	M5	1.3	0.13	0.9	
End grip and handlebar	M6	4	0.4	2.9	
Horn bracket and under bracket	M6	4	0.4	2.9	
Coolant reservoir tank and frame	M6	5	0.5	3.6	
Engine mount front (left and right)	M10	45	4.5	33 -	
Engine mount rear upper	M10	51	5.1	37	
Engine mount rear under	M10	51	5.1	37	See NOTE 2
Engine mount rear adjust bolt	M16	7	0.7	5.1 _	∐
Catalyst pipe stay and frame	M10	44	4.4	32	
Clutch cable lock nut (engine side)	M8	7	0.7	5.1	
Main frame and rear frame	M10	41	4.1	30	
Throttle cable adjust nut (throttle body side)	M6	5	0.5	3.6	
Cover 2 and plate	_	0.8	0.08	0.6	
Pivot shaft and nut	M18	105	10.5	76	
Connecting rod and frame	M10	44	4.4	32	
Relay arm and connecting rod	M10	44	4.4	32	
Relay arm and swingarm	M10	44	4.4	32	
Rear shock absorber and relay arm	M10	44	4.4	32	
Rear shock absorber and upper bracket	M10	44	4.4	32	
Upper bracket and frame	M14	92	9.2	67	
Seal guard	M6	7	0.7	5.1	
Drive chain case	M6	7	0.7	5.1	
Chain puller adjust nut	M8	16	1.6	12	
Fuel tank and fuel pump assembly	M5	4	0.4	2.9	
Fuel tank stay (front side) and frame	M6	7	0.7	5.1	
Fuel tank and fuel tank stay (front side)	M6	7	0.7	5.1	
Fuel tank stay (rear side) and rear frame	M6	7	0.7	5.1	
Side cover and fuel tank	M5	0.4	0.04	0.3	
Rider seat and frame	M6	7	0.7	5.1	
Seat lock plate and rear frame	M6	10	1.0	7	
Side cover (rear side) and frame	M5	4	0.4	2.9	

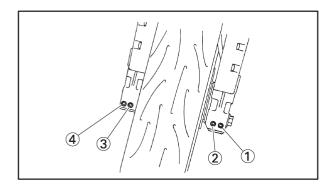
Item		Tightening			Remarks
		Nm	m•kg	ft•lb	Hemans
Battery box and frame	M6	7	0.7	5.1	
Atmospheric pressure sensor and battery box	—	0.7	0.07	0.5	
Lean angle cut-off switch and battery box	—	2	0.2	1.4	
Foot rest bracket (front) and frame	M8	28	2.8	20	
Foot rest bracket (rear) and frame	M8	28	2.8	20	
Rear brake master cylinder and foot rest bracket	M6	18	1.8	13	
Rear brake hose union bolt	M10	30	3.0	22	
Sidestand bracket and frame	M10	63	6.3	46	
Front wheel axle shaft and bolt	M14	91	9.1	66	
Rear wheel axle nut	M24	150	15.0	109	
Front brake caliper and front fork	M10	35	3.5	25	
Front brake disc and front wheel	M6	18	1.8	13	-(0)
Rear brake disc and rear wheel	M6	30	3.0	22	- (0
Rear wheel sprocket and drive hub	M10	100	10.0	72	
Brake caliper bleed screw	M8	6	0.6	4.3	
Front wheel axle pinch bolt	M8	20	2.0	14	See NOTE 3

NOTE 1: -

- 1. First, tighten the ring nut to approximately 52 Nm (5.2 m•kg, 38 ft•lb) with a torque wrench, then loosen the ring nut completely.
- 2. Retighten the lower ring nut to specification.

NOTE 2: -

Refer to "INSTALLING THE ENGINE" in chapter 5.



NOTE 3: —

- 1. Insert the front wheel axle from the right side and tighten it with the flange bolt from the left side to 91 Nm (9.1 m•kg, 65.8 ft•lb).
- In the order from the pinch bolt ② → pinch bolt ① → pinch bolt ②, tighten each bolt to 20 Nm (2.0 m•kg, 14 ft•lb) without performing temporary tightening.
- 3. Check that the end face of the axle head and the end face of the fork side are flush-mounted. If they are out of alignment, make sure to fit them by adding the external force by hand or with a plastic hammer, etc.
 - If the end face of the axle is not parallel to the end face of the fork, align them so that one point of the axle circumference is positioned on the end face of the fork.
 - At this stage, it can be accepted if the end face of the axle becomes partially concave to the end face of the fork.
- In the order from the pinch bolt ④ → pinch bolt ③ → pinch bolt ④, tighten each bolt to 20 Nm (2.0 m•kg, 14 ft•lb) without performing temporary tightening.

LUBRICATION POINTS AND LUBRICANT TYPES

SPEC U

FAS0003

LUBRICATION POINTS AND LUBRICANT TYPES ENGINE

Lubrication point	Lubricant
Oil seal lips	
O-rings	-CD-
Bearings	⊸ €
Crankshaft pins	⊸ (3
Piston surfaces	⊸ (3
Piston pins	⊸ €
Crankshaft journals	⊸ (3
Camshaft lobes	— (M
Camshaft journals	— (M
Valve stems (intake and exhaust)	— (M
Valve stem ends (intake and exhaust)	— (M
Water pump impeller shaft	⊸ €
Oil pump rotors (inner and outer)	⊸ (3)
Oil pump housing	⊸ (3)
Oil strainer	⊸ (3)
Clutch (pull rod)	-49
Oil/water pump drive sprocket and washer	— (3)
Clutch (thrust plate)	⊸ €
Starter clutch idle gear inner surface	⊸ (3)
Starter clutch assembly	— (3)
Primary driven gear	— (3)
Transmission gears (wheel and pinion)	
Main axle and drive axle	
Shift drum	— (3)
Shift forks and shift fork guide bars	— (3)
Shift shaft	—
Shift shaft boss	-
Cylinder head cover mating surface	Yamaha bond No.1215
Crankcase mating surface	Yamaha bond No.1215
Clutch cover (crankcase mating surface)	Yamaha bond No.1215
Generator rotor cover (crankcase mating surface)	Yamaha bond No.1215
Pickup rotor cover	Yamaha bond No.1215

LUBRICATION POINTS AND LUBRICANT TYPES



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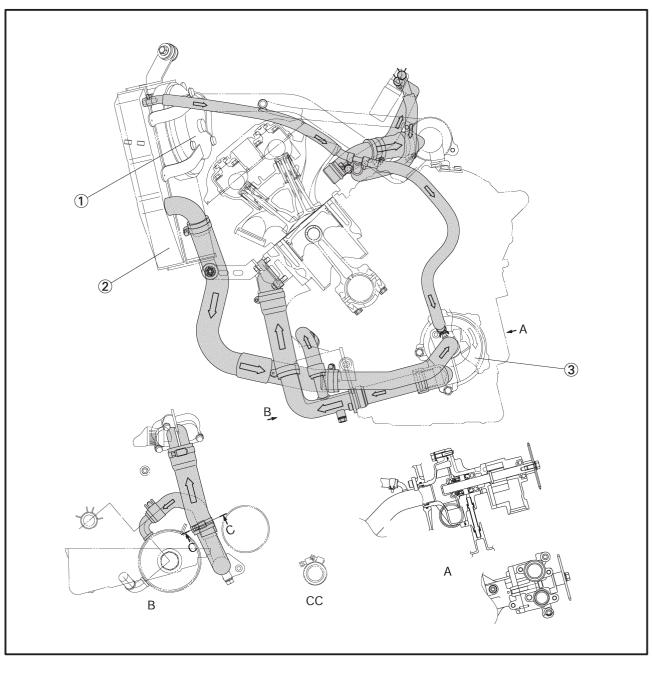
CHASSIS

Lubrication point	Lubricant
Steering bearings and bearing races (upper and lower)	- (S)-1
Throttle grip inner surface	- (S)-1
Brake lever pivoting point and metal-to-metal moving parts	- (S)-1
Clutch lever pivoting point and metal-to-metal moving parts	
Engine mount bolts (rear upper and lower)	- (S)-1
Relay arm, connecting rod and rear shock absorber collar	
Pivot shaft	→(E)
Swingarm pivot bearing	- (S)-1
Swingarm head pipe end, oil seal and bush	
Oil seal (relay arm, connecting arm and rear shock absorber)	L S
Seat lock assembly moving parts	(S)
Sidestand pivoting pint and metal-to-metal moving parts	- (5)
Link and sidestand switch contact point	(S)
Sidestand hook and spring	
Shift shaft joint	- (5)
Front wheel oil seal (right and left)	- (5)
Front axle shaft	(S)
Rear wheel oil seal	(S)
Rear wheel drive hub oil seal	(S)
Rear wheel drive hub mating surface	(§)



COOLING SYSTEM DIAGRAMS

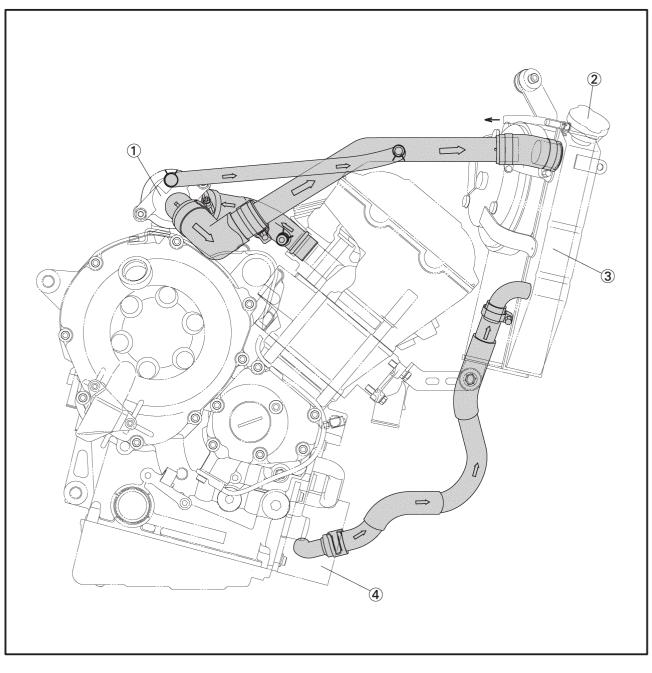
- $\begin{tabular}{ll} \hline \end{tabular} \begin{tabular}{ll} \hline \end{t$
- 2 Radiator 3 Water pump



COOLING SYSTEM DIAGRAMS

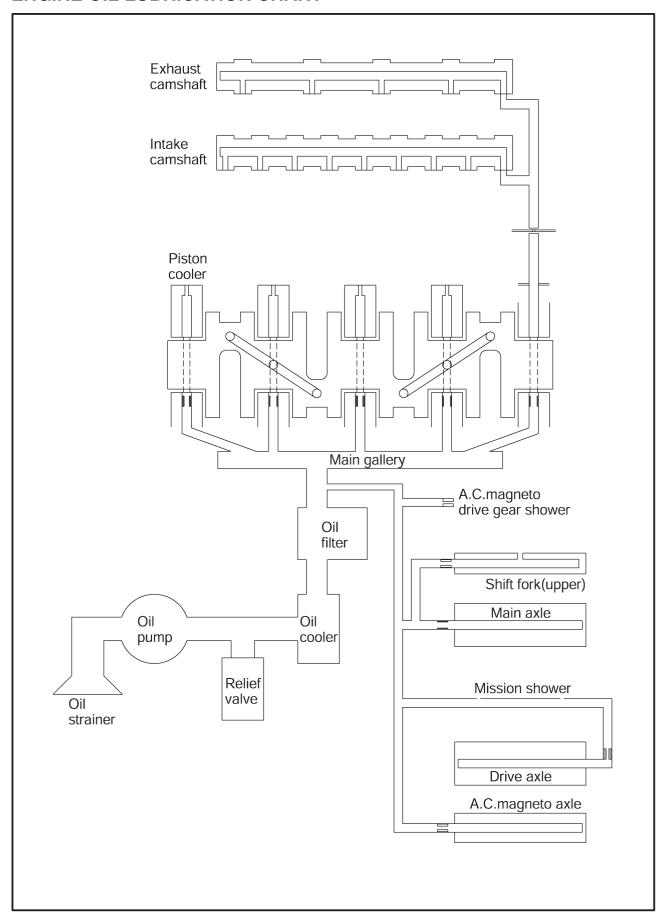


- Thermostat
 Radiator cap
 Radiator
 Oil cooler





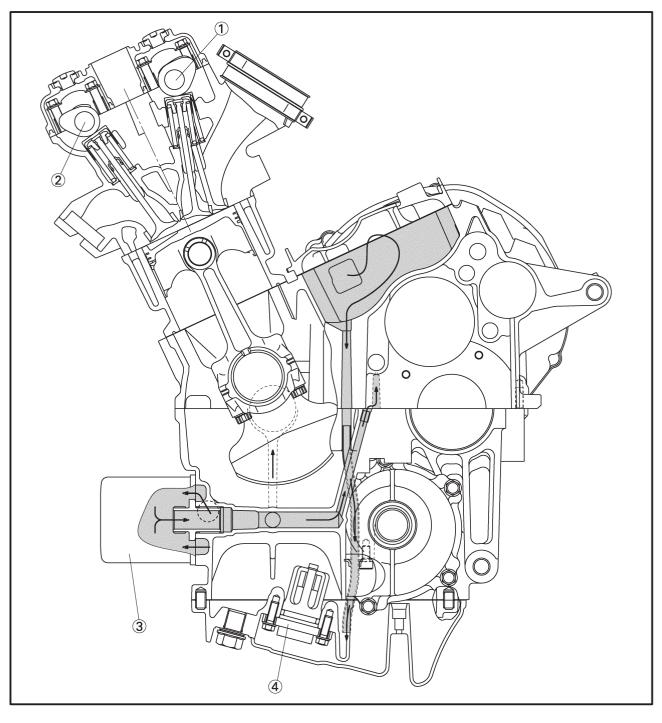
ENGINE OIL LUBRICATION CHART





LUBRICATION DIAGRAMS

- 1) Intake camshaft
- 2 Exhaust camshaft
- 3 Oil filter cartridge4 Oil level switch

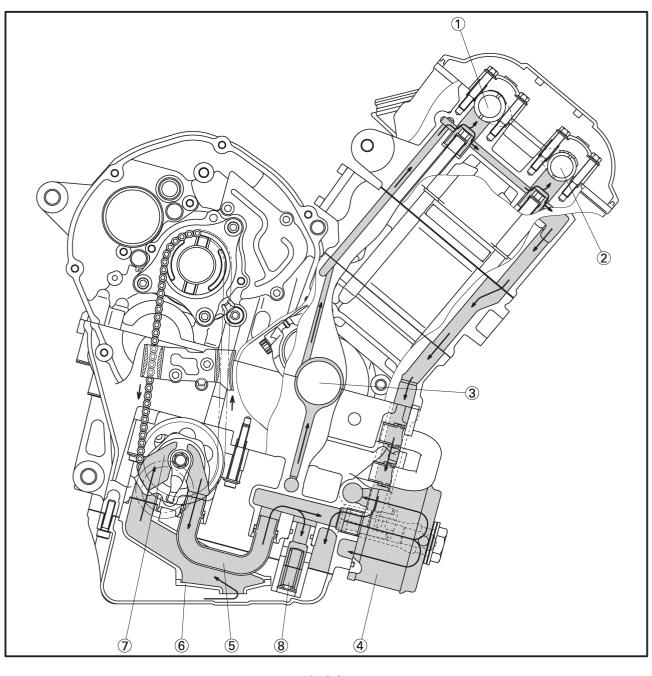


LUBRICATION DIAGRAMS



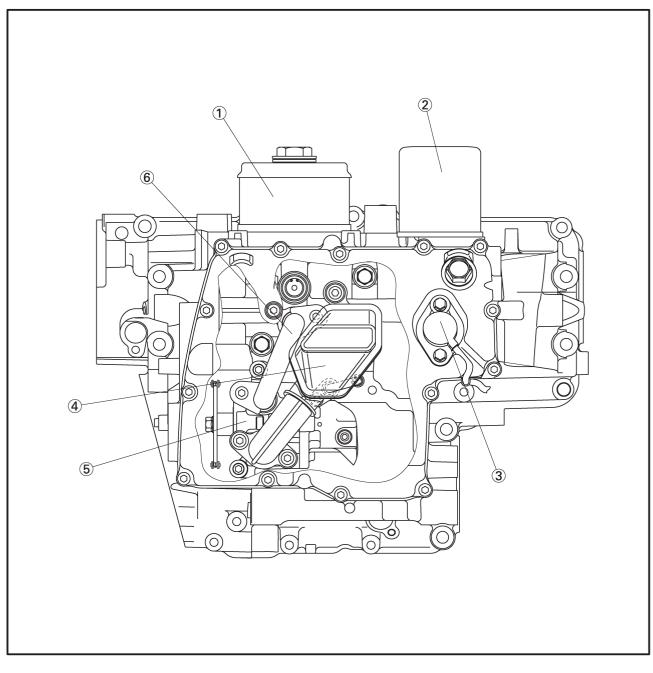
- 1 Intake camshaft
- 2 Exhaust camshaft3 Crankshaft
- 4 Oil cooler
- 5 Oil pipe

- 6 Oil strainer
 7 Oil pump
 8 Relief valve

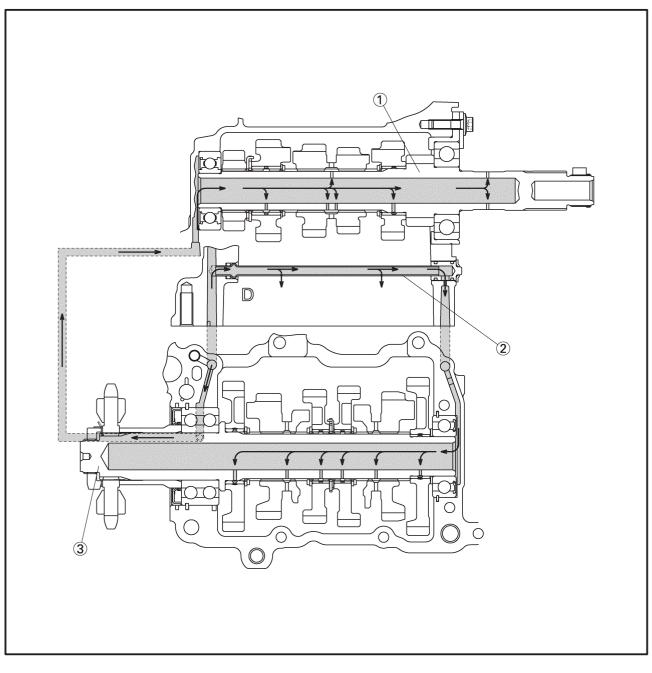


LUBRICATION DIAGRAMS

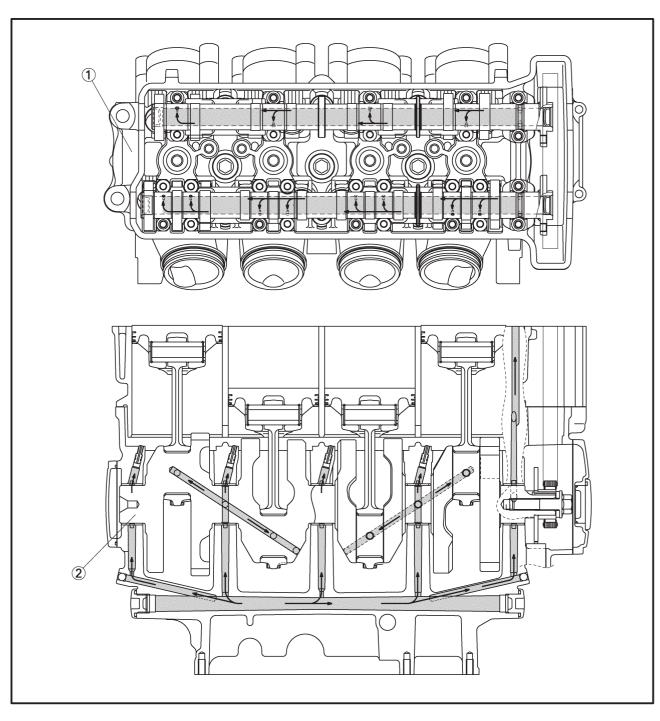
- 1 Oil cooler
 2 Oil filter cartridge
 3 Oil level switch
 4 Oil strainer
 5 Oil pump
 6 Oil pipe



- Main axle
 Oil delivery pipe
 Drive axle



- ① Cylinder head ② Crankshaft

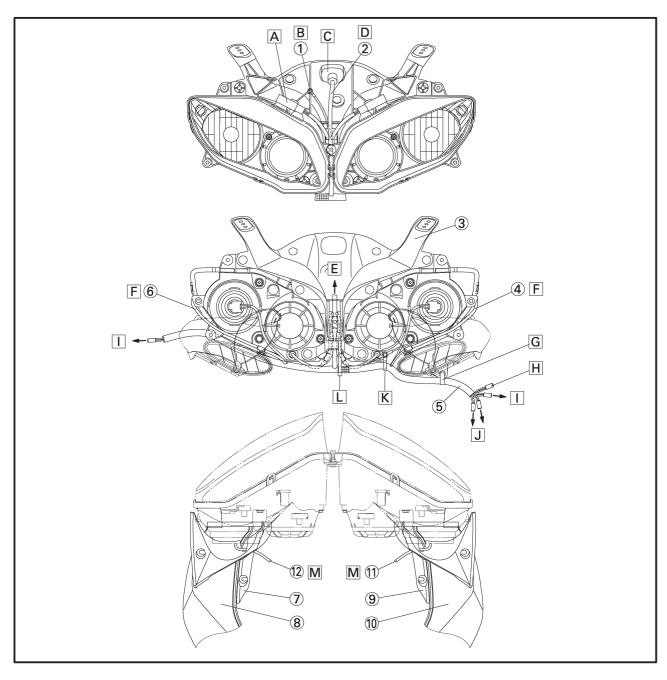




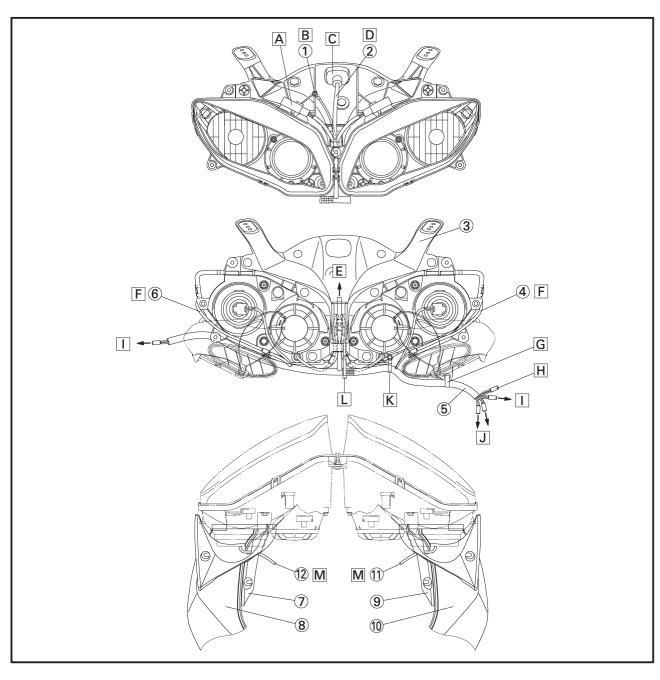
EAS00035

- (1) Ground lead
- (2) Meter lead
- (3) Stay 1
- 4 Auxiliary light lead (right)
- (5) Headlight lead
- 6 Auxiliary light lead (left)
- (7) Console panel 1
- (8) Duct 1
- 9 Console panel 2
- (10) Duct 2
- 11 Headlight lead (right)
- 12 Headlight lead (left)

- A Insert to the rib of the head light. (Either location of the right and left relays is acceptable.)
- B The lead should not stretch too much.
- Make sure to insert the coupler and boot to the stay 1 hole.
- D The speedometer lead should not be strained.
- E To the stay 1 hole
- F Connect after passing over the upper side of the duct.
- G Clamp the head light lead by wrapping and insert it to the intake air grill hole. (only at the right side.)
- H Do not connect the wire to the coupler with the plug for options.
- To the turn signal light
- J To the wire harness
- K Cut the tip of the clamp.



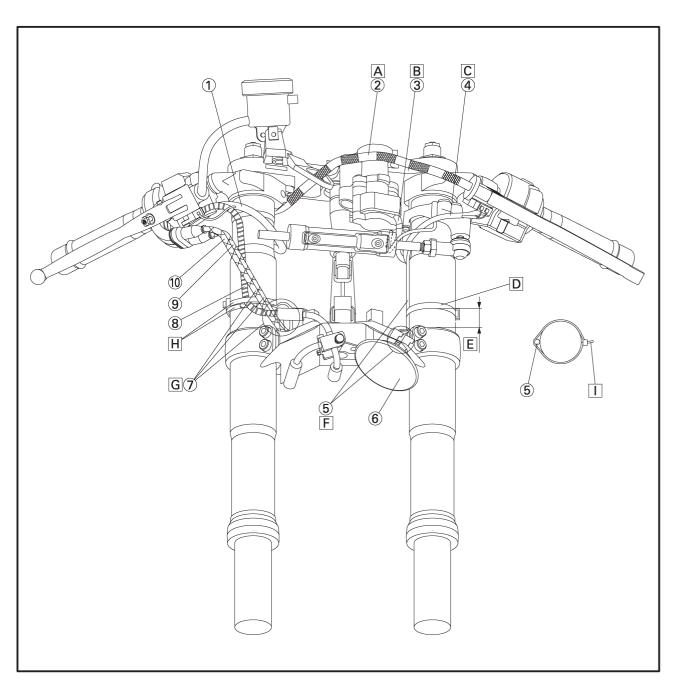
- L Clamp the head light lead to the stay 1 at the positioning white tape section. There should be no slack when clamping. Point the tip of the clamp (excessive part) to the front side of the vehicle. Fasten the head light lead with a clamp.
- M Feed a lead wire through the U shape cutout of the console panel.



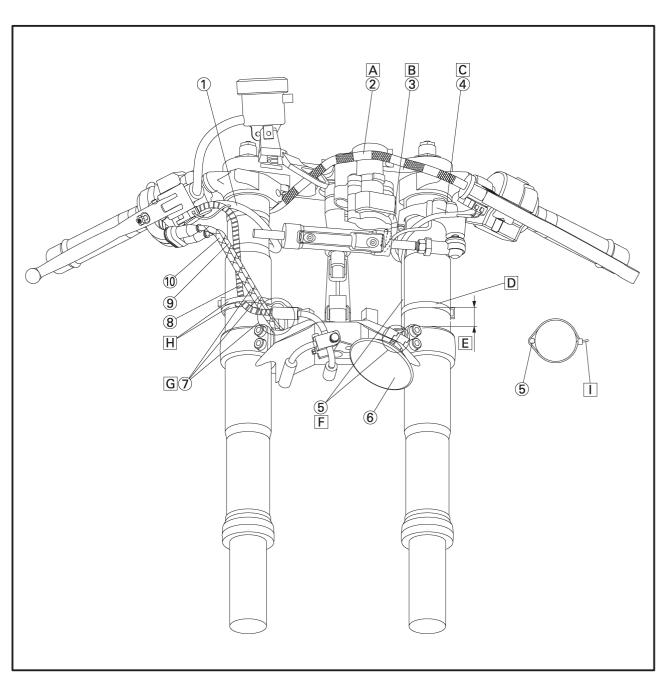
- (1) Right handlebar switch lead
- (2) Clutch cable
- (3) Main switch lead
- (4) Left handlebar switch lead
- (5) Horn lead
- 6 Horn
- (7) Throttle cables
- (8) Brake hose
- (9) Throttle cable (return side)
- 10 Throttle cable (pull side)
- A Route the clutch cable so as to F Clamp the leads inside the front get along the front side of the main switch after passing it through the guide.
- through the guide wire.
- C Pass the left handlebar switch lead through the guide wire.
- D Point the tip of the band (excessive part) to the rear side of the vehicle and cut the surplus section. Clamp it to the outer tube.
- E Clamp the section between 0 and 20 mm (0 and 0.79 in) from the split of the under bracket.

- fork of the vehicle. Point the exit of the horn lead to the left front fork side.
- B Pass the main switch lead G Two throttle cables should not cross with each other.

Route two throttle cables behind the brake hose, pass between the inside of the under bracket's upper side front fork and guide wire assembly, and then pass it through the clamp that is inserted to the cover 3 under the frame.



- H Clamp the assembly of the clamp and guide wire to the front fork outer tube. Cut the tip of the clamp leaving 2 to 4 mm (0.08 ~ 0.16 in). Point the binding part to the external part of the vehicle. Clamp it to the outer tube.
- Cut the tip leaving 2 to 4mm $(0.08 \sim 0.16 \text{ in})$.

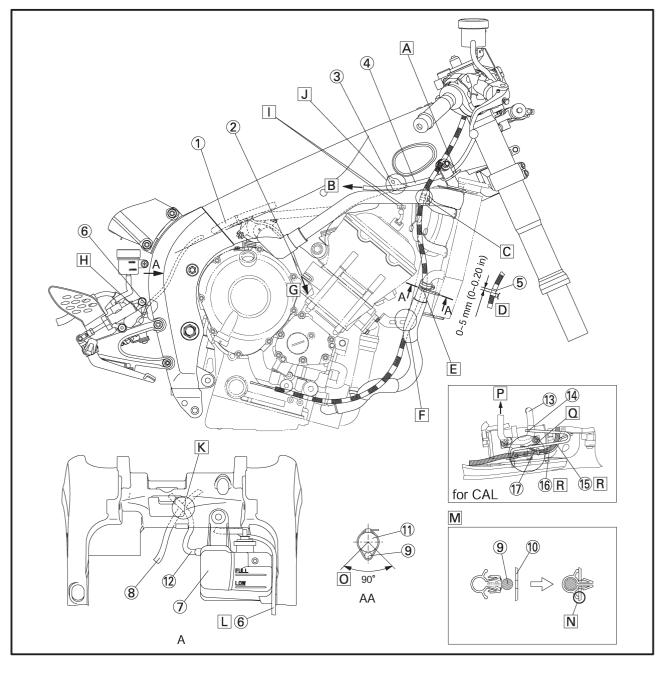




- 1) Wire harness
- (2) Crankshaft position sensor lead
- (3) Heat protector
- (4) Right handlebar switch lead
- 5 Positioning guide
- 6 Rear brake light switch lead
- (7) Coolant reservoir tank
- (8) Speed sensor lead
- (9) Clutch cable
- (10) Radiator
- (11) Oil cooler outlet hose
- (12) Coolant reservoir tank drain hose
- 13 Breather pipe
- 14 Fuel tank drain hose
- 15 A.C. magneto lead
- 16 Wire harness

- (17) Throttle body lead
- A Clamp it after passing between the frame and radiator stay. Point the tip of the clamp (excessive part) to the front side of the vehicle. Fasten the right handlebar switch lead with a clamp.
- B To the wire harness
- The clutch cable positioning guide should be above the upper end of the clamp. Fasten the clutch cable with a clamp. (Refer to M)
- D Position relation between the clamp and guide.

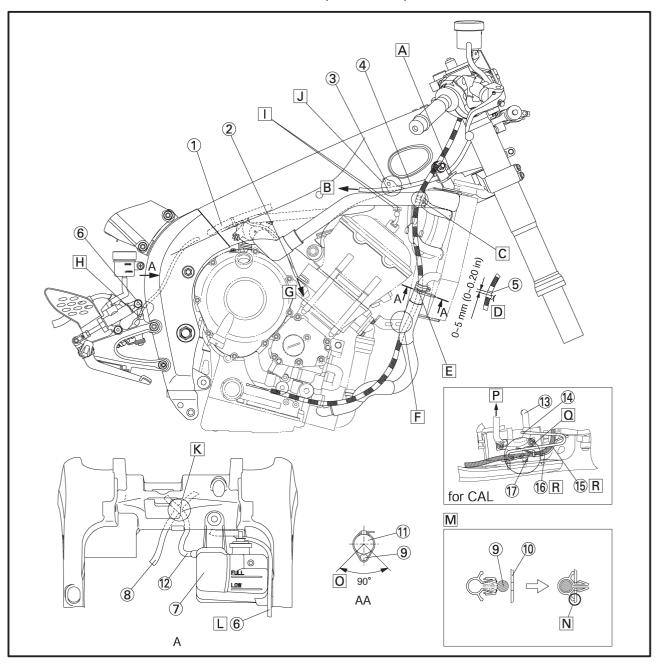
- E Clamp the clamp upper end along the line of lower end of the hose clamp assembly. Point the tip of the clamp (surplus section) to the front side of the vehicle. Clutch cable is what the clamp fastens.
- F The clutch cable doesn't project outside the water hose and the cylinder head in the box part in the figure.
- G To the engine
- H Clamp behind the bracket 3.





- The coupler for the air induction solenoid lead and camshaft sensor lead should be connected above the ignition coil sub wire harness and it should not drop on the cylinder head cover behind the ignition coil.
- J Pass the right handlebar switch lead between the frame and heat protector.
- K Coolant reservoir tank drain hose should cross with the speed sensor lead under the swingarm bracket. Route the coolant reservoir tank drain hose over the up side of the vehicle.
- Pass the rear brake light switch lead between the swingarm bracket and coolant reservoir tank.
- M Release the tip of the clamp and install it to the clutch cable. Insert the clamp to the hole located on the right back side of the radiator.
 - Radiator fan motor lead should not be caught while inserting the clamp.
- N Push the clamp until it hits the radiator side stay. Radiator fan motor lead should not be caught.
- O Clamp the clutch cable so that it is within this specified clamp.

- P To the air filter
- Q Route the fuel tank drain hose over the canister stay and between the breather hose 2 and wire harness. On the front side of the canister stay, let though the bottom of the A.C.magneto lead and the wire harness.
- Route by the upside of vehicle away from the canister stay.

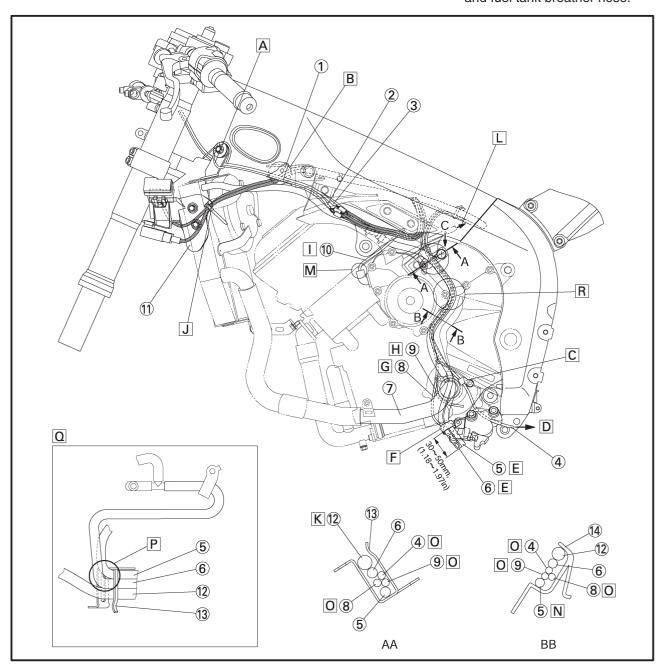




- 1 Heat protector
- (2) Main switch lead
- (3) Left handlebar switch lead
- 4 EXUP servo motor lead
- (5) Coolant reservoir tank drain hose
- (6) Fuel tank drain hose
- (7) Coolant outlet pipe
- (8) Sidestand switch lead
- (9) Oil level switch lead
- 10 A.C.magneto lead
- (11) Fuse box stay
- (12) Water hose
- 13 Stay 1
- (14) Chain case cover

- A Clamp the leads so that they are positioned inner of the vehicle than the washer position after routing them between the frame and radiator stay. Align the clamp position with the taping sections of leads. Point the tip of the clamp (surplus section) to the down front side of the vehicle.
 - What the clamp fastens at this stage are the handlebar switch and main switch leads.
- B Pass the main switch lead and left handlebar switch lead between the frame and the heat protector.

- C Fold back the clamp and secure it after passing the lead through the clamp.
- D To the EXUP servo motor
- Pass the coolant reservoir tank drain hose and fuel tank drain hose through the clamp from the outer side of the water pump inlet pipe after routing it behind the water pump breather hose.
 - The lengths of two hose ends are allowed to be random. Any direction of cut edges can be accepted. (Only for the fuel tank drain hose)
- F Clamp the fuel tank drain hose and fuel tank breather hose.



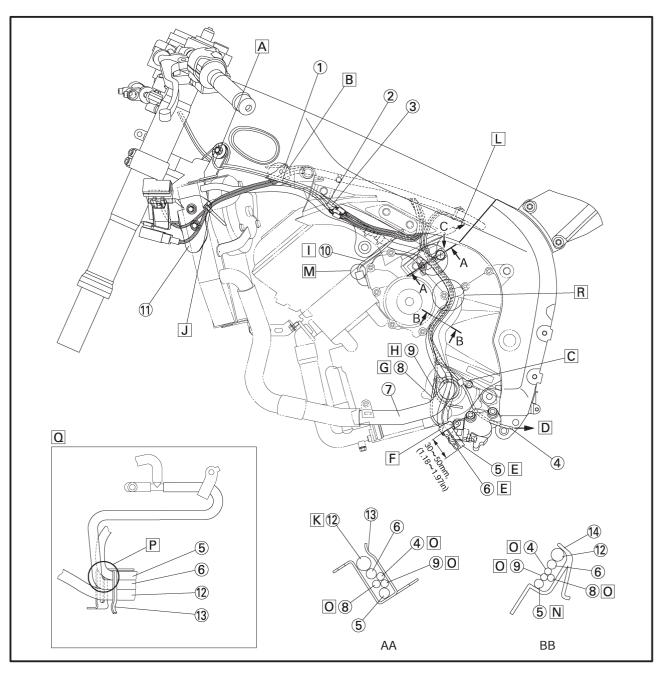


- the water hose and water pipe.
- H Route the lead by the inside of the water hose and water pipe.
- I Route by the outside of vehicle away from the water hose.
- J Point the tip of the clamp (excessive part) to the down rear side of the vehicle. Fasten the wire harness with a clamp.
- K Route the water hose so that it is Q Routing of the fuel tank drain placed at the outermost position finally after routing other leads and hoses in the guide.
- L To the coolant reservoir tank

- Route the lead by the inside of M There should be no exposure of R Arrange so as not for each hose bared conductors due to the displacement of the tube.
 - N Route the coolant reservoir tank drain hose so that it is routed at the innermost position to each hose and lead.
 - O Can be routed in any order.
 - P Align the molded part of the fuel tank drain hose with the stay 1.
 - hose. EXUP servo motor, oil level

switch and sidestand switch leads are omitted in this drawing.

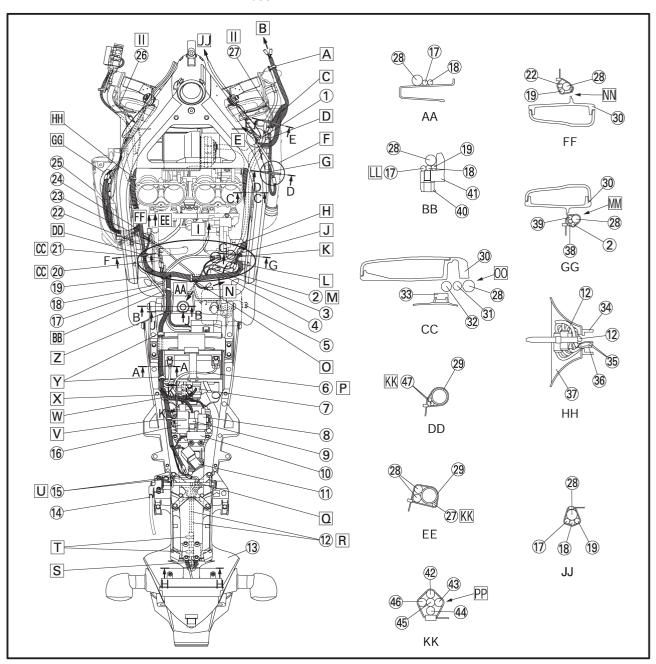
to cross in the part between "BB" from the section "AA" which is in the illustration.



- (1) Heat protector
- (2) Crankshaft position sensor lead
- (3) Neutral switch lead
- (4) Ground lead
- (5) Coolant reservoir tank
- (6) Battery positive lead
- (7) Starter relay
- (8) Turn signal relay
- (9) Main fuse
- 10 Lean angle cut-off switch
- (11) Atmospheric pressure sensor
- 12 Tail/brake light lead
- 13 Rear fender
- (14) Seat lock cable
- (15) Anti safety alarm coupler
- 16 Starting circuit cut-off relay

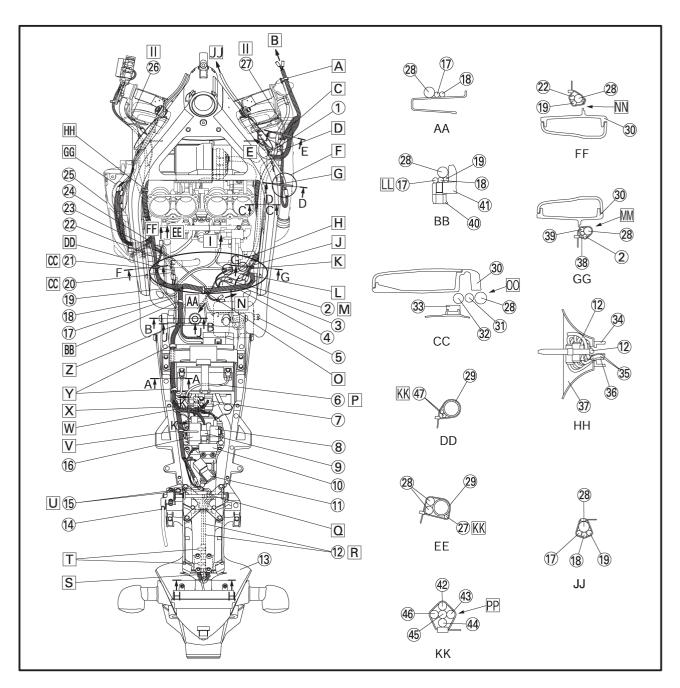
- (17) Battery negative lead
- (18) Starter motor lead
- (19) A.C.magneto lead
- 20 Oil level switch lead
- 21) Sidestand switch lead
- 22 Throttle body lead
- 23 Coolant reservoir tank drain hose
- 24 Fuel tank drain hose
- 25 Cover 7
- 26 Radiator fan motor lead (left)
- 27) Radiator fan motor lead (right)
- 28 Wire harness
- 29 Pipe 3
- 30 Frame
- 31 Coolant reservoir tank hose
- 32 Thermo stat assembly breather 47 Right handlebar switch lead hose

- 33 Throttle body side cap
- 34) Mud guard
- 35 Turn signal light lead
- 36 License plate light lead
- 37 Rear fender rib
- 38 Speed sensor lead
- 39 Rear brake light switch lead
- 40 Rear frame
- (41) Swingarm bracket
- 42 Main fuse lead
- 43 Starting circuit cut-off relay lead
- (44) Turn signal light relay lead
- 45 Starter relay lead
- 46 Main fuse lead (To the battery positive lead)



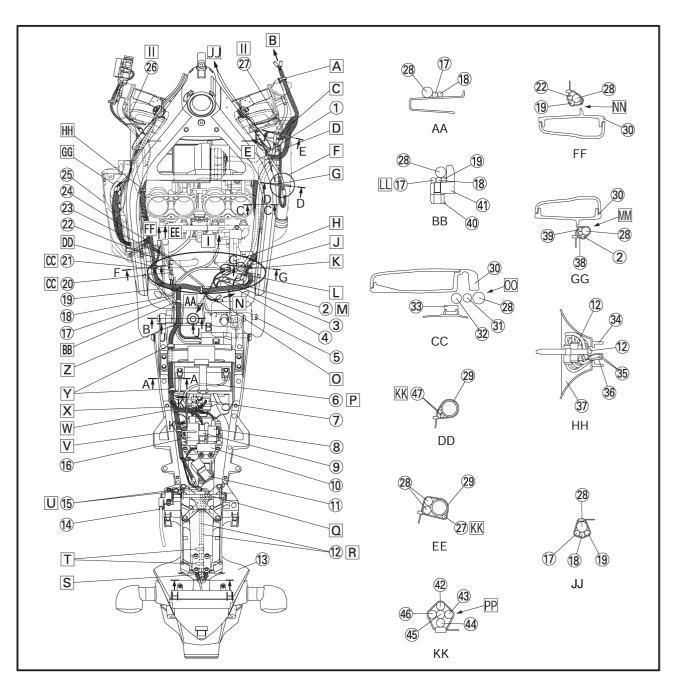
- the clamp inserted to the radiator stay.
- B To the headlight lead
- C Clamp the lead between three protrusions of the pipe (the first and second parts from the vehicle front). Point the tip of the clamp (excessive part) to the inside of the vehicle.
- D To the vehicle right side diagram E To the engine
- F Clamp the lead between three protrusions of the pipe (the inside and outside of the vehicle).

- A Pass the wire harness through G Point the tip of the clamp (exces- K Pass the water hose lower side sive part) to the inside of the vehicle.
 - H All hoses and leads should be routed over the vehicle's upper side above the heat protector.
 - To the starter motor
 - J Fasten the wire harness, clank shaft position sensor lead, rear brake light switch lead and speed sensor lead with a clamp. Then, point the tip of the clamp (cut the tip of the clamp leaving 2 to 4 mm (0.08 to 0.16 in).) to the inside of the vehicle.
- of the thermostat, and between the ground lead and the neutral switch.
- L Install the leads so that the engine ground lead is positioned lower and the battery negative lead to be upper. Install the protrusion of each lead to be above the vehicle.
- M Route the crankshaft position sensor lead under the wire harness.
- N To the fuel pump
- O Clamp the wire harness winding in and insert it to the frame hole.





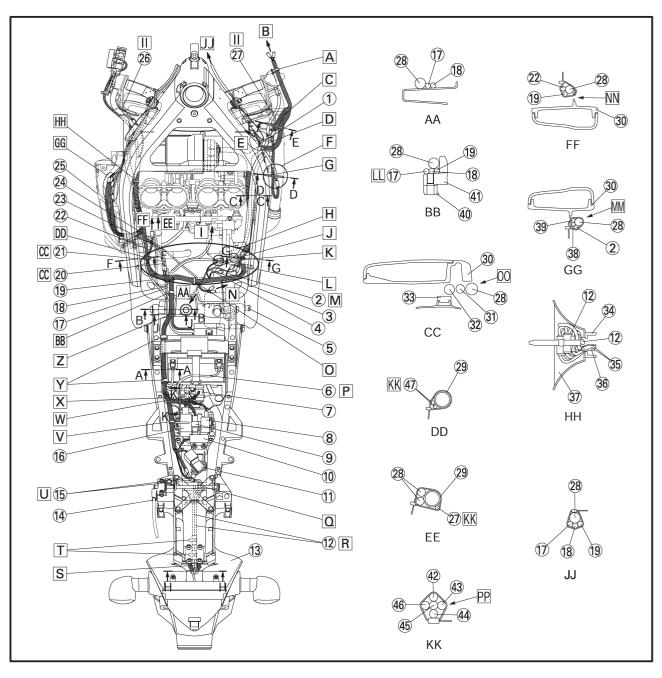
- P Pass the lead through inside of U Make sure to position the couthe battery band. pler at the downmost position of
- Q Press on the tip of the clamp after passing the leads through it.
- R Insert the tail/brake light lead to the rear frame hole.
- S Insert the clamp from the vehicle front to the rear side and fasten each lead, coupler and onionhead to the fender rib, and then point the tip of the clamp (excessive part) to the upper side of the vehicle.
- Hold down the clamp tips after passing each lead.
- U Make sure to position the coupler at the downmost position of leads. However, the coupler should be set in the rear frame so that it is not caught by the seat bottom, cover and other components.
- V Point the tip of the clamp (excessive part) to the inside of the vehicle. Fasten the wire harness with a clamp.
- W Point the tip of the clamp (surplus section) to the rear side of the vehicle. Fasten the starter relay lead, turn signal relay lead, main fuse lead (from the battery positive lead) and starting circuit cut-off relay lead with a clamp.
- X Route each lead under the wire harness.
- Y Fasten the wire harness, battery negative lead and starter motor lead with a clamp. Point the tip of the clamp (excessive part) to the inside of the vehicle.





- Point the tip of the clamp (excessive part) to the down side of the vehicle. Fasten the wire harness, battery negative lead, A.C. magneto lead and starter motor lead with a clamp.
- AA To the speed sensor
- BB Insert the wire harness wrapping clamp to the hole of the frame.
- CC After passing the lead between the wire harness and starter motor leads, fastening by the clamp should be cancelled and route the lead under the idle remote controller.
- DD Fasten the wire harness, A.C.magneto lead, and throttle body lead with a clamp. Point the tip of the clamp (cut the tip of the clamp leaving 2 to 4 mm (0.08 to 0.16 in).) to the inside of the vehicle.
- EE To the air filter
- FF To the throttle body
- GG To install the cover 7, install so as to set each coupler in the cover. Make sure that each lead is not caught by the cover 7.

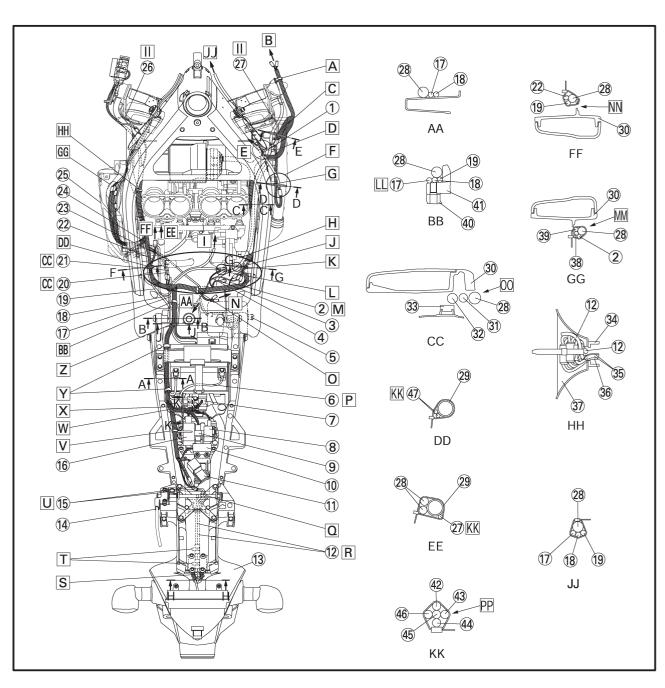
- HH Insert the wire harness wrapping clamp to the hole of the frame.
- II Make sure that the lead is fastened with the guide of the radiator stay.
- JJ To the right handlebar switch
- KK Do not place it beyond pipe 3 in the direction to the external part of the vehicle.
- LL Battery negative lead should not run on the swingarm bracket.





- MM Route each lead lower than the frame plate. Leads should be routed in random order. Clamp can be inserted in any direction.
- NN Route each lead higher than the frame plate, pass it to the inside of the vehicle from the hole. Leads should be routed in random order.
 Clamp can be inserted in any direction.
- OO The hoses should not be located higher than the throttle body side cap over the up side of the vehicle.

MM Route each lead lower than PP Route the leads in random orthe frame plate. Leads should der.

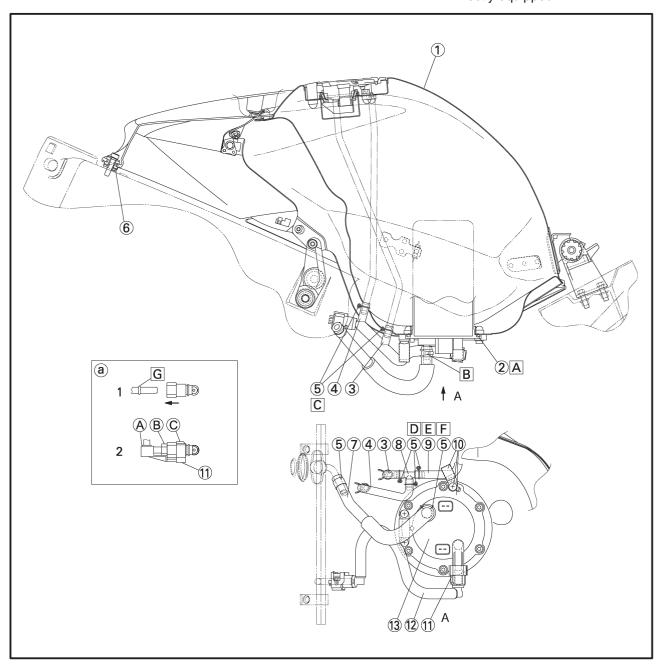




- 1) Fuel tank
- (2) O-ring
- (3) Fuel tank drain hose
- (4) Fuel tank breather hose
- (5) Clip
- 6 Air filter stay
- 7 Fuel hose 2
- (8) 3 way connector
- (9) Pipe
- 10 Fuel tank bracket
- (11) Fuel hose clamp
- 12 Fuel hose 1
- (13) Fuel pump assembly

- A Install the lip of O-ring facing up- (a) Fuel piping connector attach-
- B Install the part pointing the white paint part of the hose to the left side of the vehicle.
- C Any direction of the clip grip can be accepted.
- D Install the clip grip as specified in the drawing.
- E Install the part pointing the white side of the vehicle.
- F Point the clip grip to the left side of the vehicle.

- ment directions. (fuel pump side)
- 1. Insert the connector until the click sound is heard and check that the connector does not come off. Make sure that no foreign matter is caught in the sealing section. (It is prohibited to wear the cotton work gloves or equivalent coverings.)
- paint part of the hose to the left G This part works as a dropout stopper.
 - 2. After Item 1 mentioned above is finished, check that the clamp is inserted from the down side, and A, B and C-sections are perfectly equipped.

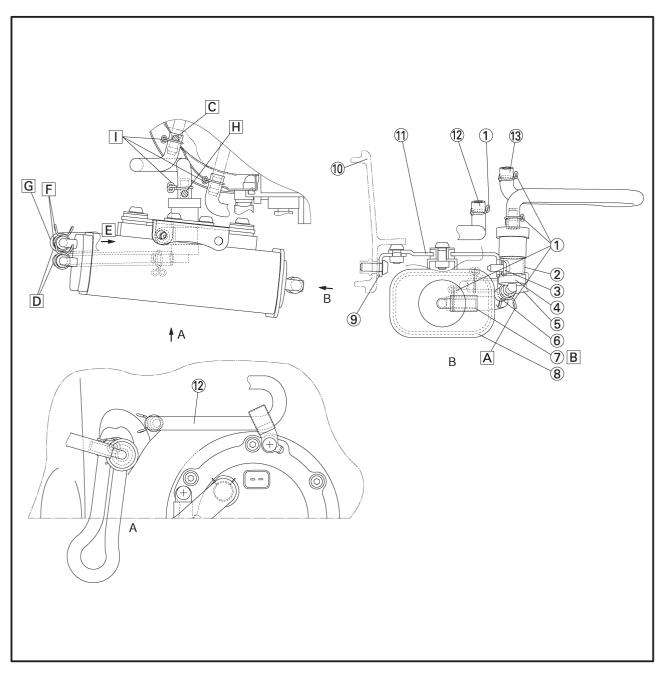




- for CAL
- 1 Clip
- 2 Clamp
- (3) Rivet
- 4 Roll over valve assembly
- (5) Balance pipe
- 6 Pipe 4
- (7) Canister hose
- (8) Canister assembly
- (9) Canister bracket
- 10 Frame
- (11) Canister stay
- (12) Pipe 2
- (13) Pipe 3

- A Point the clip grip to the down F Point the clip grip to the upper side of the vehicle.
- the nipple does not protrude.
- C Install the part pointing the white vehicle.
- D Insert the hose until it reaches the R-bottom of the pipe.
- E To the throttle body

- side of the vehicle.
- B Insert the hose so that its tip of G Install the part pointing the yellow paint mark to the front side of the vehicle.
 - paint mark to the left side of the H Install the part pointing the yellow paint mark to the left side of the vehicle.





EAS00036

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

INITIAL		ODO	OMETER REA	DINGS					
N	ο.	ITEM ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
1	*	Fuel line (See page 3-33)	Check fuel hoses for cracks or damage. Replace if necessary.		√	√	√	√	√
2	*	Spark plugs (See page 3-23)	Check Condition. Adjust gap and clean. Replace every 8000 mi (13000 km) or 12 months.		√	Replace.	√	Replace.	√
3	*	Valve clearance (See page 3-11)	Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	Crankcase breather system (See page 3-34)	Check breather hose for cracks or damage. Replace if necessary.		√	√	√	√	√
5	*	Electronic fuel injection (See page 3-17, 21)	Check and adjust engine idle speed and synchronization.	√	√	$\sqrt{}$	√	√	√
6	*	Exhaust system (See page 3-35)	Check for leakage. Tighten if necessary. Replace gasket(s) if necessary.		√	√	√	√	√
7	*	Evaporative emission control system (For California only)	Check control system for damage. Replace if necessary.				√		√ ·
8	*	Air induction system (See page 7-46)	Check the air cut-off valve, reed valve, and hose for damage. Replace any damaged parts if necessary.				√		√ ·

GENERAL MAINTENANCE AND LUBRICATION CHART

Г				INITIAL	ODOMETER READINGS				
N	о.	ITEM ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
1	*	Air filter element (See page 3-32)	Check condition and damage. Replace if necessary.		√	√	√	√	√
2	*	Clutch (See page 3-31)	Check operation. Adjust or replace cable.	√	√	√	√	√	√
3	*	Front brake (See page 3-42, 44, 45)	Check operation, fluid level, and for fluid leakage. Replace brake pads if necessary.	√	√	√	√	√	√
4	*	Rear brake (See page 3-43, 44, 45)	Check operation, fluid level, and for fluid leakage. Replace brake pads if necessary.	√	√	√	√	√	√
Ę	Ţ	Brake hoses	Check for cracks or damage.		√	√	√	√	√
5		(See page 3-46) • Replace.	Every 4 years						
6	*	Wheels (See page 4-3)	Check runout and for damage. Replace if necessary.		√	√	√	√	√
7	*	Tires (See page 3-58)	Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary.		√	√	√ 	√	√
8	*	Wheel bearings (See page 4-3)	Check bearings for smooth operation. Replace if necessary.		√	√	√	√	√

GENERAL MAINTENANCE AND LUBRICATION CHART



			INITIAL		ODO	OMETER REA	DINGS		
No	٠.	ITEM	ROUTINE	600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
9	*	Swingarm pivot bearings (See page 4-71)	Check bearing assemblies for looseness. Moderately repack with lithium-soap-based grease.			√		Repack.	
10		Drive chain (See page 3-49, 50)	Check chain slack/alignment and condition. Adjust and lubricate chain with a special Oring chain lubricant thoroughly.	Every	600 mi (800 k	m) and after wa	ashing the motor	cycle or riding in	the rain
11	*	Steering bearings (See page 3-51)	Check bearing assembly for looseness. Moderately repack with lithium-soap-based grease every 16000 mi (25000 km) or 24 months.	√	√	√	√	Repack.	√
12	*	Steering damper (See page 4-60)	Check operation and for oil leakage.		√	√	√	√	√
13	*	Chassis fasteners (See page 2-23)	Check all chassis fitting and fasteners. Correct if necessary.		√	√	√	√	√
14		Brake and clutch lever pivot shafts (See page 3-61)	Apply lithium-soap-based grease (all-purpose grease) lightly.		√	√	√	√	√
15		Sidestand pivot (See page 3-61)	Check operation. Apply lithium-soap-based grease (all-purpose grease) lightly.		√	√	√	√	√
16	*	Sidestand switch (See page 3-61, 8-4)	Check operation and replace if necessary.	√	√	√	√	$\sqrt{}$	√
17	*	Front fork (See page 3-53)	Check operation and for oil leakage. Replace if necessary.		√	√	√	√	√
18	*	Shock absorber assembly (See page 3-56, 4-67)	Check operation and for oil leakage. Replace if necessary.		√	√	√	√	√
19	*	Rear suspension link pivots (See page 4-71)	Check operation. Correct if necessary.			√		√	
20		Engine oil (See page 3-26, 28)	Change (warm engine before draining.)	√	√	√	√	√	√
21	*	Engine oil filter cartridge (See page 3-28)	Replace.	√		√		√	
		Cooling system	Check hoses for cracks or damage. Replace if necessary.		√	√	√	√	√
22		(See page 3-37, 38, 39)	Change with ethylene glycol antifreeze cool- ant every 24 months.					Change.	
23	*	EXUP system (See page 3-36)	Check operation, cable free play and pulley position.	√	Every 12000 mi (19000 km)				
24	*	Control cables (See page 3-61)	Apply Yamaha chain and cable lube or engine oil SAE 10W-30 thoroughly.	√	√	√	√	√	√
25	*	Throttle grip housing and cable (See page 3-22)	Check operation and free play. Adjust the throttle cable free play if necessary. Lubricate the throttle grip housing and cable.		√	√	√	√	√

^{*} Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE

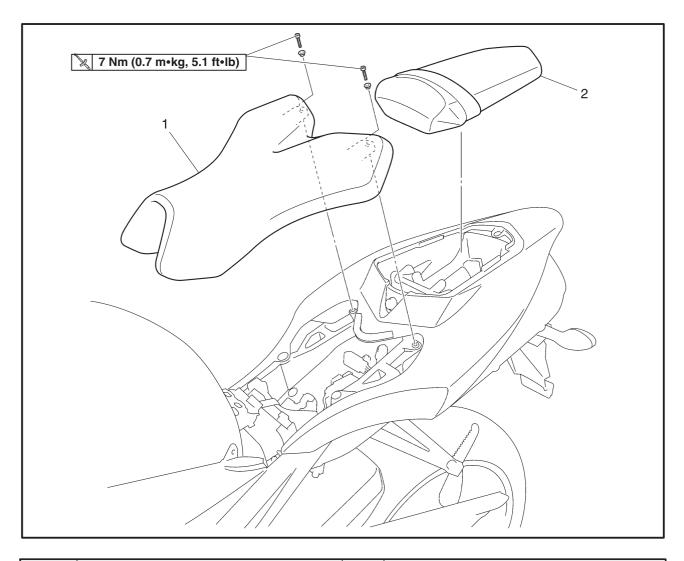
From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

NOTE: -

- Air filter
 - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
 - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- Hydraulic brake service
 - After disassembling the brake master cylinders and calipers, always change the fluid. Regularly check the brake fluid levels and fill the reservoirs as required.
 - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
 - Replace the brake hoses every four years and if cracked or damaged.



SEATS

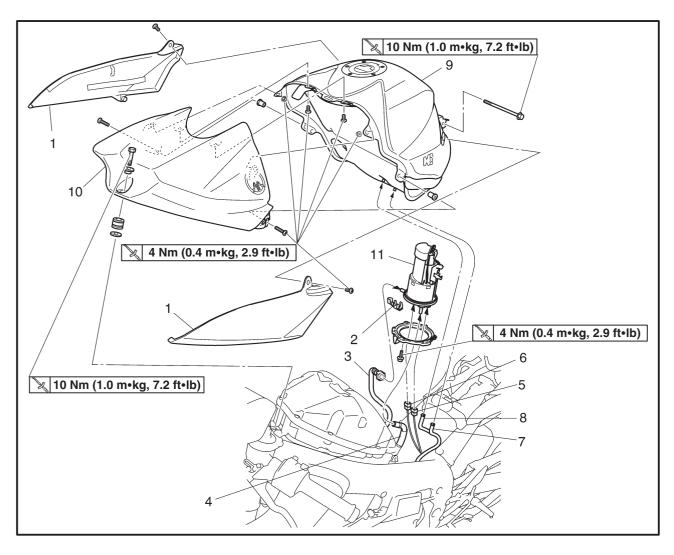


Order	Job/Part	Q'ty	Remarks
1 2	Removing the seats Rider seat Passenger seat	1 1	Remove the parts in the order listed. For installation, reverse the removal procedure.



EAS00040

FUEL TANK



Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed.
	Rider sear		Refer to "SEATS".
1	Fuel tank side cover	2	
2	Fuel hose connector cover	1	
3	Fuel hose	1	Disconnect.
4	Fuel return hose	1	Disconnect.
5	Fuel sender coupler	1	Disconnect.
6	Fuel pump coupler	1	Disconnect.
7	Fuel tank over flow hose	1	Disconnect.
8	Fuel tank breather hose	1	Disconnect.
9	Fuel tank	1	Disconnect.
10	Fuel tank cover	1	
11	Fuel pump	1	
			For installation, reverse the removal
			procedure.

FUEL TANK



REMOVING THE FUEL TANK

- 1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
- 2. Remove:
 - fuel hose connector cover
 - fuel return hose
 - fuel hose
 - fuel sender coupler
 - fuel pump coupler
 - fuel tank breather hose
 - fuel tank over flow hose





 Although the fuel has been removed from the fuel tank, be careful when removing the fuel hoses, since there may be fuel remaining in it.

re.	

- To remove the fuel hose from the fuel injection pipe, slide the cover (a) on the end of the hose in the direction of the arrow shown and then remove the hose.
- Before removing the hoses, place a few rags in the area under where it will be removed.

3.	R	le	m	O	ve

fuel tank

NOTE: -

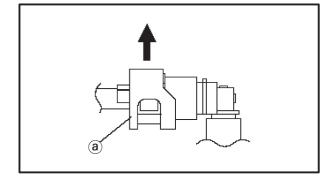
Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.

REMOVING THE FUEL PUMP

- 1. Remove:
 - fuel pump

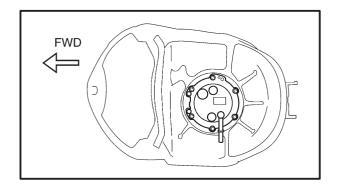
CAUTION:

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.



FUEL TANK



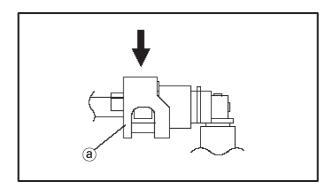


INSTALLING THE FUEL PUMP

- 1. Install:
 - fuel pump 🔀 4 Nm (0.4 m•kg, 2.9 ft•lb)

NOTE: -

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Tighten the fuel pump bolts in stages in a crisscross pattern and to the specified torque.



INSTALLING THE FUEL TANK

- 1. Install:
- fuel hose
- fuel return hose
- fuel hose connector cover

CAUTION:

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holder is in the correct position, otherwise the fuel hose will not be properly installed.

N	О	Т	Ε	
	$\mathbf{-}$		_	

Install the fuel hose connector securely onto the fuel tank until a distinct "click" is heard, and then make sure that it does not come loose.

To install the fuel hose from the fuel injection hose, slide the cover (a) on the end of the hose in the direction of arrow shown.

2. Install:

- fuel sender coupler
- fuel pump coupler
- fuel tank breather hose (except for CAL)
- fuel tank drain hose

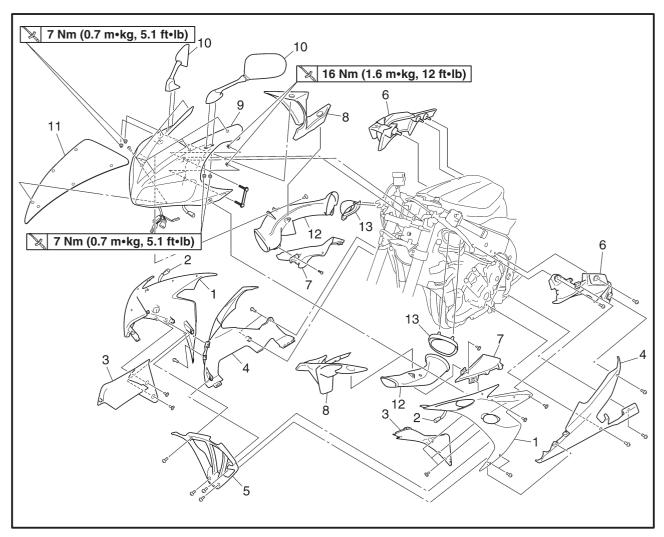
NOTE: -

There is a white paint mark on the fuel tank breather hose.

Refer to "CABLE ROUTING" in chapter 2.



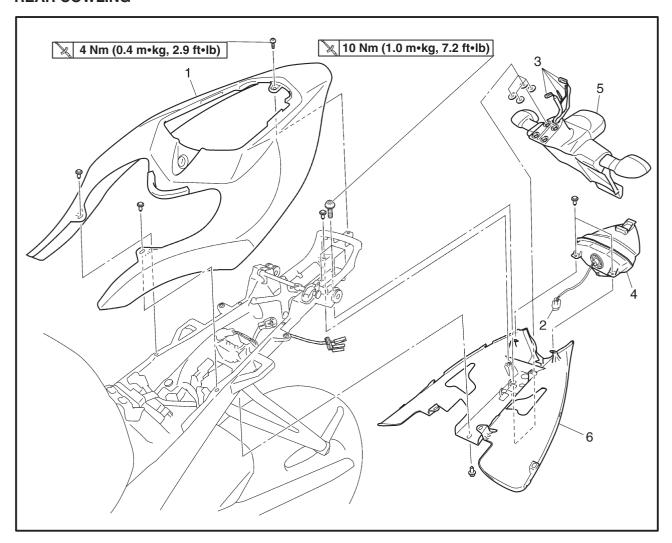
COWLINGSFRONT COWLING AND SIDE COWLINGS



Order	Job/Part	Q'ty	Remarks
	Removing the front cowling and side cowlings		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS".
1	Side cowling	2	
2	Front turn signal light lead coupler	2	Disconnect.
3	Side cowling inner panel	2	
4	Bottom cowling	2	
5	Bottom cowing front cover	1	
6	Frame side cover	2	
7	Frame side panel	2	
8	Headlight panel	2	
9	Front cowling	1	
10	Rear view mirror	2	
11	Windshield	1	
12	Air intake duct	2	
13	Air intake duck mount	2	
			For installation, reverse the removal procedure.



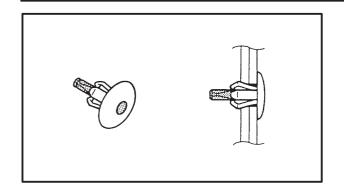
REAR COWLING



Order	Job/Part	Q'ty	Remarks
1 2 3 4 5 6	Removing the rear cowling Rider seat and passenger seat Muffler Rear cowling (upper) Tail/brake light lead coupler Rear turn signal light lead coupler Tail/brake light License plate bracket assembly Rear cowling (lower)	1 1 4 1 1	Remove the parts in the order listed. Refer to "SEATS". Refer to "EXHAUST PIPE" in chapter 5. Disconnect. Disconnect. For installation, reverse the removal procedure.

COWLINGS



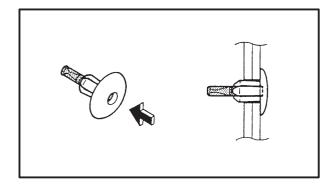


REMOVAL

- 1. Remove:
 - rear cowling
 - side cowlings

NOTE: _

To remove the quick fastener, push its center with a screwdriver, then pull the fastener out.

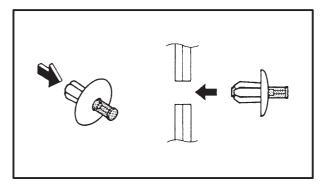


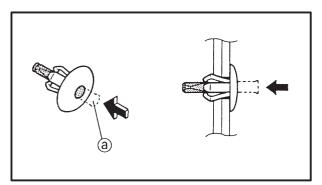
INSTALLATION

- 1. Install:
 - side cowlings
 - rear cowling

NOTE: -

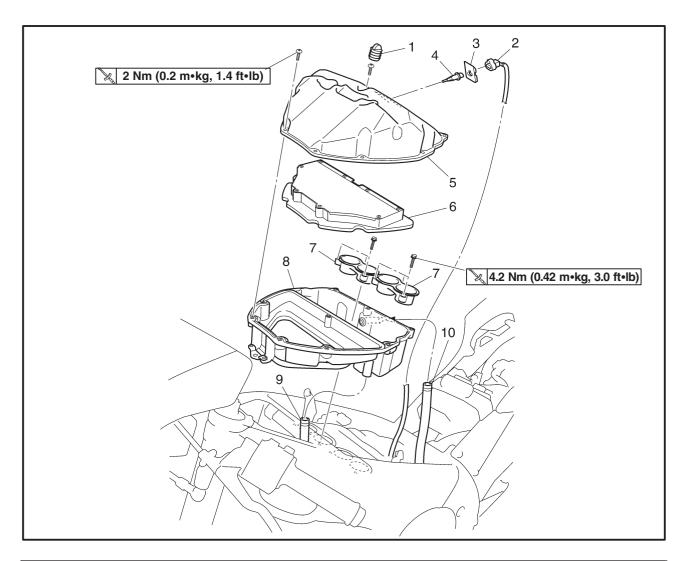
To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the cowling and push the pin (a) in with a screwdriver. Make sure that the pin is flush with the fastener's head.







AIR FILTER CASE



Order	Job/Part	Q'ty	Remarks
1 2 3 4 5 6 7 8 9	Removing the air filter case Rider sear Fuel tank Plug Air temperature sensor lead coupler Spacer Air temperature sensor Air filter case cover Air filter Funnel Air filter case Air induction system hose Crankcase breather hose	1 1 1 1 1 2 1 1	Remove the parts in the order listed. Refer to "SEATS". Refer to "FUEL TANK". Disconnect. Disconnect. Disconnect. For installation, reverse the removal
			procedure.

EAS00045

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

Refer to "SEATS".

fuel tank

Refer to "FUEL TANK".

air filter case

Refer to "AIR FILTER CASE".

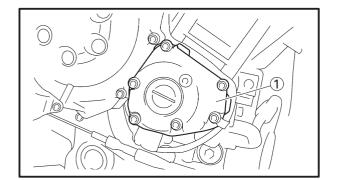
- bottom cowlings
- side cowlings

Refer to "COWLINGS".

throttle body assembly

Refer to "THROTTLE BODIES" in chapter 7.

- air cut-off valve
 Refer to "AIR INDUCTION SYSTEM" in chapter 7.
- radiator
- radiator fan motor Refer to "RADIATOR" in chapter 6.
- 2. Remove
 - ignition coils
 - spark plugs
 - cylinder head cover
 - cylinder head cover gasket Refer to "CAMSHAFT" in chapter 5.



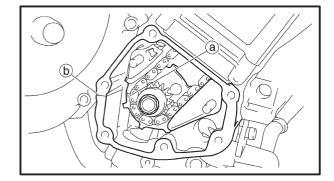
- 3. Remove
 - pickup rotor cover ①



- 4. Measure:
- valve clearance
 Out of specification → Adjust.



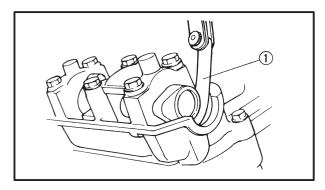
Valve clearance (cold) Intake valve $0.11 \sim 0.20 \text{ mm}$ $(0.0043 \sim 0.0079 \text{ in})$ Exhaust valve $0.21 \sim 0.25 \text{ mm}$ $(0.0083 \sim 0.0098 \text{ in})$



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



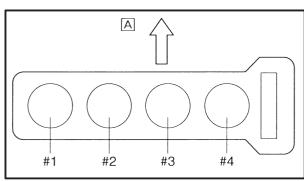
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



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.

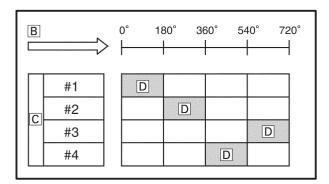


Valve clearance measuring sequence Cylinder #1 \rightarrow #2 \rightarrow #4 \rightarrow #3

A Front

- d. To measure the valve clearances of the other cylinders, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.
- B Degrees that the crankshaft is turned counterclockwise
- C Cylinder
- D Combustion cycle

Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°





- 5. Remove:
 - camshafts

NOTE: -

- Refer to "DISASSEMBLING THE ENGINE CAMSHAFT AND CYLINDER HEAD" in chapter 5.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.



valve clearance

a. Remove the valve lifter 1 and the valve pad2 with a valve lapper 3.



Valve lapper 90890-04101

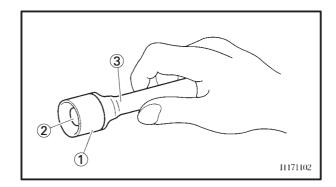
NOTE: -

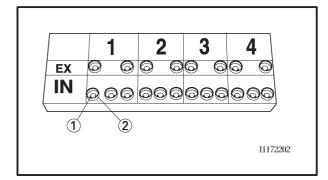
- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter
 and valve pad 1 so that they can be installed in the correct place.
- b. Select the proper valve pad from the following table.

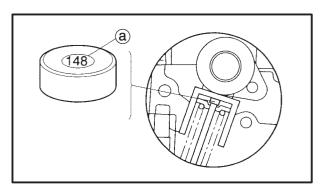
	ve pad ess range	Available valve pads
Nos. 120 ~ 240	1.20 (0.0472) ~ 2.40 mm (0.0945 in)	25 thicknesses in 0.05 mm (0.002 in) increments

NOTE: -

- The thickness ⓐ of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- 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.









c. Round off the original valve pad number according to the following table.

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

EXAMPLE:

Original valve pad number

= 148 (thickness =1.48 mm (0.058 in))

Rounded value = 150

d. Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.



The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

e. Install the new valve pad ① and the valve lifter ②.

NOTE:

- Lubricate the valve pad with molybdenum disulfide grease.
- Lubricate the valve lifter with molybdenum disulfide oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.
- f. Install the exhaust and intake camshafts, timing chain and camshaft caps.



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



NOTE: -

- Refer to "ASSEMBLING AND ADJUSTING THE ENGINE CYLINDER HEAD AND CAMSHAFT" in chapter 5.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft marks with the camshaft cap marks.
- Turn the crankshaft counterclockwise several full turns to seat the parts.
- g. Measure the valve clearance again.
- h. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.



INTAKE

MEASURED INSTALLED PAD NUMBER																									
CLEARANCE	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 ~ 0.07						135																			
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.11 ~ 0.20		STANDARD CLEARANCE 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240																							
0.21 ~ 0.25																									
0.26 ~ 0.30			140																						
0.31 ~ 0.35			145																						
0.36 ~ 0.40			150																						
0.41 ~ 0.45			155]				
0.46 ~ 0.50			160																240]					
0.51 ~ 0.55			165															240							
0.56 ~ 0.60			170																						
0.61 ~ 0.65			175																						
0.66 ~ 0.70			180																						
0.71 ~ 0.75			185]										
0.76 ~ 0.80			190										240												
0.81 ~ 0.85			195																						
0.86 ~ 0.90			200										VA	I VF	CI	FAF	RAN	CF	(col	q).					
0.91 ~ 0.95			205																•	,	0.00	70	in)		
0.96 ~ 1.00			210															•		, .	0.00) 1 3	111)		
1.01 ~ 1.05			215					240									allec								
1.06 ~ 1.10	210 215 220 225 230 235 240 Measured clearance is 0.27 mm (0.0106 in)																								
1.11 ~ 1.15	215 220 225 230 235 240 Replace 175 pad with 185 pad																								
1.16 ~ 1.20	220 225 230 235 240 Pad number: (example)																								
1.21 ~ 1.25	220 200 200 200 200 1																								
1.26 ~ 1.30	230 235 240 Pad No.1/5 = 1./5 mm (0.0689 in) 235 240 Pad No.185 = 1.85 mm (0.0728 in)																								
1.31 ~ 1.35		240	J										Р	ad I	vО. I	85	= 1.8	รอ n	um (U.U.	/ 28	III)			
1.36 ~ 1.40	240																								

EXHAUST

MEASURED		INSTALLED PAD NUMBER 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240																							
CLEARANCE	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.25												DAR													
0.26 ~ 0.30																							235	240	
0.31 ~ 0.35																		215					240		
0.36 ~ 0.40	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.41 ~ 0.45	140																	225			240				
0.46 ~ 0.50																		230							
0.51 ~ 0.55																		235	240						
0.56 ~ 0.60						180												240		-					
0.61 ~ 0.65						185																			
0.66 ~ 0.70						190										240									
0.71 ~ 0.75						195									240										
0.76 ~ 0.80						200								240											
0.81 ~ 0.85	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.86 ~ 0.90						210						240													
0.91 ~ 0.95						215					240		\//	\ I \ / I	= 01	□ ∧		NCE	(00	۱۹/۰					
0.96 ~ 1.00						220				240															
1.01 ~ 1.05						225			240									า (0.			0.0	098	in)		
1.06 ~ 1.10						230		240					E	kam	ple:	Inst	alle	d is	175						
1.11 ~ 1.15						30 235 240 Measured clearance is 0.35 mm (0.0138 in)																			
1.16 ~ 1.20						5 240 Replace 175 pad with 185 pad																			
1.21 ~ 1.25	220	225	230	235	240																·				
1.26 ~ 1.30			235	240		-												kam							
1.31 ~ 1.35		235																.75 r							
1.36 ~ 1.40	235	240											F	Pad	No.	185	= 1.	.85 r	nm	(0.0)	728	in)			
1.41 ~ 1.45	240																					-			

ADJUSTING THE VALVE CLEARANCE/ SYNCHRONIZING THE THROTTLE BODIES



7. Install:

all	removed	parts

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14	v		_	•

For installation, reverse the removal procedure.

SYNCHRONIZING THE THROTTLE BODIES

NOTE: -

Prior to synchronizing the throttle bodies, 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: -

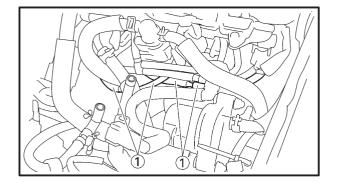
Place the motorcycle on a suitable stand.

- 2. Remove:
 - rider seat

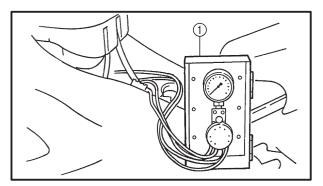
Refer to "SEATS".

fuel tank

Refer to "FUEL TANK".



- 3. Remove:
 - synchronizing hoses ①



- 4. Install:
 - vacuum gauge ①
 (onto the synchronizing hose)
 - digital tachometer (near the spark plug)

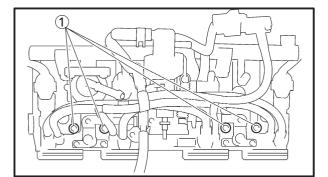


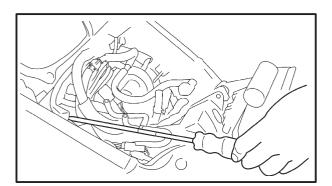
Vacuum gauge 90890-03094, YU-08030

SYNCHRONIZING THE THROTTLE BODIES



- 5. Install:
 - fuel tank
 Refer to "FUEL TANK".
- 6. Start the engine and let it warm up for several minutes.
- 7. Measure:
 - engine idling speed
 Out of specification → Adjust.
 Refer to "ADJUSTING THE ENGINE IDLING SPEED".







Engine idling speed $1,150 \sim 1,250 \text{ r/min}$

- 8. Adjust:
 - throttle body synchronization

a. With throttle body #3 as standard, adjust throttle bodies #1, #2, and #4 using the air screws (1).

NOTE: -

- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If the air screw is removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.

CAUTION:

Do not use the throttle valve adjusting screws to adjust the throttle body synchronization.



Vacuum pressure at engine idling speed 22 kPa (165 mmHg, 6.5 inHg)

NOTE: _

The difference in vacuum pressure between two throttle bodies should not exceed 1.33 kPa (10 mmHg, 0.39 inHg).

SYNCHRONIZING THE THROTTLE BODIES



- 9. Measure:
 - engine idling speed
 Out of specification → Adjust.
 Make sure that the vacuum pressure is within specification.
- 10. Stop the engine and remove the measuring equipment.
- 11. Adjust:
 - throttle cable free play Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



Throttle cable free play (at the flange of the throttle grip) $3 \sim 5 \text{ mm} (0.12 \sim 0.20 \text{ in})$

- 13. Install:
 - synchronizing hoses
 - fuel tank Refer to "FUEL TANK".
- rider seat Refer to "SEATS".

ADJUSTING THE ENGINE IDLING SPEED



EAS0005

ADJUSTING THE ENGINE IDLING SPEED

NOTE: -

Prior to adjusting the engine idling speed, the throttle bodies synchronization should be adjusted properly, and the engine should have adequate compression.

- 1. Start the engine and let it warm up for several minutes.
- 2. Install:
 - digital tachometer (near the spark plug)
- 3. Check:
 - engine idling speed
 Out of specification → Adjust.



Engine idling speed 1,150 \sim 1,250 r/min



engine idling speed

a. Turn the idle adjusting screw ① in direction
 a or b until the specified engine idling speed is obtained.

Direction (a)	Engine idling speed is increased.
Direction (b)	Engine idling speed is decreased.

- 5. Adjust:
 - throttle cable free play
 Refer to "ADJUSTING THE THROTTLE
 CABLE FREE PLAY".



Throttle cable free play (at the flange of the throttle grip)

 $3 \sim 5 \text{ mm } (0.12 \sim 0.20 \text{ in})$

(a)

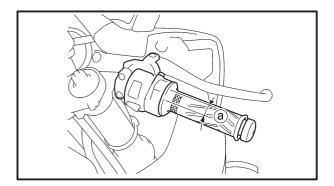
ADJUSTING THE THROTTLE CABLE FREE PLAY

EAS0005

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE: -

Prior to adjusting the throttle cable free play, the engine idling speed should be adjusted properly.



1. Check:

throttle cable free play ⓐ
 Out of specification → Adjust.



Throttle cable free play (at the flange of the throttle grip)

 $3 \sim 5 \text{ mm } (0.12 \sim 0.20 \text{ in})$

2. Adjust:

• throttle cable free play

Handlebar side

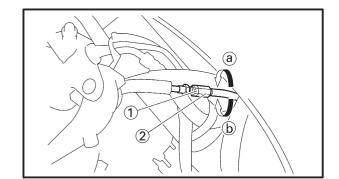
- a. Loosen the locknut (1).
- b. Turn the adjusting nut ② in direction ③ or b until the specified throttle cable free play is obtained.

Direction (a)	Throttle cable free play is increased.
Direction (b)	Throttle cable free play is decreased.

c. Tighten the locknut.



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



CHECKING THE SPARK PLUGS



EAS00059

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

- 1. Remove:
 - side cowlings
 - bottom cowlings Refer to "COWLINGS".
- 2. Remove:
 - radiator upper bolts
 - radiator lower bolt Refer to "RADIATOR" in chapter 6.
- 3. Remove:
 - ignition coils
 - spark plugs

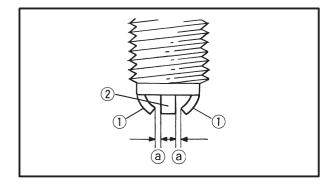
CAUTION:

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.

- 4. Check:
 - spark plug type
 Incorrect → Change.



Spark plug type (manufacturer) CR9EK (NGK)



- 5. Check:
 - electrode (1)

Damage/wear → Replace the spark plug.

• insulator 2

Abnormal color → Replace the spark plug. Normal color is medium-to-light tan.

- 6. Clean:
 - spark plug

(with a spark plug cleaner or wire brush)

- 7. Measure:
 - spark plug gap ⓐ
 (with a wire Thickness gauge)
 Out of specification → Regap.



Spark plug gap $0.6 \sim 0.7 \text{ mm}$ $(0.0236 \sim 0.0276 \text{ in})$

CHECKING THE SPARK PLUGS/ MEASURING THE COMPRESSION PRESSURE



8	Insta	п
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spark plugs

13 Nm (1.3 m•kg, 9.4 ft•lb)

• ignition coils

NOTE: -

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

- 9. Install:
 - radiator upper bolts
 - radiator lower bolt Refer to "RADIATOR" in chapter 6.
- 10. Install:
 - side cowlings
 - bottom cowlings Refer to "COWLINGS".

EAS00065

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE: -

Insufficient compression pressure will result in a loss of performance.

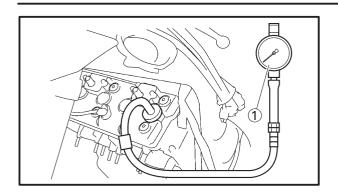
- 1. Measure:
 - valve clearance
 Out of specification → Adjust.
 Refer to "ADJUSTING THE VALVE CLEAR-ANCE".
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Remove:
 - ignition coils
 - spark plugs

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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.

MEASURING THE COMPRESSION PRESSURE





- 4. Install:
 - compression gauge ①
 - adapter



Compression gauge 90890-03081, YU-33223 Adapter 90890-04136

- 5. Measure:
 - compression pressure
 Out of specification → Refer to steps (c) and (d).



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

A 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 (1 kg/cm², 1 bar, 14.22 psi).

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.

Carbon deposits → Eliminate.

MEASURING THE COMPRESSION PRESSURE/ CHECKING THE ENGINE OIL LEVEL



d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.

Refer to the following table.

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

6. Install:

spark plug

13 Nm (1.3 m•kg, 9.4 ft•lb)

7. Install:

• ignition coils

EAS00069

CHECKING THE ENGINE OIL LEVEL

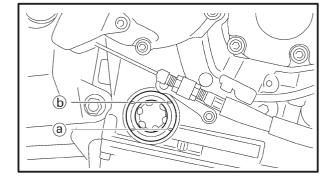
1. Stand the motorcycle on a level surface.

NOTE: -

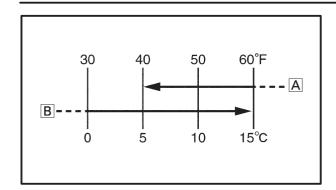
- Place the motorcycle on a suitable stand.
- Make sure the motorcycle is upright.
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Check:
 - engine oil level

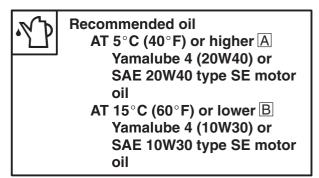
The engine oil level should be between the minimum level mark (a) and maximum level mark (b).

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



CHECKING THE ENGINE OIL LEVEL





NOTE: -

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

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

NOTE: -

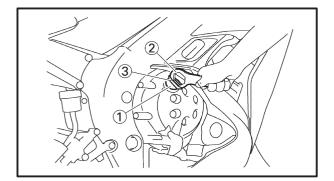
Before checking the engine oil level, wait a few minutes until the oil has settled.



EAS00074

CHANGING THE ENGINE OIL

- 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:
 - bottom cowlings Refer to "COWLINGS".

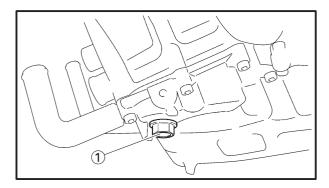


4. Remove:

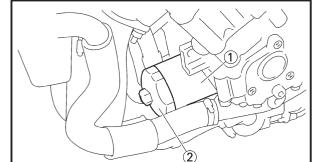
• engine oil filler cap ①

NOTE: -

Remove the engine oil filler cap ① with the special wrench ② and cover ③.

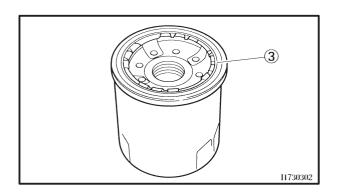


- 5. Remove:
 - engine oil drain bolt ①
 (along with the gasket)
- 6. Drain:
 - engine oil (completely from the crankcase)
- 7. If the oil filter cartridge is also to be replaced, perform the following procedure.
- a. Remove the oil filter cartridge ① with an oil filter wrench ②.





Oil filter wrench 90890-01426, YU-38411



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

CAUTION:

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

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

CHANGING THE ENGINE OIL/ MEASURING THE ENGINE OIL PRESSURE



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

- 8. Replace:
 - engine oil drain bolt gasket New
- 9. Install:
 - engine oil drain bolt (along with the new gasket)

43 Nm (4.3 m•kg, 31 ft•lb)

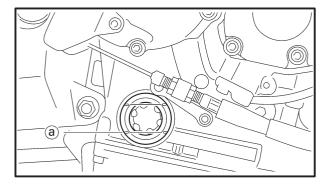
- 10. Fill:
 - crankcase
 (with the specified amount of the recommended engine oil)



Quantity

Total amount
3.8 L (3.35 Imp qt, 4.02 US qt)
Without oil filter cartridge
replacement
2.9 L (2.55 Imp qt, 3.07 US qt)
With oil filter cartridge
replacement
3.1 L (2.73 Imp qt, 3.28 US qt)

- 11. Install:
 - engine oil filler cap
 - bottom cowlings Refer to "COWLINGS".
- 12. Start the engine, warm it up for several minutes, and then turn it off.



EAS00077

MEASURING THE ENGINE OIL PRESSURE

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

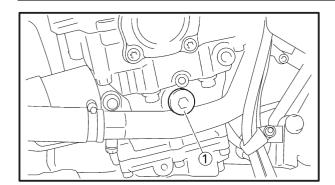
CAUTION:

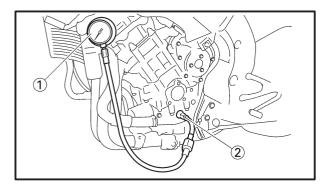
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

- 3. Remove:
 - bottom cowlings
 Refer to "COWLINGS".

MEASURING THE ENGINE OIL PRESSURE







- 4. Remove:
- oil gallery bolt 1

A WARNING

The engine, muffler and engine oil are extremely hot.

- 5. Install:
 - oil pressure gauge (1)
 - adapter 2



Pressure gauge 90890-03153, YU-03153 Oil pressure adapter 90890-03139

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



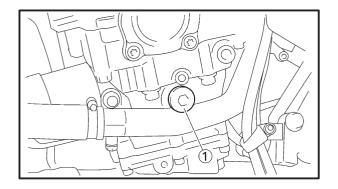
Engine oil pressure
230 kPa
(2.3 kg/cm², 2.3 bar, 32.71 psi)
Engine speed
Approx. 5,000 r/min
Engine oil temperature
100°C (212°F)

NOTE: -

Regarding the oil pressure as its own data may fluctuate depending on the oil temperature and viscosity, the oil pressure may fluctuate when measuring. The following data should be used only as a reference when measuring the engine oil pressure.

MEASURING THE ENGINE OIL PRESSURE/ ADJUSTING THE CLUTCH CABLE FREE PLAY





(a)

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

7. Install:

• oil gallery bolt ①

8 Nm (0.8 m•kg, 5.8 ft•lb)

CAUTION:

Be carful to tighten too much.

8. Install:

bottom cowlings Refer to "COWLINGS".

EAS00078

ADJUSTING THE CLUTCH CABLE FREE **PLAY**

- 1. Check:
 - clutch cable free play (a) Out of specification → Adjust.



Clutch cable free play (at the end of the clutch lever)

 $10 \sim 15 \text{ mm} (0.39 \sim 0.59 \text{ in})$

- 2. Adjust:
 - clutch cable free play

Handlebar side

a. Turn the adjusting dial 1 in direction b or c until the specified clutch cable free play is obtained.

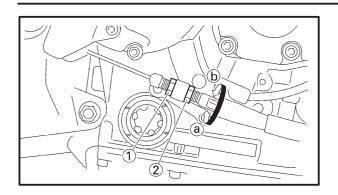
Direction (b)	Clutch cable free play is increased.
Direction ©	Clutch cable free play is decreased.

If the specified clutch cable free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.



ADJUSTING THE CLUTCH CABLE FREE PLAY/ REPLACING THE AIR FILTER ELEMENT



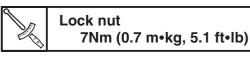


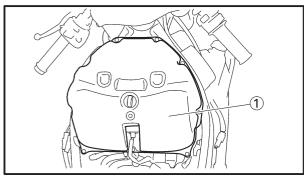
Engine side

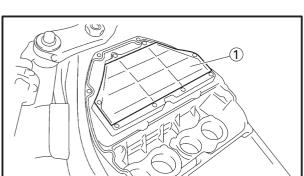
- a. Loosen the locknut ①.
- b. Turn the adjusting nut ② in direction ③ or ⑤ until the specified clutch cable free play is obtained.

Direction (a)	Clutch cable free play is increased.
Direction (b)	Clutch cable free play is decreased.

c. Tighten the locknuts.







EAS00086

REPLACING THE AIR FILTER ELEMENT

- 1. Remove:
- rider seat Refer to "SEATS".
- fuel tank
- Refer to "FUEL TANK".
- 2. Remove:
 - air filter case cover (1)
- 3. Check:
 - air filter element ①
 Damage → Replace.

NOTE: -

Replace the air filter element at periodic intervals of 40,000 km travel.

The air filter needs more frequent service if you are riding in unusuallu wet or dusty areas.

REPLACING THE AIR FILTER ELEMENT/ CHECKING THE FUEL AND BREATHER HOSES



- 4. Install:
- air filter case cover

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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 throttle bodies tuning, leading to poor engine performance and possible overheating.

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When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

- 5. Install:
 - fuel tank Refer to "FUEL TANK".
 - rider seat Refer to "SEATS".

EAS00096

CHECKING THE FUEL AND BREATHER HOSES

The following procedure applies to all of the fuel and breather hoses.

- 1. Remove:
 - rider seat

Refer to "SEATS".

fuel tank

Refer to "FUEL TANK".



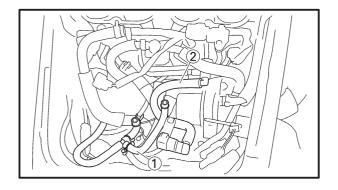
- breather hose ①
- fuel hose (2)

 $Cracks/damage \rightarrow Replace.$

Loose connection → Connect properly.

NOTE: -

Before removing the fuel hoses, place a few rags in the area under where it will be removed.



CHECKING THE FUEL AND BREATHER HOSES/ CHECKING THE CRANKCASE BREATHER HOSE



- 3. Install:
 - fuel tank

Refer to "FUEL TANK".

rider seat Refer to "SEATS".

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To install the fuel tank, check that the breather hose is not folded or pinched by the fuel tank.

EAS00098

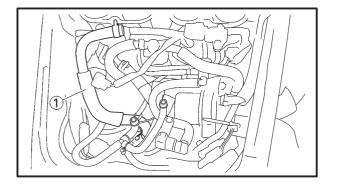
CHECKING THE CRANKCASE BREATHER HOSE

- 1. Remove:
 - rider seat

Refer to "SEATS".

fuel tank

Refer to "FUEL TANK".



2. Check:

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

CAUTION:

Make sure the crankcase breather hose is routed correctly.

- 3. Install:
 - fuel tank

Refer to "FUEL TANK".

• rider seat

Refer to "SEATS".

CAUTION:

To install the fuel tank, check that the breather hose is not folded or pinched by the fuel tank.

CHECKING THE EXHAUST SYSTEM



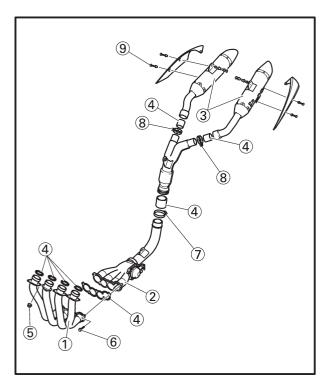
EAS00099

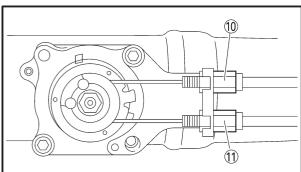
CHECKING THE EXHAUST SYSTEM

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

A WARNING

Do not touch the muffler bracket until the exhaust system has cooled.





- 1. Check:
 - exhaust pipe 1
 - exhaust valve pipe 2
 - muffler ③

Cracks/damage → Replace.

- gaskets ④ Exhaust gas leaks → Replace.
- 2. Check:
 - tightening torque



Exhaust pipe nut (5)

20 Nm (2.0 m•kg, 14 ft•lb) Exhaust pipe and exhaust valve pipe bolt ⑥

10 Nm (1.0 m•kg, 7.2 ft•lb)
Catalyst pipe assembly bolt ⑦
20 Nm (2.0m•kg, 14 ft•lb)
Catalyst pipe assembly and
muffler bolt ⑧

20 Nm (2.0 m•kg, 14 ft•lb) Muffler cover (9)

10 Nm (1.0 m•kg, 7.2 ft•lb)

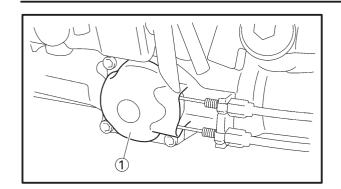
NOTE: -

Install the EXUP cable in parallel without twisting its upper (1) and lower sides (1).

- black metal 10 is upper.
- white metal 11 is lower.

ADJUSTING THE EXUP CABLES

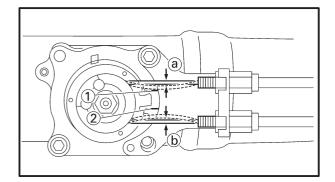




EAS00101

ADJUSTING THE EXUP CABLES

- 1. Remove:
- bottom cowlings
 Refer to "COWLINGS".
- 2. Remove:
 - EXUP valve pulley cover (1)
- 3. Check:
 - EXUP system operation
- a. Turn the main switch ON.
- b. Check that the EXUP valve operates properly.

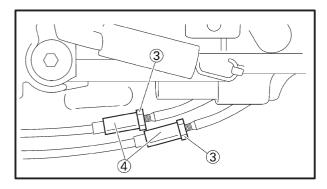


4. Check:

• EXUP cable free play (at the EXUP valve pulley) (a) + (b)



Maximum EXUP cable free play (at the EXUP valve pulley) Less than 4 mm (0.16 in)



- 5. Adjust:
- EXUP cable free play
- a. Turn the main switch to "ON".
- b. Check the EXUP pulley position.
- c. Projection of the EXUP pulley position is between (1) and (2).
- d. Loosen the both locknuts ③.
- e. Turn the both adjusting nuts 4 in or out.
- f. Tighten the both locknuts.
- 6. Install:
 - EXUP valve pulley cover



EXUP valve pulley cover bolt 10 Nm (1.0 m•kg, 7.2 ft•lb)

ADJUSTING THE EXUP CABLES/ CHECKING THE COOLANT LEVEL



- 7. Install:
- bottom cowlings Refer to "COWLINGS".

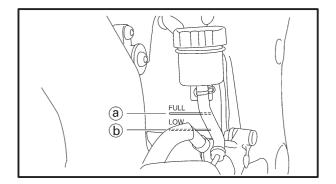
EAS00102

CHECKING THE COOLANT LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

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



2. Check:

coolant level

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

Below the minimum level mark \rightarrow Add the recommended coolant to the proper level.

CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- 3. Start the engine, warm it up for several minutes, and then turn it off.
- 4. Check:
 - coolant level

NOTE:

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

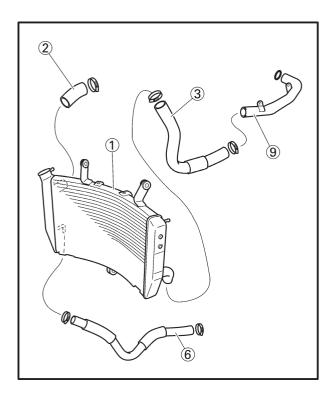
CHECKING THE COOLING SYSTEM



EAS00104

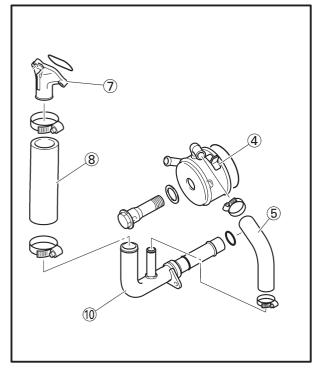
CHECKING THE COOLING SYSTEM

- 1. Remove:
- bottom cowlings
- side cowlings Refer to "COWLINGS".



2. Check:

- radiator (1)
- radiator inlet hose 2
- radiator outlet hose ③
- oil cooler (4)
- oil cooler inlet hose (5)
- oil cooler outlet hose 6
- water jacket joint 7
- water jacket joint inlet hose 8
- water pump inlet pipe 9
- water pump outlet pipe ①
 Cracks/damage → Replace.
 Refer to "COOLING SYSTEM" in chapter 6.
- 3. Install:
 - side cowlings
 - bottom cowling Refer to "COWLINGS".



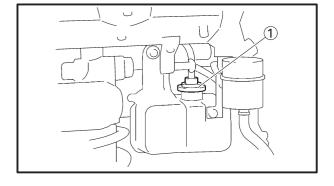
CHANGING THE COOLANT



EAS00105

CHANGING THE COOLANT

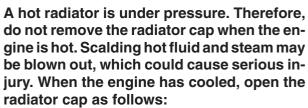
- 1. Remove:
- bottom cowlings
- side cowlings Refer to "COWLINGS".
- rider seat Refer to "SEATS".
- 2. Remove:
 - coolant reservoir tank
 - coolant reservoir hose
- 3. Disconnect:
 - coolant reservoir cap (1)
- 4. Drain:
 - coolant (from the coolant reservoir tank)



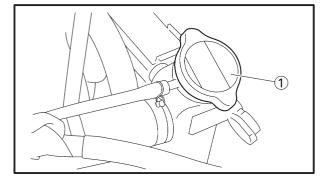
5. Remove:

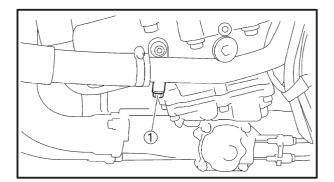
• radiator cap (1)

CAUTION:



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





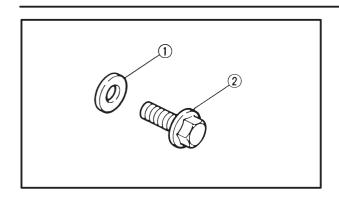
The following procedure applies to all of the coolant drain bolt and copper washer.

6. Remove:

• coolant drain bolt ①
(along with the copper washer)

CHANGING THE COOLANT

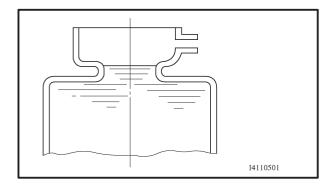




- 7. Drain:
 - coolant (water pump inlet pipe)
- 8. Install:
 - copper washers 1 New
 - coolant drain bolt 2

10 Nm (1.0 m•kg, 7.2 ft•lb)

- 9. Install:
 - coolant reservoir tank
- 10. Connect:
 - coolant reservoir hose



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

Mixing ratio

1:1 (antifreeze:water)

Quantity

Total amount

2.51 L

(2.21 Imp qt, 2.65 US qt)

Coolant reservoir capacity

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.

A WARNING

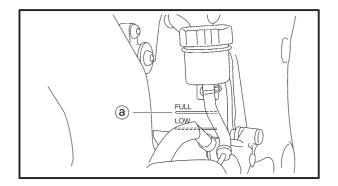
- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

CHANGING THE COOLANT

CHK ADJ

CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- 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 tank
 (with the recommended coolant to the maximum level mark (a))
- 14. Install:
 - coolant reservoir cap
- 15. Start the engine, warm it up for several minutes, and then stop it.
- 16. Check:
 - coolant level Refer to "CHECKING THE COOLANT LEV-EL".

NOTE: _

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

17. Install:

- rider seat Refer to "SEATS".
- bottom cowlings
- side cowlings Refer to "COWLINGS".

ADJUSTING THE FRONT BRAKE



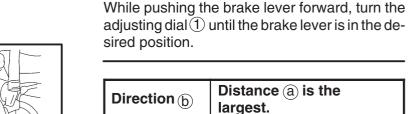
EAS00107

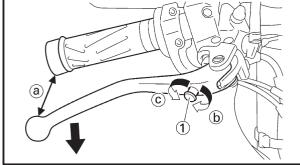
CHASSIS ADJUSTING THE FRONT BRAKE

1. Adjust:

NOTE: -

 brake lever position (distance (a) from the throttle grip to the brake lever)





A WARNING

Direction ©

 After adjusting the brake lever position, make sure the pin on the brake lever holder is firmly inserted in the hole in the adjusting dial.

smallest.

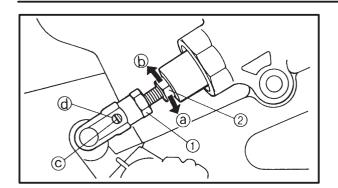
Distance (a) is the

• A soft or spongy feeling in the brake lever 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 in loss of control and possibly an accident. Therefore, check and if necessary, bleed the brake system.

CAUT	TON:		
	djusting ure there		position

ADJUSTING THE REAR BRAKE





FAS00110

ADJUSTING THE REAR BRAKE

- 1. Adjust:
- brake pedal position

~~~~~~~~~

a. Loosen the locknut (1).

b. Turn the adjusting bolt ② in direction ③ or ⑤ until the specified brake pedal position is obtained.

| Direction (a) | Brake pedal is raised.  |
|---------------|-------------------------|
| Direction (b) | Brake pedal is lowered. |

### **A** WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt  $\odot$  is visible through the hole  $\odot$ .

c. Tighten the locknut 1 to specification.



Locknut

16 Nm (1.6 m•kg, 12 ft•lb)

## **A** 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, check and, if necessary, bleed the brake system.

#### **CAUTION:**

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

#### 2. Adjust:

• rear brake light switch
Refer to "ADJUSTING THE REAR BRAKE
LIGHT SWITCH".

#### CHECKING THE BRAKE FLUID LEVEL



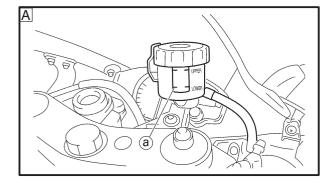
FAS0011

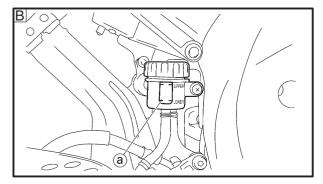
#### **CHECKING THE BRAKE FLUID LEVEL**

1. Stand the motorcycle on a level surface.

#### NOTE:

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





#### 2. Check:

brake fluid level
 Below the minimum level mark ⓐ → 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 brake fluid 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 the top of the brake fluid reservoir is horizontal.

### ADJUSTING THE REAR BRAKE LIGHT SWITCH/ CHECKING THE FRONT AND REAR BRAKE PADS



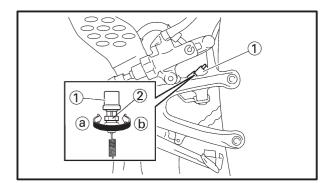
EAS0012

## ADJUSTING THE REAR BRAKE LIGHT SWITCH

|   | _   | _ | _ |   |
|---|-----|---|---|---|
| N | ( ) |   | - | ١ |

The rear brake light switch is operated by movement of the brake pedal.

The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.



- 1. Check:
  - rear brake light operation timing Incorrect → Adjust.
- 2. Adjust:
  - rear brake light operation timing

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 ③ or ⑤ until the rear brake light comes on at the proper time.

| Direction (a) | Brake light comes on sooner. |
|---------------|------------------------------|
| Direction (b) | Brake light comes on later.  |

\_\_\_\_\_

EAS0012

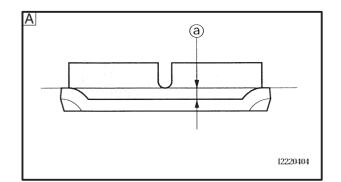
## CHECKING THE FRONT AND REAR BRAKE PADS

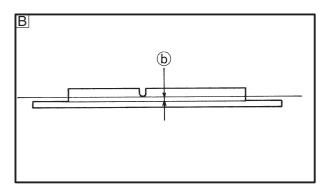
The following procedure applies to all of the brake pads.

1. Operate the brake.

### CHECKING THE FRONT AND REAR BRAKE PADS/ CHECKING THE FRONT AND REAR BRAKE HOSES









- front brake pad
- rear brake pad

Brake pad wear limit (a), (b)

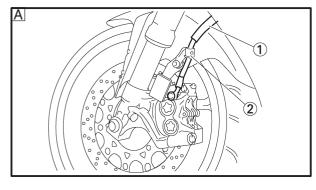
Wear limit reached  $\rightarrow$  Replace the brake pads as a set.

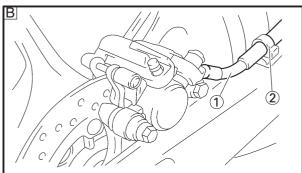
Refer to "FRONT AND REAR BRAKES" in chapter 7.



#### **Brake pad wear limit**

- (a) 0.5 mm (0.02 in)
- **b** 1.0 mm (0.04 in)
- A Front brake
- B Rear brake





FAS00131

## CHECKING THE FRONT AND REAR BRAKE HOSES

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

- 1. Check:
  - brake hose ①

Cracks/damage/wear → Replace.

- A Front
- B Rear
- 2. Check:
  - brake hose clamp ②
     Loose → Tighten the clamp bolt.
- 3. Hold the motorcycle upright and apply the brake several times.
- 4. Check:
- brake hose

Brake fluid leakage  $\rightarrow$  Replace the damaged hose.

Refer to "FRONT AND REAR BRAKES" in chapter 4.

### **BLEEDING THE HYDRAULIC BRAKE SYSTEM**



EAS00135

## BLEEDING THE HYDRAULIC BRAKE SYSTEM

### **A** WARNING

Bleed the hydraulic brake system whenever:

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

#### NOTE: \_

- Be careful not to spill any brake fluid or allow the brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure 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.
- 1. Bleed:
  - hydraulic brake system

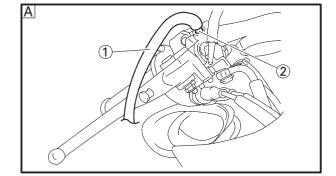
# a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.

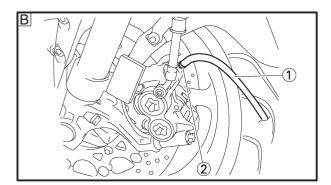
- b. Install the brake fluid reservoir diaphragm.
- c. Connect a clear plastic hose ① tightly to the bleed screw ②.
- A Front brake master cylinder
- B Front brake caliper
- C Rear brake caliper

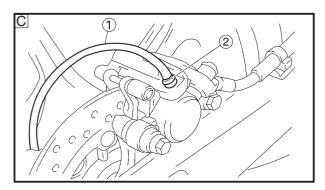
#### NOTE: -

Bleeding order of the front hydraulic brake system is the following order:

- 1. front brake master cylinder.
- 2. front brake calipers.
- 3. front brake master cylinder.
- d. Place the other end of the hose into a container.
- e. Slowly apply the brake several times.
- f. Fully pull the brake lever or fully press down the brake pedal and hold it in position.
- g. Loosen the bleed screw.







### BLEEDING THE HYDRAULIC BRAKE SYSTEM/ ADJUSTING THE SHIFT PEDAL



| N  | Т | F |  |
|----|---|---|--|
| IV |   | _ |  |

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.

- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Tighten the bleed screw to specification.



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

k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
Refer to "CHECKING THE BRAKE FLUID LEVEL".

### **A** WARNING

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

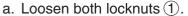
#### NOTE: \_

After bleeding air, the brake fluid may ooze around the thread section of each bleed screw. This phenomenon does not show the leakage but the brake fluid that has been accumulated in the thread of screw while bleeding air. Please wipe off to make the parts clean.

EAS00136

#### ADJUSTING THE SHIFT PEDAL

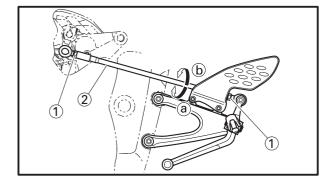
- 1. Adjust:
  - shift pedal position



b. Turn the shift rod ② in direction ③ or ⓑ to obtain the correct shift pedal position.

| Direction (a) | Shift pedal is raised.  |
|---------------|-------------------------|
| Direction (b) | Shift pedal is lowered. |

c. Tighten both locknuts.



#### ADJUSTING THE DRIVE CHAIN SLACK

EAS00140

#### ADJUSTING THE DRIVE CHAIN SLACK

NOTE: -

The drive chain slack must be checked at the tightest point on the chain.

#### **CAUTION:**

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

1. Stand the motorcycle on a level surface.

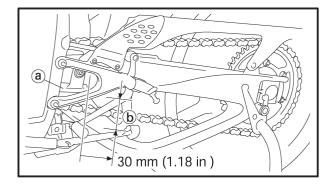
## **A** WARNING

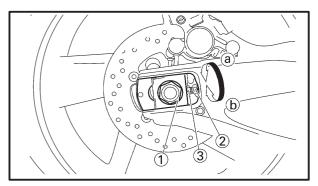
Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

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

2. Spin the rear wheel several times and find the tightest position of drive chain.





- 3. Check:
  - chain guard (a)
  - drive chain slack (b)
    (From the end behind the chain guard.)
    Out of specification → Adjust.



Drive chain slack

 $20 \sim 25 \text{ mm } (0.79 \sim 0.98 \text{ in})$ 

- 4. Adjust:
  - drive chain slack
- a. Loosen the wheel axle nut 1.
- b. Loosen both locknuts 2.
- c. Turn both adjusting bolts ③ in direction ⓐ or
  b until the specified drive chain slack is obtained.

### ADJUSTING THE DRIVE CHAIN SLACK/ LUBRICATING THE DRIVE CHAIN



| Direction (a) | Drive chain is tightened. |
|---------------|---------------------------|
| Direction (b) | Drive chain is loosened.  |

#### NOTE: -

To maintain the proper wheel alignment, adjust both sides evenly.

d. Tighten both locknuts to specification.



Locknut 16 Nm (1.6 m•kg, 12 ft•lb)

e. Tighten the wheel axle nut to specification.



Wheel axle nut 150 Nm (15 m•kg, 108 ft•lb)

EAS00142

#### **LUBRICATING THE DRIVE CHAIN**

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the motorcycle is used in dusty areas.

This motorcycle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.



Recommended lubricant
Engine oil or chain lubricant
suitable for O-ring chains

#### CHECKING AND ADJUSTING THE STEERING HEAD



EAS00146

## CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the motorcycle on a level surface.

## **A** 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.



steering head

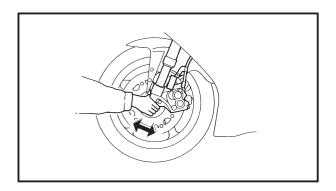
Grasp the bottom of the front fork legs and gently rock the front fork.

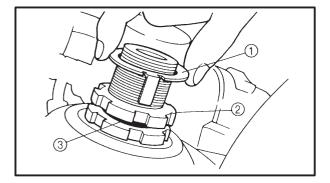
Binding/looseness  $\rightarrow$  Adjust the steering head.

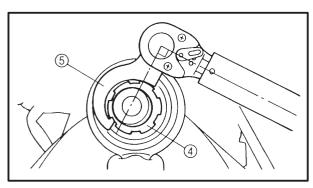
3. Remove:

upper bracket

Refer to "HANDLEBAR" and "STEERING HEAD" in chapter 4.







- 4. Adjust:
  - steering head
- a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.
- b. Loosen the lower ring nut 4 and then tighten it to specification with a steering nut wrench 5.

NOTE: -

Set the torque wrench at a right angle to the steering nut wrench.



Steering nut wrench 90890-01403, YU-33975



Lower ring nut (initial tightening torque)

52 Nm (5.2 m•kg, 38 ft•lb)

### CHECKING AND ADJUSTING THE STEERING HEAD



c. Loosen the lower ring nut 4 completely, then tighten it to specification.

## **A** WARNING

Do not overtighten the lower ring nut.



Lower ring nut (final tightening torque) 18 Nm (1.8 m•kg, 13 ft•lb)

d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the under bracket and check the upper and lower bearings.

Refer to "STEERING HEAD" in chapter 4.

- e. Install the rubber washer 3.
- f. Install the upper ring nut 2.
- g. Finger tighten the upper ring nut ②, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer ①.



Make sure the lock washer tabs ⓐ sit correctly in the ring nut slots ⓑ.

5. Install:

 upper bracket
 Refer to "HANDLEBAR" and "STEERING HEAD" in chapter 4.

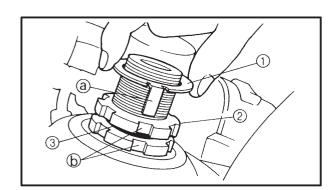
- 6. Measure:
  - steering head tension

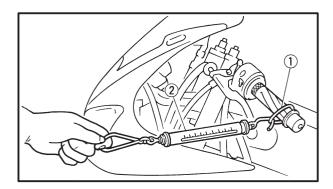
NOTE: -

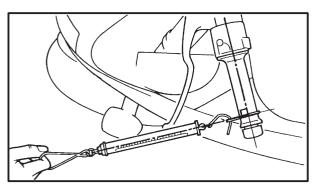
Make sure all of the cables and wires are properly routed.

\*\*\*\*\*\*\*\*\*\*\*\*

- a. Point the front wheel straight ahead.
- b. Install a plastic locking tie 1 loosely around the end of the handlebar as shown.
- c. Hook a spring gauge ② onto the plastic locking tie.
- d. Hold the spring gauge at a 90° angle from the handlebar, pull the spring gauge, and then record the measurement when the handlebar starts to run.







### CHECKING AND ADJUSTING THE STEERING HEAD/ CHECKING THE FRONT FORK





## Steering head tension $200 \sim 500 \, \mathrm{g}$

- e. Repeat the above procedure on the opposite handlebar.
- f. If the steering head tension is out of specification (both handlebars should be within specification), remove the upper bracket and loosen or tighten the upper ring nut.
- g. Reinstall the upper bracket and measure the steering head tension again as described above.
- h. Repeat the above procedure until the steering head tension is within specification.
- i. Grasp the bottom of the front fork legs and gently rock the front fork.
   Binding/looseness → Adjust the steering head

EAS00150

#### **CHECKING THE FRONT FORK**

1. Stand the motorcycle on a level surface.



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

- 2. Check:
  - inner tube (1)

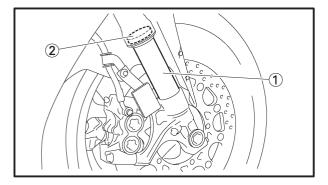
Damage/scratches → Replace.

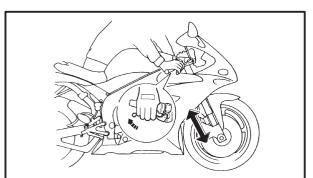
- oil seal 2
- Oil leakage → Replace.
- 3. Hold the motorcycle upright and apply the front brake.
- 4. Check:
  - front fork operation

Push down hard on the handlebars several times and check if the front fork rebounds smoothly.

Rough movement → Repair.

Refer to "FRONT FORK" in chapter 4.





#### ADJUSTING THE FRONT FORK LEGS



EAS00155

#### ADJUSTING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

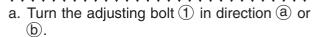
## **A** WARNING

- Always adjust both front fork legs evenly.
   Uneven adjustment can result in poor handling and loss of stability.
- Securely support the motorcycle so that there is no danger of it falling over.

| Spring | preload |
|--------|---------|
|--------|---------|

#### **CAUTION:**

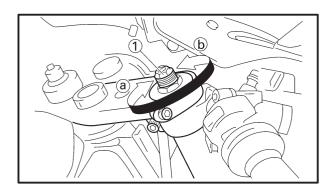
- Grooves are provided to indicate the adjustment position.
- Never go beyond the maximum or minimum adjustment positions.
- 1. Adjust:
  - spring preload

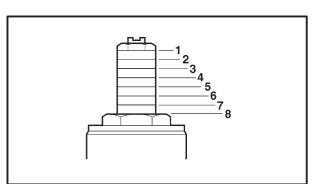


| Direction (a) | Spring preload is increased (suspension is harder). |
|---------------|-----------------------------------------------------|
| Direction (b) | Spring preload is decreased (suspension is softer). |

| Adjusting positions |
|---------------------|
| Minimum: 8          |
| 0                   |

Standard: 4.5 Maximum: 1





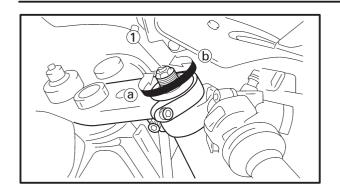
#### **Rebound damping**

## CAUTION:

Never go beyond the maximum or minimum adjustment positions.

## **ADJUSTING THE FRONT FORK LEGS**





1. Adjust:

rebound damping

a. Turn the adjusting screw ① in direction ② or ⑤.

| Direction (a) | Rebound damping is increased (suspension is harder). |
|---------------|------------------------------------------------------|
| Direction (b) | Rebound damping is decreased (suspension is softer). |

#### **Adjusting positions**

Minimum: 26 clicks in direction (b) \*

Standard: 10 clicks in direction (b) \*

Maximum: 1 clicks in direction (b) \*

\* with the adjusting screw fully

turned-in direction (a)

**Compression damping** 

## **CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

compression damping

a. Turn the adjusting screw 1 in direction a orb.





#### **Adjusting positions**

Minimum: 25 clicks in direction (b) \*

Standard: 10 clicks in direction (b) \*

Maximum: 1 clicks in direction (b) \*

\* with the adjusting screw fully

turned-in direction (a)

#### ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY



EAS00158

## ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

| <b>A</b> WARNING |  |
|------------------|--|
|                  |  |

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

Spring preload

## CAUTION:

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
  - spring preload

a. Adjust the spring preload with the special wrench and extension bar included in the owner's tool kit.

- b. Turn the adjusting ring ① in direction ② or ⑤.
- c. Align the desired position on the adjusting ring with the stopper ②.

| Direction (a) | Spring preload is increased (suspension is harder). |
|---------------|-----------------------------------------------------|
| Direction (b) | Spring preload is decreased (suspension is softer). |

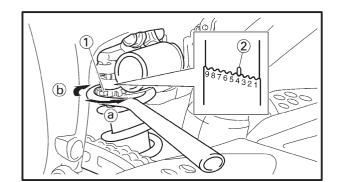
**Adjusting positions** 

Minimum: 1 Standard: 4 Maximum: 9

**Rebound damping** 

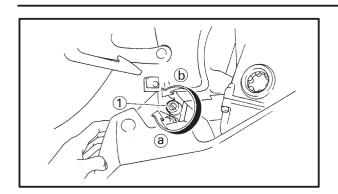
## CAUTION:

Never go beyond the maximum or minimum adjustment positions.



#### ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY





1. Adjust:

rebound damping

a. Turn the adjusting screw ① in direction ② or ⑤.

| Direction (a) | Rebound damping is increased (suspension is harder). |
|---------------|------------------------------------------------------|
| Direction (b) | Rebound damping is decreased (suspension is softer). |

#### **Adjusting positions**

Minimum: 20 clicks in direction (b) \*

Standard: 17 clicks in direction (b) \*

Maximum: 1 clicks in direction (b) \*

\* with the adjusting screw fully

turned-in direction (a)

**Compression damping** 

#### **CAUTION:**

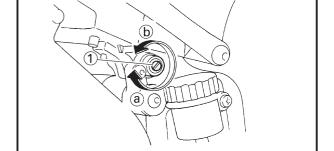
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

compression damping

a. Turn the adjusting screw 1 in direction a or (b).





#### Adjusting positions

Minimum: 20 clicks in direction (b) \*

Standard: 12 clicks in direction (b) \*

Maximum: 1 clicks in direction (b) \*

\* with the adjusting screw fully

turned-in direction (a)

#### **CHECKING THE TIRES**



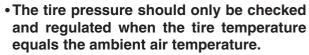
EAS00162

#### **CHECKING THE TIRES**

The following procedure applies to both of the tires.

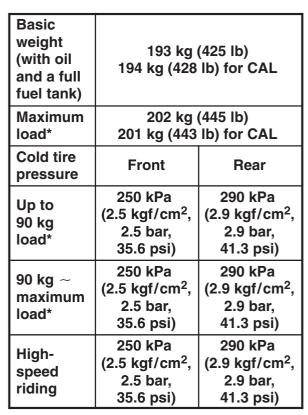
- 1. Check:
  - tire pressure
     Out of specification → Regulate.





- 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.

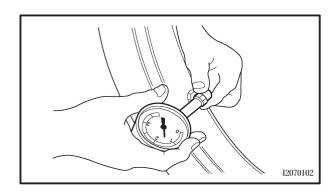
NEVER OVERLOAD THE MOTORCYCLE.



<sup>\*</sup> Total weight of rider, passenger, cargo and accessories

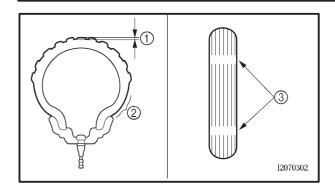
## **WARNING**

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



#### **CHECKING THE TIRES**





- 2. Check:
  - tire surfaces
     Damage/wear → Replace the tire.

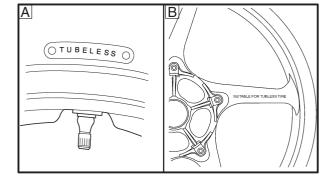


Minimum tire tread depth 1.6 mm (0.06 in)

- 1 Tire tread depth
- 2 Sidewall
- 3 Wear indicator

## **A** 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 a tube tire, 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 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 |

## **A** WARNING

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.

#### CHECKING THE TIRES/CHECKING THE WHEELS



#### Front tire

| Manufacturer | Size                     | Model            |
|--------------|--------------------------|------------------|
| DUNLOP       | 120/70ZR 17<br>M/C (58W) | D218FL           |
| MICHELIN     | 120/70ZR 17<br>M/C (58W) | Pilot<br>POWER C |

#### Rear tire

| Manufacturer | Size                     | Model            |
|--------------|--------------------------|------------------|
| DUNLOP       | 190/50ZR 17<br>M/C (73W) | D218L            |
| MICHELIN     | 190/50ZR 17<br>M/C (73W) | Pilot<br>POWER G |

## **A** WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

#### 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.



#### **CHECKING THE WHEELS**

The following procedure applies to both of the wheels.

- 1. Check:
- wheel

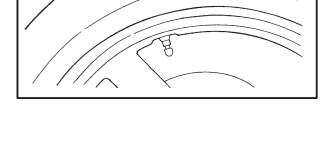
Damage/out-of-round → Replace.

## **A** 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.



2



EAS00170

## CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

## **A** WARNING

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

- 1. Check:
  - outer cable
     Damage → Replace.
- 2. Check:
  - cable operation
     Rough movement → 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 lubricating device.

EAS00171

#### **LUBRICATING THE LEVERS AND PEDALS**

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



Recommended lubricant Lithium-soap-based grease

EAS00172

#### **LUBRICATING THE SIDESTAND**

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



Recommended lubricant Lithium-soap-based grease

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

### **A** WARNING

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

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

## FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

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

#### **INTERNAL**

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

#### **CAUTION:**

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



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 "SEATS".
- 2. Disconnect:
  - battery leads (from the battery terminals)



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

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

 Connect a pocket tester to the battery terminals.



Pocket tester 90890-03112, YU-3112

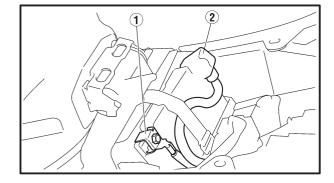
Positive tester probe → positive battery terminal Negative tester probe → negative battery terminal

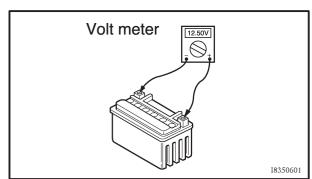
#### NOTE: -

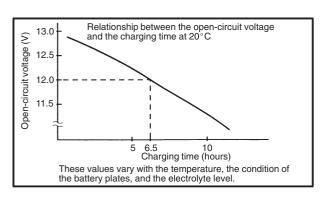
- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.
- b. Check the charge of the battery, as shown in the charts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

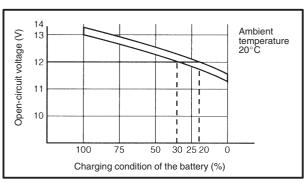
#### Example

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











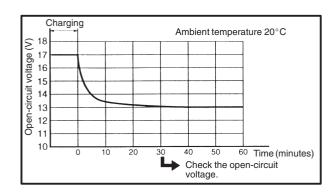
- 5. Charge:
  - battery (refer to the appropriate charging method illustration)

| A | WARNING |  |
|---|---------|--|
|   |         |  |

Do not quick charge a battery.

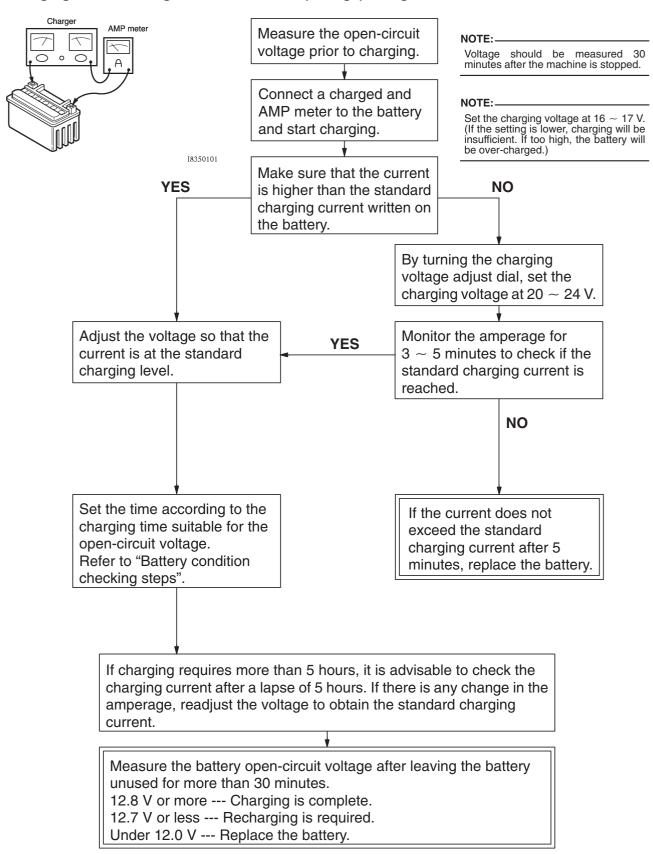
#### **CAUTION:**

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



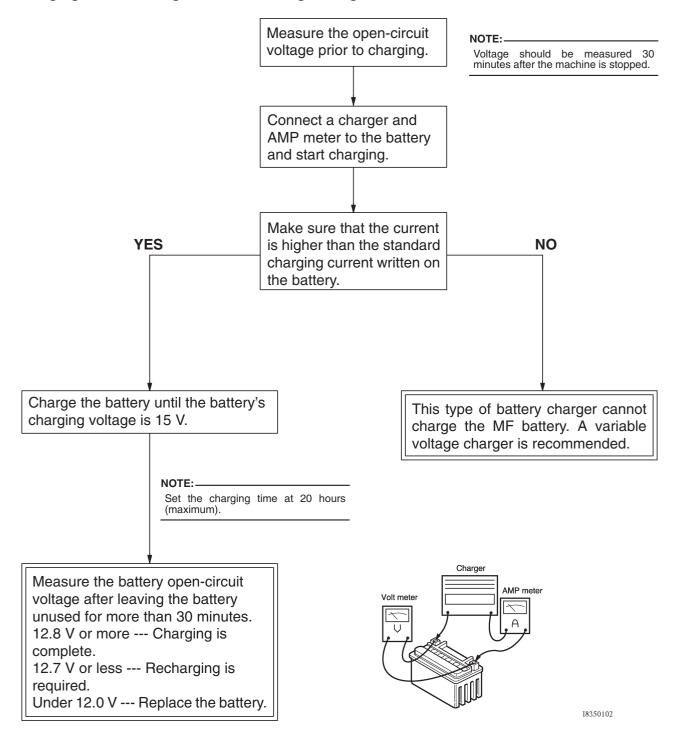


#### Charging method using a variable-current (voltage) charger



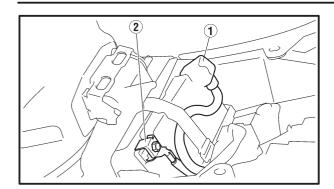


#### Charging method using a constant voltage charger



### CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES





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

#### **CAUTION:**

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

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



Recommended lubricant Dielectric grease

- 10. Install:
  - rider seat Refer to "SEATS".

EAS00181

#### **CHECKING THE FUSES**

The following procedure applies to all of the fuses.

#### **CAUTION:**

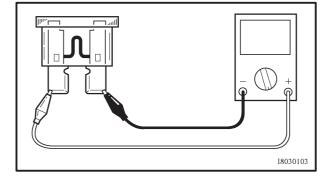
To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

- 1. Remove:
  - front cowling inner panel (left) Refer to "COWLINGS".
  - rider seat Refer to "SEATS".
- 2. Check:
  - fuse

 a. Connect the pocket tester to the fuse and check the continuity.

| NOTE: _ |  |
|---------|--|
|---------|--|

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



# **CHECKING THE FUSES**





# Pocket tester 90890-03112, YU-3112

b. If the pocket tester indicates "∞", replace the fuse.

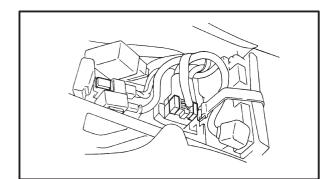
3. Replace:

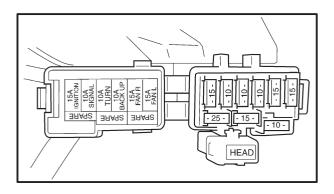
blown fuse

a. Set the main switch to "OFF".

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

| Fuses                                  | Amperage rating     | Q'ty |
|----------------------------------------|---------------------|------|
| Main                                   | 50 A                | 1    |
| Fuel injection system                  | 15 A                | 1    |
| Headlight                              | 25 A                | 1    |
| Signaling system                       | 10 A                | 1    |
| Ignition                               | 15 A                | 1    |
| Backup fuse<br>(odometer<br>and clock) | 10 A                | 1    |
| Radiator fan motor                     | 15 A                | 2    |
| Reserve                                | 25 A, 15 A,<br>10 A | 1    |





# **A** WARNING

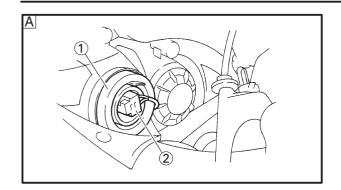
Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

\_\_\_\_

- 4. Install:
  - front cowling inner panel (left) Refer to "COWLINGS".
  - rider seat Refer to "SEATS".

# REPLACING THE HEADLIGHT BULBS

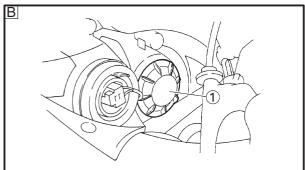


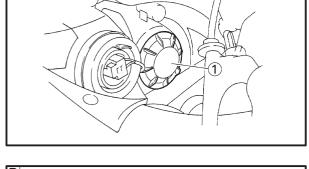


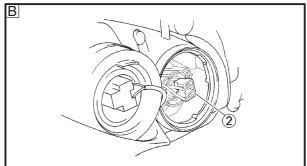
### REPLACING THE HEADLIGHT BULBS

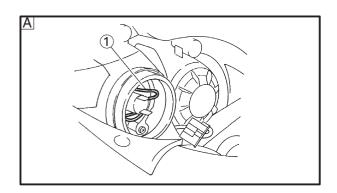
The following procedure applies to both of the headlight bulbs.

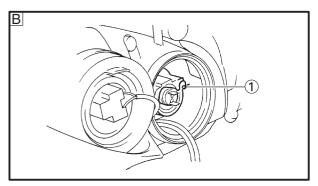
- 1. Disconnect:
  - headlight bulb cover ①
  - headlight coupler 2
- A high beam
- B low beam











- 2. Remove:
  - headlight bulb holder 1
- A high beam
- B low beam
- 3. Remove:
  - headlight bulb

# WARNING

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

- 4. Install:
  - headlight bulb New

Secure the new headlight bulb with the headlight bulb holder.

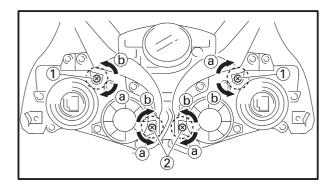
# REPLACING THE HEADLIGHT BULBS/ ADJUSTING THE HEADLIGHT BEAMS



## **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.

- 5. Install:
  - headlight bulb holder
- 6. Install:
  - headlight bulb cover (high beam)
  - headlight bulb coupler (low beam)
- 7. Connect:
  - headlight coupler (high beam)
  - headlight cover (low beam)



#### EAS00185

#### **ADJUSTING THE HEADLIGHT BEAMS**

The following procedure applies to both of the headlights.

- 1. Remove:
  - front cowling inner panels Refer to "COWLINGS".
- 2. Adjust:
  - headlight beam (vertically)
- a. Turn the adjusting screw 1 in direction a or b.

| Direction (a) | Headlight beam is raised.  |
|---------------|----------------------------|
| Direction (b) | Headlight beam is lowered. |

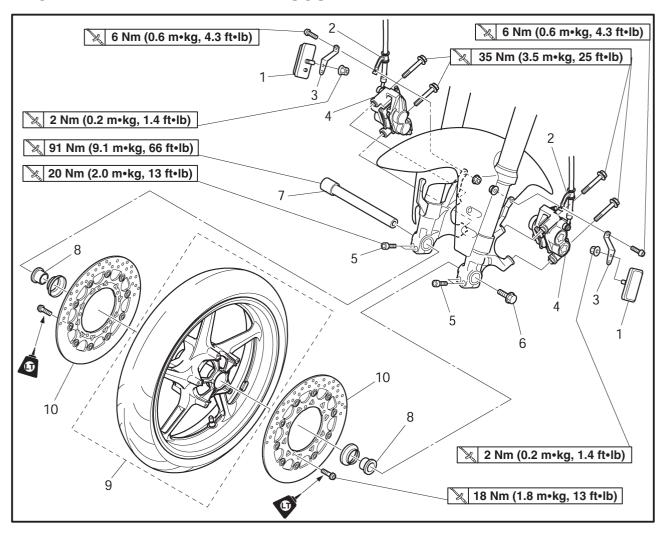
- 3. Adjust:
  - headlight beam (horizontally)
- a. Turn the adjusting screw ② in direction ③ or ⑤.

| Direction (a) | Headlight beam moves to the left.  |
|---------------|------------------------------------|
| Direction (b) | Headlight beam moves to the right. |

- 4. Install:
- front cowling inner panels Refer to "COWLINGS".

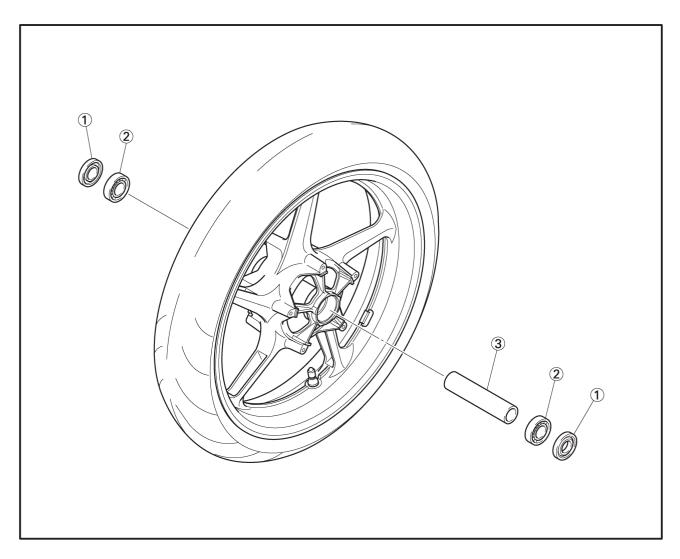
# **CHASSIS**

# 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.  NOTE:  Place the motorcycle on a suitable stand so that the front wheel is elevated. |
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10 | Side reflector (left and right) Brake hose holder (left and right) Side reflector bracket Front brake caliper (left and right) Front wheel axle pinch bolt Front wheel axle bolt Front wheel axle Collar (left and right) Front wheel Front brake disc (left and right) | 2<br>2<br>2<br>4<br>1<br>1<br>2<br>1<br>2 | For installation, reverse the removal procedure.                                                                            |





| Order | Job/Part                                                                                      | Q'ty        | Remarks                                                                                      |
|-------|-----------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------|
| 1 2 3 | Disassembling the front wheel Oil seal (left and right) Wheel bearing (left and right) Spacer | 2<br>2<br>1 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |

EAS00521

#### REMOVING THE FRONT WHEEL

1. Stand the motorcycle on a level surface.

# **A** 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:
  - left brake caliper
  - right brake caliper Refer to "FRONT BRAKE CALIPERS".

NOTE: -

Do not apply the brake lever when removing the brake calipers.

- 3. Elevate:
  - front wheel

NOTE:

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

- 4. Loosen:
  - front wheel axle pinch bolt
- 5. Remove:
  - front wheel axle bolt
  - front wheel axle
  - front wheel

EAS00525

#### CHECKING THE FRONT WHEEL

- 1. Check:
- wheel axle

Roll the wheel axle on a flat surface.

Bends → Replace.

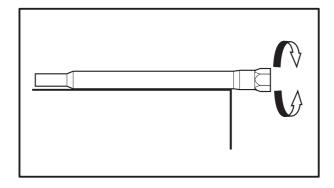
# **A** WARNING

Do not attempt to straighten a bent wheel axle.

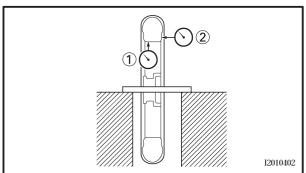
- 2. Check:
  - tire
  - front wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.





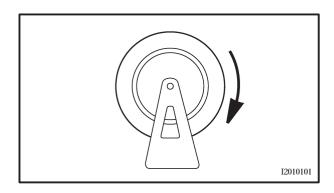


3. Measure:

- radial wheel runout 1
- lateral wheel runout ②
   Over the specified limits → Replace.

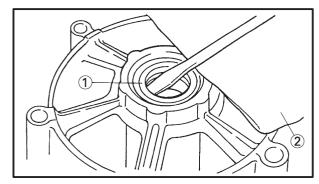


Radial wheel runout limit 1.0 mm (0.04 in) Lateral wheel runout limit 0.5 mm (0.02 in)



4. Check:

- wheel bearings
   Front wheel turns roughly or is loose → Replace the wheel bearings.
- oil seals
   Damage/wear → Replace.



- 5. Replace:
  - wheel bearings New
  - oil seals New

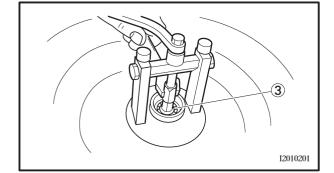
a. Clean the outside of the front wheel hub.b. Remove the oil seals ① with a flat-head

b. Remove the oil seals (1) with a flat-head screwdriver.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

NOTE: -

To prevent damaging the wheel, place a rag 2 between the screwdriver and the wheel surface.



- c. Remove the wheel bearings ③ with a general bearing puller.
- d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

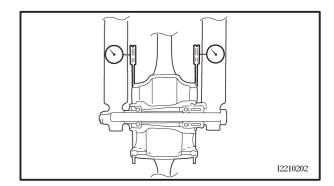
#### **CAUTION:**

Do not contact the wheel bearing inner race ① or balls ②. Contact should be made only with the outer race ③.

NOTE: \_\_\_\_\_

Use a socket ④ that matches the diameter of the wheel bearing outer race and oil seal.





ΔS00533

#### **CHECKING THE BRAKE DISCS**

The following procedure applies to all of the brake discs.

- 1. Check:
  - brake disc
     Damage/galling → Replace.
- 2. Measure:
  - brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.



# Brake disc deflection limit (maximum)

Front : 0.1 mm (0.004 in) Rear : 0.15 mm (0.006 in)

- a. Place the motorcycle on a suitable stand so that the wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebars to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.

3. Measure:

brake disc thickness

Measure the brake disc thickness at a few different locations.

Out of specification  $\rightarrow$  Replace.



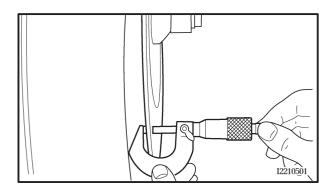
# Brake disc thickness limit (minimum)

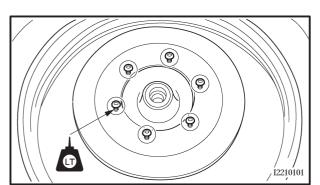
Front : 4.0 mm (0.16 in) Rear : 4.5 mm (0.18 in)

- 4. Adjust:
- brake disc deflection
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.

NOTE:

Tighten the brake disc bolts in stages and in a crisscross pattern.









#### Brake disc bolt

Front : 18 Nm (1.8 m•kg, 13 ft•lb)
Rear : 30 Nm (3.0 m•kg, 22 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.

EACOOE 45

#### **INSTALLING THE FRONT WHEEL**

The following procedure applies to both brake discs.

- 1. Lubricate:
  - wheel axle
- oil seal lips



# Recommended lubricant Lithium-soap-based grease

- 2. Lift the wheel up between the fork legs.
- 3. Insert the wheel axle.

#### NOTE: -

Install the tire and wheel with the mark 1 pointing in the direction of wheel rotation.

- 4. Lower the front wheel so that it is on the ground.
- 5. Tighten:
  - wheel axle

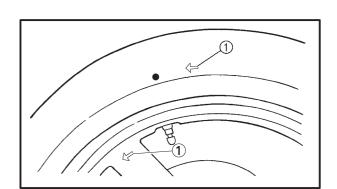
91 Nm (9.1 m•kg, 66 ft•lb)

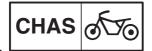
• wheel axle pinch bolt

20 Nm (2.0 m•kg, 14 ft•lb)

# **CAUTION:**

Before tightening the wheel axle nut, push down hard on the handlebars several times and check if the front fork rebounds smoothly.





- 6. Install:
  - brake caliper (left and right)

35 Nm (3.5 m•kg, 25 ft•lb)

#### NOTE: -

Make sure that there is enough space between the brake pads before installing the brake calipers onto the brake discs.

# **A** WARNING

Make sure the brake hose is routed properly.

EAS00549

# ADJUSTING THE FRONT WHEEL STATIC BALANCE

NOTE: -

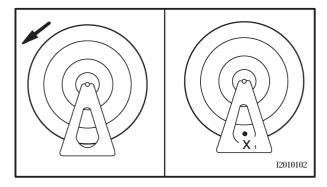
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.
- 1. Remove:
  - balancing weight(s)
- 2. Find:
  - front wheel's heavy spot

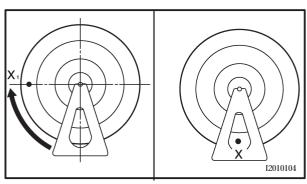
NOTE:

Place the front wheel on a suitable balancing stand.

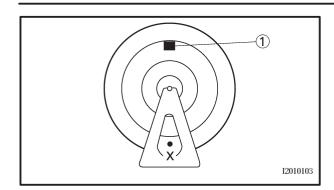


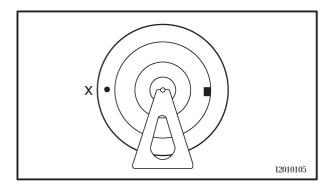
- a. Spin the front wheel.
- b. When the front wheel stops, put an "X<sub>1</sub>" mark at the bottom of the wheel.
- c. Turn the front wheel  $90^{\circ}$  so that the "X<sub>1</sub>" mark is positioned as shown.
- d. Release the front wheel.
- e. When the wheel stops, put an "X<sub>2</sub>" mark at the bottom of the wheel.
- f. Repeat steps (d) through (f) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

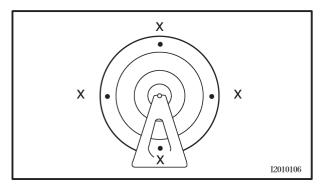












- 3. Adjust:
  - front wheel static balance

a. Install a balancing weight ① onto the rim exactly opposite the heavy spot "X".

\*\*\*\*\*\*\*

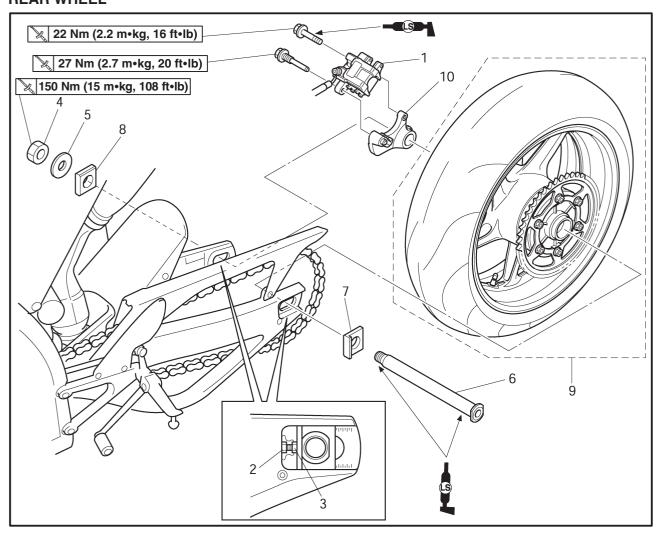
NOTE: -

Start with the lightest weight.

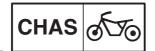
- b. Turn the front wheel  $90^{\circ}$  so that the heavy spot is positioned as shown.
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.
- 4. Check:
  - front wheel static balance
- a. Turn the front wheel and make sure it stays at each position shown.
- b. If the front wheel does not remain stationary at all of the positions, rebalance it.



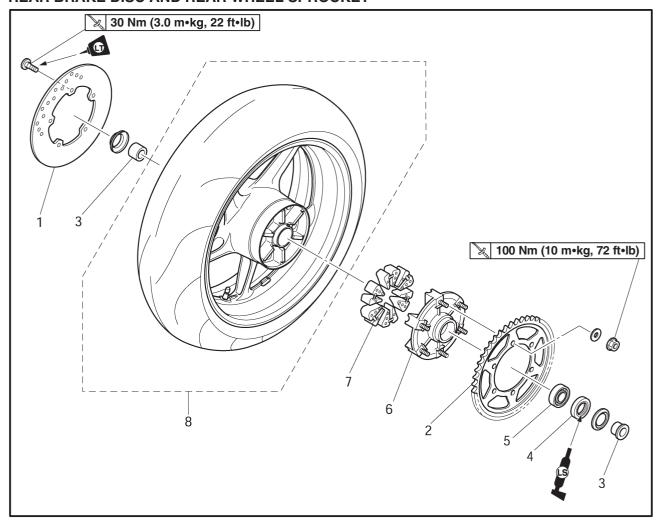
# REAR WHEEL AND BRAKE DISC REAR WHEEL



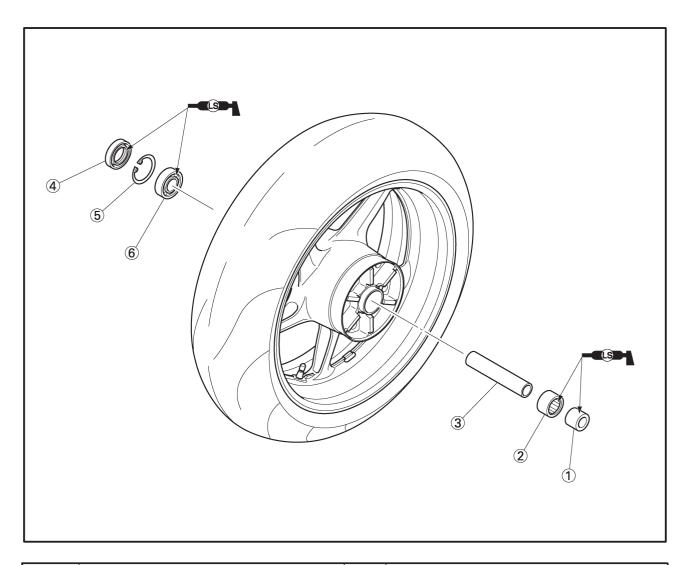
| Order | Job/Part                        | Q'ty | Remarks                                                                      |
|-------|---------------------------------|------|------------------------------------------------------------------------------|
|       | Removing the rear wheel         |      | Remove the parts in the order listed.  NOTE:                                 |
|       |                                 |      | Place the motorcycle on a suitable stand so that the rear wheel is elevated. |
| 1     | Rear brake caliper              | 1    |                                                                              |
| 2     | Lock nut (left and right)       | 2    | Loosen.                                                                      |
| 3     | Adjusting bolt (left and right) | 2    | Loosen.                                                                      |
| 4     | Wheel axle nut                  | 1    |                                                                              |
| 5     | Washer                          | 1    |                                                                              |
| 6     | Rear wheel axle                 | 1    |                                                                              |
| 7     | Left adjusting block            | 1    |                                                                              |
| 8     | Right adjusting block           | 1    |                                                                              |
| 9     | Rear wheel                      | 1    |                                                                              |
| 10    | Brake caliper bracket           | 1    |                                                                              |
|       |                                 |      | For installation, reverse the removal procedure.                             |



### REAR BRAKE DISC AND REAR WHEEL SPROCKET



| Order | Job/Part                                             | Q'ty | Remarks                                              |
|-------|------------------------------------------------------|------|------------------------------------------------------|
|       | Removing the rear brake disc and rear wheel sprocket |      | Remove the parts in the order listed.                |
| 1     | Rear brake disc                                      | 1    |                                                      |
| 2     | Rear wheel sprocket                                  | 1    |                                                      |
| 3     | Collar                                               | 2    |                                                      |
| 4     | Oil seal                                             | 1    |                                                      |
| 5     | Bearing                                              | 1    |                                                      |
| 6     | Rear wheel drive hub                                 | 1    |                                                      |
| 7     | Rear wheel drive hub damper                          | 6    |                                                      |
| 8     | Rear wheel                                           | 1    |                                                      |
|       |                                                      |      | For installation, reverse the disassembly procedure. |



| Order       | Job/Part                                                                    | Q'ty                  | Remarks                                                                                      |
|-------------|-----------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------|
| 1 2 3 4 5 6 | Disassembling the rear wheel Collar Bearing Spacer Oil seal Circlip Bearing | 1<br>1<br>1<br>1<br>1 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |

# **REAR WHEEL AND BRAKE DISC**

EAS00561

#### REMOVING THE REAR WHEEL

1. Stand the motorcycle on a level surface.

# **A** WARNING

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

NOTE: —

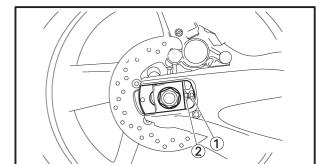
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:

• brake caliper ①

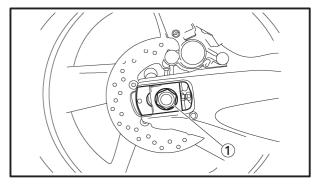
NOTE: -

Do not depress the brake pedal when removing the brake caliper.



1

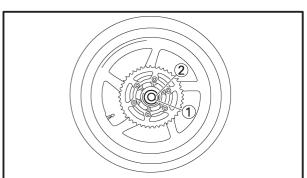
- 3. Loosen:
  - locknut (1)
  - adjusting bolt ②



- 4. Remove:
  - wheel axle nut (1)
  - wheel axle
  - rear wheel

NOTE:

Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.



- 5. Remove:
  - left collar (1)
- rear wheel drive hub 2
- rear wheel drive hub damper
- right collar

## **REAR WHEEL AND BRAKE DISC**



EAS00565

### **CHECKING THE REAR WHEEL**

- 1. Check:
- wheel axle
- rear wheel
- wheel bearings
- oil seals

Refer to "CHECKING THE FRONT WHEEL".

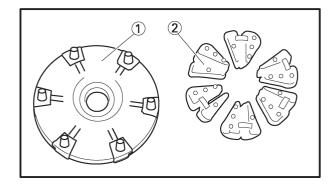
- 2. Check:
  - tire
  - rear wheel

 $\mathsf{Damage/wear} \to \mathsf{Replace}.$ 

Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.

- 3. Measure:
  - radial wheel runout
  - lateral wheel runout

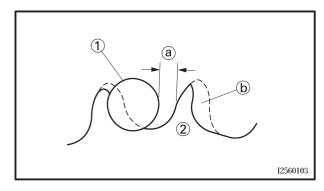
Refer to "CHECKING THE FRONT WHEEL".



EAS00567

#### CHECKING THE REAR WHEEL DRIVE HUB

- 1. Check:
  - rear wheel drive hub ①
     Cracks/damage → Replace.
  - rear wheel drive hub dampers ②
     Damage/wear → Replace.



EAS00568

# CHECKING AND REPLACING THE REAR WHEEL SPROCKET

- 1. Check:
  - rear wheel sprocket

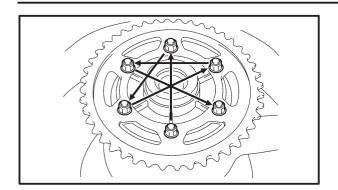
More than 1/4 tooth ⓐ wear  $\rightarrow$  Replace the rear wheel sprocket.

Bent teeth  $\rightarrow$  Replace the rear wheel sprocket.

- (b) Correct
- 1 Drive chain roller
- (2) Rear wheel sprocket

#### REAR WHEEL AND BRAKE DISC





- 2. Replace:
  - rear wheel sprocket

\*\*\*\*\*\*

- a. Remove the self-locking nuts and the rear wheel sprocket.
- b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
- c. Install the new rear wheel sprocket.



Rear wheel sprocket self-locking

100 Nm (10 m•kg, 72 ft•lb)

Tighten the self-locking nuts in stages and in a crisscross pattern.

\_\_\_\_

FAS00572

#### INSTALLING THE REAR WHEEL

- 1. Lubricate:
- wheel axle
- wheel bearings
- oil seal lips



Recommended lubricant Lithium-soap-based grease

- 2. Tighten:

• brake caliper bolts (front)

27 Nm (2.7 m•kg, 20 ft•lb) (rear)

× 22 Nm (2.2 m•kg, 16 ft•lb)

FAS00575

### ADJUSTING THE REAR WHEEL STATIC **BALANCE**

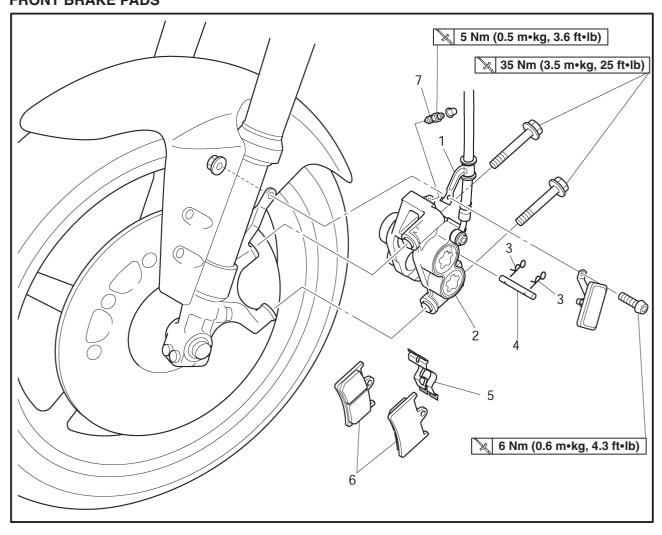
NOTE: -

- 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 "ADJUSTING THE FRONT WHEEL STATIC BALANCE".



FAS0057

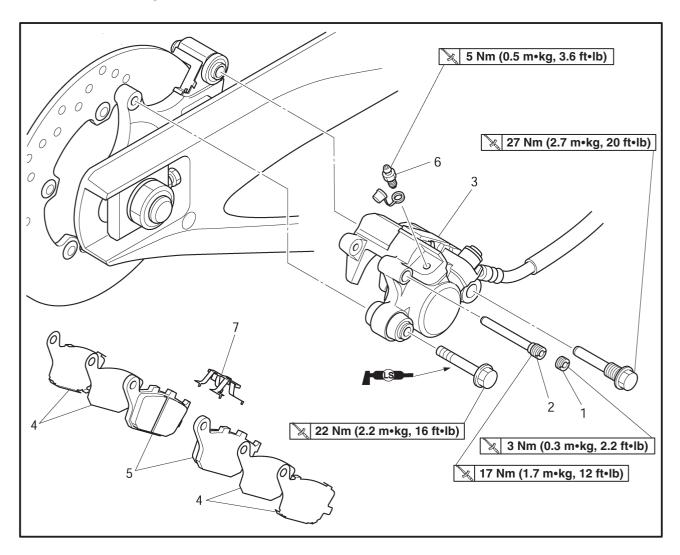
# FRONT AND REAR BRAKES FRONT BRAKE PADS



| Order                           | Job/Part                                                                                                  | Q'ty                       | Remarks                                                              |
|---------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------|
|                                 | Removing the front brake pads                                                                             |                            | Remove the parts in the order listed.                                |
|                                 |                                                                                                           |                            | The following procedure applies to both of the front brake calipers. |
| 1<br>2<br>3<br>4<br>5<br>6<br>7 | Brake hose holder Front brake caliper Brake pad clip Brake pad pin Brake pad spring Brake pad Bleed screw | 1<br>1<br>2<br>1<br>1<br>2 | For installation, reverse the removal procedure.                     |



### **REAR BRAKE PADS**



| Order | Job/Part                     | Q'ty | Remarks                                          |
|-------|------------------------------|------|--------------------------------------------------|
|       | Removing the rear brake pads |      | Remove the parts in the order listed.            |
| 1     | Screw plug                   | 1    |                                                  |
| 2     | Brake pad pin                | 1    |                                                  |
| 3     | Rear brake caliper           | 1    |                                                  |
| 4     | Brake pad shim               | 4    |                                                  |
| 5     | Brake pad                    | 2    |                                                  |
| 6     | Bleed screw                  | 1    |                                                  |
| 7     | Brake pad spring             | 1    |                                                  |
|       |                              |      | For installation, reverse the removal procedure. |

CHAS 650

EAS00579

| <b>CAUTION:</b> |  |
|-----------------|--|
| 011011011       |  |

Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

# **A** WARNING

- 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 brake 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.

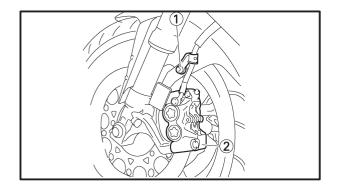
EAS0058

### **REPLACING THE FRONT BRAKE PADS**

The following procedure applies to both brake calipers.

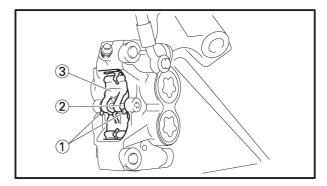
NOTE: -

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



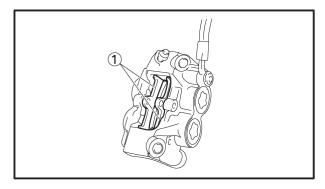
#### 1. Remove:

- brake hose holder ①
- brake caliper 2



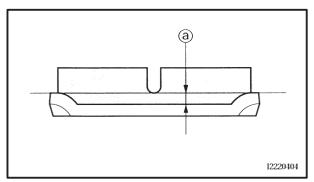
#### 2. Remove:

- brake pad clips ①
- brake pad pin 2
- brake pad spring ③



### 3. Remove:

brake pads ①
 (along with the brake pad shims)



#### 4. Measure:

brake pad wear limit (a)
 Out of specification → Replace the brake pads as a set.

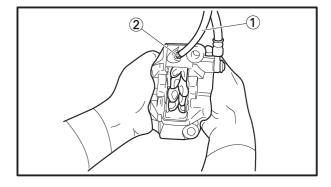


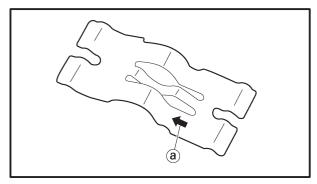
Brake pad wear limit 0.5 mm (0.02 in)

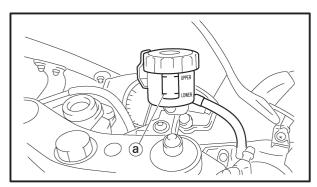
- 5. Install:
  - brake pad shims (onto the brake pads)
  - brake pads
  - brake pad spring

#### NOTE: -

Always install new brake pads, 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 5 Nm (0.5 m•kg, 3.6 ft•lb)

d. Install a new brake pad shim onto each new brake pad.

#### NOTE: -

Install the brake pad spring pointing ⓐ toward the bleed screw.

e. Install new brake pads and a new brake pad spring.

- 6. Install:
  - brake pad pins
  - brake pad clips
- brake caliper

35 Nm (3.5 m•kg, 25 ft•lb)

- 7. Check:
- brake fluid level

Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

- 8. Check:
  - brake lever operation

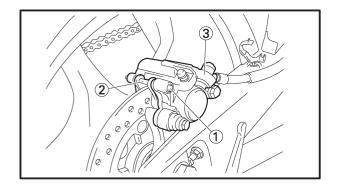
Soft or spongy feeling  $\rightarrow$  Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

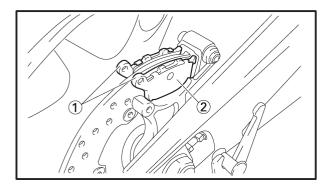
### **REPLACING THE REAR BRAKE PADS**

NOTE: -

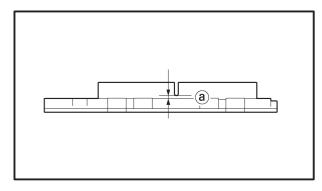
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



- 1. Remove:
  - screw plug (1)
  - brake pad pin 2
  - brake caliper (3)
  - brake pad spring



- 2. Remove:
- brake pads ①
  (along with the brake pad shims ②)



- 3. Measure:
  - brake pad wear limit ⓐ
     Out of specification → Replace the brake pads as a set.



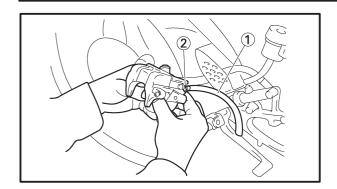
# Brake pad wear limit 1.0 mm (0.04 in)

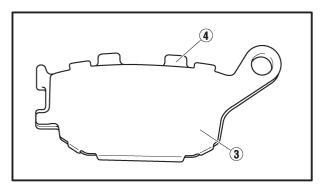
- 4. Install:
  - brake pad shims (onto the brake pads)
  - brake pads
  - brake pad spring

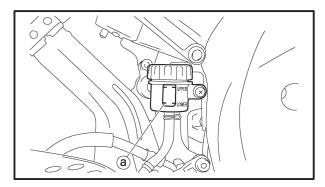
NOTE: -

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 5 Nm (0.5 m•kg, 3.6 ft•lb)

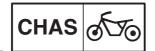
d. Install a new brake pad shim ③ onto each new brake pad ④.

- 5. Install:
  - rear brake caliper (front)

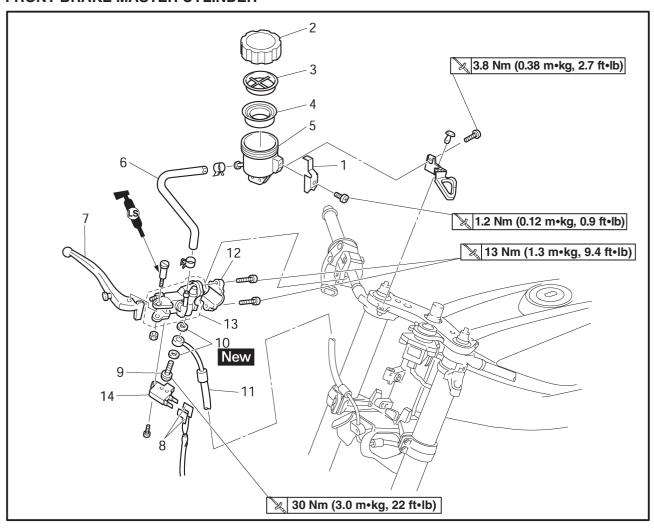
27 Nm (2.7 m•kg, 20 ft•lb) (rear) 22 Nm (2.2 m•kg, 16 ft•lb)

- brake pad pin
- screw plug
- 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.

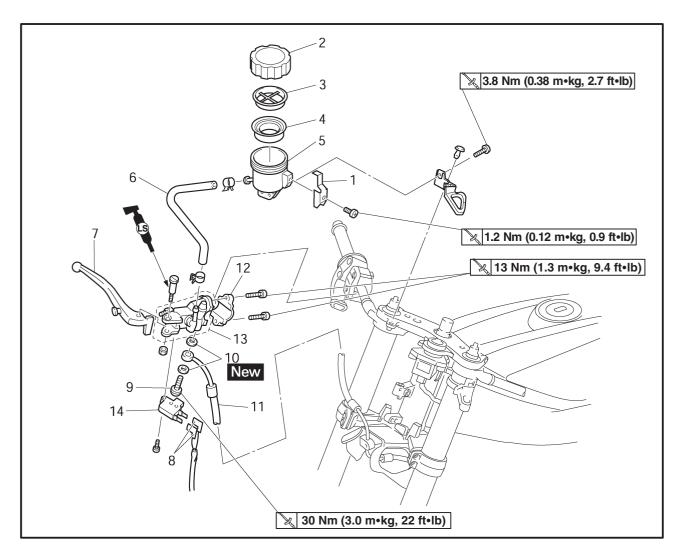
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



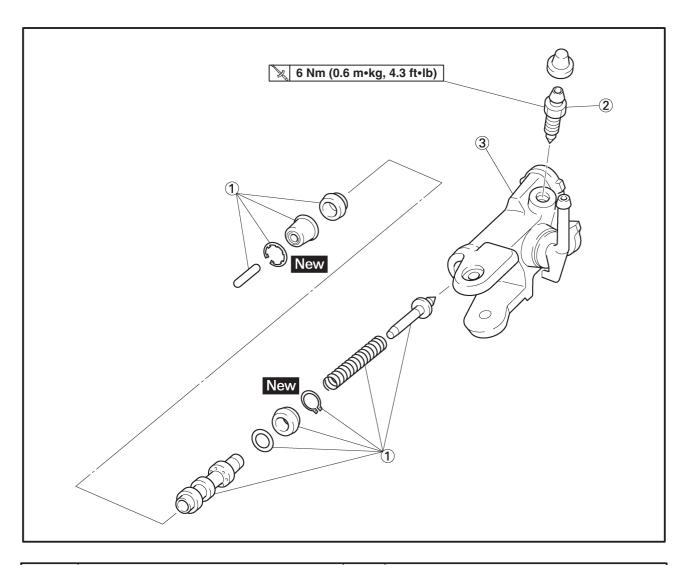
### FRONT BRAKE MASTER CYLINDER



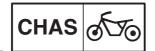
| Order | Job/Part                                 | Q'ty | Remarks                                           |
|-------|------------------------------------------|------|---------------------------------------------------|
|       | Removing the front brake master cylinder |      | Remove the parts in the order listed.             |
|       | Brake fluid                              |      | Drain.                                            |
|       |                                          |      | Refer to "CHANGING THE BRAKE FLUID" in chapter 3. |
| 1     | Stopper                                  | 1    | •                                                 |
| 2     | Brake fluid reservoir cap                | 1    |                                                   |
| 3     | Brake fluid reservoir diaphragm holder   | 1    |                                                   |
| 4     | Brake fluid reservoir diaphragm          | 1    |                                                   |
| 5     | Brake fluid reservoir tank               | 1    |                                                   |
| 6     | Brake fluid reservoir hose               | 1    |                                                   |
| 7     | Brake lever                              | 1    |                                                   |
| 8     | Front brake switch connector             | 2    | Disconnect.                                       |
| 9     | Union bolt                               | 1    |                                                   |



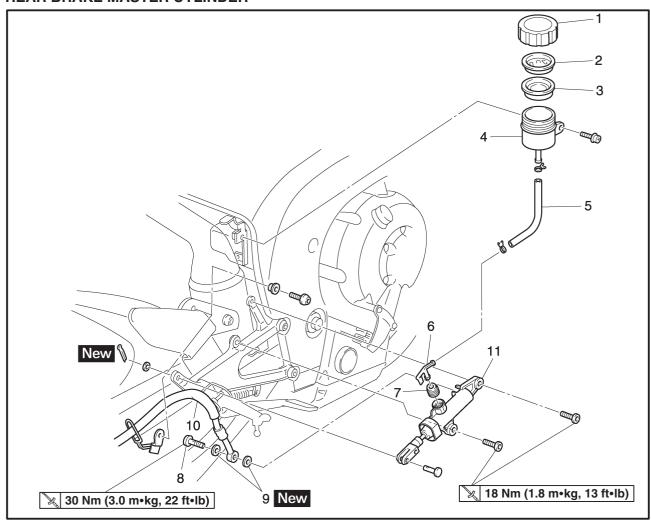
| Order                      | Job/Part                                                                                              | Q'ty                  | Remarks                                          |
|----------------------------|-------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------|
| 10<br>11<br>12<br>13<br>14 | Copper washer Brake hose Brake master cylinder bracket Brake master cylinder Front brake light switch | 2<br>1<br>1<br>1<br>1 | For installation, reverse the removal procedure. |



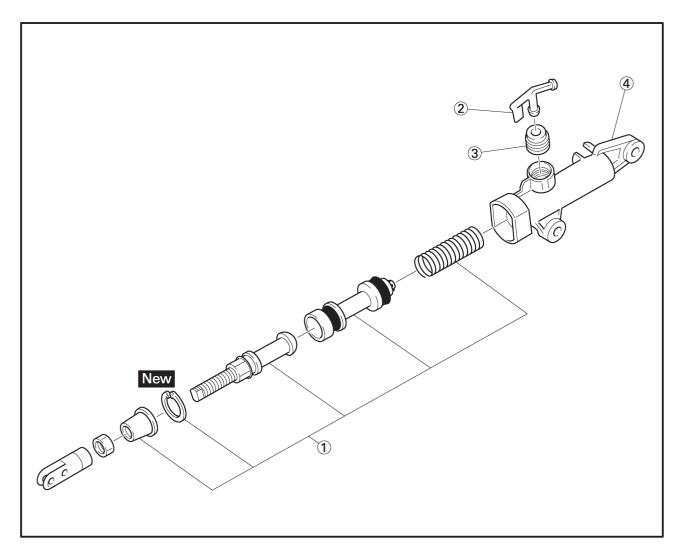
| Order | Job/Part                                                                                                                   | Q'ty        | Remarks                                                                                      |
|-------|----------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------|
| 1 2 3 | Disassembling the front brake<br>master cylinder<br>Brake master cylinder kit<br>Bleed screw<br>Brake master cylinder body | 1<br>1<br>1 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |



### **REAR BRAKE MASTER CYLINDER**



| Order | Job/Part                                            | Q'ty | Remarks                                                                     |
|-------|-----------------------------------------------------|------|-----------------------------------------------------------------------------|
|       | Removing the rear brake master cylinder Brake fluid |      | Remove the parts in the order listed.  Drain.  Refer to "CHANGING THE BRAKE |
|       |                                                     |      | FLUID" in chapter 3.                                                        |
| 1     | Brake fluid reservoir cap                           | 1    |                                                                             |
| 2     | Brake fluid reservoir diaphragm holder              | 1    |                                                                             |
| 3     | Brake fluid reservoir diaphragm                     | 1    |                                                                             |
| 4     | Brake fluid reservoir tank                          | 1    |                                                                             |
| 5     | Brake fluid reservoir hose                          | 1    |                                                                             |
| 6     | Hose joint                                          | 1    |                                                                             |
| 7     | Bush                                                | 1    |                                                                             |
| 8     | Union bolt                                          | 1    |                                                                             |
| 9     | Copper washer                                       | 2    |                                                                             |
| 10    | Brake hose                                          | 1    |                                                                             |
| 11    | Brake master cylinder                               | 1    |                                                                             |
|       |                                                     |      | For installation, reverse the removal procedure.                            |



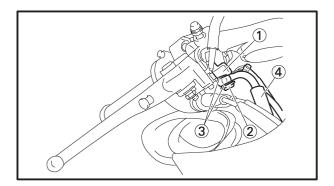
| Order            | Job/Part                                                                                                          | Q'ty        | Remarks                                                                                      |
|------------------|-------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------|
| ①<br>②<br>③<br>④ | Disassembling the rear brake master cylinder Brake master cylinder kit Hose joint Bush Brake master cylinder body | 1<br>1<br>1 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |

EAS00588

# DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE: -

Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.

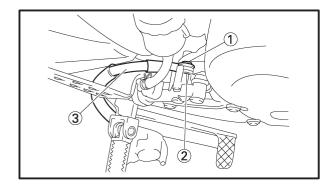


- 1. Disconnect:
  - brake light switch connector ① (from the brake light switch)
- 2. Remove:
  - union bolt (2)
  - copper washers ③
  - brake hose (4)

#### NOTE: -

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

- 3. Remove:
  - brake master cylinder bracket
  - brake master cylinder assembly
- 4. Remove:
  - dust boot
  - circlip



EASON580

# DISASSEMBLING THE REAR BRAKE MASTER CYLINDER

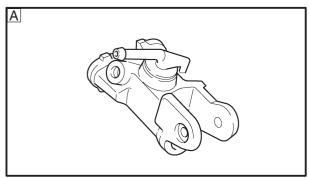
- 1. Remove:
  - union bolt (1)
  - copper washers 2
  - brake hose (3)

#### NOTE: -

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

- 2. Remove:
  - brake master cylinder assembly
- 3. Remove:
  - dust boot
  - circlip





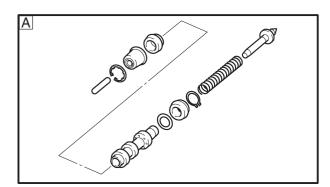
B



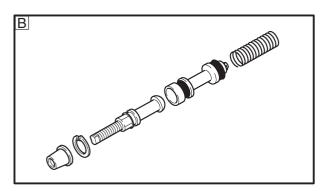
# CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

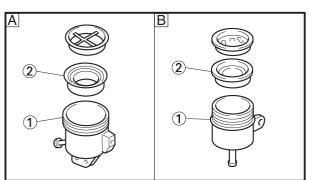
The following procedure applies to both of the brake master cylinders.

- 1. Check:
  - brake master cylinder
     Damage/scratches/wear → Replace.
  - brake fluid delivery passages (brake master cylinder body)
     Obstruction → Blow out with compressed air.
- A Front
- B Rear



- 2. Check:
  - brake master cylinder kit
     Damage/scratches/wear → Replace.
- A Front
- B Rear





- 3. Check:
  - brake fluid reservoir ①
     Cracks/damage → Replace.
  - brake fluid reservoir diaphragm ②
     Cracks/damage → Replace.
- A Front
- B Rear
- 4. Check:
  - brake hoses  $Cracks/damage/wear \rightarrow Replace.$

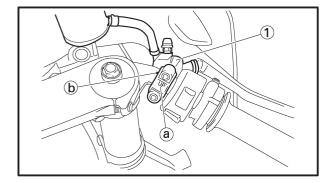


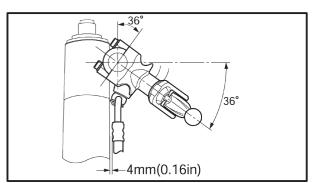
EAS00607

# ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

# **A** 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 kit
- circlip New
- dust boot
- 2. Install:
  - brake master cylinder 1

13 Nm (1.3 m•kg, 9.4 ft•lb)

#### NOTE: -

- Install the brake master cylinder holder with the "UP" mark (a) facing up.
- Align the end of the brake master cylinder holder with the punch mark (b) on the right handlebar.
- First, tighten the upper bolt, then the lower bolt. There should be 2  $\sim$  2.5 mm (0.08  $\sim$  0.10 in) for clearance between the right handlebar switch and the brake master cylinder holder.
- 3. Install:
  - copper washers New
  - brake hose
  - union bolt 30 Nm (3.0 m•kg, 22 ft•lb)
  - brake light switch coupler

# **A** WARNING

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

NOTE: -

- While holding the brake hose, tighten the union bolt.
- Turn the handlebars to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.
- 4. Fill:
  - brake fluid reservoir (with the specified amount of the recommended brake fluid)



Recommended brake fluid DOT 4

# **A WARNING**

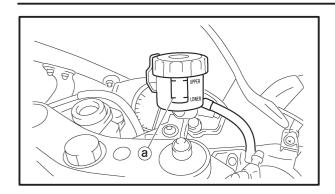
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

EAS00608

# ASSEMBLING THE REAR BRAKE MASTER CYLINDER

- 1. Install:
  - brake master cylinder kit
  - circlip
  - dust boot
- 2. Install:
  - copper washers New
  - brake hoses
  - union bolt

30 Nm (3.0 m•kg, 22 ft•lb)



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

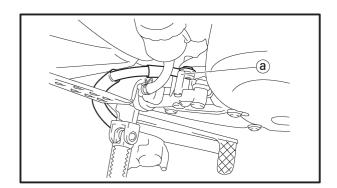
# **CAUTION:**

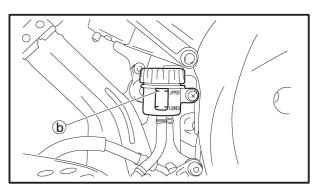
When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection (a) as shown.

- 3. Fill:
  - brake fluid reservoir (to the maximum level mark (b))



Recommended brake fluid DOT 4



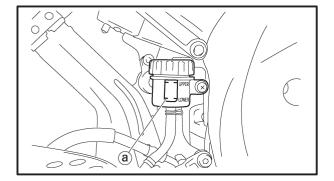


# **A** WARNING

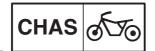
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

| C  | Λ | П | П | П | 0 | N | Н |
|----|---|---|---|---|---|---|---|
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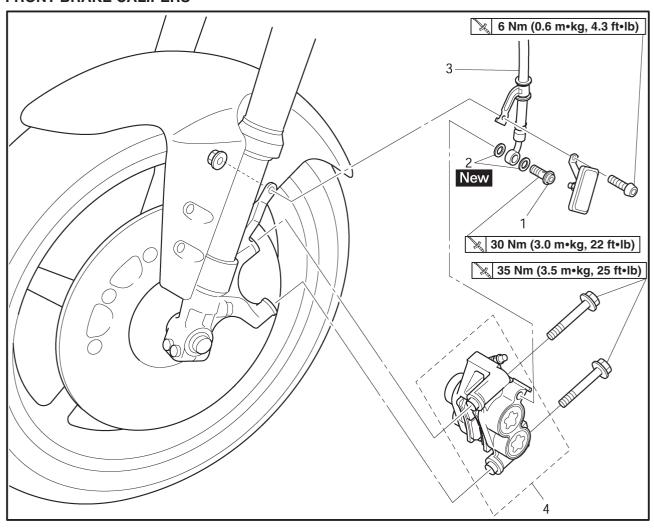
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



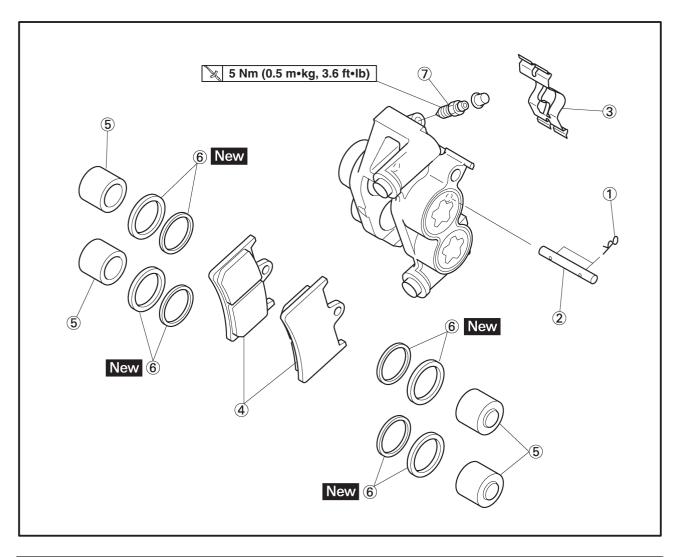
- 4. Bleed:
  - brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
- 5. Check:
  - brake fluid level
    Below the minimum level mark (a) → Add the
    recommended brake fluid to the proper level.
    Refer to "CHECKING THE BRAKE FLUID
    LEVEL" in chapter 3.
- 6. Adjust:
  - rear brake light operation timing Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" in chapter 3.



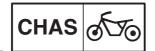
### **FRONT BRAKE CALIPERS**



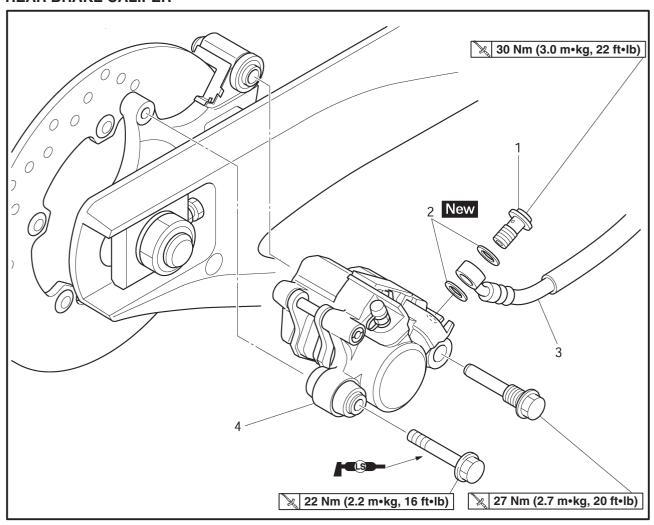
| Order | Job/Part                          | Q'ty    | Remarks                                                              |
|-------|-----------------------------------|---------|----------------------------------------------------------------------|
|       | Removing the front brake calipers |         | Remove the parts in the order listed.                                |
|       |                                   |         | The following procedure applies to both of the front brake calipers. |
|       | Brake fluid                       |         | Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.  |
| 1     | Union bolt                        | 1       | ·                                                                    |
| 2     | Copper washer                     | 2       |                                                                      |
| 3 4   | brake hose<br>brake caliper       | <br>  1 |                                                                      |
|       |                                   | •       | For installation, reverse the removal procedure.                     |



| Order         | Job/Part                                                                                                           | Q'ty                            | Remarks                                                              |
|---------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------|
|               | Disassembling the front brake calipers                                                                             |                                 | Disassemble the parts in the order listed. <b>NOTE:</b>              |
|               |                                                                                                                    |                                 | The following procedure applies to both of the front brake calipers. |
| 1 2 3 4 5 6 7 | Brake pad clip Brake pad pin Brake pad spring Brake pad Brake caliper piston Brake caliper piston seal Bleed screw | 2<br>1<br>1<br>2<br>4<br>8<br>1 | For assembly, reverse the disassembly procedure.                     |

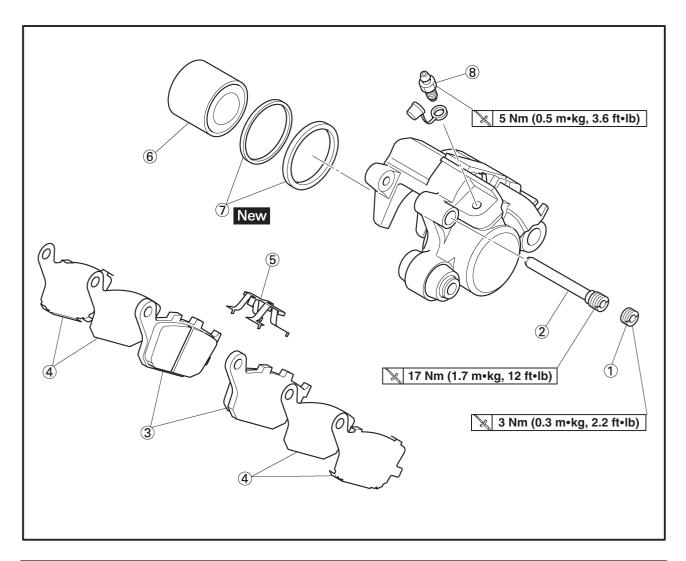


### **REAR BRAKE CALIPER**



| Order            | Job/Part                                                                                       | Q'ty             | Remarks                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4 | Removing the rear brake caliper Brake fluid  Union bolt Copper washer Brake hose Brake caliper | 1<br>2<br>1<br>1 | Remove the parts in the order listed. Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.  For installation, reverse the removal |
|                  |                                                                                                |                  | procedure.                                                                                                                                       |





| Order                                                | Job/Part                                                                                                                                                           | Q'ty                            | Remarks                                                                                      |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------|
| (1)<br>(2)<br>(3)<br>(4)<br>(5)<br>(6)<br>(7)<br>(8) | Disassembling the rear brake caliper Screw plug Brake pad pin Brake pad Brake pad shim Brake pad spring Brake caliper piston Brake caliper piston seal Bleed screw | 1<br>1<br>2<br>4<br>1<br>1<br>2 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |

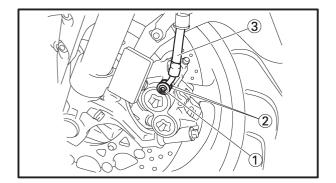
EAS00625

## DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

NOTE: -

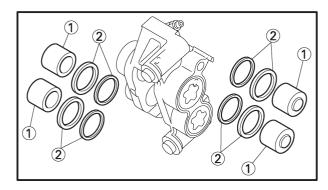
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



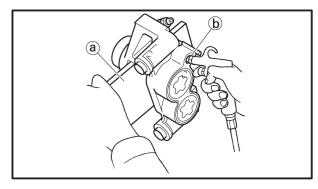
- 1. Remove:
- union bolt (1)
- copper washers 2
- brake hose (3)

NOTE: -

Put the end of the brake hose into a container and pump out the brake fluid carefully.



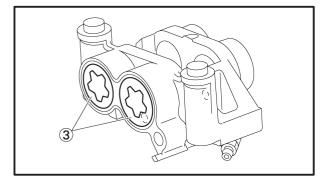
- 2. Remove:
  - brake caliper pistons (1)
  - brake caliper piston seals 2



- a. Secure the brake caliper pistons 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.

### **A** WARNING

- Never try to pry out the brake caliper pistons.
- Do not loosen the bolts ③.



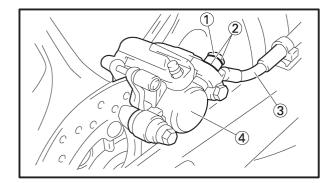
- c. Remove the brake caliper piston seals.
- d. Repeat the previous steps to force out the right side pistons from the brake caliper.

EAS00626

## DISASSEMBLING THE REAR BRAKE CALIPER

NOTE: -

Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

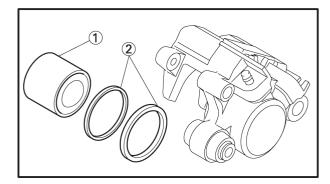


1. Remove:

- union bolt (1)
- copper washers 2
- brake hose ③
- brake caliper (4)

NOTE: -

Put the end of the brake hose into a container and pump out the brake fluid carefully.



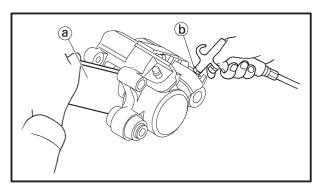
- 2. Remove:
  - brake caliper piston (1)
  - brake caliper piston seals 2

a. Secure the brake caliper piston with a piece of wood (a).

b. Blow compressed air into the brake hose joint opening **(b)** to force out the piston from the brake caliper.



- Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.
- Never try to pry out the brake caliper piston.
- c. Remove the brake caliper piston seals.

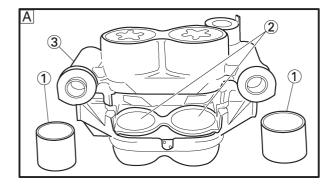


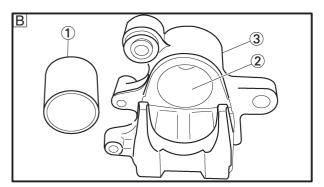


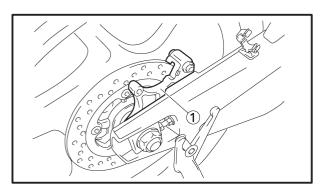
EAS00633

## CHECKING THE FRONT AND REAR BRAKE CALIPERS

| Recommended brake component replacement schedule |                                                        |  |
|--------------------------------------------------|--------------------------------------------------------|--|
| Brake pads                                       | If necessary                                           |  |
| Piston seals                                     | Every two years                                        |  |
| Brake hoses                                      | Every four 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 pistons.
  - brake caliper cylinders ②
     Scratches/wear → Replace the brake caliper assembly.
  - brake caliper body ③
     Cracks/damage → Replace the brake caliper assembly.
  - brake fluid delivery passages (brake caliper body)
     Obstruction → Blow out with compressed air.

### **A** WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

- A Front
- B Rear
- 2. Check:
- brake caliper bracket ①
   Cracks/damage → Replace.

CHAS 656

EAS00640

## ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

### **A** 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 pads
  - brake pad spring
  - brake pad pin
- 2. Install:
  - brake caliper (1)

35 Nm (3.5 m•kg, 25 ft•lb)

- copper washers New
- brake hose (2)
- union bolt ③

30 Nm (3.0 m•kg, 22 ft•lb)

brake hose holder

8 6 Nm (0.6 m•kg, 4.3 ft•lb)



**2**)

3



### **A** 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 the brake pipe ② touches the projection ⑤ on the brake caliper.



- 3. Fill:
- brake fluid reservoir (with the specified amount of the recommended brake fluid)



Recommended brake fluid DOT 4

### **A** WARNING

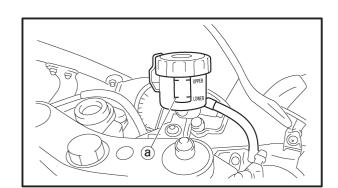
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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



CHAS 656

EAS00642

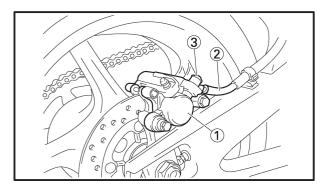
ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

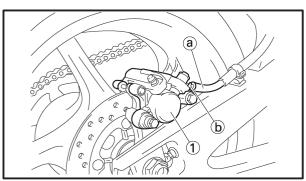
### **A** WARNING

- 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)

(front)

| 27 Nm (2.7 m•kg, 20 ft•lb) |
| (rear)
| 22 Nm (2.2 m•kg, 16 ft•lb) |

- brake pad pin
- screw plug
- copper washers New
- brake hose (2)
- union bolt ③

30 Nm (3.0 m•kg, 22 ft•lb)

### **A** 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 the brake pipe ② touches the projection ⑤ on the brake caliper.



- 2. Fill:
- brake fluid reservoir (with the specified amount of the recommended brake fluid)



Recommended brake fluid DOT 4

### **A** 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 brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

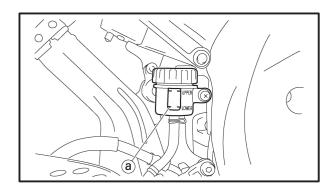
### **CAUTION:**

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. Check:
  - brake pedal operation
     Soft or spongy feeling → Bleed the brake system.

     Refer to "BLEEDING THE HYDRAULIC"

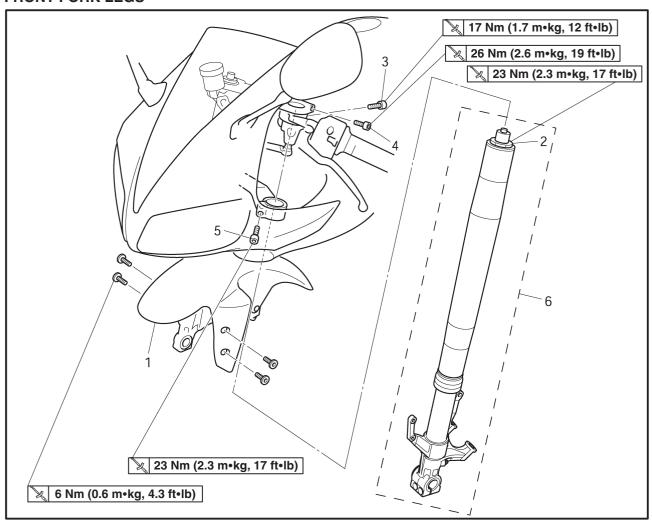
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



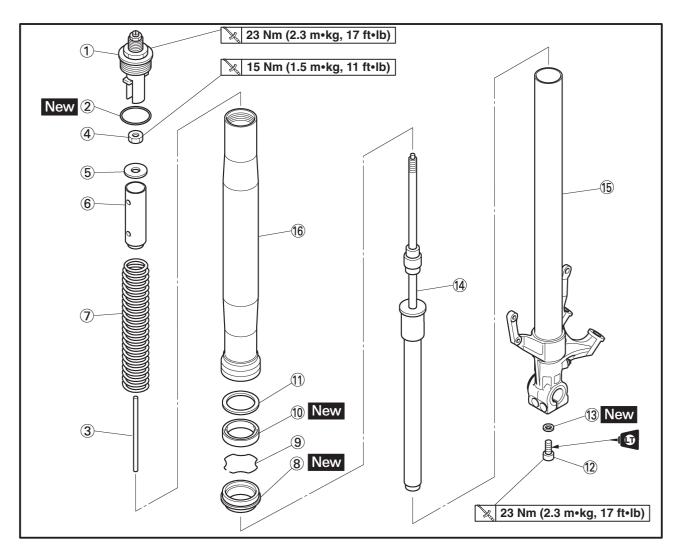


FAS0064

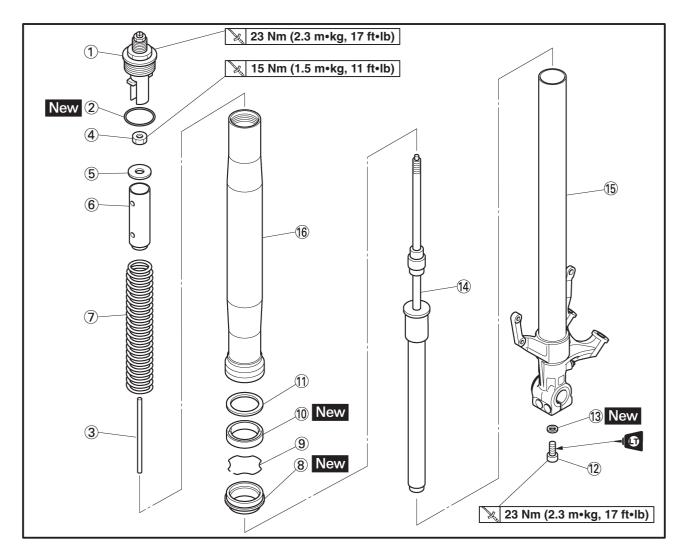
# FRONT FORK LEGS



| Order                      | Job/Part                                                                                                                                                                                 | Q'ty                  | Remarks                                                                                                                                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6 | Removing the front fork legs Front wheel  Front brake calipers Side cowlings Front fender Cap bolt Handlebar pinch bolt Upper bracket pinch bolt Under bracket pinch bolt Front fork leg | 1<br>1<br>1<br>2<br>1 | Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS". Refer to "FRONT AND REAR BRAKES". Refer to "COWLINGS" in chapter3.  Loosen. Loosen. Loosen. Loosen. For installation, reverse the removal procedure. |



| Order                    | Job/Part                          | Q'ty | Remarks                                                             |
|--------------------------|-----------------------------------|------|---------------------------------------------------------------------|
|                          | Disassembling the front fork legs |      | Disassemble the parts in the order listed. <b>NOTE:</b>             |
|                          |                                   |      | The following the procedure applies to both of the front fork legs. |
| 1                        | Cap bolt                          | 1    |                                                                     |
| (2)<br>(3)               | O-ring                            | 1    |                                                                     |
| 3                        | Damper adjusting rod              | 1    |                                                                     |
| (4)<br>(5)<br>(6)<br>(7) | Nut                               | 1    |                                                                     |
| 5                        | Washer                            | 1    |                                                                     |
| 6                        | Spacer                            | 1    |                                                                     |
| 7                        | Fork spring                       | 1    |                                                                     |
| 8                        | Dust seal                         | 1    |                                                                     |
| 9                        | Oil seal clip                     | 1    |                                                                     |
| 10                       | Oil seal                          | 1    |                                                                     |



| Order                   | Job/Part                                                                                | Q'ty                  | Remarks                                          |
|-------------------------|-----------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------|
| 11 12 (3) (14) (5) (16) | Washer Damper rod assembly bolt Copper washer Damper rod assembly Inner tube Outer tube | 1<br>1<br>1<br>1<br>1 | For assembly, reverse the disassembly procedure. |

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.

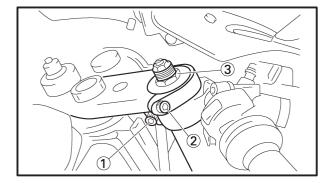
### **WARNING**

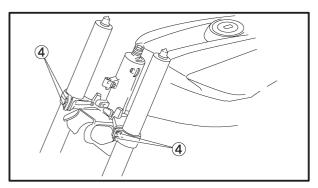
Securely support the motorcycle so that there is no danger of it falling over.

#### NOTE: ——

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

- 2. Remove
  - front wheel
  - front brake caliper
    Refer to "FRONT WHEEL AND BRAKE DISCS".
- 3. Remove:
  - Side Cowlings Refer to "COWLINGS" in chapter 3.
  - handlebar



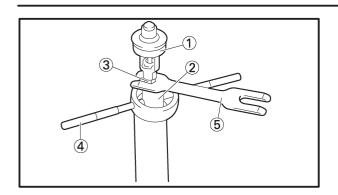


- 4. Loosen:
  - handlebar pinch bolt (1)
  - upper bracket pinch bolt 2
  - cap bolt ③
  - under bracket pinch bolt 4

## **A** WARNING

Before loosening the upper and under bracket pinch bolts, support the front fork leg.

- 5. Remove:
  - front fork leg



AS00652

### DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

- 1. Remove:
  - cap bolt ①
    (from the damper adjusting rod)
  - •spacer 2
  - nut (3)

a. Press down on the spacer with the fork spring compressor 4.

b. Install the rod holder (5) between the nut (3) and the spacer (2).



Fork spring compressor 90890-01441, YM-01441 Rod holder 90890-01434, YM-01434

NOTE: —

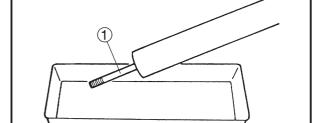
Use the side of the rod holder that is marked "B".

- c. Loosen the nut.
- d. Remove the cap bolt.
- e. Remove the rod holder and fork spring compressor.



The fork spring is compressed.

f. Remove the spacer and nut.

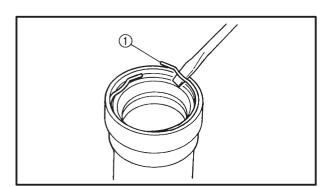


2. Drain:

fork oil

NOTE: -

Stroke the damper rod ① several times while draining the fork oil.



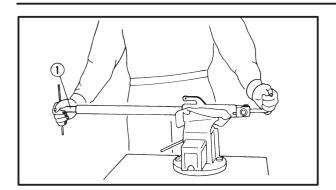
- 3. Remove:
  - dust seal
  - oil seal clip (1)
  - oil seal
  - washer

(with a flat-head screwdriver)

### **CAUTION:**

Do not scratch the inner tube.





4. Remove:

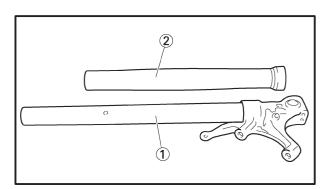
- damper rod assembly bolt
- damper rod assembly

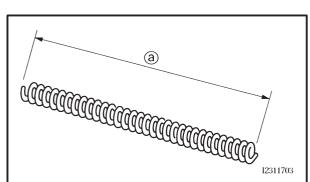
NOTE: -

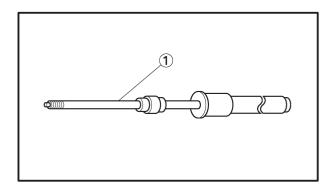
While holding the damper rod assembly with the damper rod holder ①, loosen the damper rod assembly bolt.



Damper rod holder 90890-01423, YM-01423







FAS0065

### **CHECKING THE FRONT FORK LEGS**

The following procedure applies to both of the front fork legs.

- 1. Check:
  - inner tube (1)
  - outer tube ②
    Bends/damage/scratches → Replace.

### **WARNING**

Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

- 2. Measure:
  - spring free length ⓐ
    Out of specification → Replace.



Spring free length 236.5 mm (9.31 in)

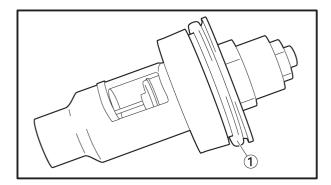
<Limit> : 231.8 mm (9.13 in)

- 3. Check:
  - damper rod ①
     Damage/wear → Replace.
     Obstruction → Blow out all of the oil passages with compressed air.
  - damper rod adjusting rod Bends/damage → Replace.

| 90 |
|----|
|    |

### **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 (1) Damage/wear → Replace.

EAS00659

#### ASSEMBLING THE FRONT FORK LEGS

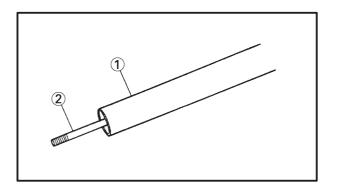
The following procedure applies to both of the front fork legs.

### A WARNING

- Make sure the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

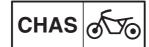
#### NOTE: ---

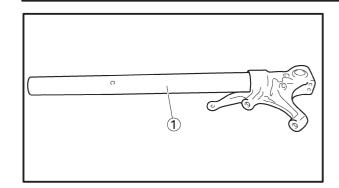
- When assembling the front fork leg, be sure to replace the following parts:
- outer tube bushing
- oil seal
- dust seal
- Before assembling the front fork leg, make sure all of the components are clean.

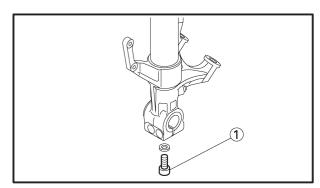


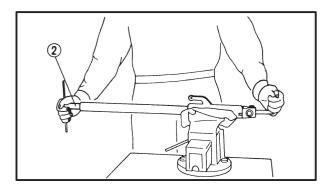
### 1. Install:

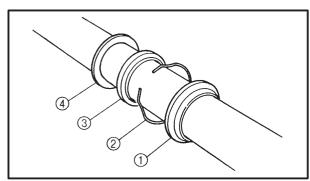
- inner tube (1)
- damper rod assembly ②
- damper rod assembly bolt
- copper washer New











### **A** WARNING

Always use new copper washer.

### **CAUTION:**

Allow the damper rod assembly to slide slowly down the inner tube ① 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 Suspension oil "01" or equivalent

- 3. Tighten:
  - damper rod assembly bolt ①

23 Nm (2.3 m•kg, 17 ft•lb)

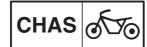
### NOTE: -

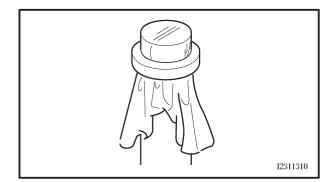
While holding the damper rod assembly with the damper rod holder ②, tighten the damper rod assembly bolt.



Damper rod holder 90890-01423, YM-01423

- 4. Install:
  - dust seal (1)
  - oil seal clip 2
  - oil seal ③
  - washer 4



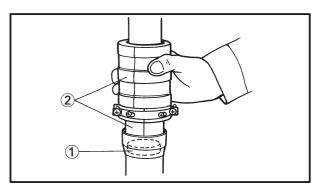


### **CAUTION:**

Make sure the numbered side of the oil seal faces up.

### NOTE: ——

- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.

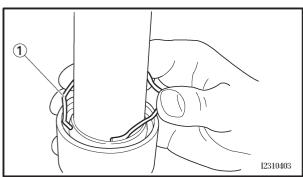


### 5. Install:

• Oil seal ①
(with the fork seal driver ②)



Fork seal driver 90890-01442, YM-01442

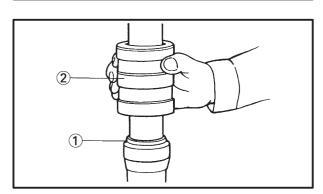


### 6. Install:

• oil seal clip (1)

#### NOTE:

Adjust the oil seal clip so that it fits into the outer tube's groove.



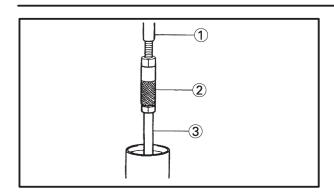
### 7. Install:

dust seal ①(with the fork seal driver weight ②)



Fork seal driver 90890-01442m YM-01442





- 8. Install:
  - rod puller (1)
  - rod puller attachment ② (onto the damper rod ③)



Rod puller 90890-01437, YM-01437 Rod puller attachment 90890-01436, YM-01436

#### 9. Fill:

 front fork leg (with the specified amount of the recommended fork oil)



Quantity (each front fork leg) 0.53 L (0.47 lmp qt, 0.56 US qt) Recommended oil Suspension oil "01" or equivalent



Front fork leg oil level (from the top of the outer tube, with the outer tube fully compressed and without the fork spring)
76 mm (2.99 in)

#### 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.

### 10. Install:

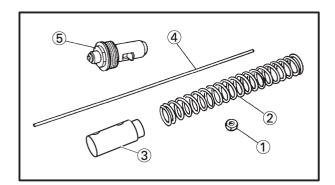
- nut (1)
- fork spring 2
- spacer (3)
- damper adjusting rod 4
- cap bolt (5)

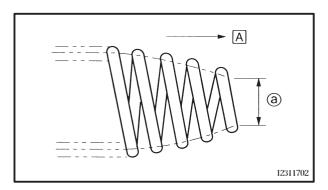
### a. Remove the rod puller and adapter.

- b. Install the nut.
- c. Install the fork spring, and spacer.

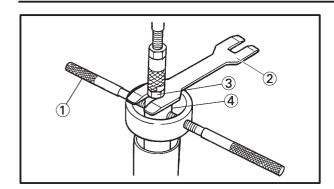
#### NOTE:

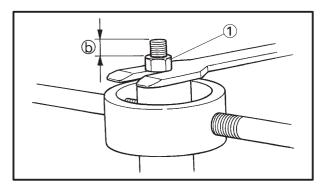
Install the spring with the smaller pitch a facing up  $\overleftarrow{A}$ .

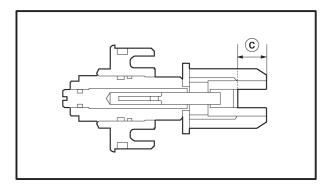












- d. Press down on the spacer with the fork spring compressor (1).
- e. Pull up the rod puller and install the rod holder ② between the nut ③ and the spacer ④.

#### NOTE:

Use the side of the rod holder that is marked "B".



Fork spring compressor 90890-01441, YM-01441 Rod holder 90890-01434, YM-01434

- f. Remove the rod puller and adapter.
- g. Install the nut ① and position it as specified (b).



Distance (b)
11 mm (0.43 in)

h. Set the cap bolt distance © to specification.



Distance © 13 mm (0.51 in)

- i. Install the damper adjusting rod and cap bolt, and then finger tighten the cap bolt.
- j. Hold the cap bolt and tighten the nut to specification.



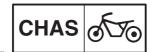
### Nut

15 Nm (1.5 m•kg, 11 ft•lb)

k. Remove the rod holder and fork spring compressor.

### **A** WARNING

- The fork spring is compressed.
- Always use a new cap bolt O-ring.



AS00662

### **INSTALLING THE FRONT FORK LEGS**

The following procedure applies to both of the front fork legs.

- 1. Install:
  - front fork leg
     Temporarily tighten the upper and lower bracket pinch bolts.



Make sure the inner fork tube is flush with the top of the handlebar holder.



• under bracket pinch bolt 1

23 Nm (2.3 m•kg, 17 ft•lb)

• cap bolt (2)

23 Nm (2.3 m•kg, 17 ft•lb)

• handlebar pinch bolt ③

17 Nm (1.7 m•kg, 12 ft•lb)

• upper bracket pinch bolt (4)

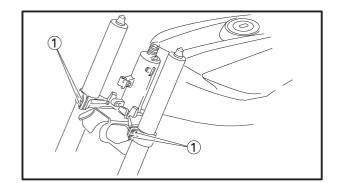
26 Nm (2.6 m•kg, 19 ft•lb)

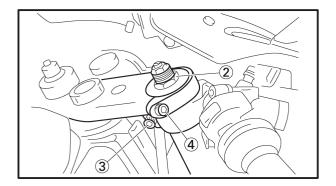


Make sure the brake hoses are routed properly.



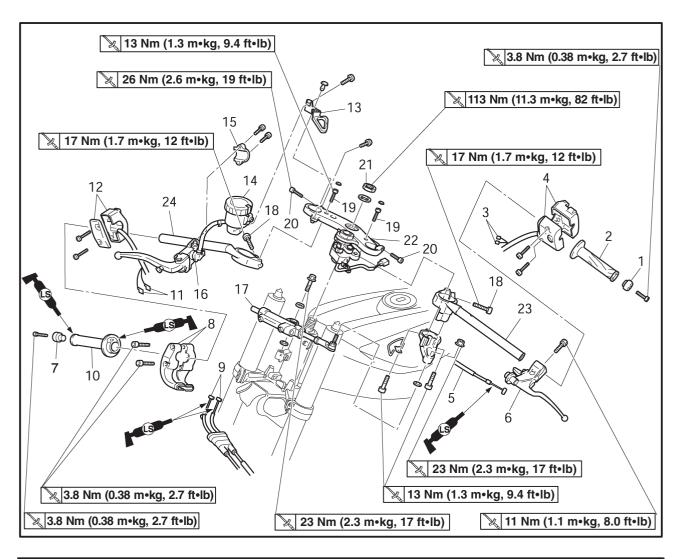
- spring preload
- rebound damping
- compression damping Refer to "ADJUSTING THE FRONT FORK LEGS" in chapter 3.



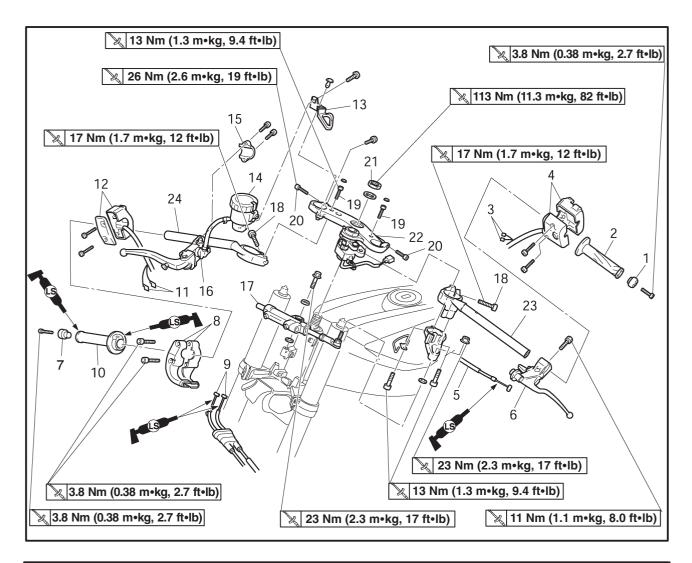




### **HANDLEBARS**



| Order | Job/Part                           | Q'ty | Remarks                               |
|-------|------------------------------------|------|---------------------------------------|
|       | Removing the handlebars            |      | Remove the parts in the order listed. |
|       | Front cowling and side cowling     |      | Refer to "COWLINGS" in chapter 3.     |
| 1     | Left grip end                      | 1    |                                       |
| 2     | Handlebar grip                     | 1    |                                       |
| 3     | Clutch switch connector            | 2    | Disconnect.                           |
| 4     | Left handlebar switch              | 1    |                                       |
| 5     | Clutch cable                       | 1    |                                       |
| 6     | Clutch lever                       | 1    |                                       |
| 7     | Right grip end                     | 1    |                                       |
| 8     | Throttle cable housing             | 1    |                                       |
| 9     | Throttle cable                     | 2    |                                       |
| 10    | Throttle grip                      | 1    |                                       |
| 11    | Front brake light switch connector | 2    | Disconnect.                           |
| 12    | Right handlebar switch             | 1    |                                       |
| 13    | Clutch cable holder                | 1    |                                       |
| 14    | Brake fluid reservoir tank         | 1    |                                       |
| 15    | Brake master cylinder bracket      | 1    |                                       |



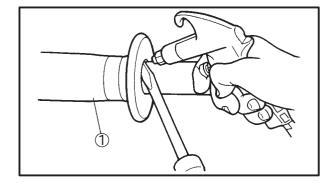
| Order | Job/Part                 | Q'ty | Remarks                                          |
|-------|--------------------------|------|--------------------------------------------------|
| 16    | Brake master cylinder    | 1    |                                                  |
| 17    | Steering damper          | 1    |                                                  |
| 18    | Handlebar pinch bolt     | 2    |                                                  |
| 19    | Upper bracket bolt       | 2    |                                                  |
| 20    | Upper bracket pinch bolt | 2    |                                                  |
| 21    | Steering stem nut        | 1    |                                                  |
| 22    | Upper bracket            | 1    |                                                  |
| 23    | Left handlebar           | 1    |                                                  |
| 24    | Right handlebar          | 1    |                                                  |
|       |                          |      | For assembly, reverse the disassembly procedure. |

### **REMOVING THE HANDLEBARS**

1. Stand the motorcycle on a level surface.

### **A** WARNING

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

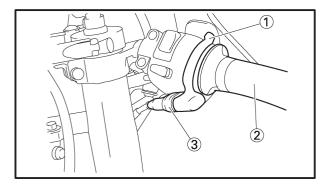


2. Remove:

• handlebar grip ①

NOTE: -

Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



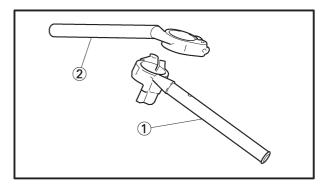
3. Remove:

• throttle cable housing 1

• throttle grip ②

NOTF:

While removing the throttle cable housing, pull back the rubber cover ③.



EAS00669

### **CHECKING THE HANDLEBARS**

1. Check:

• left handlebar (1)

right handlebar ②
 Bends/cracks/damage → Replace.

### **A** WARNING

Do not attempt to straighten bent handlebars as this may dangerously weaken them.

EAS00674

#### **INSTALLING THE HANDLEBARS**

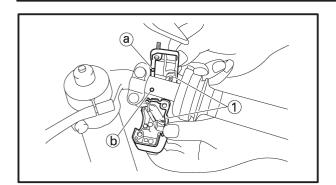
1. Stand the motorcycle on a level surface.

### **A** WARNING

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

### **HANDLEBARS**



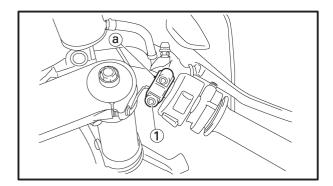


2. Install:

• right handlebar switch 1

NOTE:

Align the projection ⓐ on the right handlebar switch with the hole ⓑ in the right handlebar.



3. Install:

• brake master cylinder holder (1)

### **CAUTION:**

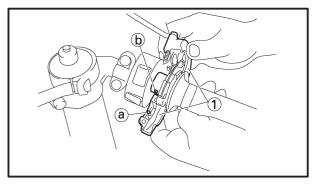
• Install the brake master cylinder holder with the "UP" mark facing up.

• First, tighten the upper bolt, then the lower bolt.

#### NOTE: -

• Align the mating surfaces of the brake master cylinder holder with the punch mark ⓐ in the right handlebar.

• There should be 2 mm (0.08 in) of clearance between the right handlebar switch and the brake master cylinder holder.

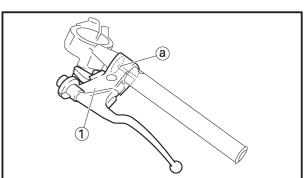


4. Install:

- throttle grip
- throttle cable housing ①
- throttle cables

### NOTE: -

Align the projection (a) on the throttle cable housing with the hole (b) in the right handlebar.



5. Install:

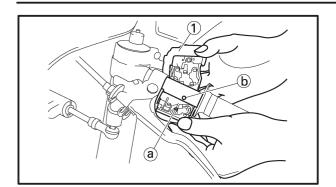
• clutch lever holder (1)

#### NOTE:

Align the slit in the clutch lever holder with the punch mark (a) in the left handlebar.

### **HANDLEBARS**





6. Install:

• left handlebar switch (1)

NOTE: -

Align the projection ⓐ on the left handlebar switch with the hole ⓑ in the left handlebar.

7. Install:

handlebar grip

a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.

- b. Slide the handlebar grip over the end of the left handlebar.
- c. Wipe off any excess rubber adhesive with a clean rag.



Do not touch the handlebar grip until the rubber adhesive has fully dried.

8. Adjust:

• clutch cable free play Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" in chapter 3.



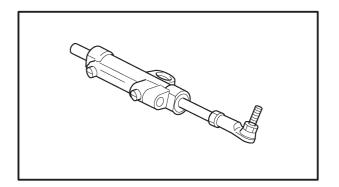
Clutch cable free play (at the end of the clutch lever)  $10 \sim 15$  mm (0.39  $\sim 0.59$  in)

9. Adjust:

• throttle cable free play
Refer to "ADJUSTING THE THROTTLE
CABLE FREE PLAY" in chapter 3.



Throttle cable free play (at the flange of the throttle grip)  $3 \sim 5 \text{ mm} (0.12 \sim 0.20 \text{ in})$ 



#### **CHECKING THE STEERING DAMPER**

1. Check:

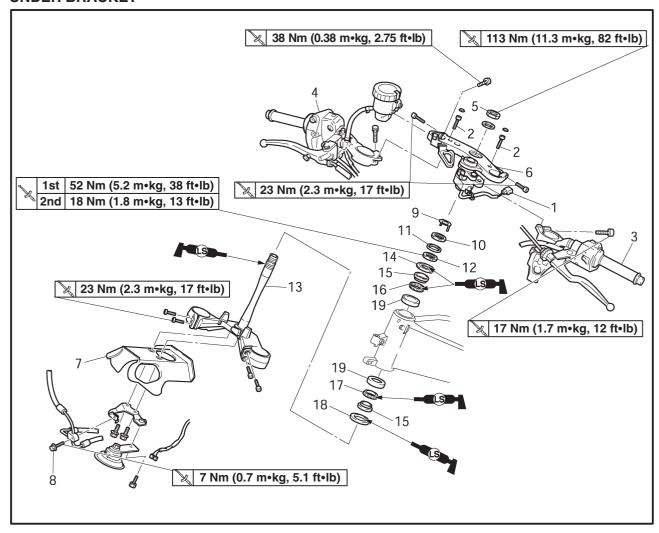
steering damper body
 Damage/oil leaks → Replace.
 (It replace with the assembly.)

 steering damper rod Bends/scratch → Replace.
 (It replace with the assembly.)

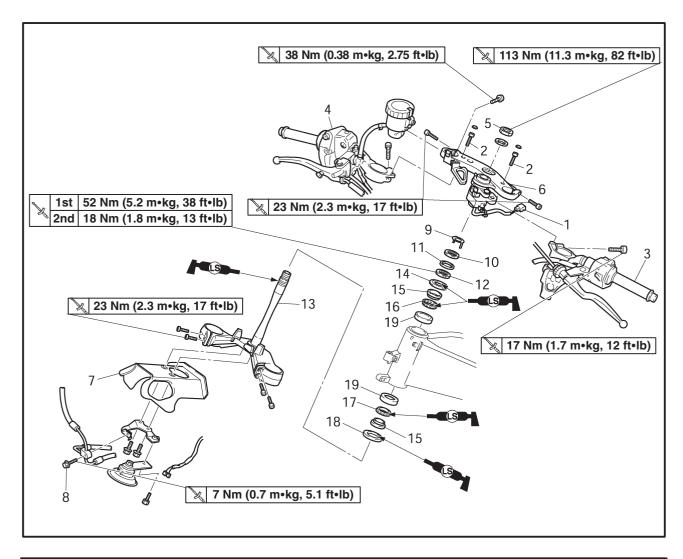
bearing
 Damage/pitting → Replace.
 (It replace with the assembly.)



### STEERING HEAD UNDER BRACKET

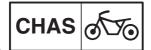


| Order                                     | Job/Part                                                                                                                                                                                                                                                                               | Q'ty                | Remarks                                                                                                                                            |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9 | Removing the under bracket Front wheel  Front cowling and side cowling Front fork legs Main switch connector Upper bracket bolt Left handlebar assembly Right handlebar assembly Steering stem nut Upper bracket Under bracket panel Brake hose holder bolt Lock washer Upper ring nut | 2 2 1 1 1 1 1 1 1 1 | Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS". Refer to "COWLINGS" in chapter 3. Refer to "FRONT FORK". Disconnect. |



| Order | Job/Part           | Q'ty | Remarks                                          |
|-------|--------------------|------|--------------------------------------------------|
| 11    | Rubber washer      | 1    |                                                  |
| 12    | Lower ring nut     | 1    |                                                  |
| 13    | Under bracket      | 1    |                                                  |
| 14    | Bearing cover      | 1    |                                                  |
| 15    | Bearing inner race | 2    |                                                  |
| 16    | Upper bearing      | 1    |                                                  |
| 17    | Lower bearing      | 1    |                                                  |
| 18    | Dust seal          | 1    |                                                  |
| 19    | Bearing outer race | 2    |                                                  |
|       | _                  |      | For assembly, reverse the disassembly procedure. |

### STEERING HEAD



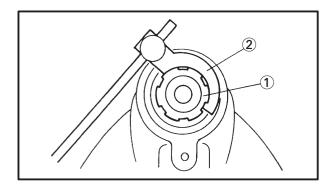
EAS00677

### REMOVING THE UNDER BRACKET

1. Stand the motorcycle on a level surface.

### **A** WARNING

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



#### 2. Remove:

• ring nut ①
(with the steering nut wrench ②)



Steering nut wrench 90890-01403, YU-33975

### **A** WARNING

Securely support the lower bracket so that there is no danger of it falling.

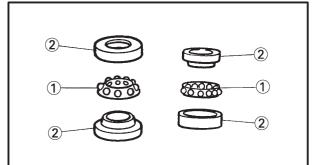
EAS00681

### **CHECKING THE STEERING HEAD**

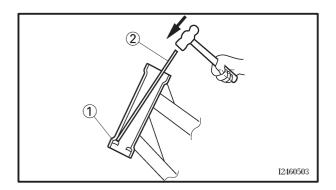
- 1. Wash:
  - bearings
  - bearing races



Recommended cleaning solvent Kerosene



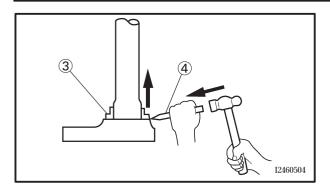
- 2. Check:
  - bearings (1)
  - bearing races ②
     Damage/pitting → Replace.



- 3. Replace:
  - bearings
  - bearing races
- a. Remove the bearing races ① from the steering head pipe with a long rod ② and hammer.

### STEERING HEAD





- b. Remove the bearing race ③ from the lower bracket with a floor chisel ④ and hammer.
- c. Install a new rubber seal and new bearing races.

### **CAUTION:**

If the bearing race is not installed properly, the steering head pipe could be damaged.

#### NOTE: \_

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the rubber 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-based grease

#### 2. Install:

- lower ring nut (1)
- rubber washer (2)
- upper ring nut ③
- lock washer 4

  Refer to "CHECKING THE STEERING HEAD" in chapter 3.

#### 3. Install:

- upper bracket
- steering stem nut

#### NOTE: -

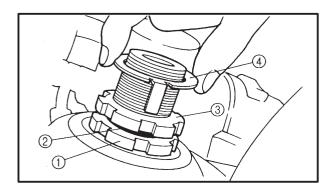
Temporarily tighten the steering stem nut.

### 4. Install:

 front fork legs
 Refer to "INSTALLING THE FRONT FORK LEGS".

#### NOTE:

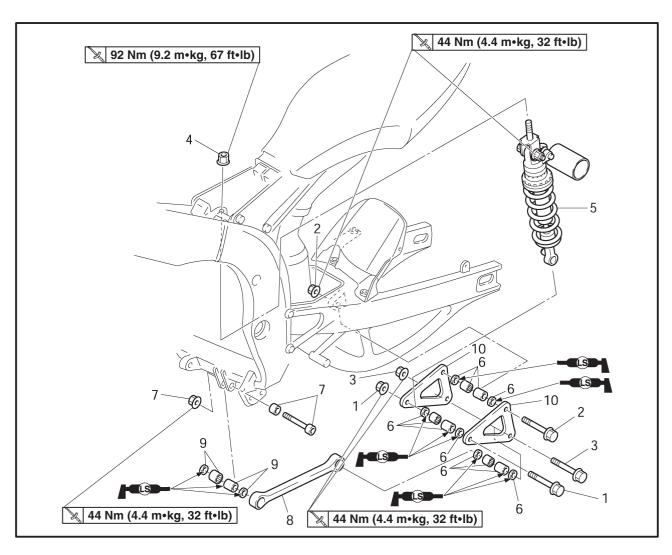
Temporarily tighten the upper and lower bracket pinch bolts.





FAS0068

### **REAR SHOCK ABSORBER ASSEMBLY**



| Order | Job/Part                                  | Q'ty  | Remarks                                          |
|-------|-------------------------------------------|-------|--------------------------------------------------|
|       | Removing the rear shock absorber assembly |       | Remove the parts in the order listed.            |
|       | EXUP servo motor                          |       | Refer to "EXHAUST PIPE" in chapter 5.            |
| 1     | Self-locking nut/bolt                     | 1/1   |                                                  |
| 2     | Self-locking nut/bolt                     | 1/1   |                                                  |
| 3     | Self-locking nut/bolt                     | 1/1   |                                                  |
| 4     | Self-locking nut                          | 1     |                                                  |
| 5     | Rear shock absorber assembly              | 1     |                                                  |
| 6     | Oil seal/bearing/collar                   | 6/3/3 |                                                  |
| 7     | Collar/self-locking nut/bolt              | 1/1/1 |                                                  |
| 8     | Connecting arm                            | 2     |                                                  |
| 9     | Oil seal/bearing/collar                   | 2/1/1 |                                                  |
| 10    | Relay arm                                 | 1     |                                                  |
|       |                                           |       | For installation, reverse the removal procedure. |

### REAR SHOCK ABSORBER ASSEMBLY



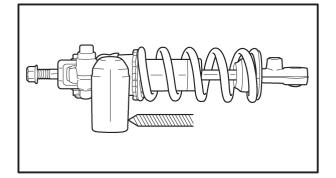
EAS00687

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

### **A** WARNING

This rear shock absorber and gas cylinder contain highly compressed nitrogen gas. Before handling the rear shock absorber or gas cylinder, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber and gas cylinder.

- Do not tamper or attempt to open the rear shock absorber or gas cylinder.
- Do not subject the rear shock absorber or gas cylinder to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber or gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, damping performance will suffer.



EAS00689

## DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, drill a 2  $\sim$  3 mm (0.08  $\sim$  0.12 in) hole through the gas cylinder at a point 15  $\sim$  20 mm (0.59  $\sim$  0.79 in) from its end as shown.

### **A** WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.

### REAR SHOCK ABSORBER ASSEMBLY



FAS00690

## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the motorcycle on a level surface.

### **A** WARNING

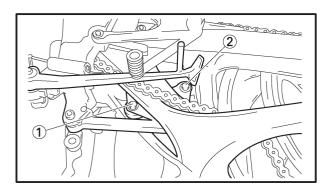
Becurely support the motorcycle so that there is no danger of it falling over.

NOTE: -

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

#### 2. Remove:

- bottom cowling Refer to "COWLINGS" in chapter 3.
- servo motor Refer to "EXHAUST PIPE" in chapter 5.



#### 3. Remove:

- rear shock absorber assembly lower bolt 1
- relay arm-to-swingarm bolt 2

#### NOTE:

While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.

### 4. Remove:

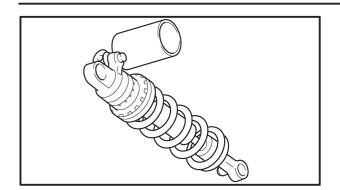
- rear shock absorber assembly upper bolt 1
- rear shock absorber assembly

#### NOTE: -

Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm.

### **REAR SHOCK ABSORBER ASSEMBLY**





EAS00695

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Check:
  - rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
  - rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
  - spring Damage/wear → Replace the rear shock absorber assembly.
  - bushings

Damage/wear → Replace.

- dust seals
   Damage/wear → Replace.
- bolts
   Bends/damage/wear → Replace.

EAS00698

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Lubricate:
  - spacers
  - bearings



Recommended lubricant
Lithium – soap-based grease

- 2. Install:
- rear shock absorber assembly

#### NOTE

- When installing the rear shock absorber assembly, lift up the swingarm.
- Install the connecting arm front bolt from the right.
- 3. Tighten:
  - rear shock absorber assembly upper nut

44 Nm (4.4 m•kg, 32 ft•lb)

rear shock absorber assembly lower nut

44 Nm (4.4 m•kg, 32 ft•lb)

relay arm-to swingarm nut

🐹 44 Nm (4.4 m•kg, 32 ft•lb)

- 4. Install:
  - EXUP servo motor

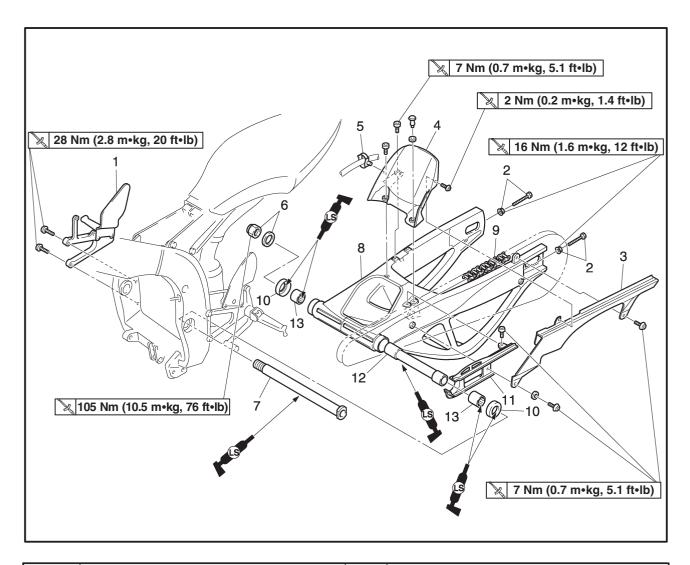
Refer to "EXHAUST PIPE" in chapter 5.

bottom cowling

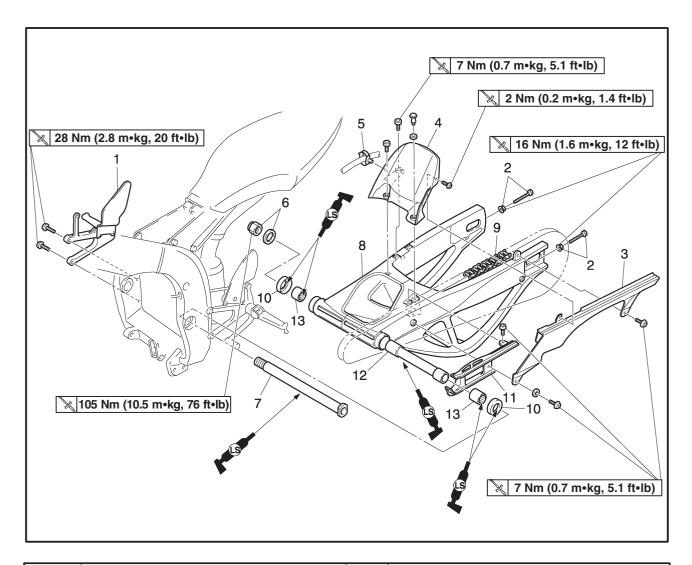
Refer to "COWLINGS" in chapter 3.



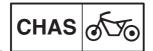
### **SWINGARM AND DRIVE CHAIN**



| Order | Job/Part                              | Q'ty | Remarks                                  |
|-------|---------------------------------------|------|------------------------------------------|
|       | Removing the swingarm and drive chain |      | Remove the parts in the order listed.    |
|       | Rear wheel                            |      | Refer to "REAR WHEEL AND BRAKE DISC".    |
|       | Rear shock absorber                   |      | Refer to "REAR SHOCK ABSORBER ASSEMBLY". |
|       | Drive sprocket                        |      | Refer to "ENGINE REMOVAL" in chapter 5.  |
|       | Muffler                               |      | Refer to "EXHAUST PIPE" in chapter 5.    |
|       | Catalyst pipe assembly                |      | Refer to "EXHAUST PIPE" in chapter 5.    |
| 1     | Right footrest bracket                | 1    |                                          |
| 2     | Adjusting bolt/locknut                | 2/2  |                                          |
| 3     | Drive chain guard                     | 1    |                                          |
| 4     | Rear fender                           | 1    |                                          |
| 5     | Brake hose holder                     | 1    |                                          |
| 6     | Pivot shaft nut/washer                | 1/1  |                                          |
| 7     | Pivot shaft                           | 1    |                                          |



| Order                          | Job/Part                                                         | Q'ty                       | Remarks                               |
|--------------------------------|------------------------------------------------------------------|----------------------------|---------------------------------------|
| 8<br>9<br>10<br>11<br>12<br>13 | Swingarm Drive chain Dust cover Drive chain guide Spacer Bearing | 1<br>1<br>2<br>1<br>1<br>2 | For installation, reverse the removal |
|                                |                                                                  |                            | procedure.                            |



EAS00703

#### REMOVING THE SWINGARM

1. Stand the motorcycle on a level surface.

# **A** 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.



- relay arm-to-swingarm bolt 1
- connecting arm bolt 2
- rear shock absorber assembly lower bolt ③



When removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.



- swingarm side play
- swingarm vertical movement

a. Measure the tightening torque of the pivot shaft nut.



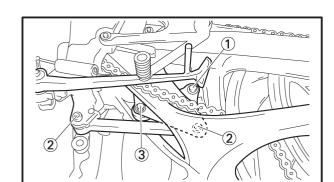
Pivot shaft nut 105 Nm (10.5 m•kg, 76 ft•lb)

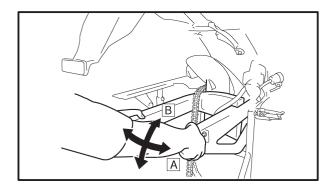
- b. Measure the swingarm side play A by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.



Swingarm side play (at the end of the swingarm) 1.0 mm (0.04 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, bearings, washers, and dust covers.





EAS00704

## **REMOVING THE DRIVE CHAIN**

1. Stand the motorcycle on a level surface.

| <b>A</b> WARNING |
|------------------|
|------------------|

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

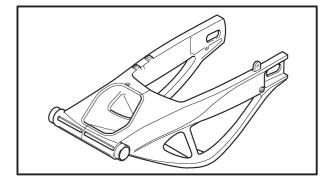
NOTE:

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

- 2. Remove:
  - drive chain (with the drive chain cutter)

NOTE:

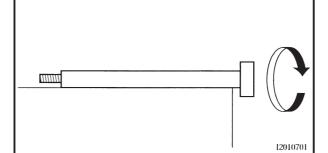
Only cut the drive chain if it or the swingarm is to be replaced.



EAS00707

## **CHECKING THE SWINGARM**

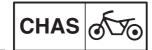
- 1. Check:
  - swingarm
    Bends/cracks/damage → Replace.



- 2. Check:
  - pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

# **A** WARNING

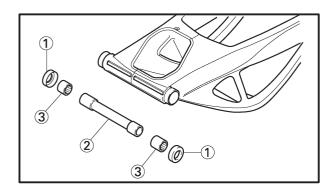
Do not attempt to straighten a bent pivot shaft.



- 3. Wash:
  - pivot shaft
  - dust covers
  - spacer
  - washers
  - bearings



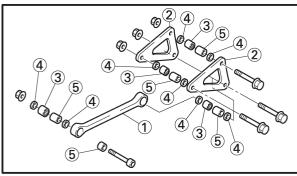
Recommended cleaning solvent Kerosene

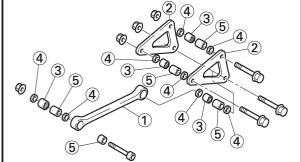


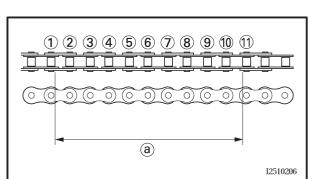
- 4. Check:
  - dust covers (1)
  - spacer 2

Damage/wear → Replace.

• bearings ③ Damage/pitting → Replace.







- 5. Check:
  - connecting arms (1)
  - relay arm (2) Damage/wear → Replace.
- 6. Check:
  - bearings ③
  - oil seals 4

Damage/pitting → Replace.

- 7. Check:
  - collars (5)

Damage/scratches → Replace.

## **CHECKING THE DRIVE CHAIN**

- 1. Measure:
  - ten-link section (a) of the drive chain Out of specification → Replace the drive chain.



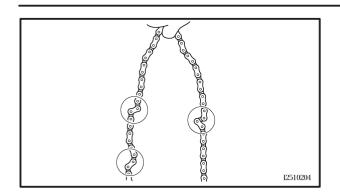
Ten-link drive chain section limit (maximum)

150.1 mm (5.91 in)

#### NOTE: -

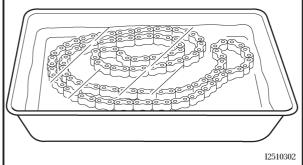
- While measuring the ten-link section, push down on the drive chain to increase its tension.
- Measure the length between drive chain roller (1) and (11) as shown.
- Perform this measurement at two or three different places.





#### 2. Check:

drive chain
 Stiffness → Clean and lubricate or replace.



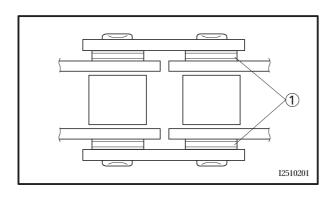
- 3. Clean:
  - drive chain

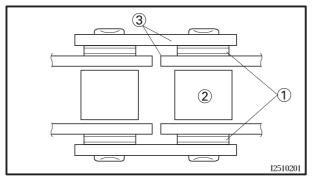


- ~~~~~~~~~
- a. Wipe the drive chain with a clean cloth.
- b. Put the drive chain in kerosene and remove any remaining dirt.
- c. Remove the drive chain from the kerosene and completely dry it.

## CAUTION:

This motorcycle has a drive chain with small rubber O-rings ① between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain. Don't soak drive chain in kerosine more them ten minutes. O-ring is damage by kerosine.





- 4. Check:
  - O-rings (1)

Damage → Replace the drive chain.

• drive chain rollers 2

Damage/wear → Replace the drive chain.

• drive chain side plates ③

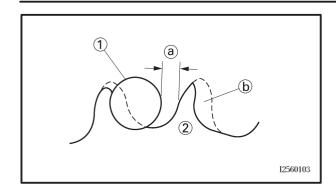
Damage/wear → Replace the drive chain. Cracks → Replace the drive chain and make sure the battery breather hose is properly routed away from the drive chain and below the swingarm.

- 5. Lubricate:
  - drive chain



Recommended lubricant
Engine oil or chain lubricant
suitable for O-ring chains





- 6. Check:
  - drive sprocket
  - rear wheel sprocket

More than 1/4 tooth ⓐ wear  $\rightarrow$  Replace the drive chain sprockets as a set.

Bent teeth  $\rightarrow$  Replace the drive chain sprockets as a set.

- (b) Correct
- 1 Drive chain roller
- 2 Drive chain sprocket

EAS00711

## **INSTALLING THE SWINGARM**

- 1. Lubricate:
  - bearings
  - spacers
  - dust covers
  - pivot shaft



## Recommended lubricant Lithium-soap-based grease



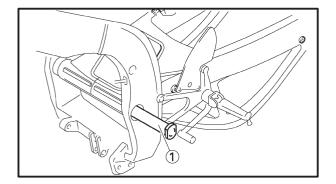
- swingarm
- pivot shaft 1
- pivot shaft nut 2
- 3. Install:
  - rear shock absorber assembly
  - rear wheel

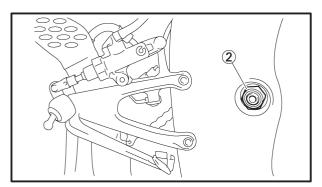
Refer to "INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY" and "INSTALLING THE REAR WHEEL".

- 4. Adjust:
  - drive chain slack
     Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.



Drive chain slack 20  $\sim$  25 mm (0.79  $\sim$  0.98 in)



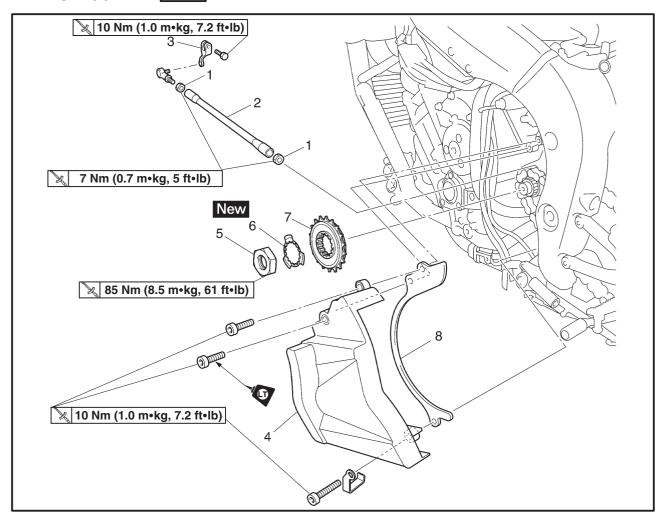




# ENGINE DRIVE SPROCKET



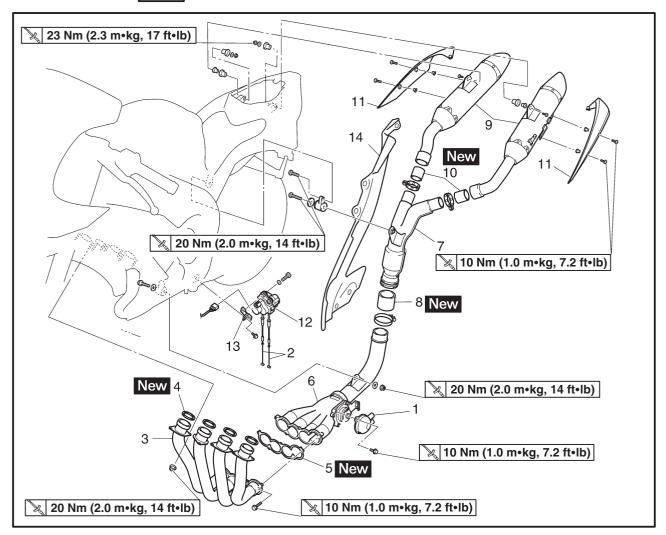
# **ENGINE**



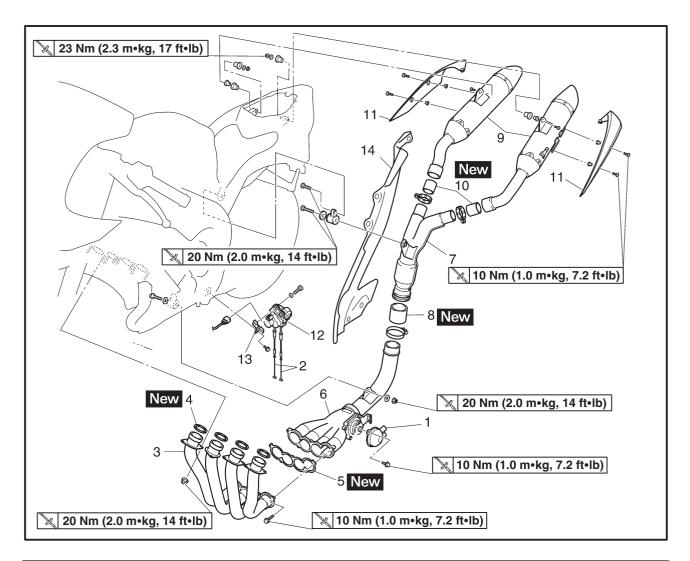
| Order                                | Job/Part                                                                                                                                         | Q'ty                            | Remarks                                                                                                                           |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | Removing the drive sprocket Bottom cowlings Lock nut Shift rod Sift arm Drive sprocket cover Drive sprocket nut Lock washer Drive sprocket Plate | 2<br>1<br>1<br>1<br>1<br>1<br>1 | Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3. Loosen.  For installation, reverse the removal procedure. |

## **EXHAUST PIPE**

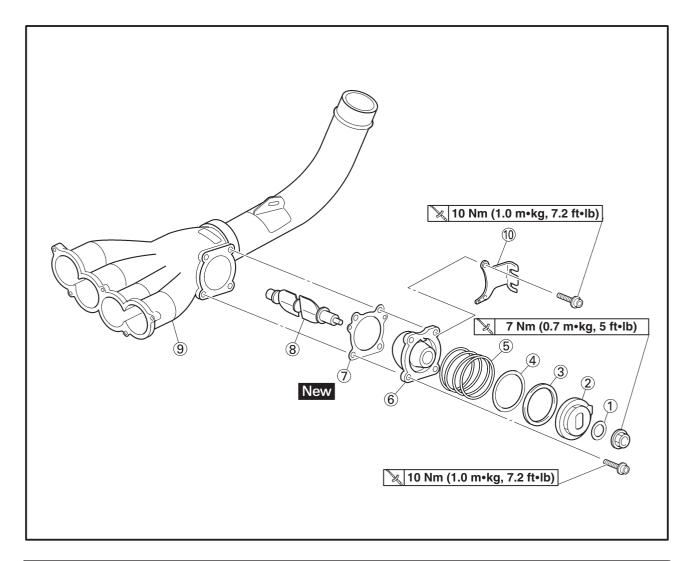




| Order                                     | Job/Part                                                                                                                                                                                                                                                                      | Q'ty                                           | Remarks                                                                                                                                   |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9 | Removing the exhaust pipe Rider seat and passenger seat Fuel tank Side cowlings and bottom cowlings EXUP pulley cover EXUP cable Exhaust pipe assembly Exhaust pipe gasket Exhaust valve pipe gasket Exhaust valve pipe assembly Catalyst pipe assembly Gasket Muffler Gasket | 1<br>2<br>1<br>4<br>1<br>1<br>1<br>1<br>2<br>2 | Remove the parts in the order listed. Refer to "SEATS" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "COWLINGS" in chapter 3. |



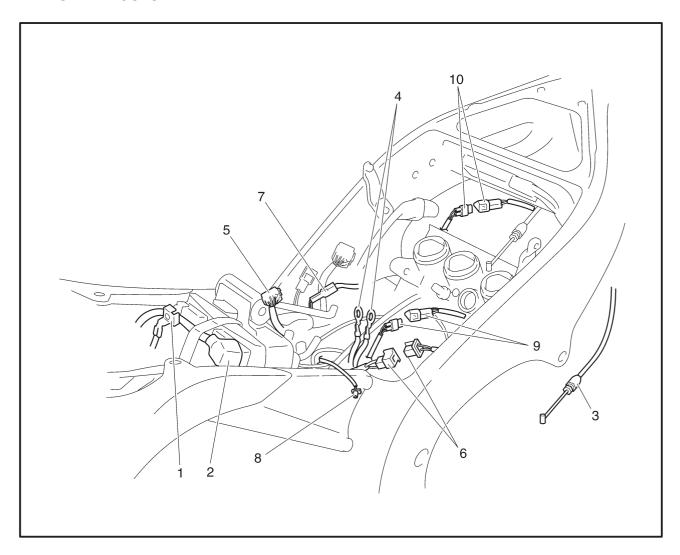
| Order          | Job/Part                                                | Q'ty        | Remarks                                          |
|----------------|---------------------------------------------------------|-------------|--------------------------------------------------|
| 11<br>12<br>13 | Muffler cover EXUP servo motor EXUP servo motor bracket | 2<br>1<br>1 |                                                  |
| 14             | Protector                                               | 1           | For installation, reverse the removal procedure. |



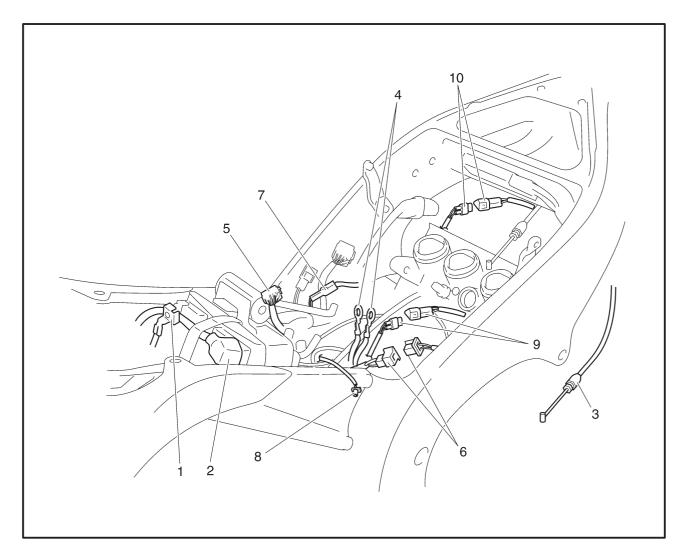
| Order      | Job/Part                                                                                                                               | Q'ty                                 | Remarks                                          |
|------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------|
| 1234567890 | Disassembling the exhaust valve pipe Washer Pulley Collar Plate Spring Housing Gasket Shaft arm Exhaust valve pipe EXUP pulley bracket | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | For assembly, reverse the disassembly procedure. |



## **LEADS AND HOSES**



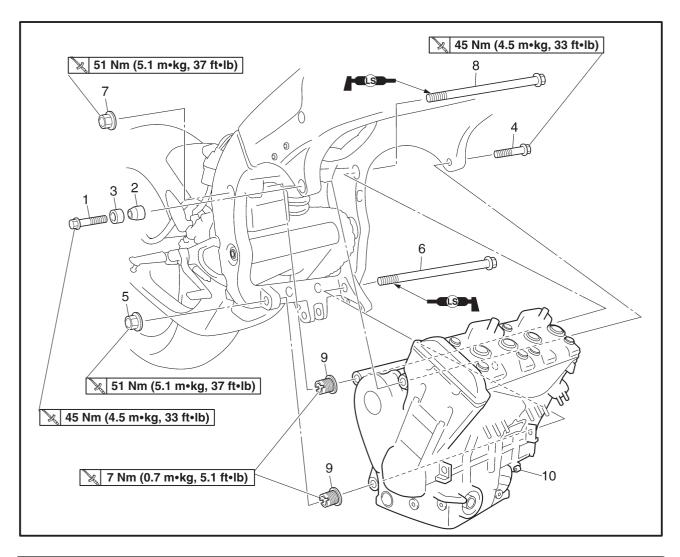
| Order | Job/Part                                                                           | Q'ty   | Remarks                                                                                                                                             |
|-------|------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|       | Disconnecting the leads and hoses Fuel tank Air filter case Throttle body assembly |        | Disconnect the parts in the order listed. Refer to "FUEL TANK" in chapter 3. Refer to "AIR FILTER CASE" in chapter 3. Refer to "THROTTLE BODIES" in |
|       | Engine oil                                                                         |        | chapter 7. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.                                                                                  |
|       | Oil cooler<br>Air cut-off valve                                                    |        | Refer to "OIL COOLER" in chapter 6. Refer to "AIR INDUCTION SYSTEM" in chapter 7.                                                                   |
|       | Starter motor                                                                      |        | Refer to "STARTING SYSTEM" in chapter 7.                                                                                                            |
| 1 2   | Battery negative lead Battery positive lead                                        | 1<br>1 | •                                                                                                                                                   |



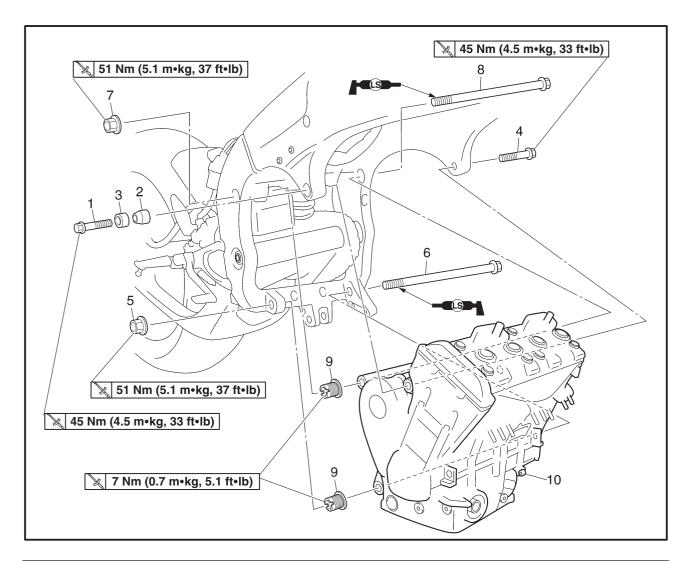
| Order                                 | Job/Part                                                                                                                                                                                                      | Q'ty                            | Remarks                                                                                                                                         |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|                                       |                                                                                                                                                                                                               |                                 | CAUTION:  First, disconnect the negative battery lead, and then the positive battery lead. For connecting, reverse the disconnection procedure. |
| 3<br>4<br>5<br>6<br>7<br>8<br>9<br>10 | Clutch cable Ground lead Stator coil assembly coupler Crankshaft position sensor lead coupler Oil level switch connector Neutral switch connector Speed sensor coupler Cylinder identification sensor coupler | 1<br>2<br>1<br>1<br>1<br>1<br>1 | Disconnect. Disconnect. Disconnect. Disconnect. Disconnect. Disconnect. Disconnect. For installation, reverse the removal procedure.            |



## **ENGINE**



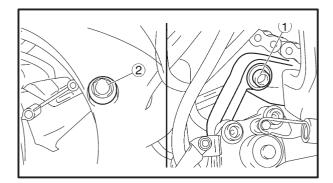
| Order                                | Job/Part                                                                                                                                                                                                                        | Q'ty                            | Remarks                                            |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------|
|                                      | Removing the engine                                                                                                                                                                                                             |                                 | Remove the parts in the order listed.              |
|                                      |                                                                                                                                                                                                                                 |                                 | Place a suitable stand under the frame and engine. |
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | Right front engine mounting bolt Engine mount collar (inside) Engine mount collar (outside) Left front engine mounting bolt Lower self locking nut Lower engine mounting bolt Upper self locking nut Upper engine mounting bolt | 1<br>1<br>1<br>1<br>1<br>1<br>1 |                                                    |



| Order | Job/Part                              | Q'ty | Remarks                                                                                   |
|-------|---------------------------------------|------|-------------------------------------------------------------------------------------------|
| 9     | Engine mounting adjust bolt<br>Engine | 2    | NOTE:  Use the pivot shaft wrench and adapter to loosen the engine mounting adjust bolts. |
|       |                                       |      | For installation, reverse the removal procedure.                                          |

## **INSTALLING THE ENGINE**

- 1. Install:
  - engine mounting adjust bolts (temporary tighten)
- 2. Install:
  - engine

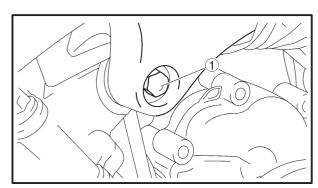


### 3. Install:

- lower engine mounting bolt 1
- upper engine mounting bolt 2
- self locking nuts

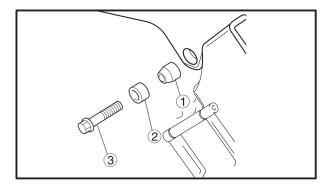
## NOTE: -

Lubricate the lower and upper engine mounting bolts threads with lithium-soap-based grease.



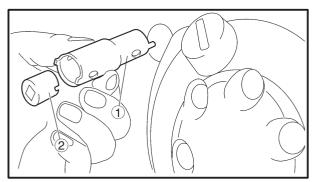
## 4. Install:

• left front engine mount bolt ① (temporary tighten)



## 5. Install:

- engine mount collar (inside) 1
- engine mount collar (outside) 2
- right front engine mount bolt (3) (temporary tighten)



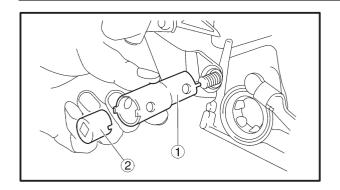
## 6. Tighten:

engine mounting adjust bolts

7 Nm (0.7 m•kg, 5.1 ft•lb)

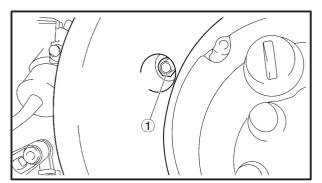
## NOTE: -

Use the pivot shaft wrench 1 and pivot shaft wrench adapter 2 to tighten the engine mounting adjust bolts.





Pivot shaft wrench 90890-01471, YM-01471 Pivot shaft wrench adapter 90890-01476



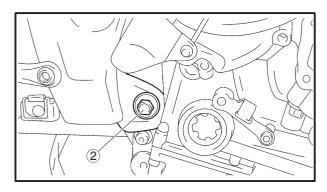


- upper self-locking nut 1
- lower self-locking nut 2

51 Nm (5.1 m•kg, 37 ft•lb)



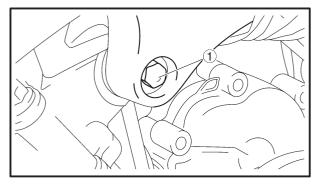
First tighten the lower self-locking nut, and then tighten the upper self-locking nut.





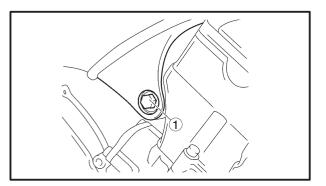
• left front engine mounting bolt ①

3 45 Nm (4.5 m•kg, 33 ft•lb)



- 9. Tighten:
  - right front engine mounting bolt ①

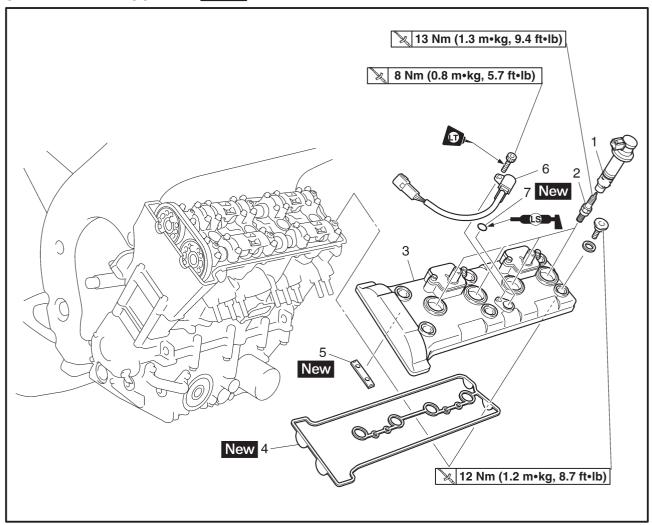
45 Nm (4.5 m•kg, 33 ft•lb)



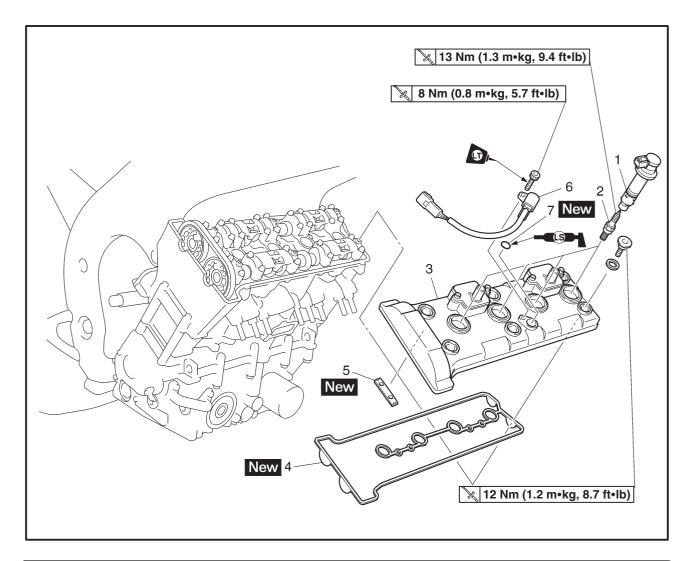


## CAMSHAFT CYLINDER HEAD COVER



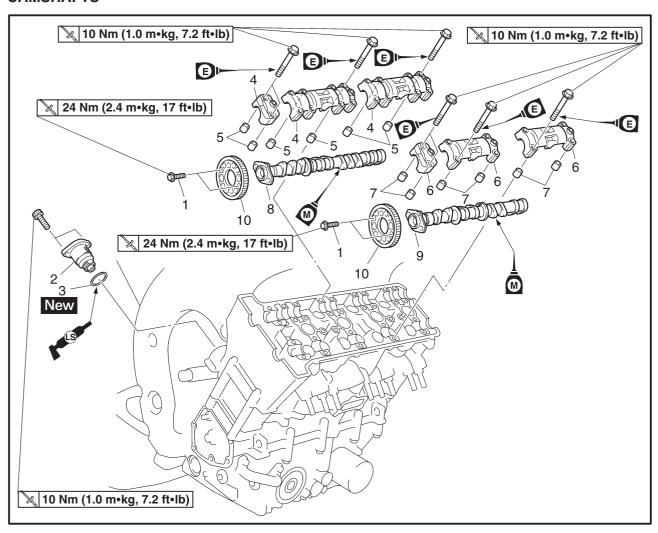


| Order            | Job/Part                                                                                                                       | Q'ty             | Remarks                                                                                                                                                                                                                             |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Removing the cylinder head cover Fuel tank Side and bottom cowlings Throttle body assembly Radiator assembly Air cut-off valve |                  | Remove the parts in the order listed. Refer to "FUEL TANK" in chapter 3. Refer to "COWLINGS" in chapter 3. Refer to "THROTTLE BODIES" in chapter 7. Refer to "RADIATOR" in chapter 3. Refer to "AIR INDUCTION SYSTEM" in chapter 7. |
| 1<br>2<br>3<br>4 | Ignition coil Spark plug Cylinder head cover Cylinder head cover gasket                                                        | 4<br>4<br>1<br>1 | onaptor 7.                                                                                                                                                                                                                          |

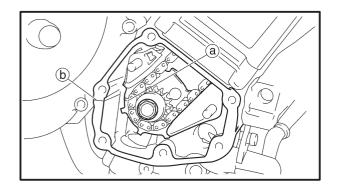


| Order       | Job/Part                                                            | Q'ty  | Remarks                                          |
|-------------|---------------------------------------------------------------------|-------|--------------------------------------------------|
| 5<br>6<br>7 | Timing chain guide (top side) Cylinder identification sensor O-ring | 1 1 1 | For installation, reverse the removal procedure. |

## **CAMSHAFTS**



| Order | Job/Part                                  | Q'ty | Remarks                                                                                       |
|-------|-------------------------------------------|------|-----------------------------------------------------------------------------------------------|
|       | Removing the camshafts Pickup rotor cover |      | Remove the parts in the order listed. Refer to "CRANKSHAFT POSITION SENSOR AND PICKUP ROTOR". |
| 1     | Camshaft sprocket bolt                    | 4    | Loosen.                                                                                       |
| 2     | Timing chain tensioner                    | 1    |                                                                                               |
| 3     | Timing chain tensioner O-ring             | 1    |                                                                                               |
| 4     | Intake camshaft cap                       | 3 -  | NOTE:                                                                                         |
| 5     | Dowel pin                                 | 6    | During removal, the dowel pins may still                                                      |
| 6     | Exhaust camshaft cap                      | 3    | be connected to the camshaft caps.                                                            |
| 7     | Dowel pin                                 | 6 -  |                                                                                               |
|       |                                           |      | Refer to "REMOVING THE CAMSHAFTS".                                                            |
| 8     | Intake camshaft                           | 1    |                                                                                               |
| 9     | Exhaust camshaft                          | 1    |                                                                                               |
| 10    | Camshaft sprocket                         | 2    |                                                                                               |
|       |                                           |      | For installation, reverse the removal procedure.                                              |



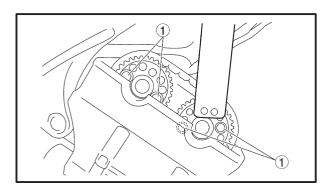
## **REMOVING THE CAMSHAFTS**

- 1. Remove:
- pickup rotor cover Refer to "CRANKSHAFT POSITION SEN-SOR AND PICKUP ROTOR".
- 2. Align:
- "T" mark (a) on the pickup rotor (with the crankcase mating surface (b))
- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the "T" mark (a) on the pick-up rotor with the crankcase mating surface (b).

NOTE: -

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

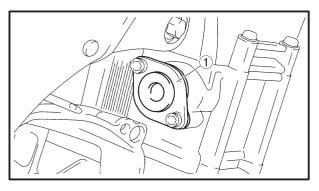
\*\*\*\*



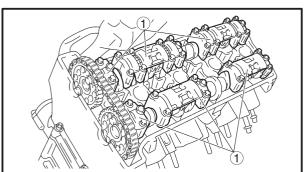
- 3. Loosen:
  - camshaft sprocket bolts (1)



Camshaft wrench 90890-04143



- 4. Remove:
  - timing chain tensioner ①
  - O-ring



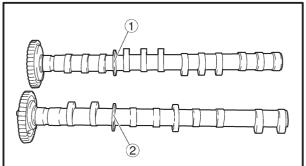
- 5. Remove:
  - camshaft caps (1)
  - dowel pins

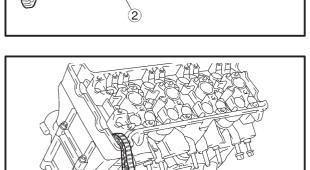
## **CAUTION:**

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









6. Remove:

- intake camshaft (1)
- exhaust camshaft (2)

NOTE: -

To prevent the timing chain from falling into the crankcase, fasten it with a wire ③.

7. Remove:

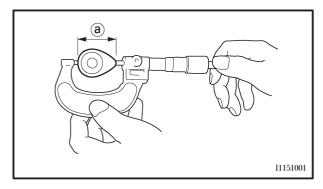
camshaft sprockets

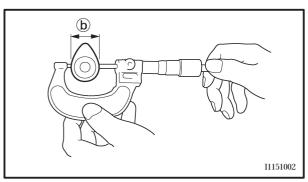
EAS00204

#### **CHECKING THE CAMSHAFTS**

- 1. Check:
  - camshaft lobes

Blue discoloration/pitting/scratches  $\rightarrow$  Replace the camshaft.





2. Measure:

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



# Camshaft lobe dimension limit Intake camshaft

(a) 32.85 ~ 32.95 mm

(1.293 ~ 1.297 in)

<Limit>: 32.75 mm (1.289 in)

(b) 25.14 ~ 25.24 mm

 $(0.990 \sim 0.994 in)$ 

<Limit>: 25.04 mm (0.986 in)

**Exhaust camshaft** 

(a) 30.75 ~ 30.85 mm

 $(1.211 \sim 1.215 in)$ 

<Limit>: 30.65 mm (1.207 in)

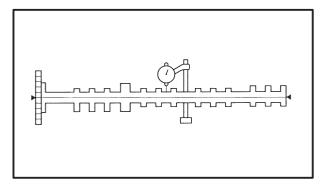
**b** 23.09 ~ 23.19 mm

 $(0.909 \sim 0.913 in)$ 

<Limit>: 22.99 mm (0.905 in)







#### 3. Measure:

camshaft runout
 Out of specification → Replace.



Camshaft runout limit 0.03 mm (0.0012 in)

#### 4. Measure:

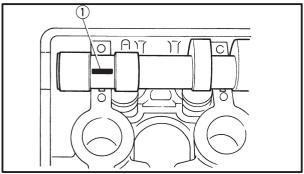
 camshaft-journal-to-camshaft-cap clearance

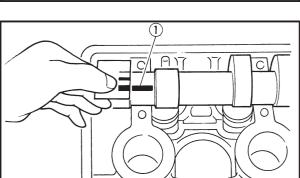
Out of specification  $\rightarrow$  Measure the camshaft journal diameter.

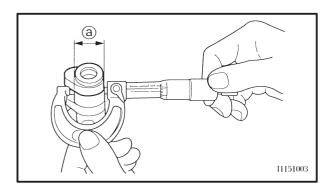


Camshaft-journal-to-camshaftcap clearance

 $0.028 \sim 0.062 \text{ mm}$  (0.0011  $\sim 0.0024 \text{ in}$ )







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



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:

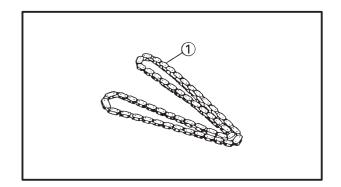
• camshaft journal diameter (a)

Out of specification  $\rightarrow$  Replace the camshaft.

Within specification  $\rightarrow$  Replace the cylinder head and the camshaft caps as a set.



Camshaft journal diameter 22.459  $\sim$  22.472 mm (0.8842  $\sim$  0.8847 in)

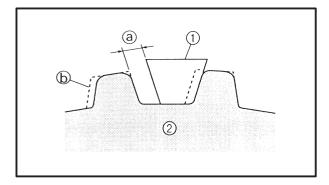


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# CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

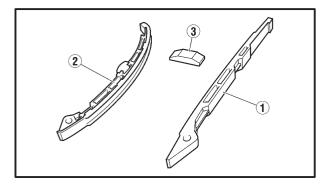
The following procedure applies to all of the camshaft sprockets and timing chain guides.

- 1. Check:
  - timing chain ①
     Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.



#### 2. Check:

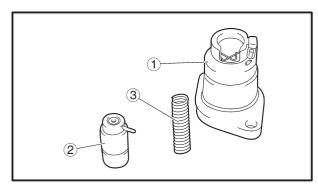
- camshaft sprocket
   More than 1/4 tooth wear ⓐ → Replace the
   camshaft sprockets and the timing chain as a
   set.
- (a) 1/4 tooth
- (b) Correct
- 1 Timing chain roller
- (2) Camshaft sprocket



#### 3. Check:

- timing chain guide (exhaust side) 1
- timing chain guide (intake side) 2
- •timing chain guide (top side) ③

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



## CHECKING THE TIMING CHAIN TENSIONER

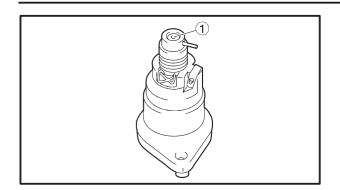
- 1. Remove:
- timing chain tensioner housing 1
- timing chain tensioner rod 2
- timing chain tensioner spring ③

#### NOTE:

Squeeze the timing chain tensioner clip, and then remove the timing chain tensioner spring and timing chain tensioner rod.

#### 2. Check:

- timing chain tensioner housing
- timing chain tensioner rod
- timing chain tensioner spring Damage/wear → Replace.

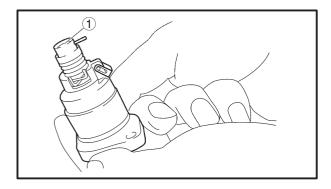


3. Install:

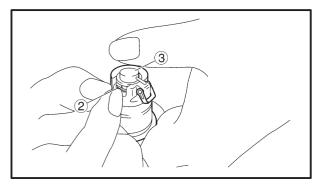
- timing chain tensioner spring
- timing chain tension rod ①

NOTE: -

Prior to installing the timing chain tensioner rod, drain the engine oil from the timing chain tensioner housing.



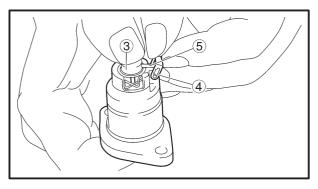
a. Install the timing chain tensioner spring and timing chain tensioner rod (1).



b. Squeeze the timing chain tensioner clip 2 and push the timing chain tensioner rod 3.

NOTE: -

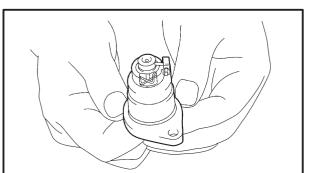
When the timing chain tensioner rod ③ is pushed while holding the grip of the timing chain tensioner clip ②, make sure not to release the timing chain tensioner rod ③ before releasing the timing chain tensioner clip ②. (Otherwise, the timing chain tensioner rod ③ may run off.)

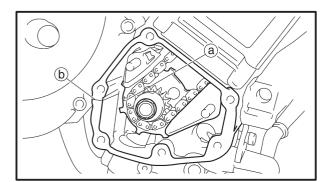


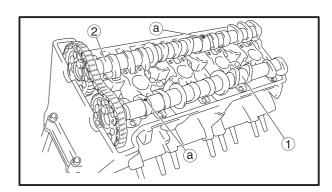
c. Hook the clip 4 to the timing chain tensioner rod 3.

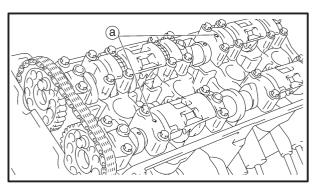
NOTE: -

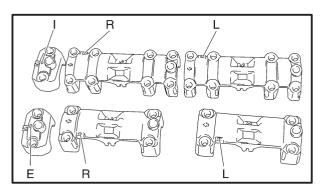
Hook the timing chain tensioner rod pin 5 to the center of the clip 4. After the installation, check that the clip 4 can come off by its own weight by pushing the timing chain tensioner rod 3 at the position of installation.











## **INSTALLING THE CAMSHAFTS**

- 1. Align:
  - "T" mark (a) on the pickup rotor (with the crankcase mating surface (b))

a. Turn the crankshaft clockwise.

- b. When piston #1 is at TDC, align the "T" mark (a) with the crankcase mating surface (b).

#### 2. Install:

- intake camshaft sprocket ①
- exhaust camshaft sprocket 2 (with the camshaft sprockets temporarily tightened)

NOTE: -

Install the camshaft sprockets as a illustration.

3. Install:

- exhaust camshaft (1)
- intake camshaft (2) (with the camshaft sprockets temporarily tightened)

NOTE: -

Make sure the punch mark (a) faces up.

4. Install:

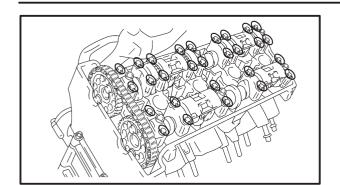
- dowel pins
- exhaust camshaft caps
- intake camshaft caps

- Make sure each camshaft cap is installed in its original place.
- Make sure the arrow mark (a) on each camshaft cap points towards the right side of the engine.

L: Left side camshaft cap mark

- R: Right side camshaft cap mark
- I: Intake side camshaft cap mark
- E: Exhaust side camshaft cap mark





5. Install:

camshaft cap bolts

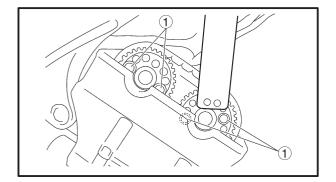
10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: -

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

## **CAUTION:**

- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.



6. Tighten:

• camshaft sprocket bolts 1

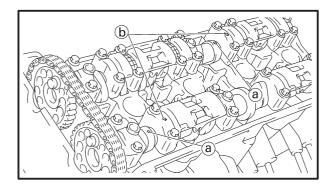
24 Nm (2.4 m•kg, 17 ft•lb)



Camshaft wrench 90890-04143

## **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.

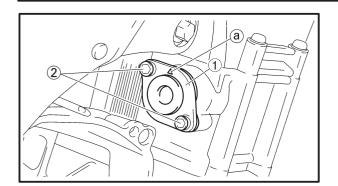


7. Align:

camshaft punch mark (a)
 Align the camshaft punch mark (b)
 and the camshaft cap arrow mark (b)



Camshaft wrench 90890-04143



- 8. Install:
  - O-ring New
  - timing chain tensioner 1
  - timing chain tensioner bolts 2

10 Nm (1.0 m•kg, 7.2 ft•lb)

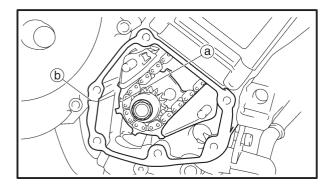
## **CAUTION:**

The "arrow" mark (a) on the timing chain tensioner should face up.

# **A** WARNING

Always use a new O-ring.

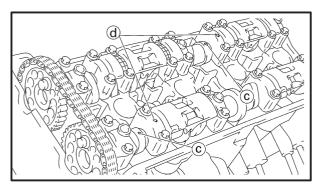
- 9. Turn:
  - crankshaft (several full turns clockwise)



## 10. Check:

• "T" mark (a)

Make sure the "T" mark on the pickup rotor is aligned with the crankcase mating sure face **(b)**.



• camshaft punch mark ©

Make sure the punch mark  $\odot$  on the camshaft is aligned with the camshaft cap arrow mark  $\odot$ .

Out of alignment → Adjust.

Refer to the installation steps above.

## 11. Measure:

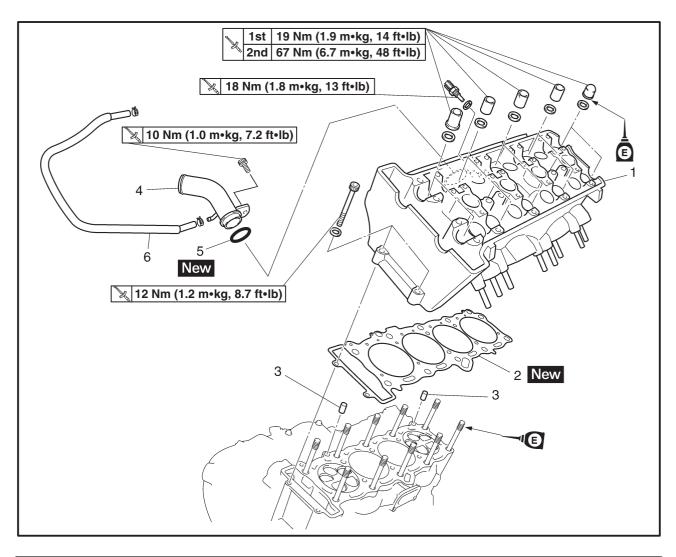
valve clearance

Out of specification  $\rightarrow$  Adjust. Refer to "ADJUSTING THE VALVE CLEAR-ANCE" in chapter 3.

12. Install:

pickup coil rotor cover
 Refer to "CRANKSHAFT POSITION SENSOR".

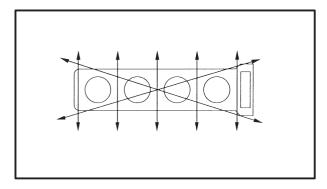
# **CYLINDER HEAD**

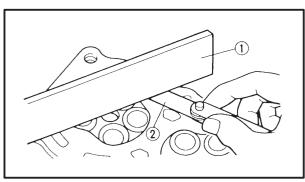


| Order                      | Job/Part                                                                                                                                                    | Q'ty                  | Remarks                                                                                                                          |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6 | Removing the cylinder head Engine Intake camshaft Exhaust camshaft Cylinder head Cylinder head gasket Dowel pin Coolant pipe O-ring Thermo wax out let hose | 1<br>1<br>2<br>1<br>1 | Remove the parts in the order listed. Refer to "ENGINE". Refer to "CAMSHAFTS".  For installation, reverse the removal procedure. |

## CYLINDER HEAD







## REMOVING THE CYLINDER HEAD

- 1. Remove:
  - intake camshaft
  - exhaust camshaft Refer to "REMOVING THE CAMSHAFTS".
- 2. Remove:
  - cylinder head nuts
  - cylinder head bolts

#### NOTE: -

- Loosen the nuts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.

#### CHECKING THE CYLINDER HEAD

- 1. Eliminate:
  - combustion chamber carbon deposits (with a rounded scraper)

NOTE: -

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

- spark plug bore threads
- valve seats
- 2. Check:
  - cylinder head Damage/scratches → Replace.
- 3. Measure:
  - cylinder head warpage Out of specification → Resurface the cylinder head.



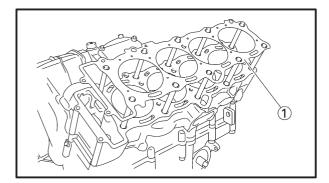
Maximum cylinder head warpage 0.10 mm (0.0039 in)

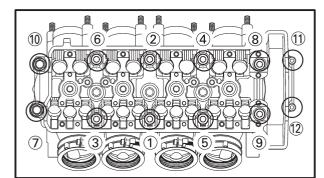
- a. Place a straightedge (1) and a thickness gauge 2 across the cylinder head.
- b. Measure the warpage.
- c. If the limit is exceeded, resurface the cylinder head as follows.
- d. Place a  $400 \sim 600$  grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding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

NOTE: -

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

## CYLINDER HEAD





EAS0023

## **INSTALLING THE CYLINDER HEAD**

- 1. Check:
- cylinder head bolts 1

8 Nm (0.8 m•kg, 5.8 ft•lb)

NOTE: -

Retighten the cylinder head bolts to specification, before installing the cylinder head.

- 2. Install:
- gasket New 1
- dowel pins
- 3. Install:
  - cylinder head

NOTE: -

Pass the timing chain through the timing chain cavity.

- 4. Tighten:
  - cylinder head nuts 1 ~ 10

• cylinder head bolts (1) (12)

12 Nm (1.2 m•kg, 8.7 ft•lb)

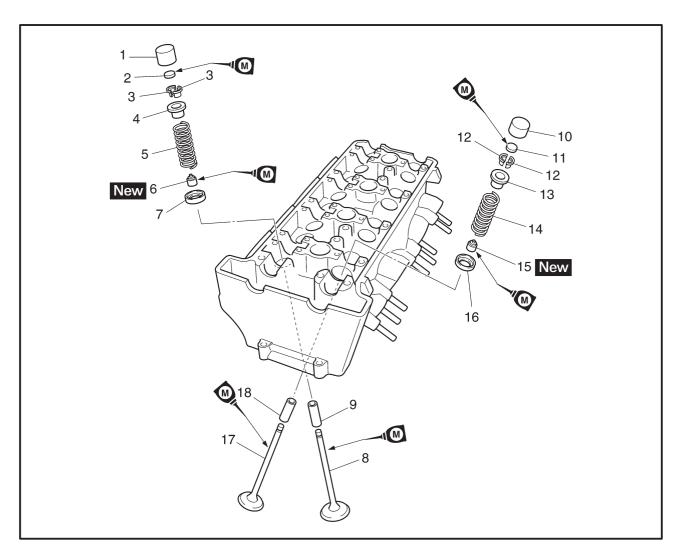
NOTE: -

- First, tighten the nuts ①  $\sim$  ① to approximately 19 Nm (1.9 m•kg, 14 ft•lb) with a torque wrench, and then tighten the 67 Nm (6.7 m•kg, 48 ft•lb).
- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.
- 5. Install:
  - exhaust camshaft
  - intake camshaft Refer to "INSTALLING THE CAMSHAFTS".

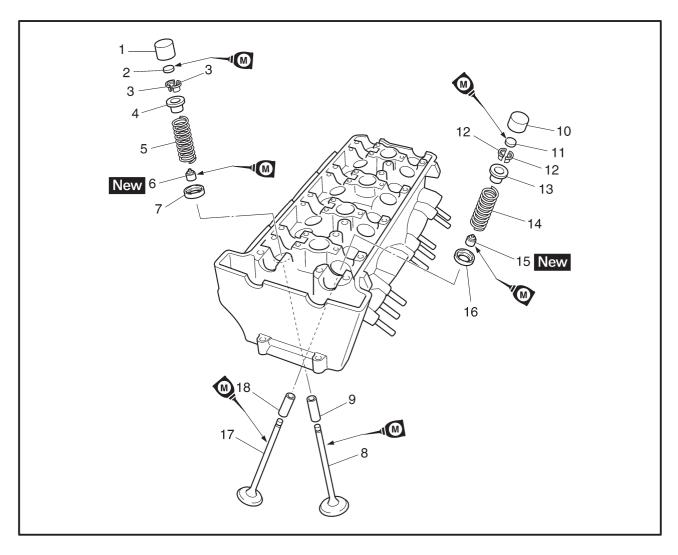


FAS0023

# **VALVES AND VALVE SPRINGS**



| Order | Job/Part                       | Q'ty | Remarks                               |
|-------|--------------------------------|------|---------------------------------------|
|       | Removing the valves and valve  |      | Remove the parts in the order listed. |
|       | springs                        |      |                                       |
|       | Cylinder head                  |      | Refer to "CYLINDER HEAD".             |
| 1     | Intake valve lifter            | 12   |                                       |
| 2     | Intake valve pad               | 12   |                                       |
| 3     | Intake valve cotter            | 24   |                                       |
| 4     | Intake valve upper spring seat | 12   |                                       |
| 5     | Intake valve spring            | 12   |                                       |
| 6     | Intake valve oil seal          | 12   |                                       |
| 7     | Intake valve lower spring seat | 12   |                                       |
| 8     | Intake valve                   | 12   |                                       |
| 9     | Intake valve guide             | 12   |                                       |



| Order | Job/Part                        | Q'ty | Remarks                               |
|-------|---------------------------------|------|---------------------------------------|
| 10    | Exhaust valve lifter            | 8    |                                       |
| 11    | Exhaust valve pad               | 8    |                                       |
| 12    | Exhaust valve cotter            | 16   |                                       |
| 13    | Exhaust valve upper spring seat | 8    |                                       |
| 14    | Exhaust valve spring            | 8    |                                       |
| 15    | Exhaust valve oil seal          | 8    |                                       |
| 16    | Exhaust valve lower spring seat | 8    |                                       |
| 17    | Exhaust valve                   | 8    |                                       |
| 18    | Exhaust valve guide             | 8    |                                       |
|       |                                 |      | For installation, reverse the removal |
|       |                                 |      | procedure.                            |

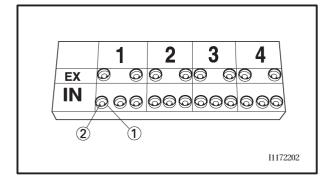
EAS00237

#### 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 the valves properly seal.

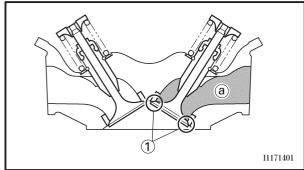


1. Remove:

- valve lifter (1)
- valve pad (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  $\rightarrow$  Check the valve face, valve seat, and valve seat width.

Refer to "CHECKING THE VALVE SEATS".

- a. Pour a clean solvent (a) into the intake and exhaust ports.
- b. Check that the valves properly seal.

NOTE: -

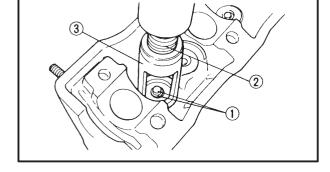
There should be no leakage at the valve seat (1).

3. Remove:

• valve cotters (1)

NOTE: -

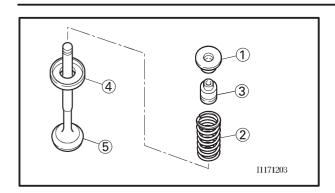
Remove the valve cotters by compressing the valve spring with the valve spring compressor (2) and the valve spring compressor attachment **3**.

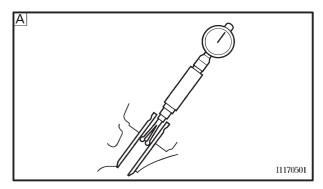


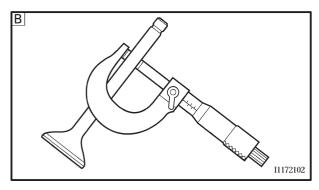


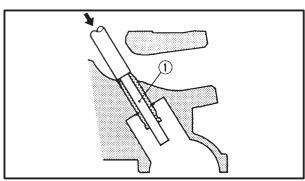
Valve spring compressor 90890-04019. YM-04019 Valve spring compressor attachment Intake valve 90890-04114, YM-4114 **Exhaust valve** 90890-04108, YM-4108

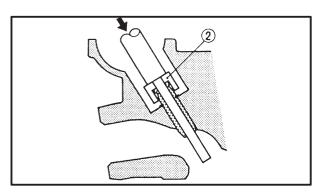












## 4. Remove:

- upper spring seat ①
- valve spring 2
- valve stem 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

Valve-stem-to-valve-guide clearance = Valve guide inside diameter A − Valve stem diameter B

Out of specification  $\rightarrow$  Replace the valve guide.



# Valve-stem-to-valve-guide clearance

Intake

 $0.0010 \sim 0.0037 \text{ mm}$  (0.0004  $\sim 0.0015 \text{ in}$ )

<Limit>: 0.08 mm (0.0032 in)

Exhaust

 $0.025 \sim 0.052 \text{ mm}$  (0.0010  $\sim 0.0020 \text{ in}$ )

<Limit>: 0.10 mm (0.0039 in)

#### 2. Replace:

valve guide

## NOTE: -

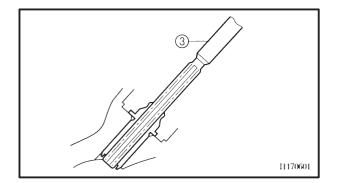
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C (212°F) in an oven.

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

ENG

NOTE: -

After replacing the valve guide, reface the valve seat.





Valve guide remover
Intake (4.0 mm, 0.16 in)
90890-04111
Exhaust (4.5 mm, 0.18 in)
90890-04116, YM-4116
Valve guide installer
Intake (4.0 mm, 0.16 in)
90890-04112
Exhaust (4.5 mm, 0.18 in)
90890-04117, YM-4117
Valve guide reamer
Intake (4.0 mm, 0.16 in)
90890-04113
Exhaust (4.5 mm, 0.18 in)
90890-04118, YM-4118

- 3. Eliminate:
- carbon deposits (from the valve face and valve seat)

\_\_\_\_

- 4. Check:
  - valve face

Pitting/wear  $\rightarrow$  Grind the valve face.

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



valve margin thickness (a)
 Out of specification → Replace the valve.



Valve margin thickness 0.5 ~ 0.9 mm (0.0197 ~ 0.0354 in) <Limit>: 0.5 mm (0.02 in)

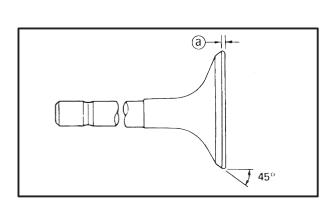
- 6. Measure:
  - valve stem runout
     Out of specification → Replace the valve.

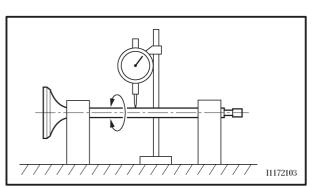
#### NOTE:

- 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 0.01 mm (0.0004 in)





ENG

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.



valve seat width ⓐ
 Out of specification → Replace the cylinder head.



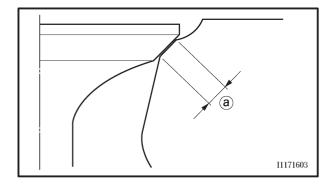
Valve seat width

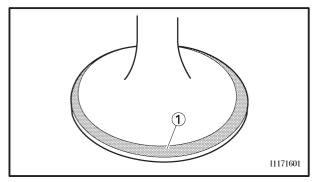
Intake:  $0.9 \sim 1.1 \text{ mm}$  (0.0354  $\sim 0.0433 \text{ in}$ )

Exhaust: 0.9 ~ 1.1 mm

 $(0.0354 \sim 0.0433 \text{ in})$ 

<Limit>: 1.6 mm (0.06 in)





- a. Apply Mechanic's blueing dye (Dykem) ① onto the valve face.
- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- Measure the valve seat width.

NOTE: -

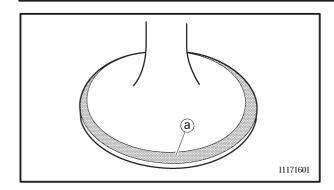
Where the valve seat and valve face contacted one another, the blueing will have been removed.

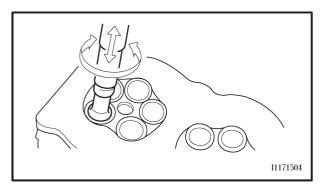
- 4. Lap:
  - valve face
  - valve seat

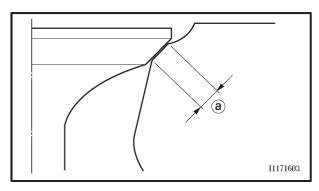
NOTE: -

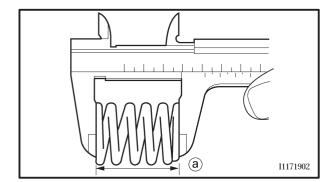
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.











a. Apply a coarse lapping compound ⓐ 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 until 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 hands.

- 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) onto the valve face.
- h. Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width ⓐ again. If the valve seat width is out of specification, reface and lap the valve seat.

EAS00241

#### CHECKING THE VALVE SPRINGS

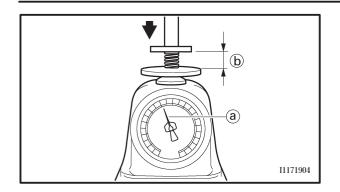
The following procedure applies to all of the valve springs.

- 1. Measure:
  - valve spring free length (a)
     Out of specification → Replace the valve spring.



Valve spring free length
Intake valve spring
39.3 mm (1.55 in)
<Limit>: 37.3 mm (1.47 in)
Exhaust valve spring
39.3 mm (1.55 in)
<Limit>: 37.3 mm (1.47 in)





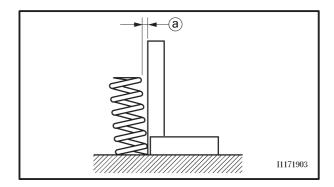
#### 2. Measure:

- compressed valve spring force (a) Out of specification → Replace the valve spring.
- (b) Installed length



# Compressed valve spring force (installed)

Intake valve spring 145.9 ~ 167.9 N  $(14.88 \sim 17.12 \text{ kg})$  $32.80 \sim 37.74 \text{ lb}) \text{ at}$ 32.65 mm (1.285 in) Exhaust valve spring 164.1 ~ 188.9 N  $(16.73 \sim 19.26 \text{ kg})$  $36.89 \sim 42.46 \text{ lb}$ ) at 32.82 mm (12.92 in)



# 3. Measure:

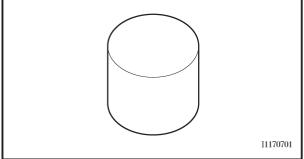
• valve spring tilt (a) Out of specification → Replace the valve spring.



# Spring tilt limit

Intake valve spring 1.7 mm (0.07 in) Exhaust valve spring 1.7 mm (0.07 in)





#### EAS00242

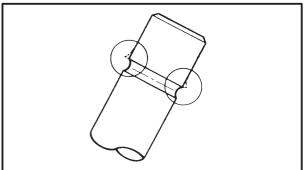
# **CHECKING THE VALVE LIFTERS**

The following procedure applies to all of the valve lifters.

- 1. Check:
- valve lifter

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

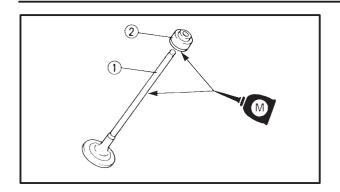




## **INSTALLING THE VALVES**

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

- 1. Deburr:
  - valve stem end (with an oil stone)

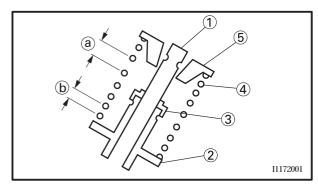




- valve stem (1)
- valve stem seal ②
  (with the recommended lubricant)



Recommended lubricant Molybdenum disulfide oil

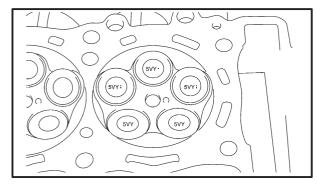


3. Install:

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

NOTE: -

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

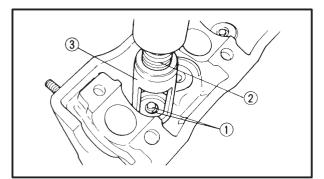


(b) Smaller pitch

NOTE: -

Make sure that each valve is installed in its original place. Refer to the following embossed marks.

Right and left intake valve(-s): "5VY:" Middle intake valve(-s): "5VY:" Exhaust valve(-s): "5VY"



4. Install:

• valve cotters (1)

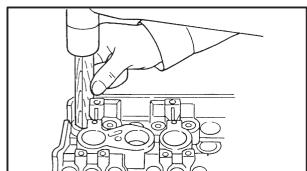
NOTE: -

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



Valve spring compressor 90890-04019, YM-04019 Valve spring compressor attachment Intake valve 90890-04114, YM-4114 Exhaust valve 90890-04108, YM-4108





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

# **CAUTION:**

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

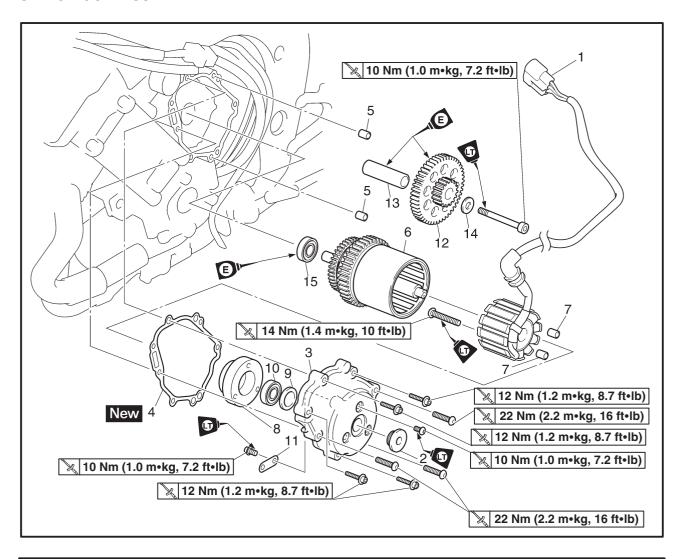
- 6. Install:
  - valve pad ①
  - valve lifter (2)

## NOTE: -

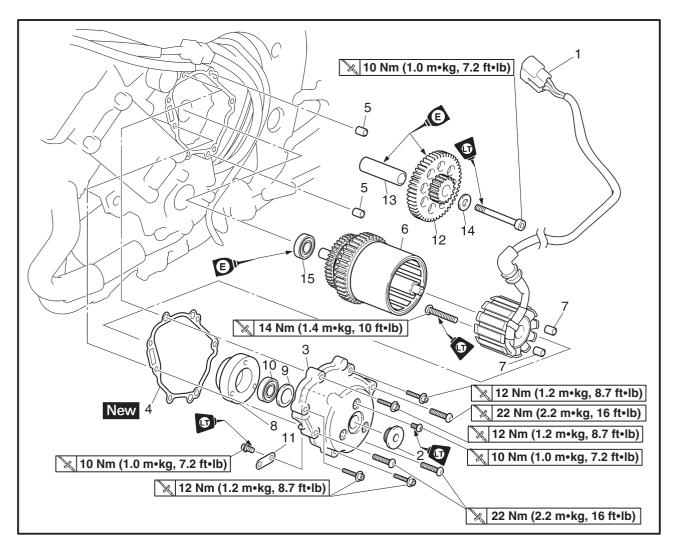
- Lubricate the valve lifter and valve pad with molybdenum disulfide oil.
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.



# STARTER CLUTCH AND GENERATOR STATOR COIL ASSEMBLY



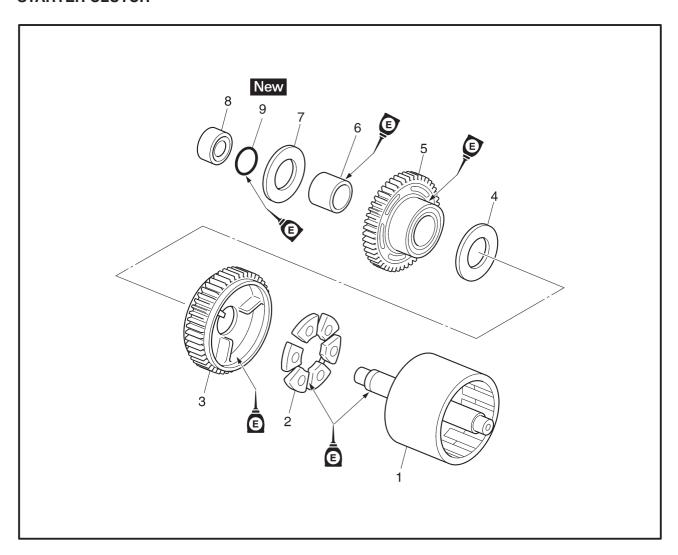
| Order                                | Job/Part                                                                                                                                | Q'ty                            | Remarks                                                                                                                                                                                            |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | Removing the stator coil assembly Rider seat Fuel tank Left side cowling Bottom cowlings Engine oil                                     |                                 | Remove the parts in the order listed. Refer to "SEATS" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "COWLINGS" in chapter 3.  Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. |
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | Stator coil assembly lead coupler Plug Generator rotor cover Gasket Dowel pin Generator rotor assembly Dowel pin Bearing housing Collar | 1<br>1<br>1<br>2<br>1<br>2<br>1 | Disconnect.                                                                                                                                                                                        |



| Order | Job/Part                         | Q'ty | Remarks                                          |
|-------|----------------------------------|------|--------------------------------------------------|
| 10    | Bearing                          | 1    |                                                  |
| 11    | Stator coil assembly lead holder | 1    |                                                  |
| 12    | Idler gear                       | 1    |                                                  |
| 13    | Idler gear shaft                 | 1    |                                                  |
| 14    | Washer                           | 1    |                                                  |
| 15    | Bearing                          | 1    |                                                  |
|       |                                  |      | For installation, reverse the removal procedure. |



# STARTER CLUTCH



| Order                                | Job/Part                                                                                                                    | Q'ty                            | Remarks                                                                                 |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | Removing the starter clutch Generator rotor Damper Driven gear Washer Starter clutch drive gear Collar Washer Spacer O-ring | 1<br>3<br>1<br>1<br>1<br>1<br>1 | Remove the parts in the order listed.  For installation, reverse the removal procedure. |

# **REMOVING THE GENERATOR**

- 1. Remove:
  - rider seat
  - fuel tank

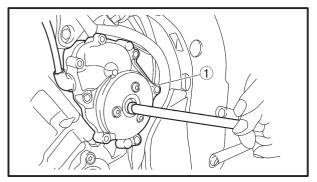
Refer to "SEATS" and "FUEL TANK" in chapter 3.

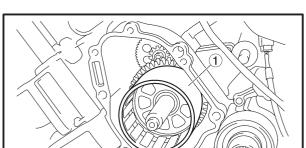
- 2. Remove:
  - left side cowling
  - bottom cowlings

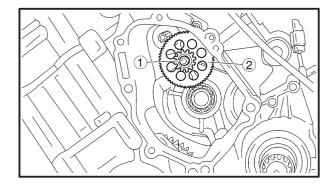
Refer to "COWLINGS" in chapter 3.

- 3. Drain:
  - engine oil

Refer to "CHANGING THE ENGINE OIL" in chapter 3.





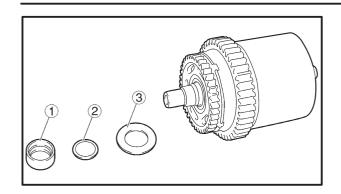


- 4. Remove:
  - plug
  - generator rotor cover ①

#### NOTE:

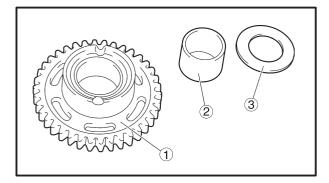
- While pushing generator rotor, remove the generator rotor cover.
- Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.
- After all of the bolts are fully loosened, remove them.
- 5. Remove:
  - generator rotor and starter clutch assembly (1).

- 6. Remove:
  - idler gear shaft bolt (1)
  - idler shaft
  - idler gear 2

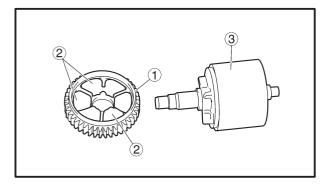


# REMOVING THE STARTER CLUTCH

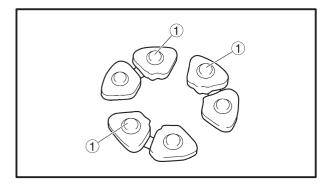
- 1. Remove:
  - spacer ①
  - O-ring ②
  - washer ③



- 2. Remove:
  - Starter clutch drive gear 1
  - collar 2
  - washer ③



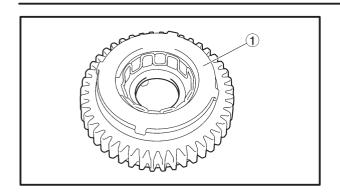
- 3. Remove:
  - driven gear ①
  - dampers ②
  - generator rotor ③



# **CHECKING THE DAMPER**

- 1. Check:
  - dampers ①

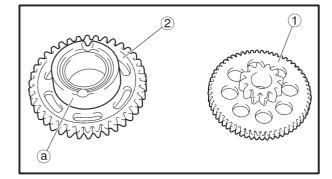
Damage/wear → Replace.

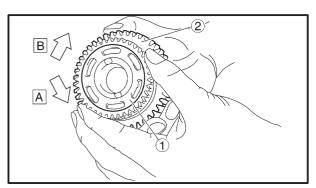


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#### CHECKING THE STARTER CLUTCH

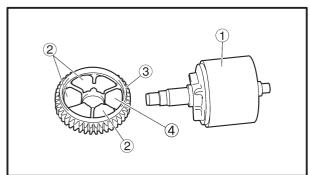
- 1. Check:
  - starter clutch rollers ①
    Damage/wear → Replace.





- 2. Check:
  - starter clutch idle gear ①
  - starter clutch drive gear ②
     Burrs/chips/roughness/wear → Replace the defective part(s).
- 3. Check:
  - starter clutch gear's contacting surfaces (a)
     Damage/pitting/wear → Replace the starter clutch gear.
- 4. Check:
  - starter clutch operation
- a. Install the starter clutch drive gear ① onto the starter clutch ② and hold the starter clutch.
- b. When turning the starter clutch drive gear counterclockwise A, the starter clutch and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.
- c. When turning the starter clutch drive gear clockwise B, it should turn freely, otherwise the starter clutch is faulty and must be replaced.



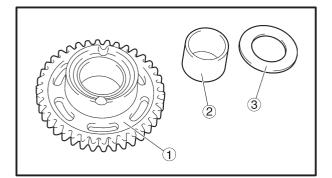


# **INSTALLING THE STARTER CLUTCH**

- 1. Install:
  - generator rotor 1
  - damper 2
  - driven gear ③

#### NOTE: -

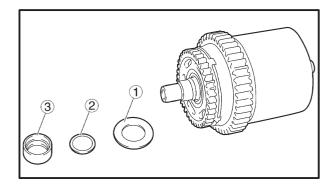
- The hole side of the damper is installed to the generator side.
- Lubricate the engine oil 4.



## 2. Install:

- starter clutch drive gear 1
- collar 2
- washer (3)

Refer to "CHECKING THE STARTER CLUTCH".

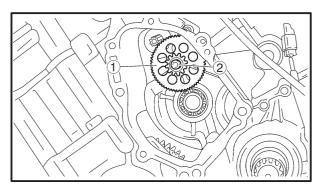


# 3. Install:

- washer (1)
- O-ring ② New
- spacer ③

#### NOTE: -

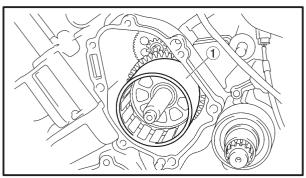
Lubricate the engine oil to O-ring.



# **INSTALLING THE GENERATOR**

- 1. Install:
  - idle gear shaft
  - idle gear 1
  - washer
  - idle gear shaft bolt 2

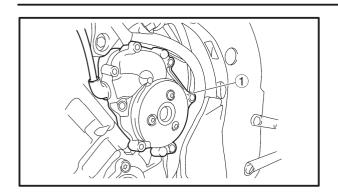
10 Nm (1.0 m•kg, 7.2 ft•lb) **LOCTITE**®



#### 2. Install:

 generator rotor and starter clutch assembly (1)





- 3. Install:
  - generator cover gasket
  - generator cover 1

(M6 bolts) 22 Nm (1.2 m•kg, 8.7 ft•lb) (M8 bolts) 22 Nm (2.2 m•kg, 16 ft•lb)

#### NOTE: -

- First tighten the M8 bolts and then tighten the M6 bolts.
- Tighten the generator rotor cover bolts in stages and in a crisscross pattern.

# 4. Fill:

- engine oil Refer to "CHANGING THE ENGINE OIL" in chapter 3.
- 5. Install:
  - bottom cowling
  - left side cowling Refer to "COWLINGS" in chapter 3.

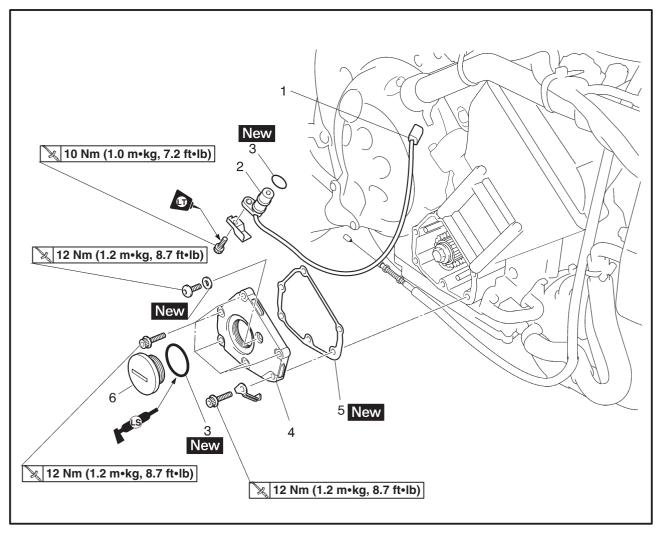
# 6. Install:

- fuel tank
- rider seat
   Refer to "SEATS" and "FUEL TANK" in chapter 3.



# **CRANKSHAFT POSITION SENSOR**





| Order | Job/Part                                                           | Q'ty | Remarks                                                              |
|-------|--------------------------------------------------------------------|------|----------------------------------------------------------------------|
|       | Removing the crankshaft position sensor                            |      | Remove the parts in the order listed.                                |
|       | Rider seat<br>Fuel tank                                            |      | Refer to "SEATS" in chapter 3.<br>Refer to "FUEL TANK" in chapter 3. |
|       | Side cowlings Bottom cowlings                                      |      | Refer to "COWLINGS" in chapter 3.                                    |
|       | Engine oil                                                         |      | Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.              |
| 1 2   | Crankshaft position sensor lead coupler Crankshaft position sensor | 1    | Disconnect.                                                          |
| 3     | O-ring                                                             | 1    |                                                                      |
| 4     | Pickup rotor cover                                                 | 1    |                                                                      |
| 5     | Gasket                                                             | 1    |                                                                      |
| 6     | Cover                                                              | 1    | For installation, reverse the removal procedure.                     |

# CRANKSHAFT POSITION SENSOR



# REMOVING THE CRANKSHAFT POSITION SENSOR

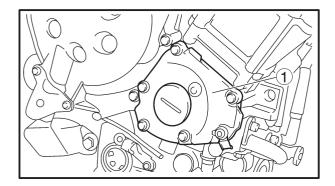
- 1. Remove:
  - rider seat
  - fuel tank

Refer to "SEATS" and "FUEL TANK" in chapter 3.

- 2. Remove:
  - right side cowling
  - bottom cowlings

Refer to "COWLINGS" in chapter 3.

- 3. Drain:
  - engine oil Refer to "CHANGING THE ENGINE OIL" in chapter 3.
- 4. Disconnect:
  - crankshaft position sensor lead coupler



- 5. Remove:
  - crankshaft position sensor
  - O-ring
  - pickup rotor cover ①

#### NOTE: -

Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.

After all of the bolts are fully loosened, remove them.

# INSTALLING THE CRANKSHAFT POSITION SENSOR

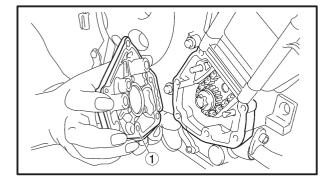
- 1. Install:
  - gasket New
  - pickup rotor cover (1)

12 Nm (1.2 m•kg, 8.7 ft•lb)

- O-ring New
- crankshaft position sensor

10 Nm (1.0 m•kg, 7.2 ft•lb)

- 2. Connect:
- crankshaft position sensor lead coupler
- 3. Fill:
  - engine oil Refer to "CHANGING THE ENGINE OIL" in chapter 3.
- 4. Install:
  - right side cowling
  - bottom cowlings Refer to "COWLINGS" in chapter 3.



# **CRANKSHAFT POSITION SENSOR**

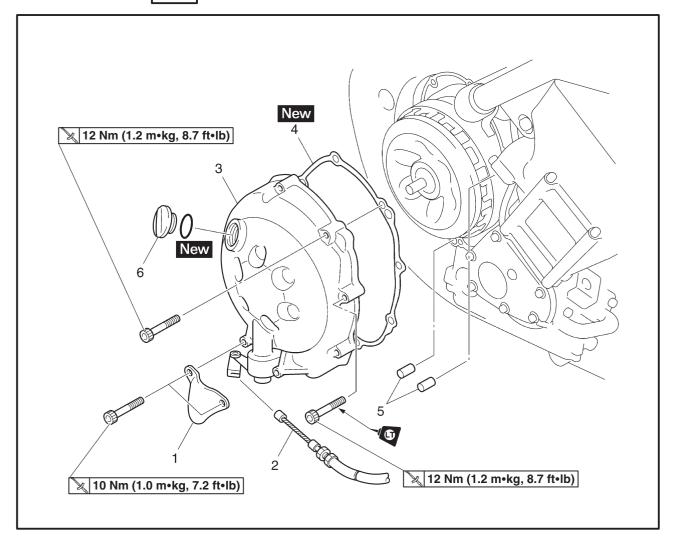


- 5. Install:
  - rider seat
  - fuel tank Refer to "SEATS" and "FUEL TANK" in chapter 3.



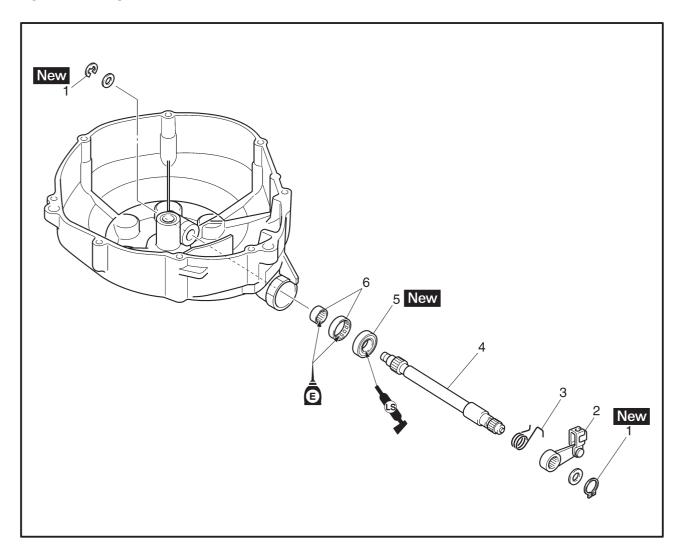
# **CLUTCH** COVER





| Order                      | Job/Part                                                                     | Q'ty                       | Remarks                                                                                                                            |
|----------------------------|------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|                            | Removing the clutch cover Right side cowling Bottom cowling Engine oil       | -                          | Remove the parts in the order listed.  Refer to "COWLINGS" in chapter 3.  Drain.  Refer to "CHANGING THE ENGINE OIL" in chapter 3. |
| 1<br>2<br>3<br>4<br>5<br>6 | Cover Clutch cable Clutch cover Clutch cover gasket Dowel pin Oil filler cap | 1<br>1<br>1<br>1<br>2<br>1 | Disconnect.  For installation, reverse the removal procedure.                                                                      |

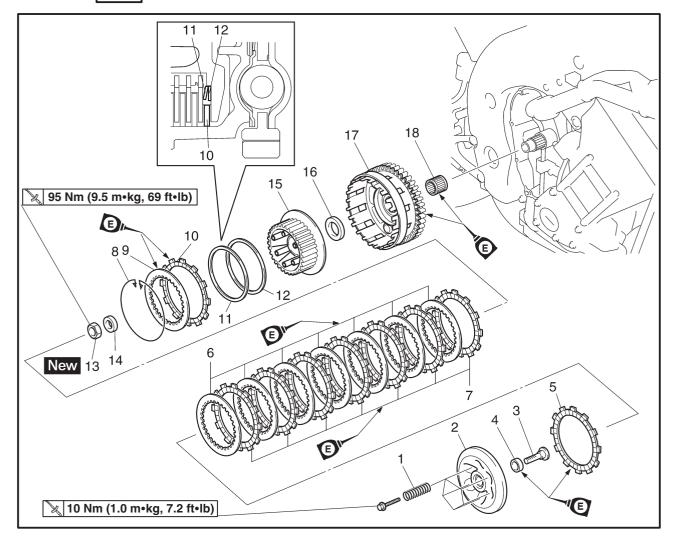
# **PULL LEVER SHAFT**



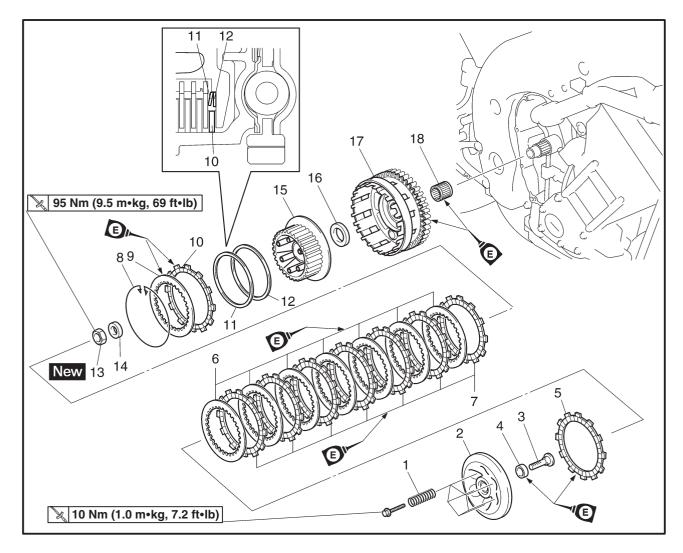
| Order                      | Job/Part                                                                                             | Q'ty                       | Remarks                                          |
|----------------------------|------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6 | Removing the pull lever shaft Circlip Pull lever Pull lever spring Pull lever shaft Oil seal Bearing | 2<br>1<br>1<br>1<br>1<br>2 | Remove the parts in the order listed.            |
|                            | Deamig                                                                                               | 2                          | For installation, reverse the removal procedure. |



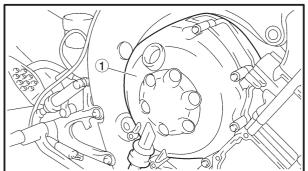


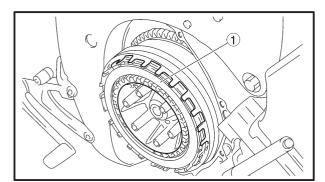


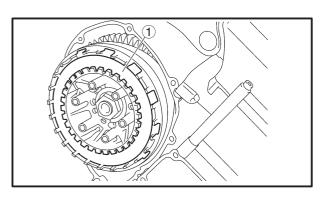
| Order | Job/Part                  | Q'ty | Remarks                               |
|-------|---------------------------|------|---------------------------------------|
|       | Removing the clutch       |      | Remove the parts in the order listed. |
| 1     | Compression spring        | 6    | ·                                     |
| 2     | Pressure plate            | 1    |                                       |
| 3     | Pull rod                  | 1    |                                       |
| 4     | Bearing                   | 1    |                                       |
| 5     | Friction plate 1          | 1    |                                       |
| 6     | Clutch plate 1            | 7    |                                       |
| 7     | Friction plate 2          | 7    |                                       |
| 8     | Wire clip                 | 1    |                                       |
| 9     | Clutch plate 2            | 1    |                                       |
| 10    | Friction plate 3          | 1    |                                       |
| 11    | Clutch damper spring      | 1    |                                       |
| 12    | Clutch damper spring seat | 1    |                                       |

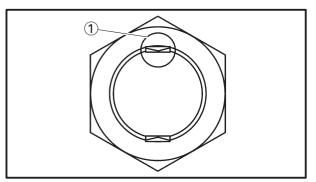


| Order | Job/Part        | Q'ty | Remarks                                          |
|-------|-----------------|------|--------------------------------------------------|
| 13    | Clutch boss nut | 1    |                                                  |
| 14    | Washer          | 1    |                                                  |
| 15    | Clutch boss     | 1    |                                                  |
| 16    | Thrust plate    | 1    |                                                  |
| 17    | Clutch housing  | 1    |                                                  |
| 18    | Bearing         | 1    |                                                  |
|       | _               |      | For installation, reverse the removal procedure. |









# **REMOVING THE CLUTCH**

- 1. Remove:
  - clutch cover ①
  - gasket

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.

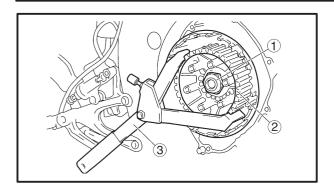
- 2. Remove:
  - compression spring bolts ①
  - compression springs
  - pressure plate 2
  - pull rod ③
- 3. Remove:
- •friction plate 1

- 4. Remove:
  - clutch plate 1 ①
  - •friction plate 2

5. Straighten the clutch boss nut rib ①.

# **CLUTCH**





- 6. Loosen:
  - clutch boss nut (1)

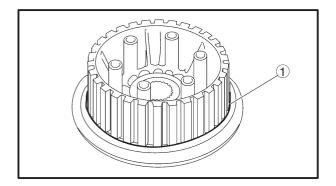
## NOTE: -

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



Universal clutch holder 90890-04086, YM-91042

- 7. Remove:
  - clutch boss nut
  - washer
  - clutch boss assembly
  - thrust plate

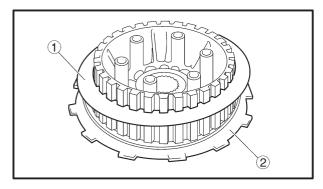


# 8. Remove:

• wire clip (1)

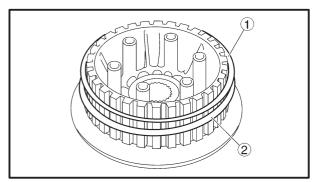
NOTE: -

There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip ① and disassemble the built-in damper unless there is serious clutch chattering.



# 9. Remove:

- clutch plate 2 ①
- friction plate 3 2



# 10. Remove:

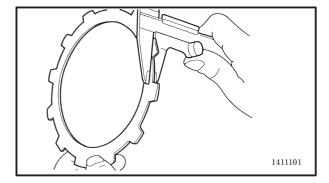
- clutch damper spring ①
- clutch damper spring seat 2

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.



#### 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  $\sim$  3.1 mm (0.114  $\sim$  0.122 in) <Limit>: 2.8 mm (0.110 in)

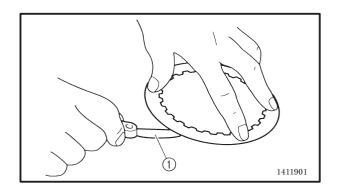
EAS00281

# **CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

- 1. Check:
  - clutch plate

Damage  $\rightarrow$  Replace the clutch plates as a set.

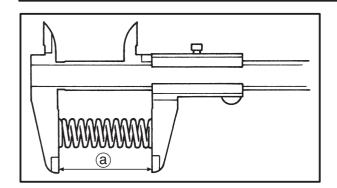


# 2. Measure:

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 0.1 mm (0.0039 in)



AS00282

## **CHECKING THE CLUTCH SPRINGS**

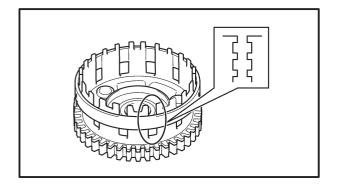
The following procedure applies to all of the clutch springs.

- 1. Check:
  - clutch spring
     Damage → Replace the clutch springs as a set.
- 2. Measure:
  - clutch spring free length (a)
     Out of specification → Replace the clutch springs as a set.



Clutch spring free length 52.5 mm (2.07 in)

<Limit>: 49.9 mm (1.96 in)



FAS00284

#### CHECKING THE CLUTCH HOUSING

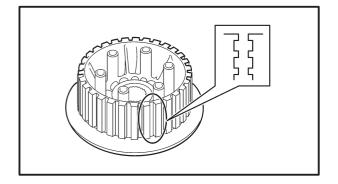
- 1. Check:
  - clutch housing dogs
     Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

#### NOTE: -

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

- 2. Check:
  - bearing

Damage/wear → Replace the bearing and clutch housing.



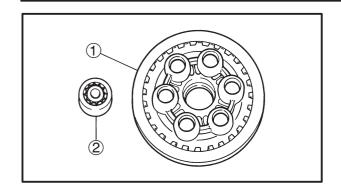
EAS00285

## **CHECKING THE CLUTCH BOSS**

- 1. Check:
  - clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

## NOTE: -

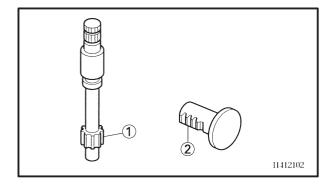
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS00286

## CHECKING THE PRESSURE PLATE

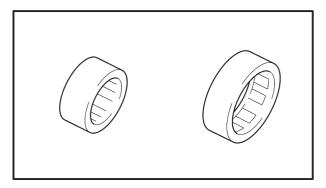
- 1. Check:
  - pressure plate ①
     Cracks/damage → Replace.
- bearing ②
  Damage/wear → Replace.



FAS00287

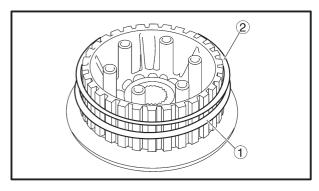
# CHECKING THE PULL LEVER SHAFT AND PULL ROD

- 1. Check:
  - pull lever shaft pinion gear teeth 1
- pull rod teeth ②
   Damage/wear → Replace the pull rod and pull lever shaft pinion gear as a set.



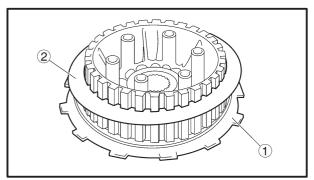
# 2. Check:

pull rod bearing
 Damage/wear → Replace.



# **INSTALLING THE CLUTCH**

- 1. Install:
  - clutch damper spring seat ①
  - clutch damper spring 2

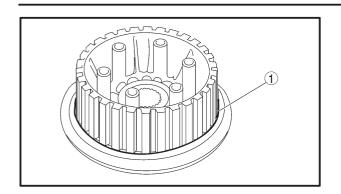


- 2. Install:
  - friction plate 3 ①
  - clutch plate 2 2

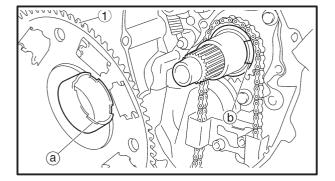
NOTE: -

Lubricate the engine oil.





- 3. Install:
  - wire clip 1

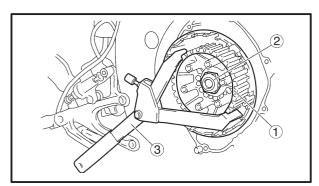


4. Install:

• clutch housing ①

NOTE: -

Align the projection of clutch housing ⓐ and hollow of the oil pump drive gear ⓑ.



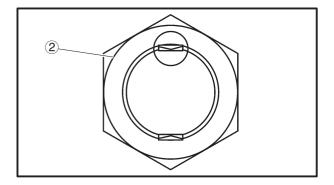
5. Install:

- thrust plate
- clutch boss assembly ①
- washer
- clutch boss nut 2 New

95 Nm(9.5 m•kg, 69 ft•lb)

NOTE: -

- Install the washer on the main axle with the "OUT" mark facing away from the motorcycle.
- Lock the threads on the clutch boss nut by staking them with a drift punch at the point aligned with the groove in the axle.
- •While holding the clutch boss assembly ① with the clutch holding tool ③, tighten the clutch boss nut.



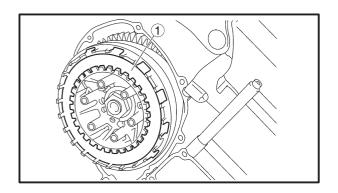


Universal clutch holder 90890-04089, YM-91042

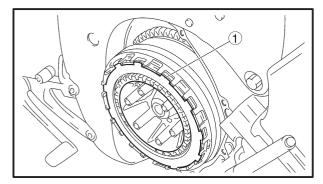
- 6. Lubricate:
  - friction plates
  - clutch plates (with the recommended lubricant)



# Recommended lubricant Engine oil



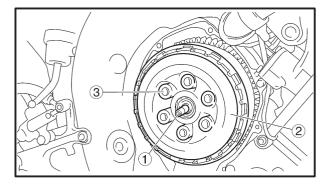
- 7. Install:
  - •friction plate 2
  - clutch plate 1 ①



- 8. Install:
  - friction plate 1 ①

NOTE:

Install the last friction plate shifting half phase.

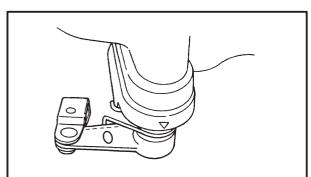


- 9. Install:
  - bearing
  - pull rod ①
  - pressure plate 2
  - clutch springs
  - clutch spring bolts 3

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTF:

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



- 10. Install:
  - pull lever

NOTE:

In stall the pull lever with the " $\bigcirc$ " mark facing toward upper side.

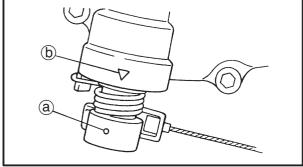
# **CLUTCH**



- 11. Install:
  - clutch cover
  - clutch cover gasket New

# NOTE: -

- Install the pull rod so that the teeth a face towards the rear of the motorcycle. Then, install the clutch cover.
- Apply oil onto the bearing.
- Apply molybdenum disulfide grease onto the pull rod.
- When installing the clutch cover, push the pull lever and check that the punch mark (a) on the pull lever aligns with the mark (b) on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



# 12. Tighten:

• clutch cover bolts 1

12 Nm (1.2 m•kg, 8.7 ft•lb)

• clutch cover bolt (2)

12 Nm (1.2 m•kg, 8.7 ft•lb)

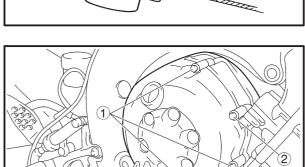
LOCTITE®

## NOTE: -

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

# 13. Adjust:

 clutch cable free play
 Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" in chapter 3.

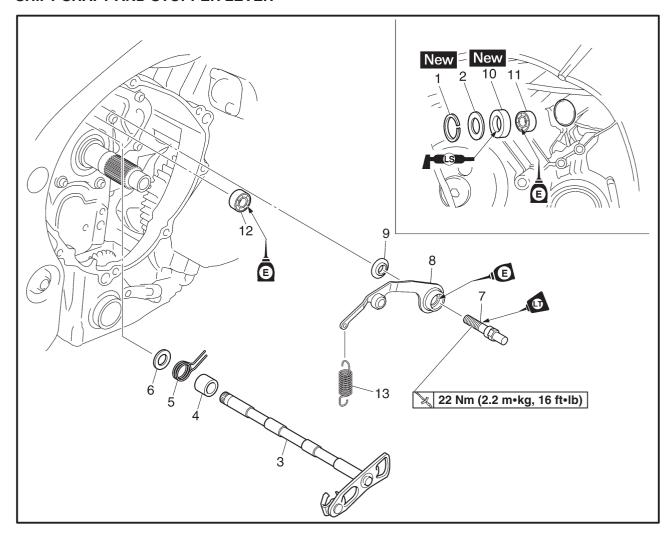




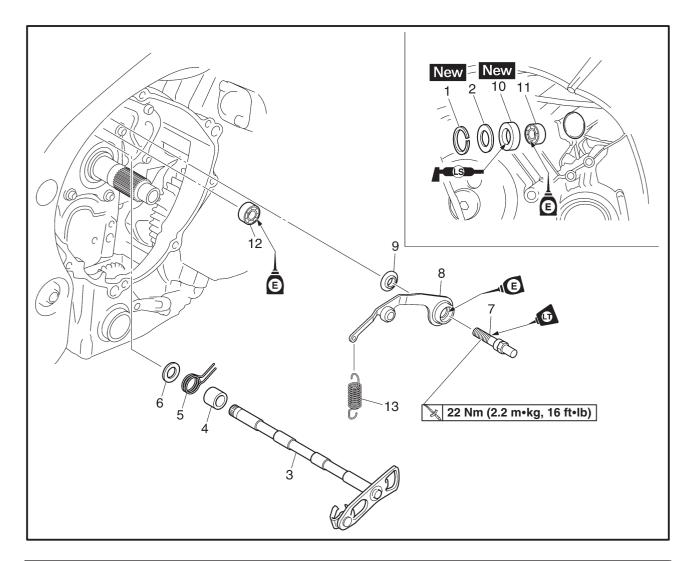
EAS0032

# SHIFT SHAFT SHIFT SHAFT AND STOPPER LEVER





| Order                 | Job/Part                                                                                                                | Q'ty             | Remarks                                                                                                          |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------|
| 1                     | Removing the shift shaft and stopper lever Side cowlings Bottom cowlings Clutch assembly Sift arm and shift rod Circlip | -<br>-<br>-      | Remove the parts in the order listed.  Refer to "COWLINGS" in chapter 3.  Refer to "CLUTCH".  Refer to "ENGINE". |
| 2<br>3<br>4<br>5<br>6 | Washer Shift shaft Collar Shift shaft spring Washer                                                                     | 1<br>1<br>1<br>1 |                                                                                                                  |
| 7<br>8<br>9           | Stopper screw Stopper lever Washer                                                                                      | 1<br>1<br>1      |                                                                                                                  |

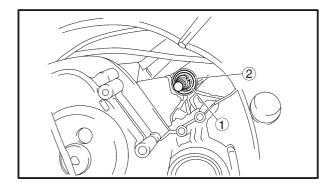


| Order | Job/Part             | Q'ty | Remarks                                          |
|-------|----------------------|------|--------------------------------------------------|
| 10    | Oil seal             | 1    |                                                  |
| 11    | Bearing              | 1    |                                                  |
| 12    | Bearing              | 1    |                                                  |
| 13    | Stopper lever spring | 1    |                                                  |
|       |                      |      | For installation, reverse the removal procedure. |

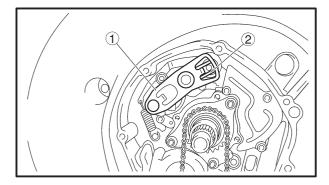
# **REMOVING THE SHIFT SHAFT**

- 1. Remove:
  - left and right side cowlings
- bottom cowlings Refer to "COWLINGS" in chapter 3.
- 2. Remove:
  - clutch assembly Refer to "CLUTCH".
- 3. Remove:
  - shift arm
  - shift rod

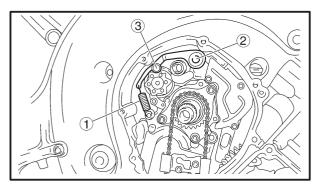
Refer to "ENGINE".



- 4. Remove:
  - circlip (1)
  - Washer ②
    (left side of the engine)



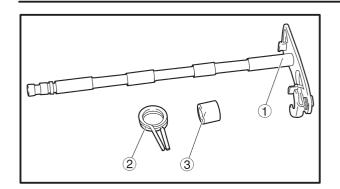
- 5. Remove:
  - shift shaft 1
  - shift shaft spring 2
  - collar
  - washer



- 6. Remove:
  - stopper lever spring ①
  - stopper screw 2
  - stopper lever ③
  - washer

# SHIFT SHAFT





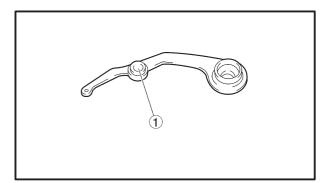
# **CHECKING THE SHIFT SHAFT**

- 1. Check:
  - shift shaft (1)

Bends/damage/wear → replace.

- shift shaft spring 2
- collar (3)

 $\mathsf{Damage/wear} \to \mathsf{Replace}.$ 

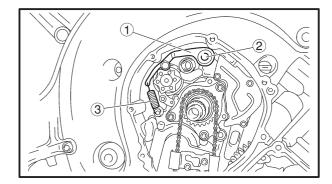


#### **CHECKING THE STOPPER LEVER**

- 1. Check:
  - stopper lever ①

Bends/damage → Replace.

Roller turns roughly  $\rightarrow$  Replace the stopper lever.



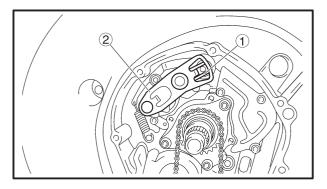
## **INSTALLING THE SHIFT SHAFT**

- 1. Install:
  - washer
  - stopper lever (1)
  - stopper screw ②

22 Nm (2.2 m•kg, 16 ft•lb)

**LOCTITE®** 

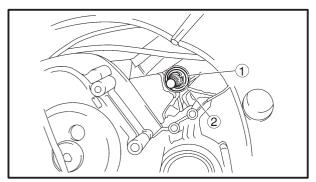
• stopper lever spring ③



- 2. Install:
  - washer
  - collar
  - shift shaft spring ①
  - shift shaft 2

#### NOTE: -

- Mesh the stopper lever with the shift drum segment assembly.
- Lubricate the oil seal lips with lithium soap base grease.
- Install the end of the shift shaft spring onto the shift shaft spring stopper.
- 3. Install:
  - Washer (1)
  - circlip 2 New



# **SHIFT SHAFT**



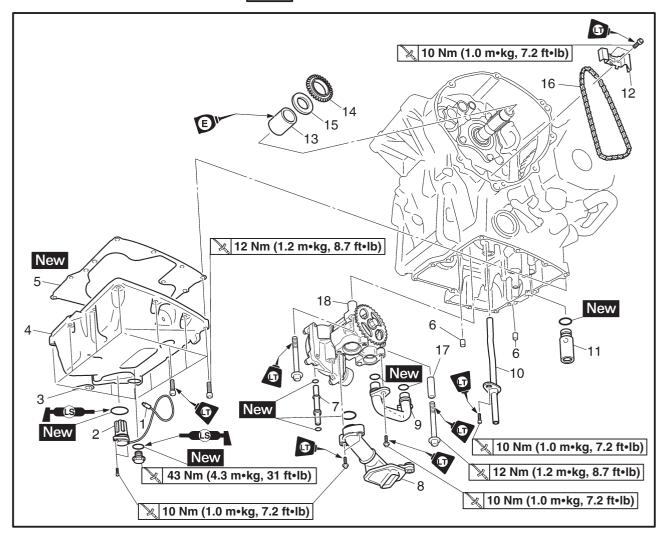
- 4. Install:
  - shift rod
  - shift arm Refer to "ENGINE".
- 5. Install:
  - clutch assembly Refer to "CLUTCH".
- 6. Install:
  - left and side cowling
  - bottom cowlings Refer to "COWLING" in chapter 3.



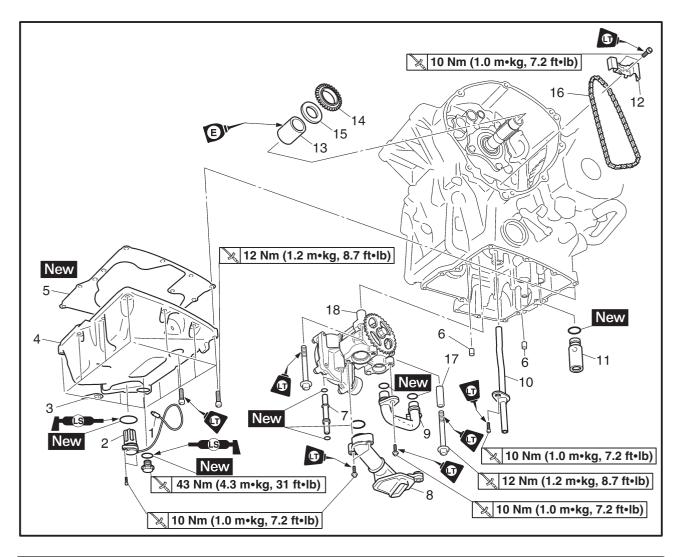
EAS0035

# OIL PAN AND OIL PUMP



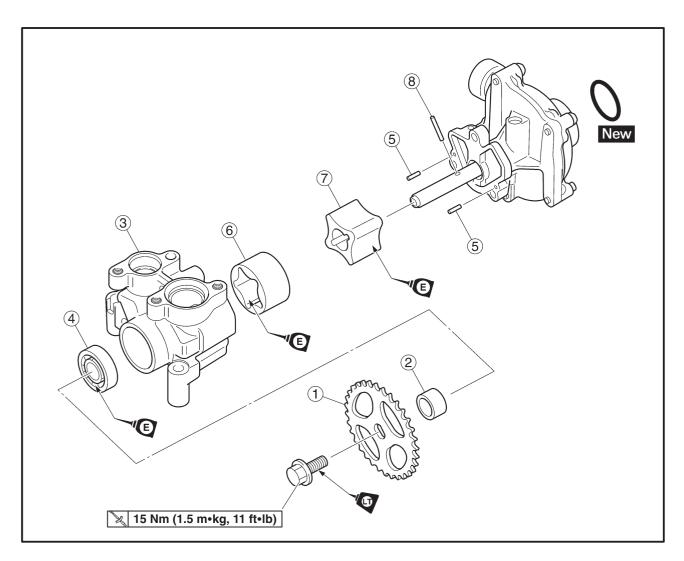


| Order       | Job/Part                                                                  | Q'ty        | Remarks                                                                         |
|-------------|---------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------|
|             | Removing the oil pan and oil pump<br>Side cowlings<br>Bottom cowlings     | -           | Remove the parts in the order listed.  Refer to "COWLINGS" in chapter 3.        |
|             | Engine oil                                                                |             | Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.                         |
|             | Exhaust pipe and exhaust valve pipe Clutch assembly Water pump inlet pipe |             | Refer to "EXHAUST PIPE". Refer to "CLUTCH". Refer to "OIL COOLER" in chapter 6. |
| 1 2         | Water pump outlet pipe Oil level switch lead coupler Oil level switch     | 1           | Disconnect.                                                                     |
| 3 4         | Oil level switch lead holder Oil pan                                      | 1           |                                                                                 |
| 5           | Oil pan gasket                                                            | 1           |                                                                                 |
| 6<br>7<br>8 | Dowel pin Drain pipe Oil strainer                                         | 2<br>1<br>1 |                                                                                 |



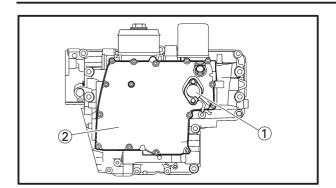
| Order | Job/Part                            | Q'ty | Remarks                                          |
|-------|-------------------------------------|------|--------------------------------------------------|
| 9     | Oil pipe                            | 1    |                                                  |
| 10    | Oil delivery pipe                   | 1    |                                                  |
| 11    | Relief valve assembly               | 1    |                                                  |
| 12    | Oil/water pump assembly drive       | 1    |                                                  |
|       | chain guide                         |      |                                                  |
| 13    | Collar                              | 1    |                                                  |
| 14    | Oil/water pump assembly drive       | 1    |                                                  |
|       | sprocket                            |      |                                                  |
| 15    | Washer                              | 1    |                                                  |
| 16    | Oil/water pump assembly drive chain | 1    |                                                  |
| 17    | Dowel pin                           | 1    |                                                  |
| 18    | Oil/water pump assembly             | 1    |                                                  |
|       |                                     |      | For installation, reverse the removal procedure. |

EAS00360



| Order    | Job/Part                                                                                                                                    | Q'ty                       | Remarks                                                                                      |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------|
| 12345678 | Disassembling the oil pump Oil/water pump driven sprocket Collar Oil pump housing Bearing Pin Oil pump outer rotor Oil pump inner rotor Pin | 1<br>1<br>1<br>2<br>1<br>1 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |

# OIL PAN AND OIL PUMP



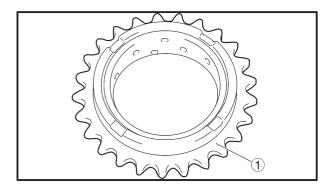
EAS00362

## REMOVING THE OIL PAN

- 1. Remove:
- oil level switch 1
- •oil pan 2
- oil pan gasket
- dowel pins

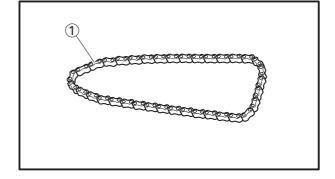
NOTE: -

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.



# CHECKING THE SPROCKET AND CHAIN

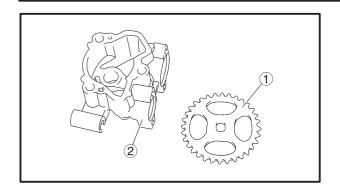
- 1. Check:
  - oil/water pump assembly drive sprocket ①
     Cracks/damage/wear → Replace the defective part(-s).



# 2. Check:

oil/water pump assembly drive chain ①
 Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.

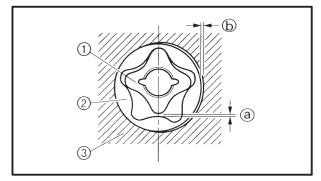




EAS00364

#### CHECKING THE OIL PUMP

- 1. Check:
  - oil pump driven gear ①
  - oil pump rotor housing ②
- oil pump 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
- 1 Inner rotor
- 2 Outer rotor
- (3) Oil pump housing



# Inner-rotor-to-outer-rotor-tip clearance

earance  $0.01 \sim 0.10 \ \text{mm} \ (0.0004 \sim 0.0039 \ \text{in})$ 

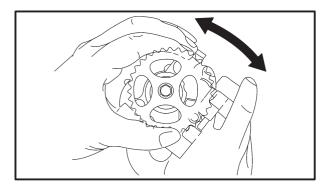
<Limit>: 0.18 mm (0.0071 in)

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

 $0.09 \sim 0.15 \, \text{mm}$ 

 $(0.0035 \sim 0.0059 \text{ in})$ 

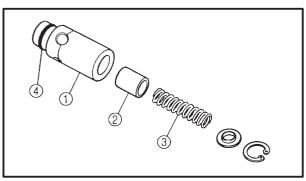
<Limit>: 0.22 mm (0.0087 in)



### 3. Check:

• oil pump operation

Rough movement  $\rightarrow$  Repeat steps (1) and (2) or replace the defective part(s).



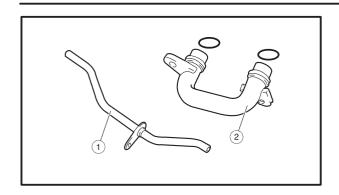
#### EAS00365

#### **CHECKING THE RELIEF VALVE**

- 1. Check:
  - relief valve body 1
  - relief valve 2
  - spring ③
- O-ring (4)

Damage/wear  $\rightarrow$  Replace the defective part(s).





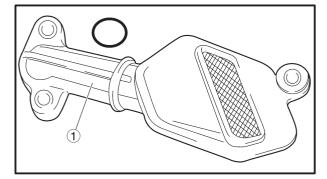
AS00367

## CHECKING THE OIL DELIVERY PIPE AND OIL PIPE

- 1. Check:
  - oil delivery pipe ①
  - oil pipe ②

Damage → Replace.

Obstruction  $\rightarrow$  Wash and blow out with compressed air.



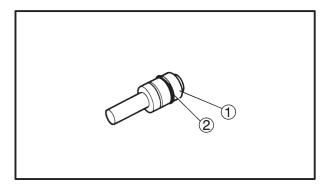
EAS00368

### **CHECKING THE OIL STRAINER**

- 1. Check:
- oil strainer (1)

Damage → Replace.

Contaminants → Clean with solvent.



EAS00373

### **CHECKING THE OIL NOZZLES**

The following procedure applies to all of the oil nozzles.

- 1. Check:
- oil nozzle (1)

Damage/wear → Replace the oil nozzle.

• O-ring 2

Damage/wear → Replace.

• oil nozzle passage

Obstruction → Blow out with compressed air.

EAS00374

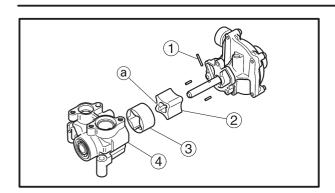
#### ASSEMBLING THE OIL PUMP

- 1. Lubricate:
  - inner rotor
  - outer rotor
  - oil pump shaft (with the recommended lubricant)



Recommended lubricant Engine oil



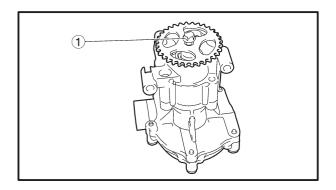


2. Install:

- pin (1)
- •inner rotor ②
- outer rotor (3)
- oil pump housing 4

NOTE: -

When installing the inner rotor, align the pin 1 in the oil pump shaft with the groove a in the inner rotor 2.



3. Install:

• oil/water pump driven sprocket ①

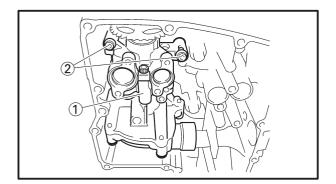
15 Nm (1.5 m•kg, 11 ft•lb)

NOTE: -

5VY mark of the oil/water pump driven gear is installed at oil pump side.

4. Check:

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

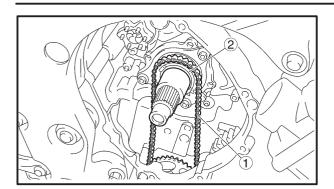


# INSTALLING THE OIL/WATER PUMP ASSEMBLY

- 1. Install:
  - •O-ring New
  - oil/water pump assembly 1
  - dowel pin
- bolts 2

12 Nm (1.2 m•kg, 8.7 ft•lb)





2. Install:

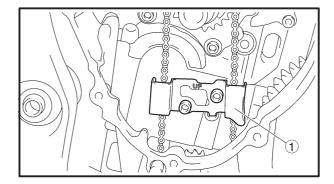
- washer
- oil/water pump assembly drive chain ①
- oil/water pump assembly drive sprocket 2
- collar

NOTE: -

Install the oil/water pump assembly drive chain ① onto the oil/water pump assembly drive sprocket ②.

**CAUTION:** 

After installing the oil/water pump assembly drive chain and drive sprocket, make sure the oil/water pump turns smoothly.



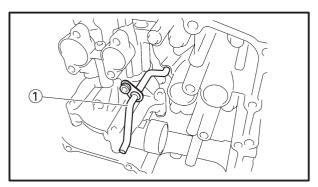
3. Install:

• oil/water pump assembly drive chain guide

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: -

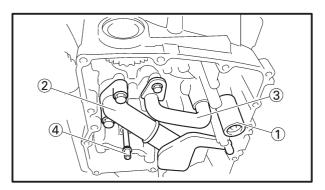
"UP" mark of the oil/water pump assembly drive chain guide is upward.



4. Install:

• oil delivery pipe ①

10 Nm (1.0 m•kg, 7.2 ft•lb)



5. Install:

• relief valve (1)

O-ring New

• oil strainer (2)

10 Nm (1.0 m•kg, 7.2 ft•lb)

O-ring New

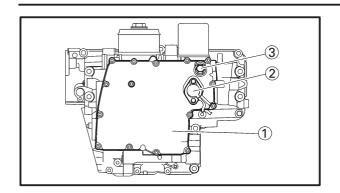
• oil pipe ③

O-ring New

• drain pipe 4

• O-ring New





EAS00380

### **INSTALLING THE OIL PAN**

- 1. Install:
- dowel pins
- gasket New
- oil pan (1)

12 Nm (1.2 m•kg, 8.7 ft•lb)

• oil level switch 2

10 Nm (1.0 m•kg, 7.2 ft•lb)

• engine oil drain bolt 3

3Nm (4.3 m•kg, 31 ft•lb)

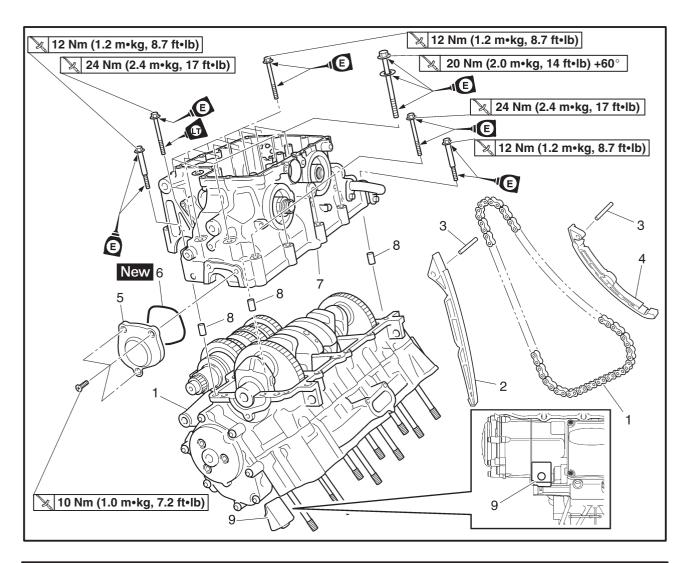


Always use new copper washers.

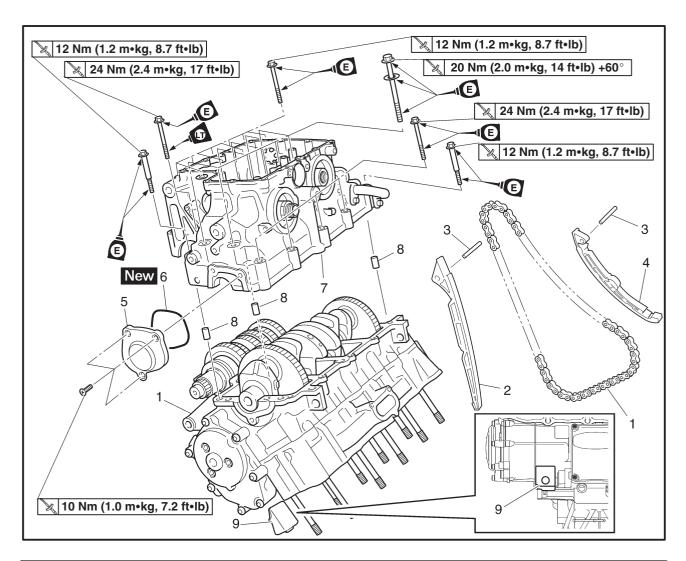
#### NOTE: -

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





| Order | Job/Part                                                                                                         | Q'ty | Remarks                                                                                                                                                                                                       |
|-------|------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | Removing the crankcase Air filter case Throttle body assembly  Engine Cylinder head Starter clutch and generator |      | Remove the parts in the order listed. Refer to "AIR FILTER CASE" in chapter 3. Refer to "THROTTLE BODIES" in chapter 7. Refer to "ENGINE". Refer to "CYLINDER HEAD". Refer to "STARTER CLUTCH AND GENERATOR". |
|       | Shift shaft Crankshaft position sensor  Clutch Oil pan and oil pump Starter motor                                |      | Refer to "SHIFT SHAFT". Refer to "CRANKSHAFT POSITION SENSOR". Refer to "CLUTCH". Refer to "OIL PAN AND OIL PUMP". Refer to "STARTING SYSTEM" in chapter 8.                                                   |



| Order | Job/Part                          | Q'ty | Remarks                                          |
|-------|-----------------------------------|------|--------------------------------------------------|
| 1     | Timing chain                      | 1    |                                                  |
| 2     | Timing chain guide (intake side)  | 1    |                                                  |
| 3     | Pin                               | 2    |                                                  |
| 4     | Timing chain guide (exhaust side) | 1    |                                                  |
| 5     | Left side cover                   | 1    |                                                  |
| 6     | O-ring                            | 1    |                                                  |
| 7     | Lower crankcase                   | 1    |                                                  |
| 8     | Dowel pin                         | 3    |                                                  |
| 9     | Damper                            | 1    |                                                  |
|       |                                   |      | For installation, reverse the removal procedure. |

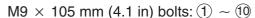
AS00384

#### **DISASSEMBLING THE CRANKCASE**

- 1. Place the engine upside down.
- 2. Remove:
  - crankcase bolts

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.



M8  $\times$  60 mm (2.4 in) bolt: 11 LOCTITE<sup>®</sup>

M8  $\times$  60 mm (2.4 in) bolts: 12, 16

 $M6 \times 70 \text{ mm } (2.8 \text{ in) bolts: } 19, 21, 23$ 

M6  $\times$  65 mm (2.5 in) bolts: 17, 18

M6  $\times$  60 mm (2.4 in) bolts: 22, 24, 25

M6  $\times$  50 mm (2.0 in) bolts: 20, 26

M8  $\times$  50 mm (2.0 in) bolts: (13)  $\sim$  (15)

- 3. Remove:
  - lower crankcase

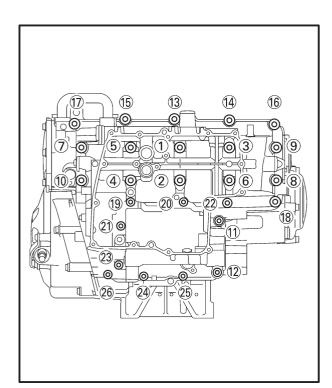
## **CAUTION:**

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

- 4. Remove:
  - dowel pins
- 5. 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.



ENG

AS00399

#### 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.

ΔS00401

## CHECKING THE BEARINGS AND OIL SEALS

- 1. Check:
  - bearings

Clean and lubricate the bearings, then rotate the inner race with your finger.

Rough movement  $\rightarrow$  Replace.

- 2. Check:
  - oil seals

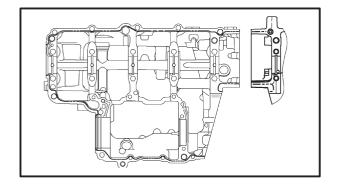
Damage/wear → Replace.

#### ASSEMBLING THE CRANKCASE

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



Recommended lubricant Engine oil



- 2. Apply:
  - sealant

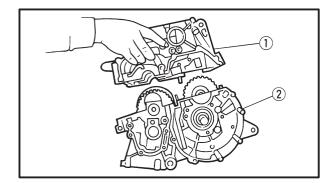


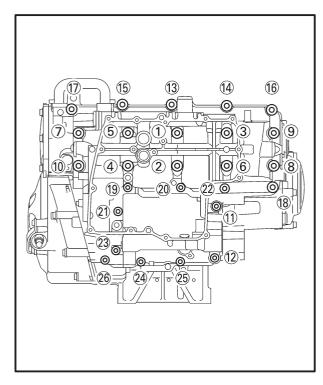
Yamaha bond No. 1215 90890-85505, ACC-1109-05-01

#### 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  $\sim$  3 mm (0.08  $\sim$  0.12 in) of the crankshaft journal bearings.

- 3. Install:
  - dowel pin
- 4. Set the shift drum assembly and transmission gears in the neutral position.





#### 5. Install:

• lower crankcase ①
(onto the upper 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.

#### 6. Install:

crankcase bolts

#### NOTE: -

- Lubricate the bolt threads with engine oil.
- Install a washer on bolts  $\bigcirc$  ~  $\bigcirc$  and  $\bigcirc$ 2.
- Seal bolt 18
- Tighten the bolts in the tightening sequence cast on the crankcase.

M9  $\times$  105 mm (4.1 in) bolts: ①  $\sim$  ①

M8  $\times$  60 mm (2.4 in) bolt: 11 LOCTITE®

M8  $\times$  60 mm (2.4 in) bolts: 12, 16

M6  $\times$  70 mm (2.8 in) bolts: (19, 21), (23)

M6  $\times$  65 mm (2.5 in) bolts: (17), (18)

M6  $\times$  60 mm (2.4 in) bolts: 22, 24, 25

M6  $\times$  50 mm (2.0 in) bolts: 20, 26

M8  $\times$  50 mm (2.0 in) bolts: (13)  $\sim$  (15)



#### Crankcase bolt

**Bolt** (1) ~ (10)

1st: 20 Nm (2.0 m•kg, 14 ft•lb)

2nd\*: 20 Nm (2.0 m•kg, 14 ft•lb)

3rd: +60 $^{\circ}$ 

Bolt (11) ~ (16)

24 Nm (2.4 m•kg, 17 ft•lb)

Bolt (17) ~ (26)

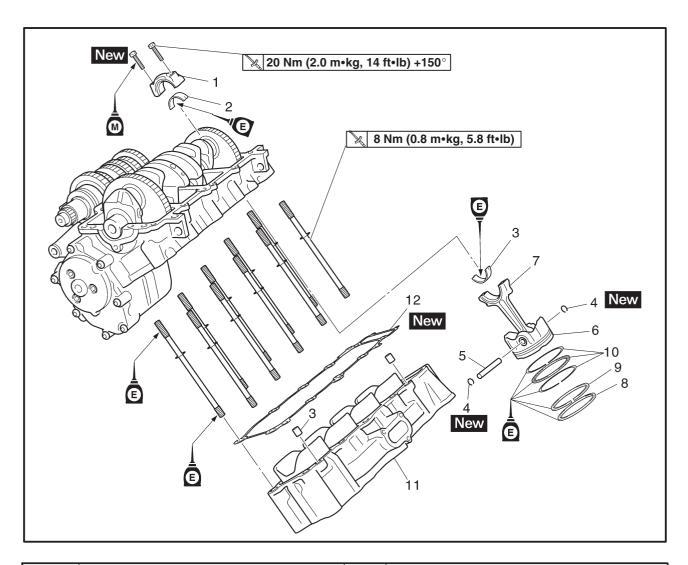
12 Nm (1.2 m•kg, 8.7 ft•lb)

<sup>\*</sup> Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.



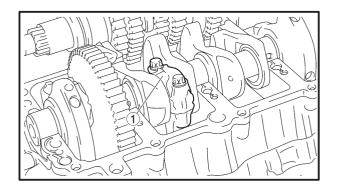
EAS00252

## **CONNECTING RODS AND PISTONS**



| Order | Job/Part                                 | Q'ty | Remarks                                          |
|-------|------------------------------------------|------|--------------------------------------------------|
|       | Removing the connecting rods and pistons |      | Remove the parts in the order listed.            |
|       | Lower crankcase                          |      | Refer to "CRANKCASE".                            |
| 1     | Connecting rod cap                       | 4    |                                                  |
| 2     | Big end lower bearing                    | 4    |                                                  |
| 3     | Big end upper bearing                    | 4    |                                                  |
| 4     | Piston pin clip                          | 8    |                                                  |
| 5     | Piston pin                               | 4    |                                                  |
| 6     | Piston                                   | 4    |                                                  |
| 7     | Connecting rod                           | 4    |                                                  |
| 8     | Top ring                                 | 4    |                                                  |
| 9     | 2nd ring                                 | 4    |                                                  |
| 10    | Oil ring                                 | 4    |                                                  |
| 11    | Cylinder                                 | 1    |                                                  |
| 12    | Cylinder gasket                          | 1    |                                                  |
|       |                                          |      | For installation, reverse the removal procedure. |





FAS00393

# REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

- 1. Remove:
  - connecting rod cap ①
  - big end bearings

#### NOTE: -

- Identify the position of each big end bearing so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.



- Cylinder
- Cylinder gasket
- Cylinder stud bolts

#### 3. Remove:

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

## **CAUTION:**

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

## NOTE: -

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set 4.



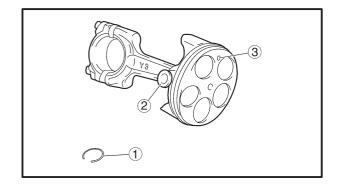
Piston pin puller set 90890-01304, YU-01304

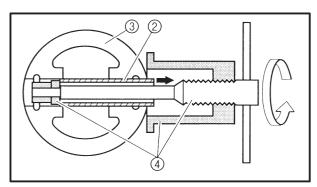
#### 4. Remove:

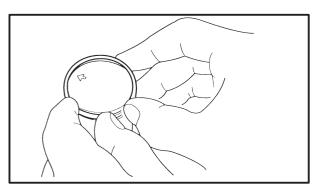
- top ring
- 2nd ring
- oil ring

#### 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.







EAS00387

#### REMOVING THE CRANKSHAFT ASSEMBLY

- 1. Remove:
- crankshaft assembly
  - crankshaft journal upper bearings (from the upper crankcase)
     Refer to "CRANKSHAFT".

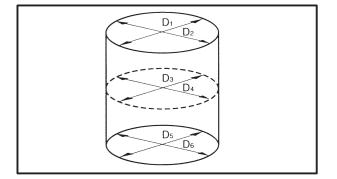
| NI |     | T |   |   |
|----|-----|---|---|---|
| N  | ( ) |   | - | • |

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

EAS00261

#### **CHECKING THE CYLINDER AND PISTON**

- 1. Check:
  - piston wall
  - cylinder wall
     Vertical scratches → Replace the cylinder, and the piston and piston rings as a set.



- 2. Measure:
  - piston-to-cylinder clearance
- a. Measure cylinder bore "C" with the cylinder bore gauge.

NOTE: \_

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



| Cylinder bore "C" | 77.00 ~ 77.01 mm<br>(3.0315 ~ 3.0319 in) |
|-------------------|------------------------------------------|
| Wear limit        | 77.06 mm (3.03 in)                       |
| Taper limit "T"   | 0.05 mm (0.002 in)                       |
| Out of round "R"  | 0.05 mm (0.002 in)                       |

| "C" = | maximum of $D_1 \sim D_6$                                         |
|-------|-------------------------------------------------------------------|
| "T" = | maximum of $D_1$ or $D_2$ – maximum of $D_5$ or $D_6$             |
| "R" = | maximum of $D_1$ $D_3$ or $D_5$ – minimum of $D_2$ $D_4$ or $D_6$ |

- b. If out of specification, replace the cylinder, and the pistons and piston rings as a set.
- c. Measure piston skirt diameter "P" with the micrometer.
- (a) 4 mm (0.16 in) from the bottom edge of the piston

Piston size "P" 76.975 ~ 76.990 mm (3.0305 ~ 3.0311 in)

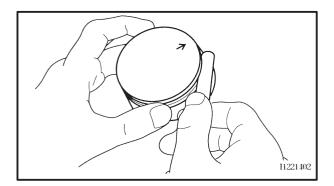
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

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



Piston-to-cylinder clearance  $0.010 \sim 0.035$  mm  $(0.0004 \sim 0.0014$  in) <Limit>: 0.120 mm (0.0047 in)

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



Ρ

#### EAS00263

## 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
       0.030 \sim 0.065 \text{ mm}
       (0.0012 \sim 0.0026 in)
       <Limit>: 0.115 mm (0.0045 in)
   2nd ring
       0.020 \sim 0.055 \text{ mm}
       (0.0008 \sim 0.002 \text{ in})
       <Limit>: 0.115 mm (0.0045 in)
```



(a)

11221401

(into the cylinder) NOTE: -

2. Install: piston ring

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

- (a) 5 mm (0.20 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
       0.15 \sim 0.25 \text{ mm}
       (0.0059 \sim 0.0098 in)
       <Limit>: 0.50 mm (0.0197 in)
   2nd ring
       0.30\,\sim\,0.45\;mm
       (0.0118 \sim 0.0177 \text{ in})
       <Limit>: 0.80 mm (0.0315 in)
   Oil ring
       0.10 \sim 0.40 \text{ mm}
       (0.0039 \sim 0.0158 \text{ in})
```

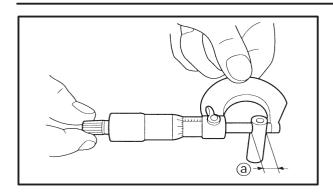
#### **CHECKING THE PISTON PINS**

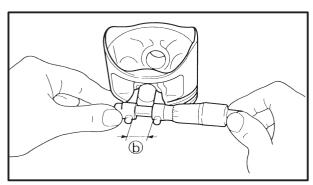
The following procedure applies to all of the piston pins.

- 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 16.991  $\sim$  17.000 mm (0.6689  $\sim$  0.6693 in) <Limit>: 16.971 mm (0.6682 in)

#### 3. Measure:

piston pin bore inside diameter (b)
 Out of specification → Replace the piston.



Piston pin bore inside diameter  $17.002 \sim 17.013 \text{ mm}$   $(0.6694 \sim 0.6698 \text{ in})$  <Limit>: 17.043 mm (0.6710 in)

#### 4. Calculate:

piston-pin-to-piston clearance
 Out of specification → Replace the piston pin and piston as a set.



Piston-pin-to-piston clearance =
Piston pin bore size –
Piston pin outside diameter
Piston-pin-to-piston clearance
0.002 ~ 0.022 mm
(0.0001 ~ 0.0009 in)
<Limit>: 0.072 mm (0.0028 in)

#### CHECKING THE BIG END BEARINGS

#### 1. Measure:

• crankshaft-pin-to-big-end-bearing clearance

Out of specification  $\rightarrow$  Replace the big end bearings.



Crankshaft-pin-to-big-end-bearing clearance

0.034 ~ 0.058 mm (0.0013 ~ 0.0023 in) <Limit>: 0.09 mm (0.0035 in)

The following procedure applies to all of the connecting rods.

ENG

### **CAUTION:**

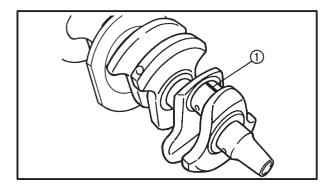
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.



I1630301

Align the projections (a) on the big end bearings with the notches (b) in the connecting rod and connecting rod cap.

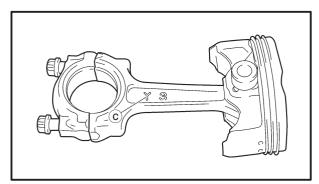


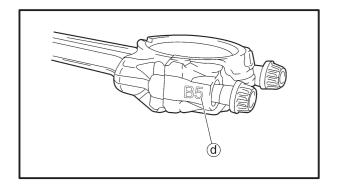
**(b)** 

- c. Put a piece of Plastigauge® ① on the crankshaft pin.
- d. Assemble the connecting rod halves.

#### NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads with molybdenum disulfide grease.
- Make sure that the "Y" mark © on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters (d) on both the connecting rod and connecting rod cap are aligned.





ENG

e. Tighten the connecting rod bolts.

NOTE: -

Install by carrying out the following procedures in order to assemble in the most suitable condition.



Connecting rod bolt 29.4 Nm (3.0 m•kg, 21 ft•lb)

NOTE: -

- First, tighten the bolts to 15 Nm (1.5 m•kg, 11 ft•lb).
- Retighten the bolts to 29.4 Nm (3.0 m•kg, 21 ft•lb).
- Replace the connecting rod bolts with new ones.
- g. Clean the connecting rod bolts.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.
- i. Tighten the connecting rod bolt while checking that the sections shown (a) and (b) are flush with each other by touching the surface.
  - Side machined face (a)
  - Thrusting faces (4 places at front and rear) (b)

NOTE: -

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

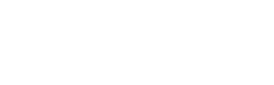
- j. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.
- k. Tighten the connecting rod bolts.



Connecting rod bolt 20 Nm (2.0 m•kg, 14 ft•lb) + 150°

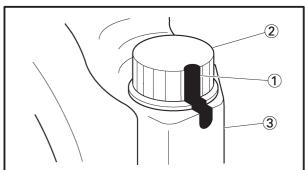
**CAUTION:** 

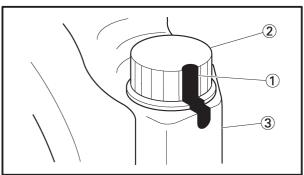
Tighten the connecting rod bolts using the plastic-region tightening angle method.

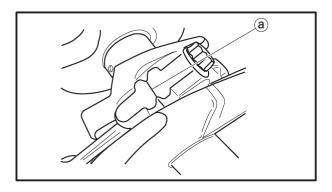


(a)









- I. Clean the connecting rod bolts.
- m. Tighten the connecting rod bolts.
- n. Put a mark 1) on the corner of the connecting rod bolt (2) and the connecting rod (3).
- o. Tighten the bolt further to reach the specified angle (150°).

- p. After the installation, check that the section shown (a) is flush with each other by touching the surface.
  - Side machined face (a)

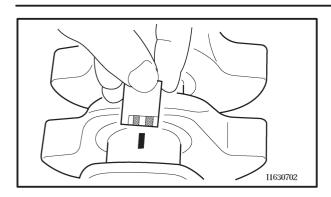
## **⚠** WARNING

- When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it.
- Replace the bolt with a new one and perform the procedure again.
- If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step "e". In this case, make sure to replace the connecting rod bolt.

## **CAUTION:**

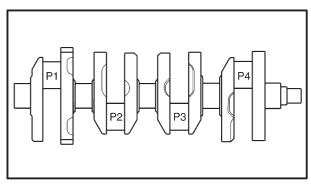
- Do not use a torque wrench to tighten the nut to the specified angle.
- Tighten the bolt until it is at the specified angles.
- q. Remove the connecting rod and big end bearings.
  - Refer to "REMOVING THE CONNECTING RODS".





r. Measure the compressed Plastigauge® width on the crankshaft pin.

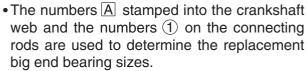
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



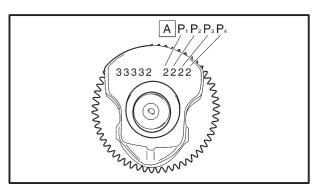
2. Select:

big end bearings (P1 ~ P4)

NOTE: -



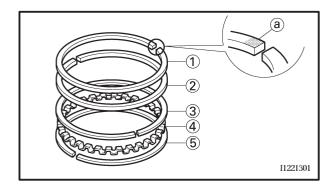
• "P1" ~ "P4" refer to the bearings shown in the crankshaft illustration.



For example, if the connecting rod "P<sub>1</sub>" and the crankshaft web "P<sub>1</sub>" numbers are "5" and "2" respectively, then the bearing size for "P1" is:

|--|

| BIG END BEARING COLOR CODE |       |  |  |
|----------------------------|-------|--|--|
| 1 Blue                     |       |  |  |
| 2                          | Black |  |  |
| 3                          | Brown |  |  |
| 4 Green                    |       |  |  |



# INSTALLING THE CONNECTING ROD AND PISTON

The following procedure applies to all of the connecting rods and pistons.

- 1. Install:
  - top ring ①
  - 2nd ring ②
  - upper oil ring rail ③
  - oil ring expander 4
  - lower oil ring rail (5)

ENG

NOTE: -

Be sure to install the piston rings so that the manufacturer's marks or numbers (a) face up.



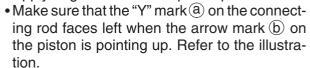
• piston ①
(onto the respective connecting rod ②)

• piston pin ③

• piston pin clip New 4



• Apply engine oil onto the piston pin.



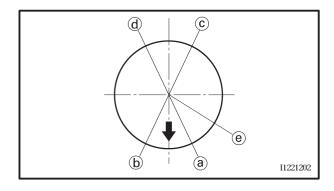
 Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



- piston
- piston rings
- cylinder (with the recommended lubricant)



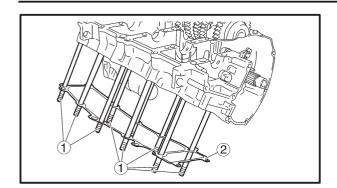
Recommended lubricant Engine oil



- 4. Offset:
  - piston ring end gaps
- (a) Top ring
- (b) Lower oil ring rail
- © Upper oil ring rail
- d 2nd ring
- (e) Oil ring expander
- 5. Lubricate:
  - crankshaft pins
  - big end bearings
  - connecting rod big end inner surface (with the recommended lubricant)



Recommended lubricant Engine oil



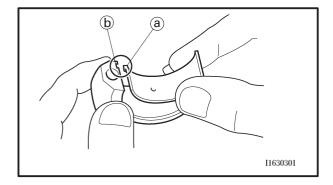
6. Check:

• cylinder stud bolts 1

8 Nm (0.8 m•kg, 5.8 ft•lb)

7. Install:

• cylinder gasket 2 New



8. Install:

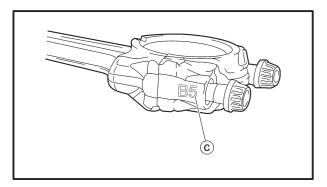
 big end bearings (onto the connecting rods and connecting rod caps)

NOTE: -

• Align the projection (a) on the big end bearings with the notches (b) in the connecting rods and connecting rod caps.

• Be sure to reinstall each big end bearing in its original place.

 Make sure that the characters © on both the connecting rod and connecting rod cap are aligned.



| _ | _    |   |   |    |        |   |   |
|---|------|---|---|----|--------|---|---|
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|   |      | ľ |   | ш  |        |   | _ |

NOTE: -

Install by carrying out the following procedures in order to assemble in the most suitable condition.

connecting rod bolts

29.4 Nm (3.0 m•kg, 21 ft•lb)

NOTE:

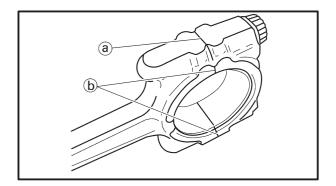
• First, tighten the bolts to 15 Nm (1.5 m•kg, 11 ft•lb).

• Retighten the bolts to 29.4 Nm (3.0 m•kg, 21 ft•lb).

a. Replace the connecting rod bolts with new ones.



- b. Clean the connecting rod bolts.
- c. After installing the big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.

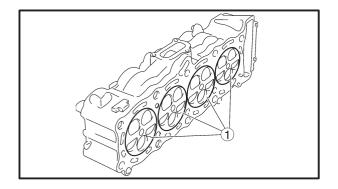


- d. Tighten the connecting rod bolt while checking that the sections shown (a) and (b) are flush with each other by touching the surface.
  - Side machined face (a)
  - Thrusting faces (4 places at front and rear) (b)

#### NOTE: -

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.



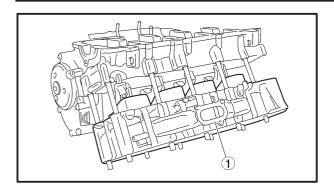
### 10. Install:

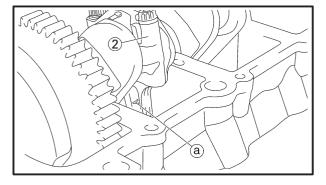
piston assemblies ①
 (into the cylinder)

#### NOTE: -

While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.





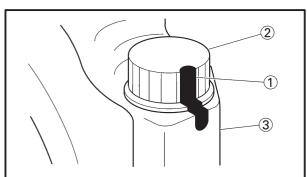


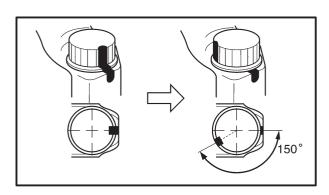


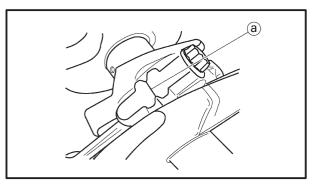
- cylinder assembly (1)
- connecting rod caps 2

### NOTE: -

- Make sure that the "Y" marks (a) on the connecting rods face towards the left side of the crankshaft.
- Make sure that the characters on both the connecting rod and connecting rod cap are aligned.







## 12. Tighten:

connecting rod bolts

20 Nm (2.0 m•kg, 14 ft•lb) + 150°

### **CAUTION:**

Tighten the connecting rod bolts using the plastic-region tightening angle method.

- a. Clean the connecting rod bolts.
- b. Tighten the connecting rod bolts.
- c. Put a mark 1 on the connecting rod bolts 2 and the connecting rod cap 3.
- d. Tighten the bolt further to reach the specified angle  $(150^{\circ})$ .
- e. After the installation, check that the section show ⓐ is flush with each other by touching the surface.
- Side machined face (a)

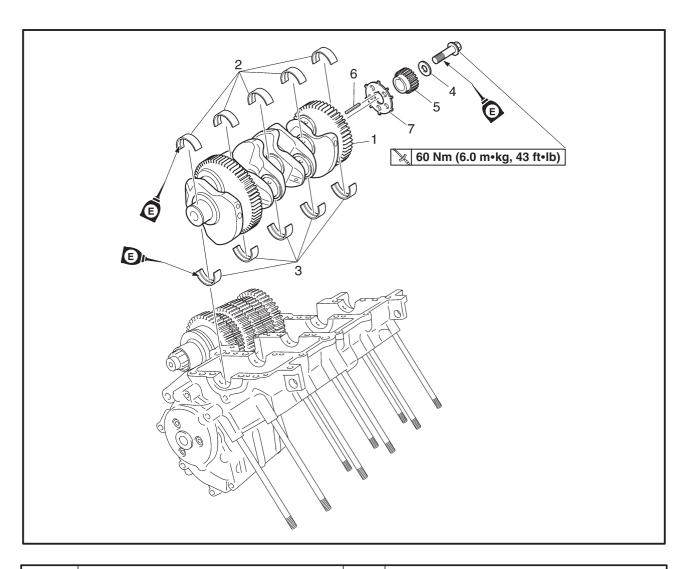
ENG

## **A** WARNING

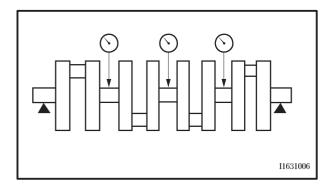
- When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it.
  - Replace the bolt with a new one and perform the procedure again.
- If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step "9".
- In this case, make sure to replace the connecting rod bolt.

| C  | Λ | П | П   | ш |   | N  | Н |
|----|---|---|-----|---|---|----|---|
| C. | А | U | , , | ш | U | IN | H |

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angles.



| Order                           | Job/Part                                                                                                                                                                                             | Q'ty                       | Remarks                                                                                                                                                         |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7 | Removing the crankshaft Crankcase  Connecting rod and connecting rod caps Crankshaft Crankshaft journal lower bearing Crankshaft journal upper bearing Washer Crankshaft drive gear Pin Pickup rotor | 1<br>5<br>5<br>1<br>1<br>1 | Remove the parts in the order listed. Separate. Refer to "CRANKCASE". Refer to "CONNECTING RODS AND PISTONS".  For installation, reverse the removal procedure. |



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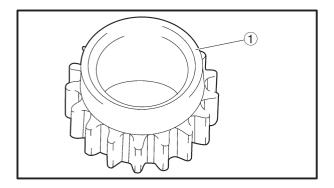
#### CHECKING THE CRANKSHAFT

- 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.



## CHECKING THE CRANKSHAFT DRIVE SPROCKET

- 1. Check:
  - crankshaft drive sprocket ①
     Cracks/damage/wear → Replace the defective part(s).

# CHECKING THE CRANKSHAFT JOURNAL BEARINGS

- 1. Measure:
  - crankshaft-journal-to-crankshaft-journalbearing clearance
     Out of specification → Replace the crankshaft journal bearings.



Crankshaft-journal-to-crankshaft-journal-bearing clearance

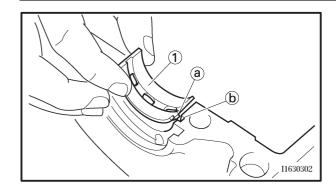
 $0.014 \sim 0.037 \text{ mm} \ (0.0006 \sim 0.0015 \text{ in})$ 

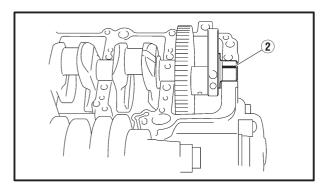
<Limit>: 0.10 mm (0.0039 in)

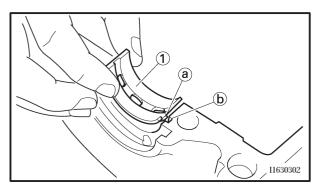
### **CAUTION:**

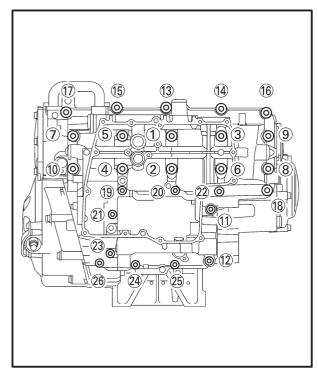
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.











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) on the crankshaft journal upper bearings with the notches (b) in the upper crankcase.

d. Put a piece of Plastigauge<sup>®</sup> ② on each crankshaft journal.

#### NOTE: -

Do not put the Plastigauge<sup>®</sup> over the oil hole in the crankshaft journal.

e. Install the crankshaft journal lower bearings

(1) 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 lower 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.



#### Crankcase bolt

Bolt (1) ~ (10)

1st: 20 Nm (2.0 m•kg, 14 ft•lb)

2nd: 20 Nm (2.0 m•kg, 14 ft•lb)

3rd: +60 $^{\circ}$ 

**Bolt** (11) ~ (16)

24 Nm (2.4 m•kg, 17 ft•lb)

Bolt 17 ~ 26

12 Nm (1.2 m•kg, 8.7 ft•lb)

M9 × 105 mm (4.1 in) bolts: (1)  $\sim$  (10)

M8  $\times$  60 mm (2.4 in) bolt: 11 LOCTITE®

M8  $\times$  60 mm (2.4 in) bolts: (12), (16)

 $M6 \times 70 \text{ mm } (2.8 \text{ in) bolts: } (19, 21), 23$ 

M6  $\times$  65 mm (2.5 in) bolts: (17), (18)

M6  $\times$  60 mm (2.4 in) bolts: 2, 4, 5

 $M6 \times 50 \text{ mm } (2.0 \text{ in}) \text{ bolts: } 20, 26$ 

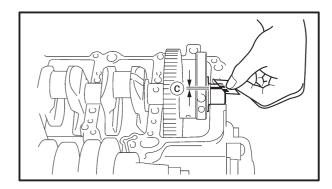
M8  $\times$  50 mm (2.0 in) bolts: 13  $\sim$  15

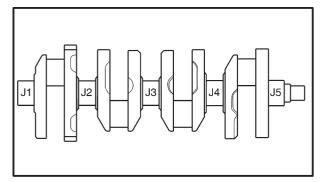
\* Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.

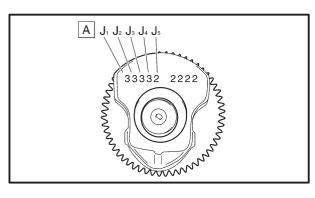
NOTE: -

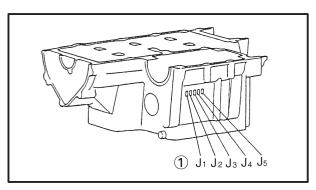
Lubricate the crankcase bolt threads with engine oil.

Refer to "CRANKCASE".









- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width © on each crankshaft journal.

  If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.
- 2. Select:
  - crankshaft journal bearings (J1 ~ J5)

NOTE:

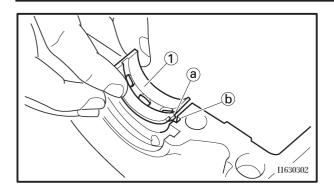
- The numbers A stamped into the crankshaft web and the numbers 1 stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- •"J1  $\sim$  J5" refer to the bearings shown in the crankshaft illustration.
- If "J1  $\sim$  J5" are the same, use the same size for all of the bearings.
- If the size is the same for all "J<sub>1</sub> to J<sub>5</sub>" one digit for that size is indicated. (Crankcase side only)

For example, if the crankcase "J<sub>1</sub>" and crankshaft web "J<sub>1</sub>" numbers are "6" and "2" respectively, then the bearing size for "J1" is:

"J<sub>1</sub>" (crankcase) – "J<sub>1</sub>" (crankshaft web) – 1 = 6 – 2 – 1 = 3 (brown)

| CRANKSHAFT JOURNAL BEARING<br>COLOR CODE |       |  |  |
|------------------------------------------|-------|--|--|
| 0 White                                  |       |  |  |
| 1                                        | Blue  |  |  |
| 2                                        | Black |  |  |
| 3                                        | Brown |  |  |
| 4                                        | Green |  |  |





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#### **INSTALLING THE CRANKSHAFT**

- 1. Install:
- crankshaft journal upper bearings ① (into the upper crankcase)
- 2. Lubricate:
  - crankshaft journal upper bearings (with the recommended lubricant)

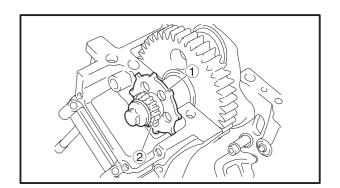


Recommended lubricant Engine oil

#### NOTE: —

- Align the projections (a) on the crankshaft journal upper bearings with the notches (b) in the upper crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.
- 3. Install:
  - crankshaft
- 4. Install:
  - crankcase (lower) Refer to "CRANKCASE".
- 5. Install:
  - pin
  - pickup rotor ①
  - drive sprocket 2

60 Nm (6.0 m•kg, 43 ft•lb)

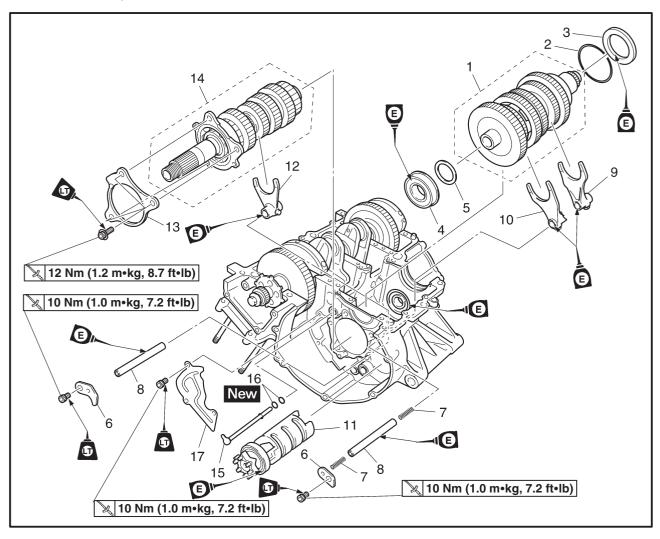




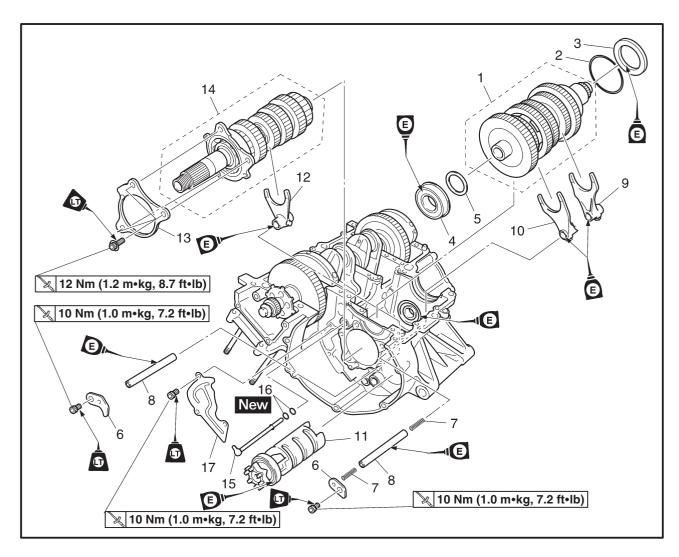
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## TRANSMISSION

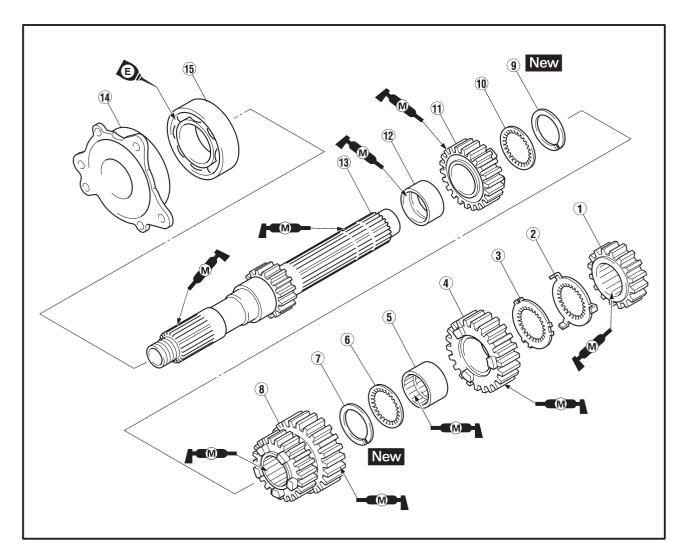
## TRANSMISSION, SHIFT DRUM ASSEMBLY AND SHIFT FORKS



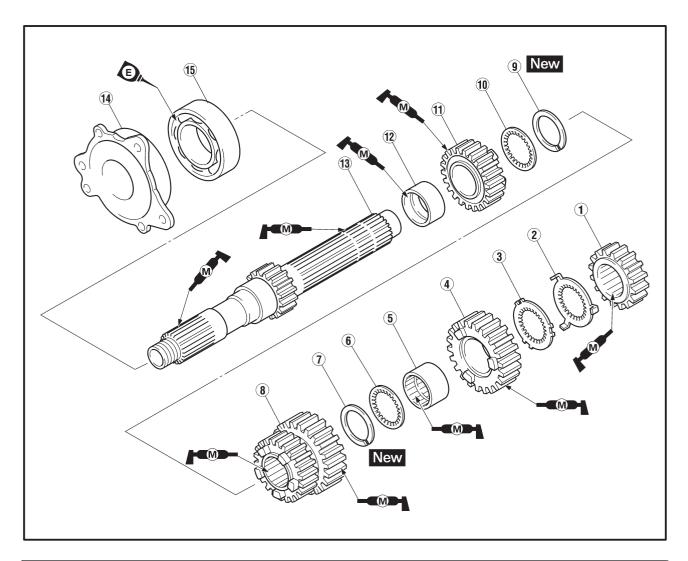
| Order | Job/Part                                                        | Q'ty | Remarks                              |
|-------|-----------------------------------------------------------------|------|--------------------------------------|
|       | Removing the transmission, shift drum assembly, and shift forks |      | Remove the part in the order listed. |
|       | Crankcase lower                                                 |      | Separate.                            |
|       |                                                                 |      | Refer to "CRANKCASE".                |
| 1     | Drive axle assembly                                             | 1    |                                      |
| 2     | Circlip                                                         | 1    |                                      |
| 3     | Oil seal                                                        | 1    |                                      |
| 4     | Bearing                                                         | 1    |                                      |
| 5     | Washer                                                          | 1    |                                      |
| 6     | Shift drum retainer                                             | 2    |                                      |
| 7     | Spring                                                          | 2    |                                      |
| 8     | Shift fork guide bar                                            | 2    |                                      |
| 9     | Shift fork "L"                                                  | 1    |                                      |
| 10    | Shift fork "R"                                                  | 1    |                                      |
| 11    | Shift drum assembly                                             | 1    |                                      |
| 12    | Shift fork "C"                                                  | 1    |                                      |



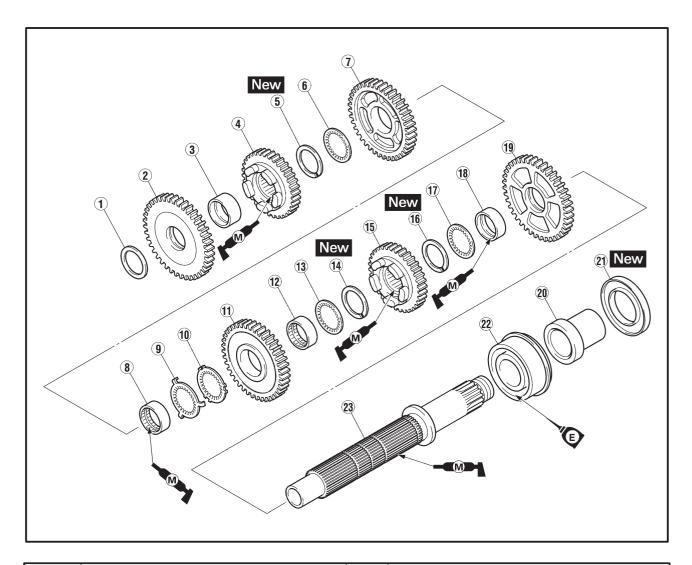
| Order                      | Job/Part                                                               | Q'ty                  | Remarks                                          |
|----------------------------|------------------------------------------------------------------------|-----------------------|--------------------------------------------------|
| 13<br>14<br>15<br>16<br>17 | Main axle retainer Main axle assembly Oil pipe O-ring Oil baffle plate | 1<br>1<br>1<br>2<br>1 | For installation, reverse the removal procedure. |



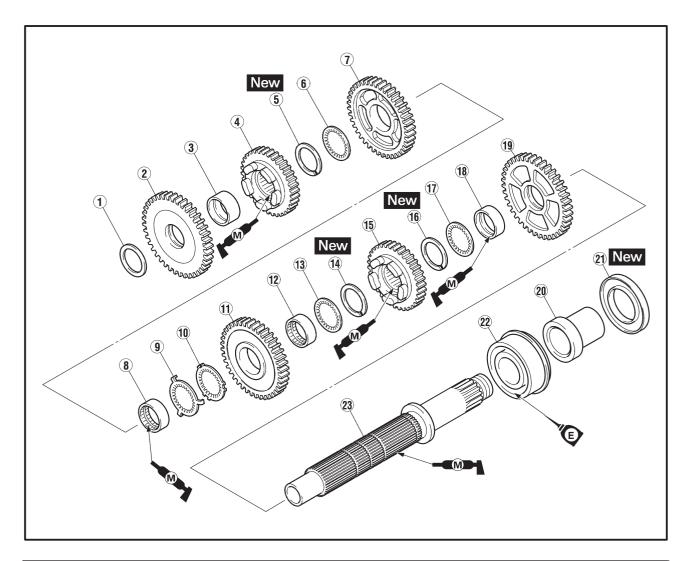
| assembly 2nd pinion gear 1 2 Toothed lock washer 3 Toothed lock washer retainer 4 6th pinion gear 5 Collar 6 Washer 1            | Order               | Job/Part                                                                                                                                                                                          | Q'ty                                                | Remarks                                    |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------|
| <ul> <li>3rd pinion gear</li> <li>Circlip</li> <li>Washer</li> <li>5th pinion gear</li> <li>Collar</li> <li>Main axle</li> </ul> | 1 2 3 4 5 6 7 8 9 0 | Disassembling the main axle assembly 2nd pinion gear Toothed lock washer Toothed lock washer retainer 6th pinion gear Collar Washer Circlip 3rd pinion gear Circlip Washer 5th pinion gear Collar | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | Disassemble the parts in the order listed. |



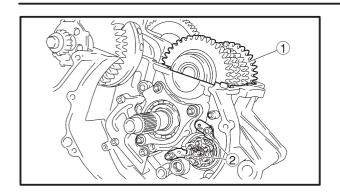
| Order        | Job/Part                   | Q'ty | Remarks                                          |
|--------------|----------------------------|------|--------------------------------------------------|
| (14)<br>(15) | Bearing housing<br>Bearing | 1    | For installation, reverse the removal procedure. |

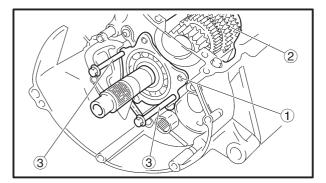


| Order                      | Job/Part                              | Q'ty | Remarks                                    |
|----------------------------|---------------------------------------|------|--------------------------------------------|
|                            | Disassembling the drive axle assembly |      | Disassemble the parts in the order listed. |
| 1                          | Washer                                | 1    |                                            |
| 1) 2) 3) 4) 5) 6) 7) 8) 9) | 1st wheel gear                        | 1    |                                            |
| 3                          | Collar                                | 1    |                                            |
| 4                          | 5th wheel gear                        | 1    |                                            |
| (5)                        | Circlip                               | 1    |                                            |
| 6                          | Washer                                | 1    |                                            |
| 7                          | 3rd wheel gear                        | 1    |                                            |
| 8                          | Collar                                | 1    |                                            |
| 9                          | Toothed lock washer                   | 1    |                                            |
| (10)                       | Toothed lock washer retainer          | 1    |                                            |
| <u>(11)</u>                | 4th wheel gear                        | 1    |                                            |
| (12)                       | Collar                                | 1    |                                            |
| 11 (12) (13)               | Washer                                | 1    |                                            |
| 14                         | Circlip                               | 1    |                                            |



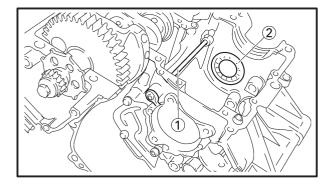
| Order                                                      | Job/Part                                                                               | Q'ty            | Remarks                                          |
|------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------|--------------------------------------------------|
| (5) (6) (7) (8) (9) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2 | 6th wheel gear Circlip Washer Collar 2nd wheel gear Collar Oil seal Bearing Drive axle | 1 1 1 1 1 1 1 1 | For installation, reverse the removal procedure. |



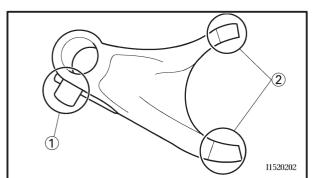


## **REMOVING THE TRANSMISSION**

- 1. Remove:
  - drive axle assembly 1
  - shift drum retainers 2
  - shift fork guide bars
  - shift fork "L" and "R"
  - shift drum assembly
  - shift fork "C"
- 2. Remove:
  - bearing housing ①
- main axle assembly ②
- a. Insert two bolts ③ of the proper size, as shown in the illustration, into the main axle assembly bearing housing.
- b. Tighten the bolts until they contact the crankcase surface.
- c. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.



- 3. Remove:
  - oil pipe ①
  - bearing 2



EAS00421

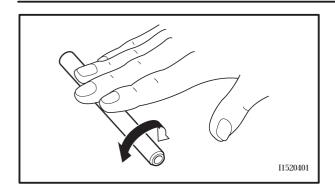
## **CHECKING THE SHIFT FORKS**

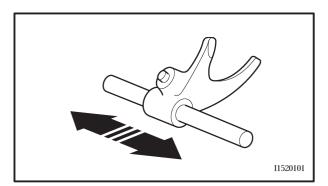
The following procedure applies to all of the shift forks.

- 1. Check:
  - shift fork cam follower 1
- shift fork pawl 2

Bends/damage/scoring/wear  $\rightarrow$  Replace the shift fork.









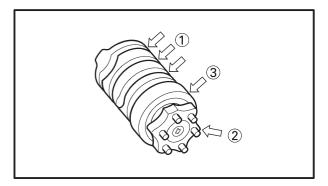
shift fork guide bar
 Roll the shift fork guide bar on a flat surface.
 Bends → Replace.

## **A** WARNING

Do not attempt to straighten a bent shift fork quide bar.



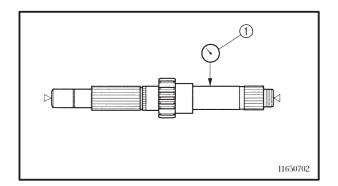
shift fork movement
 (along the shift fork guide bar)
 Rough movement → Replace the shift forks
 and shift fork guide bar as a set.



FAS00422

#### CHECKING THE SHIFT DRUM ASSEMBLY

- 1. Check:
  - shift drum grooves ①
     Damage/scratches/wear → Replace the shift drum assembly.
  - shift drum segment ②
     Damage/wear → Replace the shift drum assembly.
  - shift drum bearing ③
     Damage/pitting → Replace the shift drum assembly.



EAS00425

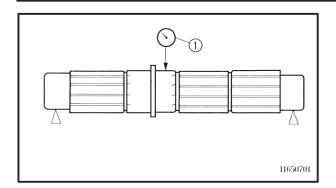
#### CHECKING THE TRANSMISSION

- 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 (0.0032 in)



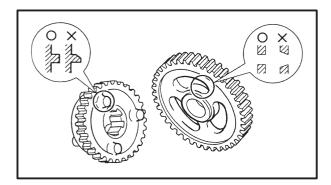


#### 2. Measure:

drive axle runout
 (with a centering device and dial gauge ①)
 Out of specification → Replace the drive axle.

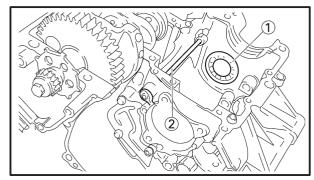


Drive axle runout limit 0.08 mm (0.0032 in)



#### 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).



#### **INSTALLING THE TRANSMISSION**

- 1. Install:
- •bearing ①

NOTE: -

Make the seal side of bearing face to the outside and install it close to the right end face of the crankcase.

- oil pipe 2
- 2. Install:
  - main axle assembly 1
  - bearing housing ②

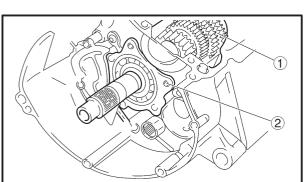
12 Nm (1.2 m•kg, 8.7 ft•lb)

- shift fork "C"
- shift drum assembly
- shift fork guide bar
- shift fork guide bar retainer

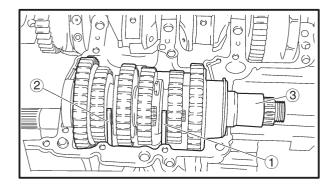
10 Nm (1.0 m•kg, 7.2 ft•lb)

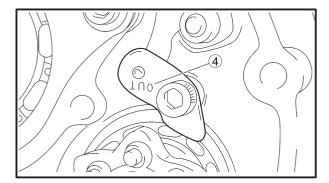


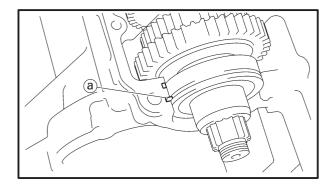
- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork "C" into the groove in the 3rd and 4th pinion gear on the main axle.











3. Install:

- shift fork "L" 1) and "R" 2)
- drive axle assembly ③
- shift fork guide bar
- shift fork guide bar retainer 4

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: -

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the drive axle bearing circlip (a) is inserted into the grooves in the upper crankcase.
- 4. Check:
  - transmission
     Rough movement → Repair.

NOTE:

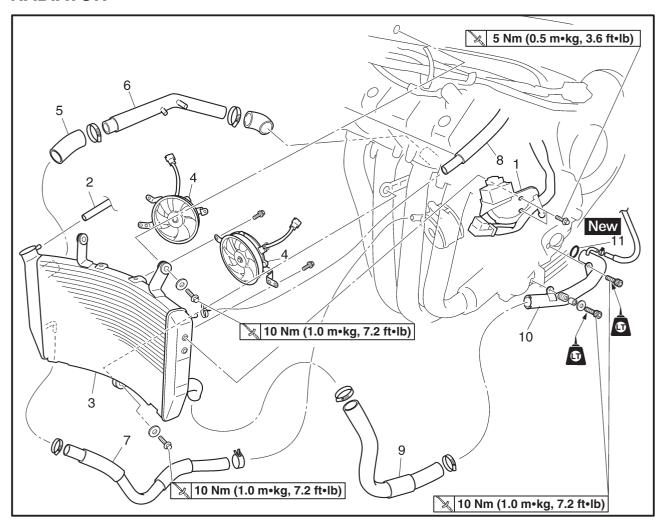
Oil each gear, shaft, and bearing thoroughly.



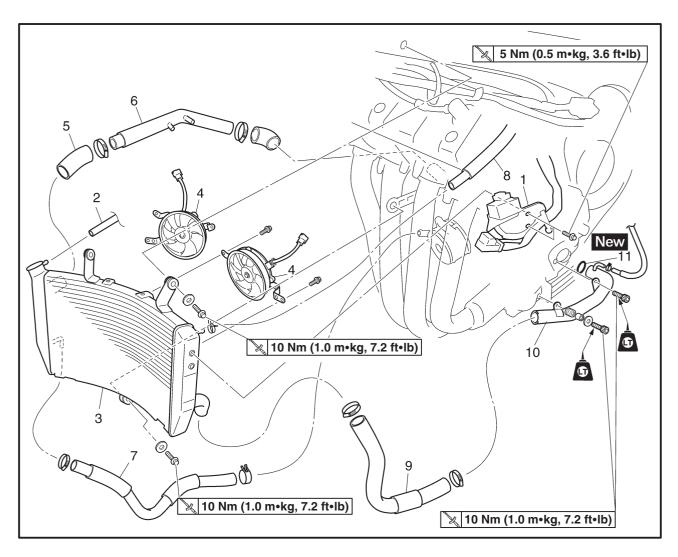
EAS00454

# **COOLING SYSTEM**

# **RADIATOR**



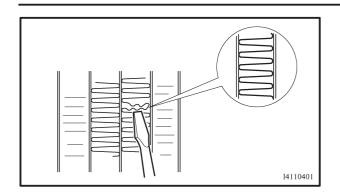
| Order                 | Job/Part                                                                                        | Q'ty                  | Remarks                                                                                                                                                                                                   |
|-----------------------|-------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Removing the radiator Rider seat Fuel tank Air filter case Side cowlings Bottom cowling Coolant | -<br>-<br>-<br>-      | Remove the parts in the order listed.  Refer to "SEATS" in chapter 3.  Refer to "AIR FILTER CASE" in chapter 3.  Refer to "COWLINGS" in chapter 3.  Drain.  Refer to "CHANGING THE COOLANT" in chapter 3. |
| 1<br>2<br>3<br>4<br>5 | Fuse box stay Coolant reservoir hose Radiator Radiator fan motor Radiator inlet hose            | 1<br>1<br>1<br>2<br>1 | Disconnect.                                                                                                                                                                                               |



| Order | Job/Part                 | Q'ty | Remarks                                          |
|-------|--------------------------|------|--------------------------------------------------|
| 6     | Radiator inlet pipe      | 1    |                                                  |
| 7     | Oil cooler outlet hose   | 1    |                                                  |
| 8     | Water pump breather hose | 1    |                                                  |
| 9     | Radiator outlet hose     | 1    |                                                  |
| 10    | Water pump inlet pipe    | 1    |                                                  |
| 11    | O-ring                   | 1    |                                                  |
|       |                          |      | For installation, reverse the removal procedure. |

#### **RADIATOR**





EAS0045

#### CHECKING THE RADIATOR

- 1. Check:
- radiator fins

Obstruction  $\rightarrow$  Clean.

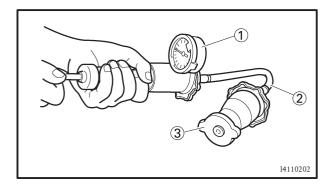
Apply compressed air to the rear of the radiator.

Damage → Repair or replace.

## NOTE: -

Straighten any flattened fins with a thin, flathead screwdriver.

- 2. Check:
  - radiator hoses
  - radiator pipes
     Cracks/damage → Replace.



#### 3. Measure:

radiator cap opening pressure
 Below the specified pressure → Replace the radiator cap.



Radiator cap opening pressure  $108 \sim 137$  kPa  $(1.08 \sim 1.37 \text{ kg/cm}^2, 1.0 \sim 1.3 \text{ bar, } 15.6 \sim 19.9 \text{ psi})$ 

a. Install the radiator cap tester ① and radiator cap tester adapter ② to the radiator cap ③.



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

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

- 4. Check:
  - radiator fan

Damage → Replace.

Malfunction → Check and repair.

Refer to "COOLING SYSTEM" in chapter 8.

## **RADIATOR**



EAS00456

## **INSTALLING THE RADIATOR**

- 1. Fill:
  - cooling system

(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

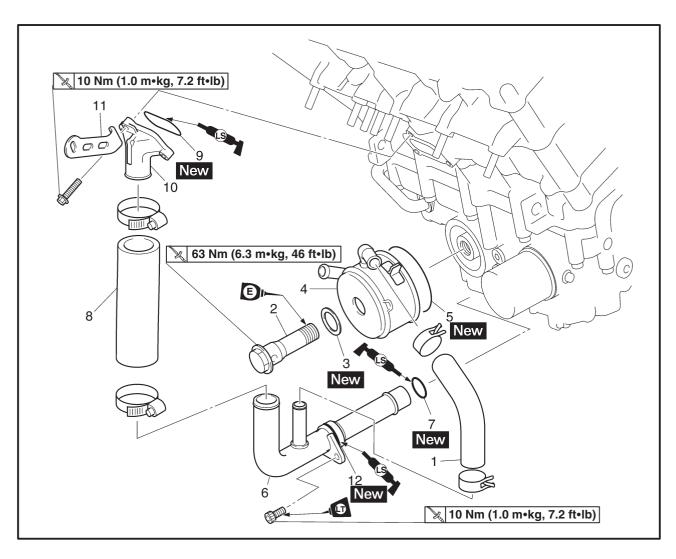
- 2. Check:
  - cooling system
     Leaks → Repair or replace any faulty part.
- 3. Measure:
  - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR".

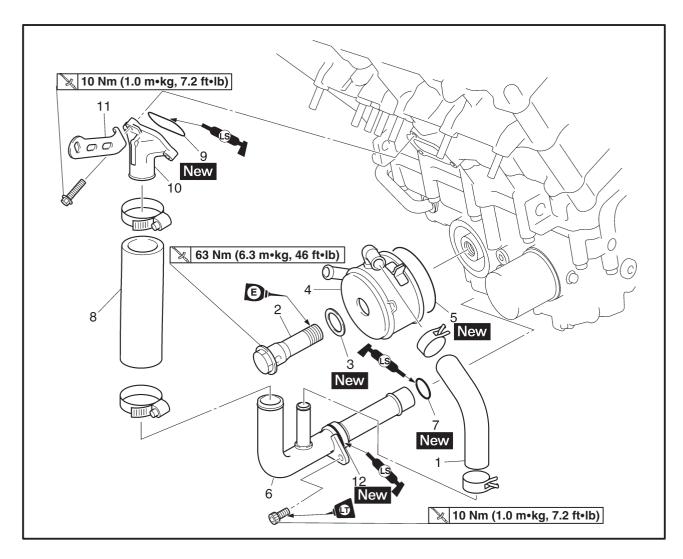


EAS00457

# **OIL COOLER**



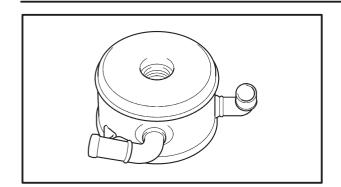
| Order | Job/Part                              | Q'ty | Remarks                                                                                       |
|-------|---------------------------------------|------|-----------------------------------------------------------------------------------------------|
|       | Removing the oil cooler<br>Engine oil |      | Remove the parts in the order listed. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. |
| 1 2   | Oil cooler inlet hose<br>Bolt         | 1    | ·                                                                                             |
| 3     | Washer                                | 1    |                                                                                               |
| 4     | Oil cooler                            | 1    |                                                                                               |
| 5     | O-ring                                | 1    |                                                                                               |
| 6     | Water pump outlet pipe                | 1    |                                                                                               |
| 7     | O-ring                                | 1    |                                                                                               |
| 8     | Water jacket joint inlet hose         | 1    |                                                                                               |
| 9     | O-ring                                | 1    |                                                                                               |



| Order          | Job/Part                             | Q'ty  | Remarks                                          |
|----------------|--------------------------------------|-------|--------------------------------------------------|
| 10<br>11<br>12 | Water jacket joint<br>Stay<br>O-ring | 1 1 1 | For installation, reverse the removal procedure. |

## **OIL COOLER**





AS00458

#### CHECKING THE OIL COOLER

- 1. Check:
  - oil cooler
     Cracks/damage → Replace.
- 2. Check:
  - oil cooler inlet hose
  - oil cooler outlet hose
     Cracks/damage/wear → Replace.

EAS00459

#### **INSTALLING THE OIL COOLER**

- 1. Clean:
  - mating surfaces of the oil cooler and the crankcase

(with a cloth dampened with lacquer thinner)

- 2. Install:
  - O-ring New
  - oil cooler (1)
  - washer 2 New
  - bolt ③

63 Nm (6.3 m•kg, 46 ft•lb)



- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil
- Make sure that the O-ring is positioned properly.
- Align the projection ⓐ on the oil cooler with the slot ⓑ in the crankcase.

#### 3. Fill:

cooling system

(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

crankcase

(with the specified amount of the recommended engine oil)

Refer to "CHANGING THE ENGINE OIL" in chapter 3.

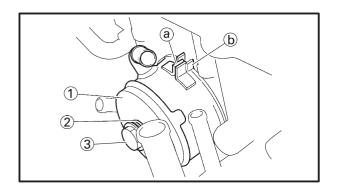
- 4. Check:
  - cooling system

Leaks → Repair or replace any faulty part.

- 5. Measure:
  - radiator cap opening pressure

Below the specified pressure  $\rightarrow$  Replace the radiator cap.

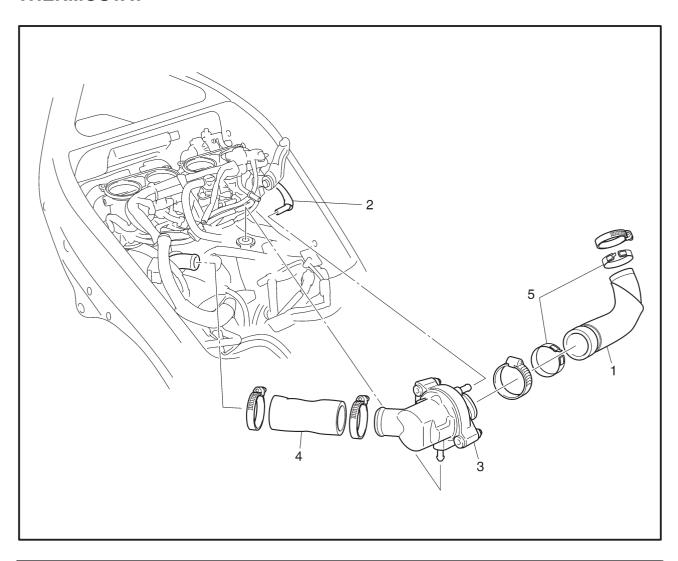
Refer to "CHECKING THE RADIATOR".





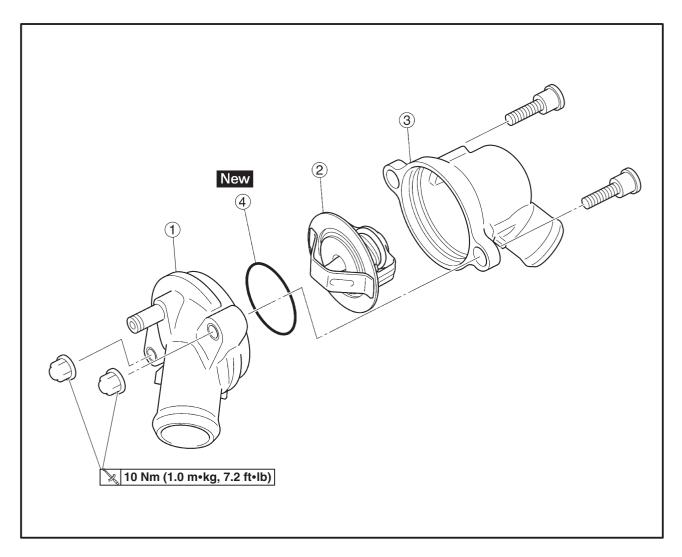
FAS0046

# **THERMOSTAT**



| Order                 | Job/Part                                                                                                                              | Q'ty                  | Remarks                                                                                                                                                                                              |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Removing the thermostat assembly Rider seat Fuel tank Air filter case Coolant                                                         |                       | Remove the parts in the order listed. Refer to "SEATS" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "AIR FILTER CASE" in chapter 3. Drain. Refer to "CHANGING THE COOLANT" in chapter3. |
| 1<br>2<br>3<br>4<br>5 | Thermostat assembly outlet hose<br>Thermostat assembly breather hose<br>Thermostat assembly<br>Thermostat assembly inlet hose<br>Band | 1<br>1<br>1<br>1<br>2 | For installation, reverse the removal procedure.                                                                                                                                                     |

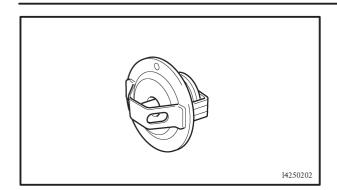


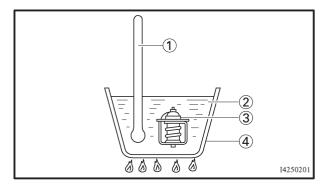


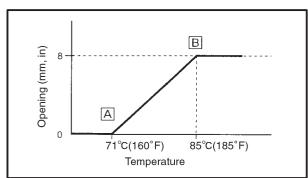
| Order                    | Job/Part                                                                                           | Q'ty        | Remarks                                                                                      |
|--------------------------|----------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------|
| (1)<br>(2)<br>(3)<br>(4) | Disassembling the thermostat housing Thermostat housing cover Thermostat Thermostat housing O-ring | 1<br>1<br>1 | Disassemble the parts in the order listed.  For assembly, reverse the disassembly procedure. |

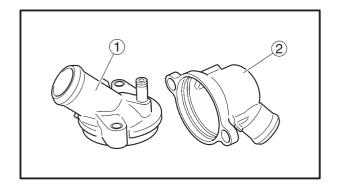
## **THERMOSTAT**











AS00462

#### **CHECKING THE THERMOSTAT**

- 1. Check:
  - thermostat
     Does not open at 71 ~ 85°C (160 ~ 185°F)
     → Replace.

a. Suspend the thermostat in a container filled with water.

- b. Slowly heat the water.
- c. Place a thermometer in the water.
- d. While stirring the water, observe the thermostat and thermometer's indicated temperature.

- 1 Thermometer
- (2) Water
- (3) Thermostat
- (4) Container
- A Fully closed
- B Fully open

NOTE: -

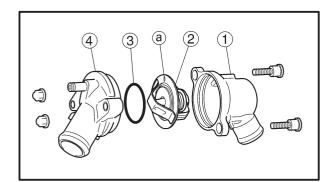
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

## 2. Check:

- thermostat housing cover ①
- thermostat housing ②
   Cracks/damage → Replace.

## **THERMOSTAT**





AS00464

# ASSEMBLING THE THERMOSTAT ASSEMBLY

- 1. Install:
  - thermostat housing ①
  - thermostat (2)
  - •O-ring New 3
  - thermostat housing cover 4

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: -

Install the thermostat with its breather hole ⓐ facing up.

EAS00466

# INSTALLING THE THERMOSTAT ASSEMBLY

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

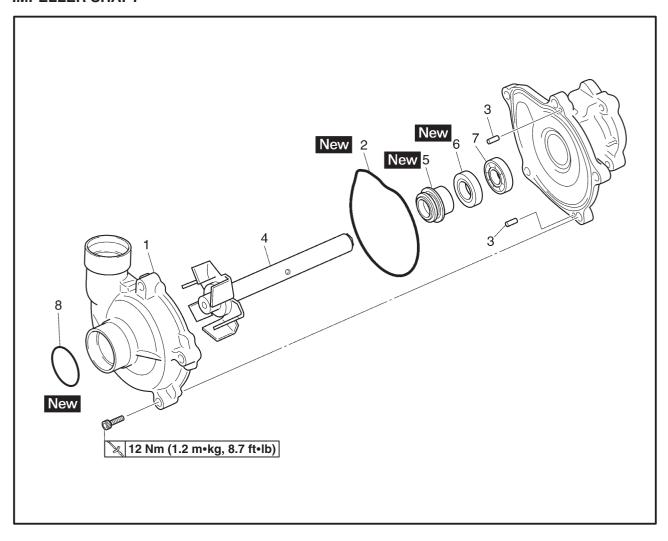
     Refer to "CHANGING THE COOLANT" in chapter 3.
- 2. Check:
  - cooling system
     Leaks → Repair or replace any faulty part.
- 3. Measure:
  - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR".

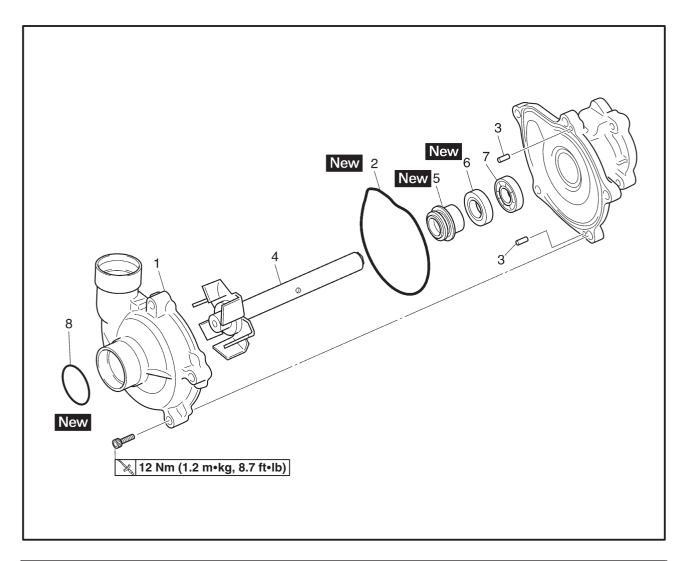


EAS00468

# WATER PUMP IMPELLER SHAFT



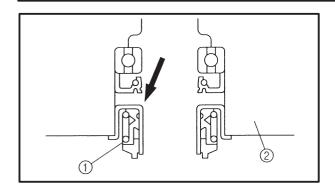
| Order            | Job/Part                                                                                                        | Q'ty             | Remarks                                                                                                                                                                                                                                      |
|------------------|-----------------------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Removing the impeller shaft                                                                                     |                  | Remove the parts in the order listed.                                                                                                                                                                                                        |
|                  |                                                                                                                 |                  | NOTE:                                                                                                                                                                                                                                        |
|                  |                                                                                                                 |                  | <ul> <li>The water pump and oil pump are combined into one unit (oil/water pump assembly).</li> <li>It is not necessary to remove the impeller shaft unless the coolant level is extremely low or coolant leaks from the oil pan.</li> </ul> |
| 1<br>2<br>3<br>4 | Oil/water pump assembly and oil pump rotor Water pump cover O-ring Pin Impeller shaft (along with the impeller) | 1<br>1<br>2<br>1 | Refer to "OIL PAN AND OIL PUMP" in chapter 5.                                                                                                                                                                                                |

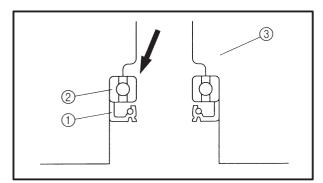


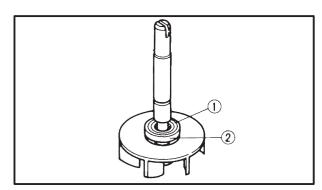
| Order | Job/Part        | Q'ty | Remarks                                          |
|-------|-----------------|------|--------------------------------------------------|
| 5     | Water pump seal | 1    |                                                  |
| 6     | Oil seal        | 1    |                                                  |
| 7     | Bearing         | 1    |                                                  |
| 8     | O-ring          | 1    |                                                  |
|       |                 |      | For installation, reverse the removal procedure. |

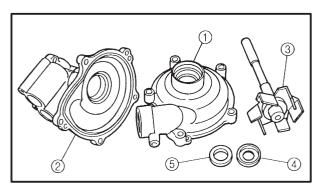
## WATER PUMP











EAS0047

#### **DISASSEMBLING THE WATER PUMP**

- 1. Remove:
  - water pump seal 1

NOTE: -

Tap out the water pump seal from the inside of the water pump housing.

- 2 Water pump housing
- 2. Remove:
  - oil seal (1)
  - bearing 2

NOTE: -

Tap out the bearing and oil seal from the outside of the water pump housing.

- (3) 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.

EAS00473

## **CHECKING THE WATER PUMP**

- 1. Check:
  - water pump housing cover 1
- water pump housing ②
- impeller ③
- rubber damper 4
- rubber damper holder 5
- water pump seals
- oil seal

Cracks/damage/wear → Replace.

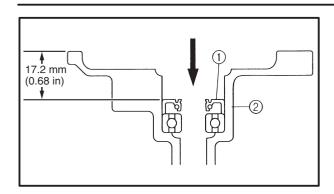
- 2. Check:
  - bearing

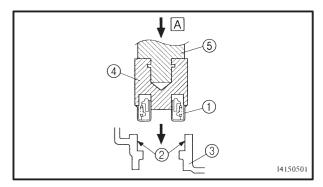
Rough movement  $\rightarrow$  Replace.

- 3. Check:
  - water pump outlet pipe
     Cracks/damage/wear → Replace.

## WATER PUMP







#### ASSEMBLING THE WATER PUMP

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

NOTE: -

- Before installing the oil seal, apply tap water or coolant onto its out surface.
- Install the oil seal with a socket that matches its outside diameter.
- 2. Install:
  - water pump seal New 1

#### **CAUTION:**

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

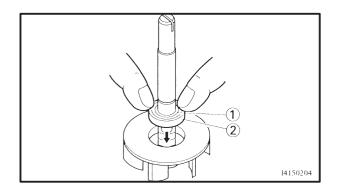
#### NOTE: —

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 or Quick Gasket ② to the water pump housing 3.



Mechanical seal installer 4 90890-04078, YM-33221 Middle driven shaft bearing driver (5) 90890-04058, YM-04058 Yamaha bond #1215 90890-85505 Quick gasket ACC-11001-05-01

A Push down.



- 3. Install:
  - rubber damper New 2
  - rubber damper holder New 1

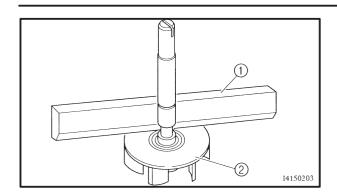


NOTE: -

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

## WATER PUMP





4. Measure:

• impeller shaft tilt
 Out of specification → Repeat steps (3) and (4).

## **CAUTION:**

Make sure the rubber damper and rubber damper holder are flush with the impeller.



Impeller shaft tilt limit 0.15 mm (0.006 in)

- 1 Straightedge
- (2) Impeller



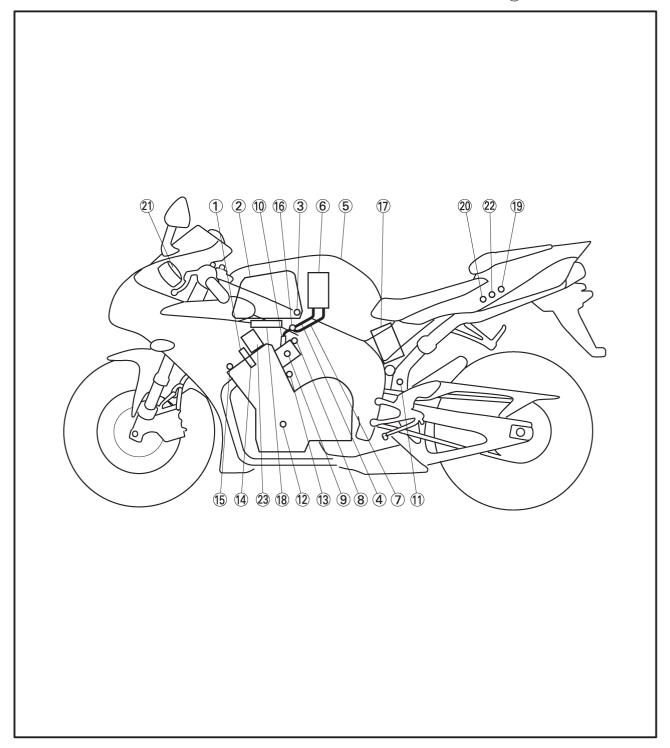


# **FUEL INJECTION SYSTEM**

## **FUEL INJECTION SYSTEM**

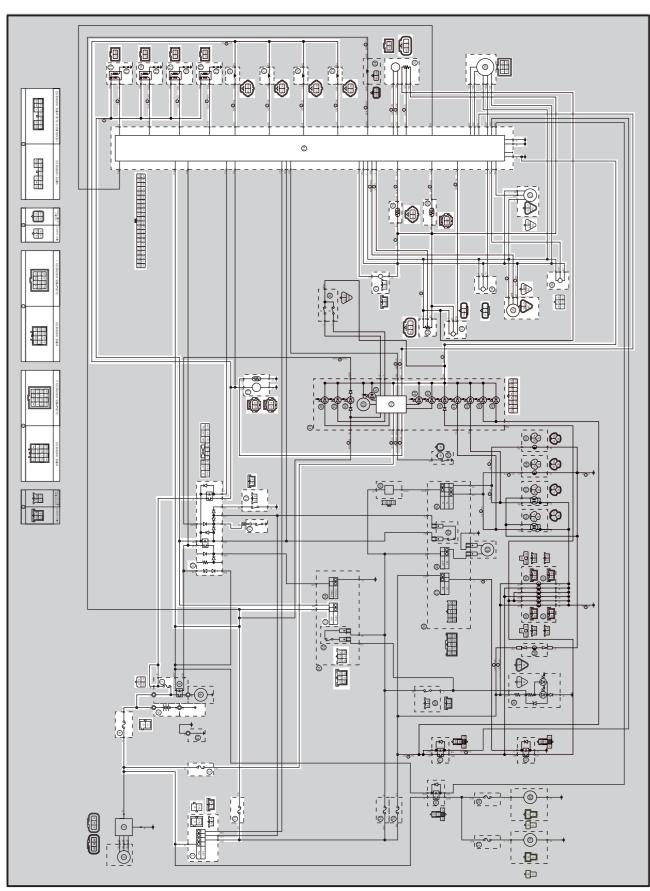
- 1) Ignition coil
- 2 Air filter case
- (3) Intake sensor
- (4) Fuel delivery hose
- 5 Fuel tank
- 6 Fuel pump
- 7 Fuel return hose
- (8) Intake air presure sen- (13) Coolant temperature (19) Atmospheric pressure
- temperature 9 Throttle position sen-
  - 10 Fuel injector
  - 11) Catalytic converter
  - (12) Crankshaft sensor
- sensor
- 14 Spark plug
- (15) Cylinder identification sensor
- 16 Pressure regulator
- position (17) Battery
  - 18 ECU

- sensor
- 20 Fuel injection system relay
- (21) Engine trouble warning light
- 22 Lean angle cut-off switch
- 23 Air cut-off valve





## **WIRING DIAGRAM**







- 1 Main switch
- (4) Fuse (main)
- 5 Fuse (backup)
- 6 Battery
- 7 Fuse (fuel injection)
- 10 Starting circuit cut-off relay
- (11) Neutral switch
- (12) Sidestand switch
- 13 Fuel pump
- (14) E.C.U.
- (15) Ignition coil #1
- (16) Ignition coil #2
- 17 Ignition coil #3
- (18) Ignition coil #4
- (19) Spark plug
- 20 Injector #1
- 21) Injector #2
- 22 Injector #3
- 23 Injector #4
- 25 Sub-throttle position sensor
- 26 EXUP servo motor
- 27) Speed sensor
- 28 Coolant temperature sensor
- 29 Intake air temperature sensor
- (31) Crankshaft position sensor
- 32 Throttle position sensor
- 3 Intake air pressure sensor
- 34) Atmospheric pressure sensor
- 35 Cylinder identification sensor
- 36 Lean angle cut-off switch
- 43 Multi function meter
- 53 Engine stop switch
- 73 Fuse (ignition)

FI



FAS00899

#### **ECU'S SELF-DIAGNOSTIC FUNCTION**

The ECU is equipped with a self-diagnostic function in order to ensure that the engine control system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, this mode provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating an engine trouble warning light.
- After the engine has been stopped, the fault code number appears from the lowest value in order of precedence on the LCD meter. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

EAS00900

## Engine trouble warning light indication and FI system operating condition

| Warning light indication | ECU's operation                              | FI operation                                                                                   | Vehicle operation                                       |
|--------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Flashing*                | Warning provided when unable to start engine | Operation stopped                                                                              | Unable                                                  |
| Remains ON               | Malfunction detected                         | Operated with substitute characteristics in accordance with the description of the malfunction | Able/Unable depending on the self-diagnostic fault code |

<sup>\*</sup> The warning light flashes when any one of the conditions listed below is present and the start switch is pushed.

11: Cylinder identification sensor 30: Lean angle cut-off switch

(latch up detected)

12: Crankshaft position sensor 41: Lean angle cut-off switch

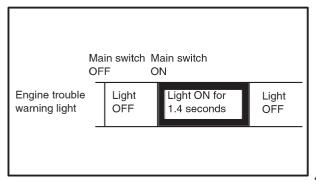
(open or short circuit)

19: Sidestand switch 50: ECU internal malfunction (open circuit in wire to ECU) (memory check error)

EAS0090

#### Checking for a defective engine trouble warning light bulb

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned "ON" and when the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.







## SUBSTITUTE CHARACTERISTICS OPERATION CONTROL (FAIL-SAFE ACTION)

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

The ECU takes fail-safe actions in two ways: one in which the sensor output is set to a prescribed value, and the other in which the ECU directly operates an actuator. Details on the fail-safe actions are given in the table below.

#### **FAIL-SAFE ACTIONS TABLE**

| Fault<br>Code No.    | Item                                                                           | Symptom                                                                                                               | Fail-safe action                                                                                                                                                                                                                                                                                                                                         | Able/unable<br>to start                                          | Able/unable<br>to drive                                          |
|----------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
| 11                   | Cylinder identification sensor                                                 | No normal signals are received from the cylinder identification sensor.                                               | Continues to operate the engine based on the results of the cylinder identification that existed up to that point.                                                                                                                                                                                                                                       | Unable                                                           | Able                                                             |
| 12                   | Crankshaft position sensor                                                     | No normal signals are received from the crankshaft position sensor.                                                   | Stops the engine (by stopping the injection and ignition).                                                                                                                                                                                                                                                                                               | Unable                                                           | Unable                                                           |
| 13<br>14             | Intake air pressure<br>sensor (open or short<br>circuit) (pipe system)         | Intake air pressure sensor-open or<br>short circuit detected.<br>Faulty intake air pressure sensor<br>system.         | Fixes the intake air pressure to 101.3 kpa.                                                                                                                                                                                                                                                                                                              | Able                                                             | Able                                                             |
| 15<br>16             | Throttle position sensor (open or short circuit) (stuck)                       | Throttle position sensor-open or short circuit detected.                                                              | Fixes the throttle position sensor to fully open.                                                                                                                                                                                                                                                                                                        | Able                                                             | Able                                                             |
| 17                   | EXUP servo motor potention (open or short circuit)                             | EXUP servo motor potention-open or short circuit detected.                                                            | Turn the EXUP servo motor toward<br>the open side for 3 seconds and then<br>stop it.                                                                                                                                                                                                                                                                     | Able                                                             | Able                                                             |
| 18                   | EXUP servo motor (lock)                                                        | A lock of the EXUP servo motor is detected.                                                                           | Perform the preventive control against motor locking.  (Perform the lock release operation twice every 100 seconds.)                                                                                                                                                                                                                                     | Able                                                             | Able                                                             |
| 19                   | Sidestand switch (open circuit in wire to ECU)                                 | Open circuit in the input line of ECU No.15 terminal is detected when the start switch is pressed.                    | (No start)                                                                                                                                                                                                                                                                                                                                               | Unable                                                           | Unable                                                           |
| 20                   | Intake air pressure<br>Atmospheric pressure                                    | Defective values are detected due to the internal malfunction                                                         | Fixes the intake air pressure and atmospheric pressure to 101.3 kpa.                                                                                                                                                                                                                                                                                     | Able                                                             | Able                                                             |
| 21                   | Coolant temperature sensor                                                     | Coolant temperature sensor-open or short circuit detected.                                                            | Fixes the coolant temperature to 60°C.                                                                                                                                                                                                                                                                                                                   | Able                                                             | Able                                                             |
| 22                   | Intake temperature sensor                                                      | Intake temperature sensor-open or short circuit detected.                                                             | Fixes the intake temperature to 20°C.                                                                                                                                                                                                                                                                                                                    | Able                                                             | Able                                                             |
| 23                   | Atmospheric pressure sensor                                                    | Atmospheric pressure sensor-open or short circuit detected.                                                           | Fixes the atmospheric pressure to<br>101.3 kpa.                                                                                                                                                                                                                                                                                                          | Able                                                             | Able                                                             |
| 33<br>34<br>35<br>36 | Faulty ignition                                                                | Open circuit detected in the primary lead of the ignition coil.                                                       | Cut the injection of other cylinder in the same group with the cylinder that the error is detected.     (Example: when the #1 cylinder is detective, cut the injection of #1 and #4 cylinders, when the #2 cylinder is detective, cut the injection of #2 and #3 cylinders).  Turn on the power to the air induction solenoid to always cut-off the air. | Able<br>(depending<br>on the num-<br>ber of faulty<br>cylinders) | Able<br>(depending<br>on the num-<br>ber of faulty<br>cylinders) |
| 30<br>41             | Lean angle cut-off<br>switch (latch up<br>detected) (open or short<br>circuit) | Lean angle cut-off switch-open or short circuit detected.                                                             | Turns OFF the fuel injection system relay of the fuel system.                                                                                                                                                                                                                                                                                            | Unable                                                           | Unable                                                           |
| 42                   | Speed sensor, neutral switch                                                   | No normal signals are received from the speed sensor; or, an open or short circuit is detected in the neutral switch. | Fixes the gear to the top gear.                                                                                                                                                                                                                                                                                                                          | Able                                                             | Able                                                             |
| 43                   | Fuel system voltage<br>(monitor voltage)                                       | The ECU is unable to monitor the battery voltage (an open circuit in the line to the ECU).                            | Fixes the battery voltage to 12 V.                                                                                                                                                                                                                                                                                                                       | Able                                                             | Able                                                             |
| 44                   | Error in writing the amount of CO adjustment on EEPROM                         | An error is detected while reading or writing on EEPROM (CO adjustment value).                                        |                                                                                                                                                                                                                                                                                                                                                          | Able                                                             | Able                                                             |





| Fault<br>Code No. | Item                                                       | Symptom                                                                                                                                                                                                          | Fail-safe action                                                                                                               | Able/unable<br>to start | Able/unable<br>to drive |
|-------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| 46                | Vehicle system power supply (Monitor voltage)              | Power supply to the FI system is not normal.                                                                                                                                                                     |                                                                                                                                | Able                    | Able                    |
| 47                | Sub-throttle servo motor potention (open or short circuit) | sub-throttle servo motor potention-<br>open or short circuit detected.                                                                                                                                           | Turn the sub-throttle servo motor<br>toward the close side for 4 seconds<br>and then stop it.                                  | Able                    | Able                    |
| 48                | Sub-throttle servo motor (lock)                            | A lock of the sub-throttle servo motor is detected.                                                                                                                                                              | Perform the preventative control<br>against motor locking.<br>(Perform the lock release operation<br>twice every 100 seconds.) | Able                    | Able                    |
| 49                | EXUP servo motor                                           | EXUP servo motor potention<br>Abnormal at the full open or full close<br>position.                                                                                                                               |                                                                                                                                | Able                    | Able                    |
| 50                | ECU internal<br>malfunction (memory<br>check error)        | Faulty ECU memory. When this malfunction is detected, the code number might not appear on the meter.                                                                                                             |                                                                                                                                | Unable                  | Unable                  |
| _                 | Start unable warning                                       | Relay is not turned ON even if the crank signal is input while the start switch is turned ON.  When the start switch is turned ON while an error is detected with the fault code of No.11, 12, 19, 30, 41 or 50. | Engine trouble warning light flashes when the start switch is turned ON.                                                       | Unable                  | Unable                  |

## **Communication error with the meter**

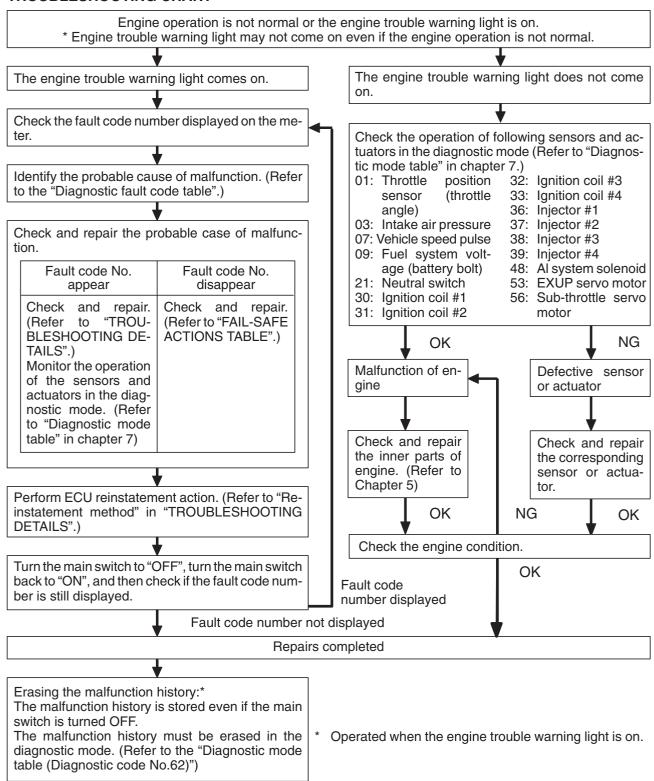
| Fault<br>Code No. | Item                                           | Symptom                                                             | Fail-safe action | Able/unable<br>to start | Able/unable<br>to drive |
|-------------------|------------------------------------------------|---------------------------------------------------------------------|------------------|-------------------------|-------------------------|
| Er-1              | ECU internal malfunction (output signal error) | No signals are received from the ECU.                               | -                | Unable                  | Unable                  |
| Er-2              | ECU internal malfunction (output signal error) | No signals are received from the ECU within the specified duration. | -                | Unable                  | Unable                  |
| Er-3              | ECU internal malfunction (output signal error) | Data from the ECU cannot be received correctly.                     | -                | Unable                  | Unable                  |
| Er-4              | ECU internal malfunction (input signal error)  | Non-registered data has been received from the meter.               | -                | Unable                  | Unable                  |

FI



FAS00904

#### TROUBLESHOOTING CHART



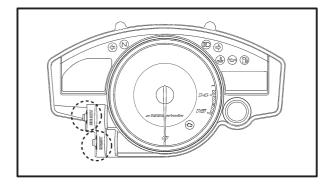
FI



EAS00905

#### DIAGNOSTIC MODE

It is possible to monitor the sensor output data or check the activation of actuators without connecting the measurement equipment by simply switching the meter indication from the normal mode to the diagnostic monitoring mode.

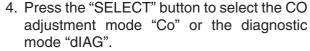


Setting the diagnostic mode

- 1. Turn the main switch to "OFF" and set the engine stop switch to "OFF".
- 2. Disconnect the wire harness coupler from the fuel pump.
- 3. Simultaneously press and hold the "SE-LECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.

#### NOTE: -

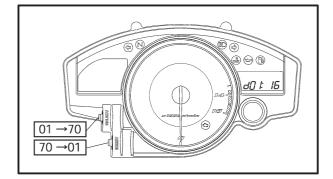
- All displays on the meter disappear except the clock and tripmeter displays.
- "dIAG" appears on the LCD meter.



- 5. After selecting "dIAG", simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to execute the selection.
- Select the diagnostic code number that applies to the item that was verified with the fault code number by pressing the "SELECT" and "RESET" buttons.



- The diagnostic code number appears on the LCD meter (01-70).
- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or longer to automatically decrease the diagnostic code numbers
- To increase the selected diagnostic code number, press the "SELECT" button. Press the "SELECT" button for 1 second or longer to automatically increase the diagnostic code numbers.







- 7. Verify the operation of the sensor or actuator.
- Sensor operation

The data representing the operating conditions of the sensor appears on the trip LCD.

- Actuator operation
   Set the engine stop switch to "ON" to operate the actuator.
- \* If the engine stop switch is set to "ON", set it to "OFF", and then set it to "ON" again.
- 8. Turn the main switch to "OFF" to cancel the the diagnostic mode.

| N  | 0 | Т | F |  |
|----|---|---|---|--|
| 14 |   |   | _ |  |

To perform a reliable diagnosis, make sure to turn "OFF" the power supply before every check and then start right from the beginning.





# Diagnostic fault code table

| Fault<br>code No. | Symptom                                                                                                                                                             | Probable cause of malfunction                                                                                                                                                                                                                                                                                     | Diagnostic code |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 11                | No normal signals are received from the cylinder identification sensor.                                                                                             | Open or short circuit in wiring sub lead. Open or short circuit in wiring harness. Defective cylinder identification sensor. Malfunction in ECU. Improperly installed sensor.                                                                                                                                     | _               |
| 12                | No normal signals are received from the crankshaft position sensor.                                                                                                 | Open or short circuit in wiring harness. Defective crankshaft position sensor. Malfunction in pickup rotor. Malfunction in ECU. Improperly installed sensor.                                                                                                                                                      | _               |
| 13                | Intake air pressure sensor-open or short circuit detected.                                                                                                          | Open or short circuit in wiring sub lead. Open or short circuit in wiring harness. Defective intake air pressure sensor. Malfunction in ECU.                                                                                                                                                                      | 03              |
| 14                | Faulty intake air pressure sensor hose system; a hose is detached, causing constant application of the atmospheric pressure to the sensor; or, the hose is clogged. | Intake air pressure sensor hose is detached, clogged, kinked, or pinched.     Malfunction in ECU.                                                                                                                                                                                                                 | 03              |
| 15                | Throttle position sensor-open or short circuit detected.                                                                                                            | Open or short circuit in wiring sub lead. Open or short circuit in wiring harness. Defective throttle position sensor. Malfunction in ECU. Improperly installed throttle position sensor.                                                                                                                         | 01              |
| 16                | A stuck throttle position sensor is detected.                                                                                                                       | Stuck throttle position sensor.     Malfunction in ECU.                                                                                                                                                                                                                                                           | 01              |
| 17                | EXUP servo motor potention circuit-open or short circuit detected.                                                                                                  | Open or short circuit in wiring sub lead.     Detective EXUP servo motor (potention circuit).                                                                                                                                                                                                                     | 53              |
| 18                | EXUP servo motor is stuck.                                                                                                                                          | <ul> <li>Open or short circuit in wiring sub lead.</li> <li>Stuck EXUP servo motor (mechanism).</li> <li>Stuck EXUP servo motor (motor).</li> </ul>                                                                                                                                                               | 53              |
| 19                | Open circuit in the input line of ECU No.15 terminal is detected when the start switch is pressed.                                                                  | Open circuit in wiring harness (ECU Coupler).     Malfunction in ECU.                                                                                                                                                                                                                                             | 20              |
| 20                | When the main switch is turned to ON, the atmospheric sensor voltage and intake air pressure sensor voltage differ greatly.                                         | Atmospheric pressure sensor hose is clogged. Intake air pressure sensor hose is clogged, kinked, or pinched. Malfunction of the atmospheric pressure sensor in the intermediate electrical potential. Malfunction of the intake air pressure sensor in the intermediate electrical potential. Malfunction in ECU. | 03<br>02        |
| 21                | Coolant temperature sensor-open or short circuit detected.                                                                                                          | <ul> <li>Open or short circuit in wiring harness.</li> <li>Defective coolant temperature sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                          | 06              |
| 22                | Intake temperature sensor-open or short circuit detected.                                                                                                           | <ul> <li>Open or short circuit in wiring harness.</li> <li>Defective intake temperature sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                           | 05              |
| 23                | Atmospheric pressure sensor-open or short circuit detected.                                                                                                         | <ul> <li>Open or short circuit in wiring sub lead.</li> <li>Defective atmospheric pressure sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                        | 02              |
| 30                | The motorcycle has overturned.                                                                                                                                      | Overturned.    Malfunction in ECU.                                                                                                                                                                                                                                                                                | 08              |
| 33                | Open circuit is detected in the primary lead of the ignition coil (#1).                                                                                             | <ul> <li>Open or short circuit in wiring harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> <li>Malfunction in a component of ignition cut-off circuit system.</li> </ul>                                                                                                          | 30              |





| Fault code No. | Symptom                                                                                                                        | Probable cause of malfunction                                                                                                                                                                                                                                                            | Diagnostic code |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 34             | Open circuit is detected in the primary lead of the ignition coil (#2).                                                        | <ul> <li>Open or short circuit in wiring harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> <li>Malfunction in a component of ignition cut-off circuit system.</li> </ul>                                                                                 | 31              |
| 35             | Open circuit is detected in the primary lead of the ignition coil (#3).                                                        | <ul> <li>Open or short circuit in wiring harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> <li>Malfunction in a component of ignition cut-off circuit system.</li> </ul>                                                                                 | 32              |
| 36             | Open circuit is detected in the primary lead of the ignition coil (#4).                                                        | <ul> <li>Open or short circuit in wiring harness.</li> <li>Malfunction in ignition coil.</li> <li>Malfunction in ECU.</li> <li>Malfunction in a component of ignition cut-off circuit system.</li> </ul>                                                                                 | 33              |
| 41             | Lean angle cut-off switch-open or short circuit detected.                                                                      | <ul><li>Open or short circuit in wiring harness.</li><li>Defective lean angle cut-off switch.</li><li>Malfunction in ECU.</li></ul>                                                                                                                                                      | 08              |
| 42             | No normal signals are received from<br>the speed sensor; or, an open or<br>short circuit is detected in the neutral<br>switch. | <ul> <li>Open or short circuit in wiring harness.</li> <li>Defective speed sensor.</li> <li>Malfunction in vehicle speed sensor detected unit.</li> <li>Defective neutral switch.</li> <li>Malfunction in the engine side of the neutral switch.</li> <li>Malfunction in ECU.</li> </ul> | 07<br>21        |
| 43             | The ECU is unable to monitor the battery voltage (an open circuit in the monitor line to the ECU).                             | Open circuit in wiring harness.     Malfunction in ECU.                                                                                                                                                                                                                                  | 09              |
| 44             | An error is detected while reading or writing on EEPROM.                                                                       | Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory).                                                                                                                                                                               | 60              |
| 46             | Power supply to the FI system is not normal.                                                                                   | Malfunction in "CHARGING SYSTEM".                                                                                                                                                                                                                                                        | _               |
| 47             | Sub-throttle servo motor potention circuit-open or short circuit detected.                                                     | Open or short circuit in wiring harness.     Detective Sub-throttle servo motor (potention circuit).                                                                                                                                                                                     | 56              |
| 48             | Sub-throttle servo motor is stuck.                                                                                             | <ul> <li>Open or short circuit in wiring harness.</li> <li>Stuck Sub-throttle servo motor (mechanism).</li> <li>Stuck Sub-throttle servo motor (motor).</li> </ul>                                                                                                                       | 56              |
| 49             | EXUP servo motor potention<br>Abnormal at the full open or full close<br>position.                                             | Improper EXUP cable adjustment.     Open or short circuit in wiring sub lead.     Detective EXUP servo motor (potention circuit).     Stuck EXUP servo motor (mechanism).     Stuck EXUP servo motor (motor).                                                                            | 53              |
| 50             | Faulty ECU memory. When this malfunction is detected, the code number might not appear on the meter.                           | Malfunction in ECU. (The program and data are not<br>properly written on or read from the internal memory.)                                                                                                                                                                              | _               |
| Er-1           | No signal are received from the ECU.                                                                                           | <ul> <li>Open or short circuit in wiring harness.</li> <li>Malfunction in meter.</li> <li>Malfunction in ECU.</li> <li>Defective wire connection of the ECU coupler.</li> </ul>                                                                                                          | _               |
| Er-2           | No signal are received from the ECU within the specified duration.                                                             | Improper connection in wiring harness.     Malfunction in meter.     Malfunction in ECU.                                                                                                                                                                                                 | _               |
| Er-3           | Data from the ECU can not be received correctly.                                                                               | <ul><li>Improper connection in wiring harness.</li><li>Malfunction in meter.</li><li>Malfunction in ECU.</li></ul>                                                                                                                                                                       | _               |
| Er-4           | Non-registered data has been received from the meter.                                                                          | <ul><li>Improper connection in wiring harness.</li><li>Malfunction in meter.</li><li>Malfunction in ECU.</li></ul>                                                                                                                                                                       | _               |



## Diagnostic mode table

Switch the meter display from the regular mode to the diagnosis mode. To switch the display, refer to "DIAGNOSTIC MODE".

## NOTE: -

- Check the intake air temperature and coolant temperature as close as possible to the intake air temperature sensor and the coolant temperature sensor respectively.
- If it is not possible to check it with an atmospheric pressure gauge, judge it by using 101.3 kPa as the standard.
- If it is not possible to check the intake air temperature, use the ambient temperature as reference.

| Diagnostic code | Item                                  | Description of action                                                                                                                                                                                                                                                                   | Data displayed on meter<br>(reference value)                                                                                                    |
|-----------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 01              | Throttle angle                        | Displays the throttle angle.  • Check with throttle fully closed.  • Check with throttle fully open.                                                                                                                                                                                    | 0 ~ 125 degrees • Fully closed position (15 ~ 18) • Fully open position (95 ~ 100)                                                              |
| 02              | Atmospheric pressure                  | Displays the atmospheric pressure.  * Use an atmospheric pressure gauge to check the atmospheric pressure.                                                                                                                                                                              | Compare it to the value displayed on the meter.                                                                                                 |
| 03              | Intake air pressure                   | Displays the intake air pressure. Engine stop switch is on. * Generate the pressure difference by cranking the engine with the starter, without actually starting the engine.                                                                                                           | Not cranking-atmospheric pressure     Cranking-intake air pressure It changes at the value whitch is smaller than in the atomospheric pressure. |
| 05              | Intake temperature                    | Displays the intake air temperature.  * Check the temperature in the air cleaner case.                                                                                                                                                                                                  | Compare it to the value displayed on the meter.                                                                                                 |
| 06              | Coolant temperature                   | Displays the coolant temperature.  * Check the temperature of the coolant.                                                                                                                                                                                                              | Compare it to the value displayed on the meter.                                                                                                 |
| 07              | Vehicle speed pulse                   | Displays the accumulation of the vehicle pulses that are generated when the tire is spun.                                                                                                                                                                                               | (0 ~ 999; resets to 0 after 999)<br>OK if the numbers appear on<br>the meter.                                                                   |
| 08              | Lean angle cut-off switch             | Displays the lean angle cut-off switch values.                                                                                                                                                                                                                                          | Upright: 0.4 ~ 1.4 V<br>Overturned: 3.7 ~ 4.4 V                                                                                                 |
| 09              | Fuel system voltage (battery voltage) | Displays the fuel system voltage (battery voltage).<br>Engine stop switch is on.                                                                                                                                                                                                        | 0 ~ 18.7 V<br>Normally, approximately 12.0 V                                                                                                    |
| 20              | Sidestand switch                      | Displays that the switch is ON or OFF. (When the gear is in a position other than neutral.)                                                                                                                                                                                             | Stand retracted: ON<br>Stand extended: OFF                                                                                                      |
| 21              | Neutral switch                        | Displays that the switch is ON or OFF.                                                                                                                                                                                                                                                  | Neutral: ON<br>In gear: OFF                                                                                                                     |
| 30              | Ignition coil #1                      | After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #1 for five times every second and illuminates the engine trouble warning light.  * Connect an ignition checker.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON. | Check that spark is generated, 5 times with the engine stop switch ON.                                                                          |
| 31              | Ignition coils #2                     | After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #2 for five times every second and illuminates the engine trouble warning light.  * Connect an ignition checker.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON. | Check that spark is generated, 5 times with the engine stop switch ON.                                                                          |





| Diagnostic code | Item                        | Description of action                                                                                                                                                                                                                                                                                                                                 | Data displayed on meter (reference value)                                                                                         |
|-----------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 32              | Ignition coil #3            | After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #3 for five times every second and illuminates the engine trouble warning light.  * Connect an ignition checker.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                               | Check that spark is generated, 5 times with the engine stop switch ON.                                                            |
| 33              | Ignition coil #4            | After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #4 for five times every second and illuminates the engine trouble warning light.  * Connect an ignition checker.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                               | Check that spark is generated, 5 times with the engine stop switch ON.                                                            |
| 36              | Injector #1                 | After the engine stop switch has been turned from OFF to ON, it actuates the injector #1 five times every second and illuminates the engine trouble warning light.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                                                                    | Check the operating sound of the injector five times with engine stop switch ON.                                                  |
| 37              | Injector #2                 | After the engine stop switch has been turned from OFF to ON, it actuates the injector #2 five times every second and illuminates the engine trouble warning light.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                                                                    | Check the operating sound of the injector five times with engine stop switch ON.                                                  |
| 38              | Injector #3                 | After the engine stop switch has been turned from OFF to ON, it actuates the injector #3 five times every second and illuminates the engine trouble warning light.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                                                                    | Check the operating sound of the injector five times with engine stop switch ON.                                                  |
| 39              | Injector #4                 | After the engine stop switch has been turned from OFF to ON, it actuates the injector #4 five times every second and illuminates the engine trouble warning light.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                                                                    | Check the operating sound of the injector five times with engine stop switch ON.                                                  |
| 48              | Al system solenoid          | After the engine stop switch has been turned from OFF to ON, it actuates the AI system solenoid five times every second and illuminates the engine trouble warning light.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                                                             | Check the operating sound of<br>the AI system solenoid 5 times<br>with the engine stop<br>switch ON.                              |
| 50              | Fuel injection system relay | After the engine stop switch has been turned from OFF to ON, it actuates the fuel injection system relay five times every second and illuminates the engine trouble warning light (the light is OFF when the relay is ON, and the light is ON when the relay is OFF).  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON. | Check the fuel injection system relay operating sound 5 times with the engine stop switch ON.                                     |
| 51              | Radiator fan motor<br>relay | After the engine stop switch has been turned from OFF to ON, it actuates the radiator fan motor relay five times every 5 seconds and illuminates the engine trouble warning light. (ON 2 seconds, OFF 3 seconds)  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                      | Check the radiator fan motor relay operating sound 5 times with the engine stop switch ON. (At that time, the fan motor rotates.) |





| Diagnostic code | Item                             | Description of action                                                                                                                                                                                                                                                                                                    | Data displayed on meter<br>(reference value)                                                                              |
|-----------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 52              | Headlight relay 1                | After the engine stop switch has been turned from OFF to ON, it actuates the headlight relay five times every 5 seconds and illuminates the engine trouble warning light. (ON 2 seconds, OFF 3 seconds)  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                  | Check the headlight relay operating sound 5 times with the engine stop switch ON. (At that time, the headlight turns ON.) |
| 53              | EXUP servo motor                 | After the engine stop switch has been turned from OFF to ON, it actuates the servo motor turns to open side and to close side.  * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.                                                                                                           | Turn on the engine trouble warning light while servo motor is operated. (Operating angle is displayed on the LCD meter)   |
| 56              | Sub-throttle servo motor         | After the engine stop switch has been turned from OFF to ON, it actuates the servo motor turns to open side and to close side.  * If the engine stop switch is ON, turn it OFF once, and then turn it back on.                                                                                                           | Turn on the engine trouble warning light while servo motor is operated (Operating angle is displayed on the LCD meter).   |
| 60              | EEPROM fault code display        | <ul> <li>Transmits the abnormal portion of the data in the E2PROM that has been detected as a self-diagnostic fault code 44.</li> <li>If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated.</li> </ul>                                         | (01 ~ 04) Displays the cylinder<br>number.<br>(00) Displays when there is no<br>malfunction.                              |
| 61              | Malfunction history code display | <ul> <li>Displays the codes of the history of the self-diagnosis malfunctions (i.e., a code of a malfunction that occurred once and which has been corrected).</li> <li>If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated.</li> </ul>       | 11 $\sim$ 50 (00) Displays when there is no malfunction.                                                                  |
| 62              | Malfunction history code erasure | <ul> <li>Displays the total number of codes that are being detected through self diagnosis and the fault codes in the past history.</li> <li>Erases only the history codes when the engine stop switch is turned from OFF to ON. If the engine stop switch is ON, turn it OFF once, and then turn it back ON.</li> </ul> | $00\sim25$ (00) Displays when there is no malfunction.                                                                    |
| 70              | Control number                   | Displays the program control number.                                                                                                                                                                                                                                                                                     | 00 ~ 255                                                                                                                  |





#### TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Carry out check and maintenance on items or components that could be a cause of malfunction in accordance with the order.

When the check and maintenance of malfunctioned part is completed, restore the meter display according to the "Restore method".

Fault code No.:

Fault code number displayed on the meter when the engine failed to work normally. (Refer to "Diagnostic fault code table".)

Diagnostic code No.:

Code number to be used when the diagnostic monitoring mode is operated. (Refer to "DIAGNOS-TIC MODE".)

|       | code No.   11   Symptom   No norriagnostic code No. –                                                                                   | nal signals are received from the cylinder identificatio                                                                                                                                                                                                                                                                                                                                                      | n sensor.                        |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Order | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                                                                                                                                                                                                             | Reinstatement method             |
| 1     | Installed condition of sensor                                                                                                           | Check the installed area for looseness or pinching.                                                                                                                                                                                                                                                                                                                                                           | Reinstated by starting the       |
| 2     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Cylinder identification sensor coupler  Main wiring harness ECU coupler  Sub-wire harness coupler                                                                                                                                                                                                                                              | engine and operating it at idle. |
| 3     | Open or short circuit in wiring harness and/or sub lead.                                                                                | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler  Blue – Blue  White/Black – White/Black  Black/Blue – Black/Blue                                                                                                                                                                                                                                              |                                  |
| 4     | Defective cylinder identification sensor.                                                                                               | Replace if defective.  1. Connect the pocket tester (DC 20 V) to the cylinder identification sensor coupler terminal as shown.  Tester positive probe → white/black 1 Tester negative probe → black/blue ②  2. Set the main switch to "ON".  3. Measure the cylinder identification sensor output voltage.  Cylinder identification sensor output voltage When sensor is on  4.8 V or more When sensor is off |                                  |





| Order | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                            | Reinstatement method       |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1     | Installed condition of sensor                                                                                                           | Check the installed area for looseness or pinching.                                                                                                                                                                          | Reinstated by cranking the |
| 2     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Crankshaft position sensor coupler  Main wiring harness ECU coupler                                                                                           | engine.                    |
| 3     | Open or short circuit in wiring harness.                                                                                                | Repair or replace if there is an open or short circuit between the main wiring harnesses.  Between sensor coupler and ECU coupler Gray – Gray  Black/Blue – Black/Blue                                                       |                            |
| 4     | Defective crankshaft position sensor.                                                                                                   | <ol> <li>Replace if defective.</li> <li>Disconnect the crankshaft position sensor coupler from the wire harness.</li> <li>Connect the pocket tester (Ω × 100) to the crankshaft position sensor coupler as shown.</li> </ol> |                            |
|       |                                                                                                                                         | Tester positive probe → gray ① Tester negative probe → black ②  B Gy ②                                                                                                                                                       |                            |
|       |                                                                                                                                         | 3. Measure the crankshaft position sensor resistance.  Crankshaft position sensor resistance resistance 336 ~ 504 Ω at 20°C (68°F) (between gray and black)                                                                  |                            |





| Fault  | t code No.   13   Symptom   Intake a                                                                                                    | air pressure sensor – open or short circuit detected.                                                                                                                                                                                                              |                                                    |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Used d | liagnostic code No. 03 (intake air pressure                                                                                             | sensor)                                                                                                                                                                                                                                                            |                                                    |
| Order  | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                                                                  | Reinstatement method                               |
| 1      | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Intake air pressure sensor coupler  Main wiring harness ECU coupler  Sub-wire harness coupler                                                                                                       | Reinstated by<br>turning the<br>main switch<br>ON. |
| 2      | Open or short circuit in wiring harness and/or sub lead.                                                                                | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler  Black/Blue – Black/Blue  Pink/White – Pink/White  Blue – Blue                                                                                                     |                                                    |
| 3      | Defective intake air pressure sensor                                                                                                    | <ul> <li>Execute the diagnostic monitoring mode (Code No.03).</li> <li>Replace if defective.</li> <li>1. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler terminal as shown.</li> <li>Tester positive probe → pink/white ①</li> </ul> |                                                    |
|        |                                                                                                                                         | 2. Set the main switch to "ON".  3. Measure the intake air pressure sensor output voltage.  Intake air pressure sensor output voltage  3.75 ~ 4.25 V  4. Is the intake air pressure sensor OK?                                                                     |                                                    |



| Fai    | ult code No.                                                                | 14                    | Symptom                | Intake a  | ir pressure sensor – hose system malfunction (clogg                                                                                                                | ed or detached                                        |
|--------|-----------------------------------------------------------------------------|-----------------------|------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Used d | iagnostic code N                                                            | lo. 03 (ir            | ntake air pres         | ssure ser | nsor)                                                                                                                                                              |                                                       |
| Order  | Inspection oper cause                                                       | ation ite             | em and proba           | able      | Operation item and countermeasuer                                                                                                                                  | Reinstatement method                                  |
| 1      | Intake air press<br>clogged, kinked<br>Intake air press<br>intermediate ele | d, or pind<br>ure sen | ched.<br>sor malfuncti |           | Repair or replace the sensor hose. Inspect and repair the connection.                                                                                              | Reinstated by starting the engine and operating it at |
| 2      | Connected con<br>Intake air press<br>Main wiring har                        | ure sen               | sor coupler            |           | Check the coupler for any pins that may have pulled out. Check the looking condition of the coupler. If there is a malfunction, repair it and connect it securely. | idle.                                                 |
| 3      | Defective intake                                                            | e air pre             | ssure senso            | r.        | Execute the diagnostic mode (Code No.03). Replace if defective. Refer to "Fault code No. 13".                                                                      |                                                       |





| Order | Inspection operation item and probable cause                                                                                            | Operation item and cou                                                                              | ntermeasure                                                                    | Reinstatement method                      |  |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------|--|
| 1     | Installed condition of throttle position sensor.                                                                                        | Check the installed area pinching. Check that it is installed position. Refer to "THROTTLE B        | I in the specified                                                             | Reinstated by turning the main switch ON. |  |
| 2     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction securely. Throttle position sense Main wiring harness Sub-wire harness co | ECU coupler                                                                    |                                           |  |
| 3     | Open or short circuit in wiring harness and/or sub lead.                                                                                | circuit. Between sensor couple                                                                      | Between sensor coupler and ECU coupler Black/Blue – Black/Blue Yellow – Yellow |                                           |  |
| 4     | Throttle position sensor lead wire open circuit output voltage check.                                                                   | Check for open circuit a position sensor.  Black/Blue – Yellow                                      | nd replace the throttle                                                        |                                           |  |
|       |                                                                                                                                         | Open circuit item                                                                                   | Output voltage                                                                 |                                           |  |
|       |                                                                                                                                         | Ground wire open circuit                                                                            | 5 V                                                                            |                                           |  |
|       |                                                                                                                                         | Output wire open circuit                                                                            | 0V                                                                             |                                           |  |
|       |                                                                                                                                         | Power supply wire open circuit                                                                      | 0V                                                                             |                                           |  |
| 5     | Defective throttle position sensor.                                                                                                     | Execute the diagnostic Replace if defective. Refer to "THROTTLE B                                   | ,                                                                              |                                           |  |

| Fault  | Fault code No.   16   Symptom   Stuck throttle position sensor detected. |          |               |        |                                                                                                                                               |                                      |
|--------|--------------------------------------------------------------------------|----------|---------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Used d | lsed diagnostic code No.01 (throttle position sensor)                    |          |               |        |                                                                                                                                               |                                      |
| Order  | Inspection op cause                                                      | eration  | item and pro  | obable | Operation item and countermeasure                                                                                                             | Reinstatement method                 |
| 1      | When detection                                                           | ng faul  | t code No.15  | j.     | Refer to "Fault code No.15".                                                                                                                  | Reinstated by                        |
| 2      | Installed cond<br>sensor.                                                | sensor.  |               | ition  | Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to "THROTTLE BODIES" section. | starting the engine, operating it at |
| 3      | Defective thro                                                           | ottle po | sition sensor | •      | Execute the diagnostic mode (Code No.01). Replace if defective. Refer to "THROTTLE BODIES" section.                                           | idle, and then<br>racing it.         |





| Used d | iagnostic code 53                                                                                                                       |                                                                                                                                                                                                                                                 |                                           |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Order  | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                                               | Reinstatemen<br>method                    |
| 1      | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  EXUP servo motor coupler  Main wireharness ECU coupler                                                                                                                           | Reinstated by turning the main switch ON. |
| 2      | Open or short circuit in wire harness.                                                                                                  | Repair or replace if there is an open or short circuit.  Between motor coupler and ECU coupler  Blue – Blue  White/Red – White/Red  Black/Blue – Black/Blue                                                                                     |                                           |
| 3      | Defective EXUP servo motor potention circuit.                                                                                           | <ol> <li>Execute the diagnostic mode (Code No.53).</li> <li>Replace if defective.</li> <li>Disconnect the EXUP servomotor coupler from the wire harness.</li> <li>Connect the pocket tester (Ω × 1k) to the EXUP servomotor coupler.</li> </ol> |                                           |
|        |                                                                                                                                         | Positive tester terminal → blue ① Negative tester probe → white/red ②                                                                                                                                                                           |                                           |
|        |                                                                                                                                         | 2<br>L W/RB/L<br>- B/GB/R                                                                                                                                                                                                                       |                                           |
|        |                                                                                                                                         | While slowly turning the EXUP servomotor pulley, measure the EXUP servomotor resistance.                                                                                                                                                        |                                           |
|        |                                                                                                                                         | EXUP servomotor resistance (when the pulley is turned once) 5.25 ~ 9.75 kΩ at 20°C (68°F)                                                                                                                                                       |                                           |





|       | t code No.   18   Symptom   EXUP siagnostic code 53                                                                                    | servo motor is stuck.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                       |
|-------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Order | Inspection operation item and probable couse                                                                                           | Operation item and countermeasure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Reinstatement method                                                  |
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler | If there is a malfunction repair it and connect it securely.  EXUP servo motor coupler  Main wire harness ECU coupler.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reinstated by<br>turning the<br>main switch<br>ON.<br>It takes 120    |
| 2     | Open or short circuit in wire harness.                                                                                                 | Repair or replace if there is an open or short circuit.  Between motor coupler and ECU coupler.  Black/Green – Black/Green  Black/Red – Black/Red                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | seconds at the<br>maximum<br>before the<br>original state<br>returns. |
| 3     | Defective EXUP servo motor.                                                                                                            | <ul> <li>Execute the diagnostic mode (Code No.53). If there is a malfunction, carry out the following checks.</li> <li>1. Check whether or not the EXUP valve is seized.</li> <li>Disconnect the EXUP cable and check that the EXUP valve is moved smoothly by hand.</li> <li>When the valve is not moved smoothly, repair or replace it. Refer to "ADJUSTING THE EXUP CABLES" in chapter 3.</li> <li>2. When the EXUP valve is moved smoothly, replace the EXUP servo motor.</li> <li>3. Perform the self-diagnosis mode and check the operation of EXUP valve by visual inspection (Code No: 53). The operation should be carried out as 3-second drive in the full open direction, 2-second stop and 3-second drive in the full close direction.</li> </ul> |                                                                       |
| 4     | Defective EXUP valve, pulley, cable.                                                                                                   | Replace if defective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                       |





|       | code No.   19   Symptom   Open ci                                                                      | rcuit in the input line of ECU No.15 terminal is detect                                                                                                                                                         | ed.                                                                                  |
|-------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Order | Inspection operation item and probable cause                                                           | Operation item and countermeasure                                                                                                                                                                               | Reinstatement method                                                                 |
| 1     | Connected condition of connector Main wiring harness ECU coupler (No.15 pin) <pin location=""> 1</pin> | Execute the diagnostic mode (Code No.20). Check the coupler for any pins that may have pulled out. Check the locking condition of the coupler.  If there is a malfunction, repair it and connected it securely. | If the transmission is in gear, it is reinstated by retracting the sidestand.        |
| 2     | Open or short circuit in wiring harness and/or sub lead.                                               | Repair or replace if there is an open or short circuit.  Between sidestand switch coupler and ECU coupler  Blue/Black – Black                                                                                   | transmission is<br>in neutral, it is<br>reinstated by<br>reconnecting<br>the wiring. |
| 3     | The malfunction of the sidestand switch.                                                               | Replace if defective. Refer to "CHECKING THE SWITCHES" in chapter 8.                                                                                                                                            |                                                                                      |

| Fault  | t code No.                                                                                         | 20       | Symptom      |                                                                                              | re values are detected due to the internal malfunction e sensor or the atmospheric pressure sensor. | of the intake air    |
|--------|----------------------------------------------------------------------------------------------------|----------|--------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------|
| Used d | Jsed diagnostic code No. 02 (atmospheric pressure sensor) → 1  03 (intake air pressure sensor) → 2 |          |              |                                                                                              |                                                                                                     |                      |
| Order  | Inspection of cause                                                                                | peration | item and pr  | obable                                                                                       | Operation item and countermeasure                                                                   | Reinstatement method |
| 1      | Defective atmospheric pressure sensor                                                              |          | sensor       | Execute the diagnostic mode (Code No.02). Replace if defective. Refer to "Fault code No.23". | Reinstated by turning the main switch                                                               |                      |
| 2      | Defective in                                                                                       | take air | pressure ser | nsor                                                                                         | Execute the diagnostic mode (Code No.03). Replace if defective. Refer to "Fault code No.13".        | ON.                  |





|       | Fault code No. 21   Symptom   Open or short circuit is detected from the coolant temperature sensor.  Jsed diagnostic code No. 06 (coolant temperature sensor) |                                                                                                                                                              |                                                    |  |  |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--|--|
| Order | Inspection operation item and probable cause                                                                                                                   | Operation item and countermeasure                                                                                                                            | Reinstatement method                               |  |  |
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.                        | If there is a malfunction, repair it and connect it securely.  Coolant temperature sensor coupler  Main wiring harness ECU coupler  Sub-wire harness coupler | Reinstated by<br>turning the<br>main switch<br>ON. |  |  |
| 2     | Open or short circuit in wiring harness and/or sub lead.                                                                                                       | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler  Black/Blue – Black/Blue  Green/White – Green/White          |                                                    |  |  |
| 3     | Defective coolant temperature sensor.                                                                                                                          | Execute the diagnostic mode (Code No.06). Replace if defective. Refer to "COOLING SYSTEM" in chapter 8.                                                      |                                                    |  |  |





| OI    | In an existence of the second second                                                                                                    | On another those and accord                                                                                                                                                                                                                                                   | I Defined to the                          |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Order | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                                                                             | Reinstatemen<br>method                    |
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Intake temperature sensor coupler  Main wiring harness ECU coupler  Sub-wire harness coupler                                                                                                                   | Reinstated by turning the main switch ON. |
| 2     | Open or short circuit in wiring harness and/or sub lead.                                                                                | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler Black/Blue - Black/Blue Brown/White - Brown/White                                                                                                                             |                                           |
| 3     | Defective intake temperature sensor.                                                                                                    | <ol> <li>Execute the diagnostic mode (Code No.05).</li> <li>Replace if defective.</li> <li>Remove the intake air temperature sensor from the air filter case.</li> <li>Connect the pocket tester (Ω × 100) to the intake air temperature sensor terminal as shown.</li> </ol> |                                           |
|       |                                                                                                                                         | Tester positive probe → brown/white ① Tester negative probe → black/blue ②  ② ① ① ② ① ③ ③ ③ ③ ③ ③ ③ ③ ③ ③ ③ ③ ③ ③                                                                                                                                                             |                                           |
|       |                                                                                                                                         | Measure the intake air temperature sensor resistance.                                                                                                                                                                                                                         |                                           |
|       |                                                                                                                                         | Intake air temperature sensor resistance 2.21 ~ 2.69 kΩ at 20°C (68°F)                                                                                                                                                                                                        |                                           |
|       |                                                                                                                                         | <ul> <li>WARNING</li> <li>Handle the intake air temperature sensor with special care.</li> <li>Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.</li> </ul>                                      |                                           |





| Order | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                                                                                                    | Reinstatement method                      |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Atmospheric pressure sensor coupler Main wiring harness ECU coupler                                                                                                                                                                   | Reinstated by turning the main switch ON. |
| 2     | Open or short circuit in wiring harness.                                                                                                | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler  Blue – Blue  Black/Blue – Black/Blue  Pink – Pink                                                                                                                                                   |                                           |
| 3     | Defective atmospheric pressure sensor.                                                                                                  | <ul> <li>Execute the diagnostic mode (Code No.02).</li> <li>Replace if defective.</li> <li>1. Connect the pocket tester (DC 20 V) to the atmospheric pressure sensor coupler terminal as shown.</li> <li>Tester positive probe → pink ①         Tester negative probe → black/blue ②     </li> </ul> |                                           |
|       |                                                                                                                                         | 2 1<br>L B/L P                                                                                                                                                                                                                                                                                       |                                           |
|       |                                                                                                                                         | Set the main switch to "ON".     Measure the atmospheric pressure sensor output voltage.                                                                                                                                                                                                             |                                           |
|       |                                                                                                                                         | Atmospheric pressure sensor output voltage 3.75 ~ 4.25 V                                                                                                                                                                                                                                             |                                           |





| Order | Inspection operation item and probable                                                                                                  | Operation item and countermeasure                                                                                                                                                                                                                                                                                                      | Reinstatement<br>method                                               |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1     | The motorcycle has overturned.                                                                                                          | Raise the motorcycle upright.                                                                                                                                                                                                                                                                                                          | Reinstated by                                                         |
| 2     | Installed condition of the lean angle cut-off switch                                                                                    | Check the installed area for looseness or pinching.                                                                                                                                                                                                                                                                                    | turning the main switch                                               |
| 3     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Lean angle cut-off switch coupler  Main wiring harness ECU coupler                                                                                                                                                                                                      | ON (however, the engine cannot be restarted unless the main switch is |
| 4     | Defective lean angle cut-off switch                                                                                                     | <ol> <li>Execute the diagnostic mode (Code No.08).</li> <li>Replace if defective.</li> <li>Remove the lean angle cut-off switch from the motorcycle.</li> <li>Connect the lean angle cut-off switch coupler to the wireharness.</li> <li>Connect the pocket tester (DC 20 V) to the emergency stop switch coupler as shown.</li> </ol> | first turned<br>OFF).                                                 |
|       |                                                                                                                                         | Tester positive prove → yellow/green ① Tester negative prove → black/blue ②                                                                                                                                                                                                                                                            |                                                                       |
|       |                                                                                                                                         | 65° 1 2 L Y/G B/L                                                                                                                                                                                                                                                                                                                      |                                                                       |
|       |                                                                                                                                         | 4. When turn the lean angle cut-off switch approx. 65°, the voltage reading is 0.4 V to 4.4 V.                                                                                                                                                                                                                                         |                                                                       |





|       | Fault code No. 33   Symptom   Malfunction detected in the primary lead of the ignition coil (#1).  Used diagnostic code No. 30 (ignition coil #1) |                                                                                                                                                               |                                                                          |  |  |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--|--|
| Order | Inspection operation item and probable cause                                                                                                      | Operation item and countermeasure                                                                                                                             | Reinstatement method                                                     |  |  |
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.           | If there is a malfunction, repair it and connect it securely.  Ignition coil primary side coupler – Orange Main wiring harness ECU coupler                    | Reinstated by<br>starting the en-<br>gine and oper-<br>ating it at idle. |  |  |
| 2     | Open or short circuit in lead.                                                                                                                    | Repair or replace if there is an open or short circuit. Between ignition coil coupler (#1) and ECU coupler/main harness Orange – Orange Red/Black – Red/Black |                                                                          |  |  |
| 3     | Detective ignition coil (test the primary and secondary coils for continuity).                                                                    | Execute the diagnostic mode (Code No.30). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.                                                      |                                                                          |  |  |

|       | Fault code No. 34 Symptom Malfunction detected in the primary lead of the ignition coil (#2).  Used diagnostic code No. 31 (ignition coil #2) |                                                                                                                                                                      |                                                                          |  |  |  |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--|--|--|
| Order | Inspection operation item and probable cause                                                                                                  | Operation item and countermeasure                                                                                                                                    | Reinstatement method                                                     |  |  |  |
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.       | If there is a malfunction, repair it and connect it securely.  Ignition coil primary side coupler – Gray/Red Main wiring harness ECU coupler                         | Reinstated by<br>starting the en-<br>gine and oper-<br>ating it at idle. |  |  |  |
| 2     | Open or short circuit in lead wire.                                                                                                           | Repair or replace if there is an open or short circuit.  Between ignition coil coupler (#2) and ECU coupler/main harness  Gray/Red – Gray/Red  Red/Black – Red/Black |                                                                          |  |  |  |
| 3     | Defective ignition coil (test the primary and secondary coils for continuity).                                                                | Execute the diagnostic mode (Code No.31). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.                                                             |                                                                          |  |  |  |

| Fault  | Fault code No.   35   Symptom   Malfunction detected in the primary lead of the ignition coil (#3).                                     |          |                                  |         |                                                                                                                                                                           |                                                                          |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Used d | Used diagnostic code No. 32 (ignition coil #3)                                                                                          |          |                                  |         |                                                                                                                                                                           |                                                                          |
| Order  | Inspection o cause                                                                                                                      | peration | item and pro                     | obable  | Operation item and countermeasure                                                                                                                                         | Reinstatement method                                                     |
| 1      | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. |          |                                  | ns that | If there is a malfunction, repair it and connect it securely. Ignition coil primary side coupler – Orange/Green Main wiring harness ECU coupler                           | Reinstated by<br>starting the en-<br>gine and oper-<br>ating it at idle. |
| 2      | Open or short circuit in lead wire.                                                                                                     |          |                                  |         | Repair or replace if there is an open or short circuit. Between ignition coil coupler (#3) and ECU coupler/main harness Orange/Green – Orange/Green Red/Black – Red/Black |                                                                          |
| 3      | Defective ig<br>and seconda                                                                                                             |          | il (test the pr<br>for continuit |         | Execute the diagnostic mode (Code No.32). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.                                                                  |                                                                          |





| Fault  | t code No.                                     | 36                   | Symptom       | Malfunc | tion detected in the primary lead of the ignition coil (#                                                                                                                | ·4).                                                                     |  |
|--------|------------------------------------------------|----------------------|---------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--|
| Used d | Used diagnostic code No. 33 (ignition coil #4) |                      |               |         |                                                                                                                                                                          |                                                                          |  |
| Order  | Inspection of cause                            | peration             | item and pr   | obable  | Operation item and countermeasure                                                                                                                                        | Reinstatement method                                                     |  |
| 1      | may have                                       | he coupl<br>e pulled | er for any pi |         | If there is a malfunction, repair it and connect it securely.  Ignition coil primary side coupler – Gray/Green Main wiring harness ECU coupler                           | Reinstated by<br>starting the en-<br>gine and oper-<br>ating it at idle. |  |
| 2      | Open or sho                                    | ort circuit          | in lead wire  |         | Repair or replace if there is an open or short circuit.  Between ignition coil coupler (#4) and ECU coupler/main harness  Gray/Green – Gray/Green  Red/Black – Red/Black |                                                                          |  |
| 3      | Defective ig and second                        |                      |               | •       | Execute the diagnostic mode (Code No.33). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.                                                                 |                                                                          |  |

| Fault  | t code No.                                   | 41                   | Symptom                                                 | Open or   | r short circuit detected in the lean angle cut-off switch                                                                                                          | i.                                                 |
|--------|----------------------------------------------|----------------------|---------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Used d | iagnostic cod                                | le No. 08            | 3 (lean angle                                           | cut-off s | witch)                                                                                                                                                             |                                                    |
| Order  | Inspection operation item and probable cause |                      |                                                         |           | Operation item and countermeasure                                                                                                                                  | Reinstatement method                               |
| 1      | Inspect to<br>may have                       | he coupl<br>e pulled | n of connecto<br>er for any pi<br>out.<br>g condition o | ns that   | If there is a malfunction, repair it and connect it securely.  Lean angle cut-off switch coupler  Main wiring harness ECU coupler                                  | Reinstated by<br>turning the<br>main switch<br>ON. |
| 2      | Open or sho                                  | ort circui           | t in wiring ha                                          | rness.    | Repair or replace if there is an open or short circuit.  Between switch coupler and ECU coupler  Black/Blue – Black/Blue  Yellow/Green – Yellow/Green  Blue – Blue |                                                    |
| 3      | Defective le                                 | an angle             | cut-off swite                                           | ch        | Execute the diagnostic mode (Code No.08). Replace if defective. Refer to Fault code No. 30.                                                                        |                                                    |





| Faul   |                                                                                                                                                      | normal signals are received from the speed sensor.<br>n or short circuit is detected in the neutral switch.                                                                                          |                                                                                              |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Used d | liagnostic code No. 07 (speed sensor) –<br>No. 21 (neutral switch) –                                                                                 | + A1 ~ A4                                                                                                                                                                                            |                                                                                              |
| Order  | Inspection operation item and probable cause                                                                                                         | Operation item and countermeasure                                                                                                                                                                    | Reinstatement method                                                                         |
| A1     | Connected condition of speed sensor connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Speed sensor coupler  Main wiring harness ECU coupler                                                                                 | Reinstated by<br>starting the<br>engine, and<br>inputting the<br>vehicle speed<br>signals by |
| A2     | Open or short circuit in speed sensor lead.                                                                                                          | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler.  Blue - Blue  White/Yellow - White/Yellow  Black/Blue - Black/Blue                                  | operating the<br>motorcycle at a<br>low speed of<br>20 to 30 km/h.                           |
| А3     | Defective speed sensor                                                                                                                               | Execute the diagnostic mode (Code No.07).  Replace if defective.  1. Measure the speed sensor output voltage.  2. Connect the pocket tester (DC 20 V) to the speed sensor coupler terminal as shown. |                                                                                              |
|        |                                                                                                                                                      | Tester positive probe → white ①  Tester negative probe → black/blue ②                                                                                                                                |                                                                                              |
|        |                                                                                                                                                      | W L/Y L W/Y B/L 2                                                                                                                                                                                    |                                                                                              |
|        |                                                                                                                                                      | 3. Measure the speed sensor output voltage.  Speed sensor output voltage When sensor is on DC 4.8 V or more When sensor is off DC 0.6 V or less                                                      |                                                                                              |
| Λ.4    | Coor for detecting vahials around has                                                                                                                | 4. Is the speed sensor OK?                                                                                                                                                                           |                                                                                              |
| A4     | Gear for detecting vehicle speed has broken.                                                                                                         | Replace if defective. Refer to "TRANSMISSION" in chapter 5.                                                                                                                                          |                                                                                              |
| Order  | Inspection operation item and probable cause                                                                                                         | Operation item and countermeasure                                                                                                                                                                    | Reinstatement method.                                                                        |
| B1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.              | If there is a malfunction, repair it and connect it securely.  Neutral switch connector  Main wiring harness ECU coupler                                                                             | Reinstated by<br>starting the<br>engine, and<br>inputting the<br>vehicle speed               |
| B2     | Open or short circuit in neutral switch lead.                                                                                                        | Repair or replace if there is an open or short circuit.  Between switch connector and ECU coupler  Sky blue – Black/Yellow                                                                           | signals by operating the motorcycle at a                                                     |
| В3     | Defective neutral switch                                                                                                                             | Execute the diagnostic mode (Code No.21). Replace if defective. Refer to "CHECKING THE SWITCHES" in chapter 8.                                                                                       | low speed of<br>20 to 30 km/h.                                                               |
| B4     | Faulty shift drum (neutral detection area)                                                                                                           | Replace if defective. Refer to "TRANSMISSION" in chapter 5.                                                                                                                                          |                                                                                              |





| rder | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                                          | Reinstatemen<br>method                                                  |
|------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 1    | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Starting circuit cut-off relay coupler (fuel injection system relay)  ECU coupler                                                                                           | Reinstated by<br>starting the<br>engine and<br>operating it at<br>idle. |
| 2    | Malfunction in ECU                                                                                                                      | Fuel injection system relay is on.                                                                                                                                                                                                         | ]                                                                       |
| 3    | Open or short circuit in the wiring harness.                                                                                            | Repair or replace if there is an open or short circuit.  Between battery terminal and ECU coupler Red/white – Red/white Red – Blue/Yellow (Main switch and engine stop switch are on.) Red – Red/Blue (Fuel injection system relay is on.) |                                                                         |
|      | Malfunction or open circuit in fuel injection system relay                                                                              | Execute the diagnostic mode (Code No.09). Replace if defective.  NOTE: When the leads are disconnected, the voltage check by the code No.09 is impossible.                                                                                 |                                                                         |
|      |                                                                                                                                         | <ol> <li>Disconnect the starting circuit cut-off relay from the wire harness.</li> <li>Connect the pocket tester (Ω × 1) and battery (12 V) to the starting circuit cut-off relay terminals as shown.</li> </ol>                           |                                                                         |
|      |                                                                                                                                         | Battery positive terminal → red/black ① Battery positive terminal → blue/yellow ②                                                                                                                                                          |                                                                         |
|      |                                                                                                                                         | Tester positive probe → red ③ Tester negative probe → red/blue ④                                                                                                                                                                           |                                                                         |
|      |                                                                                                                                         | 3 2 1 4  R LWS/R R/B LW R/L  B/W B/R LWL/Y RWL/B L/Y Sb B/Y Sb/W                                                                                                                                                                           |                                                                         |
|      |                                                                                                                                         | Does the starting circuit cut-off relay have continuity between blue/white and black?                                                                                                                                                      |                                                                         |





| Fault code No.  44 Symptom Error is detected while reading or writing on EEP-ROM (CO adjustment value). |                    |          |               |            |                                                                                                                                                                                                                                                                                                               |                                           |
|---------------------------------------------------------------------------------------------------------|--------------------|----------|---------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Used d                                                                                                  | liagnostic No.     | 60 (EE   | P-ROM impr    | oper cylir | nder indication)                                                                                                                                                                                                                                                                                              |                                           |
| Order                                                                                                   | Inspection o cause | peration | n item and pr | obable     | Operation item and countermeasure                                                                                                                                                                                                                                                                             | Reinstatement method                      |
| 1                                                                                                       | Malfunction        | in ECU   |               |            | Execute diagnostic code 60  1. Check the faulty cylinder. (If there are multiple cylinders, the number of the faulty cylinders appear alternately at 2-second intervals.)  2. Readjust the CO of the displayed cylinder. Refer to "ADJUSTING THE EXHAUST GAS VALUME" in chapter 3.  Replace ECU if defective. | Reinstated by turning the main switch ON. |

| Fault code No. 46 Symptom Power supply to the FI system relay is not normal.  Used diagnostic code No |                                                                                                                                         |                                                                                                                                                                                                                            |                                                             |  |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--|
| Order                                                                                                 | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                                                                          | Reinstatement method                                        |  |
| 1                                                                                                     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely. ECU coupler.                                                                                                                                                 | Reinstated by starting the engine and operating it at idle. |  |
| 2                                                                                                     | Faulty battery                                                                                                                          | Replace or change the battery Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.                                                                                                                                   |                                                             |  |
| 3                                                                                                     | The malfunction of the rectifier/regulator.                                                                                             | Replace if defective. Refer to "CHARGING SYSTEM" in chapter 8.                                                                                                                                                             |                                                             |  |
| 4                                                                                                     | Open or short circuit in wiring harness.                                                                                                | Repair or replace if there is an open or short circuit.  Between battery and main switch red – red  Between main switch and fuse (ignition) brown/blue – brown/blue  Between fuse (ignition) and ECU red/white – red/white |                                                             |  |





|       | t code No.   47   Symptom   Sub-thro                                                                                                    | ottle position sensor – open or short circuit detected.                                                                                                            |                                           |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Order | Inspection operation item and probable cause                                                                                            | Operation item and countermeasure                                                                                                                                  | Reinstatement method                      |
| 1     | Installed condition of sub-throttle position sensor.                                                                                    | Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to "THROTTLE BODIES" section.                      | Reinstated by turning the main switch ON. |
| 2     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. | If there is a malfunction, repair it and connect it securely.  Throttle position sensor coupler  Main wiring harness ECU coupler  Sub-wire harness coupler         |                                           |
| 3     | Open or short circuit in wiring harness and/or sub lead.                                                                                | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler  Black/Blue – Black/Blue  Green/yellow – Green/yellow  Blue – Blue |                                           |
| 4     | Defective sub-throttle position sensor.                                                                                                 | Replace if defective. Refer to "THROTTLE BODIES" section.                                                                                                          |                                           |





| Used d | liagnostic code 56                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                  |
|--------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Order  | Inspection operation item and probable couse                                                                                           | Operation item and countermeasure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reinstatement method                                                                                             |
| 1      | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler | If there is a malfunction repair it and connect it securely. Sub-throttle servo motor coupler Main wire harness ECU coupler.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reinstated by turning the main switch ON. It takes 120 seconds at the maximum before the original state returns. |
| 2      | Open or short circuit in wire harness.                                                                                                 | Repair or replace if there is an open or short circuit.  Between motor coupler and ECU coupler.  Yellow/Red – Yellow/Red  Yellow/White – Yellow/White                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                  |
| 3      | Defective sub-throttle servo motor.                                                                                                    | Execute the diagnostic mode (Code No.56).  If there is a malfunction, carry out the following checks.  1. Check whether or not the sub-throttle valve is seized.  1) Turn the nut of worm shaft of the sub-throttle servo motor by hand to check that the sub-throttle valve is moved smoothly by hand.  2) If it is not moved smoothly, disconnect the link between the sub-throttle servo motor and sub-throttle valve, and then check whether or not the sub-throttle valve is moved smoothly by hand.  Refer to "THROTTLE BODIES" in chapter 7.  3) When the sub-throttle valve is not moved smoothly, repair or replace it since the cause is the seizure of sub-throttle valve body itself.  When it is moved smoothly at Step (1) and (2), replace the sub-throttle servo motor.  2. Perform the self-diagnosis mode and check the operation of sub-throttle valve by visual inspection (Code No: 56).  The operation should be carried out as 5-second drive in the full open direction, 2-second stop and 5-second drive in the full |                                                                                                                  |





|       | Abnorm                                                                                                                                 | servo motor potention<br>nal at the full open or full close position.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
|-------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Order | Inspection operation item and probable couse                                                                                           | Operation item and countermeasure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Reinstatement method                               |
| 1     | Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler | If there is a malfunction repair it and connect it securely.  EXUP servo motor coupler  Main wire harness ECU coupler.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reinstated by<br>turning the<br>main switch<br>ON. |
| 2     | Open or short circuit in wire harness.                                                                                                 | Repair or replace if there is an open or short circuit.  Between motor coupler and ECU coupler.  Black/Green – Black/Green  Black/Red – Black/Red                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |
| 3     | Defective EXUP servo motor.                                                                                                            | <ul> <li>Execute the diagnostic mode (Code No.53).</li> <li>If there is a malfunction, carry out the following checks.</li> <li>1. Check whether or not the EXUP valve is seized.</li> <li>Disconnect the EXUP cable and check that the EXUP valve is moved smoothly by hand.</li> <li>When the valve is not moved smoothly, repair or replace it. Refer to "ADJUSTING THE EXUP CABLES" in chapter 3.</li> <li>2. When the EXUP valve is moved smoothly, replace the EXUP servo motor.</li> <li>3. Perform the self-diagnosis mode and check the operation of EXUP valve by visual inspection (Code No: 53). The operation should be carried out as 3-second drive in the full open direction, 2-second stop and 3-second drive in the full close direction.</li> </ul> |                                                    |
| 4     | Defective EXUP valve, pulley, cable.                                                                                                   | Replace if defective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |

| Fault  | code No.                                     | 50     | Symptom | Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.) |                                   |                                           |  |  |
|--------|----------------------------------------------|--------|---------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------|--|--|
| Used d | Used diagnostic code No. – –                 |        |         |                                                                                                                         |                                   |                                           |  |  |
| Order  | Inspection operation item and probable cause |        |         | obable                                                                                                                  | Operation item and countermeasure | Reinstatement method                      |  |  |
| 1      | Malfunction                                  | in ECU |         |                                                                                                                         | Replace the ECU.                  | Reinstated by turning the main switch ON. |  |  |

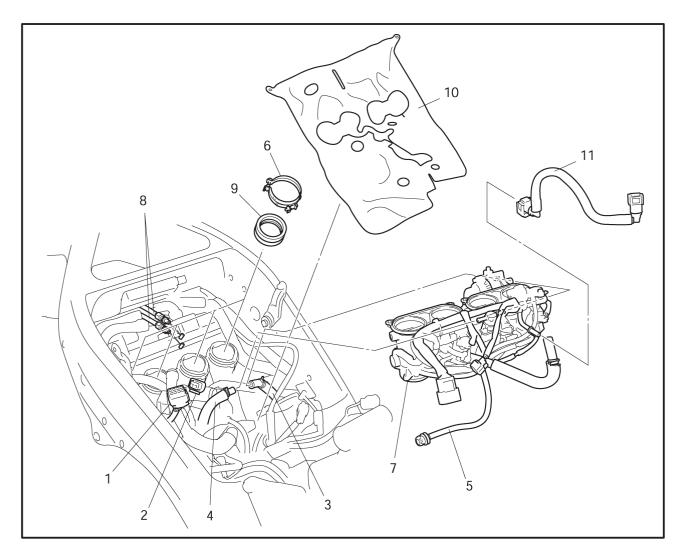




| Fault code No.         |                                                                                                                                                         | Er-1 | Symptom | No signal are received from the ECU.                                                                                                                             |                                                |                      |  |  |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------|--|--|
|                        |                                                                                                                                                         | Er-2 | Symptom | No signal are received from the ECU within the specified duration.                                                                                               |                                                |                      |  |  |
| Er-3 Symptom Data from |                                                                                                                                                         |      | Symptom | Data fro                                                                                                                                                         | m the ECU cannot be received correctly.        |                      |  |  |
| Er-4 Symptom Non-reg   |                                                                                                                                                         |      | Symptom | Non-reg                                                                                                                                                          | istered data has been received from the meter. |                      |  |  |
| Used d                 | Used diagnostic code No                                                                                                                                 |      |         |                                                                                                                                                                  |                                                |                      |  |  |
| Order                  | Order Inspection operation item and probable cause                                                                                                      |      |         | obable                                                                                                                                                           | Operation item and countermeasure              | Reinstatement method |  |  |
| 1                      | Connected condition of connector     Inspect the coupler for any pins that     may have pulled out.     Check the locking condition of the     coupler. |      | ns that | If there is a malfunction, repair it and connect it securely.  Cylinder identification sensor coupler  Main wiring harness ECU coupler  Sub-wire harness coupler | Reinstated by turning the main switch ON.      |                      |  |  |
| 2                      | Open or short circuit in wiring harness and/or sub lead.                                                                                                |      | rness   | Repair or replace if there is an open or short circuit.  Between sensor coupler and ECU coupler Yellow/Blue – Yellow/Blue  Black/White – Black/White             |                                                |                      |  |  |
| 3                      | Malfunction in meter                                                                                                                                    |      |         | Replace the meter.                                                                                                                                               | 1                                              |                      |  |  |
| 4                      | Malfunction in ECU                                                                                                                                      |      |         |                                                                                                                                                                  | Replace the ECU.                               |                      |  |  |

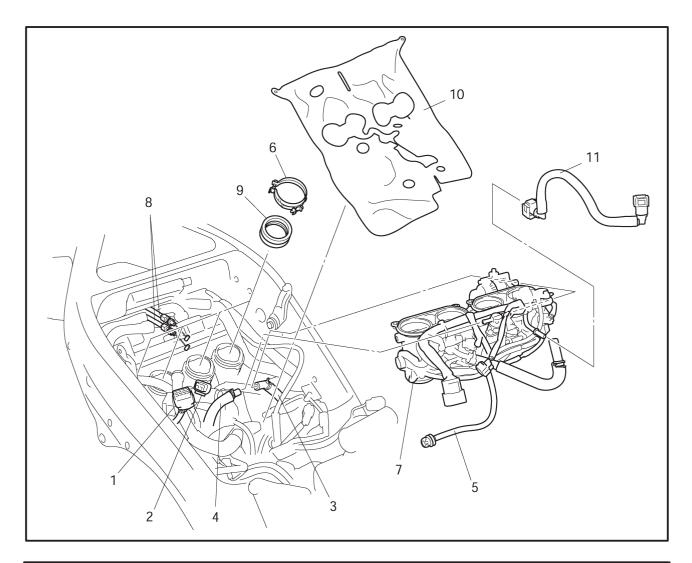






| Order                      | Job/Part                                                                                                                                                                                                              | Q'ty                       | Remarks                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6 | Removing the throttle bodies Seat Fuel tank Air filter case Sub-wire harness coupler Coolant temperature sensor coupler Thermo wax inlet hose Thermo wax outlet hose Idle adjust screw wire Throttle body joint clamp | 2<br>1<br>1<br>1<br>1<br>4 | Remove the parts in the order listed. Refer to "SEAT" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "AIR FILTER CASE" in chapter 3. Disconnect. Disconnect.  Loosen. NOTE: If it loosens too much, the nut will separate. |
| 7<br>8                     | Throttle bodies Throttle cables                                                                                                                                                                                       | 1 2                        | Disconnect.                                                                                                                                                                                                                           |

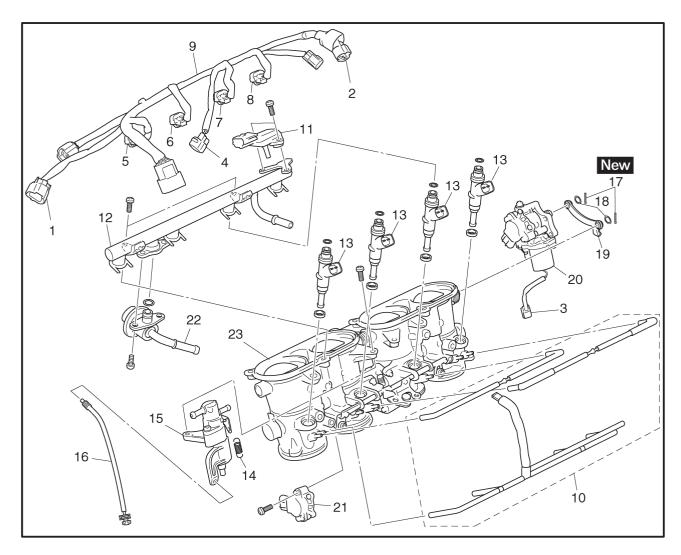




| Order    | Job/Part                    | Q'ty | Remarks                                                                                                                                                           |
|----------|-----------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9        | Throttle body joint         | 4    | NOTE:                                                                                                                                                             |
|          |                             |      | To install the throttle body joint, make sure to install it to the cylinder with the same figures corresponding to the figures stated on the throttle body joint. |
| 10<br>11 | Heat protector<br>Fuel hose | 1    | For installation, reverse the removal procedure.                                                                                                                  |

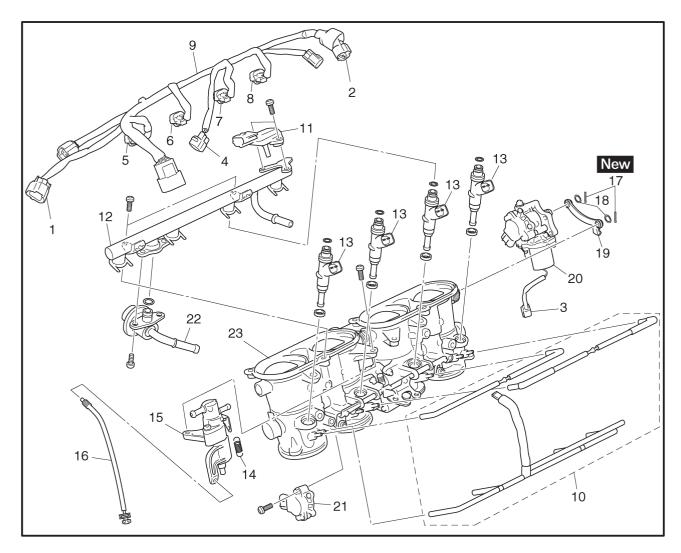


## **INJECTORS**



| Order | Job/Part                             | Q'ty | Remarks                               |
|-------|--------------------------------------|------|---------------------------------------|
|       | Removing the injectors               |      | Remove the parts in the order listed. |
| 1     | Throttle position sensor coupler     | 1    | Disconnect.                           |
| 2     | Sub-throttle position sensor coupler | 1    | Disconnect.                           |
| 3     | Sub-throttle motor assembly coupler  | 1    | Disconnect.                           |
| 4     | Intake air pressure sensor coupler   | 1    | Disconnect.                           |
| 5     | Cylinder #1-injector coupler         | 1    | Disconnect.                           |
| 6     | Cylinder #2-injector coupler         | 1    | Disconnect.                           |
| 7     | Cylinder #3-injector coupler         | 1    | Disconnect.                           |
| 8     | Cylinder #4-injector coupler         | 1    | Disconnect.                           |
| 9     | Sub wire harness                     | 1    |                                       |
| 10    | Negative pressure hose               | 1    |                                       |
| 11    | Intake air pressure sensor           | 1    |                                       |
| 12    | Fuel distributor                     | 1    |                                       |
| 13    | Injector                             | 4    |                                       |
| 14    | Spring                               | 1    |                                       |
| 15    | Thermo wax assembly                  | 1    |                                       |





| Order | Job/Part                          | Q'ty | Remarks                               |
|-------|-----------------------------------|------|---------------------------------------|
| 16    | Idle adjust screw wire            | 1    |                                       |
| 17    | Cotter pin                        | 2    |                                       |
| 18    | Washer                            | 2    |                                       |
| 19    | Link                              | 1    |                                       |
| 20    | Sub-throttle servo motor assembly | 1    |                                       |
| 21    | Throttle position sensor          | 1    |                                       |
| 22    | Fuel pressure regulator           | 1    |                                       |
| 23    | Throttle body assembly            | 1    |                                       |
|       |                                   |      | For installation, reverse the removal |
|       |                                   |      | procedure.                            |

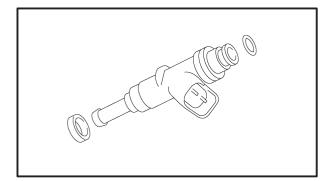
FI



EAS00911

### **CAUTION:**

The throttle bodies should not be disassembled.



EAS00912

#### **CHECKING THE INJECTORS**

- 1. Check:
  - injectors
     Damage → Replace.

EAS00913

#### **CHECKING THE THROTTLE BODIES**

- 1. Check:
  - throttle bodies
     Cracks/damage → Replace the throttle bodies as a set.
- 2. Check:
  - fuel passages
     Obstructions → Clean.

a. Wash the throttle bodies in a petroleum-based solvent.

Do not use any caustic carburetor cleaning solution.

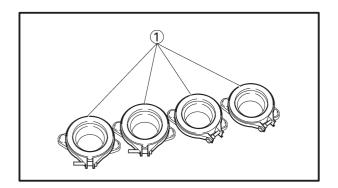
b. Blow out all of the passages with compressed air.

EAS00095

#### **CHECKING THE THROTTLE BODY JOINTS**

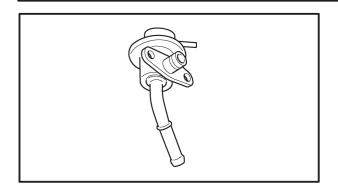
The following procedure applies to all of the throttle body joints and intake manifolds.

- 1. Remove:
  - throttle bodies Refer to "THROTTLE BODIES".
- 2. Check:
  - throttle body joints ①
     Cracks/damage → Replace.
- 3. Install:
  - throttle bodies Refer to "THROTTLE BODIES".









#### **CHECKING THE PRESSURE REGULATOR**

- 1. Check:
  - pressure regulator
     Damage → Replace.

# CHECKING THE FUEL PUMP AND PRESSURE REGULATOR OPERATION

- 1. Check:
- pressure regulator operation
- a. Remove the fuel tank.

  Refer to "FUEL TANK" in chapter 3.
- b. Disconnect the negative pressure hose 1 from the pressure regulator at the joint.

\*\*\*\*\*\*\*\*\*\*

- c. Connect the vacuum/pressure pump gauge set ② onto the negative pressure hose from the pressure regulator.
- d. Connect the pressure gauge ③ and adapter
  ④ onto the fuel injection pipe.



Vacuum/pressure pump gauge set 90890-06756, YB-35956 Pressure gauge 90890-03153, YU-03153 Adapter 90890-03176, YM-03176

- e. Install the fuel tank. Refer to "FUEL TANK" in chapter 3.
- f. Start the engine.
- g. Measure the fuel pressure.

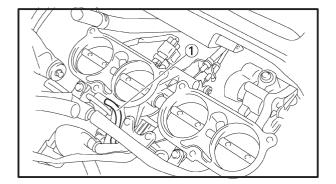


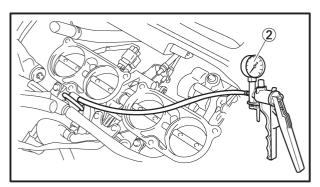
Fuel pressure 294 kPa (2.94 kg/cm<sup>2</sup>, 42.6 psi)

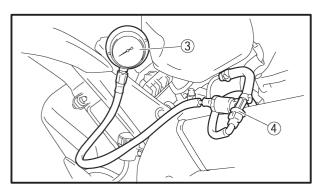
h. Use the vacuum pressure pump gauge set to adjust the fuel pressure in relation to the vacuum pressure as described below.

NOTE: -

The vacuum pressure should not exceed 100 kPa (760 mmHg, 29.9 inHg).







FI



Increase the vacuum pressure  $\rightarrow$  Fuel pressure is decreased

Decrease the vacuum pressure → Fuel pressure is increased

Faulty → Replace the pressure regulator.

EAS00916

# CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE:

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.

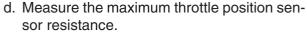
- 1. Check:
  - throttle position sensor



- b. Remove the throttle position sensor from the throttle body.
- c. Connect the pocket tester ( $\Omega \times 1$ k) to the throttle position sensor.

Positive tester probe  $\rightarrow$  blue terminal 1Negative tester probe  $\rightarrow$ 

black/blue terminal 2



Out of specification  $\rightarrow$  Replace the throttle position sensor.



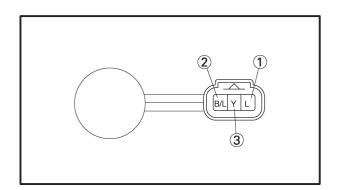
Maximum throttle position sensor resistance

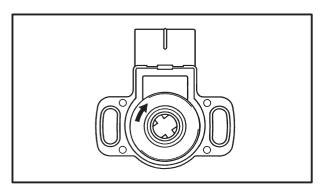
4  $\sim$  6 k $\Omega$  at 20°C (68°F) (blue – black/blue)

e. Connect the pocket tester ( $\Omega \times 1$ k) to the throttle position sensor.

Positive tester probe → yellow terminal ③ Negative tester probe →

black/blue terminal 2





FI



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  $\rightarrow$  Replace the throttle position sensor.

The slot is worn or broken  $\rightarrow$  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.

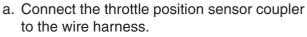


Throttle position sensor resistance

 $0 \sim 6 \text{ k}\Omega \text{ at } 20^{\circ}\text{C } (68^{\circ}\text{F})$  (yellow – black)



• throttle position sensor angle



b. Connect the digital circuit tester to the throttle position sensor.

Tester positive probe →

yellow terminal (1)

Tester negative probe →

black/blue terminal ②



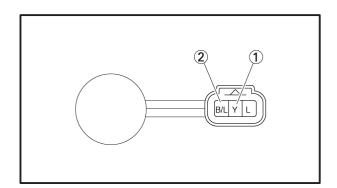
# Digital circuit tester 90890-03174

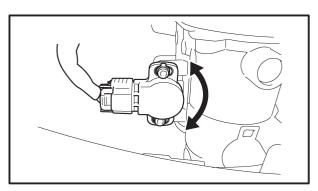
- c. Measure the throttle position sensor voltage.
- d. Adjust the throttle position sensor angle so the measured voltage is within the specified range.



Throttle position sensor voltage 0.63 ~ 0.73 V (yellow – black/blue)

e. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.



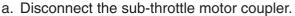




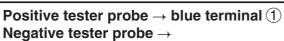


# CHECKING AND ADJUSTING THE SUB-THROTTLE POSITION SENSOR

- 1. Check:
  - sub-throttle position sensor



- b. Disconnect the sub-throttle position sensor coupler.
- c. Remove the sub-throttle position sensor from the sub-throttle servo motor.
- d. Connect the pocket tester ( $\Omega \times 1$ k) to the sub-throttle position sensor.



black/blue terminal 2

e. Measure the maximum sub-throttle position sensor resistance.

Out of specification  $\rightarrow$  Replace the subthrottle position sensor.



# Maximum sub-throttle position sensor resistance

 $4 \sim 6 \text{ k}\Omega \text{ at } 20^{\circ}\text{C } (68^{\circ}\text{F})$  (blue – black/blue)

f. Connect the pocket tester ( $\Omega \times 1k$ ) to the sub-throttle position sensor.

Positive tester probe → green/yellow terminal ③
Negative tester probe → black/blue terminal ②

g. While slowly opening the sub-throttle worm nut, check that the sub-throttle position sensor resistance is within the specified range. The resistance does not change or it changes abruptly → Replace the sub-throttle position sensor.

#### NOTE: -

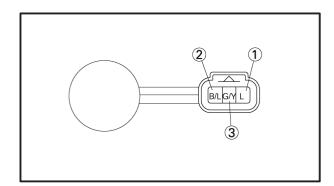
Check mainly that the resistance changes gradually when turning the sub-throttle worm nut, since the readings (from closed to wide-open sub-throttle) may differ slightly from those specified.

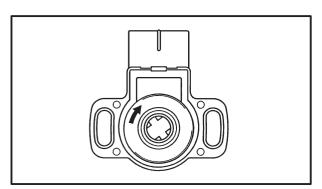


# Sub-throttle position sensor resistance

\_\_\_\_

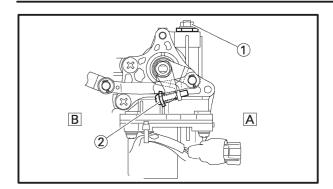
 $0 \sim 6 \text{ k}\Omega$  at 20°C (68°F) (black/blue – green/yellow)

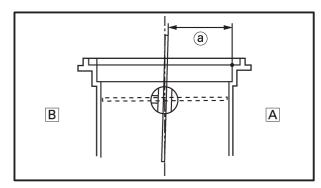


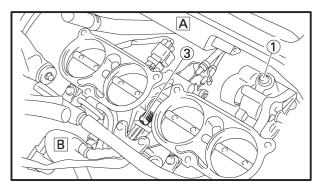


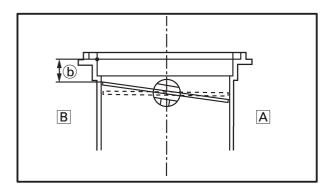












- 2. Adjust:
- sub-throttle position sensor full open angle
- a. Turn the nut ① of the worm shaft of the subthrottle counterclockwise until it contacts with the full open stopper.
- b. When the dimension of ⓐ sections of the throttle bodies #3 and #4 is measured with a micrometer caliper, adjust with the adjuster ② of the output shaft section of the subthrottle servo motor so that the dimension is in a range from 24.2 to 24.6 mm (0.95 to 0.97 in).
- A Front side
- B Rear side



Sub-throttle dimension a 24.2  $\sim$  24.6 mm (0.95  $\sim$  0.97 in)

- c. After adjusting the dimension of ⓐ sections of the throttle bodies #3 and #4, measure the dimension of ⓐ sections of #1 and #2.
- d. If the dimension of ⓐ sections of the throttle bodies #1 and #2 is different from the dimension of ⓐ sections of the throttle bodies #3 and #4, adjust it to the same dimension as the measurement value adjusted for the throttle bodies #3 and #4, using the tuning screw ③ located between the throttle bodies #2 and #3.

- 3. Adjust:
  - primary opening
- a. After performing the full open angle of the sub-throttle position sensor, turn the nut of the worm shaft clockwise, measure the dimension of (b) section with a micrometer caliper or other device and adjust so that the dimension is in a range from 8.1 to 8.5 mm (0.32 to 0.33 in).
- A Front side
- B Rear side



Sub-throttle dimension b8.1  $\sim$  8.5 mm (0.32  $\sim$  0.33 in)





- 4. Adjust
- Sub-throttle position sensor voltage

a. Connect the sub-throttle position sensor coupler to the wire harness.

b. Connect the digital circuit tester to the subthrottle position sensor.

Positive tester prove → green/yellow terminal Negative tester prove → black/blue terminal



# Digital circuit tester 90890-03174

c. Move the sub-throttle position sensor to adjust to be in the specified range.



# Sub-throttle position sensor voltage

 $0.97 \sim 1.07 \text{ V}$  (green/yellow – black/blue)

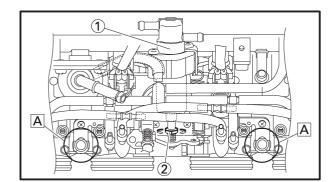
 d. After adjusting the sub-throttle position sensor voltage, tighten the sub-throttle position sensor screws.

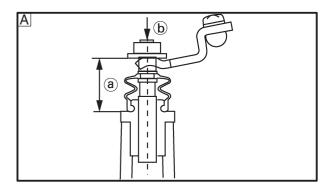
#### NOTE: -

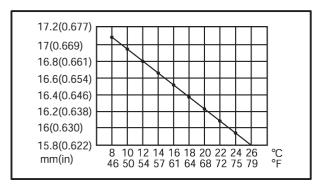
- After setting up the sub-throttle position sensor, check that the sub-throttle position sensor output voltage is 0.4 V or more with the nut of worm shaft turned to the full close side until it stops
- When the sub-throttle position sensor output voltage is 0.4 V or more, check that the subthrottle position sensor output voltage is 4.6 V or less with the nut of worm shaft turned to the full open side until it stops.
- 5. Connect
  - sub-throttle motor coupler











# CHECKING AND ADJUSTING THE THERMO WAX

- 1. Check:
  - thermo wax ①
     Damege → Replace the thermo wax.
- 2. Adjust:
  - thermo wax the end face distance (a)
- a. Before adjusting the distance, push the rod
  b in order to be fitted in several times by hand.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

b. Measure the outside air temperature, and adjust the distance ⓐ by turning the adjusting screw ②. Refer to the thermo wax tolerance table based on the measured outside air temperature for correct adjustment.

#### NOTE:

- Setup tolerance of the longitudinal axis should be  $\pm$  0.2 mm ( $\pm$  0.008 in).
- After adjusting the thermo wax, check that the first idling is released at the coolant temperature around 60°C (140°F) by idling.
- If the first idling is not released around 60°C (140°F), make sure to set it again. (When the coolant temperature is low, adjust the distance between the end faces longer or adjust it shorter when the coolant temperature is high.)
- In case of turning the adjusting bolt two-third turn, the temperature varies about 10°C (50°F).

FI

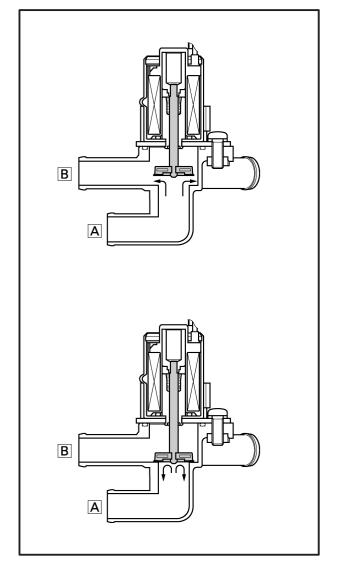


EAS00507

# AIR INDUCTION SYSTEM AIR INJECTION

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons.

When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C (1112 to 1292°F).



EAS0097

#### **AIR CUT-OFF VALVE**

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the motorcycle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.

- A From the air cleaner
- B To the cylinder head

## **AIR INDUCTION SYSTEM**

FI

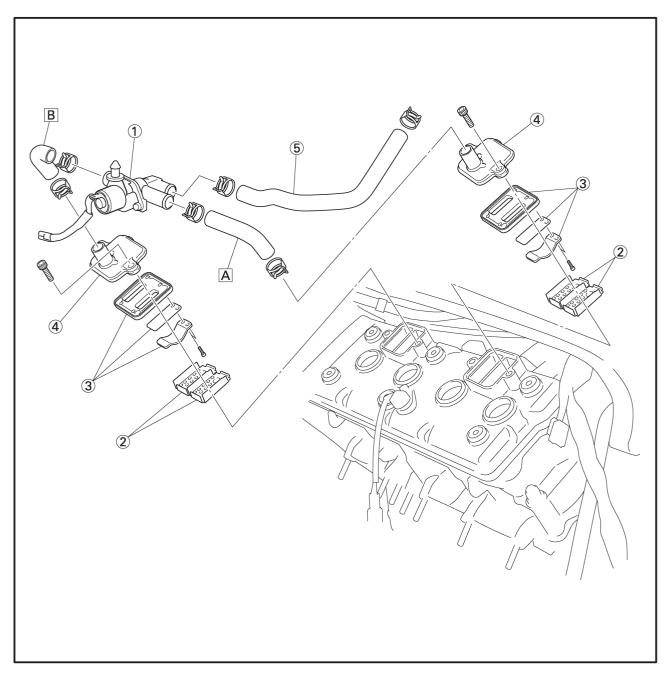


### **AIR INDUCTION SYSTEM DIAGRAMS**

- 1 Air cut-off valve
- A To cylinder #1 and #2 B To cylinder #3 and #4

2 Plate

- 3 Reed valve assembly 4 Reed valve cap
- 5 To air filter case



### **AIR INDUCTION SYSTEM**

FI



EAS00510

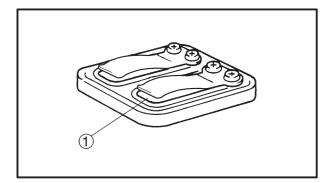
#### **CHECKING THE AIR INDUCTION SYSTEM**

- 1. Check:
- hoses

Loose connection  $\rightarrow$  Connect properly. Cracks/damage  $\rightarrow$  Replace.

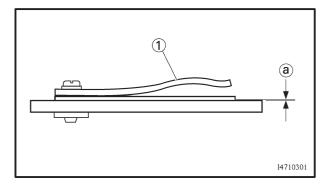
• pipes

Cracks/damage → Replace.



### 2. Check:

- reed valve (1)
- reed valve stopper
- reed valve seat
   Cracks/damage → Replace the reed valve.



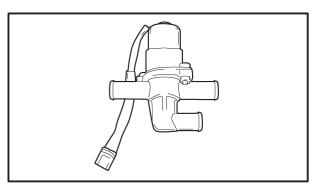
#### 3. Measure:

reed valve bending limit (a)
 Out of specification → Replace the reed valve.



Reed valve bending limit 0.4 mm (0.016 in)

1 Surface plate



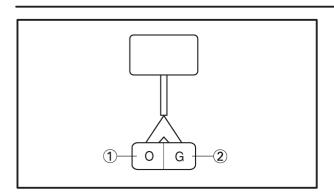
### 4. Check:

air cut-off valve
 Cracks/damage → Replace.

### **AIR INDUCTION SYSTEM**







- 5. Check:
  - Air induction system solenoid
- a. Remove the Air induction system solenoid coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times$  1) to the Air induction system solenoid terminal as shown.

Tester positive probe → orange ①
Tester negative probe → green ②

c. Measure the Air induction system solenoid resistance.



Air induction system solenoid resistance

18  $\sim$  22  $\Omega$  at 20°C (68°F)

d. Out of specification  $\rightarrow$  Replace.



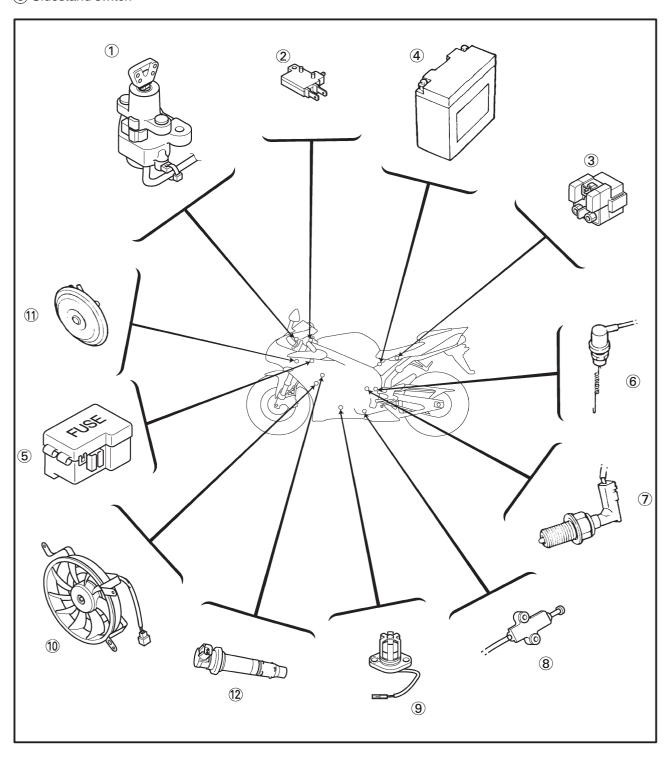
EAS00729

## **ELECTRICAL SYSTEM**

## **ELECTRICAL COMPONENTS**

- 1) Main switch
- (2) Front brake light switch
- 3 Starter relay
- (4) Battery
- 5 Fuse box
- 6 Rear brake light switch
- (7) Neutral switch
- (8) Sidestand switch

- 9 Oil level switch
- 10 Radiator fan motor
- (11) Horn
- (12) Ignition coil

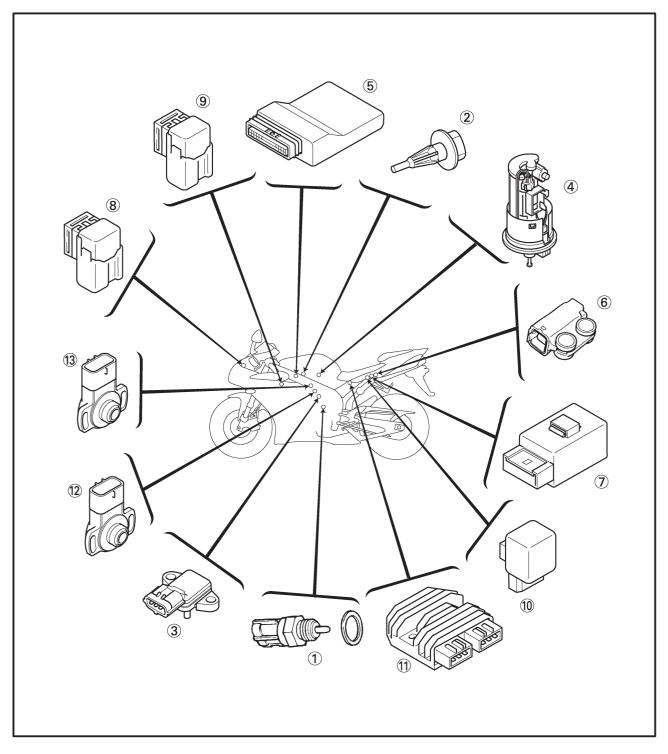


# **ELECTRICAL COMPONENTS**



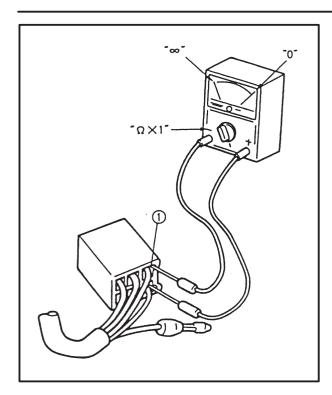
- 1 Coolant temperature sensor
- 2 Intake air temperature sensor
- 3 Intake air pressure sensor
- 4 Fuel pump
- 5 ECU
- 6 Lean angle cut-off switch7 Starting circuit cut-off relay
- (8) Headlight relay (dimmer)

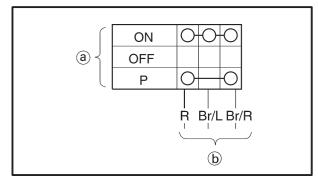
- (9) Radiator fan motor relay
- 10 Turn signal relay
- 11) Rectifier/regulator
- 12 Throttle position sensor
- 13 Sub-throttle position sensor



## **CHECKING SWITCH CONTINUITY**







EAS00730

# **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. Always insert the probes from the opposite end of the coupler ① taking care not to loosen or damage the leads.



Pocket tester 90890-03112, YU-3112

#### NOTE: -

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times$  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 ⓐ are shown in the far left column and the switch lead colors ⓑ are shown in the top row in the switch illustration.

#### NOTE: -

"O—O" 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 red and brown/red when the switch is set to "P".

There is continuity between red, brown/blue and brown/red when the switch is set to "ON".

## **CHECKING THE SWITCHES**



EAS00731

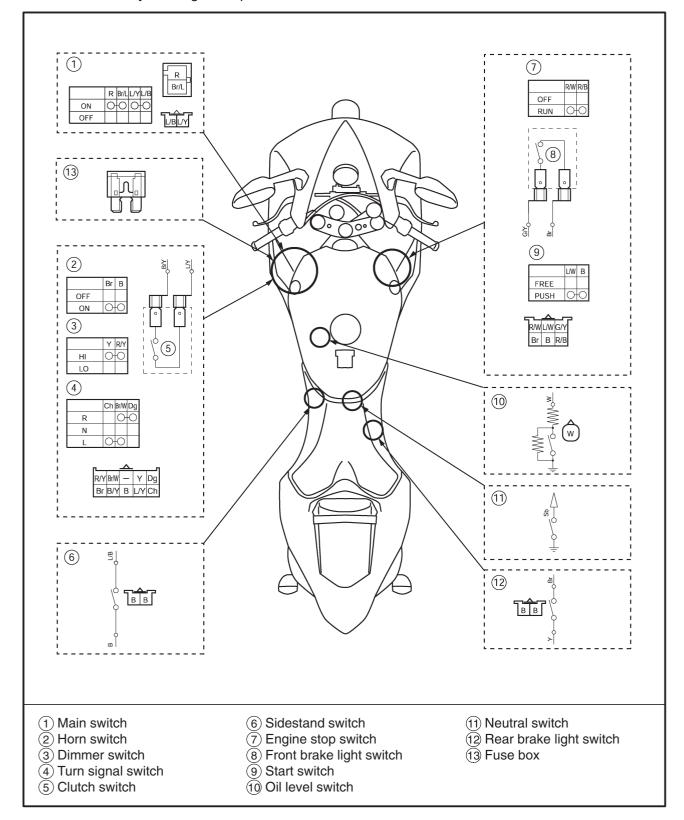
## **CHECKING THE SWITCHES**

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.

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.

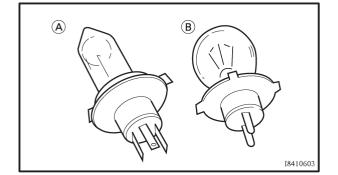
Damage/wear → Repair or replace the bulb, bulb socket or both.

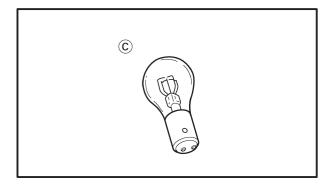
Improperly connected  $\rightarrow$  Properly connect. No continuity  $\rightarrow$  Repair or replace the bulb, bulb socket or both.

#### TYPES OF BULBS

The bulbs used on this motorcycle are shown in the illustration on the left.

- Bulbs (A) and (B) are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs © are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.





# CHECKING THE CONDITION OF THE

The following procedure applies to all of the bulbs.

- 1. Remove:
- bulb

# **A** WARNING

- Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.
- When changing the tail/brake light bulb, confirm that the frame has cooled according to the warning label and change the tail/brake light bulb.

## **CAUTION:**

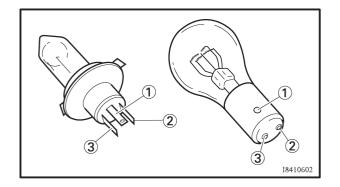
- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.
- 2. Check:
  - bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.



Pocket tester 90890-03112, YU-3112

#### NOTF:

Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.



- a. Connect the positive tester probe to terminal
  - 1 and the negative tester probe to terminal
  - (2), and check the continuity.
- b. Connect the positive tester probe to terminal
  - 1 and the negative tester probe to terminal
  - ③, and check the continuity.
- c. If either of the readings indicate no continuity, replace the 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.

## CHECKING THE BULBS AND BULB SOCKETS

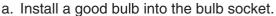




## Pocket tester 90890-03112, YU-3112

#### NOTE: -

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.



b. Connect the pocket tester probes to the respective leads of the bulb socket.

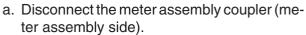
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

 c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

#### **CHECKING THE LEDs**

The following procedures applies to all of the LEDs.

- 1. Check:
  - LED (for proper operation)
    Improper operation → Replace.



b. Connect two jumper leads ① from the battery terminals to the respective coupler terminal.

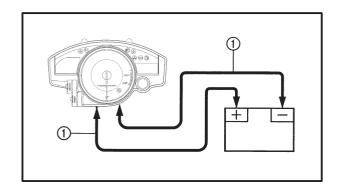
#### NOTE: -

As for connecting with which coupler terminal, refer to "CABLE ROUTING" in chapter 2.

# **A** WARNING

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.
- c. When the jumper leads are connected to the terminals the respective LED should illuminate

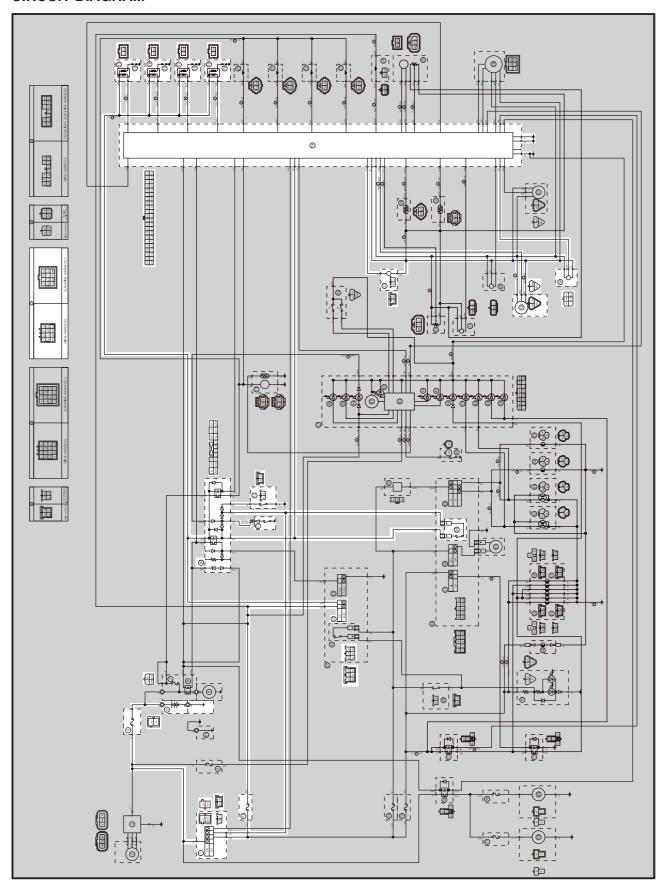
Does not light  $\rightarrow$  Replace the meter assembly.





EAS0073

# IGNITION SYSTEM CIRCUIT DIAGRAM





- 1 Main switch
- 4 Fuse (main)
- 6 Battery
- 10 Starting circuit cut-off relay
  11 Neutral switch
- 12 Sidestand switch
- 14 E.C.U.
- 15 Ignition coil #1
- 16 Ignition coil #2
- 17 Ignition coil #3
- (18) Ignition coil #4
- 19 Spark plug
- (31) Crankshaft position sensor
- 35 Cylinder identification sensor
- 36 Lean angle cut-off switch
- 53 Engine stop switch
- 69 Clutch switch
- 73 Fuse (ignition)



FAS0073

#### 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. ignition coil resistance
- 6. crankshaft position sensor
- 7. main switch
- 8. engine stop switch
- 9. neutral switch
- 10. sidestand switch
- 11. clutch switch
- 12. starting circuit cut-off relay (diode)
- 13. lean angle cut-off switch
- 14. wiring connections (of the entire ignition system)

#### NOTE:

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- 3. side cowlings
- Troubleshoot with the following special tool(s).



Ignition checker 90890-06754 Dynamic spark tester YM-34487 Pocket tester 90890-03112, YU-3112

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?





Replace the fuse(s).

AS00739

## 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

• Is the battery OK?





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 CR9EK (NGK) Spark plug gap

 $0.6 \sim 0.7 \, \mathrm{mm} \, (0.0236 \sim 0.0276 \, \mathrm{in})$ 

 Is the spark plug in good condition, is it of the correct type, and is its gap within specification?





Re-gap or replace the spark plug.

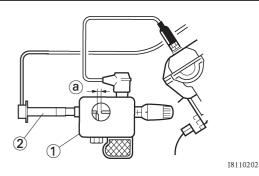


FAS0074

## 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 ① and spark plug cap ② as shown.
- Set the main switch to "ON".
- Measure the ignition spark gap a.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.



N.

# Minimum ignition spark gap 6 mm (0.24 in)

• Is there a spark and is the spark gap within specification?



NO



The ignition system is OK.

EAS00747

#### 5. Ignition coil resistance

The following procedure applies to all of the ignition coils.

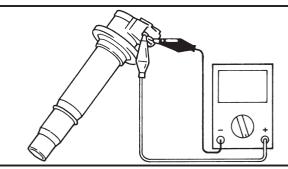
- Disconnect the ignition coil leads from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil as shown.

**Positive tester probe** →

ignition coil terminal

Negative tester probe →

ignition coil terminal



Measure the primary coil resistance.



# Primary coil resistance 1.19 $\sim$ 1.61 $\Omega$ at 20°C

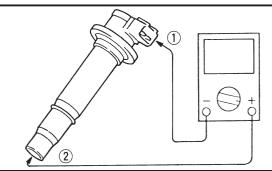
• Connect the pocket tester ( $\Omega \times 1$ k) to the ignition coil as shown.

Negative tester probe  $\rightarrow$ 

ignition coil terminal ①

Positive tester probe →

spark plug terminal 2



Measure the secondary coil resistance.



Secondary coil resistance 8.5  $\sim$  11.5 k $\Omega$  at 20°C

Is the ignition coil OK?





NO

Replace the ignition coil.

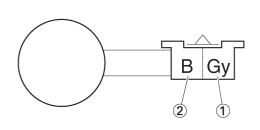


FAS0074

## 6. Crankshaft position sensor resistance

- Disconnect the crankshaft position sensor coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the crankshaft position sensor coupler as shown.

Positive tester probe → gray ①
Negative tester probe → black②



 Measure the crankshaft position sensor resistance.



**Crankshaft position sensor** resistance

336  $\sim$  504  $\Omega$  at 20°C (between gray and black)

• Is the crankshaft position sensor OK?





Replace the crankshaft position sensor.

EAS00749

#### 7. Main switch

- Check the main switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch.

AS00750

- 8. 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.

EAS0075

- 9. Neutral switch
- Check the neutral switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?





Replace the neutral switch.

EAS00752

#### 10. Sidestand switch

- Check the sidestand switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?



YES



Replace the sidestand switch.

-AS00763

## 11. Clutch switch

- Check the clutch switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the clutch switch OK?





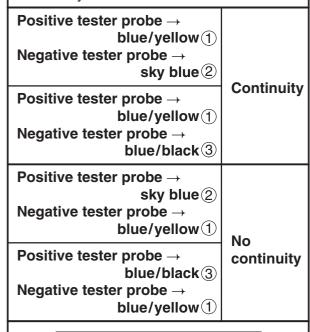
Replace the clutch switch.

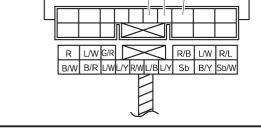


FAS0075

## 12. Starting circuit cut-off relay (diode)

- 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 as shown.
- Check the starting circuit cut-off relay for continuity.





312

## NOTE: -

When you switch the positive and negative tester probes, the readings in the above chart will be reversed.

Are the tester readings correct?





NO

Replace the starting circuit cut-off relay.

### 13. Lean angle cut-off switch

- Check the lean angle cut-off switch.
   Refer to "FUEL INJECTION SYSTEM" in chapter 7.
- Is the lean angle cut-off switch OK?





NO

Replace the lean angle cut-off switch.

EAS00754

#### 14. Wiring

- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?





NO

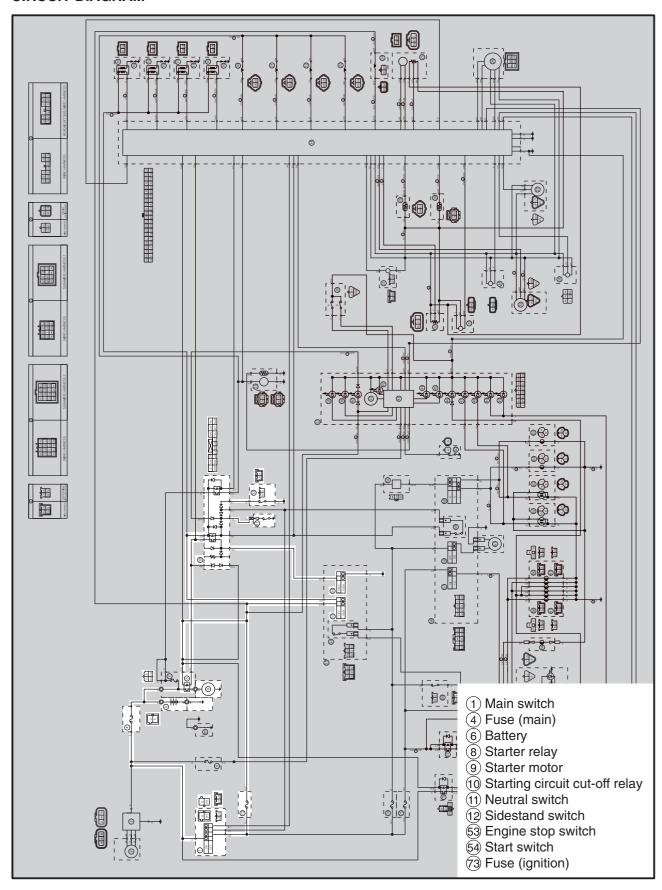
Replace the ECU.

Properly connect or repair the ignition system's wiring.

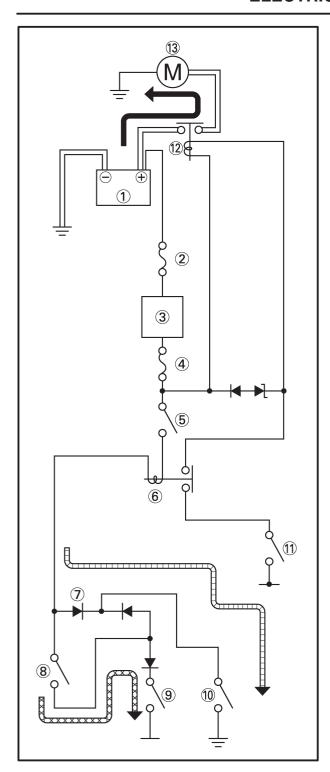


FAS0075

# ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM







EAS00756

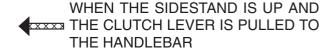
# STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

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 starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the starter switch.





- (1) Battery
- (2) Main fuse
- (3) Main switch
- (4) Ignition fuse
- (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



FAS0075

#### 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
- wiring connections
   (of the entire starting system)

#### NOTE:

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- 3. side cowlings
- 4. throttle body assembly
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-3112

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?





Replace the fuse(s).

EAS00739

## 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





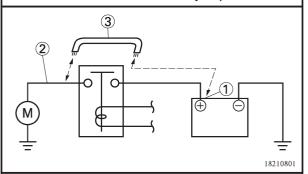
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00758

#### 3. Starter motor

• Connect the positive battery terminal ① and starter motor lead ② with a jumper lead ③.



# **A** WARNING

- A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.
- Does the starter motor turn?





NO

Repair or replace the starter motor.



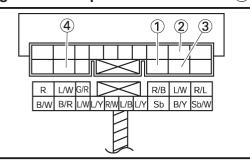
EAS0075

- 4. 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.

Positive battery terminal  $\rightarrow$  red/black ① Negative battery terminal  $\rightarrow$ 

black/yellow 2

Positive tester probe → blue/white ③ Negative tester probe → blue/white ④



• Does the starting circuit cut-off relay have continuity between blue/white ③ and blue/white ④?



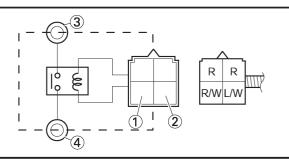
Replace the starting circuit cut-off relay.

EAS00761

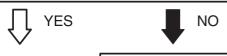
- 5. Starter relay
- Disconnect the starter relay coupler from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the starter relay coupler as shown.

Positive battery terminal → blue/white ① Negative battery terminal → red/white ②

Positive tester probe → red ③
Negative tester probe → black ④



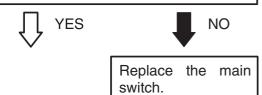
 Does the starter relay have continuity between red and black?



Replace the starter relay.

EAS00749

- 6. Main switch
- Check the main switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



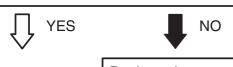
EAS00750

- 7. Engine stop switch
- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?



EAS00751

- 8. Neutral switch
- Check the neutral switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



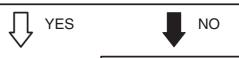
Replace the neutral switch.



FAS00752

#### 9. Sidestand switch

- Check the sidestand switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?



Replace the sidestand 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?



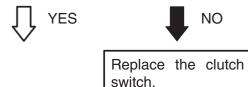
The starting system circuit is OK.

Properly connect or repair the starting system's wiring.

EAS00763

#### 10. Clutch switch

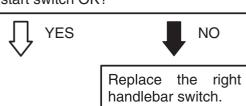
- Check the clutch switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the clutch switch OK?



EAS0076

## 11. Start switch

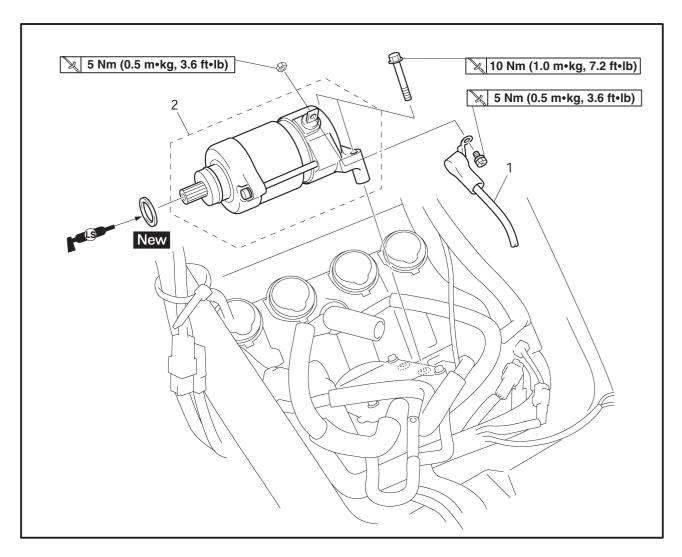
- Check the start switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the start switch OK?





EAS00767

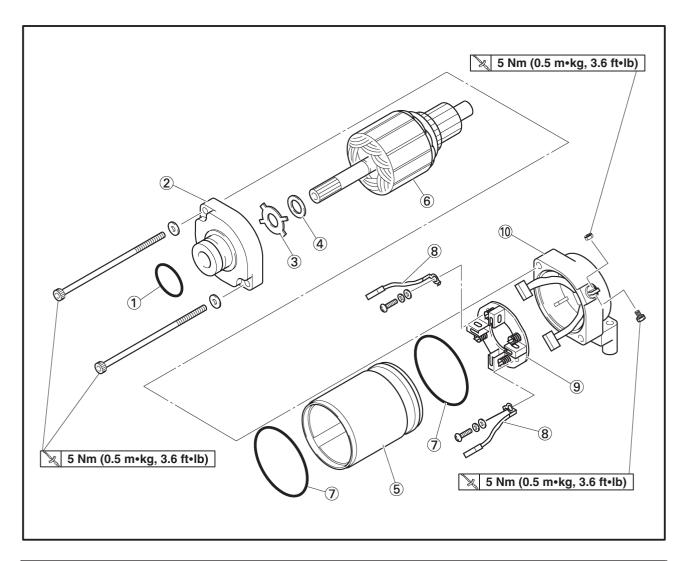
# STARTER MOTOR



| Order | Job/Part                                                         | Q'ty | Remarks                                                                                                                                         |
|-------|------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|       | Removing the starter motor Seat Fuel tank Throttle body assembly |      | Remove the parts in the order listed. Refer to "SEAT" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "THROTTLE BODIES" in chapter 7. |
| 1     | Starter motor lead                                               | 1    | ·                                                                                                                                               |
| 2     | Starter motor                                                    | 1    |                                                                                                                                                 |
|       |                                                                  |      | For installation, reverse the removal procedure.                                                                                                |



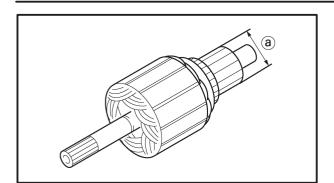
EAS00768

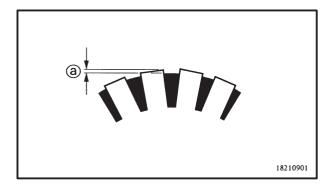


| Order                       | Job/Part                                                                                                                                                               | Q'ty                    | Remarks                                          |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------|
| Order  1 2 3 4 5 6 7 8 9 10 | Job/Part  Disassembling the starter motor O-ring Front cover Lock washer Washer Starter motor yoke Armature assembly O-ring Starter motor lead Brush holder Rear cover | Q'ty  1 1 1 1 1 2 2 1 1 | Disassemble the parts in the order listed.       |
|                             |                                                                                                                                                                        |                         | For assembly, reverse the disassembly procedure. |

## **STARTER MOTOR**







AS00770

## **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 24.5 mm (0.96 in)

- 3. Measure:
  - mica undercut (a)

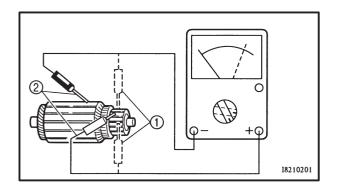
Out of specification — Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



Mica undercut 1.5 mm (0.06 in)

#### NOTE: -

The mica of the commutator must be undercut to ensure proper operation of the commutator.



- 4. Measure:
  - armature assembly resistances (commutator and insulation)

Out of specification  $\rightarrow$  Replace the starter motor.

a. Measure the armature assembly resistances with the pocket tester.



Pocket tester 90890-03112, YU-3112



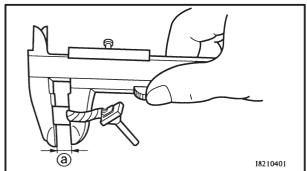
**Armature coil** 

Commutator resistance ①  $0.0090 \sim 0.0110 \,\Omega$  at  $20^{\circ}\text{C}$  (68°F) Insulation resistance ② Above 1 M $\Omega$  at  $20^{\circ}\text{C}$  (68°F)

b. If any resistance is out of specification, replace the starter motor.

# STARTER MOTOR



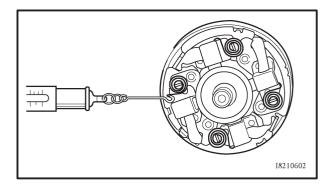




## 5. Measure:

brush length ⓐ.
 Out of specification → Replace the brushes as a set.

Brush length wear limit 3.6 mm (0.14 in)



#### 6. Measure:

brush spring force
 Out of specification → Replace the brush springs as a set.



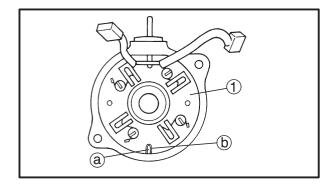
# **Brush spring force**

5.28 ~ 7.92 N

 $(538 \sim 808 \, \mathrm{gf}, 18.99 \sim 28.48 \, \mathrm{oz})$ 

#### 7. Check:

• gear teeth
Damage/wear → Replace the gear.



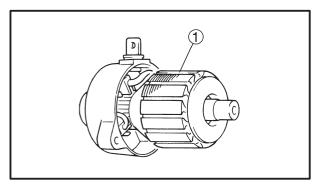


## **ASSEMBLING THE STARTER MOTOR**

- 1. Install:
  - brush seat 1

NOTE:

Align the slot ⓐ on the brush seat with the tab ⓑ in the starter motor rear cover.

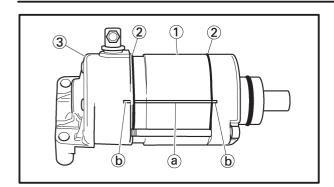


#### 2. Install:

• armature ①

# STARTER MOTOR





- 3. Install:
  - starter motor yoke ①

  - O-rings ② New starter motor rear cover ③

5 Nm (0.5 m•kg, 3.6 ft•lb)

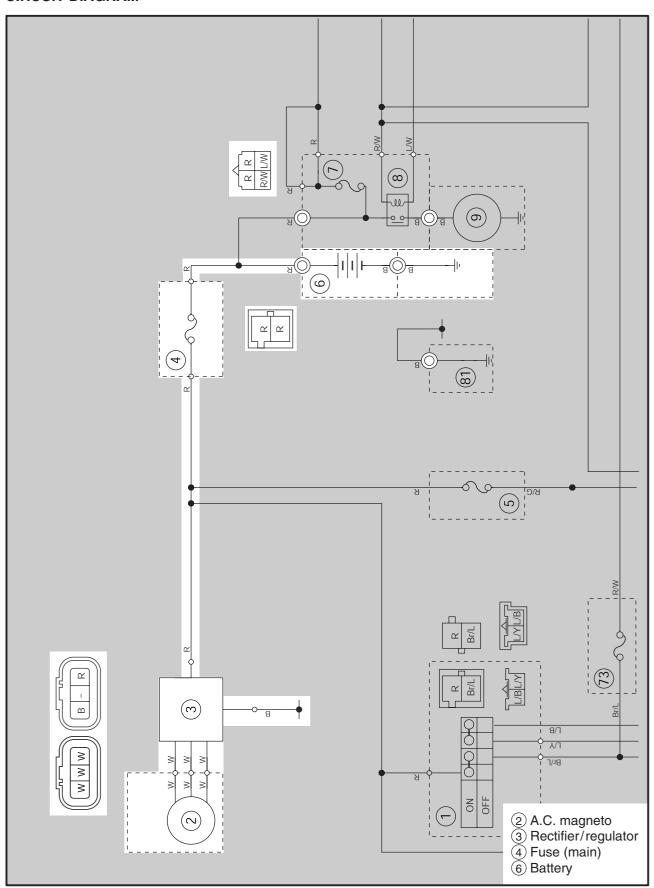
NOTE: —

Align the match marks a on the starter motor yoke with the match marks b on the front and rear covers.



EAS00773

# CHARGING SYSTEM CIRCUIT DIAGRAM



## **CHARGING SYSTEM**



EAS00774

### **TROUBLESHOOTING**

## The battery is not being charged.

#### Check:

- 1. main fuse
- 2. battery
- 3. charging voltage
- 4. stator coil lead
- 5. stator coil resistance
- 6. wiring connections (of the entire charging system)

#### NOTE

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- Troubleshoot with the following special tool(s).



## Pocket tester 90890-03112, YU-3112

EAS00738

- 1. Main fuse
- Check the main fuse for continuity.
   Refer to "CHECKING THE FUSES" in chapter 3.
- Is the main fuse OK?





Replace the fuse.

EAS00739

### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





Clean the battery terminals.

• Recharge or replace the battery.

EAS00775

## 3. Charging voltage

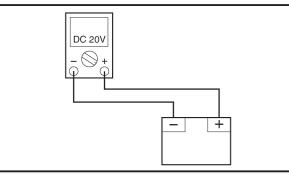
- Set the engine tachometer to the ignition coil of cylinder #1.
- Connect the pocket tester (DC 20 V) to the battery as shown.

#### Positive tester probe →

positive battery terminal

Negative tester probe →

negative battery 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 the battery is fully charged.

• Is the charging voltage within specification?



NO



The charging circuit is OK.

## **CHARGING SYSTEM**



#### 4. Stator coil lead

- Disconnect stator coil lead coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) to the stator coil lead coupler as shown.

**Positive tester probe** →

white (1)

Negative tester probe →

ground

Positive tester probe  $\rightarrow$ 

white (2)

Negative tester probe →

ground

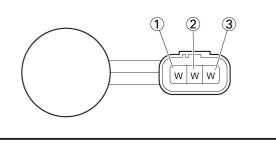
No continuity

Positive tester probe  $\rightarrow$ 

white ③

Negative tester probe →

ground



Are the tester readings correct?





Replace the stator coil lead.

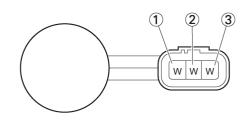
EAS00776

## 5. Stator coil resistance

- Remove the generator cover.
- Connect the pocket tester ( $\Omega \times 1$ ) to the stator coils as shown.

Positive tester probe → white ①
Negative tester probe → white ②

Positive tester probe → white ①
Negative tester probe → white ③



• Measure the stator coil resistances.



Stator coil resistance  $0.14 \sim 0.18 \Omega$  at  $20^{\circ}$ C (68°F)

Is the stator coil OK?





NO

Replace the stator coil assembly.

EAS00779

## 6. 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?





NO

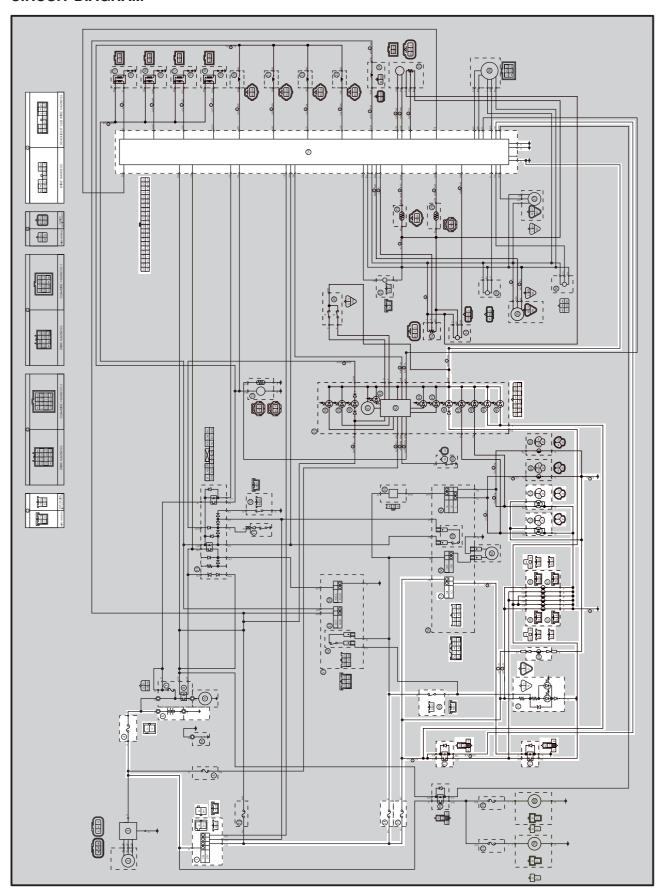
Replace the rectifier/regulator.

Properly connect or repair the charging system's wiring.



EAS00780

# LIGHTING SYSTEM CIRCUIT DIAGRAM





- 1 Main switch
- 4 Fuse (main)
- 6 Battery
- 14 E.C.U.
- 46 Hi beam indicator light
- 49 Meter light
- 57 Dimmer switch
- © Front turn signal/position light (left)
- 63 Front turn signal/position light (right)
- 66 Headlight
- 67 Auxiliary light
- 68 License plate light
- 69 Rear brake light switch
- 70 Tail/brake light
- 71 Headlight relay (on/off)
- 72 Headlight relay (dimmer)
- 74 Fuse (signal)
- 75 Fuse (headlight)



FAS0078

### **TROUBLESHOOTING**

Any of the following fail to light: headlight, high beam indicator light, taillight, licence light or meter light.

#### Check:

- 1. main, turn and headlight fuses
- 2. battery
- 3. main switch
- 4. dimmer switch
- 5. pass switch
- 6. headlight relay (on/off)
- 7. headlight relay (dimmer)
- 8. wiring connections (of the entire lighting system)

#### NOTE:

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- 3. side cowlings
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-3112

#### EAS00738

- 1. Main, turn and headlight fuses
- Check the main, turn and headlight fuses for continuity.

Refer to "CHECKING THE FUSES" in chapter 3.

Are the main, turn and headlight fuses OK?



EAS00739

### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

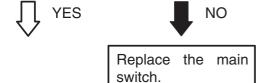
Is the battery OK?



- 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?



EAS00784

- 4. Dimmer switch
- Check the dimmer switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the dimmer switch OK?



The dimmer switch is faulty. Replace the left handlebar switch.

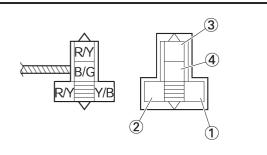


## 5. Headlight relay (on/off)

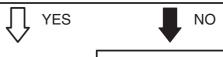
- Disconnect the headlight relay (on/off) from the coupler.
- Connect the pocket tester ( $\Omega \times$  1) and battery (12 V) to the headlight relay (on/off) as shown.

Positive battery lead  $\rightarrow$  red/yellow 1Negative battery lead  $\rightarrow$  yellow/black 2

Positive tester probe → red/yellow ③
Negative tester probe → black/green ④



• Does the Headlight relay (dimmer) have continuity between red/yellow ③ and black/green ④?



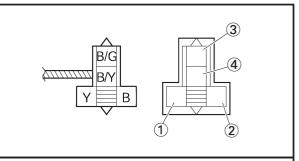
Replace the dimmer relay.

#### 6. Headlight relay (dimmer)

- Disconnect the headlight relay (dimmer) from the coupler.
- Connect the pocket tester ( $\Omega \times$  1) and battery (12 V) to the headlight relay (dimmer) as shown.

Positive battery lead → black ①
Negative battery lead → yellow ②

Positive tester probe → black/green ③ Negative tester probe → black/yellow ④



• Does the headlight relay (dimmer) have continuity between black/green ③ and black/yellow④?



Replace the headlight relay (dimmer).

#### EAS0078

#### 7. Wiring

- Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the lighting system's wiring properly connected and without defects?



Check the condition of each of the lighting system's circuits.

Refer to "CHECK-ING THE LIGHTING SYSTEM".

Properly connect or repair the lighting system's wiring.



FAS00788

#### **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.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the headlight bulb and socket OK?





Replace the headlight bulb, socket or both.

## 2. Voltage

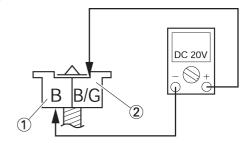
- Connect the pocket tester (DC 20 V) to the headlight and meter assembly couplers as shown.
- A When the dimmer switch is set to " \(\exists \)0 "

## Headlight

Positive tester probe → black ①
Negative tester probe → black/green ②

Headlight coupler (wire harness side)

A Low beam

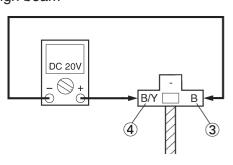


Headlight

Positive tester probe → black ③
Negative tester probe → black/yellow ④

Headlight coupler (wire harness side)

B High beam



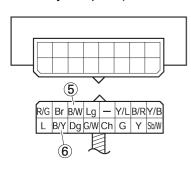
High beam indicator light (LEDs)

Positive tester probe → black/yelle

Positive tester probe → black/ yellow ⑥
Negative tester probe →

black/white 5

Meter assembly coupler (wire harness side)



- Turn the main switch to "ON".
- Start the engine.
- Set the dimmer switch to " \( \bigcirc\) or " \( \bigcirc\) or " \( \bigcirc\) .
- Measure the voltage (DC 12 V) of black/green ② or black/yellow ④ on the headlight coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the headlight coupler is faulty and must be repaired.



EAS00792

2. The license plate light fails to come on.

- 1. License plate light bulb and socket
- Check the license plate light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the license plate light bulb and socket OK?



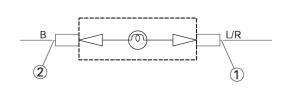


Replace the license plate light bulb, socket or both.

#### 2. Voltage

 Connect the pocket tester (DC 20 V) to the license plate light coupler (wire harness light side) as shown.

Positive tester probe → blue/red ① Negative tester probe → black ②



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) of blue/red
   1 on the license plate light coupler (wire harness side).
- Is the voltage within specification?





NO

This circuit is OK.

The wiring circuit from the main switch to the license plate light coupler is faulty and must be repaired.

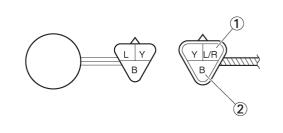
EAS00790

3. The tail/brake light fails to come on.

#### 1. Voltage

 Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Positive tester probe → blue/red ① Negative tester probe → black ②



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) of blue/red
   1 on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?





NO

This circuit is OK.

Wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.



EAS0079

- 4. The auxiliary light fails to come on.
- 1. Auxiliary light and socket
- Check the auxiliary light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the auxiliary light .bulb and socket OK?



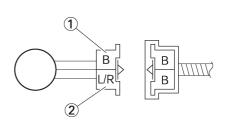


Replace the auxiliary light bulb, socket or both.

## 2. Voltage

 Connect the pocket tester (DC 20 V) to the auxiliary light coupler (auxiliary light side) as shown.

Positive tester probe  $\rightarrow$  blue/red ② Negative tester probe  $\rightarrow$  black (1)



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) of blue/red
  ② on the auxiliary light coupler (auxiliary light side).
- Is the voltage within specification?





NO

This circuit is OK.

The wiring circuit from the main switch to the auxiliary light coupler is faulty and must be repaired.

- 5. The turn signal/position light fails to come on.
- 1. Turn signal/position light and socket
- Check the turn signal/position light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the turn signal/position light bulb and socket OK?





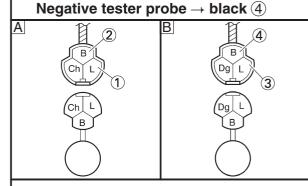
NO

Replace the turn signal/position light bulb, socket or both.

## 2. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal/position light coupler (wire harness side) as shown.
- A Left turn signal/position light
- B Right turn signal/position light

Left turn signal/position light
Positive tester probe → blue ①
Negative tester probe → black ②
Right turn signal/position light
Positive tester probe → blue ③



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) of blue ① or blue ③ on the turn signal/position light coupler (wire harness side).
- Is the voltage within specification?





NO

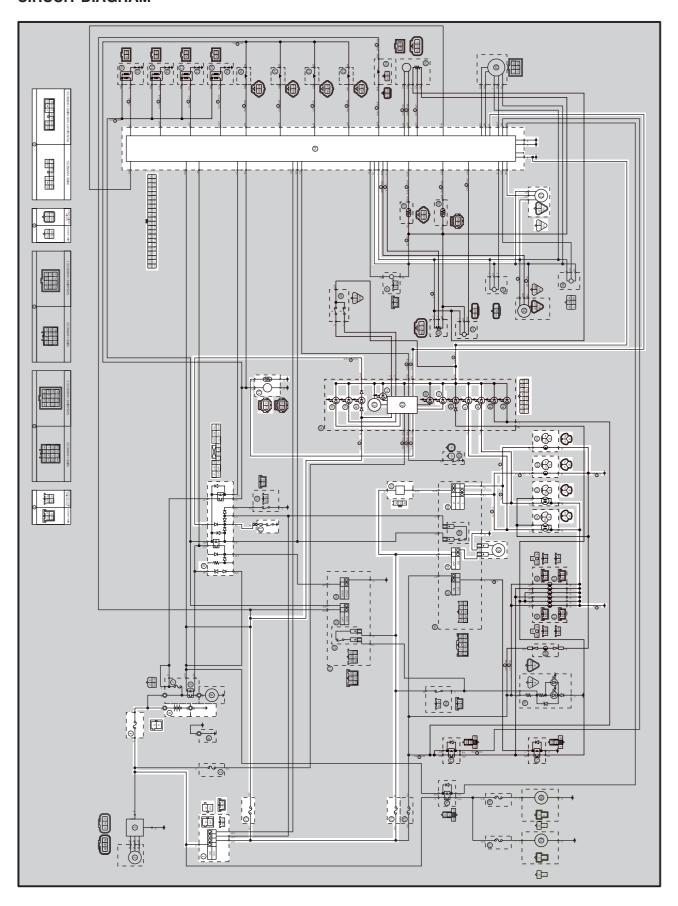
This circuit is OK.

The wiring circuit from the main switch to the turn signal/position light coupler is faulty and must be repaired.



EAS00793

# SIGNALING SYSTEM CIRCUIT DIAGRAM



## SIGNALING SYSTEM



- 1 Main switch
- 4 Fuse (main)
- 6 Battery
- 10 Starting circuit cut-off relay
- 11) Neutral switch
- 13 Fuel pump
- (14) E.C.U.
- 27 Speed sensor
- 38 Fuel level warning light
- 39 Oil level warning light
- 40 Neutral indicator light
- (41) Tachometer
- 42 Shift timing indicator light
- 43 Multi function meter
- 45 Coolant temperature indicator light
- 47 Turn signal indicator light (left)
- 48 Turn signal indicator light (light)
- 55 Turn signal relay
- 58 Horn switch
- 60 Turn signal switch
- (61) Horn
- 62 Front turn signal/position light (left)
- 63 Front turn signal/position light (right)
- 64 Rear turn signal light (left)
- 65 Rear turn signal light (right)
- 73 Fuse (ignition)
- 74 Fuse (signal)

## SIGNALING SYSTEM

ELEC - +

FAS00794

#### **TROUBLESHOOTING**

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

#### Check:

- 1. backup, main, ignition, signal, and park fuses
- 2. batterv
- 3. main switch
- wiring connections (of the entire signaling system)

#### NOTE:

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- 3. side cowlings
- Troubleshoot with the following special tool(s).



## Pocket tester 90890-03112, YU-3112

EAS00738

- 1. Backup, main, ignition, signal and park fuses
- Check the backup, main, ignition, signal and park fuses for continuity.
   Refer to "CHECKING THE FUSES" in chap-
- Are the backup, main, ignition, signal and park fuses OK?





Replace the fuse(s).

EAS00739

#### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





- Clean the battery terminals.
- Recharge or replace the battery.

AS00749

#### 3. Main switch

- Check the main switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





NO

Replace the main switch.

EAS00795

### 4. Wiring

- Check the entire signaling 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 "CHECK-ING THE LIGHTING SYSTEM".

Properly connect or repair the signaling system's wiring.

EAS00796

#### CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

### 1. Horn switch

- Check the horn switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the horn switch OK?



YES



NO

Replace the left handlebar switch.

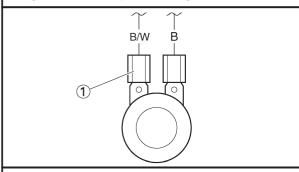
## **SIGNALING SYSTEM**



### 2. Voltage

 Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

Positive tester probe → black/white ① Negative tester probe → ground



- Turn the main switch to "ON".
- Push the horn switch.
- Measure the voltage (DC 12 V) of black/white at the horn terminal.
- Is the voltage within specification?

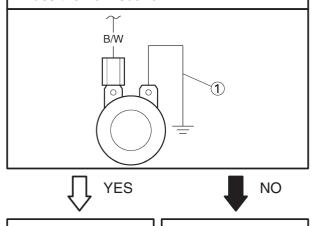




The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

## 3. Horn

- Disconnect the black connector at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Turn the main switch to "ON".
- Push the horn switch.
- Does the horn sound?



The horn is OK.

Replace the horn.

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.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

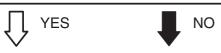
Are the tail/brake light bulb and socket OK?



Replace the tail/ brake light bulb, socket or both.

## 2. Brake light switches

- Check the brake light switches for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the brake light switch OK?

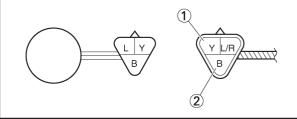


Replace the brake light switch.

### 3. Voltage

 Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown

Positive tester probe → yellow ①
Negative tester probe → black ②



- Turn the main switch to "ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (DC 12 V) of yellow ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?







This circuit is OK.

The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EAS00799

- 3. The turn signal/position light, turn signal indicator light or both fail to blink.
  - 1. Turn signal indicator light (LEDs)
- Check the turn signal indicator light for continuity.

Refer to "CHECKING THE LEDs".

Are the turn signal indicator light OK?





Replace the meter assembly.

- 2. Turn signal switch
- Check the turn signal switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the turn signal switch OK?



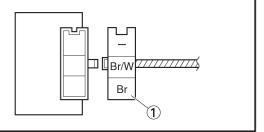


NO

Replace the left handlebar switch.

- 3. Voltage
- Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown.

Positive tester probe → brown ①
Negative tester probe → ground



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) on brown ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?



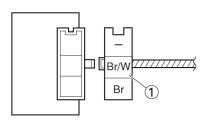


The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.

## 4. Voltage

 Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown.

Positive tester probe → brown/white ①
Negative tester probe → ground



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) on brown/white ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?





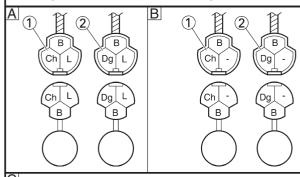
The turn signal relay is faulty and must be replaced.

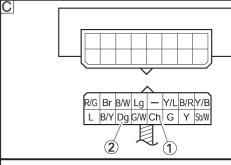


- 5. Voltage
- Connect the pocket tester (DC 20 V) to the turn signal light connector or meter assembly coupler (wire harness side) as shown.
- A Left turn signal light
- B Right turn signal light
- C Turn signal indicator light

Left turn signal/position light
Positive tester probe → chocolate ①
Negative tester probe → ground
Right turn signal/position light

Positive tester probe → dark green ②
Negative tester probe → ground





- Turn the main switch to "ON".
- Set the turn signal switch to "<> " or " <> ".
- Measure the voltage (DC 12 V) of the chocolate ① or dark green ② at the turn signal light connector (wire harness side).
- Is the voltage within specification?



This circuit is OK.

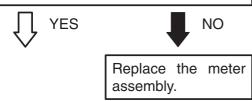
The wiring circuit from the turn signal switch to the turn signal light connector is faulty and must be repaired.

EAS00801

- 4. The neutral indicator light fails to come on.
- 1. Neutral indicator light (LEDs)
- Check the neutral indicator light for continuity.

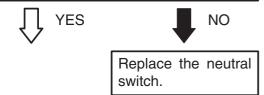
Refer to "CHECKING THE LEDs".

Are the neutral indicator light OK?



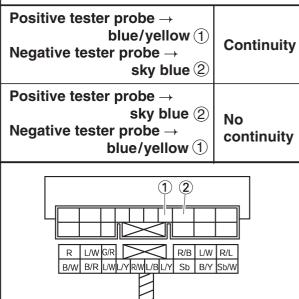
#### 2. Neutral switch

- Check the neutral switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



EAS00753

- 3. Starting circuit cut-off relay (diode)
- 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 as shown.
- Check the starting circuit cut-off relay for continuity.





### NOTE: -

When you switch the positive and negative tester probes, the readings in the above chart will be reversed.

Are the tester readings correct?



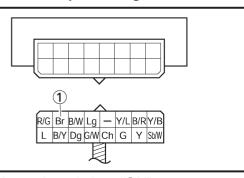


Replace the starting circuit cut-off relay.

### 4. Voltage

 Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe → brown ①
Negative tester probe → ground



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) of brown ①
   at the meter assembly coupler (wire harness side).
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

EAS00802

- 5. The oil level warning light fails to come on.
- 1. Oil level warning light (LEDs)
- Check the oil level warning light for continuitv.

When the main switch is turn to "ON", the oil level warning light is come on.

Are the oil level warning light OK?





Replace the meter assembly.

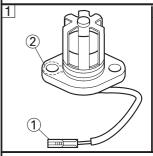
#### 2. Oil level switch

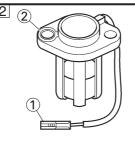
- Drain the engine oil and remove the oil level switch from the oil pan.
- Connect the pocket tester ( $\Omega \times$  100) to the oil level switch as shown.

Positive tester probe →

Connector (1) (white)

Negative tester probe → Body ground ②





Measure the oil level switch resistance.



Oil level switch resistance

1 114  $\sim$  126  $\Omega$  at 20°C (68°F)

**2** 484  $\sim$  536  $\Omega$  at 20°C (68°F)

Is the oil level switch OK?





NO

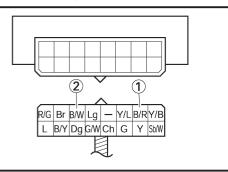
Replace the oil level switch.



3. Voltage

 Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Positive tester probe → black/red ① Negative tester probe → black/white ②



- Turn the main switch to "ON".
- Measure the voltage (DC 12V) of black/ red ① and black/white ② at the meter assembly coupler.
- Is the voltage within specification?





This circuit is OK.

The wiring circuit from the main switch to the meter assembly is faulty and must be repaired.

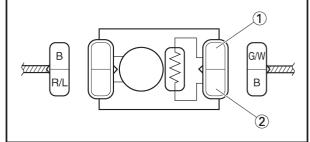
AS00803

6. The fuel level warning light fails to come on.

#### 1. Fuel sender

- Drain the fuel from the fuel tank and remove the fuel pump from the fuel tank.
- Disconnect the fuel sender coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 10$ ) to the fuel sender terminals as shown.

Positive tester probe → green/white ①
Negative tester probe → black ②



Measure the fuel sender resistances.

#### NOTE: -

Measure the resistances when the float arm is in contact with the full position and empty position of the stopper.



Fuel sender resistance Full position of the float 20  $\sim$  26  $\Omega$  at 20°C (68°F) Empty position of the float 134  $\sim$  140  $\Omega$  at 20°C (68°F)

• Is the fuel sender OK?





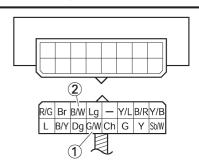
NO

Replace the fuel pump.

### 2. Voltage

• Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

**Positive tester probe** → green/white (1) Negative tester probe → black/white ②



- Turn the main switch to "ON".
- Measure the voltage (DC 12 V) of green/white (1) and black/white (2) at the meter assembly coupler.
- Is the voltage within specification?



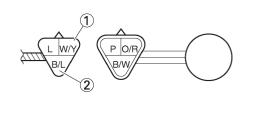
This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

### 2. Speed sensor

 Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.

Positive tester probe → white/yellow ① Negative tester probe → black/blue ②



- Set the main switch to "ON".
- Elevate the rear wheel and slowly rotate it.
- Measure the voltage (DC 5 V) of white/yellow and blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.
- Does the voltage reading cycle correctly?



This circuit is OK.

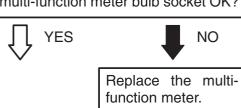
Replace the speed sensor.

7. The speedometer fails to come on.

- 1. Multi-function meter bulb socket
- Check the multi-function meter bulb socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

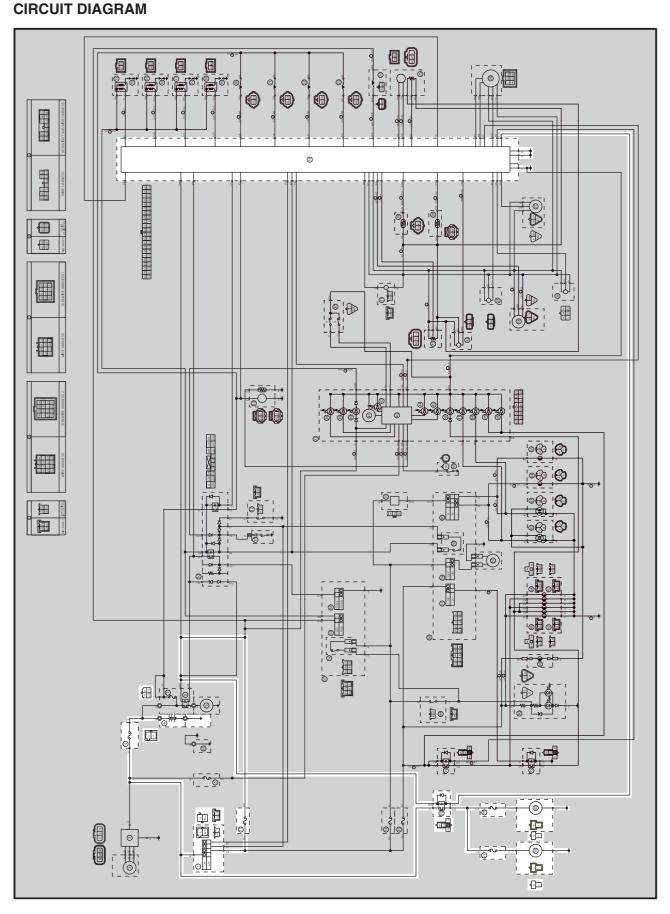
Is the multi-function meter bulb socket OK?





EAS0080

# COOLING SYSTEM





- 1 Main switch 4 Fuse (main)
- 6 Battery
- 14 E.C.U.
- 28 Coolant temperature sensor
- 73 Fuse (ignition)
- 76 Radiator fan motor relay
- Fuse (radiator fan motor left)
- 78 Fuse (radiator fan motor right)
- 79 Radiator fan motor 2
- 80 Radiator fan motor 1



FAS00808

#### **TROUBLESHOOTING**

- The radiator fan motor fails to turn.
- The coolant temperature indicator light fails to light when the engine is warm.

#### Check:

- 1. main, ignition, and radiator fan motor fuses
- 2. battery
- 3. main switch
- 4. radiator fan motor
- 5. radiator fan motor relay
- 6. coolant temperature sensor
- 7. wiring connections (the entire cooling system)

#### NOTF:

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- 3. side cowlings
- Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-3112

EAS00738

- 1. Main, ignition and radiator fan motor fuses
- Check the main, ignition and radiator fan motor fuses for continuity.
   Refer to "CHECKING THE FUSES" in chap-
- Are the main, ignition and radiator fan motor fuses OK?





Replace the fuse(s).

AS00739

## 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





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

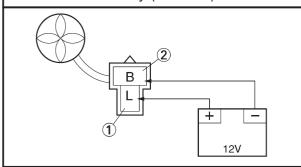
Replace the main switch.



FASO080

#### 4. Radiator fan motor

- Disconnect the radiator fan motor coupler from the wire harness.
- Connect the battery (DC 12 V) as shown.



Positive battery lead  $\rightarrow$  blue ① Negative battery lead  $\rightarrow$  black ②

Does the radiator fan motor turn?





The radiator fan motor is faulty and must be replaced.

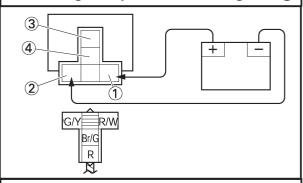
### 5. Radiator fan motor relay

- Disconnect the radiator fan motor relay form the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the radiator fan motor terminal as shown.
- Check the radiator fan motor for continuity.

Battery positive terminal → red/white ①
Battery negative terminal →

green/yellow 2

Tester positive probe → red ③
Tester negative probe → brown/green ④



• Does the radiator fan motor relay have continuity between red and brown/green?



YES



NO

Replace the radiator fan motor relay.

ELEC - +

FAS0081:

## 6. Coolant temperature sensor

- Remove the coolant temperature sensor.
- Connect the pocket tester ( $\Omega \times 1$ k) to the coolant temperature sensor (1) as shown.
- Immerse the coolant temperature sensor in a container filled with coolant ②.

#### NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

- Place a thermometer (3) in the coolant.
- Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
- Check the coolant temperature sensor for continuity at the temperatures indicated in the table.



Coolant temperature sensor resistance

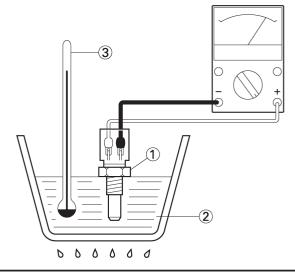
0°C (32°F): 5.21  $\sim$  6.37 kΩ 80°C (176°F): 0.29  $\sim$  0.35 kΩ

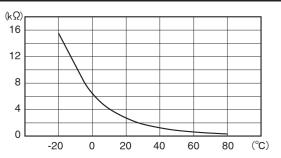
# **A** WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.



Coolant temperature sensor 20 Nm (2.0 m•kg, 14 ft•lb) Three bond sealock<sup>®</sup>10





Does the coolant temperature sensor operate properly?





NO

Replace the coolant temperature sensor.

EAS00813

#### 7. Wiring

- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?



YES



NO

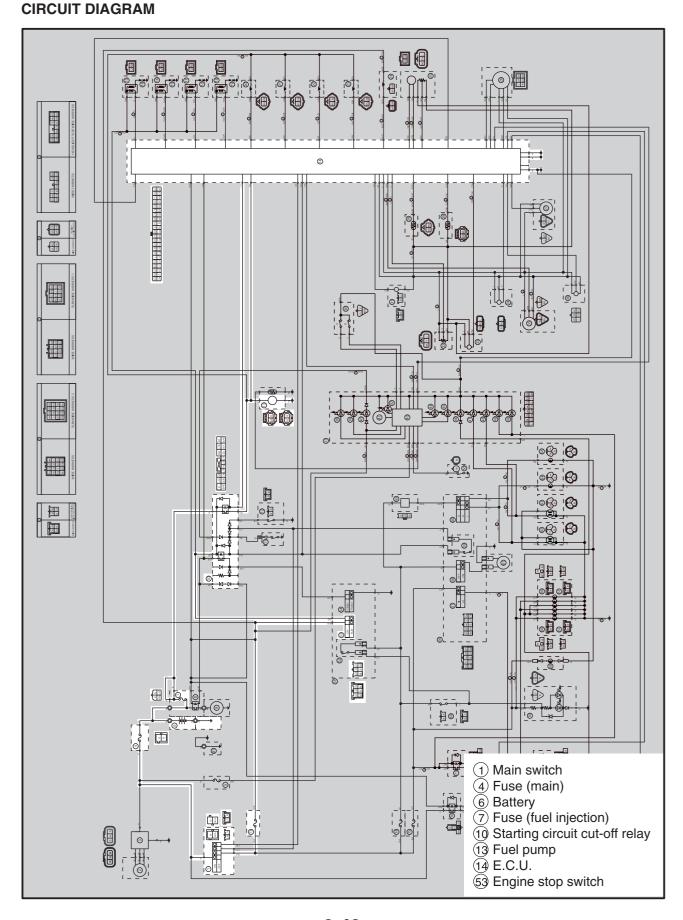
This circuit is OK.

Properly connect or repair the cooling system's wiring.



EAS00814

# **FUEL PUMP SYSTEM**



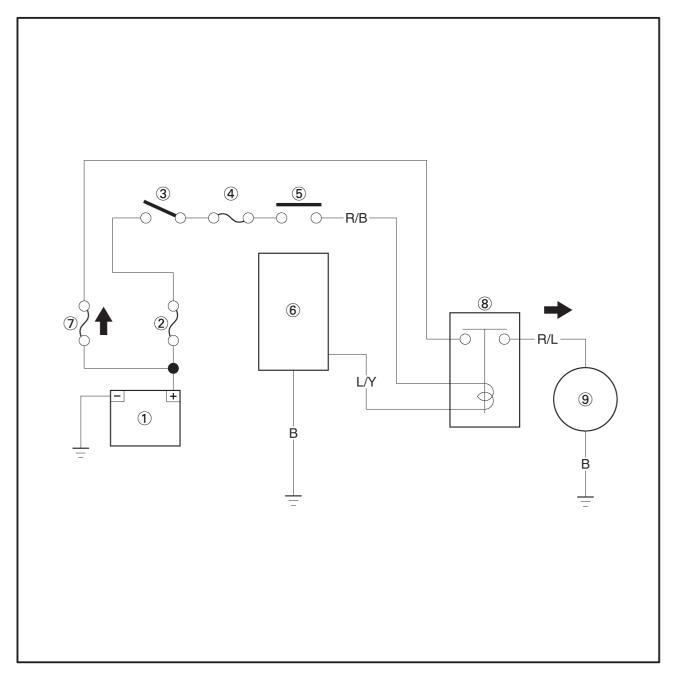


FAS00815

## **FUEL PUMP SYSTEM**

The ECU includes the control unit for the fuel pump.

- 1) Battery
- 2 Fuse (main)
- 3 Main switch
- 4 Fuse (ignition)
- 5 Engine stop switch
- 6 ECU
- 7 Fuse (fuel injection)
- 8 Starting circuit cut-off relay (fuel injection system relay)
- 9 Fuel pump





EAS00816

# **TROUBLESHOOTING**

If the fuel pump fails to operate.

#### Check:

- 1. main, ignition and fuel injection fuses
- 2. battery
- 3. main switch
- 4. engine stop switch
- 5. starting circuit cut-off relay (the fuel injection system relay)
- 6. fuel pump
- 7. wiring connections (the entire fuel system)

#### NOTE:

- Before troubleshooting, remove the following part(s):
- 1. seat
- 2. fuel tank
- 3. side cowlings

Troubleshoot with the following special tool(s).



Pocket tester 90890-03112, YU-3112

#### EAS00738

- 1. Main, ignition and fuel injection system
- Check the main, ignition and fuel system fuses for continuity.

Refer to "CHECKING THE FUSES" in chapter 3.

Are the main, ignition and fuel injection system fuses OK?





Replace the fuse(s).

EAS00739

# 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





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?





NO

Replace the right handlebar switch.

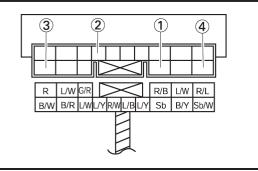


FAS0075

- 5. Starting circuit cut-off relay (fuel injection system 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.

Positive battery lead  $\rightarrow$  red/black 1Negative battery lead  $\rightarrow$  blue/yellow 2

Positive tester probe → red ③
Negative tester probe → red/blue ④



• Does the starting circuit cut-off relay have continuity between red and red/blue?





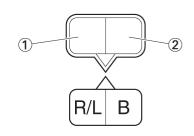
Replace the starting circuit cut-off relay.

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.

Positive tester probe → red/blue ①
Negative tester probe → black ②



• Measure the fuel pump resistance.



Fuel pump resistance  $0.2 \sim 3.0 \Omega$  at  $20^{\circ}$ C (68°F)

• Is the fuel pump OK?





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?





NO

Replace the ECU.

Properly connect or repair the fuel system's wiring.



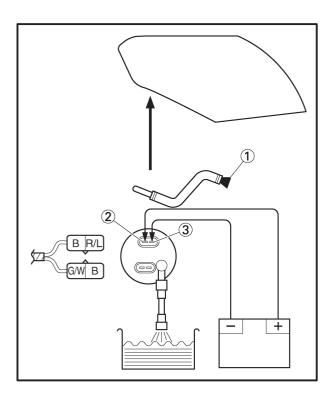
EAS00819

# **CHECKING THE FUEL PUMP**

# **A** 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 refueling.
- 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 hot, a fire may occur. Therefore, make sure the engine is completely cool before performing the following test.



- 1. Check:
  - Fuel pump operation
- a. Insert the plug ① to fuel return hose end.
- b. Fill the fuel tank.
- c. Put the end of the fuel hose into an open container.
- d. Connect the battery (DC 12 V) to the fuel pump coupler as shown.

Positive battery lead  $\rightarrow$  red/blue ② Negative battery lead  $\rightarrow$  black ③

e. If fuel flows out of the fuel hose, the fuel pump is OK. If fuel does not flow, replace the fuel pump.

# **SELF-DIAGNOSIS**



# **SELF-DIAGNOSIS**

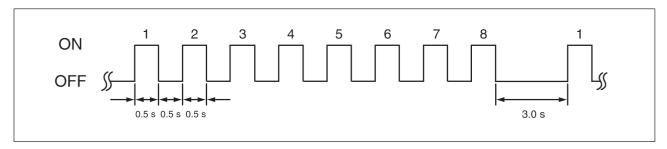
The YZF-R1(S) features a self-diagnosing system for the following circuit(-s):

- Fuel pump thermistor
- Oil level switch

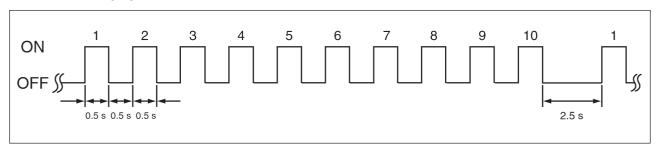
If any of these circuits are defective, their respective condition codes will be displayed on the warning light when the main switch is turned "ON" (irrespective of whether the engine is running or not).

| Circuit              | Defect(-s)                     | System response                                           | Condition code |
|----------------------|--------------------------------|-----------------------------------------------------------|----------------|
| Fuel pump thermistor | Open-circuit     Short-circuit | The fuel level warning light indicate the condition code. | Refer to *1    |
| Oil level switch     | Open-circuit Short-circuit     | The oil level warning light indicate the condition code.  | Refer to *2    |

\*1 Condition code Fuel level warning light



\*2 Condition code Oil level warning light



# **SELF-DIAGNOSIS**



#### **TROUBLESHOOTING**

The warning light starts to indicate the self-diagnosis sequence.

#### Check:

- 1. fuel pump thermistor
- 2. oil level switch

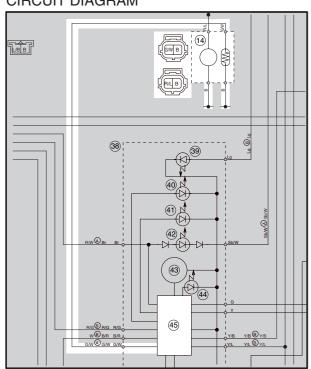
#### NOTE: -

- Before troubleshooting, remove the following part(-s):
- 1. seat
- 2. fuel tank
- Troubleshoot with the following special tool(-s).



Pocket tester 90890-03112, YU-3112

# 1. Fuel pump thermistor CIRCUIT DIAGRAM



- (14) Fuel pump
- 45 Multi-function meter

#### 1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



Repair or replace the wire harness.

## 2. Fuel pump thermistor

- Check the fuel pump thermistor for continuity.
   Refer to "The fuel level warning light fails to come on".
- Is the fuel pump thermistor OK?

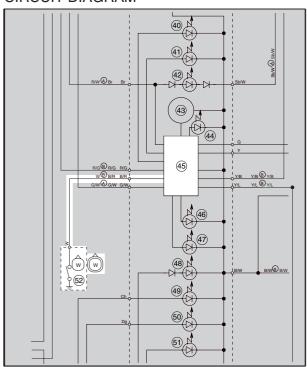


Replace the multifunction meter. Replace the fuel pump.

# **SELF-DIAGNOSIS**



# 2. Oil level switch CIRCUIT DIAGRAM



- 45 Multi-function meter
- 52 Oil level 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. Oil level switch

- Check the oil level switch for continuity.
   Refer to "The oil level warning light fails to come on".
- Is the oil level switch OK?





NO

Replace the multifunction meter. Replace the oil level switch.

## **STARTING FAILURES**

EAS00844

# **TROUBLESHOOTING**

#### NOTE: -

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 FAILURES

#### **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
- Deteriorated or contaminated fuel

## Fuel pump

- Faulty fuel pump
- Faulty fuel pump relay

# Throttle body (-ies)

- Deteriorated or contaminated fuel
- Sucked-in air

#### **ELECTRICAL SYSTEMS**

#### **Battery**

- Discharged 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

### Ignition coil(s)

- Cracked or broken ignition coil body
- Broken or shorted primary or secondary coils

## **Ignition system**

- Faulty ECU
- Faulty crankshaft position sensor

# STARTING FAILURES/INCORRECT ENGINE IDLING SPEED/ POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

## 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

# Starting system

- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cut-off relay
- Faulty starter clutch

#### 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**

# Throttle body (-ies)

- Damaged or loose throttle body joint
- Improperly synchronized throttle bodies
- Improperly adjusted engine idling speed (idle adjusting screw)
- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

### **ELECTRICAL SYSTEMS**

#### **Battery**

- Discharged 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

# Ignition coil(s)

- Broken or shorted primary or secondary coils
- Cracked or broken ignition coil

# Ignition system

- Faulty ECU
- Faulty crankshaft position sensor

#### EAS00848

# POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES".

**ENGINE** 

Air filter

Clogged air filter element

**FUEL SYSTEM** 

**Fuel pump** 

Faulty fuel pump

9

## **FAULTY GEAR SHIFTING/FAULTY CLUTCH**



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 forks

- Foreign object in a 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 forks

Worn shift fork

#### Shift drum

- Incorrect axial play
- Worn shift drum groove

#### **Transmission**

Worn gear dog

EAS0085

# FAULTY CLUTCH CLUTCH SLIPS

#### Clutch

- Improperly assembled clutch
- Improperly adjusted clutch cable
- · Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate

## **Engine oil**

- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

# CLUTCH DRAGS

- Clutch
  - Unevenly tensioned clutch springs
  - Warped pressure plate
  - Bent clutch plate
  - Swollen friction plate
  - Bent clutch pull rod
  - Broken clutch boss
  - Burnt primary driven gear bushing
  - Match marks not aligned

#### Engine oil

- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

# OVERHEATING/OVERCOOLING/ POOR BRAKING PERFORMANCE

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

#### **COOLING SYSTEM**

#### Coolant

Low coolant level

#### Radiator

- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fin

## Water pump

- Damaged or faulty 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

#### **FUEL SYSTEM**

# Throttle body (-ies)

Damaged or loose throttle body joint

#### Air filter

Clogged air filter element

# **CHASSIS**

# Brake(s)

Dragging brake

# **ELECTRICAL SYSTEMS**

## Spark plug(s)

- Incorrect spark plug gap
- Incorrect spark plug heat range

## Ignition system

• Faulty E.C.U.

#### EAS00856

## **OVERCOOLING**

## **COOLING SYSTEM**

#### **Thermostat**

Thermostat stays open

#### EAS00857

## POOR BRAKING PERFORMANCE

- 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 or grease on the brake pad
- Incorrect brake fluid level

## FAULTY FRONT FORK LEGS/UNSTABLE HANDLING



EAS0086

# 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 assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

#### MALFUNCTION

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

AS00863

### **UNSTABLE HANDLING**

#### **Handlebars**

- Bent or improperly installed right handlebar
- Bent or improperly installed left handlebar

# Steering head components

- Improperly installed upper bracket
- Improperly installed under bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

#### Front fork leg(s)

- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

## **Swingarm**

- · Worn bearing or bushing
- Bent or damaged swingarm

### Rear shock absorber assembly(-ies)

- Faulty rear shock absorber spring
- · Leaking oil or gas

#### Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

#### 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

## **FAULTY LIGHTING OR SIGNALING SYSTEM**

TRBL ?

FAS00866

## FAULTY LIGHTING OR SIGNALING SYSTEM

#### **HEADLIGHT DOES NOT COME ON**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

## **HEADLIGHT BULB BURNT OUT**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

## TAIL/BRAKE LIGHT DOES NOT COME ON

- Too many electrical accessories
- Incorrect connection

#### TAIL/BRAKE LIGHT BULB BURNT OUT

- Faulty battery
- Incorrectly adjusted rear brake light switch

# TURN SIGNAL DOES NOT COME ON

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

# TURN SIGNAL BLINKS SLOWLY

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

#### **TURN SIGNAL REMAINS LIT**

- Faulty turn signal relay
- Burnt-out turn signal bulb

#### TURN SIGNAL BLINKS QUICKLY

- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

## 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

### YZF-R1S/YZF-R1SC WIRING DIAGRAM

- 1 Main switch
- (2) A.C. magneto
- 3 Rectifier/regulator
- 4) Fuse (main)
- 5 Fuse (backup)
- (6) Battery
- (7) Fuse (fuel injection)
- 8 Starter relay
- (9) Starter motor
- 10 Starting circuit cut-off relay
- (11) Neutral switch
- (12) Sidestand switch
- 13 Fuel pump
- (14) E.C.U
- (15) Ignition coil #1
- 16 Ignition coil #2
- 17 Ignition coil #3
- 18 Ignition coil #4
- (19) Spark plug
- 20 Injector #1
- 21) Injector #2
- 22 Injector #3
- 23 Injector #4
- 24 Air induction system solenoid
- 25 Sub-throttle position sensor
- 26 EXUP servo motor
- 27) Speed sensor
- 28 Coolant temperature sensor
- 29 Intake air temperature sensor
- 30 Option switch
- (31) Crankshaft position sensor
- 32 Throttle position sensor
- 33 Intake air pressure sensor
- 34 Atmospheric pressure sensor
- 35 Cylinder identification sensor
- 36 Lean angle cut-off switch
- (37) Meter assembly
- 38 Fuel level warning light
- 39 Oil level warning light
- 40 Neutral indicator light
- (41) Tacho meter
- (42) Shift timing indicator light
- 43 Multi function meter
- 44 Engine trouble warning light
- 45 Coolant temperature indicator light
- 46 Hi beam indicator light
- 47 Turn signal indicator light (left)
- 48 Turn signal indicator light (light)
- 49 Meter light
- 50 Oil level switch
- (51) Right handlebar switch
- (52) Front brake light switch
- 53 Engine stop switch
- 54) Start switch
- 55 Turn signal relay
- 56 Left handlebar switch
- 57 Dimmer switch
- 58 Horn switch

- 59 Clutch switch
- 60 Turn signal switch
- (61) Horn
- 62 Front turn signal/position light (left)
- 63 Front turn signal/position light (right)
- 64) Rear turn signal light (left)
- 65 Rear turn signal light (right)
- 66 Headlight
- 67) Auxiliary light
- 68 License plate light
- 69 Rear brake light switch
- 70 Tail/brake light
- (71) Headlight relay (on/off)
- 72 Headlight relay (dimmer)
- 73 Fuse (ignition)
- 74 Fuse (signal)
- 75 Fuse (headlight)
- 76 Radiator fan motor relay
- 77) Fuse (radiator fan motor left)
- 78 Fuse (radiator fan motor light)
- 79 Radiator fan motor 2
- 80 Radiator fan motor 1
- (81) Ground

#### **COLOR CODE**

Dg ... Dark green Gy/R . Gray/Red L/B... Blue/Black

Gy ... Gray L/R .. Blue/Red L .... Blue L/W .. Blue/White

Lg .... Light green L/Y ... Blue/Yellow O .... Orange O/B .. Orange/Black

P . . . . Pink O/G . . Orange/Green

R . . . . Red P/W . . Pink/White Sb . . . Sky blue R/B . . Red/Black

W .... White R/G .. Red/Green

Y . . . . Yellow R/L . . Red/Blue

B/G .. Black/Green R/W .. Red/White B/L ... Black/Blue R/Y .. Red/Yellow

B/R .. Black/Red Sb/W . Sky blue/White

B/W .. Black/White W/B .. White/Black B/Y .. Black/Yellow W/R .. White/Red

Br/G . Brown/Green W/Y .. White/Yellow

Br/L .. Brown/Blue Y/B .. Yellow/Black

Br/R . Brown/Red Y/G . Yellow/Green Br/W . Brown/White Y/L . . Yellow/Blue

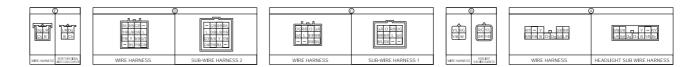
G/B . Green/Black Y/R . Yellow/Red

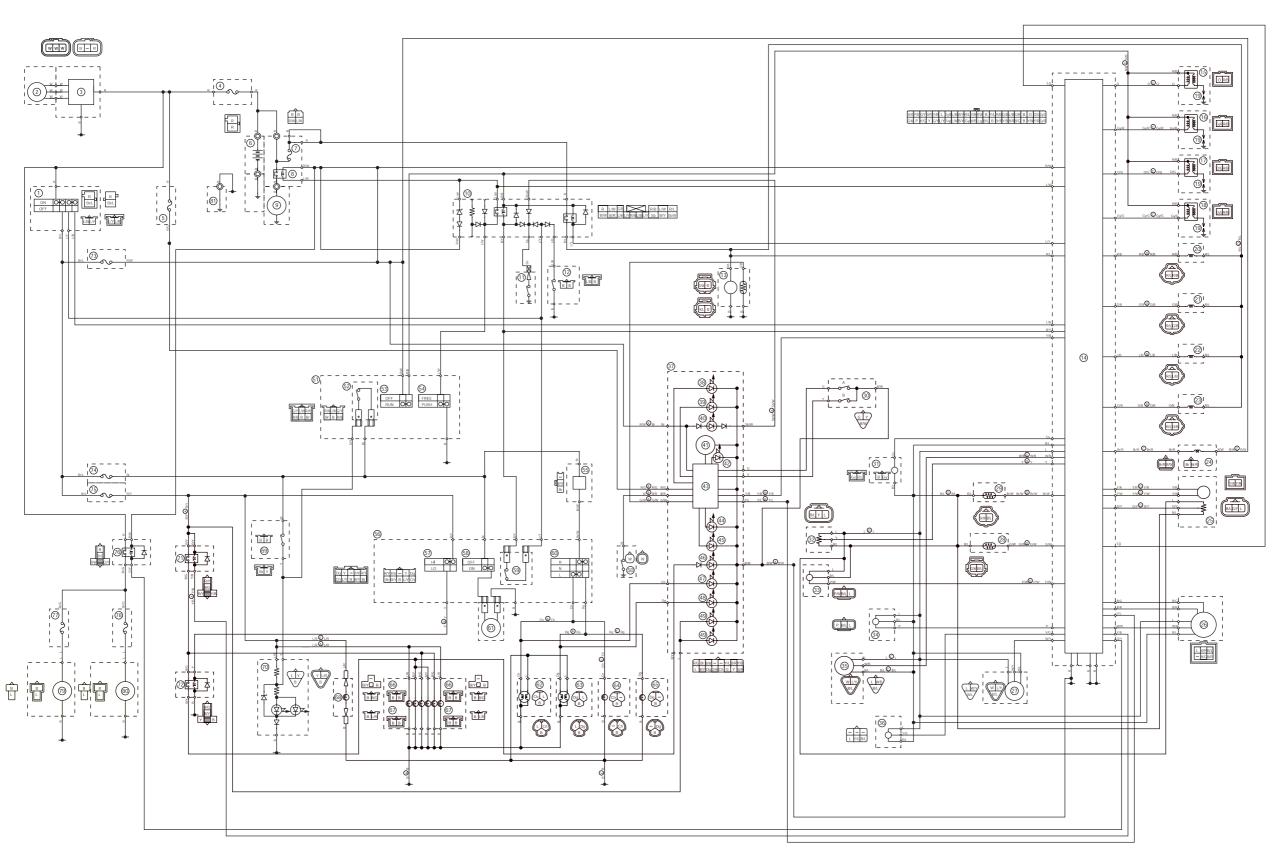
G/R .. Green/Red Y/W .. Yellow/White

G/W... Green/White



# YZF-R1S/YZF-R1SC WIRING DIAGRAM





# YZF-R1S/ YZF-R1SC WIRING DIAGRAM

