YAMAHA

FZS600 '98

5DM1-AE1

SERVICE MANUAL

EB001000

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.

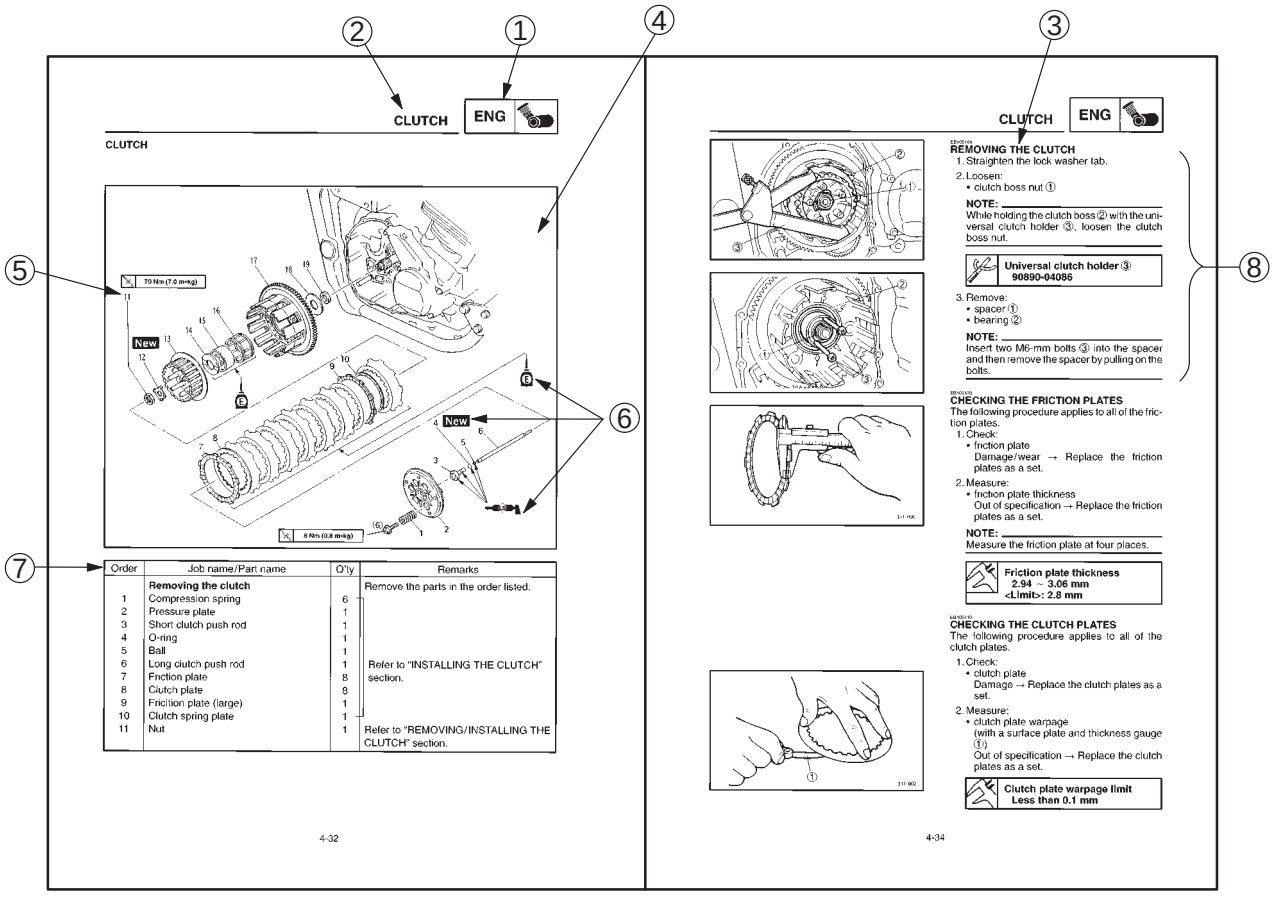
④To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

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

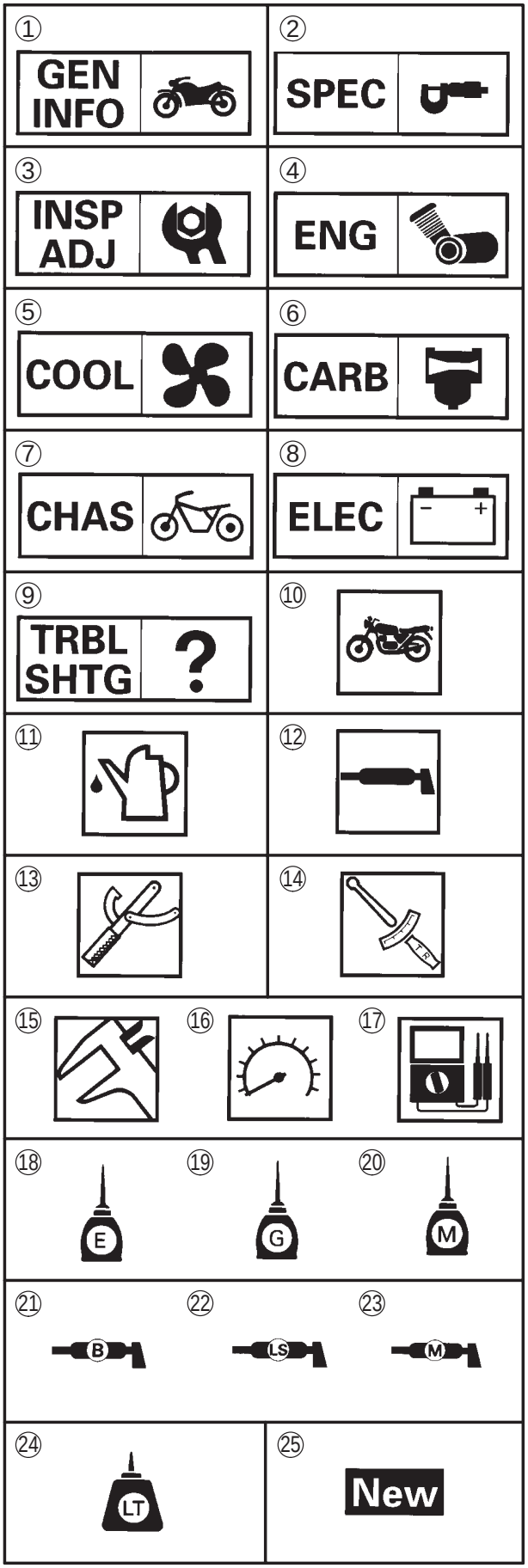
⑥Symbols indicate parts to be lubricated or replaced (see “SYMBOLS”).

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

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



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” section.
7	Friction plate	8	
8	Clutch plate	8	
9	Friction plate (large)	1	
10	Clutch spring plate	1	
11	Nut	1	Refer to “REMOVING/INSTALLING THE CLUTCH” section.



EB003000

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)
⑦ Chassis
⑧ Electrical system
⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

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

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

⑱ Apply engine oil
⑲ Apply gear oil
⑳ Apply molybdenum disulfide oil
㉑ Apply wheel bearing grease
㉒ Apply lightweight lithium-soap base grease
㉓ Apply molybdenum disulfide grease

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

㉔ Apply locking agent (LOCTITE®)
㉕ Use new one

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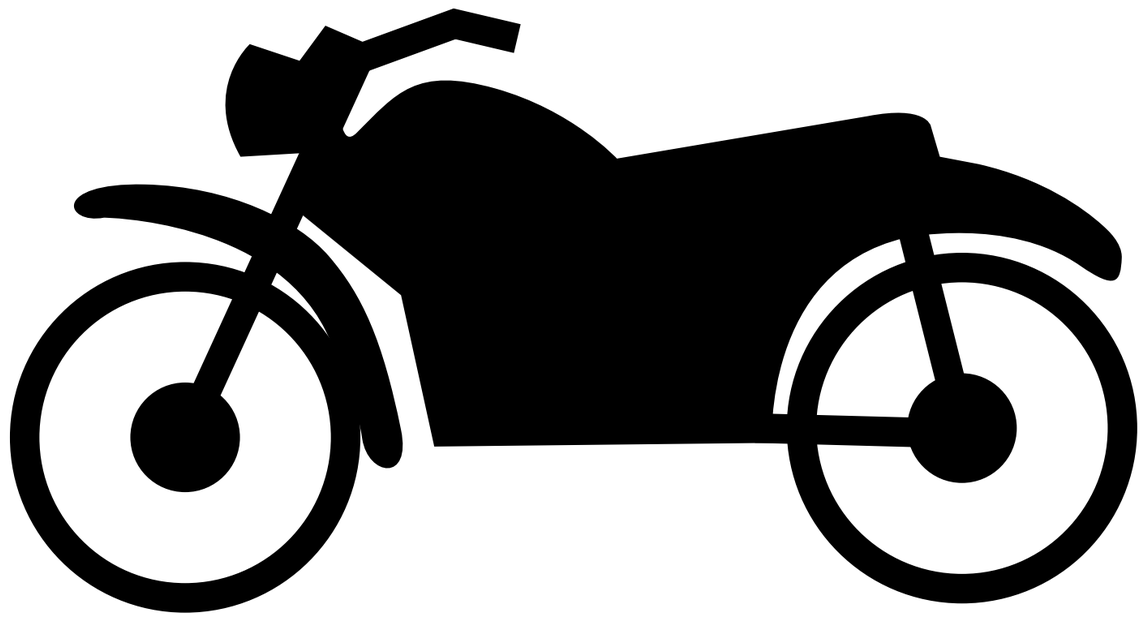
CARBURETORS	CARB 6
CHASSIS	CHAS 7
ELECTRICAL SYSTEM	ELEC 8
TROUBLESHOOTING	? TRBL SHTG 9



GEN INFO

1

CHAPTER 1
GENERAL INFORMATION

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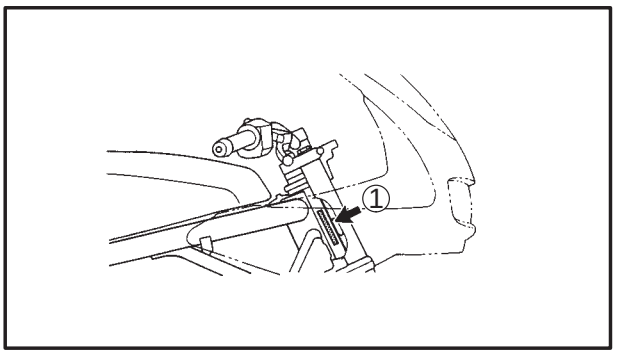


EB100000

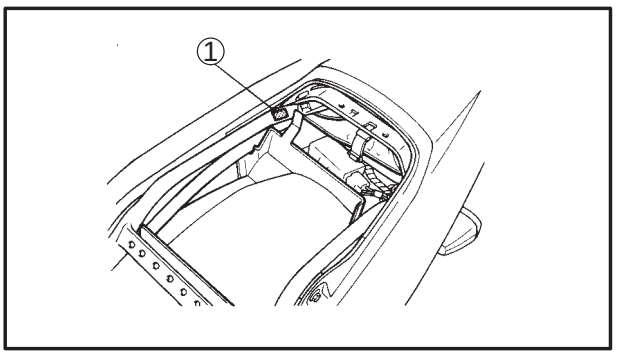
GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

EB100010

VEHICLE IDENTIFICATION NUMBER

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



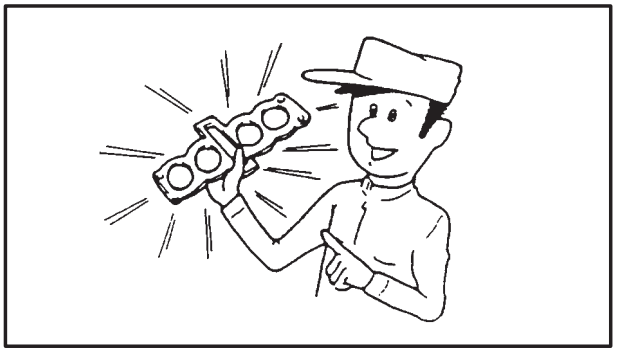
EB100020

MODEL CODE

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

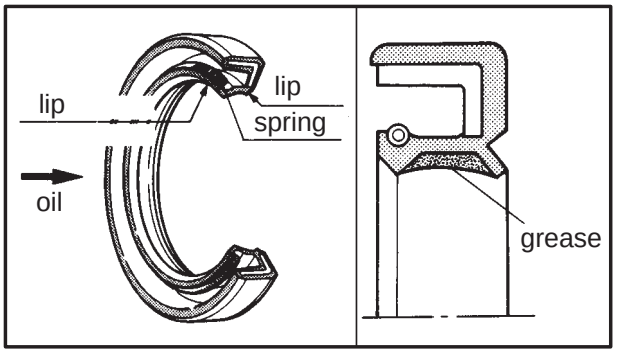
EB102000
IMPORTANT INFORMATION
PREPARATION FOR REMOVAL AND DISASSEMBLY

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.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been “mated” through normal wear.
   Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.



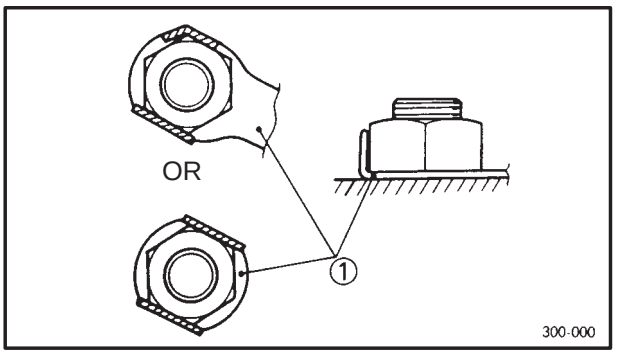
EB102010
REPLACEMENT PARTS

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



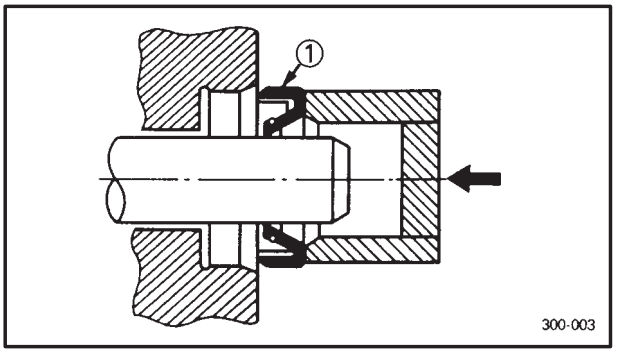
EB102020
GASKETS, OIL SEALS AND O-RINGS

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.



EB102030
LOCK WASHERS/PLATES AND COTTER PINS

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



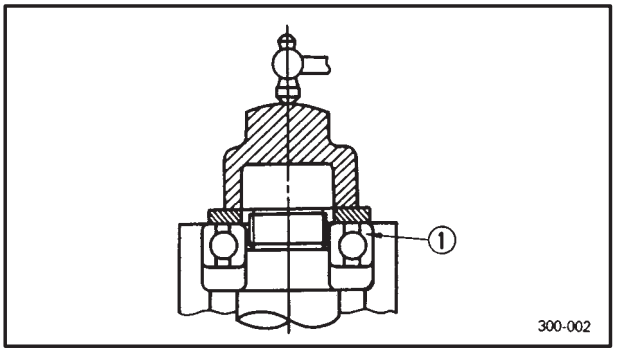
EB102040
BEARINGS AND OIL SEALS

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.

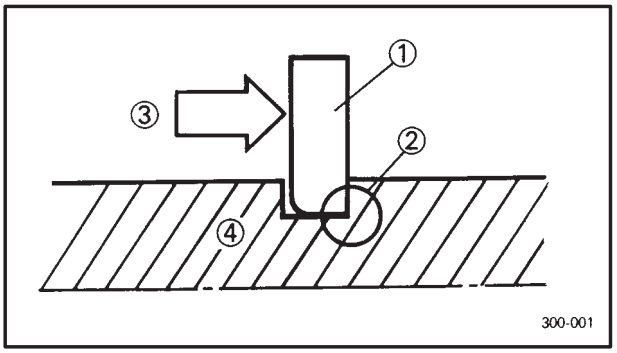
① Oil seal

CAUTION:

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



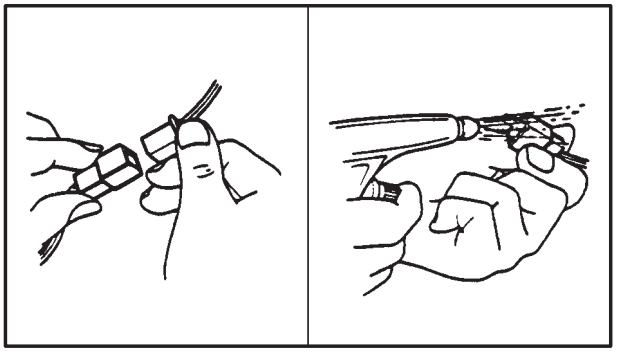
① Bearing

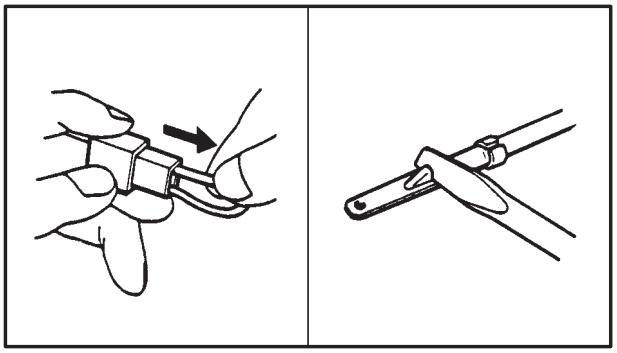


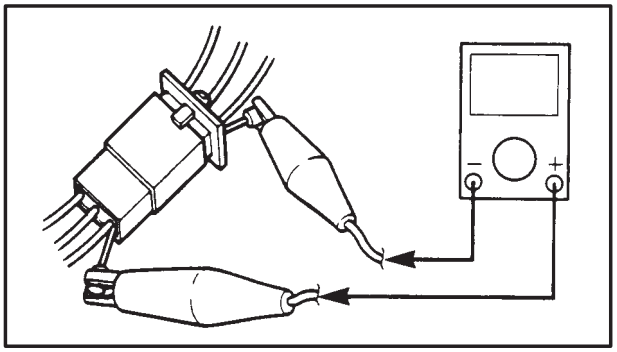
EB102050
CIRCLIPS

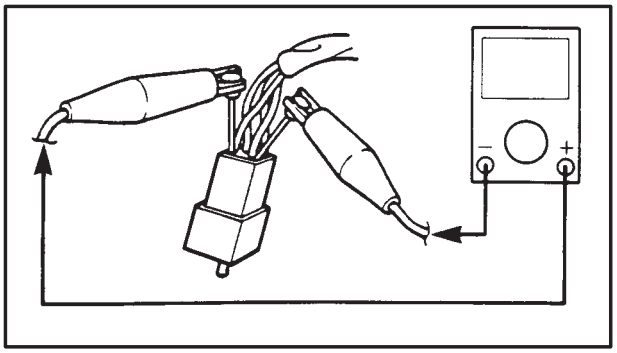
1. Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlips①, make sure that the sharp-edged corner②, is positioned opposite the thrust ③ that the circlip receives.

④ Shaft









EB103000

CHECKING THE CONNECTIONS

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

1. Disconnect:
   - ° lead
   - ° coupler
   - ° connector
2. Check:
   - ° lead
   - ° coupler
   - ° connector

   Moisture →Dry with an air blower.
   Rust/stains → Connect and disconnect several times.
3. Check:
   - ° all connections

   Loose connection → Connect properly.

NOTE:
If the pin 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)

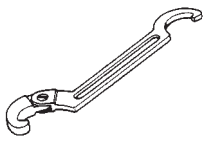
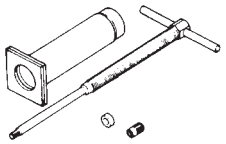
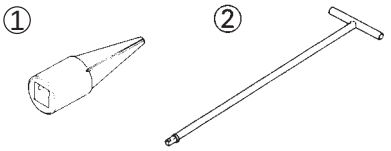
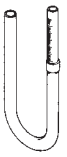
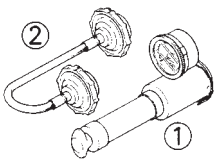
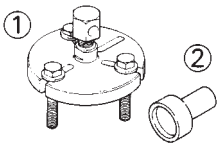
	Pocket tester **90590-03112**

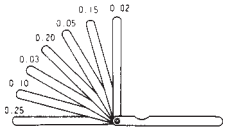
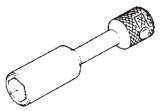
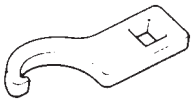
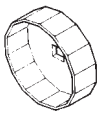
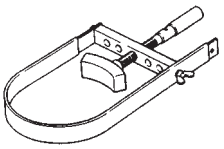
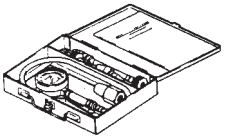
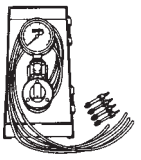
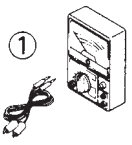
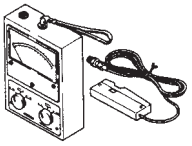
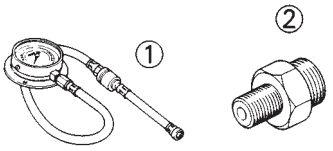
NOTE:
- ° If there is no continuity, clean the terminals.
- ° When checking the wire harness, perform steps 1 to 3.
- ° As a quick remedy, use a contact revitalizer available at most part stores.

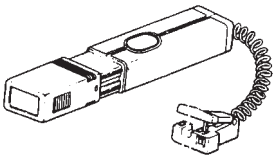
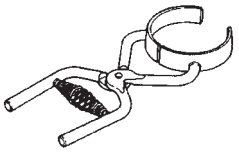
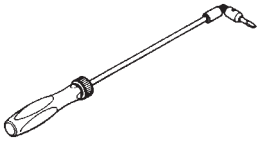
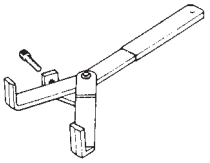
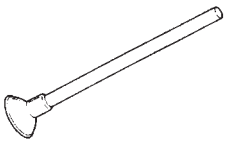
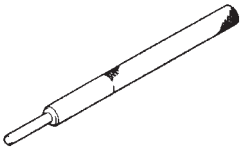
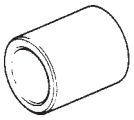
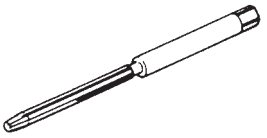
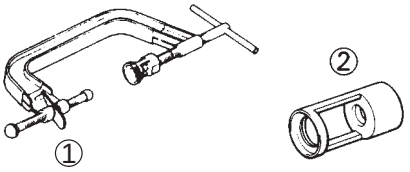
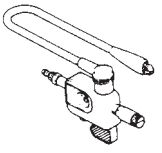
EB104000

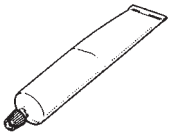
SPECIAL TOOLS

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.	
90890-01304	Piston pin puller This tool is used to remove the piston pin.	
90890-01460 -01326	Damper rod holder ① T-handle ② These tool ar used for holding the damper rod when removing or installing the damper rod.	
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.	
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.	
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.	
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 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 when installing the cylinder.	
90890-03158	Carburetor angle driver This tool is used to adjust the pilot screw.	
90890-04086	Clutch holding tool 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.	
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.	

SPEC 2

CHAPTER 2
SPECIFICATIONS

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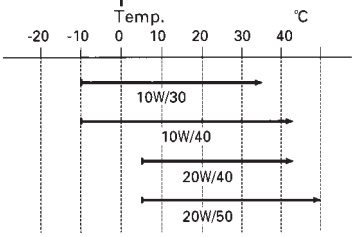
SPECIFICATIONS

GENERAL SPECIFICATIONS

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

Model		FZS600
Carburetor:		
Type/quantity		BSR 33/4
Manufacturer		MIKUNI
Spark plug:		
Type		CR9E, CR8E/U27ESR-NU24ESR-N
Manufacturer		NGK/DENSO
Spark plug gap		0.7 ~ 0.8 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:		
Type		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 ~ 90 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 kPa (2.8 kg/cm^2, 2.8 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)

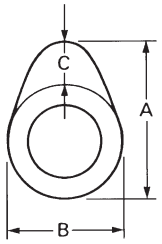
*Load is the total weight of cargo, rider, passenger, and accessories.

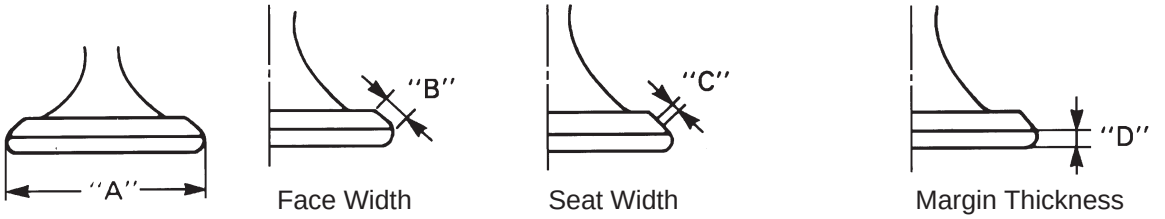
Model	FZS600
Brake:	
Front brake type	Dual disc brake
operation	Right hand operation
Rear brake type	Single disc brake
operation	Right foot operation
Suspension:	
Front suspension	Telescopic fork
Rear suspension	Swingarm (link suspension)
Shock absorber:	
Front shock absorber	Coil spring/Oil damper
Rear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

MAINTENANCE SPECIFICATIONS

ENGINE

Item		Standard	Limit
Cylinder head:			
Warp limit		∘∘∘	0.05 mm
Cylinder:			
Bore size		62.00 × 62.01 mm	62.1 mm
Taper limit		∘∘∘	0.09 mm
Out of round limit		∘∘∘	0.07 mm
Camshaft:			
Drive method		Chain drive (center)	∘∘∘
Cam cap inside dia.		23.000 × 23.021 mm	∘∘∘
Camshaft out side dia.		23.967 × 22.980 mm	∘∘∘
Camshaft to cap clearance		0.020 × 0.054 mm	0.08 mm
Cam dimensions:			
Intake	"A"	32.75 × 32.85 mm	32.7 mm
	"B"	25.0 × 25.1 mm	24.95 mm
	"C"	7.65 × 7.85 mm	7.5 mm
Exhaust	"A"	32.45 × 32.55 mm	32.4 mm
	"B"	24.95 × 25.05 mm	24.9 mm
	"C"	7.4 × 7.6 mm	7.25 mm
Camshaft runout limit		∘∘∘	0.03 mm
Cam chain:			
Cam chain type/No. of links		92RH2010J/130	∘∘∘
Cam chain adjustment method		Automatic	∘∘∘
Valve, valve seat, valve guide:			
Valve clearance (cold)	IN	0.11 × 0.20 mm	∘∘∘
	EX	0.21 × 0.30 mm	∘∘∘
Valve dimensions:			
"A" head dia.	IN	23.9 × 24.1 mm	∘∘∘
	EX	20.9 × 21.1 mm	∘∘∘
"B" face width	IN	1.56 × 2.40 mm	∘∘∘
	EX	1.56 × 2.40 mm	∘∘∘
"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 × 4.012 mm	4.042 mm
	EX	4.000 × 4.012 mm	4.042 mm





Face Width Seat Width Margin Thickness

Item		Standard	Limit
Stem-to-guide clearance	IN	0.010 0.037 mm	0.08 mm
	EX	0.025 0.052 mm	0.1 mm
Stem runout limit		○○○	0.04 mm
Valve seat width	IN	0.9 1.1 mm	1.6 mm
	EX	0.9 1.1 mm	1.6 mm
Valve spring:			
Free length	IN/EX	40.09 mm	37.5 mm
Set length (valve closed)	IN/EX	34.5 mm	○○○
Compressed pressure	IN/EX	134 156 N (13.4 15.6 kg)	○○○
Tilt limit	IN/EX	○○○	2.5 /1.8 mm
Direction of winding	IN/EX	Clockwise	○○○
Piston:			
Piston clearance		0.025 0.050 mm	0.07 mm
Piston size “D”		61.960 61.975 mm	○○○
Measuring point “H”		5 mm	○○○
Piston off-set		0.5 mm	○○○
Piston off-set direction		In side	○○○
Piston pin bore inside dia.		17.002 17.013 mm	○○○
Piston pin outside dia.		16.991 17.000 mm	○○○
Piston rings:			
Top ring:			
Type		Barrel	○○○
Dimensions (B × T)		0.8 × 2.2 mm	○○○
End gap (installed)		0.15 0.30 mm	0.6 mm
Side clearance (installed)		0.020 0.075 mm	0.1 mm
2nd ring:			
Type		Taper	○○○
Dimensions (B × T)		0.8 × 2.3 mm	○○○
End gap (installed)		0.25 0.40 mm	0.7 mm
Side clearance (installed)		0.020 0.055 mm	0.1 mm
Oil ring:		1.5 × 2.3 mm	○○○
End gap (installed)		0.10 0.35 mm	○○○
Connecting rod:			
Oil clearance		0.043 0.066 mm	0.08 mm
Color code (corresponding size)		1. Blue 2. Black 3. Brown 4. Green	○○○
Crankshaft:			
Crankshaft width “A”		48.4 mm	○○○
Assembly width “B”		296.8 298.0 mm	○○○
Runout limit “C”		○○○	0.03 mm
Big end side clearance “D”		0.160 0.262 mm	0.5 mm
Big end radial clearance “E”		0.043 0.066 mm	0.08 mm
Small end free play “F”		0.32 0.50 mm	0.8 mm
Journal oil clearance		0.025 0.043 mm	0.08 mm
Color code (corresponding size)		1. Black 2. Brown 3. Green 4. Yellow 5. Pink	○○○

Item		Standard	Limit
Clutch:			
Friction plate thickness		2.94 × 3.06 mm	∘∘∘
Quantity		8 pcs	∘∘∘
Wear limit		∘∘∘	2.8 mm
Friction plate thickness		2.94 × 3.06 mm	∘∘∘
Quantity		1 pcs	∘∘∘
Clutch plate thickness		1.9 × 2.1 mm	∘∘∘
Quantity		8 pcs	∘∘∘
Warp limit		∘∘∘	0.1 mm
Clutch spring free length		34.9 mm	∘∘∘
Quantity		6 pcs	∘∘∘
Minimum length		∘∘∘	34.3 mm
Clutch housing thrust clearance		0.05 × 0.13 mm	0.2 mm
Clutch housing radial clearance		0.005 × 0.041 mm	∘∘∘
Clutch release method		Inner push, screw push	∘∘∘
Push rod bending limit		∘∘∘	0.3 mm
Transmission:			
Main axle deflection limit		∘∘∘	0.02 mm
Drive axle deflection limit		∘∘∘	0.02 mm
Shifter:			
Shifter type		Guide bar	∘∘∘
Guide bar bending limit		∘∘∘	0.05 mm
Carburetor:			
I.D. mark		5DM1 00	∘∘∘
Main jet	(M.J)	#115	∘∘∘
Main air jet	(M.A.J)	#80	∘∘∘
Jet needle	(J.N)	5D86	∘∘∘
Needle jet	(N.J)	P-O	∘∘∘
Pilot air jet	(P.A.J.1)	#130	∘∘∘
Pilot outlet	(P.O)	0.9	∘∘∘
Pilot jet	(P.J)	#12.5	∘∘∘
Bypass 1	(B.P.1)	0.9	∘∘∘
Bypass 2	(B.P.2)	0.8	∘∘∘
Bypass 3	(B.P.3)	0.8	∘∘∘
Pilot screw	(P.S)	2	∘∘∘
Valve seat size	(V.S)	1.0	∘∘∘
Starter jet	(G.S.1)	0.6	∘∘∘
Starter jet	(G.S.2)	0.8	∘∘∘
Throttle valve size	(TH.V)	#110	∘∘∘
Fuel level	(F.L) (with special tool)	4.5 mm	∘∘∘
Engine idle speed		1,150 × 1,250 r/min	∘∘∘
Intake vacuum		30.7 × 33.3 kPa (230 × 250 mmHg)	∘∘∘

Item	Standard	Limit
Lubrication system:		
Oil filter type	Paper type	○○○
Oil pump type	Trochoid type	○○○
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)	○○○
Relief valve operating pressure	450 550 kPa (4.5 5.5 kg/cm^2)	○○○
Pressure check location	Main gallery	○○○
Cooling system:		
Radiator core size:		
Width	320 mm	○○○
Height	161.4 mm	○○○
Thickness	27 mm	○○○
Radiator cap opening pressure	95 125 kPa (0.95 1.25 kg/cm^2)	○○○
Radiator capacity	0.6 L	○○○
Reservoir tank capacity	0.61 L	○○○
From low to full level	0.22 L	○○○
Water pump:		
Type	Single suction centrifugal pump	○○○
Reduction ratio	82/48 × 48/49 (1.673)	○○○

Item	Size
Bearings and oil seals:	
Big end bearing	Plane 30 × 15
Crankshaft bearing	Plane 30 × 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

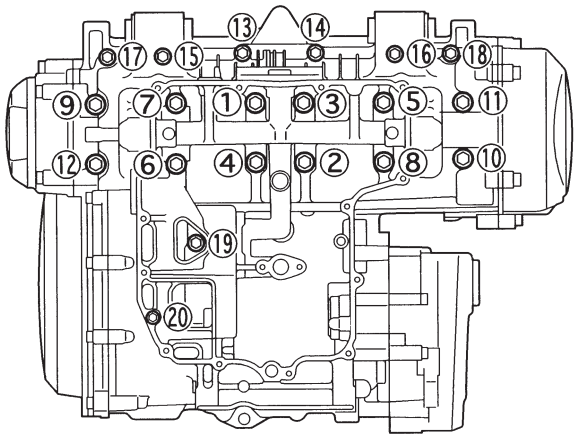
Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m°kg	
Camshaft cap	Bolt	M6	24	10	1.0	
Cylinder head	Nut	M9	12	35	3.5	E
Spark plug	–	M10	4	13	1.3	
Cylinder head cover	Bolt	M6	8	10	1.0	
Cylinder head side cover	Bolt	M5	8	9	0.9	
Connecting rod cap	Nut	M7	8	See NOTE		M
Camshaft sprocket	Bolt	M7	4	24	2.4	
Timing chain tensioner case	Bolt	M6	2	10	1.0	
Timing chain guide (intake side)	Bolt	M6	2	10	1.0	LT
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	M6	3	10	1.0	
Conduction assembly	Bolt	M6	1	10	1.0	
Radiator	Bolt	M6	3	7	0.7	
Joint	Bolt	M6	4	10	1.0	
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	LT
Strainer housing	Bolt	M6	2	10	1.0	LT
Strainer cover	Bolt	M6	14	12	1.2	
Oil cooler	Union bolt	M20	1	63	6.3	E
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	M
Crankcase	Bolt	M6	21	12	1.2	E
Crankcase	Bolt	M8	1	24	2.4	E
Breather plate	Screw	M6	6	7	0.7	LT
Oil seal stopper plate	Bolt	M6	2	10	1.0	LT
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	LT

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m°kg	
Starter cover	Bolt	M6	7	12	1.2	
Oil gallery	–	M16	2	8	0.8	E
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	LT
Pressure plate	Screw	M6	6	8	0.8	
Clutch boss	Bolt	M18	1	70	7.0	
Push lever	Screw	M5	2	5	0.5	LT
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	LT
Shift arm	Bolt	M6	1	10	1.0	
Shift fork guide bar retainer	Bolt	M6	2	10	1.0	LT
Shift pedal adjuster	Nut	M6	2	7	0.7	
Stopper lever	Bolt	M6	1	10	1.0	LT
Side plate 2	Screw	M5	1	4	0.4	LT
A.C magneto roter	Bolt	M12	1	130	13.0	
Stator coil	Bolt	M6	3	10	1.0	LT
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	

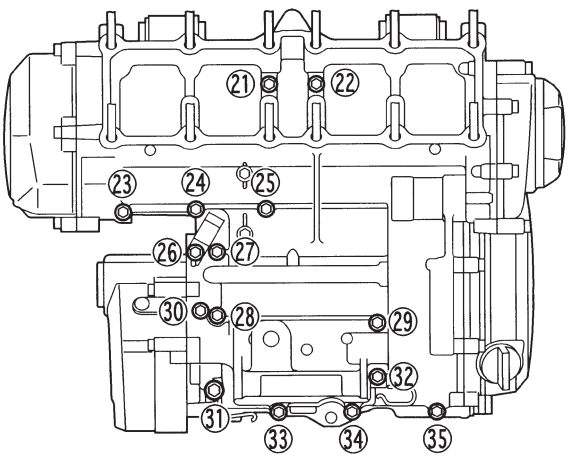
NOTE:
After tightening to 15 Nm (1.5 m°kg), tighten another 90 .

Crankcase tightening sequence

Lower crankcase



Upper crankcase



CHASSIS

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

Item	Standard	Limit
Front disc brake:		
Type	Dual	○○○
Disc outside dia. × thickness	298 × 4 mm	○○○
Disc deflection limit	○○○	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	○○○
Caliper cylinder inside dia.	30.2 mm	○○○
	27 mm	○○○
Brake fluid type	DOT No.4	○○○
Rear disc brake:		
Type	Single	○○○
Disc outside dia. × thickness	245 × 5 mm	○○○
Disc deflection limit	○○○	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	○○○
Caliper cylinder inside dia.	38.1 mm	○○○
Brake fluid type	DOT No.4	○○○
Brake lever and brake pedal:		
Brake pedal position (N)	36.6 mm	○○○
Clutch lever free play (lever end)	10 15 mm	○○○
Throttle grip free play	3 5 mm	○○○

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

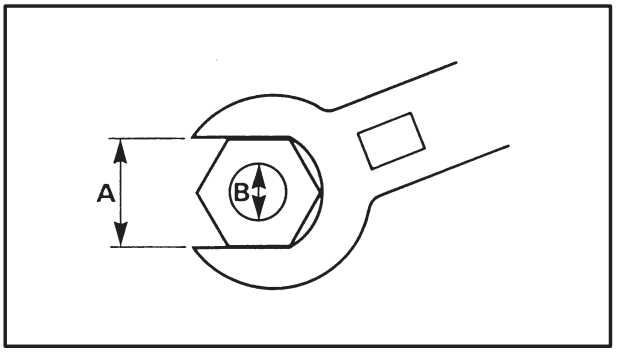
Item	Standard	Limit
Starter motor:		
Model/manufacturer	SM-13/MITSUBA	○○○
I.D. number	SM-13	○○○
Output	0.7 kW	○○○
Armature coil resistance	0.0015 0.0025 Ω at 20 C	○○○
Brush overall length	10 mm	4 mm
Brush spring pressure	7.8 10.2 N (780 1.020 gf)	○○○
Commutator dia.	28 mm	27 mm
Mica undercut (depth)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

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

EB201000

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

LUBRICATION POINT AND LUBRICATION TYPES

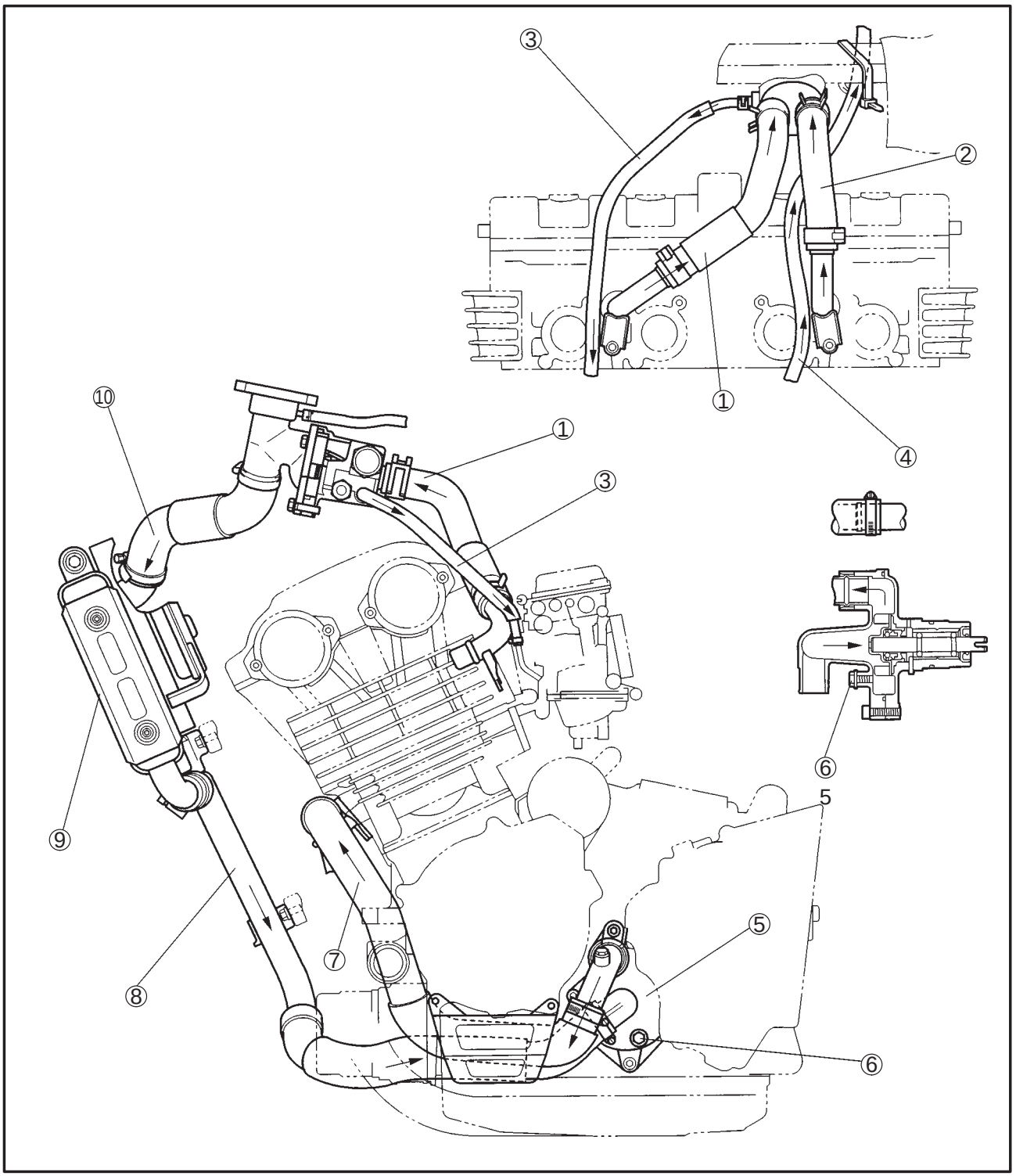
CHASSIS

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

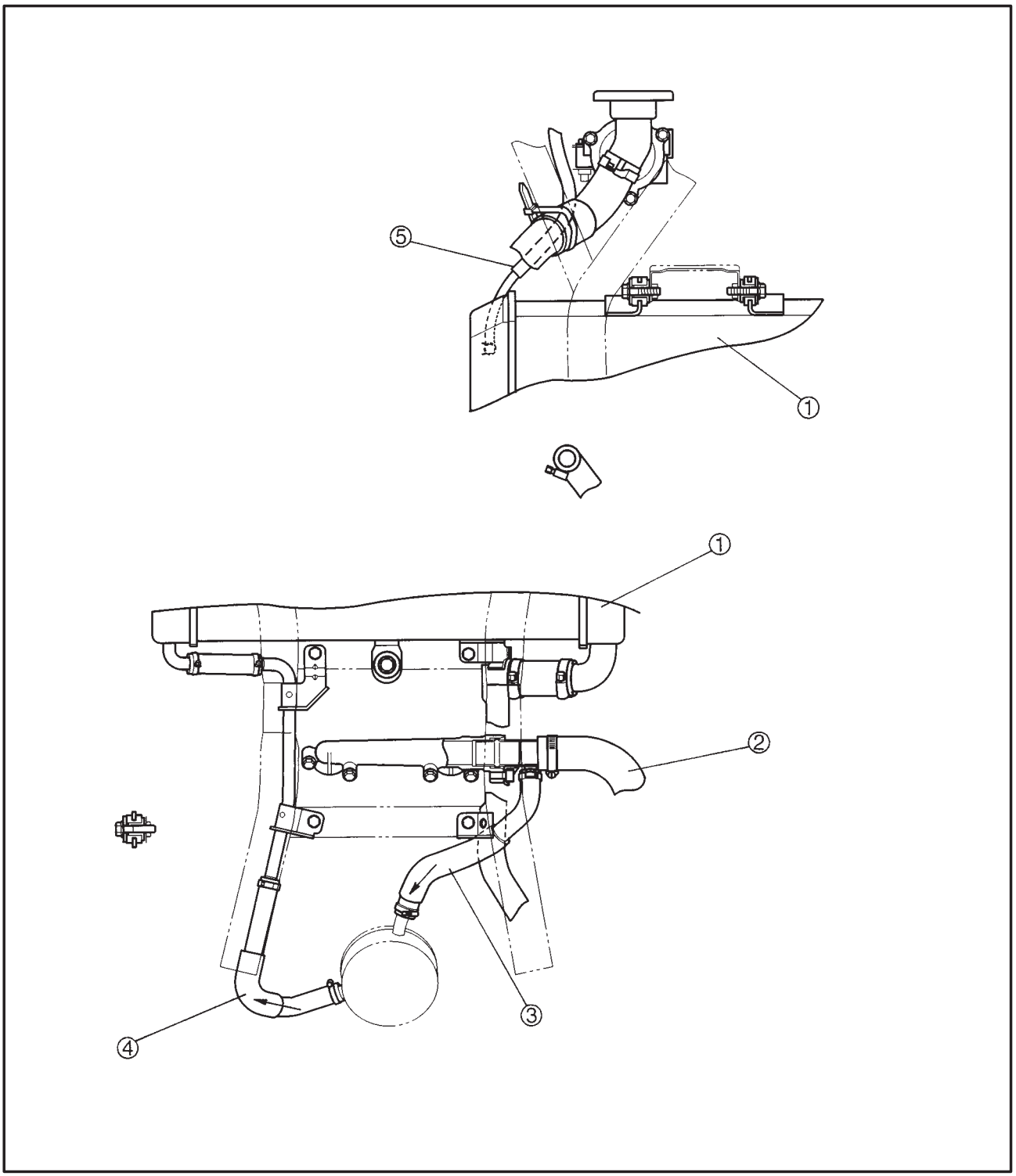
EB203000

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



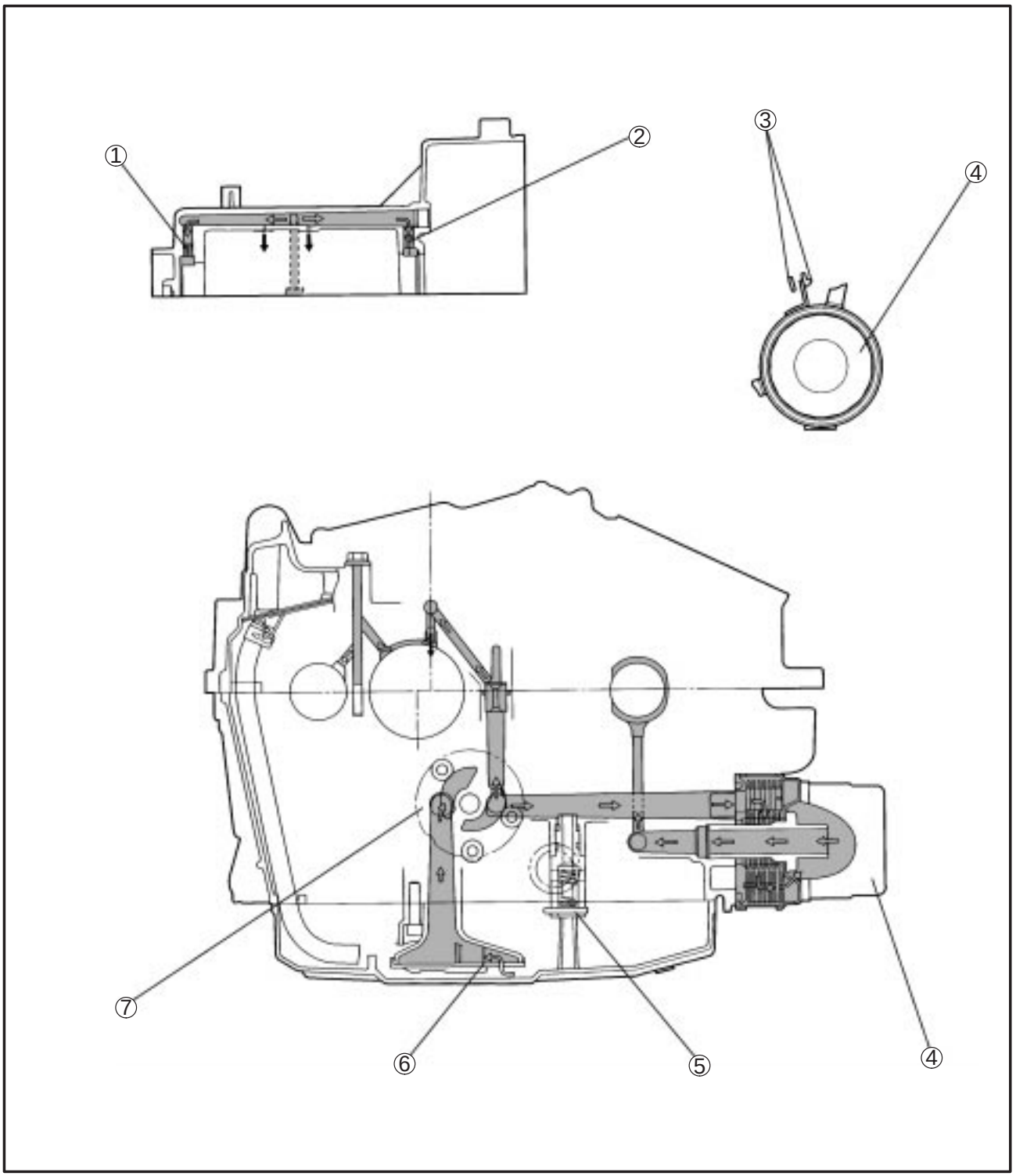
① Radiator
② Water pump outlet hose
③ Oil cooler inlet hose
④ Oil cooler outlet hose
⑤ Carburetor outlet hose



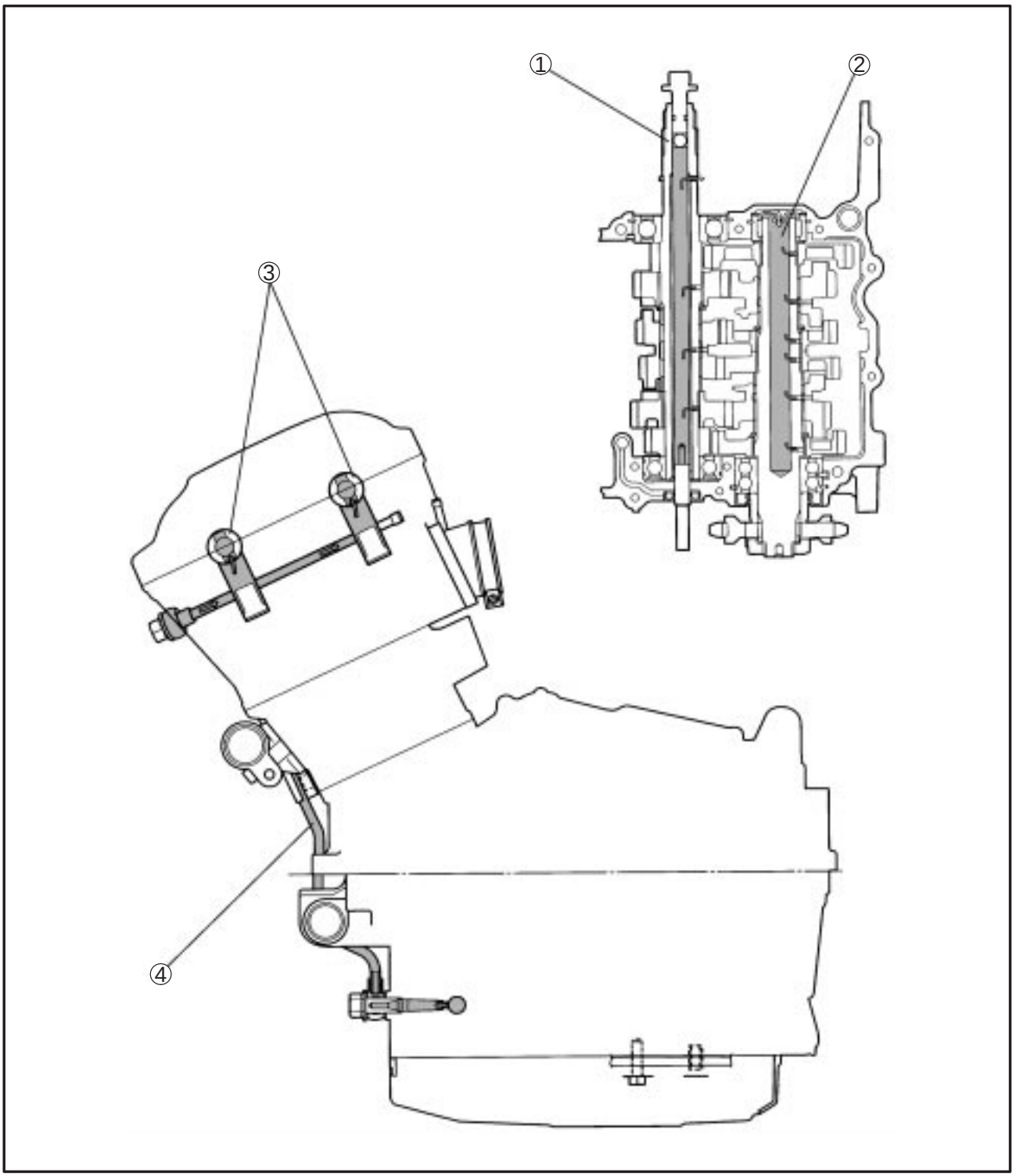
EB204000

LUBRICATION DIAGRAMS

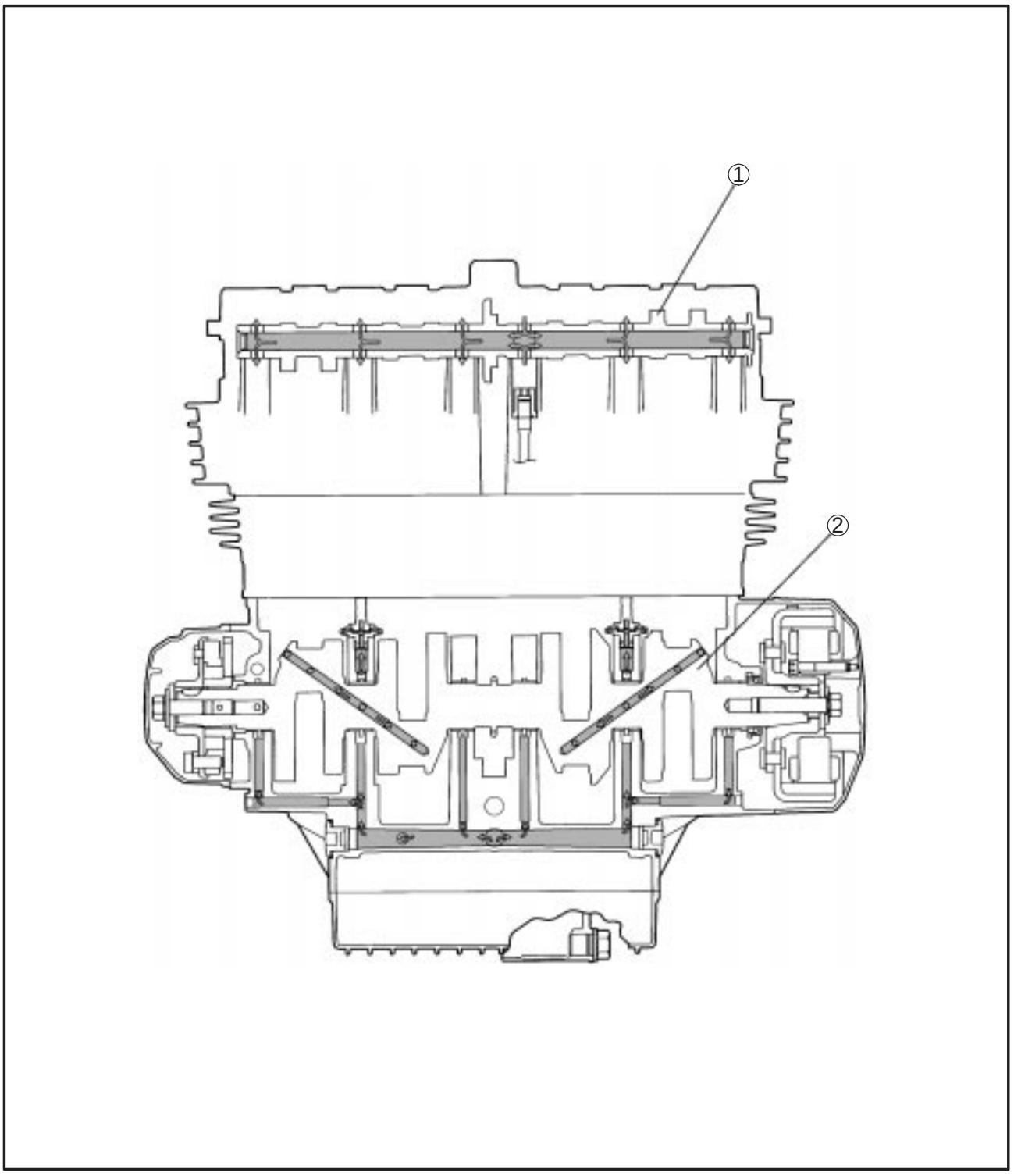
① Oil nozzle (main nozzle)
② Oil nozzle (drive axle)
③ Projection
④ Oil filter
⑤ Relief valve
⑥ Oil strainer
⑦ Oil pump



① Main axle
② Drive axle
③ Camshaft
④ Oil delivery pipe



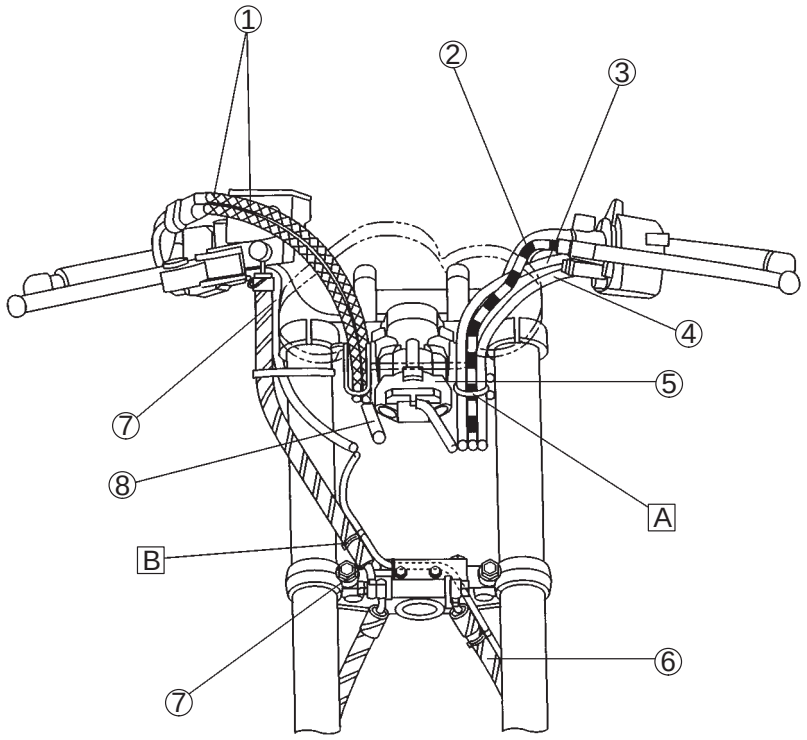
① Camshaft
② Crankshaft



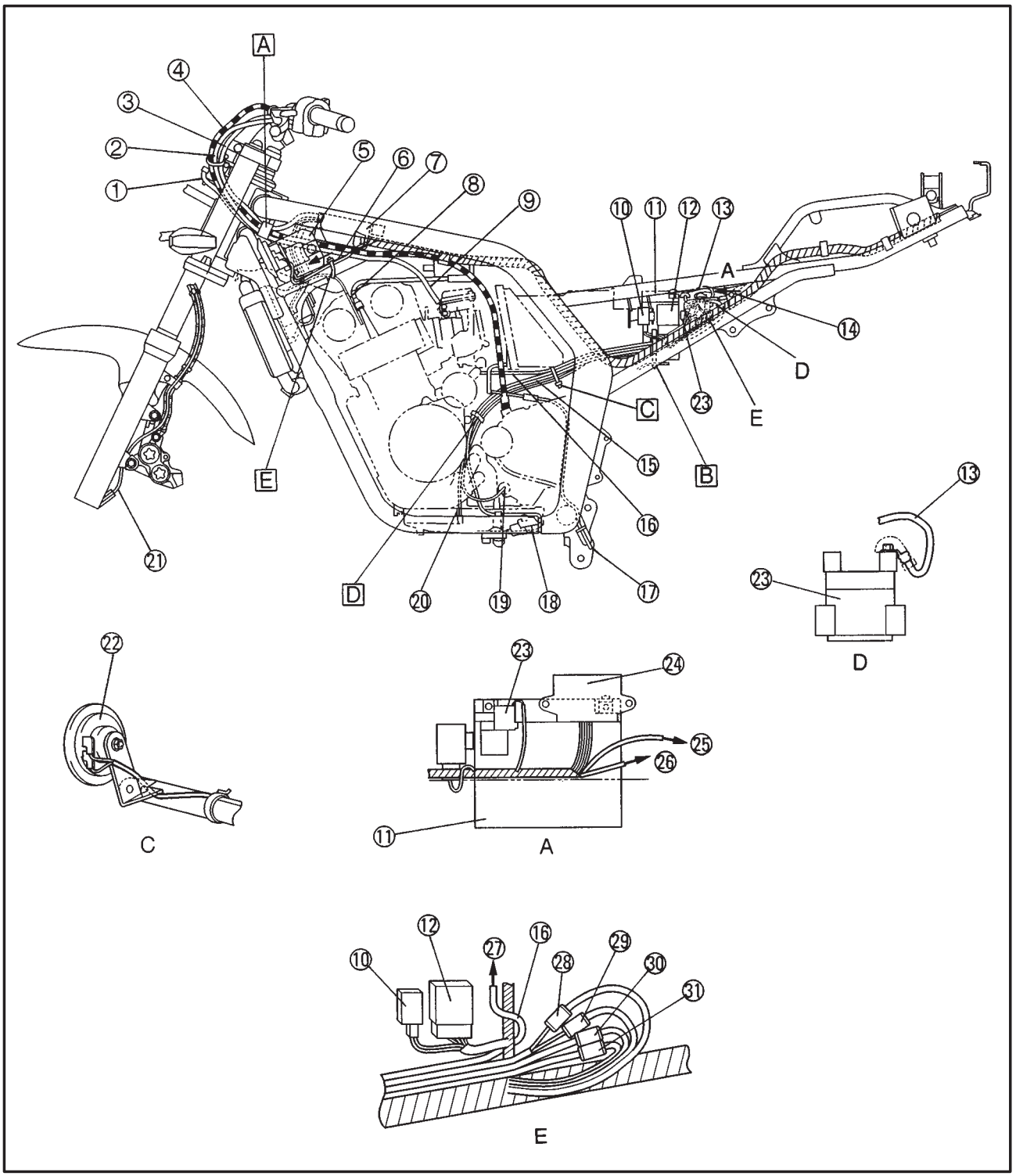
EB205000

CABLE ROUTING

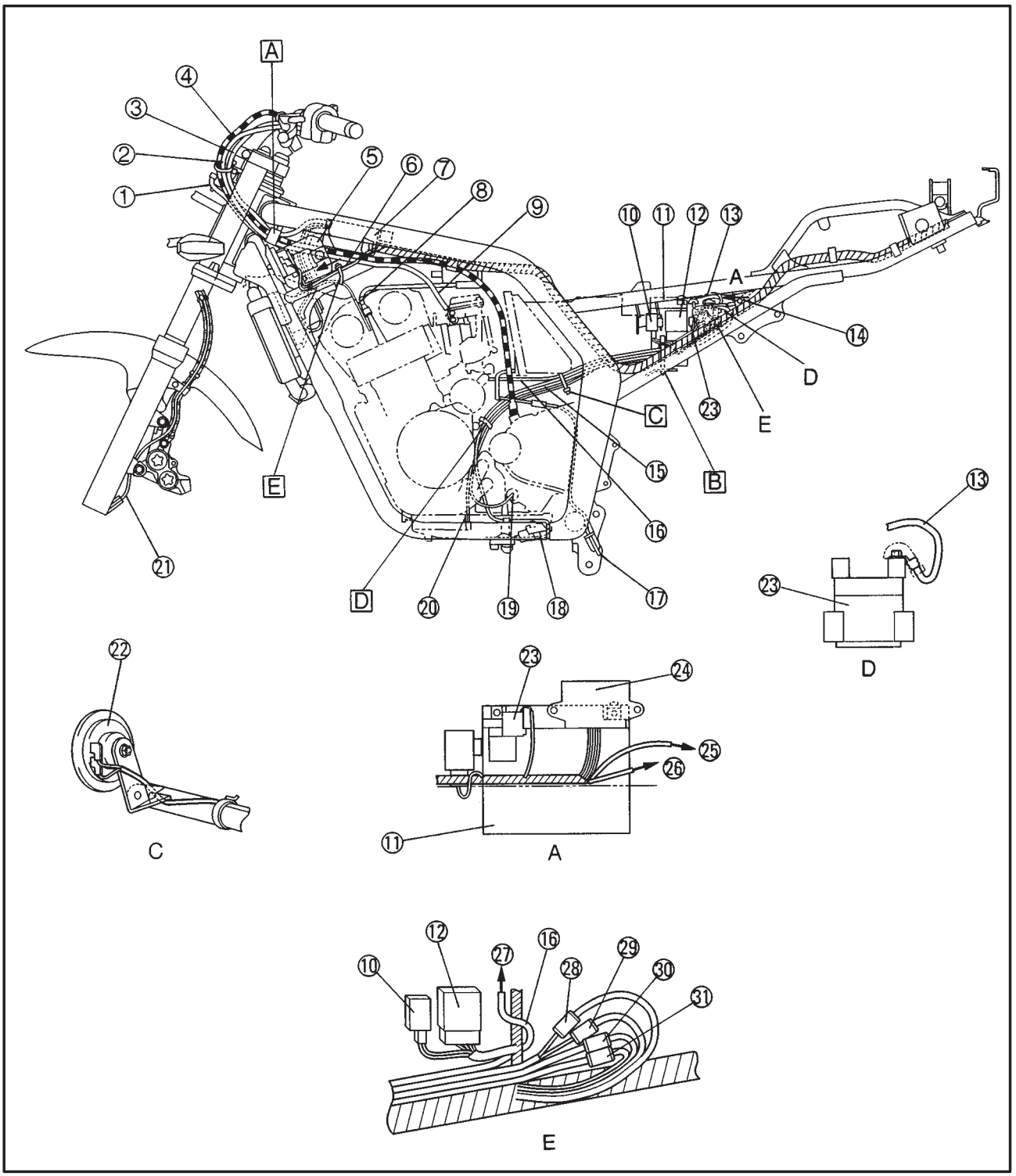
① Throttle cable
② Clutch cable
③ Handlebar switch (right)
④ Starter cable
⑤ Main switch
⑥ Brake hose
⑦ Speed sensor lead
⑧ Headlight lead
⑨ Handlebar switch (left)
[A] Use a plastic clamp to fasten together the handlebar switch lead (left), clutch cable and starter cable.
[B] Pass the brake hose out 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
⑪ Battery
⑫ Starting circuit cut-off relay
⑬ Battery positive (+) lead
⑭ Seat lock cable
⑮ AC magneto lead
⑯ Starter motor lead
⑰ Air filter drain hose
⑱ Sidestand switch
⑲ Neutral switch
⑳ Oil level switch
㉑ Speed sensor lead
㉒ Horn
㉓ Starter relay
㉔ Fuse box
㉕ To front brake switch
㉖ To battery negative (–) lead
㉗ To starter relay
㉘ AC magneto coupler
㉙ Pickup coupler
㉚ Sidestand switch coupler
㉛ Oil level/neutral switch coupler

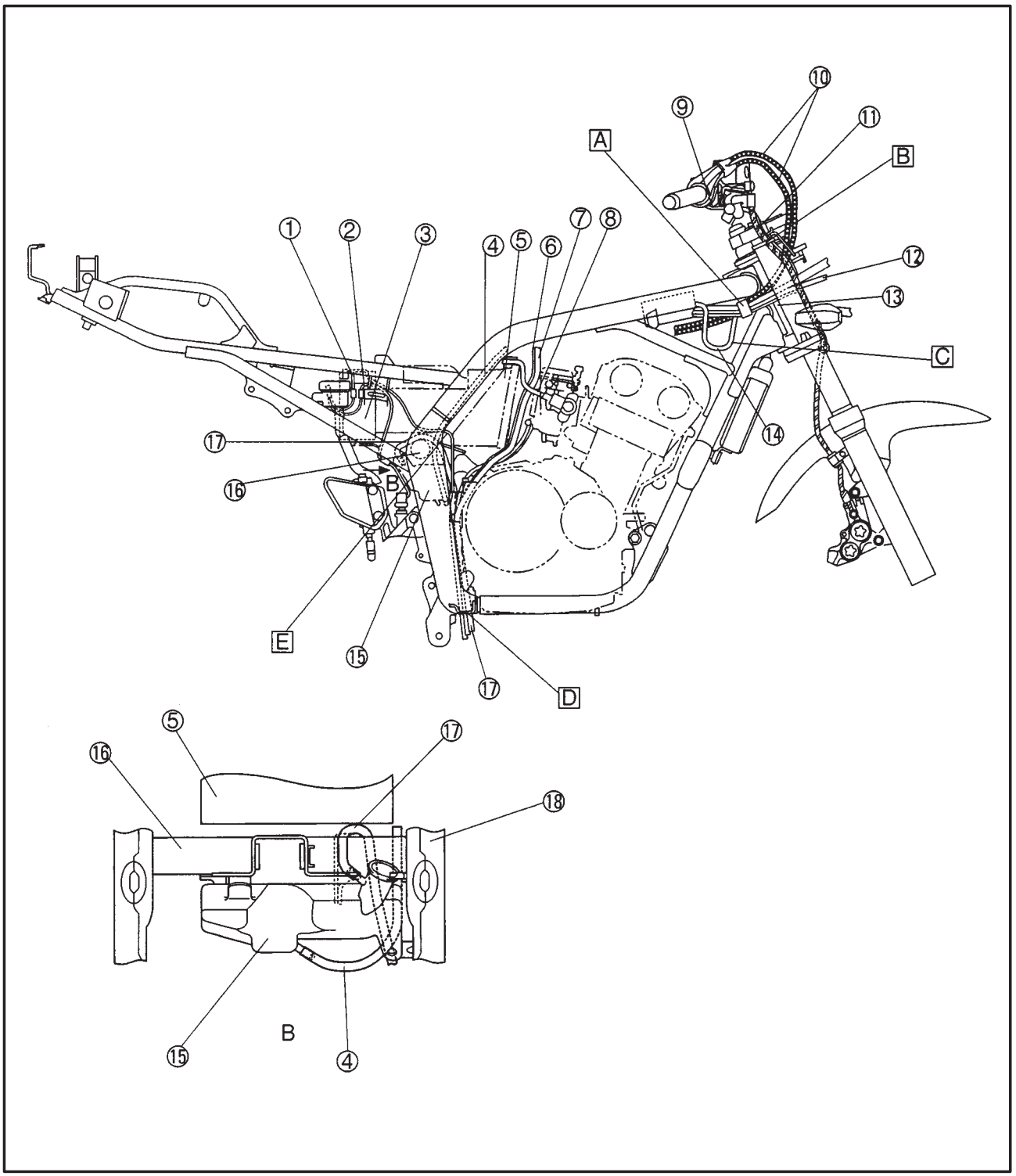


A Use a plastic clamp to fasten the handlebar switch lead (left), main switch lead, clutch cable and starter cable to the frame.
B Use a plastic band to fasten together wireharness, starter motor lead, AC magneto lead, sidestand switch lead and oil level/neutral switch lead, then hold the clamp to the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

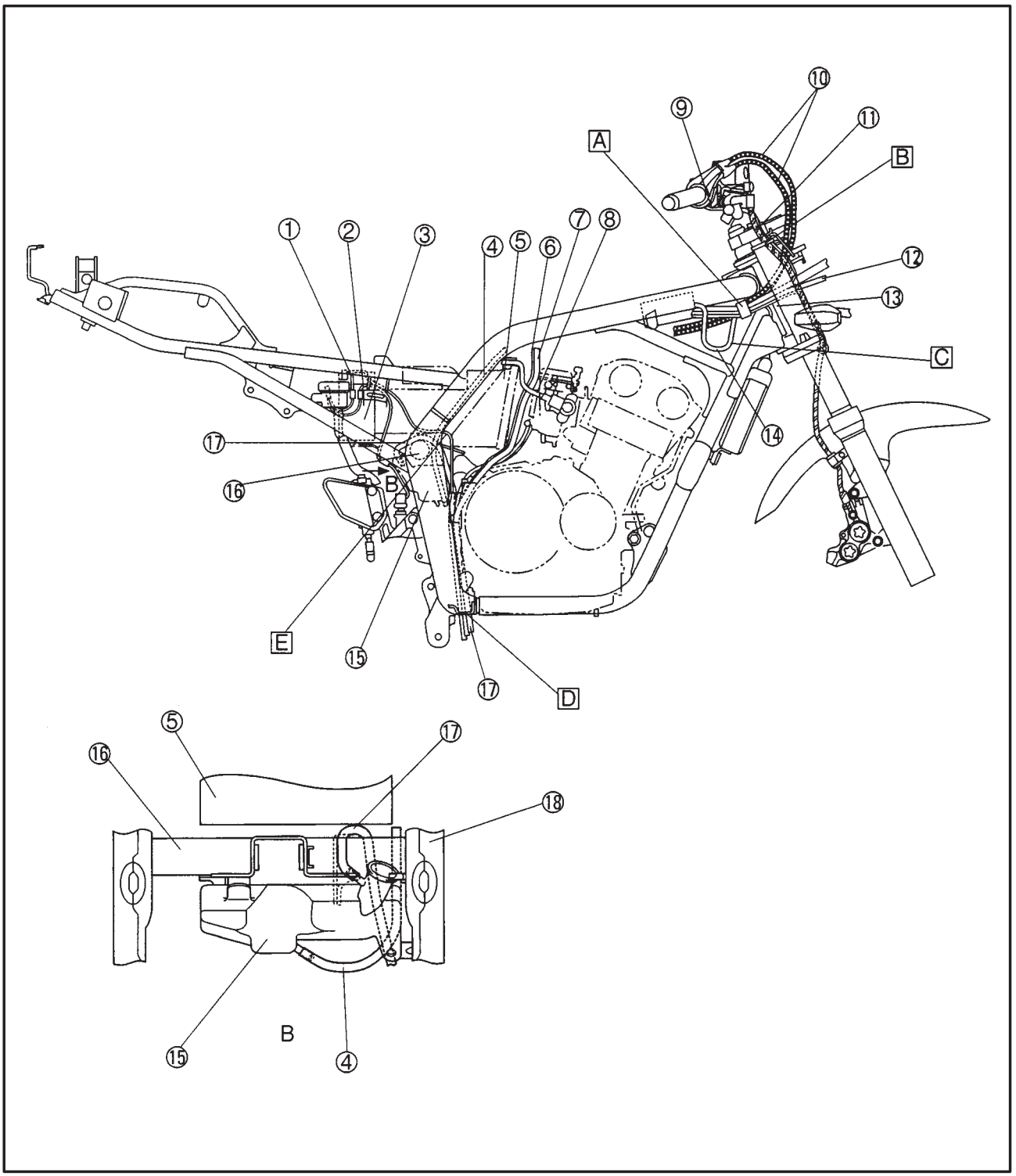


① Battery negative (–) lead
② Rear brake switch lead
③ Battery
④ Reservoir tank hose
⑤ Air filter
⑥ Fuel tank breather hose
⑦ Fuel tank drain hose
⑧ T.P.S. lead
⑨ Handlebar switch lead (right)
⑩ Throttle cable
⑪ Brake hose
⑫ Headlight lead
⑬ Speed sensor lead
⑭ Main switch lead
⑮ Reservoir tank
⑯ Cross tube
⑰ Reservoir tank over flow hose
⑱ Swingarm bracket

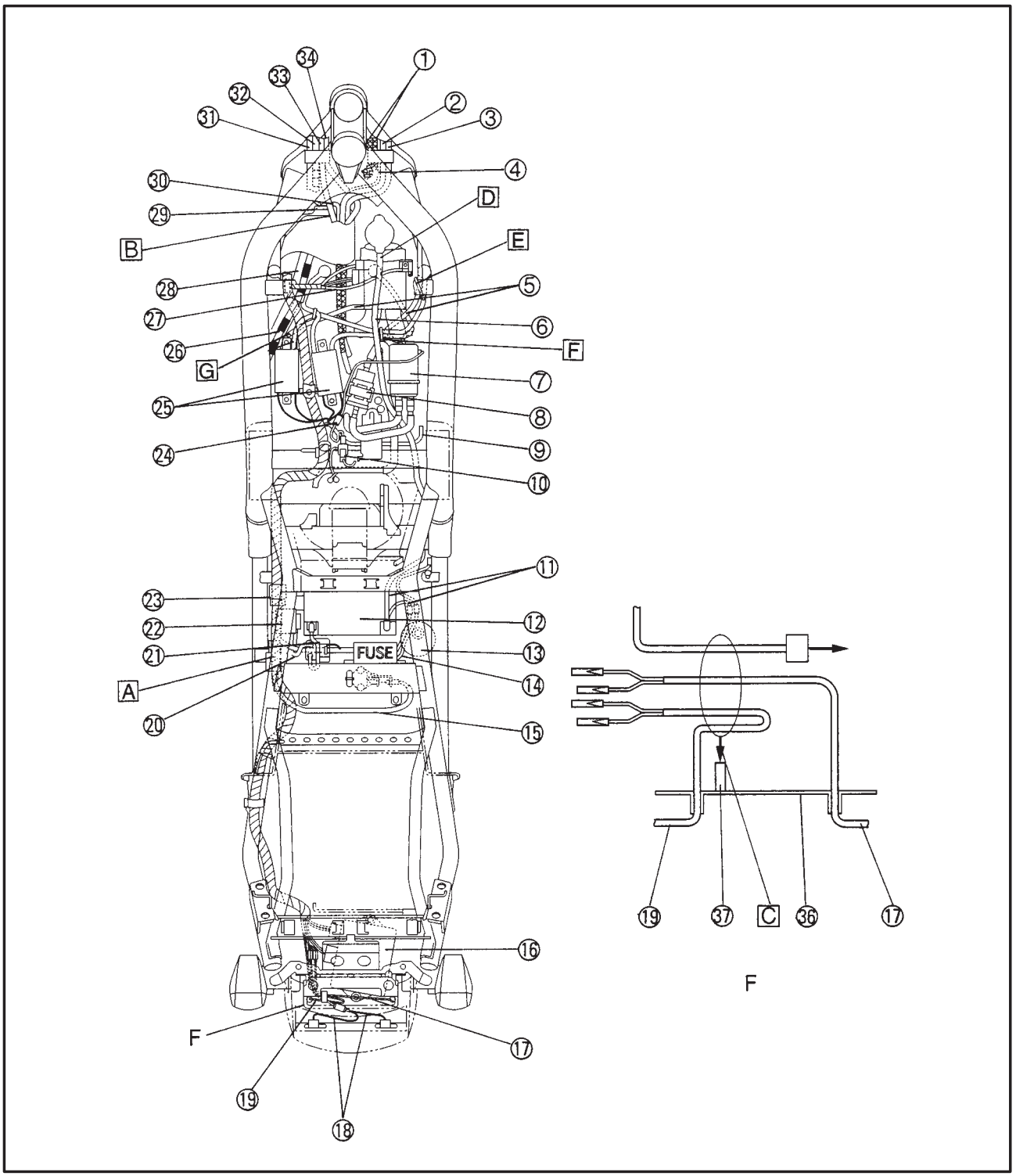
A Use a plastic clamp to fasten together the throttle cables, headlight lead handlebar switch (right) and speed sensor lead.
B Use a plastic locking tie to fasten the handlebar switch (right) and brake hose to the right front fork inner tube.



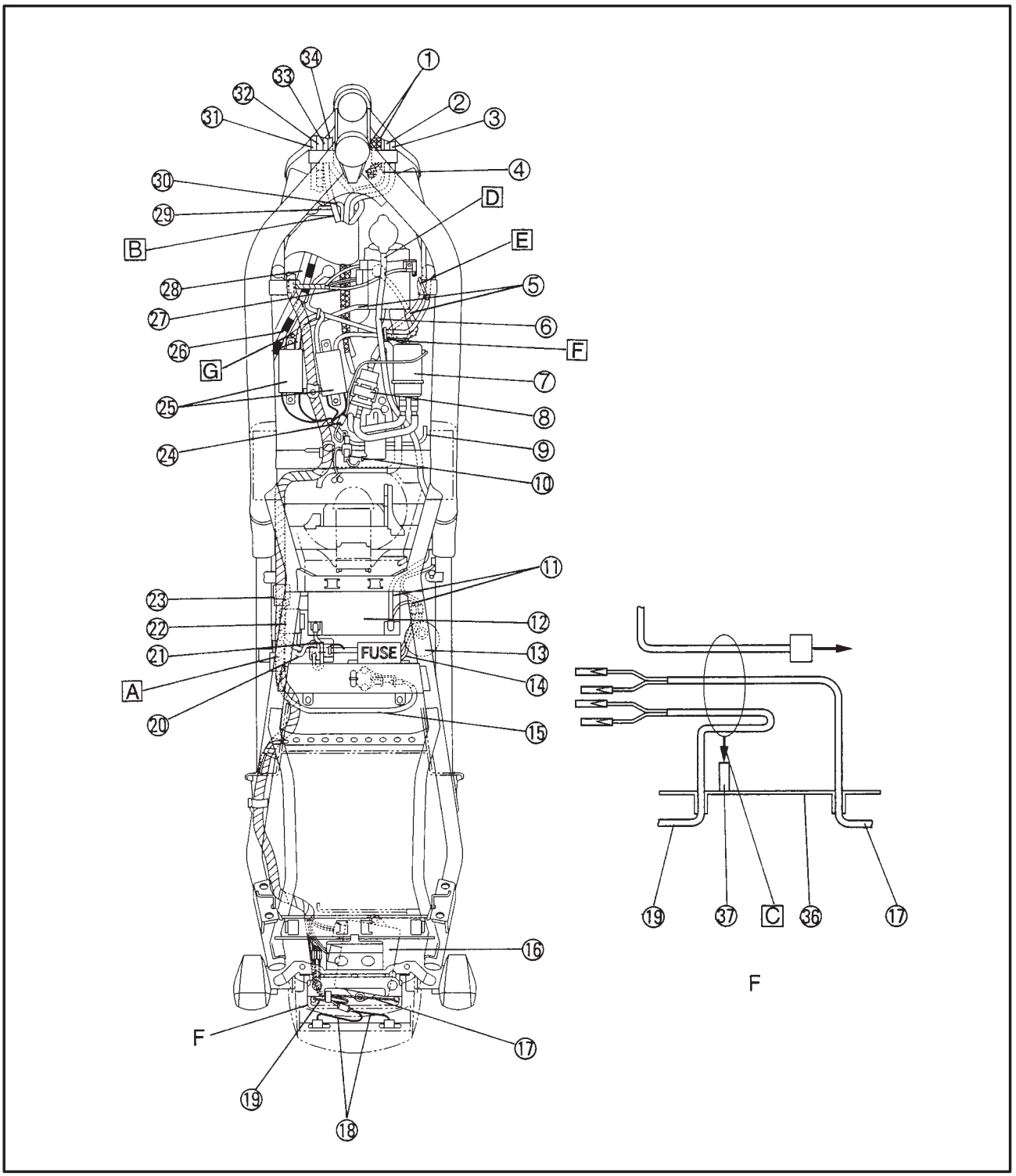
C Pass the main switch lead under the throttle cables, headlight lead, handlebar switch lead (right) and speed sensor lead, then insert it right side of the box.
D Pass the reservoir tank over flow hose, fuel tank breather hose and fuel tank drain hose through the cable holder.
E Pass the battery negative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

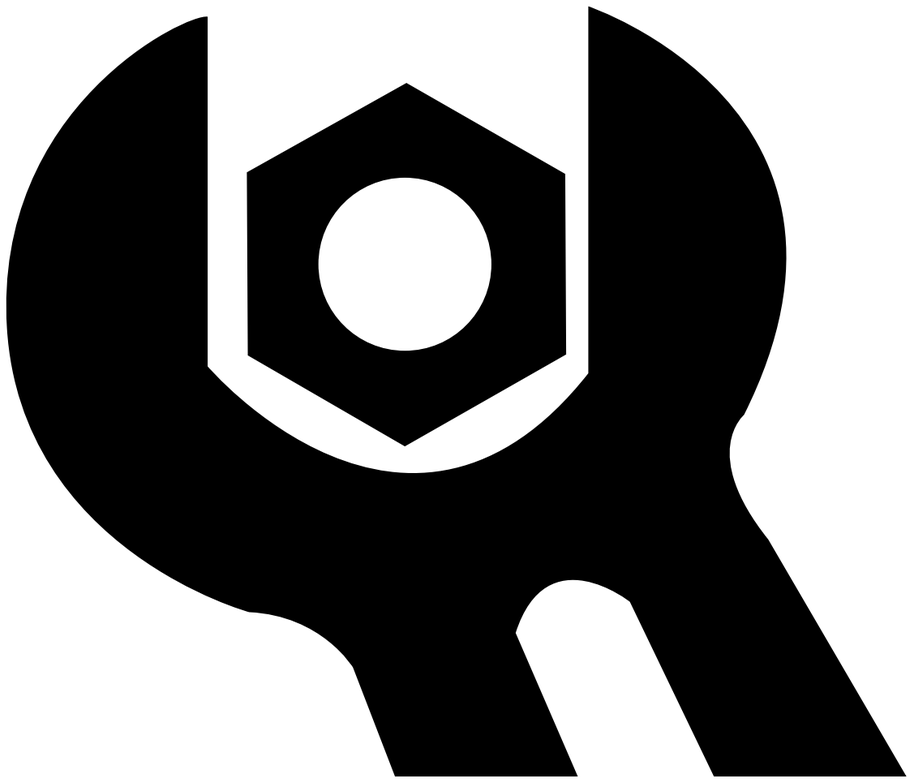


① Throttle cable
② Handlebar switch lead (right)
③ Headlight lead
④ Speed sensor lead
⑤ Carburetor heater hose
⑥ Reservoir tank hose
⑦ Fuel pump
⑧ Fuel filter
⑨ T.P.S lead
⑩ Fuel sender, coupler
⑪ Battery negative (–) lead
⑫ Battery
⑬ Rear brake reservoir tank
⑭ Rear brake switch lead
⑮ Seat lock cable
⑯ Ignitor
⑰ 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
㉔ Fuel pump lead coupler
㉕ Ignition coil
㉖ Clutch cable
㉗ Ground lead
㉘ Starter cable
㉙ Fan motor lead
㉚ Rectifier/regulator lead



㉛ Starter cable
㉜ Clutch cable
㉝ 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.





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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.

EB301000

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

NO.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL (1,000 km)	EVERY	
					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.		√	√
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.	Every 42,000 km or 42 months (whichever comes first)		
5		Air filter	° Clean or replace if necessary.		√	√
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.	√	√	√
8	*	Rear brake	° Check operation, fluid level and vehicle for fluid leakage. (See NOTE.) ° Correct accordingly. ° Replace brake pads if necessary.	√	√	√
9	*	Wheels	° Check balance, runout and for damage. ° Rebalance or replace if necessary.		√	√
10	*	Tires	° Check tread depth and for damage. ° Replace if necessary. ° Check air pressure. ° Correct if necessary.		√	√
11	*	Wheel bearings	° Check bearing for looseness or damage. ° Replace if necessary.		√	√
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).		√	√
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	° 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.		√	√
16	*	Sidestand/ centerstand	° Check operation. ° Lubricate and repair if necessary.		√	√

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NO.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL (1,000 km)	EVERY	
					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.	√	√	√
18	*	**Front fork**	◦ Check operation and for oil leakage. ◦ Correct accordingly.		√	√
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).		√	√
21	*	**Carburetors**	◦ Check engine idling speed, synchronization and starter operation. ◦ Adjust if necessary.	√	√	√
22		**Engine oil**	◦ Check oil level and vehicle for oil leakage. ◦ Correct if necessary. ◦ Change. (Warm engine before draining.)	√	√	√
23		**Engine oil filter cartridge**	◦ Replace.	√		√
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).		√	√

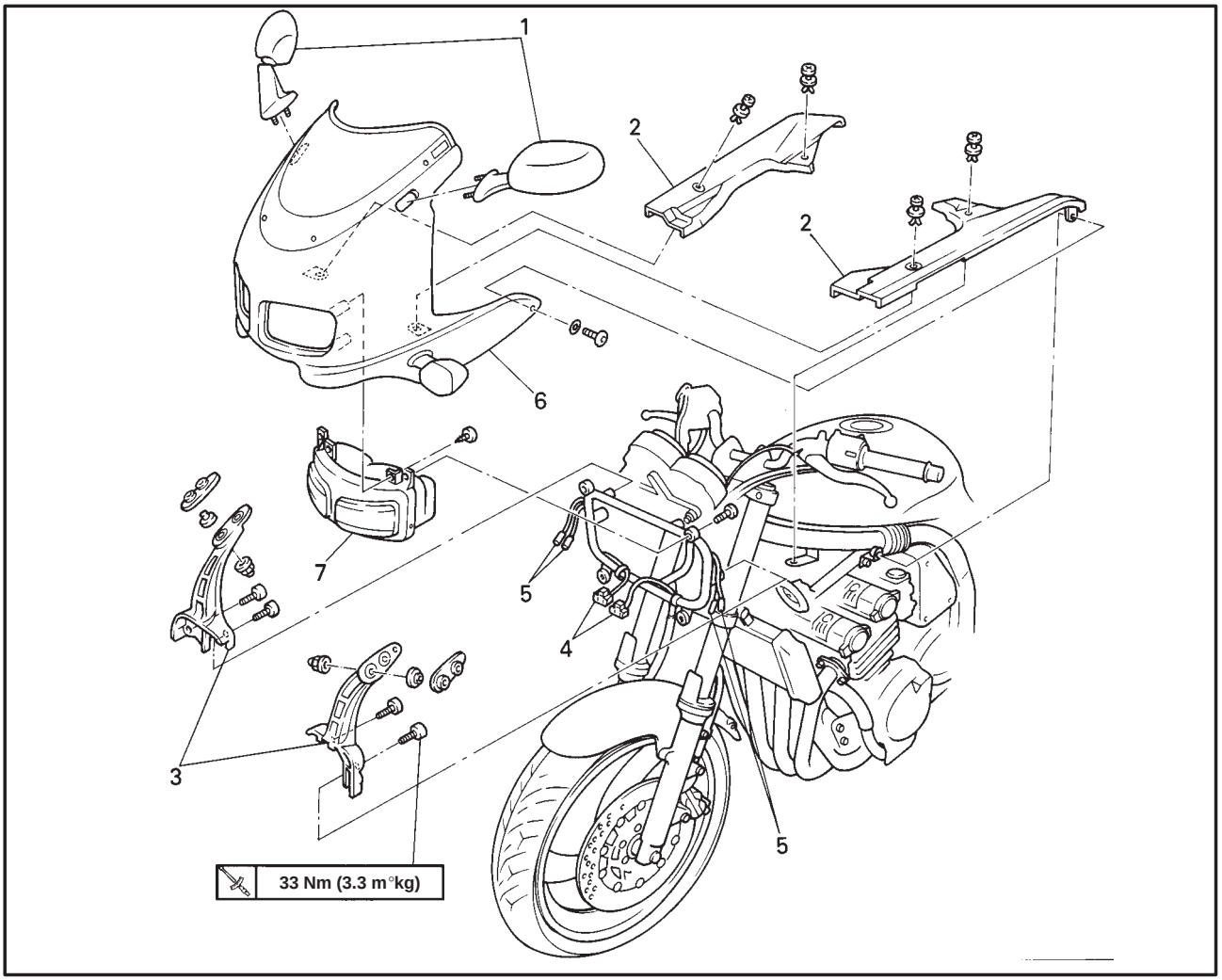
*Since these items require special tools, data and technical skills, they should be serviced by a Yamaha dealer.

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.

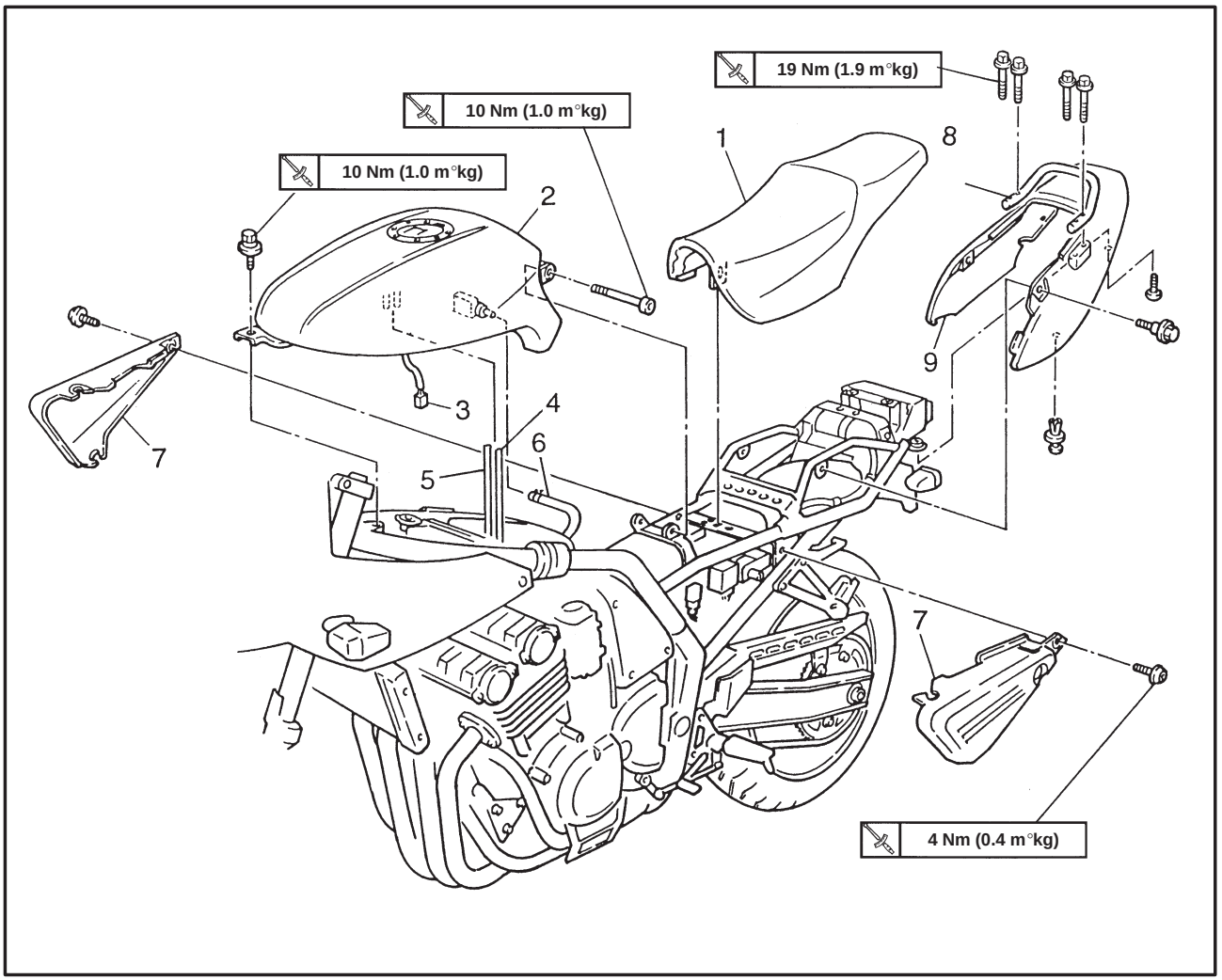
FRONT COWLING/SEAT/SIDE COVER/FUEL TANK

FRONT COWLING



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.

SEAT, SIDE COVER AND FUEL TANK



Order	Job name/Part name	Q'ty	Remarks
	Removing the seat, side cover and fuel tank		Remove the parts in the order listed.
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.

EB303001
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.

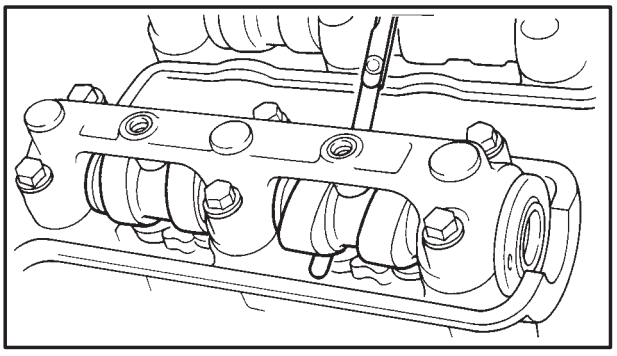
1. Remove:
   - front cowling
   - seat
   - fuel tank

   (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

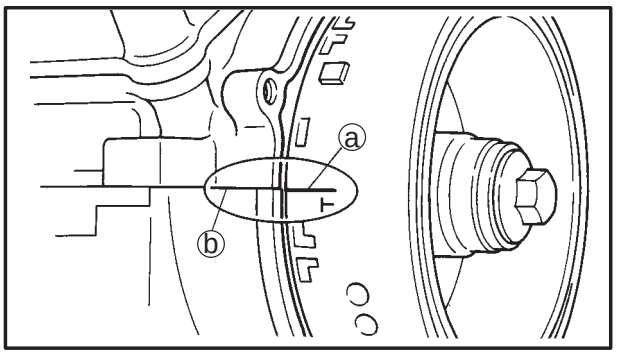
   (Refer to "RADIATOR" in chapter 5)
4. Remove:
   - spark plug cap
   - spark plug
   - magneto cover

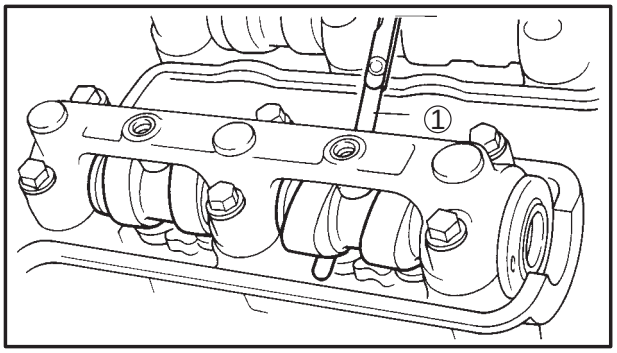


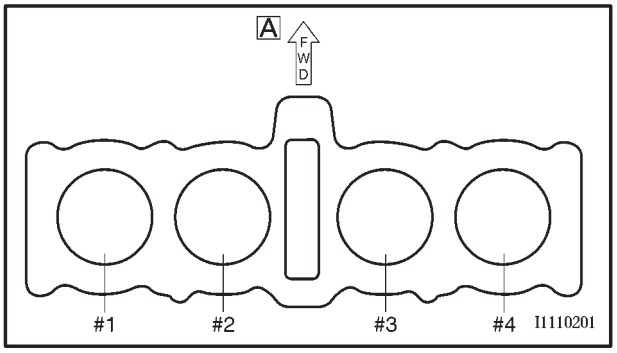
5. Measure:
   - valve clearance

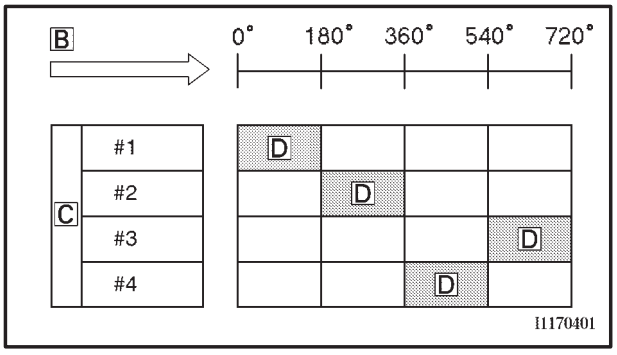
   Out of specification → Adjust.

Valve clearance (cold)
Intake valve
0.11 × 0.20 mm
Exhaust valve
0.21 × 0.30 mm









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

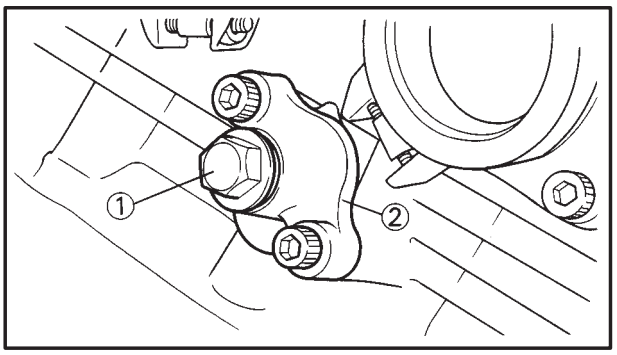
NOTE:
° If the valve clearance is incorrect, record the measured reading.
° Measure the valve clearance in the following sequence.

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

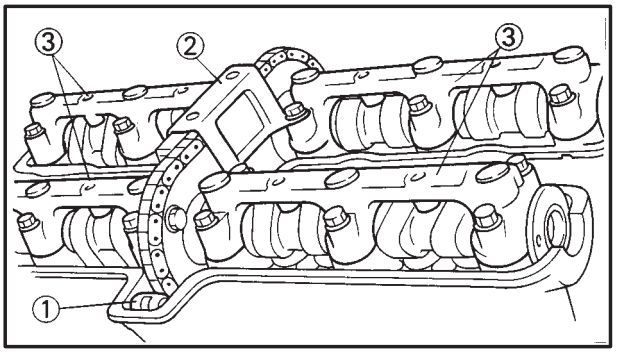
A Front
d. For each cylinder, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.
B Degrees that the crankshaft is turned counterclockwise.
C Cylinder
D Combustion cycle

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

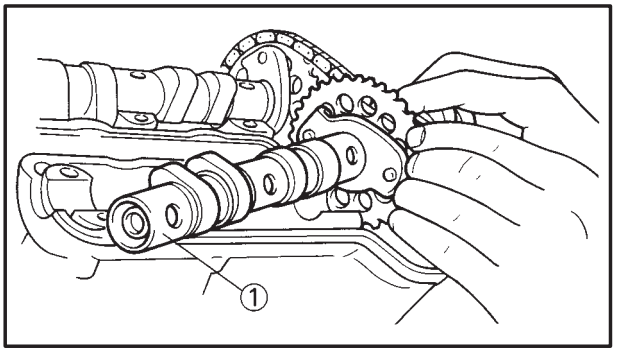
6. Remove:
° carburetor
Refer to “CARBURETION” in chapter 6.



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

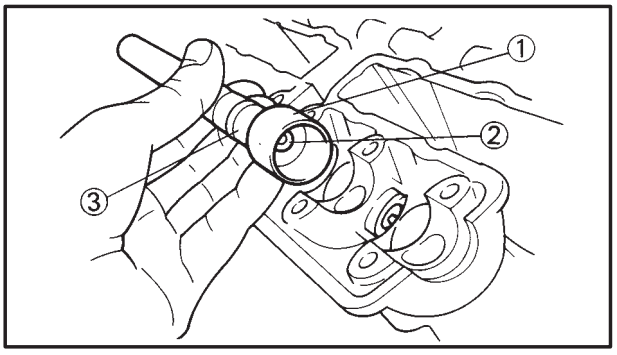


8. Remove:
   ° timing chain guide ①
   ° timing chain guide (upper) ②
   ° camshaft cap ③



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.

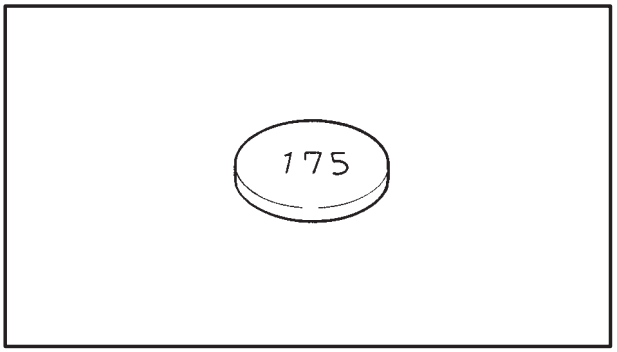


10. Adjust:
    ° valve clearance

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

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

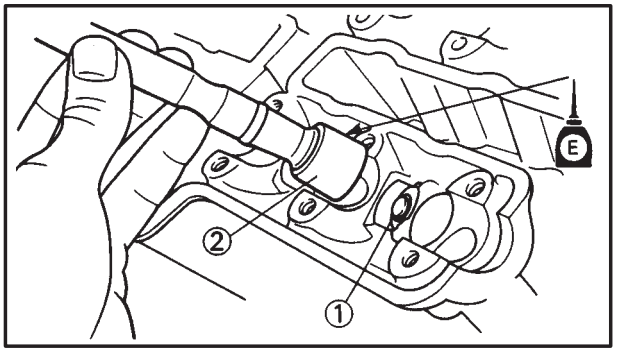
Measured clearance ↓	INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 × 0.02				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 × 0.07			120	125	130	135	140	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	Specification																								
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	
→ 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	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.58 × 0.62	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.63 × 0.67	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.68 × 0.72	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.73 × 0.77	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.78 × 0.82	185	190	195	200	205	210	215	220	225	230	235	240													
0.83 × 0.87	190	195	200	205	210	215	220	225	230	235	240														
0.88 × 0.92	195	200	205	210	215	220	225	230	235	240															
0.93 × 0.97	200	205	210	215	220	225	230	235	240																
0.98 × 1.02	205	210	215	220	225	230	235	240																	
1.03 × 1.07	210	215	220	225	230	235	240																		
1.08 × 1.12	215	220	225	230	235	240																			
1.13 × 1.17	220	225	230	235	240																				
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																								

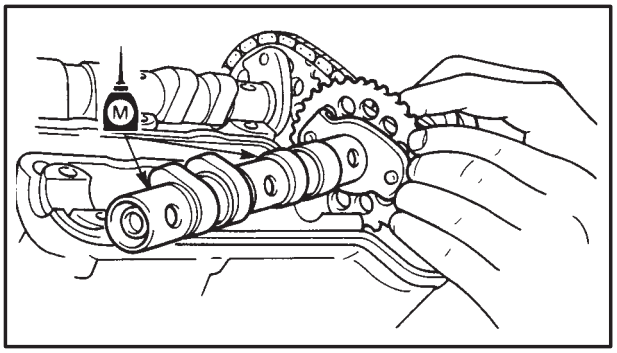
EXAMPLE:
VALVE CLEARANCE: 0.11 × 0.20 mm
Installed is 150
Measured clearance is 0.25 mm
Replace 150 pad with 160 pad

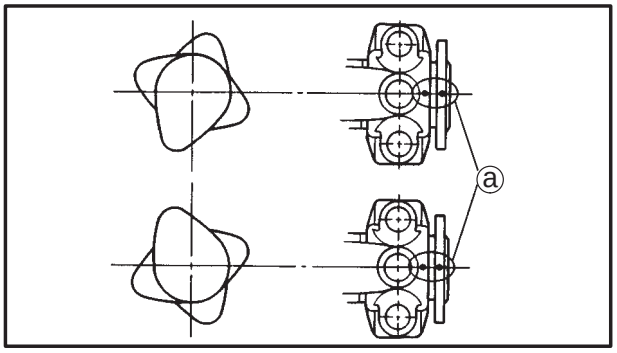
EXHAUST

Measured clearance ↓	INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
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	Specification																								
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	
→ 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	210	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						
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	215	220	225	230	235	240									
0.73 × 0.77	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.78 × 0.82	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.83 × 0.87	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.88 × 0.92	185	190	195	200	205	210	215	220	225	230	235	240													
0.93 × 0.97	190	195	200	205	210	215	220	225	230	235	240														
0.98 × 1.02	195	200	205	210	215	220	225	230	235	240															
1.30 × 1.07	200	205	210	215	220	225	230	235	240																
1.08 × 1.12	205	210	215	220	225	230	235	240																	
1.13 × 1.17	210	215	220	225	230	235	240																		
1.18 × 1.22	215	220	225	230	235	240																			
1.23 × 1.27	220	225	230	235	240																				
1.28 × 1.32	225	230	235	240																					
1.33 × 1.37	230	235	240																						
1.38 × 1.42	235	240																							
1.43 × 1.47	240																								

EXAMPLE:
VALVE CLEARANCE: 0.21 × 0.30 mm
Installed is 175
Measured clearance is 0.35 mm
Replace 175 pad with 185 pad







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 ⓐ 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.
h. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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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)

14. Install:
    ° cylinder head cover
    ° spark plugs

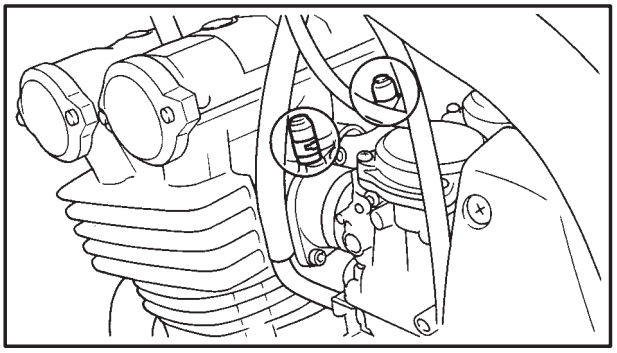
Bolt (cylinder head cover):
10 Nm (1.0 m°kg)
Spark plug:
13 Nm (1.3 m°kg)

EB303010
SYNCHRONIZING THE CARBURETORS

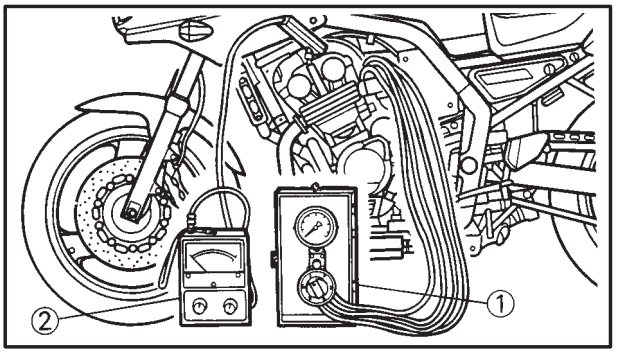
NOTE:
Prior to synchronizing the carburetors, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

1. Stand the motorcycle on a level surface.

NOTE:
Place the motorcycle on a suitable stand.



2. Remove:
    ° cap

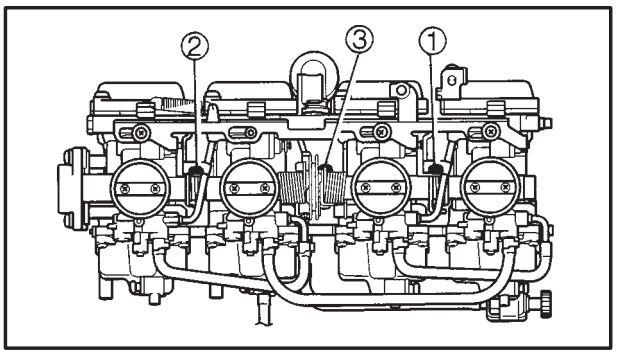


3. Install:
    ° vacuum gauge ①
    ° engine tachometer ②
    (to the spark plug lead of cyl. #1)

Vacuum gauge
90890-03094
Engine tachometer
90890-03113

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 IDLING SPEED”.

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



6. Adjust:
   ° carburetor synchronization

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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).

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

Throttle cable free play (at the flange of the throttle grip)
3 × 5 mm

10. Install:
    ° cap

EB303020
ADJUSTING THE ENGINE IDLING SPEED

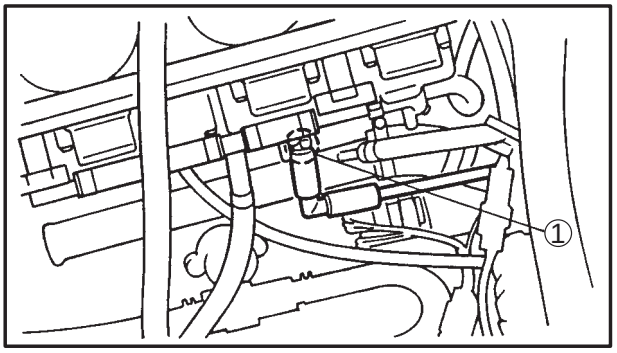
NOTE:
Prior to adjusting the engine idling speed, the carburetor synchronization should be adjusted properly, the air filter should be clean, and the engine should have adequate compression.

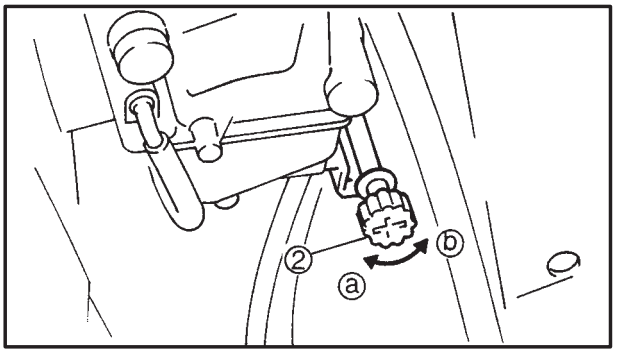
1. Start the engine and let it warm up for several minutes.
2. Install:
   ° engine tachometer
   (to the spark plug lead of cyl. #1)

	Engine tachometer 90890-03113

3. Check:
   ° engine idling speed
   Out of specification → Adjust.

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





4. Adjust:
   ° engine idling speed

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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 ⓐ or ⓑ until the specified idling speed is obtained.

Direction ⓐ → Idling speed is increased.
Direction ⓑ → Idling sped is decreased.

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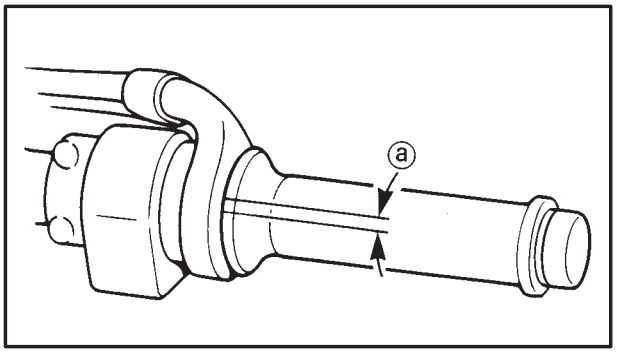
5. Adjust:
   ° throttle cable free play
   Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY”.

	Throttle cable free play (at the flange of the throttle grip) 3 × 5 mm

EB303032
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.

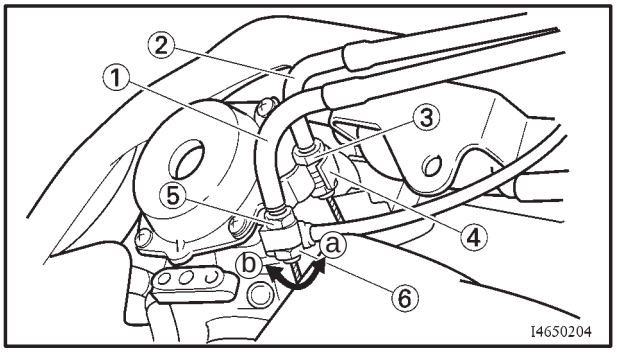


Throttle cable free play (at the flange of the throttle grip)
3 × 5 mm

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.



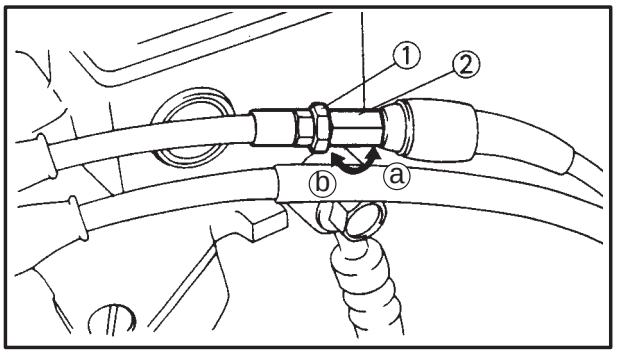
a. Loosen the locknut ③ on throttle cable #2.
b. Turn the adjuster ④ ⓐ or ⓑ to take up any slack on throttle cable #2.
c. Loosen the locknut ⑤ on throttle cable #1.
d. Turn the adjuster ⑥ ⓐ or ⓑ until the specified free play is obtained.

Direction ⓐ →	**Throttle cable free play is increased.**
Direction ⓑ →	**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 ⓐ or ⓑ until the specified throttle cable free play is obtained.

Direction ⓐ →	**Throttle cable free play is increased.**
Direction ⓑ →	**Throttle cable free play is decreased.**

c. Tighten the locknut.

⚠ WARNING

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

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

EB303040

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

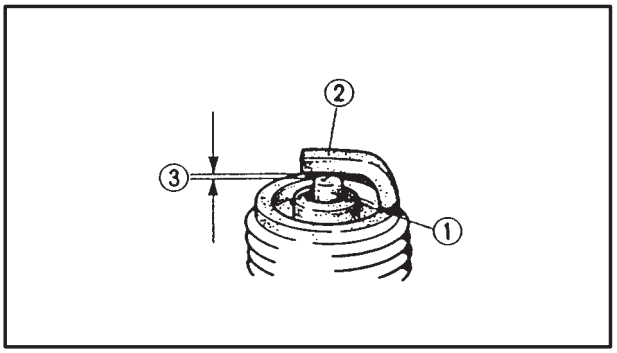
1. Disconnect:
   ° spark plug cap
2. Remove:
   ° spark plug

CAUTION:

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

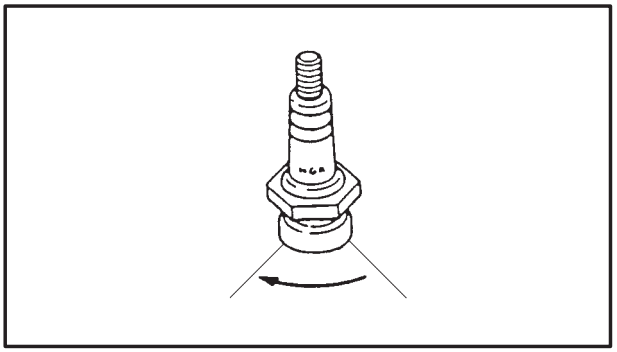
3. Check:
   ° spark plug type
   Incorrect → Change.

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



4. Check:
   ° electrode ①
   Damage/wear → Replace the spark plug.
   ° insulator ②
   Abnormal color → Replace the spark plug.
   Normal color is a medium-to-light tan color.
5. Clean:
   ° spark plug
   (with a spark plug cleaner or wire brush)
6. Measure:
   ° spark plug gap ③
   (with a specification → Regap.

Spark plug gap
0.7 × 0.8 mm



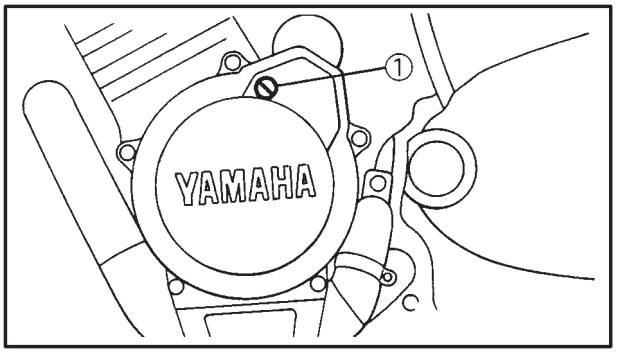
7. Install:
   ° spark plug

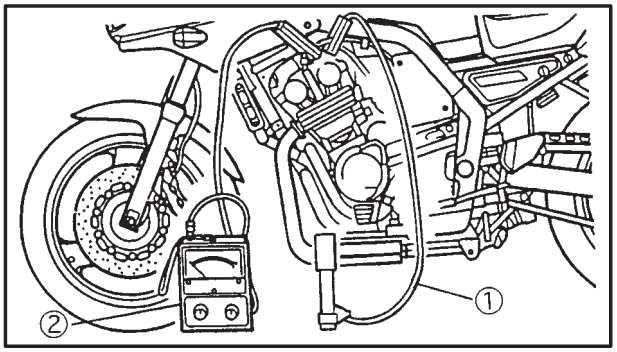
Spark plug
13 Nm (1.3 m°kg)

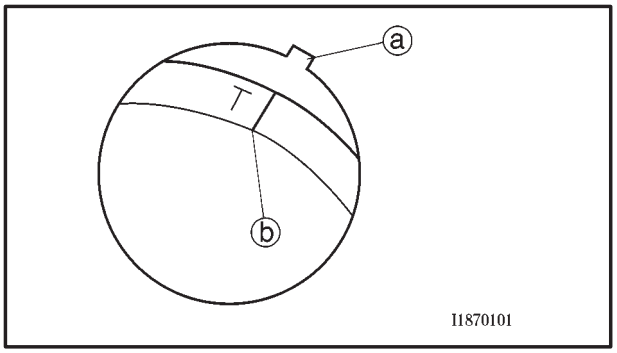
NOTE:

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

8. Connect:
   ° spark plug cap







EB303053
CHECKING THE IGNITION TIMING

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

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

Timing light
90890-03141
Engine tachometer
90890-03113

3. Check:
   ° ignition timing

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

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

   b. Check that the stationary pointer ⓐ is within the firing range ⓑ on the generator rotor.
   Incorrect firing range → Check the ignition system.

NOTE:
The ignition timing is not adjustable.

4. Remove:
   ° engine tachometer
   ° timing light

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5. Install:
   ° timing plug

EB303060

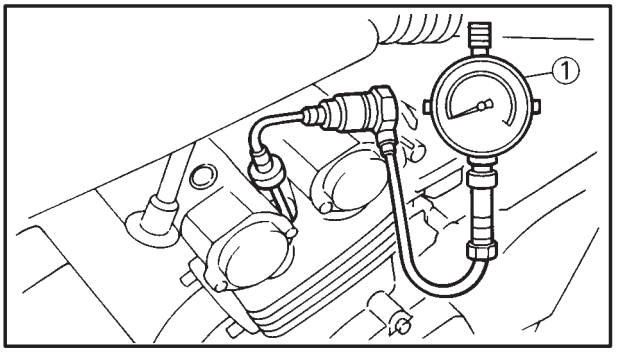
MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE:
Insufficient compression pressure will result in a loss of performance.

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

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



5. Install:
   ° compression gauge ①

	Compression gauge 90890-03081

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

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

Compression pressure
(at sea level)
Standard
1,500 kPa (15.0 kg/cm²)
Minimum
1,200 kPa (12.0 kg/cm²)

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

⚠ WARNING

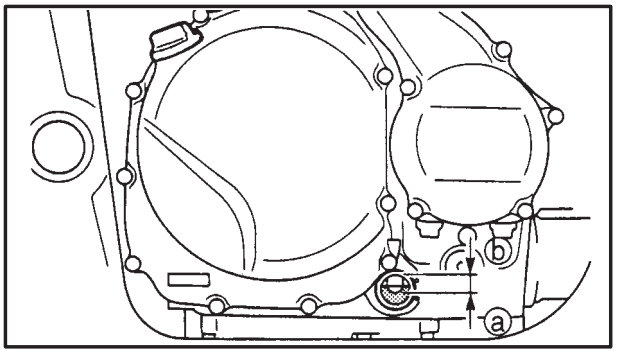
To prevent sparking, ground all spark plug leads before cranking the engine.

NOTE:
The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 1 bar).

7. Install:
   ° spark plug

Spark plug
13 Nm (1.3 m°kg)

8. Connect:
   ° spark plug cap

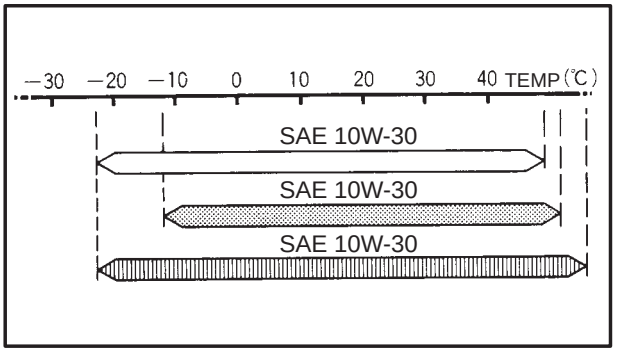


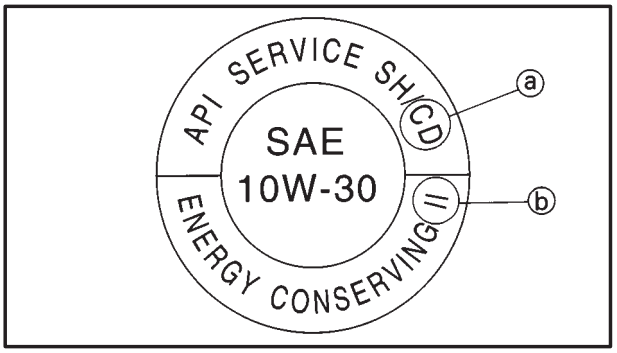
EB303070
CHECKING THE ENGINE OIL LEVEL

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 ⓐ and maximum level marks ⓑ.
   Below the minimum level mark → Add the recommended engine oil to the proper level.





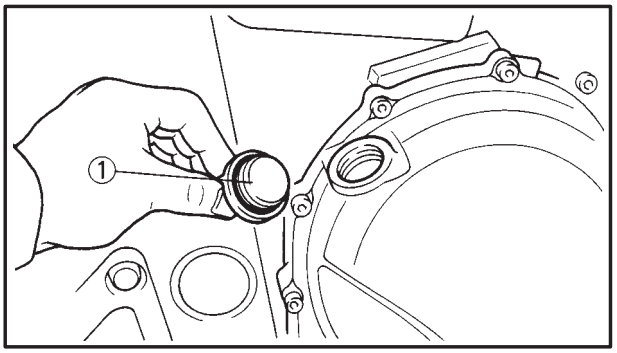
Recommended engine oil
Refer to the chart for the engine oil grade which is best suited for certain atmospheric temperatures.
API standard → SE or higher grade
ACEA standard → G4 or G5

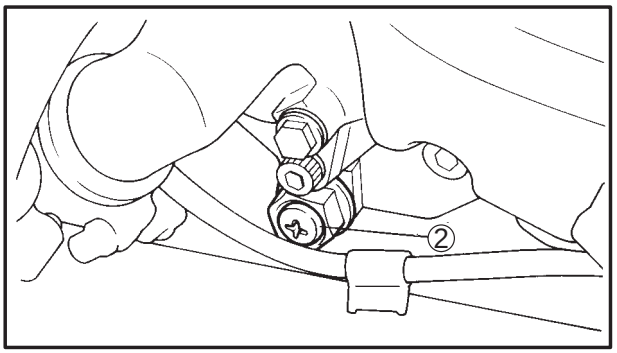
CAUTION:

- **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 ⓐ or higher and do not use oils labeled "ENERGY CONSERVING II" ⓑ 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.

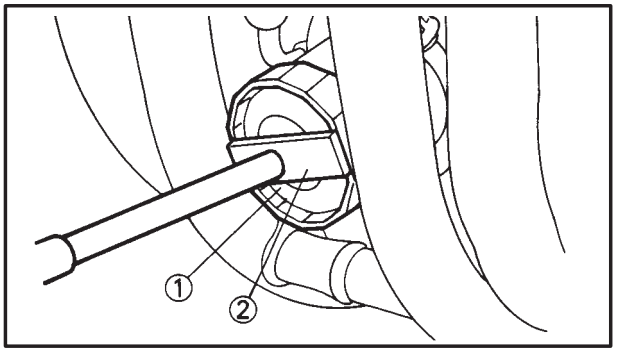
NOTE:
Before checking the engine oil level, wait a few minutes until the oil has settled.

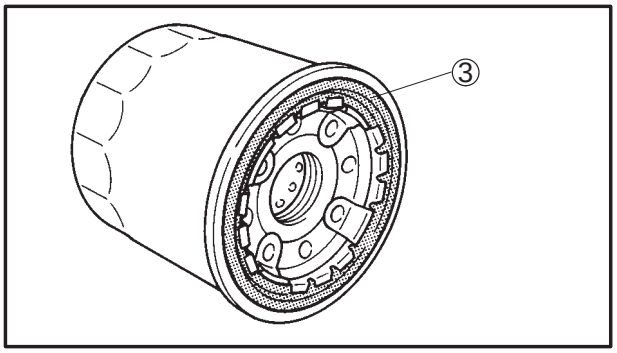


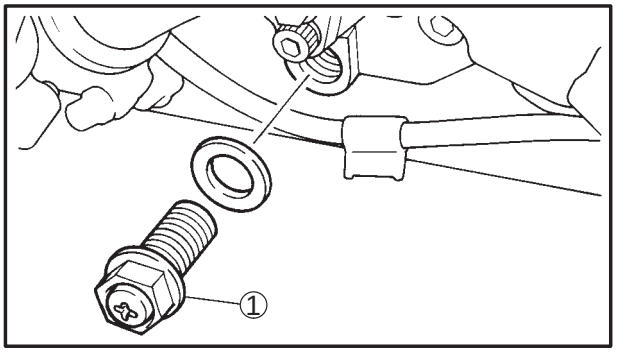


EB303081
CHANGING THE ENGINE OIL

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:
   - engine oil filler cap ①
   - 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.







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

	Oil filter wrench **90890-01469**

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

CAUTION:

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

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

	Oil filter cartridge **17 Nm (1.7m°kg)**

6. Check:
   ° engine oil drain bolt gasket
   Damage → Replace.
7. Install:
   ° engine oil drain bolt ①

	43 Nm (4.3 m°kg)

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

	Quantity **Total amount** **3.5 L** **Without oil filter cartridge replacement** **2.5 L** **With oil filter cartridge replacement** **2.7 L**

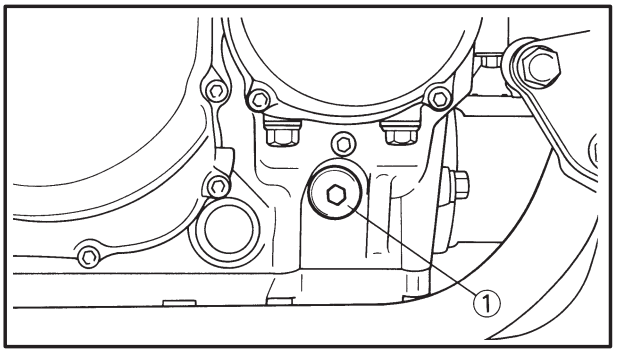
9. Install:
   ° engine oil filler cap
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
    ° engine
    (for engine oil leaks)
12. Check:
    ° engine oil level
    Refer to “CHECKING THE ENGINE OIL LEVEL”.

EB303090
MEASURING THE ENGINE OIL PRESSURE

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

CAUTION:

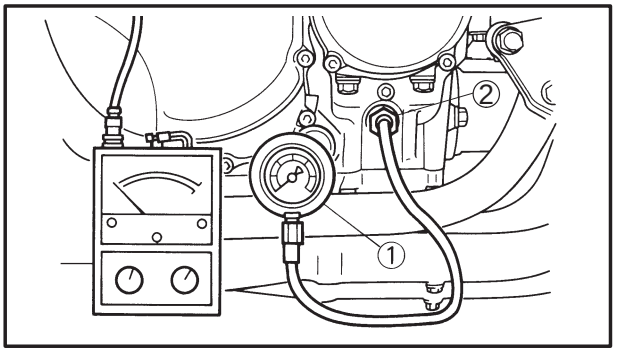
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.



3. Remove:
   ° oil gallery bolt ①

⚠ WARNING

The engine, muffler and engine oil are extremely hot.



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

Oil pressure gauge
90890-03153
Adapter
90890-03139

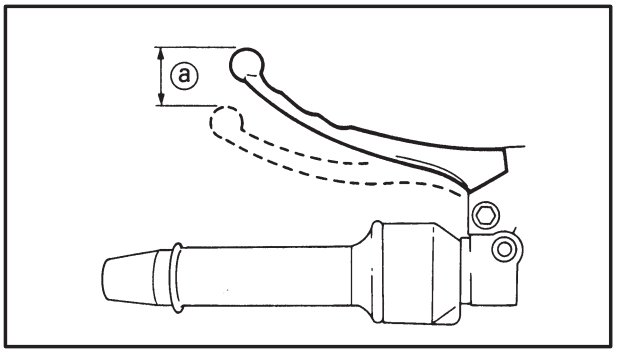
5. Measure:
   ° engine oil pressure
   (at the following conditions)

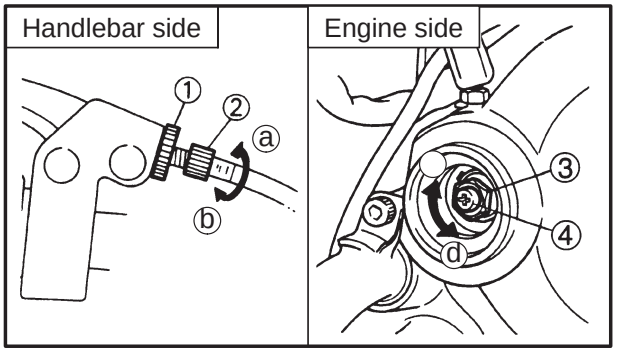
Engine oil pressure
450 kPa (4.5 kg/cm²)
Engine speed
Approx. 10,000 r/min
Engine oil temperature
115 C

Out of specification → 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

6. Install:
   ° oil gallery bolt — 8 Nm (0.8 m°kg)





EB303100
ADJUSTING THE CLUTCH CABLE FREE PLAY

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

Clutch cable free play (at the end of the clutch lever)
10 × 15 mm

2. Adjust:
   ° clutch cable free play

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

Direction ⓐ →	**Clutch cable free play is increased.**
Direction ⓑ →	**Clutch cable free play is decreased.**

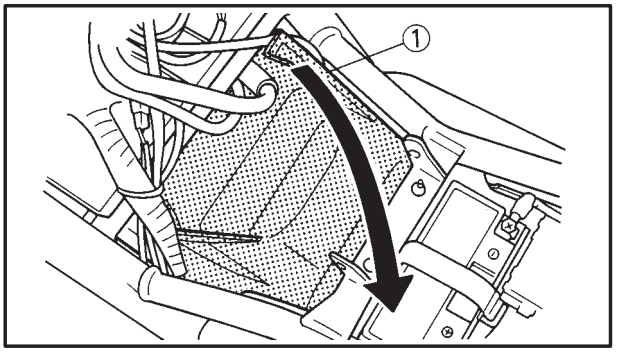
c. Tighten the locknut.

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 ⓓ until the specified clutch cable free play is obtained.

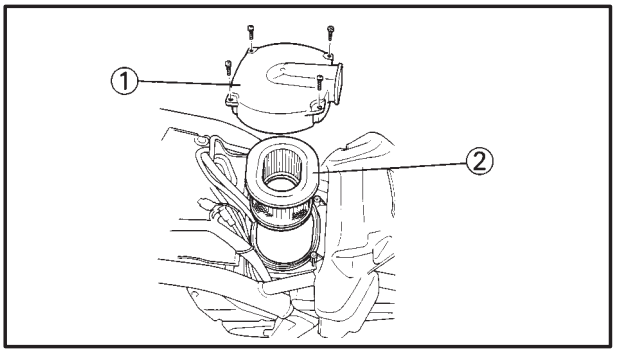
Direction ⓒ →	**Clutch cable free play is increased.**
Direction ⓓ →	**Clutch cable free play is decreased.**

c. Tighten the locknuts.

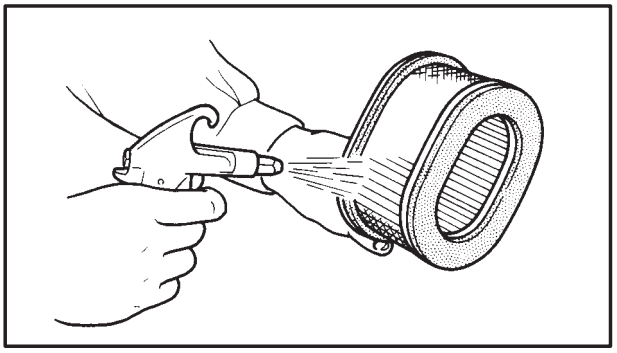


EB303130
CLEANING THE AIR FILTER ELEMENT

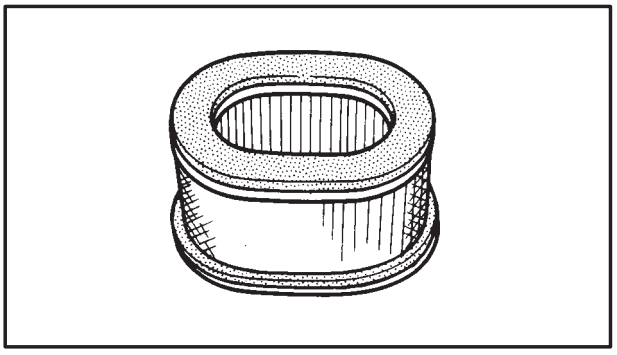
1. Remove:
   ° Seat
   ° Fuel tank
   ° Cover ①



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

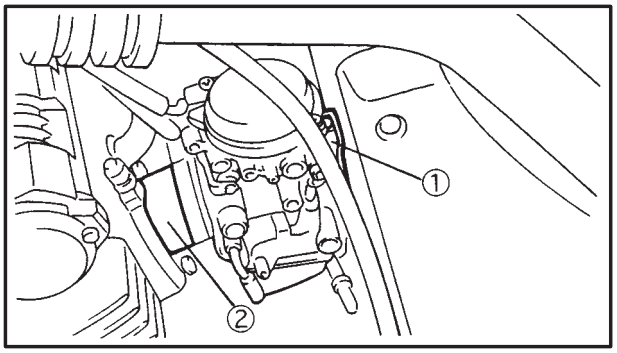
CAUTION:

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.

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

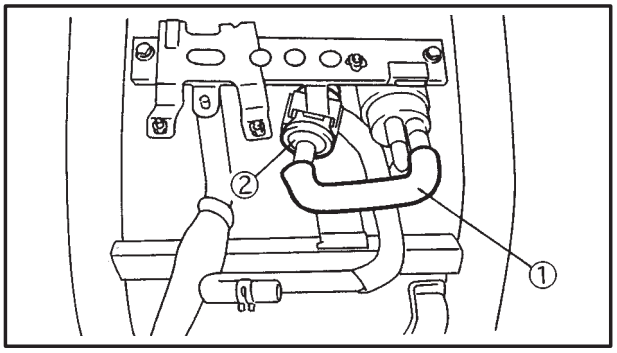
EB303171
CHECKING THE CARBURETOR JOINTS AND INTAKE MANIFOLDS



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

1. Remove:
   ° seat
   ° fuel tank
2. Check:
   ° carburetor joint ①
   ° intake manifold ②
   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 6.
3. Install:
   ° fuel tank
   ° seat

EB303181
CHECKING THE FUEL HOSES AND FUEL FILTER

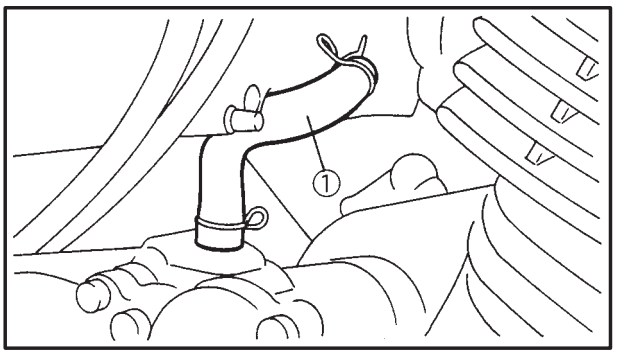


The following procedure applies to all of the fuel hoses.

1. Remove:
   ° seat
   ° fuel tank
2. Check:
   ° fuel hose ①
   Cracks/damage → Replace.
   ° fuel filter ②
   Damage/dirt → Replace.

NOTE:
° Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.

3. Install:
   ° fuel tank
   ° seat



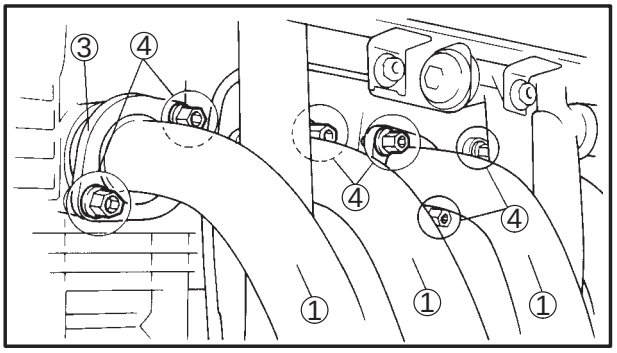
EB303190
CHECKING THE CRANKCASE BREATHER HOSE

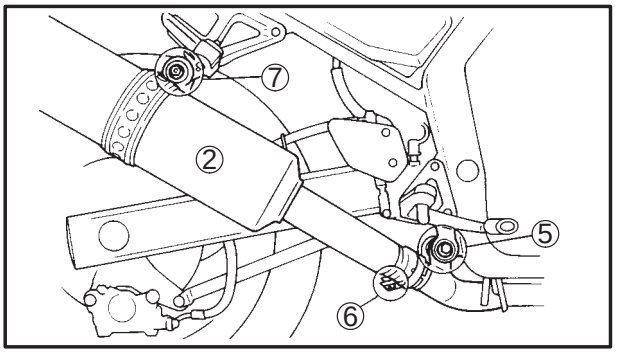
1. Remove:
   - seat
   - fuel tank
   - carburetor
2. Check:
   - crankcase breather hose ①
     Cracks/damage → Replace.
     Loose connection → Connect properly.

CAUTION:

Make sure that the crankcase breather hose is routed correctly.

3. Install:
   - carburetor
   - fuel tank
   - seat



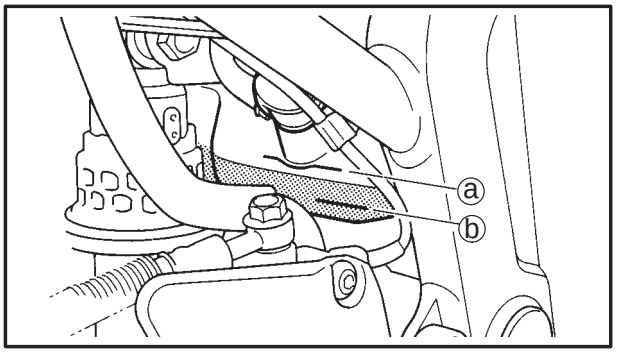


EB303200
CHECKING THE EXHAUST SYSTEM

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

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

Exhaust pipe ring nut ④
10 Nm (1.0 m°kg)
Exhaust pipe and footrest bracket ⑤
20 Nm (2.0 m°kg)
Exhaust pipe and muffler ⑥
20 Nm (2.0 m°kg)
Muffler and footrest bracket (rear) ⑦
30 Nm (3.0 m°kg)



EB303220
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 ⓐ and minimum level marks ⓑ.
   Below the minimum level mark → Add the recommended coolant to the proper level.

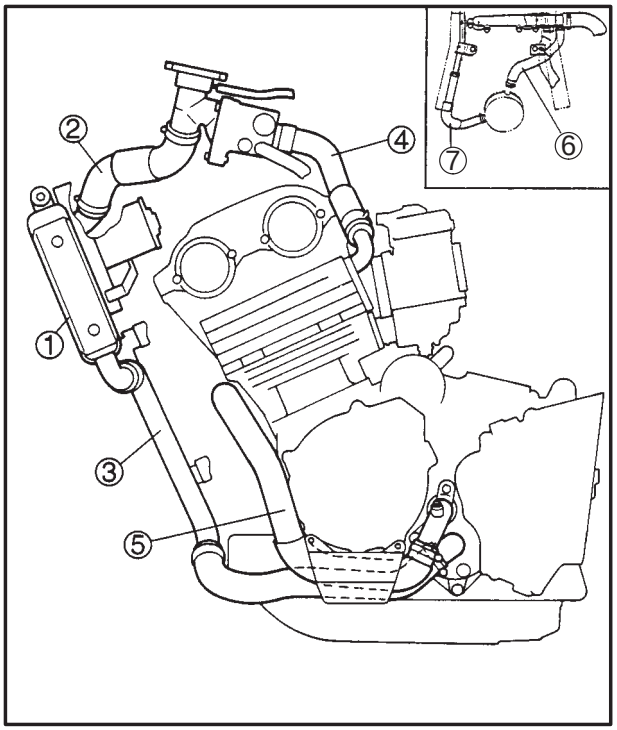
CAUTION:

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

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

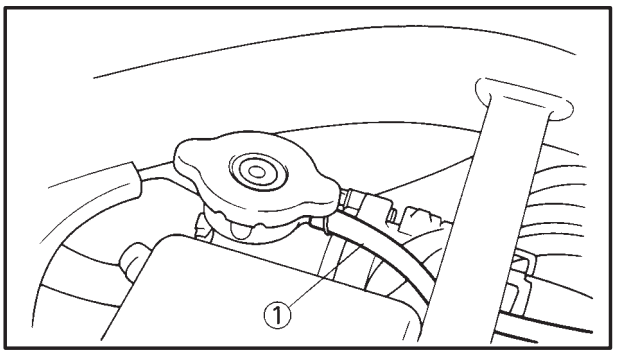
NOTE:
Before checking the coolant level, wait a few minutes until it settles.

6. Install:
   ° side cover (right)



EB303230
CHECKING THE COOLING SYSTEM

1. Remove:
   ° seat
   ° fuel tank
2. Check:
   ° radiator ①
   ° radiator inlet hose ②
   ° radiator outlet hose ③
   ° water jacket outlet joint ④
   ° water jacket inlet joint ⑤
   ° oil cooler inlet hose ⑥
   ° oil cooler outlet hose ⑦
   Cracks/damage → Replace.
   Refer to “COOLING SYSTEM” in chapter 5.
3. Install:
   ° fuel tank
   ° seat



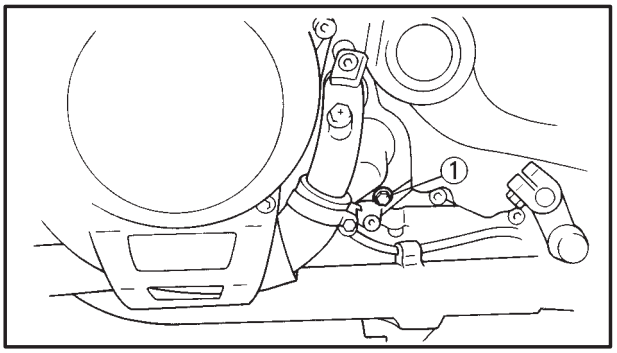
EB303240
CHANGING THE COOLANT

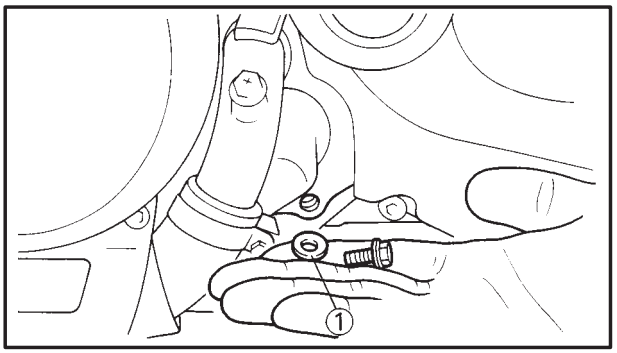
1. Remove:
   ° seat
   ° fuel tank
2. Disconnect:
   ° coolant reservoir hose ①
3. Drain:
   ° coolant
   (from the coolant reservoir)
4. Remove:
   ° radiator cap

⚠ WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly rotate the radiator cap counterclockwise 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.

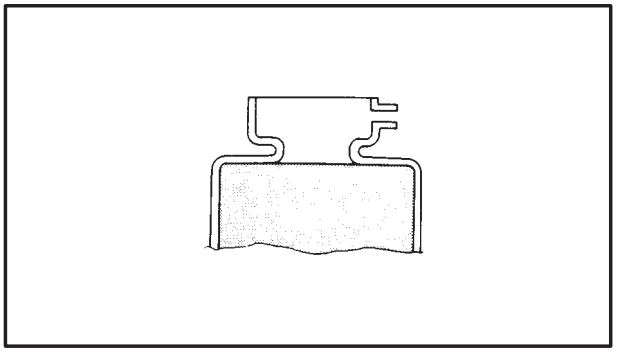
The following procedure applies to all of the coolant drain bolts and copper washers.





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)



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

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

Handling notes for coolant
Coolant is potentially harmful and should be handled with special care.

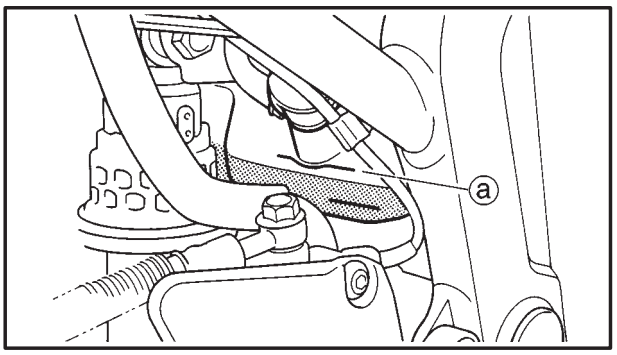
⚠ WARNING

- **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:

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

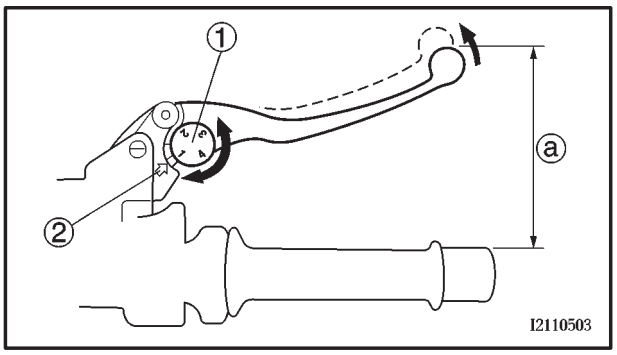
11. Install:
   ° radiator cap



12. Fill:
    ° coolant reservoir
    (with the recommended coolant to the maximum level mark ⓐ)
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



EB304001
CHASSIS
ADJUSTING THE FRONT BRAKE

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

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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 ⓐ is the smallest.**

⚠ 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.

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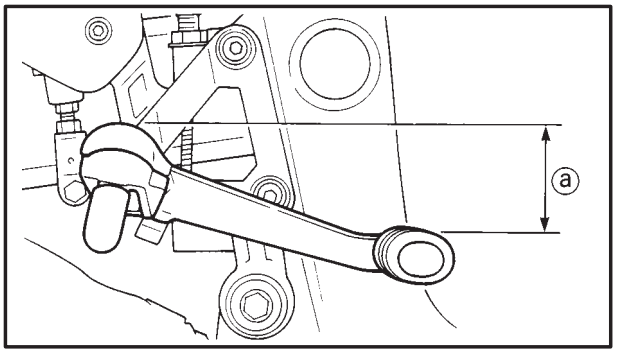

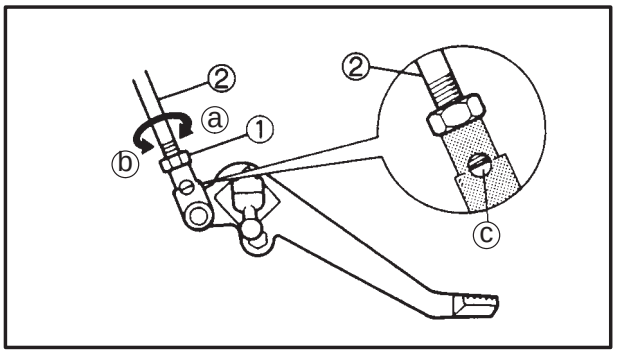

EB304010
ADJUSTING THE REAR BRAKE

1. Check:
   ° brake pedal position
   (distance ⓐ from the top of the rider footrest to the top of the brake pedal)
   Out of specification → Adjust.

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

2. Adjust:
   ° brake pedal position

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

Direction ⓐ → Brake pedal is raised.
Direction ⓑ → Brake pedal is lowered.

⚠ WARNING

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

c. Tighten the locknut ① to specification.

⚠ WARNING

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

CAUTION:

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

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

EB304020

CHECKING THE BRAKE FLUID LEVEL

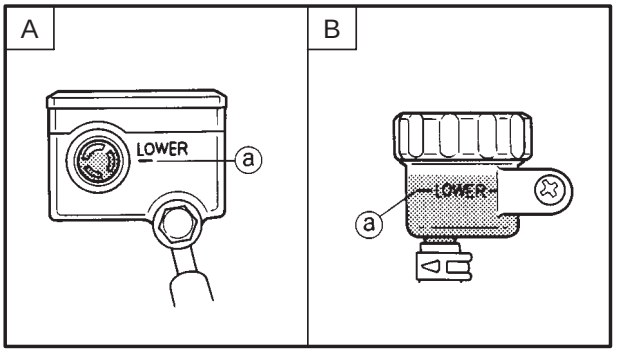
1. Stand the motorcycle on a level surface.

NOTE:

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

2. Check:
   ° brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.

Recommended brake fluid
DOT4



A Front brake
B Rear brake

⚠ WARNING

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

CAUTION:

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

NOTE:

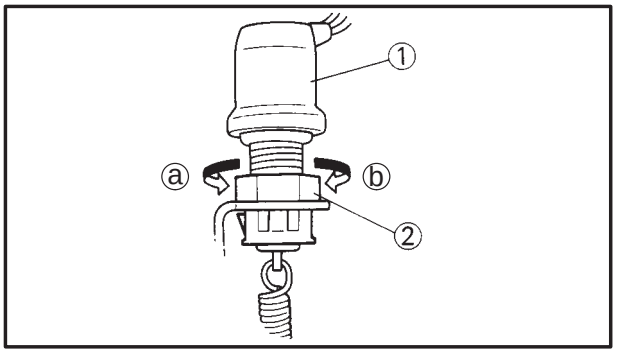
In order to ensure a correct reading of the brake fluid level, make sure that the top of the reservoir is horizontal.

EB304050

ADJUSTING THE REAR BRAKE LIGHT SWITCH

NOTE:

The rear brake light switch is operated by movement of the brake pedal.
The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.



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

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

Direction ⓐ →	**Brake light comes on sooner.**
Direction ⓑ →	**Brake light comes on later.**

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EB304062
CHECKING THE BRAKE HOSES

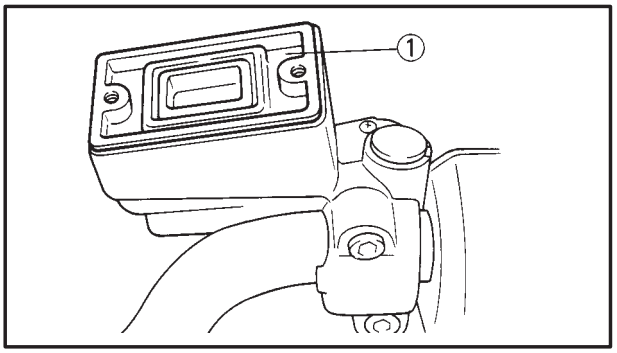
The following procedure applies to all of the brake hoses and clamps.

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

EB304071
BLEEDING THE HYDRAULIC BRAKE SYSTEM

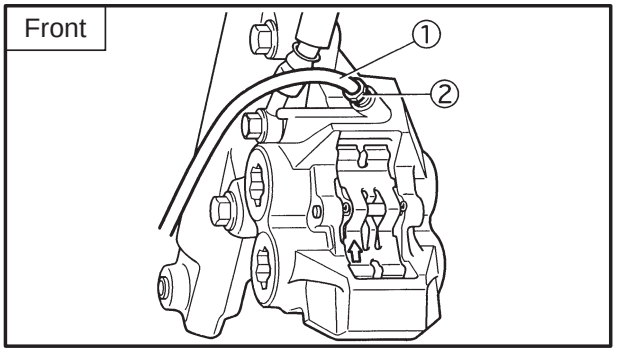
⚠ WARNING

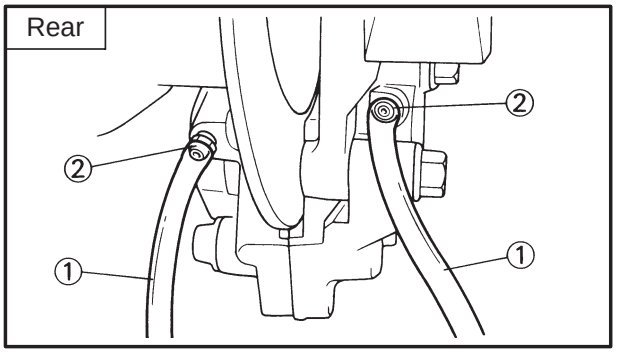
Bleed the hydraulic brake system whenever:
- **° the system was disassembled,**
- **° a brake hose was loosened or removed,**
- **° the brake fluid level is very low,**
- **° brake operation is faulty.**

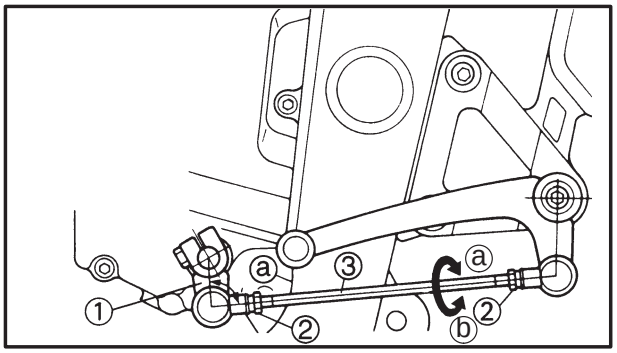


1. Remove:
   ° reservoir cap
   ° diaphragm ①

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.







2. Bleed:
   ° hydraulic brake system

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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”.

⚠ WARNING

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

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EB304080

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

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

Direction ⓐ → shift pedal is raised.
Direction ⓑ → pedal is lowered.

° Tighten both locknuts.

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EB304090
ADJUSTING THE DRIVE CHAIN SLACK

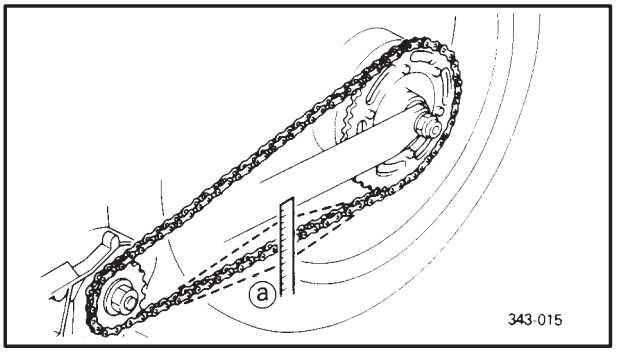
NOTE:
The drive chain slack must be checked at the tightest point on the chain.

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.

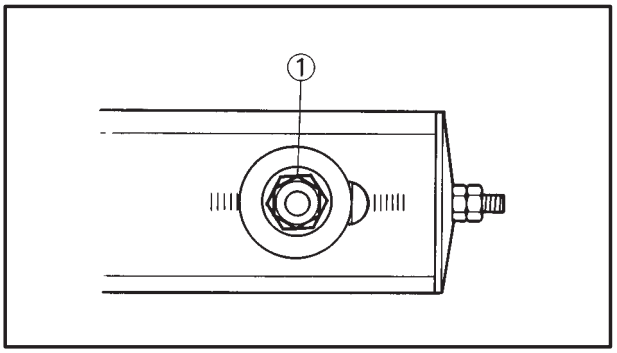
⚠ WARNING
Securely support the motorcycle so that there is no danger of it falling over.

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:
   ° drive chain slack ⓐ
   Out of specification → Adjust.

	Drive chain slack **30 × 40 mm**



4. Loosen:
   ° wheel axle nut ①
5. Adjust:
   ° drive chain slack

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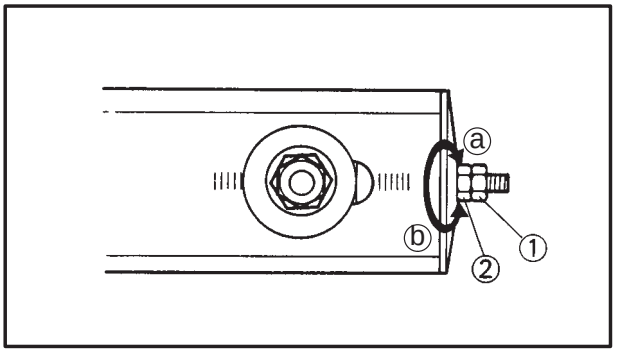
a. Loosen both locknuts ①.
b. Turn both adjusting nuts ② in direction ⓐ or ⓑ until the specified drive chain slack is obtained.



Direction ⓐ →	**Drive chain is tightened.**
Direction ⓑ→	**Drive chain is loosened.**

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.

Wheel axle nut
117 Nm (11.7 m°kg)

Locknut
16 Nm (1.6 m°kg)

EB304100
LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out rapidly.
Therefore, the drive chain should be serviced, especially when the motorcycle is used in dusty areas. This motorcycle has a drive chain with small rubber 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.

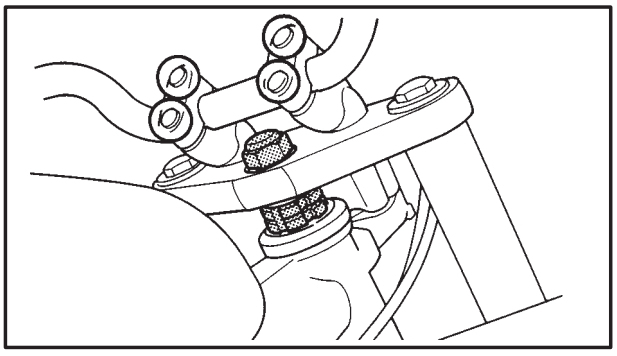
Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

EB304130
CHECKING AND ADJUSTING THE STEERING HEAD

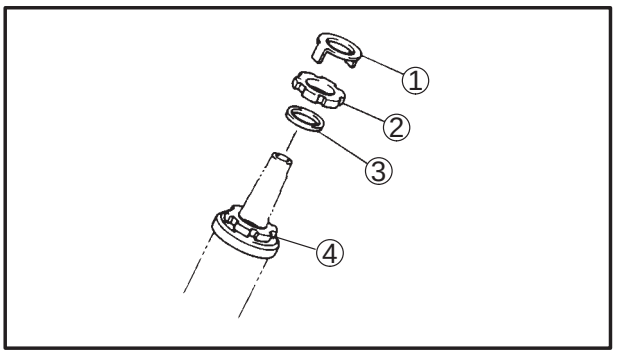
1. Stand the motorcycle on a level surface.

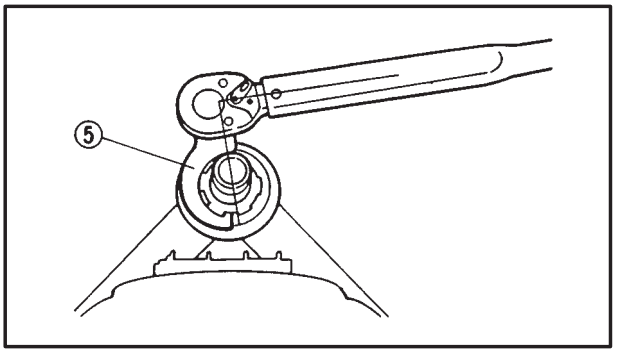
⚠ WARNING
Securely support the motorcycle so that there is no danger of it falling over.

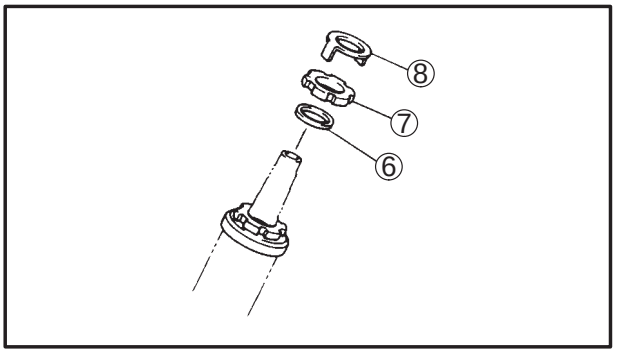
NOTE:
Place the motorcycle on a suitable stand so that the front wheel is elevated.

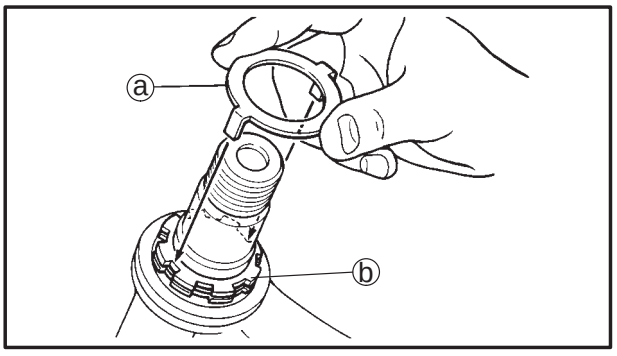


2. Check:
   ° steering head
   Grasp the bottom of the front fork legs and gently rock the front fork.
   Looseness or binding → Adjust the steering head.
3. Remove:
   ° handlebar
   ° upper bracket









4. Adjust:
   ° steering head

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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.

Ring nut wrench
90890-01403

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

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

⚠ WARNING
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 HANDLEBAR” in chapter 7.

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e. Install the rubber washer ⑥.
f. Install the upper ring nut ⑦.
g. Finger tighten the upper ring nut ⑦, 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 ⓐ sit correctly in the ring nut slots ⓑ.

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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)

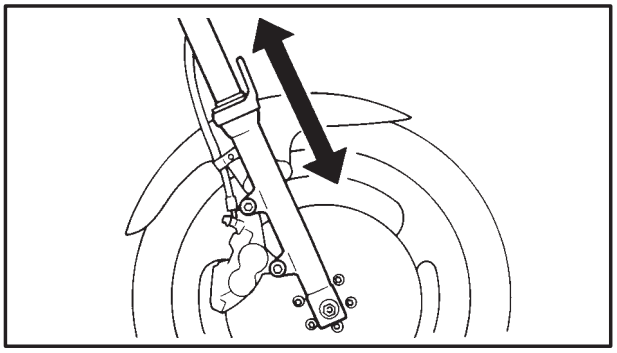
EB304140
CHECKING THE FRONT FORK

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

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



EB304160
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

⚠ WARNING

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

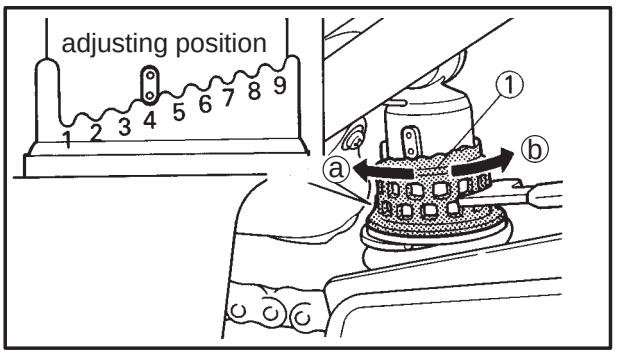
Spring preload

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   ° spring preload

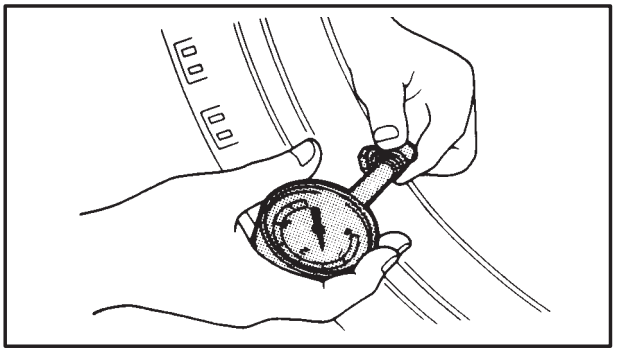
NOTE:
Adjust the spring preload with the special wrench and extension bar included in the owner’s tool kit.



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

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

	Minimum	Standard	Maximum
Adjusting positions	**1**	**4**	**9**



EB304170
CHECKING THE TIRES
The following procedure applies to both of the tires.
1. Measure:
   ° tire pressure
   Out of specification → Regulate.

⚠ WARNING

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

NEVER OVERLOAD THE MOTORCYCLE.

Basic weight (with oil and 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/cm²)	250 kPa (2.50 kg/cm²)
90 kg maximum load*	225 kPa (2.25 kg/cm²)	280 kPa (2.80 kg/cm²)
High speed riding	225 kPa (2.25 kg/cm²)	280 kPa (2.80 kg/cm²)

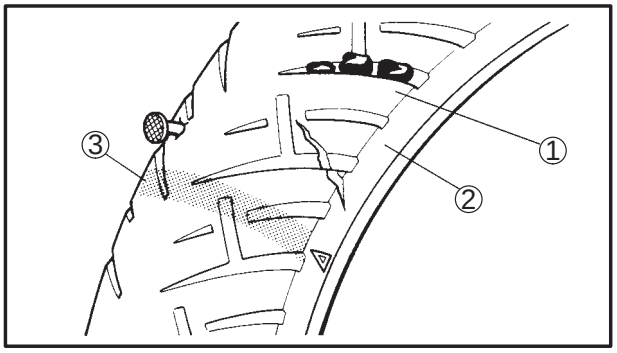
*: total of cargo, rider, passenger and accessories

⚠ WARNING

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

2. Check:
   ° tire surface
   Damage/wear → Replace the tire.

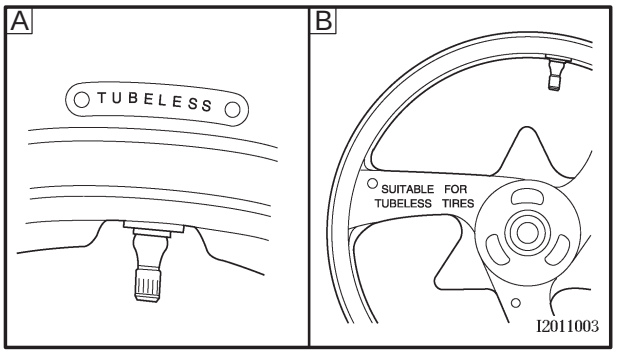
Minimum tire tread depth 1.6 mm



① Tire tread depth
② Side wall
③ Wear indicator

⚠ WARNING

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



A Tire **B Wheel**

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

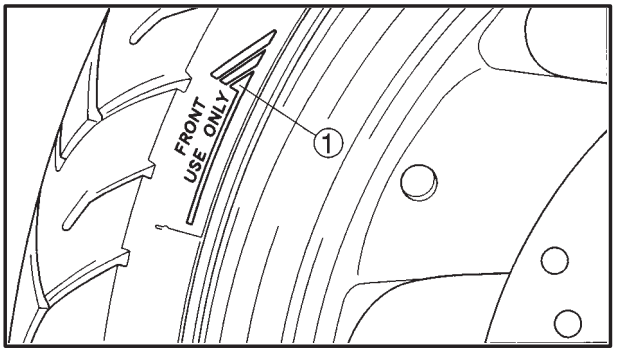
° **After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one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

Front tire

Manufacturer	Size	Type
BRIDGESTONE	110/70-ZR17 (54 W)	BT57F
DUNLOP	110/70-ZR17 (54 W)	D207F

Rear tire

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



⚠ WARNING

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

NOTE:

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

EB304180

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

⚠ WARNING

Never attempt to make any repairs to the wheel.

NOTE:

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

EB304200
CHECKING AND LUBRICATING THE CABLES

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

⚠ WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

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

DB304210
LUBRICATING THE LEVERS AND PEDALS

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

Recommended lubricant
Lithium soap base grease

EB304220
LUBRICATING THE SIDESTAND

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

Recommended lubricant
Lithium soap base grease

LUBRICATING THE CENTER STAND

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

Recommended lubricant
Lithium soap base grease

EB304240
LUBRICATING THE REAR SUSPENSION

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

Recommended lubricant
Molybdenum disulfide grease

EB305020

ELECTRICAL SYSTEM

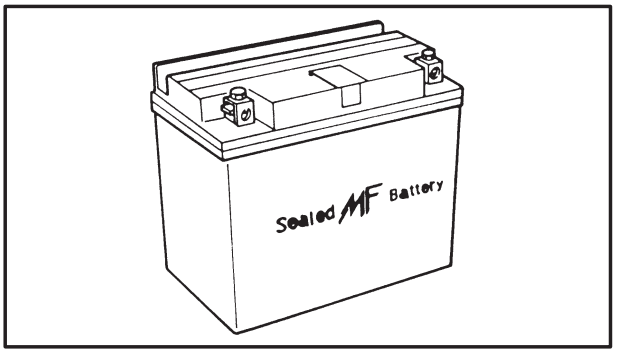
CHECKING AND CHARGING THE BATTERY

⚠ WARNING

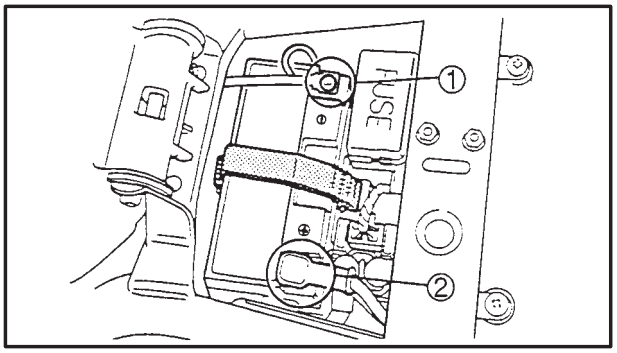
Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid.
Therefore, always follow these preventive measures:
- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

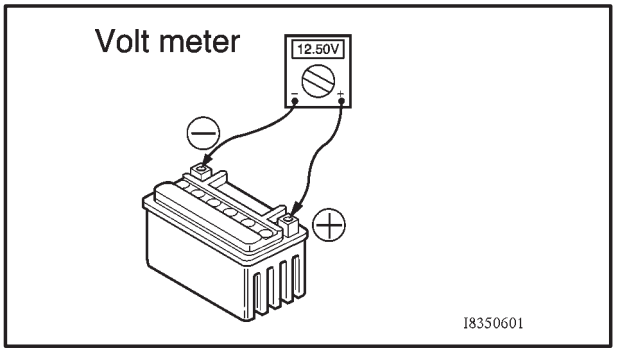
First aid in case of bodily contact:
External
- **SKIN – Wash with water.**
- **EYES – Flush with water for 15 minutes and get immediate medical attention.**

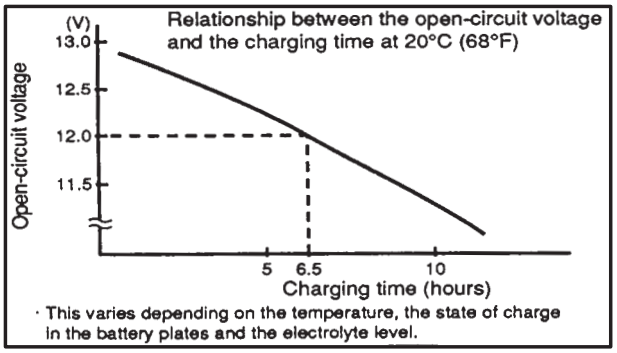
Internal
Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

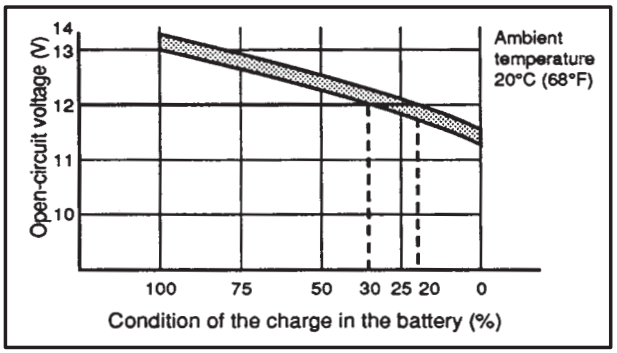


CAUTION:
- **This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for a MF battery are different from those of conventional batteries. The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









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

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a. Connect a digital voltmeter to the battery terminals.

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

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

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

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

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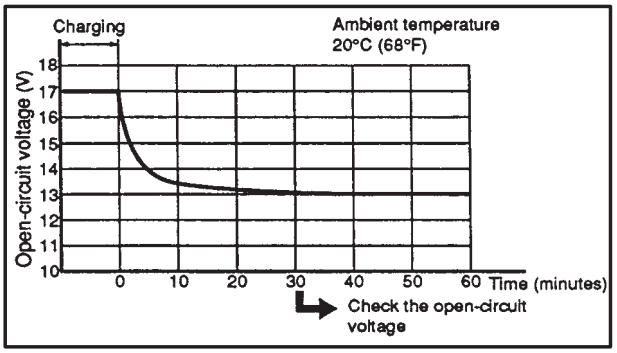
5. Charge:
   ° battery
   (refer to the appropriate charging method illustration)

⚠ WARNING

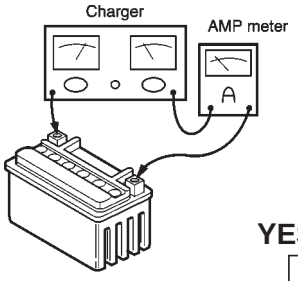
Do not quick charge a battery.

⚠ WARNING

- **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.**
- **When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative lead from the battery terminal.)**
- **To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.**
- **Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.**
- **Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**
- **As shown in the following illustration, the open-circuit voltage of 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



Measure the open-circuit voltage prior to charging.

NOTE:
Voltage should be measured 30 minutes after the machine is stopped.

Connect a charged and AMP meter to the battery and start charging.

NOTE:
Set the charging voltage at 16 × 17 V. (If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.)

Make sure that the current is higher than the standard charging current written on the battery.

YES

NO

By turning the charging voltage adjust dial, set the charging voltage at 20 × 24 V.

Monitor the amperage for 3 × 5 minutes to check if the standard charging current is reached.

YES

Adjust the voltage so that the current is at the standard charging level.

NO

If the current does not exceed the standard charging current after 5 minutes, replace the battery.

Set the time according to the charging time suitable for the open-circuit voltage.
Refer to “Battery condition checking steps”.

If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.
12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

Charging method using a constant-voltage type charger

Measure the open-circuit voltage prior to charging.

NOTE:
Voltage should be measured 30 minutes after the machine is stopped.

Connect a charger and AMP meter to the battery and start charging.

Make sure that the current is higher than the standard charging current written on the battery.

YES

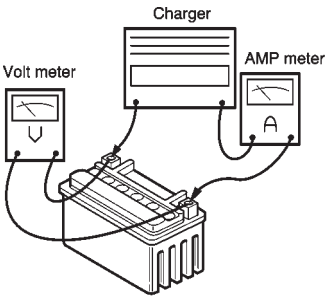
Charge the battery until the battery's charging voltage is 15 V. Charge the battery until the battery's charging voltage is 15 V.

NOTE:
Set the charging time at 20 hours (maximum).

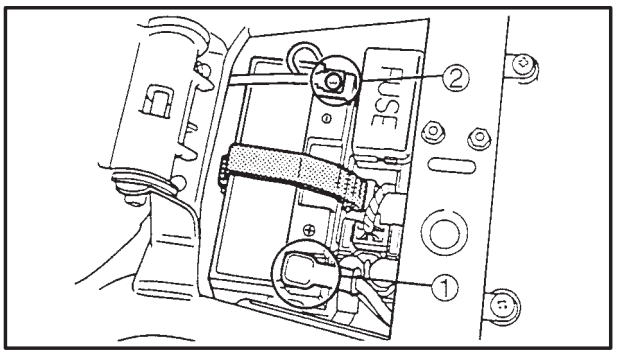
Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.
12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

NO

This type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.



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



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

CAUTION:

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

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

	Recommended lubricant **Dielectric grease**

10. Install:
    ° seat

EB305040
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

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

NOTE:

Se the pocket tester selector to "Ω × 1".

	Pocket tester **96890-03112**

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

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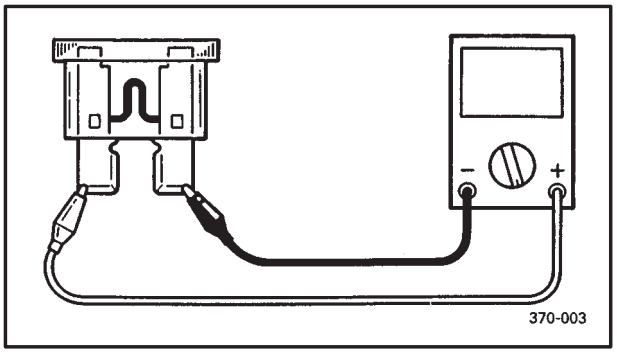

3. Replace:
   ° blown fuse

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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.

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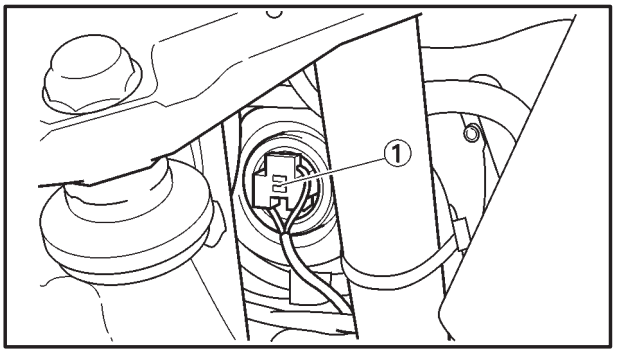
Fuses	Amperage rating	Quantity
Main fuse	30 A	1
Headlight fuse	20 A	1
Signaling system fuse	20 A	1
Ignition fuse	20 A	1
Radiator fan fuse	5 A	1
Reserve fuse	30 A	1
	20 A	1
	10 A	1

⚠ WARNING

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

4. Install:
   ° seat

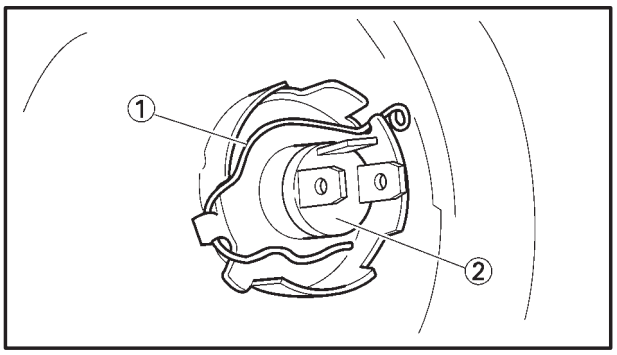


EB305051

REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

1. Disconnect:
   ° headlight lead ①



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

⚠ WARNING

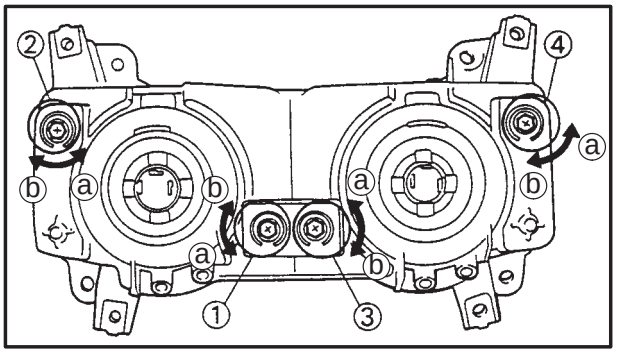
Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

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



EB305061

ADJUSTING THE HEADLIGHT BEAMS

The following procedure applies to both of the headlights.

1. Adjust:
   ° headlight beam (vertically)

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a. Turn the adjusting screw ① ③ in direction ⓐ or ⓑ.

Direction ⓐ →	**Headlight beam is raised.**
Direction ⓑ →	**Headlight beam is lowered.**

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2. Adjust:
   ° headlight beam (horizontally)

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a. Turn the adjusting knob ② ④ in direction ⓐ or ⓑ.
   Left headlight ②

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

Right headlight ④

Direction ⓐ →	**Headlight beam moves to the left.**
Direction ⓑ →	**Headlight beam moves o the right.**

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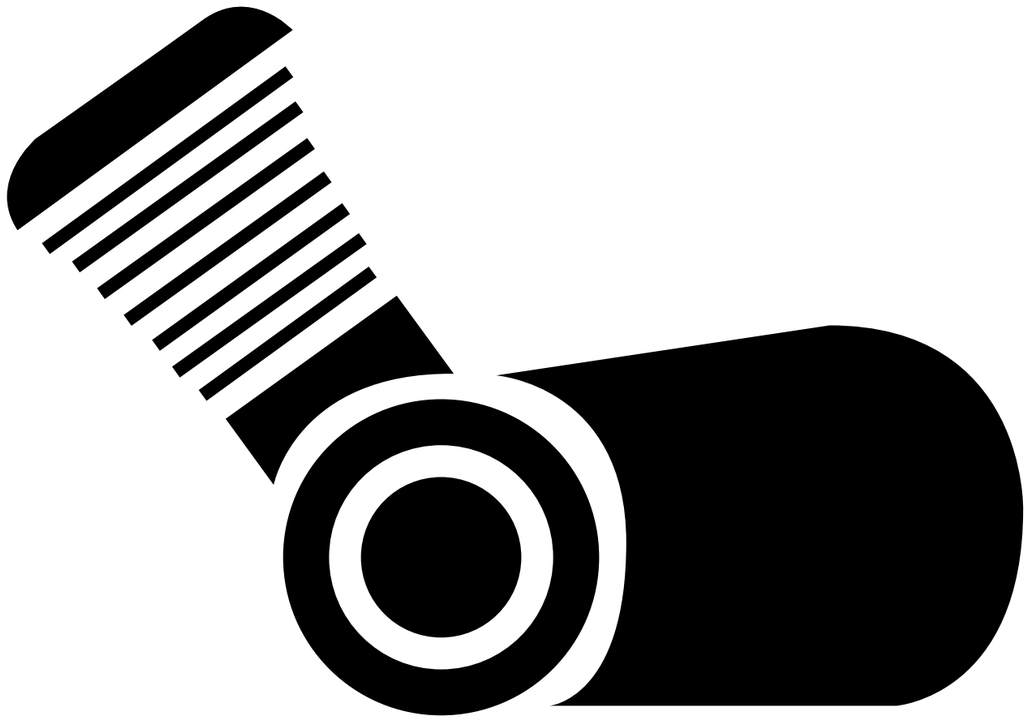

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4

CHAPTER 4
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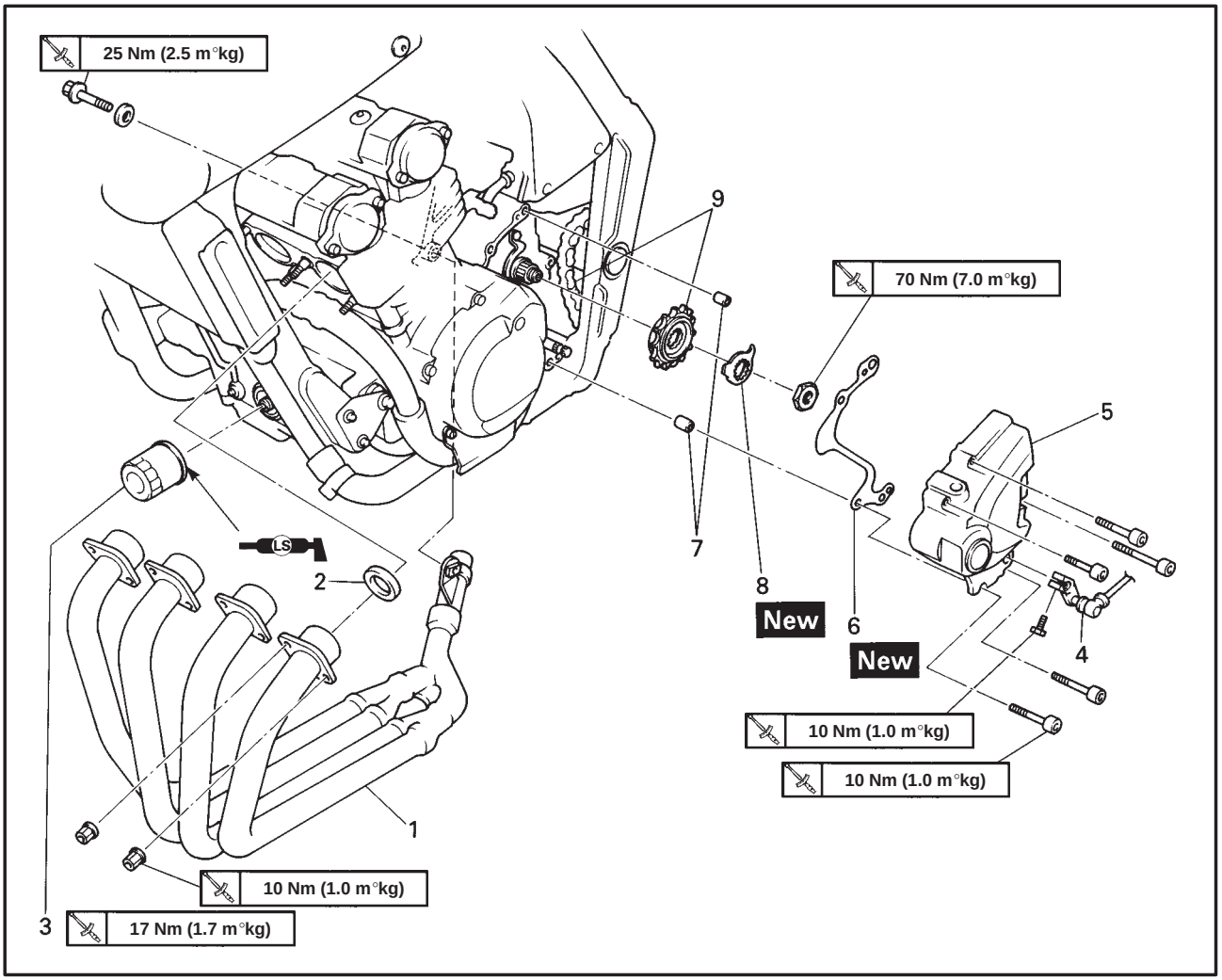
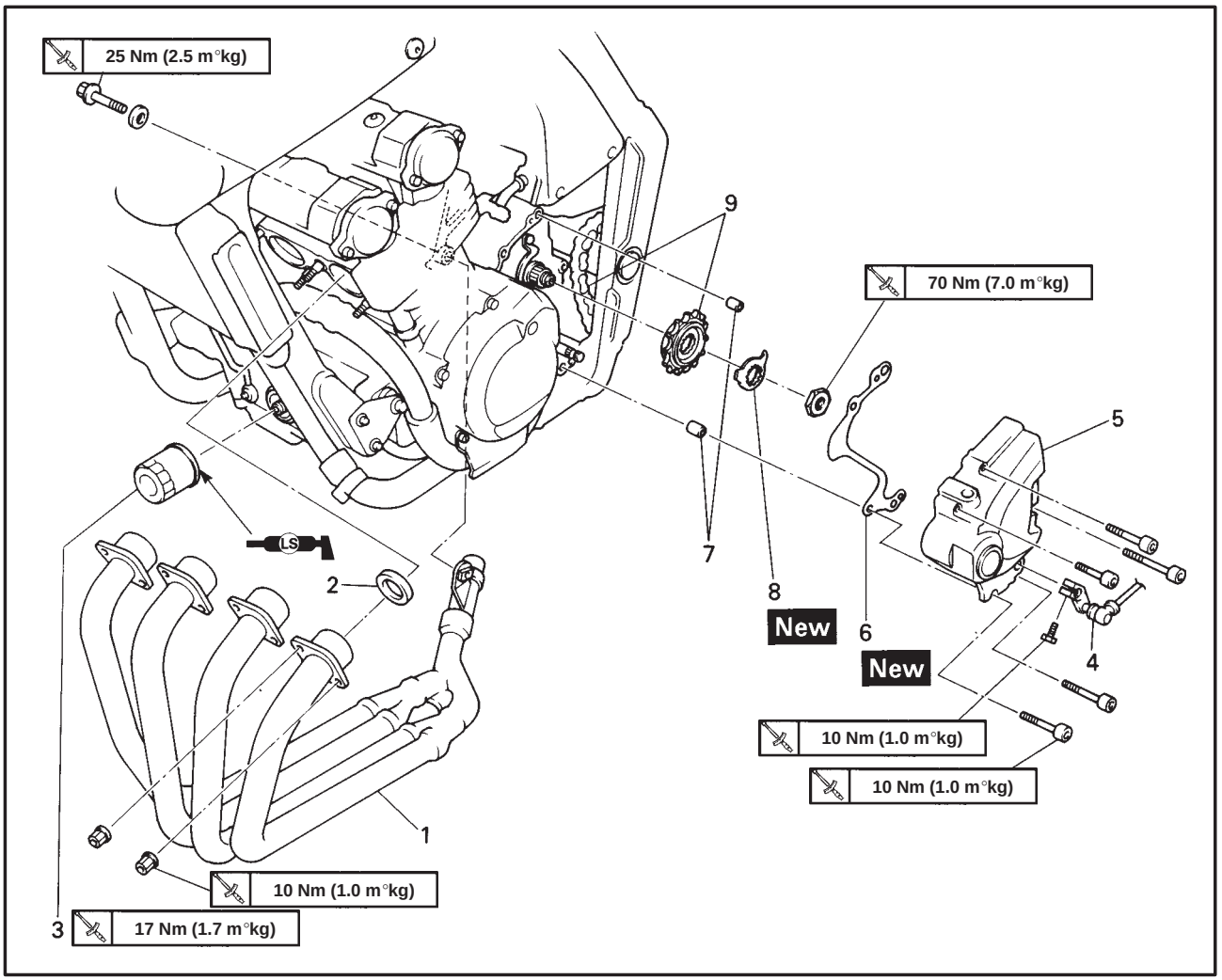
OVERHAULING THE ENGINE

REMOVING THE ENGINE

DRIVE SPROCKET AND EXHAUST PIPE

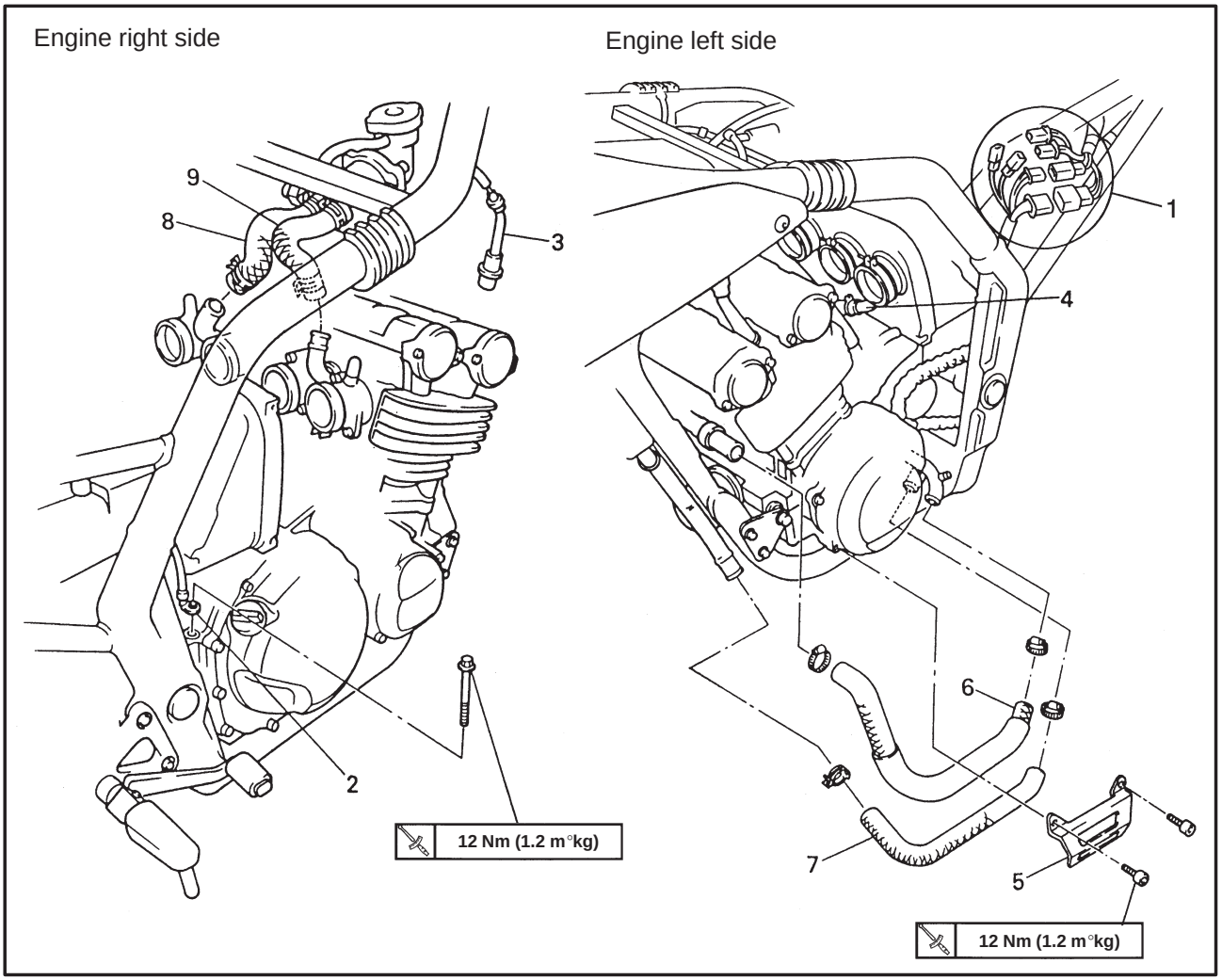


Order	Job name/Part name	Q'ty	Remarks
	Removing the drive sprocket and exhaust pipe		Remove the parts in the order listed.
	Drain the coolant		
	Drain the engine oil		Refer to "CHANGING THE ENGINE OIL" section in capter 3.
	Front cowling		Refer to "FRONT COWLING/SEAT/SIDE COVER/FUEL TANK" section in chapter 3.
	Fuel tank		
	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	



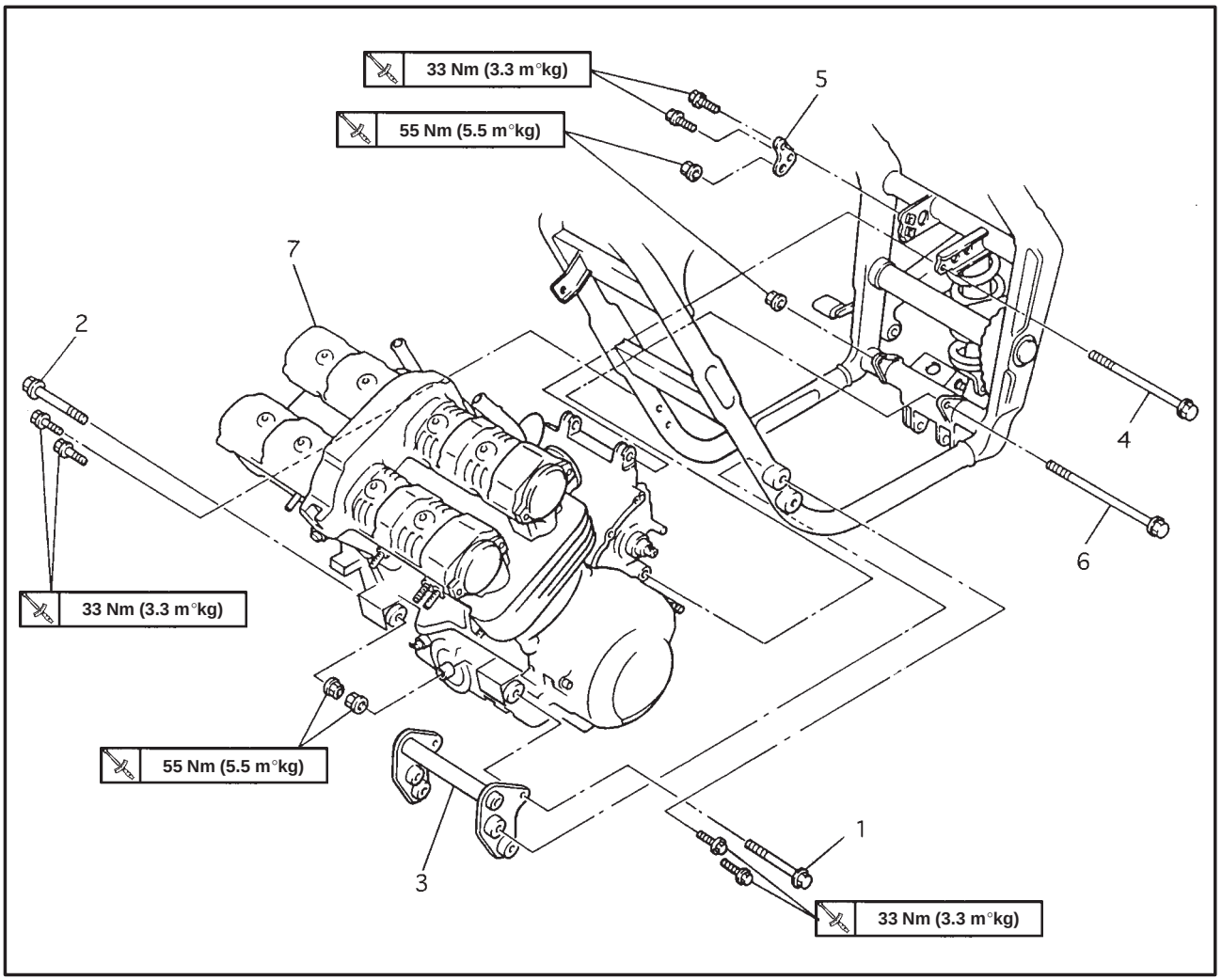
Order	Job name/Part name	Q'ty	Remarks
4	Shift arm	1	Refer to "INSTALLING THE ENGINE" section.
5	Drive sprocket cover	1	
6	Drive chain sprocket gasket	1	
7	Dowel pin	2	
8	Lock washer	1	
9	Drive sprocket/Drive chain	1/1	
			For installation, reverse the removal procedure.

LEADS AND HOSES

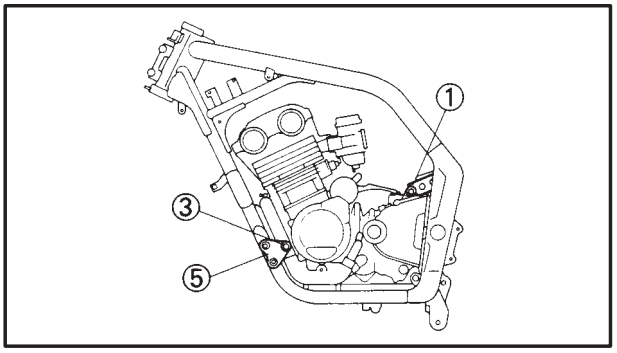


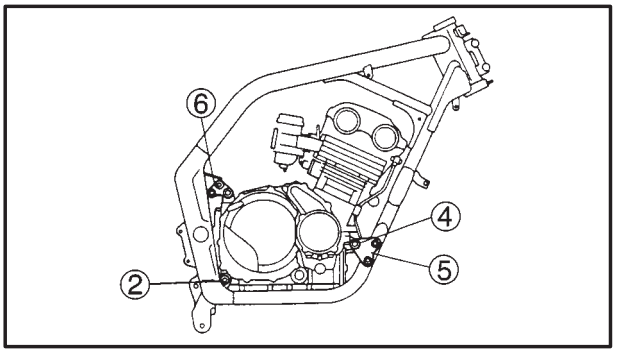
Order	Job name/Part name	Q'ty	Remarks
	Disconnecting the leads and hoses		Disconnect the parts in the order listed.
1	Magneto/sidestand/neutral/engine oil level switch lead	1/1/1/1	
2	Ground lead	1	
3	Plug cap	4	
4	Crankcase breather hose	1	
5	Cover	1	
6	Water pump outlet hose	1	
7	Radiator outlet hose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

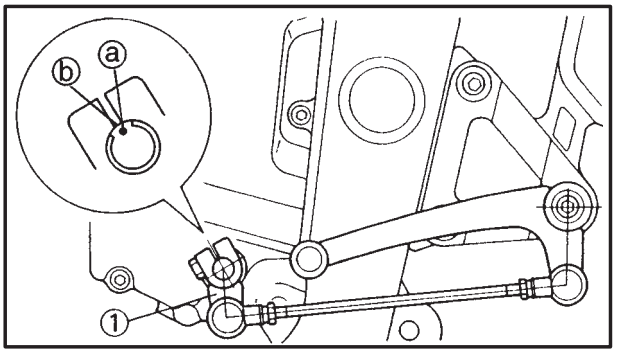
ENGINE BRACKET AND ENGINE



Order	Job name/Part name	Q'ty	Remarks
	Removing the engine bracket and engine		Remove the parts in the order listed.
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" section.
5	Engine bracket (rear right)	1	
6	Engine mounting bolt (rear lower)	1	
7	Engine	1	
			For installation, reverse the removal procedure.







EB400700
INSTALLING THE ENGINE

1. Install:
   ° bolt ①
   ° 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.

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)

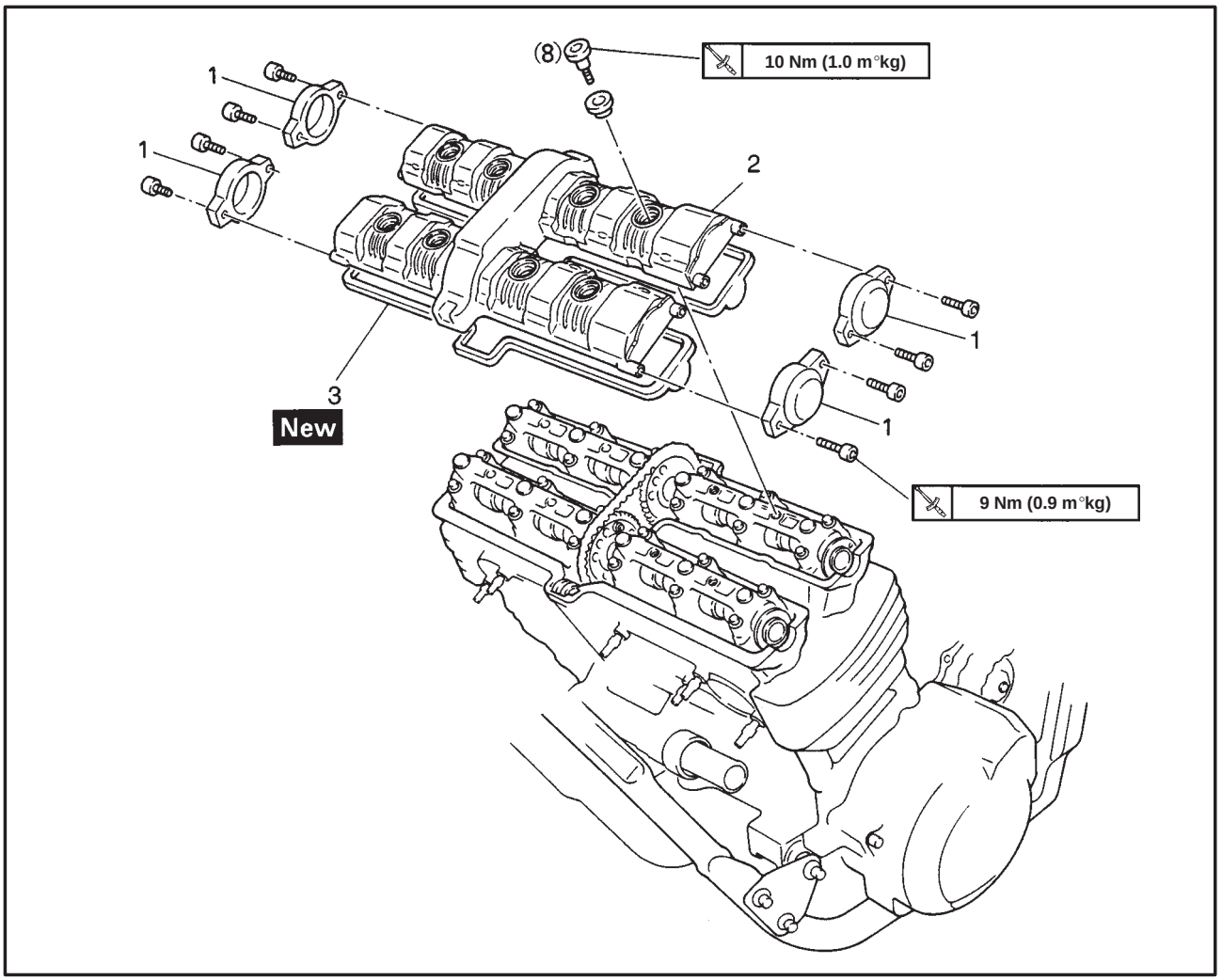
3. Install:
   ° shift arm ①

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

Shift arm bolt
10 Nm (1.0 m°kg)

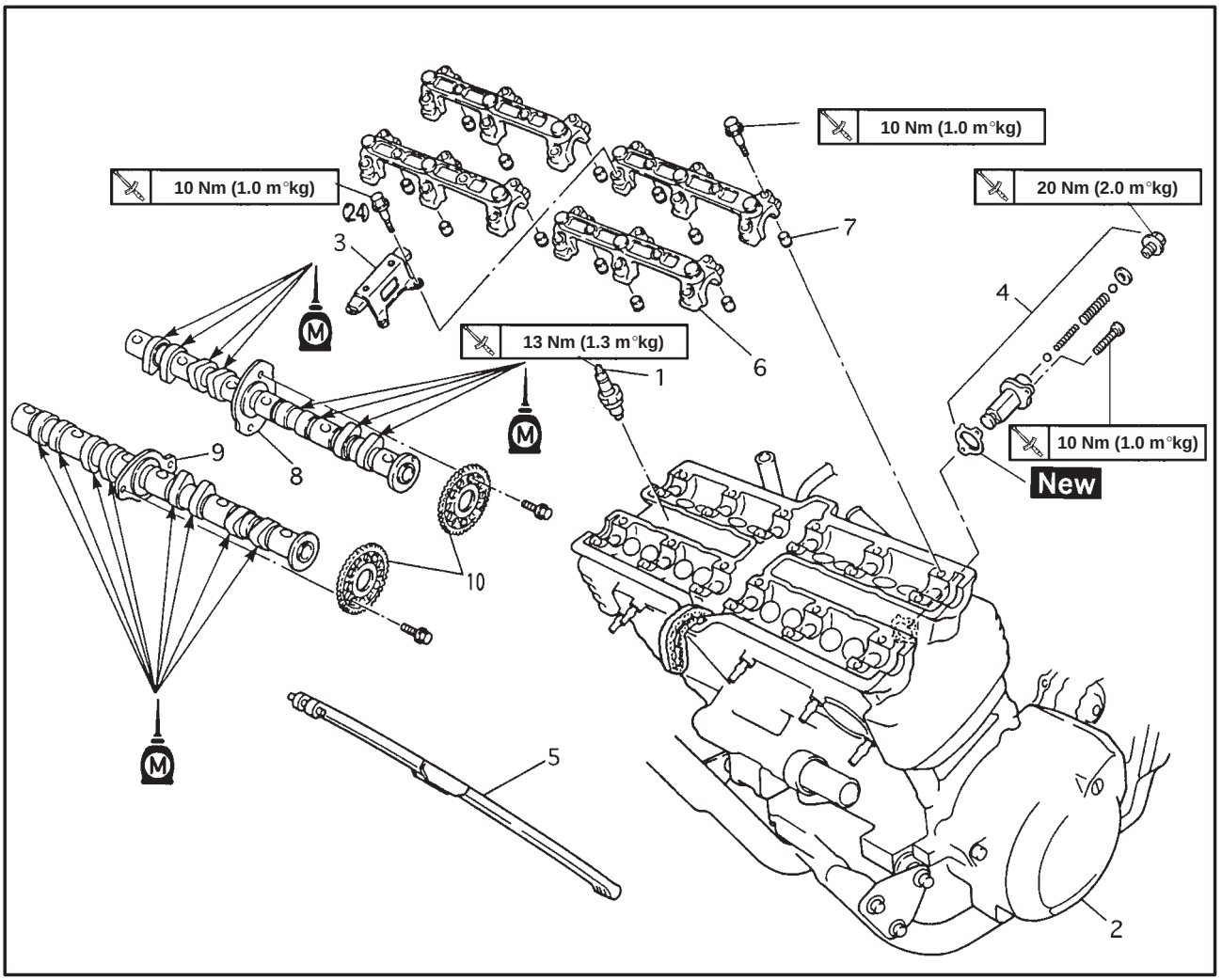
CAMSHAFT

CYLINDER HEAD COVERS

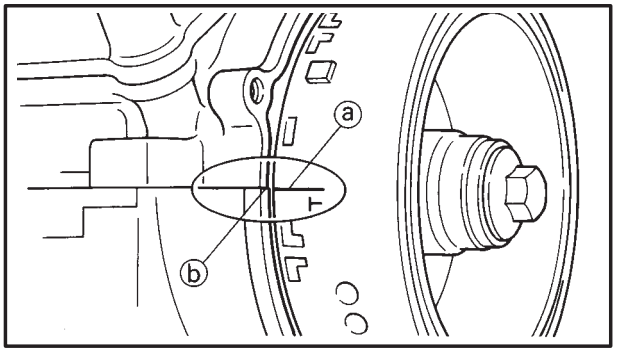


Order	Job name/Part name	Q'ty	Remarks
	Removing the cylinder head cover		Remove the parts in the order listed.
	Front cowling		Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3.
	Seat and fuel tank		
	Drain the coolant		
	Radiator		Refer to "RADIATOR" section in chapter 5.
	Carburetor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

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 CAMSHAFT" section.
6	Camshaft cap	4	
7	Dowel pin	12	
8	Camshaft (intake)	1	
9	Cmashaft (exhaust)	1	
10	Camshaft sprocket	2	
			For installation, reverse the removal procedure.



EB401102
REMOVING THE CAMSHAFTS

1. Remove:
   ° magneto cover
2. Align:
   ° "T" mark on the magneto rotor
   (with the stationary pointer on the crankcase)

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

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

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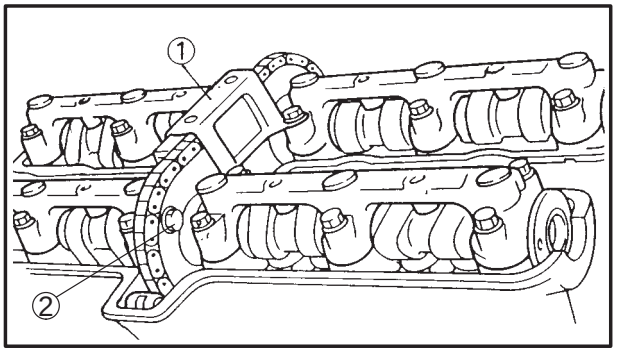
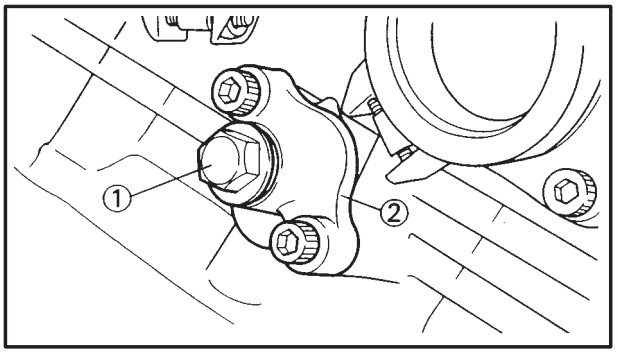
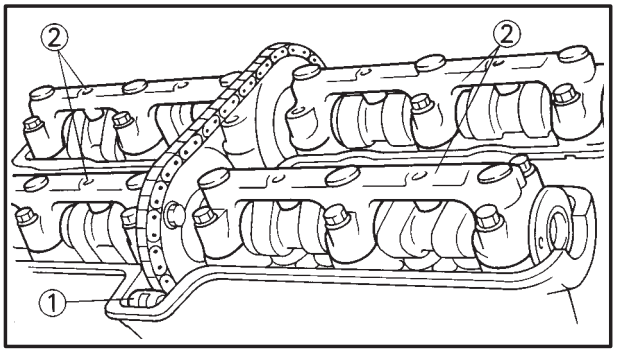


3. Remove:
   ° timing chain guide (top side) ①
4. Loosen:
   ° camshaft sprocket bolts ②

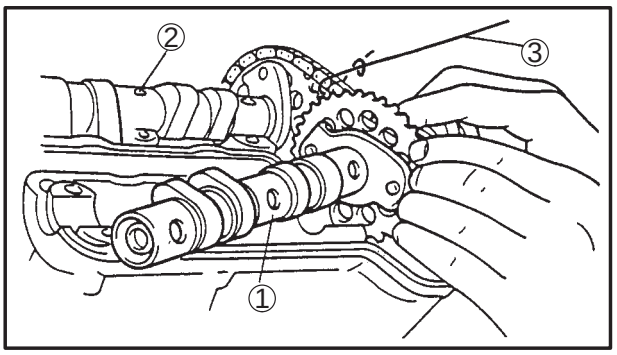


5. Loosen:
   ° timing chain tensioner cap bolt ①
6. Remove:
   ° timing chain tensioner ②



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

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



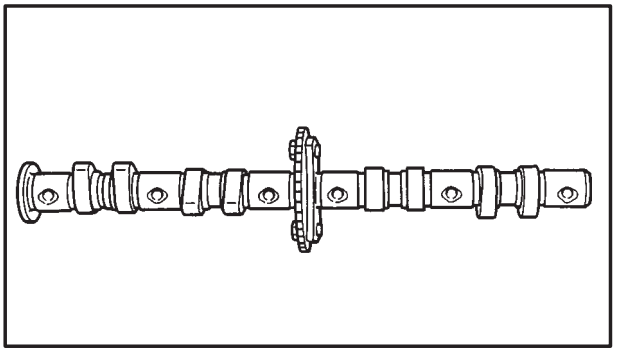
CAUTION:

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:
   ° intake camshaft ①
   ° exhaust camshaft ②

NOTE:

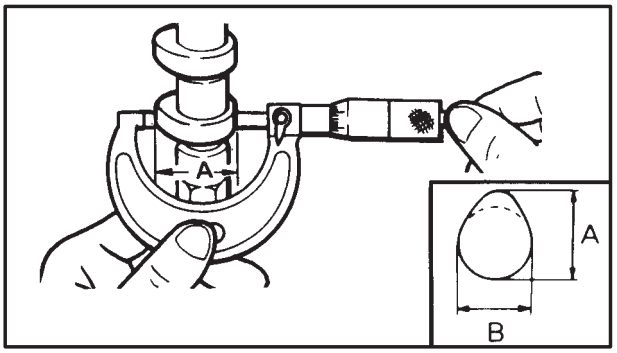
To prevent the timing chain from falling into the crankcase, fasten it with a wire ③.



EB401401

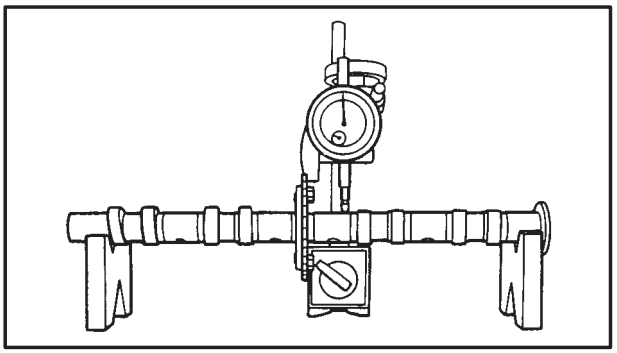
CHECKING THE CAMSHAFTS

1. Check:
   ° camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.



2. Measure:
   ° camshaft lobe dimensions A and B
   Out of specification → Replace the camshaft.

Camshaft lobe dimension limit
Intake
Ⓐ 32.7 mm
Ⓑ 24.95 mm
Exhaust
Ⓐ 32.4mm
Ⓑ 24.9 mm

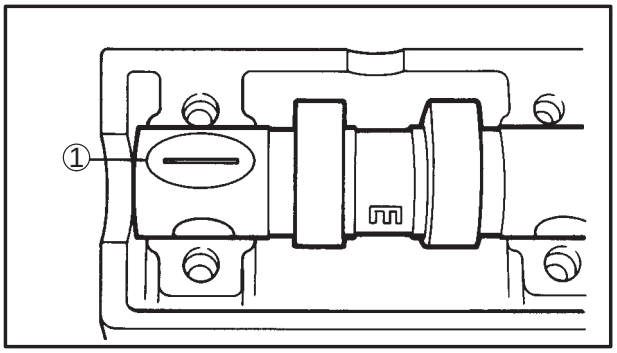


3. Measure:
   ° camshaft runout
   Out of specification → Replace.

Camshaft runout
Less than 0.03 mm

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

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

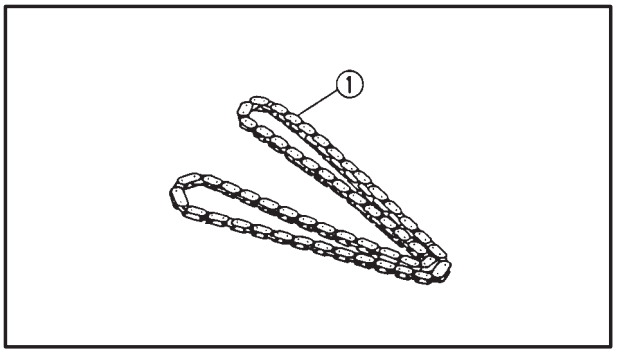
Camshaft cap bolt
10 Nm (1.0 m°kg)

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

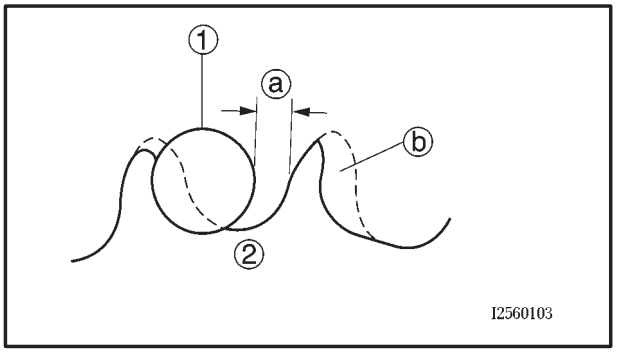
EB401421
CHECKING THE TIMING CHAIN, CAMSHAFT SPFROCKETS, AND TIMING CHAIN GUIDES

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

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



2. Check:
   ° camshaft sprocket
   More than 1/4 tooth ⓐ wear → Replace the camshaft sprockets and the timing chain as a set.

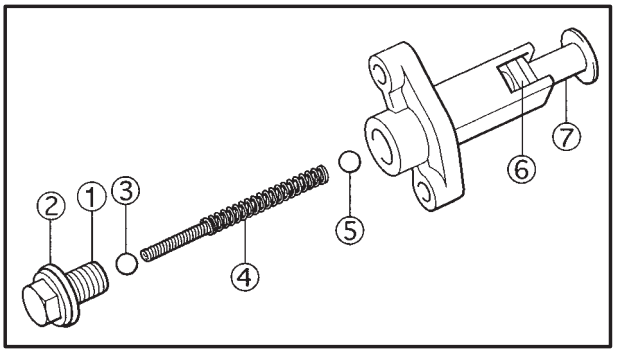


ⓐ 1/4 tooth
ⓑ Correct
① Timing chain roller
② Camshaft sprocket

3. Check:
   ° timing chain guide (exhaust side)
   ° timing chain guide (intake side)
   ° timing chain guide (top side)
   Damage/wear → Replace the defective part(-s).

EB401430
CHECKING THE TIMING CHAIN TENSIONER

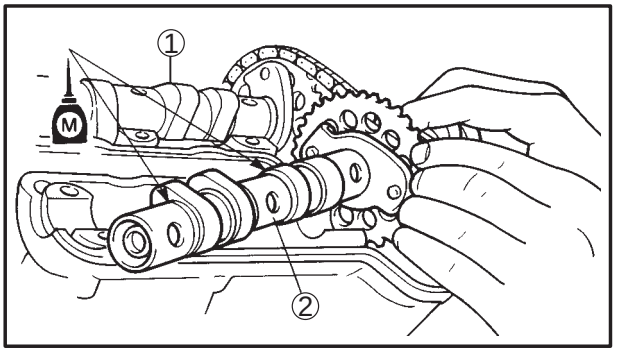
1. Check:
   ° timing chain tensioner
   Cracks/damage → Replace.
2. Check:
   ° one-way cam operation
   Rough movement → Replace the timing chain tensioner housing.
3. Check:
   ° cap bolt ①
   ° copper washer ②
   ° ball ③
   ° spring ④
   ° ball ⑤
   ° one-way cam ⑥
   ° gasket
   ° timing chain tensioner rod ⑦
   Damage/wear → Replace the defective part(-s).



EB401702
INSTALLING THE CAMSHAFTS

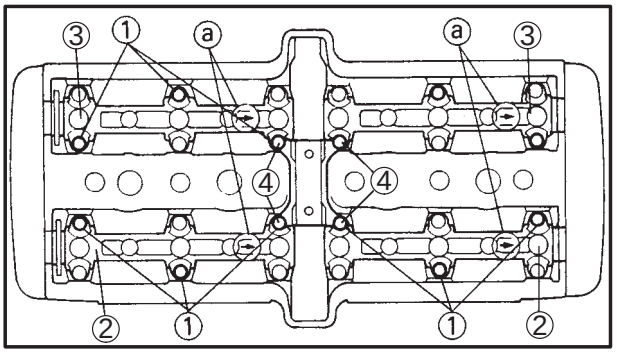
1. Install:
   ° exhaust camshaft ①
   ° intake camshaft ②
   (with the camshaft sprockets temporarily tightened)

   NOTE:
   Install the camshafts with their punch marks facing up.



2. Install:
   ° dowel pins ①
   ° intake camshaft caps ②
   ° exhaust camshaft caps ③

   NOTE:
   Install the camshaft cap with the arrow mark ⓐ pointing towards the right side of the engine.



3. Install:
   ° camshaft cap bolts

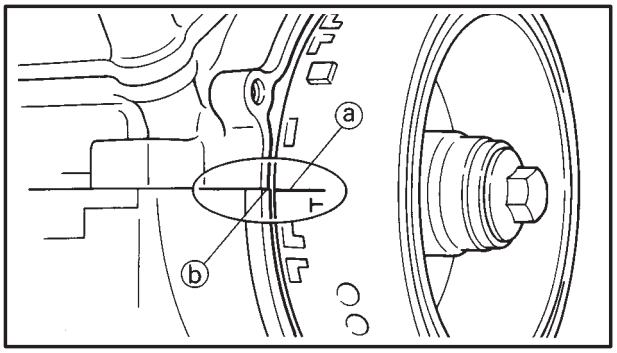
   NOTE:
   ° Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
   ° Do not install the designated camshaft cap bolts ④ at this stage.

CAUTION:

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

	Camshaft cap bolt **10 Nm (1.0 m°kg)**

4. Install:
   ° intake camshaft sprocket
   ° exhaust camshaft sprocket



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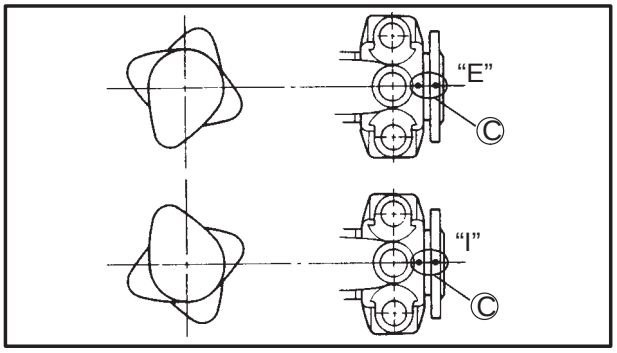
a. Turn the crankshaft counterclockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark ⓐ on the magneto rotor with the stationary pointer ⓑ on the crankcase.
c. Install the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.



NOTE:

° 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 ⓐ and ⓑ are aligned.

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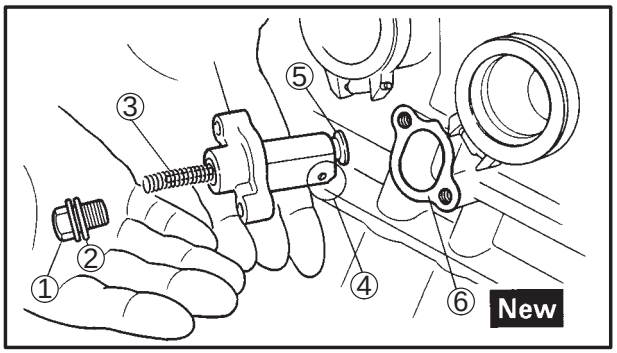
5. Install:
   ° timing chain guide (exhaust side)
6. Install:
   ° timing chain tensioner



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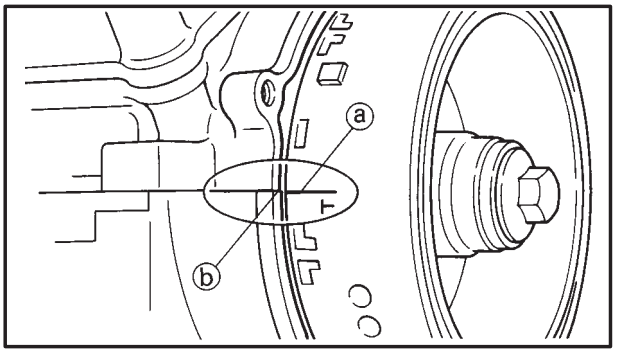
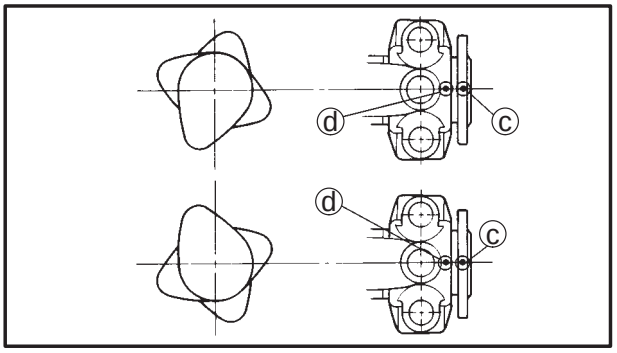
a. Remove the cap bolt ①, washer ②, and springs ③
b. Release the timing chain tensioner one-way cam ④ and push the timing chain tensioner rod ⑤ all the way into the timing chain tensioner housing.
c. Install the timing chain tensioner and gasket ⑥ onto the cylinder block.





⚠ 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.

Cap bolt
20 Nm (2.0 m°kg)

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 ⓑ 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

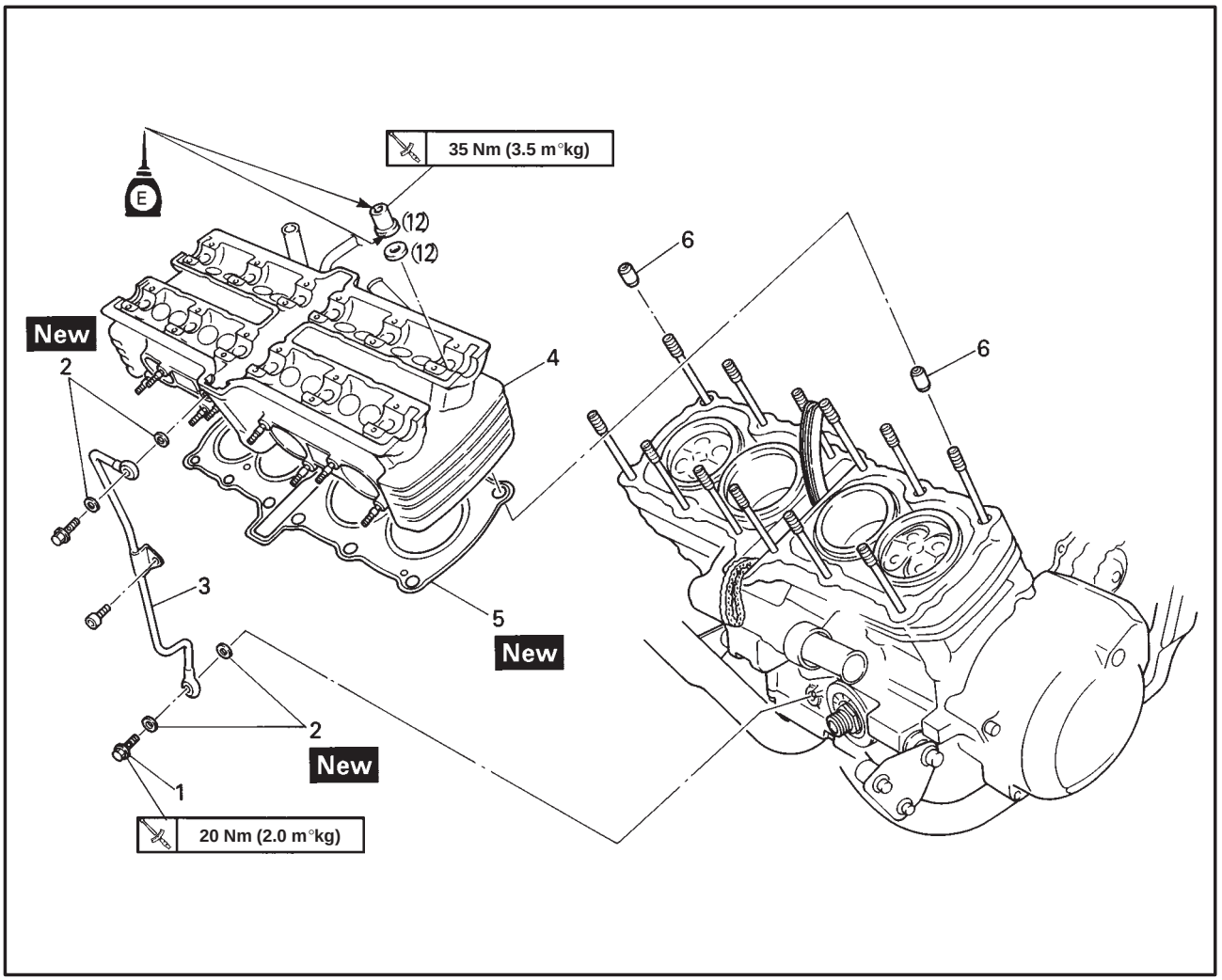
CAUTION:

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.

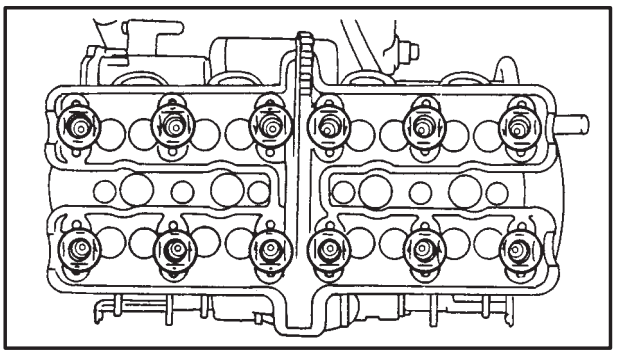
Camshaft sprocket bolt
24 Nm (2.4 m°kg)

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

CYLINDER HEAD



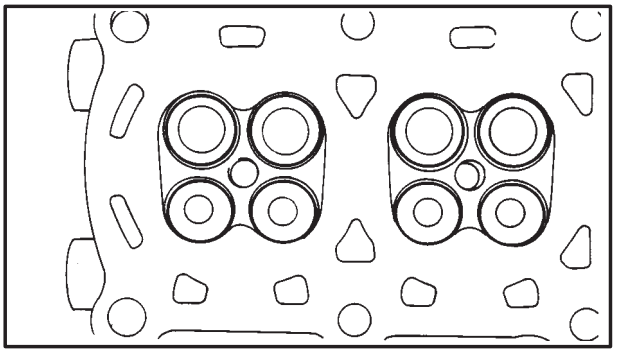
Order	Job name/Part name	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Camshaft		Refer to "CAMSHAFT"section.
1	Union bolt	2	
2	Copper washer	4	
3	Oil delivery pipe	1	
4	Cylinder head	1	Refer to "REMOVING/INSTALLING THE
5	Cylinder head gasket	1	CYLINDER HEAD" section.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



EB402101
REMOVING THE CYLINDER HEADS

1. Remove:
   ° cylinder head nuts

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

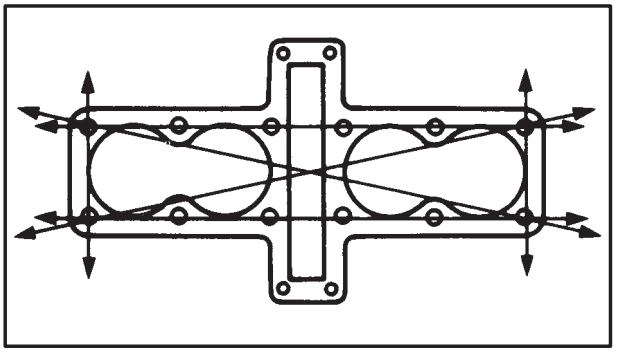


EB402403
CHECKING THE CYLINDER HEADS

The following procedure applies to all of the cylinder heads.

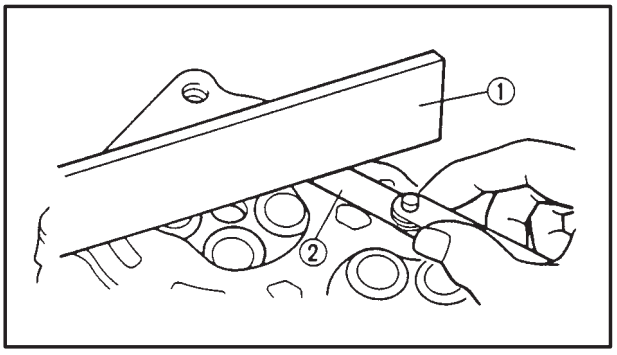
1. Eliminate:
   ° carbon deposits
   (from the combustion chambers with a pounded scraper)

NOTE:
Do not use a sharp instument to avoid damaging or scratching:
° spark plug threads
° valve seats



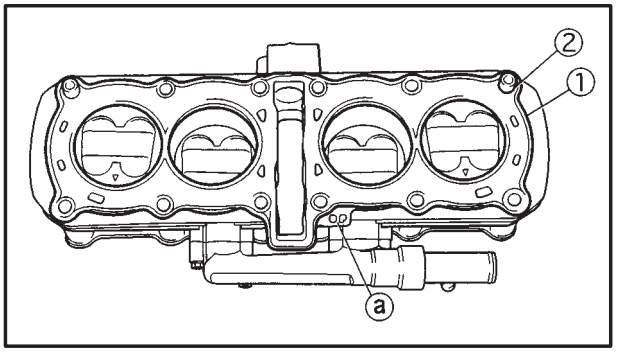
2. Check:
   ° cylinder head
   Damage/scratches → Replace.
   ° cylinder head water jacket
   Mineral deposits/rust → Eliminate.
3. Measure:
   ° cylinder head warpage
   Out of specification → Resurface the cylinder head.

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.

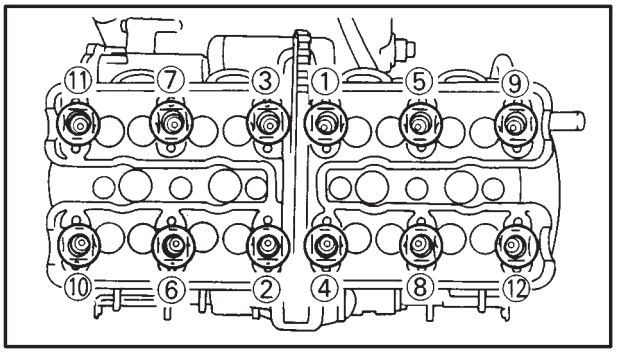
NOTE:
To ensure an even surface, rotate the cylinder head several times.



EB402702
INSTALLING THE CYLINDER HEAD

1. Install:
   ° gasket (New) ①
   ° dowel pins ②

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



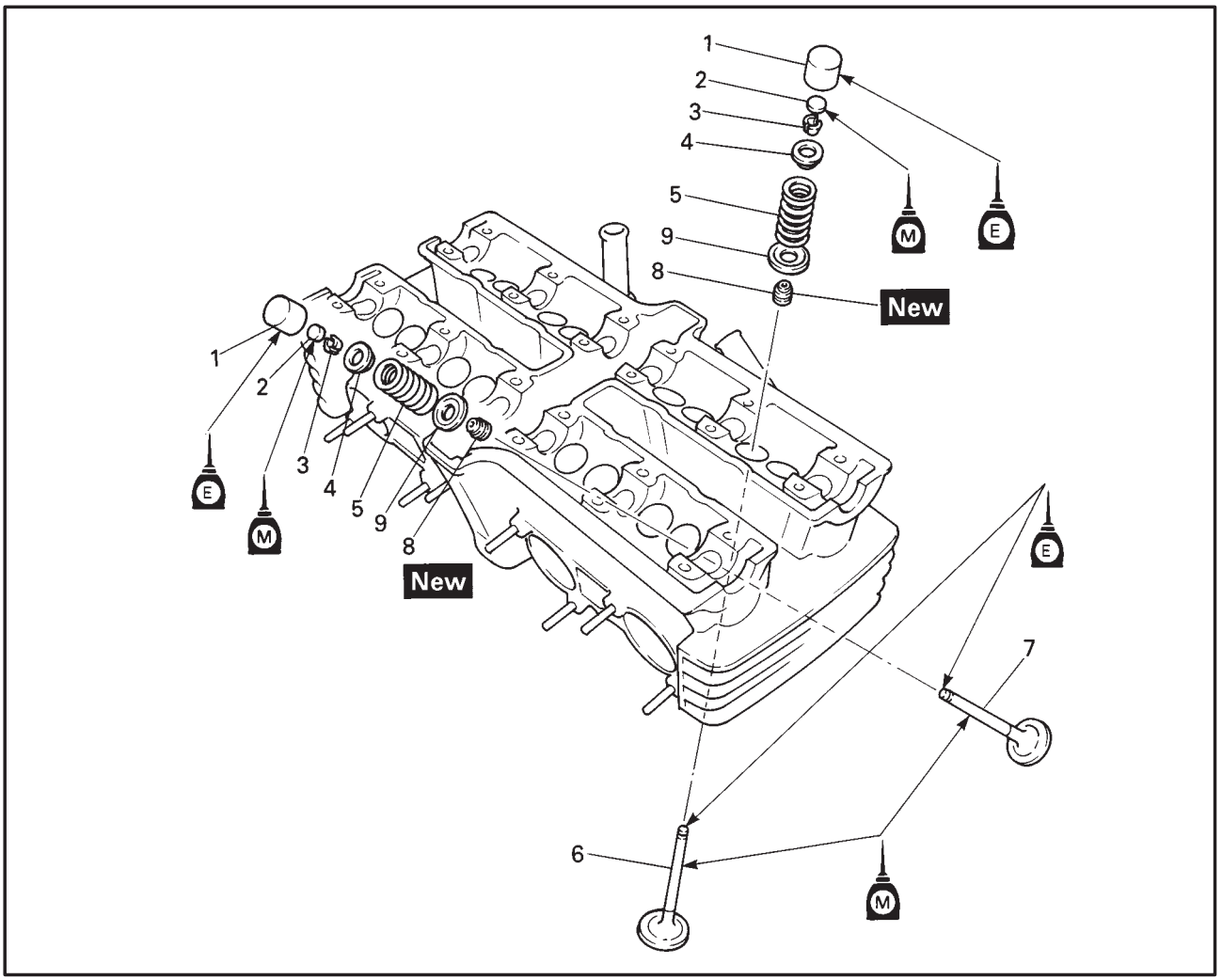
2. Install:
   ° cylinder head

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 CAMSHAFTS".

VALVES AND VALVE SPRINGS



Order	Job name/Part name	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	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 VALVES" section.
5	Valve spring	4	
6	Valve (intake)	2	
7	Valve (exhaust)	2	
8	Oil seal	4	
9	Lower spring seat	4	
			For installation, reverse the removal procedure.

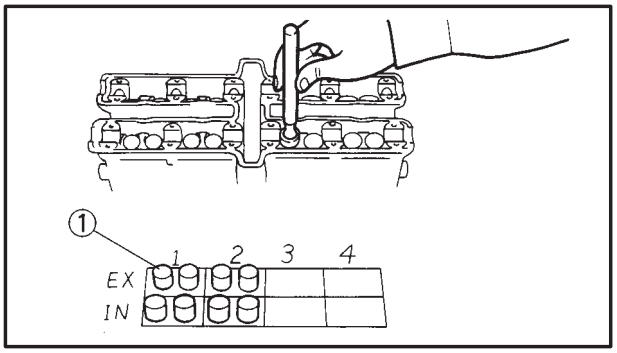
EB403100
REMOVING THE VALVES

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

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

1. Remove:
   ° valve lifter ①
   ° valve pad

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



2. Check:
   ° valve sealing
   Leakage at the valve seat → Check the valve face, valve seat, and valve seat aidth.
   Refer to "CHECKING THE VALVE SEATS".

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

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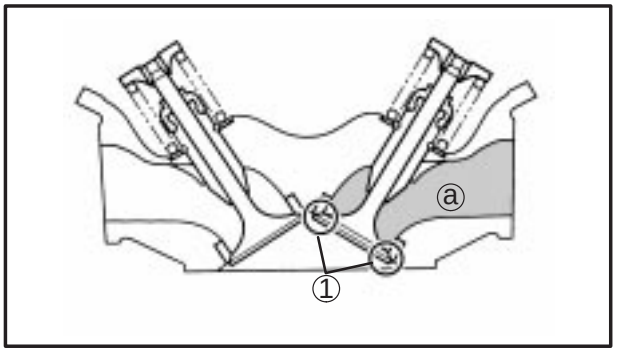
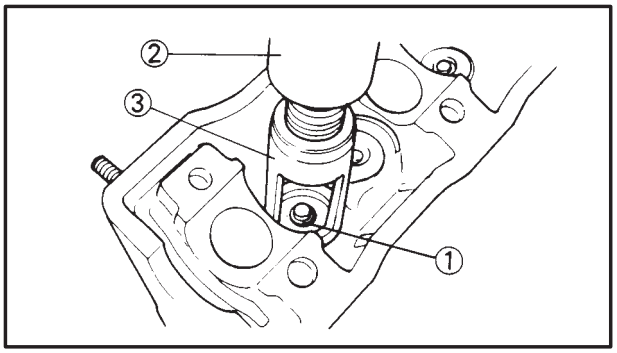
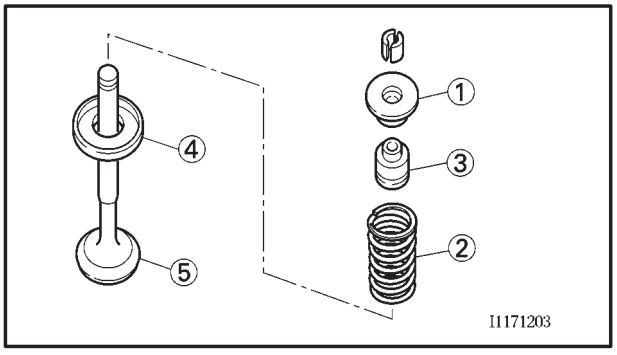




3. Remove:
   ° valve cotters ①

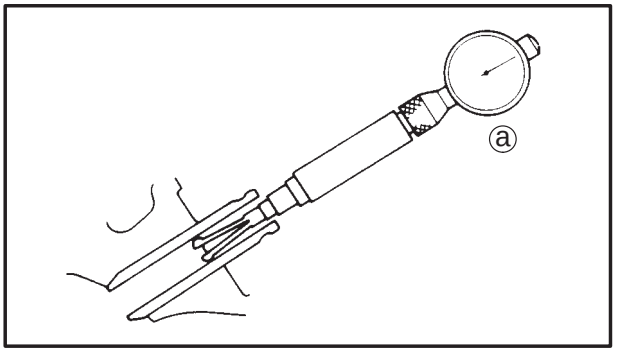
NOTE:
Remove the valve cotters by compressing the valve spring with the valve spring compressor ② and attachment ③.

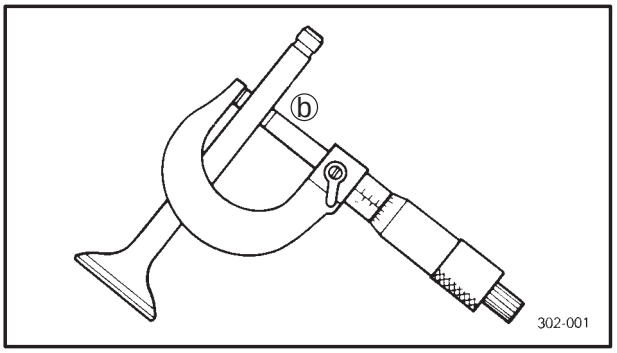
Valve spring compressor
90890-04019
Attachment
90890-04114



4. Remove:
   ° upper spring seat ①
   ° valve spring ②
   ° oil seal ③
   ° lower spring seat ④
   ° valve ⑤

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





EB403400
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

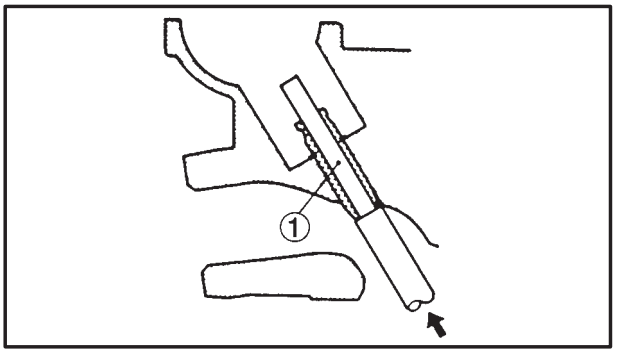
Valve-stem-to-valve-guide clearance =
Valve guide inside diameter ⓐ –
Valve stem diameter ⓑ

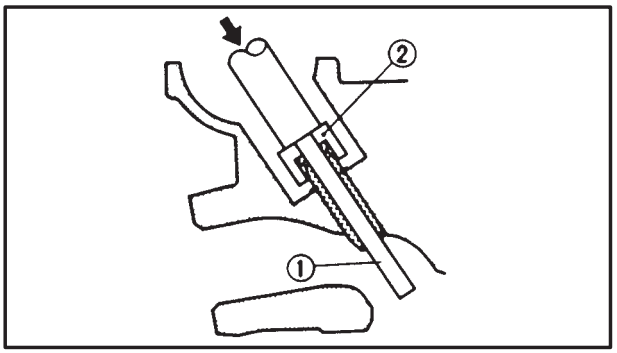
Out of specification → Replace the valve guide.

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°C (212°C) in an oven.



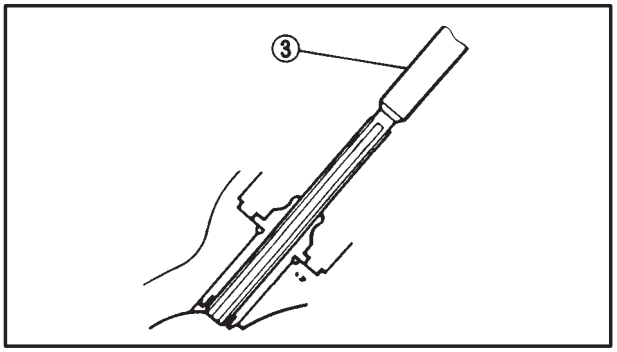


a. Remove the valve guide with a valve guide remover ①.
b. Install the new valve guide with a valve guide installer ② and valve guide remover ①.
c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

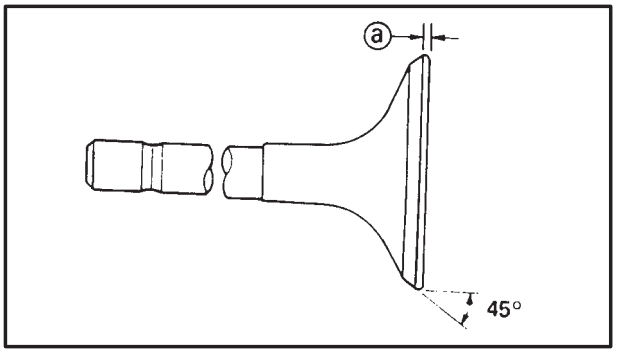
NOTE:
After replacing the valve guide, reface the valve seat.

Valve guide remover (ø4.0 mm)
90890-04111
Valve guide installer (ø4.0 mm)
90890-04112
Valve guide reamer (ø4.0 mm)
90890-04113

3. Eliminate:
   ° carbon deposits
   (from the valve face and valve seat)

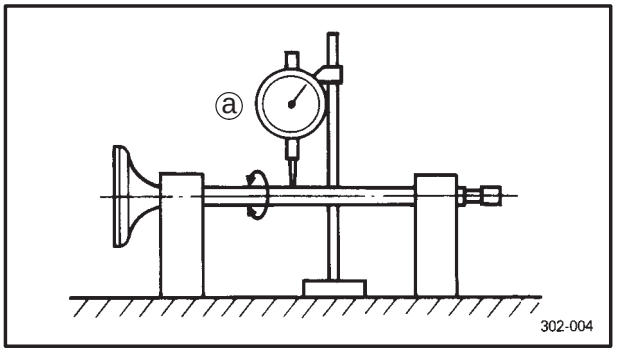


4. Check:
   ° valve face
   Pitting/wear → Grind the valve face.
   ° valve stem end
   Mushroom shape of diameter larger than the body of the valve stem → Replace the valve.



5. Measure:
   ° valve margin thickness ⓐ
   Out of specification → Replace the valve.

Valve margin thickness
0.5 mm



6. Measure:
   ° valve stem runout ⓐ
   Out of specification → Replace the valve.

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

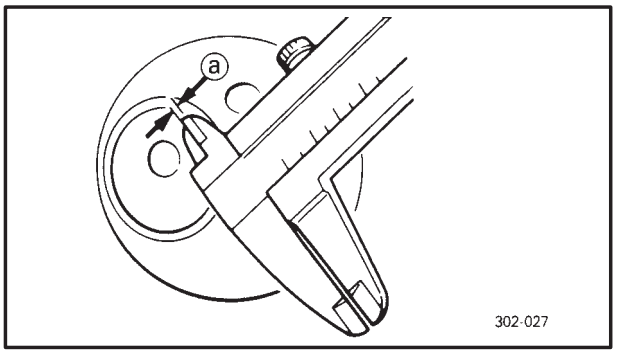
   If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
Limit 0.04 mm

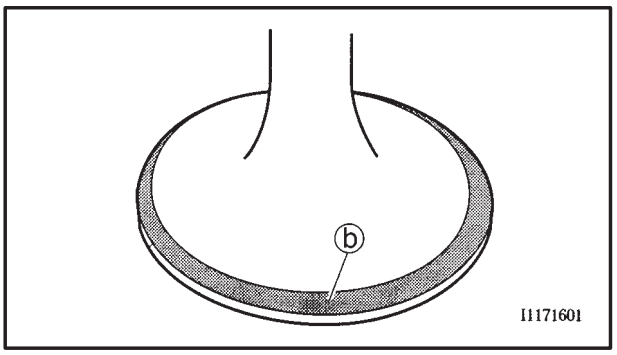
EB403410
CHECKING THE VALVE SEATS

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

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



Valve seat width
Intake: 0.9 × 1.1 mm
(Limit 1.6 mm)
Exhaust: 0.9 × 1.1 mm
(Limit 1.6 mm)

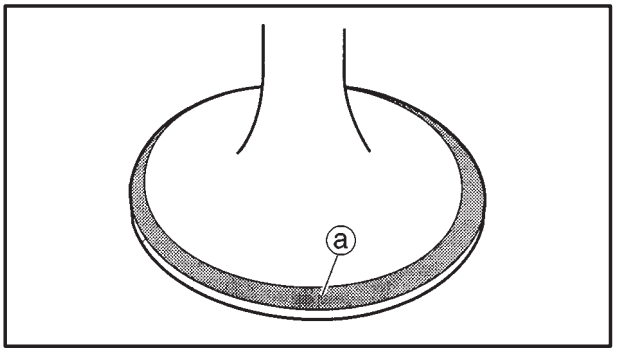


a. Apply Mechanic's blueing dye (Dykem) ⓑ onto the valve face.
b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
d. Measure the valve seat width. Where the valve seat and valve face contacted one another, the blueing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

4. Lap:
° valve face
° valve seat

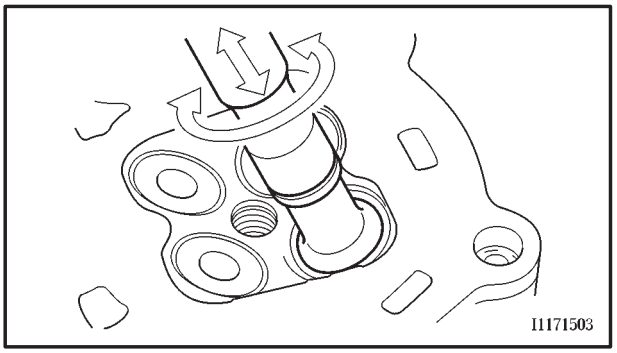
NOTE:
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

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



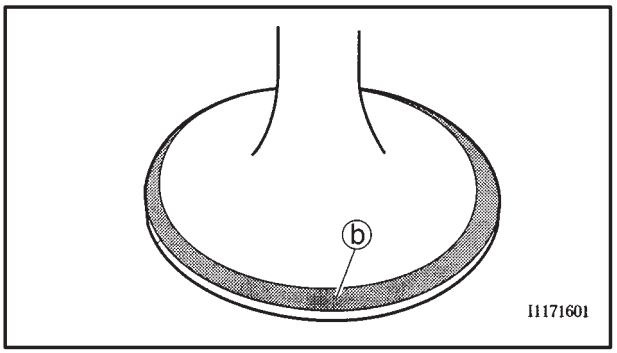
CAUTION:
Do not let the lapping compound enter the gap between the valve stem and the valve guide.

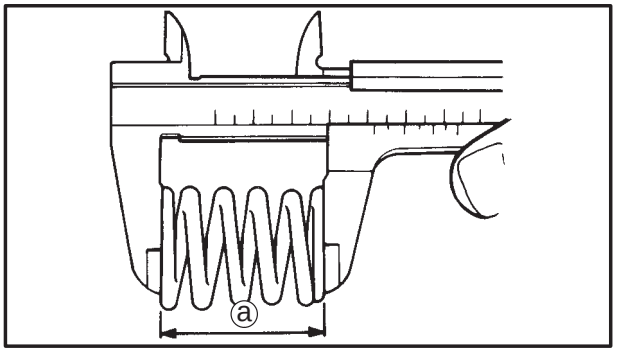
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

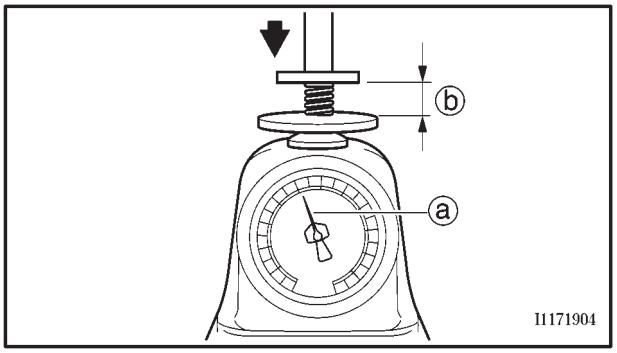


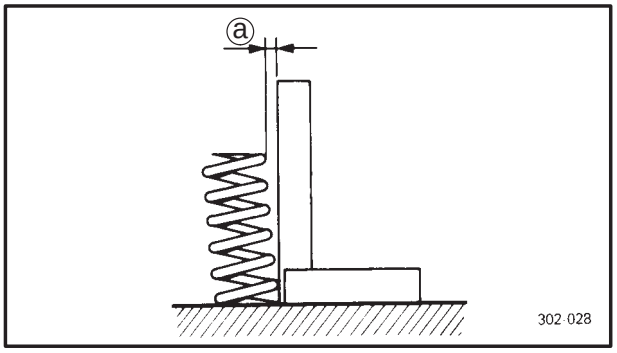
NOTE:
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

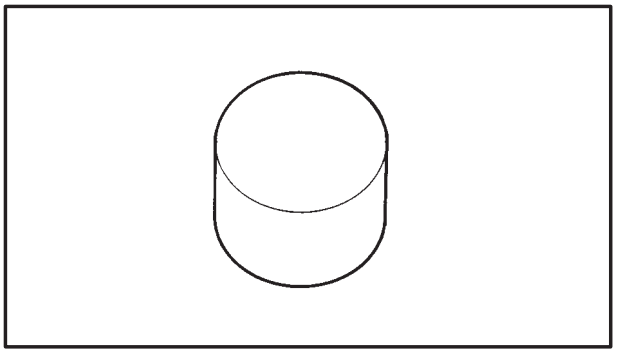
e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply Mechanic's blueing dye (Dykem) ⓑ onto the valve face.
h. Install the valve into the cylinder head.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











EB403420
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.

Valve spring free length (intake and exhaust)
Spring
40.09 mm (Limit 37.5 mm)

2. Measure:
   ° compressed spring force ⓐ
   Out of specification → Replace the valve spring.
   ⓑ Installed length

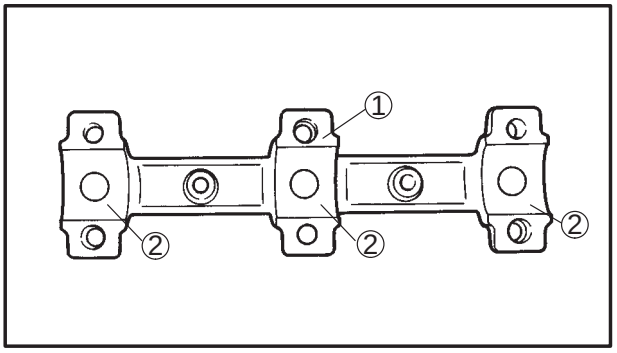
Compressed spring force
Intake and exhaust spring
13,4 × 15,6 kg at 34.5 mm

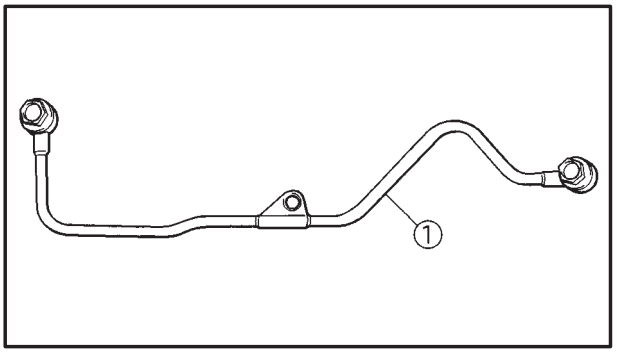
3. Measure:
   ° valve spring tilt ⓐ
   Out of specification → Replace the valve spring.

Spring tilt limit
Intake and exhaust spring
1.8 mm

EB403430
CHECKING THE VALVE LIFTERS
The following procedure applies to all of the valve lifters.

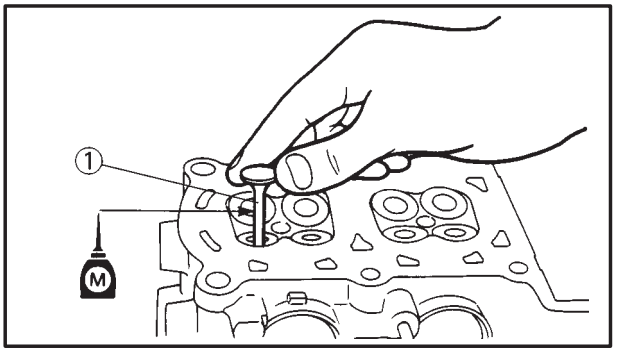
1. Check:
   ° valve lifter
   Damage/scratches → Replace the valve lifters and cylinder head.

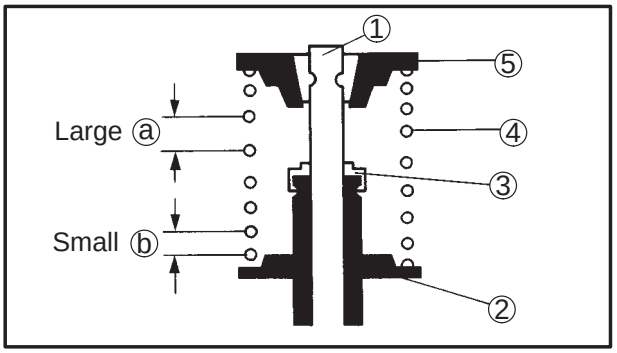


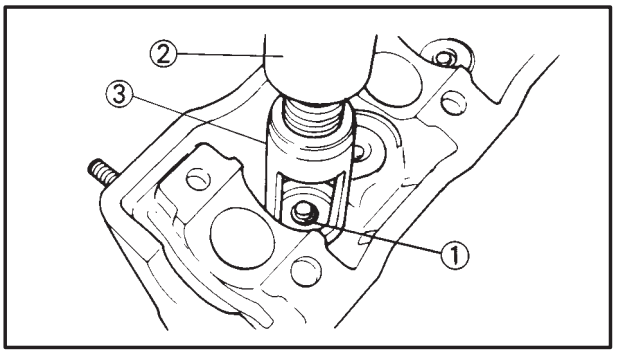


EB403440
CHECKING THE CAMSHAFT CAP

1. Check:
   - ° camshaft case
   - ° camshaft caps ①
     Cracks/damage → Replace th camshaft case and camshaft caps as a set, and check the camshafts (Refer to "CHECKING THE CAMSHAFTS".).
   - ° 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.







EB403700
INSTALLING THE VALVES

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

1. Deburr:
   - ° valve stem end
     (with an oil stone)
2. Lubricate:
   - ° valve stem ①
   - ° oil seal
     (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

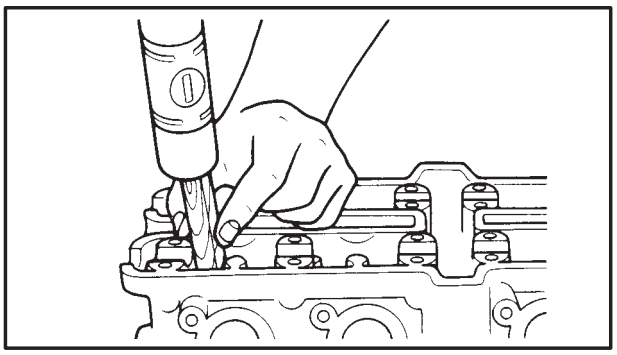
3. Install:
   - ° valve ①
   - ° lower spring seat ②
   - ° oil seal ③
   - ° valve spring ④
   - ° upper spring seat ⑤
     (into the cylinder head)

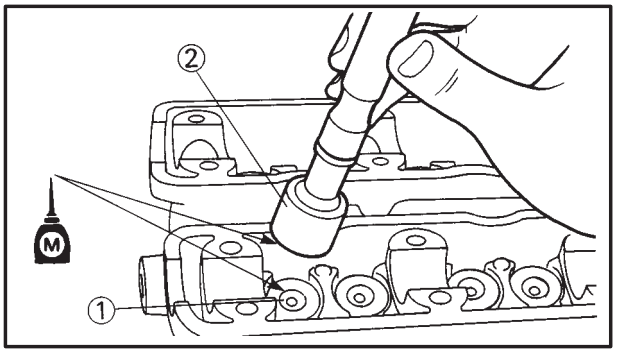
NOTE:
Install the valve spring with the larger pitch ⓐ facing up.

ⓑ Smaller pitch

4. Install:
   - ° valve cotters ①

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





Valve spring compressor
90890-04019
Attachment
90890-04114

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

CAUTION:

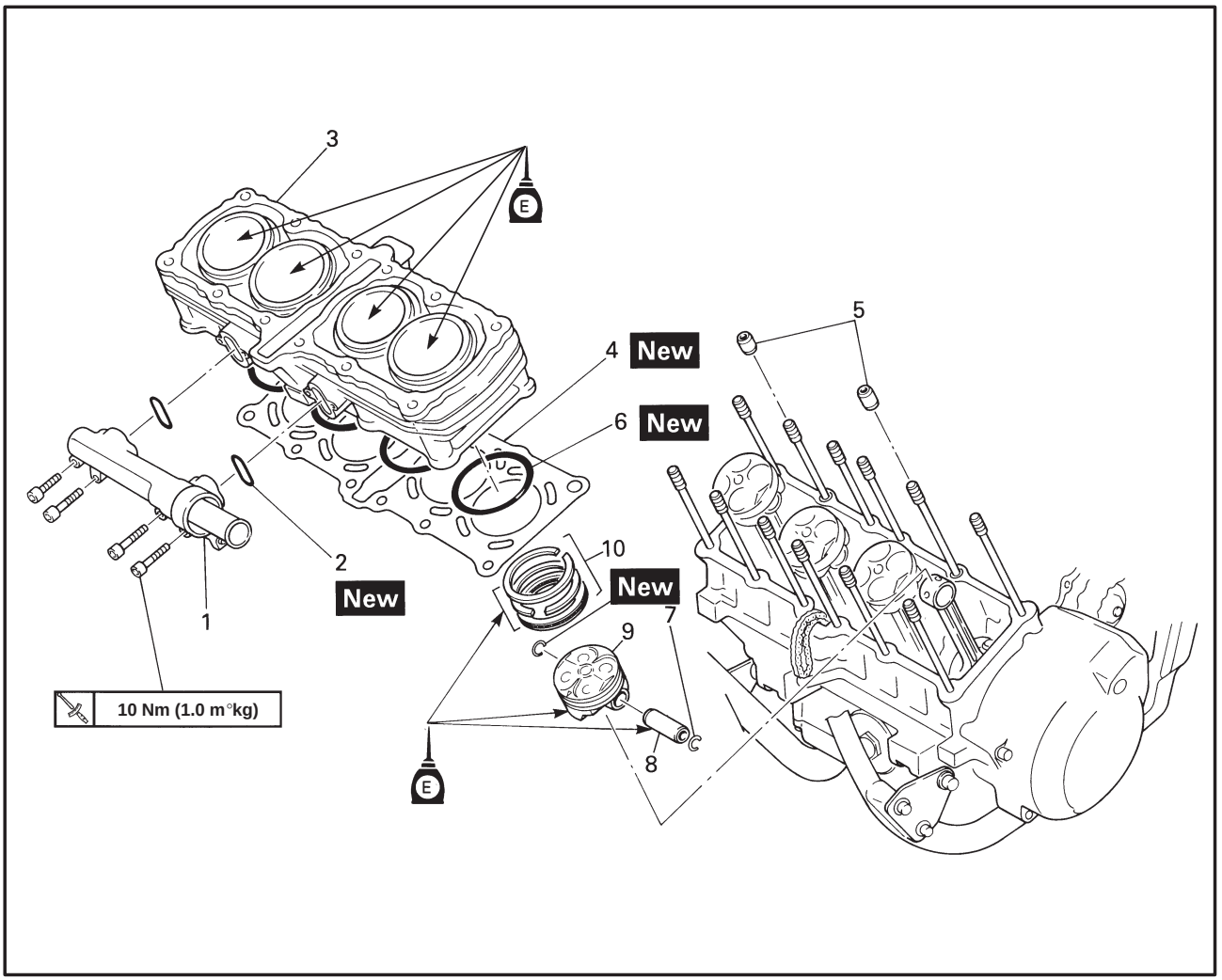
Hitting the valve tip with excessive force could damage the valve.

6. Install:
   - valve pad ①
   - valve lifter ②

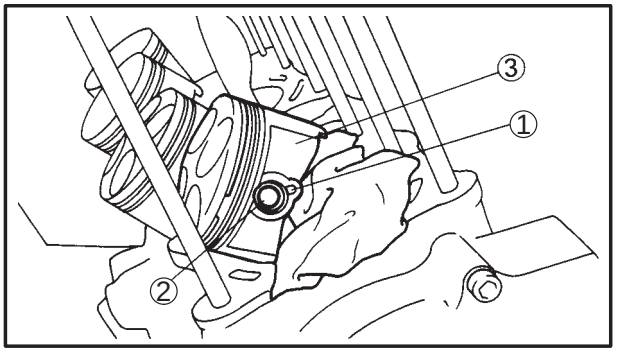
NOTE:

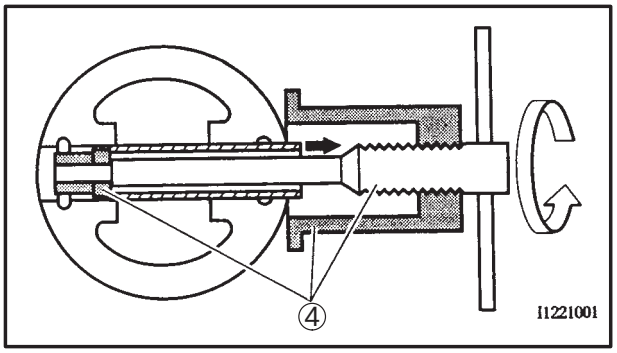
- Apply molybdenum disulfide oil onto the valve lifter and valve pad.
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be re-installed in its original position.

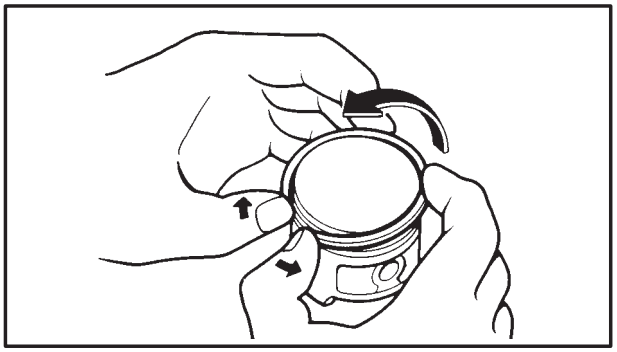
CYLINDER AND PISTON



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







EB404101
REMOVING THE CYLINDERS AND PISTONS

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

1. Remove:
   - ° piston pin clip ①
   - ° piston pin ②
   - ° piston ③

CAUTION:

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

NOTE:

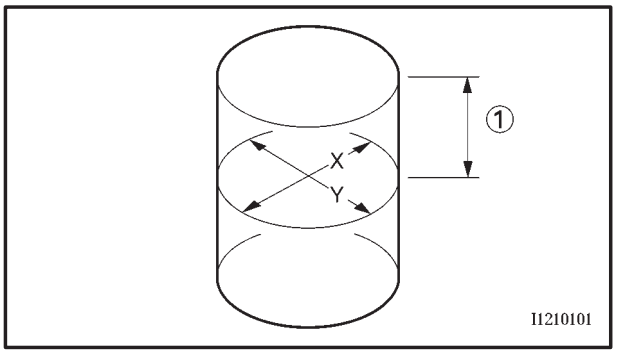
- ° Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- ° For reference during installation, put an identification mark on each piston crown.
- ° Before removing the piston pin, deburr the piston pin clip's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

	Piston pin puller **90890-01304**

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.



EB404405
CHECKING THE CYLINDERS AND PISTONS

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

1. Check:
   - ° piston wall
   - ° cylinder wall
     Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - ° piston-to-cylinder clearance

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

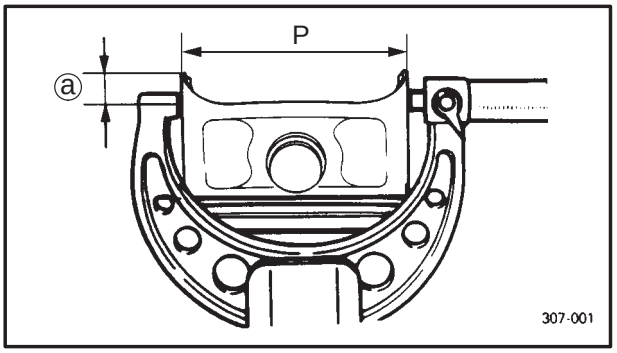
① 20 mm from the top of the cylinder

NOTE:

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

	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.



ⓐ 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 clearance	=	cylinder bore "C" – Piston skirt diameter "P"

Piston-to-cylinder clearance
0.025 × 0.050 mm
<Limit>: 0.07 mm

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

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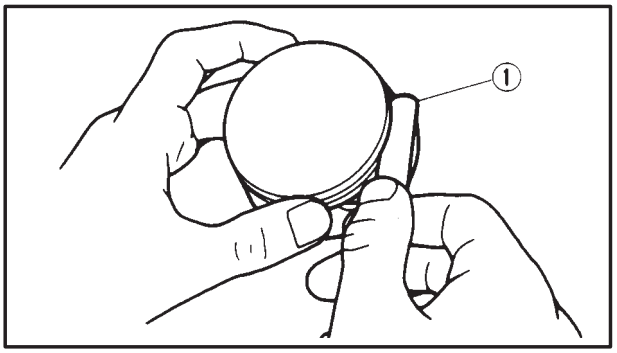
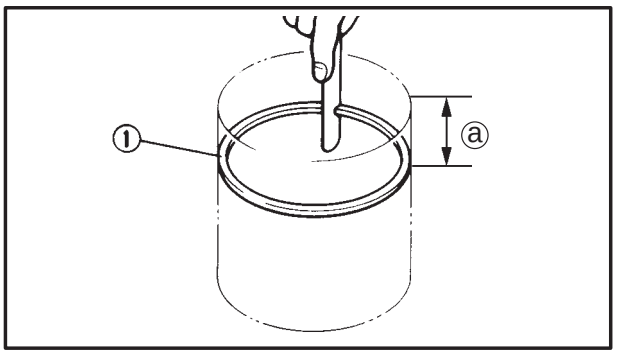
EB404410
CHECKING THE PISTON RINGS



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.

Piston ring side clearance
Top ring
0.020 × 0.075 mm
<Limit>: 0.1 mm
2nd ring
0.020 × 0.055 mm
<Limit>: 0.1 mm



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

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

ⓐ 20 mm

3. Measure:
   ° piston ring end gap
   Out of specification → Replace the piston ring.

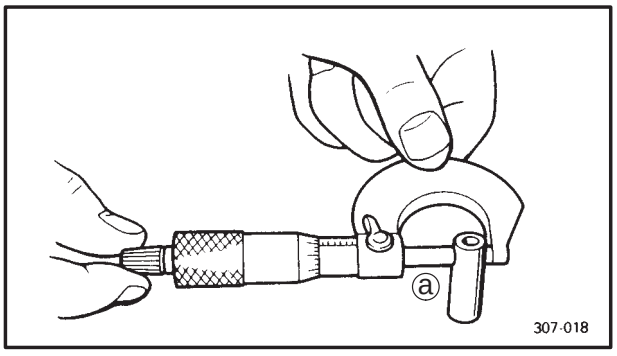
NOTE:
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Piston ring end gap
Top ring
0.15 × 0.30 mm
<Limit>: 0.6 mm
2nd ring
0.25 × 0.40 mm
<Limit>: 0.7 mm
Oil ring
0.1 × 0.35 mm

EB404421
CHECKING THE PISTON PINS

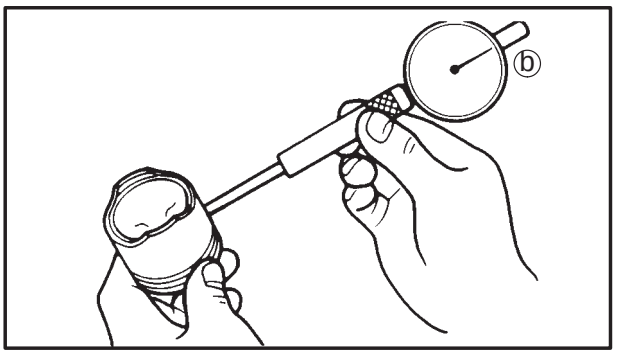
The following procedure applies to all of the piston pins.

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



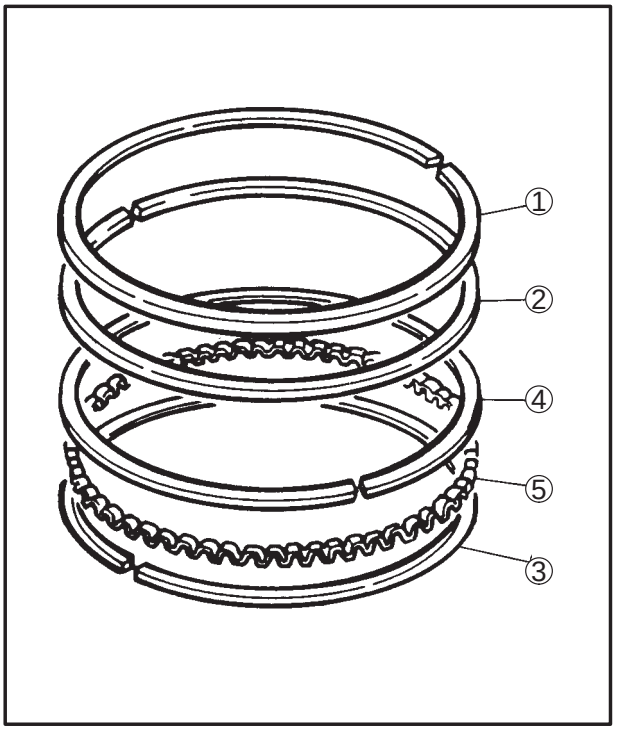
2. Measure:
   ° piston pin outside diameter ⓐ
   Out of specification → Replace the piston pin.

Piston pin outside diameter
16.991 × 17.000 mm



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

Piston-pin-to-piston clearance =
Piston pin bore size ⓑ –
Piston pin outside diameter ⓐ
Piston-pin-to-piston clearance
0.011 × 0.013 mm
<Limit>: 0.023 mm

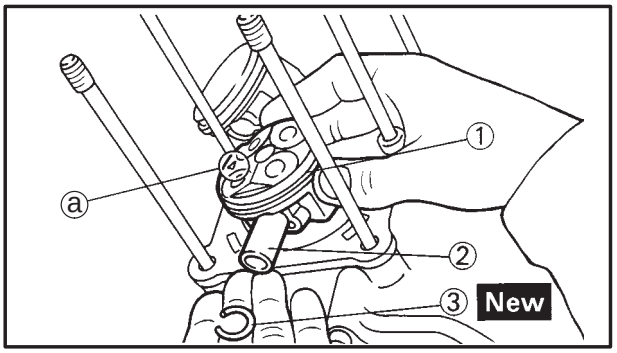


EB404701
INSTALLING THE PISTON AND CYLINDER

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

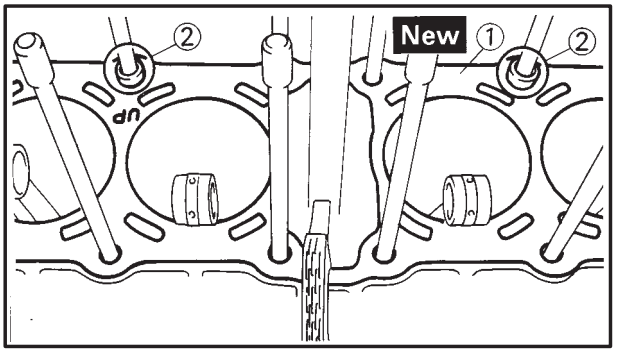
1. Install:
   ° top ring ①
   ° 2nd ring ②
   ° lower oil ring rail ③
   ° upper oil ring rail ④
   ° oil ring expander ⑤

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



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

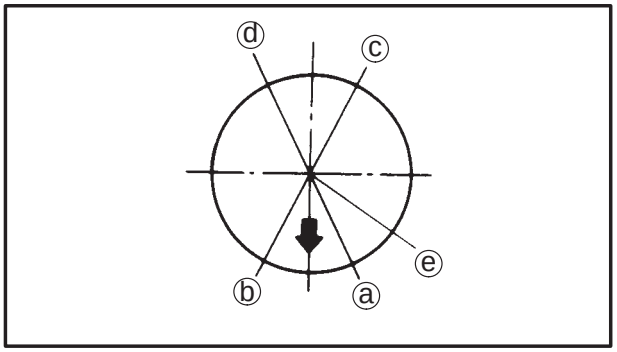
NOTE:
° Apply engine oil onto the piston pin.
° Make sure that the "EX" mark ⓐ on the piston faces towards the exhaust side of the engine.
° Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.



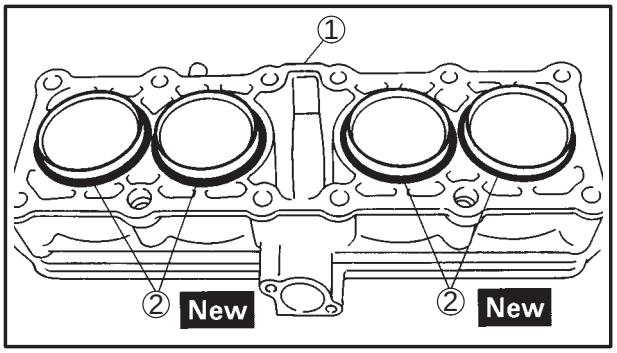
3. Install:
   ° gasket (New) ①
   ° dowel pins ②

4. Lubricate:
   ° piston
   ° piston rings
   ° cylinder
   (with the recommended lubricant)

Recommended lubricant
Engine oil



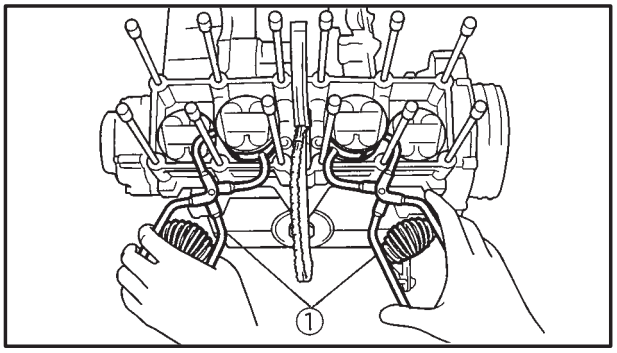
5. Offset:
   ° piston ring end gaps
   ⓐ Top ring
   ⓑ Lower oil ring rail
   ⓒ Upper oil ring rail
   ⓓ 2nd ringe
   ⓔ Oil ring expander

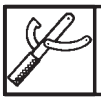


6. Install:
   ° cylinder ①
   ° O-ring ②

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

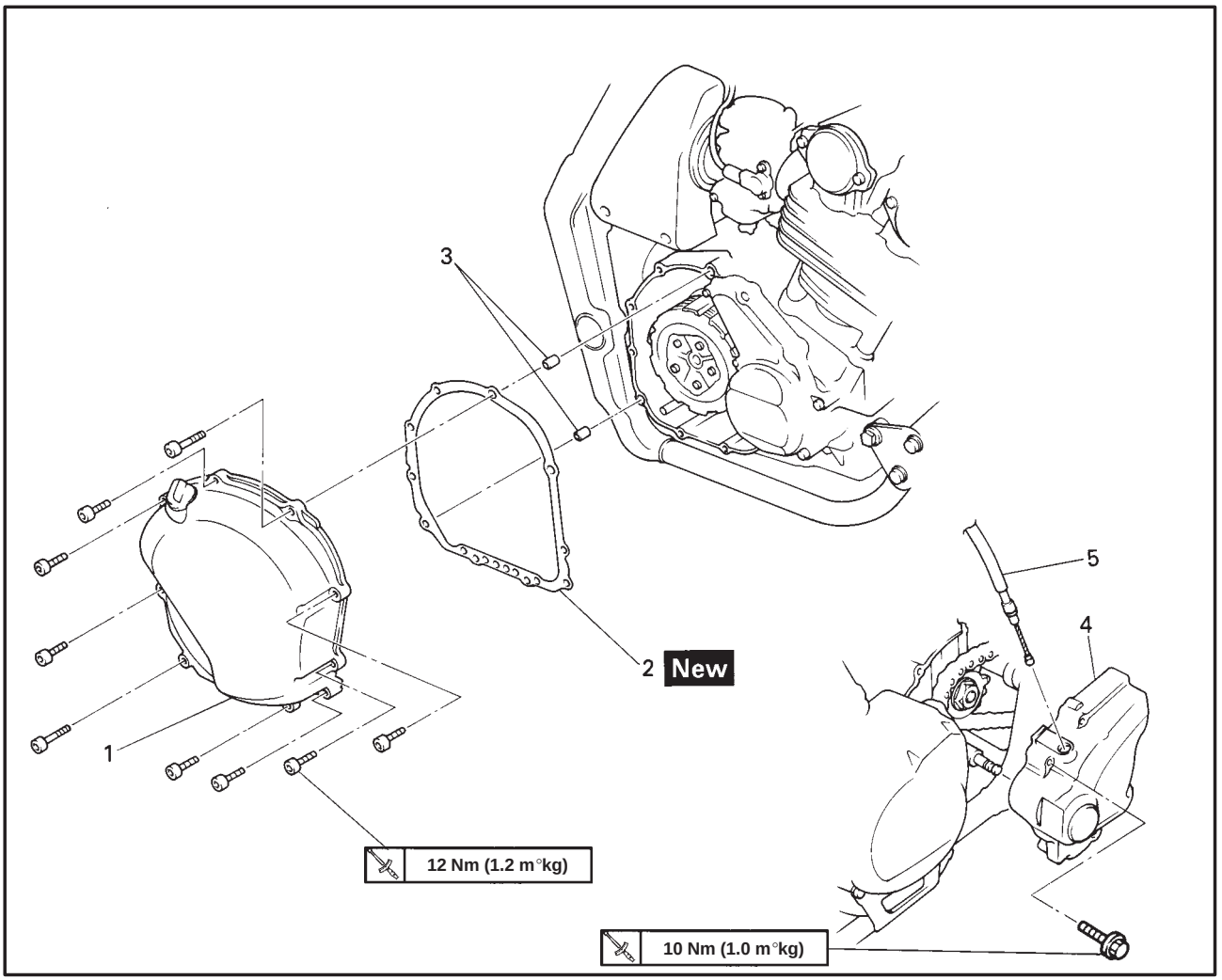
a. Install a piston ring compressor ① to piston #2 and #3.
b. Install pistons #2 and #3 onto the cylinder.
c. Remove the piston ring compressor.
d. Install the piston ring compressor ① to pistons #1 and #4.
e. Install pistons #1 and #4 onto the cylinder.
f. Remove the piston ring compressor.





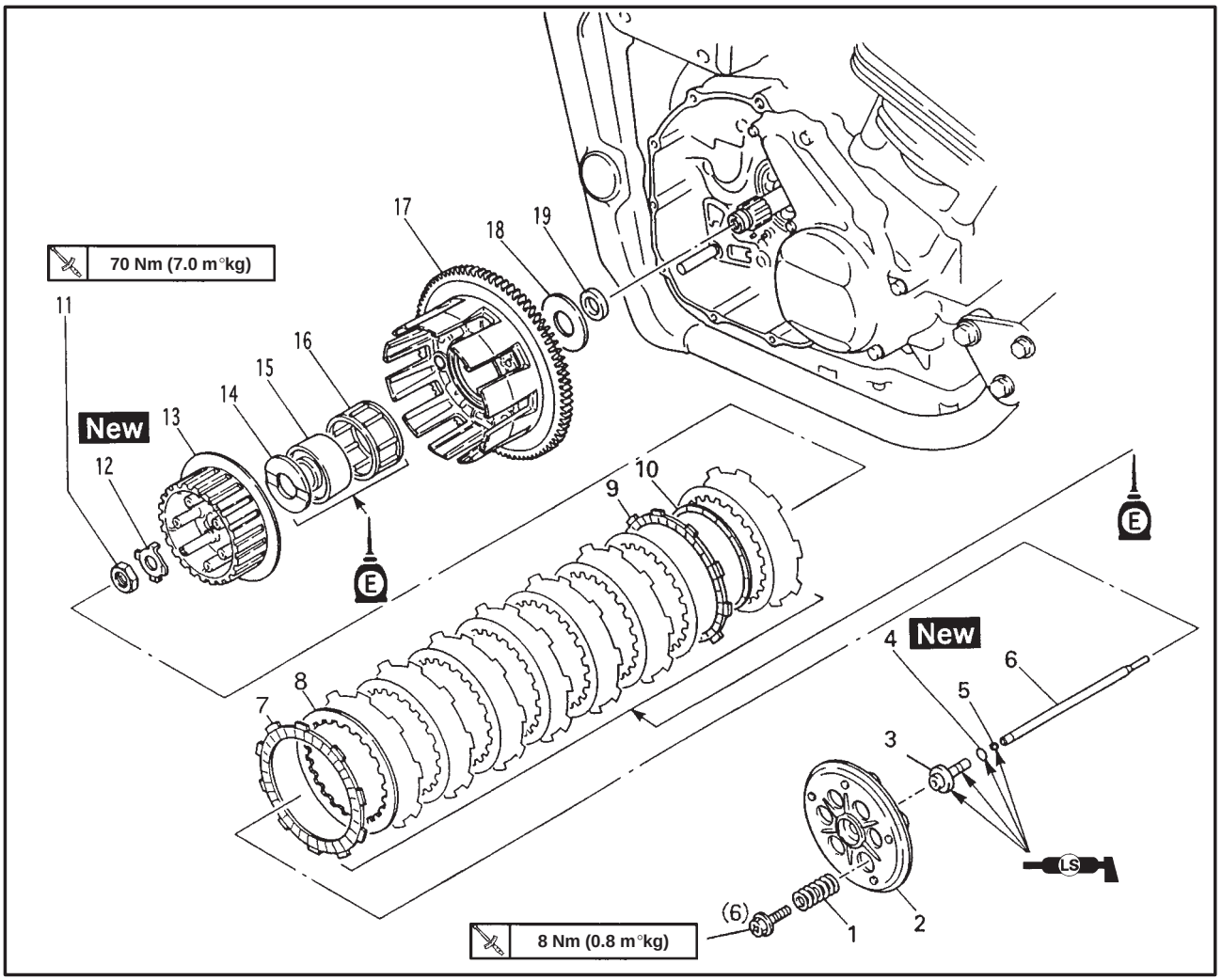
Piston ring compressor:
90890-04044

CLUTCH
CLUTCH COVER

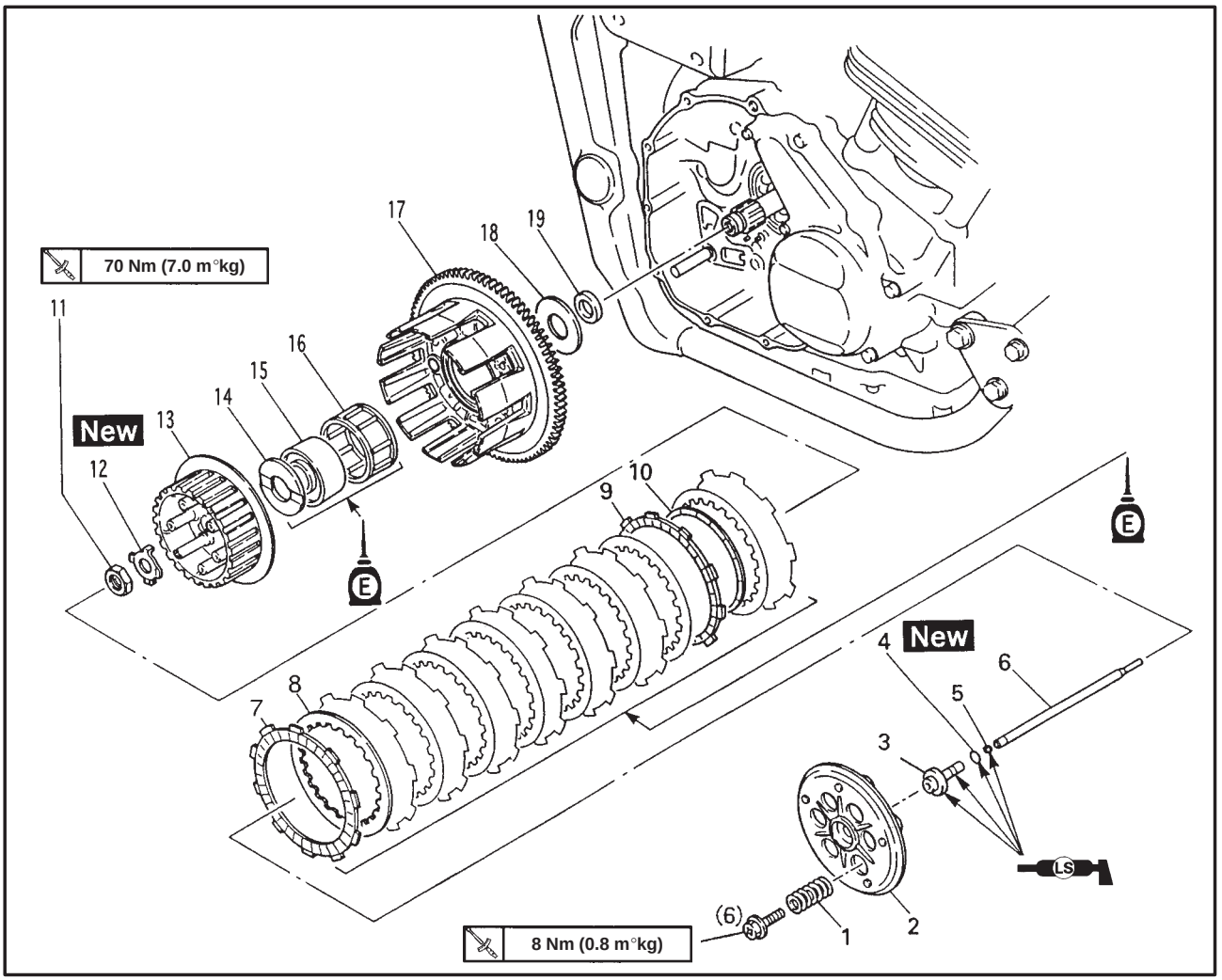


Order	Job name/Part name	Q'ty	Remarks
	Removing the clutch cover		Remove the parts in the order listed.
	Drain the engine oil		Refer to "CHANGING THE ENGINE OIL" section in chapter 3.
1	Clutch cover	1	
2	Clutch cover gasket	1	
3	Dowel pin	2	
4	Drive sprocket cover	1	
5	Clutch cable	1	For installation,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

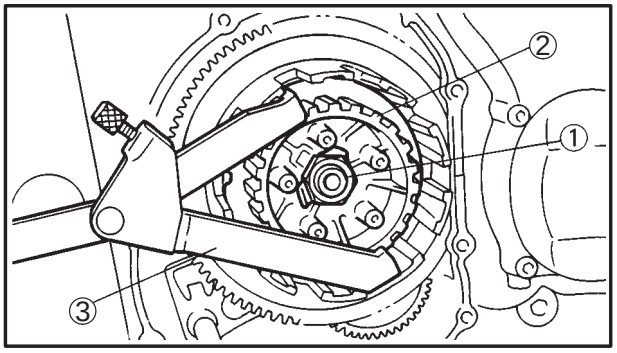
CLUTCH

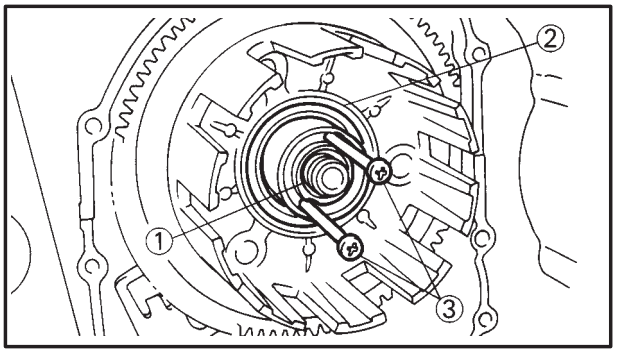


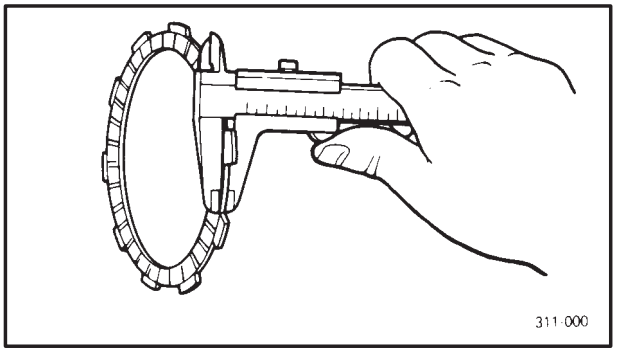
Order	Job name/Part name	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Compression spring	6	
2	Pressure plate	1	
3	Short clutch push rod	1	
4	O-ring	1	
5	Ball	1	
6	Long clutch push rod	1	Refer to "INSTALLING THE CLUTCH" section.
7	Friction plate	8	
8	Clutch plate	8	
9	Fricition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



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







EB405100
REMOVING THE CLUTCH

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

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

Universal clutch holder 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.

EB405400
CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

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

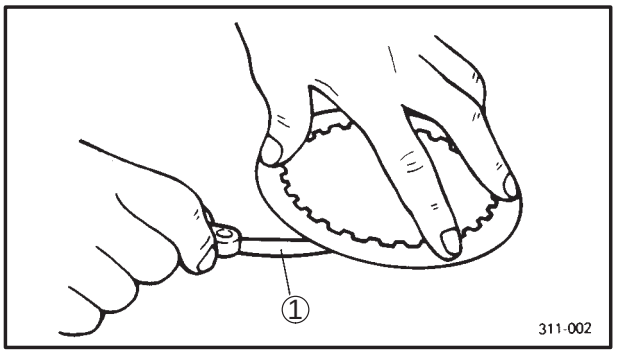
NOTE:
Measure the friction plate at four places.

Friction plate thickness
2.94 × 3.06 mm
<Limit>: 2.8 mm

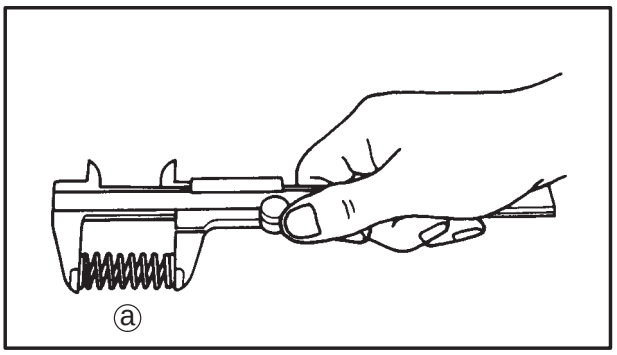
EB405410
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

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



Clutch plate warpage limit
Less than 0.1 mm



EB405420
CHECKING THE CLUTCH SPRINGS

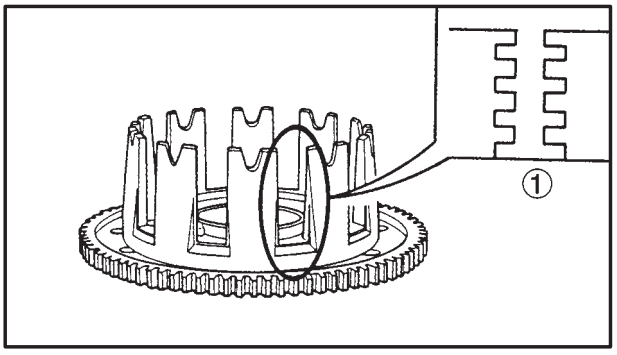
The following procedure applies to all of the clutch springs.

1. Check:
   ° clutch spring
   Damage → Replace the clutch springs as a set.
2. Measure:
   ° clutch spring free length ⓐ
   Out of specification → Replace the clutch springs as a set.

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

EB405430
CHECKING THE CLUTCH SPRING PLATE

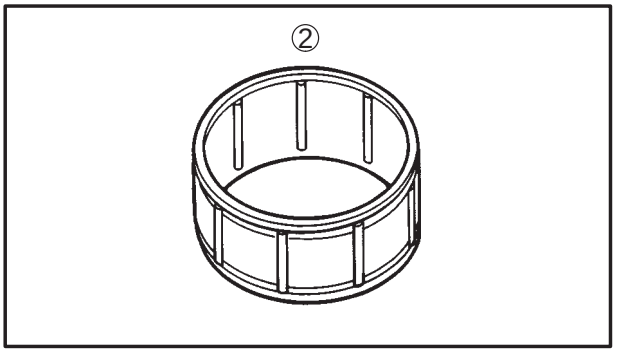
1. Check:
   ° clutch spring plate
   Damage → Replace.
2. Check:
   ° clutch spring plate seat
   Damage → Replace.



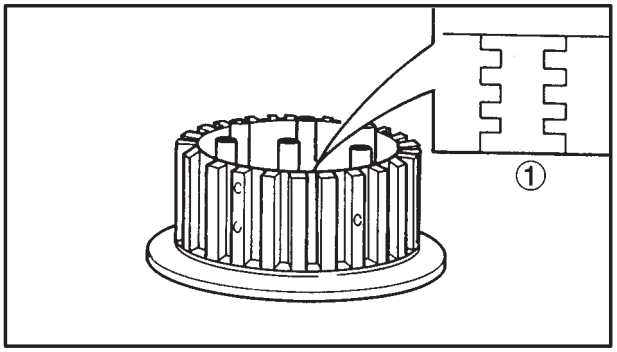
EB405440
CHECKING THE CLUTCH HOUSING

1. Check:
   ° clutch housing dogs ①
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

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



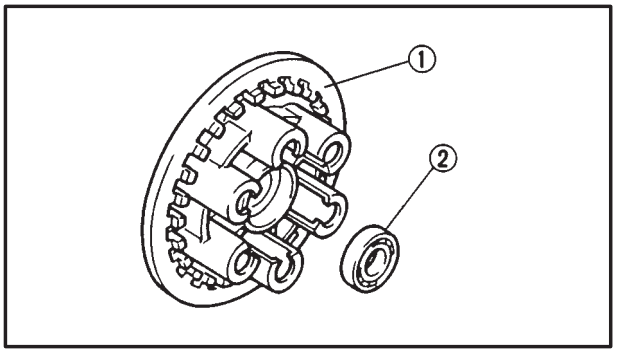
2. Check:
   ° bearing ②
   Damage/wear → Replace the clutch housing.



EB405450
CHECKING THE CLUTCH BOSS

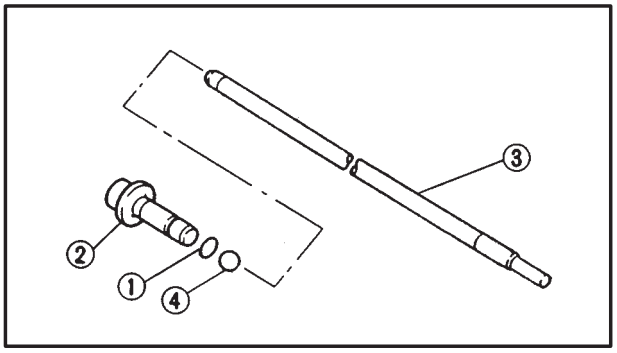
1. Check:
   ° clutch boss splines ①
   Damage/pitting/wear → Replace the clutch boss.

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



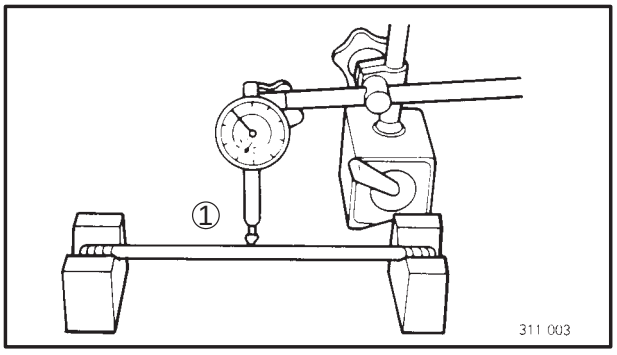
EB405450
CHECKING THE PRESSURE PLATE

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



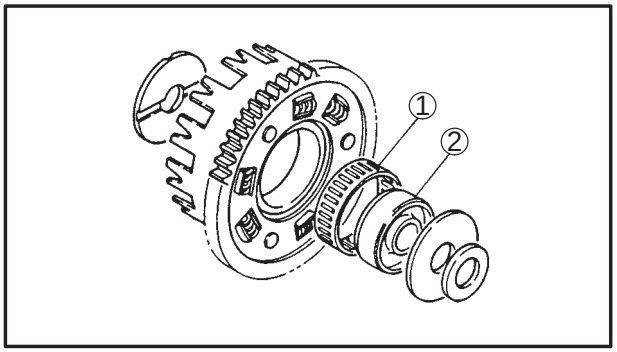
EB405480
CHECKING THE CLUTCH PUSH RODS

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



2. Measure:
   ° long clutch push rod bending limit ①
   Out of specification → Replace the long clutch push rod.

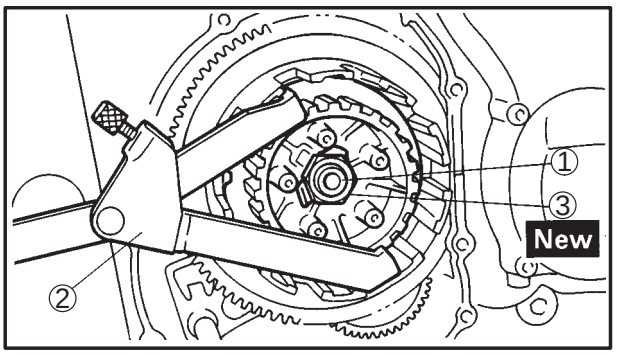
Long clutch push rod bending limit
0.3 mm

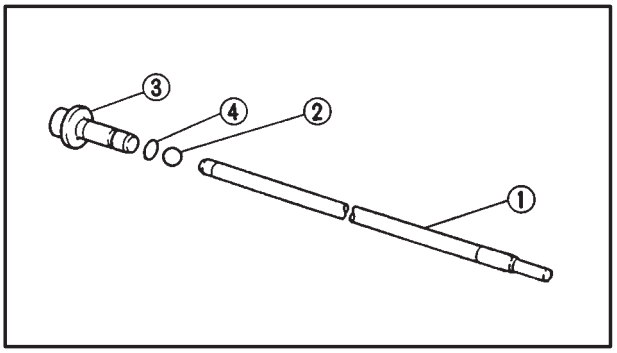


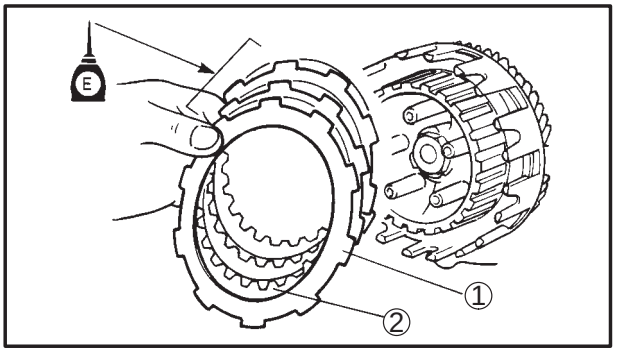
EB405701
INSTALLING THE CLUTCH

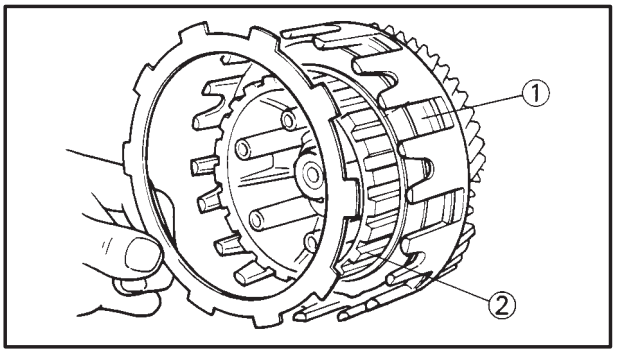
1. Install:
   ° bearing ①
   ° spacer ②

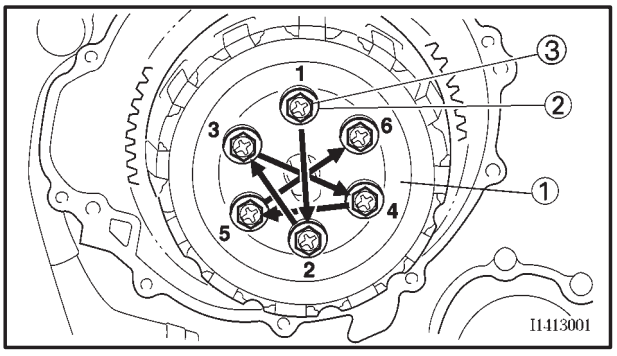
NOTE:
Install the spacer with the two screw holes facing towards the clutch boss.











2. Tighten:
   ° clutch boss nut ① 70 Nm (7.0 m°kg)

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

Universal clutch holder
90890-04086

3. Bend the lock washer ③ tab along a flat side of the nut.
4. Lubricate:
   ° 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:
   ° friction plates ①
   ° clutch plates ②
   (with the recommended lubricant)

Recommended lubricant
Engine oil

7. Install:
   ° friction plates ①
   ° clutch plates ②

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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.

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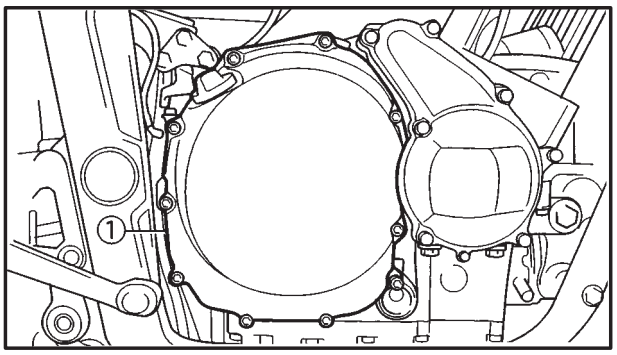
8. Install:
   ° pressure plate ①
   ° clutch springs ②
   ° clutch spring bolts ③ 8.0 Nm (0.8 m°kg)

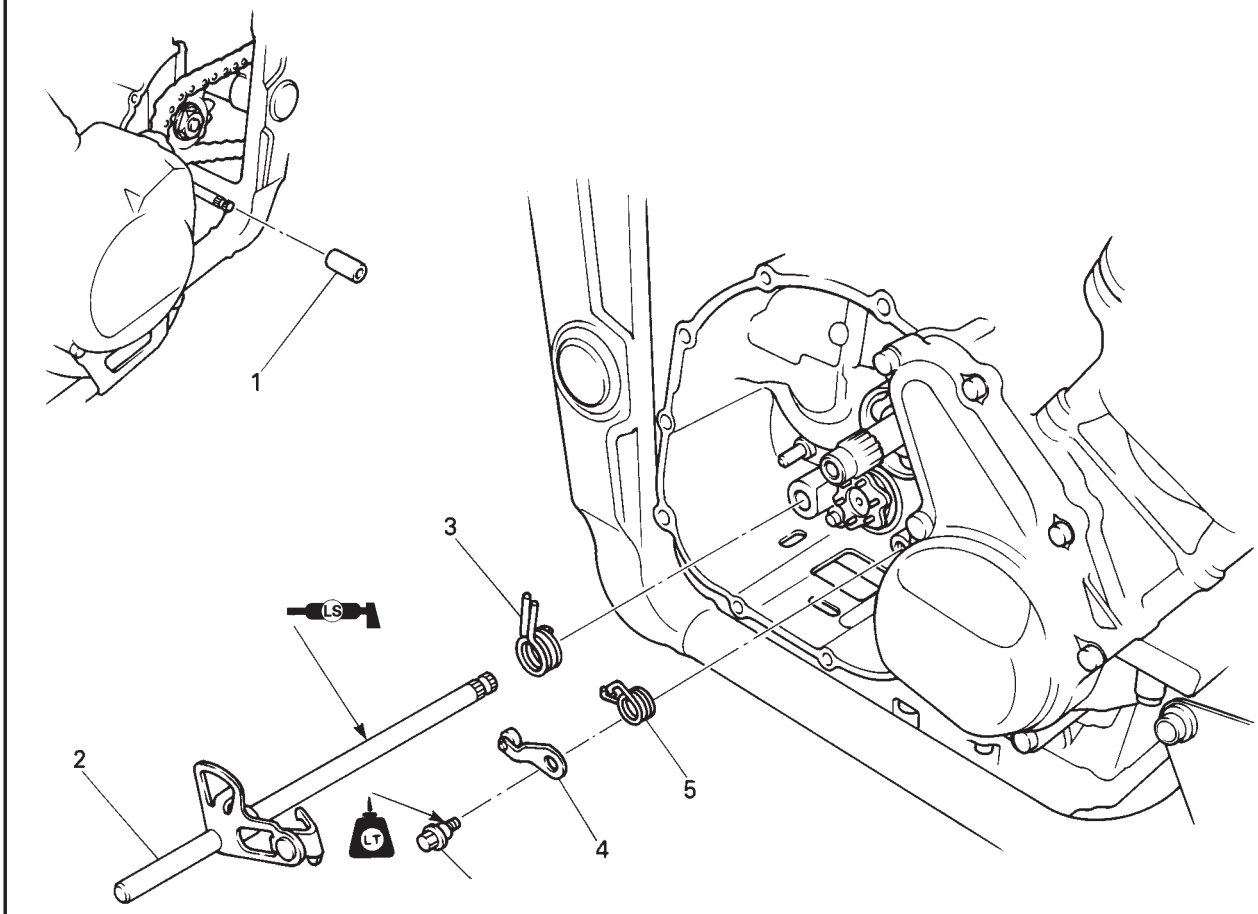
NOTE:
° When installing the clutch springs, alternate between long and short clutch springs.
° Tighten the clutch spring bolts in stages and in a crisscross pattern.



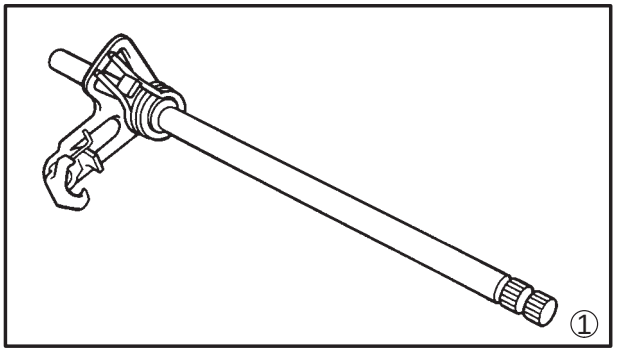
9. Install:
   ° clutch cover ① 12 Nm (1.2 m°kg)

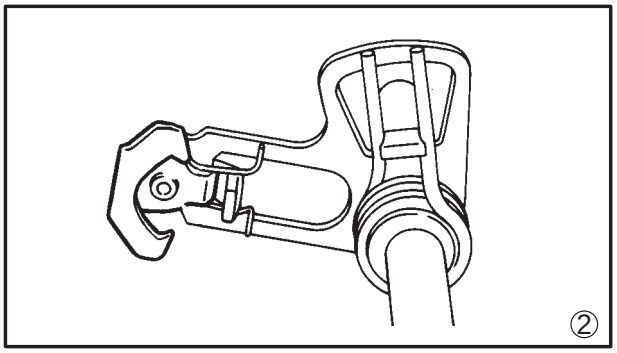
NOTE:
Tighten the clutch cover bolts in stages and in a crisscross pattern.

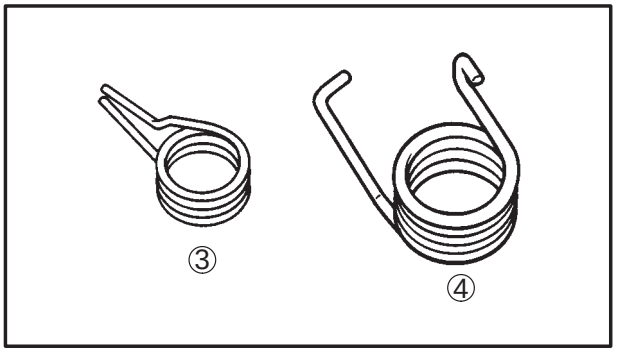
SHIFT SHAFT



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

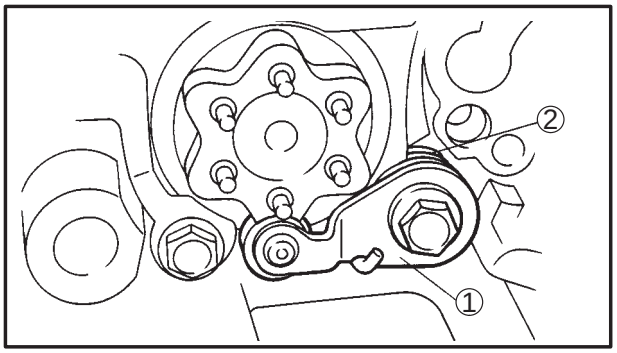






EB408400
CHECKING THE SHIFT SHAFT

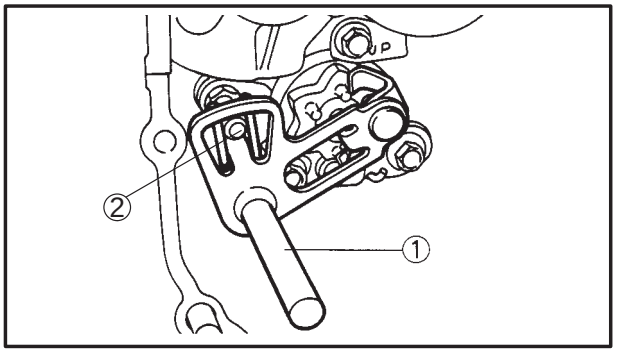
1. Check:
   - ° shift shaft ①
   - ° shift lever ②
     Bends/damage/wear → Replace.
   - ° shift lever spring ③
   - ° stopper lever spring ④
     Damage/wear → Replace.



EB408700
INSTALLING THE SHIFT SHAFT

1. Install:
   - ° stopper lever ①
   - ° stopper lever spring ②
   - ° shift shaft lever

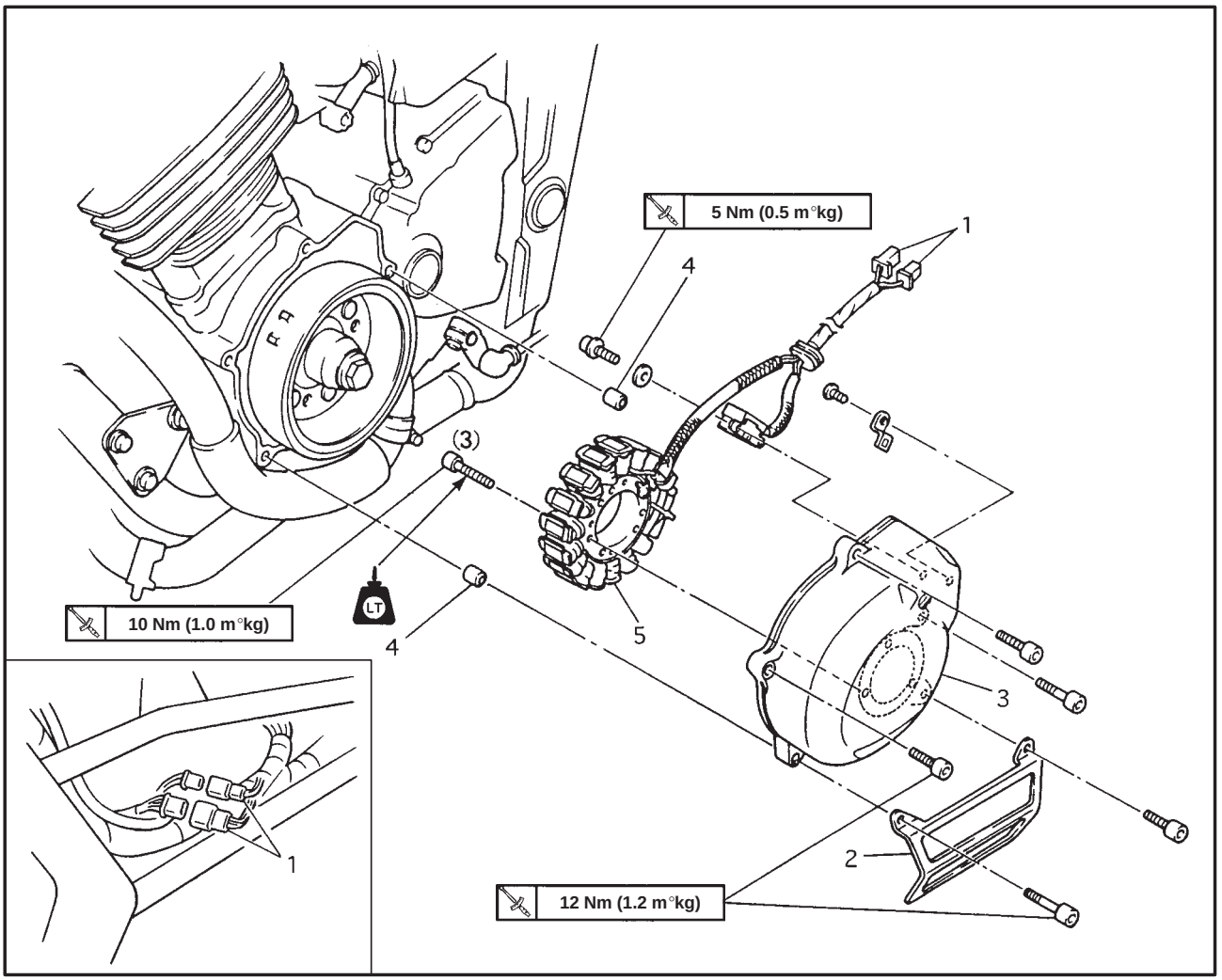
NOTE:
- ° Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
- ° Mesh the stopper lever with the shift drum segment assembly.



2. Install:
   - ° shift shaft ①

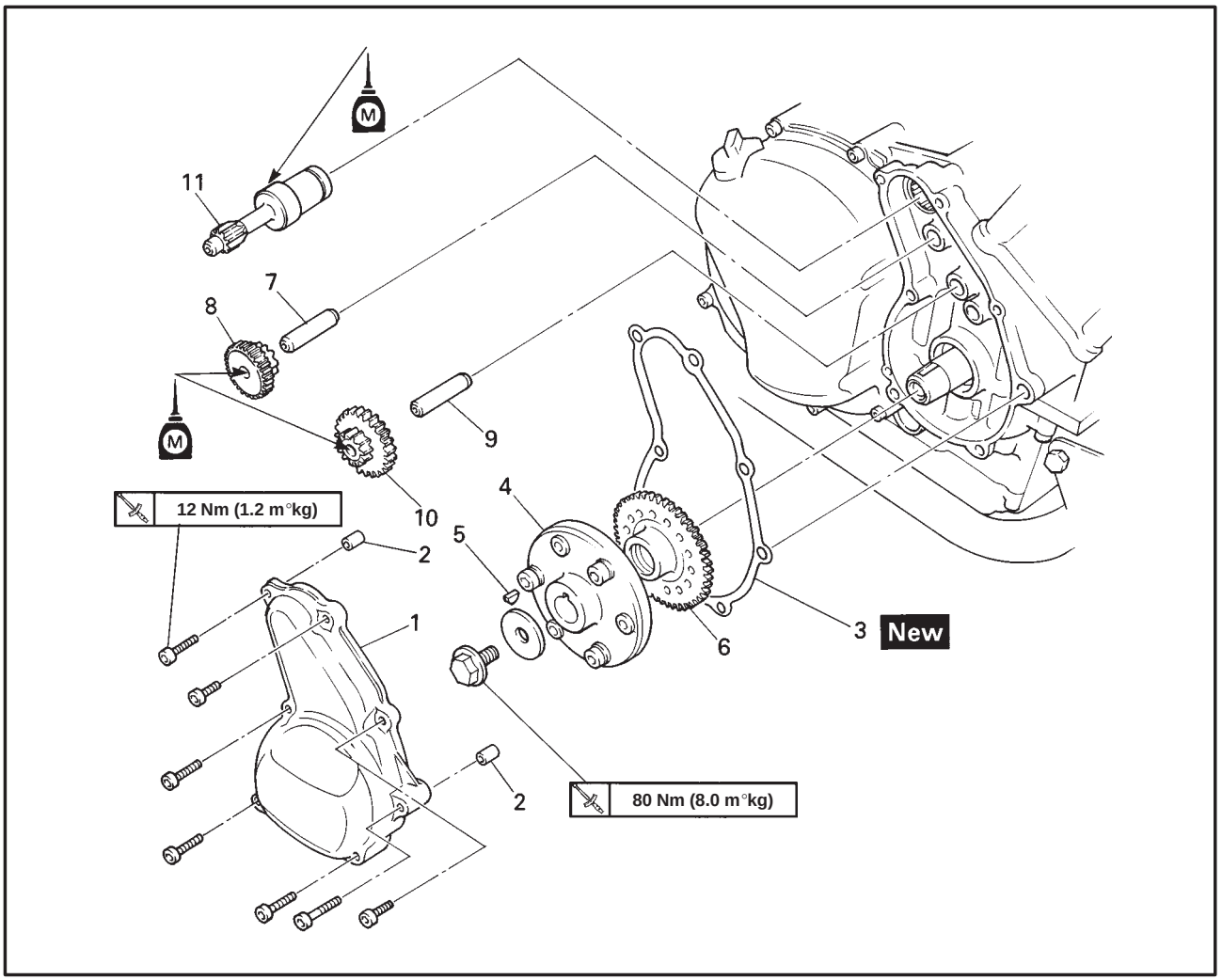
NOTE:
- ° Lubricate the oil seal lips with lithium soap base grease.
- ° Hook the end of the shift lever spring onto the shift lever spring stopper ②.

AC MAGNETO AND STARTER CLUTCH
STATOR COIL



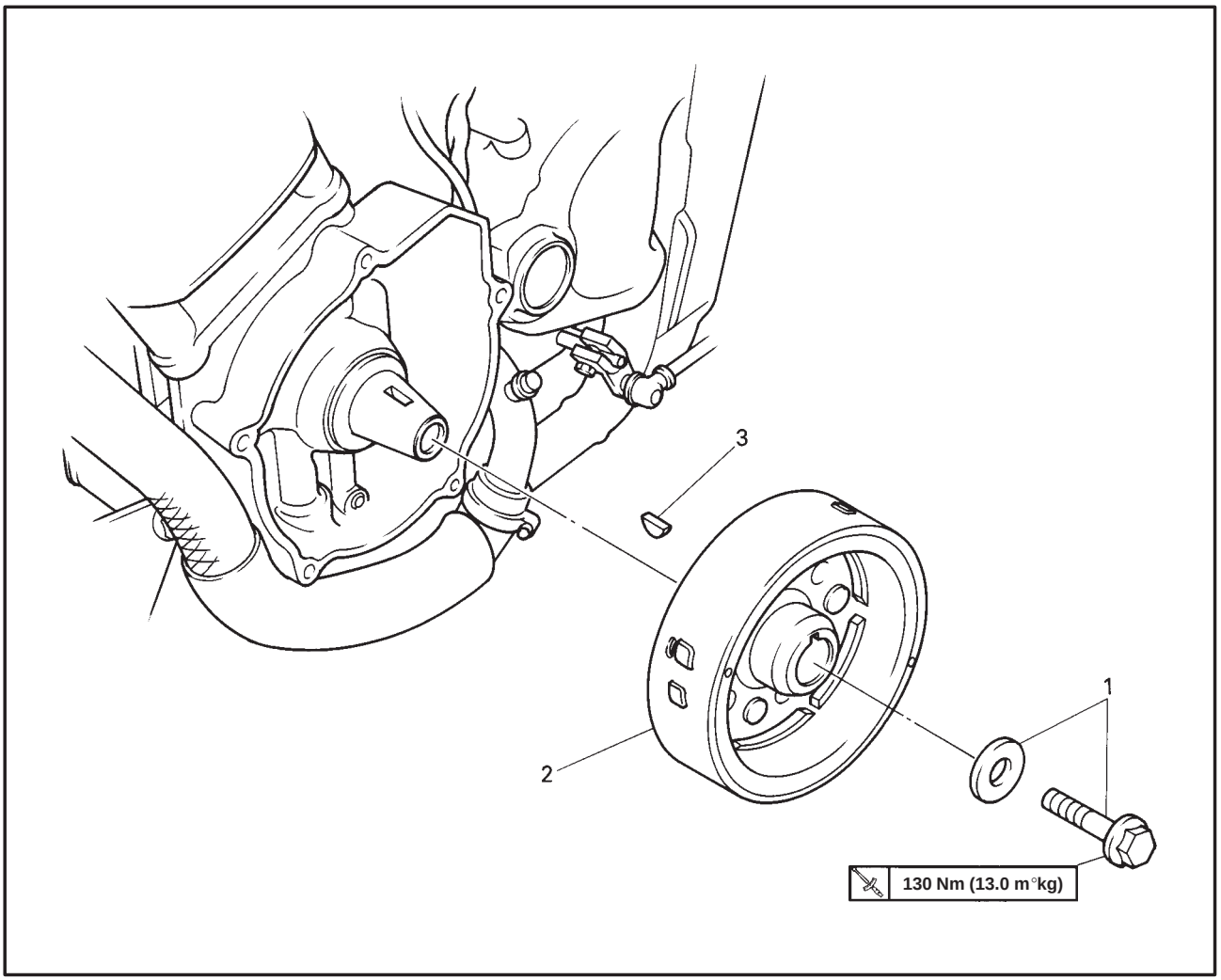
Order	Job name/Part name	Q'ty	Remarks
	Removing the stator coil		Remove the parts in the order listed.
	Seat		Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3.
	Fuel tank		
1	Stator/pickup coil lead	1/1	
2	Cover	1	
3	Generator cover	1	
4	Dowel pin	2	
5	Stator coil	1	
			For installation,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

STARTER CLUTCH

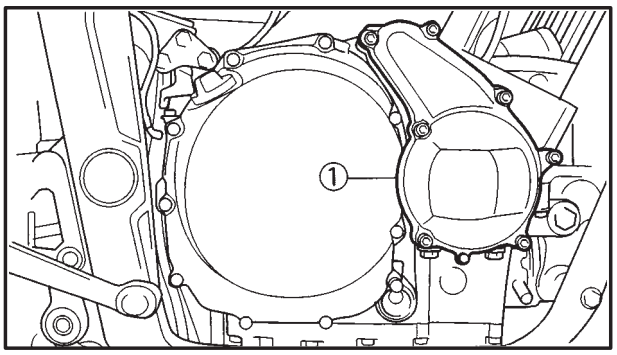


Order	Job name/Part name	Q'ty	Remarks
	Removing the starter clutch		Remove the parts in the order listed.
	Generator cover		
1	Starter clutch cover	1	
2	Dowel pin	2	
3	Gasket	1	
4	Starter clutch assembly	1	Refer to "REMOVING/INSTALLING THE STARTER CLUTCH" section.
5	Wood ruff key	1	
6	Starter wheel gear	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
	Removing the generator roter		Remove the parts in the order listed.
1	Bolt/washer	1/1	Refer to "REMOVING/INSTALLING
2	Rotor	1	THE AC MAGNETO" section.
3	Woodruff key	1	
			For installation, reverse the removal procedure.



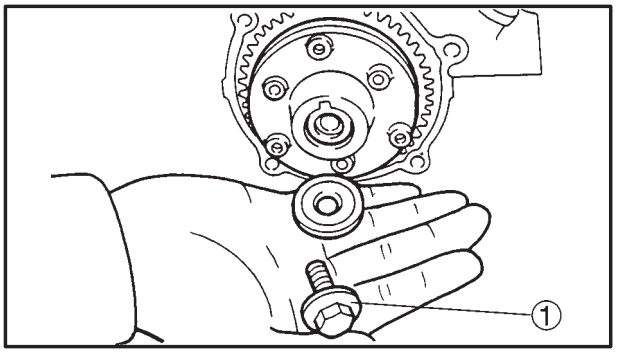
EB410100

REMOVING THE STARTER CLUTCH

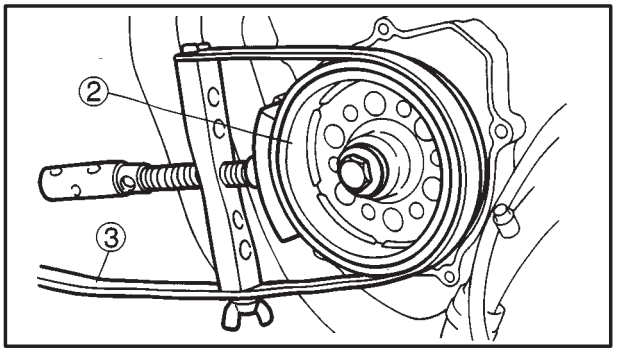
1. Remove:
   ° starter clutch cover ①

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.



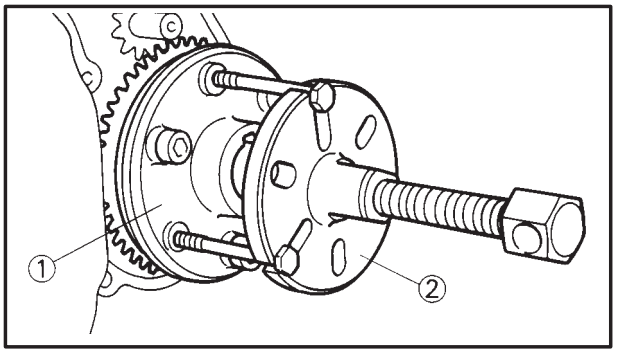
2. Remove:
   ° starter clutch bolt ①



NOTE:

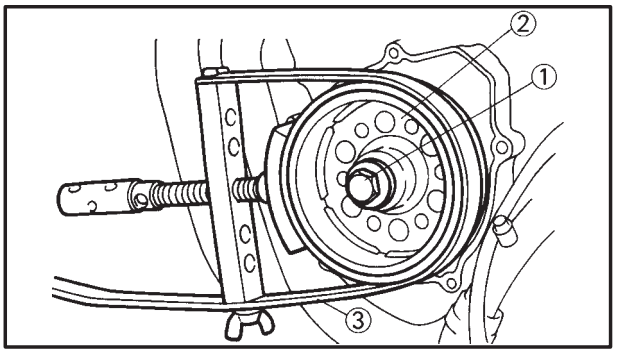
° While holding the magneto rotor ② with the sheave holder ③, remove the starter clutch bolt.

	Sheave holder **90890-01701**



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

	Flywheel puller set **90890-01362**



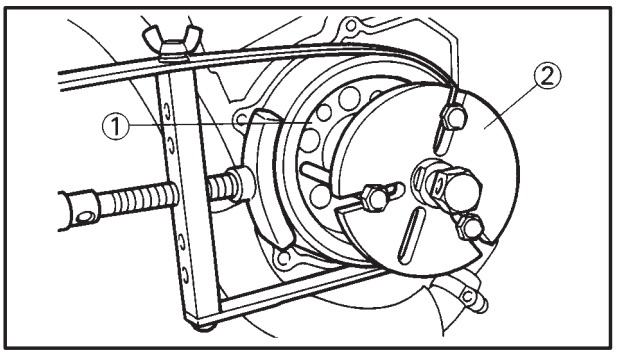
REMOVING THE AC MAGNETO

1. Remove:
   ° 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.

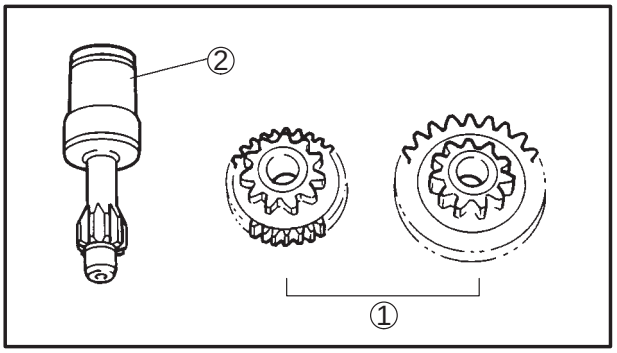
	Sheave holder: **90890-01701**



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

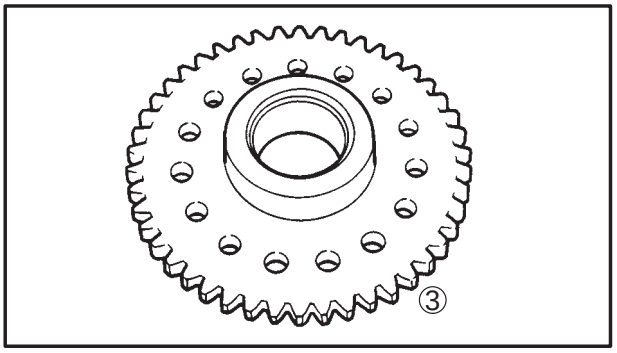
NOTE:
Use a flywheel puller ② to remove the AC magneto rotor ①.

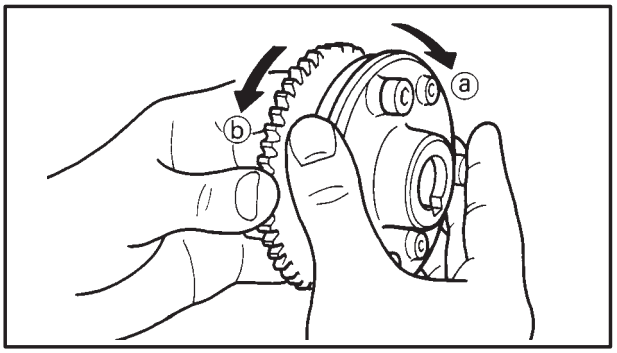
	Flywheel puller: **90890-01362**



EB410401
CHECKING THE STARTER CLUTCH

1. Check:
   ° starter clutch idle gear ①
   ° starter clutch drive gear ②
   ° starter clutch gear ③
   Burrs/chips/roughness/wear → Replace the defective part(-s).





2. Check:
   ° starter clutch operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. When turning the starter clutch drive gear clockwise ⓐ, 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 ⓑ, it should turn freely. If the starter clutch drive gear does not turn freely, the starter clutch is faulty and must be replaced.

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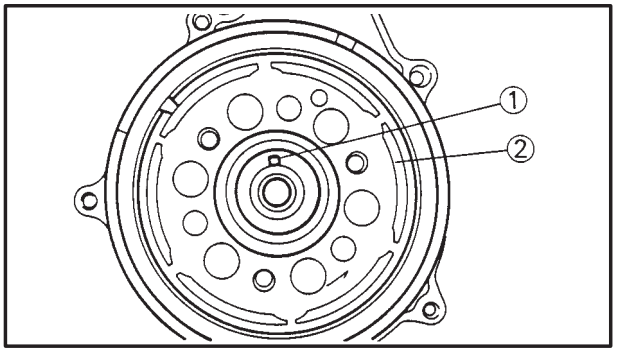
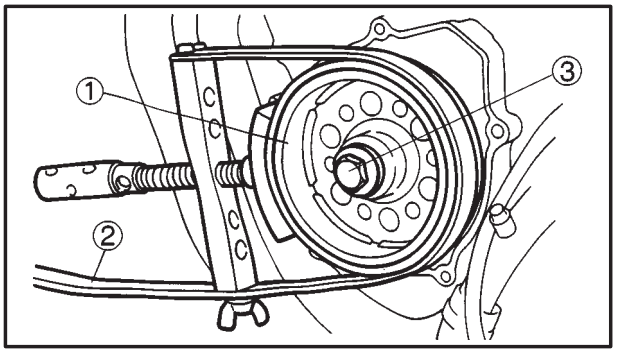




INSTALLING THE AC MAGNETO

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

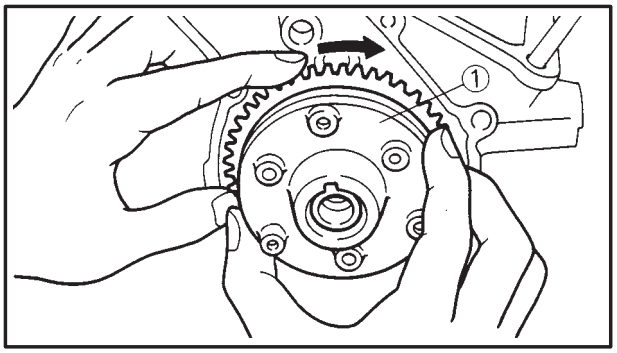
NOTE:
- Clean the tapered portion of the crankshaft and the AC magneto rotor.
- When installing the AC magneto rotor, make sure that the woodruff key is properly seated in the key way of the crankshaft.

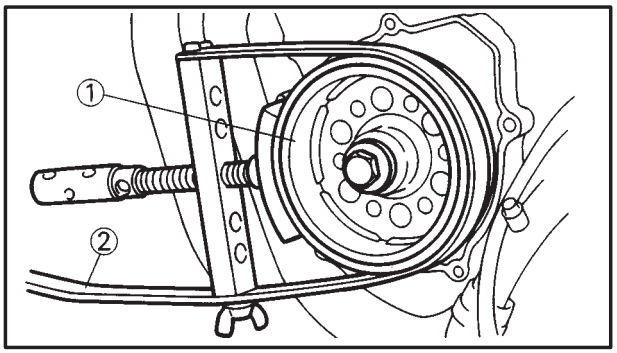
2. Tighten:
   - Bolt (magneto rotor)

	Bolt (AC magneto rotor): 130 Nm (13.0 m°kg)

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

	Sheave holder: 90890-01701





EB410710

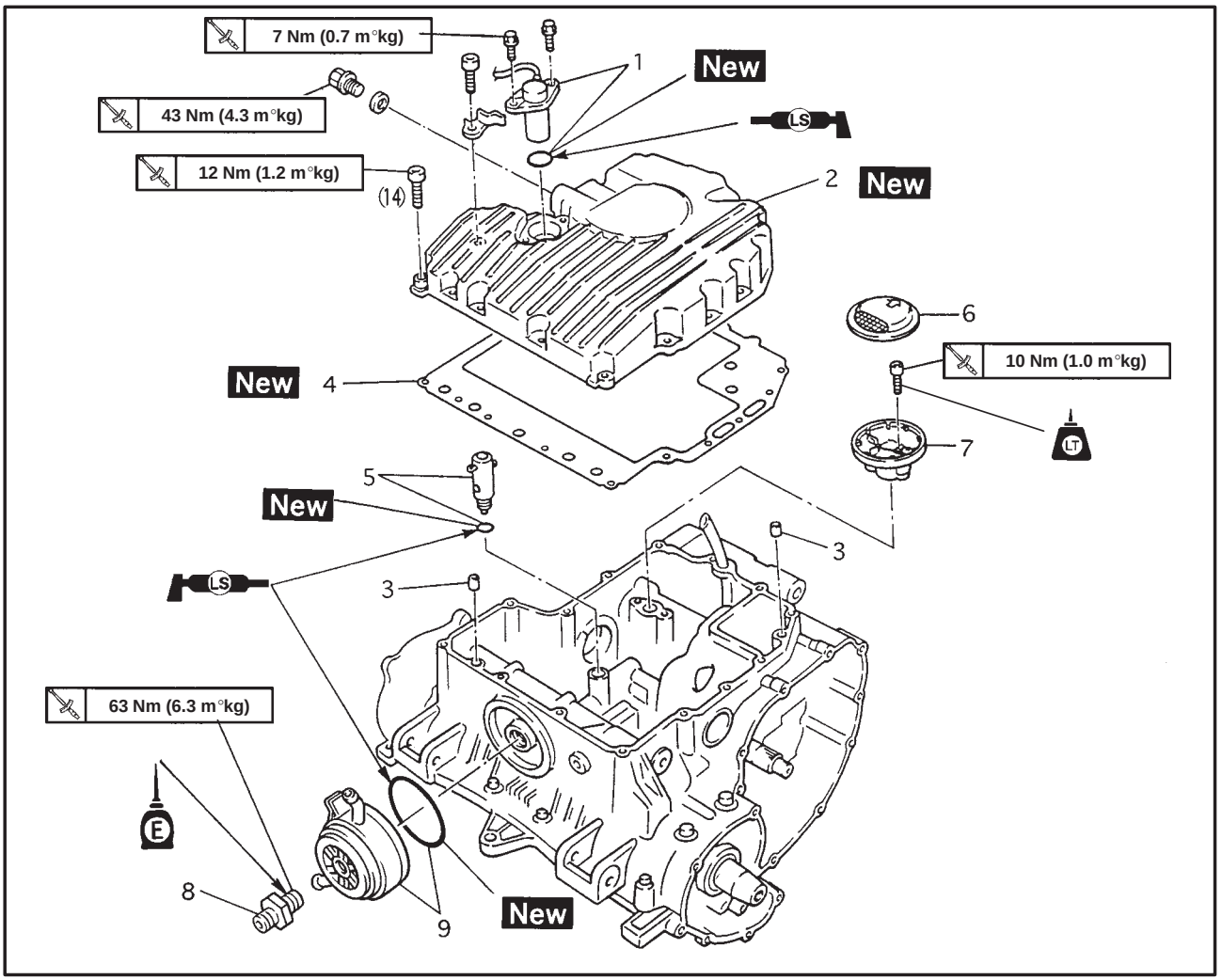
INSTALLING THE STARTER CLUTCH

1. Install:
   - starter clutch ①

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

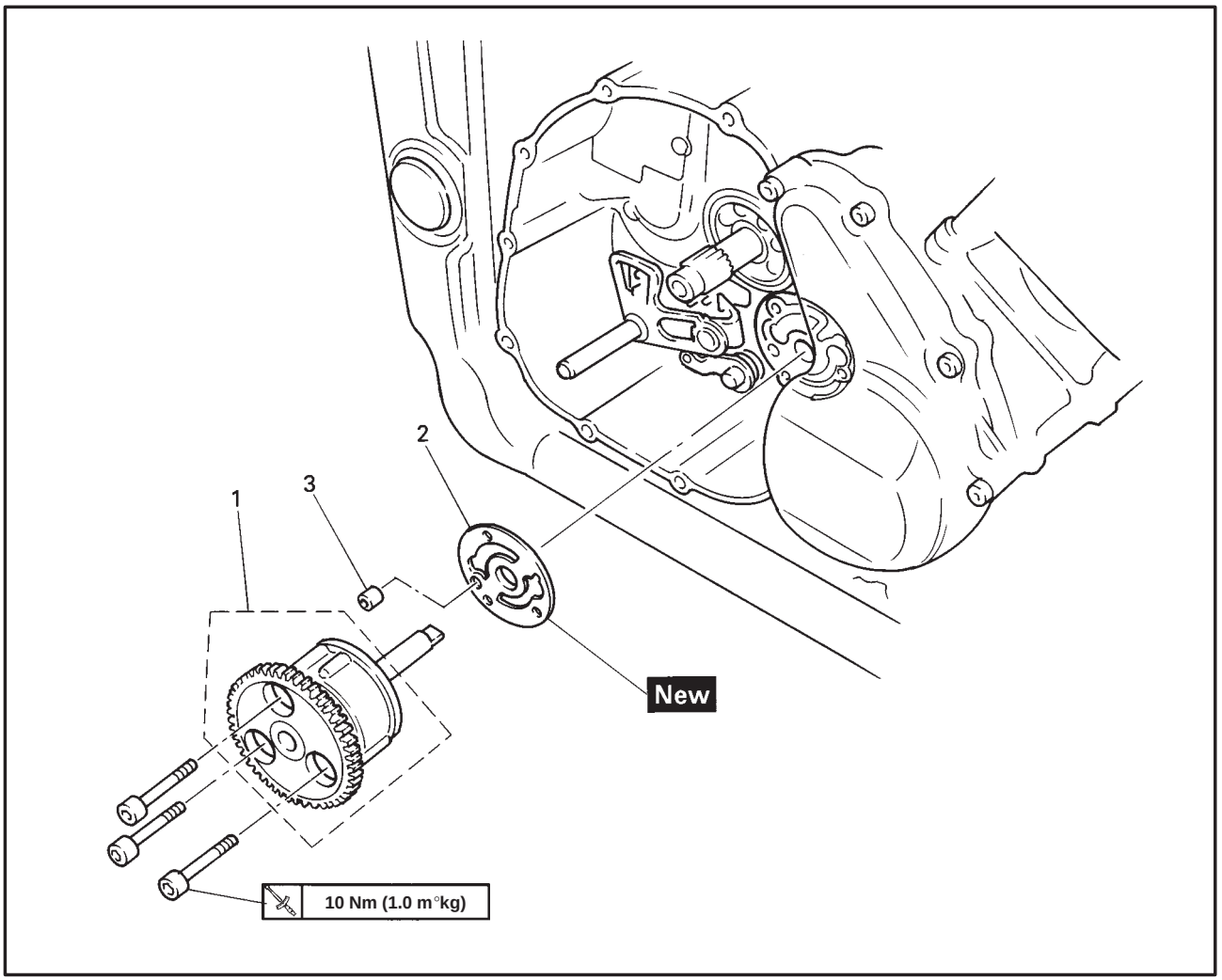
	Sheave holder 90890-01701
	Starter clutch bolt 80 Nm (8.0 m°kg)

OIL PAN AND OIL STRAINER
OIL STRAINER

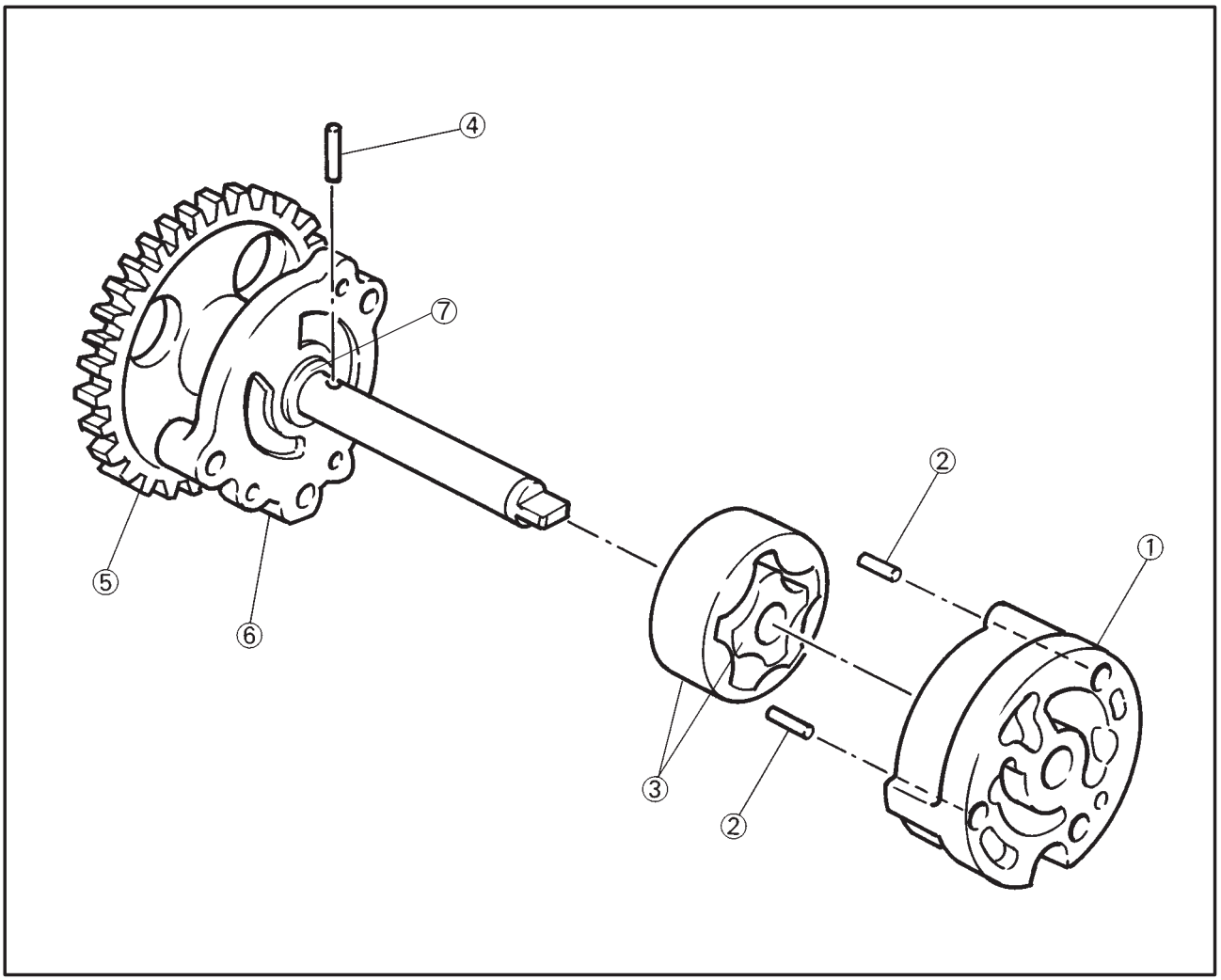


Order	Job name/Part name	Q'ty	Remarks
	Removing the oil strainer Engine		Remove the parts in the order listed. Refer to "REMOVING THE ENGINE" section.
1	Oil level warning switch/O-ring	1/1	
2	Oil pan	1	Refer to "INSTALLING THE OIL PAN" section.
3	Dowel pin	2	
4	Oil pan gasket	1	
5	Relief valve/O-ring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

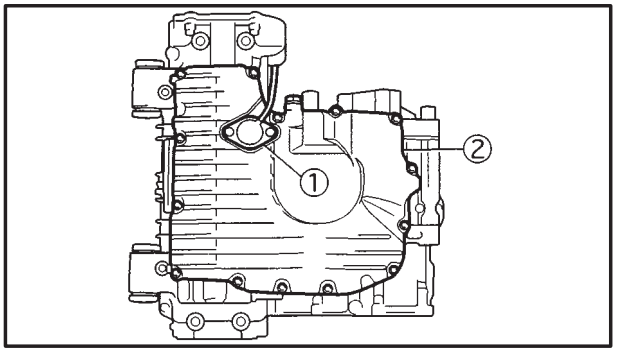
OIL PUMP



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



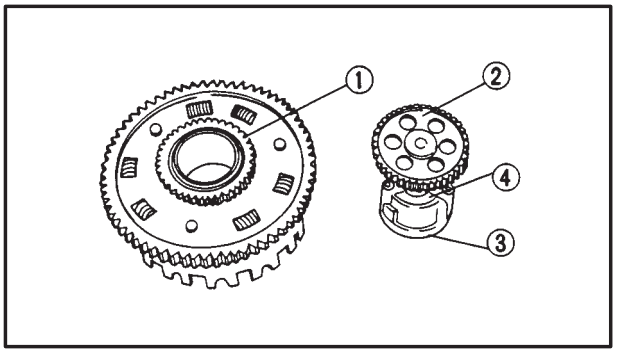
Order	Job name/Part name	Q'ty	Remarks
	Disassembling the oil pump		Disassembly the parts in the order listed.
①	Oil pump rotor housing	1	
②	Dowel pin	2	
③	Inner rotor/outer rotor	1/1	Refer to "ASSEMBLING THE OIL PUMP" section.
④	Dowel pin	1	
⑤	Oil pump shaft assembly	1	
⑥	Oil pump cover	1	
⑦	Washer	1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



EB411100
REMOVING THE OIL PAN

1. Remove:
   - ° oil level switch ①
   - ° oil pan ②
   - ° gasket
   - ° dowel pins

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

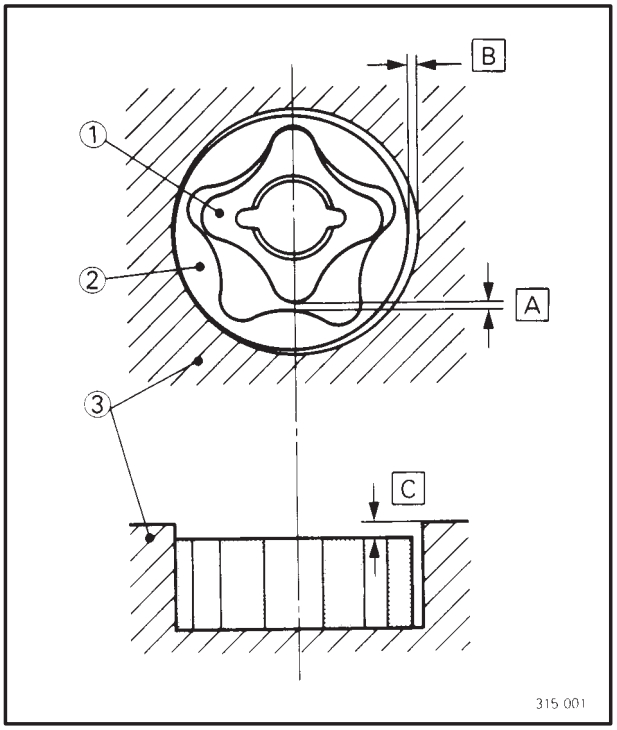


EB411401
CHECKING THE OIL PUMP

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]
   - ° outer-rotor-to-oil-pump-housing clearance [B]
   - ° oil-pump-housing-to-inner-rotor-and-outer-rotor clearance [C]

   Out of specification → Replace the oil pump.

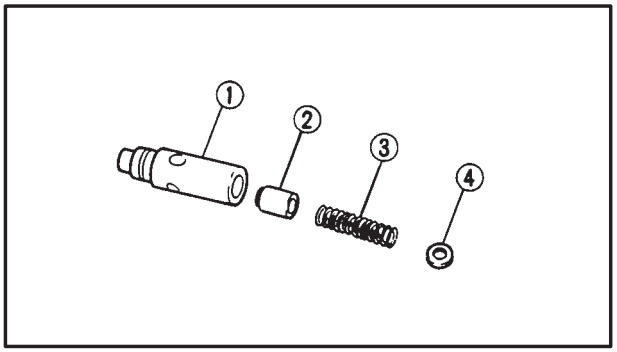


① Inner rotor
② Outer rotor
③ Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance
0.03 × 0.09 mm Limit 0.15 mm
Outer-rotor-to-oil-pump-housing clearance
0.03 × 0.08 mm Limit 0.15 mm
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance
0.03 × 0.08 mm Limit 0.15 mm

3. Check:
   - ° oil pump operation

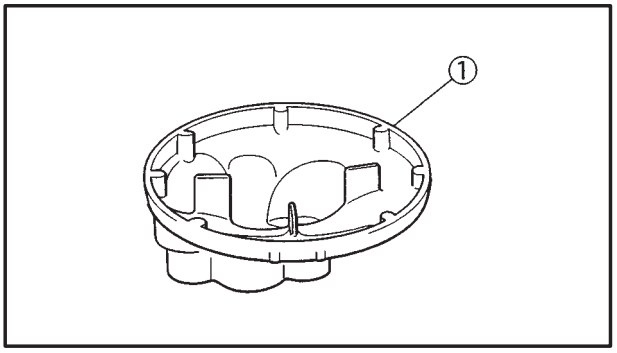
   Unsmooth → Repeat steps (1) and (2) or replace the defective part(-s).



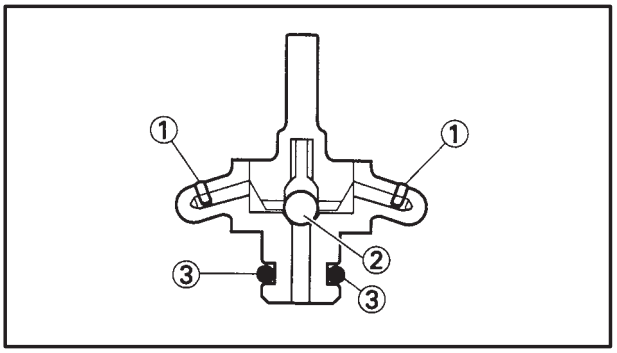
EB411410
CHECKING THE RELIEF VALVE

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

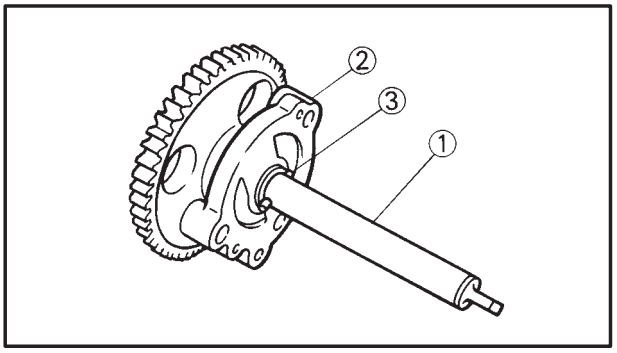
   Damage/wear → Replace the defective part(-s).



EB411430
CHECKING THE OIL STRAINER
1. Check:
   ° oil strainer ①
   Damage → Replace.
   Contaminants → Clean with engine oil.

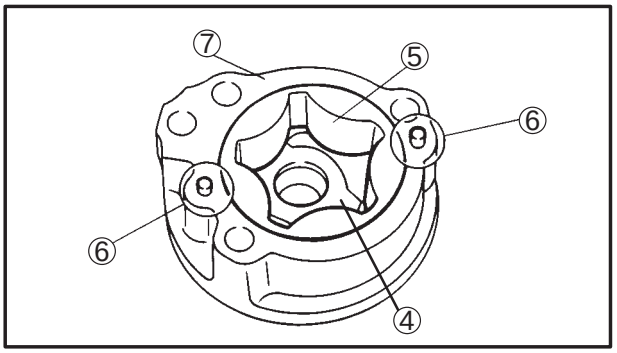


EB411470
CHECKING THE OIL NOZZLE
1. Check:
   ° oil nozzle ①
   ° check ball ②
   Damage/wear → Replace the oil nozzle.
   ° O-ring ③
   Damage/wear → Replace.
   ° oil nozzle passage
   Obstruction → Blow out with compressed air.



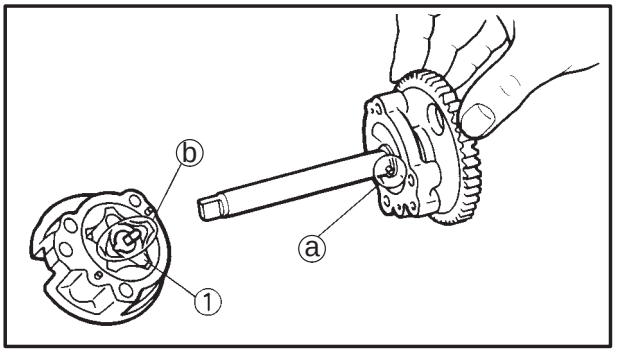
EB411701
ASSEMBLING THE OIL PUMP
1. Lubricate:
   ° inner rotor
   ° outer rotor
   ° oil pump shaft
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

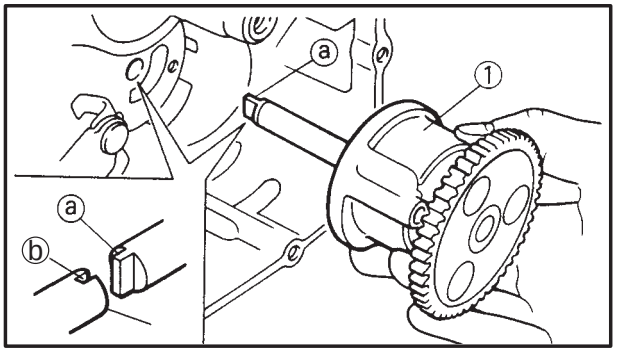


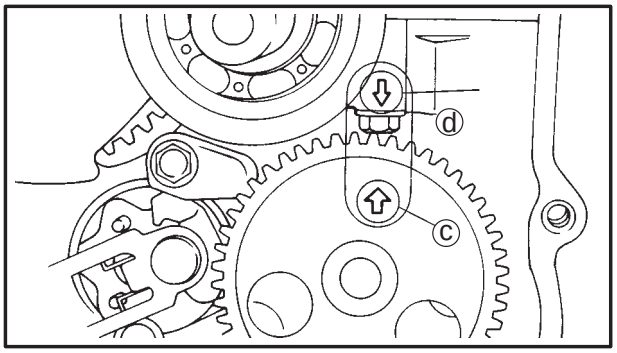
2. Install:
   ° oil pump shaft ①
   (to the oil pump cover ②)
   ° washer
   ° pin ③
   ° inner rotor ④
   ° outer rotor ⑤
   ° dowel pin ⑥
   ° oil pump housing ⑦ **7.0 Nm (0.7 m·kg)**

NOTE:
When installing the inner rotor, align the pin ⓐ in the oil pump shaft with the groove ⓑ on the inner rotor ①.



3. Check:
   ° oil pump operation
   Refer to “CHECKING THE OIL PUMP”.





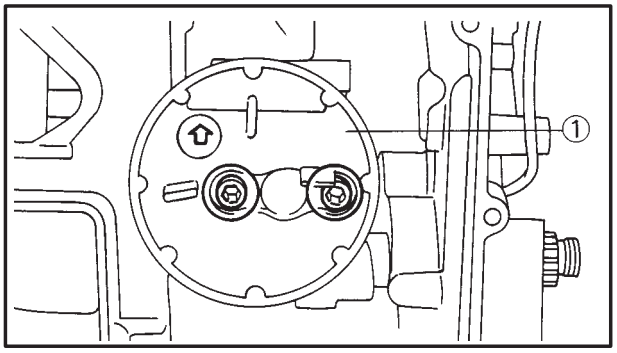
EB411710
INSTALLING THE OIL PUMP

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 ⓐ on the oil pump shaft with the slot ⓑ on the water pump shaft.

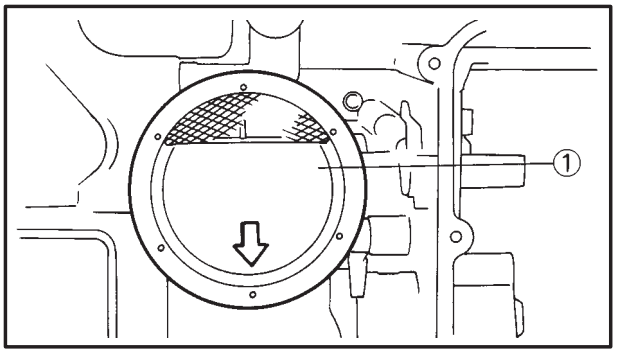
NOTE:
Align the arrow ⓒ on the oil pump with the arrow ⓓ on the crankcase.



EB411720
INSTALLING THE OIL STRAINER

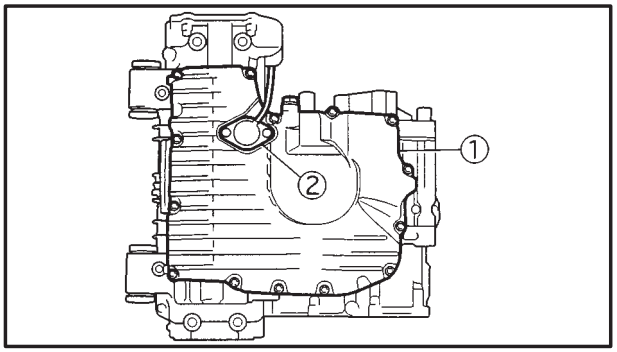
1. Install:
   - oil strainer housing ① — 10 Nm (10 m·kg) **LOCKTITE®**

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



2. Install:
   - oil strainer cover ①

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



EB411730
INSTALLING THE OIL PAN

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

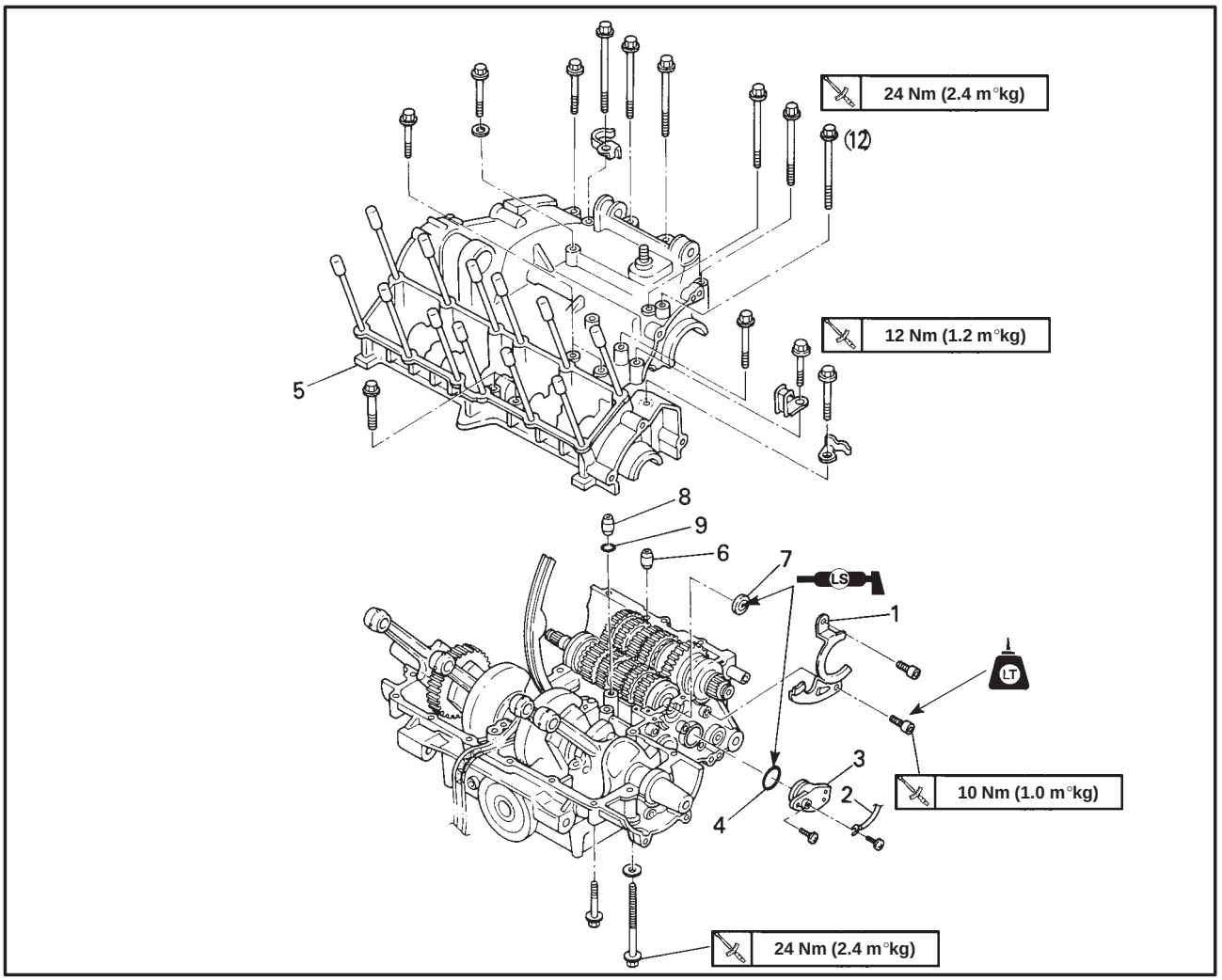
⚠ WARNING
Always use new copper washers.

NOTE:

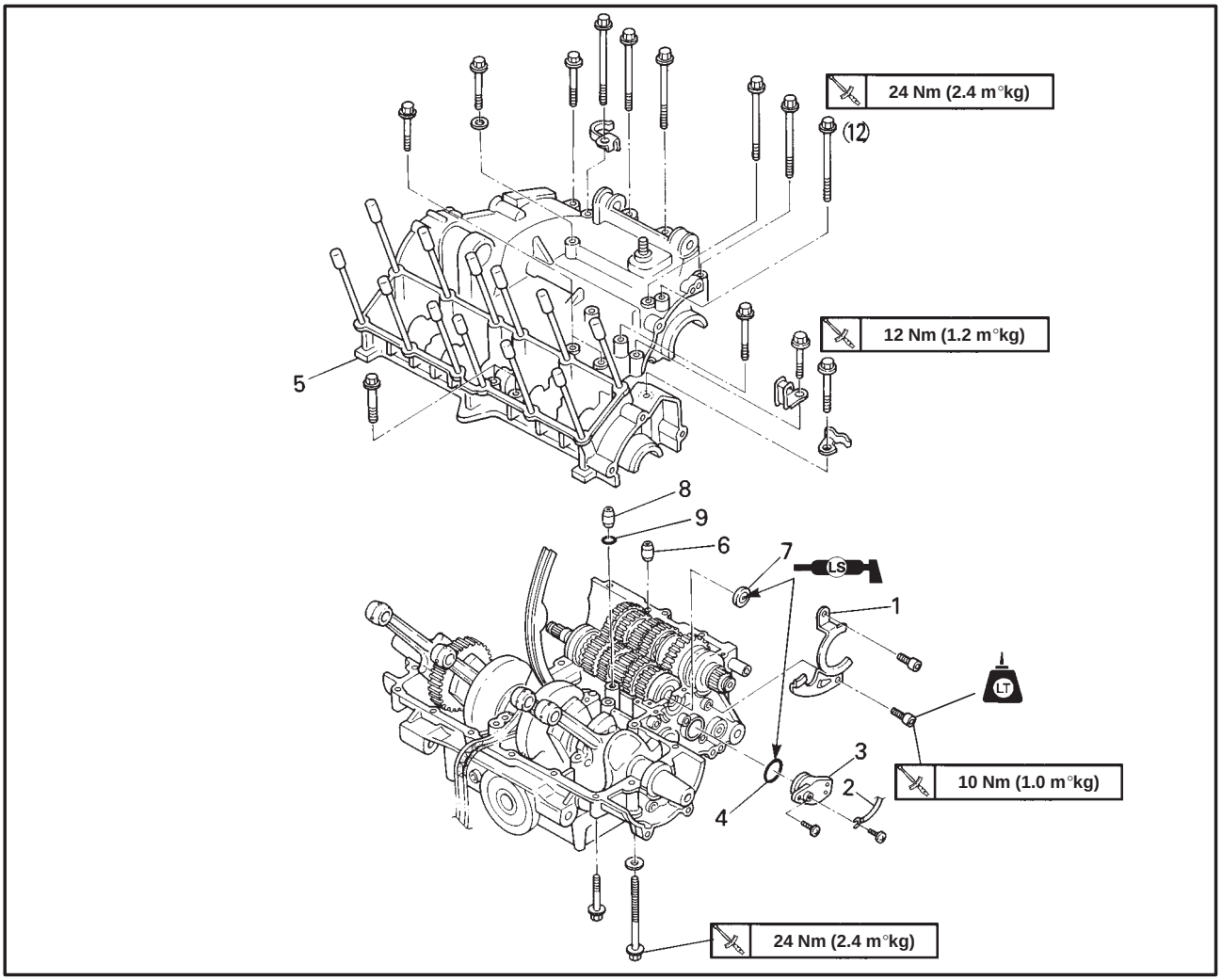
° Tighten the oil pan bolts in stages and in a crisscross pattern.
° Lubricate the oil level switch's O-ring with engine oil.

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

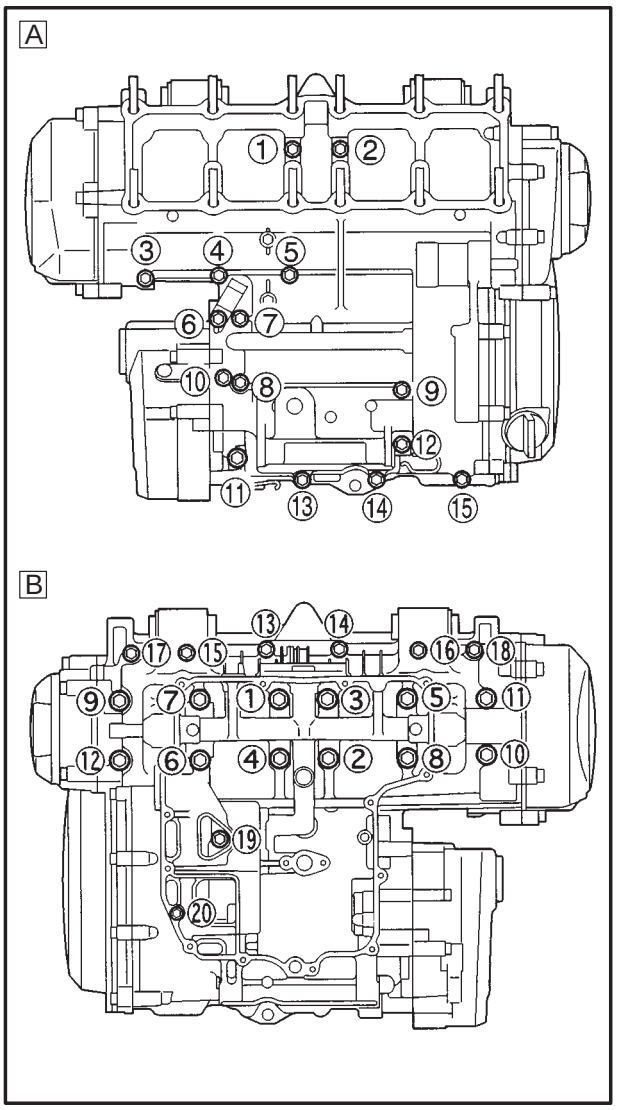
CRANKCASE



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



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



EB412100
DISASSEMBLING THE CRANKCASE

1. Remove:
   ° crankcase bolts ① × ⑮
   A Upper crankcase

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

2. Place the engine upside down.
3. Remove:
   ° lower crankcase bolts ① × ⑳
   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 → Replace.
   ° oil delivery passages
   Obstruction → Blow out with compressed air.

EB412742
ASSEMBLING THE CRANKCASE

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

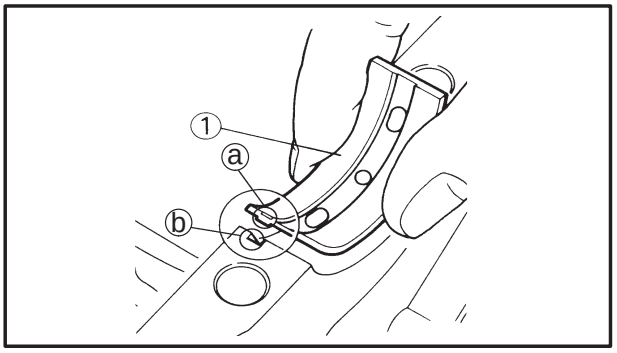
	Recommended lubricant **Engine oil**

2. Apply:
   ° sealant
   (onto the crankcase mating surfaces)

	Yamaha bond No. 1215 **90890-85505**

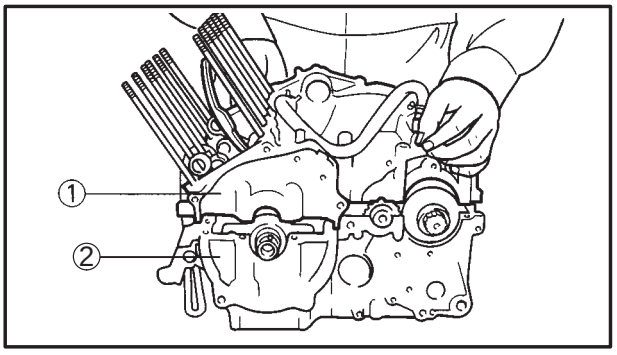
NOTE:
Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2 × 3 mm of the crankshaft journal bearings.

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

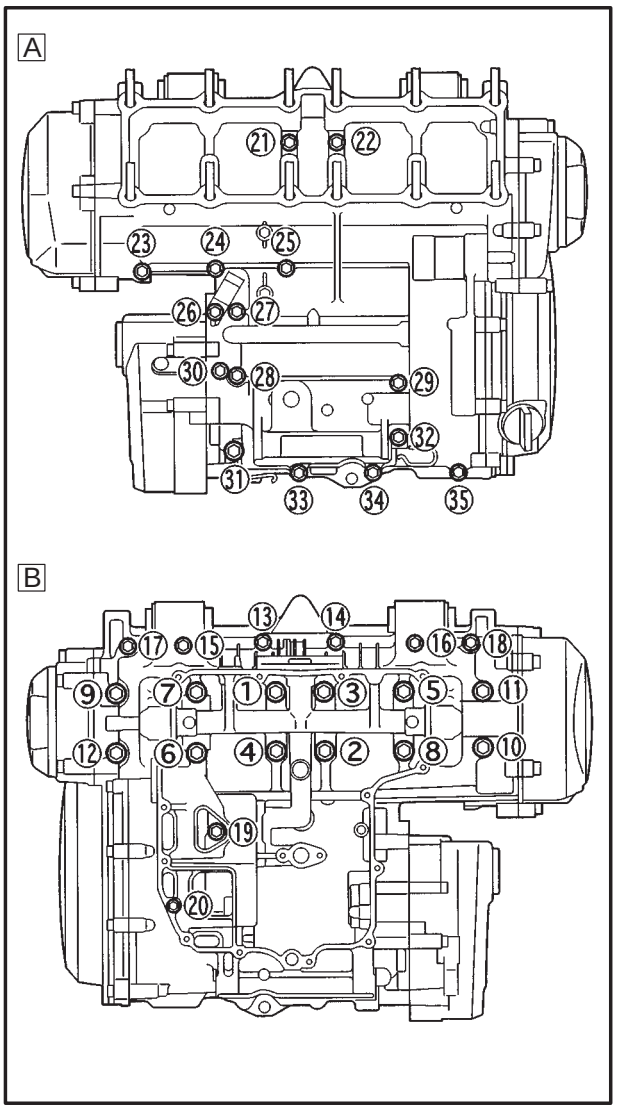


NOTE:
° Align the projections ⓐ on the crankshaft journal lower bearings with the notches ⓑ in the crankcase.
° Install each crankshaft journal lower bearing in its original place.

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.



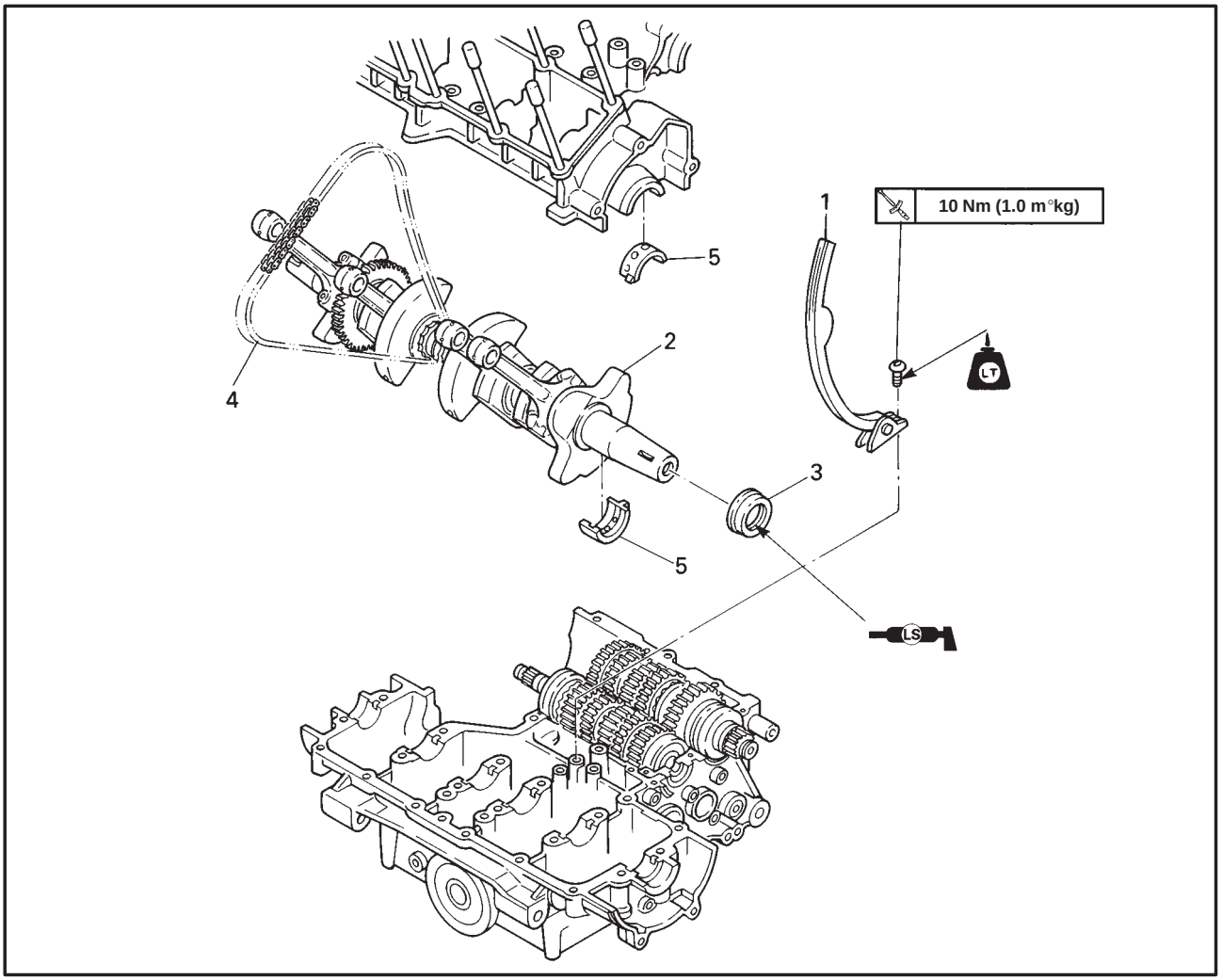
7. Install:
   - upper crankcase bolts
   - lower crankcase bolts

NOTE:
- Lubricate the bolt threads with engine oil.
- Tighten the bolts in increasing numerical order.
- Install washers on bolts ① × ⑫.
- Install the cable holder on bolt #35.

A Upper crankcase
B Lower crankcase

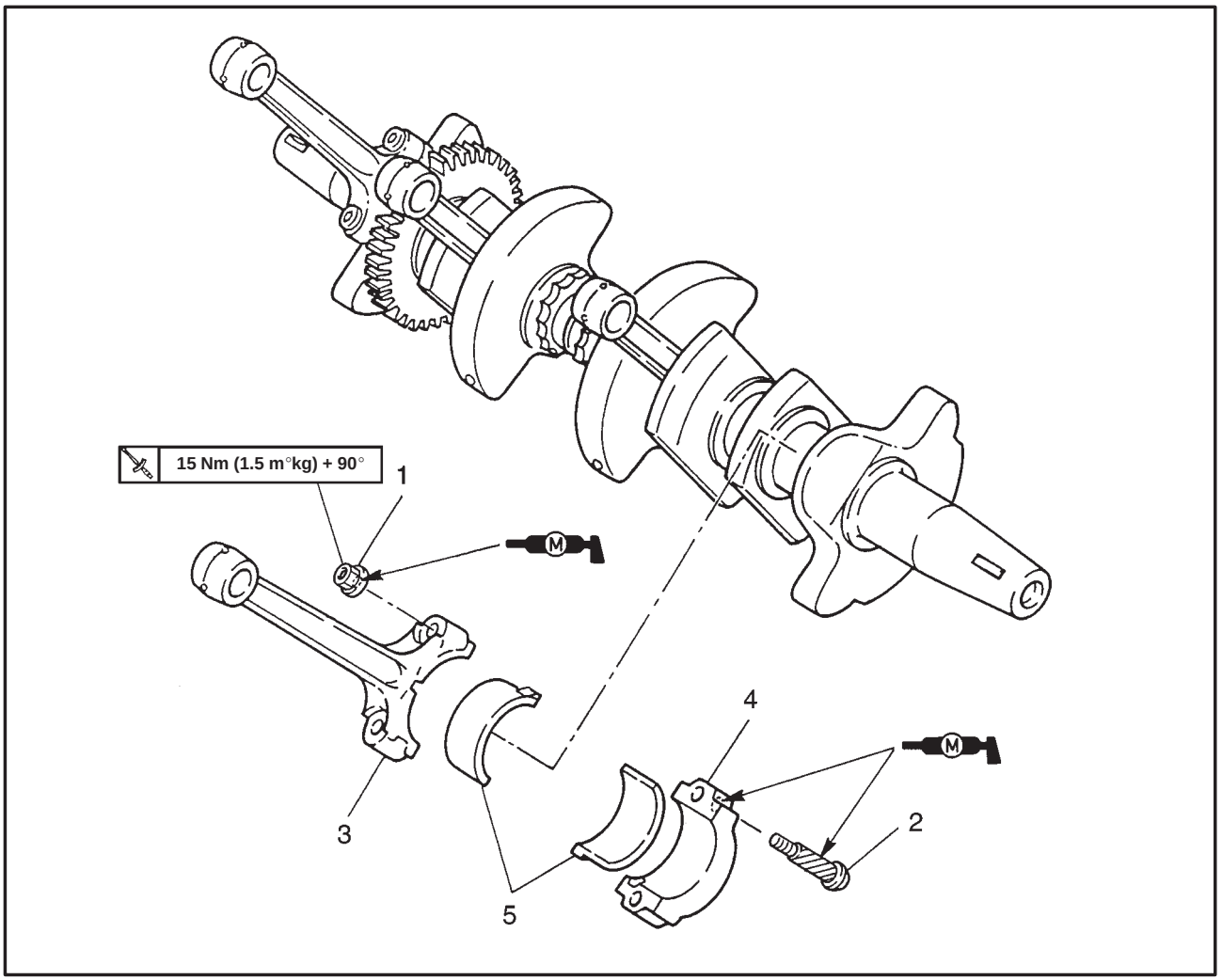
M8 bolt
24 Nm (2.4 m·kg)
M6 bolt
12 Nm (1.2 m·kg)

CRANKSHAFT

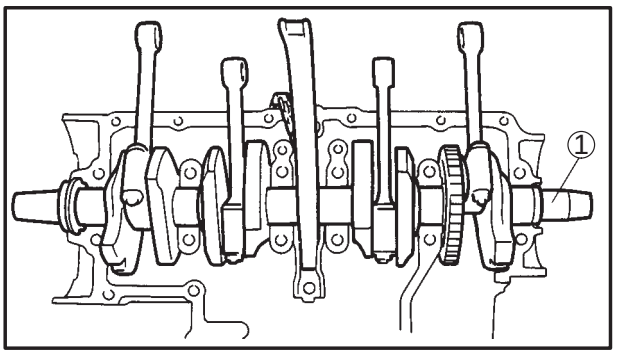


Order	Job name/Part name	Q'ty	Remarks
	Removing the crankshaft		Remove the parts in the order listed.
	Disassembly the crankcase		Refer to "CRANKCASE" section.
1	Timing chain guide (intake side)	1	
2	Crankshaft assembly	1	Refer to "REMOVING/INSTALLING THE
3	Oil seal	1	CRANKSHAFT ASSEMBLY" section.
4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

CONNECTING ROD



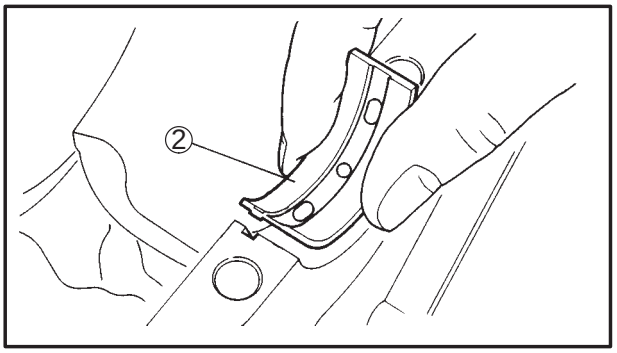
Order	Job name/Part name	Q'ty	Remarks
	Removing the connecting rod		Remove the parts in the order listed.
1	Nut	8	Refer to "INSTALLING THE CONNECTING RODS" section.
2	Connecting rod bolt	8	
3	Connecting rod	4	Refer to "REMOVING/INSTALLING THE CONNECTING RODS" section.
4	Connecting rod cap	4	
5	Connecting rod big end bearing	8	
			For installation, reverse the removal procedure.

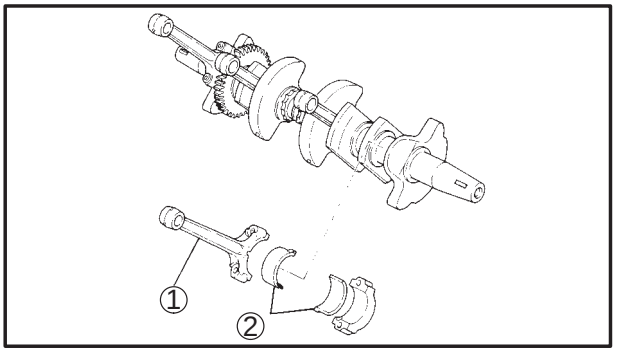


EB412110
REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
   ° 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.

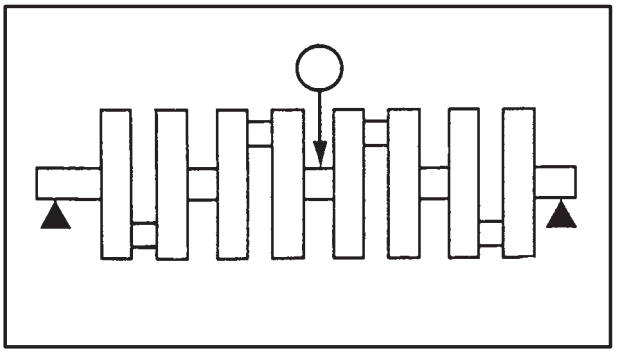




EB412121
REMOVING THE CONNECTING RODS

1. Remove:
   ° 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.



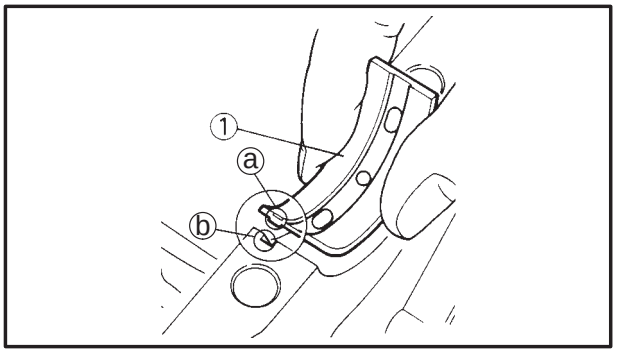
EB412401
CHECKING THE CRANKSHAFT AND CONNECTING RODS

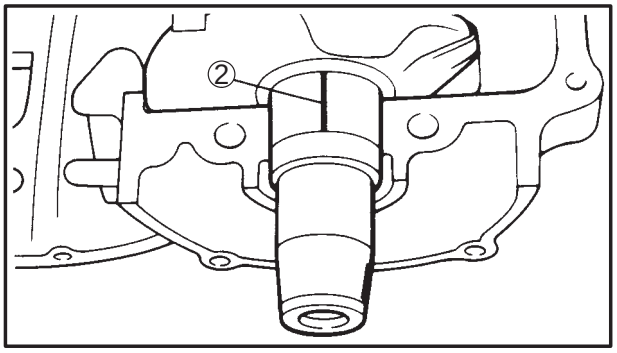
1. Measure:
   ° crankshaft runout
   Out of specification → Replace the crankshaft.

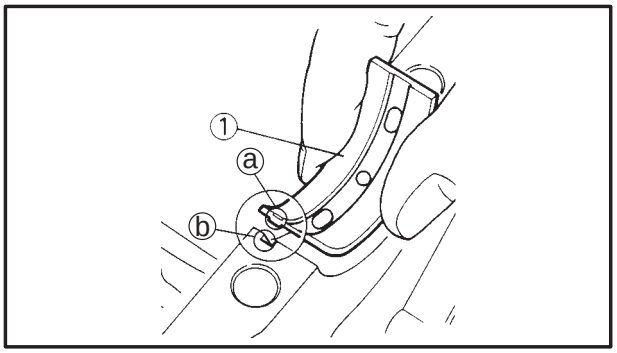
Crankshaft runout
Less than 0.03 mm

2. Check:
   ° crankshaft journal surfaces
   ° crankshaft pin surfaces
   ° bearing surfaces
   Scratches/wear → Replace the crankshaft.
3. Measure:
   ° crankshaft-journal-to-crankshaft-journal-bearing clearance
   Out of specification → Replace the crankshaft journal bearings.

Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.025 × 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.

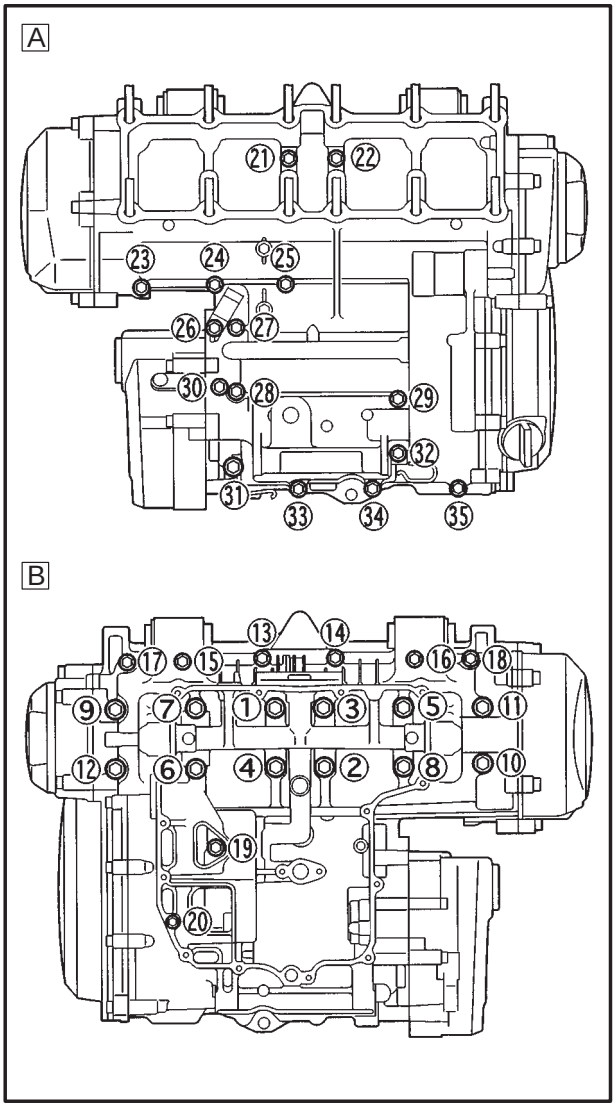
NOTE:
Align the projections ⓐ of the crankshaft journal upper bearings with the notches ⓑ in the crankcase.

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

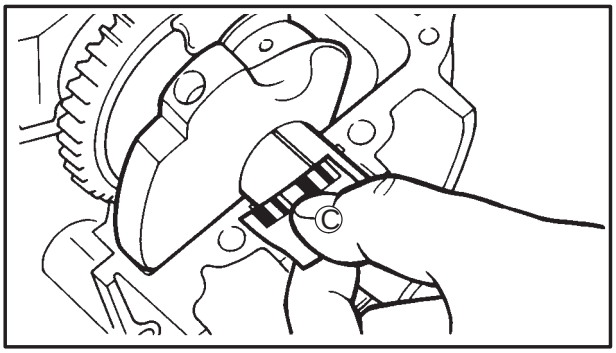


f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.

Crankcase bolt
M8:
24 Nm (2.4 m°kg)
M6:
12 Nm (1.2 m°kg)

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.

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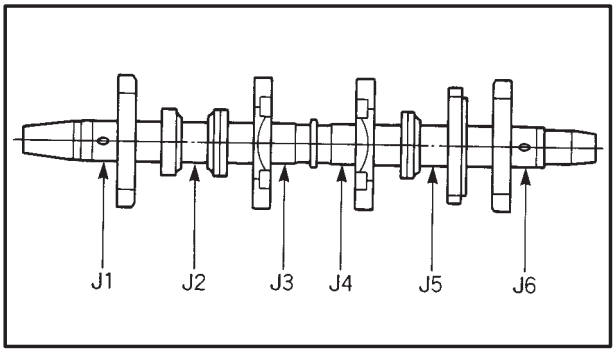
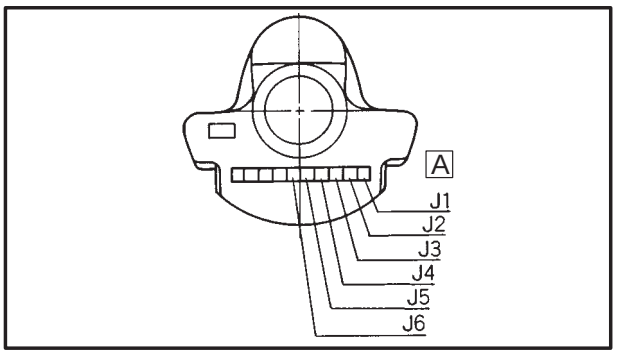
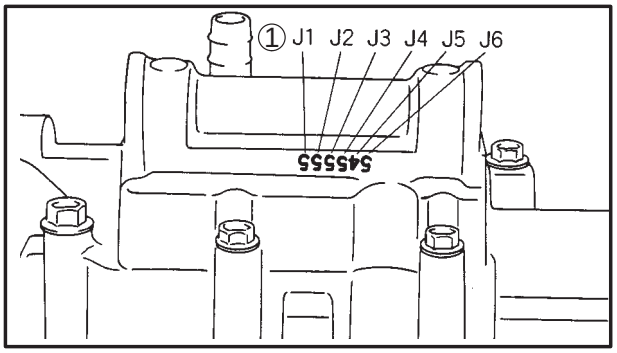
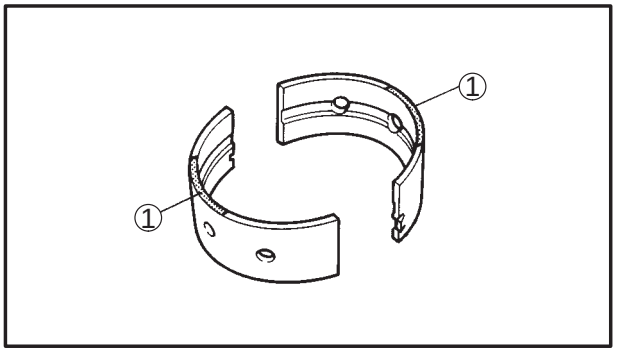


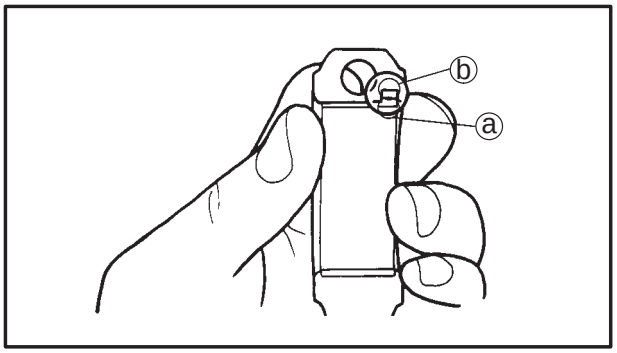
4. Select:
° Crankshaft journal bearings (J1 × J6)

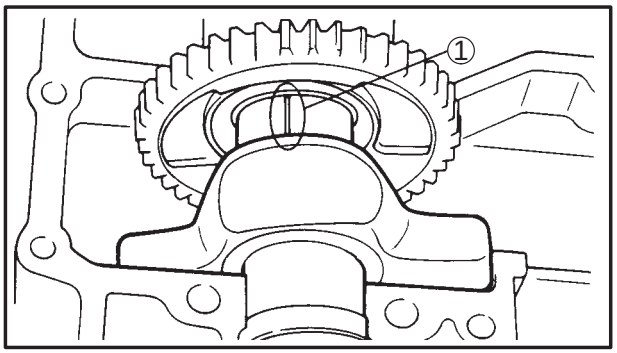
NOTE:
° The numbers A stamped into the crankshaft web and the numbers ① stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
° "J1 × J6" refer to the bearings shown in the crankshaft illustration.
° If "J1 × J6" are the same, use the same size for all 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:
J_1 (crankcase) – J1 (crankshaft web) + 1 = 6 – 2 + 1 = 5 (yellow)

CRANKSHAFT JOURNAL BEARING COLOR CODE①	1	2	3	4	5	6
	blue	black	brown	green	yellow	pink

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

Crankshaft-pin-to-big-end-bearing clearance
0.043 × 0.066 mm
Limit 0.08 mm

The following procedure applies to all of the connecting rods.

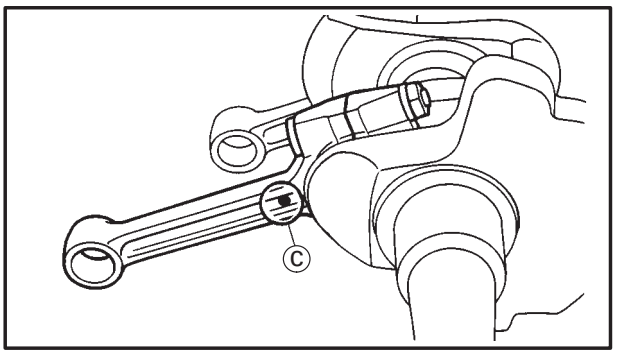
CAUTION:

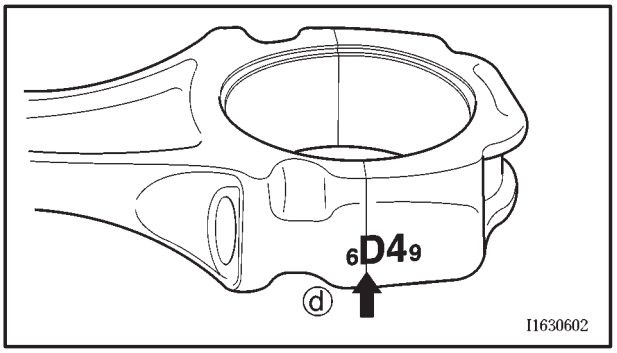
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

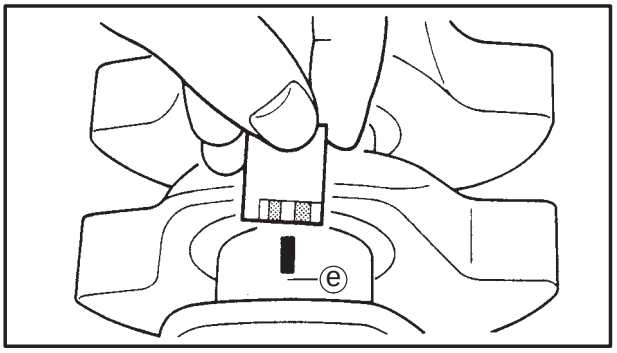
a. Clean the big end bearings, crankshaft pins, and bearing portions of the connecting rods.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

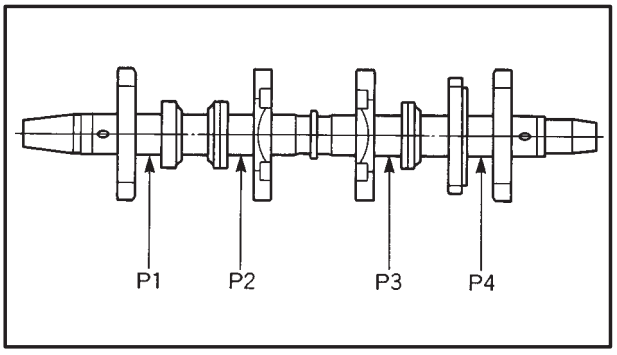
NOTE:
Align the projections ⓐ on the big end bearings with the notches ⓑ in the connecting rod and connecting rod cap.

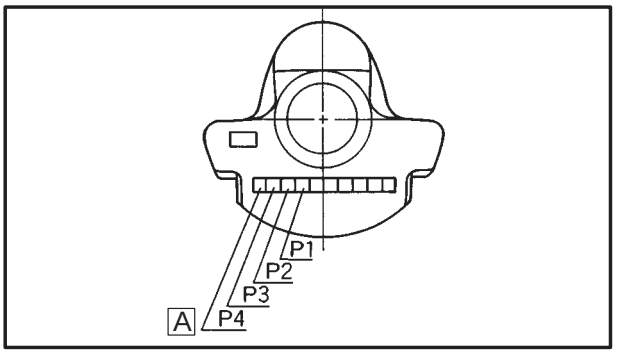
c. Put a piece of Plastigauge® ① on the crankshaft pin.











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.
- Make sure that the characters ⓓ on both the connecting rod and connecting rod cap are aligned.

e. Tighten the connecting rod nuts.

Nut (connecting rod):
15 Nm (1.5 m°kg, 11 ft°lb) +
(turn the nut another 90°)

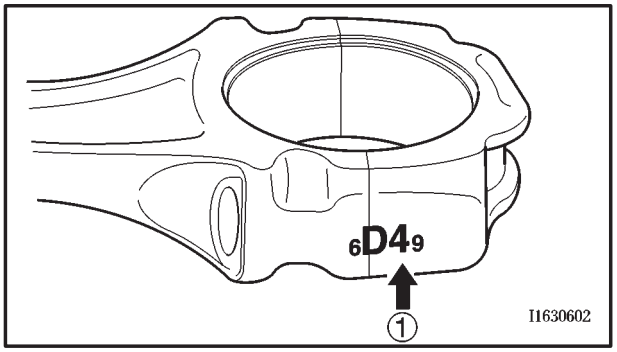
Refer to "INSTALLING THE CONNECTING RODS".

f. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS".

g. Measure the compressed Plastigauge® width ⓔ on the crankshaft pin.
If the clearance is out of specification, select replacement big end bearings.

6. Select:
- big end bearings ($P_1 \times P_4$)

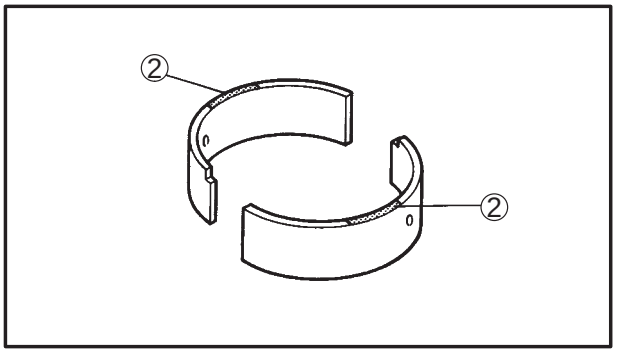
NOTE:
- The numbers [A] stamped into the crankshaft web and the numbers ① on the connecting rods are used to determine the replacement big end bearing sizes.
- "P1" × "P4" refer to the bearings shown in the crankshaft illustration.

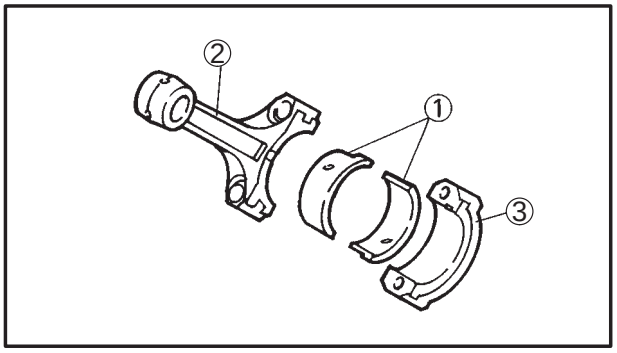


For example, if the connecting rod "P_1" and the crankshaft web "P1" numbers are "4" and "1" respectively, then the bearing size for "P_1" is:

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

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





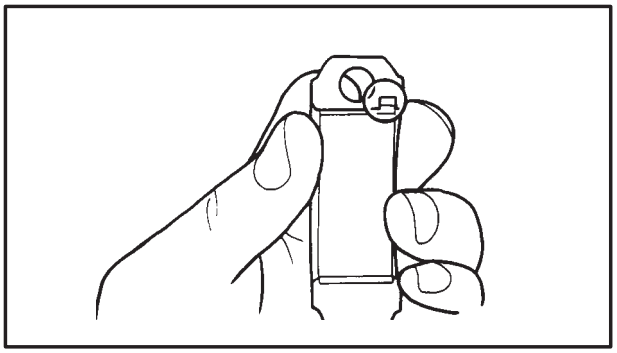
EB412700
INSTALLING THE CONNECTING RODS

1. Lubricate:
   ° bolt threads
   ° nut seats
   (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide grease

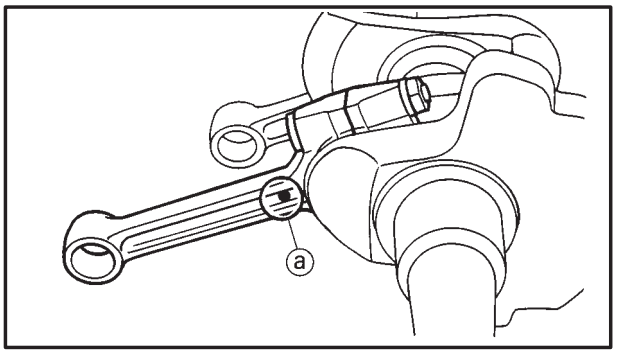
2. Lubricate:
   ° crankshaft pins
   ° big end bearings
   ° connecting rod inner surface
   (with the recommended lubricant)

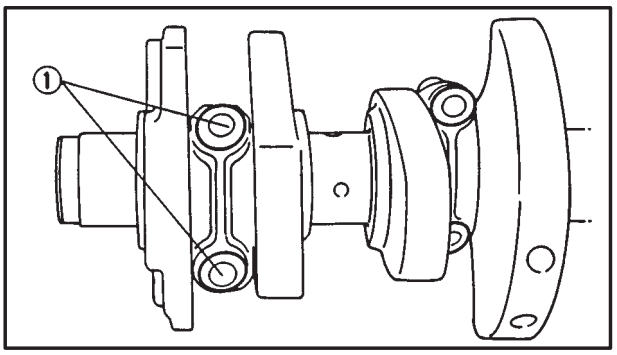
Recommended lubricant
Engine oil



3. Install:
   ° 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.
° Make sure that the "Y" marks ⓐ 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.





4. Align:
   ° bolt heads ①
   (with the connecting rod caps)
5. Tighten:
   ° Nuts (connecting rod)

Nut (connecting rod):
15 Nm (1.5 m°kg) +
(turn the nut another 90°)

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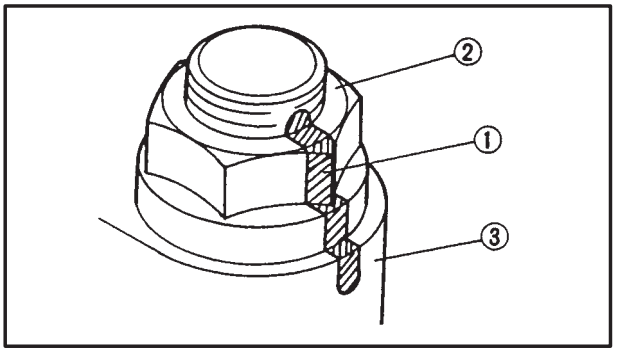
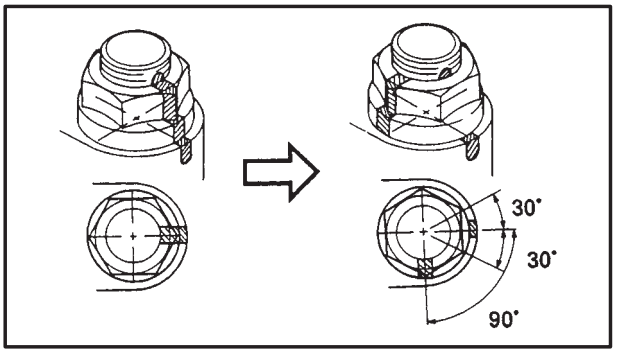
a. Replace the connecting rod bolts and nuts with new ones.

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°.

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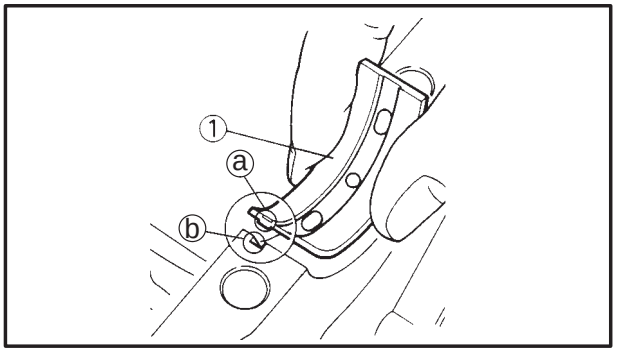
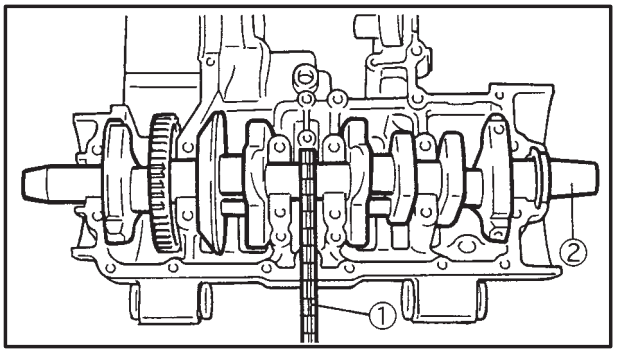
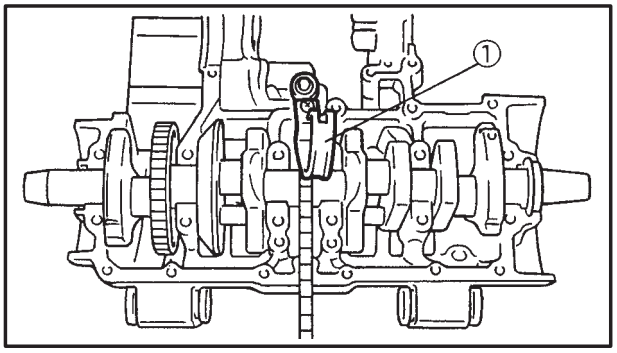






EB412720

INSTALLING THE CRANKSHAFT

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

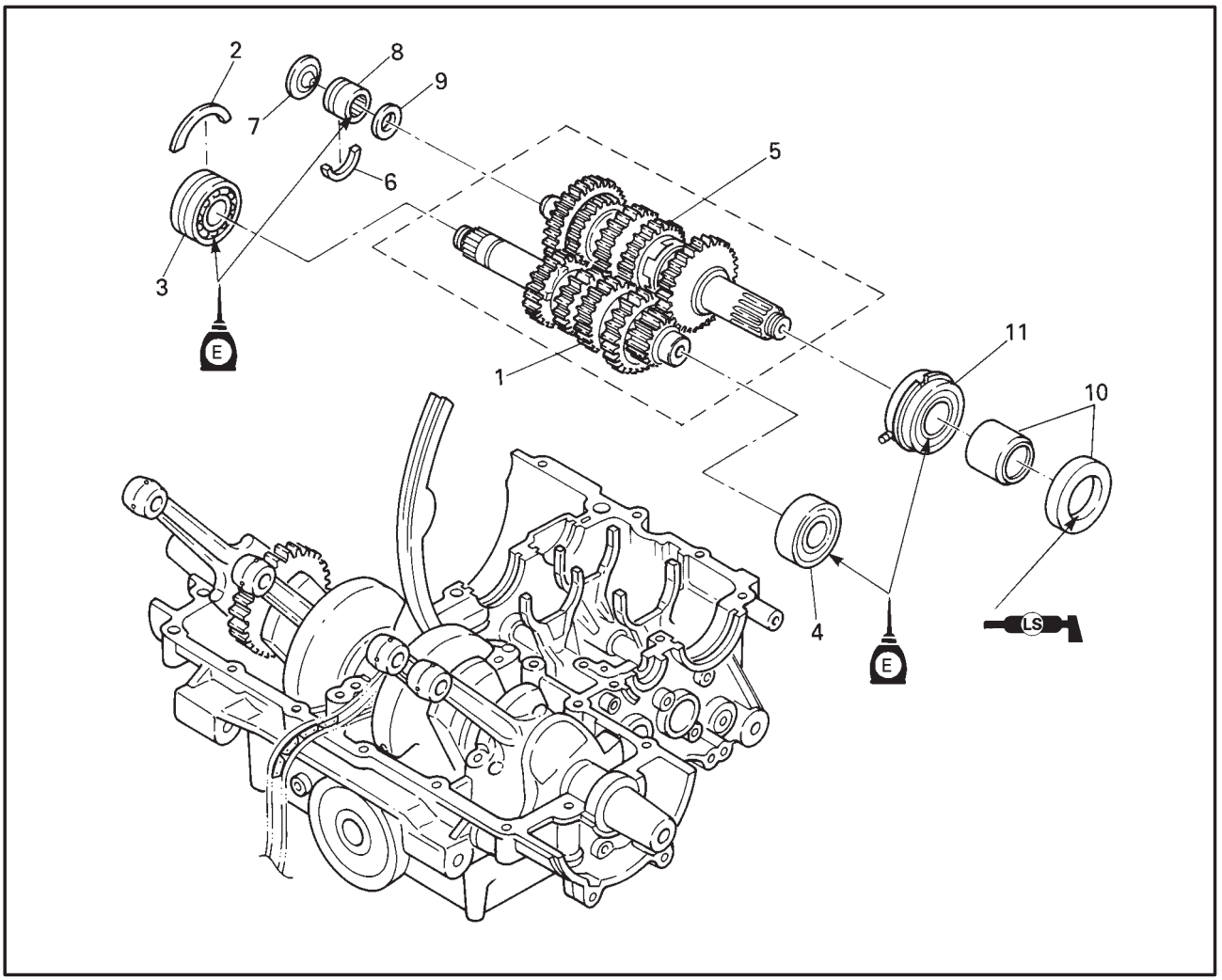
NOTE:
° Align the projections ⓐ on the crankshaft journal upper bearings with the notches ⓑ in the crankcase.
° Be sure to install each crankshaft journal upper bearing in its original place.

2. Install:
   ° timing chain ①
   (onto the crankshaft sprocket)
   ° crankshaft assembly ②

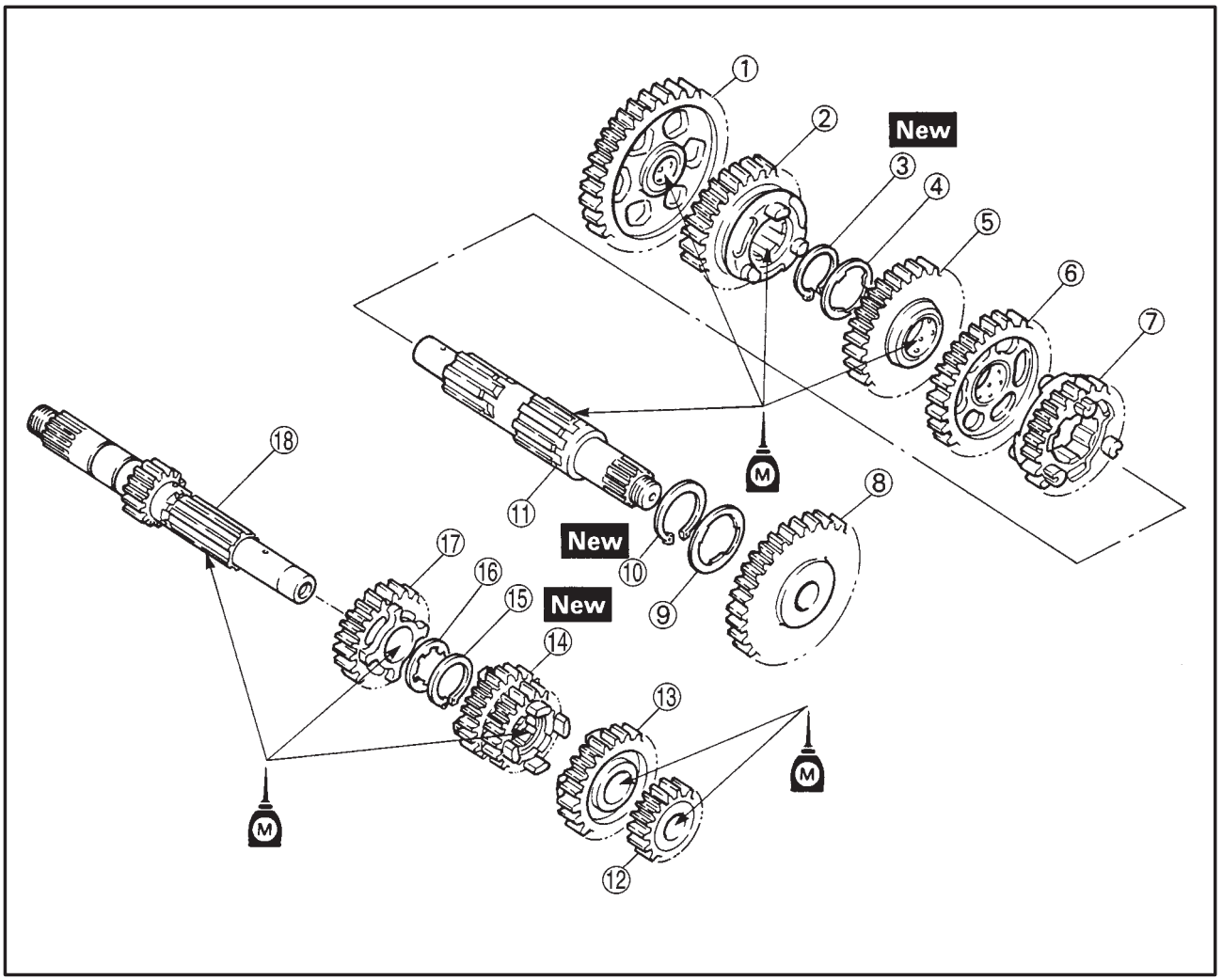
NOTE:
° Pass the timing chain through the timing chain cavity.
° To prevent the timing chain from falling into the crankcase, fasten it with a wire.

3. Install:
   ° timing chain guide ① 10 Nm (1.0 m°kg)

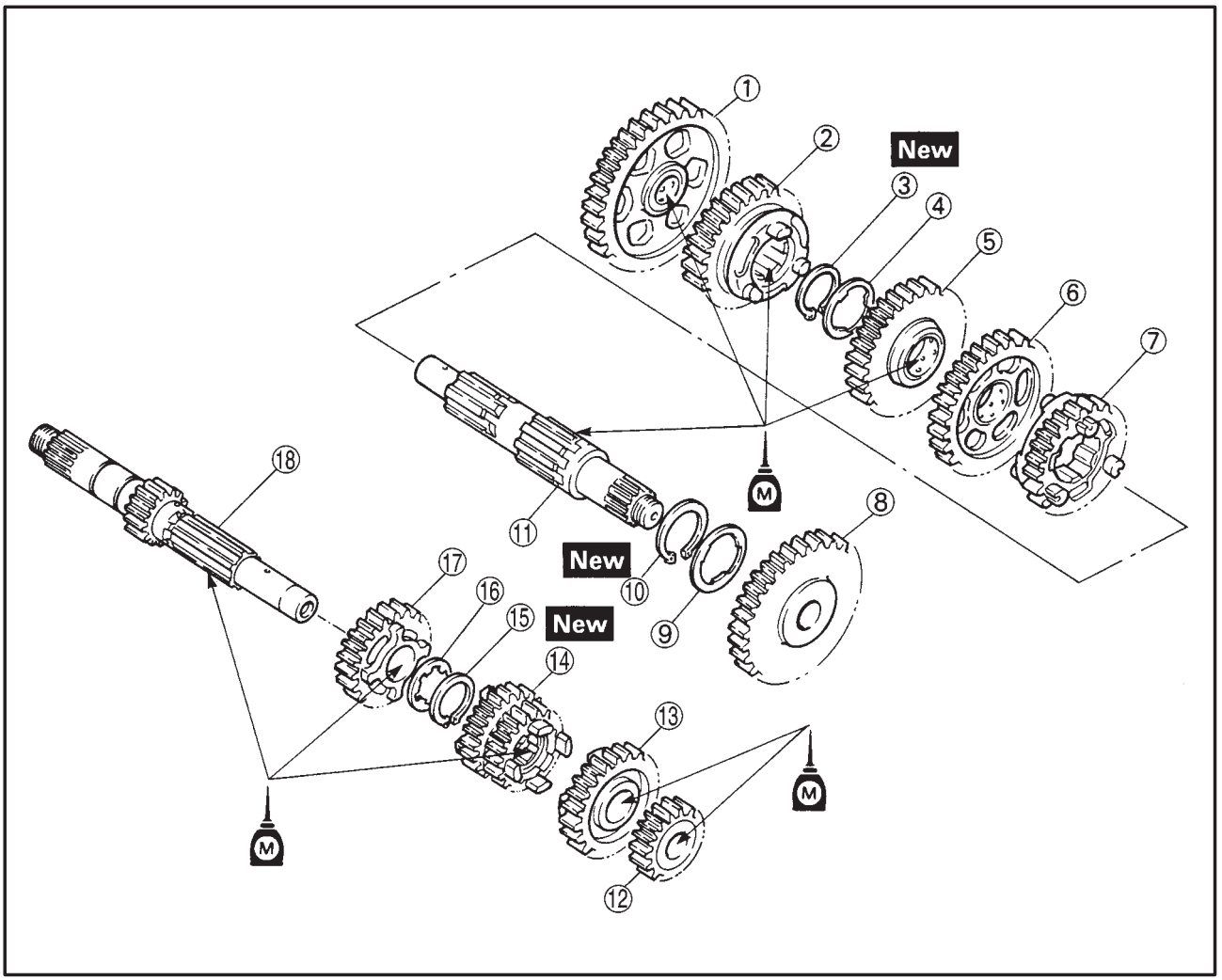
TRANSMISSION



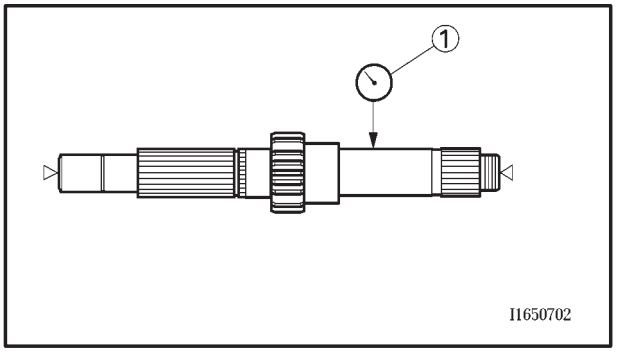
Order	Job name/Part name	Q'ty	Remarks
	Removing the transmission		Remove the parts in the order listed.
	Disassembly the crankcase		Refer to "CRANKCASE" section.
1	Main axle assembly	1	Refer to "INSTALLING THE
2	Circlip	1	TRANSMISSION" section.
3	Bearing	1	
4	Bearing	1	
5	Drive axle assembly	1	Refer 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.



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	
⑦	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	



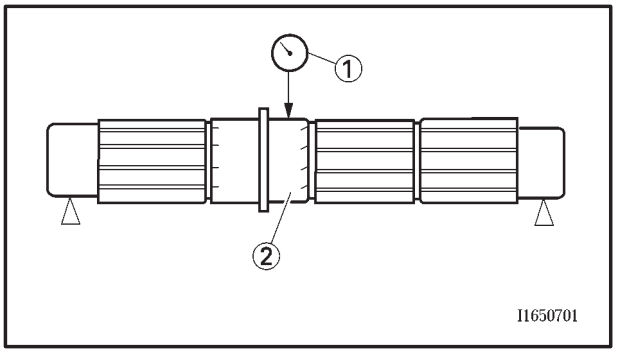
Order	Job name/Part name	Q'ty	Remarks
⑭	3rd/4th pinion gear	1	
⑮	Circlip	1	
⑯	Washer	1	
⑰	5th	1	
⑱	Main axle	1	
			For assembly, reverse the disassembly procedure.



EB413422
CHECKING THE TRANSMISSION

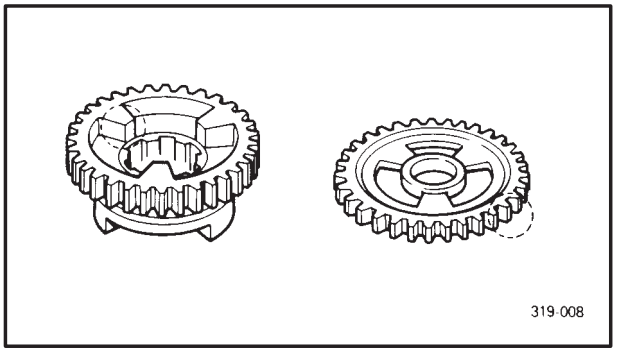
1. Measure:
   ° main axle runout
   (with a centering device and dial gauge ①)
   Out of specification → Replace the main axle.

Main axle runout limit
0.02 mm

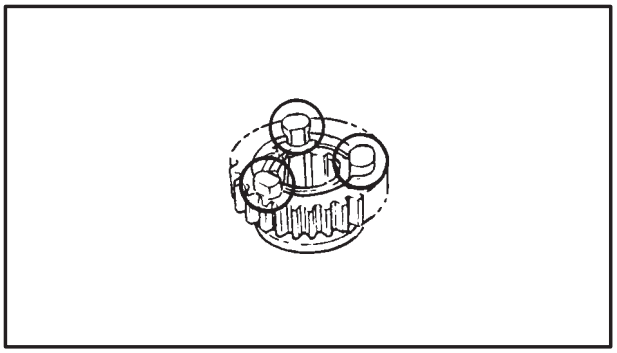


2. Measure:
   ° drive axle runout
   (with a centering device and dial gauge ①)
   Out of specification → Replace the drive axle.

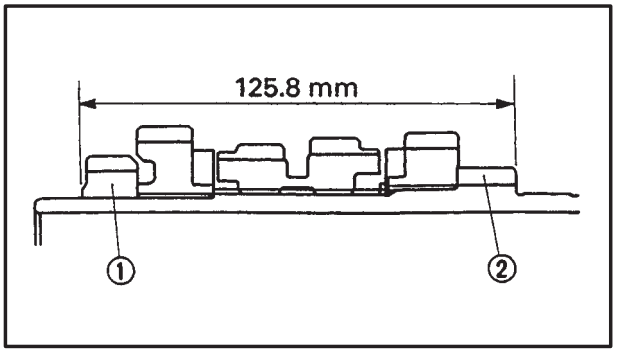
Drive axle runout limit
0.02 mm



3. Check:
   ° transmission gears
   Blue discoloration/pitting/wear → Replace the defective gear(-s).
   ° transmission gear dogs
   Cracks/damage/rounded edges → Replace the defective gear(-s).



4. Check:
   ° transmission gear engagement
   (each pinion gear to its respective wheel gear)
   Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   ° transmission gear movement
   Rough movement → Replace the defective part(-s).



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

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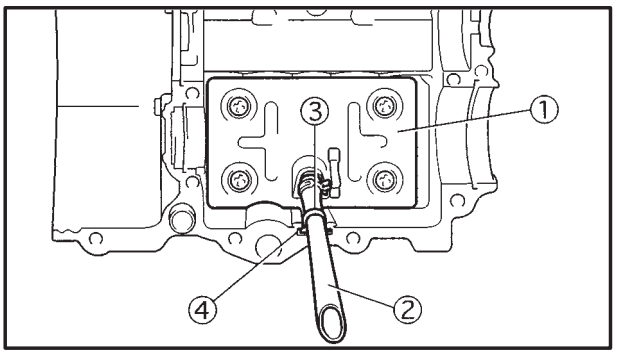
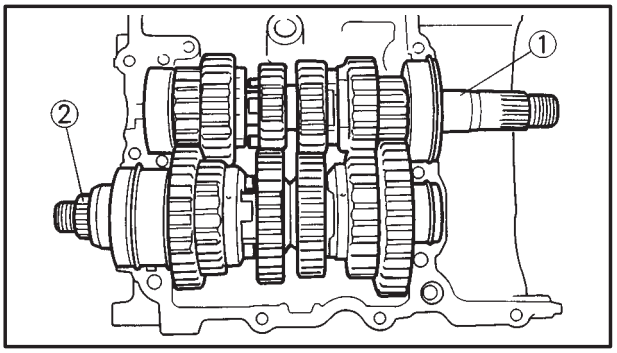


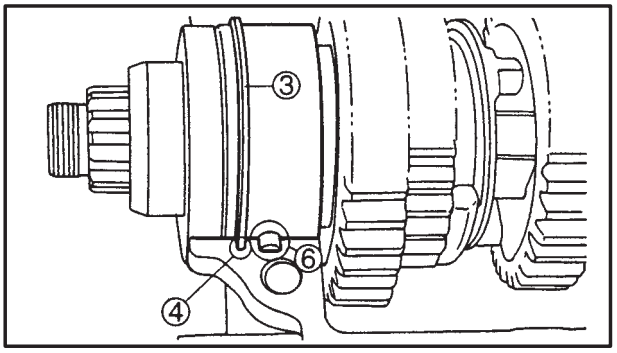
EB413710
INSTALLING THE TRANSMISSION

1. Install:
   ° oil baffle plate ①
   ° crankcase breather hose ②

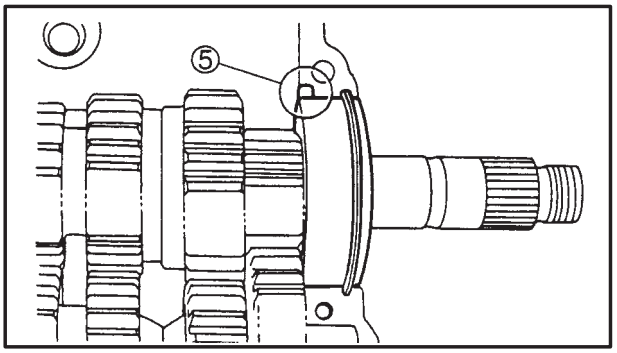
NOTE:
Insert the metal clamp ③ on the crankcase breather hose into the slots ④ in the crankcase.



2. Install:
   ° main axle assembly ①
   ° drive axle assembly ②
   ° oil seals
   ° circlips
   ° lock washer



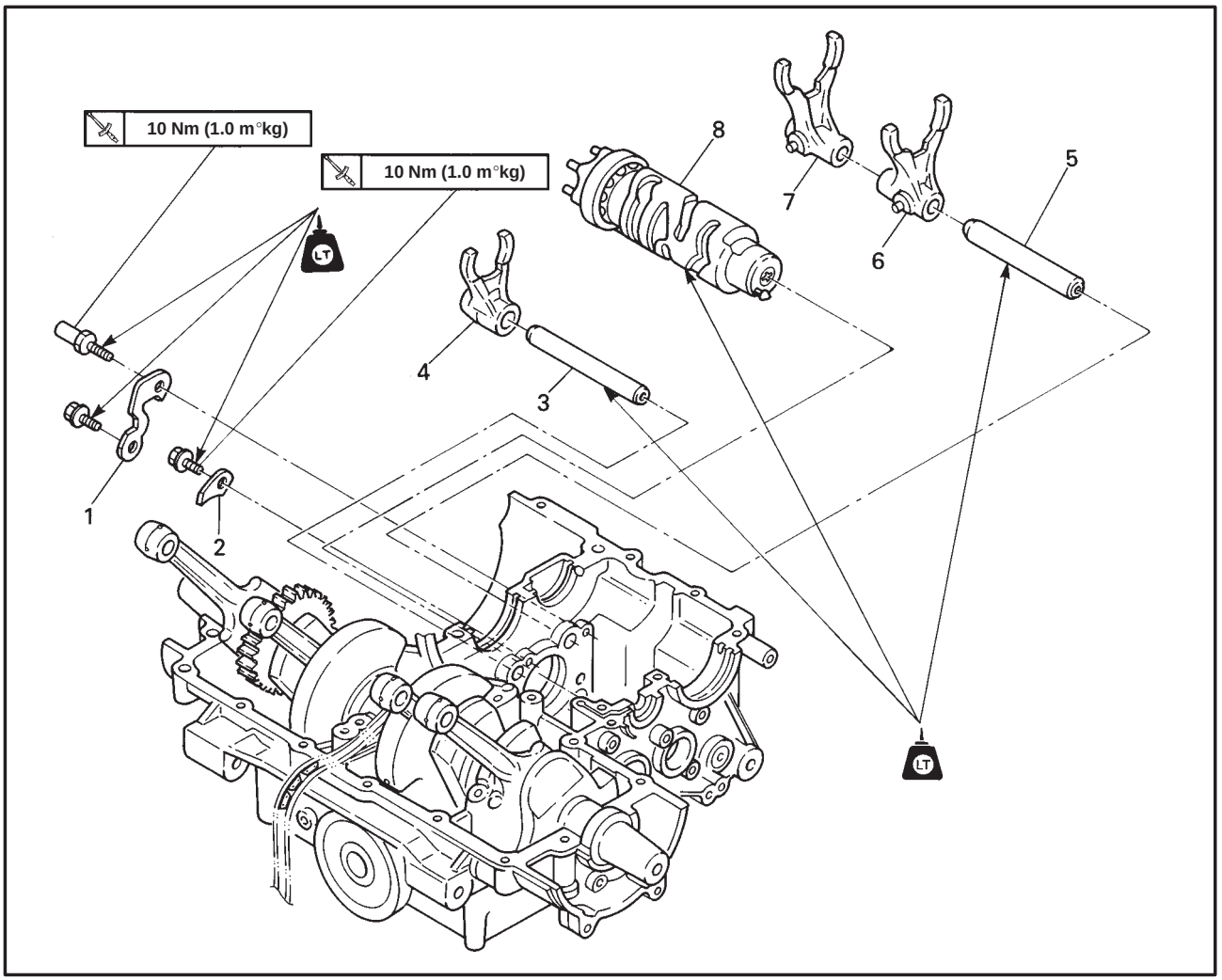
NOTE:
° Make sure that the drive axle bearing circlips ③ are inserted into the grooves ④ in the upper crankcase.
° The main axle bearing pin ⑤ must face towards the front of the crankcase and the drive axle bearing pin ⑥ must face towards the rear of the crankcase.



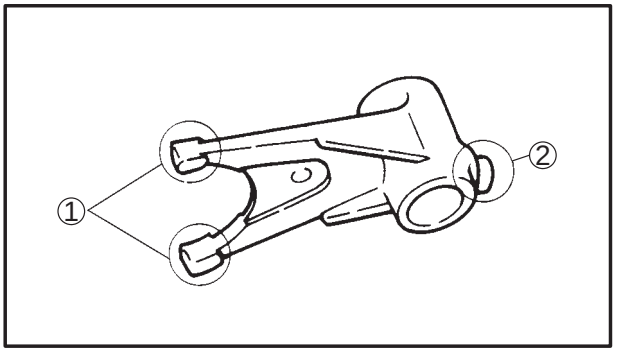
3. Check:
   ° transmission
   Rough movement → Repair.

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 shift forks		Remove the parts in the order listed.
	Disassembly the crankcase		Refer to "CRANKCASE" section.
	Transmission		Refer to "TRANSMISSION" section.
1	Shift fork guide bar retainer	1	Refer to "INSTALLING THE SHIFT FORKS AND SHIFT DRUM" section.
2	Shift drum retainer	1	
3	Shift fork guide bar 1	1	
4	Shift fork C	1	
5	Shift fork guide bar 2	1	
6	Shift fork L	1	
7	Shift fork R	1	
8	Shift drum	1	
			For installation, reverse the removal procedure.

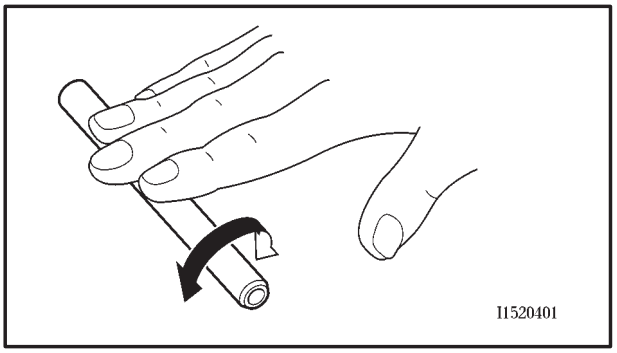


EB413400
CHECKING THE SHIFT FORKS

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 → Replace the shift fork.

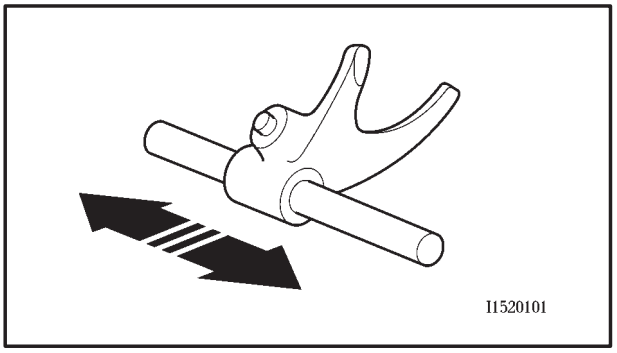


2. Check:
   - ° shift fork guide bar

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

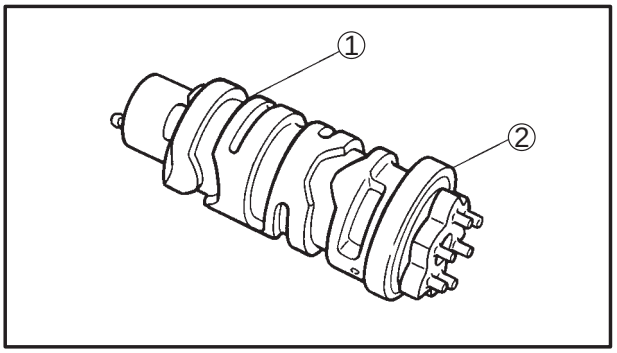
⚠ WARNING

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



3. Check:
   - ° shift fork movement

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



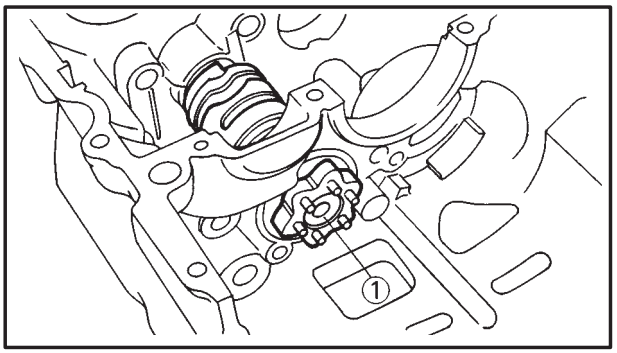
EB413410
CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
   - ° shift drum grooves

   Damage/scratches/wear → Replace the shift drum.
   - ° shift drum segment ①

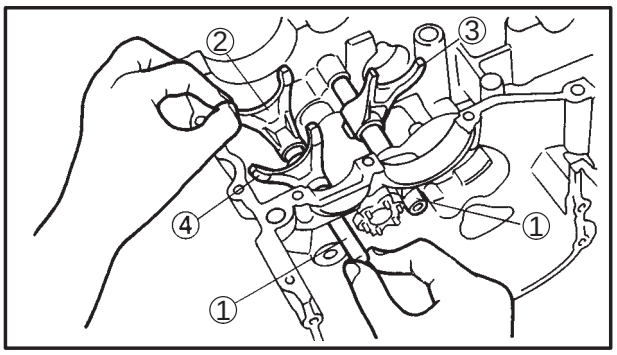
   Damage/wear → Replace.
   - ° shift drum bearing ②

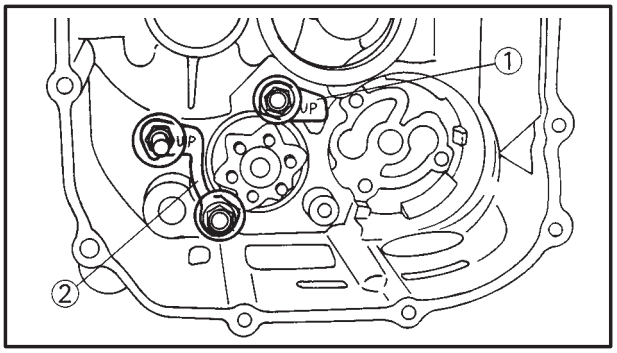
   Damage/pitting → Replace.



EB413701
INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY

1. Install:
   - ° shift drum assembly ①

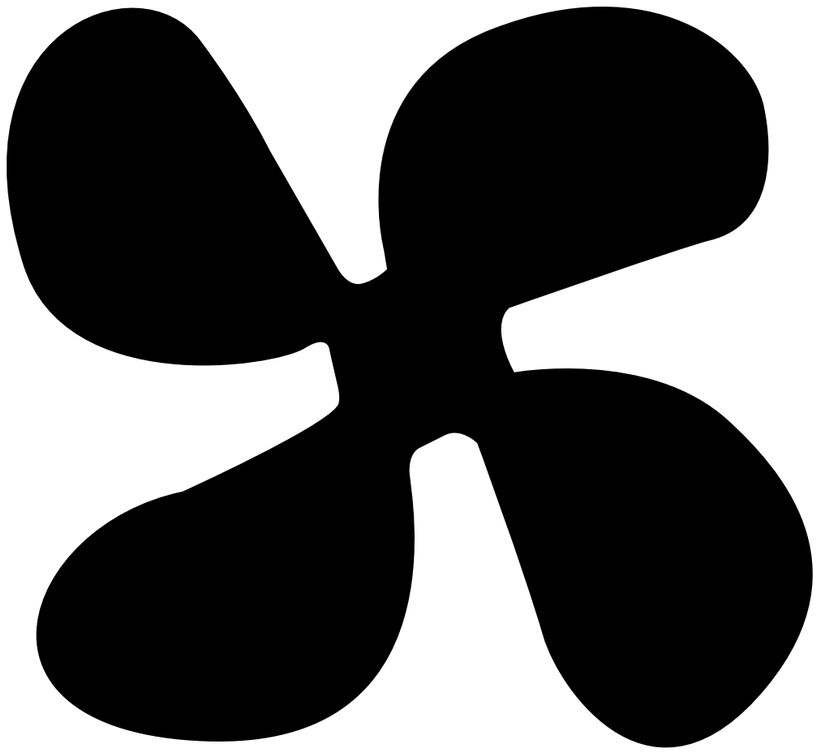




2. Install:
   - shift fork guide bars ①
   - shift fork “L” ②
   - shift fork “C” ③
   - shift fork “R” ④

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
     10 Nm (1.0 m•kg) **LOCKTITE**®
   - shift fork guide bar retainer ②
     10 Nm (1.0 m•kg)r



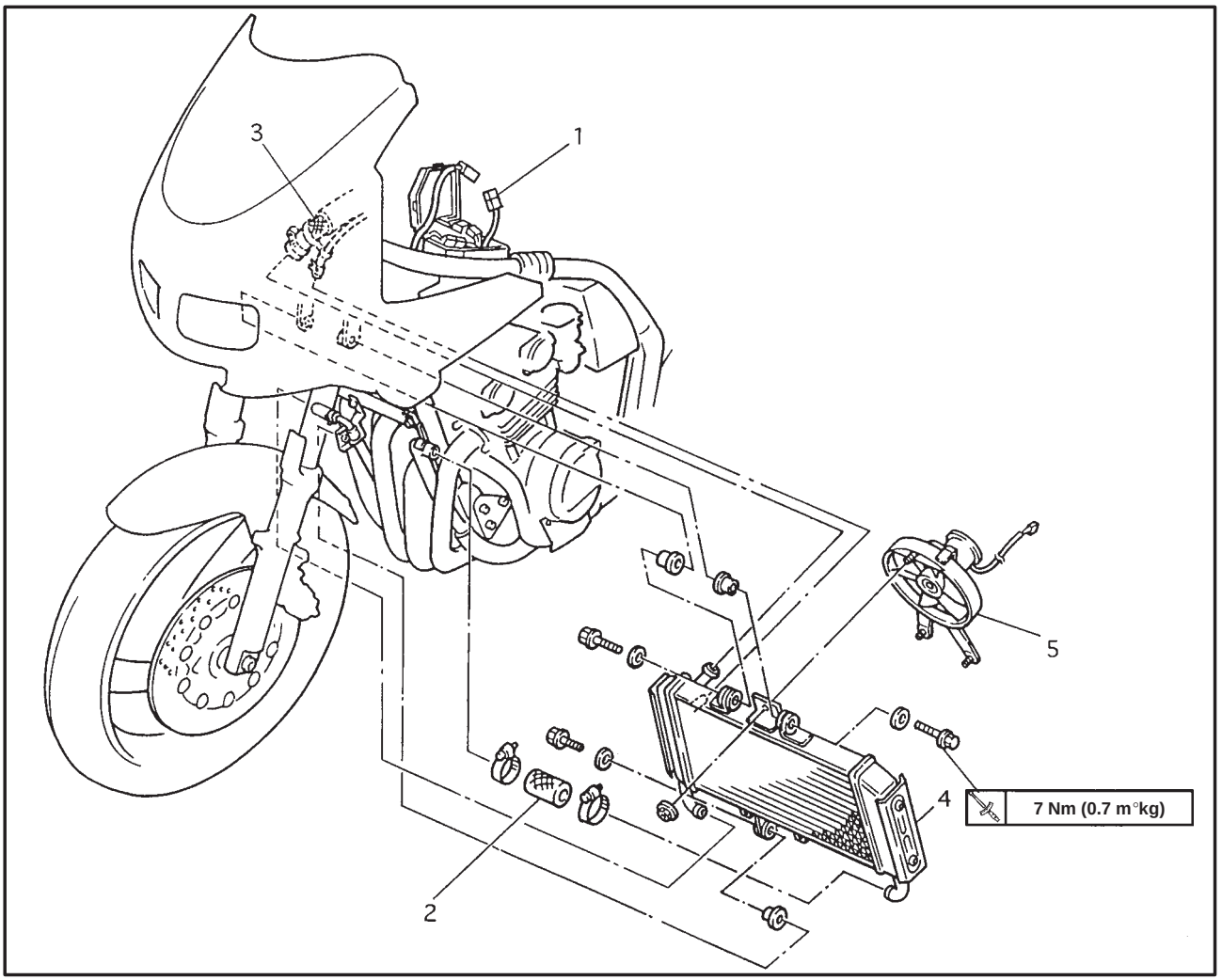
COOL 5

CHAPTER 5
COOLING SYSTEM

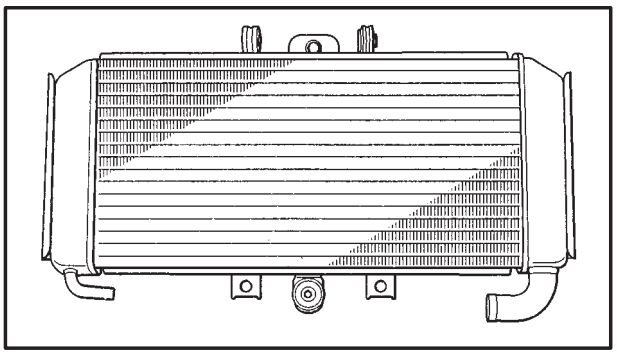
RADIATOR 5-1
CHECKING THE RADIATOR 5-2
INSTALLING THE RADIATOR 5-3
THERMOSTAT 5-4
CHECKING THE THERMOSTAT 5-6
ASSEMBLING THE THERMOSTAT 5-7
INSTALLING THE THERMOSTAT 5-7
WATER PUMP 5-8
REMOVING THE WATER PUMP 5-9
CHECKING THE WATER PUMP 5-9
INSTALLING THE WATER PUMP 5-9

COOLING SYSTEM

RADIATOR



Order	Job name/Part name	Q'ty	Remarks
	Removing the radiator		Remove the parts in the order listed.
	Seat		Refer to "FRONT COWLING/SEAT/SIDE COVER/FUEL TANK" section in chapter 3.
	Fuel tank		
	Drain the coolant		Refer to "CHANGING THE COOLANT" section in chapter 3.
1	Fan motor leads	1	**NOTE:**
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.



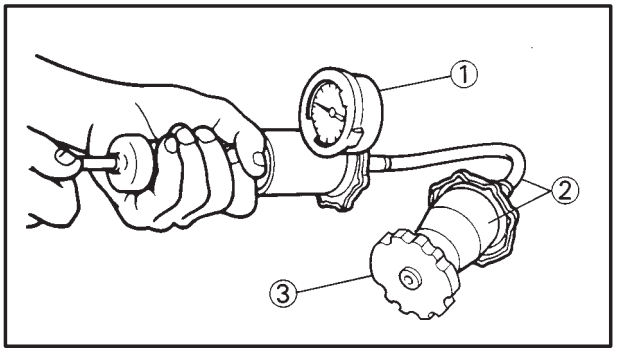
EB500010
CHECKING THE RADIATOR

1. Check:
   ° radiator fins
   Obstruction → Clean.
   Apply compressed air to the rear of the radiator.
   Damage → Repair or replace.

NOTE:
Straighten any flattened fins with a thin, flathead screwdriver.

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

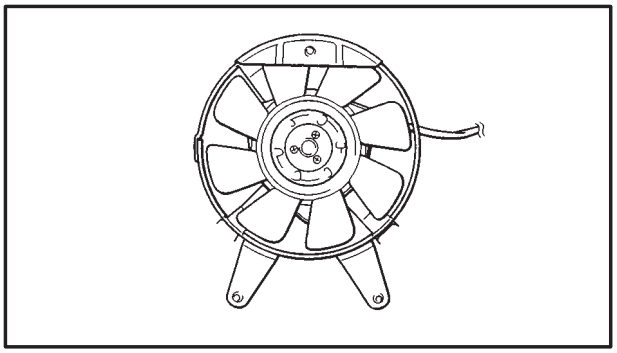
Radiator cap opening pressure
95 × 125 kPa
(0.95 × 1.25 kg/cm²)



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

Radiator cap tester
90890-01325
Adapter
90890-01352

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



4. Check:
   ° radiator fan
   Damage → Replace.
   Malfunction → Check and repair.
   Refer to “COOLING SYSTEM” in chapter 8.

EB500020
INSTALLING THE RADIATOR

1. Fill:
   ° cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” in chapter 3.
2. Check:
   ° cooling system
   Leaks → Repair or replace any faulty part.

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

Radiator cap tester:
90890-01325

b. Apply 100 kPa (1.0 kg/cm^2) of pressure.
c. Measure the indicated pressure with the gauge.

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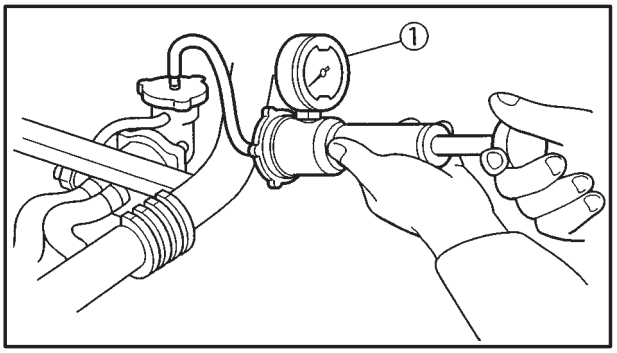
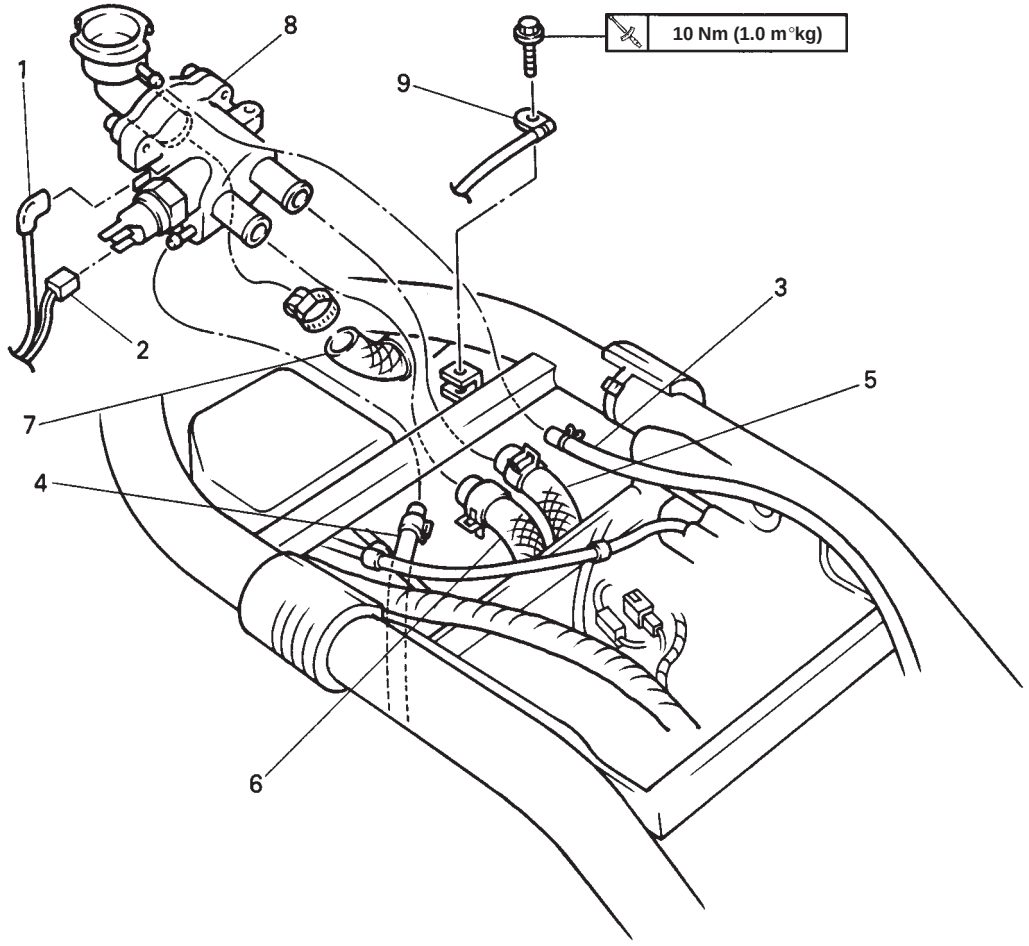
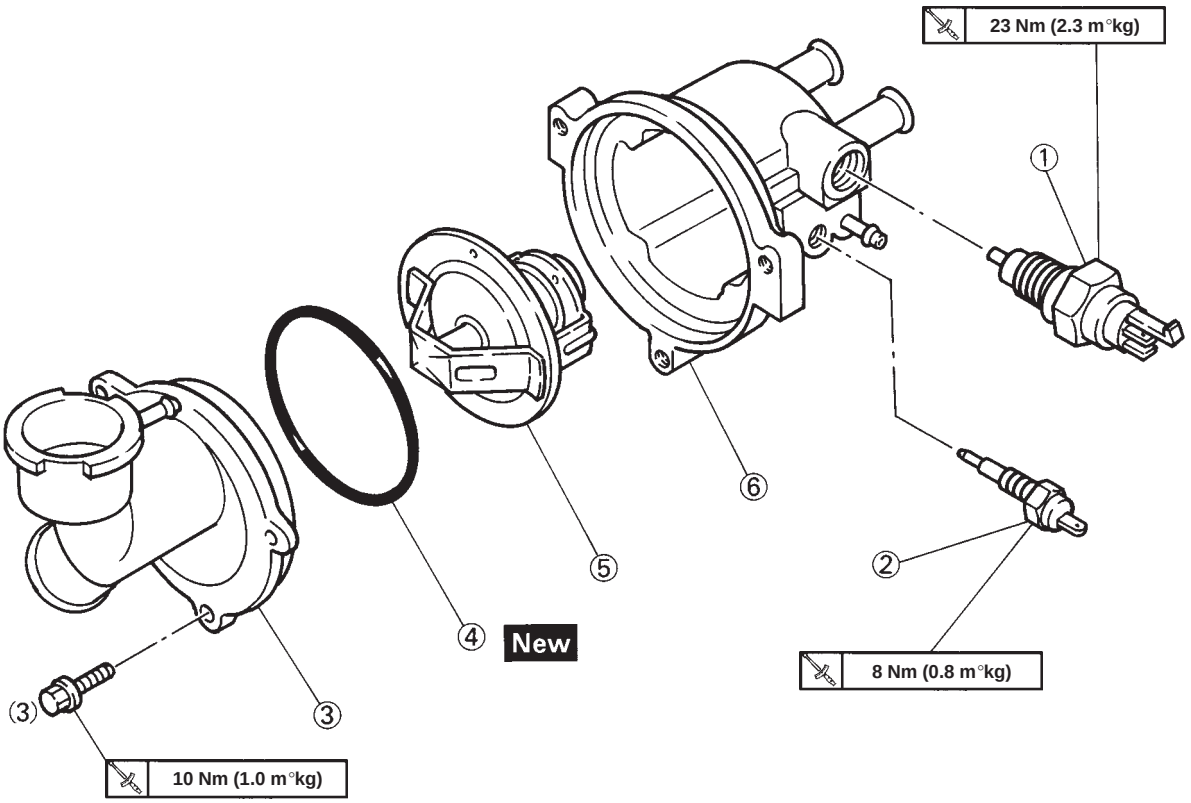


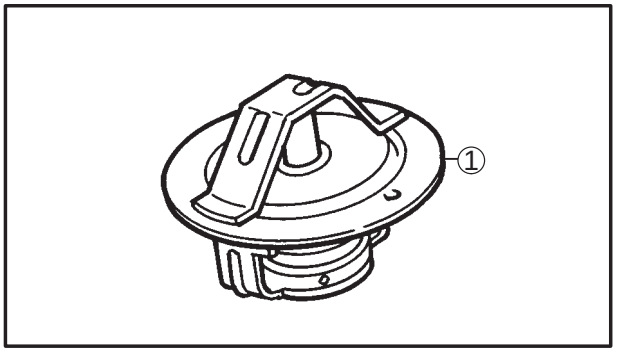
THERMOSTAT

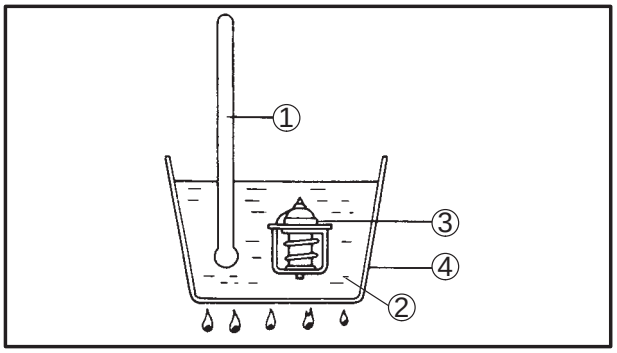


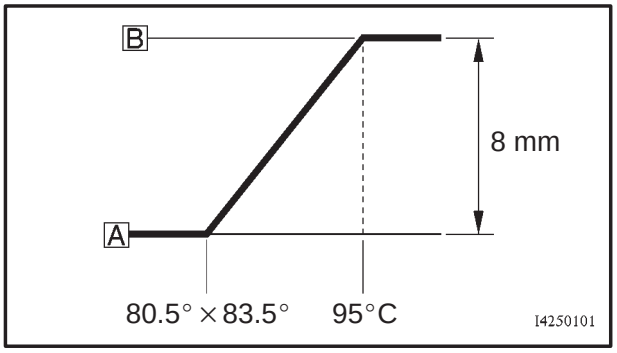
Order	Job name/Part name	Q'ty	Remarks
	Removing the thermostat		Remove the parts in the order listed.
	Seat Fuel tank		Refer to "FRONT COWLING/SEAT/SIDE COVER/FUEL TANK" section in chapter 3.
	Drain the coolant		Refer to "CHANGING THE COOLANT" section in chapter 3.
1	Thermo switch lead (engine temperature)	1	**NOTE:** Disconnect the lead.
2	Thermo switch lead (fan motor)	1	**NOTE:** Disconnect the coupler.
3	Reservoir tank hose	1	
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.

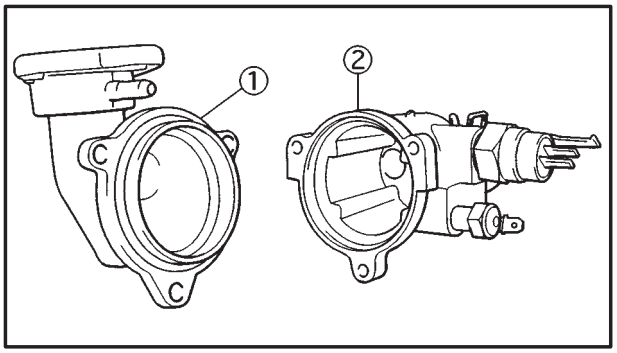


Order	Job name/Part name	Q'ty	Remarks
	Disassembling the thermostat		Disassembly the parts in the order listed.
①	Thermo switch (fan motor)	1	
②	Thermo switch (engine temperature)	1	
③	Thermostat housing cover	1	Refer to "ASSEMBLING THE THERMOSTAT" section.
④	O-ring	1	
⑤	Thermostat	1	
⑥	Thermostat housing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









EB502021
CHECKING THE THERMOSTAT

1. Check:
   ° thermostat ①
   Does not open at 80.5 × 83.5°C → Replace.

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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.

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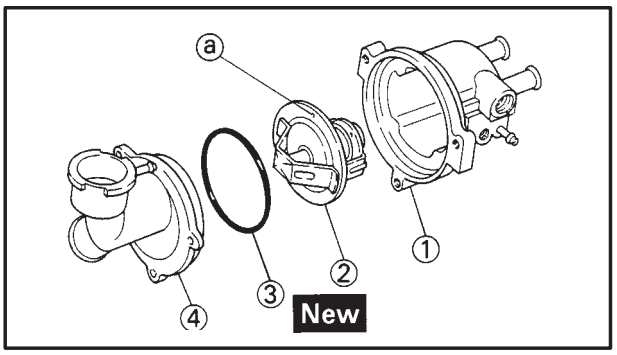
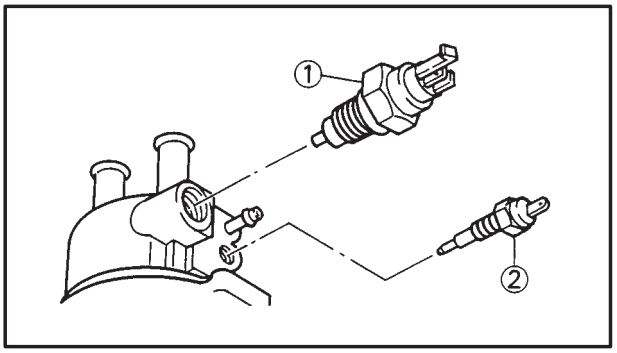
① Thermometer
② Water
③ Thermostat
④ Container
A Closes
B Opens

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

2. Check:
   ° thermostat housing cover ①
   ° thermostat housing ②
   Cracks/damage → 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 → Replace.





EB502030
ASSEMBLING THE THERMOSTAT

1. Install:
   - thermostat housing ①
   - thermostat ②
   - O-ring (New) ③
   - thermostat housing cover ④

NOTE:
Install the thermostat with its breather hole ⓐ facing up.

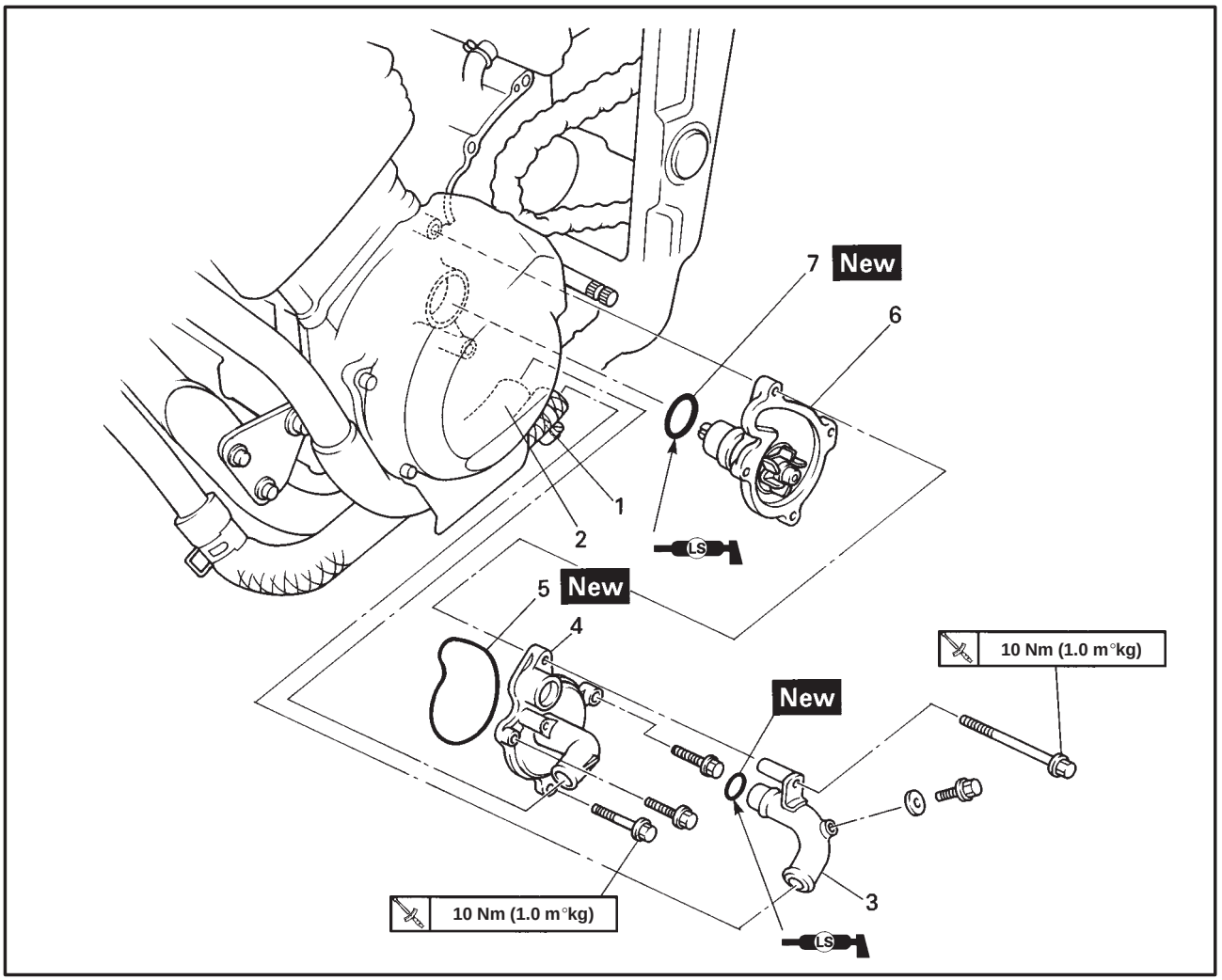
2. Install:
   - thermo switch (fan motor) ①
     23 Nm (2.3 m·kg)
   - thermo switch (engine temperature) ②
     8 Nm (0.8 m·kg)

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

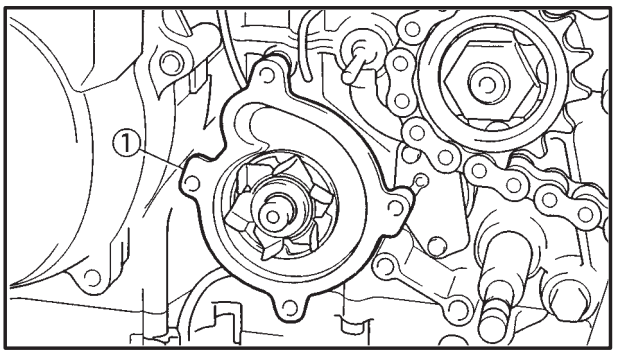
EB502040
INSTALLING THE THERMOSTAT

1. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” in chapter 3.
2. Check:
   - cooling system
     Leaks → Repair or replace any faulty part.
3. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR”.

WATER PUMP



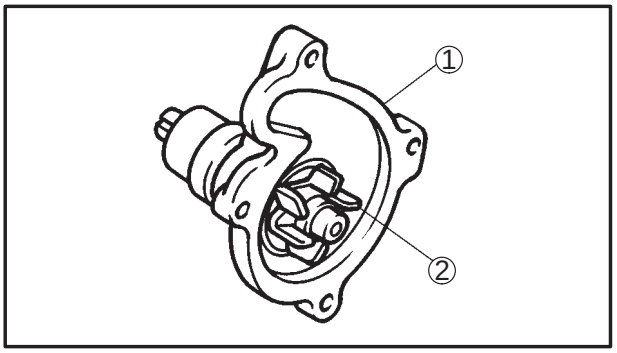
Order	Job name/Part name	Q'ty	Remarks
	Removing the water pump		Remove the parts in the order listed.
	Drain the coolant		Refer to "CHANGING THE COOLANT" section in chapter 3.
	Shift arm, drive chain cover		Refer to "REMOVING THE ENGINE" section in chapter 4.
1	Radiator outlet hose	1	
2	Water pump outlet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



EB503020
REMOVING THE WATER PUMP

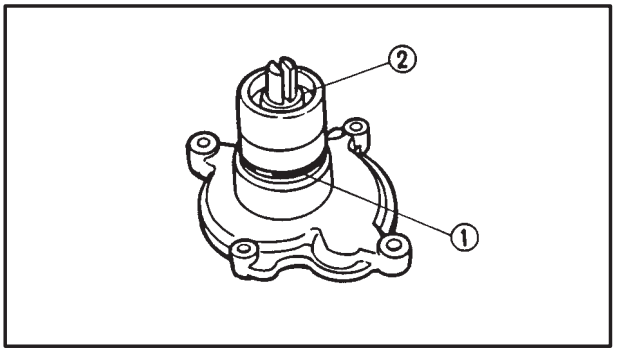
1. Remove:
   ° water pump housing ①

NOTE:
Tap out the water pump seal from the inside of the water pump housing.

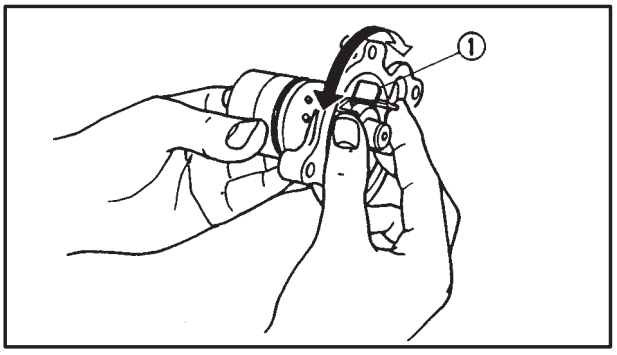


EB503032
CHECKING THE WATER PUMP

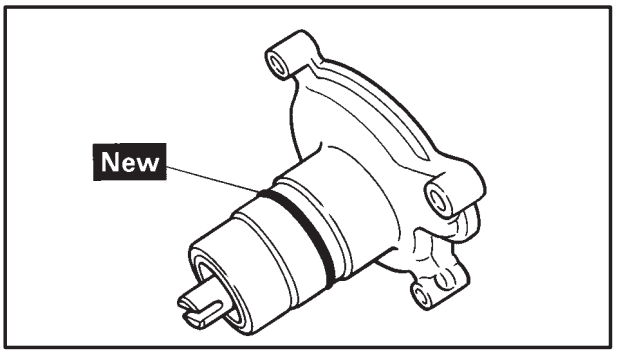
1. Check:
   ° water pump housing cover
   ° water pump housing ①
   ° impeller ②



2. Check:
   ° water pump seal ①
   ° oil seal ②
   Cracks/damage/wear → Replace.



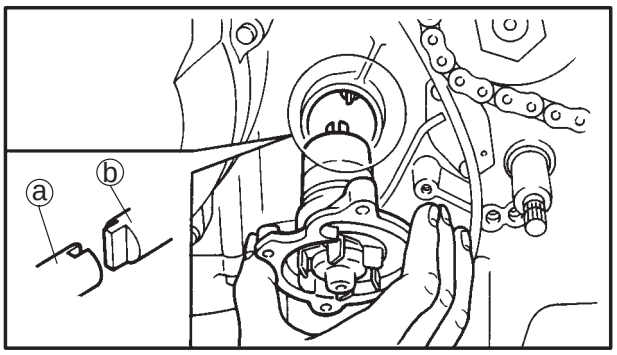
3. Check:
   ° bearing ①
   Roughness → Replace.
4. Check:
   ° water pump inlet pipe
   ° radiator outlet hose
   Cracks/damage/wear → Replace.



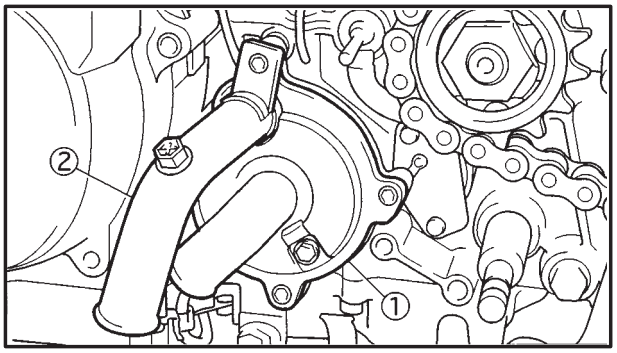
EB503052
INSTALLING THE WATER PUMP

1. Install:
   ° water pump housing

⚠ WARNING
Always use a new O-ring



NOTE:
- Align the slot ⓐ on the impeller shaft with the projection ⓑ on the oil pump shaft.
- Before installing the water pump housing, apply a thin coat of lithium soap base grease onto the O-ring.



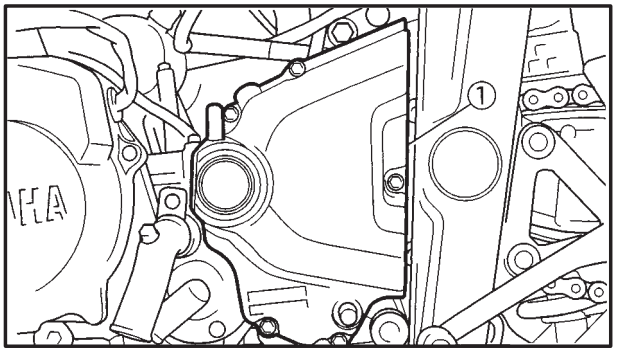
2. Install:
   - water pump housing cover ①
   - water pump outlet pipe ②

⚠ WARNING

Always use a new gasket and O-rings.

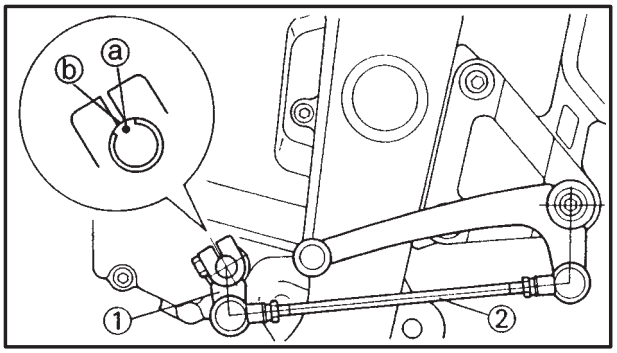
NOTE:
Before installing the water pump outlet pipe, apply a thin coat of lithium soap base grease onto the O-rings.

	Water pump housing cover bolt 10 Nm (1.0 m·kg)



3. Install:
   - gasket
   - dowel pins
   - drive chain sprocket cover ①

	10 Nm (1.0 m·kg)

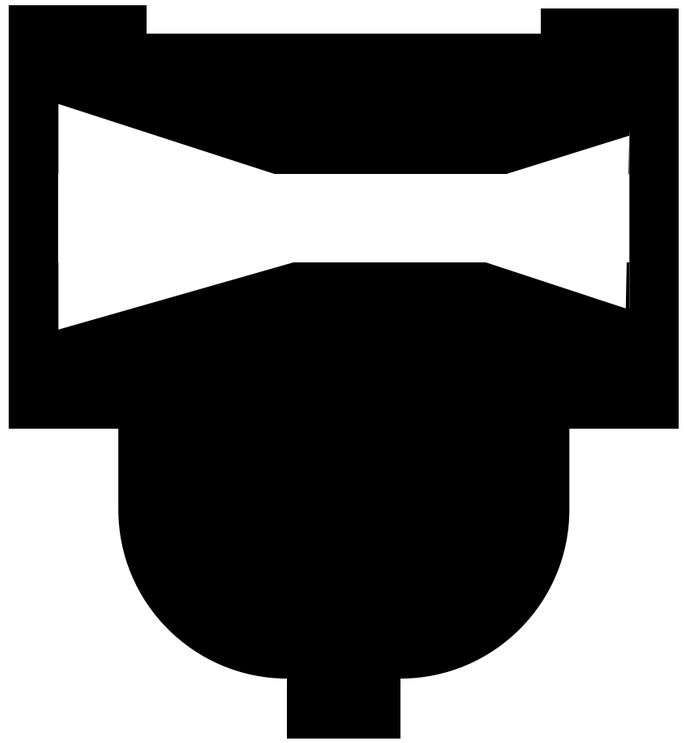


4. Install:
   - shift arm ①

	10 Nm (1.0 m·kg)

NOTE:
Align the slot ⓐ on the shift arm ① with the punch mark ⓑ 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 → 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”.



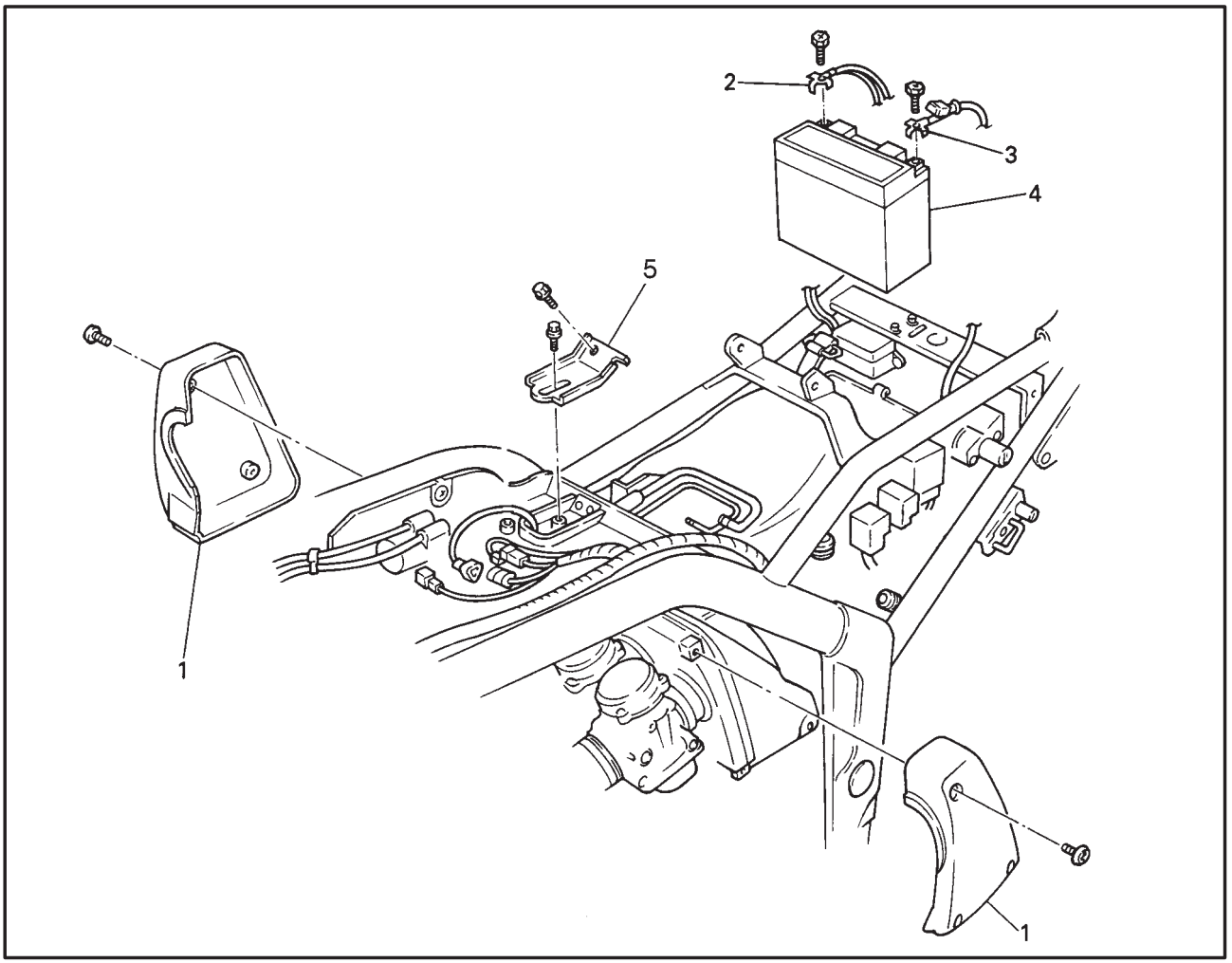
CARB 6

CHAPTER 6
CARBURETORS

CARBURETORS 6-1
AIR FILTER CASE 6-1
CARBURETORS 6-2
CHECKING THE CARBURETORS 6-5
ASSEMBLING THE CARBURETORS 6-7
INSTALLING THE CARBURETORS 6-8
MEASURING AND ADJUSTING THE FUEL LEVEL 6-9
CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR 6-10

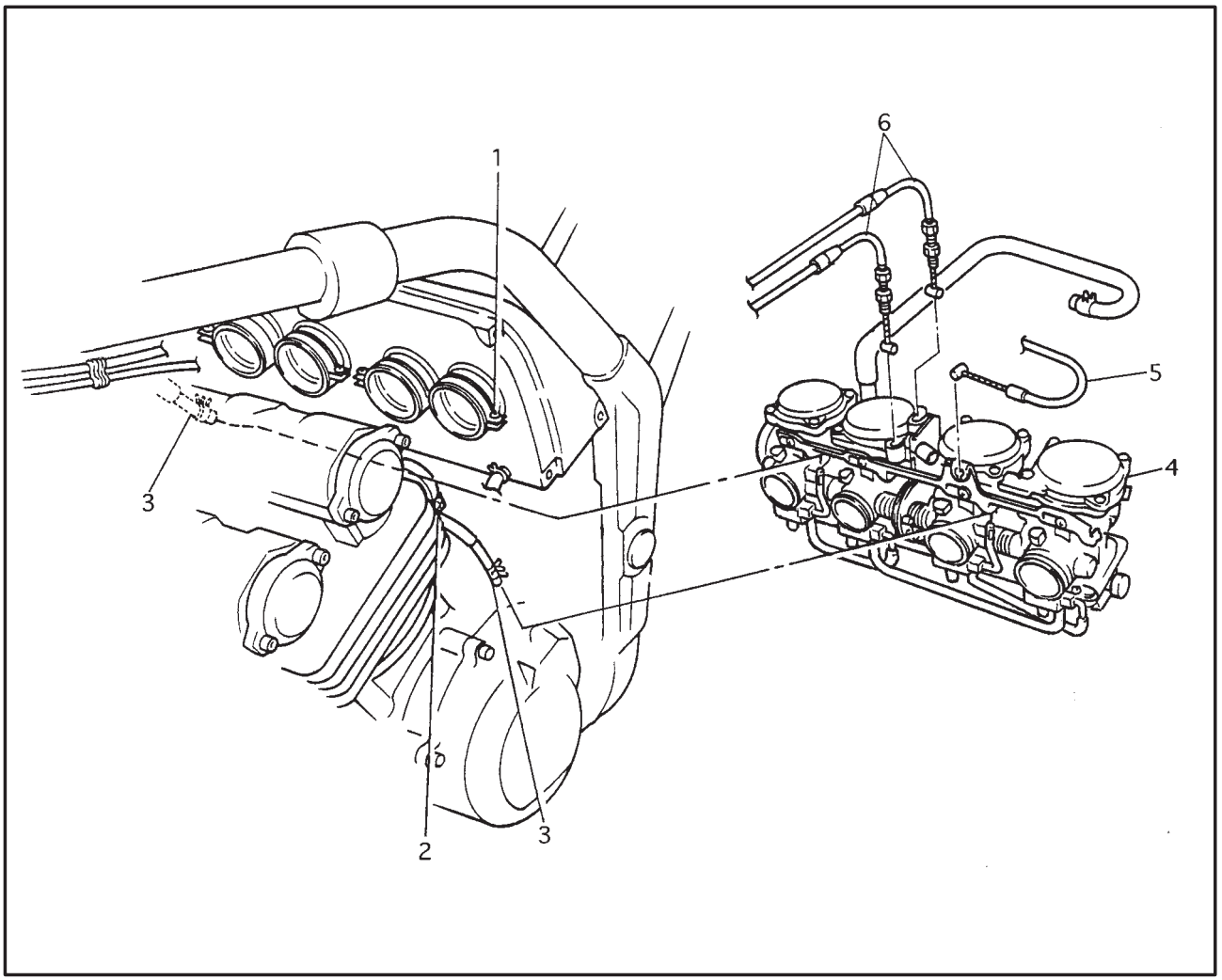
CARBURETORS

CARBURETORS
AIR FILTER CASE

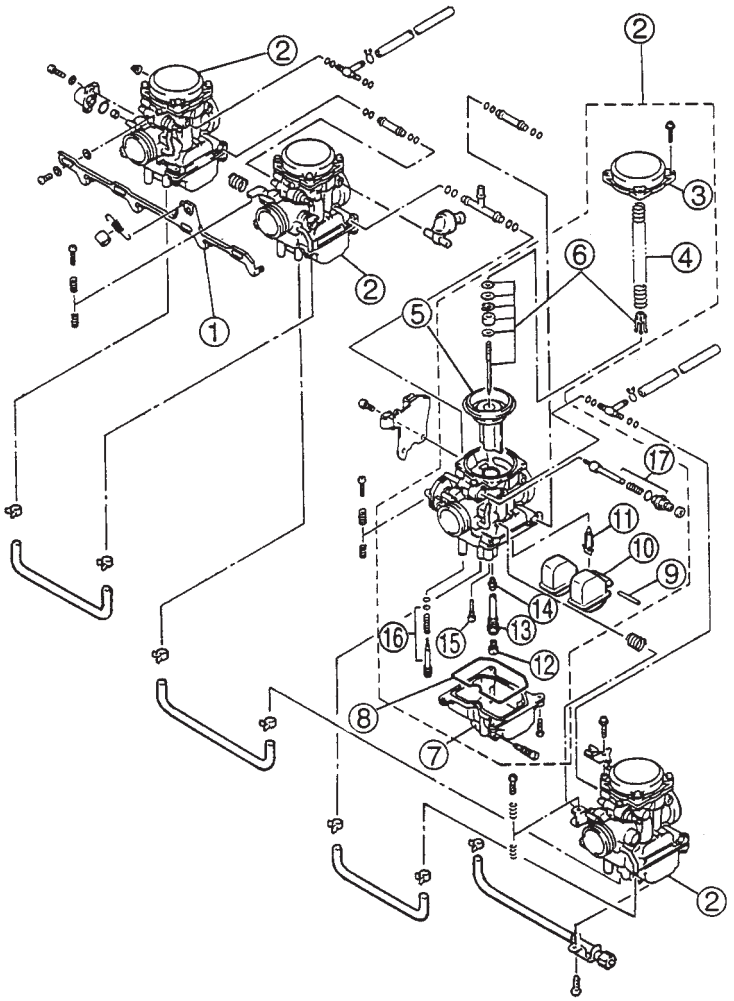


Order	Job name/Part name	Q'ty	Remarks
	Removing the air filter case		Remove the parts in the order listed.
	Seat, fueltank and sidecovers		Refer to "FRONT COWLING/SEAT/SIDE COVER/FUEL TANK" section in chapter 3.
	Drain the coolant		Refer to "CHANGING THE COOLANT" section.
1	Air filter case (left/right)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

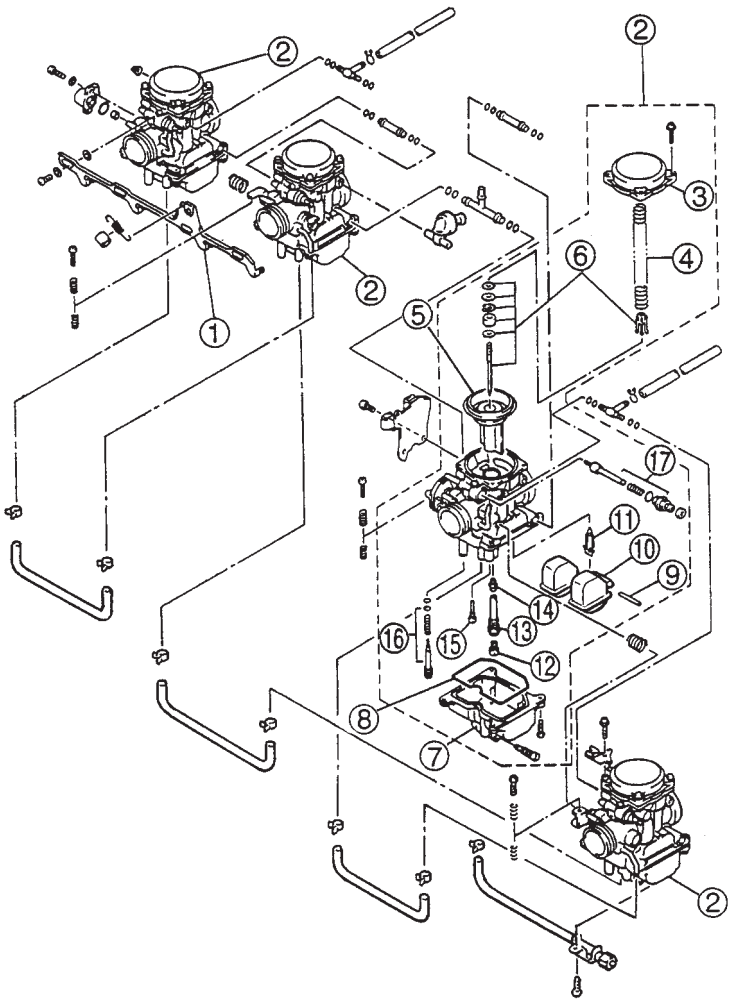
CARBURETORS



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
	Disassembling the carburetors		Disassembly the parts in the order listed.
①	Starter plunger link	1	
②	Carburetors assembly	4	#1, #2, #3, #4
③	Vacuum chamber cover	1	Refer to "ASSEMBLING THE CARBURETERS" section.
④	Piston valve spring	1	
⑤	Piston valve	1	
⑥	Needle kit	1	
⑦	Float chamber	1	
⑧	Float chamber gasket	1	
⑨	Float pin	1	
⑩	Float	1	
⑪	Needle valve assembly	1	
⑫	Main jet	1	



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.

EB600031
CHECKING THE CARBURETORS

The following procedure applies to all of the carburetors.

1. Check:
   ° carburetor body
   ° float chamber
   ° main jet holder
   Cracks/damage → Replace.
2. Check:
   ° fuel passages
   Obstruction → Clean.

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a. Wash the carburetor in a petroleumbased solvent. Do not use any caustic-carburetor-cleaning solution.
b. Blow out all of the passages and jets with compressed air.

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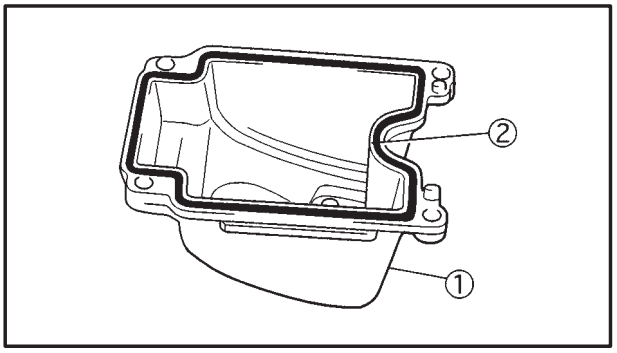
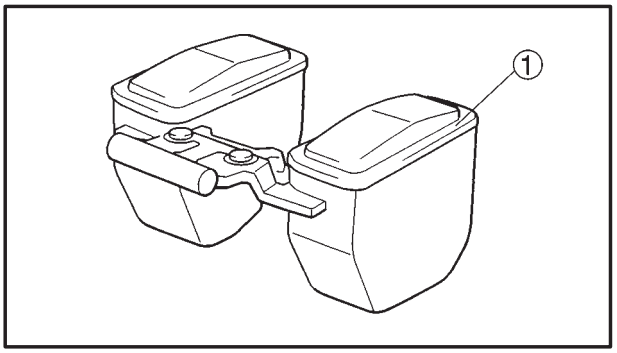
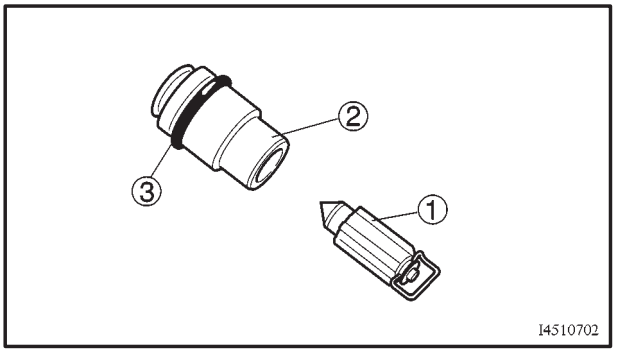


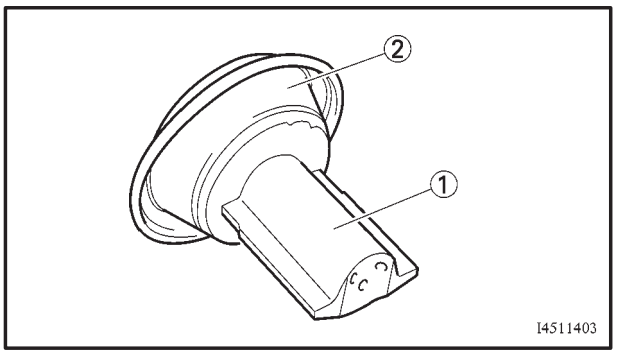
3. Check:
   ° float chamber body ①
   Dirt → Clean.
4. Check:
   ° float chamber rubber gasket ②
   Cracks/damage/wear → Replace.



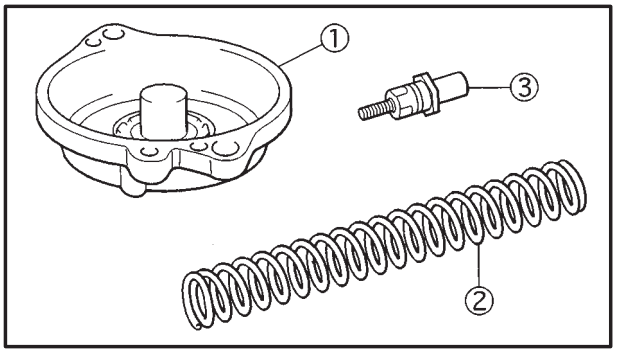
5. Check:
   ° float ①
   Damage → Replace.



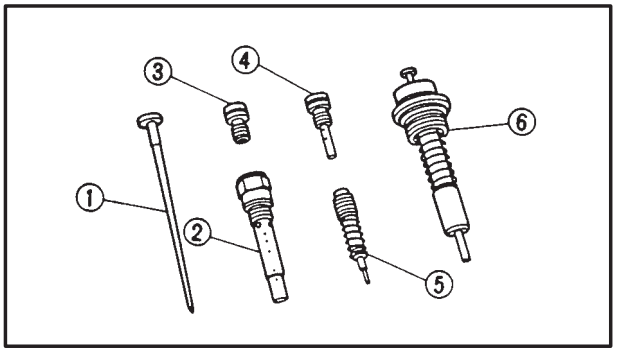
6. Check:
   ° needle valve ①
   ° needle valve seat ②
   Damage/obstruction/wear → Replace the needle valve, needle valve seat and O-ring as a set.
7. Check:
   ° O-ring ③
   Damage/wear → Replace the needle valve, needle valve seat and O-ring as a set.



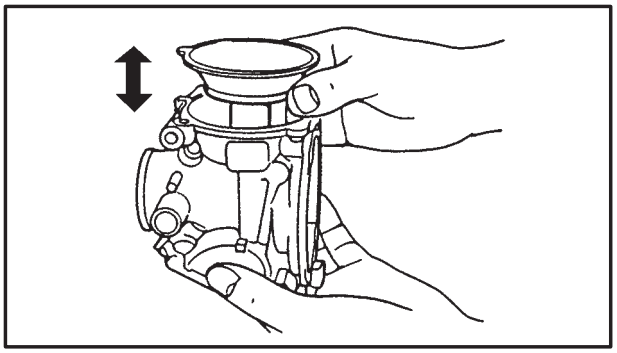
8. Check:
   ° piston valve ①
   Damage/scratches/wear → Replace.
   ° rubber diaphragm ②
   Cracks/tears → Replace.



9. Check:
   ° vacuum chamber cover ①
   ° piston valve spring ②
   ° jet needle holder ③
   Cracks/damage → Replace.



10. Check:
   ° jet needle kit ①
   ° needle jet ②
   ° main jet ③
   ° pilot jet ④
   ° pilot screw ⑤
   ° starter plunger ⑥
   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.

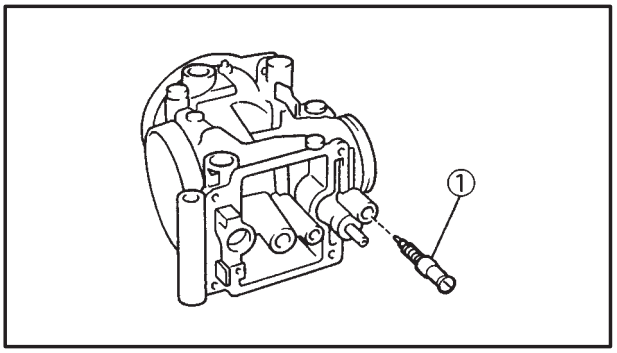
13. Check:
   ° fuel hoses
   Cracks/damage/wear → Replace.
   Obstruction → Clean.
   Blow out the hoses with compressed air.

EB600041
ASSEMBLING THE CARBURETORS

The following procedure applies to all of the carburetors.

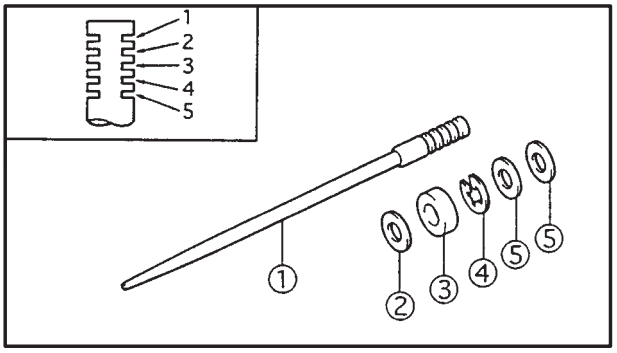
CAUTION:

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



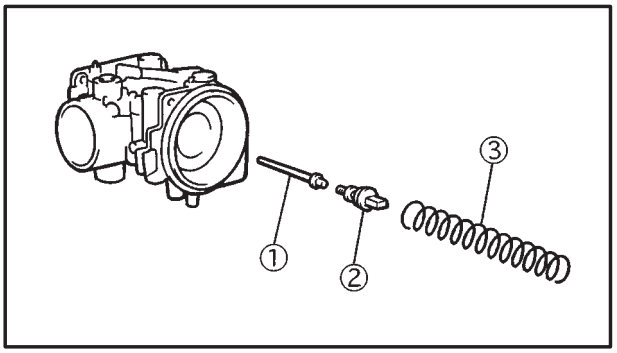
1. Install:
   - O-ring (New)
   - washer
   - pilot screw spring
   - pilot screw ①

Pilot screw
2 turns out



2. Install:
   - jet needle ①
   - washer ② (0.5 mm)
   - ring ③
   - clip ④
   - washer ⑤ (0.5 mm)

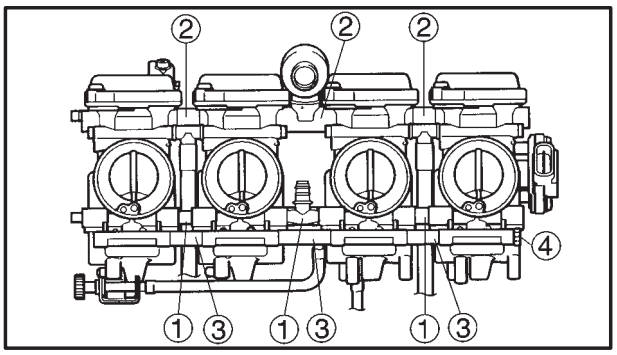
Standard clip position:
No. 3 Groove

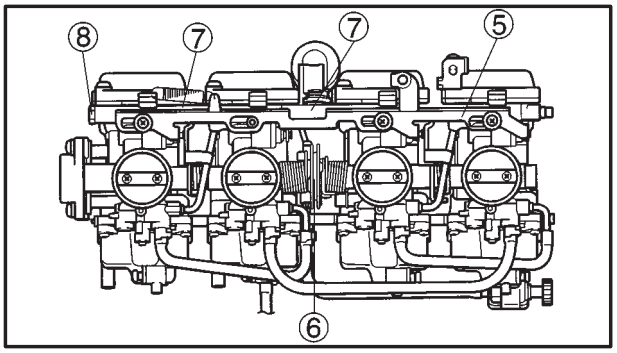


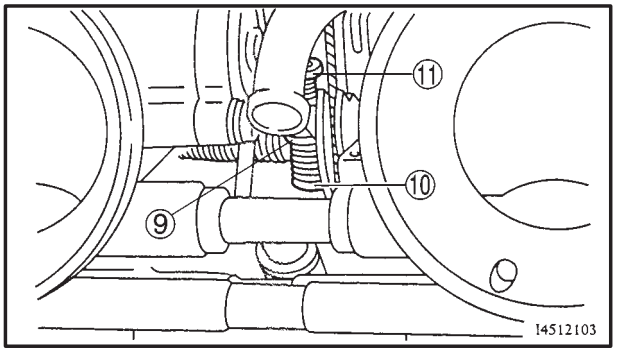
3. Install:
   - piston valve
   - jet needle kit ①
   - jet needle holder ②
   - piston valve spring ③
   - vacuum chamber cover

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 ②
   ° 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.
° 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.

EB600051
INSTALLING THE CARBURETORS

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

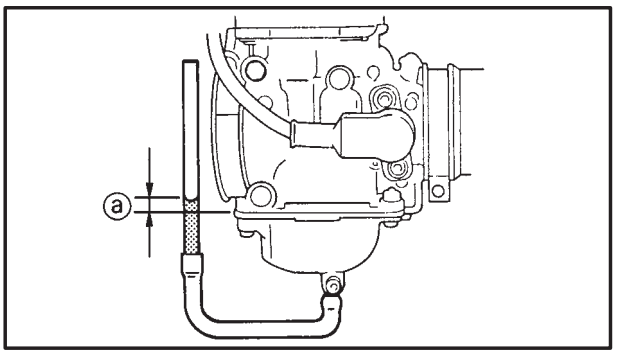
Engine idling speed
1,150 × 1,250 r/min

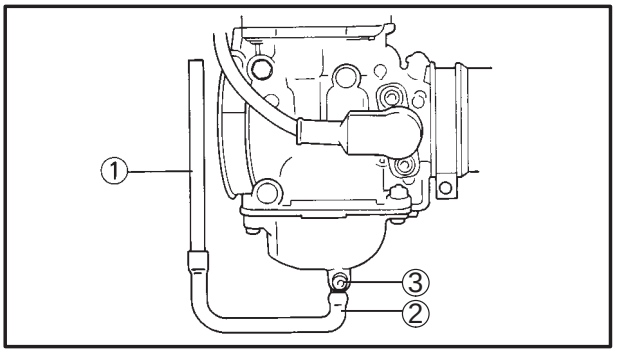
Refer to "ADJUSTING THE ENGINE IDLING SPEED" in chapter 3.

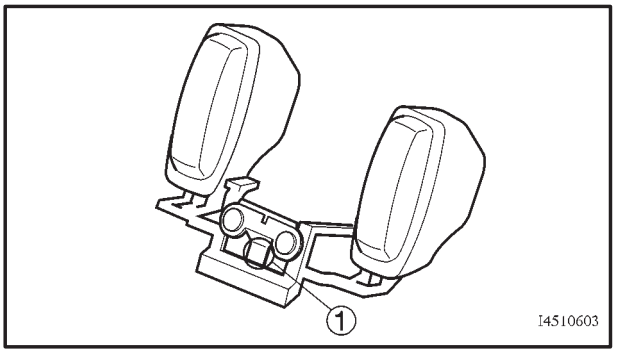
3. Adjust:
   ° throttle cable free play

Throttle cable free play (at the flange of the throttle grip)
3 × 5 mm

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







EB600062
MEASURING AND ADJUSTING THE FUEL LEVEL

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.

Fuel level gauge
90890-01312

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

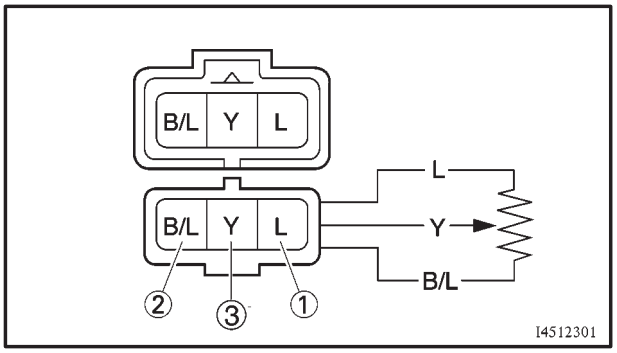
NOTE:
Fuel level readings should be equal on both sides of the carburetor assembly.

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.

EB600070
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

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a. Disconnect the throttle position sensor coupler.
b. Connect the pocket tester (Ω × 1k) to the throttle position sensor.

Tester positive lead → BLUE ①
Tester negative lead → BLACK/BLUE ②

c. Check the throttle position sensor maximum resistance.
Out of specification → Replace the throttle position sensor.

Throttle position sensor maximum resistance
3.5 ~ 6.5 kΩ at 20°C
(BLUE — BLACK/BLUE)

d. Install the throttle position sensor onto the carburetor.
e. Connect the pocket tester (Ω × 1k) to the throttle position sensor.

Tester positive lead → YELLOW ③
Tester negative lead → BLACK/BLUE ②

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.

Throttle position sensor resistance
0 ~ 5 ± 1.5 kΩ at 20°C
(YELLOW — BLACK/BLUE)

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2. Adjust:
° throttle position sensor angle

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

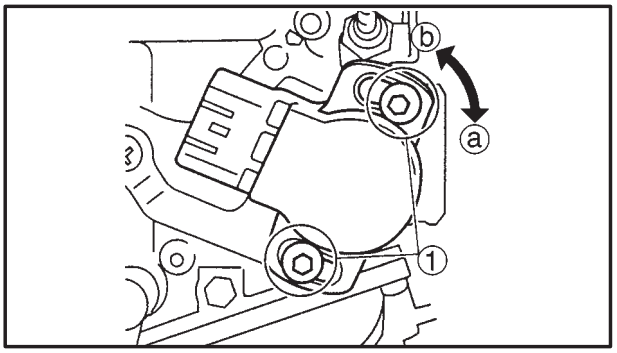
a. Turn the main switch to “ON”.

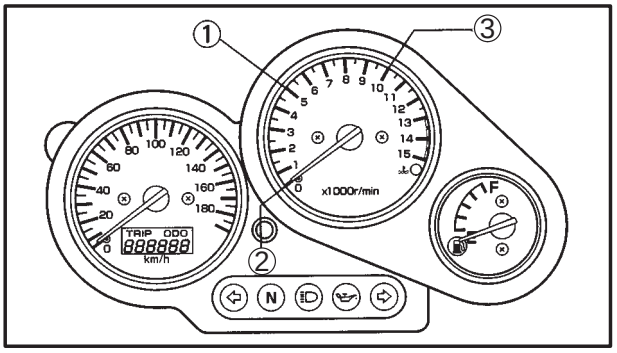
b. Disconnect the throttle position sensor coupler.
c. Reconnect the throttle position sensor coupler.

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	Adjustment direction
5000 rpm ①	Correct	——
0 rpm ②	Incorrect	ⓐ
10000 rpm ③	Incorrect	ⓑ

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”.

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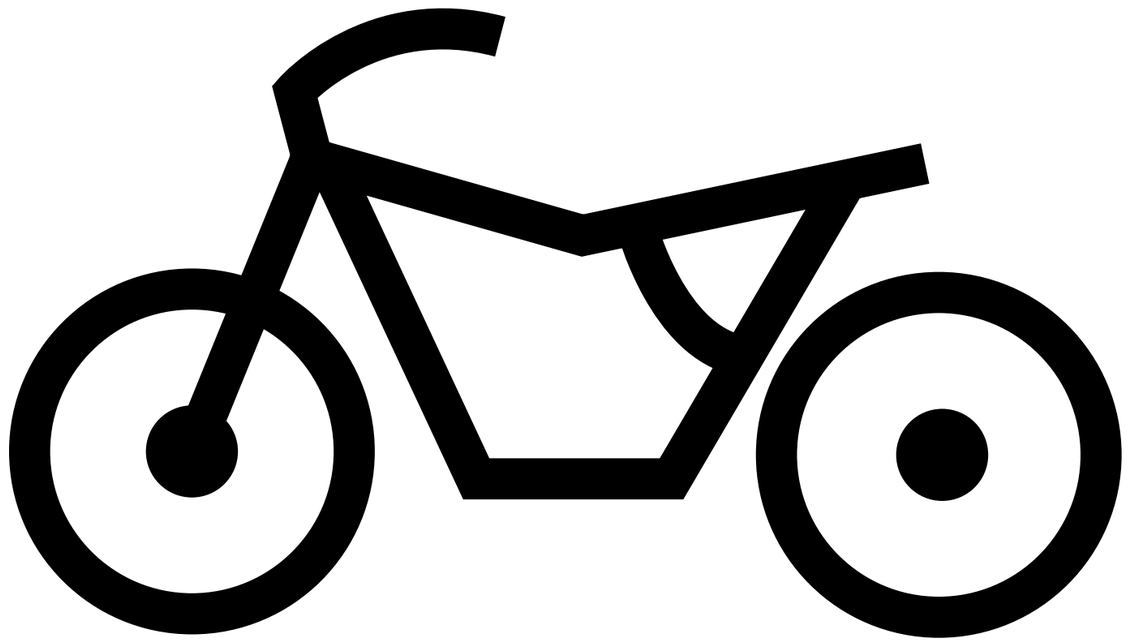

CHAS 7

CHAPTER 7
CHASSIS

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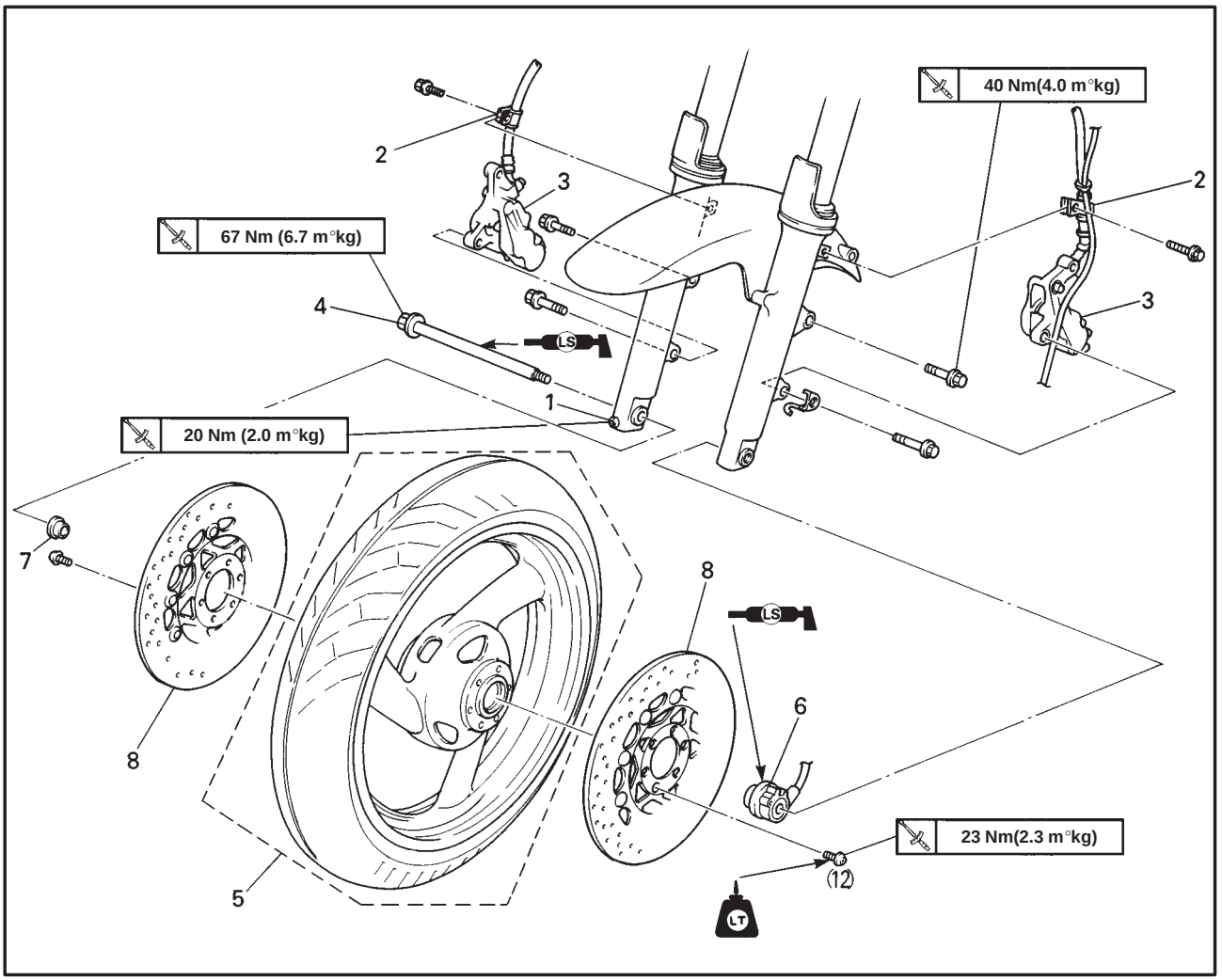
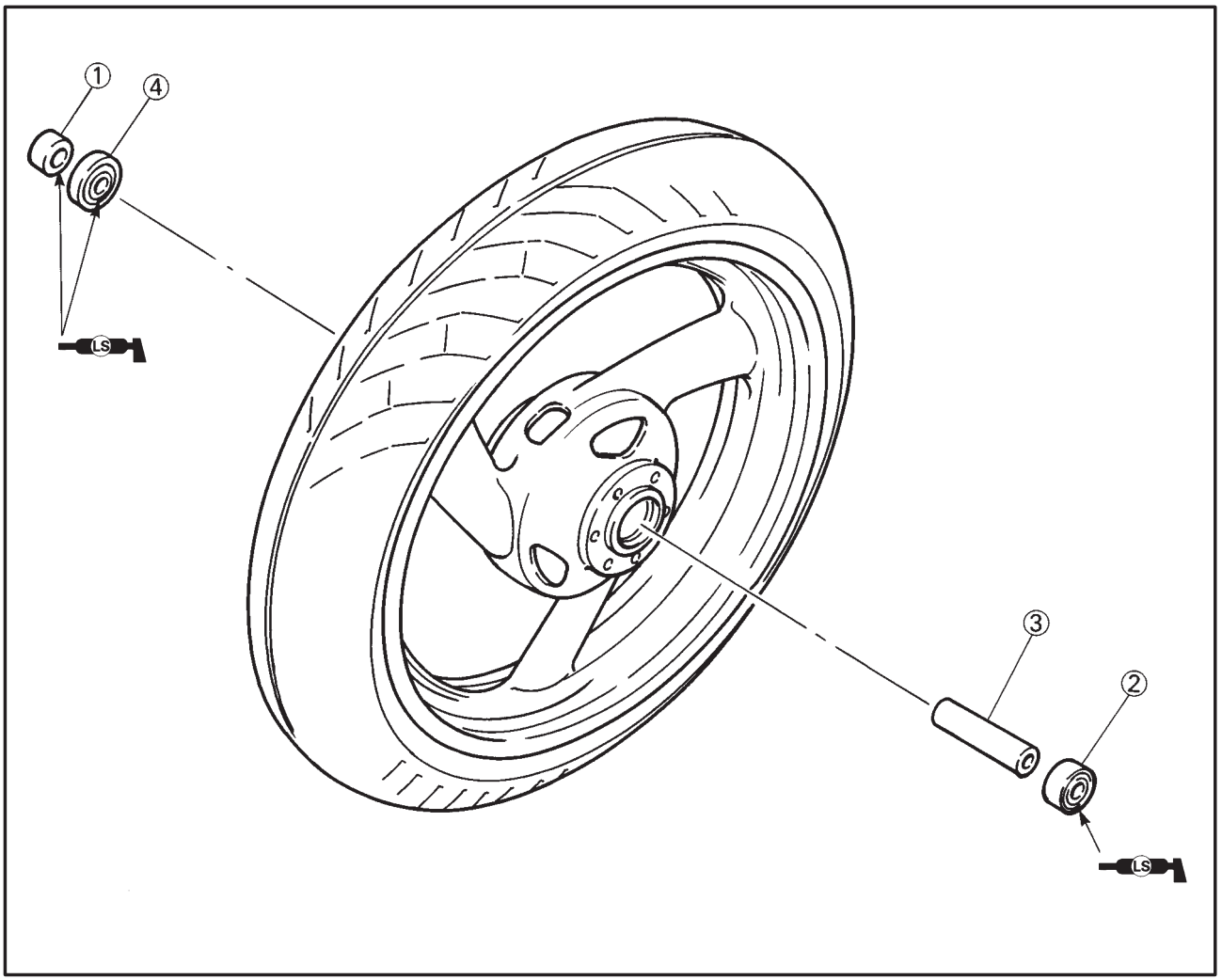
CHASSIS

FRONT WHEEL AND BRAKE DISC



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

FRONT WHEEL



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.

EB700102
REMOVING THE FRONT WHEEL

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

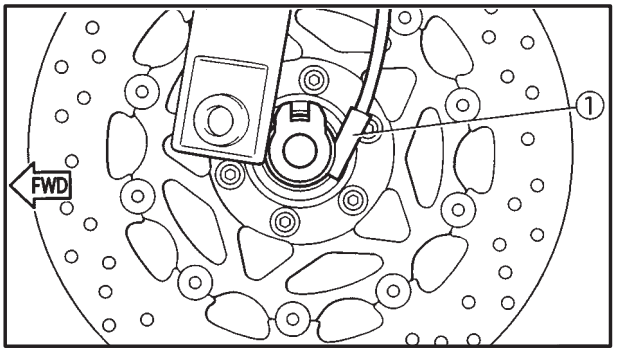
Place the motorcycle on a suitable stand so that the front wheel is elevated.

2. Remove:
   - 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

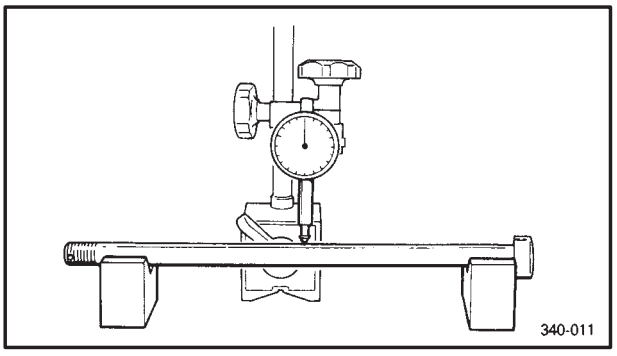
NOTE:

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

EB700400
CHECKING THE FRONT WHEEL

1. Measure:
   - wheel axle runout

Wheel axle runout
<Limit> 0.25 mm



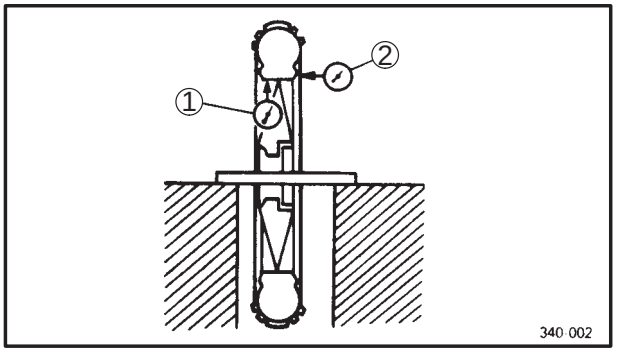
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

2. Check:
   - tire
   - front wheel

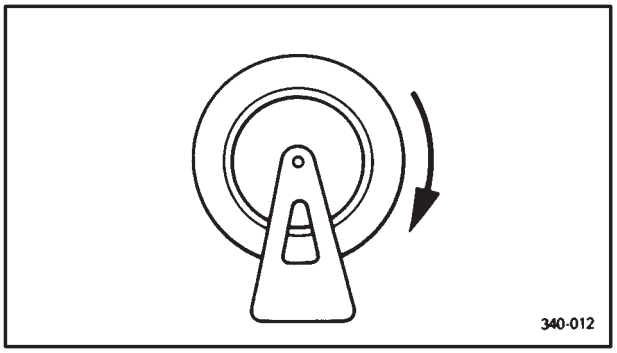
   Damage/wear → Replace.

   Refer to “CHECKING THE TIRES” and ”!CHECKING THE WHEELS” in chapter 3.

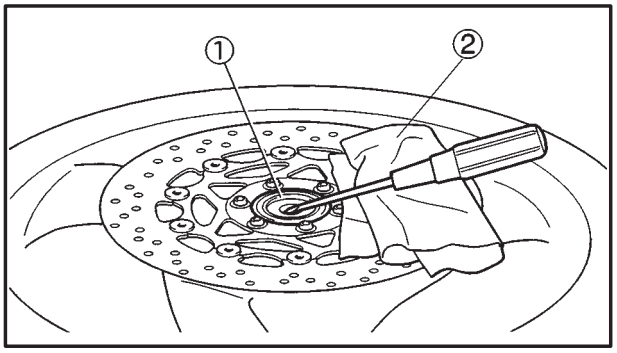


3. Measure:
   ° front wheel radial runout ①
   ° front wheel lateral runout ②
   Over the specified limits → Replace.

Front wheel radial runout limit
1.0 mm
Front wheel lateral runout limit
0.5 mm



4. Check:
   ° wheel bearings
   Front wheel turns roughly or is loose → Replace the wheel bearings.
   ° oil seals
   Damage/wear → Replace.



5. Replace:
   ° wheel bearings (New)
   ° oil seals (New)

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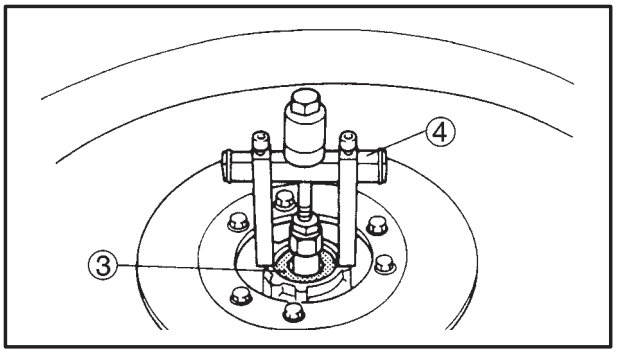
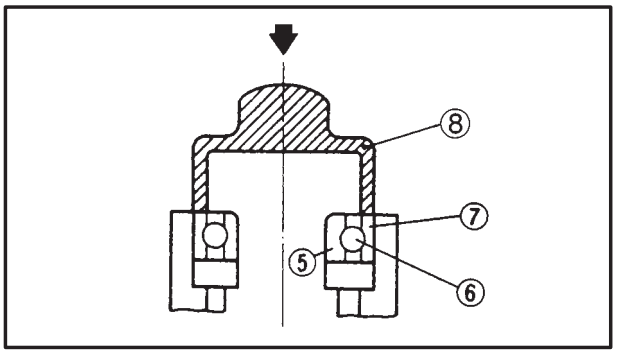
a. Clean the outside of the front wheel hub.
b. Remove the oil seals ① with a flat-head screwdriver.

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.

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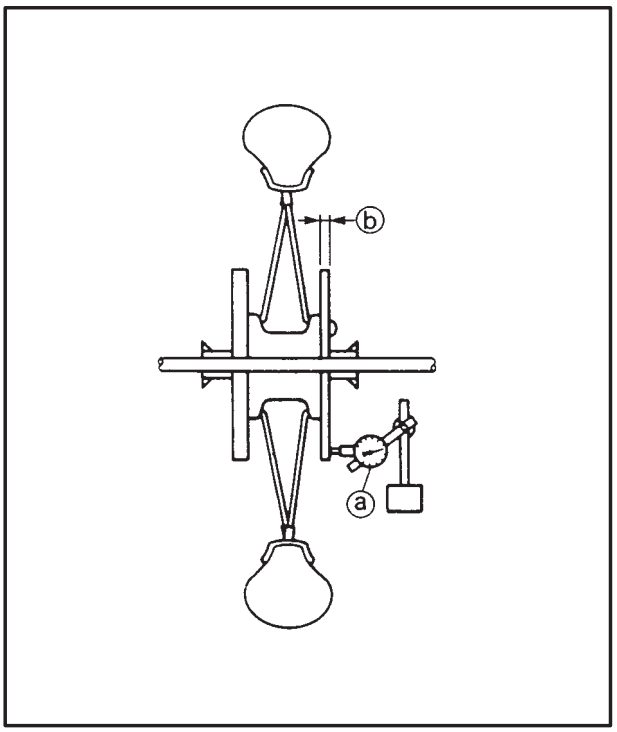

EB700414
CHECKING THE BRAKE DISCS

The following procedure applies to all of the brake discs.

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

Brake disc deflection limit (maximum)
Front: 0.2 mm
Rear: 0.15 mm

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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.

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3. Measure:
   - brake disc thickness ⓑ
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.

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

4. Adjust:
   - brake disc deflection

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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.

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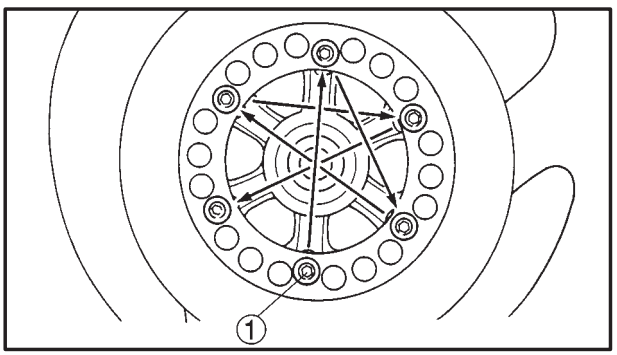
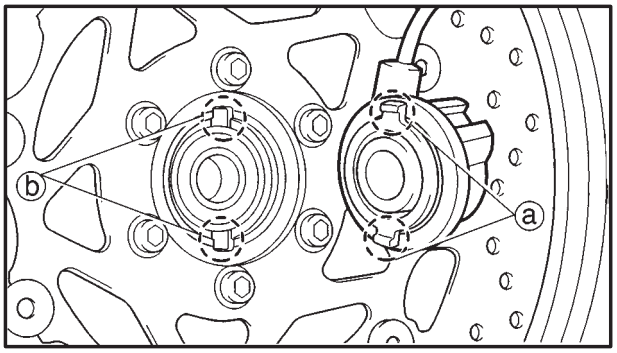


EB700722
INSTALLING THE FRONT WHEEL

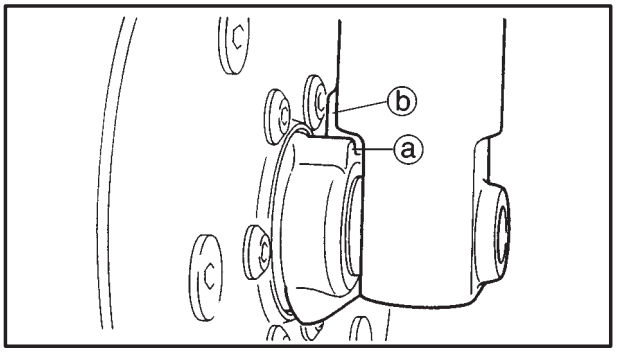
1. Lubricate:
   ° wheel axle
   ° wheel bearings
   ° oil seal lips

	Recommended lubricant **Lithium soap base grease**



2. Install:
   ° Speed sensor unit

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



3. Install:
   ° front wheel

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

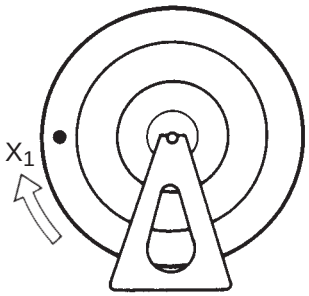
4. Tighten:
   ° wheel axle
   ° wheel axle pinch bolt
   ° brake caliper bolts

	Wheel axle **67 Nm (6.7 m°kg)** **Wheel axle pinch bolt** **20 Nm (2.0 m°kg)** **Brake caliper bolt** **40 Nm (4.0 m°kg)**

⚠ 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.

A



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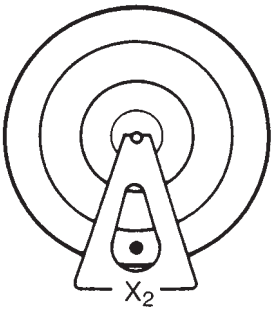

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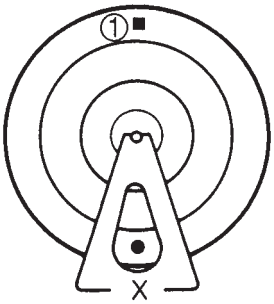
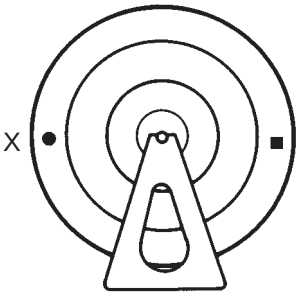


D



EB700901

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

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a. Spin the front wheel
b. When the front wheel stops, put an "X_1" mark at the bottom of the wheel.
c. Turn the front wheel 90° so that the "X_1" mark is positioned as shown A.
d. Release the front wheel.
e. When the wheel stops, put an "X_2" mark at the bottom of the wheel 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".

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3. Adjust:
° front wheel static balance

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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.

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4. Check:
° front wheel static balance

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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.

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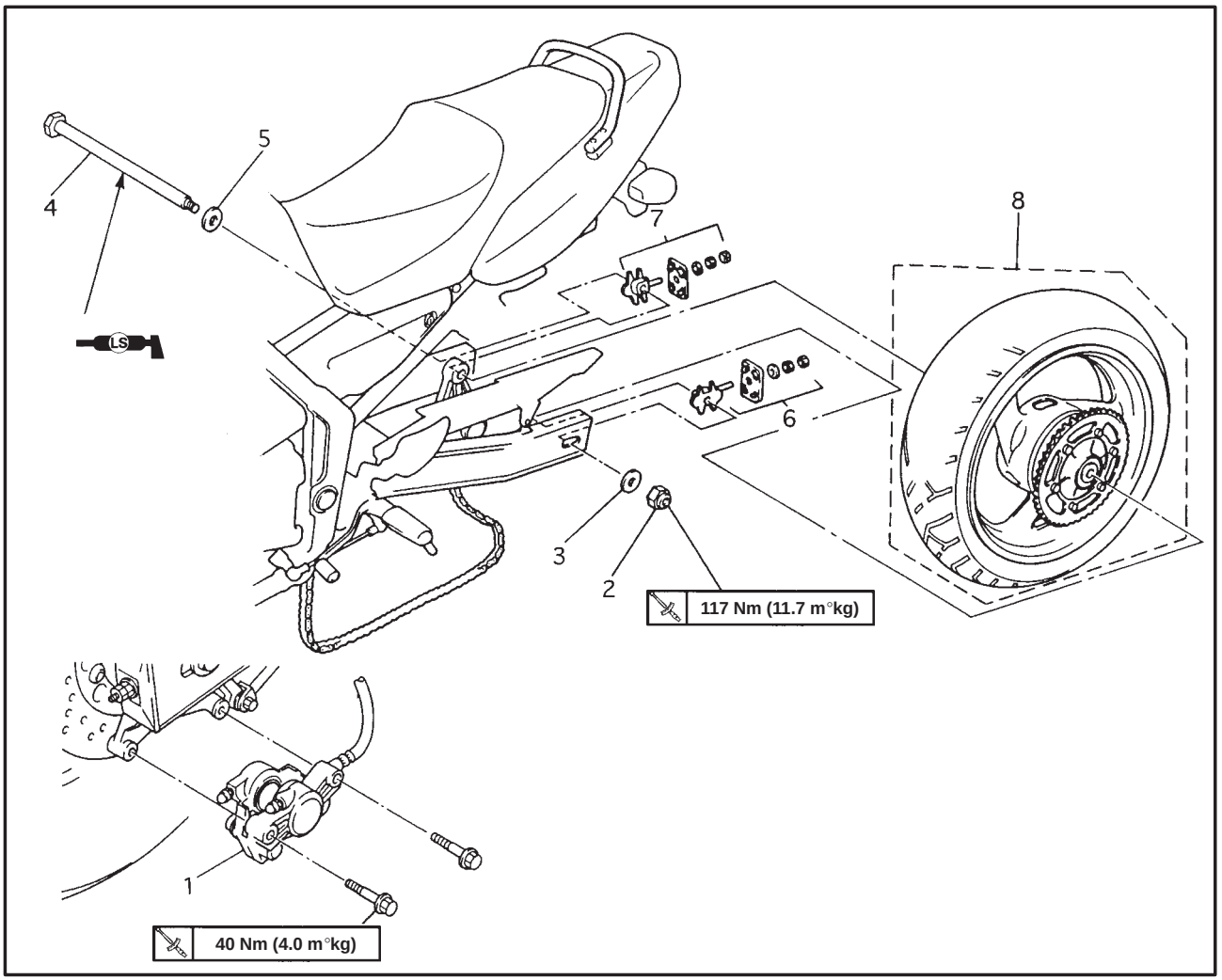
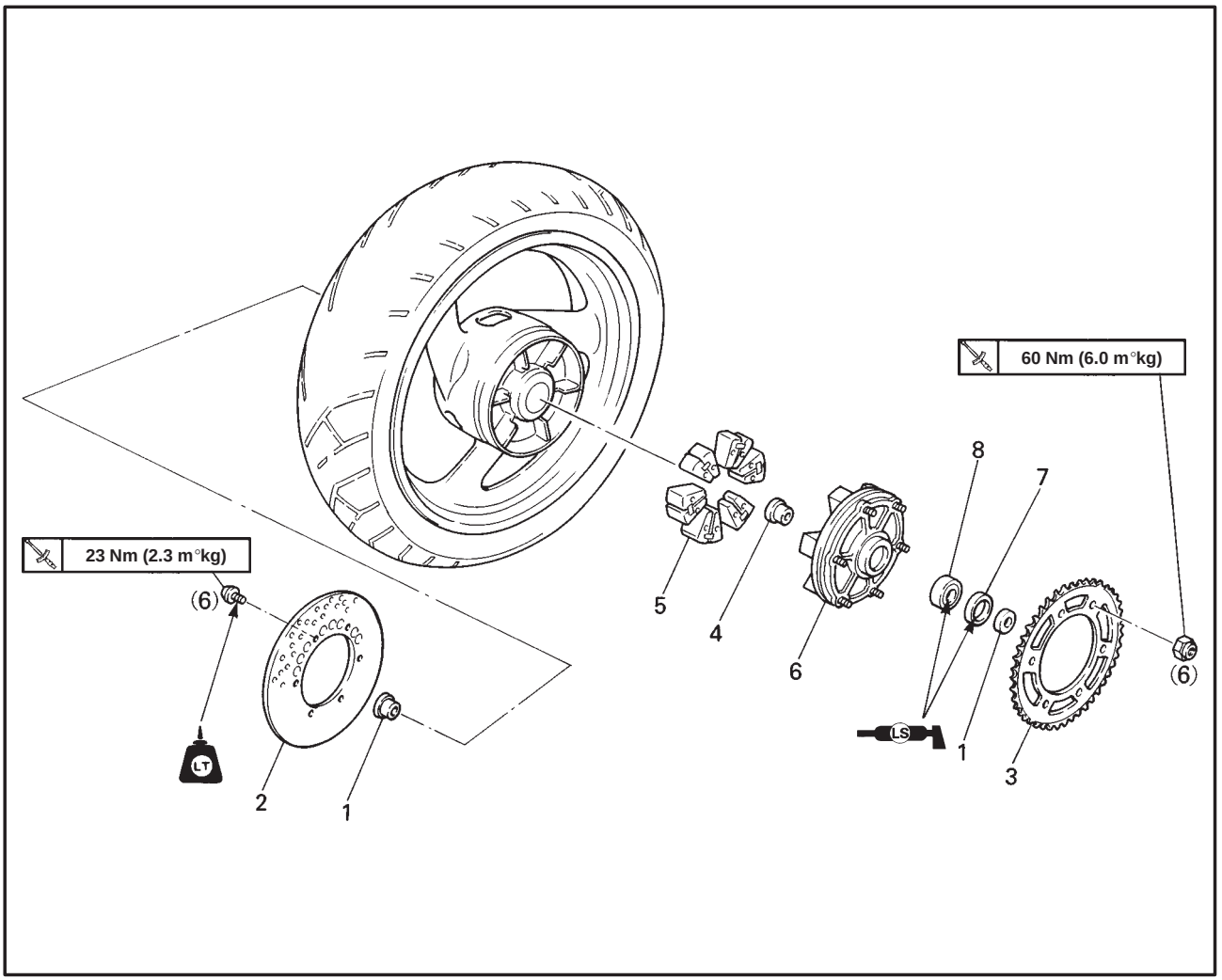
REAR WHEEL, BRAKE DISC AND REAR WHEEL SPROCKET

REAR WHEEL



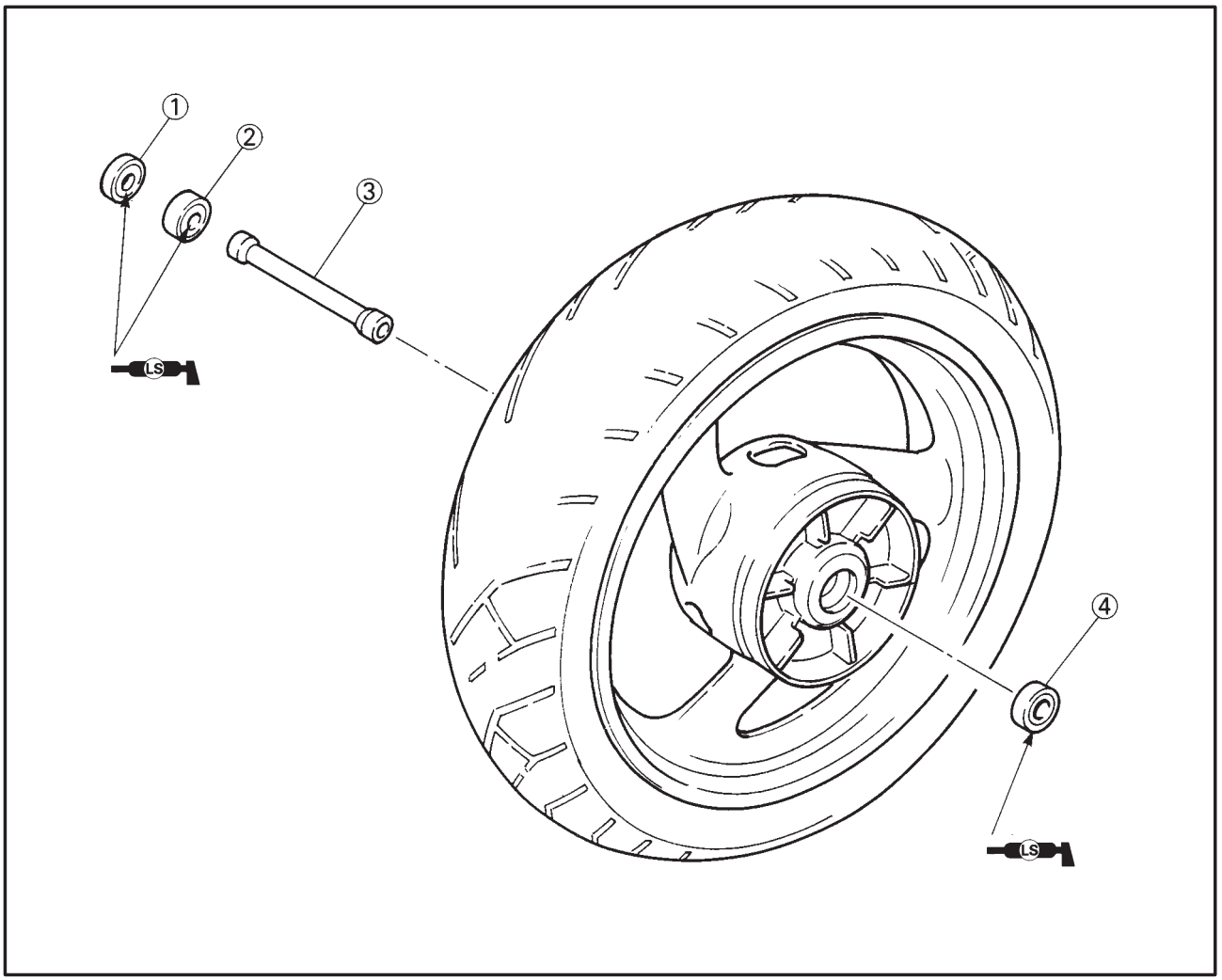
Order	Job name/Part name	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed.
1	Brake caliper	1	
2	Nut	1	
3	Washer	1	
4	Wheel axle	1	Refer to "REMOVING/INSTALLING THE
5	Washer	1	REAR WHEEL" section.
6	Drive chain puller (left)	1	
7	Drive chain puller (right)	1	
8	Rear wheel assembly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

EB701100
REMOVING THE REAR WHEEL

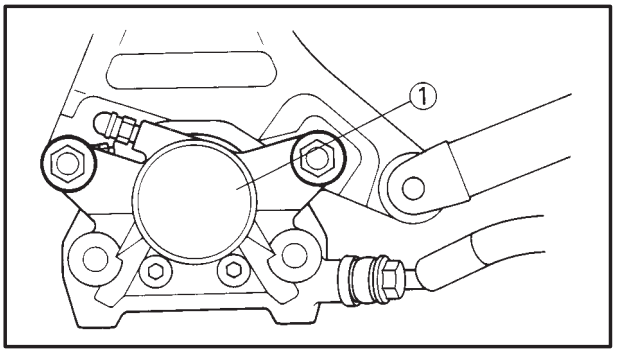
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

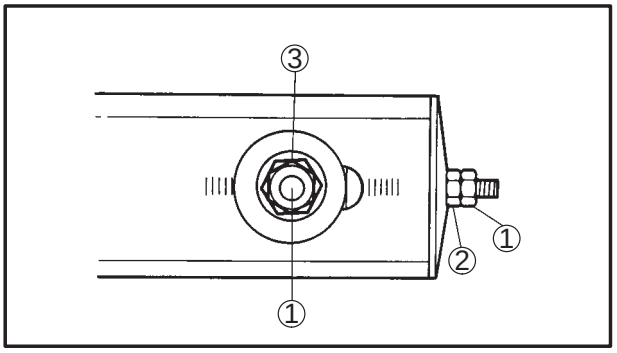
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   ° brake caliper ①

NOTE:

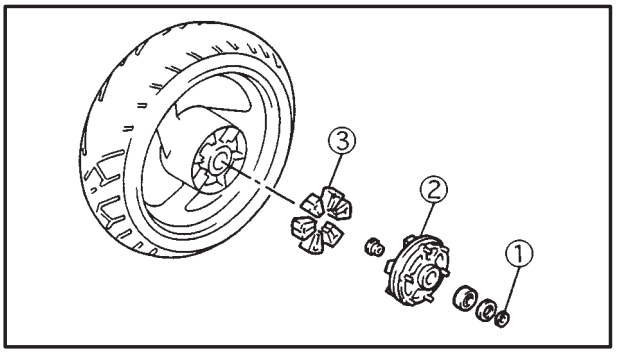
Do not depress the brake pedal when removing the brake caliper.



3. Loosen:
   ° locknut ①
   ° adjusting nut ②
4. Remove:
   ° wheel axle nut ③
   ° wheel axle ④
   ° rear wheel

NOTE:

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



5. Remove:
   ° left collar ①
   ° rear wheel drive hub ②
   ° rear wheel drive hub damper ③
   ° right collar

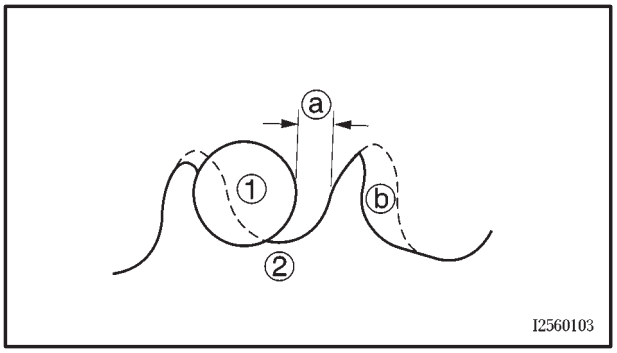
EB701400
CHECKING THE REAR WHEEL

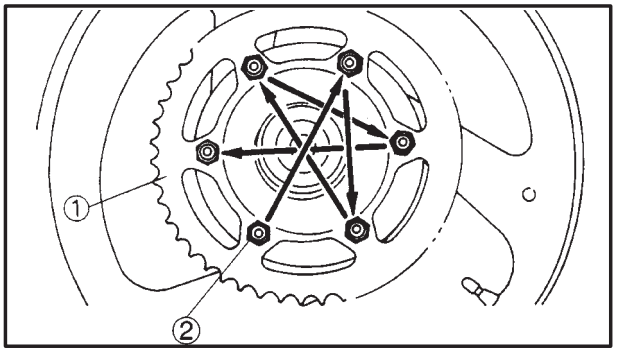
1. Check:
   ° wheel axle
   ° rear wheel
   ° wheel bearings
   ° oil seals
   Refer to “FRONT WHEEL AND BRAKE DISC”
2. Check:
   ° tire
   ° rear wheel
   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” and “CHECKING THE WHEELS” in chapter 3.

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 ⓐ wear → Replace the rear wheel sprocket.
   Bent teeth → Replace the rear wheel sprocket.
   ° correct ⓑ
   ° drive chain roller ①
   ° rear wheel sprocket ②





2. Replace:
   ° rear wheel sprocket ①

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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.

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EB701711
INSTALLING THE REAR WHEEL

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

Recommended lubricant
Lithium soap base grease

2. Tighten:
   ° wheel axle nut
   ° brake caliper bolts

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

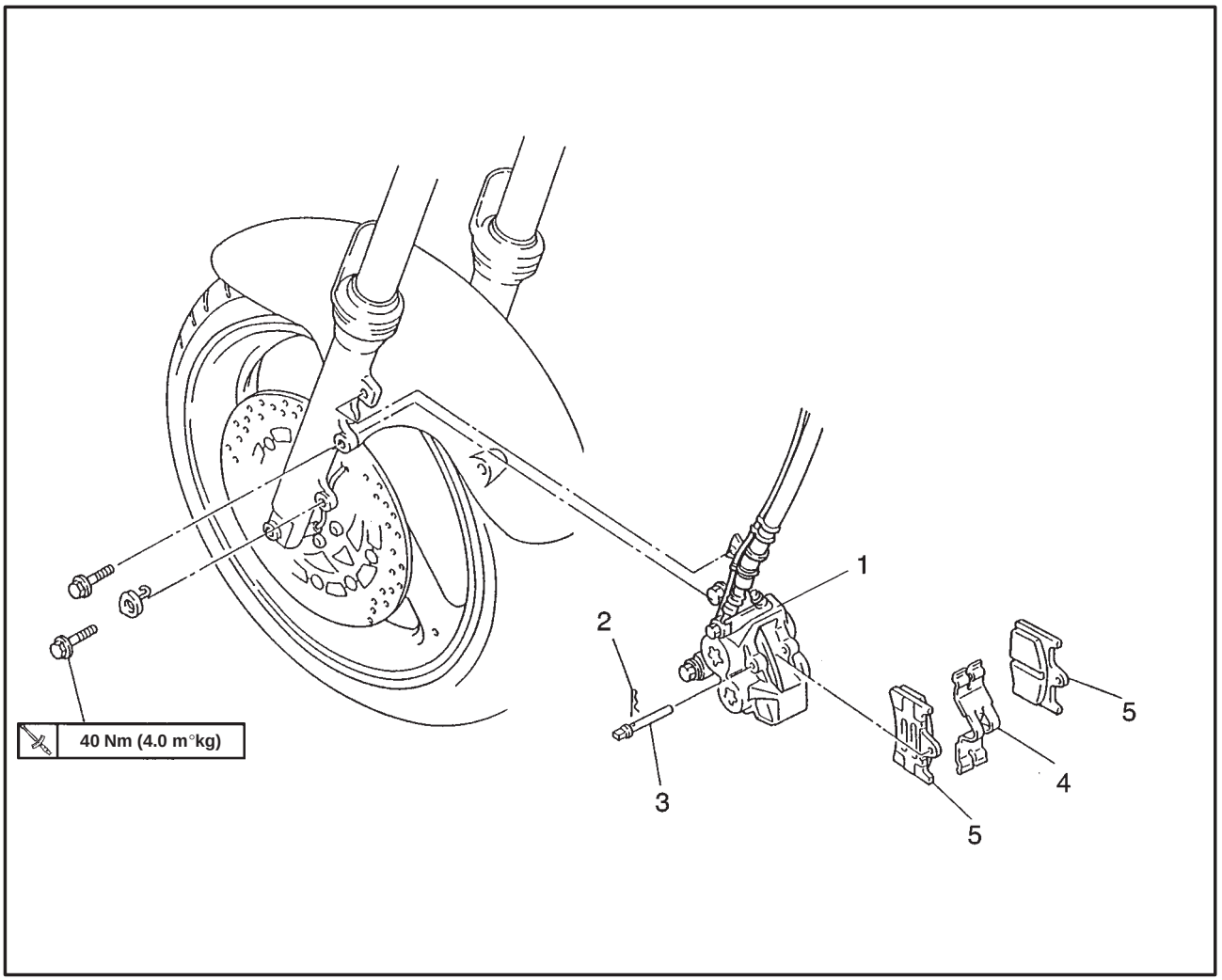
EB701900
ADJUSTING THE REAR WHEEL STATIC BALANCE

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”.

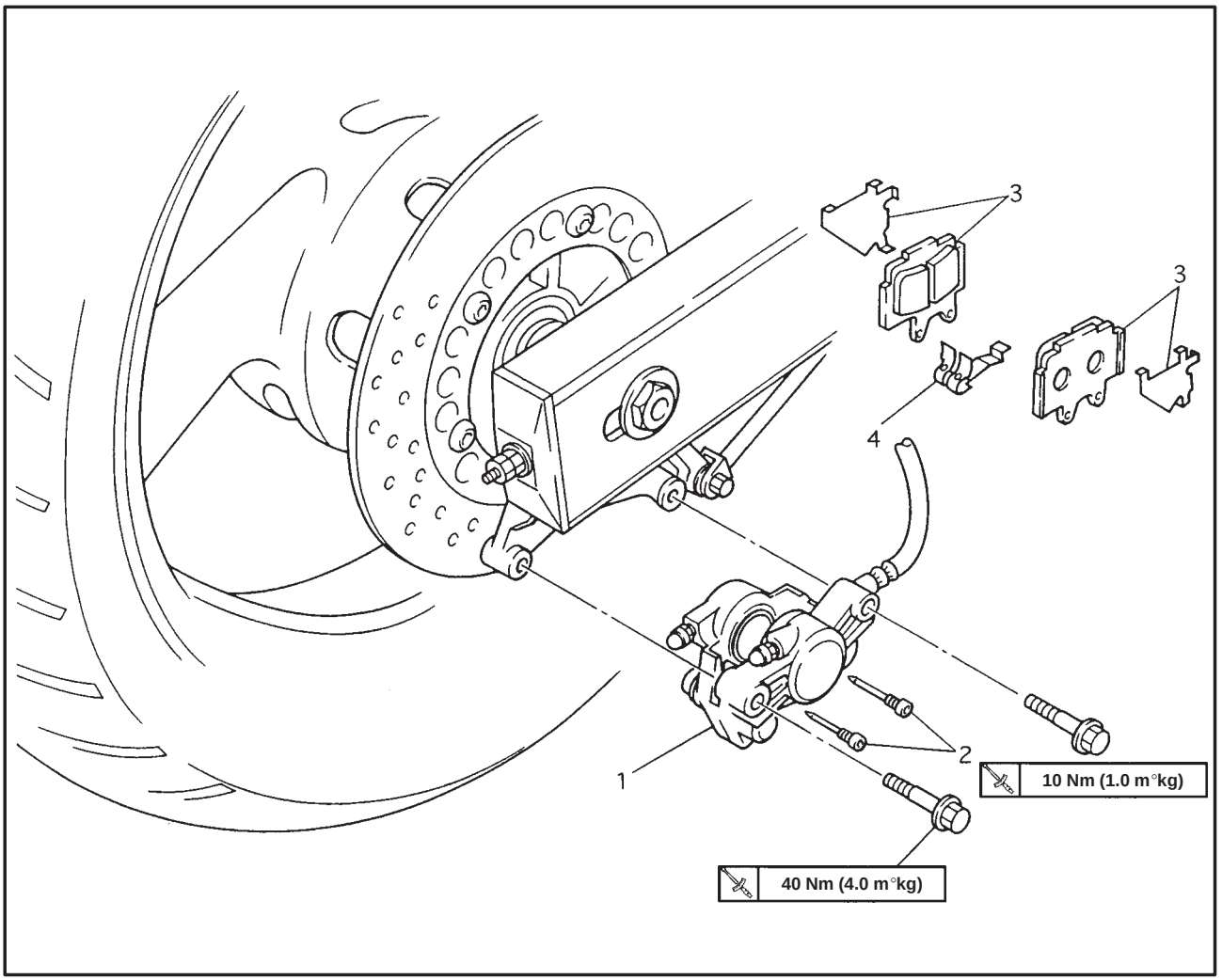
FRONT AND REAR BRAKES

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 BRAKE PADS" section.
4	Brake pad spring	1	
5	Brake pad	2	
			For installation, reverse the removal procedure.

REAR BRAKE PADS



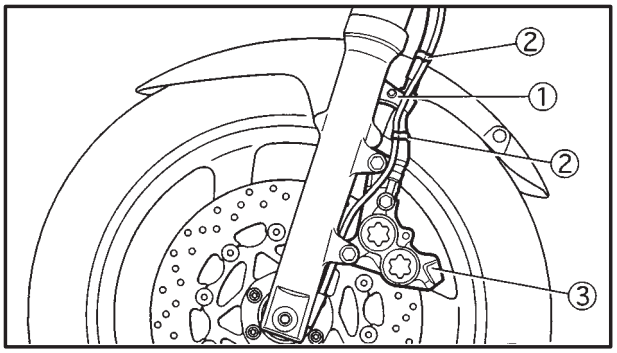
Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order listed.
1	Caliper	1	
2	Brake pad pin	2	Refer to "REPLACING THE REAR
3	Brake pad/shim	2/2	BRAKE PADS" section.
4	Brake pad spring	1	
			For instalation, reverse the removal procedure.

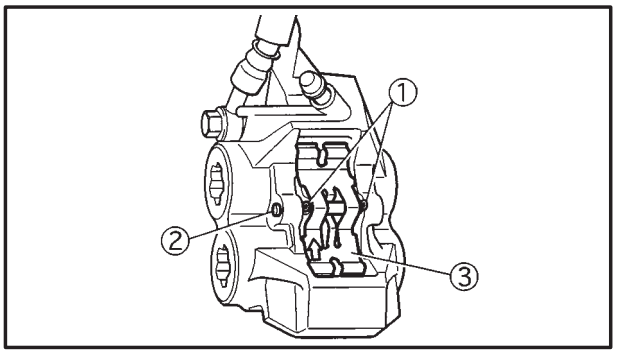
EB702100

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





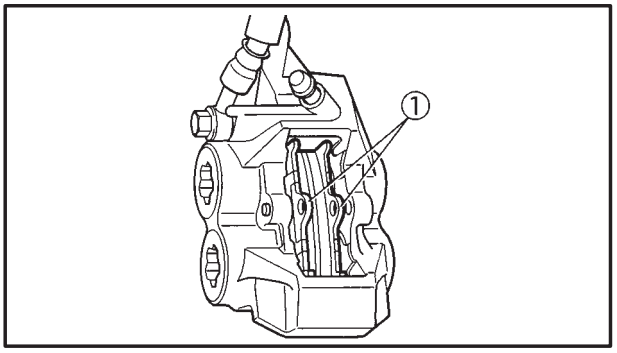
EB702112

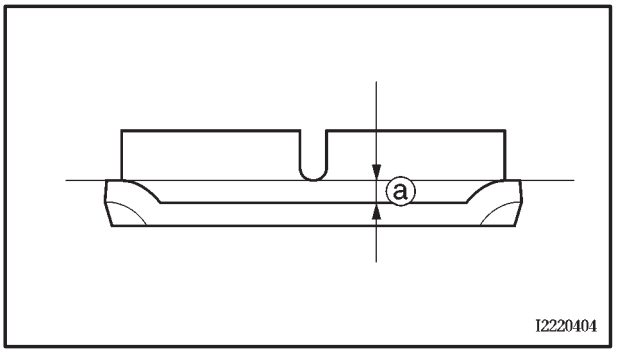
REPLACING THE FRONT BRAKES PADS

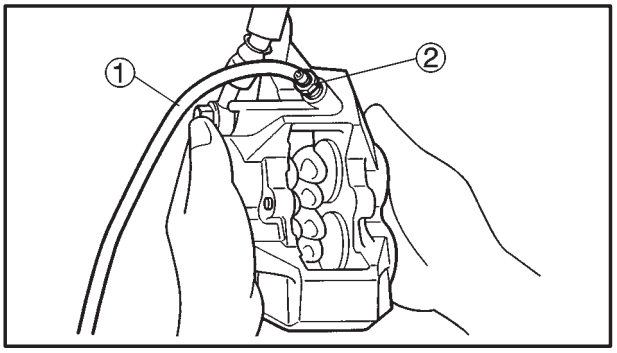
The following procedure applies to both brake calipers.

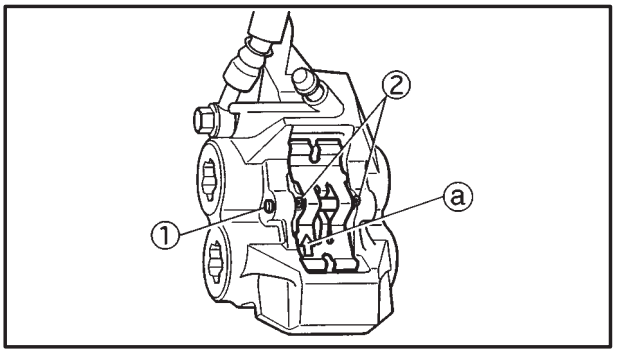
NOTE:
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

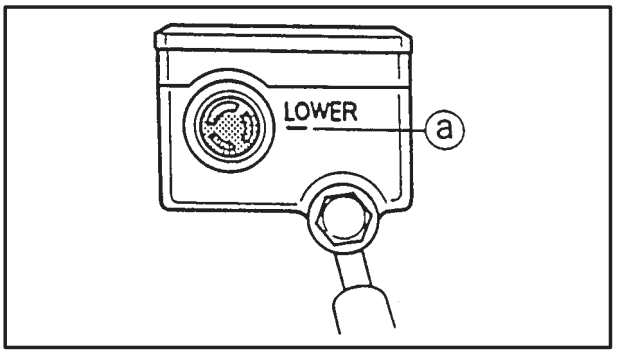
1. Remove:
   - brake hose holder ①
   - speedometer cable guide ②
   - brake caliper ③
2. Remove:
   - brake pad clips ①
   - brake pad pins ②
   - brake pad spring ③











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.

	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.

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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.
   6 Nm (0.6 m°kg)
d. Install new brake pad shims onto the new brake pads.
e. Install new brake pads and a new brake pad spring.

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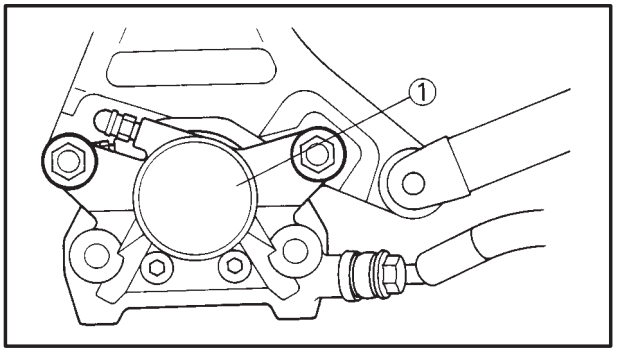
6. Install:
   ° brake pad spring
   ° brake pad pins ①
   ° brake pad clips ②
   ° brake caliper 40 Nm (4.0 m°kg)

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

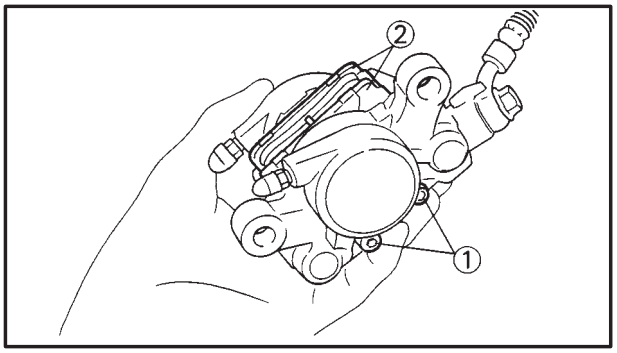
7. Check:
   ° brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
8. Check:
   ° brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.



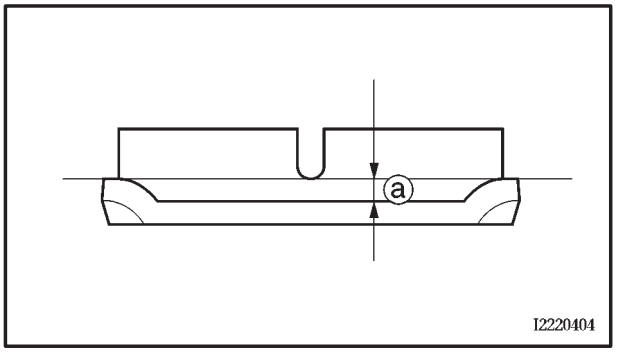
EB702113
REPLACING THE REAR BRAKE PADS

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

1. Remove:
   ° brake caliper ①

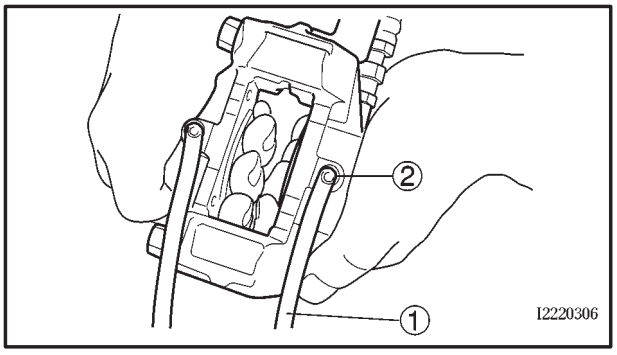


2. Remove:
   ° brake pad pins ①
3. Remove:
   ° brake pads ②
   (along with the brake pad shims)
   ° brake pad spring



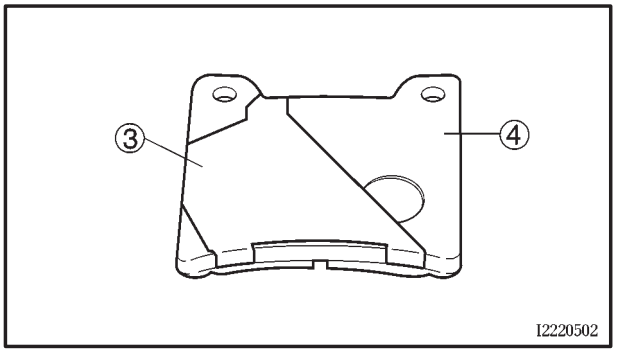
4. Measure:
   ° brake pad wear limit ⓐ
   Out of specification → Replace the brake pads as a set.

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.



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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.

6 Nm (6 m°kg)

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.

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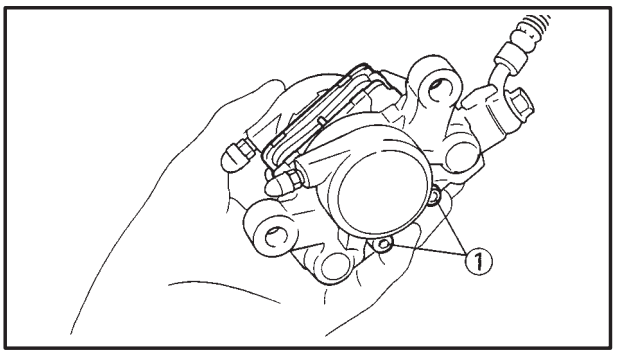
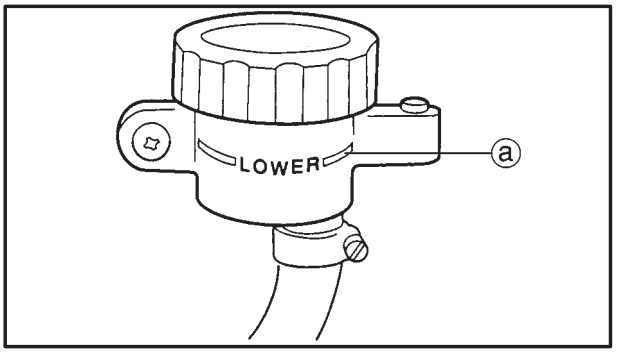


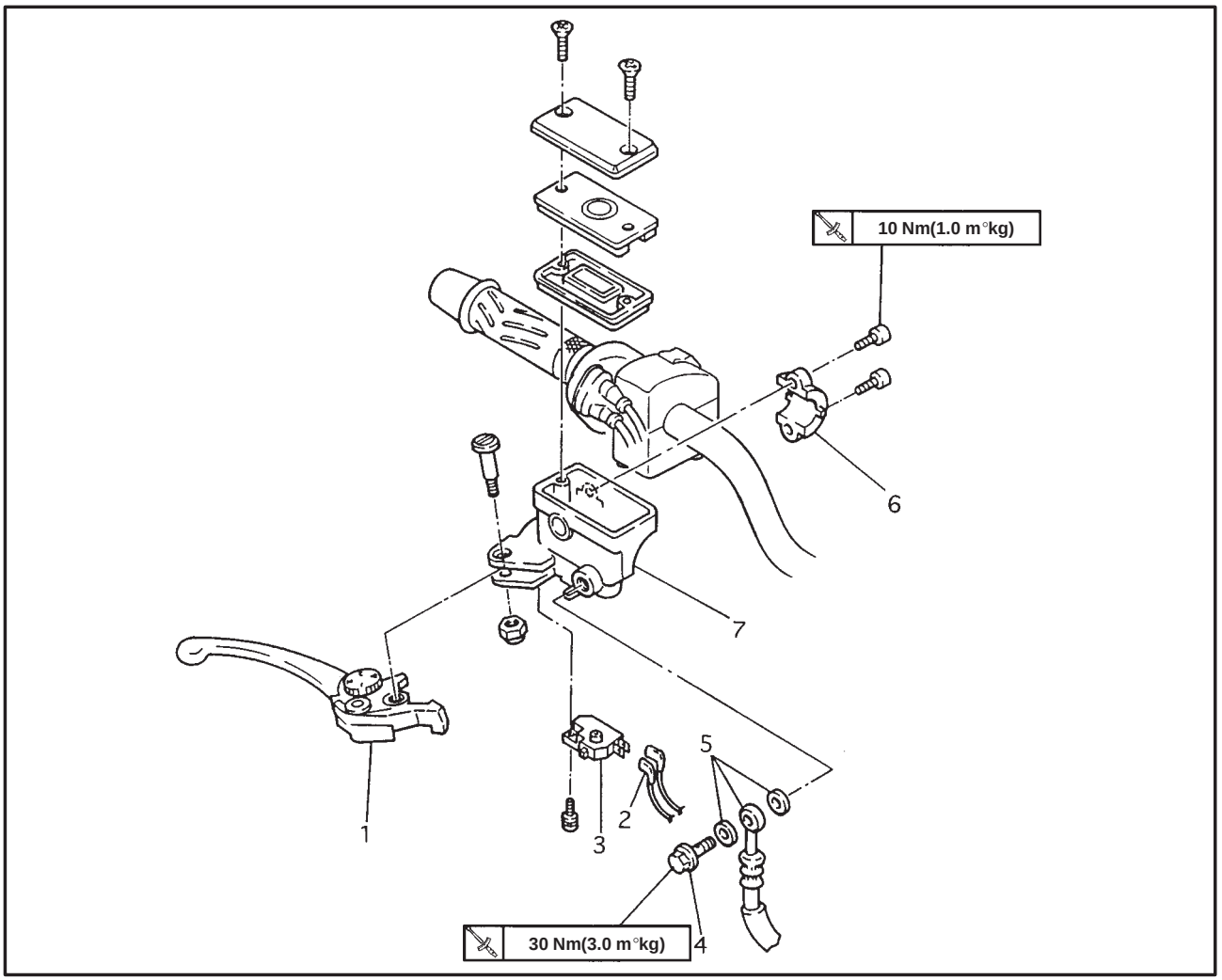
6. Install:
   ° brake pad pins ① 10 Nm (1.0 m°kg)
   ° brake caliper 40 Nm (4.0 m°kg)



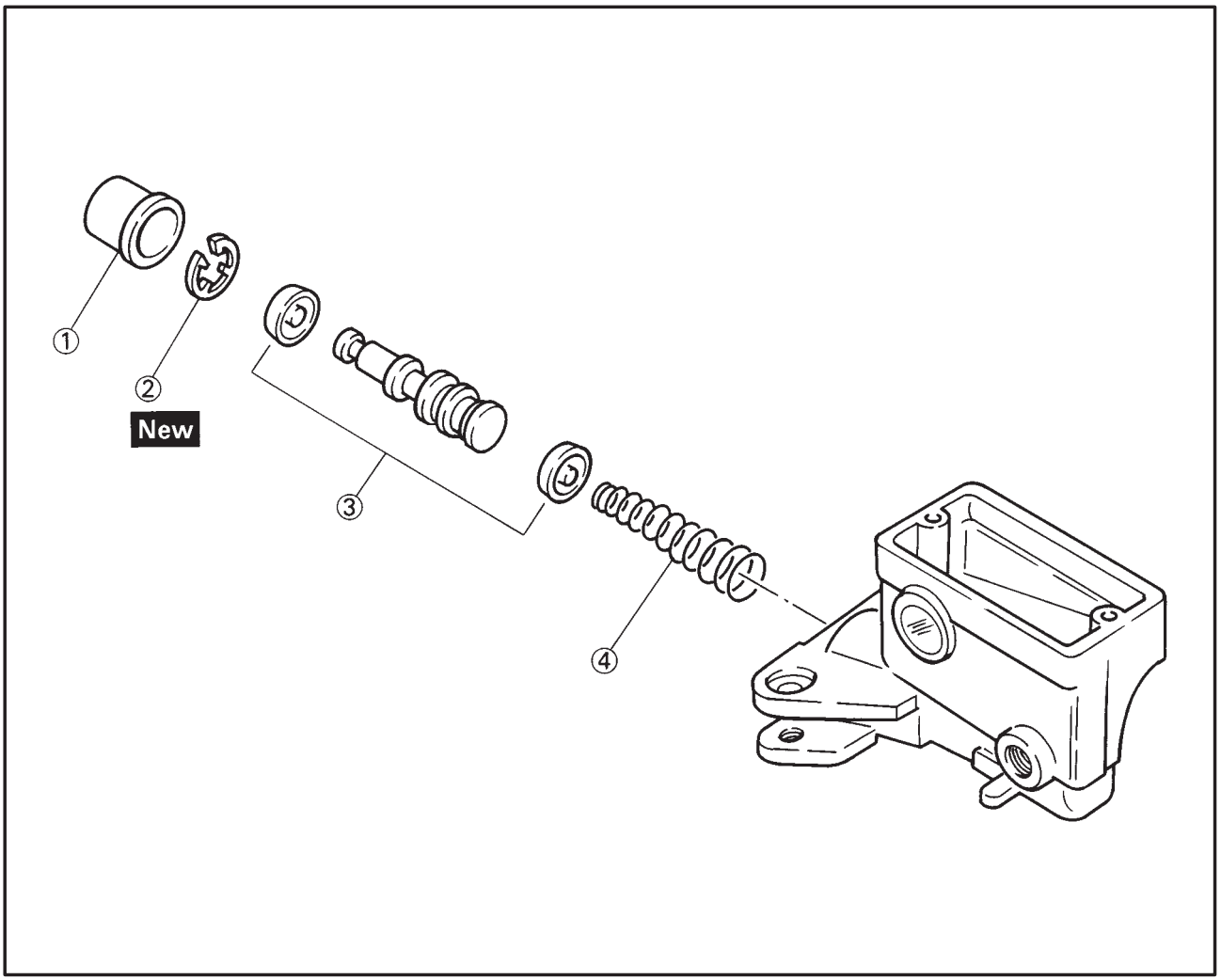
7. Check:
   ° brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

8. Check:
   ° brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

FRONT BRAKE MASTER CYLINDER

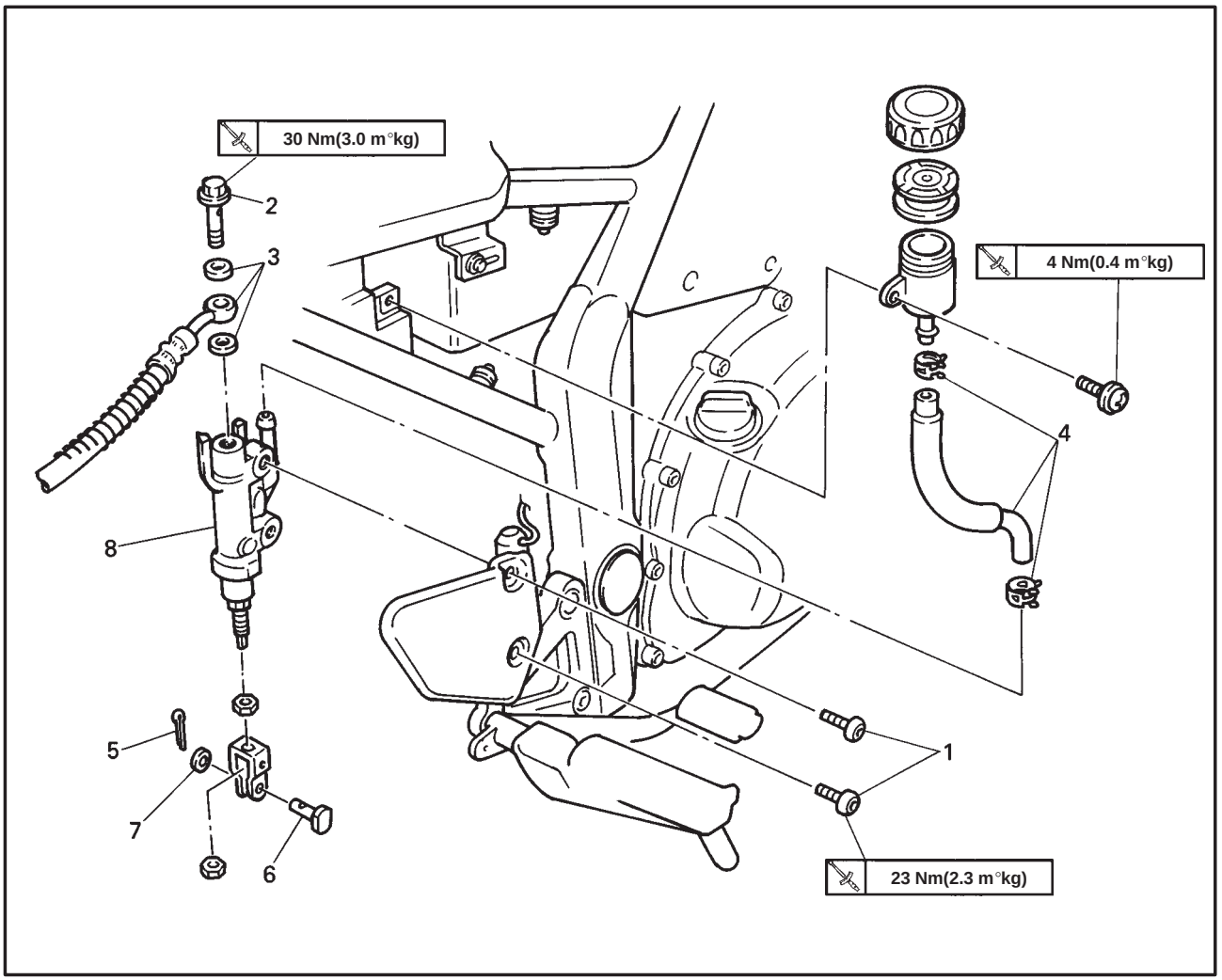


Order	Job name/Part name	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Drain the brake fluid		
1	Brake lever	1	
2	Brake switch lead	2	
3	Brake switch	1	
4	Union bolt	1	Refer to "REMOVING/ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER" section.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

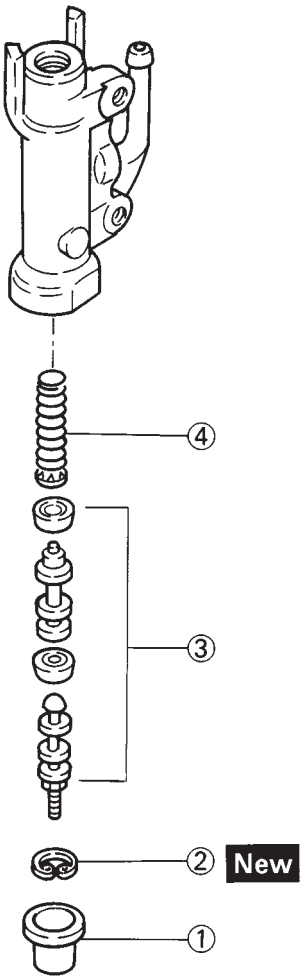


Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front brake master cylinder		Disassembly the parts in the order listed.
①	Master cylinder boot	1	
②	Circlip	1	
③	Master cylinder kit	1	
④	Spring	1	
			For assembly, reverse the disassembly procedure.

REAR BRAKE MASTER CYLINDER



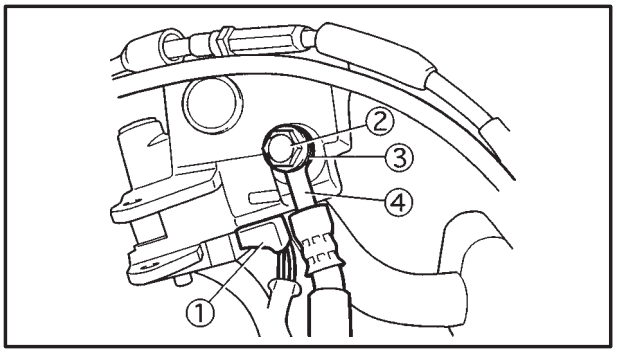
Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake master cylinder		Remove the parts in the order listed.
	Side cover (right)		
	Drain the brake fluid		
1	Master cylinder bolt	2	
2	Union bolt	1	Refer to "REMOVING/ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER" section.
3	Copper washer/brake hose	2/1	
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.



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.

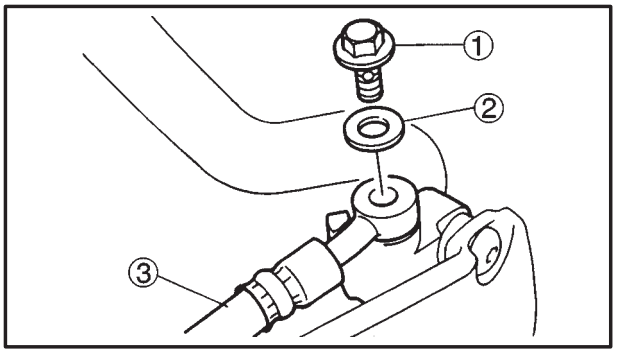
EB702210
REMOVING THE FRONT BRAKE MASTER CYLINDER

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
   ° copper washers ③
   ° brake hoses ④

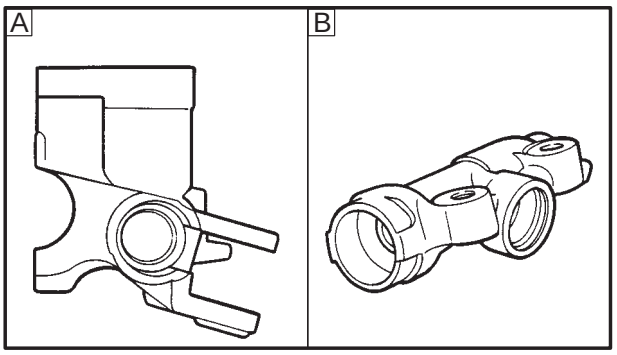
NOTE:
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

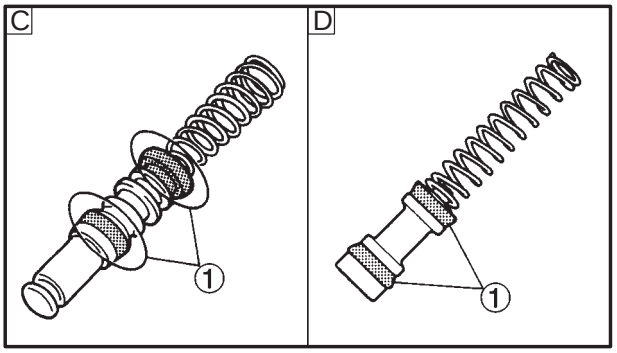


EB702220
REMOVING THE REAR BRAKE MASTER CYLINDER

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.





EB702242
CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

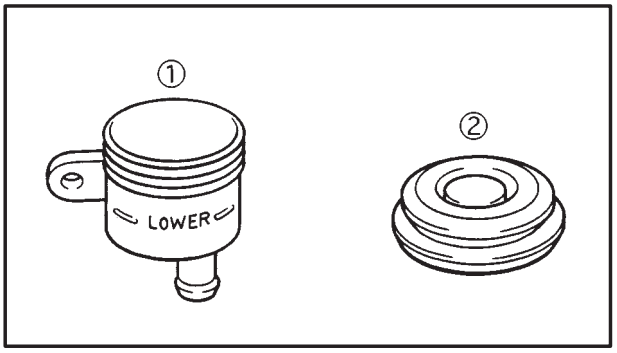
The following procedure applies to the both of the brake master cylinders.

1. Check:
   - ° brake master cylinder
     Damage/scratches/wea → Replace.
   - ° brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.

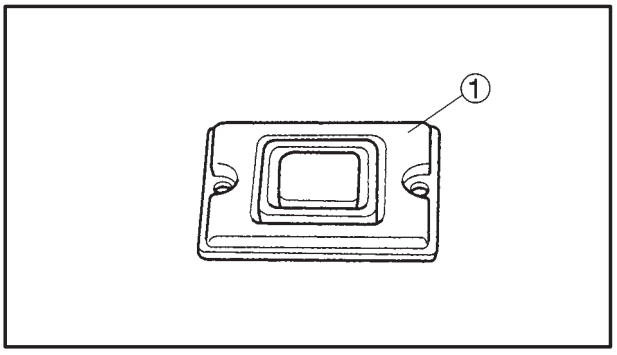
A Front
B Rear

2. Check:
   - ° brake master cylinder kit ①
     Damage/scratches/wear → Replace.

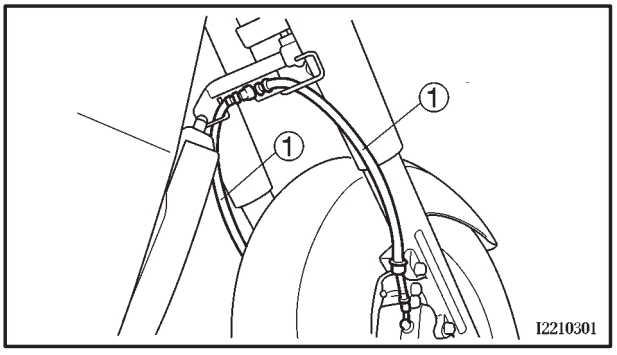
C Front
D Rear



3. Check:
   - ° rear brake fluid reservoir ①
     Cracks/damage → Replace.
   - ° rear brake fluid reservoir diaphragm ②
     Cracks/damage → Replace.



4. Check
   - ° front brake master cylinder diaphragm ①
     Damage/wear → Replace.



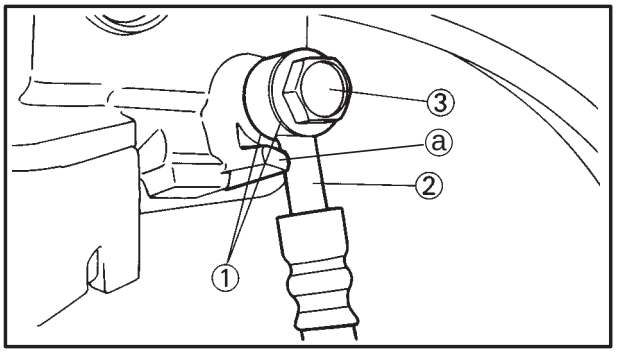
5. Check:
   - ° brake hoses ①
     Cracks/damage/wear → Replace.

EB702270
ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

⚠ WARNING

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

Recommended brake fluid
DOT 4



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

⚠ 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 ⓐ on the brake master cylinder.

NOTE:

- While holding the brake hose, tighten the union bolt as shown.
- 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

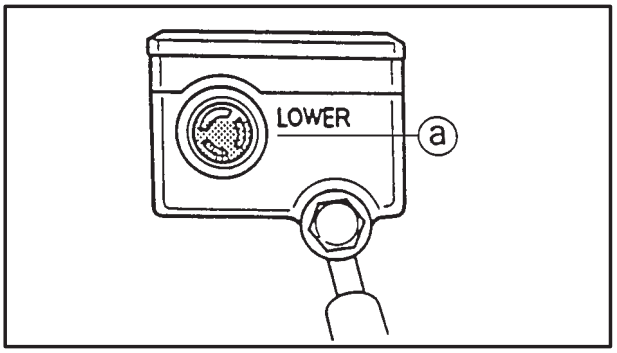
⚠ WARNING

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

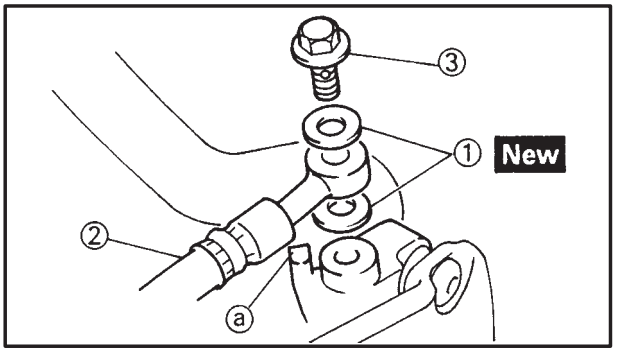
CAUTION:

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

3. Bleed:
   ° brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



4. Check:
   ° brake fluid level
   Below the minimum level mark ⓐ → 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 → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



EB702292
ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER

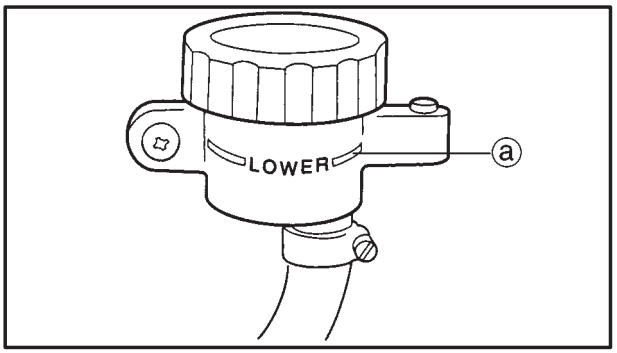
1. Install:
   ° copper washers (New) ①
   ° brake hose ②
   ° union bolt ③ 30 Nm (3.0 m°kg)

CAUTION:

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

⚠ 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 ⓐ)

Recommended brake fluid
DOT 4

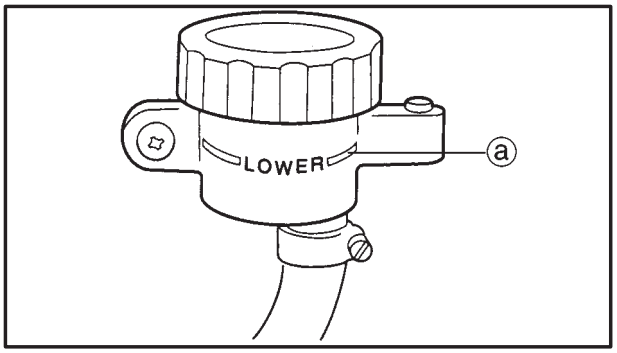
⚠ WARNING

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

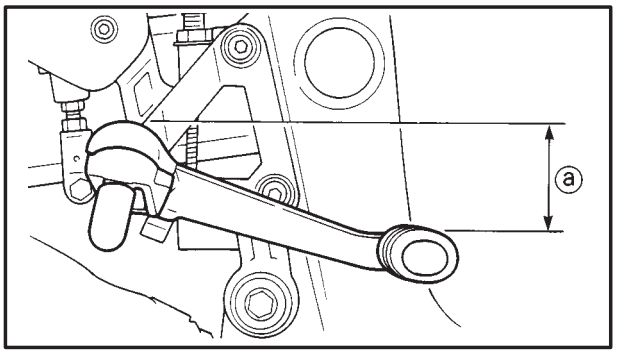
CAUTION:

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

3. Bleed:
   - brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



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

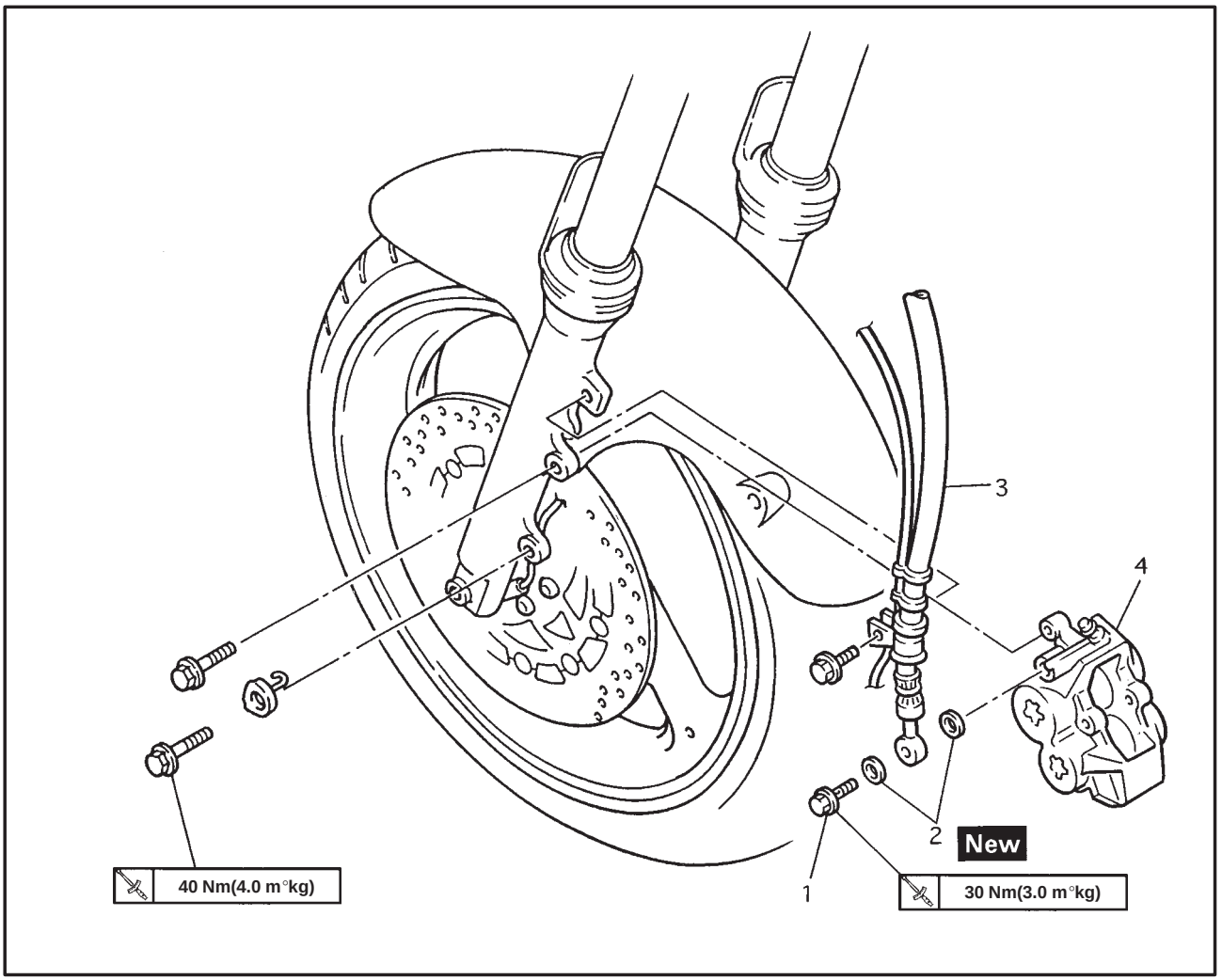


5. Adjust:
   - brake pedal position ⓐ
     Refer to "ADJUSTING THE REAR BRAKE" in chapter 3.

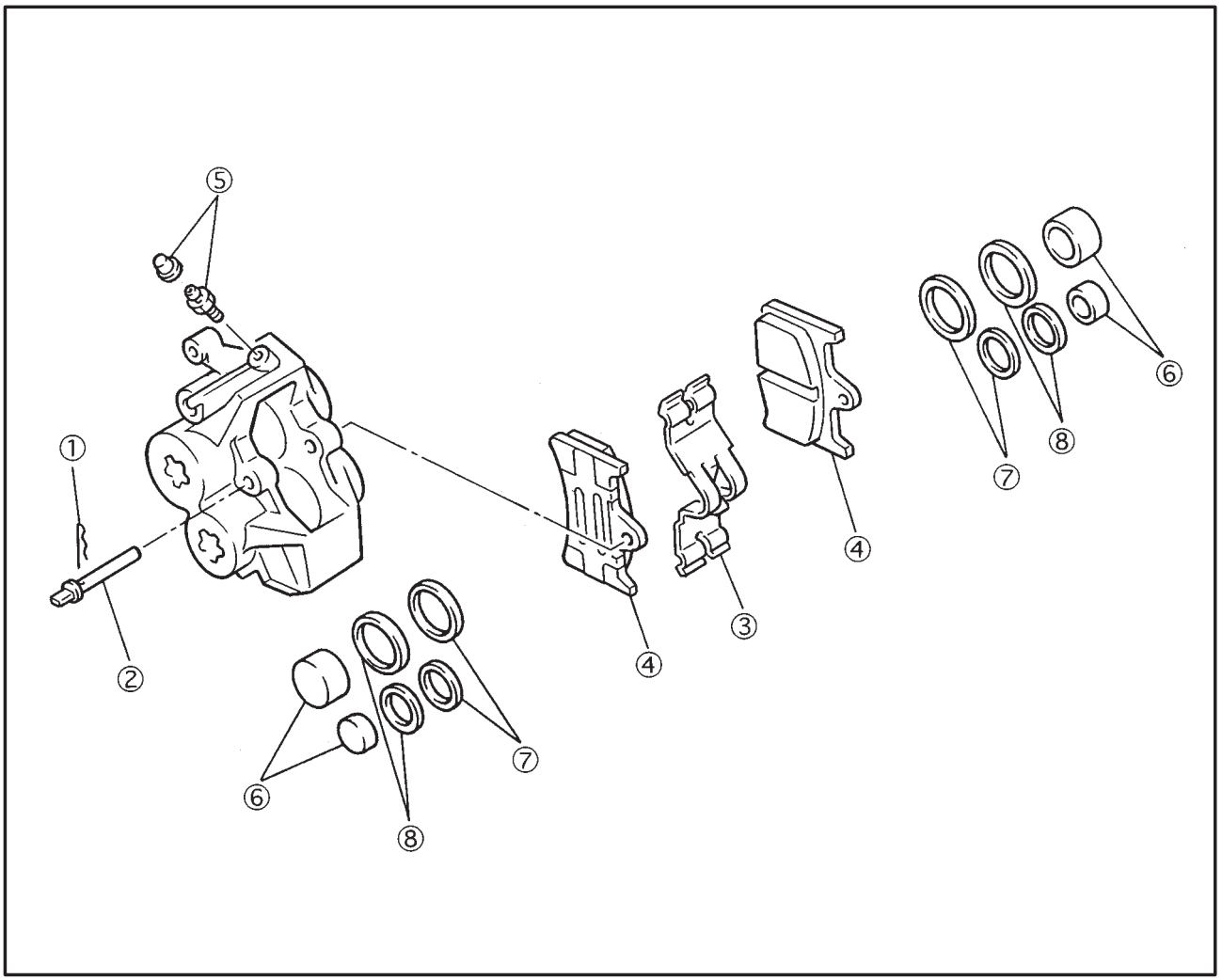
Brake pedal position (below the top of the rider footrest)
36.6 mm

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

FRONT BRAKE CALIPERS

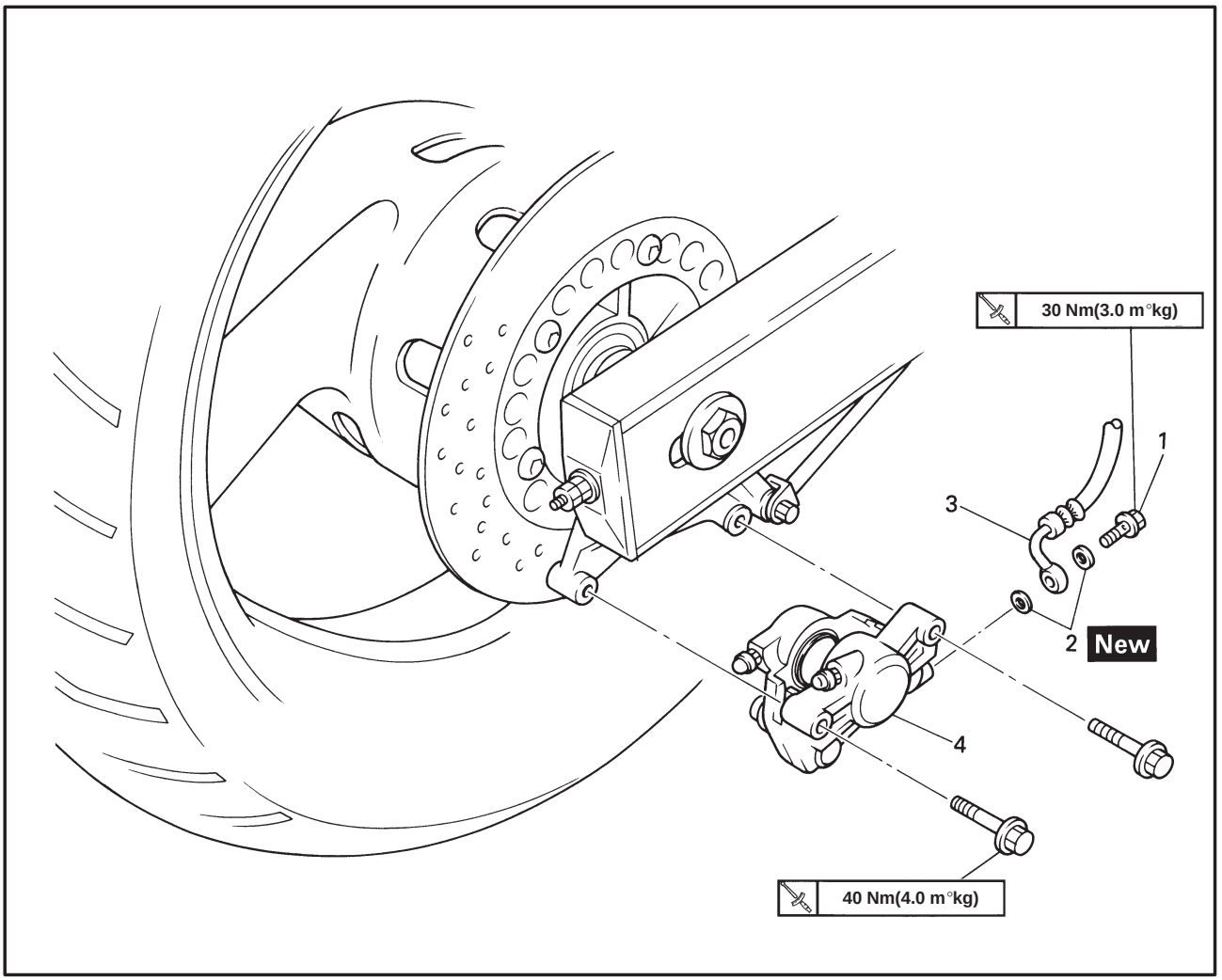


Order	Job name/Part name	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed.
	Drain the brake fluid		
1	Union bolt	1	Refer to "ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS" section.
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper assembly	1	
			For installation, reverse the removal procedure.

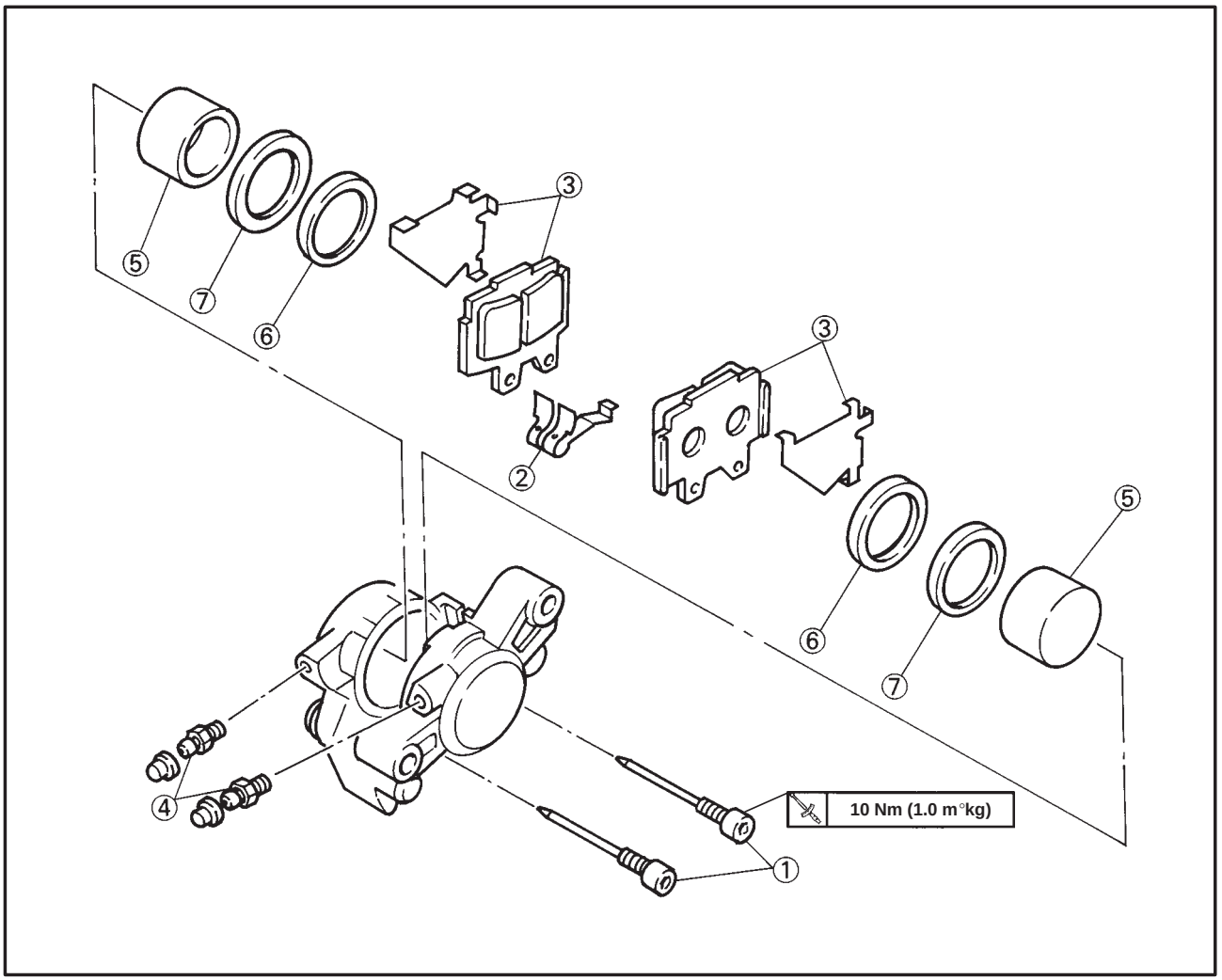


Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front brake calipers		Disassembly the parts in the order listed.
①	Clip	2	Refer to "REPLACING THE FRONT BRAKE PADS" section.
②	Pad pin	1	
③	Brake pad spring	1	
④	Brake pad	2	
⑤	Bleed screw kit	1	
⑥	Brake caliper piston	4	Refer to "DISASSEMBLING THE FRONT BRAKE CALIPER" section.
⑦	Dust seal	4	
⑧	Piston seal	4	
			For assembly, reverse the disassembly procedure.

REAR BRAKE CALIPER



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order listed.
	Drain the brake fluid		
1	Union bolt	1	Refer to "ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER" section.
2	Copper washer	2	
3	Brake hose	1	
4	Rear brake caliper	1	
			For installation, revers the removal procedure.

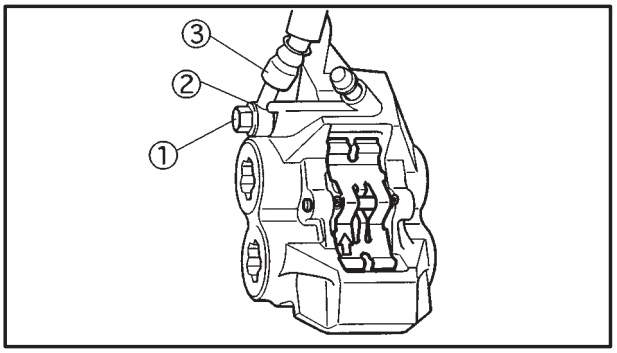


Order	Job name/Part name	Q'ty	Remarks
	Disassembling the rear brake caliper		Disassembly the parts in the order listed.
①	Pad pin	2	Refer to "REPLACING THE REAR BRAKE PAD" section.
②	Pad spring	1	
③	Brake pad assembly/shim	2/2	
④	Bleed screw kit	2	
⑤	Brake caliper piston	2	Refer to "DISASSEMBLING THE REAR BRAKE CARIPER" section.
⑥	Dust seal	2	
⑦	Piston seal	2	
			For assembly, reverse the disassembly procedure.

EB702317
DISASSEMBLING THE FRONT BRAKE CALIPERS

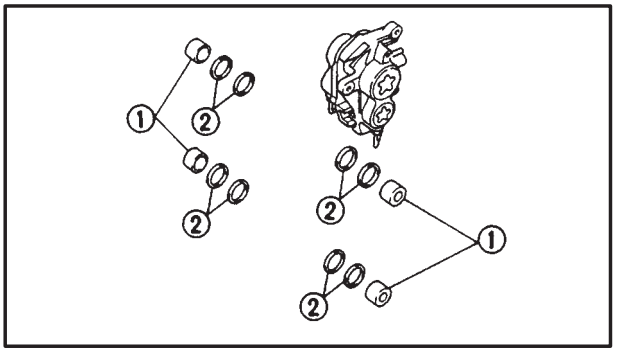
The following procedure applies to both of the brake calipers.

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

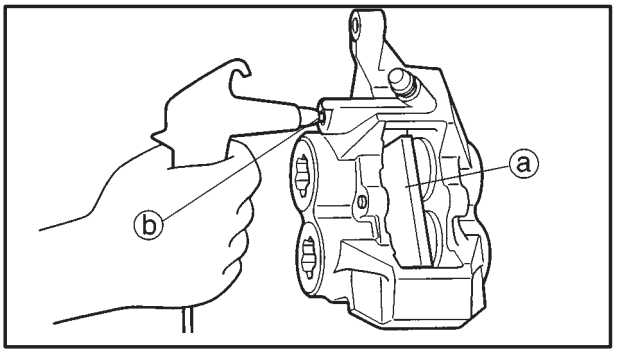


1. Remove:
   - ° union bolt ①
   - ° copper washers ②
   - ° brake hose ③

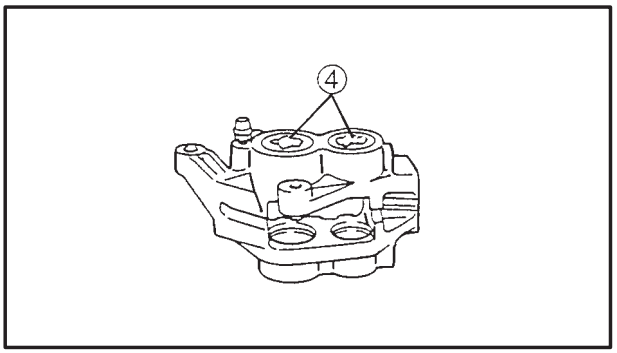
NOTE:
Put the end of the brake hose into a container and pump out the brake fluid carefully.



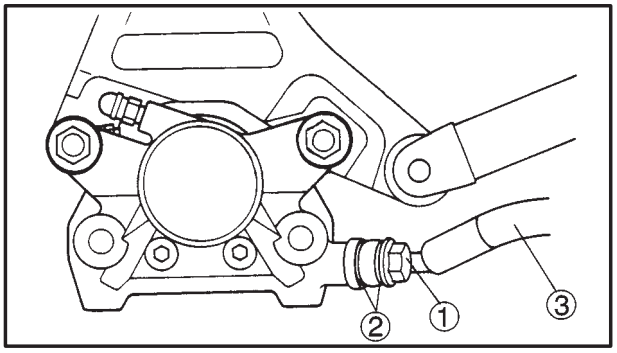
2. Remove:
   - ° brake caliper pistons ①
   - ° brake caliper piston seals ②



a. Secure the right side brake caliper pistons with a piece of wood ⓐ
b. Blow compressed air into the brake hose joint opening ⓑ 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.



⚠ WARNING
- ° **Never try to pry out the caliper pistons.**
- ° **Do not remove the plugs ④.**

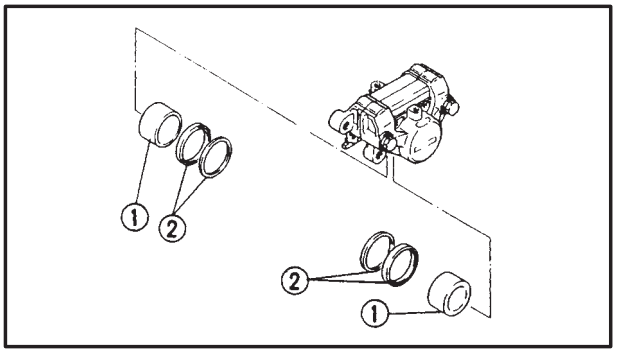


EB702322
DISASSEMBLING THE REAR BRAKE CALIPER

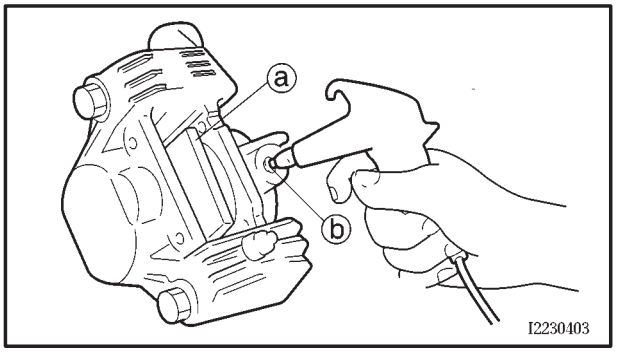
NOTE:
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   ° union bolt ①
   ° copper washers ②
   ° brake hose ③

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



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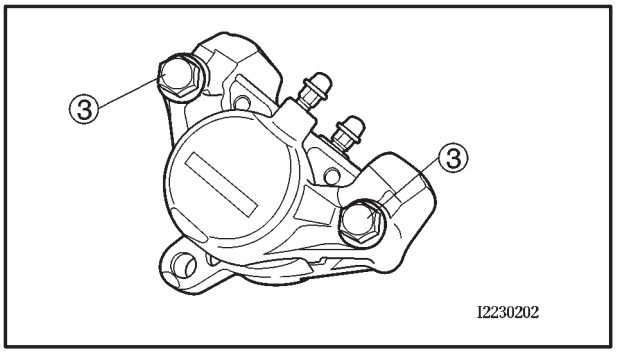
a. Secure the right side brake caliper piston with a piece of wood ⓐ
b. Blow compressed air into the brake hose joint opening ⓑ to force out the left side piston from the brake caliper.



⚠ WARNING

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

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

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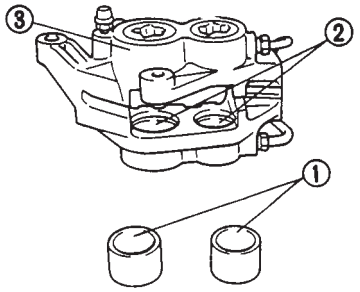
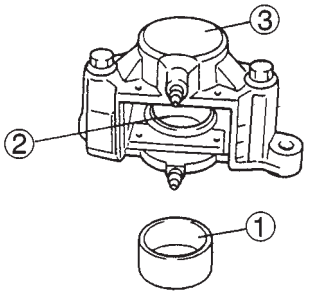
EB702343
CHECKING THE FRONT AND REAR BRAKE CALIPERS

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.

A



B

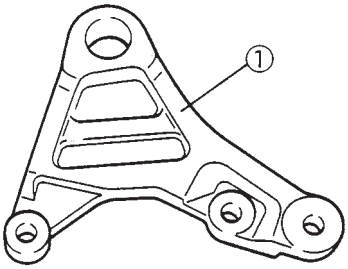


1. Check:
   - ° brake caliper pistons ①
     Rust/scratches/wear → Replace the brake caliper.
   - ° brake caliper cylinders ②
     Scratches/wear → Replace the brake caliper.
   - ° brake calipers ③
     Cracks/damage → Replace.
   - ° brake fluid delivery passages (brake caliper body)
     Obstruction → Blow out with compressed air.

⚠ WARNING

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

A Front
B Rear



2. Check:
   - ° brake caliper brackets ①
     Cracks/damage → Replace.

EB702374

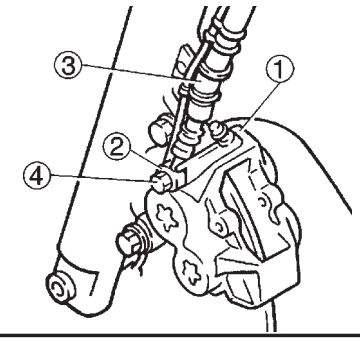
ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

⚠ WARNING

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

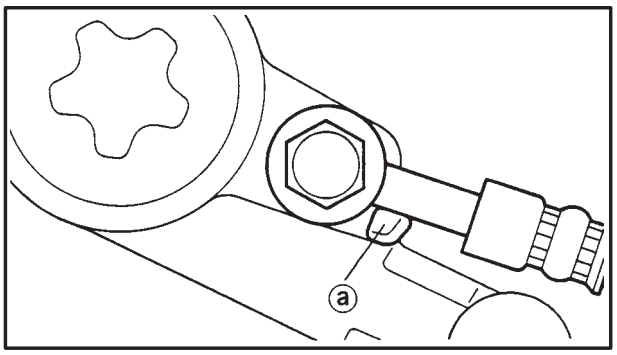
Recommended brake fluid
DOT 4



1. Install:
   - ° brake caliper ① (temporarily)
   - ° copper washers (New) ②
   - ° brake hose ③
   - ° union bolt ④ **30 Nm (30 m·kg)**

⚠ WARNING

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



CAUTION:

When installing the brake hose onto the brake caliper, make sure that the brake pipe a touches the projection ⓐ on the brake caliper.

2. Remove:
   ° brake caliper
3. Install:
   ° brake pads
   ° brake spring
   ° brake caliper pins
   ° brake caliper clips
   ° brake caliper
   ° brake hose holder
   Refer to "REPLACING THE BRAKE PADS".

Brake caliper bolt
40 Nm (40 m°kg)

4. Fill:
   ° brake master cylinder reservoir
   (with the specified amount of the recommended brake fluid)

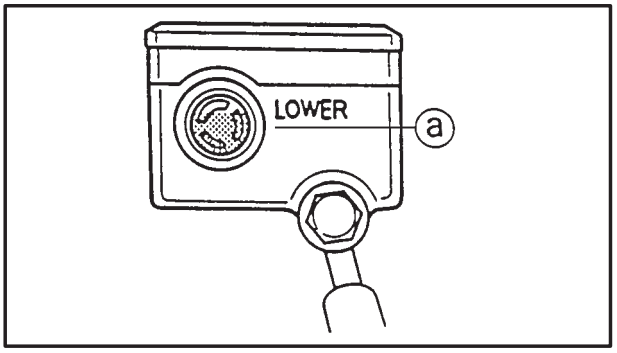
Recommended brake fluid
DOT 4

⚠ WARNING

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

CAUTION:

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

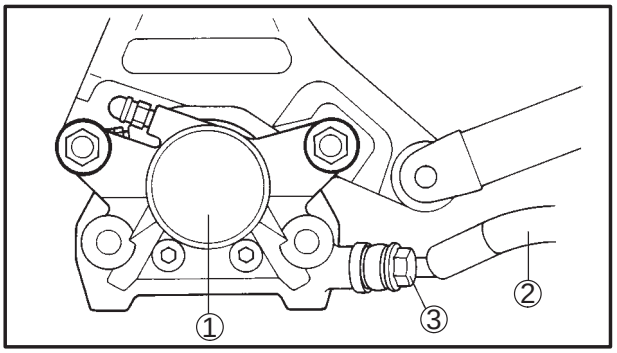


5. Bleed:
   ° brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
6. Check:
   ° brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
7. Check:
   ° brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

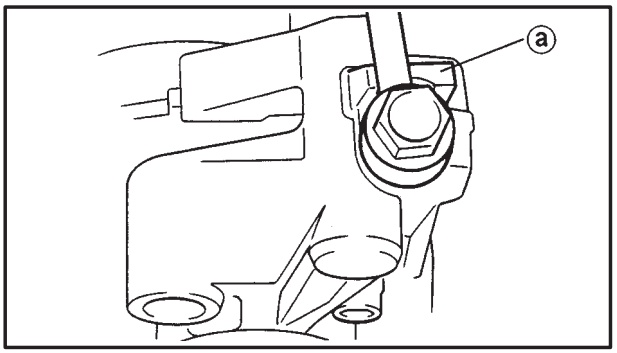
EB702378
ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

⚠ WARNING
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components as they will cause the piston seals to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston seals.**

Recommended brake fluid
DOT 4



1. Install:
   ° brake caliper ①
   (temporarily)
   ° copper washers (New)
   ° brake hose ②
   ° union bolt ③ **30 Nm (3.0 m°kg)**



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

CAUTION:
When installing the brake hose onto the brake caliper, make sure that the brake pipe a slot the projection ⓐ on the brake caliper.

2. Remove:
   ° brake caliper
3. Install:
   ° brake pad spring
   ° brake pads
   ° brake pad pins
   ° brake caliper
   ° brake hose holder
   Refer to “REPLACING THE BRAKE PADS”.

Brake caliper pad pin
10 Nm (1.0 m°kg)
Brake caliper bolt
40 Nm (4.0 m°kg)

4. Fill:
   ° brake fluid reservoir
   (with the specified amount of the recommended brake fluid)

Recommended brake fluid
DOT 4

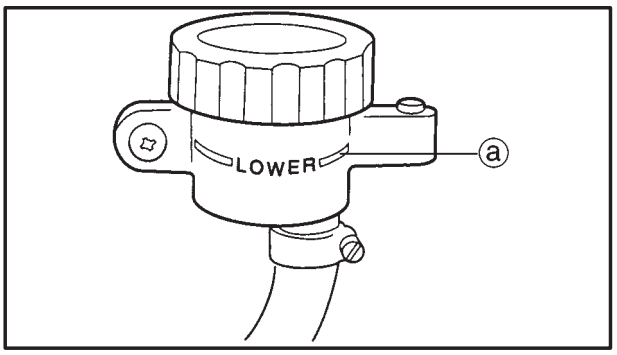
⚠ WARNING

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

CAUTION:

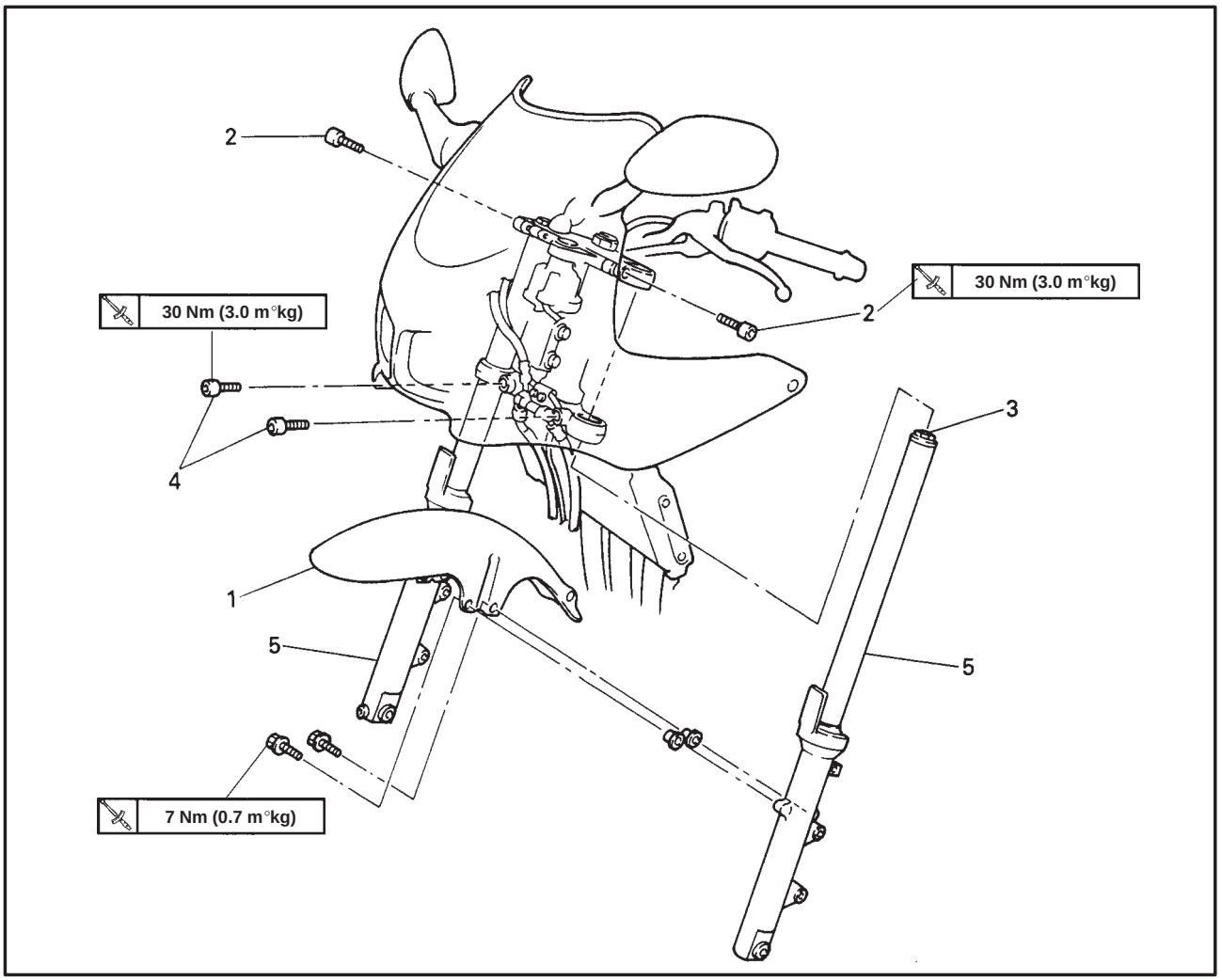
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
   ° brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

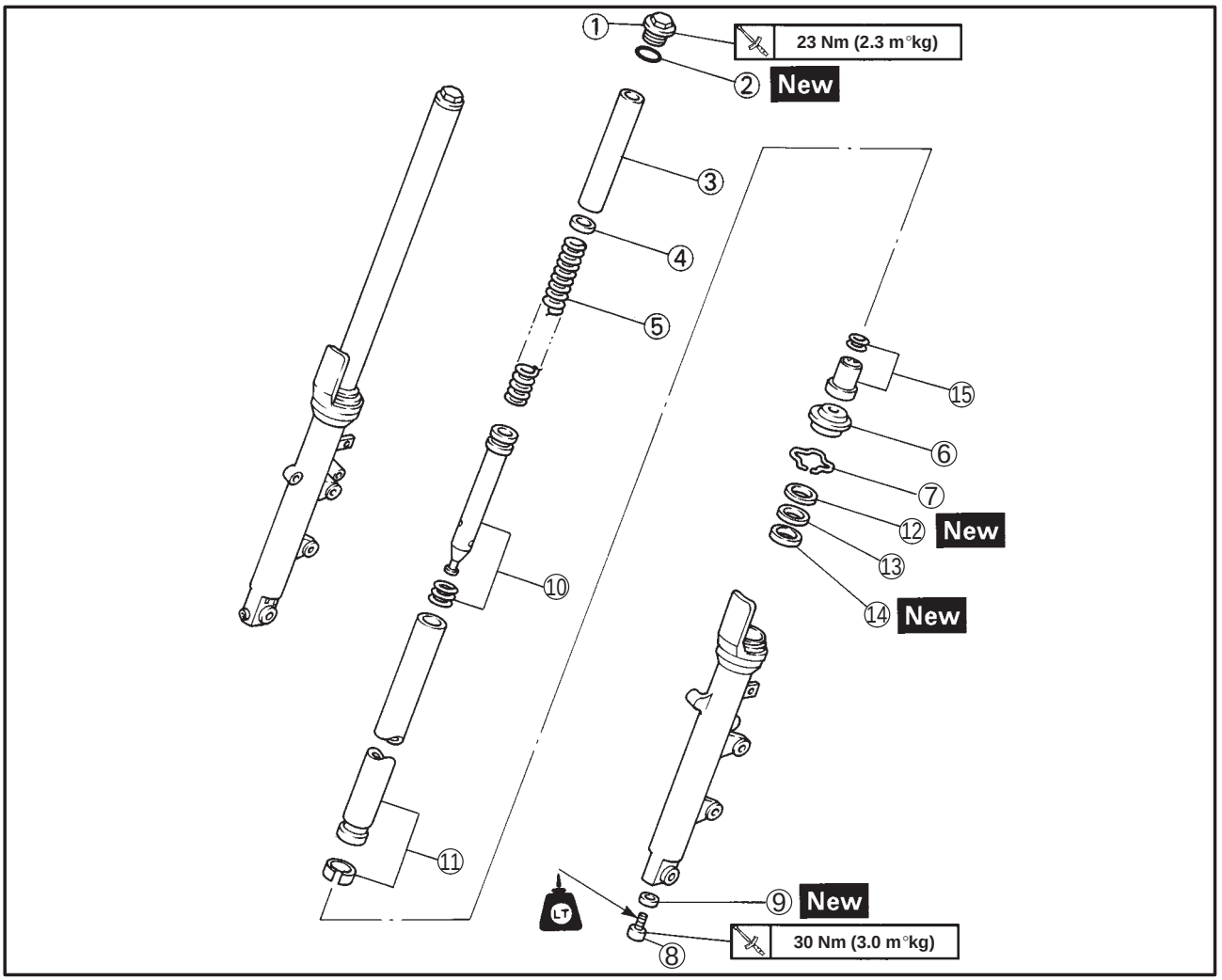


6. Check:
   ° brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
7. Check:
   ° brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

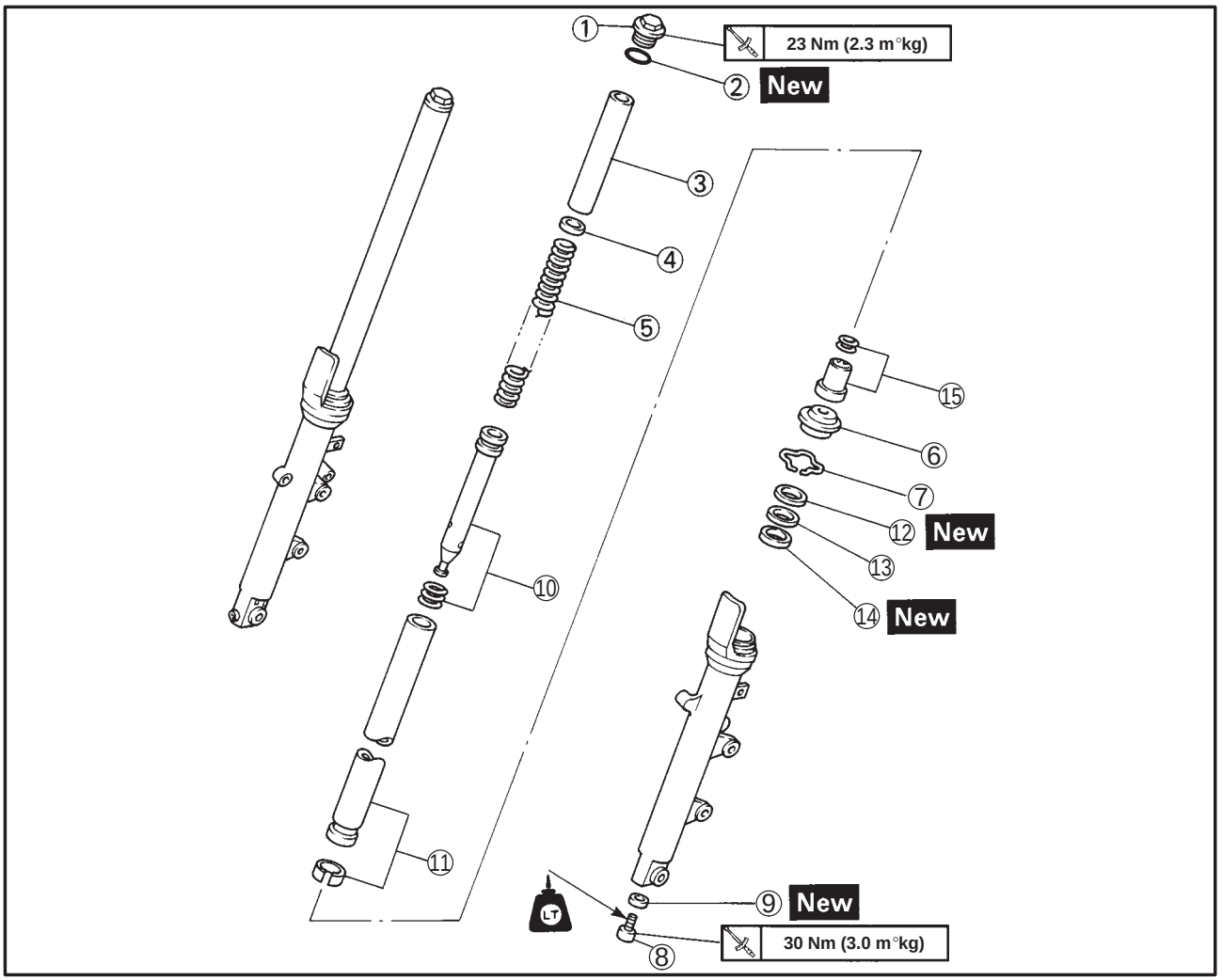
FRONT FORK



Order	Job name/Part name	Q'ty	Remarks
	Removing the front fork		Remove the parts in the order listed.
	Front wheel		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:** Loosen
3	Cap bolt	2	**NOTE:** Loosen
4	Bolt (lower bracket)	2	**NOTE:** Loosen Refer to "REMOVING/INSTALLING THE 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	
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.
⑦	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	Outer tube bushing	1	Refer to "ASSEMBLING THE FRONT FORK LEGS" section. For assembly, reverse the disassembly procedure.
⑮	Oil flow stopper	1/1	

EB703100
REMOVING THE FRONT FORK LEGS

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

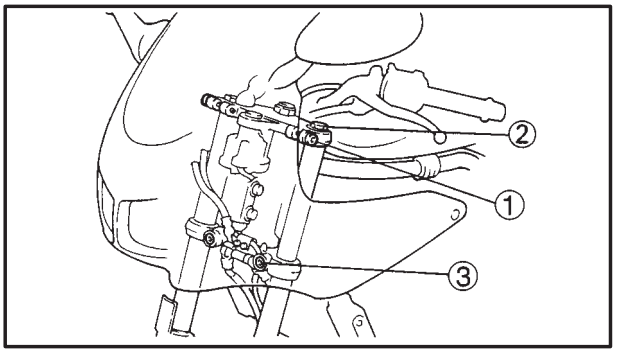
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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

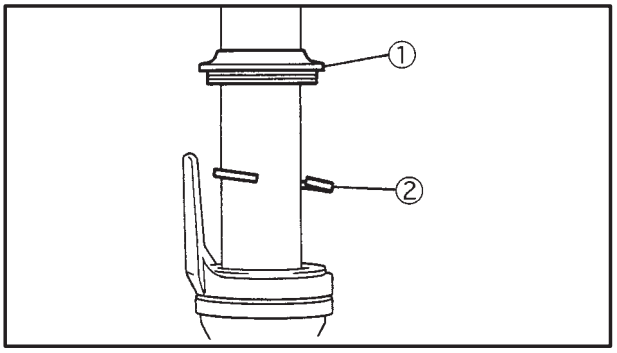


2. Loosen:
   - ° upper bracket pinch bolt ①
   - ° cap bolt ②
   - ° lower bracket pinch bolt ③

⚠ WARNING

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

3. Remove:
   - ° front fork leg



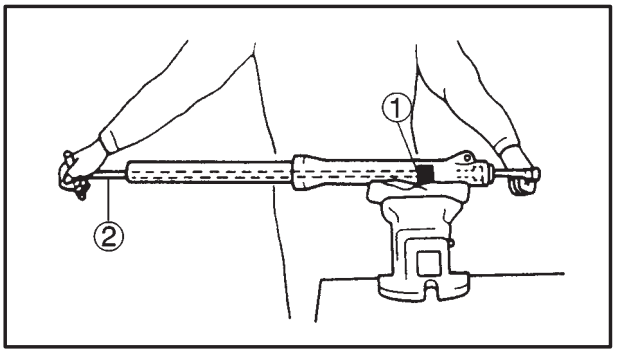
EB703110
DISASSEMBLING THE FRONT FORK LEGS

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

1. Remove:
   - ° dust seal ①
   - ° oil seal clip ②
     (with a flat-head screwdriver)

CAUTION:

Do not scratch the inner tube.

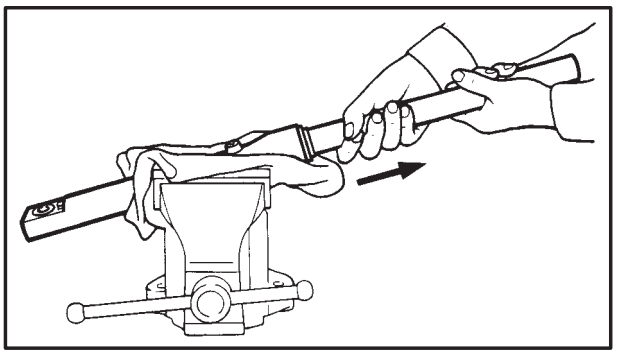


2. Remove:
   - ° damper rod bolt

NOTE:

While holding the damper rod with the damper rod holder ① and T-handle ②, loosen the damper rod bolt.

Damper rod holder
90890-01460
T-Handle
90890-01326



3. Remove:
   ° inner tube

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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.**

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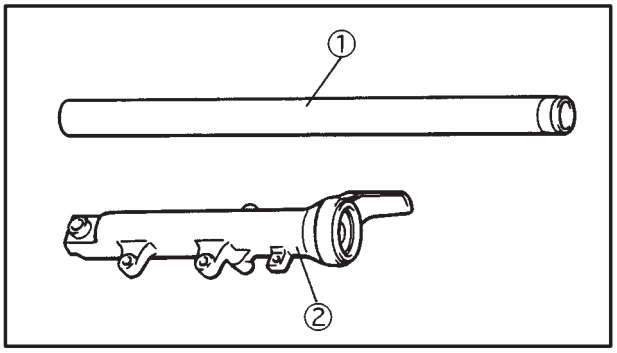
EB703401
CHECKING THE FRONT FORK LEGS

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

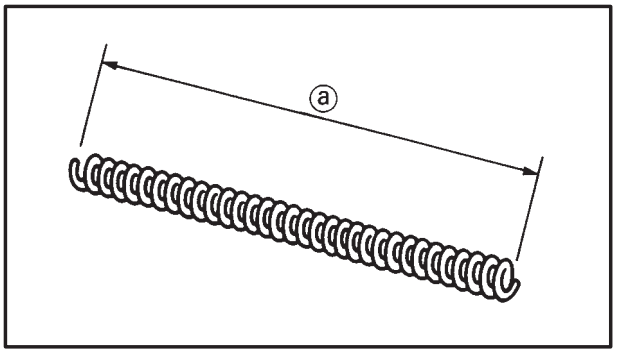
1. Check:
   ° inner tube ①
   ° outer tube ②
   Bends/damage/scratches → Replace.



⚠ WARNING

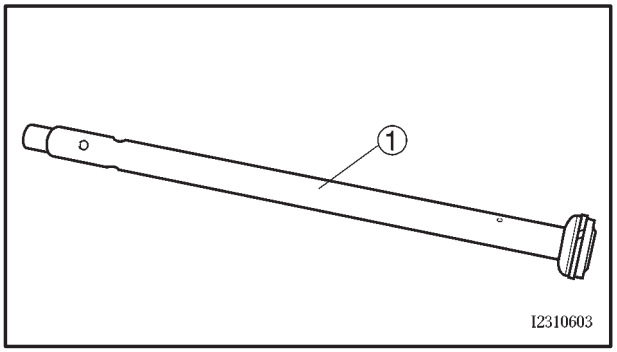
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:
   ° spring free length ⓐ
   Over the specified limit → Replace.



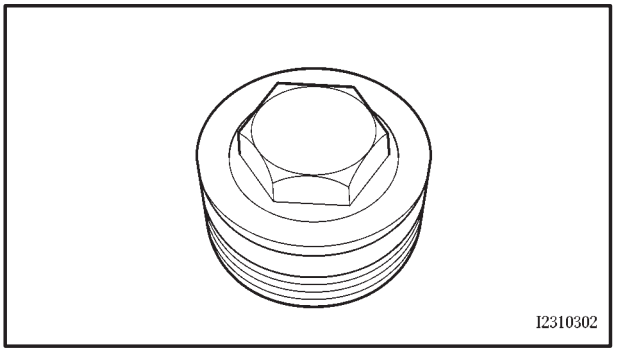
Spring free length limit
319 mm

3. Check:
   ° damper rod ①
   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.
   ° oil flow stopper
   Damage/wear → Replace.



CAUTION:

- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**



4. Check:
   ° cap bolt O-ring
   Damage/wear → Replace.

EB703700
ASSEMBLING THE FRONT FORK LEGS

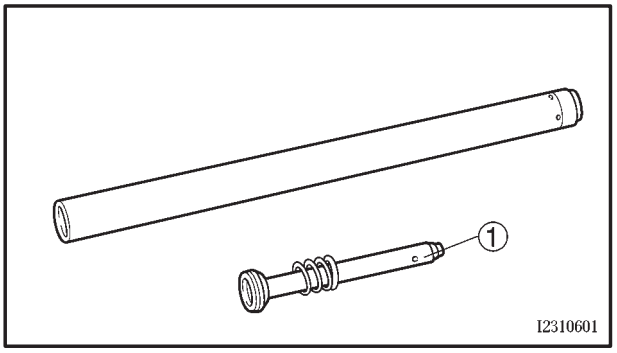
The following procedure applies to both of the front fork legs.

⚠ WARNING

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

NOTE:

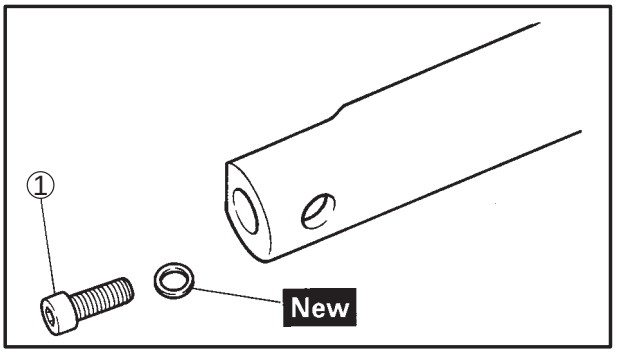
- When assembling the front fork leg, be sure to replace the following parts:
  -inner tube bushing
  -outer tube bushing
  -oil seal
  -dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.



1. Install:
   ° damper rod ①

CAUTION:

Allow the damper rod to slide slowly down the inner tube until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



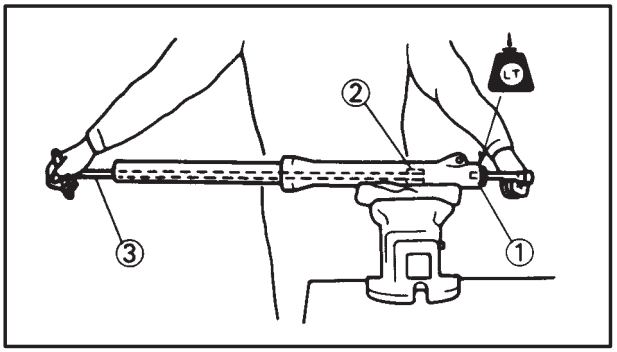
2. Lubricate:
   ° inner tube's outer surface

	Recommended lubricant **Fork oil 10 W or equivalent**

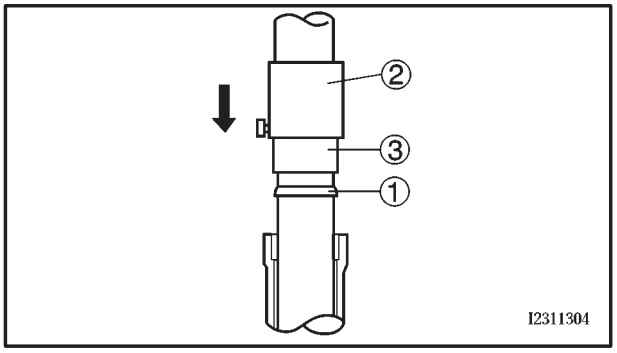
3. Tighten:
   ° damper rod bolt ① **30 Nm (3.0 m°kg)**

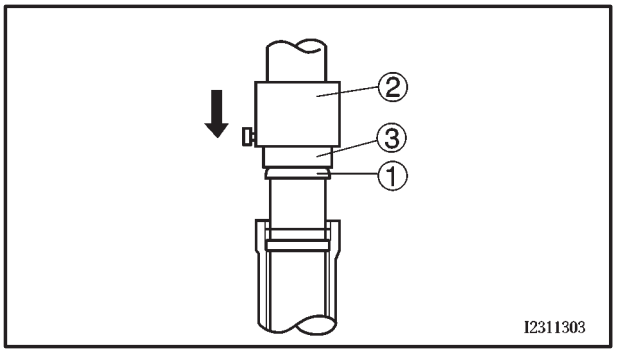
NOTE:

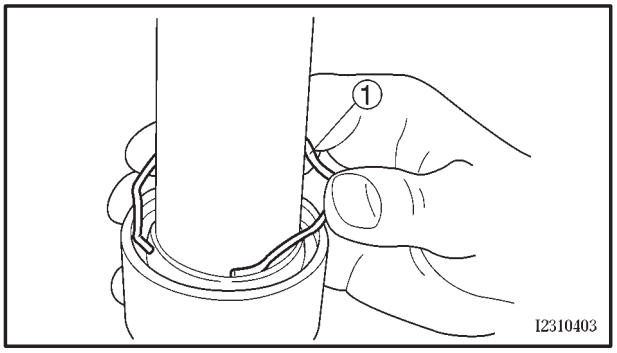
While holding the damper rod with the damper rod holder ② and T-handle ③, tighten the damper rod bolt.

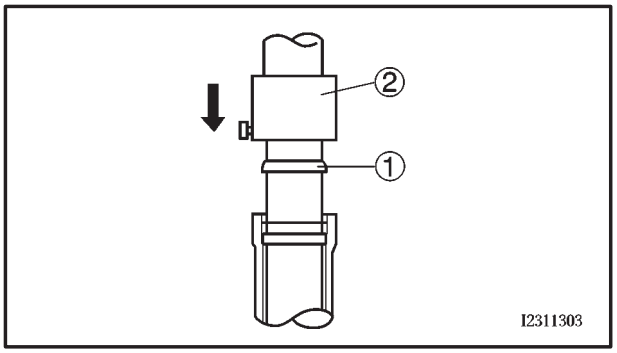


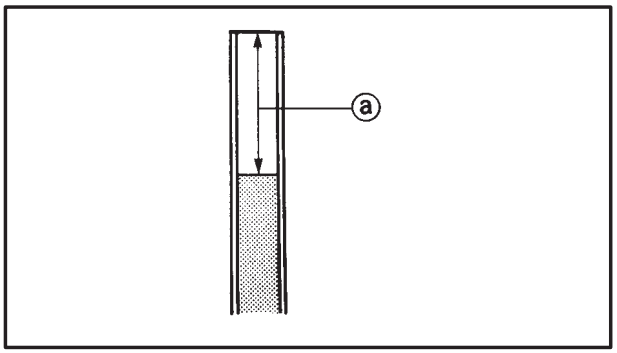
	Damper rod holder **90890-01460** **T-handle** **90890-01326**











4. Install:
   ° outer tube bushing ①
   (with the fork seal driver weight ② and adapter ③)

	Fork seal driver weight ② **90890-01367** **Adapter ③** **90890-01381**

5. Install:
   ° washer
   ° oil seal ①
   (with the fork seal driver weight ② and adapter ③)

	Fork seal driver weight ② **90890-01367** **Adapter ③** **90890-01381**

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:
   ° oil seal clip ①

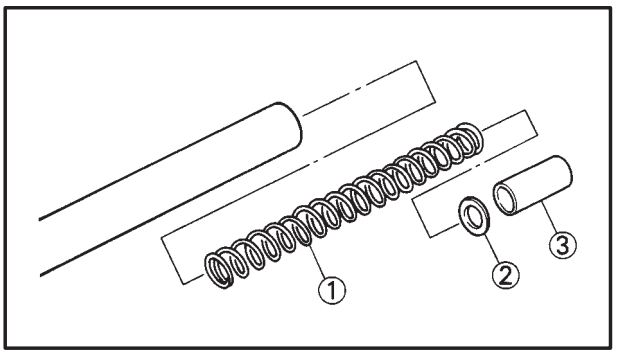
NOTE:
Adjust the oil seal clip so that it fits into the outer tube's groove.

7. Install:
   ° dust seal ①
   (with the fork seal driver weight) ①

	Fork seal driver weight **90890-01367**

8. Fill:
   ° front fork leg
   (with the specified amount of the recommended fork oil)

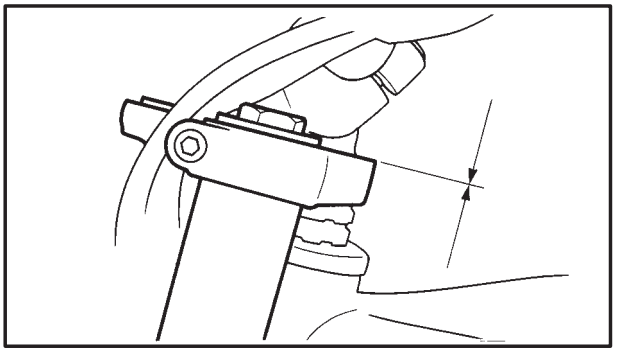
	Quantity (each front fork leg) **0.475 L**
	Yamaha fork and shock oil **10 W or equivalent.**
	Front fork leg oil level ⓐ (from the top of the inner tube, with the inner tube fully compressed and without the fork spring) **121 mm**

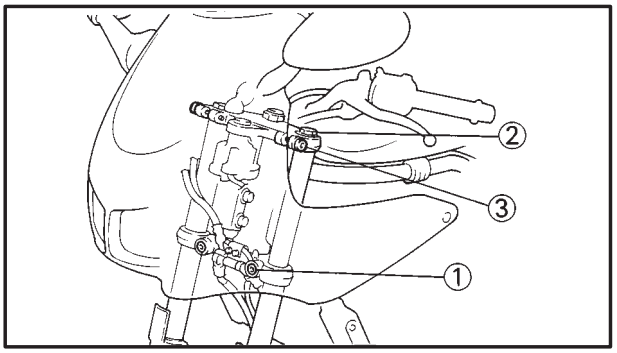


NOTE:
° While filling the front fork leg, keep it upright.
° After filling, slowly pump the front fork leg up and down to distribute the fork oil.

9. Install:
° spring ①
° 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.





EB703710
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.

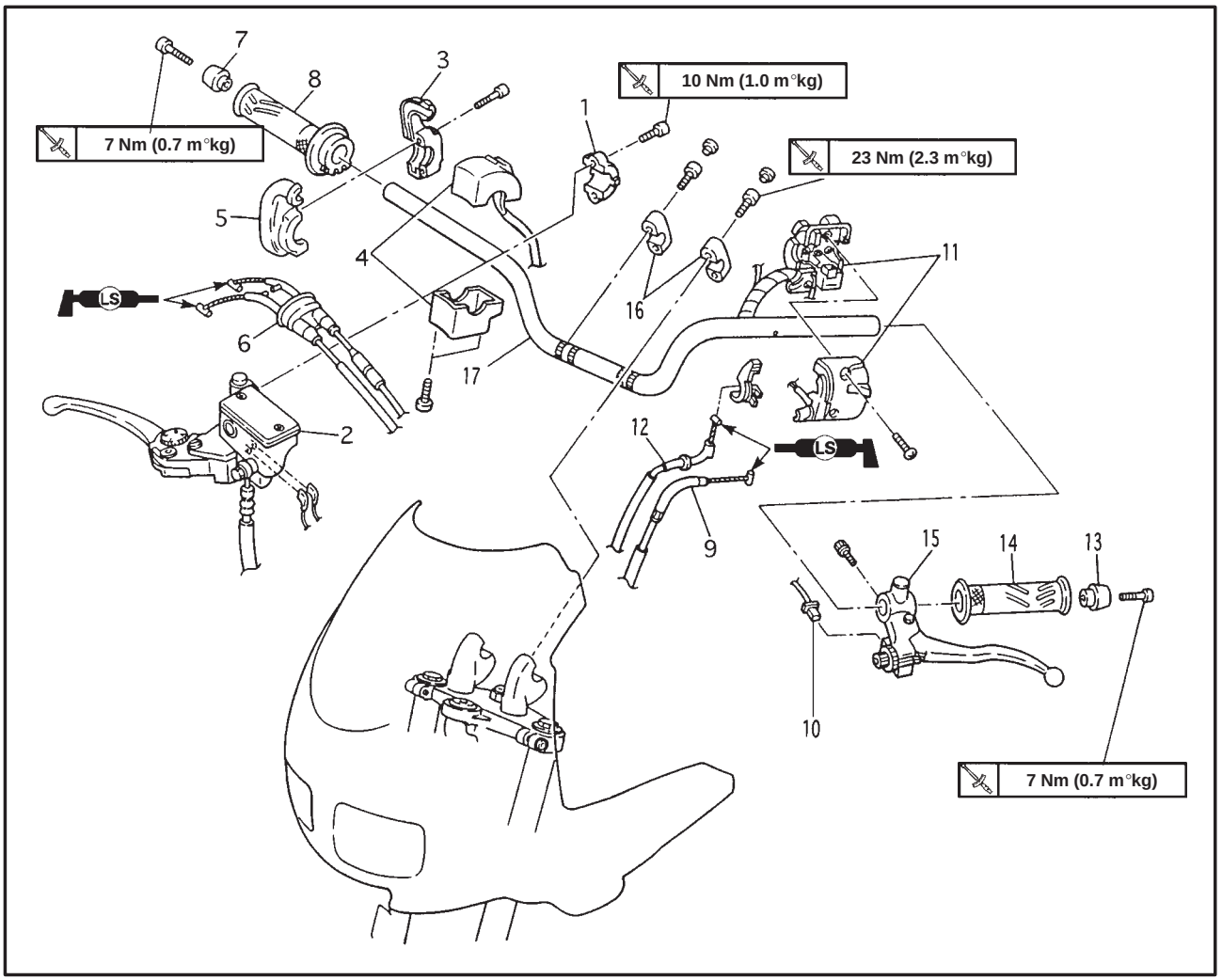
2. Tighten:
° lower bracket pinch bolt ①
° cap bolt ②
° upper bracket pinch bolt ③

Lower bracket pinch bolt
30 Nm (3.0 m°kg)
Cap bolt
23 Nm (2.3 m°kg)
Upper bracket pinch bolt
30 Nm (3.0 m°kg)

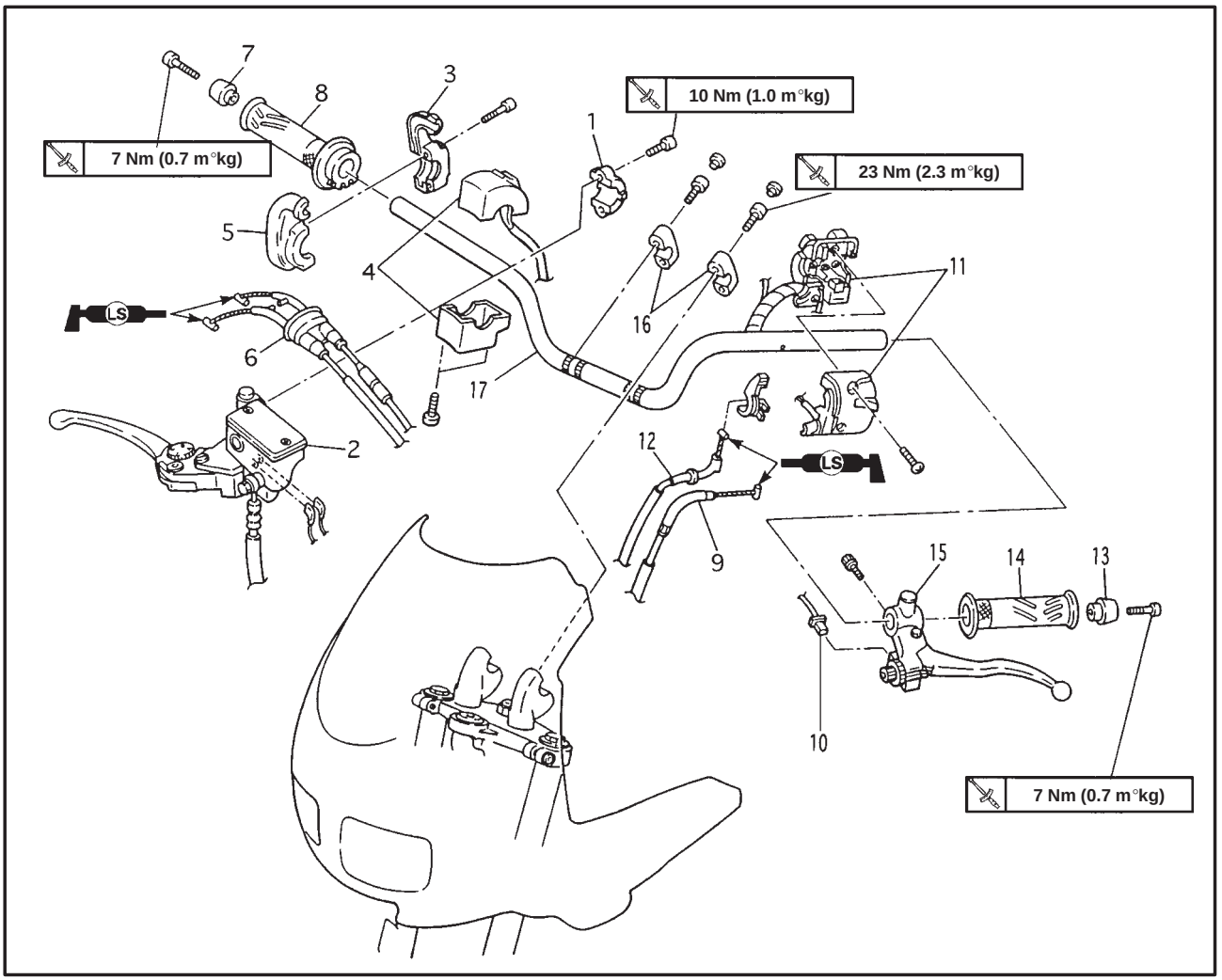
⚠ WARNING

Make sure that the brake hoses are routed properly.

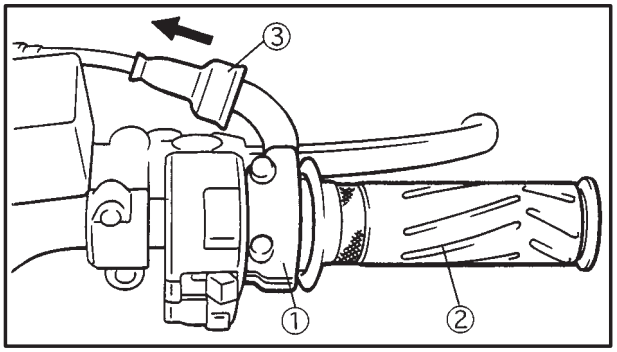
HANDLEBAR

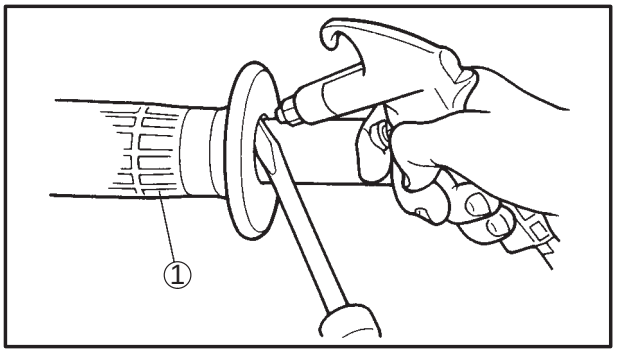


Order	Job name/Part name	Q'ty	Remarks
	Removing the handle bar		Remove the parts in the order listed.
1	Master cylinder bracket	1	
2	Master cylinder assembly	1	
3	Throttle cable housing cover	1	
4	Handle bar switch (right)	1	
5	Throttle cable housing	1	
6	Throttle cable	1	
7	Grip end	1	
8	Grip assembly	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.



Order	Job name/Part name	Q'ty	Remarks
14	Grip (left)	1	Refer to "REMOVING THE HANDLEBAR" section.
15	Clutch lever holder	1	
16	Upper handlebar holder	2	Refer to "INSTALLING THE HANDLEBAR" section.
17	Handle bar	1	
			For installation, reverse the removal procedure.





EB704100
REMOVING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

⚠ WARNING

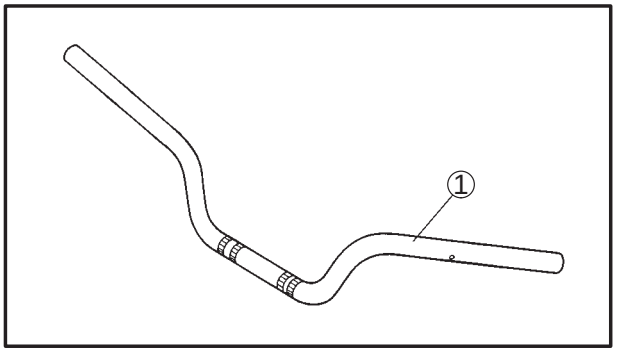
Securely support the motorcycle so that there is no danger of it falling over.

2. 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.



EB704400
CHECKING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

2. Check:
   ° handlebar ①
   Bends/cracks/damage → Replace.

⚠ 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.

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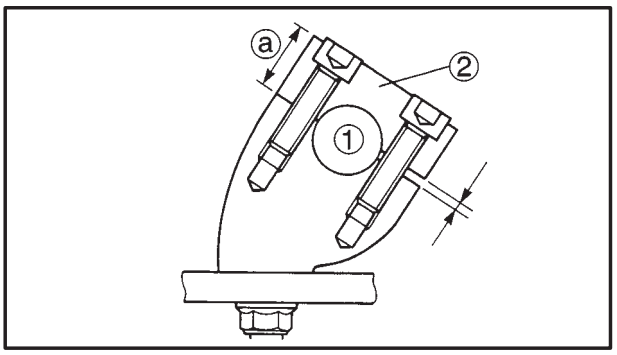
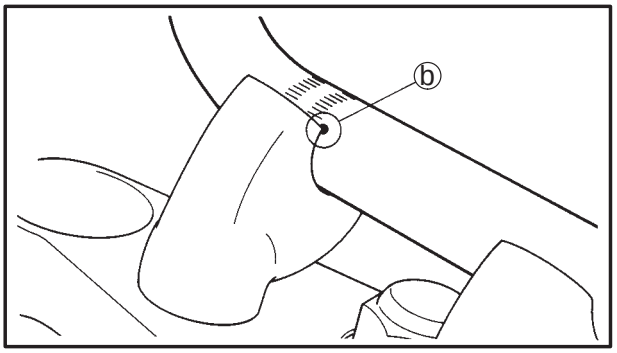
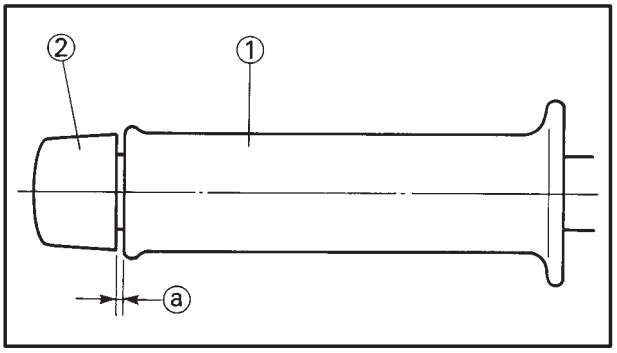
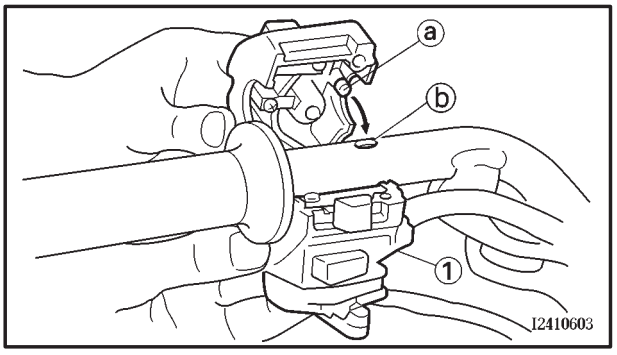
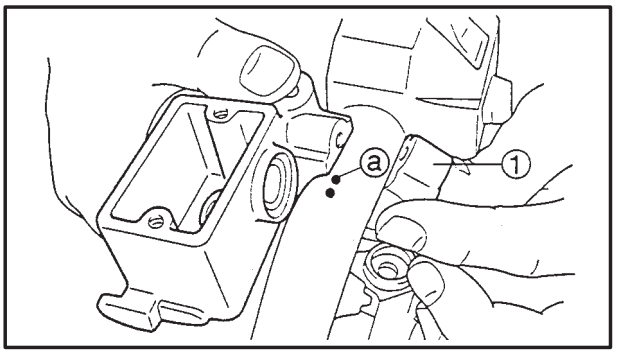










EB704701
INSTALLING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

2. Install:
   - handlebar ①
   - upper handlebar holders ②

   23 Nm (2.3 m·kg)

CAUTION:

- **First, tighten the bolts on the front side ⓐ of the handlebar holder, then on the rear side.**
- **turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.**

NOTE:

- The upper handlebar holders should be installed with the arrows facing forward.
- Align the match marks ⓑ on the handlebar with the upper surface of the lower handlebar holders.

3. Install:
   - clutch lever holder
   - handlebar grip ①
   - left grip end ②

NOTE:

There should be 1.0 mm of clearance ⓐ between the handlebar grip and the left grip end.

4. Install:
   - left handlebar switch ①

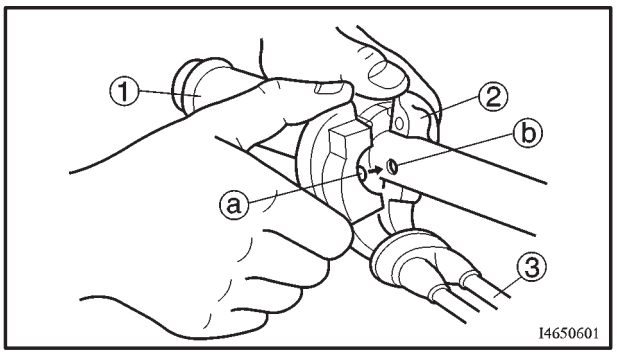
NOTE:

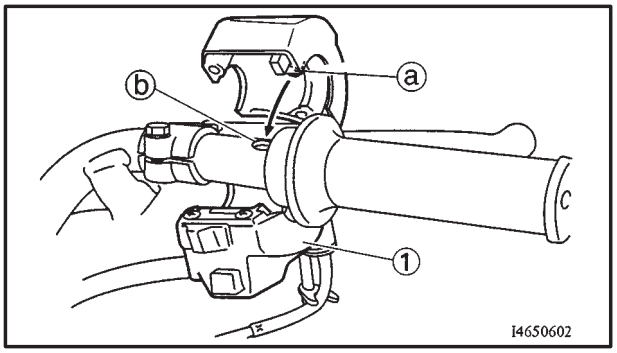
Align the projection ⓐ on the left handlebar switch with the hole ⓑ in the handlebar.

5. Install:
   - master cylinder bracket ①

NOTE:

Align the mating surfaces of the master cylinder bracket with the punch mark (right handlebar switch side) ⓐ on the handlebar.





6. Install:
   ° throttle grip ①
   ° throttle cable housing ②
   ° throttle cables ③

NOTE:
Apply ⓐ thin coat of lithium soap base grease onto the inside of the throttle grip and install it onto the handlebar.

NOTE:
° Align the projection ⓐ on the throttle cable housing with the hole ⓑ in the handlebar.

7. Install:
   ° right grip end
   ° right handlebar switch ①

⚠ WARNING
Make sure that the throttle grip operates smoothly.

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

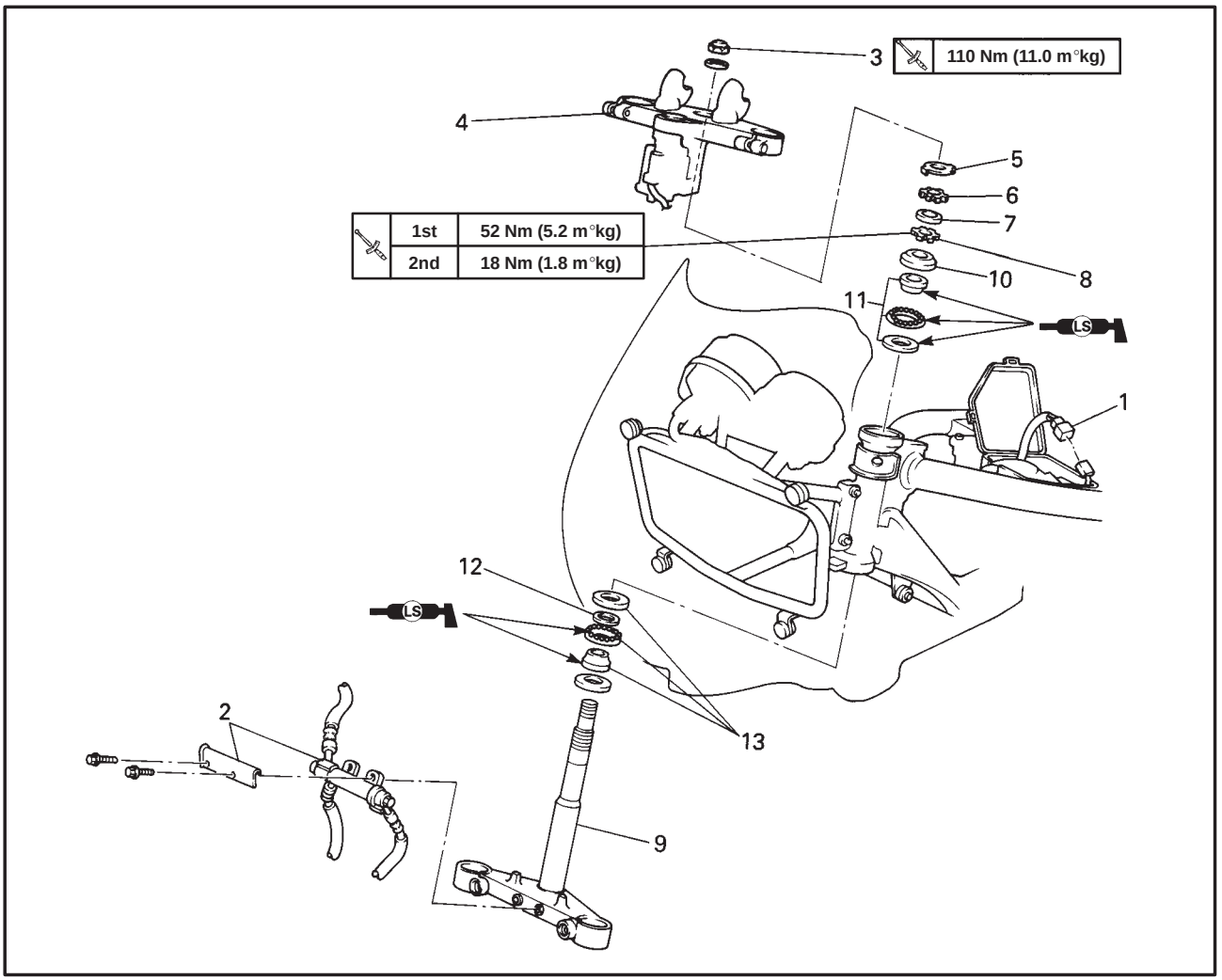
8. Adjust:
   ° clutch cable free play
   Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" in chapter 3.

Clutch cable free play (at the end of the clutch lever)
10 × 15 mm

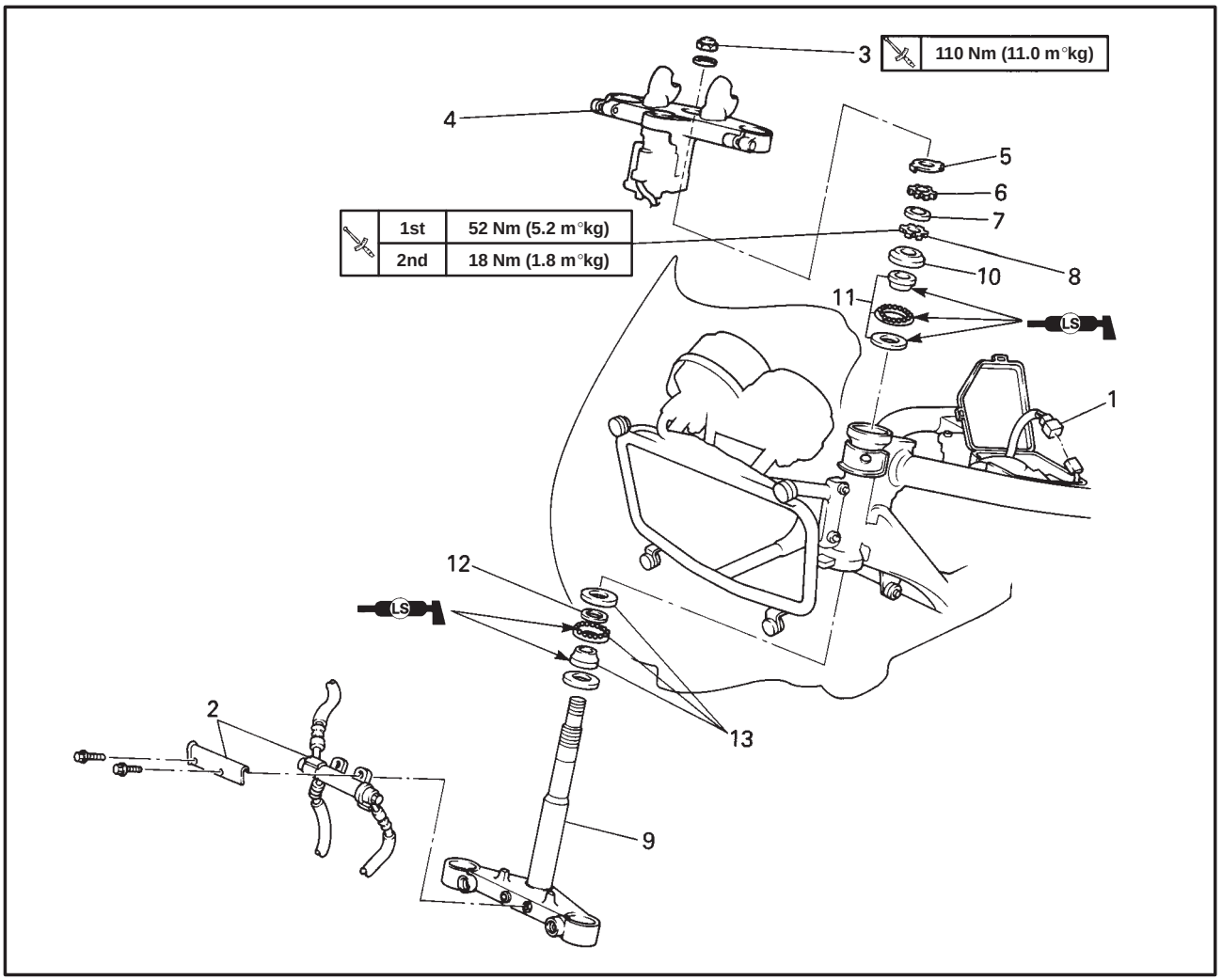
9. Adjust:
   ° throttle cable free play
   Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.

Throttle cable free play (at the flange of the throttle grip)
3 × 5 mm

STEERING HEAD
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 chapter 3
	Fuel tank		
	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:** Disconnect the coupler.
2	Brake hose joint/cover	1/1	
3	Steering stem nut	1	
4	Upper bracket	1	
5	Lock washer	1	
6	Ring nut (upper)	1	Refer to "REMOVING THE LOWER BRACKET/INSTALLING THE STEERING HEAD" section.
7	Rubber washer 1	1	
8	Ring nut (lower)	1	



Order	Job name/Part name	Q'ty	Remarks
9	Lower bracket	1	
10	Ball race cover	1	
11	Ball bearing	1	Refer to "INSTALLING THE STEERING HEAD" section.
12	Rubber washer 1	1	
13	Ball bearing	1	
			For installation, reverse the removal procedure.

EB705102
REMOVING THE LOWER BRACKET

1. Stand the motorcycle on a level surface.

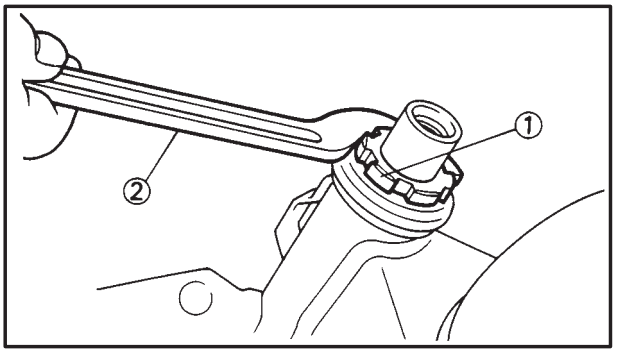
⚠ WARNING

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

2. Remove:
   - upper ring nut
   - 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

⚠ WARNING

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

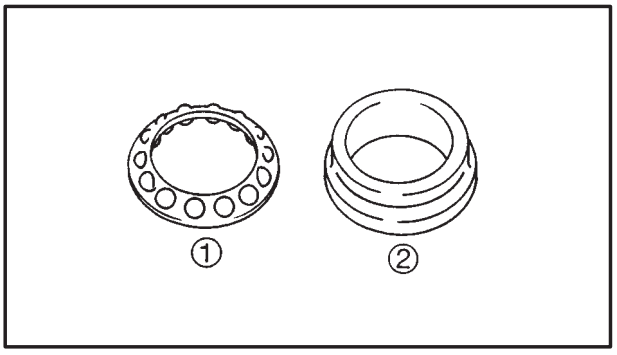
EB705401
CHECKING THE STEERING HEAD

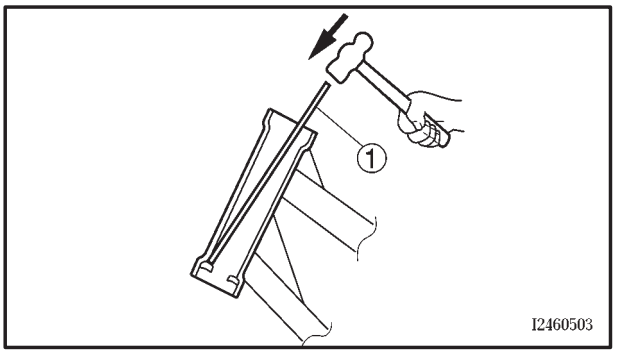
1. Wash:
   - bearing balls
   - bearing races

Recommended cleaning solvent
Kerosine

2. Check:
   - bearing ①
   - bearing race ②

   Damage/pitting → Replace.





3. Replace:
   - bearing balls
   - bearing races

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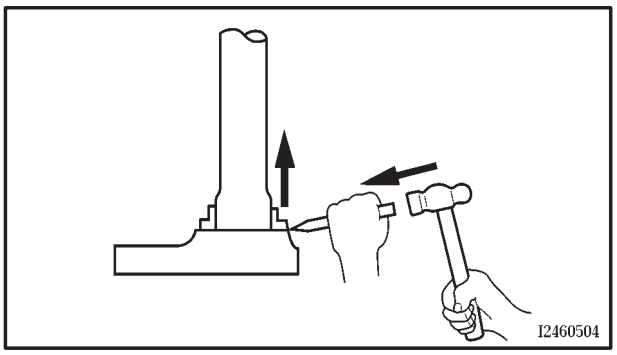
a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.



b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
c. Install a new dust seal and new bearing races.

CAUTION:

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

NOTE:

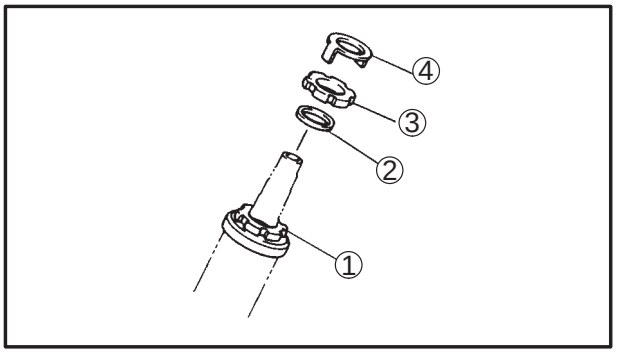
° Always replace the bearing balls and bearing races as a set.
° Whenever the steering head is disassembled, replace the dust seal.

4. Check:
° upper bracket
° lower bracket
(along with the steering stem)
Bends/cracks/damage → Replace.

EB705700
INSTALLING THE STEERING HEAD

1. Lubricate:
° upper bearing
° lower bearing
° bearing races

	Recommended lubricant **Lithium soap base grease**



2. Install:
° lower ring nut ①
° rubber washer ②
° upper ring nut ③
° lock washer ④
Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” in chapter 3.
3. Install:
° upper bracket
° steering stem nut

NOTE:

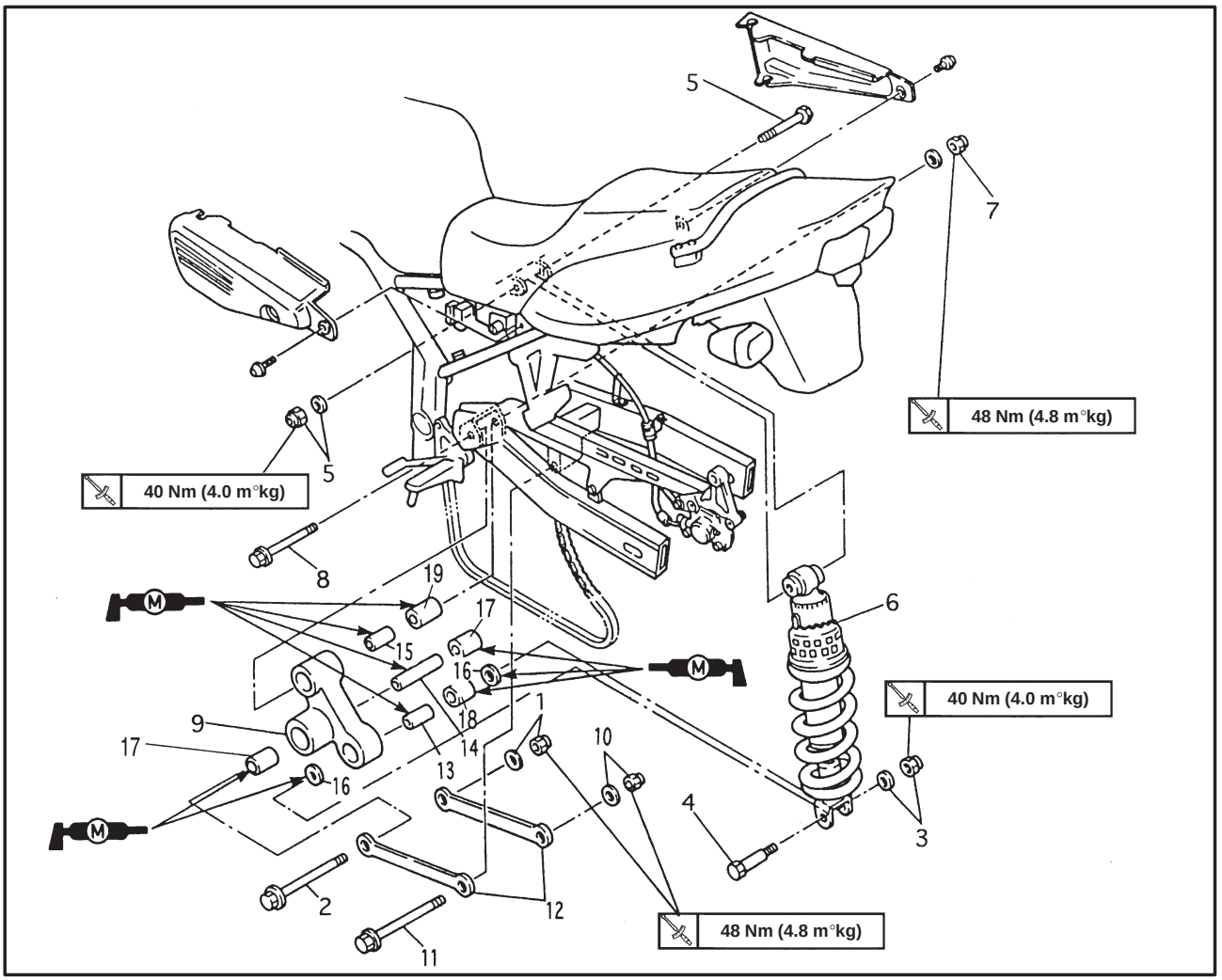
Temporarily tighten the steering stem nut.

4. Install:
° front fork legs
Refer to “FRONT FORK”.

NOTE:

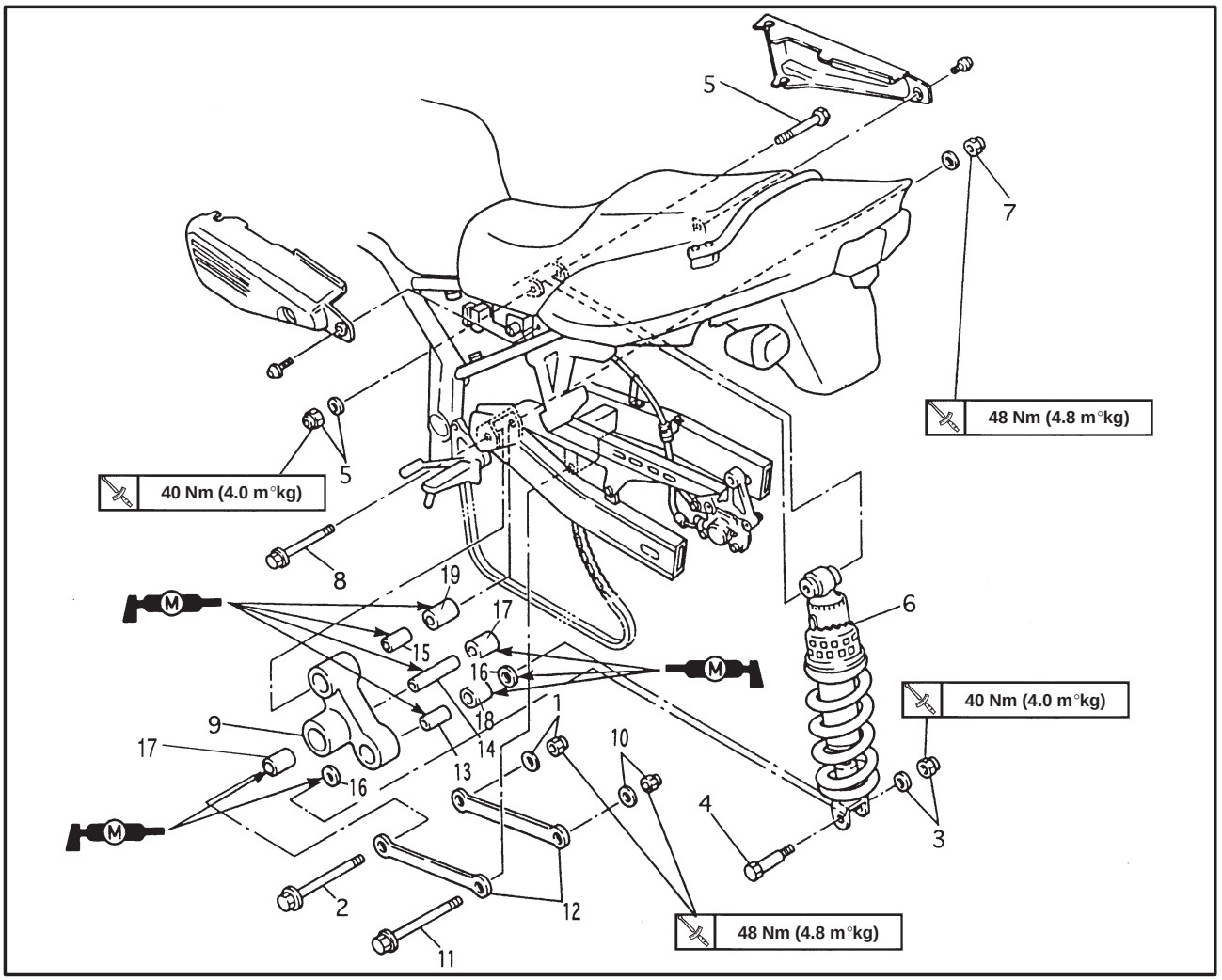
Temporarily tighten the upper and lower bracket pinch bolts.

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	
3	Self-locking nut/washer	1/1	×= 120 mm
4	Bolt	1	
5	Self-locking nut/bolt	1/1	×= 40 mm
6	Rear shock absorber assembly	1	
7	Self-locking nut	1	

Refer to "REMOVING/INSTALLING THE REAR SHOCK ABSORBER" section.

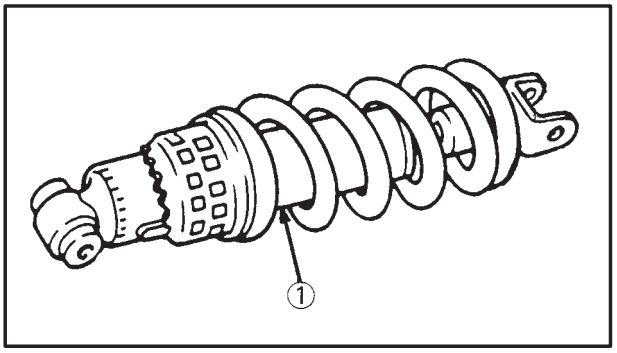


Order	Job name/Part name	Q'ty	Remarks
8	Bolt	1	×= 80 mm
9	Relay arm	1	
10	Self-locking nut/washer	1/1	
11	Bolt	1	×= 120 mm
12	Connecting plate	2	
13	Spacer	1	
14	Spacer	2	
15	Spacer	1	
16	Oil seal	2	
17	Bearing	2	
18	Bearing	1	
19	Bearing	1	
			For installation, reverse the removal procedure.

EB706101
HANDLING THE REAR SHOCK ABSORBER

⚠ 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.**
- **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.**



EB706111
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 × 3 mm hole through the gas cylinder at a point 15 × 20 mm from its end as shown ①.

⚠ WARNING

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

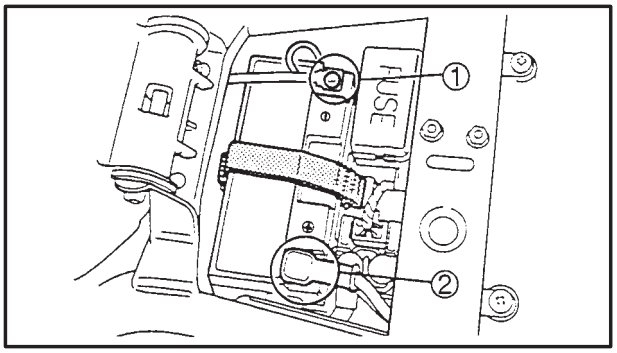
EB706204
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

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

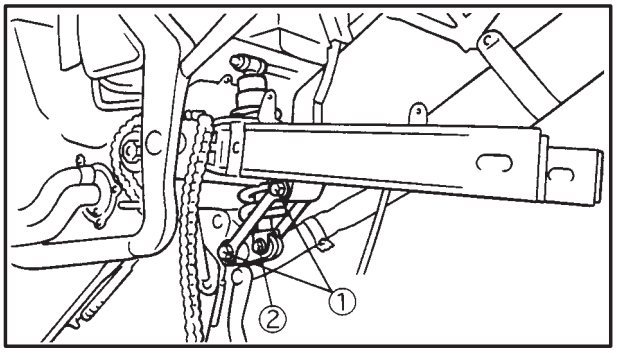


2. Disconnect:
   ° battery leads
   (from the battery terminals)

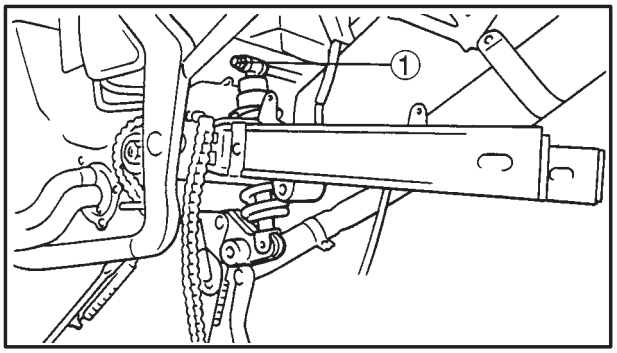
CAUTION:

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

3. Remove:
   ° battery
4. Remove:
   ° side covers
   ° connecting plate bolt ①
   ° rear shock absorber assembly lower bolt ②

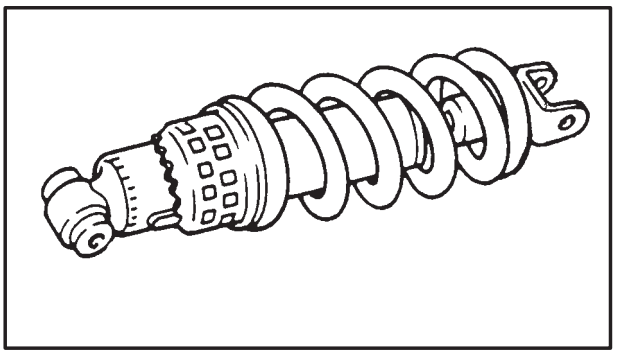


NOTE:
While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.



5. Remove:
   ° 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.



EB706401
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

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

EB706701
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

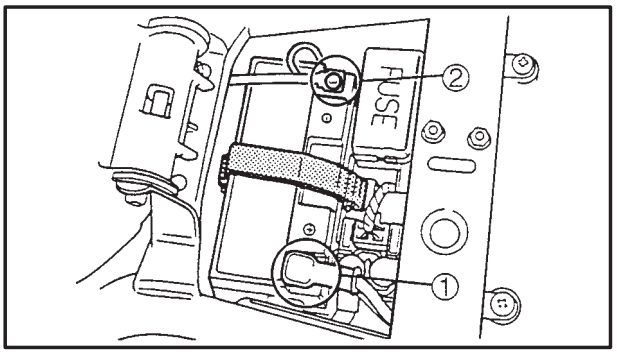
1. Lubricate:
   - spacers
   - bearings

Recommended lubricant
Molybdenum disulfide grease

2. Install:
   - rear shock absorber assembly

Rear shock absorber assembly upper nut
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)

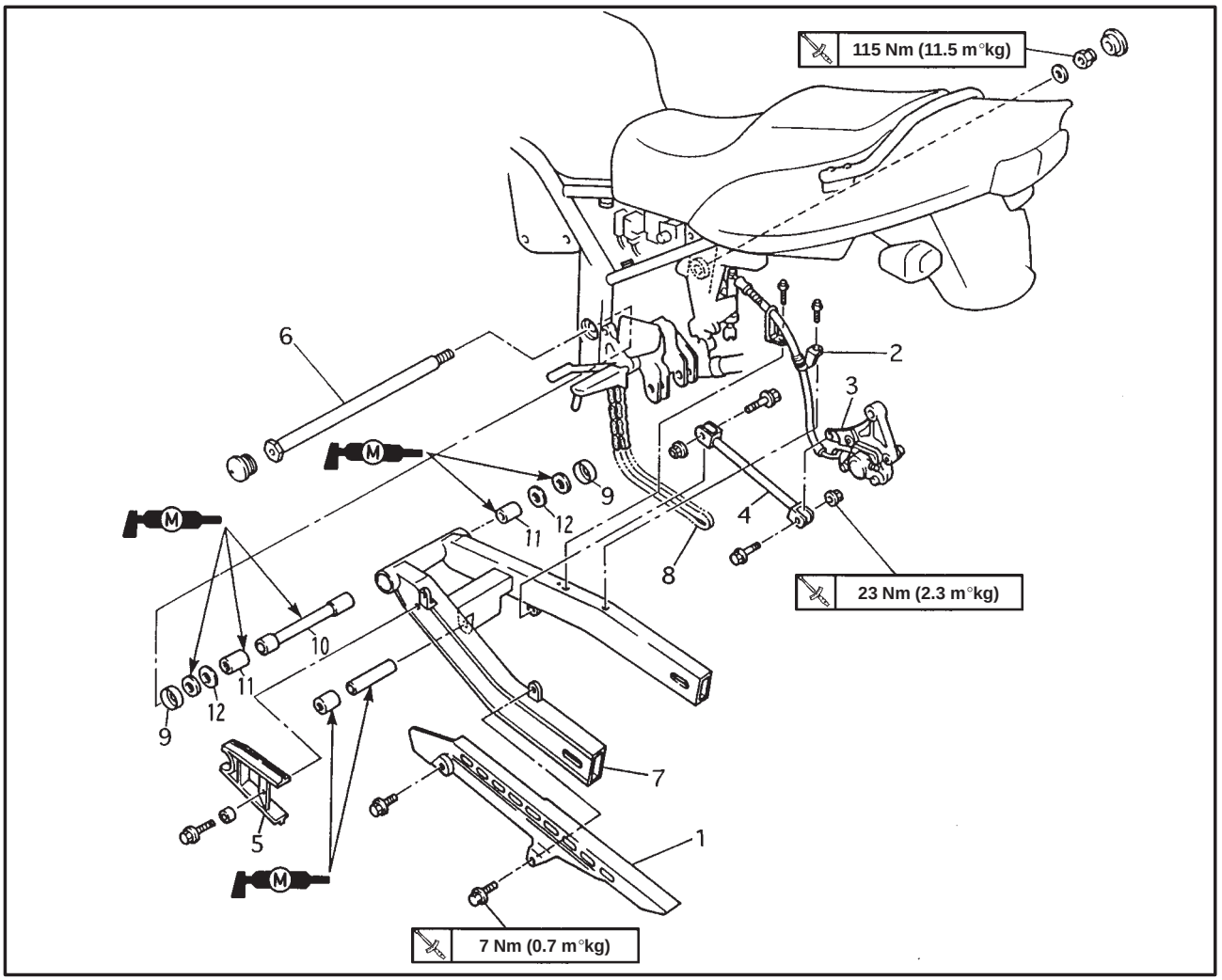
NOTE:
- When installing the rear shock absorber assembly, lift up the swingarm.
- Install the connecting arm front bolt from the right.



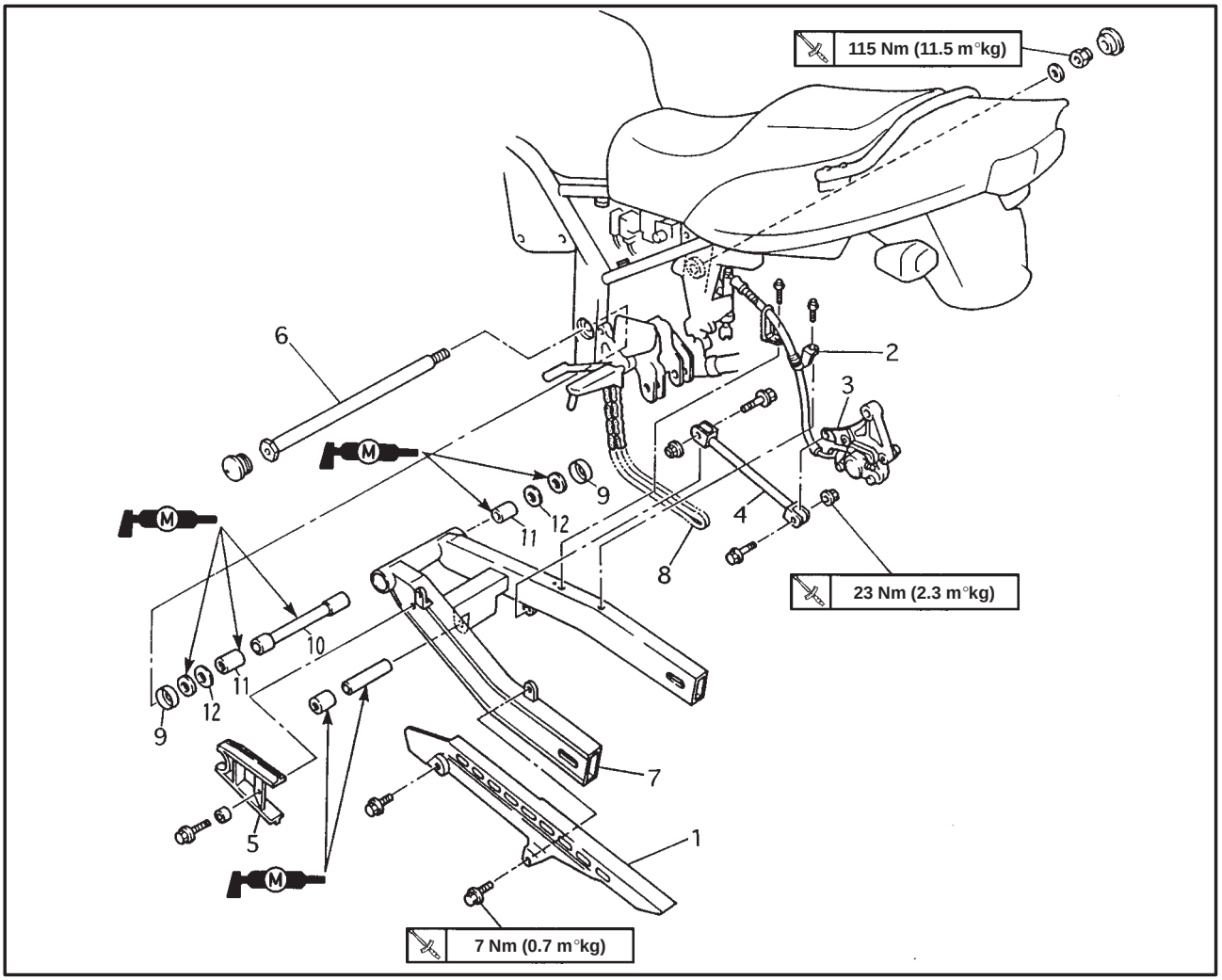
3. Connect:
   - battery leads
     (to the battery terminals)

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	



Order	Job name/Part name	Q'ty	Remarks
10	Spacer	1	
11	Bearing	2	
12	Washer	2	
			For installation, reverse the removal procedure.

EB707100

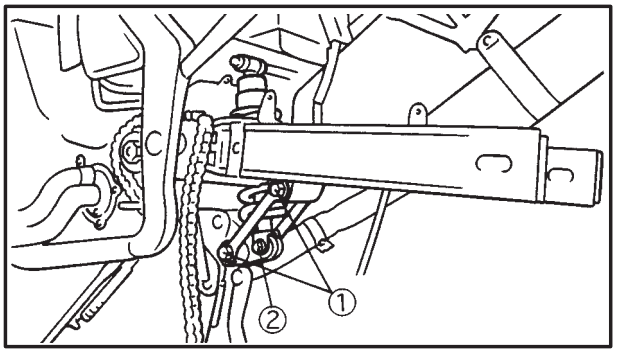
NOTE:
Before removing the drive sprocket, drive chain, and rear wheel, measure the drive chain slack and the length of a ten-link section of the drive chain.

EB707111
REMOVING THE SWINGARM

1. Stand the motorcycle on a level surface.

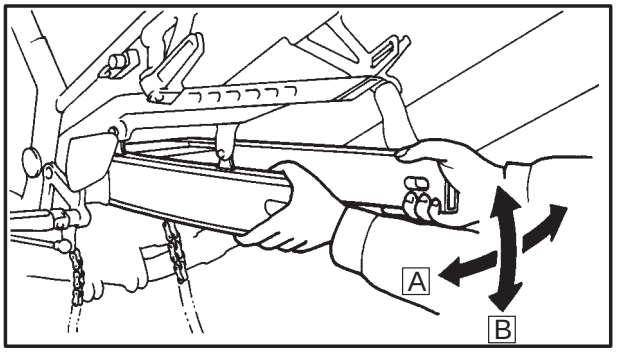
⚠ WARNING
Securely support the motorcycle so that there is no danger of it falling over.

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



2. Remove:
   ° side covers
   ° connecting plate bolt ①
   ° rear shock absorber assembly lower bolt ②

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

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

	Pivot shaft nut **115 Nm (11.5 m°kg)**

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.

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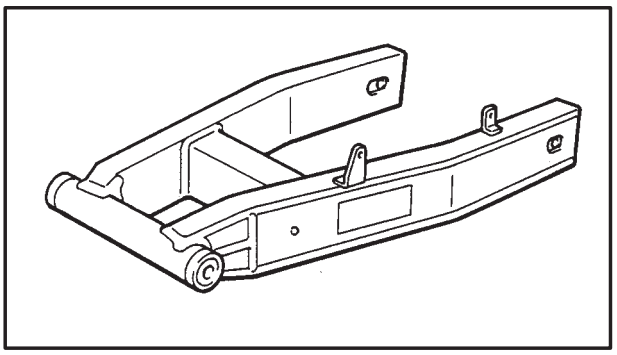
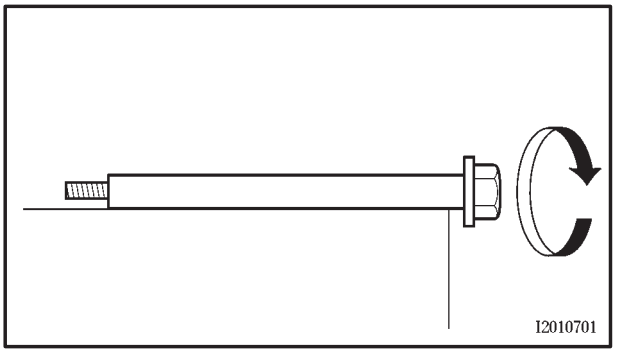


EB707400
CHECKING THE SWINGARM

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



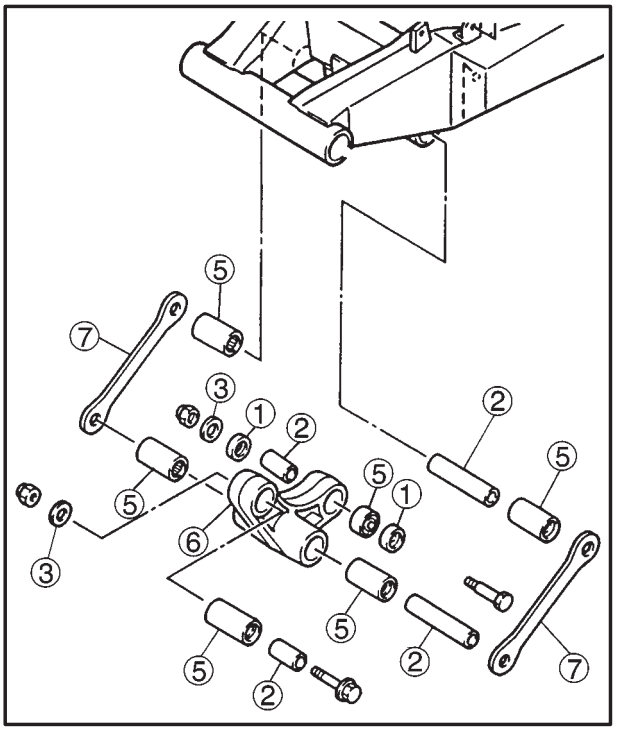
2. Check:
   ° pivot shaft
   Roll the pivot shaft on a flat surface.
   Bends → Replace.

⚠ WARNING

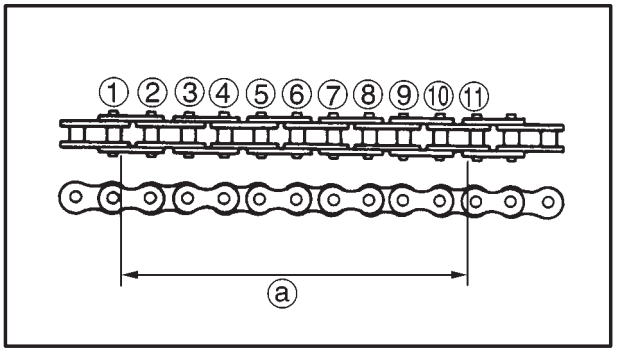
Do not attempt to straighten a bent pivot shaft.

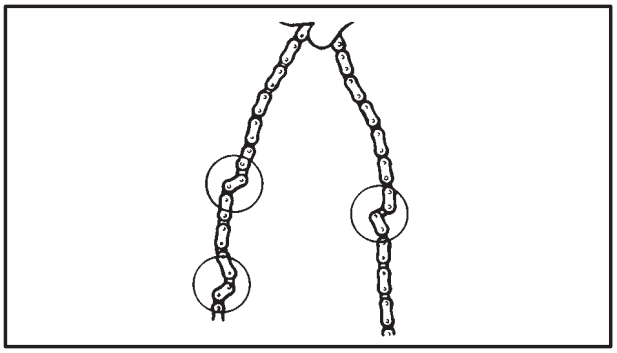
3. Wash:
   ° pivot shaft
   ° dust covers
   ° spacer
   ° washers
   ° bearings

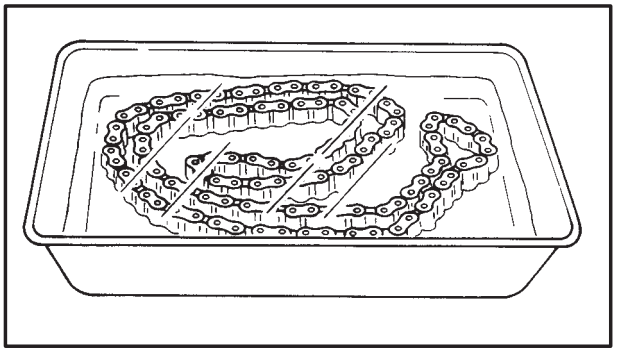
Recommended cleaning solvent
Kerosine

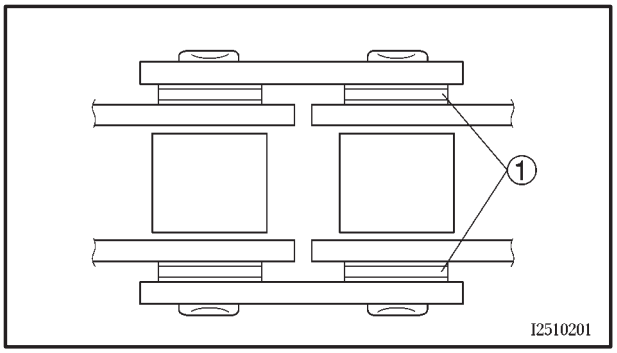


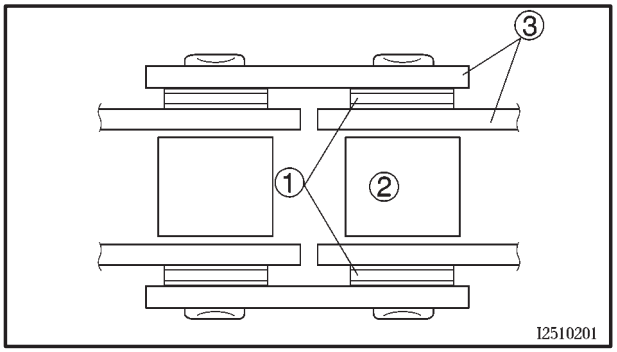
4. Check:
   ° dust covers ①
   ° spacer ②
   ° washers ③
   ° oil seals ④
   Damage/wear → Replace.
   ° bearings ⑤
   Damage/pitting → Replace.
5. Check:
   ° connecting arms ⑥
   ° relay arm ⑦
   Damage/wear → Replace.











EB707410

CHECKING THE DRIVE CHAIN

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

Ten-link drive chain section limit (maximum)
150 mm

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

2. Check:
   ° drive chain
   Stiffness → Clean and lubricate or replace.

3. Clean:
   ° drive chain

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

CAUTION:

This motorcycle has a drive chain with small rubber O-rings ① between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosine to clean the drive chain.

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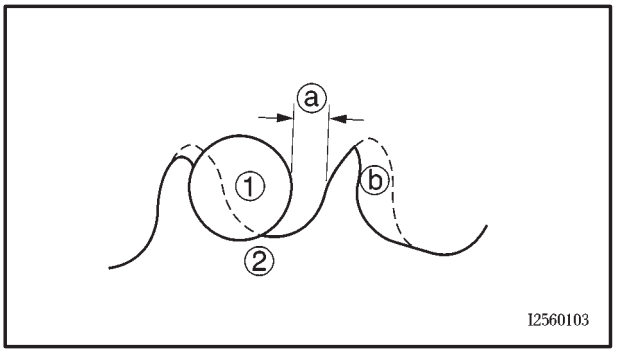
4. Check:
   ° O-rings ①
   Damage → Replace the drive chain.
   ° drive chain rollers ②
   Damage/wear → Replace the drive chain.
   ° drive chain side plates ③
   Damage/wear → Replace the drive chain.
   Cracks → Replace the drive chain.

5. Lubricate:
   ° drive chain

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

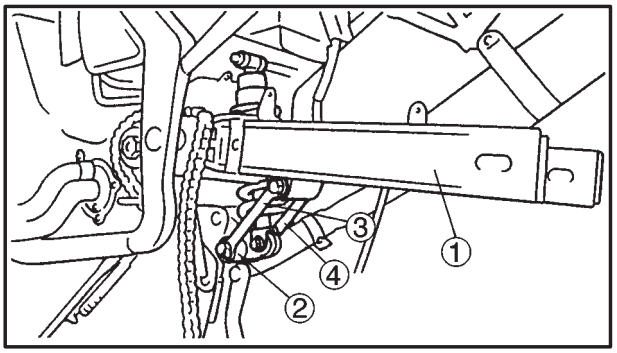


6. Check:
   ° drive sprocket
   ° rear wheel sprocket
   More than 1/4 tooth ⓐ wear → Replace the drive chain sprockets as a set.
   Bent teeth → Replace the drive chain sprockets as a set.
   ⓑ Correct
   ① Drive chain roller
   ② Drive chain sprocket

EB707700
INSTALLING THE SWINGARM

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

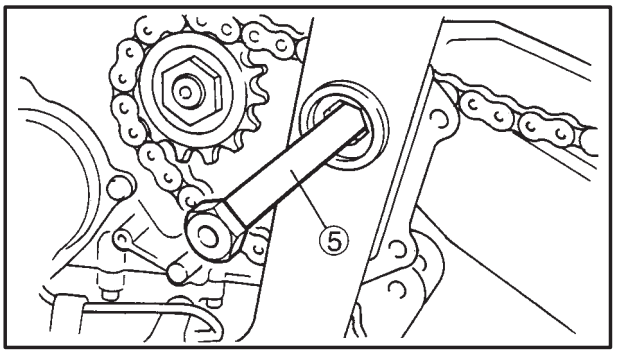
	Recommended lubricant **Molybdenum disulfide grease**



2. Install:
   ° drive chain
   ° swingarm ①
   ° relay arm ②
   ° left connecting plate ③
   ° right connecting plate ④

	Swingarm pivot shaft nut **115 Nm (11.5 m°kg)** **Relay arm nut** **48 Nm (4.8 m°kg)** **Connecting plate nut** **48 Nm (4.8 m°kg)**

NOTE:
Install the swingarm bolt ⑤ from the left.



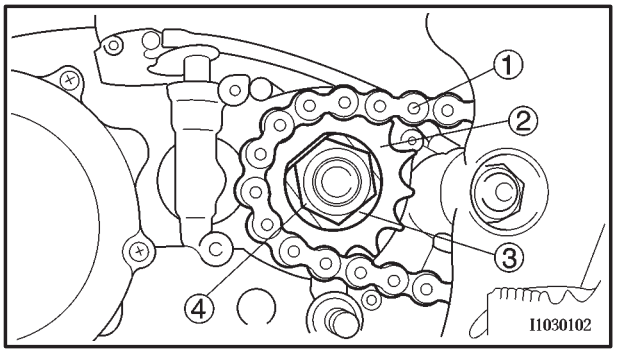
3. Install:
   ° rear shock absorber assembly
   ° rear wheel
   Refer to “INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY” and “REAR WHEEL”.

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

	Drive chain slack **30 × 45 mm**

EB707710
INSTALLING THE DRIVE CHAIN

1. Lubricate:
   ° drive chain



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

2. Install:
   ° drive chain ①
   ° drive sprocket ②
   ° washer ③
   ° drive sprocket nut ④ 70 Nm (7.0 m°kg)

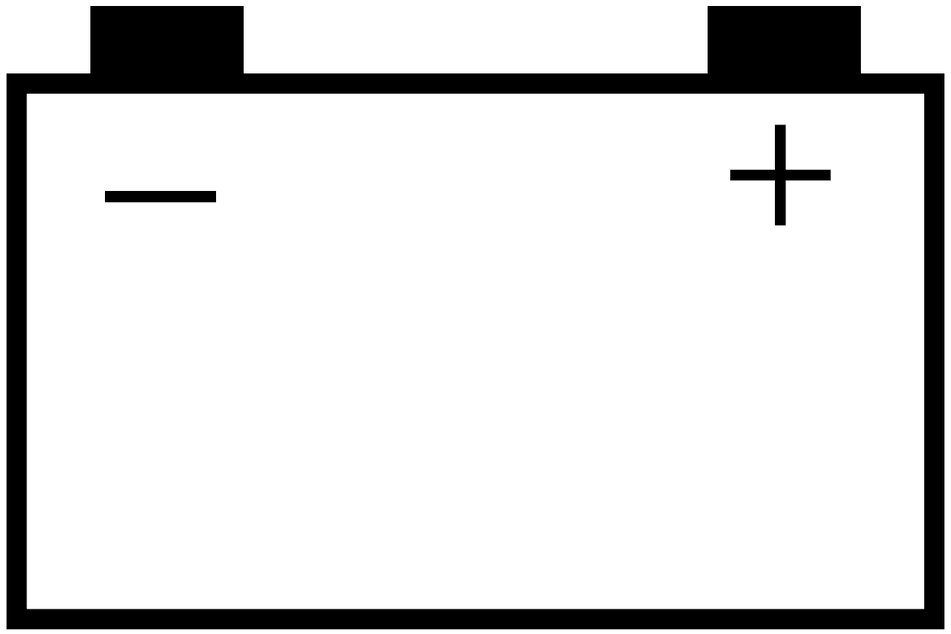
NOTE:
While applying the rear brake, tighten the drive sprocket nut.

CAUTION:
Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain's life.

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

	Drive chain slack **30 × 45 mm**

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.



ELEC 8

CHAPTER 8
ELECTRICAL

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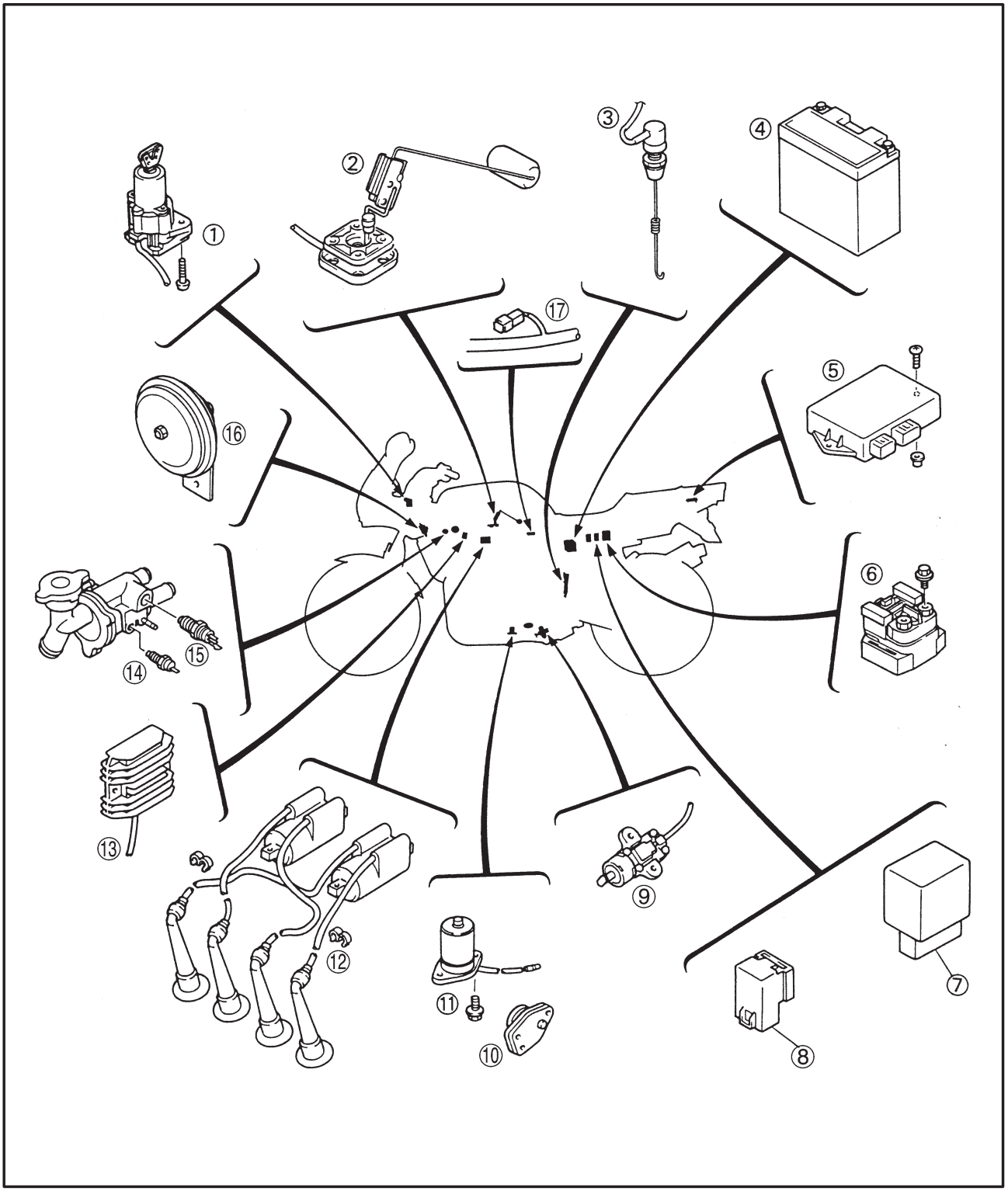
EB800000

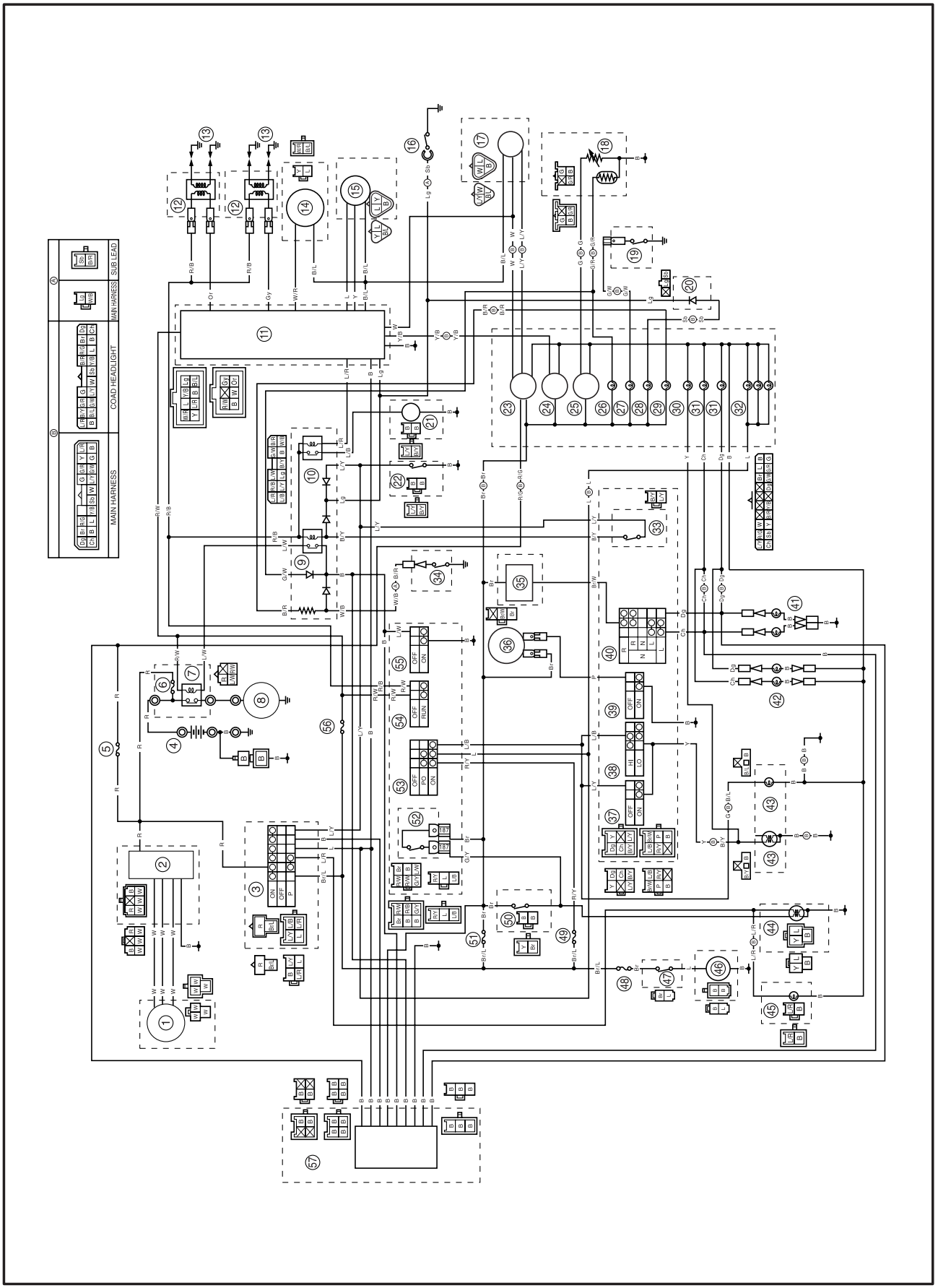
ELECTRICAL

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
⑪ Oil level gauge
⑫ Ignition coil
⑬ Rectifier/Regulator
⑭ Thermo switch (warning light)
⑮ Thermo switch (fan motor)
⑯ Horn
⑰ Diode



CIRCUIT DIAGRAM

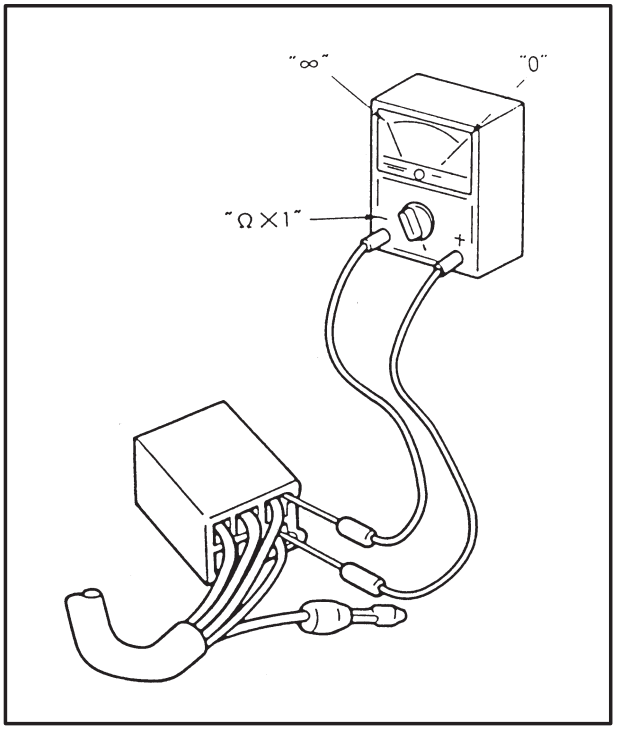


① A.C. magneto
② Rectifier regulator
③ Main switch
④ Battery
⑤ Fuse (back up)
⑥ Fuse (main)
⑦ Starter relay
⑧ Starter motor
⑨ Starting circuit cut-off relay
⑩ Fuel pump relay
⑪ Ignitor unit
⑫ Ignition coil
⑬ Spark plug
⑭ Pickup coil
⑮ Throttle position sensor
⑯ Neutral switch
⑰ Speed sensor
⑱ Fuel sender
⑲ Thermo switch (warning light)
⑳ Diode
㉑ Fuel pump
㉒ Sidestand switch
㉓ Speedometer
㉔ Tachometer
㉕ Fuel meter
㉖ Fuel level warning light
㉗ Engine temperature warning light
㉘ Neutral indicator light
㉙ Oil level warning 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
㊳ 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
㊺ Auxiliary 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)

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.

COLOR CODE

B	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
O	Orange	G/R	Green/Red	Y/R	Yellow/White
Sb	Sky blue	G/W	Green/White	W/B	White/Black
P	Pink	G/Y	Green/Yellow	W/G	White/Green
R	Red	L/B	Blue/Black		



YP-N

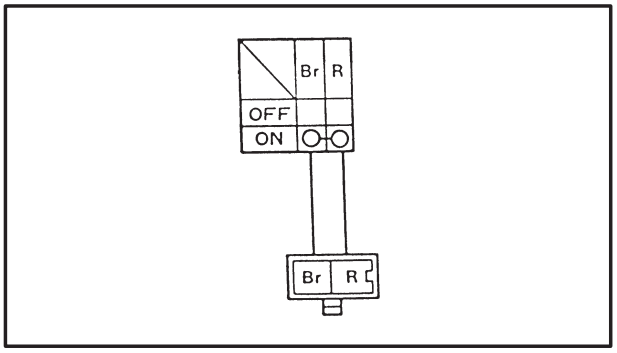
CHECKING SWITCHES

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:
- Turn the switch to the "ON", "OFF" positions several times.
- Adjust the pocket tester to correct "0" position before checking switches.
- Set the pocket tester selector to "×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.

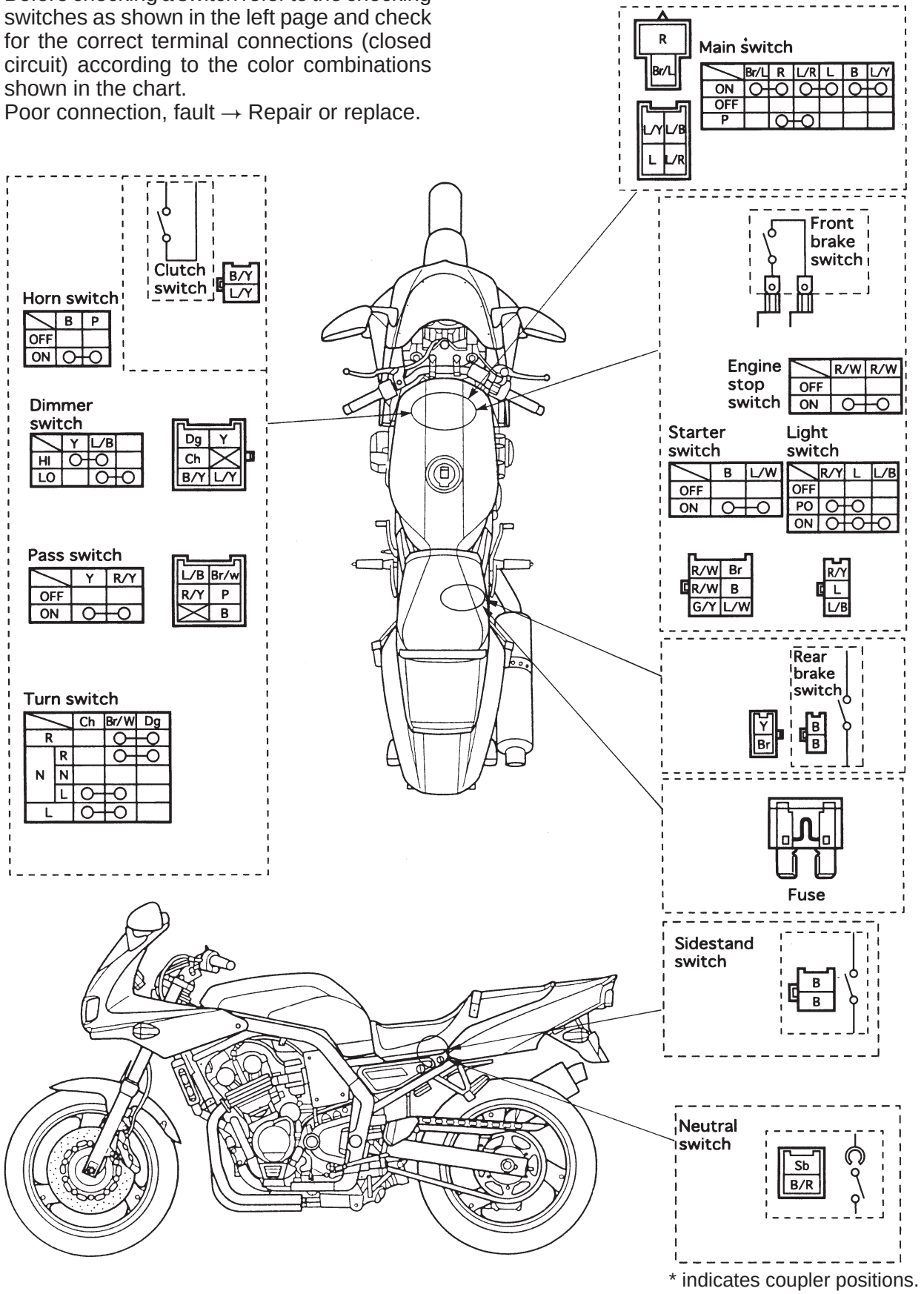
"○—○" indicates terminals between which there is continuity, i.e. a closed circuit, in the given switch position.

In this chart:
"Br and R" have continuity with the switch in the "ON" position.

YP******

SWITCH POSITION AND TERMINAL CONNECTION

Before checking a switch refer to the checking switches as shown in the left page and check for the correct terminal connections (closed circuit) according to the color combinations shown in the chart.
Poor connection, fault → Repair or replace.

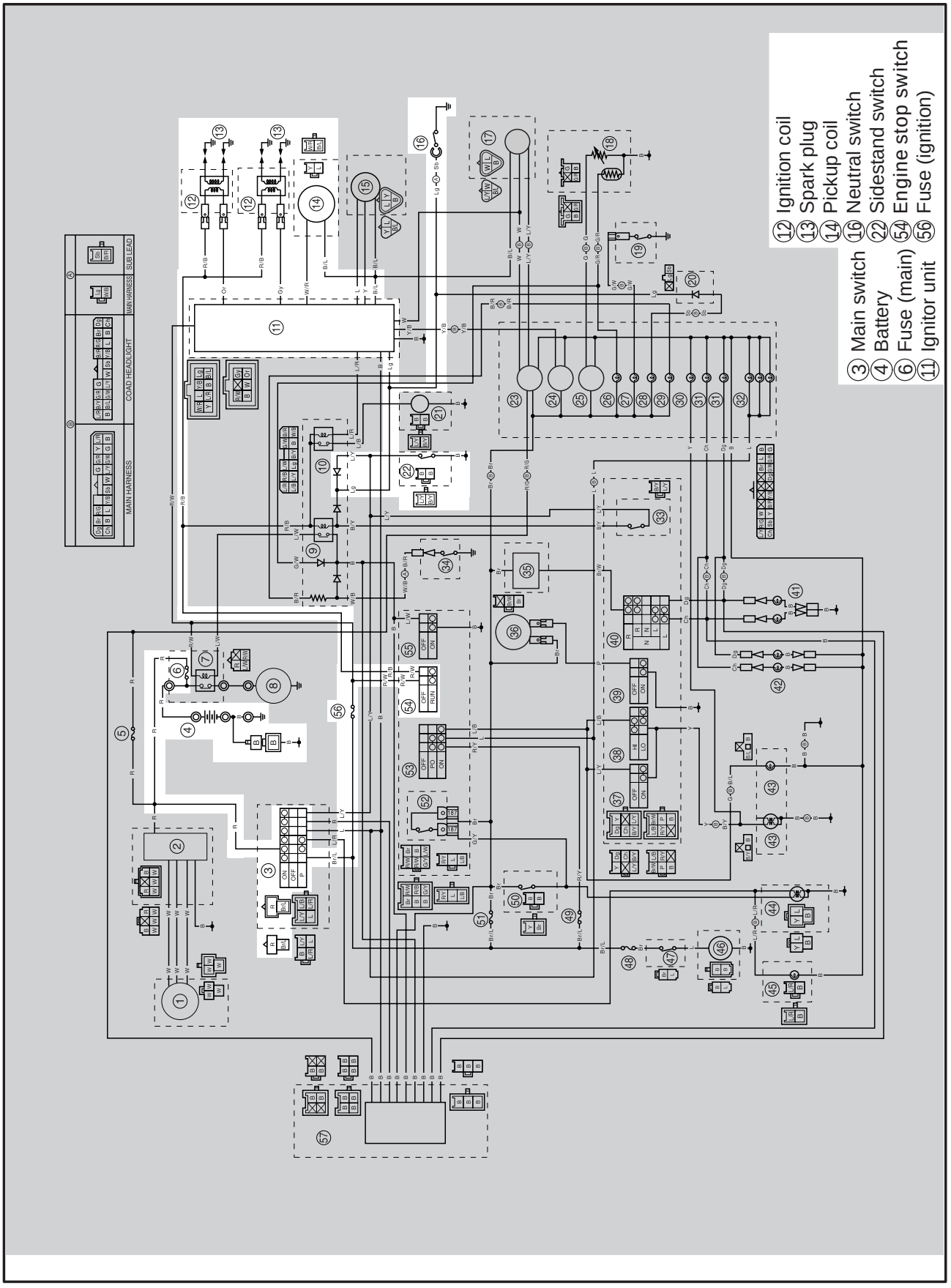


* indicates coupler positions.

EB802000

IGNITION SYSTEM

CIRCUIT DIAGRAM



EB802010
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
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)

NOTE:
- Remove the following part(s) before trouble-shooting:

1) Seat
2) Fuel tank
3) Side cover (left)

- Use the following special tool(s) for trouble-shooting.

Ignition checker:
90890-06754
Pocket tester:
90890-03112

EB802011

1. Fuses (main and ignition)

- Remove the fuses.
- Connect the pocket tester (Ω × 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace the fuses.

CONTINUITY ⇩

EB802012

2. Battery

- Check the battery condition.
  Refer to "BATTERY INSPECTION" in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

INCORRECT → • Clean the battery terminals.
• Recharge or replace the battery.

CORRECT ⇩

✳

✳

EB802013

3. Spark plugs

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.
  Refer to “SPARK LUG INSPECTION” in CHAPTER 3.

Standard spark plug:
CR9E, CR8E/U27ESR-N, U24ESR-N
NGK/NIPPONDENSO

Spark plug gap:
0.7 ~ 0.8 mm

INCORRECT

Repair or replace the spark plugs.

CORRECT

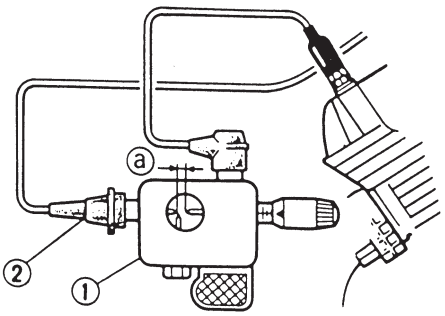
EB802014

4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.

② Spark plug cap

- Turn the main switch to “ON”.



- Check the ignition spark gap ⓐ.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfire occurs.

Minimum spark gap:
6.0 mm

MEETS SPECIFICATION

The ignition system is not faulty.

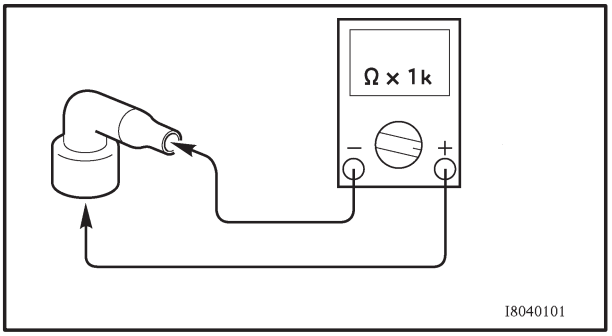
OUT OF SPECIFICATION OR NO SPARK

✳

EB802015

5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester (Ω × 1k) to the spark plug cap.



- Check if the spark plug cap has the specified resistance.

Spark plug cap resistance:
10 kΩ at 20°C

OUT OF SPECIFICATION

Replace the spark plug cap.

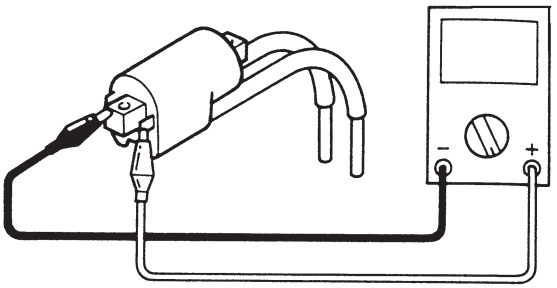
MEETS SPECIFICATION

EB802016

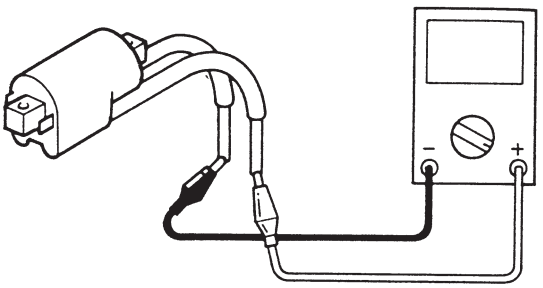
6. Ignition coil resistance

- Disconnect the ignition coil connector from the wire harness.
- Connect the pocket tester (Ω × 1) to the ignition coil.

Tester (+) lead → Red/Black terminal
Tester (–) lead → Orange (Gray) terminal



Tester (+) lead → spark plug lead ①
Tester (–) lead → spark plug lead ②



- Check if the primary coil has the specified resistance.

Primary coil resistance:
1.87 ~ 2.53 Ω at 20°C

- Connect the pocket tester (Ω × 1k) to the ignition coil.

- Check if the secondary coil has the specified resistance.

Secondary coil resistance:
12 ~ 18 kΩ at 20°C

OUT OF SPECIFICATION

Replace the ignition coil.

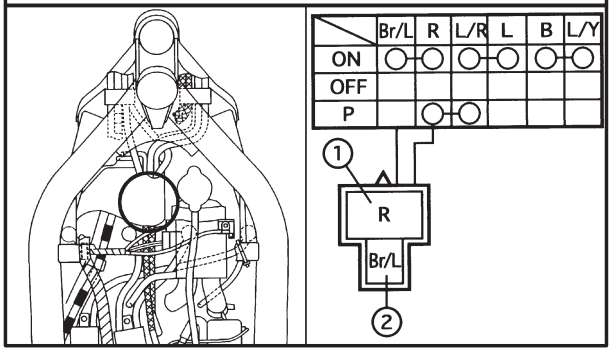
BOTH MEET SPECIFICATION

✳

EB802017

7. Main switch

- Disconnect the main switch couplers from the wire harness.
- Check for continuity as follows:
  Red ① – Brown/Blue ②



NO CONTINUITY

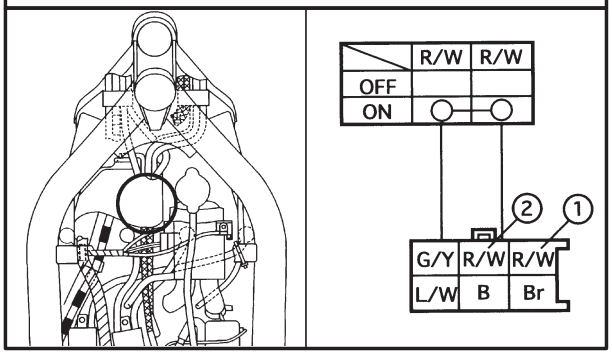
Replace the main switch.

CONTINUITY

EB802018

8. Engine stop switch

- Disconnect the right handlebar switch coupler from the wire harness.
- Check for continuity as follows:
  Red/White ① – Red/Black ②



NO CONTINUITY

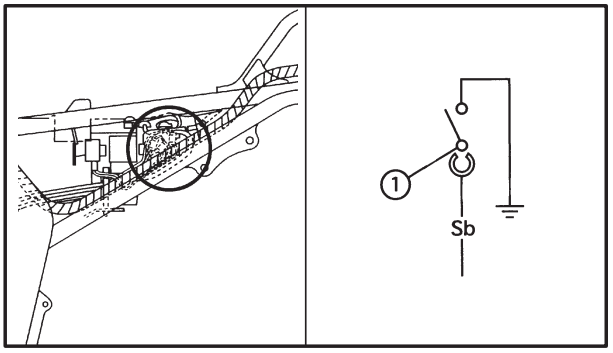
Replace the right handlebar switch.

CONTINUITY

EB802019

9. Neutral switch

- Disconnect the neutral switch/lead from the neutral switch.
- Check for continuity as follows:
  Neutral switch terminal ① – Ground



NO CONTINUITY

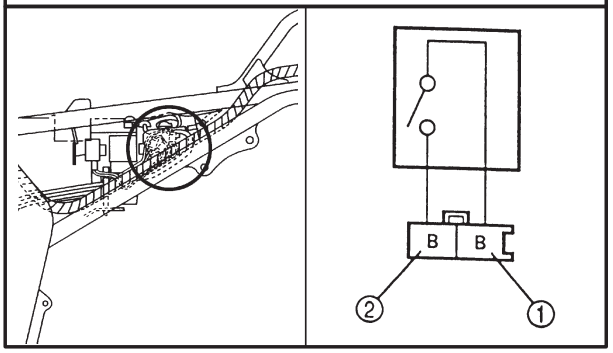
Replace the main switch.

CONTINUITY

EB80201A

10. Sidestand switch

° Disconnect the sidestand switch coupler from the wire harness.
° Check for continuity as follows:
Black ① – Black ②



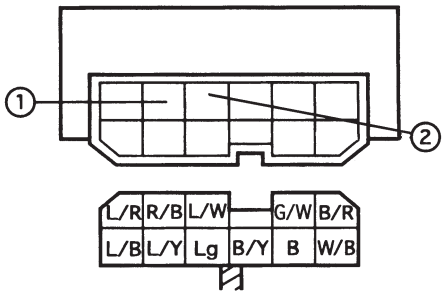
NO CONTINUITY

Replace the sidestand switch.

CONTINUITY

11. Diode (starting circuit cut-off relay unit)

° Remove the relay unit from the wire harness.
° Check for continuity as follows:
Blue/Yellow ① – Light green ②



Tester ⊕ lead → Blue/Yellow ① **Tester ⊖ lead → Light green ②**	**Continuity**
Tester ⊖ lead → Blue/Yellow ① **Tester ⊖ lead → Light green ②**	**No Continuity**

INCORRECT

Replace the relay unit.

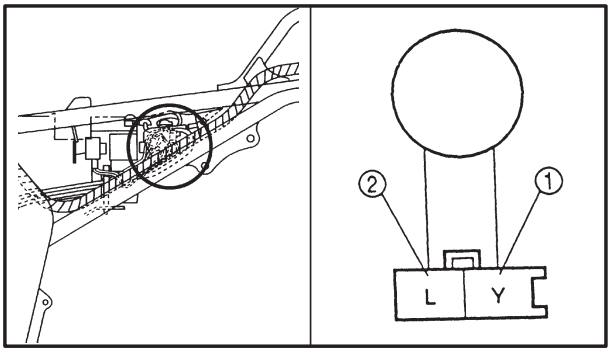
CORRECT

EB80201C

12. Pickup coil resistance

° Disconnect the pickup coil coupler from the wire harness.
° Connect the pickup coil terminal.

Tester (+) lead → Yellow terminal ①
Tester (–) lead → Blue terminal ②



° Check if the pickup coil has the specified resistance.

Pickup coil resistance:
189 ~ 231 Ω at 20°C
(Yellow – Blue)

OUT OF SPECIFICATION

Replace the pickup coil.

MEETS SPECIFICATIONS

EB80201D

13. Wiring connection

° Check the connections of the entire ignition system.
Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTION

Properly connect the ignition system.

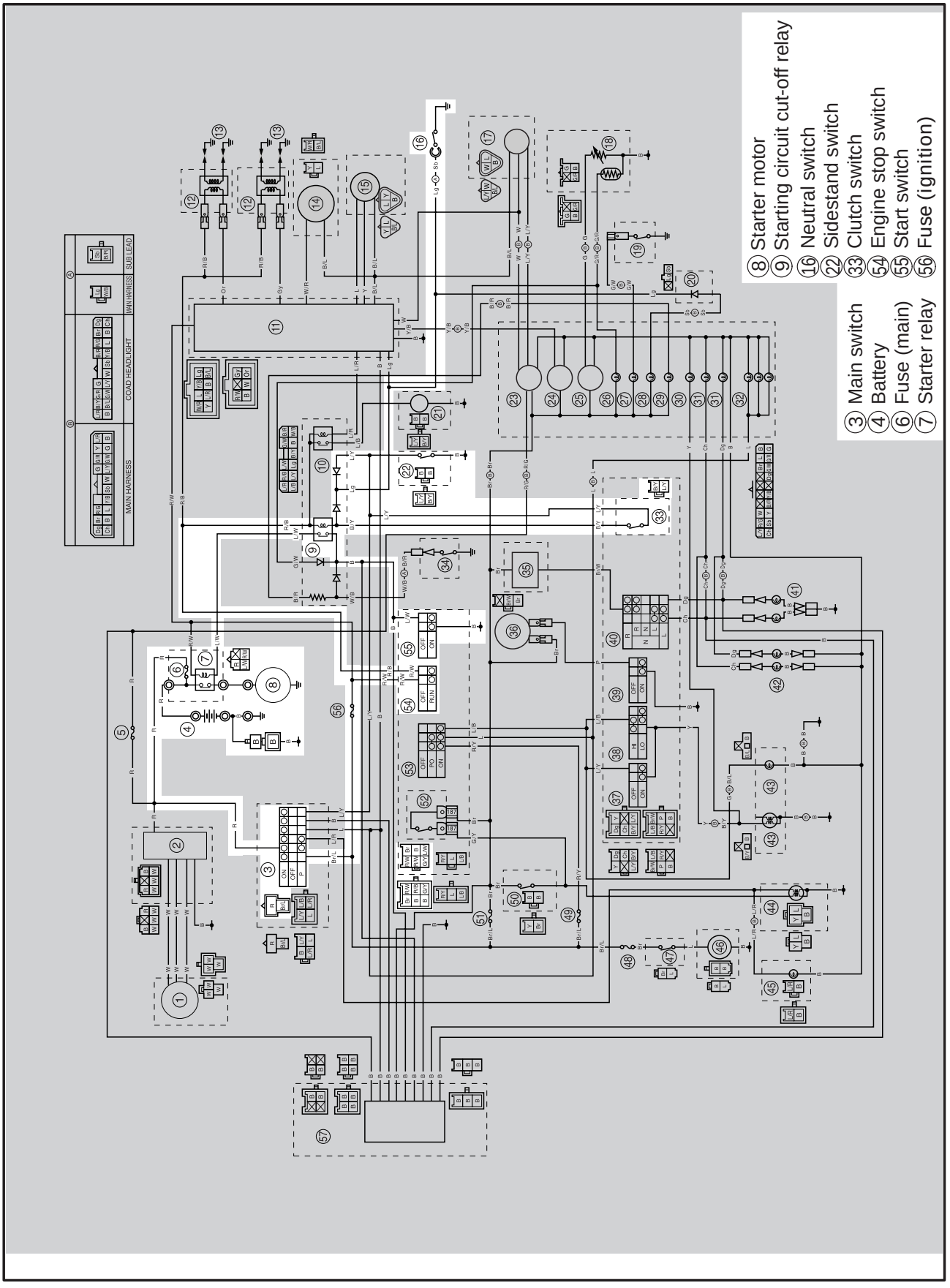
CORRECT

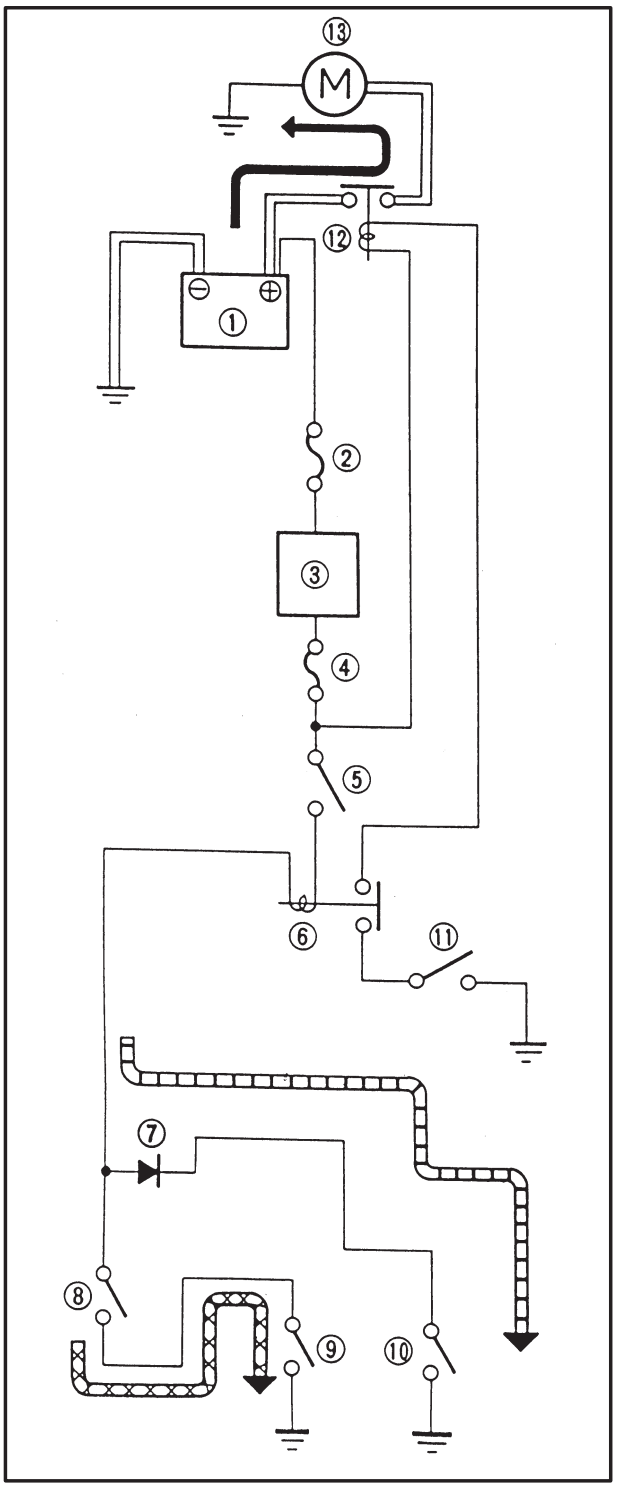
Replace the ignitor unit.

EB803000

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM





EB803010

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 NEUTRAL

⟵ 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
⑪ Start switch
⑫ Starter relay
⑬ Starter motor

EB803020
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
8. Neutral switch
9. Sidestand switch
10. Clutch switch
11. Start switch
12. Diode (starting circuit cut-off relay)
13. Wiring connection (the entire starting system)

NOTE:
- Remove the following part(s) before trouble-shooting:

1) Seat
2) Fuel tank
3) Side cover (left)

- Use the following special tool(s) for trouble-shooting.

Pocket tester:
90890-03112

EB802011

1. Fuses (main and ignition)

- Remove the fuses.
- Connect the pocket tester (Ω × 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace the fuses.

CONTINUITY ⇩

EB802012

2. Battery

- Check the battery condition. Refer to “BATTERY INSPECTION” in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

INCORRECT → • Clean the battery terminals.
• Recharge or replace the battery.

CORRECT ⇩

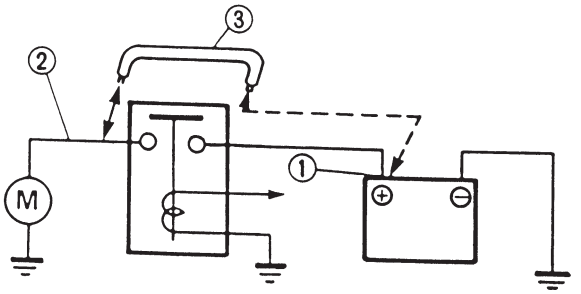
✳

✳

EB803021

3. Starter motor

- Connect the battery positive terminal ①and starter motor cable ②using a jumper lead ③✳.
- Check the operation of the starter motor.



✳

⚠ WARNING

- **A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to reduce sparks, so be sure that no flammable gas or fluid is in the vicinity.**

DOES NOT MOVE

Repair or replace the starter motor.

MOVES

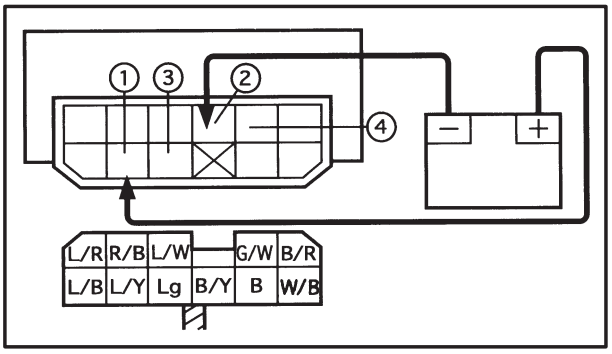
EB803023

4. Starting circuit cut-off relay (relay unit)

- Remove the relay unit from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the relay unit terminals.

Battery (+) terminal → Red/Black terminal①
Battery (–) terminal → Black/Yellow terminal②

Tester (+) lead → Blue/White terminal ③
Tester (–) lead → Black terminal ④



- Check the starting circuit cut-off relay for continuity.

NO CONTINUITY

Replace the starting circuit cut-off relay.

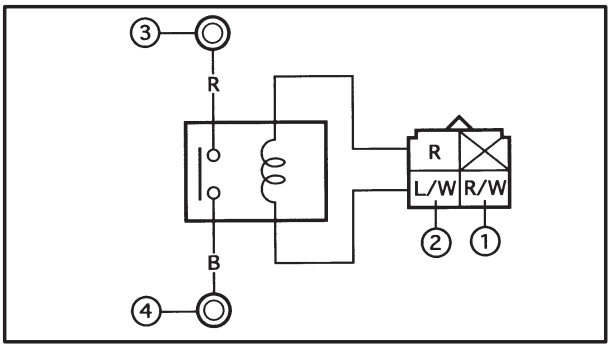
CONTINUITY

✳

EB803024

5. Starter relay

- Disconnect the relay unit coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the relay unit coupler terminals.



Battery (+) terminal →
Red/White terminal ③
Battery (–) terminal →
Blue/White terminal ④

Tester (+) lead → Red terminal ③
Tester (–) lead → Black terminal ④

- Check the starter relay for continuity.

NO CONTINUITY

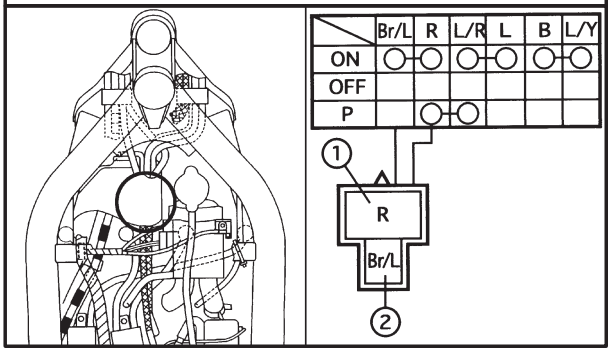
Replace the starter relay.

CONTINUITY

EB802017

6. Main switch

- Disconnect the main switch couplers from the wire harness.
- Check for continuity as follows:
  Red ① – Brown/Blue ②



NO CONTINUITY

Replace the main switch.

CONTINUITY

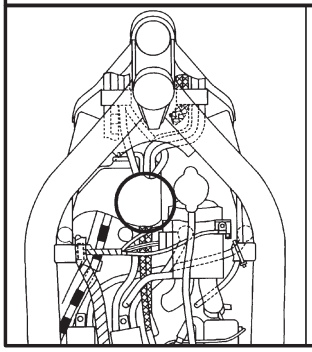
✳

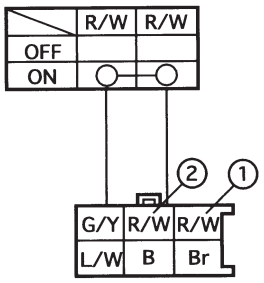
✳

EB802018

7.Engine stop switch

- Disconnect the right handlebar switch coupler from the wire harness.
- Check for continuity as follows:
  Red/White ① – Red/White ②





NO CONTINUITY

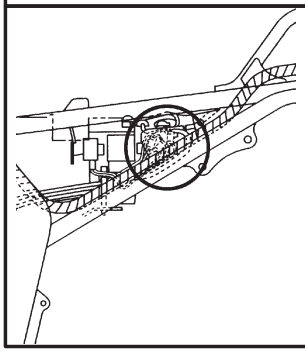
Replace the right handlebar switch.

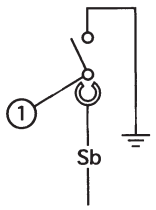
CONTINUITY

EB802019

8. Neutral switch

- Disconnect the neutral switch/lead from the neutral switch.
- Check for continuity as follows:
  Neutral switch terminal ①– Ground





NO CONTINUITY

Replace the neutral switch.

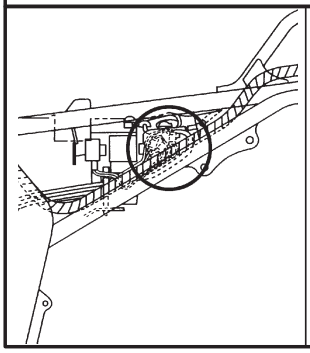
CONTINUITY

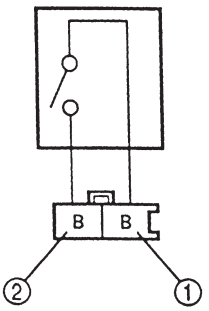
✳

EB80201A

9. Sidestand switch

- Disconnect the sidestand switch coupler from the wire harness.
- Check for continuity as follows:
  Black① – Black②





NO CONTINUITY

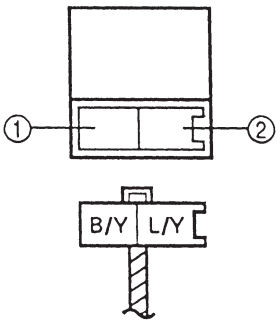
Replace the sidestand switch.

CONTINUITY

EB803025

10. Clutch switch

- Disconnect the clutch switch coupler from the wire harness.
- Check for continuity as follows:
  Black/Yellow① – Blue/Yellow②



NO CONTINUITY

Replace the clutch switch.

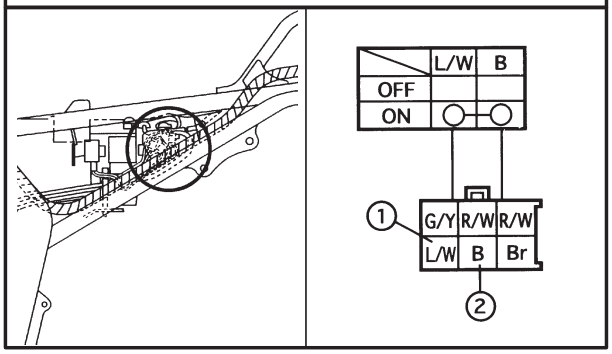
CONTINUITY

✳

EB803027

11. Start switch

- Disconnect the right handlebar switch coupler from the wire harness.
- Check for continuity as follows:
  Blue/White ① – Black ②



NO CONTINUITY

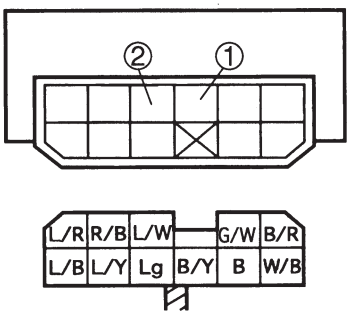
Replace the right handlebar switch.

CONTINUITY

EB803026

12. Diode (starting circuit cut-off relay)

- Remove the relay unit from the wire harness.
- Check for continuity as follows:
  Black/Yellow ① – Light green ②



Tester (+) lead→Black/Yellow ① Tester (–) lead→Light green ②	**Continuity**
Tester (+) lead→Light green ① Tester (–) lead→Black/Yellow ②	**No Continuity**

INCORRECT

Replace the relay unit.

CORRECT

✳

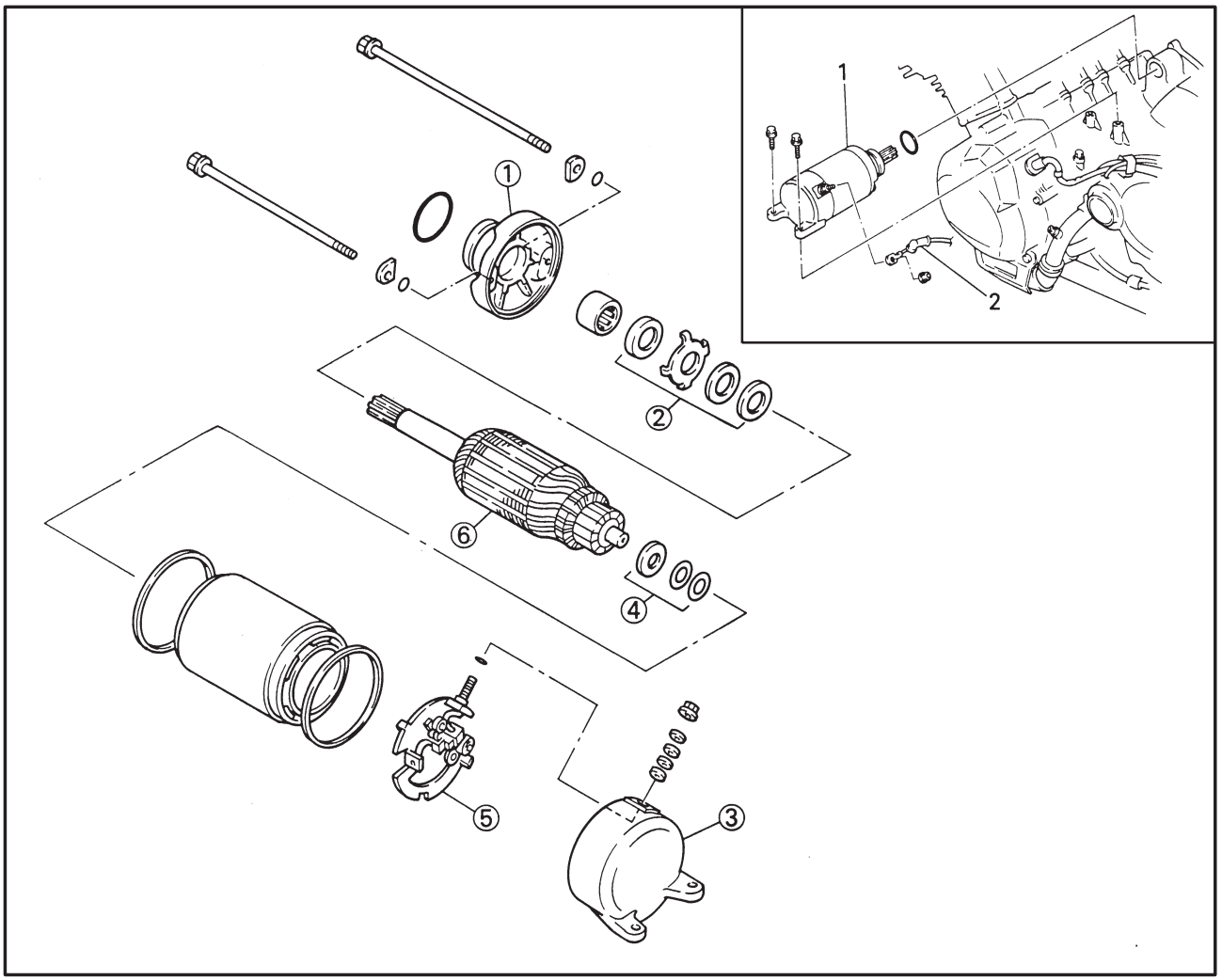
EB803028

13. Wiring connection
• Check the connections of the entire starting system. Refer to “CIRCUIT DIAGRAM”.

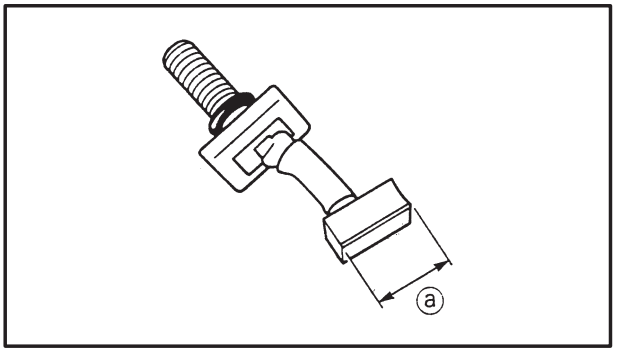
POOR CONNECTION

Properly connect the starting system.

EB803030
STARTER MOTOR



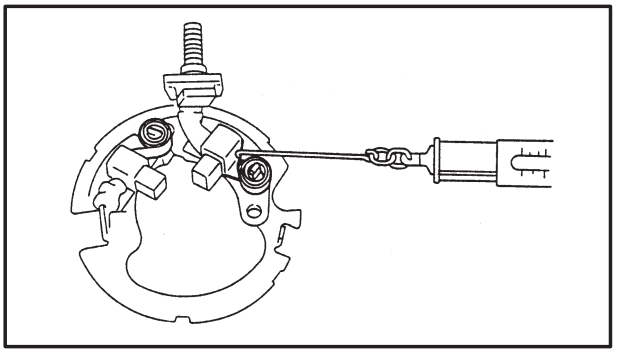
Order	Job name/Part name	Q'ty	Remarks
	Starter motor removal		Remove the parts in order.
1	Starter motor	1	
2	Starter motor lead	1	
			Reverse the removal procedure for installation.
	Starter motor disassembly		Disassembly the parts in order.
①	Front bracket	1	
②	Washers	1	
③	Rear bracket	2	
④	Shims	1	
⑤	Brush holder/Brush	1/1	
⑥	Armature ass'y	1	
			Reverse the disassembly procedure for assembly.



CHECKING THE STARTER MOTOR

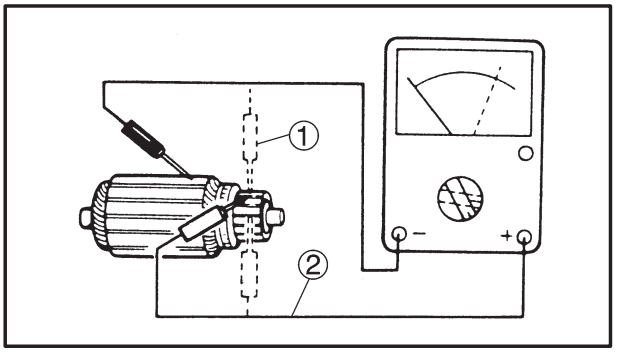
1. Measure:
   ° Brush length ⓐ
   Out of specification → Replace.

Brush length wear limit:
4 mm



2. Measure:
   ° Brush spring force
   Fatigue/out of specification → Replace as a set.

Brush spring force:
780 ~ 1,020 g



3. Inspect:
   ° Commutator
   Dirty → Clean it with #600 grit sandpaper.
4. Inspect:
   ° Armature coil resistances (insulation/continuity)
   Defects → Replace the starter motor.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

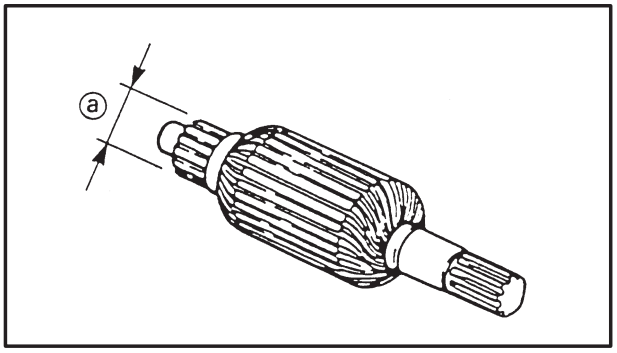
Inspection steps:

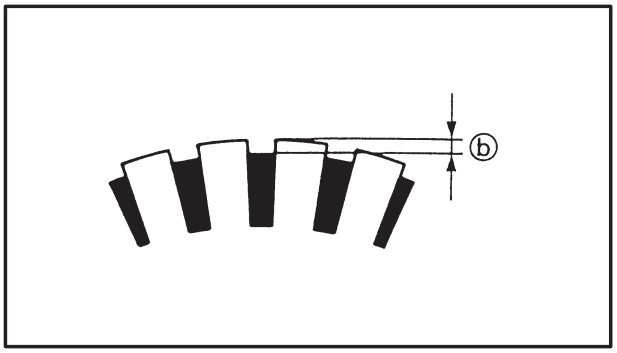
° Connect the pocket tester for the continuity ① and insulation ② checks.
° Measure the armature coil resistances.

Armature coil continuity resistance ①:
0.0015 ~ 0.0025 Ω at 20°C
Armature coil insulation resistance ②:
More than 1 MΩ at 20°C

° If the resistance is incorrect, replace the starter motor.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲





5. Measure:
   ° Commutator diameter ⓐ
   Out of specification → Replace the starter motor.

Commutator wear limit:
27 mm

6. Measure:
   ° Mica undercut ⓐ
   Out of specification → Scrape the mica to the proper measurement using a hacksaw blade which has been grounded to fit the commutator.

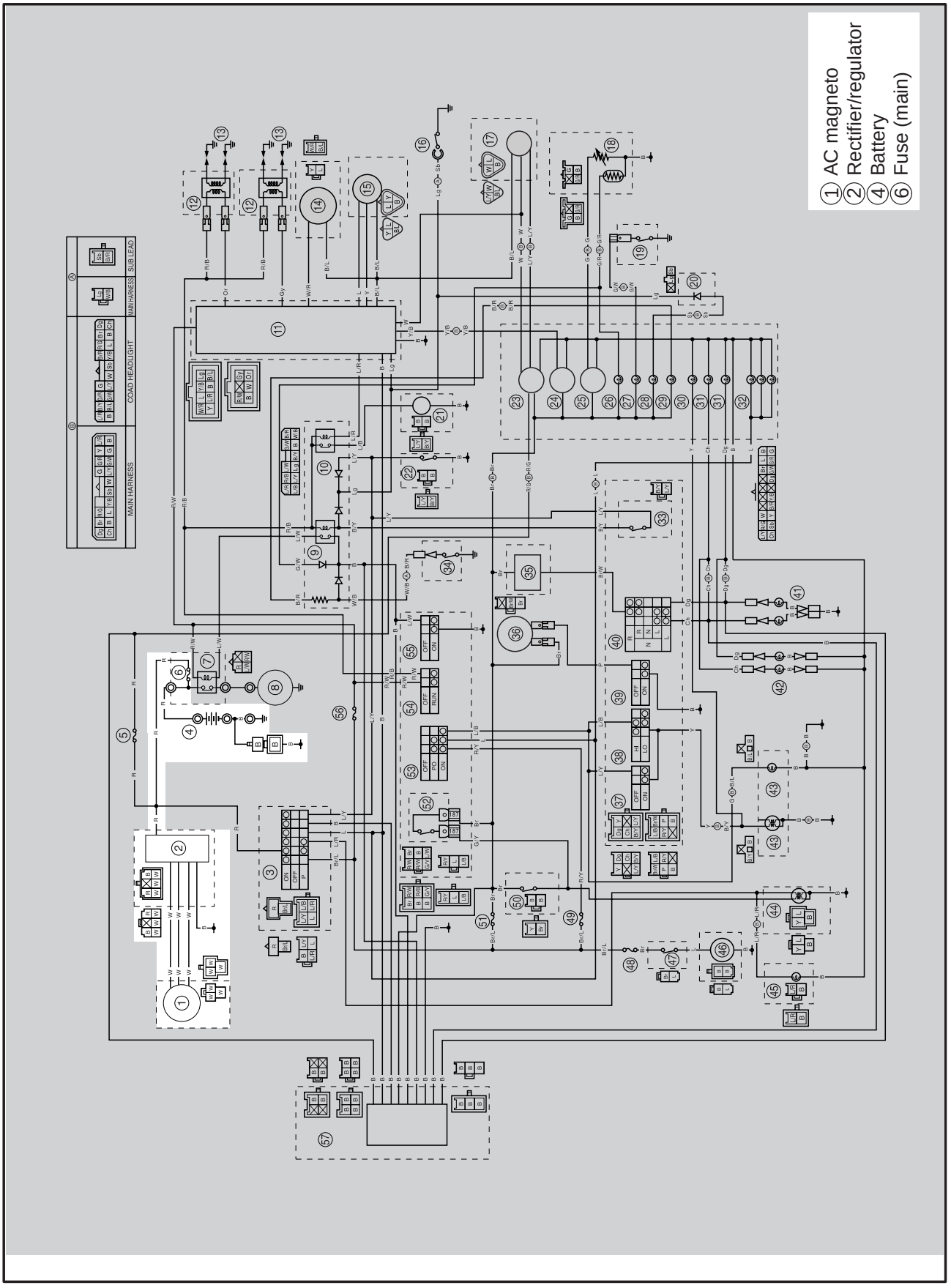
Mica undercut:
0.7 mm

NOTE:
The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.

EB804000

CHARGING SYSTEM

CIRCUIT DIAGRAM



EB803020
TROUBLESHOOTING

IF THE BATTERY IS NOT CHARGED:

Procedure
Check:
1. Fuse (main)
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connections (the entire charging system)

NOTE:
- Remove the following part(s) before trouble-shooting:
1) Seat
2) Side cover (left)
- Use the following special tool(s) for trouble-shooting.

Engine tachometer:
90890-03113
Pocket tester:
90890-03112

EB802011

1. Fuses (main)

- Remove the fuses.
- Connect the pocket tester (Ω × 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace the fuses.

CONTINUITY ⇩

EB802012

2. Battery

- Check the battery condition.
  Refer to “BATTERY INSPECTION” in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

INCORRECT → • Clean the battery terminals.
• Recharge or replace the battery.

CORRECT ⇩

✳

EB804011

3. Charging voltage

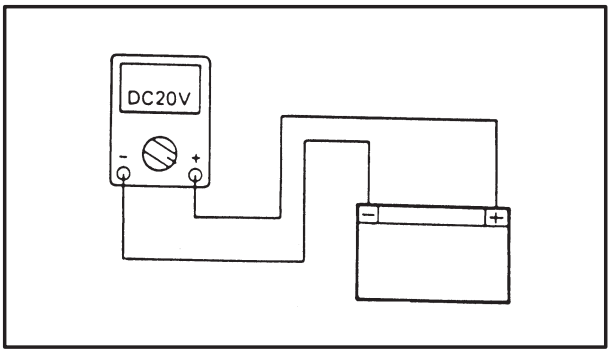
- Connect the engine tachometer to the spark plug lead.
- Connect the pocket tester (DC 20 V) to the battery.

Tester (+) lead → Battery (+) terminal
Tester (–) lead → Battery (–) terminal

- Measure the battery terminal voltage.
- Start the engine and accelerate to about 5,000 r/min.
- Check the terminal voltage.

Charging voltage = measured voltage-terminal voltage:
0.2 ~ 2.5 V up

NOTE:
Use a fully charged battery.



MEETS SPECIFICATION

The charging circuit is not faulty.

OUT OF SPECIFICATION

EB804012

4. Stator coil resistance

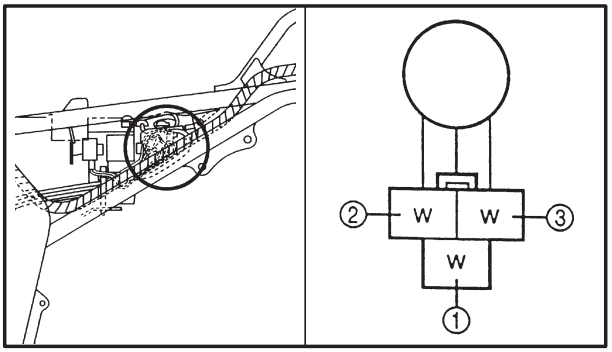
- Remove the generator cover.
- Connect the pocket tester (Ω × 1) to the stator coils.

Tester (+) lead → White terminal ①
Tester (–) lead → White terminal ②

Tester (+) lead → White terminal ①
Tester (–) lead → White terminal ③

- Measure the stator coil resistance.

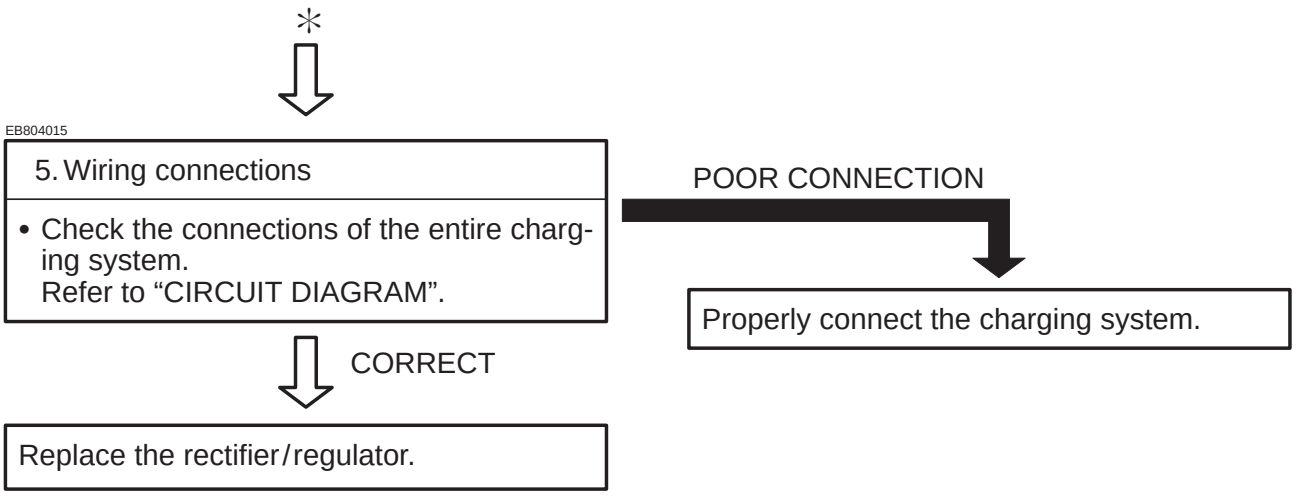
Stator coil resistance:
0.36 ~ 0.44 Ω at 20°C



OUT OF SPECIFICATION

Replace the stator coil assembly.

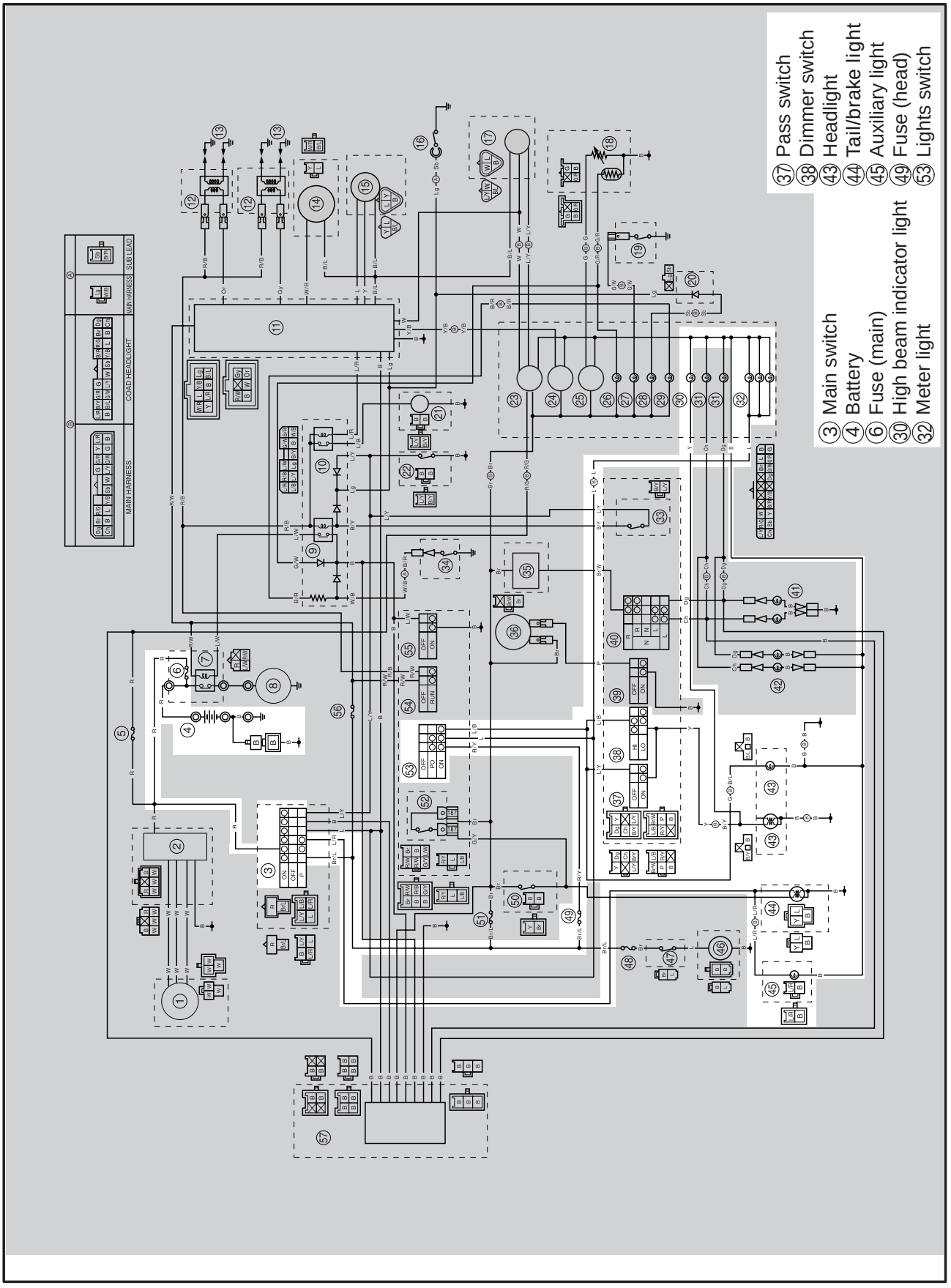
BOTH MEET SPECIFICATION


EB804015
5. Wiring connections
• Check the connections of the entire charging system.
Refer to “CIRCUIT DIAGRAM”.
POOR CONNECTION
Properly connect the charging system.
CORRECT
Replace the rectifier/regulator.

EB805000

LIGHTING SYSTEM

CIRCUIT DIAGRAM



EB803020
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)
5. Dimmer switch
6. Pass switch (for Europe and Australia)
7. Wiring connections (the entire lighting system)

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.

Pocket tester:
90890-03112

EB802011

1. Fuses (main and head)

- Remove the fuses.
- Connect the pocket tester (Ω × 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace the fuses.

CONTINUITY ↓

EB802012

2. Battery

- Check the battery condition.
  Refer to "BATTERY INSPECTION" in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

INCORRECT → • Clean the battery terminals.
• Recharge or replace the battery.

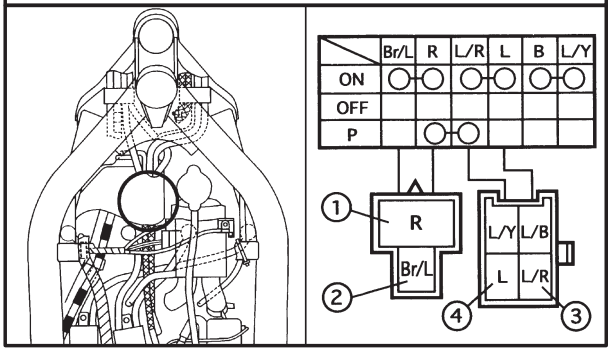
CORRECT ↓

✳

EB802017

3. Main switch

Disconnect the main switch couplers from the wire harness.
Check for continuity as follows:
Red ① – Brown/Blue ②
Blue/Red ① – Blue ②



NO CONTINUITY

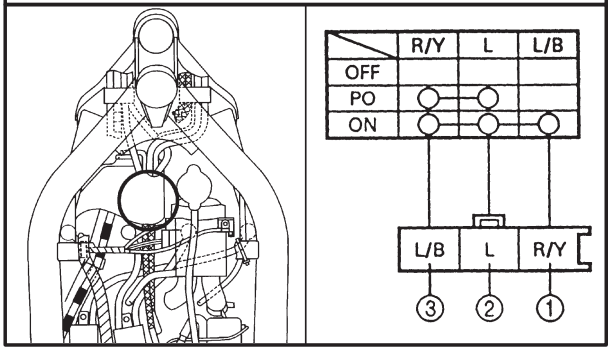
Replace the main switch.

CONTINUITY

EB805011

4. Lights switch

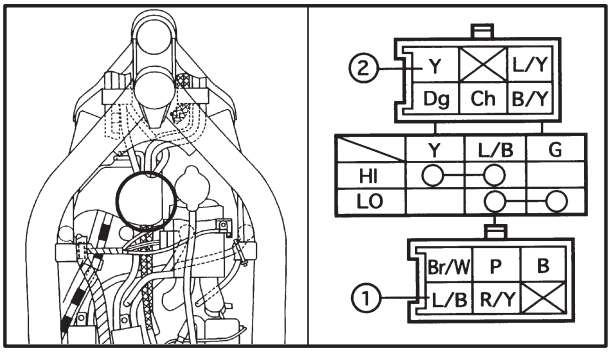
Disconnect the right handlebar switch coupler from the wire harness.
Turn the lights switch to “ON” or “PO”.
Check for continuity as follows:
Red/Yellow① – Blue ②
Turn the lights switch to “ON”.
Check for continuity as follows:
Red/Yellow① – Blue②
Red/Yellow① – Blue/Black ②



NO CONTINUITY

The lights switch is faulty. Replace the right handlebar switch.

CONTINUITY



5. Dimmer switch

Disconnect the left handlebar switch couplers from the wire harness.
Turn the dimmer switch to “HI”.
Check for continuity as follows:
Blue/Black ① – Yellow ②

NO CONTINUITY

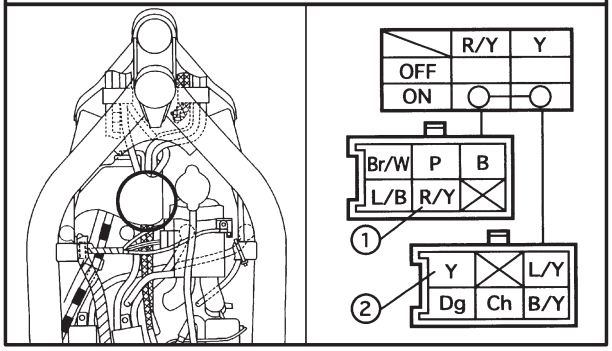
The dimmer switch is faulty.
Replace the left handlebar switch.

CONTINUITY

EB805012

6. Pass switch

Disconnect the left handlebar switch coupler from the wire harness.
Turn the pass switch to “ON”.
Check for continuity as follows:
Red/Yellow ① – Yellow ②



NO CONTINUITY

The pass switch is faulty. Replace the left handlebar switch.

CONTINUITY

EB805013

7. Wiring connections

Check the connections of the entire lighting system.
Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTION

Properly connect the lighting system.

CORRECT

Check the condition of each of the lighting system’s circuits.
Refer to “LIGHTING SYSTEM CHECK”.

EB805020
LIGHTING SYSTEM CHECK

1. If the headlight and the high beam indicator light fail to come on:

1. Bulb and bulb socket.

- Check the bulb and bulb socket for continuity.

NO CONTINUITY

Replace the bulb and/or bulb socket.

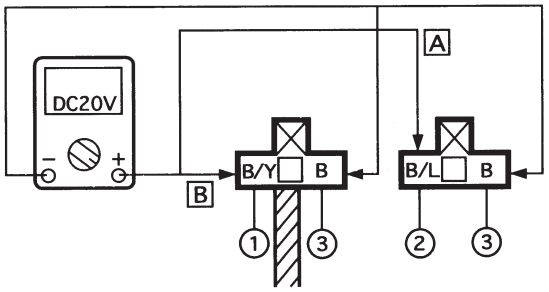
CONTINUITY

2. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers.

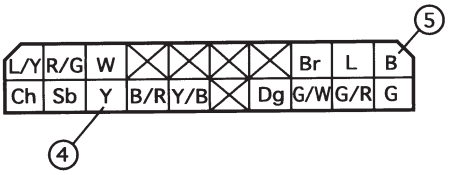
A When the dimmer switch is on “LO”.
B When the dimmer switch is ON “HI”.

Headlight connector



Headlight:
Tester (+) lead → Black/Yellow lead ① or Black/Blue lead ②
Tester (–) lead → Black lead ③
High beam indicator light:
Tester (+) lead → Yellow lead ④
Tester (–) lead → Black lead ⑤

B Meter connector



- Turn the main switch to “ON”.
- Turn the light switch to “ON”.
- Turn the dimmer switch to “LO” or “HI”.
- Check the voltage (12 V) of the “Black/Yellow”, “Black/Blue” and “Yellow” leads on the bulb socket connector.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION

This circuit is not faulty.

EB805021

2. If the meter light fails to come on:

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

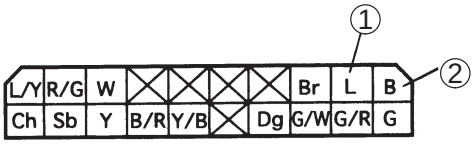
NO CONTINUITY → Replace the bulb and/or bulb socket.

CONTINUITY ↓

2. Voltage

- Connect the pocket tester (20 V) to the bulb socket coupler.

Tester (+) lead → Blue terminal ①
Tester (–) lead → Black terminal ②



- Turn the main switch to “ON”.
- Turn the light switch to “ON” or “PO”.
- Check the voltage (12 V) of the “blue” lead on the bulb socket connector.

OUT OF SPECIFICATION → The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION ↓

The circuit is not faulty.

EB805022

3. If the taillight fails to come on:

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

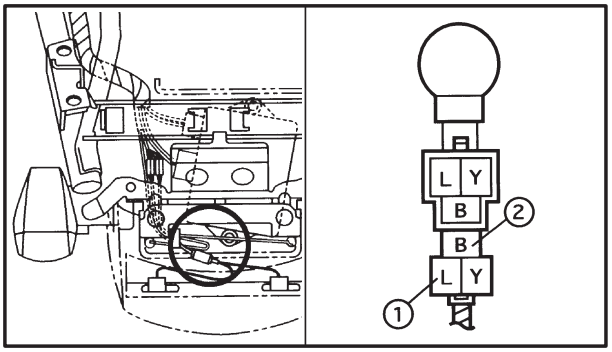
NO CONTINUITY → Replace the bulb and/or bulb socket.

CONTINUITY ↓

2. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Blue terminal ①
Tester (–) lead → Black terminal ②



- Turn the main switch to “ON”.
- Turn the lights switch to “ON” or “PO”.
- Check the voltage (12 V) of the “Blue” lead on the bulb socket connector.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION

This circuit is not faulty.

EB805023

4. If the auxiliary light fails to come on:

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

NO CONTINUITY

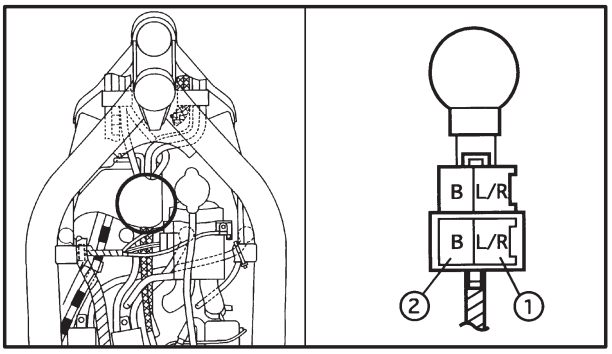
Replace the bulb and/or bulb socket.

CONTINUITY

2. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Blue/Red terminal ①
Tester (–) lead → Black terminal ②



- Turn the main switch is “ON”.
- Turn the lights switch to “ON” or “PO”.
- Check the voltage (12 V) of the “Blue/Red” lead on the bulb socket connector.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

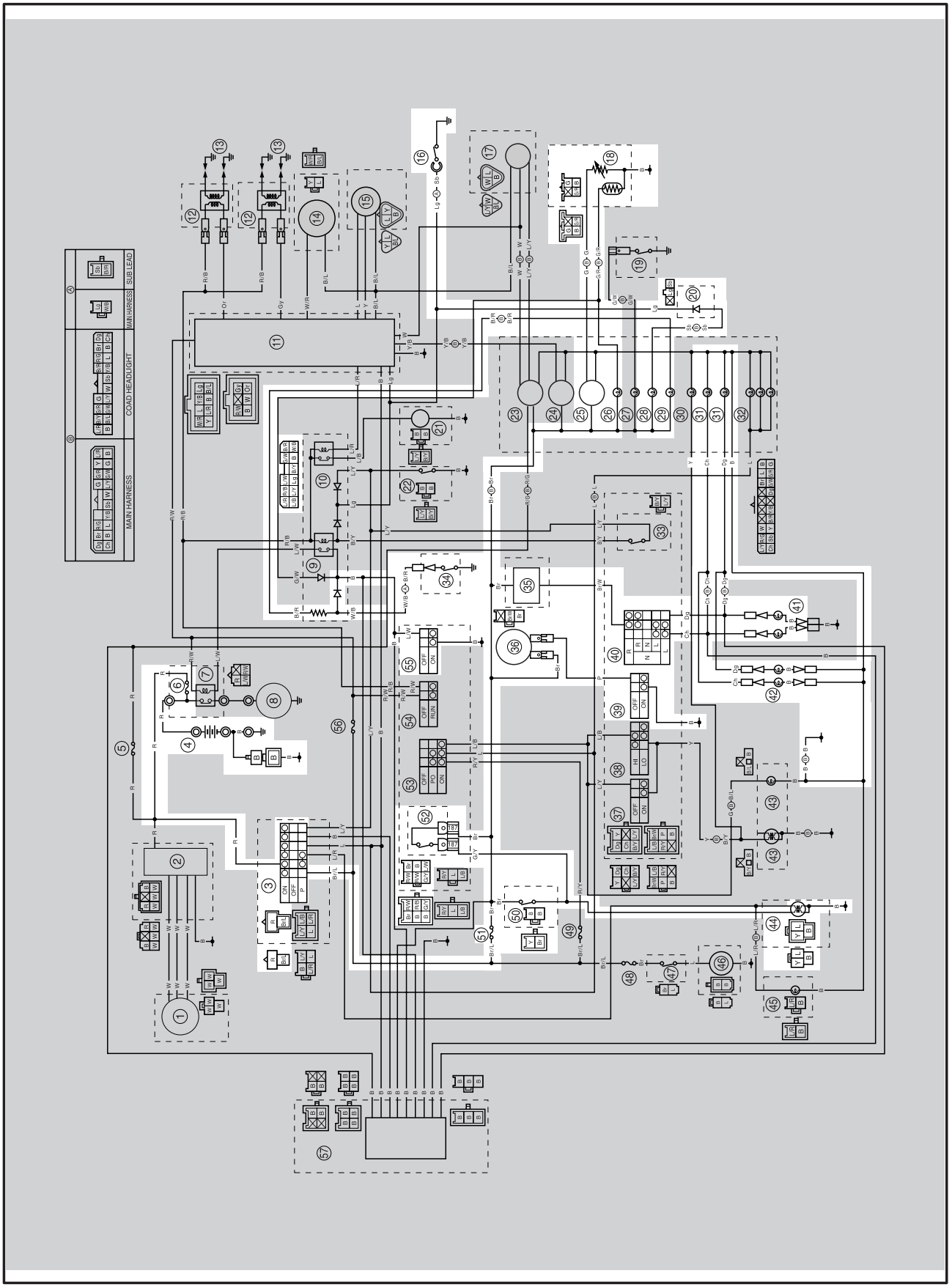
MEETS SPECIFICATION

This circuit is not faulty.

EB806000

SIGNAL SYSTEM

CIRCUIT DIAGRAM



③ Main switch
④ Battery
⑥ Fuse (main)
⑯ Neutral switch
⑱ Fuel sender
⑳ Diode
㉕ Fuel meter
㉖ 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
㊶ Front turn signal light
㊷ Rear turn signal light
㊹ Tail/brake light
㊿ Rear brake switch
(51) Fuse (signal)
(52) Front brake switch
(55) Start switch

B806010
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 trouble-shooting:
1) Seat
2) Fuel tank
3) Side covers (left and right)
4) Front cowling assembly

Use the following special tool8s) for trouble-shooting.

Pocket tester:
90890-03112

EB802011

1. Fuses (main and signal)

Remove the fuses.
Connect the pocket tester (Ω × 1) to the fuses.
Check the fuses for continuity.

NO CONTINUITY → Replace the fuses.

CONTINUITY ↓

EB802012

2. Battery

Check the battery condition.
Refer to "BATTERY INSPECTION" in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

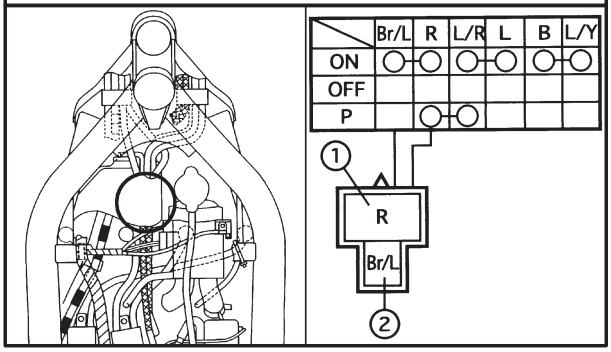
INCORRECT → Clean the battery terminals.
Recharge or replace the battery.

CORRECT ↓

EB802017

3. Main switch

Disconnect the main switch coupler from the wire harness.
Check for continuity as follows:
Red ① – Brown/Blue ②



NO CONTINUITY

Replace the main switch.

CONTINUITY

EB806011

4. Wiring connections

Check the connections of the entire signal system.
Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTION

Properly connect the signal system.

CORRECT

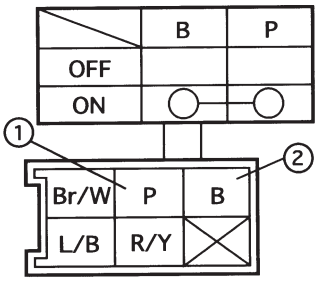
Check the condition of each of the signal system’s circuits.
Refer to “SIGNAL SYSTEM CHECK”.

EB806020

SIGNAL SYSTEM CHECK

1. If the horn fails to sound:

1. Horn switch



- Disconnect the left handlebar switch coupler from the wire harness.
- Disconnect the "Black/White" lead at the horn terminal.
- Check for continuity as follows:
  Pink ① – Black ②

NO CONTINUITY

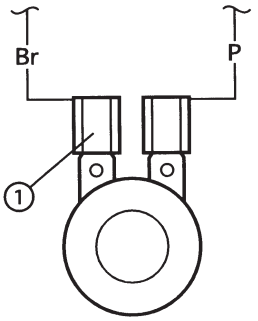
Replace the left handlebar switch.

CONTINUITY

2. Voltage

- Connect the pocket tester (DC 20 V) to the horn lead.

Tester (+) lead → Brown lead ①
Tester (–) lead → Frame ground



- Turn the main switch to "ON".
- Check the voltage (12 V) of the "Brown" lead at the horn terminal.

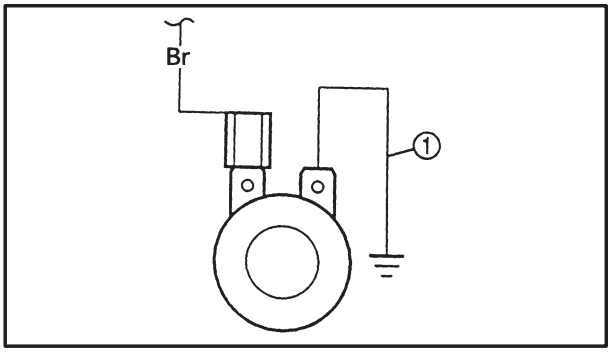
OUT OF SPECIFICATION

The wiring circuit from the main switch to the horn terminal is faulty, repair it.

MEETS SPECIFICATION

3. Horn

- Disconnect the "Pink" lead at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Turn the main switch to "ON".



HORN SOUNDS

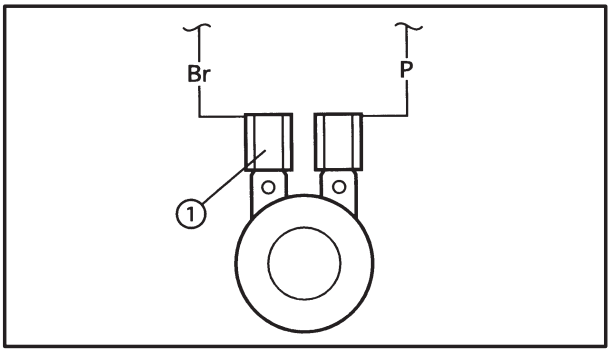
The horn is not faulty.

HORN DOES NOT SOUND

4. Voltage

Connect the pocket tester (DC 20 V) to the horn at the “Pink” terminal.

Tester (+) lead → Brown lead ①
Tester (–) lead → Pink



Turn the main switch to “ON”.
Check the voltage (12 V) of the “Pink” lead at the horn terminal.

OUT OF SPECIFICATION

Replace the horn.

MEETS SPECIFICATION

Adjust or replace the horn.

EB806022

2. If the brake light fails to come on:

1. Bulb and bulb socket

Check the bulb and bulb socket for continuity.

NO CONTINUITY

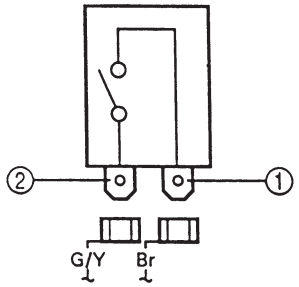
Replace the bulb and/or bulb socket.

CONTINUITY

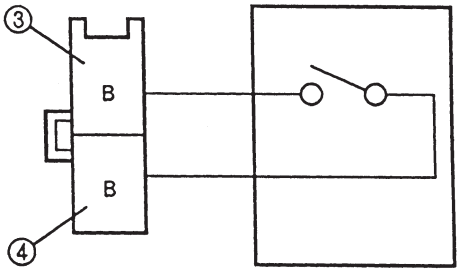
2. Brake switch

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



B



A Front brake switch
B Rear brake switch

NO CONTINUITY

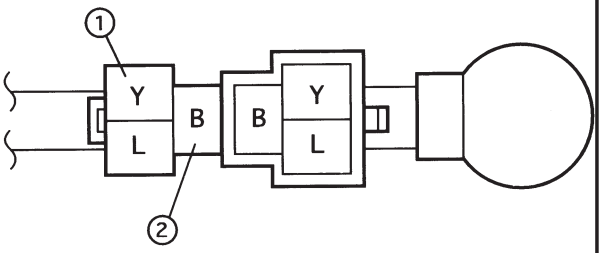
Replace the brake switch.

CONTINUITY

3. Voltage

Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Yellow terminal ①
Tester (–) lead → 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.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION

This circuit is not faulty.

EB806023

3. If the turn signal light and/or turn indicator light fails to blink:

1. Bulb and bulb socket

Check the bulb and bulb socket for continuity.

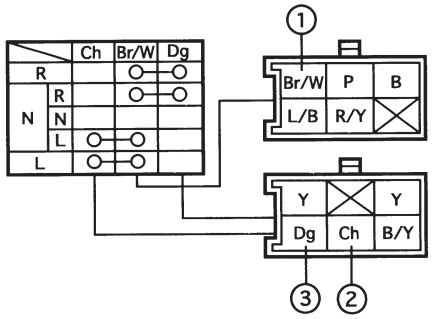
NO CONTINUITY

Replace the bulb and/or bulb socket.

CONTINUITY

2. Turn switch

Disconnect the left handlebar switch couplers from the wire harness.
Check for continuity as follows:
Brown/White ① – Chocolate ②
Brown/White ① – Dark green ③



NO CONTINUITY

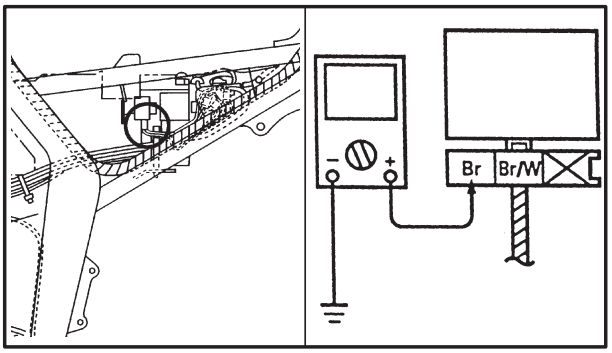
Replace the left handlebar switch.

CONTINUITY

3. Voltage

Connect the pocket tester (DC 20 V) to the flasher relay coupler.

Tester (+) lead → Brown terminal ①
Tester (–) lead → Frame ground



Turn the main switch to “ON”.
Check the voltage (12 V) of the “Brown” ① lead at the flasher relay terminal.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the flasher relay connector is faulty, repair it.

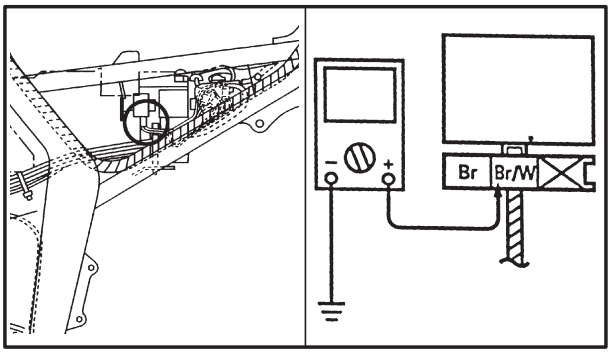
MEETS SPECIFICATION

○

4. Voltage

Connect the pocket tester (DC 20 V) to the flasher relay coupler.

Tester (+) lead →
Brown/White terminal ①
Tester (–) lead → 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.

OUT OF SPECIFICATION

The flasher relay is faulty, replace it.

MEETS SPECIFICATION

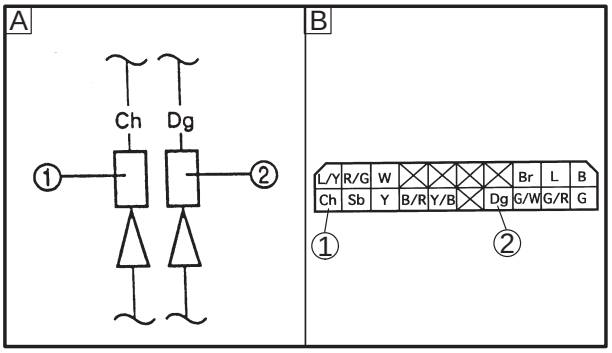
5. Voltage

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 → Chocolate lead ①
Tester (–) lead → Frame ground

At the flasher light (right):
Tester (+) lead → Dark green lead ②
Tester (–) lead → 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.

OUT OF SPECIFICATION

The wiring circuit from the turn switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION

This circuit is not faulty.

EB806024

4. If the neutral indicator light fails to come on:

1. Bulb and bulb socket

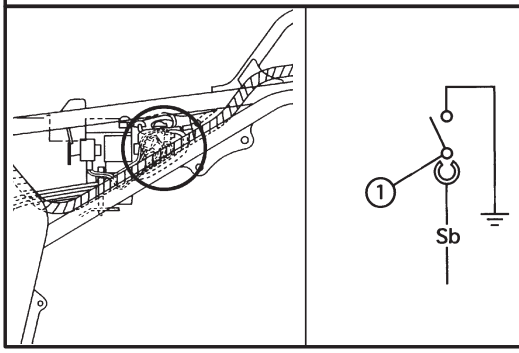
Check the bulb and bulb socket for continuity.

NO CONTINUITY → Replace the bulb and/or bulb socket.

CONTINUITY ↓

2. Neutral switch

Disconnect the neutral switch lead from the neutral switch.
Check for continuity as follows:
Neutral switch terminal ① – Ground

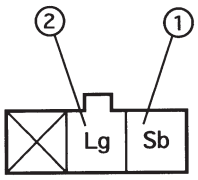


NO CONTINUITY → Replace the neutral switch.

CONTINUITY ↓

3. Diode

Remove the diode from the wire harness.
Check for continuity as follows:
Sky blue ① – Light green ②



Tester (+) lead → Sky blue ① **Tester (–) lead → Light green ②**	**Continuity**
Tester (+) lead → Light green ① **Tester (–) lead → Sky blue ②**	**No Continuity**

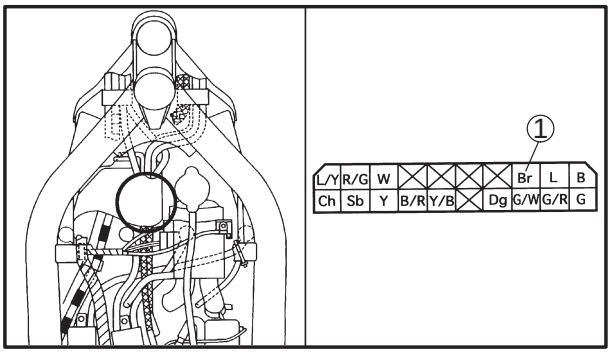
INCORRECT → Replace the diode.

CORRECT ↓

4. Voltage

Connect the pocket tester (DC 20 V) to the bulb socket coupler.

Tester (+) lead → Brown terminal ①
Tester (–) lead → Frame ground



OUT OF SPECIFICATION

Turn the main switch to “ON”.
Check the voltage (12 V).

MEETS SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

This circuit is not faulty.

EB806025

5. If the oil level warning light fails to come on:

1. Bulb and bulb socket

Check the bulb and bulb socket for continuity.

NO CONTINUITY

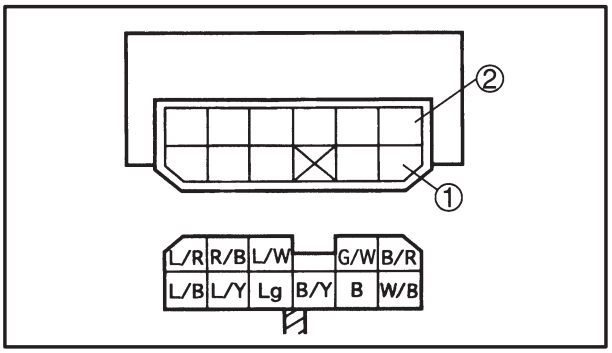
Replace the bulb and/or bulb socket.

CONTINUITY

2. Starting circuit cut-off relay

Disconnect the starting circuit cut-off relay coupler from the wire harness.
Connect the pocket tester (Ω × 100) to the starting circuit cut-off relay coupler terminals.
Check the resistor for the specified resistance.

Tester (+) terminal → Black/Red terminal ①
Tester (–) terminal → White/Black ②



8 Ω at 20°C

OUT OF SPECIFICATION

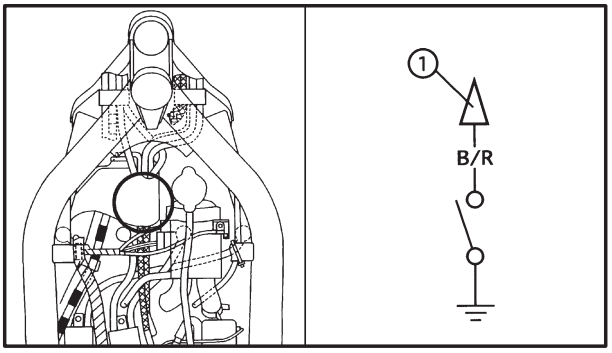
MEETS SPECIFICATION

Replace the starting circuit cut-off relay.

3. Oil level switch

Drain the engine oil and remove the oil level switch from the oil pan.
Connect the pocket tester (Ω × 1) to the oil level switch.

Tester (+) lead → Black/Red terminal ①
Tester (–) lead → Frame ground



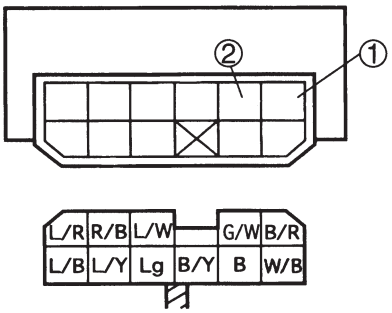
Check the oil level switch for continuity.

NO CONTINUITY → Replace the oil level switch.

CONTINUITY ⇩

4. Diode (starting circuit cut-off relay)

Remove the relay unit from the wire harness.
Check for continuity as follows:
White/Black ① – Black ②



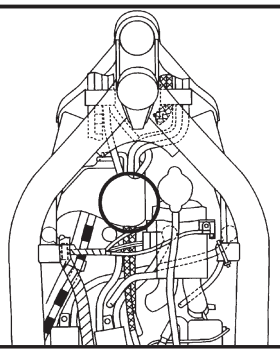
Tester (+) lead → White/Black ① **Tester (–) lead → Black ②**	**Continuity**
Tester (+) lead → Black ① **Tester (–) lead → White/Black ②**	**No Continuity**

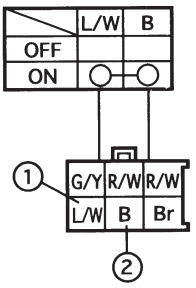
INCORRECT → Replace the relay unit.

CORRECT ⇩

5. Start switch

- Disconnect the right handlebar switch coupler from the wire harness.
- Check for continuity as follows:
  Blue/White ① – Black ②





NO CONTINUITY

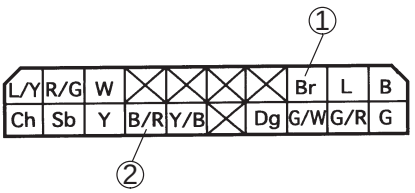
Replace the right handlebar switch.

CONTINUITY

6. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Brown lead ①
Tester (–) lead → Black/Red lead ②



OUT OF SPECIFICATION

- Turn the main switch to “ON”.
- Check the voltage (12 V).

MEETS SPECIFICATION

This circuit is not faulty.

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

6. If the fuel level warning light fails to come on or the fuel meter fails to operate:

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

NO CONTINUITY

Replace the bulb and/or bulb socket.

CONTINUITY

2. Fuel sender

- Drain the fuel and remove the fuel sender from the fuel tank.
- Disconnect the fuel sender coupler from the wire harness.
- Connect the pocket tester (Ω × 1) to the fuel sender.

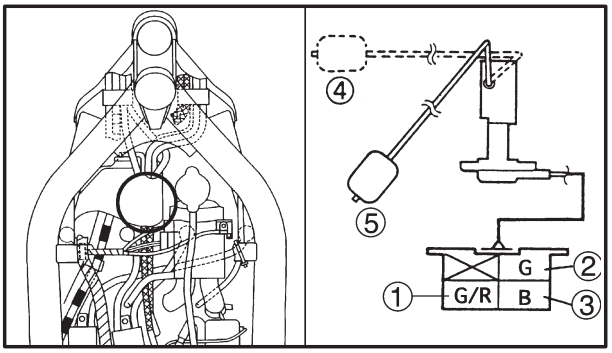
Tester (+) lead → Green/Red terminal ①
Tester (–) lead → Black terminal ③

- Check the fuel sender for continuity.
- Connect the pocket tester (Ω × 1) to the fuel sender.

Tester (+) lead → Green terminal ②
Tester (–) lead → Black terminal ③

- Measure the fuel sender resistance.

Fuel sender resistance
④ : 4 ~ 10 Ω at 20°C
⑤ : 90 ~ 100 Ω at 20°C



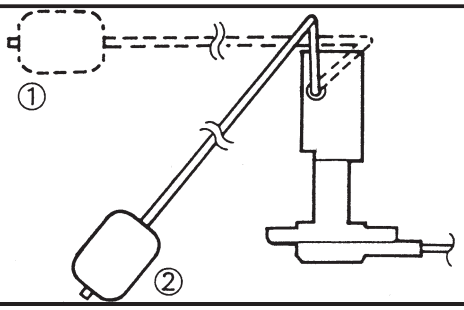
OUT OF SPECIFICATION

Replace the fuel sender.

MEETS SPECIFICATION

3. Fuel meter

- Drain the fuel and remove the fuel sender from the fuel tank.
- Connect the fuel sender to wireharness.
- Move the float to "UP"① or "DOWN" ②.



- Turn the main switch to "ON".
- Check the fuel gauge needle moves "F" or "E".

Float position	Needle moves
Float "UP" ①	"F"
Float "DOWN" ②	"E"

NOTE:
Before reading the meter, stay put the float for more than three minutes respectively at "UP" or "DOWN".

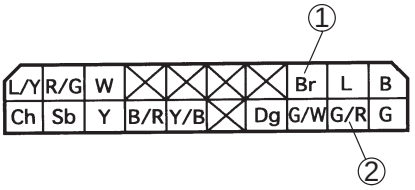
DOES NOT MOVE

Replace the fuel meter.

3. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Brown terminal ①
Tester (–) lead → Green/Red terminal ②



OUT OF SPECIFICATION

- Drain the fuel.
- Turn the main switch to “ON”.
- Check the voltage (12 V).

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

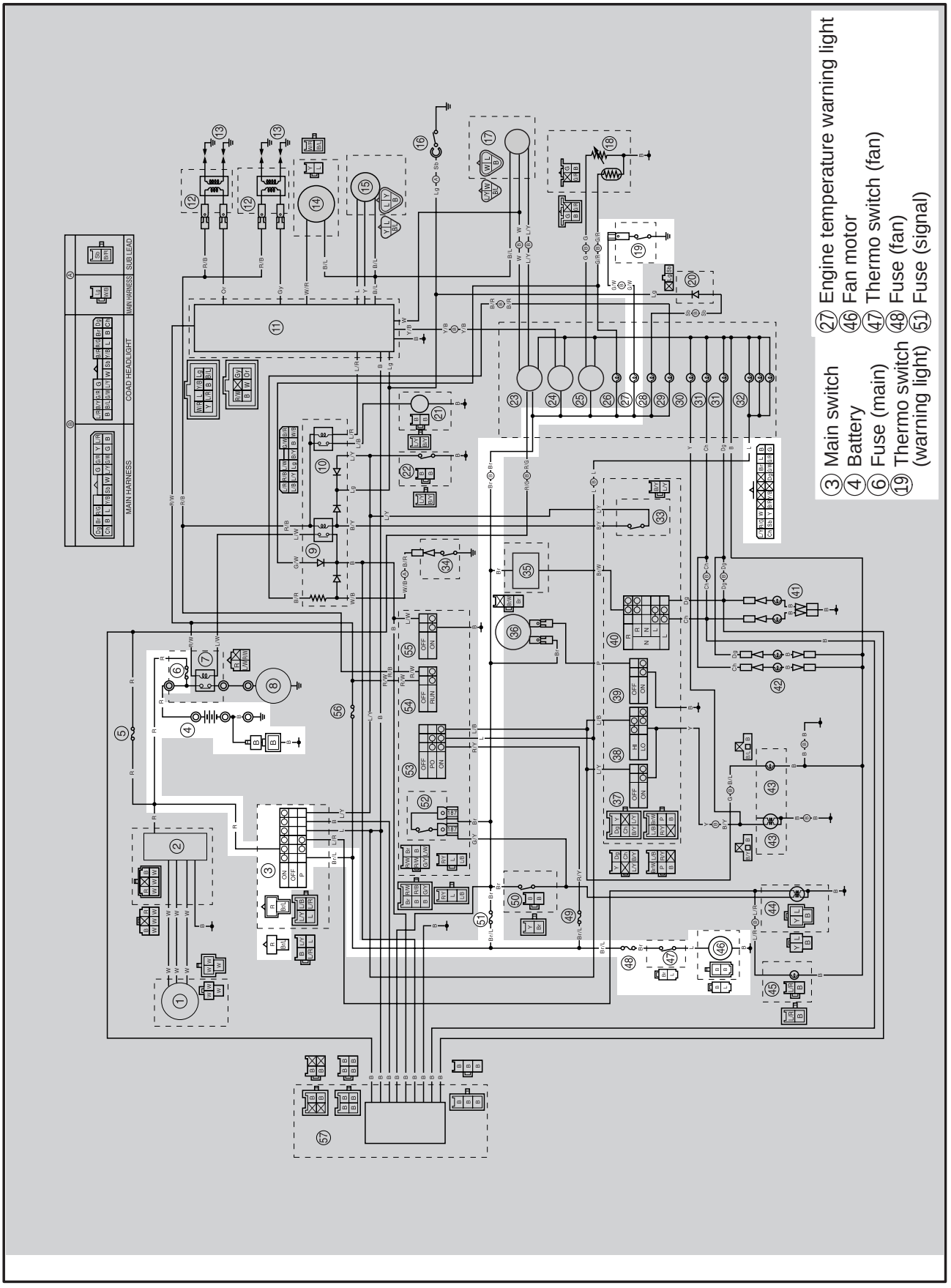
MEETS SPECIFICATION

This circuit is not faulty.

EB807000

COOLING SYSTEM

CIRCUIT DIAGRAM



EB807010
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
6. Engine temperature warning light
7. Voltage
8. Wiring connections (the entire cooling system)

NOTE:
Remove the following part(s) before trouble-shooting.
1) Seat
2) Fuel tank
3) Front cowling assembly

Use the following special tool(s) for trouble-shooting.

Pocket tester:
90890-03112

EB802011

1. Fuses (main, signal and fan)

Remove the fuses.
Connect the pocket tester (Ω × 1) to the fuses.
Check the fuses for continuity.

NO CONTINUITY → Replace the fuse(s).

CONTINUITY ↓

EB802012

2. Battery

Check the battery condition.
Refer to "BATTERY INSPECTION" in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

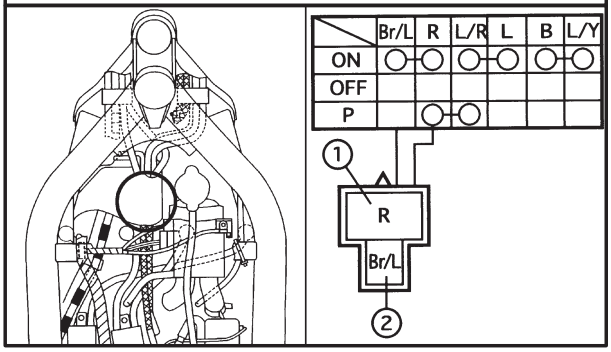
INCORRECT → Clean the batery terminals.
Recharge or replace the battery.

CORRECT ↓

EB802017

3. Main switch

Disconnect the main switch coupler from the wire harness.
Check for continuity as follows:
Red ① – Brown/Blue ②



NO CONTINUITY

Replace the main switch.

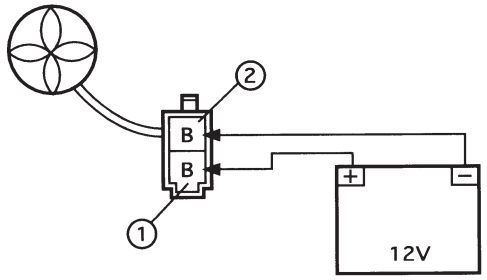
CONTINUITY

EB807011

4. Fan motor

Disconnect the fan motor coupler.
Connect the battery (12 V) as shown.

Battery (+) lead → Black terminal ①
Battery (–) led → Black terminal ②



Check the operation of the fan motor.

DOES NOT MOVE

The fan motor is faulty, replace it.

MOVES

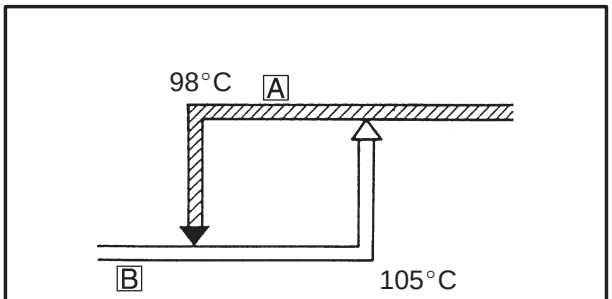
EB802017

5. Thermo switch (fan, engine temperature)

Remove the thermo switch from the thermostatic valve housing.
Connect the pocket tester (Ω × 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 step	Water temperature Thermo switch	Good condition
1	0 ~ 105°C	×
2	More than 105°C	○
3*	105 to 98°C	○
4*	Les than 98°C	×

Tests 1 & 2; Heat-up tests
Tests 3* & 4*; Cool-down tests
○: Continuity ×: No continuity

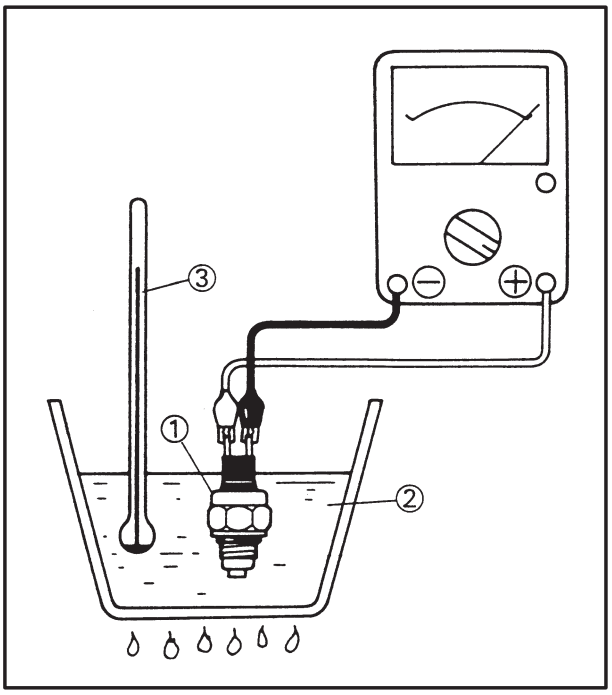


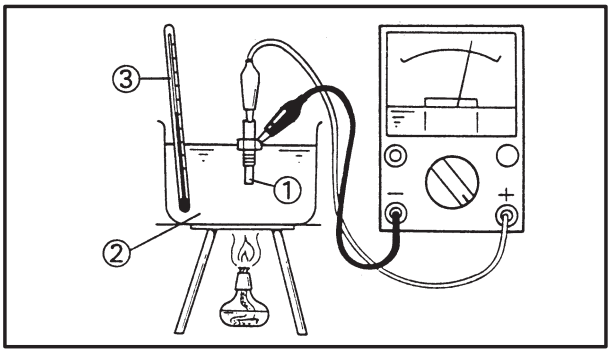
A THERMO SWITCH "ON"
B THERMO SWITCH "OFF"

GOOD CONDITION

⚠ WARNING

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.





BAD CONDITION

Replace the thermo switch.

6. Engine temperature warning light

Check the bulb and bulb socket for continuity.

NO CONTINUITY

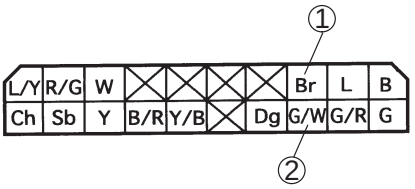
Replace the bulb and/or bulb socket.

CONTINUITY

7. Voltage

Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Brown lead ①
Tester (–) lead → Green/White lead ②



Turn the main switch to “ON”.
Check the voltage (12 V).

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION

EB807014

8. Wiring connections

Check the connections of the entire cooling system.
Refer to “CIRCUIT DIAGRAM.

POOR CONNECTION

Properly connect the cooling system.

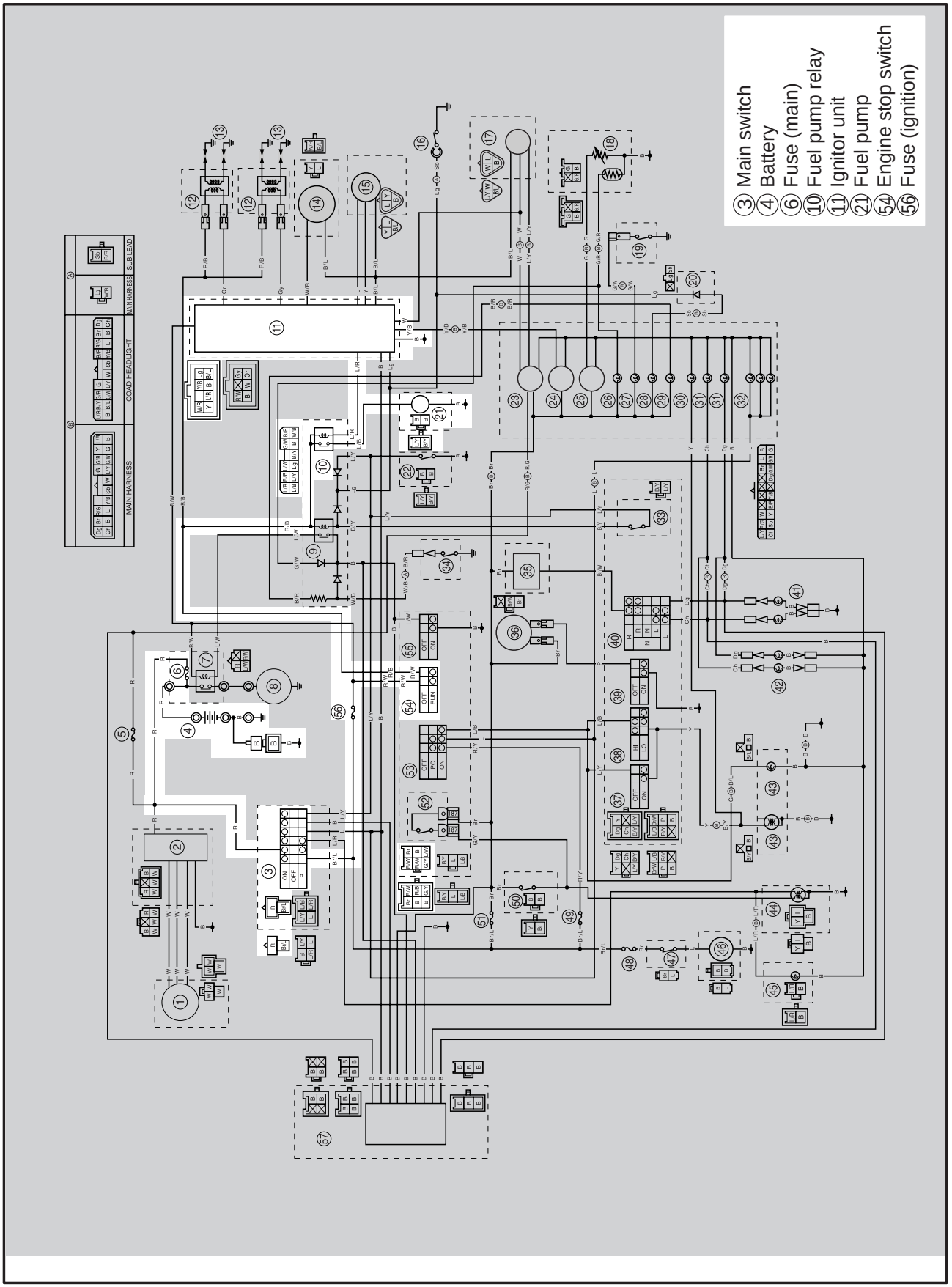
CORRECT

This circuit is not faulty.

EB808000

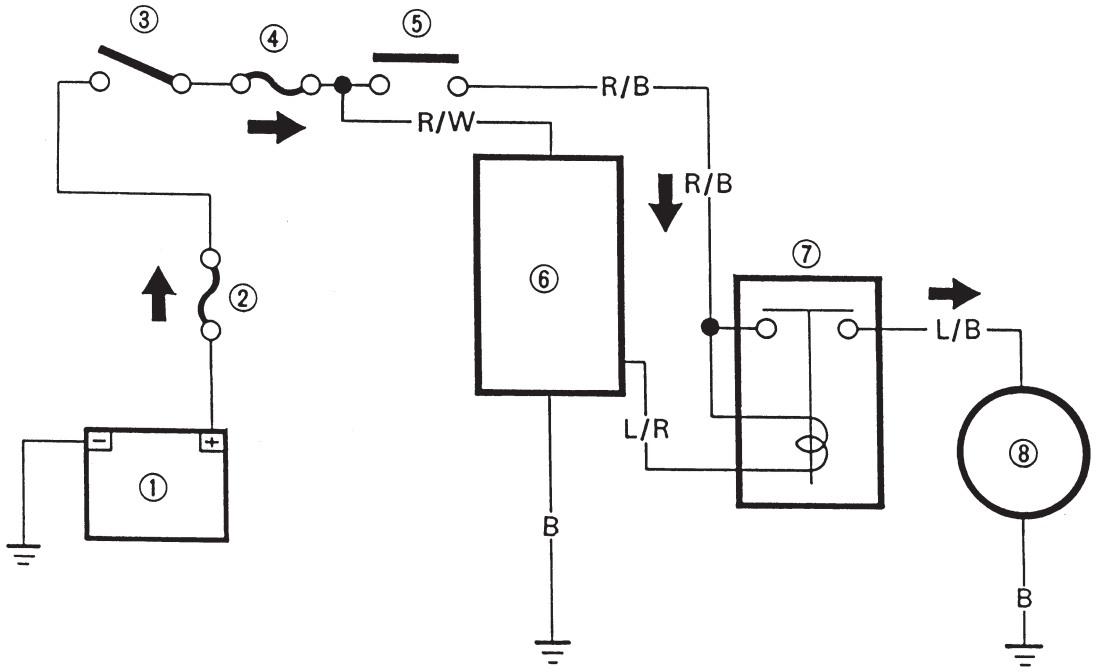
FUEL PUMP SYSTEM

CIRCUIT DIAGRAM



EB808010
FUEL PUMP CIRCUIT OPERATION
The fuel pump circuit consists of the fuel pump relay, fuel pump, engine stop switch and ignitor unit.
The ignitor unit includes the control unit for the fuel pump.

① Battery
② Fuse (main)
③ Main switch
④ Fuse (ignition)
⑤ Engine stop switch
⑥ Ignitor unit
⑦ Fuel pump relay
⑧ Fuel pump



EB808020
TROUBLESHOOTING

IF THE FUEL PUMP FAILS TO OPERATE:

Procedure
Check:
1. Fuses (main and ignition)
2. Battery
3. Main switch
4. Engine stop switch
5. Fuel pump relay (starting circuit cut-off relay)
6. Fuel pump resistance
7. Wiring connections (the entire fuel system)

NOTE:
Remove the following part(s) before trouble-shooting:
1) Seat
2) Fuel tank
3) Side cover (left)

Use the following special tool(s) for trouble-shooting.

Pocket tester:
90890-03112

EB802011

1. Fuses (main and ignition)

Remove the fuses.
Connect the pocket tester (Ω × 1) to the fuses.
Check the fuses for continuity.

NO CONTINUITY → Replace the fuse(s).

CONTINUITY ↓

EB802012

2. Battery

Check the battery condition.
Refer to "BATTERY INSPECTION" in CHAPTER 3.

Open-circuit voltage:
12.8 V or more at 20°C

INCORRECT → Clean the battery terminals.
Recharge or replace the battery.

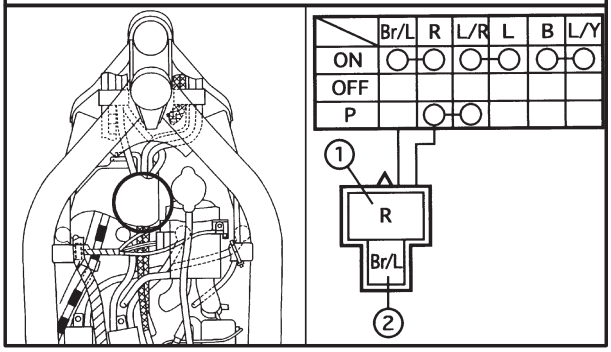
CORRECT ↓

○

EB802017

3. Main switch

Disconnect the main switch coupler from the wire harness.
Check for continuity as follows:
Red ① – Brown/Blue ②



NO CONTINUITY

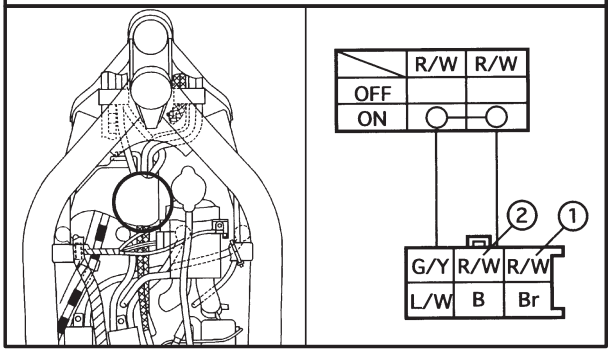
Replace the main switch.

CONTINUITY

EB802018

4. Engine stop switch

Disconnect the right handlebar switch coupler from the wire harness.
Check for continuity as follows:
Red/White ① – Red/White ②



NO CONTINUITY

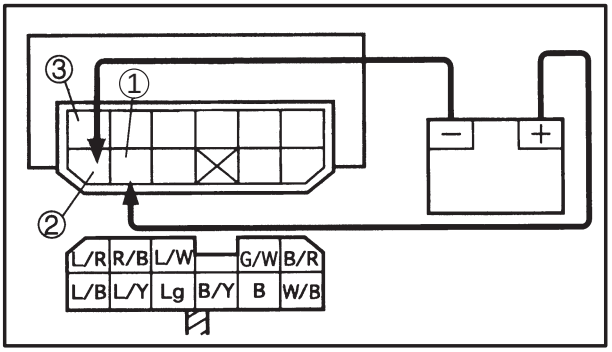
Replace the right handlebar switch.

CONTINUITY

EB803023

5. Fuel pump relay (starting circuit cut-off relay)

Remove the relay unit from the wire harness.
Connect the pocket tester (Ω × 1) and battery (12 V) to the relay unit terminals.



Battery (+) terminal →
Red/Black terminal ①
Battery (–) terminal →
Blue/Red terminal ③

Tester (+) lead → Red/Black terminal ①
Tester (–) lead → Blue/Black terminal ③

- Check the fuel pump relay for continuity.

NO CONTINUITY → Replace the starting circuit cut-off relay.

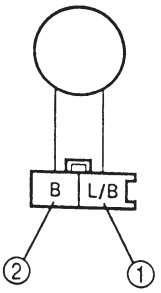
CONTINUITY ↓

EB808021

6. Fuel pump resistance

- Disconnect the fuel pump coupler from the wire harness.
- Connect the pocket tester (Ω × 1) to the fuel pump coupler terminals.

Tester (+) lead → Black/Blue terminal ①
Tester (–) lead → Black terminal ②



- Check if the fuel pump has the specified resistance.

Fuel pump resistance:
1.8 ~ 2.6 Ω at 20°C

OUT OF SPECIFICATION → Replace the fuel pump.

MEETS SPECIFICATION ↓

EB808022

7. Wiring connections

- Check the connections of the entire fuel pump system.
  Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTION → Properly connect the fuel pump system.

CORRECT ↓

Replace the ignitor unit.

EB808030
FUEL PUMP TEST

⚠ 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

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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 → Black terminal ①
Battery (–) lead → Black terminal ②

d. If fuel flows out from the fuel hose, the fuel pump is good. If not, replace the fuel pump assembly.

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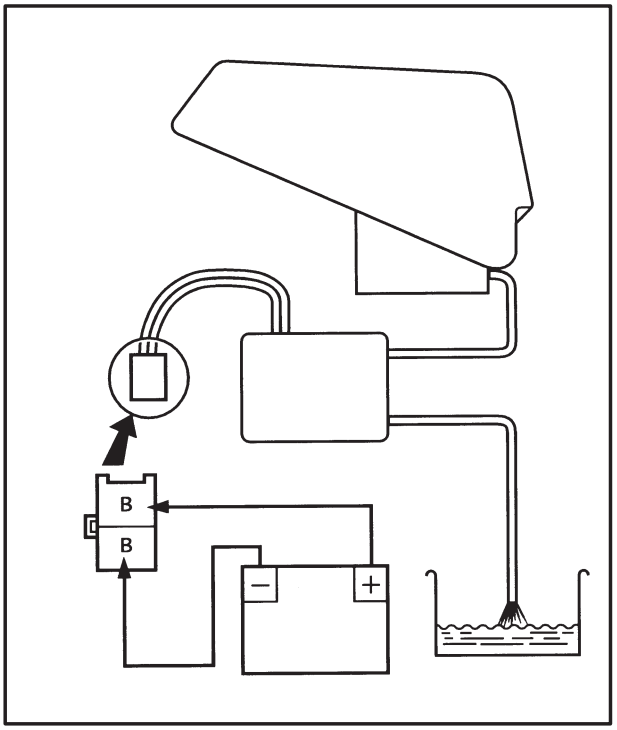


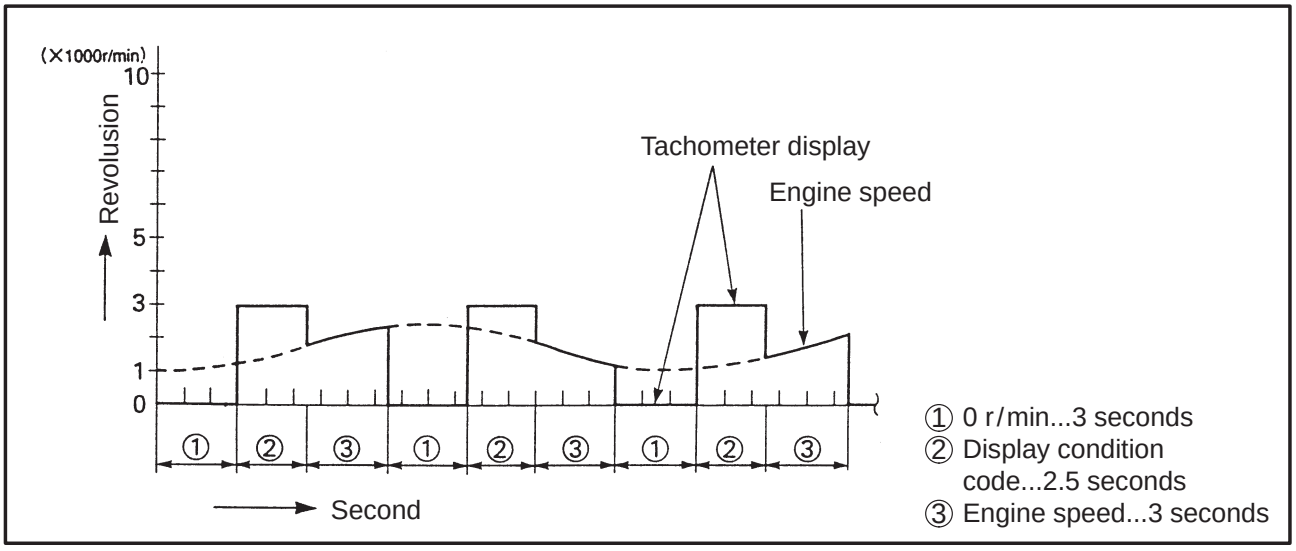
SELF-DIAGNOSIS

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

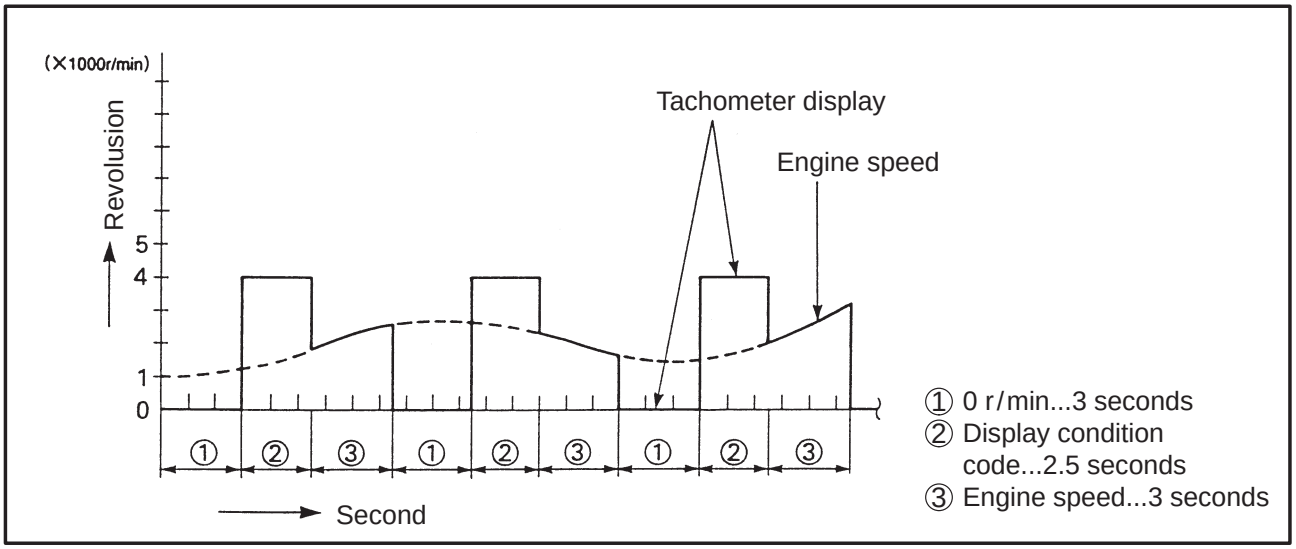
Display order on the tachometer

1. Fail to the throttle position sensor



While the engine is stopped, the engine speed ③ 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.

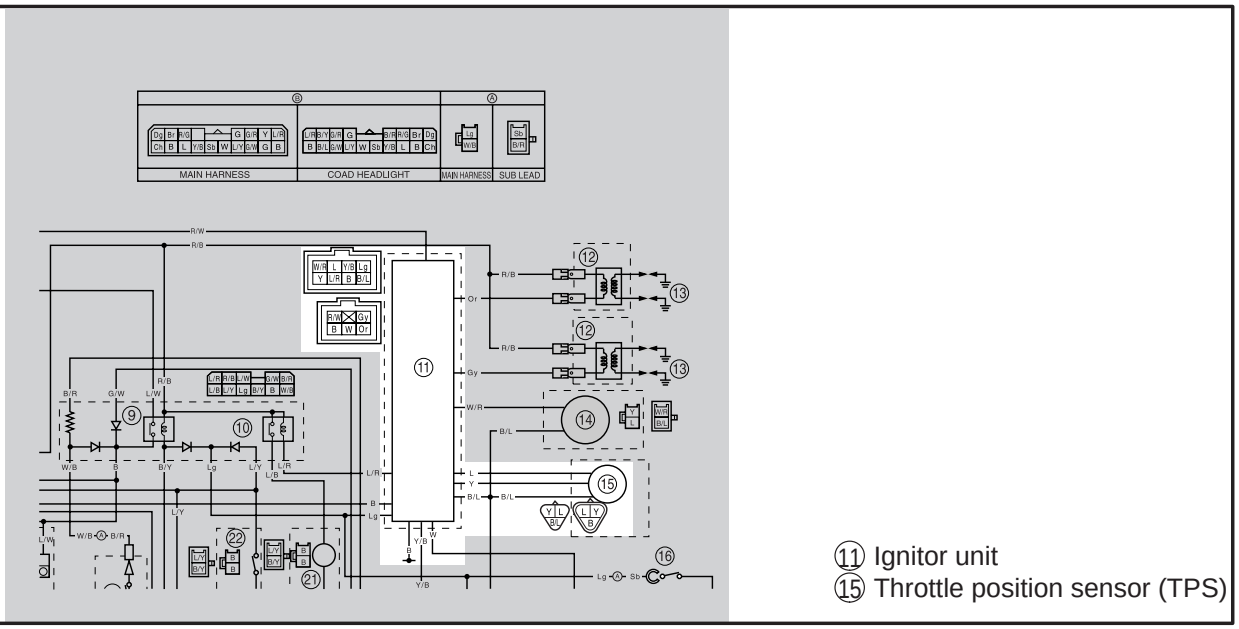
TROUBLESHOOTING

The tachometer starts to display the self-diagnosis sequence.

NOTE:
Use the following special tool in this trouble-shooting.

Pocket tester:
90890-03112

1. Throttle position sensor (TPS)
CIRCUIT DIAGRAM



1. Wire harness

° Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.

NO CONTINUITY

Repair or replace the wire harness.

CONTINUITY

2. TPS

° Check the TPS for continuity.
° Refer to “THROTTLE POSITION SENSOR (TPS) ADJUSTMENT AND INSPECTION” in CHAPTER 6.

BAD CONDITION

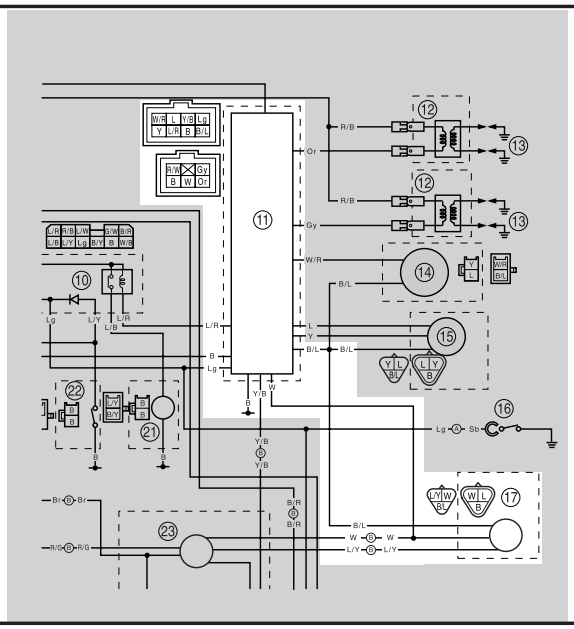
Replace the TPS.

GOOD CONDITION.

Replace the ignitor unit.

2. Speed sensor

CIRCUIT DIAGRAM



⑪ Ignitor unit
⑰ Speed sensor

1. Wire harness

° Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.

NO CONTINUITY

Repair or replace the wire harness.

CONTINUITY

Replace the speed sensor.

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TRBL SHTG

9

CHAPTER 9.
TROUBLESHOOTING

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FZS600'98 WIRING DIAGRAM

EB900000

TROUBLESHOOTING

NOTE:
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

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

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

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
° 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

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

EB901000
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

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

EB902000
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

Transmission
° Seized transmission gear
° Jammed impurities
° Incorrectly assembled transmission

JUMPS-OUT-OF GEAR
Shift shaft
° Improperly adjusted shift lever position
° Improperly returned stopper lever

Shift fork
° Worn shift fork

Shift cam
° Improper thrust play
° Worn shift cam groove

Transmission
° Worn gear dog

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

Engine oil
° Improper oil level
° Improper viscosity (low)
° Deterioration

CLUTCH DRAGGING
Clutch
° 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

Engine oil
° Improper oil level
° Improper viscosity (high)
° Deterioration

EB905000
OVERHEATING

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

Compression system
° Heavy carbon build-up

Engine oil
° Improper oil level
° Improper oil viscosity
° Inferior oil quality

Brake
° Brake drag

OVERCOOLING

OVERCOOLING
° Faulty cooling fan
° Faulty thermo stat
° Faulty thermo switch

EB906000
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

EB907000
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

OIL LEAKAGE
° 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

EB908000
UNSTABLE HANDLING

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
° Deformed cast wheel
° Damaged bearing
° Bent or loose wheel axle
° Excessive wheel runout

Frame
° Bent
° Damaged steering head tube
° Improperly installed bearing race

EB909000
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
° 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

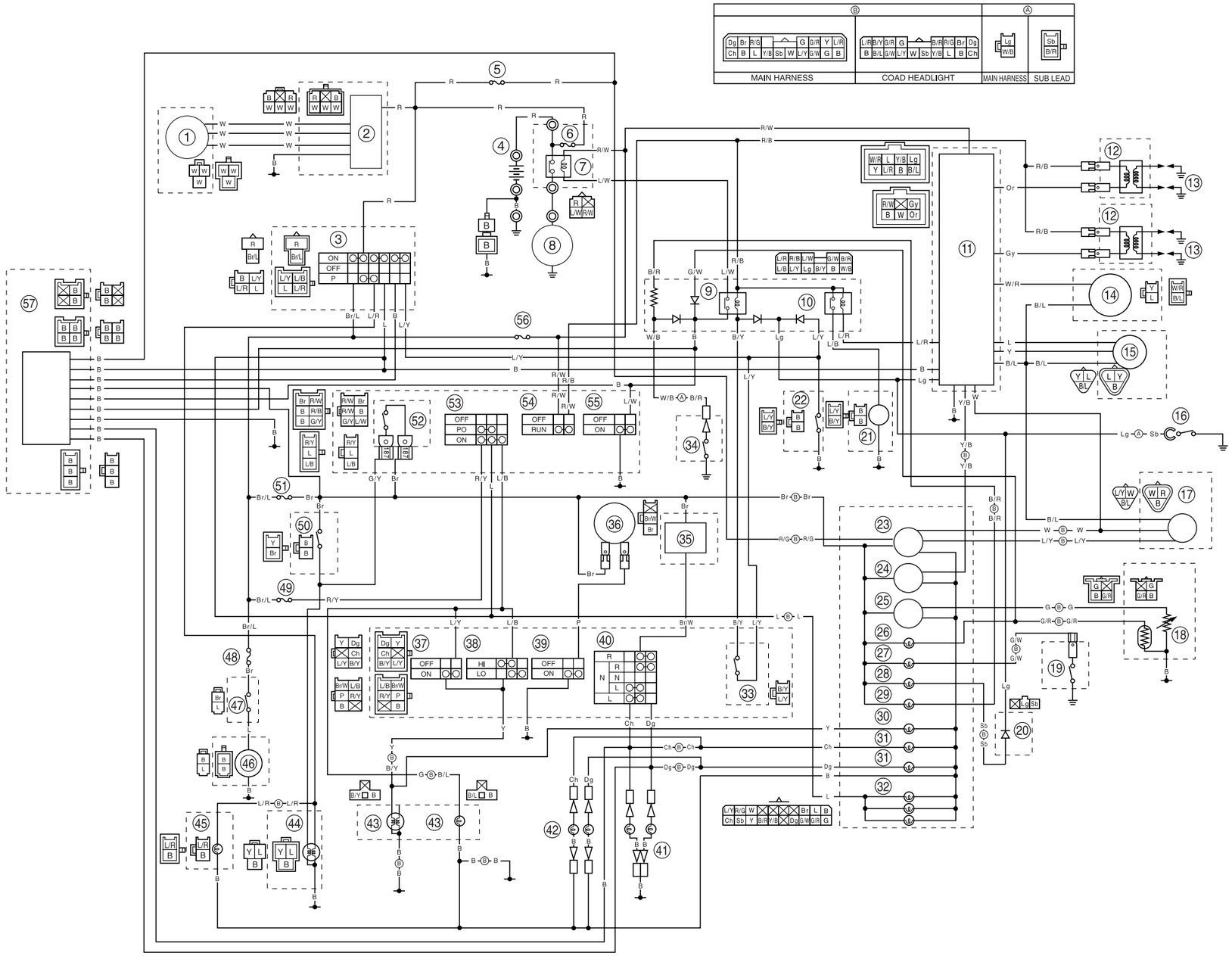
BULB BURNT OUT
° Improper bulb
° Faulty battery
° Faulty rectifier/regulator
° Improperly grounded
° Faulty main and/or light switch
° Bulb life expired

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



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
11. Ignitor unit
12. Ignition coil
13. Spark plug
14. Pick up coil
15. Throttle position sensor
16. Neutral switch
17. speed sensor
18. Fuel sender
19. Thermo switch (engine temperature)
20. Diode
21. Fuel pump
22. Sidestand switch
23. Speedometer
24. Tachometer
25. Fuel meter
26. Fuel level warning light
27. 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
34. Oil level switch
35. Flasher relay
36. Horn
37. Pass switch
38. Dimmer switch
39. Horn switch
40. Turn switch
41. Front turn signal light
42. Rear turn signal light
43. Headlight
44. Tail/Brake light
45. Auxiliary 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. Light switch
54. Engine stop switch
55. Starter switch
56. Fuse (ignition)
57. Alarm (option)

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	R	Red	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