

YZF-R6L YZF-R6LL

SERVICE MANUAL

LIT-11616-12-62 5GV-28197-EO

EAS00001

YZF-R6L/YZF-R6CL SERVICE MANUAL © 1999 by Yamaha Motor Corporation, U.S.A.

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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 in necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform with federal environmental quality objectives.

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

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.

EB002000

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!

A WARNING 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 mo-

torcycle.

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

to the motorcycle.

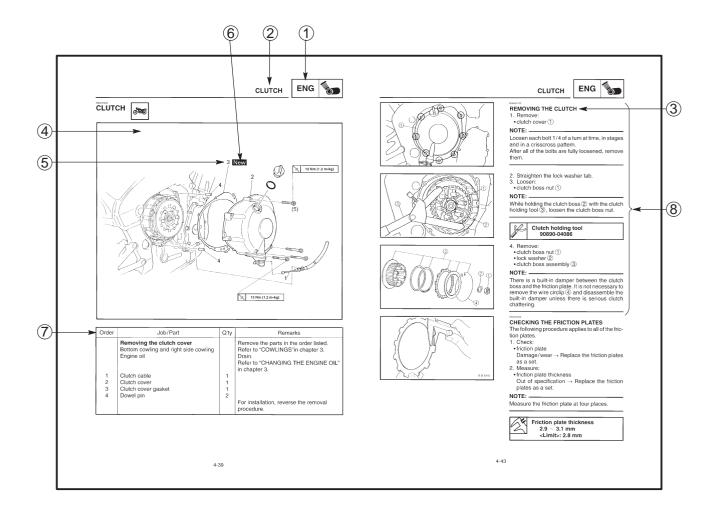
NOTE: A NOTE provides key information to make procedures easier or clearer.

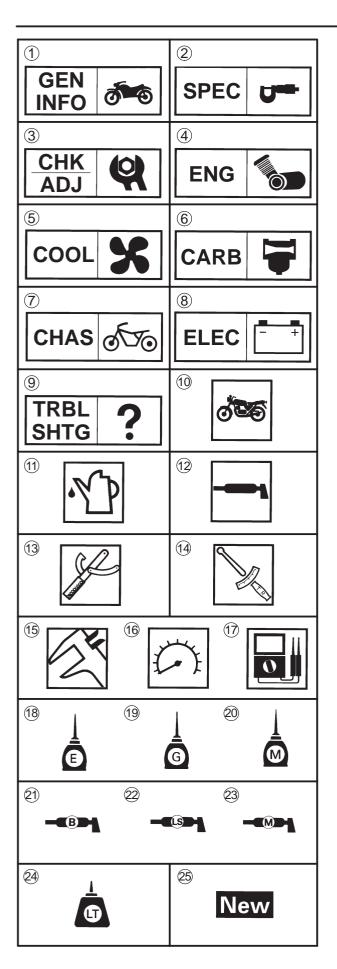
HOW TO USE THIS MANUAL

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





FB004000

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 Engine
- (5) Cooling system
- 6 Carburetor(-s)
- (7) Chassis
- (8) Electrical system
- (9) Troubleshooting

Symbols 10 to 17 indicate the following.

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

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

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

Symbols 4 to 5 in the exploded diagrams indicate the following.

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

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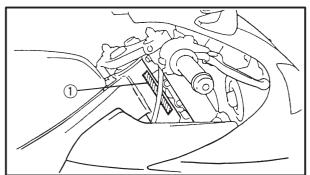
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GEN INFO

MOTORCYCLE IDENTIFICATION





EB100000

GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EB10001

VEHICLE IDENTIFICATION NUMBER

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

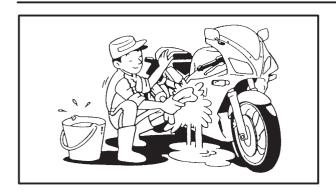
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MODEL CODE

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

IMPORTANT INFORMATION



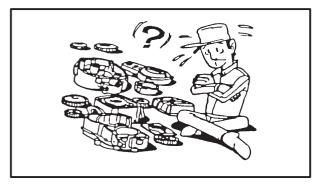


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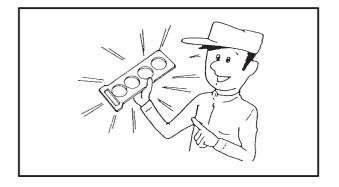
IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DIS-ASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust, and foreign material.



- 2. Use only the proper tools and cleaning equipment.
 - Refer to "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.



EB102010

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.

EB102020

GASKETS, OIL SEALS AND O-RINGS

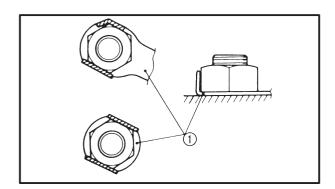
- When overhauling the engine, replace all gaskets, seals, and O-rings. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
- 2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.

IMPORTANT INFORMATION



USING A DYNAMOMETER

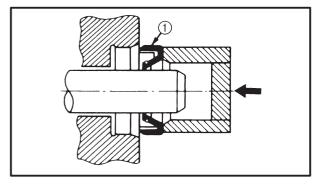
The YZF-R6L/YZF-R6CL has a carbon muffler that may change color when exposed to high temperatures. Therefore, when using a dynamometer always use a fan to cool the muffler.



EB102030

LOCK WASHERS/PLATES AND COTTER PINS

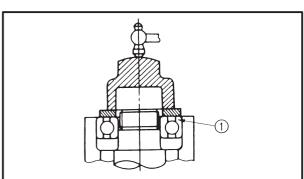
After removal, replace all lock washers/plates 1 and cotter pins. After the bolt or nut has been tightened to specification, bend the lock washer tabs and the cotter pin ends along a flat of the bolt or nut.



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BEARINGS AND OIL SEALS

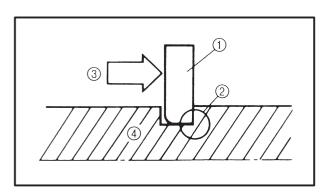
- Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium soap base grease. Oil bearings liberally when installing, if appropriate.
- (1) Oil seal



CAUTION:

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

(1) Bearing



EB102050

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 that the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

(4) Shaft

CHECKING THE CONNECTIONS

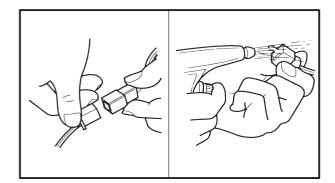


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CHECKING THE CONNECTIONS

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

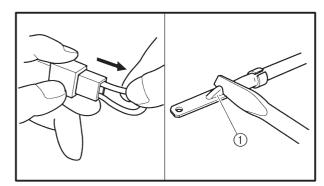
- 1. Disconnect:
 - lead
 - coupler
 - connector



2. Check:

- lead
- coupler
- connector

Moisture → Dry with an air blower. Rust/stains → Connect and disconnect several times.

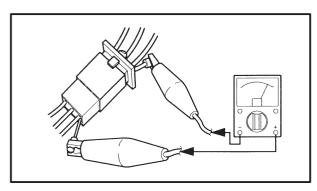


3. Check:

all connections
 Loose connection → Connect properly.

NOTE:

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



- 4. Connect:
 - lead
 - coupler
- connector

NOTE: -

Make sure that all connections are tight.

5. Check:

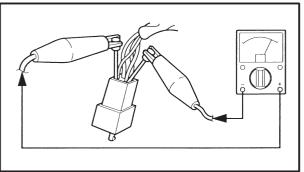
continuity (with the pocket tester)



Pocket tester 90890-03112



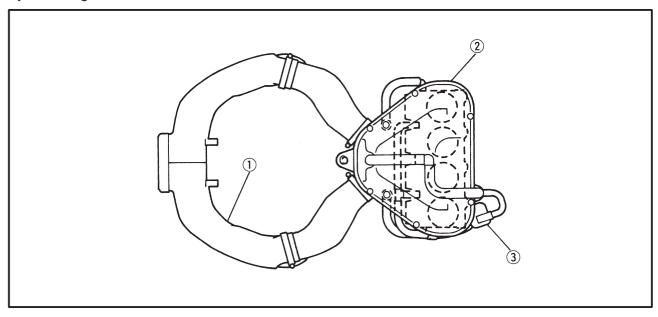
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.





FEATURES AIR INTAKE SYSTEM

System diagram



This system is designed to improve the power while riding a motorcycle at a high speed by increasing the air intake efficiency by means of pressurizing the air filter case 2 where the air is taken in via the air duct 1) from the air intake port located under the headlight.

The system also delivers air pressure from the air filter case to the carburetor side.

The air pressure is operated to the fuel level in the carburetor to supply the appropriate fuel to increase the power.

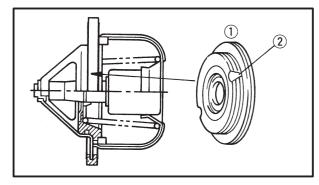
The air chamber ③ is also installed between the air filter case and carburetor for delivery of stabilized air pressure to the carburetor.

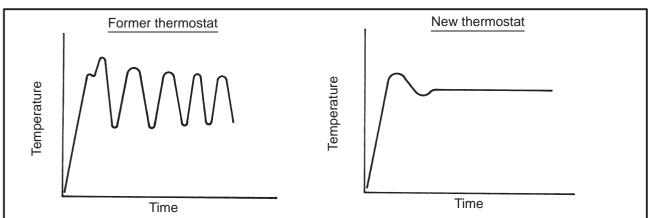
THERMOSTAT

Coolant flow is controlled by the thermostat of which flow control valve 1 is newly developed for avoiding quick temperature change.

(Refer to the graphs)

2 Notch groove



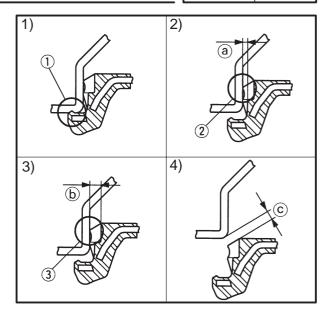


FEATURES

GEN INFO

Flow control operation

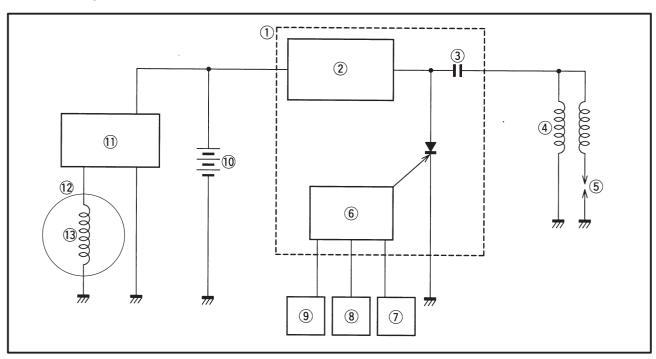
- 1) When valve is closed The lip ① seals the coolant.
- 2) When valve is set as low-lift The 2nd lip ② seals the coolant. To reduce the water temperature change, the coolant starts flowing through the notch depending on its area at ③ section.
- 3) When the valve is set as middle-lift
 The 3rd lip ③ seals the coolant.
 The coolant flows through the notch depending on its area at ⑤ section.
 This flow rate is larger than the case of 2).
- 4) When the valve is set as high-lift
 In the same way as the regular thermostat
 control, the coolant flows through clearance
 © between the valve and flange.



IGNITION SYSTEM

- 1. DC CDI
- 1) Features
- * Battery is used as the power source.
- * Stabilized spark performance is provided in the range from a low speed to high speed since the battery is used as the power source.
- * Compact AC magneto design is possible since the source coil is unnecessary.
- * Compact ignition coil design is possible since the condenser stores electricity.

 Plug top ignition coil is equipped in which the plug cap and ignition coil are integrated.
- * Stator coil can supply power even if the battery is running out.
- 2) Circuit diagram



- 1 CDI unit
- 2 Voltage converter
- 3 Condenser
- (4) Ignition coil
- 5 Spark plug
- 6 Ignition timing controller
- 7 Pickup coil
- (8) T. P. S.

- 9 Speed sensor
- 10 Battery
- (11) Rectifier/regulator
- 12 AC magneto

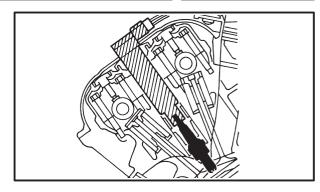
FEATURES



2. Ignition coil

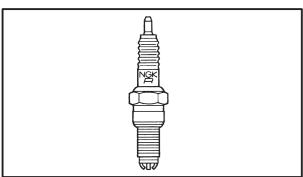
Compact and right weight design is provided since the plug top ignition coil is equipped in which the plug cap ignition coil are integrated.

High tension cord was cut an end to use and ignition energy loss has become lower.



3. Spark plug

The 2-pole spark plug is applied to improve the ignition quality and combustion efficiency.





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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.

When placing an order, refer to the list provided below to avoid any mistakes.

Tool No.	Tool name/Function	Illustration
Flywheel puller YU-33270 90890-01362 Adapter YM-33282 90890-04089	Flywheel puller Adapter This tool is used to remove the generator rotor.	
YS-01880 90890-01701	Sheave holder This tool is used to hold the generator rotor when removing or installing the generator rotor bolt or pickup coil rotor bolt.	
YU-01304 90890-01304	Piston pin puller This tool is used to remove the piston pins.	
YM-01312-A 90890-01312	Fuel level gauge This tool is used to measure the fuel level in the float chamber.	
Radiator cap tester YU-24460-01 90890-01325 Adapter YU-33984 90890-01352	Radiator cap tester Adapter These tools are used to check the cooling system.	
YU-33975 90890-01403	Steering nut wrench This tool is used to loosen or tighten the steering stem ring nuts.	
YM-01425 90890-01425	Damper rod holder This tool is used to hold the damper rod assembly when loosening or tightening the damper rod assembly bolt.	
YM-01471 90890-01471	Pivot shaft wrench This tool is used to loosen or tighten the pivot adjust bolt and engine mount adjust bolt.	



Tool No.	Tool name/Function	Illustration
	Oil filter wrench	
YU-38411 90890-01426	This tool is needed to loosen or tighten the oil filter cartridge.	
	Rod holder	
90890-01434	This tool is used to support the damper adjusting rod.	
Rod puller YM-01437 90890-01437	Rod puller Rod puller attachment	
Rod puller attachment 90890-01436	These tools are used to pull up the front fork damper rod.	S
	Fork spring compressor	
90890-01441	This tool is used to disassemble or assemble the front fork legs.	
Fork seal driver YM-33963 90890-01367 Fork seal driver	Fork seal driver weight Fork seal driver attachment	
attachment YM-8020 90890-01374	This tool is used to install the front fork's oil seal and dust seal.	
	Micrometer	
YU-03008 90890-03008	This tool is used to measure the piston skirt diameter.	
	Cylinder bore gauge (50~100mm)	
YU-03017 90890-03017		
	This gauge is used to measure cylinder bore.	
Vacuum gauge YU-08030-A 90890-03094 Valve gauge	Vacuum gauge Vacuum gauge attachment	
attachment 90890-03060	This gauge is used to synchronize the carburetors.	
Compression gauge	Compression gauge Adapter	
90890-03081 Adapter 90890-04136	These tools are used to measure engine compression.	
	Pocket tester	
YU-03112 90890-03112	This tool is used to check the electrical sys-	
	tem.	



Tool No.	Tool name/Function	Illustration
90793-80009	Engine tachometer This tool is used to check engine speed.	
YU-33277-A 90890-03141	Timing light This tool is used to check the ignition timing.	
Oil pressure gauge 90890-03153 Adapter 90890-03139	Oil pressure gauge Adapter These tools are used to measure engine oil pressure.	
YM-04044 90890-04044	Piston ring compressor This tool is used to compress piston rings when installing the cylinder.	
Valve spring compressor YM-04019 90890-04019 Attachment YM-01253-1 90890-04108	Valve spring compressor Attachment These tools are used to remove or install the valve assemblies.	
Middle driven shaft bearing driver YM-04058-1 90890-04058 Mechanical seal in- staller YM-33221 90890-04078	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
YM-91042 90890-04086	Clutch holding tool This tool is used to hold the clutch boss when removing or installing the clutch boss nut.	
YM-4111 90890-04111	Valve guide remover This tool is used to remove or install the valve guides.	The state of the s



Tool No.	Tool name/Function	Illustration
YM-34487 90890-06754	Ignition checker This tool is used to check the ignition system components.	
ACC-1100-15-01 90890-85505	Yamaha bond No. 1215 This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	

GEN INFO



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SPEC U

GENERAL SPECIFICATIONS



SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard	Limit
Model code	YZF-R6L: 5GV1 (U.S.A.)	•••
	YZF-R6CL:5GV2 (California)	•••
	YZF-R6L: 5GV3 (Canada)	•••
Dimensions		
Overall length	2025 mm (79.7 in)	•••
Overall width	690 mm (27.2 in)	•••
Overall height	1105 mm (43.5 in)	•••
Seat height	820 mm (32.3 in)	•••
Wheelbase	1380 mm (54.3 in)	•••
	1385 mm (54.5 in) (California)	•••
Minimum ground clearance	135 mm (5.3 in)	•••
Minimum turning radius	3400 mm (133.9 in)	•••
Weight		
Wet (with oil and a full fuel tank)	188 kg (415 lb)	•••
	189 kg (417 lb) (California)	•••
Dry (without oil and fuel)	169 kg (373 lb)	•••
	170 kg (375 lb) (California)	•••
Maximum load (total of cargo, rider,	375 kg (827 lb)	•••
passenger, and accessories)		



Item	Standard	Limit
Engine Engine tipe 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 600 cm ³ (36.61 cu.in) Forward-inclined parallel 4-cylinder 65.5 × 44.5 mm (2.58 × 1.75 in) 12.4 : 1 1,250 ~ 1,350 r/min 24.0 kPa (180 mmHg, 7.0866 in Hg) 1550 kPa (15.5 kg/cm ² , 224.75 psi) at 400 r/min	•••
Fuel Recommended fuel Fuel tank capacity Total (including reserve) Reserve only	Regular gasoline 17 L (3.74 Imp gal, 4.49 US gal) 3.5 L (0.77 Imp gal, 0.93 US gal)	•••
Engine oil Lubrication system Recommended oil	Wet sump	•••
0° 10° 30° 50° 70° 90° 110° 130°F A B -20° -10° 0° 10° 20° 30° 40° 50°C	A: Yamalube 4 (10 W 30) or SAE 10 W 30 type SE motor oil (-10°C (10°F) or higher) B: Yamalube 4 (20 W 40) or SAE 20 W 40 type SE motor oil (5°C (40°F) or higher)	
Quantity Total amount Without oil filter cartridge replacement With oil filter cartridge replacement	3.5 L (3.08 Imp qt, 3.70 US qt) 2.5 L (2.20 Imp qt, 2.64 US qt) 2.7 L (2.38 Imp qt, 2.85 US qt)	•••
Oil pressure (hot) Relief valve opening pressure	80 kPa (0.8 kg/cm ² , 11.6 psi) at 1300 r/min 450 ~ 550 kPa (4.5 ~ 5.5 kg/cm ² , 65.3 ~ 79.8 psi)	•••

Item	Standard	Limit
Oil filter Oil filter type Bypass valve opening pressure	Cartridge (paper) 80 ~ 120 kPa (0.8 ~ 1.2 kg/cm², 11.6 ~ 17.4 psi)	•••
Oil pump Oil pump type Inner-rotor-to-outer-rotor-tip clearance Outer-rotor-to-oil-pump-housing clearance	Trochoidal $0.03 \sim 0.09 \text{ mm} \ (0.0012 \sim 0.0035 \text{ in})$ $0.03 \sim 0.08 \text{ mm} \ (0.0012 \sim 0.0031 \text{ in})$	0.15 mm (0.0059 in) 0.15 mm (0.0059 in)
Cooling system Radiator capacity Radiator cap opening pressure	2.15 L (2.27 US qt) 110 ~ 140 kPa (1.10 ~ 1.40 kg/cm², 16.0 ~ 20.3 psi)	•••
Radiator core Width Height Depth Coolant reservoir	320 mm (12.6 in) 258 mm (10.2 in) 24 mm (0.94 in)	•••
Capacity Water pump Water pump type Reduction ratio	0.44 L (0.47 US qt) Single-suction centrifugal pump 86/44 × 31/31 (1.955)	•••
Starting system type	Electric starter	
Spark plugs Model (manufacturer) × quantity Spark plug gap	CR10EK/NGK \times 4 CR9EK/NGK \times 4 (California) 0.6 \sim 0.7 mm (0.02 \sim 0.03 in)	•••
Cylinder head Max. warpage	•••	0.05 mm (0.002 in)

Item	Standard	Limit
Camshafts Drive system Camshaft cap inside diameter Camshaft journal diameter Camshaft-journal-to-camshaftcap clearance Intake camshaft lobe dimensions	Chain drive (right) 23.000 \sim 23.021 mm (0.9055 \sim 0.9063 in) 22.967 \sim 22.980 mm (0.9042 \sim 0.9047 in) 0.020 \sim 0.054 mm (0.0008 \sim 0.0021 in)	0.08 mm (0.0031 in)
Measurement A	33.05 ~ 33.15 mm (1.3012 ~ 1.3051 in)	33.0 mm
Measurement B	25.14 ~ 25.24 mm (0.9898 ~ 0.9937 in)	(1.3 in) 25.09 mm
	, , , , , , , , , , , , , , , , , , ,	(0.99 in)
Measurement C Exhaust camshaft lobe dimensions	7.81 \sim 8.01 mm (0.3075 \sim 0.3154 in)	•••
C A A		
Measurement A	32.55 ~ 32.65 mm (1.2815 ~ 1.2854 in)	32.50 mm (1.28 in)
Measurement B	25.07 ~ 25.17 mm (0.9870 ~ 0.9909 in)	25.02 mm
Measurement C Max. camshaft runout	7.38 ~ 7.58 mm (0.2906 ~ 0.2984 in)	(0.99 in) ••• 0.06 mm (0.0024 in)
		(31002 1 111)



Item	Standard	Limit
Timing chain Model/number of links Tensioning system	RH2015/120 Automatic	•••
Valves, valve seats, valve guides Valve clearance (cold) Intake Exhaust Valve dimensions	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in) 0.21 ~ 0.30 mm (0.0083 ~ 0.0118 in)	•••
B	C	→ D
Head Diameter Face Width Valve head diameter A Intake Exhaust	Seat Width Margin 24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in) 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	Thickness
Valve face width B Intake Exhaust	1.14 ~ 1.98 mm (0.0449 ~ 0.0780 in) 1.14 ~ 1.98 mm (0.0449 ~ 0.0780 in)	•••
Valve seat width C Intake Exhaust	$0.9 \sim 1.1 \text{ mm } (0.0354 \sim 0.0433 \text{ in})$ $0.9 \sim 1.1 \text{ mm } (0.0354 \sim 0.0433 \text{ in})$	1.6 mm (0.06 in) 1.6 mm
Valve margin thickness D Intake	0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in)	(0.06 in) 0.5 mm (0.02 in)
Exhaust	0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in)	0.02 in) 0.5 mm (0.02 in)
Valve stem diameter Intake	3.975 ~ 3.990 mm (0.1565 ~ 0.1571 in)	3.950 mm (0.1555 in)
Exhaust Valve guide inside diameter	$3.960 \sim 3.975 \text{ mm } (0.1559 \sim 0.1565 \text{ in})$	3.935 mm (0.1549 in)
Intake	4.000 ~ 4.012 mm (0.1575 ~ 0.1580 in)	4.042 mm (0.1591 in)
Exhaust Valve-stem-to-valve-guide clearance	4.000 ~ 4.012 mm (0.1575 ~ 0.1580 in)	4.042 mm (0.1591 in)
Intake Exhaust	$0.010 \sim 0.037 \text{ mm} (0.0004 \sim 0.0015 \text{ in})$ $0.025 \sim 0.052 \text{ mm} (0.001 \sim 0.002 \text{ in})$	0.08 mm (0.0031 in) 0.1 mm
Valve stem runout	0.025 ~ 0.052 Hilli (0.001 ~ 0.002 iii)	(0.0039 in) 0.04 mm
Valve seat width		(0.0016 in)
Intake Exhaust	$0.9 \sim 1.1 \text{ mm } (0.0354 \sim 0.0433 \text{ in})$ $0.9 \sim 1.1 \text{ mm } (0.0354 \sim 0.0433 \text{ in})$	1.6 mm (0.06 in) 1.6 mm (0.06 in)



Item	Standard	Limit
Valve springs		
Free length Intake (inner)	37.0 mm (1.46 in)	35 mm (1.38 in)
(outer)	38.4 mm (1.51 in)	36.5 mm (1.44 in)
Exhaust	41.7 mm (1.64 in)	39.5 mm (1.56 in)
Installed length (valve closed) Intake (inner) (outer) Exhaust Compressed spring force (installed)	30.0 mm (1.18 in) 32.5 mm (1.28 in) 36.1 mm (1.42 in)	•••
Intake (inner) (outer)	69 ~ 79 N (15.51 ~ 17.76 lb, 7.04 ~ 8.06 kg) 114 ~ 132 N (25.63 ~ 29.67 lb, 11.62 ~ 13.46 kg)	
Exhaust Spring tilt	160 ~ 184 N (35.97 ~ 41.36 lb, 16.32 ~ 18.76 kg)	•••
Intake (inner)	•••	2.5°/1.6 mm (0.06 in)
(outer) Exhaust	•••	(0.00 in) 2.5°/1.7 mm (0.07 in) 2.5°/1.8 mm (0.07 in)
Winding direction (top view) Intake (inner) (outer) Exhaust	Counter clockwise Clockwise Clockwise	•••
Cylinders Cylinder arrangement Bore × stroke Compression ratio Bore Max. taper Max. out-of-round	Forward-inclined, parallel 4-cylinder 65.5×45.5 mm $(2.58 \times 1.75$ in) $12.4:1$ $65.50 \sim 65.51$ mm $(2.5787 \sim 2.5791$ in)	0.05 mm (0.002 in) 0.05 mm (0.002 in)

Item	Standard	Limit
Pistons Piston-to-cylinder clearance Diameter D Height H Piston pin bore (in the piston) Diameter Offset Offset direction Piston pins Outside diameter Piston-pin-to-piston-pin-bore clearance Piston rings Top ring	0.025 ~ 0.050 mm (0.001 ~ 0.002 in) 65.460 ~ 65.475 mm (2.5772 ~ 2.5778 in) 4 mm (0.16 in) 16.002 ~ 16.013 mm (0.6300 ~ 0.6304 in) 0.5 mm (0.0197 in) Intake side 15.991 ~ 16.000 mm (0.6296 ~ 0.6299 in) 0.002 ~ 0.022 mm (0.00008 ~ 0.0009 in)	0.07 mm (0.0028 in) ••• ••• ••• 0.072 mm (0.0028 in)
Ring type Dimensions (B × T) End gap (installed) Ring side clearance 2nd ring	Barrel $0.80 \times 2.45 \text{ mm } (0.03 \times 0.10 \text{ in})$ $0.15 \sim 0.25 \text{ mm } (0.006 \sim 0.009 \text{ in})$ $0.030 \sim 0.065 \text{ mm } (0.0012 \sim 0.0026 \text{ in})$	0.50 mm (0.02 in) 0.115 mm (0.05 in)
Ring type Dimensions (B × T) End gap (installed) Ring side clearance Oil ring	Taper $0.8 \times 2.5 \text{ mm } (0.03 \times 0.10 \text{ in})$ $0.40 \sim 0.50 \text{ mm } (0.016 \sim 0.020 \text{ in})$ $0.020 \sim 0.055 \text{ mm } (0.0008 \sim 0.0022 \text{ in})$	0.85 mm (0.033 in) 0.115 mm (0.05 in)
Dimensions (B × T) End gap (installed)	1.5×2.3 mm (0.06 \times 0.09 in) $0.10 \sim 0.35$ mm (0.004 \sim 0.014 in)	•••

Item	Standard	Limit
Connecting rods Crankshaft-pin-to-big-end-bearing clearance	0.028 ~ 0.052 mm (0.0011 ~ 0.0020 in)	•••
Bearing color code	1 = Blue 2 = Black 3 = Brown 4 = Green	•••
Width B Max. runout C Big end side clearance D Crankshaft-journal-to-crankshaft-journal-bearing clearance Bearing color code	268.8 ~ 270.0 mm (10.58 ~ 10.63 in) 0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in) 0.034 ~ 0.058 mm (0.0013 ~ 0.0023 in) 0 = White 1 = Blue 2 = Black 3 = Brown 4 = Green	0.03 mm (0.0012 in)
Clutch Clutch type Clutch release method Clutch release method operation Operation Clutch cable free play (at the end of the clutch lever) Friction plates Thickness Plate quantity Clutch plates Thickness Plate quantity Max. warpage	Wet, multiple disc Rack and pinion (pull rod type) Cable operation Left hand operation $10 \sim 15 \text{ mm} (0.39 \sim 0.59 \text{ in})$ $2.9 \sim 3.1 \text{ mm} (0.11 \sim 0.12 \text{ in})$ 8 $1.9 \sim 2.1 \text{ mm} (0.07 \sim 0.08 \text{ in})$ 7	2.8 mm (0.1102 in) 0.1 mm (0.0039 in)
Clutch plate Thickness Plate quantity Max. warpage Clutch springs Free length Spring quantity	2.2 ~ 2.4 mm (0.087 ~ 0.094 in) 1 ••• 55 mm (2.17 in) 6	0.1 mm (0.0039 in) 54 mm (2.13 in)



Item	Standard	Limit
Transmission		
Transmission type	Constant mesh, 6-speed	•••
Primary reduction system	Spur gear	•••
Primary reduction ratio	86/44 (1.9545)	•••
Secondary reduction system	Chain drive	•••
Secondary reduction ratio	48/16 (3.000)	•••
Operation	Left-foot operation	•••
Gear ratios		
1st gear	37/13 (2.846)	•••
2nd gear	37/19 (1.947)	•••
3rd gear	28/18 (1.555)	•••
4th gear	32/24 (1.333)	•••
5th gear	25/21 (1.190)	•••
6th gear	26/24 (1.083)	•••
Max. main axle runout	•••	0.02 mm
Max. Main axio ranoat		(0.0008 in)
Max. drive axle runout	•••	0.02 mm
Max. divo axio ranoat		(0.0008 in)
Shifting machanism		(0.0000 111)
Shifting mechanism	Como directo	
Shift mechanism type	Cam drum	0.05
Max. shift fork guide bar bending	•••	0.05 mm
	(0.50 ;)	(0.002 in)
installed shift rod length	242 mm (9.52 in)	•••
Air filter type	Wet element	•••
Fuel pump		
Pump type	Electrical	•••
Model (manufacturer)	5EB (MITSUBISHI)	•••
Output pressure	$15 \sim 20 \text{ kPa} (0.15 \sim 0.2 \text{ kg/cm}^2,$	•••
	2.2 ~ 2.9 psi)	
Carburetors		
Model (manufacturer) × quantity	CVRD37 (KEIHIN) × 4	•••
Throttle cable free play (at the	6 ~ 8 mm (0.24 ~ 0.31 in)	•••
flange of the throttle grip)	(0.2) (0.3)	
ID mark	5GV101, 5GV210 (California)	•••
Main jet	Carburetors 1 and 4: #152, #148 (California)	•••
,	Carburetors 2 and 3: #148	•••
Main air jet	#110	•••
Jet needle	Carburetors 1 and 4: N7SB	•••
	Carburetors 2 and 3: N7SA	•••
Needle jet	2.6	•••
Pilot air jet	Carburetors 1 and 4: #105	•••
	Carburetors 2 and 3: #110	•••
Pilot outlet	0.9	•••
Pilot jet	#38, #35 (California)	•••
Bypass 1	0.8	•••
Bypass 2	0.8	•••
Bypass 3	0.8	•••
Valve seat size	1.2	•••
valve seat size	1.4	



Item	Standard	Limit
Starter jet 1	#50	•••
Starter jet 2	0.6	•••
Butterfly valve size	#110	•••
Fuel level (below the line on the	17.5 ~ 18.5 mm (0.69 ~ 0.73 in)	•••
float chamber)		

CHASSIS SPECIFICATIONS



CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Diamond	•••
Caster angle	24°	•••
Trail	81 mm (3.19 in)	•••
Front wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 × MT3.50	•••
Material	Aluminum	•••
Wheel travel	130 mm (5.12 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	Odst wricer	
Size	17 × MT5.50	
Material	Aluminum	•••
Wheel travel	120 mm (4.72 in)	•••
Wheel runout	120 11111 (4.72 111)	
Max. radial wheel runout	•••	1 mm
Max. radiai wrieer furiout		(0.04 in)
Max. lateral wheel runout		0.5 mm
Max. lateral writer fullout		(0.02 in)
Front tire		(0.02 111)
	Tubeless	
Tire type Size		
1	120/60ZR17 (55W)	•••
Model (manufacturer)	BRIDGESTON BT56FE	•••
	DUNLOP D207F·J	
Tire pressure (cold)		
$0 \sim 90 \text{ kg } (0 \sim 198 \text{ lb})$	250 kPa (2.5 kg/cm ² , 36.3 psi)	
90 ~ 187 kg (198 ~ 412 lb)	250 kPa (2.5 kg/cm ² , 36.3 psi)	
,	250 kPa (2.5 kg/cm ² , 36.3 psi)	•••
High-speed riding Min. tire tread depth	250 kPa (2.5 kg/cm², 36.3 psi)	1.6 mm
wiiii. tiie tieau deptii		
		(0.06 in)

CHASSIS SPECIFICATIONS

Item	Standard	Limit
Rear tire Tire type Size Model (manufacturer)	Tubeless 180/55 ZR17 (73 W) BRIDGESTON BT56R·E DUNLOP D207·N	•••
Tire pressure (cold) 0 ~ 90 kg (0 ~ 198 lb) 90 ~ 187 kg (198 ~ 412 lb) High-speed riding Min. tire tread depth	250 kPa (2.5 kg/cm ² , 36.3 psi) 290 kPa (2.9 kg/cm ² , 42.1 psi) 250 kPa (2.5 kg/cm ² , 36.3 psi)	1.6 mm (0.06 in)
Front brakes Brake type Operation Recommended fluid Brake discs	Dual-disc brake Right-hand operation DOT 4	•••
Diameter × thickness Min. thickness Max. deflection	298 × 5 mm (11.73 × 0.20 in) •••	4.5 mm (0.18 in) 0.1 mm
Brake pad lining thickness	5.5 mm (0.22 in)	(0.0039 in) 0.5 mm (0.02 in)
Master cylinder inside diameter Caliper cylinder inside diameter	14 mm (0.55 in) 30.2 mm (1.19 in) and 27 mm (1.06 in)	•••
Rear brake Brake type Operation Brake pedal position (from the top of the brake pedal to the bottom of the rider footrest bracket bolt center.)	Single-disc brake Right-foot operation 4.3 ~ 9.3 mm (0.17 ~ 0.37 in)	•••
Recommended fluid Brake discs Diameter × thickness	DOT 4 220 × 5 mm (8.66 × 0.20 in)	•••
Min. thickness Max. deflection	•••	4.5 mm (0.18 in) 0.1 mm (0.0039 in)
Brake pad lining thickness	5 mm (0.2 in)	0.8 mm (0.03 in)
Master cylinder inside diameter Caliper cylinder inside diameter	12.7 mm (0.5 in) 27.0 mm (1.06 in) and 22.2 mm (0.87 in)	•••

CHASSIS SPECIFICATION



Item	Standard	Limit
Front suspension		
Suspension type	Telescopic fork	•••
Front fork type	Coil spring/oil damper	•••
Front fork travel	130 mm (5.12 in)	•••
Spring	(61.2 m.)	
Free length	251.8 mm (9.91 in)	246 mm (9.69 in)
Spacer length	125 mm (4.92 in)	•••
Installed length	247.8 mm (9.76 in)	•••
Spring rate (K1)	7.5 N/mm (0.75 kg/mm, 42.83 lb/in)	
Spring stroke (K1)	$0 \sim 130 \text{ mm} (0.00 \sim 5.12 \text{ in})$	•••
Optional spring available	No	•••
Fork oil		
Recommended oil	Suspension oil "01" or equivalent	•••
Quantity (each front fork leg)	476 cm ³ (16.09356 US oz)	•••
Level (from the top of the innertube,	107 mm (4.21 in)	•••
with the inner tube fullycompressed,	101 1111 (1121 111)	
and without thefork spring)		
Damper adjusting rod locknut distance	25 mm (0.98 in)	•••
Spring preload adjusting positions	,	
Minimum	8	•••
Standard	7.5	•••
Maximum	11	•••
Rebound damping adjusting positions		
Minimum*	9	•••
Standard*	6	•••
Maximum*		•••
Compression damping adjusting		
positions		
Minimum*	10	•••
Standard*	6	•••
Maximum*	1	•••
*from the fully turned-in position		

CHASSIS SPECIFICATIONS



Item	Standard	Limit
Steering		
Steering bearing type	Angular ball bearings	•••
Rear suspension		
Suspension type	Swingarm (link suspension)	•••
Rear shock absorber assemblytype	Coil spring/gas-oil damper	•••
Rear shock absorber assemblytravel	60 mm (2.36 in)	•••
Spring		
Free length		
Installed length	169.5 mm (6.67 in)	•••
Spring rate (K1)	159 mm (6.26 in)	•••
Spring stroke (K1)	95.1 N/mm (9.51 kg/mm, 543.02 lb/in)	•••
Optional spring available	$0 \sim 60 \text{ mm} (0.00 \sim 2.36 \text{ in})$	•••
Standard spring preload gas/air	No ,	•••
pressure	1,200 kPa (12 kg/cm ² , 174 psi)	•••
Spring preload adjusting positions		
Minimum	1	•••
Standard	4	•••
Maximum	9	•••
Rebound damping adjusting positions		
Minimum*	25	•••
Standard*	9	•••
Maximum*	1	•••
Compression damping adjusting		
positions		
Minimum*	13	•••
Standard*	7	•••
Maximum*	1	•••
*from the fully turned-in position		
Swingarm		
Free play (at the end of the swingarm)		
Radial	•••	1 mm
		(0.04 in)
Axial	•••	1 mm
		(0.04 in)
Drive chain		
Model (manufacturer)	532ZLV KAI (DID)	•••
Link quantity	116	•••
Drive chain slack	40 ~ 50 mm (1.57 ~ 1.97 in)	•••
Maximum ten-link section	149 mm (5.87 in)	•••

ELECTRICAL SPECIFICATIONS



ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	•••
Ignition system Ignition system type Ignition timing Advanced timing Advancer type Pickup coil resistance/color Transistorized coil ignition unit model (manufacturer)	C.D.I. 10° BTDC at 1300 r/min 5° BTDC at 1300 r/min (California) 55° BTDC at 5250 r/min Throttle position sensor and electrical 248 ~ 372 Ω/Gy-B F8T362 (MITSUBISHI)	•••
Ignition coils Model (manufacturer) Minimum ignition spark gap Primary coil resistance Secondary coil resistance Throttle position sensor standard	F6T549 (MITSUBISHI) 6 mm (0.24 in) 0.204 \sim 0.276 Ω 8.5 \sim 11.5 kΩ 4 \sim 6 kΩ	•••
resistance	T 0 1/22	
Charging system System type Model (manufacturer) Nominal output Stator coil resistance	AC magneto F4T366 (MITSUBISHI) 14 V/320W at 5,000 r/min 0.27 ~ 0.33 Ω at 20°C (68°F)	•••
Voltage regulator Regulator type Model (manufacturer) No-load regulated voltage	Semiconductor, short circuit type SH650A-12 (SHINDENGEN) 14.1 ~ 14.9 V	•••
Rectifier Model Rectifier capacity Withstand voltage	SH650A-12 18 A 200 V	•••
Battery Battery type Battery voltage/capacity	GT12B-4 12 V/10 AH	•••
Headlight type	Halogen bulb	
Indicator light type × quantity	LED × 6	-
Bulbs (voltage/wattage × quantity) Headlight Tail/brake light Turn signal/position light	12 V 60 W/55 W × 2 12 V 21 W/5 W × 2 12 V 27 W/8 W × 2 (front) 12 V 27 W × 2 (rear)	•••

ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
Meter light	12 V 1.4 W × 2	•••
Electric starting system System type Starter motor	Constant mesh	•••
Model (manufacturer) Power output Brushes	SM-14 (MITSUBA) 0.6 kW	•••
Overall length Spring force	10 mm (0.39 in) 7.16 ~ 9.52 N (730 ~ 970 g,	3.5 mm (0.14 in)
Commutator resistance Commutator diameter Mica undercut	$25.77 \sim 34.27 \text{ oz})$ $0.012 \sim 0.022 \Omega$ 28 mm (1.1 in) 0.7 mm (0.03 in)	27 mm (1.06 in)
Starter relay Model (manufacturer) Amperage Coil resistance	MS5F-631 (JIDECO) 180 A 4.18 ~ 4.62 Ω	•••
Horn Horn type Model (manufacturer) × quantity Max. amperage	Plain YF-12 (NIKKO) × 1 3 A	•••
Flasher relay Relay type Model (manufacturer) Self-cancelling device built-in Turn signal blinking frequency Wattage	Full-transistor FE246BH (DENSO) No 75 ~ 95 cycles/min. 27 W × 2 + 3.4 W	•••
Oil level switch model (manufacturer)	5EB (DENSO)	•••
Fuel sender Model (manufacturer) Resistance	1UF (NIPPON SEIKI) 0.7 \sim 1.1 kΩ GW-B	•••
Sidestand relay Model Coil resistance	G8R-30Y-K 162 ~ 198 Ω	•••
Fuel pump maximum amperage	1 A	•••
Fuel pump relay model (manufacturer) Resistance	G8R-30Y-K (OMRON) 162 ~ 198 Ω	•••
Radiator fan model (manufacturer)	4XV (TOYO RADIATOR)	•••
Thermo switch model (manufacturer)	5EB (NIPPON THERMOSTAT)	•••
Headlight relay (manufacturer) Resistance	ACA12115 (MATSUSHITA) 72 \sim 88 Ω	•••

ELECTRICAL SPECIFICATIONS



Item	Standard	Limit
Temperature sender Model (manufacturer) Resistance	11H (NIPPON SEIKI) 50.6 ~ 64.2 Ω at 80°C (176°F)	•••
Fuses (amperage × quantity)	16.1 ~ 17.3 Ω at 120°C (248°F)	
Main fuse Headlight fuse	30 A × 1 20 A × 1	•••
Signaling system fuse Ignition fuse	20 A × 1 15 A × 1	•••
Radiator fan fuse Backup fuse (odometer)	7.5 A × 1 7.5 A × 1	•••

CONVERSION TABLE/TIGHTENING TORQUES



EB201000

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

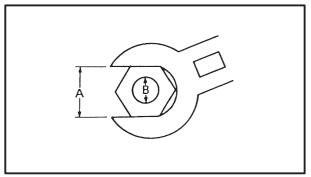
CONVERSION TABLE

	METRIC TO	O 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)	

EB202001

TIGHTENING TORQUES GENERAL TIGHTENING TORQUES

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: Width across flats

B: Thread diameter

A (nut)	B (bolt)	Gene	eral tight torques	•
(Hut)	(boit)	Nm	m•kg	ft•lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
18 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



ENGINE TIGHTENING TORQUES

ltem	Fastener	Thread size	Q'ty	1	Tightening torque		Remarks
		3120		Nm	m•kg	ft•lb	
Spark plugs	_	M10	4	13	1.3	9.4	
Cylinder head	Bolt	M10	10	51	5.1	37	⊸ €
Cylinder head	Bolt	M6	2	10	1.0	7.2	
Camshaft caps	Bolt	M6	20	10	1.0	7.2	⊸ (€)
Cylinder head cover	Bolt	M6	6	10	1.0	7.2	
Oil passage check bolt	Bolt	M8	1	20	2.0	14	
Cylinder head (exhaust pipe)	Stud bolt	M8	8	15	1.5	11	⊸ €
Connecting rod caps	Nut	M7		See N	OTE	'	
Generator rotor	Bolt	M12	1	65	6.5	47	⊸ €
Pickup rotor	Bolt	M8	1	35	3.5	25	⊸ (€
Cap bolt (timing chain tensioner)	Bolt	M6	1	10	1.0	7.2	
Timing chain tensioner bolt	Bolt	M6	2	12	1.2	8.7	
Camshaft sprocket	Bolt	M7	4	24	2.4	17	
Oil pump	Bolt	M6	3	12	1.2	8.7	
Oil cooler	Bolt	M20	1	63	6.3	46	─ ■ (
Engine oil drain bolt	-	M14	1	43	4.3	31	
Oil pump assembly driven sprocket	Bolt	M6	2	10	1.0	7.2	-(0
cover							_
Oil pipe	Bolt	M6	2	15	1.5	11	-@
Oil filter bolt	Bolt	M20	1	80	8.0	58	
Oil filter cartridge		M20	1	17	1.7	12	⊸ (E)
Exhaust pipes	Nut	M8	8	20	2.0	14	
Muffler clamp	Bolt	M8	1	20	2.0	14	
Exhaust pipe emission check bolts	Bolt	M6	4	10	1.0	7.2	
Exhaust pipe bracket	Bolt	M8	1	20	2.0	14	⊸ €
Crankcase	Bolt	M6	2	14	1.4	10	
Crankcase	Bolt	M6	12	12	1.2	8.7	
Crankcase	Bolt	M8	12	24	2.4	17	
Generator rotor cover	Bolt	M6 M6	9 5	12 10	1.2 1.0	8.7 7.2	
Drive sprocket cover	Bolt	OIVI	၂ ၁	10	1.0	1.2	

NOTE: _

After tightening to 15 Nm (1.5 m•kg, 11 ft•lb), tighten another 90°

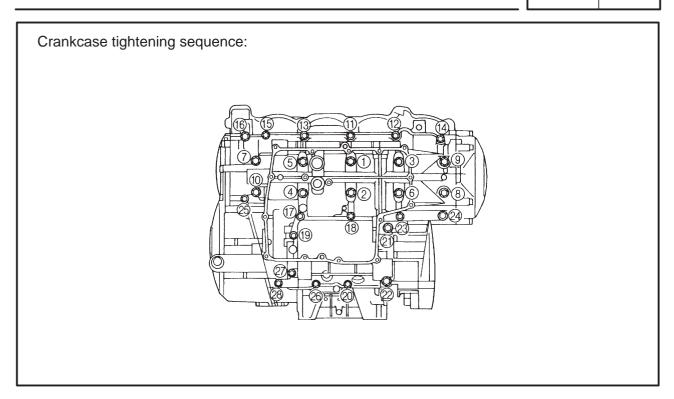




Item	Item Fastener Thread Q'ty			ghtenir torque	_	Remarks	
		Size		Nm	m•kg	ft•lb	
Clutch cover	Bolt	M6	10	12	1.2	8.7	
Pickup coil rotor cover	Bolt	M6	5	12	1.2	8.7	
Shift shaft cover	Bolt	M6	6	12	1.2	8.7	
Breather plate 2	_	M6	3	12	1.2	8.7	-©
Starter clutch	Bolt	M8	3	32	3.2	23	⊣©
Clutch boss	Nut	M20	1	70	7.0	51	Use a lock
							washer.
Clutch springs	Bolt	M6	6	8	0.8	5.8	
Drive sprocket	Nut	M18	1	70	7.0	51	Use a lock
							washer.
Main axle bearing housing	Screw	M6	3	12	1.2	8.7	⊣ 0
Shift bar stopper	Bolt	M6	2	10	1.0	7.2	→ ⊕
Shift shaft spring stopper	Bolt	M8	1	22	2.2	16	⊣ 0
Shift rod locknut	Nut	M6	1	7	0.7	5.1	
		M8	1	10	1.0	7.2	
Oil level switch	Bolt	M6	2	10	1.0	7.2	
Shift arm	Bolt	M6	1	10	1.0	7.2	
Stator coil	Bolt	M6	3	10	1.0	7.2	⊣©
Ignitor unit	Bolt	M6	1	10	1.0	7.2	
Neutral switch	Screw	M6	2	4.0	0.4	2.9	
Pickup coil	Bolt	M5	2	10	1.0	7.2	⊸ ©
Thermo unit	_	PT1/8	1	15	1.5	11	
Thermo switch	_	$M18 \times 1.5$	1	28	2.8	20	









CHASSIS TIGHTENING TORQUES

Item	Thread size	Tightening torque		Remarks	
		Nm	m•kg	ft•lb	
Upper bracket pinch bolts	M8	26	2.6	19	
Steering stem nut	M28	115	11.5	83	
Handlebar pinch bolts	M8	33	3.3	24	
Lower ring nut	M30	9	0.9	6.5	See NOTE.
Lower bracket pinch bolts	M8	23	2.3	17	
Brake fluid reservoir cap stopper	M4	12	1.2	8.7	
Front brake hose union bolts	M10	30	3.0	22	
Front brake master cylinder	M6	13	1.3	9.4	
Engine mounting					
Front mounting bolts	M12	55	5.5	40	
ĺ	M12	55	5.5	40	
Rear mounting bolts	M10	45	4.5	33	⊸ (3
Pinch bolts	M8	24	2.4	17	
	M6	13	1.3	9.4	
Button head bolt	M10	39	3.9	28	
Exhaust pipe bracket	M8	20	2.0	14	
Pivot shaft nut	M18	95	9.5	69	
Connecting arms	M10	40	4.0	29	
Relay arm and connecting arms	M10	40	4.0	29	
Relay arm	M10	40	4.0	29	
Rear shock absorber and relay arm	M10	55	5.5	40	
Fuel cock	M6	7	0.7	5.1	
Fuel sender and fuel tank	M6	7	0.7	5.1	
Coolant reservoir and radiator	M6	5	0.5	3.6	
Rider footrest bracket	M8	28	2.8	20	
Passenger footrest bracket	M8	28	2.8	20	
Rear master cylinder	M8	23	2.3	17	
Rear brake hose union bolts	M10	30	3.0	22	
Sidestand	M10	60	6.0	43	
Front wheel axle	M18	72	7.2	52	
Rear wheel axle nut	M24	150	15.0	108	
Front brake caliper and front fork	M10	40	4.0	29	
Rear brake caliper and bracket	M10	27	2.7	20	
Brake disc and wheel	M6	18	1.8	13	
Rear wheel sprocket and rear wheel drive hub	M10	69	6.9	50	
Brake caliper and bleed screw	M8	6	0.6	4.3	
Pinch bolt (front wheel axle)	M8	23	2.3	17	

NOTE: -

- 1. First, tighten the ring nut to approximately 17 Nm (1.7 m•kg, 12 ft•lb) with a torque wrench, then loosen the ring nut completely.
- 2. Retighten the ring nut to specification.

LUBRICATION POINTS AND LUBRICANT TYPES

SPEC U

EB202000

LUBRICATION POINTS AND LUBRICANT TYPES ENGINE LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Oil seal lips	-(9)
O-rings	- (G)-
Bearings	⊸ €
Crankshaft pins	⊸ €
Piston surfaces	⊸ €
Piston pins	⊸ €
Connecting rod bolts and nuts	— M
Crankshaft journals	-(3)
Camshaft lobes	— (M
Camshaft journals	— ™
Valve stems (intake and exhaust)	⊸™
Valve stem ends (intake and exhaust)	⊸ €
Water pump impeller shaft	⊸ €
Oil pump rotors (inner and outer)	⊸ €
Oil pump housing	⊸ (€)
Oil strainer	⊸ (€)
Starter clutch idle gear inner surface	⊸ (€)
Starter clutch assembly	-(3)
Primary driven gear	⊸ €
Transmission gears (wheel and pinion)	→®
Main axle and drive axle	─®
Shift drum	— (E)
Shift forks and shift fork guide bars	— [3
Shift shaft	
Shift shaft boss	- (5)
Engine mounting bolts (rear)	(s)
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
Cylinder head cover	Yamaha bond No.1215

LUBRICATION POINTS AND LUBRICANT TYPES



EB202010

CHASSIS LUBRICATION POINTS AND LUBRICANT TYPES

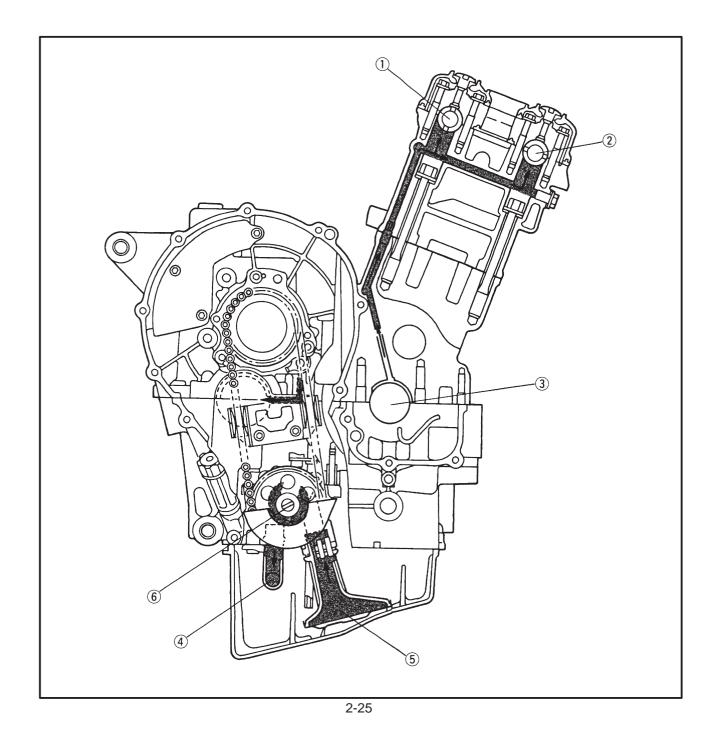
Lubrication	Lubricant
Steering bearings and bearing races (upper and lower)	(g)
Front wheel oil seal (right and left)	-Œ
Rear wheel oil seal	- Lis
Rear wheel drive hub oil seal	LS
Rear wheel drive hub mating surface	- LS
Rear brake pedal	LS
Sidestand pivoting point and metal-to-metal moving parts	- LS
Throttle grip inner surface	- LS
Brake lever pivoting point and metal-to-metal moving parts	LS
Clutch lever pivoting point and metal-to-metal moving parts	- LS
Rear shock absorber assembly oil seal	LS
Rear shock absorber assembly bearing	- LS
Rear shock absorber assembly spacer	LS -
Pivot shaft	- LS
Connecting arm bearing (left and right)	LS
Spacer (relay arm and connecting arm)	- (g)
Oil seal (relay arm and connecting arm)	(g)



OIL FLOW DIAGRAMS

- 1 Intake camshaft
- ② Exhaust camshaft③ Crankshaft

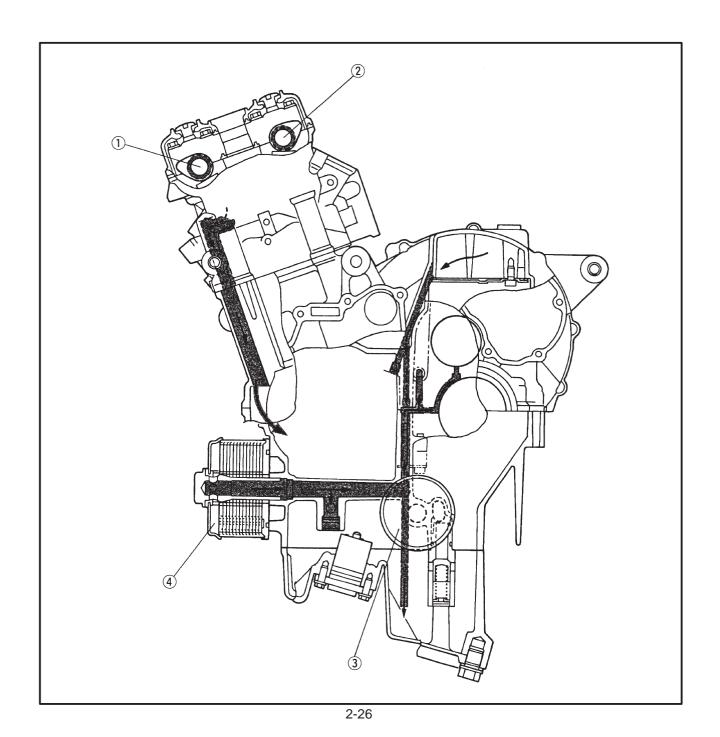
- 4 Oil pipe
 5 Oil strainer
 6 Oil pump



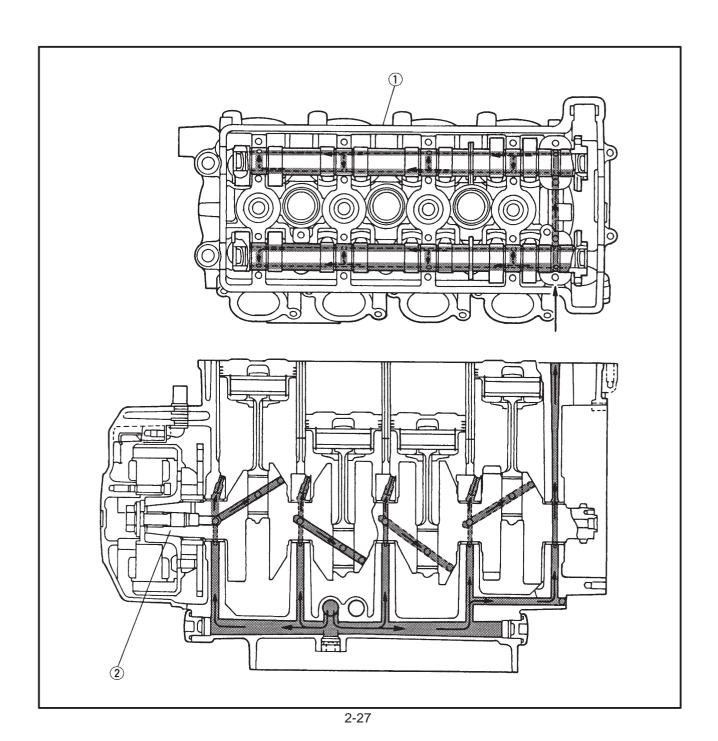
OIL FLOW DIAGRAMS



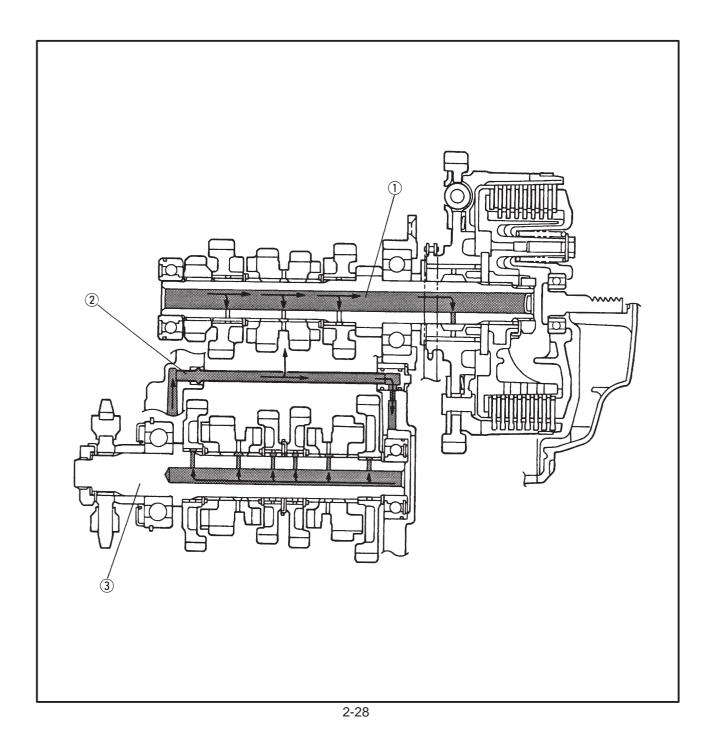
- Exhaust camshaft
 Intake camshaft
 Oil filter
 Oil cooler



- ① Cylinder head ② Crankshaft

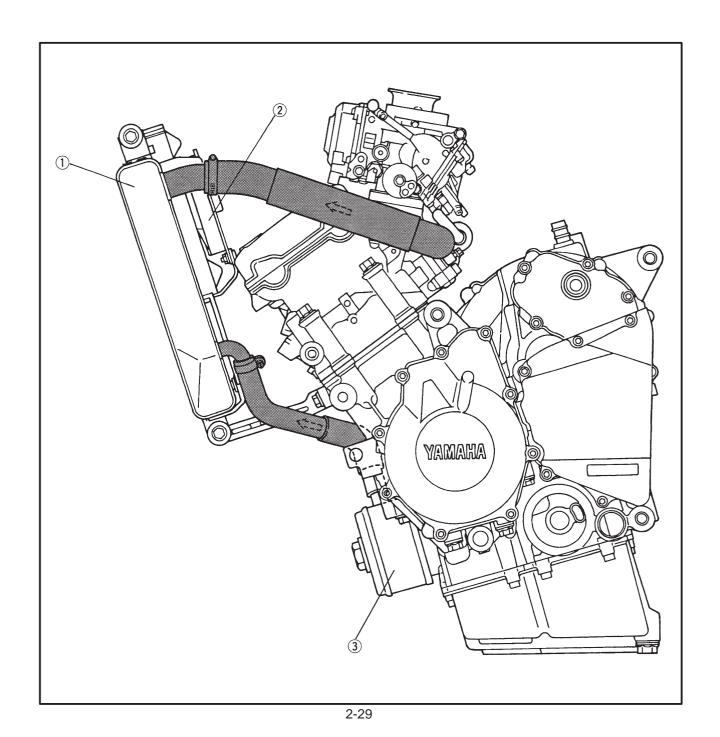


- Main axle
 Oil delivery pipe
 driveaxle



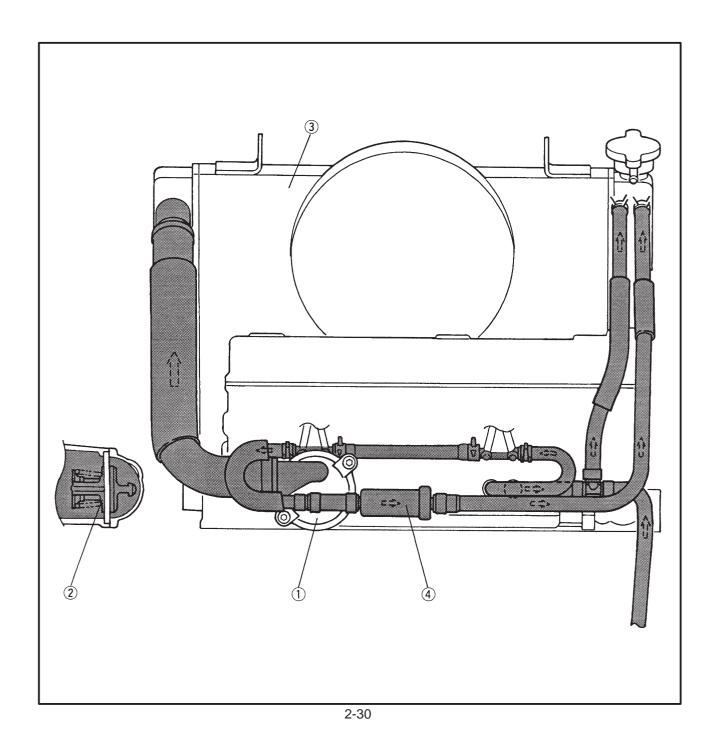


- 1 Radiator
- 2 Radiator fan3 Oil cooler



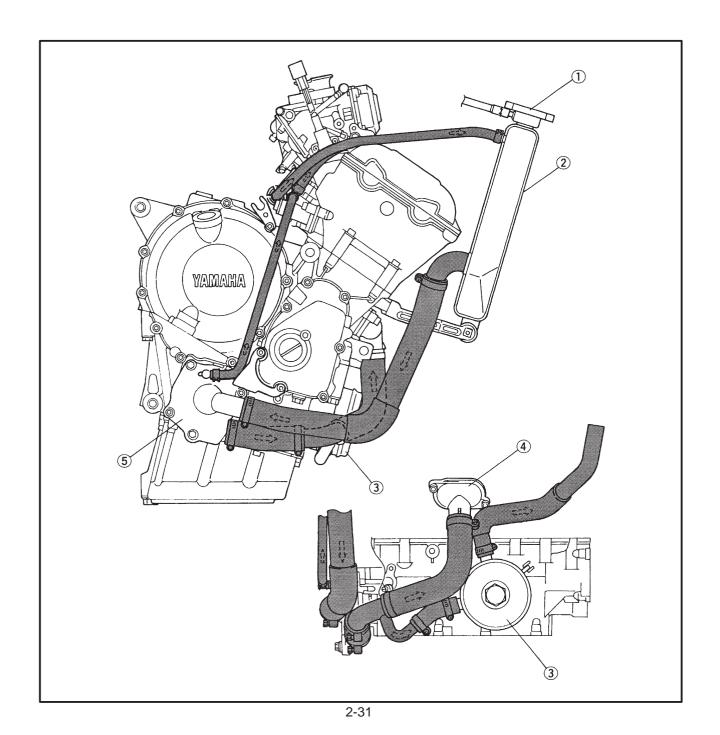


- Thermostat housing
 Thermostat
 Radiator
 Therm



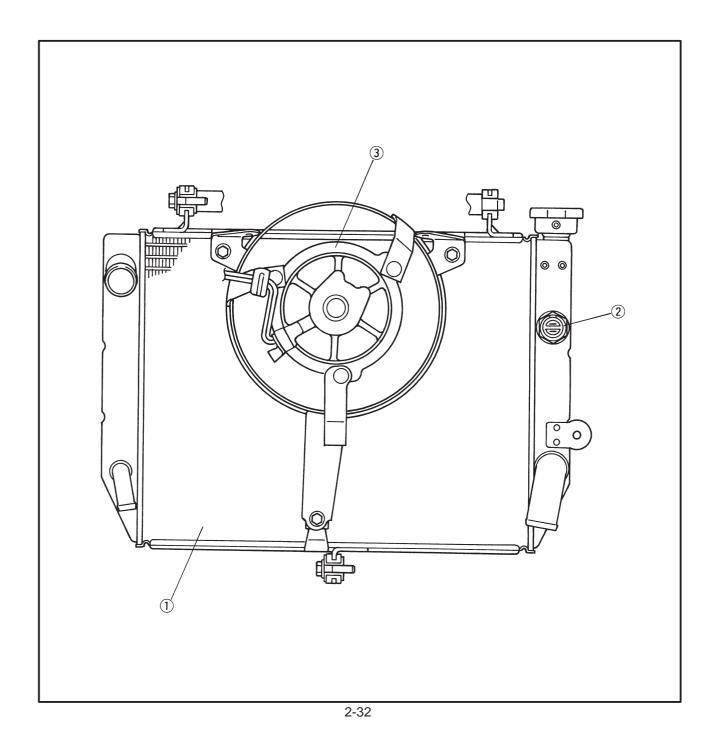


- Radiator cap
 Radiator
 Oil cooler
 Water jacket joint
 Water pump





- Radiator
 Radiator fan switch
 Radiator fan

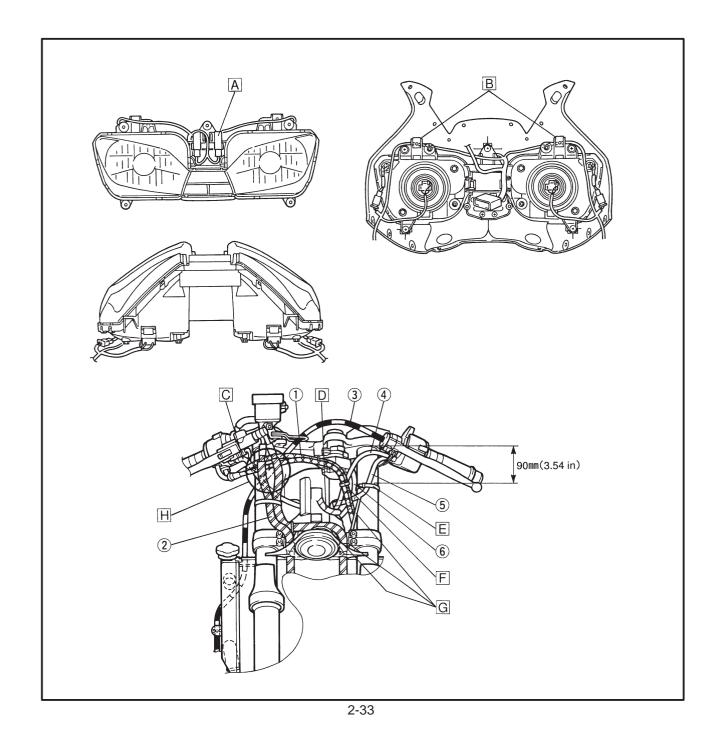


SPEC U

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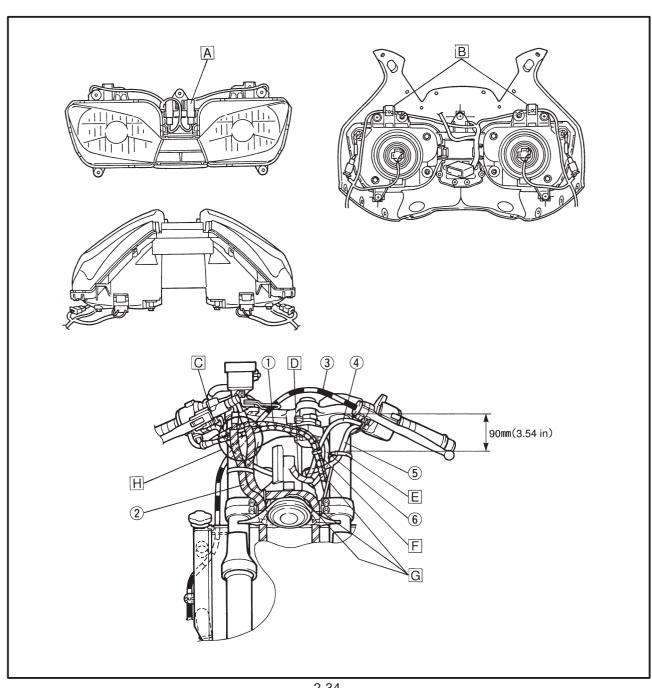
- 1 Throttle cables
- (2) Front brake hose
- (3) Clutch cable
- 4 Starter cable
- 5 Left handlebar switch lead
- (6) Main switch lead

- A Install the headlight relays onto the headlight housing bridge.
- B Route the headlight lead through the plastic guide.
- C Route the right handlebar switch lead in front of the front fork inner tube.
- D Route the wire harness through under the left handlebar switch lead and starter cable.
- E Fasten the left handlebar switch lead to the front fork with a plastic locking tie and cut the end of locking tie.
- F Fasten the throttle cables and starter cable with a band. Locate the end of band to forward.





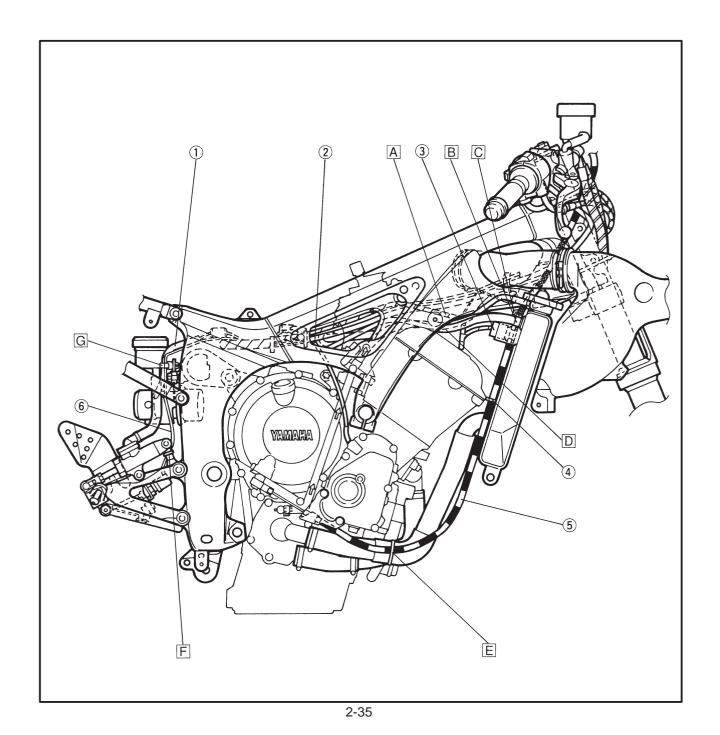
- G Route the horn lead outside the throttle cables and fasten it to the under bracket with a plastic locking tie. Cut the end of locking tie. And then, route the horn lead under the brake hose and clamp it to the under cover.
- H Route the throttle cables between the brake hose and right handlebar switch lead.





- 1 Fuel pump lead
- 2 Pickup coil lead
- (3) Thermo switch
- 4 Plastic clamp
- (5) Clutch cable
- 6 Rear brake switch lead
- A Route the ignition coil lead and thermo switch lead over the heat protector plate.
- B Position the face of steel clip up ward.
- C Route the clutch cable through the guide on the frame.
- D Route the coolant hose under the heat protector plate.

- E Fasten the clutch cable to the coolant hose protector with a plastic band.
- F Fasten the rear brake switch lead to the footrest bracket with a plastic locking tie and cut the end of locking tie.
- G Fasten the fuel pump lead and rear brake switch lead with a plastic band on the fuel pump bracket.





- (1) Oil lever switch lead
- (2) Sidestand switch lead
- (3) Reservoir tank breather hose
- (4) AC magneto lead
- (5) Neutral switch lead
- 6 Fuel pump lead
- (7) Speed sensor lead
- A Route the throttle cable through inside of the radia- G Put the fuel tank drain hose and fuel tank breather tor bracket and outside of the wireharness.
- B Fasten the wireharness, radiator hose and fan motor lead with a plastic band.
- C Do not touch the wireharness with the throttle cable

Route the wireharness under the radiator hose.

- D Pass the fuel tank drain hose and the fuel tank breather hose should between the reservoir thank breather hose and the coolant breather hose, and kept outside the leads.
- E Route the wireharness through the slit of rear fender.
- F Pass the fuel tank drain hose and the fuel tank breather hose inside the curved under cowling.
- hose into the reservoir tank by passing through the tank holder.

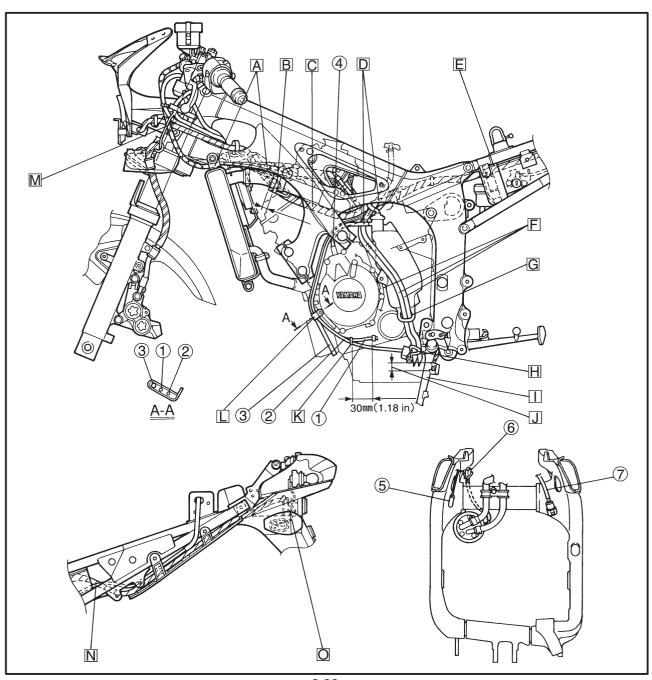
No fixed order required.

Do not twist the hoses.

H Put the fuel tank drain hose and the fuel tank breather hose through the hook and the side stand's holder.

No fixed order required.

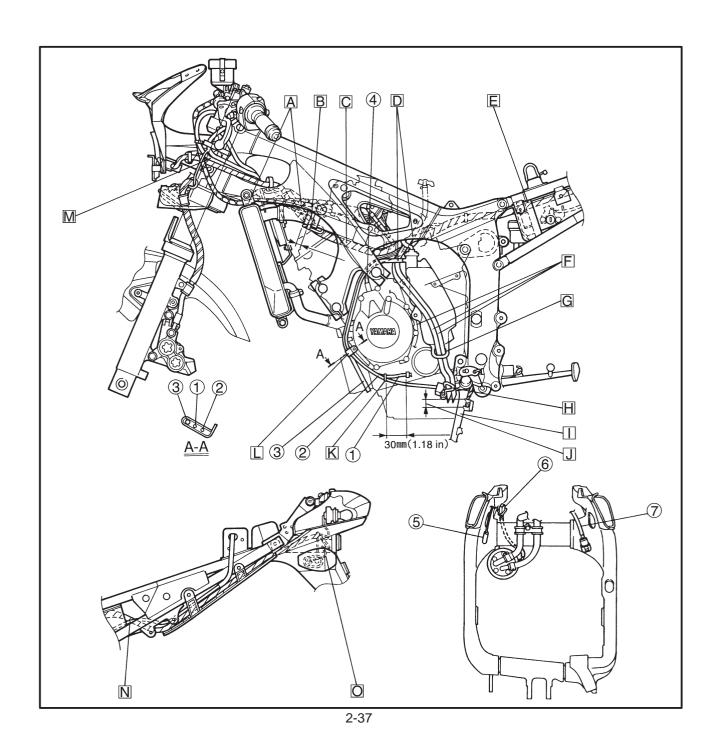
Do not twist the hoses.





- I When the sidestand is down.
- J The end of the drain hose must be located in between.
- K Fasten the sidestand switch lead and oil level sensor lead with a band.
- L Route the fuel tank drain hose, fuel tank breather hose, reservoir tank breather hose, oil level switch lead and sidestand switch lead through the guide on the frame.
- M Route the starter cable between the main switch lead and left handlebar switch lead.
- N Route the seat lock cable outside of the wireharness.

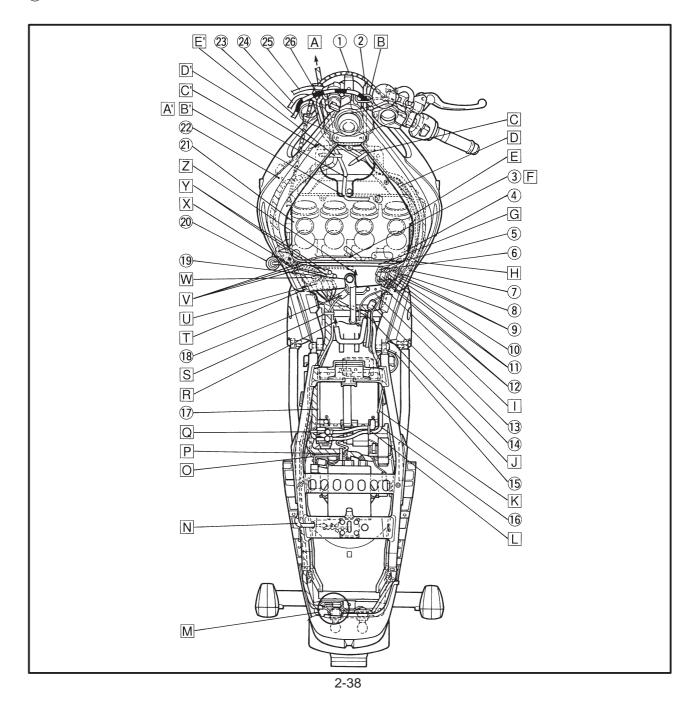
O Route the rear turn signal light leads (left and right) through the hole of rear fender.





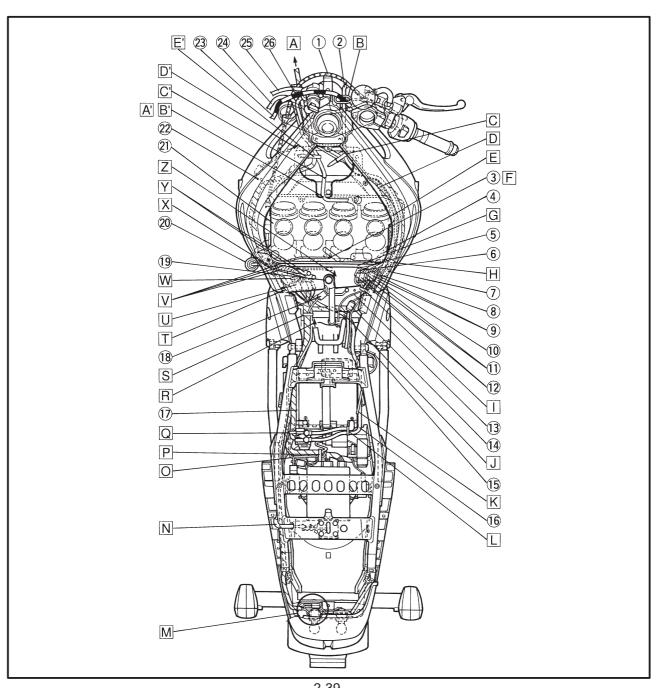
- 1 Throttle cable
- (2) Handlebar switch lead (right)
- (3) Coolant temperature sensor lead
- 4 Coolant reservoir breather hose
- 5 Idle adjust screw
- 6 Pickup coil connector
- 7 Neutral switch connector
- 8 Rear brake switch connector
- Handlebar switch (right) connectors
- 10 Throttle position sensor connector
- (1) Main switch connectors
- 12 Handlebar switch (left) connectors
- (13) Neutral switch lead
- 14 Fuel pump connector
- (15) Rear brake switch lead

- (16) Starter motor lead
- (17) Battery negative (-) cable
- 18 Fuel sender connector
- (19) Crankcase breather hose
- 20 Coolant reservoir tank cap
- (21) Heat protector
- 2 Fan motor lead connector
- 23 Clutch cable
- 24) Handlebar switch lead (left)
- 25) Starter cable
- 26 Main switch lead
- A To headlight lead
- B Route the clutch cable through the guide.





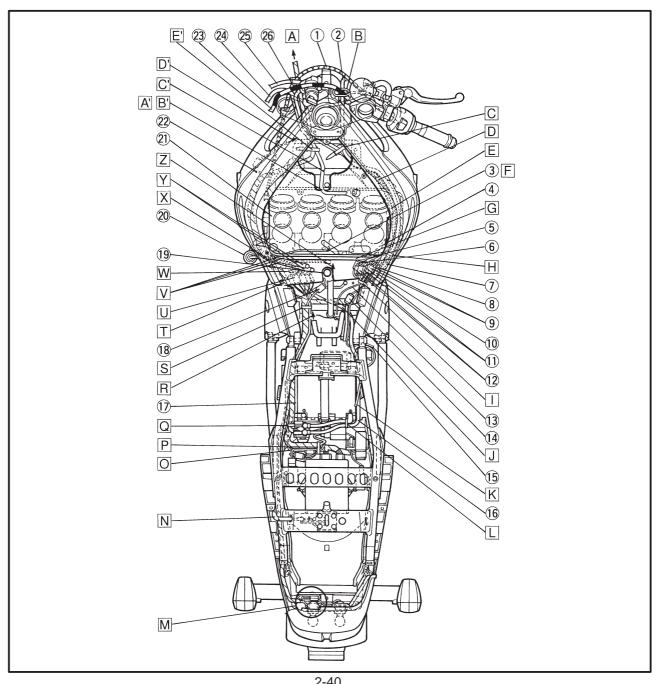
- C Fasten the handlebar switch leads (left and right) and main switch lead with a band.
- D Route the ignition coil lead and handlebar switch leads (left and right) over the heat protection plate.
- |E| Route the reservoir tank hose, carburetor heater hoses under the heat protector plate.
- F Route the coolant temperature lead upper the heat protection plate.
- G Route the coolant breather hose upper the heat protection plate.
- H Fasten the neutral switch lead, right handlebar switch lead, main switch lead, TPS lead, left handlebar switch lead, pickup coil lead and main harness with a band.
- Insert the projection of the band to the hole of the frame and fasten the wireharness, neutral switch lead, handlebar switch leads (left and right), main switch lead, throttle position sensor lead, rear brake switch lead and pickup coil lead with them.
- J Route the starter motor lead under the wireharness.
- K Fasten the starter motor to the rear fender with a band.
- ☐ Fasten the battery positive (+) cable and starter motor cable with a plastic band.
- M Position the rear turn signal light connectors (left and right) and taillight connector between the rear fender and taillight bracket.
- N Install the seat lock cable to the frame bracket with protector side.





- O Fasten the battery negative lead after passing under the main harness and oil level sensor lead.
- P Fasten the main harness, oil level sensor lead and ground lead with a band.
- Q Fasten the starter relay lead and battery negative (-) lead to the wireharness with a plastic band.
- R To fuel filter
- S Fasten the battery negative (–) lead and wireharness with a plastic band.
- T Insert the projection of the band (wireharness) into the hole of the frame.
- U 1: Speed sensor connector
 - 2: AC magneto connector
 - 3: Sidestand switch connector
 - 4: Oil level switch connector
 - 5: Meter ground lead

- V The fuel tank drain hose, coolant temperature lead and the coolant breather hose must be located over the groove.
- $\overline{\mathbf{W}}$ Fasten the leads (above 1 5) and starter motor lead with a steel band on the engine.
- X Route the coolant breather hose upper the main harness.
- Y Route the fuel tank breather hose and fuel tank drain hose over the wireharness.
- To carburetor
 A The starter cable must not be out off the guide groove of the cover.
- B' Route the starter cable upper the heat protection plate.
- Insert the starter cable to the guide.
- D' To fan motor
- E' Route the starter cable and main harness through the guide of the heat protection plate.





CHAPTER 3. PERIODIC CHECKS AND ADJUSTMENTS

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INTRODUCTION/PERIODIC MAINTENANCE CHART FOR EMISSION CONTROL SYSTEM



EB300000

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.

EB301000

PERIODIC MAINTENANCE CHART FOR EMISSION CONTROL SYSTEM

Γ				INITIAL		ODO	METER READ	INGS	
N	о.	ITEM	ROUTINE	600 mi (1,000 km) or 1 month	4,000 mi (7,000 km) or 6 months	8,000 mi (13,000 km) or 12 months	12,000 mi (19,000 km) or 18 months	16,000 mi (25,000 km or 24 months	20,000 mi (31,000 km) or 30 months
1	*	Valve clearance	Check and adjust valve clearance when engine is cold.		Every 26,600 mi (42,000 km)				
2		Spark plugs	Check condition. Adjust gap and clean. Replace at 8,000 mi (13,000 km) or 12 months and thereafter every 8,000 mi (12,000 km) or 12 months.		V	Replace	٧	Replace	V
3	*	Crankcase ventilation system	Check ventilation hose for cracks or damage. Replace if necessary.		V	√	V	√	√
4	*	Fuel line	Check fuel hose for cracks or damage. Replace if necessary.		√	√	√	√	√
5	*	Fuel filter	Replace initial 20,000 mi (31,000 km) and thereafter every 20,000 mi (31,000 km).						Replace
6	*	Exhaust system	Check for leakage. Retighten if necessary. Replace gasket(s) if necessary.		V	V	V	V	√
7	*	Carburetor Synchronization	Adjust synchronization of carburetors.	√	√	V	√	√	V
8	*	Idle speed	Check and adjust engine idle speed. Adjust throttle cable free play.		V	V	V	V	√
9	*	Evaporative emission control system**	Check control system for damage. Replace if necessary.				V		√

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

^{**} California only.

GENERAL MAINTENANCE AND LUBRICATION CHART



GENERAL MAINTENANCE AND LUBRICATION CHART

	П			INITIAL		ODO	METER READ	DINGS	
No.		ITEM	ROUTINE	600 mi (1,000 km) or 1 month	4,000 mi (7,000 km) or 6 months	8,000 mi (13,000 km) or 12 months	12,000 mi (19,000 km) or 18 months	16,000 mi (25,000 km) or 24 months	20,000 mi (31,000 km) or 30 months
1		Engine oil	Replace. Warm engine before draining.	√	$\sqrt{}$	√	√	√	$\sqrt{}$
2	*	Engine oil filter	Replace at 600 mi (1,000 km) or 1 month, and thereafter every 8,000 mi (12,000 km) or 12 months.	V		V		V	
3	*	Air filter/Surge tank	Clean. Replace if necessary.		√	V	V	√	√
4	*	Cooling system	Check hose for cracks or damage. Replace if necessary.		√	√	√	√	√
		Occurring dystorii	Replace coolant every 24 months. Ethylene glycol anti-freeze coolant.					Replace	
5	*	Brake system	Check operation, pad wear, and fluid leakage. (See NOTE.) Correct if necessary.	V	V	V	V	V	V
6	*	Clutch	Check operation. Correct if necessary.	V	√	V	V	√	√
7	*	Control cable	Apply chain lube thoroughly. Yamaha chain and cable lube or SAE 10 W 30 motor oil.	V	V	V	V	V	V
8	*	Swing arm pivot bearing	Check bearing assembly for looseness. Moderately repack every 16,000 mi (24,000 km) or 24 months. Lithium soap base grease.			V		Repack	
9	*	Rear suspension link pivots	Check operation. Correct if necessary.			V		√	
10	*	Rear shock absorber	Check operation and oil leakage. Replace if necessary.		√	V	V	√	√
11	*	Front fork	Ckeck operation and leakage. Replace if necessary.		√	$\sqrt{}$	V	√	√
12	*	Steering bearings	Check bearing assembly for looseness. Correct accordingly. Moderately repack every 16,000 mi (24,000 km). Lithum soap base grease.		V	√	V	Repack	V
13		Brake/clutch lever pivot shaft	Apply chain lube lightly. Yamaha chain and cable lube or SAE 10 W 30 motor oil.		V	V	V	V	√
14		Brake pedal and shift pedal shafts	Apply chain lube lightly. Yamaha chain and cable lube or SAE 10 W 30 motor oil.		V	V	V	V	√
15	*	Drive chain	Check chain slack/alignment condition. Adjust and lubricate chain throughly. SAE 30 W-50 W motor oil.	Every 600 mi (1,000 km) and after washing the motorcycle or riding in the rain					
16	*	Wheel bearings	Check bearing for smooth rotation.		√	V	√	√	√
17	*	Sidestand pivot	Check operation and lubricate. Apply chain lube lightly. Yamaha chain and cable lube or SAE 10 W 30 motor oil.		V	V	V	V	V
18	*	Sidestand switch	Check and clean or replace if necessary.	√	√	√	√	√	√
19	*	Chassis fasteners	Check all chassis fittings and fasteners. Correct if necessary.		V	V	V	V	√

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

NOTE: -

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

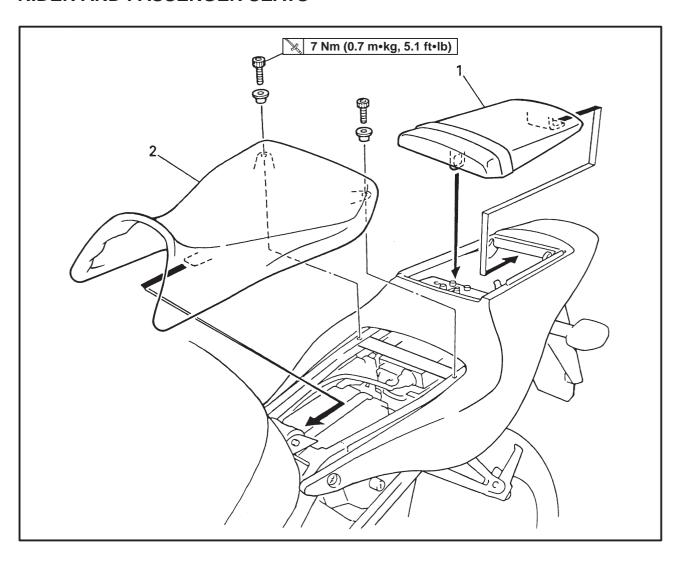
NOTE: -

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



EB302000

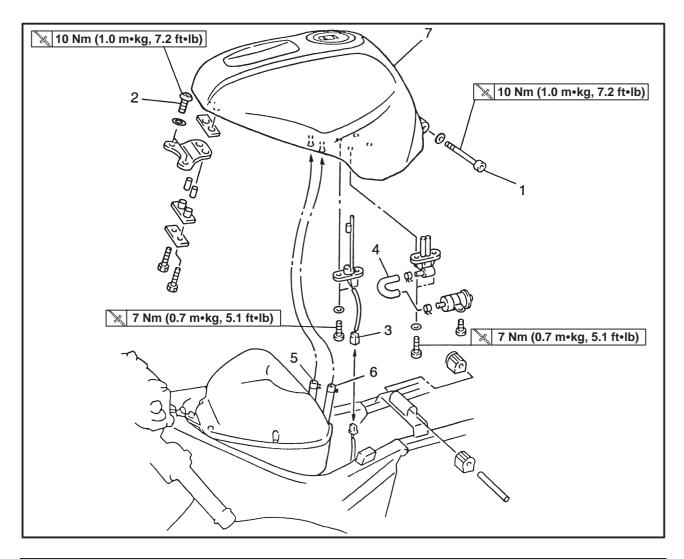
RIDER AND PASSENGER SEATS



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



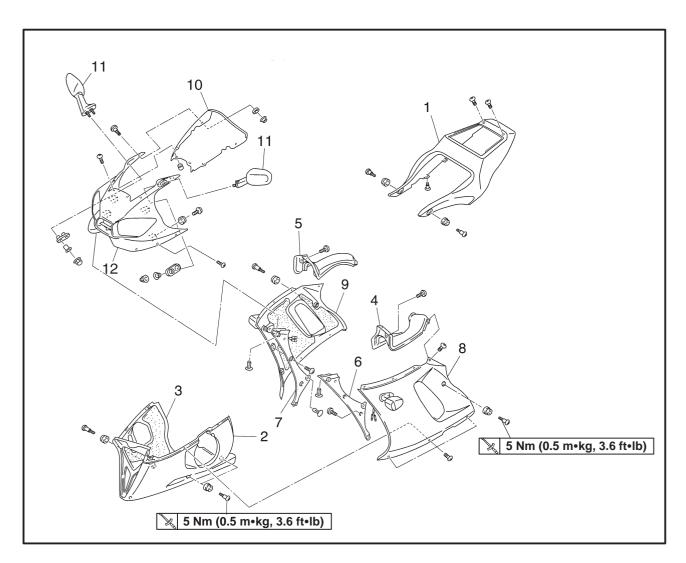
FUEL TANK



Order	Job/Part	Q'ty	Remarks
1 2 3 4	Removing the fuel tank Rider seat Bolt Bolts Fuel sender coupler Fuel hose	1 2 1	Remove the parts in the order listed Refer to "SEATS". Disconnect. NOTE: Before disconnecting the fuel hose, set
5 6 7	Fuel tank overflow hose Fuel tank breather hose Fuel tank	1 1 1	the fuel cock "OFF". For installation reverse the removal procedure.



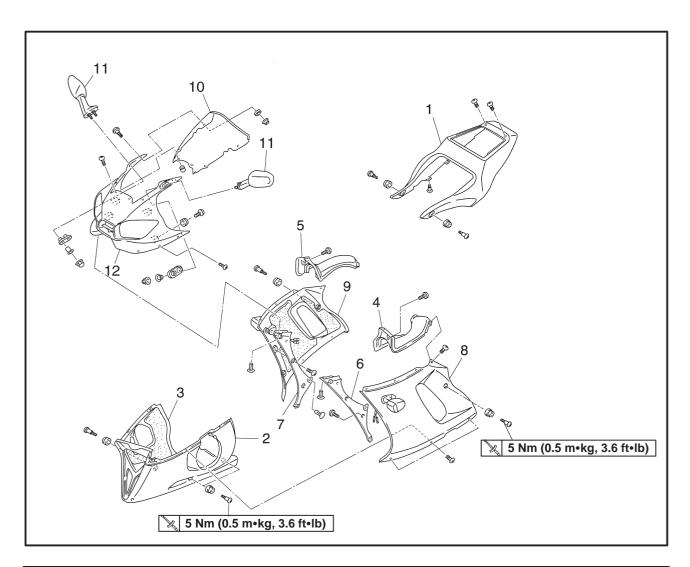
COWLINGS



Order	Job/Part	Q'ty	Remarks
	Removing the cowlings		Remove the parts in the order listed
	Rider and passenger seats		Refer to "SEATS".
1	Rear cowling	1	
2	Bottom cowling (left)	1	
3	Bottom cowling (right)	1	
4	Front cowling inner panel (left)	1	
5	Front cowling inner panel (right)	1	
6	Side cowling inner panel (left)	1	
7	Side cowling inner panel (right)	1	



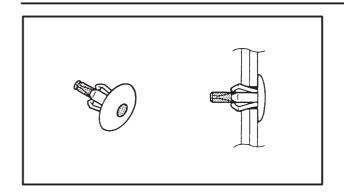
COWLINGS



Order	Job/Part	Q'ty	Remarks
8 9 10 11 12	Left side cowling Right side cowling Windshield Rear view mirror Front cowling	1 1 1 2 1	For installation, reverse the removal procedure.

COWLINGS



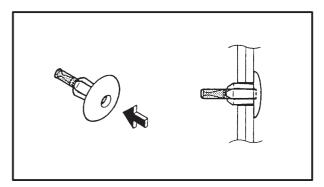


REMOVAL

- 1. Remove:
 - rear cowling
 - side cowlings

NOTE: -

To remove the quick fastener, turn its center to 90° with a screwdriver, then pull the fastener out.

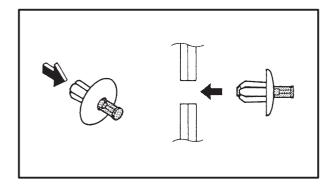


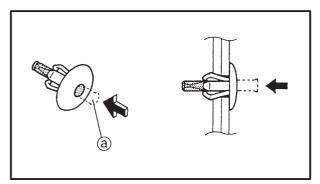
INSTALLATION

- 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 ⓐ in with a screwdriver. Make sure that the pin is flush with the fastener's head.

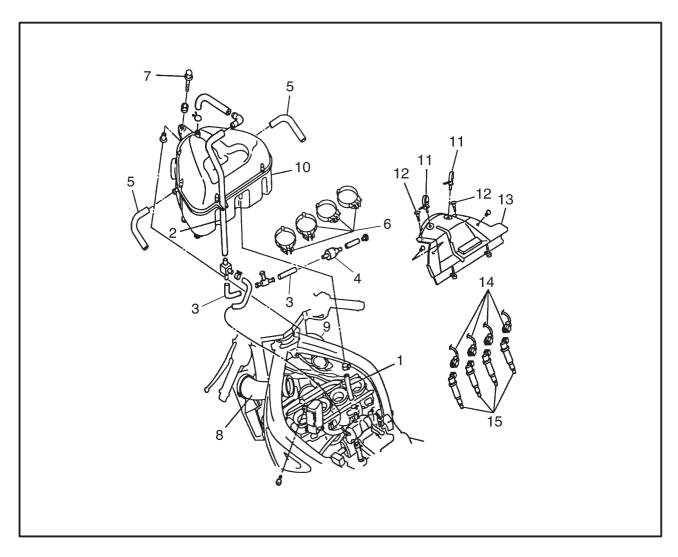




AIR FILTER CASE AND IGNITION COILS



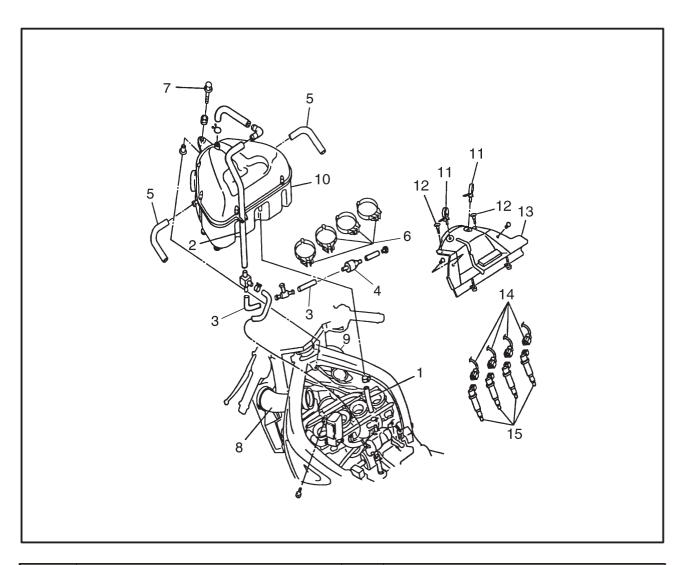
AIR FILTER CASE AND IGNITION COILS



Order	Job/Part	Q'ty	Remarks
	Removing the air filter case and		Remove the parts in the order listed.
	ignition coils		
	Rider seat and fuel tank		Refer to "SEATS" and "FUEL TANK".
	Front cowling inner panel (left)		Refer to "COWLINGS".
	Front cowling inner panel (right)		
1	Crankcase breather hose	1	
2	Air vent hose	1	
3	Hoses	2	
4	Drain cup	1	
5	Air filter case balance hose	2	
6	Clamp screw	4	Loosen.
7	Bolt	1	
8	Surge tank joint (left)	1	
9	Surge tank joint (right)	1	
10	Air filter case	1	
11	Clamp	2	
12	Quick fastener	2	

AIR FILTER CASE AND IGNITION COILS

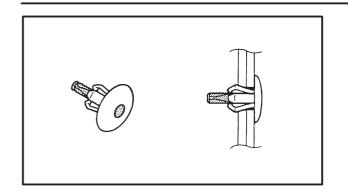




Order	Job/Part	Q'ty	Remarks
13 14 15	Heat protector plate Ignition coil coupler Ignition coil	1 4 4	For installation, reverse the removal procedure.

AIR FILTER CASE AND IGNITION COIL PLATE



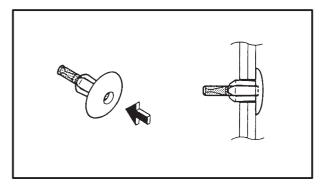


REMOVAL

- 1. Remove:
 - heat protector plate

NOTE: -

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

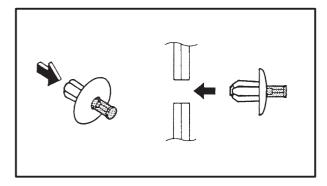


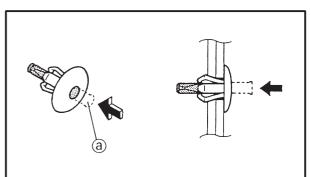
INSTALLATION

- 1. Install:
- heat protector plate

NOTE: _

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





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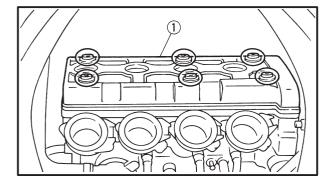
ENGINE

ADJUSTING THE VALVE CLEARANCE

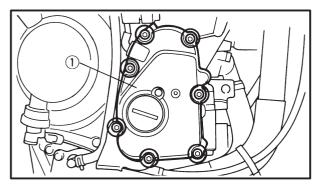
The following procedure applies to all of the valves.

NOTE: -

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.
- 1. Remove:
 - rider seat
 - fuel tank Refer to "SEATS" and "FUEL TANK".
 - air filter case
 - heat protector plate Refer to "AIR FILTER CASE AND IGNITION COILS".
 - bottom cowling
 - side cowlings Refer to "COWLINGS".
 - carburetor assembly Refer to "CARBURETORS" in chapter 6.
 - radiator assembly
 Refer to "RADIATOR" in chapter 5.

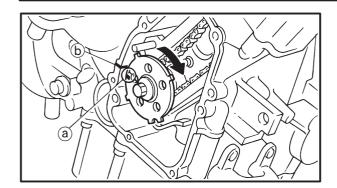


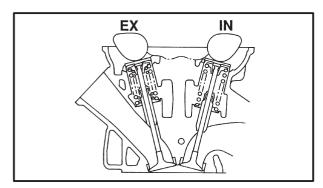
- 2. Remove:
 - ignition coils
 - spark plugs
 - cylinder head cover 1
 - cylinder head cover gasket

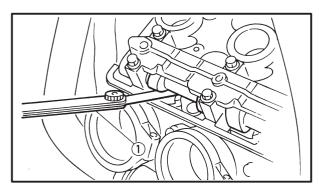


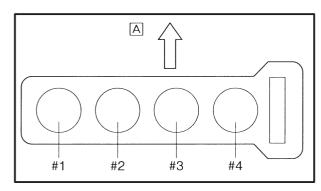
- 3. Remove:
 - pickup coil rotor cover ①

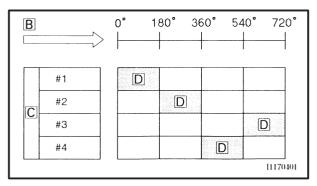












4. Measure:

valve clearance
 Out of specification → Adjust



Valve clearance (cold)
Intake valve
0.11 ~ 0.20 mm
(0.0043 ~ 0.0079 in)
Exhaust valve
0.21 ~ 0.30 mm
(0.0083 ~ 0.0118in)

- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the TDC mark (a) on the pickup coil 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.

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

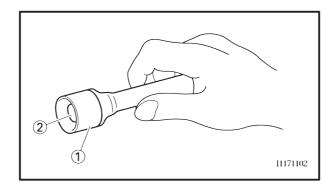
Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°

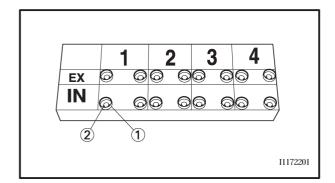


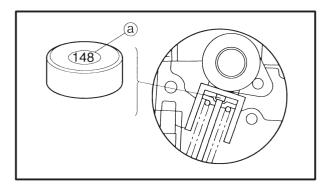
- 5. Remove:
 - timing chain tensioner
 - timing chain guide (exhaust side)
 - camshaft cap
 - timing chain (from the camshaft sprockets)
 - intake camshaft
 - exhaust camshaft

NOTE: -

- Refer to "CAMSHAFTS" in chapter 4.
- When removing the timing chain from camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.







- 6. Adjust:
 - valve clearance
- a. Remove the valve lifter ① and the valve pad ②.

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 ② so that they can be installed in the correct place.
- b. Select the proper valve pad from the following table.

1	•	ad thick- range	Available valve pads
Nos. 120 - 240		1.20 ~ 2.40 mm	25 thicknesses in 0.05 mm incre- ments

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)

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.

NOTE: -

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: -

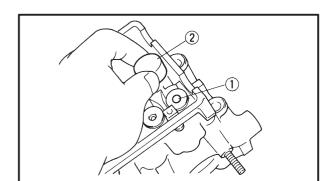
- Lubricate the valve pad with molybdenum disulfide grease.
- Lubricate the valve lifter with molybdenum disulfide oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.
- f. Install the exhaust and intake camshafts, timing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



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

NOTE: -

- Refer to "CAMSHAFTS" in chapter 4.
- Lubricate the 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.





VALVE PAD SELECTION TABLE INTAKE

B MEASURED									Α	ORI	GIN/	AL VA	LVE	PAD	NUI	ИВЕІ	₹								
VALVE 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			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
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		120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 235 235 235 235 235 235 235 236 235 236 235 236 235 236 235 236																							
0.21 ~ 0.22																								240	
0.23 ~ 0.27																							240		
0.28 ~ 0.32			145]		
			150																						
			155]				
			160]					
			165															240							
			170																						
0.58 ~ 0.62			175																						
			180]									
			185]										
0.73 ~ 0.77			190										240	١,	Exai	mnle	٥.								
0.78 ~ 0.82																			. /	기시)					
			200												Valv										
			205							240					Ü	.11	~ 0	.20	mm						
			210												Rou	nde	d va	lue	150						
			215					240							Λ	/leas	sure	d va	lve	clea	aran	ce is	s 0.2	24 m	nm
			220				240								Rep	lace	nac	1 15	0 w	ith n	ad 1	160			
			225			240											No.								
			230		24 U																				
			235	240													No.								
	230 235		240											-	Alwa	ays i	insta	all th	e va	alve	pac	l wit	h the	Э	
	240	240												1	num	ber	faci	ng d	lowi	٦.					
1.33 ~ 1.37	24 0																	<u> </u>							

EXHAUST

B MEASURED									Α			AL VA													
VALVE 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																							220		
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 ~ 0.30												DARE						,							
0.31 ~ 0.32			135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.33 ~ 0.37																							240		
0.38 ~ 0.42												190										240			
0.43 ~ 0.47												195													
0.48 ~ 0.52												200													
0.53 ~ 0.57												205							240						
												210													
0.63 ~ 0.67												215]							
0.68 ~ 0.72												220				240]								
0.73 ~ 0.77												225													
												230]										
0.83 ~ 0.87												235	240	١,	Exai	mnla	٠.								
0.88 ~ 0.92						210													. /	- 1 -1\					
0.93 ~ 0.97						215								,				ance	•						
						220				240					0	.21	~ (0.30	mm	1					
						225			240						Rou	nde	d va	ılue	175						
						230		240							N	leas	sure	d va	lve	clea	ıran	ce is	s 0.3	5 n	nm
						235	240								Ren	lace	nac	d 15	O w	ith n	ad 1	185			
			225			240												175				. 55			
			230 235																-						
		235		240	J													185							
	235		240											1	Alwa	ays i	insta	all th	e va	alve	pac	l wit	h the	Э	
	240	240	l											1	num	ber	faci	ng d	lowr	٦.					
1.43 ~ 1.47	240																								

ADJUSTING THE VALVE CLEARANCE/ SYNCHRONIZING THE CARBURETORS



	B 4	4.1			
$^{\circ}$		tha	MAIMA	clearance	anain
u.	MCasarc	เมเบ	vaivo	olcai ai icc	auani

h.	If the valve clearance is still out of specifica-
	tion, repeat all of the valve clearance adjust-
	ment steps until the specified clearance is
	obtained.
A 4	

7. Install:• all removed parts
NOTE:
For installation, reverse the removal procedure Note the following points.

8. Install:

- timing chain guide (exhaust side)
- timing chain tensioner
- pickup coil rotor cover
- cylinder head cover
- spark plugs
- ignition coils Refer to "CAMSHAFTS" in chapter 4.

SYNCHRONIZING THE CARBURETORS

NOTE:

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

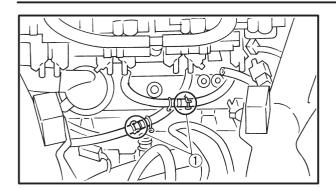
1. Stand the motorcycle on a level surface.

2. Remove:

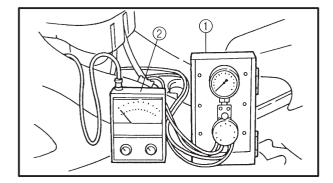
- rider seat
- fuel tank Refer to "SEATS" and "FUEL TANK".

SYNCHRONIZING THE CARBURETORS





- 3. Remove:
 - hose (1)



- 4. Install:
 - vacuum gauge attachments (into the bolt holes)
 - vacuum gauge ①
 (onto the vacuum gauge attachments)
 - engine tachometer ②
 (onto the ignition coil of cylinder #1)

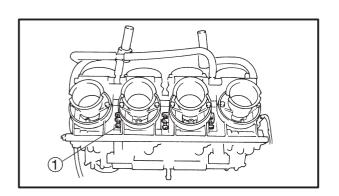


Vacuum gauge 90890-03094, YU-08030-A Vacuum gauge attachment 90890-03060 Engine tachometer 90793-80009

- 5. Start the engine and let it warm up for several minutes.
- 6. Measure:
 - engine idling speed
 Out of specification → Adjust.
 Refer to "ADJUSTING THE ENGINE ID-LING SPEED".



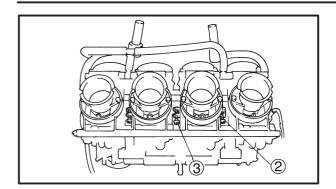
Engine idling speed $1,250 \sim 1,350 \text{ r/min}$



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

SYNCHRONIZING THE CARBURETORS/ ADJUSTING THE ENGINE IDLING SPEED





NOTE: -

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

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



Vacuum pressure at engine idling speed 24.0 kPa (0.24 kg/cm², 3.41 psi)

NOTE: -

The difference in vacuum pressure between two carburetors should not exceed 1.33 kPa (10 mm Hg).

8. Measure:

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



Throttle cable free play (at the flange of the throttle grip) $6 \sim 8 \text{ mm} (0.24 \sim 0.31 \text{ in})$

EB303020

ADJUSTING THE ENGINE IDLING SPEED

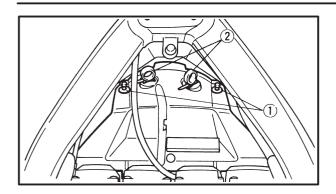
NOTE: -

Prior to adjusting the engine idling speed, the carburetor synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

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

ADJUSTING THE ENGINE IDLING SPEED





- 2. Remove:
- air filter case
- quick fasteners ①
- band ②
 Refer to "AIR FILTER CASE AND IGNITION COILS".
- 3. Install:
 - engine tachometer
 (onto the ignition coil of cylinder #1)



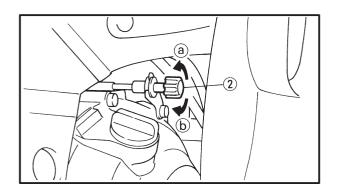
Engine tachometer 90793-80009

- 4. Install:
 - air filter case
 Refer to "AIR FILTER CASE AND IGNITION COILS".
- 5. Measure:
 - engine idling speed
 Out of specification → Adjust.



Engine idling speed $1,250 \sim 1,350 \text{ r/min}$

- 6. Adjust:
 - engine idling speed



a. Turn the throttle stop screw ② in direction ③ or ⑤ until the specified engine idling speed is obtained.

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

ADJUSTING THE ENGINE IDLING SPEED/ ADJUSTING THE THROTTLE CABLE FREE PLAY



7. Adjust:

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



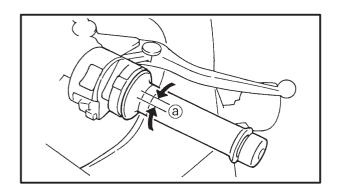
Throttle cable free play (at the flange of the throttle grip) $6 \sim 8 \text{ mm} (0.24 \sim 0.31 \text{ in})$

EB303031

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE: -

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



1. Measure:

throttle cable free play ⓐ
 Out of specification → Adjust.



Throttle cable free play (at the flange of the throttle grip) $6 \sim 8 \text{ mm} (0.24 \sim 0.31 \text{ in})$

2. Remove:

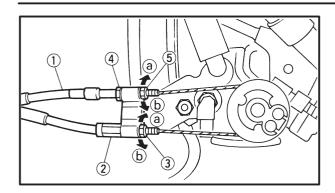
- rider seat
- fuel tank

Refer to "SEATS" and "FUEL TANK".

- air filter case
- heat protector plate Refer to "AIR FILTER CASE AND IGNITION COILS".

ADJUSTING THE THROTTLE CABLE FREE PLAY





3. Adjust:

• throttle cable free play

NOTE:

When the throttle is opened, the accelerator cable ① is pulled.

Carburetor side

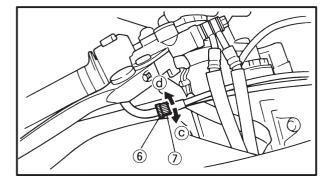
- a. Loosen the locknut ② on the decelerator cable.
- b. Turn the adjusting nut ③ in direction ② or ⓑ to take up any slack on the decelerator cable.
- c. Loosen the locknut 4 on the accelerator cable.
- d. Turn the adjusting nut 5 in direction a or b until the specified throttle cable free play is obtained.

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

e. Tighten the locknuts.

NOTE: -

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



Handlebar side

- a. Loosen the locknut (6).
- b. Turn the adjusting nut 7 in direction c or d until the specified throttle cable free play is obtained.

Direction ©	Throttle cable free play is increased.
	T1 441 11 6 1

d. Tighten the locknut.

A WARNING

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



FB303040

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

- 1. Remove:
 - rider seat
 - fuel tank

Refer to "SEATS" and "FUEL TANK".

- air filter case
- heat protector plate
 Refer to "AIR FILTER CASE AND IGNITION COILS".
- 2. Disconnect:
 - Ignition coils
- 3. Remove:
 - spark plug

NOTE: -

- a. Remove the coupler.
- b. Turn the coil counterdockwise. (5 to 6 turns would be adequate.)
- c. Pull out the coil upward.

 Never pry the coupler with a screw driver.
- d. Press the coil in the plug hole by hand as faras it will go.
- e. Turn the coil clockwise and screw it in, 5 to 6 turns would be adequate.
- f. Reins tall the coupler.
 Do not strike on the coil with a hammer or the like.

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.

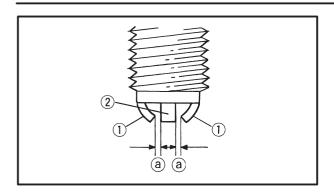
- 4. Check:
 - spark plug type Incorrect → Change.



Spark plugs type (manufacturer) CR10EK (NGK) CR9EK (NGK) (California)

CHECKING THE SPARK PLUGS/ CHECKING THE IGNITION TIMING





- 5. Check:
 - electrodes (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 (a)
 (with a wire gauge)
 Out of specification → Regap.



Spark plug gap

 $0.6 \sim 0.7 \text{ mm} (0.02 \sim 0.03 \text{ in})$

8. Install:

spark plug

13 Nm (1.3 m•kg, 9.4 ft•lb)

NOTE: -

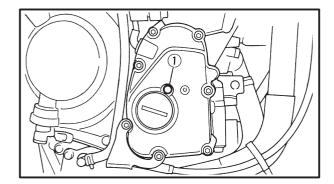
Before installing the spark plug, clean the spark plug and gasket surface.

EB303050

CHECKING THE IGNITION TIMING

NOTE: -

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



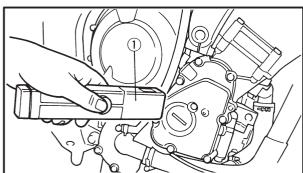
- 1. Remove:
 - bottom cowling Refer to "COWLINGS".
 - rider seat
 - fuel tank

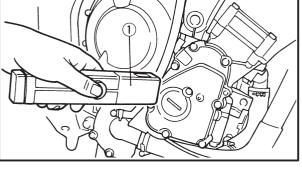
Refer to "SEATS" and "FUEL TANK".

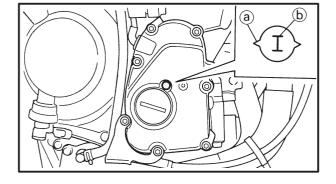
- air filter case
 Refer to "AIR FILTER CASE AND IGNITION COILS".
- timing mark accessing screw 1

CHECKING THE IGNITION TIMING/ **MEASURING THE COMPRESSION PRESSURE**









2	Inetall
٠,	Inctall

- timing light 1
- engine tachometer (onto the ignition coil of cylinder #1)



Timing light 90890-03141, YU-33277-A **Engine tachometer** 90793-80009

- 3. Check:
 - ignition timing

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



Engine idling speed 1,250 ~ 1,350 r/min

b. Check that the mark (a) is within the required firing range (b) on the pickup coil rotor. Incorrect firing range → Check the ignition system.

NOTE: -

The ignition timing is not adjustable.

MEASURING THE COMPRESSION PRES-

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 stop it.
- 3. Remove:
 - rider seat
 - fuel tank

Refer to "SEATS" and "FUEL TANK".

- air filter case
- heat protector plate
- ignition coils

Refer to "AIR FILTER CASE AND IGNITION COILS".

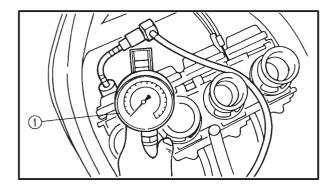
MEASURING THE COMPRESSION PRESSURE



- 4. Remove:
 - spark plug

CAUTION:

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



5. Install:

• compression gauge 1



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

6. Measure:

compression pressure
 Out of specification → Refer to steps (c) and (d).



Compression pressure (at sea level)

Minimum

1300 kPa (13.0 kg/cm²,

184.90 psi)

Standard

1550 kPa (15.5 kg/cm²,

224.75 psi)

Maximum

1600 kPa (16.0 kg/cm²,

227.57 psi)

- a. Set 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, 14.22 psi).

MEASURING THE COMPRESSION PRESSURE/ CHECKING THE ENGINE OIL LEVEL



- 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.
- d. If the compression pressure is below the minimum specification, squirt a few drops of oil into the cylinder and measure again.

Refer to the following table.

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

7. Install:

spark plug

13 Nm (1.3 m•kg, 9.4 ft•lb)

EB303070

CHECKING THE ENGINE OIL LEVEL

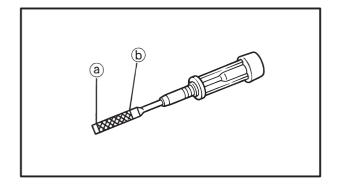
1. Stand the motorcycle on a level surface.

NOTE: -

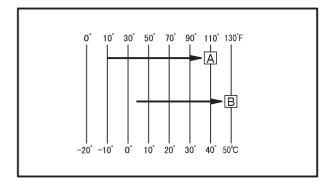
- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.
- 2. Start the engine, let it idle for several minutes, and then stop it.
- 3. Check:
 - engine oil level

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/ CHANGING THE ENGINE OIL





Recommended oil:

At -10°C (10°F) or higher A:
Yamalube 4 (10W-30)
or SAE
10W-30 type SE motor oil
At 5°C (40°F) or higher B:
Yamalube 4 (20W-40)
or SAE
20W-40 type SE motor oil

CAUTION:

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

NOTE: -

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

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

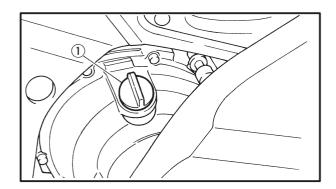
NOTE:

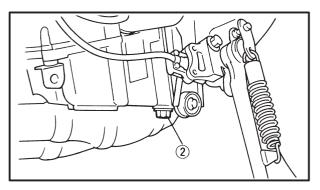
Before checking the engine oil level, wait a few minutes until the oil has settled.

EB30308

CHANGING THE ENGINE OIL

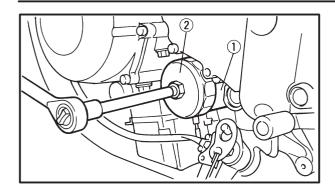
- 1. Remove:
 - bottom cowling Refer to "COWLINGS".
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Place a container under the engine oil drain bolt.
- 4. Remove:
 - engine oil filler cap (1)
 - engine oil drain bolt ② (along with the washer)
- 5. Drain:
 - engine oil (completely from the crankcase)

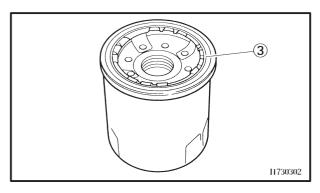




CHANGING THE ENGINE OIL







6. If the oil filter cartridge is also to be replaced, perform the following procedure.

a. Remove the oil filter cartridge ① with an oil



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:

filter wrench (2).

Make sure theat 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.



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

7. Check:

- engine oil drain bolt washer Damage → Replace.
- 8. Install:
 - engine oil drain bolt

3 Nm (4.3 m•kg, 31 ft•lb)

9. Fill:

crankcase
 (with the specified amount of the recommended engine oil)



Quantity

Total amount

3.5 L (3.7 US qt)

Without oil filter cartridge replacement

2.5 L (2.64 US qt)

With oil filter cartridge replacement

2.7 L (2.85 US qt)

10. Install:

- engine oil filler cap
- 11. Start the engine, warm it up for several minutes, and then turn it off.
- 12. Check:
 - engine (for engine oil leaks)

CHANGING THE ENGINE OIL/ MEASURING THE ENGINE OIL PRESSURE



- 13. Check:
 - engine oil level
 Refer to "CHECKING THE ENGINE OIL LEVEL".
- 14. Install:
- bottom cowling Refer to "COWLINGS".

EB303090

MEASURING THE ENGINE OIL PRESSURE

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



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

- 3. Remove:
- oil gallery bolt 1



The engine, muffler and engine oil are extremely hot.

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

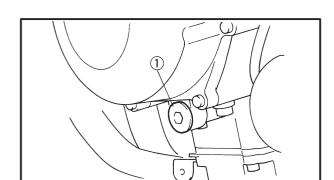


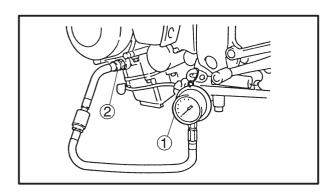
Oil pressure gauge 90890-03153 Adapter 90890-03139

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



Engine oil pressure 240 kpa (2.4 kg/cm², 34.1 psi) Engine speed Approx. 6000 r/min Engine oil temperature 96°C (205°F)





MEASURING THE ENGINE OIL PRESSURE



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.

Out of specification → Adjust.

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

6. Tighten the oil gallery bolt

20 Nm (2.0 m•kg, 14 ft•lb)

EB303100

ADJUSTING THE CLUTCH CABLE FREE PLAY

- 1. Measure:
 - clutch cable free play ⓐ
 Out of specification → Adjust.



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

- 2. Adjust:
 - clutch cable free play

Handlebar side

a. Turn the adjusting bolt ① in direction ② 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.

NOTE: -

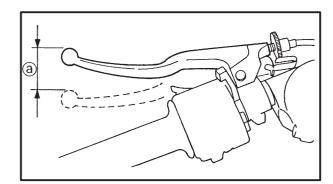
If the specified clutch cable free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.

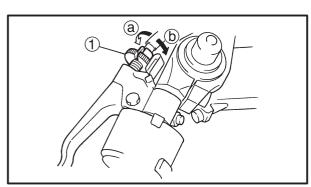
Engine side

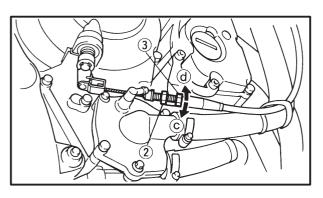
- a. Loosen the locknut 2
- b. Turn the adjusting nut ③ in direction ⓒ or ⓓ until the specified clutch cable free play is obtained.

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

c. Tighten the locknut.

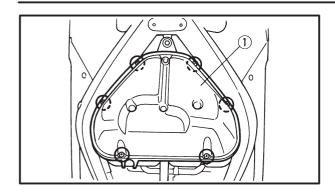






CLEANING THE AIR FILTER ELEMENT





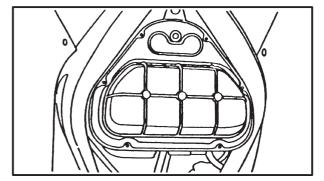


CLEANING THE AIR FILTER ELEMENT

- 1. Remove:
 - fuel tank

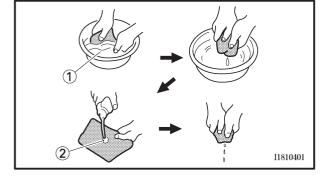
Refer to "FUEL TANK".

- air filter case cover ①
- air filter element





- air filter element
 Use solvent to clean the air filter element. After cleaning the air filter element, remove the
 solvent from the air filter element.
- 3. Apply the engine oil to the entire surface of the filter and remove the excess oil. The air filter should be wet but not dripping.
- 4. Check:
 - air filter element
 Damage → Replace.
- 5. Install:
 - air filter element
 - air filter case cover



CAUTION:

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

NOTE: -

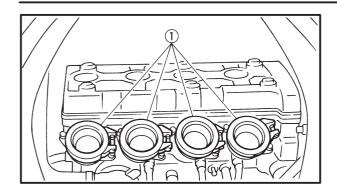
When installing the air filter element into the air filter case cover, make sure that their sealing surfaces are aligned to prevent any air leaks.

6. Install:

• fuel tank Refer to "FUEL TANK".

CHECKING THE CARBURETOR JOINTS/ CHECKING THE FUEL HOSES AND FUEL FILTER/





EB30317

CHECKING THE CARBURETOR JOINTS

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

- 1. Remove:
 - carburetor assembly Refer to "CARBURETORS" in chapter 6.
- 2. Check:
 - carburetor joint ①
 Cracks/damage → Replace.
 Refer to "CARBURETORS" in chapter 6.
- 3. Install:
 - carburetor assembly Refer to "CARBURETORS" in chapter 6.

EB303181

CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

- 1. Remove:
 - fuel tank Refer to "FUEL TANK".
- 2. Check:
 - fuel hose (1)

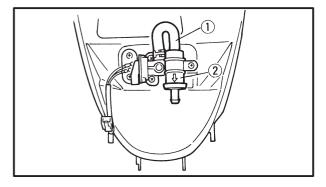
Cracks/damage → Replace.

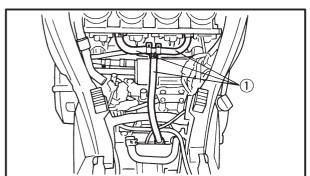
• fuel filter 2

Contaminants/damage → Replace.

NOTE: -

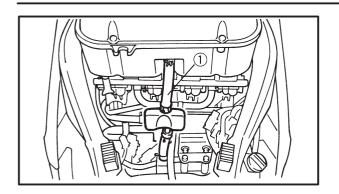
- Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
- The arrow mark on the fuel filter must point towards the fuel pump as shown.
- 3. Install:
 - fuel tank
 Refer to "FUEL TANK".





CHECKING THE CRANKCASE BREATHER HOSE/ CLEANING THE AIR INTAKE SYSTEM





EB303190

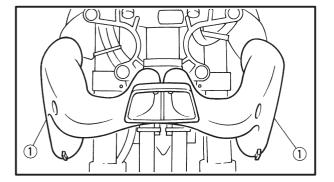
CHECKING THE CRANKCASE BREATHER HOSE

- 1. Remove:
 - fuel tank
 Refer to "FUEL TANK".
- 2. Check:
 - crankcase breather hose ①
 Cranks/damage → Replace.
 Loose connection → Connect properly.

CAUTION:

Make sure that the crankcase breather hose is routed correctly.

- 3. Install:
 - fuel tank
 Refer to "FUEL TANK".



EAS00092

CLEANING THE AIR INTAKE SYSTEM

The following procedure applies to both air intake system.

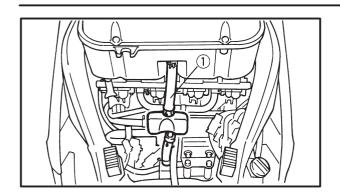
- 1. Remove:
 - side cowling inner covers
 - side cowlings
 - front cowling inner covers
 - front cowling
 - fuel tank
- 2. Loosen:
 - clamps

(on the inside of the front cowling)

- 3. Remove:
 - air intake system air ducts (1)
- 4. Clean:
 - air intake system air ducts
- a. Thoroughly flush out the air intake system air ducts with clean water.
- b. Hold the air intake system air ducts upside down to allow the water to drain out.
- c. Repeat the flushing steps until the excess water is clear and free of debris.
- d. Place the air intake system air ducts in an upright position to allow any remaining water to drain out of the lower drain tube.
- e. Keep the air intake system air ducts upright to allow it to dry sufficiently.
- 5. Install:
 - air intake system air ducts
 - fuel tank
 - front cowling
 - front cowling inner covers
 - side cowlings
 - side cowlings inner covers

CLEANING THE AIR INTAKE SYSTEM/ CHECKING THE EXHAUST SYSTEM





2. Check:

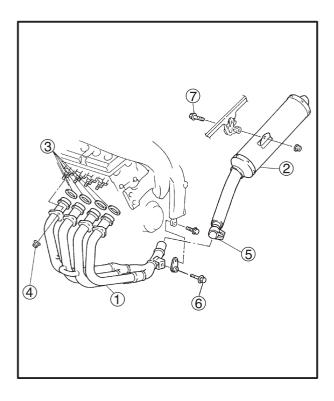
crankcase breather hose ①
 Cracks/damage → Replace.
 Loose connection → Connect properly.

CAUTION:

Make sure that the crankcase breather hose is routed correctly.

3. Install:

• fuel tank Refer to "FUEL TANK".



EB303200

CHECKING THE EXHAUST SYSTEM

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

1. Remove:

• radiator assembly Refer to "RADIATOR" in chapter 5.

2. Check:

- exhaust pipe (1)
- muffler (2)

Cracks/damage → Replace.

• gasket ③

Exhaust gas leaks → Replace.

- 3. Measure:
 - tightening torque



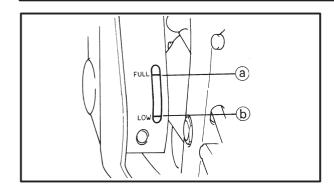
Exhaust pipe nut 4
20 Nm (2.0 m•kg, 14 ft•lb)
Muffler clamp bolt 5
20 Nm (2.0 m•kg, 14 ft•lb)
Exhaust pipe bolt 6
20 Nm (2.0 m•kg, 14 ft•lb)
Muffler bolt 7
38 Nm (3.8 m•kg, 27 ft•lb)

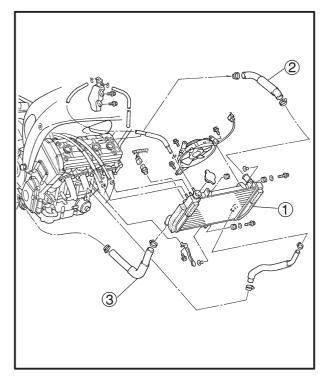
4. Install:

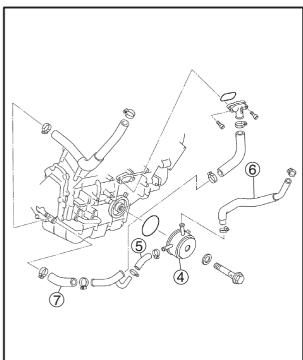
 radiator assembly Refer to "RADIATOR" in chapter 5.

CHECKING THE COOLANT LEVEL/ CHECKING THE COOLING SYSTEM









EB303220

CHECKING THE COOLANT LEVEL

1. Stand the motorcycle on a level surface.

NOTE: -

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

2. Check:

coolant level

The coolant level should be between the maximum level mark (a) and minimum level marks (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 correct the antifreeze concentration of the coolant.
- Use only distilled water. Soft water may be used if distilled water is not available.
- 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.

EB303230

CHECKING THE COOLING SYSTEM

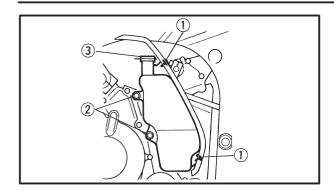
- 1. Remove:
 - bottom cowling
 - side cowlings Refer to "COWLINGS".
- 2. Check:
 - radiator (1)
 - radiator inlet hose 2
 - radiator outlet hose (3)
 - oil cooler (4)
 - oil cooler inlet hose (5)
 - oil cooler outlet hose 6
 - water pump outlet hose ⑦
 Cracks/damage → Replace.
 Refer to "COOLING SYSTEM"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

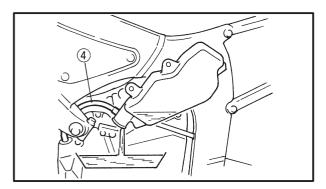
3. Install:

- side cowlings
- bottom cowling Refer to "Cowlings".

CHANGING THE COOLANT







EB303240

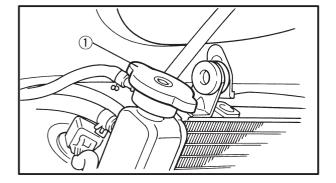
CHANGING THE COOLANT

- 1. Remove:
- bottom cowling
- left side cowling Refer to "COWLINGS".
- reservoir hose clamps (1)
- 2. Remove:
 - coolant reservoir bolts (2)
 - coolant reservoir cap ③

NOTE: -

When draining the coolant from the coolant reservoir, be sure to tilt the reservoir so that coolant cannot flow through the coolant reservoir breather hose (4).

- 3. Drain:
 - coolant (from the coolant reservoir)
- 4. Install:
 - coolant reservoir bolts
 - reservoir cover



- 5. Remove:
 - radiator cap (1)

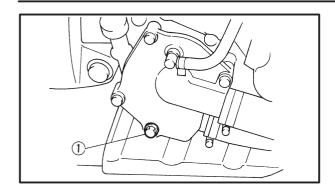
A WARNING

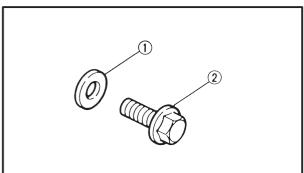
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

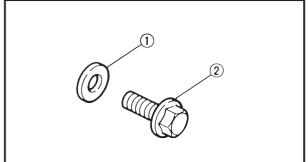
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, turn the radiator cap counterclockwise while pressing down on it and then remove it.

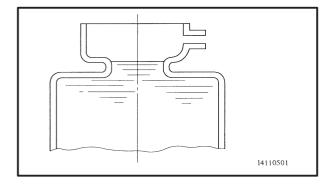
CHANGING THE COOLANT











- 6. Remove:
- coolant drain bolt (1) (along with the copper washer)
- 7. Drain:
 - coolant
- 8. Check:
 - coper washer 1
 - coolant drain bolt 2 Damage → Replace
- 9. Install:
 - coolant drain bolt

7 Nm (0.7 m•kg, 5.1 ft•lb)



 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

2.15 L (2.27 US qt)

Coolant reservoir capacity

0.44 L (0.47 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

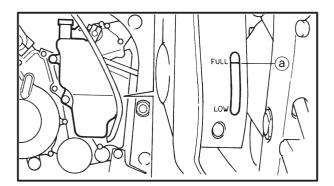
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- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, soft water may be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

11. Install:

radiator cap



12. Fill:

- coolant reservoir (with the recommended coolant to the maximum level mark (a))
- 13. Install:
 - coolant reservoir cap
- 14. Start the engine, warm it up for several minutes, and then turn it off.

15. Check:

• coolant level Refer to "CHECKING THE COOLANT LEV-EL".

NOTE: -

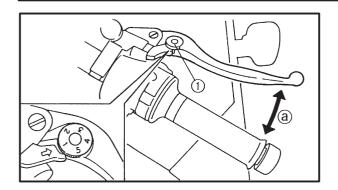
Before checking the coolant level, wait a few minutes until the coolant has settled.

16. Install:

- left side cowling
- bottom cowling Refer to "COWLINGS".

ADJUSTING THE FRONT BRAKE/ ADJUSTING THE REAR BRAKE





EB304001

CHASSIS

ADJUSTING THE FRONT BRAKE

- 1. Adjust:
- brake lever position (distance (a) from the throttle grip to the brake lever)

a. While pushing the brake lever forward, turn the adjusting dial ① until the brake lever is in the desired position.

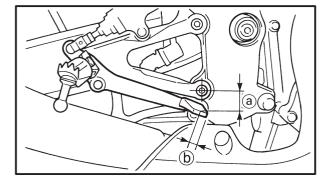
NOTE: -

Be sure to align the setting on the adjusting dial with the arrow mark ② on the brake lever holder.

	Distance (a) is the largest.
Position #5	Distance (a) is the smallest.

A WARNING

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



B304010

ADJUSTING THE REAR BRAKE

- 1. Measure:
 - brake pedal position (distance (a) from the top of the brake pedal to the bottom of the rider footrest bracket bolt center)

Out of specification → Adjust.



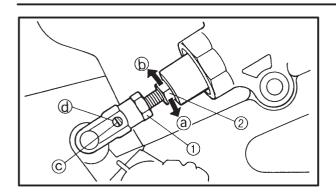
Brake pedal position (from the top of the brake pedal to the bottom of the rider footrest bracket bolt center)

 $4.3 \sim 9.3 \text{ mm} (0.17 \sim 0.37 \text{ in})$

(b): 11mm (0.43 in)

ADJUSTING THE REAR BRAKE





- 2. Adjust:
 - brake pedal position
- a. Loosen the locknut (1).
- b. Turn the adjusting bolt ② in direction ③ or ⓑ 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 that there is no brake drag.

- 3. Adjust:
 - rear brake light switch Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH".

CHECKING THE BRAKE FLUID LEVEL



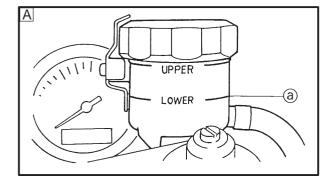
EB304020

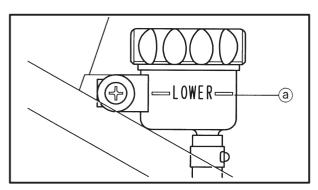
CHECKING THE BRAKE FLUID LEVEL

1. Stand the motorcycle on a level surface.

NOTE: -

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





2. Check:

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



Recommended brake fluid DOT 4

A Front brake

B Rear brake

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:

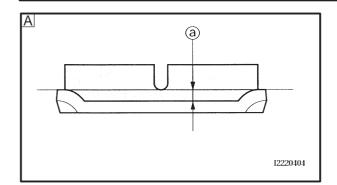
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

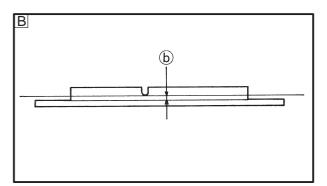
NOTE: —

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

CHECKING THE BRAKE PADS/ ADJUSTING THE REAR BRAKE LIGHT SWITCH







B304032

CHECKING THE BRAKE PADS

The following procedure applies to all of the brake pads.

- 1. Operate the brake.
- 2. Check:
 - front brake pad
 - rear brake pad

Brake pad wear limit (a)

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)** 0.8 mm (0.03 in)
- A Front brake
- B Rear brake

EB304050

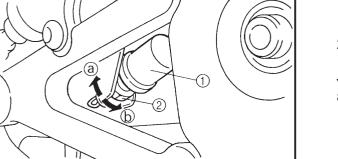
ADJUSTING THE REAR BRAKE LIGHT SWITCH

NOTE: -

- 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.



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

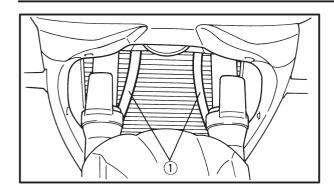


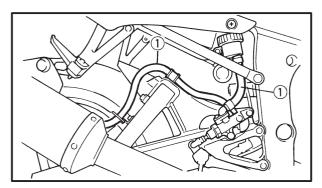
a. Hold the main body ① of the rear brake light switch so that it does not rotate and turn the adjusting nut ② in direction ③ or ⑤ until the rear brake light comes on at the proper time.

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

CHECKING THE BRAKE HOSES/ BLEEDING THE HYDRAULIC BRAKE SYSTEM







EB304062

CHECKING THE 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.
- 2. Check:
 - brake hose clamp
 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 7.

EB304072

BLEEDING THE HYDRAULIC BRAKE SYSTEM

A WARNING

Bleed the hydraulic brake system whenever:

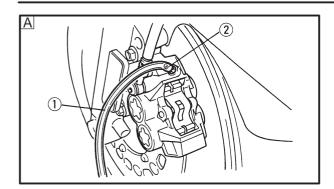
- the brake system was disassembled,
- a brake hose was loosened, disconnected or replaced,
- the brake fluid level is very low,
- brake operation is faulty.

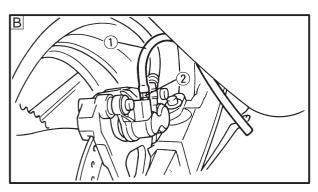
NOTE: -

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

BLEEDING THE HYDRAULIC BRAKE SYSTEM







- 5. 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
- B Rear brake
- d. Place the other end of the hose into a container.
- e. Slowly apply the brake several times.
- f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
- g. Loosen the bleed screw.

NOTE: -

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)

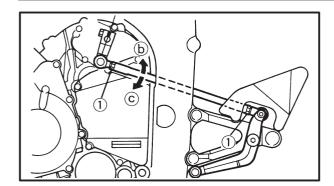
k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
Refer to "CHECKING THE BRAKE FLUID LEVEL".

A WARNING

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

ADJUSTING THE SHIFT PEDAL/ ADJUSTING THE DRIVE CHAIN SLACK





EB30408

ADJUSTING THE SHIFT PEDAL

NOTE: -

The shift pedal position is determined by the shift rod length.

- Measure:
- incorrect → Adjust.



The top of sift pedal should be aligned with the lower part of the bracket. (from the horizontal view)

- 2. Adjust:
 - installed shift rod length
- a. Loosen both locknuts 1.

~~~~~~~~~~~~

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

| Direction (b) | Installed shift rod length increases. |
|---------------|---------------------------------------|
| Direction ©   | Installed shift rod length decreases. |

- c. Tighten both locknuts.
- d. Make sure that the installed shift rod length is within specification.

FB304093

### 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

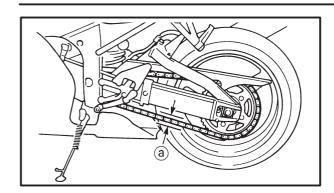
Securely support the motorcycle so that there is no danger of it falling over.

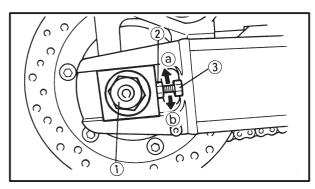
| NOTE: |  |
|-------|--|
|       |  |

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

## ADJUSTING THE DRIVE CHAIN SLACK







- 2. Rotate the rear wheel several times and check the drive chain to locate its tightest point.
- 3. Measure:
  - drive chain slack (a)
     Out of specification → Adjust.



Drive chain slack

 $40 \sim 50 \text{ mm} (1.57 \sim 1.97 \text{ in})$ 

- 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.

| Direction (a) | Drive chain slack is reduced.   |
|---------------|---------------------------------|
| Direction (b) | Drive chain slack is increased. |

### 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 (15.0 m•kg, 108 ft•lb)

## LUBRICATING THE DRIVE CHAIN/ CHECKING AND ADJUSTING THE STEERING HEAD



EB304100

### **LUBRICATING THE DRIVE CHAIN**

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out rapidly. 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 Orings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these Orings. Therefore, use only kerosine 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

EB304130

## CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the motorcycle on a level surface.

| A |    |    |     |
|---|----|----|-----|
|   | WA | RN | ING |

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

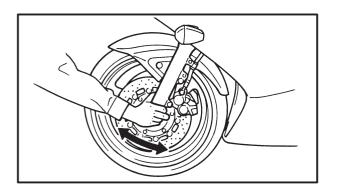
Place the motorcycle on a suitable stand so that the front wheel is elevated.

### 2. Check:

steering head

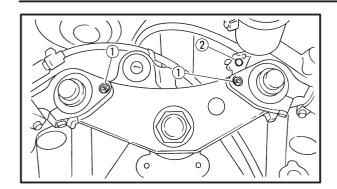
Grasp the bottom of the front fork legs and gently rock the front fork.

Looseness/binding  $\rightarrow$  Adjust the steering head.

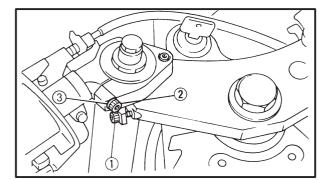


## **CHECKING AND ADJUSTING THE STEERING HEAD**

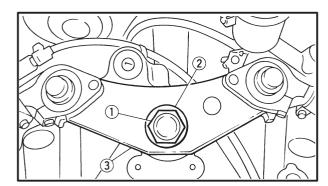




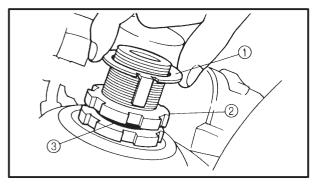
- 3. Remove:
  - upper bracket bolts ①
  - front brake fluid reservoir bolt 2



- 4. Loosen:
  - upper bracket pinch bolts 1
  - handlebar pinch bolts 2
  - washer ③
- 5. Remove:
  - handlebars (from the upper bracket)



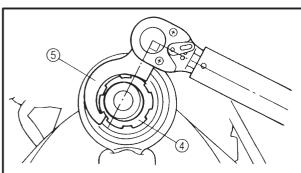
- 6. Remove:
  - steering stem nut 1
  - washer 2
  - upper bracket ③



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

#### NOTF:

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)

17 Nm (1.7 m•kg, 12 ft•lb)

## CHECKING AND ADJUSTING THE STEERING HEAD



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

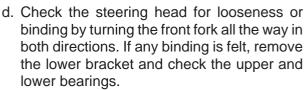
## **A** WARNING

Do not overtighten the lower ring nut.



Lower ring nut (final tightening torque)

9 Nm (0.9 m•kg, 6.5 ft•lb)



Refer to "STEERING HEAD" in chapter 7.

- e. Install the 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.

### NOTE: -

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

### 8. Install:

steering stem nut

🔀 115 Nm (11.5 m•kg, 83 ft•lb)

upper bracket bolt

13 Nm (1.3 m•kg, 9.4 ft•lb)

• handlebar pinch bolt

🗽 13 Nm (1.3 m•kg, 9.4 ft•lb)

upper bracket pinch bolt

23 Nm (2.3 m•kg, 17 ft•lb)

#### 9. Measure:

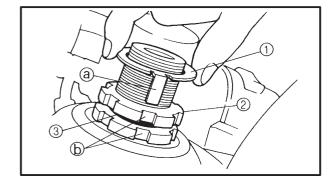
 steering head tension (with the motorcycle still on the stand)

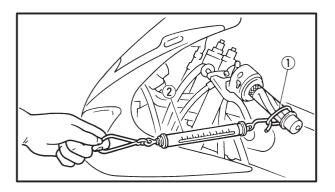
#### NOTE: -

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

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

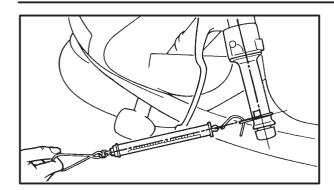
- a. Point the front wheel straight ahead.
- b. Install a plastic locking tie 1 loosely around the end of the handlebar as shown.
- c. Hook a spring gauge ② onto the plastic locking tie.





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



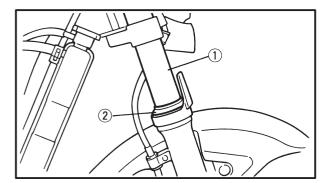


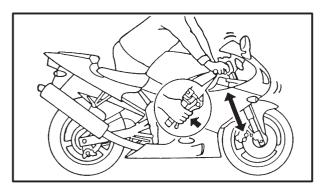
d. Hold the spring gauge at a 90° angle from the handlebar, pull the spring gauge, and record the measurement when the handlebar starts to turn.



Steering head tension 200  $\sim$  500 g (7.1  $\sim$  17.6 oz)

- 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.
   Looseness or binding → Adjust the steering head.





EB304141

### **CHECKING THE FRONT FORK**

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. Check:
  - inner tube (1)

 $Damage/scratches \rightarrow Replace.$ 

- 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 7.

## **ADJUSTING THE FRONT FORK LEGS**



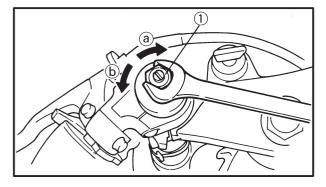
EB304153

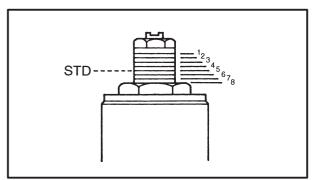
### **ADJUSTING THE FRONT FORK LEGS**

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

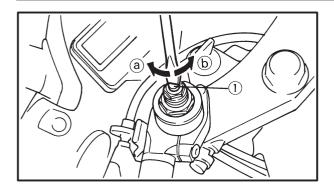
a. Turn the adjusting bolt ① in direction ② or ⑤.

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

|                    |   | Standard ——— |   |  |   |  |   |  |   |   |     |  |   |  |   |  |
|--------------------|---|--------------|---|--|---|--|---|--|---|---|-----|--|---|--|---|--|
|                    |   | Hard         |   |  |   |  |   |  | ٧ | s | oft |  |   |  |   |  |
| Adjusting position | 1 |              | 2 |  | 3 |  | 4 |  | 5 |   | 6   |  | 7 |  | 8 |  |

## ADJUSTING THE FRONT FORK LEGS





Rebound damping

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

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- rebound damping
- a. Turn the adjusting screw 1 in direction a or b.

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

**Adjusting positions** 

Minimum: 9 clicks out\* Standard: 6 clicks out\* Maximum: 1 clicks out\*

\* from the fully turned-in position

### NOTE: -

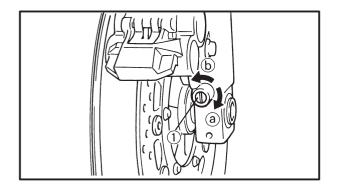
Although the number of clicks between the minimum and maximum settings may vary with each individual shock absorber and may not exactly match these specifications, it is always the full damping force range that extends over the actual number of clicks.

\*\*\*\*

**Compression damping** 

### **CAUTION:**

Never go beyond the maximum or minimum adjustment positions.



- 1. Adjust:
- compression damping
- a. Turn the adjusting screw ① in direction ② or ⑤).

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

### ADJUSTING THE FRONT FORK LEGS



Adjusting positions

Minimum: 10 clicks out\* Standard: 6 clicks out\* Maximum: 1 clicks out\*

\* from the fully turned-in position

NOTE: -

Although the number of clicks between the minumum and maximum settings may vary with each individual shock absorber and may not exactly match these specifications, it is always the full damping force range that extends over the actual number of clicks.



EB304162

ADJUSTING THE REAR SHOCK ABSORB-ER 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 |   | Ad  | just: |
|---|---|-----|-------|
|   | • | , , | Juot. |

spring preload

NOTE: —

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

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

b. Align the desired position on the adjusting ring with the position indicator ②.

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

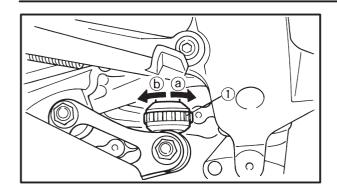
**Adjusting positions** 

Minimum: 1 Standard: 4 Maximum: 9



## ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY





Rebound damping

Never go beyond the maximum or minimum adjustment positions.

- 1. Adjust:
- rebound damping
- a. Turn the adjusting screw 1 in direction a or b.

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

Adjusting positions

Minimum: 25 clicks out\* Standard: 9 clicks out\* Maximum: 1 click out\*

\* from the fully turned-in position

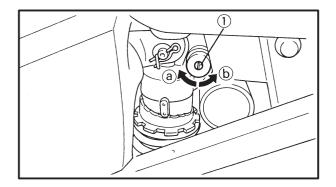
NOTE: -

Although the number of clicks between the minimum and maximum settings may vary with each individual shock absorber and may not exactly match these specifications, it is always the full damping force range that extends over the actual number of clicks.

**Compression damping** 

### **CAUTION:**

Never go beyond the maximum or minimum adjustment positions.



- 1. Adjust:
- compression damping
- a. Turn the adjusting screw ① in direction ② or ⑤).

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

## ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY



Adjusting positions
Minimum: 13 clicks out\*
Standard: 7 clicks out\*

Maximum: 1 click out\*

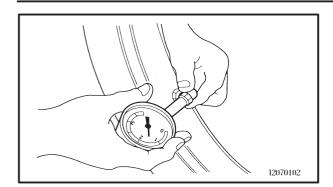
\* from the fully turned-in position

NOTE: -

Although the number of clicks between the minimum and maximum settings may vary with each individual shock absorber and may not exactly match these specifications, it is always the full damping force range that extends over the actual number of clicks.

### **CHECKING THE TIRES**





EB304170

#### **CHECKING THE TIRES**

The following procedure applies to both of the tires.

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

## **A** WARNING

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

NEVER OVERLOAD THE MOTORCYCLE.

| Basic weight<br>(with oil<br>and a full<br>fuel tank) | 188 kg                                            |                                                   |
|-------------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| Maximum<br>load*                                      | 187 kg                                            |                                                   |
| Cold tire pressure                                    | Front                                             | Rear                                              |
| Up to 90 kg<br>(198 lb)<br>load*                      | 250 kPa<br>(2.5 kg/cm <sup>2</sup> ,<br>36.3 psi) | 250 kPa<br>(2.5 kg/cm <sup>2</sup> ,<br>36.3 psi) |
| 90 kg (198 lb)<br>~maximum<br>load*                   | 250 kPa<br>(2.5 kg/cm <sup>2</sup> ,<br>36.3 psi) | 290 kPa<br>(2.9 kg/cm <sup>2</sup> ,<br>42.1 psi) |
| High-speed riding                                     | 250 kPa<br>(2.5 kg/cm <sup>2</sup> ,<br>36.3 psi) | 250 kPa<br>(2.5 kg/cm <sup>2</sup> ,<br>36.3 psi) |

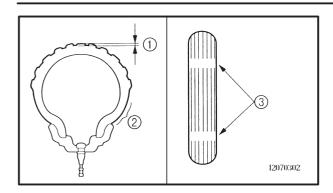
<sup>\*</sup> total of cargo, rider, passenger and accessories

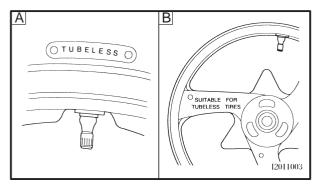
## **A** WARNING

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 Side wall
- (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 that the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

A Tire B Wheel

| Tube wheel     | Tube tire only        |
|----------------|-----------------------|
| Tubeless wheel | Tube or tubeless tire |

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

### Front tire

| Manufacturer | Size                 | Model   |
|--------------|----------------------|---------|
| BRIDGESTONE  | 120/60 ZR17<br>(55W) | BT56F•E |
| DUNLOP       | 120/60 ZR17<br>(55W) | D207F•J |

## CHECKING THE TIRES/CHECKING THE WHEELS



### Rear tire

| Manufacturer | Size                 | Model   |
|--------------|----------------------|---------|
| BRIDGESTONE  | 180/55 ZR17<br>(73W) | BT56R•E |
| DUNLOP       | 180/55 ZR17<br>(73W) | D207•N  |

## **A** WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km sould be traveled at normal speed before any highspeed 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

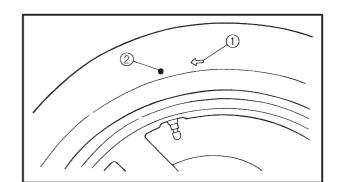
Damage/out-of-round  $\rightarrow$  Replace.

## **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.





FB304200

## CHECKING AND LUBRICATING THE CABLES

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

## **A** WARNING

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

- 1. Check:
  - cable sheath
     Damage → Replace.
- 2. Check:
  - cable operation
     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 lubing device.

EB304210

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

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



Recommended lubricant
Lithium soap base grease

EB304220

### LUBRICATING THE SIDESTAND

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



Recommended lubricant Lithium soap base grease

FB304240

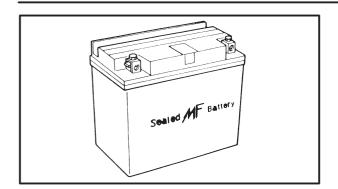
### LUBRICATING THE REAR SUSPENSION

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



Recommended lubricant Lithium soap base grease





EB305020

## 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.



- rider seat Refer to "SEATS".
- 2. Disconnect:
  - battery leads (from the battery terminals)



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

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

a. Connect a digital voltmeter to the battery terminals.

Tester positive probe  $\rightarrow$  battery positive terminal

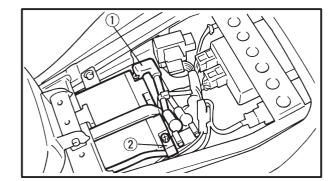
Tester negative probe → battery negative terminal

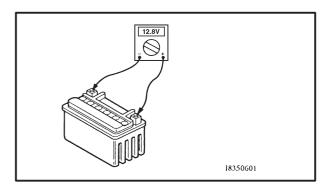
### NOTE: -

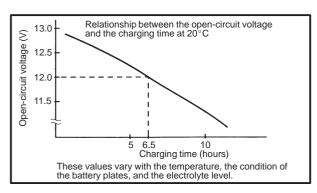
- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.
- b. Check the charge of the battery, as shown in the charts and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

### **Example**

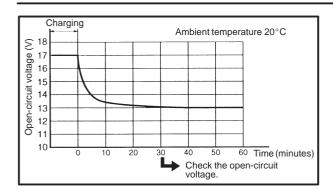
Open-circuit voltage = 12.0 V Charging time = 6.5 hours Charge of the battery = 20 ~ 30%

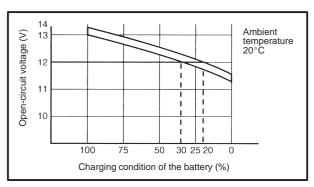












- 5. Charge:
- battery (refer to the appropriate charging method illustration)

| A |    |    |     |
|---|----|----|-----|
| A | WA | RN | ING |

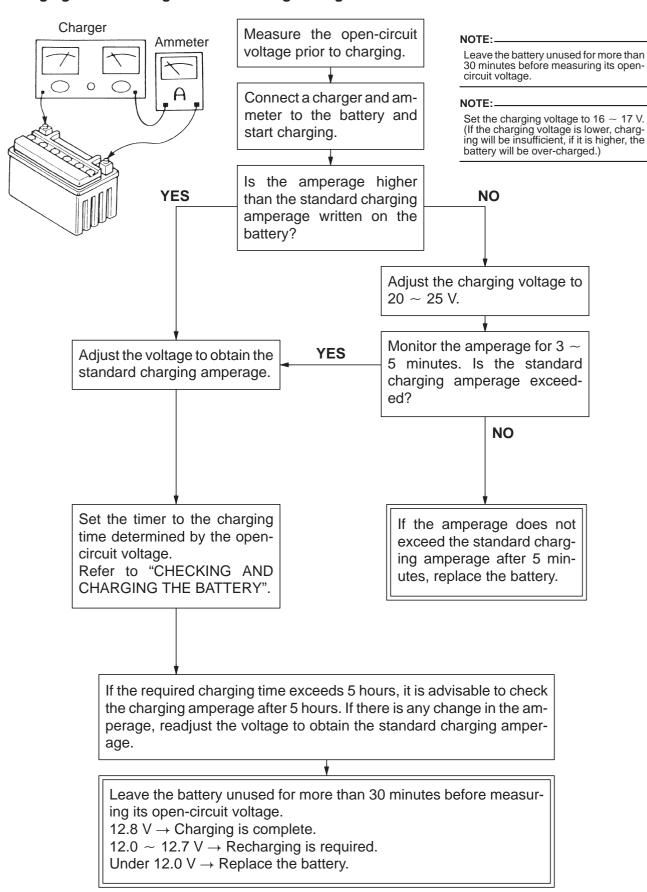
Do not quick charge a battery.

### **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 lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A 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.

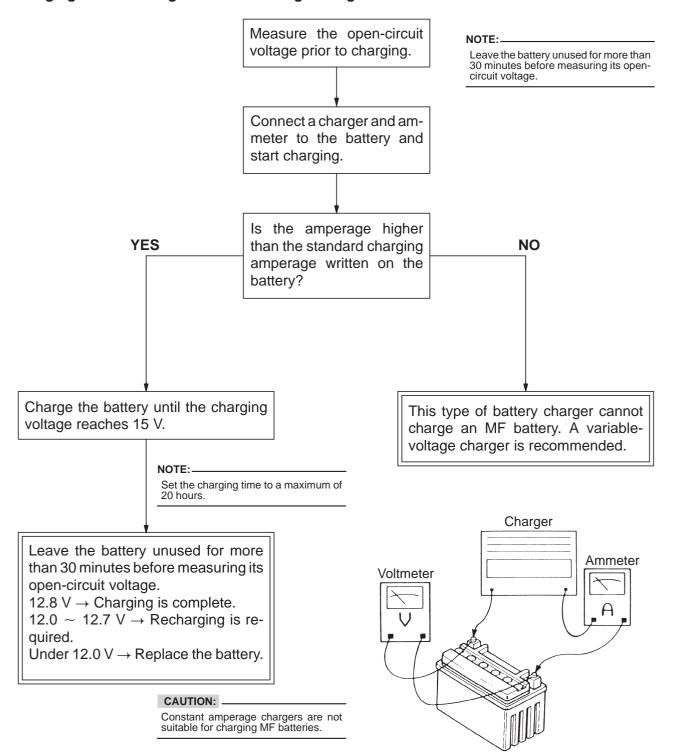


### Charging method using a variable-voltage charger



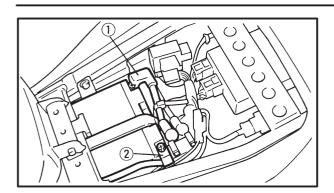


### Charging method using a constant-voltage charger



## CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES





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

### **CAUTION:**

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

### **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:
  - rider seat Refer to "SEATS".
- 2. Check:
  - continuity
- a. Connect the pocket tester to the fuse and check the continuity.

NOTE:

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

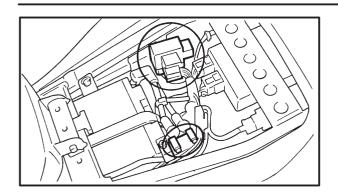


## Pocket tester 90890-03112, YU-03112

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

## **CHECKING THE FUSES**





- 3. Replace:
  - blown fuse

a. Set the main switch to "OFF".

b. Install a new fuse of the correct amperage.

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

- c. Set the main switch to "ON" and verify if the electrical circuit is operational.
- d. If the fuse immediately blows again, check the electrical circuit.

| Item                          | Amperage | Q'ty |
|-------------------------------|----------|------|
| Main fuse                     | 30 A     | 1    |
| Headlight fuse                | 20 A     | 1    |
| Signaling system fuse         | 20 A     | 1    |
| Ignition<br>fuse              | 15 A     | 1    |
| Radiator<br>fan motor<br>fuse | 7.5 A    | 1    |
| Backup fuse (odometer)        | 7.5 A    | 1    |

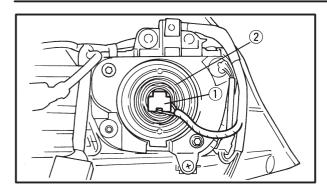
## **A** WARNING

Never use a fuse with an amperage 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:
  - rider seat Refer to "SEATS".

### REPLACING THE HEADLIGHT BULBS





EB30505

### REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

- 1. Disconnect:
  - headlight coupler (1)
  - headlight bulb holder cover 2
- 2. Detach:
  - headlight bulb holder 1
- 3. Remove:
  - headlight bulb 2

## **A** 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
     Secure the new headlight bulb with the headlight bulb holder.

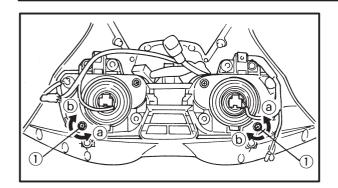
### **CAUTION:**

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

- 5. Attach:
  - headlight bulb holder
- 6. Install:
  - headlight bulb holder cover
- 7. Connect:
  - headlight coupler

## **ADJUSTING THE HEADLIGHT BEAMS**





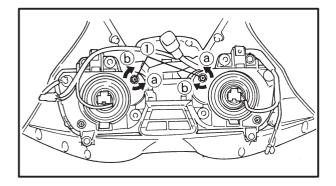
EB305061

### **ADJUSTING THE HEADLIGHT BEAMS**

The following procedure applies to both of the headlights.

- 1. Adjust:
  - headlight beam (vertically)
- a. Turn the adjusting screw ① in direction ② or ⑤.

| Direction (a) | Headlight beams is raised.       |
|---------------|----------------------------------|
| Direction (b) | Headlight beams is low-<br>ered. |



2. Adjust:

headlight beam (horizontally)

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

Left headlight

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

Right headlight

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



# CHAPTER 4. ENGINE OVERHAUL

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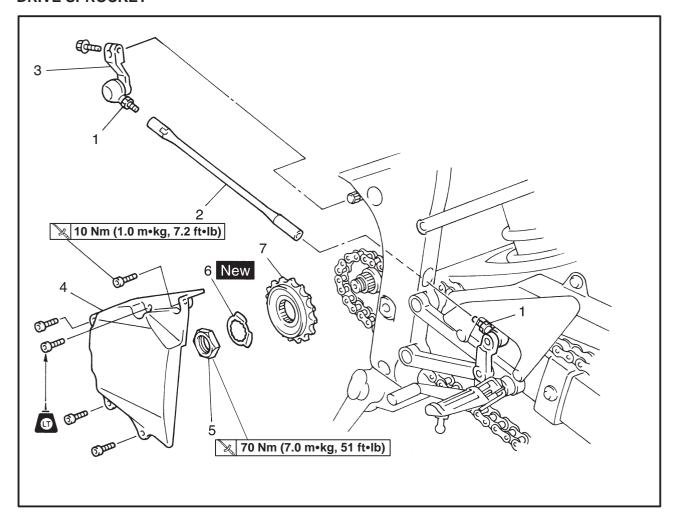
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## **ENGINE OVERHAUL**

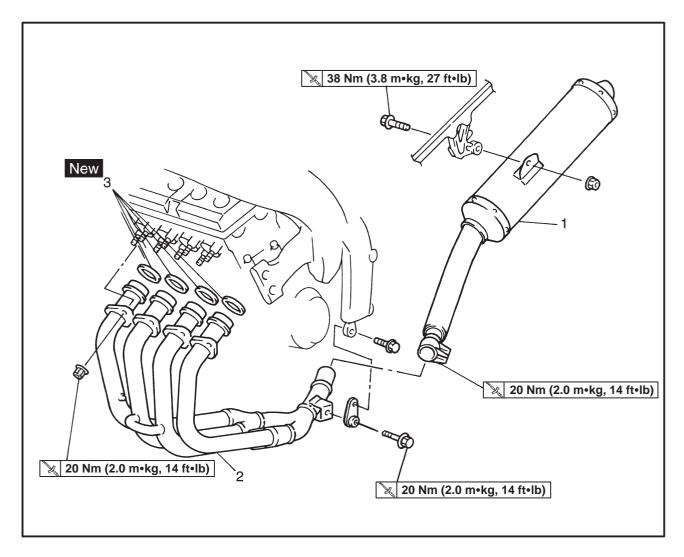
## **ENGINE**DRIVE SPROCKET



| Order                           | Job/Part                                                                                                                 | Q'ty                       | Remarks                                                                                                               |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7 | Removing the drive sprocket Reserve tank Locknut Shift rod Shift arm Drive sprocket cover Nut Lock washer Drive sprocket | 2<br>1<br>1<br>1<br>1<br>1 | Remove the parts in the order listed. Refer to "CHANGING THE COOLANT"  For installation reverse the remove procedure. |

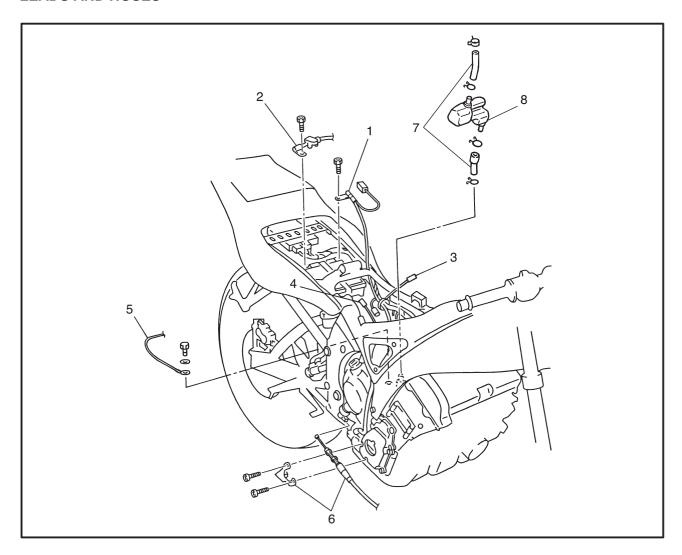


### **EXHAUST ASSEMBLY**

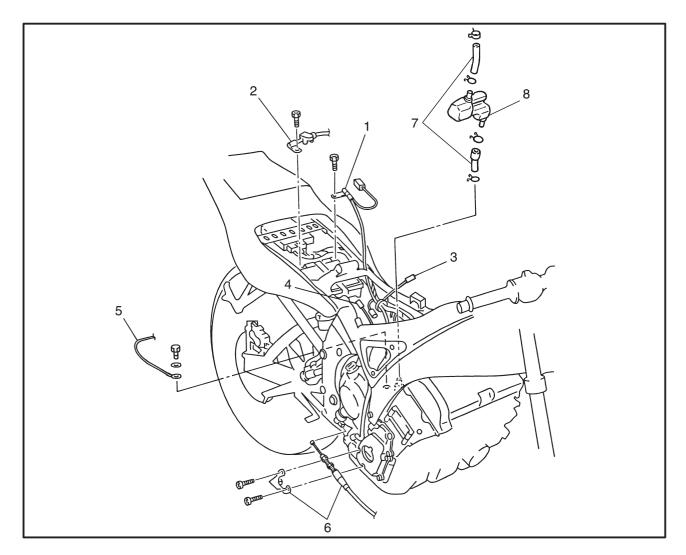


| Order       | Job/Part                                                               | Q'ty        | Remarks                                                                                                                     |
|-------------|------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------|
|             | Removing the exhaust assembly Bottom cowling and side cowlings Coolant |             | Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3 Drain. Refer to "CHANGING THE COOLANT" in chapter 3. |
| 1<br>2<br>3 | Radiator assembly Muffler Exhaust pipe assembly Exhaust pipe gasket    | 1<br>1<br>4 | Refer to "RADIATOR" in chapter 5.  For installation reverse the removal procedure.                                          |

## **LEADS AND HOSES**

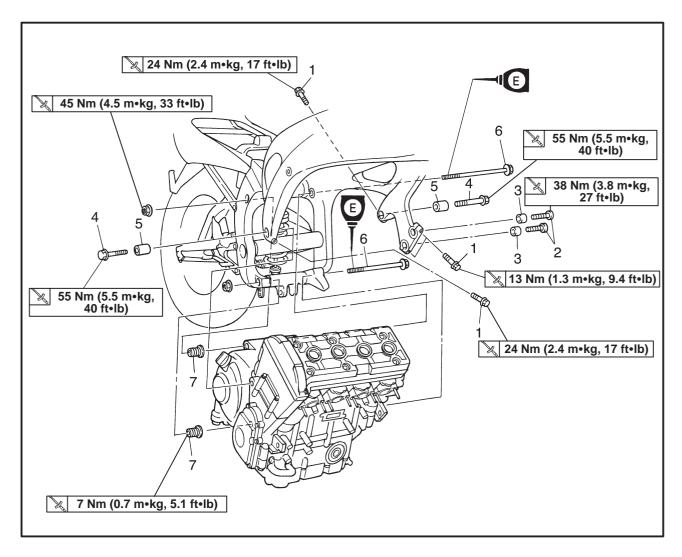


| Order | Job/Part                                                    | Q'ty | Remarks                                                                                                    |
|-------|-------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------|
|       | Disconnecting the leads and hoses Fuel tank Air filter case |      | Disconnect the parts in the order listed. Refer to "FUEL TANK" in chapter 3. Refer to "AIR FILTER CASE AND |
|       | Carburetor assembly and joints                              |      | IGNITION COILS" in chapter 3.<br>Refer to "CARBURETORS" in chapter 6.                                      |
|       | Engine oil and oil filter cartridge                         |      | Drain.  Refer to "CHANGING THE ENGINE OIL" in chapter 3.                                                   |
|       | Oil cooler                                                  |      | Refer to "OIL COOLER" in chapter 5.                                                                        |



| Order | Job/Part                      | Q'ty | Remarks                                                     |
|-------|-------------------------------|------|-------------------------------------------------------------|
| 1     | Battery negative lead         | 1    | CAUTION:                                                    |
| 2     | Battery positive lead         | 1    |                                                             |
|       |                               |      | First, disconect the negative lead, then the positive lead. |
| 3     | Startor coil assembly coupler | 1    |                                                             |
| 4     | Pickup coil coupler           | 1    |                                                             |
| 5     | Engine earth                  | 1    |                                                             |
| 6     | Clutch wire and holder        | 1    |                                                             |
| 7     | Crankcase breather hose       | 1    |                                                             |
| 8     | Separator                     | 1    |                                                             |
|       |                               |      | For connecting reverse the discomecting procedure.          |

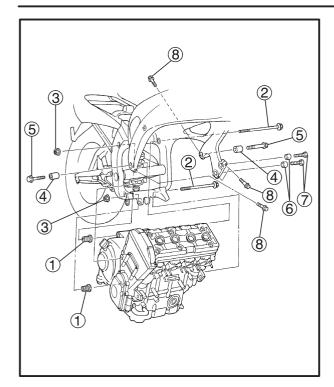
### **ENGINE**

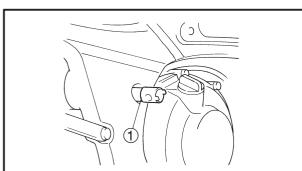


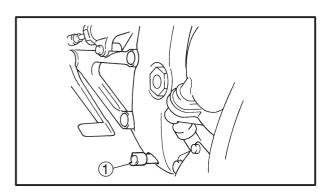
| Order                           | Job/Part                                                                                                            | Q'ty                                   | Remarks                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|                                 | Removing the engine                                                                                                 |                                        | Remove The Parts In The Order Listed.  NOTE:  Place a suitable stand under the frame and engine.                |
| 1<br>2<br>3<br>4<br>5<br>6<br>7 | Pinch bolts Button head bolts Collars Front mounting bolts Collars Rear mounting bolts Engine mounting adjust bolts | 4 -<br>2<br>2<br>2<br>2<br>2<br>2<br>2 | Refer to "INSTALLING THE ENGINE".  NOTE:  Use the point shaft wrench to loosen the engine mounting adjust bolt. |
|                                 |                                                                                                                     |                                        | For Installation, Reverse The Removal Procedure.                                                                |

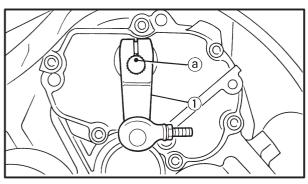
### **ENGINE**











### **INSTALLING THE ENGINE**

- 1. Install:
  - engine mounting adjust bolts (1)
  - rear mounting bolts 2
  - self-locking nuts ③
  - collars (4)
  - front mounting bolts (5)
  - collars (6)
- button head bolts 7
- pinch bolts (8)

#### NOTE: -

- Lubricate the rear mounting bolt threads with lithium soap base grease.
- Do not fully tighten the nuts and bolts.
- 2. Tighten:
  - self-locking nut 3 45 Nm (4.5 m•kg, 33 ft•lb)
  - front mounting bolts

55 Nm (5.5 m•kg, 40 ft•lb)

button head bolt

38 Nm (3.8 m•kg, 27 ft•lb)

- pinch bolt M8 24 Nm (2.4 m•kg, 17 ft•lb) M6 3 Nm (1.3 m•kg, 9.4 ft•lb)
- engine adjusting bolts

### NOTE: -

Use the pivot shaft wrench (1) to tighten the engine mounting adjust bolt to finger tightness.



### Pivot shaft wrench 90890-01471

- 3. Install:
- 4. Install:
  - drive sprocket cover

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: -

Refer to "CABLE ROUTING" in chapter 2.

- 5. Install:
- shift arm (1)

10 Nm (1.0 m•kg, 7.2 ft•lb)

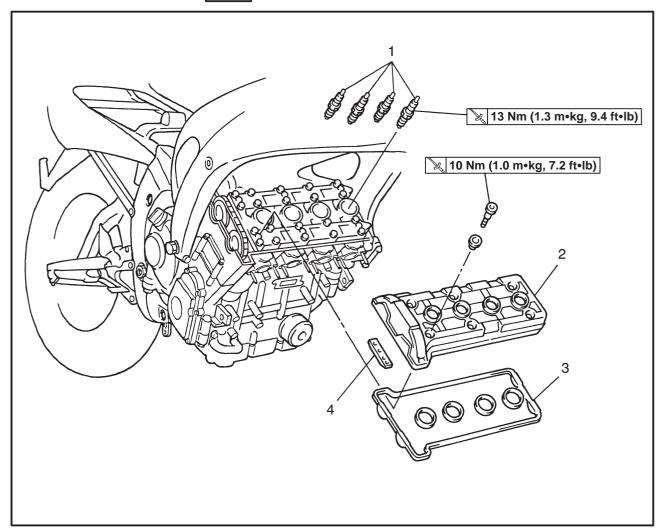
NOTE: -

Align the punch mark (a) in the shift shaft with the slot in the shift arm.



CAMSHAFTS
CYLINDER HEAD COVER

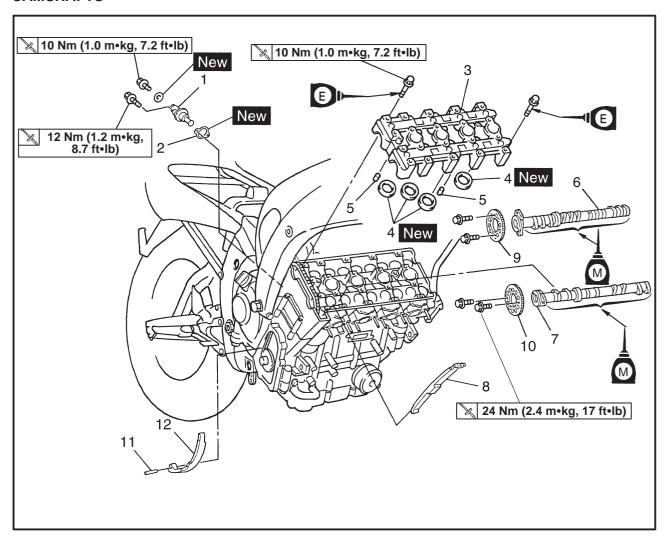




| Order            | Job/Part                                                                                                                                                        | Q'ty        | Remarks                                                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4 | Removing the cylinder head cover Carburetor assembly Radiator assembly Spark plugs Cylinder head cover Cylinder head cover gasket Timing chain guide (top side) | 4<br>1<br>1 | Remove the parts in the order listed. Refer to "CARBURETORS" in chapter 6. Refer to "RADIATOR" in chapter 5.  For installation reverse the removal procedure. |

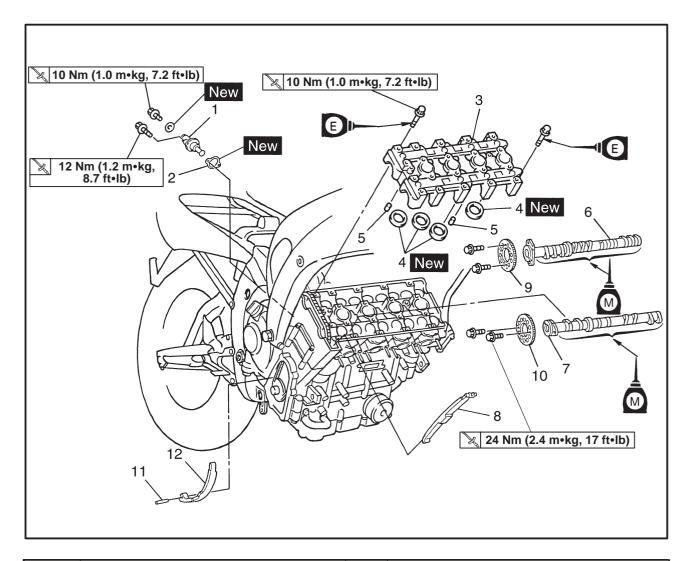
EAS00196

#### **CAMSHAFTS**



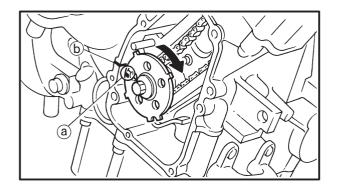
| Order       | Job/Part                                                                 | Q'ty         | Remarks                                                                              |
|-------------|--------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------|
|             | Removing the camshafts Pickup coil rotor cover                           |              | Remove the parts in the order listed. Refer to "PICKUP COIL AND PICK UP COIL COVER". |
| 1 2 3       | Timing chain tensioner Timing chain tensioner gasket Camshaft cap        | 1 -<br>1 1 - | Refer to "REMOVING/INSTALLING THE CAMSHAFTS". NOTE:                                  |
| 5           | Camshaft cap gasket Dowel pin                                            | 4 -<br>2 -   | During removal, the dowel pins may still be connected to the camshaft cap.           |
| 6<br>7<br>8 | Intake camshaft<br>Exahust camshaft<br>Timing chain guide (exhaust side) | 1 -<br>1 1 - | Refer to "REMOVING/INSTALLING<br>THE CAMSHAFT".                                      |





| Order               | Job/Part                                                                              | Q'ty                 | Remarks                                                                               |
|---------------------|---------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------|
| 9<br>10<br>11<br>12 | Intake camshaft sproket Exhaust camshaft sproket Pin Timing chain guide (intake side) | 1 -<br>1<br>1<br>1 - | Refer to "INSTALLING THE CAMSHAFTS".  For installation reverse the removal procedure. |





#### **REMOVING THE CAMSHAFTS**

- 1. Align:
- TDC mark on the pickup coil rotor (with the crankcase mating surface)

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

NOTE: -

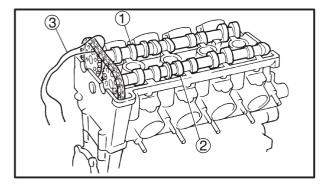
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

2. Remove:

- timing chain tensioner
- 3. Remove:
  - camshaft cap
  - dowel pins

**CAUTION:** 

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



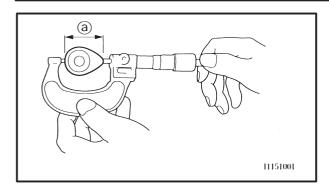
- 4. Remove:
  - intake camshaft (1)
  - exhaust camshaft 2

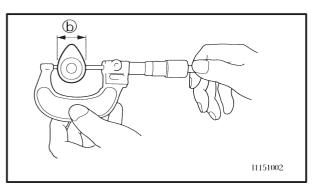
To prevent the timing chain from falling into the crankcase, fasten it with a wire 3.

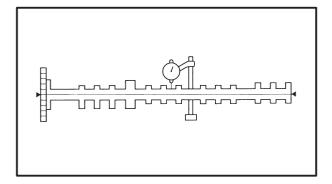
- 5. Remove:
  - timing chain guide (exhaust side)

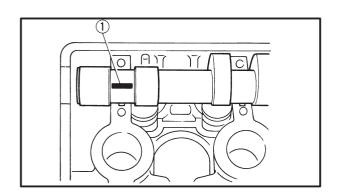












EAS00204

#### **CHECKING THE CAMSHAFTS**

- 1. Check:
  - camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.
- 2. Measure:
  - camshaft lobe dimensions ⓐ and ⓑ
     Out of specification → Replace the camshaft.



#### Camshaft lobe dimensions limit Intake camshaft

- (a) 33.0 mm (1.3 in)
- **b** 25.09 mm (0.99 in)

#### **Exhaust camshaft**

- (a) 32.50 mm (1.28 in)
- **b** 25.02 mm (0.99 in)

#### 3. Measure:

camshaft runout
 Out of specification → Replace.



Max. camshaft runout 0.06 mm (0.0024 in)

#### 4. Measure:

• camshaft-journal-to-camshaft-cap clearance

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



Camshaft-journal-to-camshaftcap clearance

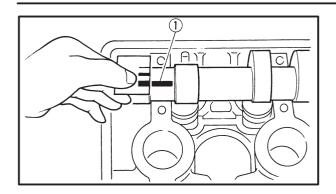
 $0.020 \sim 0.054 \text{ mm}$  (0.0008  $\sim 0.0021 \text{ in}$ )

<Limit>: 0.08 mm (0.0031 in)

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







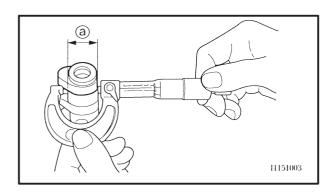
#### NOTE: -

- 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  $^{\text{@}}$   $\bigcirc$ .



#### 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 22.967 ~ 22.980 mm (0.9042 ~ 0.9047 in)

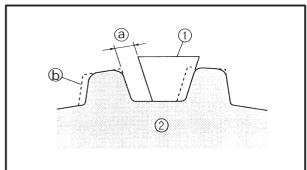
AS00208

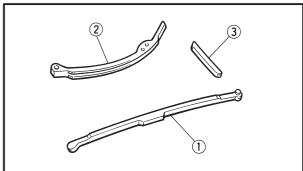
# CHECKING THE CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

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









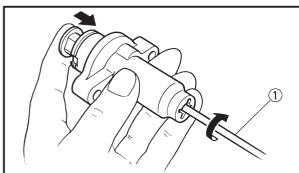


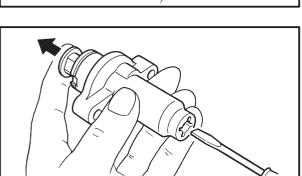


camshaft sprocket
 More than 1/4 tooth wear (a) → Replace the
 camshaft sprockets and the timing chain as a
 set.

- (a) 1/4 tooth
- **b** Correct
- 1 Timing chain roller
- 2 Camshaft sprocket
- 2. 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. Check:
  - timing chain tensioner
     Cracks/damage/rough movement → Replace.
- a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

NOTE: -

While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver ① until it stops.

- b. Remove the screwdriver and slowly release the timing chain tensioner rod.
- c. Make sure that the timing chain tensioner rod comes out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.





#### **INSTALLING THE CAMSHAFTS**

- 1. Install:
  - timing chain guide (intake side)
  - timing chain guide (exhaust side)
- 2. Install:
  - intake camshaft sprocket

24 Nm (2.4 m•kg, 17 ft•lb)

exhaust camshaft sprocket

24 Nm (2.4 m•kg, 17 ft•lb)



Cam sprocket timing mark is outside and align the cam sprocket hole to camshaft hole.

- 3. Install:
  - exhaust camshaft ③
  - intake camshaft ②
  - camshaft cap gasket
  - camshaft cap



The brim ① of intake camshaft is not processed.

The groove is processed around the brim ① of exhaust camshaft as illustration.

- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the (a) mark on the pickup coil rotor with the crankcase mating surface (b).
- c. Install the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.

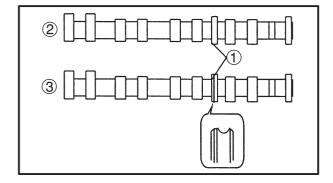
#### **CAUTION:**

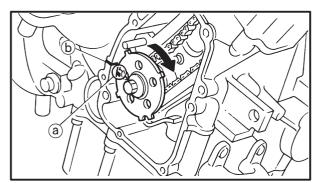
Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

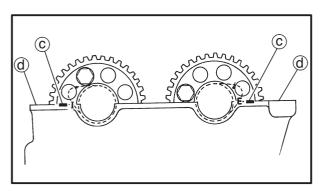
d. Install the exhaust and intake camshaft cap.



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







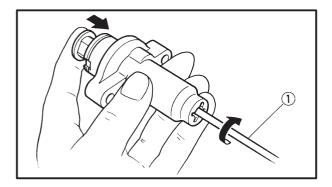


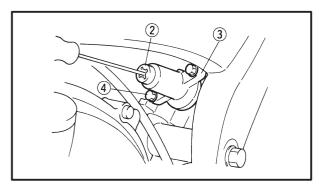
NOTE: -

Make sure that the camshaft sprocket timing marks  $\odot$  are aligned with the cylinder head edge  $\odot$ 

Out of alignment → Reinstall.

e. Remove the wire from the timing chain.





4. Install:

• timing chain tensioner

- a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand
- b. While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver 

  1 until if stops.
- C. With the screwdriver still inserted into the timing chain tensioner, install the timing chain tensioner ②, gasket, and float chamber air vent hose holder ③ onto the cylinder block. Then, tighten the timing chain tensioner bolts ④ to the specified torque.

### **A** WARNING

Always use a new gasket.

NOTE: —

The "UP" mark on the timing chain tensioner should face up.



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

d. Remove the screwdriver, make sure that the timing chain tensioner rod releases, and tighten the cap bolt to the specified torque.



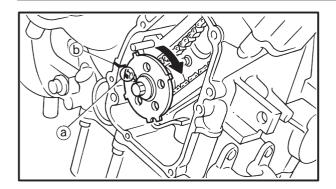
Cap bolt 10 Nm (1.0 m•kg, 7.2 ft•lb)

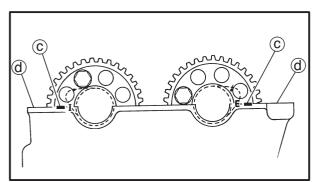
5. Turn:

crankshaft (several turns counterclockwise)









#### 6. Check:

• TDC mark ⓐ

Make sure that the TDC mark is aligned with the crankcase mating surface **(b)**.

camshaft sprocket timing mark ©
 Make sure that the camshaft sprocket timing mark is aligned with the cylinder head edge
 d

Out of alignment → Adjust.

Refer to the installation steps above.

#### 7. Measure:

valve clearance
 Out of specification → Adjust.
 Refer to "ADJUSTING THE VALVE CLEAR-ANCE" in chapter 3.

#### 8. Install:

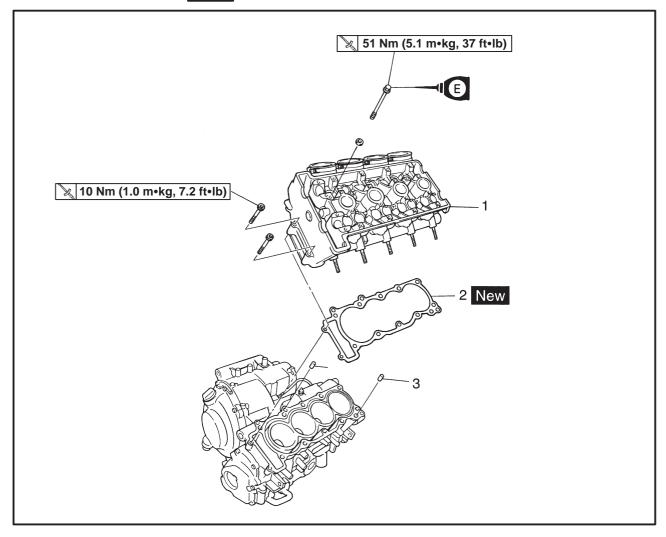
- cylinder head cover gasket
- cylinder head cover

#### NOTE: -

- Apply bond TB1541 onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply bond 1215B onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts in stages and in a crisscross pattern.

## **CYLINDER HEAD**



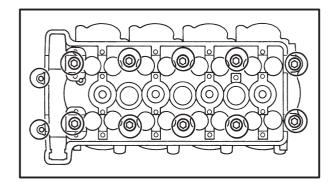


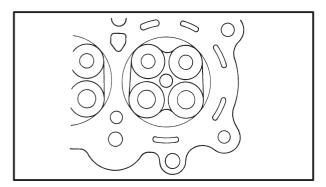
| Order | Job/Part                                                                                                | Q'ty | Remarks                                                                                              |
|-------|---------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------|
|       | Removing the cylinder head Intake and exhaust camshafts Water hose Temp senser lead Front mounting bolt |      | Remove the parts in the order listed. Refer to "CAMSHAFTS". Disconnect Disconnect Refer to "ENGINE". |
| 1     | Cylinder head                                                                                           | 1    | Refer to "REMOVING/INSTALLING THE CYLINDER HEAD".                                                    |
| 2 3   | Cylinder head gasket<br>Dowel pin                                                                       | 1 2  | For installation reverse the removal procedure.                                                      |

#### **CYLINDER HEAD**









EAS00223

#### REMOVING THE CYLINDER HEAD

- 1. Remove:
  - cylinder head bolts
  - cylinder head

NOTE: -

Loosen each bolt and nut 1/2 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts and nuts are fully loosened, remove them.

EAS00229

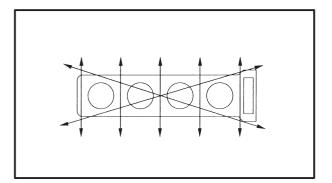
#### **CHECKING THE CYLINDER HEAD**

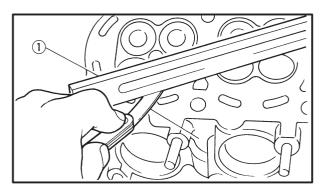
- 1. Eliminate:
- combustion chamber carbon deposits (with a rounded scraper)

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.
  - cylinder head water jacket
     Mineral deposits/rust → Eliminate.





- 3. Measure:
  - cylinder head warpage
     Out of specification → Resurface the cylinder head.



Max. cylinder head warpage 0.05 mm (0.002 in)

- a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
- b. Measure the warpage.
- c. If the limited in exceeded, resurface the cylinder head as follows.

#### **CYLINDER HEAD**



d. Place a  $400\sim600$  grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

| JO | TE | - |  |
|----|----|---|--|

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

EAS00223

#### **INSTALLING THE CYLINDER HEAD**

- 1. Install:
  - cylinder head gasket
  - cylinder head
  - cylinder headbolt

(M10) 3 51 Nm (5.1 m•kg, 37 ft•lb) (M6) 10 Nm (1.0 m•kg, 7.2 ft•lb)

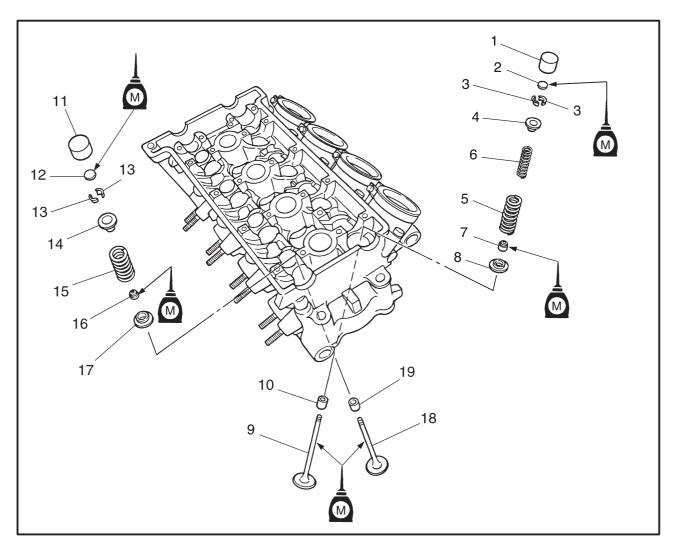
#### NOTE: -

- Lubricate the cylinder head nuts with engine oil
- Tighten the cylinder head nuts and bolts in two stages and in a crisscross pattern.

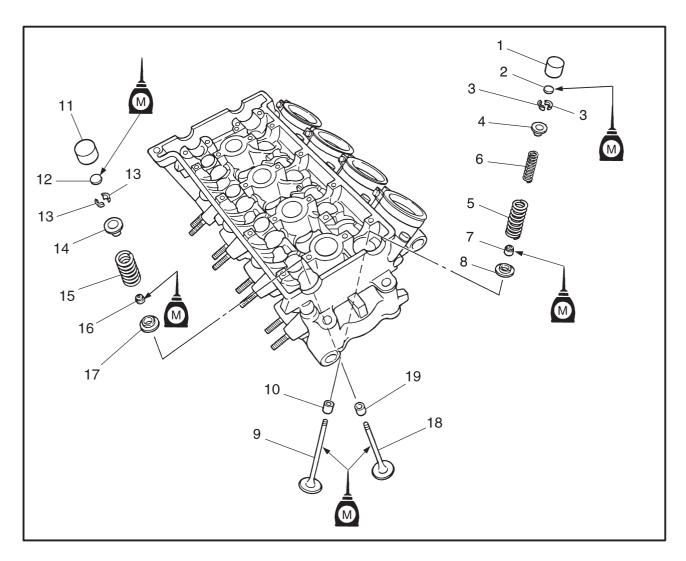
ENG

EAS0023

## **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            | 8 -  | <br>                                  |
| 2     | Intake valve pad               | 8    |                                       |
| 3     | Intake valve cotter            | 16   |                                       |
| 4     | Intake valve upper spring seat | 8    |                                       |
| 5     | Intake valve spring outer      | 8    | Refer to "REMOVING/INSTALLING         |
| 6     | Intake valve spring inner      | 8    | THE VALVES".                          |
| 7     | Intake valve oil seal          | 8    |                                       |
| 8     | Intake valve lower spring seat | 8    |                                       |
| 9     | Intake valve                   | 8    |                                       |
| 10    | Intake valve guide             | 8 -  |                                       |



| Order                                              | Job/Part                                                                                                                                                                                    | Q'ty                        | Remarks                                                                           |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------|
| 11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19 | Exhaust valve lifter Exhaust valve pad Exhaust valve cotter Exhaust valve upper spring seat Exhaust valve spring Exhaust valve oil seal Exhaust valve lower spring seat Exhaust valve guide | 8 -<br>8 16<br>8 8 -<br>8 8 | Refer to "REMOVING/INSTALLING THE VALVES".  For installation, reverse the removal |
|                                                    |                                                                                                                                                                                             |                             | procedure.                                                                        |

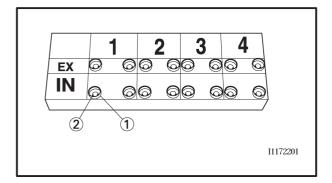
EAS00237

#### **REMOVING THE VALVES**

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

NOTE: -

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

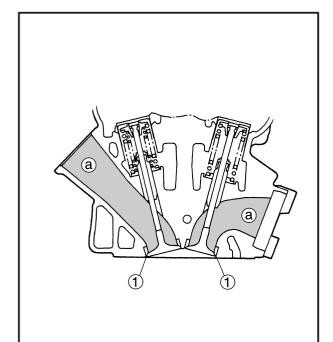


1. Remove:

- valve 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

(for leakage)

Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.

Refer to "CHECKING THE VALVE SEATS".

a. Pour a clean solvent (a) into the intake and exhaust ports.

b. Check that the valves properly seal.

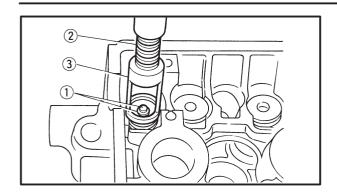
NOTE

There should be no leakage at the valve seat (1).

\_\_\_\_







#### 3. Remove:

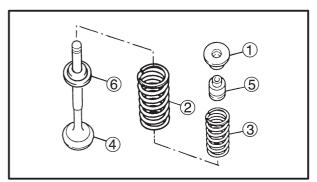
• valve cotters 1

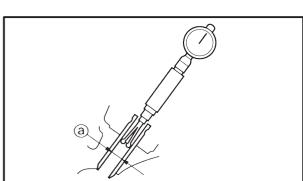
#### NOTE: -

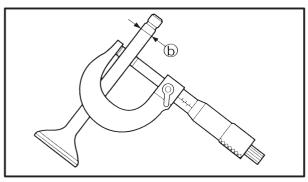
Remove the valve cotters by compressing the valve spring with the valve spring compressor ② and attachment ③.



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







#### 4. Remove:

- upper spring seat 1
- valve spring outer 2
- valve spring inner (intake only) ③
- valve (4)
- oil seal (5)
- lower spring seat 6

#### 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)

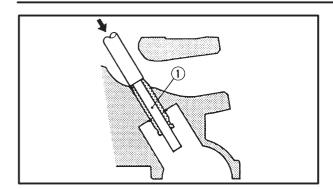
Out of specification  $\rightarrow$  Replace the valve guide.

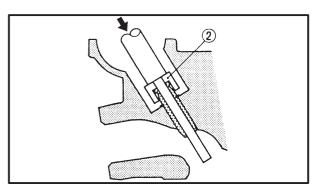


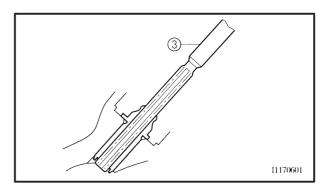
# Valve-stem-to-valve-guide clearance

Intake  $0.010 \sim 0.037 \text{ mm}$   $(0.0004 \sim 0.0015 \text{ in})$  <Limit> : 0.08 mm (0.0031 in) Exhaust  $0.025 \sim 0.052 \text{ mm}$   $(0.001 \sim 0.002 \text{ in})$  <Limit>: 0.1 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 a valve guide remover (1).

- b. Install the new valve guide with the valve guide installer ② and valve guide remover ①.
- c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

#### NOTE: -

After replacing the valve guide, reface the valve seat .

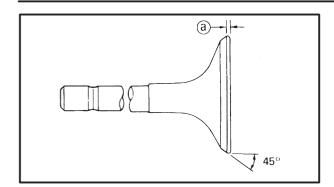


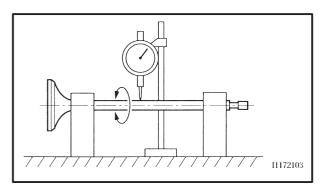
Valve guide remover (4.0 mm, 0.16 in) 90890-04111 Valve guide installer (4.0 mm, 0.16 in) 90890-04112 Valve guide reamer (4.0 mm, 0.16 in) 90890-04113

- 3. Eliminate:
  - carbon deposits
     (from the valve face and valve seat)
- 4. Check:
  - valve face
     Pitting/wear → Grind the valve face.
  - valve stem end Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.









#### 5. Measure:

valve margin thickness (a)
 Out of specification → Replace the valve.



Valve margin thickness

0.6 mm ~ 0.8 mm (0.0236 ~ 0.0315 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 0.04 mm (0.0016 in)

EAS00240

#### **CHECKING THE VALVE SEATS**

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

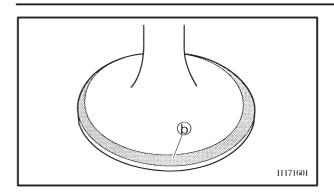
- 1. Eliminate:
- carbon deposits (from the valve face and valve seat)
- 2. Check:
  - valve seat
     Pitting/wear → Replace the cylinder head.
- 3. Measure:
  - valve seat width ⓐ
     Out of specification → Replace the cylinder head.



Valve seat width

Intake: 0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in) <Limit>: 1.6 mm (0.06 in)





a. Apply Mechanic's blueing dye (Dykem) **(b)** onto the valve face.

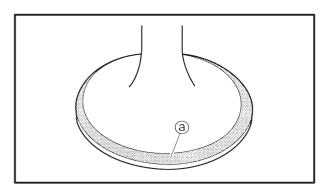
b. Install the valve into the cylinder head.

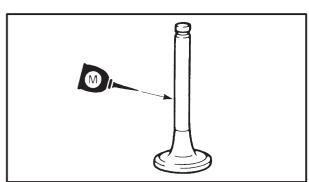
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.

d. Measure the valve seat width.

NOTE: \_

Where the valve seat and valve face contacted one another, the blueing will have been removed.





| 11171503 |
|----------|

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.

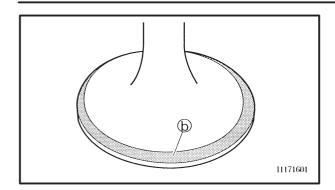
c. Install the valve into the cylinder head.

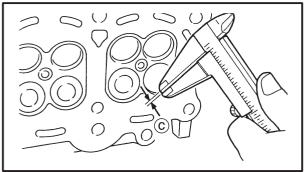
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

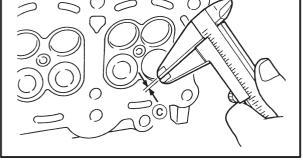
NOTE: -

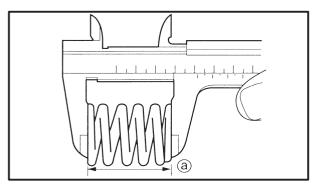
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.











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

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

g. Apply Mechanic's blueing dye (Dykem) (b) onto the valve face.

h. Install the valve into the cylinder head.

i. Press the valve through the valve guide and onto the valve seat to make a clear impression.

j. Measure the valve seat width © 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

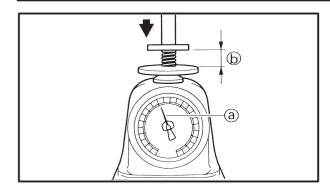


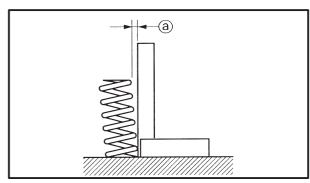
Valve spring free length Intake valve spring (inner) 37.0 mm (1.46 in) <Limit>: 35mm (1.38 in) Intake valve spring (outer) 38.4 mm (1.51 in) <Limit>: 36.5mm (1.44 in) Exhaust valve spring 41.7 mm (1.64 in)

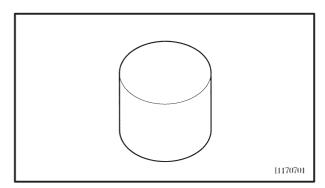
<Limit>: 39.5mm (1.56 in)

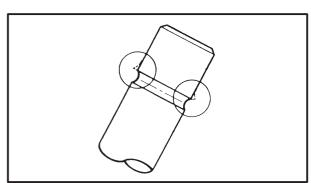


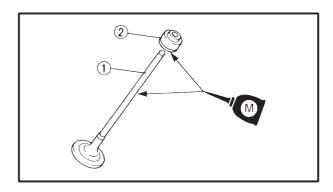












#### 2. Measure:

compressed spring force 

 Out of specification → Replace the valve spring.

#### (b) Installed length



# Compressed spring force (installed)

Intake valve spring inner
69 ~ 79 N (15.51 ~ 17.76 lb,
7.04 ~ 8.06 kg) at 30.0 mm
(1.18 in)
Intake valve spring outer
114 ~ 132 N (25.63 ~ 29.67 lb,
11.62 ~ 13.46 kg) at 32.5 mm
(1.28 in)
Exhaust valve spring
160 ~ 184 N (35.97 ~ 41.36 lb,
16.32 ~ 18.76 kg) at 36.1 mm
(1.42 in)

#### 3. Measure:

valve spring tilt ⓐ
 Out of specification → Replace the valve spring.



#### Max. Spring tilt

Intake valve spring inner 2.5°/1.6 mm (0.06 in)
Intake valve spring outer 2.5°/1.7 mm (0.07 in)
Exhaust valve spring 2.5°/1.8 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.

FAS00247

#### **INSTALLING THE VALVES**

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

#### 1. Deburr:

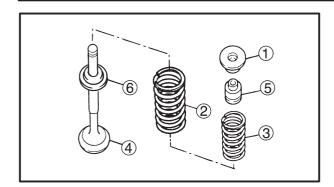
- valve stem end (with an oil stone)
- 2. Lubricate:
  - valve stem (1)
  - oil seal (2)

(with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide oil

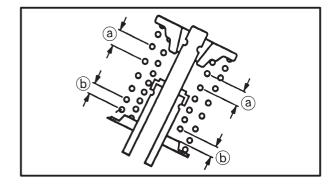


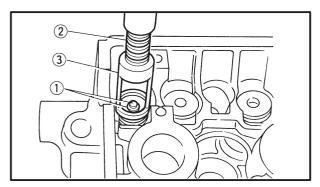


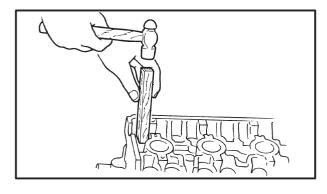
- 3. Install:
  - lower spring seat 6
  - oil seal 5 New
  - valve 4
  - valve spring inner (intake only) ③
  - valve spring outer 2
  - upper spring seat ①
    (into the cylinder head)

#### NOTE: -

- Make sure that each valve is installed in its original place. Refer to the following embossed marks.
- Install the valve spring with the larger pitch ⓐ facing up.
- (b) Smaller pitch







- 4. Install:
  - valve cotters (1)

#### NOTE: -

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



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

5. To secure the valve cotters ① 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. Lubricate:
- valve pad (with the recommended lubricant)



Recommended lubricant Molybdenum disulfide oil

- 7. Install:
  - valve pad
  - valve lifter

#### NOTE: —

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

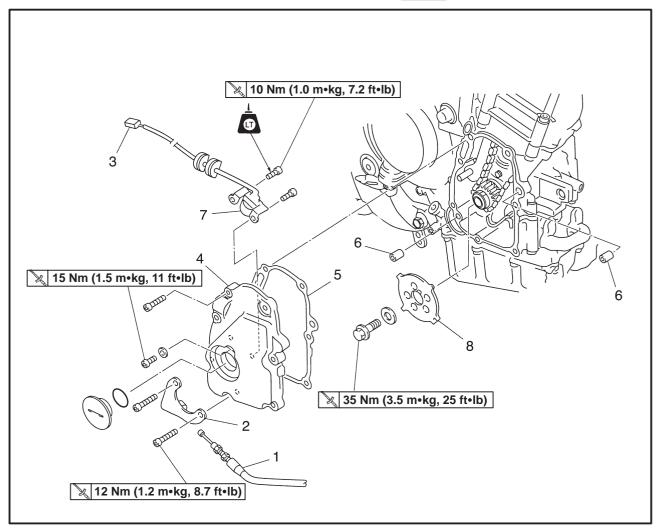
## PICKUP COIL AND PICKUP COIL ROTOR



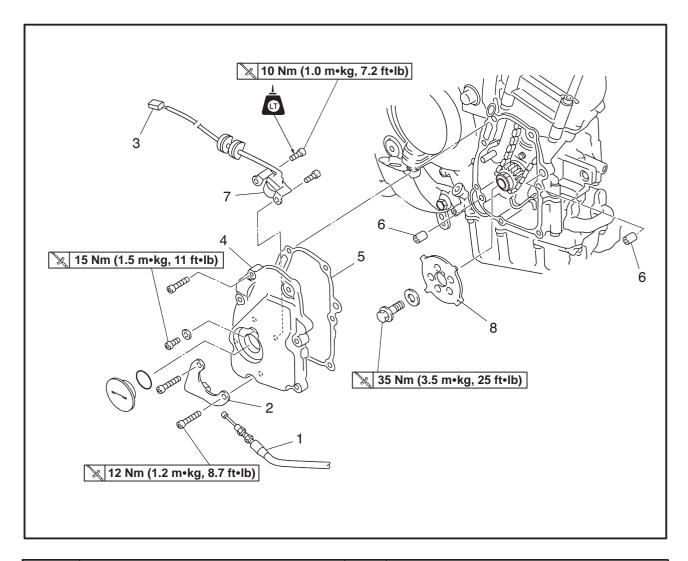


## PICKUP COIL AND PICKUP COIL ROTOR





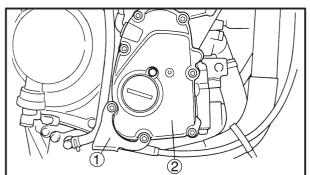
| Order | Job/Part                                       | Q'ty | Remarks                                                 |
|-------|------------------------------------------------|------|---------------------------------------------------------|
|       | Removing the pickup coil and pickup coil rotor |      | Remove the parts in the order listed.                   |
|       | Riders seat and fuel tank                      |      | Refer to "SEATS" and "FUEL TANK" in chapter 3.          |
|       | Bottom cowling and right side cowling          |      | Refer to "COWLINGS" in chapter 3.                       |
|       | Engine oil                                     |      | Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. |
|       | Generator cover                                |      | Refer to "STARTER CLUTCH AND GENERATOR".                |

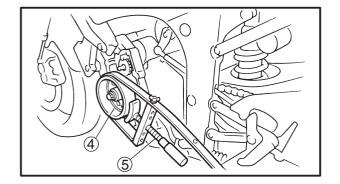


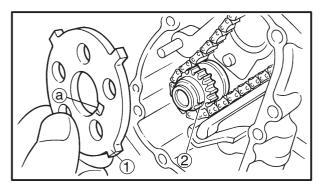
| Order                                | Job/Part                                                                                                                           | Q'ty                              | Remarks                                                                                                            |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | Clutch cable Clutch cable holder Pickup coil coupler Pickup coil cover Pickup coil cover gasket Dowel pin Pickup coil Pickup rotor | 1<br>1<br>1<br>1<br>2<br>1<br>1 - | Disconnect  Refer to "REMOVING/INSTALLING THE PICKUP COIL ROTOR".  For installation reverse the removal procedure. |

#### PICKUP COIL AND PICKUP ROTOR









#### REMOVING THE PICKUP COIL ROTOR

- 1. Remove:
  - clutch cable holder (1)
  - pickup coil cover 2

#### 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:

- pickup coil rotor bolt 1
- plain washer 2
- pickup coil rotor ③

#### NOTE: -

While holding the generator rotor 4 with the rotor holding tool (5), loosen the pickup coil rotor bolt.



Sheave holder 90890-01701, YS-01880

#### **INSTALLING THE PICKUP COIL ROTOR**

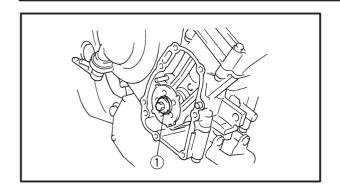
- 1. Install:
- pickup coil rotor ①
- plain washer
- pickup coil rotor bolt

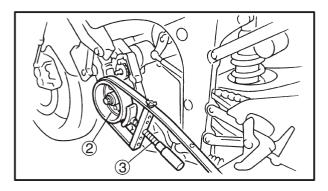
#### NOTE: -

When installing the pickup coil rotor, align the pin 2 in the crankshaft sprocket with the groove a in the pickup coil rotor.

### PICKUP COIL AND PICKUP ROTOR









• pickup coil rotor bolt 1

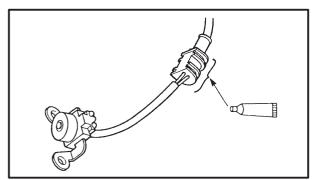
35 Nm (3.5 m•kg, 25 ft•lb)

NOTE: -

While holding the generator rotor ② with the sheave holder ③, tighten the pickup coil rotor bolt.



Sheave holder 90890-01701, YS-01880

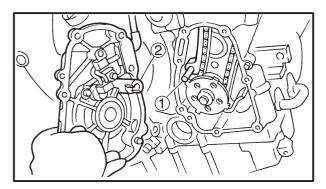


3. Apply:

• sealant (onto the pickup coil lead grommet)



Yamaha bond No.1215 90890-85505, ACC-1100-15-01



4. Install:

- pickup coil cover
- clutch cable holder

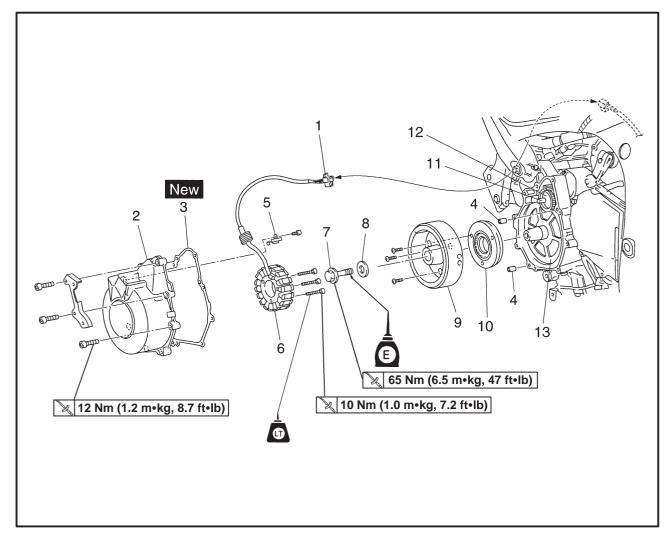
NOTE: -

- When installing the pickup coil cover, align the timing chain guide (intake side) pin ① of the with the hole ② in the pickup coil cover.
- Tighten the pickup coil cover bolts in stages and in a crisscross pattern.

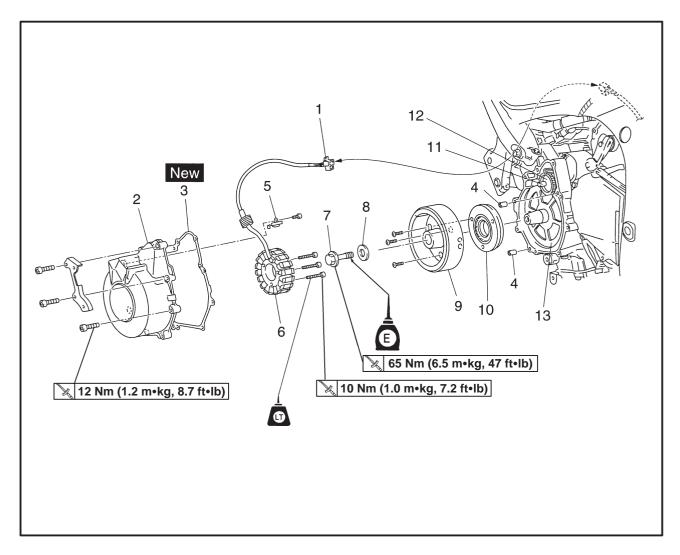
**ENG** 

## STARTER CLUTCH AND GENERATOR



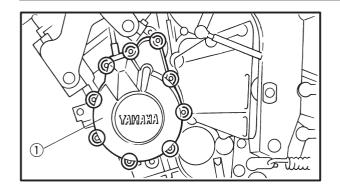


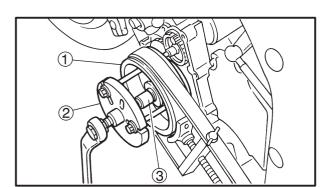
| Order | Job/Part                                  | Q'ty | Remarks                                        |
|-------|-------------------------------------------|------|------------------------------------------------|
|       | Removing the starter clutch and generator |      | Remove the parts in the order listed.          |
|       | Riders seat and fuel tank                 |      | Refer to "SEATS" and "FUEL TANK" in chapter 3. |
|       | Buttom and left side cowlings             |      | Refer to "COWLINGS" in chapter 3.              |
|       | Engine oil                                |      | Drain.                                         |
|       |                                           |      | Refer to "CHANGING THE ENGINE OIL"             |
|       |                                           |      | in chapter 3.                                  |
|       | Coolant treserver                         |      | Drain.                                         |
|       |                                           |      | Refer to "CHANGING THE COOLANT" in chapter 3.  |
| 1     | Stator coil assembly coupler              | 1    | Disconnect.                                    |
| 2     | Generator cover                           | 1    | Refer to "REMOVING/INSTALLING THE GENERATOR".  |
| 3     | Generator rotor cover gasket              | 1    |                                                |
| 4     | Dowel pin                                 | 2    |                                                |
| 5     | Stator coil assembly lead holder          | 1    |                                                |
| 6     | Stator coil assembly                      | 1    |                                                |



| Order                               | Job/Part                                                                                                               | Q'ty                       | Remarks                                                                                        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------|
| 7<br>8<br>9<br>10<br>11<br>12<br>13 | Generator rotor bolt Plain washer Generator rotor Starter one-way assy Idler gear shaft Idler hear Starter clutch gear | 1 -<br>1 1 -<br>1 1<br>1 1 | Refer to "REMOVING/INSTALLING THE GENERATOR".  For installation reverse the removal proceduer. |







EAS00346

#### **REMOVING THE GENERATOR**

- 1. Remove:
  - generator rotor cover 1

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:
  - generator rotor bolt 1
  - Plain washer

NOTE:

While holding the generator rotor ② with the sheave holder ③, loosen the generator rotor bolt.

Do not allow the sheave holder to touch the projection on the generator rotor.



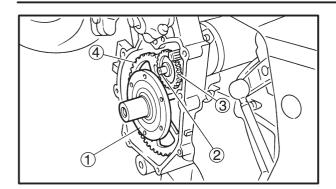
Sheave holder 90890-01701, YS-01880

- 3. Remove:
  - generator rotor ①
    (with the flywheel puller ② and adapter ③)



Flywheel puller 90890-01362, YU-33270 Flywheel puller attachment 90890-04089, YM-33282





EAS00345

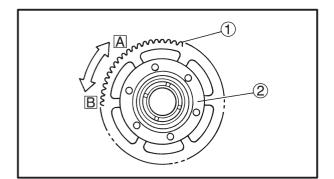
#### REMOVING THE STARTER CLUTCH

- 1. Remove:
  - Generator
  - Starter one-way assy 1
  - Idler gear shaft 2
  - Idler gear ③
  - Starter clutch gear 4

EAS00351

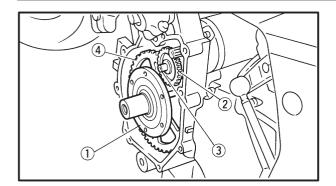
#### **CHECKING THE STARTER CLUTCH**

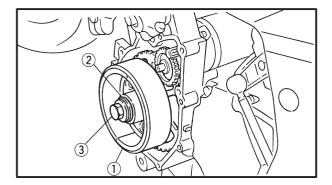
- 1. Check:
  - Starter one-way assy Damage/wear → Replace.
- 2. Check:
  - Idler gear
  - Idler gear shaft
  - starter clutch gear
     Pitting/Burrs/chips/roughness/wear → Replace the defective parts.
- 3. Check: Starter clutch operation

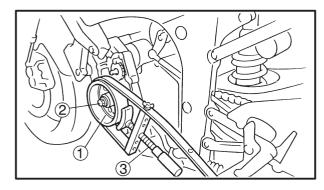


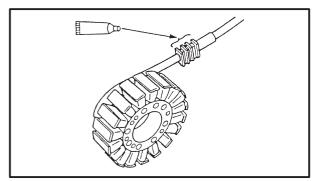
- a. Install the starter clutch gear ① onto the starter clutch ② and hold the starter clutch.
- b. When turning the starter clutch drive gear clockwise A, the starter clutch and the starter clutch gear should engage.
  - If the starter clutch gear and starter clutch do not engage, the starter clutch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











EAS00355

#### **INSTALLING THE STARTER CLUTCH**

- 1. Install:
  - starter clutch gear (1)
  - idler gear 2
  - idler gear shaft ③
  - startor one-way assy 4

EAS00354

#### **INSTALLING THE GENERATOR**

- 1. Install:
- generator rotor (1)
- washer (2)
- generator rotor bolt ③

NOTE: -

Clean the tapered portion of the crankshaft and the generator rotor hub with lacquer tinner.

- 2. Tighten:
  - generator rotor bolt ③

8 65 Nm (6.5 m•kg, 47 ft•lb)

NOTE: -

While holding the generator rotor ② with the sheave holder ③, tighten the generator rotor bolt

Do not allow the sheave holder to touch the projection on the generator rotor.



### Sheave holder 90890-01701, YS-01880

- 3. Apply:
  - sealant

(onto the stator coil assembly lead grommet)



Yamaha bond No.1215 90890-85505, ACC-1100-15-01

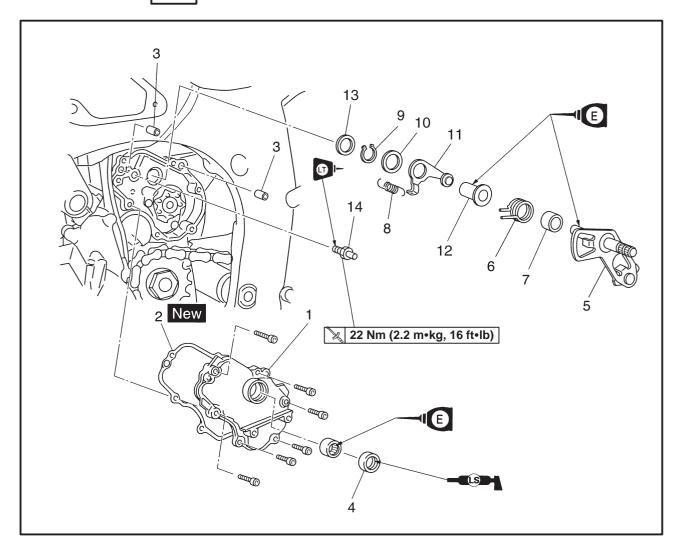
- 4. Install:
  - stator coil
- 5. Install:
  - generator rotor cover

NOTE:

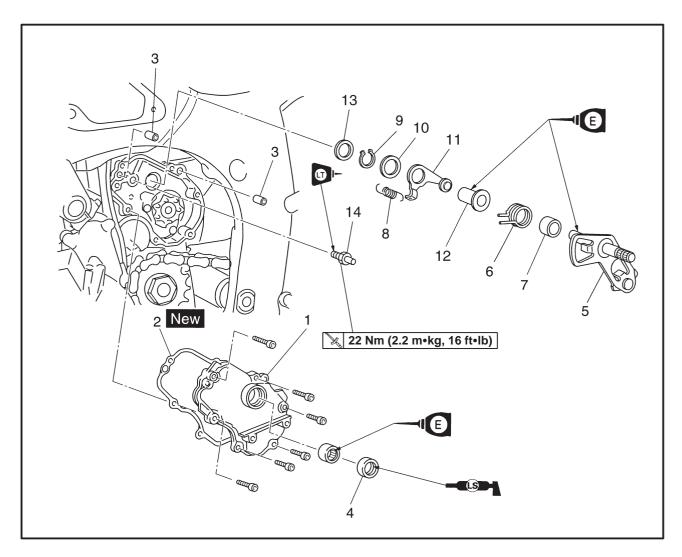
Tighten the generator rotor cover bolts in stages and in a crisscross pattern.







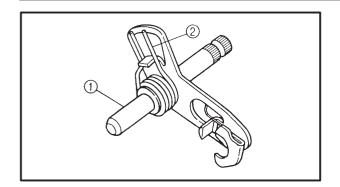
| Order | Job/Part                                     | Q'ty | Remarks                                                                                    |
|-------|----------------------------------------------|------|--------------------------------------------------------------------------------------------|
|       | Removing the shift shaft<br>Coolant reserver |      | Remove the parts in the order listed. Drain. Refer to "CHANGING THE COOLANT" in chapter 3. |
|       | Drive sprocket cover, sift rod and sift arm. |      | Refer to "ENGINE".                                                                         |
| 1     | Shift shaft cover                            | 1    |                                                                                            |
| 2     | Shift shaft cover gasket                     | 1    |                                                                                            |
| 3     | Dowel pin                                    | 2    |                                                                                            |
| 4     | Oil seal                                     | 1    |                                                                                            |
| 5     | Sift shaft                                   | 1    | Refer to "INSTALLING THE SHIFT SHAFT".                                                     |



| Order | Job/Part                   | Q'ty | Remarks                                         |
|-------|----------------------------|------|-------------------------------------------------|
| 6     | Shift shaft spring         | 1    |                                                 |
| 7     | Collar                     | 1    |                                                 |
| 8     | Stopper lever spring       | 1    |                                                 |
| 9     | Circrip                    | 1    |                                                 |
| 10    | Washer                     | 1    |                                                 |
| 11    | Stopper lever              | 1 -  |                                                 |
| 12    | Collar                     | 1    | Refer to "INSTALLING THE SHIFT                  |
| 13    | Washer                     | 1    | SHAFT".                                         |
| 14    | Shift shaft spring stopper | 1 -  |                                                 |
|       |                            |      | For installation reverse the removal procedure. |

#### SHIFT SHAFT

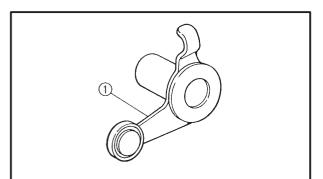




EAS00329

#### **CHECKING THE SHIFT SHAFT**

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

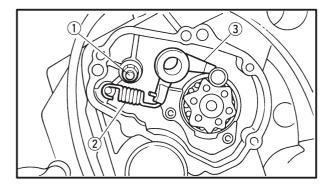


EAS00330

#### **CHECKING THE STOPPER LEVER**

- 1. Check:
  - stopper lever ①
     Bends/damage → Replace.

     Roller turns roughly → Replace the stopper lever.



EAS00334

#### **INSTALLING THE SHIFT SHAFT**

1. Install:

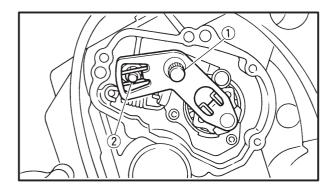
• shift shaft spring stopper 1

• stopper lever spring (2)

- washer
- stopper lever ③

#### NOTE: \_

- Apply LOCTITE® to the threads of the shift shaft spring stopper.
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
- Mesh the stopper lever with the shift drum segment assembly.



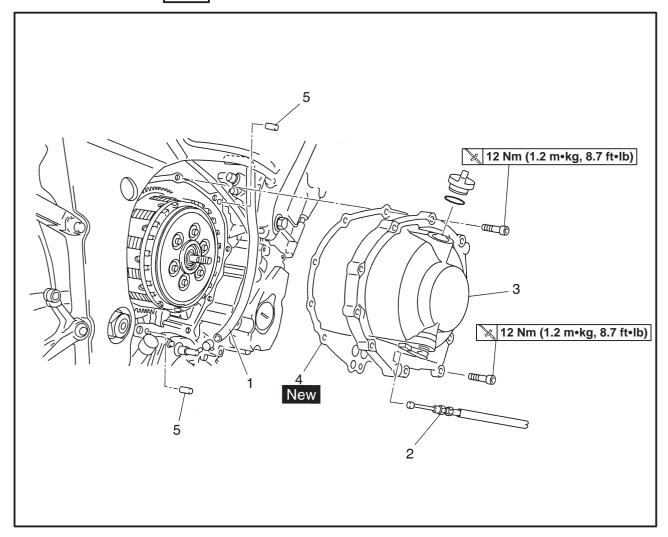
- 2. Install:
  - shift shaft (1)
  - collor

#### NOTE

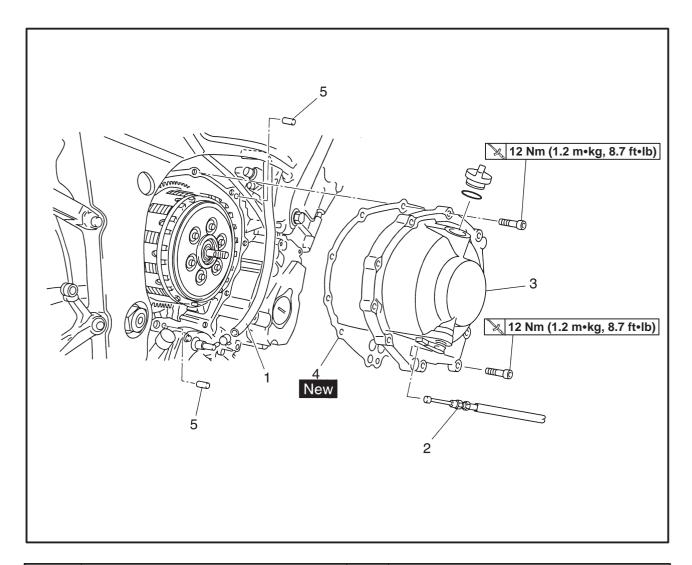
- Lubricate the oil seal lips with lithium soap base grease.
- Install the end of the shift shaft spring onto the shift shaft spring stopper ②

CLUTCH CLUTCH COVER



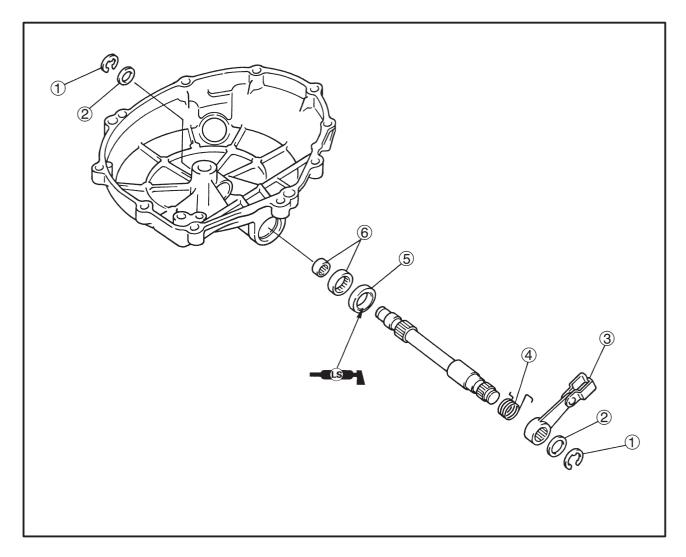


| Order | Job/Part                                                                           | Q'ty   | Remarks                                                                                                                                                                              |
|-------|------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | Removing the clutch cover Bottom cowing and right side cowling Engine oil  Coolant |        | Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. Drain. Refer to "CHANGING THE COOLANT" in chapter 3. |
| 1 2   | Therm bypass hose<br>Clutch cable                                                  | 1<br>1 | •                                                                                                                                                                                    |



| Order | Job/Part                      | Q'ty | Remarks                                         |
|-------|-------------------------------|------|-------------------------------------------------|
| 3     | Clutch cover                  | 1    | Refer to "REMOVING/INSTALLING THE CLUTCH".      |
| 4 5   | Clutch cover gasket Dowel pin | 1 2  |                                                 |
|       | '                             |      | For installation reverse the removal procedure. |



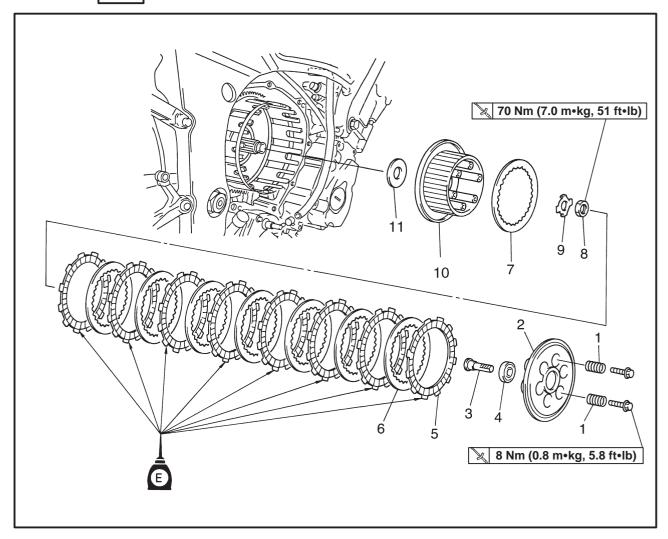


| Order                                  | Job/Part                                                                                                   | Q'ty                       | Remarks                                                                                                              |
|----------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------|
| (1)<br>(2)<br>(3)<br>(4)<br>(5)<br>(6) | Disassembling the clutch cover assembly Circlip Plain washer Pull lever Pull lever spring Oil seal Bearing | 2<br>2<br>1<br>1<br>1<br>2 | Disassemble the parts in the order listed.  Refer to "INSTALLING THE CLUTCH".  For assembly, reverse the disassembly |
|                                        |                                                                                                            |                            | procedure.                                                                                                           |

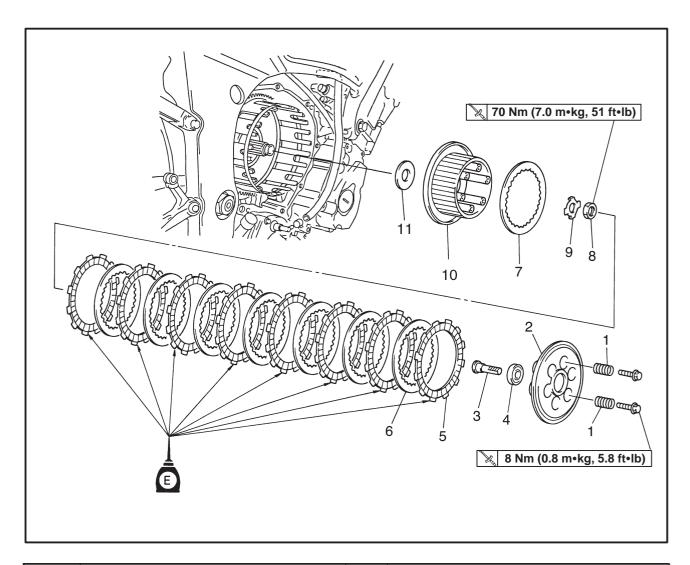


CLUTCH



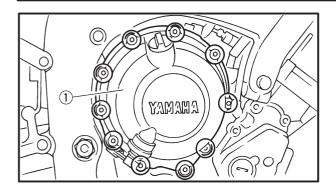


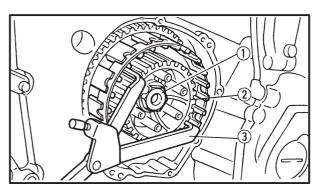
| Order | Job/Part            | Q'ty | Remarks                               |
|-------|---------------------|------|---------------------------------------|
|       | Removing the clutch |      | Remove the parts in the order listed. |
| 1     | Compression spling  | 6    | ·                                     |
| 2     | Pressure plate      | 1    |                                       |
| 3     | Pull rod            | 1 -  | Refer to "INSTALLING THE CLUTCH".     |
| 4     | Bearing             | 1 -  | Refer to INSTALLING THE CLUTCH .      |
| 5     | Friction plate      | 8 -  |                                       |
| 6     | Clutch plate        | 7    |                                       |
| 7     | Clutch plate        | 1    | Refer to "REMOVING/INSTALLING         |
| 8     | Clutch boss nut     | 1    | THE CLUTCH".                          |
| 9     | Look washer         | 1    |                                       |
| 10    | Clutch boss         | 1 -  |                                       |

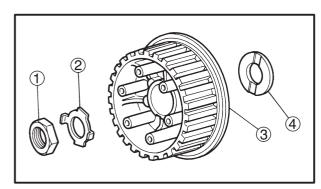


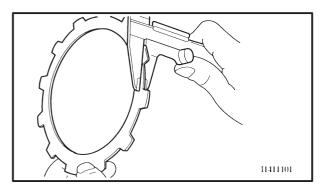
| Order | Job/Part     | Q'ty | Remarks                                          |
|-------|--------------|------|--------------------------------------------------|
| 11    | Thrust plate | 1    | For installation, reverse the removal procedure. |











#### REMOVING THE CLUTCH

- 1. Remove:
  - clutch cover ①

#### 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.

- Pressure plate
- Fricttion and clutch plates
- 2. Straighten the lock washer tab.
- 3. Loosen:
  - clutch boss nut (1)

#### NOTE: -

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



# Clutch holding tool 90890-04086, YM-91042

- 4. Remove:
  - clutch boss nut (1)
  - lock washer (2)
  - clutch boss (3)
  - thrust plate 4

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: -

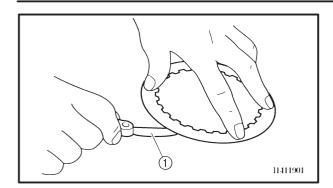
Measure the friction plate at four places.



Friction plate thickness

2.9 ~ 3.1 mm (0.114 ~ 0.122 in) <Limit>: 2.8 mm (0.11 in)





FAS00281

#### **CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

- 1. Check:
  - clutch plate
     Damage → Replace the clutch plates as a set.
- 2. Measure:
  - clutch plate warpage
    (with a surface plate and thickness gauge
    1)

Out of specification  $\rightarrow$  Replace the clutch plates as a set.



Max. clutch plate warpage 0.1 mm (0.0039 in)

EAS00282

#### **CHECKING THE CLUTCH SPRINGS**

The following procedure applies to all of the clutch springs.

- 1. Check:
  - clutch spring
  - $\label{eq:definition} \mbox{Damage} \rightarrow \mbox{Replace the clutch springs as a set.}$
- 2. Measure:
  - clutch spring free length (a)
  - Out of specification  $\rightarrow$  Replace the clutch springs as a set.
  - Clutch spring free length



Clutch spring free length 55 mm (2.17 in)

<Limit>: 54 mm (2.13 in)

AS00284

#### CHECKING THE CLUTCH HOUSING

- 1. Check:
  - clutch housing dogs
     Damage/pitting/wear → Deburr the clutch

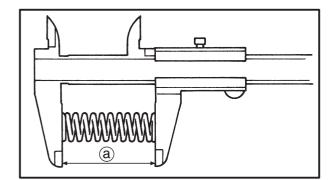
housing dogs or replace the clutch housing.

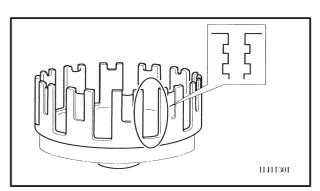
NOTF-

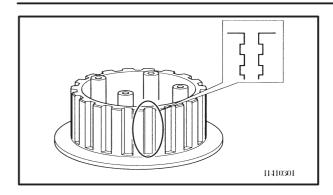
Pitting on the clutch housing dogs will cause erratic clutch operation.

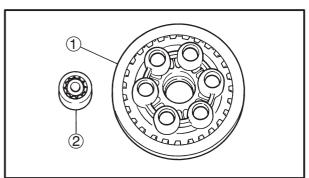
- 2. Check:
  - bearing

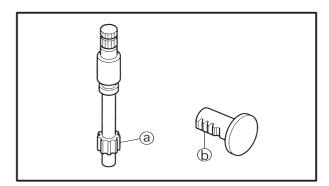
 $\label{eq:decomposition} \mathsf{Damage/wear} \to \mathsf{Replace} \ \mathsf{the} \ \mathsf{clutch} \ \mathsf{housing}.$ 











#### **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

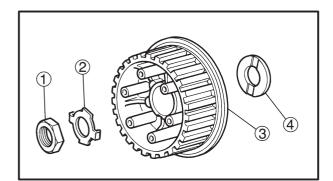
#### **CHECKING THE PRESSURE PLATE**

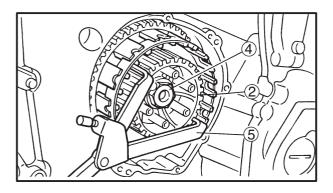
- 1. Check:
  - pressure plate ①
    Cracks/damage → Replace.
- bearing ②
   Damage/wear → Replace.

EAS00287

# CHECKING THE PULL LEVER SHAFT AND PULL ROD

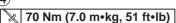
- 1. Check:
  - pull lever shaft pinion gear teeth (a)
  - pull rod teeth (b)
     Damage/wear → Replace the pull rod and pull lever shaft as a set.
- 2. Check:
- pull rod bearing
   Damage/wear → Replace.





#### INSTALLING THE CLUTCH

- 1. Install:
  - thrust plate (1)
  - clutch boss 2
- 2. Install:
  - lock washer 3 New
  - clutch boss nut (4)



NOTE: -

While holding the clutch boss ② with the clutch holding tool ⑤, tighten the clutch boss nut.



# Clutch holding tool 90890-04086, YM-91042

- 3. Bend the lock washer tab along a flat side of the nut.
- 4. Lubricate:
  - friction plates
  - clutch plates (with the recommended lubricant)



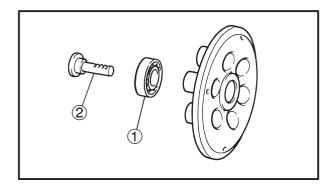
### Recommended lubricant Engine oil

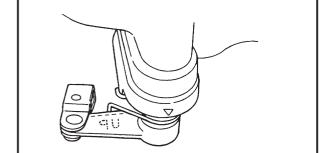
- 5. Install:
  - friction plates
  - clutch plates

NOTE: -

First, install a friction plate and then alternate between a clutch plate and a friction plate.

- 6. Install:
  - washer
  - bearing 1
  - pull rod 2





NOTE: -

Install the pull rod so that the teeth a face towards the rear of the motorcycle. Then, install the clutch cover.

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

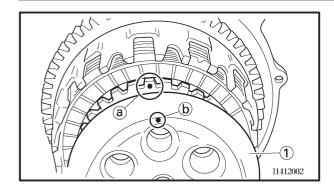
Apply oil onto the bearing.

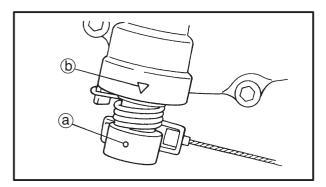
Apply molybdenum disulfide grease onto the pull rod.

## **CLUTCH**









#### 7. Install:

- pressure plate (1)
- clutch springs
- clutch spring bolts

8 Nm (0.8 m•kg, 5.8 ft•lb)

#### NOTE: -

Tighten the clutch spring bolts in stages and in a criss cross pattern.

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

#### 8. Install:

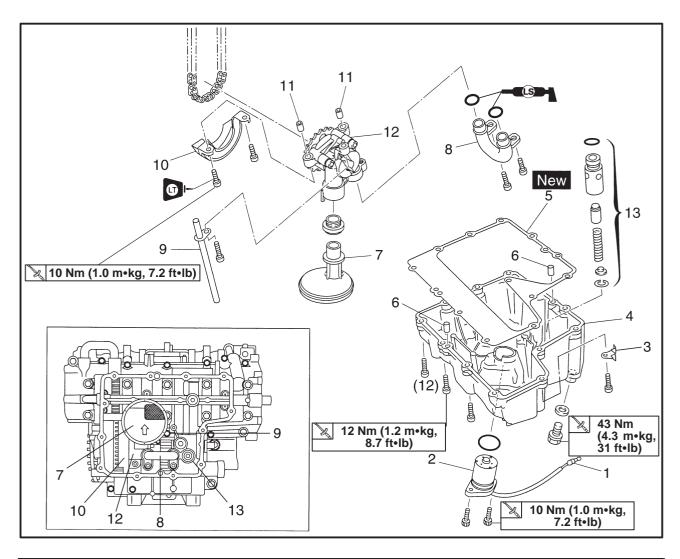
clutch cover

12 Nm (1.2 m•kg, 8.7 ft•lb)

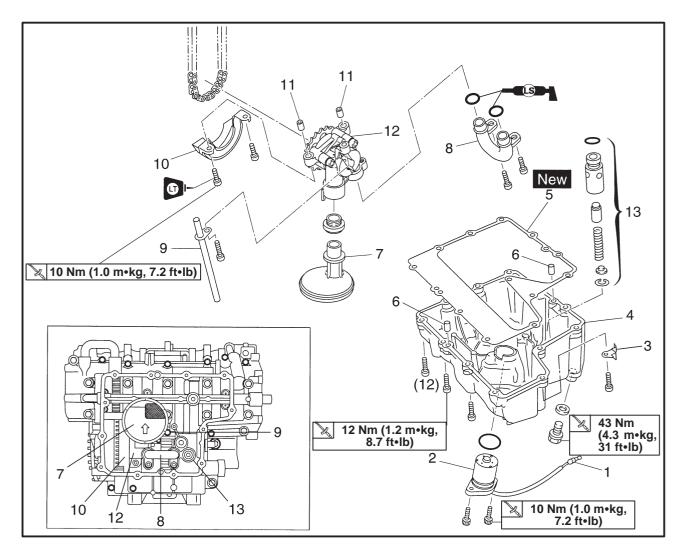
#### NOTE: -

- When installing the clutch cover, push the pull lever and check that the punch mark ⓐ on the pull lever aligns with the mark ⓑ 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.

## OIL PAN AND OIL PUMP



| Order | Job/Part                                                        | Q'ty   | Remarks                                                                                       |
|-------|-----------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------|
|       | Removing the oil pan and oil pump<br>Engine oil                 |        | Remove the parts in the order listed. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. |
|       | Coolant                                                         |        | Drain. Refer to "CHANGING THE COOLANT" in chapter 3.                                          |
|       | Radiator assembly and water pump assembly Exhaust pipe assembly |        | Refer to "RADIATOR" and "WATER PUMP" in chapter 5. Refer to "ENGINE".                         |
| 1 2   | Oil level switch couplar Oil level switch                       | 1<br>1 | Disconnect.                                                                                   |

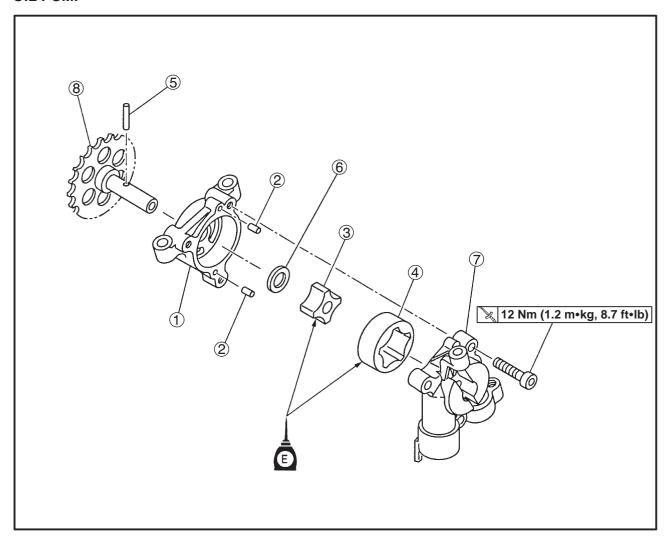


| Order | Job/Part                     | Q'ty | Remarks                                          |
|-------|------------------------------|------|--------------------------------------------------|
| 3     | Oil level switch lead holder | 1 -  |                                                  |
| 4     | Oil pan                      | 1    | Refer to "REMOVEING/INSTALLING                   |
| 5     | Oil pan gasket               | 1    | THE OIL PAN.                                     |
| 6     | Dowel pin                    | 2 -  | <u> </u>                                         |
| 7     | Oil strainer                 | 1    | Refer to "INSTALLING THE OIL                     |
|       |                              |      | STRAINER".                                       |
| 8     | Oil pipe                     | 1    |                                                  |
| 9     | Oil delivery pipe            | 1    |                                                  |
| 10    | Gear cover                   | 1    |                                                  |
| 11    | Dowel pin                    | 2    | Refer to "INSTALLING THE OIL PUMP".              |
| 12    | Oil pump assembly            | 1    |                                                  |
| 13    | Relief valve assembly        | 1    |                                                  |
|       |                              |      | For installation, reverse the removal procedure. |

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## **OIL PUMP**

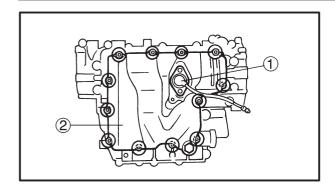


| Order           | Job/Part                                                                                                                                                    | Q'ty                            | Remarks                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------|
| 1 2 3 4 5 6 7 8 | Disassemblying the oil pump assembly Oil pump rotor housing Dowel pin Oil pump inner rotor Oil pump outer rotor Dowel pin Washer Oil pump cover Driver gear | 1<br>2<br>1<br>1<br>1<br>1<br>1 | Disassemble the parts in the order listed.  For assembly reverse the disassembly procedure. |

#### OIL PAN AND OIL PUMP







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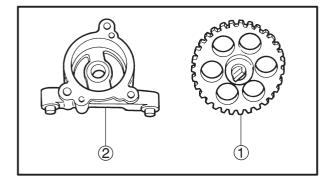
#### REMOVING THE OIL PAN

- 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.

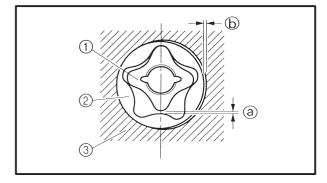
After all of the bolts are fully loosened, remove them.



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#### **CHECKING THE OIL PUMP**

- 1. Check:
- oil/pump driven gear (1)
- rotor housing ②
   Cracks/damage/wear → Replace the defective part(-s).



2. Measure:

- inner-rotor-to-outer-rotor-tip clearance (a)
- outer-rotor-to-oil-pump-cover clearance (b)
   Out of specification → Replace the oil pump.
- 1 Inner rotor
- 2 Outer rotor
- 3 Oil pump cover



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

0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)

<Limit>: 0.15 mm (0.0059 in)

Outer-rotor-to-oil-pump-cover clearance

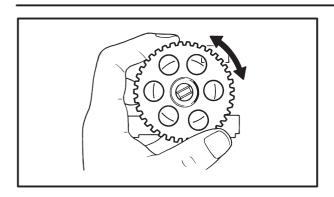
 $0.03 \sim 0.08 \text{ mm}$ 

(0.0012 ~ 0.0031 in) <Limit>: 0.15 mm (0.0059 in)

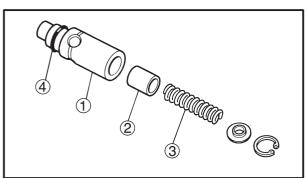
4-56

#### OIL PAN AND OIL PUMP





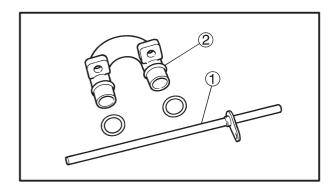
- 3. Check:
  - oil pump operation Unsmooth → Repair or replace the defective part(-s).



#### **CHECKING THE RELIEF VALVE**

- 1. Check:
  - relief valve body 1
  - relief valve 2
  - spring ③
  - O-ring **4**

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

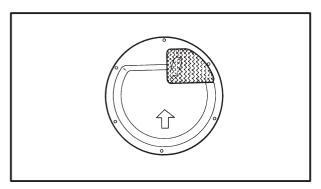


### CHECKING THE OIL DELIVERY PIPE AND **OIL PIPE**

- 1. Check:
  - oil delivery pipe ①
- oil pipe ②

Damage → Replace.

Obstruction → Wash and blow out with compressed air.

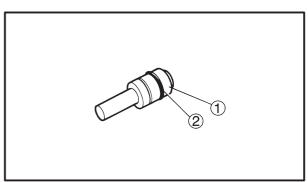


### **CHECKING THE OIL STRAINER**

- 1. Check:
- oil strainer (1)

Damage → Replace.

Contaminants → Clean with engine oil.



#### **CHECKING THE OIL NOZZLES**

The following procedure applies to all of the oil nozzles.

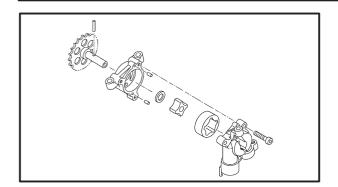
- 1. Check:
  - oil nozzle (1)
  - O-ring ②

Damage/wear → Replace the oil nozzle. oil nozzle passage

Obstruction → Blow out with compressed air.

#### OIL PAN AND OIL PUMP





EAS00375

#### ASSEMBLING THE OIL PUMP

- 1. Lubricate:
- inner rotor
- outer rotor
- impeller shaft (with the recommended lubricant)



### Recommended lubricant Engine oil

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

#### **INSTALLING THE OIL PUMP**

- 1. Install:
  - oil pump ①

12 Nm (1.2 m•kg, 8.7 ft•lb)

NOTE: -

Install the oil pump assembly drive chain onto the oil pump assembly driven sprocket.

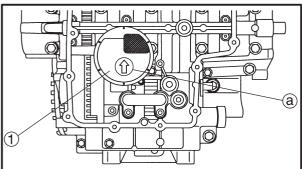
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#### INSTALLING THE OIL STRAINER

- 1. Install:
  - oil strainer (1)

NOTE: -

The arrow (a) on the oil strainer housing must point towards the front of the engine.



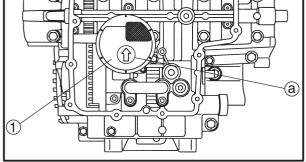
#### **INSTALLING THE OIL PAN**

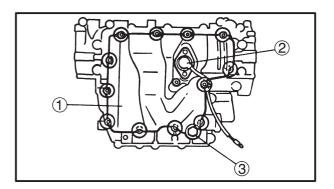
- 1. Install:
- dowel pins
- oil pan gasket New
- oil pan (1)
- 12 Nm (1.2 m•kg, 8.7 ft•lb)
- oil level switch (2)
  - 🗽 10 Nm (1.0 m•kg, 7.2 ft•lb)
- engine oil drain bolt (3)

3 Nm (4.3 m•kg, 31 ft•lb)

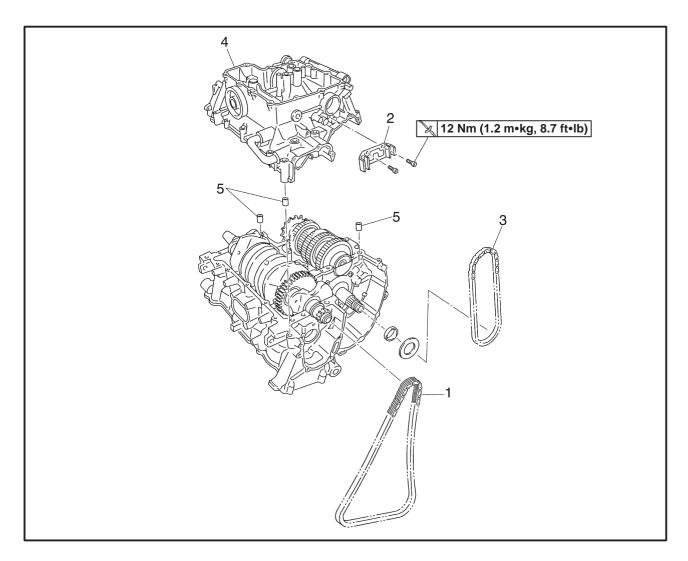
#### NOTE: -

- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with lithium soap base grease.

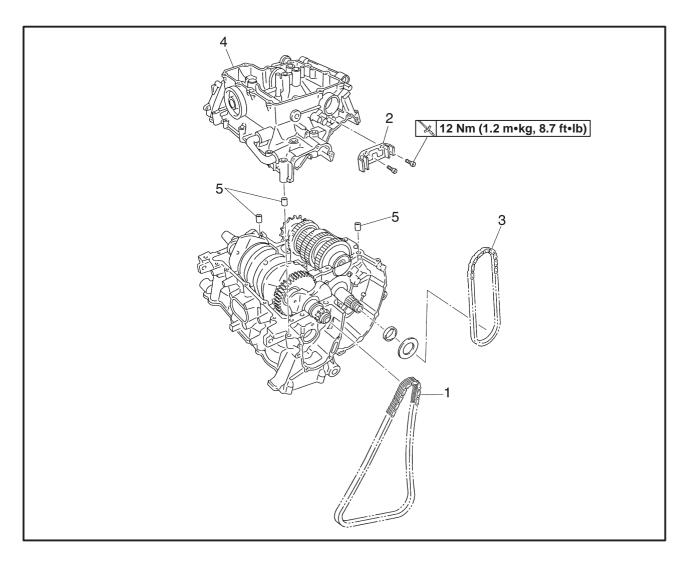




# **CRANKCASE**

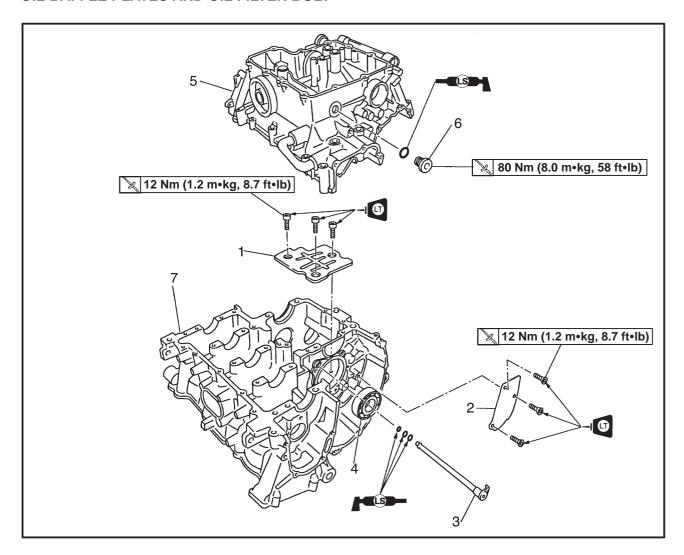


| Order | Job/Part                                                 | Q'ty | Remarks                                                                                 |
|-------|----------------------------------------------------------|------|-----------------------------------------------------------------------------------------|
|       | Separating the crankcase Engine Cylinder bood            |      | Remove the parts in the order listed. Refer to "ENGINE". Refer to "CYLINDER HEAD".      |
|       | Cylinder head Starter clutch and generator               |      | Refer to "STARTER CLUTCH AND GENERATOR".                                                |
|       | Shift shaft Pickup coil and pickup rotor                 |      | Refer to "SHIFT SHAFT". Refer to "PICKUP COIL AND PICKUP ROTOR".                        |
|       | Clutch assembly Water pump assembly Oil pan and oil pump |      | Refer to "CLUTCH". Refer to "WATER PUMP" in chapter 5. Refer to "OIL PAN AND OIL PUMP". |



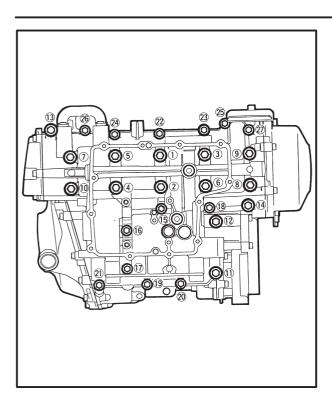
| Order | Job/Part                   | Q'ty | Remarks                                          |
|-------|----------------------------|------|--------------------------------------------------|
| 1     | Timing chain               | 1    |                                                  |
| 2     | Oil pump drive chain guide | 1    |                                                  |
| 3     | Oil pump drive chain       | 1    |                                                  |
| 4     | Lower crankcase            | 1    | Refer to "DISASSEMBLY/ASSEMBLY THE CRANKCASE".   |
| 5     | Dowel pin                  | 3    |                                                  |
|       |                            |      | For installation, reverse the removal procedure. |

### OIL BAFFLE PLATES AND OIL FILTER BOLT



| Order                           | Job/Part                                                                                                                                                                    | Q'ty                       | Remarks                                                                                                          |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7 | Removing the oil baffle plates and oil filter bolt Transmission Oil baffle plate Oil baffle plate Oil delivery pipe Bearing Lower crankcase Oil filter bolt Upper crankcase | 1<br>1<br>1<br>1<br>1<br>1 | Remove the parts in the order listed.  Refer to "TRANSMISSION".  For instalation, reverse the removal procedure. |





#### **DISASSEMBLING THE CRANKCASE**

1. Place the engine upside down.

#### 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.
- Remove: crankcase bolts
- 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 that the crankcase halves separate evenly.

- M8  $\times$  85 mm bolts: 1  $\sim$  7 10
- $M8 \times 115 \text{ mm bolts: } (8) (9)$
- M8  $\times$  65 mm bolt: (11) (12)
- M6  $\times$  65 mm bolts: (13) (14) (17) (27)
- M6  $\times$  55 mm bolts:  $(\overline{15})$   $(\overline{22})$   $\sim$   $(\overline{26})$
- M6 × 45 mm bolt:  $(16)(19) \sim (21)$
- M6  $\times$  75 mm bolt:  $(\overline{18})$
- 4. Remove:
  - dowel pins

#### 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:
  - upper crankcase
  - lower crankcase
     Cracks/damage → Replace.
  - oil delivery passages
     Obstruction → Blow out with compressed air.

EAS0040

# CHECKING THE BEARINGS AND OIL SEALS

- 1. Check:
  - bearings

Clean and lubricate the bearings, then rotate the inner race with your finger.

Rough movement → Replace.

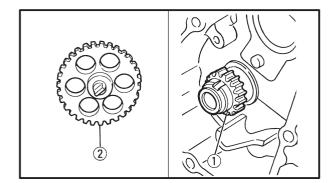
2. Check:

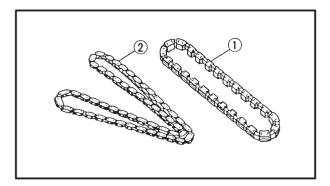
oil seals

Damage/wear → Replace.

#### **CHECKING THE SPROCKETS AND CHAINS**

- 1. Check:
  - crankshaft sprocket (1)
  - oil/water pump assembly drive sprocket②
     Cracks/damage/wear → Replace the defective part(-s).





#### 2. Check:

- timing chain (1)
  - Damage/stiffness  $\rightarrow$  Replace the timing chain and crankshaft sprocket as a set.
- oil/water pump assembly drive chain②
   Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.

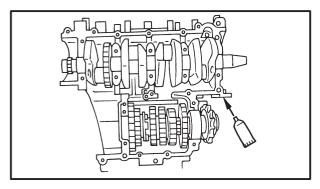


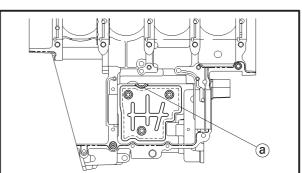
#### ASSEMBLING THE CRANKCASE

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



Recommended lubricant Engine oil





#### 2. Apply:

 sealant (onto the crankcase mating surfaces and the groove (a) of the oil baffle plate)



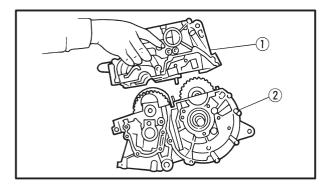
Yamaha bond No. 1215 90890-85505, ACC-1100-15-01

#### NOTE: -

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2  $\sim$  3 mm 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)

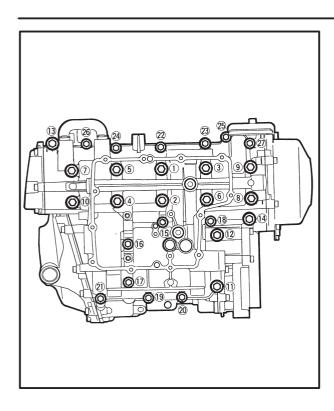
#### **CAUTION:**

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

#### **CRANKCASE**







- 6. Install:
  - crankcase bolts

#### NOTE: -

- Lubricate the bolt threads with engine oil.
- Install a washer on bolts ① ~ ①.
- Install a gasket on bolt 21.
- Not lubricate seal botts 18 12
- Tighten the bolts in the tightening sequence cast on the crankcase.

M8  $\times$  85 mm bolts:  $\bigcirc$   $\bigcirc$   $\bigcirc$   $\bigcirc$   $\bigcirc$ 

 $M8 \times 115 \text{ mm bolts: } (8) (9)$ 

 $M8 \times 65$  mm bolt: (11) (12)

M6  $\times$  65 mm bolts: (13) (14) (17) (27)

M6  $\times$  55 mm bolts: (15) (22)  $\sim$  (26)

M6  $\times$  45 mm bolts:  $\textcircled{16} \textcircled{19} \sim \textcircled{21}$ 

 $M6 \times 75$  mm bolts: 18



Bolt (15) ~ (27)

12 Nm (1.2 m•kg, 8.7 ft•lb)

Bolt 13 ~ 14

14 Nm (1.4 m•kg, 10 ft•lb)

Bolt (1) ~ (12)

24 Nm (2.4 m•kg, 17 ft•lb)

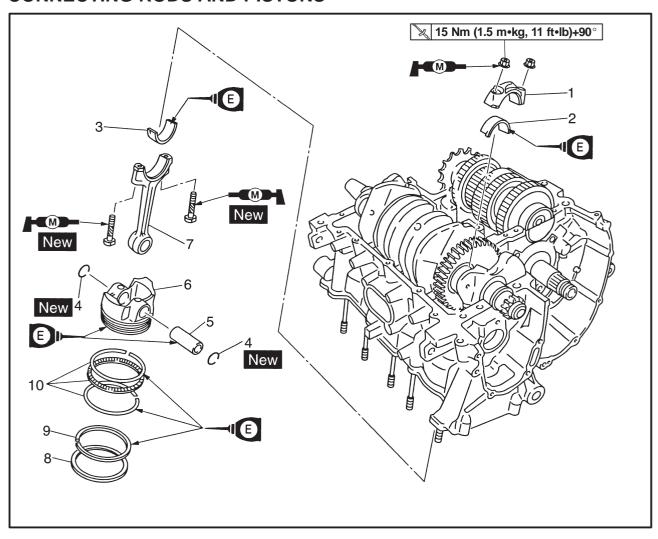
# **A** WARNING

Always use new copper washers.

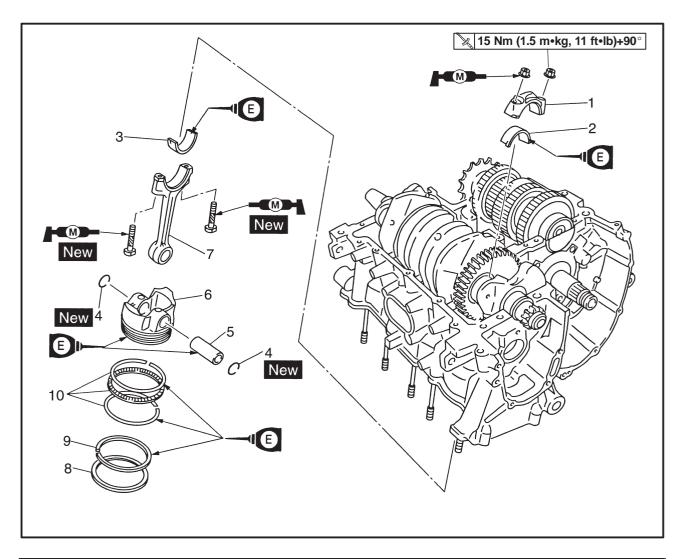
ENG

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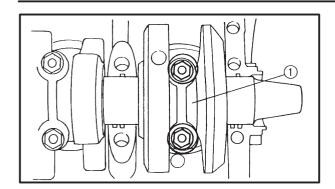
## **CONNECTING RODS AND PISTONS**



| Order | Job/Part                                 | Q'ty | Remarks                               |
|-------|------------------------------------------|------|---------------------------------------|
|       | Removing the connecting rods and pistons |      | Remove the parts in the order listed. |
|       | Lower crankcase                          |      | Separate.                             |
|       |                                          |      | Refer to "CRANKCASE".                 |
| 1     | Connecting rod cap                       | 4 _  |                                       |
| 2     | Big end lower bearing                    | 4    |                                       |
| 3     | Big end upper bearing                    | 4    | Refer to "REMOVING/INSTALLING THE     |
| 4     | Piston pin clip                          | 8    | CONNECTING RODS AND PISTONS".         |
| 5     | Piston pin                               | 4    | CONTROL RODO / IND 1 IOTONO .         |
| 6     | Piston                                   | 4    |                                       |
| 7     | Connecting rod                           | 4 -  | <u> </u>                              |



| Order | Job/Part | Q'ty | Remarks                                                                                                           |
|-------|----------|------|-------------------------------------------------------------------------------------------------------------------|
| 8     | Top ring | 4 -  | Refer to "REMOVING/INSTALLING THE CONNECTING RODS AND PISTONS".  For installation, reverse the removal procedure. |
| 9     | 2nd ring | 4    |                                                                                                                   |
| 10    | Oil ring | 4 -  |                                                                                                                   |



EAS00393

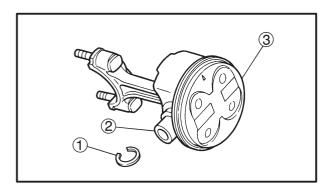
# REMOVING THE CONNECTING RODS AND PISTONS

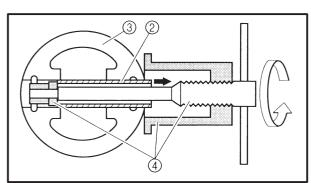
The following procedure applies to all of the connecting rods and pistons.

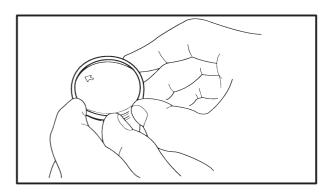
- 1. Remove:
  - connecting rod cap (1)
  - big end bearings

#### NOTE:

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







#### 2. Remove:

- piston pin clips 1
- piston pin 2
- piston ③
- connecting rod

### **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 in the piston. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller 4.



Piston pin puller 90890-01304, YU-01304

#### 3. Remove:

- top ring
- 2nd ring
- oil ring

#### NOTE: -

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

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#### **CHECKING THE CYLINDER AND PISTONS**

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

- 1. Check:
  - piston wall
  - cylinder wall
     Vertical scratches → Replace the crankcases, and the piston and piston rings as a set.



• 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 gauge 90890-03017, YU-03017

| Cylinder bore "C" | 65.50 ~ 65.51 mm<br>(25.787 ~ 25.791 in) |  |
|-------------------|------------------------------------------|--|
| Max. taper "T"    | 0.05 mm (0.002 in)                       |  |
| Out of round "R"  | 0.05 mm (0.002 in)                       |  |

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

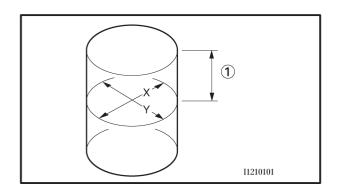


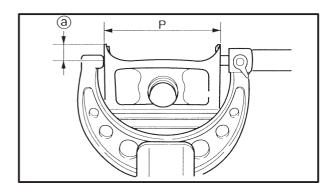
# Micrometer 90890-03008, YU-03008

(a) 4 mm from the bottom edge of the piston

|          | Piston size "P"                            |
|----------|--------------------------------------------|
| Standard | 65.460 ~ 65.475 mm<br>(2.5772 ~ 2.5778 in) |

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





ENG

e. Calculate the piston-to-cylinder clearance with the following formula.

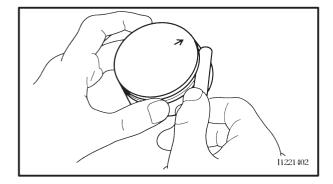
Piston-to-cylinder clearance = Cylinder bore "C" – Piston skirt diameter "P"



Piston-to-cylinder clearance  $0.025 \sim 0.050 \text{ mm}$   $(0.001 \sim 0.002 \text{ in})$ 

<Limit>: 0.07 mm (0.0028 in)

f. If out of specification, replace the crankcases, and the pistons and piston rings as a set.



EVSUUSES

#### **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  $0.030 \sim 0.065 \text{ mm}$ 

 $(0.0012 \sim 0.0026 \text{ in})$ 

<Limit>: 0.115 mm (0.005 in)

2nd ring

 $0.020 \sim 0.055 \, \text{mm}$ 

(0.0008  $\sim$  0.0022 in)

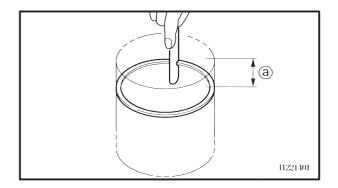
<Limit>: 0.115 mm (0.005 in)

- 2. Install:
  - piston ring (into the cylinder)

NOTE:

Level the piston ring in the cylinder with the piston crown.

(a) 5 mm (0.20 in)



**ENG** 

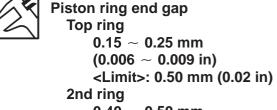


- 3. Measure:
  - piston ring end gap

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.



 $0.40 \sim 0.50 \text{ mm}$  $(0.016 \sim 0.02 \text{ in})$ 

<Limit>: 0.85 mm (0.033 in)

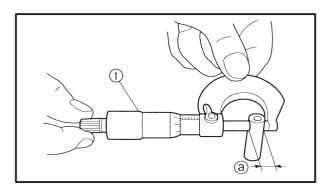
Oil ring  $0.10 \sim 0.35 \text{ mm}$  $(0.004 \sim 0.014 in)$ 

#### **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:

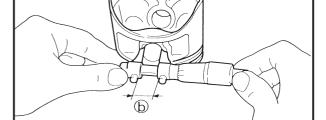
• piston pin outside diameter (a) Out of specification → Replace the piston pin.



Piston pin outside diameter 15.991 ~ 16.000 mm  $(0.6296 \sim 0.6299 in)$ 



 piston pin bore diameter (in the piston) Out of specification → Replace the piston pin.





Piston pin bore diameter (in the piston) 16.002 ~ 16.013 mm  $(0.6300 \sim 0.6304 \text{ in})$ 

ENG

- 4. Calculate:
- piston-pin-to-piston-pin-bore clearance
   Out of specification → Replace the piston pin.

Piston-pin-to-piston-pin-bore clearance = Piston pin bore diameter (in the piston)

\_

Piston pin outside diameter



Piston-pin-to-piston-pin-bore clearance

 $0.002 \sim 0.022 \text{ mm}$  (0.00008  $\sim 0.0009 \text{ in}$ )

<Limit>: 0.072 mm (0.0028 in)

#### CHECKING THE BIG END BEARINGS

- 1. Measure:
  - crankshaft-pin-to-big-end-bearing clearance
     Out of specification → Replace the big end bearings.



Crankshaft-pin-to-big-endbearing clearance  $0.028 \sim 0.052 \text{ mm}$   $(0.0011 \sim 0.002 \text{ in})$ 

The following procedure applies to all of the connecting rods.

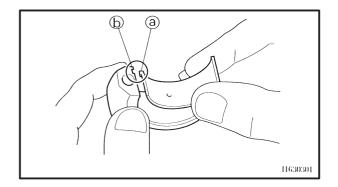
#### **CAUTION:**

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

- a. Clean the big end bearings, crankshaft pins, and bearing portions of the connecting rods.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

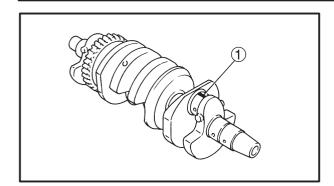
#### NOTE: -

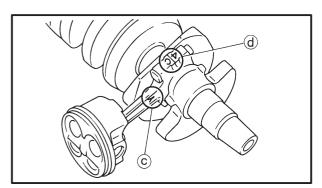
Align the projections (a) on the big end bearings with the notches (b) in the connecting rod and connecting rod cap.











- c. Put a piece of Plastigauge<sup>®</sup> 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 and nut seats 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.
- e. Tighten the connecting rod nuts.

#### **CAUTION:**

- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- After tightening the connecting rod nut to the specified torque, turn the connecting rod nut another+90°.

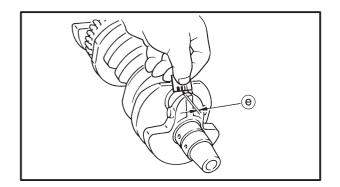
Refer to "INSTALLING THE PISTONS AND CONNECTING RODS".



Connecting rod nut 15 Nm (1.5 m•kg, 11 ft•lb) + 90°

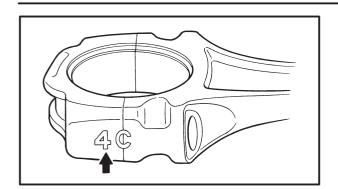
- f. Remove the connecting rod and big end bearings.
  - Refer to "REMOVING THE CONNECTING RODS AND PISTONS".
- g. Measure the compressed Plastigauge<sup>®</sup> width <sup>®</sup> on the crankshaft pin.

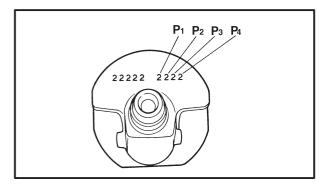
  If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

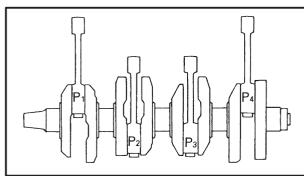


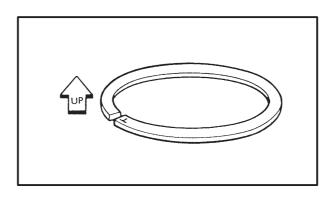












2. Select:

big end bearings ("P₁" ~ "P₄")

NOTE:

• The numbers stamped into the crankshaft web and the numbers on the connecting rods are used to determine the replacement big end bearing sizes.

• "P<sub>1</sub>" ~ "P<sub>4</sub>" 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 "1" respectively, then the bearing size for "P<sub>1</sub>" is:

"P<sub>1</sub>" (connecting rod) – "P<sub>1</sub>" (crankshaft) = 5 – 1 = 4

| BIG END BEARIN | BIG END BEARING COLOR CODE |  |
|----------------|----------------------------|--|
| 1              | blue                       |  |
| 2              | black                      |  |
| 3              | brown                      |  |
| 4              | green                      |  |

FAS00271

# INSTALLING THE PISTONS AND CONNECTING RODS

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

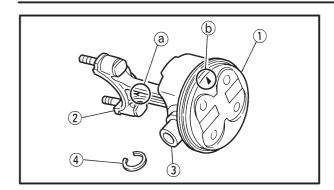
- 1. Install:
  - top ring
  - 2nd ring
  - oil ring

NOTE:

Be sure to install the piston rings so that the manufacturer's marks or numbers face up.



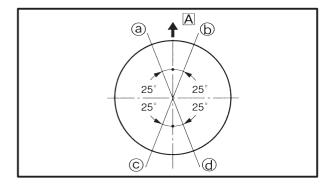




- 2. Install:
  - piston (1) (onto the respective connecting rod 2)
  - piston pin (3)
  - piston pi clip 4 New

#### NOTE: -

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark a on the connecting rod faces left when the arrow mark (b) on the piston is pointing up. Refer to the illustra-
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



- 3. Offset:
  - piston ring end gaps
- (a) Top ring
- (b) Lower oil ring rail
- © Upper oil ring rail
- d 2nd ring
- A Intake side
- 4. Lubricate:
  - piston
  - piston rings
  - cylinder

(with the recommended lubricant)



**Recommended lubricant** Engine oil

- 5. Lubricate:
  - bolt threads
  - nut seats

(with the recommended lubricant)



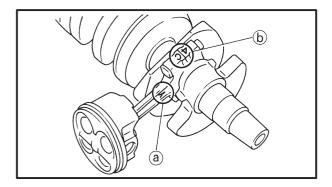
Recommended lubricant Molybdenum disulfide grease



- 6. Lubricate:
  - crankshaft pins
  - big end bearings
  - connecting rod big end inner surface (with the recommended lubricant)



Recommended lubricant Engine oil



#### 7. Install:

- big end bearings
- connecting rod assembly (into the cylinder and onto the crankshaft pin).
- connecting rod cap (onto the connecting rod)

#### NOTE: -

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.
- Make sure that the "Y" marks (a) on the connecting rods face towards the left side of the crankshaft.
- 8. Align:
  - bolt heads (with the connecting rod caps)
- 9. Tighten:
  - connecting rod nuts

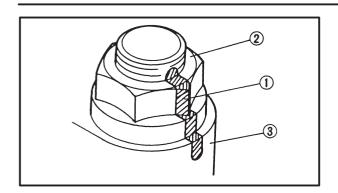
15 Nm (1.5 m•kg, 11 ft•lb)+90°

a. Replace the connecting rod bolts and nuts with new ones.

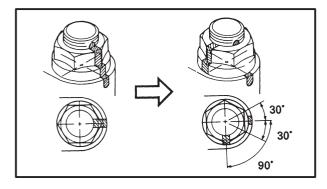
#### **CAUTION:**

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts and nuts.





- b. Clean the connecting rod bolts and nuts.
- c. Tighten the connecting rod nuts.
- d. Put a mark ① on the corner of the connecting rod nut ② and the connecting rod ③.



e. Tighten the nut further to reach the specified angle (90°).

# **A** WARNING

When the nut is tightened more than the specified angle, do not loosen the nut and then retighten it.

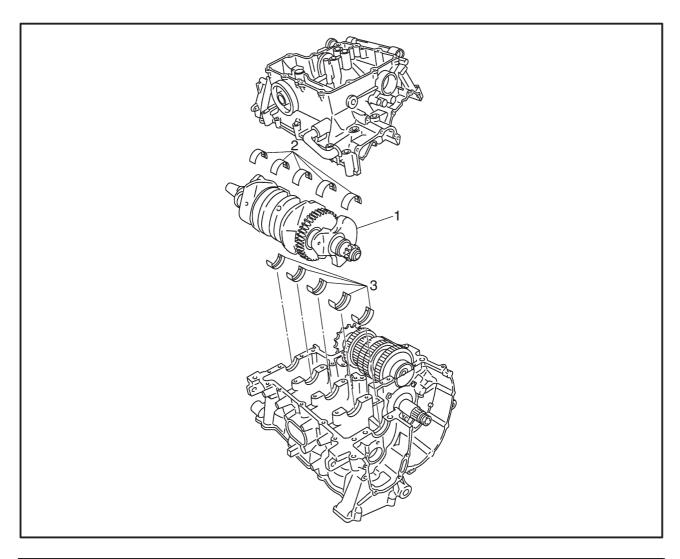
Replace the bolt with a new one and perform the procedure again.

### **CAUTION:**

- Do not use a torque wrench to tighten the nut to the specified angle.
- Tighten the nut until it is at the specified angles.

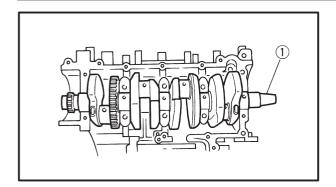
When using a hexagonal nut, note that the angle from one corner to another is  $60^{\circ}$ .

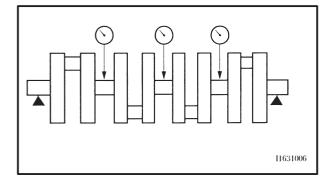
# **CRANKSHAFT**



| Order       | Job/Part                                                                     | Q'ty            | Remarks                                                                                                       |
|-------------|------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------|
|             | Removing the crankshaft Crankcase lower Connecting rods and pistons          |                 | Remove the parts in the order listed. Separate. Refer to "CRANKCASE". Refer to "CONNECTING RODS AND PISTONS". |
| 1<br>2<br>3 | Crankshaft Crankshaft journal lower bearing Crankshaft journal upper bearing | 1 -<br>5<br>5 - | Refer to "REMOVING/INSTALLING THE CRANKSHAFT".  For installation, reverse the removal procedure.              |







EAS00387

#### REMOVING THE CRANKSHAFT

- 1. Remove:
  - crankshaft (1)
- crankshaft journal upper bearings (from the upper / lower crankcase)

#### NOTE:

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

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#### CHECKING THE CRANKSHAFT

- 1. Measure:
  - crankshaft runout
     Out of specification → Replace the crankshaft.



Max. crankshaft runout 0.03 mm (0.0012 in)

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

## CHECKING THE CRANKSHAFT JOURNAL BEARINGS

- 1. Measure:
  - crankshaft-journal-to-crankshaft-journalbearing clearance
     Out of specification → Replace the crankshaft journal bearings.



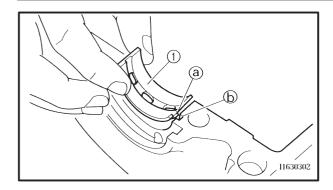
Crankshaft-journal-to-crankshaftjournal-bearing clearance  $0.034 \sim 0.058 \text{ mm}$  (0.0013  $\sim 0.0023 \text{ in}$ )

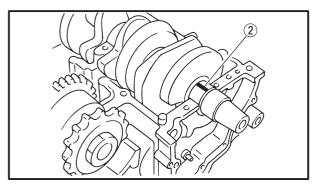
#### **CAUTION:**

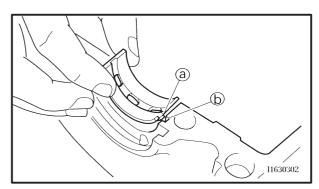
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

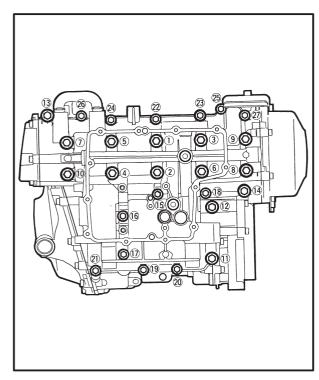












- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a hench.
- c. Install the crankshaft journal upper bearings

  (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 into the lower crankcase and assemble the crankcase.

#### NOTE: -

- Align the projections (a) on 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.



Bolt (5) ~ (27) 12 Nm (1.2 m•kg, 8.7 ft•lb) Bolt (3) (4) 14 Nm (1.4 m•kg, 10 ft•lb)

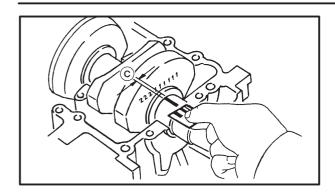
Bolt ① ~ ② 24 Nm (2.4 m•kg, 17 ft•lb)

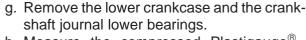
#### NOTE:

Lubricate the crankcase bolt threads with engine oil.



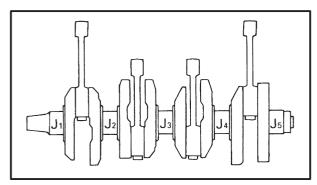






h. Measure the compressed Plastigauge<sup>®</sup> width © each crankshaft journal.

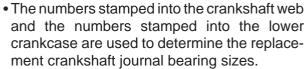
If the clearance is out of specification, select replacement crankshaft journal bearings.



#### 2. Select:

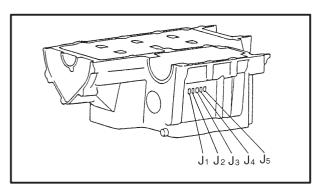
crankshaft journal bearings (J<sub>1</sub> ∼ J<sub>5</sub>)

NOTE: -

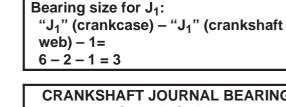


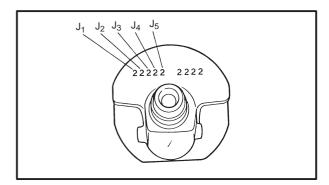
• " $J_1$ "  $\sim$  " $J_5$ " refer to the bearings shown in the crankshaft illustration.

• If " $J_1$ "  $\sim$  " $J_5$ " are the same, use the same size for all of the bearings.



For example, if the crankcase " $J_1$ " and crankshaft web " $J_1$ " numbers are "6" and "2" respectively, then the bearing size for " $J_1$ " is:



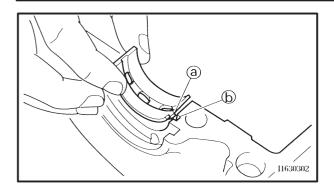


| CRANKSHAFT JOURNAL BEARING<br>COLOR CODE |       |  |
|------------------------------------------|-------|--|
| 0                                        | White |  |
| 1                                        | Blue  |  |
| 2                                        | Black |  |
| 3                                        | Brown |  |
| 4                                        | Green |  |

NOTE:

If the size is the same for all " $J_1$  to  $J_5$ ", one digit for that size is indicated. (crankcase side only)





EAS00407

#### **INSTALLING THE CRANKSHAFT**

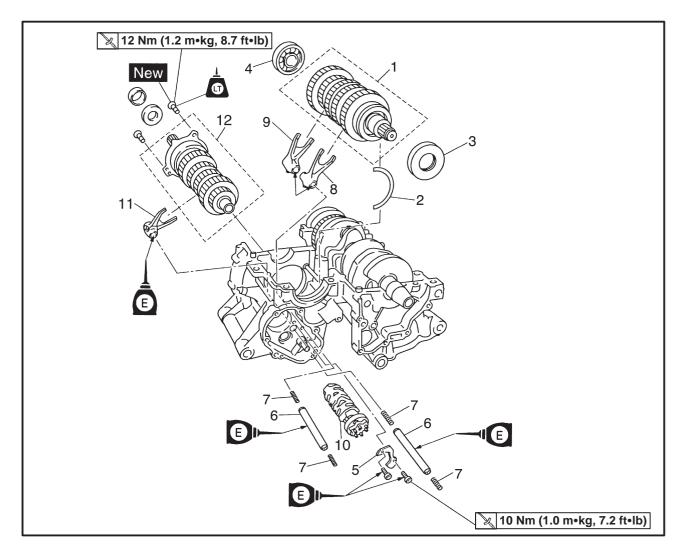
- 1. Install:
- crankshaft journal upper bearings (into the upper / lower crankcase)

NOTE: -

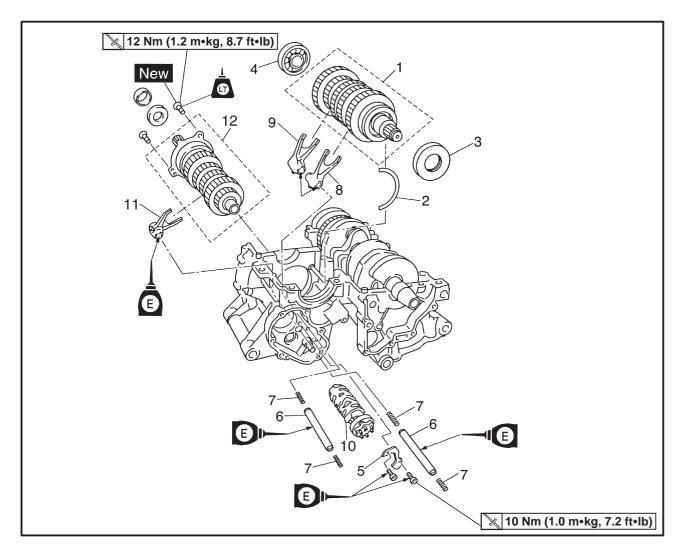
- Align the projections ⓐ on the crankshaft journal upper bearings with the notches ⓑ in the upper crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.

EAS00419

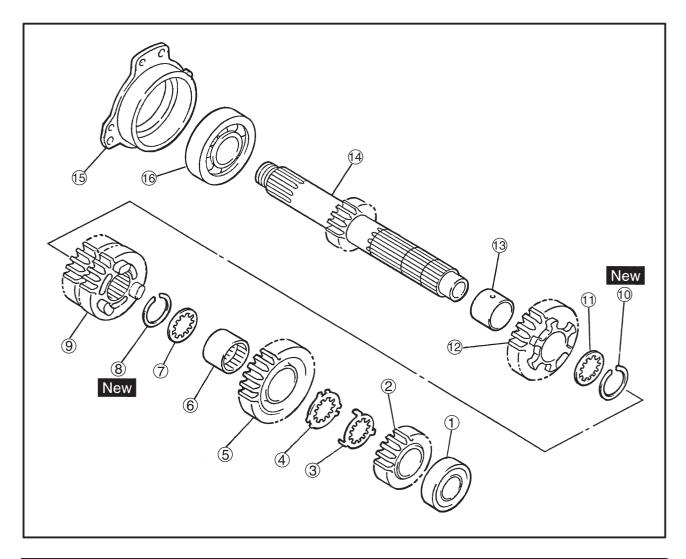
#### **TRANSMISSION**



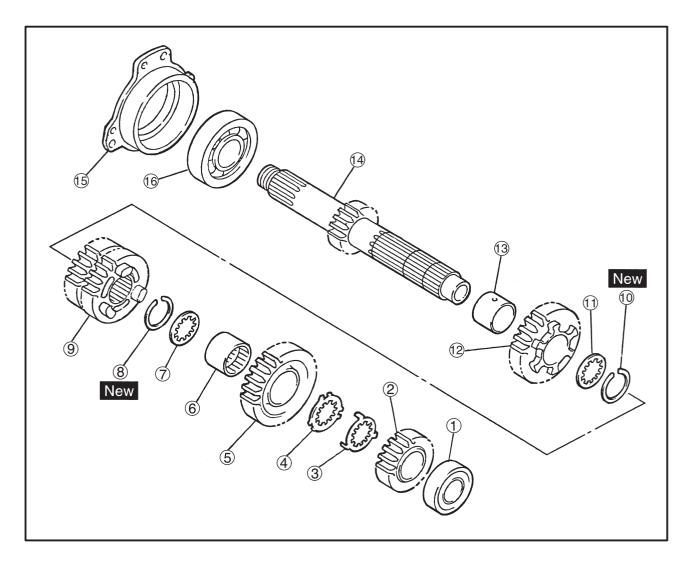
| Order | Job/Part                                     | Q'ty | Remarks                                                               |
|-------|----------------------------------------------|------|-----------------------------------------------------------------------|
|       | Removing the transmission<br>Crankcase lower |      | Remove the parts in the order listed. Separate. Refer to "CRANKCASE". |
|       | Shift shaft and stopper lever                |      | Refer to "SHIFT SHAFT".                                               |
| 1     | Drive axle assembly                          | 1    |                                                                       |
| 2     | Circlip                                      | 1    |                                                                       |
| 3     | Oil seal                                     | 1    |                                                                       |
| 4     | Bearing                                      | 1    |                                                                       |
| 5     | Shift bar stopper                            | 1    |                                                                       |
| 6     | Shift fork guide bar                         | 2    |                                                                       |



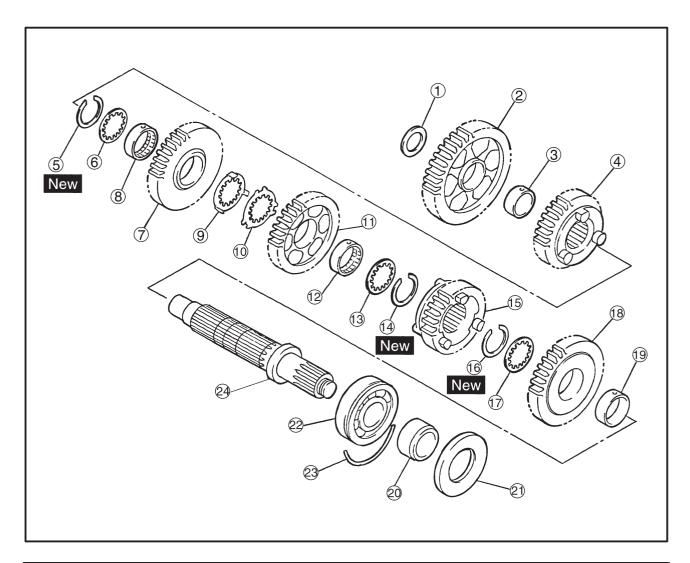
| Order                         | Job/Part                                                                                   | Q'ty                           | Remarks                                                                                                                         |
|-------------------------------|--------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 7<br>8<br>9<br>10<br>11<br>12 | Spring Shift fork "L" Shift fork "R" Shift drum assembly Shift fork "C" Main axle assembly | 4 -<br>1<br>1<br>1<br>1 -<br>1 | Refer to "INSTALLING THE TRANSMISSION". Refer to "REMOVING THE TRANSMISSION".  For installation, reverse the removal procedure. |



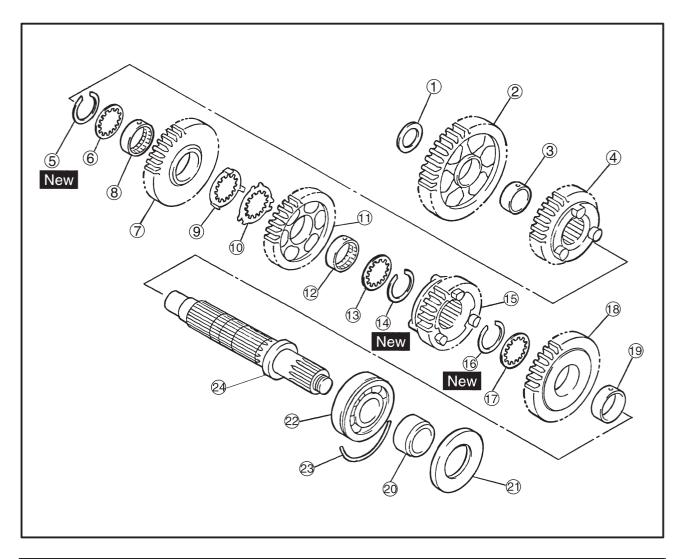
| Order     | Job/Part                                                                                                       | Q'ty                            | Remarks                               |
|-----------|----------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------|
| 1 2 3     | Disassembling the main axle assembly Bearing 2nd pinion gear                                                   | 1                               | Remove the parts in the order listed. |
| )34567890 | Toothed lock washer Toothed lock washer retainer 6th pinion gear Collar Washer Circlip 3rd pinion gear Circlip | 1<br>1<br>1<br>1<br>1<br>1<br>1 |                                       |



| Order                                  | Job/Part                                                        | Q'ty                  | Remarks                                          |
|----------------------------------------|-----------------------------------------------------------------|-----------------------|--------------------------------------------------|
| (1)<br>(2)<br>(3)<br>(4)<br>(5)<br>(6) | Washer 5th pinion gear Collar Main axle Bearing housing Bearing | 1<br>1<br>1<br>1<br>1 | For installation, reverse the removal procedure. |



| Order       | Job/Part                                                                                                                                                                               | Q'ty                                      | Remarks                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------|
| 12345678991 | Disassembling the drive axle assembly Washer 1st wheel gear Collar 5th wheel gear Circlip Washer 3rd wheel gear Collar Toothed lock washer Toothed lock washer retainer 4th wheel gear | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | Remove the parts in the order listed. |



| Order                                                          | Job/Part       | Q'ty | Remarks                                          |
|----------------------------------------------------------------|----------------|------|--------------------------------------------------|
| 12                                                             | Collar         | 1    |                                                  |
|                                                                | Washer         | 1    |                                                  |
| (3) (4) (6) (6) (7) (8) (9) (9) (9) (9) (9) (9) (9) (9) (9) (9 | Circrip        | 1    |                                                  |
| 15                                                             | 6th wheel gear | 1    |                                                  |
| 16                                                             | Circrip        | 1    |                                                  |
| 17                                                             | washer         | 1    |                                                  |
| 18                                                             | 2nd wheel gear | 1    |                                                  |
| 19                                                             | Collar         | 1    |                                                  |
| 20                                                             | Collar         | 1    |                                                  |
| 21)                                                            | Oil seal       | 1    |                                                  |
| 22                                                             | Bearing        | 1    |                                                  |
| 23                                                             | Circrip        | 1    |                                                  |
| 24                                                             | Drive axle     | 1    |                                                  |
|                                                                |                |      | For installation, reverse the removal procedure. |



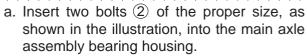


#### **REMOVING THE TRANSMISSION**

1. Remove:

EAS00420

- drive axle assembly
- 2. Remove:
  - main axle assembly ①
    (with the Torx® wrench T30)



- 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.

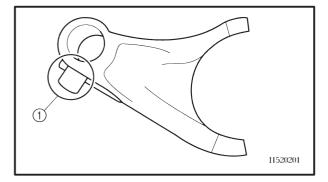
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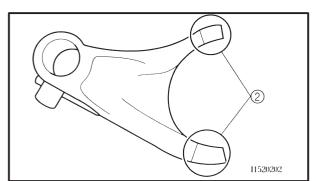


#### **CHECKING THE SHIFT FORKS**

The following procedure applies to all of the shift forks.

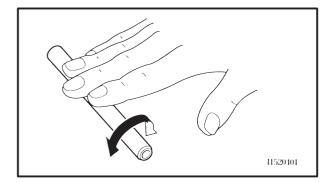
- 1. Check:
  - shift fork cam follower (1)
  - shift fork pawl ②
     Bends/damage/scoring/wear →
     Replace the shift fork.





#### 2. Check:

shift fork guide bar
 Roll the shift fork guide bar on a flat surface.
 Bends → Replace.



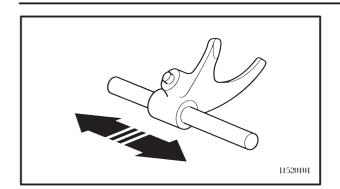
#### **A** WARNING

Do not attempt to straighten a bent shift fork guide bar.

#### **TRANSMISSION**



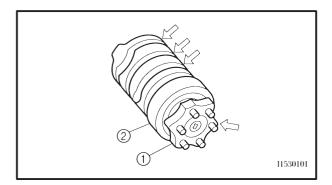




#### 3. Check:

shift fork movement

 (along the shift fork guide bar)
 Rough movement → Replace the shift fork(-s) and shift fork guide bar as a set.



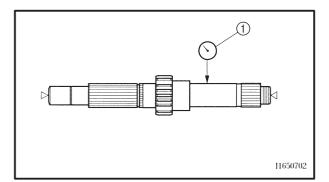
#### EAS00422

#### CHECKING THE SHIFT DRUM ASSEMBLY

#### 1. Check:

- shift drum grooves
   Damage/scratches/wear → Replace the shift drum assembly.
- shift drum segment ①
   Damage/wear → Replace the shift drum assembly.
- shift drum bearing ②
  Damage/pitting → Replace the shift drum assembly.

  EASO0425



#### **CHECKING THE TRANSMISSION**

#### Measure:

 main axle runout (with a centering device and dial gauge ①)
 Out of specification → Replace the main axle.



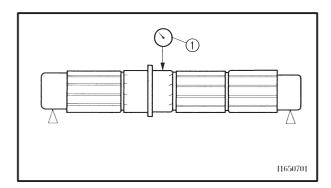
Max. main axle runout 0.02 mm (0.0008 in)



drive axle runout
 (with a centering device and dial gauge ①)
 Out of specification → Replace the drive axle.



Max. drive axle runout 0.02 mm (0.0008 in)



## 3. Che • trar

#### 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).

#### **TRANSMISSION**

ENG

- 4. Check:
- transmission gear engagement (each pinion gear to its respective wheel gear)

Incorrect  $\rightarrow$  Reassemble the transmission axle assemblies.

- 5. Check:
  - transmission gear movement Rough movement → Replace the defective part(-s).
- 6. Check:
  - circlips
    Bends/damage/looseness → Replace.

#### **INSTALLING THE TRANSMISSION**

- 1. Install:
  - main axle assembly
  - shift fork "C"
  - shift drum assembly
  - shift fork "R"
  - shift fork "L"
  - springs
  - shift fork guide bars
  - drive axle assembly

#### NOTE: -

- 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.
- 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 is inserted into the grooves in the upper crankcase.
- 2. Check:
- transmission
   Rough movement → Repair.

#### NOTE: -

Oil each gear, shaft, and bearing thoroughly.

ENG



# CHAPTER 5. COOLING SYSTEM

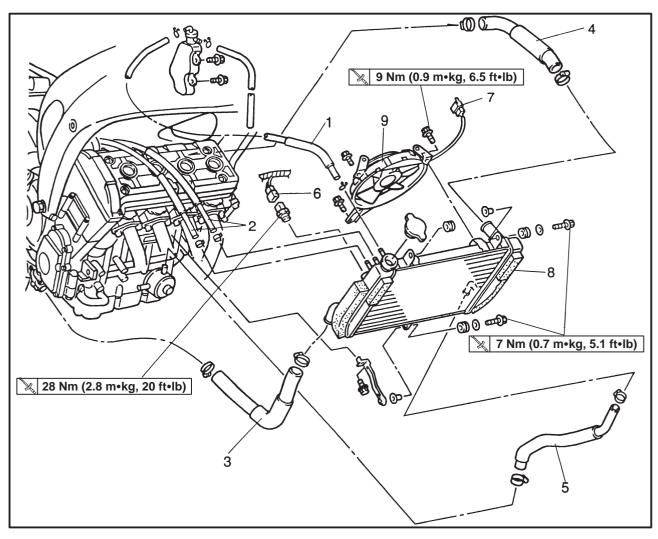
| RADIATOR                     | 5-1  |
|------------------------------|------|
| CHECKING THE RADIATOR        | 5-3  |
| INSTALLING THE RADIATOR      | 5-4  |
| OIL COOLER                   |      |
| CHECKING THE OIL COOLER      | 5-7  |
| INSTALLING THE OIL COOLER    | 5-7  |
| THERMOSTAT                   |      |
| CHECKING THE THERMOSTAT      |      |
| INSTALLING THE THERMOSTAT    | 5-11 |
| WATER PUMP                   |      |
| DISASSEMBLING THE WATER PUMP |      |
| CHECKING THE WATER PUMP      | 5-15 |
| ASSEMBLING THE WATER PLIMP   | 5-16 |





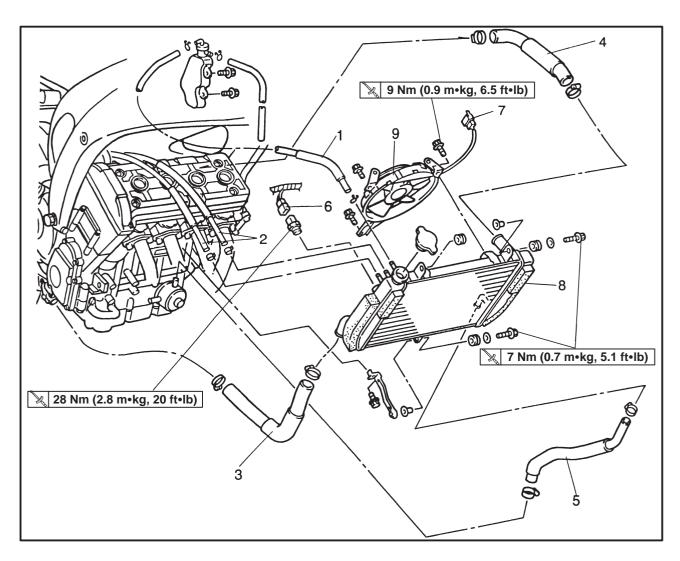
### **COOLING SYSTEM**

### **RADIATOR**



| Order | Job/Part                                        | Q'ty | Remarks                                                                                    |
|-------|-------------------------------------------------|------|--------------------------------------------------------------------------------------------|
|       | Removeing the radiator Rider seat and fuel tank |      | Remove the parts in the order listed.<br>Refer to "SEATS" and "FUEL TANK" in<br>chapter 3. |
|       | Air filter case and heat protector plate        |      | Refer to "AIRFILTER CASE AND IGNITION COILS" in chapter 3.                                 |
|       | Bottom cowling and side cowlings Coolant        |      | Refer to "COWLINGS" in chapter 3. Drain.                                                   |
| 1     | Coolant reserver hose                           | 1    |                                                                                            |
| 2     | Breather hose                                   | 2    |                                                                                            |
| 3     | Radiator outlet hose                            | 1    | Disconnect.                                                                                |

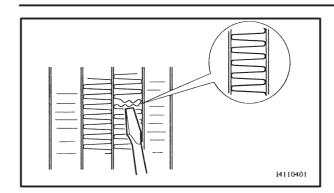




| Order                      | Job/Part                                                                                                                   | Q'ty                  | Remarks                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------|
| 4<br>5<br>6<br>7<br>8<br>9 | Radiator inlet hose Oil cooler outlet hose Thermo switch coupler Radiator fan motor coupler Radiator Radiator Radiator fan | 1<br>1<br>1<br>1<br>1 | Disconnect.  Disconnect.  Disconnect.  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.

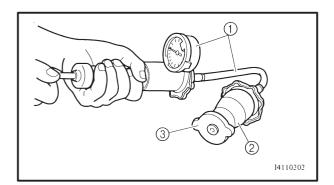
Damage → Repair or replace.

#### NOTE: -

Straighten any flattened fins with a thin, flathead screwdriver.

#### 2. Check:

radiator hoses
 Cracks/damage → Replace.



#### 3. Measure:

radiator cap opening pressure
 Below the specified pressure → Replace the radiator cap.



Radiator cap opening pressure

110 ~ 140 kPa

 $(1.1 \sim 1.4 \text{ kg/cm}^2)$ 

 $16.0 \sim 20.3 \text{ psi}$ )

a. Install the radiator cap tester ① and adapter
② onto the radiator cap ③.



Radiator cap tester 90890-01325, YU-24460-01 Adapter 90890-01352, YU-33984

 Apply the specified pressure for ten seconds and make sure that there is no drop in pressure.

#### 4. Check:

radiator fan

Damage → Replace.

Malfunction → Check and repair.

Refer to "COOLING SYSTEM" in chapter 8.

#### **RADIATOR**



EAS00456

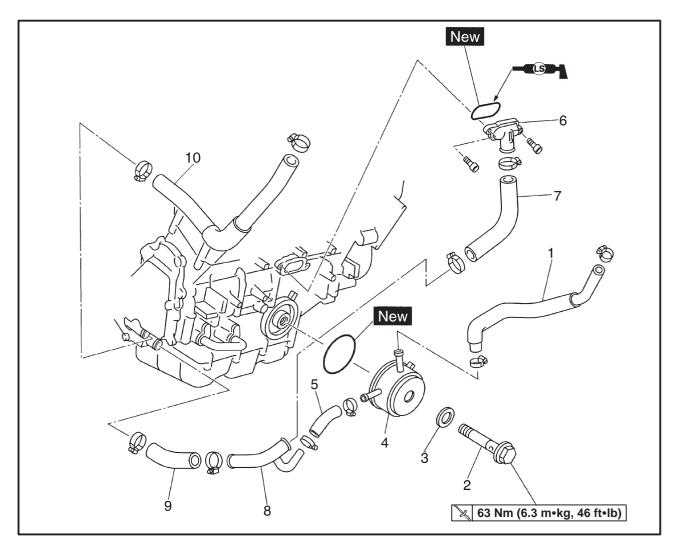
#### **INSTALLING THE RADIATOR**

- 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".

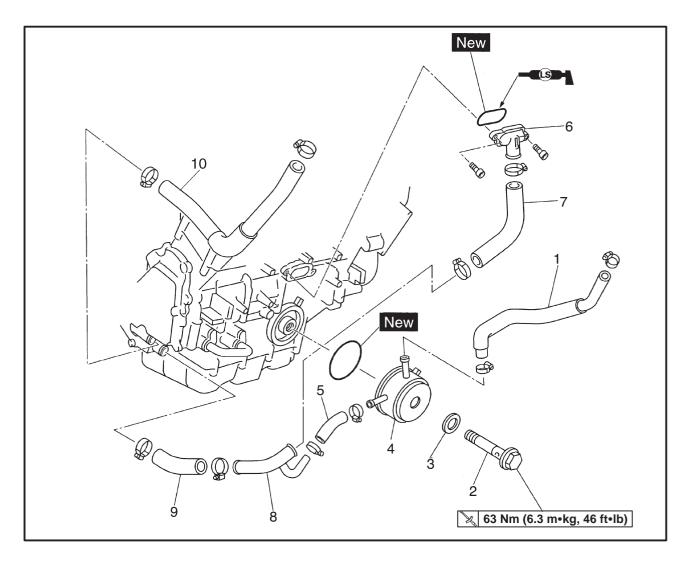


## OIL COOLER



| Order            | Job/Part                                                                  | Q'ty                 | Remarks                                                                                                                                            |
|------------------|---------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Removing the oil cooler Radiator assembly Exaust pipe assembly Engine oil |                      | Remove the parts in the order listed. Refer to "RADIATOR". Refer to "ENGINE" in chapter 4. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. |
| 1<br>2<br>3<br>4 | Oil cooler outlet hose<br>Bolt<br>Washer<br>Oil cooler                    | 1<br>1 -<br>1<br>1 - | Refer to "INSTALLING THE OIL COOLER".                                                                                                              |

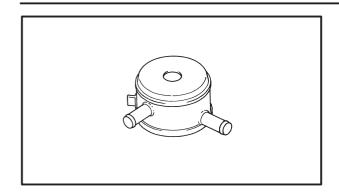




| Order                       | Job/Part                                                                                                                             | Q'ty                  | Remarks                                          |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------|
| 5<br>6<br>7<br>8<br>9<br>10 | Oil cooler inlet hose Water jacket joint Water jacket joint hose Water pump outlet pipe Water pump outlet hose Water pump inlet hose | 1<br>1<br>1<br>1<br>1 | For installation, reverse the removal procedure. |

#### **OIL COOLER**





EAS00458

#### **CHECKING THE OIL COOLER**

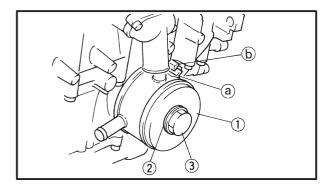
- 1. Check:
  - oil cooler
     Cracks/damage → Replace.
- 2. Check:
  - oil cooler inlet hose
  - oil cooler outlet hose Cracks/damage/wear → Replace.
- 3. Check:
  - water jacket joint
  - water jacket joint inlet hose
  - water pump outlet hose Cracks/damage → Replace.

EBS00459

#### **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)

#### NOTE: -

- 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. Bend the lock washer tab along a flat side of the bolt.

#### **OIL COOLER**



- 4. Fill:
  - cooling system
     (with the specified amount of the recommended coolant)

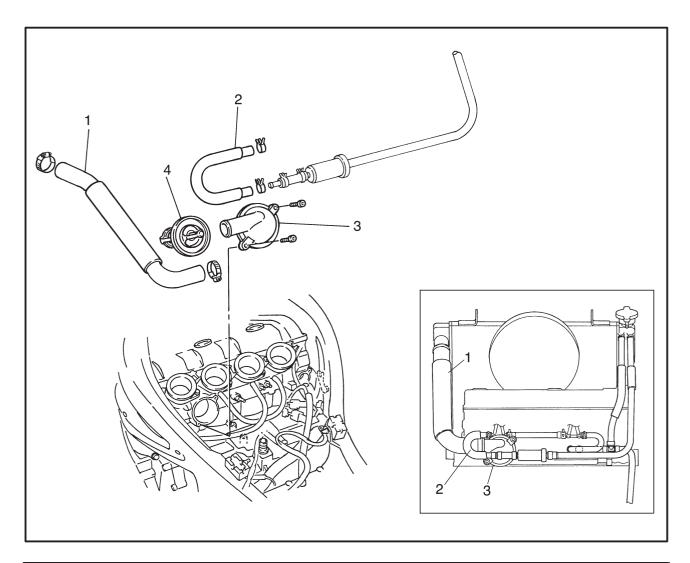
     Refer to "CHANGING THE COOLANT" in chapter 3.
- crankcase

   (with the specified amount of the recommended engine oil)
   Refer to "CHANGING THE ENGINE OIL" in chapter 3.
- 5. Check:
  - cooling system
     Leaks → Repair or replace any faulty part.
- 6. Measure:
  - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

     Refer to "CHECKING THE RADIATOR".

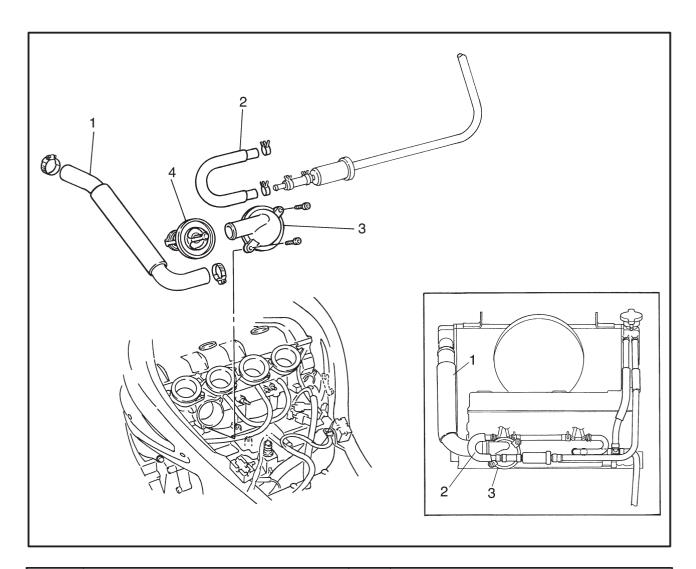


### **THERMOSTAT**



| Order | Job/Part                                        | Q'ty | Remarks                                                                             |
|-------|-------------------------------------------------|------|-------------------------------------------------------------------------------------|
|       | Removing the termostat Rider seat and fuel tank |      | Remove the parts in the order listed. Refer to "SEAT" and "FUEL TANK" in chapter 3. |
|       | Coolant                                         |      | Drain. Refer to "CHANGING THE COOLANT" in                                           |
|       | Air filter case                                 |      | chapter 3. Refer to "AIRFILTER CASE AND IGNITION COILS" in chapter 3.               |
|       | Carburetor assembly                             |      | Refer to "CARBURETORS" in chapter 6.                                                |

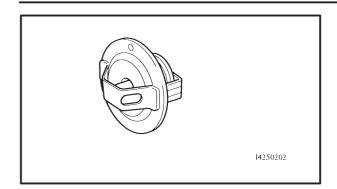


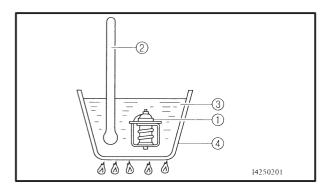


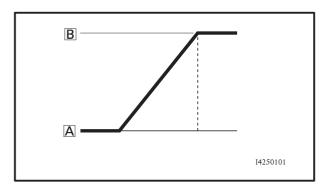
| Order            | Job/Part                                                                        | Q'ty | Remarks                                                                             |
|------------------|---------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4 | Radiator inlet hose<br>Carburator outlet hose<br>Thermostat cover<br>Thermostat |      | Refer to "INSTALLING THE THERMOSTAT For installation, revers the removal procedure. |

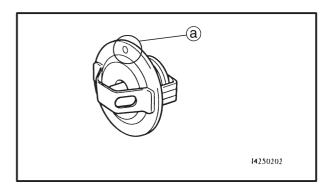
#### **THERMOSTAT**

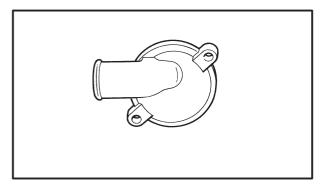












FAS00462

#### **CHECKING THE THERMOSTAT**

- 1. Check:
- thermostat (1)

Does not open at 71  $\sim$  84°C (160  $\sim$  183°F) (without California)  $\rightarrow$  Replace. Does not open at 82  $\sim$  95°C (178  $\sim$  203°F)

(California) → 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 Thermostat
- (2) Thermometer
- (3) Water
- (4) Container
- A Fully closed
- B Fully opens

#### 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
  - thermostat housing Cracks/damage → Replace.

EB00467

#### **INSTALLING THE THERMOSTAT**

- 1. Install:
  - thermostat

#### NOTE: \_

Install the thermostat with its breather hole ⓐ facing up.

- 2. Install
  - thermostat cover

10 Nm (1.0 m•kg, 7.2 ft•lb)

#### NOTE: -

Befor installing the thermostat cover to the cylinder head, lubricate the O-ring with a thin coat of litium soap base grease.

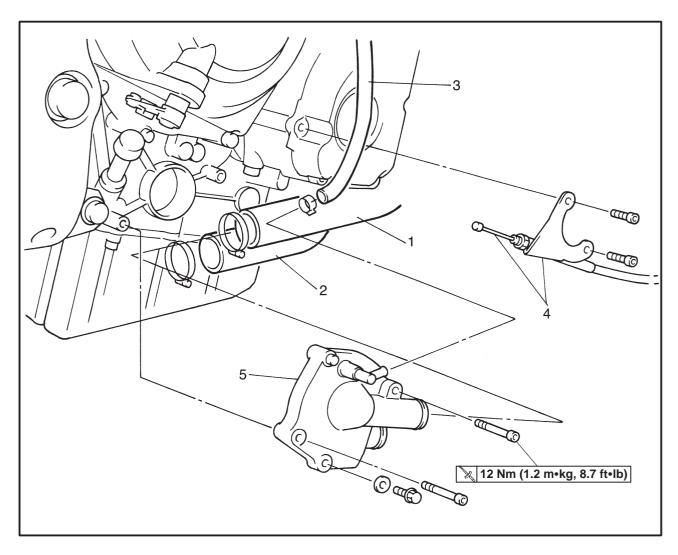
#### **THERMOSTAT**



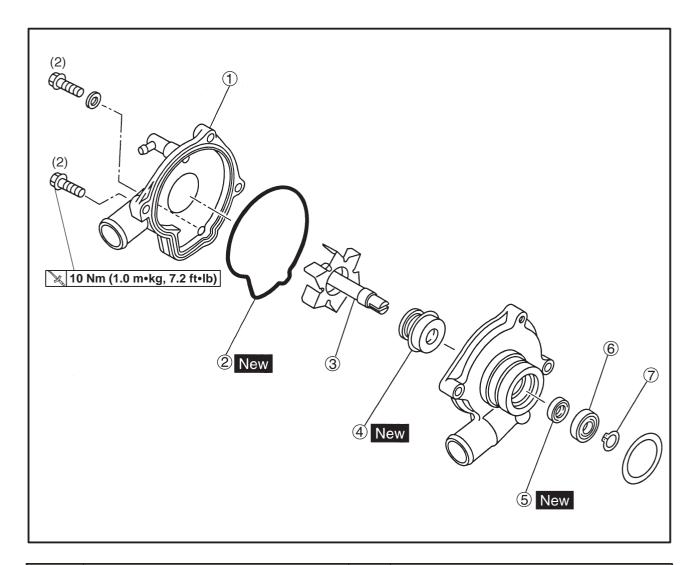
- 3. Fill:
  - coolling system
     (with the specified amount of the recommended coolant)

     Refer to "CHANGING THE COOLANT" in chapter 3.
- 4. Check:
  - cooling system
     Leaks → Repair or replace any faulty part.
- 5. Measure:
  - radiator cap opening pressure
     Below the specified pressure → Replace the
     radiator cap.
     Refer to "CHECKING THE RADIATOR".



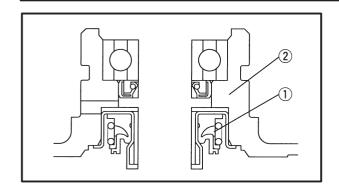


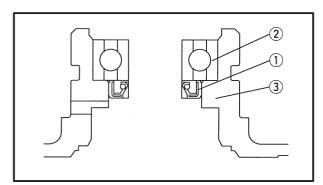
| Order                 | Job/Part                                                                                       | Q'ty                  | Remarks                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
|                       | Removing the water pump assembly Coolant                                                       |                       | Remove the parts in the order listed. Drain. Refer to "CHANGING THE COOLANT" in chapter 3. |
| 1<br>2<br>3<br>4<br>5 | Water pump inlet hose Water pump outlet hose Water pump hose Clutch wire and holder Water pump | 1<br>1<br>1<br>1<br>1 | For installation, reverse the removal procedure.                                           |

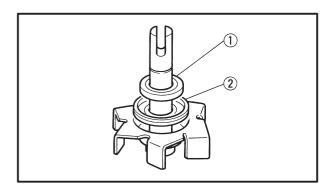


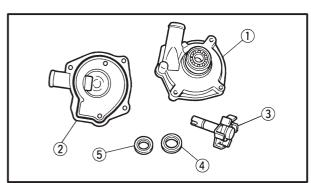
| Order   | Job/Part                                                                                                                                        | Q'ty                              | Remarks                                                                                                                                            |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1034567 | Disassembling the water pump assembly Water pump cover O-ring Impeller shaft (along with the impeller) Water pump seal Oil seal Bearing Circlip | 1 -<br>1<br>1<br>1<br>1<br>1<br>1 | Disassemble the parts in the order listed.  Refer to "DISASSEMBLING/ ASSEMBLING THE WATER PUMP".  For assembly, reverse the disassembly procedure. |











EAS00470

#### **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)
  - circlip
  - 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.

EAS00474

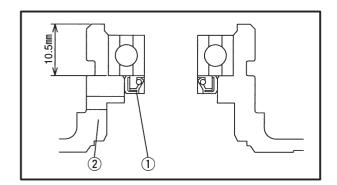
#### **CHECKING THE WATER PUMP**

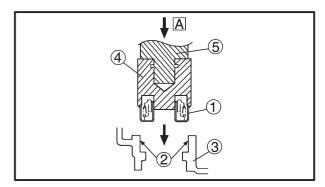
- 1. Check:
  - water pump housing cover 1
- water pump housing ②
- impeller ③
- rubber damper 4
- rubber damper holder ⑤
  Cracks/damage/wear → Replace.
- 2. Check:
  - water pump seal
  - oil seal

Cracks/damage/wear → Replace.

 bearing Rough movement → Replace.







#### **ASSEMBLING THE WATER PUMP**

- 1. Install:
  - bearing oil seal 1 New

(into the water pump housing 2)

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket that matches its outside diameter.
- 2. Install:
  - water pump seal 1 New

#### **CAUTION:**

Never lubricate the water pump seal surface with oil or grease.

#### NOTE: -

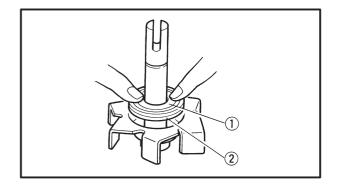
- Install the water pump seal with the special
- Before installing the water pump seal, apply Yamaha bond No.1215 (2) to the water pump housing (3).



Mechanical seal installer 90890-04078, YM-33221 (4) Middle driven shaft bearing driver

90890-04058, YM-04058-1 (5) Yamaha bond No. 1215 90890-85505, ACC-1100-15-01

A Push down.



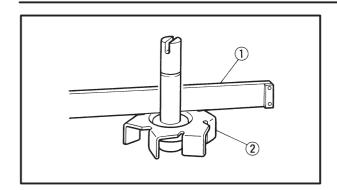
- 3. Install:
  - rubber damper 1 New
  - rubber damper holder ② New



NOTE: -

Before installing the rubber damper, apply tap water or coolant onto its outer surface.





4. Measure:

• impeller shaft tilt
 Out of specification → Repeat steps (3) and (4).

#### **CAUTION:**

Make sure that the rubber damper and rubber damper holder are flush with the impeller.



Max. impeller shaft tilt 0.15 mm (0.006 in)

- 1 Straightedge
- (2) Impeller





# CHAPTER 6. CARBURETORS

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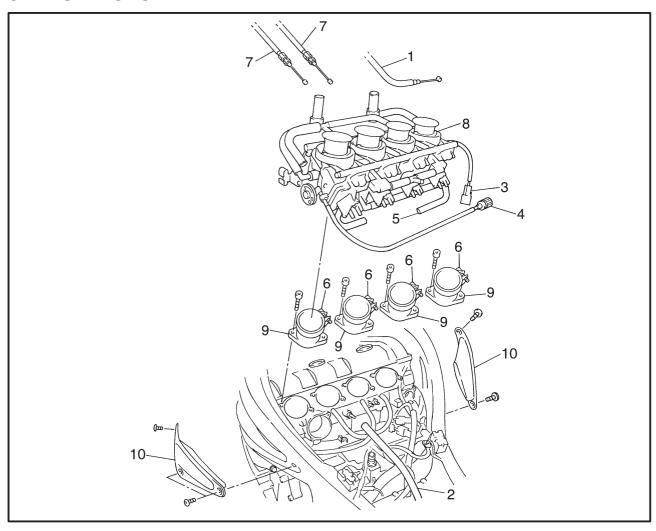




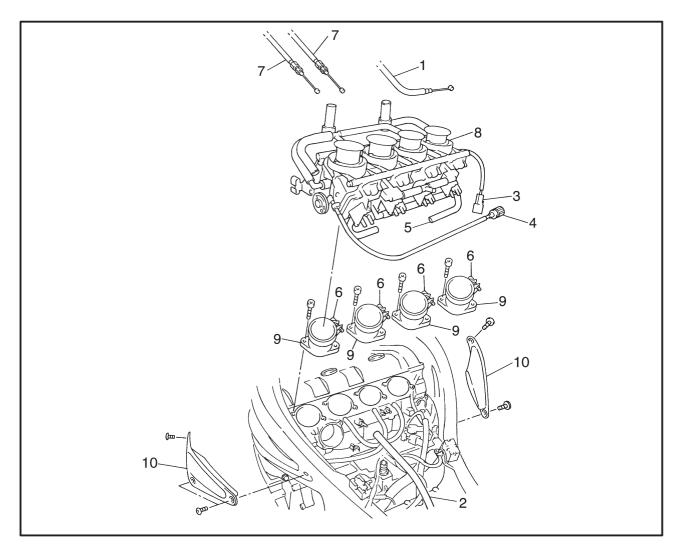
EAS00481

# **CARBURETORS**

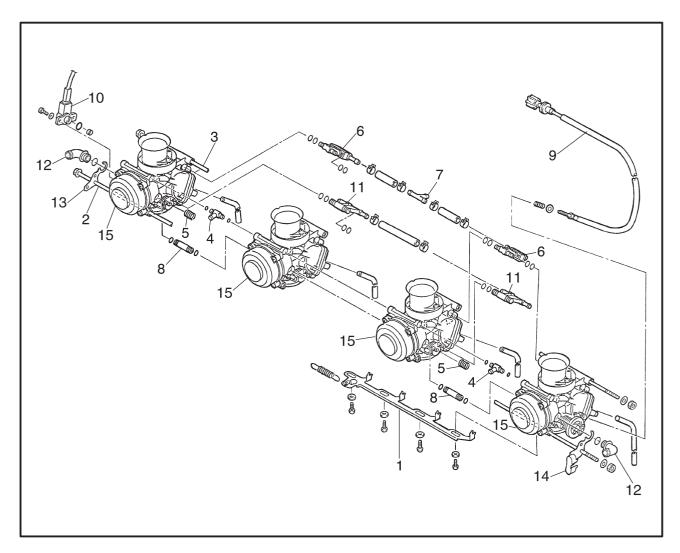
# **CARBURETORS**



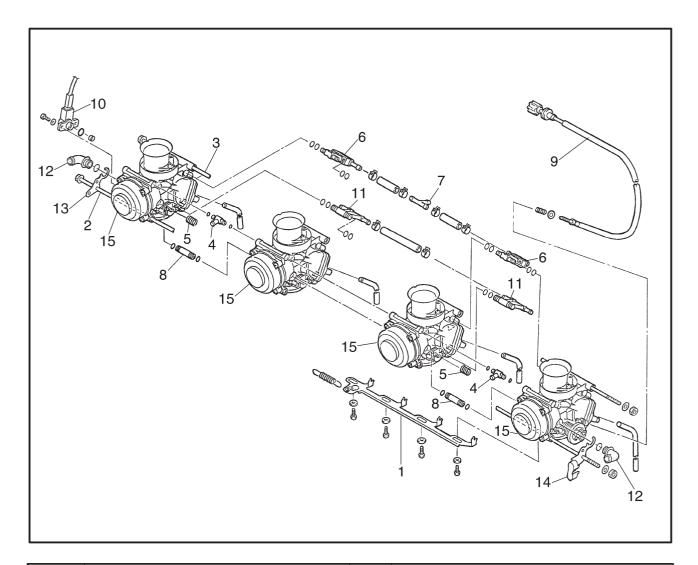
| Order | Job/Part                                          | Q'ty | Remarks                                                                              |
|-------|---------------------------------------------------|------|--------------------------------------------------------------------------------------|
|       | Removing the carburetors Rider seat and fuel tank |      | Remove the parts in the order listed. Refer to "Seats" and "FUEL TANK" in chapter 3. |
|       | Air filter case and heat protector plate          |      | Refer to "AIR FILTER CASE AND IGNITION COILS" in chapter 3.                          |
| 1     | Starter cable                                     | 1    | ·                                                                                    |
| 2     | Fuel hose                                         | 1    |                                                                                      |
| 3     | Throttle position sensor coupler                  | 1    | Disconnect                                                                           |
| 4     | Throttle stop screw                               | 1    |                                                                                      |



| Order                       | Job/Part                                                                                                      | Q'ty                       | Remarks                                          |
|-----------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------|
| 5<br>6<br>7<br>8<br>9<br>10 | Therm bypass hose Carburetor joint clamp screw Throttle cable Carburetor assembly Carburetor joint Side cover | 2<br>4<br>2<br>1<br>4<br>2 | For installation, reverse the removal procedure. |



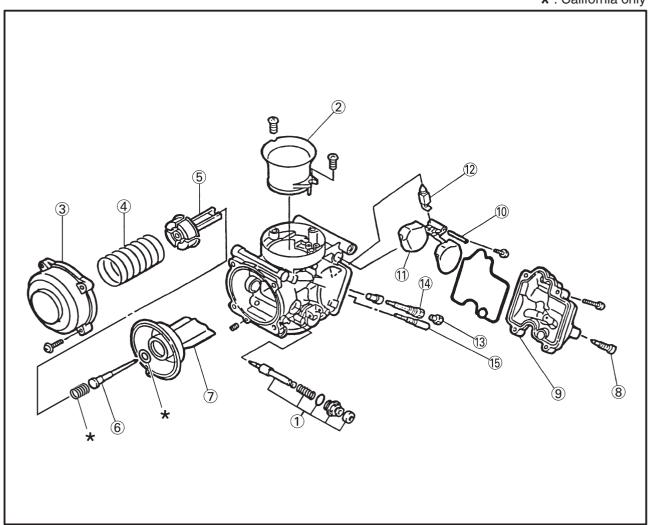
| Order                        | Job/Part                                                                                          | Q'ty                            | Remarks                                                                                                |
|------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5        | Separating the carburetors Starter plunger link Connecting bolt Connecting bolt Hose joint Spring | 1 -<br>1 1 -<br>2 2             | Remove the parts in the order listed.  Refer to "ASSEMBLING THE CARBURETORS"  Refer to "ASSEMBLING THE |
| 6<br>7<br>8<br>9<br>10<br>11 | Fuel feed pipe Fuel feed pipe Pipe Throttle stop screw Throttle position sensor Water pipe        | 2<br>1<br>2<br>1<br>1<br>1<br>2 | CARBURETORS"                                                                                           |



| Order          | Job/Part                                                 | Q'ty        | Remarks                                         |
|----------------|----------------------------------------------------------|-------------|-------------------------------------------------|
| 12<br>13<br>14 | Balance pipe Balance pipe bracket Throttle cable bracket | 2<br>1<br>1 |                                                 |
| 15             | Carburetor                                               | 4           | For installation, reverse the removal procedure |

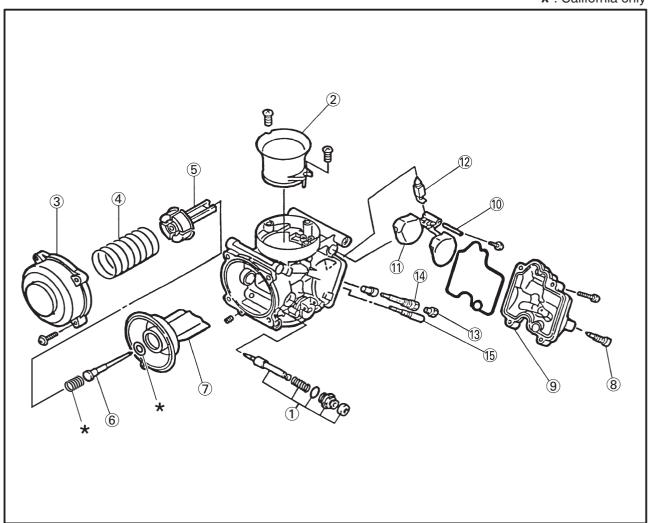


\* : California only



| Order   | Job/Part                                                                                                                                                         | Q'ty                            | Remarks                                                    |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------|
|         | Disassembling the carburetor                                                                                                                                     |                                 | Disassemble the parts in the order listed.                 |
|         |                                                                                                                                                                  |                                 | The following procedure applies to all of the carburetors. |
| 1234567 | Starter plunger Air funnel Vacuum chamber cover Piston valve spring Jet needle holder Jet needle kit Piston valve  Fuel drain bolt Float chamber Float pivot pin | 1<br>1<br>1<br>1<br>1<br>1<br>1 | Refer to "ASSEMBLING THE CARBURETORS."                     |

\* : California only



| Order                               | Job/Part                                                          | Q'ty             | Remarks                                          |
|-------------------------------------|-------------------------------------------------------------------|------------------|--------------------------------------------------|
| (1)<br>(12)<br>(13)<br>(14)<br>(15) | Float<br>Needle valve<br>Main jet<br>Main jet holder<br>Pilot jet | 1<br>1<br>1<br>1 | For assembly, reverse the disassembly procedure. |

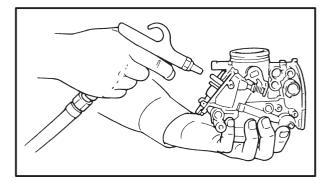


EAS00486

### **CHECKING THE CARBURETORS**

The following procedure applies to all of the carburetors.

- 1. Check:
  - carburetor body
  - float chamber
     Cracks/damage → Replace.

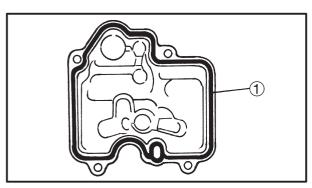




fuel passages
 Obstruction → Clean.

a. Wash the carburetor in a petroleum-based solvent. Do not use any caustic carburetor cleaning solution.

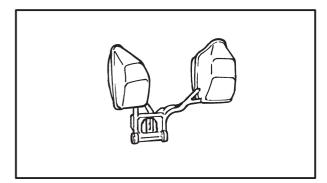
b. Blow out all of the passages and jets with compressed air.



3. Check:

 float chamber body Dirt → Clean.

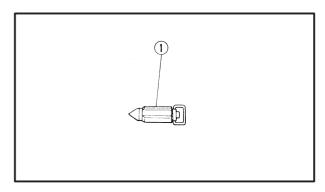
- 4. Check:
- •float chamber rubber gasket ①
  Cracks/damage/wear → Replace.



5. Check:

float

Damage → Replace.

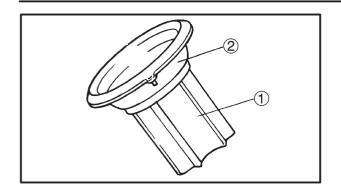


6. Check:

• needle valve 1

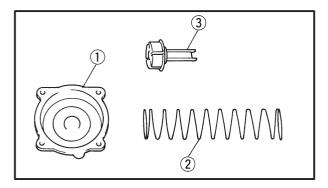
Damage/obstruction/wear  $\rightarrow$  Replace the needle valve, needle valve seat and O-ring as a set.





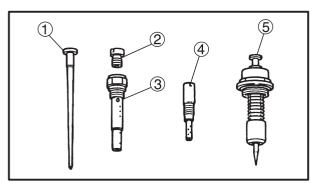
### 7. Check:

- piston valve ①
   Damage/scratches/wear→ Replace.
- piston valve diaphragm ②
   Cracks/tears → Replace.



### 8. Check:

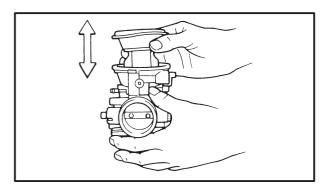
- vacuum chamber cover ①
- piston valve spring 2
- jet needle holder ③
   Cracks/damage → Replace.



### 9. Check:

- jet needle kit ①
- main jet 2
- main jet holder ③
- pilot jet 4
- starter plunger ⑤
  Bends/damage/wear → Replace.
  Obstruction → Clean.

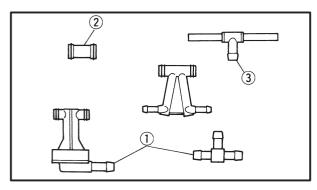
Blow out the jets with compressed air.



### 10. Check:

 piston valve movement Insert the piston valve into the carburetor body and move it up and down.
 Tightness → Replace the piston valve.

rigniness → Replace the piston valve



### 11. Check:

- fuel feed pipes ①
- pipes ②
- hose joint ③

Cracks/damage → Replace.

Obstruction → Clean.

Blow out the pipes with compressed air.



- 12. Check:
  - fuel hoses

Cracks/damage/wear → Replace.

Obstruction → Clean.

Blow out the hoses with compressed air.

EAS00490

### **ASSEMBLING THE CARBURETORS**

The following procedure applies to all of the carburetors.

### **CAUTION:**

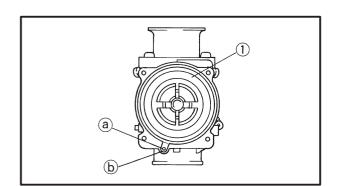
- Before assembling the carburetors, wash all of the parts in a petroleumbased solvent.
- Always use a new gasket.



- piston valve 1
- jet needle
- jet needle holder
- piston valve spring
- vacuum chamber cover

#### NOTE: -

- Install the end of the piston valve spring onto the spring guide on the vacuum chamber cover
- Align the tab a on the piston valve diaphragm with the recess b in the carburetor body.

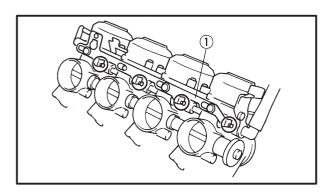




- 2. Install:
  - pipes
  - fuel feed pipes
  - vacuum chamber pipe
  - vacuum chamber air vent hose
  - springs
  - float chamber air vent hoses
  - hose joint
  - spacers
  - copper washer
  - connecting bolts



- Do not tighten the connecting bolts yet.
- Install the throttle valve lever ① onto carburetors #2, #3, and #4 between the spring ② and synchronizing screw ③.



- 3. Install:
- starter plunger link 1

NOTE:

Install the starter plunger link ① onto each starter plunger.

- 4. Tighten:
  - connecting bolts

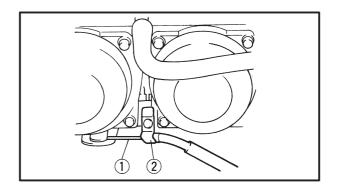
7 Nm (0.7 m•kg, 5.1 ft•lb)

NOTE: -

- Place the carburetor assembly on a surface plate with the intake manifold side down.
   Then, tighten the connecting bolts while pushing down the carburetor assembly with an even force.
- After tightening the connecting bolts, check that the throttle valve lever and starter plunger link operate smoothly.
- 5. Install:
  - starter cable (1)

NOTE:

Install the starter cable holder ② onto the starter cable.





EAS00493

### **INSTALLING THE CARBURETORS**

- 1. Adjust:
  - carburetor synchronization
     Refer to "SYNCHRONIZING THE CARBURETORS" in chapter 3.
- 2. Adjust:

• engine idling speed



Engine idling speed  $1250 \sim 1350 \text{ r/min}$ 

Refer to "ADJUSTING THE ENGINE ID-LING SPEED" in chapter 3.

- 3. Adjust:
  - throttle cable free play

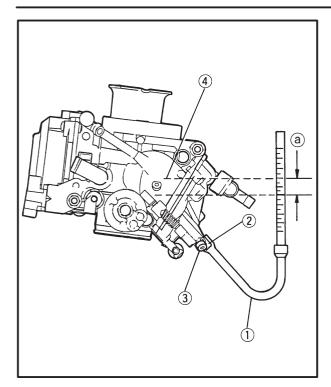


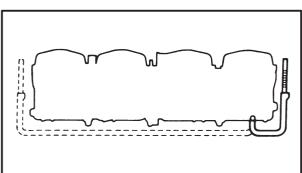
Throttle cable free play (at the flange of the throttle grip)

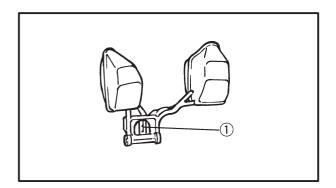
 $6\sim 8$  mm (0.24  $\sim$  0.31 in)

Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.









EAS0049

# MEASURING AND ADJUSTING THE FUEL LEVEL

- 1. Measure:
  - fuel level (a)
     Out of specification → Adjust.



Fuel level (below the mark on the body)

 $17.5 \sim 18.5 \; \text{mm} \; (0.69 \sim 0.73 \; \text{in})$ 

- a. Stand the motorcycle on a level surface.
- b. Place the motorcycle on a suitable stand to ensure that the motorcycle is standing straight up.
- c. Install the fuel level gauge ① onto the fuel drain pipe ②.



### Fuel level gauge 90890-01312, YM-01312-A

- d. Loosen the fuel drain bolt 3.
- e. Hold the fuel level gauge vertically next to the line 4 on the float chamber.
- f. Measure the fuel level (a).

### NOTE: -

Fuel level readings should be equal on both sides of the carburetor assembly.

- 2. Adjust:
  - fuel level
- a. Remove the carburetor assembly.
- b. Check the needle valve seat and needle valve.
- c. If either is worn, replace them as a set.
- d. If both are fine, adjust the float level by slightly bending the float tang ①.
- e. Install the carburetor assembly.
- f. Measure the fuel level again.
- g. Repeat steps (a) to (f) until the fuel level is within specification.



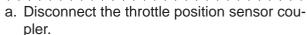
EAS00502

# CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE: -

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.

- 1. Check:
  - throttle position sensor (installed on the carburetor)



b. Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor.

Tester positive probe → blue ①
Tester negative probe → black/blue②

c. Measure the throttle position sensor maximum resistance.

Out of specification  $\rightarrow$  Replace the throttle position sensor.



Throttle position sensor maximum resistance

4.0  $\sim$  6.0 k $\Omega$  at 20°C (68°F) (blue – black/blue)

d. Connect the pocket tester ( $\Omega \times 1$ k) to the throttle position sensor.

Tester positive probe → yellow ③
Tester negative probe → black/blue②

e. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.

#### NOTE:

Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.

Out of specification or the resistance changes abruptly  $\rightarrow$  Go to step (2).



6-13

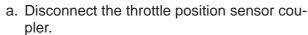
Throttle position sensor resistance  $0 \sim 5 \pm 1.0 \text{ k}\Omega$  at  $20^{\circ}\text{C}$  (68°F) (yellow – black/blue)

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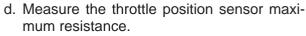


 throttle position sensor (removed from the carburetor)



- b. Remove the throttle position sensor from the carburetor.
- c. Connect the pocket tester ( $\Omega \times 1$ k) to the throttle position sensor.

Tester positive probe → blue ①
Tester negative probe → black/blue②



Out of specification  $\rightarrow$  Replace the throttle position sensor.



Throttle position sensor maximum resistance

4.0  $\sim$  6.0 k $\Omega$  at 20°C (68°F) (blue – black/blue)

e. Connect the pocket tester ( $\Omega \times 1$ k) to the throttle position sensor coupler.

Tester positive probe → yellow ③
Tester negative probe → black/blue②

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.

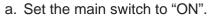


Throttle position sensor resistance 0  $\sim$  5  $\pm$  1.0 k $\Omega$  at 20°C (68°F) (yellow – black/blue)

\_\_\_\_



- 3. Adjust:
  - throttle position sensor angle



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

- b. Disconnect the throttle position sensor coupler.
- c. Reconnect the throttle position sensor coupler.

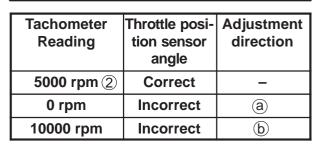


After reconnecting the throttle position sensor coupler, the tachometer switches to the throttle position sensor adjustment mode.

- d. Loosen the throttle position sensor screws (1).
- e. Adjust the throttle position sensor angle according to the following table.



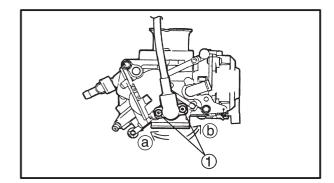
The angle of the throttle position sensor is indicated by the r/min which are displayed on the tachometer.

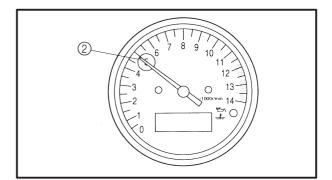


f. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.

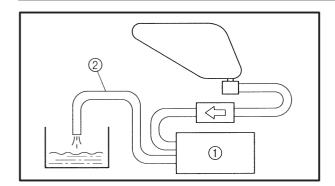
NOTE: -

To exit the throttle position sensor adjustment mode, start the engine or set the main switch to "OFF".









EASON50

### **CHECKING THE FUEL PUMP**

- 1. Check:
  - fuel pump ①
- a. Remove the fuel tank.Refer to "FUEL TANK" in chapter 3.b. Disconnect the fuel-nump-to-carburetor fuel-nump-to-carburetor
- b. Disconnect the fuel-pump-to-carburetor fuel hose ② from the carburetor.
- c. Connect the fuel-tank-to-fuel-pump fuel hose to the fuel tank and then set the fuel cock to "ON".
- d. Place a container under the end of the fuel hose ②.
- e. Start the engine and check if fuel flows from the fuel hose ②.

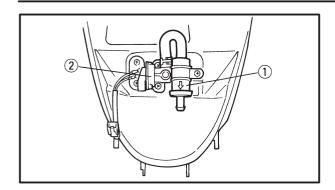
| Fuel flows.   | Fuel pump is OK. |  |  |
|---------------|------------------|--|--|
| Fuel does not | Replace the fuel |  |  |
| flow.         | pump.            |  |  |

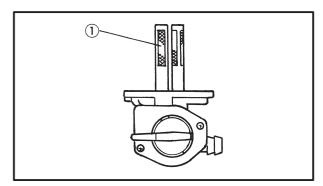
f. Stop the engine and check if the fuel stops flowing from the fuel hose ②.

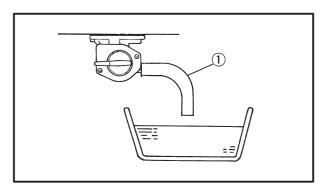
| Fuel stops flowing. | Fuel pump is OK. |  |
|---------------------|------------------|--|
| Fuel flows.         | Replace the fuel |  |
| i dei ilows.        | pump.            |  |

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EAS0050

### CHECKING THE FUEL COCK

- 1. Remove
  - fuel tank
  - fuel filter (1)
  - fuel cock (2)
- 2. Check:
  - fuel cock

Cracks/damage/wear → Replace.

- 3. Check:
  - fuel cock strainer ①
     (with compressed air)
     Dirt/obstruction → Clean.
     Damage → Replace.
- 4. Install
  - fuel cock
  - fuel filter
  - fuel tank

EAS00506

## CHECKING THE FUEL COCK OPERATION

NOTE

After installing the fuel cock, check its operation.

- 1. Check that the fuel cock lever is turned to "ON" or "OFF".
- 2. Place a container under the end of the fuel hose.
- 3. Check:
  - fuel cock operation
- a. Suck on the end of the vacuum hose.

Fuel flows.

Fuel cock is OK.

Fuel does not flow.

Replace the fuel cock.

### AIR INDUCTION SYSTEM

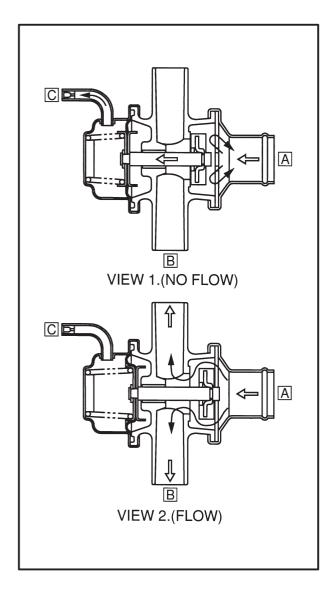


EAS00507

# 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).



EAS00508

#### AIR CUTOFF VALVE

The air cutoff valve is operated by the intake gas pressure through the piston valve diaphragm. Normally, the air cutoff valve is open to allow fresh air to flow into the exhaust port. During sudden deceleration (the throttle valve suddenly closes), negative pressure is generated and the air cutoff valve is closed in order to prevent after-burning.

Additionally, at high engine speeds and when the pressure decreases, the air cutoff valve automatically closes to guard against a loss of performance due to self-EGR.

(This "low-boost close" function is the same as on the FZR600 (3HW).)

VIEW 1. (NO FLOW)

When decelerating (the throttle closes), the valve will close.

VIEW 2. (FLOW)

During normal operation the valve is open.

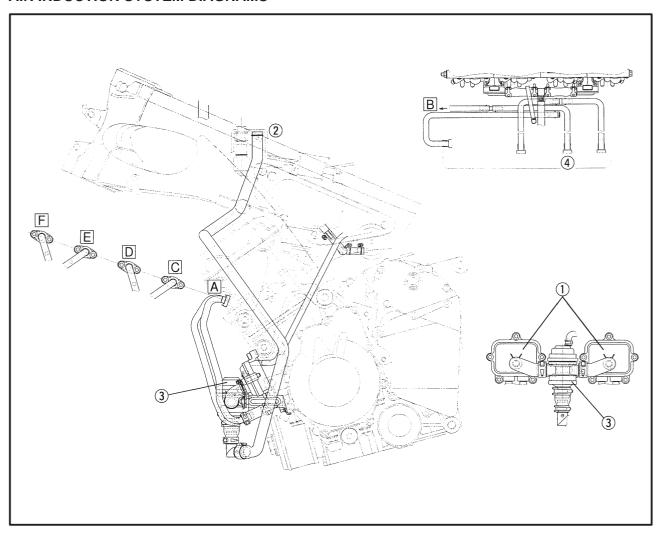
- A From the air filter
- B To the reed valve
- C To the carburetor joint

## **AIR INDUCTION SYSTEM**



EAS00509

### **AIR INDUCTION SYSTEM DIAGRAMS**



- (1) Reed valve
- (2) Air cleaner
- 3 Air cutoff valve
- 4 Carburetor joint (cylinder #3)

- A To the cylinders
- B To the air cutoff valve
- C To cylinder #1
- D To cylinder #2
- E To cylinder #3
- F To cylinder #4

## **AIR INDUCTION SYSTEM**



EAS00510

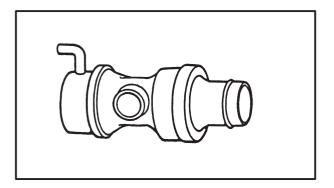
### **CHECKING THE AIR INDUCTION SYSTEM**

- 1. Check:
- hoses

Loose connection  $\rightarrow$  Connect properly. Cracks/damage  $\rightarrow$  Replace.

• pipes

Cracks/damage → Replace.



### 2. Check:

air cutoff valve
 Cracks/damage → Replace.



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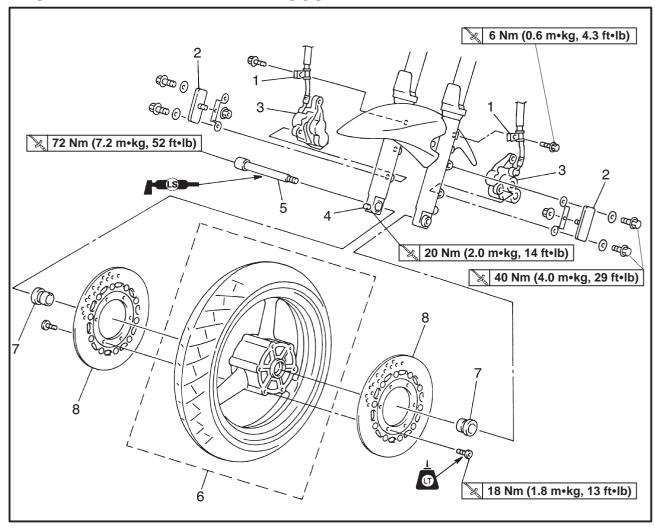
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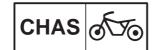
EAS00514

# **CHASSIS**

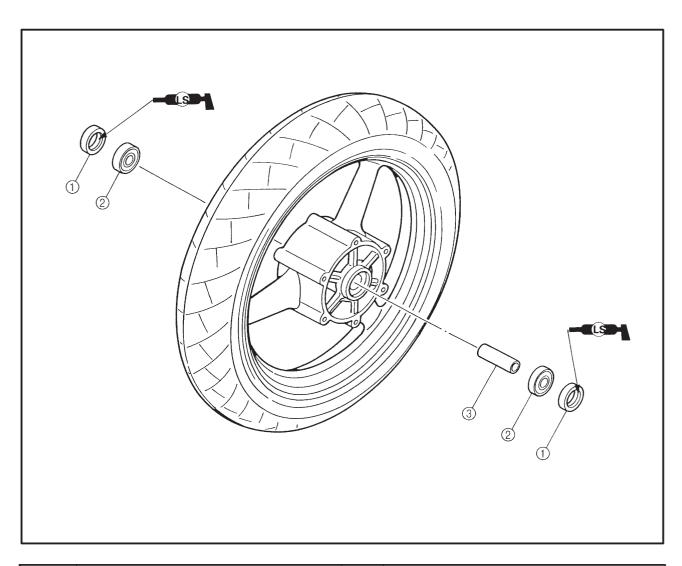
# FRONT WHEEL AND BRAKE DISCS



| Order                                | Job/Part                                                                                                                                                                                                                                                 | Q'ty                              | Remarks                                                                                                                                                                                                                                                                                 |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | Removing the front wheel and brake discs  Brake hose holders (left and right) Front reflectors (left and right) Brake calipers (left and right) Wheel axle pinch bolt Front wheel axle Front wheel Collars (left and right) Brake discs (left and right) | 2 -<br>2 -<br>1 1 -<br>1 -<br>2 2 | Remove the parts in the order listed.  NOTE:  Place the motorcycle on a suitable stand so that the front wheel is elevated.  Refer to "REMOVING/INSTALLING THE FRONT WHEEL".  Loosen  Refer to "REMOVING/INSTALLING THE FRONT WHEEL".  For installation, reverse the removal procedure. |



EAS00518



| Order | Job/Part                                                                                        | Q'ty        | Remarks                                                                                 |
|-------|-------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------|
| 1 2 3 | Disassembling the front wheel Oil seals (left and right) Wheel bearings (left and right) Spacer | 2<br>2<br>1 | Remove 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.

# **▲** 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:
  - Brake hose holders
  - front reflectors
  - left brake caliper
  - right brake caliper
  - wheel axle

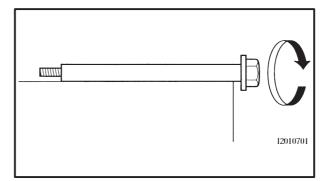
NOTE: -

Do not squeeze 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.



EAS00525

#### CHECKING THE FRONT WHEEL

- 1. Check:
  - wheel axle
     Roll the wheel axle on a flat surface.
     Bends → Replace.

# **A** WARNING

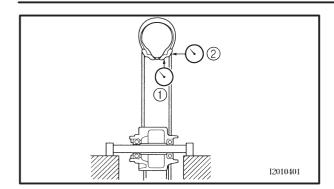
Do not attempt to straighten a bent wheel axle.

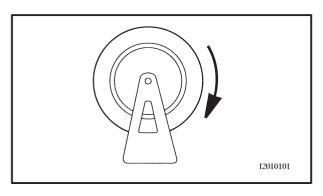
- 2. Check:
  - tire
  - front wheel

Damage/wear → Replace.

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









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

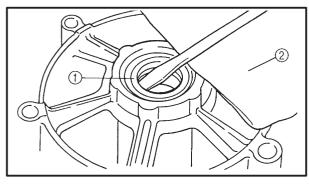


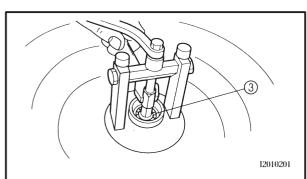
Front radial wheel runout 1.0 mm (0.04 in) Front lateral wheel runout 0.5 mm (0.02 in)

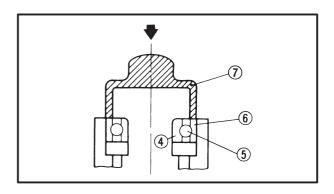
- 4. Check:
  - wheel bearings

Front wheel turns roughly or is loose  $\rightarrow$  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 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.

| $\sim 1$ | W  |   | N | н |
|----------|----|---|---|---|
| C/A      | NU | Ю | N | н |

Do not contact the wheel bearing center race 4 or balls 5. Contact should be made only with the outer race 6

NOTE: ----

Use a socket ⑦ that matches the diameter of the wheel bearing outer race and oil seal.



EAS00533

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

The following procedure applies to both of the brake discs.

- 1. Check:
  - brake disc

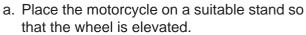
Damage/galling → Replace.

- 2. Measure:
  - brake disc deflection

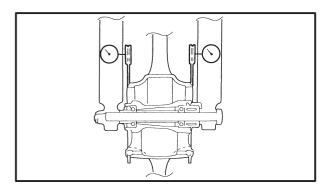
Out of specification  $\rightarrow$  Correct the brake disc deflection or replace the brake disc.

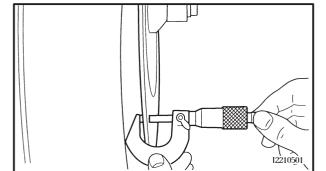


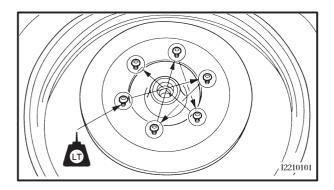
Max. brake disc deflection Front: 0.1 mm (0.0039 in) Rear: 0.1 mm (0.0039 in)



- 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.



Min. brake disc thickness Front: 4.5 mm (0.18 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.

NOTF:

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





### Brake disc bolt 18 Nm (1.8 m•kg, 13 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.

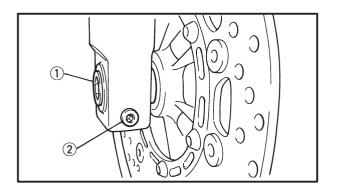
EAS00548

### **INSTALLING THE FRONT WHEEL**

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



Recommended lubricant
Lithium soap base grease



- 2. Tighten:
  - wheel axle 1 2 Nm (7.2 m•kg, 52 ft•lb)
  - wheel axle pinch bolt (2)

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.

- 3. Install:
  - brake calipers | 40 Nm (4.0 m•kg, 29 ft•lb)
  - front reflectors
  - brake hose holders

# **A** WARNING

Make sure that the brake hose is routed properly.

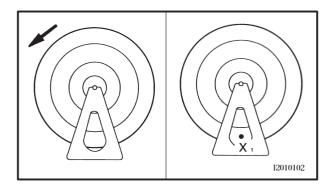
EAS00549

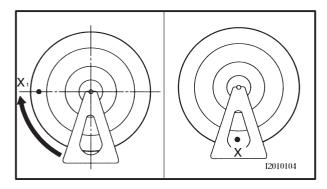
# ADJUSTING THE FRONT WHEEL STATIC BALANCE

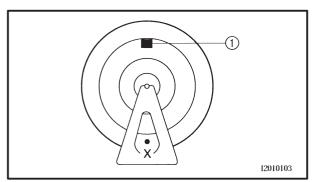
NOTE: -

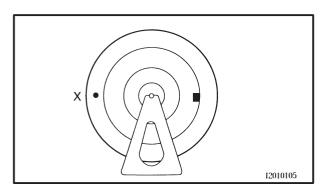
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.

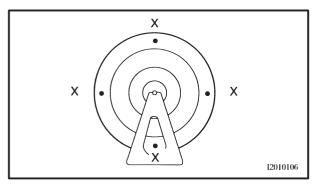












- 1. Remove:
- balancing weight(-s)
- 2. Find:
  - front wheel's heavy spot
- a. Place the front wheel on a suitable balancing stand.
- b. Spin the front wheel.
- c. When the front wheel stops, put an "X<sub>1</sub>" mark at the bottom of the wheel.
- d. Turn the front wheel  $90^{\circ}$  so that the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

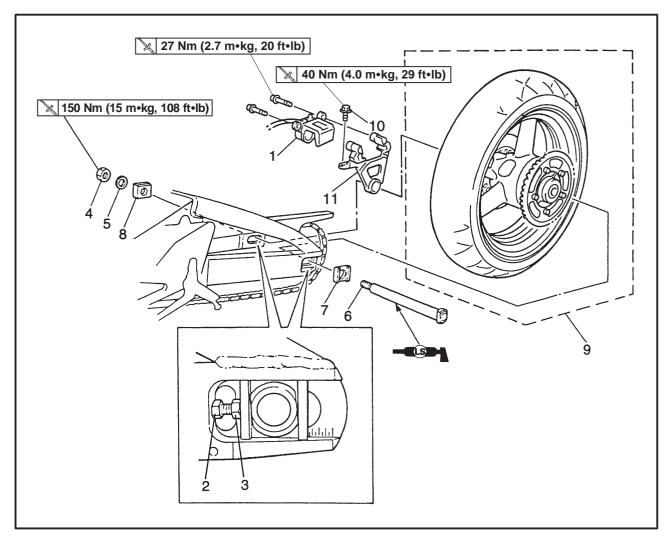
- b. Turn the front wheel 90° so that the heavy spot is positioned as shown.
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.

- 4. Check:
  - front wheel static balance
- a. Turn the front wheel and make sure that it stays at each position shown.
- b. If the front wheel does not remain stationary at all of the positions, rebalance it.



EAS0055

# REAR WHEEL, BRAKE DISC, AND REAR WHEEL SPROCKET REAR WHEEL

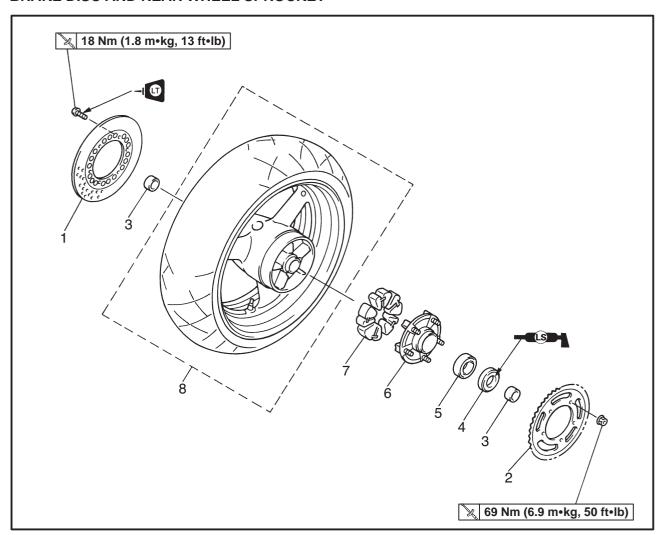


| Order                                                 | Job/Part                                                                                                                                                                                                              | Q'ty                                                | 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<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11 | Brake caliper Locknuts (left and right) Adjusting bolts (left and right) Wheel axle nut Washer Rear wheel axle Left adjusting block Right adjusting block Rear wheel Brake caliper bracket bolt Brake caliper bracket | 1<br>2<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | Loosen. Loosen.  NOTE:  Make sure that the tapered side of the right adjusting block faces the wheel.  For installation, reverse the removal procedure. |

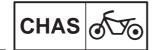


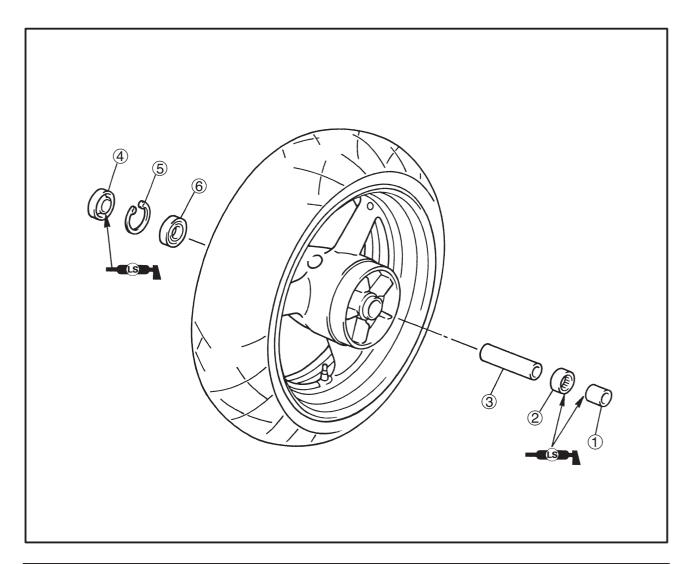
EAS00556

### **BRAKE DISC AND REAR WHEEL SPROCKET**



| Order | Job/Part                                        | Q'ty | Remarks                                          |
|-------|-------------------------------------------------|------|--------------------------------------------------|
|       | Removing the brake disc and rear wheel sprocket |      | Remove the parts in the order listed.            |
| 1     | Brake disc                                      | 1    |                                                  |
| 2     | Rear wheel sprocket                             | 1    |                                                  |
| 3     | Spacers (left and right)                        | 2    |                                                  |
| 4     | Oil seal                                        | 1    |                                                  |
| 5     | Bearing                                         | 1    |                                                  |
| 6     | Rear wheel drive hub                            | 1    |                                                  |
| 7     | Rear wheel drive hub dampers                    | 5    |                                                  |
| 8     | Rear wheel                                      | 1    |                                                  |
|       |                                                 |      | For installation, reverse the removal procedure. |





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



EAS00561

#### REMOVING THE REAR WHEEL

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: ——

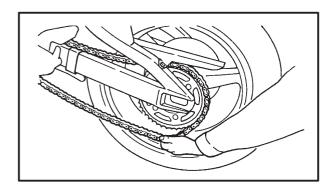
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:

brake caliper

NOTE: -

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



- 3. Remove:
  - wheel axle nut
  - washer
  - wheel axle
  - adjusting blocks
  - brake caliper bracket.
  - rear wheel

NOTE: -

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

EAS00565

### **CHECKING THE REAR WHEEL**

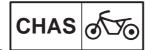
- 1. Check:
  - wheel axle
  - rear wheel
  - wheel bearings

SPROKET".

- oil seals
- brake disc Refer to "BRAKE DISC AND REAR WHEEL
- 2. Check:
  - tire
  - rear wheel

Damage/wear → Replace.

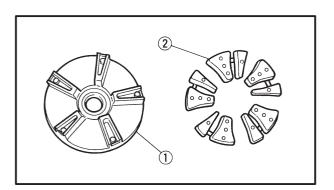
Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.



- 3. Measure:
- radial wheel runout
- lateral wheel runout Refer to "FRONT WHEEL".
   Over the specified limits → Replace.



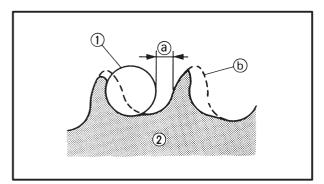
Max. radial wheel runout 1.0 mm (0.04 in) Max. lateral wheel runout 0.5 mm (0.02 in)



FAS00567

### 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
- 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 nut

69 Nm (6.9 m•kg, 50 ft•lb)

NOTE: -

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



EAS00571

### **INSTALLING THE REAR WHEEL**

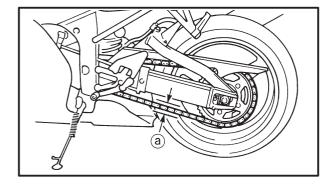
- 1. Lubricate:
- wheel axle
- wheel bearings
- oil seal lips



Recommended lubricant Lithium soap base grease

### 2. Install:

- rear wheel
- brake caliper bracket
- adjusting blocks
- wheel axle
- washer
- wheel axle nut
- brake caliper



### 3. Adjust:

• drive chain slack (a)



Drive chain slack

 $40 \sim 50 \text{ mm} (1.57 \sim 1.97 \text{ in})$ 

Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.

- 4. Tighten:
  - wheel axle nut 150 Nm (15.0 m•kg, 108 ft•lb)
  - brake caliper bolts

27 Nm (2.7 m•kg, 20 ft•lb)

brake caliper bracket bolt

40 Nm (4.0 m•kg, 29 ft•lb)

# **A** WARNING

Make sure that the brake hose is routed properly.

EAS00575

# ADJUSTING THE REAR WHEEL STATIC BALANCE

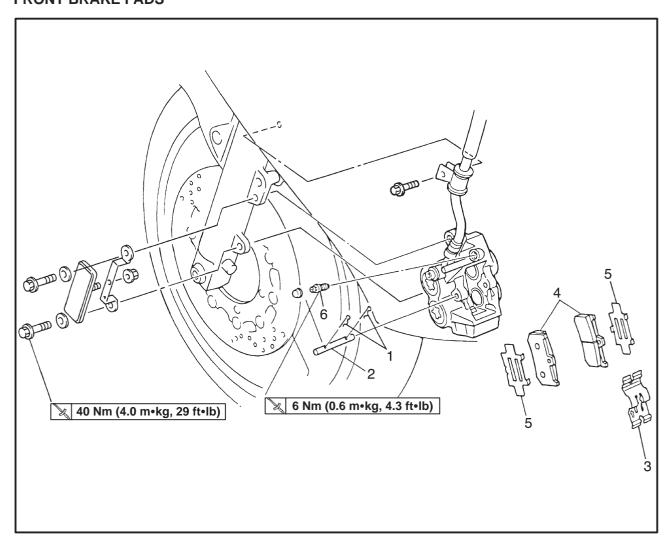
NOTE: -

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.
- 1. Adjust:
  - rear wheel static balance Refer to "FRONT WHEEL".



EAS0057

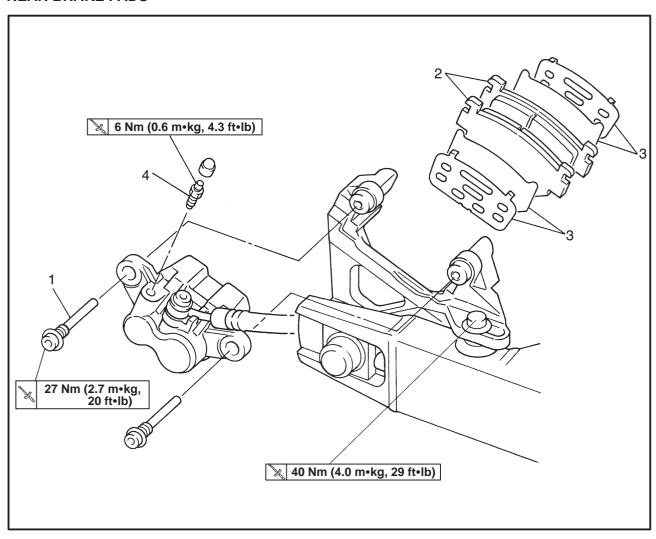
# FRONT AND REAR BRAKES FRONT BRAKE PADS



| 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 | Brake pad clips Brake pad pin Brake pad spring Brake pads Brake pad shims Bleed screw | 2 -<br>1 1<br>2 2<br>1 - | Refer to "REPLACING THE FRONT BRAKE PADS".  For installation, reverse the removal procedure.               |



#### **REAR BRAKE PADS**



| Order            | Job/Part                                                                                | Q'ty                 | Remarks                                                                                                                            |
|------------------|-----------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4 | Removing the rear brake pads Brake caliper bolts Brake pads Brake pad shims Bleed screw | 2 -<br>2<br>4<br>1 - | Remove the parts in the order listed.  Refer to "REPLACING THE REAR BRAKE PADS".  For installation, reverse the removal procedure. |

CHAS 650

EAS00579

| 0 A I I | TION |   |
|---------|------|---|
| (ΔΙΙ    | TION | - |
|         |      | - |

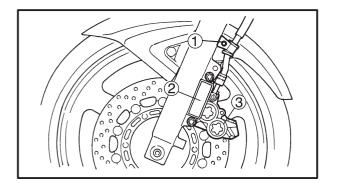
Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt 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.



ΔS00582

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

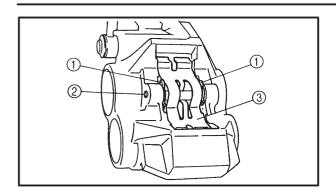
The following procedure applies to both brake calipers.

NOTE: -

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

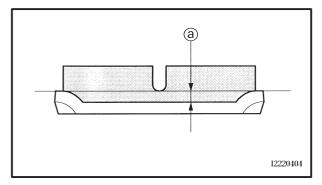
- 1. Remove:
  - brake hose holder bolt 1
  - front refrector (2)
  - brake caliper ③





#### 2. Remove:

- brake pad clips (1)
- brake pad pins 2
- brake pad spring (3)
- brake pads (along with the brake pad shims)



#### 3. Measure:

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



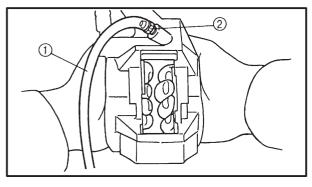
Brake pad wear limit 0.5 mm (0.02 in)

#### 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 screw②. Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.

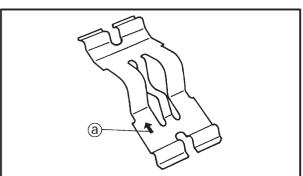


### Bleed screw 6 Nm (0.6 m•kg, 4.3 ft•lb)

- d. Install a new brake pad shim onto each new brake pads.
- e. Install new brake pads and a new brake pad spring.

#### NOTE: -

The arrow ⓐ on the brake pad spring must point in the direction of disc rotation.



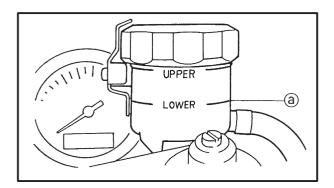


- 5. Install:
  - brake pad pins
  - brake pad clips
  - brake caliper bolts

40 Nm (4.0 m•kg, 29 ft•lb)

brake hose holder bolt

6 Nm (0.6 m•kg, 4.3 ft•lb)



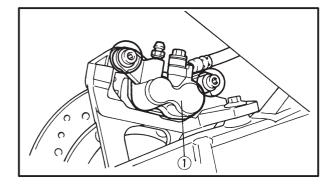
#### 6. Check:

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.

#### 7. Check:

brake lever operation
 Soft or spongy feeling → Bleed the brake system.

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



AS00583

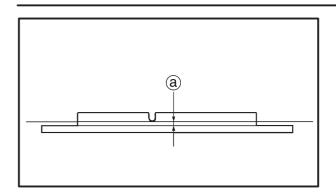
#### REPLACING THE REAR BRAKE PADS

NOTE: -

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

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





3. Measure:

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



Brake pad wear limit 0.8 mm (0.03 in)

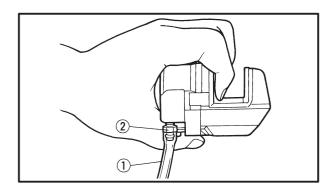
4. Install:

brake pad shims (onto the brake pads)

brake pads

#### NOTE: -

Always install new brake pads, brake pad shims, and a brake pad spring as a set.



a. Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.

 b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.

c. Tighten the bleed screw.



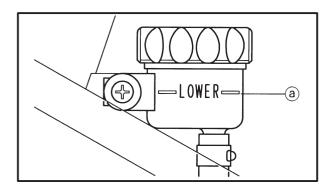
Bleed screw 6 Nm (0.6 m•kg, 4.3 ft•lb)

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



- 5. Install:
  - brake caliper bolts

27 Nm (2.7 m•kg, 20 ft•lb)



#### 6. Check:

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

#### 7. Check:

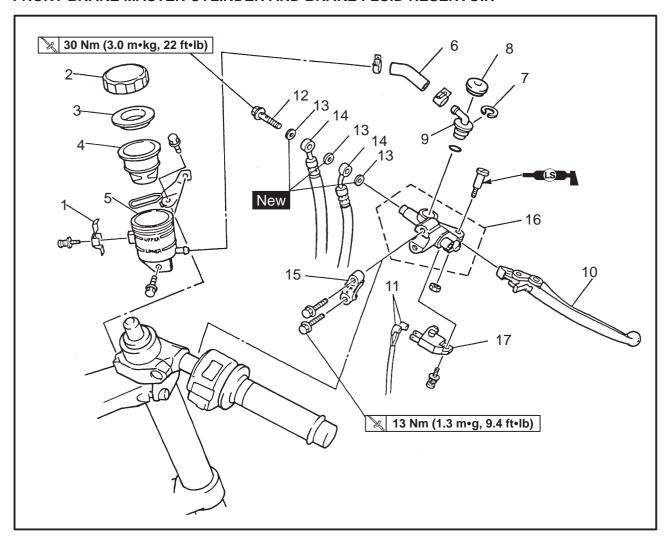
brake pedal operation
 Soft or spongy feeling → Bleed the brake system.

 Refer to "BLEEDING THE HYDRAULIC"

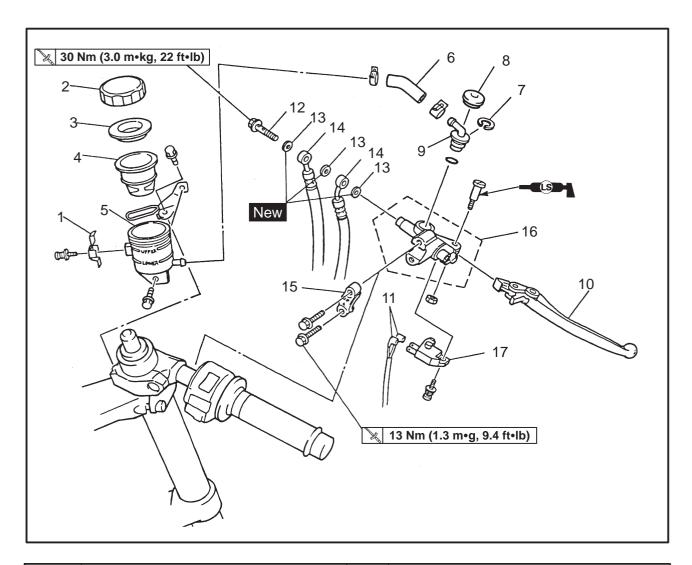
BRAKE SYSTEM" in chapter 3.



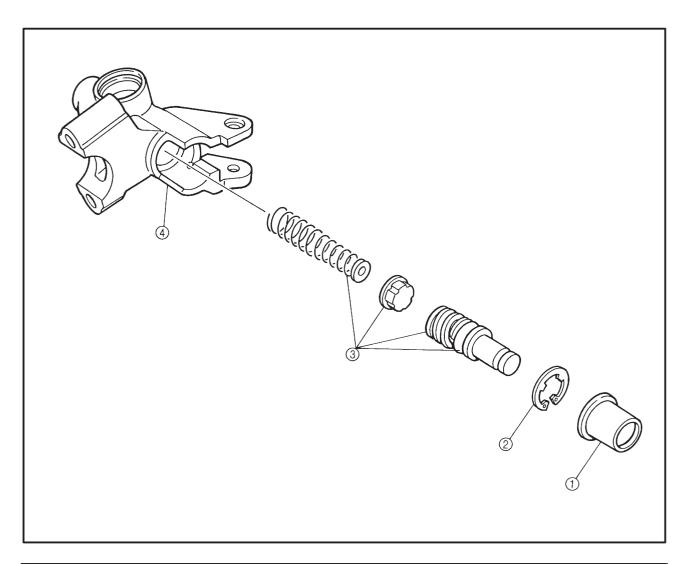
#### FRONT BRAKE MASTER CYLINDER AND BRAKE FLUID RESERVOIR



| Order | Job/Part                               | Q'ty | Remarks                               |
|-------|----------------------------------------|------|---------------------------------------|
|       | Removing the front brake master        |      | Remove the parts in the order listed. |
|       | cylinder and brake fluid reservoir     |      |                                       |
|       | Brake fluid                            |      | Drain.                                |
| 1     | Brake fluid reservoir cap 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                  | 1    |                                       |
| 6     | Brake fluid reservoir hose             | 1    |                                       |
| 7     | Circlip                                | 1    |                                       |
| 8     | Dust cover                             | 1    |                                       |
| 9     | Hose joint                             | 1    |                                       |
| 10    | Brake lever                            | 1    |                                       |
| 11    | Front brake switch connector           | 2    | Disconnect.                           |
| 12    | Union bolt                             | 1 -  | Refer to "INSTALLING THE FRONT        |
| 13    | Copper washer                          | 3 -  | BRAKE MASTER CYLINDER".               |
|       |                                        |      |                                       |



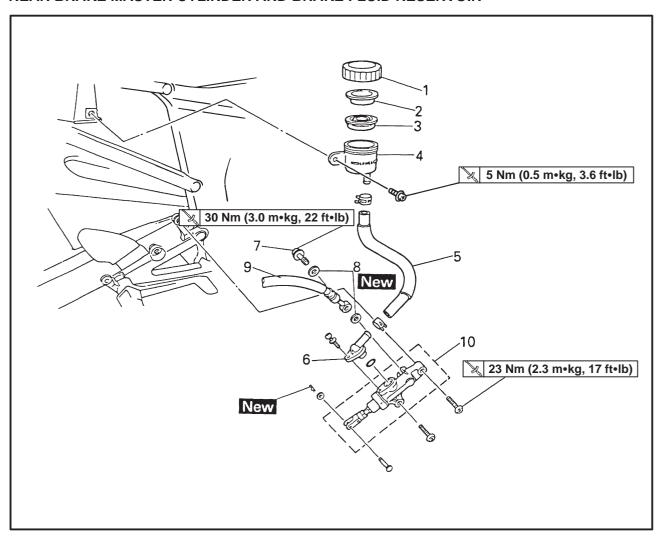
| Order                | Job/Part                                                                         | Q'ty                 | Remarks                                                                                       |
|----------------------|----------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|
| 14<br>15<br>16<br>17 | Brake hose Brake master cylinder holder Brake master cylinder Front brake switch | 2 -<br>1<br>1 -<br>1 | Refer to "INSTALLING THE FRONT BRAKE MASTER SYLINDER".  For installation, reverse the removal |
|                      |                                                                                  |                      | procedure.                                                                                    |



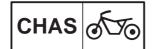
| Order            | Job/Part                                                                                                        | Q'ty        | Remarks                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------|
| ①<br>②<br>③<br>④ | Disassembling the front brake master cylinder Dust boot Circlip Brake master cylinder kit Brake master cylinder | 1<br>1<br>1 | Remove the parts in the order listed.  For assembly, reverse the disassembly procedure. |

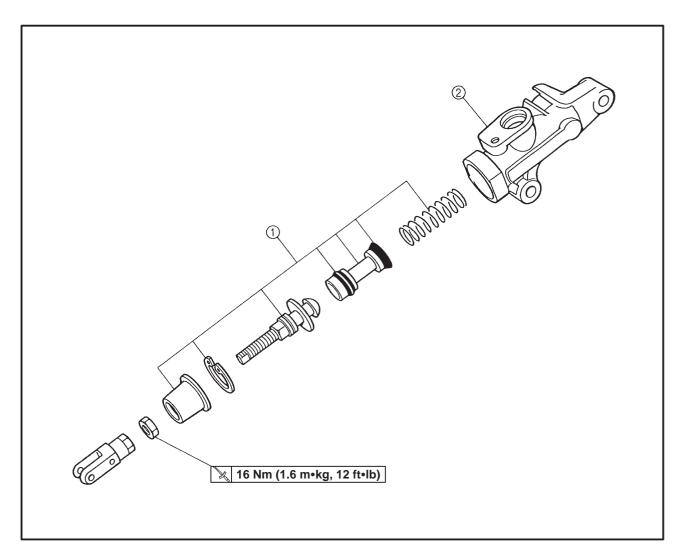


### REAR BRAKE MASTER CYLINDER AND BRAKE FLUID RESERVOIR



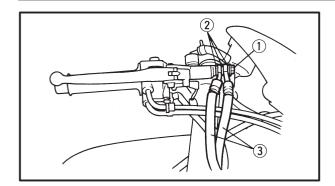
| Order | Job/Part                                                                                                                                                                                                                                                                                          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





| Order | Job/Part                                                                                     | Q'ty | Remarks                                                                                 |
|-------|----------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------|
| 1) 2  | Disassembling the rear brake master cylinder Brake master cylinder kit Brake master cylinder | 1 1  | Remove the parts in the order listed.  For assembly, reverse the disassembly procedure. |





EAS00588

## REMOVING THE FRONT BRAKE MASTER CYLINDER

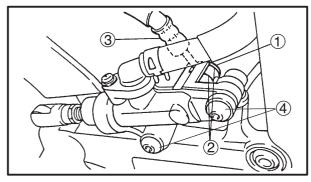
NOTE: -

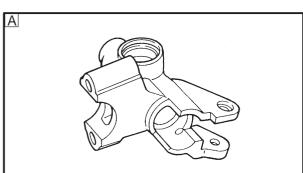
Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.

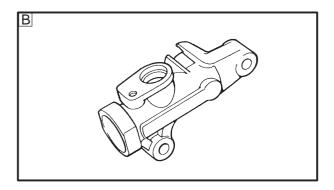
- 1. Remove:
  - union bolt (1)
  - copper washers 2
  - brake hoses (3)
  - master cylinder holder 4

NOTE: -

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







EAS00589

# REMOVING THE REAR BRAKE MASTER CYLINDER

- 1. Remove:
  - union bolt (1)
  - copper washers 2
  - brake hose (3)
  - button head bolts 4

NOTE: \_

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

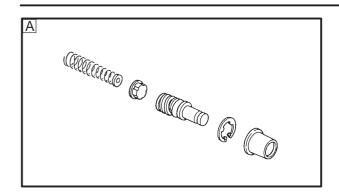
EAS00593

# CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

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

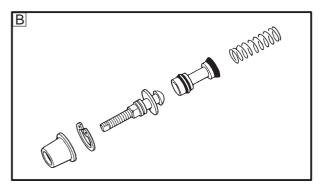
- 1. Check:
  - brake master cylinder
     Damage/scratches/wear → Replace.
  - brake fluid delivery passages (brake master cylinder body)
     Obstruction → Blow out with compressed air.
- A Front
- B Rear

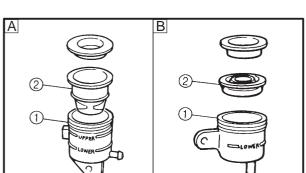






- brake master cylinder kit
   Damage/scratches/wear → Replace.
- A Front
- B Rear





- 3. Check:
  - brake fluid reservoir ①
     Cracks/damage → Replace.
- brake fluid reservoir diaphragm ②
   Cracks/damage → Replace.
- 4. Check:
  - brake hoses
     Cracks/damage/wear → Replace.

EAS00607

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

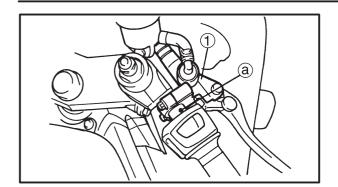
## **A** WARNING

- 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







brake master cylinder 1

13 Nm (1.3 m•kg, 9.4 ft•lb)

• brake master cylinder holder

#### NOTE

- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the end of the brake master cylinder holder with the punch mark (a) in the right handlebar
- First, tighten the upper bolt, then the lower bolt.

#### 2. Install:

- copper washers New
- brake hose
- 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".

#### NOTE: -

- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebars to the left and to the right to make sure that the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.

#### 3. Fill:

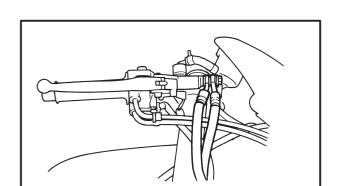
 brake fluid reservoir (with the specified amount of the recommended brake fluid)



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.





|   | •             | П | Т | T | -            |              |   |
|---|---------------|---|---|---|--------------|--------------|---|
| C | Δ             |   |   |   |              | $\mathbf{I}$ | В |
|   | $\overline{}$ | v | , | _ | $\mathbf{u}$ | 4 N.         |   |

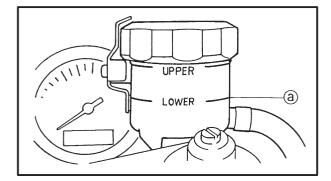
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

#### 4. Bleed:

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

#### 5. Check:

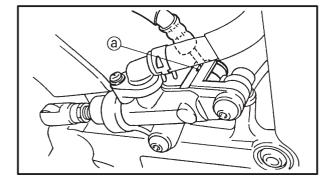
brake fluid level
Below the minimum level mark (a) → Add the
recommended brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID
LEVEL" in chapter 3.



#### 6. Check:

brake lever operation
 Soft or spongy feeling → Bleed the brake system.

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



FAS00608

## INSTALLING THE REAR BRAKE MASTER CYLINDER

- 1. Install:
  - copper washers New
  - brake hoses
  - union bolt 30 Nm (3.0 m•kg, 22 ft•lb)
- button head bolts

## **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 master cylinder, make sure that the brake pipe touches the projection ⓐ as shown.



- 2. Fill:
  - brake fluid reservoir



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

#### **CAUTION:**

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

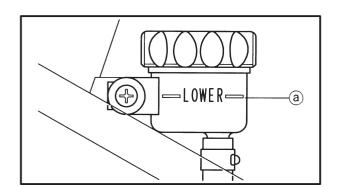
- 3. Bleed:
  - brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
- 4. Check:
  - brake fluid level
    Below the minimum level mark (a) → Add the
    recommended brake fluid to the proper level.
    Refer to "CHECKING THE BRAKE FLUID
    LEVEL" in chapter 3.
- 5. Adjust: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



Brake pedal position (from the top of the brake pedal to the bottom of the rider footrest bracket bolt center)

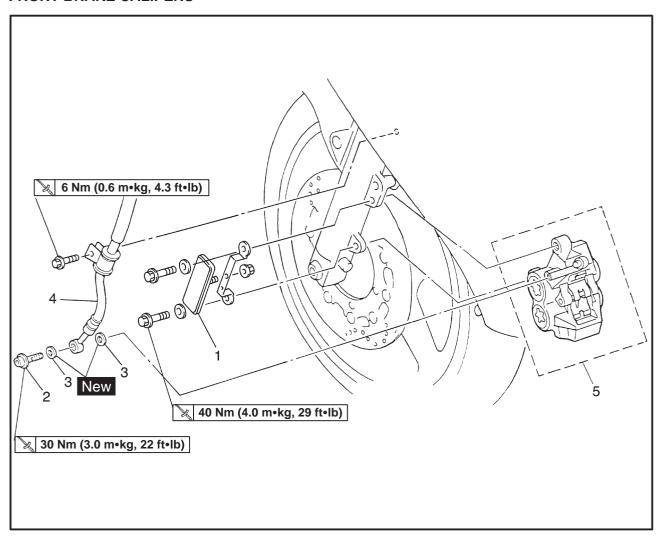
 $4.3 \sim 9.3 \text{ mm} (0.17 \sim 0.37 \text{ in})$ 

- 6. Adjust:
  - rear brake light operation timing Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" in chapter 3.

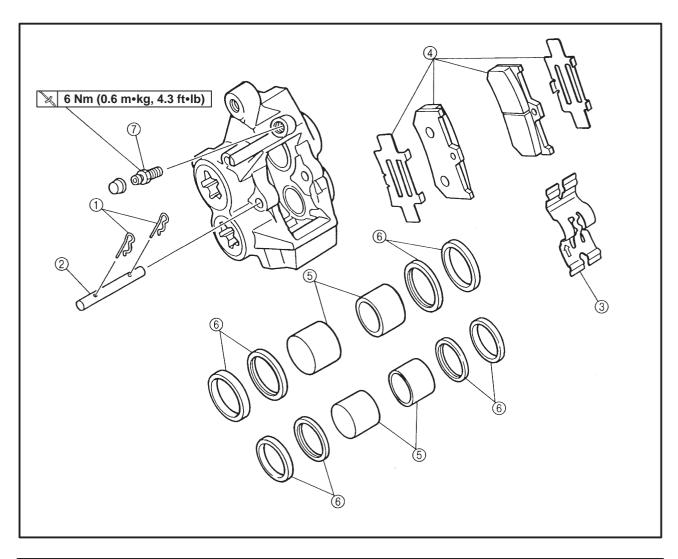




#### **FRONT BRAKE CALIPERS**



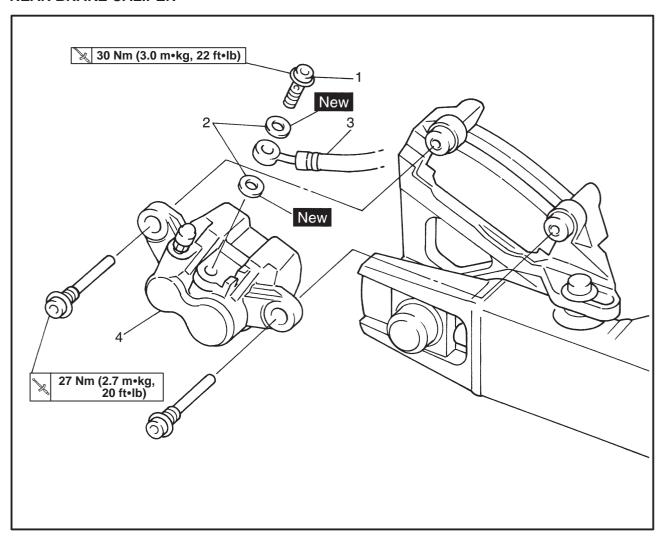
| Order                 | Job/Part                                                                                                         | Q'ty                      | Remarks                                                                                                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>2<br>3<br>4<br>5 | Removing the front brake calipers  Brake fluid Front refrector Union bolt Copper washer Brake hose Brake caliper | 1<br>1 -<br>2<br>1<br>1 - | Remove the parts in the order listed. The following procedure applies to both of the front brake calipers. Drain.  Refer to "INSTALLING THE FRONT BRAKE CALIPERS".  For installation, reverse the removal procedure. |



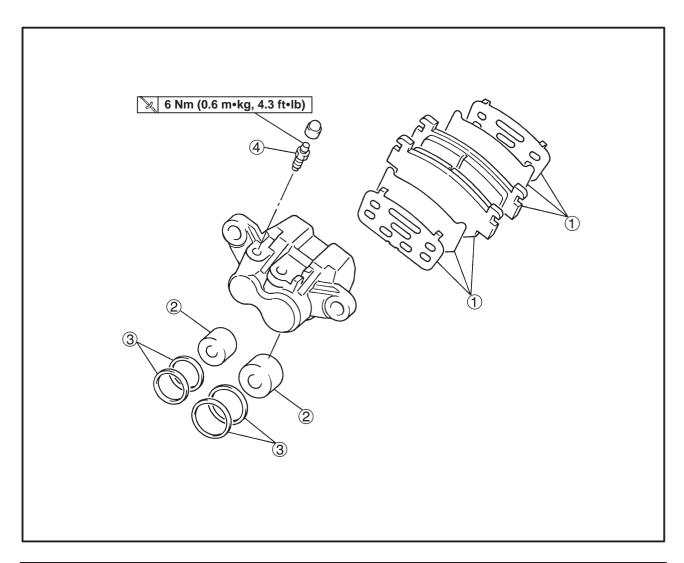
| Order   | Job/Part                                                                                                           | Q'ty                                | Remarks                                                                                                                                                               |
|---------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | Disassembling the front brake calipers                                                                             |                                     | Disassemble the parts in the order listed.                                                                                                                            |
| 3 4 5 6 | 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 - | The following procedure applies to both of the front brake calipers.  Refer to "REMOVING THE FRONT BRAKE CALIPERS".  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 "INSTALLING THE REAR BRAKE CALIPERS".  For installation, reverse the removal procedure. |



| Order   | Job/Part                                                                                                  | Q'ty     | Remarks                                                                                                                                    |
|---------|-----------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1 2 3 4 | Disassembling the rear brake caliper Brake pad Brake caliper piston Brake caliper piston seal Bleed screw | 2<br>2 - | Disassemble the parts in the order listed.  Refer to "REMOVING THE REAR BRAKE CALIPERS".  For assembly, reverse the disassembly procedure. |

EAS00625

#### REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

#### NOTE: -

Before removing either brake caliper, drain the brake fluid from the entire brake system.



- front refrector (1)
- union bolt (2)
- copper washers ③
- brake hose 4
- brake caliper ⑤



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



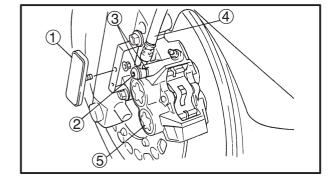
- brake caliper pistons ①
- brake caliper piston seals 2

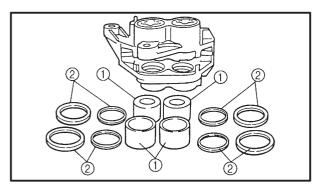
a. Secure the right side brake caliper pistons with a piece of wood ⓐ.

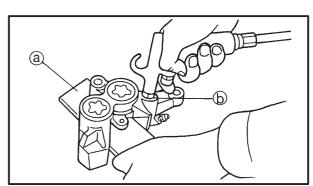
b. Blow compressed air into the brake hose joint opening **(b)** to force out the pistons from the brake caliper.

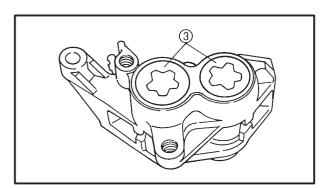
## **WARNING**

- 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.







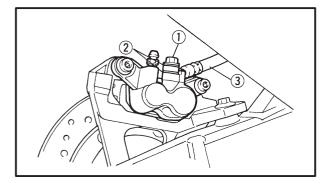


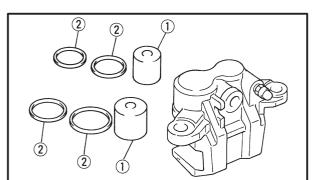
EAS00628

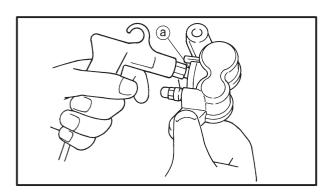
#### **REMOVING THE REAR BRAKE CALIPER**

NOTE: -

Before removing 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. Blow compressed air into the brake hose joint opening (a) to force out the pistons from the brake caliper.

Be careful not to get injured when the pistons are expelled from the brake caliper..

## **A** WARNING

- Cover the brake caliper piston with a rag.
- Never try to pry out the brake caliper pistons.
- b. 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 |  |  |

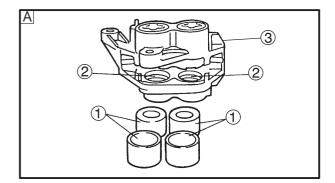


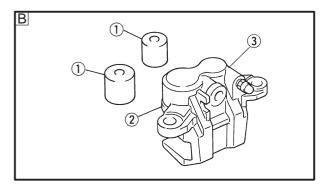
- brake caliper pistons ①
   Rust/scratches/wear → Replace the brake caliper.
- brake caliper cylinders ②
   Scratches/wear → Replace the brake caliper.
- brake calipers ③
   Cracks/damage → Replace.
- brake fluid delivery passages (brake caliper body)
   Obstruction → Blow out with compressed air.

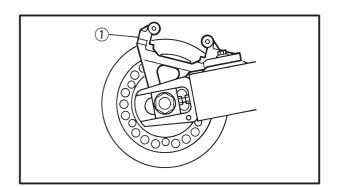


Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

- A Front
- B Rear







- 2. Check:
  - rear brake caliper bracket ①
    Cracks/damage → Replace.

CHAS 656

EAS00640

#### **INSTALLING THE FRONT BRAKE CALIPERS**

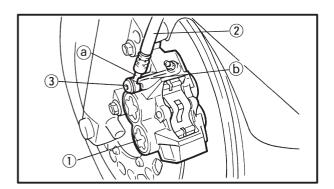
The following procedure applies to both of the brake calipers.

## **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 caliper (1) (temporarily)
  - 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 that the brake pipe ② touches the projection ⑤ on the brake caliper.

- 2. Remove:
  - brake caliper
- 3. Install:
  - brake pads
  - brake pad spring

  - front refrector
  - brake hose holder

6 Nm (0.6 m•kg, 4.3 ft•lb)

Refer to "REPLACING THE FRONT BRAKE PADS".



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



Recommended brake fluid DOT 4

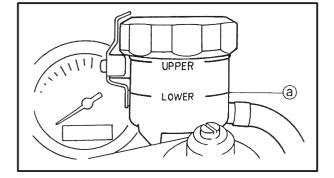
## **A** WARNING

- 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  $\rightarrow$  Bleed the brake system.

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



EAS00642

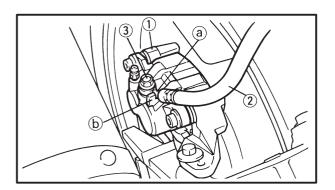
#### **INSTALLING THE REAR BRAKE CALIPER**

## **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 pads
  - brake caliper (1)
  - copper washers New
  - brake hose (2)
  - union bolt ③

30 Nm (3.0 m•kg, 22 ft•lb)

## **WARNING**

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

### **CAUTION:**

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe 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

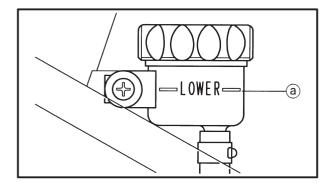
## **A** WARNING

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

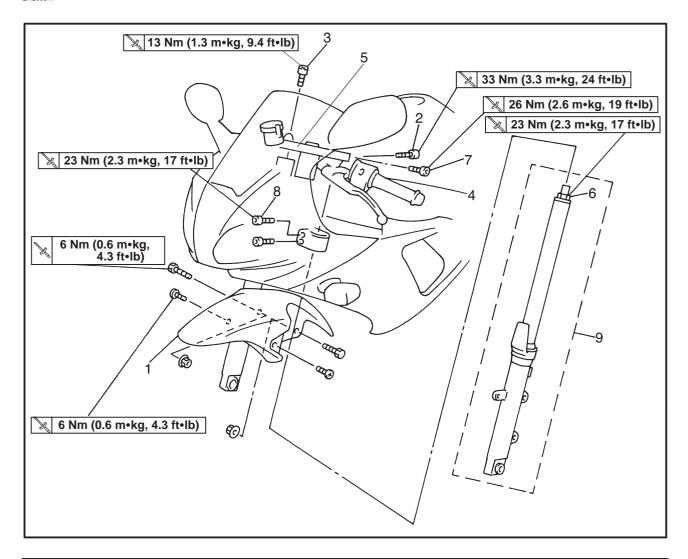


- 5. Check:
  - brake pedal operation
     Soft or spongy feeling → Bleed the brake system.

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

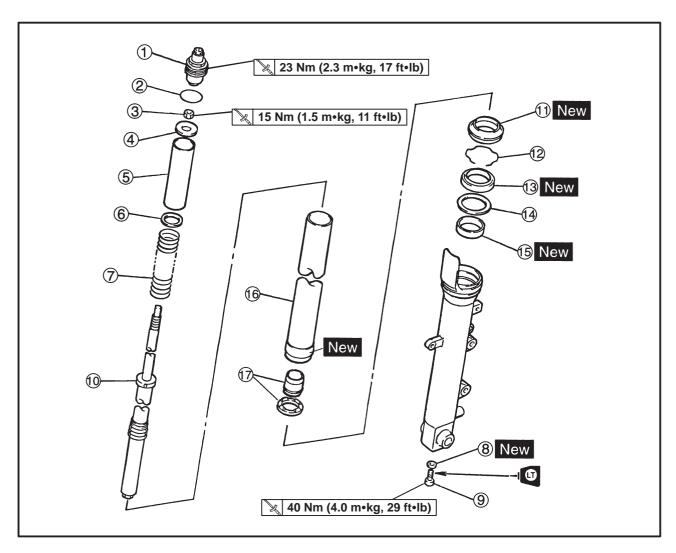


EAS00647

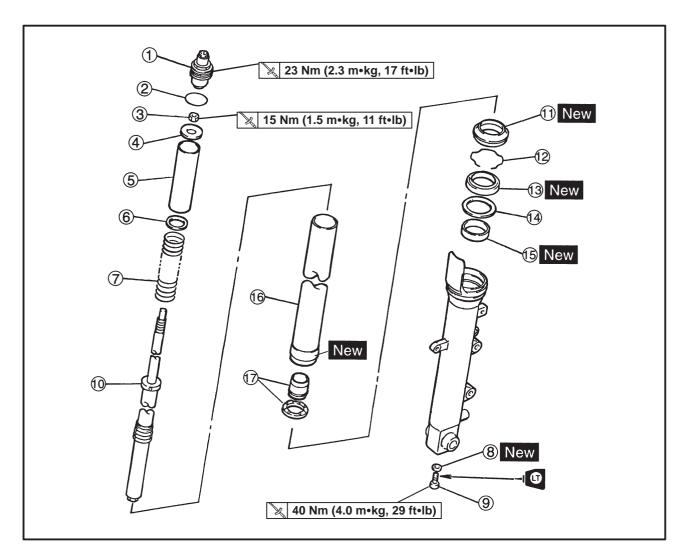


| Order | Job/Part                                                      | Q'ty | Remarks                                                                                                                               |
|-------|---------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------|
|       | Removing the front fork legs Front brake calipers Front wheel |      | Remove the parts in the order listed. The following procedure applies to both of the front fork legs. Refer to "FRONT WHEEL AND BRAKE |
| 1     | Front cowling inner panel Front fender                        | 1    | DISCS". Refer to "COWLINGS" in chapter 3.                                                                                             |
| 2 3   | Handlebar pinch bolt Upper bracket bolt                       | 2 2  | Loosen                                                                                                                                |
| 4 5   | Handlebar (left) Handlebar (right)                            | 1    |                                                                                                                                       |
| 6     | Cap bolts                                                     | 2    | Loosen                                                                                                                                |
| 7     | Upper bracket pinch bolts                                     | 2    | Loosen                                                                                                                                |
| 8     | Lower bracket pinch bolts                                     | 4    | Loosen                                                                                                                                |
| 9     | Front fork legs                                               | 2    | For installation, reverse the removal procedure.                                                                                      |

EB703002



| Order               | Job/Part                                                                                                        | Q'ty                                    | Remarks                                                                                               |
|---------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------|
|                     | Disassembling the front fork legs                                                                               |                                         | Remove the parts in the order listed. The following procedure applies to both of the front fork legs. |
| 1 2 3 4 5 6 7 8 9 0 | Cap bolt O-ring Nut Washer Spacer Washer Fork spring Copper washer Damper rod assembly bolt Damper rod assembly | 1 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Refer to "DISASSEMBLING/<br>ASSEMBLING THE FRONT FORK<br>LEGS".                                       |



| Order                                   | Job/Part                                                                             | Q'ty            | Remarks                                                                                                              |
|-----------------------------------------|--------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------|
| ① ① ② ① ① ① ① ① ① ① ① ① ① ① ① ① ① ① ① ① | Dust seal Oil seal clip Oil seal Washer Outer tube bushing Inner tube Oil lock piece | 1 - 1 1 1 1 1 - | Refer to "DISASSEMBLING/<br>ASSEMBLING THE FRONT FORK<br>LEGS".  For assembly, reverse the disassembly<br>procedure. |



FAS00649

#### REMOVING THE FRONT FORK LEGS

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

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. Loosen:

- upper bracket pinch bolt ③
- cap bolt 2
- handlebar pinch bolt 1
- lower bracket pinch bolt
- upper bracket bolt 4
- handlebar (5)

## **WARNING**

Before loosening the upper and lower bracket pinch bolts and handlebar pinch bolt, support the front fork leg.

#### 3. Remove:

front fork leg

4)



#### 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 Rod holder 90890-01434

NOTE: -

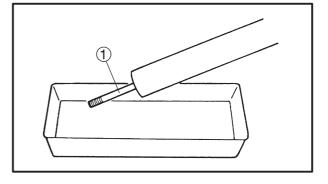
Use the side of the rod holder that is marked "B".

- 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.
- g. Remove the fork spring.

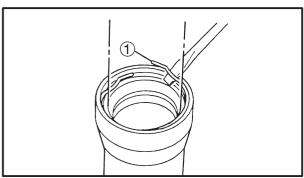


2. Drain:

• fork oil

NOTE: -

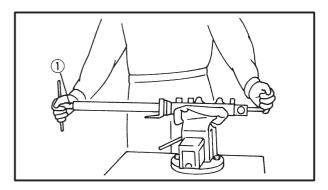
Stroke the damper rod ① several times while draining the fork oil.



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

(with a flat-head screwdriver)

Slide metal



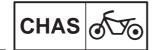
- 4. Remove:
  - damper rod assembly bolt
  - copper washer

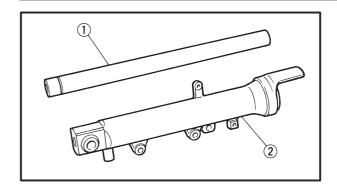
NOTE: -

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



Damper rod holder 90890-01425, YM-01425





EAS0065

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

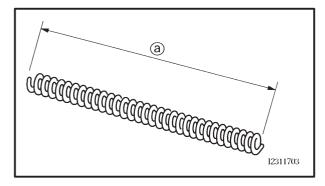
The following procedure applies to both of the front fork legs.

- 1. Check:
  - inner tube (1)
  - outer tube 2

Bends/damage/scratches → Replace.

## **A** WARNING

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



#### 2. Measure:

spring free length (a)
 Out of specification → Replace.



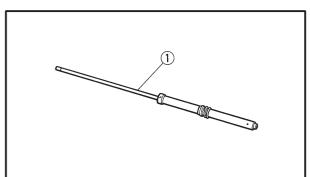
Spring free length limit 251.8 mm (9.91 in) <Limit>: 246 mm (9.69 in)

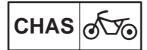


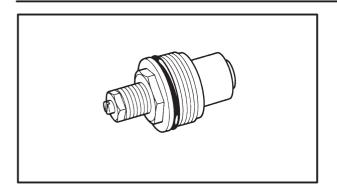
damper rod ①
 Damage/wear → Replace.
 Obstruction → Blow out all of the oil passages with compressed air.



- The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.







- 4. Check:
  - cap bolt O-ring
     Damage/wear → Replace.

EAS0066

#### **ASSEMBLING THE FRONT FORK LEGS**

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

### **WARNING**

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

#### NOTE: -

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



- oil lock piece
- inner tube (2)
- damper rod assembly ①



Always use new copper washers.

#### **CAUTION:**

Allow the damper rod assembly to slide slowly down the inner tube ② until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

#### 2. Lubricate:

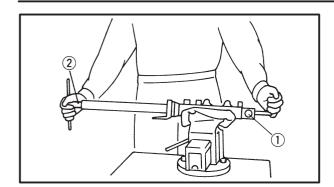
• inner tube's outer surface

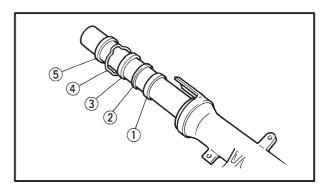


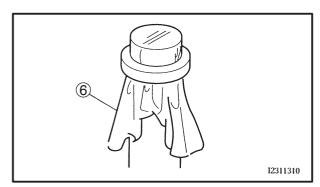
Recommended lubricant
Yamaha fork and suspension oil
01 or equivalent

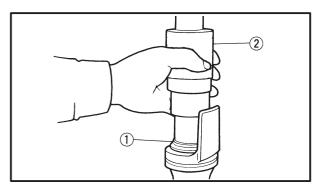
7-48

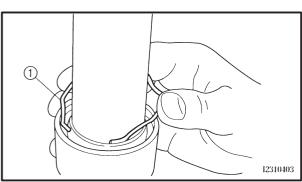












#### 3. Tighten:

damper rod assembly bolt 1



40 Nm (4.0 m•kg, 29 ft•lb)

#### NOTE: -

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



Damper rod holder 90890-01425, YM-01425

#### 4. Install:

- outer tube bushing 1
- washer (2)
- oil seal ③
- oil seal clip (4)
- dust seal (5)

#### **CAUTION:**

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

#### NOTE: ——

- Before installing the oil seal, lubricate its lips with lithium soap base 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 6 to protect the oil seal during installation.

#### 5. Install:

- washer
- oil seal ① (with the fork seal driver ②)



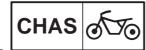
Fork seal driver weight 90890-01367, YM-33963 Fork seal driver attachment 90890-01374, YM-8020

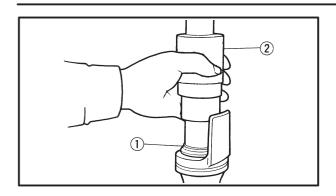
#### 6. Install:

• oil seal clip (1)

#### NOTE:

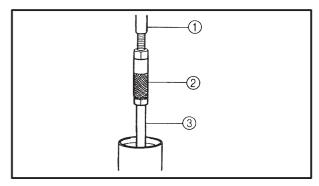
Adjust the oil seal clip so that it fits into the outer tube's groove.





#### 7. Install:

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



#### 8. Install:

- rod puller ①
- adapter ②
  (onto the damper rod ③)



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

9. Fully compress the front fork leg.

#### 10. Fill:

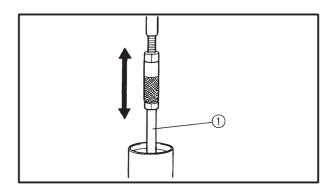
 front fork leg (with the specified amount of the recommended fork oil)



Quantity (each front fork leg)
476 cm<sup>3</sup> (16.09356 US oz)
Recommended oil
Yamaha fork and suspension
oil 01
or equivalent

### **CAUTION:**

- Be sure to use the recommended fork oil.
   Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

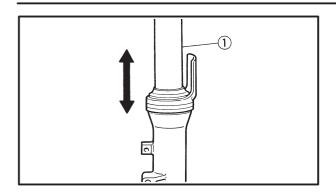


11. After filling the front fork leg, slowly stroke the damper rod ① up and down (at least ten times) to distribute the fork oil.

#### NOTE: -

Be sure to stroke the damper rod slowly because the fork oil may spurt out.

# FRONT FORK



12. Slowly stroke the inner tube ① up and down to distribute the fork oil once more (1 stroke = about 100 mm (3.94 in)).

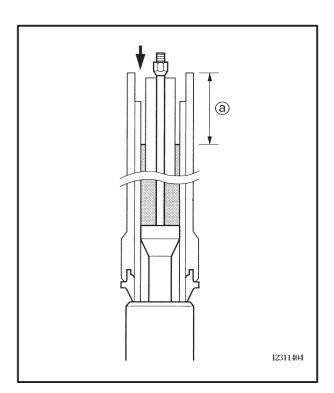
NOTE: -

Be careful not to stroke the inner tube over 100 mm (3.94 in) as this will cause air to enter. If the inner tube is stroked more than 100 mm (3.94 in), repeat steps (12) and (13).

13. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

NOTE:

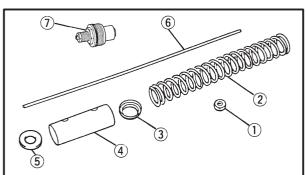
Be sure to bleed the front fork leg of any residual air.



- 14. Measure:
  - front fork leg oil level (a)
     Out of specification → Correct.

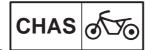


Front fork leg oil level (from the top of the inner tube, with the inner tube fully compressed, and without the spring)
107 mm (4.21 in)



- 15. Install:
  - nut (1)
  - fork spring 2
  - washer ③
  - spacer (4)
  - washer (5)
  - damper adjusting rod 6
  - cap bolt (7)
- a. Remove the rod puller and adapter.
- b. Install the nut.

## FRONT FORK



c. Install the rod puller and adapter onto the damper rod.



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

- d. Install the fork spring, washers and spacer.
- e. Press down on the spacer with the fork spring compressor (8).
- f. Pull up the rod puller and install the rod holder 9 between the nut 1 and the spacer 4.

NOTE: -

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



Fork spring compressor 90890-01441 Rod holder 90890-01434

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



Distance **(b)**11 mm (0.43 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:** 

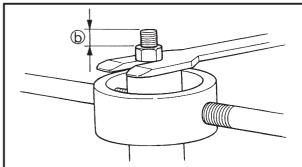
15 Nm (1.5 m•kg, 11 ft•lb)

k. Remove the rod holder and fork spring compressor.

# **A** WARNING

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

1



### FRONT FORK



16. Install:

• cap bolt (onto the inner tube)

NOTE: -

Temporarily tighten the cap bolt.

EAS00662

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

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

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

NOTE: -

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

2. Tighten:

lower bracket pinch bolt

23 Nm (2.3 m•kg, 17 ft•lb)

• handlebar pinch bolt 1

33 Nm (3.0 m•kg, 24 ft•lb)

• cap bolt 2

23 Nm (2.3 m•kg, 17 ft•lb)

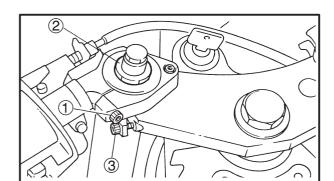
• upper bracket pinch bolt 3

26 Nm (2.6 m•kg, 19 ft•lb)

# **A** WARNING

Make sure that the brake hoses are routed properly.

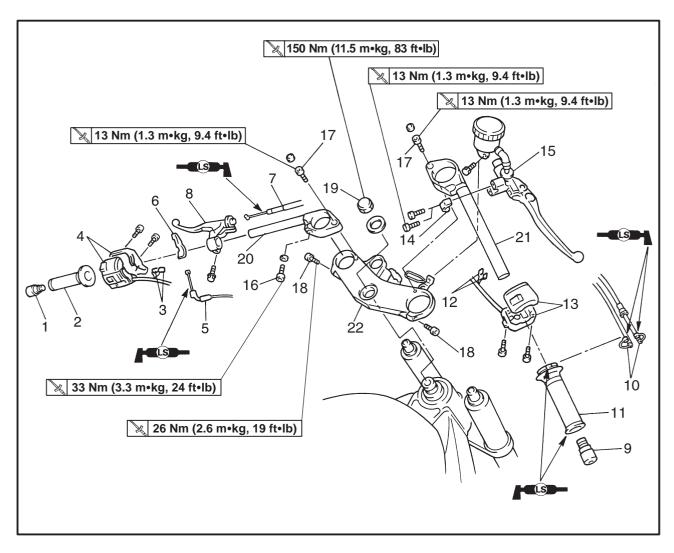
- 3. Adjust:
  - spring preload
  - rebound damping
  - compression damping Refer to "ADJUSTING THE FRONT FORK LEGS" in chapter 3.



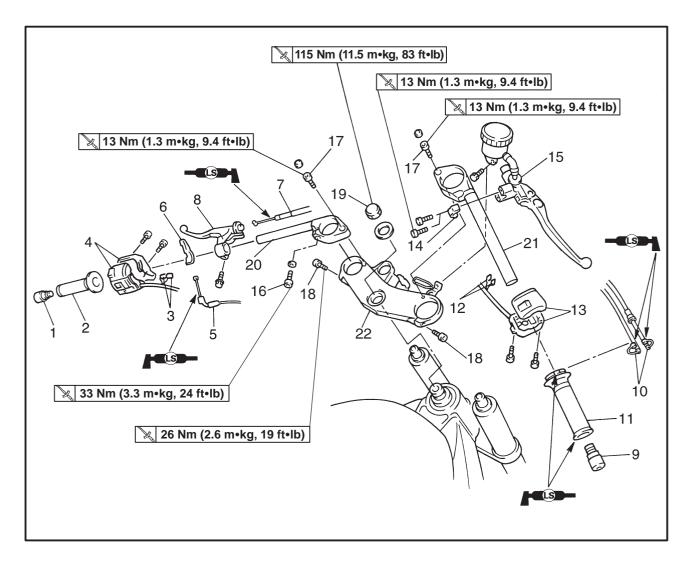


EAS00665

# **HANDLEBARS**



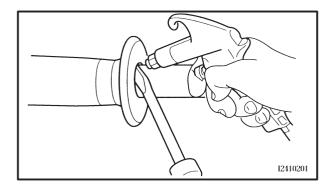
| Order | Job/Part                               | Q'ty | Remarks                               |
|-------|----------------------------------------|------|---------------------------------------|
|       | Removing the handlebars                |      | Remove the parts in the order listed. |
| 1 2   | Left grip end                          | 1 -  | Refer to "REMOVING/INSTALLING THE     |
| 3     | Handlebar grip Clutch switch connector | 2    | HANDLEBARS". Disconnect.              |
| 4     | Left handlebar switch                  | 4    | Refer to "INSTALLING THE              |
| 4     | Left handlebar switch                  | '    | HANDLEBARS".                          |
| 5     | Starter cable                          | 1    | Disconnect.                           |
| 6     | Starter lever                          | 1    |                                       |
| 7     | Clutch cable                           | 1    | Disconnect.                           |
| 8     | Clutch lever holder                    | 1 -  |                                       |
| 9     | Right grip end                         | 1    | Refer to "INSTALLING THE              |
| 10    | Throttle cable                         | 2    | HANDLEBARS".                          |
| 11    | Throttle grip                          | 1 -  |                                       |



| Order                                                          | Job/Part                                                                                                                                                                                                                               | Q'ty                                               | Remarks                                                                                              |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>22 | Front brake switch connector Right handlebar switch Brake master cylinder holder Brake master cylinder Handlebar pinch bolt Upper bracket bolt Upper bracket pinch bolt Steering stem nut Left handlebar Right handlebar Upper bracket | 2<br>1 -<br>1<br>1 -<br>2<br>2<br>2<br>1<br>1<br>1 | Disconnect.  Refer tp "INSTALLING THE HANDLEBARS".  For installation, reverse the removal procedure. |

## **HANDLEBARS**





EAS00667

### **REMOVING THE HANDLEBARS**

1. Stand the motorcycle on a level surface.

# **A** WARNING

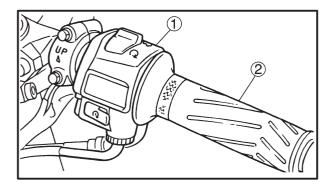
Securely support the motorcycle so that there is no danger of it falling over.

## 2. Remove:

- grip end
- handlebar grip
- left handlebar switch
- clutch lever holder

### NOTE: -

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



### 3. Remove:

- grip end
- right handle switch 1
- throttle grip 2
- right handlebar switch
- brake master cylinder holder

EAS00669

#### **CHECKING THE HANDLEBARS**

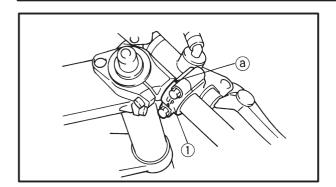
- 1. Check:
  - left handlebar
- right handlebar Bends/cracks/damage → Replace.

# **WARNING**

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

## **HANDLEBARS**





AS00674

### **INSTALLING THE HANDLEBARS**

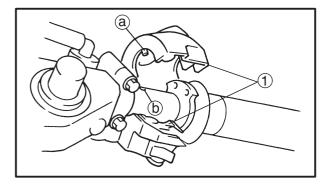
- 1. Install:
  - brake master cylinder holder 1

### **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 (a) in the right handlebar.
- There should be 2 mm of clearance between the right handlebar switch and the brake master cylinder holder.

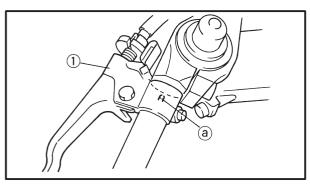


### 2. Install:

- right handlebar switch (1)
- throttle cables
- grip end

### NOTE: -

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



### 3. Install:

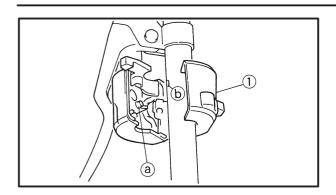
• clutch lever holder (1)

#### NOTE:

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

# **HANDLEBARS**





4. Install:

• left handlebar switch 1

NOTE:

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

5. Install:

- handlebar grip
- grip end

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.

# **A** WARNING

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

### 6. 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)

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

### 7. Adjust:

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



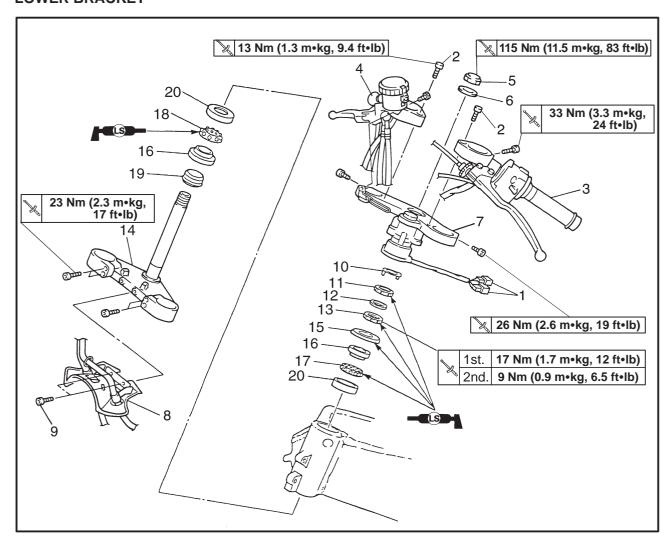
Throttle cable free play (at the flange of the throttle grip)

 $6 \sim 8 \text{ mm } (0.24 \sim 0.31 \text{ in})$ 

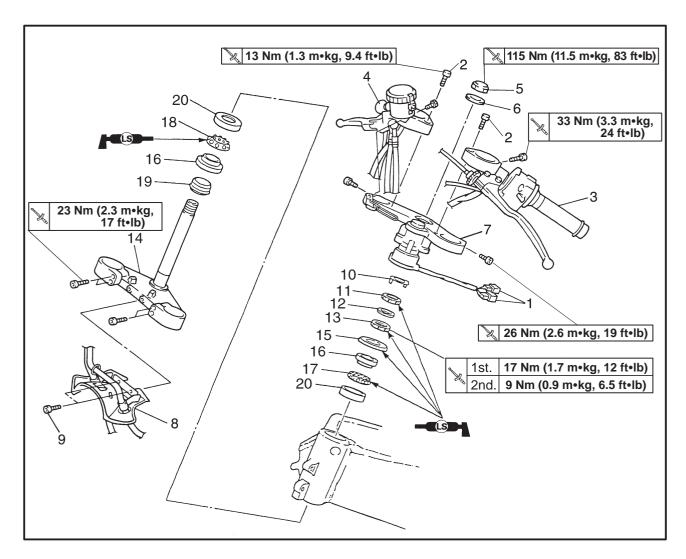


EAS00676

# STEERING HEAD LOWER BRACKET



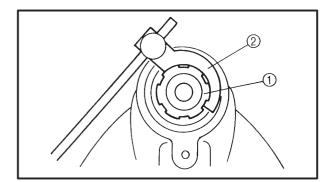
| Order | Job/Part                                  | Q'ty | Remarks                                                                       |
|-------|-------------------------------------------|------|-------------------------------------------------------------------------------|
|       | Removing the lower bracket<br>Front wheel |      | Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS". |
|       | Front fork legs                           |      | Refer to "FRONT FORK".                                                        |
| 1     | Main switch coupler                       | 2    | Disconnect.                                                                   |
| 2     | Upper bracket bolt                        | 2    |                                                                               |
| 3     | Left handlebar assembly                   | 1    |                                                                               |
| 4     | Right handlebar assembly                  | 1    |                                                                               |
| 5     | Steering stem nut                         | 1    |                                                                               |
| 6     | Washer                                    | 1    |                                                                               |
| 7     | Upper bracket                             | 1    |                                                                               |
| 8     | Lower bracket panel                       | 1    |                                                                               |
| 9     | Brake hose holder bolt                    | 2    |                                                                               |
| 10    | Lock washer                               | 1 -  | Defer to "CHECK AND AD ILICTING THE                                           |
| 11    | Upper ring nut                            | 1    | Refer to "CHECK AND ADJUSTING THE                                             |
| 12    | Rubber washer                             | 1 -  | STEERING HEAD" in chapter 3.                                                  |



| Order | Job/Part           | Q'ty | Remarks                                                        |
|-------|--------------------|------|----------------------------------------------------------------|
| 13    | Lower ring nut     | 1    | Refer to "CHECK AND ADJUSTING THE STEERING HEAD" in chapter 3. |
| 14    | Lower bracket      | 1    | ·                                                              |
| 15    | Bearing cover      | 1    |                                                                |
| 16    | Bearing inner race | 2    |                                                                |
| 17    | Upper bearing      | 1    |                                                                |
| 18    | Lower bearing      | 1    |                                                                |
| 19    | Dust seal          | 1    |                                                                |
| 20    | Bearing outer race | 2    |                                                                |
|       |                    |      | For installation, reverse the removal procedure.               |

### STEERING HEAD





EAS00677

### REMOVING THE LOWER BRACKET

1. Stand the motorcycle on a level surface.

# **WARNING**

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

- 2. Remove:
  - front fork legs
  - steering stem nut
  - upper bracket
  - ring nuts ①
    (with the special tool ②)



Ring nut wrench 90890-01403, YU-33975

# **A** WARNING

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

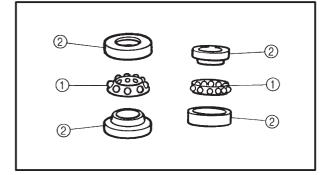
EAS00682

### **CHECKING THE STEERING HEAD**

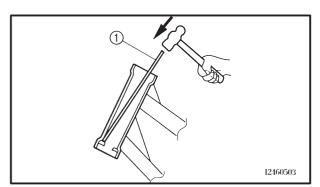
- 1. Wash:
  - bearing balls
  - bearing races



Recommended cleaning solvent Kerosine



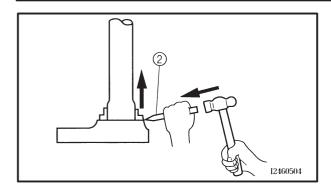
- 2. Check:
  - bearing balls 1
  - bearing races ②
     Damage/pitting → Replace.



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

## STEERING HEAD





- b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
- c. Install a new dust 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 bearing balls and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.

### 4. Check:

- upper bracket
- lower bracket

   (along with the steering stem)
   Bends/cracks/damage → Replace.

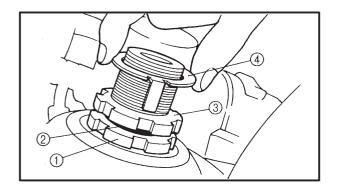
EAS00683

## **INSTALLING THE STEERING HEAD**

- 1. Lubricate:
  - upper bearing
  - lower bearing
  - bearing races



Recommended lubricant Lithium soap base grease



- 2. Install:
  - bearing
  - bearing cover
  - lower ring nut (1)
  - rubber washer 2
  - upper ring nut ③
  - lock washer 4

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

# **STEERING HEAD**



- 3. Install:
  - upper bracket
  - steering stem nut

NOTE: -

Temporarily tighten the steering stem nut.

- 4. Install:
  - front fork legs Refer to "FRONT FORK".

NOTE:

Temporarily tighten the upper and lower bracket pinch bolts, and handlebar pinch bolts.

- 5. Tighten:
  - steering stem nut

115 Nm (11.5 m•kg, 83 ft•lb)

lower bracket pinch bolt

23 Nm (2.3 m•kg, 17 ft•lb)

upper bracket pinch bolt

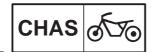
26 Nm (2.6 m•kg, 19 ft•lb)

upper bracket bolt

X 13 Nm (1.3 m•kg, 9.4 ft•lb)

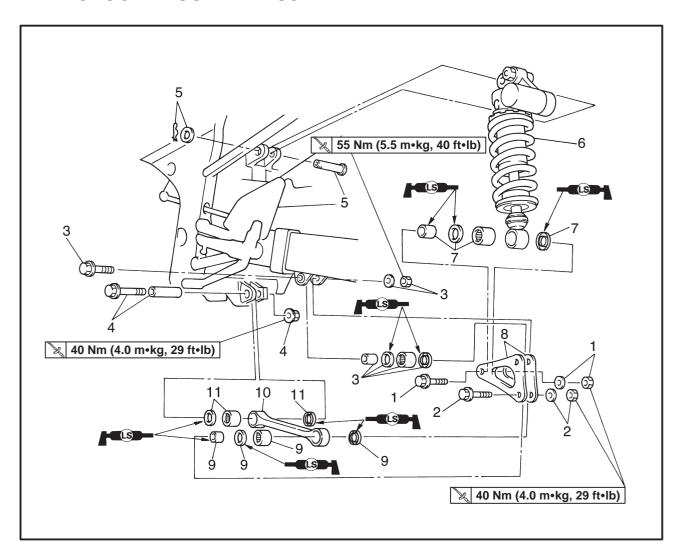
handlebar pinch bolt

33 Nm (3.3 m•kg, 24 ft•lb)



EAS00685

# **REAR SHOCK ABSORBER ASSEMBLY**



| Order | Job/Part                                  | Q'ty  | Remarks                                          |
|-------|-------------------------------------------|-------|--------------------------------------------------|
|       | Removing the rear shock absorber assembly |       | Remove the parts in the order listed.            |
|       | Rear wheel                                |       | Refer to "REMOVING THE REAR WHEEL".              |
| 1     | Self-locking nut/bolt                     | 1/1 - | 7                                                |
| 2     | Self-locking nut/bolt                     | 1/1   | Deter to "DEMOVING THE DEAD                      |
| 3     | Self-locking nut/bolt/coller              | 1/1/1 | Refer to "REMOVING THE REAR                      |
| 4     | Self-locking nut/bolt                     | 1/1   | SHOCK ABSORBER ASSEMBLY".                        |
| 5     | Pin/clip/washer                           | 1/1/1 |                                                  |
| 6     | Rear shock absorber assembly              | 1 -   |                                                  |
| 7     | Coller/oil seal/bearing                   | 1/2/1 |                                                  |
| 8     | Relay arm                                 | 2     |                                                  |
| 9     | Coller/oil seal/bearing                   | 1/2/1 |                                                  |
| 10    | Connecting arm                            | 1     |                                                  |
| 11    | Coller/oil seal/bearing                   | 1/2/1 |                                                  |
|       |                                           |       | For installation, reverse the removal procedure. |

## REAR SHOCK ABSORBER ASSEMBLY



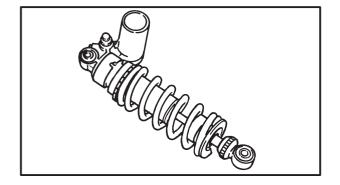
EAS00687

# 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 ABSORB-ER AND GAS CYLINDER

Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, press on the gas valve needle with a suitable tool as shown, until all of the gas is released (the hissing has stopped).

# **A** WARNING

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

# REAR SHOCK ABSORBER ASSEMBLY



EAS00694

# REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the motorcycle on a level surface.



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



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

#### 2. Remove:

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



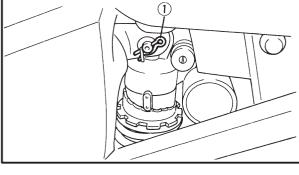
While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.

### 3. Remove:

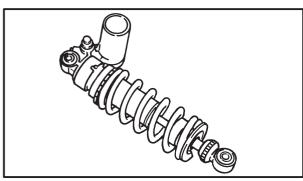
- rear shock absorber assembly upper bin 1
- rear shock absorber assembly

#### NOTE:

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



010 010 0



EAS00696

# CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND GAS CYLINDER

- 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.

- gas cylinder
- Damage/gas leaks → Replace.
- bushings

Damage/wear → Replace.

dust seals

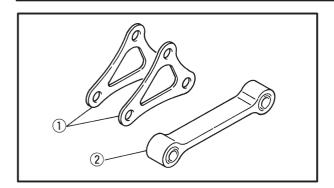
Damage/wear → Replace.

bolts

Bends/damage/wear → Replace.

## REAR SHOCK ABSORBER ASSEMBLY





# CHECKING THE RELAY ARM AND CONNECTING ARM

- 1. Check:
  - relay arm 1
  - connecting arm ②
    Damage/wear → Replace.
  - bearings
  - oil seals

Damage/pitting → Replace.

spacers

 $\underset{\text{\tiny EAS00698}}{\mathsf{Damage/scratches}} \to \mathsf{Replace}.$ 

# INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Lubricate:
  - bearings
  - oil seals
  - spacers



Recommended lubricant
Lithium soap base grease

- 2. Install:
  - connecting arm
  - relay arm
  - rear shock absorber assembly

## NOTE: -

When installing the rear shock absorber assembly, lift up the swingarm.

- 3. Tighten:
  - connecting-arm-to-frame nut

3 40 Nm (4.0 m•kg, 29 ft•lb)

• relay-arm-to-connecting-arm nut

40 Nm (4.0 m•kg, 29 ft•lb)

• relay-arm-to-swingarm nut

40 Nm (4.0 m•kg, 29 ft•lb)

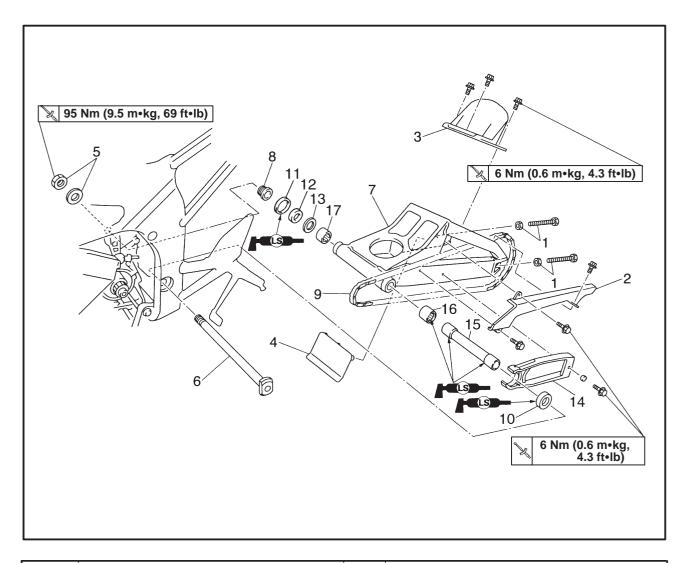
• rear shock absorber assembly lower nut

55 Nm (5.5 m•kg, 40 ft•lb)

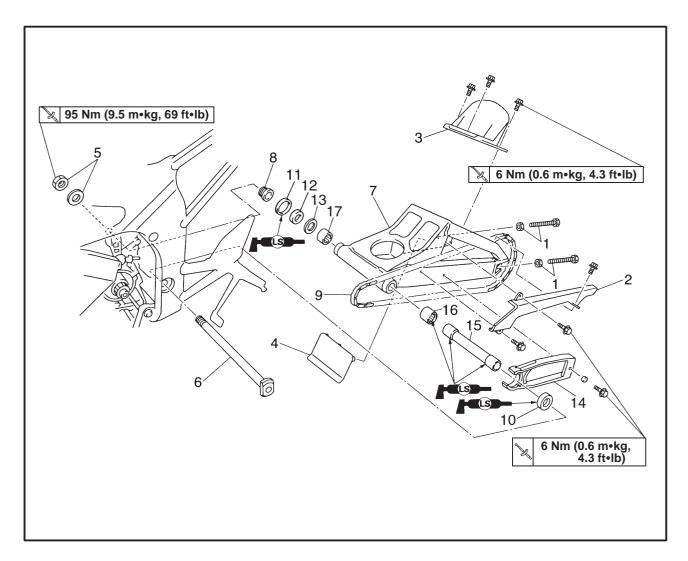


EAS00700

# **SWINGARM AND DRIVE CHAIN**



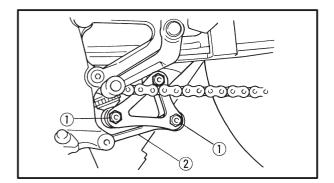
| Order | Job/Part                              | Q'ty | Remarks                                                     |
|-------|---------------------------------------|------|-------------------------------------------------------------|
|       | Removing the swingarm and drive chain |      | Remove the parts in the order listed.                       |
|       | Drive sprocket                        |      | Refer to "ENGINE" in chapter 4.                             |
|       | Rear wheel                            |      | Refer to "REAR WHEEL, BRAKE DISC, AND REAR WHEEL SPROCKET". |
|       | Rear shock absorber assembly          |      | Refer to "REAR SHOCK ABSORBER ASSEMBLY".                    |
| 1     | Adjusting bolt/locknut                | 2/2  |                                                             |
| 2     | Drive chain guard                     | 1    |                                                             |
| 3     | Rear fender                           | 1    |                                                             |
| 4     | Flap                                  | 1    |                                                             |
| 5     | Pivot shaft nut/washer                | 1/1  |                                                             |
| 6     | Pivot shaft                           | 1    |                                                             |
| 7     | Swingarm                              | 1    |                                                             |



| Order | Job/Part                | Q'ty | Remarks                                          |
|-------|-------------------------|------|--------------------------------------------------|
| 8     | Pivot shaft adjust bolt | 2    | Refer to "REMOVING/INSTALLING THE SWINGARM".     |
| 9     | Drive chain             | 1    |                                                  |
| 10    | Dust cover              | 1    |                                                  |
| 11    | Oil seal                | 1    |                                                  |
| 12    | Bush                    | 1    |                                                  |
| 13    | Shim                    | 1    |                                                  |
| 14    | Drive chain guide       | 1    |                                                  |
| 15    | Bush                    | 1    |                                                  |
| 16    | Left bearing            | 1    |                                                  |
| 17    | Right bearing           | 1    |                                                  |
|       |                         |      | For installation, reverse the removal procedure. |

|   |     | $\overline{}$ |   |   |
|---|-----|---------------|---|---|
| N | ( ) |               | _ | • |
|   |     |               |   |   |

Before removing the drive sprocket, drive chain, and rear wheel, measure the drive chain slack and the length of a tenlink section of the drive chain.



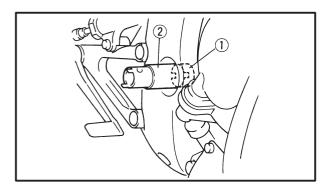
#### EC573000

### **REMOVING THE SWINGARM**

- 1. Remove:
- Bolt (connecting rod) 1
- Connecting rod 2

### NOTE:

Remove the bolt while holding the swingarm.



### 2. Loosen:

Pivot shaft adjust bolt 1

### NOTE:

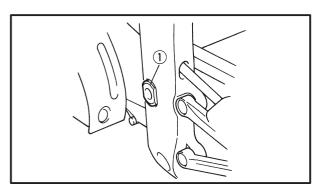
Loosen the pivot shaft adjust bolt using a pivot shaft wrench (2)



# Pivot shaft wrench: 90890-01471, YM-01471



- Pivot shaft 1
- Swingarm



EAS00704

### **REMOVING THE DRIVE CHAIN**

- 1. Remove:
  - drive chain

NOTE: -

When replacing the swingarm, the drive chain is cut.



EAS00703

## **CHECKING THE SWINGARM**

1. Stand the motorcycle on a level surface.



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. Measure:
  - swingarm side play
- swingarm vertical movement

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



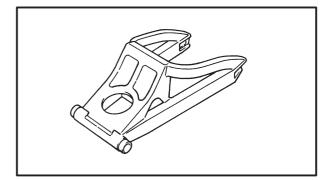
Pivot shaft nut 95 Nm (9.5 m•kg, 69 ft•lb)

- 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 bust covers.

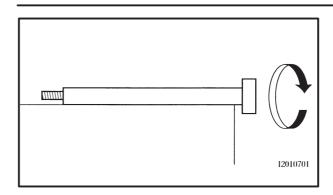


- 3. Check:
- swingarm
  Bends/cracks/damage → Replace.

NOTE:

If the swingarm must be replaced, the drive chain must be cut with a drive chain cutter.





4. Check:

pivot shaft
 Roll the pivot shaft on a flat surface.

 Bends → Replace.

# **A** WARNING

Do not attempt to straighten a bent pivot shaft.

- 5. Wash:
  - pivot shaft
  - pivot shaft adjust bolt
  - dust covers
  - spacer
  - bearings



Recommended cleaning solvent Kerosine

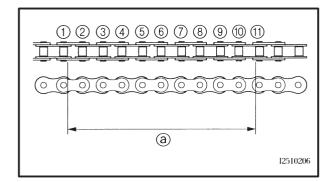
- 6. Check:
  - dust covers
  - spacer
  - oil seals

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

bearings

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





EAS00709

### **CHECKING THE DRIVE CHAIN**

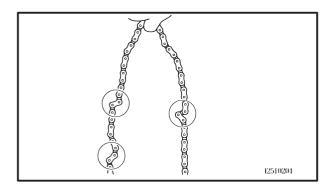
- 1. Measure:
  - ten-link section ⓐ of the drive chain
     Out of specification → Replace the drive chain.



Max. ten-link drive chain section 149 mm (5.87 in)

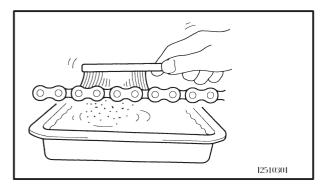
### NOTE: —

- 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.



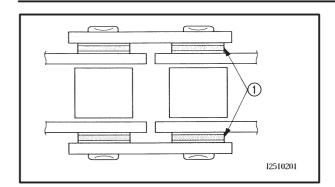
### 2. Check:

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 kerosine and remove any remaining dirt.





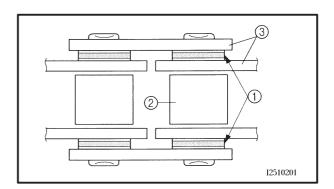
c. Remove the drive chain from the kerosine and completely dry it.

### **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 kerosine to clean the drive chain.

Don't soak drive drain in kerosine more them ten minutes. O-ring is damage by kerosine.



### 4. Check:

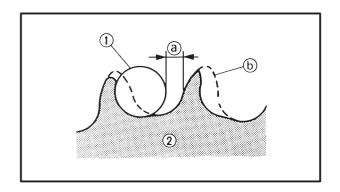
- O-rings ①
- Damage → Replace the drive chain.
- drive chain rollers 2
- Damage/wear → Replace the drive chain.
- drive chain side plates ③
   Cracks/damage/wear → Replace the drive chain.

### 5. Lubricate:

drive chain

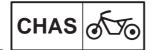


Recommended lubricant Engine oil or chain lubricant suitable for O-ring chains



#### 6 Check:

- drive sprocket
- rear wheel sprocket
   More than 1/4 tooth wear → Replace the
   drive chain sprockets as a set.
   Bent teeth → 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 base grease



- swingarm
- pivot shaft
- washer
- pivot shaft adjust bolt (1)
- pivot shaft nut | 95 Nm (9.5 m•kg, 69 ft•lb)



Use the pivot shaft wrench ② to tighten the pivot adjust bolt to finger tightness.



Pivot shaft wrench: 90890-01471, YM-01471

- 3. Install:
  - rear shock absorber assembly
  - rear wheel
     Refer to "REAR SHOCK ABSORBER ASSEMBLY" and "REAR WHEEL".
- 4. Adjust:
  - drive chain slack
     Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.



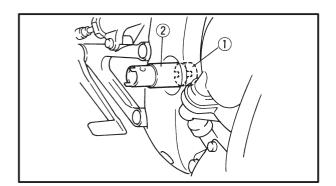
**Drive chain slack** 

 $40 \sim 50 \text{ mm} (1.5 \sim 1.97 \text{ in})$ 

AS00713

### **INSTALLING THE DRIVE CHAIN**

- 1. Lubricate:
  - drive chain
- 2. Install:
  - drive chain (with the drive chain riveter)



CHAS 656



# CHAPTER 8. ELECTRICAL

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# **ELECTRICAL COMPONENTS**



EB800000

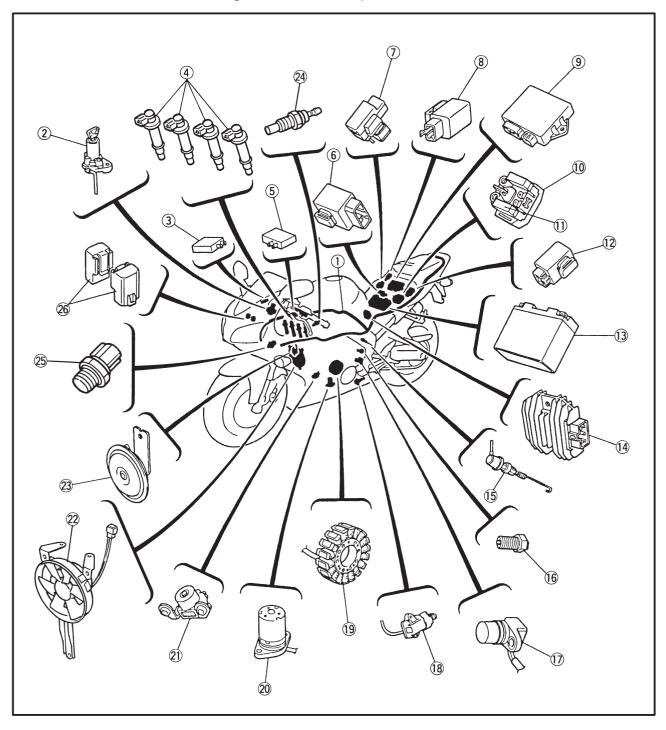
# **ELECTRICAL**

# **ELECTRICAL COMPONENTS**

- 1 Wire harness
- (2) Main switch
- 3 Front brake light switch
- 4 Plug top ignition coils
- (5) Clutch switch
- 6 Starting circuit cutoff relay
- (7) Fuse box
- 8 Flasher relay
- (9) CDI unit

- 10 Starter relay
- 11) Main fuse
- (12) Oil level relay
- 13 Battery
- 14 Rectifier/regulator
- 15 Rear brake light switch
- 16 Neutral switch
- 17) Speed sensor
- 3 Sidestand switch
- 19 Stator coil assembly

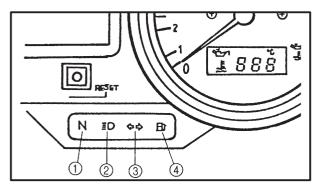
- 20 Oil level switch
- 21) Pickup coil
- 22 Radiator fan
- 23 Horn
- 24) Thermo unit
- 25 Thermo switch
- 26 Headlight relay (HI, LO)



# **INSTRUMENT FUNCTIONS**



# INSTRUMENT FUNCTIONS INDICATOR LIGHTS



- 1 Neutral indicator light "N"
- (2) High beam indicator light "≣O"
- (3) Turn indicator light "> > "
- (4) Fuel indicator light " 1 "

### Turn indicator light "⋄⋄"

This indicator flashes when the turn switch is moved to the left or right.

## Neutral indicator light "N"

This indicator comes on when the transmission is in neutral.

## High beam indicator light "≣○"

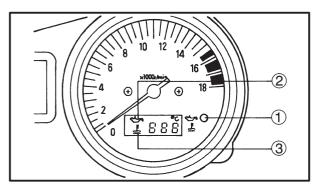
This indicator comes on when the headlight high beam is used.

## Fuel indicator light "▶"

When the fuel level drops below approximately 3.7 L, this light will come on.

When this light comes on, fill the fuel tank at the first opportunity.

### OIL LEVEL/COOLANT TEMPERATURE WARNING LIGHT



- 2 Oil level symbol " 🖘 "
- (3) Coolant temperature symbol " 👢 "

This warning light has two functions.

- The light will come on and symbol " " will flash if the engine oil level is low. If this symbol flashes, stop the engine immediately and fill it with oil to the specified level.
- The light will come on and symbol " will flash if the coolant temperature is too high. The following chart shows the conditions of the indicator light, symbol and temperature display in accordance with the coolant temperature.

## **CAUTION:**

- Do not run the motorcycle until you know it has sufficient engine oil.
- Do not run the motorcycle if the engine is overheated.

### NOTE: -

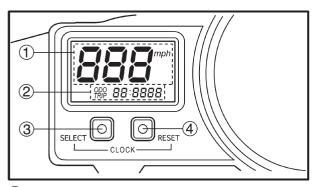
Even if the oil is filled to the specified level, the warning light may flicker when riding on a slope or during sudden acceleration or deceleration, but this is normal.

## **INSTRUMENT FUNCTIONS**



| Coolant temperature              | Display | Conditions                                                                                   | What to do                                                                                                                                                                     |
|----------------------------------|---------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0°C ~ 40°C<br>(0°F ~ 104°F)      |         | Symbol is on and "LO" is displayed.                                                          | Go ahead with riding.                                                                                                                                                          |
| 41°C ~ 117°C<br>(106°F ~ 243°F)  |         | Symbol is on and temperature is displayed.                                                   | Go ahead with riding.                                                                                                                                                          |
| 118°C ~ 140°C<br>(244°F ~ 284°F) |         | Symbol and temperature flashes and indicator light comes on.                                 | Stop the motorcycle and allow it to idle until the coolant temperature goes down.  If the temperature does not go down, stop the engine. Refer to "OVER-HEATING" in chapter 9. |
| 141 °C ~<br>(286°F)              |         | Symbol flashes,<br>"HI" is displayed<br>and flashes, and<br>the indicator light<br>comes on. | Stop the engine and allow it to cool. Refer to "OVERHEATING" in chapter 9.                                                                                                     |

### **COMBINATION METER**



- 1 Speedometer
- (2) Clock, odometer
- (3) "SELECT" button
- (4) "RESET" button

This combination meter is equipped with the following.

- A speedometer
- An odometer
- Two trip odometers
- A fuel reserve tripmeter
- A clock

To change the speedometer display from kilometers to miles, press the "SELECT" button for at least two seconds.

### **Odometer and trip meters**

Use the trip meters to estimate how far you can ride on a tank of fuel.

Use the fuel reserve trip meter to see the distance traveled from when the fuel level dropped to the reserve level.

Push the "SELECT" button to change between the odometer mode "ODO" and the trip odometer modes "TRIP 1" and "TRIP 2" in the following order:

"ODO" → "TRIP 1" → "TRIP 2" → "ODO"

### **INSTRUMENT FUNCTIONS**



When the fuel level indicator light comes on the odometer display will automatically change to the fuel reserve trip meter mode "TRIP F" and start counting the distance traveled from that point. Push the "SELECT" button to change between the fuel odometer, trip odometer and odometer modes in the following order:

"TRIP F"  $\rightarrow$  "TRIP 1"  $\rightarrow$  "TRIP 2"  $\rightarrow$  "ODO"  $\rightarrow$  "TRIP F"

To reset a trip odometer to 0.0, select it by pushing the "SELECT" button and push the "RESET" button for at least one second. To reset the fuel reserve trip meter, select it by pushing the "SELECT" button and push the "RESET" button for at least one second.

The display will return to "TRIP 1". If you do not reset the fuel reserve trip meter manually, it will automatically reset and return to "TRIP 1" after refueling and the motorcycle has traveled both 5 km and for approximately 3 minutes.

#### Clock

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

To set the clock:

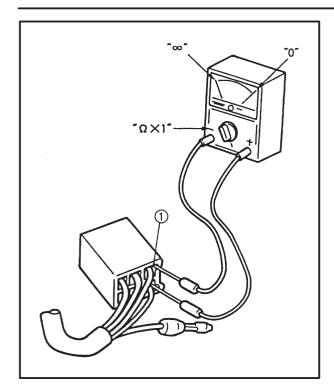
- 1. Push both the "SELECT" and "RESET" buttons for at least two seconds.
- 2. When the hour digits start flashing, push the "RESET" button to set the hours.
- 3. Push the "SELECT" button to change the minutes.
- 4. When the minute digits start flashing, push the "RESET" button to set the minutes.
-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

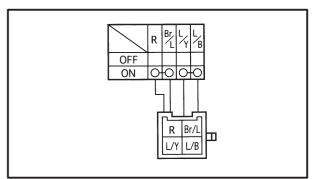
#### NOTE: -

After setting the clock, be sure to push the "SE-LECT" button before turning the main switch to "OFF", otherwise the clock will not be set.

## **SWITCHES**







EB801000

# SWITCHES

### **CHECKING SWITCH CONTINUITY**

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

## **CAUTION:**

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



# Pocket tester 90890-03112

### NOTE: -

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times$  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 blue/red and red when the switch is set to "P≤".

There is continuity between blue/red and blue, between brown/blue and red, and between blue/yellow and blue/black when the switch is set to "ON".

# **CHECKING THE SWITCHES**



EB801010

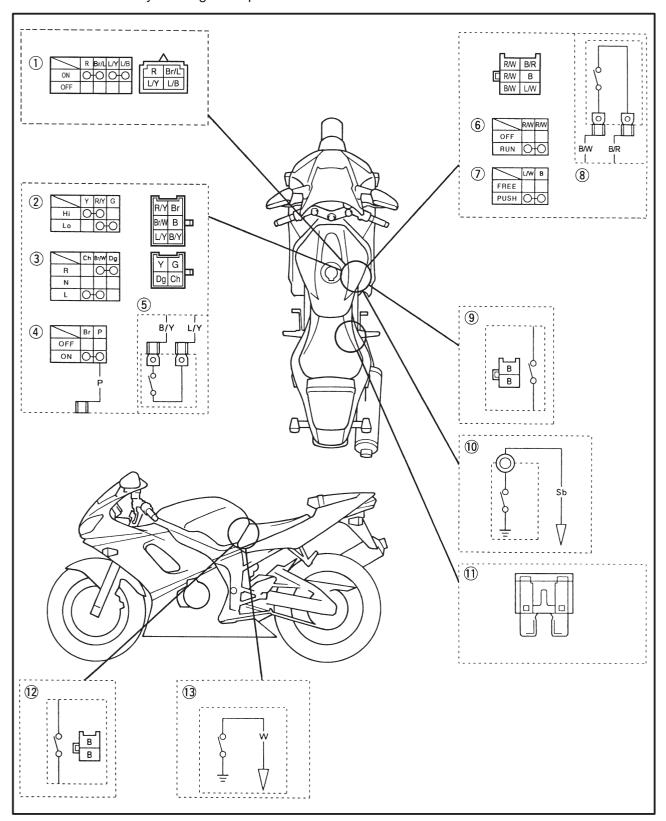
# **CHECKING THE SWITCHES**

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 the switch.

Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.



# **CHECKING THE SWITCHES**



- 1 Main switch
- 2 Dimmer switch
- 3 Turn signal switch4 Horn switch
- (5) Clutch switch
- 6 Engine stop switch
- 7 Start switch
- 8 Front brake light switch
  9 Rear brake light switch
  10 Neutral switch

- 11) Fuse
- 12 Sidestand switch
- (13) Oil level switch

# CHECKING THE BULBS AND BULB SOCKETS



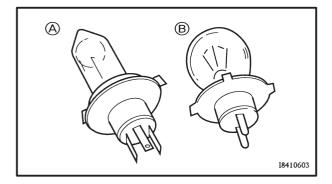
EB801020

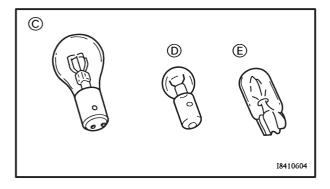
# CHECKING THE BULBS AND BULB SOCKETS

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. Incorrect continuity reading  $\rightarrow$  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 headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb © is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs ① and ② are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

#### CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

- 1. Remove:
- bulb

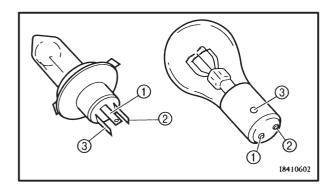


# **A** WARNING

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

### **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

### NOTE: -

Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.

- a. Connect the tester positive probe to terminal
  - ① and the tester negative probe to terminal
  - (3), and check the continuity.
- b. Connect the tester positive probe to terminal
  - 2 and the tester negative probe to terminal
  - (3), and check the continuity.
- c. If either of the readings indicate no continuity, replace the bulb.

## CHECKING THE BULBS AND BULB SOCKETS



# CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

- 1. Check:
  - bulb socket (for continuity) (with the pocket tester)
     No continuity → Replace.



Pocket tester 90890-03112

### NOTE: -

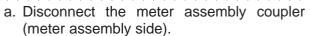
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity.
   If any of the readings indicate no continuity, replace the bulb socket.

### **CHECKING THE LEDS**

The following procedure applies to all of the LEDs.

 Check: LED (for proper operation)

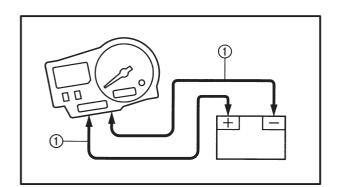


b. Connect two jumper leads ① from the battery terminals to the respective coupler terminals as shown.

# **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 that no flammable gas or fluid is in the vicinity.
- When the jumper leads are connected to the terminals the respective LED should illuminate.

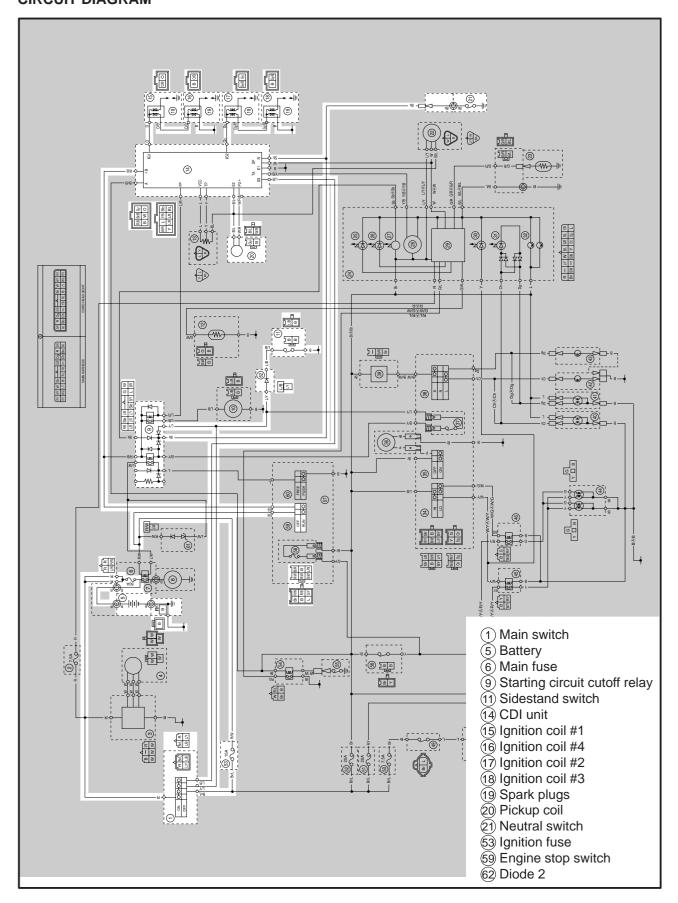
Does not light → Replace the meter assembly.





EB80200

# IGNITION SYSTEM CIRCUIT DIAGRAM





EB80201

### **TROUBLESHOOTING**

The ignition system fails to operate (no spark or intermittent spark).

### Check:

- 1. main and ignition fuses
- 2. battery
- 3. spark plugs
- 4. ignition spark gap
- 5. spark plug cap resistance
- 6. ignition coil resistance
- 7. pickup coil resistance
- 8. main switch
- 9. engine stop switch
- 10. neutral switch
- 11. sidestand switch
- 12. starting circuit cutoff relay
- 13. wiring (of the entire ignition system)

### NOTE:

- Before troubleshooting, remove the following part(-s):
- 1) rider seat
- 2) fuel tank
- 3) air filter case
- 4) heat protector plate
- 5) front cowling inner panel (right)
- 6) side cowling inner panel (right)
- 7) side cowling (right)
- Troubleshoot with the following special tool (-s).



Ignition checker 90890-06754 Pocket tester 90890-03112

EB802400

- 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).

EB802401

### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Min. 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.

EB802403

# 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
CR10EK (NGK)
CR9EK (NGK) (California)
Spark plug gap
0.6 ~ 0.7 mm (0.02 ~ 0.03 in)

 Is the spark plug in good condition, is it of the correct type, and its gap within specification?





NO

Re-gap or replace the spark plug.

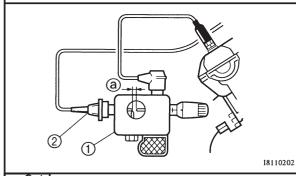


EB80240

### 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) as shown.
- 2 Spark plug cap
- Set the main switch to "ON".
- Measure the ignition spark gap (a).
- Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.





# Min. 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.

EB802409

# 6. Ignition coil resistance

The following procedure applies to all of the ignition coils.

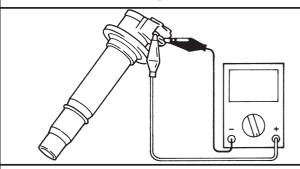
- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil as shown.

Tester positive probe →

ignition coil terminal

Tester negative probe →

ignition coil terminal



• Measure the primary coil resistance.



Primary coil resistance 0.238  $\sim$  0.322  $\Omega$  at 20°C (68°F)

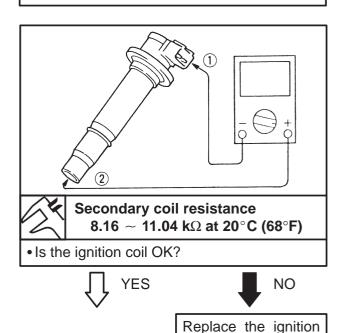
- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil as shown.
- Measure the secondary coil resistance.

Tester positive probe →

ignition coil terminal (1)

Tester positive probe →

spark plug terminal (2)



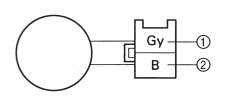


EB80241

### 7. Pickup coil resistance

- Disconnect the pickup coil coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the pickup coil terminal.

Tester positive probe → gray ①
Tester negative probe → black ②



• Measure the pickup coil resistance.



Pickup coil resistance 248  $\sim$  372  $\Omega$  at 20°C (68°F) (between gray and black)

• Is the pickup coil OK?





Replace the pickup coil.

EB802411

### 8. Main switch

- Check the main switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

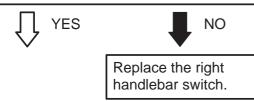


Replace the main switch.

EB802412

### 9. Engine stop switch

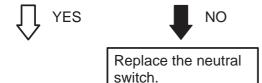
- Check the engine stop switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?



EB802413

### 10. Neutral switch

- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



EB802414

### 11. Sidestand switch

- Check the sidestand switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?



Replace the sidestand switch.



EB80241

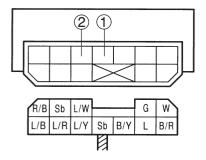
# 12. Starting circuit cutoff relay

- Remove the relay unit from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the relay terminals as shown.
- Check the starting circuit cutoff relay for continuity.

Tester positive probe →
sky blue ①
Tester negative probe →
blue/yellow②

Tester positive probe →
blue/yellow②
Tester negative probe →
sky blue ①

Continuity



### NOTE:

When you switch the "—" and "+" leads of the digital pocket tester, the readings in the above chart will be reversed.

Are the tester readings correct?





NO

Replace the starting circuit cutoff relay.

EB802416

### 13. Wiring

- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?



NO



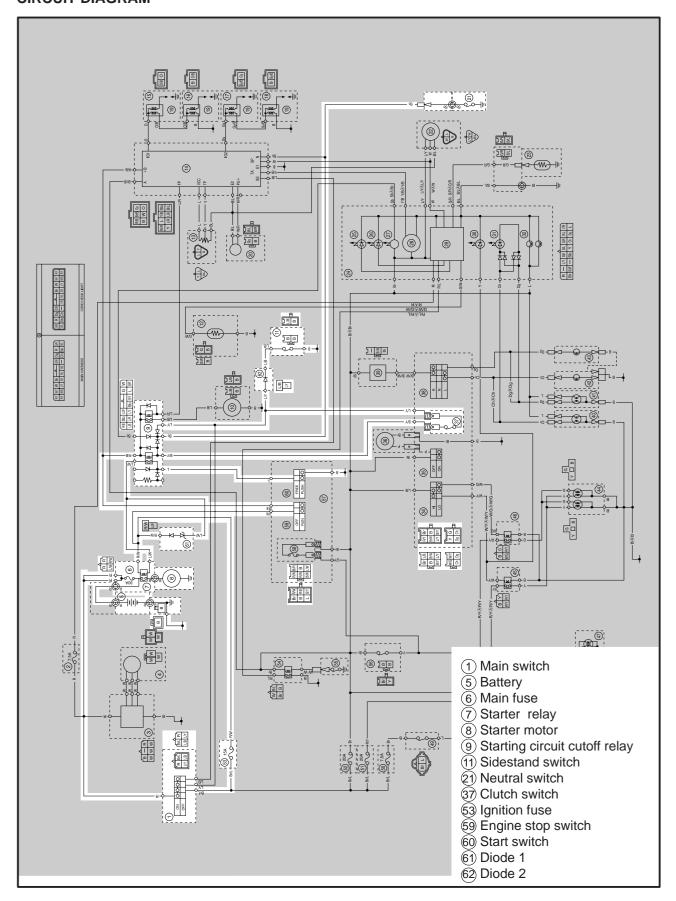
Properly connect or repair the ignition system's wiring.

Replace the ignitor unit.

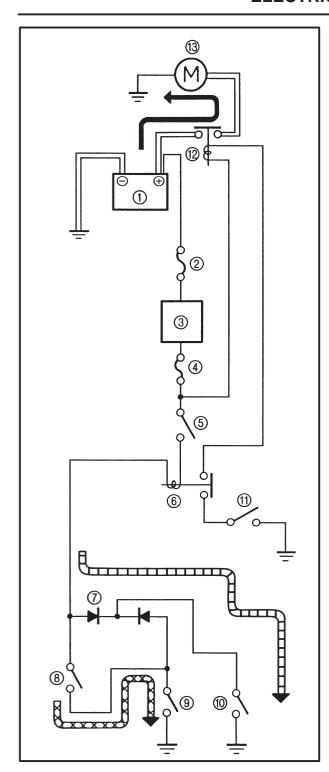


EB80300

# ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM







## STARTING CIRCUIT CUTOFF SYSTEM OP-**ERATION**

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 cutoff relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cutoff relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cutoff relay is closed and the engine can be started by pressing the start switch.



WHEN THE TRANSMISSION IS IN **NEUTRAL** 





- (1) Battery
- (2) Main fuse
- (3) Main switch
- (4) Ignition fuse
- (5) Engine stop switch
- (6) Starting circuit cutoff relay
- (7) Diode
- (8) Clutch switch
- (9) Sidestand switch
- 10 Neutral switch
- (11) Start switch
- (12) Starter relay
- (13) Starter motor



FB803020

### TROUBLESHOOTING

### The starter motor fails to turn.

### Check:

- 1. main and ignition fuses
- 2. battery
- 3. starter motor
- 4. starting circuit cutoff relay
- 5. Diode
- 6. starter relay
- 7. main switch
- 8. engine stop switch
- 9. neutral switch
- 10. sidestand switch
- 11. clutch switch
- 12. start switch
- 13. wiring (of the entire starting system)

### NOTE: -

- Before, troubleshooting, remove the following part(-s):
- 1) rider seat
- 2) fuel tank
- 3) air filter case
- 4) front cowling inner panels
- 5) Side cowling inner panels
- 6) Side cowlings
- Troubleshoot with the following special tool



## Pocket tester 90890-03112

- 1. Main and ignition fuses
- Check the main and ignition fuses for continuity.

Refer to "CHECKING THE FUSES" in chap-

Are the main and ignition fuses OK?





NO

Replace the fuse(-s).

FR802401

### 2. Battery

 Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Open-circuit voltage 12.8 V or more at 20°C (68°F)

• Is the battery OK?





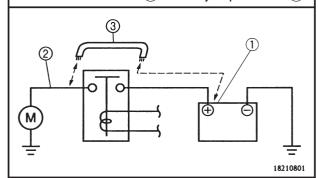
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB803400

### 3. Starter motor

 Connect the battery positive 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 of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure that no flammable gas or fluid is in the vicinity.
- Does the starter motor turn?





NO

Repair or replace the starter motor.



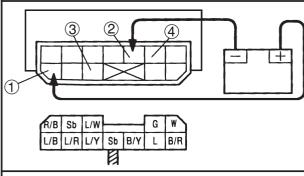
# 4. Starting circuit cutoff relay

- Disconnect the relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay terminals as shown.

Battery positive terminal → red/black (1) Battery negative terminal →

black/yellow (2)

**Tester positive probe** → blue/white ③ **Tester negative probe** → **blue** (4)



• Does the starting circuit cutoff relay have continuity between black and blue/white?





Replace the starting circuit cutoff relay

### 5. DIODE

- Disconnect the relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) to the relay terminals as shown.
- Measure the starting circuit cutoff relay for continuity as follows.

Tester positive probe → sky blue (1) Tester negative probe → black/yellow (2)

No continuity

Tester positive probe → sky blue (1)

Tester negative probe →

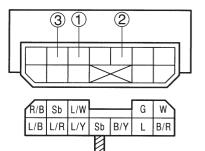
blue/yellow (3)

Tester positive probe → black/yellow (2) Tester negative probe →

sky blue (1)

Tester positive probe → blue/yellow(3)

Tester negative probe → sky blue (1) Continuity



### NOTE: -

When you switch the "-" and "+" leads of the digital pocket tester, the readings in the above chart will be reversed.

Are the tester readings correct?





NO

Replace the starting circuit cutoff relay



EB80340

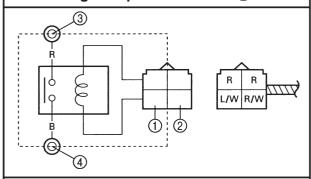
# 6. Starter relay

- Disconnect the starter relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the starter relay coupler as shown.

Battery positive terminal → red/white ① Battery negative terminal →

blue/white (2)

Tester positive probe  $\rightarrow$  red  $\bigcirc$  Tester negative probe  $\rightarrow$  black  $\bigcirc$ 



 Does the starter relay have continuity between red and black?





Replace the starter relay.

FR802411

### 7. Main switch

- Check the main switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





Replace the main switch.

B802412

# 8. Engine stop switch

- Check the engine stop switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?



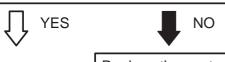


Replace the right handlebar switch.

EB802413

### 9. Neutral switch

- Check the neutral switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



Replace the neutral switch.

### 10. Diode

- Check the diode for continuty.
- Disconnect the diode from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) to the diode terminals as a shown.
- Measur the diode for continuity as follows.

| Woodan the diede for continuity de followe.                                |                  |  |  |
|----------------------------------------------------------------------------|------------------|--|--|
| Tester positive probe → blue/yellow ① Tester negative probe → blue/black ② | No<br>continuity |  |  |
| Tester positive probe → blue/black② Tester negative probe → blue/yellow①   | Continuity       |  |  |
| L/B 2                                                                      |                  |  |  |

• Is the diode ok?





NO

Replace the diode.



#### EB8022414

- 11. Sidestand switch
- Check the sidestand switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?

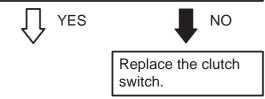


sidestand switch.

#### EB803405

### 12. Clutch switch

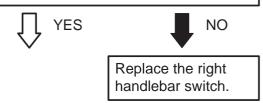
- Check the clutch switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the clutch switch OK?



### EB803406

## 13. Start switch

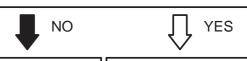
- Check the start switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the start switch OK?



### EB803408

## 14. Wiring

- Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the starting system's wiring properly connected and without defects?



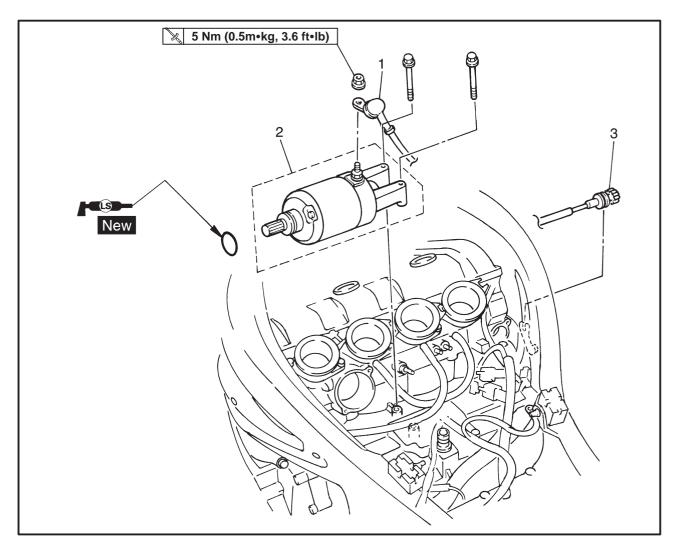
Properly connect or repair the starting system's wiring.

The starting system circuit is OK.

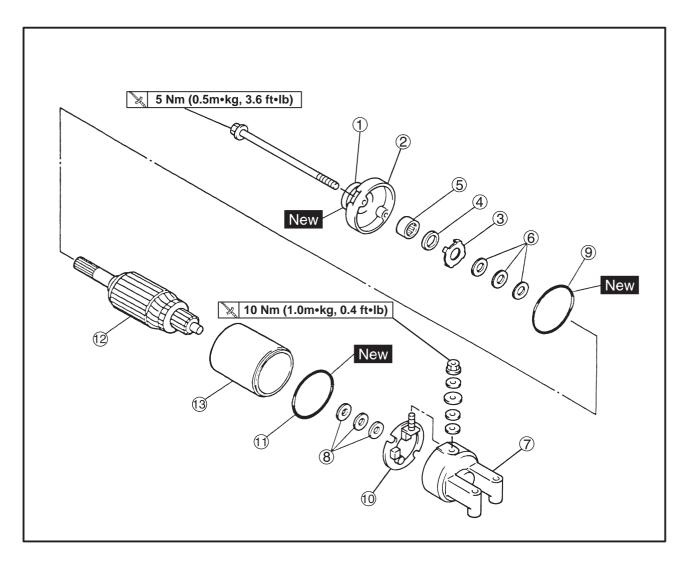


EAS0076

# STARTER MOTOR



| Order       | Job/Part                                                                 | Q'ty        | Remarks                                                                                                                                                                                          |
|-------------|--------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Removing the starter motor Rider seat Fuel tank Carburetors Coolant      |             | Remove the parts in the order listed. Refer to "SEATS" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "CARBURETORS" in chapter 6. Drain Refer to "CHANGING THE COOLANT" in chapter 3. |
| 1<br>2<br>3 | Thermostat Starter motor lead Starter motor assembly Throttle stop screw | 1<br>1<br>1 | Refer to "THERMOSTAT" in chapter 5.  For installation, reverse the removal procedure.                                                                                                            |



| Order         | Job/Part                                                                                                                                                                                                         | Q'ty                                                | Remarks                                                                                 |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1234567899123 | Disassembling the starter motor O-ring Starter motor front cover Lock washer Oil seal Bearing Washer set Starter motor rear cover Washer set O-ring Brush holder set O-ring Armature assembly Starter motor yoke | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>2<br>1<br>1<br>1 | Remove the parts in the order listed.  For assembly, reverse the disassembly procedure. |

# STARTER MOTOR



EB803511



- 1. Check:
- commutator

Dirt → Clean with 600 grit sandpaper.

- 2. Measure:
  - commutator diameter (a)
     Out of specification → Replace the starter motor.



18210101

18210901

Min. commutator diameter 27 mm (1.06 in)

### 3. Measure:

• mica undercut (a)

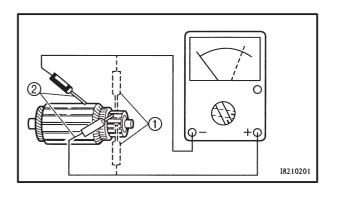
Out of specification — Scrape the mica to the proper measurement with a hacksaw blade which has been grounded to fit the commutator.



Mica undercut 0.7 mm (0.03 in)

### NOTE: -

The mica must be undercut to ensure proper operation of the commutator.



- 4. Measure:
  - armature assembly resistances (commutator and insulation)

Out of specification  $\rightarrow$  Replace the starter motor.

a. Measure the armature assembly resistances with the pocket tester.



Pocket tester 90890-03112



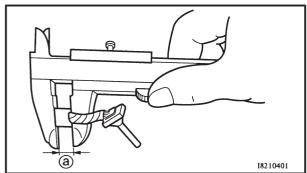
Armature assembly Commutator resistance ① 0.012  $\sim$  0.022  $\Omega$  at 20°C (68°F) Insulation resistance ②

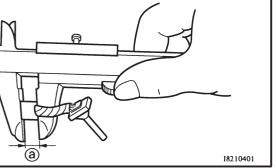
Above 1 M $\Omega$  at 20°C (68°F)

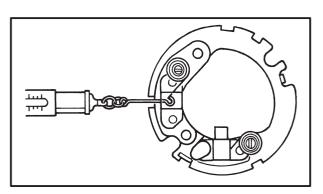
b. If any resistance is out of specification, replace the starter motor.

# STARTER MOTOR









5. Measure:

• brush length (a) Out of specification → Replace the brushes as a set.



Min. brush length 3.5 mm (0.14 in)

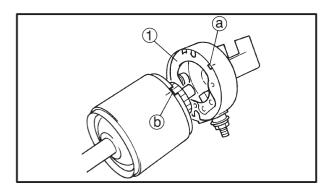
- 6. Measure:
  - brush spring force Out of specification → Replace the brush springs as a set.



**Brush spring force** 7.16  $\sim$  9.52 N (7.16  $\sim$  9.52 g,  $25.77 \sim 34.27 \text{ oz}$ 

- 7. Check:
  - gear teeth Damage/wear → Replace the gear.
- 8. Check:
  - bearing
  - oil seal

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



(a)

(b)

(4)

(b)

(3)

(2)

### ASSEMBLING THE STARTER MOTOR

- 1. Install:
- brush seat (1)

NOTE: -

Align the tab (a) on the starter motor rear cover with the slot **b** in the yoke.



- starter motor yoke 1
- O-rings 2 New
- starter motor front cover ③
- starter motor rear cover (4)
- bolts

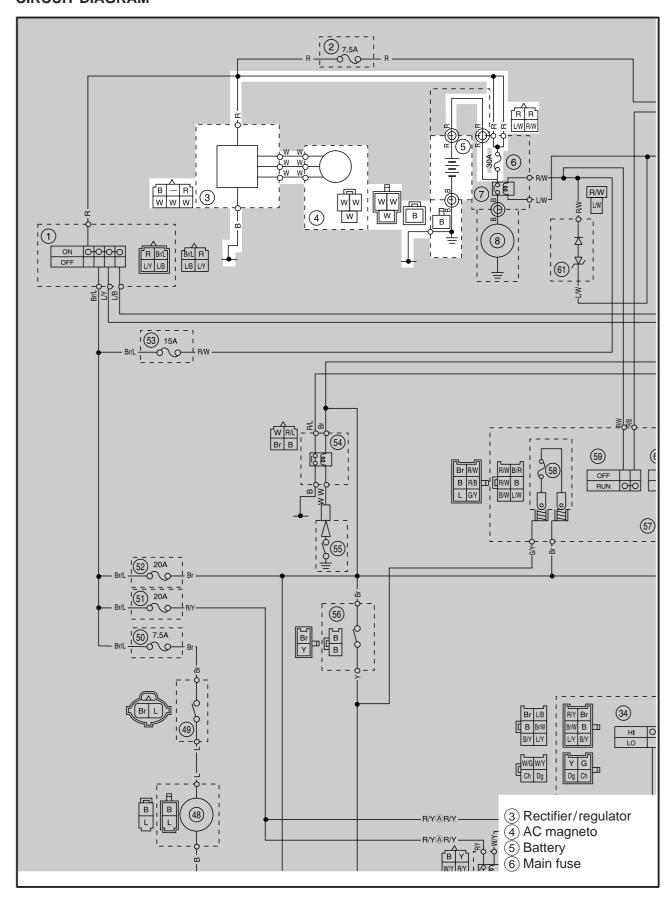
5 Nm (0.5 m•kg, 3.6 ft•lb)

Align the match marks (a) on the starter motor yoke with the match marks (b) on the front and rear covers.



EB804000

# CHARGING SYSTEM CIRCUIT DIAGRAM



# **CHARGING SYSTEM**



FB804010

### **TROUBLESHOOTING**

# The battery is not being charged.

### Check:

- 1. main fuse
- 2. battery
- 3. charging voltage
- 4. stator coil assembly resistance
- 5. wiring (of the entire charging system)

### NOTE:

- Before troubleshooting, remove the following part(-s):
- 1) rider seat
- 2) fuel tank
- Troubleshoot with the following special tool(-s).



Engine tachometer 90793-80009

Pocket tester 90890-03112

### EB802400

- 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.

EB802401

### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB804400

# 3. Charging voltage

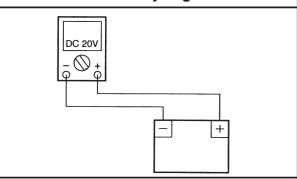
- Connect the engine tachometer to the spark plug lead of cylinder #1.
- Connect the pocket tester (DC 20 V) to the battery as shown.

Tester positive probe →

battery positive terminal

Tester negative probe →

battery negative terminal



- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.



Charging voltage 14 V at 5,000 r/min

# **CHARGING SYSTEM**

ELEC - +

NOTE: -

Make sure that the battery is fully charged.

Is the charging voltage within specification?



NO



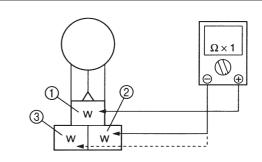
The charging circuit is OK.

EB804401

- 4. Stator coil assembly resistances
- Remove the generator cover.
- Connect the pocket tester ( $\Omega \times 1$ ) to the stator coil assembly coupler as shown.

Tester positive probe  $\rightarrow$  white ① Tester negative probe  $\rightarrow$  white ②

Tester positive probe  $\rightarrow$  white ① Tester negative probe  $\rightarrow$  white ③



Measure the stator coil assembly resistances.



Stator coil resistance

 $0.27 \sim 0.33 \Omega$  at  $20^{\circ}$ C (68°F)

Is the stator coil assembly OK?





NO

Replace the stator coil assembly.

EB804404

# 5. Wiring

- Check the wiring connections of the entire charging system.
- Refer to "CIRCUIT DIAGRAM".
- Is the charging system's wiring properly connected and without defects?



NO



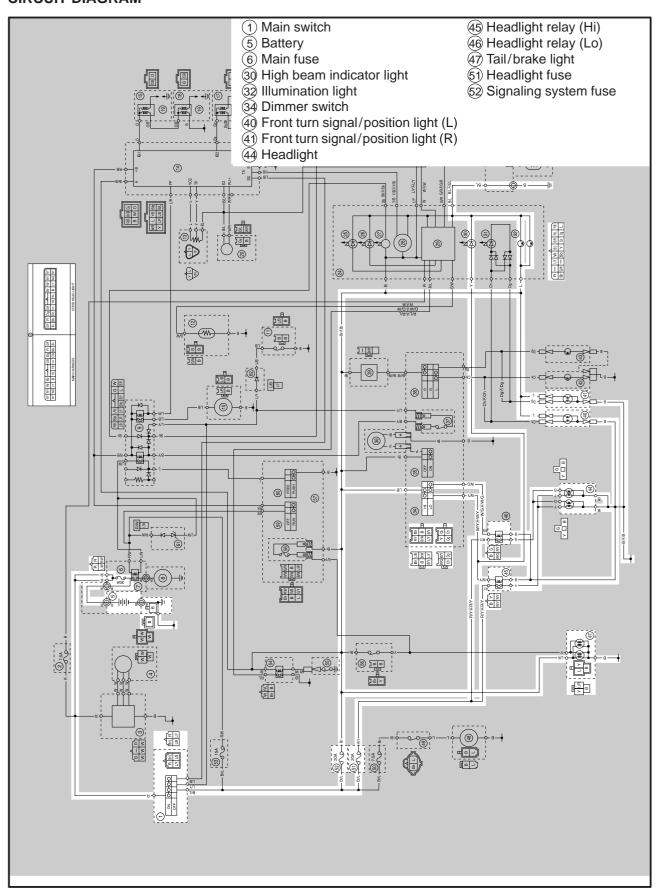
Properly connect or repair the charging system's wiring.

Replace the rectifier/regulator.



EB805000

# LIGHTING SYSTEM CIRCUIT DIAGRAM





FB805010

### **TROUBLESHOOTING**

Any of the following fail to light: headlight, high beam indicator light, taillight, auxiliary light or meter light.

### Check:

- 1. main, signaling system, and headlight fuses
- 2. battery
- 3. main switch
- 4. dimmer switch
- 5. wiring (of the entire charging system)

### NOTE:

- Before troubleshooting, remove the following part(-s):
- 1) seats
- 2) fuel tank
- 3) air filter case
- 4) front cowling inner panels
- 5) front cowling
- 6) rear cowling
- Troubleshoot with the following special tool(-s).



Pocket tester 90890-03112

### EB802400

- 1. Main, signaling system, and headlight fuses
- Check the main, signaling system, and headlight fuses for continuity.
   Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, signaling system, and headlight fuses OK?



Replace the fuse(-s).

NO

EB802401

### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB80241

### 3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





NO

Replace the main switch.



EB805401

### 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.

EB805404

### 5. Wiring

- Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the lighting system's wiring properly connected and without defects?





NO

Check the condition of each of the lighting system's circuits.

Refer to "CHECKING THE LIGHTING SYSTEM".

Properly connect or repair the lighting system's wiring.

EB805410

### **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. High beam indicator light LED
- Check the LED of the high beam indicator light.

Refer to "CHECKING THE LEDs".

Is the high beam indicator light LED OK?





NO

Replace the meter assembly.

# 3. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.
- A When the dimmer switch is set to " ≦○ "
- BWhen the dimmer switch is set to "
  © "

### Headlight

Tester positive probe →

yellow (1) or green (2)

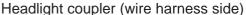
Tester negative probe → black ③

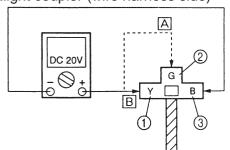
High beam indicator light

Tester positive probe →yellow ④

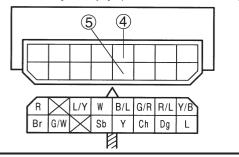
Tester negative probe → black/blue (5)







Meter assembly couply (wire harness side)



- Set the main switch to "ON".
- Set the dimmer switch to " **EO** " or " **EO** ".
- Measure the voltage (12 V) of yellow (green) 2 on the headlight coupler (headlight side).
- Is the voltage within specification?





wiring circuit from the main switch to the headlight coupler is faulty and must be repaired.

- 4. Headlight relay (Hi or Lo)
- Disconnect the headlight relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the headlight relay terminals as shown.

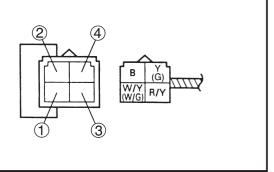
**Battery positive terminal** → white/yellow (white/green)(1)

Battery negative terminal  $\rightarrow$  black (2)

Tester positive probe →

yellow (green) 4

Tester negative probe → red/yellow ③



 Does the headlight relay have continuity between yellow (green) and red/yellow?



This circuit is OK.

Replace the headlight relay.

NO

- 2. Illumination fails to come on.
- 1. Meter light bulb and socket.
- Check the meter light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the meter light bulb and socket OK?

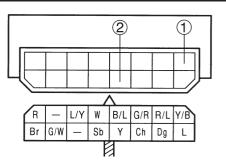


Replace the meter light bulb, socket or both.

## 2. Voltage

• Connect the pocket tester (20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → blue ① Tester negative probe → black/blue ②





- Set the main switch to "ON".
- Measure the voltage (12 V) of blue ① on 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.

- Set the main switch to "ON".
- Measure the voltage (12 V) of blue/red 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.

### EB805412

3. A 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.

### EB805413

4. The turn signal/position light fails to come on.

- 1. Turn signal/position light bulb and socket
- Check the turn signal/position light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

 Are the turn signal/position light bulb and socket OK?



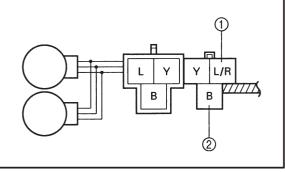


Replace the turn signal/position light bulb, socket or both.

### 2. Voltage

• Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

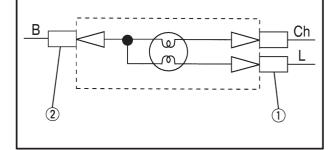
Tester positive probe → blue/red ①
Tester negative probe → black ②



### 2. Voltage

 Connect the pocket tester (DC 20 V) to the turn signal/position light couplers (wire harness side) as shown.

Tester positive probe → blue ①
Tester negative probe → black ②





- Set the main switch to "ON".
- Measure the voltage (12 V) of blue ① on the turn signal/position light couplers (wire harness side).
- Is the voltage within specification?



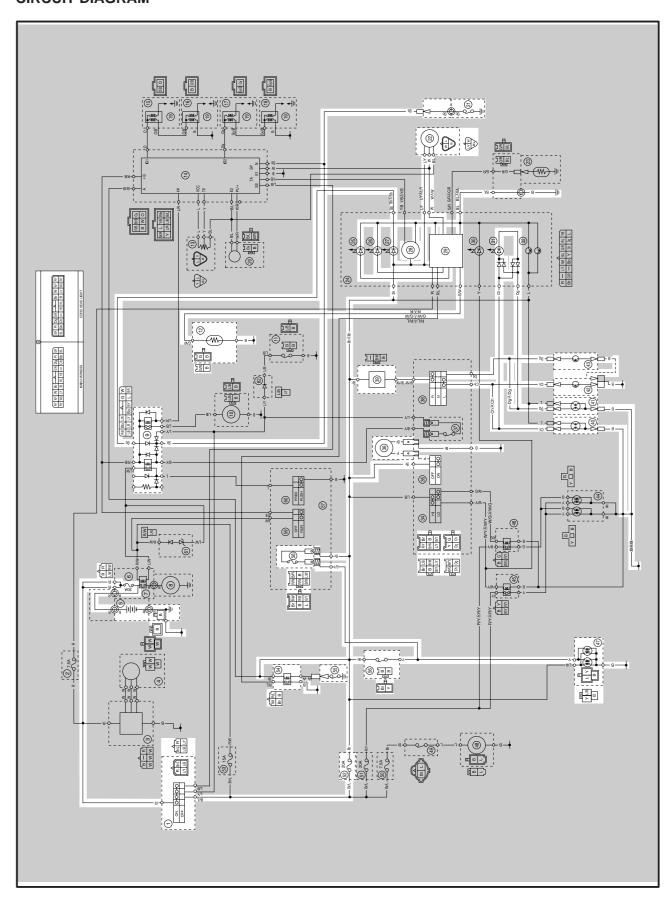
This circuit is OK.

The wiring circuit from the main switch to the turn signal/position light connectors is faulty and must be repaired.



EB806000

# SIGNALING SYSTEM CIRCUIT DIAGRAM





- 1) Main switch
- (5) Battery
- (6) Main fuse
- 9 Starting circuit cutoff relay
- 12 Fuel sender
- 21) Neutral switch
- 22 Speed sensor
- 25 Fuel level indicator light
- 26 Oil level/coolant temperature warning light
- 27 Neutral indicator light
- 28 Tachometer
- 29 Combination meter
- (31) Turn signal indicator light
- 35 Horn switch
- 36 Horn
- 38 Turn signal switch
- 39 Flasher relay
- 40 Front turn signal/position light (L)
- 41 Front turn signal/position light (R)
- 42 Rear turn signal light (L)
- 43 Rear turn signal light (R)
- 47 Tail/brake light
- 52 Signaling system fuse
- 64 Oil level relay
- (55) Oil level switch
- 66 Rear brake light switch
- 58 Front brake light switch



EB806010

### **TROUBLESHOOTING**

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

### Check:

- 1. main and signaling system fuses
- 2. battery
- 3. main switch
- wiring (of the entire signaling system)

### NOTE

- Before troubleshooting, remove the following part(-s):
- 1) seats
- 2) fuel tank
- 3) air filter case
- 4) front cowling inner panels
- 5) bottom cowling
- 6) side cowling inner panels
- 7) side cowlings
- 8) windshield
- 9) rear cowling
- Troubleshoot with the following special tool (-s).



Pocket tester 90890-03112

FB802400

- 1. Main and signaling system fuses
- Check the main and signaling system fuses for continuity.

Refer to "CHECKING AND CHARGING THE FUSES" in chapter 3.

Are the main and signaling system fuses OK?





Replace the fuse(-s).

EB802401

### 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING THE BATTERY" in chapter 3.



Open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?





NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

### 3. Main switch

- Check the main switch for continuity.
   Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?





NO

Replace the main switch.

EB806400

### 4. Wiring

- Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM".
- Is the signaling system's wiring properly connected and without defects?





Check the condition of each of the signaling system's circuits. Refer to "CHECKING THE SIGNALING SYSTEM".

Properly connect or repair the signaling system's wiring.



EB806410

### **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?



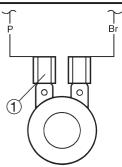


Replace the left handlebar switch.

# 2. Voltage

 Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

Tester positive probe → pink ①
Tester negative probe → ground



- Set the main switch to "ON".
- Push the horn switch.
- Measure the voltage (12 V) of pink ① at the horn terminal.
- Is the voltage within specification?

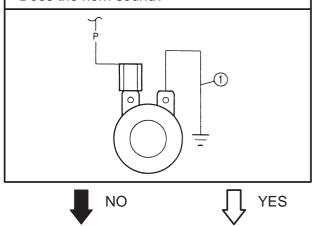




The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

### 3. Horn

- Disconnect the black connector at the horn terminal.
- Connect a jumper lead 1 to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Push the horn switch.
- Does the horn sound?

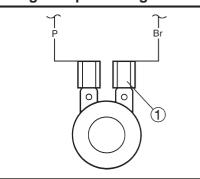


# 4. Voltage

 Connect the pocket tester (DC 20 V) to the horn connector at the black terminal as shown.

The horn is OK.

Tester positive probe → black ①
Tester negative probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown 1 at the horn terminal.
- Is the voltage within specification?





Repair or adjust the horn.

Replace the horn.



FB806411

- 2. A 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?





the tail/ Replace brake light bulb, socket or both.

- Set the main switch to "ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (12 V) of yellow at 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.

## 2. Brake light switches

- Check the brake light switches for continuity. Refer to "CHECKING THE SWITCHES".
- Is the brake light switch OK?



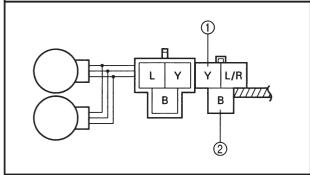


Replace the brake light switch.

### Voltage

• Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Tester positive probe → yellow (1) Tester negative probe → black ②



- 3. A turn signal light, turn signal indicator light or both fail to blink.
- 1. Turn signal light bulb and socket
- Check the turn signal light bulb and socket for continuity.

Refer to "CHECKING THE BULBS AND BULB SOCKETS".

Are the turn signal light bulb and socket OK?





Replace the turn signal light bulb, socket or both.

- 2. Turn signal indicator light LED
- Check the LED of the turn signal indicator

Refer to "CHECKING THE LEDs".

Is the turn signal indicator light LED OK?





Replace the meter assembly.



- 3. Turn signal switch
- Check the turn signal switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the turn signal switch OK?



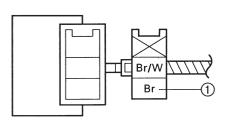


Replace the left handlebar switch.

# 4. Voltage

• Connect the pocket tester (DC 20 V) to the relay coupler (wire harness side) as shown.

Tester positive probe  $\rightarrow$  brown ① Tester negative probe  $\rightarrow$  ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?



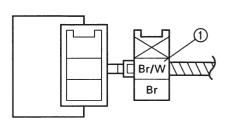


NO

The wiring circuit from the main switch to the turn signal relay coupler (turn signal relay side) is faulty and must be repaired.

# 5. Voltage

 Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown. Tester positive probe → brown/white ①
Tester negative probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) or brown/white at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?





The turn signal relay is faulty and must be replaced.

# 6. Voltage

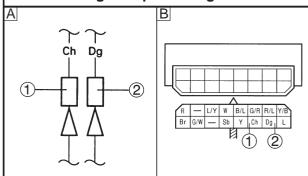
- Connect the pocket tester (DC 20 V) to the turn signal light connectors or the meter assembly coupler (wire harness side) as shown.
- A Turn signal light
- B Turn signal indicator light

### Left turn signal light

Tester positive probe → chocolate ①
Tester negative probe → ground

Right turn signal light

Tester positive probe → dark green ②
Tester negative probe → ground





- Set the main switch to "ON".
- Set the turn signal switch to "  $\Leftrightarrow$  " or "  $\Leftrightarrow$  ".
- Measure the voltage (12 V) of 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.

4. The neutral indicator light fails to come on.

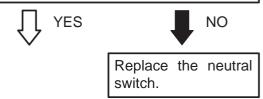
- Neutral indicator light LED
- Check the LED of the neutral indicator light. Refer to "CHECKING THE LEDs".
- Is the neutral indicator light LED OK?



assembly.

### 2. Neutral switch

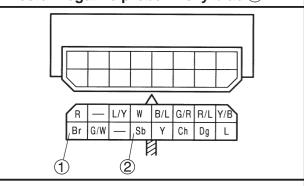
- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



### 3. Voltage

• Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → brown (1) Tester negative probe  $\rightarrow$  sky blue (2)



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown (1) and sky blue (2) at the meter assembly coupler.
- Is the voltage within specification?

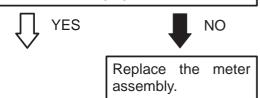


This circuit is OK.

The wiring circuit from the main switch to the meter light bulb coupler is faulty and must be repaired.

5. The oil level warning light fails to come on.

- 1. Oil level warning light LED
- Check the LED of the oil level warning light. Refer to "CHECKING THE LEDs".
- Is the oil level warning light LED OK?





### 2. Oil level switch

- Drain the engine oil and remove the oil level switch from the oil pan.
- Check the oil level switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the oil level switch OK?





NO

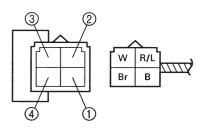
Replace the oil level switch.

# 3. Oil level relay

- Disconnect the oil level relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the oil level relay terminals as shown.

Battery positive terminal → brown (1) Battery negative terminal  $\rightarrow$  white (2)

Tester positive probe → red/blue ③ Tester negative probe → black (4)



 Does the oil level relay have continuity between red/blue and black?



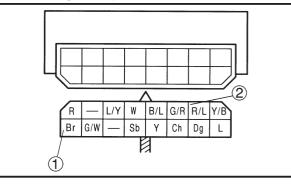


Replace the oil level relay.

### 4. Voltage

• Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → brown (1) Tester negative probe → red/blue ②



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown (1) and red/blue at the meter assembly coupler.
- Is the voltage within specification?



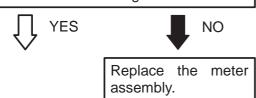
This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

NO

6. The fuel level indicator light fails to come on.

- 1. Fuel level indicator light LED
- Check the LED of the fuel level indicator light. Refer to "CHECKING THE LEDs".
- Is the fuel level indicator light LED OK?

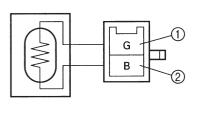




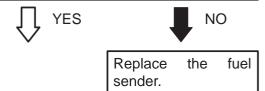
### 2. Fuel sender

- Disconnect the fuel sender coupler from the wire harness.
- Drain the fuel from the fuel tank and remove the fuel sender from the fuel tank.
- Check the fuel sender for continuity.

Tester positive probe  $\rightarrow$  green (1) Tester negative probe → black ②



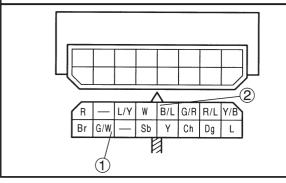
Is the fuel sender OK?



### 3. Voltage

Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → green/white (1) Tester negative probe → black/blue ②



- Set the main switch to "ON".
- Measure the voltage (12 V).
- Is the voltage within specification?



This circuit OK.

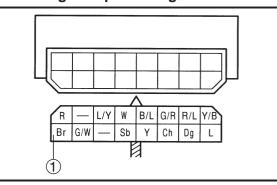
The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

7.The clock fails to come on.

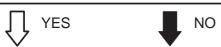
### 1. Voltage

Connect the pocket tester (20 V DC) to the clock coupler (clock side) as shown.

Tester positive probe → brown (1) Tester negative probe → ground



Set the main switch to "ON". Measure the voltage (12 V). Is the voltage within specification?

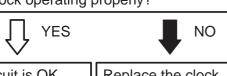


The wiring circuit from the main switch to the clock coupler (clock side) is faulty and must be repaired.

# 2. Clock

Check that the clock is operating properly. When setting the clock after its power source has been disconnected (e.g., when the battery is removed), first set the clock to 1:00 AM and then to the correct time.

Is the clock operating properly?





FAS00806

- 8. The speedometer fails to come on.
- 1. Speedometer bulb socket
- Check the speedometer bulb socket for continuity.
- Is the speedometer bulb socket OK?



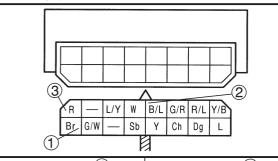


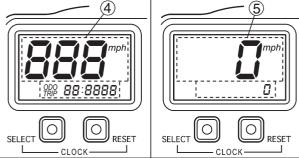
Replace the speedometer bulb socket.

### 2. Voltage

 Connect the pocket tester (20 V DC) to the speedometer coupler (wire harness side) as shown.

Battery positive lead  $\rightarrow$  green/yellow ① Battery negative lead  $\rightarrow$  black/blue ② Battery positive lead  $\rightarrow$  red ③





### NOTE:

First, connect the battery to the brown ① and black/blue② coupler terminals, then connect the battery positive lead to the red ③ terminal.

When connecting the battery, check whether the startup display ⓐ appears first and then after approximately three seconds the normal display appears ⑤ .

Does the startup display appear first and then after approximately three seconds the normal display appears?





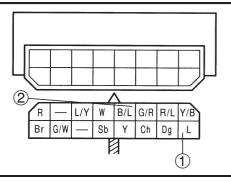
NO

Replace the speedometer.

# 3. Voltage

• Connect the pocket tester (20 V DC) to the speedometer bulb socket coupler (wire harness side) as shown.

Tester positive probe → blue ①
Tester negative probe → black/blue ②



- Set the main switch to "ON".
- Measure the voltage (12 V) of blue ① on the speedometer bulb socket coupler (wire harness side).
- Is the voltage within specification?



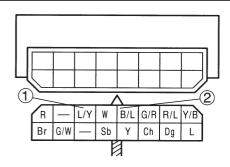


The wiring circuit from the main switch to the speedometer bulb socket coupler (wire harness side) is faulty, repair it.

## SIGNALING SYSTEM

- 4. Speedometer sensor
- Connect the pocket tester (20 V DC) to the speedometer coupler (wire harness side) as shown.

Tester positive probe → blue/yellow ①
Tester negative probe → black/blue ②



- Set the main switch to "ON".
- Elevate the rear wheel and slowly rotate it.
- Measure the voltage (5 V) of blue/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0 V to 5 V to 0 V to 5 V.
- Does the voltage reading cycle correctly?



NO

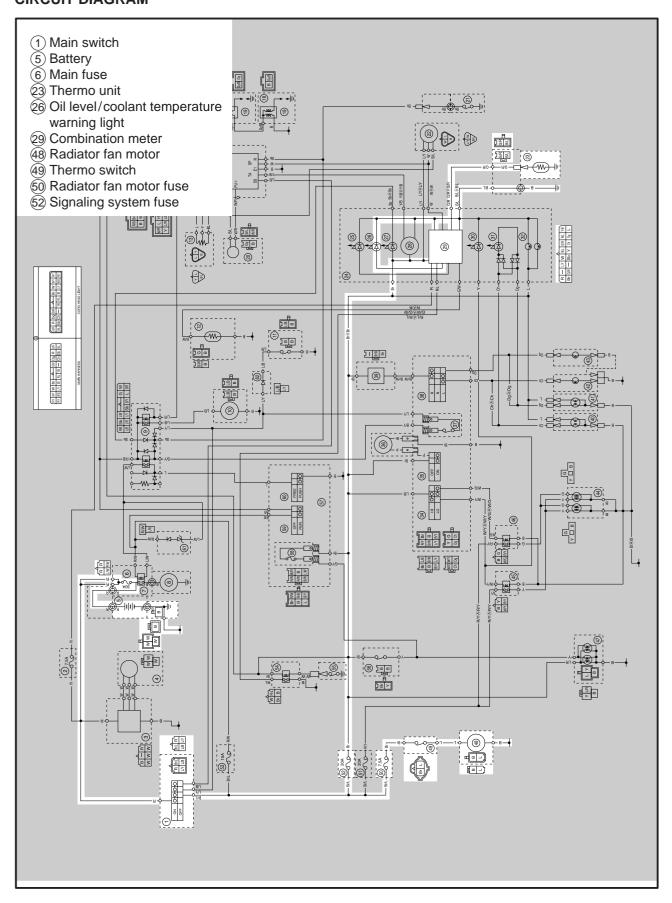
\_\_\_\_\_

This circuit is OK.

Replace the speedometer sensor.



## COOLING SYSTEM CIRCUIT DIAGRAM



## **COOLING SYSTEM**



EB807010

#### **TROUBLESHOOTING**

- The radiator fan motor fails to turn.
- The coolant temperature display and/or warning light fails to indicate when the engine is warm.

#### Check:

- main, signal system, and radiator fan motor fuses
- 2. battery
- 3. main switch
- 4. radiator fan motor
- 5. thermo switch
- 6. thermo unit
- 7. wiring (the entire cooling system)

## NOTE: -

- Before troubleshooting, remove the following part(-s):
- 1) rider seat
- 2) bottom cowling
- 3) front cowling inner panels
- 4) side cowling inner panels
- 5) side cowlings
- 6) windshield
- Troubleshoot with the following special tool (-s).



## Pocket tester 90890-03112

EB802400

- 1. Main, signal system and radiator fan motor fuses
- Check the main, signal system, and radiator fan motor fuses for continuity.
   Refer to "CHECKING THE FUSES" in chap-
- Are the main, signal system, and radiator fan motor fuses OK?



EB802401

#### 2. Battery

• Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



## Open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?



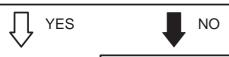


- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

#### 3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



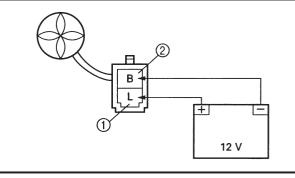
Replace the main switch.

EB807400

## 4. Radiator fan motor (test 1)

- Disconnect the radiator fan motor coupler from the wire harness.
- Connect the battery (12 V) as shown.

Battery positive lead → blue ①
Battery negative lead → black ②



Does the radiator fan motor turn?



The radiator fan motor is faulty and must be replaced.

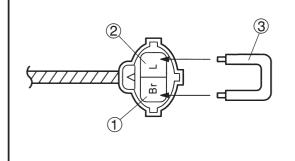
## **COOLING SYSTEM**

ELEC - +

EB80740

## 5. Radiator fan motor (test 2)

- Disconnect the thermo switch coupler.
- Set the main switch to "ON".
- Connect the brown ① and blue ② terminals with a jumper lead ③ as shown.



Does the radiator fan motor turn?





The wiring circuit from the main switch to the radiator fan motor coupler is faulty and must be repaired.

#### 6. Thermo switch

- Remove the thermo switch from the radiator.
- Connect the pocket tester ( $\Omega \times 1$ ) to the thermo switch 1 as shown.
- Immerse the thermo switch in a container filled with coolant (2).

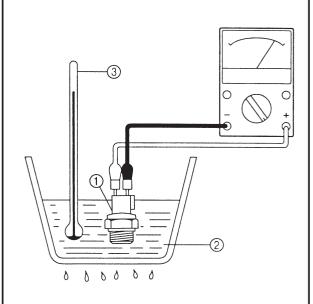
#### NOTE:

Make sure that the thermo switch terminals do not get wet.

- Place a thermometer (3) in the coolant.
- Slowly heat the coolant, then let it cool to the specified temperature as indicated in the table.
- Check the thermo switch for continuity at the temperatures indicated in the table.

| Test | Coolant temperature                        | Continuity |  |
|------|--------------------------------------------|------------|--|
| step | Thermo switch                              |            |  |
| 1    | 0 ~ 105 ± 3°C                              | NO         |  |
|      | (0 $\sim$ 221 $\pm$ 5.4°F)                 |            |  |
| 2    | More than 105 ± 3°C                        | VEC        |  |
|      | (221 ± 5.4°F)                              | YES        |  |
| 3*   | $105\pm3^{\circ}$ C to $100\pm3^{\circ}$ C |            |  |
|      | (221 $\pm$ 5.4°F to 212 $\pm$              | YES        |  |
|      | 5.4°F)                                     |            |  |
| 4*   | Less than 100 ± 3°C                        | NO         |  |
|      | (212 ± 5.4°F)                              | NO         |  |

Test steps 1 & 2: Heating phase Test steps 3\* & 4\*: Cooling phase



## **A** WARNING

- Handle the thermo switch with special care.
- Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.

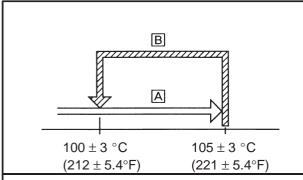


Thermo switch
28 Nm (2.8 m•kg, 20 ft•lb)
Three bond sealock® 10

- A The thermo switch circuit is open and the radiator fan is off.
- B The thermo switch circuit is closed and the radiator fan is on.

## **COOLING SYSTEM**





 Does the thermo switch operate properly as described above?





Replace the thermo switch.

#### 7. Thermo unit

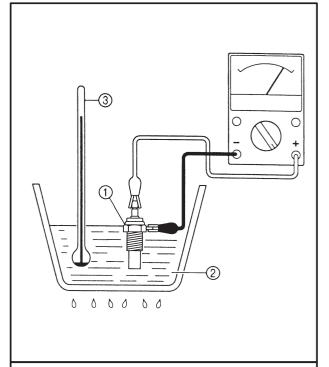
- Remove the temperature sender from the cylinder head.
- Connect the pocket tester ( $\Omega \times 10$ ) to the thermo unit (1) as shown.
- Immerse the thermo unit in a container filled with coolant ②.
- Place a thermometer (3) in the coolant.
- Slowly heat the water, then let it cool down to the specified temperature.
- Check the thermo unit for continuity at the temperatures indicated below.



Thermo unit resistance

50.6  $\sim$  64.2 Ω at 80°C (176°F)

17.3  $\sim$  16.1 Ω at 120°C (248°F)



## **A** WARNING

Handle the temperature sender with special care.

Never subject the temperature sender to strong shocks. If the temperature sender is dropped, replace it.



Temperature sender 15 Nm (1.5 m•kg, 11 ft•lb) Three bond sealock<sup>®</sup> 10





Replace the temperature sender.

EB807403

## 8. Wiring

- Check the entire cooling system's wiring.
   Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?



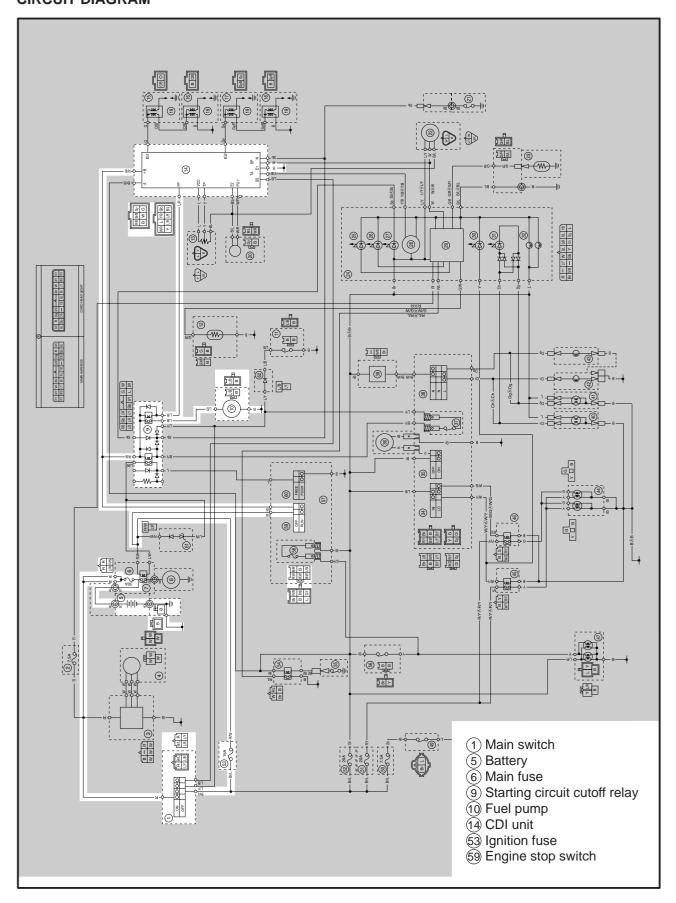


Replace the combination meter.

Properly connect or repair the cooling system's wiring.



## FUEL PUMP SYSTEM CIRCUIT DIAGRAM

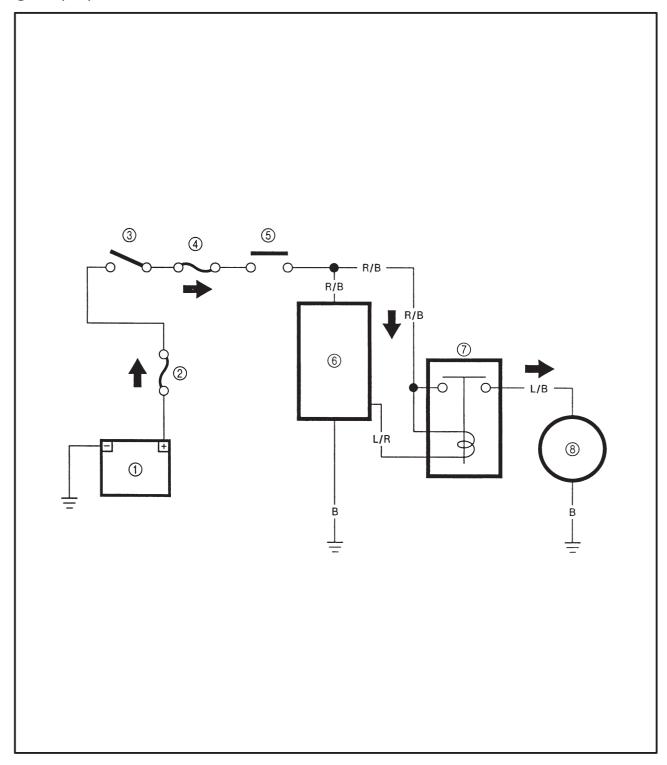




## **FUEL PUMP CIRCUIT OPERATION**

The CDI unit includes the control unit for the fuel pump.

- 1 Battery
- 2 Main fuse
- (3) Main switch
- (4) Ignition fuse
- 5 Engine stop switch
- 6 CDI unit
- The starting circuit cutoff relay
- 8 Fuel pump



## **FUEL PUMP SYSTEM**



EB808020

#### **TROUBLESHOOTING**

## The fuel pump fails to operate.

#### Check:

- 1. main and ignition fuses
- 2. battery
- 3. main switch
- 4. engine stop switch
- 5. starting circuit cutoff relay
- 6. fuel pump
- 7. wiring (the entire fuel pump system)

#### NOTE:

- Before troubleshooting, remove the following part(-s):
- 1) rider seat
- 2) fuel tank
- 3) air filter case
- 4) front cowling inner panel (left)
- Troubleshoot with the following special tool(-s).



Pocket tester 90890-03112

EB802400

- 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?



EB802401

## 2. Battery

 Check the condition of the battery.
 Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Open-circuit voltage 12.8 V or more at 20°C (68°F)

Is the battery OK?

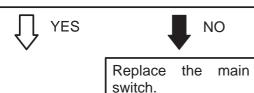


- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

#### 3. Main switch

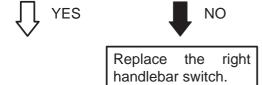
- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



EB802412

## 4. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?



## **FUEL PUMP SYSTEM**

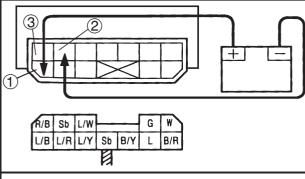


## 5. Starting circuit cutoff relay

- Disconnect the relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay terminals as shown.

Battery positive terminal → red/black ①
Battery negative terminal → blue/red ②

Tester positive probe → red/black ①
Tester negative probe → blue/black ③



 Does the fuel pump relay have continuity between red/black and blue/black?



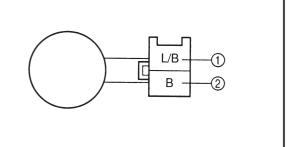
Replace the starting circuit cutoff relay.

#### EB808400

## 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 (fuel pump side) as shown.

Tester positive probe → blue/black ①
Tester negative probe → black ②

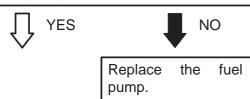


Measure the fuel pump resistance.



Fuel pump resistance  $4 \sim 30 \Omega$  at  $20^{\circ}$ C (68°F)

Is the fuel pump OK?



#### EB80840

#### 7. Wiring

- Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the fuel pump system's wiring properly connected and without defects?



Replace the CDI unit.

Properly connect or repair the fuel pump system's wiring.

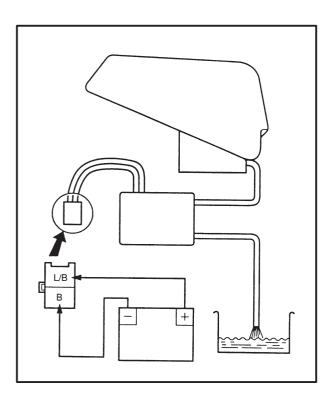


#### **CHECKING THE FUEL PUMP**

## **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 refuelling.
- Do not smoke and keep away from open flames, sparks or any other source of fire.
- If you do accidentally spill gasoline, wipe it up immediately with dry rags.
- If gasoline touches the engine when it is hot, a fire may occur. Therefore, make sure that the engine is completely cool before performing the following test.



- 1. Check:
- fuel pump operation
- a. Fill the fuel tank.
- b. Put the end of the fuel hose into an open container.
- c. Connect the battery (12 V) to the fuel pump coupler as shown.

Battery positive lead → blue/black ①
Battery negative lead → black ②

d. If fuel flows out of the fuel hose, the fuel pump is OK. If fuel does not flow, replace the fuel pump.



EB812000

## **SELF-DIAGNOSIS**

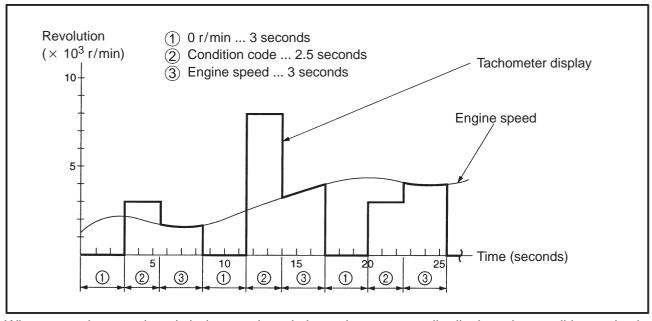
The YZF-R6 L/YZF-R6CL features a self-diagnosing system for the following circuit(-s):

- throttle position sensor
- fuel level indicator light

If any of these circuits are defective, their respective condition codes will be displayed on the tachometer when the main switch is set to "ON" (irrespective of whether the engine is running or not)

| Circuit                         | Defect(-s)                                | System response                                                                                                                                                              | Condition code |
|---------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Throttle position sensor        | Disconnected     Short-circuit     Locked | <ul> <li>The ignitor unit stays set to the wide-open throttle ignition timing. The motorcycle can be ridden.</li> <li>The tachometer displays the condition code.</li> </ul> | 3,000 r/min    |
| Fuel level indi-<br>cator light | • Improper connection                     | The tachometer displays the condition code.                                                                                                                                  | 8,000 r/min    |

## **Tachometer display sequence**



When more than one item is being monitored, the tachometer needle displays the condition codes in ascending order, cycling through the sequence repeatedly. If the engine is stopped, the engine speed ③ is 0 r/min.



FB812010

## **TROUBLESHOOTING**

The tachometer starts to display the selfdiagnosis sequence.

#### Check:

- 1. throttle position sensor
- 2. fuel level indicator light

#### NOTE: -

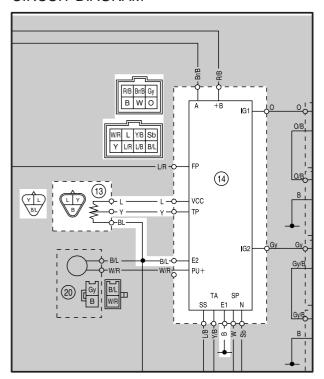
- Before troubleshooting, remove the following part(-s):
- 1) rider seat
- 2) fuel tank
- 3) air filter case
- 4) right side cowling inner panel
- 5) right side cowling
- Troubleshoot with the following special tool(-s).



Pocket tester 90890-03112

EB812020

## 1. Throttle position sensor CIRCUIT DIAGRAM



- 13 Throttle position sensor
- 14 CDI unit

#### 1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?





NO

Repair or replace the wire harness.

#### EB81240

- 2. Throttle position sensor
- Check the throttle position sensor for continuity.

Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR" in chapter 6.

• Is the throttle position sensor OK?





NO

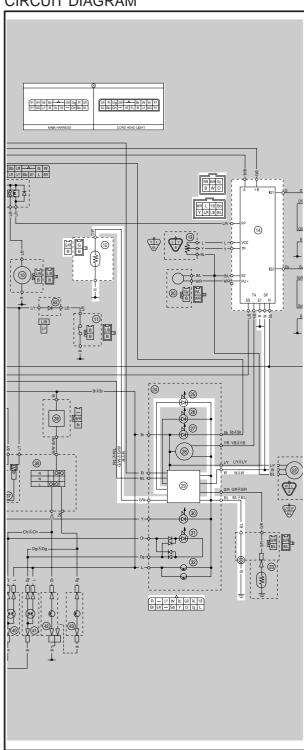
Replace the CDI unit.

Replace the throttle position sensor.



EB812040

## **2. Fuel level indicator light** CIRCUIT DIAGRAM



- 12 Fuel sender
- (14) CDI unit
- 25 Fuel level indicator light
- 29 Combination meter

EB812403

- 1. Fuel level indicator light LED
- Check the LED of the fuel level indicator light. Refer to "CHECKING THE LEDs".
- Is the fuel level indicator light LED OK?



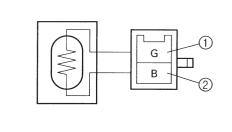
Repair the fuel level indicator light LED.

EB812404

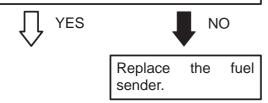
#### 2. Fuel sender

- Disconnect the fuel sender coupler from the wire harness.
- Connect the pocket tester (W  $\times$  1) to the fuel sender coupler as shown.

Tester positive probe  $\rightarrow$  green ① Tester negative probe  $\rightarrow$  black ②



- Check the fuel sender for continuity.
- Is the fuel sender OK?

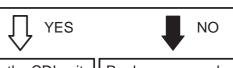


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EB812405

## 3. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



Replace the CDI unit.

Replace or replace the wire harness.

# CHAPTER 9. TROUBLESHOOTING

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## **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 is this manual for checks, adjustments, and replacement of parts.

## STARTING PROBLEMS

### **ENGINE**

## Cylinders and cylinder head(-s)

- Loose spark plug
- Loose cylinder head
- Damaged cylinder head gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Incorrectly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

## Pistons and piston rings

- Incorrectly installed piston ring
- · Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

#### Air filter

- Incorrectly installed air filter
- Clogged air filter element

#### Crankcase and crankshaft

- Incorrectly assembled crankcase
- Seized crankshaft

#### **ELECTRICAL SYSTEMS**

## **Battery**

- Faulty battery
- Discharged battery

#### **Fuses**

- Blown, damaged or incorrect fuse
- · Incorrectly installed fuse

## Spark plugs

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

## **Ignition coils**

- Damaged ignition coil
- Broken or shorted primary or secondary coils

#### **FUEL SYSTEM**

#### Fuel tank

- Empty fuel tank
- Clogged fuel filter
- Clogged fuel tank breather hose
- Deteriorated or contaminated fuel

## Fuel pump

- Faulty fuel pump
- Faulty fuel pump relay

#### Fuel cock

Clogged or damaged fuel hose

## Carburetors

- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Incorrectly installed needle valve seat
- Incorrect fuel level
- Incorrectly installed pilot jet
- Clogged starter jet
- Faulty starter plunger
- Incorrectly adjusted starter cable

## **Ignition system**

- Faulty CDI unit
- Faulty pickup coil

## 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
- Incorrectly grounded circuit
- Loose connections

#### Starting system

- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cutoff relay
- Faulty starter clutch

## INCORRECT ENGINE IDLING SPEED/POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE/FAULTY GEAR SHIFTING

TRBL ?

EB901000

## **INCORRECT ENGINE IDLING SPEED**

#### **ENGINE**

## Cylinders and cylinder head

- Incorrect valve clearance
- Damaged valve train components

#### Air filter

Clogged air filter element

#### **FUEL SYSTEM**

#### **Carburetors**

- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Incorrectly synchronized carburetors
- Incorrectly adjusted engine idling speed (throttle stop screw)
- Incorrect throttle cable free play
- Flooded carburetor

### **ELECTRICAL SYSTEMS**

#### **Battery**

- Faulty battery
- Discharged battery

## Spark plugs

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

## **Ignition coils**

- Broken or shorted primary or secondary coils
- · Faulty spark plug lead
- Damaged ignition coil

## **Ignition system**

- Faulty ignition unit
- Faulty pickup coil

EB902000

## POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING PROBLEMS".

#### **ENGINE**

#### Air filter

Clogged air filter element

## Air intake system

Clogged air ducts

## FUEL SYSTEM

## **Carburetors**

- Faulty diaphragm
- Incorrect fuel level
- · Loose or clogged main jet

## Fuel pump

Faulty fuel pump

EB903000

## **FAULTY GEAR SHIFTING**

## SHIFTING IS DIFFICULT

Refer to "CLUTCH DRAGS".

## SHIFT PEDAL DOES NOT MOVE

## Shift shaft

- Incorrectly 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
- Incorrectly assembled transmission

#### JUMPS OUT OF GEAR

#### Shift shaft

- Incorrect shift pedal position
- Incorrectly returned stopper lever

## **Shift forks**

Worn shift fork

## Shift drum

- Incorrect axial play
- Worn shift drum groove

## **Transmission**

Worn gear dog

## FAULTY CLUTCH/OVERHEATING/OVERCOOLING

TRBL ?

EB904000

## FAULTY CLUTCH CLUTCH SLIPS

#### Clutch

- Incorrectly assembled clutch
- Incorrectly 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

EB905001

## **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

## Hoses and pipes

- Damaged hose
- Incorrectly connected hose
- Damaged pipe
- Incorrectly connected pipe

EB906000

## OVERCOOLING COOLING SYSTEM

## Thermostat

Thermostat stays open

## CLUTCH DRAGS

## Clutch

- Unevenly tensioned clutch spring plate
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch pull rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned

## **Engine oil**

- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

## **FUEL SYSTEM**

#### Carburetors

- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

#### Air filter

Clogged air filter element

#### **CHASSIS**

#### **Brakes**

Dragging brake

#### **ELECTRICAL SYSTEMS**

## Spark plugs

- Incorrect spark plug gap
- Incorrect spark plug heat range

## **Ignition** system

Faulty CDI unit

## POOR BRAKING PERFORMANCE/FAULTY FRONT FORK LEGS/UNSTABLE HANDLING

TRBL ?

EB907000

## POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- · Air in hydraulic brake system
- · Leaking brake fluid
- Faulty brake caliper piston 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

EB908001

## FAULTY FRONT FORK LEGS LEAKING OIL

- Bent, damaged or rusty inner tube
- Damaged outer tube
- Incorrectly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Damaged cap bolt O-ring

#### **MALFUNCTION**

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube busing
- · Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EB909001

## **UNSTABLE HANDLING**

#### **Handlebars**

- Bent or incorrectly installed right handlebar
- Bent or incorrectly installed left handlebar

## Steering head components

- Incorrectly installed upper bracket
- Incorrectly installed lower bracket (incorrectly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

## Front fork legs

- Unevenoil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Damaged 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

- · Faulty rear shock absorber spring
- · Leaking oil or gas

### Tires

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

## Wheels

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

#### Frame

- Bent frame
- Damaged steering head pipe
- Incorrectly installed bearing race

## FAULTY LIGHTING AND SIGNALING SYSTEMS

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EB910000

## FAULTY LIGHTING AND SIGNALING SYSTEMS

## **HEADLIGHT DOES NOT LIGHT**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrectly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

## **HEADLIGHT BULB BURNT OUT**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrectly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

## TAIL/BRAKE LIGHT DOES NOT LIGHT

- Wrong tail/brake light bulb
- Too may electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

#### TAIL/BRAKE LIGHT BULB BURNT OUT

- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

## **TURN SIGNAL DOES NOT LIGHT**

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Incorrectly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

#### TURN SIGNAL BLINKS SLOWLY

- Faulty flasher relay
- Faulty main switch
- Faulty turn signal switch
- Wrong turn signal bulb

#### **TURN SIGNAL REMAINS LIT**

- Faulty flasher relay
- Burnt-out-turn signal bulb

## TURN SIGNAL BLINKS QUICKLY

- Incorrect turn signal bulb
- Faulty flasher relay
- Burnt-out turn signal bulb

## HORN DOES NOT SOUND

- Incorrectly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

