YAMAHA F7S600 '98 5011-AE1

SERVICE MANUAL

EB000000

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NOTICE

This manual was produced by the Yamaha Motor Company 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, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha scooter has a basic understanding of the mechanical ideas and the procedures of scooter repair. Repairs attempted by anyone without this knowledge are likely to render the scooter unfit for use.

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

NOTE: .

Designs and specifications ar subject to change without notice.

IMPORTANT INFORMATION

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

The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
 WARNING
 Failure to follow WARNING instructions could result in severe injury or death to the motorcycle operator, a bystander or a person inspecting or repairing the motorcycle.
 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.

YP002000

HOW TO USE THIS MANUAL

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

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

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

(In Chapter3, "Periodic Inspections and Adjustments", the sub-section title appears at the top of each page, instead of the section title.)

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

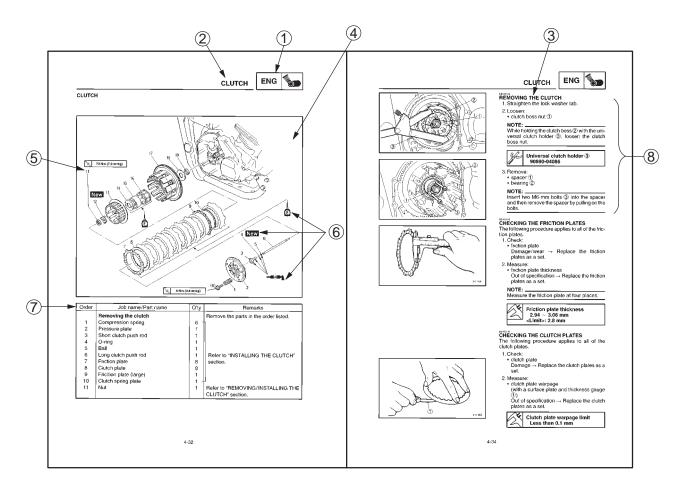
(4)To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

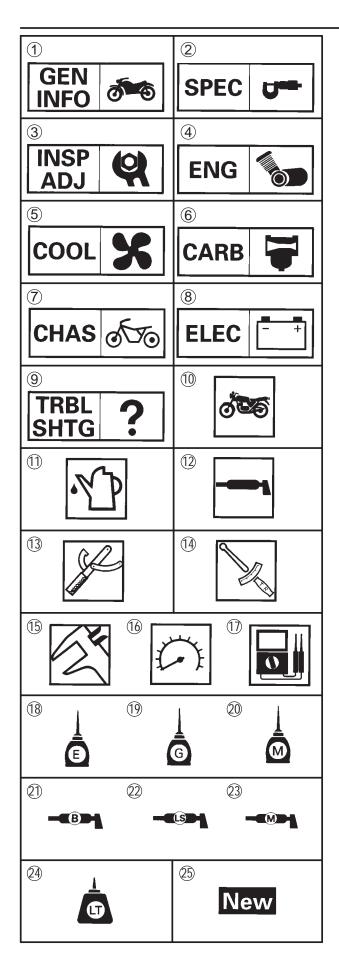
⑤Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

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

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

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





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 inspection and adjustment
- ④ Engine
- (5) Cooling system
- 6 Carburetor(-s)
- \bigcirc Chassis
- (8) Electrical system
- (9) Troubleshooting
- Symbols 0 to 0 indicate the following.
- 1 Serviceable with engine mounted
- Tilling fluid
- 12 Lubricant
- (13) Special tool
- (1) Tightening torque
- 15 Wear limit, clearance
- 16 Engine speed
- 1 Electrical data

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

(18) Apply engine oil

- (19) Apply gear oil
- (2) Apply molybdenum disulfide oil
- D Apply wheel bearing grease
- 2 Apply lightweight lithium-soap base grease

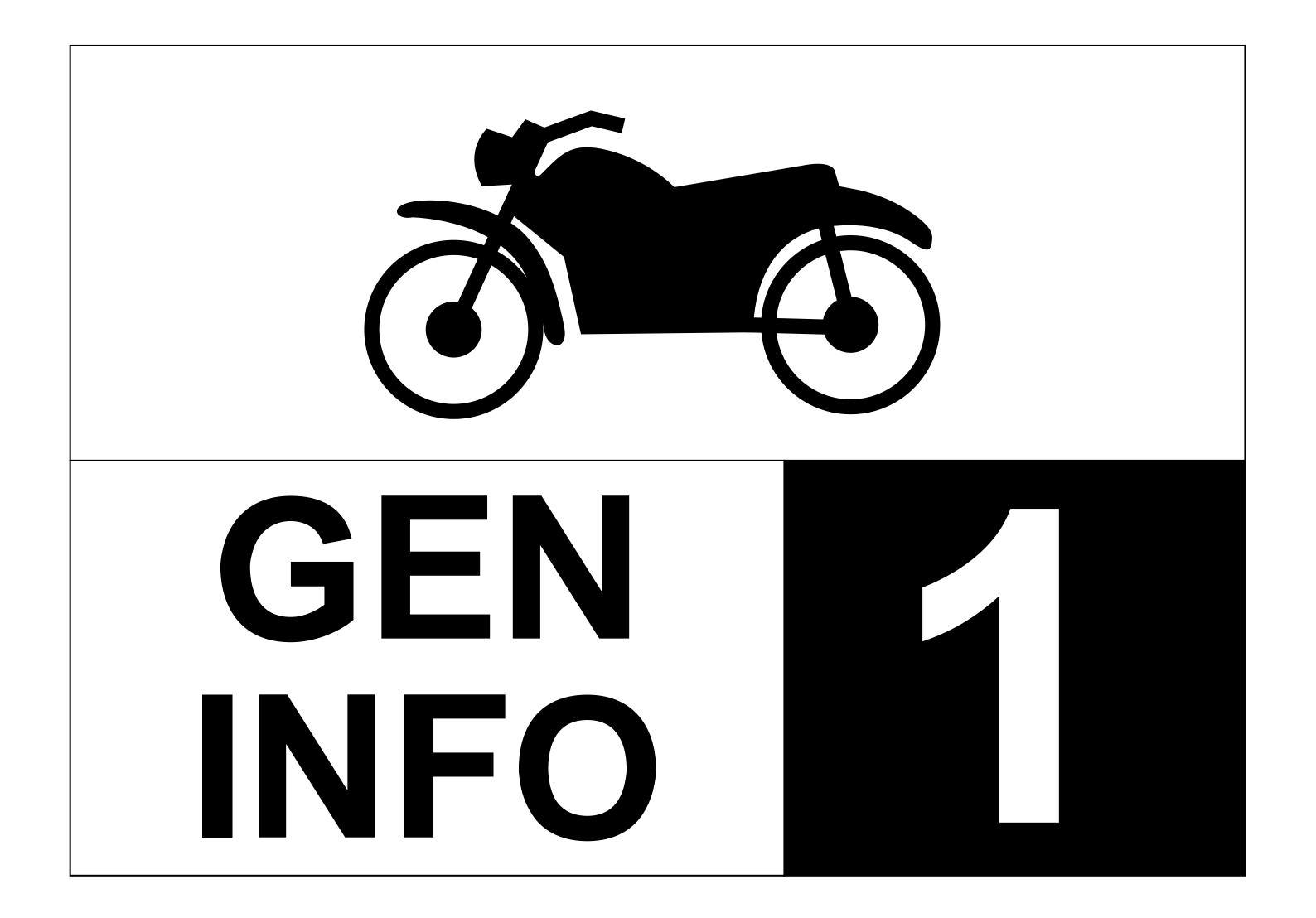
23 Apply molybdenum disulfide grease

Symbols (4) to (2) in the exploded diagrams indicate the following:

(2) Apply locking agent (LOCTITE[®])
 (2) Use new one

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ELECTRICAL SYSTEM	ELEC 8
TROUBLESHOOTING	?TRBL SHTG9





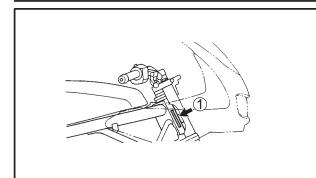
CHAPTER 1 GENERAL INFORMATION

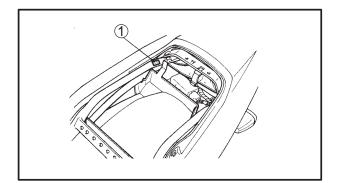
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MOTORCYCLE IDENTIFICATION







GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

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

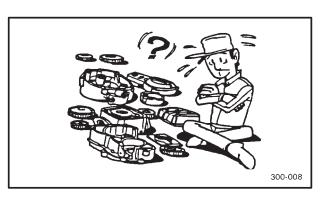
MODEL CODE

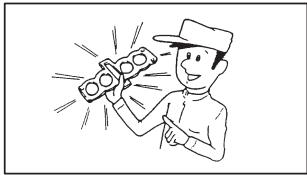
The model code label 1 is affixed to the frame. This information will be needed to order spare parts.

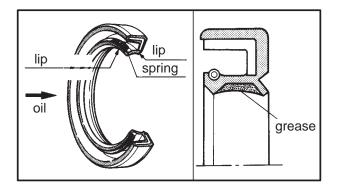


IMPORTANT INFORMATION PREPARATION FOR REMOVAL AND DISASSEMBLY

- 1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.
- 2. Use only the proper tools and cleaning equipment.
- Refer to the "SPECIAL TOOLS" section.
- 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 re-
- placed as an assembly.
 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.







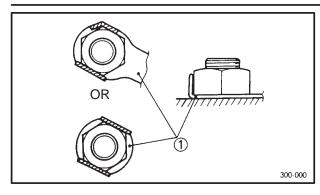
REPLACEMENT PARTS

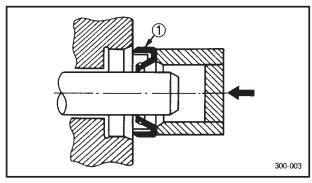
 Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in-function and appearance, but inferior in quality.

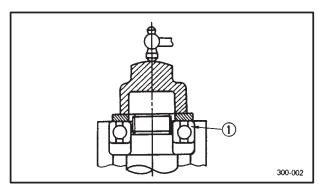
GASKETS, OIL SEALS AND O-RINGS

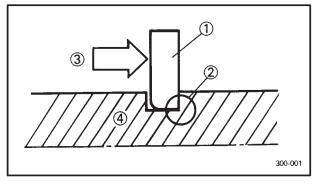
- 1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
- 2. During reassembly, properly oil all mating parts and bearings and apply grease onto the oil seal lips.











LOCK WASHERS/PLATES AND COTTER PINS

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

BEARINGS AND OIL SEALS

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

1 Oil seal

CAUTION:

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

① Bearing

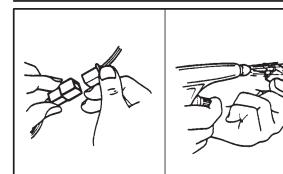
CIRCLIPS

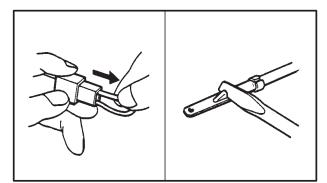
 Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlips ①, make sure that the sharp-edged corner ②, is positioned opposite the thrust ③ that the circlip receives.

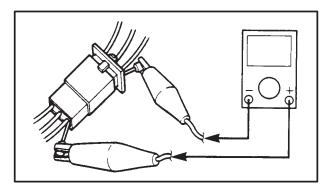
④ Shaft

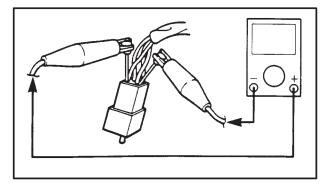
CHECKING THE CONNECTIONS











CHECKING THE CONNECTIONS

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

- 1. Disconnect:
 - ° lead
 - $^{\circ}$ coupler
 - ° connector
- 2. Check:
 - ° lead
 - ° coupler
 - ° connector

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

3. Check:

° all connections

Loose connection \rightarrow Connect properly.

NOTE: .

If the pin 2 on the terminal is flattened, bend in up.

- 4. Connect:
 - ° lead
 - ° coupler
 - ° connector

NOTE:

Make sure that all connections are tight.

5. Check:

° continuity

(with a pocket tester)



NOTE: .

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



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/Usage	Illustration
90890-01268	Ring nut wrench	
	This tool is used to loosen and tighten the steering ringnut.	Ge
90890-01304	Piston pin puller	
	This tool is used to remove the piston pin.	6
90890-01460 -01326	Damper rod holder ① T-handle ②	1 2 >>>
	These tool ar used for holding the damper rod when removing or installing the damper rod.	a a
90890-01312	Fuel level gauge	
	This gauge is used to measure the fuel level in the float chamber.	
90890-01325 -01352	Radiator cap tester ① Adaptor ②	
	These tools are used for checking the cooling system.	
90890-01362 -01382	Flywheel puller ① Crank shaft protector ②	
	These tools are used for removing the rotor and starter clutch.	TT OF
90890-01367 -01381	Fork seal driver weight Fork seal driver attachment (ø41 mm)	
	These tools are used when installing the forkseal.	

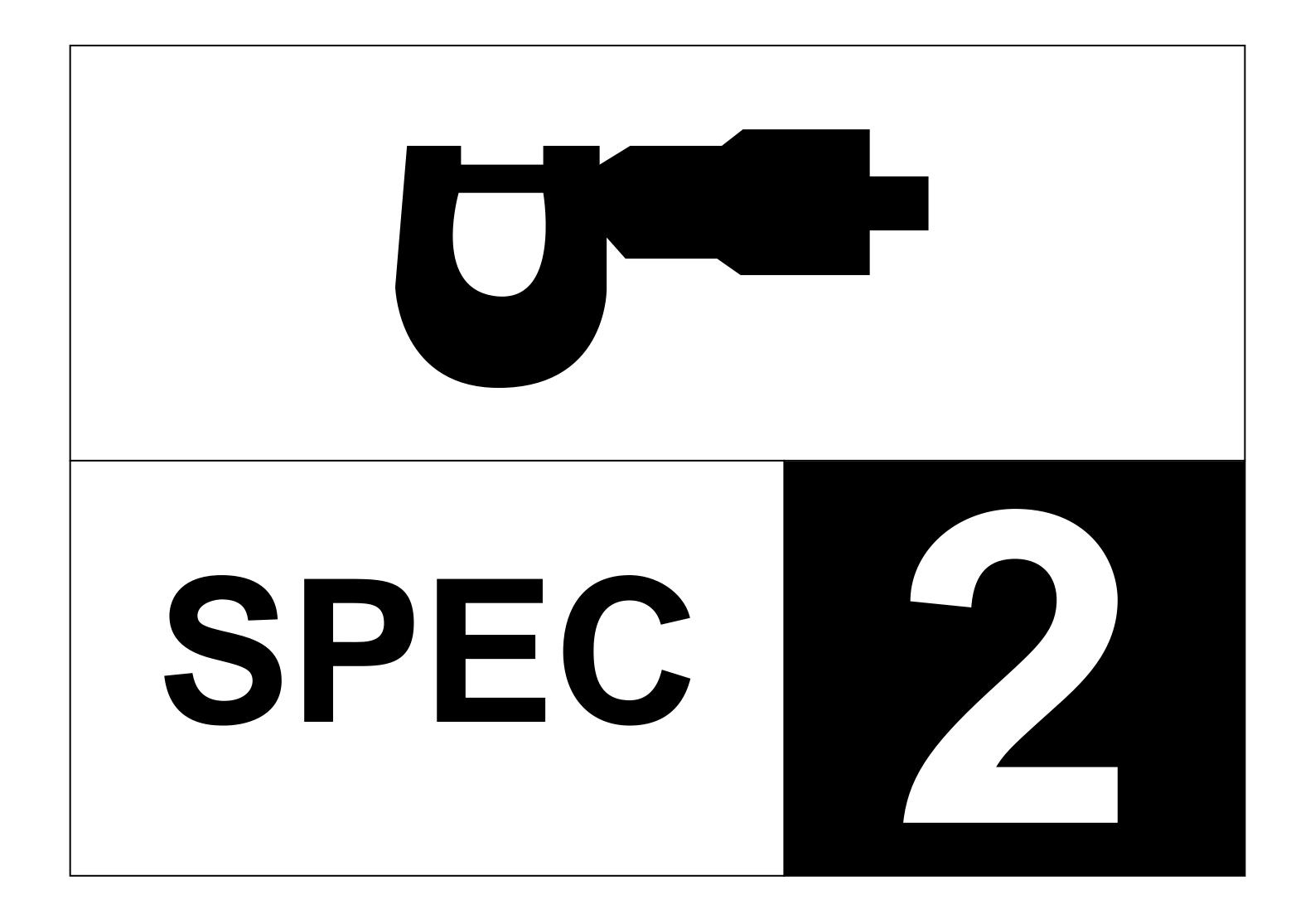


Tool No.	Tool name/Usage	Illustration		
90890-01399	Special thickness gauge This tool is used to measure the valve clearance.			
90890-01401	Spark plug wrench			
	This tool is used for removing or installing the spark plug.			
90890-01403	Ring nut wrench			
	This tool is used to tighten the steering ring nut.	(F. H.)		
90890-01469	Oil filter wrench			
	This tool is used for removing or installing the oil filter.			
90890-01701	Sheave holder This tool is used for holding the magneto rotor.	Contraction of the second seco		
90890-03081				
90890-03081	Compression gauge This tool is used to measure the engine compression			
90890-03094	Vacuum gauge			
	This tool is used to measure the synchronizing the carburetors.			
90890-03112	Pocket tester ① These instruments are invaluable for checking the electrical system.			
90890-03133	Engine tachometer			
00000 00450	This tool is needed for detecting engine rpm.	~		
90890-03153 -03139	Oil pressure gauge Oil pressure adaptor H			
	These tools are used to measure the engine oil pressure.			



Tool No.	Tool name/Usage	Illustration		
90890-03141	Timing light This tool is necessary for checking ignition timing.			
90890-04044	Piston ring compressor This tool is used to compress piston rings			
00000 00450	when installing the cylinder.			
90890-03158	Carburetor angle driver This tool is used to adjust the pilot screw.			
90890-04086	Clutch holding tool			
30030-04000				
	This tool is used for holding the clutch boss.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
90890-04101	Valve lapper This tool is used for removing and installing the valve lifter and for lapping the valve.			
90890-04111	Valve guide remover (4.0 mm)			
	This tool is used to remove the valve guides.			
90890-04112	Valve guide installer (4.0 mm) This tool is needed to install the valve guides properly.	\bigcirc		
90890-04113	Valve guide reamer (4.0 mm) This tool is used to rebore the new valve guide.			
90890-04019 -04114	Valve spring compressor ① Valve spring compressor attachment ② These tools are used when removing or installing the valve and the valve spring.			
90890-06754	Ignition checker This instrument is necessary for checking the ignition system components.			

Tool No.	Tool name/Usage	Illustration
90890-85505	Yamaha bond No.1215 This sealant (bond) is used for crankcase mating surface, etc.	





CHAPTER 2 SPECIFICATIONS

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	FZS600	
Model code:	5DM1	
Dimensions: Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance Minimum turning radius Basic weight: With oil and full fuel tank Engine: Engine type Cylinder arrangement	2,080 mm 710 mm 1,170 mm 790 mm 1,415 mm 130 mm 2,900 mm 210 kg Liquid cooled 4-stroke, DOHC Forward inclined parallel 4-cylinder	
Displacement Bore × stroke Compression ratio Compression pressure (STD) Starting system Lubrication system: Oil type or grade:	599 cm ³ 62.0 × 49.6 mm 12 : 1 1,550 kPa/400 r/min (15.5 kgf/cm ²) Electric starter Wet sump	
Engine oil	API STANDARD: SE or higher grade ACEA STANDARD: G4 or G5	
Periodic oil change With oil filter replacement Total amount	2.5 L 2.7 L 3.5 L	
Radiator capacity Total amount (including all routes) Air filter:	1.95 L	
	Dry type element	
Fuel: Type Fuel tank capacity Fuel reserve amount	Regular unleaded gasoline 18 L 3.5 L	

GENERAL SPECIFICATIONS



Model	FZS600	
Carburetor:		
Type/quantity	BSR 33/4	
Manufacturer	MIKUNI	
Spark plug:		
Туре	CR9E, CR8E/U27ESR-NU24ESR-N	
Manufacturer	NGK/DENSO	
Spark plug gap	$0.7 \sim 0.8 \text{ mm}$	
Clutch type:	Wet, multiple-disc	
Transmission:		
Primary reduction system	Spur gear	
Primary reduction ratio	82/48 (1.708)	
Secondary reduction system	Chain drive	
Secondary reduction ratio	48/15 (3.200)	
Transmission type	Constant mesh 6-speed	
Operation	Left foot operation	
Gear ratio 1st	37/13 (2.846)	
2nd	37/19 (1.947)	
3rd	34/22 (1.545)	
4th	28/21 (1.333)	
5th	25/21 (1.190)	
6th	29/27 (1.074)	
Chassis:		
Frame type	Double cradle	
Caster angle	24°	
Trail	88 mm	
Tire:		
Туре	Tubeless	
Size front	110/70ZR 17 (54W)	
rear	160/60ZR 17 (69W)	
Manufacturer front	BRIDGESTONE/DUNLOP	
rear	BRIDGESTONE/DUNLOP	
Type front	BT-57F/D207F	
rear	BT-57R/D207J	
Tire pressure:		
Maximum load-except motorcycle	187 kg	
Loading condition A*	$0 \sim 90 \text{ kg}$	
front	225 kPa (2.25 kg/cm ² , 2.25 bar)	
rear	250 kPa (2.5 kg/cm ² , 2.5 bar)	
Loading condition B*	90 ~ 187 kg	
front	225 kPa (2.25 kg/cm ² , 2.25 bar)	
rear	$280 \text{ kPa} (2.8 \text{ kg/cm}^2, 2.8 \text{ bar})$	
High-speed riding		
front	225 kPa (2.25 kg/cm ² , 2.25 bar)	
rear	280 kPa (2.8 kg/cm ² , 2.8 bar)	

*Load is the total weight of cargo, rider, passenger, and accessories.

GENERAL SPECIFICATIONS

S	SPEC	

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Model	FZS600
Brake: Front brake type operation Rear brake type operation	Dual disc brake Right hand operation Single disc brake Right foot operation
Suspension: Front suspension Rear suspension	Telescopic fork Swingarm (link suspension)
Shock absorber: Front shock absorber Rear shock absorber	Coil spring/Oil damper Coil spring/Gas-oil damper
Wheel travel: Front wheel travel Rear wheel travel	120 mm 120 mm
Electrical: Ignition system Generator system Battery type Battery capacity	T.C.I. (digital) A.C. magneto GT12B-4 12V 10 AH
Headlight bulb type:	Halogen bulb
Bulb voltage, wattage × quantity: Headlight Brake/tail light Front turn signal light Rear turn signal light License light Meter light Indicator light Neutral indicator light High beam indicator light Oil level warning light Turn indicator light Fuel level warning light Engine temperature warning light	$12V \ 60 \ W/55 \ W \times 2$ $12V \ 21W/5W \times 2$ $12V \ 21W \times 2$ $12V \ 21W \times 2$ $12V \ 21W \times 2$ $12V \ 5W \times 2$ $12V \ 5W \times 2$ $12V \ 2W \times 3$ $12V \ 1.4W \times 1$



MAINTENANCE SPECIFICATIONS ENGINE

Item		Standard		Limit
Cylinder head:				
Warp limit		000		0.05 mm
Cylinder:				
Bore size		62.00 × 62.01 mm		62.1 mm
Taper limit		000		0.09 mm
Out of round limit		000		0.07 mm
Camshaft:				
Drive method		Chain drive (center)		000
Cam cap inside dia.		23.000 × 23.021 mm		000
Camshaft out side dia		23.967 × 22.980 mm		
Camshaft to cap clear	ance	0.020 × 0.054 mm		0.08 mm
Cam dimensions:	¥	22.75 × 22.05 mm		20.7
Intake "A" "B"		32.75 × 32.85 mm 25.0 × 25.1 mm		32.7 mm 24.95 mm
в "C"		$7.65 \times 7.85 \text{ mm}$		24.95 mm 7.5 mm
Exhaust "A"	())	32.45×32.55 mm		32.4 mm
"B"		$24.95 \times 25.05 \text{ mm}$		24.9 mm
"C"		$7.4 \times 7.6 \text{ mm}$		7.25 mm
Camshaft runout limit		000		0.03 mm
Cam chain:				
Cam chain type/No. o	f links	92RH2010J/130		000
Cam chain adjustmen		Automatic		000
Valve, valve seat, valve				
Valve clearance (cold)	-	0.11 × 0.20 mm		000
	EX	$0.21 \times 0.30 \text{ mm}$		000
Valve dimensions:				I
	11	(11	
	"В"	*"C"		Ť
				"D"
<	1			▲
	Face Width	Seat Width	Margin TI	nickness
"A" head dia.	IN	23.9 × 24.1 mm		000
	EX	20.9 × 21.1 mm		000
"B" face width	IN	1.56 × 2.40 mm		000
	EX	1.56 × 2.40 mm		000
"C" seat width	IN	0.9 × 1.1 mm		1.6 mm
	EX	0.9 × 1.1 mm		1.6 mm
"D" margin thickness	IN	0.6 × 0.8 mm		0.5 mm
	EX	0.6 × 0.8 mm		0.5 mm
Stem outside dia.	IN	3.975 × 3.990 mm		3.95 mm
	EX	3.960 × 3.975 mm		3.935 mm
Guide inside dia.	IN	$4.000 \times 4.012 \text{ mm}$		4.042 mm
	EX	4.000 × 4.012 mm		4.042 mm

Item Standard Limit Stem-to-guide clearance IN 0.010 0.037 mm 0.08 mm Stem runout limit 0.025 0.052 mm 0.1 mm Valve seat width IN 0.9 1.1 mm 1.6 mm Valve spring: IN/EX 0.9 1.1 mm 1.6 mm Valve spring: IN/EX 40.09 mm 37.5 mm 0.025 Compressed pressure IN/EX 34.5 mm 0.025 0.50 mm 0.07 mm Direction of winding IN/EX 134 156 N (13.4 15.6 kg) 0.07 mm Piston clearance 0.025 0.050 mm 0.07 mm 0.07 mm Piston off-set 0.025 0.050 mm 0.07 mm 0.07 mm Piston off-set direction In side 17.002 17.013 mm 0.02 Piston pin bore inside dia. 16.991 17.000 mm 0.02 0.01 mm Direction fing: Type Dast 0.30 mm 0.6 mm Direction fing: Type Dast 0.20 mm			L	J
Stem runout limitEX 0.025 0.052 mm 0.1 mm Valve seat widthINN0.9 1.1 mm 1.6 mm Valve spring:Free lengthIN/EX 40.09 mm 37.5 mm Set length (valve closed)IN/EX 34.5 mm 37.5 mm Compressed pressureIN/EX 34.5 mm 37.5 mm Direction of windingIN/EX 34.5 mm 37.5 mm Piston clearanceIN/EX 34.5 mm 37.5 mm Piston clearanceIN/EX 34.5 mm 37.5 mm Piston clearance0.025 0.050 mm 61.975 mm Piston off-set0.025 0.050 mm 61.975 mm Piston off-set direction 17.002 17.013 mm 37.5 mm Piston rings:Top ring: 70.02 17.013 mm 37.5 mm Top ring:Type $0.48 \times 2.2 \text{ mm}$ 3.6 mm 3.6 mm Dimensions (B $\times T$) $0.8 \times 2.2 \text{ mm}$ 0.6 mm 0.1 mm Side clearance (installed) 0.20 0.055 mm 0.1 mm Onlight ing: $1.5 \times 2.3 \text{ mm}$ 3.6 cm 3.6 cm Connecting rod: 0.043 0.066 mm 0.08 mm Oil clearance 0.043 0.066 mm 0.08 mm Color code (corresponding size) 0.43 mm 3.066 mm 0.38 mm Connecting rod: 0.43 0.066 mm 0.08 mm Oil cleara	Item		Standard	Limit
Valve seat widthIN EX0.91.1 mm1.6 mmValve spring: Free lengthIN/EX Set length (valve closed)IN/EX IN/EX40.09 mm 34.5 mm37.5 mmSet lengthIN/EX IN/EX40.09 mm 34.5 mm37.5 mmDirection of windingIN/EX IN/EX13415.6 kg) $^{\circ\circ\circ}$ Direction of windingIN/EX13415.6 kg) $^{\circ\circ\circ}$ Piston iclearance0.0250.050 mm 61.9600.07 mm 61.960 $^{\circ\circ\circ}$ Piston off-set direction Piston pin bore inside dia.0.0250.050 mm 61.960 $^{\circ\circ\circ}$ Piston ings: Top ring: Type0.5 mm 16.991 $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ Piston rings: Type0.150.30 mm 0.220 $^{\circ\circ\circ}$ Type Dimensions (B × T) End gap (installed) Side clearance (installed) Oil fing: End gap (installed)0.250.40 mm 0.220 $^{\circ\circ\circ}$ Connecting rod: Oil clearance (installed)0.0250.40 mm 0.220 $^{\circ\circ\circ}$ Other or clearance (installed) Oil clearance Color code (corresponding size) $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ Crankshaft width "A" Big end radial clearance Color code (corresponding size) $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ Crankshaft width "A" Durnal oil clearance Color code (corresponding size) $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ Crankshaft width "A" Durnal oil clearance Color code (corresponding size) $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ $^{\circ\circ\circ}$ Crankshaft width "A" Durnal oil clearance Color code (corresponding size) $^{\circ\circ\circ}$ <td></td> <td></td> <td>0.025 0.052 mm</td> <td>0.1 mm</td>			0.025 0.052 mm	0.1 mm
EX0.91.1 mm1.6 mmValve spring: Free lengthIN/EX40.09 mm 34.5 mm37.5 mm ore oreSet length (valve closed)IN/EX34.5 mm37.5 mm ore ore000Compressed pressureIN/EX13415.6 N (13.415.6 kg)000Direction of windingIN/EX13415.6 N (13.415.6 kg)000Piston clearance Piston clearance Piston pin dutside dia.0.0250.050 mm 0.5 mm0.07 mm orePiston fi-set direction Piston pin outside dia.17.00217.013 mm 0.5 mm000Piston rings: Top ring: Type Dimensions (B × T) End gap (installed) Old clearance (installed)0.150.30 mm 0.250.66 mm oreOutor fing: Type Dimensions (B × T) End gap (installed)0.250.40 mm 0.250.7 mm oreOcior code (corresponding size)0.0430.066 mm 0.0230.08 mm oreConnecting rod: Oli clearance Crankshaft width "A" Assembly width "B"0.0430.066 mm 0.0230.03 mm oreCrankshaft width "A" Journal oil clearance "D" Big end radial clearance "D		INI	0.9 1.1 mm	
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Piston clearance Piston size "D" Measuring point "H" Piston off-set direction $0.025 0.050 \text{ mm}$ $61.960 61.975 \text{ mm}$ 0.07 mm $0.0000 61.975 \text{ mm}$ Piston off-set direction Piston pin bore inside dia. $16.991 17.000 \text{ mm}$ 0.0000 mm Piston rings: Top ring: Type $16.991 17.000 \text{ mm}$ 0.0000 mm Piston rings: Top ring: Type $0.025 0.050 \text{ mm}$ 0.0000 mm Piston rings: Top ring: Type $0.8 \times 2.2 \text{ mm}$ 0.0000 mm Dimensions (B \times T) End gap (installed) $0.15 0.30 \text{ mm}$ 0.6 mm $0.025 0.40 \text{ mm}$ Old ring: End gap (installed) $0.25 0.40 \text{ mm}$ 0.7 mm $0.025 0.40 \text{ mm}$ Old ring: End gap (installed) $0.025 0.40 \text{ mm}$ 0.7 mm Oil clearance Color code (corresponding size) $0.043 0.066 \text{ mm}$ 0.08 mm Crankshaft: Crankshaft width "A" Runout limit "C" Big end side clearance "D" Big end side clearance "E" Numula oil clearance $0.025 0.50 \text{ mm}$ 0.08 mm Color code (corresponding size) $0.160 0.262 \text{ mm}$ 0.025 mm 0.08 mm Color code (corresponding size) $0.160 0.262 \text{ mm}$ 0.025 mm 0.08 mm 0.026 mm Color code (corresponding size) $0.160 0.262 \text{ mm}$ 0.025 mm 0.08 mm 0.026 mm Color code (corresponding size) $0.160 0.262 \text{ mm}$ 0.250 mm 0.08 mm 0.026 mm Color code (corresponding size) $0.18 \text{ corresponding size)$ 0.025 mm 0.08 mm <br< td=""><td>v</td><td>IN/EX</td><td>Clockwise</td><td>000</td></br<>	v	IN/EX	Clockwise	000
Piston rings: Top ring: Type Barrel	Piston clearance Piston size "D" Measuring point "H" Piston off-set Piston off-set direction Piston pin bore inside dia.		61.960 61.975 mm 5 mm 0.5 mm In side 17.002 17.013 mm	000 000 000 000 000
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Item	Standard	Limit
Clutch:		
Friction plate thickness	2.94 imes 3.06 mm	000
Quantity	8 pcs	000
Wear limit	000	2.8 mm
Friction plate thickness	2.94 imes 3.06 mm	000
Quantity	1 pcs	000
Clutch plate thickness	1.9 × 2.1 mm	000
Quantity	8 pcs	000
Warp limit	000	0.1 mm
Clutch spring free length	34.9 mm	000
Quantity	6 pcs	000
Minimum length	000	34.3 mm
Clutch housing thrust clearance	$0.05 \times 0.13 \text{ mm}$	0.2 mm
Clutch housing radial clearance	$0.005 \times 0.041 \text{ mm}$	000
Clutch release method	Inner push, screw push	000
Push rod bending limit	000	0.3 mm
Transmission:		
Main axle deflection limit	000	0.02 mm
Drive axle deflection limit	000	0.02 mm
Shifter:		
Shifter type	Guide bar	000
Guide bar bending limit	000	0.05 mm
Carburetor:		
I.D. mark	5DM1 00	000
Main jet (M.J)	#115	000
Main air jet (M.A.J)	#80	000
Jet needle (J.N)	5D86	000
Needle jet (N.J)	P-O	000
Pilot air jet (P.A.J.1)	#130	000
Pilot outlet (P.O)	0.9	000
Pilot jet (P.J)	#12.5	000
Bypass 1 (B.P.1)	0.9	000
Bypass 2 (B.P.2)	0.8	000
Bypass 3 (B.P.3)	0.8	000
Pilot screw (P.S)	2	000
Valve seat size (V.S)	1.0	000
Starter jet (G.S.1)	0.6	000
Starter jet (G.S.2)	0.8	000
Throttle valve size (TH.V)	#110	000
Fuel level (F.L) (with	4.5 mm	000
special tool)		
Engine idle speed	1,150 × 1,250 r/min	000
Intake vacuum	30.7 × 33.3 kPa (230 × 250 mmHg)	000



Item	Standard	Limit		
Lubrication system:				
Oil filter type	Paper type	000		
Oil pump type	Trochoid type	000		
Tip clearance "A" or "B"	0.03 0.09 mm	0.15 mm		
Side clearance	0.03 0.08 mm	0.15 mm		
Bypass valve setting pressure	80 120 kPa (0.8 1.2 kg/cm ²)	000		
Relief valve operating pressure	450 550 kPa (4.5 5.5 kg/cm ²)	000		
Pressure check location	Main gallery	000		
Cooling system:				
Radiator core size:				
Width	320 mm	000		
Height	161.4 mm	000		
Thickness	27 mm	000		
Radiator cap opening pressure	95 125 kPa (0.95 1.25 kg/cm ²)	000		
Radiator capacity	0.6 L	000		
Reservoir tank capacity	0.61 L	000		
From low to full level	0.22 L	000		
Water pump:				
Туре	Single suction centrifugal pump	000		
Reduction ratio	82/48 × 48/49 (1.673)	000		
Item Size				
Bearings and oil seals:				
Big end bearing	Plane 30×15			
Crankshaft bearing	Plane 30 \times 16			

Big end bearing	Plane 30 \times 15
Crankshaft bearing	Plane 30 \times 16
Crankshaft oil seal	S3-29-40-7.5L HS
Water pump bearing	BWF26-44R
Water pump oil seal	SD-12-28-7-1 HS
Main axle bearing (left)	Ball 6204DLA8NUR
Main axle bearing (right)	83B285SH2C3 22 × 56 × 16
Drive axle bearing (left)	83424ASH2CS41
Drive axle bearing (right)	20NQ3315NE 20 × 33 × 15
Drive axle oil seal	SD7-35-52-8 VS
Shift shaft oil seal	SD-12-22-5 HS



TIGHTENING TORQUES ENGINE

Part to be tightened	Part name	Thread size	Q'ty	tor	ening que	Remarks
Camshaft cap	Bolt	M6	24	Nm 10	m°kg 1.0	
Cylinder head	Nut	M9	12	35	3.5	
	Nut	M10	4	13	1.3	
Spark plug	Bolt	M6	4 8	10	1.0	
Cylinder head cover	Bolt	M5	0 8	9	0.9	
Cylinder head side cover				-		
Connecting rod cap Camshaft sprocket	Nut Bolt	M7 M7	8 4	24	NOTE	
Timing chain tensioner case	Bolt	M6	2	10	1.0 1.0	
Timing chain guide (intake side)	Bolt	M6		10		-10
Timing chain tensioner cap	Bolt	M11	1	20	2.0	
Pipe 2	Bolt	M6	2	10	1.0	
Pipe 3/Pipe 4	Bolt	M6	2	10	1.0	
Thermostat cover	Bolt Bolt	M6 M6	3	10	1.0	
Conduction assembly Radiator	Bolt	-		10 7	1.0 0.7	
		M6	3	10	1.0	
Joint	Bolt	M6	4			
Water pump	Bolt	M6	2	10	1.0	
Water pump housing	Bolt	M6	2	10	1.0	
Radiator cover	Bolt	M6	4	8	0.8	
Pipe 5/Pipe 6	Bolt	M6	4	10	1.0	
Roter housing	Screw	M6	1	7	0.7	
Oil pump assembly	Bolt	M6	3	10	1.0	-0
Strainer housing	Bolt	M6	2	10	1.0	-10
Strainer cover	Bolt	M6	14	12	1.2	~
Oil cooler	Union bolt	M20	1	63	6.3	
Oil drain bolt	Bolt	M14	1	43	4.3	
Delivery pipe	Bolt	M10	2	20	2.0	
Delivery pipe holder	Bolt	M6	1	10	1.0	
Oil filter element	-	M20	1	17	1.7	
Carburetor joint 1.2	Bolt	M6	8	10	1.0	
Cap case to air filter case	Screw	M5	4	1	0.1	
Air filter case	Bolt	M6	3	7	0.7	
Air filter cover to air clearance	Screw	M6	6	2	0.2	
Exhaust pipe	Nut	M6	8	10	1.0	
Exhaust joint	Bolt	M8	1	20	2.0	
Crankcase	Bolt	M8	12	24	2.4	
Crankcase	Bolt	M6	21	12	1.2	
Crankcase	Bolt	M8	1	24	2.4	
Breather plate	Screw	M6	6	7	0.7	-6
Oil seal stopper plate	Bolt	M6	2	10	1.0	-16
A.C magneto cover	Bolt	M6	5	12	1.2	
Drive sprocket cover	Bolt	M6	5	10	1.0	
Drive sprocket cover	Screw	M5	4	4	0.4	-16

SPEC U

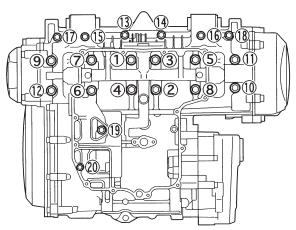
Part to be tightened Part name		Thread Q	d Q'ty	Tightening torque		Remarks
		Size	_	Nm	m°kg	
Starter cover	Bolt	M6	7	12	1.2	
Oil gallery	—	M16	2	8	0.8	
Clutch cover	Bolt	M6	10	12	1.2	
Clamp (A.C magneto cover)	Screw	M6	1	7	0.7	
Starter clutch assembly	Bolt	M10	1	80	8.0	
Starter clutch outer	Bolt	M8	3	30	3.0	-0
Pressure plate	Screw	M6	6	8	0.8	
Clutch boss	Bolt	M18	1	70	7.0	
Push lever	Screw	M5	2	5	0.5	-0
Push rod adjuster	Nut	M8	1	16	1.6	
Drive sprocket	Nut	M18	1	70	7.0	
Shift drum retainer	Bolt	M6	1	10	1.0	-0
Shift arm	Bolt	M6	1	10	1.0	
Shift fork guide bar retainer	Bolt	M6	2	10	1.0	-0
Shift pedal adjuster	Nut	M6	2	7	0.7	
Stopper lever	Bolt	M6	1	10	1.0	-0
Side plate 2	Screw	M5	1	4	0.4	-0
A.C magneto roter	Bolt	M12	1	130	13.0	-
Stator coil	Bolt	M6	3	10	1.0	-0
Pickup coil	Screw	M5	2	5	0.5	-
Starter motor	Bolt	M6	2	10	1.0	
Neutral switch	Screw	M6	2	4	0.4	
Oil level sensor	Bolt	M6	2	7	0.7	
Thermo switch (fan motor)	_	M16	1	23	2.3	
Thermo switch (warning light)	_	PT1/8	1	8	0.8	

NOTE: _

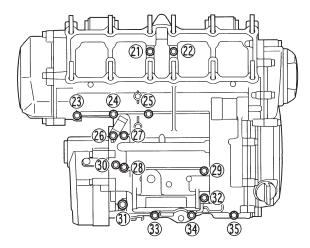
After tightening to 15 Nm (1.5 m°kg), tighten another 90 .

Crankcase tightening sequence

Lower crankcase



Upper crankcase





CHASSIS

Item	Standard	Limit
Steering system:	Angular bearing	
Steering bearing type		000
Front suspension:		
Front fork travel	120 mm	000
Fork spring free length	323 mm	319 mm
Fitting length	315.9 mm	000
Collar length	200 mm	000
Spring Rate (K1)	7.5 N/mm (0.75 kg/mm)	000
(K2)	14 N/mm (1.4 kg/mm)	000
Stroke (K1)	0 70 mm	000
(K2)	70 120 mm	000
Optional spring	No	000
Oil capacity	475 cm ³	000
Oil level	121 mm	000
Oil grade	Fork oil 10W or equivalent	000
Rear suspension:		
Shock absorber travel	50 mm	000
Spring free length	177 mm	000
Fitting length	168 mm	000
Spring Rate (K1)	147 N/mm (14.7 kg/mm)	000
Stroke (K1)	0 50 mm	000
Optional spring	No	000
Enclosed gas/air pressure (STD)	1200 kPa (12 kg/cm ²)	000
Swingarm:		
Swingarm free play limit-end	000	1 mm
Swingarm free play limit-side	000	1 mm
Front wheel:		
Туре	Cast wheel	000
Rim size	$17 \times MT3.00$	000
Rim material	Aluminum	000
Rim runout limit radial	000	1 mm
lateral	000	0.5 mm
Rear wheel:		
Туре	Cast wheel	000
Rim size	$17 \times MT5.00$	000
Rim material	Aluminum	000
Rim runout limit radial	000	1 mm
lateral	000	0.5 mm
Drive chain:		
Type/manufacturer	50VA7/DAIDO	000
No. of links	110	000
Chain free play	30 40 mm	000

SPEC	U
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Item	Standard	Limit
Front disc brake:		
Туре	Dual	000
Disc outside dia. \times thickness	298 × 4 mm	000
Disc deflection limit	000	0.2 mm
Pad thickness Inner	5.5 mm	0.5 mm
Pad thickness Outer	5.5 mm	0.5 mm
Master cylinder inside dia.	14 mm	000
Caliper cylinder inside dia.	30.2 mm	000
	27 mm	000
Brake fluid type	DOT No.4	000
Rear disc brake:		
Туре	Single	000
Disc outside dia. \times thickness	245 × 5 mm	000
Disc deflection limit	000	0.15 mm
Pad thickness inner	5.5 mm	0.5 mm
Pad thickness outer	5.5 mm	0.5 mm
Master cylinder inside dia.	12.7 mm	000
Caliper cylinder inside dia.	38.1 mm	000
Brake fluid type	DOT No.4	000
Brake lever and brake pedal:		
Brake pedal position (N)	36.6 mm	000
Clutch lever free play (lever end)	10 15 mm	000
Throttle grip free play	3 5 mm	000
		!

Item	Size
Bearings and oil seals:	
Pivot shaft bearing	TA2428Z/24 × 31 × 28
Front wheel bearing (left)	6203LLU/2A 17 × 40 × 12
Front wheel bearing (right)	6203 LLU/2A 17 × 40 × 12
Rear wheel bearing (left)	6204 2RS 20 × 47 × 14
Rear wheel bearing (right)	6204 2RS 20 × 47 × 14
Rear wheel oil seal (right)	SD-28-47-7-1
Clutch hub bearing	62062RS 30 × 62 × 16
Clutch hub oil seal	MHSA-40-62-8-B



TIGHTENING TORQUES CHASSIS

Part to be tightened	Thread size	Tighte tore		Remarks
-		Nm	m°kg	
Upper bracket and inner tube	M8 × 1.25	30	3.0	
Upper bracket and steering stem	M22 × 1.0	110	11.0	
Handlebar under holder	M10 × 1.25	40	4.0	
Handlebar upper holder	M8 × 1.25	23	2.3	
Under bracket and inner tube	M10 × 1.25	30	3.0	
Ring nut (steering stem)	M25 × 1.0	_	_	NOTE
Master cylinder bracket	M6 × 1.0	10	1.0	
Master cylinder cap	M4 × 0.7	2	0.2	
Brake hose union bolt	M10 × 1.25	30	3.0	
Grip end	M10 × 1.0	7	0.7	
Cowling stay	M8 × 1.25	33	3.3	
Cowling bracket	M6 × 1.0	7	0.7	
Front fender	M6 × 1.0	7	0.7	
Engine bracket (front)	M8 × 1.25	33	3.3	
Engine mount (front)	M10 × 1.25	55	5.5	
Engine mount (rear upper)	M10 × 1.25	55	5.5	
Engine mount (rear under)	M10 × 1.25	55	5.5	
Engine bracket (rear)	M8 × 1.25	33	3.3	
Pivot shaft	M16 × 1.5	11.5	11.5	
Rear shock absorber (upper)	M10 × 1.25	40	4.0	
Rear shock absorber and relay arm	M10 × 1.25	40	4.0	
Relay arm and rear shock absorber bracket	M10 × 1.25	48	4.8	
Relay arm and connecting rod	M12 × 1.25	48	4.8	
Connecting rod and rear arm	M12 × 1.25	48	4.8	
Chain guide	M6 × 1.0	7	0.7	
Chain case	M6 × 1.0	7	0.7	
Fuel tank (front)	M6 × 1.0	10	1.0	
Fuel tank (rear)	M6 × 1.0	10	1.0	
Fuel tank bracket (rear)	M6 × 1.0	7	0.7	
Сар	M5 × 0.8	6	0.6	
Fuel cock	M6 × 1.0	7	0.7	
Fuel sender	M5 × 0.8	4	0.4	
Ignition coil	M6 × 1.0	7	0.7	
Seat lock	M6 × 1.0	7	0.7	
Roter	M6 × 1.0	7	0.7	
Rear fender and frame	M6 × 1.0	7	0.7	
Taillight bracket and rear fender	M6 × 1.0	7	0.7	
Tail cover and Taillight bracket	M5 × 0.8	4	0.4	
Tail cover and frame	M6 × 1.0	7	0.7	
Rear turn signal light	M6 × 1.0	7	0.7	
Taillight	M6 × 1.0	4	0.4	



Part to be tightened	Thread size	Tightening torque		Remarks
		Nm	m°kg	
Side cover and frame	M6 × 1.0	4	0.4	
Garb bar	M8 × 1.25	19	1.9	
Front wheel axle	M16 × 1.5	67	6.7	
Front wheel axle pinch bolt	M8 × 1.0	20	2.0	
Front brake caliper	M8 × 1.25	40	4.0	
Front brake disc	M8 × 1.25	23	2.3	-10
Front brake caliper bleed screw	M7 × 1.0	6	0.6	
Compression bar	M8 × 1.25	23	2.3	
Rear wheel sprocket	M10 × 1.25	60	6.0	
Drive chain puller nut	M8 × 1.25	16	1.6	
Rear brake caliper and caliper bracket	M10 × 1.25	40	4.0	
Rear wheel axle nut	M18 × 1.5	117	11.7	
Rear brake hose union bolt	M10 × 1.25	30	3.0	
Rear brake caliper bleed screw	M7 × 1.0	6	0.6	
Rear brake disc	M8 × 1.25	23	2.3	-10
Sidestand	M8 × 1.25	23	2.3	
Bracket footrest and frame	M8 × 1.25	28	2.8	
Rear master cylinder and bracket	M8 × 1.25	23	2.3	
Footrest bracket and footrest	M10 × 1.25	55	5.5	
Footrest bracket (rear) and frame	M8 × 1.25	28	2.8	
Center stand nut	M10 × 1.25	56	5.6	
Footrest bracket and exhaust pipe	M8 × 1.25	20	2.0	
Footrest bracket (rear) and muffler	M10 × 1.25	30	3.0	

NOTE:

1. First, tighten the ring nut (lower) approximately 52 Nm (5.2 m°kg) by using the torque wrench, then loosen the right nut completely.

2. Second, tighten the ring nut (lower) approximately 18 Nm (1.8 m°kg) by using the torque wrench, then finger tighten the ring nut (center). Align the slots both ring nut and install the lock washer.

3. Final, hold the ring nuts (lower and center) and tighten the ring nut (upper) 110 Nm (11.0 m°kg) by using the torque wrench.



ELECTRICAL

Item	Standard	Limit
Voltage	12 V	000
Ignition system: Ignition timing (B.T.D.C.) Advanced timing (B.T.D.C.) Advance type	10 /1,250 r/min 50 /4,500 r/min TPS and electrical type	000 000 000
T.C.I.: Pickup coil resistance T.C.I. unit model/manufacturer	189 × 231 Ω Y-L J4T085/MITSUBISHI	000
Ignition coil: Model/manufacturer Primary winding resistance Secondary winding resistance	J0313/DENSO 1.87 × 2.53 Ω at 20 C 12 × 18 kΩ at 20 C	000 000 000
Spark plug cap: Type Resistance	Resin type 10 kΩ	000
Charging system: Type Model/manufacturer Standard output Stator coil resistance	A.C. magneto F4T359/MITSUBISHI 12 V 18 A at 5,000 r/min $0.36 \times 0.44 \Omega$ at 20 C/W-W	000 000 000 000
Voltage regulator: Type Model/manufacturer No load regulated voltage	Semi conductor-short circuit type SH650-12/SHINDENGEN 14.1 × 14.9 V	000 000 000
Rectifier: Model/manufacture Capacity Withstand voltage	SH650-12/SHINDENGEN 18 A 200 V	000 000 000
Battery: Specific gravity	1,320	000
Electric starter system: Type	Constant mesh type	000

MAINTENANCE SPECIFICATIONS



Item	Standard	Limit
Starter motor:		
Model/manufacturer	SM-13/MITSUBA	000
I.D. number	SM-13	000
Output	0.7 kW	000
Armature coil resistance	0.0015 0.0025 Ω at 20 C	000
Brush overall length	10 mm	4 mm
Brush spring pressure	7.8 10.2 N (780 1.020 gf)	000
Commutator dia.	28 mm	27 mm
Mica undercut (depth)	0.7 mm	000
Starter relay:		
Model/manufacturer	MS5F-631/JIDECO	000
Amperage rating	100 A	000
Coil winding resistance	4.18 4.62 Ω at 20 C	000
Horn:		
Туре	Plane type	000
Quantity	1 pcs	000
Model manufacturer	YF-12/NIKKO	000
Maximum amperage	3.0 A	000
Performance	105 120 db/2 m	000
Coil winding resistance	1.15 1.25 Ω at 20 C	000
Flasher relay:		
Туре	Full transistor type	000
Model/manufacturer	FE246BH/DENSO	000
Self cancelling device	No	000
Hazard flasher device	Yes	000
Flasher frequency	75 95 cyl/min	000
Wattage	21 W × 2 + 1.4 W	000
Oil level gauge:		
Model/manufacture	4JH/SOMIC	000
Fuel gauge:		
Model/manufacture	4YR/NIPPON SEIKI	000
Sender unit resistance-full	4 10 Ω	000
-empty	90 100 Ω	000
Electric fan:		
Model/manufacturer	5DM/DENSO	000
Thermostat switch:		
Model/manufacture	3LN/NIPPON THERMOSTAT	000
Circuit breaker:		
Туре	Fuse	000

MAINTENANCE SPECIFICATIONS

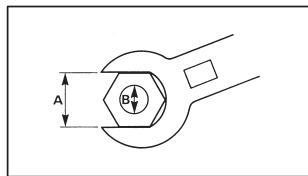


Item	Standard	limit
Amperage for individual circuit:		
Main	30 A	000
Headlight	20 A	000
Signal	20 A	000
Ignition	20 A	000
Fan	10 A	000
Back up	5 A	000
Reserve	30 A	000
	20 A	000
	10 A	000
	5 A	000



GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A: Width across flats

B: Thread diameter

A (Nut)	B (Polt)	General t torq	
(Nut)	(Bolt)	Nm	m°kg
10 mm	6 mm	6	0.6
12 mm	8 mm	15	1.5
14 mm	10 mm	30	3.0
17 mm	12 mm	55	5.5
19 mm	14 mm	85	8.5
22 mm	16 mm	130	13.0



LUBRICATION POINT AND LUBRICATION TYPES ENGINE

Lubrication Point	Symbol
Oil seal lips	
Bearing	(Ē
Crankshaft journal	
Connecting rod big end and small end	
Piston, piston pin	
Connecting rod bolt	
Camshaft journal, profile	
Valve stem (IN, EX)	
Valve stem end (IN, EX)	
Cylinder head tightening nut mounting surface	
Valve lifter	
Camshaft cap	
Water pump seal	Coolant
Water pump shaft	
Radiator hose	Silicon
Oil pump	€
Relief valve O-ring	
Oil cooler O-ring	
Oil filter	
Oil level gauge	(Ē
Starter moter O-ring	
Starter idrer gear	(Ē
Main axle 5, 6th pinion	
Drive axle 1 \sim 4th wheel gear	
Push lever	
Push rod	
Shift cam	(Ē
Shift fork guide bar	(Ē
Shift shaft	(E
Starter idrer gear shaft 1	
Neutral switch O-ring	E
Push rod	-437
Push rod 1 O-ring	
Shift pedal	
Shift shaft	
Water pump O-ring	
Cylinder head cover gasket	Yamaha bond No. 1215
Shift cam plug	-6
Breather plate	-6
Crankcase	Yamaha bond No. 1215
Taper plug	-6
Bearing plate	-6



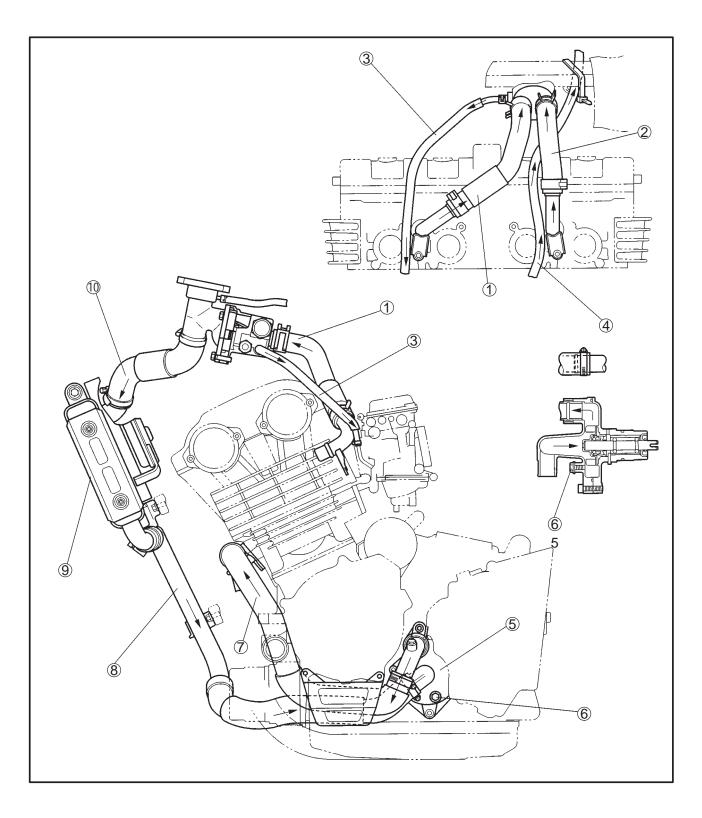
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Lubrication Point	Symbol
Steering bearing and bearing race (upper and lower)	
Pivot shaft	
Rear arm bearing	
Rear arm oil seal	
Rear arm cover oil seal lips	
Relay arm bearing	
Relay arm oil seal	
Rear shock absorber (upper/lower)	
Front wheel oil seal	
Speed sensor oil seal	
Rear wheel oil seal	
Clutch damper oil seal	
Clutch and rear wheel	
Throttle cable inner surface	
Starter cable inner surface and lever pivot	
Rear brake pedal shaft	
Shift pedal shaft	
Side stand sliding surface	
Rear foot rest pivot bolt	



EB203000 **COOLING SYSTEM DIAGRAMS**

- (1) Engine outlet hose
- 2 Engine outlet hose
 3 Carburetor inlet hose
- (4) Carburetor outlet hose
- 5 Water pump
- 6 Coolant drain bolt
- 7 Water pump outlet hose
- (8) Radiator outlet hose
- (9) Radiator
 - 10 Radiator inlet hose

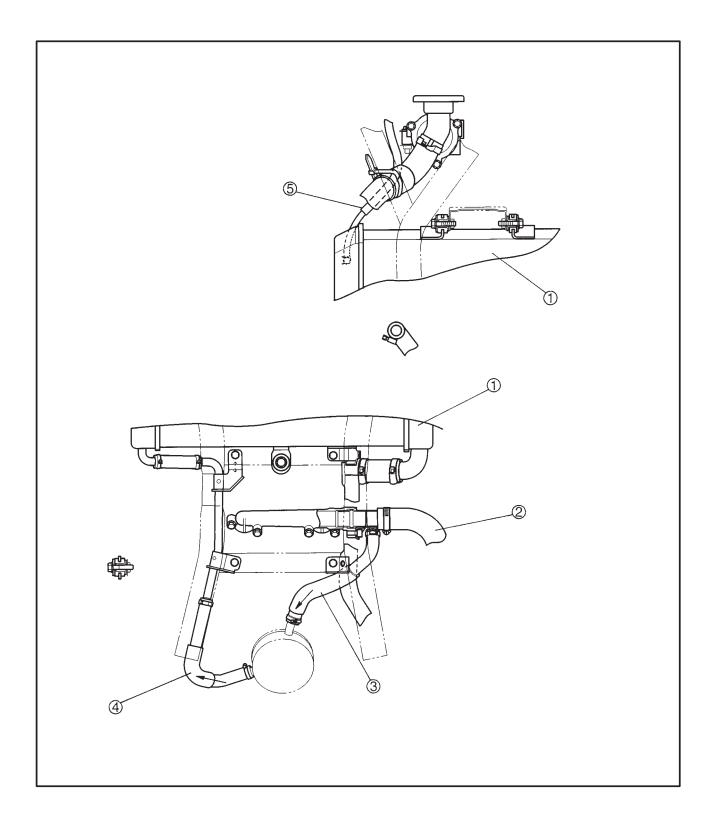




1 Radiator

Water pump outlet hose
Oil cooler inlet hose
Oil cooler outlet hose

(5) Carburetor outlet hose

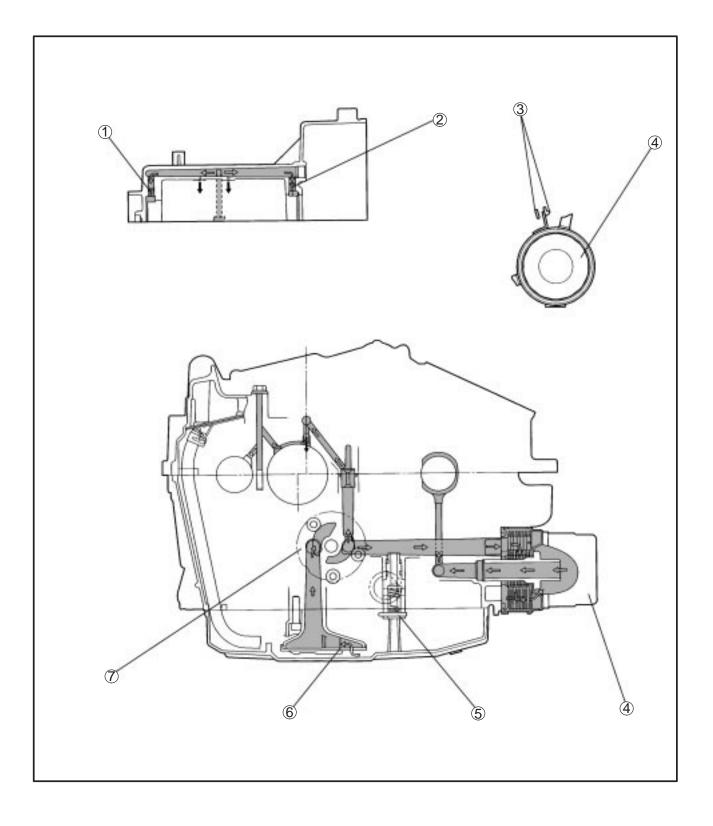




EB204000 **LUBRICATION DIAGRAMS**

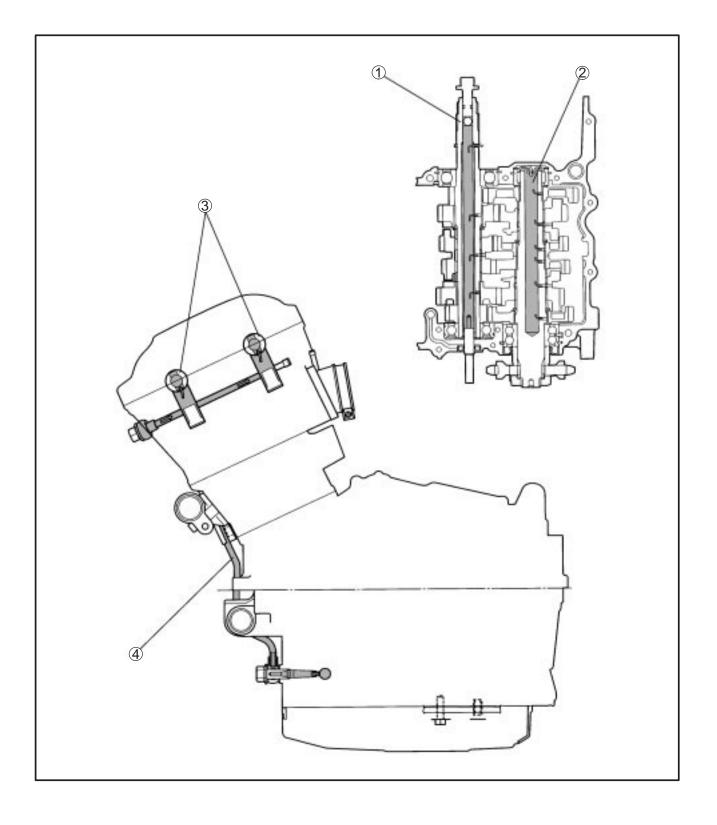
- Oil nozzle (main nozzle)
 Oil nozzle (drive axle)
 Projection
 Oil filter

- 5 Relief valve
- 6 Oil strainer
- (7) Oil pump



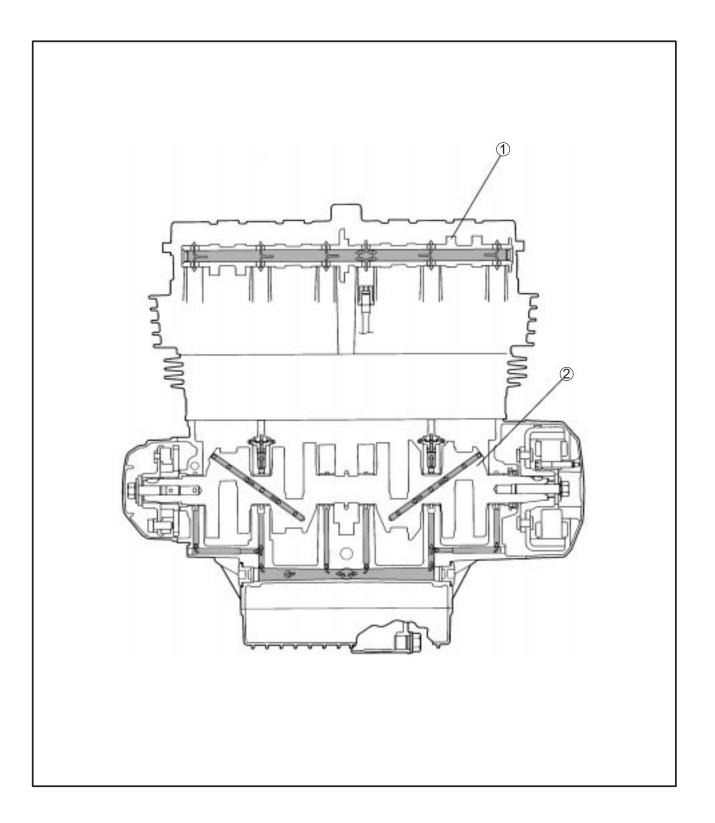


Main axle
 Drive axle
 Camshaft
 Oil delivery pipe





1 Camshaft 2 Crankshaft

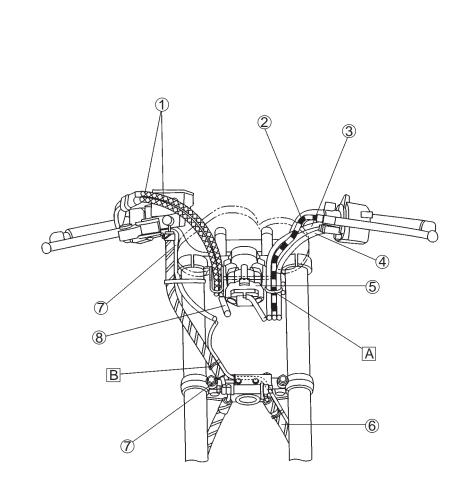


SPEC

CABLE ROUTING

- 1 Throttle cable
- 2 Clutch cable
- (3) Handlebar switch (right)
- (4) Starter cable
- (5) Main switch
- 6 Brake hose
- (7) Speed sensor lead
- 8 Headlight lead

- (9) Handlebar switch (left)
- A Use a plastic clamp to fasten together the handlebar switch lead (left), clutch cable and starter cable.
- B Pass the brake hose out side of the speed sensor lead, then use a plastic clamp to fasten them.





- 1 Main switch lead
- 2 Starter cable
- (3) Handlebar switch lead (left)
- (4) Clutch cable
- (5) Rectifier/regulator
- 6 Horn lead
- ⑦ Box
- (8) Air guide plate
- (9) Starter cable
- 10 Flasher leray

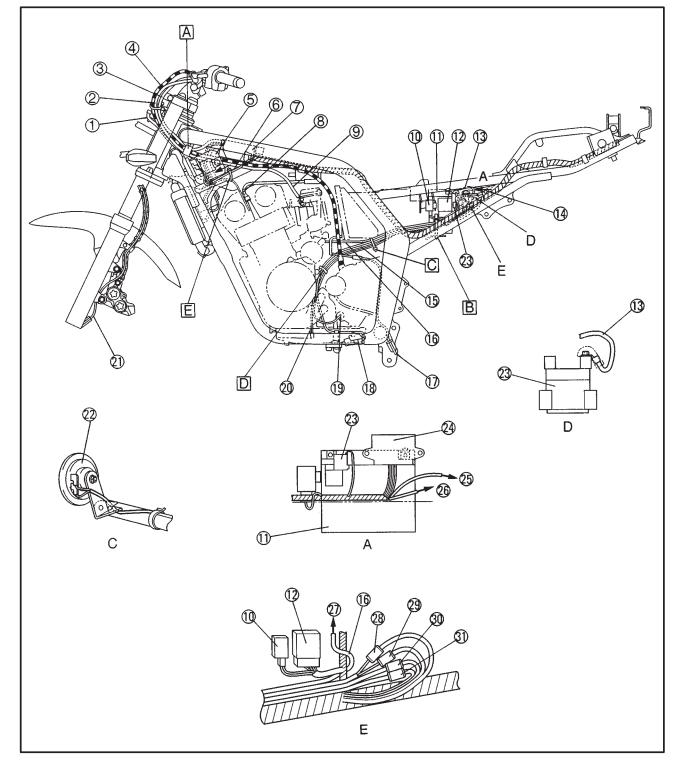
Battery positive (+) lead
 Seat lock cable

12 Starting circuit cut-off relay

(11) Battery

- (15) AC magneto lead(16) Starter motor lead
- (17) Air filter drain hose
- (18) Sidestand switch
- 19 Neutral switch
- 20 Oil level switch

- 2 Speed sensor lead
- 2 Horn
- 23 Starter relay
- 24 Fuse box
- 25 To front brake switch
- To battery negative (-) lead
- (27) To starter relay
- 28 AC magneto coupler
- 29 Pickup coupler
- 30 Sidestand switch coupler
- 3 Oil level/neutral switch coupler

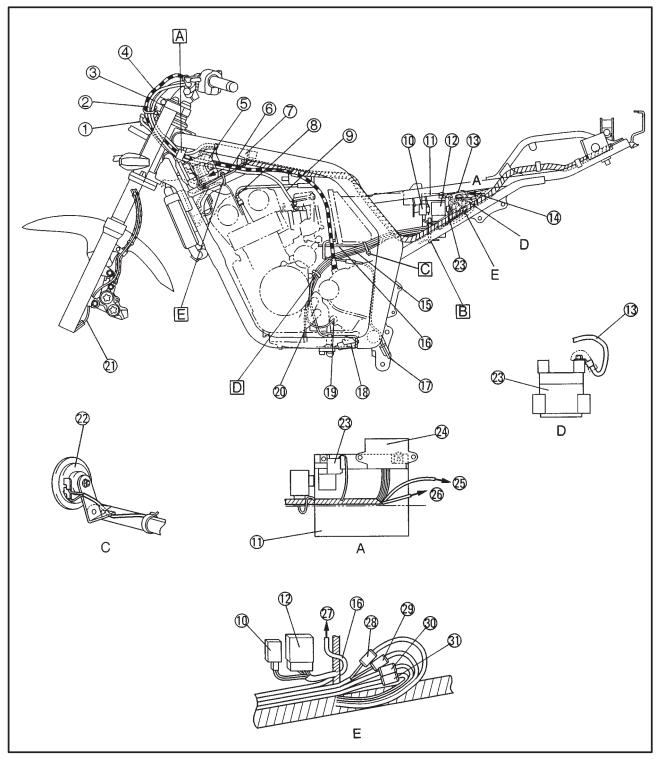


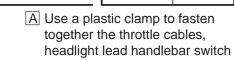


- A Use a plastic clamp to fasten the handlebar switch lead (left), main switch lead, clutch cable and starter cable to the frame.
- B Use a plastic band to fasten together wireharness, starter motor lead, AC magneto lead, sidestand switch lead and oil level/neutral switch lead, then hold the clamp to the frame bracket.

Position the band end to out side of D Use a steel holder to fasten together the AC magneto lea

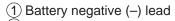
- C Use a plastic locking tie to fasten the starter motor lead, AC magneto lead, sidestand switch lead and oil level/neutral switch lead to the frame bracket. Cut off the excess end of the tie.
- D Use a steel holder to fasten together the AC magneto lead, sidestand lead and oil level/neutral switch lead.
- E Use a plastic clamp to fasten the horn lead and air guide plate to the frame.





(right) and speed sensor lead. B Use a plastic locking tie to fasten the handlebar switch (right) and brake hose to the right front fork inner tube.

SPEC



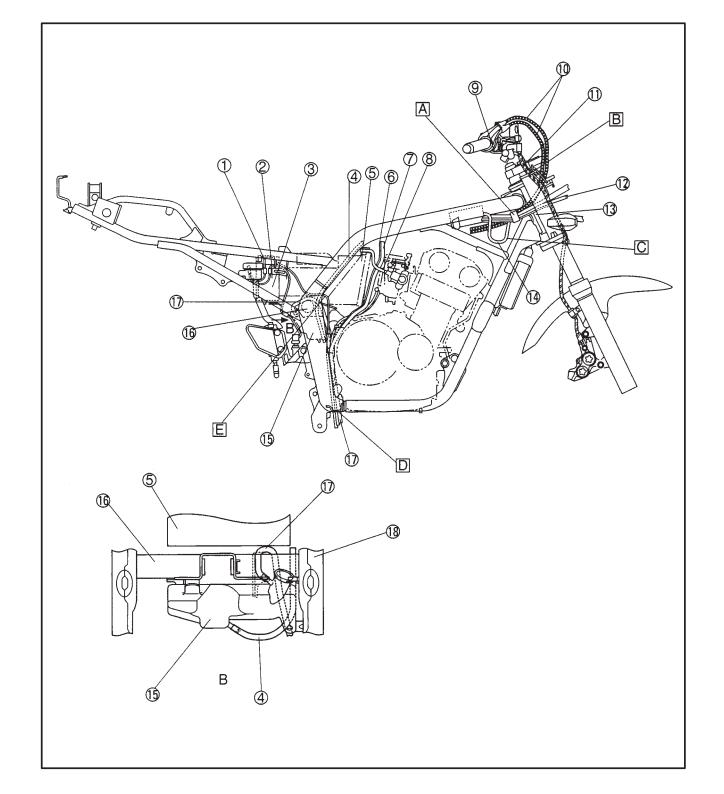
- (2) Rear brake switch lead
- 3 Battery
- (4) Reservoir tank hose
- (5) Air filter
- (6) Fuel tank breather hose (7) Fuel tank drain hose
- (8) T.P.S. lead
- (9) Handlebar switch lead (right)
- (13) Speed sensor lead (14) Main switch lead (15) Reservoir tank

(12) Headlight lead

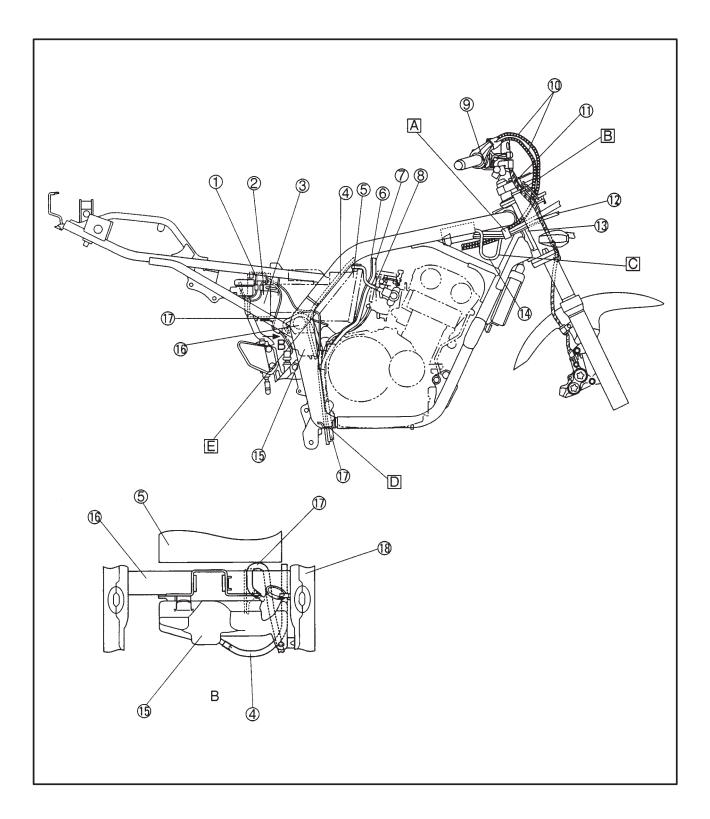
(10) Throttle cable

(1) Brake hose

- (16) Cross tube
- (17) Reservoir tank over flow hose
- 18 Swingarm bracket



- SPEC
- C Pass the main switch lead under E Pass the battery negative (-) the throttle cables, headlight lead, handlebar switch lead (right) and speed sensor lead, then insert it right side of the box.
- D Pass the reservoir tank over flow hose, fuel tank breather hose and fuel tank drain hose through the cable holder.
- lead inside of the reservoir hose.

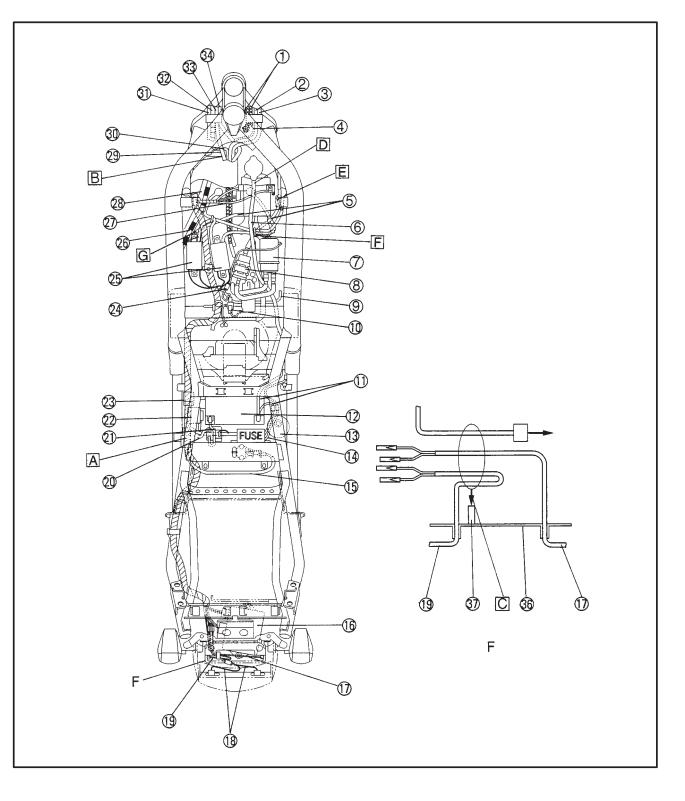




- 1 Throttle cable
- 2 Handlebar switch lead (right)
- (3) Headlight lead
- (4) Speed sensor lead
- $(\underline{5})$ Carburetor heater hose
- 6 Reservoir tank hose
- Tuel pump
- 8 Fuel filter
- 9 T.P.S lead
- 1 Fuel sender, coupler

- 1) Battery negative (-) lead
- 12 Battery
- 1 Rear brake reservoir tank
- (1) Rear brake switch lead
- (15) Seat lock cable
- (16) Ignitor
- $(\overline{1})$ Rear turn signal light lead (right)
- (18) Taillight lead
- 19 Rear turn signal light lead (left)
- 20 Starter motor lead

- 21 Starter relay
- 22 Starting circuit cut-off relay
- 23 Flasher relay
- 2 Fuel pump lead coupler
 - 25 Ignition coil
 - 26 Clutch cable
 - 2 Ground lead
 - 28 Starter cable
 - 29 Fan motor lead
 - 30 Rectifier/regulator lead

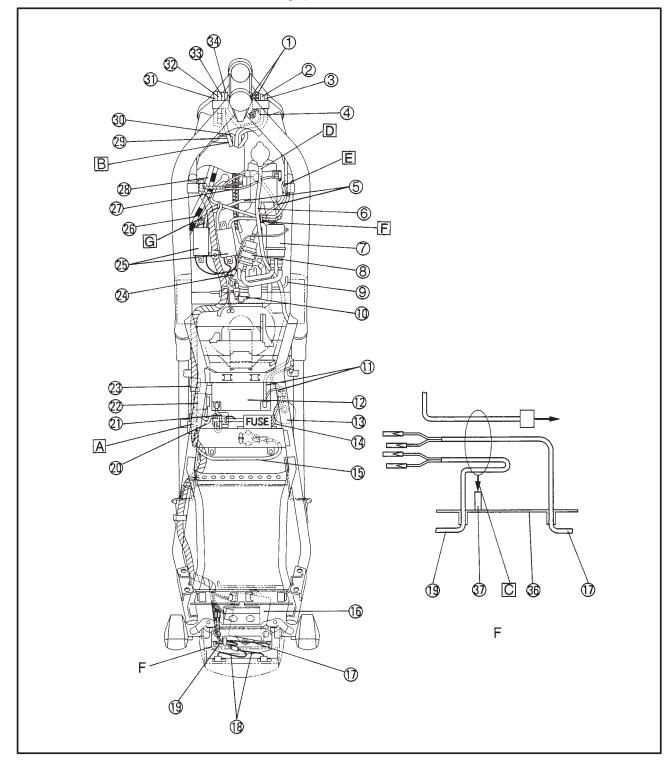




- 31 Starter cable
- 32 Clutch cable
- 3 Handlebar switch lead (left)
- 34 Main switch lead
- 35 To taillight
- 36 Rear fender
- 37 Clamp
- A Pass the wireharness under the starter relay.
- B Pass the rectifier/regulator
- lead, fan motor lead, handlebar switch lead (left), main switch lead, headlight lead, handlebar switch lead (right) and speed sensor lead through front side of the box, then connecte each coupler in the box.
- C Align the connector position of rear turn signal light leads (left and right), then bend the rear

turn signal light lead and clamp it.

- D Pass the reservoir hose left side of thermo stat housing.
- E Do not fasten the high tension cord #4 with locking tie.
- F Use a plastic band to fasten the high tension cord #3, #4.
- G Pass the carburetor inlet hose under the high tension cord #2, #4.









CHAPTER 3 PERIODIC INSPECTIONS AND ADJUSTMENTS

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EB300000

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

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

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

					EVERY	
N	D.	ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL (1,000 km)	6,000 km or 6 months (whichever comes first)	12,000 km or 12 months (whichever comes first)
1	*	Fuel line	 Check fuel hoses and vacuum hose for cracks or damage. Replace if necessary. 		\checkmark	
2	*	Fuel filter	[°] Check condition.[°] Replace if necessary.			
3		Spark plugs	 Check condition. Clean, regap or replace if necessary. 			
4	*	Valves	 Check valve clearance. Adjust if necessary. 		2,000 km or 42 chever comes f	
5		Air filter	° Clean or replace if necessary.			\checkmark
6		Clutch	 Check operation Adjust or replace cable. 			
7	*	Front brake	 Cehck operation, fluid level and vehicle for fluid leakage. (See NOTE.) Correct accordingly. Replace brake pads if necessary. 	leakage. (See NOTE.)		N
8	*	Rear brake	 Check operation, fluid level and vehicle for fluid leakage. (See NOTE.) Correct accordingly. Replace brake pads if necessary. 	V	V	\checkmark
9	*	Wheels	 Check balance, runout and for damage. Rebalance or replace if necessary. 			\checkmark
10	*	Tires	 Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary. 	age.		
11	*	Wheel bearings	 Check bearing for looseness or damage. Replace if necessary. 	\checkmark		\checkmark
12	*	Swingarm	 Check swingarm pivoting point for play. Correct if necessary. Lubricate with molybdenum disulfide grease every 24,000 km or 24 months (whichever comes first). 	rect if necessary. ricate with molybdenum disulfide grease every		\checkmark
13		Dirve chain	 Check chain slack. Adjust if necessary. Make sure that the rear wheel is properly aligned. Clean and lubricate. 	Every 1,000 km and after washing the motorcycle or riding in the rain		
14	*	Steering bearings	 Section 24,000 km or 24 months (whichever comes first). Check bearing play and steering for roughness. Correct accordingly. Lubricate with lithium soap base grease every 24,000 km or 24 months (whichever comes first). 			
15	*	Chassis fasteners	 Make sure that all nuts, bolts and screws are properly tightened. Tighten if necessary. 	rly $$		N
16	*	Sidestand/ centerstand	 Check operation. Lubricate and repair if necessary. 	ssary.		

PERIODIC MAINTENANCE/LUBRICATION INTERVALS



					EVE	RY
N	NO. ITEM CHECKS AND MAINTENANCE JOBS		INITIAL (1,000 km)	6,000 km or 6 months (whichever comes first)	12,000 km or 12 months (whichever comes first)	
17	*	Sidestand switch	° Check operation.° Replace if necessary.		\checkmark	\checkmark
18	*	Front fork	 Check operation and for oil leakage. Correct accordingly. 			\checkmark
19	*	Rear shock absorber assembly	 Check operation and shock absorber for oil leakage. Replace shock absorber assembly if necessary. 			
20	*	Rear suspension relay arm and connecting arm pivoting points	 Check operation. Lubricate with molybdenum disulfide grease every 24,000 km or 24 months (whichever comes first). 		\checkmark	\checkmark
21	*	Carburetors	 Check engine idling speed, synchronization and starter operation. Adjust if necessary. 			V
22		Engine oil	 Check oil level and vehicle for oil leakage. Correct if necessary. Change. (Warm engine before draining.) 	\checkmark	\checkmark	
23		Engine oil filter cartridge	° Replace.	\checkmark		\checkmark
24	*	Cooling system	 Check coolant level and vehicle for coolant leakage. Correct if necessary. Change coolant every 24,000 km or 24 months (whichever comes first). 			

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

NOTE: .

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

° Brake fluid replacement

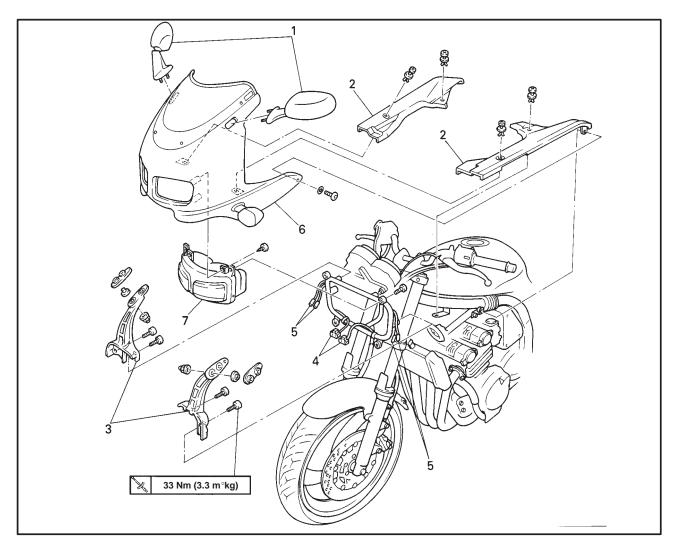
- 1. When disassembling the master cylinder or caliper cylinder, always replace the brake fluid. Check the brake fluid level regularly and fill as required.
- 2. Replace the oil seals on the inner parts of the master cylinder and caliper cylinder every two years.

3. Replace the brake hose every four years or if cracked or damaged.

FRONT COWLING/ SEAT/SIDE COVER/FUEL TANK



FRONT COWLING/SEAT/SIDE COVER/FUEL TANK FRONT COWLING

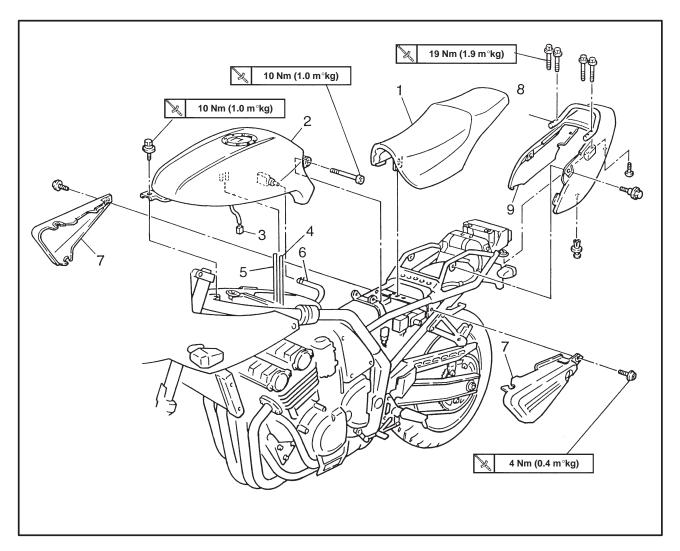


Order	Job name/Part name	Q'ty	Remarks
	Removing the front cowling		Remove the parts in the order listed.
1	View mirror (left/right)	1/1	
2	Inner panel (left/right)	1/1	
3	Cowling stay (left/right)	1/1	
4	Head light lead	2	NOTE:
5	Front flasher light lead (left/right)	2/2	Disconnect the couplers.
6	Front cowling	1	
7	Head light assembly	1	
			For installation, reverse the removal
			procedure.

FRONT COWLING/ SEAT/SIDE COVER/FUEL TANK



SEAT, SIDE COVER AND FUEL TANK



Order	Job name/Part name	Q'ty	Remarks
	Removing the seat, side cover		Remove the parts in the order listed.
	and fuel tank		
1	Seat	1	
2	Fuel tank	1	
3	Fuel sender lead	1	NOTE:
4	Fuel tank breaser hose	1	Disconnect the couplers.
5	Fuel tank drain hose	1	
6	Fuel hose	1	
7	Side cover (left/right)	1/1	
8	Grab bar	1	
9	Tail cover	1	
			For installation, reverse the removal procedure.



ENGINE

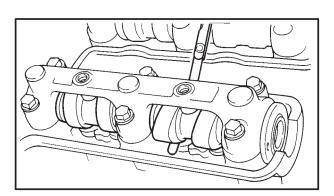
ADJUSTING THE VALVE CLEARANCE

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:
 - ° front cowling
 - ° seat
 - fuel tank (Refer to "FRONT COWLING SEAT, SIDE COVER AND FUEL TANK" in chapter 3)
- 2. Drain the coolant (Refer to "COOLANT REPLACEMENT" in chapter 3)

- 3. Remove:
 - radiator (Refer to "RADIATOR" in chapter 5)
- 4. Remove:
 - $^\circ$ spark plug cap
 - ° spark plug
 - ° magneto cover



5. Measure: ° valve clearance

Out of specification \rightarrow Adjust.



ADJUSTING THE VALVE CLEARANCE



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

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.
- ^o Measure the valve clearance in the following sequence.

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

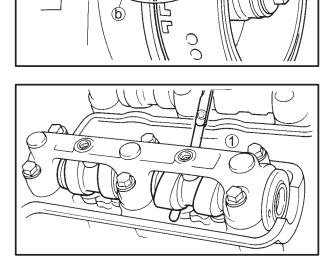
- A Front
- d. For each cylinder, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.
- B Degrees that the crankshaft is turned counterclockwise.
- C Cylinder
- D Combustion cycle

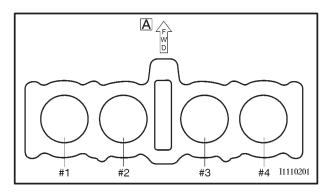
#2 Cylinder	180 °
#4 Cylinder	360 °
#3 Cylinder	540 °

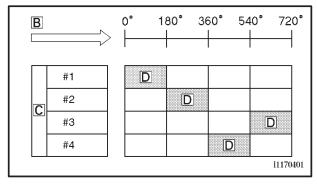
6. Remove:

° carburetor

Refer to "CARBURETION" in chapter 6.

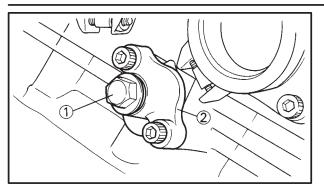


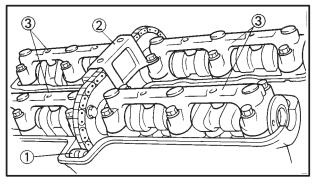


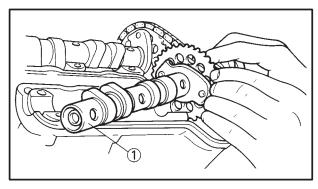


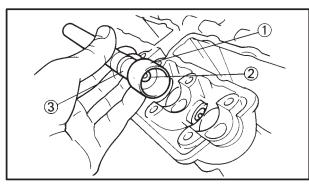
ADJUSTING THE VALVE CLEARANCE

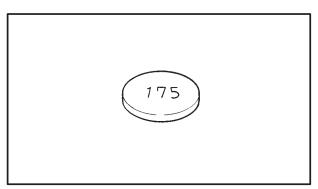












- 7. Remove:
 - ° timing chain tensioner bolt ①
 - ° timing chain tensioner assembly 2

- 8. Remove:
 - ° timing chain guide ①
 - ° timing chain guide (upper) ②
 - ° camshaft cap 3

9. Remove: ° camshaft ①

NOTE: .

- ° Refer to "DISASSEMBLING THE ENGINE - CAMSHAFT AND CYLINDER HEAD" in chapter 4.
- ° When removing the timing chain and camshafts, fasten a wire to the timing chain to retrieve it if it falls into the crankcase.

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

Valve pad		Available valve
thickness range		pads
Nos. 120 × 240	120 × 2.40 mm	25 thickness in 0.05 mm increments



NOTE: ____

- ° The thickness (a) 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 valve
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.



VALVE PAD SELECTION TABLE INTAKE

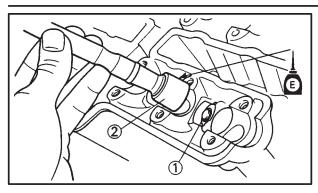
	Measured clearance									INS	STA	LLE	D	PAC) NI	JME	BEF	2								
	Ļ	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
	0.00 × 0.02				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
	0.03 × 0.07			120	125	130	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											Sp	ecific	ation												
exa	0.21 × 0.22	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
\rightarrow	0.23 × 0.27	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
	0.28 × 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	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
	0.38 × 0.42	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
	0.43 × 0.47	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
	0.48 × 0.52	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
	0.53×0.57 0.58×0.62	160 165	165 170	170 175	175 180	180 185	185	190 195	195 200	200 205	205 210	210 215	215 220	220 225	225 230	230 235	235 240	240								
	0.58×0.62 0.63×0.67	100	170	175	180	185	190 195	200	200	205	210	215	220	225	230	235	240									
	0.63×0.67 0.68×0.72	170	175	185	100	190	200	200	205	210	215	220	225	230	235	240										
	0.08×0.72 0.73×0.77	175	185	185	190	200	200	205	210	215	220	225	230	235	240	l										
	0.73×0.77 0.78×0.82	185	190	195	200	200	203	210	213	220	225	230	235	240												
	0.70×0.02 0.83×0.87	190	195	200	200	210	215	213	225	230	235	240	240													
	0.88×0.92	195	200	205	210	215	220	225	230	235	240	210														
	0.93×0.97	200	205	210	215	220	225	230	235	240		I						EXA	MPL	E:						
	0.98 × 1.02	205	210	215	220	225	230	235	240									VA	LVE	CLE	ARAI	VCE:	0.11	× 0.2	20 m	m
	1.03 × 1.07	210	215	220	225	230	235	240										I	nstal	led is	150					
	1.08 × 1.12	215	220	225	230	235	240																	25 mi	m	
	1.13 × 1.17	220	225	230	235	240												F	Repla	ice 1	50 pa	d wit	h 160) pad		
	1.18 × 1.22	225	230	235	240																					
	1.23 × 1.27	230	235	240																						
	1.28 × 1.32	235	240																							
	1.33 × 1.37	240																								

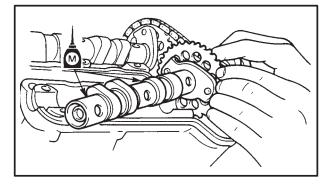
EXHAUST

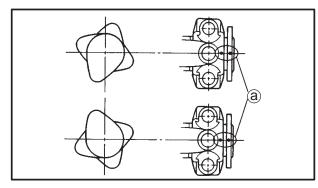
	Measured clearance									INS	STA		ED	PAD	D N	UM	BEI	R								
	Ļ	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
	0.00 × 0.02						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
	0.03 × 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
	0.08 × 0.10				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
	0.13 × 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
	0.18 × 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
	0.21 × 0.30											Sp	ecific	ation												
exa	0.31 × 0.32	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
\rightarrow	0.33 × 0.37	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
	0.38 × 0.42	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
	0.43×0.47	140	145	150	155	160	165	170	175	180	185	190	195	200	205	<u> </u>	215	220	225	230	235	240				
	0.48 × 0.52	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
	0.53 × 0.57	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	l					
	0.58 × 0.62	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
	0.63 × 0.67	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
	0.68 × 0.72	165	170	175	180	185	190	195	200	205	210		220	225	230	235	240									
	0.73 × 0.77	170	175	180	185	190	195	200	205	210	215		225	230	235	240										
	0.78 × 0.82	175	180	185	190	195	200	205	210	215	220	225	230	235	240	J										
	0.83×0.87	180 185	185	190	195 200	200 205	205 210	210	215 220	220 225	225	230 235	235	240												
	0.88×0.92 0.93×0.97	185	190 195	195 200	200	205	210	215 220	220	225	230 235	235	240													
	0.93×0.97 0.98×1.02	190	200	200	205	210	215	220	225	230	235	240														
	1.30×1.02	200	200	205	210	215	220	225	230	235	240							KAMF								
	1.30×1.07 1.08×1.12	200	203	210	215	220	223	230	235	240												=. 0 3	01 V	0.30	mm	
	1.00×1.12 1.13×1.17	210	215	220	225	230	235	233	240										alled			0.2		0.50		
	1.13×1.17 1.18×1.22	215	213	225	230	235	233	240													aran	no is	0 35	mm		
	1.10×1.22 1.23×1.27	213	225	223	235	240	270														pad v					
	1.23×1.27 1.28×1.32	225	230	235	240	210												1.04	1400		pau v		50 p			
	1.33×1.32	230	235	240		I																				
	1.38×1.42	235	240		I																					
	1.43×1.47	240																								

ADJUSTING THE VALVE CLEARANCE









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

NOTE: .

- ° Apply molybdenum disulfide grease to the valve pad.
- ° 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)

NOTE:

- ° Refer to "CAMSHAFT" in chapter 4.
- ° Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- ° First, install the exhaust camshaft.
- ° Align the camshaft marks (a) with the camshaft cap marks.
- [°] Rotate the crankshaft counterclockwise several turns to seat the parts.

CAUTION:

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

- g. Measure the valve clearance again.
- If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.
- 11. Install:
 - ° all removed parts

NOTE: .

For installation, reverse the removal procedure. Note the following points.

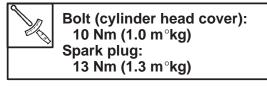
- 12. Install:
 - ° timing chain guide (exhaust side)
 - ° timing chain guide (upper)
 - timing chain tensioner
 Refer to "CAMSHAFT" in CHAPTER 4.
- 13. Install:
 - ° AC magneto cover

Bolt (AC magneto cover): 12 Nm (1.2 m°kg)

ADJUSTING THE VALVE CLEARANCE/ SYNCHRONIZING THE CARBURETORS



- 14. Install:
 - ° cylinder head cover
 ° spark plugs



SYNCHRONIZING THE CARBURETORS

NOTE: .

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

1. Stand the motorcycle on a level surface.

NOTE: _

Place the motorcycle on a suitable stand.

2. Remove: ° cap

()

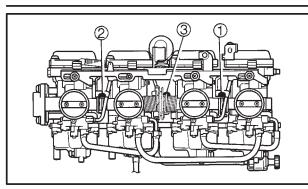
- 3. Install:
 - ° vacuum gauge ①
 - engine tachometer ②
 (to the spark plug lead of cyl. #1)



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







- 6. Adjust:
 - $^{\circ}$ carburetor synchronization
 - ****
 - a. Synchronize carburetor #1 to carburetor #2 by turning the synchronizing screw ① in either direction until both gauges read the same.

NOTE: .

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

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

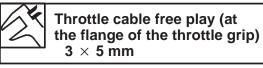


Vacuum pressure at engine idling speed 30.7 × 33.3 kPa (230 × 250 mm Hg)

NOTE:

The difference in vacuum pressure between two carburetors should not exceed 1.33 kPa (10 mm Hg, 0.4 in Hg).

- 7. Check:
 - $^\circ$ engine idling speed Out of specification \rightarrow Adjust.
- 8. Stop the engine and remove the measuring equipment.
- 9. Adjust:
 - throttle cable free play Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



10. Install: ° cap



ADJUSTING THE ENGINE IDLING SPEED

NOTE: _

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

- 1. Start the engine and let it warm up for several minutes.
- 2. Install:

engine tachometer
 (to the spark plug lead of cyl. #1)



3. Check:

 $^{\circ}$ engine idling speed Out of specification \rightarrow Adjust.



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

4. Adjust:

° engine idling speed

- a. Turn the pilot screw ① in or out until it is lightly seated.
- b. Turn the pilot screw out by the specified number of turns.



Carburetor angle driver: 90890-03158

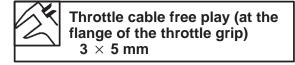
Pilot screw: 2 turns out

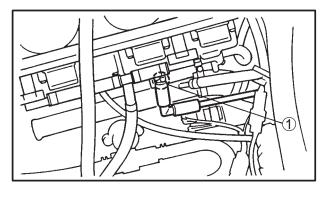
c. Turn the throttle stop screw (2) (a) or (b) until the specified idling speed is obtained.

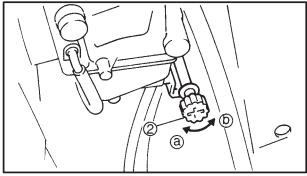
Direction ⓐ → Idling speed is increased.
Direction (b) \rightarrow Idling sped is
decreased.

5. Adjust:

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







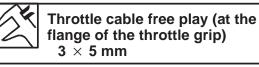


ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE: .

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

- 1. Check:
 - ° throttle cable free play ⓐ
 Out of specification → Adjust.



- 2. Remove:
 - ° bracket
 - ° ignition coil
 - ° fuel pump
- 3. Adjust:
 - ° throttle cable free play

Carburetor side

NOTE: _

When the motorcycle is accelerating, throttle cable #1 1 is pulled and throttle cable #2 2 is pushed.

- a. Loosen the locknut ③ on throttle cable #2.
- b. Turn the adjuster ④ ⓐ or ⓑ to take up any slack on throttle cable #2.
- c. Loosen the locknut (5) on throttle cable #1.
- d. Turn the adjuster (6) (a) or (b) until the specified free play is obtained.

Direction (a) \rightarrow Throttle cable free play is increased.
Direction $\textcircled{b} \rightarrow$ Throttle cable free play is decreased.

e. Tighten the locknuts.

NOTE:

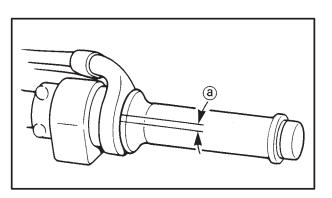
If the specified throttle cable free play cannot be obtained on the carburetor side of the cable, use the adjusting nut on the handlebar side.

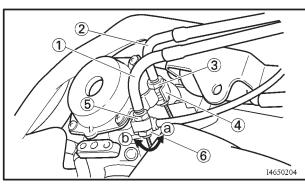
Handlebar side

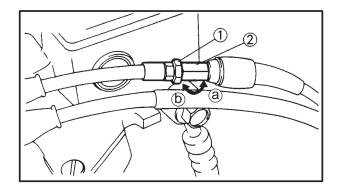
- a. Loosen the locknut ①.
- b. Turn the adjusting nut ② in direction ③ or
 ⑤ until the specified throttle cable free play is obtained.

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

c. Tighten the locknut.









A WARNING

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

- 4. Install:
 - ° fuel pump
 - ° ignition coil
 - ° bracket

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

- 1. Disconnect:
 - ° spark plug cap
- 2. Remove:
 - ° spark plug

CAUTION:

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

3. Check:

° spark plug type Incorrect \rightarrow Change.



Spark plug type (manufacturer) CR8E (NGK) **U24ESR-N (DENSO)**

- 4. Check:
 - ° electrode ①
 - Damage/wear \rightarrow Replace the spark plug. ° insulator 2

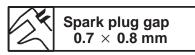
Abnormal color \rightarrow Replace the spark plug. Normal color is a medium-to-light tan color.

5. Clean:

° spark plug (with a spark plug cleaner or wire brush)

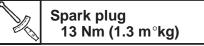
6. Measure:

° spark plug gap ③ (with a specification \rightarrow Regap.



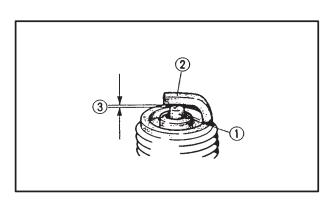
7. Install:

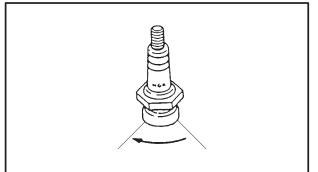
° spark plug



NOTE:

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

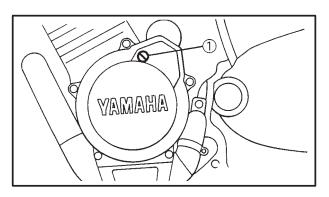


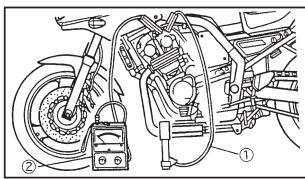


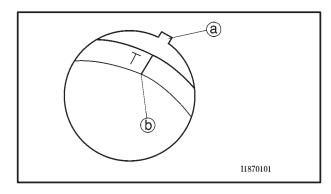
CHECKING THE SPARK PLUGS/ CHECKING THE IGNITION TIMING



8. Connect: ° spark plug cap







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:
 - $^{\circ}$ timing plug (1)
- 2. Install:
 - ° timing light ①
 - engine tachometer 2
 (to the spark plug lead of cyl. #1)



- 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.

b. Check that the stationary pointer (a) is within the firing range (b) on the generator rotor.

Incorrect firing range \rightarrow Check the ignition system.

NOTE:

The ignition timing is not adjustable.

- 4. Remove:
 - ° engine tachometer
 - ° timing light
- 5. Install:
 - ° timing plug



MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE: .

Insufficient compression pressure will result in a loss of performance.

- 1. Check:
 - $^\circ$ valve clearance Out of specification \rightarrow Adjust. Refer to "ADJUSTING THE VALVE CLEARANCE".
- 2. Start the engine, warm it up for several minutes, and then turn it off.
- 3. Disconnect: ° spark plug cap
- 4. Remove: ° spark plug

CAUTION:

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

5. Install:

° compression gauge ①

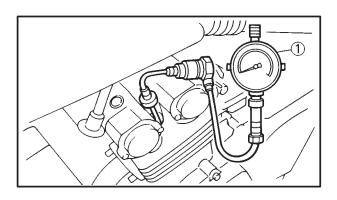


6. Measure:

 ^o compression pressure Above the maximum pressure → Inspect the cylinder head, valve surfaces, and piston crown for carbon deposits. Below the minimum pressure → Squirt a few measure again.

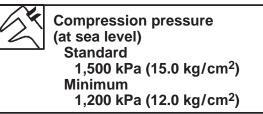
° Refer to the following table.

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



MEASURING THE COMPRESSION PRESSURE CHECKING THE ENGINE OIL LEVEL





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

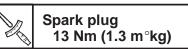
To prevent sparking, ground all spark plug leads before cranking the engine.

NOTE:

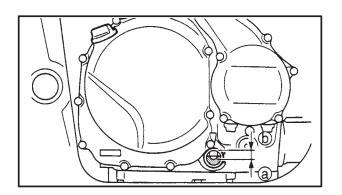
The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/ cm^2 , 1 bar).

7. Install:

° spark plug



- 8. Connect:
 - ° spark plug cap



EB303070 CHECKING THE ENGINE OIL LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

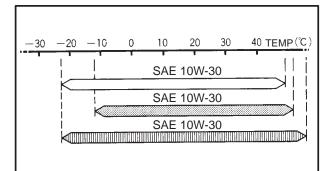
° Place the motorcycle on a suitable stand. ° Make sure that the motorcycle is upright.

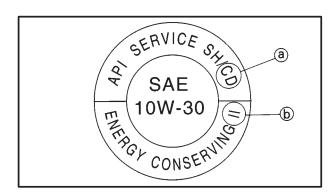
- 2. Let the engine idle for a few minutes.
- 3. Check:
 - ° engine oil level

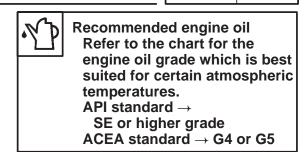
The engine oil level should be between the minimum level marks (a) and maximum level marks (b).

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

CHECKING THE ENGINE OIL LEVEL/ CHANGING THE ENGINE OIL







CHK

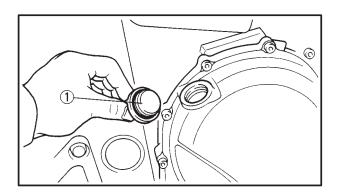
ADJ

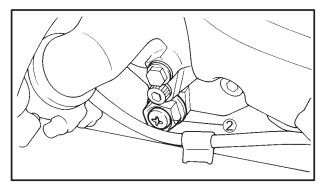
CAUTION:

- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD (a) or higher and do not use oils labeled "ENERGY CONSERVING II" (b) or higher.
- Do not allow foreign materials to enter the carankcase.
- 4. Start the engine, warm it up for several minutes, and then turn it off.
- 5. Check the engine oil level again.

NOTE:

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



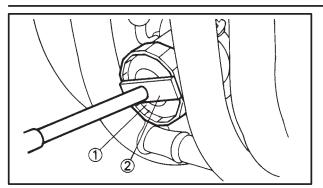


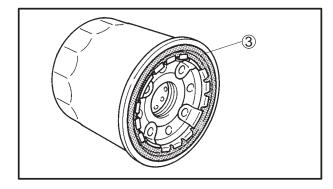
CHANGING THE ENGINE OIL

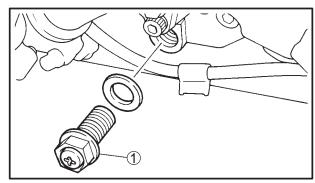
- 1. Start the engien, warm it up for several minutes, and then turn it off.
- 2. Place a container under the engine oil drain bolt.
- 3. Remove:
 - $^{\circ}$ engine oil filler cap \bigcirc
 - ° engine oil drain bolt 2
 - (along with the gasket)
- 4. Drain:
 - engine oil (completely from the crankcase)
- 5. If the oil filter cartridge is also to be replaced, perform the following procedure.

CHANGING THE ENGINE OIL









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

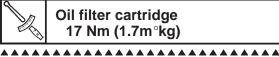


b. Apply a thin coat of engine oil onto the Oring ③ of the new oil filter cartridge.

CAUTION:

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

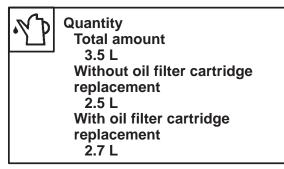
c. Tighten the new oil filter cartridge to specification with an oil filter wrench.



6. Check:

- ° engine oil drain bolt gasket
 Damage → Replace.
- 7. Install:
 - ° engine oil drain bolt ①
- 8. Fill:
 - ° crankcase

(with the specified amount of the recommended engine oil)



9. Install:

° engine oil filler cap

- 10. Start the engine, warm it up for several minutes, and then turn it off.
- 11. Check: ° engine

(for engine oil leaks)

- 12. Check:
 - ° engine oil level Refer to "CHECKING THE ENGINE OIL LEVEL".



MEASURING THE ENGINE OIL PRESSURE

1. Check: ° engine oil level

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

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

CAUTION:

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

- 3. Remove:
 - $^{\circ}$ oil gallery bolt (1)

A WARNING

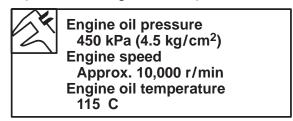
The engine, muffler and engine oil are extremely hot.

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



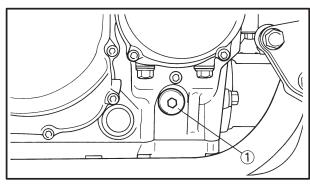
5. Measure:

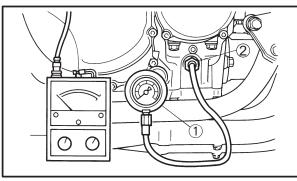
 engine oil pressure (at the following conditions)



Out of specification \rightarrow Adjust.

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



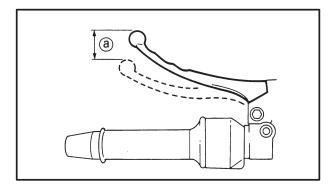


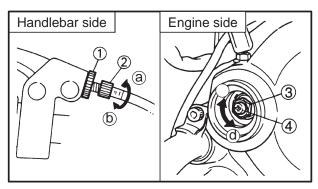
MEASURING THE ENGINE OIL PRESSURE/ ADJUSTING THE CLUTCH CABLE FREE PLAY



8 Nm (0.8 m°kg)

6. Install: ° oil gallery bolt

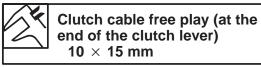




ADJUSTING THE CLUTCH CABLE FREE PLAY

X

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



- 2. Adjust:
 - ° clutch cable free play

Handlebar side

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

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

c. Tighten the locknut.

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

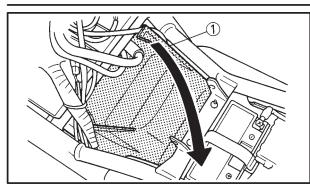
- a. Loosen the locknuts ③.
- b. Turn the adjusting bolt ④ in direction ⓒ or
 ③ until the specified clutch cable free play is obtained.

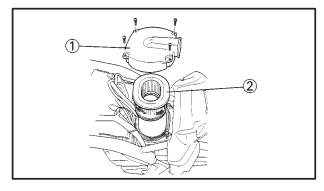
Direction $\bigcirc \rightarrow$ Clutch cable free play is increased.	
Direction $\textcircled{d} \rightarrow Clutch cable free play is decreased.$	

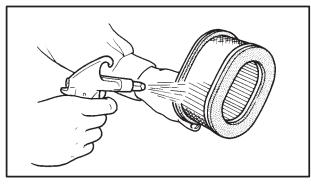
c. Tighten the locknuts.

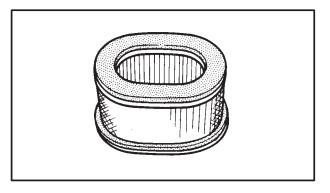
CHK ADJ

CLEANING THE AIR FILTER ELEMENT









CLEANING THE AIR FILTER ELEMENT

- 1. Remove:
 - ° Seat
 - ° Fuel tank
 - $^{\circ}$ Cover (1)
- 2. Remove:
 - ° air filter case cover 1
 - ° air filter element 2

 3. Clean:
 ° air filter element Apply compressed air to the outer surface of the air filter element.

- 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 turning, leading to poor engine performance and possible overheating. CLEANING THE AIR FILTER ELEMENT/ CHECKING THE CARBURETOR JOINTS AND IN TAKE MANIFOLDS/ CHECKING THE FUEL HOSES AND FUEL FILTER



NOTE: ___

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

- 6. Install:
- ° cover
- ° fuel tank
- ° seat

CHECKING THE CARBURETOR JOINTS AND INTAKE MANIFOLDS

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

- 1. Remove:
 - ° seat
 - ° fuel tank
- 2. Check:
 - $^{\circ}$ carburetor joint (1)
 - ° intake manifold 2

Cracks/damage \rightarrow Replace.

Refer to "CARBURETOR" in chapter 6.

- 3. Install:
 - ° fuel tank
 - ° seat

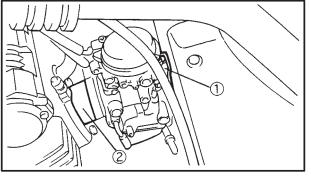
CHECKING THE FUEL HOSES AND FUEL FILTER

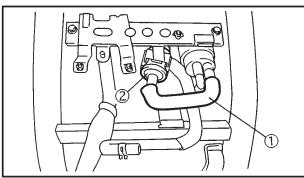
The following procedure applies to all of the fuel hoses.

- 1. Remove:
 - ° seat
 - ° fuel tank
- 2. Check:
 - ° fuel hose ①
 - Cracks/damage \rightarrow Replace.
 - ° fuel filter 2
 - $\mathsf{Damage/dirt} \to \mathsf{Replace}.$

NOTE: .

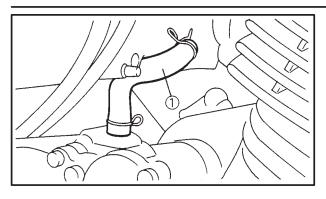
- Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
- 3. Install:
 - ° fuel tank
 - ° seat





CHECKING THE CRANKCASE BREATHER HOSE/ CHECKING THE EXHAUST SYSTEM





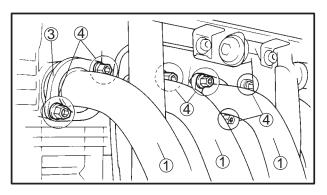
CHECKING THE CRANKCASE BREATHER HOSE

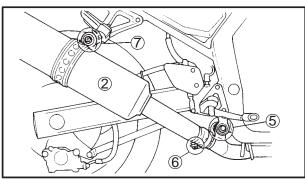
- 1. Remove:
 - ° seat
 - ° fuel tank
 - ° carburetor
- 2. Check:
 - ° crankcase breather hose ① Cracks/damage → Replace. Loose connection → Connect properly.

CAUTION:

Make sure that the crankcase breather hose is routed correctly.

- 3. Install:
 - ° carburetor
 - ° fuel tank
 - ° seat

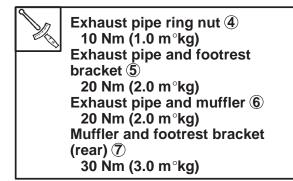




CHECKING THE EXHAUST SYSTEM

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

- 1. Check:
 - ° exhaust pipe 1
 - ° muffler 2
 - $Cracks/damage \rightarrow Replace.$
 - ° gasket (3) Exhaust gas leaks \rightarrow Replace.
- 2. Check:
 - ° tightening torque





CHECKING THE COOLANT LEVEL

- 1. Stand the motorcycle on a level surface.
 - ° Place the motorcycle on a suitable stand.
 - ° Make sure that the motorcycle is upright.
- 2. Remove:
 - ° side cover (right)
- 3. 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:

- ^o 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.
- ^o Use only distilled water. Soft water may be used if distilled water is not available.
- 4. Start the engine, warm it up for several minutes, and then turn it off.
- 5. Check:
 - ° coolant level

NOTE: .

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

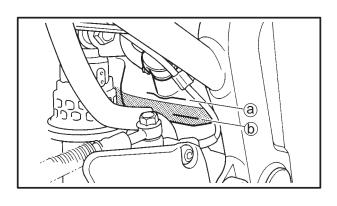
- 6. Install:
 - ° side cover (right)

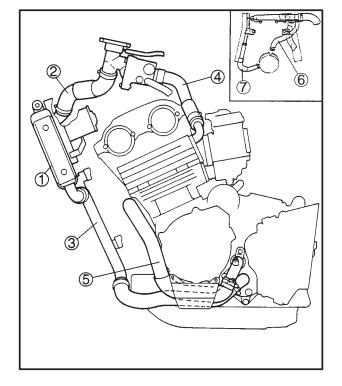
CHECKING THE COOLING SYSTEM

- 1. Remove:
 - ° seat

° fuel tank

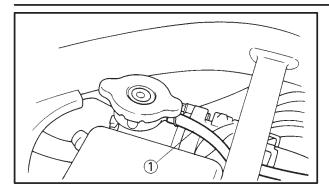
- 2. Check:
 - ° radiator (1)
 - $^{\circ}$ radiator inlet hose (2)
 - ° radiator outlet hose ③
 - $^\circ$ water jacket outlet joint (4)
 - ° water jacket inlet joint (5)
 - ° oil cooler inlet hose 6
 - $^{\circ}$ oil cooler outlet hose \overline{O}
 - Cracks/damage → Replace. Refer to "COOLING SYSTEM" in chapter 5.
- 3. Install:
 - ° fuel tank
 - ° seat





CHANGING THE COOLANT





CHANGING THE COOLANT

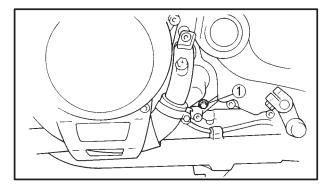
- 1. Remove:
 - ° seat
 - ° fuel tank
- 2. Disconnect:
 - $^\circ$ coolant reservoir hose 1
- 3. Drain: ° coolant (from the coolant reservoir)
- 4. Remove:
 - ° radiator cap

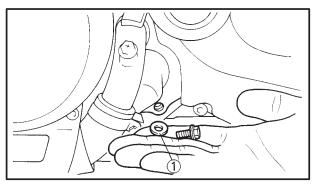
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

Place a thick rag or a towel over the radiator cap and slowly rotate the radiator cap counterclockwise towrd the detent to allow any residual pressure to escape.

When the hissing sound has stopped, press down on the radiator cap, while still pressing down turn it counterclockwise, and then remove it.

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





5. Remove:

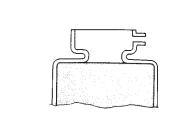
 coolant drain bolt (water pump) ① (along with the copper washer)

- 6. Drain:
 ° coolant (from the engine and radiator)
- 7. Check:
 - copper washer ① (coolant drain bolt water pump)
 Damage → Replace.
- 8. Install:

coolant drain bolt (water pump)
 10 Nm (1.0 m°kg)

CHANGING THE COOLANT





- 9. Coonect:
 - ° coolant reservoir hose
- 10. Fill:
 - cooling system (with the specified amount of the recommended coolant)

Recommended antifreeze High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines Mix ratio 50% antifreeze/50 % water

٠ţ ۲	Quantity Total amount 1.95 L Coolant reservoir capacity 0.61 L From minimum to maximum level mark
	From minimum to maximum level mark
	0.22 L

Handling notes for coolant

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

WARNING

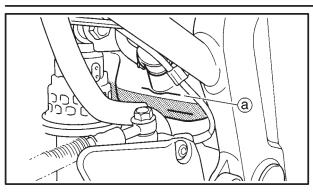
- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

CAUTION:

- ^o 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.
- ^o Use only distilled water. Soft water may be used if distilled water is not available.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- $^\circ$ Do not mix different types of antifreeze.
- 11. Install:
 - ° radiator cap

CHANGING THE COOLANT





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 if off.
- 15. Check:

° coolant level Refer to "CHECKING THE COOLANT LEVEL".

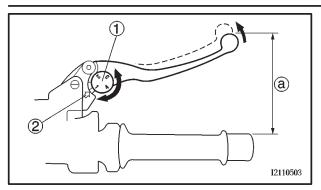
NOTE: _

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

- 16. Install:
 - ° fuel tank

° seat





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.

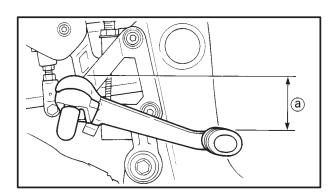
NOTE:

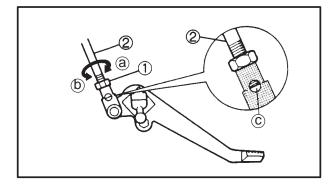
Be sure to align the setting on the adjusting dial with the arrow mark 2

Position #1	Distance ⓐ is the largest.
Position #4	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.





ADJUSTING THE REAR BRAKE

1. Check:

- ° brake pedal position
- (distance (a) from the top of the rider footrest to the top of the brake pedal) Out of specification \rightarrow Adjust.



Brake pedal position (below the top of the rider footrest) 36.6 mm

- 2. Adjust:
 - ° brake pedal position
 - •••••
 - a. Loosen the locknut ①.
 - b. Turn the adjusting bolt ② in direction ③ or
 ⑤ until the specified brake pedal position is obtained.

 $\begin{array}{l} \mbox{Direction} (a) \rightarrow \mbox{Brake pedal is raised.} \\ \mbox{Direction} (b) \rightarrow \mbox{Brake pedal is lowered.} \end{array}$



A WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt 2 is visible through the hole C.

c. Tighten the locknut ① to specification.

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

CAUTION:

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

3. Adjust:

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

CHECKING THE BRAKE FLUID LEVEL

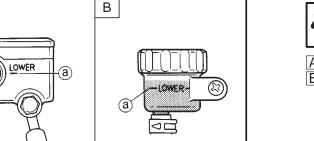
1. Stand the motorcycle on a level surface.

NOTE:

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

2. Check:

 $^\circ$ brake fluid level Below the minimum level mark (a) \rightarrow Add the recommended brake fluid to the proper level.



А

Recommended brake fluid DOT4

A Front brake B Rear brake



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

CAUTION:

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

NOTE: .

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

ADJUSTING THE REAR BRAKE LIGHT SWITCH

NOTE: .

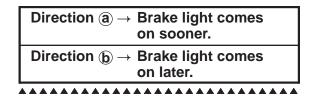
The rear brake light switch is operated by movement of the brake pedal.

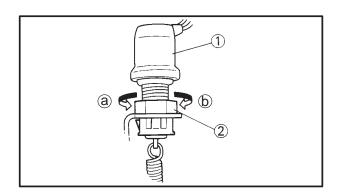
The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

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

the proper time.

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





CHECKING THE BRAKE HOSES/ BLEEDING THE HYDRAULIC BRAKE SYSTEM



CHECKING THE BRAKE HOSES

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

1. Check:

[°] brake hose
 Cracks/damage/wear → Replace.

- 2. Check:
 - ° brake hose clamp
 Loose connection → Tighten.
- 3. Hold the motorcycle upright and apply the brake.

4. Check:

 brake hose Activate the brake several times.

Brake fluid leakage \rightarrow Replace damaged hose.

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

BLEEDING THE HYDRAULIC BRAKE SYSTEM

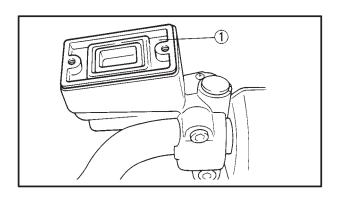
A WARNING

Bleed the hydraulic brake system whenever:

- ° the system was disassembled,
- $^{\circ}\,$ a brake hose was loosened or removed,
- ° the brake fluid level is very low,
- ° brake operation is faulty.
- 1. Remove:
 - ° reservoir cap
 - ° diaphragm (1)

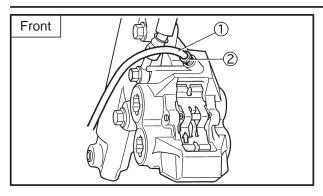
NOTE: .

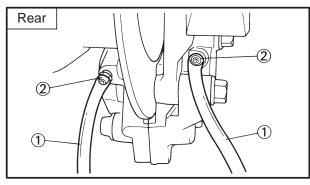
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- [°] When bleeding the hydraulic brake system, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the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

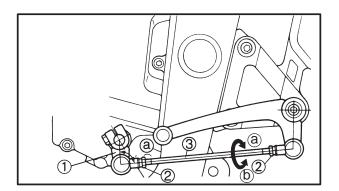


BLEEDING THE HYDRAULIC BRAKE SYSTEM/ ADJUSTING THE SHIFT PEDAL









- 2. Bleed:
 - ° hydraulic brake system

 - a. Add the recommended brake fluid to the proper level.
 - b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
 - c. Connect a clear plastic hose ① tightly to the bleed screw ②.
 - 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.
 - This will release the tension and cause the brake lever to contact the throttle grip of 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)

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

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

ADJUSTING THE SHIFT PEDAL

1. Check:

° shift pedal position The end ① of the shift pedal is above the shift rod. (The angle ⓐ should be approximately 90 .) Incorrect → Adjust.

2. Adjust:

° shift pedal position

- a. Loosen both locknuts 2.
- b. Turn the shift rod ③ in direction ⓐ or ⓑ to obtain the correct shift pedal position.

 $\begin{array}{l} \mbox{Direction (a)} \rightarrow \mbox{shift pedal is raised.} \\ \mbox{Direction (b)} \rightarrow \mbox{pedal is lowered.} \end{array}$

° Tighten both locknuts.



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.

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

NOTE: .

Both wheels should be on the ground without rider on the motorcycle.

- 2. Rotate the rear wheel several times and check the drive chain to locate its tightest point.
- 3. Check:

o drive chain slack ⓐ
 Out of specification → Adjust.

Drive chain slack 30 × 40 mm

4. Loosen:

 $^{\circ}$ wheel axle nut (1)

5. Adjust:

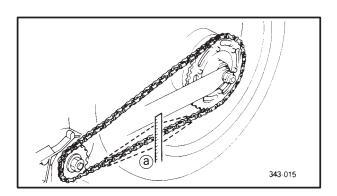
° drive chain slack

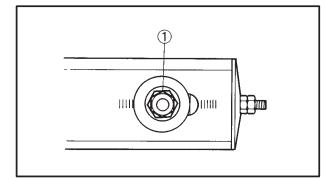
- ****
- a. Loosen both locknuts ①.
- b. Turn both adjusting nuts ② in direction ③ or ⑤ until the specified drive chain slack is obtained.

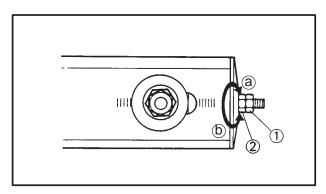
Direction (a) \rightarrow Drive chain is tightened.
Direction (b)→ Drive chain is loosened.
loosenedi

NOTE: .

- ° To maintain the proper wheel alignment, adjust both sides evenly.
- Push the rear wheel forward to make sure that there is no clearance between the swingarm end plates and the ends of the swingarm.

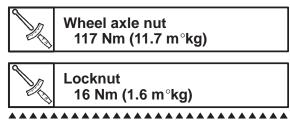








c. Tighten the wheel axle nut to specification.



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 O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only 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

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the motorcycle on a level surface.

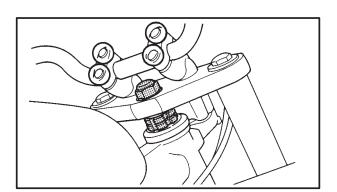
Securely support the motorcycle so that there is no danger of it falling over.

NOTE: .

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

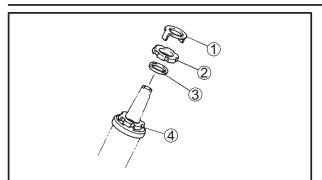
2. Check:

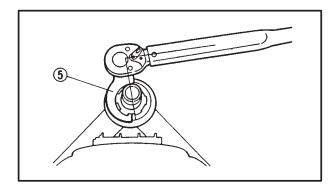
- ^o steering head Grasp the bottom of the front fork legs and gently rock the front fork. Looseness or binding → Adjust the steering head.
- 3. Remove:
 - ° handlebar
 - ° upper bracket

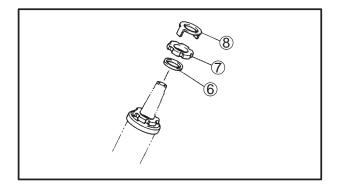


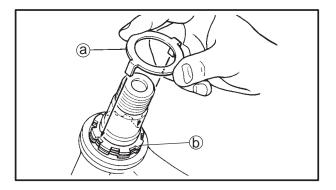
CHECKING AND ADJUSTING THE STEERING HEAD











- 4. Adjust:
 - ° steering head

•••••

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

NOTE: .

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





Lower ring nut (initial tightening torque) 52 Nm (5.2 m°kg)

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

Do not overtighten the lower ring nut.



Lower ring nut (final tightening torque) 18 Nm (1.8 m°kg)

- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and inspect the upper and lower bearings. Refer to "STEERING HEAD AND HAN-DLEBAR" in chapter 7.
- a Install the rubber weeker
- e. Install the rubber washer 6.f. Install the upper ring nut 7.
- g. Finger tighten the upper ring nut ①, 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 (8).

NOTE: .

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

CHECKING ADJUSTING THE STEERING HEAD/CHECKING THE FRONT FORK/ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY



- 5. Install:
 - ° upper bracket
 - ° handlebar

Steering stem nut 110 Nm (11.0 m°kg) Upper bracket pinch bolt 30 Nm (3.0 m°kg) Handlebar upper holder bolt 23 Nm (2.3 m°kg)

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:
 - o inner tube
 Damage/scratches → Replace.
 o oil seal
 - Oil leakage \rightarrow Replace.
- 3. Hold the motorcycle upright and apply the front brake.
- 4. Check:
 - operation
 Push down hard on the handlebar several
 times and check if the front fork rebounds
 - smoothly. Unsmooth operation \rightarrow Repair.
 - Refer to "FRONT FORK" in chapter 7.

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

A WARNING

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

Spring preload

CAUTION:

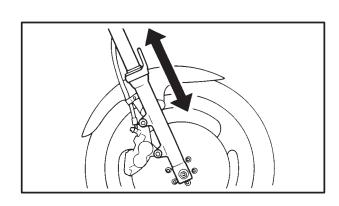
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

° spring preload

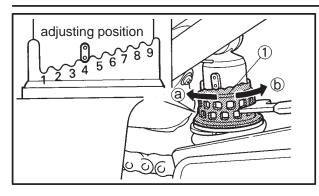
NOTE: .

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



ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY/CHECKING THE TIRES

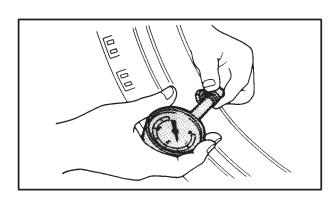




- Turn the adjusting ring () in direction ()
- a. Turn the adjusting ring ① in direction (a) or (b).
- b. Align the desired position on the adjusting ring with the stopper.

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

	Minimum	Standard	Maximum
Adjusting positions	1	4	9



CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Measure:

° tire pressure

Out of specification \rightarrow 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.

CHECKING THE TIRES



Basic weight (with oil and a full fuel tank)	210 kg	
Maximum load	187 kg	
Cold tire pressure	Front tire	Rear tire
Up to 90 kg load*	225 kPa (2.25 kg/cm ²)	250 kPa (2.50 kg/cm ²)
90 kg maximum load*	225 kPa (2.25 kg/cm ²)	280 kPa (2.80 kg/cm ²)
High speed riding	225 kPa (2.25 kg/cm ²)	280 kPa (2.80 kg/cm ²)

*: 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.

2. Check:

° tire surface Damage/wear \rightarrow Replace the tire.



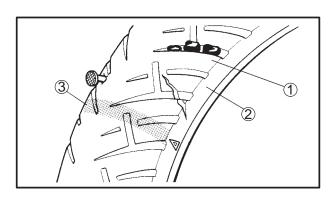
Minimum tire tread depth 1.6 mm

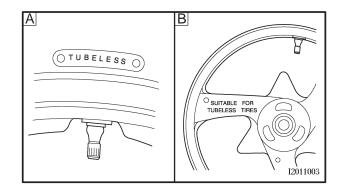
- 1 Tire tread depth
- 2 Side wall
- 3 Wear indicator

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







^o 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	Туре
BRIDGESTONE	110/70-ZR17 (54 W)	BT57F
DUNLOP	110/70-ZR17 (54 W)	D207F

Rear tire

Manufacture	Size	Туре
BRIDGESTONE	160/60-ZR17 (69 W)	BT57R
DUNLOP	160/60-ZR17 (69 W)	D207J

After mounting a new tire, ride conservatively for a while to become accustomed to the "feel" of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.

NOTE: _

For tires with a direction of rotation mark ①: ^o Install the tire with the mark printing in the direction of wheel rotation.

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

- 1. Check:
 - ° wheel

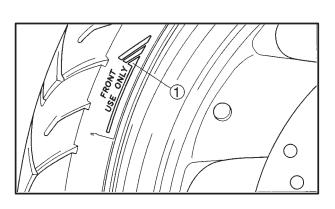
Damage/out-of-round \rightarrow Replace.

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.





CHECKING AND LUBRICATING THE CABLES/LUBRICATING THE LEVERS AND PEDALS/LUBRICATING THE SIDESTAND/LUBRICATING THE CENTER STAND/LUBRICATING THE REAR SUSPENSION



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
 - $\mathsf{Damage} \to \mathsf{Replace}.$
- 2. Check:

 $^{\circ}$ cable operation Unsmooth operation \rightarrow Lubricate.



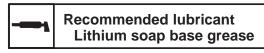
Recommended lubricant Engine oil or a suitable cable lubricant

NOTE: .

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

LUBRICATING THE LEVERS AND PEDALS

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



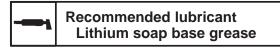
LUBRICATING THE SIDESTAND

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

Recommended lubricant Lithium soap base grease

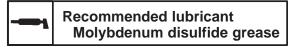
LUBRICATING THE CENTER STAND

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



LUBRICATING THE REAR SUSPENSION

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





ELECTRICAL SYSTEM CHECKING AND CHARGING THE BATTERY

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

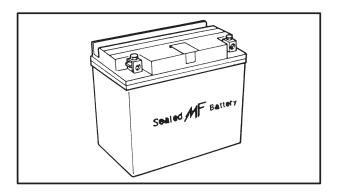
- ° SKIN Wash with water.
- EYES Flush with water for 15 minutes and get immediate medical attention.

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.
- ^o Charging time, charging amperage and charging voltage for a MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably.

Therefore, take special care when charging the battery.





NOTE: _

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

- 1. Remove:
- ° seat
- 2. Disconnect:
 battery leads (from the battery terminals)

CAUTION:

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

- 3. Remove:
- ° battery
- 4. Check:
 - ° battery charge
 - a. Connect a digital voltmeter to the battery terminals.

Tester positive	battery positive
lead	terminal
Tester negative	battery negative
lead	terminal

NOTE:

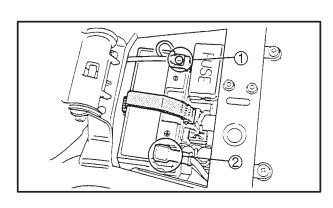
- The charge state of a MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- ^o No charging is necessary when the opencircuit voltage equals or exceeds 12.8 V.
- b. Check the charge of the battery, as shown in the charts and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

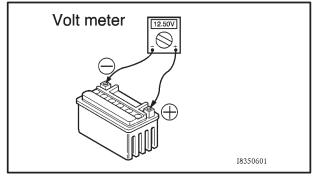
Example

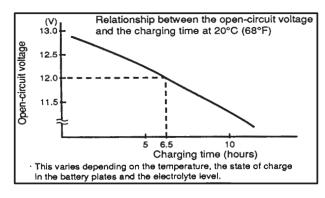
- c. Open-circuit voltage = 12.0 V
- d. Charging time = 6.5 hours
- e. Charge of the battery = $20 \times 30 \%$

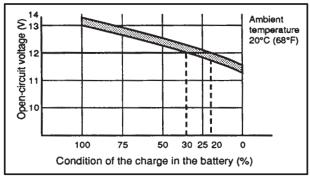
5. Charge:

- battery (refer to the
 - (refer to the appropriate charging method illustration)







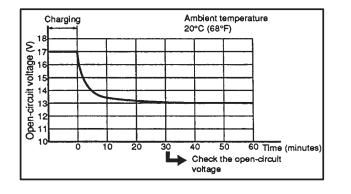




A WARNING

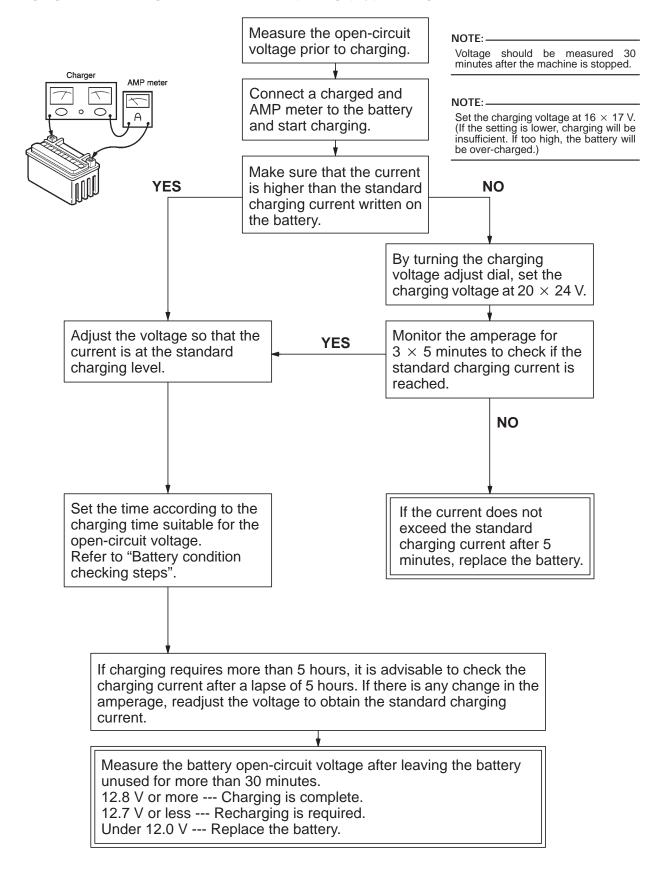
Do not quick charge a battery.

- ^o Make sure that the battery vent is free of obstructions.
- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- ^o 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.
- ^o If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



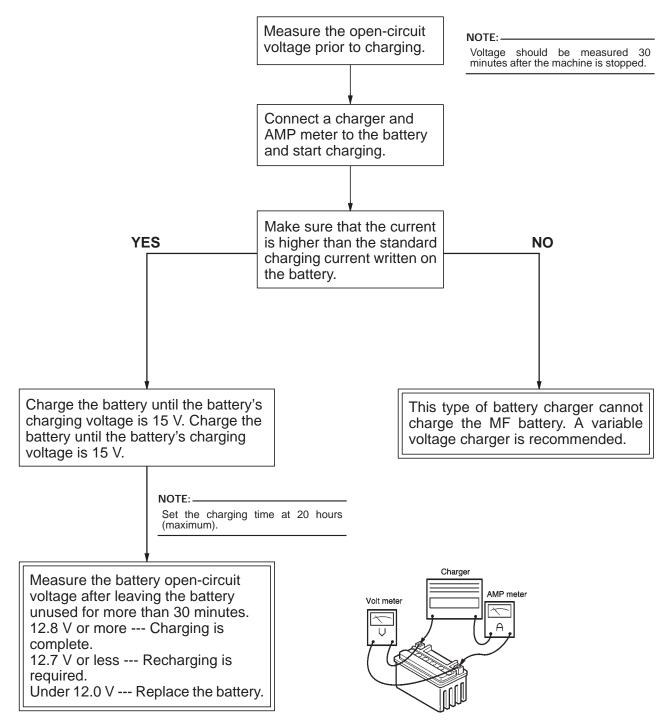


Charging method using a variable-current (voltage) type charger





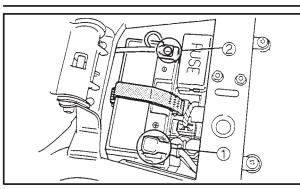
Charging method using a constant-voltage type charger



Charging method using a constant-current type charger This type of battery charger cannot charge the MF battery.

CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES



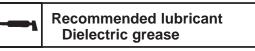


- 6. Install:
 - ° battery
- 7. Connect:
 ° battery leads (to the battery terminals)

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



- 10. Install:
 - ° seat

CHECKING THE FUSES

The following procedure applies to all of the fuses.

CAUTION:

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

- 1. Remove:
 - ° seat
- 2. Check:
- ° fuse

•••••

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

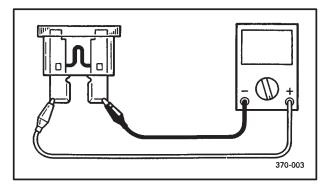
NOTE: .

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



Pocket tester 96890-03112

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





CHECKING THE FUSES/ REPLACING THE HEADLIGHT BLUBS

- 3. Replace:
 - ° blown fuse

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

Fuses	Amperage rating	Quantity
Main fuse	30 A	1
Headlight fuse	20 A	1
Signaling system fuse	20 A	1
Ignition fuse	20 A	1
Radiator fan fuse	5 A	1
Reserve fuse	30 A	1
	20 A	1
	10 A	1

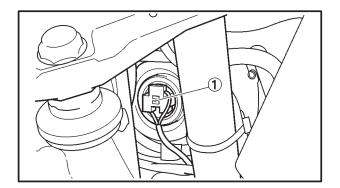
Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

- 4. Install:
 - ° seat

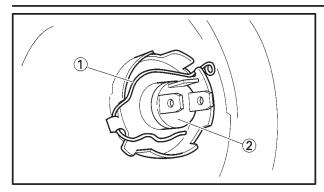
REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

- 1. Disconnect:
 - $^{\circ}$ headlight lead (1)







- 2. Remove:
 - ° headlight bulb holder ①
- 3. Remove:
 - ° headlight bulb 2

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

4. Install:

 headlight bulb (New)
 Secure the new headlight bulb with the headlight bulb holder.

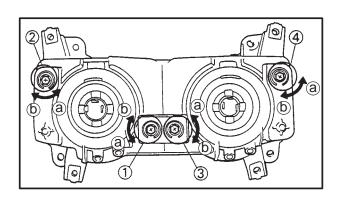
CAUTION:

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

5. Install:

° headlight bulb holder

6. Connect: ° headlight lead



ADJUSTING THE HEADLIGHT BEAMS

The following procedure applies to both of the headlights.

- 1. Adjust:
 - ° headlight beam (vertically)
 - *****
 - a. Turn the adjusting screw 1 (3) in direction (a) or (b).

Direction (a) \rightarrow	Headlight beam is raised.
Direction $(b) \rightarrow$	Headlight beam is lowered.



2. Adjust:

° headlight beam (horizontally)

- ****
- a. Turn the adjusting knob 2 4 in direction (a) or (b).

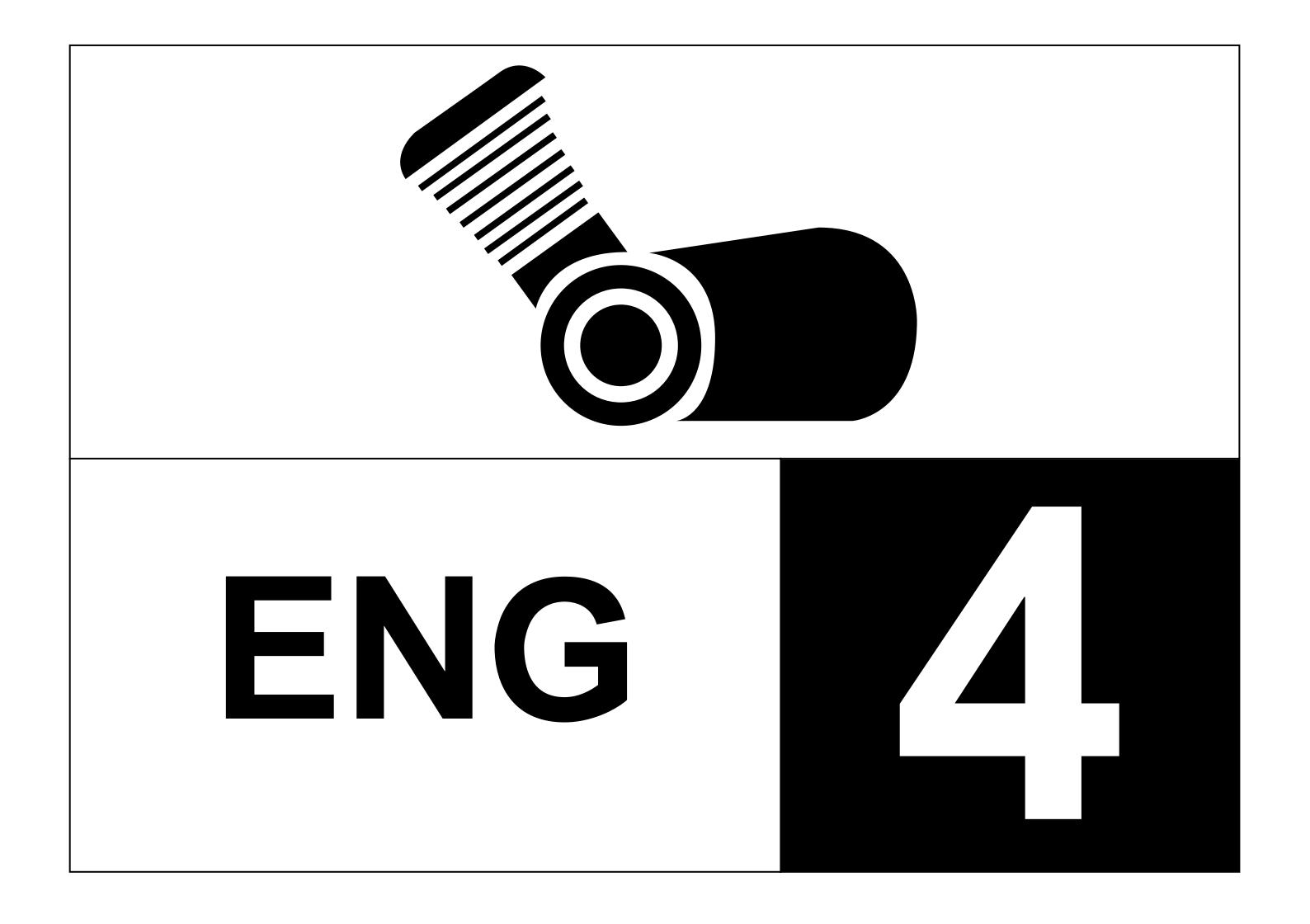
Left headlight 2

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

Right headlight ④

Direction (a) \rightarrow	Headlight beam moves to the left.
Direction (b) \rightarrow	Headlight beam moves o the right.







CHAPTER 4 OVERHAULING THE ENGINE

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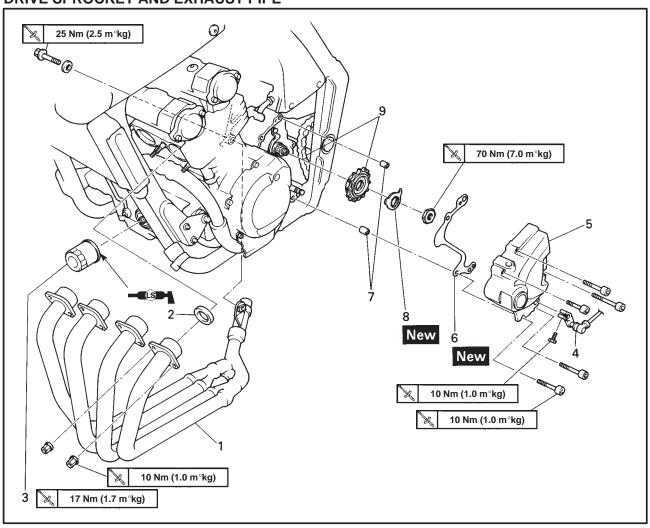
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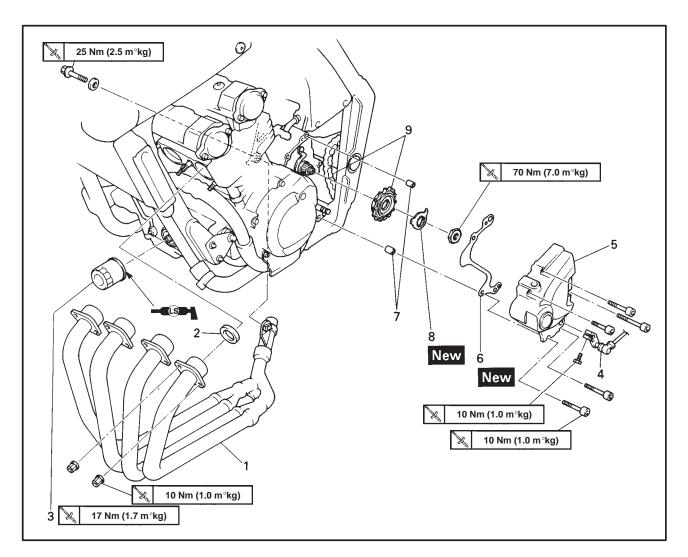
OVERHAULING THE ENGINE

REMOVING THE ENGINE DRIVE SPROCKET AND EXHAUST PIPE



Order	Job name/Part name	Q'ty	Remarks
	Removing the drive sprocket and		Remove the parts in the order listed.
	exhaust pipe		
	Drain the coolant		
	Drain the engine oil		Refer to "CHANGING THE ENGINE OIL" section in capter 3.
	Front cowling	-	Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in
	Fuel tank	-	chapter 3.
	Battery negative terminal		
	Radiator		Refer to "RADIATOR" section in chapter 5.
	Carburetor		Refer to "CARBURETOR" section in
			chapter 6.
	Starter motor		Refer to "STARTER MOTOR" section in
			chapter 8.
1	Exhaust pipe assembly	1	
2	Exhaust pipe gasket	4	
3	Oil filter	1	

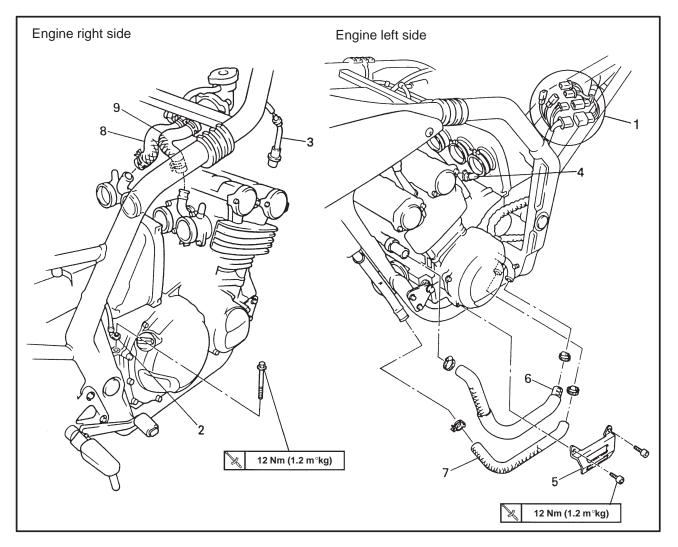




Order	Job name/Part name	Q'ty	Remarks
4	Shift arm	1	Refer to "INSTALLING THE ENGINE"
5	Drive sprocket cover	1	section.
6	Drive chain sprocket gasket	1	
7	Dowel pin	2	
8	Lock washer	1	
9	Drive sprocket/Drive chain	1/1	
			For installation, reverse the removal
			procedure.



LEADS AND HOSES

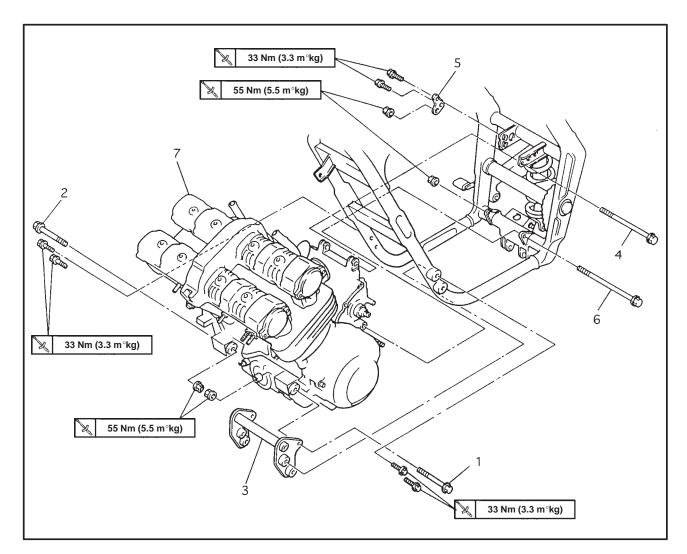


Order	Job name/Part name	Q'ty	Remarks
	Disconnecting the leads and hoses		Disconnect the parts in the order listed.
1	Magneto/sidestand/neutral/engine oil	1/1/1/1	
	level switch lead		
2	Ground lead	1	
3	Plug cap	4	
4	Crankcase breather hose	1	
5	Cover	1	
6	Water pump outlet hose	1	
7	Radiator outlet hose	1	
8	Engine outlet hose	1	
9	Engine outlet hose	1	
			For connecting, reverse the disconnection
			procedure.

REMOVING THE ENGINE

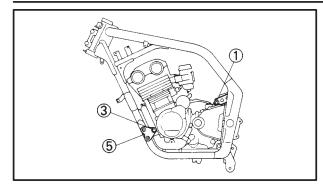


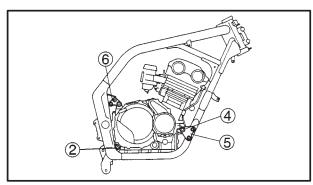
ENGINE BRACKET AND ENGINE



Order	Job name/Part name	Q'ty	Remarks
	Removing the engine bracket and		Remove the parts in the order listed.
	engine		
1	Engine mounting bolt (front left)	1 -	
2	Engine mounting bolt (front right)	1	
3	Engine bracket (front)	1	
4	Engine mounting bolt (rear upper)	1	Refer to "INSTALLING THE ENGINE"
5	Engine bracket (rear right)	1	section.
6	Engine mounting bolt (rear lower)	1	
7	Engine	1 _	
			For installation, reverse the removal
			procedure.







INSTALLING THE ENGINE

- 1. Install:
 - $^{\circ}$ bolt (1) $^{\circ}$ bolt (2)
 - ° bolt ③
 - ° bolt ④
 - ° engine bracket (5)
 - ° engine bracket 6

NOTE:

Do not fully tighten the bolts.

2. Tighten the bolts in the following order.

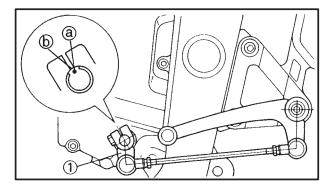
No.	Bolt ① 55 Nm (5.5 m°kg) Bolt ②
	55 Nm (5.5 m°kg) Bolt ③ 55 Nm (5.5 m°kg)
	Bolt ④ 55 Nm (5.5 m°kg) Engine bracket ⑤
	33 Nm (3.3 m°kg) Engine bracket 6 10 Nm (10 m°kg)

3. Install:

 $^\circ$ shift arm (1)

NOTE: .

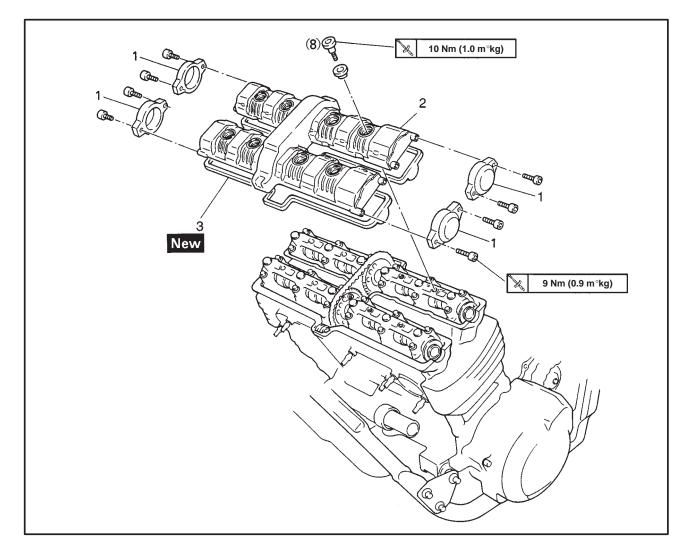
- Align the punch mark (a) in the shift shaft with the slot in the shift arm.
- ° Align the bottom edge of the shift pedal (b) with the mark (a) on the frame-to-swingarm bracket.



Shift arm bolt 10 Nm (1.0 m°kg)



CAMSHAFT CYLINDER HEAD COVERS

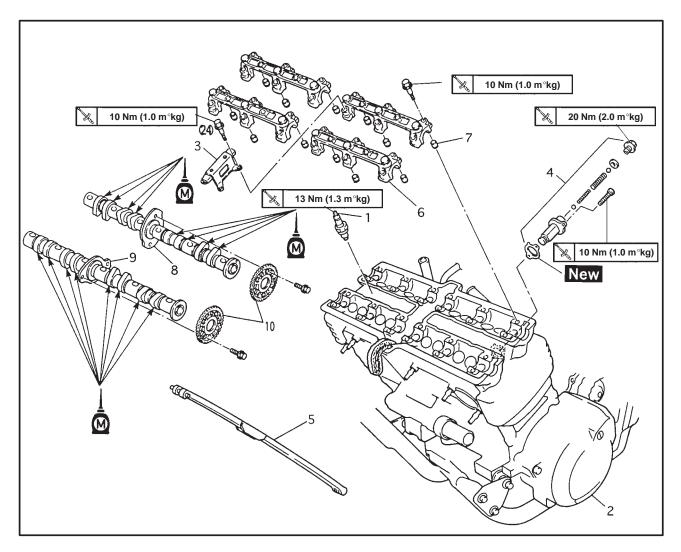


Order	Job name/Part name	Q'ty	Remarks
	Removing the cylinder head cover Front cowling Seat and fuel tank	-	Remove the parts in the order listed. Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3.
	Drain the coolant Radiator Carburetor		Refer to "RADIATOR" section in chapter 5. Refer to "CARBURETOR" section in chapter 6. Refer to "REMOVING THE ENGINE"
	Exhaust pipe Plug cap	-	section.
1	Cylinder head side cover Cylinder head cover	4	
	Cylinder head cover gasket		
			For installation, reverse the removal procedure.

ENG

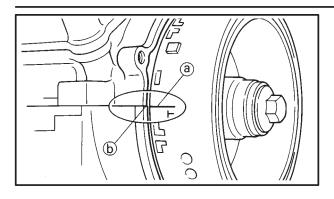
5

CAMSHAFT



Order	Job name/Part name	Q'ty	Remarks
	Removing the camshafts		Remove the parts in the order listed.
1	Spark plug	4	
2	Magneto cover	1 -	
3	Timing chain guide (upper)	1	
4	Timing chain tensioner assembly	1	
5	Timing chain guide (exhaust side)	1	Refer to "REMOVING/INSTALLING THE
6	Camshaft cap	4	CAMSHAFT" section.
7	Dowel pin	12	
8	Camshaft (intake)	1	
9	Cmashaft (exhaust)	1	
10	Camshaft sprocket	2 _	
			For installation, reverse the removal
			procedure.





REMOVING THE CAMSHAFTS

1. Remove:

° magneto cover

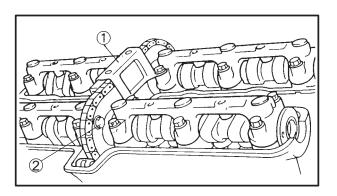
2. Align:

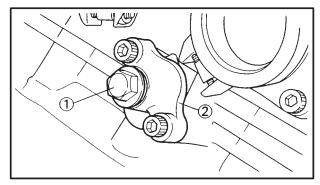
 "T" mark on the magneto rotor (with the stationary pointer on the crankcase)

- a. Turn the crankshaft counterclockwise.
- b. When piston #1 is at TDC on the compression stroke, align the "T" mark (a) with the stationary pointer (b).

NOTE: _

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





- 3. Remove:
 - $^\circ$ timing chain guide (top side) 1
- 4. Loosen:
 - ° camshaft sprocket bolts 2

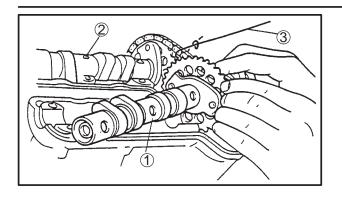
- 5. Loosen:
 - ° timing chain tensioner cap bolt ①
- 6. Remove:
 - ° timing chain tensioner 2

- 7. Remove:
 - timing chain guide (exhaust side) ①
 camshaft caps ②

NOTE: _

For reference during installation, put identification marks on each camshaft cap.





CAUTION:

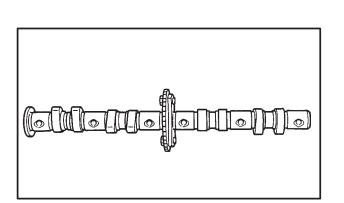
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.

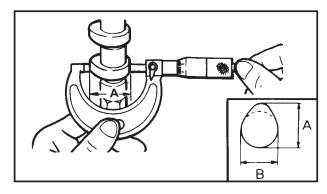
8. Remove:

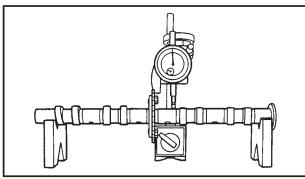
- $^{\circ}$ intake camshaft ①
- ° exhaust camshaft 2

NOTE: .

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

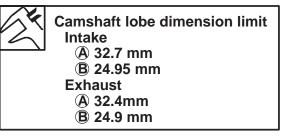




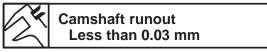


CHECKING THE CAMSHAFTS

- 1. Check:
 - $^\circ$ camshaft lobes Blue discoloration/pitting/scratches \rightarrow Replace the camshaft.
- 2. Measure:
 - $^\circ$ camshaft lobe dimensions A and B Out of specification \rightarrow Replace the camshaft.



- 3. Measure:
 - ° camshaft runout Out of specification \rightarrow Replace.





- 4. Measure:
 - ° camshaft-journal-to-camshaft-cap clearance

Out of specification \rightarrow Measure the camshaft journal diameter.



Camshaft-journal-tocamshaft-cap clearance 0.08 mm

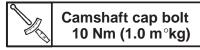
- a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- b. Position a strip of Plastigauge[®] ① onto the camshaft journal as shown.
- c. Install the dowel pins and camshaft caps.

NOTE:

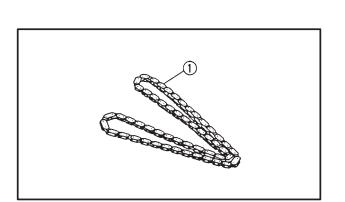
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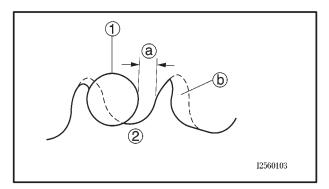
- ° Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- 0 Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge[®].



a. Remove the camshaft caps and then measure the width of the Plastigauge[®] 1.



1



CHECKING THE TIMING CHAIN, CAMSHAFT SPFROCKETS, AND TIMING **CHAIN GUIDES**

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

1. Check:

. . . .

- ° timing chain ① Damage/stiffness \rightarrow Replace the timing chain and camshaft sprockets as a set.
- 2. Check:
 - ° camshaft sprocket More than 1/4 tooth (a) wear \rightarrow Replace the camshaft sprockets and the timing chain as a set.
 - (a) 1/4 tooth
 - (b) Correct
 - (1) Timing chain roller
 - (2) Camshaft sprocket
- 3. Check:
 - ^o timing chain guide (exhaust side)
 - [°] timing chain guide (intake side)
 - ^o timing chain guide (top side) Damage/wear \rightarrow Replace the defective part(-s).



EB401430 CHECKING THE TIMING CHAIN TENSIONER

- 1. Check:
 - ° timing chain tensioner
 - Cracks/damage \rightarrow Replace.
- 2. Check:

° one-way cam operation Rough movement \rightarrow Replace the timing chain tensioner housing.

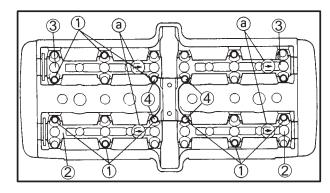
- 3. Check:
 - $^{\circ}$ cap bolt (1)
 - ° copper washer (2)
 - ° ball ③
 - $^{\circ}$ spring (4)
 - ° ball (5)
 - ° one-way cam (6)
 - ° gasket

 $\overline{7}$

- $^{\circ}$ timing chain tensioner rod $\overline{\mathcal{O}}$
- Damage/wear \rightarrow Replace the defective part(-s).

4

13



INSTALLING THE CAMSHAFTS

- 1. Install:
 - ° exhaust camshaft ①
 - ° intake camshaft 2 (with the camshaft sprockets temporarily tightened)

NOTE:

Install the camshafts with their punch marks facing up.

- 2. Install:
 - $^{\circ}$ dowel pins (1)
 - ° intake camshaft caps 2
 - ° exhaust camshaft caps ③

NOTE: _

Install the camshaft cap with the arrow mark (a) pointing towards the right side of the engine.

- 3. Install:
 - ° camshaft cap bolts

NOTE: _

- ° Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- ° Do not install the designated camshaft cap bolts ④ at this stage.



CAUTION:

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



- 4. Install:
 - ° intake camshaft sprocket
 - ° exhaust camshaft sprocket
 - ****
 - a. Turn the crankshaft counterclockwise.
 - b. When piston #1 is at TDC on the compression stroke, align the "T" mark (a) on the magneto rotor with the stationary pointer (b) on the crankcase.
 - c. Install the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.

NOTE: .

- ^o When installing the camshaft sprockets, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
- ° Make sure that the match marks ⓒ are parallel with the edge of the cylinder head.

"I": Intake side "E": Exhaust side

CAUTION:

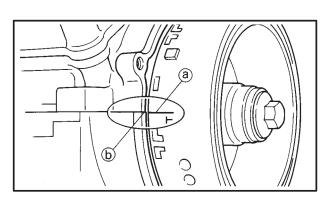
Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

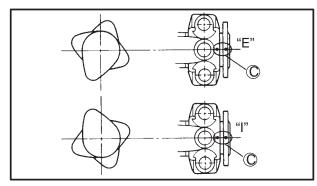
- d. After the crankshaft is turned several full turns and piston #1 is at TDC, make sure that marks (a) and (b) are aligned.
- 5. Install:

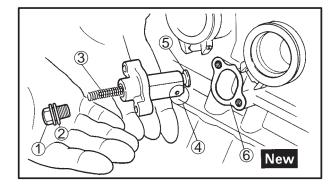
° timing chain guide (exhaust side)

- 6. Install:
 - ° timing chain tensioner

 - a. Remove the cap bolt ①, washer ②, and springs ③
 - b. Release the timing chain tensioner oneway cam ④ and push the timing chain tensioner rod ⑤ all the way into the timing chain tensioner housing.
 - c. Install the timing chain tensioner and gasket (6) onto the cylinder block.









A WARNING

Always use a new gasket.



Timing chain tensioner bolt 10 Nm (1.0 m°kg)

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



7. Turn:

- crankshaft (several full turns counterclockwise)
- 8. Check:
 - ° "T" mark @

Make sure that the "T" mark on the magneto rotor is aligned with the stationary pointer D on the crankcase.

- camshaft punch marks ⓒ Make sure that the punch marks on the camshafts are aligned with the embossed marks ⓓ on the camshaft cap. Out of alignment → Adjust. Refer to the installation steps above.
- 9. Tighten:
 - ° camshaft sprocket bolts

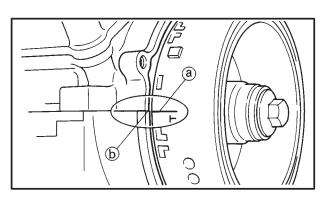
CAUTION:

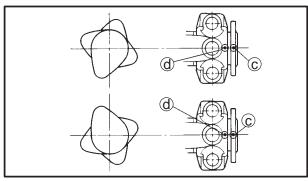
Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possiblity of the bolts coming loose and damaging the engine.



10. Measure:

° valve clearance Out of specification → Adjust. Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.

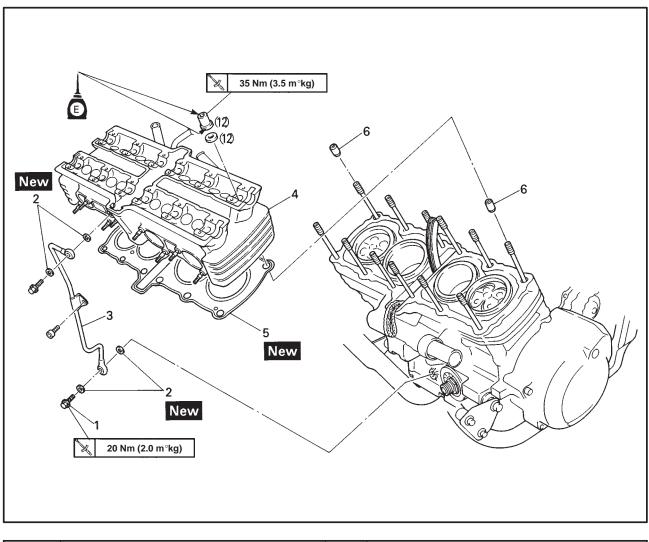




CYLINDER HEAD



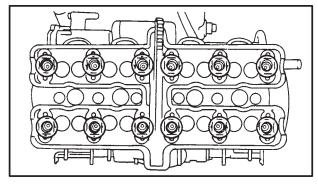
CYLINDER HEAD

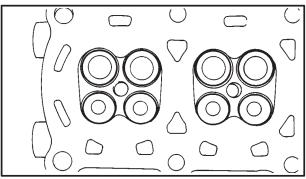


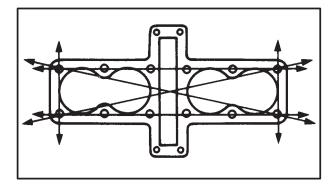
Order	Job name/Part name	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Camshaft		Refer to "CAMSHAFT" section.
1	Union bolt	2	
2	Copper washer	4	
3	Oil delivery pipe	1	
4	Cylinder head	1 -	Refer to "REMOVING/INSTALLING THE
5	Cylinder head gasket	1 _	CYLINDER HEAD" section.
6	Dowel pin	2	
			For installation, reverse the removal
			procedure.

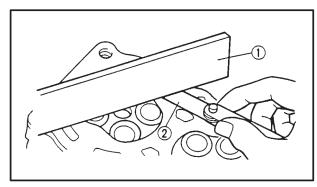
CYLINDER HEAD











REMOVING THE CYLINDER HEADS

- 1. Remove:
 - ° cylinder head nuts

NOTE: .

- ° Loosen the nuts in the proper sequence as shown.
- ^o Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.

CHECKING THE CYLINDER HEADS

The following procedure applies to all of the cylinder heads.

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

NOTE: .

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

- ° spark plug threads
- ° valve seats
- 2. Check:
 - ° cylinder head
 - Damage/scratches \rightarrow Replace.
 - ° cylinder head water jacket
 - Mineral deposits/rust \rightarrow Eliminate.
- 3. Measure:
 - ° cylinder head warpage
 Out of specification → Resurface the cylinder head.



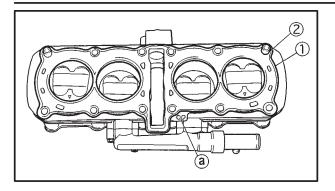
Cylinder head warpage Less than 0.05 mm

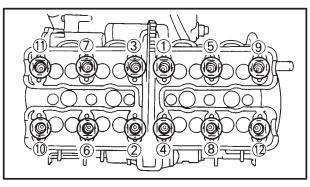
- a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
- b. Measure the warpage.
- c. If the limited is exceeded, resurface the cylinder head as follows.
- d. Place a 400×600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

NOTE: _

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







INSTALLING THE CYLINDER HEAD

1. Install:

CYLINDER HEAD

- ° gasket (New) 1
- ° dowel pins 🖄

NOTE:

The "UP" mark a on the gasket must face up.

- 2. Install:
 - ° cylinder head

NOTE: _

- ° Apply engine oil onto the threads of the cylinder head nuts.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.



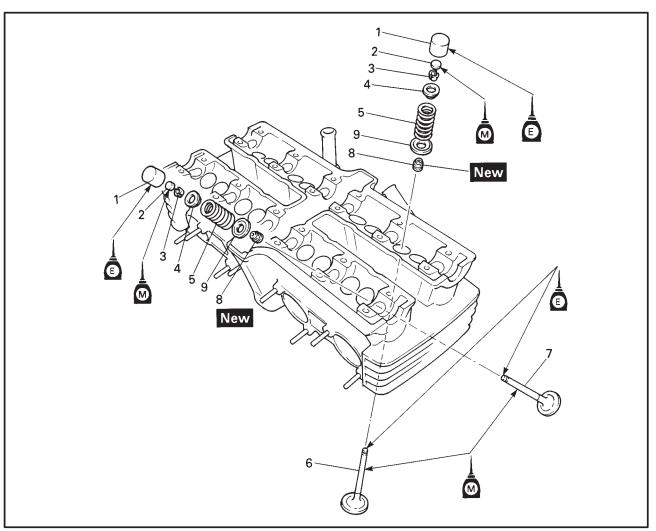
Cylinder head nut First 20 Nm (2.0 m°kg) Second 35 Nm (3.5 m°kg)

- 3. Install:
 - ° exhaust camshaft
 - ° intake camshaft
 - Refer to "INSTALLING THE CAM-SHAFTS".

ENG

VALVES AND VALVE SPRINGS





Order	Job name/Part name	Q'ty	Remarks
	Removing the valves and valve		Remove the parts in the order listed.
	springs		
	Camshaft		Refer to "CAMSHAFT" section.
	Cylinder head		Refer to "CYLINDER HEAD" section.
1	Valve lifter	4 -	
2	Adjusting pad	4	
3	Valve cotters	8	
4	Upper spring seat	4	Refer to "REMOVING/INSTALLING THE
5	Valve spring	4	VALVES" section.
6	Valve (intake)	2	
7	Valve (exhaust)	2	
8	Oil seal	4	
9	Lower spring seat	4 -	μ
			For installation, reverse the removal
			procedure.



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:
 - $^\circ$ valve lifter (1)
 - ° valve pad

NOTE: _

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

2. Check:

- ° valve sealing
 - Leakage at the valve seat \rightarrow Check the valve face, valve seat, and valve seat aidth.

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

- 3. Remove:
 - $^{\circ}$ valve cotters (1)

NOTE:

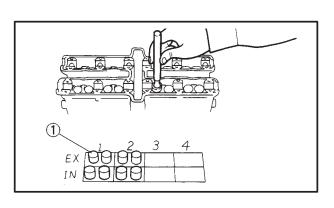
Remove the valve cotters by compressing the valve spring with the valve spring compressor (2) and attachment (3).

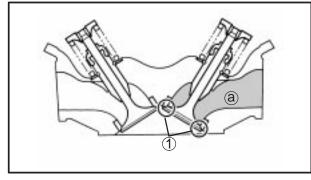


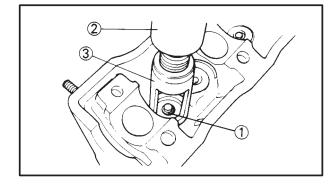
- 4. Remove:
 - ° upper spring seat ①
 - $^{\circ}$ valve spring 2
 - ° oil seal ③
 - $^\circ$ lower spring seat (4)
 - ° valve (5)

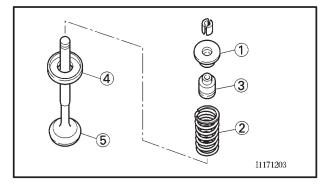
NOTE:

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

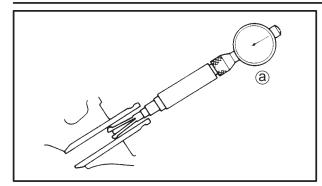


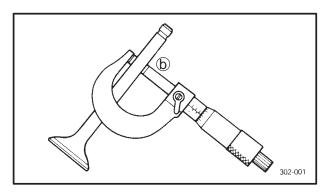












CHECKING THE VALVES AND VALVE GUIDES

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.



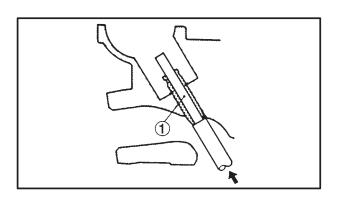
Valve-stem-to-valve-guide clearance Intake Limit: 0.08 mm Exhaust Limit: 0.1 mm

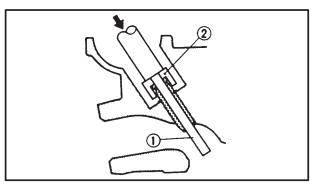
2. Replace:

° valve guide

NOTE: .

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to $100^{\circ}C$ ($212^{\circ}C$) in an oven.





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

NOTE: .

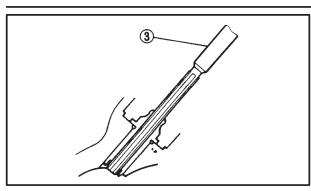
After replacing the valve guide, reface the valve seat.

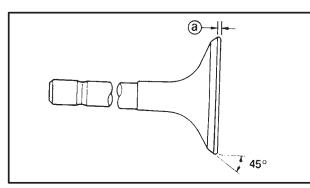


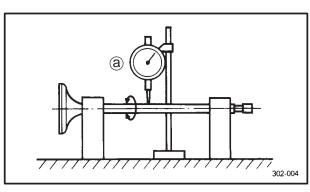
3. Eliminate:

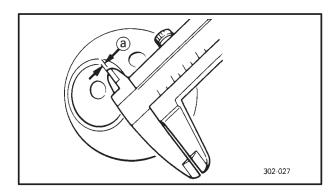
 carbon deposits (from the valve face and valve seat)











- 4. Check: ° valve face
 - Pitting/wear \rightarrow Grind the value face.
 - valve stem end Mushroom shape of diameter larger than the body of the valve stem → Replace the valve.
- 5. Measure:
 - valve margin thickness ⓐ
 Out of specification → Replace the valve.

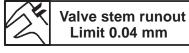


- 6. Measure:
 - ° valve stem runout (a)

Out of specification \rightarrow Replace the valve.

When installing a new valve, always replace the valve guide.

If the valve is removed or replaced, always replace the oil seal.

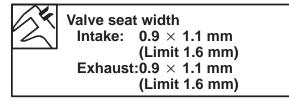


EB403410 CHECKING THE VALVE SEATS

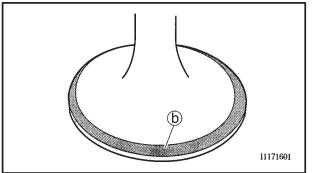
The following procedure applies to all of the valves and vive seats.

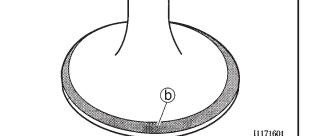
- 1. Eliminate:
 - carbon deposits (from the valve face and valve seat)
- 2. Check:
 - ° valve seat Pitting/wear \rightarrow Replace the cylinder head.
- 3. Measure:
 - ° valve seat width (a)

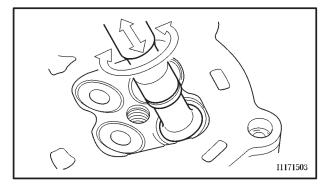
Out of specification \rightarrow Replace the cylinder head.

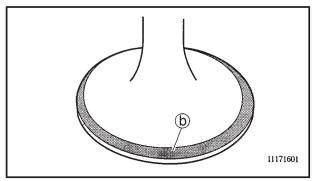












- a. Apply Mechanic's blueing dye (Dykem) (b) onto the valve face.
- b. Install the valve into the cylinder head.
- c. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- d. Measure the valve seat width. Where the valve seat and valve face contacted one another,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

4. Lap:

- ° valve face
- ° valve seat

NOTE:

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

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

CAUTION:

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

- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

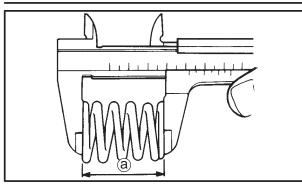
NOTE: .

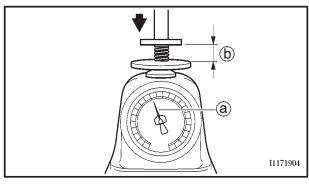
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

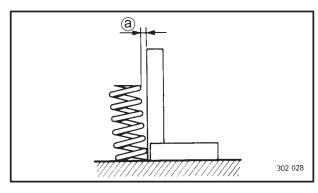
- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) b onto the valve face.
- h. Install the valve into the cylinder 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 (a) again. If the valve seat width is out of specification, reface and lap the valve seat.

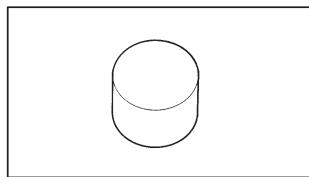












CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

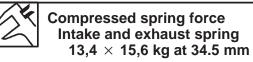
- 1. Measure:
 - valve spring free length ⓐ
 Out of specification → Replace the valve spring.



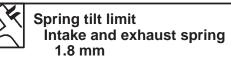
2. Measure:

compressed spring force ⓐ
 Out of specification → Replace the valve spring.

b Installed length



- 3. Measure:
 - valve spring tilt ⓐ
 Out of specification → Replace the valve spring.

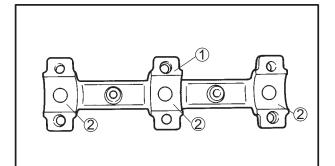


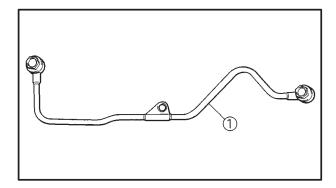
CHECKING THE VALVE LIFTERS

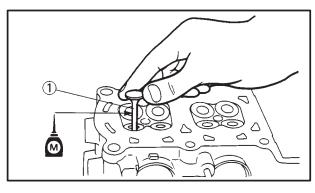
The following procedure applies to all of the valve lifters.

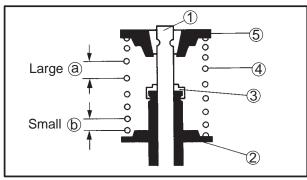
- 1. Check:
- ° valve lifter
 - $\label{eq:constraint} \begin{array}{l} \mbox{Damage/scratches} \rightarrow \mbox{Replace the valve} \\ \mbox{lifters and cylinder head.} \end{array}$

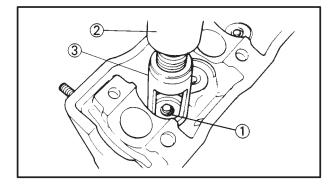












CHECKING THE CAMSHAFT CAP

1. Check:

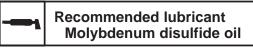
- ° camshaft case
- $^{\circ}$ camshaft caps (1)
- Cracks/damage \rightarrow Replace th camshaft case and camshaft caps as a set, and check the camshafts (Refer to "CHECK-ING THE CAMSHAFTS".).
- ^o camshaft bearing surfaces ②
 Damage/pitting/scratches → Replace the camshaft case and camshaft caps as a set, and check the camshafts (Refer to "CHECKING THE CAMSHAFTS".).
- 2. Check:

° oil delivery pipes ① Damage → Replace the defective part(-s). Dirt/obstruction → Wash the pipe(-s) and then blow it out with compressed air.

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:
 - $^{\circ}$ valve stem (1)
 - ° oil seal
 - (with the recommended lubricant)



- 3. Install:
 - $^{\circ}$ valve (1)
 - ° lower spring seat 2
 - $^{\circ}$ oil seal ③
 - ° valve spring ④
 - o upper spring seat (5)
 (into the cylinder head)

NOTE: .

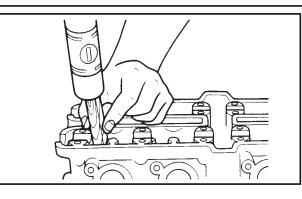
Install the valve spring with the larger pitch (a) facing up.

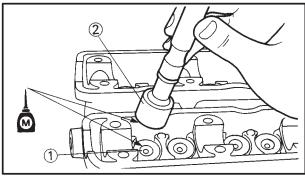
- (b) Smaller pitch
- 4. Install:
 - $^{\circ}$ valve cotters (1)

NOTE: .

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









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5. To secure the valve cotters ① onto the a valve stem, lightly tap the valve tip with a soft-face hammer.

CAUTION:

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

6. Install:

- $^{\circ}$ valve pad (1)
- ° valve lifter 2

NOTE: .

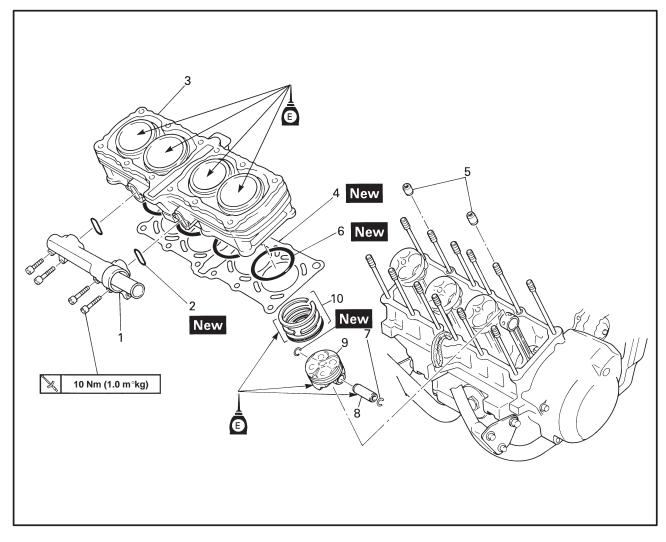
- ° Apply molybdenum disulfide oil onto the valve lifter and valve pad.
- ° The valve lifter must move smoothly when rotated with a finger.
- ° Each valve lifter and valve pad must be reinstalled in its original position.

CYLINDER AND PISTON

ENG

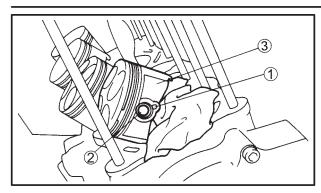
CYLINDER AND PISTON

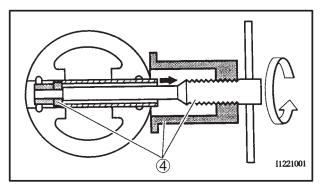


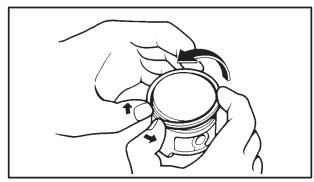


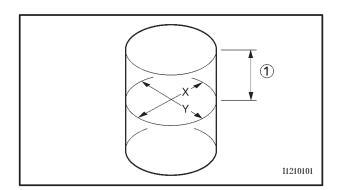
Order	Job name/Part name	Q'ty	Remarks
1 2	Removing the cylinder and pistons Cylinder head Water jacket joint O-ring	1 2	Remove the parts in the order listed. Refer to "CYLINDER HEAD" section.
3 4 5 6	Cylinder Cylinder gasket Dowel pin O-ring	1 - 1 2 4 -	Refer to "INSTALLING THE PISTON AND CYLINDER" section.
7 8 9 10	Piston pin circlip Piston pin Piston Piston ring set	8 - 4 4 4 -	Refer to "REMOVING THE CYLINDER AND PISTONS/INSTALLING THE PISTON AND CYLINDER" section.
			For installation, reverse the removal procedure.











REMOVING THE CYLINDERS AND PISTONS The following procedure applies to all of the cyl-

inders and pistons.

- 1. Remove:
 - $^{\circ}$ piston pin clip (1)
 - ° piston pin ②
 - ° piston ③

CAUTION:

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

NOTE: .

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



- 2. Remove:
 - ° top ring
 - ° 2nd ring
 - ° oil ring

NOTE: _

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

CHECKING THE CYLINDERS AND PISTONS

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

- 1. Check:
 - ° piston wall
 - ° cylinder wall

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

2. Measure:

- ° piston-to-cylinder clearance
- ****
- a. Measure cylinder bore "C" with the cylinder bore gauge.
- 1 20 mm from the top of the cylinder

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 AND PISTON ENG



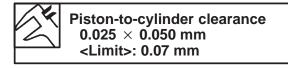
	Standard	Wear limit				
Cylinder bore "C"	62.00 × 62.01	62.1 mm				
$"C" = \frac{X + Y}{2}$						

- b. If out of specification, replace the cylinder, piston and piston rings as a set.
- c. Measure piston skirt diameter "P" with the micrometer.
- (a) 5 mm from the bottom edge of the piston.

	Piston size P	
Standard	61.960 × 61.975	

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

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



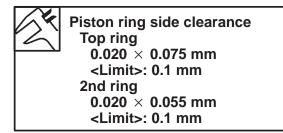
f. If out of specification, replace the cylinder, piston and piston rings as a set.

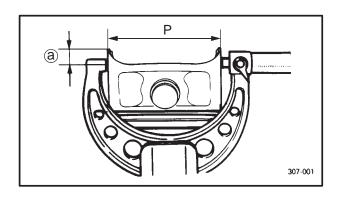
CHECKING THE PISTON RINGS

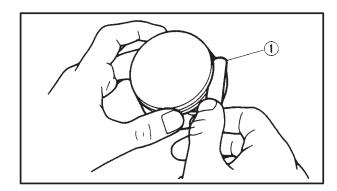
- 1. Measure:
 - ° piston ring side clearance ①
 Out of specification → Replace the piston and piston rings as a set.

NOTE: .

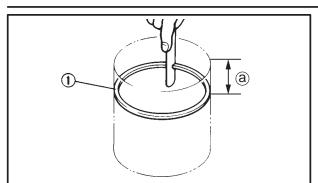
Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.











- 2. Install: ° piston ring ①
 - (into the cylinder)

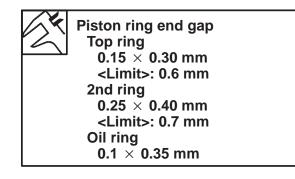
NOTE:

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

- (a) 20 mm
- 3. Measure:
 - $^\circ$ piston ring end gap Out of specification \rightarrow Replace the piston ring.

NOTE: .

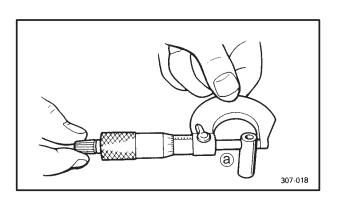
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.



CHECKING THE PISTON PINS

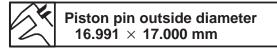
The following procedure applies to all of the piston pins.

- 1. Check:
 - [°] piston pin Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.



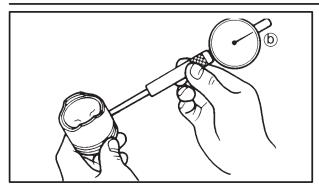
2. Measure:

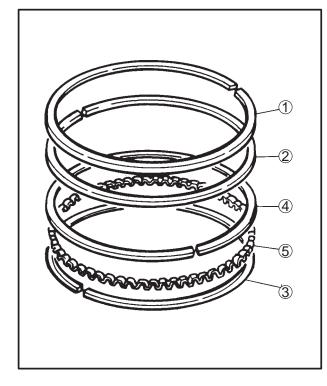
 $^\circ$ piston pin outside diameter (a) Out of specification \rightarrow Replace the piston pin.

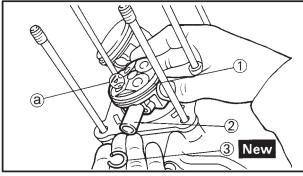


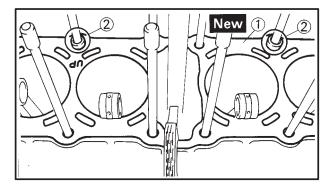


CYLINDER AND PISTON

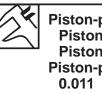








- 3. Calculate:
 - ° piston-pin-to-piston clearance Out of specification \rightarrow Replace the piston pin.



Piston-pin-to-piston clearance : Piston pin bore size (b) – Piston pin outside diameter (a) Piston-pin-to-piston clearance $0.011 \times 0.013 \text{ mm}$ <Limit>: 0.023 mm

EB40470 INSTALLING THE PISTON AND CYLINDER

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

- 1. Install:
 - $^{\circ}$ top ring (1)
 - ° 2nd ring 2
 - ° lower oil ring rail 3
 - ° upper oil ring rail ④
 - ° oil ring expander (5)

NOTE: _

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

- 2. Install:
 - ° piston ①
 - ° piston pin ②
 - ° piston pin clip (New) ③

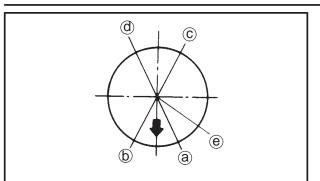
NOTE: .

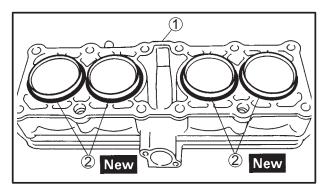
- ° Apply engine oil onto the piston pin.
- ° Make sure that the "EX" mark (a) on the piston faces towards the exhaust side of the engine.
- ^o Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.
- 3. Install:
 - ° gasket (New) ① ° dowel pins 2
- 4. Lubricate:
- ° piston
 - ° piston rings
 - ° cylinder
 - (with the recommended lubricant)

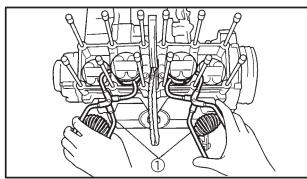
Recommended lubricant Engine oil

CYLINDER AND PISTON









- 5. Offset:
 - ° piston ring end gaps
 - ⓐ Top ring
 - (b) Lower oil ring rail (c) Upper oil ring rail
 - (d) 2nd ringe
 - (e) Oil ring expander
- 6. Install:
 - $^{\circ}$ cylinder (1)
 - ° Ó-ring ②

NOTE: _

- ° First, install pistons #2 and #3.
- ^o Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

- a. Install a piston ring compressor ① to piston #2 and #3.
- b. Install pistons #2 and #3 onto the cylinder.
- c. Remove the piston ring compressor.
- d. Install the piston ring compressor ① to pistons #1 and #4.
- e. Install pistons #1 and #4 onto the cylinder.
- f. Remove the piston ring compressor.

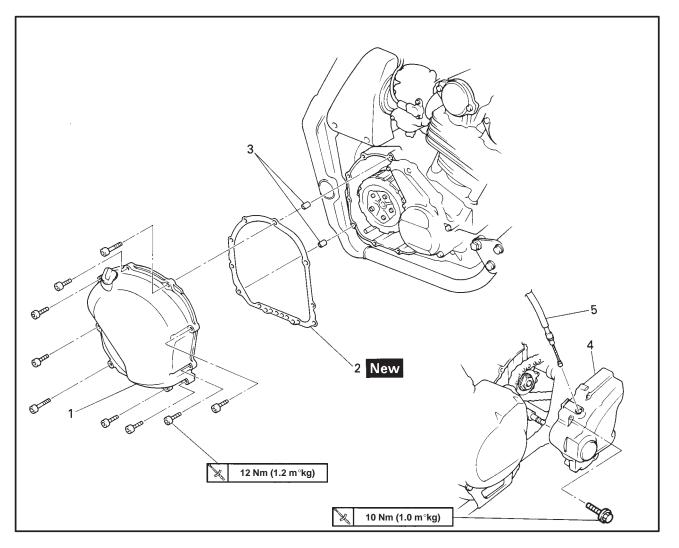


CLUTCH

ENG



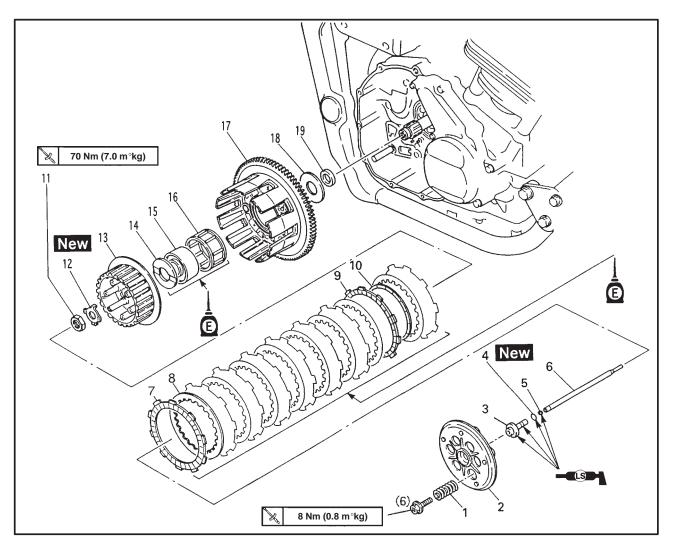




Order	Job name/Part name	Q'ty	Remarks
	Removing the clutch cover Drain the engine oil		Remove the parts in the order listed. Refer to "CHANGING THE ENGINE OIL" section in chapter 3.
1	Clutch cover	1	
2	Clutch cover gasket	1	
3	Dowel pin	2	
4	Drive sprocket cover	1	
5	Clutch cable	1	For installation, reverse the removal procedure.

CLUTCH

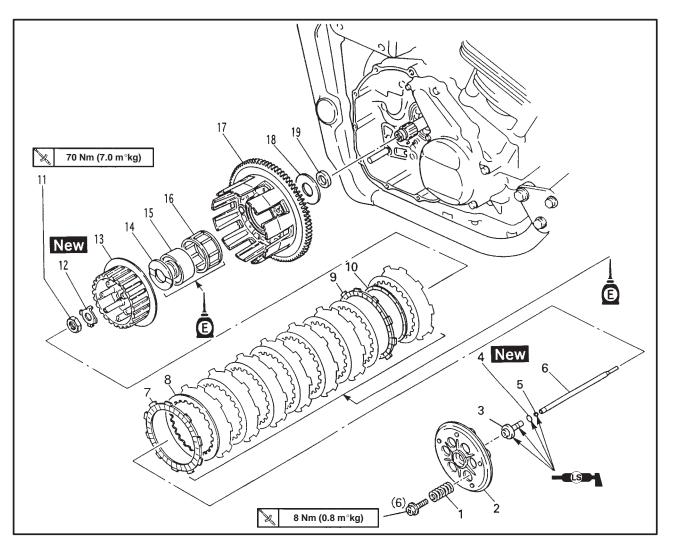




Order	Job name/Part name	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Compression spring	6 -	
2	Pressure plate	1	
3	Short clutch push rod	1	
4	O-ring	1	
5	Ball	1	
6	Long clutch push rod	1	Refer to "INSTALLING THE CLUTCH"
7	Friction plate	8	section.
8	Clutch plate	8	
9	Fricition plate (large)	1	
10	Clutch spring plate	1 -	
11	Nut	1	Refer to "REMOVING/INSTALLING THE
			CLUTCH" section.

CLUTCH

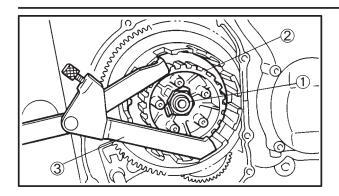
ENG

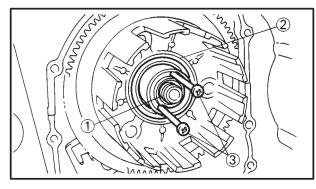


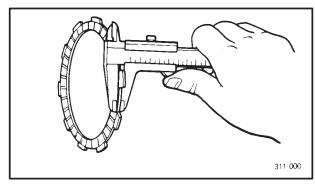
Order	Job name/Part name	Q'ty	Remarks
12	Lock washer	1 -	Refer to "REMOVING/INSTALLING
13	Clutch boss	1 -	THE CLUTCH" section.
14	Thrust washer	1	Refer to "INSTALLING THE CLUTCH" section.
15	Spacer	1 -	Refer to "REMOVING/INSTALLING
16	Bearing	1 -	THE CLUTCH" section.
17 18 19	Clutch housing Thrust washer Spacer	1 - 1 1 -	Refer to "INSTALLING THE CLUTCH" seciton.
			For installation, reverse the removal procedure.

CLUTCH









CLUTCH

- **REMOVING THE CLUTCH** 1. Straighten the lock washer tab.
 - 2. Loosen:

EB405100

 $^{\circ}$ clutch boss nut (1)

NOTE: .

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

Universal clutch holder ③ 90890-04086

3. Remove:

- ° spacer ①
- ° bearing ②

NOTE: .

Insert two M6-mm bolts ③ into the spacer and then remove the spacer by pulling on the bolts.

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:

 $^{\circ}$ friction plate thickness Out of specification \rightarrow Replace the friction plates as a set.

NOTE: .

Measure the friction plate at four places.

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

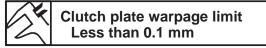
1. Check:

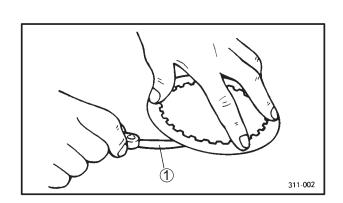
° clutch plate

- 2. Measure:
 - ° clutch plate warpage

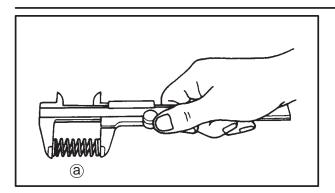
(with a surface plate and thickness gauge 1)

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









CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

- 1. Check:
 - ° clutch spring

Damage \rightarrow Replace the clutch springs as a set.

2. Measure:

° clutch spring free length ⓐ
 Out of specification → Replace the clutch springs as a set.



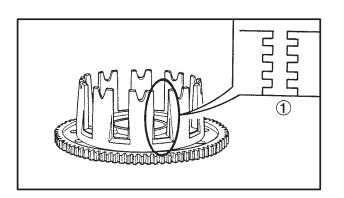
Clutch spring free length 34.9 mm <Limit>: 34.3 mm

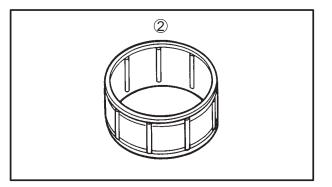
CHECKING THE CLUTCH SPRING PLATE

- 1. Check:
 - ° clutch spring plate
 - Damage \rightarrow Replace.

2. Check:

 $^{\circ}$ clutch spring plate seat Damage \rightarrow Replace.





CHECKING THE CLUTCH HOUSING

1. Check:

° clutch housing dogs ①

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

NOTE: _

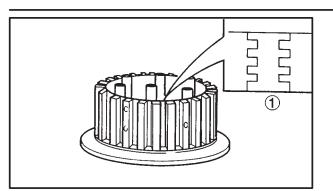
Pitting on the clutch housing dogs will cause erratic clutch operation.

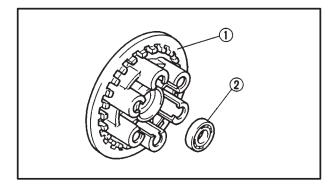
2. Check:

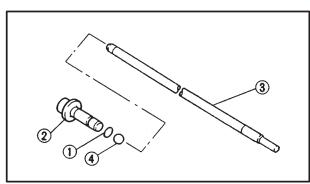
° bearing ②
 Damage/wear → Replace the clutch housing.

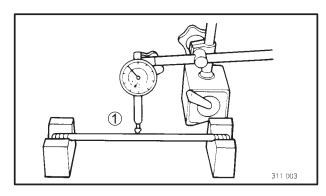
CLUTCH

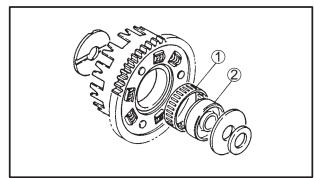












CHECKING THE CLUTCH BOSS

- 1. Check:
 - ° clutch boss splines (1) Damage/pitting/wear \rightarrow Replace the clutch boss.

NOTE: _

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

CHECKING THE PRESSURE PLATE

- 1. Check:
 - ° pressure plate ①
 - $Cracks/damage \rightarrow Replace.$
 - ° bearing ②
 - Damage/wear \rightarrow Replace.

CHECKING THE CLUTCH PUSH RODS

- 1. Check:
 - ° O-ring ①
 - $^{\circ}$ short clutch push rod 2
 - $^\circ$ long clutch push rod 3
 - ° ball 4

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

- 2. Measure:
 - $^\circ$ long clutch push rod bending limit 1 Out of specification \rightarrow Replace the long clutch push rod.

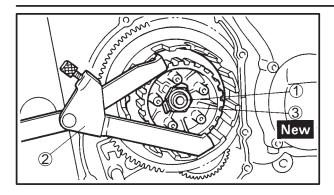


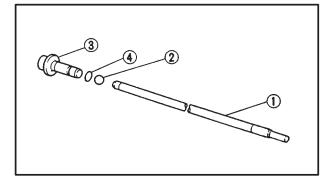
INSTALLING THE CLUTCH

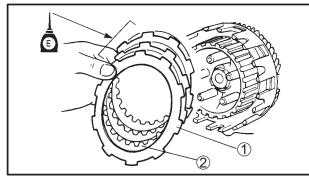
- 1. Install:
 - ° bearing ①
 - ° spacer 2

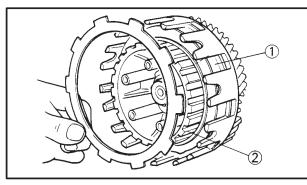
NOTE: .

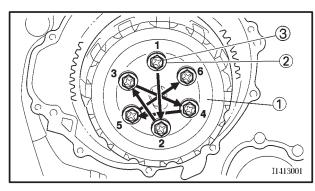
Install the spacer with the two screw holes facing towards the clutch boss.











- 2. Tighten:
- ° clutch boss nut 1 🕅

CLUTCH

ENG

NOTE: .

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



- 3. Bend the lock washer ③ tab along a flat side of the nut.
- 4. Lubricate:
 - $^{\circ}$ long clutch push rod 1
 - ° ball 2
 - ° short clutch push rod 3
 - ° O-ring ④
 - (with the recommended lubricant)

Recommended lubricant Lithium soap base grease

- 5. Install:
 - ° long clutch push rod
 - ° ball
 - ° short clutch push rod
 - (along with a new O-ring ④)
- 6. Lubricate:
 - $^{\circ}$ friction plates (1)
 - clutch plates <a>2

 (with the recommended lubricant)

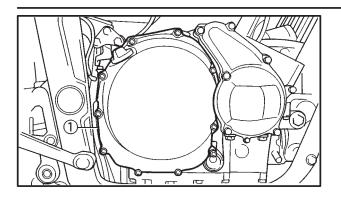


- 7. Install:
 - $^{\circ}$ friction plates ①
 - $^{\circ}$ clutch plates (2)

 - a. Install a friction plate and clutch plate.
 - b. Install a clutch spring plate, friction plate (large of inside dia.) and clutch plate.
 - c. Install a friction plate and then alternate between a clutch plate and a friction plate.
- 8. Install:
 - ° pressure plate (1)
 - ° clutch springs ②
 - ° clutch spring bolts ③ 🛛 🗽 8.0 Nm (0.8 m°kg)
 - NOTE:
 - When installing the clutch springs, alternate between long and short clutch springs.
 - ^o Tighten the clutch spring bolts in stages and in a crisscross pattern.



12 Nm (1.2 m°kg)



9. Install: ° clutch cover ①

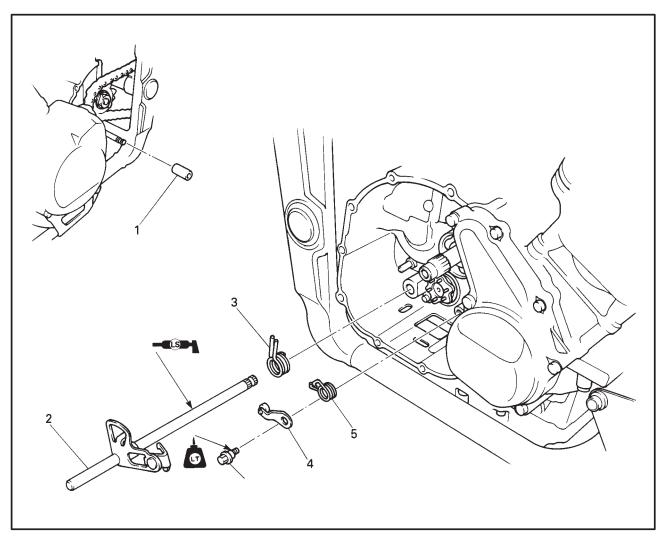
CLUTCH





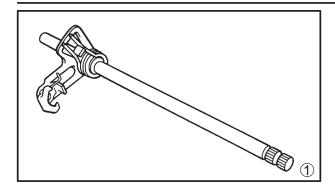
SHIFT SHAFT

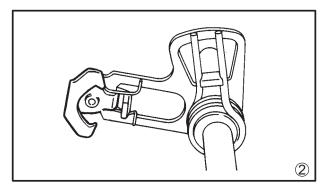


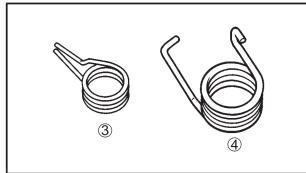


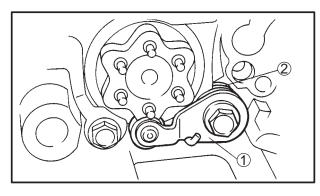
Order	Job name/Part name	Q'ty	Remarks
	Removing the shift shaft Oil pump Drive sprocket cover		Remove the parts in the order listed. Refer to "OIL PUMP" section. Refer to "REMOVING THE ENGINE" section.
1 2 3 4 5	Collar Shift shaft Shift lever spring Stopper lever SHift lever spring	1 1 - 1 1 1 -	Refer to "INSTALLING THE SHIFT SHAFT" section. For installation, reverse the removal procedure.

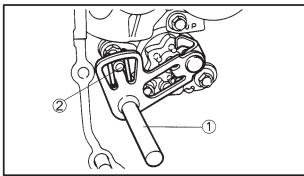












CHECKING THE SHIFT SHAFT

- 1. Check:
 - ° shift shaft ①
 - $^{\circ}$ shift lever (2)
 - Bends/damage/wear \rightarrow Replace.
 - $^{\circ}$ shift lever spring (3)

SHIFT SHAFT

stopper lever spring ④
 Damage/wear → Replace.

EB408700 INSTALLING THE SHIFT SHAFT

- 1. Install:
 - $^{\circ}$ stopper lever (1)
 - ° stopper lever spring ②
 - ° shift shaft lever

NOTE:

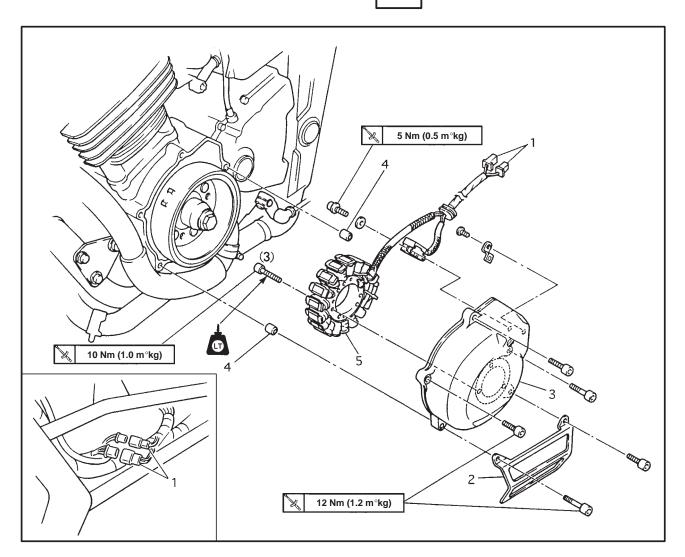
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
- ° Mesh the stopper lever with the shift drum segment assembly.
- 2. Install:

° shift shaft ①

NOTE: .

- [°] Lubricate the oil seal lips with lithium soap base grease.
- Hook the end of the shift lever spring onto the shift lever spring stopper 2.



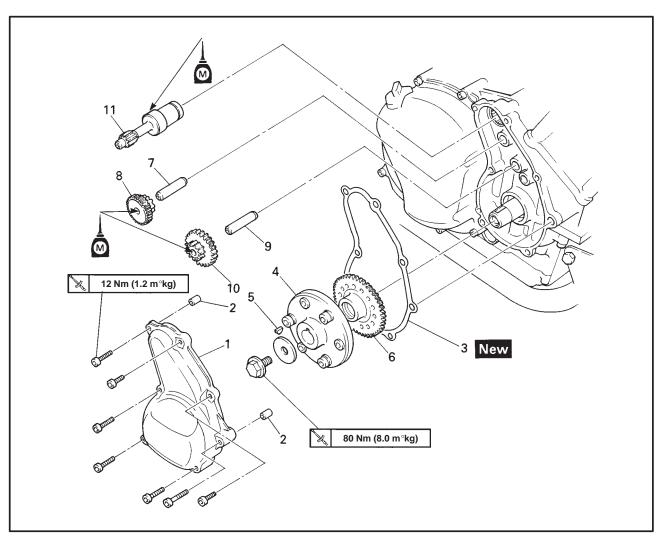


Order	Job name/Part name	Q'ty	Remarks
	Removing the stator coil Seat Fuel tank	-	Remove the parts in the order listed. Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3.
1 2 3 4 5	Stator/pickup coil lead Cover Generator cover Dowel pin Stator coil	1/1 1 1 2 1	For installation, reverse the removal procedure.



STARTER CLUTCH



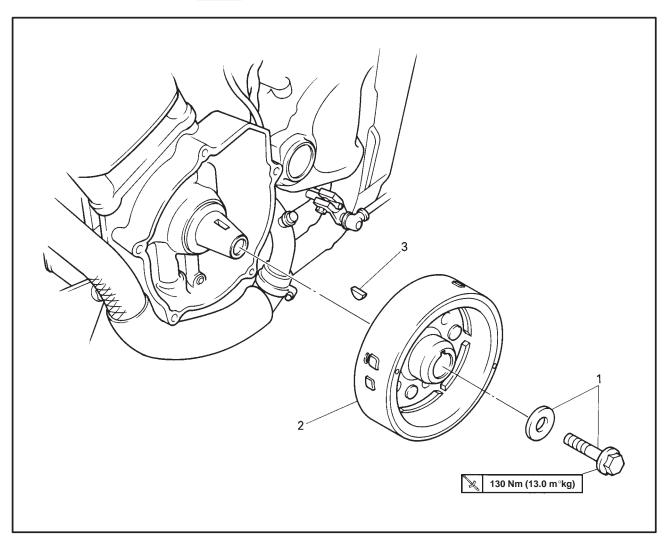


Order	Job name/Part name	Q'ty	Remarks
	Removing the starter clutch		Remove the parts in the order listed.
	Generator cover		
1	Starter clutch cover	1	
2	Dowel pin	2	
3	Gasket	1	
4	Starter clutch assembly	1	Refer to "REMOVING/INSTALLING THE
			STARTER CLUTCH" section.
5	Wood ruff key	1	
6	Starter wheel gear	1	
7	Shaft (Primary)	1	
8	Starter idle gear (primary)	1	
9	Shaft (Secondary)	1	
10	Starter idle gear (secondary)	1	
11	Shaft drive gear	1	
			For installation, reverse the removal
			procedure.



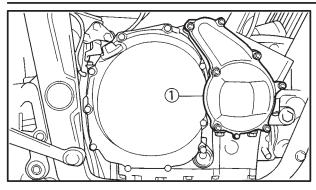
AC MAGNETO ROTOR

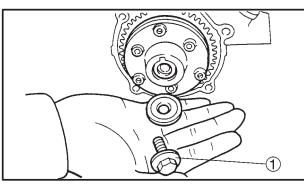


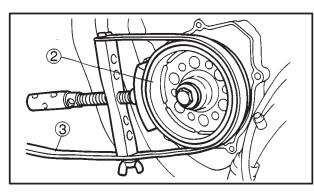


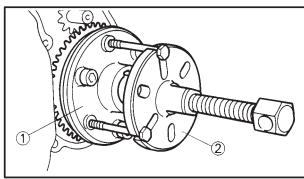
Order	Job name/Part name	Q'ty	Remarks
1 2 3	Removing the generator roter Bolt/washer Rotor Woodruff key	1/1- 1 1-	Remove the parts in the order listed. Refer to "REMOVING/INSTALLING THE AC MAGNETO" section. For installation, reverse the removal procedure.

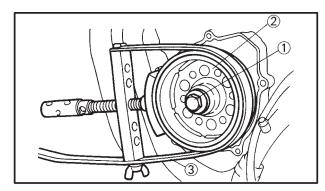












REMOVING THE STARTER CLUTCH

- 1. Remove:
 - $^{\circ}$ starter 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.

- 2. Remove:
 - $^{\circ}$ starter clutch bolt (1)

NOTE: .

° While holding the magneto rotor ② with the sheave holder ③, remove the starter clutch bolt.



- 3. Remove:
 - ° starter clutch ① (with the flywheel puller set ②)



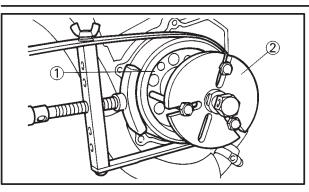
REMOVING THE AC MAGNETO

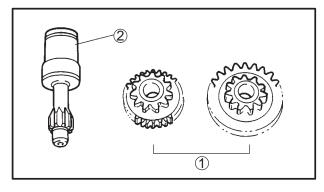
- 1. Remove:
 - $^\circ$ Bolt (AC magneto rotor) (1)
 - ° Washer

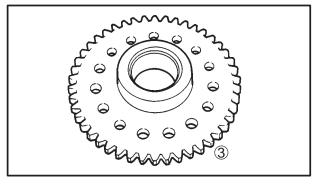
NOTE: .

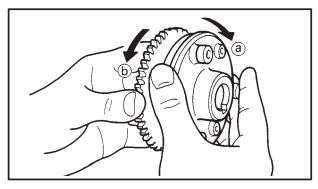
While holding the AC magneto rotor ② with a sheave holder ③, loosen the AC magneto rotor bolt ①.

Sheave holder: 90890-01701









- 2. Remove:
 - AC magneto rotor ①
 Woodruff key

NOTE: .

Use a flywheel puller 2 to remove the AC magneto rotor 1.

ENG

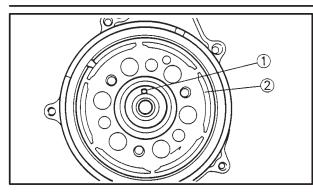


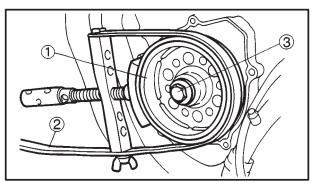
CHECKING THE STARTER CLUTCH

- 1. Check:
 - $^{\circ}$ starter clutch idle gear (1)
 - $^\circ$ starter clutch drive gear (2)
 - $^{\circ}$ starter clutch gear $\bar{\Im}$
 - Burrs/chips/roughness/wear \rightarrow Replace the defective part(-s).

- 2. Check:
 - ° starter clutch operation
 - ****
 - a. When turning the starter clutch drive gear clockwise (a), the starter clutch and the starter clutch drive gear should engage. If the starter clutch drive gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.
 - b. 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.







INSTALLING THE AC MAGNETO

- 1. Install:
 - ° Woodruff key ①
 - ° AC magneto rotor 2
 - Bolt (AČ magneto rotor)

NOTE: .

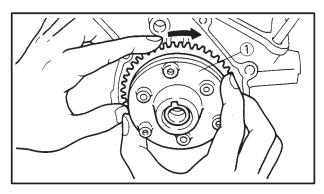
- ° Clean the tapered portion of the crankshaft and the AC magneto rotor.
- ^o When installing the AC magneto rotor, make sure that the woodruff key is properly seated in the key way of the crankshaft.
- 2. Tighten:
 - Bolt (magneto rotor)

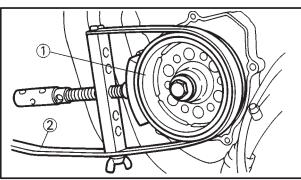
NOTE:

While holding the AC magneto rotor ① with a sheave holder ② tighten the AC magneto rotor bolt ③.



Sheave holder: 90890-01701





INSTALLING THE STARTER CLUTCH

1. Install:

° starter clutch ①

NOTE:

° While holding the generator rotor ① with the sheave holder ②, tighten the starter clutch bolt.

Sheave holder 90890-01701

Starter clutch bolt 80 Nm (8.0 m°kg)

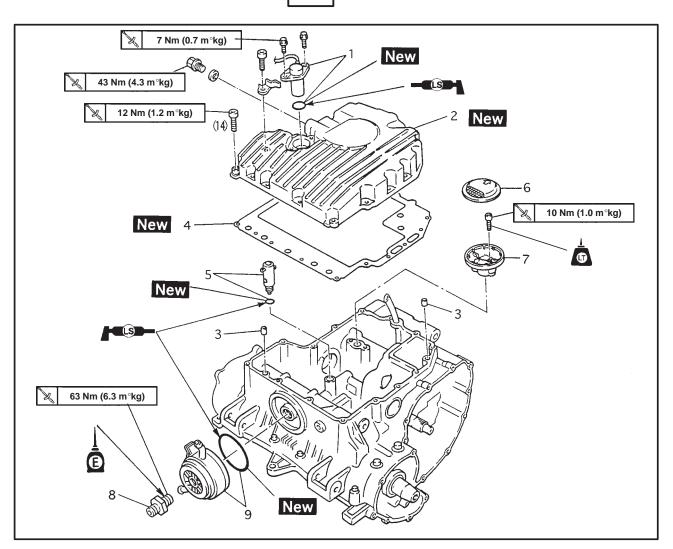
OIL PAN AND OIL STRAINER



OIL PAN AND OIL STRAINER





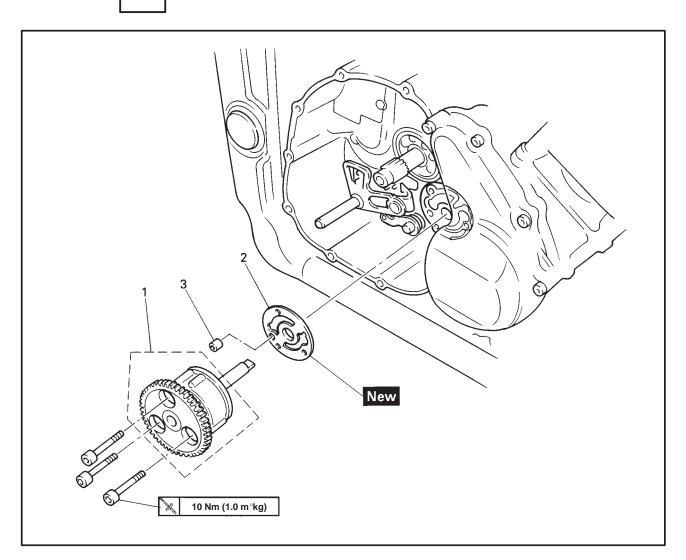


Order	Job name/Part name	Q'ty	Remarks
	Removing the oil strainer Engine		Remove the parts in the order listed. Refer to "REMOVING THE ENGINE" section.
1 2 3 4 5 6 7 8 9	Oil level warning switch/O-ring Oil pan Dowel pin Oil pan gasket Relief valve/O-ring Oil strainer Oil strainer housing Oil bypass valve Oil cooler/O-ring	1/1 - 1 2 1 - 1/1 1 - 1 1 1/1	

OIL PAN AND OIL STRAINER

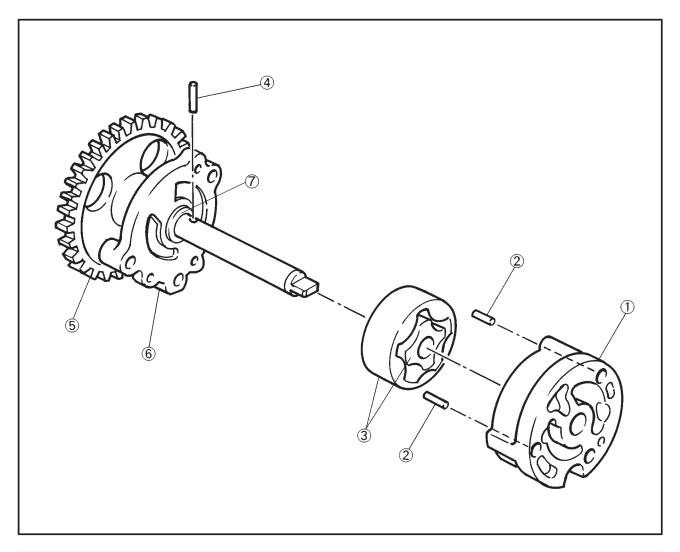


OIL PUMP

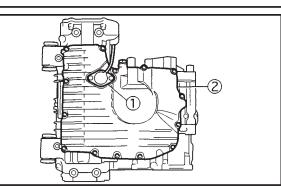


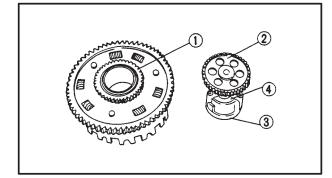
Order	Job name/Part name	Q'ty	Remarks
1 2 3	Removing the oil pump Clutch Oil pump assembly Oil pump gasket Dowel pin	1 - 1 1 -	Remove the parts in the order listed. Refer to "CLUTCH" section. Refer to "INSTALLING THE OIL PUMP" section. For installation, reverse the removal procedure.

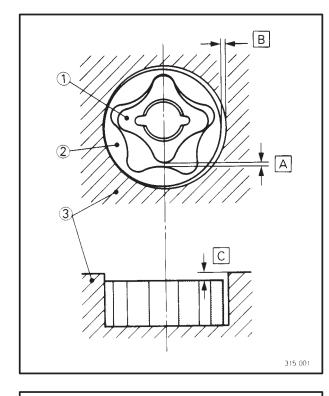


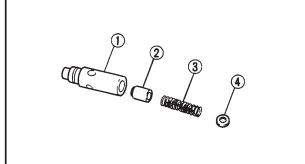


Order	Job name/Part name	Q'ty	Remarks
	Disassembling the oil pump		Disassembly the parts in the order listed.
1	Oil pump rotor housing	1 -	7
2	Dowel pin	2	
3	Inner rotor/outer rotor	1/1	Refer to "ASSEMBLING THE OIL PUMP"
4	Dowel pin	1	section.
5	Oil pump shaft assembly	1	
6	Oil pump cover	1 -	
$\overline{\mathcal{O}}$	Washer	1	
			For assembly, reverse the disassembly
			procedure.









REMOVING THE OIL PAN

- 1. Remove:
 - ° oil level switch ①
 - $^\circ$ oil pan (2)
 - ° gasket
 - ° dowel pins

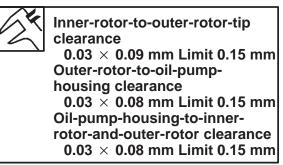
NOTE: _

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

ENG

CHECKING THE OIL PUMP

- 1. Check:
 - ° oil pump drive gear ①
 - ° oil pump driven gear ②
 - ° oil pump housing ③
 - oil pump housing cover ④
 Cracks/damage/wear → Replace the defective part(-s).
- 2. Measure:
 - ° inner-rotor-to-outer-rotor-tip clearance A
 - $^\circ$ outer-rotor-to-oil-pump-housing clear-ance $\ensuremath{\mathbb{B}}$
 - $^\circ$ oil-pump-housing-to-inner-rotor-and-outer-rotor clearance \fbox{C}
 - Out of specification \rightarrow Replace the oil pump.
 - 1 Inner rotor
 - Outer rotor
 - ③ Oil pump housing



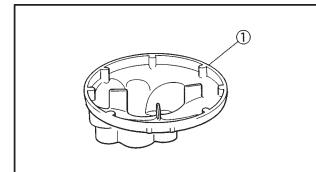
- 3. Check:
 - $^{\circ}$ oil pump operation Unsmooth \rightarrow Repeat steps (1) and (2) or replace the defective part(-s).

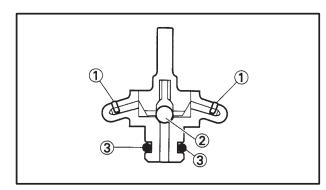
CHECKING THE RELIEF VALVE

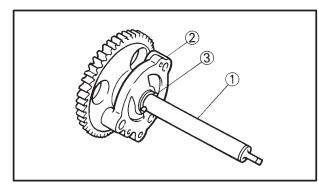
- 1. Check:
 - $^{\circ}$ relief valve body (1)
 - ° relief valve 2
 - ° spring ③
 - ° Ö-ring (4)
 - Damage/wear \rightarrow Replace the defective part(-s).

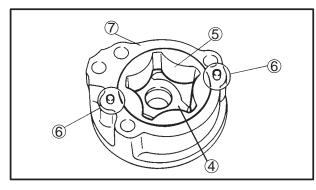
OIL PAN AND OIL STRAINER

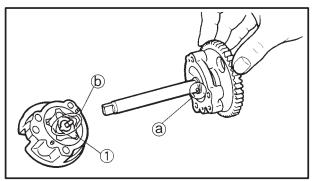












CHECKING THE OIL STRAINER

- 1. Check:
 - ° oil strainer (1)
 - Damage \rightarrow Replace.
 - Contaminants \rightarrow Clean with engine oil.

EB411470 CHECKING THE OIL NOZZLE

- 1. Check:
 - ° oil nozzle
 - ° check ball 2
 - $Damage/wear \rightarrow Replace$ the oil nozzle.
 - ° O-ring ③
 - Damage/wear \rightarrow Replace.
 - oil nozzle passage
 Obstruction → Blow out with compressed air.

ASSEMBLING THE OIL PUMP

- 1. Lubricate:
 - $^{\circ}$ inner rotor
 - ° outer rotor
 - oil pump shaft (with the recommended lubricant)



- 2. Install:
 - ° oil pump shaft ①
 - (to the oil pump cover (2))
 - ° washer
 - ° pin ③
 - $^{\circ}$ inner rotor ④
 - ° outer rotor (5)
 - ° dowel pin 6
 - ° oil pump housing 🕖 🛛 📐
- 7.0 Nm (0.7 m°kg)

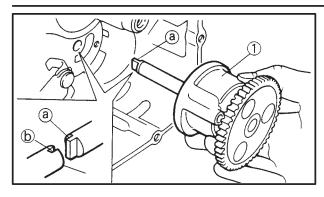
NOTE: _

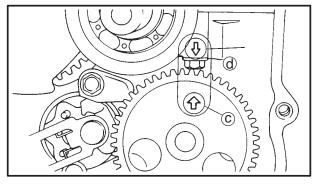
When installing the inner rotor, align the pin a in the oil pump shaft with the groove b on the inner rotor b.

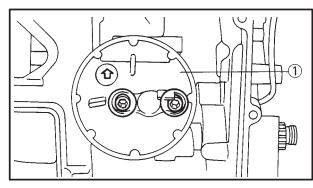
- 3. Check:
 - oil pump operation Refer to "CHECKING THE OIL PUMP".

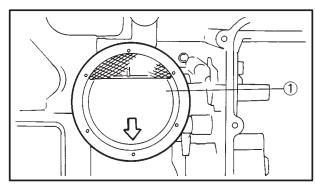
OIL PAN AND OIL STRAINER

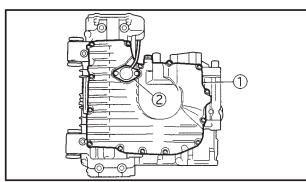












EB411710 INSTALLING THE OIL PUMP

Install: ° oil pump ①

10 Nm (1.0 m°kg)

CAUTION:

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

NOTE: .

Align the projection (a) on the oil pump shaft with the slot (b) on the water pump shaft.

NOTE: .

Align the arrow \bigcirc on the oil pump with the arrow \bigcirc on the crankcase.

INSTALLING THE OIL STRAINER 1. Install:

- ° oil strainer housing ①

NOTE:

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

- 2. Install:
 - $^{\circ}$ oil strainer cover 1

NOTE:

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

INSTALLING THE OIL PAN

- 1. Install:
 - ° dowel pins
 - ° gasket (New)
 - ° oil pan (1)
 - $^{\circ}$ oil level switch (2)
 - ° engine oil drain bolt

Always use new copper washers.



NOTE: .

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

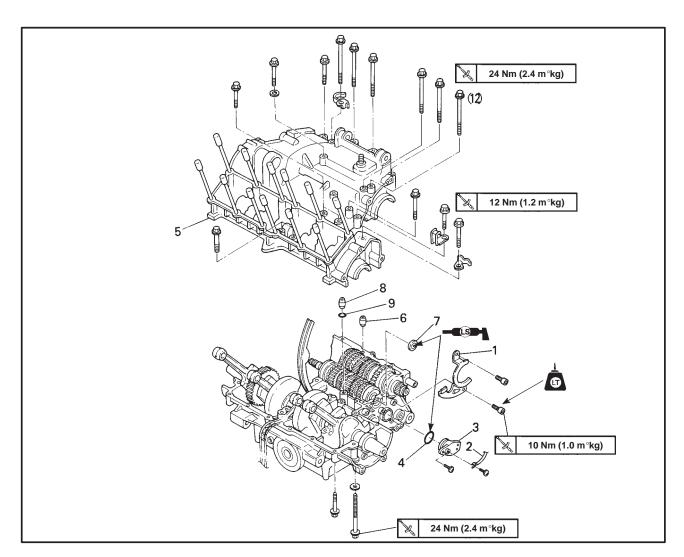
Oil pan bolt 12 Nm (1.2 m°kg) X Oil level switch bolt 7 Nm (0.7 m°kg)

4-53

CRANKCASE



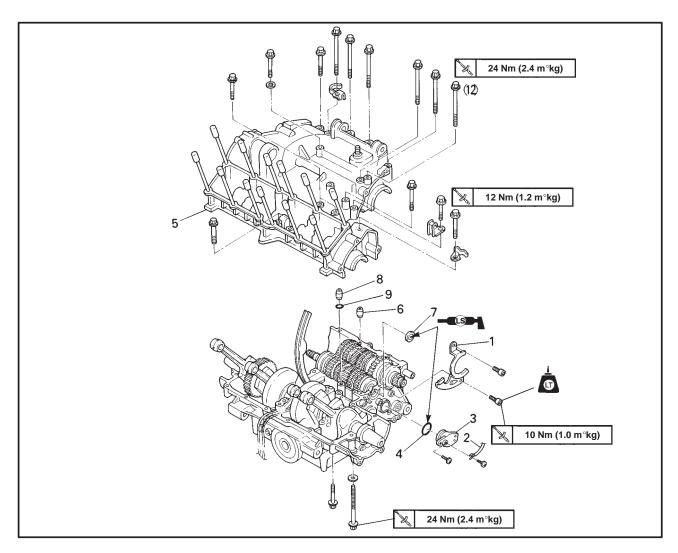
CRANKCASE



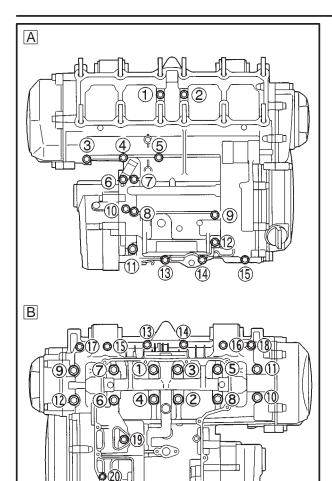
Order	Job name/Part name	Q'ty	Remarks
Order	Disassembling the crankcase Engine Camshaft Cylinder head Cylinder, piston Clutch Oil pump Shift shaft Magneto rotor Starter clutch		Remarks Disassembly the parts in the order listed. Refer to "REMOVING THE ENGINE" section. Refer to "CAMSHAFT" section. Refer to "CYLINDER HEAD" section. Refer to "CYLINDER AND PISTON" section. Refer to "CLUTCH" section in chapter 4. Refer to "OIL PUMP" section. Refer to "SHIFT SHAFT" section. Refer to "AC MAGNETO AND STARTER CLUTCH section.
	Oil strainer Water pump		Refer to "OIL PAN AND OIL STRAINER" section. Refer to "WATER PUMP" section in chapter 5.
1 2 3	Oil seal stopper plate Neutral switch lead Neutral switch	1 1 1	

CRANKCASE





Order	Job name/Part name	Q'ty	Remarks
4	O-ring	1	
5	Upper crankcase	1	Refer to "DISASSEMBLING/
6	Dowel pin	1	ASSEMBLING THE CRANKCASE"
7	Oil seal	1	section.
8	Oil jet	1	
9	O-ring	1	
			For assembly, reverse the disassembly
			procedure.





DISASSEMBLING THE CRANKCASE

- 1. Remove:
 - $^{\circ}$ crankcase bolts (1) \times (15)
 - A Upper crankcase

NOTE: .

- ^o Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.
- 2. Place the engine upside down.
- 3. Remove:
 - ° lower crankcase bolts $\textcircled{1} \times \textcircled{2}$ B lower crankcase
- 4. Remove:
 - lower crankcase

CAUTION:

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

- 5. Remove:
 - ° dowel pins
 - ° oil jet
- 6. Remove:
 - crankshaft journal lower bearing (from the lower crankcase)

NOTE: .

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

EB412420 CHECKING THE CRANKCASE

- 1. Thoroughly wash the crankcase halves in a mild solvent.
- 2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.

3. Check:

- ° crankcase
 - Cracks/damage \rightarrow Replace.
- oil delivery passages
 Obstruction → Blow out with compressed air.



ASSEMBLING THE CRANKCASE

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



2. Apply: ° sealant

(onto the crankcase mating surfaces)



NOTE: .

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

- 3. Install:
 - ° dowel pin
- 4. Install:
 - crankshaft journal lower bearings ① (into the lower crankcase)

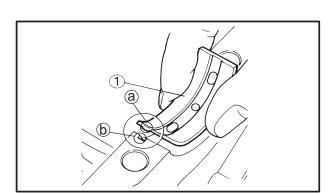
NOTE:

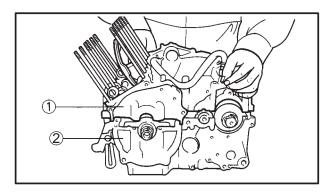
- Align the projections (a) on the crankshaft journal lower bearings with the notches (b) in the crankcase.
- Install each crankshaft journal lower bearing in its original place.
- 5. Set the shift drum assembly and transmission gears in the neutral position.
- 6. Install:

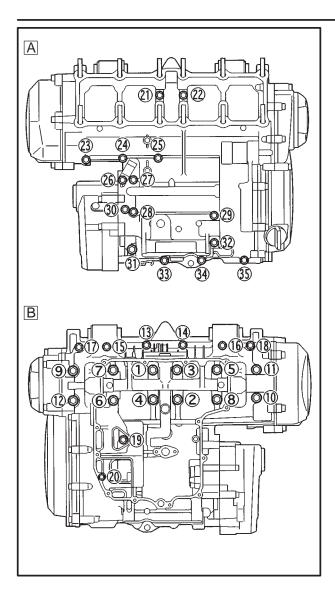
upper crankcase ①
 (onto the lower crankcase ②)

CAUTION:

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







CRANKCASE

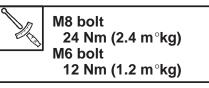


- 7. Install:
 - ^o upper crankcase bolts
 ^o lower crankcase bolts

NOTE: .

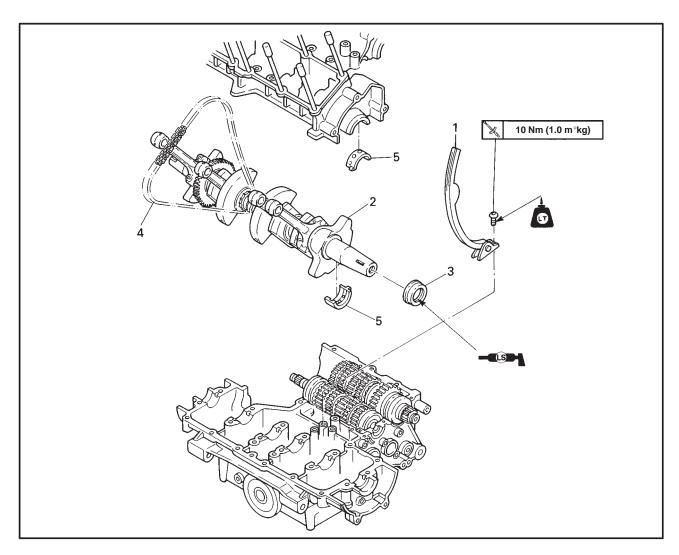
- ° Lubricate the bolt threads with engine oil.
- ° Tighten the bolts in increasing numerical order.
- ° Install washers on bolts 1×2 .
- ° Install the cable holder on bolt #35.
- A Upper crankcase

B Lower crankcase





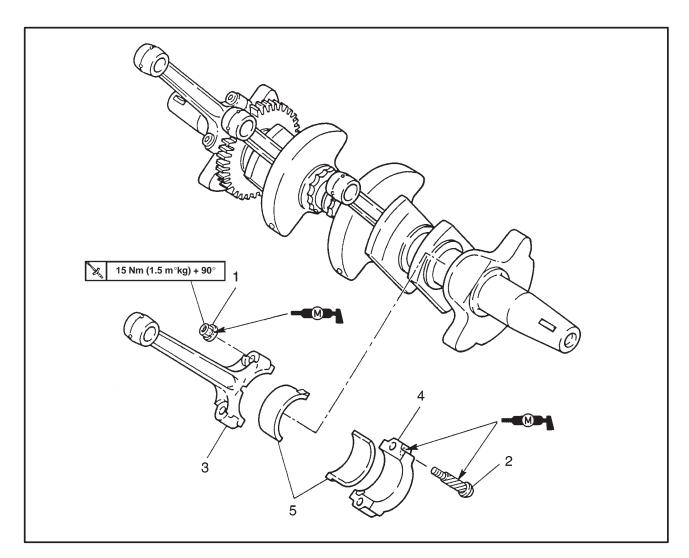
CRANKSHAFT



Order	Job name/Part name	Q'ty	Remarks
	Removing the crankshaft		Remove the parts in the order listed.
	Disassembly the crankcase		Refer to "CRANKCASE" section.
1	Timing chain guide (intake side)	1 -	
2	Crankshaft assembly	1	Refer to "REMOVING/INSTALLING THE
3	Oil seal	1	CRANKSHAFT ASSEMBLY" section.
4	Timing chain	1 -	
5	Crankshaft journal bearing	12	
			For installation, reverse the removal
			procedure.

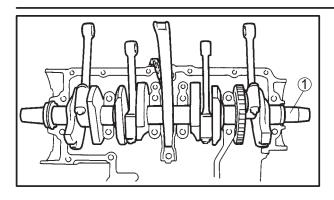


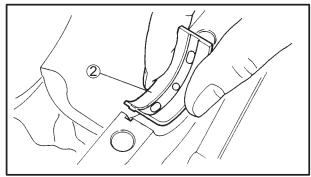
CONNECTING ROD

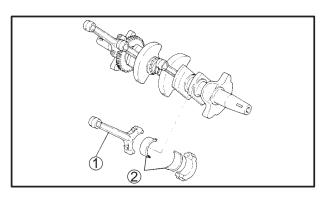


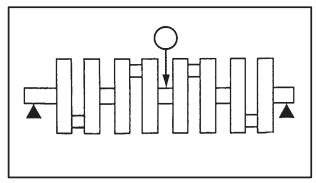
Order	Job name/Part name	Q'ty	Remarks
1 2 3 4 5	Removing the connecting rod Nut Connecting rod bolt Connecting rod Connecting rod cap Connecting rod big end bearing		Remove the parts in the order listed. Refer to "INSTALLING THE CONNECTING RODS" section. Refer to "REMOVING/INSTALLING THE CONNECTING RODS" section. For installation, reverse the removal procedure.











REMOVING THE CRANKSHAFT ASSEMBLY

- 1. Remove:
 - $^\circ$ crankshaft assembly (1)
 - crankshaft journal upper bearing ② (from the upper crankcase)
 - ° timing chain guide (intake side)

NOTE: .

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

REMOVING THE CONNECTING RODS

- 1. Remove:
 - $^{\circ}$ connecting rods (1)
 - ° big end bearings 2

NOTE: .

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

CHECKING THE CRANKSHAFT AND CONNECTING RODS

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



Crankshaft runout Less than 0.03 mm

- 2. Check:
 - ° crankshaft journal surfaces
 - ° crankshaft pin surfaces
 - $^\circ$ bearing surfaces Scratches/wear \rightarrow Replace the crank-shaft.
- 3. Measure:
 - crankshaft-journal-to-crankshaft-journalbearing clearance
 Out of specification → Replace the crankshaft journal bearings.





Crankshaft-journal-to-crank-shaft-journal-bearing clearance 0.025 \times 0.043 mm Limit 0.08 mm

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 position.

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

NOTE: _

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

d. Put a piece of Plastigauge[®] ② on each crankshaft journal.

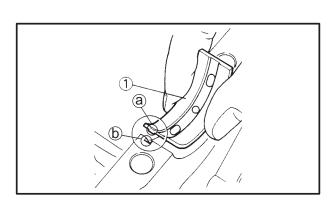
NOTE:

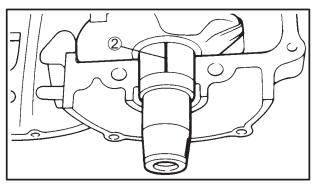
Do not put the Plastigauge[®] over the oil hole in the crankshaft journal.

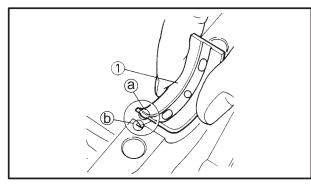
e. Install the crankshaft journal lower bearings into the lower crankcase and assemble the crankcase halves.

NOTE:

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

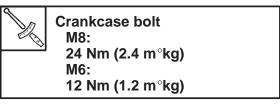








f. Tighten the bolts to specification in the tightening sequence cast on the crank-case.



A Upper crankcase

B Lower crankcase

NOTE: .

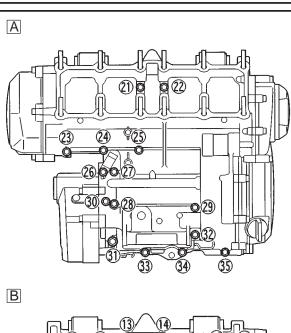
Lubricate the crankcase bolt threads (M8) and (M6) with engine oil.

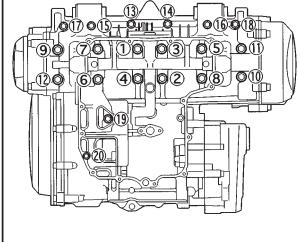
- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge[®] width [©] on each crankshaft journal. If the clearance is out of specification, select replacement crankshaft journal bearings.
- 4. Select:

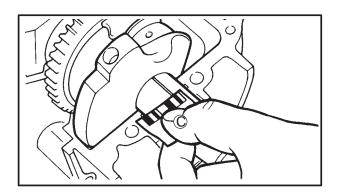
 $^\circ$ Crankshaft journal bearings (J1 imes J6)

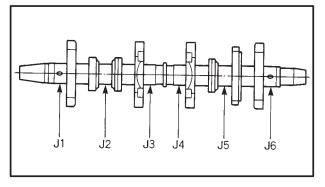
NOTE: .

- [°] The numbers A stamped into the crankshaft web and the numbers ① stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- $^\circ$ "J1 \times J6" refer to the bearings shown in the crankshaft illustration.
- $^\circ$ If "J1 $\,\times\,$ J6" are the same, use the same size for all of the bearings.











For example, if the crankcase " J_1 " and crankshaft web "J1" numbers are "6" and "2" respectively, then the bearing size for "J1" is:

Bearing size for J1: J₁ (crankcase) – J1 (crankshaft web) + 1 = 6 – 2 + 1 = 5 (yellow)

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

- 5. Measure:
 - ° crankshaft-pin-to-big-end-bearing clearance

Out of specification \rightarrow Replace the big end bearings.



Crankshaft-pin-to-big-endbearing clearance $0.043 \times 0.066 \text{ mm}$ Limit 0.08 mm

The following procedure applies to all of the connecting rods.

CAUTION:

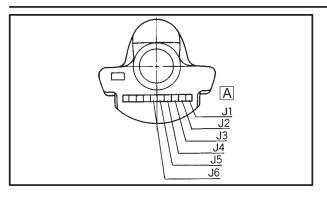
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

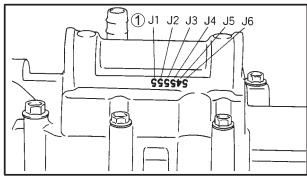
- a. Clean the big end bearings, crankshaft pins, and bearing portions of the connecting rods.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

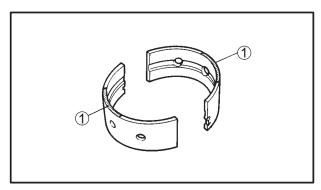
NOTE: .

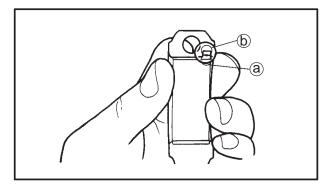
Align the projections (a) on the big end bearings with the notches (b) in the connecting rod and connecting rod cap.

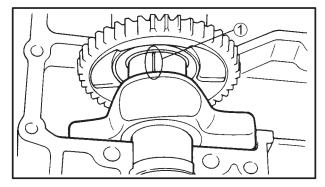
c. Put a piece of $\mathsf{Plastigauge}^{\texttt{B}}$ (1) on the crankshaft pin.



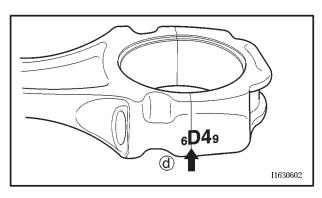


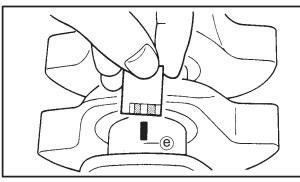


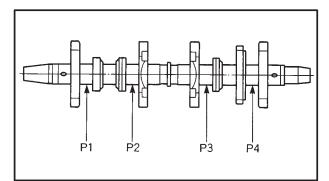


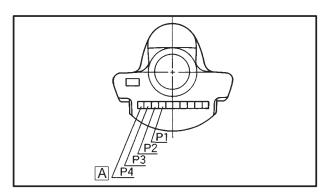


ENG







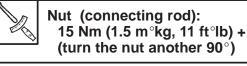


CRANKSHAFT

NOTE:

- ° Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nut seats.
- [°] Make sure that the "Y" mark © on the connecting rod faces towards the left side of the crankshaft.
- $^\circ$ Make sure that the characters 0 on both the connecting rod and connecting rod cap are aligned.

e. Tighten the connecting rod nuts.



Refer to "INSTALLING THE CONNECT-ING RODS".

- Remove the connecting rod and big end bearings.
 Refer to "REMOVING THE CONNECT-
- ING RODS".
 g. Measure the compressed Plastigauge[®] width [®] on the crankshaft pin.
 If the clearance is out of specification, se-

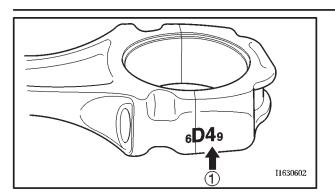
6. Select:

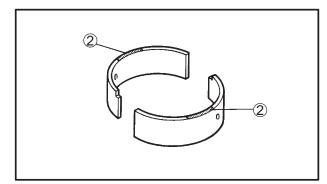
 $^{\circ}$ big end bearings (P_1 \times P_4)

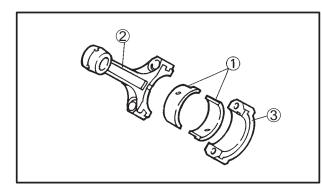
NOTE: .

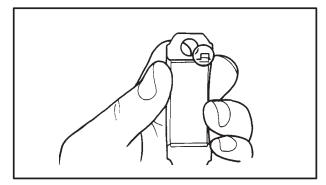
- The numbers A stamped into the crankshaft web and the numbers ① on the connecting rods are used to determine the replacement big end bearing sizes.
- $^\circ$ "P1" \times "P4" refer to the bearings shown in the crankshaft illustration.

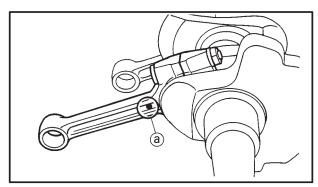
lect replacement big end bearings.













For example, if the connecting rod " P_1 " and the crankshaft web "P1" numbers are "4" and "1" respectively, then the bearing size for " P_1 " is:

Bearing size for P_1 : P_1 (connecting rod) – P1 (crankshaftweb) = 4 – 1 = 3 (brown)

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

INSTALLING THE CONNECTING RODS

- 1. Lubricate:
 - $^{\circ}$ bolt threads
 - nut seats (with the recommended lubricant)

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

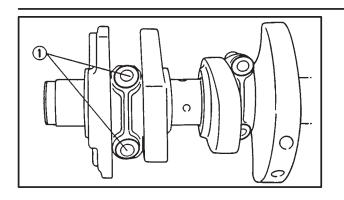
3. Install:

- $^\circ$ big end bearings (1)
- ° connecting rods 2
- connecting rod caps ③
 (onto the crankshaft pins)

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.
- ^o Make sure that the "Y" marks (a) on the connecting rods face towards the left side of the crankshaft.
- ° Make sure that the characters on both the connecting rod and connecting rod cap are aligned.

ENG

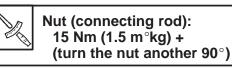


4. Align: ° bolt heads ①

(with the connecting rod caps)

5. Tighten: ° Nuts (connecting rod)

CRANKSHAFT



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°).

WARNING

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

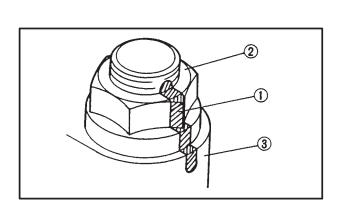
Replace the bolt with a new one and perform the procedure again.

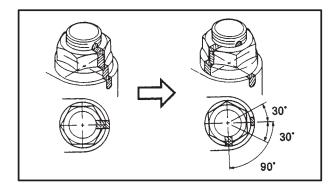
CAUTION:

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

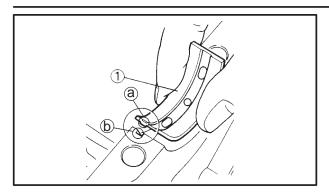
NOTE: .

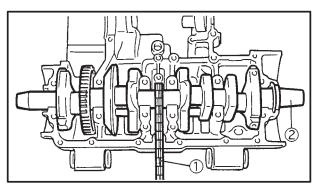
When using a hexagonal nut, note that the angle from one corner to another is 60° .

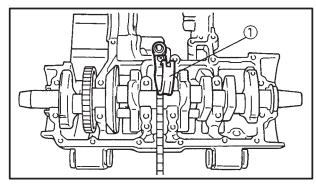












EB412720 INSTALLING THE CRANKSHAFT

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

NOTE: _

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

2. Install:

- $^{\circ}$ timing chain (1)
- (onto the crankshaft sprocket)
- ° crankshaft assembly 2

NOTE:

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

X

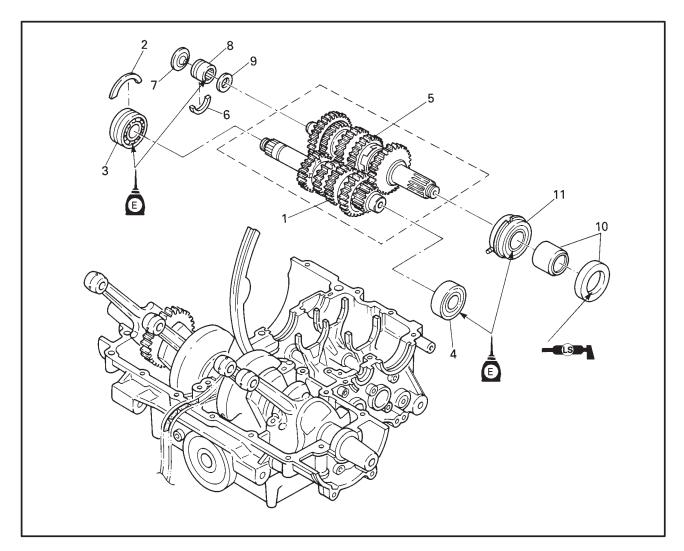
- 3. Install:
 - ° timing chain guide ①

10 Nm (1.0 m°kg)

TRANSMISSION



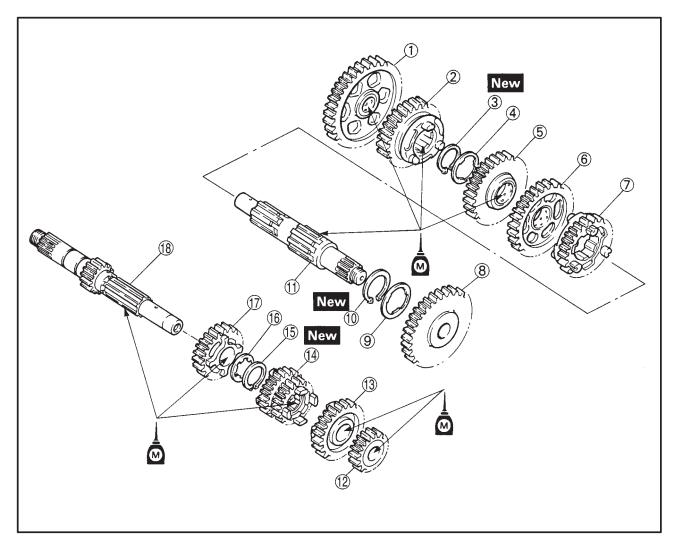
TRANSMISSION



Order	Job name/Part name	Q'ty	Remarks
	Removing the transmission		Remove the parts in the order listed.
	Disassembly the crankcase		Refer to "CRANKCASE" section.
1	Main axle assembly	1 -	Refer to "INSTALLING THE
2	Circlip	1 -	TRANSMISSION" section.
3	Bearing	1	
4	Bearing	1	
5	Drive axle assembly	1 -	Refer to "INSTALLING THE
6	Circlip	1 -	TRANSMISSION" section.
7	Nozzle	1	
8	Bearing	1	
9	Plate washer	1	
10	Oil seal/collar	1/1	
11	Bearing	1	
	-		For installation, reverse the removal
			procedure.

TRANSMISSION

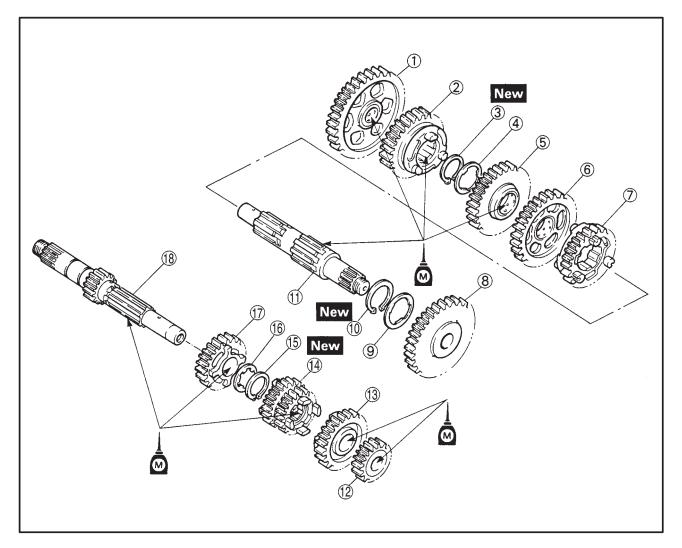




Order	Job name/Part name	Q'ty	Remarks
	Disassembling the transmission		Disassembly the parts in the order listed.
1	1st wheel gear	1	
2	5th wheel gear	1	
3	Circlip	1	
4	Washer	1	
5	4th wheel gear	1	
6	3rd wheel gear	1	
$\overline{\mathcal{O}}$	6th wheel gear	1	
8	2nd wheel gear	1	
9	Washer	1	
10	Circlip	1	
11	Drive axle	1	
12	2nd pinion gear	1	
13	6th pinion gear	1	

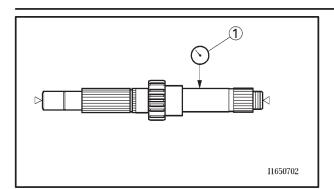
ENG

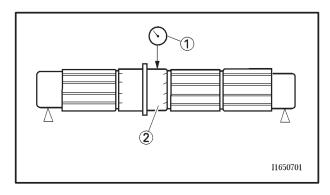


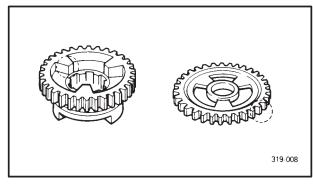


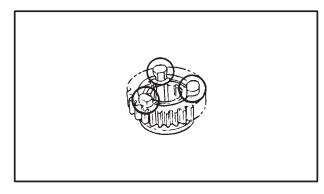
Order	Job name/Part name	Q'ty	Remarks
14	3rd/4th pinion gear	1	
15	Circlip	1	
16	Washer	1	
1)	5th	1	
18	Main axle	1	
			For assembly, reverse the disassembly
			procedure.

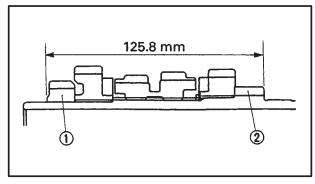








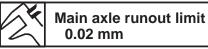




EB413422 CHECKING THE TRANSMISSION

- 1. Measure:
 - ° main axle runout
 - (with a centering device and dial gauge 1)

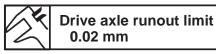
Out of specification \rightarrow Replace the main axle.



2. Measure:

- ° drive axle runout
 - (with a centering device and dial gauge 1

Out of specification \rightarrow Replace the drive axle.



3. Check:

° transmission gears Blue discoloration/pitting/wear \rightarrow Replace the defective gear(-s).

° transmission gear dogs Cracks/damage/rounded edges \rightarrow Replace the defective gear(-s).

4. Check:

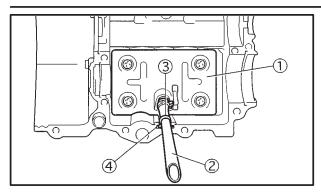
 transmission gear engagement (each pinion gear to its respective wheel gear)

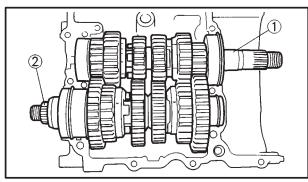
Incorrect \rightarrow Reassemble the transmission axle assemblies.

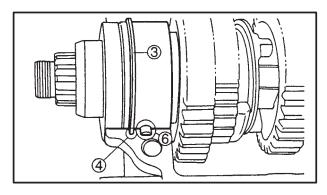
5. Check:

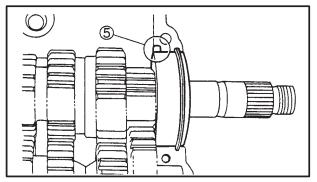
 [°] transmission gear movement Rough movement → Replace the defective part(-s).

Transmission gear reassembling point: Press the 2nd pinion gear ① into the main axle ②, as shown in the illustration.









TRANSMISSION



INSTALLING THE TRANSMISSION

- 1. Install:
 - $^{\circ}$ oil baffle plate (1)
 - $^{\circ}$ crankcase breather hose (2)

NOTE: .

Insert the metal clamp 3 on the crankcase breather hose into the slots 4 in the crankcase.

- 2. Install:
 - $^\circ$ main axle assembly 1
 - $^\circ$ drive axle assembly 2
 - $^{\circ}$ oil seals
 - ° circlips
 - ° lock washer

NOTE: _

- ^o Make sure that the drive axle bearing circlips ③ are inserted into the grooves ④ in the upper crankcase.
- The main axle bearing pin (5) must face towards the front of the crankcase and the drive axle bearing pin (6) must face towards the rear of the crankcase.
- 3. Check:

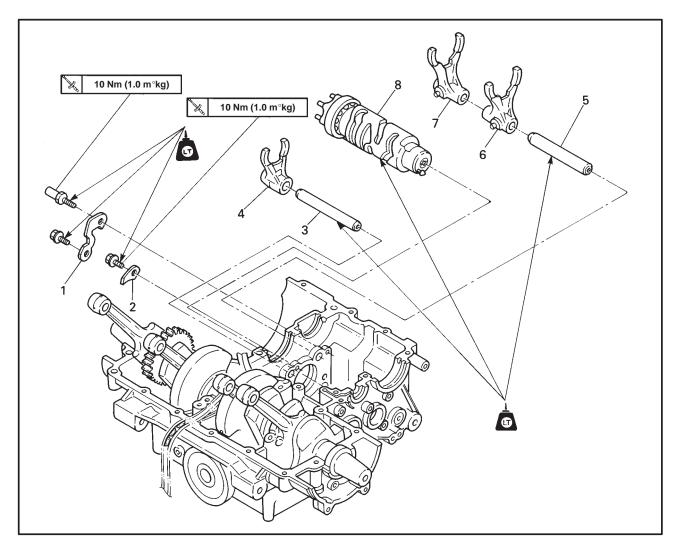
 $^{\circ}$ transmission Rough movement \rightarrow Repair.

NOTE: .

Oil each gear, shaft, and bearing thoroughly.



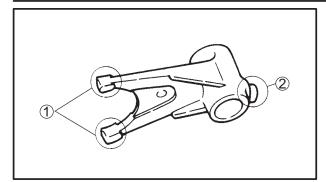
SHIFT DRUM AND SHIFT FORKS

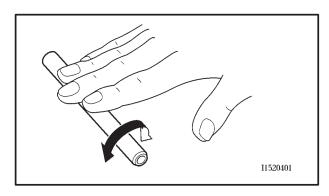


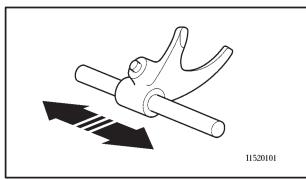
Order	Job name/Part name	Q'ty	Remarks
	Removing the shift drum and		Remove the parts in the order listed.
	shift forks		
	Disassembly the crankcase		Refer to "CRANKCASE" section.
	Transmission		Refer to "TRANSMISSION" section.
1	Shift fork guide bar retainer	1 -	
2	Shift drum retainer	1	
3	Shift fork guide bar 1	1	
4	Shift fork C	1	Refer to "INSTALLING THE SHIFT
5	Shift fork guide bar 2	1	FORKS AND SHIFT DRUM" section.
6	Shift fork L	1	
7	Shift fork R	1	
8	Shift drum	1 -	μ
			For installation, reverse the removal
			procedure.

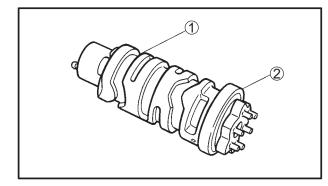
SHIFT DRUM AND SHIFT FORKS

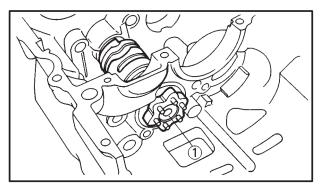












EB413400 **CHECKING THE SHIFT FORKS**

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

- 1. Check:
 - ° shift fork cam follower ①

° shift fork pawl ② Bends/damage/scoring/wear \rightarrow Replace the shift fork.

2. Check: ° shift fork guide bar Roll the shift fork guide bar on a flat surface.

 $\mathsf{Bend} \to \mathsf{Replace}.$

WARNING

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

3. Check:

° shift fork movement (on the shift fork guide bar) Rough movement \rightarrow Replace the shift forks and shift fork guide bar as a set.

EB413410 CHECKING THE SHIFT DRUM ASSEMBLY 1. Check:

- - ° shift drum grooves Damage/scratches/wear \rightarrow Replace the shift drum.
 - ° shift drum segment ①
 - Damage/wear \rightarrow Replace.
 - ° shift drum bearing 2
 - Damage/pitting \rightarrow Replace.

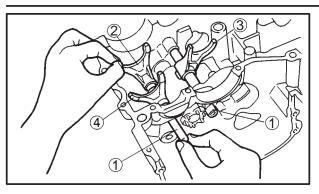
INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY

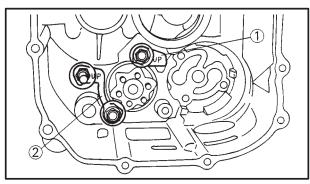
1. Install:

° shift drum assembly ①

SHIFT DRUM AND SHIFT FORKS





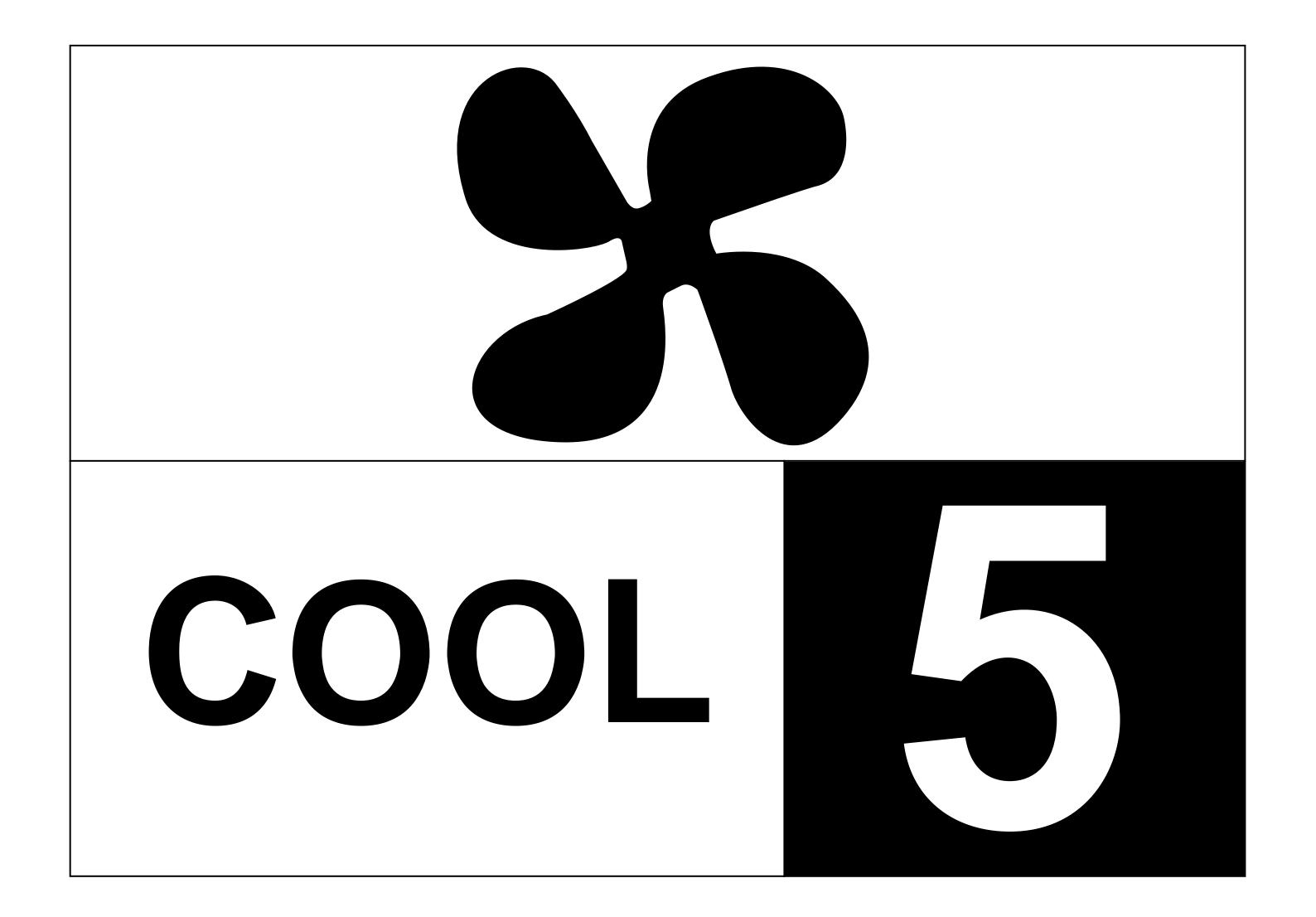


- 2. Install:
 - shift fork guide bars ①
 shift fork "L" ②
 shift fork "C" ③

 - shift fork "R" (4)

NOTE: _

- The embossed marks on the shift forks should face towards the left side of the engine and be in the following sequence: "L", "C", "R".
- The grooved side of the shift fork guide bar should face towards the right side of the engine.
- 3. Install:
 - shift drum retainer ① X 10 Nm (1.0 m•kg) **LOCKTITE**[®]
 - shift fork guide bar retainer 2 10 Nm (1.0 m•kg)r X





CHAPTER 5 COOLING SYSTEM

RADIATOR
CHECKING THE RADIATOR 5-2
INSTALLING THE RADIATOR
THERMOSTAT
CHECKING THE THERMOSTAT 5-6
ASSEMBLING THE THERMOSTAT 5-7
INSTALLING THE THERMOSTAT 5-7
WATER PUMP
REMOVING THE WATER PUMP 5-9
CHECKING THE WATER PUMP 5-9
INSTALLING THE WATER PUMP 5-9

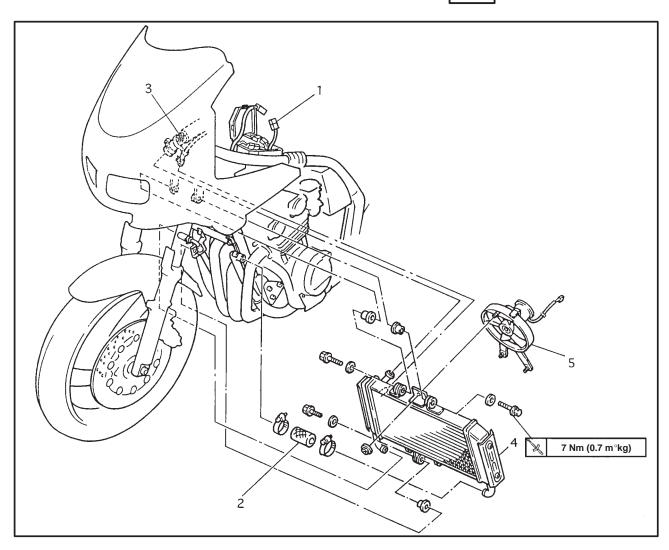


RADIATOR



COOLING SYSTEM

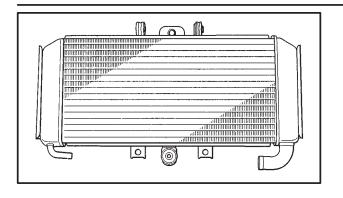
RADIATOR

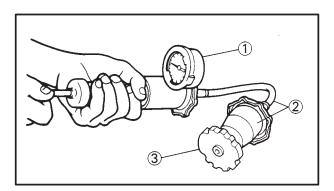


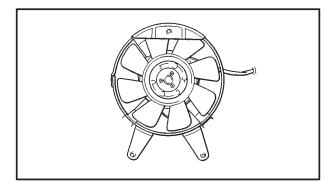
Order	Job name/Part name	Q'ty	Remarks
	Removing the radiator Seat Fuel tank		Remove the parts in the order listed. Refer to "FRONT COWLING/SEAT/SIDE COVER/FUEL TANK" section in chapter 3.
1	Drain the coolant Fan motor leads	1	Refer to "CHANGING THE COOLANT" section in chapter 3.
2	Radiator outlet hose	1	Disconnect the coupler.
3	Radiator inlet hose	1	
4	Radiator	1	
5	Fan	1	
			For installation, reverse the removal procedure.

RADIATOR









EB500010 **CHECKING THE RADIATOR**

- 1. Check:
 - ° radiator fins Obstruction \rightarrow Clean.

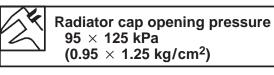
 - Apply compressed air to the rear of the radiator.

Damage \rightarrow Repair or replace.

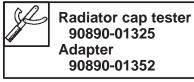
NOTE: .

Straighten any flattened fins with a thin, flathead screwdriver.

- 2. Check:
 - ° radiator hoses
 - ° radiator pipes
 - Cracks/damage \rightarrow Replace.
- 3. Measure:
 - ° radiator cap opening pressure Below the specified pressure \rightarrow Replace the radiator cap.



a. Install the radiator cap tester (1) and adapter 2 to the radiator cap 3.



- b. Apply the specified pressure for ten seconds and make sure that there is no drop in pressure.
- 4. Check:

° radiator fan Damage \rightarrow Replace. Malfunction \rightarrow Check and repair. Refer to "COOLING SYSTEM" in chapter 8.

RADIATOR



INSTALLING THE RADIATOR

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

Refer to "CHANGING THE COOLANT" in chapter 3.

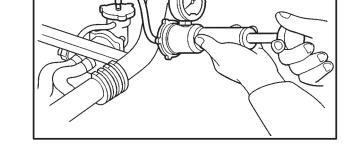
- 2. Check:
 - ° cooling system

Leaks \rightarrow Repair or replace any faulty part.

a. Attach the radiator cap tester ① to the radiator.



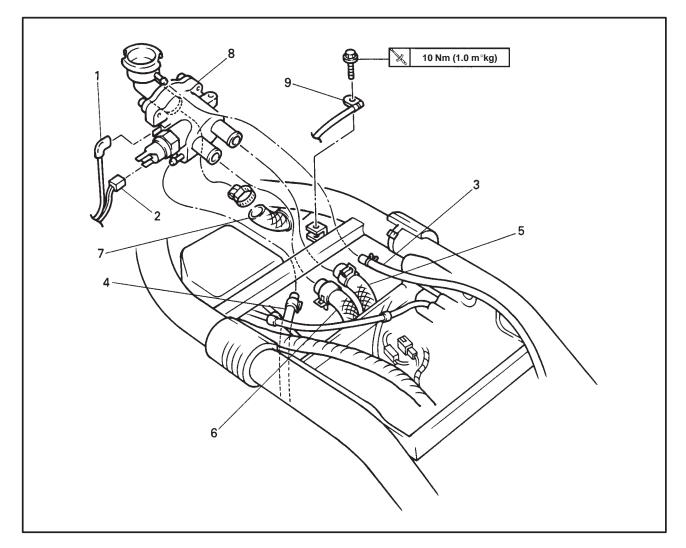
- b. Apply 100 kPa (1.0 kg/cm²) of pressure.
- c. Measure the indicated pressure with the gauge.



1

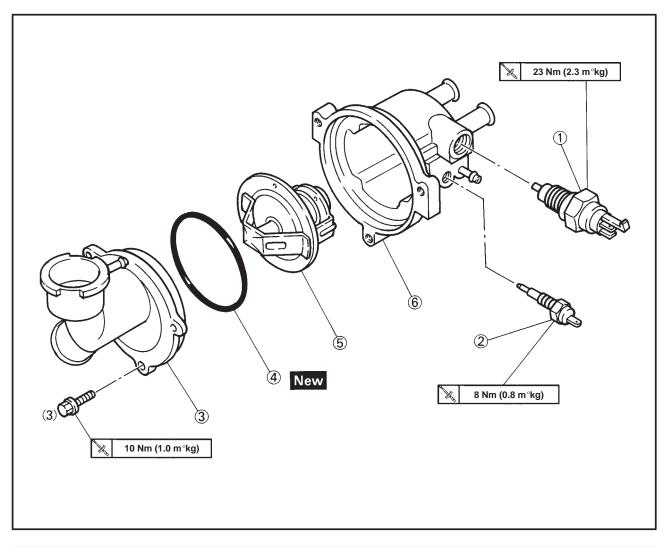


THERMOSTAT

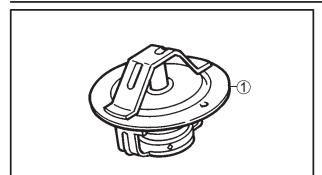


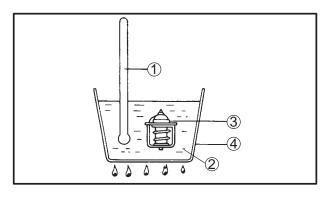
Order	Job name/Part name	Q'ty	Remarks
	Removing the thermostat Seat Fuel tank	-	Remove the parts in the order listed. Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3.
	Drain the coolant		Refer to "CHANGING THE COOLANT" section in chapter 3.
1	Thermo switch lead	1	NOTE:
	(engine temperature)		Disconnect the lead.
2	Thermo switch lead (fan motor)	1	NOTE:
3	Reservoir tank hose	1	Disconnect the coupler.
4	Carburetor inlet hose	1	
5	Engine outlet hose	1	
6	Engine outlet hose	1	
7	Radiator inlet hose	1	
8	Thermostat housing	1	
9	Ground read	1	
			For installation, reverse the removal procedure.

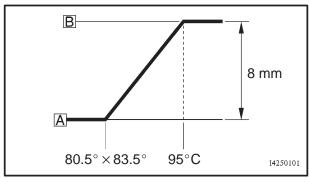
COOL

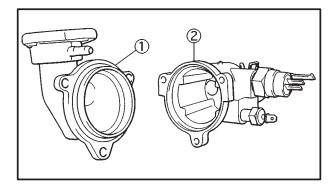


Order	Job name/Part name	Q'ty	Remarks
	Disassembling the thermostat		Disassembly the parts in the order listed.
1	Thermo switch (fan motor)	1_	
2	Thermo switch (engine temperature)	1	
3	Thermostat housing cover	1	Refer to "ASSEMBLING THE
4	O-ring	1	THERMOSTAT" section.
5	Thermostat	1	
6	Thermostat housing	1 -	
			For assembly, reverse the disassembly
			procedure.











CHECKING THE THERMOSTAT

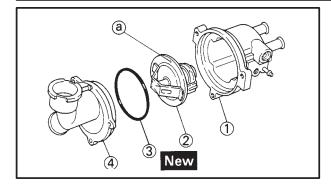
- 1. Check: ° thermostat ① Does not open at 80.5 × 83.5°C → Replace.
 - .
 - a. Suspend the thermostat in a container filled with water.
 - b. Slowly heat the water.
 - c. Place a thermometer in the water.
 - d. While stirring the water, observe the thermometer's indicated temperature.
 - *******************
 - (1) Thermometer
 - Water
 - (3) Thermostat
 - (4) Container
 - A Closes
 - **B** Opens

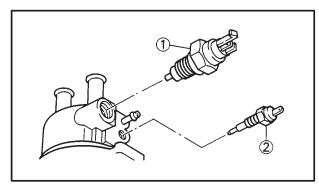
NOTE: _

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

- 2. Check:
 - $^\circ$ thermostat housing cover 1
 - ° thermostat housing (2) Cracks/damage \rightarrow Replace.
- 3. Measure:
 - radiator cap opening pressure Below the specified pressure → Replace the radiator cap.
 Refer to "CHECKING THE RADIATOR".
- 4. Check:
 - ° thermostat housing cover O-ring
 - ° thermostat inlet pipe O-ring
 - ° thermostat inlet pipe
 - ° water pump outlet pipe Damage \rightarrow Replace.







ASSEMBLING THE THERMOSTAT

- 1. Install:
 - $^\circ$ thermostat housing 1
 - ° thermostat 2
 - $^{\circ}$ O-ring (New) (3)
 - ° thermostat housing cover ④

NOTE: _

Install the thermostat with its breather hole (a) facing up.

2. Install:

```
^{\circ} thermo switch (fan motor) ①
```

23 Nm (2.3 m°kg)

° thermo switch (engine temperature) ②

CAUTION:

Use extreme care when handling the thermo switch and temperature sender. Replace any part that was dropped or subjected to a strong impact.

INSTALLING THE THERMOSTAT

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

Refer to "CHANGING THE COOLANT" in chapter 3.

2. Check:

 $^{\circ}$ cooling system Leaks \rightarrow Repair or replace any faulty part.

3. Measure:

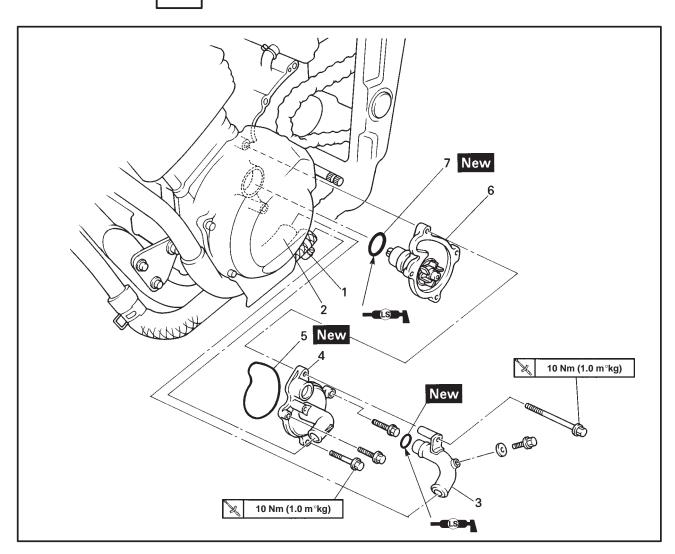
 [°] radiator cap opening pressure Below the specified pressure → Replace the radiator cap. Refer to "CHECKING THE RADIATOR".

WATER PUMP

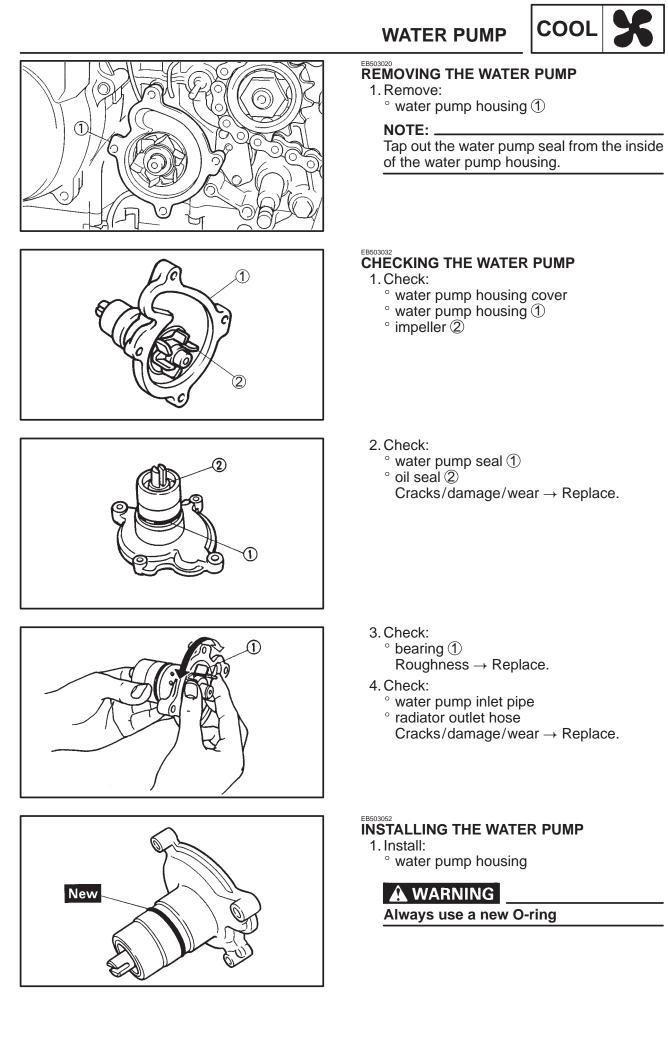


WATER PUMP

d**e**s



Order	Job name/Part name	Q'ty	Remarks
	Removing the water pump		Remove the parts in the order listed.
	Drain the coolant		Refer to "CHANGING THE
			COOLANT" section in chapter 3.
	Shift arm, drive chain cover		Refer to "REMOVING THE ENGINE" section in chapter 4.
1	Radiator outlet hose	1	
2	Water pump outlet hose	1	
3	Water pump outlet pipe	1	
4	Water pump housing cover	1	
5	O-ring	1	
6	Water pump assembly	1 -	Refer to "REMOVING/INSTALLING THE
7	O-ring	1 -	WATER PUMP" section.
			For installation, reverse the removal procedure.

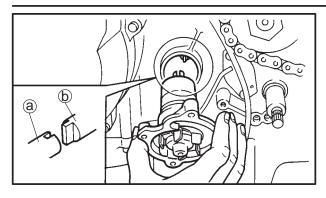


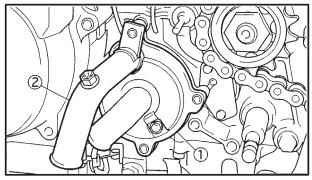
5-9

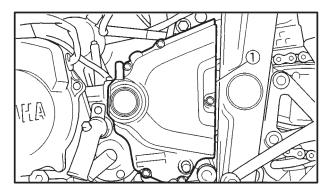
WATER PUMP

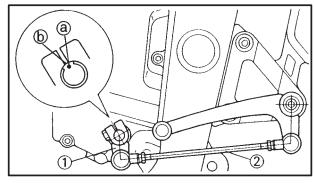
NOTE:











2. Install: ° water pump housing cover ①

grease onto the O-ring.

water pump nousing cover ()
 water pump outlet pipe (2)

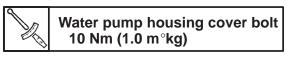
Always use a new gasket and O-rings.

 Align the slot (a) on the impeller shaft with the projection (b) on the oil pump shaft.

 Before installing the water pump housing, apply a thin coat of lithium soap base

NOTE: .

Before installing the water pump outlet pipe, apply a thin coat of lithium soap base grease onto the O-rings.



- 3. Install:
- ° gasket
 - ° dowel pins
 - ° drive chain sprocket cover ①
- 4. Install: ° shift arm ① 🗽 10 Nm (1.0 m°kg)

NOTE: _

Align the slot (a) on the shift arm (1) with the punch mark (b) on the shift shaft (2).

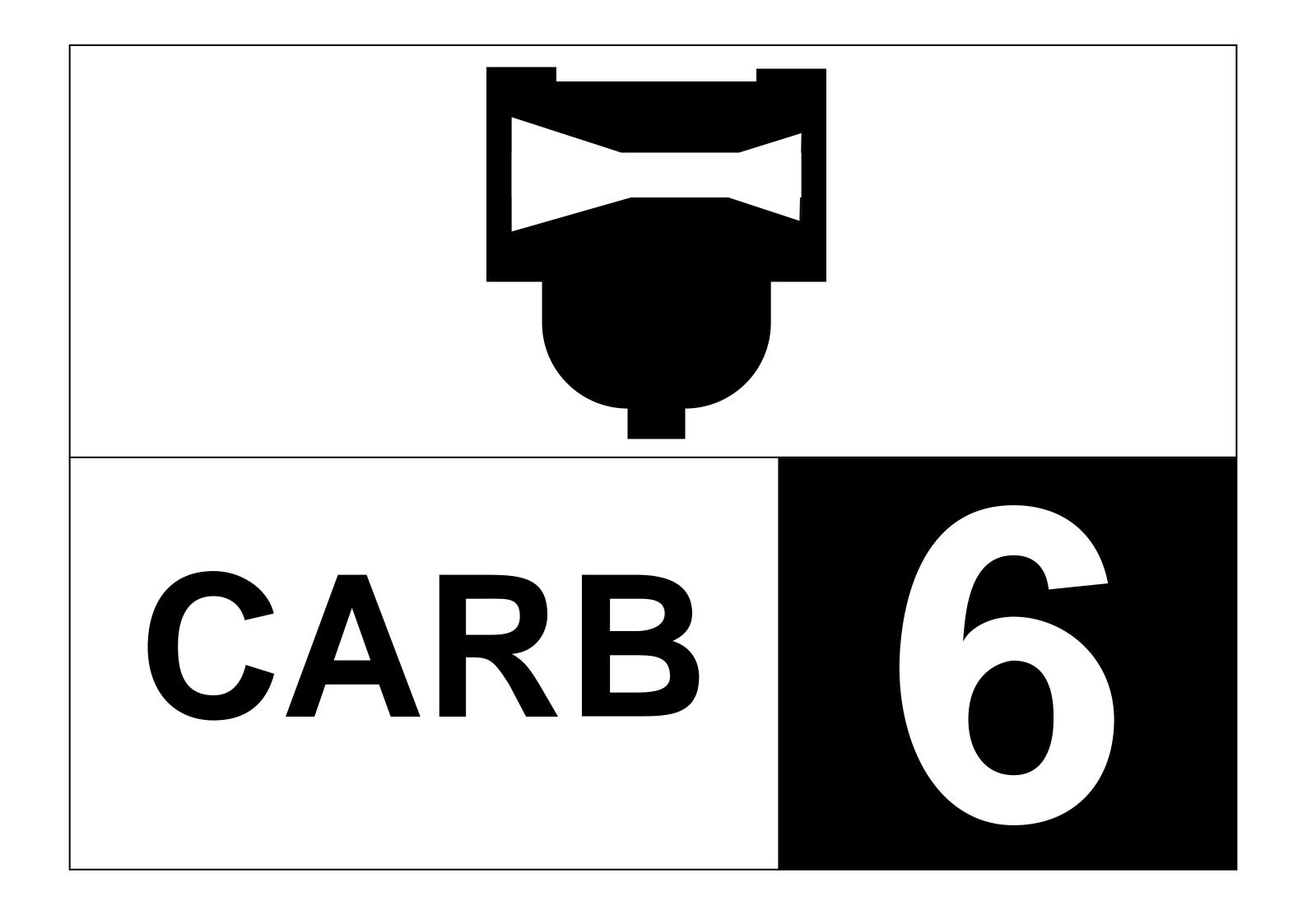
5. Fill:

 cooling system (with the specified amount of the recommended coolant) Refer to "CHANGING THE COOLANT" in chapter 3.

- 6. Check:
 - ° cooling system

Leaks \rightarrow Repair or replace any faulty part.

- 7. Measure:
 - radiator cap opening pressure Below the specified pressure → Replace the radiator cap.
 Refer to "CHECKING THE RADIATOR".





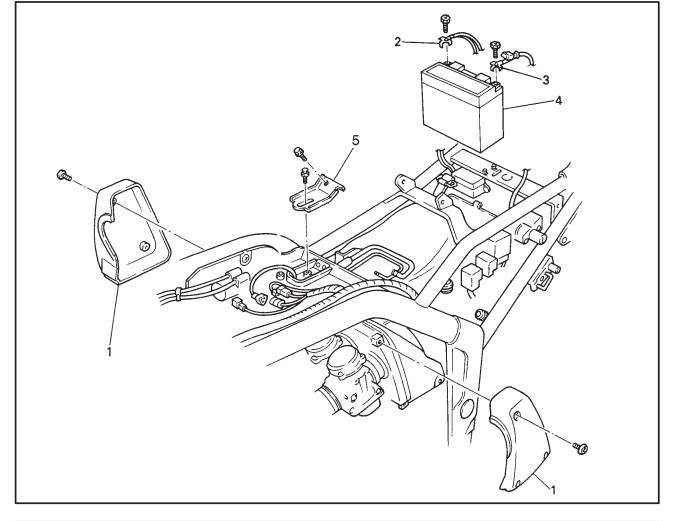
CHAPTER 6 CARBURETORS

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CARBURETORS

CARBURETORS AIR FILTER CASE



Order	Job name/Part name	Q'ty	Remarks
	Removing the air filter case Seat, fueltank and sidecovers Drain the coolant		Remove the parts in the order listed. Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3. Refer to "CHANGING THE COOLANT"
1 2 3 4 5	Air filter case (left/right) Battery negative lead Battery positive lead Battery Stay	1/1 1 1 1 1	section. For installation, reverse the removal
			procedure.

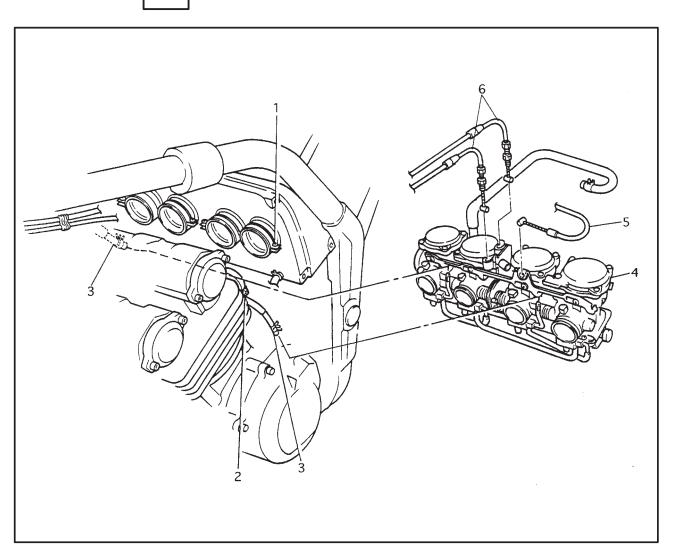






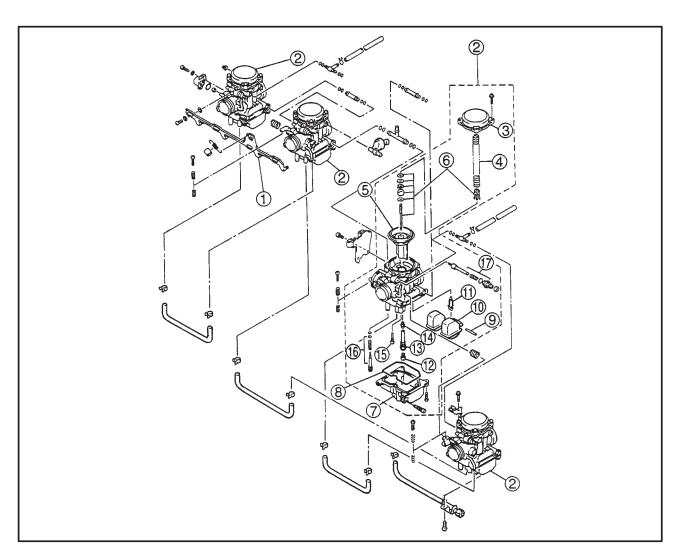
CARBURETORS

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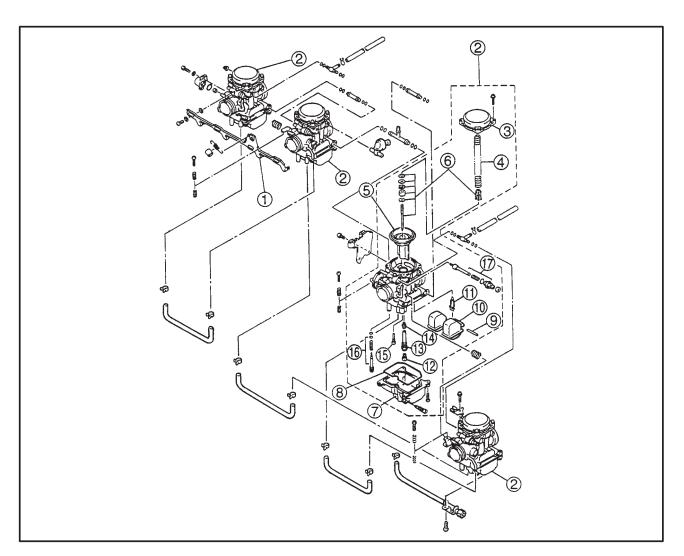
Order	Job name/Part name	Q'ty	Remarks
	Removing the carburetors		Remove the parts in the order listed.
	Throttle position sensor lead		NOTE:
1	Air filter joint screw	4	Disconnect the coupler.
2	Carburetors joint screw	4	
3	Carburetor inlet/outlet hose	1/1	
4	Carburetors assembly	1	
5	Starter cable	1	
6	Throttle cable	2	
			For installation, reverse the removal
			procedure.





Order	Job name/Part name	Q'ty	Remarks
1 2 3 4 5 6 7 8 9 10 1 2	Disassembling the carburetors Starter plunger link Carburetors assembly Vacuum chamber cover Piston valve spring Piston valve Needle kit Float chamber Float chamber gasket Float pin Float Needle valve assembly Main jet	1 4 1 - 1 1 1 1 1 1 1 1	Disassembly the parts in the order listed. #1, #2, #3, #4 Refer to "ASSEMBLING THE CARBURETERS" section.





Order	Job name/Part name	Q'ty	Remarks
13	Main jet holder	1	
14	Needle jet	1	
15	Pilot jet	1	
16	Pilot screw set	1	Refer to "ASSEMBLING THE
			CARBURETORS" section.
17	Starter plunger kit	1	
			For assembly, reverse the disassembly
			procedure.

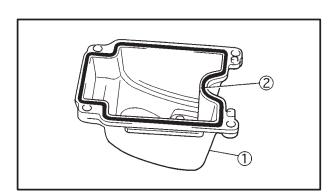


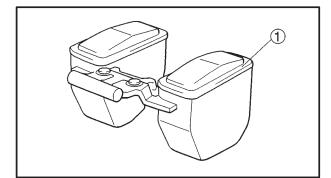
CHECKING THE CARBURETORS

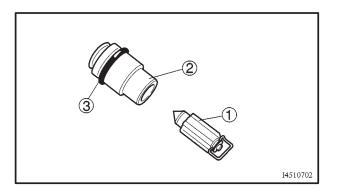
The following procedure applies to all of the carburetors.

- 1. Check:
 - ° carburetor body
 - ° float chamber
 - ° main jet holder
 - $Cracks/damage \rightarrow Replace.$
- 2. Check:
 - [◦] fuel passages
 Obstruction → Clean.
 - ****
 - a. Wash the carburetor in a petroleumbased solvent. Do not use any caustic-carbure-tor-cleaning solution.
 - b. Blow out all of the passages and jets with compressed air.









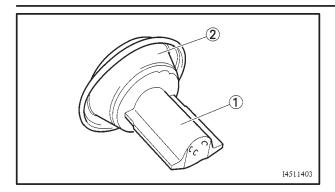
- 3. Check:
 - ° float chamber body (1) Dirt \rightarrow Clean.
- 4. Check:
 ° float chamber rubber gasket ② Cracks/damage/wear → Replace.
- 5. Check: ° float ① Damage → Replace.

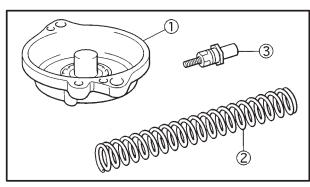
- 6. Check:
 - $^{\circ}$ needle valve (1)
 - $^\circ$ needle valve seat 2

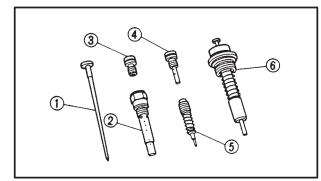
Damage/obstruction/wear \rightarrow Replace the needle valve, needle valve seat and O-ring as a set.

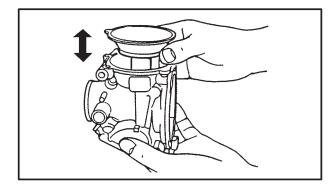
7. Check:

° O-ring ③ Damage/wear → Replace the needle valve, needle valve seat and O-ring as a set.











- 8. Check: ° piston valve ①
 - Damage/scratches/wear \rightarrow Replace.
 - ° rubber diaphragm ②Cracks/tears → Replace.
- 9. Check:
 - $^{\circ}$ vacuum chamber cover (1)
 - piston valve spring (2)
 jet needle holder (3)
 - Cracks/damage \rightarrow Replace.
- 10. Check:
 - $^{\circ}$ jet needle kit 1
 - ° needle jet 2
 - ° main jet 3
 - ° pilot jet ④
 - pilot screw (5)
 starter plunger (1)
 - ° starter plunger \bigcirc Bends/damage/wear → Replace. Obstruction → Clean. Blow out the jets with compressed air.
- 11. Check:
 - ° piston valve movement Insert the piston valve into the carburetor body and move it up and down.
 Tightness → Replace the piston valve.
- 12. Check:
 - ° fuel feed pipes
 - ° hose joint Cracks/damage → Replace. Obstruction → Clean.
 - Blow out the pipes with compressed air.
- 13. Check:
 - ° fuel hoses
 - $Cracks/damage/wear \rightarrow Replace.$
 - Obstruction \rightarrow Clean.
 - Blow out the hoses with compressed air.

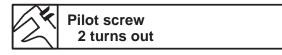


ASSEMBLING THE CARBURETORS

The following procedure applies to all of the carburetors.

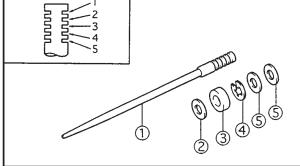
CAUTION:

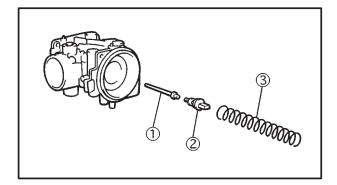
- ^o Before assembling the carburetors, wash all of the parts in a petroleumbased solvent.
- ° Always use a new gasket.
- 1. Install:
 - ° O-ring (New)
 - ° washer
 - ° pilot screw spring
 - ° pilot screw 1





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2. Install:

- ° jet needle 1
- ° washer 2 (0.5 mm)
- $^{\circ}$ ring (3)
- ° clip ④
- ° washer (5) (0.5 mm)

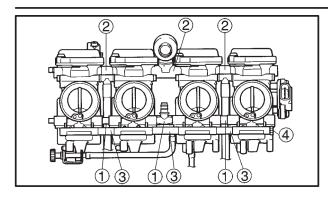


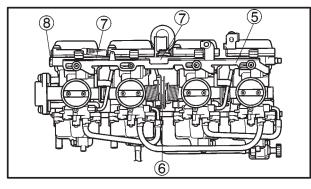
Standard clip position: No. 3 Groove

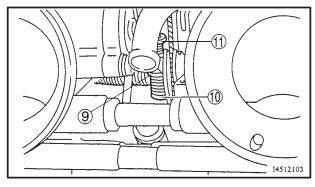
- 3. Install:
 - ° piston valve
 - $^\circ$ jet needle kit 1
 - ° jet needle holder 2
 - ° piston valve spring ③
 - ° vacuum chamber cover

NOTE: _

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









- 4. Install: ° fuel feed joints ①
 - ° hose joints (1
 - ° spacer ③
 - ° connecting bolt ④
 - ° starter plunger link (5)
 - ° throttle cable holder 6
 - ° spacer ⑦
 - ° connecting bolt (8)

NOTE: .

- ° Do not tighten the connecting bolts yet.
- Install the throttle arm (9) onto carburetors #1, #2, and #4 between the spring (10) and synchronizing screw (11).
- ^o Install the starter plunger link onto each starter plunger.
- 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 cable lever and starter plunger link operate smoothly.

INSTALLING THE CARBURETORS

- 1. Adjust:
 - carburetor synchronization Refer to "SYNCHRONIZING THE CAR-BURETORS" in chapter 3.
- 2. Adjust:
 - ° engine idling speed

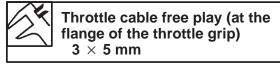
Engine idling speed 1,150 × 1,250 r/mi

[F] 1,150 × 1,250 r/min for to "ADJUSTING THE ENGINE

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

3. Adjust:

° throttle cable free play



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



MEASURING AND ADJUSTING THE FUEL

1. Measure:

fuel level ⓐ
 Out of specification → Adjust



Fuel level (above the float chamber mating surface) 4.5 mm

- 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 to the fuel drain pipe ②.



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

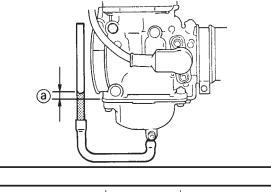
NOTE:

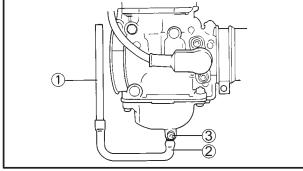
Fuel level readings should be equal on both sides of the carburetor assembly.

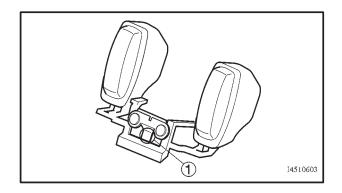


- 2. Adjust:
 - ° fuel level

 - 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.









CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE: _

- Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.
- When installing the throttle position sensor, adjust its angle according to the RPM which is displayed on the tachometer.
 Refer to the adjustment procedure below.
- 1. Check:
 - ° throttle position sensor

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

Tester positive lead $\rightarrow BLUE$ Tester negative lead $\rightarrow BLACK/BLUE$

c. Check the throttle position sensor maximum resistance.

Out of specification \rightarrow Replace the throttle position sensor.

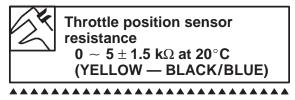


Throttle position sensor maximum resistance $3.5 \sim 6.5 \text{ k}\Omega \text{ at } 20^{\circ}\text{C}$ (BLUE — BLACK/BLUE)

- d. Install the throttle position sensor onto the carburetor.
- e. Connect the pocket tester ($\Omega \times 1k$) to the throttle position sensor.

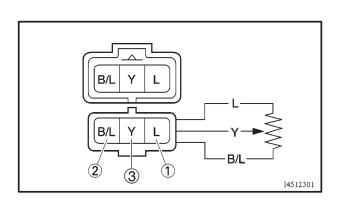
 $\begin{array}{c} \mbox{Tester positive lead} \rightarrow \mbox{YELLOW} \begin{tabular}{l} \hline \end{tabular} \\ \mbox{Tester negative lead} \rightarrow \begin{tabular}{l} \end{tabular} \\ \end{$

 f. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range. Out of specification → Replace the throttle position sensor.



- 2. Adjust:
 - ° throttle position sensor angle

 - a. Turn the main switch to "ON".





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

NOTE: _

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:

NOTE: .

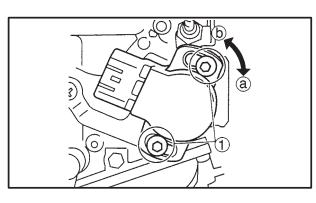
The angle of the throttle position sensor is indicated by the RPM which is displayed on the tachometer.

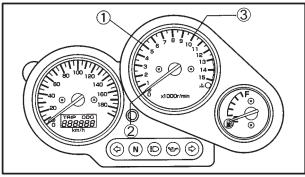
Tachometer Reading	Throttle position sensor angle	Adjust- ment direction
5000 rpm ①	Correct	
0 rpm ②	Incorrect	a
10000 rpm ③	Incorrect	b

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

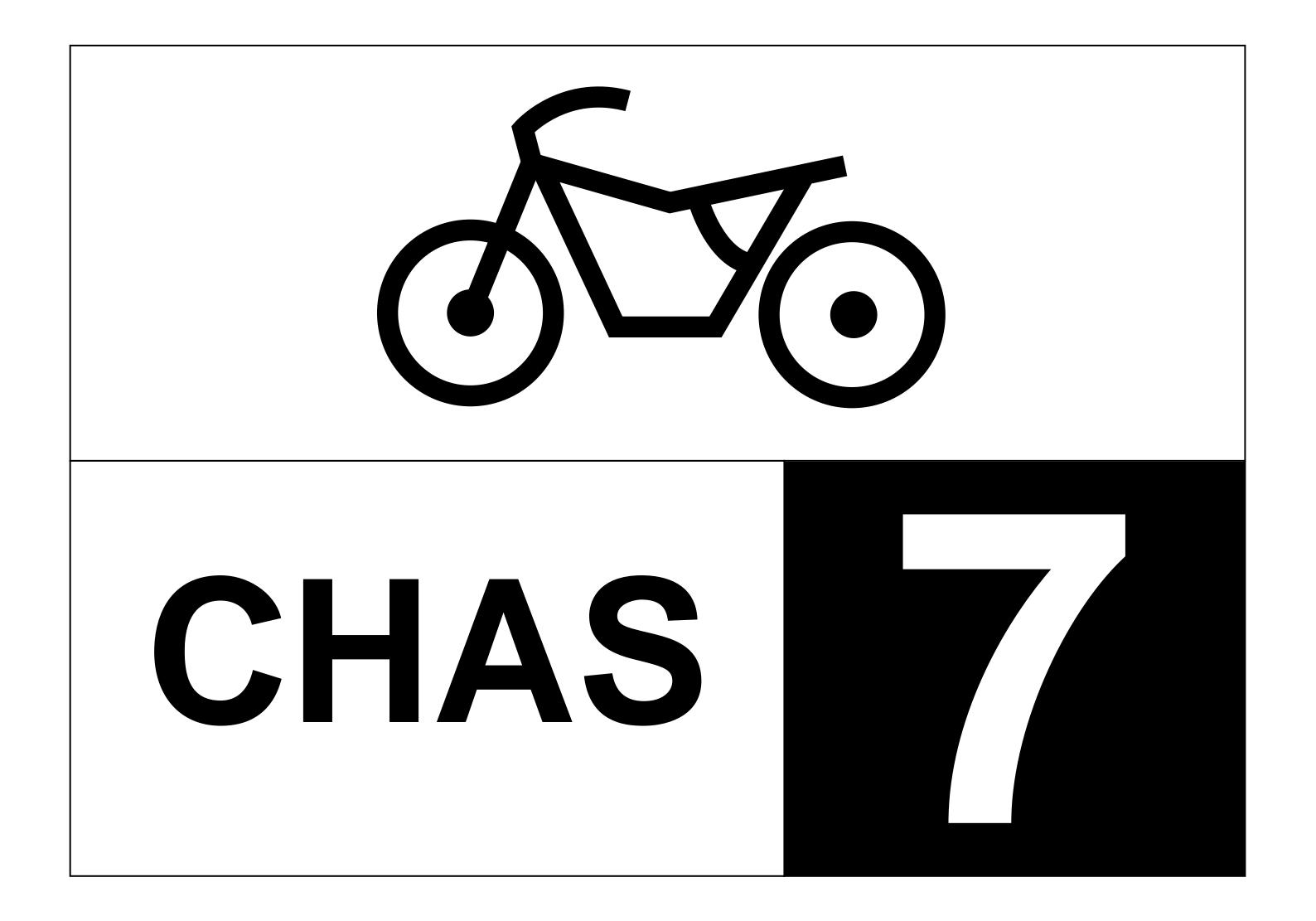
NOTE: .

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











CHAPTER 7 CHASSIS

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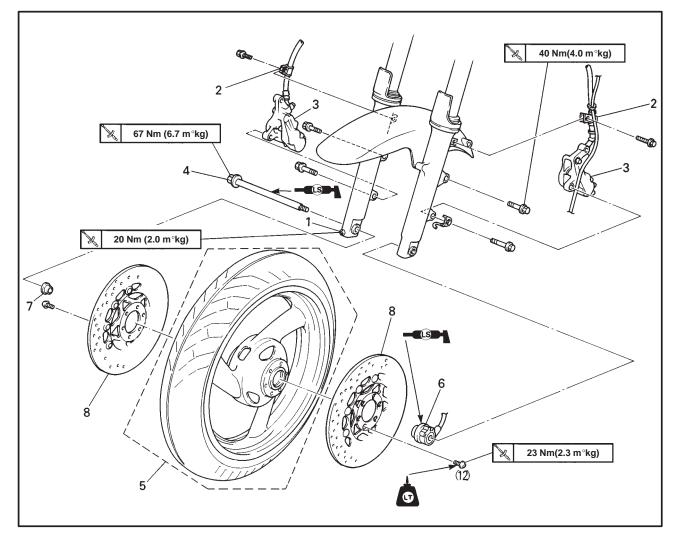


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CHASSIS

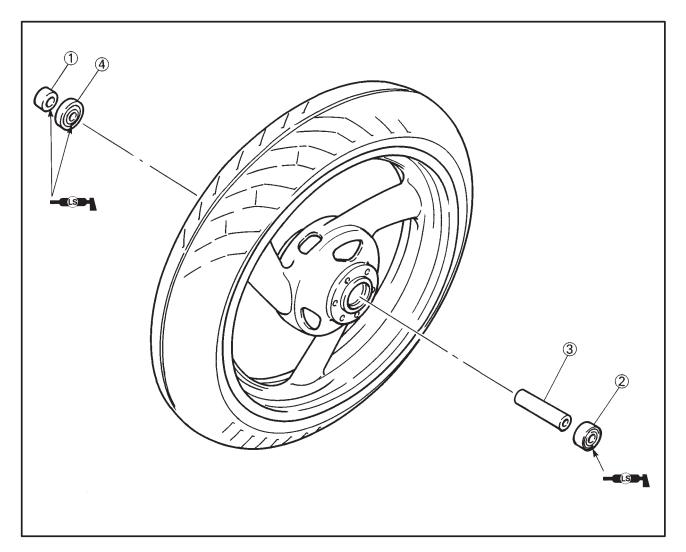
FRONT WHEEL AND BRAKE DISC



Order	Job name/Part name	Q'ty	Remarks
	Removing the flont wheel and brake		Remove the parts in the order listed.
	discs		
1	Wheel axle pinch bolt	1	NOTE:
			Loosen
2	Brake hose horder (left/right)	1/1	
3	Brake caliper (left/right)	1/1	
4	Wheel axle	1	Refer to "REMOVING/INSTALLING THE
5	Front wheel assembly	1	FRONT WHEEL" section.
6	Speed sensor unit	1 -	4
7	Collar	1	
8	Brake disc (left/right)	1/1	
			For installation, reverse the removal
			procedure.

CHAS of





Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front wheel		Disassembly the parts in the order listed.
1	Oil seal	1	
2	Bearing	1	
3	Spacer	1	
4	Bearing	1	
			For assembly, reverse the disassembly
			prodedure.



REMOVING THE FRONT WHEEL

1. Stand the motorcycle on a level surface.

A WARNING

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

NOTE: .

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

- 2. Remove:
 - ° wheel axle pinch bolt
 - ° brake hose holder (left/right)
- 3. Remove:
 - left brake caliper
 right brake caliper

NOTE: _

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

- 4. Remove:
 - ° Wheel axle° Speed sensor unit ①

CAUTION:

Push the front wheel rearward and remove the speed sensor unit 1 from the front wheel.

5. Elevate:

° front wheel

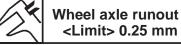
NOTE: _

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

CHECKING THE FRONT WHEEL

1. Measure:

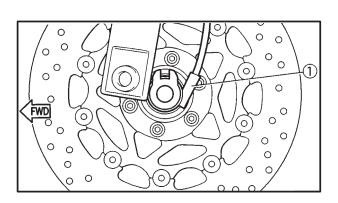
° wheel axle runout

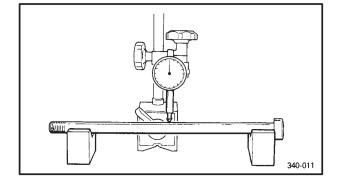


A WARNING

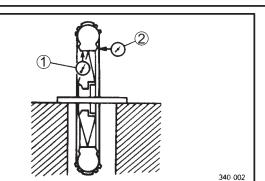
Do not attempt to straighten a bent wheel axle.

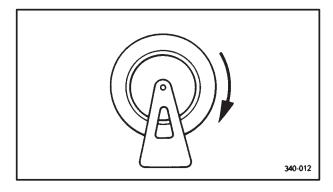
- 2. Check:
- ° tire
 - ° front wheel
 - Damage/wear \rightarrow Replace.
 - Refer to "CHECKING THE TIRES" and "ICHECKING THE WHEELS" in chapter 3.

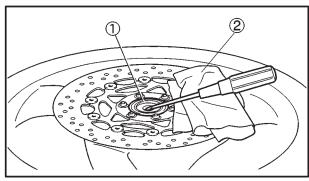


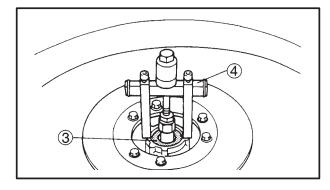


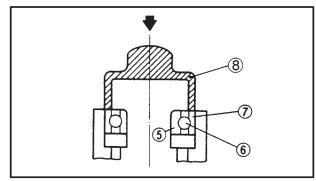
FRONT WHEEL AND BRAKE DISC



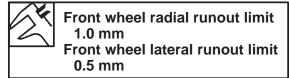








- 3. Measure:
 - $^{\circ}$ front wheel radial runout (1)
 - $^\circ$ front wheel lateral runout (2) Over the specified limits \rightarrow Replace.



CHAS

- 4. Check:
 - $^{\circ}$ wheel bearings Front wheel turns roughly or is loose \rightarrow Replace the wheel bearings.
 - ° oil seals
 - Damage/wear \rightarrow 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 ④.
- d. install the new wheel bearings and oil seals in the reverse order of disassembly.

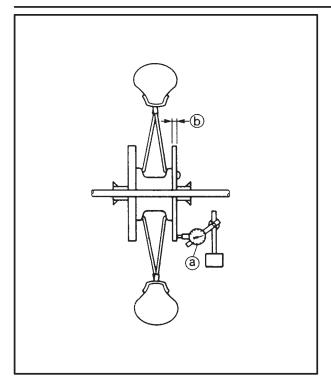
CAUTION:

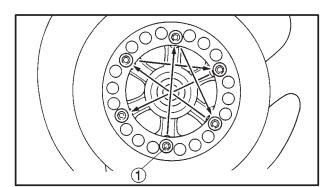
Do not contact the wheel bearing center race (5) or balls (6). Contact should be made only with the outer race (7).

NOTE: .

Use a socket (8) that matches the diameter of the wheel bearing outer race and oil seal.







CHECKING THE BRAKE DISCS

The following procedure applies to all of the brake discs.

- 1. Check:
 - brake disc

Damage/galling \rightarrow Replace.

- 2. Measure:
 - brake disc deflection ⓐ Out of specification → Correct the brake disc deflection or replace the brake disc.



- a. Place the motorcycle on a suitable stand so that the wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar 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 2×3 mm below the edge of the brake disc.
- 3. Measure:
 - brake disc thickness (b) Measure the brake disc thickness at a few different locations. Out of specification → Replace.

Brake disc thickness limit



Brake disc thickness limit (minimum) Front: 3.5 mm Rear: 4.5 mm

- 4. Adjust:
 - brake disc deflection

- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.

NOTE: .

Tighten the brake disc bolts 1 in stages and in a crisscross pattern.

Brake disc bolt LOCKTITE[®] 23 Nm (2.3 m•kg)

- 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.



INSTALLING THE FRONT WHEEL

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

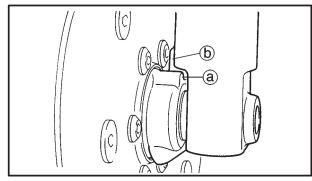


2. Install:

° Speed sensor unit

NOTE: .

Make sure that the speed sensor unit and the wheel hud are installed with the two projections (a) meshed into the two slots (b) respectively.

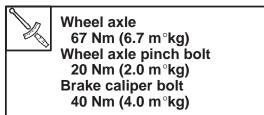


- 3. Install:
 - ° front wheel

NOTE: _

Make sure that the slot a in the speed sensor unit fits over the stopper on the outer tube b.

- 4. Tighten:
 - ° wheel axle
 - ° wheel axle pinch bolt
 - ° brake caliper bolts



A WARNING

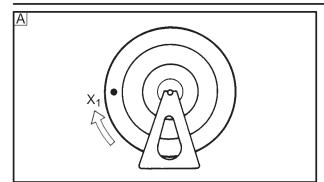
Make sure that the brake cable is routed properly.

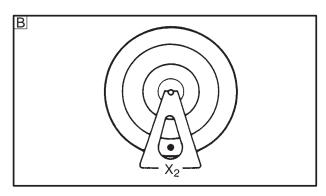
CAUTION:

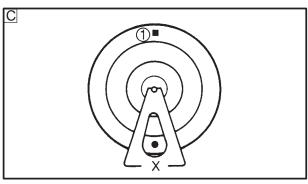
Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

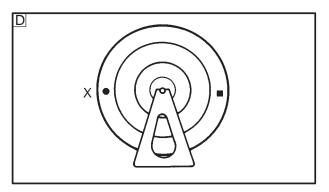
FRONT WHEEL AND BRAKE DISC











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)

NOTE: _

Place the front wheel on a suitable balancing stand.

2. Find:

° front wheel's heavy spot

a. Spin the front wheel

- b. When the front wheel stops, put an "X₁" mark at the bottom of the wheel.
- c. Turn the front wheel 90° so that the "X₁" mark is positioned as shown \boxed{A} .
- d. Release the front wheel.
- e. When the wheel stops, put an " X_2 " mark at the bottom of the wheel \mathbb{B} .
- f. Repeat steps (b) through (d) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the front wheel's heavy spot "X".
- 3. Adjust:
 - ° front wheel static balance

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

NOTE: .

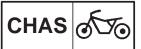
Start with the lightest weight.

- b. Turn the front wheel 90° so that the heavy spot is positioned as shown D.
- 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.

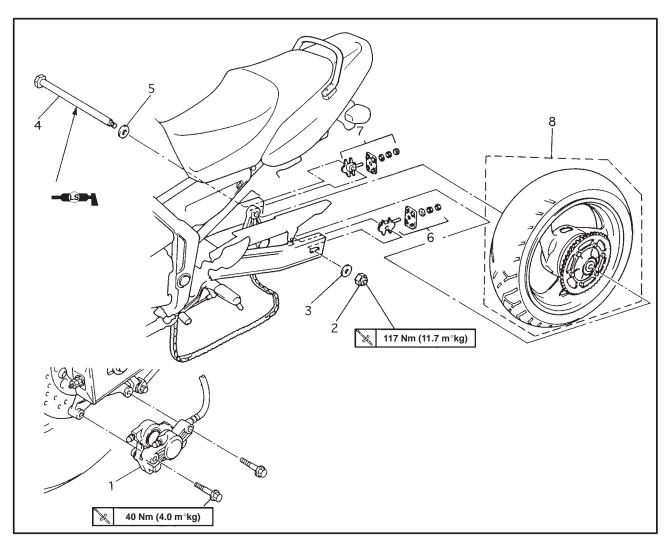
4. Check:

° front wheel static balance

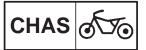
- a. Turn the front wheel and make sure that it stays at each position shown.
- b. If the front wheel does not remain stationary at all of the positions, rebalance it.



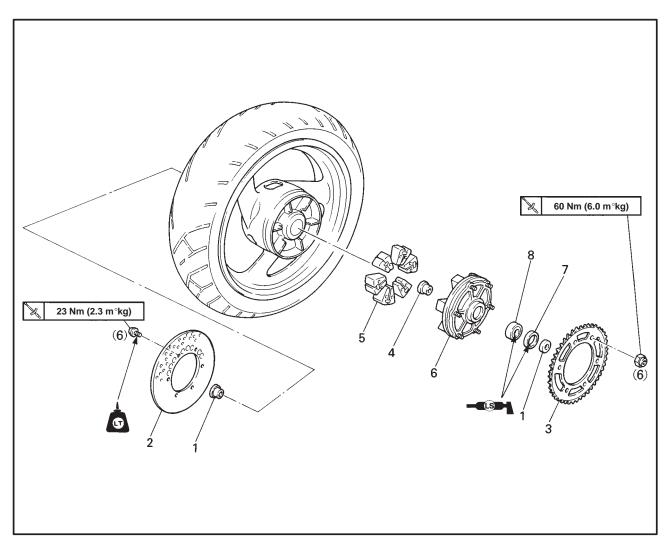
REAR WHEEL, BRAKE DISC AND REAR WHEEL SPROCKET REAR WHEEL



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed.
1	Brake caliper	1 -	
2	Nut	1	
3	Washer	1	
4	Wheel axle	1	Refer to "REMOVING/INSTALLING THE
5	Washer	1	REAR WHEEL" section.
6	Drive chain puller (left)	1	
7	Drive chain puller (right)	1	
8	Rear wheel assembly	1 _	
			For installation, reverse the removal
			procedure.



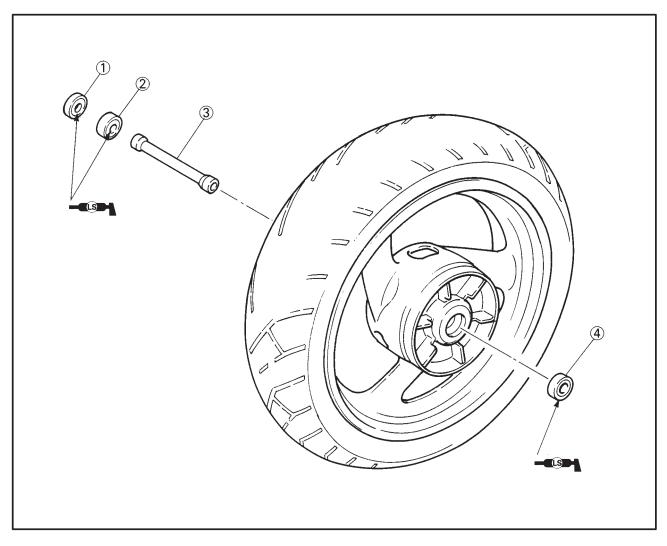
BRAKE DISC AND REAR WHEEL SPROCKET



Order	Job name/Part name	Q'ty	Remarks
	Removing the brake disk and rear wheel sprocket		Remove the parts in the order listed.
1	Collar (left/right)	1/1	
2	Brake disc	1	
3	Rear wheel sprocket	1	
4	Collar	1	
5	Drive hub damper	6	
6	Rear wheel drive hub	1	
7	Oil seal	1	
8	Bearing	1	
			For instalation, reverse the removal
			procedure.



DIASSEMBLY THE REAR WHEEL



Order	Job name/Part name	Q'ty	Remarks
	Disassembling the rear wheel		Disassembly the parts in the order listed.
1	Oil seal	1	
2	Bearing	1	
3	Collar	1	
(4)	Bearing	1	
			For assembly, reverse the disassembly
			procedure.



REMOVING THE REAR WHEEL

1. Stand the motorcycle on a level surface.

A WARNING

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

NOTE:

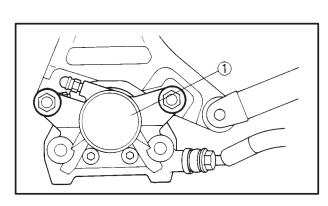
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

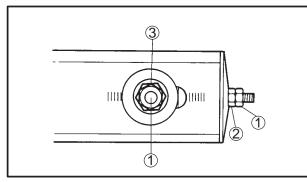


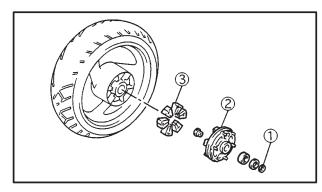
° brake caliper ①

NOTE: .

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







3. Loosen:

- $^{\circ}$ locknut (1)
- $^{\circ}$ adjusting nut 2
- 4. Remove:
 - $^\circ$ wheel axle nut 3
 - $^{\circ}$ wheel axle 4
 - ° rear wheel

NOTE: _

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

- 5. Remove:
 - $^{\circ}$ left collar (1)
 - $^\circ$ rear wheel drive hub (2)
 - $^\circ$ rear wheel drive hub damper (3)
 - ° right collar

CHECKING THE REAR WHEEL

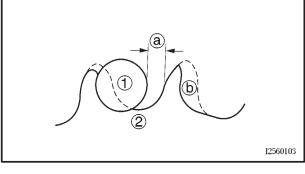
- 1. Check:
 - ° wheel axle
 - ° rear wheel
 - ° wheel bearings
 - ° oil seals
 - Refer to "FRONT WHEEL AND BRAKE DISC"
- 2. Check:
 - ° tire
 - ° rear wheel
 - Damage/wear \rightarrow Replace.
 - Refer to "CHECKING THE TIRES" and
 - "CHECKING THE WHEELS" in chapter 3.

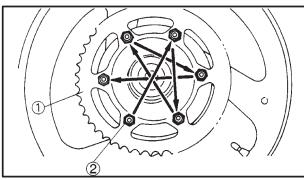


- 3. Measure:
 - ° rear wheel radial runout
 - ° rear wheel lateral runout Refer to "FRONT WHEEL AND BRAKE
- DISC". EB701440

CHECKING AND REPLACING THE REAR WHEEL SPROCKET

- 1. Check:
 - ° rear wheel sprocket More than 1/4 tooth (a) wear \rightarrow Replace
 - the rear wheel sprocket. Bent teeth \rightarrow Replace the rear wheel
 - sprocket.
 - ° correct (b)
 - ° drive chain roller ①
 - ° rear wheel sprocket 2





- 2. Replace:
 - ° rear wheel sprocket ①

 - 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.



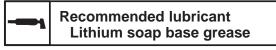
Rear wheel sprocket self-locking nut 60 Nm (6.0 m°kg)

NOTE:

Tighten the self-locking nuts 2 in stages and in a crisscross pattern.

INSTALLING THE REAR WHEEL

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



- 2. Tighten:
 - ° wheel axle nut
 - ^o brake caliper bolts



Wheel axle nut 117 Nm (11.7 m°kg) Brake caliper bolt 40 Nm (4.0 m°kg)



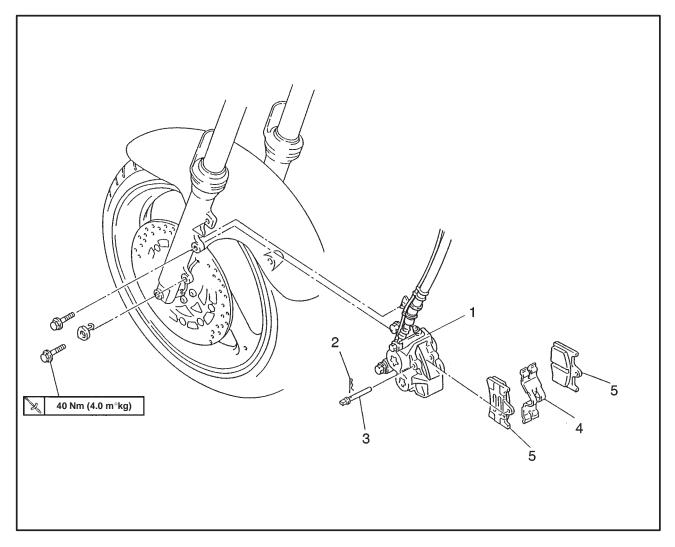
ADJUSTING THE REAR WHEEL STATIC BALANCE

NOTE: _

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.
- 1. Adjust:
 - rear wheel static balance Refer to "FRONT WHEEL AND BRAKE DISC".



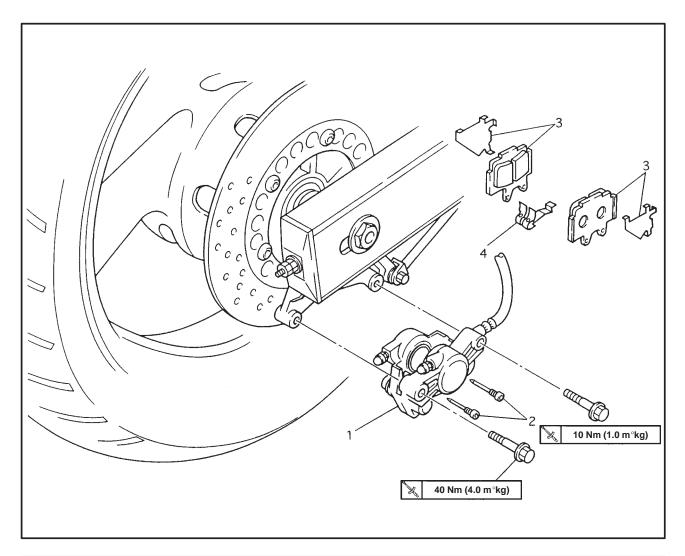
FRONT AND REAR BRAKES FRONT BRAKE PADS



Order	Job name/Part name	Q'ty	Remarks
	Removing the front brake pads		Remove the parts in the order listed.
1	Brake caliper	1	
2	Brake pads clip	2 -	
3	Brake pad pin	1	Refer to "REPLACING THE FRONT
4	Brake pad spring	1	BRAKE PADS" section.
5	Brake pad	2 -	
			For installation, reverse the removal
			procedure.



REAR BRAKE PADS



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order listed.
1	Caliper	1 -	
2	Brake pad pin	2	Refer to "REPLACING THE REAR
3	Brake pad/shim	2/2	BRAKE PADS" section.
4	Brake pad spring	1 -	4
			For instalation, reverse the removal
			procedure.



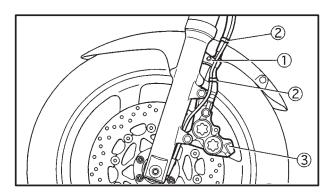
EB702100

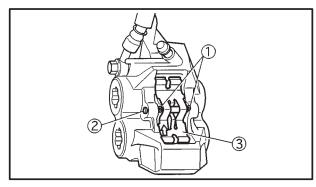
CAUTION:

Disc brake componets rarely require disassembly.

Tehrefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- [°] Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.
- First aid for brake fluid entering the eyes:
- ^a Flush with water for 15 minutes and get immediate medical attention.





REPLACING THE FRONT BRAKES PADS

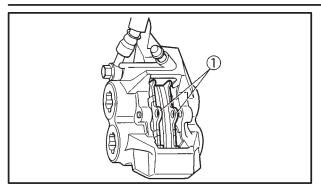
The following procedure applies to both brake calipers.

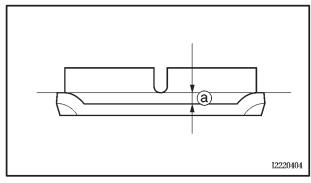
NOTE: .

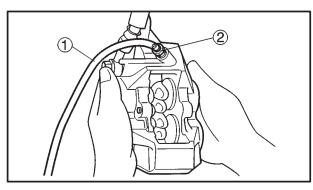
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

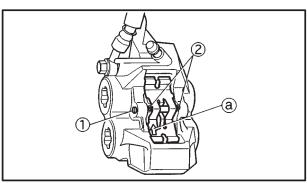
- 1. Remove:
 - $^\circ$ brake hose holder (1)
 - ° speedometer cable guide 2
 - ° brake caliper ③
- 2. Remove:
 - ° brake pad clips ①
 - ° brake pad pins ②
 - ° brake pad spring ③

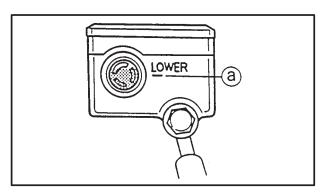












3. Remove:

brake pads ①

 (along with the brake pad shims)

4. Measure:

[°] brake pad wear limit ⓐ
 Out of specification → Replace the brake pads as a set.



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

NOTE:

Always install new brake pads, brake pad shims, and a brake pad spring as a set.

- a. Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.
- d. Install new brake pad shims onto the new brake pads.
- e. Install new brake pads and a new brake pad spring.

- 6. Install:
 - ° brake pad spring
 - $^{\circ}$ brake pad pins (1)
 - ° brake pad clips 2
 - ° brake caliper 🗽 40 Nm (4.0 m°kg)

NOTE: .

The arrow (a) on the brake pad spring must point in the direction of disc rotation.

- 7. Check:
 - ° brake fluid level

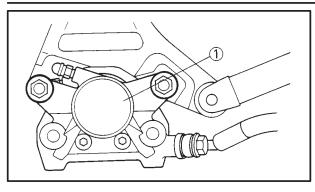
Below the minimum level mark (a) \rightarrow Add the recommended brake fluid to the proper level.

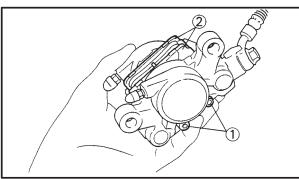
Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

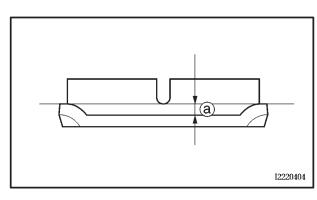
- 8. Check:
 - [°] brake lever operation
 Soft or spongy feeling → Bleed the brake system.

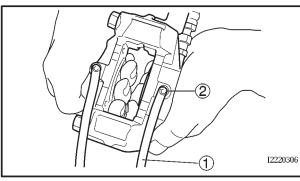
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

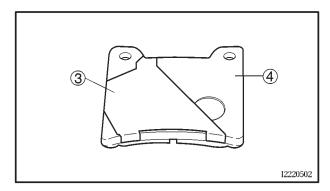












REPLACING THE REAR BRAKE PADS

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:
 - $^{\circ}$ brake pad pins (1)
- 3. Remove:
 - ° brake pads ②
 - (along with the brake pad shims)
 - ° brake pad spring
- 4. Measure:
 - ^o brake pad wear limit ⓐ
 Out of specification → Replace the brake pads as a set.



Brake pad wear limit 0.5 mm

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

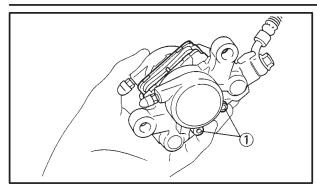
NOTE:

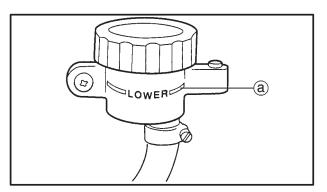
Always install new brake pads, brake pad shims, and a brake pad spring as a set.

- ****
- a. Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.
- d. Install a new brake pad shim ③ onto each new brake pad ④.
- e. Install new brake pads and a new brake pad spring.



10 Nm (1.0 m°kg)





- 6. Install:
 - brake pad pins ① x
 brake caliper x 40 k

40 Nm (4.0 m°kg)

7. Check:

 $^\circ$ brake fluid level Below the minimum level mark $\textcircled{a} \rightarrow \text{Add}$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

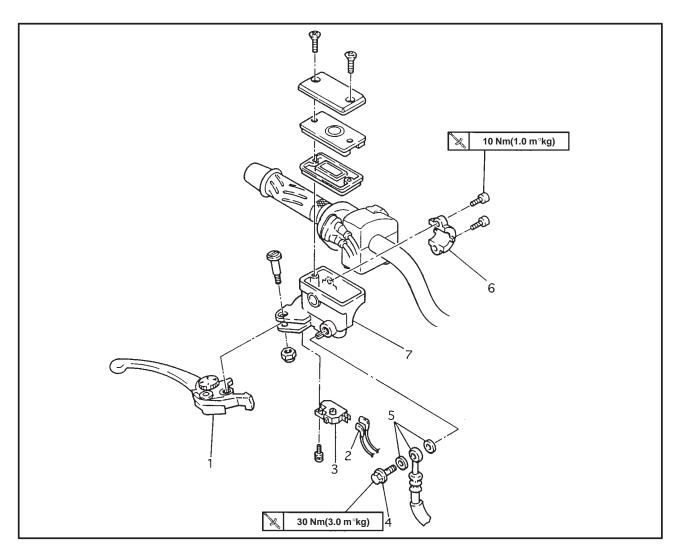
8. Check:

 $^\circ$ brake lever operation Soft or spongy feeling \rightarrow Bleed the brake system.

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

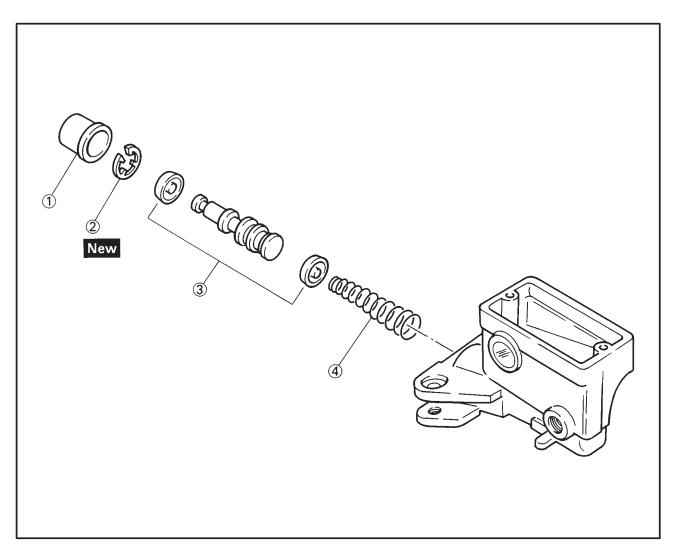
CHAS of 50

FRONT BRAKE MASTER CYLINDER



Order	Job name/Part name	Q'ty	Remarks
1 2 3 4 5 6 7	Removing the front brake master cylinder Drain the brake fluid Brake lever Brake switch lead Brake switch Union bolt Copper washer/brake hose Master cylinder bracket Master cylinder	1 2 1 2/1 2/1 1 1 -	Remove the parts in the order listed. Refer to "REMOVING/ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER" section. For installation, reverse the removal

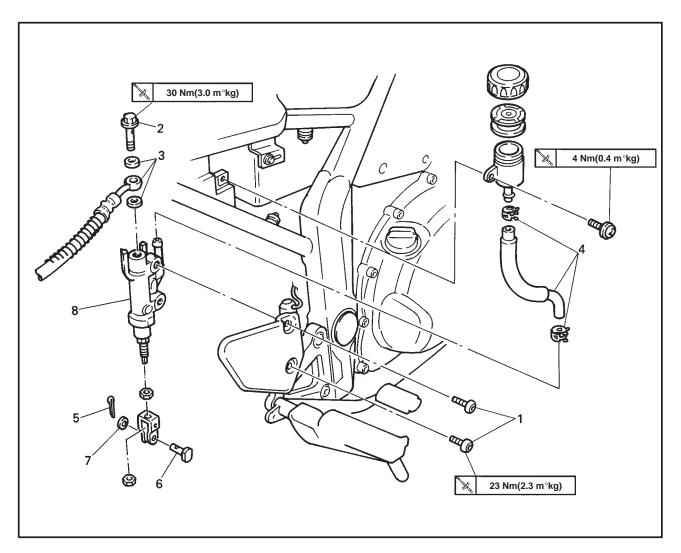




Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front brake master cylinder		Disassembly the parts in the order listed.
1	Master cylinder boot	1	
2	Circlip	1	
3	Master cylinder kit	1	
4	Spring	1	
			For assembly, reverse the disassembly
			procedure.

CHAS 5

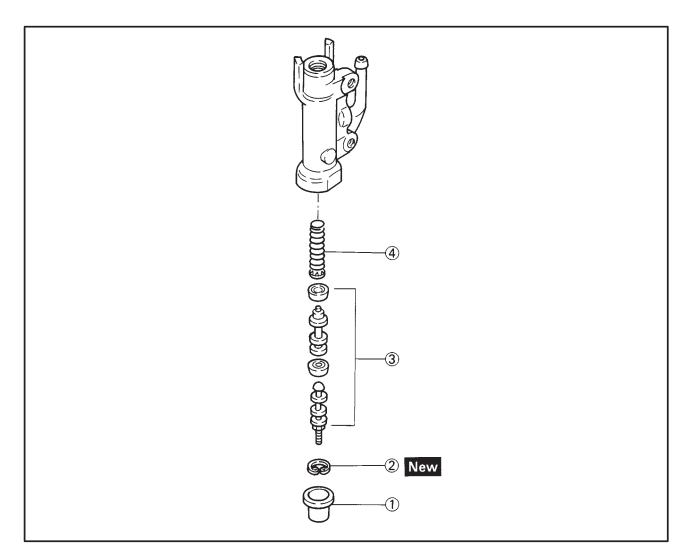
REAR BRAKE MASTER CYLINDER



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake master		Remove the parts in the order listed.
	cylinder		
	Side cover (right)		
	Drain the brake fluid		
1	Master cylinder bolt	2	
2	Union bolt	1 -	Refer to "REMOVING/ASSEMBLING
3	Copper washer/brake hose	2/1-	AND INSTALLING THE REAR BRAKE
			MASTER CYLINDER" section.
4	Clip/hose	2/1	
5	Cotter pin	1	
6	Pin	1	
7	Washer	1	
8	Master cylinder	1	
			For installation, reverse the removal
			procedure.

CHAS of

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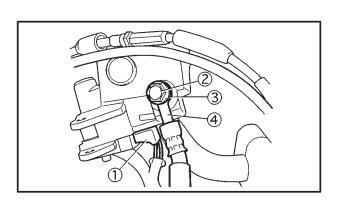
Order	Job name/Part name	Q'ty	Remarks
	Disassembling the rear brake master cylinder		Disassembly the parts in the order listed.
1	Master cylinder boot	1	
2	Circlip	1	
3	Master cylinder kit	1	
4	Spring	1	
			For assembly, reverse the disassembly
			procedure.



REMOVING THE FRONT BRAKE MASTER CYLINDER

NOTE: _

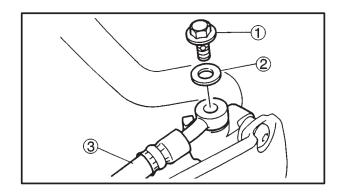
Befor disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.



- 1. Disconnect:
 - brake switch coupler ① (from the brake switch)
- 2. Remove:
 - ° union bolt 2
 - $^{\circ}$ copper washers (3)
 - ° brake hoses ④

NOTE: _

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



REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:

- ° side cover right
- 2. Remove:
 - ° union bolt ①
 - ° copper washers 2
 - ° brake hose ③

NOTE: .

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



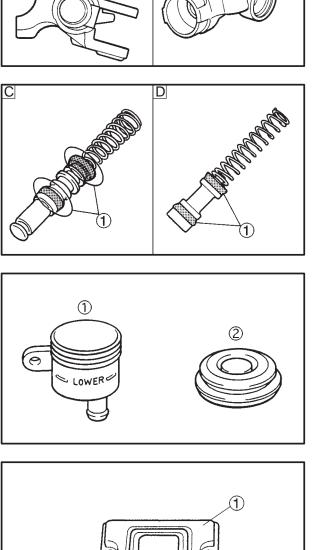


The following procedure applies to the both of the brake master cylinders.

- 1. Check:
 - ° brake master cylinder
 - Damage/scratches/wea \rightarrow Replace.
 - ° brake fluid delivery passages
 - (brake master cylinder body) Obstruction → Blow out with compressed air.
- A Front
- B Rear
 - 2. Check:
 ° brake master cylinder kit ①
 Damage/scratches/wear → Replace.
- C Front
- D Rear
- 3. Check: ° rear brake fluid reservoir ①
 - Cracks/damage \rightarrow Replace.
 - rear brake fluid reservoir diaphragm ②
 Cracks/damage → Replace.
 - 4. Check

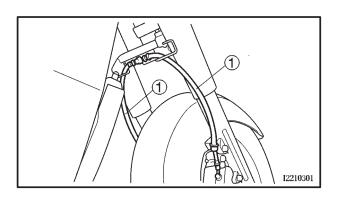
[°] front brake master cylinder diaphragm ①
 Damage/wear → Replace.

5. Check:
 ° brake hoses ①
 Cracks/damage/wear → Replace.



В

Α





ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

A WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.

Recommended brake fluid DOT 4

- 1. Install:
 - ° copper washers (New) ①
 - ° brake hose 2
 - ° union bolt ③ 🛛 🔀 30 Nm (3.0 m°kg)

A WARNING

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

CAUTION:

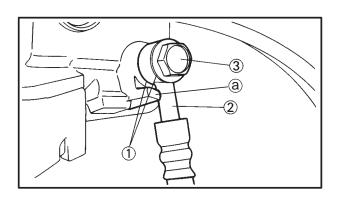
When installing the brake hose onto the brake master cylinder, make sure that the brake pipe touches the projection (a) on the brake master cylinder.

NOTE:

- ^o While holding the brake hose, tighten the union bolt as shown.
- ^o Turn the handlebar to the left and to the right to make sure that the brake hose does not touch other parts (e.g, wire harness, cables, leads). Correct if necessary.
- 2. Fill:
 - brake master cylinder reservoir (with the specified amount of the recommended brake fluid)

Recommended brake fluid DOT 4

- ^o 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.
- ^o 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:

 ^o brake system
 Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

4. Check:

 $^\circ$ brake fluid level Below the minimum level mark (a) \rightarrow Add the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

5. Check:

° brake lever operation

Soft or spongy feeling \rightarrow Bleed the brake system.

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

ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER

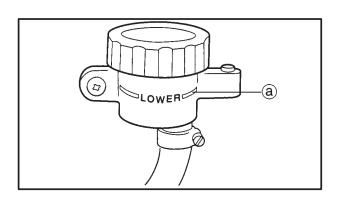
- 1. Install:
 - $^{\circ}$ copper washers (New) (1)
 - ° brake hose 2
 - ° union bolt ③ 🛛 🔀 30 Nm (3.0 m°kg)

CAUTION:

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

A WARNING

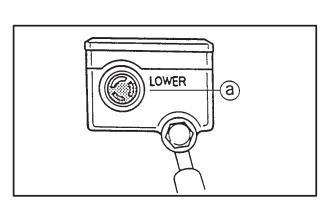
Proper brake hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".

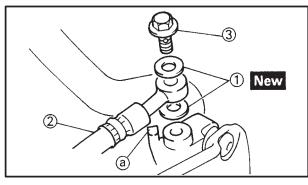


2. Fill:

 brake fluid reservoir (to the maximum level mark (a))









A WARNING

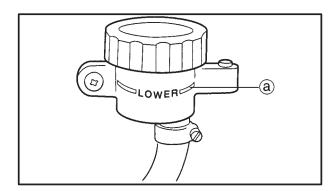
- ^o Use only the designated brake fluid.
 Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- ^o 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.

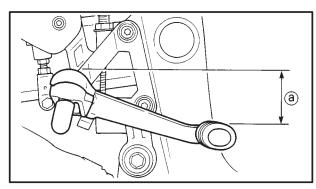
CAUTION:

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

3. Bleed:

 ^o brake system
 Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



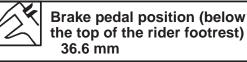


4. Check:

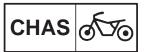
° brake fluid level Below the minimum level mark $\textcircled{a} \rightarrow \text{Add}$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

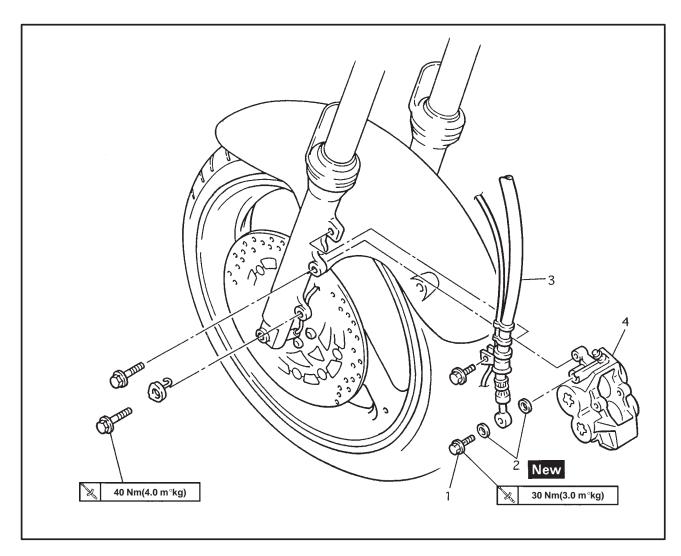
- 5. Adjust:
 - brake pedal position (a)
 Refer to "ADJUSTING THE REAR BRAKE" in chapter 3.



- 6. Adjust:
 - rear brake light operation timing Refer to "ADJUSTING THE REAR BRAKE LICHT SWITCH" in chapter 3.

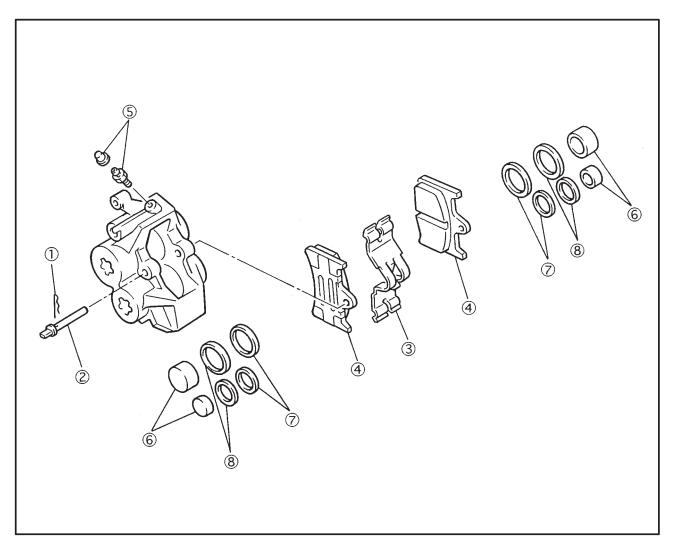


FRONT BRAKE CALIPERS



Order	Job name/Part name	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed.
	Drain the brake fluid		
1	Union bolt	1 -	Refer to "ASSEMBLING AND
2	Copper washer	2	INSTALLING THE FRONT BRAKE
3	Brake hose	1	CALIPERS" section.
4	Brake caliper assembly	1 -	
			For installation, reverse the removal
			procedure.

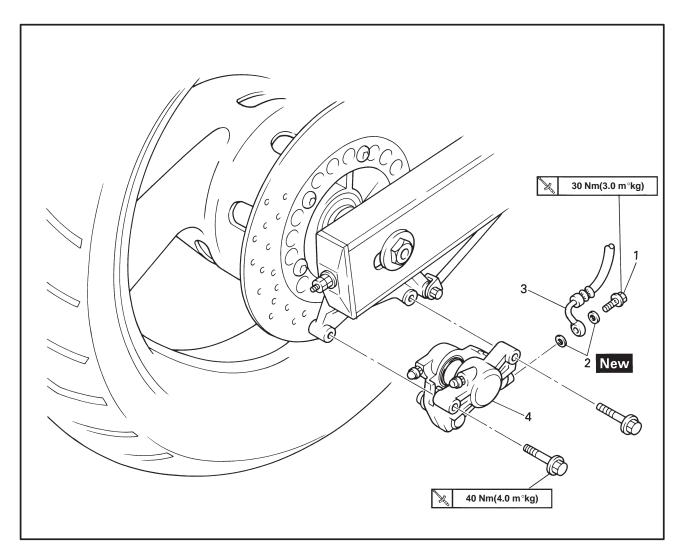
CHAS of To



Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front brake calipers		Disassembly the parts in the order listed.
1 2 3 4 5	Clip Pad pin Brake pad spring Brake pad Bleed screw kit	2 - 1 1 2 1 -	Refer to "REPLACING THE FRONT BRAKE PADS" section.
6 7 8	Brake caliper piston Dust seal Piston seal	4 - 4 4 -	Refer to "DISASSEMBLING THE FRONT BRAKE CALIPER" section.
			For assembly, reverse the disassembly procedure.

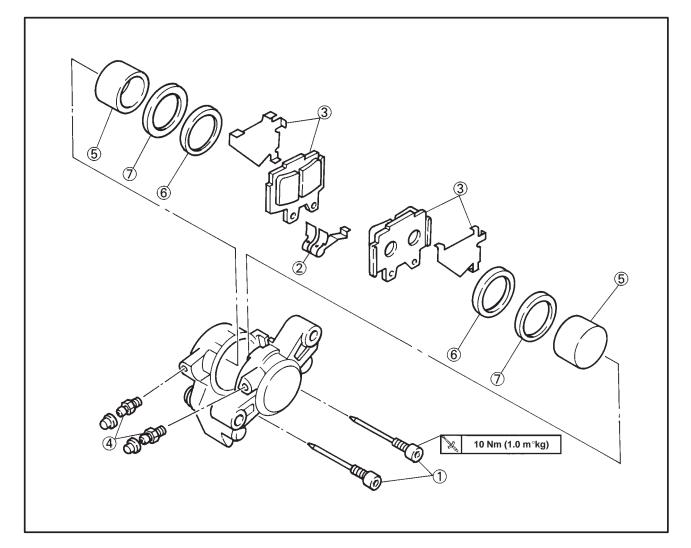


REAR BRAKE CALIPER



Order	Job name/Part name	Q'ty	Remarks
1 2 3 4	Removing the rear brake caliper Drain the brake fluid Union bolt Copper washer Brake hose Rear brake caliper	1 - 2 1 1 -	Remove the parts in the order listed. Refer to "ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER" section. For installation, revers the removal procedure.

CHAS of To



Order	Job name/Part name	Q'ty	Remarks
-	Disassembling the rear brake caliper		Disassembly the parts in the order listed.
1	Pad pin	2 -	
2	Pad spring	1	Refer to "REPLACING THE REAR
3	Brake pad assembly/shim	2/2	BRAKE PAD" section.
4	Bleed screw kit	2 -	1
(5)	Brake caliper piston	2 -	
6	Dust seal	2	Refer to "DISASSEMBLING THE REAR
\bigcirc	Piston seal	2 -	BRAKE CARIPER" section.
			For assembly, reverse the disassembly
			procedure.



DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

NOTE: .

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

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

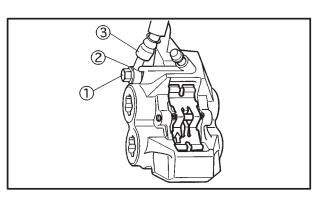
NOTE: _

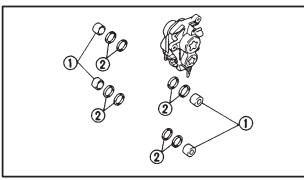
Put the end of the brake hose into a container and pump out the brake fluid carefully.

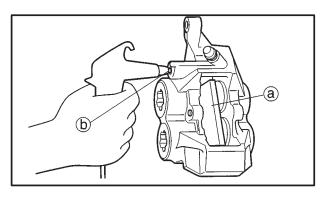
- 2. Remove:
 - ° brake caliper pistons ①
 - $^{\circ}$ brake caliper piston seals (2)

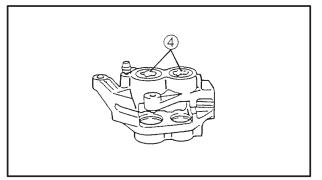
- a. Secure the right side brake caliper pistons with a piece of wood ⓐ
- b. Blow compressed air into the brake hose joint opening (b) to force out the left side pistons from the brake caliper.
- c. Remove the brake caliper piston seals.
- d. Repeat the previous steps to force out the right side pistons from the brake caliper.



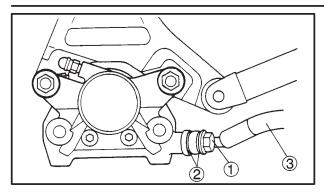


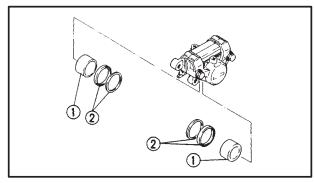


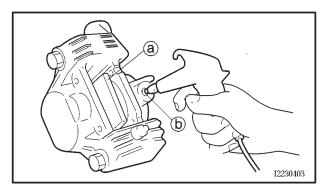


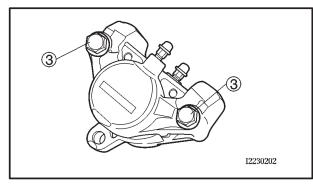












DISASSEMBLING THE REAR BRAKE CALIPER

NOTE: _

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

- 1. Remove:
 - $^{\circ}$ union bolt (1)
 - ° copper washers 2
 - ° brake hose ③

NOTE: .

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

- 2. Remove:
 - ° brake caliper pistons ①
 - ° brake caliper piston seals 2
 - a. Secure the right side brake caliper piston with a piece of wood ⓐ
 - b. Blow compressed air into the brake hose joint opening (b) to force out the left side piston from the brake caliper.

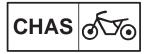
A WARNING

- [°] Never try to pry out the brake caliper pistons.
- [°] Do not loosen the bolts ③.
- c. Remove the brake caliper piston seals.
- d. Repeat the previous steps to force out the right side piston from the brake caliper.

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.			

FRONT AND REAR BRAKES



- 1. Check:
 - ° brake caliper pistons ① Rust/scratches/wear Replace the \rightarrow brake caliper.
 - ° brake caliper cylinders 2 Scratches/wear → Replace the brake caliper.
 - ° brake calipers ③
 - Cracks/damage \rightarrow Replace.
 - ° brake fluid delivery passages (brake caliper body) Obstruction \rightarrow Blow out with compressed air.

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

A Front

- **B** Rear
- 2. Check:
 - ° brake caliper brackets (1) Cracks/damage \rightarrow Replace.

ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

A WARNING

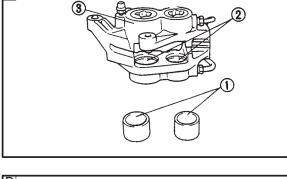
- [°] Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- ° Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- ° Whenever a brake caliper is disassembled, replace the brake caliper piston seals.



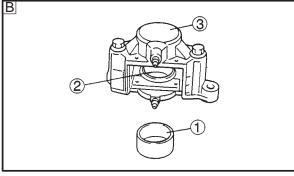
- 1. Install:
 - ° brake caliper ①
 - (temporarily) ° copper washers (New) 2

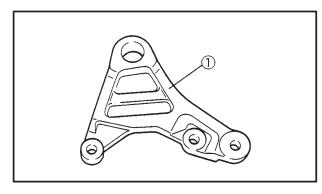
 - ° brake hose ③
 - 30 Nm (30 m°kg) ° union bolt ④ X

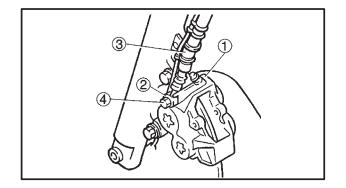
Proper brake hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".



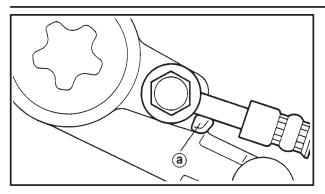
Α







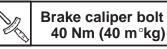




CAUTION:

When installing the brake hose onto the brake caliper, make sure that the brake pipe a touches the projection (a) on the brake caliper.

- 2. Remove:
- ° brake caliper
- 3. Install:
 - ° brake pads
 - ° brake spring
 - ° brake caliper pins
 - ° brake caliper clips
 - ° brake caliper
 - ^o brake hose holder Refer to "REPLACING THE BRAKE PADS".



- 4. Fill:
 - brake master cylinder reservoir (with the specified amount of the recommended brake fluid)

R R

Recommended brake fluid DOT 4

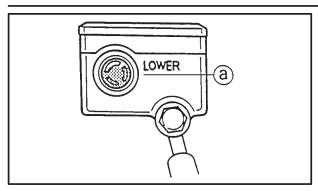
- ^o Use only the designated brake fluid.
 Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- ^o Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- ^o 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.

FRONT AND REAR BRAKES





5. Bleed: ° brake system

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

- 6. Check:
 - ° brake fluid level

Below the minimum level mark $(a) \rightarrow Add$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

7. Check:

° brake lever operation

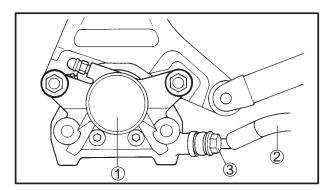
Soft or spongy feeling \rightarrow Bleed the brake system.

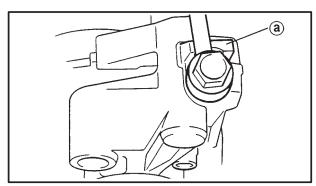
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

A WARNING

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





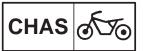
Recommended brake fluid DOT 4

- 1. Install:
 - brake caliper 1
 - (temporarily) ° copper washers (New)
 - ° brake hose ②
 - ° union bolt ③ 30 Nm (3.0 m°kg)

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

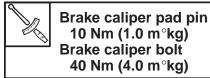
CAUTION:

When installing the brake hose onto the brake caliper, make sure that the brake pipe a slot the projection (a) on the brake caliper.



- 2. Remove:
 - ° brake caliper
- 3. Install:
 - ° brake pad spring
 - ° brake pads
 - ° brake pad pins
 - ° brake caliper

^o brake hose holder Refer to "REPLACING THE BRAKE PADS".



4. Fill:

 ^o brake fluid reservoir (with the specified amount of the recommended brake fluid)



A WARNING

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

CAUTION:

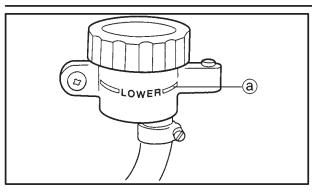
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:

 ^o brake system
 Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

FRONT AND REAR BRAKES





6. Check: ° brake fluid level

Below the minimum level mark $\textcircled{a} \rightarrow \text{Add}$ the recommended brake fluid to the proper level.

Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

7. Check:

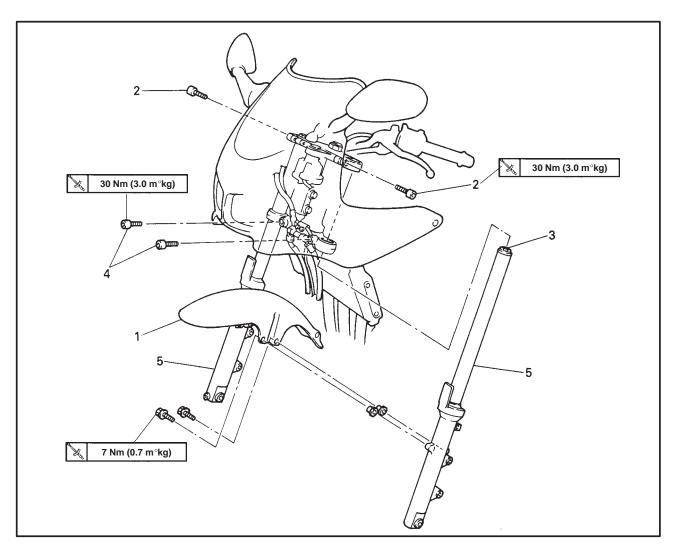
° brake pedal operation

Soft or spongy feeling \rightarrow Bleed the brake system.

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

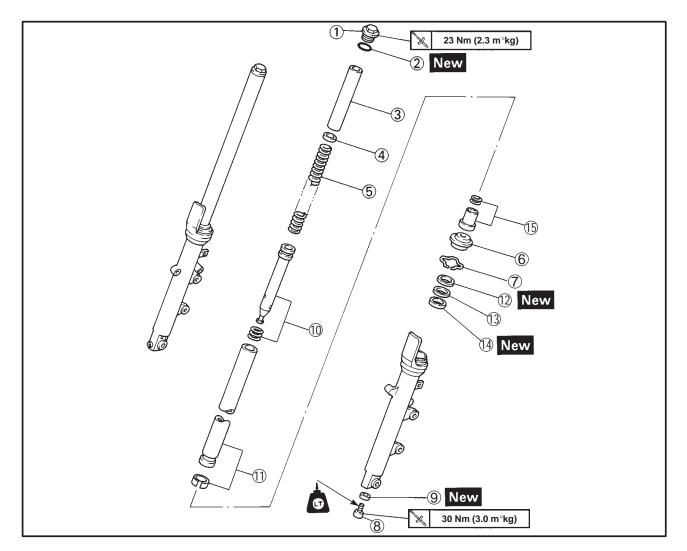


FRONT FORK



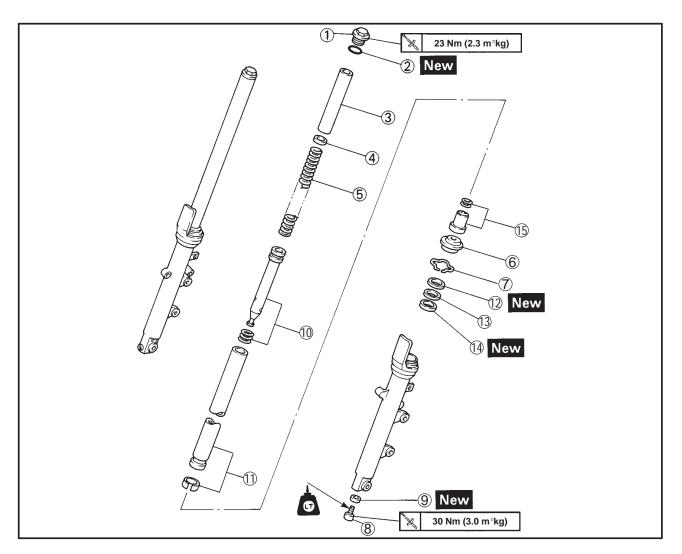
Order	Job name/Part name	Q'ty	Remarks
	Removing the front fork Front wheel		Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS" section.
	Front brake calipers		Refer to "FRONT AND REAR BRAKES" section.
1	Front fender	1	
2	Bolt (upper bracket)	2	NOTE:
3	Cap bolt	2	NOTE: Refer to Note: "REMOVING/ Loosen INSTALLING THE
4	Bolt (lower bracket)	2	NOTE: FRONT FORK LEGS" section.
5	Front fork assembly (left/right)	1/1	Refer to "REMOVING/INSTALLING THE FRONT FORK LEGS" section. For installation, reverse the removal procedure.





Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front fork		Disassembly the parts in the order listed.
1	Cap bolt	1 -	7
2	O-ring	1	
3	Spacer	1	
4	Washer	1	
5	Front fork spring	1	Refer to "ASSEMBLING THE FRONT
6	Dust seal	1	FORK LEGS" section.
$\overline{\mathcal{O}}$	Oil seal clip	1	
8	Bolt	1	
9	Gasket	1	
10	Damper rod/rebound spring	1/1-	
11	Inner tube/Inner tube bushing	1 -	Refer to "DISASSEMBLING/
12	Oil seal	1	ASSEMBLING THE FRONT FORK
13	Washer	1 -	LEGS" section.





Order	Job name/Part name	Q'ty	Remarks
14 15	Outer tube bushing Oil flow stopper	1	Refer to "ASSEMBLING THE FRONT FORK LEGS" section. For assembly, reverse the disassembly procedure.



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:
 - $^\circ$ upper bracket pinch bolt 1
 - ° cap bolt 2
 - ° lower bracket pinch bolt ③

A WARNING

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

- 3. Remove:
 - ° front fork leg

DISASSEMBLING THE FRONT FORK LEGS The following procedure applies to both of the

- front fork legs. 1. Remove:
 - $^{\circ}$ dust seal (1)
 - ° oil seal clip 2
 - (with a flat-head screwdriver)

CAUTION:

Do not scratch the inner tube.

2. Remove:

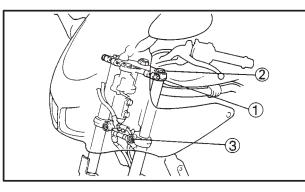
° damper rod bolt

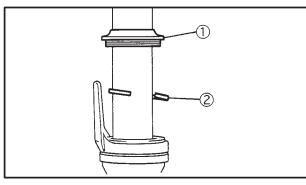
NOTE: .

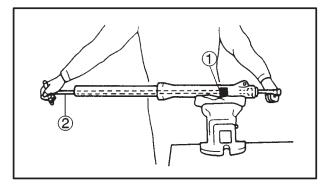
While holding the damper rod with the damper rod holder ① and T-handle ②, loosen the damper rod bolt.

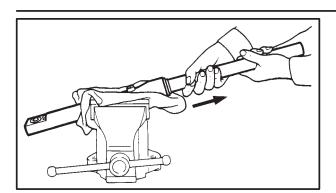


Damper rod holder 90890-01460 T-Handle 90890-01326











- 3. Remove: ° inner tube

 - a. Hold the front fork leg horizontally.
 - b. Securely clamp the brake caliper bracket in a vise with soft jaws.
 - c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

CAUTION:

- Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.
- Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.

CHECKING THE FRONT FORK LEGS

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

- 1. Check:
 - $^{\circ}$ inner tube ①
 - ° outer tube 2
 - Bends/damage/scratches \rightarrow Replace.

A WARNING

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

- 2. Measure:
 - ° spring free length ⓐ
 Over the specified limit → Replace.

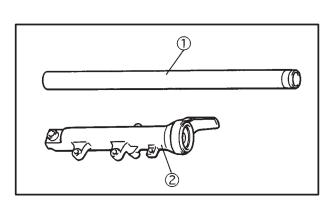


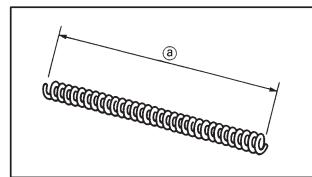
Spring free length limit 319 mm

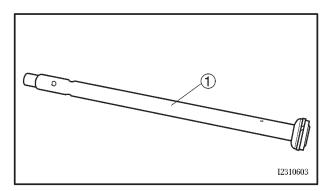
- 3. Check:
 - ° damper rod ①
 Damage/wear → Replace.
 Obstruction → Blow out all of the oil passages with compressed air.
 - ° oil flow stopper Damage/wear \rightarrow Replace.

CAUTION:

- ^o 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 \rightarrow Replace.

ASSEMBLING THE FRONT FORK LEGS

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

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

NOTE: _

12310302

- ° When assembling the front fork leg, be sure to replace the following parts:
 - -inner tube bushing -outer tube bushing
 - -oil seal
- -dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.
- 1. Install: ° damper rod ①

CAUTION:

Allow the damper rod to slide slowly down the inner tube until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

2. Lubricate:

° inner tube's outer surface

Recommended lubricant Fork oil 10 W or equivalent

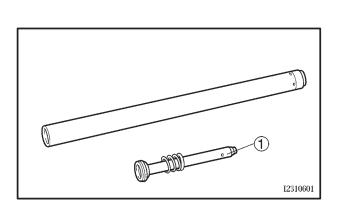
3. Tighten:

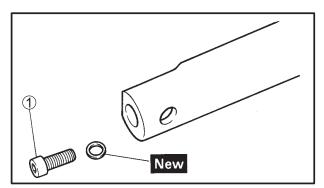
° damper rod bolt ① 🔀 30 Nm (3.0 m°kg)

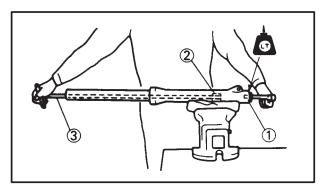
NOTE:

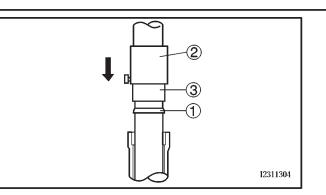
While holding the damper rod with the damper rod holder 3 and T-handle 3, tighten the damper rod bolt.

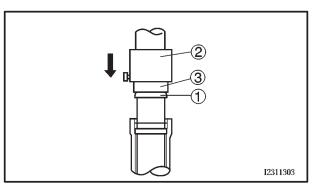


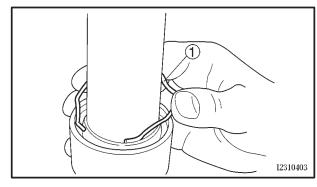


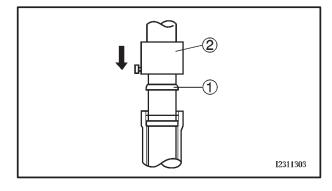


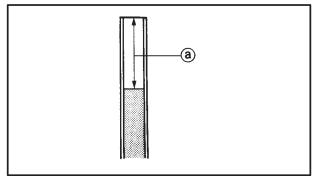














4. Install:
outer tube bushing ①
(with the fork seal driver weight ② and adapter ③)



5. Install:

- ° washer
- ° oil seal ①

(with the fork seal driver weight 2 and adapter 3)



CAUTION:

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

NOTE:

- Before installing the oil seal, apply lithium soap base grease onto its lips.
- Apply fork oil onto the outer surface of the inner tube.
- 6. Install:

 $^\circ$ oil seal clip (1)

NOTE: _

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

7. Install:

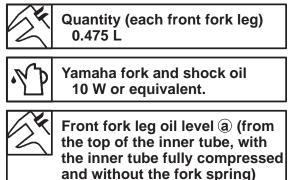
o dust seal ①
 (with the fork seal driver weight) ①



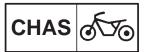
8. Fill:

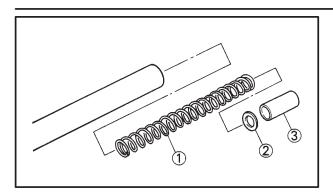
° front fork leg

(with the specified amount of the recommended fork oil)



121 mm





NOTE: . ° While

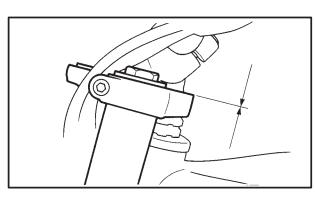
- ° While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.

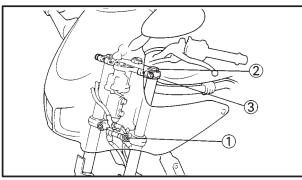
9. Install:

- $^{\circ}$ spring (1)
- ° spring seat 2
- ° spacer ③
- ° cap bolt

NOTE: .

- ° Install the spring with the smaller pitch facing up.
- Before installing the cap bolt, apply grease onto the O-ring.
- [°] Temporarily tighten the cap bolt.





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 holder.

2. Tighten:

- ° lower bracket pinch bolt ①
- ° cap bolt 2
- ° upper bracket pinch bolt ③

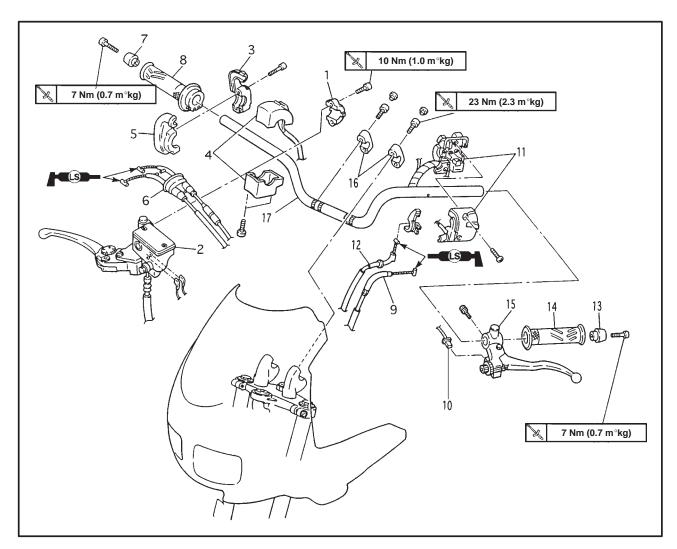


Make sure that the brake hoses are routed properly.

HANDLEBAR



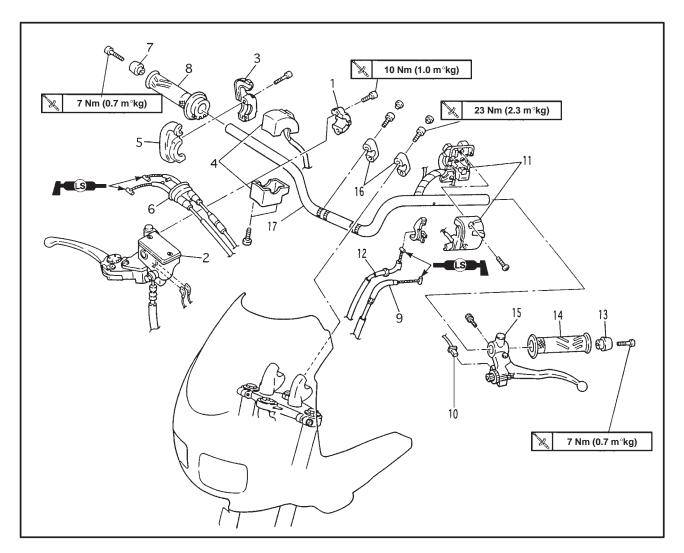
HANDLEBAR



Order	Job name/Part name	Q'ty	Remarks
	Removing the handle bar		Remove the parts in the order listed.
1	Master cylinder bracket	1	
2	Master cylinder assembly	1	
3	Throttle cable housing cover	1	
4	Handle bar switch (right)	1	
5	Throttle cable housing	1	
6	Throttle cable	1	
7	Grip end	1	
8	Grip assembly	1	
9	Clutch cable	1	
10	Clutch switch	1	
11	Handle bar switch (left)	1	Refer to "INSTALLING THE
			HANDLEBAR" section.
12	Starter cable	1	
13	Grip end	1	Refer to "INSTALLING THE
			HANDLEBAR" section.

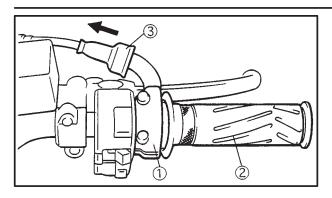
HANDLEBAR

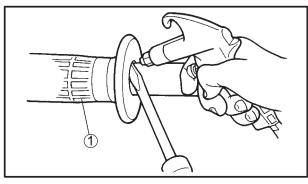
CHAS of

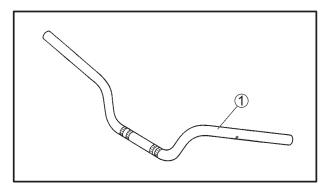


Order	Job name/Part name	Q'ty	Remarks
14 15 16 17	Grip (left) Clutch lever holder Upper handlebar holder Handle bar	1 1 2 -	Refer to "REMOVING THE HANDLEBAR" section. Refer to "INSTALLING THE HANDLEBAR" section. For installation, reverse the removal procedure.









REMOVING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

A WARNING

HANDLEBAR

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

- 2. Remove:
 - throttle cable housing ①
 throttle grip ②

NOTE: _

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

3. Remove:

° left handlebar grip ①

NOTE: _

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

CHECKING THE HANDLEBAR

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:

° handlebar ① Bends/cracks/damage \rightarrow Replace.

A WARNING

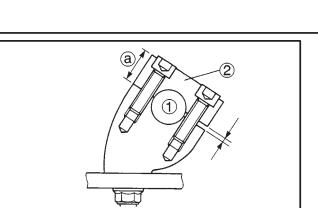
Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

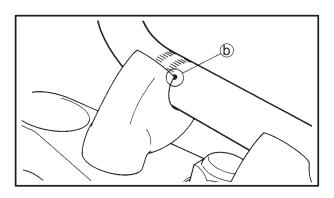
- 3. Install:
 - ° handlebar grip

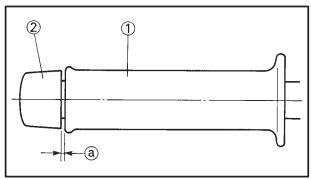
 - a. Apply a light coat of rubber adhesive onto the left end of the handlebar.
 - b. Slide the handlebar grip over the left end of the handlebar.
 - c. Wipe off any excess rubber adhesive with a clean rag.

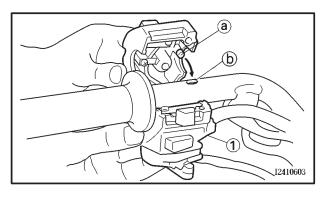
WARNING

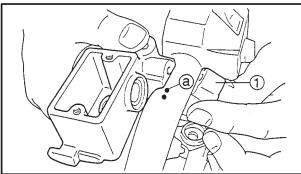
Do not touch the handlebar grip until the rubber adhesive has fully dried.











HANDLEBAR



INSTALLING THE HANDLEBAR

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. Install:
 - handlebar ①
 upper handlebar holders ②
 23 Nm (2.3 m°kg)

CAUTION:

- First, tighten the bolts on the front side
 a) of the handlebar holder, then on the rear side.
- turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.

NOTE: _

- [°] The upper handlebar holders should be installed with the arrows facing forward.
- Align the match marks b on the handlebar with the upper surface of the lower handlebar holders.

3. Install:

- ° clutch lever holder
- $^\circ$ handlebar grip 1
- ° left grip end 2

NOTE: .

There should be 1.0 mm of clearance (a) between the handlebar grip and the left grip end.

4. Install:

° left handlebar switch ①

NOTE: .

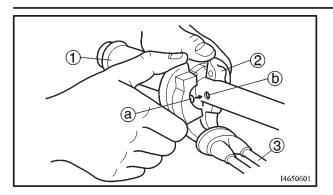
Align the projection (a) on the left handlebar switch with the hole (b) in the handlebar.

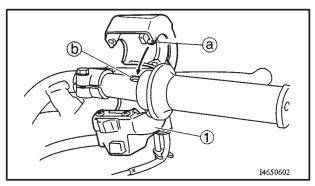
5. Install:

 $^{\circ}$ master cylinder bracket (1)

NOTE: .

Align the mating surfaces of the master cylinder bracket with the punch mark (right handlebar switch side) (a) on the handlebar.





HANDLEBAR



- 6. Install: ° throttle grip ①
- ° throttle cable housing ②
- ° throttle cables ③

NOTE:

Apply (a) thin coat of lithium soap base grease onto the inside of the throttle grip and install it onto the handlebar.

NOTE:

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

7. Install:

- ° right grip end
- $^{\circ}$ right handlebar switch (1)

A WARNING

Make sure that the throttle grip operates smoothly.

NOTE: .

- Align the projection (a) on the right handlebar switch with the hole (b) in the handlebar.
- 8. Adjust:
 - clutch cable free play Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" in chapter 3.



Clutch cable free play (at the end of the clutch lever) 10 \times 15 mm

- 9. Adjust:
 - throttle cable free play Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.

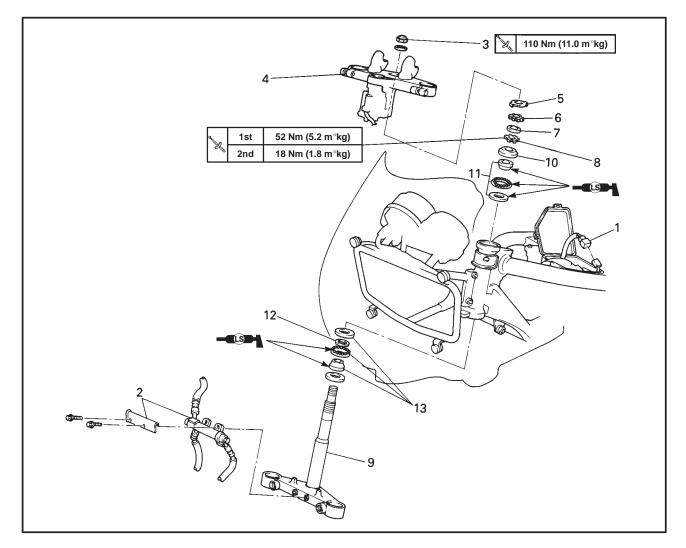


Throttle cable free play (at the flange of the throttle grip) 3×5 mm



STEERING HEAD

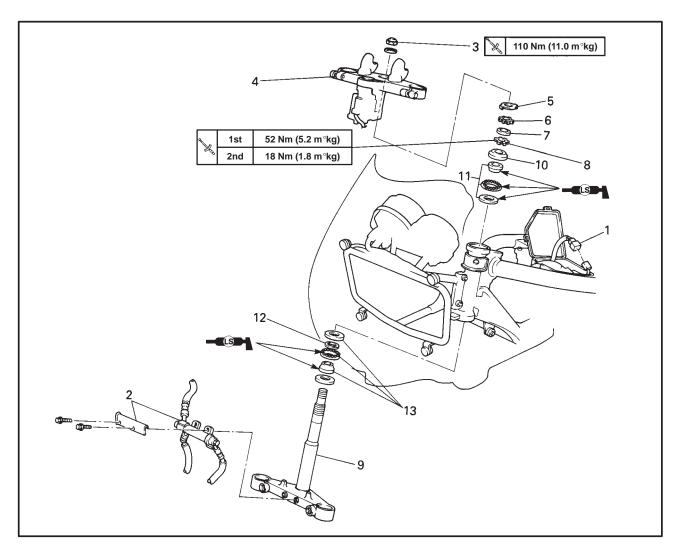
STEERING HEAD LOWER BRACKET



Order	Job name/Part name	Q'ty	Remarks
	Removing the lower bracket		Remove the parts in the order listed.
	Front cowling	-	Refer to "FRONT COWUNG/SEAT/
			SIDE COVER/FUEL TANK" section in
	Fuel tank	-	chapter 3
	Front wheel		Refer to "FRONT WHEEL" section.
	Front fork		Refer to "FRONT FORK" section.
	Handle bar		Refer to "HANDLEBAR" section.
1	Main switch lead coupler	1	NOTE:
2	Brake hose joint/cover	1/1	Disconnect the coupler.
3	Steering stem nut	1	
4	Upper bracket	1	
5	Lock washer	1	
6	Ring nut (upper)	1 -	Refer to "REMOVING THE LOWER
7	Rubber washer 1	1	BRACKET/INSTALLING THE STEER-
8	Ring nut (lower)	1 _	ING HEAD" section.

STEERING HEAD

CHAS 🔗



Order	Job name/Part name	Q'ty	Remarks
9 10 11 12 13	Lower bracket Ball race cover Ball bearing Rubber washer 1 Ball bearing	1 1 1 - 1 1 -	Refer to "INSTALLING THE STEERING HEAD" section. For installation, reverse the removal procedure.



REMOVING THE LOWER BRACKET

1. Stand the motorcycle on a level surface.

A WARNING

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

- 2. Remove:
 - ° upper ring nut
 - ° lower ring nut 1

NOTE: _

Hold the lower ring nut with the exhaust and steering nut wrench 2, then remove the upper ring nut with the ring nut wrench.

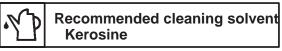


Exhaust and steering nut wrench 90890-01268

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

CHECKING THE STEERING HEAD

- 1. Wash:
 - ° bearing balls
 - ° bearing races

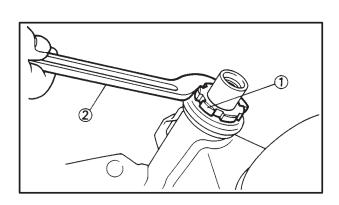


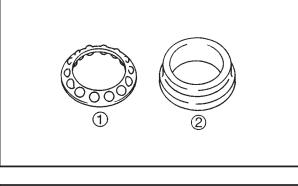
2. Check:

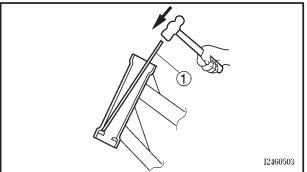
- bearing ①
 bearing race ②
 - bearing race (2)Damage/pitting \rightarrow Replace.

- 3. Replace:
 - ° bearing balls
 - bearing races

 - a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.

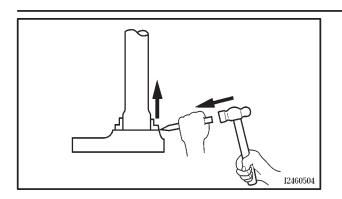






STEERING HEAD





- 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.
- ^o 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.

INSTALLING THE STEERING HEAD

- 1. Lubricate:
 - ° upper bearing
 - ° lower bearing
 - ° bearing races



- 2. Install:
 - $^\circ$ 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.
- 3. Install:
 - ° upper bracket
 - ° steering stem nut

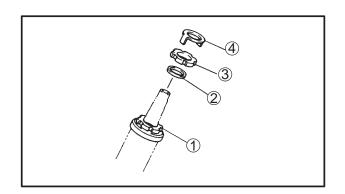
NOTE:

Temporarily tighten the steering stem nut.

- 4. Install:
 - front fork legs Refer to "FRONT FORK".

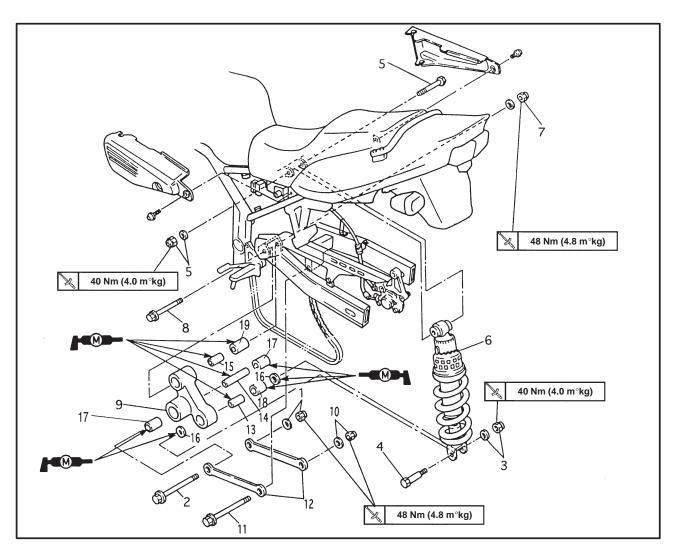
NOTE: .

Temporarily tighten the upper and lower bracket pinch bolts.

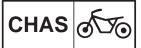


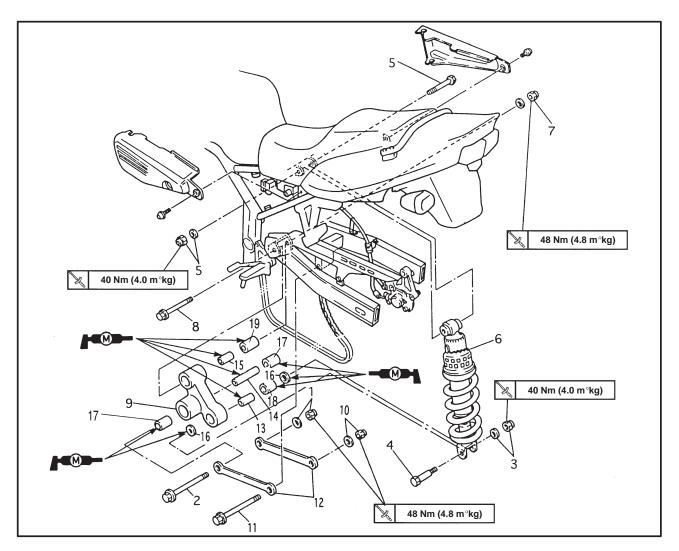


REAR SHOCK ABSORBER AND RELAY ARM



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear shock absorber assembly and relay arm		Remove the parts in the order listed.
	Side covers		Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3
	Rear wheel		Refer to "REAR WHEEL, BRAKE DISK AND REAR WHEEL SPROCKET" section.
1	Self-locking nut/washer	1/1	
2	Bolt	1	Refer to "REMOVING/
3	Self-locking nut/washer	1/1	×= 120 mm INSTALLING THE
4	Bolt	1	REAR SHOCK
5	Self-locking nut/bolt	1/1	×= 40 mm ABSORBER" section.
6	Rear shock absorber assembly	1	
7	Self-locking nut	1	





Order	Job name/Part name	Q'ty	Remarks
8	Bolt	1	×= 80 mm
9	Relay arm	1	
10	Self-locking nut/washer	1/1	
11	Bolt	1	×= 120 mm
12	Connecting plate	2	
13	Spacer	1	
14	Spacer	2	
15	Spacer	1	
16	Oil seal	2	
17	Bearing	2	
18	Bearing	1	
19	Bearing	1	
			For installation, reverse the removal
			procedure.



HANDLING THE REAR SHOCK ABSORBER

A WARNING

This rear shock absorber contain highly compressed nitrogen gas.

Before handling the rear shock absorber, 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.

- Do not tamper or attempt to open the rear shock absorber.
- ^o Do not subject the rear shock absorber 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 in any way. If the rear shock absorber, or both are damaged, damping performance will suffer.

DISPOSING OF A REAR SHOCK ABSORBER

- ****
- a. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2 \times 3 mm hole through the gas cylinder at a point 15 \times 20 mm from its end as shown ①.

WARNING

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

T



REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the motorcycle on a level surface.

A WARNING

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

NOTE:

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

 2. Disconnect:
 ° battery leads (from the battery terminals)

CAUTION:

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

- 3. Remove:
 - ° battery
- 4. Remove:
 - ° side covers
 - ° connecting plate bolt ①
 - $^\circ$ rear shock absorber assembly lower bolt 2

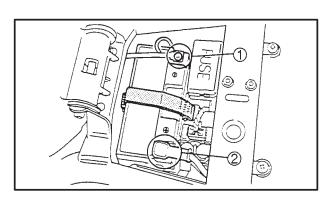
NOTE: .

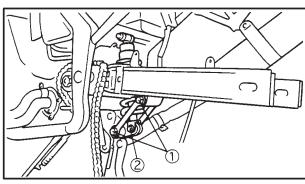
While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.

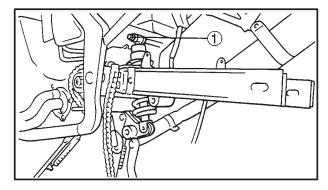
- 5. Remove:
 - $^\circ$ rear shock absorber assembly upper bolt 1
 - ° rear shock absorber assembly

NOTE:

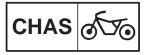
Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm and relay arm.

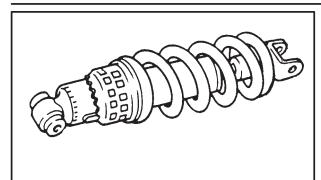






REAR SHOCK ABSORBER AND RELAY ARM



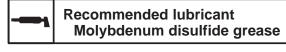


CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Check:
 - ° rear shock absorber rod
 - $$\label{eq:Bends/damage} \begin{split} & \text{Bends/damage} \to \text{Replace the rear shock} \\ & \text{absorber assembly.} \end{split}$$
 - rear shock absorber oil leaks
 — Replace the rear sho
 - oil leaks \rightarrow Replace the rear shock absorber assembly.
 - ° spring
 - Damage/wear \rightarrow Replace the rear shock absorber assembly.
 - ° bushings
 - Damage/wear \rightarrow Replace.
 - ° dust seals
 - Damage/wear \rightarrow Replace.
 - ° bolts
 - Bends/damage/wear \rightarrow Replace.

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- 1. Lubricate:
 - ° spacers
 - ° bearings



2. Install:

° rear shock absorber assembly

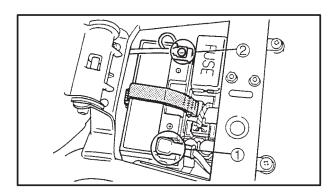
Rear shock absorber assembly upper nut 40 Nm (4.0 m°kg) Rear shock absorber assembly lower nut 40 Nm (4.0 m°kg) Relay-arm-to-frame-nut 48 Nm (4.8 m°kg)

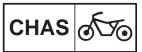
NOTE: .

- [°] When installing the rear shock absorber assembly, lift up the swingarm.
- Install the connecting arm front bolt from the right.
- 3. Connect:
 - battery leads (to the battery terminals)

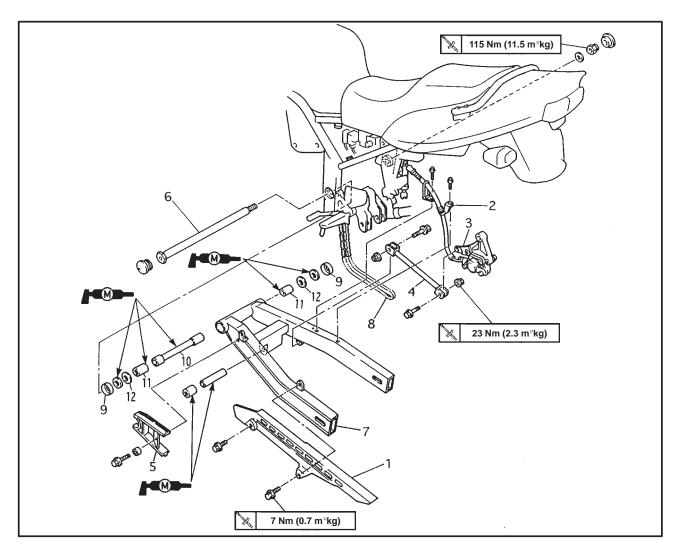
CAUTION:

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





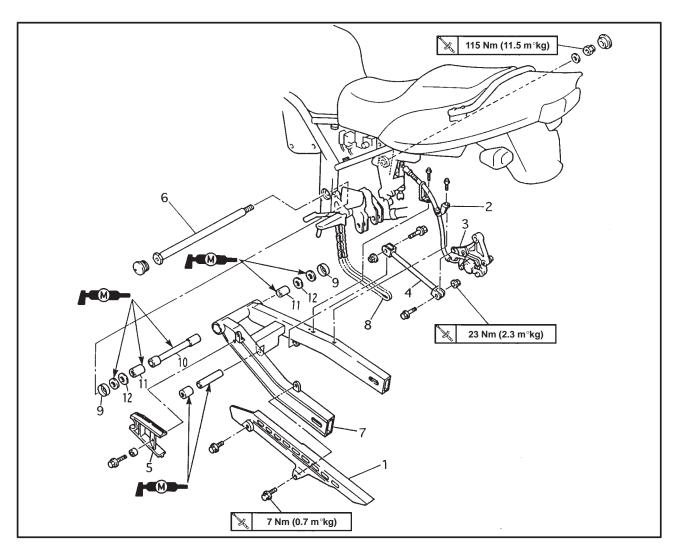
SWINGARM AND DRIVE CHAIN



Order	Job name/Part name	Q'ty	Remarks
	Removing the swingarm and drive chain		Removing the parts in the order listed.
	Rear wheel		Refer to "REAR WHEEL, BRAKE DISC AND REAR WHEEL SPROCKET" section.
	Rear shock absorber assembly Relay arm	-	Refer to "REAR SHOCK ABSORBER AND RELAY ARM" section.
	Rear wheel sprocket		Refer to "REMOVING THE ENGINE" section in chapter 4
1	Drive chain guard	1	
2	Brake hose holder	2	
3	Caliper bracket	1	
4	Compression bar	1	
5	Drive chain guide	1	
6	Pivot shaft	1	
7	Swingarm	1	
8	Drive chain	1	
9	Cover	2	

SWINGARM AND DRIVE CHAIN

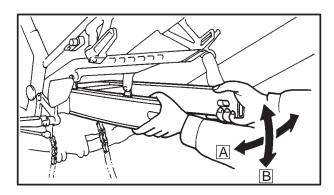




Order	Job name/Part name	Q'ty	Remarks
10	Spacer	1	
11	Bearing	2	
12	Washer	2	
			For installation, reverse the removal
			procedure.



EB707100



NOTE: .

Before removing the drive sprocket, drive chain, and rear wheel, measure the drive chain slack and the length of a ten-link section of the drive chain.

REMOVING THE SWINGARM

1. Stand the motorcycle on a level surface.

A WARNING

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

NOTE:

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

- 2. Remove:
 - ° side covers
 - ° connecting plate bolt ①
 - ° rear shock absorber assembly lower bolt

NOTE: .

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

- 3. Check:
 - ° swingarm side play
 - ° swingarm vertical movement
 - ****
 - a. Check the tightening torque of the pivot shaft nut.



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

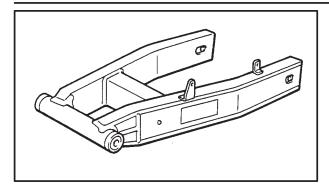


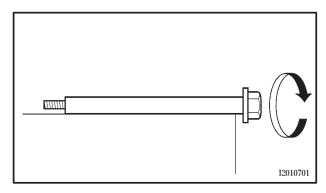
Swingarm side play (at the end of the swingarm) 1 mm

d. Check the swingarm vertical movement B by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.

SWINGARM AND DRIVE CHAIN







CHECKING THE SWINGARM

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

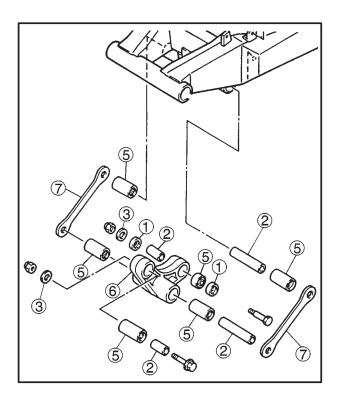
2. Check:
 ° pivot shaft
 Roll the pivot shaft on a flat surface.
 Bends → Replace.

A WARNING

Do not attempt to straighten a bent pivot shaft.

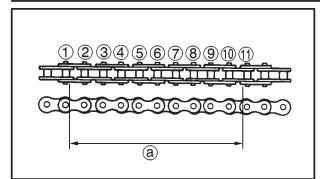
- 3. Wash:
 - ° pivot shaft
 - ° dust covers
 - ° spacer
 - ° washers
 - ° bearings

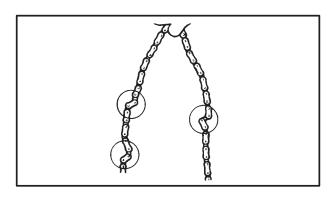


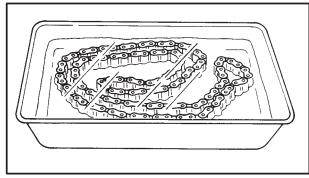


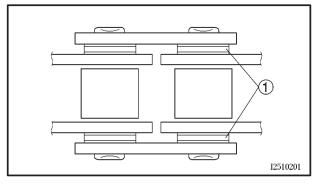
- 4. Check:
 - $^{\circ}$ dust covers (1)
 - ° spacer 2
 - ° washers ③
 - $^{\circ}$ oil seals (4)
 - Damage/wear \rightarrow Replace.
 - ° bearings 5
 - Damage/pitting \rightarrow Replace.
- 5. Check:
 - ° connecting arms 6
 - ° relay arm \overline{O} Damage/wear \rightarrow Replace.

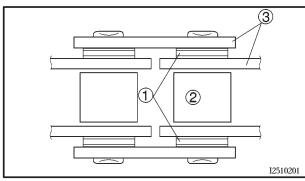








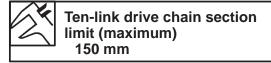




CHECKING THE DRIVE CHAIN

1. Measure:

 $^\circ$ ten-link section (a) of the drive chain Out of specification \rightarrow Replace the drive chain.



NOTE:

- ° While measuring the ten-link section, push down on the drive chain to increase its tension.
- $^\circ$ Measure the length between drive chain roller (1) and (1) as shown.
- Perform this measurement at two or three different places.
- 2. Check:
 - ° drive chain Stiffness \rightarrow 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 highpressure 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 Orings. Therefore, use only kerosine to clean the drive chain.

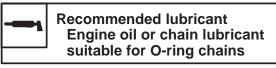
- 4. Check:
 - ° O-rings ①
 - Damage \rightarrow Replace the drive chain.
 - ° drive chain rollers 2
 - Damage/wear \rightarrow Replace the drive chain. $^{\circ}$ drive chain side plates (3)
 - Damage/wear \rightarrow Replace the drive chain. Cracks \rightarrow Replace the drive chain.

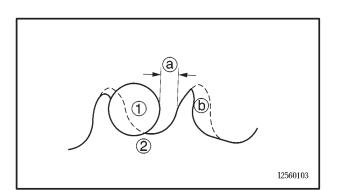
SWINGARM AND DRIVE CHAIN



5. Lubricate:







- 6. Check:
 - ° drive sprocket
 - ° rear wheel sprocket
 - More than 1/4 tooth (a) wear \rightarrow Replace the drive chain sprockets as a set.
 - Bent teeth \rightarrow Replace the drive chain sprockets as a set.

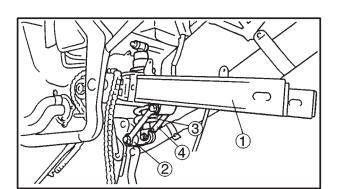
Recommended lubricant

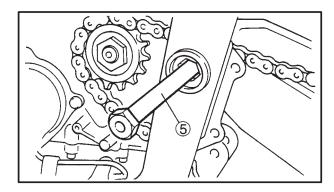
Molybdenum disulfide grease

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

EB707700 INSTALLING THE SWINGARM

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





2. Install:

- ° drive chain
- ° swingarm ①
- ° relay arm (2)
- ° left connecting plate ③
- ° right connecting plate ④



NOTE:

Install the swingarm bolt (5) from the left.

3. Install:

- ° rear shock absorber assembly
- ° rear wheel
- Refer to "INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY" and "REAR WHEEL".



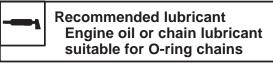
- 4. Adjust: ° drive chain slack
 - Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.



INSTALLING THE DRIVE CHAIN

1. Lubricate:

° drive chain



2. Install:

- $^{\circ}$ drive chain (1)
- ° drive sprocket 2
- ° washer 3
- ° drive sprocket nut ④ 🔀 70 Nm (7.0 m°kg)

NOTE:

While applying the rear brake, tighten the drive sprocket nut.

CAUTION:

Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain's life.

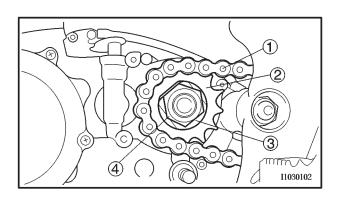
- 5. Adjust:
 - orive chain slack
 Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.

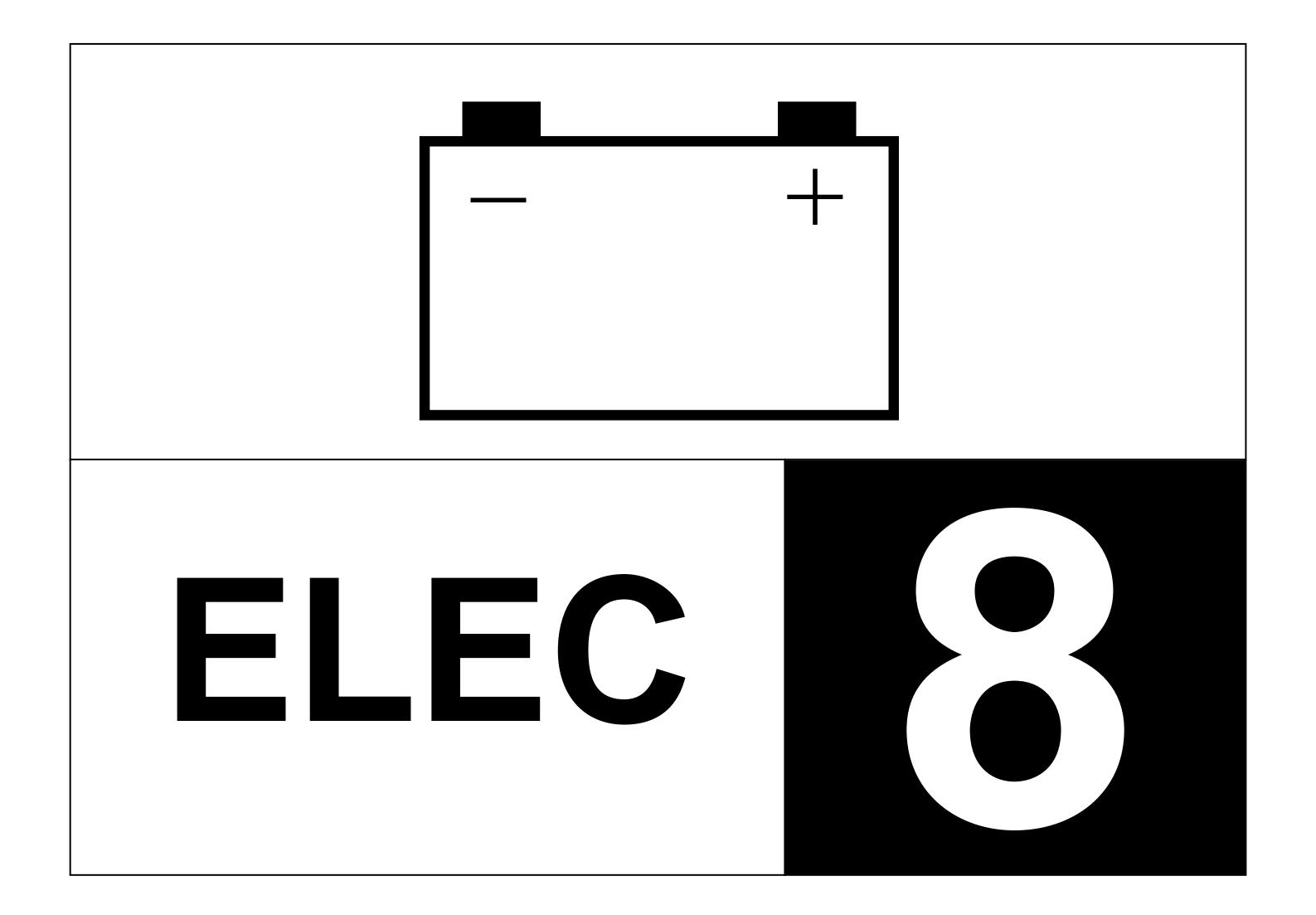


 $\begin{array}{l} \text{Drive chain slack} \\ \text{30} \, \times \, \text{45 mm} \end{array}$

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.





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CHAPTER 8 ELECTRICAL

ELECTRICAL COMPONENTS
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CHECKING SWITCHES
CHECKING STEPS
SWITCH CONNECTION AS SHOWN IN THIS MANUAL
SWITCH POSITION AND TERMINAL CONNECTION
IGNITION SYSTEM
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ELECTRIC STARTING SYSTEM
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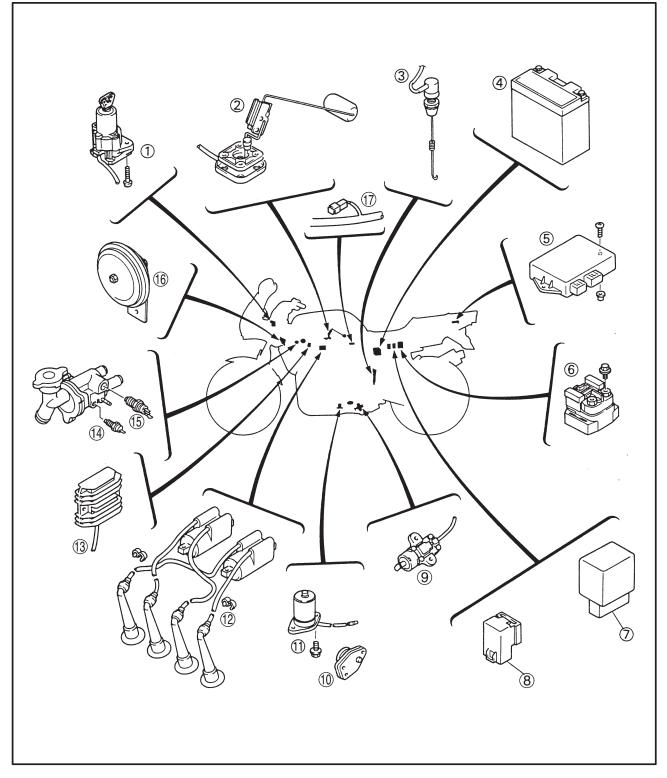
ELECTRICAL

ELECTRICAL COMPONENTS

- 1 Main switch
- 2 Fuel sender
- 3 Rear brake switch
- (4) Battery
- 5 Ignitor unit
- 6 Starter relay

- 7 Starting circuit cut-off relay
- 8 Flasher relay
- 9 Sidestand switch
- 10 Neutral switch
- 1 Oil level gauge
- 12 Ignition coil

- 13 Rectifier/Regulator
- 14 Thermo switch (warning light)
- (15) Thermo switch (fan motor)
- 16 Horn
- 17 Diode

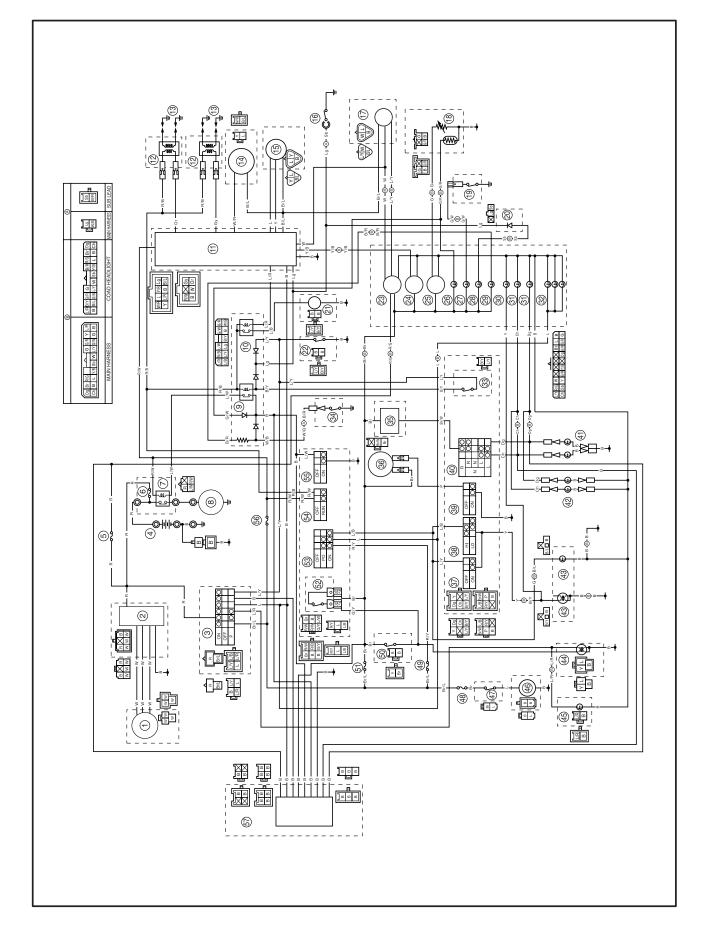


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CIRCUIT DIAGRAM



	CIRCUIT DIAGRAM	ELEC	
 A.C. magneto Rectifier regulator Main switch Battery Fuse (back up) Fuse (back up) Fuse (main) Starter relay Starter motor Starting circuit cut-off relay Fuel pump relay Ignition coil Spark plug Pickup coil Throttle position sensor Neutral switch Speed sensor Fuel sender Thermo switch (warning light) Diode Fuel pump Sidestand switch Speedometer Fuel mup Fuel pump Sidestand switch Speedometer Fuel meter Fuel meter Fuel level warning light Pengine temperature warning light Neutral indicator light 	 30 High beam indicator light 31 Turn indicator lights 32 Meter lights 33 Clutch switch 34 Oil level switch 35 Flasher relay 36 Horn 37 Pass switch 39 Dimmer switch 39 Horn switch 40 Turn switch 41 Front turn signal lights 42 Rear turn signal lights 43 Head light 44 Tail/Brake light 46 Fan motor 47 Thermo switch (fan motor) 48 Fuse (fan) 49 Fuse (head) 50 Rear brake switch 51 Fuse (signal) 52 Front brake switch 53 Lights switch 54 Engine stop switch 55 Starter switch 56 Fuse (ignition) 57 Alarm (option) 		
29 Oil level warning light			

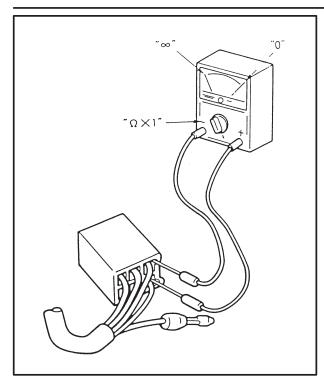
NOTE: _

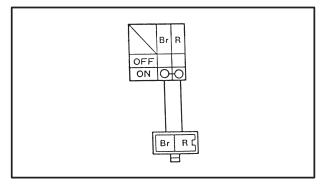
- Starter switch is closed while the button (switch) is pushed.
 Sidestand switch is closed while the side stand is upped.
 Clutch switch is closed while the clutch lever is pulled.
 Brake switch is closed while the brake is applied.

В	Black	Y	Yellow	L/Y	Blue/Yellow
Br	Brown	W	White	L/W	Blue/White
Ch	Chocolate	B/L	Black/Blue	L/R	Blue/Red
Dg	Dark green	B/R	Black/Red	R/B	Red/Black
G	Green	B/Y	Black/Yellow	R/Y	Red/Yellow
L	Blue	Br/L	Brown/Blue	R/W	Red/White
Lg	Light green	Br/W	Brown/White	Y/B	Yellow/Black
0	Orange	G/R	Green/Red	Y/R	Yellow/White
Sb	Sky blue	G/W	Green/White	W/B	White/Black
Р	Pink	G/Y	Green/Yellow	W/G	White/Green
R	Red	L/B	Blue/Black		

COLOR CODE







CHECKING SWITCHES CHECKING STEPS

Using pocket tester, check switches for continuity between their terminals to determine whether they are correctly connected.

Replace the switch component if any of the combinations does not produce the correct reading.

Pocket tester: 90890-03112

NOTE: .

- ^o Turn the switch to the "ON", "OFF" positions several times.
- ^o Adjust the pocket tester to correct "0" position before checking switches.
- ° Set the pocket tester selector to " \times 1" Ω .

SWITCH CONNECTION AS SHOWN IN THIS MANUAL

This manual contains connection charts, like the one shown on the left, showing the terminal connections of switches (e.g. the main switch, handlebar switch, brake switch, lighting switch etc.)

The column on the extreme left indicates the different switch positions, the top line indicates the colors of the leads connected to the terminals on the switch.

" \bigcirc " indicates terminals between which there is continuity, i.e. a closed circuit, in the given switch position.

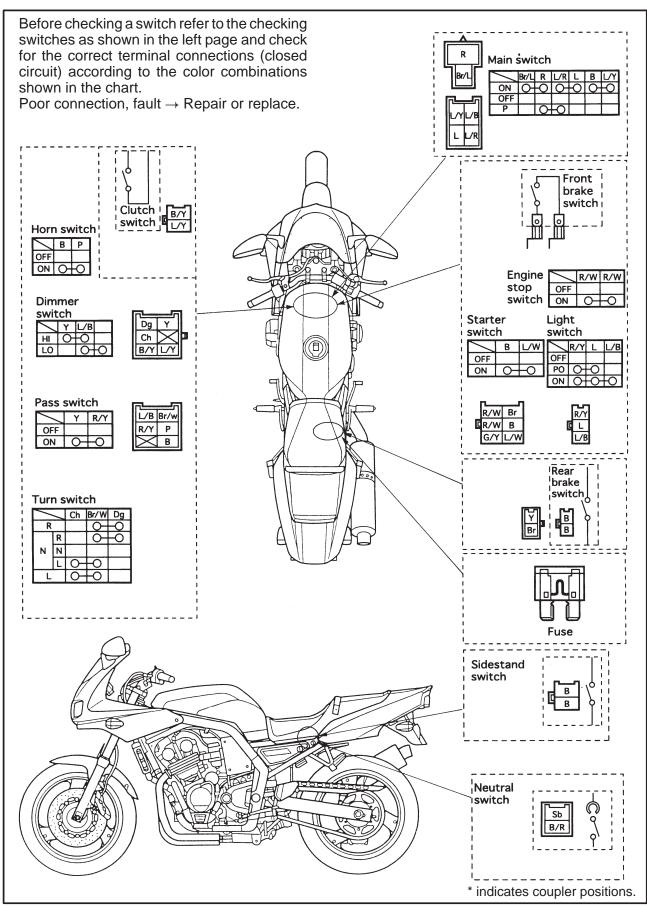
In this chart:

"Br and R" have continuity with the switch in the "ON" position.

CHECKING SWITCHES

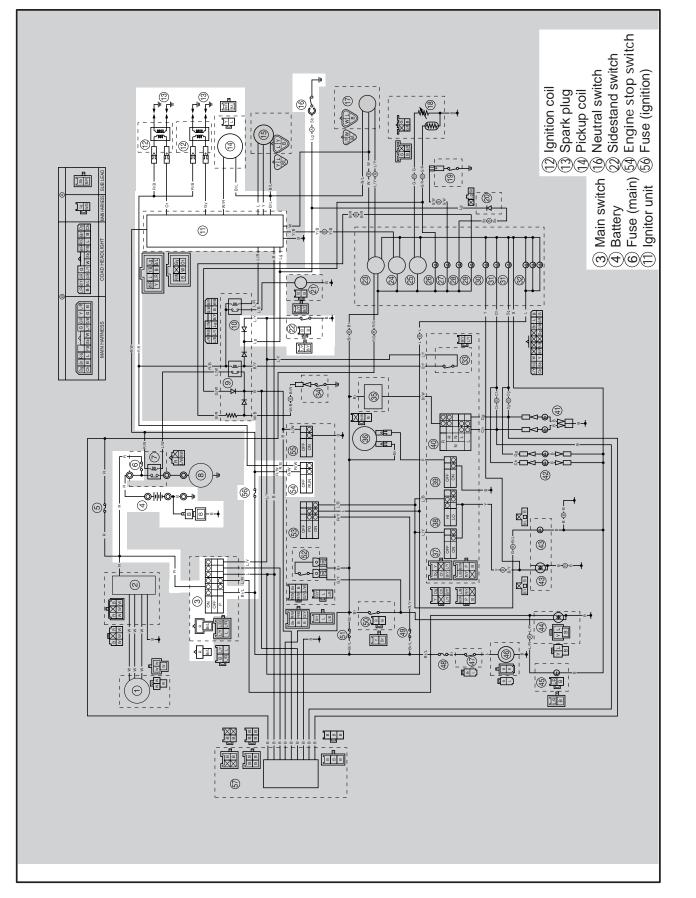


SWITCH POSITION AND TERMINAL CONNECTION





IGNITION SYSTEM CIRCUIT DIAGRAM





TROUBLESHOOTING

IF THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK):

Procedure

Check:

- 1. Fuses (main and ignition)
- 2. Battery
- 3. Spark plugs
- 4. Ignition spark gap
- 5. Spark plug cap resistance
- 6. Ignition coil resistance
- 7. Main switch

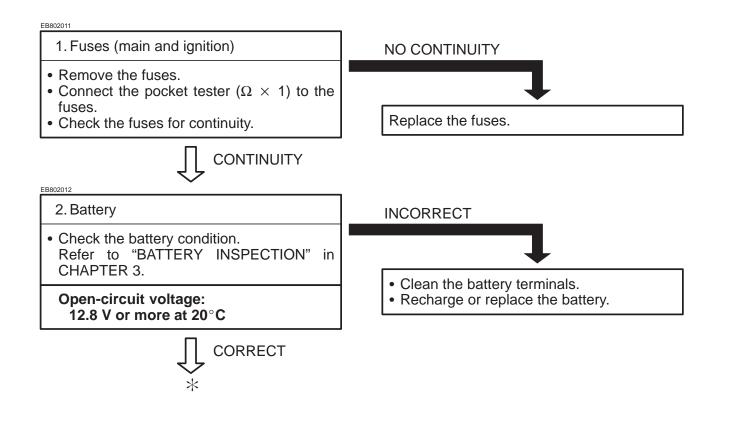
NOTE: _

- Remove the following part(s) before troubleshooting:
- 1) Seat
- 2) Fuel tank
- 3) Side cover (left)
- Use the following special tool(s) for troubleshooting.

8. Engine stop switch

- 9. Neutral switch
- 10. SIdestand switch
- 11. Diode (starting circuit cut-off relay)
- 12. Pickup coil resistance
- 13. Wiring connection (the entire ignition system)

Ignition checker: 90890-06754 Pocket tester: 90890-03112







Standard spark plug:

NGK/NIPPONDENSO

CR9E, CR8E/U27ESR-N, U24ESR-N

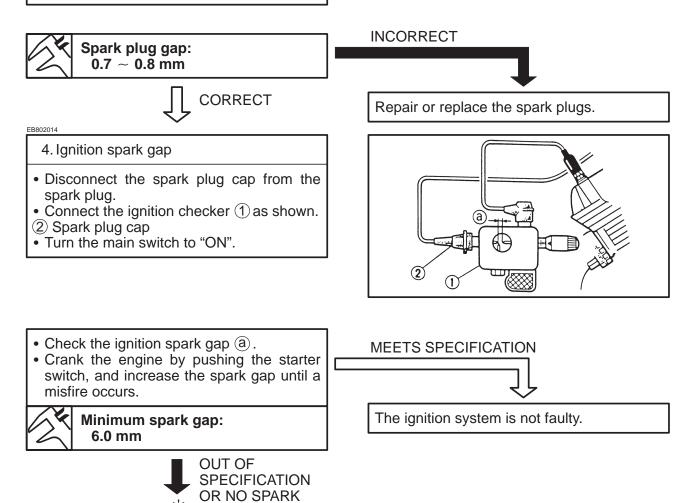


3. Spark plugs

EB802013

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.
- Refer to "SPARK LUG INSPECTION" in CHAPTER 3.

*



IGNITION SYSTEM

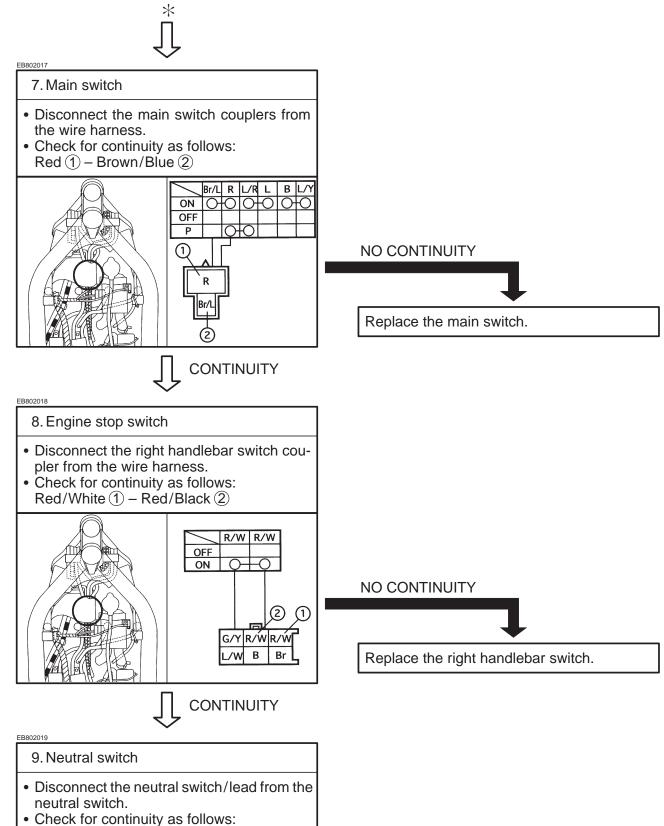


* $\Omega \times 1k$ EB802015 5. Spark plug cap resistance • Remove the spark plug cap. • Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap. I8040101 · Check if the spark plug cap has the speci-OUT OF SPECIFICATION fied resistance. Spark plug cap resistance: 0 10 kΩ at 20°C Replace the spark plug cap. MEETS **SPECIFICATION** EB802016 Tester (+) lead \rightarrow Red/Black terminal 6. Ignition coil resistance Tester (–) lead \rightarrow Orange (Gray) terminal Disconnect the ignition coil connector from the wire harness. • Connect the pocket tester ($\Omega \times 1$) to the ignition coil. $\mathcal{O}\mathcal{I}$ Tester (+) lead \rightarrow spark plug lead (1) • Check if the primary coil has the specified Tester (–) lead \rightarrow spark plug lead (2) resistance. Primary coil resistance: 0 1.87 \sim 2.53 Ω at 20°C • Connect the pocket tester ($\Omega \times 1k$) to the ignition coil. \bigcirc · Check if the secondary coil has the speci-OUT OF SPECIFICATION fied resistance. Secondary coil resistance: 0 12 \sim 18 k Ω at 20°C Replace the ignition coil. BOTH MEET **SPECIFICATION**

*

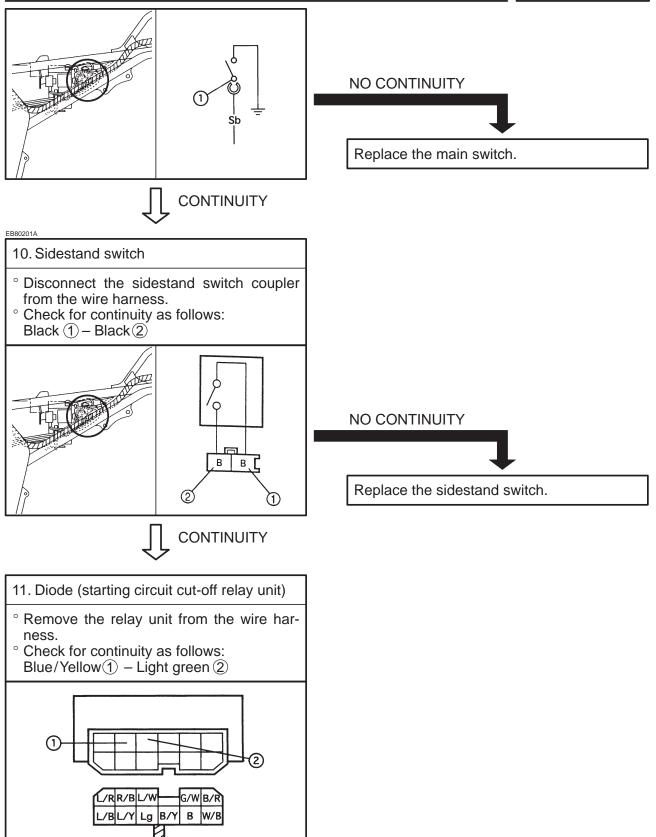




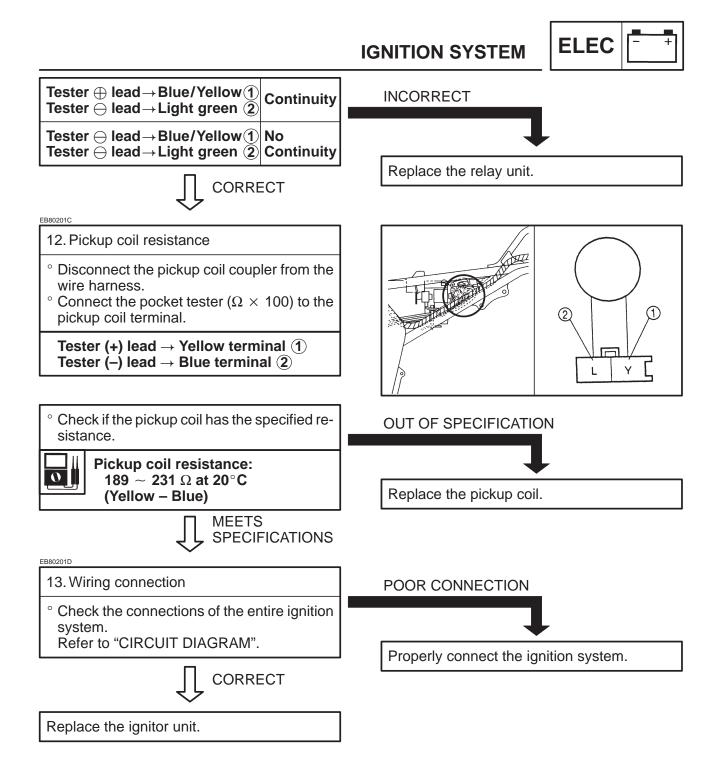


Neutral switch terminal ①– Ground



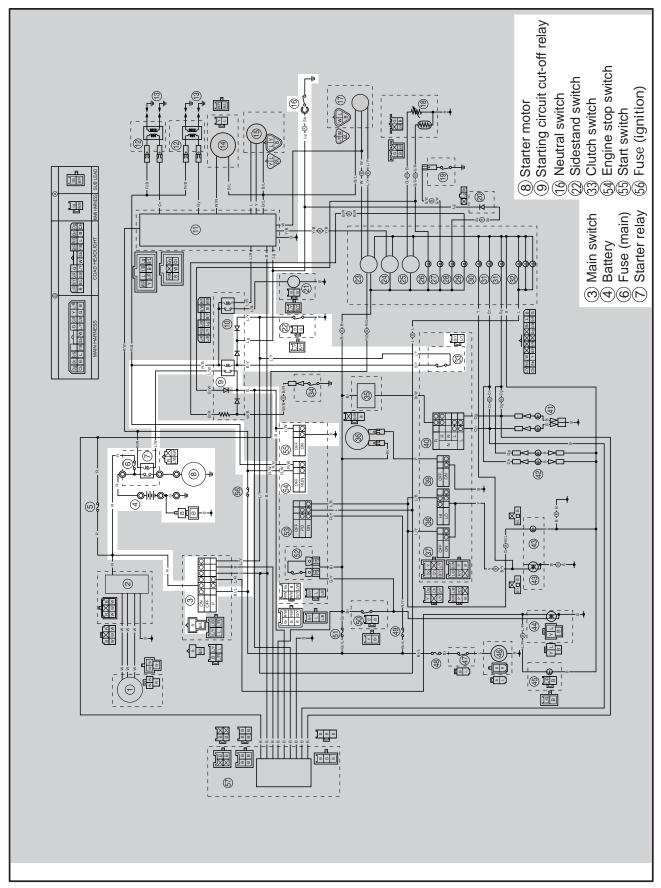


IGNITION SYSTEM



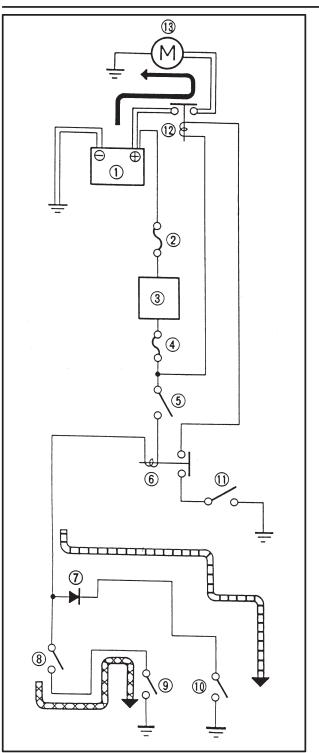


ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM



ELECTRIC STARTING SYSTEM





STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, and the starting circuit cut-off relay. If the engine stop switch is on "RUN" and the main switch is on "ON" (both switches are closed), the starter motor can operate only if.

The transmission is in neutral (the neutral switch is closed).

or if

The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter from operating when neither of these conditions have been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor.

When at least one of the above conditions have been met however, the starting circuit cut-off relay is closed, and the engine can be started by pressing the starter switch.

WHEN THE TRANSMISSION IS IN

WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED IN

- 1 Battery
- 2 Fuse (main)
- (3) Main switch
- ④ Fuse (ignition)
- (5) Engine stop switch
- 6 Starting circuit cut-off relay
- ⑦ Diode
- (8) Clutch switch
- (9) Sidestand switch
- 10 Neutral switch
- 1 Start switch
- 12 Starter relay
- 13 Starter motor

TROUBLESHOOTING

IF THE STARTER MOTOR FAILS TO OPERATE:

Procedure

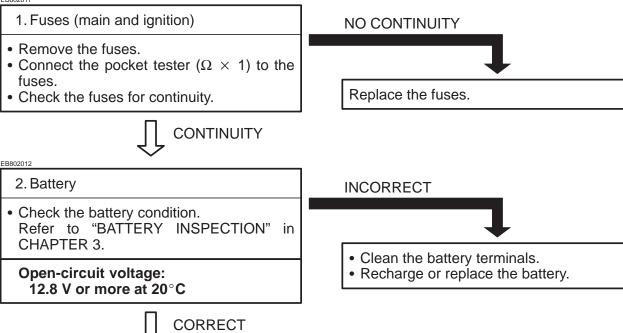
Check:

- 1. Fuses (main and ignition)
- 2. Battery
- 3. Starter motor
- 4. Starting circuit cut-off relay
- 5. Starter relay
- 6. Main switch
- 7. Engine stop switch

NOTE: _

- Remove the following part(s) before troubleshooting:
- 1) Seat
- 2) Fuel tank
- 3) Side cover (left)
- Use the following special tool(s) for troubleshooting.

EB802011



- 9. Sidestand switch
- 10. Clutch switch
- 11. Start switch
- 12. Diode (starting circuit cut-off relay)
- 13. Wiring connection (the entire starting system)

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Pocket tester: 90890-03112

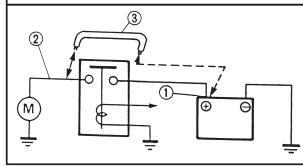




3. Starter motor

EB803021

- Connect the battery positive terminal ①and starter motor cable ② using a jumper lead ③ *.
- Check the operation of the starter motor.



MOVES

EB803023

4. Starting circuit cut-off relay (relay unit)

- Remove the relay unit from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay unit terminals.

Battery (+) terminal → Red/Black terminal①

Battery (–) terminal → Black/Yellow terminal②

```
Tester (+) lead \rightarrow Blue/White terminal \textcircled{3}
Tester (–) lead \rightarrow Black terminal \textcircled{4}
```

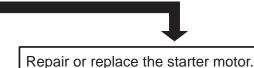
• Check the starting circuit cut-off relay for continuity.



 \ast

- A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to reduce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT MOVE



NO CONTINUITY

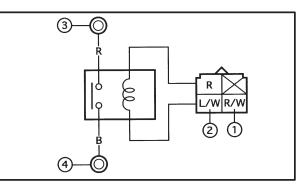
Replace the starting circuit cut-off relay.

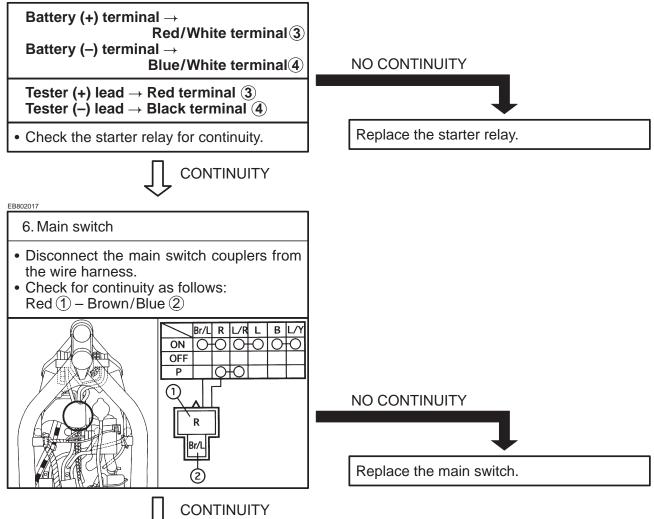




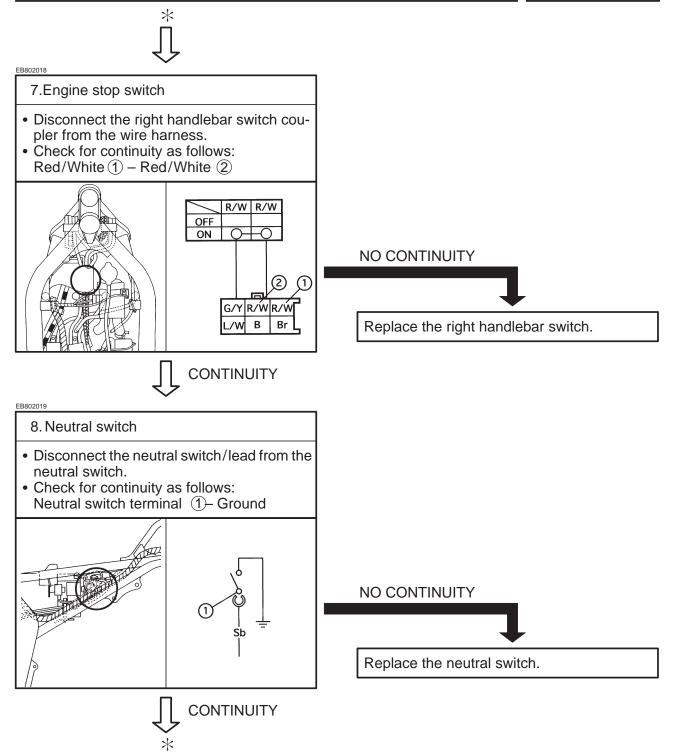
5. Starter relay

- Disconnect the relay unit coupler from the wire harness.
- Connect the pocket tester ($\Omega \times$ 1) and battery (12 V) to the relay unit coupler terminals.



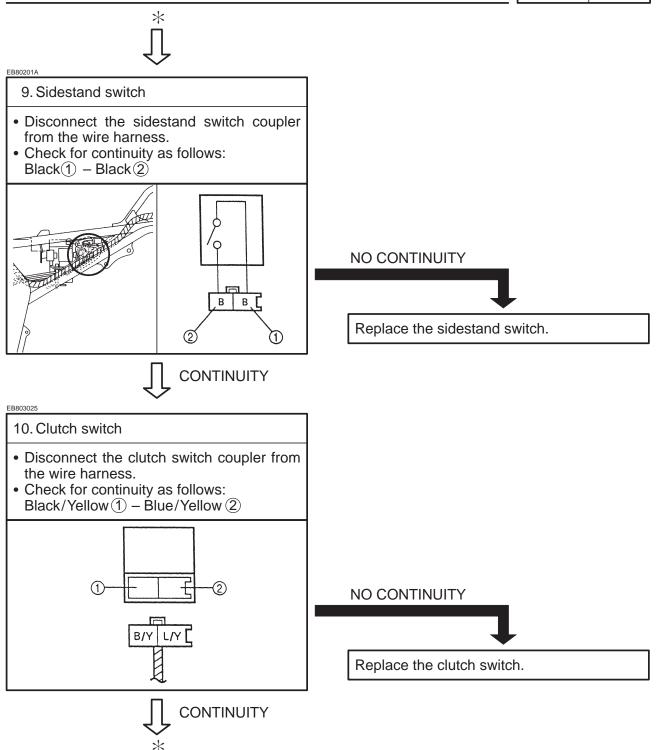




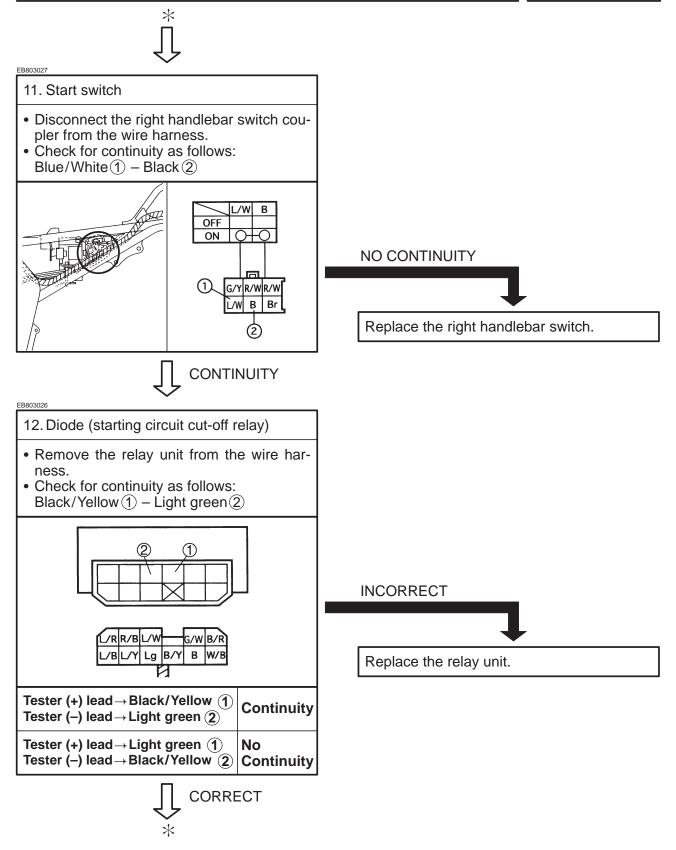
















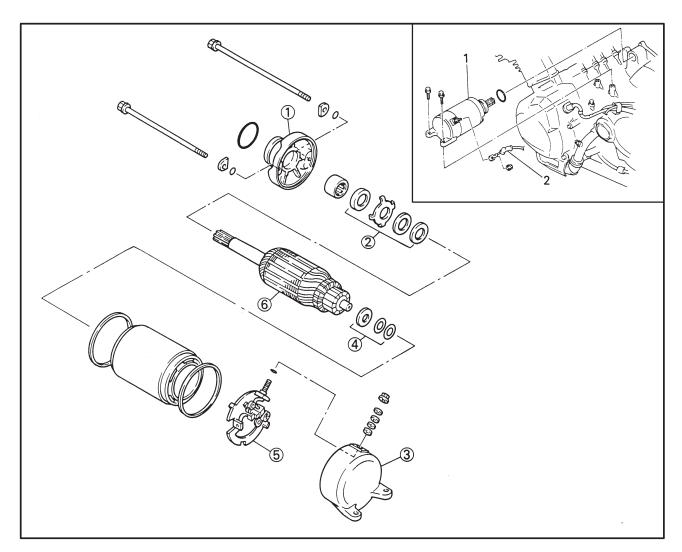
13. Wiring connection

 Check the connections of the entire starting system.
 Refer to "CIRCUIT DIAGRAM". POOR CONNECTION

Properly connect the starting system.



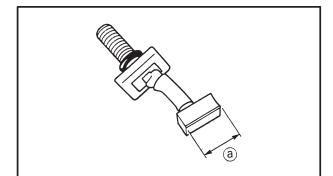
EB803030 STARTER MOTOR

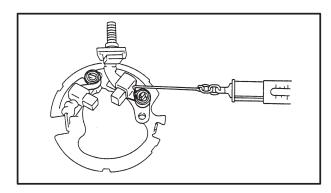


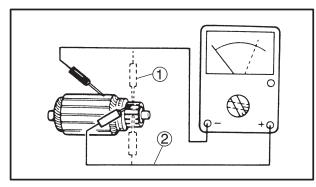
1 S	Starter motor removal Starter motor Starter motor lead	1	Remove the parts in order. Reverse the removal procedure for installation.
i		1	
 F V R A S B 	Starter motor disassembly Front bracket Washers Rear bracket Shims Brush holder/Brush Armature ass'y	1 1 2 1 1/1 1	Disassembly the parts in order. Reverse the disassembly procedure for

ELECTRIC STARTING SYSTEM









CHECKING THE STARTER MOTOR

Measure:

 Brush length ⓐ
 Out of specification → Replace.



- 2. Measure:
 - [°] Brush spring force Fatigue/out of specification → Replace as a set.



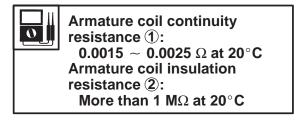
- 3. Inspect:
 - ° Commutator

Dirty \rightarrow Clean it with #600 grit sandpaper.

- 4. Inspect:
 - Armature coil resistances (insulation/continuity)
 - Defects \rightarrow Replace the starter motor.

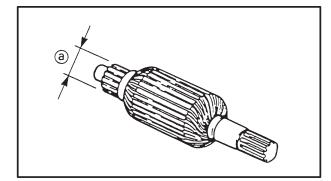
Inspection steps:

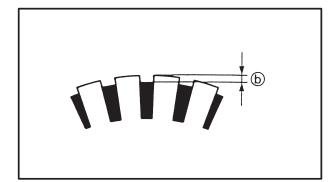
- $^\circ$ Connect the pocket tester for the continuity (1) and insulation (2) checks.
- ° Measure the armature coil resistances.



If the resistance is incorrect, replace the starter motor.







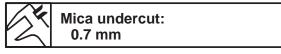
- 5. Measure:
 - $^\circ$ Commutator diameter (a) Out of specification \rightarrow Replace the starter motor.



Commutator wear limit: 27 mm

- 6. Measure:
 - ° Mica undercut (a)

Out of specification \rightarrow Scrape the mica to the proper measurement using a hacksaw blade which has been grounded to fit the commutator.

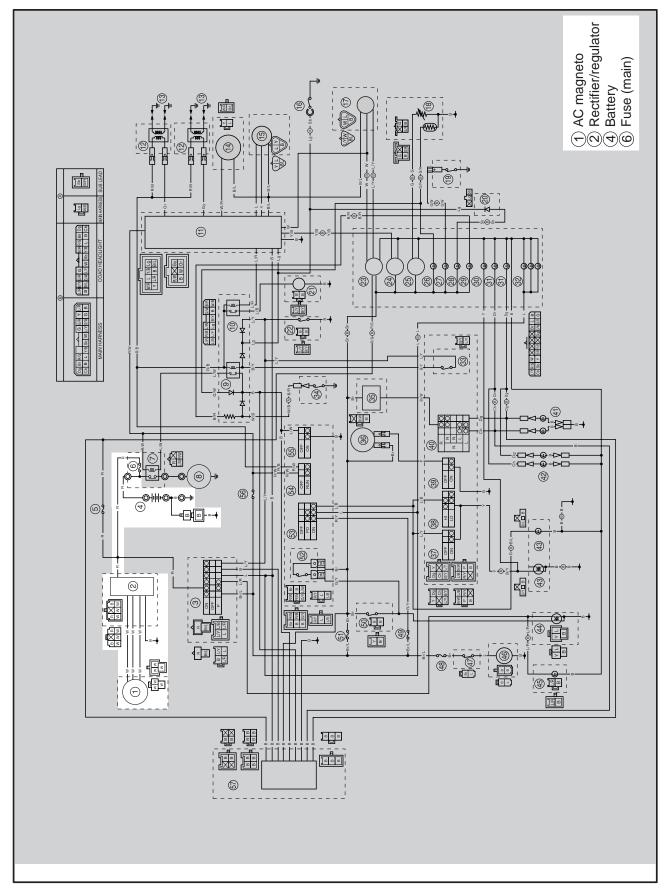


NOTE: .

The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.

CHARGING SYSTEM

CHARGING SYSTEM CIRCUIT DIAGRAM





TROUBLESHOOTING

IF THE BATTERY IS NOT CHARGED:

Procedure

Check:

- 1. Fuse (main)
- 2. Battery
- 3. Charging voltage

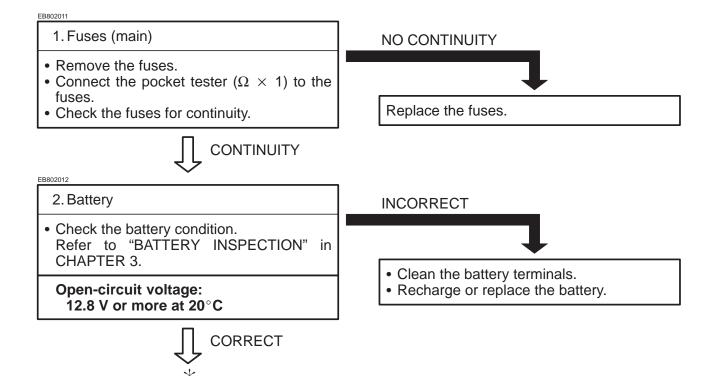
NOTE: .

- Remove the following part(s) before troubleshooting:
- 1) Seat
- 2) Side cover (left)
- Use the following special tool(s) for trouble-shooting.

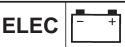
- 4. Stator coil resistance
- 5. Wiring connections (the entire charging system)

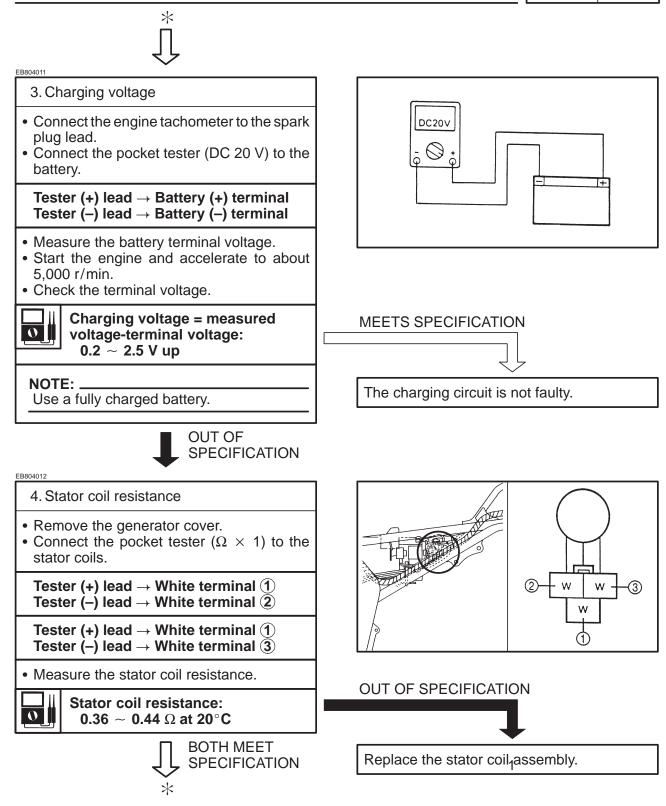


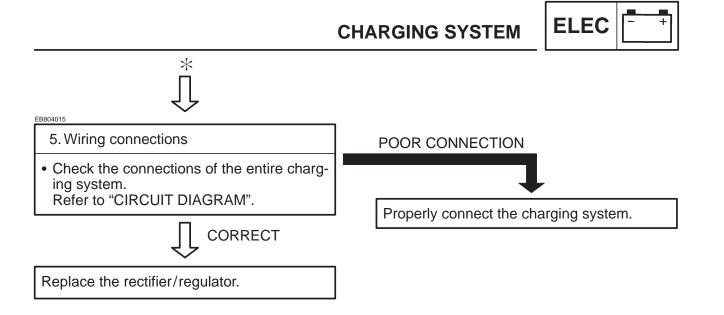
 Engine tachometer: 90890-03113
 Pocket tester: 90890-03112



CHARGING SYSTEM ELEC

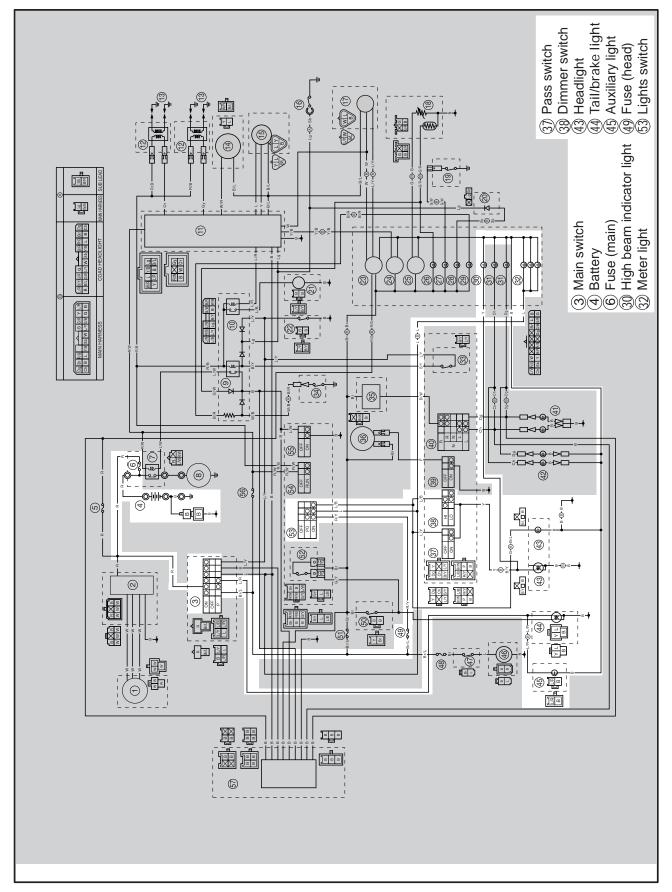


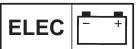




LIGHTING SYSTEM

LIGHTING SYSTEM CIRCUIT DIAGRAM





TROUBLESHOOTING

IF THE HEADLIGHT, HIGH BEAM INDICATOR LIGHTS, TAILLIGHT, AUXILIARY LIGHT AND/OR METER LIGHT FAIL TO COME ON:

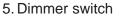
Procedure

Check:

- 1. Fuses (main and head)
- 2. Battery
- 3. Main switch
- 4. Lights switch (for Europe)

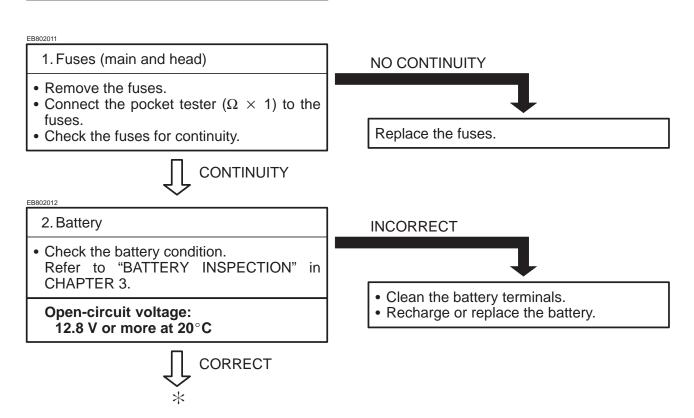
NOTE: .

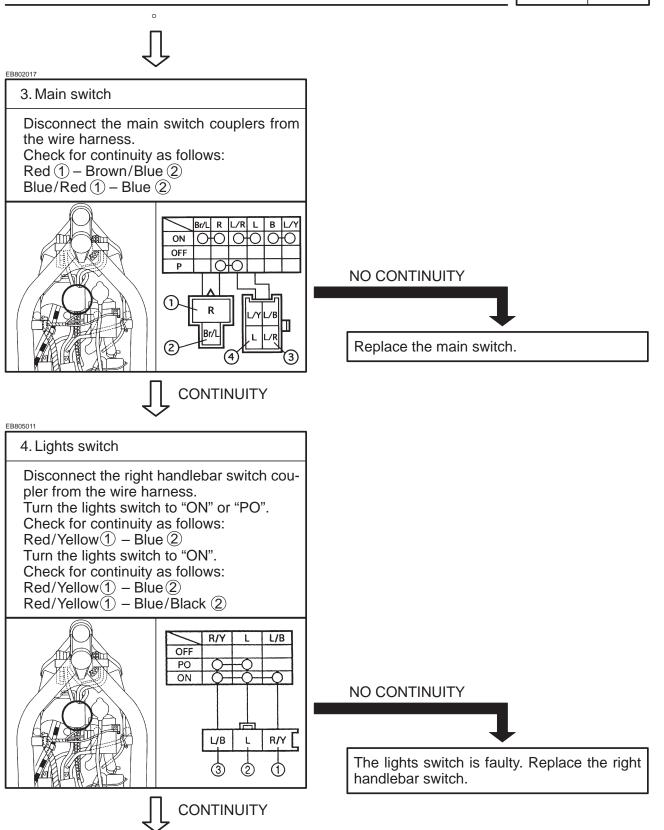
- Remove the following part(s) before troubleshooting:
- 1) Seat
- 2) Fuel tank
- 3) Side cover (left)
- 4) Front cowling assembly
- Use the following special tool(s) for troubleshooting.



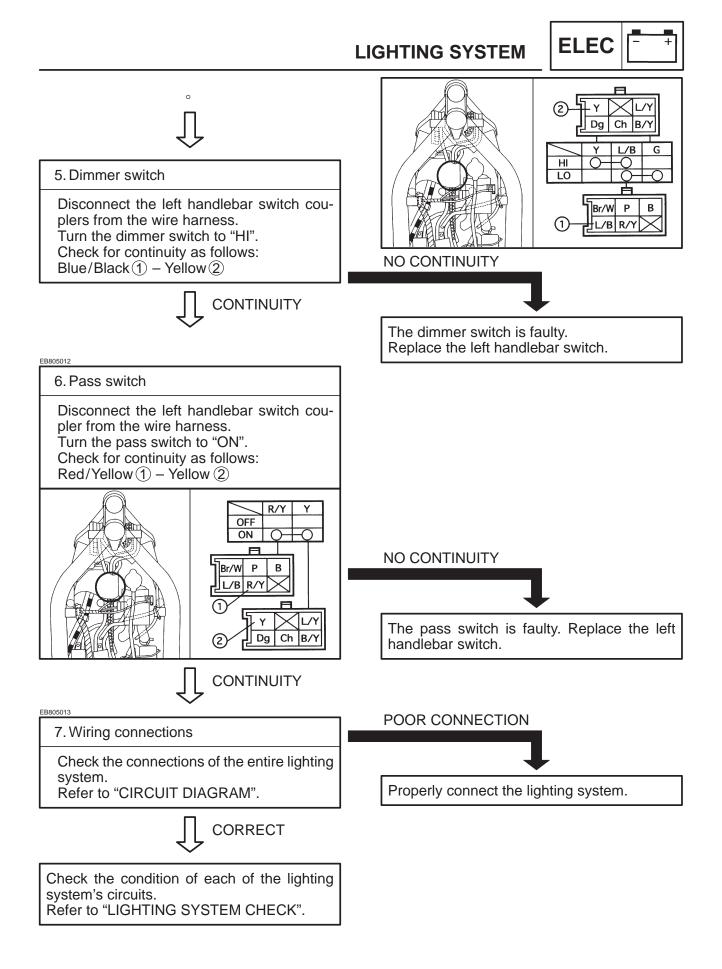
- 6. Pass switch (for Europe and Australia)
- 7. Wiring connections (the entire lighting system)

Pocket tester: 90890-03112





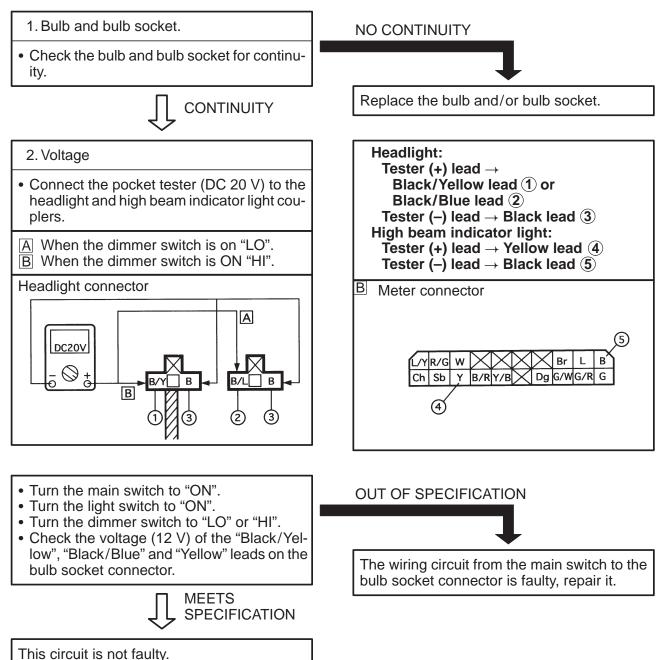
LIGHTING SYSTEM





LIGHTING SYSTEM CHECK

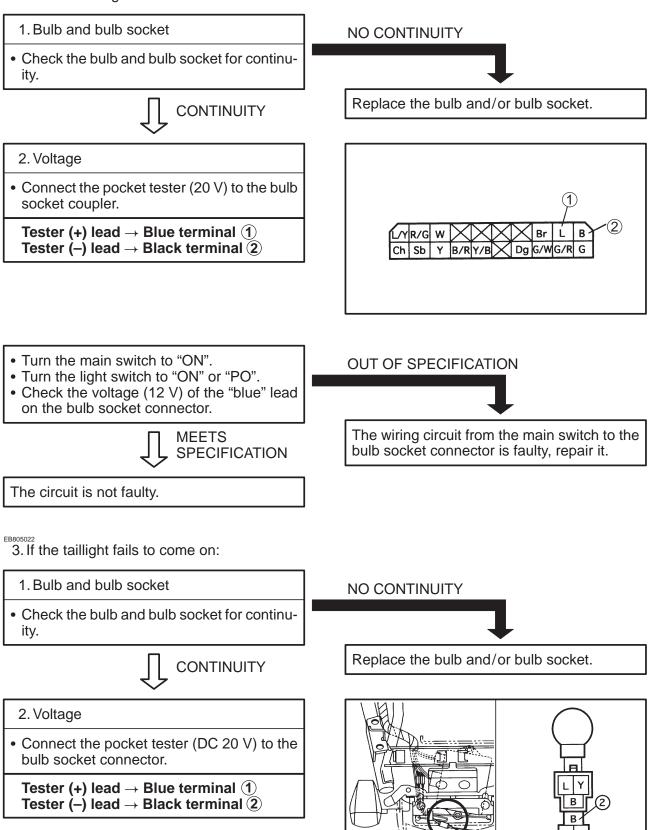
1. If the headlight and the high beam indicator light fail to come on:

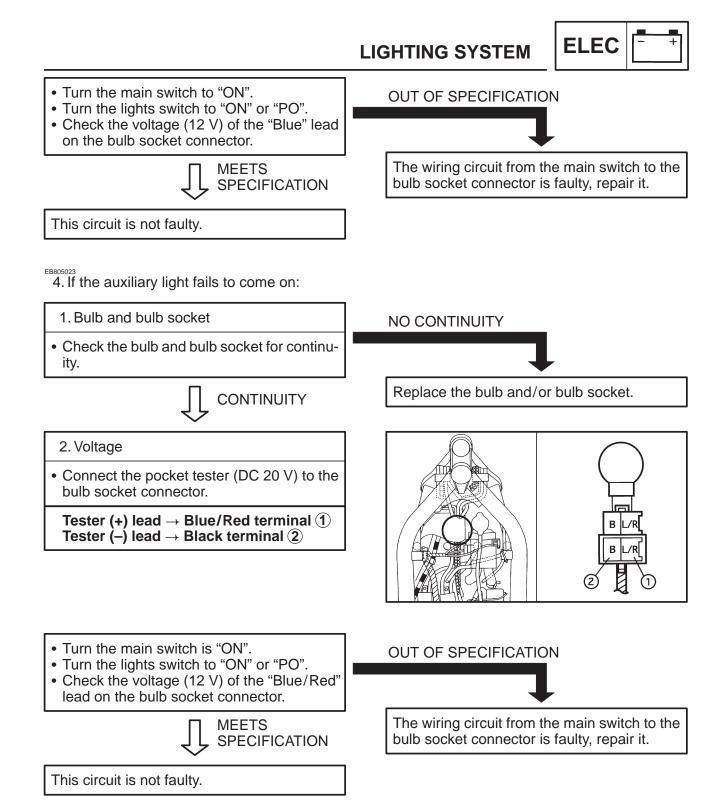


(1)

LIGHTING SYSTEM

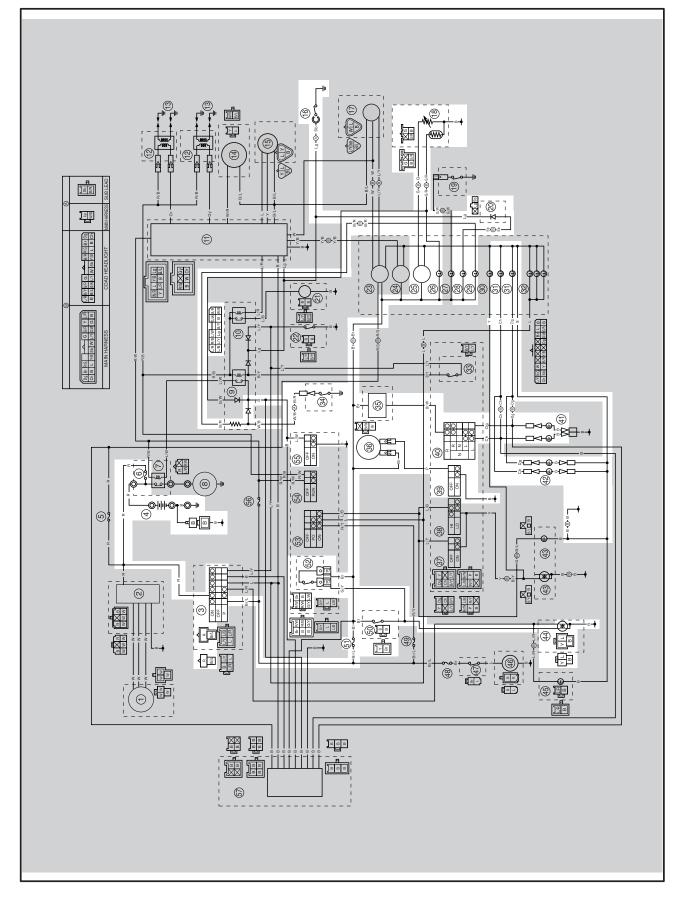
2. If the meter light fails to come on:







SIGNAL SYSTEM CIRCUIT DIAGRAM



ELEC

- ③ Main switch
- (4) Battery
- 6 Fuse (main)
- (16) Neutral switch
- 18 Fuel sender
- 20 Diode
- 25 Fuel meter
- 6 Fuel level warning light
- 28 Neutral indicator light
- 29 Oil level warning light
- (31) Turn indicator light
- 34 Oil level switch
- 35 Flasher relay
- 36 Horn
- (39) Horn switch
- 40 Turn switch
- Tront turn signal light
- (42) Rear turn signal light
- 4 Tail/brake light
- 50 Rear brake switch
- (51) Fuse (signal)
- (52) Front brake switch
- 55 Start switch

Pocket tester:

90890-03112



TROUBLESHOOTING

IF THE TURN SIGNAL LIGHT, BRAKE LIGHT AND/OR INDICATOR LIGHT FAIL TO COME ON: IF THE HORN FAILS TO SOUND:

Procedure

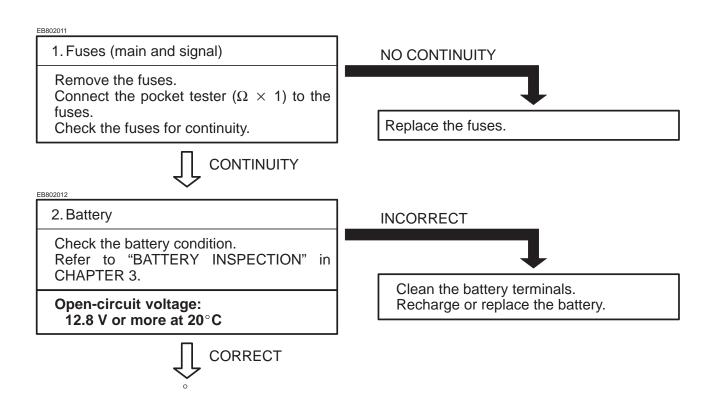
Check:

- 1. Fuses (main and signal)
- 2. Battery
- 3. Main switch
- 4. Wiring connection (the entire signal system)

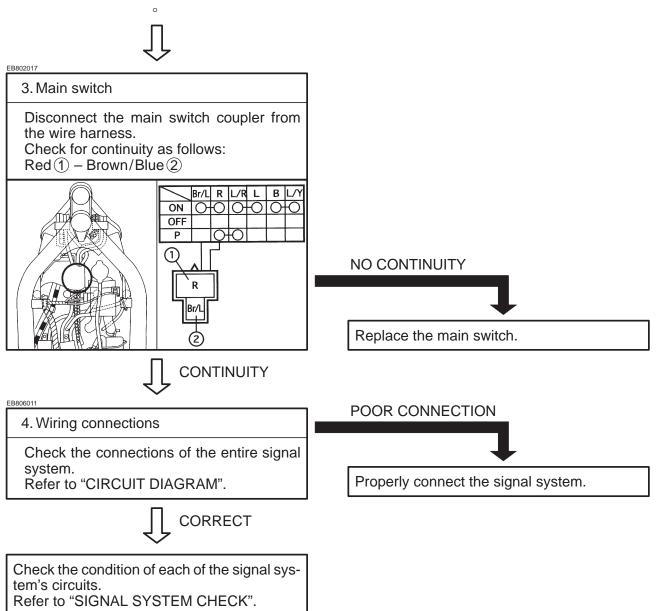
NOTE: .

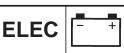
Remove the following part(s) before troubleshooting:

- 1) Seat
- 2) Fuel tank
- 3) Side covers (left and right)
- Front cowling assembly Use the following special tool8s) for troubleshooting.



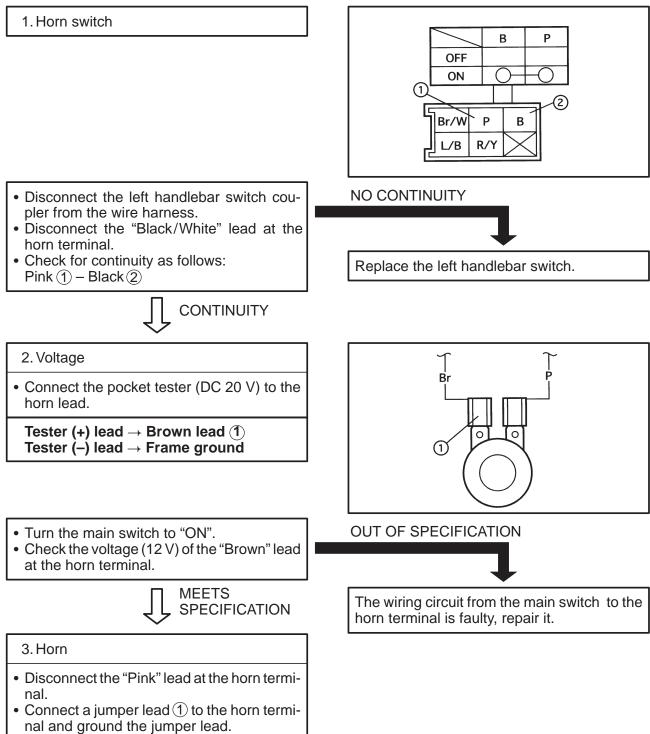






SIGNAL SYSTEM CHECK

1. If the horn fails to sound:



• Turn the main switch to "ON".



Br ⓓ HORN SOUNDS 0 С The horn is not faulty. HORN DOES NOT SOUND 4. Voltage Br Connect the pocket tester (DC 20 V) to the horn at the "Pink" terminal. Tester (+) lead \rightarrow Brown lead (1) Tester (-) lead \rightarrow Pink \bigcirc Turn the main switch to "ON". OUT OF SPECIFICATION Check the voltage (12 V) of the "Pink" lead at the horn terminal. MEETS Replace the horn. **SPECIFICATION** Adjust or replace the horn. EB806022 2. If the brake light fails to come on: 1. Bulb and bulb socket NO CONTINUITY Check the bulb and bulb socket for continuity. Replace the bulb and/or bulb socket. CONTINUITY

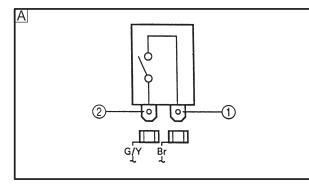




0

2. Brake switch

Disconnect the front brake switch leads. Disconnect the rear brake switch coupler from the wire harness. Check for continuity as follows: Brown (1 - Green/Yellow (2))Black (3) - Black (4)



A Front brake switch B Rear brake switch

NO CONTINUITY

Replace the brake switch.

3. Voltage

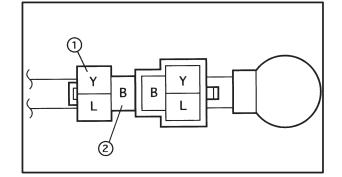
Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead \rightarrow Yellow terminal (1) Tester (-) lead \rightarrow Black terminal (2)

Turn the main switch to "ON". The brake lever is pulled in or the brake pedal is pressed down. Check the voltage (12 V) of the "Yellow" lead on the bulb socket connector.



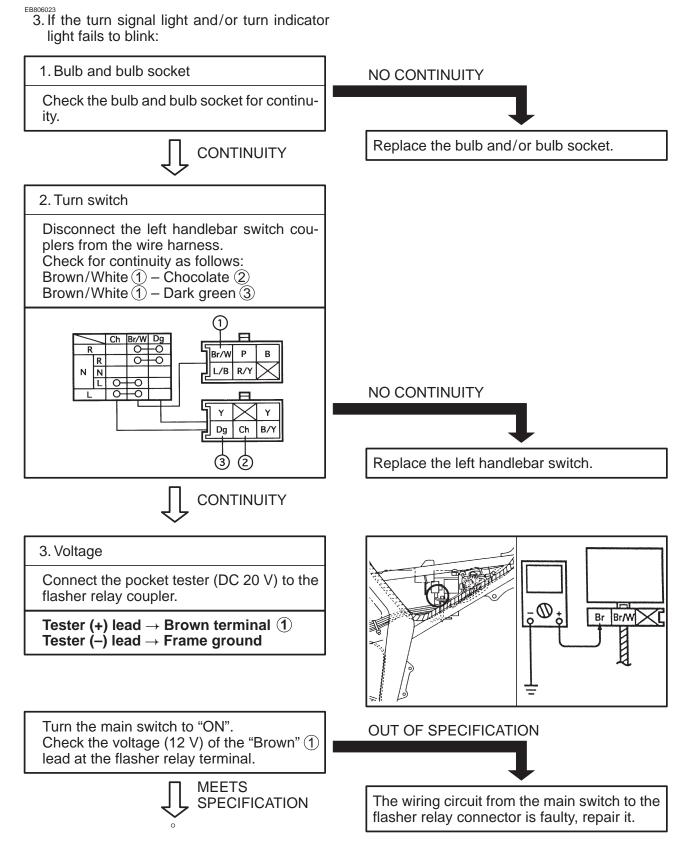
This circuit is not faulty.



OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.





ELEC



4. Voltage

Connect the pocket tester (DC 20 V) to the flasher relay coupler.

Tester (+) lead \rightarrow Brown/White terminal (1) Tester (-) lead \rightarrow Frame ground

Turn the main switch to "ON". Turn the turn switch to "L" or "R". Check the voltage (12 V) on the "Brown/White" ① lead at the flasher relay terminal.



5. Voltage

Connect the pocket tester (DC 20 V) to the bulb socket connector.

A Flasher light

B Turn indicator light

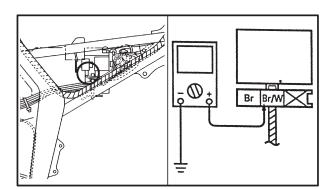
At the flasher light (left): Tester (+) lead \rightarrow Chocolate lead (1) Tester (-) lead \rightarrow Frame ground

At the flasher light (right): Tester (+) lead \rightarrow Dark green lead 2 Tester (–) lead \rightarrow Frame ground

Turn the main switch to "ON". Turn the turn switch to "L" or "R". Check the voltage (12 V) of the "Chocolate" lead or "Dark green" lead on the bulb socket connector.

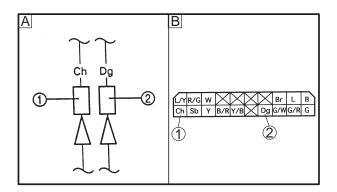


This circuit is not faulty.



OUT OF SPECIFICATION

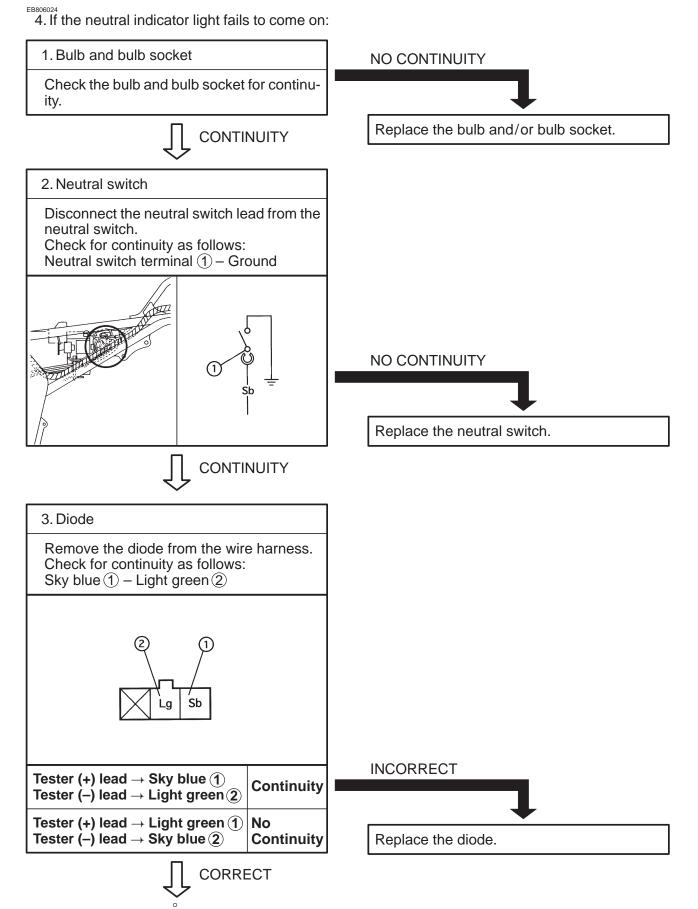
The flasher relay is faulty, replace it.



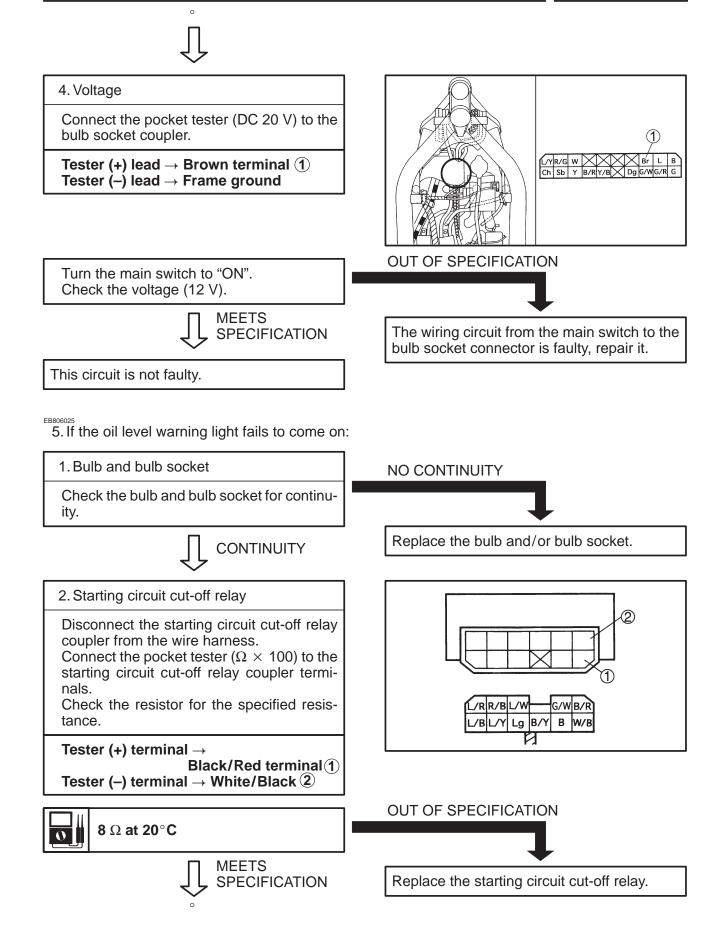
OUT OF SPECIFICATION

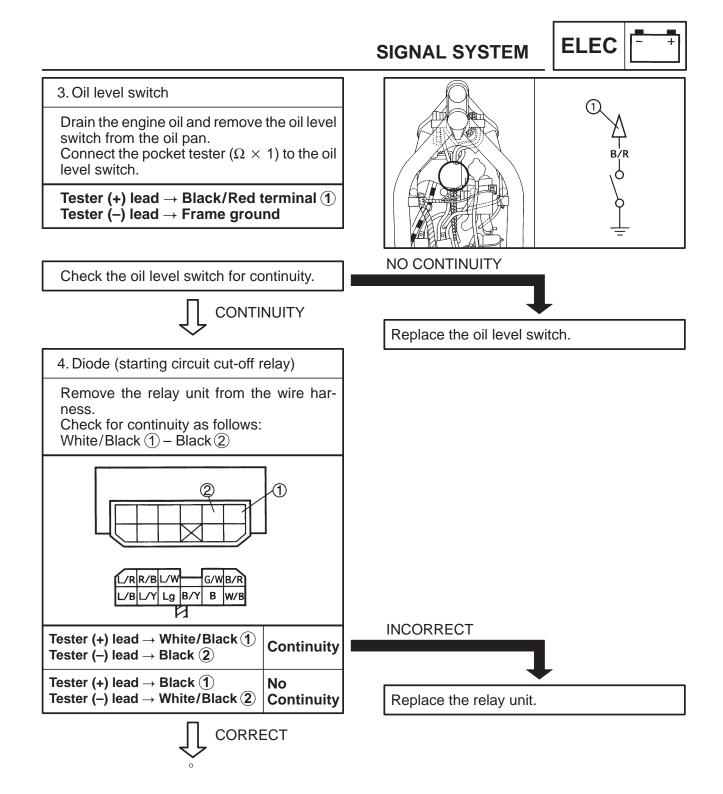
The wiring circuit from the turn switch to the bulb socket connector is faulty, repair it.



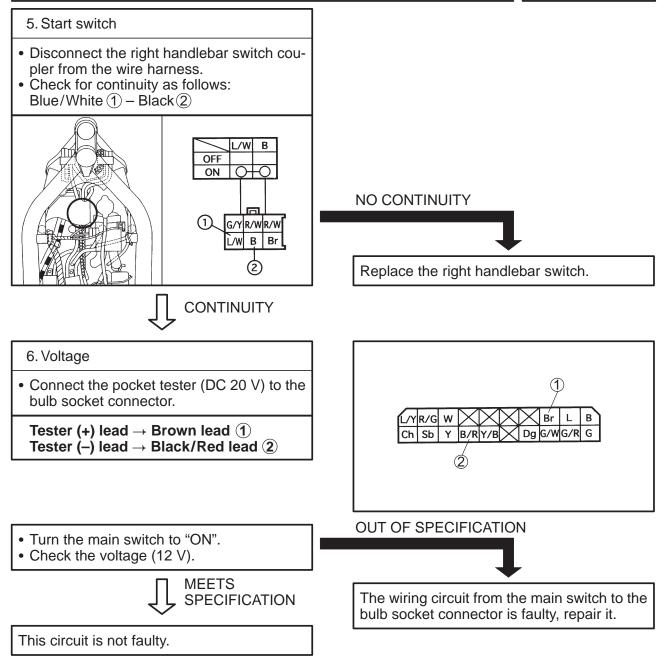




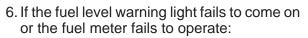


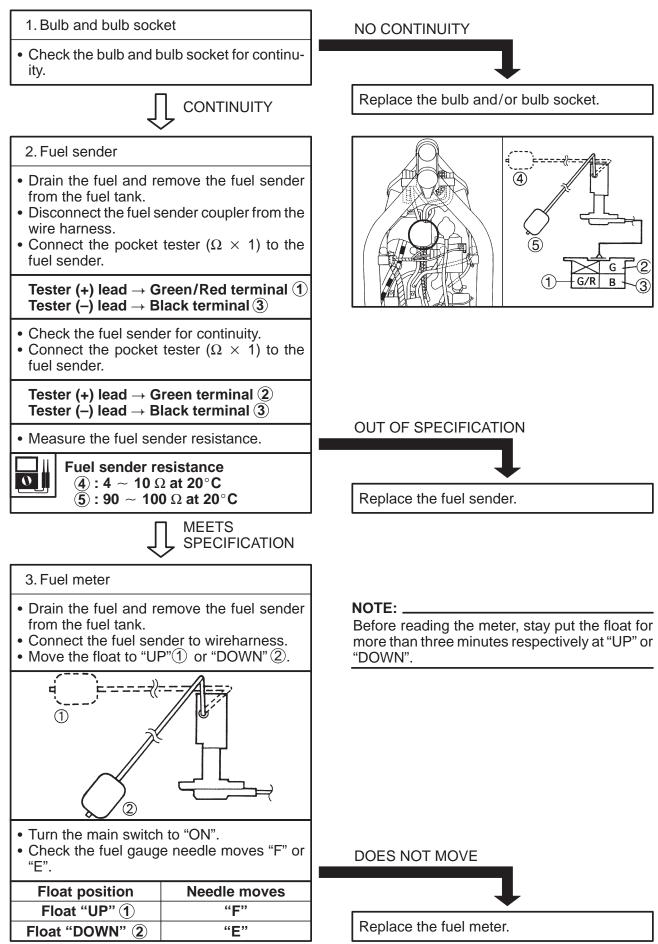


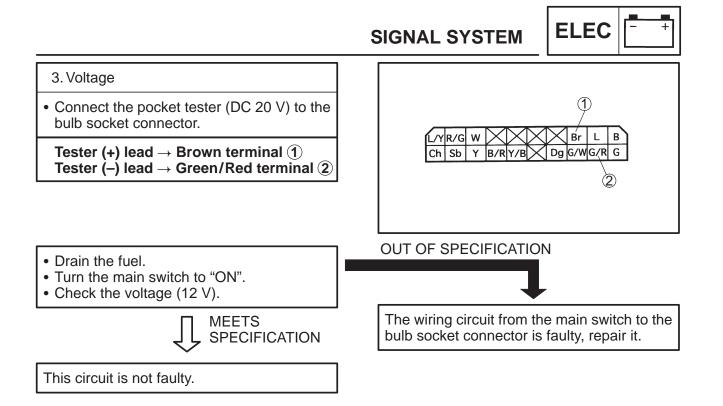






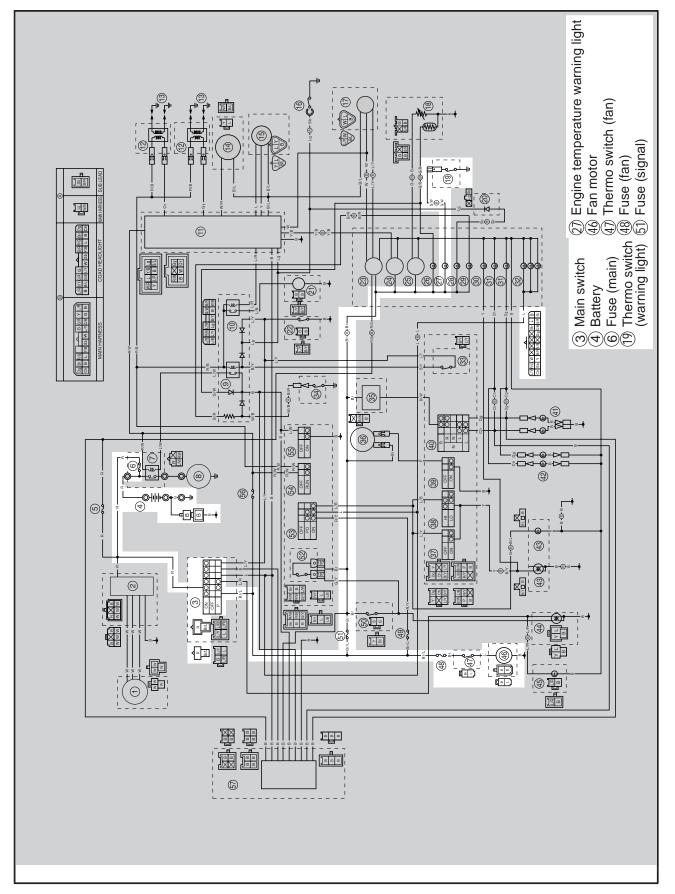






COOLING SYSTEM

COOLING SYSTEM





TROUBLESHOOTING

IF THE FAN MOTOR FAILS TO TURN: IF THE WATER TEMPERTATURE METER FAILS TO MOVE, WHEN THE ENGINE IS WARM:

Procedure

Check:

- 1. Fuses (main, signal and fan)
- 2. Battery
- 3. Main switch
- 4. Fan motor
- 5. Thermo switch

NOTE: _

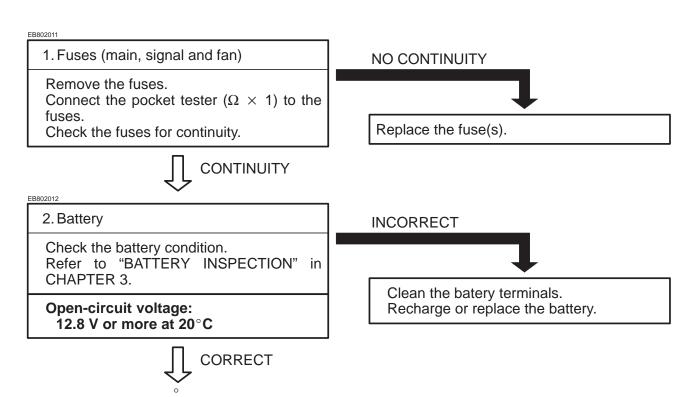
Remove the following part(s) before troubleshooting.

- 1) Seat
- 2) Fuel tank
- 3) Front cowling assembly
- Use the following special tool(s) for trouble-shooting.

6. Engine temperature warning light

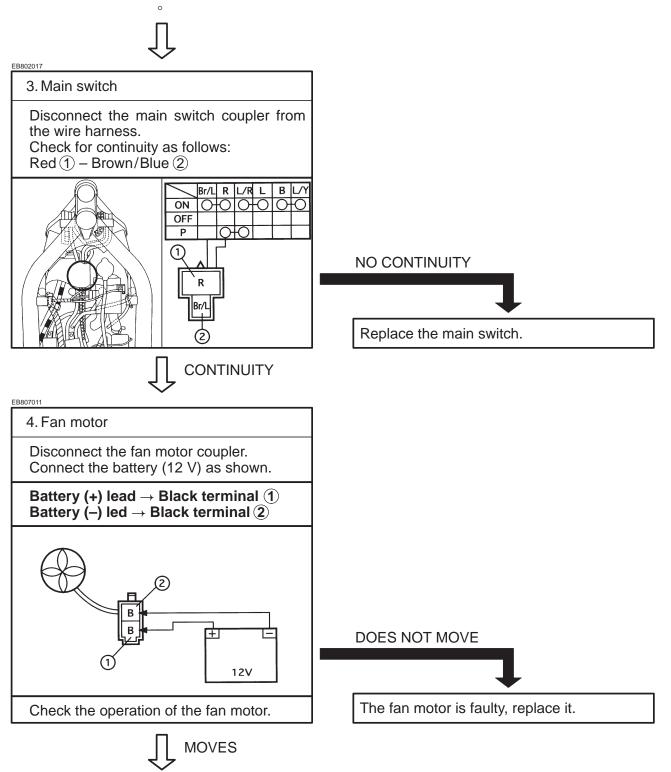
Pocket tester: 90890-03112

- 7. Voltage
- 8. Wiring connections (the entire cooling system)



COOLING SYSTEM









EB802017

5. Thermo switch (fan, engine temperature)

Remove the thermo switch from the thermostatic valve housing.

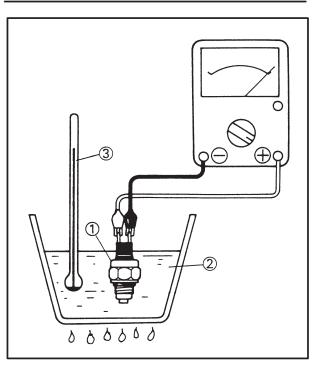
Connect the pocket tester ($\Omega \times 1$) to the thermo switch (1).

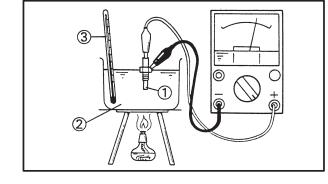
Immerse the thermo switch in coolant (2). Check the thermo switch for continuity. While heating the coolant use a thermometer (3) to record the temperatures.

Test	Water temperature	Good condition	
step	Thermo switch		
1	$0 \sim 105^{\circ}$ C	×	
2	More than 105°C	0	
3*	105 to 98°C	0	
4*	Les than 98°C	×	

Tests 1 & 2; Heat-up tests Tests 3* & 4*; Cool-down tests O: Continuity X: No continuity

Handle the thermo switch with special care. Never subjct it to strong shocks or allow it to be dropped. Should it be dropped, it must be replaced.





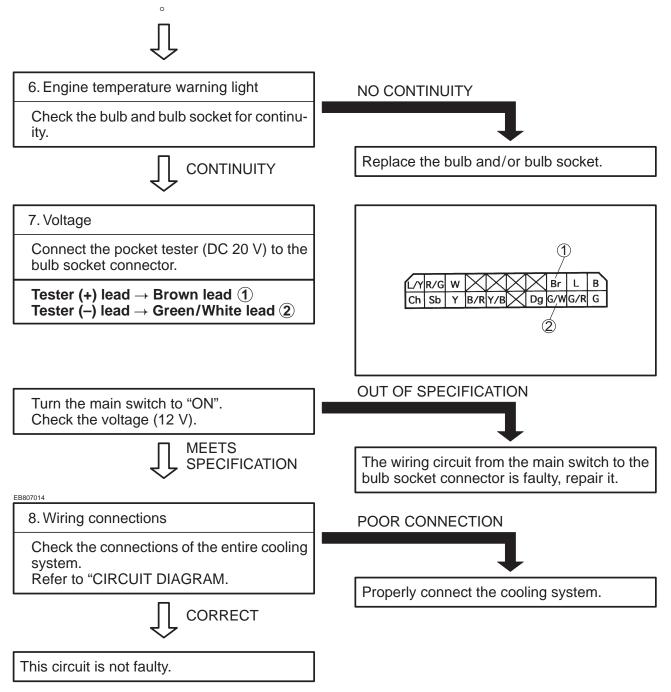
98°C A 98°C A 105°C 105°C A THERMO SWITCH "ON" B THERMO SWITCH "OFF" GOOD



Replace the thermo switch.

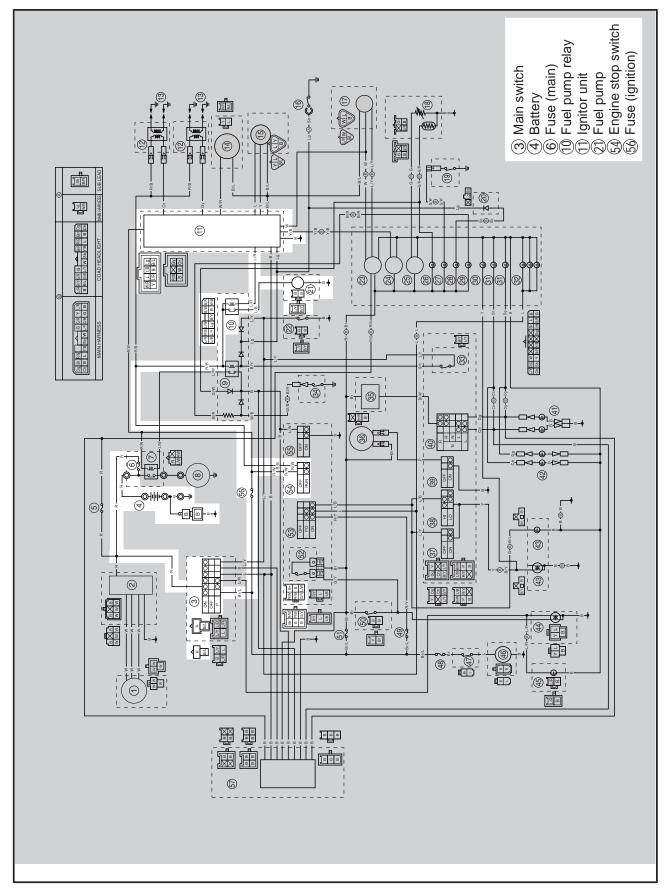
BAD CONDITION







FUEL PUMP SYSTEM CIRCUIT DIAGRAM

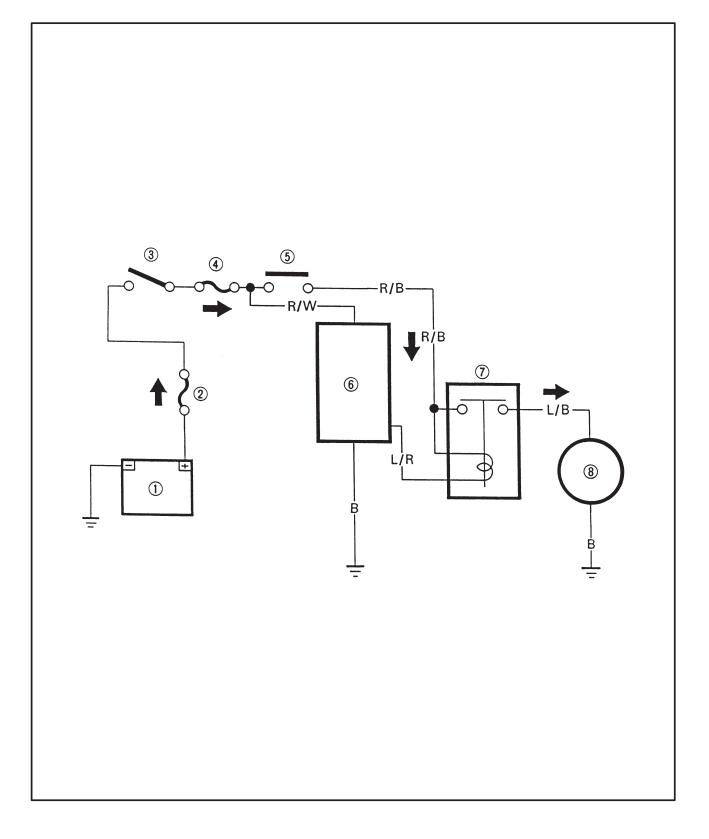




The fuel pump circuit consists of the fuel pump relay, fuel pump, engine stop switch and ignitor unit.

The ignitor unit includes the control unit for the fuel pump.

- Battery
 Fuse (main)
- 3 Main switch
- (4) Fuse (ignition)
- 5 Engine stop switch
- 6 Ignitor unit
- Tuel pump relay
- 8 Fuel pump





TROUBLESHOOTING

IF THE FUEL PUMP FAILS TO OPERATE:

Procedure

Check:

- 1. Fuses (main and ignition)
- 2. Battery
- 3. Main switch
- 4. Engine stop switch

NOTE: _

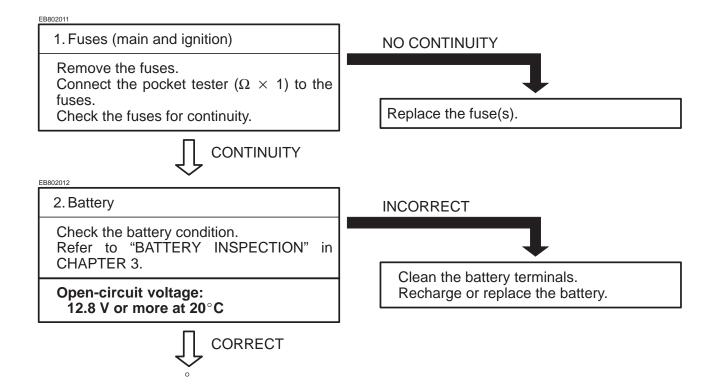
Remove the following part(s) before troubleshooting:

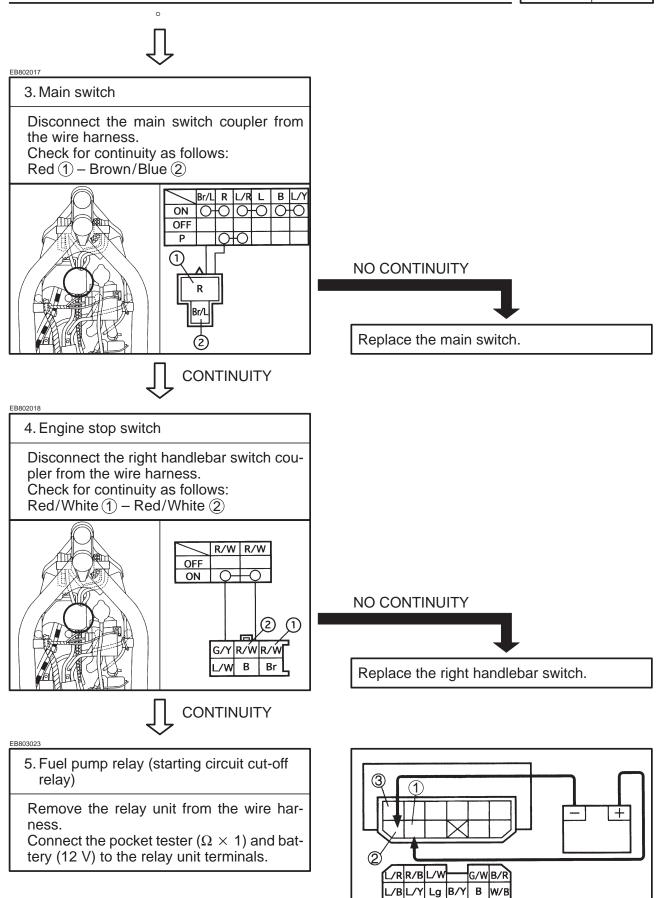
- 1) Seat
- 2) Fuel tank
- Side cover (left) Use the following special tool(s) for troubleshooting.

- 5. Fuel pump relay (starting circuit cut-off relay)
- 6. Fuel pump resistance
- 7. Wiring connections (the entire fuel system)



Pocket tester:
 90890-03112



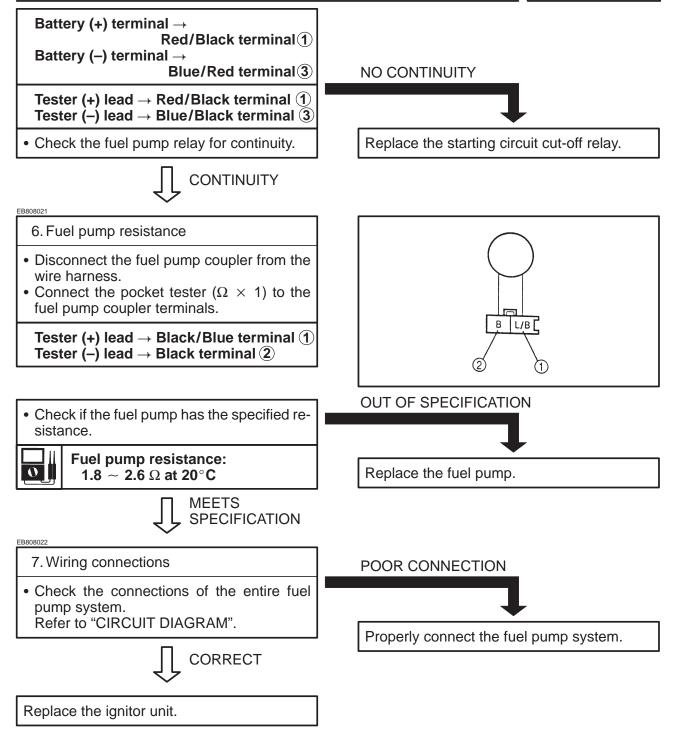


FUEL PUMP SYSTEM

И









FUEL PUMP TEST

A WARNING

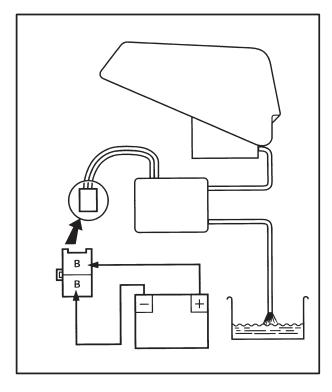
Gasoline is extremely flammable and under certain circumstances there can be danger of an explosion or combustion. Be extremely careful and note the following points:

- Stop the engine before refuelling.
- Do not smoke and keep away from open flames, sparks, or any other source of fire.
- Take care not to spill gasoline. If you do accidentally spill some, wipe it up immediately with dry rags.
- If gasoline touches the engine when the engine is still hot, there is a danger of combustion. Make sure that the engine is completely cool before performing the following test.
- 1. Check:
 - Fuel pump operation

 - a. Fill up 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 terminals.

Battery (+) lead \rightarrow Black terminal (1) Battery (-) lead \rightarrow Black terminal (2)

d. If fuel flows out from the fuel hose, the fuel pump is good. If not, replace the fuel pump assembly.





SELF-DIAGNOSIS

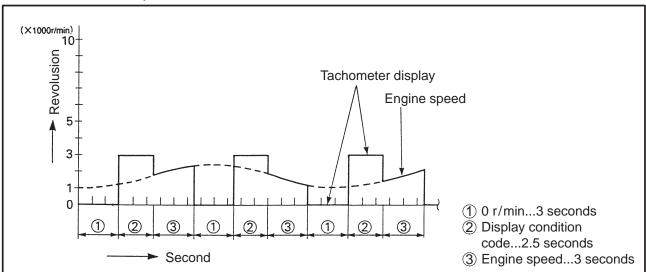
The YZF600R features self-diagnosis.

When the main switch is turned to "ON", the following items are monitored and the condition codes are displayed on the tachometer (irrespective of whether the engine is running or not).

Item	Condition	Response	Display condition code
Throttle position sensor (TPS)	Disconnected Short-circuit Locked	 Enables the motorcycle to run so that the ignition timing is fixed when the throttle is fully opened. Displays the condition code on the tachometer. 	3,000 r/min
Speed sensor	Disconnected short-circuit Wheel IC fails to pulse	 Displays the condition code on the tachometer. 	4,000 r/min

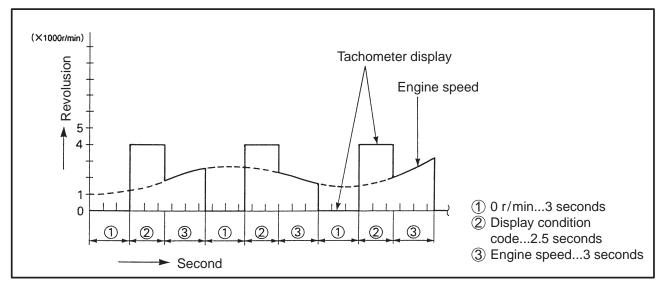
Display order on the tachometer

1. Fail to the throttle position sensor



While the engine is stopped, the engine speed \Im is shown as 0 r/min.

2. Fail to speed sensor



While the engine is stopped, the engine speed ③ is shown as 0 r/min.



TROUBLESHOOTING

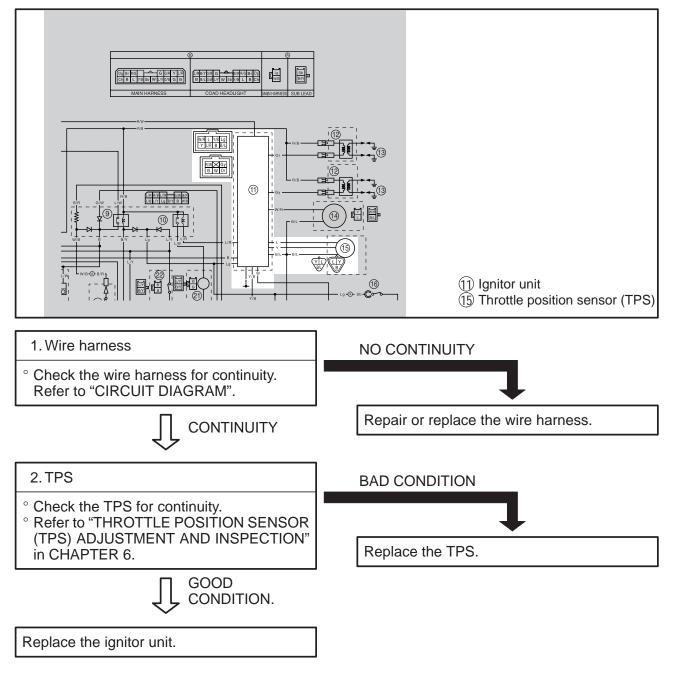
The tachometer starts to display the self-diagnosis sequence.

NOTE: _

Use the following special tool in this trouble-shooting.

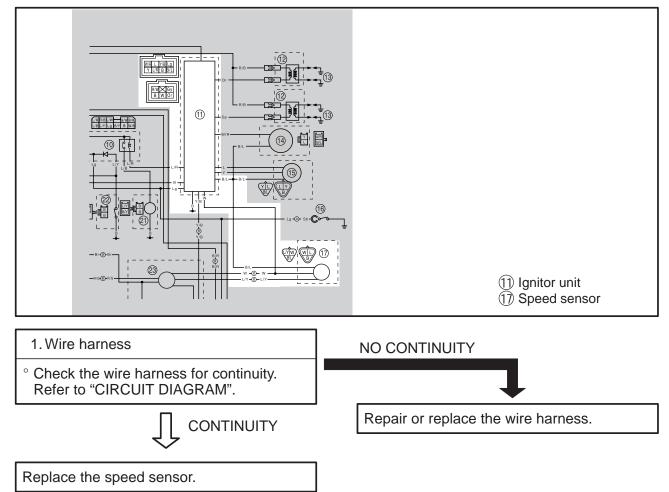


1. Throttle position sensor (TPS) CIRCUIT DIAGRAM



SELF-DIAGNOSIS

2. Speed sensor CIRCUIT DIAGRAM







CHAPTER 9. TROUBLESHOOTING

STARTING FAILURE/HARD STARTING	9-1
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ELECTRICAL SYSTEM	9-1
COMPRESSION SYSTEM	
POOR ENGINE IDLE SPEED PERFORMANCE	9-2
POOR ENGINE IDLE SPEED PERFORMANCE	9-2
POOR MEDIUM-AND HIGH-SPEED PERFORMANCE	9-2
POOR MEDIUM-AND HIGH-SPEED PERFORMANCE	9-2
FAULTY GEAR SHIFTING	9-3
HARD SHIFTING	
SHIFT PEDAL DOES NOT MOVE	
JUMPS-OUT-OF GEAR	9-3
FAULTY CLUTCH PERFORMANCE	9-3
CLUTCH SLIPPING	9-3
CLUTCH DRAGGING	9-3
OVERHEATING	
OVERHEATING	-
OVERCOOLING	
OVERCOOLING	
POOR BRAKING	
POOR BRAKING EFFECT	
FAULTY FRONT FORK LEGS	
MALFUNCTION	-
OIL LEAKAGE	
UNSTABLE HANDLING	
UNSTABLE HANDLING	
FAULTY LIGHTING AND SIGNAL SYSTEMS	
HEADLIGHT DOES NOT LIGHT	
BULB BURNT OUT	
FLASHER DOES NOT LIGHT	
FLASHER BLINKS SLOWLY	
FLASHER REMAINS LIT	
FLASHER BLINKS QUICKLY	
HORN DOES NOT SOUND	9-5
FZS600'98 WIRING DIAGRAM	





TROUBLESHOOTING

NOTE:

EB900000

The following guide for troubleshooting does not cover all the possible causes of problems. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM

Fuel tank

- ° Empty
- ° Clogged fuel filter
- ° Clogged fuel strainer
- ° Clogged fuel tank drain hose
- ° Clogged roll-over valve
- ° Clogged roll-over valve breather hose
- ° Deteriorated or contaminated fuel

Fuel cock

° Clogged fuel hose

ELECTRICAL SYSTEM

Spark plug

- ° Improper plug gap
- ° Worn electrodes
- ° Wire between terminals severed
- ° Improper heat range
- Faulty spark plug cap

Ignition coil

- [°] Faulty spark plug lead
- ° Broken body

Full-transistor system

- ° Faulty ignitor unit
- ° Faulty pickup coil

Carburetor

- ° Deteriorated or contaminated fuel
- ° Clogged pilot jet
- ° Clogged pilot air passage
- ° Sucked-in air
- ° Deformed float
- ° Worn needle valve
- ° Improperly sealed valve seat
- ° Improperly adjusted fuel level
- ° Improperly set pilot jet
- ° Clogged starter jet
- ° Faulty starter plunger
- ° Improperly adjusted starter cable

Air filter

° Clogged air filter element

Fuel pump

- ° Faulty fuel pump
- ° Faulty fuel pump relay

Switch 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

Starter motor

- ° Faulty starter motor
- ° Faulty starter relay
- ° Faulty circuit cut-off relay
- ° Faulty starter clutch



COMPRESSION SYSTEM Cylinder and cylinder head

- ^o Loose spark plug
- ° Loose cylinder head or cylinder
- ° Faulty cylinder head gasket
- ° Worn, damaged or seized cylinder
- ° Improperly sealed valve
- ° Improper valve-to-valve seat contact
- ° Improper valve timing
- ° Faulty valve spring

/ valve spring

POOR ENGINE IDLE SPEED PERFORMANCE

POOR ENGINE IDLE SPEED PERFORMANCE Carburetor

- Improperly returned starter plunger
- Loose pilot jet
- ° Clogged pilot air jet
- Improperly synchronized carburetors
- Improperly adjusted idle speed (throttle stop screw)
- Improper throttle cable free play
- Flooded carburetor

Piston and piston ring

- ° Improperly installed piston ring
- ° Worn, fatigued or broken piston ring
- ° Seized piston ring
- ° Seized or damaged piston
- Crankcase and crankshaft
- ° Improperly seated crankcase
- ° Seized crankshaft

ERFORMANCE

- Electrical system
- ° Faulty battery
- ° Faulty spark plug
- ° Faulty ignitor unit
- ° Faulty pickup coil
- ° Faulty ignition coil

Valve train

- ° Improperly adjusted valve clearance
- Air filter

° Clogged air filter element

POOR MEDIUM-AND HIGH-SPEED PERFORMANCE

POOR MEDIUM-AND HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURE/HARD STARTING". (Fuel system, electrical system, compression system and valve train)

Carburetor

- ° Faulty diaphragm
- ° Improperly adjusted fuel level
- ° Clogged or loose main jet

Air filter

° Clogged air filter element

Fuel pump

° Faulty fuel pump



EB903000 FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to "CLUTCH DRAGGING".

SHIFT PEDAL DOES NOT MOVE Shift shaft

- ° Improperly adjusted shift pedal link
- ° Bent shift shaft

Shift cam, shift fork

- ° Groove jammed with impurities
- ° Seized shift fork
- ° Bent shift fork guide bar

JUMPS-OUT-OF GEAR

Shift shaft

- ° Improperly adjusted shift lever position
- ° Improperly returned stopper lever

Shift fork

° Worn shift fork

EB904000 FAULTY CLUTCH PERFORMANCE

CLUTCH SLIPPING Clutch

- ° Improperly adjusted clutch cable
- ° Loose clutch spring
- ° Fatigued clutch spring
- ° Worn friction plate/clutch plate
- ° Incorrectly assembled clutch

CLUTCH DRAGGING Clutch

- ^o Warped pressure plate
- Unevenly tensioned clutch springs
- ° Bent push rod
- ° Broken clutch boss
- ° Burnt primary driven gear bushing
- [°] Bent clutch plate
- ° Swollen friction plate
- ° Match marks not aligned

Transmission

- ° Seized transmission gear
- ° Jammed impurities
- ° Incorrectly assembled transmission

Shift cam

- ° Improper thrust play
- ° Worn shift cam groove

Transmission

° Worn gear dog

Engine oil

- ° Improper oil level
- ° Improper viscosity (low)
- ° Deterioration

Engine oil

- ° Improper oil level
- ° Improper viscosity (high)
- ^o Deterioration



OVERHEATING

Ignition system

- ° Improper spark plug gap
- ° Improper spark plug heat range
- Faulty ignitor unit

Fuel system

- Improper carburetor main jet setting
- ° Improper fuel level
- ° Clogged air filter element

Cooling system

- ° Faulty cooling fan
- ° Faulty thermo stat
- ° Faulty thermo switch
- ° Improper coolant level (low)
- ° Faulty radiator
- ° Faulty radiator cap
- Faulty water pump

OVERCOOLING

OVERCOOLING

° Faulty cooling fan

POOR BRAKING

POOR BRAKING EFFECT

Disc brake

- ° Worn brake pad
- ° Worn disc
- ° Air in brake fluid
- ° Leaking brake fluid
- ° Faulty cylinder cup kit
- ° Faulty caliper seal kit
- ° Loose union bolt
- ° Broken brake hose
- ° Oily or greasy brake disc/brake pad
- ° Improper brake fluid level

FAULTY FRONT FORK LEGS

MALFUNCTION

- ° Bent, deformed or damaged inner tube
- ° Bent or deformed outer tube
- ° Damaged fork spring
- ° Worn or damaged slide metal
- ° Bent or damaged damper rod
- ° Improper oil viscosity
- ° Improper oil level

Compression system

- Heavy carbon build-up
 Engine oil
- ° Improper oil level
- ° Improper oil viscosity
- Inferior oil quality
- Brake
- ° Brake drag

- ° Faulty thermo stat
- ° Faulty thermo switch

- **OIL LEAKAGE**
- ^o Bent, damaged or rusty inner tube
- ° Damaged or cracked outer tube
- ° Damaged oil seal lip
- ° Improperly installed oil seal
- ° Improper oil level (too high)
- ° Loose damper rod holding bolt
- ° Broken cap bolt O-ring
- ° Loose drain bolt
- ° Damaged drain bolt gasket



UNSTABLE HANDLING

Handlebar

° Improperly installed or bent

Steering

- ° Improperly installed handlebar crown
- ° Bent steering stem
- ° Improperly installed steering shaft
- (improperly tightened ring nut)
- ° Damaged ball bearing or bearing race

Swingarm

- ° Worn bearing or busing
- ° Bent or damaged

Rear shock absorber

- ° Faulty spring
- ° Oil and gas leakage

Tire

- ° Uneven tire pressures on both sides
- ° Incorrect tire pressure
- ° Uneven tire wear

Front fork

- ° Uneven oil levels on both sides
- Uneven spring tension
- ° Broken spring
- ° Twisted front fork

Wheel

- ° Incorrect wheel balance
- $^{\circ}$ Deformed cast wheel
- ° Damaged bearing
- ° Bent or loose wheel axle
- ° Excessive wheel runout

Frame

- ° Bent
- ° Damaged steering head tube
- ° Improperly installed bearing race

FAULTY LIGHTING AND SIGNAL SYSTEMS

HEADLIGHT DOES NOT LIGHT

- ° Improper bulb
- ° Too many electric accessories
- Hard charging (broken stator coil wire, faulty rectifier/regulator)
- ° Incorrect connection
- ° Improperly grounded
- ^o Poor contacts (main or light switch)

FLASHER DOES NOT LIGHT

- ° Improperly grounded
- ° Discharged battery
- ° Faulty turn switch
- ° Faulty flasher relay
- ° Faulty wire harness
- ° Loosely connected coupler
- ° Burnt-out bulb
- ° Faulty fuse

FLASHER BLINKS SLOWLY

- ° Faulty flasher relay
- ° Faulty main and/or turn switch
- ° Improper bulb

BULB BURNT OUT

- ° Improper bulb
- ° Faulty battery
- ° Faulty rectifier/regulator
- Improperly grounded
- ° Faulty main and/or light switch
- ° Bulb life expired
- FLASHER REMAINS LIT
- ° Faulty flasher relay
- ° Burnt-out bulb

FLASHER BLINKS QUICKLY

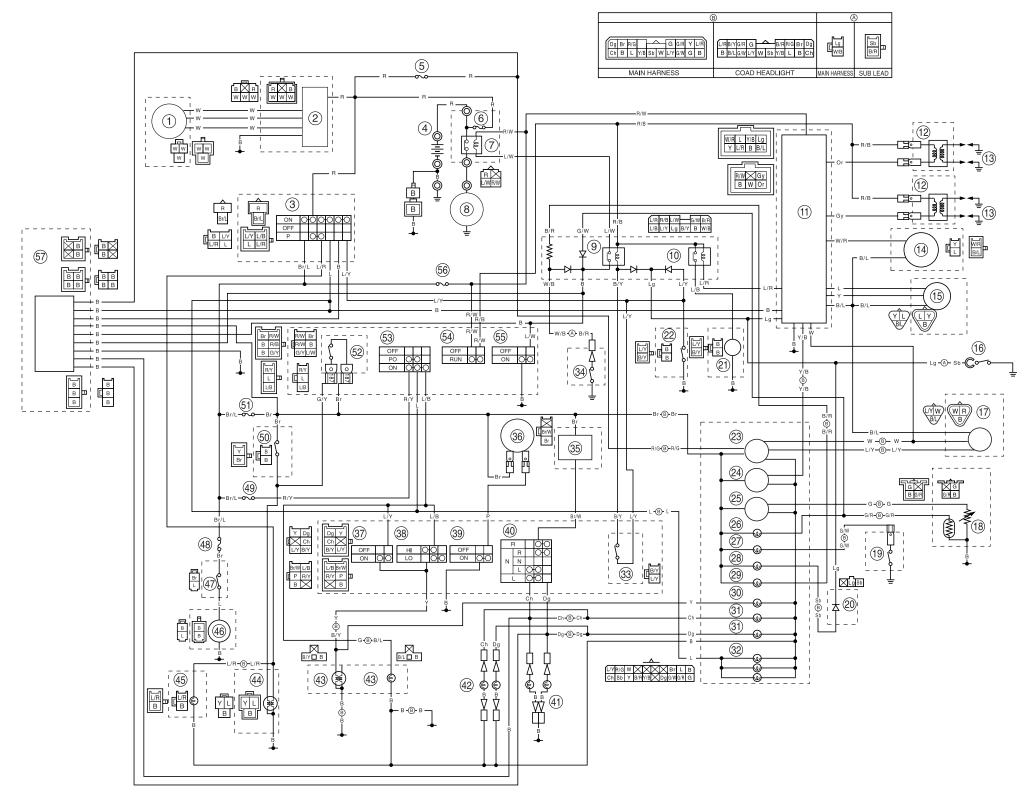
- ° Improper bulb
- ° Faulty flasher relay
- ° Burnt-out bulb

HORN DOES NOT SOUND

- ° Faulty battery
- ° Faulty fuse
- ° Faulty main and/or horn switch
- ° Improperly adjusted horn
- ° Faulty horn
- ° Broken wire harness



FZS600 '98 WIRING DIAGRAM



COLOR CODE

B Black	P Pink	B/L Black/Blue	G/W Green/White	R/W Red/White
Br Brown	Lg Light green	B/R Black/Red	G/Y Green/Yellow	R/Y Red/Yellow
Ch Chocolate	O Orange	B/W Black/	L/B Blue/Black	W/B White/Black
Dg Dark green	RRed	B/Y Black/Yellow	L/R Blue/Red	W/G White/Green
G Green	Sb Sky blue	Br/L Brown/Blue	L/W Blue/White	W/R White/Red
Gy Gray	W White	Br/W . Brown/White	L/Y Blue/Yellow	Y/B Yellow/Black
L Blue	Y Yellow	G/R Green/Red	R/B Red/Black	Y/R Yellow/Red

- (1) A.C. magneto
- 2 Rectifier/regulator
- (3) Main switch
- (4) Battery
- 5 Fuse (back up)
- 6 Fuse (main)
- (7) Starter relay
- 8 Starter motor
- 9 Starting circuit cut-off relay
- 10 Fuel pump relay
- 1 Ignitor unit
- 12 Ignition coil
- (13) Spark plug
- (14) Pick up coil
- (15) Throttle position sensor
- (16) Neutral switch
- (1) speed sensor
- 18 Fuel sender
- 19 Thermo switch (engine temperature)
- 20 Diode
- 21) Fuel pump
- 22 Sidestand switch
- 3 Speedometer
- 24 Tachometer
- 25 Fuel meter
- 26 Fuel level warning light
- D Engine temperature warning light
- 28 Neutral indicator light
- 29 Oil level warning light
- 30 High beam indicator light
- 31 Turn indicator light
- 32 Meter light
- 33 Clutch switch
- 3 Oil level switch
- 35 Flasher relay
- 36 Horn
- (37) Pass switch
- 38 Dimmer switch
- (39) Horn switch
- (40) Turn switch
- (4) Front turn signal light
- 42 Rear turn signal light
- 43 Headlight
- (4) Tail/Brake light
- 45 Auxiliary light
- (46) Fan motor
- $(\overline{4})$ Thermo switch (fan motor)
- 48 Fuse (fan)
- (49) Fuse (head)
- 50 Rear brake switch
- 51 Fuse (signal)
- 52 Front brake switch
- 53 Light switch
- 54 Engine stop switch
- (55) Starter switch
- 56 Fuse (ignition)
- (57) Alarm (option)