YAMAHA

FZS1000(N) 2001

5LV1-AE1

SERVICE MANUAL

EAS00000

FZS1000 (N)
SERVICE MANUAL
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NOTICE

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

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

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

NOTE:

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

EAS00004

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 checking or repairing the motorcycle.

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

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

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HOW TO USE THIS MANUAL

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

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

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

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

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

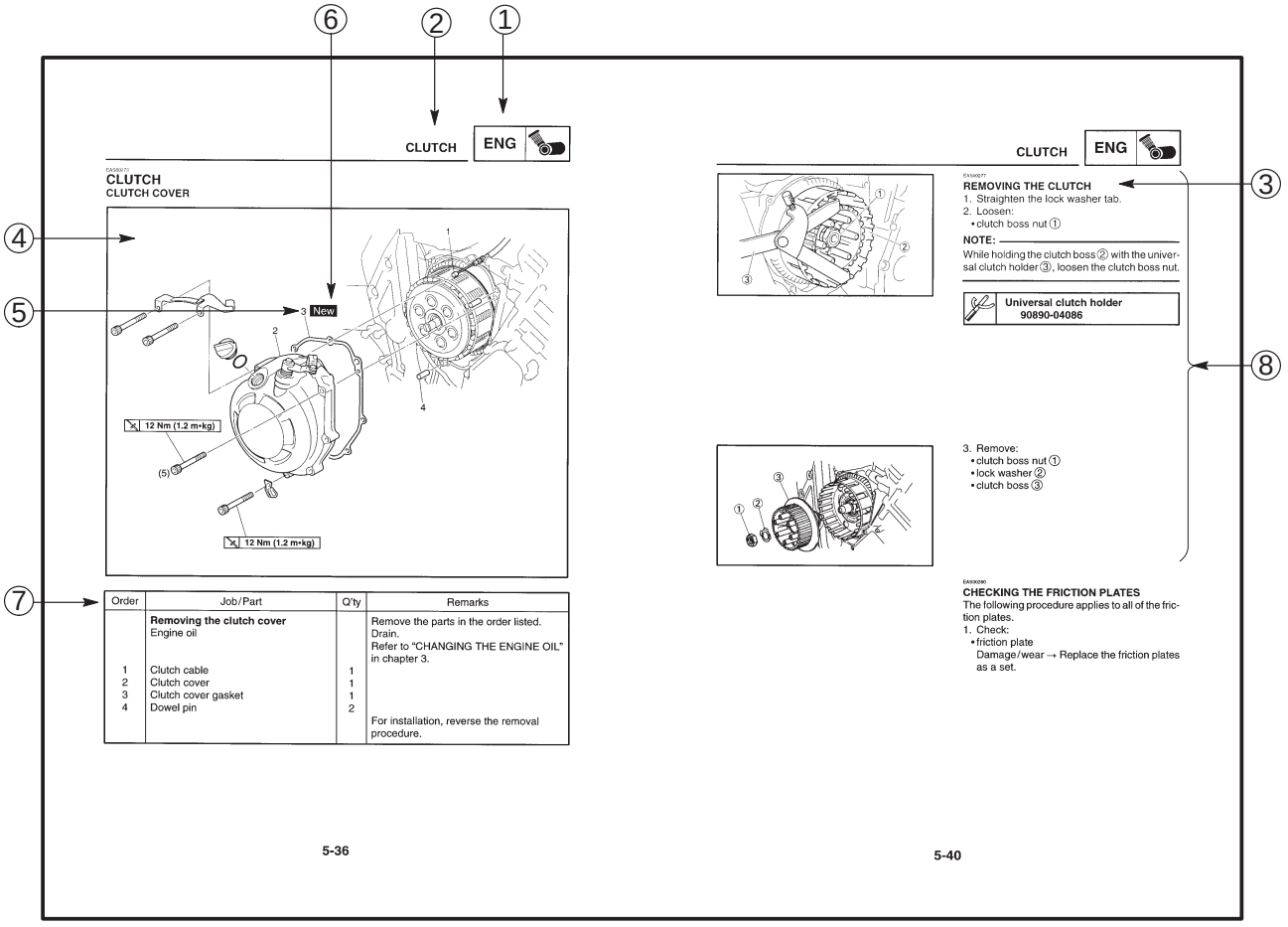
④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

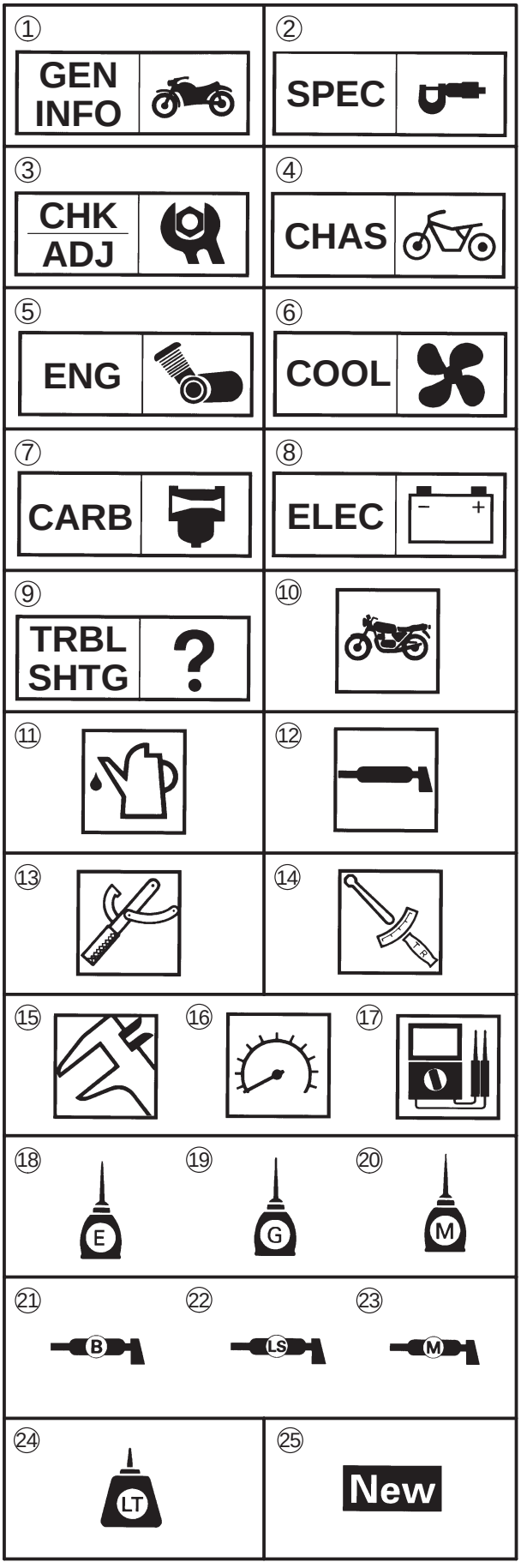
⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

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

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

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





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SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

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

Symbols ⑩ to ⑰ indicate the following.

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

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

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

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

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

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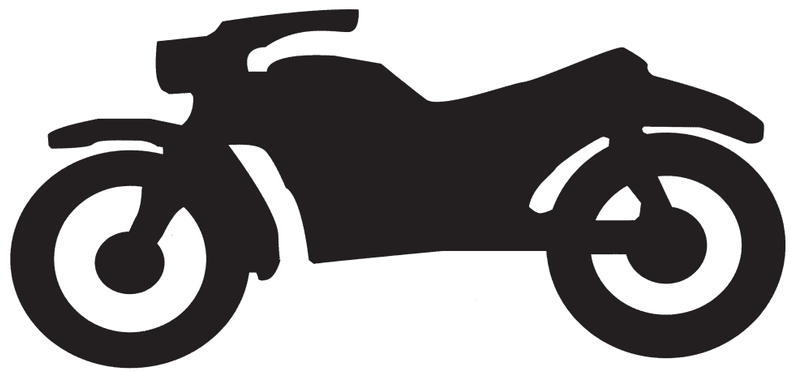
ENGINE	ENG 5
COOLING SYSTEM	COOL 6
CARBURETORS	CARB 7
ELECTRICAL SYSTEM	ELEC 8
TROUBLESHOOTING	? TRBL SHTG 9



GEN INFO

1

CHAPTER 1
GENERAL INFORMATION

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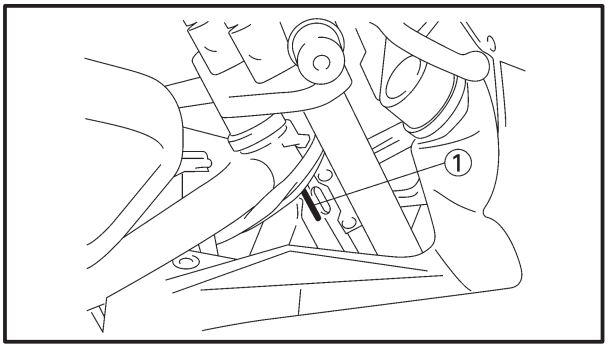

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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

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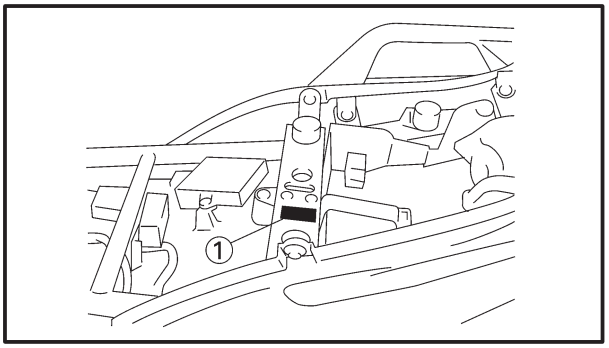
VEHICLE IDENTIFICATION NUMBER

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



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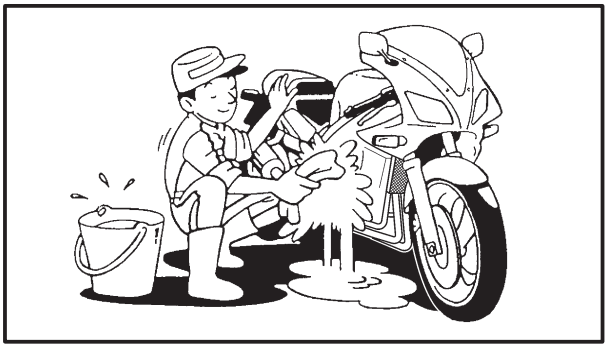
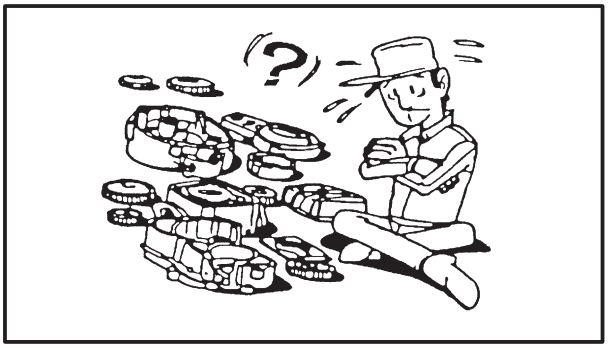
MODEL CODE

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



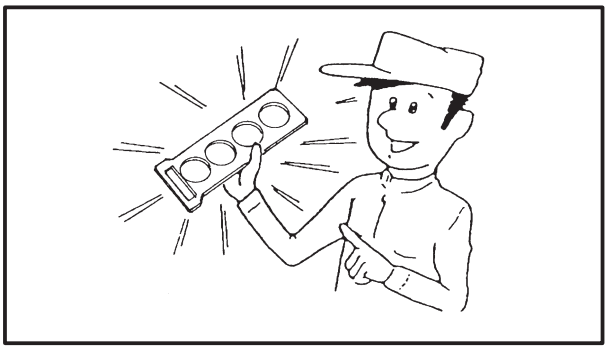


EAS00020

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

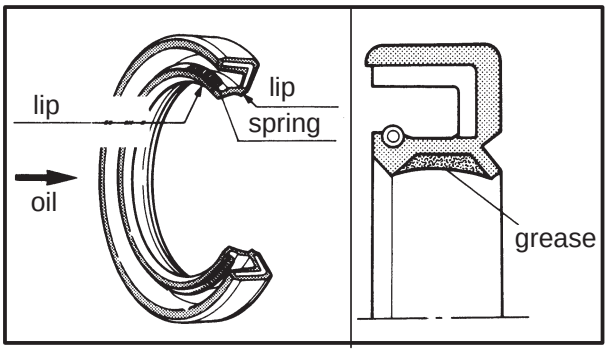
1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.
2. Use only the proper tools and cleaning equipment.
   Refer to the “SPECIAL TOOLS” section.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have 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.



EAS00021

REPLACEMENT PARTS

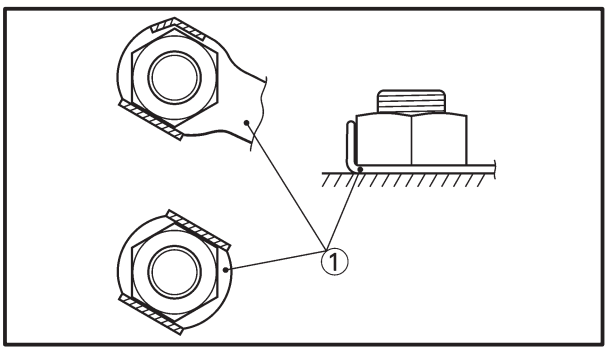
1. Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS00022

GASKETS, OIL SEALS AND O-RINGS

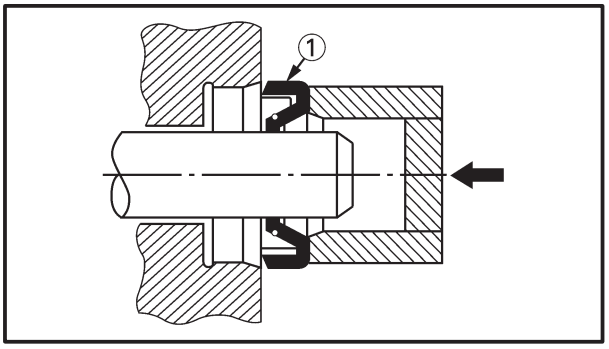
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and apply grease onto the oil seal lips with greace.

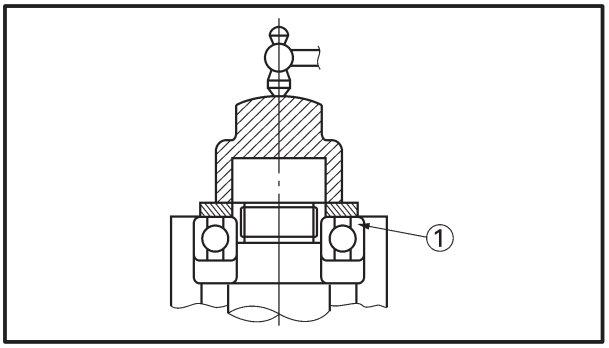


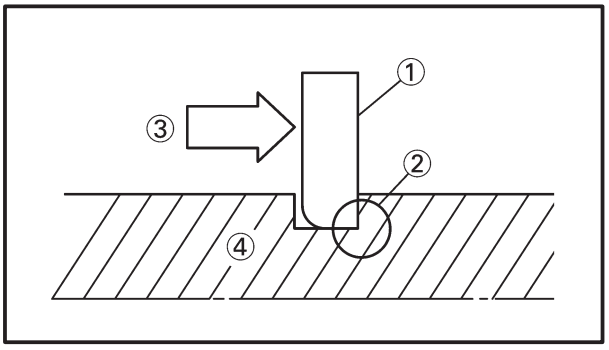
EAS00023

LOCK WASHERS/PLATES AND COTTER PINS

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







EAS00024

BEARINGS AND OIL SEALS

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

① Oil seal

CAUTION:

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

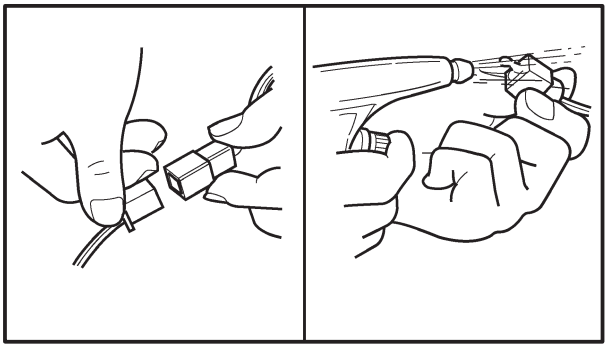
① Bearing

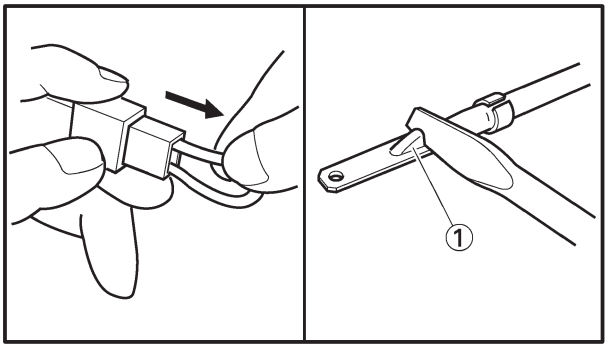
EAS00025

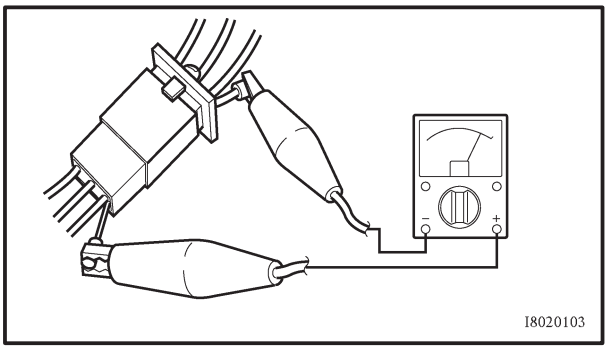
CIRCLIPS

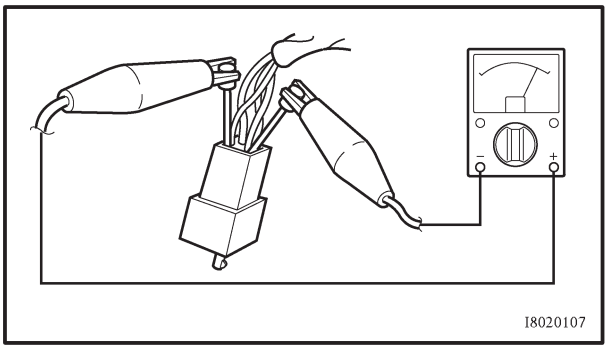
1. Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

④ Shaft









EAS00026

CHECKING THE CONNECTIONS

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

1. Disconnect:
   - lead ①
   - coupler ②
   - connector ③
2. Check:
   - lead
   - coupler
   - connector

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

   Loose connection → Connect properly.

NOTE:

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

4. Connect:
   - lead
   - coupler
   - connector

NOTE:

Make sure that all connections are tight.

5. Check:
   - continuity

   (with a pocket tester)

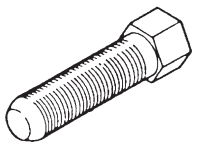
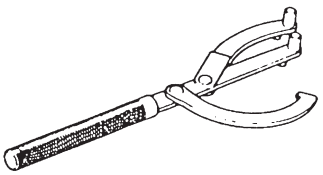
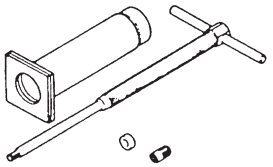
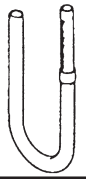
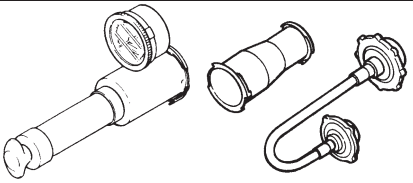
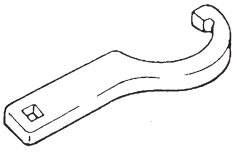
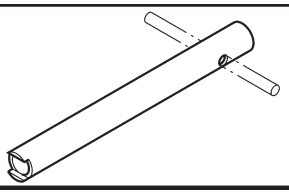
	Pocket tester **90890-03112**

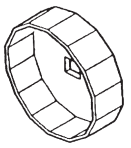
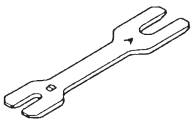
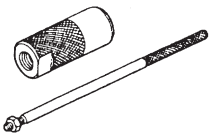
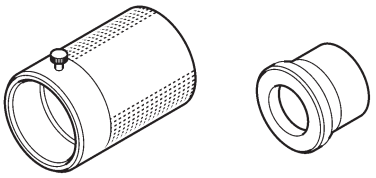
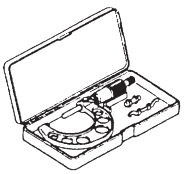
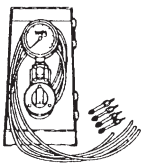
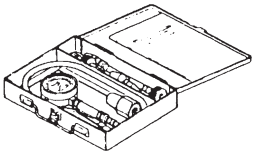
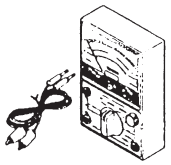
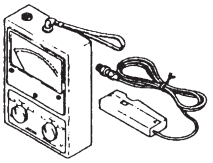
NOTE:

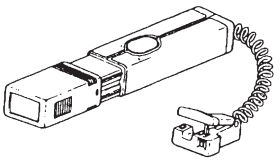
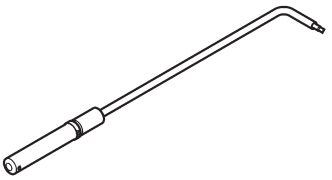
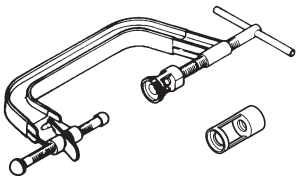
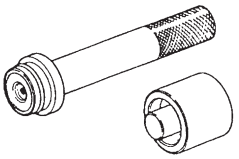
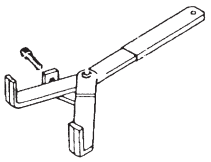
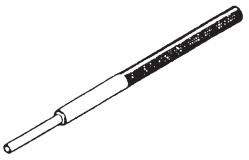
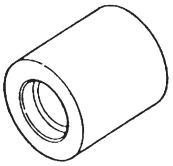
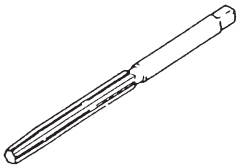
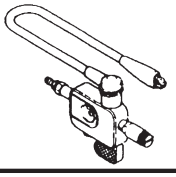
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps 1 to 3.
- As a quick remedy, use a contact revitalizer available at most part stores.

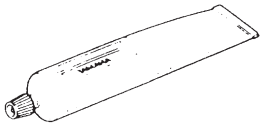
EAS00027
SPECIAL TOOLS

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

Tool No.	Tool name/Function	Illustration
90890-01080	Rotor puller This tool is used to remove the generator rotor.	
90890-01235	Rotor holding tool This tool is used to hold the generator rotor when removing or installing the generator rotor bolt or pickup coil rotor bolt.	
90890-01304	Piston pin puller set This tool is used to remove the piston pins.	
90890-01312	Fuel level gauge This tool is used to measure the fuel level in the float chamber.	
Radiator cap tester 90890-01325 Adapter 90890-01352	Radiator cap tester Adapter These tools are used to check the cooling system.	
90890-01403	Steering nut wrench This tool is used to loosen or tighten the steering stem ring nuts.	
90890-01447	Damper rod holder This tool is used to hold the damper rod assembly when loosening or tightening the damper rod assembly bolt.	

Tool No.	Tool name/Function	Illustration
90890-01426	Oil filter wrench This tool is needed to loosen or tighten the oil filter cartridge.	
90890-01434	Rod holder This tool is used to support the damper adjusting rod.	
Rod puller 90890-01437 Rod puller attachment 90890-01436	Rod puller Rod puller attachment These tools are used to pull up the front fork damper rod.	
Fork seal driver weight 90890-01367 Fork seal driver attachment (ø43) 90890-01374	Fork seal driver weight Fork seal driver attachment (ø43) This tool is used to install the front fork's oil seal and dust seal.	
90890-03008	Micrometer (50 ~ 75 mm) This tool is used to measure the piston skirt diameter.	
Vacuum gauge 90890-03094 Vacuum gauge attachment 90890-03060	Vacuum gauge Vacuum gauge attachment This guide is used to synchronize the carburetors.	
Compression gauge 90890-03081 Compression gauge adapter 90890-04136	Compression gauge Compression gauge adapter These tools are used to measure engine compression.	
90890-03112	Pocket tester This tool is used to check the electrical system.	
90890-03113	Engine tachometer This tool is used to check engine speed.	

Tool No.	Tool name/Function	Illustration
90890-03141	Timing light This tool is used to check the ignition timing.	
90890-03173	Carburetor angle driver 2 This tool is used to turn the pilot screw when adjusting the engine idling speed.	
Valve spring compressor 90890-04019 Attachmenht 90890-04108 90890-04114	Valve spring compressor Valve spring compressor attachment These tools are used to remove or install the valve assemblies.	
Middle driven shaft bearing driver 90890-04058 Mechanical seal installer 90890-04078	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
90890-04086	Universal clutch holder This tool is used to hold the clutch boss when removing or installing the clutch boss nut.	
90890-04111 90890-04116	Valve guide remover (ø4) Valve guide remover (ø4.5) This tool is used to remove or install the valve guides.	
90890-04112 90890-04117	Valve guide installer (ø4) Valve guide installer (ø4.5) This tool is used to install the valve guides.	
90890-04113 90890-04118	Valve guide reamer (ø4) Valve guide reamer (ø4.5) This tool is used to rebore the new valve guides.	
90890-06754	Ignition checker This tool is used to check the ignition system components.	

Tool No.	Tool name/Function	Illustration
90890-85505	Yamaha bond No. 1215 This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	

SPEC 2

CHAPTER 2.
SPECIFICATIONS

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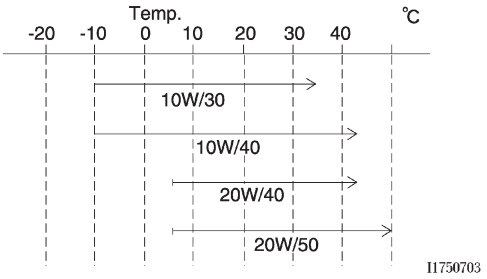
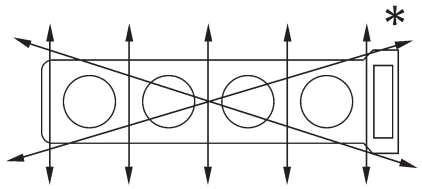
SPECIFICATIONS

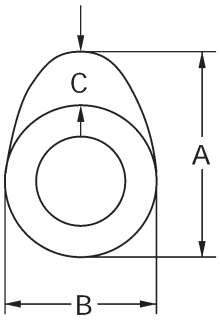
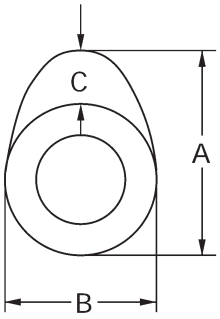
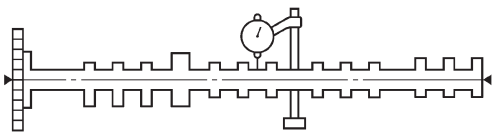
GENERAL SPECIFICATIONS

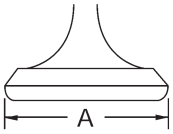
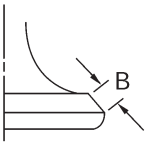
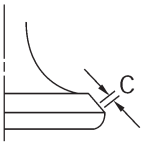
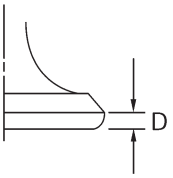
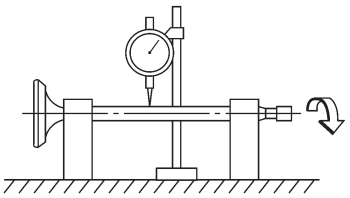
Item	Standard	Limit
Model code	5VL1 (A) (B) (D) (DK) (E) (GB) (GR) (I) (N) (NL) (S) (SF) (CH) (P)	•••
	5LV2 (F)	•••
	5LV3 (D)	•••
	5LV4 (AUS)	•••
Dimensions		
Overall length	2,125 mm	•••
Overall width	765 mm	•••
Overall height	1,190 mm	•••
Seat height	820 mm	•••
Wheelbase	1,450 mm	•••
Minimum ground clearance	140 mm	•••
Minimum turning radius	2,900 mm	•••
Weight		
Wet (with oil and a full fuel tank)	231 kg	•••
Dry (without oil and fuel)	208 kg	•••
Maximum load (total of cargo, rider, passenger, and accessories)	189 kg	•••

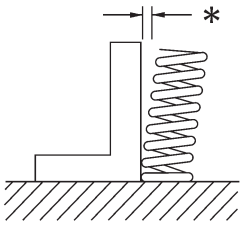
ENGINE SPECIFICATIONS

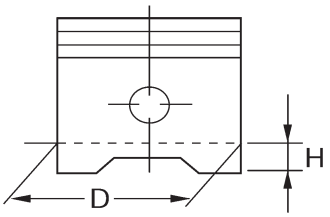
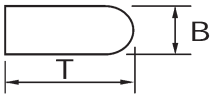
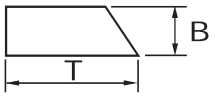
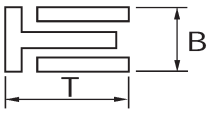
Item	Standard	Limit
Engine		
Engine type	Liquid-cooled, 4-stroke, DOHC	•••
Displacement	998 cm^3	•••
Cylinder arrangement	Forward-inclined parallel 4-cylinder	•••
Bore × stroke	74 × 58 mm	•••
Compression ratio	11.4 : 1	•••
Engine idling speed	1,050 ~ 1,150 r/min	•••
Vacuum pressure at engine idling speed	30 kPa (225 mm Hg)	•••
Standard compression pressure (at sea level)	1,450 kPa (14.5 kg/cm^2) at 400 r/min	•••
Fuel		
Recommended fuel	Regular unleaded gasoline	•••
Fuel tank capacity		
Total (including reserve)	21 L	•••
Reserve only	4.0 L	•••
Engine oil		
Lubrication system	Wet sump	•••
Recommended oil	 SAE20W40SE or SAE10W30SE	•••
Quantity		•••
Total amount	3.7 L	•••
Without oil filter cartridge replacement	2.8 L	•••
With oil filter cartridge replacement	3.0 L	•••
Oil pressure (hot)	45 kPa at 1,100 r/min (0.45 kg/cm^2 at 1,100 r/min)	•••
Relief valve opening pressure	490 ~ 570 kPa (4.9 ~ 5.7 kg/cm^2)	•••

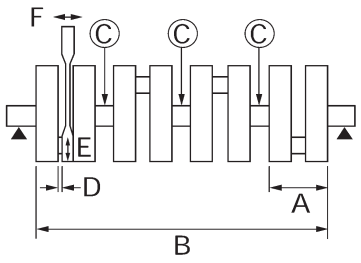
Item	Standard	Limit
Oil filter		
Oil filter type	Cartridge (paper)	•••
Bypass valve opening pressure	180 ~ 220 kPa (1.8 ~ 2.2 kg/cm^2)	•••
Oil pump		
Oil pump type	Trochoid	•••
Inner-rotor-to-outer-rotor-tip clearance	0.09 ~ 0.15 mm	•••
Outer-rotor-to-oil-pump-housing clearance	0.03 ~ 0.08 mm	•••
Cooling system		
Radiator capacity	2.4 L	
Radiator cap opening pressure	95 ~ 125 kPa (0.95 ~ 1.25 kg/cm^2)	•••
Radiator core		
Width	340 mm	•••
Height	238 mm	•••
Depth	24 mm	•••
Coolant reservoir		
Capacity	0.3 L	•••
Water pump		
Water pump type	Single-suction centrifugal pump	•••
Reduction ratio	68/43 × 28/28 (1.581)	•••
Max. impeller shaft tilt	•••	0.15 mm
Starting system type	Electric starter	
Spark plugs		
Model (manufacturer) × quantity	CR9E/U27ESR-N (NGK/DENSO) × 4	•••
Spark plug gap	0.7 ~ 0.8 mm	•••
Cylinder head		
Max. warpage	•••	0.1 mm
		

Item	Standard	Limit
Camshafts		
Drive system	Chain drive (right)	•••
Camshaft cap inside diameter	24.500 ~ 24.521 mm	•••
Camshaft journal diameter	24.459 ~ 24.472 mm	•••
Camshaft-journal-to-camshaft-cap clearance	0.028 ~ 0.062 mm	•••
Intake camshaft lobe dimensions		
		
Measurement A	32.5 ~ 32.6 mm	32.4 mm
Measurement B	24.95 ~ 25.05 mm	24.85 mm
Measurement C	7.45 ~ 7.65 mm	•••
Exhaust camshaft lobe dimensions		
		
Measurement A	32.95 ~ 33.05 mm	32.85 mm
Measurement B	24.95 ~ 25.05 mm	24.85 mm
Measurement C	7.75 ~ 7.95 mm	•••
Max. camshaft runout	•••	0.03 mm
		

Item	Standard	Limit
Timing chain		
Model/number of links	RH2015/130	•••
Tensioning system	Automatic	•••
Valves, valve seats, valve guides		
Valve clearance (cold)		
Intake	0.11 ~ 0.20 mm	•••
Exhaust	0.21 ~ 0.25 mm	•••
Valve dimensions		
 Head Diameter	 Face Width	 Seat Width	 Margin Thickness
Valve head diameter A		
Intake	22.9 ~ 23.1 mm	•••
Exhaust	24.4 ~ 24.6 mm	•••
Valve face width B		
Intake	1.76 ~ 2.90 mm	•••
Exhaust	1.76 ~ 2.90 mm	•••
Valve seat width C		
Intake	0.9 ~ 1.1 mm	•••
Exhaust	0.9 ~ 1.1 mm	•••
Valve margin thickness D		
Intake	0.5 ~ 0.9 mm	•••
Exhaust	0.5 ~ 0.9 mm	•••
Valve stem diameter		
Intake	3.975 ~ 3.990 mm	3.945 mm
Exhaust	4.465 ~ 4.480 mm	4.43 mm
Valve guide inside diameter		
Intake	4.000 ~ 4.012 mm	4.05 mm
Exhaust	4.500 ~ 4.512 mm	4.55 mm
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm	0.08 mm
Exhaust	0.020 ~ 0.047 mm	0.10 mm
Valve stem runout	•••	0.01 mm
		
Valve seat width		
Intake	0.9 ~ 1.1 mm	•••
Exhaust	0.9 ~ 1.1 mm	•••

Item	Standard	Limit
Valve springs		
Free length		
Intake	38.9 mm	•••
Exhaust	40.67 mm	•••
Installed length (valve closed)		
Intake	34.5 mm	•••
Exhaust	35 mm	•••
Compressed spring force (installed)		
Intake	82 ~ 96 N (8.36 ~ 9.79 kg)	•••
Exhaust	110 ~ 126 N (11.22 ~ 12.85 kg)	•••
Spring tilt		
		
Intake	•••	2.5°/ 1.7 mm
Exhaust	•••	2.5°/ 1.8 mm
Winding direction (top view)		
Intake	Clockwise	•••
Exhaust	Clockwise	•••
Cylinders		
Cylinder arrangement	Forward-inclined, parallel 4-cylinder	•••
Bore × stroke	74 × 58 mm	•••
Compression ratio	11.4 : 1	•••
Bore	74.00 ~ 74.01 mm	•••
Max. taper	•••	0.05 mm
Max. out-of-round	•••	0.05 mm

Item	Standard	Limit
Piston		
Piston-to-cylinder clearance	0.030 ~ 0.055 mm	0.12 mm
Diameter D	73.955 ~ 73.970 mm	•••
		
Height H	5 mm	•••
Piston pin bore (in the piston)		
Diameter	17.002 ~ 17.013 mm	17.043
Offset		•••
Offset direction	Intake side	•••
Piston pins		
Outside diameter	16.991 ~ 17.000 mm	16.971
Piston-pin-to-piston-pin-bore clearance	0.002 ~ 0.022 mm	0.072 mm
Piston rings		
Top ring		
		
Ring type	Barrel	•••
Dimensions (B × T)	0.90 × 2.75 mm	•••
End gap (installed)	0.32 ~ 0.44 mm	•••
Ring side clearance	0.030 ~ 0.065 mm	•••
2nd ring		
		
Ring type	Taper	•••
Dimensions (B × T)	0.8 × 2.8	•••
End gap (installed)	0.43 ~ 0.58 mm	•••
Ring side clearance	0.020 ~ 0.055 mm	•••
Oil ring		
		
Dimensions (B × T)	1.5 × 2.6 mm	•••
End gap (installed)	0.10 ~ 0.35	•••

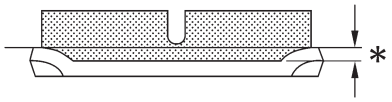
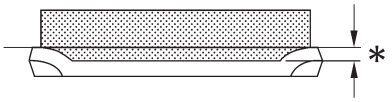
Item	Standard	Limit
Connecting rods		
Crankshaft-pin-to-big-end-bearing clearance	0.031 ~ 0.055 mm	•••
Bearing color code	–1 = Violet 0 = White 1 = Blue 2 = Black	•••
Crankshaft		
		
Width A	52.40 ~ 57.25 mm	••
Width B	300.75 ~ 302.65 mm	•••
Max. runout C	•••	0.03 mm
Big end side clearance D	0.160 ~ 0.262 mm	•••
Crankshaft-journal-to-crankshaft-journal-bearing clearance	0.029 ~ 0.053 mm	•••
Bearing color code	–1 = Pink/violet 0 = Pink/white 1 = Pink/blue 2 = Pink/black 3 = Pink/brown	•••
Clutch		
Clutch type	Wet, multiple disc	•••
Clutch release method	Cam (pull rod type)	•••
Clutch release method operation	Cable operation	•••
Operation	Left-hand operation	•••
Clutch cable free play (at the end of the clutch lever)	10 ~ 15 mm	•••
Friction plates		
Thickness	2.92 ~ 3.08 mm	2.82 mm
Plate quantity	8	•••
Thickness	3.42 ~ 3.58 mm	3.32 mm
Plate quantity	1	•••
Clutch plates		
Thickness	1.9 ~ 2.1 mm	•••
Plate quantity	8	•••
Max. warpage	•••	0.1 mm
Clutch springs		
Free length	50 mm	•••
Spring quantity	6	•••

Item	Standard	Limit
Transmission		
Transmission type	Constant mesh, 6-speed	•••
Primary reduction system	Spur gear	•••
Primary reduction ratio	68/43 (1.581)	•••
Secondary reduction system	Chain drive	•••
Secondary reduction ratio	44/16 (2.750)	•••
Operation	Left-foot operation	•••
Gear ratios		
1st gear	35/14 (2.500)	•••
2nd gear	35/19 (1.842)	•••
3rd gear	30/20 (1.500)	•••
4nd gear	28/21 (1.333)	•••
5th gear	30/25 (1.200)	•••
6th gear	29/26 (1.115)	•••
Max. main axle runout	•••	0.08 mm
Max. drive axle runout	•••	0.08 mm
Shifting mechanism		
Shift mechanism type	Guide bar	•••
Max. shift fork guide bar bending	•••	0.1 mm
Installed shift rod length	260 mm	•••
Air filter type	Dry element	•••
Fuel pump		
Pump type	Electrical	•••
Model (manufacturer)	4SV (MITSUBISHI)	•••
Output pressure	20 kPa (0.2 kg/cm^2)	•••

Item	Standard	Limit
Carburetors		
Model (manufacturer) × quantity	BSR37 (MIKUNI) × 4	•••
Throttle cable free play (at the flange of the throttle grip)	3 ~ 5 mm	•••
ID mark	5LV1 00	•••
Main jet	Carburetors 1 and 4: #132.5	•••
	Carburetors 2 and 3: #130	•••
Main air jet	#80	•••
Jet needle	Carburetor 1 and 4: 5D129-3/5	•••
	Carburetor 2 and 3: 5D130-3/5	•••
Needle jet	P-OM	•••
Pilot air jet	#85	•••
Pilot outlet	1.0	•••
Pilot jet	#15	•••
Bypass 1	0.9	•••
Bypass 2	0.9	•••
Bypass 3	0.9	•••
Pilot screw turns out	2.0	•••
Valve seat size	1.5	•••
Starter jet 1	#42.5	•••
Starter jet 2	0.8	•••
Throttle valve size	#115	•••
Fuel level (above the line on the float chamber)	3.0 ~ 4.0 mm	•••
Max. EXUP cable free play (at the EXUP valve pulley)	1.5 mm	•••

CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Double cradle	•••
Caster angle	26°	•••
Trail	104 mm	•••
Front wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 × MT3.50	•••
Material	Aluminum	•••
Wheel travel	140 mm	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm
Max. lateral wheel runout	•••	0.5 mm
Rear wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 × MT5.50	•••
Material	Aluminum	•••
Wheel travel	135 mm	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm
Max. lateral wheel runout	•••	0.5 mm
Front tire		
Tire type	Tubeless	•••
Size	120/70 ZR17 (58W)	•••
Model (manufacturer)	MEZ4Y FRONT (METZELER) BT020F U (BRIDGESTONE)	•••
Tire pressure (cold)		
0 ~ 90 kg	250 kPa (2.5 kgf/cm^2, 2.5 bar)	•••
90 ~ 201 kg	250 kPa (2.5 kgf/cm^2, 2.5 bar)	•••
High-speed riding	250 kPa (2.5 kgf/cm^2, 2.5 bar)	•••
Min. tire tread depth	•••	1.6 mm

Item	Standard	Limit
Rear tire		
Tire type	Tubeless	•••
Size	180/55 ZR17 (73W)	•••
Model (manufacturer)	MEZ4Y (METZELER) BT020R U (BRIDGESTONE)	•••
Tire pressure (cold)		
0 ~ 90 kg	270 kPa (2.7 kgf/cm^2, 2.7 bar)	•••
90 ~ 201 kg	290 kPa (2.9 kgf/cm^2, 2.9 bar)	•••
High-speed riding	290 kPa (2.9 kgf/cm^2, 2.9 bar)	•••
Min. tire tread depth	•••	1.6 mm
Front brakes		
Brake type	Dual-disc brake	•••
Operation	Right-hand-operation	•••
Recommended fluid	DOT 4	•••
Brake discs		
Diameter × thickness	298 × 5 mm	•••
Min. thickness	•••	4.5 mm
Max. deflection	•••	0.1 mm
Brake pad lining thickness	5.5 mm	0.5 mm
		
Master cylinder inside diameter	14 mm	•••
Caliper cylinder inside diameter	30.2 mm and 27 mm	•••
Rear brake		
Brake type	Single-disc brake	•••
Operation	Right-foot operation	•••
Brake pedal position (from the top of the brake pedal to the top of the rider footrest)	35 ~ 40 mm	•••
Recommended fluid	DOT 4	•••
Brake discs		
Diameter × thickness	267 × 5 mm	•••
Min. thickness	•••	4.5 mm
Max. deflection	•••	0.1 mm
Brake pad lining thickness	5.5 mm	0.5 mm
		
Master cylinder inside diameter	12.7 mm	•••
Caliper cylinder inside diameter	42.9 mm	•••

Item	Standard	Limit
Front suspension		
Suspension type	Telescopic fork	•••
Front fork type	Coil spring/oil damper	•••
Front fork travel	140 mm	•••
Spring		
Free length	344.0 mm	•••
Spacer length	78.5 mm	•••
Installed length	320.0 mm	•••
Spring rate (K1)	8.1 N/mm (0.83 kg/mm)	•••
Spring rate (K2)	11.8 N/mm (1.2 kg/mm)	•••
Spring stroke (K1)	0 ~ 55 mm	•••
Spring stroke (K2)	55 ~ 140 mm	•••
Optional spring available	No	•••
Fork oil		
Recommended oil	Suspension oil “01” or equivalent	•••
Quantity (each front fork leg)	440 cm^3	•••
Level (from the top of the inner tube, with the inner tube fully compressed, and without the fork spring)	140 mm	•••
Spring preload adjusting positions		
Minimum	8	•••
Standard	4	•••
Maximum	1	•••
Rebound damping adjusting positions		
Minimum*	17	•••
Standard*	7	•••
Maximum*	1	•••
Compression damping adjusting positions		
Minimum*	21	•••
Standard*	6	•••
Maximum*	1	•••
*from the fully turned-in position		

Item	Standard	Limit
Steering		
Steering bearing type	Angular ball bearings	•••
Rear suspension		
Suspension type	Swingarm (link suspension)	•••
Rear shock absorber assembly type	Coil spring/gas-oil damper	•••
Rear shock absorber assembly travel	65 mm	•••
Spring		
Free length	182.5 mm	•••
Installed length	163 mm	•••
Spring rate (K1)	73.6 N/mm (7.5 kgf/mm)	•••
Spring stroke (K1)	0 ~ 65 mm	•••
Optional spring available	No	•••
Standard spring preload gas/air pressure	1,200 kPa (12 kgf/cm^2)	•••
Spring preload adjusting positions		
Minimum	1	•••
Standard	6	•••
Maximum	11	•••
Rebound damping adjusting positions		
Minimum*	20	•••
Standard*	10	•••
Maximum*	3	•••
Compression damping adjusting positions		
Minimum*	1	•••
Standard*	7	•••
Maximum*	12	•••
*from the fully turned-in position		
Swingarm		
Free play (at the end of the swingarm)		
Radial	•••	1 mm
Axial	•••	1 mm
Drive chain		
Model (manufacturer)	50ZVM (DAIDO)	•••
Link quantity	116	•••
Drive chain slack	40 ~ 50 mm	•••
Maximum ten-link section	150.1 mm	152.5 mm

ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	•••
Ignition system		
Ignition system type	Transistorized coil ignition	•••
Ignition timing	5° BTDC at 1,100 r/min	•••
Advanced timing	55° BTDC at 5,000 r/min	•••
Advancer type	Throttle position sensor and electrical	•••
Pickup coil resistance/color	248 ~ 372 Ω/Gy-B	•••
Transistorized coil ignition unit model (manufacturer)	TNDF66 (DENSO)	•••
Ignition coils		
Model (manufacturer)	J0313 (DENSO)	•••
Minimum ignition spark gap	6 mm	•••
Primary coil resistance	1.87 ~ 2.53 Ω	•••
Secondary coil resistance	12 ~ 18 kΩ	•••
Spark plug caps		
Material	Rubber	•••
Resistance	10 kΩ	•••
Throttle position sensor standard resistance	4 ~ 6 kΩ	•••
Charging system		
System type	AC magneto	•••
Model (manufacturer)	F4T361 (MITSUBISHI)	•••
Normal output	14 V/365 W at 5,000 r/min	•••
Stator coil resistance/color	0.27 ~ 0.33 Ω at 20°C/W-W	•••
Rectifier/regulator		
Regulator type	Semiconductor short circuit	•••
Model (manufacture)	SH650C-11 (SHINDENGEN)	•••
No-load regulated voltage	14.1 ~ 14.9 V	•••
Rectifier capacity	18 A	•••
Withstand voltage	200 V	•••
Battery		
Battery type	GT14B-4	•••
Battery voltage/capacity	12 V/12AH	•••
Headlight type	Halogen bulb	
Bulbs (voltage/wattage × quantity)		
Headlight	12 V 60 W/55 W × 2	•••
Auxiliary light	12 V 5 W × 2	•••
Tail/brake light	12 V 5 W/21 W × 2	•••
Turn signal light	12 V 21 W × 4	•••
Meter light	12 V 2 W × 3	•••

Item	Standard	Limit
Indicator light (voltage/wattage × quantity)		
Neutral indicator light	14 V 1.4 W × 1	•••
High beam indicator light	14 V 1.4 W × 1	•••
Oil level indicator light	14 V 1.4 W × 1	•••
Turn signal indicator light	14 V 1.4 W × 2	•••
Fuel indicator light	12 V 2 W × 1	•••
Water temperature indicator light	LED	•••
Electric starting system		
System type	Constant mesh	•••
Starter motor		
Model (manufacturer)	SM-13 (MITSUBA)	•••
Power output	0.8 kW	•••
Brushes		
Overall length	12.5 mm	4 mm
Spring force	7.65 ~ 10.01 N (780 ~ 1,021 gf)	•••
Commutator resistance	0.025 ~ 0.035 Ω	•••
Commutator diameter	28 mm	27 mm
Mica undercut	0.7 mm	•••
Starter relay		
Model (manufacturer)	MS5F-631 (JIDECO)	•••
Amperage	180 A	•••
Coil resistance	4.18 ~ 4.62 Ω	•••
Horn		
Horn type	Plain	•••
Model (manufacturer) × quantity	YF-12 (NIKKO) × 1	•••
Max. amperage	3 A	•••
Turn signal relay		
Relay type	Full-transistor	•••
Model (manufacturer)	FE246BH (DENSO)	•••
Self-cancelling device built-in	No	•••
Turn signal blinking frequency	75 ~ 95 cycles/min.	•••
Wattage	21 W × 2 + 3.4 W	•••
Oil level switch		
Model (manufacturer)	5LV (DENSO)	•••
Fuel sender		
Model (manufacturer)	5LV (NIPPON SEIKI)	•••
Resistance	4 ~ 100 Ω at 25°C	•••
Sidestand/fuel pump relay		
Model (manufacturer)	5EB-20 (OMRON)	•••
Coil resistance	180 Ω	•••
Fuel pump maximum amperage	1.2 A	•••
Radiator fan		
Model (manufacturer)	4XV (TOYO RADIATOR)	•••
Thermo switch		
Model (manufacturer)	5JJ (NIPPON THERMOSTAT)	•••

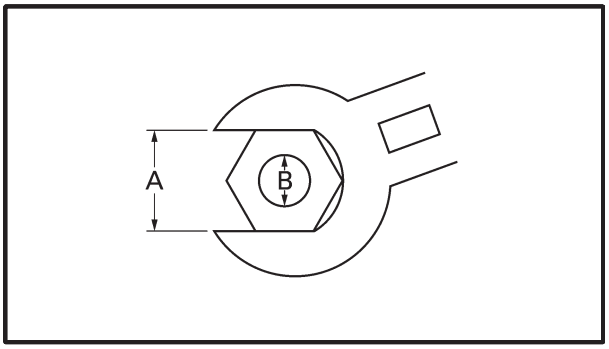
Item	Standard	Limit
Fuses (amperage × quantity)		
Main fuse	30 A × 1	•••
Headlight fuse	20 A × 1	•••
Signaling system fuse	20 A × 1	•••
Ignition fuse	20 A × 1	•••
Radiator fan fuse	10 A × 1	•••
Turn signal relay fuse	10 A × 1	•••
Backup fuse (odometer)	10 A × 1	•••
Reserve fuse	30 A × 1	•••
	20 A × 1	•••
	10 A × 1	•••

EAS00029

TIGHTENING TORQUE

GENERAL TIGHTENING TORQUES

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



A: Distance between flats
B: Outside thread diameter

A (Nut)	B (Bolt)	General 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

ENGINE TIGHTENING TORQUES

Item	Fastener	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kgf	
Spark plugs	–	M10	4	13	1.3	
Cylinder head	Nut	M10	8	50	5.0	E
Cylinder head	Cap nut	M10	2	50	5.0	E
Cylinder head	Bolt	M6	2	12	1.2	
Camshaft caps	Bolt	M6	28	10	1.0	E
Cylinder head cover	Bolt	M6	6	12	1.2	
Cylinder head (exhaust pipe)	Stud bolt	M8	8	15	1.5	E
Connecting rod caps	Nut	M8	8	36	3.6	M
Generator rotor	Bolt	M10	1	65 + 60°	6.5 + 60°	E
Crankshaft sprocket	Bolt	M10	1	60	6.0	E
Cap bolt (timing chain tensioner)	Bolt	M6	1	6.4	0.64	
Camshaft sprocket	Bolt	M7	4	24	2.4	
Water pump inlet pipe	Bolt	M6	1	10	1.0	LT
Water pump outlet pipe	Bolt	M6	1	10	1.0	LT
Oil/water pump assembly driven sprocket	Bolt	M6	1	15	1.5	LT
Oil pump	Bolt	M6	1	12	1.2	
Oil cooler	Bolt	M20	1	35	3.5	E
Engine oil drain bolt	–	M14	1	43	4.3	
Oil strainer housing	Bolt	M6	2	10	1.0	LT
Oil/water pump assembly driven sprocket cover	Bolt	M6	1	12	1.2	LT
Oil delivery pipe	Bolt	M6	1	10	1.0	LT
Oil filter bolt	Bolt	M20	1	70	7.0	
Oil filter cartridge	–	M20	1	17	1.7	E
Oil pipe	Bolt	M6	2	10	1.0	
Air cleaner cap and air cleaner	Screw	M6	4	6	0.6	
Frame and air cleaner	Bolt	M6	3	7	0.7	
Air cleaner cover and air cleaner	Screw	M6	6	2	0.2	
Ring nut and cylinder head	Nut	M8	8	20	2.0	
Exhaust pipe and muffler	Bolt	M8	3	20	2.0	
Emission check bolt	Bolt	M8	4	10	1.0	
EXUP pulley cover	Bolt	M6	3	10	1.0	LT
EXUP cable bracket	Bolt	M6	3	10	1.0	
EXUP pulley and shaft arm	Bolt	M5	1	10	1.0	
Exhaust joint	Bolt	M4	2	3	0.3	
Exhaust pipe assembly	Bolt	M8	1	20	2.0	
Air induction system pipe	Band	–	4	3.5	0.35	E
Crankcase (cylinder head)	Stud bolt	M10	10	10	1.0	E
Crankcase	Bolt	M9	10	See note		E
Crankcase	Bolt	M6	2	14	1.4	E
Crankcase	Bolt	M6	14	12	1.2	E
Crankcase	Bolt	M8	2	24	2.4	

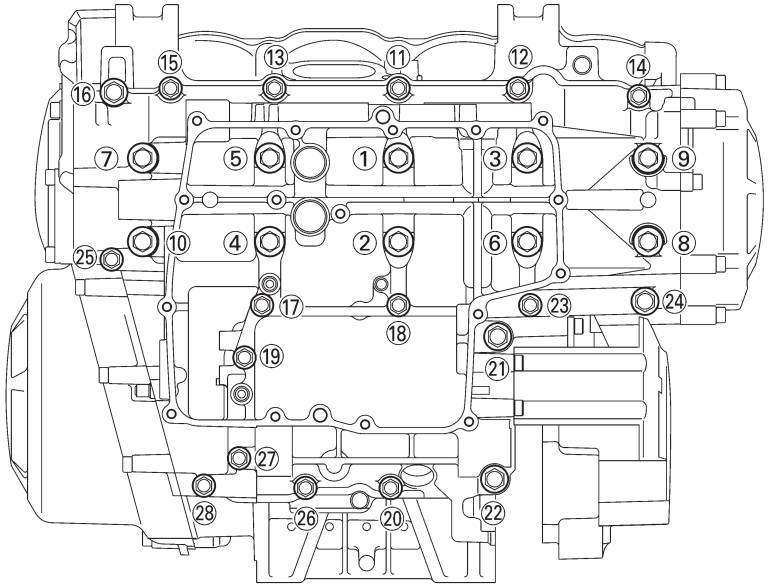
TIGHTENING TORQUES

Item	Fastener	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kgf	
AC magneto cover	Bolt	M6	9	12	1.2	
Drive sprocker cover	Bolt	M6	4	10	1.0	
Plate	Bolt	M6	2	10	1.0	
Clutch cover	Bolt	M6	8	12	1.2	
Timing chain cap bolt	Bolt	M6	8	12	1.2	
Shift shaft cover	Bolt	M6	5	12	1.2	
Breather plate	Bolt	M6	5	10	1.0	
Timing mark accessing screw	Bolt	M8	1	15	1.5	
Starter clutch idle gear shaft	Bolt	M6	1	10	1.0	
Starter one-way clutch	Bolt	M6	3	12	1.2	
Clutch boss	Nut	M20	1	90	9.0	Use a lock washer.
Clutch spring	Bolt	M6	6	8	0.8	
Drive sprocket	Nut	M22	1	85	8.5	Use a lock washer.
Main axle bearing housing	Screw	M6	3	12	1.2	
Shift lever stopper	Bolt	M6	2	10	1.0	
Stopper screw	Screw	M8	1	22	2.2	
Shift rod	Nut	M6	1	6.5	0.65	Left thread
Shift rod	Nut	M6	2	6.5	0.65	
Shift rod joint	Bolt	M6	1	10	1.0	
Shift arm	Bolt	M6	1	10	1.0	
AC magneto stator coil	Screw	M6	3	14	1.4	
Ignitor unit	Screw	M5	2	7	0.7	
Neutral switch	–	M10	1	20	2.0	
Pick up coil	Bolt	M6	2	10	1.0	
Thermo unit	–	–	1	15	1.5	

NOTE:

1. First, tighten the bolt to approximately 14.7 Nm (1.5 m•kg) with a torque wrench.
2. Retighten the bolt to 14.7 Nm (1.5 m•kg), and tighten another 45 ~ 50°.

Crankcase tightening sequence:



CHASSIS TIGHTENING TORQUES

Item	Thread size	Tightening		Remarks
		Nm	m•kgf	
Upper bracket pinch bolt	M8	30	3.0	
Upper bracket cap nut	M22	110	11	
Upper bracket and handlebar holder	M10	32	3.2	
Handlebar holder	M8	23	2.3	
Lower bracket pinch bolt	–	23	2.3	
Lower bracket ring nut	M25	18	1.8	See note
Front brake master cylinder	M6	10	10	
Front brake hose union bolt	M10	30	3.0	
Engine mounting				
Engine mounting bolt/nut	M10	55	5.5	
Engine mounting bolt/nut	M8	33	3.3	
Frame and down tube	M10	89	8.9	
Clutch cable lock nut	M8	7	0.7	
Ignition coil and stay	M6	7	0.7	
Pivot shaft	M18	125	12.5	
Rear shock absorber (upper)	M10	40	4.0	
Rear shock absorber and relay arm	M10	40	4.0	
Relay arm and frame	M10	40	4.0	
Relay arm and connecting arm	M12	48	4.8	
Connecting arm and swing arm	M12	48	4.8	
Drive chain guard	M6	7	0.7	
Drive chain case	M6	7	0.7	
Fuel cock	M6	7	0.7	
Fuel sender	M5	4	0.4	
Side cover	M6	4	0.4	
Coolant reservoir tank	M6	4	0.4	
Front wheel axle	M16	72	7.2	
Front wheel axle pinch bolt	M8	23	2.3	
Front brake caliper	M10	40	4.0	
Front brake disk	M6	18	1.8	LT
Front brake bleed screw	M8	6	0.6	
Rear brake torque rod	M8	23	2.3	
Rear wheel sprocket	M10	69	6.9	
Drive chain adjusting nut	M8	16	1.6	
Rear brake caliper	M10	40	4.0	
Rear wheel axle	M24	150	15	
Rear brake hose union bolt	M10	30	3.0	
Rear brake bleed screw	M8	6	0.6	
Rear brake disk	M8	23	2.3	LT
Rider footrest bracket and frame	M8	30	3.0	
Rear brake reservoir tank	M6	4	0.4	
Rear brake master cylinder	M8	23	2.3	
Rider footrest and bracket	M10	55	5.5	
Passenger footrest bracket and frame	M8	28	2.8	
Passenger footrest bracket and muffler	M10	48	4.8	

NOTE:

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

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LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearings	E
Crankshaft pins	E
Piston surfaces	E
Piston pins	E
Connecting rod bolts and nuts	M
Crankshaft journals	E
Camshaft lobes	M
Camshaft journals	M
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	E
Water pump impeller shaft	E
Oil pump rotors (inner and outer)	E
Oil strainer	E
Starter clutch idle gear inner surface	E
Starter clutch assembly	E
Primary driven gear	E
Transmission gears (wheel and pinion)	M
Main axle and drive axle	M
Shift drum	E
Shift forks and shift fork guide bars	E
Shift shaft	E
Shift shaft boss	LS
Cylinder head cover mating surface	Yamaha bond No.1215
Crankcase mating surface	Yamaha bond No.1215
Clutch cover (crankcase mating surface)	Yamaha bond No.1215
Generator rotor cover (crankcase mating surface)	Yamaha bond No.1215

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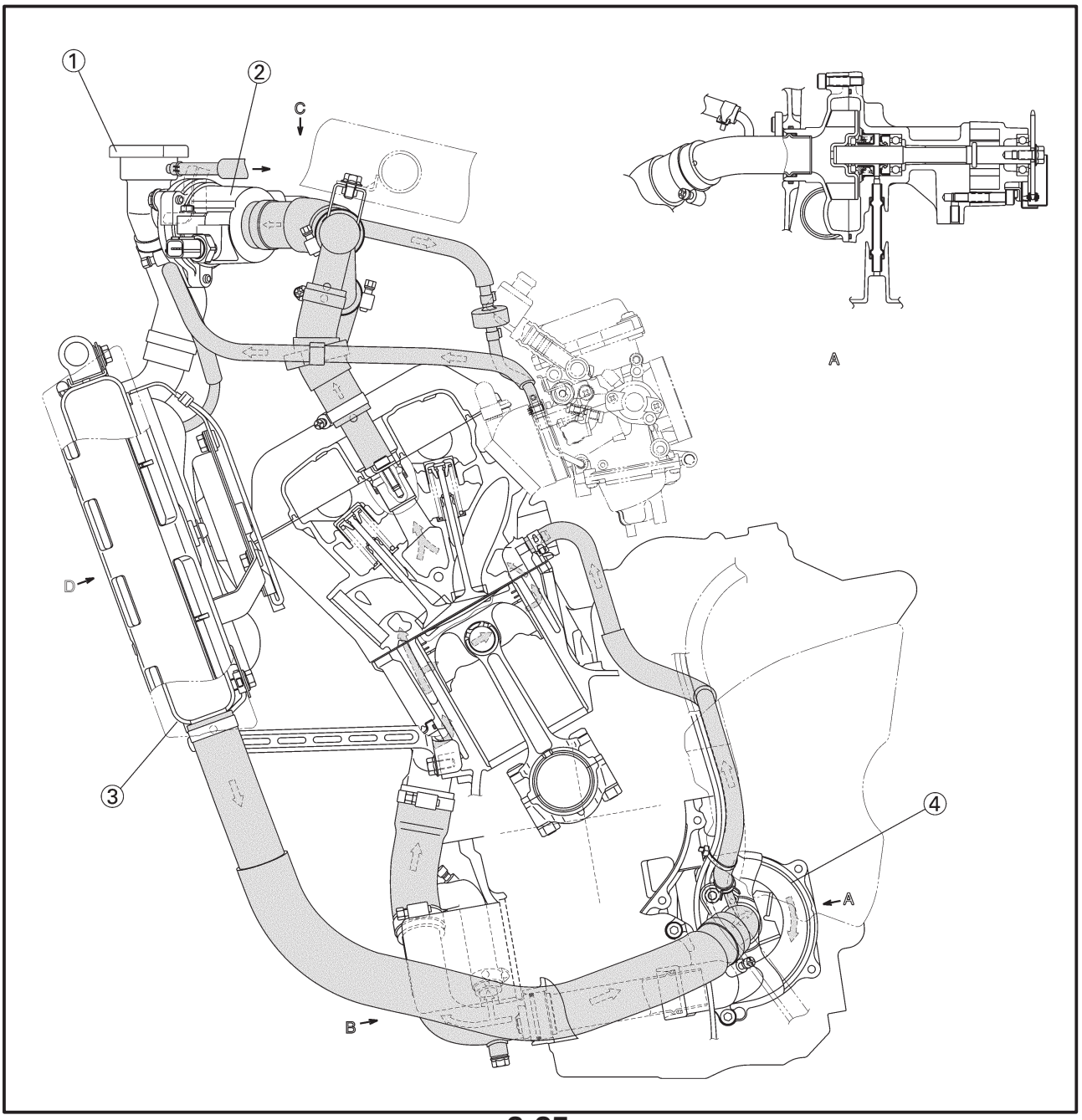
CHASSIS

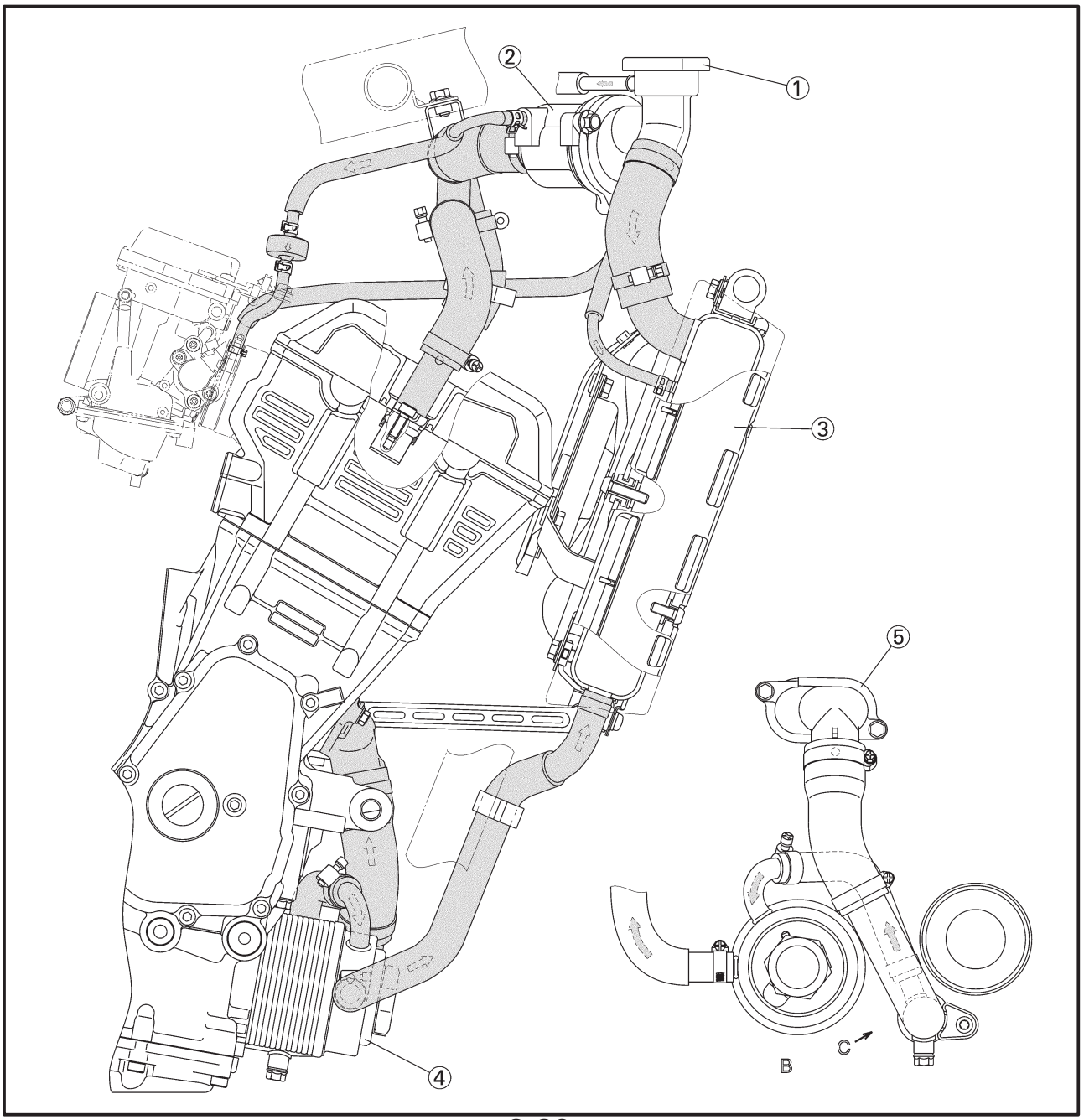
Lubrication point	Lubricant
Steering bearings, steering seal lips and ball race cover lips	LS
Pivot shaft	LS
Swing arm pivoting points and connecting arm bearings	LS
Connecting arm oil seal lips	LS
Swing arm oil seal lips	LS
Relay arm bearings	LS
Relay arm oil seal lips	LS
Rear shock absorber upper bolt	LS
Front wheel oil seal lips	LS
Rear wheel oil seal lips	LS
Clutch hub oil seal lips	LS
Throttle cable end	LS
Starter cable end and starter lever	LS
Rear brake pedal moving point	LS
Shift pedal moving point	LS
Side stand moving point	LS
Passenger footrest ball joint and moving point	LS
Engine mounting bracket collar and oil seal lips	LS
Mainstand moving point	LS

EAS00033
COOLING SYSTEM DIAGRAMS

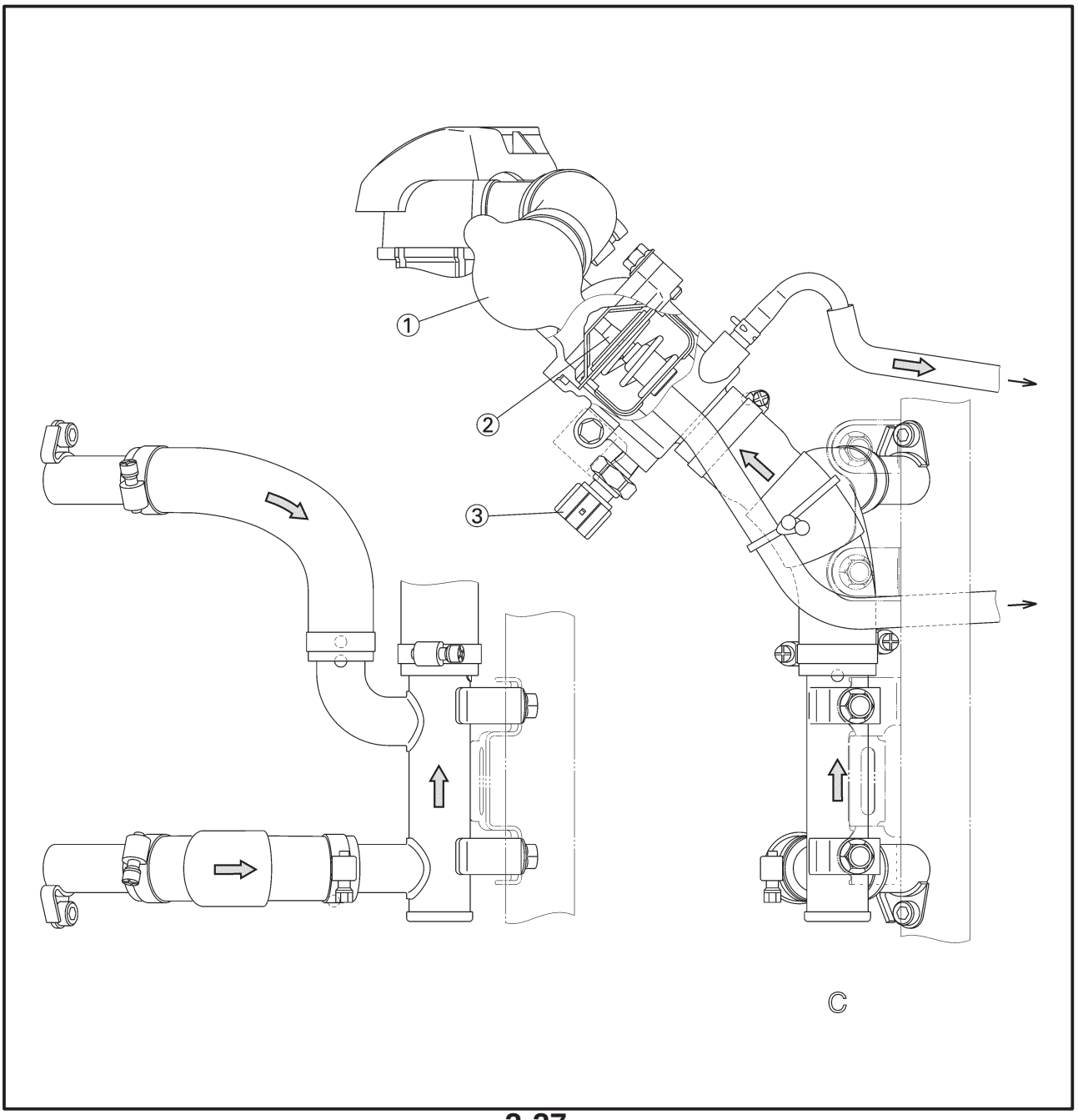
① Radiator cap
② Thermostat housing
③ Radiator
④ Water pump



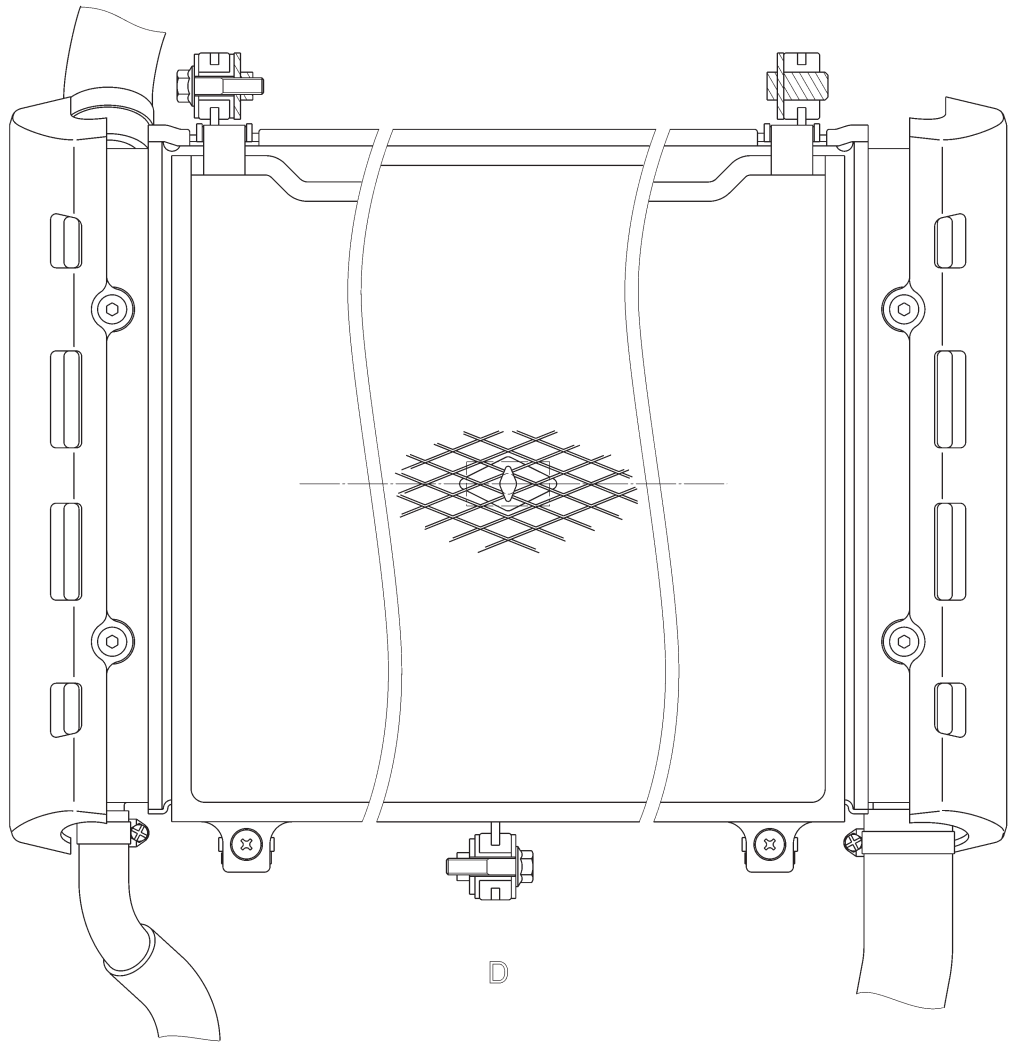
① Radiator cap
② Thermostat housing
③ Radiator
④ Oil cooler
⑤ Water jacket joint



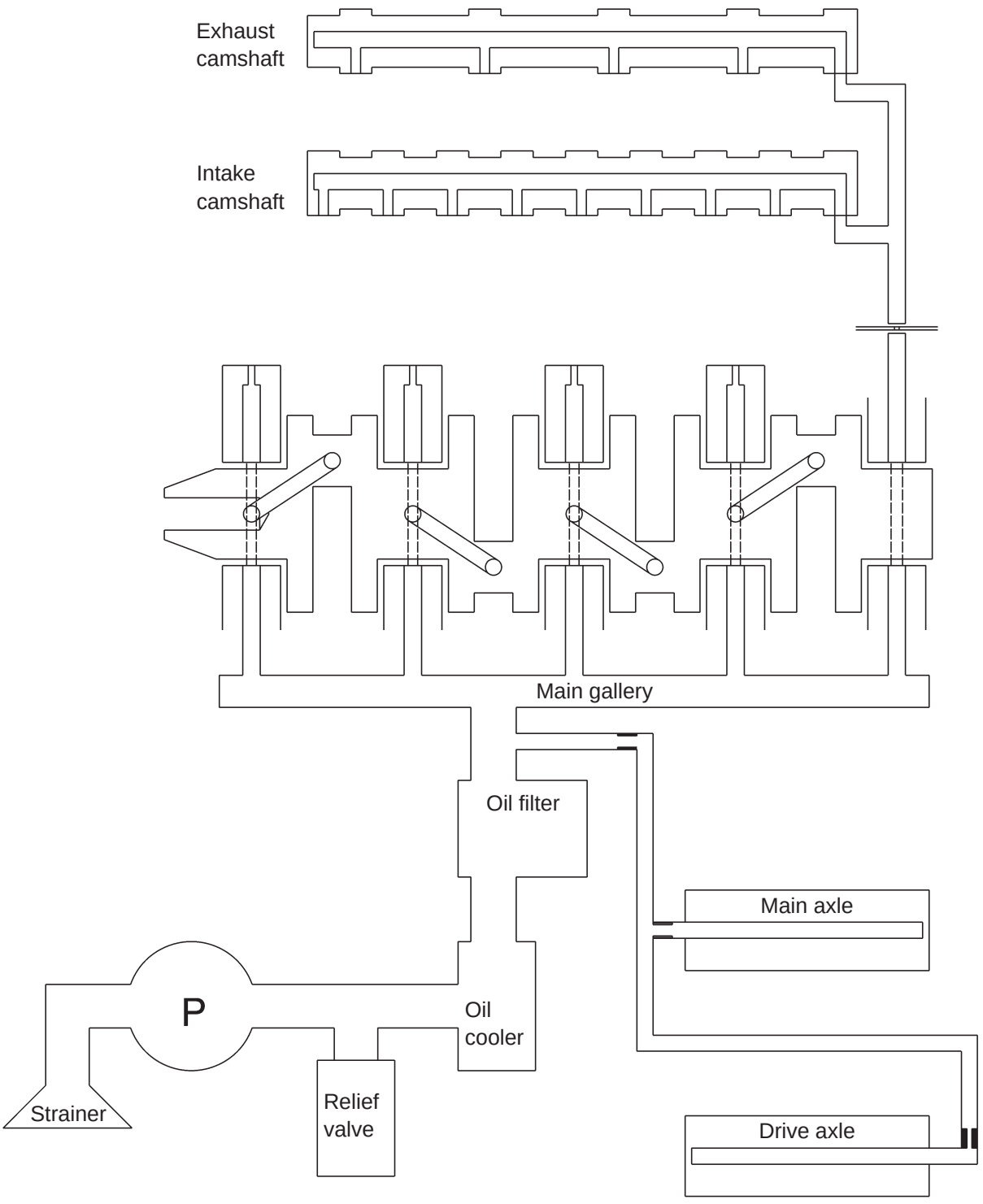
① Radiator cap
② Thermostat
③ Thermo unit



① Radiator

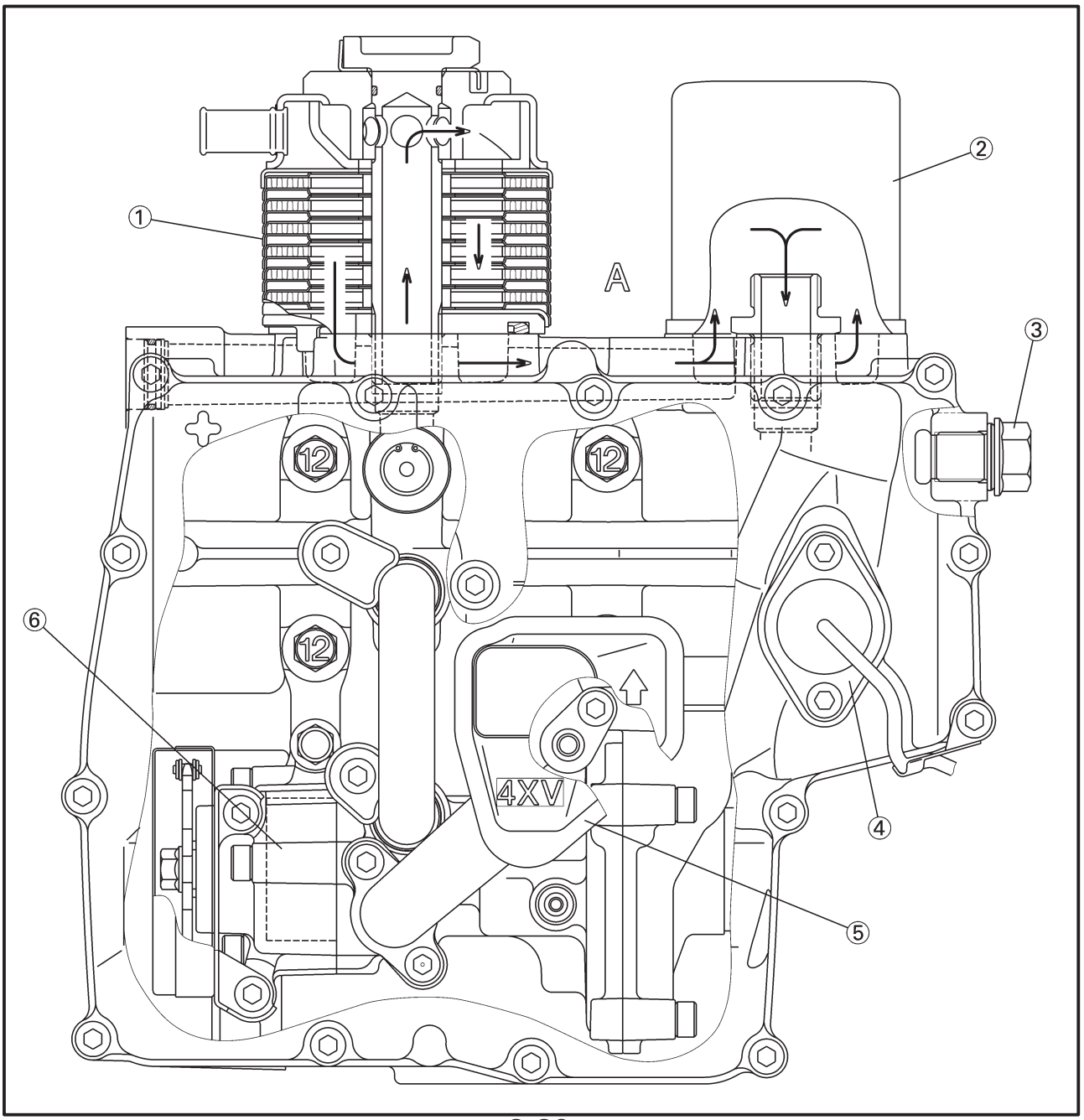


ENGINE OIL LUBRICATION CHART

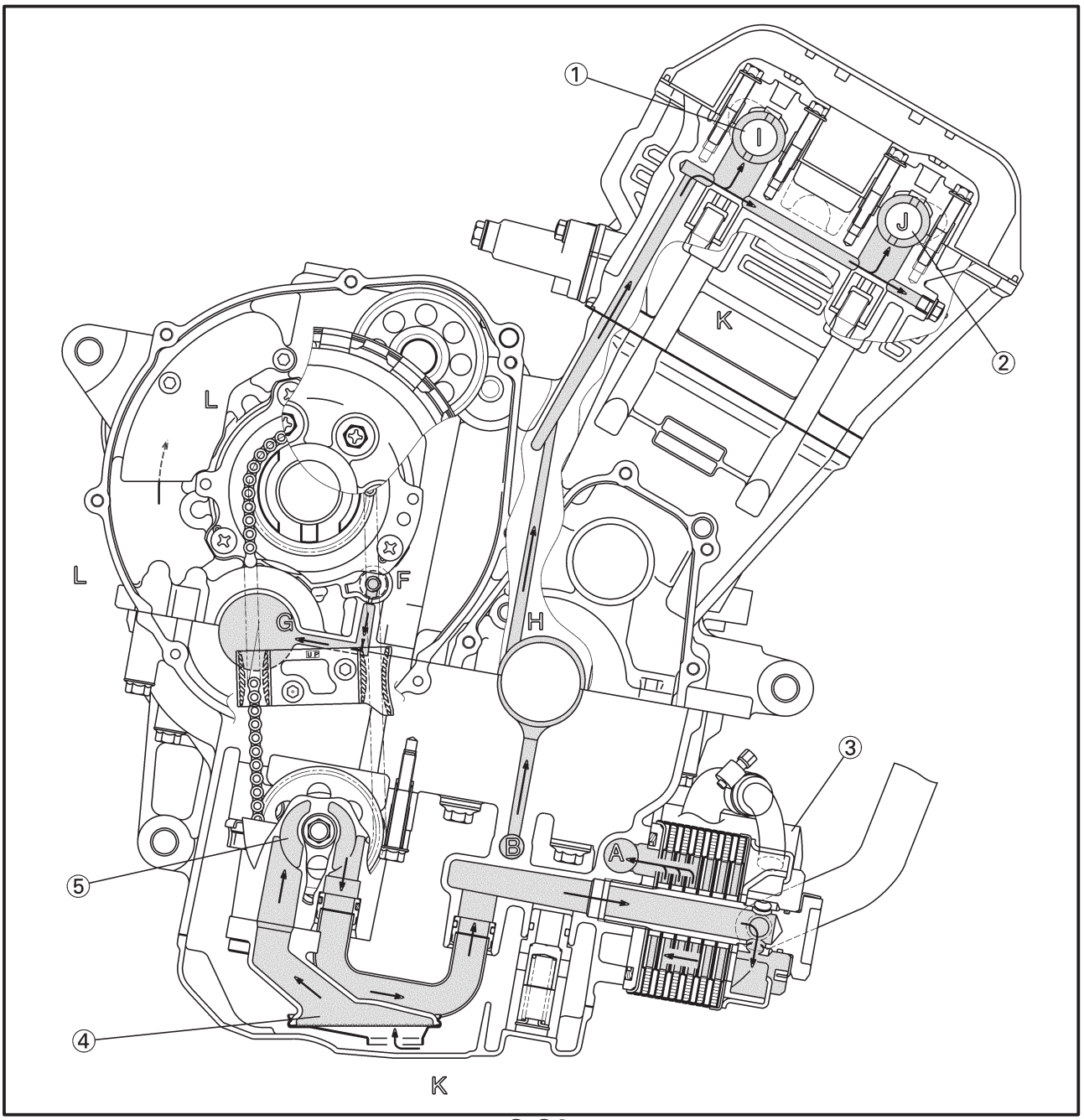


EAS00034
LUBRICATION DIAGRAMS

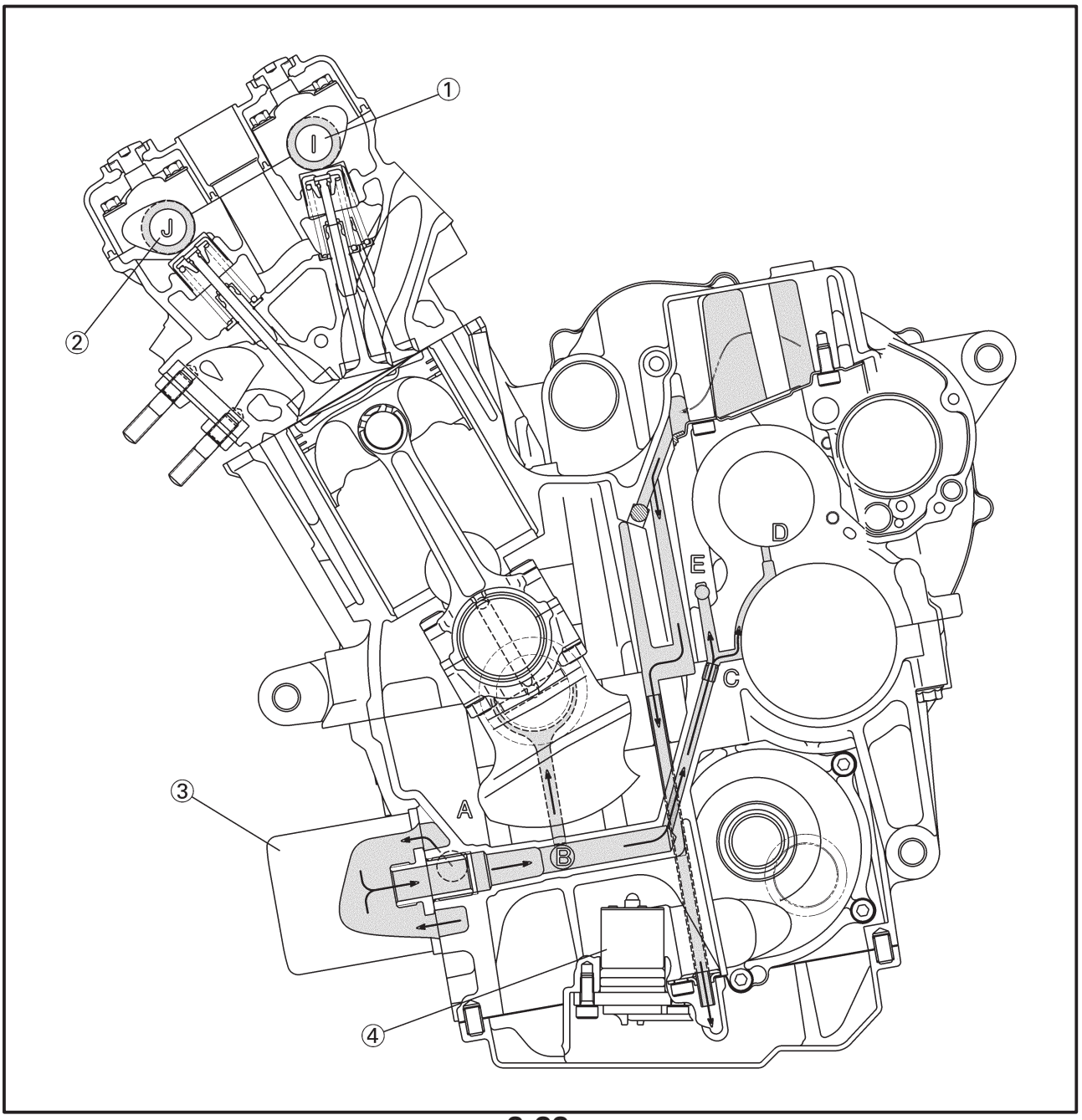
① Oil cooler
② Oil filter cartridge
③ Drain bolt
④ Oil level switch
⑤ Oil strainer
⑥ Oil pump



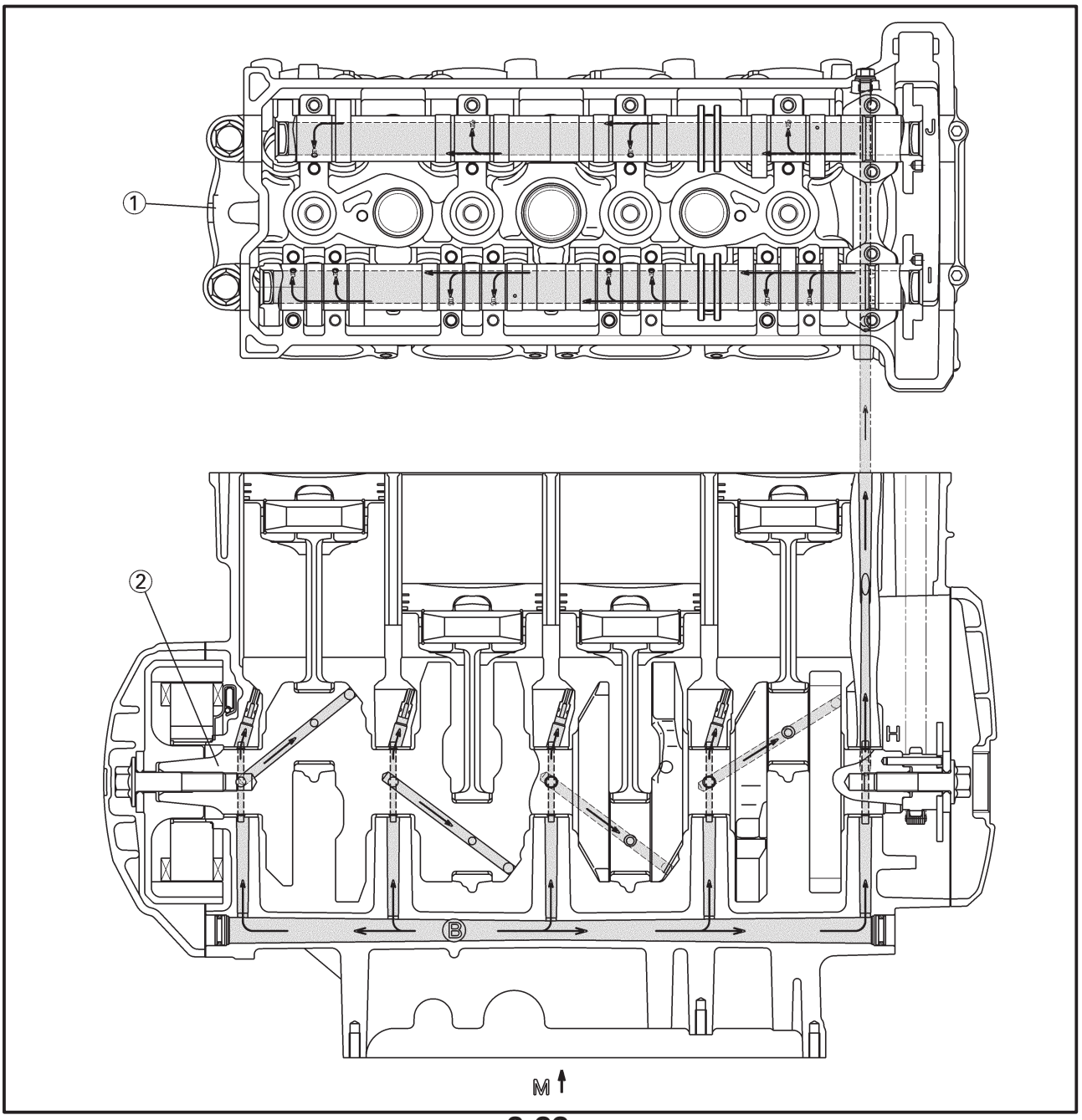
① Intake camshaft
② Exhaust camshaft
③ Oil cooler
④ Oil strainer
⑤ Oil pump



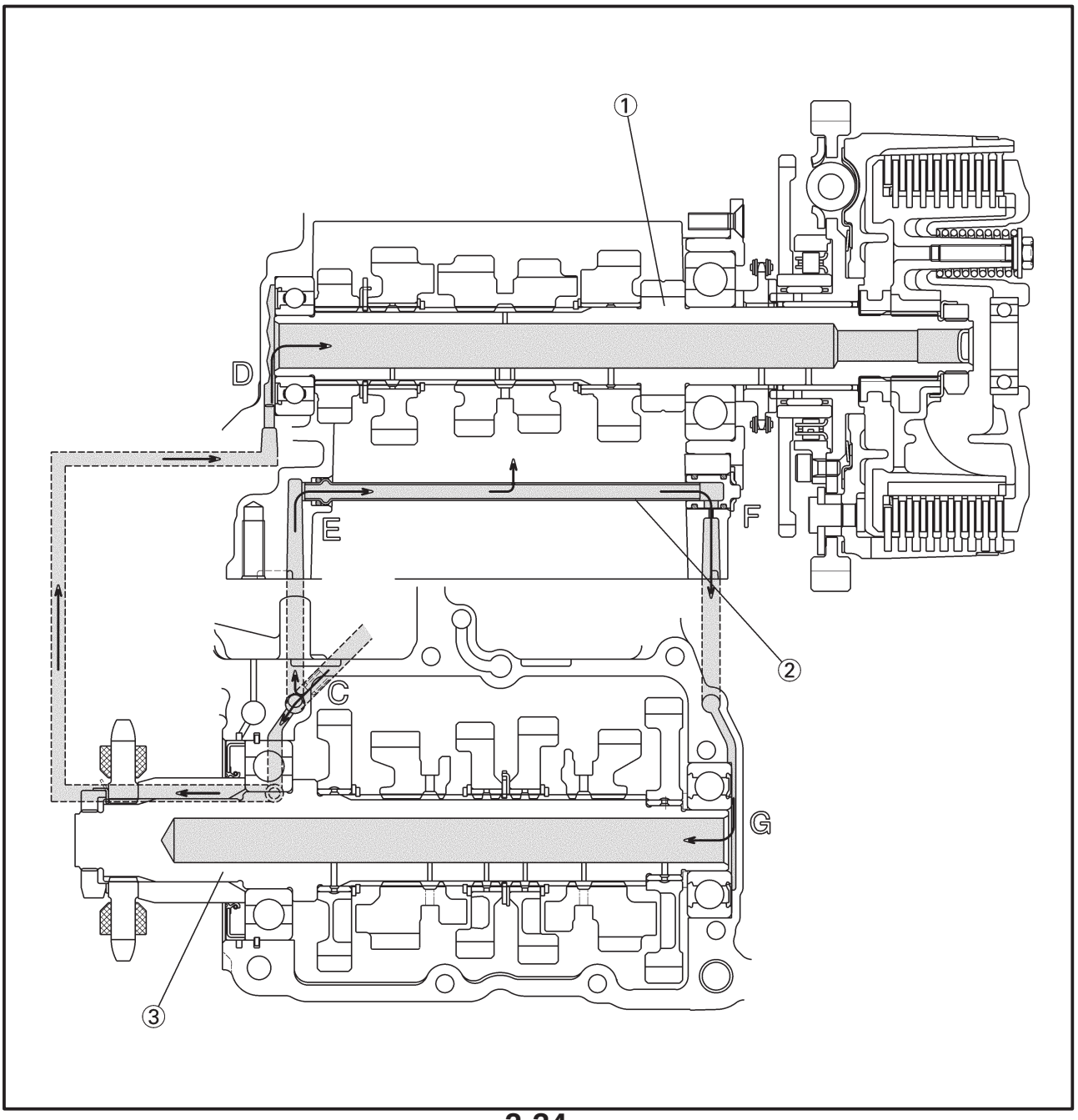
① Intake camshaft
② Exhaust camsahft
③ Oil filter cartridge
④ Oil level switch



① Cylinder head
② Crankshaft

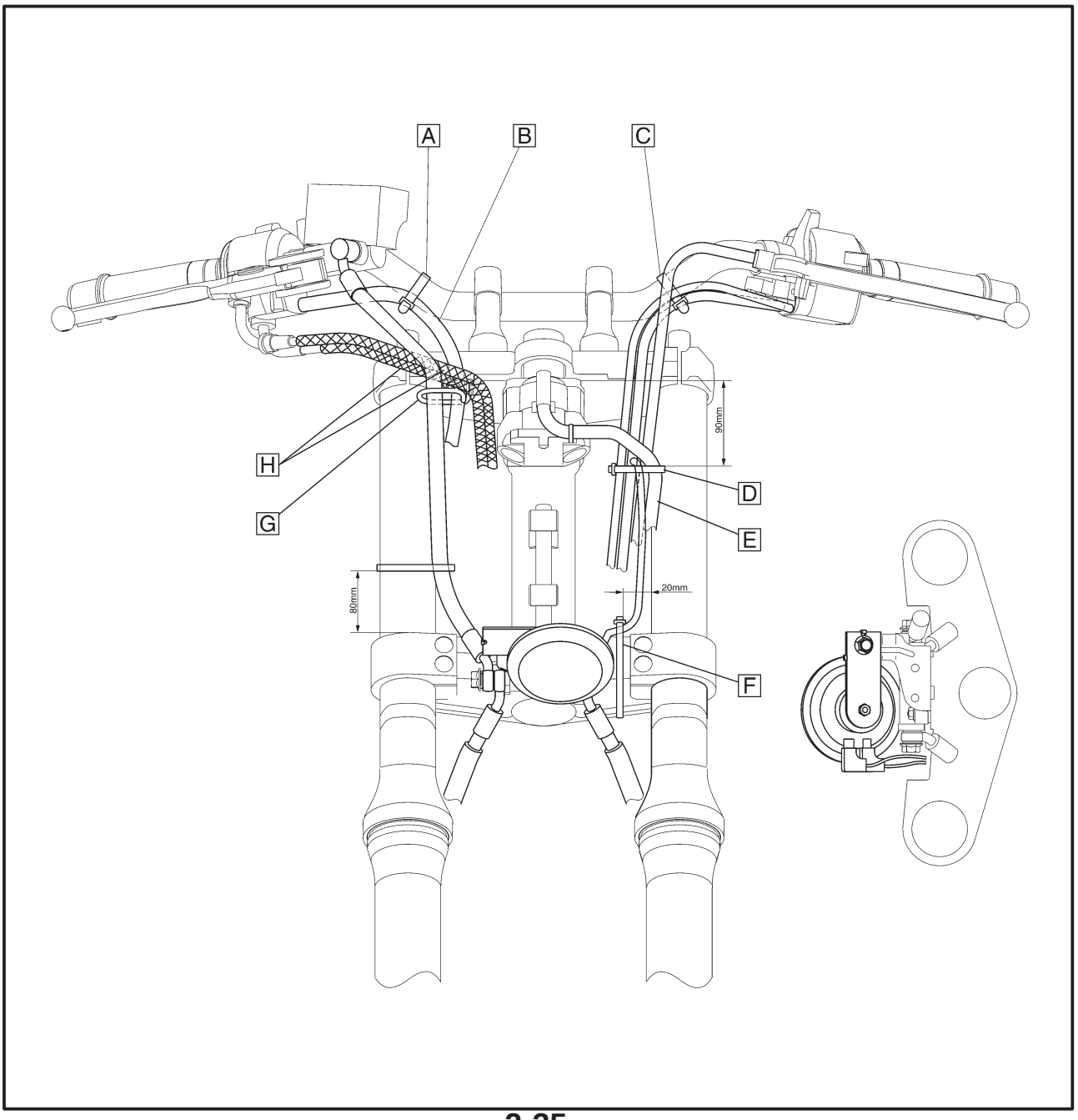


① Main axle
② Oil delivery pipe
③ Drive axle



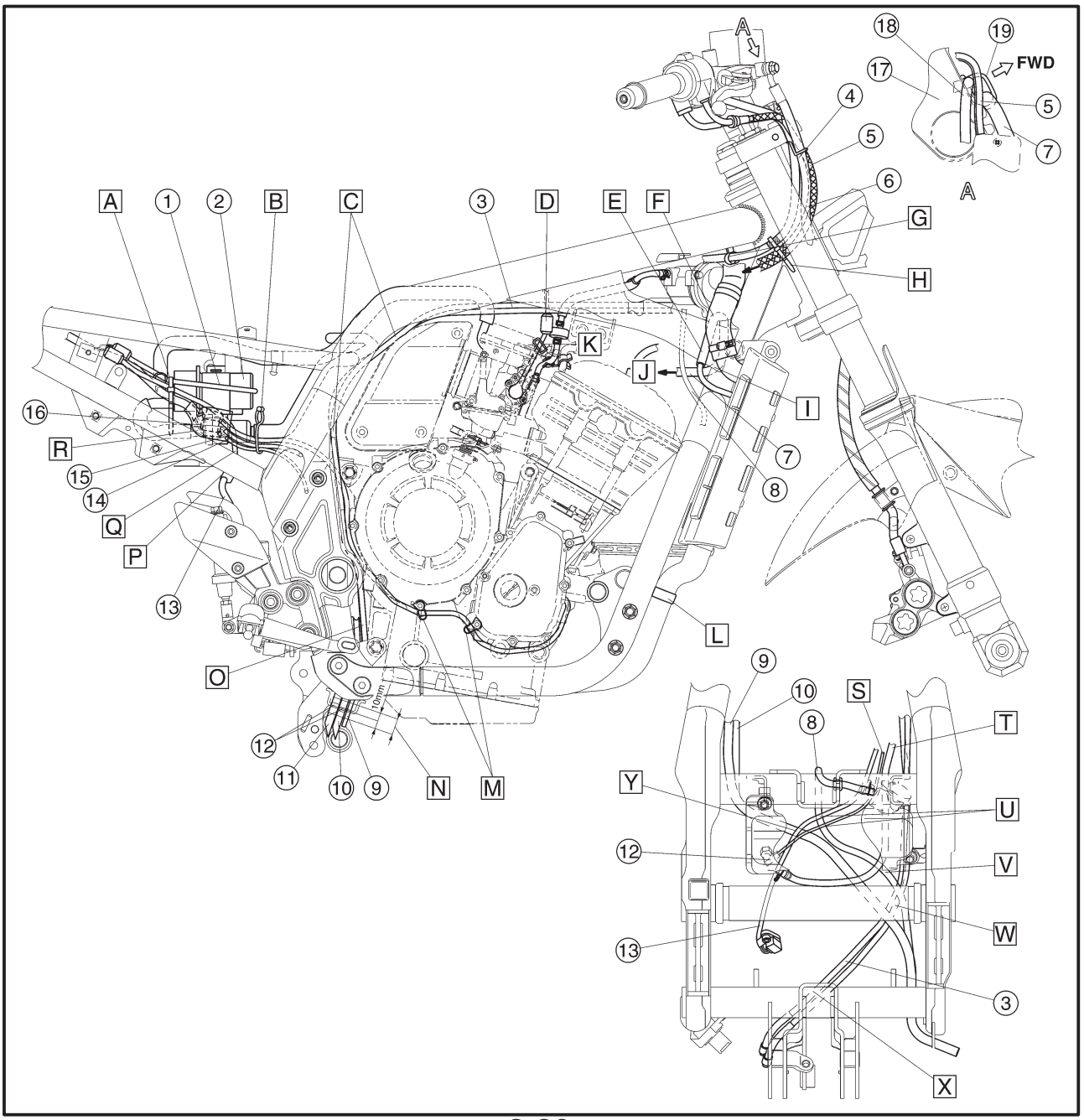
EAS00035
CABLE ROUTING

A Fasten the handlebar switch lead (right) and handlebar with a plastic band.
B Route the handlebar switch lead (right) backward the throttle cable and right side the brake hose guide.
C Fasten the handlebar switch lead (left) and handlebar with a plastic band.
D Fasten the handlebar switch lead (left), main switch lead, clutch cable and starter cable with a plastic band. Clamp beneath the horn lead branching position. Do not fasten the horn lead.
E Route the main switch lead front and left side the another leads.
F Route the horn lead outside the motorcycle body, and fasten with the under bracket. Do not loose between the horn and under bracket.
G Route the brake hose through the brake hose guide.
H Route the throttle cable 1 and 2 backward the brake hose, and left side the brake hose guide.

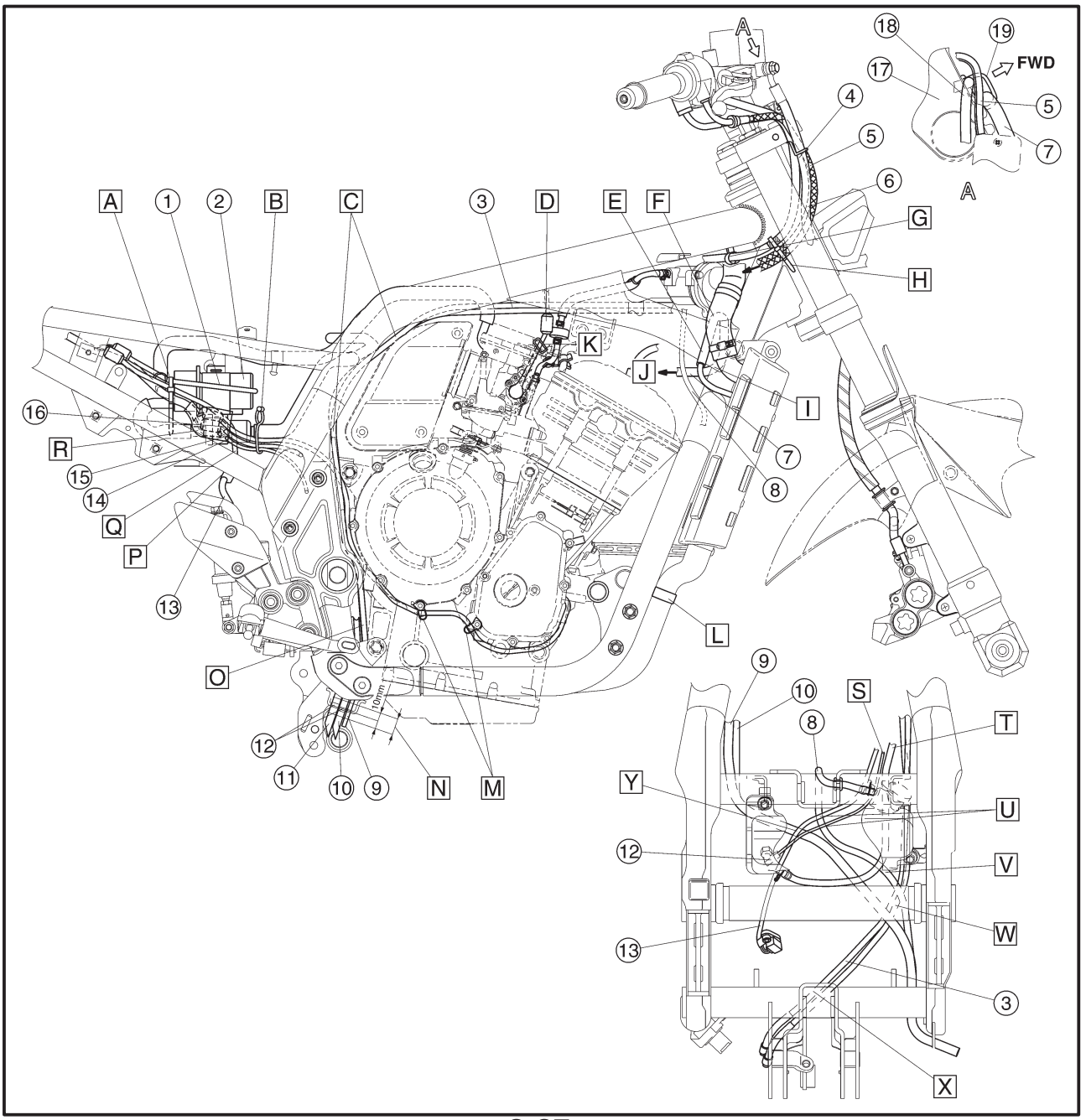


① Fuel pump lead
② Fuel pump
③ EXUP cable
④ Handlebar switch lead (right)
⑤ Throttle cable 1
⑥ Throttle cable 2
⑦ Water-carburetor hose
⑧ Fan motor lead
⑨ Coolant reservoir tank over flow hose
⑩ Fuel tank drain hose
⑪ Fuel tank breather hose
⑫ White paint mark
⑬ Rear brake light switch lead
⑭ Neutral switch lead
⑮ Speedo sensor lead
⑯ Pickup coil lead
⑰ Handle crown
⑱ Handlebar switch lead
⑲ Brake hose guide

A Fasten the fuel pump lead, pickup coil lead, neutral switch lead, speed sensor lead, rear brake light switch lead and fuel pump with a plastic clamp.
B Fasten the fuel hose, pickup coil lead, neutral switch lead and speed sensor lead with a plastic clamp under the fuel hose.
C Put the EXUP cable into the air box cover.
D Route the T.P.S. lead inward the EXUP cable.
E Fasten the water-carburetor hose with a plastic band.
F Route the coolant hose over the frame.
G Fasten the handlebar switch lead and frame with a plastic guide.
H Align the white tape mark of the handlebar switch lead (right) with the tank rail welding bead and clamp down throttle cables 1 and 2.

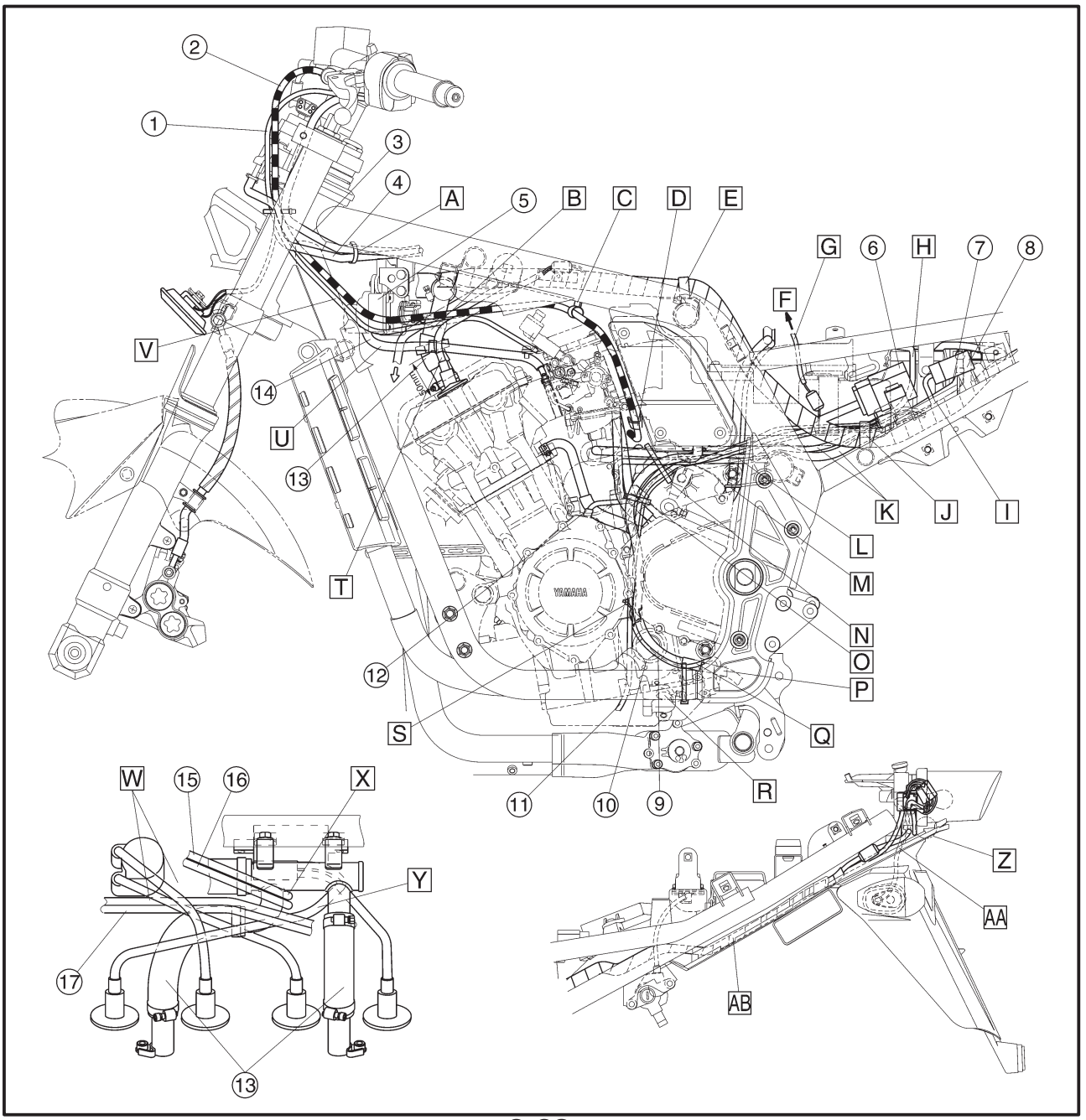


[I] Route the water-carburetor hose between the frame cross pipe and fan motor lead.
[J] To the carburetor
[K] Fasten the T.P.S. lead with a steel clamp.
[L] Fasten the coolant hose with a plastic band.
[M] Fasten the pickup coil lead with a steel clamp.
[N] Pass the coolant reservoir tank overflow hose, fuel tank drain hose and fuel tank breather hose through the frame hose holder from the inside of the vehicle to the outside. At this time, pull the fuel tank drain hose and fuel tank breather hose so that the white paint marks are within a 20 mm range.
[O] Route the EXUP cable forward the another hoses, and upward the engine mounting bracket.
[P] Fasten the rear brake light switch lead with a plastic guide.
[Q] Insert the all couplers into the rubber cover.
[R] Route the rear brake light switch lead inside the another leads.
[S] Route the neutral switch lead and speed sensor lead left side the coolant reservoir hose.
[T] Route the coolant reservoir hose left side the engine mounting bracket.
[U] Route the coolant reservoir hose forward the neutral switch lead and speed sensor lead.
[V] Route the coolant reservoir hose backward the another hoses.
[W] Route the EXUP cable forward the another hoses.
[X] Route the EXUP cable forward the frame cross pipe.
[Y] Route the fuel tank drain hose and fuel tank breather hose forward the neutral switch lead and speed sensor lead.

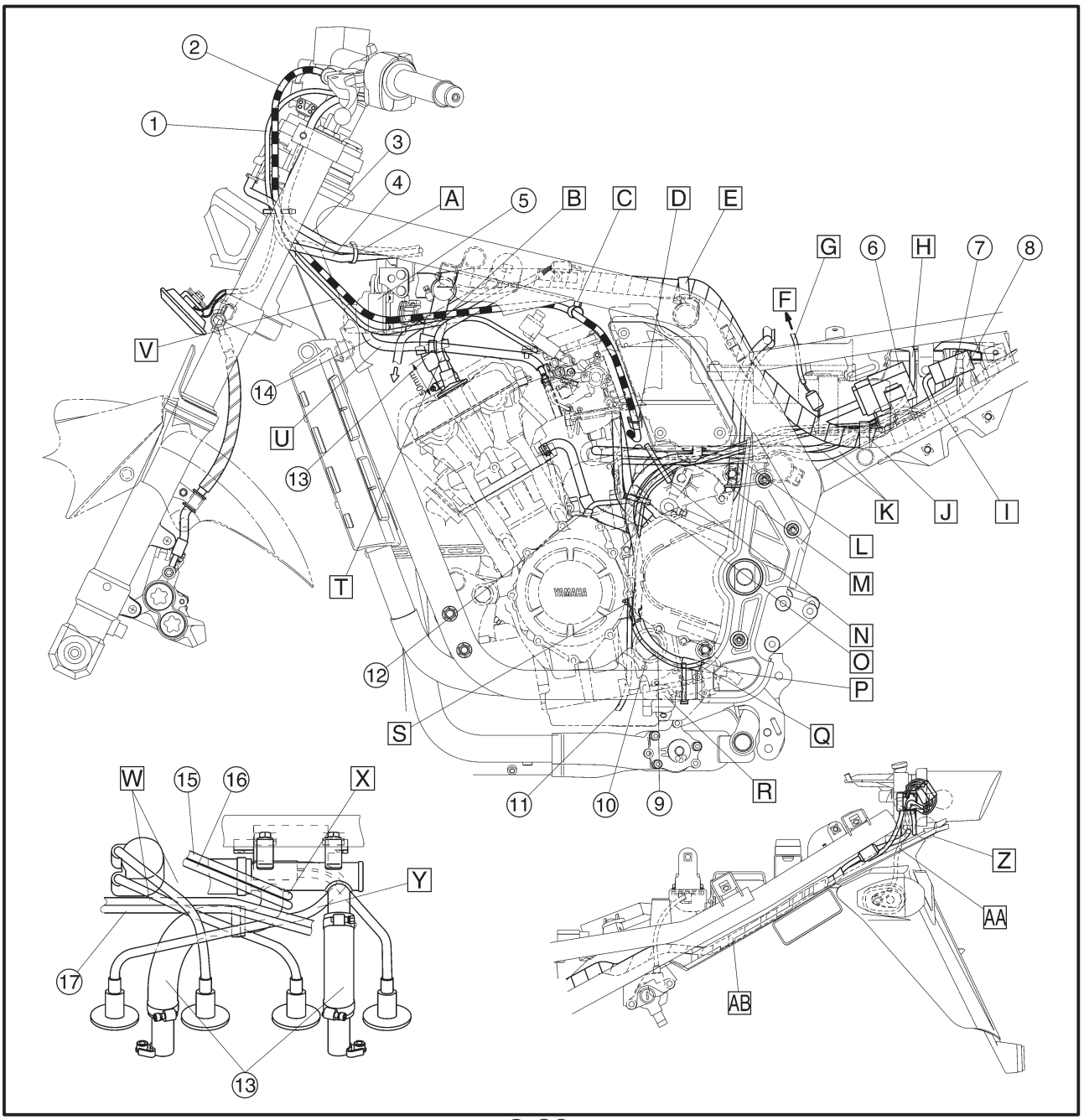


① Starter cable
② Clutch cable
③ Handlebar switch lead (left)
④ Main switch lead
⑤ EXUP servo motor
⑥ Starting circuit cutoff relay
⑦ Starter motor lead
⑧ Fan motor relay
⑨ Air cleaner case drain hose
⑩ Sidestand switch lead
⑪ oil level switch lead
⑫ ACgenerator lead
⑬ Water-head pipe
⑭ Water-carburetor hose
⑮ Throttle cable 2
⑯ Throttle cable 1
⑰ EXUP cable

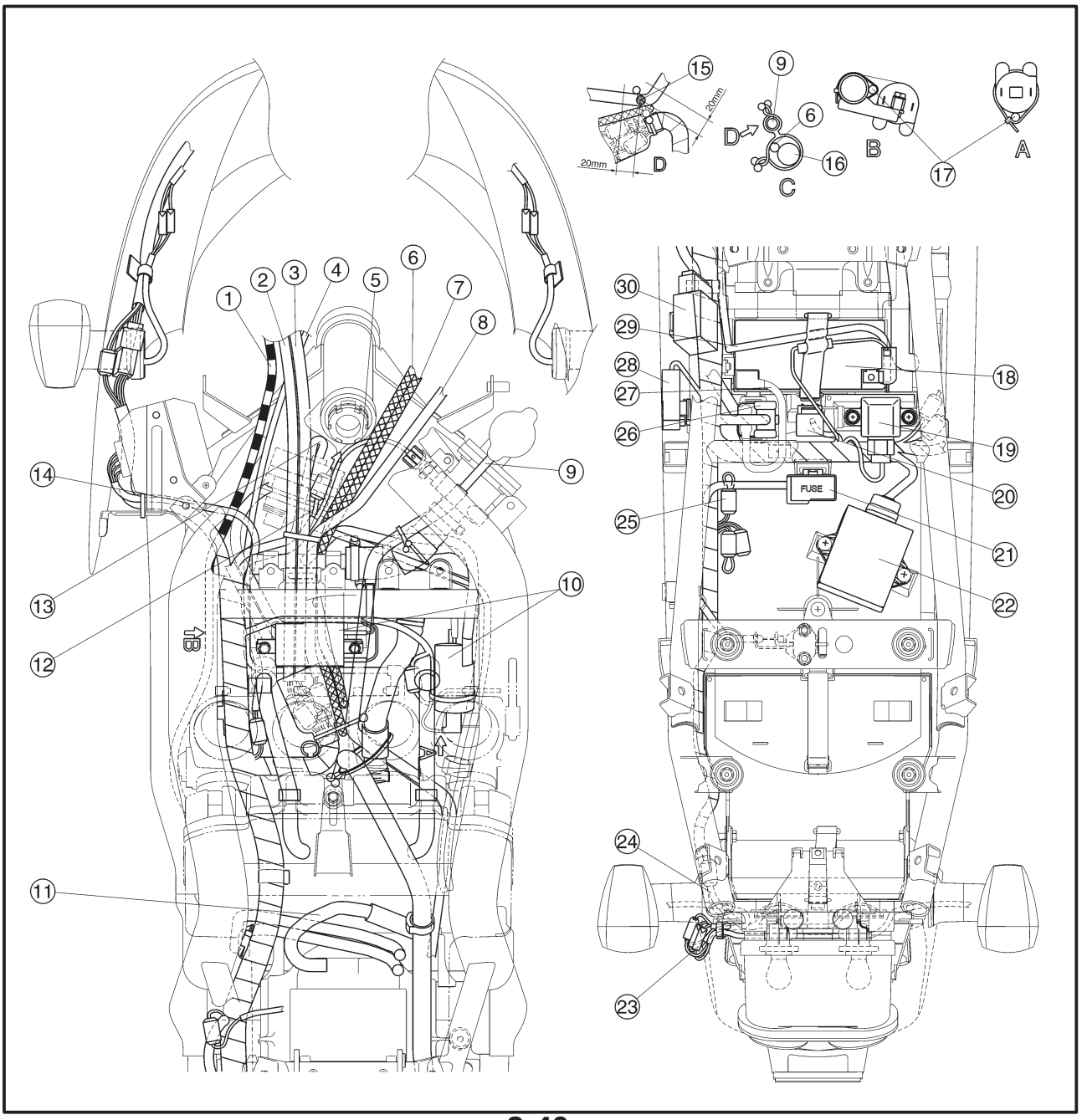
Ⓐ Fasten the main switch lead and handlebar switch lead with a plastic guide.
Ⓑ Fasten the water-head hose and water-carburetor hose with a plastic band.
Ⓒ Fasten the clutch cable with a plastic band.
Ⓓ Fasten the clutch cable with a steel clamp.
Ⓔ Fasten the wire harness with a plastic band.
Ⓕ To the fuel sender.
Ⓖ Route the fuel sender lead inside the seat rail.
Ⓗ Route the battery negative lead forward the frame stay.
Ⓘ Route the main harness inside the rear fender groove.
Ⓙ Fasten the wire harness, sidestand switch lead, oil level switch and flame with a plastic band. Do not fasten the Acgenerator lead (white).
Ⓚ Route the starter motor lead and battery negative lead inside the plastic band.
Ⓛ Route the all hoses outside the fuel hose.
Ⓜ Route the fuel hose through the steel guide.



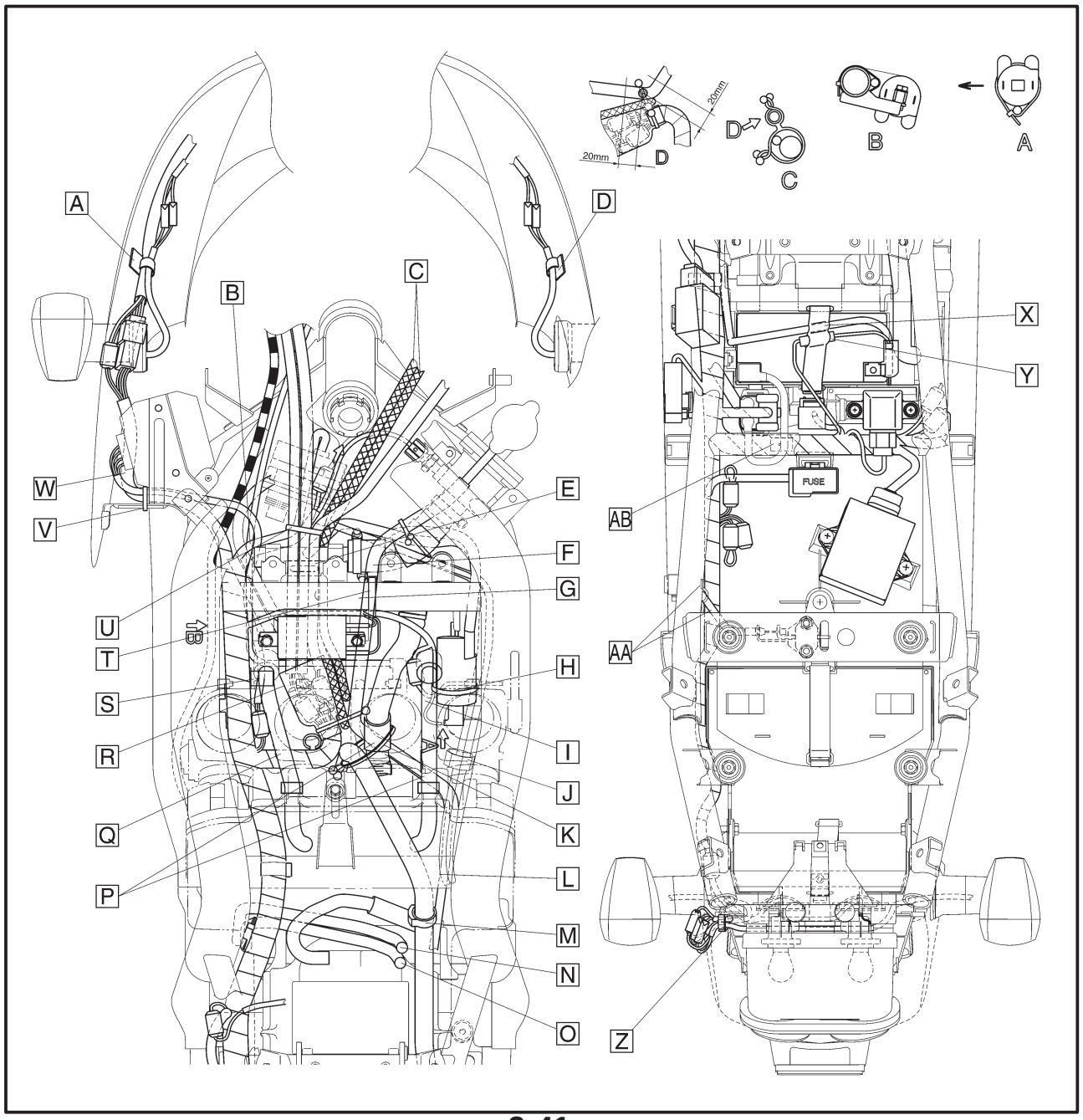
[N] Fasten the sidestand switch lead, oil level switch lead, ACgenerator lead, starter motor lead, battery negative lead and air cleaner case drain hose with a plastic clamp.
[O] Fasten the sidestand switch lead, oil level switch lead, ACgenerator lead and air filter case drain hose with a plastic clamp.
[P] Fasten the sidestand switch lead and frame with a plastic clamp.
[Q] Route the air cleaner box drain hose inside the sidestand switch lead, and put the end of the hose backward.
[R] Fasten the sidestand switch lead and frame with a plastic clamp.
[S] Fasten the sidestand switch lead, oil level switch lead and air filter case drain hose with a plastic clamp. Do not crush the air filter case drain hose.
[T] Route the high tension cable (#1) outside the starter cable and water-carburetor hose, and under the clutch cable and rectifier regulator lead.
[U] Route the water carburetor hose outside the coolant hose.
[V] Route the starter cable outside the coolant hose, and upper the water-carburetor hose.
[W] Route the high tension cable (#2, 3) forward the EXUP cable and high tension cable (#4).
[X] Route the throttle cable between the water-head hose, and upper the EXUP cable.
[Y] Route the high tension cable (#4) between the water-head hose.
[Z] Taillight lead and flasher light lead (right) should not be stick out from the gap between the rear fender and taillight.
[AA] Route the flasher light lead through the hole on the rear fender.
[AB] Route the wire harness in the groove.



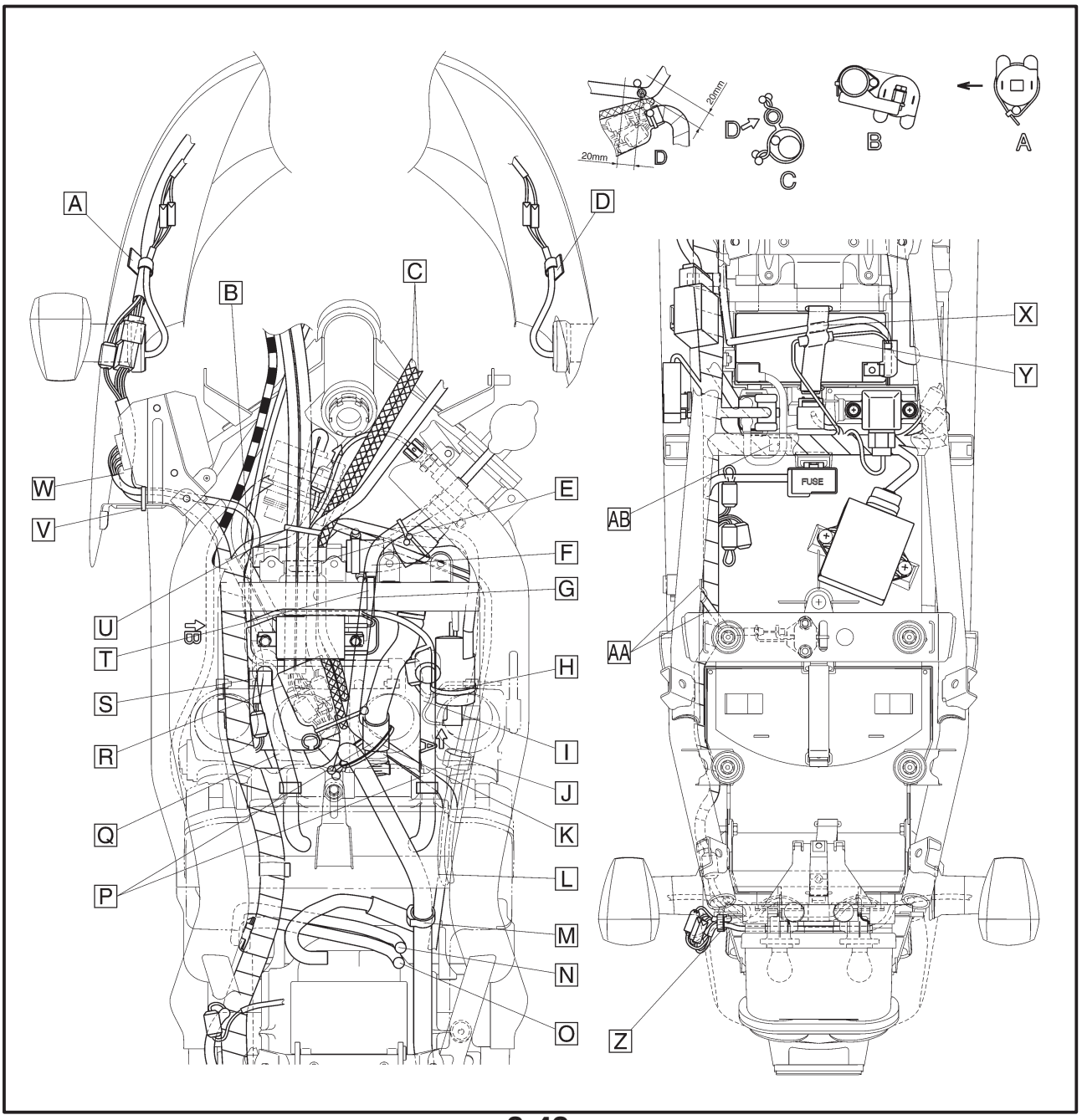
① Clutch cable
② Handlebar switch lead
③ Main switch lead
④ Starter cable
⑤ Thermo unit lead
⑥ Throttle cable 1
⑦ Throttle cable 2
⑧ Handlebar switch lead (right)
⑨ Coolant reservoir hose
⑩ Ignition coil
⑪ Fuel hose
⑫ Fan motor lead
⑬ EXUP servo motor lead
⑭ Rectifier/regulator lead
⑮ White paint mark
⑯ Main harness
⑰ Ignition coil lead
⑱ Battery
⑲ Emergency engine stop switch
⑳ Flasher relay
㉑ Fuse box
㉒ Igniter unit
㉓ Flasher light lead
㉔ Taillight lead
㉕ Alarm coupler (free)
㉖ Starter relay
㉗ Battery positive lead
㉘ Fan motor lead
㉙ Battery negative lead
㉚ Starting circuit cutoff relay



[A] Fasten the flasher light lead and headlight lead with a plastic clamp.
[B] Route the rectifier/regulator lead upper the fan motor lead and EXUP servomotor lead.
[C] Route the throttle cable right side the fan motor lead, EXUP servo motor lead and thermo unit lead.
[D] Fasten the flasher light lead with a plastic clamp.
[E] Route the all leads between the frame cross pipe and bracket.
[F] Do not excessively bend the throttle cable.
[G] Route the coolant reservoir hose under the frame cross pipe.
[H] Fasten the ignition coil and ignition coil lead with a plastic clamp.
[I] Route the T.P.S. lead under the air vent hose.
[J] Fasten the EXUP cable with a plastic band.
[K] Fasten the fuel hose and air induction system hose with a plastic clamp.
[L] Route the coolant reservoir hose under the frame cross pipe.
[M] Fasten the fuel hose and frame with a plastic band.
[N] Put the fuel tank drain hose into the frontward nipple on the fuel tank.
[O] Put the fuel tank breather hose into the backward nipple on the fuel tank.
[P] Route the coolant reservoir hose under the air vent hose and air induction system hose.
[Q] Route the air vent hose upper the main harness.
[R] All coupler into the rubber cover.
[S] Fasten the Rectifier/regulator lead with a plastic band in the main harness.



T Fasten the ignition coil lead and frame cross pipe with a plastic clamp. Do not fasten the red/black lead and orange lead.
U Fasten the handlebar switch lead (left/right), main switch lead, EXUP servo motor lead, fan motor lead and thermo unit lead with a plastic clamp.
V Fasten the rectifier/regulator stay and rectifier/regulator lead with a plastic clamp.
W Route the wire harness under the rectifier/regulator.
X Fasten the battery negative lead with a battery band.
Y Insert the ground lead coupler in the battery band.
Z Fasten the taillight lead and flasher light lead, and put in the groove on the taillight bracket.
AA Put the seat lock cable into the groove on the rear fender.
AB Fasten the battery positive lead with a plastic band.



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CHK ADJ

CHAPTER 3
PERIODIC CHECKS AND ADJUSTMENTS

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PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

EAS00037

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

NOTE:

- **The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.**
- From 50,000 km, repeat the maintenance intervals starting from 10,000 km.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1,000 km)					ANNUAL CHECK
				1	10	20	30	40	
1	*	**Fuel line (See page 3-24)**	• Check fuel hoses for cracks or damage.		√	√	√	√	√
2	*	**Fuel filter (See page 3-24)**	• Check condition.			√		√	
3		**Spark plugs (See page 3-15)**	• Check condition. • Clean and regap.		√		√		
			• Replace.			√		√	
4	*	**Valves (See page 3-5)**	• Check valve clearance. • Adjust.	Every 40,000 km					
5		**Air filter element (See page 3-23)**	• Clean.		√		√		
			• Replace.			√		√	
6		**Clutch (See page 3-22)**	• Check operation. • Adjust.	√	√	√	√	√	
7	*	**Front brake (See page 3-35) (See page 3-36)**	• Check operation, fluid level and vehicle for fluid leakage. (See NOTE)	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
8	*	**Rear brake (See page 3-35) (See page 3-36)**	• Check operation, fluid level and vehicle for fluid leakage. (See NOTE)	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
9	*	**Brake hoses (See page 3-37)**	• Check for cracks or damage.		√	√	√	√	√
			• Replace. (See NOTE)	Every 4 years					
10	*	**Wheels (See page 4-4)**	• Check runout and for damage.		√	√	√	√	
11	*	**Tires (See page 3-47)**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	
12	*	**Wheel bearings (Seep age 4-4)**	• Check bearing for looseness or damage.		√	√	√	√	
13	*	**Swingarm (See page 4-68) (See page 4-69)**	• Check operation and for excessive play.		√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 50,000 km					
14		**Drive chain (See page 3-39) (See page 4-69)**	• Check chain slack. • 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.					
15	*	**Steering bearings (See page 3-41) (See page 4-59)**	• Check bearing play and steering for roughness.	√	√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 20,000 km					

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

CHK ADJ

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1,000 km)					ANNUAL CHECK
				1	10	20	30	40	
16	*	**Chassis fasteners (See page 2-22)**	• Make sure that all nuts, bolts and screws and properly tightened.		√	√	√	√	√
17		**Sidestand / centerstand (Seep age 3-50)**	• Check operation. • Lubricate.		√	√	√	√	√
18	*	**Sidestand switch (See page 8-21)**	• Check operaiton.	√	√	√	√	√	√
19	*	**Front fork (See page 3-43)**	• Check operation and for oil leakage.		√	√	√	√	
20	*	**Rear shock absorber assembly (See page 4-64)**	• Check operation and shock absorber for oil leakage.		√	√	√	√	
21	*	**Rear suspension relay arm and connecting arm pivoting points (See page 4-69)**	• Check operation.		√	√	√	√	
			• Lubricate with lithium-soap-based grease.			√		√	
22	*	**Carburetors (See page 3-10) (See page 3-12)**	• Check starter (choke) operation. • Adjust engine idling speed and synchronization.	√	√	√	√	√	√
23		**Engine oil (See page 3-20)**	• Change.	√	√	√	√	√	√
24		**Engine oil filter cartridge (See page 3-20)**	• Replace.	√		√		√	
25	*	**Cooling system (See page 3-29) (See page 3-30)**	• Check coolant level and vehicle. for coolant leakage		√	√	√	√	√
			• Change.	Every 3 years					
26	*	**Front and rear brake switches (See page 3-36) (See page 8-38)**	• Chck operation.	√	√	√	√	√	√
27		**Moving parts and cables (See page 2-24) (See page 3-50)**	• Lubricate.		√	√	√	√	√
28	*	**Air induction system (See page 7-16)**	• Check the air cut valve and reed valve for damage. • Replace the entire air induction system if necessary.		√	√	√	√	√
29	*	**Lights, signals and switches (See page 3-59) (See page 8-30) (See page 8-35)**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

*: It is recommended that these items be serviced by a Yamaha dealer.

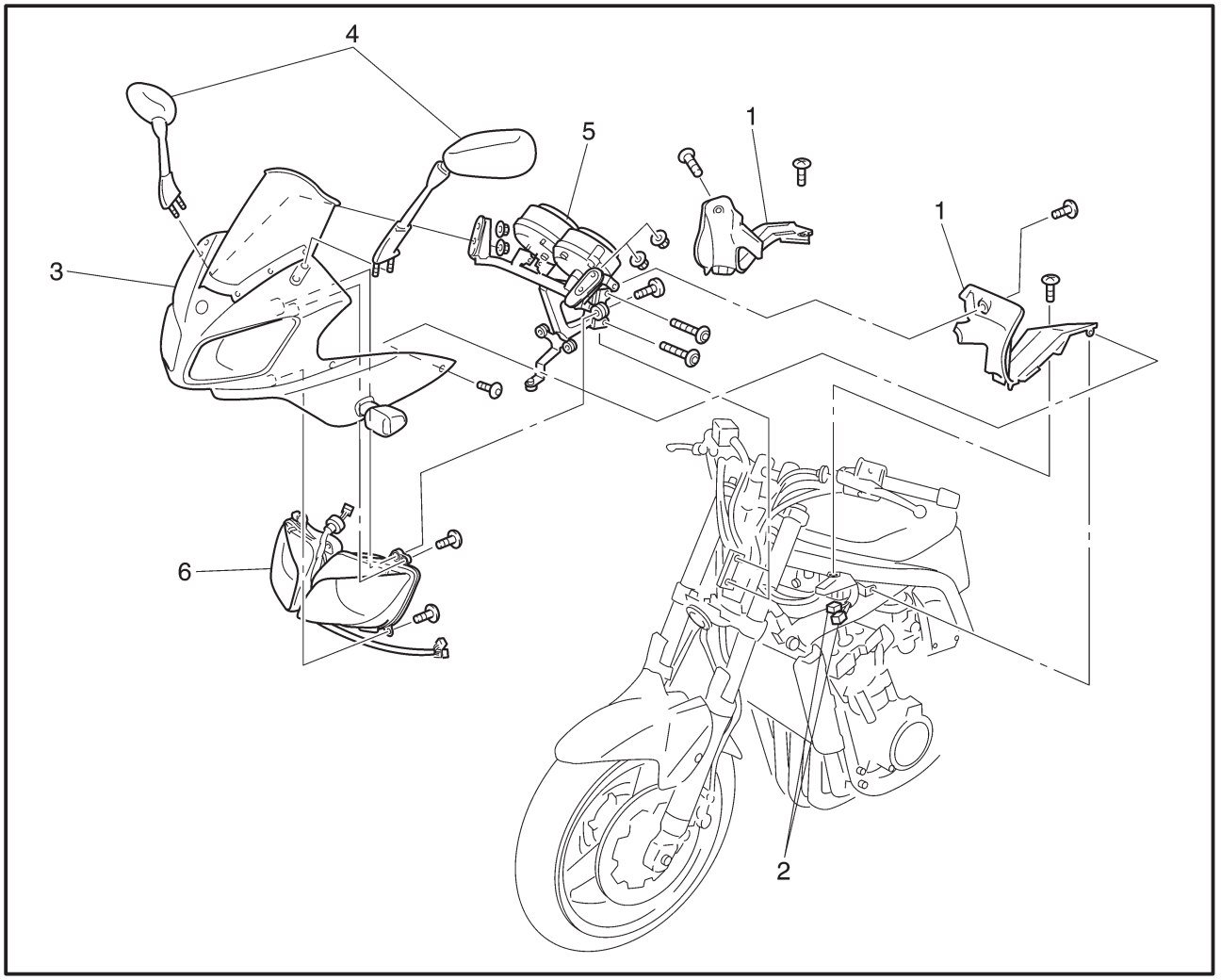
NOTE:

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake service
  - Regularly check and, if necessary, correct the brake fluid level.
  - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
  - Replace the brake hoses every four years and if cracked or damaged.

EAS00038

FRONT COWLING/SEAT/SIDE COVER/FUEL TANK

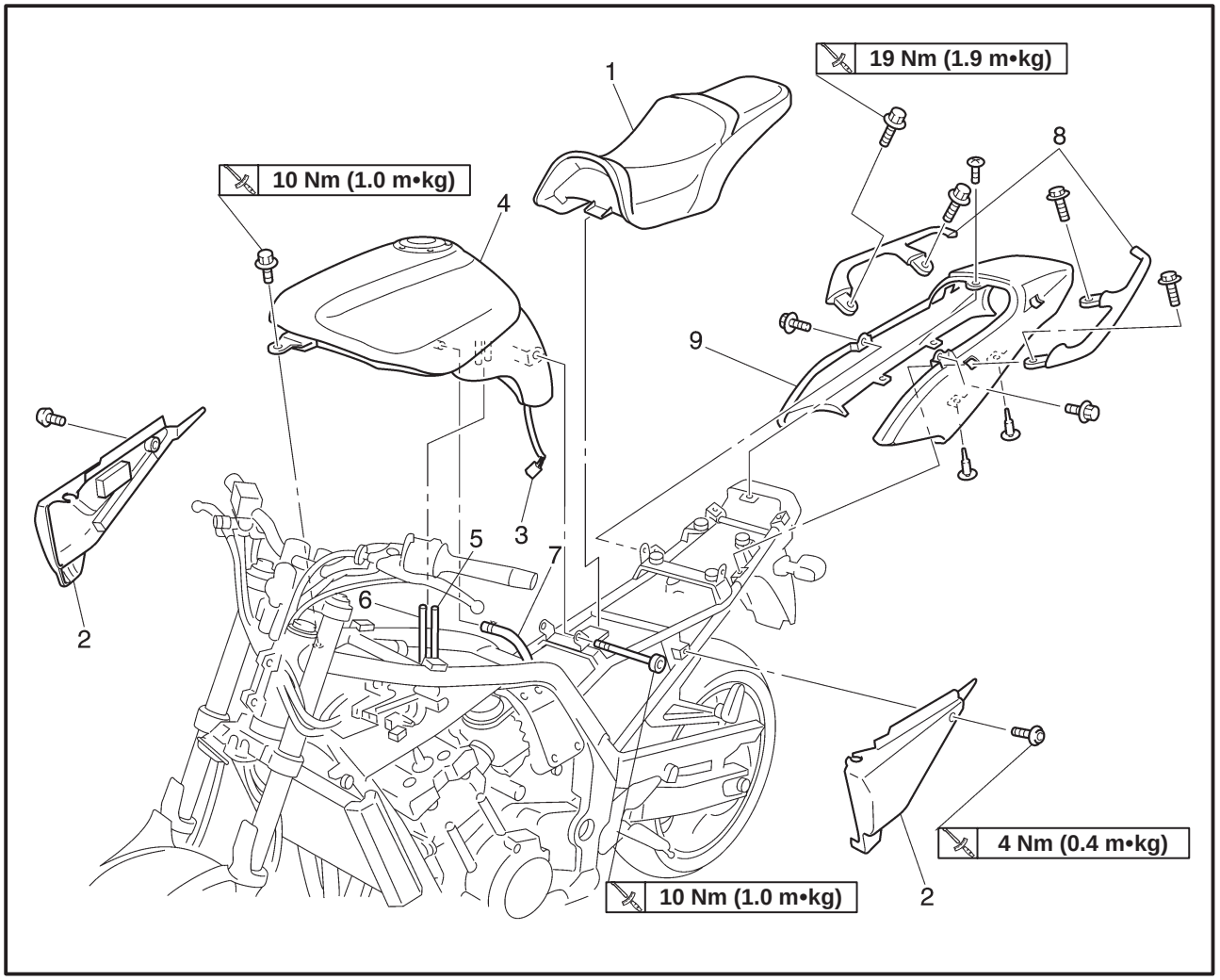
FRONT COWLING



Order	Job/Part	Q'ty	Remarks
	Removing the fron cowling		Remove the4 parts in the order listed.
1	Inner panel	2	
2	Headlight/meter coupler	1/1	Disconnect.
3	Front cowling assembly	1	
4	Back view mirror	2	
5	Meter unit	1	
6	Headlight unit	1	
			For installation, reverse the removal procedure.

EAS00040

SEAT, SIDE COVER AND FUEL TANK



Order	Job/Part	Q'ty	Remarks
	Removing the seat, side cover and fuel tank		Remove the parts in the order listed.
1	Seat	1	
2	Side cover (left and right)	2	
3	Fuel sender coupler	1	Disconnect.
4	Fuel tank	1	
5	Fuel tank breather hose	1	
6	Fuel tank drain hose	1	**NOTE:**
7	Fuel hose	1	Befor disconnecting the fuel hose, turn the fuel cock off.
8	Grab bar	1	
9	Rear cowling	1	
			For installation, reverse the removal procedure.

EAS00045

ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

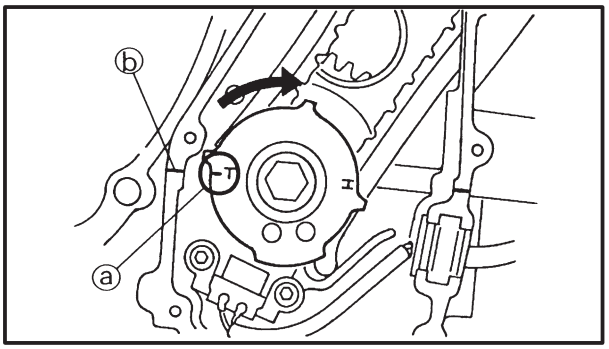
NOTE:

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

1. Remove:
   - cylinder head cover
     Refer to “CYLINDER HEAD COVER” in chapter 5.

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

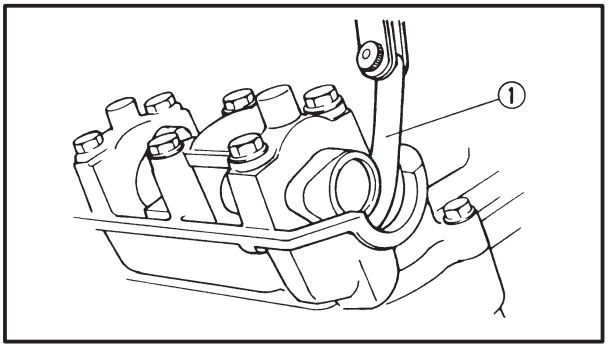
Valve clearance (cold)
Intake valve
0.11 ~ 0.20 mm
Exhaust valve
0.21 ~ 0.25 mm



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

NOTE:

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

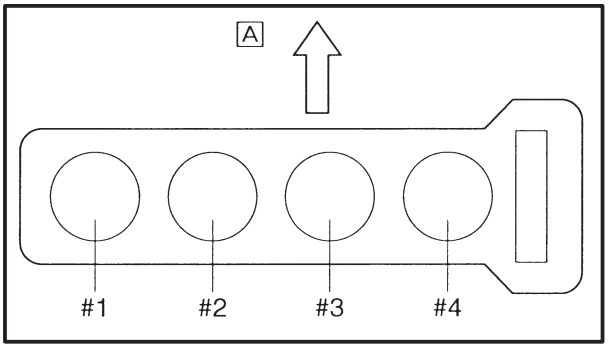


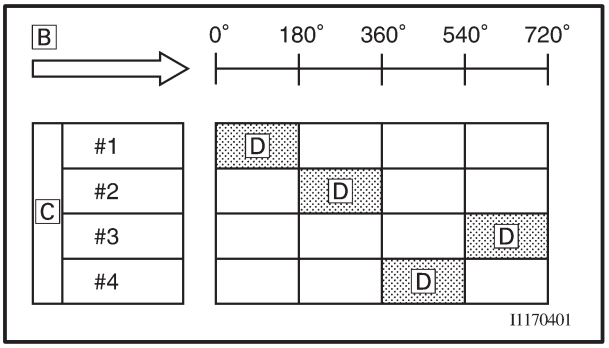
c. Measure the valve clearance with a thickness gauge ①.

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 clockwise as specified in the following table.

B Degrees that the crankshaft is turned clockwise

C Cylinder

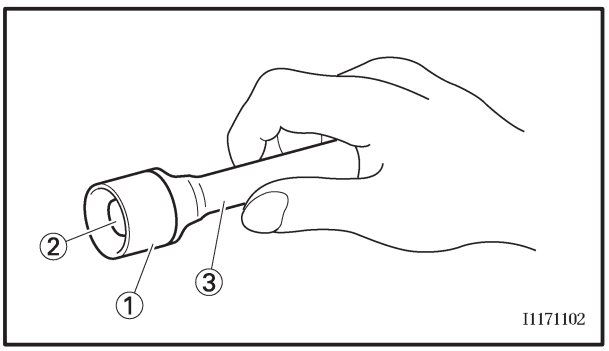
D Combustion cycle

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

3. Remove:
   - intake camshaft
   - exhaust camshaft

NOTE:

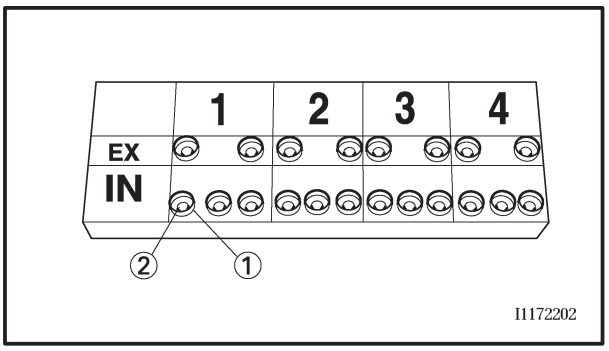
- Refer to “DISASSEMBLING THE ENGINE – CAMSHAFT AND CYLINDER HEAD” in chapter 5.
- When removing the timing chain and camshafts, fasten a wire to the timing chain to retrieve it if it falls into the crankcase.



4. Adjust:
   - valve clearance

a. Remove the valve lifter ① and the valve pad ② with a valve lapper ③.

Valve lapper
90890–04101

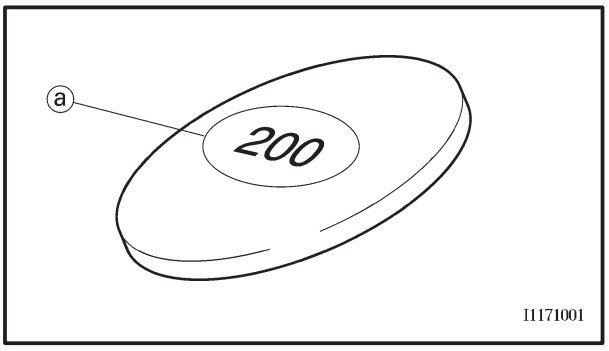


NOTE:

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter 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	1.20 ~ 2.40 mm	25 thicknesses 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 value
0 or 2	**0**
5	**5**
8	**10**

EXAMPLE:

Original valve pad number = 148 (thickness =1.48 mm (0.058 in))

Rounded value = 150

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

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

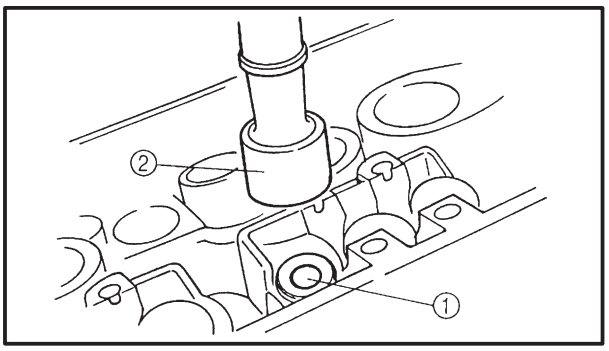
Measured clearance ↓	INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 ~ 0.07			120	125	130	135	140	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 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 "ASSEMBLING AND ADJUSTING THE ENGINE – CYLINDER HEAD AND 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 clockwise several turns to seat the parts.

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

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5. Install:
   - cylinder head cover
     Refer to "CYLINDER HEAD COVER" in chapter 5.
6. Install:
   - all removed parts

NOTE:

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

EAS00050

SYNCHRONIZING THE CARBURETORS

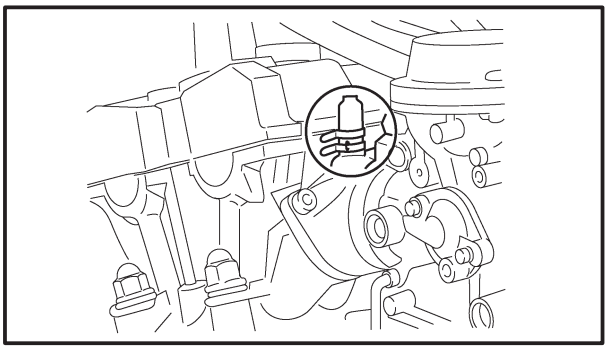
NOTE:

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

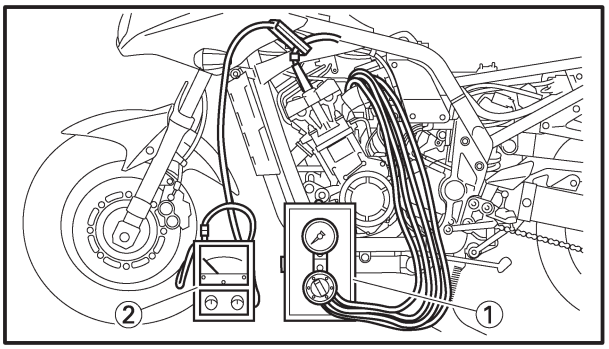
1. Stand the motorcycle on a level surface.

NOTE:

Place the motorcycle on a suitable stand.



2. Remove:
   - vacuum cap

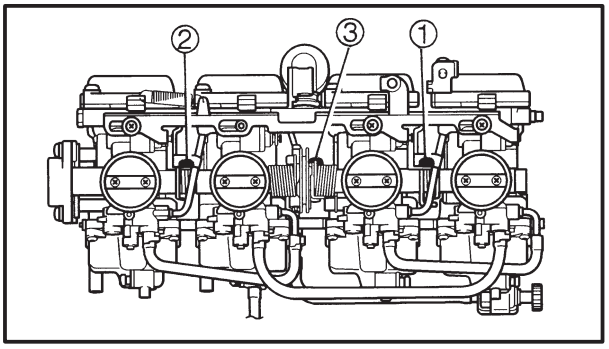


3. Install:
   - vacuum gauge attachment
   - vacuum gauge ①
   - engine tachometer ②
     (to the spark plug lead of cyl. #1)

Vacuum gauge
90890-03094
Vacuum gauge attachment
90890-03060
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
1,050 ~ 1,150 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 kPa (225 mm Hg)

NOTE:

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

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7. Measure:
   • 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:
    • vacuum cap

EAS00052

ADJUSTING THE ENGINE IDLING SPEED

NOTE:

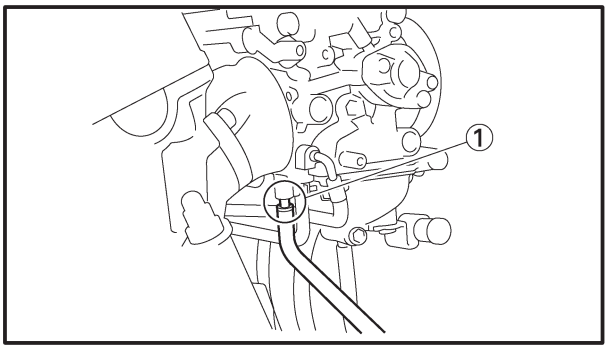
Prior to adjusting the engine idling speed, the carburetor synchronization should be adjusted properly, the air filter should be clean, and the engine should have adequate compression.

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. Measure:
   • engine idling speed
   Out of specification → Adjust.

Engine idling speed
1,050 ~ 1,150 r/min



4. Adjust:
   • engine idling speed

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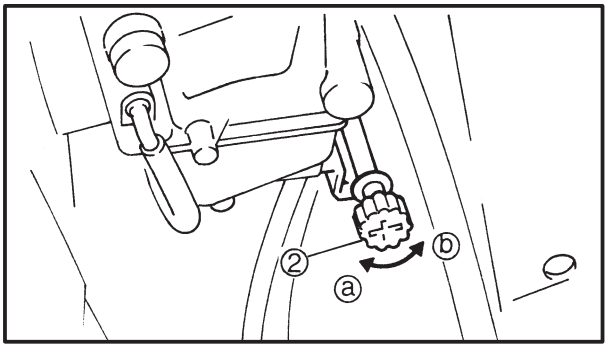
a. Turn the pilot screw ① in or out until it is lightly seated.
b. Turn the pilot screw out the specified number of turns.

Carburetor angle driver 2
908900-03173

Pilot screw
2 turns out



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

Direction ⓐ	**Engine idling speed is increased.**
Direction ⓑ	**Engine idling speed is decreased.**

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

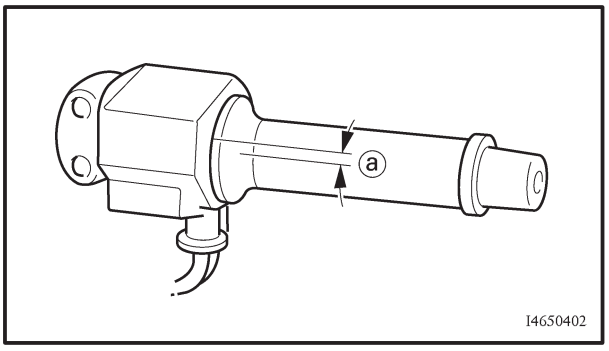
Throttle cable free play (at the flange of the throttle grip)
3 ~ 5 mm

EAS00055

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

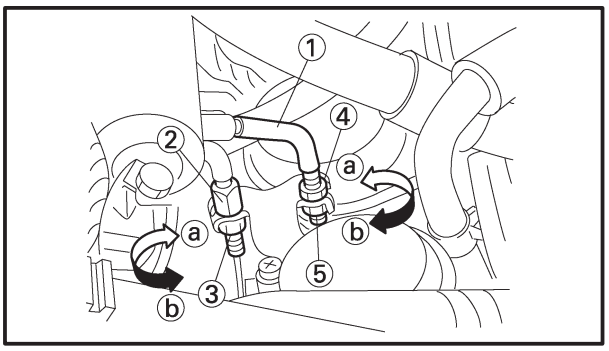
Prior to adjusting the throttle cable free play, the engine idling speed and carburetor synchronization should be adjusted properly.



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:
   • seat
   • fuel tank



3. Adjust:
   • throttle cable free play

NOTE:

When the motorcycle is accelerating, the accelerator cable ① is pulled.

Carburetor side

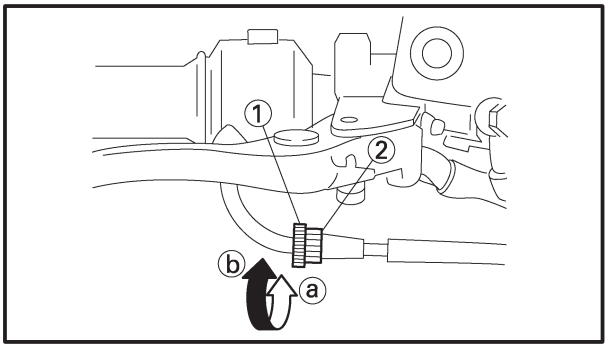
a. Loosen the locknut ② on the decelerator cable.
b. Turn the adjusting nut ③ in direction ⓐ or ⓑ to take up any slack on the decelerator cable.
c. Loosen the locknut ④ on the accelerator cable.
d. Turn the adjusting nut ⑤ in direction ⓐ or ⓑ until the specified throttle cable free play is obtained.

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 tank
   • seat

EAS00059

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

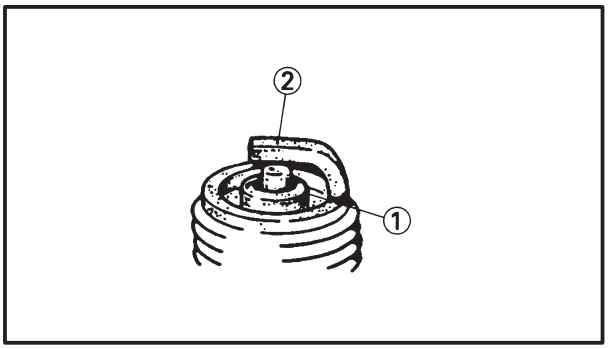
1. Disconnect:
   • spark plug cap
2. Remove:
   • spark plug

CAUTION:

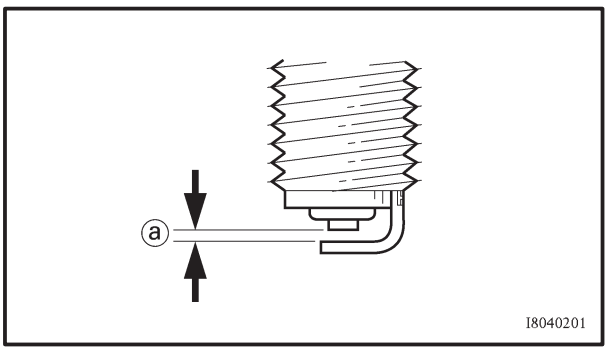
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

Spark plug type (manufacturer)
CR9E (NGK)
U27ESR-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 ⓐ
   (with a wire gauge)
   Out of specification → Regap.

Spark plug gap
0.7 ~ 0.8 mm

7. Install:
   • spark plug

13 Nm (1.3 m•kg)

NOTE:

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

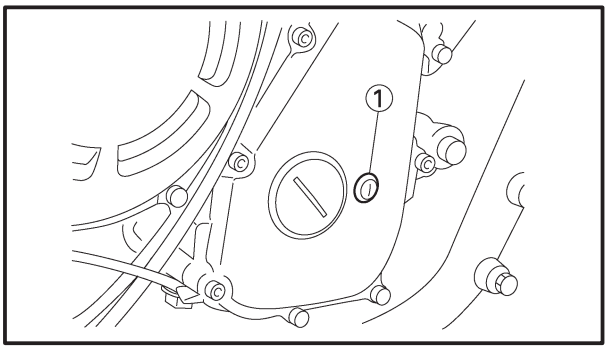
8. Connect:
   • spark plug cap

EAS00063

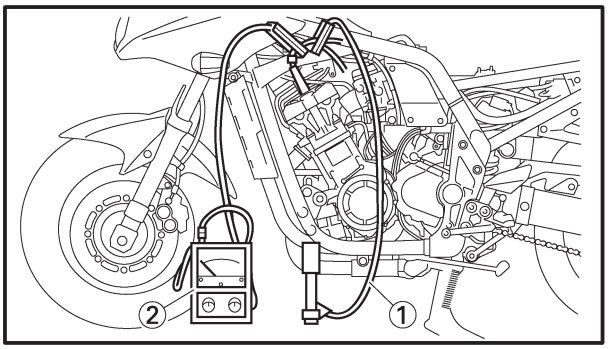
CHECKING THE IGNITION TIMING

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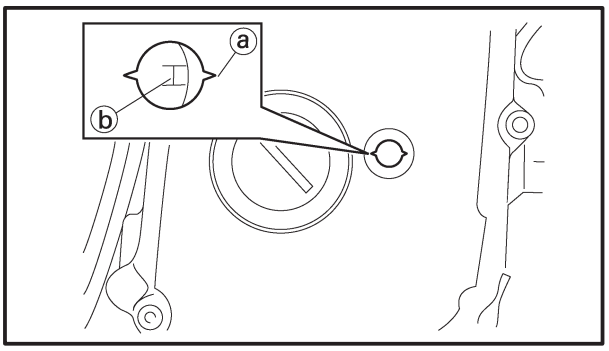
a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

Engine idling speed
1,050 ~ 1,150 r/min



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

NOTE:

The ignition timing is not adjustable.

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4. Remove:
   • timing light
   • engine tachometer
5. Install:
   • timing plug

EAS00065

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

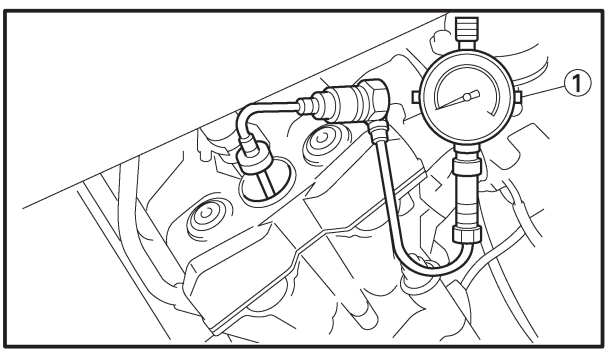
NOTE:

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   • valve clearance
   Out of specification → Adjust.
   Refer to "ADJUSTING THE VALVE 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
Compression gauge adapter
90890-04136

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

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

Compression pressure (at sea level):
Standard:
1,450 kPa (14.5 kg/cm²)
Minimum:
1,260 kPa (12.6 kg/cm²)
Maximum:
1,620 kPa (16.2 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).

7. Install:
   • spark plug — **13 Nm (1.3 m•kg)**
8. Connect:
   • spark plug cap

EAS00069

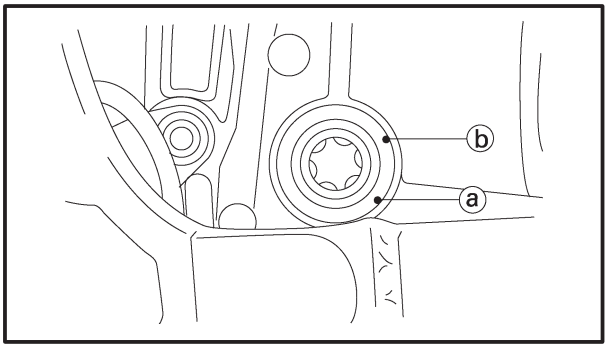
CHECKING THE ENGINE OIL LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

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

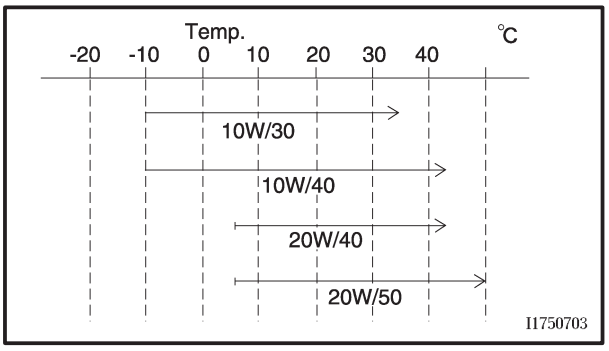
2. Let the engine idle for a few minutes.



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

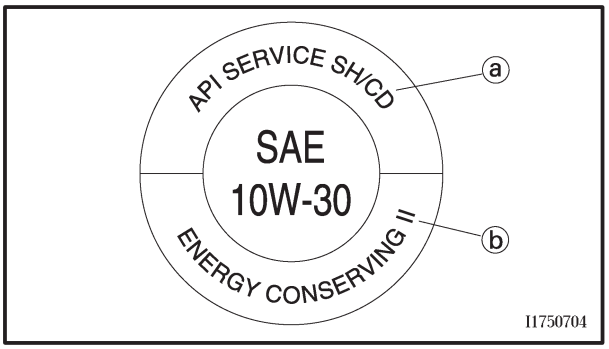
Refer to the chart for the engine oil grade which is best suited for certain atmospheric temperatures.

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 crankcase.**

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

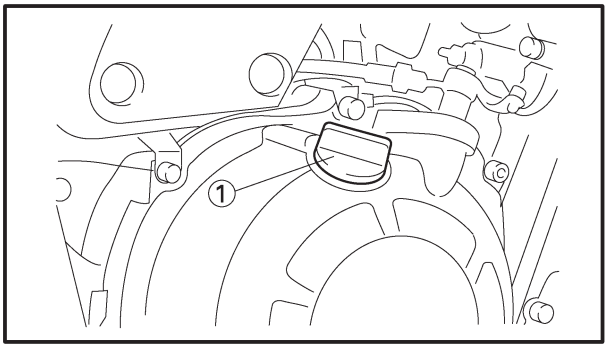
NOTE:

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

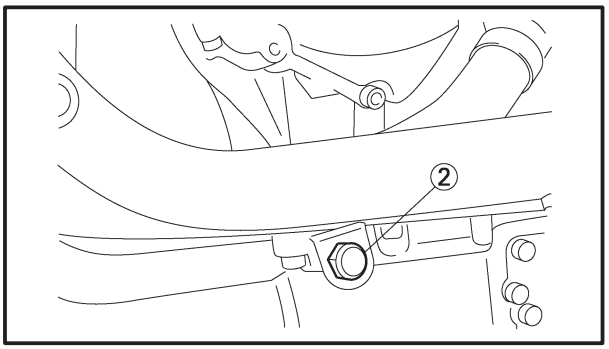
EAS00073

CHANGING THE ENGINE OIL

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



3. Remove:
   - 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.



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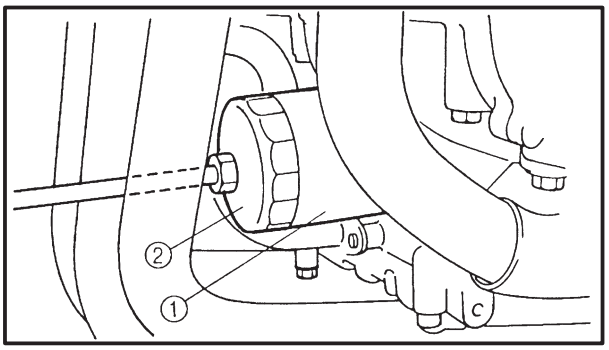
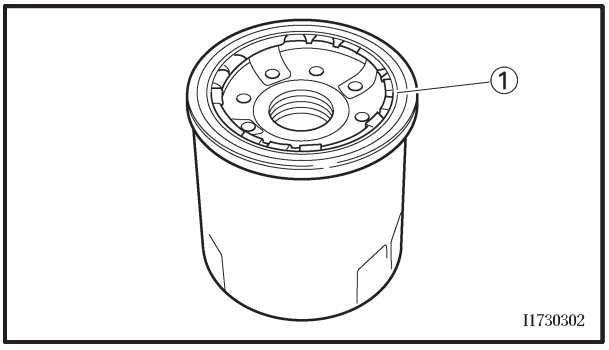
a. Remove the oil filter cartridge ① with an oil filter wrench ②.



Oil filter wrench
90890-01426



b. Apply a thin coat of engine oil onto the O-ring ① of the new oil filter cartridge.

CAUTION:

Make sure that the O-ring ① is positioned correctly in the groove of the oil filter cartridge.

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

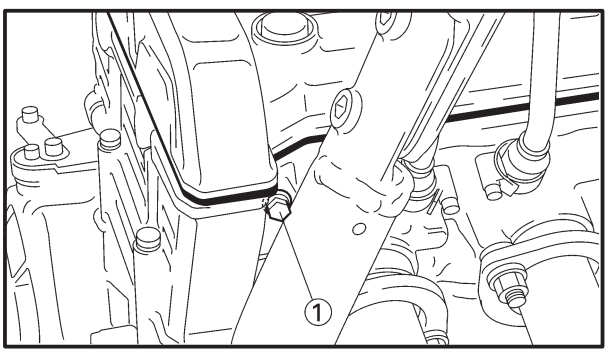
Oil filter cartridge
17 Nm (1.7 m•kg)

6. Check:
   • engine oil drain bolt gasket
   Damage → Replace.
7. Install:
   • engine oil drain bolt **43 Nm (4.3 m•kg)**
8. Fill:
   • crankcase
   (with the specified amount of the recommended engine oil)

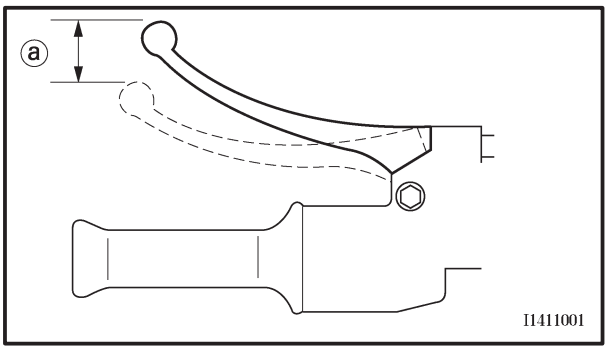
Quantity
Total amount
3.7 L
Without oil filter cartridge replacement
2.7 L
With oil filter cartridge replacement
3.0 L

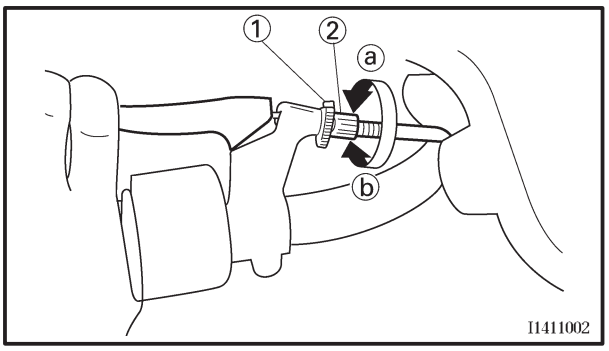
9. Install:
   • engine oil filler cap
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
   • engine
   (for engine oil leaks)
12. Check:
   • engine oil level
   Refer to "CHECKING THE ENGINE OIL LEVEL".
13. Check:
   • engine oil pressure

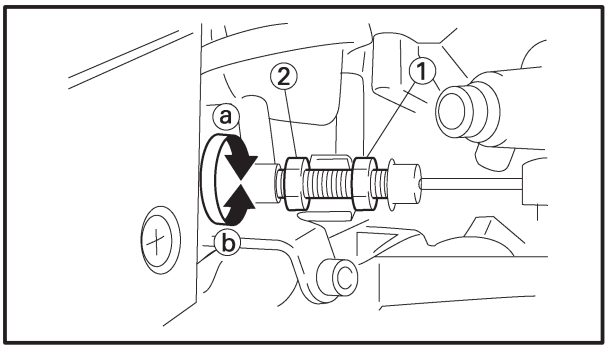
a. Slightly loosen the oil gallery bolt ①.
b. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
c. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to "OIL PAN AND OIL PUMP" in chapter 5.
d. Start the engine after solving the problem(-s) and check the engine oil pressure again.
e. Tighten the oil gallery bolt to specification.



	Oil gallery bolt **10 Nm (1.0 m•kg)**







EAS00078

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:

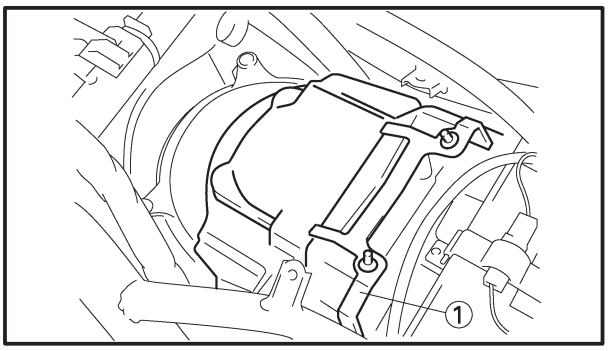
If the specified clutch cable free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.

Engine side

a. Loosen the locknuts 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**

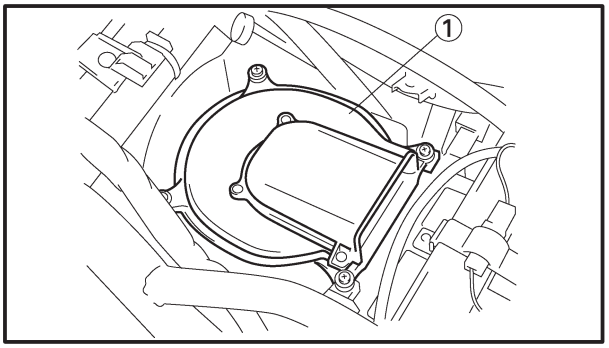
c. Tighten the locknuts.



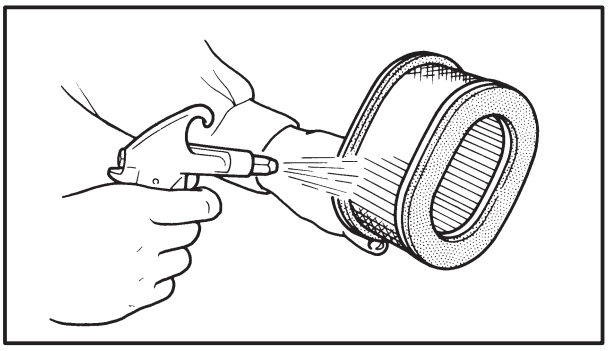
EAS00086

CLEANING THE AIR FILTER ELEMENT

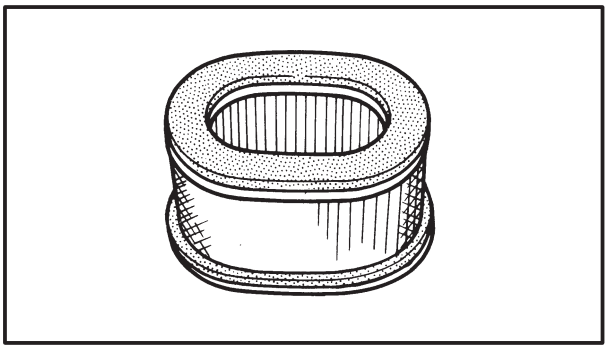
1. Remove:
   - seat
   - fuel tank
   - side cover
   - cover ①



2. Remove:
   - air filter case cover ①
   - air filter element



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

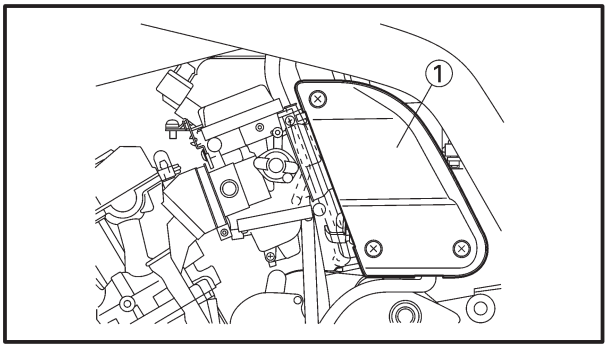
CAUTION:

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 tuning, 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
   - side cover
   - fuel tank
   - seat

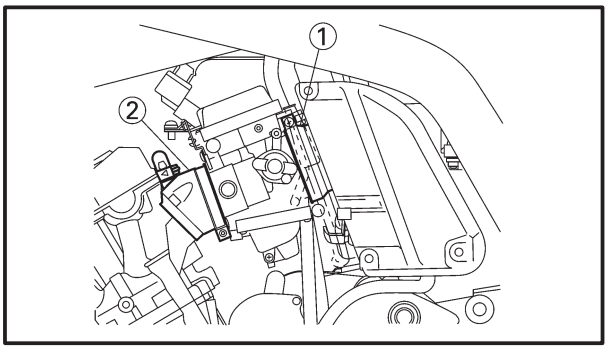


EAS00095

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
   - air filter case panel ①



2. Check:
   - carburetor joint ①
   - intake manifold ②

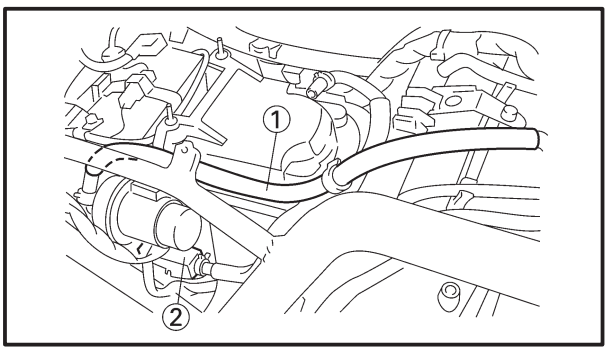
   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 6.
3. Install:
   - air chamber cover
   - fuel tank
   - seat

EAS00097

CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

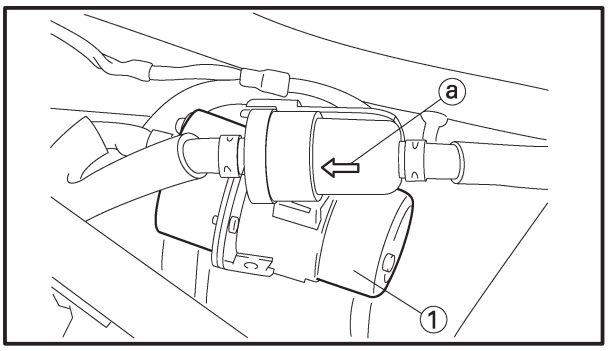
1. Remove:
   - seat
   - fuel tank
   - side cover



2. Check:
   - fuel hose ①

   Cracks/damage → Replace.
   - fuel filter ②

   Damage/dirt → Replace.



NOTE:

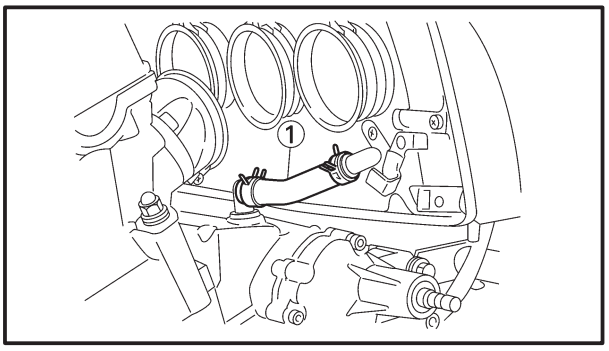
- Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
- The arrow mark ⓐ on the fuel filter should face to the side of the fuel pump ①.

3. Install:
   - side cover
   - fuel tank
   - seat

EAS00098

CHECKING THE CRANKCASE BREATHER HOSE

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



CAUTION:

Make sure that the crankcase breather hose is routed correctly.

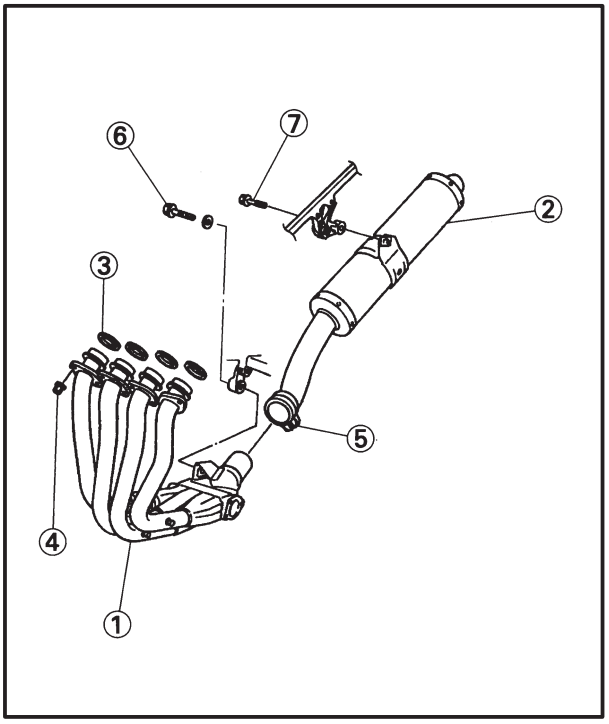
3. Install:
   - fuel tank
   - seat

EAS00099

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

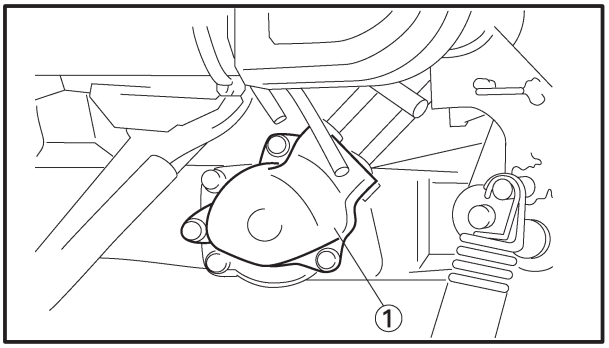


Exhaust pipe nut ④
20 Nm (2.0 m•kg)
Exhaust pipe and muffler bolt ⑤
20 Nm (2.0 m•kg)
Exhaust pipe and bracket bolt ⑥
20 Nm (2.0 m•kg)
Muffler and muffler bracket bolt ⑦
48 Nm (4.8 m•kg)

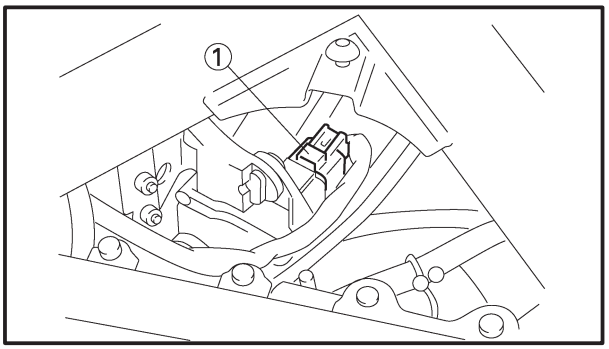
EAS00101

ADJUSTING THE EXUP CABLES

1. Remove:
   - seat
   - fuel tank



2. Remove:
   - EXUP valve pulley cover ①



3. Check:
   - EXUP operation

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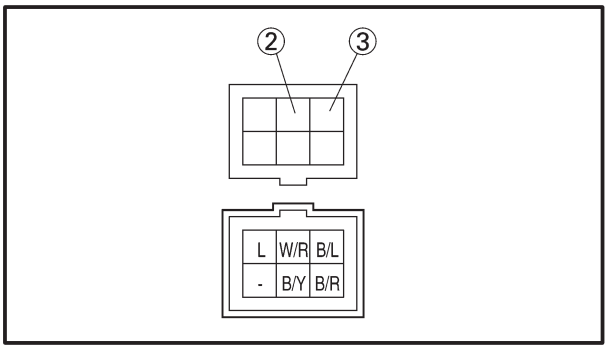
a. Disconnect the EXUP servomotor connector ①.



b. Connect the battery to the EXUP servomotor connector and check if the servomotor operates properly.

Battery positive lead → black/yellow②
Battery negative lead → black/red③

CAUTION:

To avoid damaging the servomotor, do not leave the battery connected to it for more than a few seconds.

c. Check that the EXUP valve operates properly.
d. Connect the EXUP servomotor connector.

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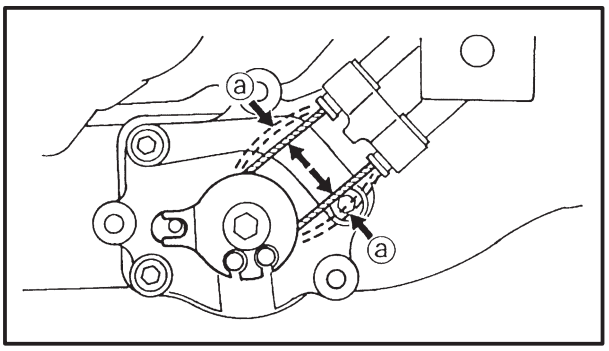
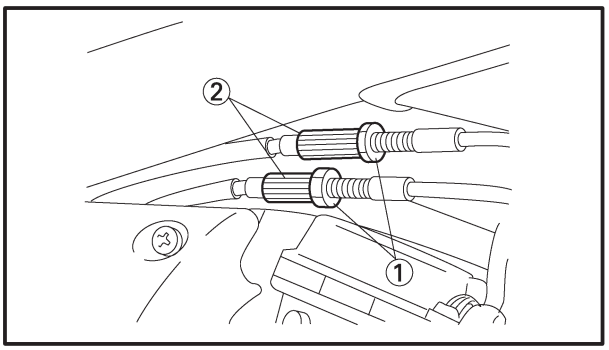


4. Check:
   • EXUP cable free play ⓐ

EXUP cable free play
1.5 mm max.



5. Adjust:
   • EXUP cable free play

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a. Loosen both locknuts ①.
b. Insert a 4 mm long pin through the notch in the EXUP valve pulley and into the hole in the EXUP valve cover.
c. Turn both adjusting bolts ② counterclockwise until there is no EXUP cable free play.
d. Turn both adjusting bolts 1/2 of a turn clockwise.
e. Tighten both locknuts and then remove the pin.

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6. Install:
   • EXUP valve pulley cover

10 Nm (1.0 m•kg)

7. Install:
   • fuel tank
   • seat

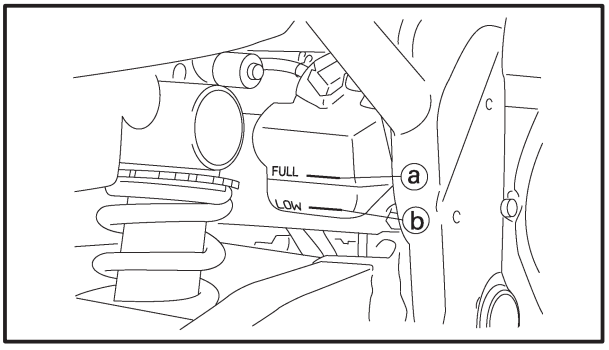
EAS00102

CHECKING THE COOLANT LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

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



2. 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.

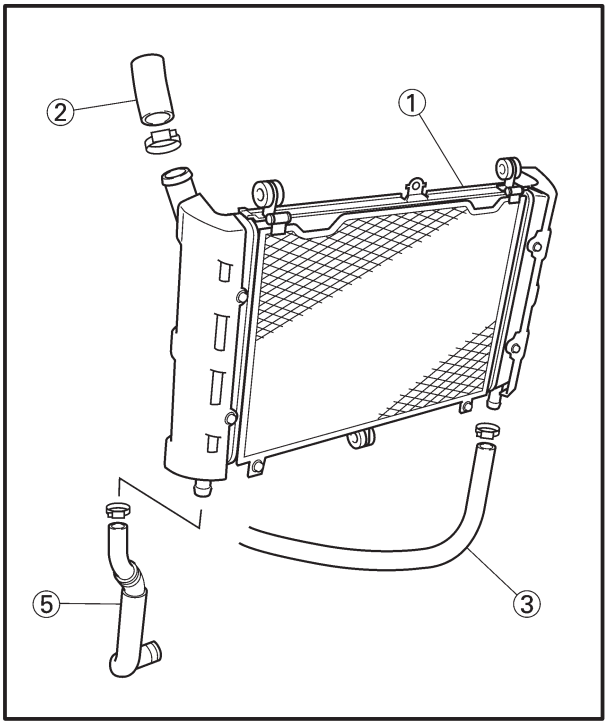
CAUTION:

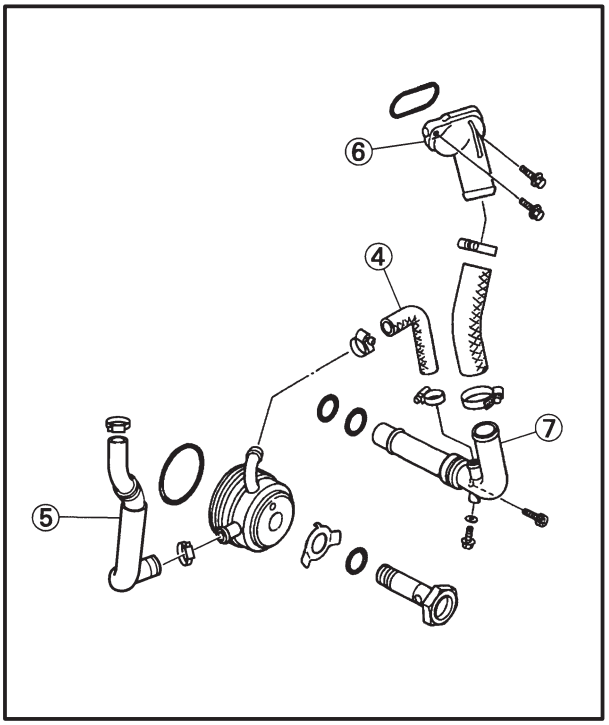
- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check and correct the antifreeze concentration of the coolant.**
- **Use only distilled water. Soft water may be used if distilled water is not available.**

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

NOTE:

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



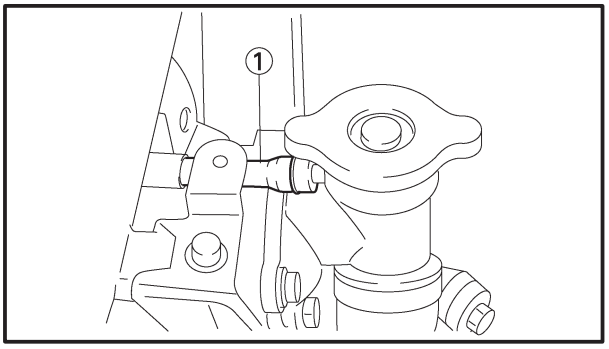


EAS00104

CHECKING THE COOLING SYSTEM

1. Check:
   - radiator ①
   - radiator inlet hose ②
   - radiator outlet hose ③
   - oil cooler inlet hose ④
   - oil cooler outlet hose ⑤
   - water jacket inlet joint ⑥
   - water pump outlet joint ⑦

   Cracks/damage → Replace.
   Refer to “COOLING SYSTEM” in chapter 5.



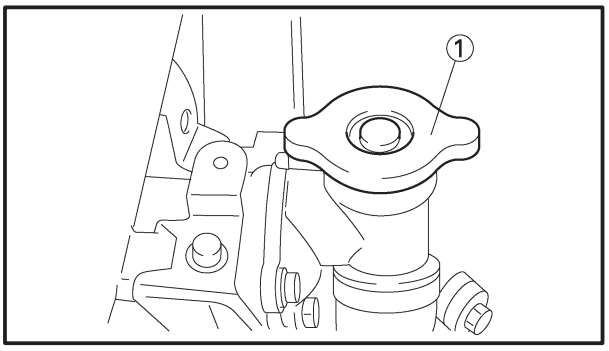
EAS00105

CHANGING THE COOLANT

1. Remove
   - seat
   - fuel tank
   - front cowling
   - rear suspension

   Refer to "REAR SHOCK ABSORBER ASSEMBLY" in chapter 4.
2. Disconnect:
   - coolant reservoir hose ①
3. Drain:
   - coolant

   (from the coolant reservoir)

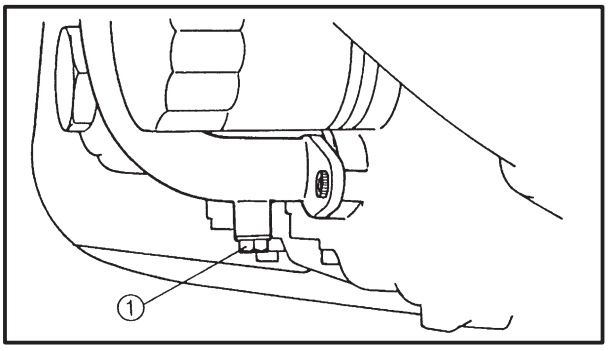


4. Remove:
   - radiator cap ①

⚠ WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap, while still pressing down turn it counterclockwise, and then remove it.

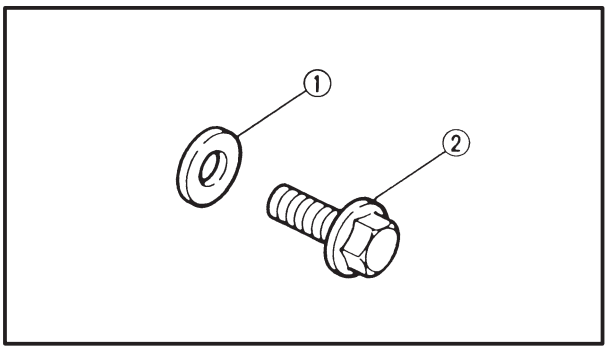
The following procedure applies to all of the coolant drain bolts and copper washers.



5. Remove:
   - coolant drain bolt ①

   (along with the copper washer)
6. Drain:
   - coolant

   (from the engine and radiator)



7. Check:
   • copper washer ①
   • coolant drain bolt ②
   Damage → Replace.
8. Install:
   • coolant drain bolt

7 Nm (0.7 m•kg)

9. Connect:
   • coolant reservoir hose
10. Fill:
   • cooling system
   (with the specified amount of the recommended coolant)

Recommended antifreeze
High-quality ethylene glycol anti freeze containing corrosion inhibi tors for aluminum engines
Mix ratio
50% antifreeze/50% water

Quantity
Total amount
2.4 L
Coolant reservoir capacity
0.3 L
From minimum to maximum level mark
0.2 L

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

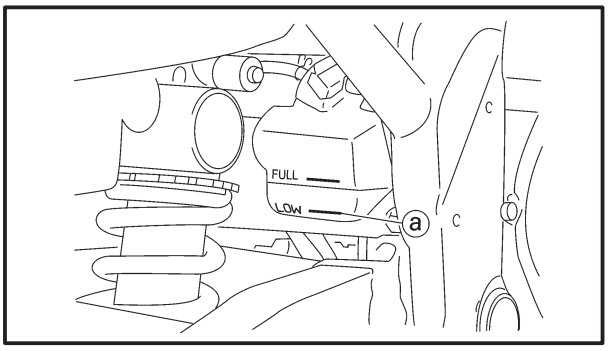
⚠ WARNING

- **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 it off.
15. Check:
    - coolant level

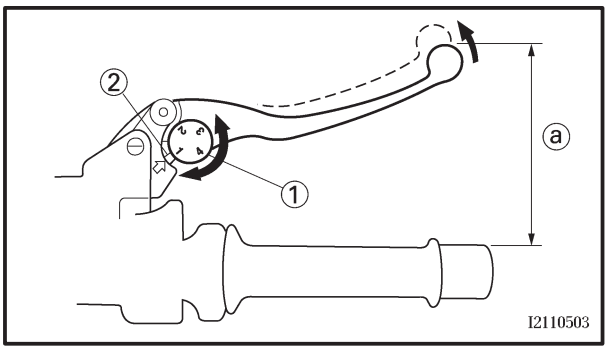
    Refer to "CHECKING THE COOLANT LEVEL".

NOTE:

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

16. Install:
    - rear suspension

    Refer to "REAR SHOCK ABSORBER ASSEMBLY" in chapter 4.
    - fuel tank
    - seat



EAS00107

CHASSIS

ADJUSTING THE FRONT BRAKE

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

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

NOTE:

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

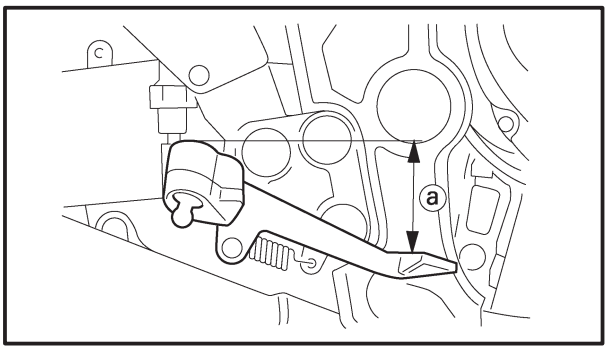
Position #1	**Distance ⓐ is the largest.**
Position #4	**Distance ⓐ is the smallest.**

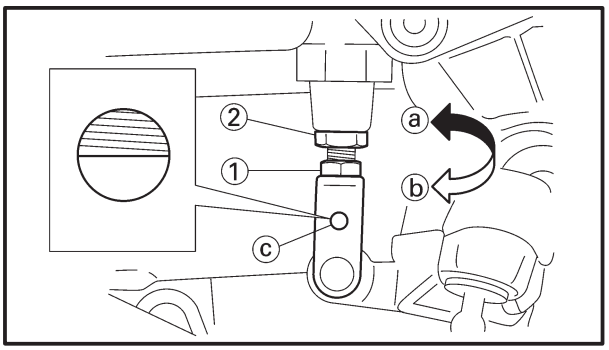
⚠ WARNING

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

CAUTION:

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





EAS00110

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)
40 mm

2. Adjust:
   - brake pedal position

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.

Locknut
18 Nm (1.8 m•kg)

⚠ WARNING

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

CAUTION:

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

3. Adjust:
   • rear brake light switch
   Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH”.

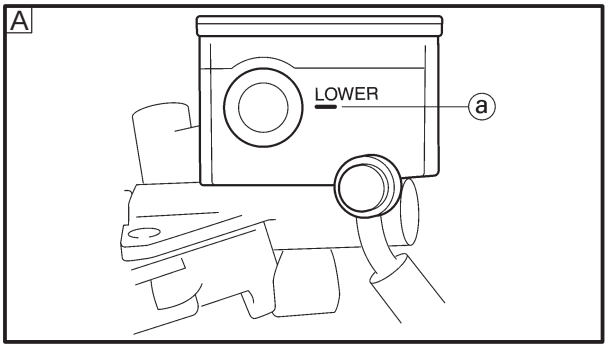
EAS00115

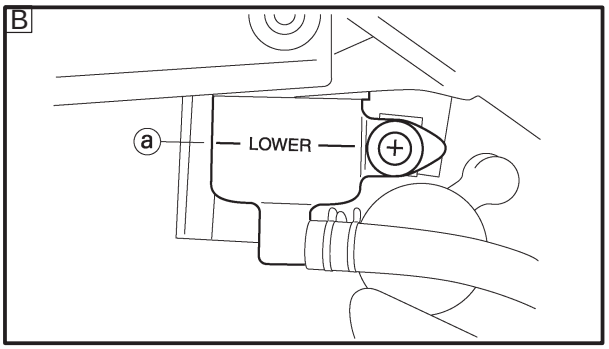
CHECKING THE BRAKE FLUID LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

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





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

Recommended brake fluid
DOT 4

A Front brake
B Rear brake

⚠ WARNING

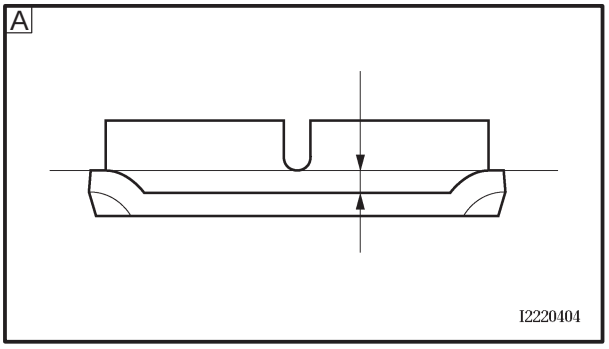
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

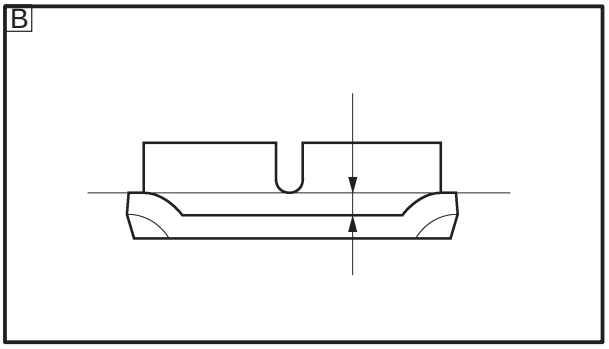
CAUTION:

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

NOTE:

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





EAS00122

CHECKING THE BRAKE PADS

The following procedure applies to all of the brake pads.

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

   Wear indicator groove ① almost disappeared → Replace the brake pads as a set. Refer to "REPLACING THE FRONT BRAKE PADS" and "REPLACING THE REAR BRAKE PADS" in chapter 4.

A Front brake

B Rear brake

EAS00128

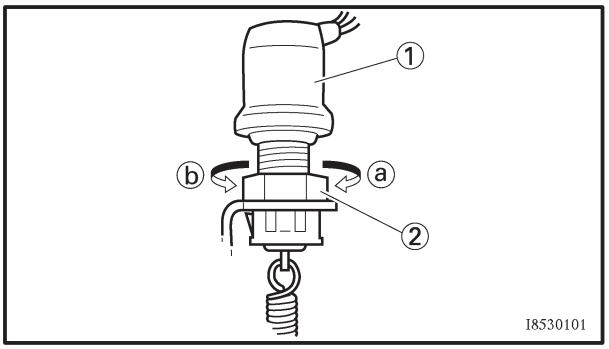
ADJUSTING THE REAR BRAKE LIGHT SWITCH

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

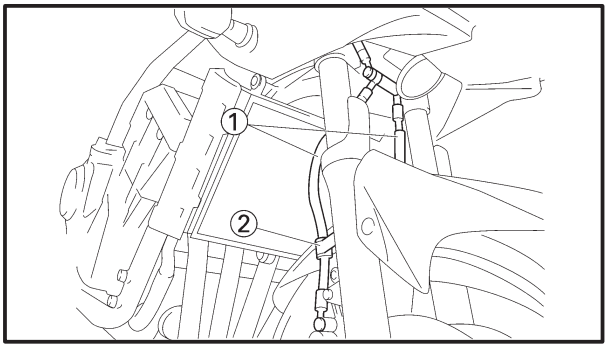
   Incorrect → Adjust.

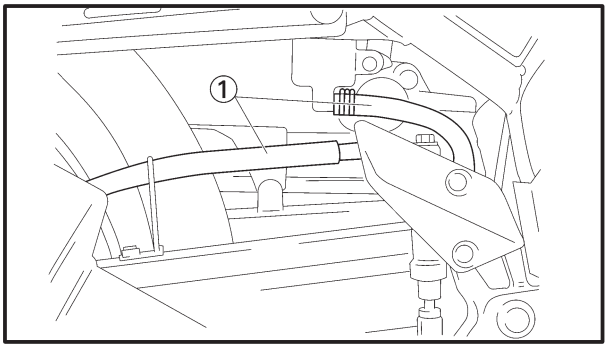


2. Adjust:
   - rear brake light operation timing

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.**





EAS00131

CHECKING THE BRAKE HOSES

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

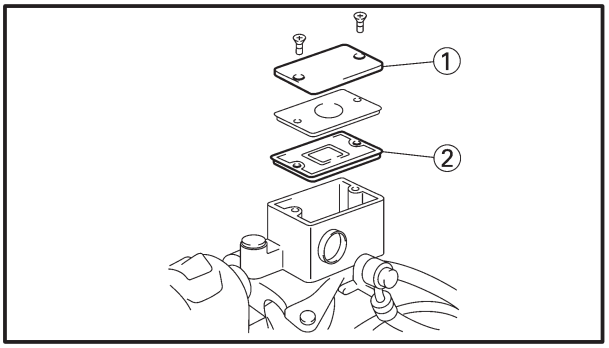
1. Check:
   - brake hose ①
   Cracks/damage/wear → Replace.
2. Check:
   - brake hose clamp ②
   Loose connection → Tighten.
3. Hold the motorcycle upright and apply the brake.
4. Check:
   - brake hose ①
   Activate the brake several times.
   Brake fluid leakage → Replace the damaged hose.
   Refer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

EAS00134

BLEEDING THE HYDRAULIC BRAKE SYSTEM

⚠ WARNING

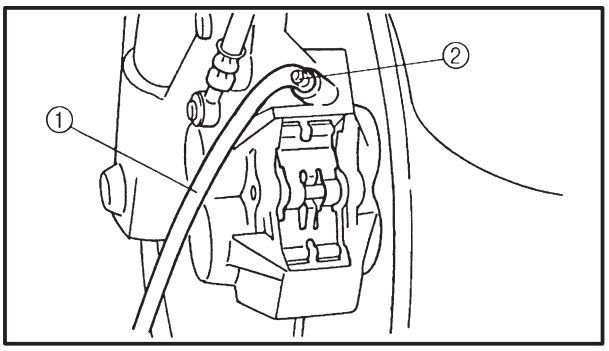
Bleed the hydraulic brake system whenever:
- **the system was disassembled,**
- **a brake hose was loosened or removed,**
- **the brake fluid level is very low,**
- **brake operation is faulty.**

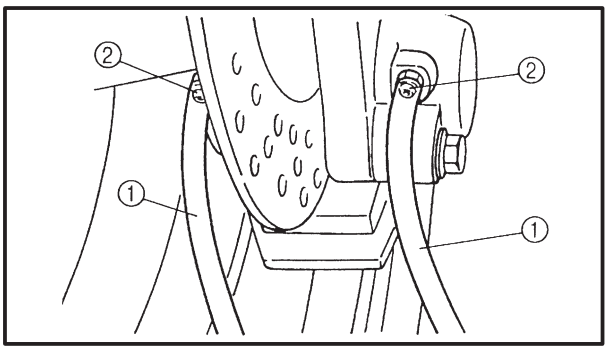


1. Remove:
   - reservoir cap ①
   - diaphragm ②

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.

A Front
B Rear

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

	Bleed screw **6 Nm (0.6 m•kg)**

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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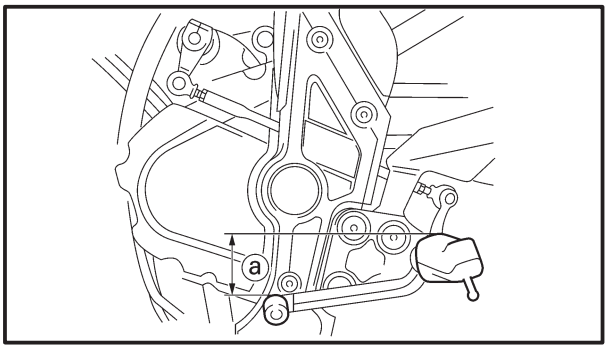
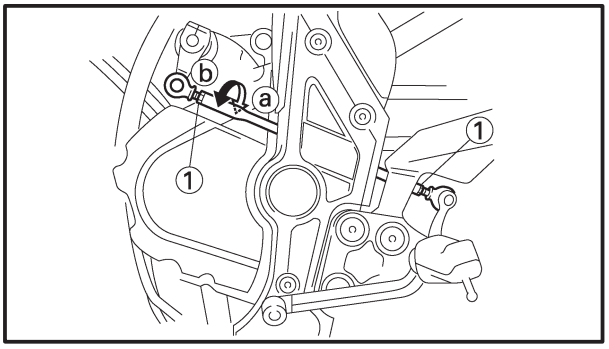


EAS00110

ADJUSTING THE SHIFT PEDAL

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

	Shift pedal position (below the top of the rider footrest) **40 mm**



2. Adjust:
   • adjusting bolt length

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a. Loosen both locknuts ①.
b. Turn the adjusting bolt ② in direction ⓐ or ⓑ to obtain the correct shift pedal position.

Direction ⓐ	**Shift pedal is raised.**
Direction ⓑ	**Shift pedal is lowered.**

   • Tighten both locknuts.

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EAS00140

ADJUSTING THE DRIVE CHAIN SLACK

NOTE:

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

CAUTION:

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

1. Stand the motorcycle on a level surface.

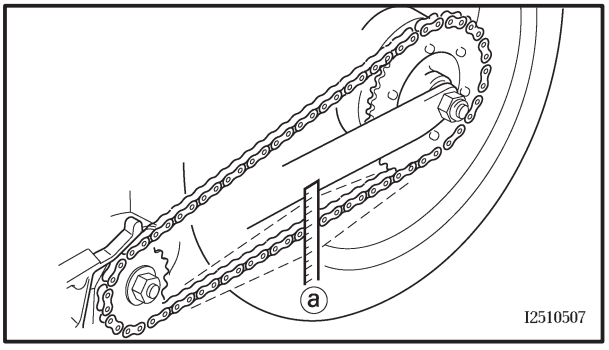
⚠ WARNING

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

NOTE:

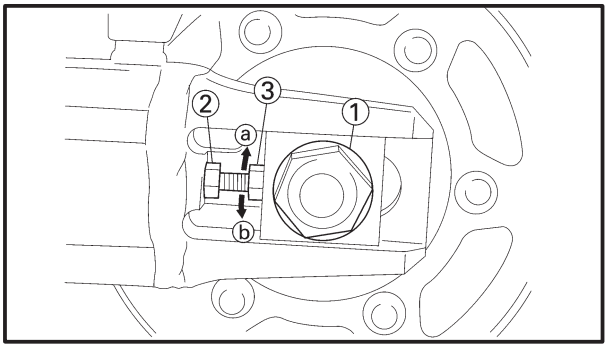
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. 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
40 ~ 50 mm



4. Adjust:
   • drive chain slack

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a. Loosen the brake caliper bracket bolt.
b. Loosen the wheel axle nut ①.
c. Loosen both locknuts ②.
d. Turn both adjusting nuts ③ 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.

e. Tighten both locknuts to specification.

Locknut
16 Nm (1.6 m•kg)

f. Tighten the wheel axle nut to specification.

Wheel axle nut
150 Nm (15 m•kg)

EAS00142

LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out 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 forO-ring chains

EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

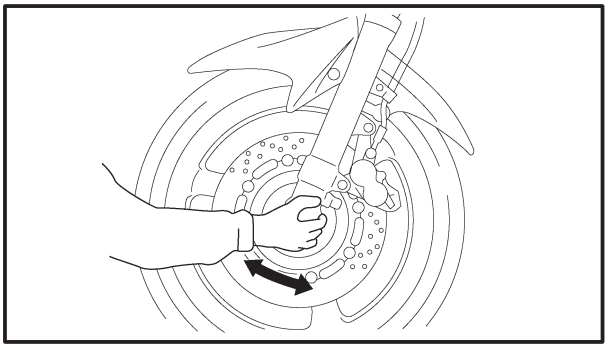
1. Stand the motorcycle on a level surface.

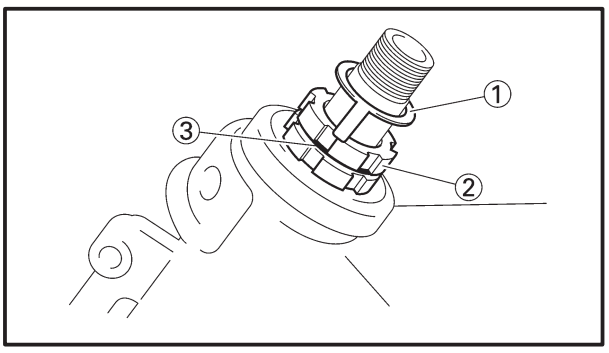
⚠ WARNING

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

NOTE:

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





2. Check:
   - steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Looseness or binding → Adjust the steering head.
3. Remove:
   - front cowling assembly
     Refer to “FRONT COWLING”.
   - upper bracket
     Refer to “HANDLEBAR” and “STEERING HEAD” in chapter 4.
4. Adjust:
   - steering head

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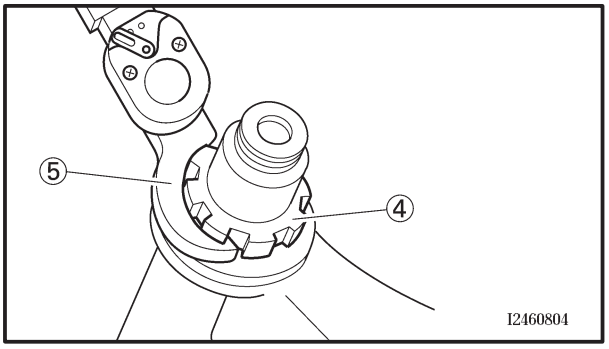
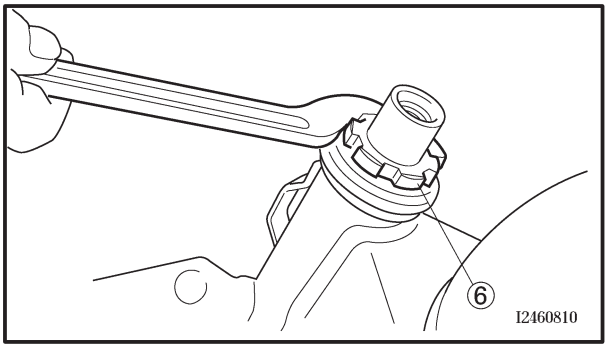
a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.





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)

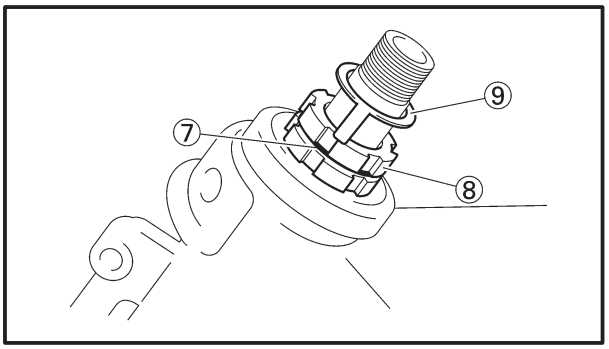
c. Loosen the lower ring nut ⑥ completely, then tighten it to specification.

⚠ WARNING

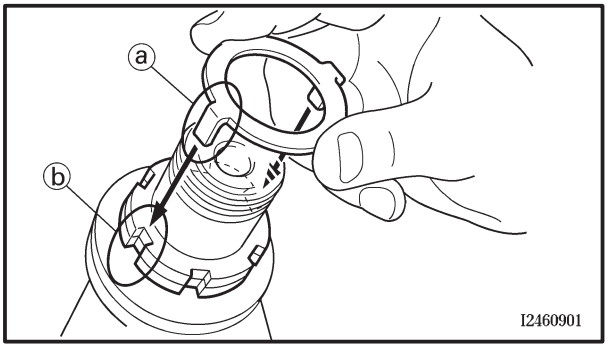
Do not overtighten the lower ring nut.

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 4.



e. Install the rubber washer ⑦.
f. Install the upper ring nut ⑧.
g. Finger tighten the upper ring nut ⑧, 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 ⑨.



NOTE:

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

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5. Install:
   • upper bracket
   • front cowling assembly

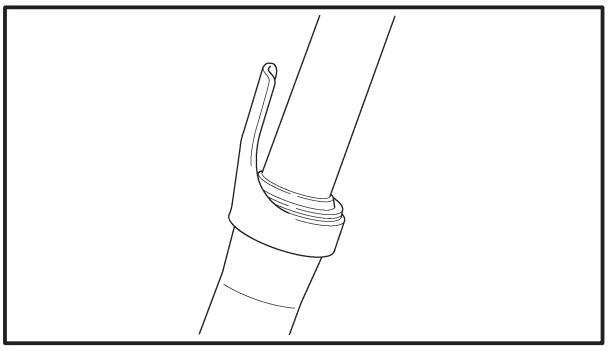
Steering stem nut
110 Nm (11 m•kg)
Upper bracket pinch bolt
30 Nm (3.0 m•kg)
Handlebar holder bolt
23 Nm (2.3 m•kg)

EAS00149
CHECKING THE FRONT FORK

1. Stand the motorcycle on a level surface.

⚠ WARNING

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



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

EAS00155
ADJUSTING THE FRONT FORK LEGS

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

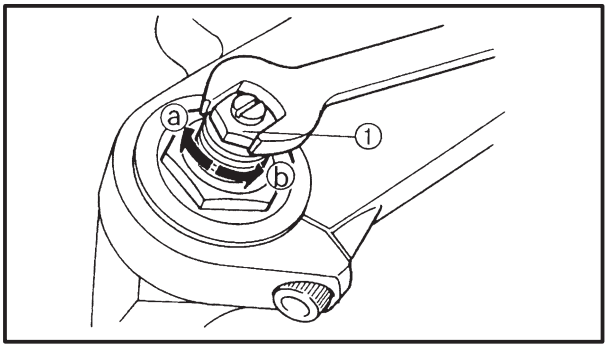
⚠ WARNING

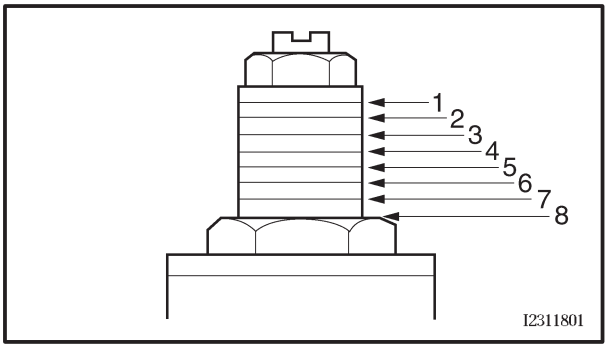
- **Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.**
- **Securely support the motorcycle so that there is no danger of it falling over.**

Spring preload

CAUTION:

- **Grooves are provided to indicate the adjustment position.**
- **Never go beyond the maximum or minimum adjustment positions.**





1. Adjust:
   • spring preload

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a. Turn the adjusting bolt ① in direction ⓐ or ⓑ.

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

Adjusting positions
Standard: 4
Minimum: 8
Maximum: 1

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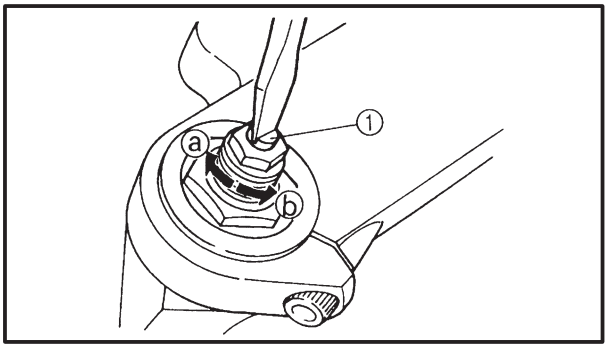
Rebound damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.



1. Adjust:
   • rebound damping

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

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

Adjusting positions
Standard: 7 clicks out*
Minimum: 17 clicks out*
Maximum: 1 clicks out*

*: from the fully turned-in position

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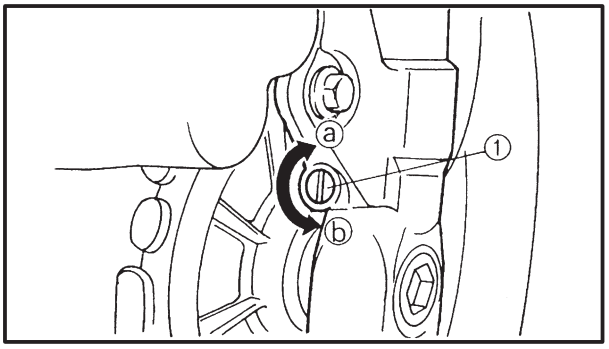
Compression damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.



1. Adjust:
   • compression damping

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

Direction	**Compression damping is increased (suspension is harder).**
Direction	**Compression damping is decreased (suspension is softer).**

Adjusting positions
Standard: 6 clicks out*
Minimum: 21 clicks out*
Maximum: 1 clicks out*

*: from the fully turned-in position

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EAS00158

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

⚠ WARNING

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

Spring preload

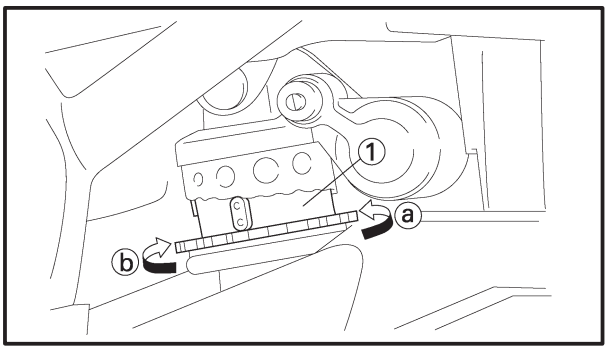
CAUTION:

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 ②.

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

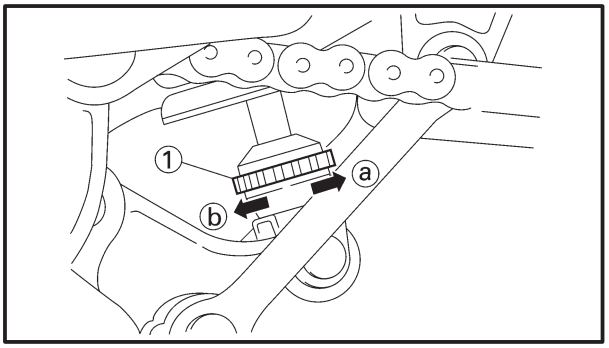
Adjusting positions
Standard: 6
Minimum: 1
Maximum: 11

Rebound damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • rebound damping



a. Turn the adjusting knob ① in direction ⓐ or ⓑ.

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

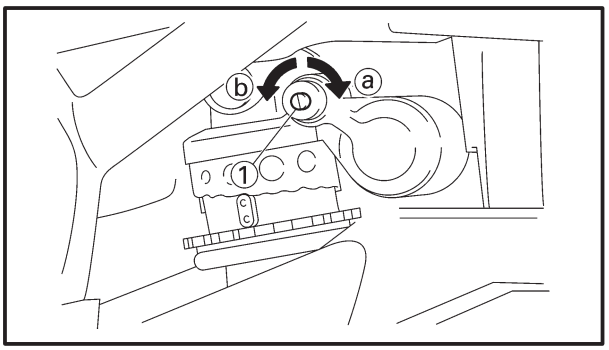
Adjusting positions
Standard: 20 clicks out*
Minimum: 10 clicks out*
Maximum: 3 clicks out*

*: from the fully turned-in position

Compression damping

CAUTION:

Never go beyond the maximum or minimum adjustment positions.



1. Adjust:
   • compression damping

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

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

Adjusting positions
Standard: 7 clicks in
Minimum: 1 clicks in
Maximum: 12 clicks in

*: from the fully turned-out position

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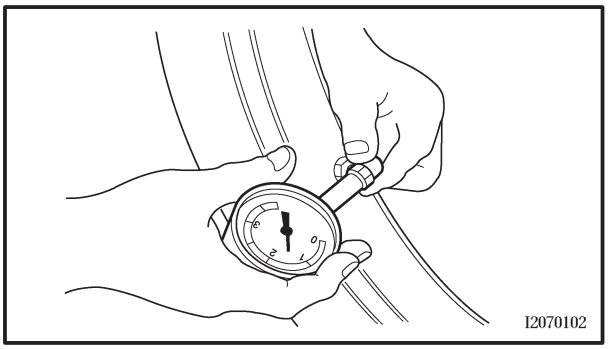


EAS00162

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.**

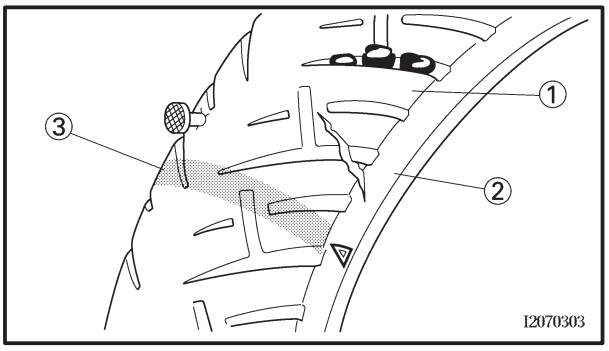
NEVER OVERLOAD THE MOTORCYCLE.

Basic weight (with oil and a full fuel tank)	231 kg	
Maximum load*	189 kg	
Cold tire pressure	Front tire	Rear tire
Up to 90 kg load*	250 kPa (2.5 kgf/cm^2)	270 kPa (2.7 kgf/cm^2)
90 kg ~ maximum load*	250 kPa (2.5 kgf/cm^2)	290 kPa (2.9 kgf/cm^2)
High speed riding	250 kPa (2.5 kgf/cm^2)	290 kPa (2.9 kgf/cm^2)

*: total of cargo, rider, passenger and accessories

⚠ WARNING

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



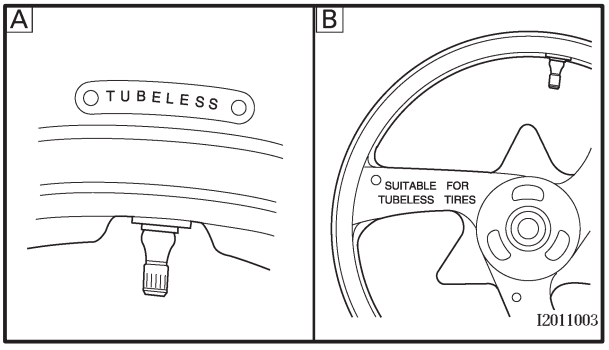
2. Check:
   • tire surfaces
   Damage/wear → Replace the tire.

Minimum tire tread depth
1.6 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

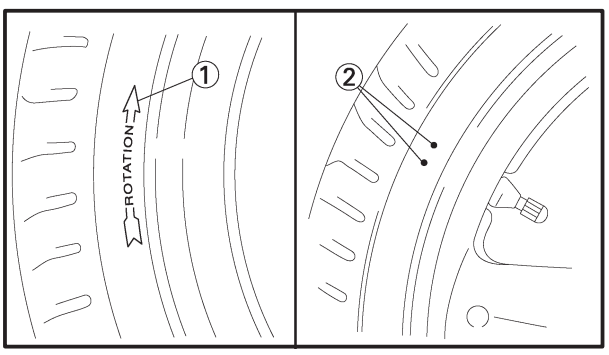
Manufacturer	Type	Size
BRIDGESTONE	Tubeless	120/70 ZR17 (58 W)
METZELER	Tubeless	120/70 ZR17 (58 W)

Rear tire

Manufacturer	Type	Size
BRIDGESTONE	Tubeless	180/55 ZR17 (73 W)
METZELER	Tubeless	180/55 ZR17 (73 W)

⚠ WARNING

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



NOTE:

For tires with a direction of rotation mark ①:
- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark ② with the valve installation point.

EAS00170

CHECKING AND LUBRICATING THE CABLES

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

⚠ WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

NOTE:

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

EAS00171

LUBRICATING THE LEVERS AND PEDALS

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

Recommended lubricant
lithium soap base grease

EAS00172

LUBRICATING THE SIDESTAND

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

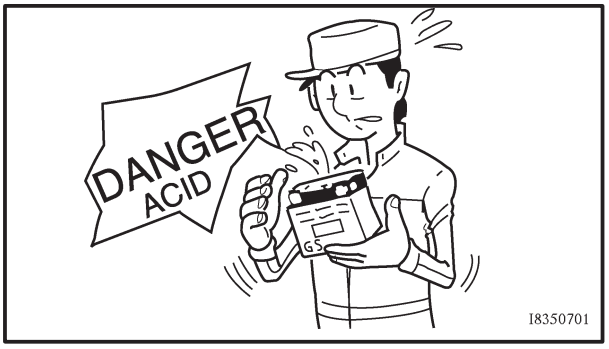
Recommended lubricant
lithium soap base grease

EAS00174

LUBRICATING THE REAR SUSPENSION

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

Recommended lubricant
lithium soap base grease



EAS00178

ELECTRICAL SYSTEM

CHECKING AND CHARGING THE BATTERY

⚠ WARNING

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

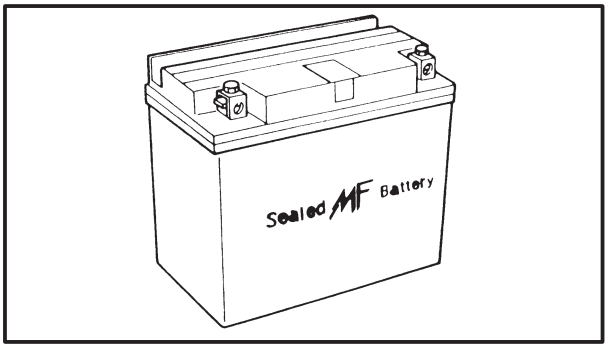
- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES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

First aid in case of bodily contact:
External

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

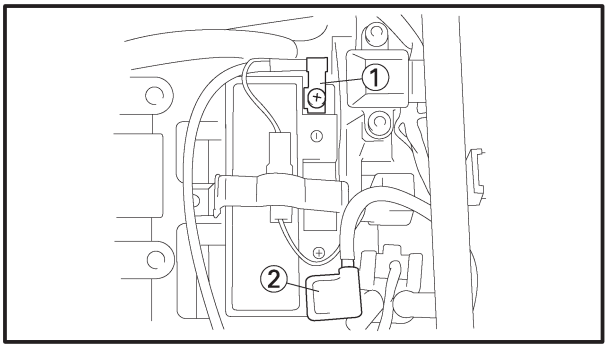
Internal

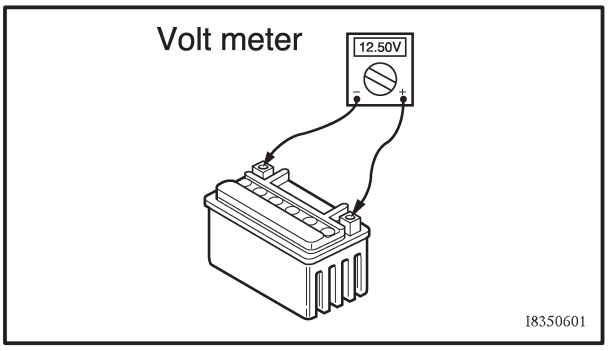
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

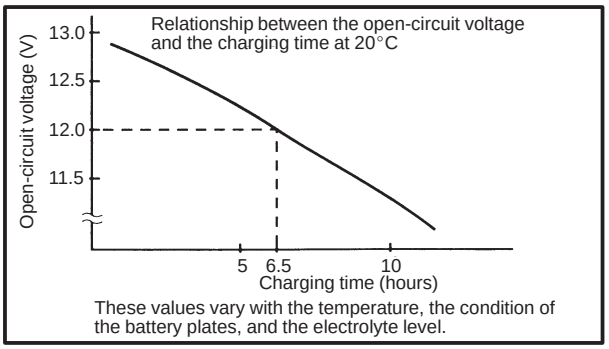


CAUTION:

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







NOTE:

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

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

CAUTION:

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

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

a. Connect a pocket tester to the battery terminals.

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

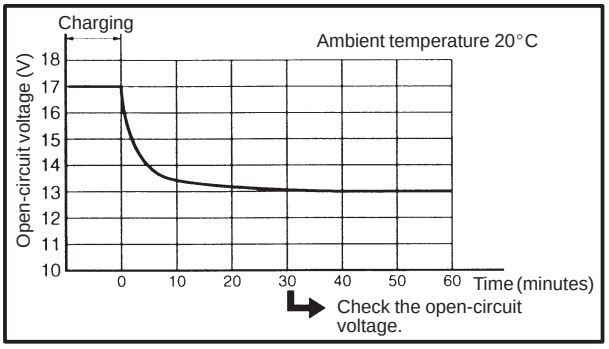
NOTE:

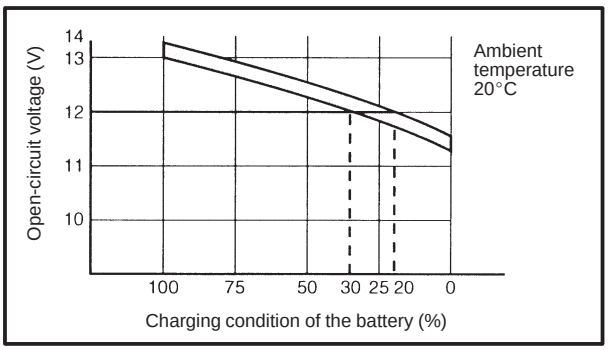
- The charge state of a MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

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

Example

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





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

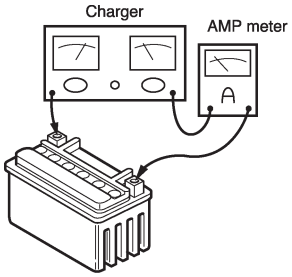
⚠ WARNING

Do not quick charge a battery.

CAUTION:

- **Make sure that the battery 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 voltage charger



I8350101

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 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

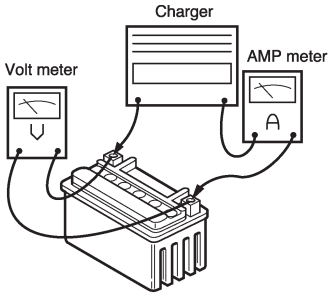
Charge the battery until the battery's charging voltage is 15 V. Charge the battery until the battery's charging voltage is 15 V.

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.



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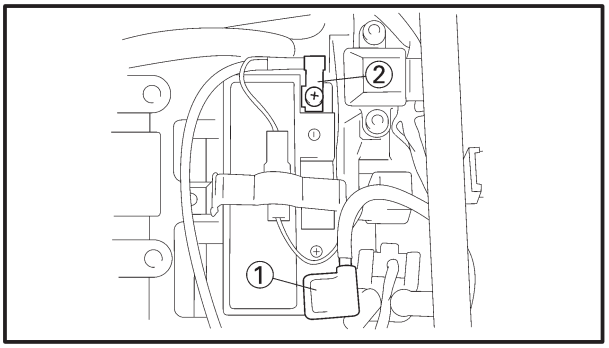
6. Check:
   • battery vent
   Obstruction → Clean.
   Damage → Replace.
7. Install:
   • battery



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

CAUTION:

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

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

	Recommended lubricant **Dielectric grease**

11. Install:
    • seat

EAS00181

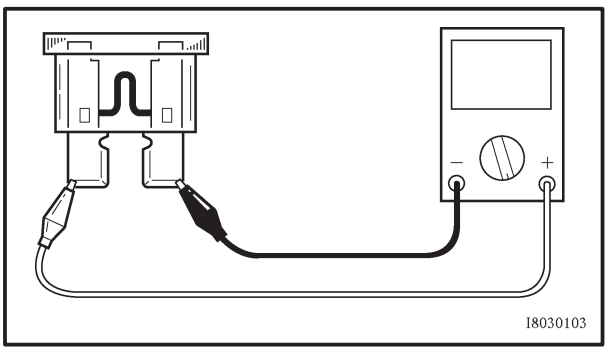
CHECKING THE FUSES

The following procedure applies to all of the fuses.

CAUTION:

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

1. Remove:
   • seat
2. Check:
   • fuse



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

NOTE:

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

Pocket tester
90890-03112

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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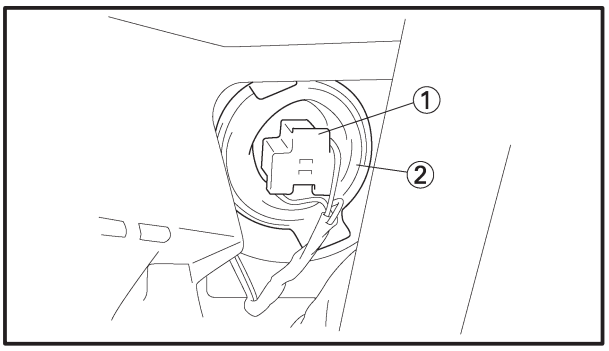
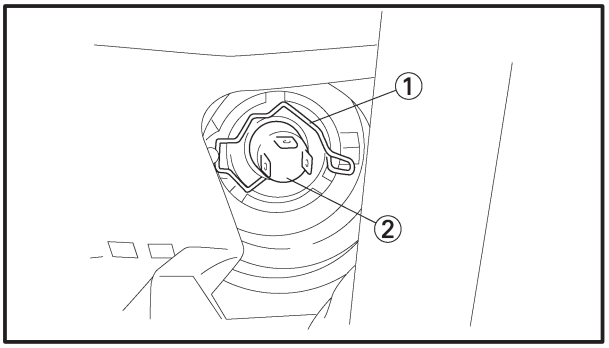
Fuses	Amperage rating	Quantity
Main fuse	30A	1
Headlight fuse	20A	1
Signaling system fuse	20A	1
Ignition fuse	20A	1
Turn signal relay fuse	10 A	1
Digital clock fuse	10A	1
Radiator fan fuse	10A	1
Reserve fuse	30A	1
Reserve fuse	20 A	1
Reserve fuse	10 A	1

⚠ 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





EAS00183

REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

1. Disconnect:
   - headlight coupler ①
   - bulb cover ②
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.

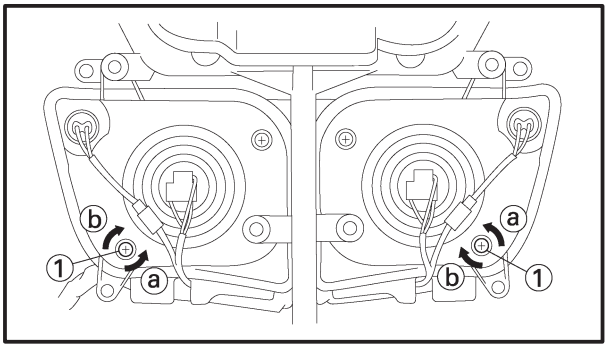
4. Install:
   - headlight bulb New

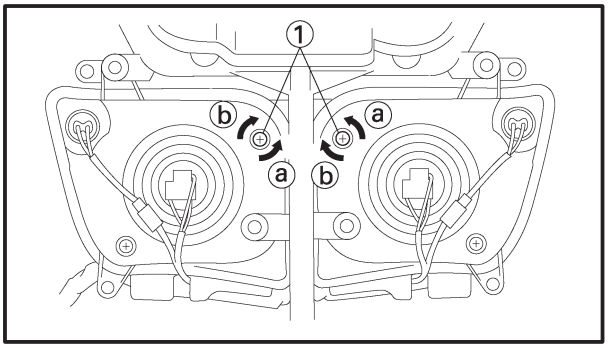
   Secure the new headlight bulb with the headlight bulb holder.

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. Install:
   - bulb cover
7. Connect:
   - headlight coupler





EAS00185

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 in direction ⓐ or ⓑ.

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

2. Adjust:
   • headlight beam (horizontally)

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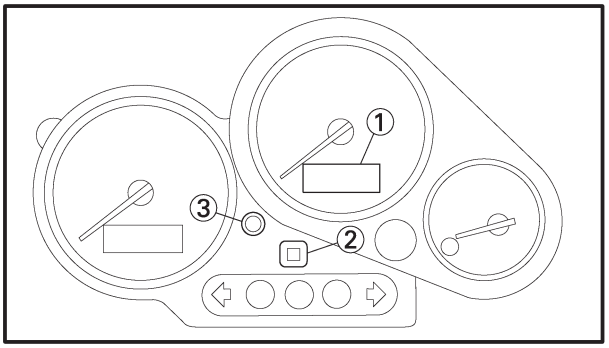
a. Turn the adjusting knob ① in direction ⓐ or ⓑ.

Left headlight

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

Right headlight

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



EAS00187

ADJUSTING THE DIGITAL CLOCK

NOTE:

This digital clock constantly displays the time.

1. Adjust:
   • digital clock ①

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a. Hold down the “RESET” button ② and “SELECT” button ③.
b. Push the “RESET” button ② to set the hour. And push the “SELECT” button.
c. Push the “RESET” button ② to set the minutes. And push the “SELECT” button.

NOTE:

When setting the time (e.g., after reconnecting the battery), first set the clock to 1:00 AM, then set it to the correct time.

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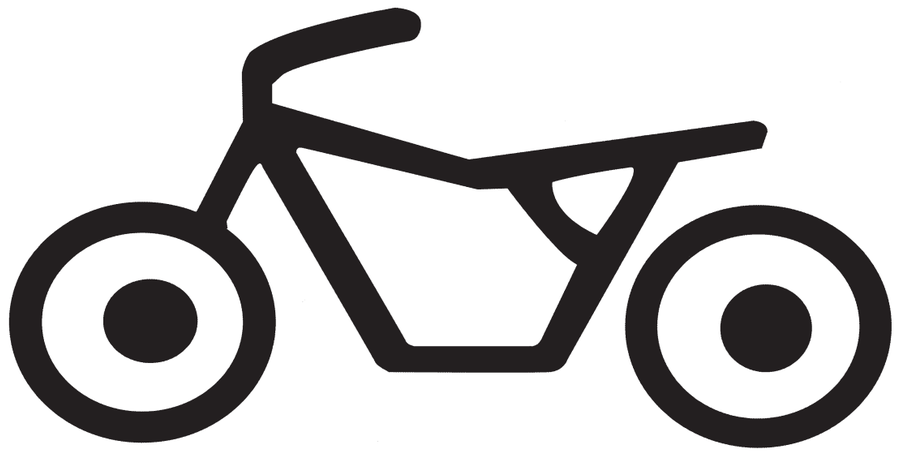

CHAS 4

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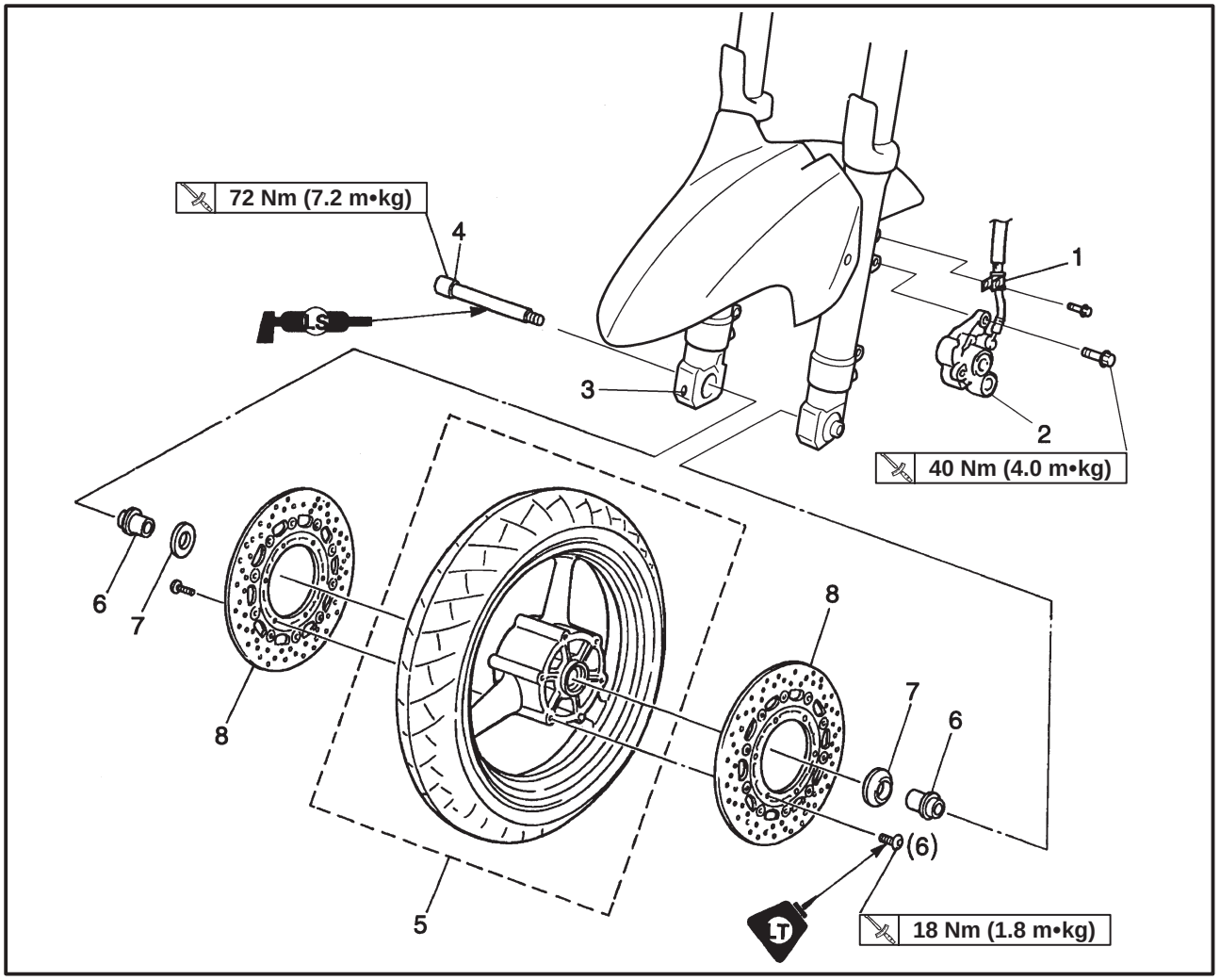
EAS00514

CHASSIS

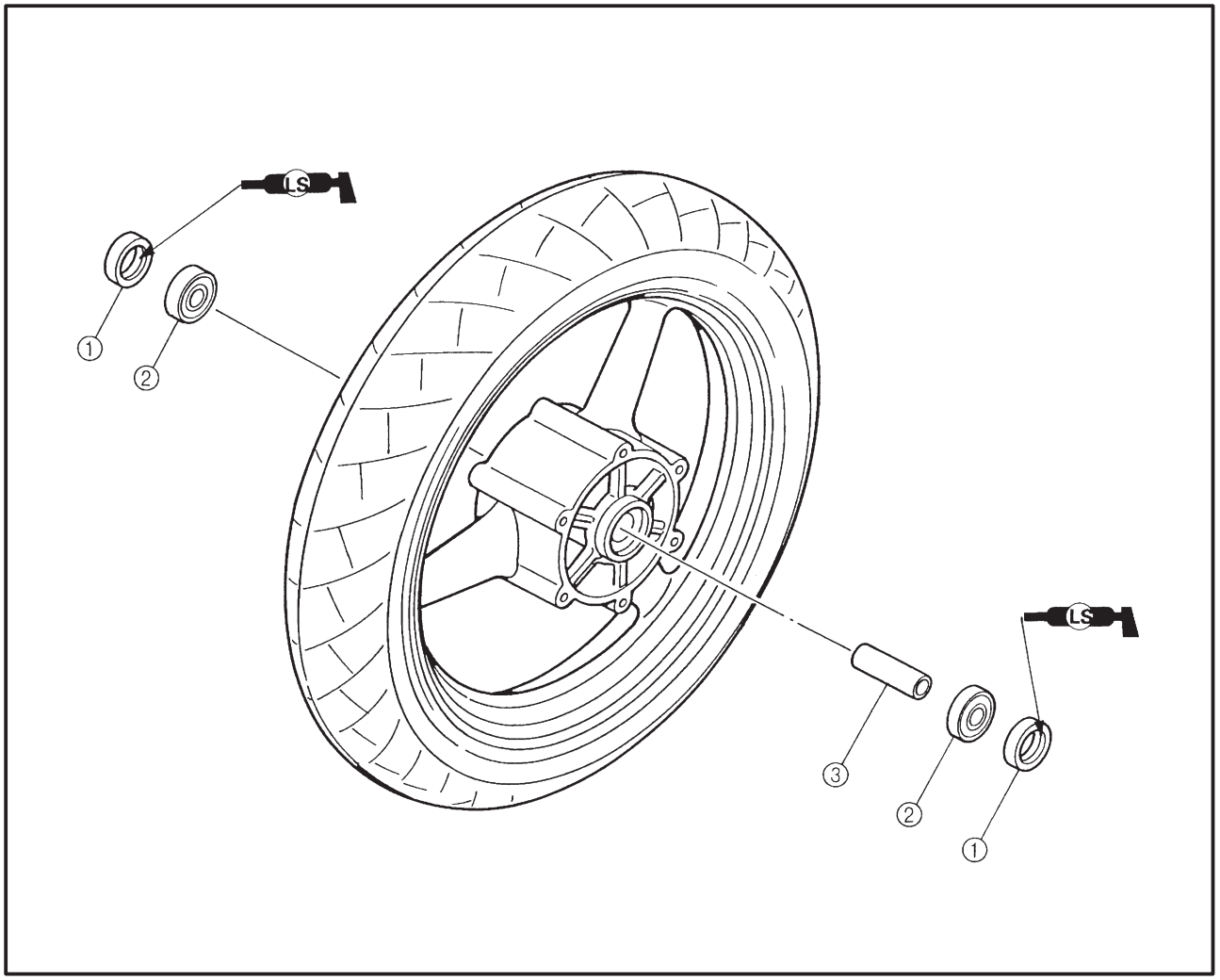
FRONT WHEEL AND BRAKE DISCS



Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake discs		Remove the parts in the order listed. **NOTE:** Place the motorcycle on a suitable stand so that the front wheel is elevated.
1	Brake hose holder (left and right)	2	
2	Brake caliper (left and right)	2	
3	Wheel axle pinch bolt	1	Loosen.
4	Front wheel axle	1	
5	Front wheel	1	
6	Collar (left and right)	2	
7	Oil seal cover (left and right)	2	
8	brake disc (left and right)	2	
			For installation, reverse the removal procedure.

EAS00518

FRONT WHEEL



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

EAS00521
REMOVING THE FRONT WHEEL

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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

2. Remove:
   - left brake caliper
   - right brake caliper

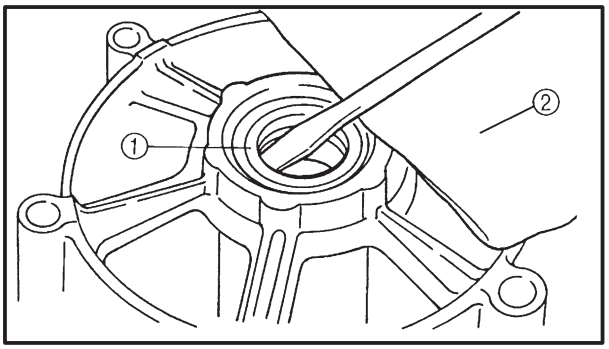
NOTE:

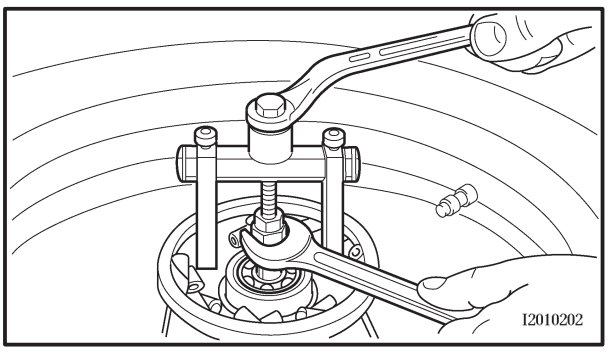
Do not squeeze the brake lever when removing the brake calipers.

3. Elevate:
   - front wheel

NOTE:

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





EAS00523
DISASSEMBLING THE FRONT WHEEL

1. Remove:
   - oil seals
   - wheel bearings

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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 with a general bearing puller.

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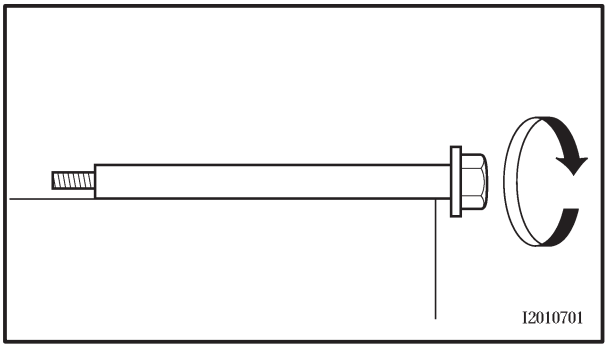


EAS00525

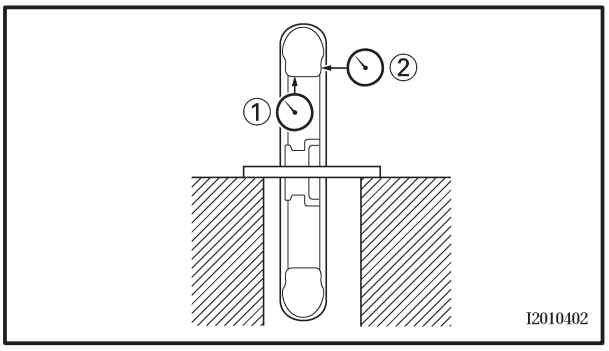
CHECKING THE FRONT WHEEL

1. Check:
   • wheel axle
   Roll the wheel axle on a flat surface.
   Bends → Replace.

⚠ WARNING

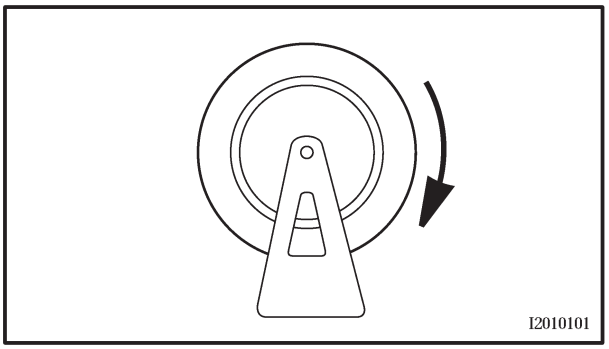
Do not attempt to straighten a bent wheel axle.

2. Check:
   • tire
   • front wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.

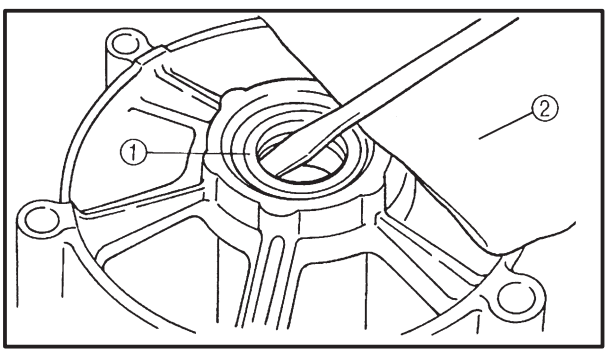


3. Measure:
   • front wheel radial runout ①
   • front wheel lateral runout ②
   Over the specified limits → Replace.

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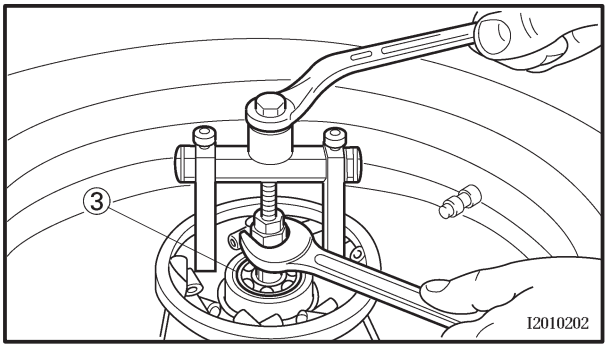
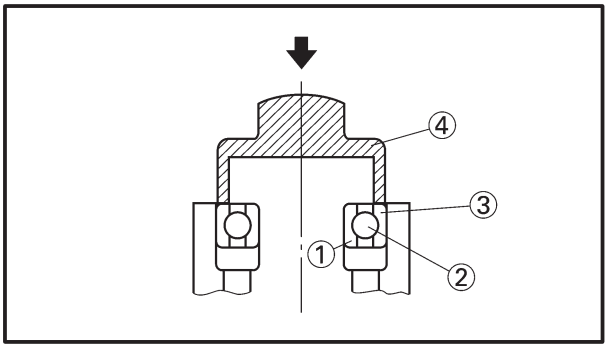
a. Clean the outside of the front wheel hub.
b. Remove the oil seals ① with a flat-head screwdriver.

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.
d. Install the new wheel bearings and oil seals in the reverse order of disassembly.



CAUTION:

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

NOTE:

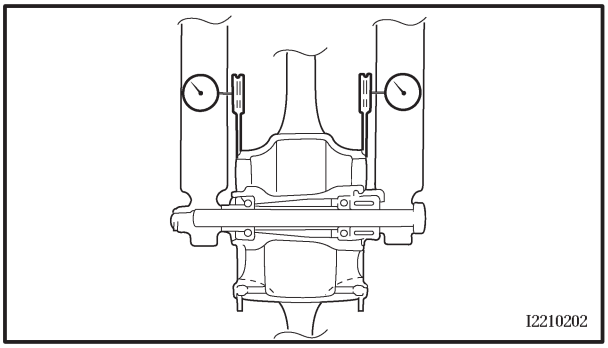
Use a socket ④ that matches the diameter of the wheel bearing outer race and oil seal.

EAS00531

CHECKING THE BRAKE DISCS

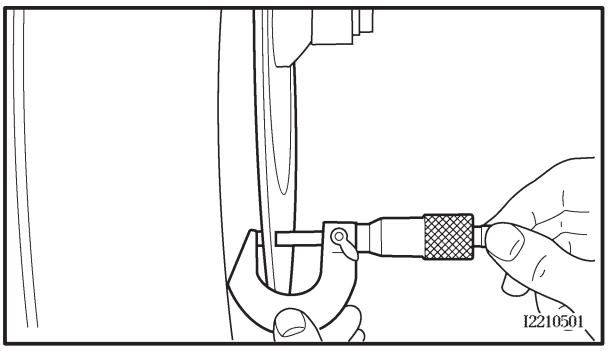
The following procedure applies to all of the brake discs.

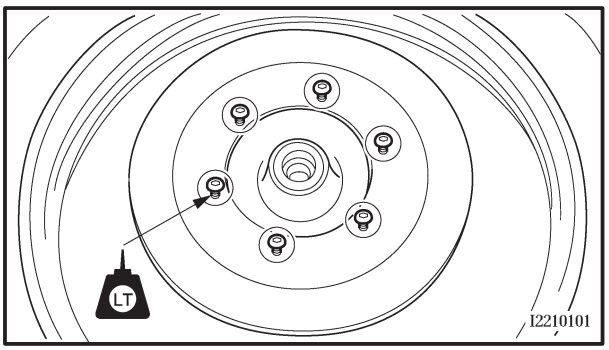
1. Check:
   - brake disc
     Damage/galling → Replace.
2. Measure:
   - brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.



Brake disc deflection limit (maximum)
0.1 mm

a. Place the motorcycle on a suitable stand so that the wheel is elevated.
b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection 2 ~ 3 mm below the edge of the brake disc.





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

Brake disc thickness limit (minimum)
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 in stages and in a crisscross pattern.

Brake disc bolt
18 Nm (1.8 m•kg)
LOCTITE®

d. Measure the brake disc deflection.
e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
f. If the brake disc deflection cannot be brought within specification, replace the brake disc.

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EAS00539

ASSEMBLING THE FRONT WHEEL

1. Install:
   • wheel bearings
   • oil seals New

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a. Install the new wheel bearings and oil seals in the reverse order of disassembly.

CAUTION:

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

NOTE:

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

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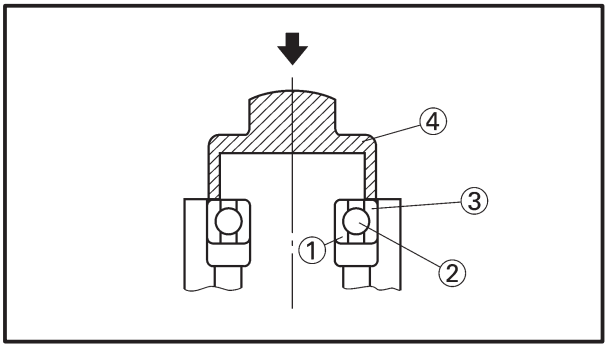
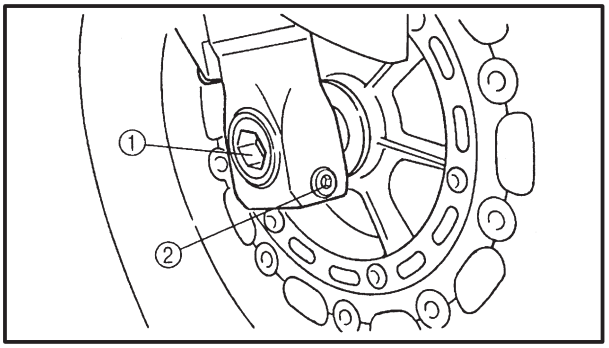




EAS00544
INSTALLING THE FRONT WHEEL
The following procedure applies to both brake discs.
1. Lubricate:
   • wheel axle
   • oil seal lips

Recommended lubricant
Lithium soap base grease

2. Tighten:
   • wheel axle ① — **72 Nm (7.2 m•kg)**
   • wheel axle pinch bolt ② — **23 Nm (2.3 m•kg)**

CAUTION:

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

3. Install:
   • brake caliper — **40 Nm (4.0 m•kg)**

WARNING

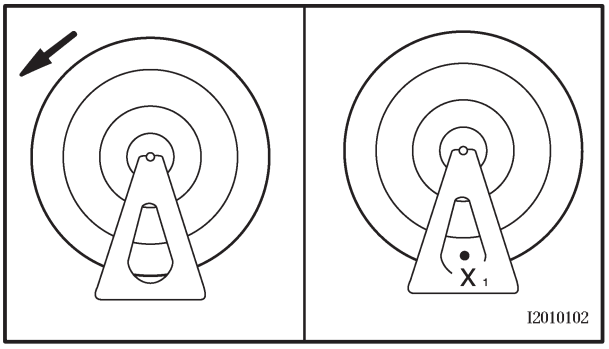
Make sure that the brake hose is routed properly.

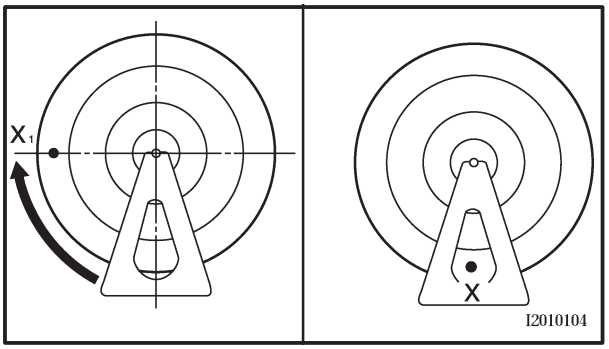
EAS00549
ADJUSTING THE FRONT WHEEL STATIC BALANCE

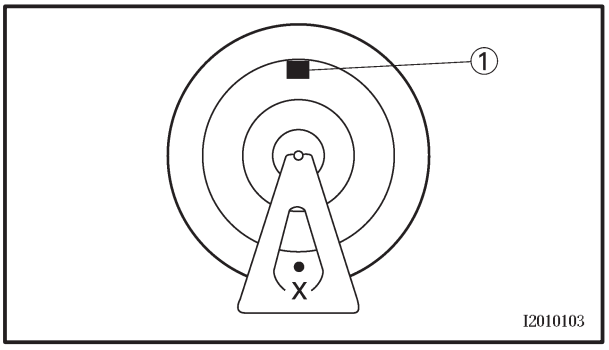
NOTE:
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.

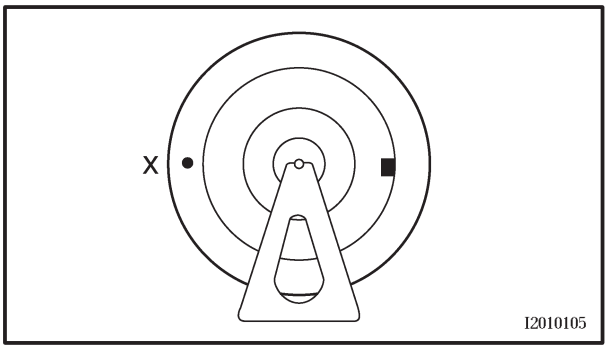
1. Remove:
   • balancing weight(-s)

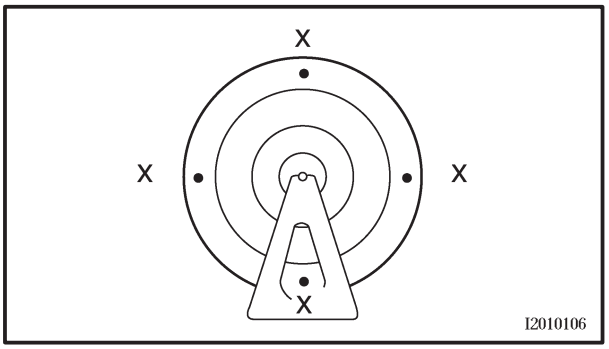
NOTE:
Place the front wheel on a suitable balancing stand.











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.
d. Release the front wheel.
e. When the wheel stops, put an "X_2" mark at the bottom of the wheel.
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".

NOTE:

Start with the lightest weight.

b. Turn the front wheel 90° so that the heavy spot is positioned as shown.
c. If the heavy spot does not stay in that position, install a heavier weight.
d. Repeat steps (b) and (c) until the front wheel is balanced.

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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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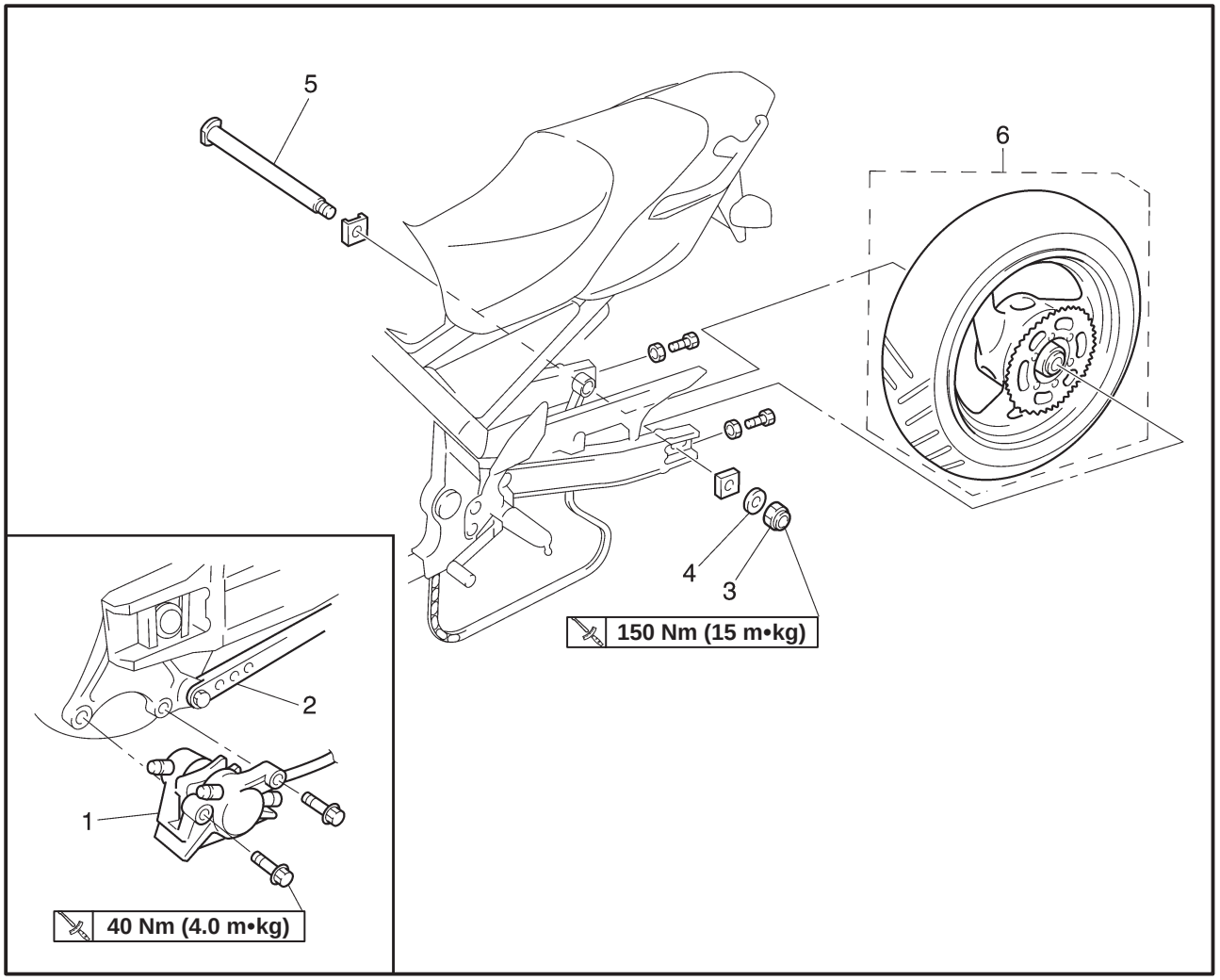
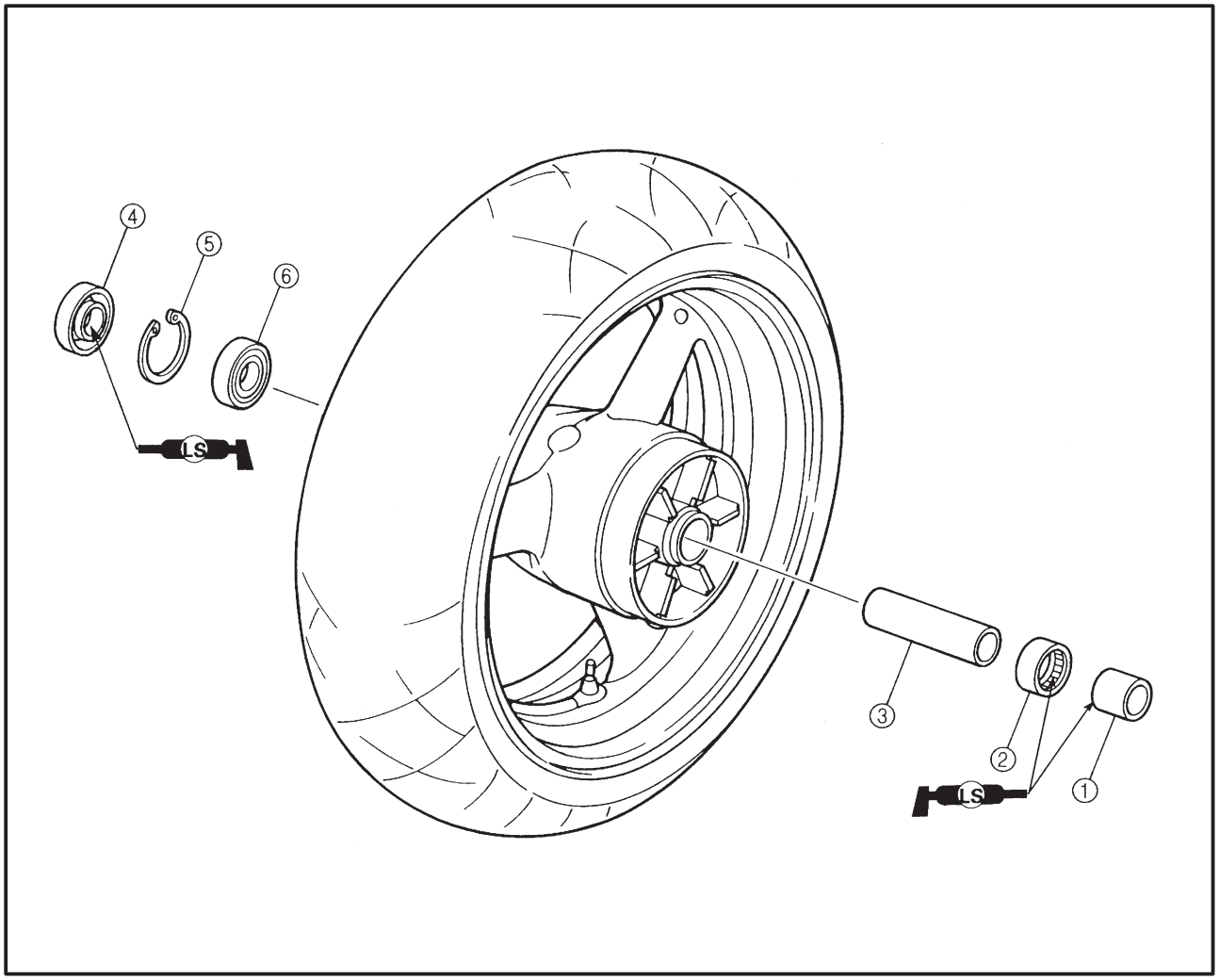
EAS00551
REAR WHEEL AND BRAKE DISC
REAR WHEEL

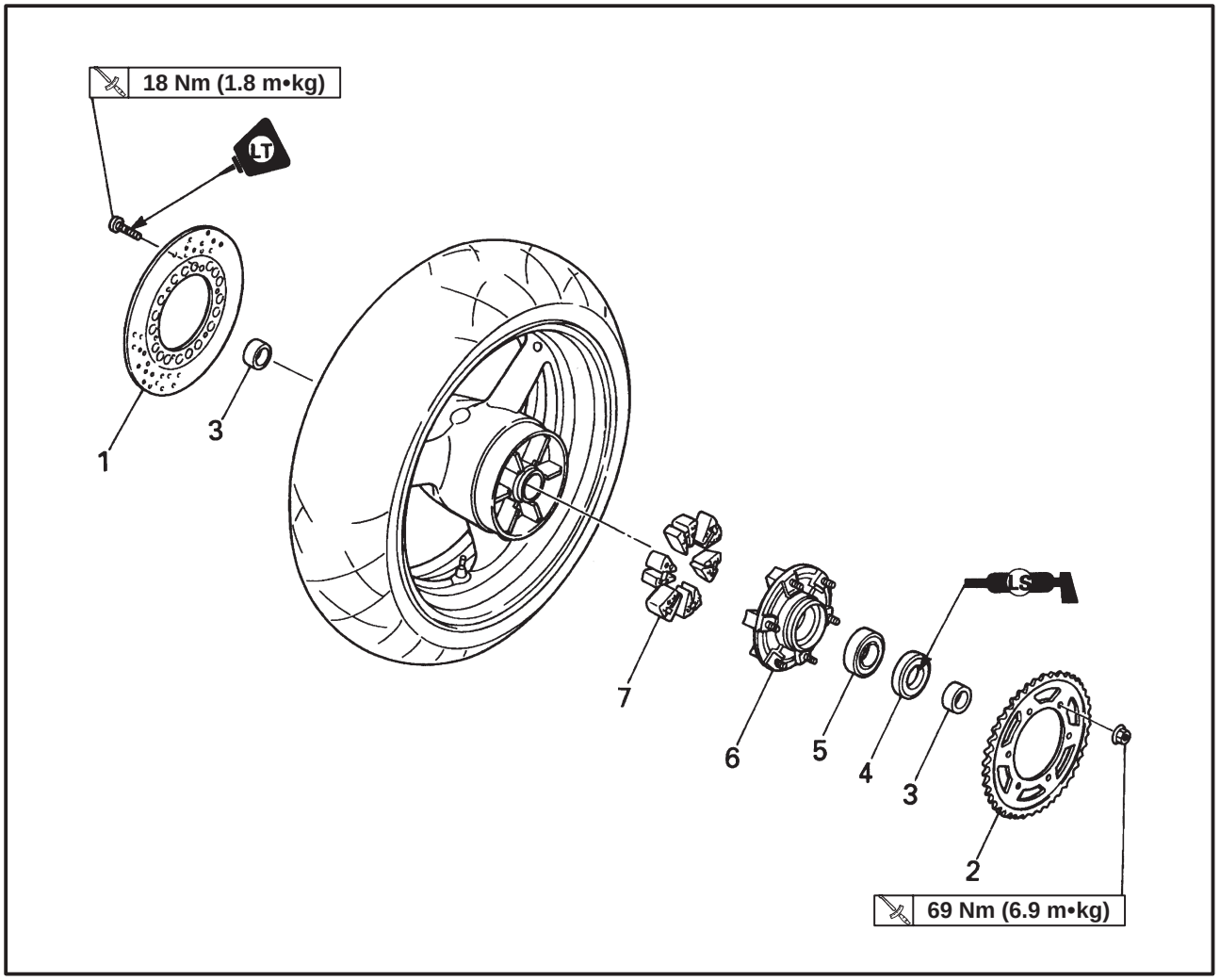


Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed. **NOTE:** Place the motorcycle on a suitable stand so that the rear wheel is elevated.
1	Brake caliper	1	
2	Brake torque rod	1	Loosen.
3	Nut	1	
4	Washer	1	
5	Wheel axle	1	
6	Rear wheel assembly	1	
			For installation, reverse the removal procedure.

EAS00560



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



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

EAS00561

REMOVING THE REAR WHEEL

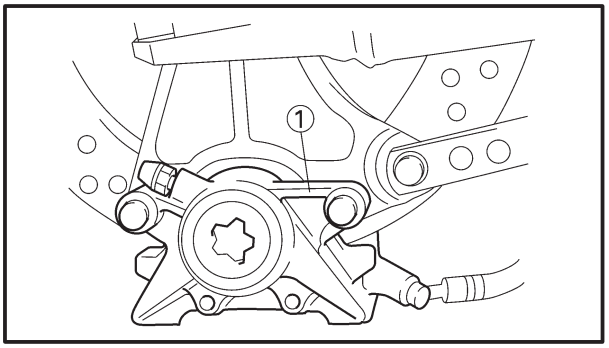
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

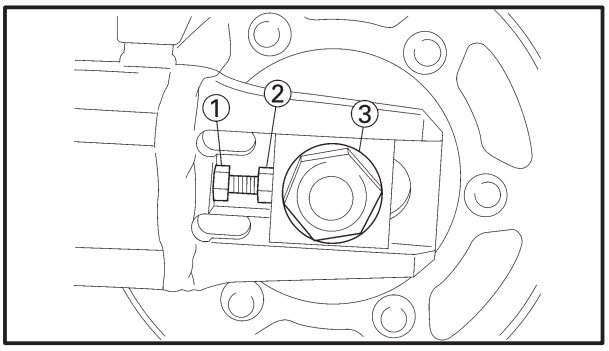
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - brake caliper ①

NOTE:

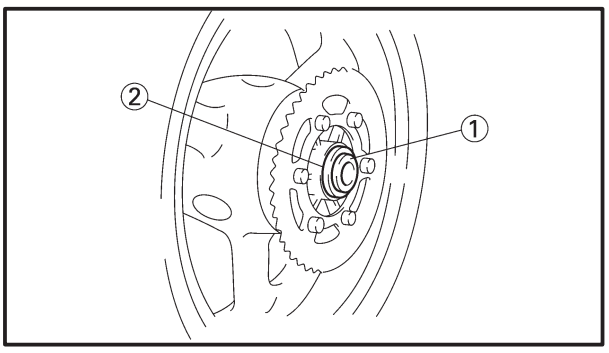
Do not depress the brake pedal when removing the brake caliper.



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

NOTE:

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



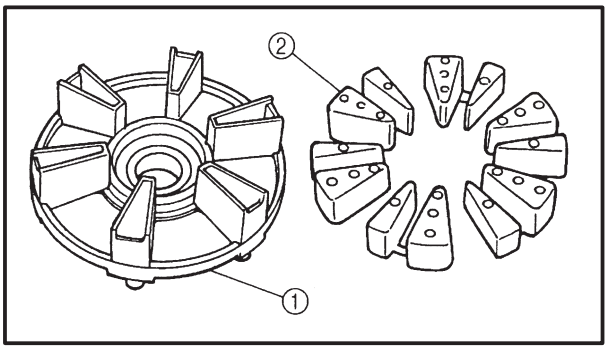
5. Remove:
   - left collar ①
   - rear wheel drive hub ②
   - rear wheel drive hub damper
   - right collar

EAS00565
CHECKING THE REAR WHEEL
1. Check:
   - wheel axle
   - rear wheel
   - wheel bearings
   - oil seals

   Refer to “FRONT WHEEL”.
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

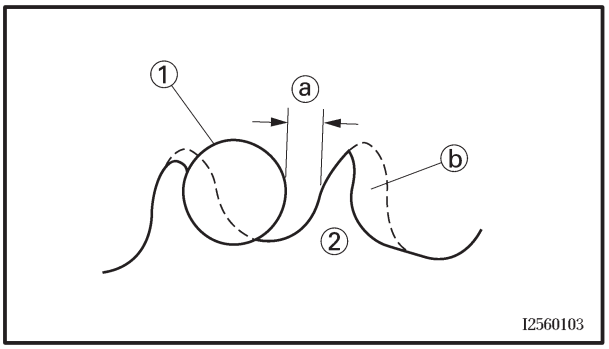
   Refer to “FRONT WHEEL”.



EAS00567
CHECKING THE REAR WHEEL DRIVE HUB
1. Check:
   - rear wheel drive hub ①

   Cracks/damage → Replace.
   - rear wheel drive hub dampers ②

   Damage/wear → Replace.



EAS00568
CHECKING AND REPLACING THE REAR WHEEL SPROCKET
1. Check:
   - rear wheel sprocket

   More than 1/4 tooth ⓐ wear → Replace the rear wheel sprocket.
   Bent teeth → Replace the rear wheel sprocket.

ⓑ Correct
① Drive chain roller
② Rear wheel sprocket

2. Replace:
   - rear wheel sprocket

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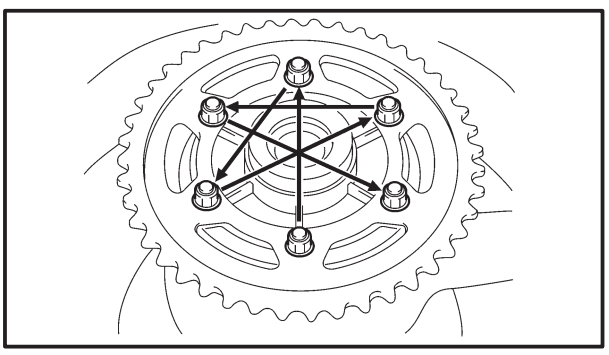
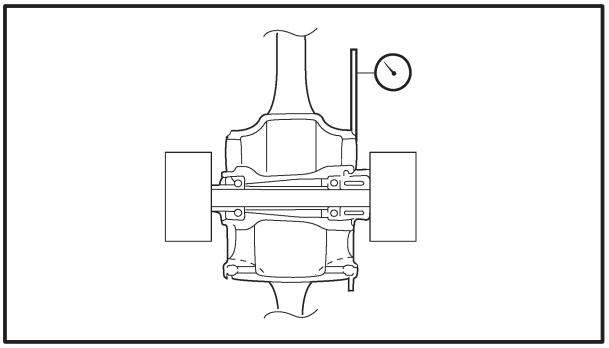
a. Remove the self-locking nuts and the rear wheel sprocket.
b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
c. Install the new rear wheel sprocket.



Rear wheel sprocket self-locking nut
69 Nm (6.9 m•kg)

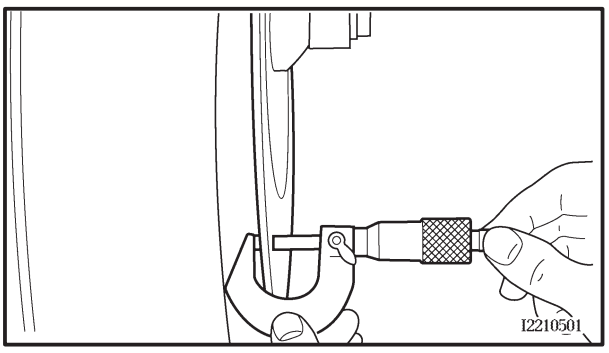
NOTE:
Tighten the self-locking nuts in stages and in a crisscross pattern.



EAS00531
CHECKING THE BRAKE DISC
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.

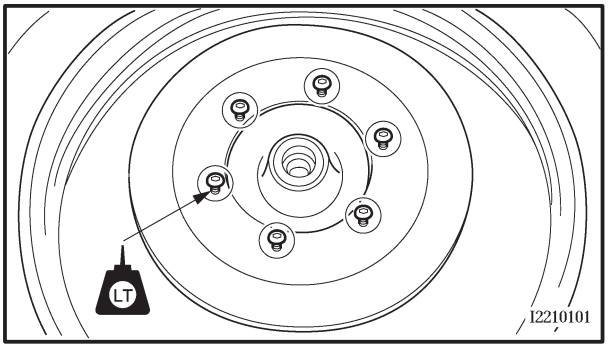
Brake disc deflection limit (maximum)
0.1 mm

a. Place the motorcycle on a suitable stand so that the wheel is elevated.
b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection 2 ~ 3 mm below the edge of the brake disc.



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

Brake disc thickness limit (minimum)
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 in stages and in a crisscross pattern.

Brake disc bolt
18 Nm (1.8 m•kg)
LOCTITE®

d. Measure the brake disc deflection.
e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
f. If the brake disc deflection cannot be brought within specification, replace the brake disc.

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EAS00572

INSTALLING THE REAR WHEEL

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

Recommended lubricant
Lithium soap base grease

2. Tighten:
   • wheel axle nut — **150 Nm (15 m•kg)**
   • brake caliper bolts — **40 Nm (4.0 m•kg)**

EAS00575

ADJUSTING THE REAR WHEEL STATIC BALANCE

NOTE:

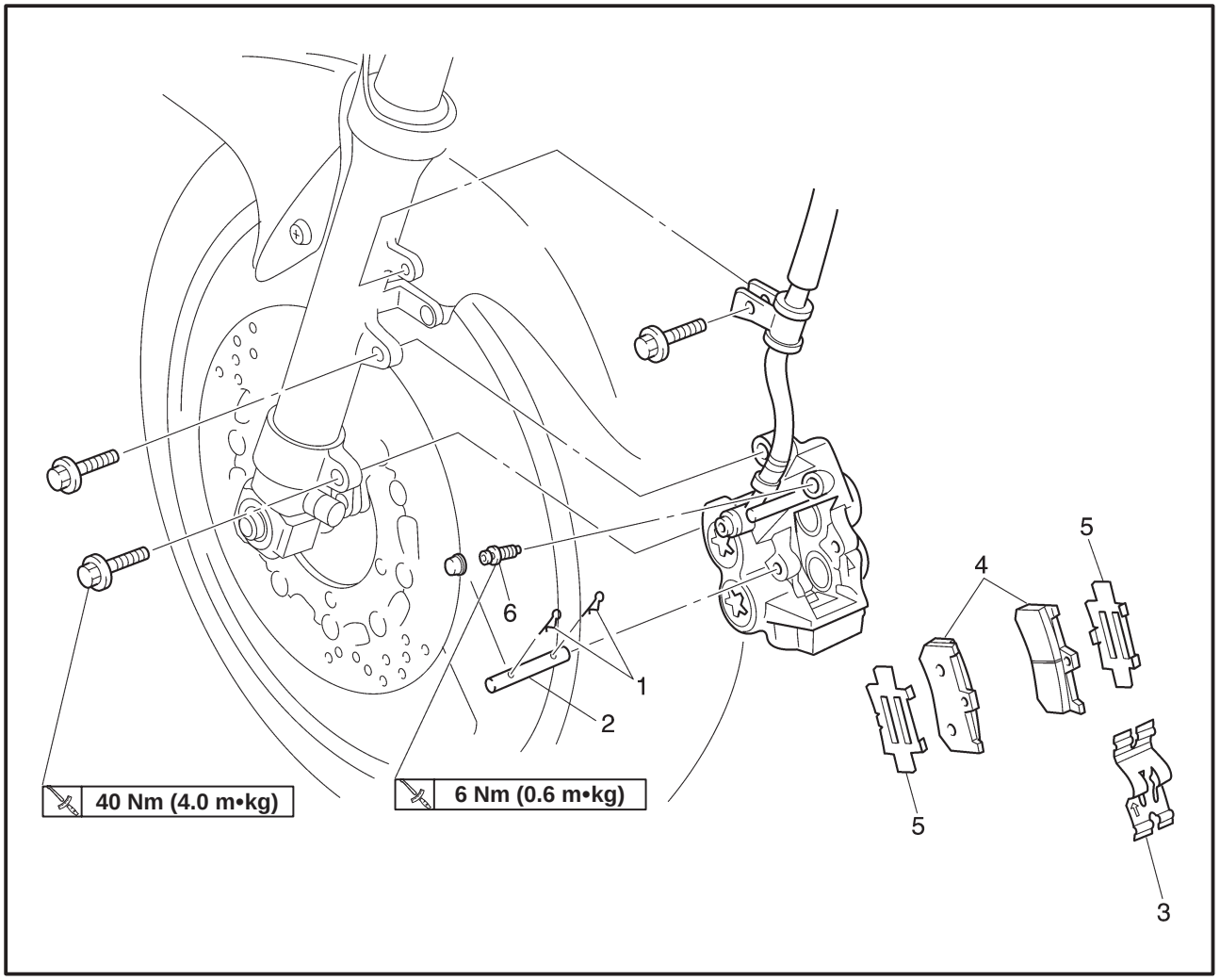
- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:
   • rear wheel static balance
   Refer to “FRONT WHEEL”.

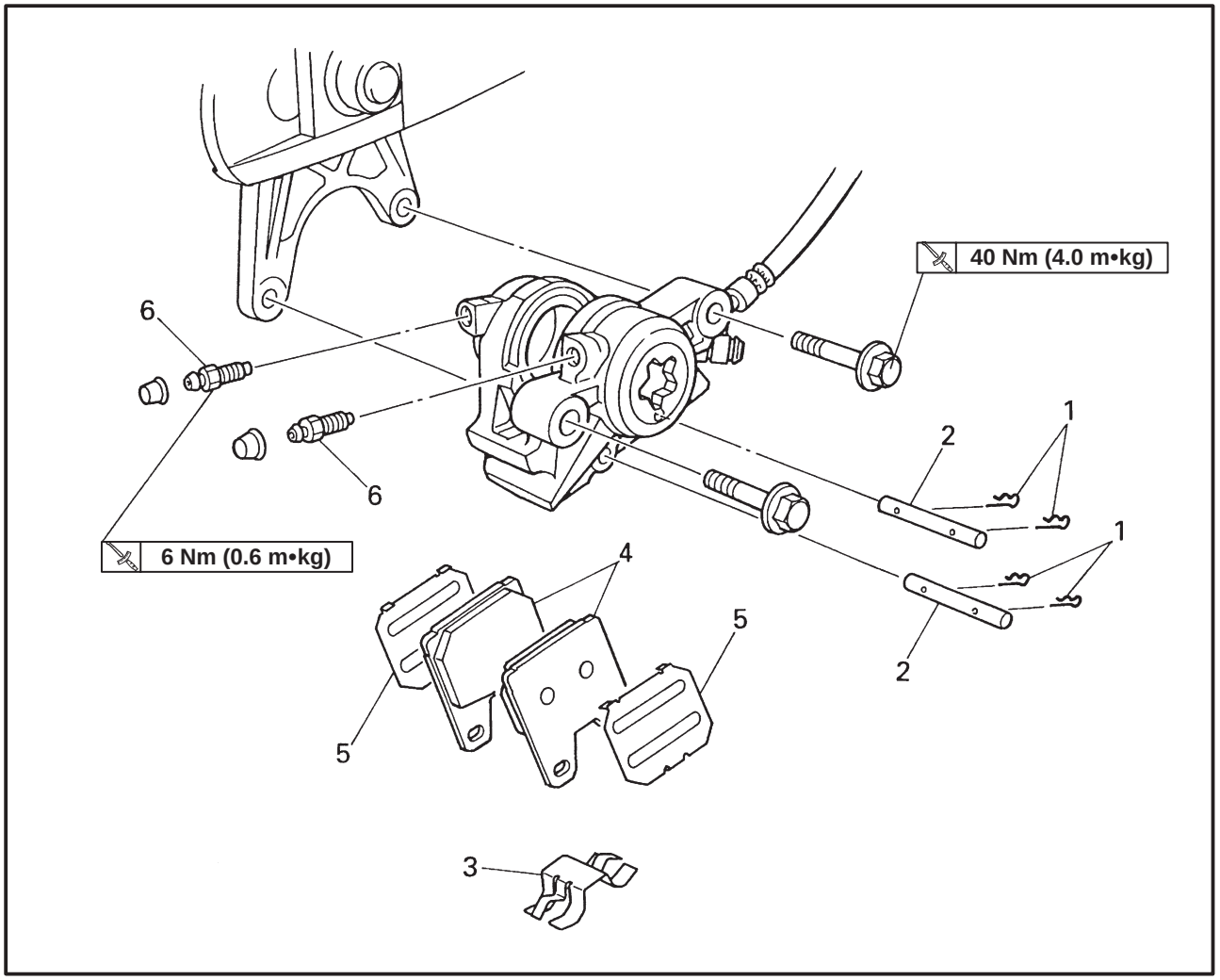
EAS00577

FRONT AND REAR BRAKES

FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake pads		Remove the parts in the order listed.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	brake pad	2	
5	Brake pad shim	2	
6	Bleed scrw	1	
			For installation, reverse the removal procedure.



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

EAS00579

CAUTION:

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

First aid for brake fluid entering the eyes:
- **Flush with water for 15 minutes and get immediate medical attention.**

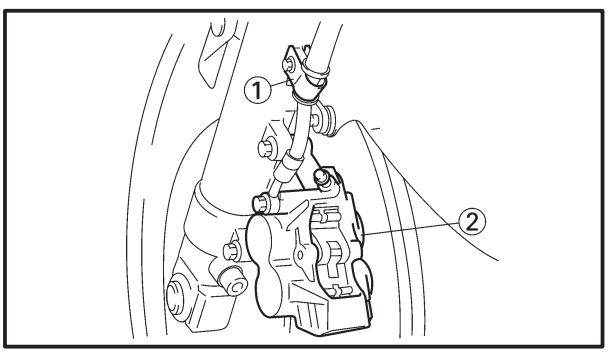
EAS00582

REPLACING THE FRONT BRAKE PADS

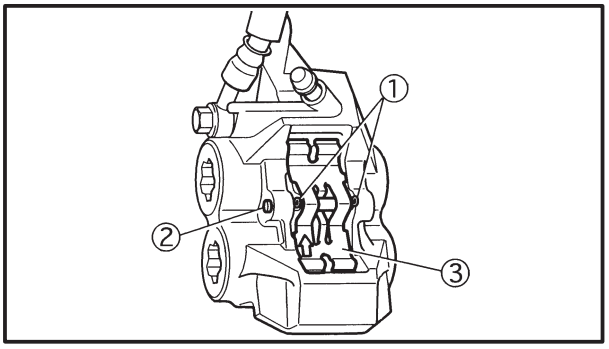
The following procedure applies to both brake calipers.

NOTE:

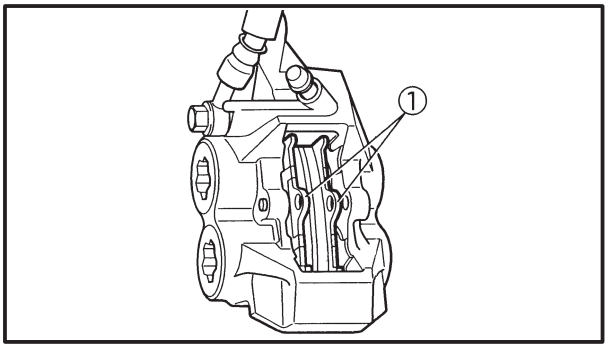
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



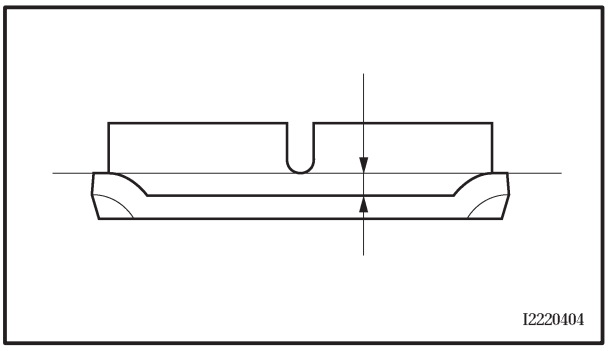
1. Remove:
   - brake hose holder ①
   - brake caliper ②



2. Remove:
   • brake pad clips ①
   • brake pad pins ②
   • brake pad spring ③



3. Remove:
   • brake pads ①
   (along with the brake pad shims)



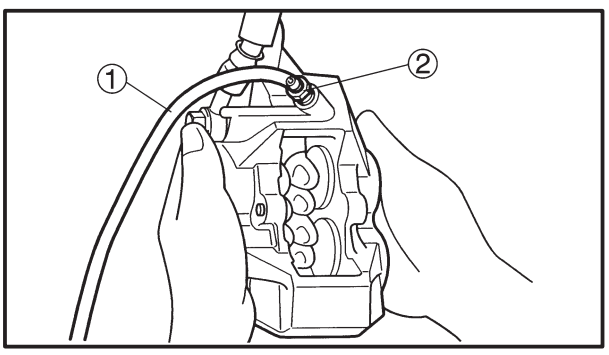
4. Measure:
   • brake pad wear limit
   Out of specification → Replace the brake pads as a set.

Brake pad wear limit
0.5 mm

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

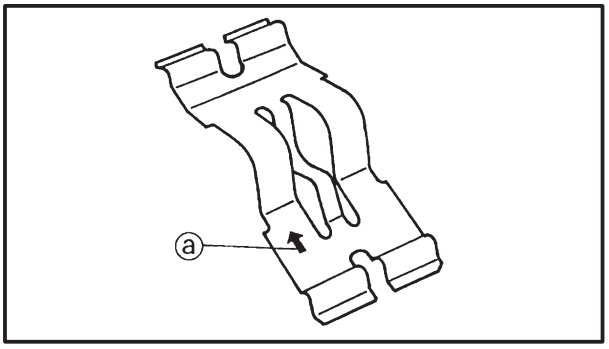
NOTE:

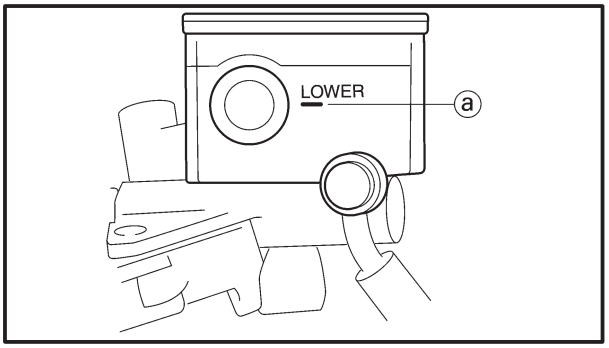
Always install new brake pads, brake pad shims, and a brake pad spring as a set.



a. Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.

Bleed screw
6 Nm (0.6 m•kg)





d. Install new brake pad shims onto the new brake pads.
e. Install new brake pads and a new brake pad spring.

NOTE:

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

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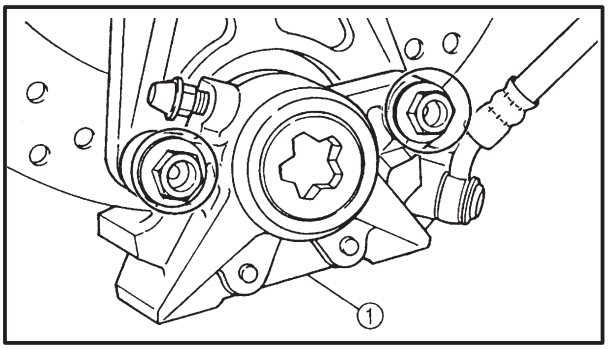
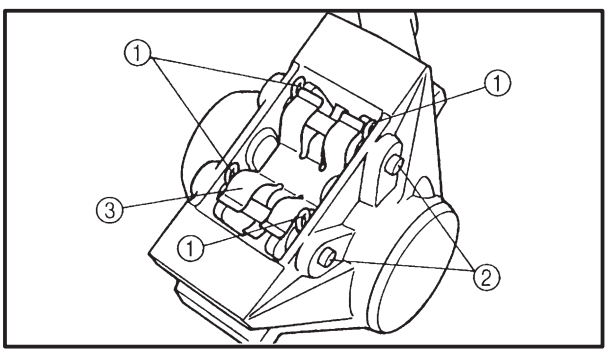
6. Install:
   - brake pad cover
   - brake pad pins
   - brake pad clips
   - brake caliper — **40 Nm (4.0 m•kg)**
7. Check:
   - brake fluid level

   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.





EAS00583

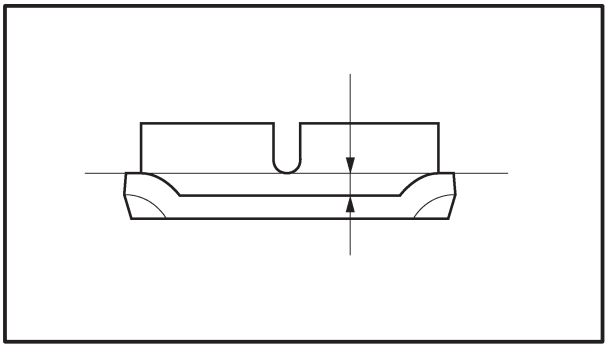
REPLACING THE REAR BRAKE PADS

NOTE:

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

1. Remove:
   - brake caliper ①
2. Remove:
   - brake pad clips ①
   - brake pad pins ②
   - brake pad spring ③
   - brake pads

   (along with the brake pad shims)



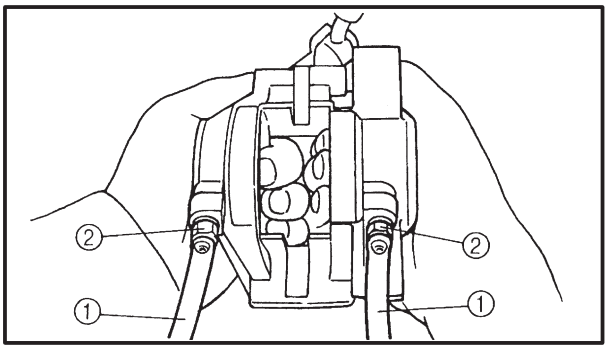
3. Measure:
   • brake pad wear limit
   Out of specification → Replace the brake pads as a set.

	Brake pad wear limit **0.5 mm**

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

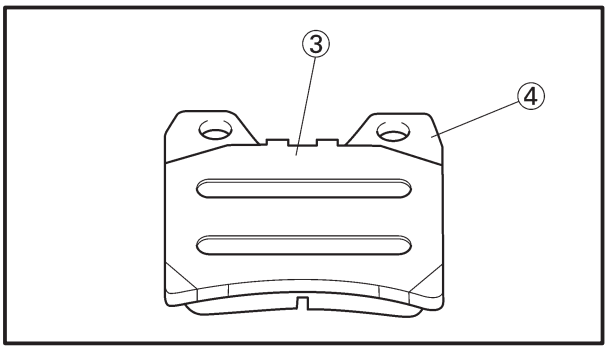
NOTE:

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



a. Connect a clear plastic hose ① tightly to the bleed screw ②. Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.

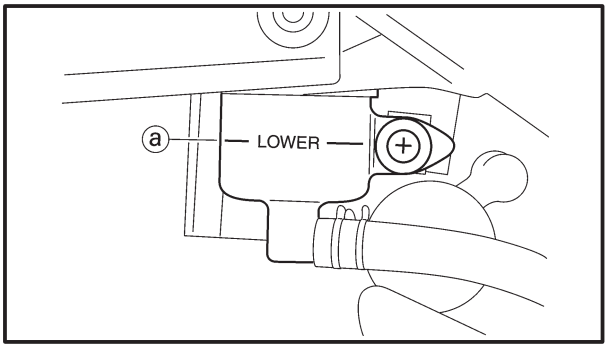
	Bleed screw **6 Nm (0.6 m•kg)**



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.

5. Install:
   • brake pad cover
   • brake pad pins
   • brake pad clips
   • brake caliper

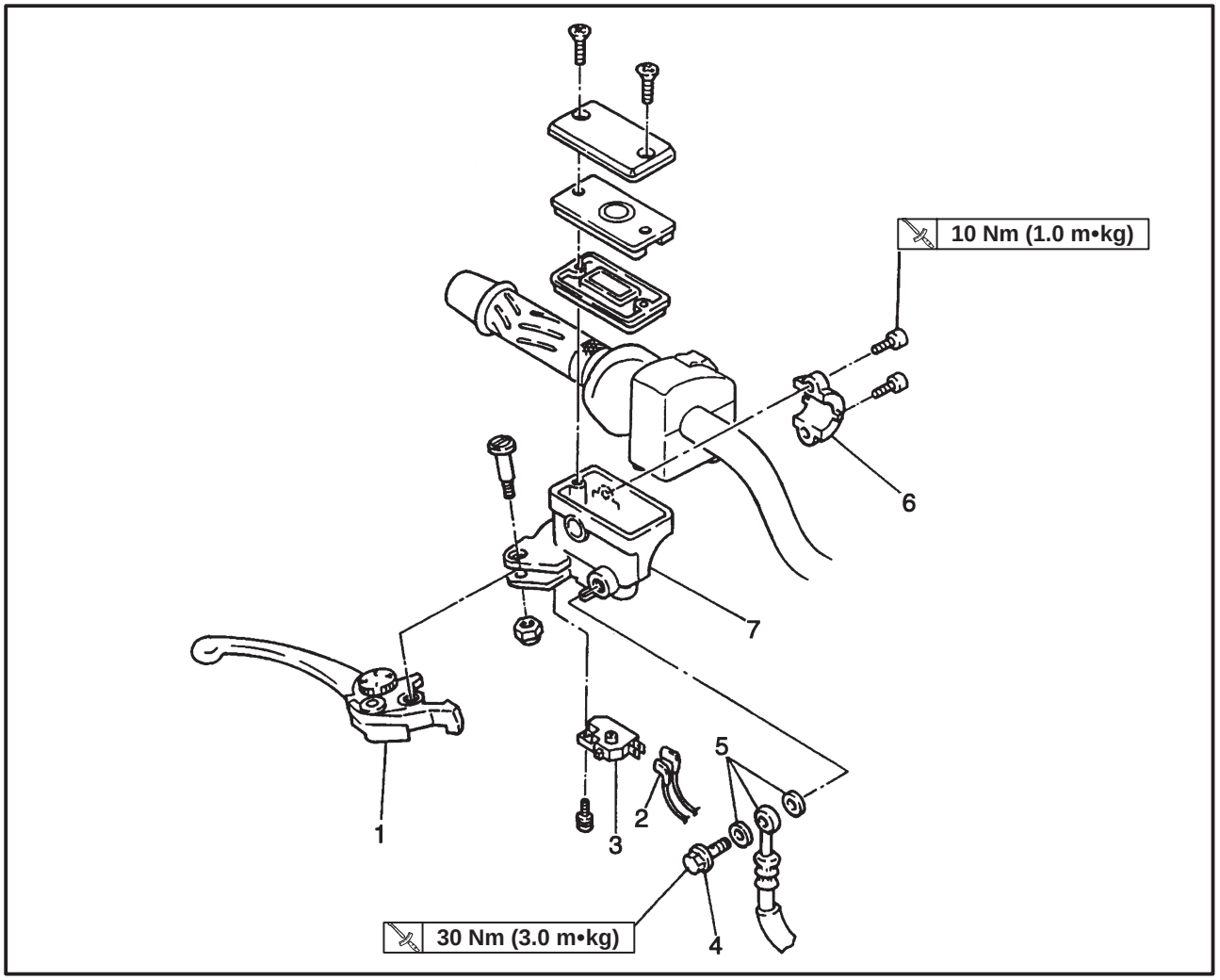
40 Nm (4.0 m•kg)



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.

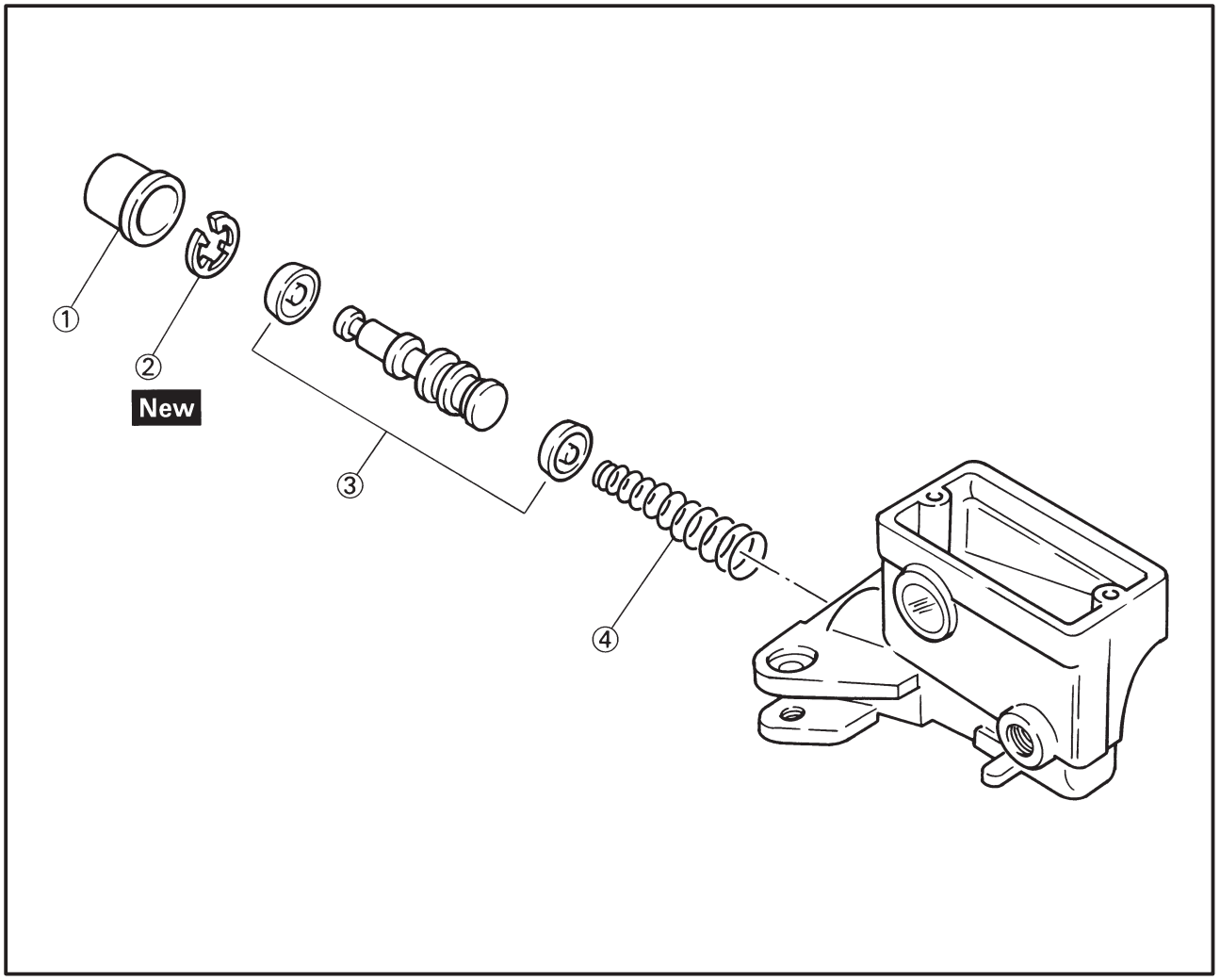
EAS00584

FRONT BRAKE MASTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain.
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	Brake hose/copper washer	1/2	
6	Master cylinder bracket	1	
7	Master cylinder	1	
			For installation, reverse the removal procedure.

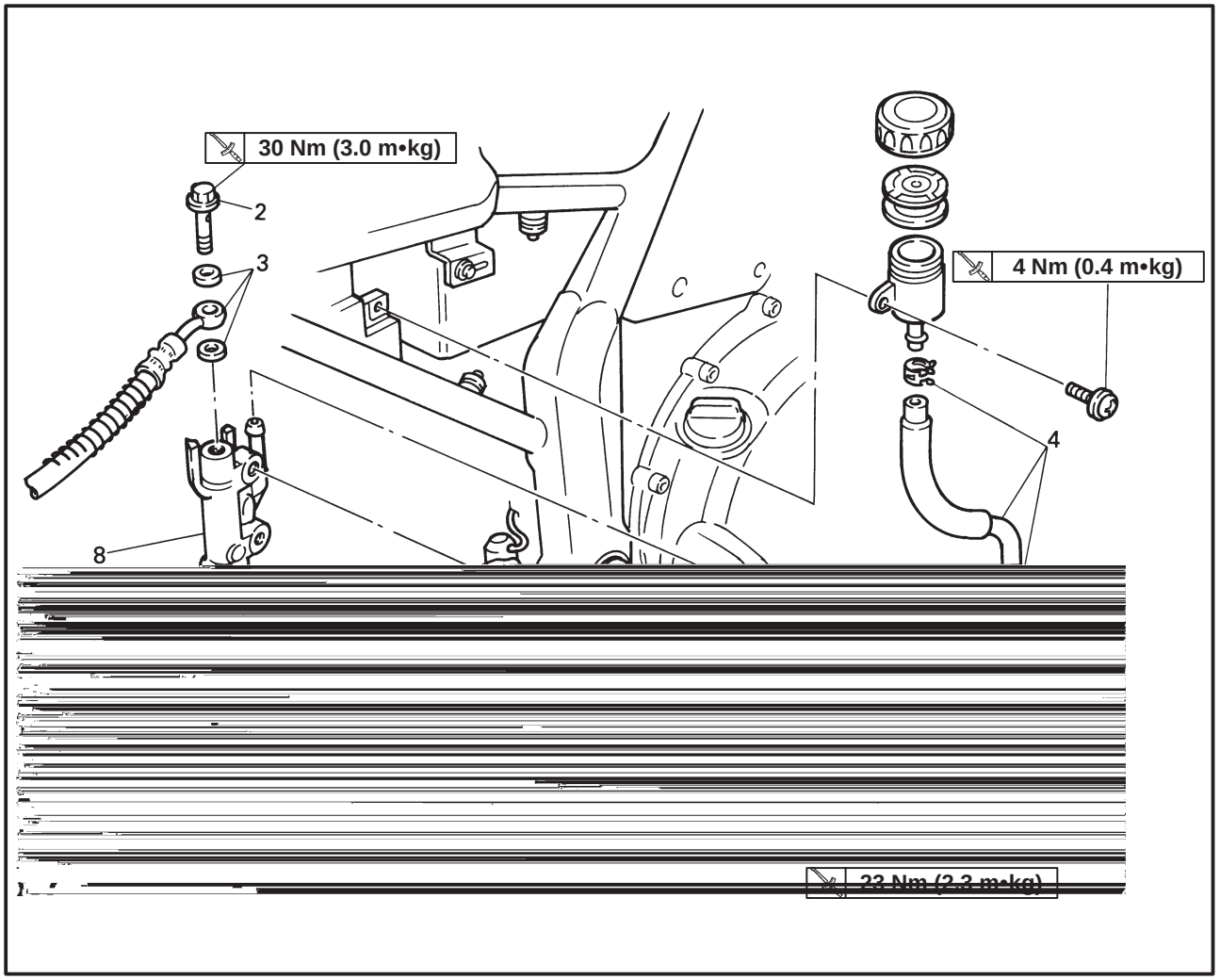
EAS00585



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

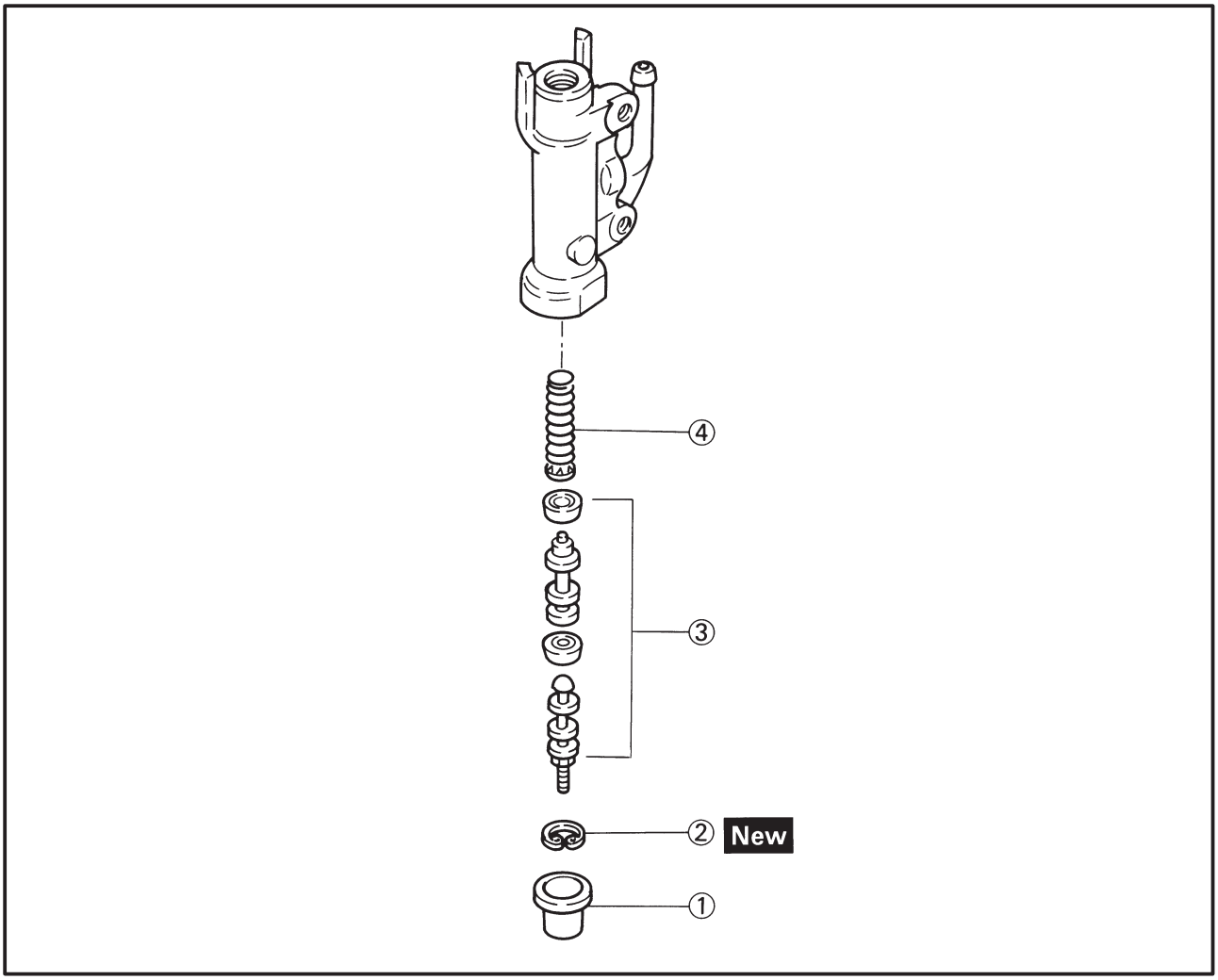
EAS00586

REAR BRAKE MASTER CYLINDER



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

EAS00587



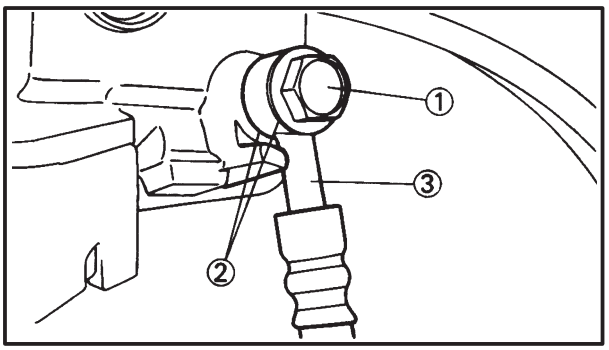
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake master cylinder		Disassemble the parts in the order listed.
①	Master cylinder boot	1	
②	Circlip	1	
③	Master cylinder kit	1	
④	Spring	1	
			For assembly, reverse the disassembly procedure.

EAS00588

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE:

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



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

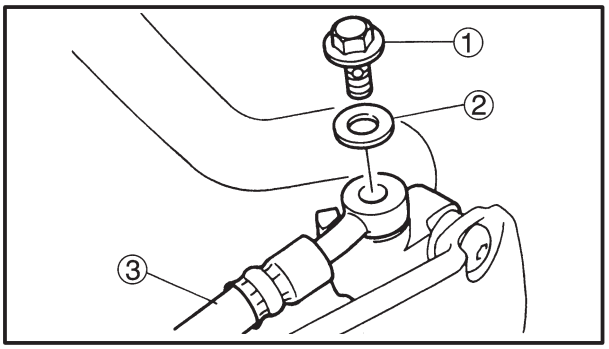
NOTE:

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

EAS00589

DISASSEMBLING THE REAR BRAKE MASTER CYLINDER

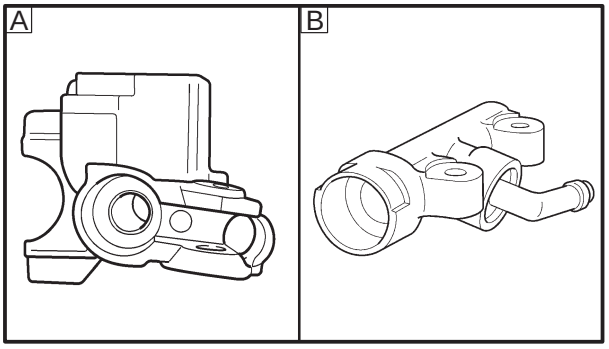
1. Remove:
   - side cover (right)

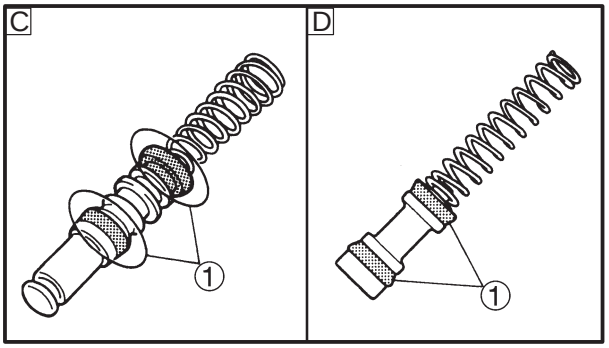


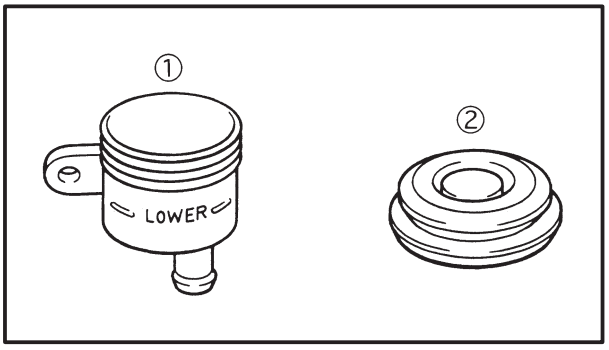
2. Remove:
   - union bolt ①
   - copper washers ②
   - brake hose ③

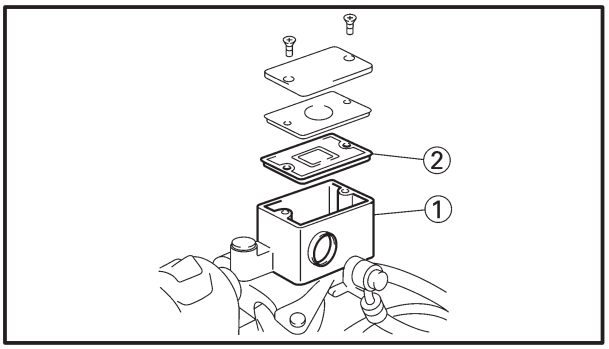
NOTE:

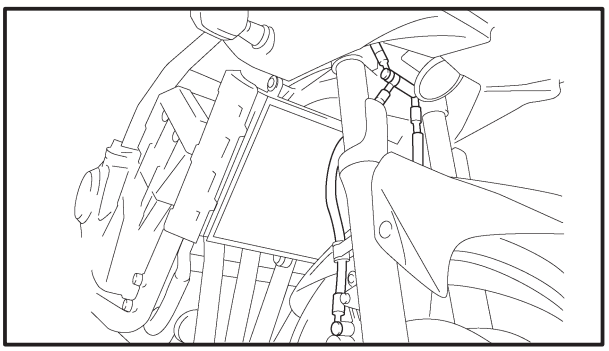
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.











EAS00592

CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

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

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

A Front
B Rear

2. Check:
   - brake master cylinder kit 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 reservoir ①
     Cracks/damage → Replace.
   - front brake master cylinder reservoir diaphragm ②
     Damage/wear → Replace.

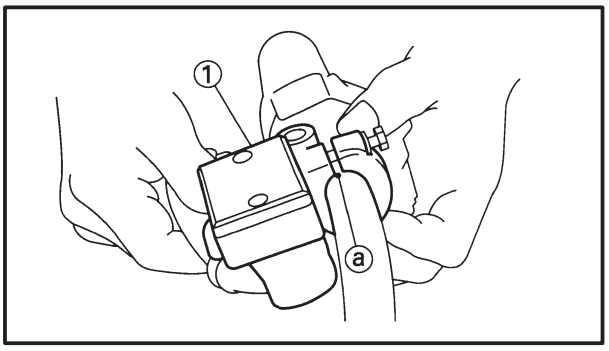
5. Check:
   - brake hoses
     Cracks/damage/wear → Replace.

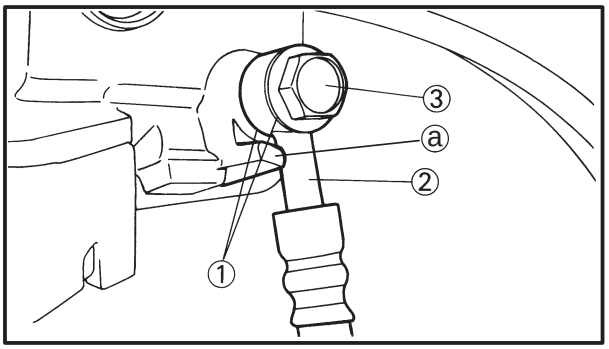
EAS00598
ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

⚠ 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:
   - brake master cylinder ①

10 Nm (1.0 m•kg)

NOTE:

- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the end of the brake master cylinder holder with the punch mark ⓐ on the handlebar.
- First, tighten the upper bolt, then the lower bolt.

2. Install:
   - copper washers ① New
   - brake hose ②
   - union bolt ③

30 Nm (3.0 m•kg)

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".

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.

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

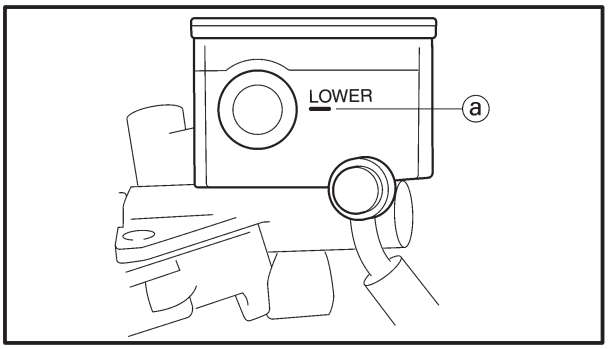
Recommended brake fluid
DOT 4

⚠ WARNING

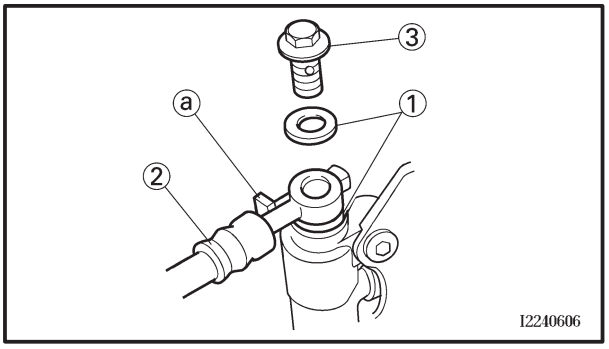
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

CAUTION:

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



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



EAS00608

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - copper washers ① New
   - brake hose ②
   - union bolt ③

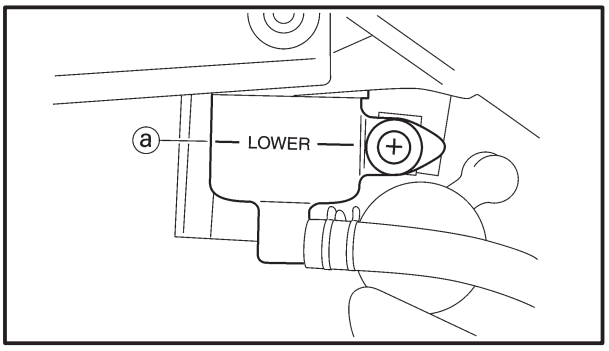
30 Nm (3.0 m•kg)

CAUTION:

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

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

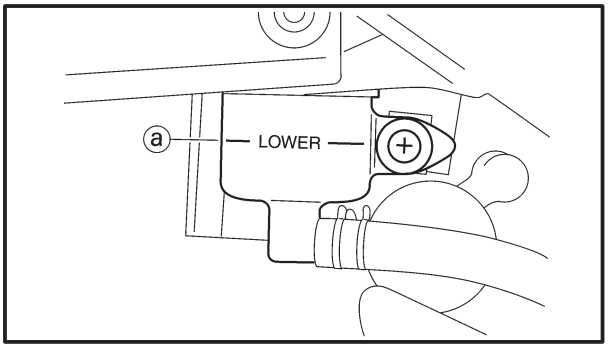
WARNING

- **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.**

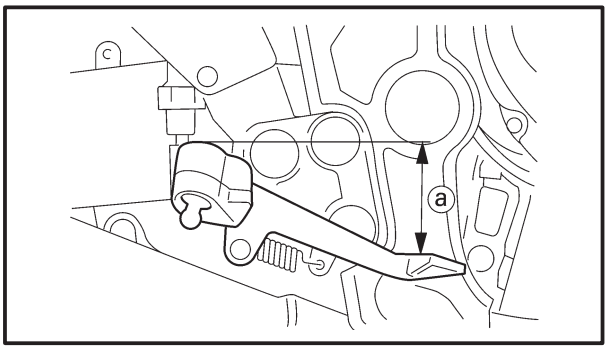
CAUTION:

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.



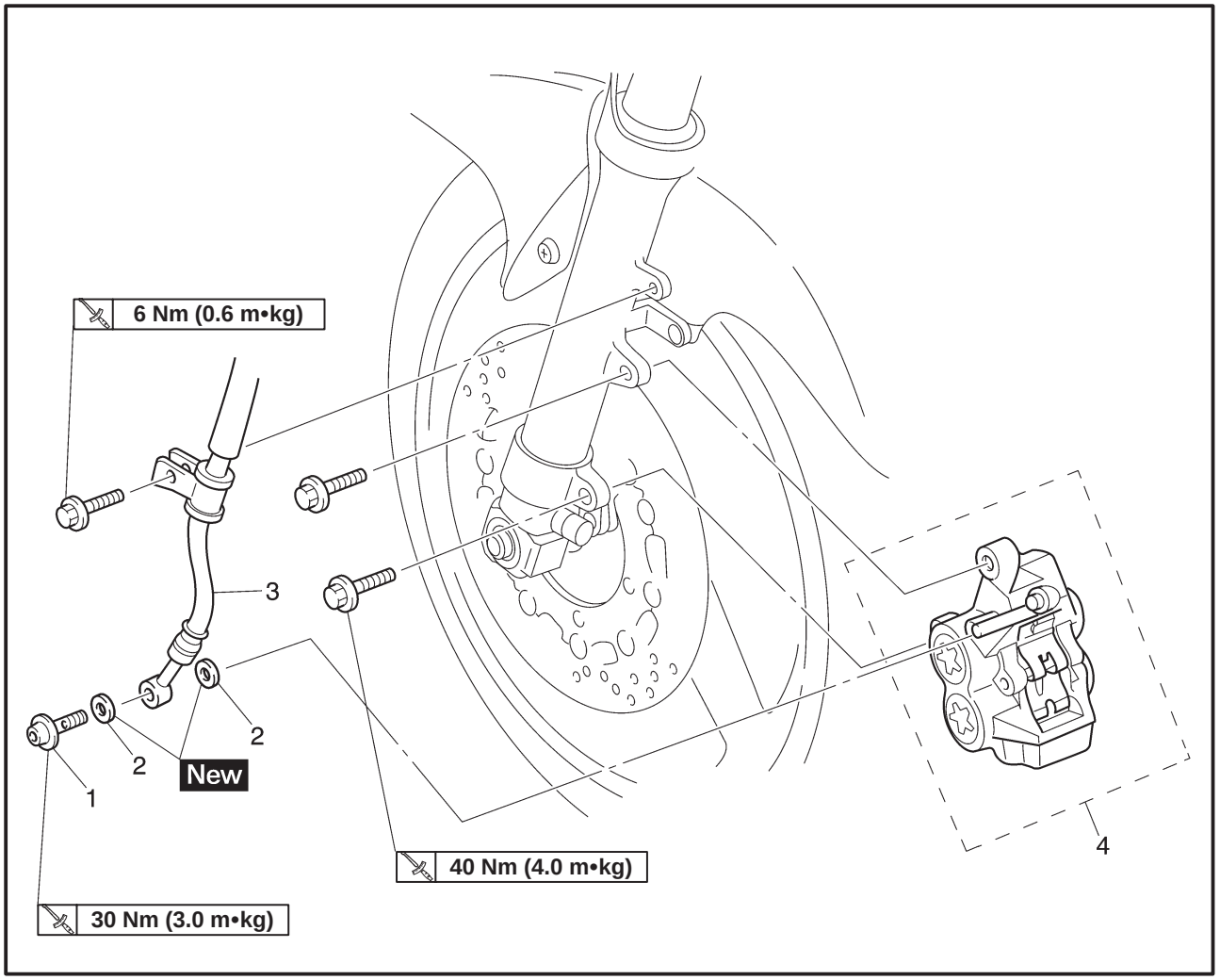
5. Adjust:
   • brake pedal position ⓐ
   Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.

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

6. Adjust:
   • rear brake light operation timing
   Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” in chapter 3.

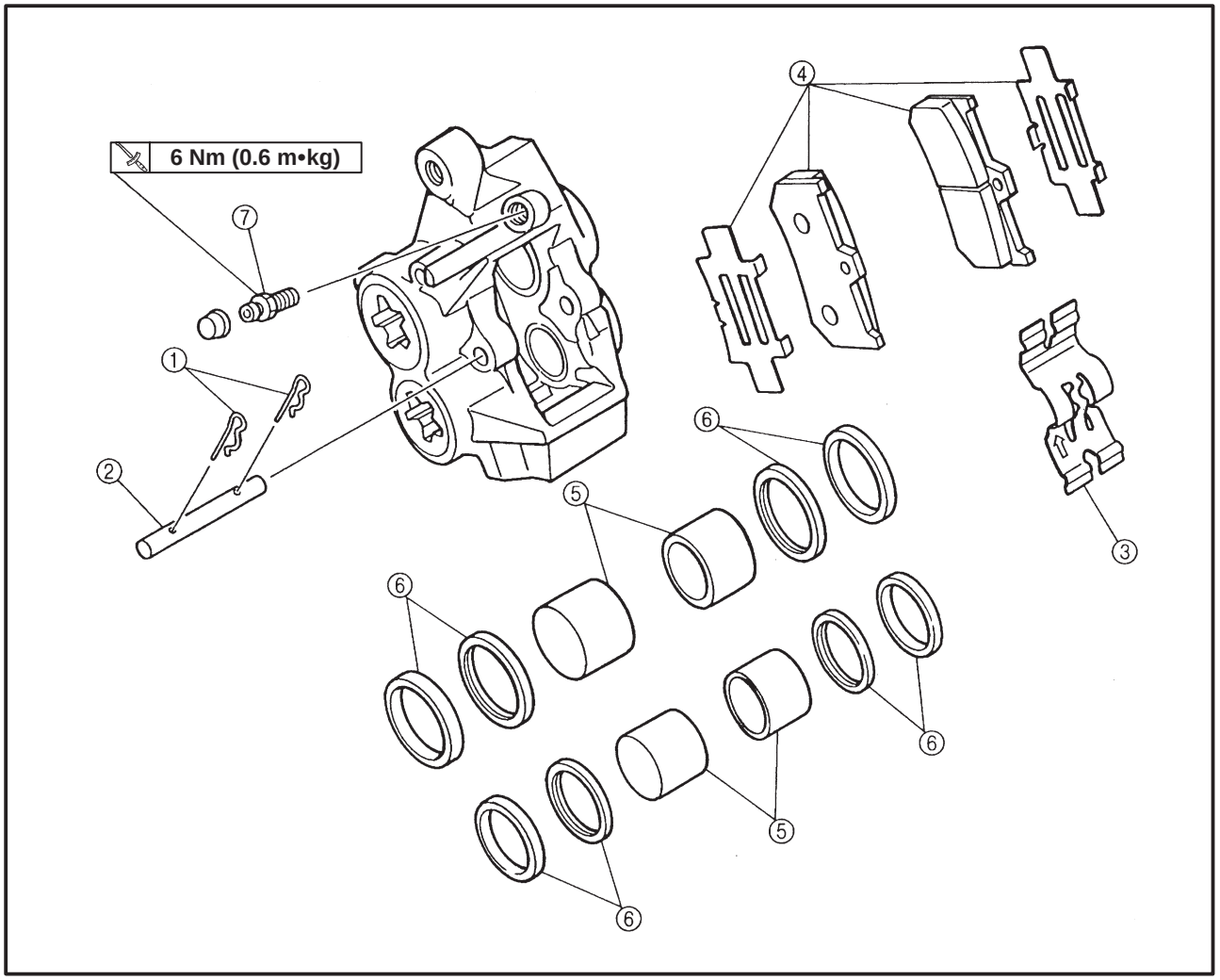
EAS00613

FRONT BRAKE CALIPERS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper	1	
			For installation, reverse the removal procedure.

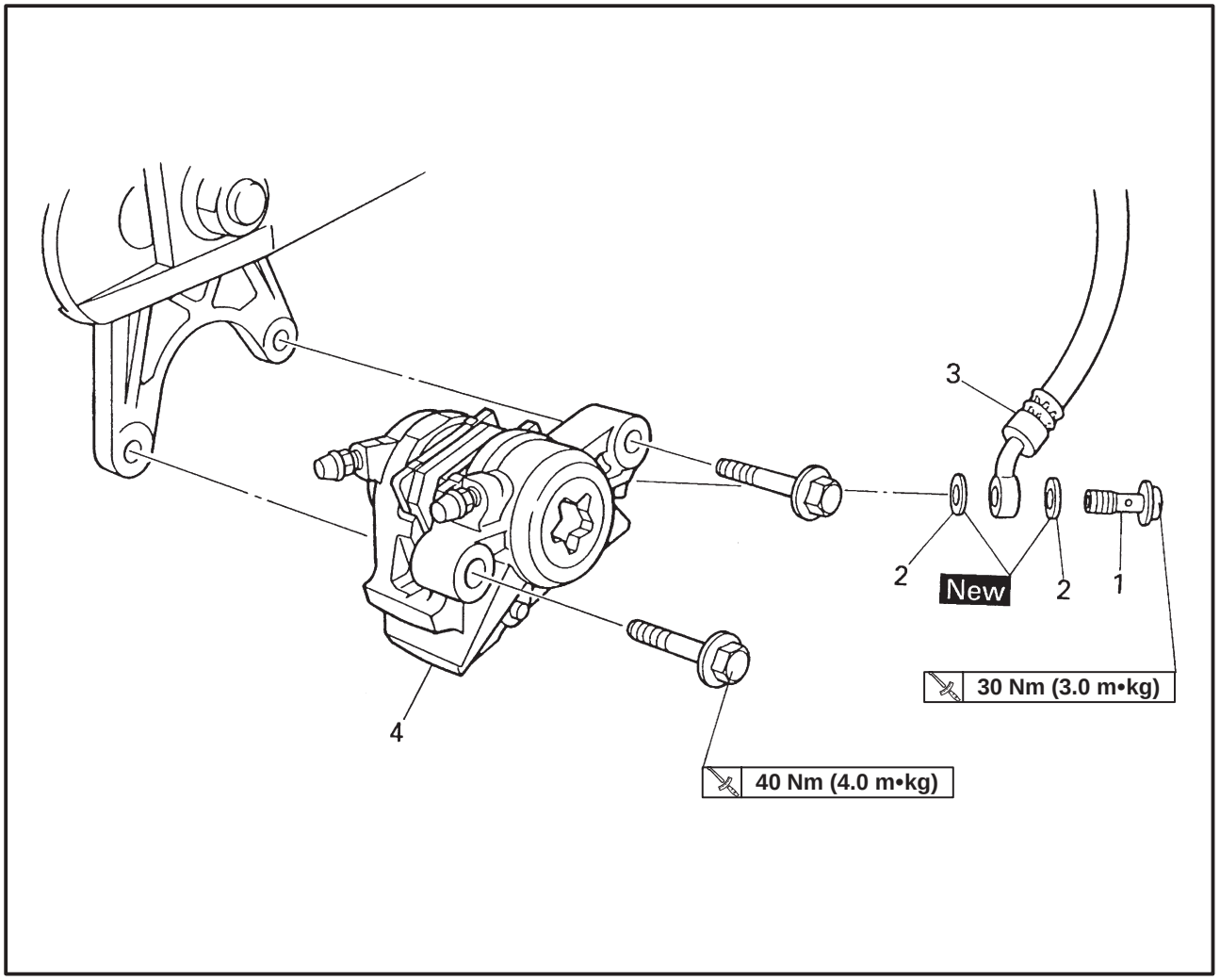
EAS00615



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

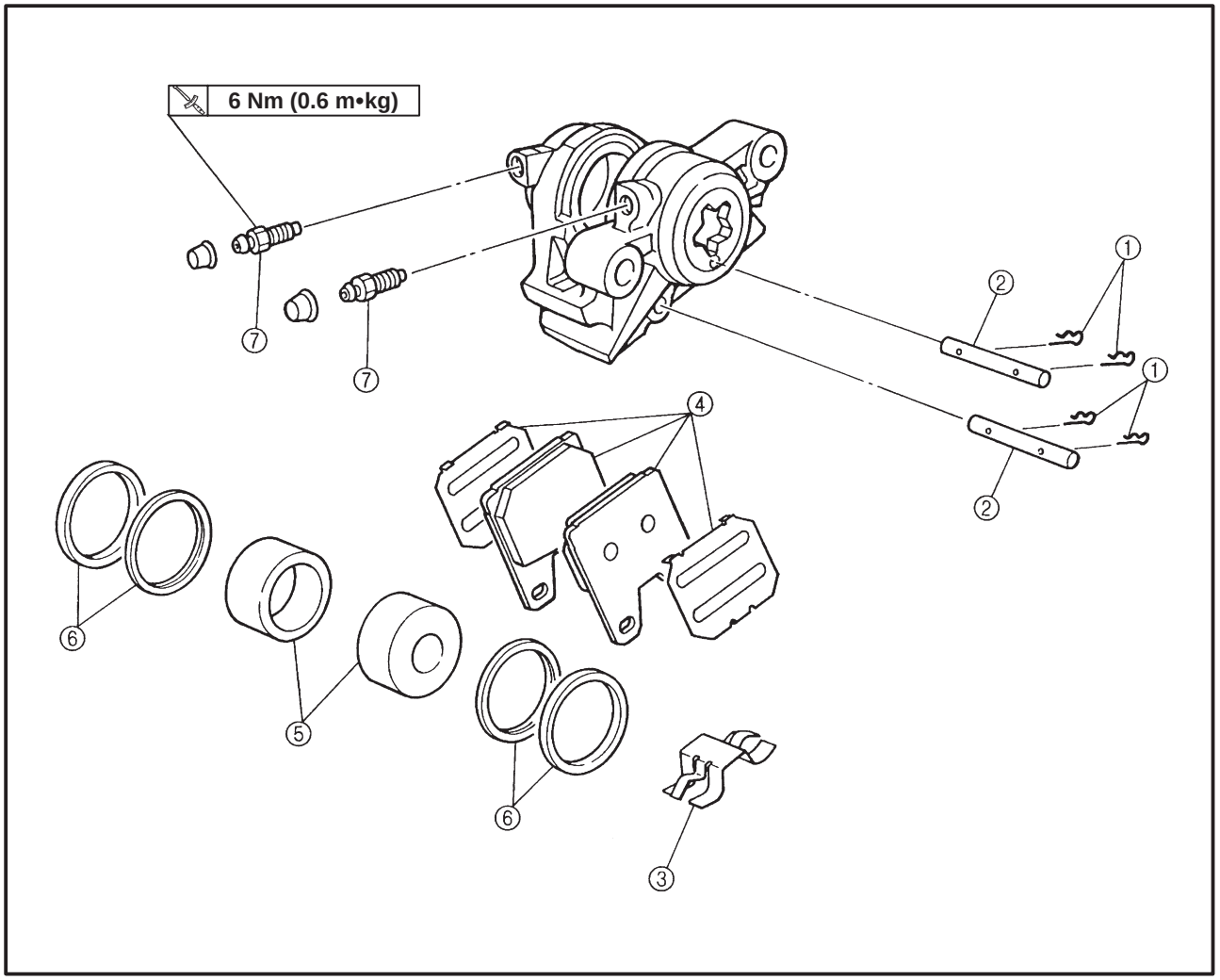
EAS00616

REAR BRAKE CALIPER



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper	1	
			For installation, reverse the removal procedure.

EAS00617



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake caliper		Disassemble the parts in the order listed.
①	Brake pad clip	4	
②	Brake pad pin	2	
③	Brake pad spring	1	
④	Brake pad	2	
⑤	Brake caliper piston	2	
⑥	Brake caliper piston seal	4	
⑦	Bleed screw	2	
			For assembly, reverse the disassembly procedure.

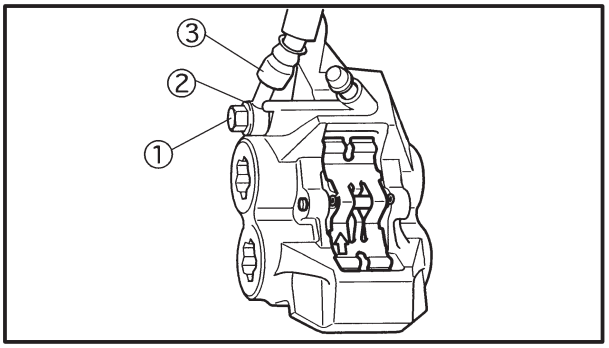
EAS00625

DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

NOTE:

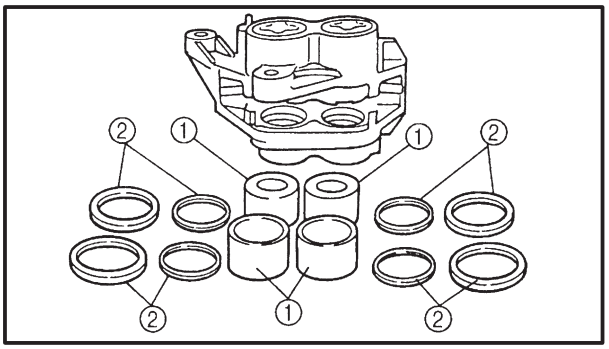
Before disassembling either brake caliper, drain the brake fluid from the entire brake system.



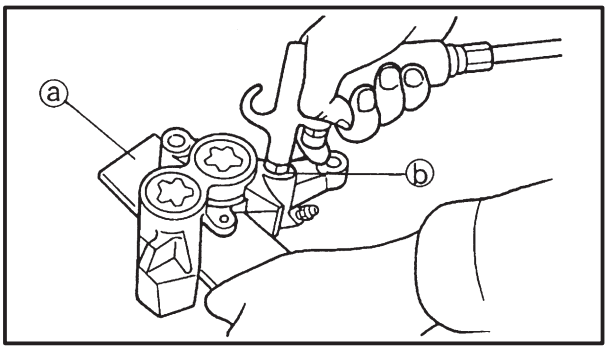
1. Remove:
   - union bolt ①
   - copper washers ②
   - brake hose ③

NOTE:

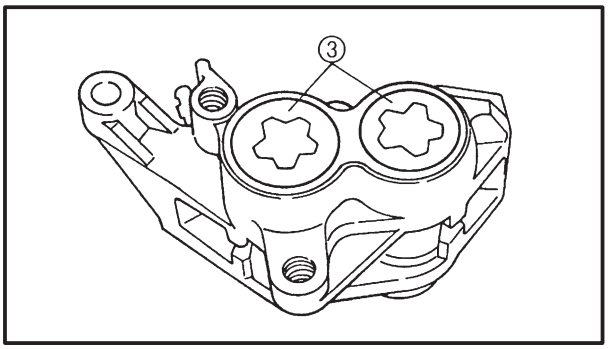
Put the end of the brake hose into a container and pump out the brake fluid carefully.



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.



⚠ WARNING

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

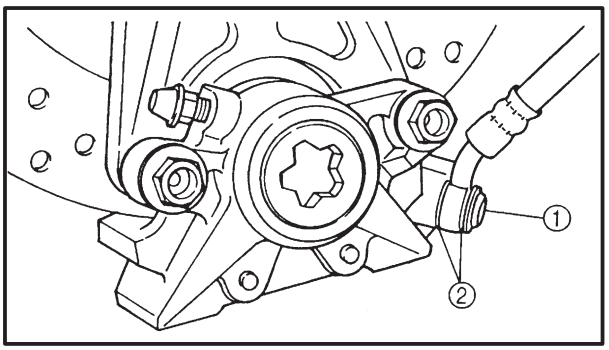
c. Remove the brake caliper piston seals.
d. Repeat the previous steps to force out the right side pistons from the brake caliper.

EAS00628

DISASSEMBLING THE REAR BRAKE CALIPER

NOTE:

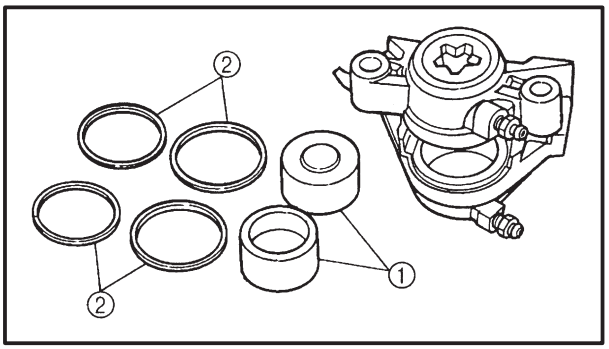
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



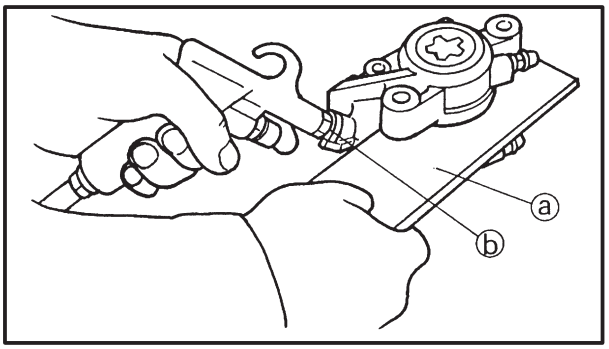
1. Remove:
   - union bolt ①
   - copper washers ②
   - brake hose

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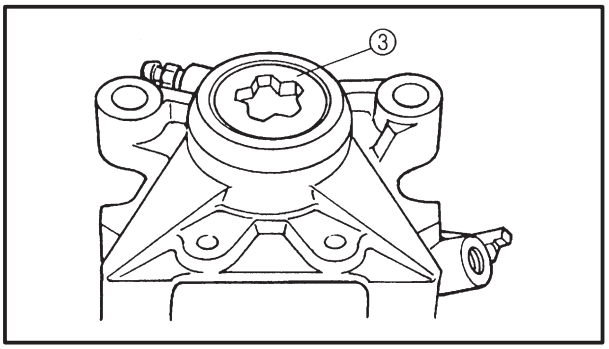
a. Secure the right side brake caliper piston with a piece of wood ⓐ.
b. Blow compressed air into the brake hose joint opening ⓑ to force out the left side piston from the brake caliper.



⚠ 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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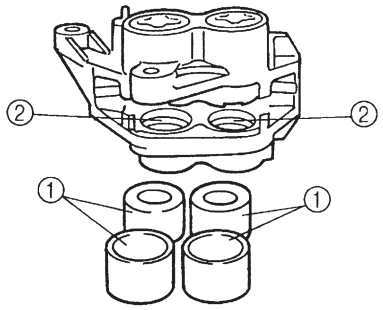
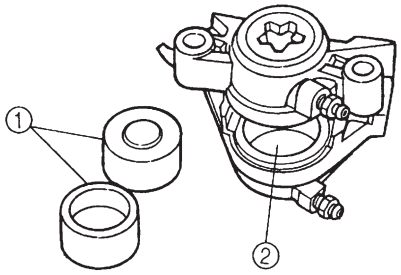
EAS00633
CHECKING THE FRONT AND REAR BRAKE CALIPERS

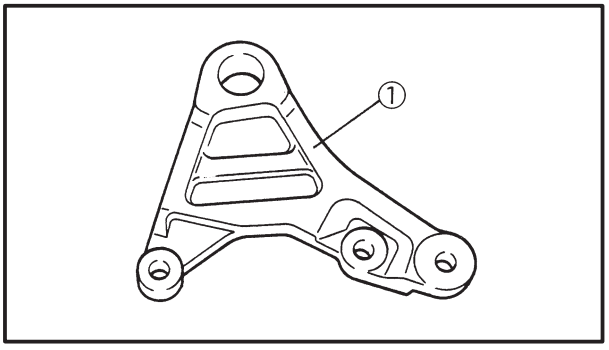
Recommended brake component replacement schedule	
Brake pads	**If necessary**
Piston seals	**Every two years**
Brake hoses	**Every two years**
Brake fluid	**Every two years and whenever the brake is disassembled.**

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
     Cracks/damage → Replace.
   - brake fluid delivery passages
     (brake caliper body)
     Obstruction → Blow out with compressed Air.

⚠ WARNING

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

A Front
B Rear

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

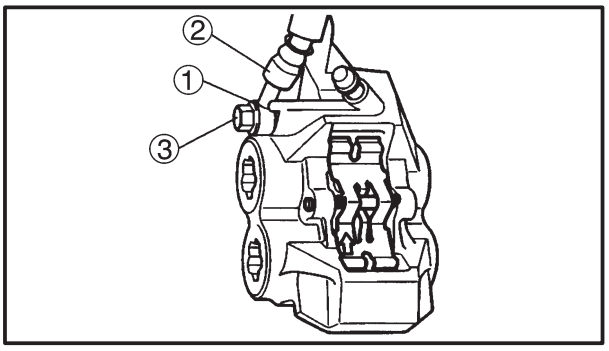
EAS00638
ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS

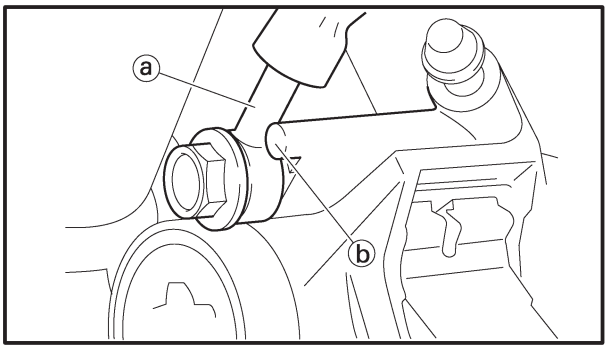
The following procedure applies to both of the brake calipers.

⚠ 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 (temporarily)
   - copper washers ① 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 ⓐ touches the projection ⓑ on the brake caliper.

2. Remove:
   - brake caliper
3. Install:
   - brake pads
   - brake pad pins
   - brake pad clips
   - brake hose holder — **6 Nm (0.6 m•kg)**
   - brake caliper — **40 Nm (4.0 m•kg)**

   Refer to "REPLACING THE BRAKE PADS".

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

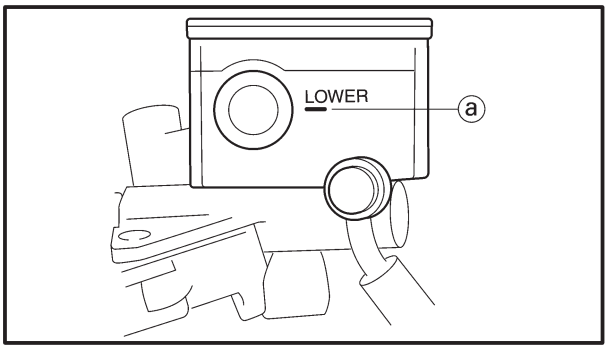
Recommended brake fluid
DOT 4

⚠ WARNING

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

CAUTION:

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



5. Bleed:
   • brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
6. Check:
   • brake fluid level
   Below the minimum level mark ⓐ → 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.

EAS00644

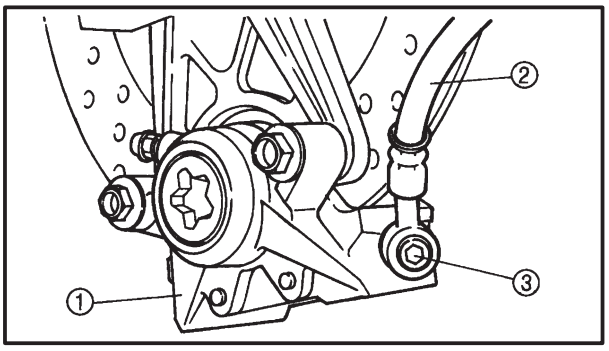
ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

⚠ WARNING

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

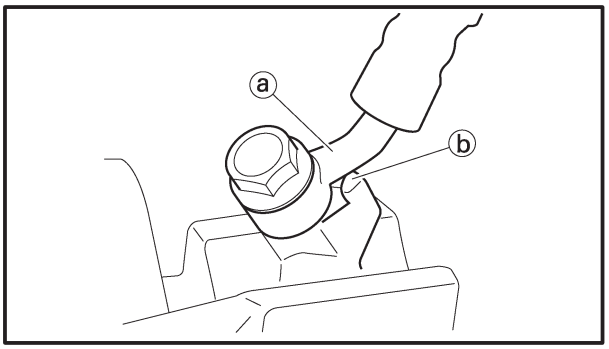


⚠ WARNING

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 ⓐ touches the projection ⓑ on the brake caliper.



2. Remove:
   - brake caliper
3. Install:
   - brake pads
   - brake pad pin
   - brake pad clips
   - brake caliper **40 Nm (4.0 m•kg)**
     Refer to "REPLACING THE BRAKE PADS".
4. Fill:
   - brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

Recommended brake fluid
DOT 4

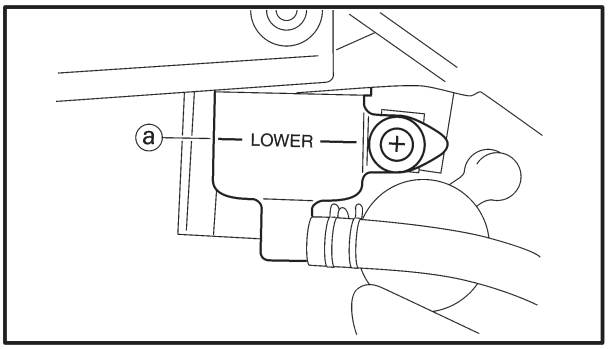
⚠ WARNING

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

CAUTION:

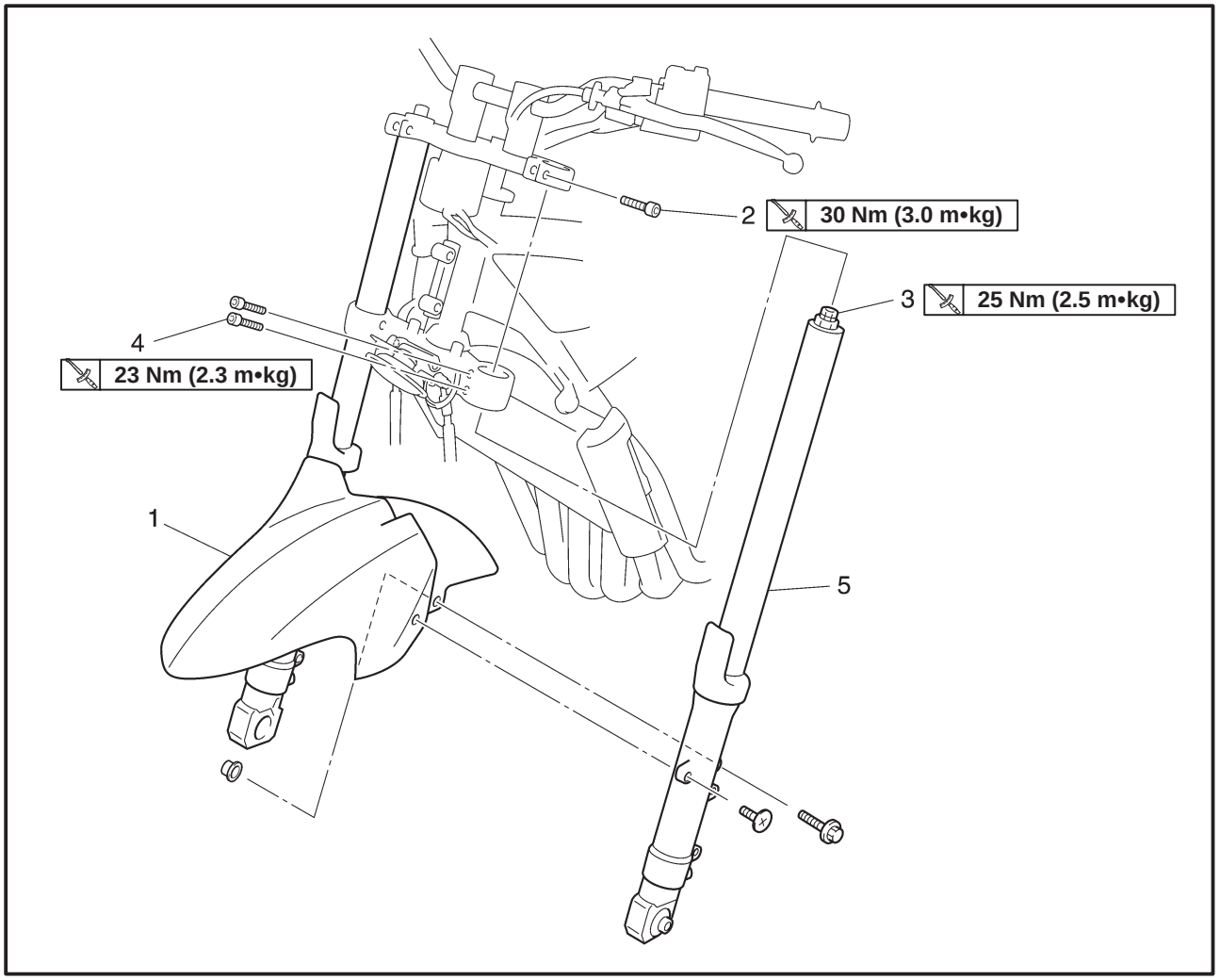
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

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



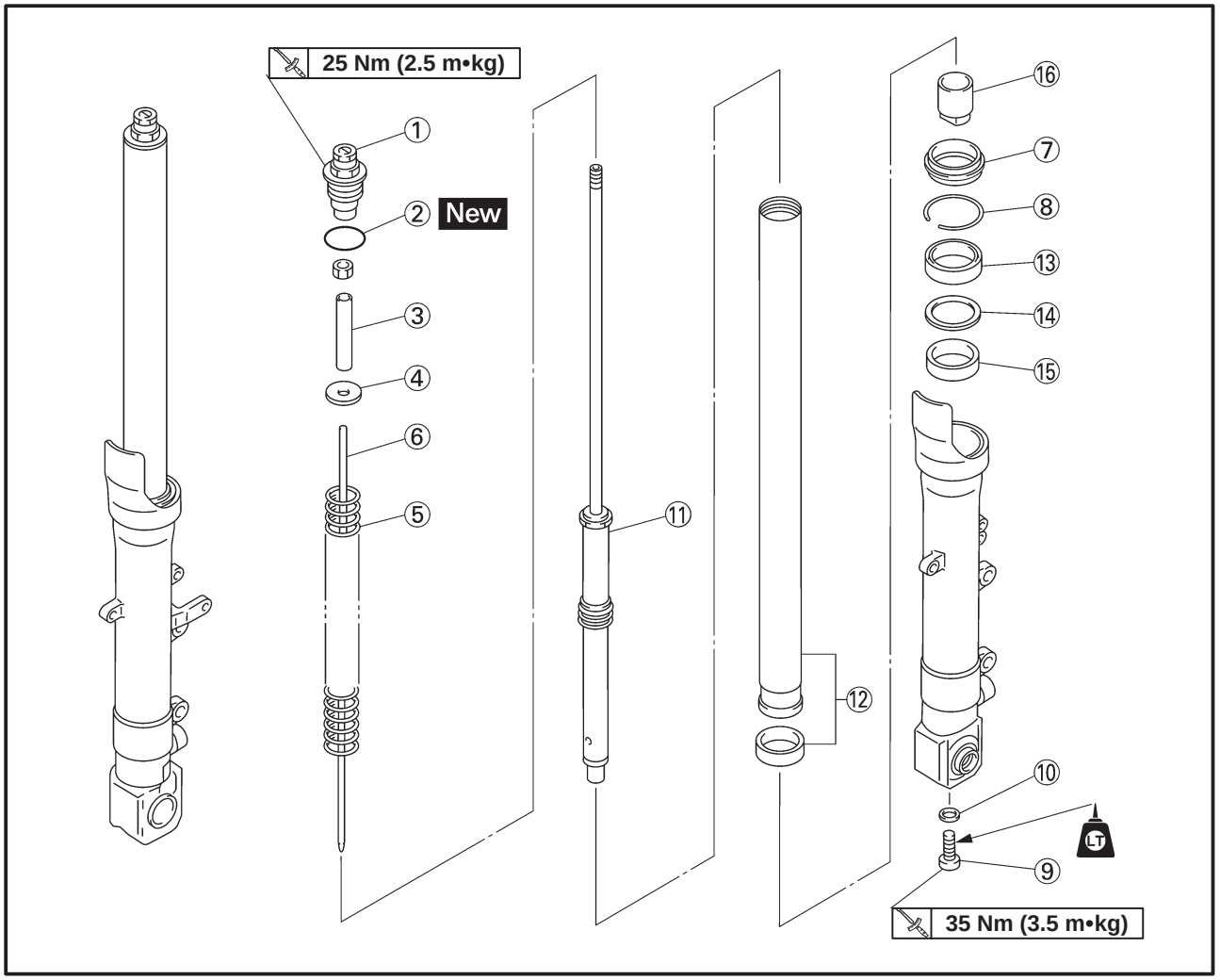
6. Check:
   - brake fluid level
     Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
7. Check:
   - brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE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

EAS00647
FRONT FORK



Order	Job/Part	Q'ty	Remarks
	Removing the front fork Front wheel		Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS".
1	Front fender	1	
2	Bolt (upper bracket)	2	Loosen. ┐ Refer to "REMOVING/
3	Cap bolt	2	Loosen. ├ INSTALLING THE FRONT
4	Bolt (lower bracket)	4	Loosen. ┘ FORK LEGS" section.
5	Front fork assembly (left/right)	1/1	
			For installation, reverse the removal procedure.

EAS00648



Order	Job/Part	Q'ty	Remarks
	Disassembly the front fork		Disassemble the parts in the order listed.
①	Cap bolt	1	
②	O-ring	1	
③	Spacer	1	
④	Spring seat	1	
⑤	Fork spring	1	
⑥	Damper adjusting rod	1	
⑦	Dust seal	1	
⑧	Oil seal clip	1	
⑨	Damper rod bolt	1	
⑩	Copper washer	1	
⑪	Damper rod	1	
⑫	Inner tube	1	
⑬	Oil seal	1	
⑭	Washer	1	
⑮	Slide metal	1	
⑯	Oil flow stopper	1	
			For assembly, reverse the disassembly procedure.

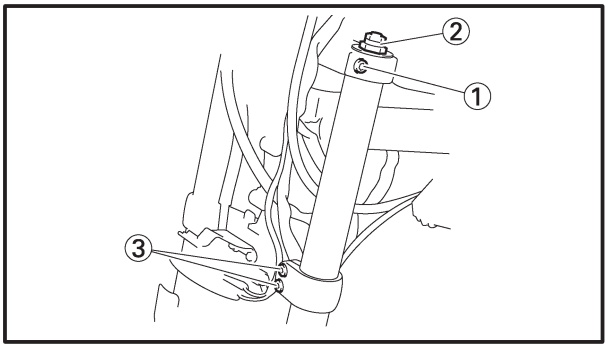
EAS00649
REMOVING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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

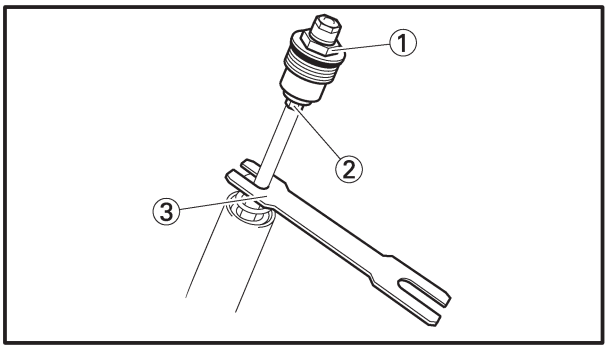


2. Loosen:
   - upper bracket pinch bolt ①
   - cap bolt ②
   - lower bracket pinch bolt ③

⚠ WARNING

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

3. Remove:
   - front fork leg

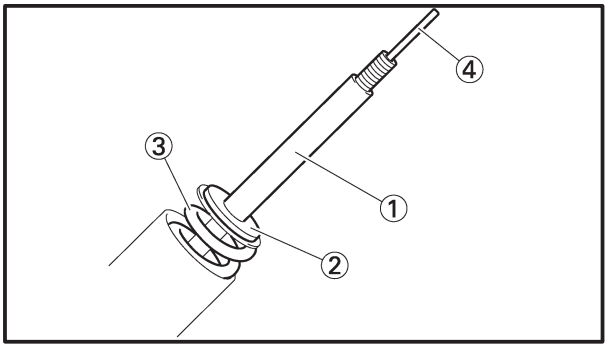


EAS00653
DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Remove:
   - cap bolt ①
     (from the damper adjusting rod)
   - nut ②

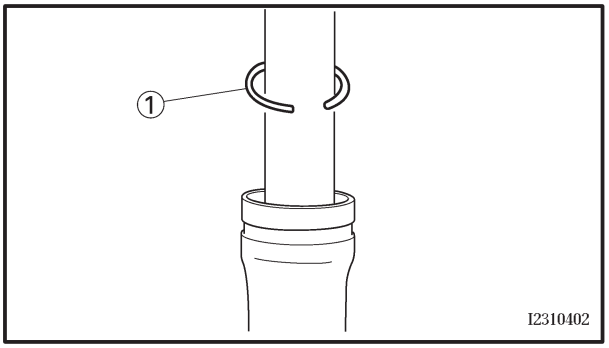
NOTE:

Remove the cap bolt with the piston rod holder ③.

Piston rod holder
90890-01434



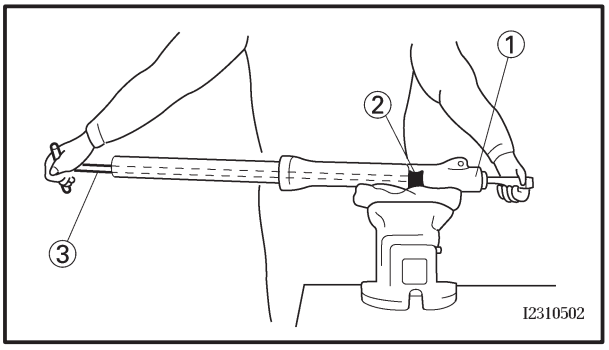
2. Remove:
   - spacer ①
   - spring seat ②
   - spring ③
   - damper adjusting rod ④
3. Drain:
   - fork oil



4. Remove:
   - oil seal clip ①
     (with a flat-head screwdriver)

CAUTION:

Do not scratch the inner tube.

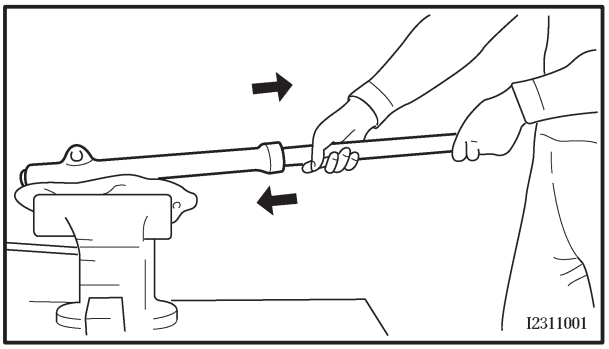


5. Remove:
   - damper rod bolt
   - damper rod ①

NOTE:

While holding the damper rod with the damper rod holder ②, loosen the damper rod bolt.

Damper rod holder
90890-01447

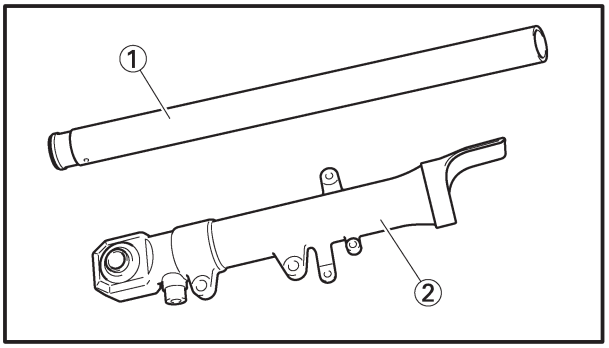


6. Remove:
   - inner tube

a. Hold the front fork leg horizontally.
b. Securely clamp the brake caliper bracket in a vise with soft jaws.
c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

CAUTION:

- **Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.**
- **Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.**



EAS00657

CHECKING THE FRONT FORK LEGS

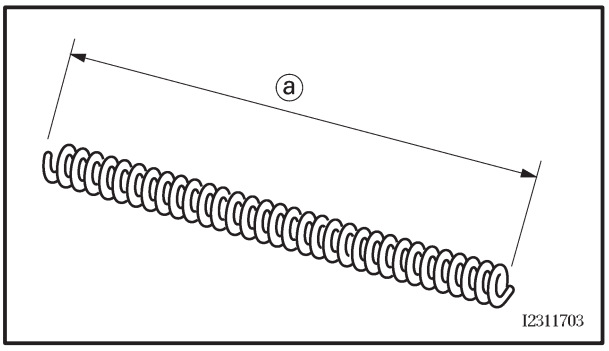
The following procedure applies to both of the front fork legs.

1. Check:
   - inner tube ①
   - outer tube ②

   Bends/damage/scratches → Replace.

⚠ WARNING

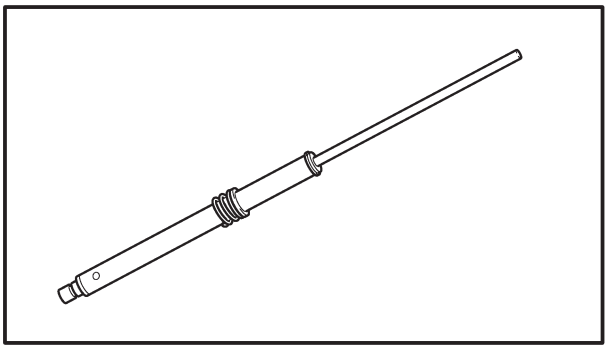
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.



2. Measure:
   - spring free length ⓐ

   Over the specified limit → Replace.

Spring free length limit
347.0 mm



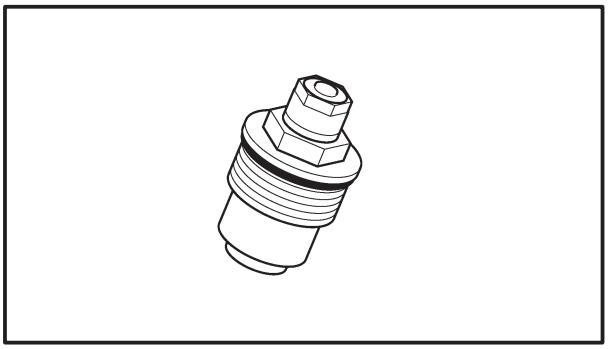
3. Check:
   - damper rod

   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.
   - oil flow stopper

   Damage → 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.

EAS00660

ASSEMBLING THE FRONT FORK LEGS

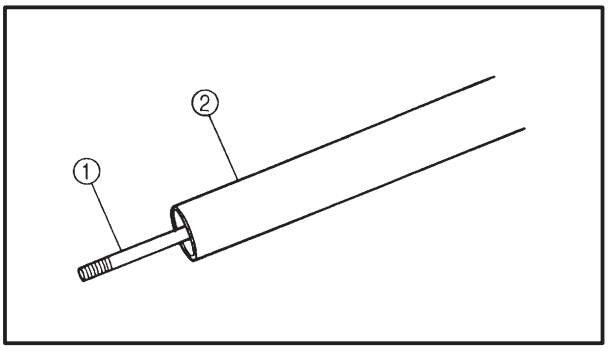
The following procedure applies to both of the front fork legs.

⚠ 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:

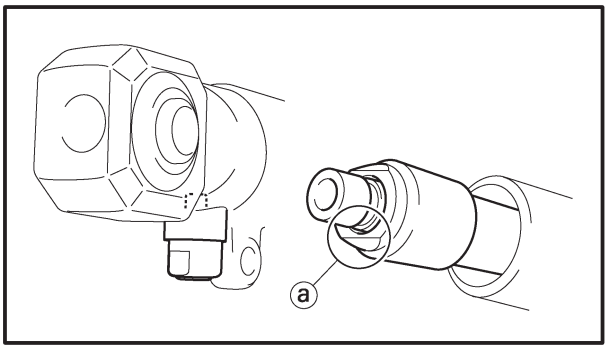
- When assembling the front fork leg, be sure to replace the following parts:
  -inner tube bushing
  -outer tube bushing
  -oil seal
  -dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.



1. Install:
   - damper rod ①

CAUTION:

Allow the damper rod to slide slowly down the inner tube ② until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



NOTE:

Install the oil flow stopper with a flat surface part ⓐ downward.

2. Lubricate:
   - inner tube's outer surface

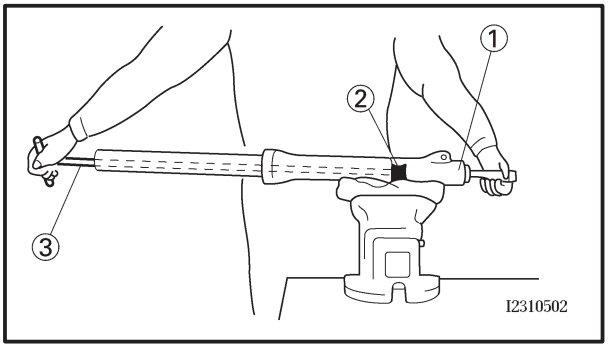
	Recommended lubricant **Fork oil 5W or equivalent**

3. Tighten:
   - damper rod bolt ①

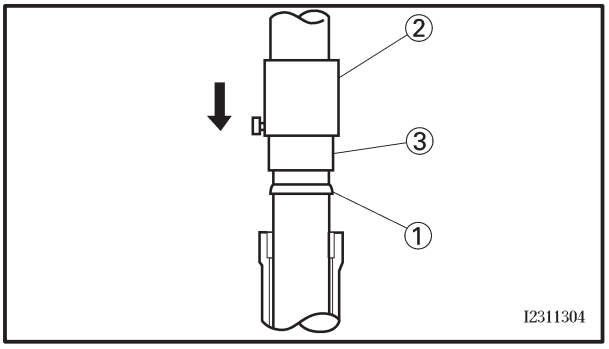
35 Nm (3.5 m•kg)
LOCTITE®

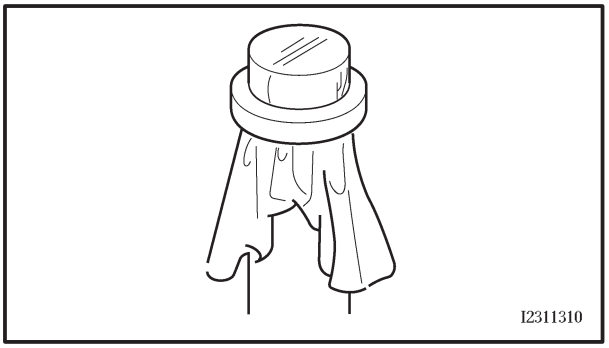
NOTE:

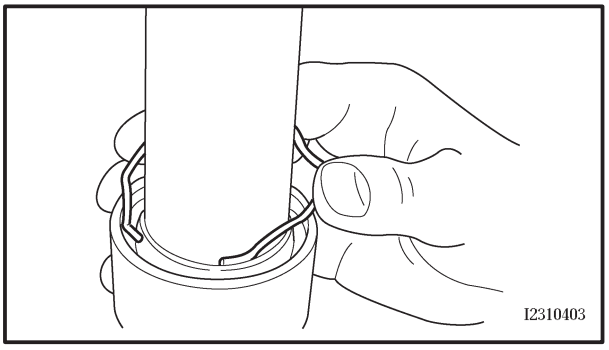
While holding the damper rod with the damper rod holder ②, tighten the damper rod bolt.



	Damper rod holder **90890-01447**







4. Install:
   • oil seal ①
   (with the fork seal driver weight ② and fork seal driver attachemt ③)

Fork seal driver weight
90890-01367
Fork seal driver attachment
90890-01374

CAUTION:

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

NOTE:

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

5. Install:
   • oil seal clip

NOTE:

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

6. Fill:
   • front fork leg
   (with the specified amount of the recommended fork oil)

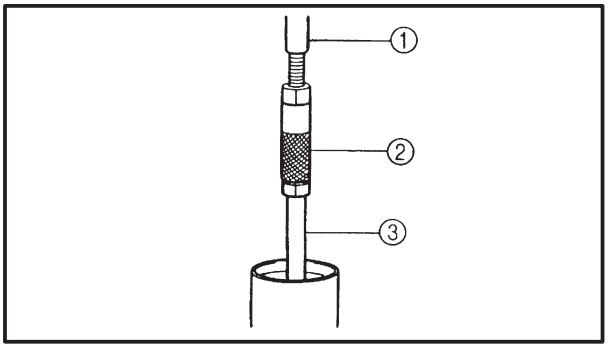
Quantity (each front fork leg)
0.44 L (440 cm^3)
Recommended oil
Yamaha suspension oil "01" or equivalent

CAUTION:

- **Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

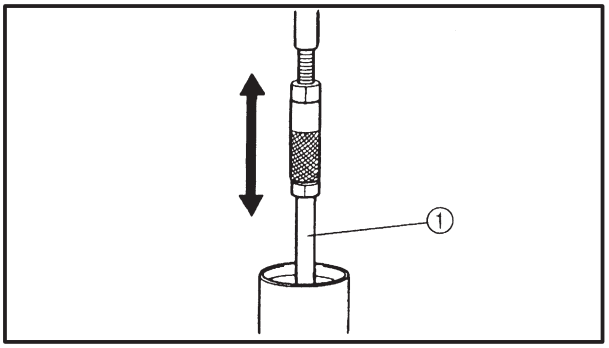
NOTE:

Be sure to bleed the front fork.



7. Install:
   • rod puller ①
   • rod puller attachment ②
   (onto the damper rod ③)

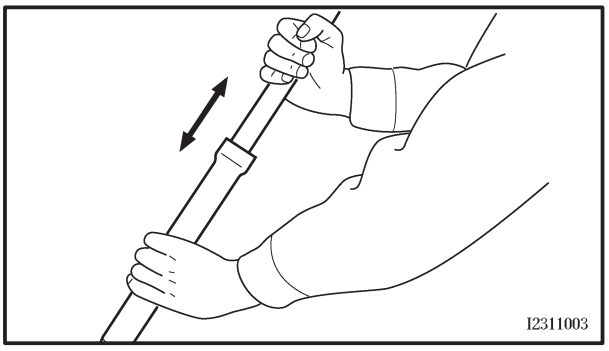
Rod puller
90890-01437
Rod puller attachment
90890-01436



8. After filling the front fork leg, slowly stroke the damper rod ① up and down (at least ten times) to distribute the fork oil.

NOTE:

Be sure to stroke the damper rod slowly because the fork oil may spurt out.



9. Slowly stroke the inner tube ② up and down to distribute the fork oil once more (1 stroke = about 150 mm).

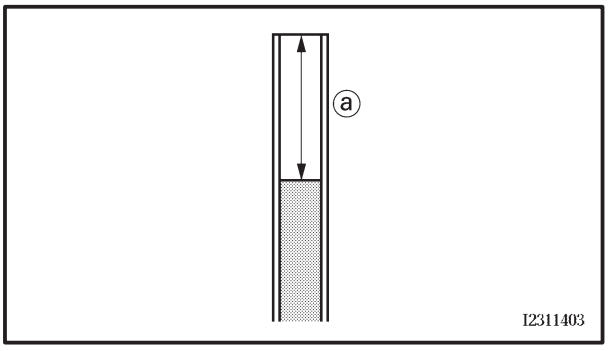
NOTE:

Be careful not to stroke the inner tube over 150 mm as this will cause air to enter. If the inner tube is stroke more than 150 mm, repeat steps (10) and (11).

10. Before checking the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

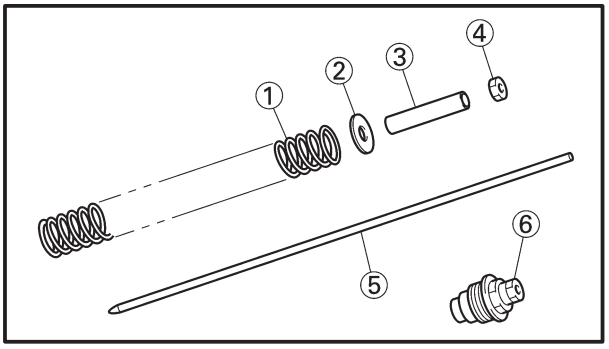
NOTE:

Be sure to bleed the front fork leg of any residual air.

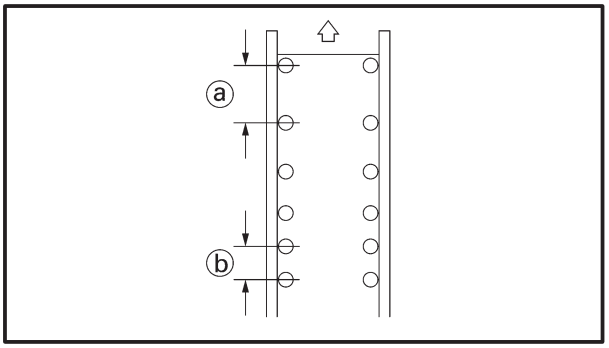


11. Measure:
   • front fork leg oil level ⓐ
   Out of specification → Correct.

Front fork leg oil level (from the top of the inner tube and damper rod, with the inner tube fully compressed, and without the spring)
140 mm



12. Install:
    - spring ①
    - spring seats ②
    - spacer ③
    - nut ④
    - damper adjusting rod ⑤
    - cap bolt ⑥



a. Install the fork spring, spring seats, and spacer.

NOTE:

Install the fork spring with the larger pitch ⓐ facing up.

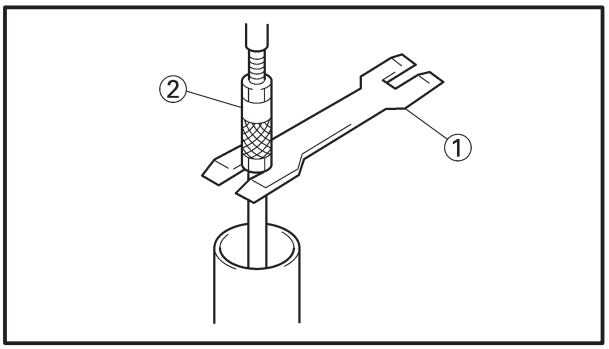
ⓑ smaller pitch

b. Install the rod puller and the rod puller attachment onto the damper rod.

c. Pull up the rod puller and install the rod holder ① between the rod puller attachment ② and the spacer.

NOTE:

Use the side of the rod holder that is marked “B”.



Piston rod holder
90890-01434

d. Remove the rod puller and the rod puller attachment.
e. Install the damper adjusting rod locknut.
f. Tighten the damper adjusting rod locknut.

Damper adjusting rod locknut
25 Nm (2.5 m•kg)

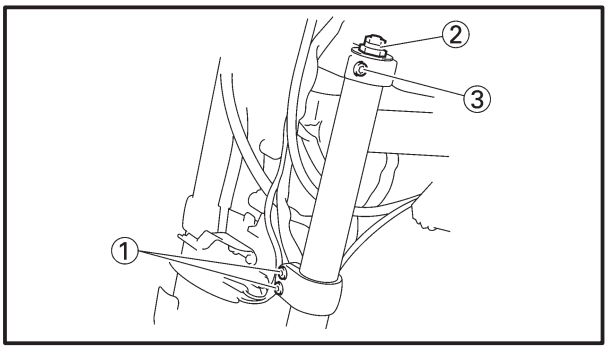
g. Install the damper adjusting rod and cap bolt, and finger tighten it.
h. Remove the rod holder.

CAUTION:

The spring is compressed.

EAS00662
INSTALLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Install:
   • front fork leg
     Temporarily tighten the upper and lower bracket pinch bolts.

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

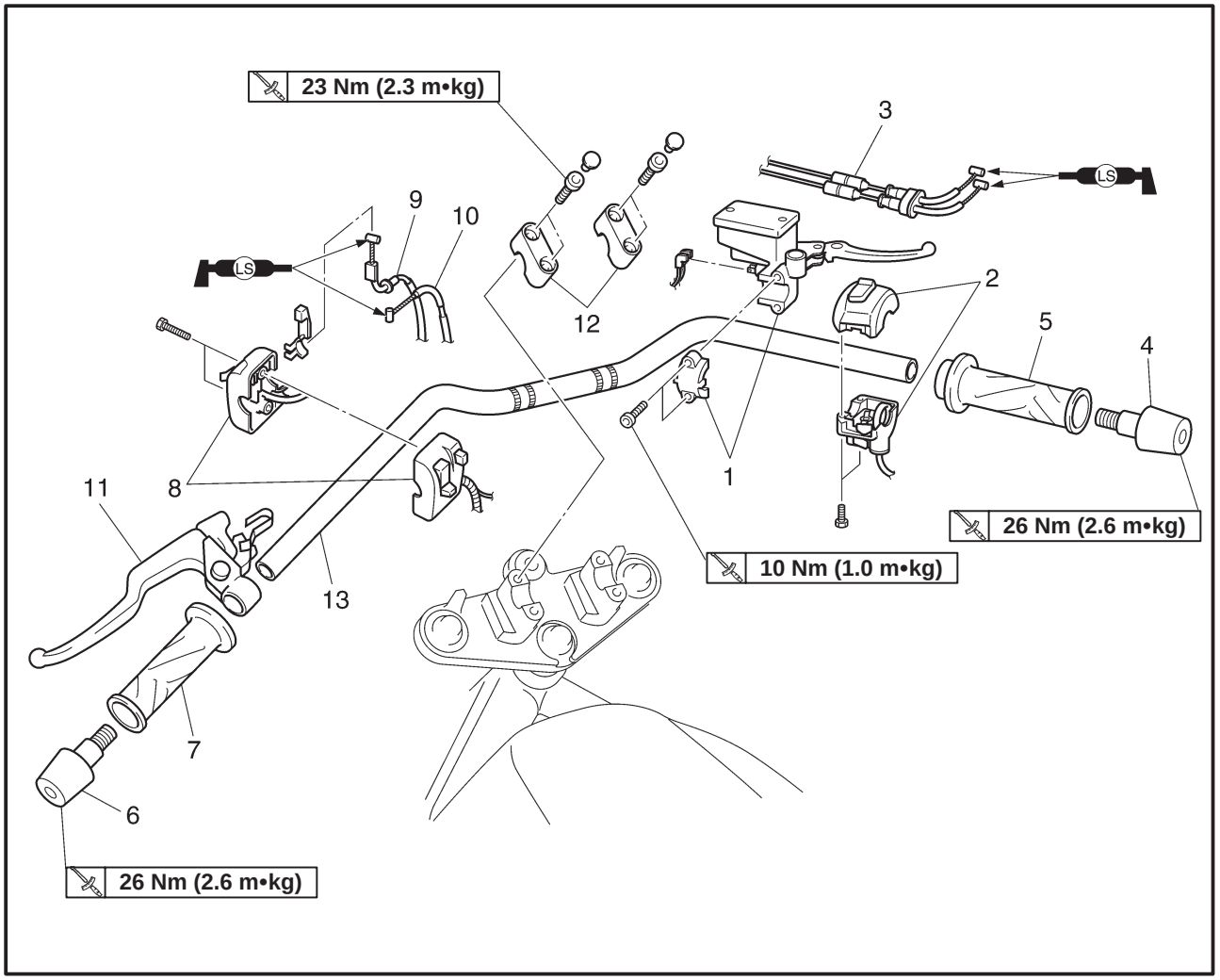


2. Tighten:
   • lower bracket pinch bolt ①
     23 Nm (2.3 m•kg)
   • cap bolt ②
     25 Nm (2.5 m•kg)
   • upper bracket pinch bolt ③
     30 Nm (3.0 m•kg)

⚠ WARNING
Make sure that the brake hoses are routed properly.

3. Adjust:
   • spring preload
   • rebound damping
   • compression damping
     Refer to “ADJUSTING THE FRONT FORK” in chapter 3.

EAS00664
HANDLEBAR

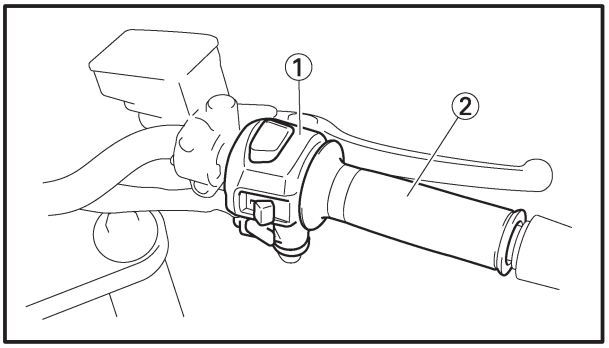


Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed.
1	Front brake master cylinder	1	
2	Right handlebar switch	1	
3	Throotle cable	1	
4	Grip end (right)	1	
5	Throttle grip	1	
6	Grip end (left)	1	
7	Left grip	1	
8	Left handlebar switch	1	
9	Starter cable	1	
10	Clutch cable	1	
11	Clutch lever	1	
12	Handlebar holder	2	
13	Handlebar	1	
			For installation, reverse the removal procedure.

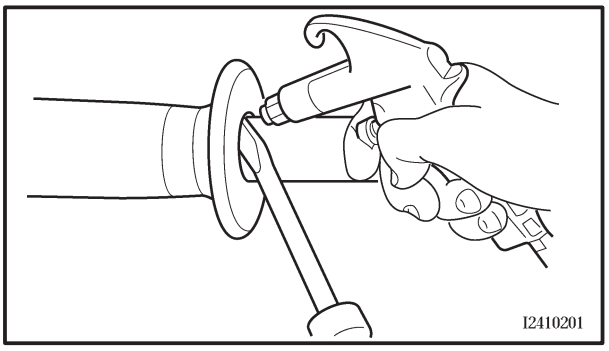
EAS00666
REMOVING THE HANDLEBAR
1. Stand the motorcycle on a level surface.

⚠ WARNING

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



2. Remove:
   - throttle cable housing ①
   - throttle grip ②



3. Remove:
   - handlebar grip ①

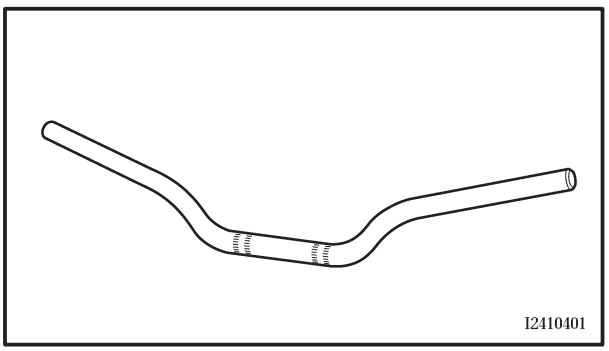
NOTE:

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

EAS00668
CHECKING THE HANDLEBAR
1. Stand the motorcycle on a level surface.

⚠ WARNING

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



2. Check:
   - handlebar
     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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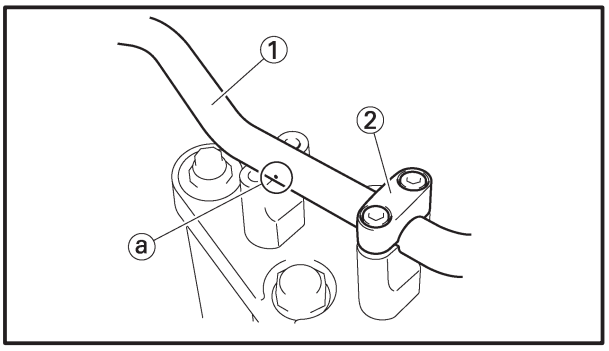
EAS00672

INSTALLING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

⚠ WARNING

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



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

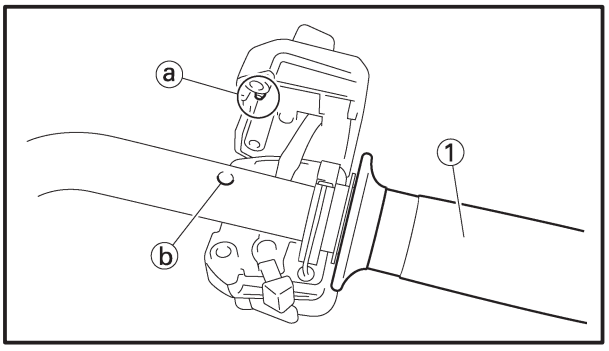
23 Nm (2.3 m•kg)

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:

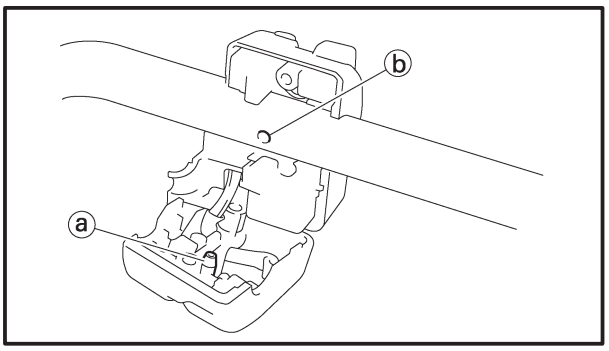
Align the match marks ⓐ in the handlebar with the upper surface of the lower handlebar holders.



3. Install:
• throttle grip ①
• throttle cables

NOTE:

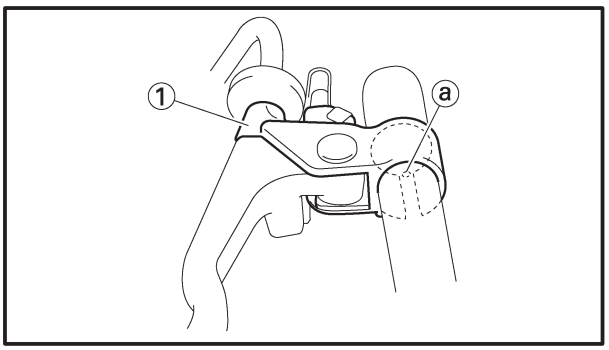
Align the pins ⓐ on the right handlebar switch with the holes ⓑ in the handlebar.



5. Install:
   • left handlebar switch

NOTE:

Align the pins ⓐ on the right handlebar switch with the holes ⓑ in the handlebar.



6. Install:
   • clutch lever holder

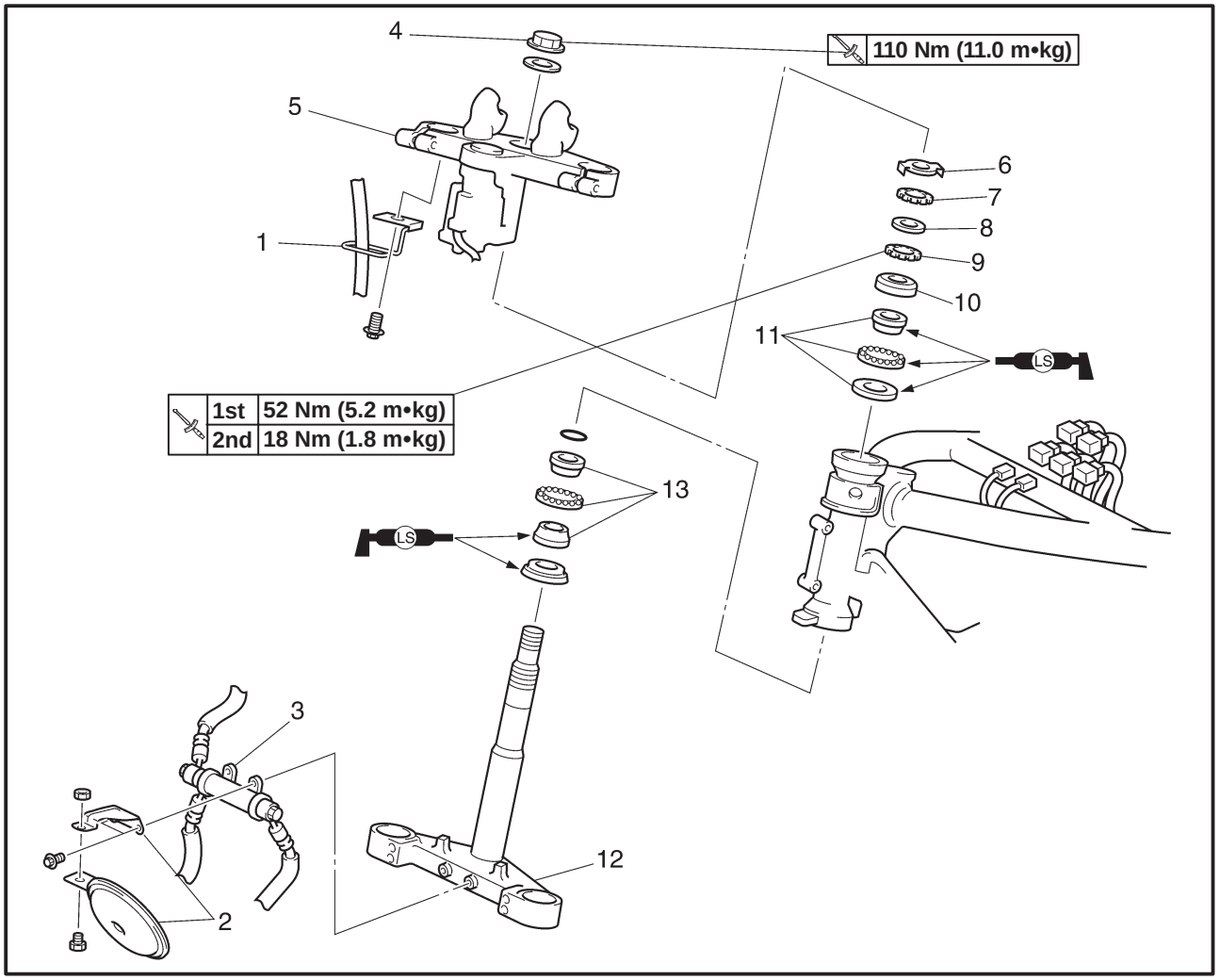
NOTE:

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

7. Install:
   • brake master cylinder
   Refer to “ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER”.
8. 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

EAS00676
STEERING HEAD

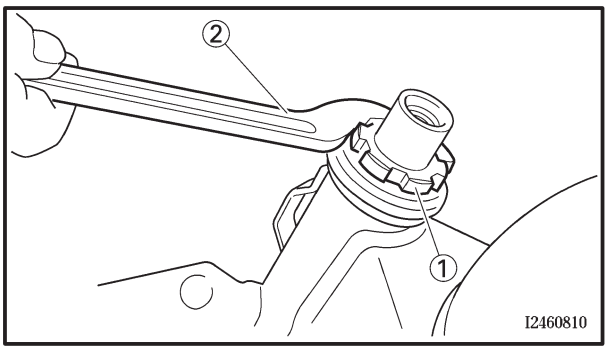


Order	Job/Part	Q'ty	Remarks
	Removing the steering head		Remove the parts in the order listed.
	Front wheel		Refer to "FRONT WHEEL"
	Front fork		Refer to "FRONT FORK"
	Handlebar		Refer to "HANDLEBAR"
1	Front brake hose bracket	1	
2	Horn/bracket	1/1	
3	Brake hose joint	1	
4	Upper bracket cap nut	1	
5	Upper bracket	1	
6	Lock washer	1	
7	Upper ring nut	1	
8	Rubber washer	1	
9	Lower ring nut	1	
10	Dust cover	1	
11	Steering bearing (upper)	1	
12	Lower bracket	1	
13	Steering bearing (lower)	1	
			For installation, reverse the removal procedure.

EAS00677
REMOVING THE LOWER BRACKET
1. Stand the motorcycle on a level surface.

⚠ WARNING

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



2. Remove:
   - lower ring nut ①
     (with the special tool ②)

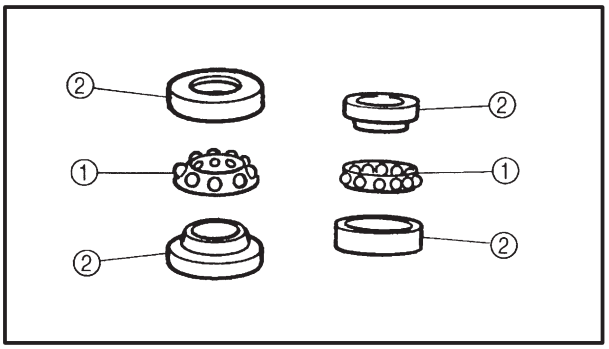
	Ring nut wrench **90890-01403**

⚠ WARNING

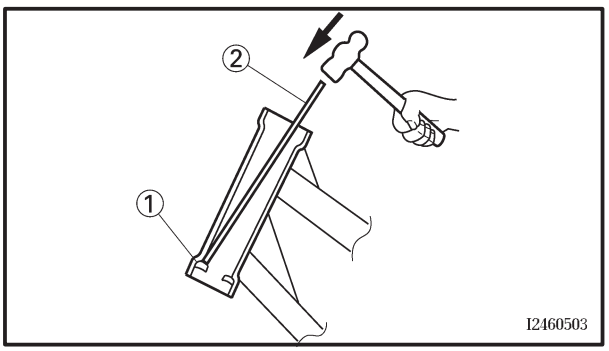
Securely support the lower bracket so that there is no danger of it falling.

EAS00681
CHECKING THE STEERING HEAD
1. Wash:
   - bearings
   - bearing races

	Recommended cleaning solvent **Kerosine**



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



3. Replace:
   - bearings
   - bearing races

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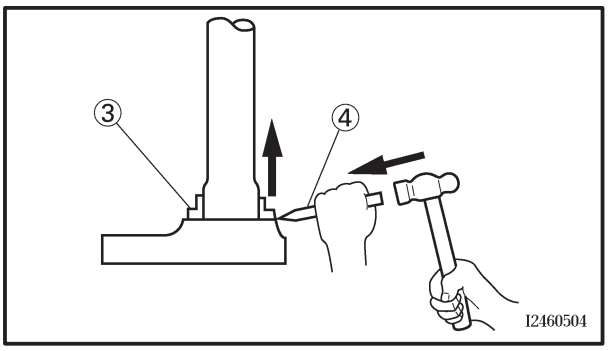
a. Remove the bearing races ① from the steering head pipe with a long rod ② and hammer.



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

CAUTION:

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

NOTE:

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

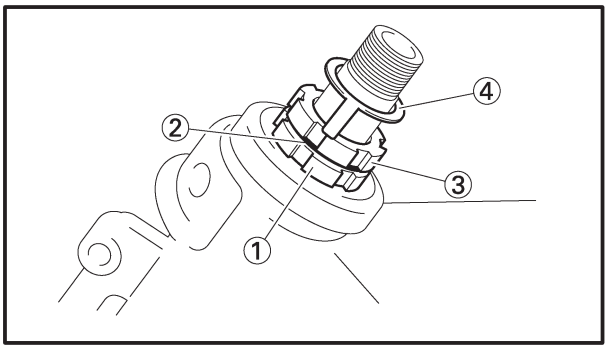
4. Check:
   - upper bracket
   - lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

EAS00683

INSTALLING THE STEERING HEAD

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

	Recommended lubricant **Lithium soap base grease**



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

NOTE:

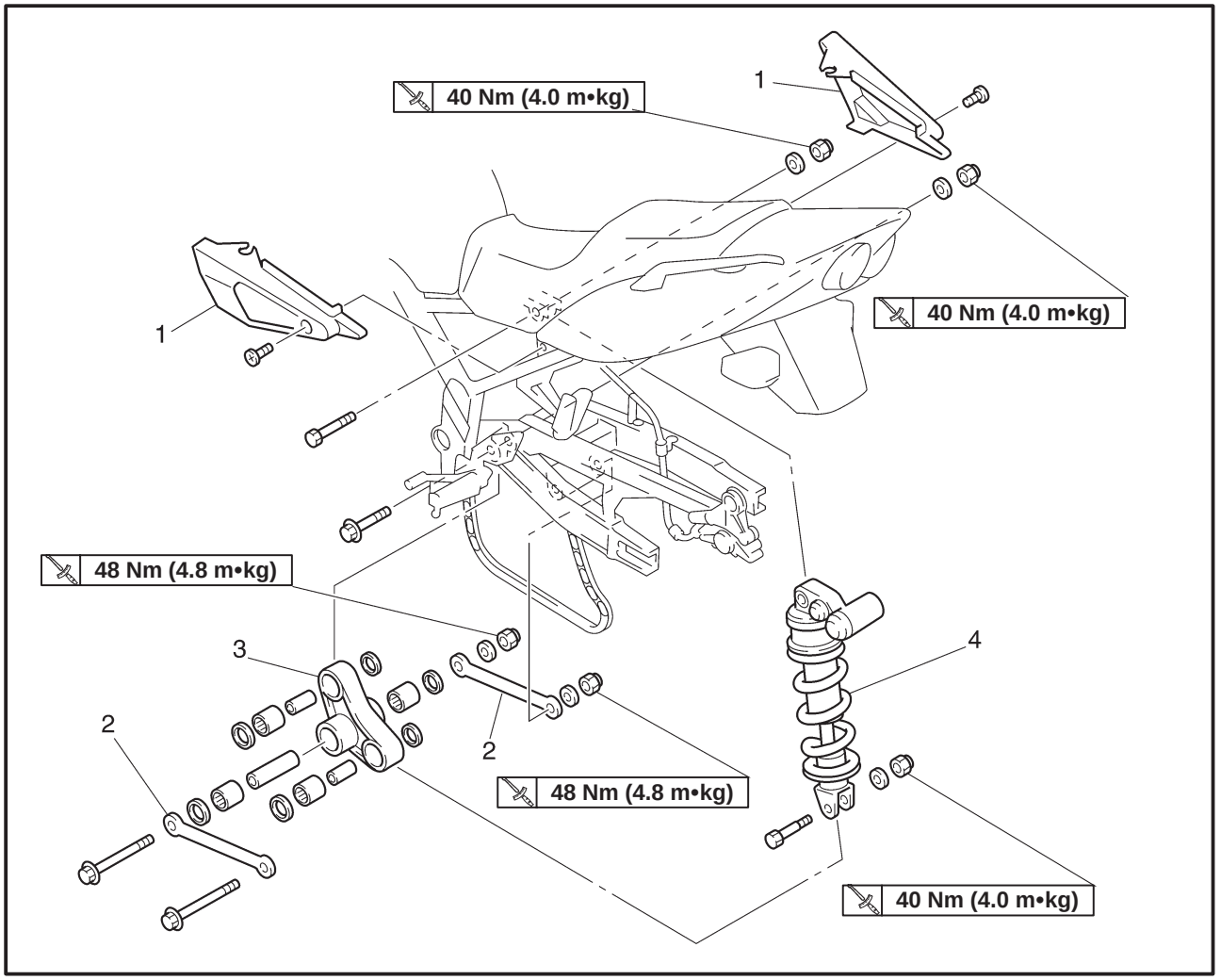
Temporarily tighten the steering stem nut.

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

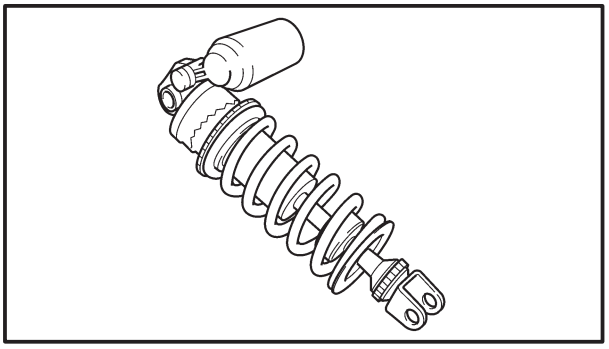
NOTE:

Temporarily tighten the upper and lower bracket pinch bolts.

EAS00685
REAR SHOCK ABSORBER ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber assembly		Remove the parts in the order listed.
	Rear wheel		Refer to "REAR WHEEL"
1	Side cover (left/right)	1/1	
2	Connecting arm	1	
3	Relay arm	1	
4	Rear shock absorber	1	
			For installation, reverse the removal procedure.



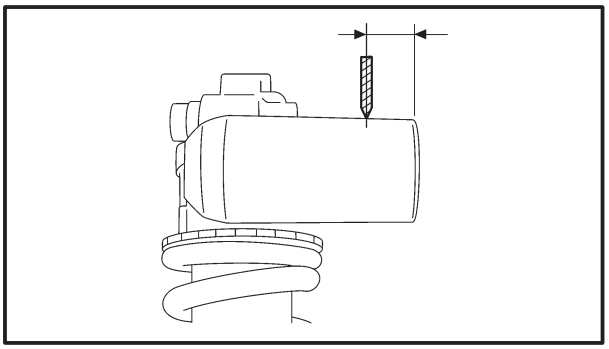
EAS00687

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

⚠ WARNING

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

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



EAS00689

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

a. Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. 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.

⚠ WARNING

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

EAS00694

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

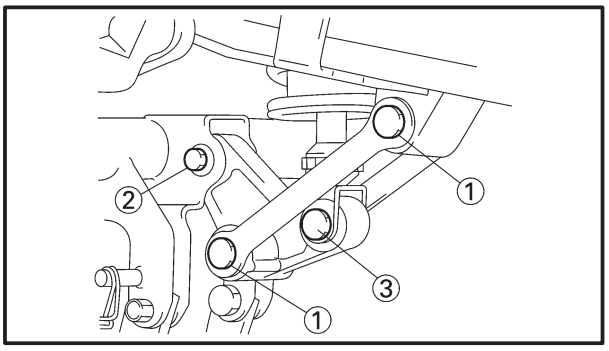
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

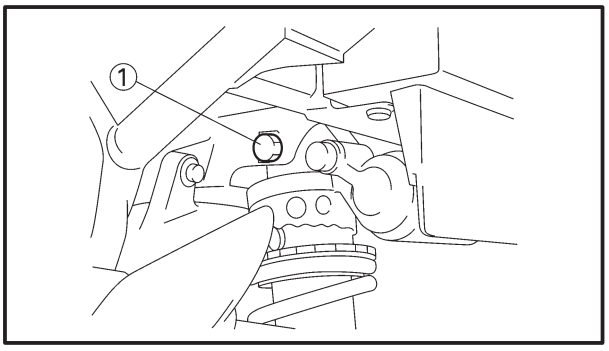
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - connecting arm bolt ①
   - relay arm bolt ②
   - rear shock absorber assembly lower bolt ③

NOTE:

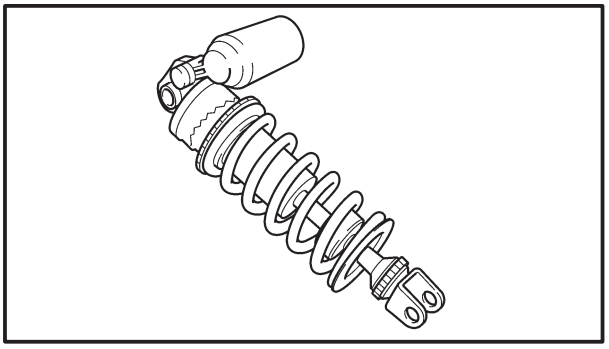
While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.



3. Remove:
   - rear shock absorber assembly upper 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.



EAS00696

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

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

EAS00698

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   - spacers
   - bearings

Recommended lubricant
Molybdenum disulfide grease

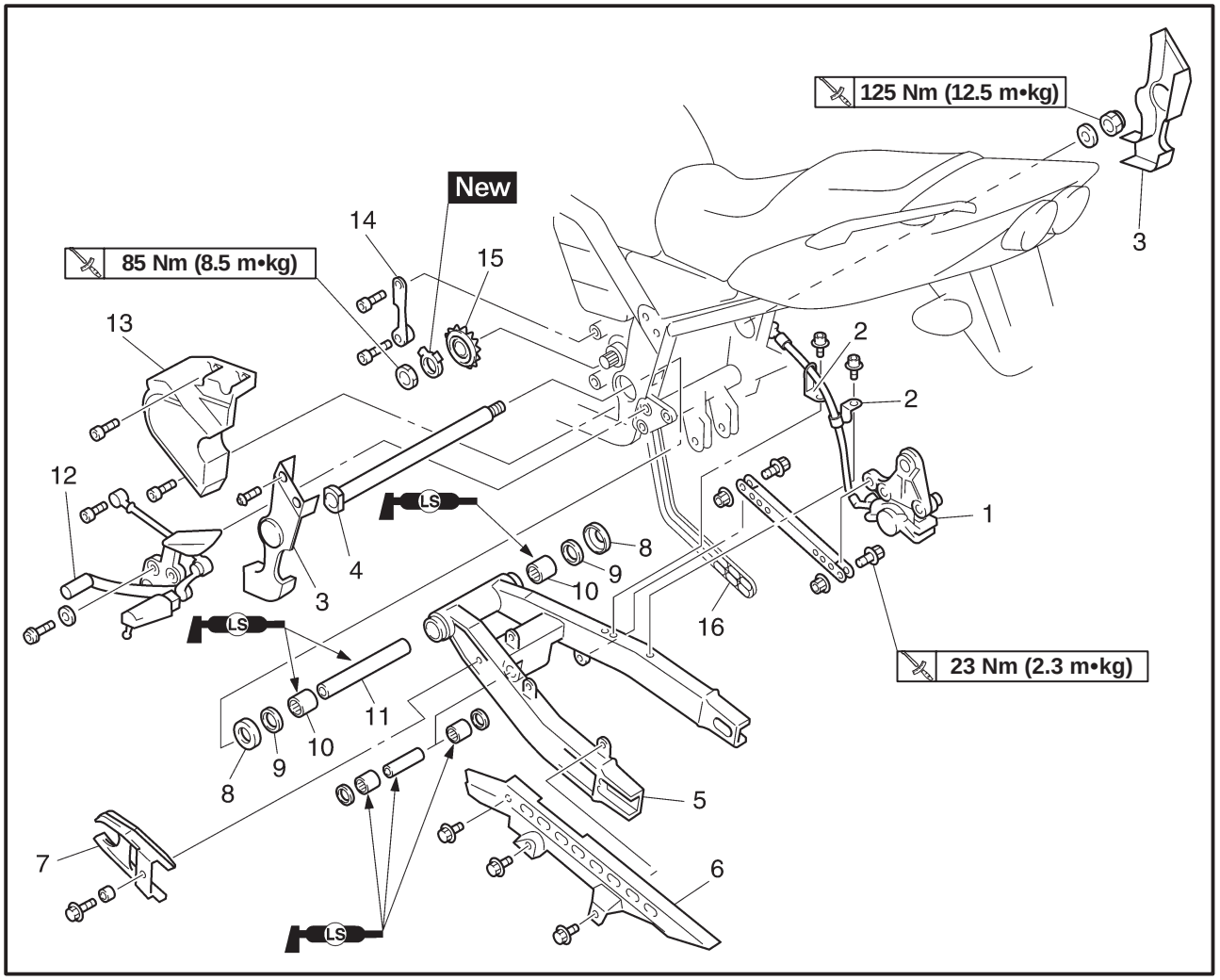
2. Install:
   - rear shock absorber assembly

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
40 Nm (4.0 m•kg)

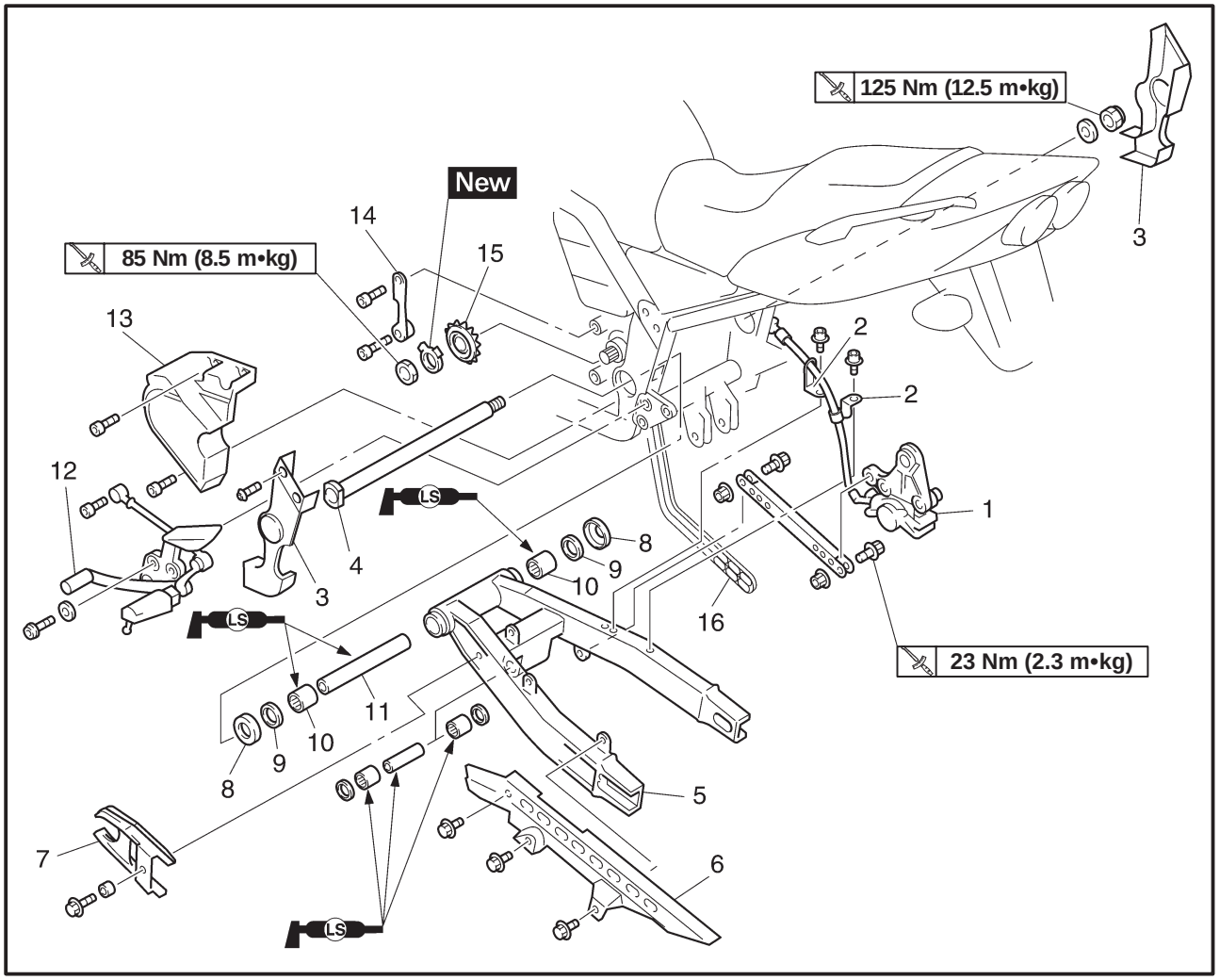
NOTE:

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

EAS00700
SWINGARM AND DRIVE CHAIN



Order	Job/Part	Q'ty	Remarks
	Removing the swing arm and drive chain		Remove the parts in the order listed.
	Rear wheel		Refer to "REAR WHEEL"
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY"
1	Rear brake caliper	1	
2	Brake hose holder	2	
3	Side protector (left/right)	1/1	**NOTE:** Remove the side protector assembly. Do not remove the center cap.
4	Pivot shaft	1	
5	Swing arm	1	
6	Drive chain case	1	
7	Drive chain guard	1	
8	Dust cover	2	
9	Oil seal	2	



Order	Job/Part	Q'ty	Remarks
10	Bearing	2	
11	Spacer	1	
12	Shoft pedal assembly	1	
13	Drive sprocket cover	1	
14	Drive chain guide	1	
15	Drive sprocket	1	
16	Drive chain	1	
			For installation, reverse the removal procedure.

EAS00703

REMOVING THE SWINGARM

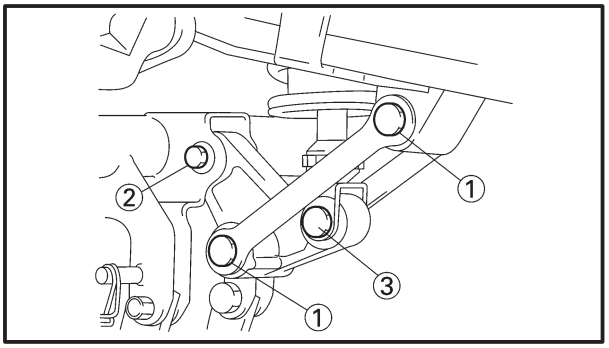
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

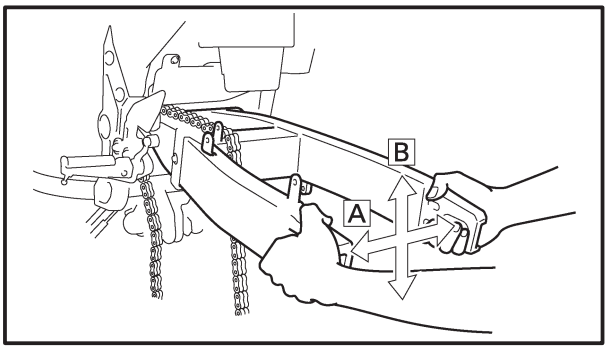
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - connecting arm bolt ①
   - relay arm bolt ②
   - rear shock absorber assembly lower bolt ③

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 [A]
   - swingarm vertical movement [B]

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

	Pivot shaft nut **125 Nm (12.5 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) **1.0 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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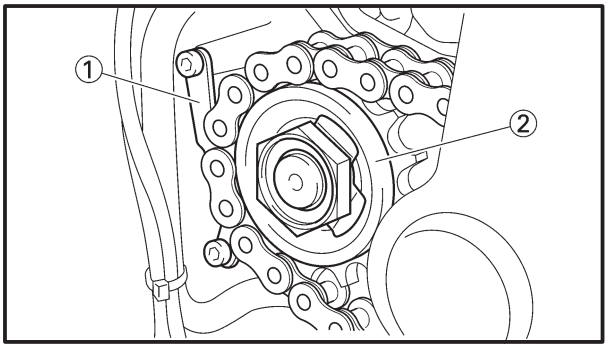
EAS00704
REMOVING THE DRIVE CHAIN
1. Stand the motorcycle on a level surface.

⚠ WARNING

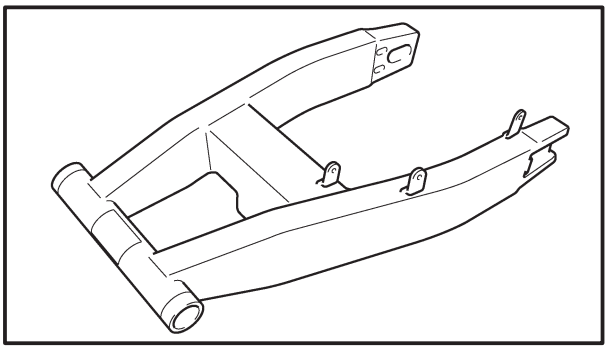
Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

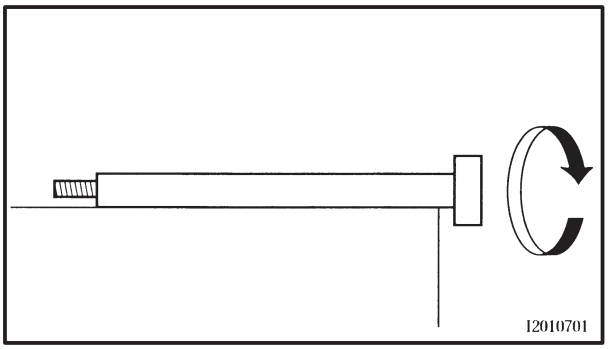
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - foot rest (left)
   - drive sprocket cover
   - drive chain guide ①
   - drive sprocket ②



EAS00707
CHECKING THE SWINGARM
1. Check:
   - swingarm
     Bends/cracks/damage → Replace.



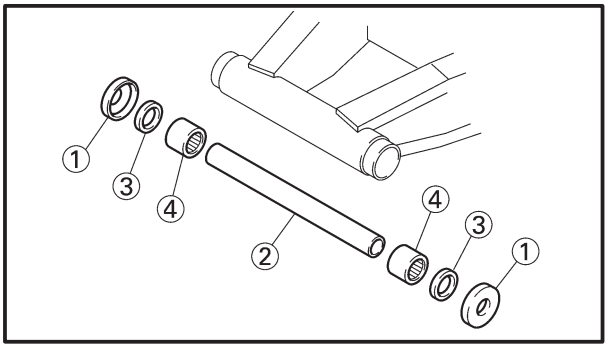
2. Check:
   - pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

⚠ WARNING

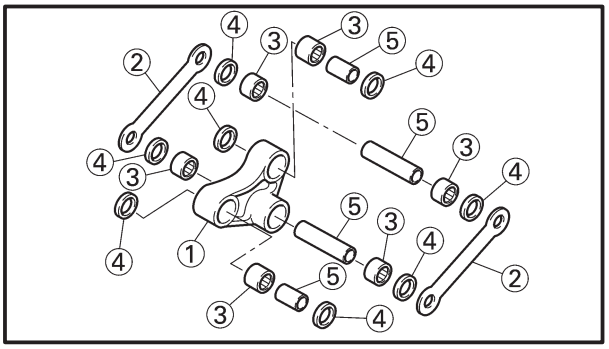
Do not attempt to straighten a bent pivot shaft.

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

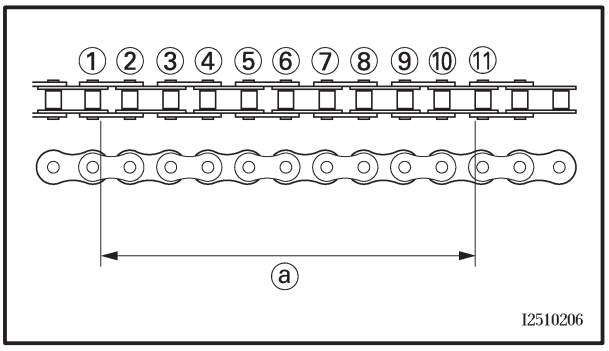
Recommended cleaning solvent
Kerosine



4. Check:
   - dust covers ①
   - spacer ②
   - oil seals ③
     Damage/wear → Replace.
   - bearings ④
     Damage/pitting → Replace.



5. Check:
   - connecting arms ①
   - relay arm ②
     Damage/wear → Replace.
   - bearings ③
   - oil seals ④
     Damage/pitting → Replace.
   - spacers ⑤
     Damage/scratches → Replace.



EAS00709

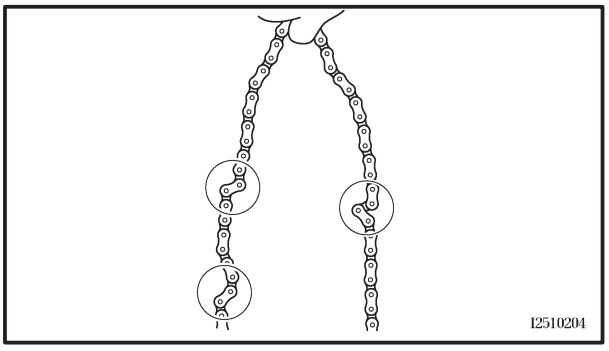
CHECKING THE DRIVE CHAIN

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

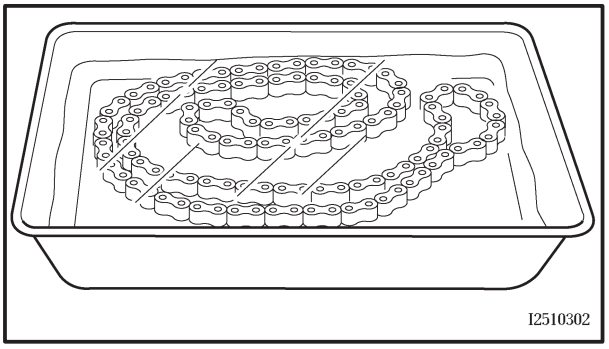
Ten-link drive chain section limit (maximum)
150.1 mm

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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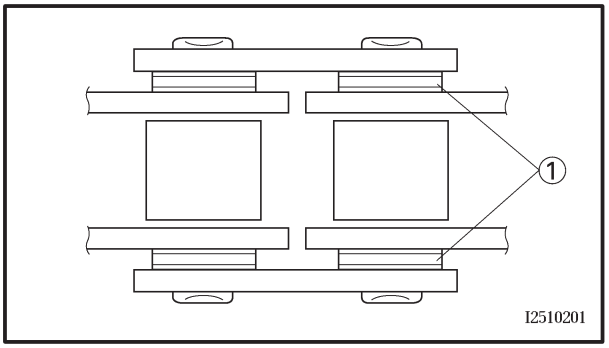
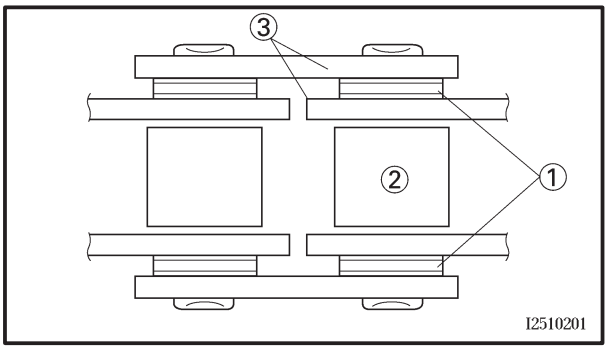
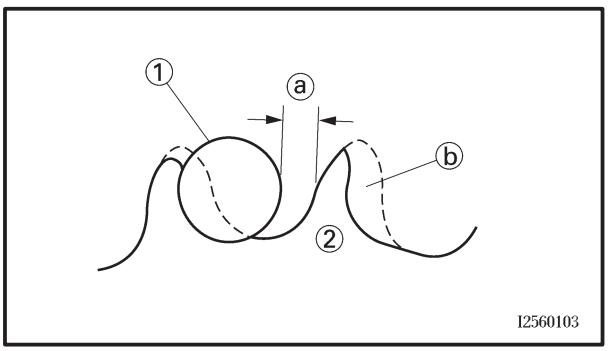




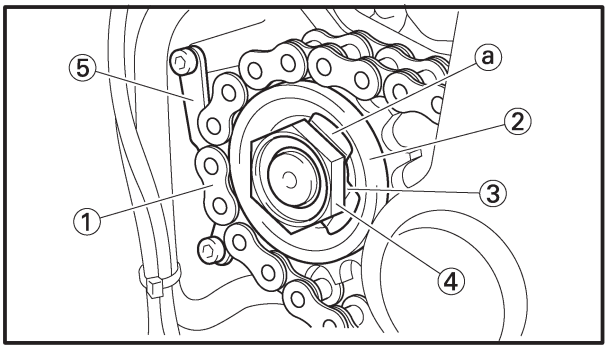
4. Check:
   • O-rings ①
     Damage → Replace the drive chain.
   • drive chain rollers ②
     Damage/wear → Replace the drive chain.
   • drive chain side plates ③
     Damage/wear → Replace the drive chain.
     Cracks → Replace the drive chain and make sure that the battery breather hose is properly routed away from the drive chain and below the swingarm.
5. Lubricate:
   • drive chain

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



6. Check:
   • drive sprocket
   • rear wheel sprocket
     More than 1/4 tooth ⓐ wear → 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



EAS00713
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 New
   • drive sprocket nut ④ — **85 Nm (8.5 m•kg)**
   • drive chain guide ⑤

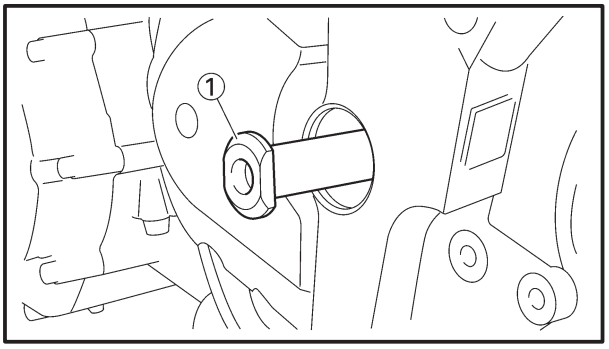
NOTE:
While applying the rear brake, tighten the drive sprocket nut.

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

EAS00711
INSTALLING THE SWINGARM
1. Lubricate:
   • bearings
   • spacers
   • dust covers
   • pivot shaft

Recommended lubricant
Molybdenum disulfide grease

2. Install:
   • relay arm — **48 Nm (4.8 m•kg)**
   • left connecting arm
   • right connecting arm — **48 Nm (4.8 m•kg)**



NOTE:

Install the connecting arm front bolt ① from the right.

3. Install:
   - rear shock absorber assembly
   - rear wheel

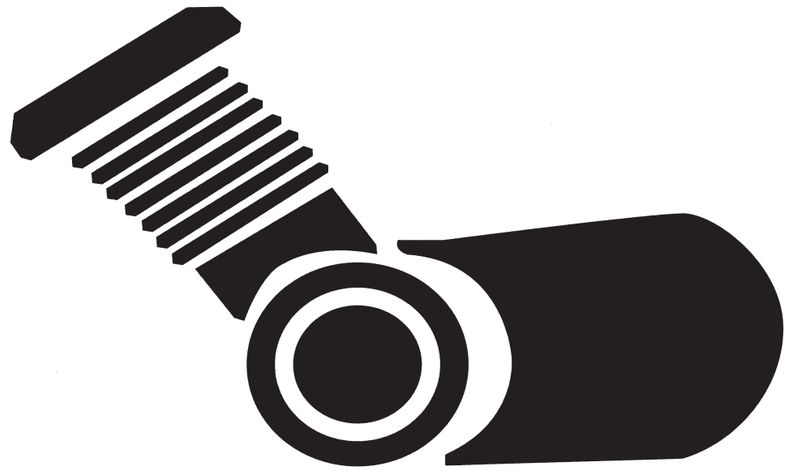
   Refer to "INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY" and "REAR WHEEL".
4. Adjust:
   - drive chain slack

   Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.

Drive chain slack
40 ~ 50 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.



ENG 5

CHAPTER 5
OVERHAULING THE ENGINE

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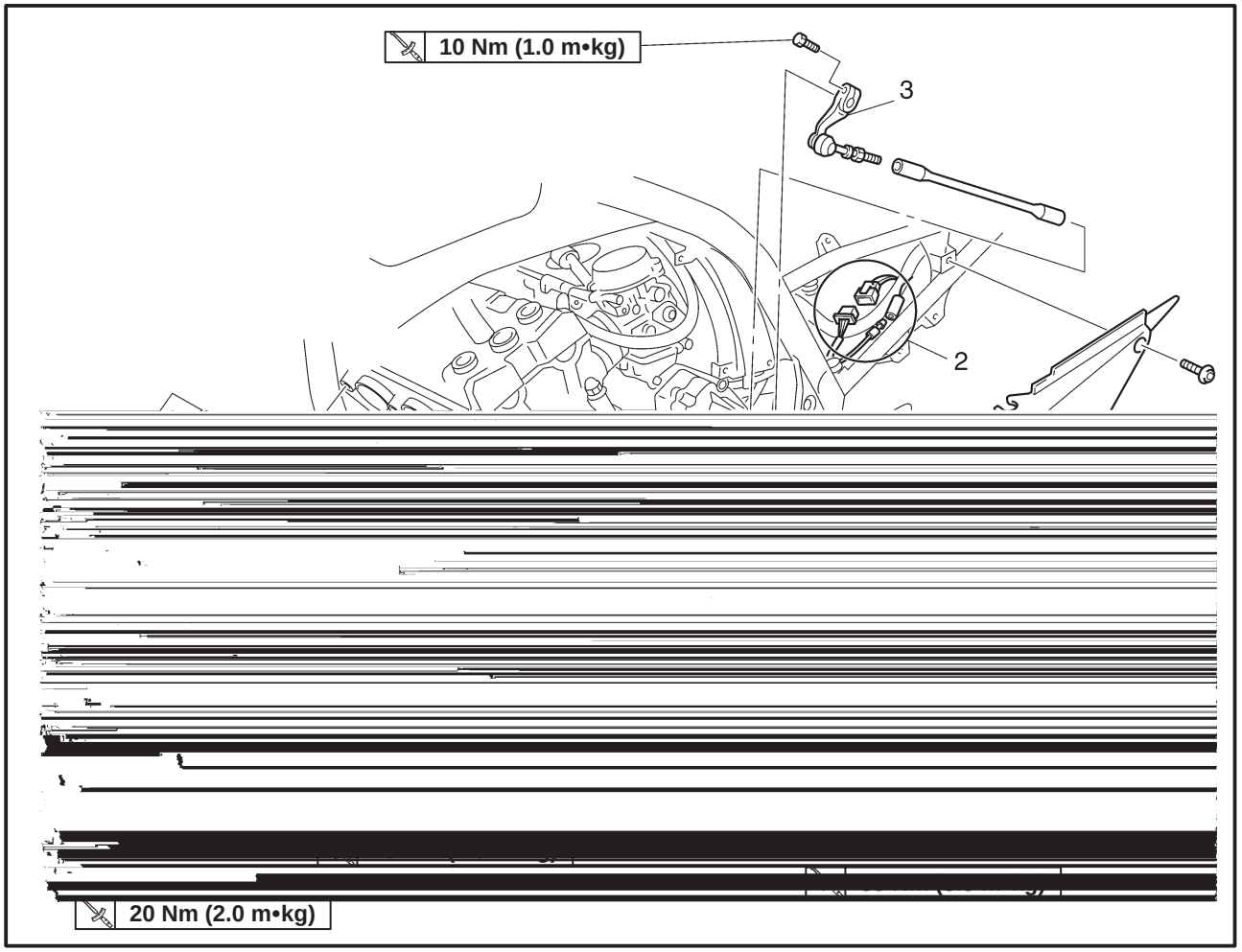
EAS00188

OVERHAULING THE ENGINE

ENGINE

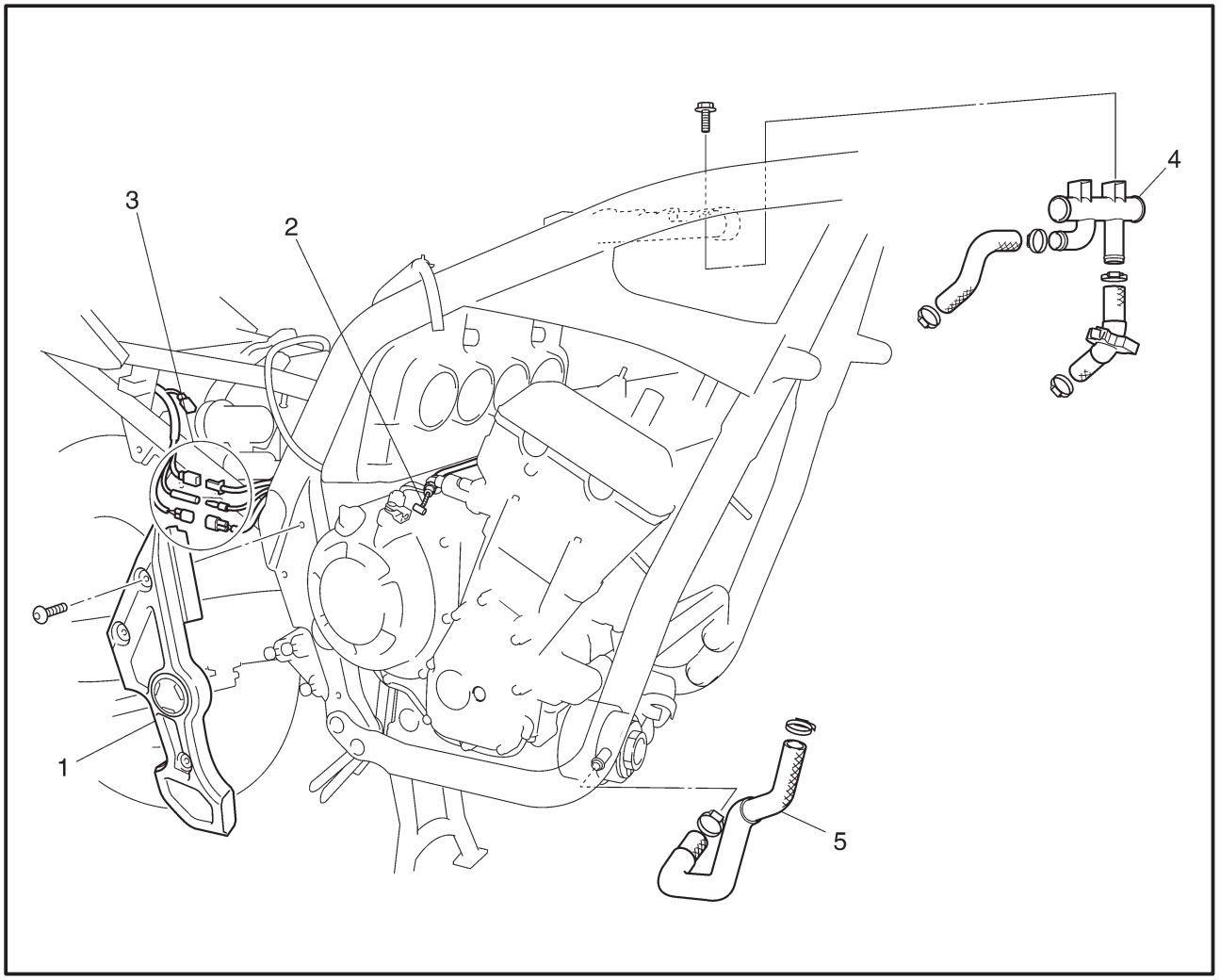
DRIVE SPROCKET AND EXHAUST PIPE



Order	Job/Part	Q'ty	Remarks
	Removing the drive sprocket and exhaust pipe		Remove the parts in the order listed.
	Carburetor		Refer to "CARBURETOR" in chapter 6.
	Plug code		
	Ignition coil		
	Radiator		Refer to "RADIATOR" in chapter 7.
	Water hose		
	Air iduction system		Refer to "AIR INDUCTION SYSTEM" in chapter 6.
1	Side cover (left)	1	
2	Stator coil coupler/oil level switch	1/1	
3	Shit rod	1	
4	Drive sprocket cover	1	
5	Drive sprocket	1	
6	Water outlet hose	1	
7	Exhaust pipe	1	
			For installation, reverse the removal procedure.

EAS00189

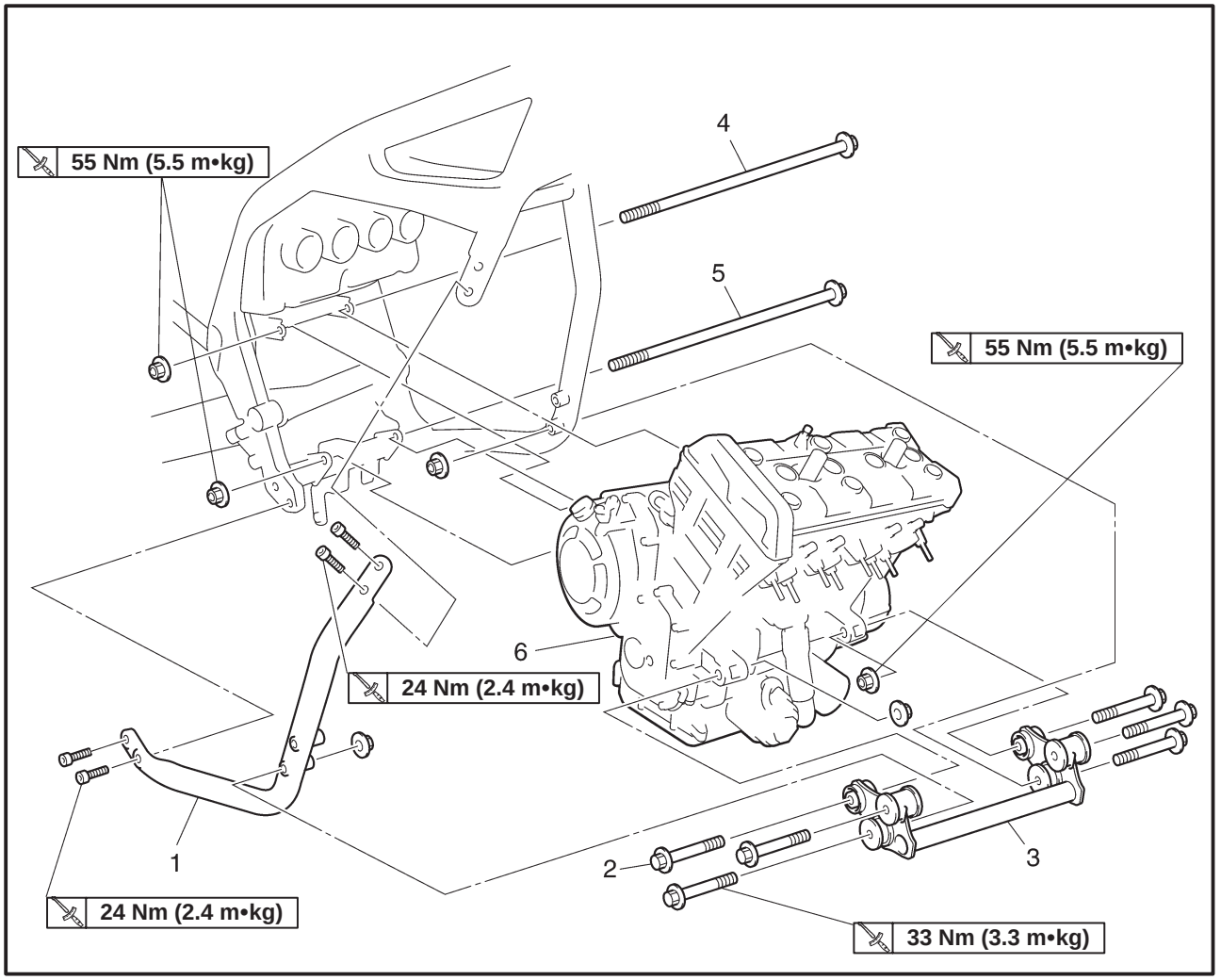
LEADS AND HOSES



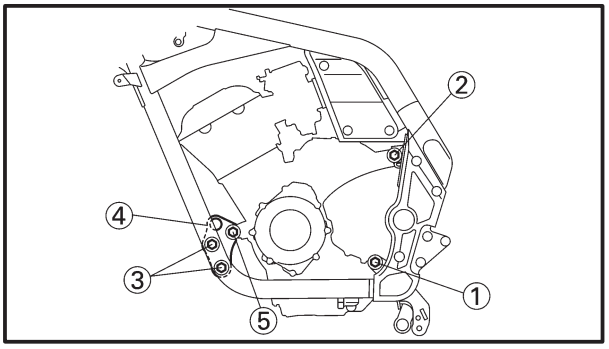
Order	Job/Part	Q'ty	Remarks
	Removing the leads and hoses		Remove the parts in the order listed.
1	Cover	1	
2	Clutch cable	1	
3	Nuetral switch/speed sensor/pickup coil lead	1/1/1	Disconnect.
4	Water head pipe	1	
5	Coolant outlet hose	1	
			For installation, reverse the removal procedure.

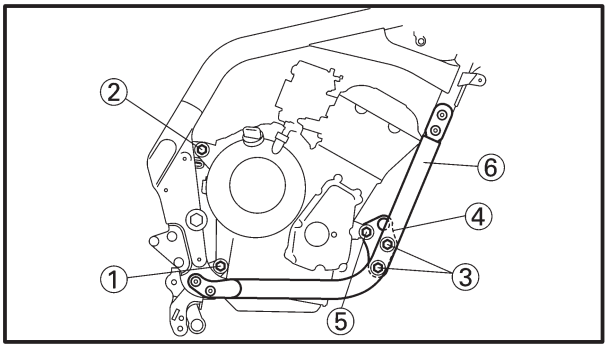
EAS00191

ENGINE



Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed.
1	Down tube	1	
2	Engine mounting bolt (front)	2	
3	Engine bracket	1	
4	Engine mounting bolt (rear upper)	1	
5	Engine mounting bolt (rear lower)	1	
6	Engine	1	
			For installation, reverse the removal procedure.





EAS00192

INSTALLING THE ENGINE

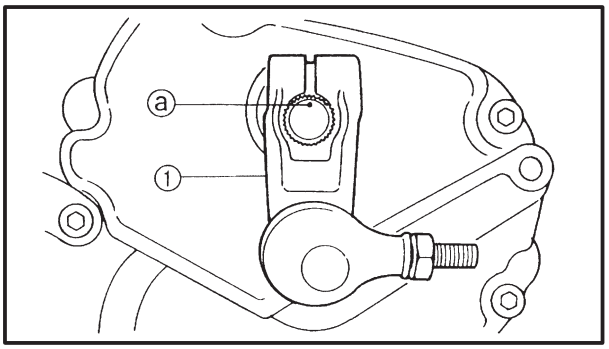
1. Install:
   - engine mount bolt ①
   - engine mount bolt ②
   - engine mount bolt ③
   - engine bracket ④
   - engine mount bolt ⑤
   - down tube ⑥

NOTE:

Do not fully tighten the bolts.

2. Tighten the bolts in the following order.

Engine mount bolt ①
55 Nm (5.5 m•kg)
Engine mount bolt ②
55 Nm (5.5 m•kg)
Engine mount bolt ③
33 Nm (3.3 m•kg)
Engine mount bolt ⑤
55 Nm (5.5 m•kg)
Down tube ⑥
24 Nm (2.4 m•kg)



3. Install:
   - shift arm ①

10 Nm (10 m•kg)

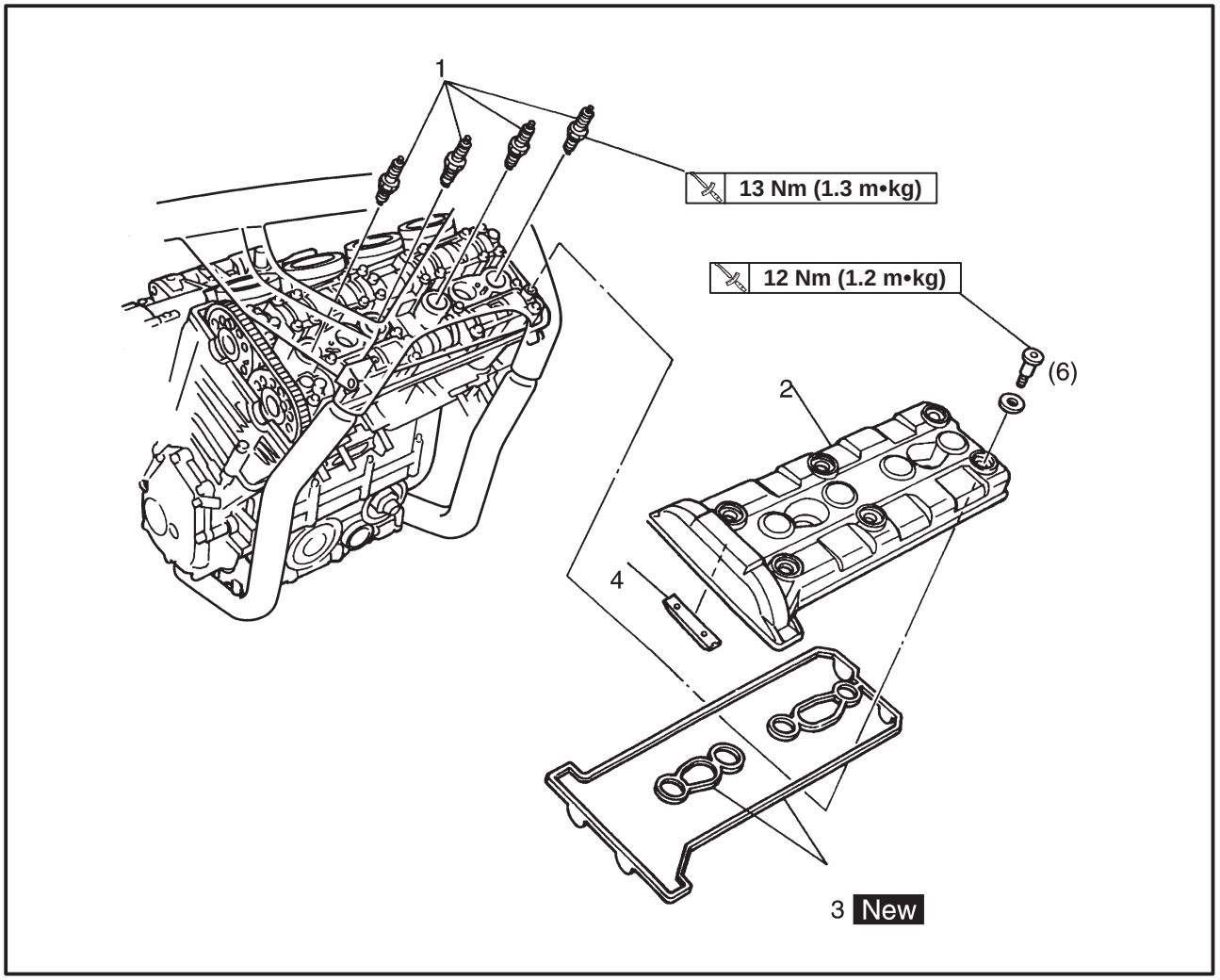
NOTE:

- 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.

EAS00194

CAMSHAFT

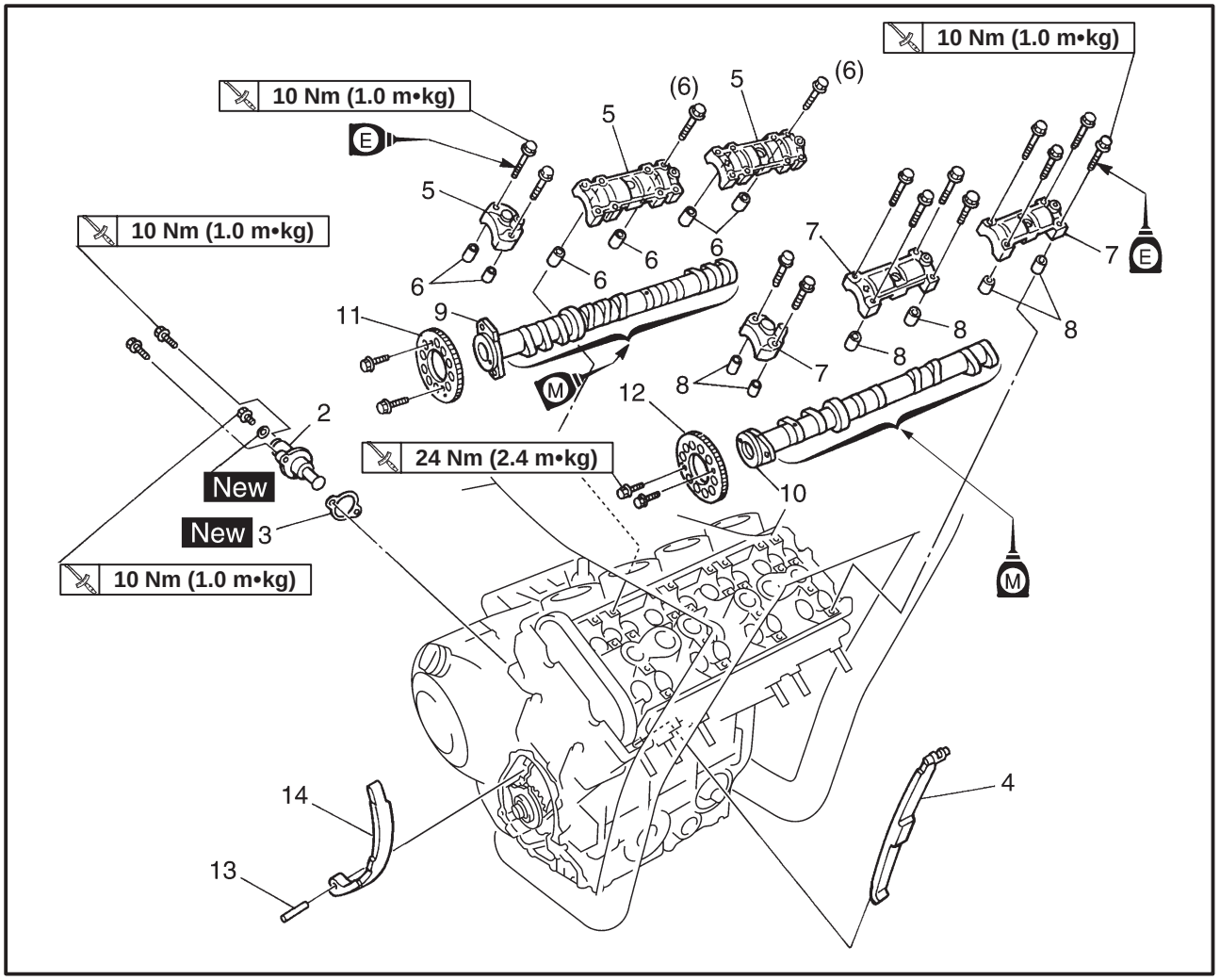
CYLINDER HEAD COVERS



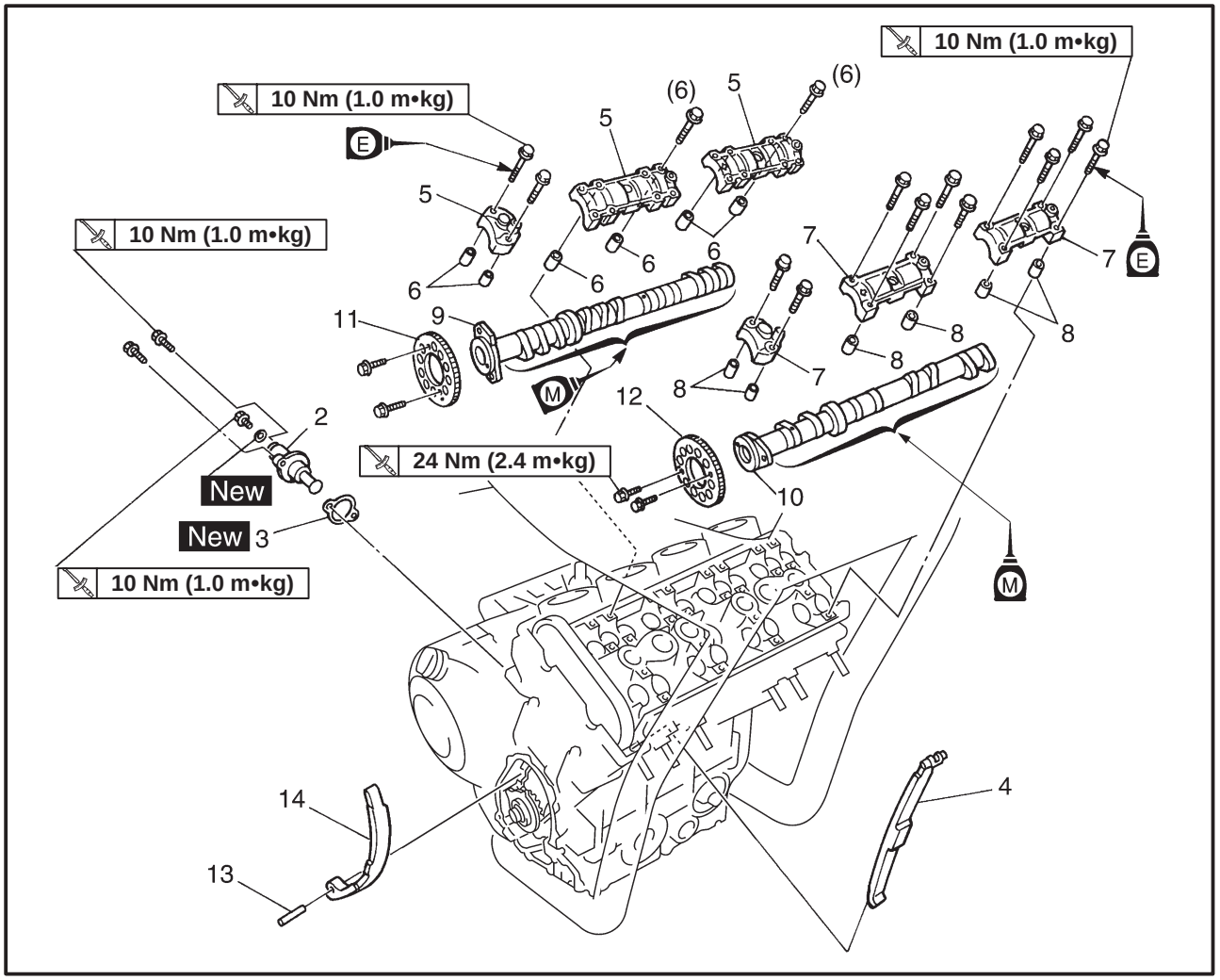
Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head cover		Remove the parts in the order listed.
	Carburetor assembly		Refer to "CARBURETORS" in chapter 6.
	Radiator assembly and thermostat assembly		Refer to "RADIATOR" and "THERMOSTAT ASSEMBLY" in chapter 7.
1	Spark plug	4	
2	Cylinder head cover	1	
3	Cylinder head cover gasket	1	
4	Timing chain guide (top side)	1	
			For installation, reverse the removal procedure.

EAS00196

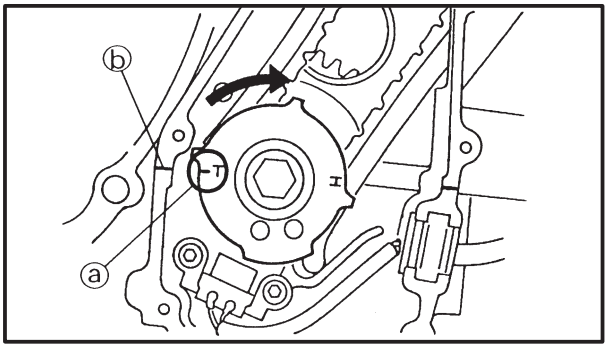
CAMSHAFTS



Order	Job/Part	Q'ty	Remarks
	Removing the camshafts		Remove the parts in the order listed.
	Pickup coil rotor cover		Refer to "PICKUP COIL".
1	Float chamber air vent hose holder	1	
2	Timing chain tensioner	1	
3	Timing chain tensioner gasket	1	
4	Timing chain guide (exhaust side)	1	
5	Intake camshaft cap	3	**NOTE:**
6	Dowel pin	6	During removal, the dowel pins may still be connected to the camshaft caps.
7	Exhaust camshaft cap	3	
8	Dowel pin	6	
9	Intake camshaft	1	
10	Exhaust camshaft	1	



Order	Job/Part	Q'ty	Remarks
11	Intake camshaft sprocket	1	
12	Exhaust camshaft sprocket	1	
13	Pin	1	
14	Timing chain guide (intake side)	1	
			For installation, reverse the removal procedure.



EAS00198
REMOVING THE CAMSHAFTS
1. Remove:
   • pickup rotor coil cover
2. Align:
   • "T" mark on the pickup coil rotor ⓐ (with the crankcase mating surface ⓑ)

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a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark ⓐ with the crankcase mating surface ⓑ.

NOTE:

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

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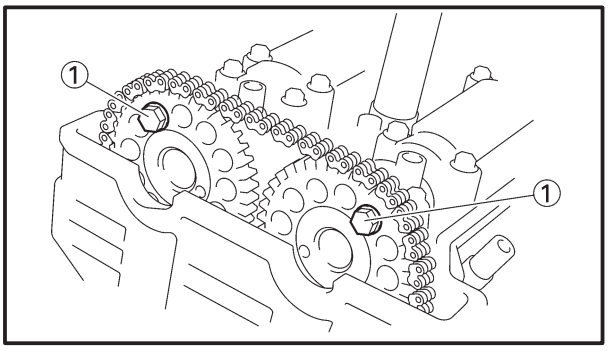
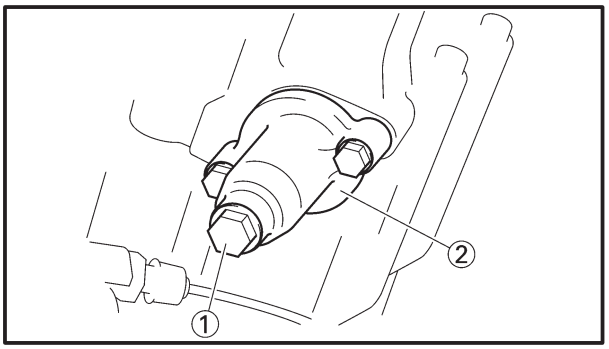
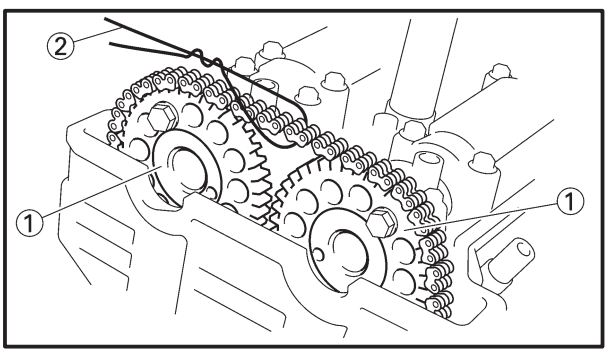


3. Loosen:
   • camshaft sprocket bolts ①



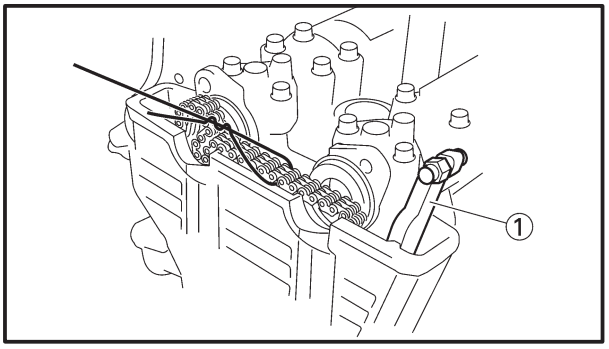
4. Loosen:
   • cap bolt ①
5. Remove:
   • timing chain tensioner ②
   • gasket



6. Remove:
   • camshaft sprocket ①

NOTE:

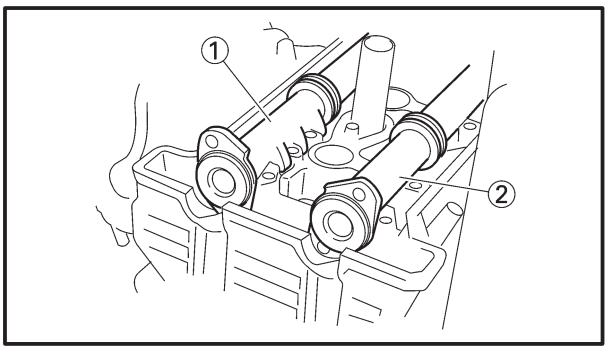
To prevent the timing chain from falling into the crankcase, fasten it with a wire ②.



7. Remove
   • timing chain guide (exhaust side) ①
   • camshaft caps
   • dowel pins

CAUTION:

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

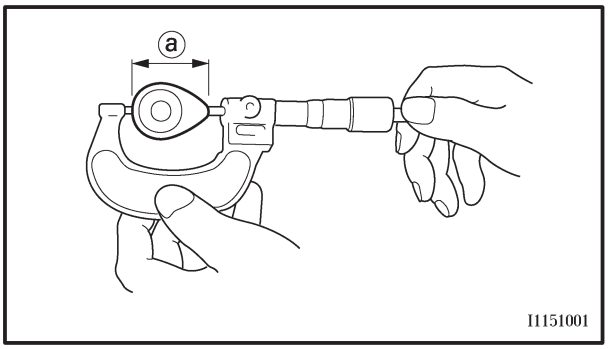


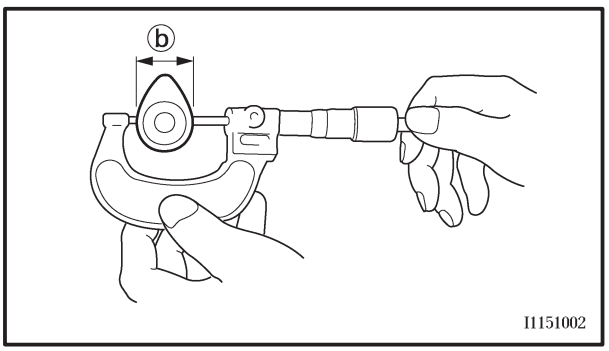
8. Remove:
   • intake camshaft ①
   • exhaust camshaft ②

EAS00204

CHECKING THE CAMSHAFTS

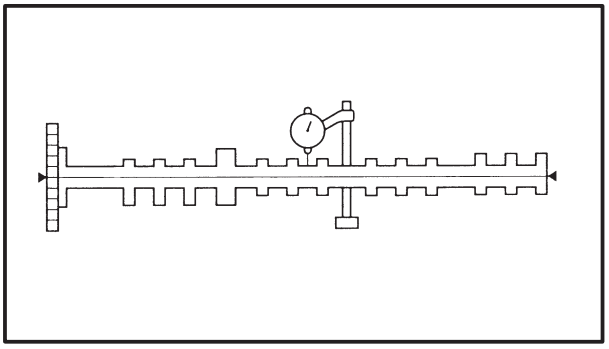
1. Check:
   • camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.





2. Measure:
   • camshaft lobe dimensions ⓐ and ⓑ
   Out of specification → Replace the camshaft.

Camshaft lobe dimension limit
Intake
ⓐ 32.4 mm
ⓑ 24.85 mm
Exhaust
ⓐ 32.85 mm
ⓑ 24.85 mm

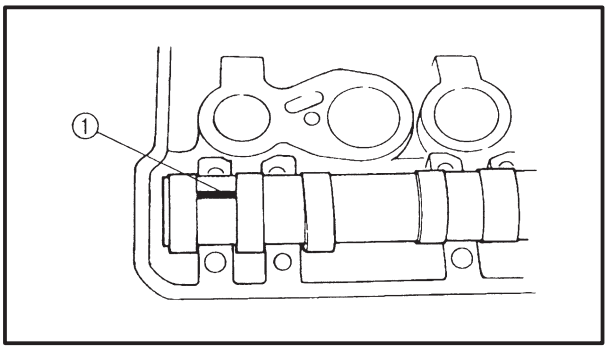


3. Measure:
   • camshaft runout
   Out of specification → Replace.

Camshaft runout
Less than 0.03 mm

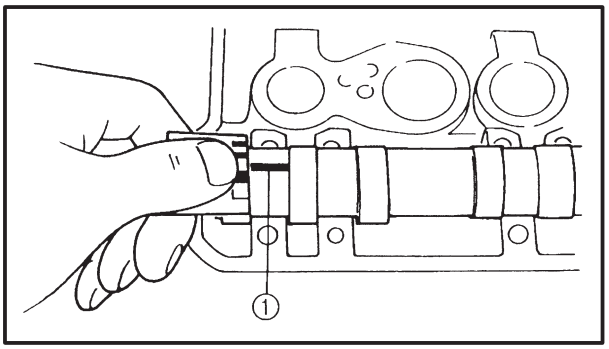
4. Measure:
   • camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

Camshaft-journal-to-camshaft-cap clearance
0.028 ~ 0.062 mm



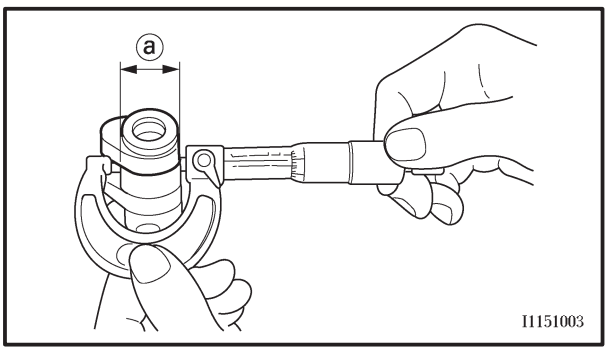
a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
b. Position a strip of Plastigauge® ① onto the camshaft journal as shown.
c. Install the dowel pins and camshaft caps.

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®.



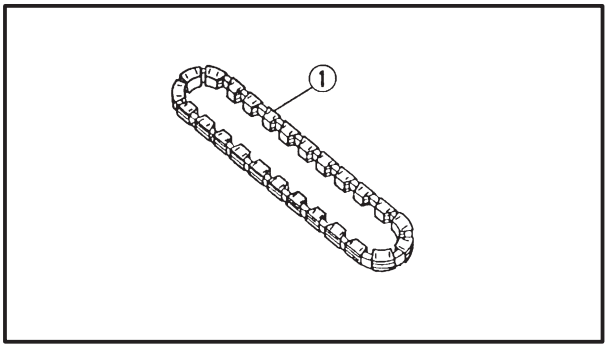
Camshaft cap bolt
10 Nm (1.0 m•kg)

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

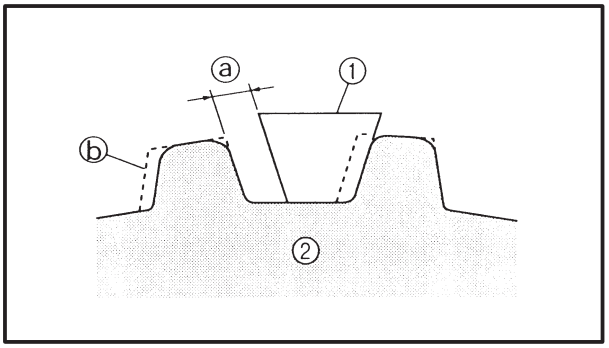


5. Measure:
   • camshaft journal diameter ⓐ
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

Camshaft journal diameter
24.459 ~ 24.472 mm



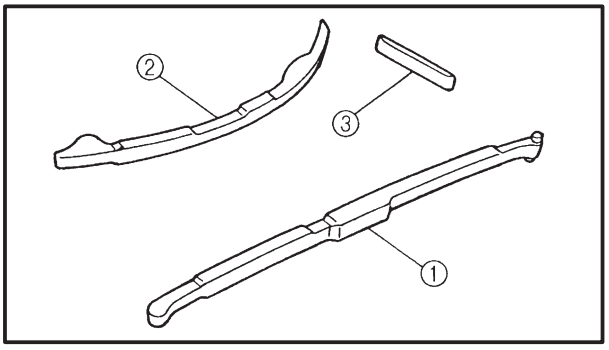
EAS00208
CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES
The following procedure applies to all of the camshaft sprockets and timing chain guides.
1. Check:
   • timing chain ①
   Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.



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

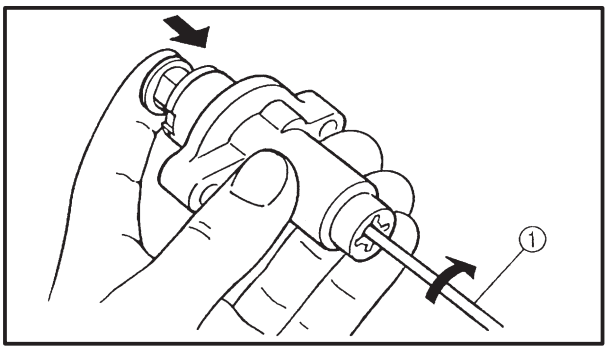
ⓐ 1/4 tooth
ⓑ Correct

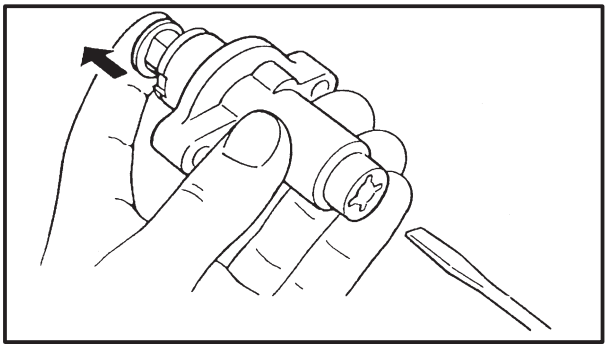
① Timing chain roller
② Camshaft sprocket



3. Check:
   • timing chain guide (exhaust side) ①
   • timing chain guide (intake side) ②
   • timing chain guide (top side) ③
   Damage/wear → Replace the defective part(-s).

EAS00210
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.

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a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

NOTE:

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

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

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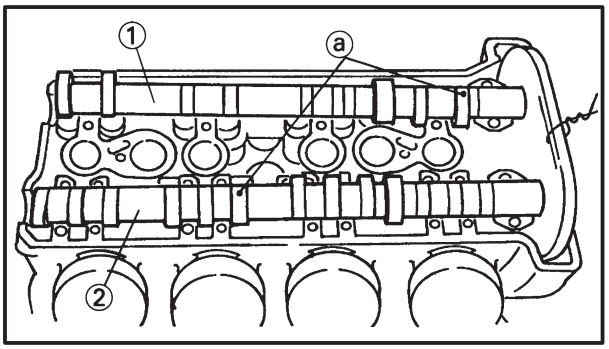
3. Check:
   • cap bolt
   • copper washer
   • spring
   • gasket
   • timing chain tensioner rod
   Damage/wear → Replace the defective part(-s).



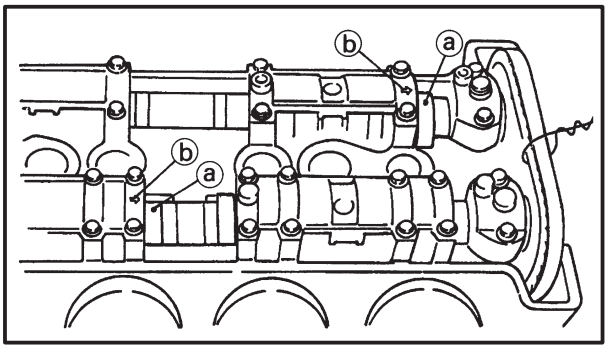
EAS00217

INSTALLING THE CAMSHAFTS

1. Install:
   • exhaust camshaft ①
   • intake camshaft ②

NOTE:

Install the camshafts with the punch mark ⓐ facing up.



2. Install:
   • dowel pins
   • intake camshaft caps
   • exhaust camshaft caps

NOTE:

Make sure that the punch marks ⓐ on the camshafts are aligned with the arrow marks ⓑ on the camshaft caps.
Out of alignment → Reinstall.

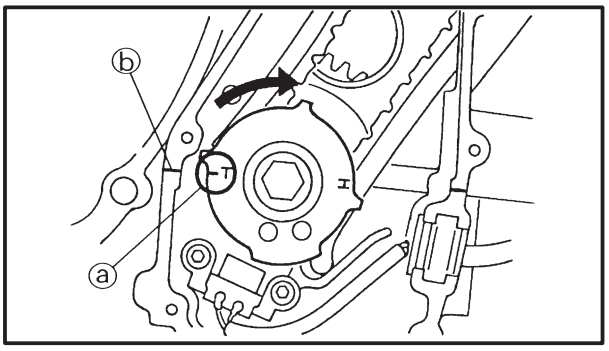
3. Install:
   • camshaft cap bolts — 10 Nm (1.0 m•kg)

NOTE:

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

CAUTION:

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



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

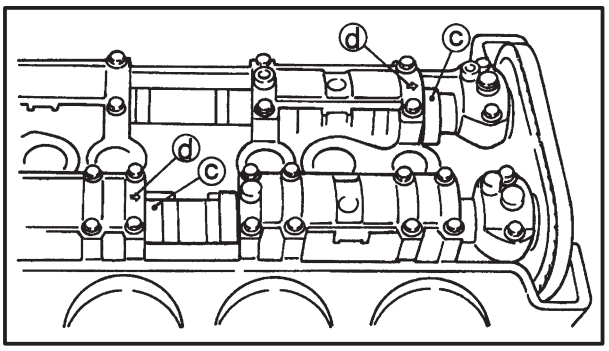
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark ⓐ on the pick-up coil rotor with the crankcase mating surface ⓑ.
c. Place the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.

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.

CAUTION:

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



d. Turn both camshafts opposite each other so that the punch marks ⓒ in the camshaft are aligned with the arrow marks ⓓ in the camshaft caps as shown.
e. While holding the camshafts, temporarily tighten the camshaft sprocket bolts.

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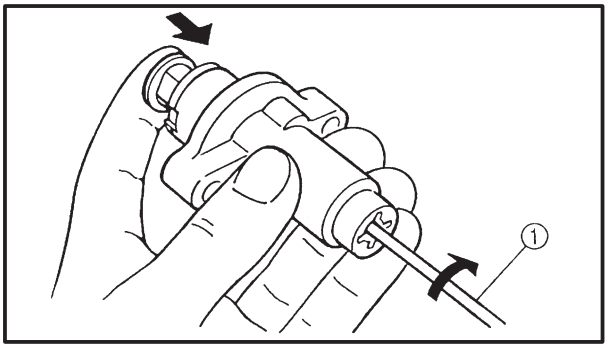

5. Install:
   • timing chain tensioner

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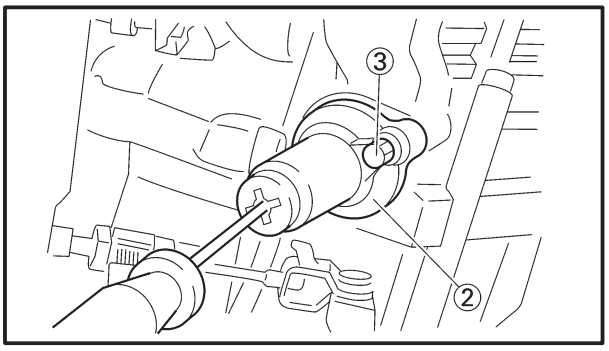
a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver ①.
b. With the timing chain tensioner rod turned all the way into the timing chain tensioner housing (with the thin screwdriver still installed), install the gasket and the timing chain tensioner ② onto the cylinder block.



⚠ WARNING

Always use a new gasket.

c. Tighten the timing chain tensioner bolts ③ to the specified torque.

	Timing chain tensioner bolt **10 Nm (1.0 m•kg)**

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

	Timing chain cap bolt **12 Nm (1.2 m•kg)**

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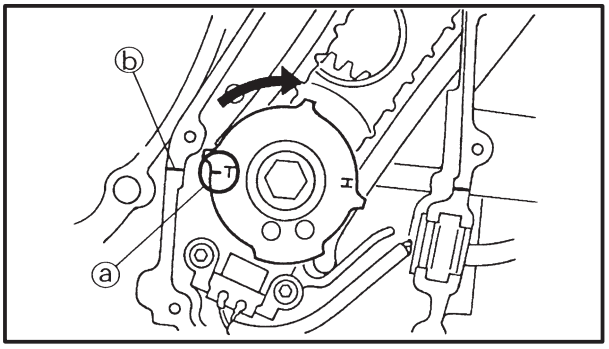
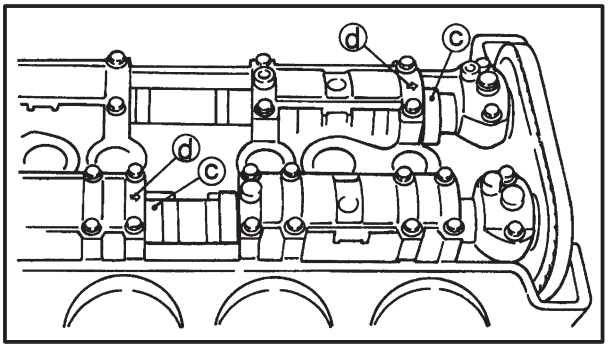
6. Turn:
   • crankshaft
   (several turns clockwise)



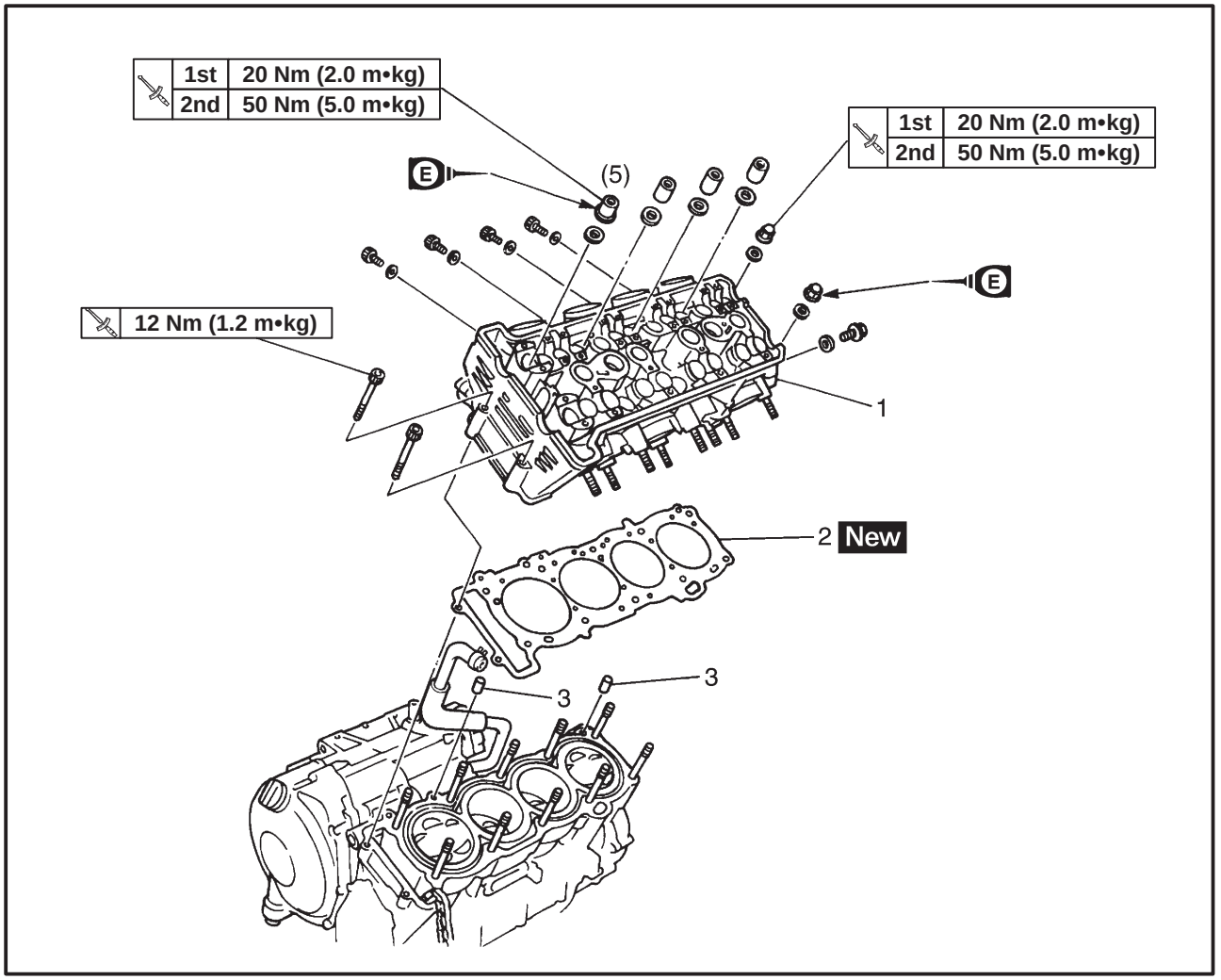
7. Check:
   - "T" mark ⓐ
     Make sure that the "T" mark ⓐ on the pickup coil rotor is aligned with the crankcase mating surface ⓑ.



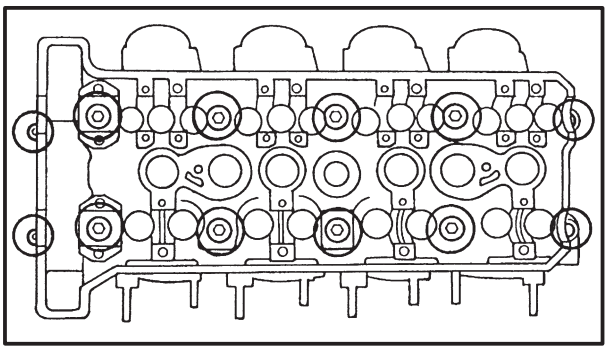
   - camshaft punch marks ⓒ
     Make sure that the marks ⓒ on the camshaft are aligned with the arrow marks ⓓ in the comshaft caps.
     Out of alignment → Adjust.
     Refer to the installation steps above.

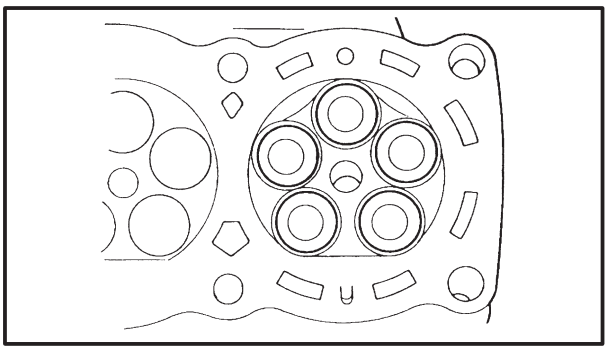
8. Measure:
   - valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.
9. Install:
   - timing mark accessing screw
     15 Nm (15 m•kg)
   - crankshaft end cover

EAS00221
CYLINDER HEAD



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Engine		Refer to "ENGINE".
	Intake and exhaust camshafts		Refer to "CAMSHAFTS".
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
			For installation, reverse the removal procedure.





EAS00223
REMOVING THE CYLINDER HEADS
1. Remove:
   - cylinder head nuts
   - cylinder head cap nuts
   - cylinder head bolts

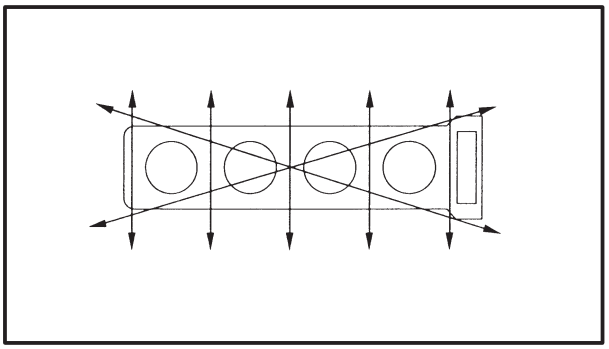
NOTE:
- Loosen the nuts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.

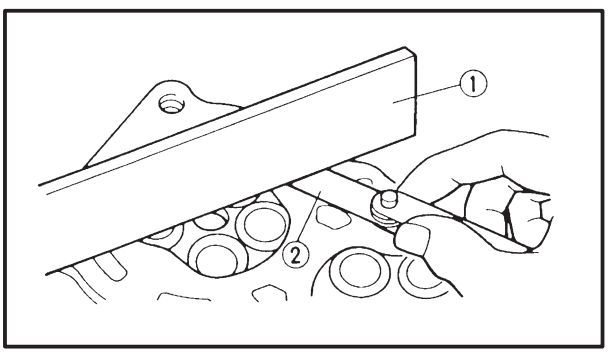
EAS00230
CHECKING THE CYLINDER HEADS
The following procedure applies to all of the cylinder heads.
1. Eliminate:
   - carbon deposits
     (from the combustion chambers with a rounded scraper)

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

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.

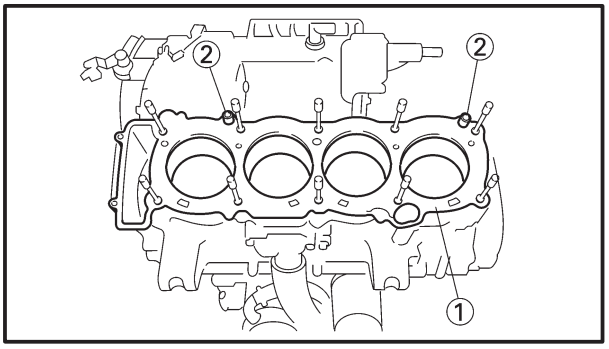
Cylinder head warpage
Less than 0.1 mm





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.

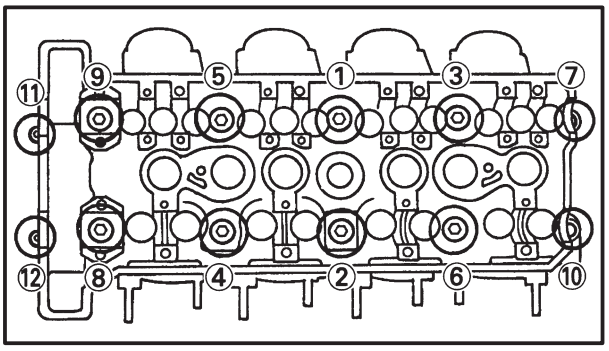


EAS00233
INSTALLING THE CYLINDER HEAD

1. Install:
   - gasket New ①
   - dowel pins ②
2. Install:
   - cylinder head

NOTE:

Pass the timing chain through the timing chain cavity.



3. Tighten:
   - cylinder head nuts ① ~ ⑩

1st	20 Nm (2.0 m•kg)
2nd	50 Nm (5.0 m•kg)

   - cylinder head bolt ⑪ ⑫

NOTE:

- First, tighten the nuts ① ~ ⑩ to approximately 20 Nm (2.0 m•kg) with a torque wrench.
- Retighten the nuts to 50 Nm (5.0 m•kg).

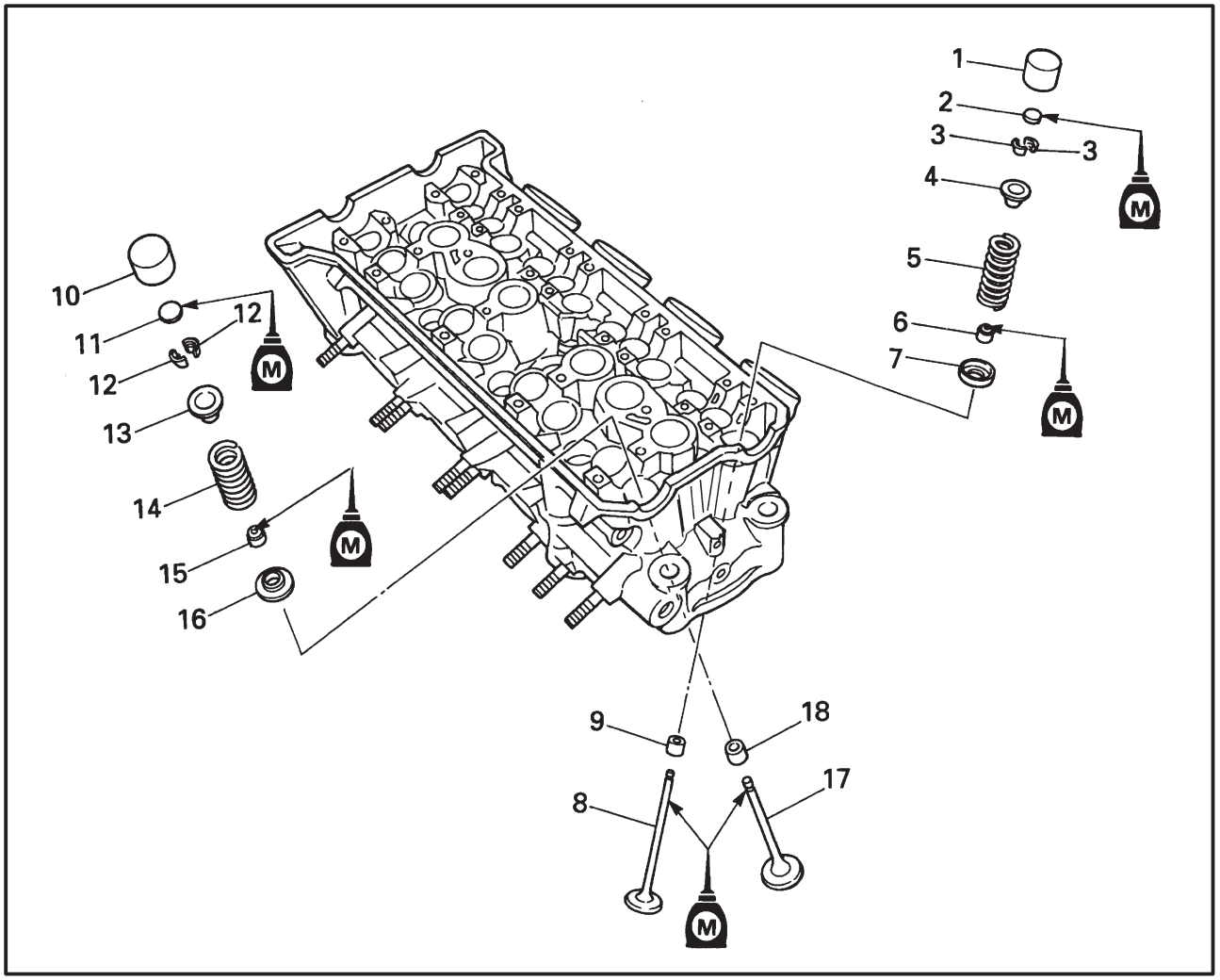
NOTE:

- 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.

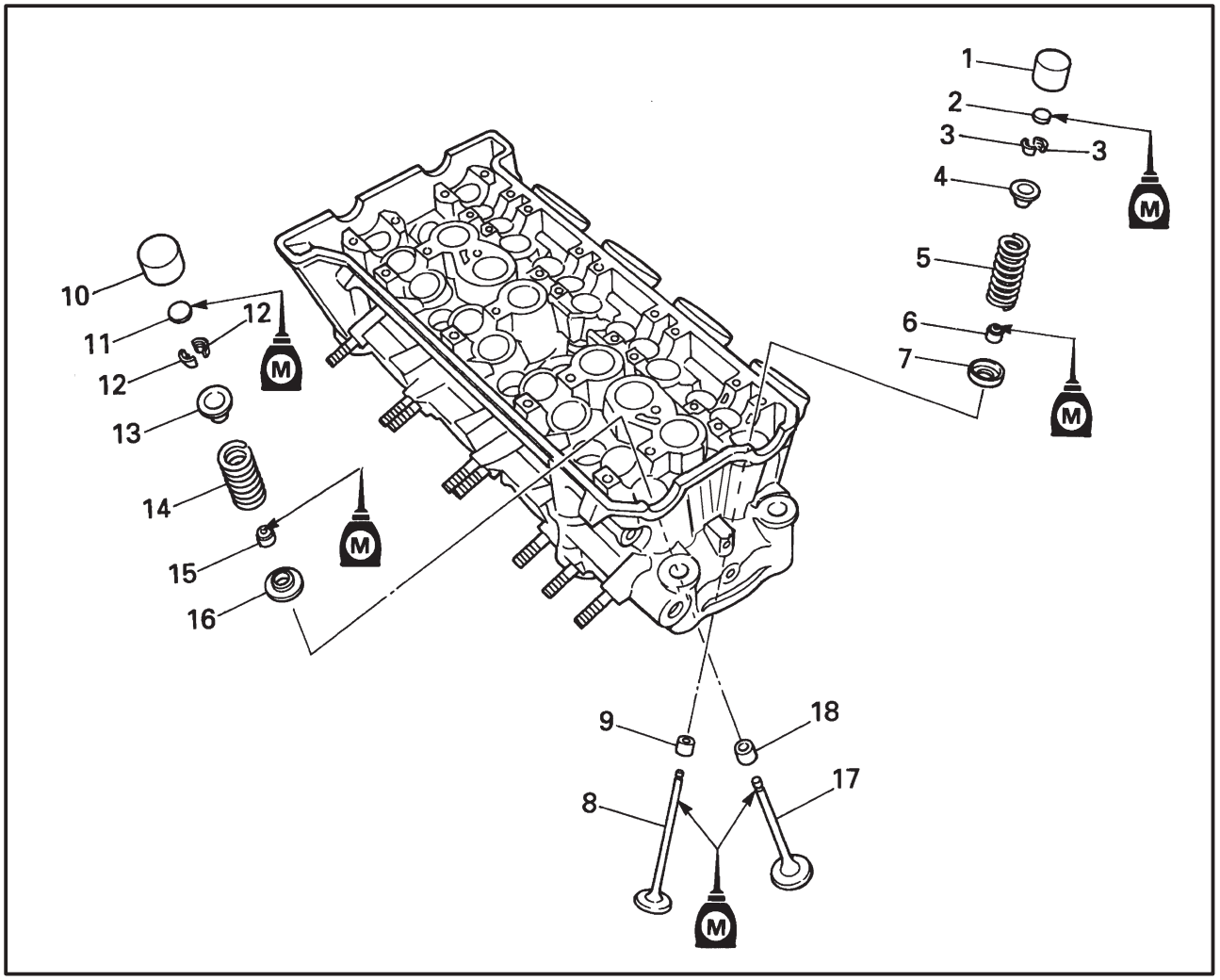
4. Install:
   - exhaust camshaft
   - intake camshaft

   Refer to “INSTALLING THE CAMSHAFTS”.

EAS00236
VALVES AND VALVE SPRINGS



Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Intake valve lifter	12	
2	Intake valve pad	12	
3	Intake valve cotter	24	
4	Intake valve upper spring seat	12	
5	Intake valve spring	12	
6	Intake valve oil seal	12	
7	Intake valve lower spring seat	12	
8	Intake valve	12	
9	Intake valve guide	12	



Order	Job/Part	Q'ty	Remarks
10	Exhaust valve lifter	8	
11	Exhaust valve pad	8	
12	Exhaust valve cotter	16	
13	Exhaust valve upper spring seat	8	
14	Exhaust valve spring	8	
15	Exhaust valve oil seal	8	
16	Exhaust valve lower spring seat	8	
17	Exhaust valve	8	
18	Exhaust valve guide	8	
			For installation, reverse the removal procedure.

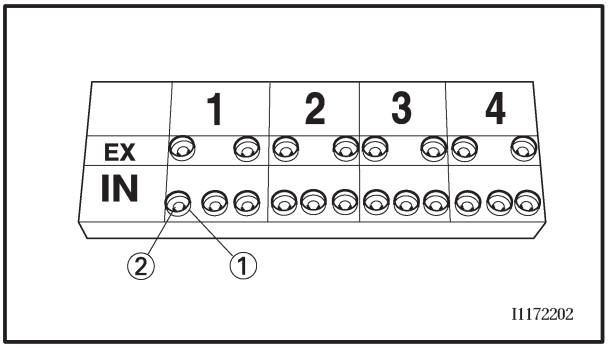
EAS00237

REMOVING THE VALVES

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

NOTE:

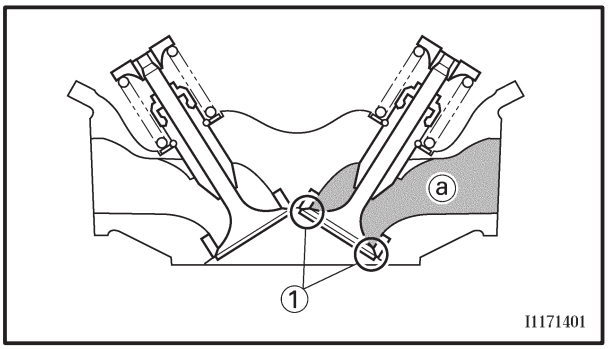
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves properly seal.



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

NOTE:

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



2. Check:
   - valve sealing

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

NOTE:

There should be no leakage at the valve seat ①.

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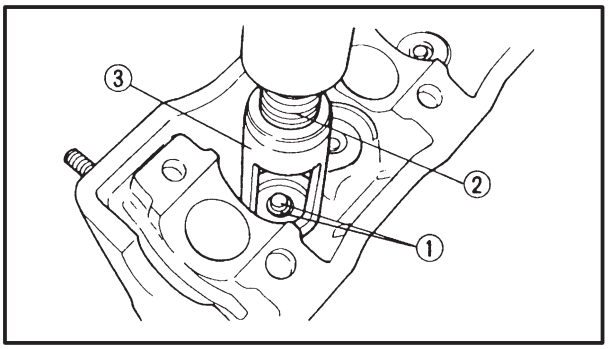
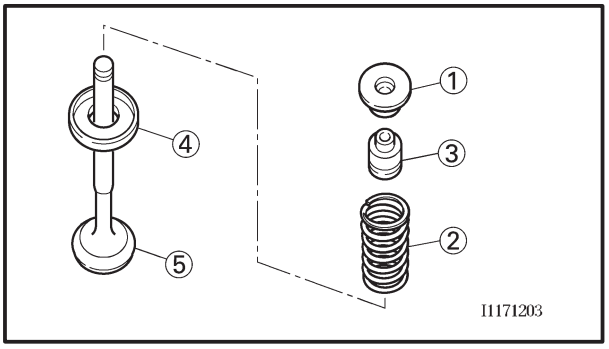


3. Remove:
   - valve cotters ①

NOTE:

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

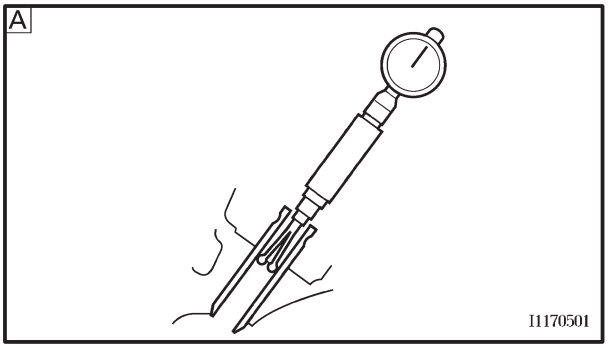
Valve spring compressor
90890-04019
Valve spring compressor attachment
Intake valve
90890-04114
Exhaust valve
90890-04108

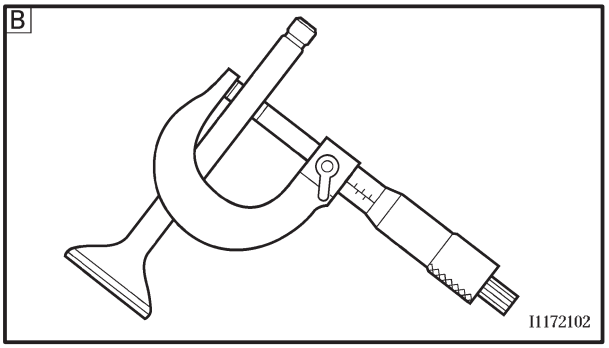


4. Remove:
   - upper spring seat ①
   - valve spring ②
   - oil seal ③
   - lower spring seat ④
   - valve ⑤

NOTE:

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





EAS00239

CHECKING THE VALVES AND VALVE GUIDES

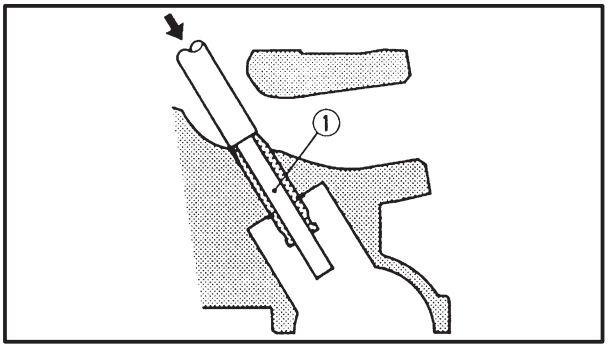
The following procedure applies to all of the valves and valve guides.

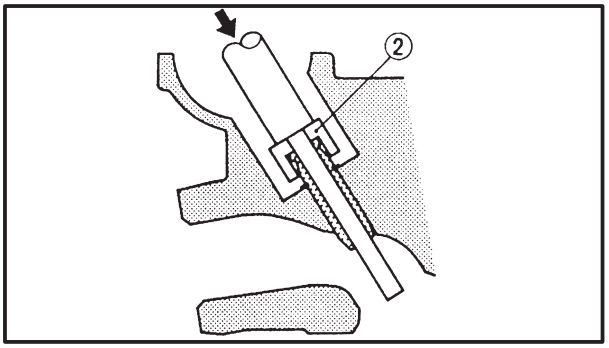
1. Measure:
   - valve-stem-to-valve-guide clearance

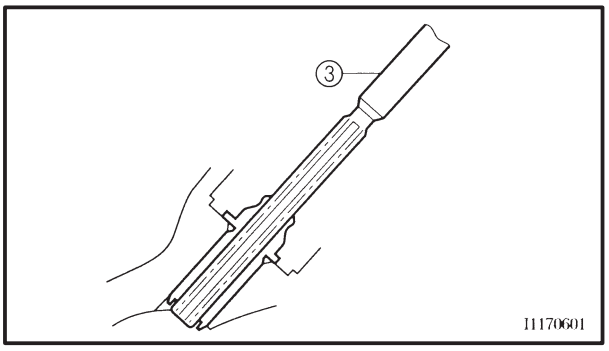
Valve-stem-to-valve-guide clearance =
Valve guide inside diameter A **–**
Valve stem diameter B

Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance
Intake
0.010 ~ 0.037 mm
<Limit>: 0.08 mm
Exhaust
0.020 ~ 0.047 mm
<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 in an oven.

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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
Intake (4.0 mm)
90890-04111
Exhaust (4.5 mm)
90890-04116
Valve guide installer
Intake (4.0 mm)
90890-04112
Exhaust (4.5 mm)
90890-04117
Valve guide reamer
Intake
90890-04113
Exhaust
90890-04118

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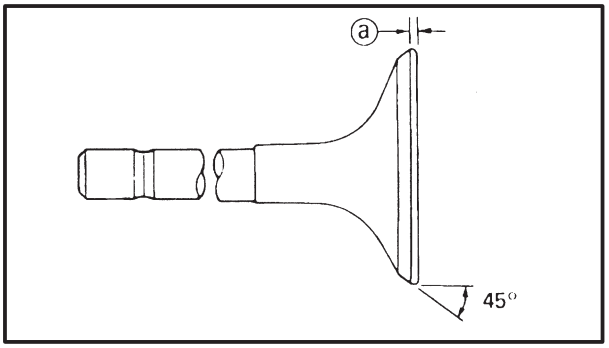
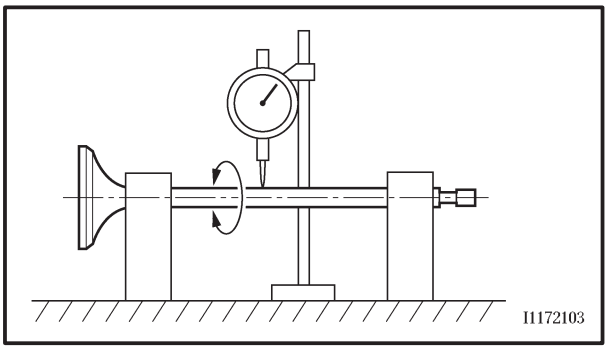
3. Eliminate:
   • carbon deposits
   (from the valve face and valve seat)
4. Check:
   • valve face
   Pitting/wear → Grind the valve face.
   • valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.



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

Valve margin thickness
0.5 ~ 0.9 mm



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

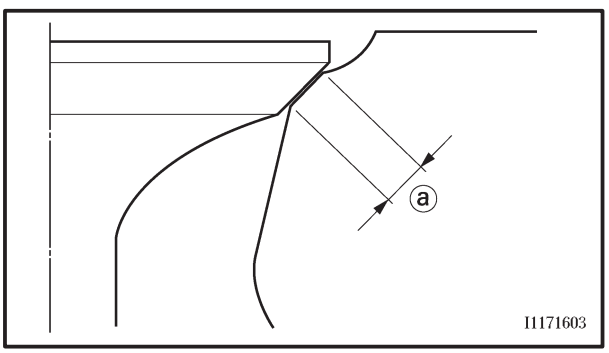
NOTE:
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
0.01 mm

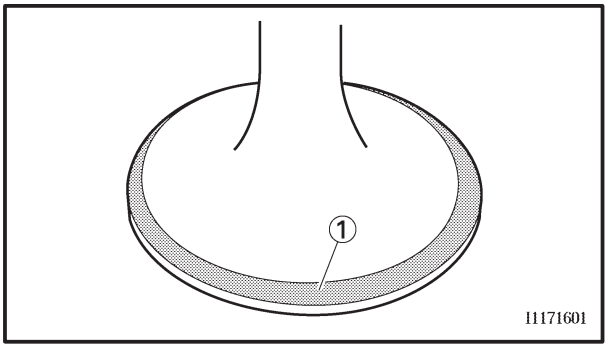
EAS00240
CHECKING THE VALVE SEATS

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

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



Valve seat width
Intake: 0.9 ~ 1.1 mm
Exhaust: 0.9 ~ 1.1 mm



a. Apply Mechanic's blueing dye (Dykem) ① onto the valve face.
b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
d. Measure the valve seat width.

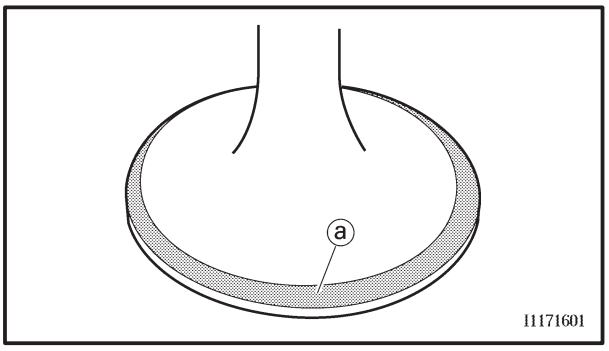
NOTE:

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

4. Lap:
   • valve face
   • valve seat

NOTE:

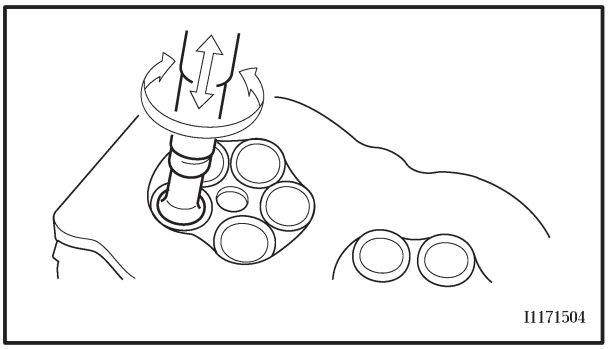
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.



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

CAUTION:

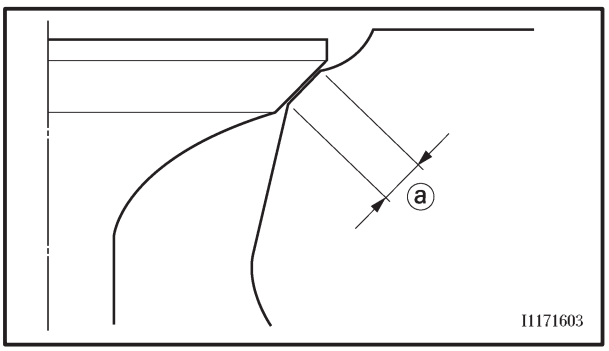
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



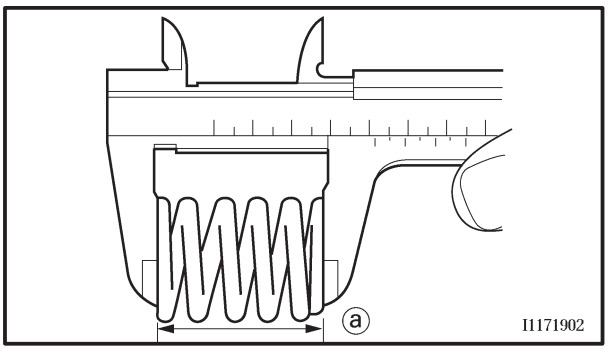
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

NOTE:

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



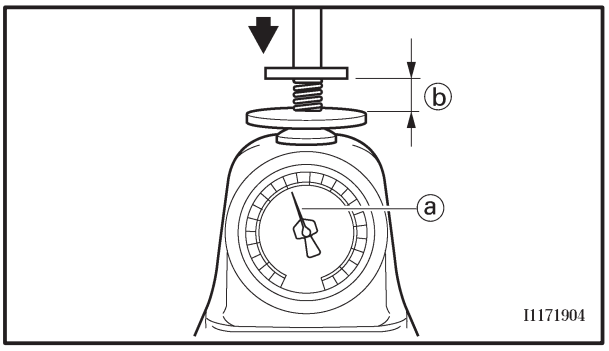
EAS00241

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.

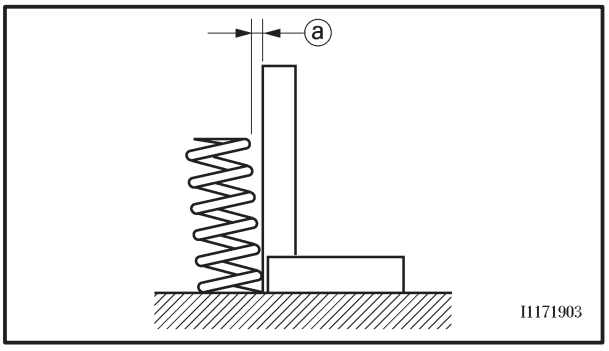
Valve spring free length
Intake spring
38.9 mm
Exhaust spring
40.67 mm



2. Measure:
   - compressed spring force ⓐ
     Out of specification → Replace the valve spring.

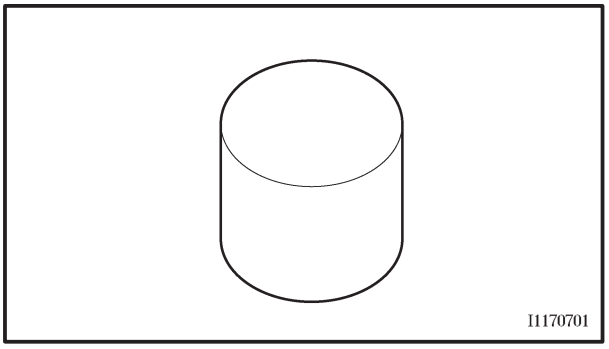
ⓑ Installed length

Compressed spring force
Intake
8.2 ~ 9.6 kg at 34.5 mm
Exhaust
11.0 ~ 12.6 kg at 35.0 mm

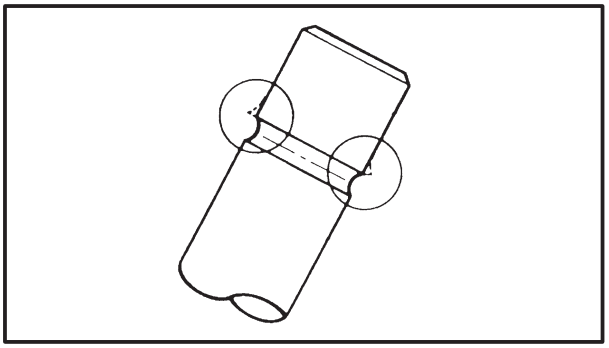


3. Measure:
   - valve spring tilt ⓐ
     Out of specification → Replace the valve spring.

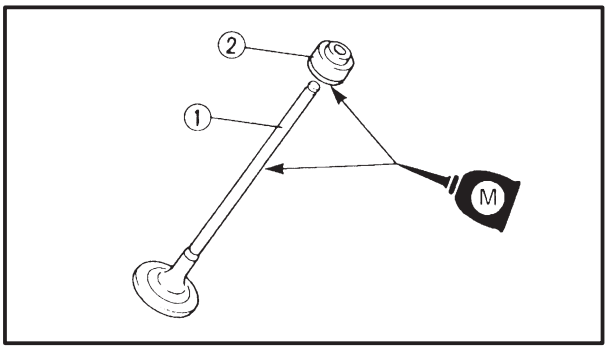
Spring tilt limit
Intake
1.7 mm
Exhaust
1.8 mm



EAS00242
CHECKING THE VALVE LIFTERS
The following procedure applies to all of the valve lifters.
1. Check:
   • valve lifter
   Damage/scratches → Replace the valve lifters and cylinder head.

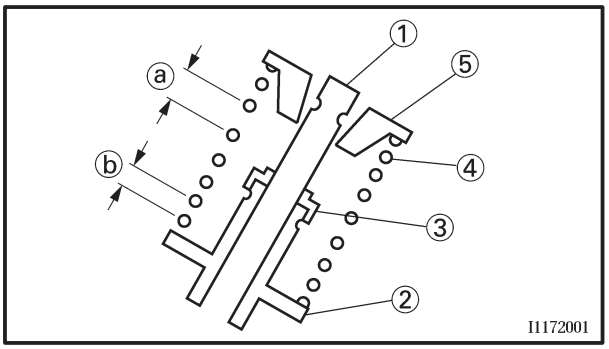


EAS00245
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   • valve stem end
   (with an oil stone)



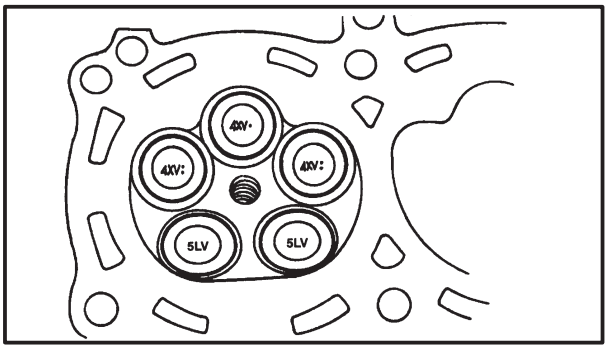
2. Lubricate:
   • valve stem ①
   • oil seal ②
   (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**



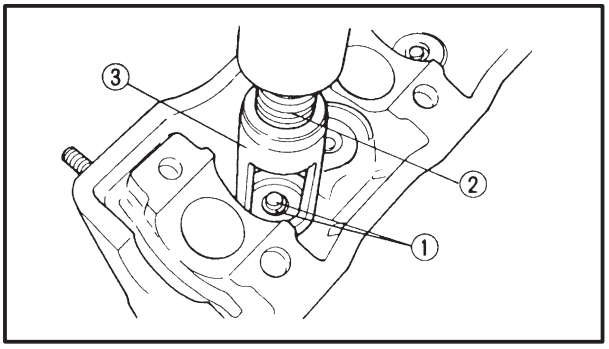
3. Install:
   • valve ①
   • lower spring seat ②
   • oil seal ③
   • valve spring ④
   • upper spring seat ⑤
   (into the cylinder head)

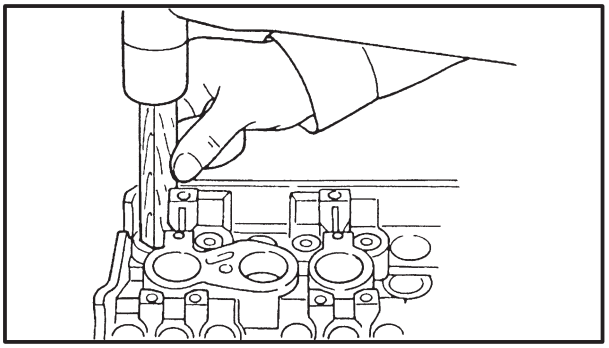
NOTE:
Install the valve spring with the larger pitch ⓐ facing up.

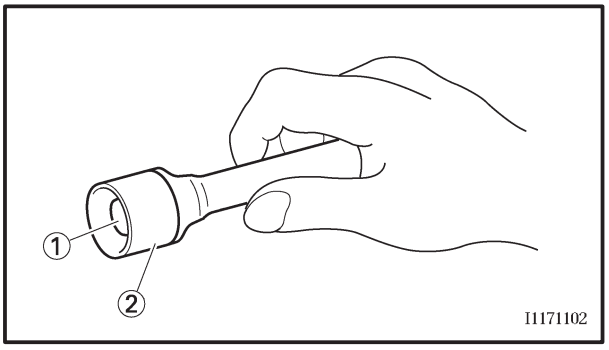


ⓑ Smaller pitch

NOTE:
Make sure that each valve is installed in its original place. Refer to the following embossed marks.
Right and left intake valve(-s): “4XV:”
Middle intake valve(-s): “4XV.”
Exhaust valve(-s): “5LV”







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
Intake valve
90890-04114
Exhaust valve
90890-04108

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

CAUTION:

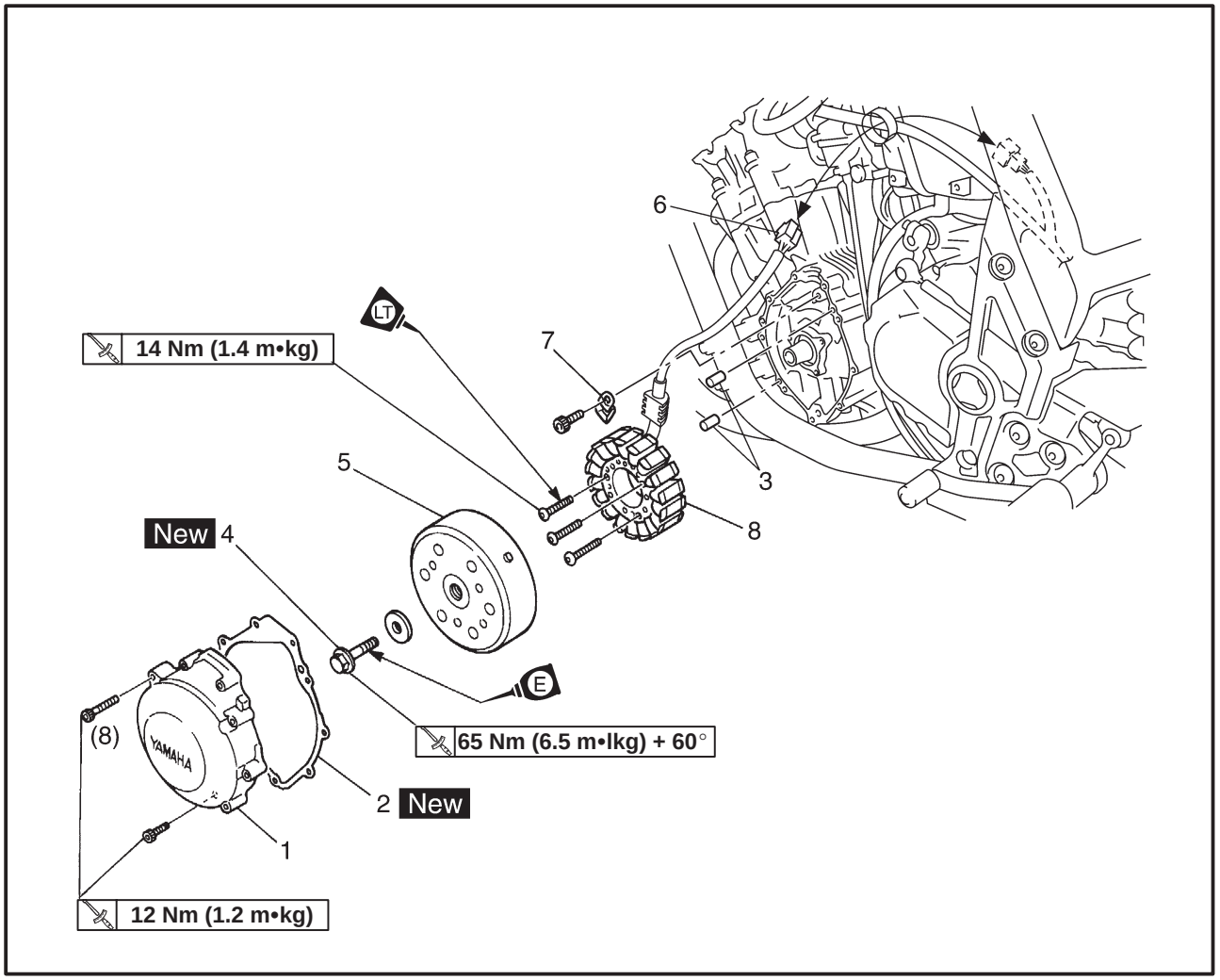
Hitting the valve tip with excessive force could damage the valve.

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

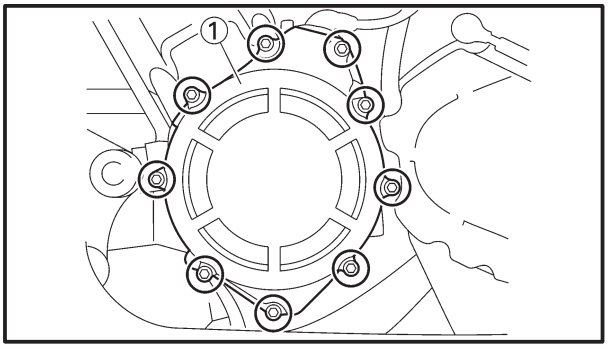
NOTE:

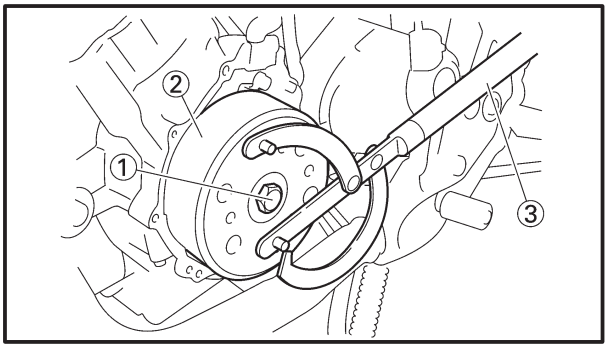
- Apply molybdenum disulfide oil onto the valve lifter and valve pad.
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

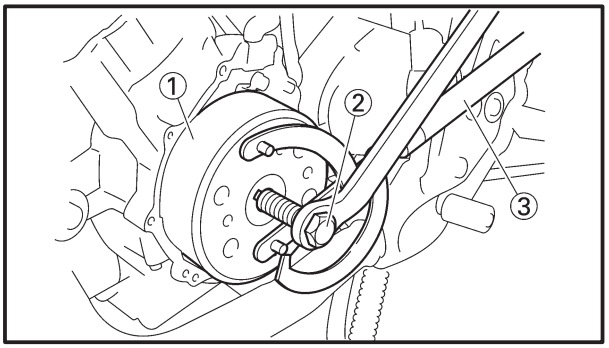
EB410000
GENERATOR

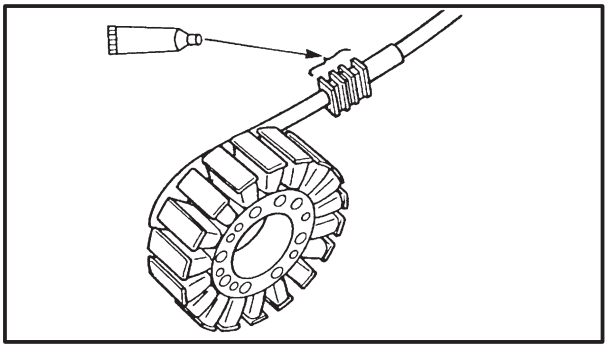


Order	Job/Part	Q'ty	Remarks
	Removing the stator coil assembly		Remove the parts in the order listed.
	Rider seat and fuel tank		Refer to "SEATS" and "FUEL TANK" in chapter 3.
	Bottom cowling		Refer to "COWLINGS" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Generator rotor cover	1	
2	Generator rotor cover gasket	1	
3	Dowel pin	2	
4	Generator rotor bolt	1	
5	Generator rotor	1	
6	Stator coil assembly coupler	1	Disconnect.
7	Stator coil assembly lead holder	1	
8	Stator coil assembly	1	
			For installation, reverse the removal procedure.









REMOVING THE GENERATOR

1. Remove:
   - generator rotor cover ①

NOTE:

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

2. Remove:
   - generator rotor bolt ①
   - washer

NOTE:

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

	Rotor holding tool **90890-01235**

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

	Flywheel puller **90890-01080**

INSTALLING THE GENERATOR

1. Apply:
   - sealant
     (onto the stator coil assembly lead grommet)

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

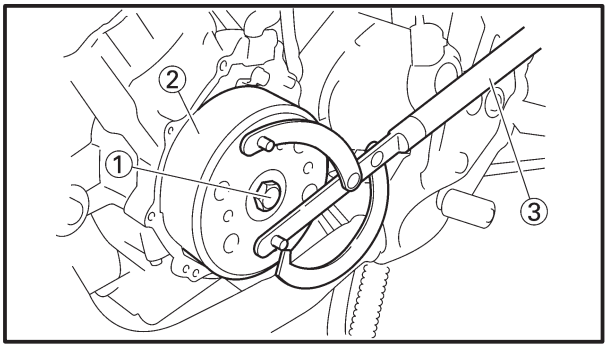
2. Install:
   - generator rotor
   - washer
   - generator rotor bolt

⚠ WARNING

Always use a new generator rotor bolt.

CAUTION:

- **Clean the tapered portion of the crankshaft and the generator rotor hub with lacquer thinner.**
- **Lubricate the generator rotor bolt threads with engine oil.**



3. Tighten:
   • generator rotor bolt ① New

65 Nm (6.5 m•kg) + 60°

NOTE:

- While holding the generator rotor ② with the rotor holding tool ③, tighten the generator rotor bolt.
- After tightening to 65 Nm (6.5 m•kg), tighten another 60°.

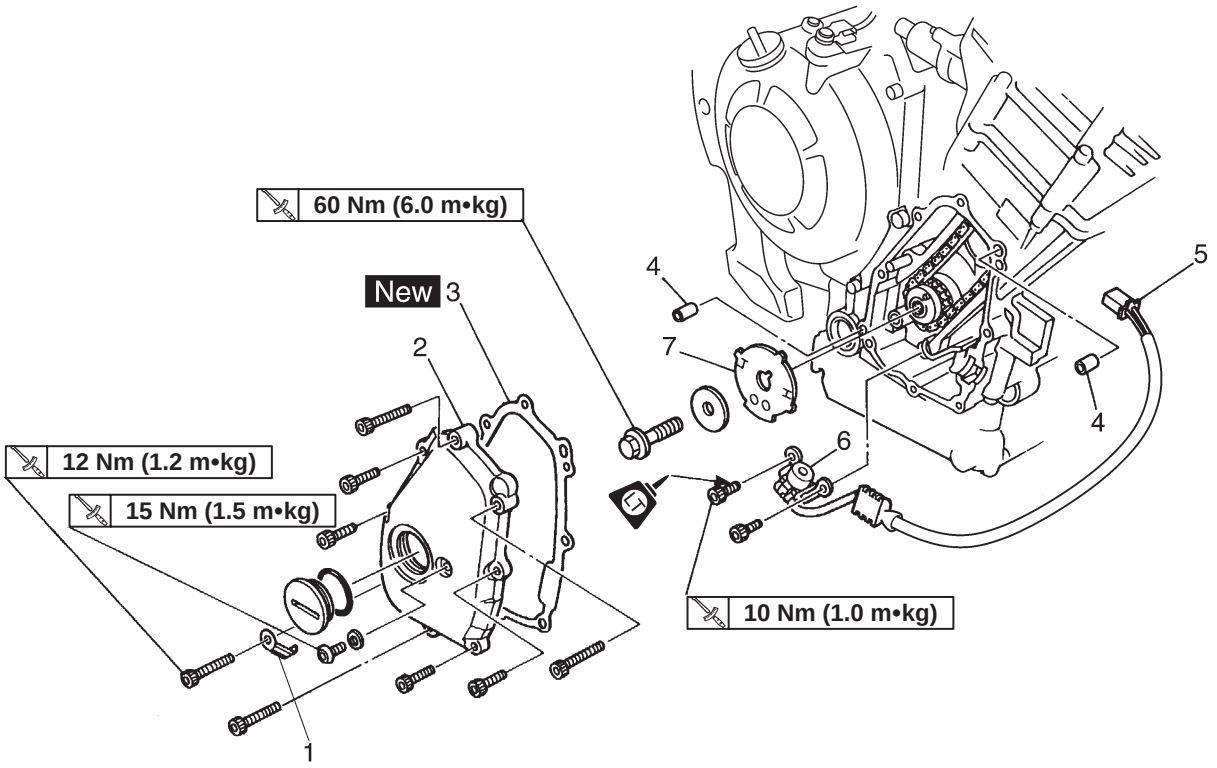
Rotor holding tool
90890-01235

4. Install:
   • generator rotor cover

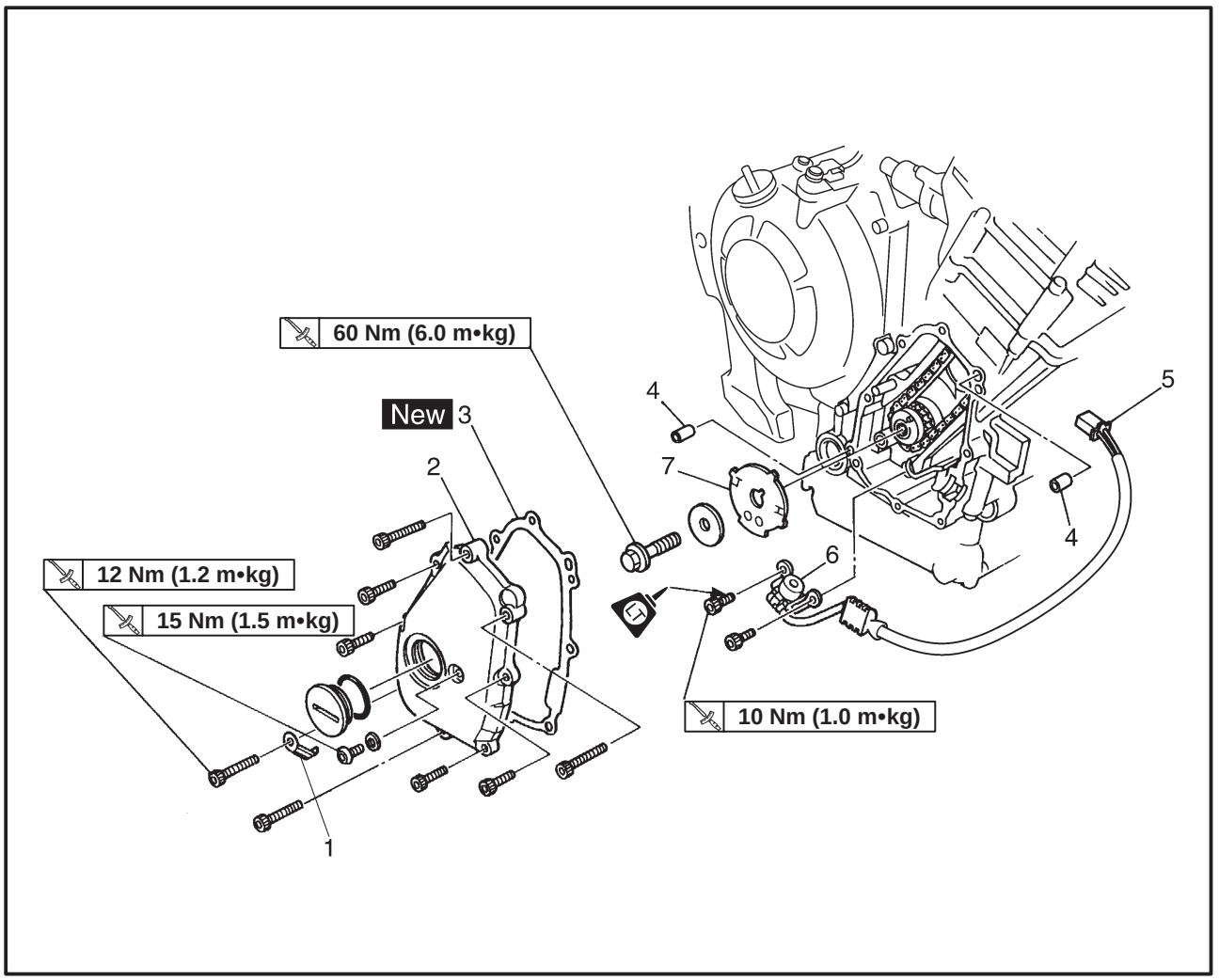
NOTE:

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

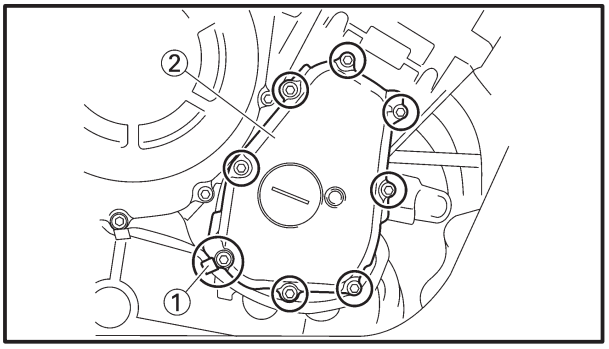
PICKUP COIL

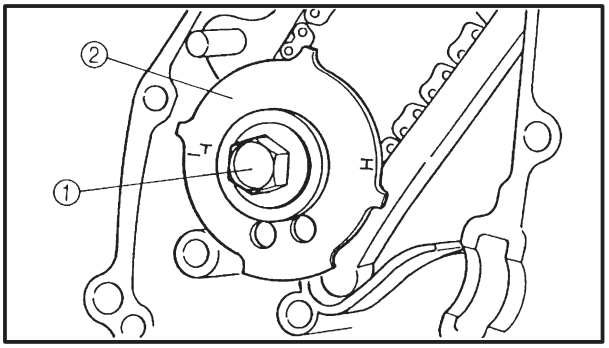


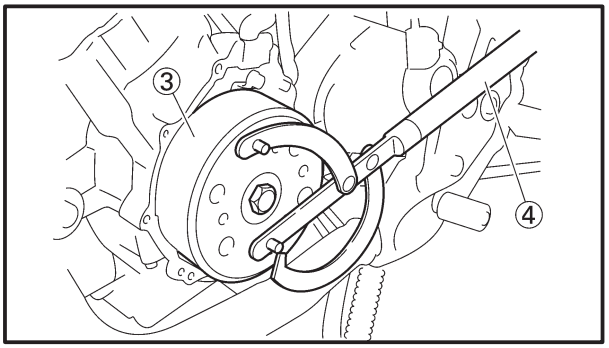
Order	Job/Part	Q'ty	Remarks
	Removing the pickup coil and pickup coil rotor		Remove the parts in the order listed.
	Rider seat and fuel tank		Refer to "SEATS" and "FUEL TANK" in chapter 3.
	Bottom cowling and right side cowling		Refer to "COWLINGS" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Generator rotor cover		Refer to "GENERATOR".
1	Pickup coil lead holder	1	
2	Pickup coil rotor cover	1	
3	Pickup coil rotor cover gasket	1	
4	Dowel pin	2	

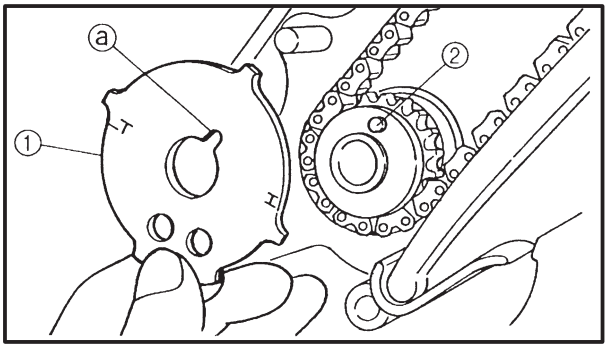


Order	Job/Part	Q'ty	Remarks
5	Pickup coil coupler	1	Disconnect.
6	Pickup coil	1	
7	Pickup coil rotor	1	
			For installation, reverse the removal procedure.









REMOVING THE PICKUP COIL ROTOR

1. Remove:
   - pickup coil lead holder ①
   - pickup coil rotor cover ②

NOTE:

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

2. Remove:
   - pickup coil rotor bolt ①
   - washer
   - pickup coil rotor ②

NOTE:

While holding the generator rotor ③ with the rotor holding tool ④, loosen the pickup coil rotor bolt.

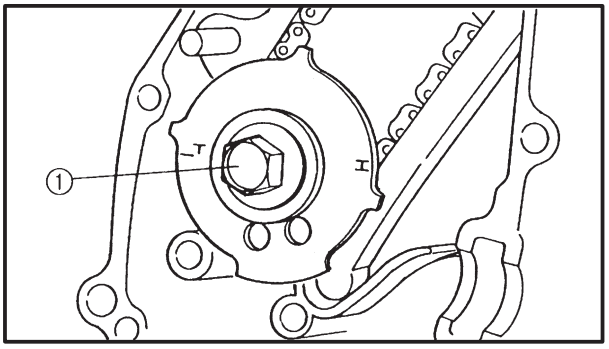
Rotor holding tool
90890-01235

INSTALLING THE PICKUP COIL ROTOR

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

NOTE:

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

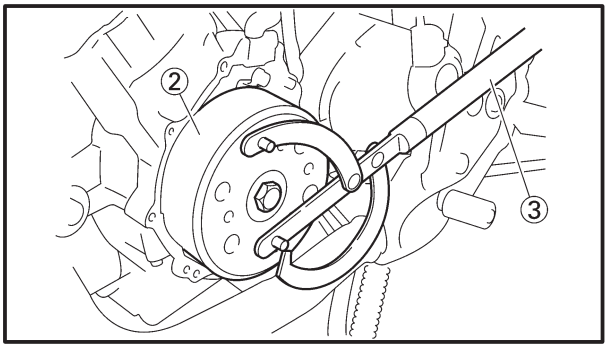


2. Tighten:
   • pickup coil rotor bolt ①

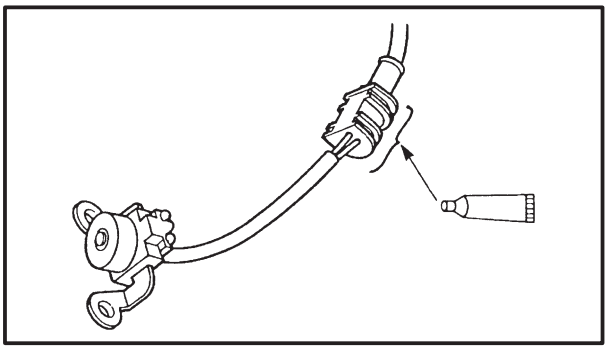
	60 Nm (6.0 m•kg)

NOTE:

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

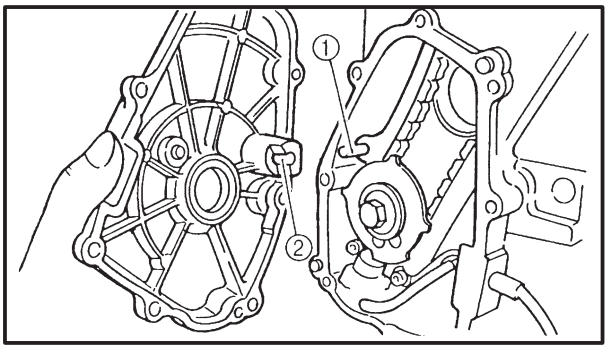


	Rotor holding tool **90890-01235**



3. Apply:
   • sealant
   (onto the pickup coil lead grommet)

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

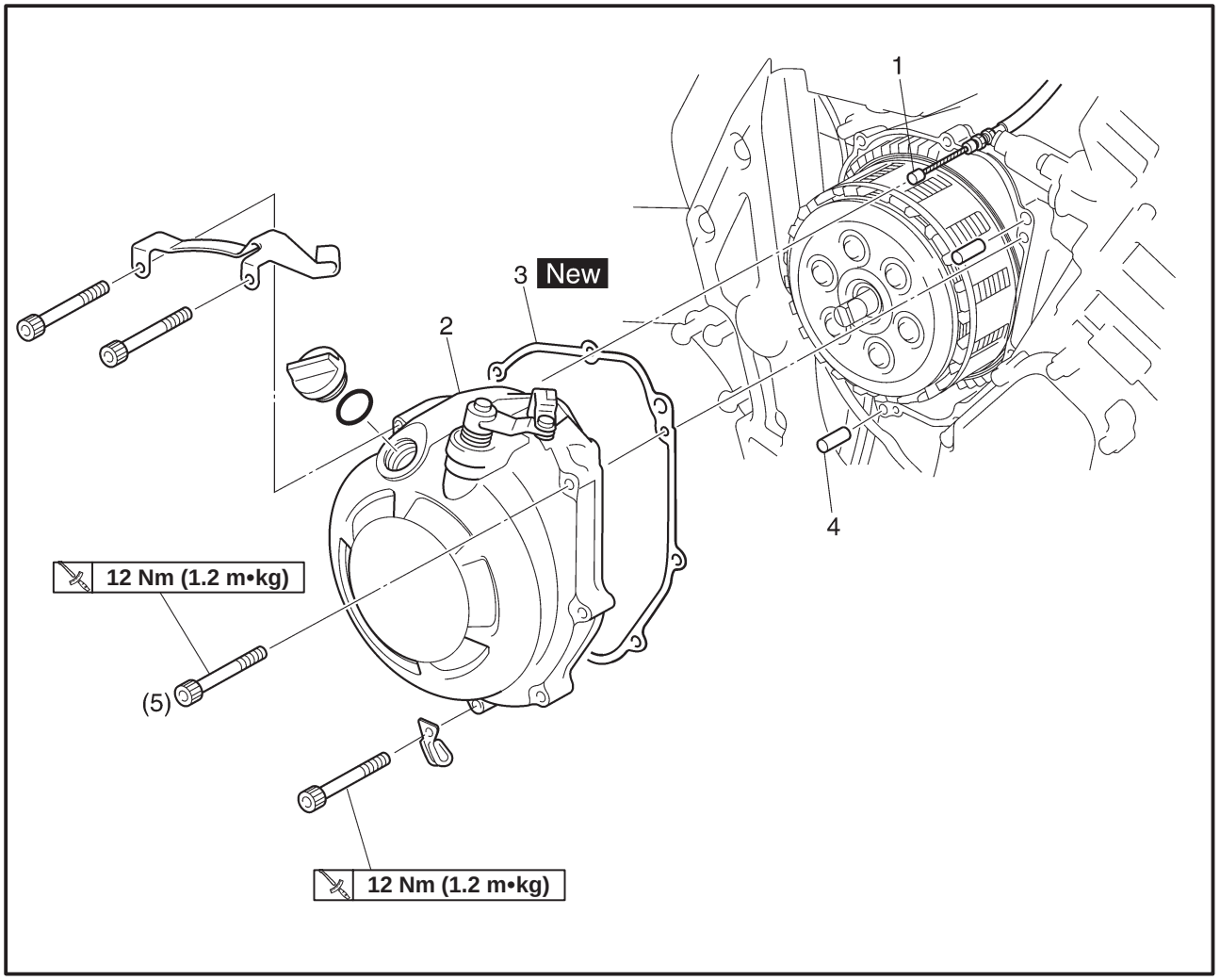


4. Install:
   • pickup coil rotor cover
   • pickup coil lead holder

NOTE:

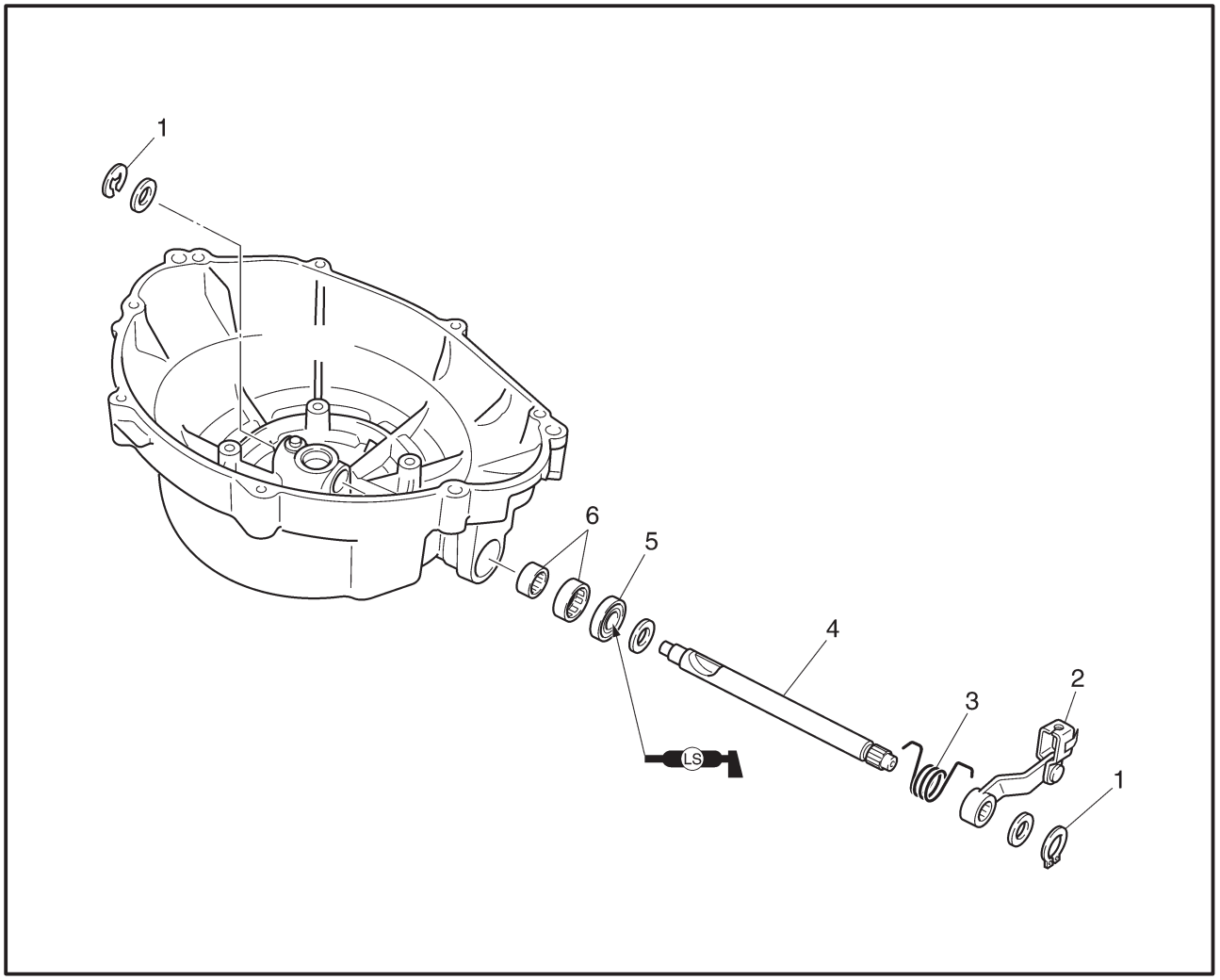
- When installing the pickup coil rotor cover, align the timing chain guide (intake side) pin ① with the hole ② in the pickup coil rotor cover.
- Tighten the pickup coil rotor cover bolts in stages and in a crisscross pattern.

EAS00273
CLUTCH
CLUTCH COVER



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

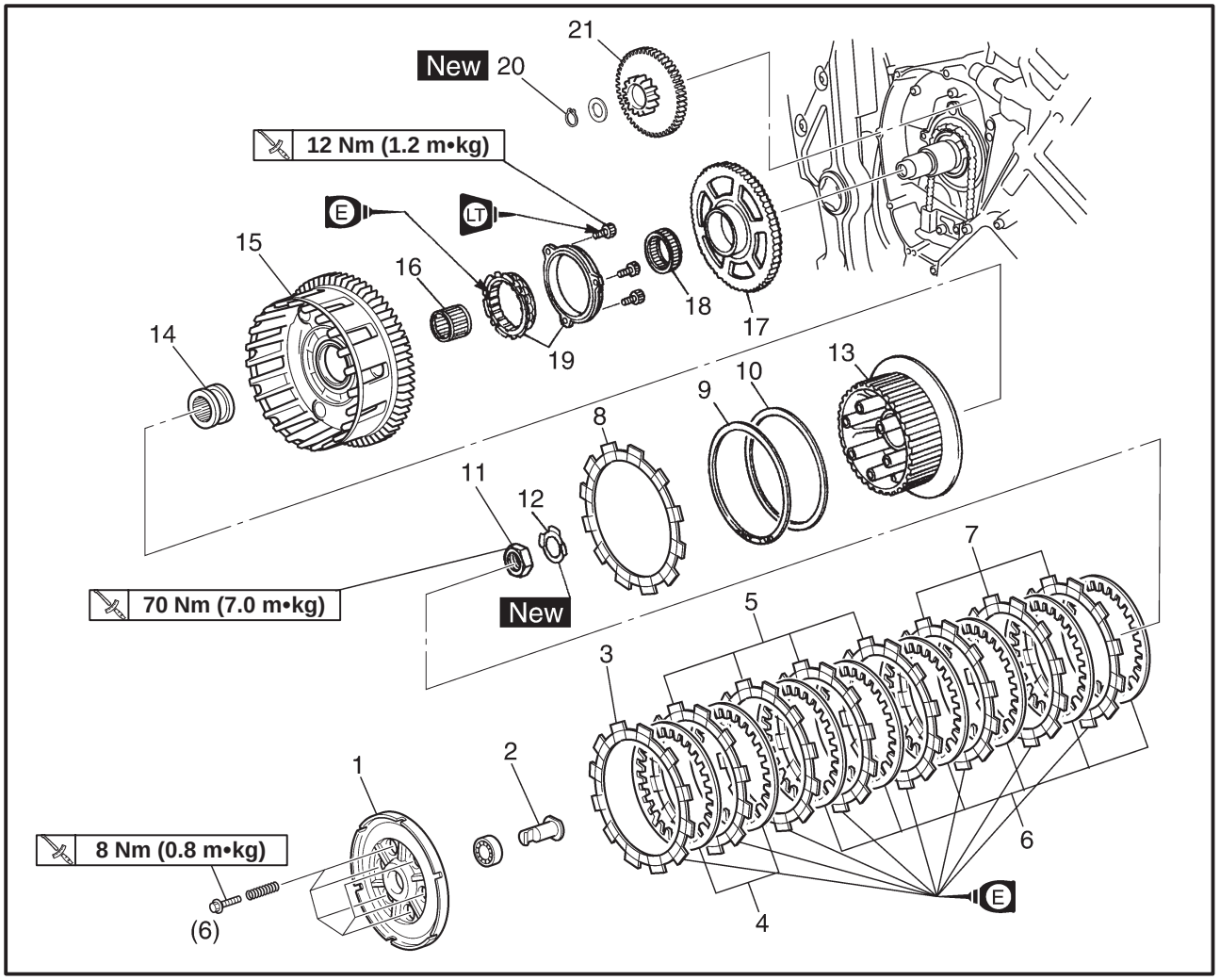
EB405010



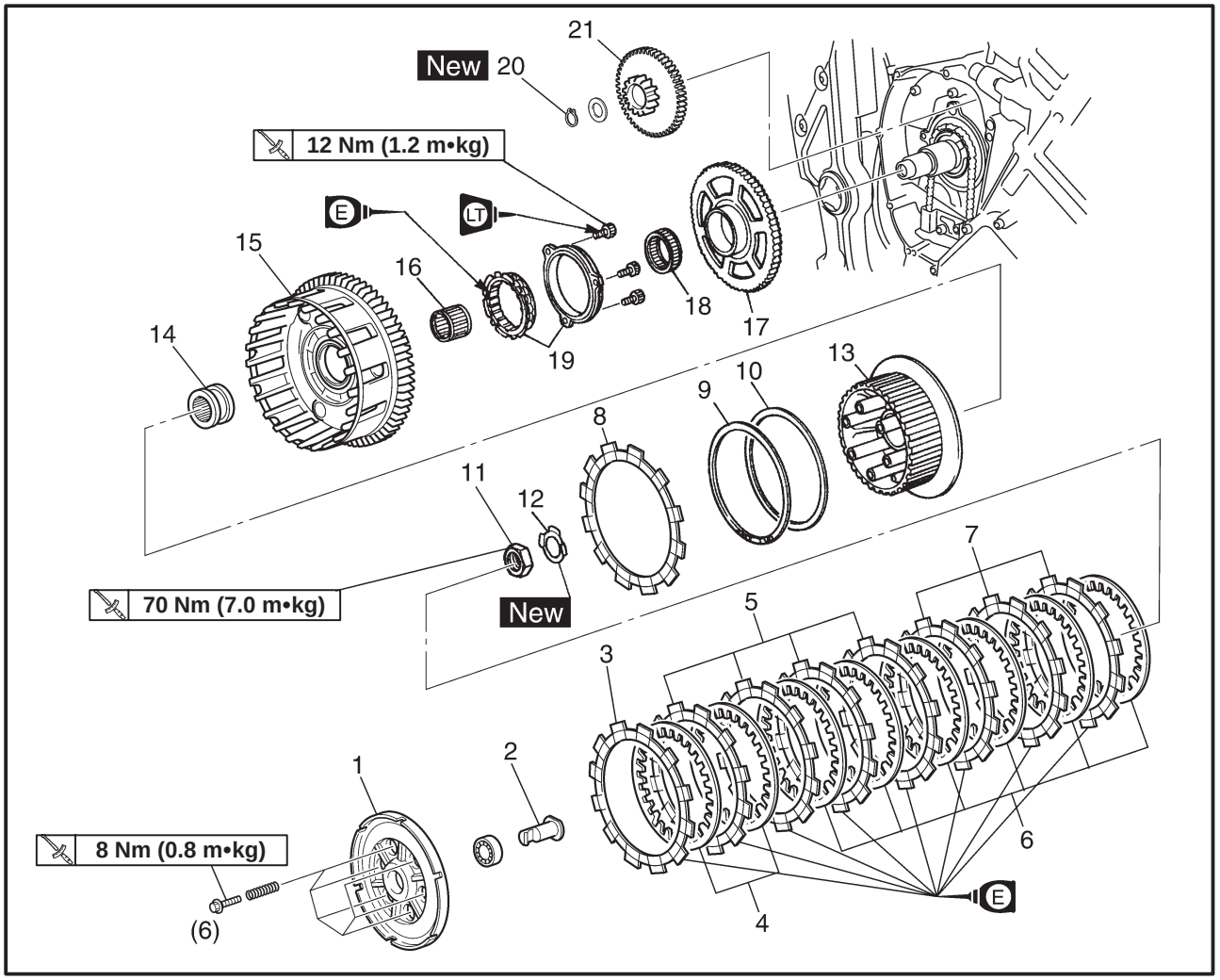
Order	Job/Part	Q'ty	Remarks
	Removing the pull lever shaft		Remove the parts in the order listed.
1	Circlip	2	
2	Pull lever	1	
3	Pull lever spring	1	
4	Pull lever shaft	1	
5	Oil seal	1	
6	Bearing	2	
			For installation, reverse the removal procedure.

EAS00274

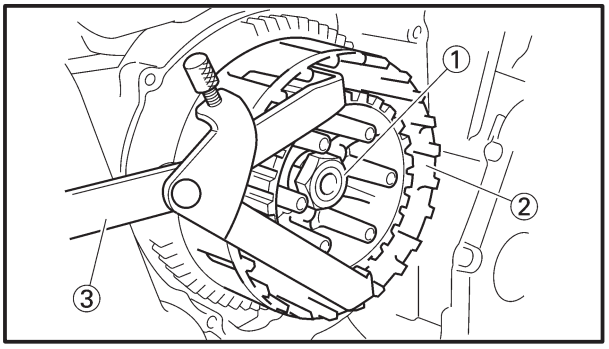
CLUTCH



Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Clutch cover	1	
2	Pull rod	1	
3	Friction plate	1	
4	Clutch plate	2	Select.
5	Friction plate	4	Color code: Black
6	Clutch plate	6	
7	Friction plate	3	Color code: Blue
8	Friction plate	1	Refer to "INSTALLING THE CLUTCH".
9	Clutch damper spring	1	
10	Clutch damper spring seat	1	



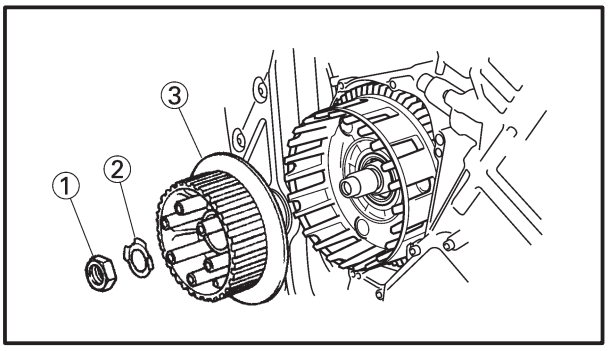
Order	Job/Part	Q'ty	Remarks
11	Clutch boss nut	1	
12	Lock washer	1	
13	Clutch boss	1	
14	Thrust washer	1	
15	Clutch housing	1	
16	Bearing	1	
17	Starter clutch gear	1	
18	Bearing	1	
19	Starter clutch assembly	1	
20	Circlip	1	
21	Starter clutch idle gear	1	
			For installation, reverse the removal procedure.



EAS00277
REMOVING THE CLUTCH
1. Straighten the lock washer tab.
2. Loosen:
   • clutch boss nut ①

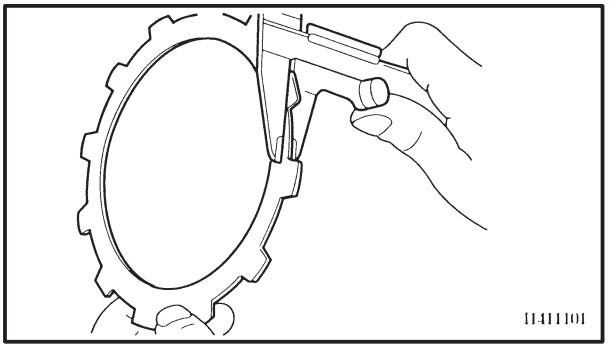
NOTE:
While holding the clutch boss ② with the universal clutch holder ③, loosen the clutch boss nut.

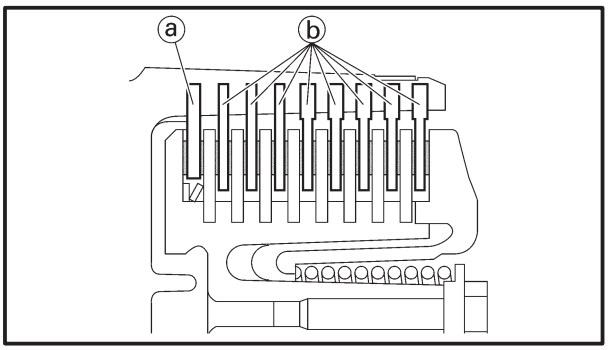
	Universal clutch holder **90890-04086**

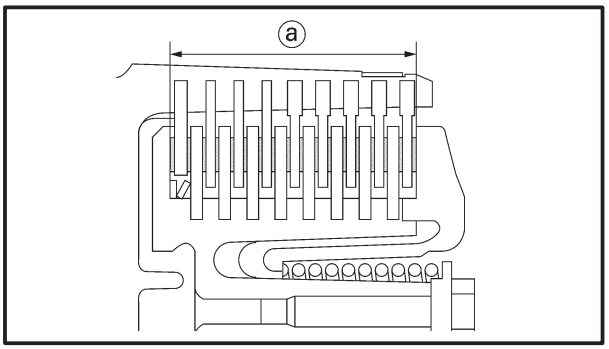


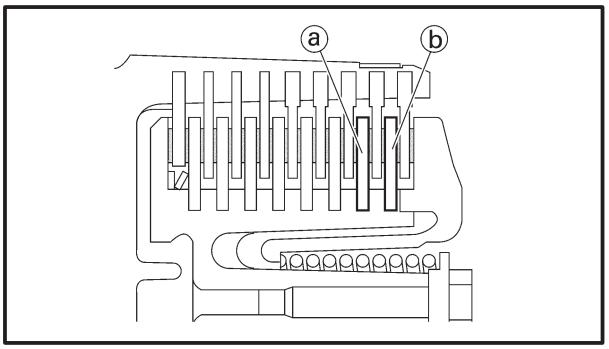
3. Remove:
   • clutch boss nut ①
   • lock washer ②
   • clutch boss ③

EAS00280
CHECKING THE FRICTION PLATES
The following procedure applies to all of the friction plates.
1. Check:
   • friction plate
     Damage/wear → Replace the friction plates as a set.









2. Measure:
   • friction plate thickness
   Out of specification → Replace the friction plates as a set.

NOTE:

Measure the friction plate at four places.

Friction plate thickness
Friction plate ⓐ
3.42 ~ 3.58 mm
<Limit>: 3.32 mm
Friction plate ⓑ
2.92 ~ 3.08 mm
<Limit>: 2.82 mm

3. Measure:
   • assembly width ⓐ
   Out of specification → Adjust.

Assembly width
43.1 ~ 43.9 mm

a. Assembly width adjusted by clutch plate ⓐ and ⓑ.
b. Select the clutch plate from the following table.

Clutch plate ⓐ

Part No.	Thickness	
168-16325-00	1.6 mm	
31A-16325-00	2.0 mm	STD
168-16324-00	2.3 mm	

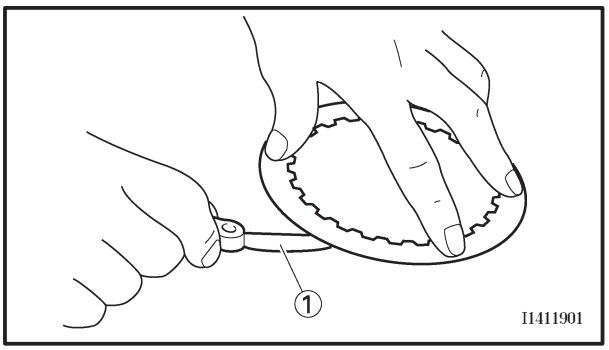
Clutch plate ⓑ

Part No.	Thickness	
31A-16325-00	2.0 mm	STD
168-16324-00	2.3 mm	

NOTE:

When selecting a 2.3 mm clutch plate, make the replacement giving priority to ⓑ.

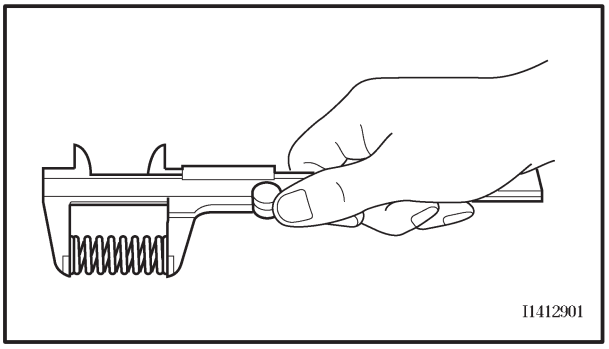
EAS00281
CHECKING THE CLUTCH PLATES
The following procedure applies to all of the clutch plates.
1. Check:
   • clutch plate
   Damage → Replace the clutch plates as a set.



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

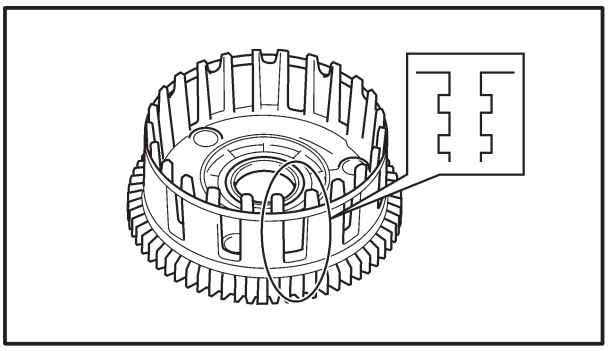
Clutch plate warpage limit
Less than 0.1 mm

EAS00282
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.

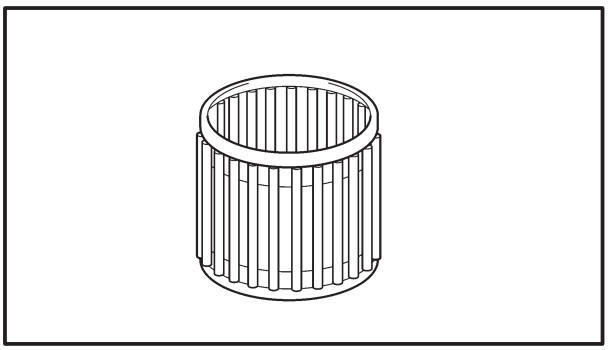
Clutch spring free length
50 mm
<Limit>: 47.5 mm



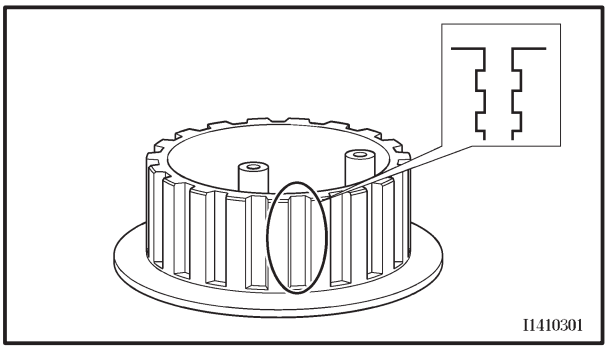
EAS00284
CHECKING THE CLUTCH HOUSING
1. Check:
   • clutch housing dogs
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE:

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



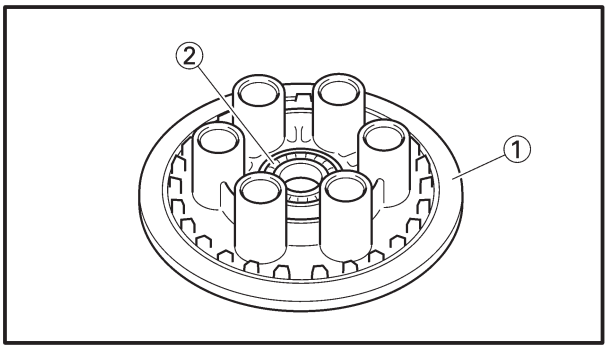
2. Check:
   • bearing
   Damage/wear → Replace the clutch housing.



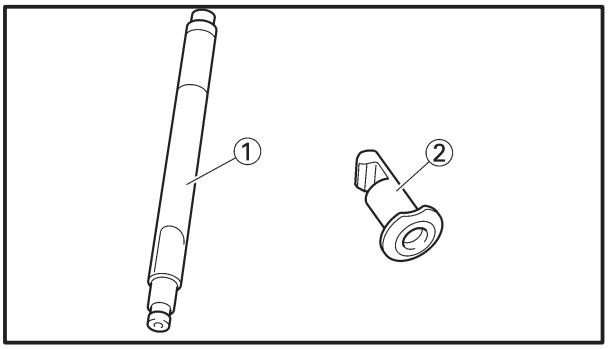
EAS00285
CHECKING THE CLUTCH BOSS
1. Check:
   • clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

NOTE:

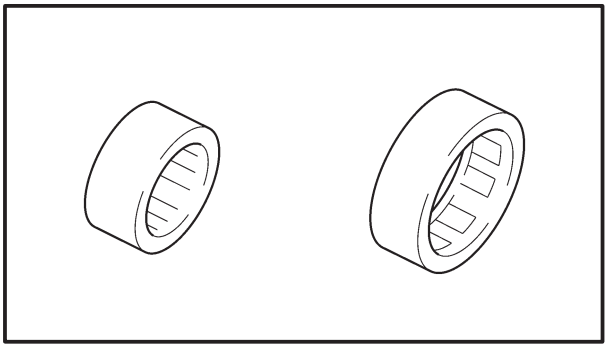
Pitting on the clutch boss splines will cause erratic clutch operation.



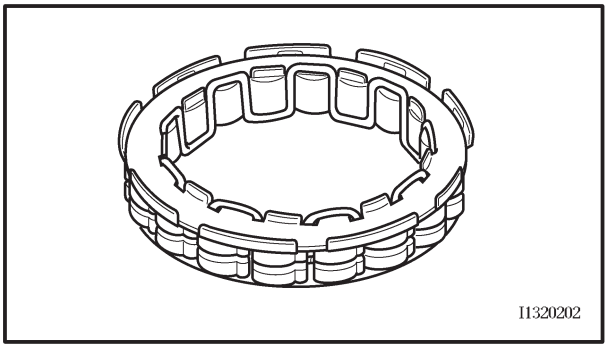
EAS00286
CHECKING THE PRESSURE PLATE
1. Check:
   • pressure plate ①
   Cracks/damage → Replace.
   • bearing ②
   Damage/wear → Replace.



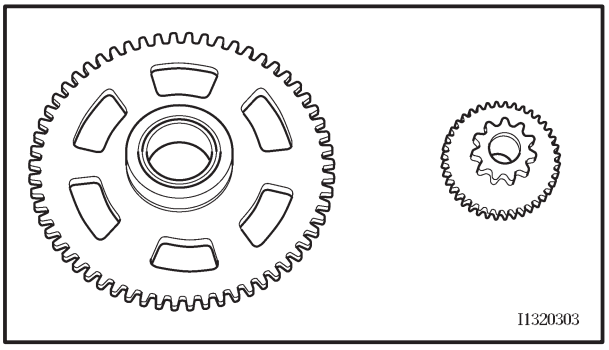
EAS00287
CHECKING THE PULL LEVER AND PULL ROD
1. Check:
   • pull lever ①
   • pull rod ②
   Damage/wear → Replace the pull rod and pull lever pinion gear as a set.



2. Check:
   • pull rod bearing
   Damage/wear → Replace.

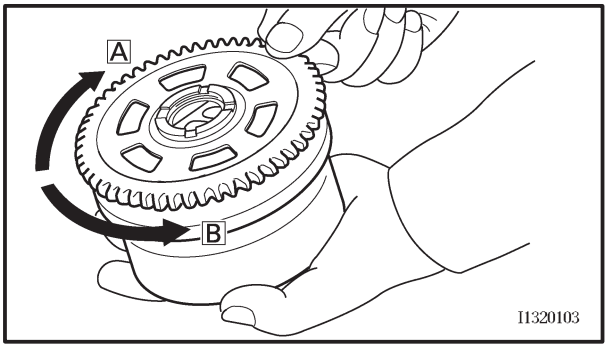


EAS00351
CHECKING THE STARTER CLUTCH
1. Check:
   • starter clutch rollers
   Damage/wear → Replace.



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

3. Check:
   • starter clutch gear's contacting surfaces
   Damage/pitting/wear → Replace the starter clutch gear.



4. Check:
   • starter clutch operation

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

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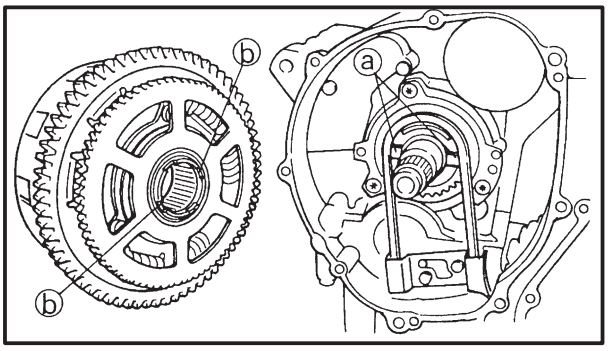
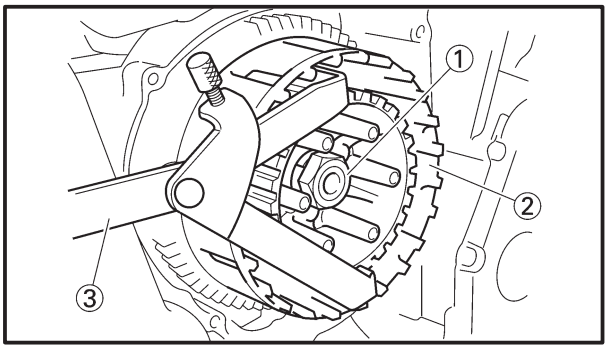


EAS00299
INSTALLING THE CLUTCH

1. Install:
   • clutch housing

NOTE:

- Make sure that the slots ⓐ in the clutch housing align with the tabs ⓑ on the oil/water pump assembly drive sprocket.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Make sure that the starter clutch gear teeth and starter clutch idle gear teeth mesh correctly.



2. Install:
   • lock washer New
   • clutch boss nut ①

90 Nm (9.0 m•kg)

NOTE:

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

	Universal clutch holder **90890-04086**

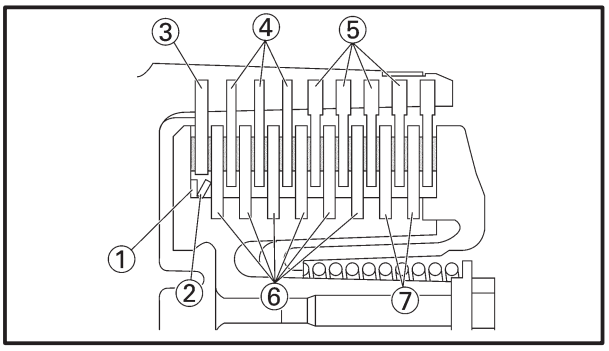
3. Bend the lock washer tab along a flat side of the nut.
4. Lubricate:
   • friction plates
   • clutch plates
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

5. Install:
   • friction plates
   • clutch plates

NOTE:

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



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a. Install the clutch damper spring seat ①, clutch damper spring ② and friction plate (smaller size) ③.
b. Install the clutch plate and friction plate at following the illustrated.
   Friction plate ④: Color code/Blue
   Friction plate ⑤: Color code/Black
   Clutch plate ⑥: 20 mm
   Clutch plate ⑦: Select. Refer to "CHECKING THE FRICTION PLATE"

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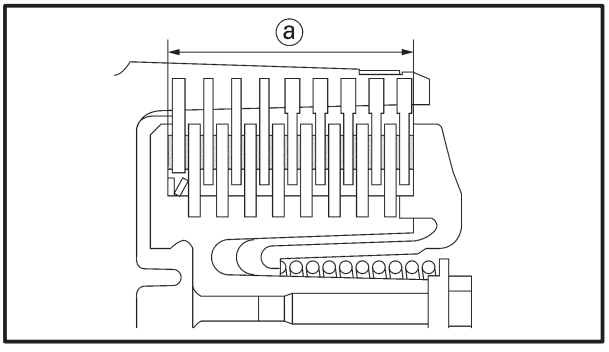
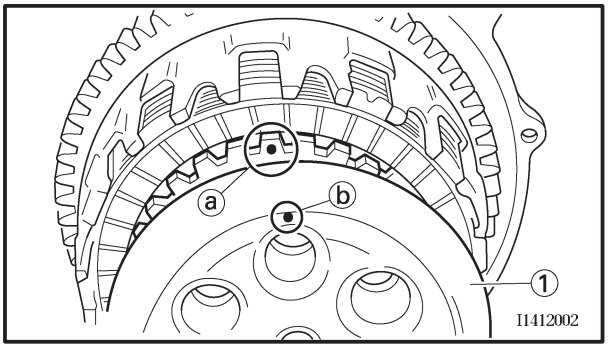


6. Measure:
   • assembly width ⓐ
   Out of specification → Adjust.
   Refer to "CHECKING THE FRICTION PLATE".

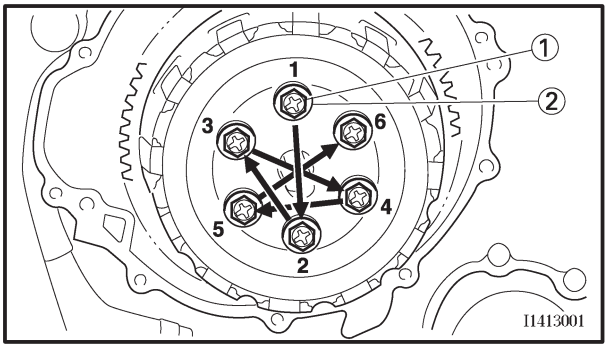
	Assembly width **43.1 ~ 43.6 mm**



7. Install:
   • pressure plate ①

NOTE:

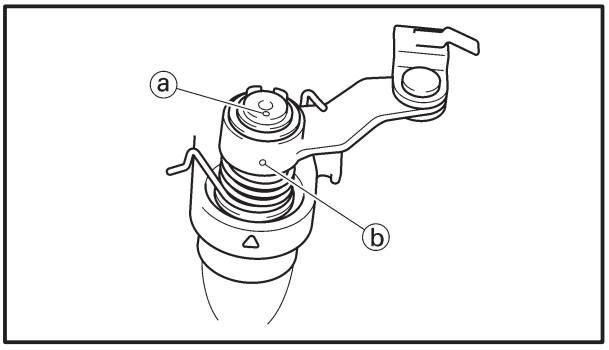
Align the punch mark ⓑ in the pressure plate with the punch mark ⓐ in the clutch boss.



8. Install:
   • clutch springs
   • clutch spring bolts — **8 Nm (0.8 m•kg)**

NOTE:

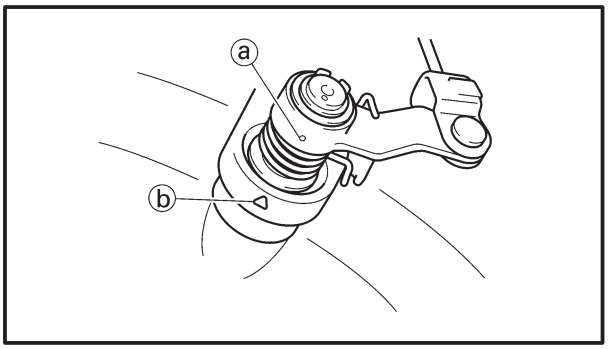
Tighten the clutch spring bolts in stages and in a crisscross pattern.



9. Install:
   • pull lever

NOTE:

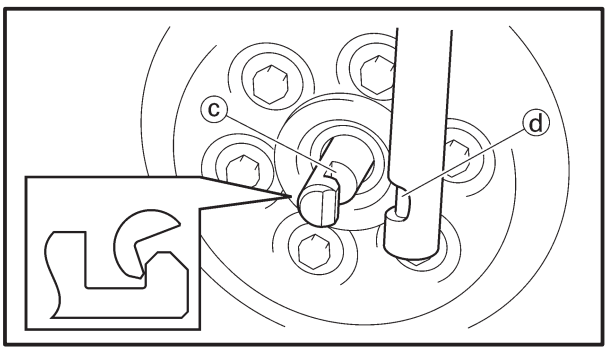
Align the punch mark ⓐ in the pull lever shaft with the mark ⓑ on the clutch cover.



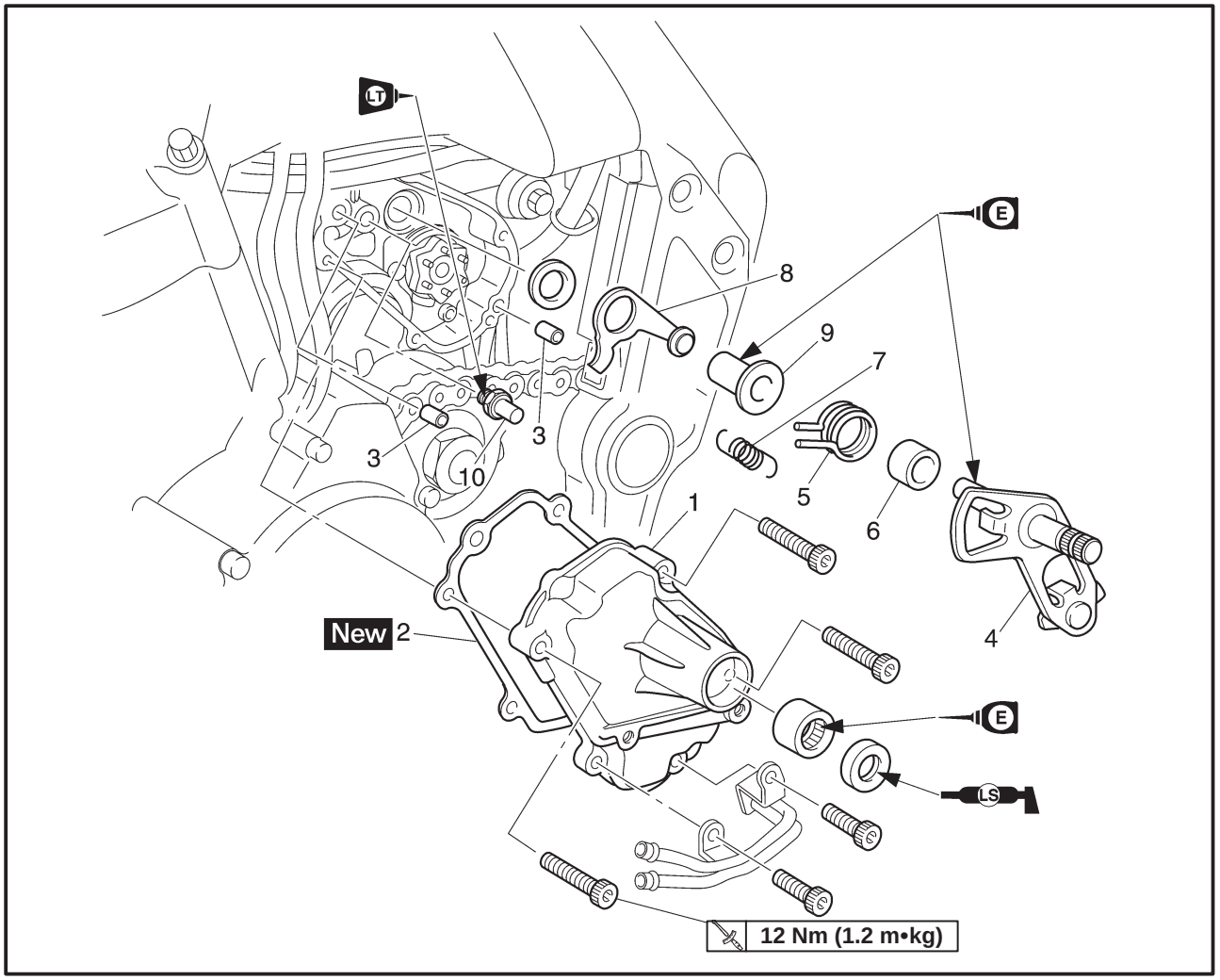
10. Install:
    • dowel pins
    • gasket New
    • clutch cover — **12 Nm (1.2 m•kg)**

NOTE:

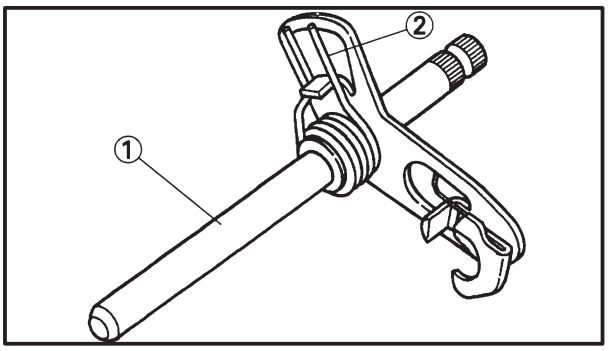
- When installing the clutch cover, push the pull lever and check that the punch mark ⓐ on the pull lever aligns with the mark ⓑ on the clutch cover. Make sure that the pull rod groove ⓒ and pull lever shaft groove ⓓ are engaged.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



EAS00326
SHIFT SHAFT
GENERATOR ROTOR COVER



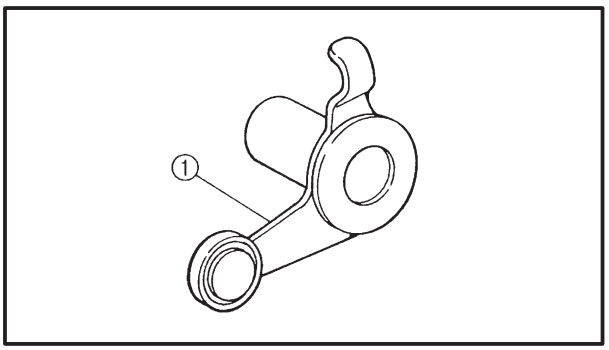
Order	Job/Part	Q'ty	Remarks
	Removing the shift shaft and stopper lever		Remove the parts in the order listed.
	Drive sprocket cover		Refer to "ENGINE".
1	Shift shaft cover	1	
2	Shift shaft cover gasket	1	
3	Dowel pin	2	
4	Shift shaft	1	
5	Shift shaft spring	1	
6	Spacer	1	
7	Stopper lever spring	1	
8	Stopper lever	1	
9	Collar	1	
10	Shift shaft spring stopper	1	
			For installation, reverse the removal procedure.



EAS00328

CHECKING THE SHIFT SHAFT

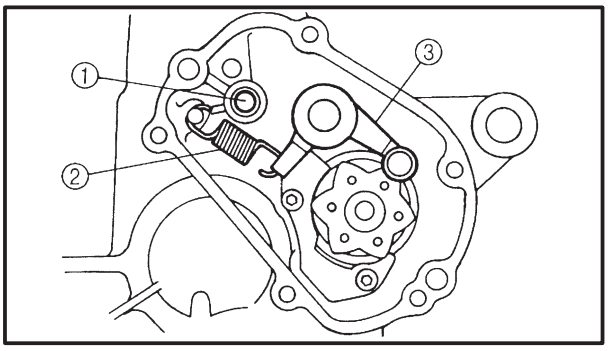
1. Check:
   - shift shaft ①
     Bends/damage/wear → Replace.
   - shift shaft spring ③
     Damage/wear → Replace.



EAS00330

CHECKING THE STOPPER LEVER

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



EAS00331

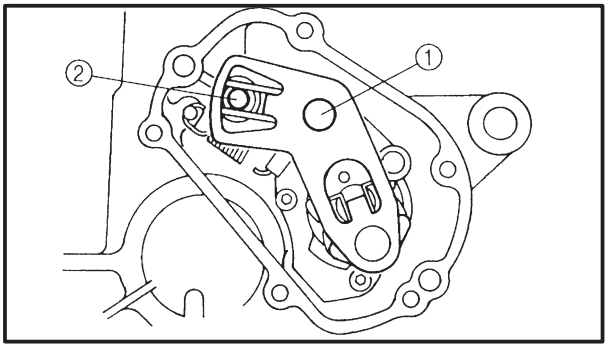
INSTALLING THE SHIFT SHAFT

1. Install:
   - shift shaft spring stopper ①

     22 Nm (2.2 m•kg)
   - stopper lever spring ②
   - stopper lever ③

NOTE:

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

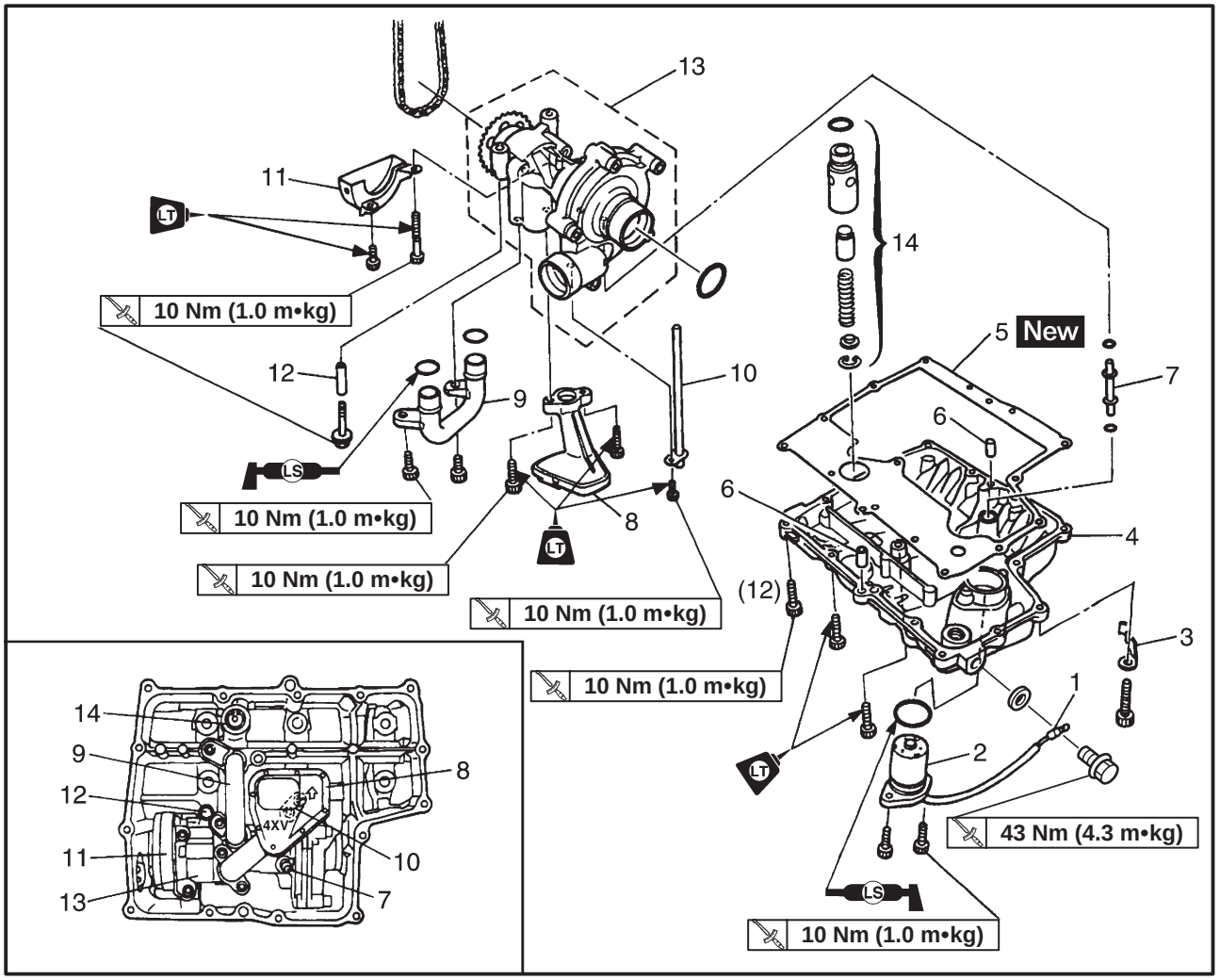


2. Install:
   - shift shaft ①
   - spacer

NOTE:

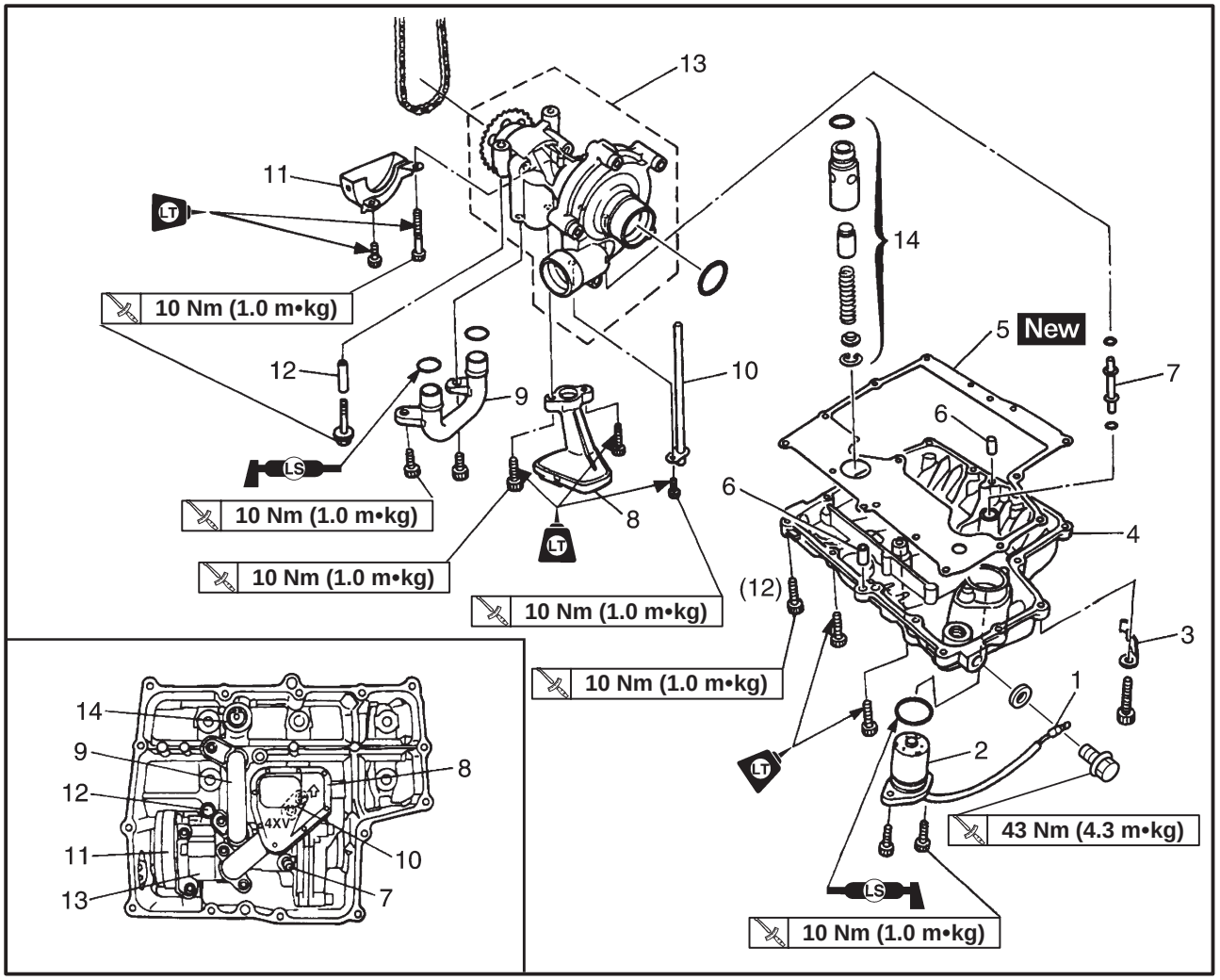
- Lubricate the oil seal lips with lithium soap base grease.
- Install the end of the shift shaft spring onto the shift shaft spring stopper ②.

EAS00356
OIL PAN AND OIL PUMP



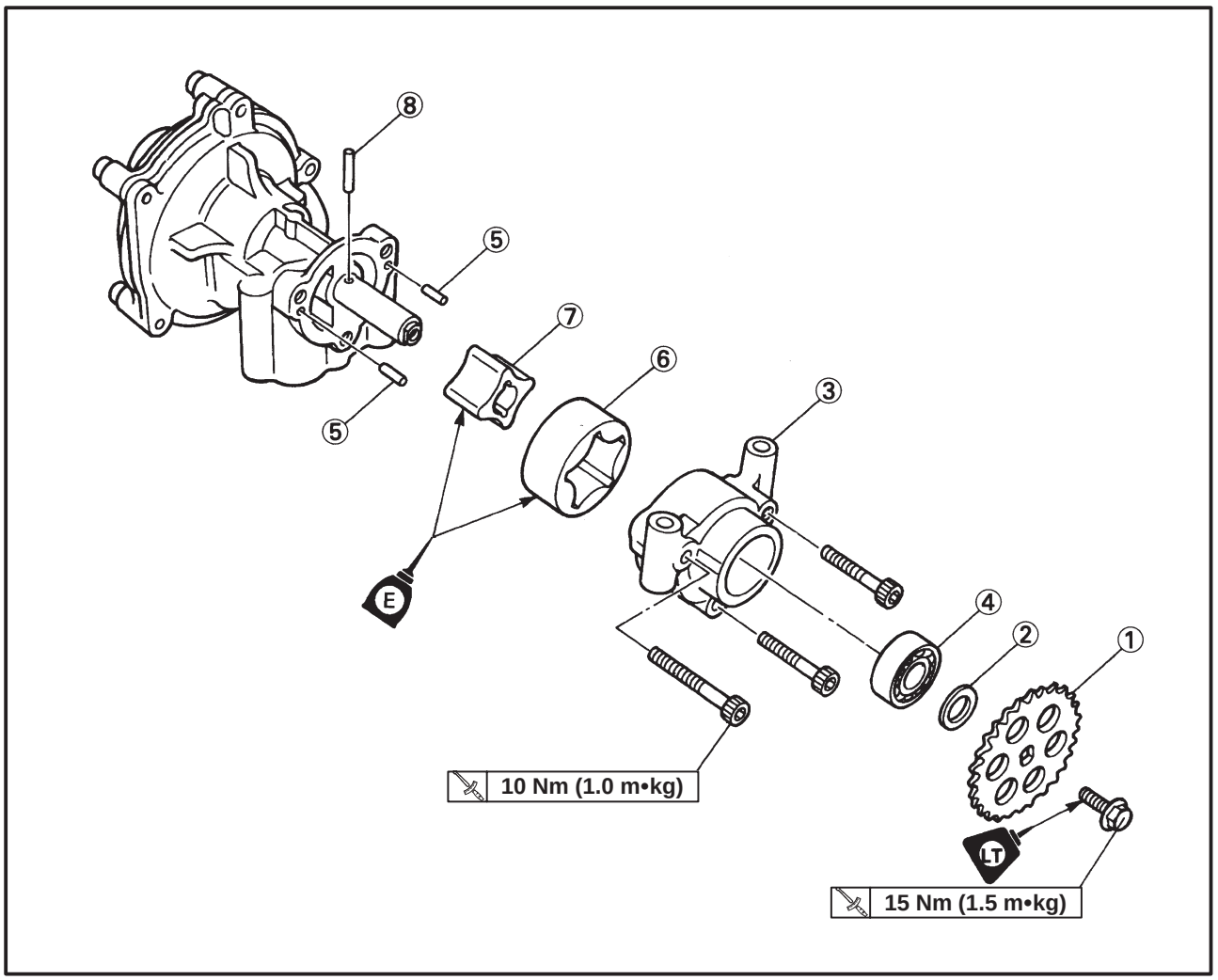
Order	Job/Part	Q'ty	Remarks
	Removing the oil pan and oil pump		Remove the parts in the order listed.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
	Radiator assembly and water pump outlet pipe		Refer to "RADIATOR" and "OIL COOLER" in chapter 5.
	Exhaust pipe assembly		Refer to "ENGINE".
1	Oil level switch connector	1	Disconnect.
2	Oil level switch	1	
3	Oil level switch lead holder	1	
4	Oil pan	1	
5	Oil pan gasket	1	
6	Dowel pin	2	

EB411001

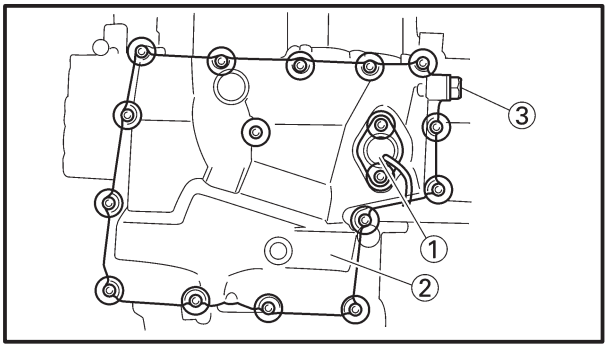


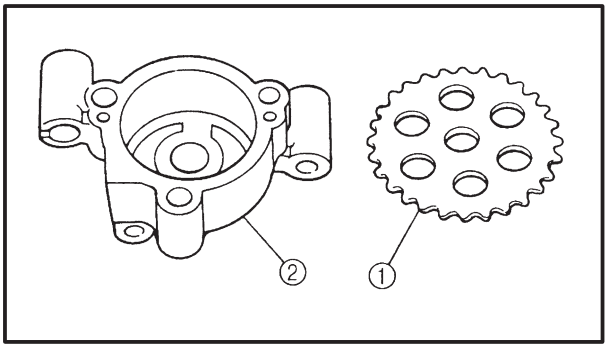
Order	Job/Part	Q'ty	Remarks
7	Drain pipe	1	
8	Oil strainer	1	
9	Oil pipe	1	
10	Oil delivery pipe	1	
11	Oil/water pump assembly drive sprocket cover	1	
12	Dowel pin	1	
13	Oil/water pump assembly	1	
14	Relief valve assembly	1	
			For installation, reverse the removal procedure.

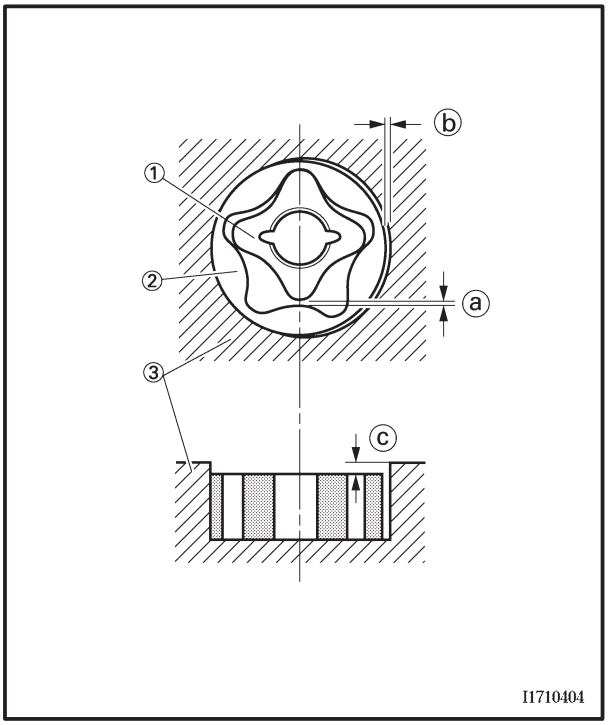
EAS00360



Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Disassemble the parts in the order listed.
①	Oil/water pump assembly driven sprocket	1	
②	Washer	1	
③	Oil pump housing	1	
④	Bearing	1	
⑤	Pin	2	
⑥	Oil pump outer rotor	1	
⑦	Oil pump inner rotor	1	
⑧	Pin	1	
			For assembly, reverse the disassembly procedure.







EAS00362
REMOVING THE OIL PAN

1. Remove:
   - oil level switch ①
   - oil pan ②
   - engine oil drain bolt ③
   - gasket
   - dowel pins

NOTE:

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

EAS00364
CHECKING THE OIL PUMP

1. Check:
   - oil pump drive gear ①
   - oil pump driven gear ②
   - oil pump housing
   - oil pump housing cover

   Cracks/damage/wear → Replace the defective part(-s).
2. Measure:
   - inner-rotor-to-outer-rotor-tip clearance ⓐ
   - outer-rotor-to-oil-pump-housing clearance ⓑ
   - oil-pump-housing-to-inner-rotor-and-outer-rotor clearance ⓒ

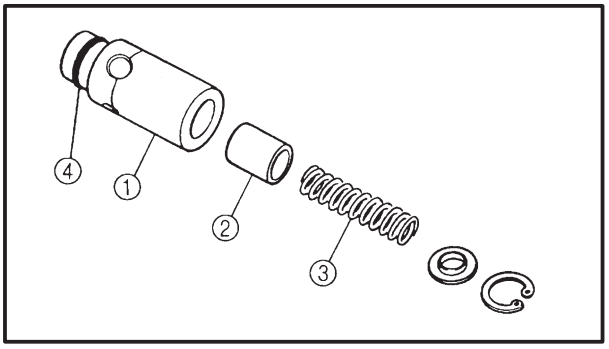
   Out of specification → Replace the oil pump.

① Inner rotor
② Outer rotor
③ Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance
0.09 ~ 0.15 mm
<Limit>: 0.23 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
0.06 ~ 0.11 mm
<Limit>: 0.18 mm

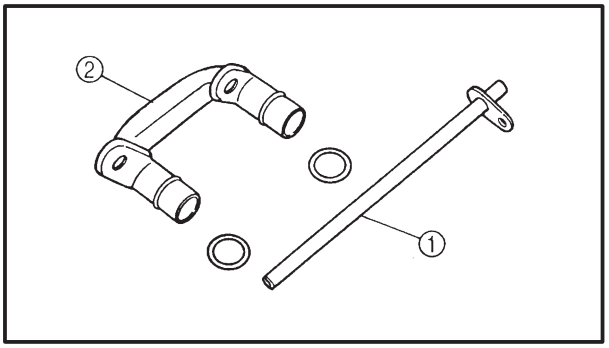
3. Check:
   - oil pump operation

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



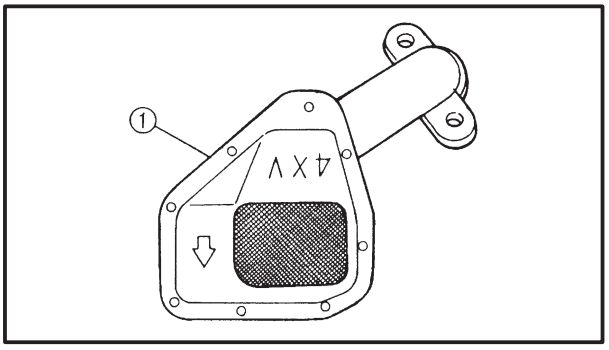
EAS00365
CHECKING THE RELIEF VALVE
1. Check:
   - relief valve body ①
   - relief valve ②
   - spring ③
   - O-ring ④

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



EAS00366
CHECKING THE OIL DELIVERY PIPE
1. Check:
   - oil delivery pipe ①
   - oil pipe ②

   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.



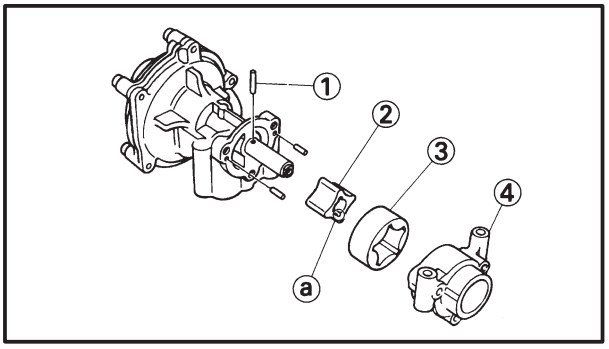
EAS00368
CHECKING THE OIL STRAINER
1. Check:
   - oil strainer ①

   Damage → Replace.
   Contaminants → Clean with engine oil.

EAS00374
ASSEMBLING THE OIL PUMP
1. Lubricate:
   - inner rotor
   - outer rotor
   - oil pump shaft

   (with the recommended lubricant)

	Recommended lubricant **Engine oil**



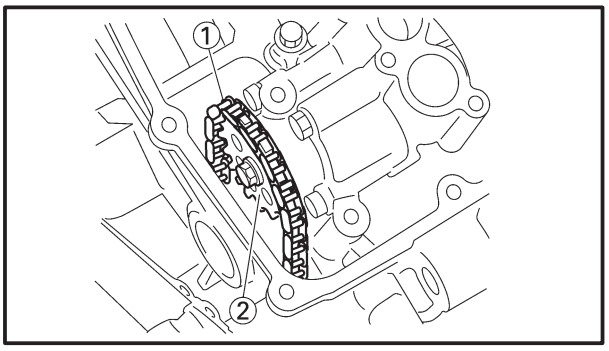
2. Install:
   • pin ①
   • inner rotor ②
   • outer rotor ③
   • oil pump housing ④

	Oil pump housing screw 10 Nm (1.0 m•kg)

NOTE:

When installing the inner rotor, align the pin ① in the oil pump shaft with the groove ⓐ on the inner rotor ②.

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



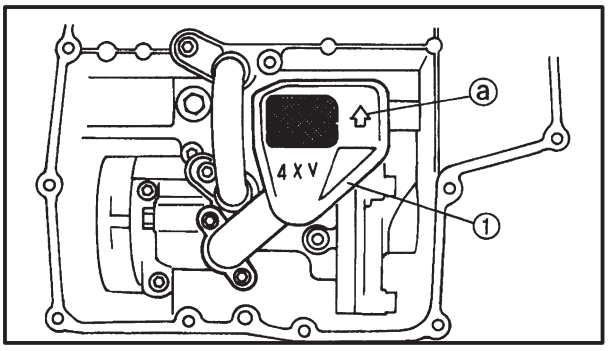
EAS00376

INSTALLING THE OIL PUMP

1. Install:
   • oil pump — **12 Nm (1.2 m•kg)**

NOTE:

Install the oil/water pump drive chain ① onto the oil/water pump driven sprocket ②.



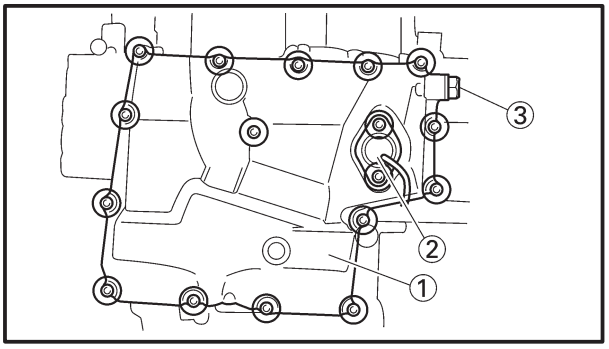
EAS00378

INSTALLING THE OIL STRAINER

1. Install:
   • oil strainer housing ① — **10 Nm (1.0 m•kg)**
   LOCTITE®

NOTE:

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



EAS00380

INSTALLING THE OIL PAN

1. Install:
   - dowel pins
   - gasket New
   - oil pan ①
   - oil level switch ②
   - engine oil drain bolt ③

	10 Nm (10 m•kg)
	10 Nm (10 m•kg)
	43 Nm (4.3 m•kg)

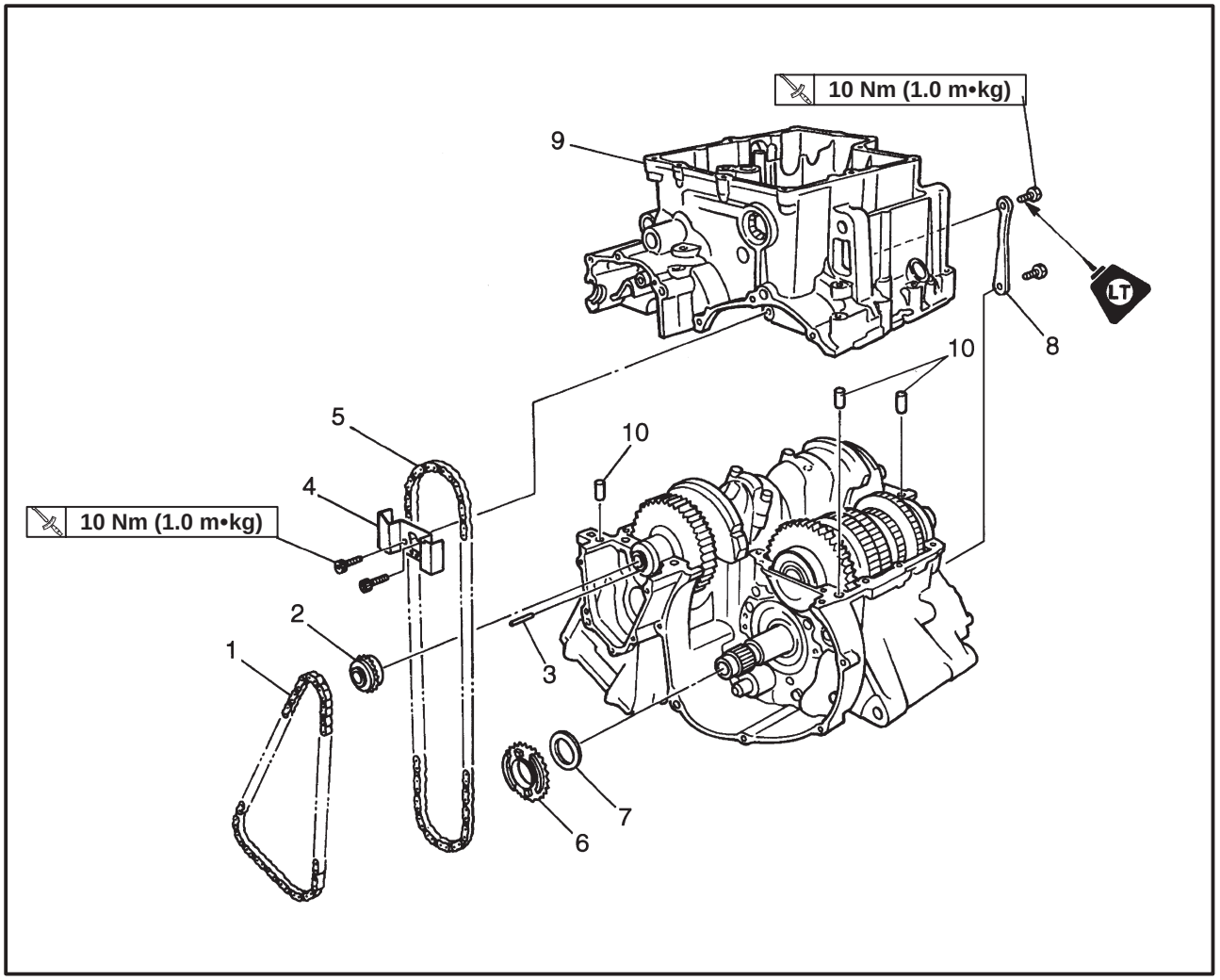
⚠ WARNING

Always use new copper washers.

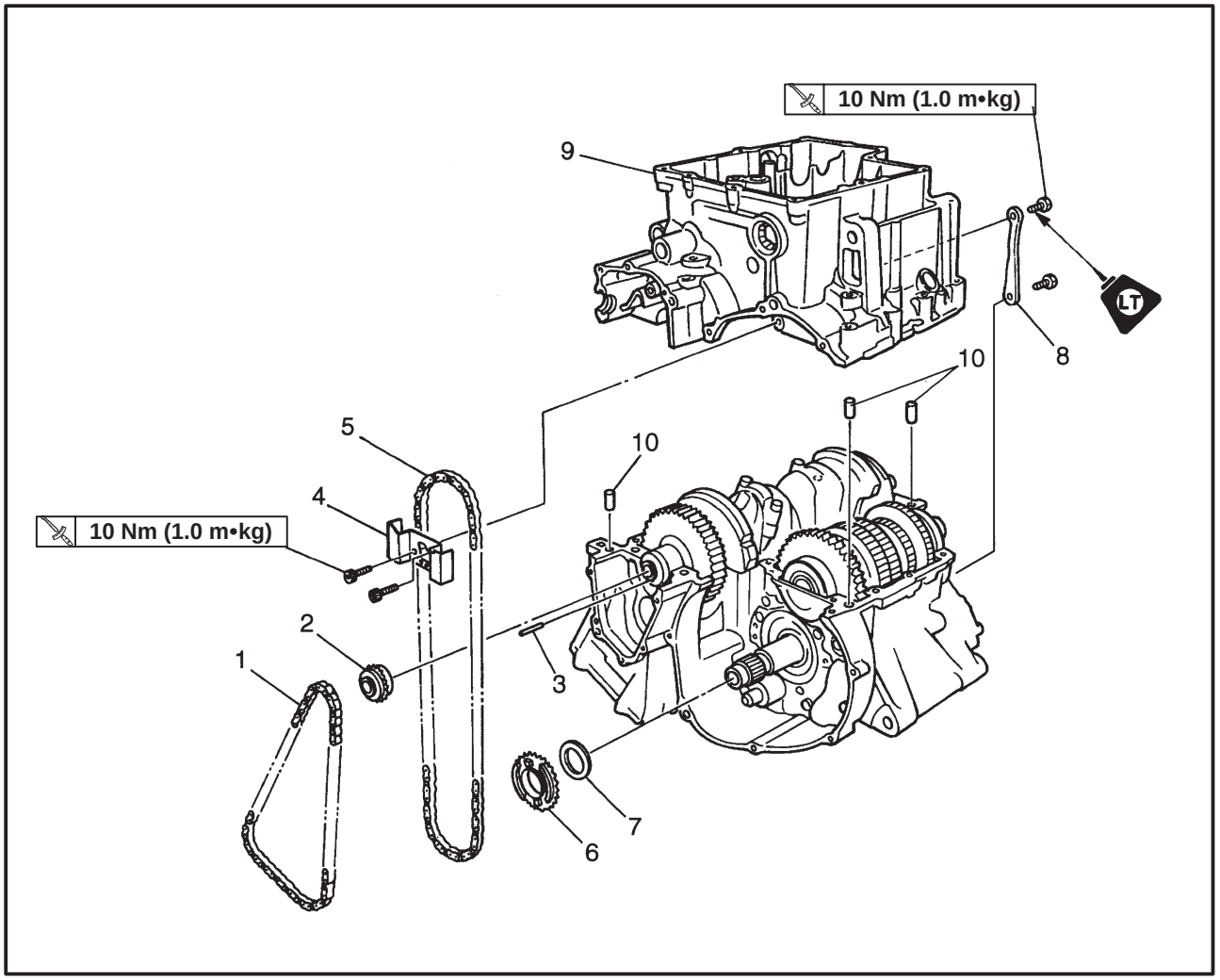
NOTE:

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

EAS00381
CRANKCASE
CRANKCASE



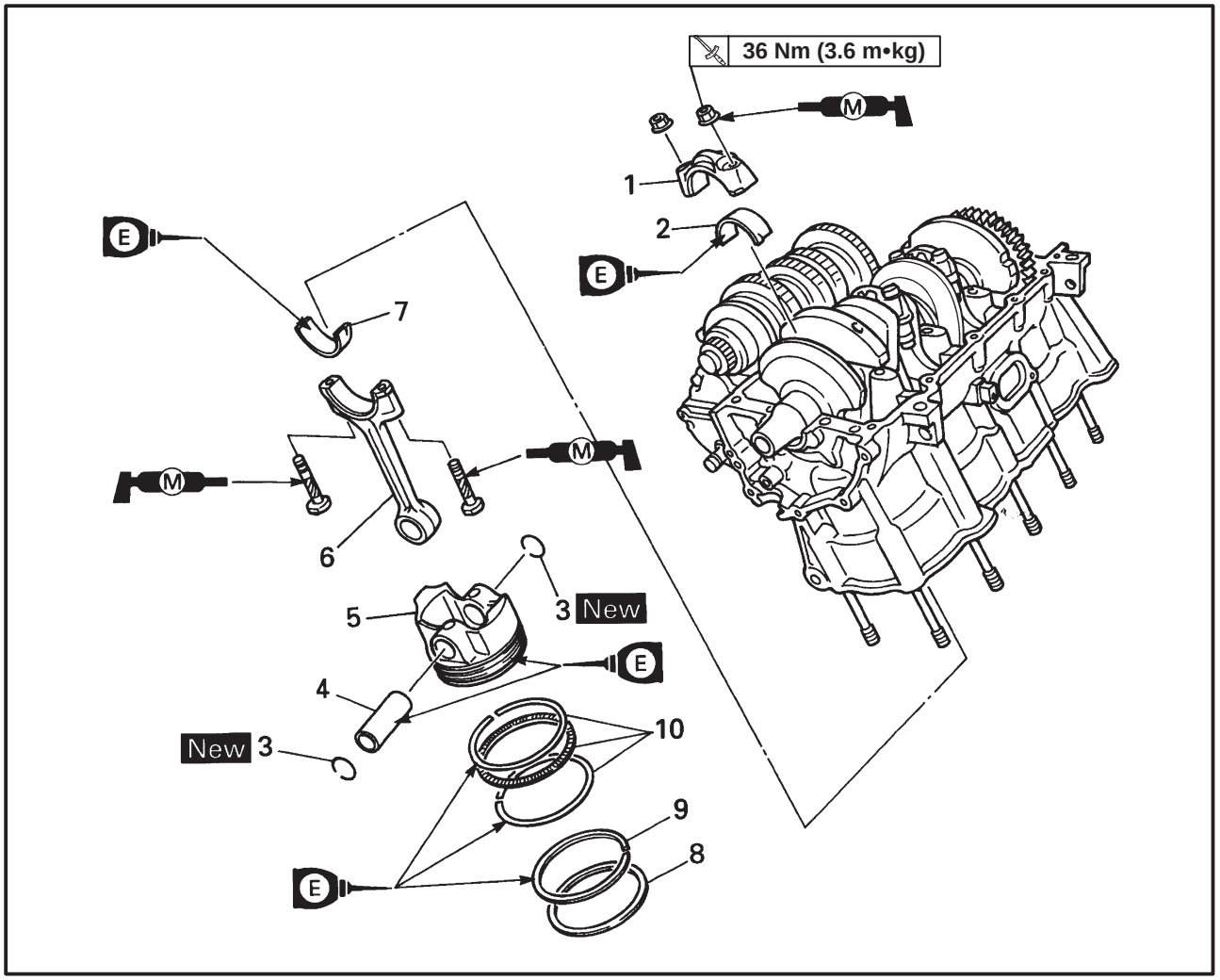
Order	Job/Part	Q'ty	Remarks
	Removing the crankcase		Remove the parts in the order listed.
	Engine		Refer to "ENGINE".
	Cylinder head		Refer to "CYLINDER HEAD".
	Pickup coil and pickup coil rotor		Refer to "PICKUP COIL".
	Stator coil assembly		Refer to "GENERATOR".
	Clutch housing and starter clutch idle gear		Refer to "CLUTCH".
	Oil/water pump assembly		Refer to "OIL PAN AND OIL PUMP".
1	Timing chain	1	
2	Crankshaft sprocket	1	
3	Pin	1	
4	Oil/water pump assembly drive chain guide	1	
5	Oil/water pump assembly drive chain	1	



Order	Job/Part	Q'ty	Remarks
6	Oil/water pump assembly drive sprocket	1	
7	Washer	1	
8	Plate	1	
9	Lower crankcase	1	
10	Dowel pin	3	
			For installation, reverse the removal procedure.

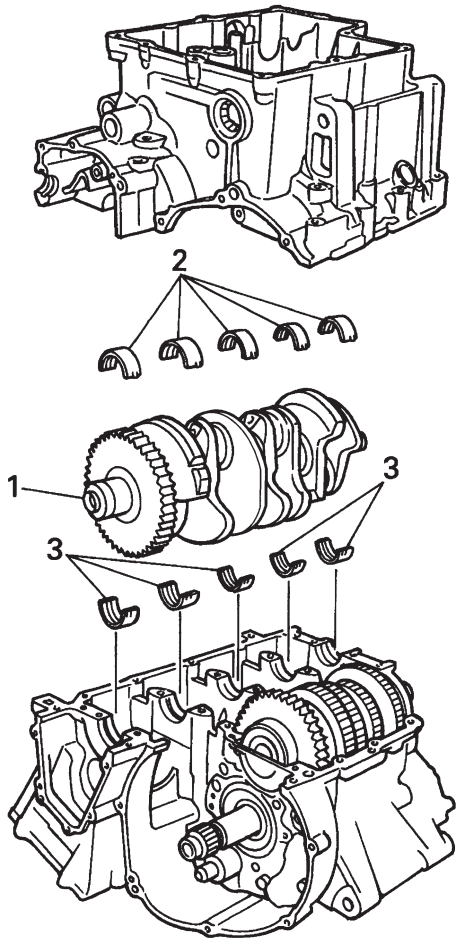
EAS00382

CONNECTING RODS AND PISTONS

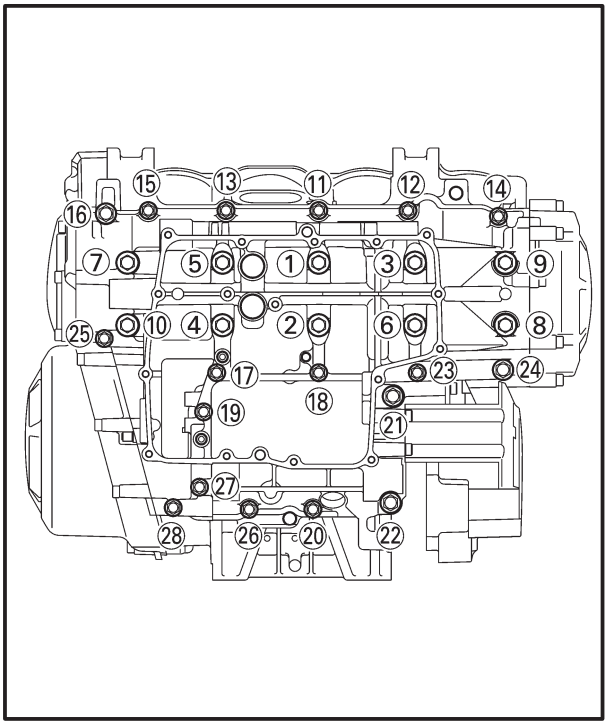


Order	Job/Part	Q'ty	Remarks
	Removing the connecting rods and pistons		Remove the parts in the order listed.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Piston pin clip	8	
4	Piston pin	4	
5	Piston	4	
6	Connecting rod	4	
7	Big end upper bearing	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
			For installation, reverse the removal procedure.

CRANKSHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft assembly		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
	Connecting rod caps		Refer to "CONNECTING RODS AND PISTONS".
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
			For installation, reverse the removal procedure.



EAS00384

DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
   - crankcase bolts

NOTE:

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

3. Remove:
   - lower crankcase

CAUTION:

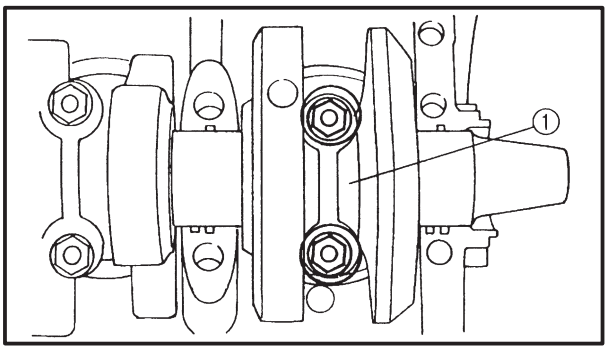
Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.

M9 × 125 mm bolts: ① ~ ⑩
M8 × 125 mm bolts: ㉑ ~ ㉒
M6 × 100 mm bolts: ⑪ ~ ⑳, ㉓ ~ ㉘

4. Remove:
   - dowel pins
   - O-ring
5. Remove:
   - crankshaft journal lower bearing (from the lower crankcase)

NOTE:

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



EAS00393

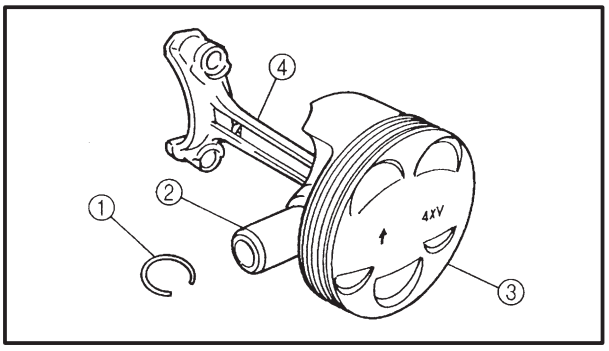
REMOVING THE CONNECTING RODS AND PISTONS

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

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

NOTE:

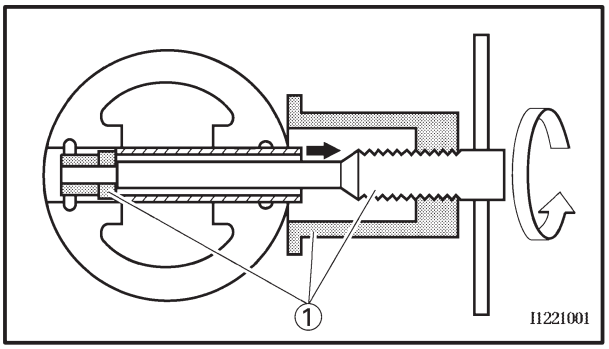
Identify the position of each big end bearing so that it can be reinstalled in its original place.



2. Remove:
   - piston pin clips ①
   - piston pin ②
   - piston ③

CAUTION:

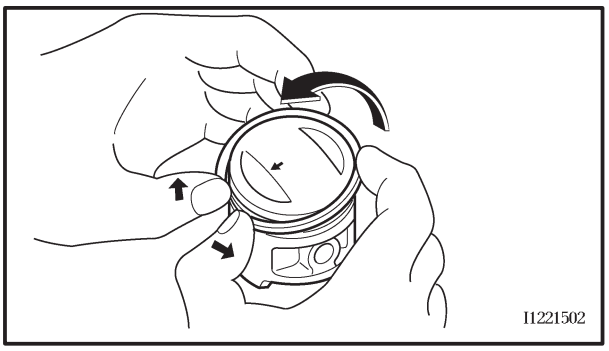
Do not use a hammer to drive the piston pin out.



NOTE:

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip'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 ①.

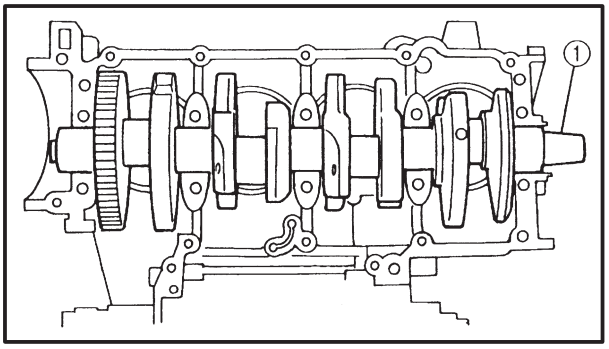
	Piston pin puller **90890-01304**



3. Remove:
   • top ring
   • 2nd ring
   • oil ring

NOTE:

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



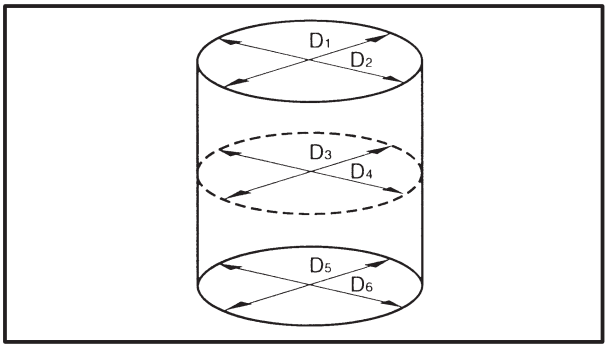
EAS00387

REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
   • crankshaft assembly ①
   • crankshaft journal upper bearings (from the upper crankcase)

NOTE:

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



EAS00256

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.

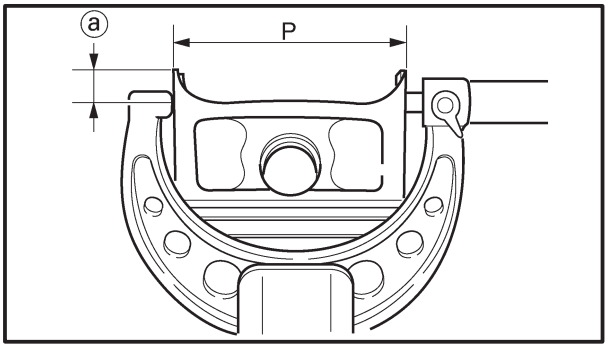
NOTE:

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

Cylinder bore "C"	**74.00 ~ 74.01 mm**
Wear limit	**74.06 mm**
Taper limit "T"	**0.05 mm**
Out of round "R"	**0.05 mm**

"C" = maximum of $D_1 \sim D_6$
"T" = maximum of D_1 or D_2 – maximum of D_5 or D_6
"R" = maximum of D_1 D_3 or D_5 – minimum of D_2 D_4 or D_6

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



c. Measure piston skirt diameter "P" with the micrometer.

ⓐ 0.5 mm from the bottom edge of the piston.

Piston size "P"
73.955 ~ 73.970 mm

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
0.030 ~ 0.055 mm
<Limit>: 0.12 mm

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

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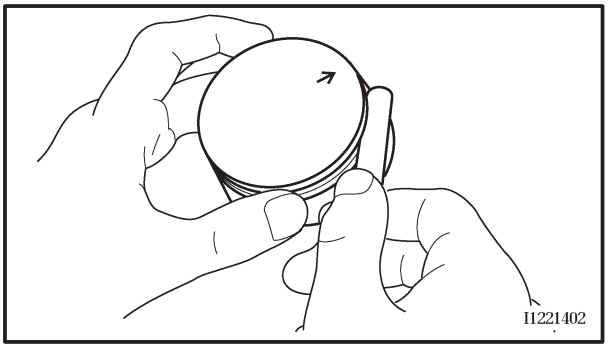


EAS00263

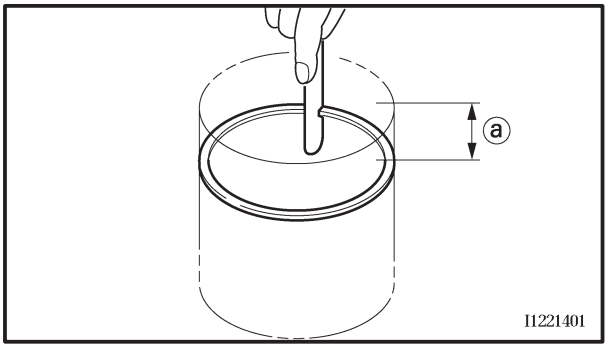
CHECKING THE PISTON RINGS

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

NOTE:

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

Piston ring side clearance
Top ring
0.030 ~ 0.065 mm
2nd ring
0.020 ~ 0.055 mm



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

NOTE:

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

ⓐ 5 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.

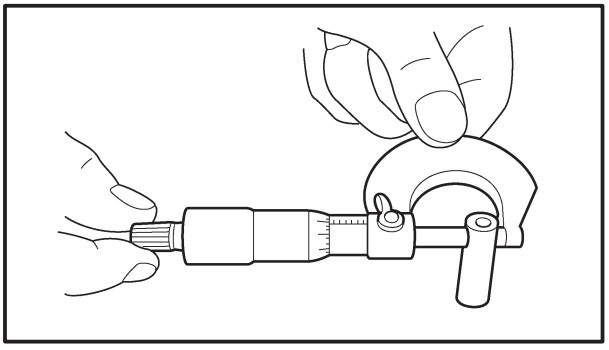
Piston ring end gap
Top ring
0.32 ~ 0.44 mm
2nd ring
0.43 ~ 0.58 mm
Oil ring
0.10 ~ 0.35 mm

EAS00266

CHECKING THE PISTON PINS

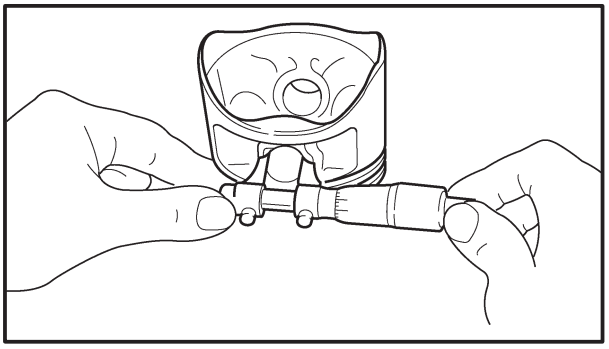
The following procedure applies to all of the piston pins.

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



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

Piston pin outside diameter
16.991 ~ 17.000 mm

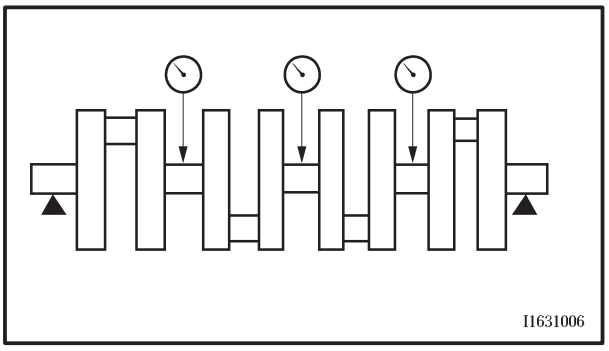


3. Measure:
   • piston pin bore inside diameter
   Out of specification → Replace the piston.

Piston pin bore inside diameter
17.002 ~ 17.013 mm

4. Calculate:
   • piston-pin-to-piston clearance
   Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston clearance =
Piston pin bore size –
Piston pin outside diameter
Piston-pin-to-piston clearance
0.002 ~ 0.022 mm
<Limit>: 0.072 mm



EAS00395

CHECKING THE CRANKSHAFT AND CONNECTING RODS

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

Crankshaft runout
Less than 0.03 mm

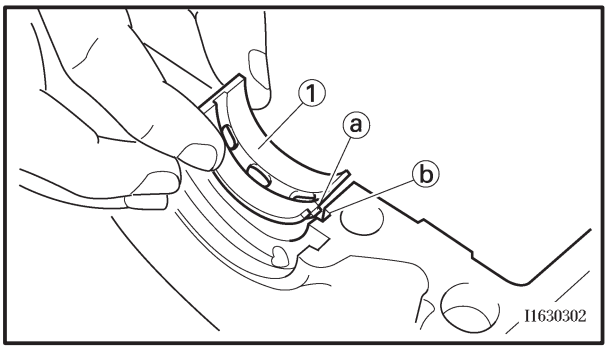
2. Check:
   • crankshaft journal surfaces
   • crankshaft pin surfaces
   • bearing surfaces
   Scratches/wear → Replace the crankshaft.
3. Measure:
   • crankshaft-journal-to-crankshaft-journal-bearing clearance
   Out of specification → Replace the crankshaft journal bearings.

Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.029 ~ 0.053 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 positions.

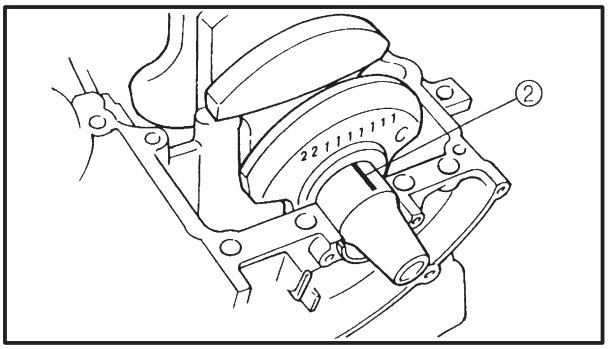
a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
b. Place the upper crankcase upside down on a bench.



c. Install the crankshaft journal upper bearings ① and the crankshaft into the upper crankcase.

NOTE:

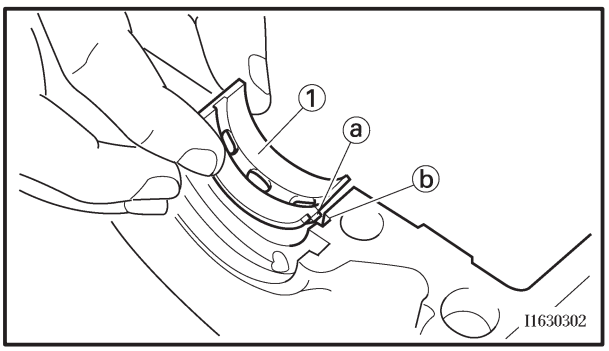
Align the projections ⓐ of the crankshaft journal upper bearings with the notches ⓑ in the crankcase.



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

NOTE:

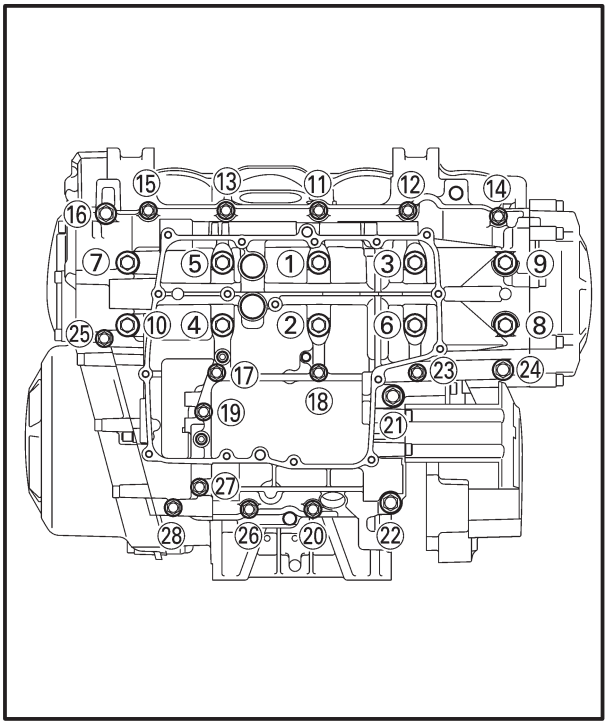
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



e. Install the crankshaft journal lower bearings ① into the lower crankcase and assemble the crankcase halves.

NOTE:

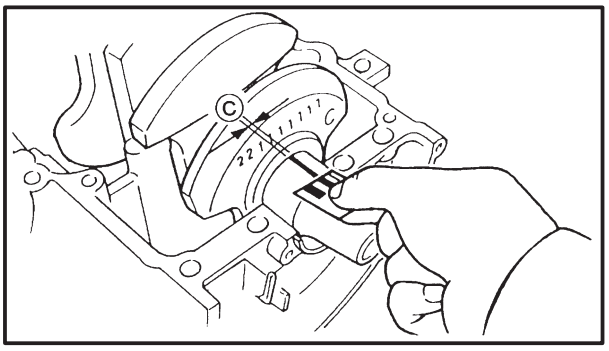
- Align the projections ⓐ of the crankshaft journal lower bearings with the notches ⓑ in the crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



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

Crankcase bolt
Bolt ① ~ ⑩
1st: 15 Nm (1.5 m•kg)
2nd: 15 Nm (1.5 m•kg) + 45 ~ 50°
Bolt ⑪ ~ ⑮, ⑰ ~ ⑳, ㉓, ㉕ ~ ㉘
12 Nm (1.2 m•kg)
Bolt ⑯, ㉔
14 Nm (1.4 m•kg)
Bolt ㉑ ~ ㉒
24 Nm (24 m•kg)

NOTE:
Lubricate the crankcase bolt threads 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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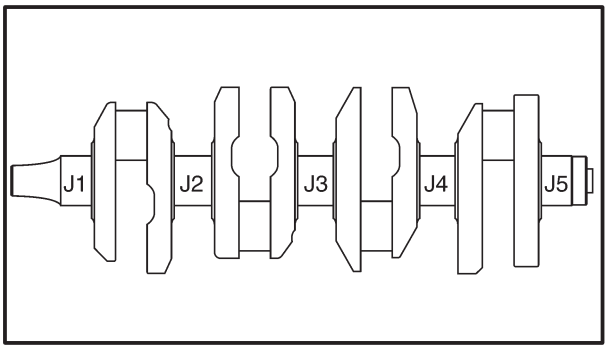
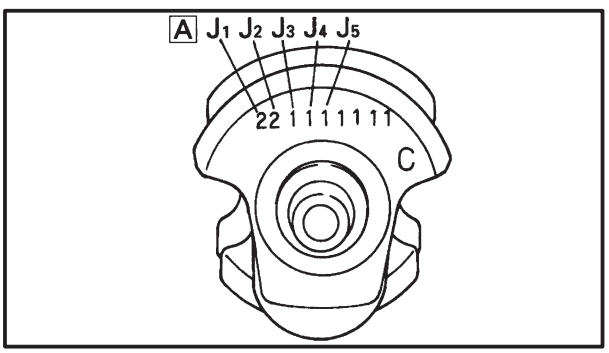


4. Select:
• crankshaft journal bearings (J1 ~ J5)

NOTE:
- The numbers Ⓐ 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 ~ J5" refer to the bearings shown in the crankshaft illustration.
- If "J1 ~ J5" are the same, use the same size for all of the bearings.



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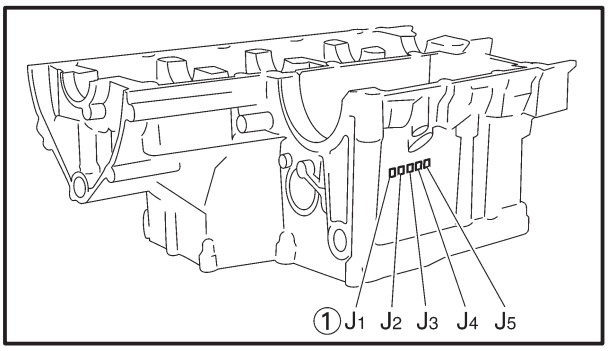
For example, if the crankcase "J_1" and crankshaft web "J_1" numbers are "6" and "2" respectively, then the bearing size for "J_1" is:

Bearing size for J1:
J1 (crankcase) – J_1 (crankshaft web) –2 = 6 – 2 – 2 = 2 (Pink/black)



CRANKSHAFT JOURNAL BEARING COLOR CODE	
–1	Pink/violet
0	Pink/white
1	Pink/blue
2	Pink/black
3	Pink/brown

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

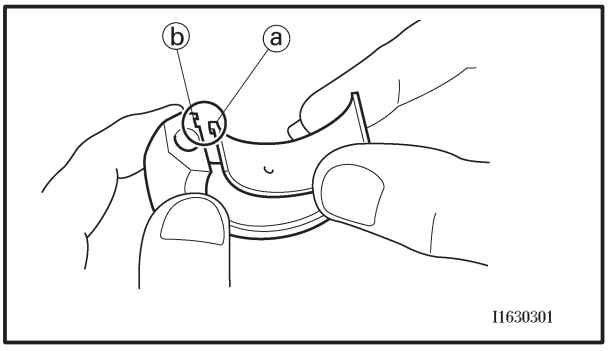
Crankshaft-pin-to-big-end-bearing clearance
0.031 ~ 0.055 mm

The following procedure applies to all of the connecting rods.

CAUTION:

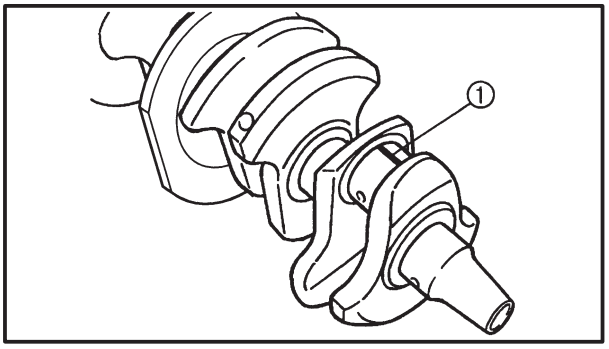
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

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.



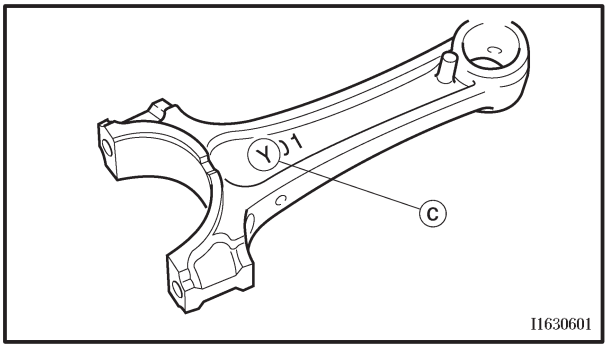
NOTE:

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.
d. Assemble the connecting rod halves.

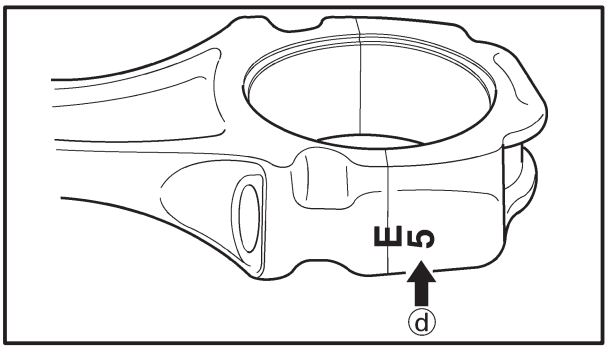
NOTE:
- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nut seats.



- Make sure that the "Y" mark ⓒ 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.

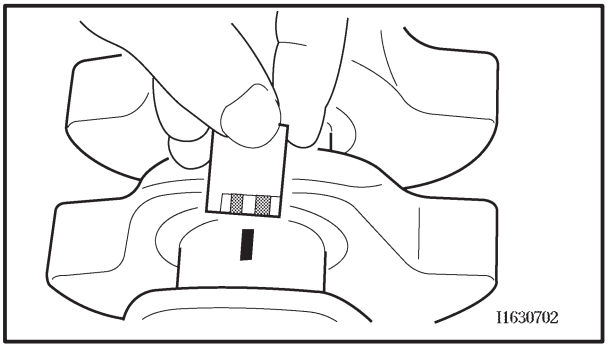
CAUTION:
- **When tightening the connecting rod nuts, be sure to use an F-type torque wrench.**
- **Without pausing, tighten the connecting rod nuts to the specified torque. Apply continuous torque between 2.0 and 3.6 m•kg. Once you reach 2.0 m•kg, DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 2.0 and 3.6 m•kg, loosen the connecting rod nut to less than 2.0 m•kg and start again.**

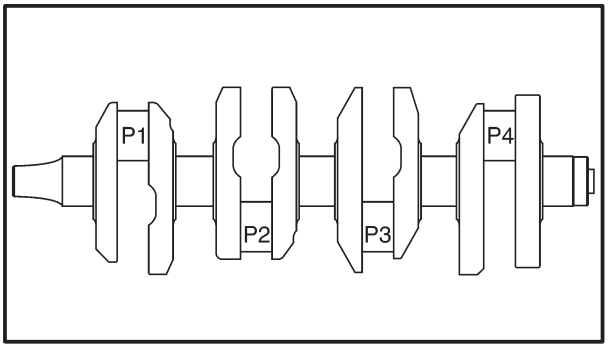


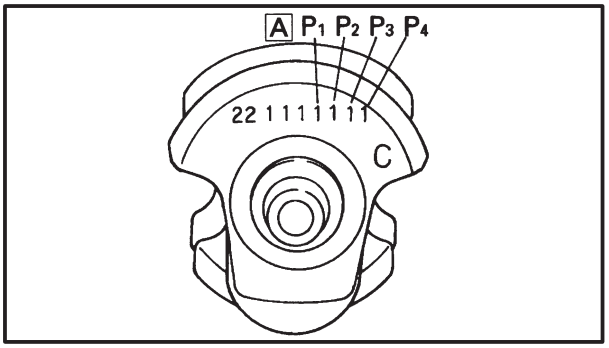
Refer to "INSTALLING THE CONNECTING RODS".

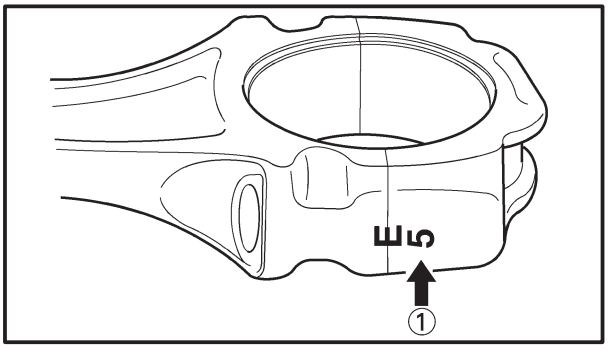
	Connecting rod nut **36 Nm (3.6 m•kg)**

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 ($P_1 \sim P_4$)

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" ~ "P5" refer to the bearings shown in the crankshaft illustration.

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

Bearing size for "P_1":
"P_1" (connecting rod) – "P_1" (crankshaft) –2 =
4 – 1 – 2 = 1 (Blue)

BIG END BEARING COLOR CODE	
–1	Violet
0	White
1	Blue
2	Black

EAS00399

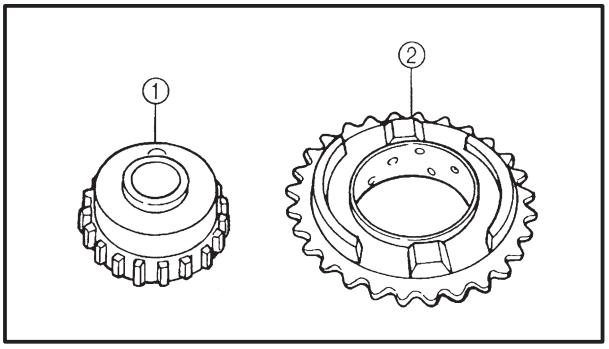
CHECKING THE CRANKCASE

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

EAS00401

CHECKING THE BEARINGS AND OIL SEALS

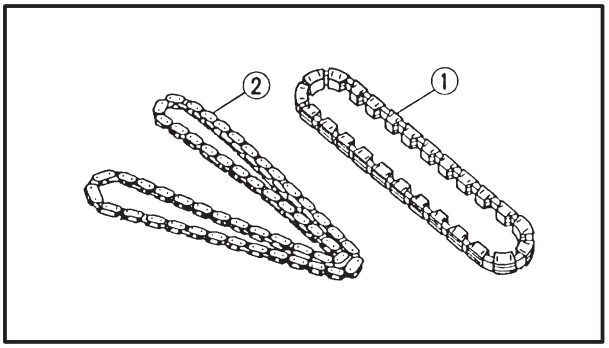
1. Check:
   • bearings
   Clean and lubricate the bearings, then rotate the inner race with your finger.
   Rough movement → Replace.
2. Check:
   • oil seals
   Damage/wear → Replace.



CHECKING THE SPROCKETS AND CHAINS

1. Check:
   - crankshaft sprocket ①
   - oil/water pump assembly drive sprocket ②

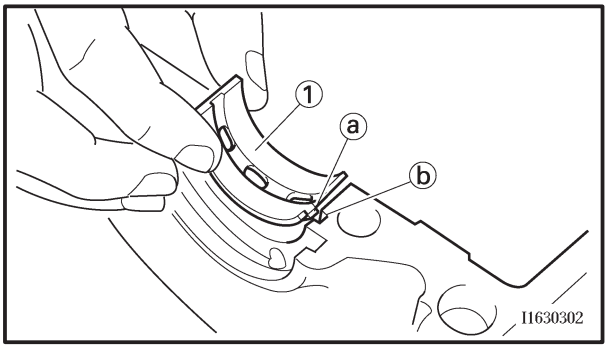
   Cracks/damage/wear → Replace the defective part(-s).



2. Check:
   - timing chain ①

   Damage/stiffness → Replace the timing chain and crankshaft sprocket as a set.
   - oil/water pump assembly drive chain ②

   Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.



EAS00407

INSTALLING THE CRANKSHAFT

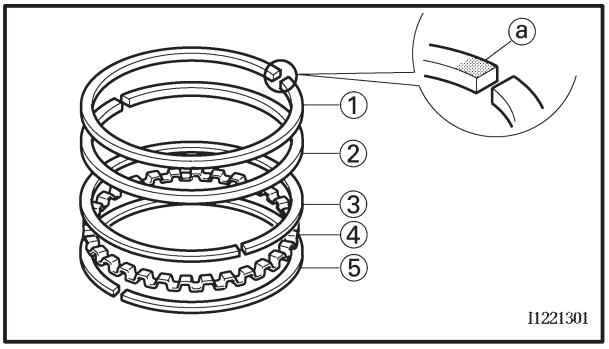
1. Install:
   - crankshaft journal upper bearings ①

     (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:
   - crankshaft



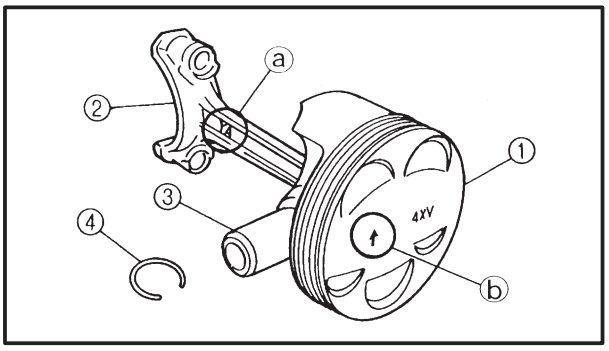
EAS00268
INSTALLING THE CONNECTING ROD AND PISTON

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

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

NOTE:

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



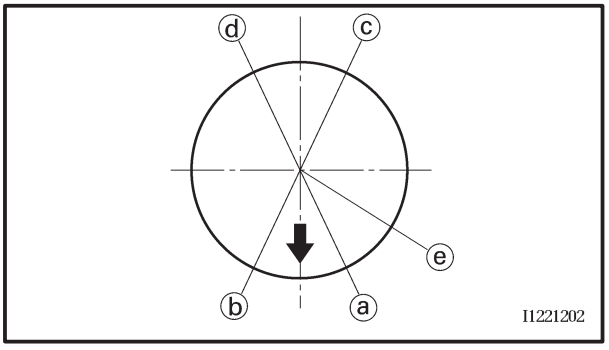
2. Install:
   - piston ①
     (onto the respective connecting rod ②)
   - piston pin ③
   - piston pin clip New ④

NOTE:

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

3. Lubricate:
   - piston
   - piston rings
   - cylinder
     (with the recommended lubricant)

Recommended lubricant
Engine oil



4. Offset:
   - piston ring end gaps

ⓐ Top ring
ⓑ Lower oil ring rail
ⓒ Upper oil ring rail
ⓓ 2nd ring
ⓔ Oil ring expander

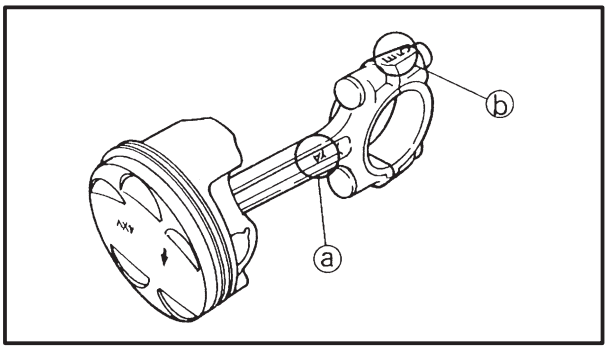
5. Lubricate:
   • crankshaft pins
   • big end bearings
   • connecting rod big end inner surface
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

6. Install:
   • big end bearings
   • connecting rod assembly
   (into the cylinder and onto the crankshaft pin).
   • connecting rod cap
   (onto the connecting rod)

NOTE:

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.
- Make sure that the "Y" marks ⓐ 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.



7. Align:
   • bolt heads
   (with the connecting rod caps)
8. Tighten:
   • connecting rod nuts

36 Nm (3.6 m•kg)

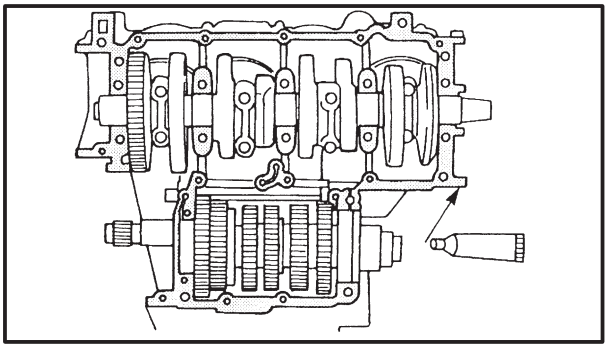
CAUTION:

- **When tightening the connecting rod nuts, be sure to use an F-type torque wrench.**
- **Without pausing, tighten the connecting rod nuts to the specified torque. Apply continuous torque between 2.0 and 3.6 m•kg. Once you reach 2.0 m•kg DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 2.0 and 3.6 m•kg, loosen the connecting rod nut to less than 2.0 m•kg and start again.**

EAS00414
ASSEMBLING THE CRANKCASE

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

	Recommended lubricant **Engine oil**



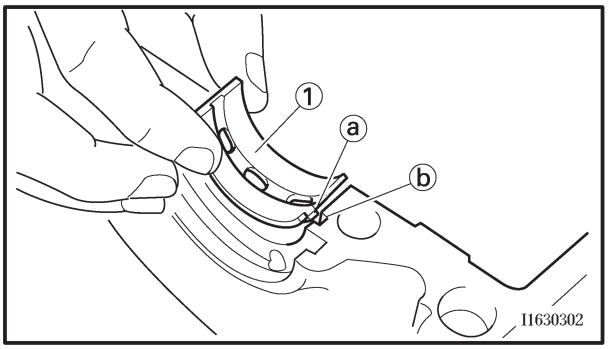
2. Apply:
   • sealant
   (onto the crankcase mating surfaces)

	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

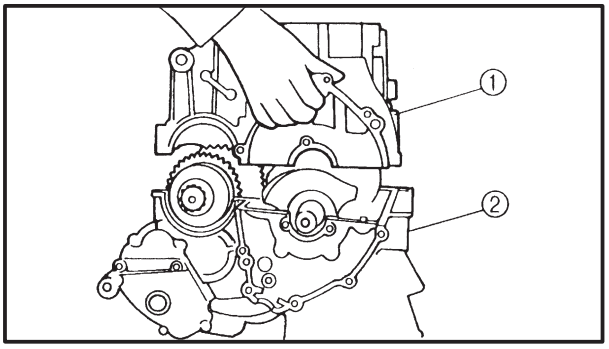


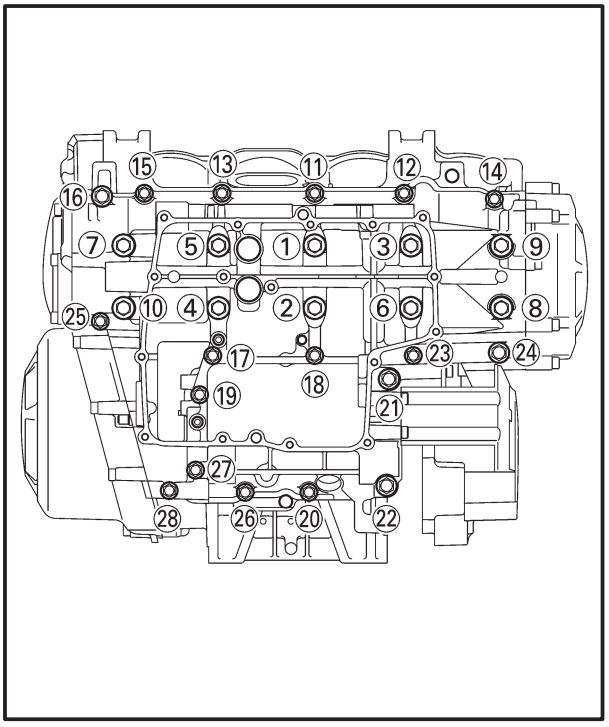
4. Install:
   • crankshaft journal lower bearings ①
   (into the lower crankcase)

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:
   • crankcase bolts

NOTE:

• Lubricate the bolt threads with engine oil.
• Tighten the bolts in increasing numerical order.
• Install washers on bolts ① ~ ⑩.

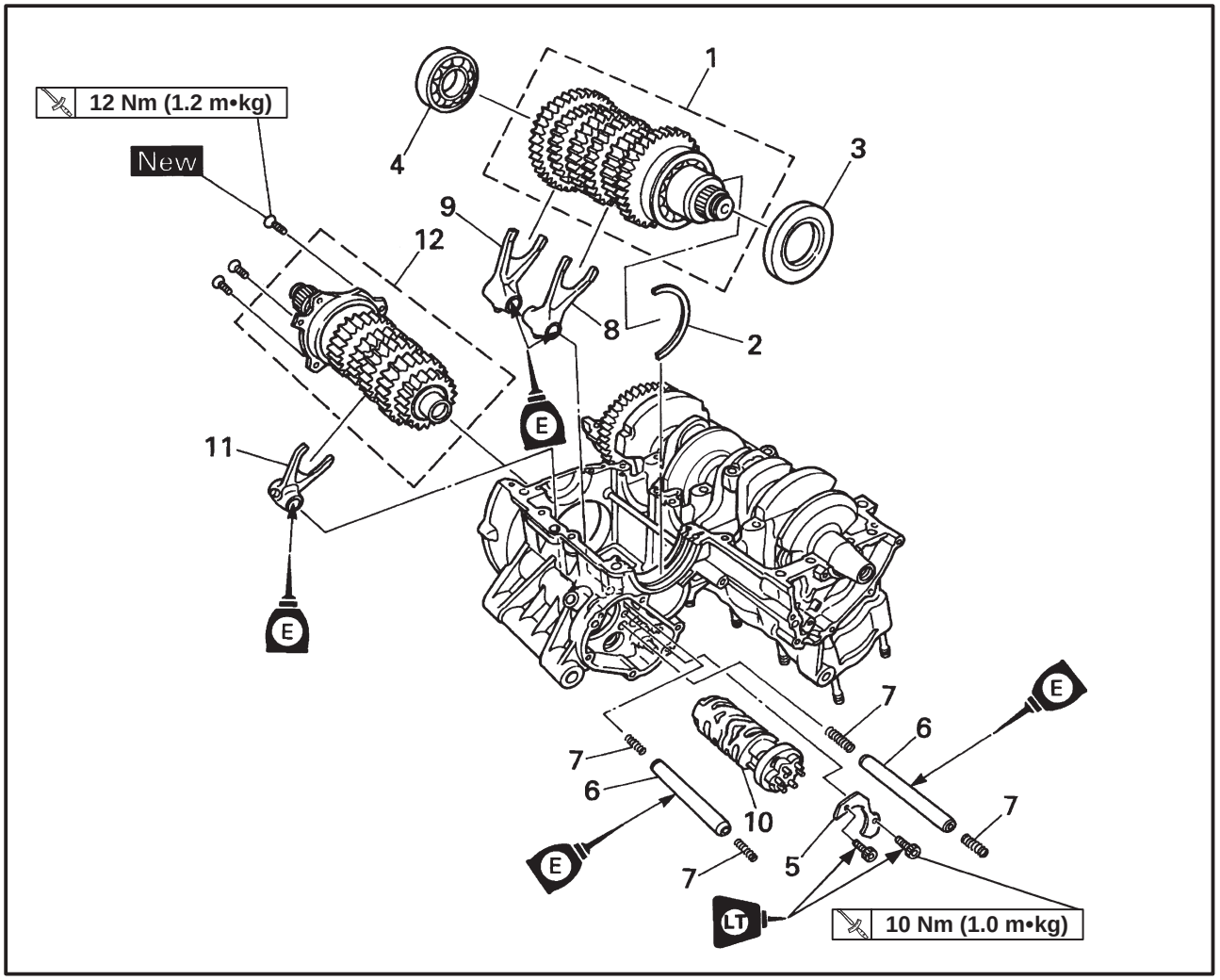
M9 × 125 mm bolts: ① ~ ⑩
M8 × 125 mm bolts: ㉑ ~ ㉒
M6 × 100 mm bolts: ⑪ ~ ⑳, ㉓ ~ ㉘

Crankcase bolt
Bolt ① ~ ⑩
1st: 15 Nm (1.5 m•kg)
2nd: 15 Nm (1.5 m•kg) + 45 ~ 50°
Bolt ⑪ ~ ⑮, ⑰ ~ ⑳, ㉓, ㉕ ~ ㉘
12 Nm (1.2 m•kg)
Bolt ⑯, ㉔
14 Nm (1.4 m•kg)
Bolt ㉑ ~ ㉒
24 Nm (24 m•kg)

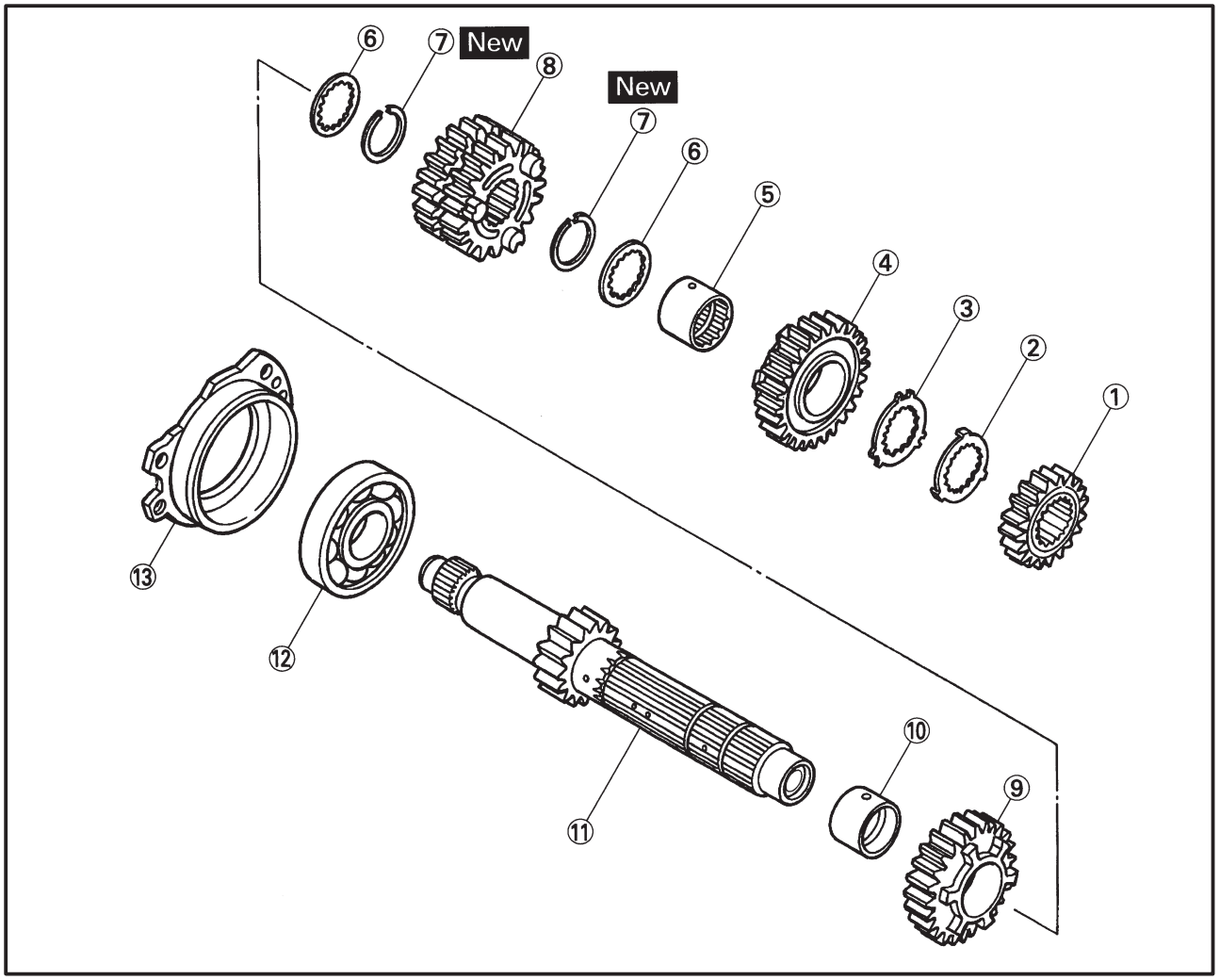
EAS00419

TRANSMISSION

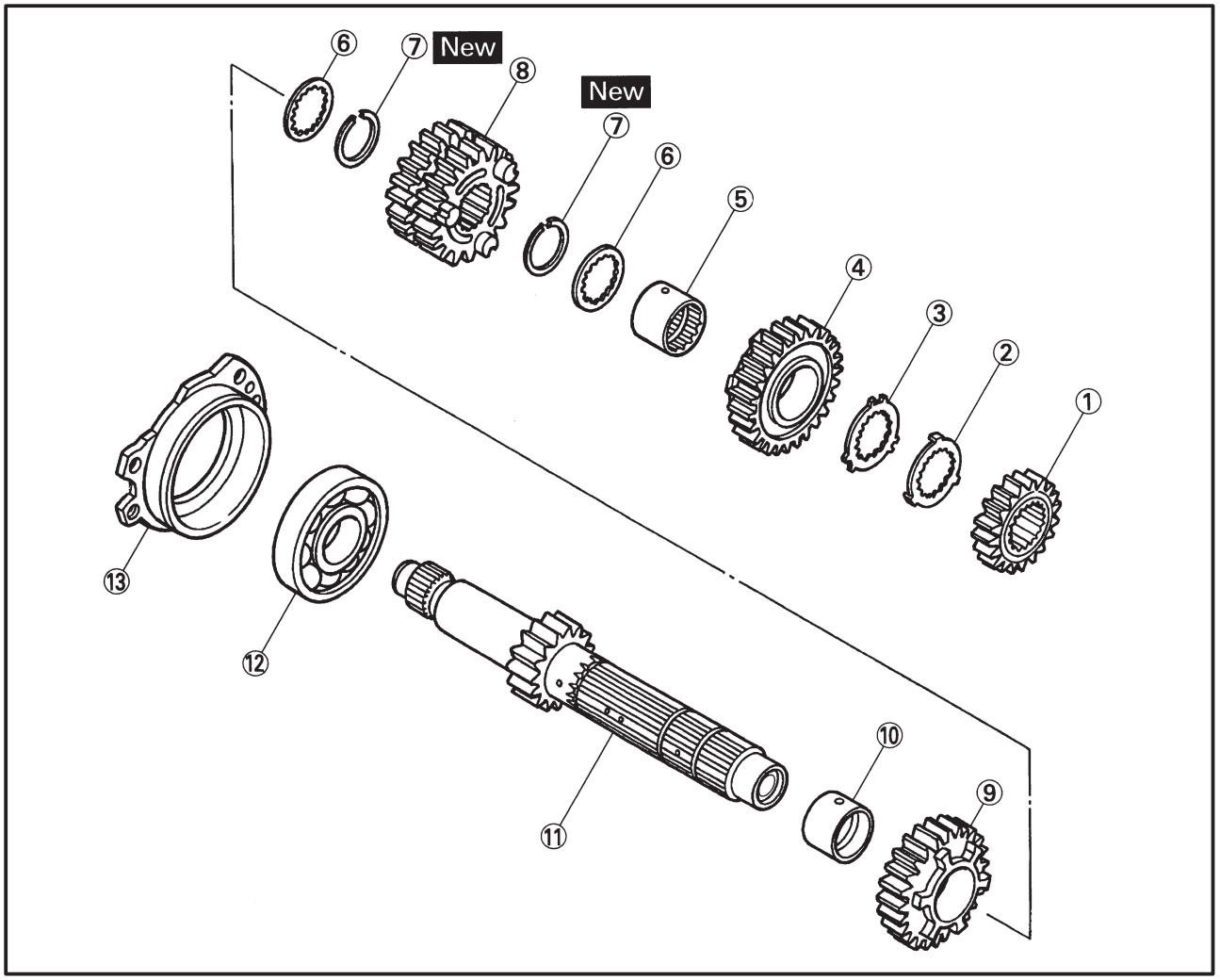
TRANSMISSION, SHIFT DRUM ASSEMBLY AND SHIFT FORKS



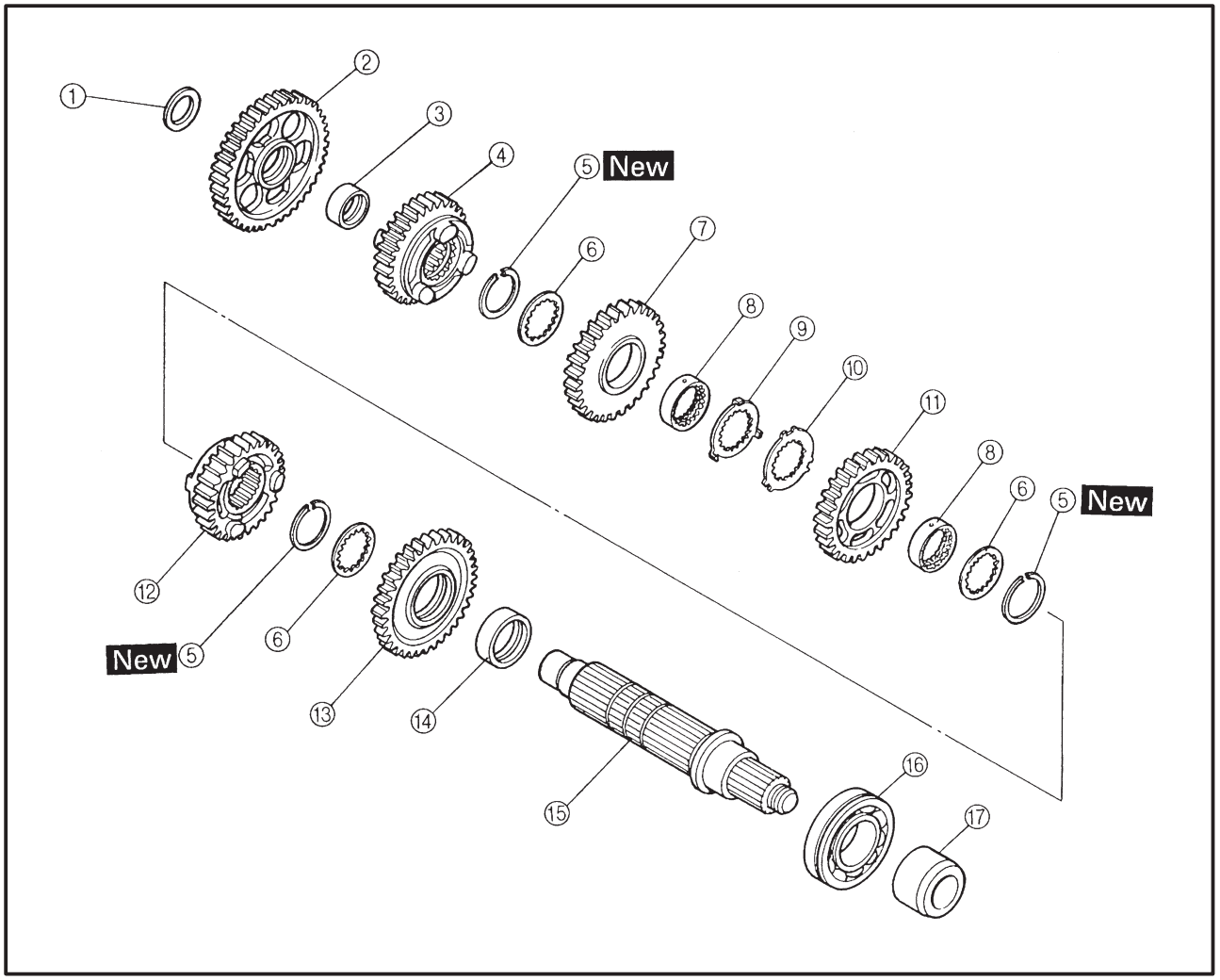
Order	Job/Part	Q'ty	Remarks
	Removing the transmission, shift drum assembly, and shift forks		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
	Stopper lever		Refer to "SHIFT SHAFT".
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Bearing	1	
5	Shift drum retainer	1	
6	Shift fork guide bar	2	
7	Spring	4	
8	Shift fork "L"	1	
9	Shift fork "R"	1	
			For installation, reverse the removal procedure.



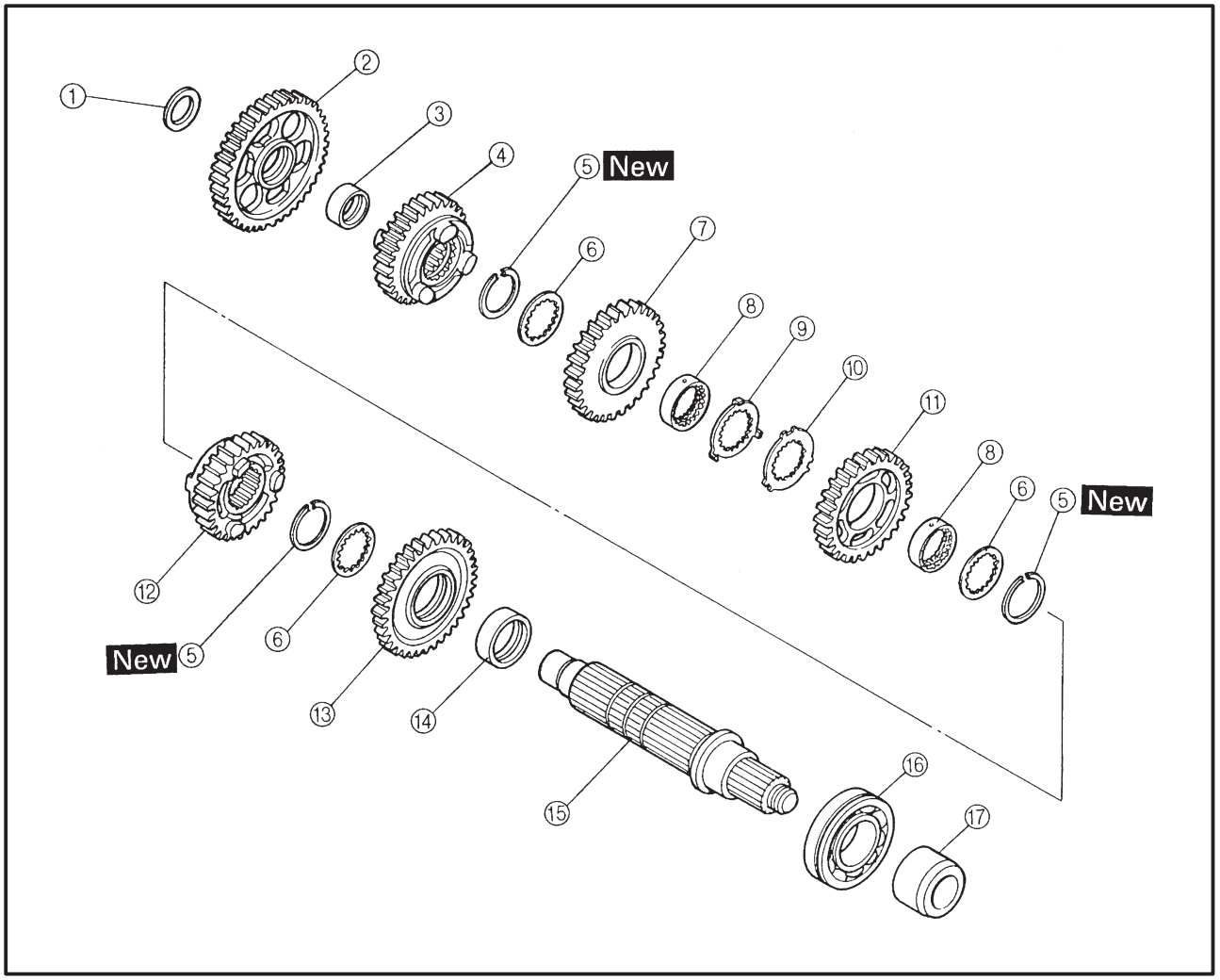
Order	Job/Part	Q'ty	Remarks
	Disassembling the main axle assembly		Disassembly the parts in the order listed.
①	2nd pinion gear	1	
②	Toothed lock washer	1	
③	Toothed lock washer retainer	1	
④	6th pinion gear	1	
⑤	Toothed spacer	1	
⑥	Toothed washer	2	
⑦	Circlip	2	
⑧	3rd/4th pinion gears	1	
⑨	5th pinion gear	1	
⑩	Collar	1	



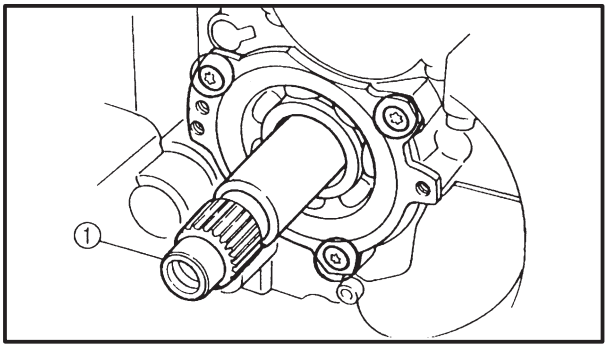
Order	Job/Part	Q'ty	Remarks
⑪	Main axle/1st pinion gear	1	
⑫	Bearing	1	
⑬	Main axle bearing housing	1	
			For assembly, reverse the disassembly procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the drive axle assembly		Disassembly the parts in the order listed.
①	Washer	1	
②	1st wheel gear	1	
③	Spacer	1	
④	5th wheel gear	1	
⑤	Circlip	3	
⑥	Washer	3	
⑦	3rd wheel gear	1	
⑧	Toothed spacer	2	
⑨	Toothed lock washer	1	
⑩	Toothed lock washer retainer	1	



Order	Job/Part	Q'ty	Remarks
⑪	4th wheel gear	1	
⑫	6th wheel gear	1	
⑬	2nd wheel gear	1	
⑭	Spacer	1	
⑮	Drive axle	1	
⑯	Bearing	1	
⑰	Spacer	1	
			For assembly, reverse the disassembly procedure.



EAS00420
REMOVING THE TRANSMISSION

1. Remove:
   • main axle assembly ①
   (with the Torx® wrench T30)

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a. Insert two bolts ② of the proper size, as shown in the illustration, into the main axle assembly bearing housing.
b. Tighten the bolts until they contact the crankcase surface.
c. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.

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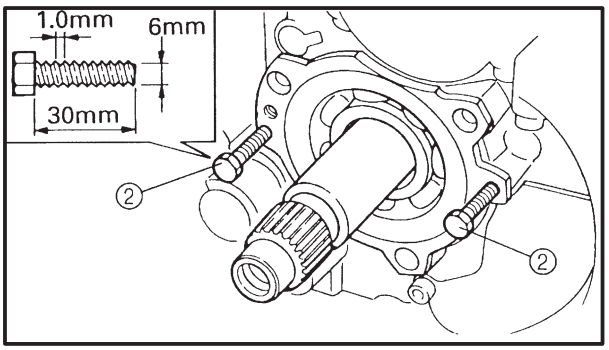
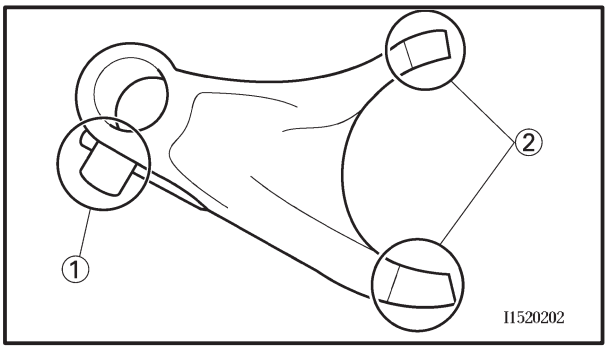
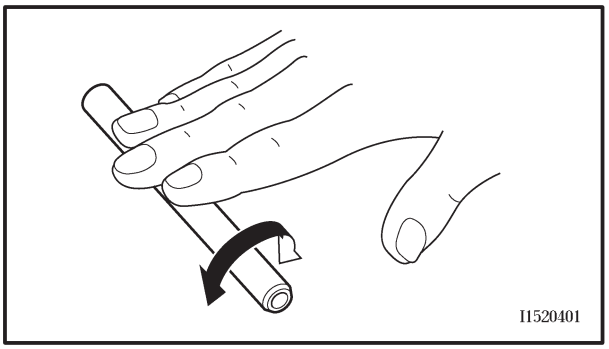




EAS00421
CHECKING THE SHIFT FORKS

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

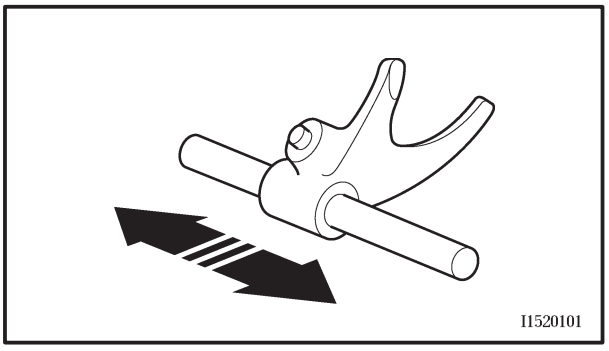
1. Check:
   • shift fork cam follower ①
   • shift fork pawl ②
   Bends/damage/scoring/wear → Replace the shift fork.



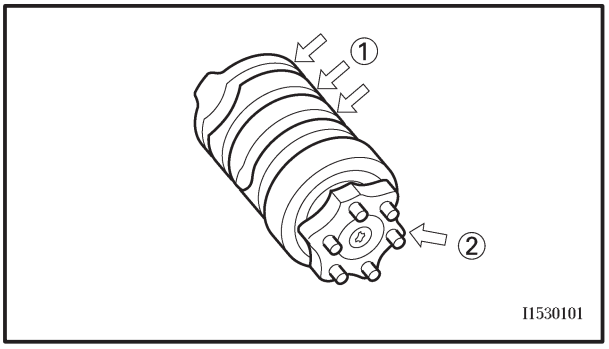
2. Check:
   • shift fork guide bar
   Roll the shift fork guide bar on a flat surface.
   Bends → Replace.

⚠ WARNING

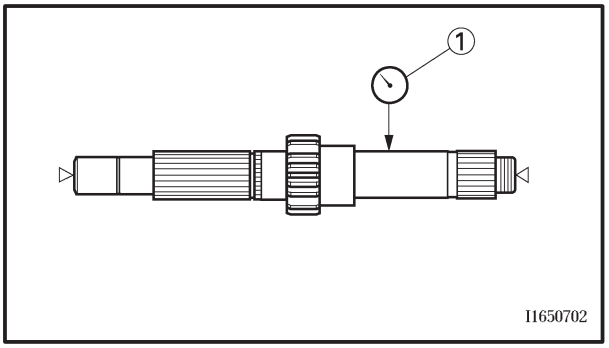
Do not attempt to straighten a bent shift fork guide bar.



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

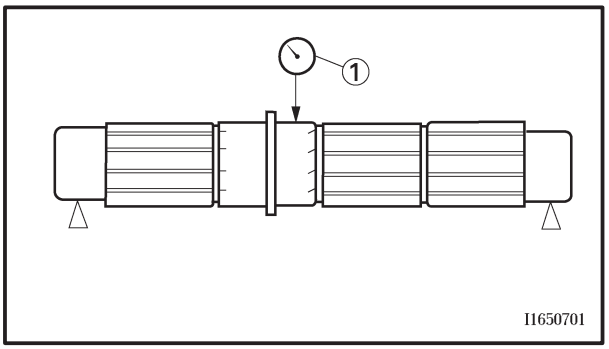


EAS00422
CHECKING THE SHIFT DRUM ASSEMBLY
1. Check:
   - shift drum grooves
     Damage/scratches/wear → Replace the shift drum.
   - shift drum segment ①
     Damage/wear → Replace.
   - shift drum bearing ②
     Damage/pitting → Replace.



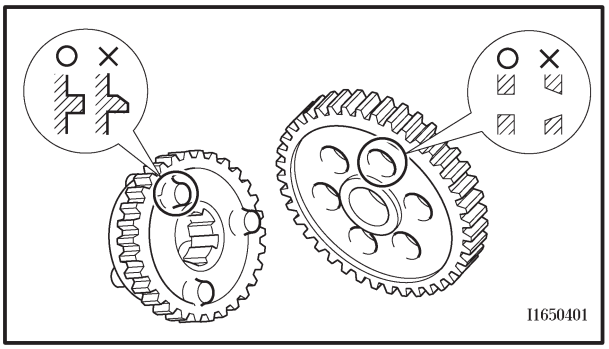
EAS00425
CHECKING THE TRANSMISSION
1. Measure:
   - main axle runout
     (with a centering device and dial gauge ①)
     Out of specification → Replace the main axle.

Main axle runout limit
0.08 mm



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

Drive axle runout limit
0.08 mm



3. Check:
   - transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear(-s).
   - transmission gear dogs
     Cracks/damage/rounded edges → Replace the defective gear(-s).
4. Check:
   - transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - transmission gear movement
     Rough movement → Replace the defective part(-s).
6. Check:
   - circlips
     Damage/bends/looseness → Replace.

EAS00428

INSTALLING THE TRANSMISSION

- main axle assembly
- shift fork “C”
- shift drum assembly
- shift fork “R”
- shift fork “L”
- springs
- shift fork guide bars
- drive axle assembly

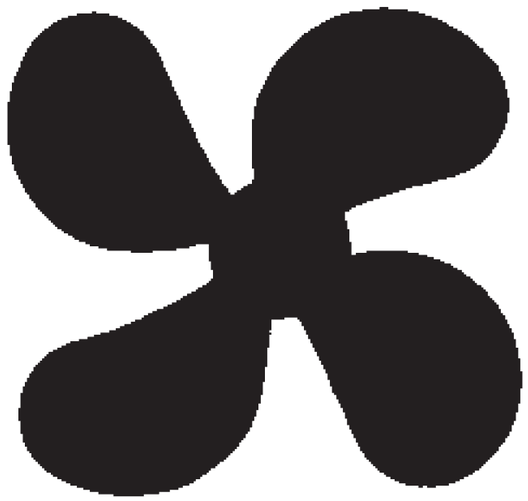
NOTE:

- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork “C” into the groove in the 3rd and 4th pinion gear on the main axle.
- Install shift fork “L” into the groove in the 6th wheel gear and shift fork “R” into the groove in the 5th wheel gear on the drive axle.
- Make sure that the drive axle bearing circlip is inserted into the grooves in the upper crankcase.

2. Check:
   - transmission
     Rough movement → Repair.

NOTE:

Oil each gear, shaft, and bearing thoroughly.



COOL 6

CHAPTER 6
COOLING SYSTEM

RADIATOR 6-1
CHECKING THE RADIATOR 6-2
INSTALLING THE RADIATOR 6-3

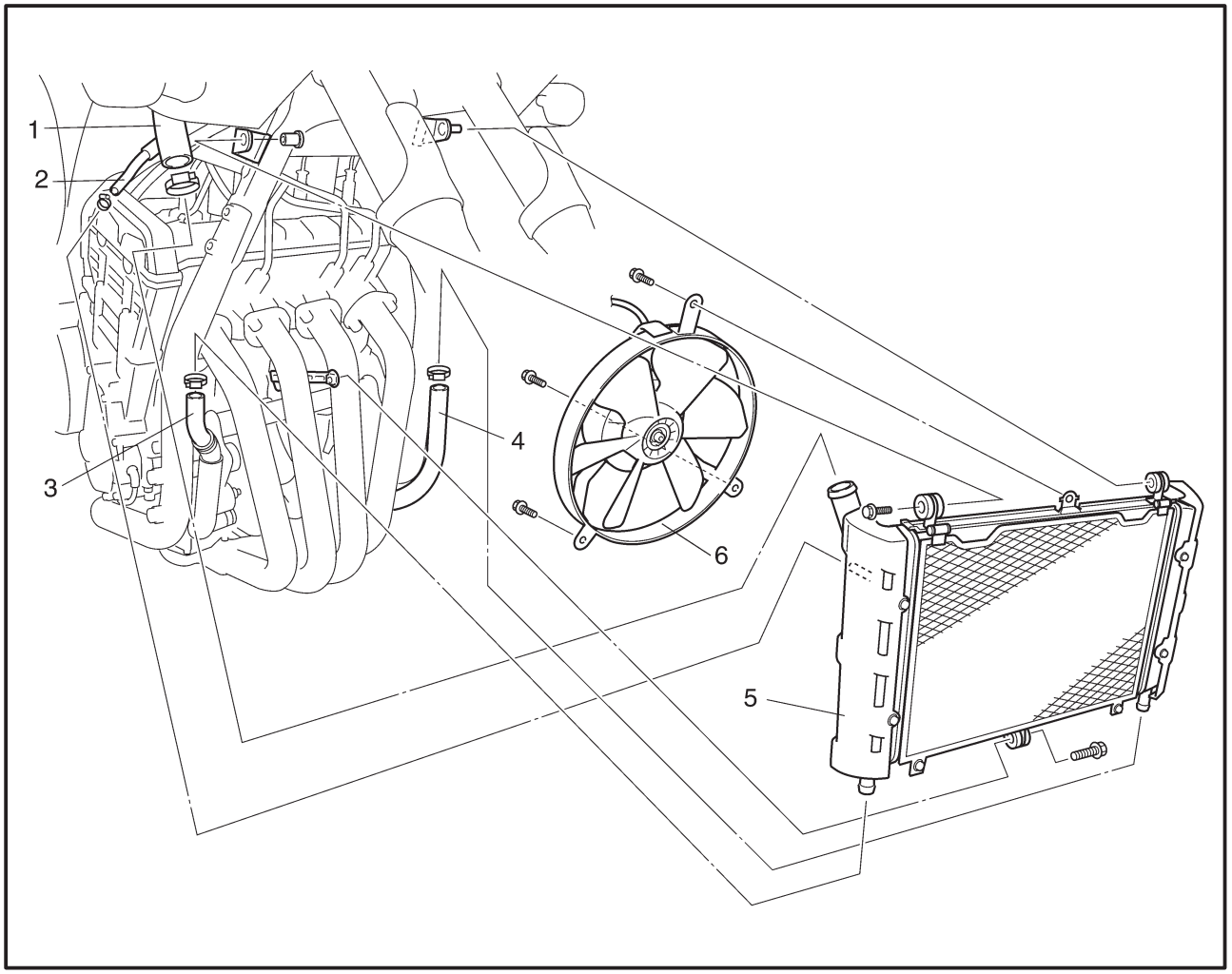
THERMOSTAT 6-4
CHECKING THE THERMOSTAT 6-6
ASSEMBLING THE THERMOSTAT 6-6
INSTALLING THE THERMOSTAT 6-7

WATER PUMP 6-8
DISASSEMBLING THE WATER PUMP 6-10
CHECKING THE WATER PUMP 6-10
ASSEMBLING THE WATER PUMP 6-11

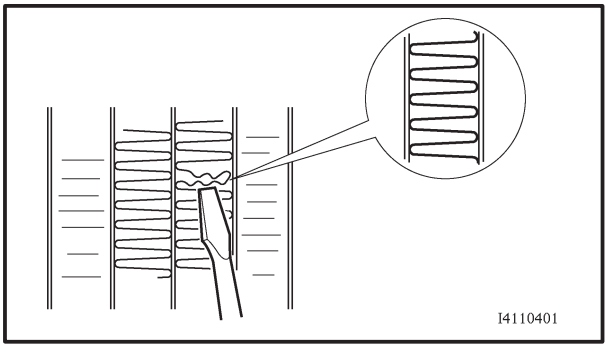
EAS00454

COOLING SYSTEM

RADIATOR



Order	Job/Part	Q'ty	Remarks
	Removing the radiator		Remove the parts in the order listed.
	Coolant		Drain.
1	Water inlet hose	1	
2	Carburetor hose	1	
3	Oil cooler hose	1	
4	Water outlet hose	1	
5	Radiator	1	
6	Fan motor	1	
			For installation, reverse the removal procedure.



EAS00455
CHECKING THE RADIATOR

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

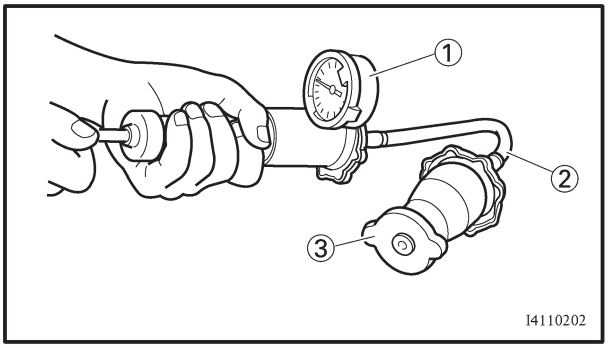
NOTE:
Straighten any flattened fins with a thin, flat-head screwdriver.

2. Check:
   - radiator hoses
   - radiator pipes
     Cracks/damage → Replace.

3. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

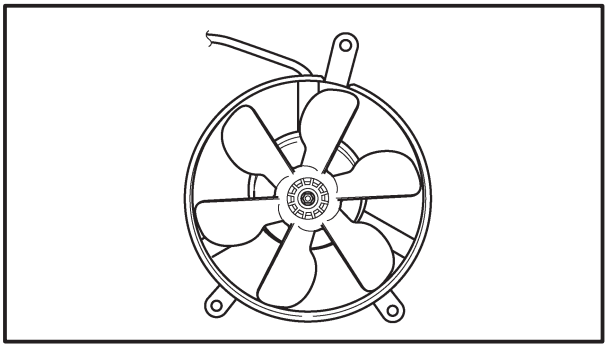
Radiator cap opening pressure
95 ~ 125 kPa
(0.95 ~ 1.25 kg/cm²)

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.

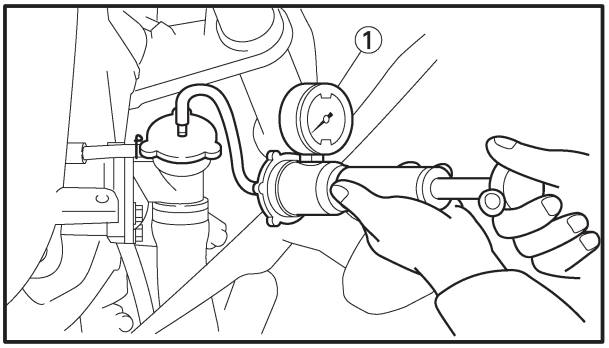


4. Check:
   - radiator fan
     Damage → Replace.
     Malfunction → Check and repair.
     Refer to “COOLING SYSTEM” in chapter 8.

EAS00456

INSTALLING THE RADIATOR

1. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” in chapter 3.



2. Check:
   - cooling system
     Leaks → Repair or replace any faulty part.

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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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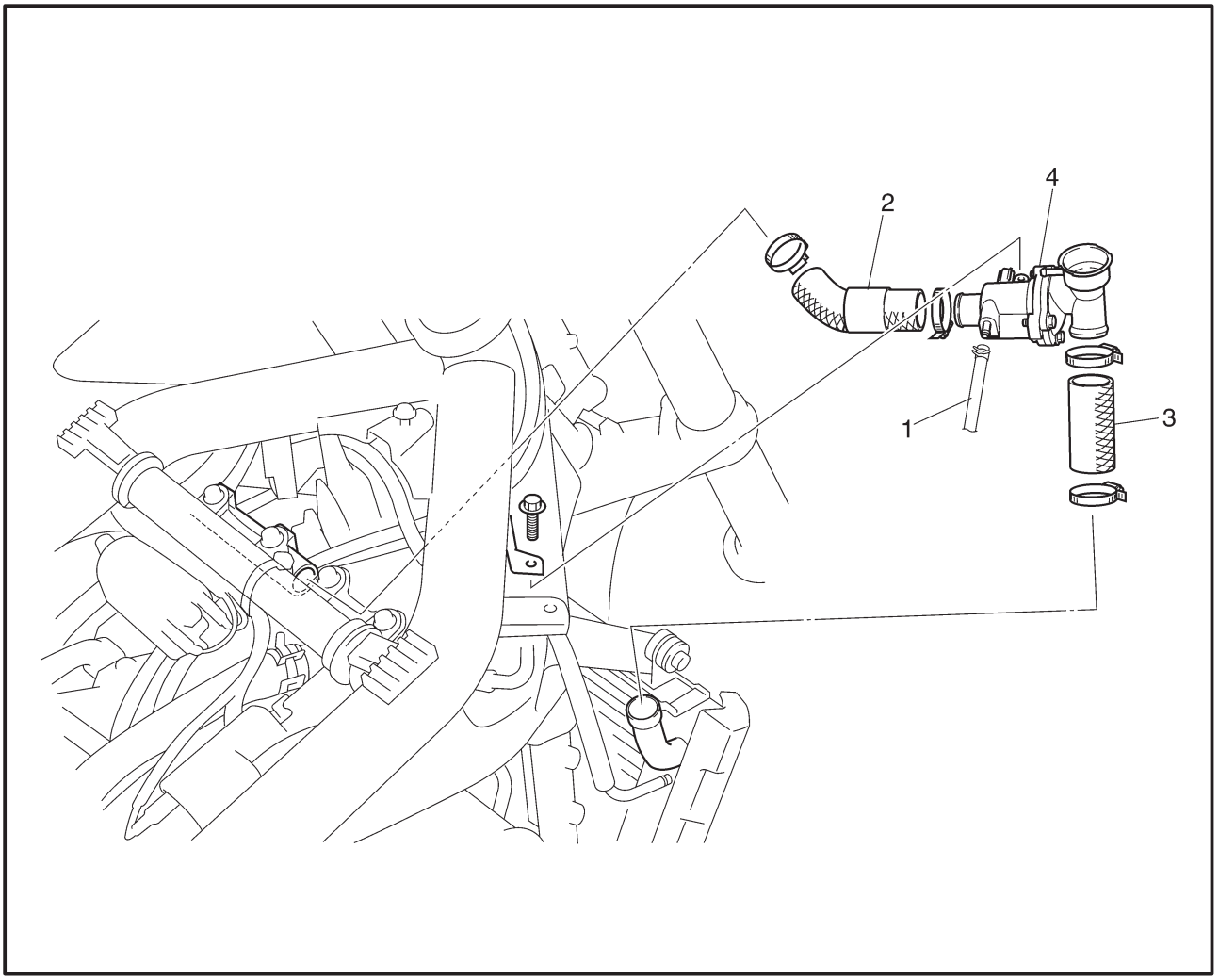
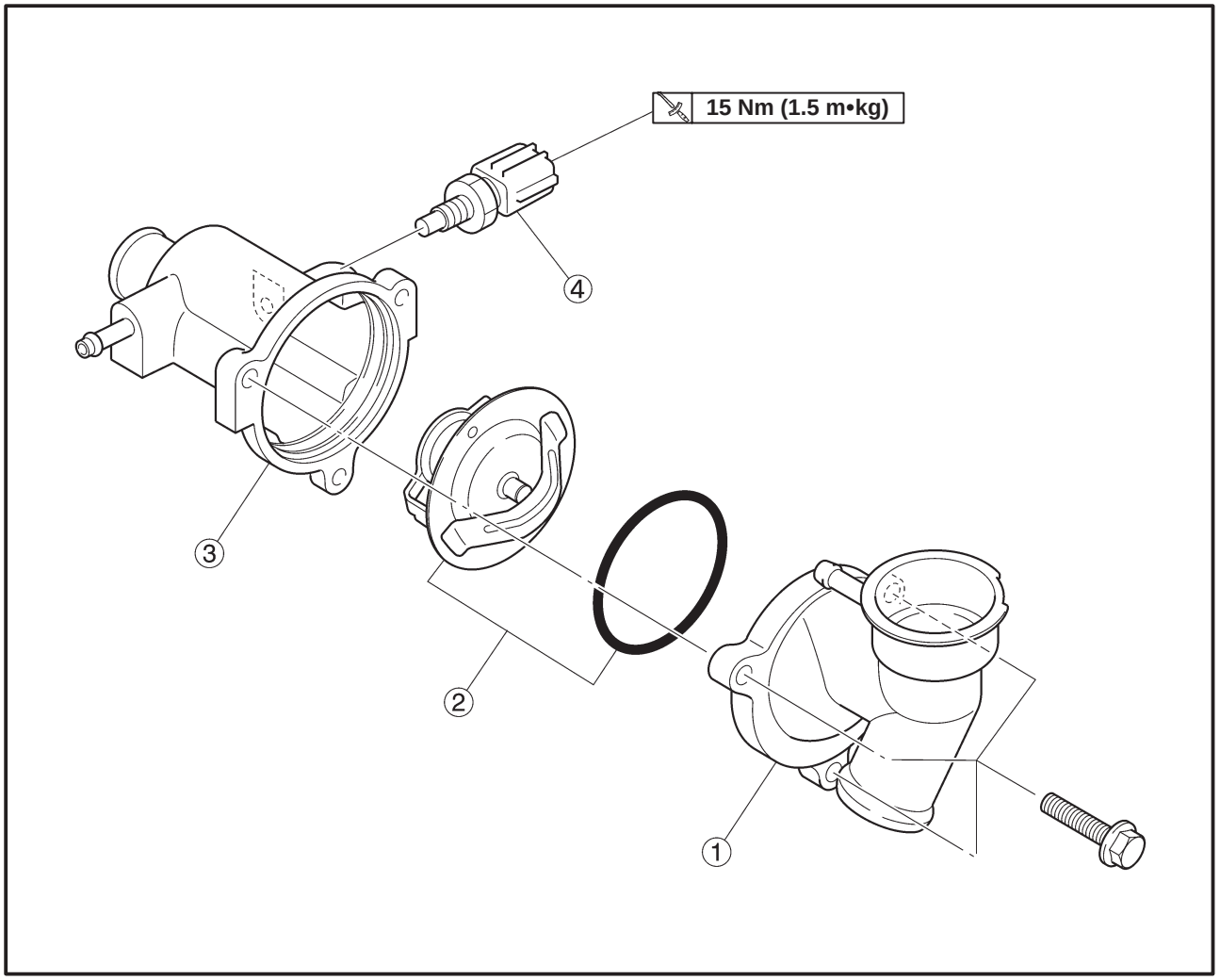
EAS00460
THERMOSTAT

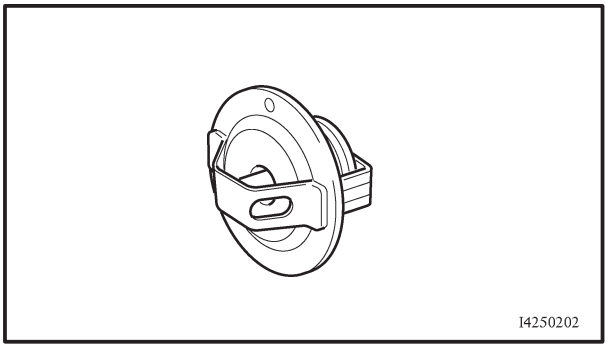


Order	Job/Part	Q'ty	Remarks
	Removing the thermostat		Remove the parts in the order listed.
	Front cowling		Refer to "FRONT COWLING" in chapter 3.
1	Coolant reservoir hose	1	
2	Water inlet hose	1	
3	Water outlet hose	1	
4	Thermostat housing	1	
			For installation, reverse the removal procedure.

EAS00461



Order	Job/Part	Q'ty	Remarks
	Disassembling the thermostat housing		Disassemble the parts in the order listed.
①	Thermostat housing cover	1	
②	Thermostat/O-ring	1/1	
③	Thermostat housing	1	
④	Thermo unit	1	
			For assembly, reverse the disassembly procedure.


I4250202

EAS00462
CHECKING THE THERMOSTAT
1. Check:
   • thermostat
   Does not open at 71 ~ 85°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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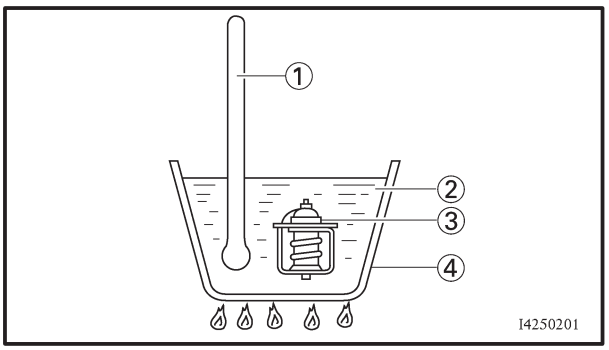
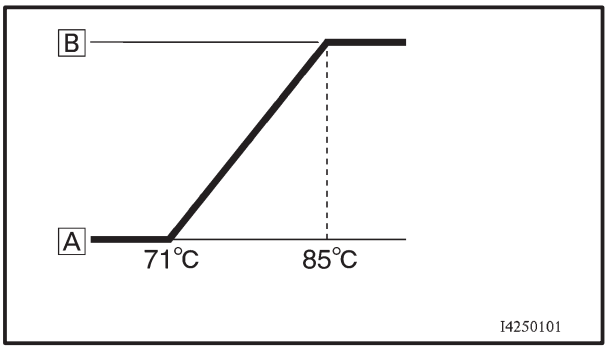


I4250201

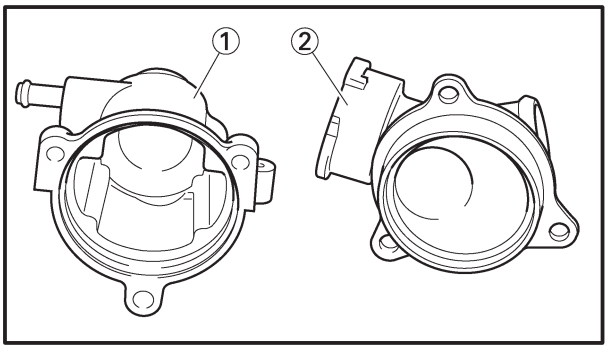
① Thermometer
② Water
③ Thermostat
④ Container
A Closes
B Opens

NOTE:

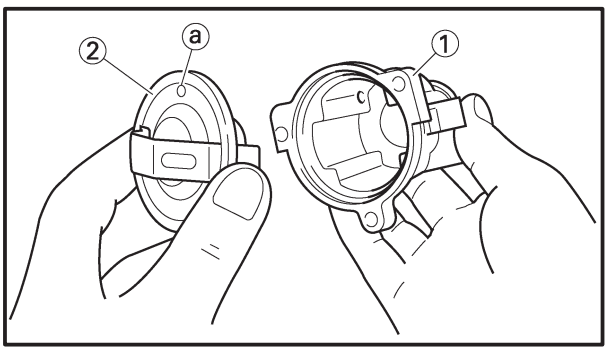
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.



I4250101



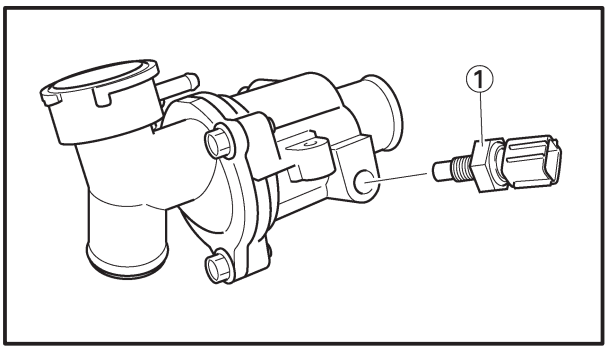
2. Check:
   • thermostat housing cover ①
   • thermostat housing ②
   Cracks/damage → Replace.



EAS00464
ASSEMBLING THE THERMOSTAT
1. Install:
   • thermostat housing ①
   • thermostat ②
   • O-ring New
   • thermostat housing cover

NOTE:

Install the thermostat with its breather hole ⓐ facing up.



2. Install:
   • thermo unit ①

15 Nm (1.5 m•kg)

CAUTION:

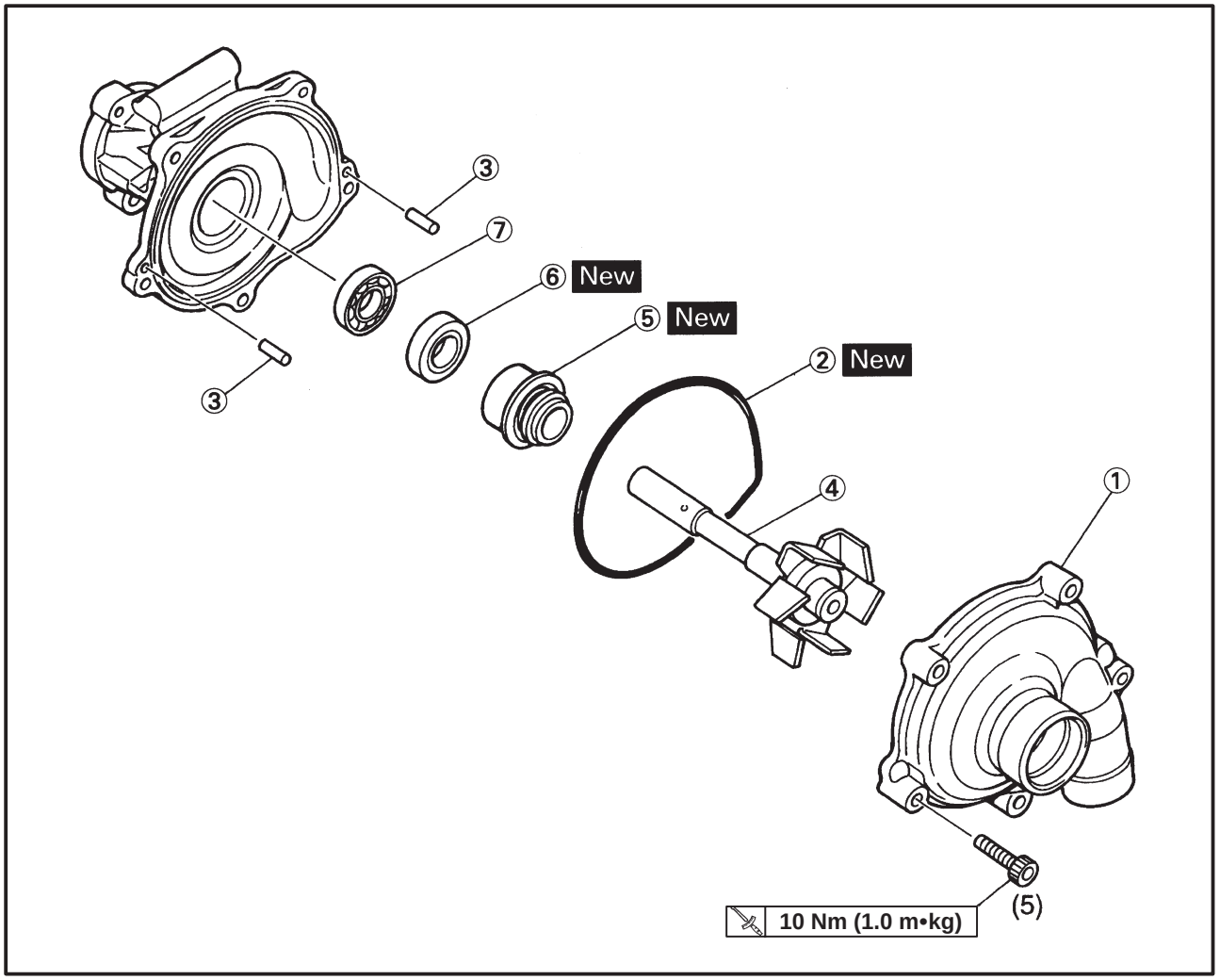
Use extreme care when handling the thermo unit. Replace any part that was dropped or subjected to a strong impact.

EAS00466

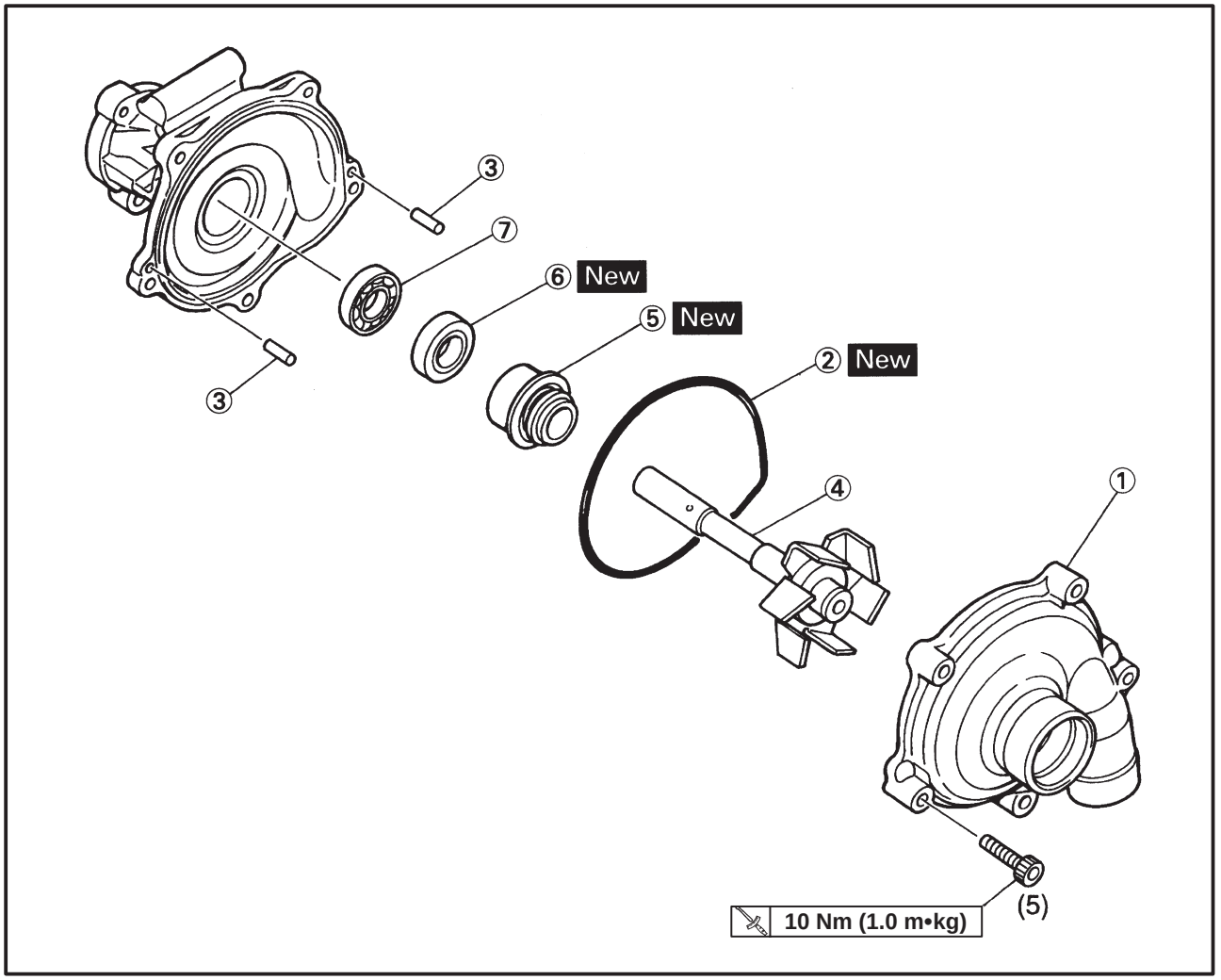
INSTALLING THE THERMOSTAT

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

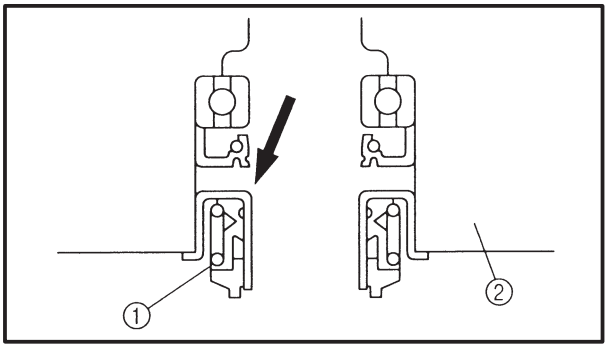
EAS00469
WATER PUMP



Order	Job/Part	Q'ty	Remarks
	Disassembling the water pump		Disassemble the parts in the order listed. **NOTE:** • The water pump and oil pump are combined into one unit (oil/water pump assembly). • It is not necessary to remove the impeller shaft unless the coolant level is extremely low or coolant leaks from the oil pan.
	Oil/water pump assembly and oil pump rotor		Refer to "OIL PAN AND OIL PUMP" in chapter 5.
①	Water pump cover	1	
②	O-ring	1	
③	Pin	2	
④	Impeller shaft (along with the impeller)	1	



Order	Job/Part	Q'ty	Remarks
⑤	Water pump seal	1	
⑥	Oil seal	1	
⑦	Bearing	1	
			For assembly, reverse the disassembly procedure.

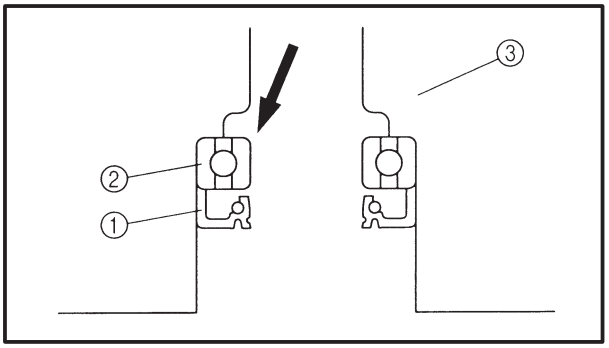


EAS00470
DISASSEMBLING THE WATER PUMP
1. Remove:
   • water pump seal ①

NOTE:

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

② Water pump housing

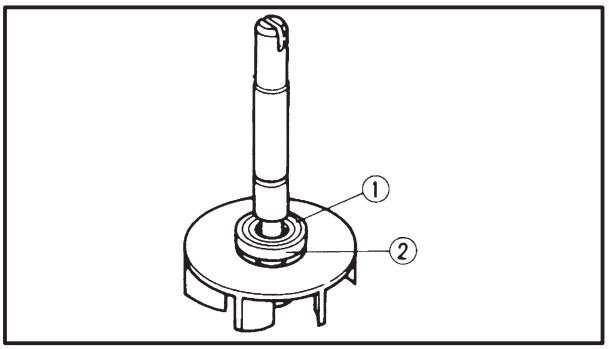


2. Remove:
   • oil sesal ①
   • bearing ②

NOTE:

Tap out the bearing and oil seal from the outside of the water pump housing.

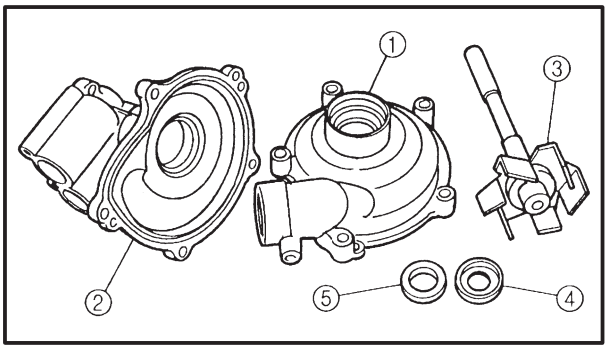
③ Water pump housing



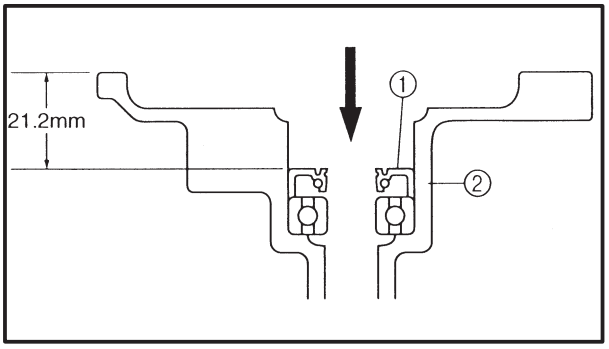
3. Remove:
   • rubber damper holder ①
   • rubber damper ②
   (from the impeller, with a thin, flat-head screwdriver)

NOTE:

Do not scratch the impeller shaft.



EAS00473
CHECKING THE WATER PUMP
1. Check:
   • water pump housing cover ①
   • water pump housing ②
   • impeller ③
   • rubber damper ④
   • rubber damper holder ⑤
2. Check:
   • water pump seal
   • oil seal
   • water pump inlet pipe
   Crack/damage/wear → Replace
   • bearing
   Roughness → Replace.



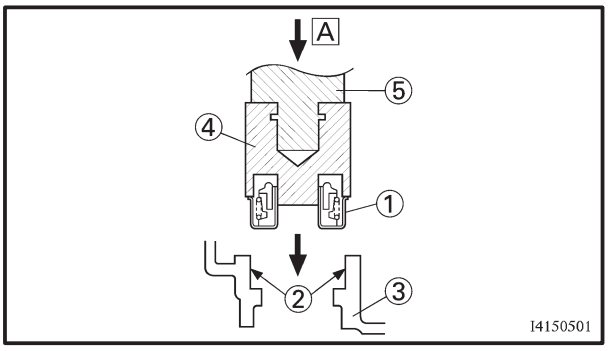
EAS00475

ASSEMBLING THE WATER PUMP

1. Install:
   • oil seal New ①
   (to the water pump housing ②)

NOTE:

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



2. Install:
   • water pump seal New ①

CAUTION:

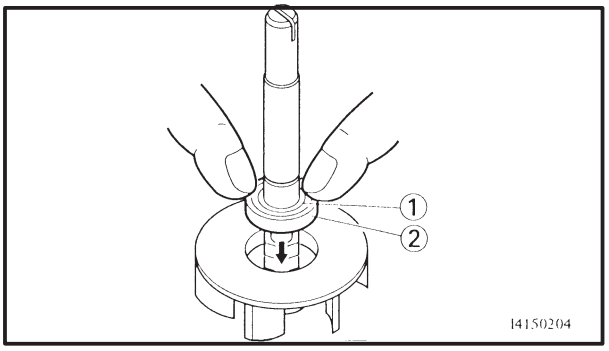
Never apply oil or grease onto the water pump seal surface.

NOTE:

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

Water pump seal installer ④
90890-04078
Middle driven shaft bearing driver ⑤
90890-04058
Yamaha bond No.1215
90890-85505

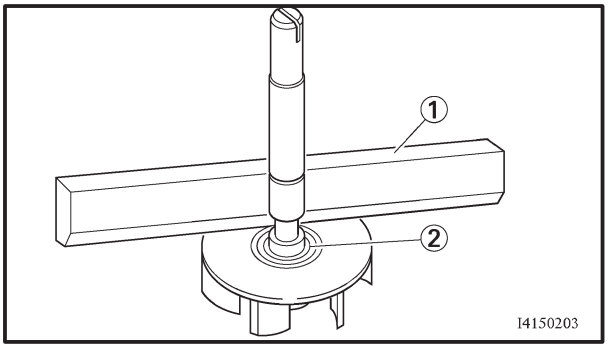
A Push down



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

NOTE:

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



4. Measure:
   - tilt

   Out of specification → Repeat steps (3) and (4).

CAUTION:

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

Tilt limit
0.15 mm

① Straightedge
② Impeller

CARB 7

CHAPTER 7
CARBURETORS

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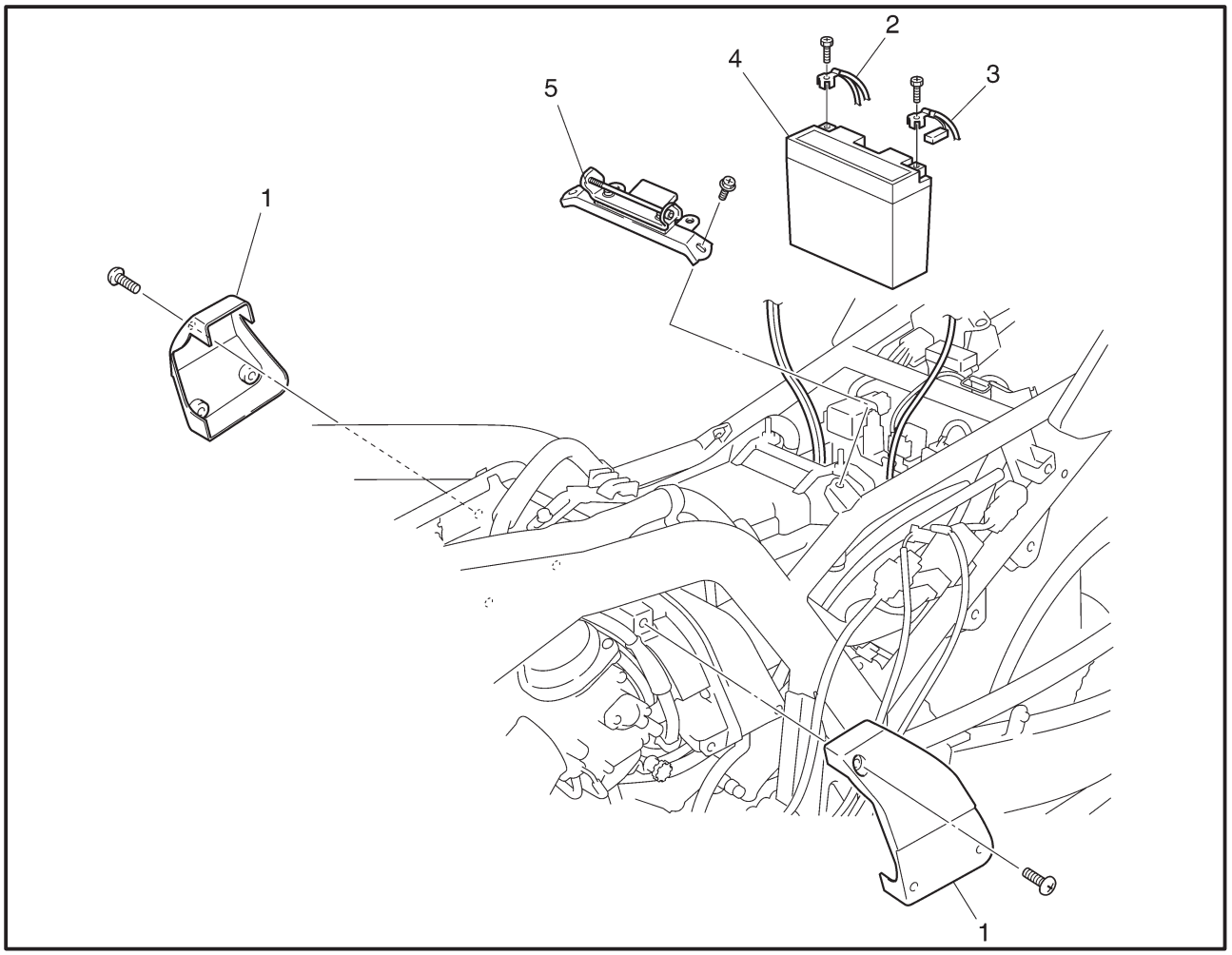
CARBURETORS

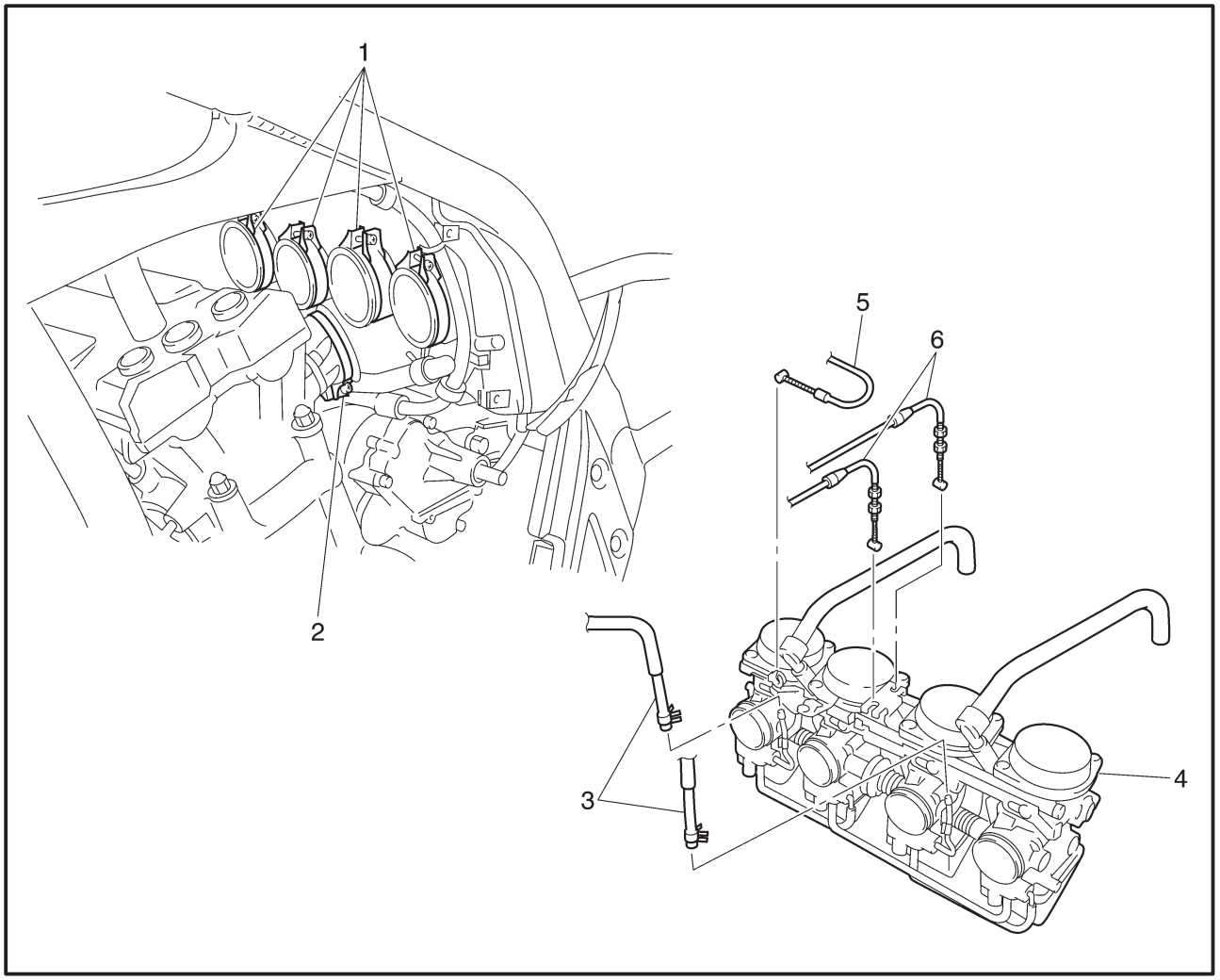
CARBURETORS

AIR FILTER CASE



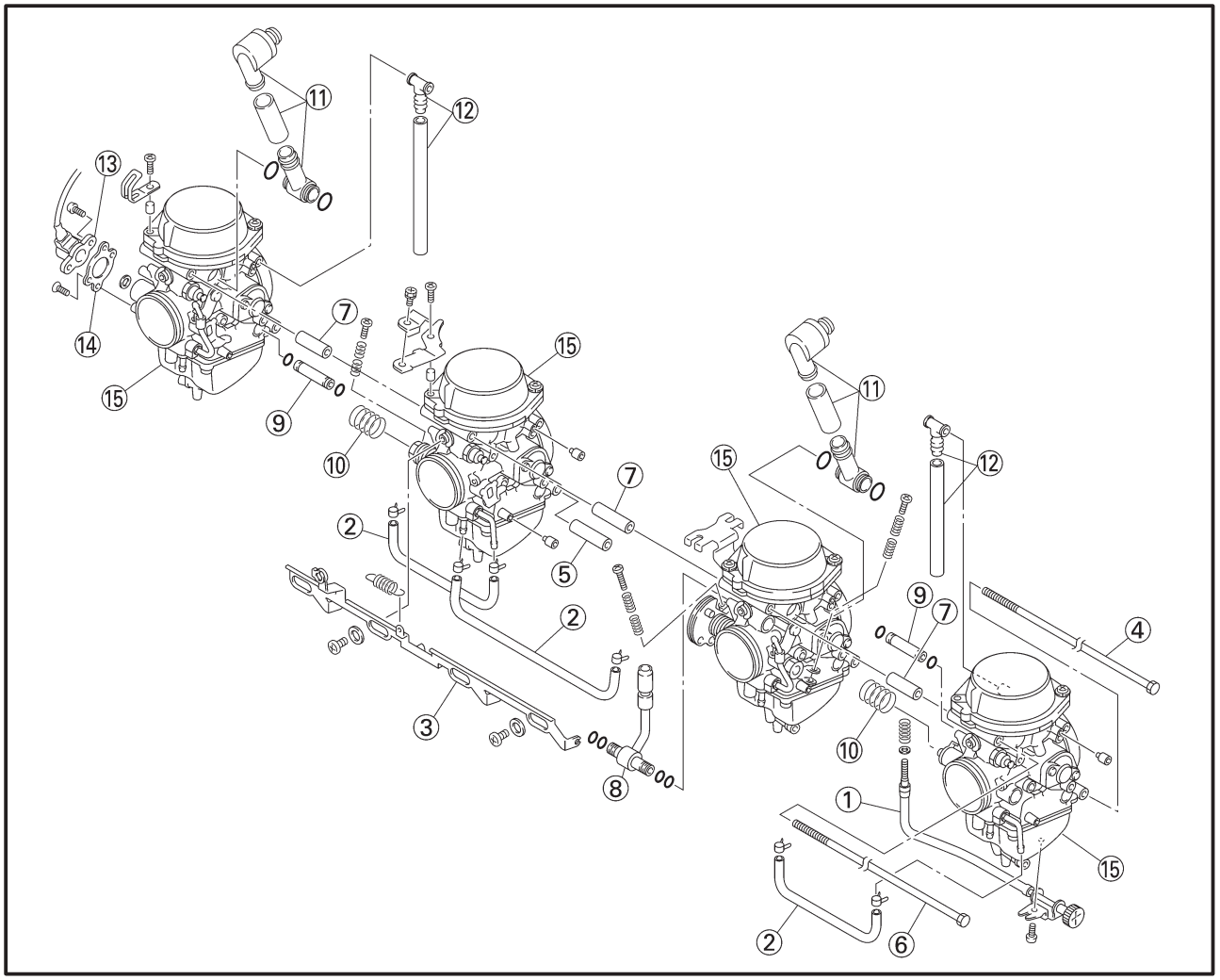
Order	Job/Part	Q'ty	Remarks
	Removing the air filter case		Remove the parts in the order listed.
	Seat, fueltank and sidecovers		Refer to "FRONT COWLING/SEAT/ SIDE COVER/FUEL TANK" section in chapter 3.
	Drain the coolant		Refer to "CHANGING THE COOLANT" section.
1	Air filter case panel (left/right)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

EAS00481



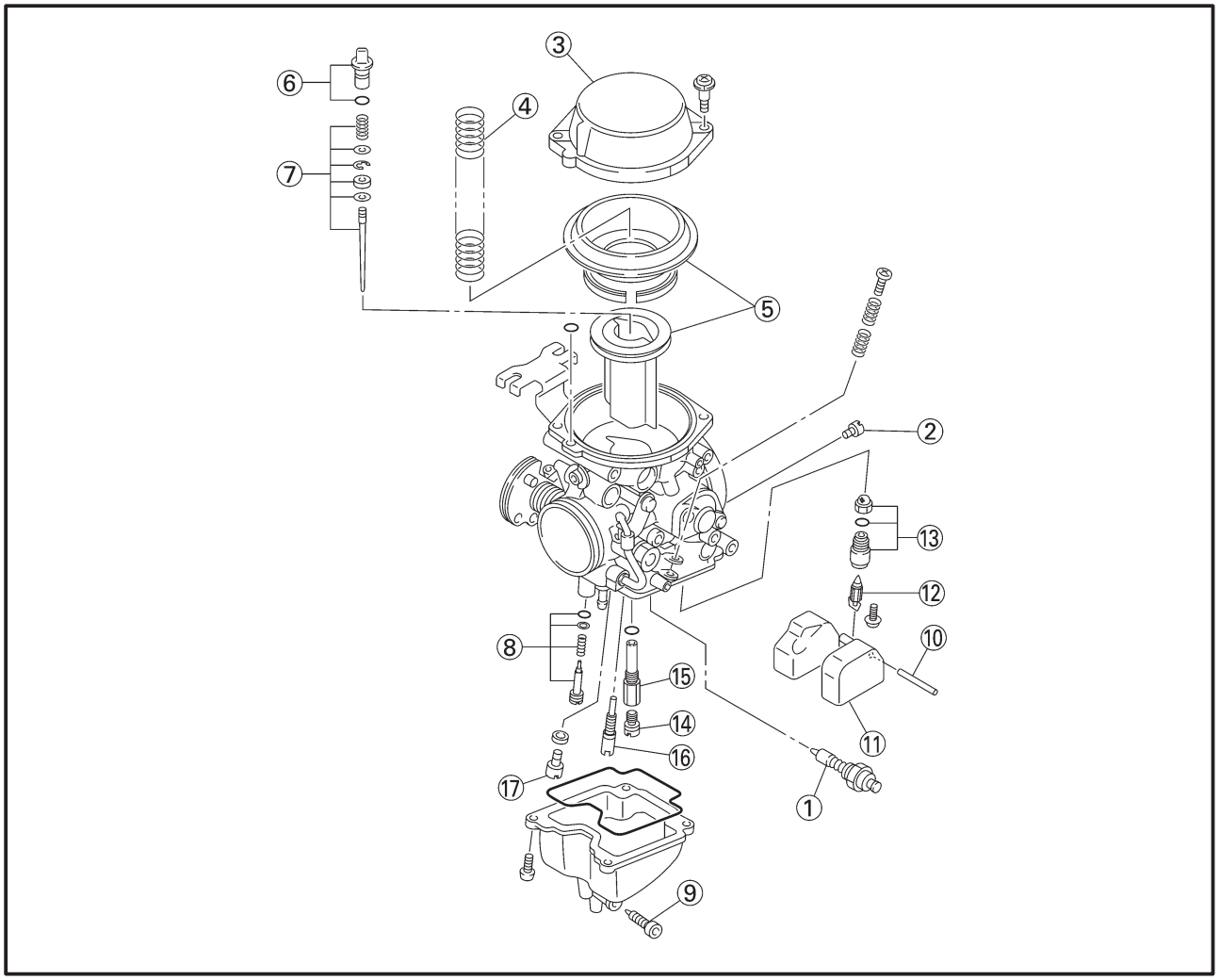
Order	Job/Part	Q'ty	Remarks
	Removing the carburetors		Remove the parts in the order listed.
	Throttle position sensor lead		Disconnect.
1	Air filter joint screw	4	
2	Carburetors joint screw	4	
3	Carburetor inlet/outlet hose	1/1	
4	Carburetors assembly	1	
5	Starter cable	1	
6	Throttle cable	2	
			For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

EAS00482

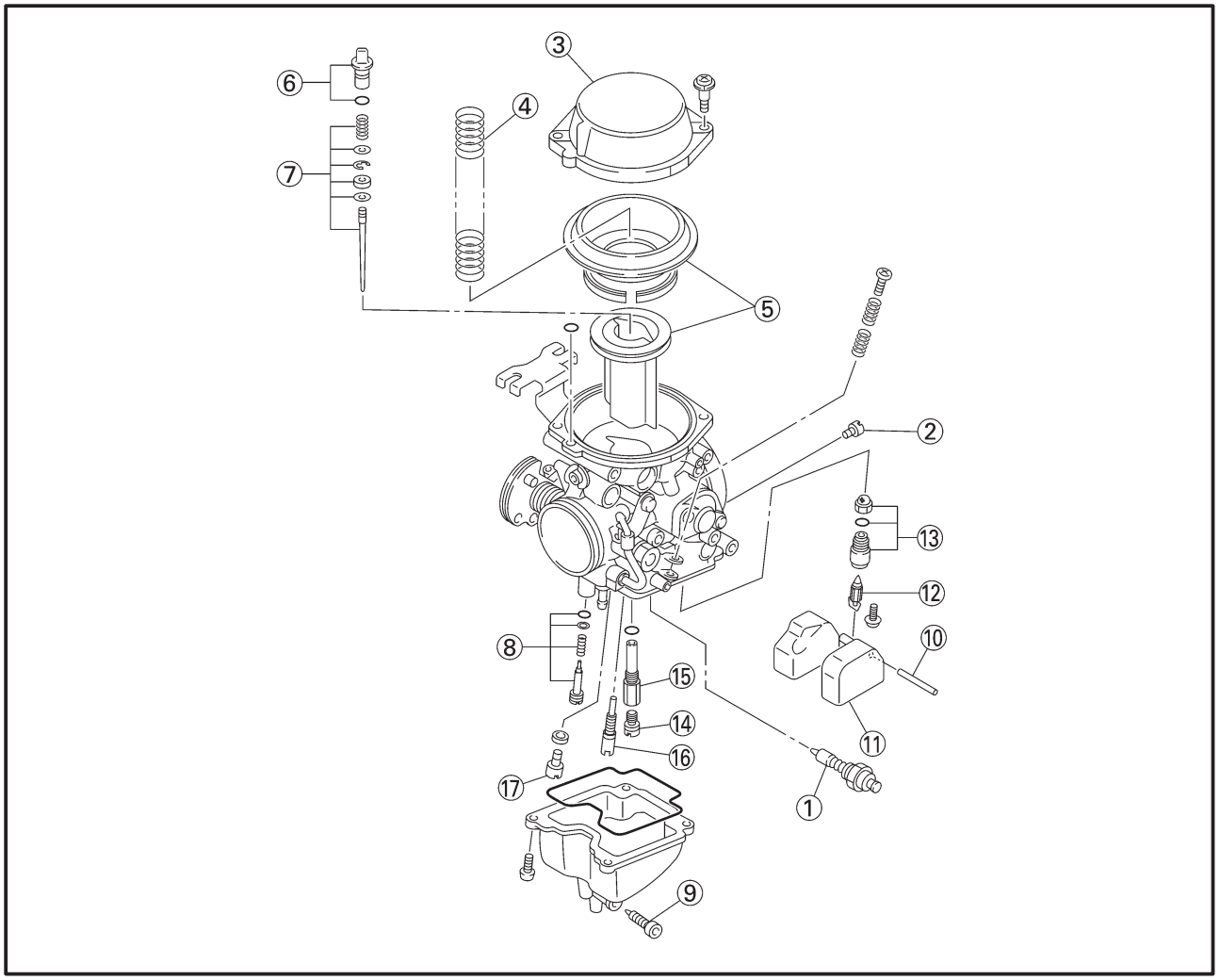


Order	Job/Part	Q'ty	Remarks
	Separating the carburetor		Remove the parts in the order listed.
1	Throttle stop screw	1	
2	Coolant hose	1	
3	Starter plunger link	1	
4	Connecting bolt	1	
5	Spacer	1	
6	Connecting bolt	1	
7	Spacer	3	
8	Fuel inlet pipe	1	
9	Fuel feed pipe	2	
10	Spring	2	
11	Vacuum chamber air vent hose	2	
12	Float chamber air vent hose	2	
13	Throttle position sensor	1	
14	Throttle position sensor bracket	1	
15	Carburetor	4	
			For installation, reverse the removal procedure.

EAS00484

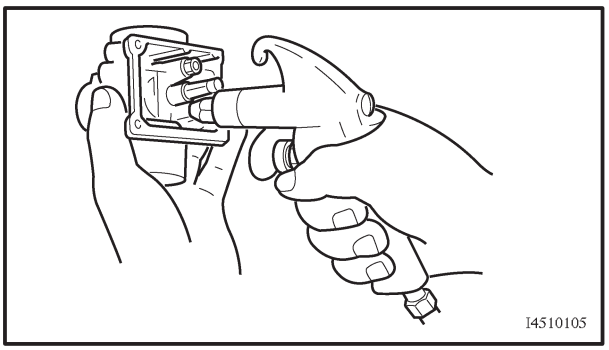


Order	Job/Part	Q'ty	Remarks
	Disassembling the carburetor		Disassemble the parts in the order listed. **NOTE:** The following procedure applies to all of the carburetors.
①	Starter plunger	1	
②	Pilot air jet	1	
③	Vacuum chamber cover	1	
④	Piston valve spring	1	
⑤	Piston valve	1	
⑥	Jet needle holder	1	
⑦	Jet needle kit	1	
⑧	Pilot screw	1	
⑨	Fuel drain bolt	1	
⑩	Float pin	1	



Order	Job/Part	Q'ty	Remarks
⑪	Float	1	
⑫	Needle valve	1	
⑬	Needle valve seat	1	
⑭	Main jet	1	
⑮	Main jet holder	1	
⑯	Pilot jet	1	
⑰	Needle jet	1	
			For assembly, reverse the disassembly procedure.

EAS00486
CHECKING THE CARBURETORS
The following procedure applies to all of the carburetors.
1. Check:
   - carburetor body
   - float chamber
   - jet housing
   Cracks/damage → Replace.



2. Check:
   - fuel passages
   Obstruction → Clean.

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

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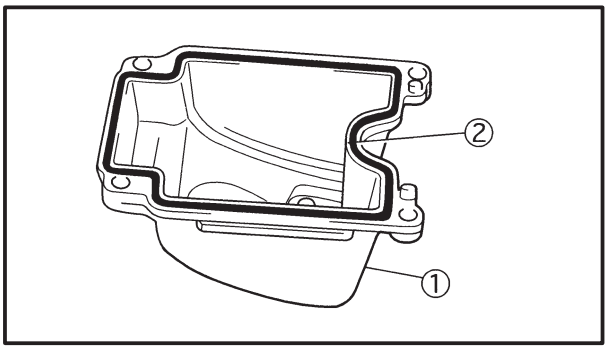
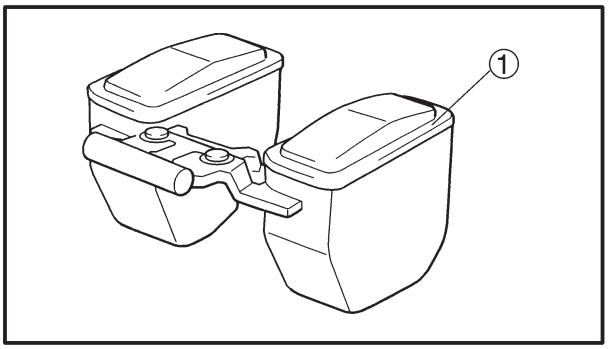
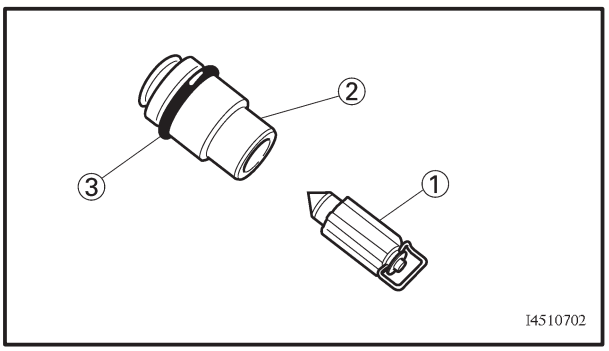


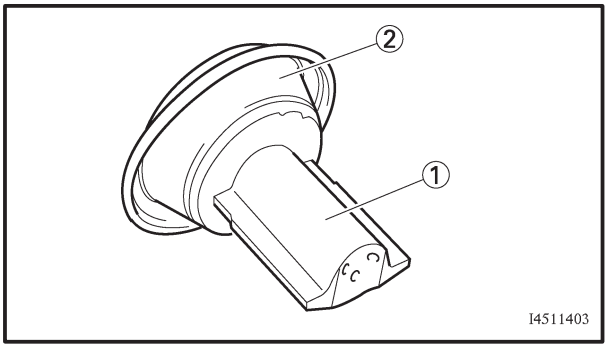
3. Check:
   - float chamber body ①
   Dirt → Clean.
4. Check:
   - float chamber rubber gasket ②
   Cracks/damage/wear → Replace.



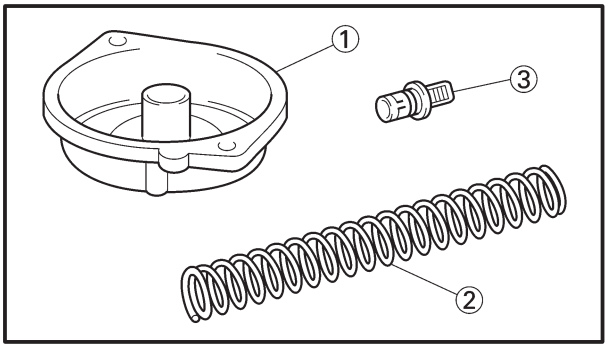
5. Check:
   - float ①
   Damage → Replace.



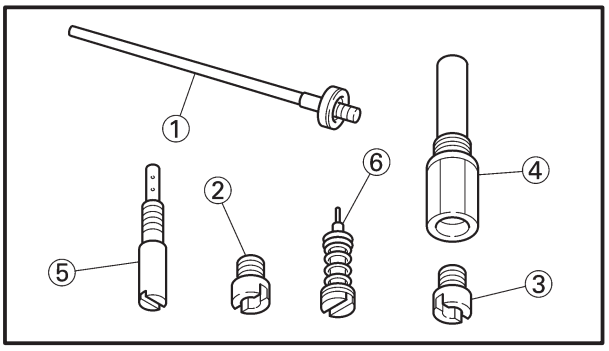
6. Check:
   - needle valve ①
   - needle valve seat ②
   Damage/obstruction/wear → Replace the needle valve, needle valve seat and O-ring as a set.
7. Check:
   - O-ring ③
   Damage/wear → Replace the needle valve, needle valve seat and O-ring as a set.



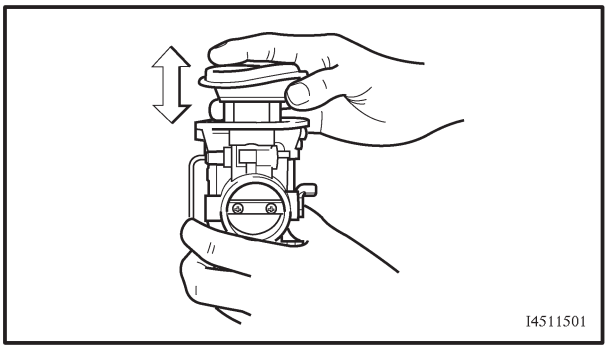
8. Check:
   • piston valve ①
     Damage/scratches/wear→ Replace.
   • rubber diaphragm ②
     Cracks/tears → Replace.



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
   • main jet holder ④
   • pilot jet ⑤
   • pilot screw ⑥
     Bends/damage/wear → Replace.
     Obstruction → Clean.
     Blow out the jets with compressed air.

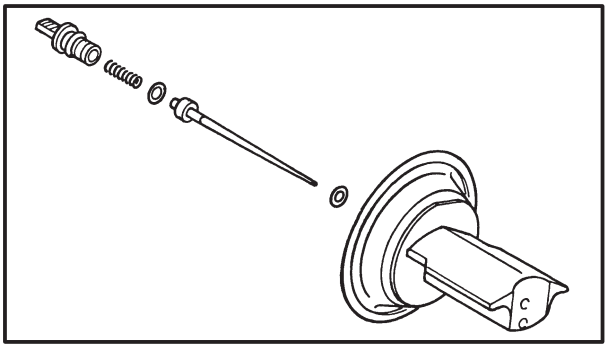


11. Check:
   • piston valve movement
     Insert the piston valve into the carburetor body and move it up and down.
     Tightness → Replace the piston valve.
12. Check:
   • fuel feed pipes
   • hose joint
     Cracks/damage → Replace.
     Obstruction → Clean.
     Blow out the pipes with compressed air.
13. Check:
   • fuel feed hoses
   • fuel hoses
     Cracks/damage/wear → Replace.
     Obstruction → Clean.
     Blow out the hoses with compressed air.

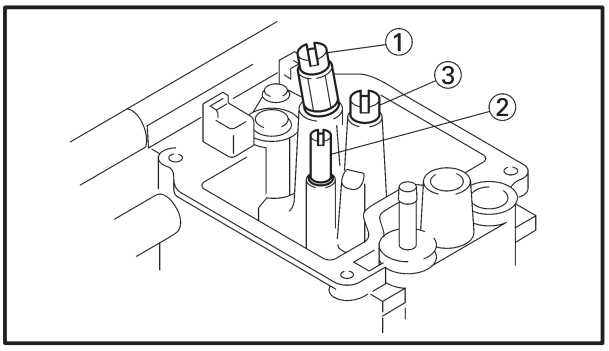
EAS00489
ASSEMBLING THE CARBURETORS
The following procedure applies to both of the carburetors.

CAUTION:

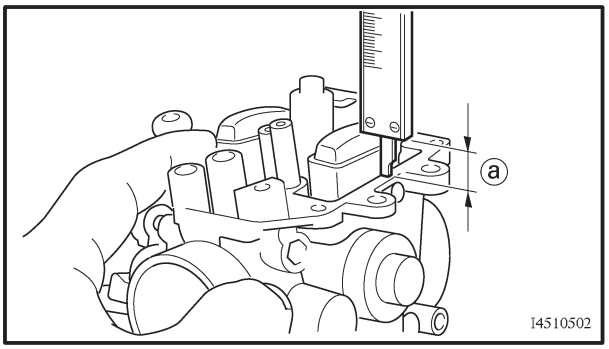
- **Before assembling the carburetors, wash all of the parts in a petroleum-based solvent.**
- **Always use a new gasket.**



1. Install:
   - jet needle kit



2. Install:
   - needle jet ①
   - pilot jet ②
   - main jet ③



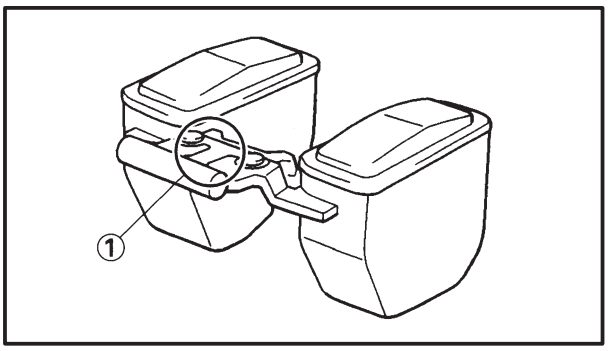
3. Measure:
   - float height ⓐ
     Out of specification → Adjust.

Float height
12.5 ~ 13.5 mm

a. Hold the carburetor upside down.
b. Measure the distance from the mating surface of the float chamber (with the gasket removed) to the top of the float.

NOTE:
The float arm should rest on the needle valve without depressing it.

c. If the float height is not within specification, check the needle valve seat and needle valve.



d. If either the needle valve seat or needle valve is worn, replace them both.
e. If both the needle valve seat and needle valve are fine, adjust the float height by bending the float tang ①.
f. Check the float height again.

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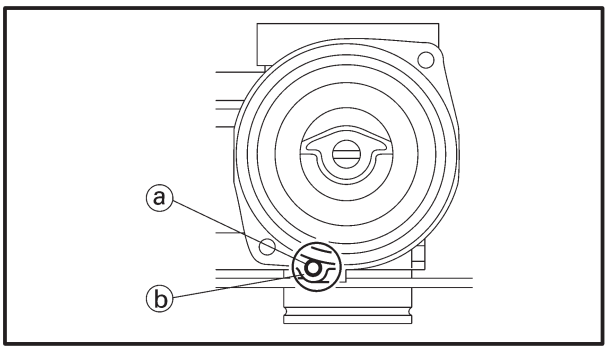


4. Install:
   • piston valve
   • piston valve spring
   • vacuum chamber cover

NOTE:

Align the tab ⓐ on the piston valve diaphragm with the recess ⓑ in the carburetor body.

5. Install:
   • connecting bracket

NOTE:

After installing the connecting bracket, check that the throttle cable lever and starter plunger link operate smoothly.

EAS00493

INSTALLING THE CARBURETORS

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

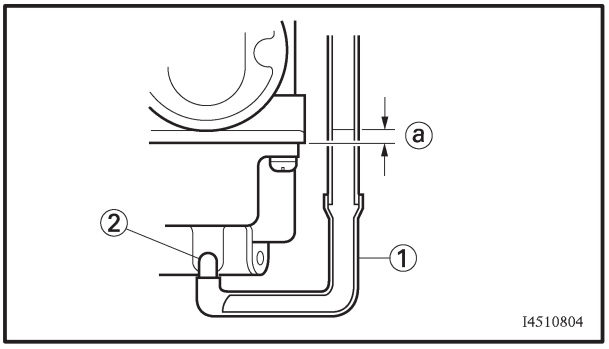
	Engine idling speed **1,050 ~ 1,150 r/min**

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.



EAS00495
MEASURING AND ADJUSTING THE FUEL LEVEL

1. Measure:
   • fuel level ⓐ
   Out of specification → Adjust.

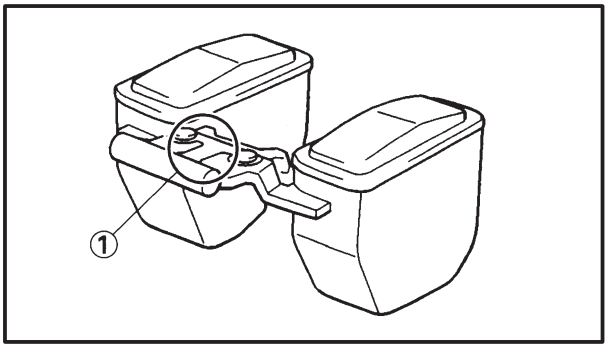
Fuel level (below the line on the float chamber)
3.0 ~ 4.0 mm

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

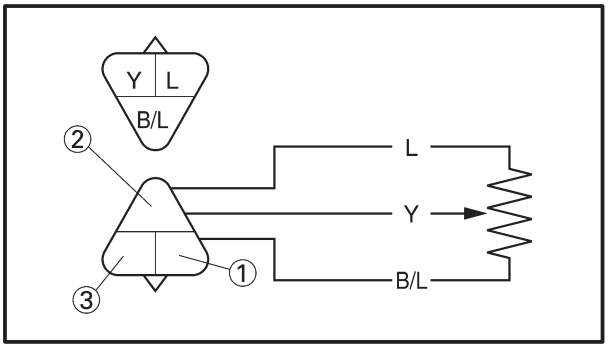
d. Loosen the fuel drain screw.
e. Hold the fuel level gauge vertically next to the line on the float chamber ③.
f. Measure the fuel level ⓐ on both sides of the carburetor assembly.

NOTE:
The fuel level readings should be equal on both sides.



2. Adjust:
   • fuel level

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



EAS00500

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. Remove the throttle position sensor from the carburetor.
c. Connect the pocket tester (Ω × 1k) to the throttle position sensor.

Tester positive lead → Black/blue ①
Tester negative lead → Blue ②

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

Throttle position sensor maximum resistance
4 ~ 6 kΩ at 20°C

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

Tester positive lead → Yellow ③
Tester negative lead → Blue ②

g. 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
0.4 ~ 5.4 kΩ at 20°C

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2. Adjust:
   • throttle position sensor angle

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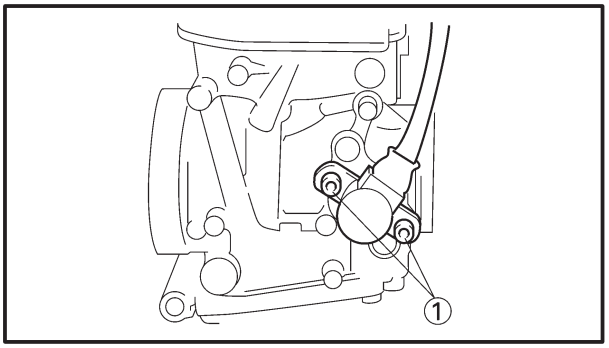
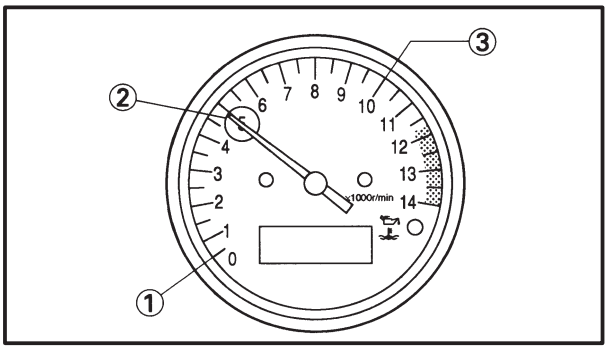
a. Turn the main switch to “ON”.
b. Disconnect the throttle position sensor coupler.
c. Reconnect the throttle position sensor coupler.

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 are displayed on the tachometer.

Tachometer reading	Throttle position sensor angle
0 r/min ①	Too small
5,000 r/min ②	Correct
10,000 r/min ③	Too large

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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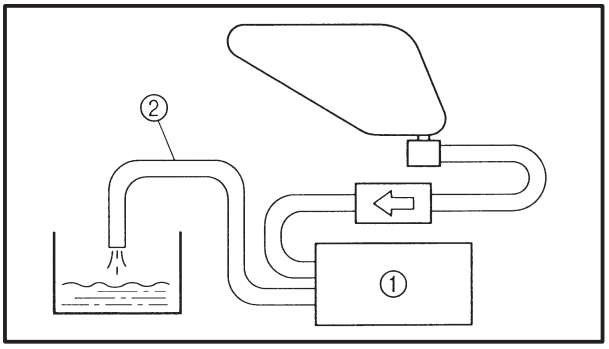


EAS00504
CHECKING THE FUEL PUMP

1. Check:
   • fuel pump ①

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Place a container under the end of the fuel hose.
b. Start the engine and check if fuel flows from the fuel hose ②.

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

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

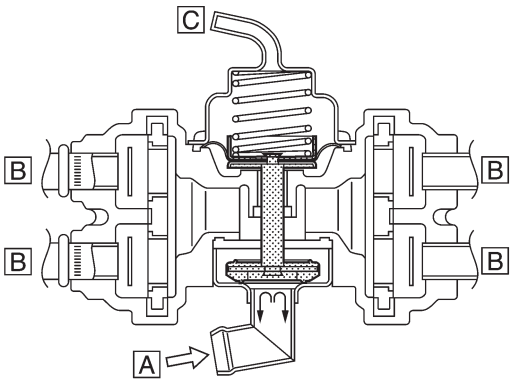
Fuel stops flowing.	Fuel pump is OK.
Fuel flows.	Replace the fuel pump.

EAS00507

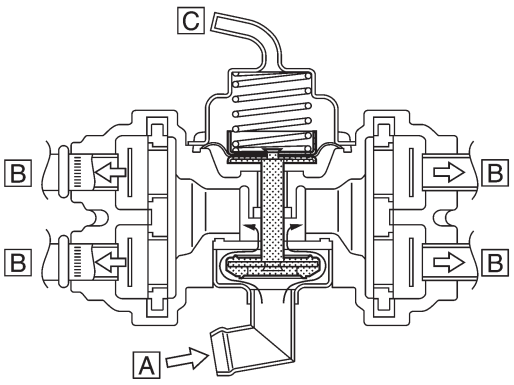
AIR INDUCTION SYSTEM

AIR INJECTION

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons.
When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C.



VIEW 1. (NO FLOW)



VIEW 2. (FLOW)

EAS00508

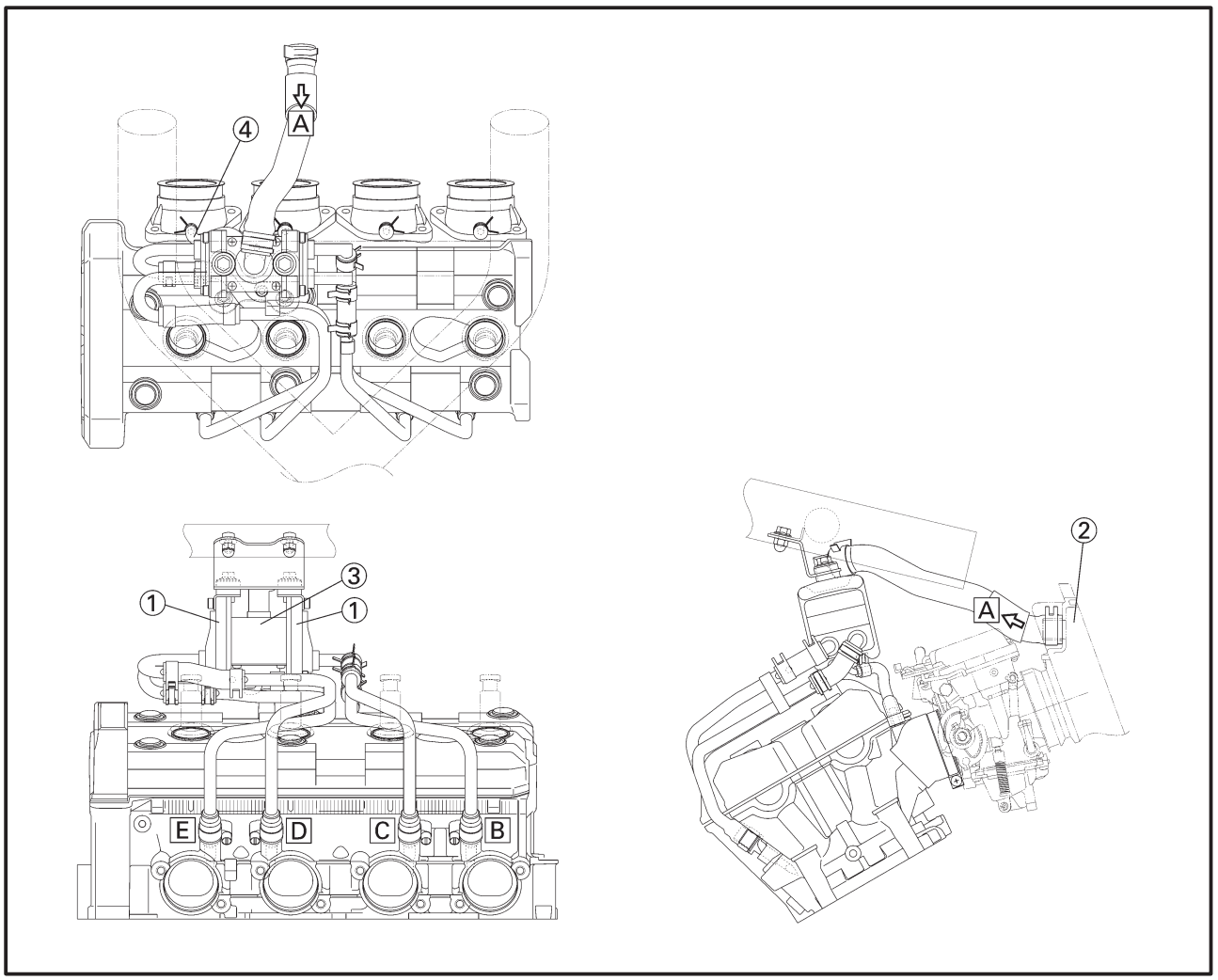
AIR CUTOFF VALVE

The air cutoff valve is operated by the intake gas pressure through the piston valve diaphragm. Normally, the air cutoff valve is open to allow fresh air to flow into the exhaust port. During sudden deceleration (the throttle valve suddenly closes), negative pressure is generated and the air cutoff valve is closed in order to prevent after-burning.
Additionally, at high engine speeds and when the pressure decreases, the air cutoff valve automatically closes to guard against a loss of performance due to self-EGR.

VIEW 1. (NO FLOW)
When decelerating (the throttle closes), the valve will close.
VIEW 2. (FLOW)
During normal operation the valve is open.
A From the air cleaner
B To the reed valve
C To the carburetor joint

EAS00509

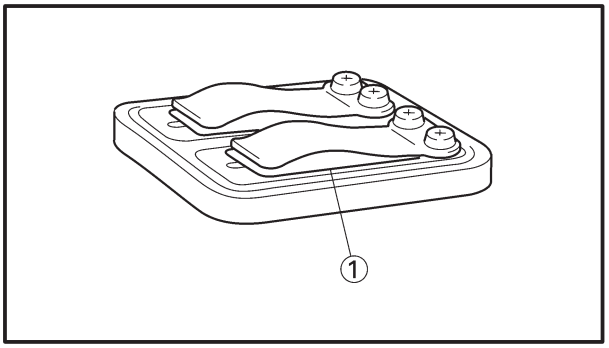
AIR INDUCTION SYSTEM DIAGRAMS



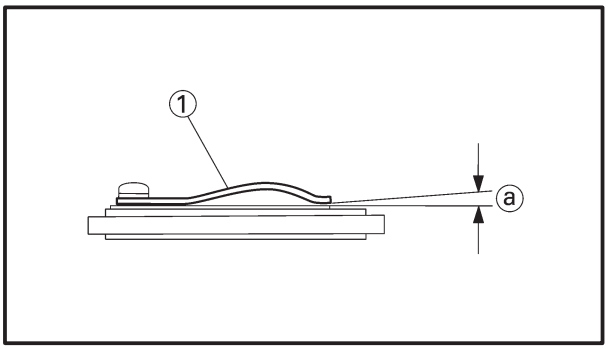
① Reed valve
② Air cleaner
③ Air cutoff valve
④ Carburetor joint (cylinder #4)
A To the air cutoff valve
B To cylinder #1
C To cylinder #2
D To cylinder #3
E To cylinder #4

EAS00510
CHECKING THE AIR INDUCTION SYSTEM

1. Check:
   - hoses
     Loose connection → Connect properly.
     Cracks/damage → Replace.
   - pipes
     Cracks/damage → Replace.



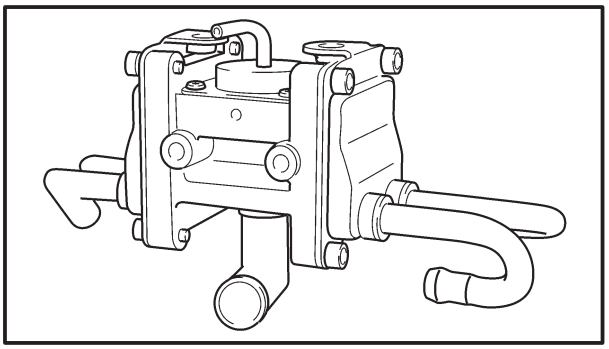
2. Check:
   - fibre reed ①
   - fibre reed stopper
   - reed valve seat
     Cracks/damage → Replace the reed valve.



3. Measure:
   - fibre reed bending limit ⓐ
     Out of specification → Replace the reed valve.

Fibre reed bending limit
0.2 mm

① Surface plate



4. Check:
   - air cutoff valve
     Cracks/damage → Replace.

ELEC 8

CHAPTER 8
ELECTRICAL

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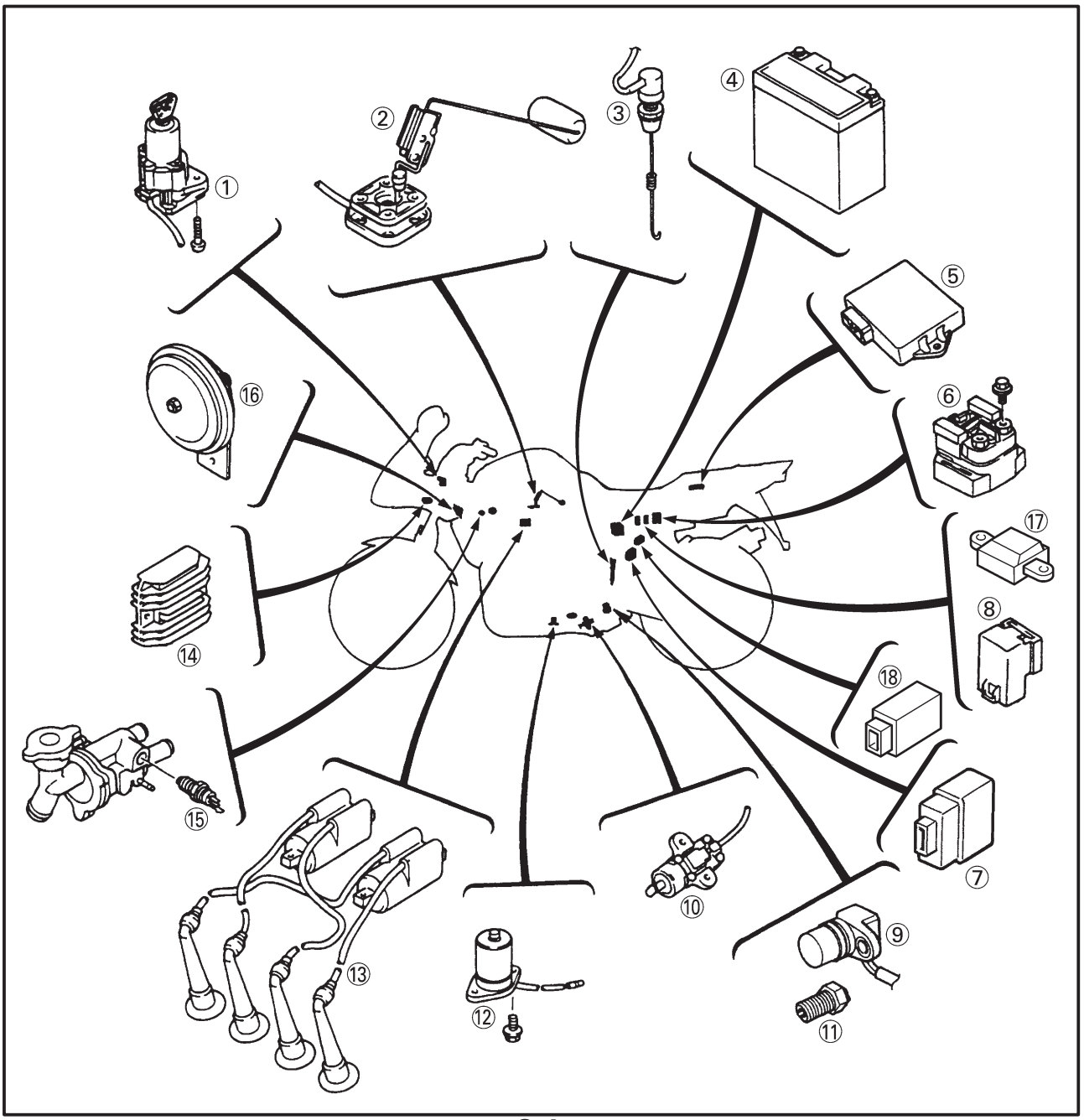
EAS00729

ELECTRICAL

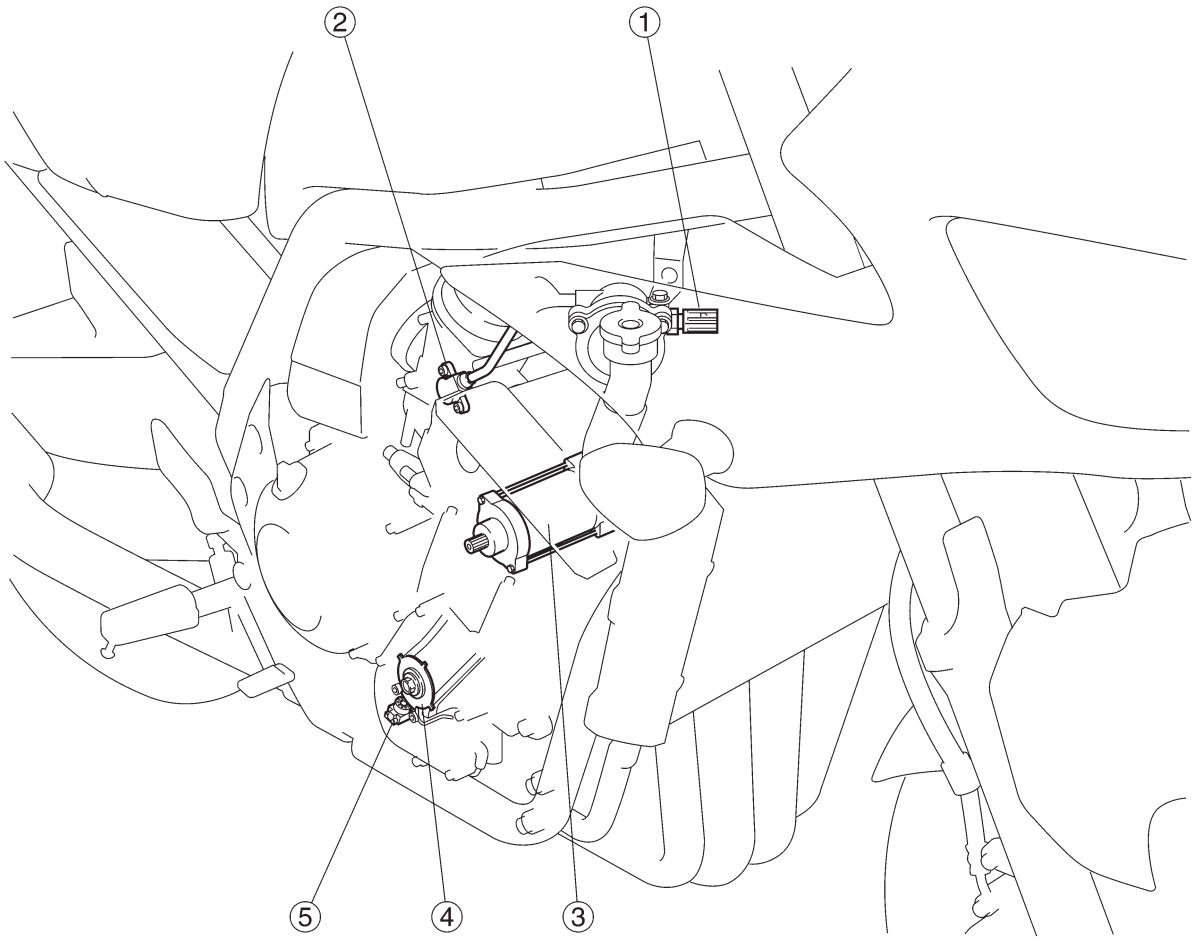
ELECTRICAL COMPONENTS

① Main switch
② Fuel sender
③ Rear brake switch
④ Battery
⑤ Ignitor unit
⑥ Starter relay
⑦ Starting circuit cutoff relay
⑧ Flasher relay
⑨ Speed sensor
⑩ Sidestand switch
⑪ Neutral switch
⑫ Oil level gauge
⑬ Ignition coil
⑭ Rectifier/Regulator
⑮ Thermo unit
⑯ Horn
⑰ Emargency stop switch
⑱ Fan motor relay

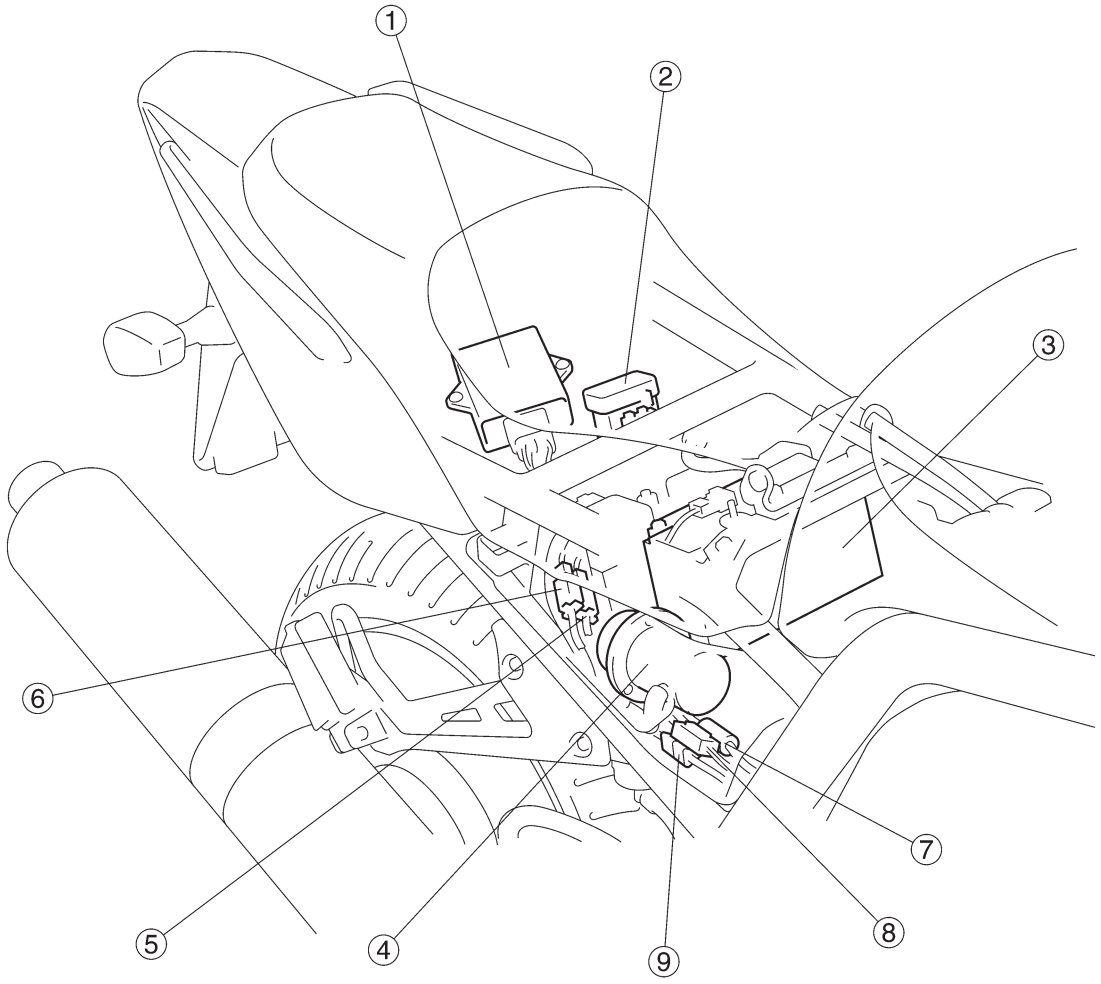


ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS

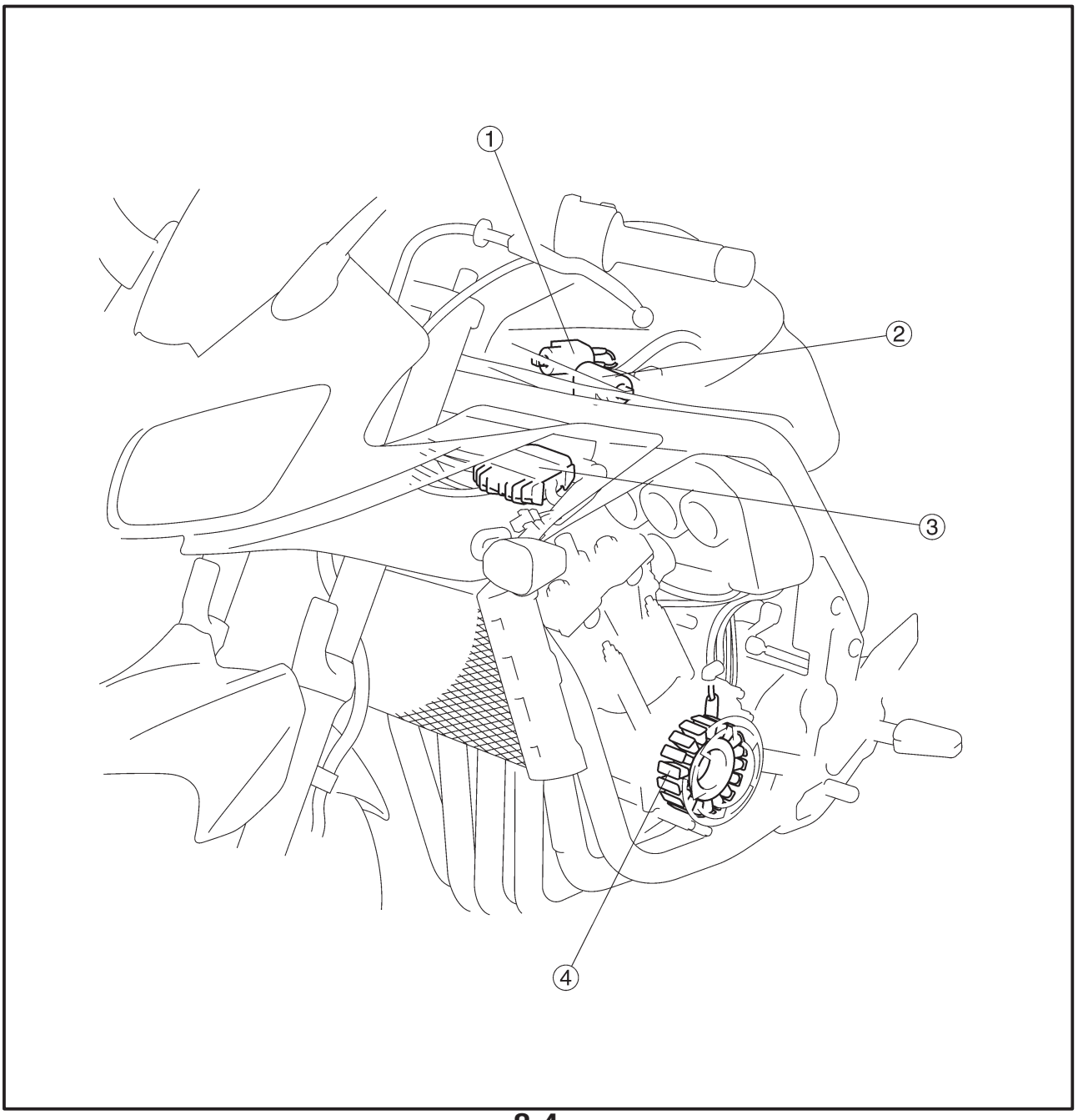
① Thermo unit
② T.P.S.
③ Starter motor
④ Pickup rotor
⑤ Pickup coil



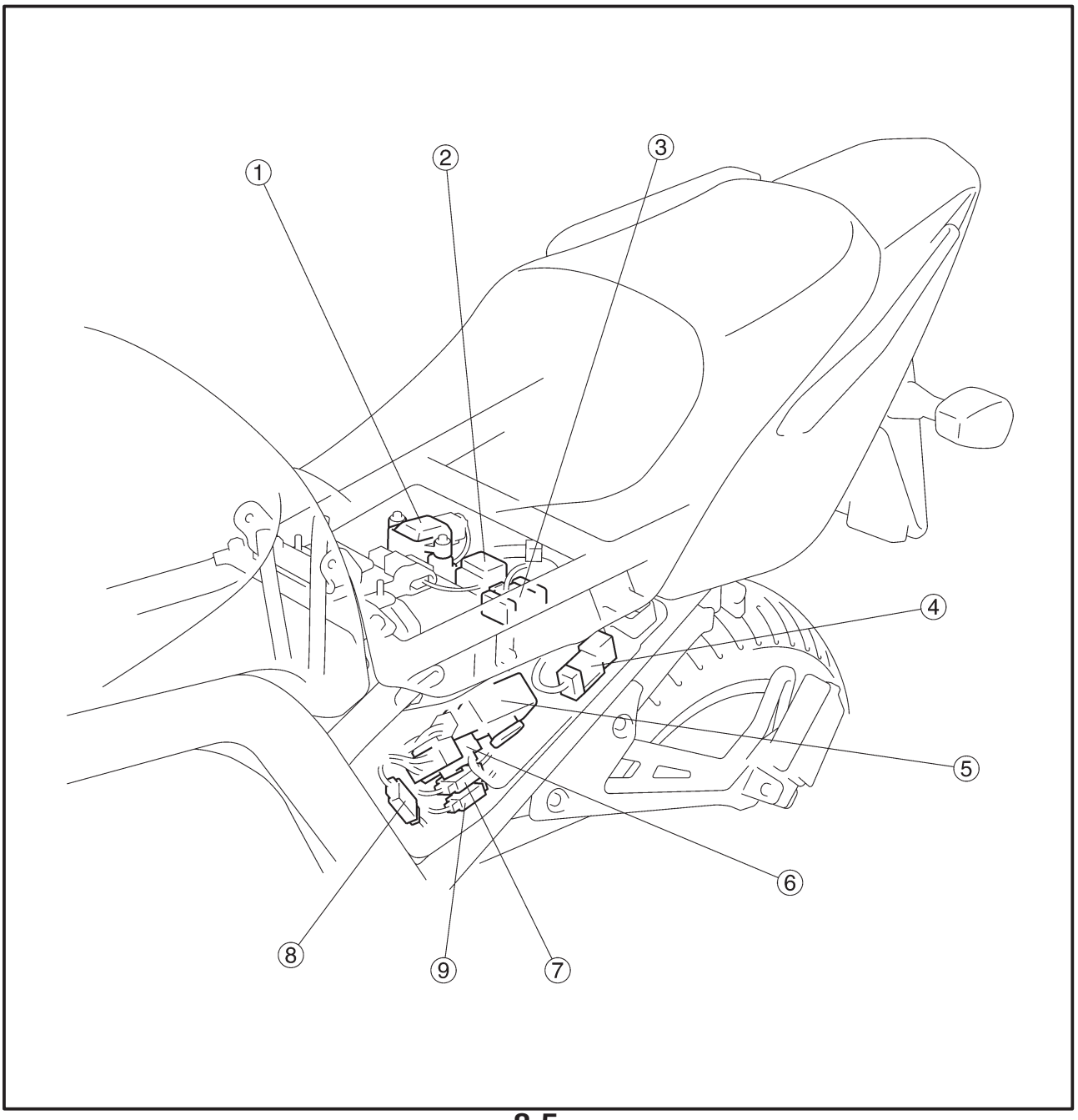
① Ignitor unit
② Fuse box
③ Battery
④ Fuel pump
⑤ Fuel pump coupler
⑥ Brake light switch coupler
⑦ Newtral switch coupler
⑧ Pickup coil coupler
⑨ Speed sensor coupler



① Ignition coil #2.3
② Ignition coil #1.4
③ Rectifier/regulator
④ Stator coil

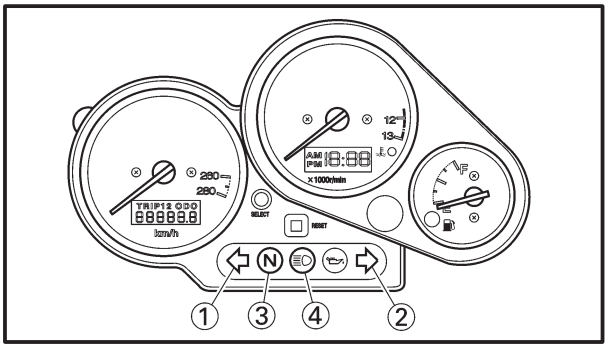


① Emargency stop switch
② Flasher relay
③ Starter relay
④ Fan motor relay
⑤ Starting circuit cutoff relay
⑥ Stator coil coupler
⑦ Sidestand switch coupler
⑧ Fuel sender coupler
⑨ Oil level switch coupler



INSTRUMENT FUNCTIONS

INDICATOR LIGHTS



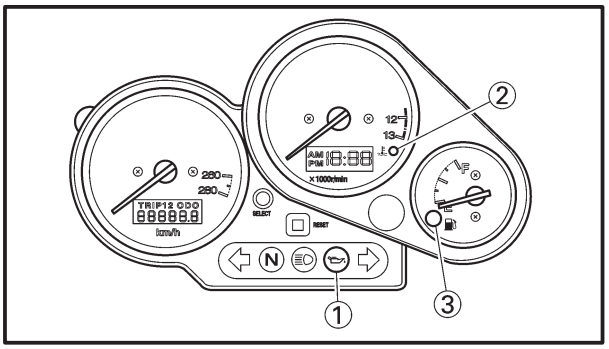
① Turn indicator light (left) " ⇦ "
② Turn indicator light (right) " ⇨ "
③ Neutral indicator light " N "
④ High beam indicator light " ≡D "

Turn indicator light " ⇦ " " ⇨ "
This indicator flashes when the turn switch is moved to the left or right, and the hazard switch is on.

Neutral indicator light " N "
This indicator comes on when the transmission is in neutral.

High beam indicator light " ≡D "
This indicator comes on when the headlight high beam is used.

WARNING LIGHT



① Oil level warning light " "
② Coolant temperature warning light " "
③ Fuel level warning light " "

Oil evel warning light " "
This warning light comes on when the engine oil level is low. If this symbol flashes, stop the engine immediately and fill it with oil to the specified level.

Coolant temperature warning light " "
This warning light comes on when the coolant temperature is too high.

Fuel level warning light " "
When the fuel level drops below approximately 5.5 L, this light will come on.When this light comes on, fill the fuel tank at the first opportunity.

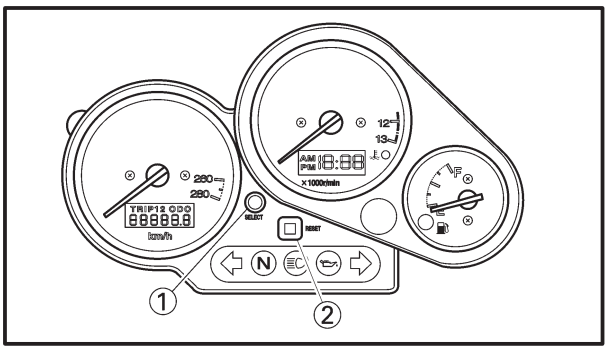
CAUTION:

- **Do not run the motorcycle until you know it has sufficient engine oil.**
- **Do not run the motorcycle if the engine is overheated.**

NOTE:

Even if the oil is filled to the specified level, the warning light may flicker when riding on a slope or during sudden acceleration or deceleration, but this is normal.

DIGITAL CLOCK



① "SELECT" button
② "RESET" button

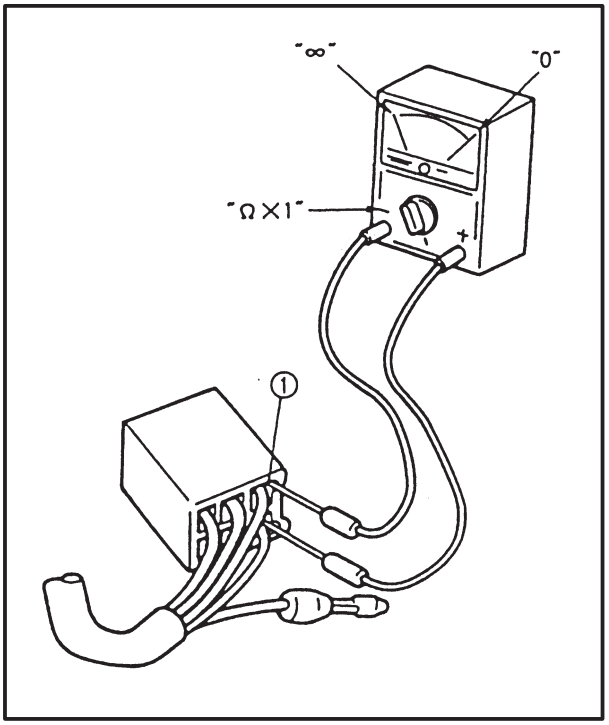
Clock

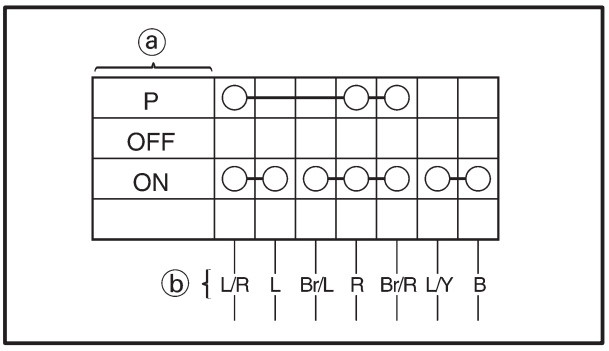
To set the clock:

1. Push both the "SELECT" ① and "RESET" ② buttons for at least two seconds.
2. When the hour digits start flashing, push the "RESET" button ② to set the hours.
3. Push the "SELECT" button ① to change the minutes.
4. When the minute digits start flashing, push the "RESET" button ② to set the minutes.
5. Push the "SELECT" button ① to start the clock.

NOTE:

After setting the clock, be sure to push the "SELECT" button ① before turning the main switch to "OFF", otherwise the clock will not be set.





EAS00730

CHECKING SWITCH CONTINUITY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

CAUTION:

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

Pocket tester
90890-03112

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.
The switch positions ⓐ are shown in the far left column and the switch lead colors ⓑ are shown in the top row in the switch illustration.

NOTE:

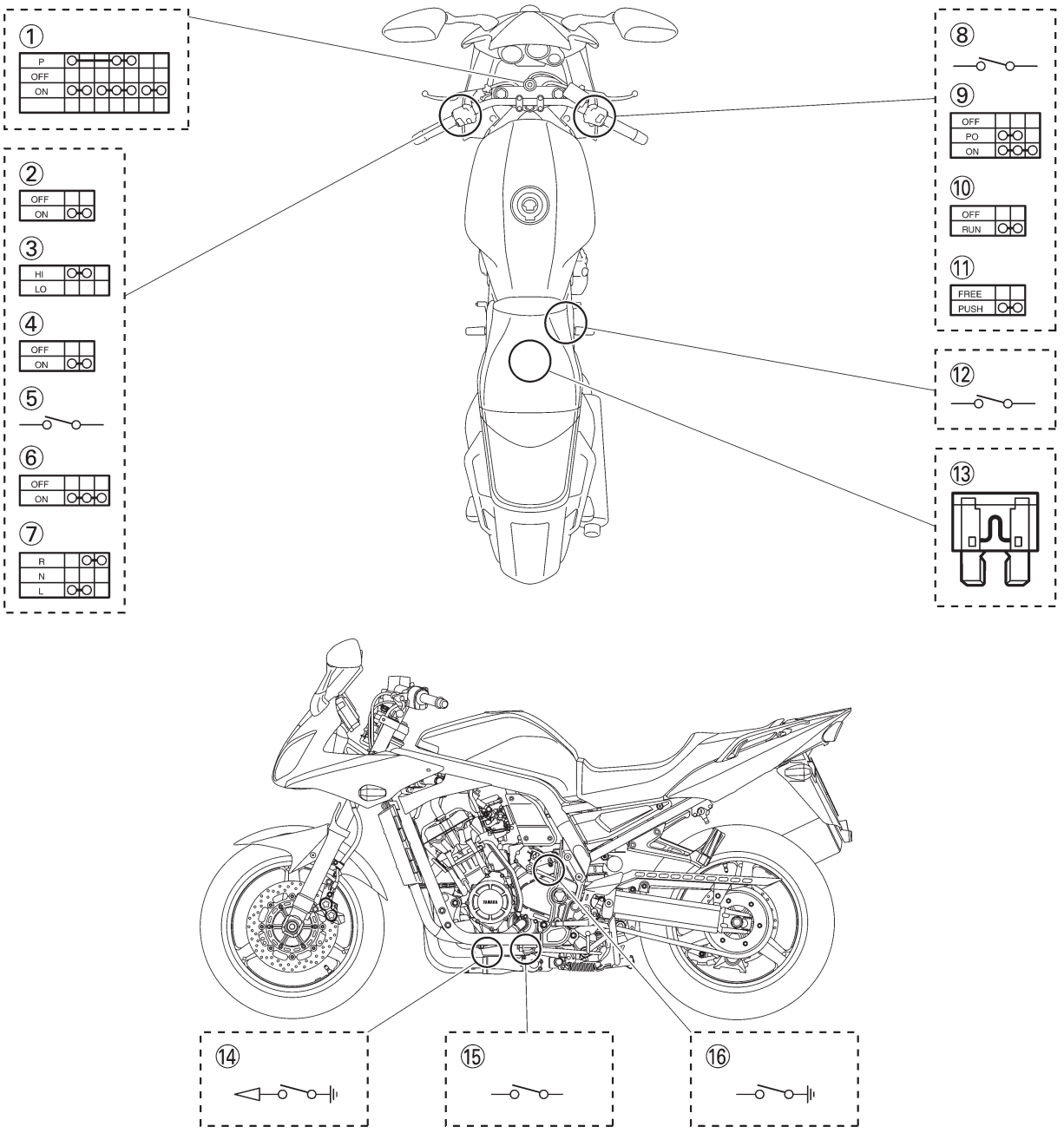
"○——○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:
There is continuity between blue/red and red when the switch is set to "P".
There is continuity between blue/red and blue when the switch is set to "ON".

EAS00731
CHECKING THE SWITCHES

Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to “CHECKING SWITCH CONTINUITY”.

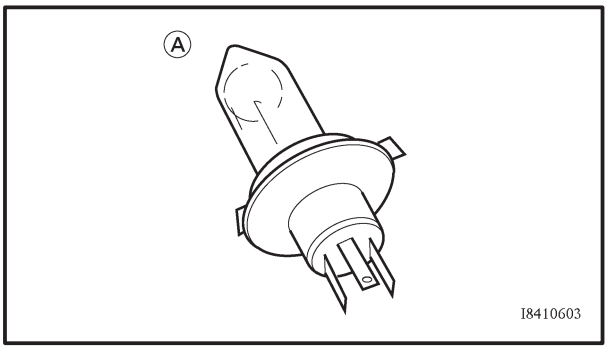
Damage/wear → Repair or replace the switch.
Improperly connected → Properly connect.
Incorrect continuity reading → Replace the switch.

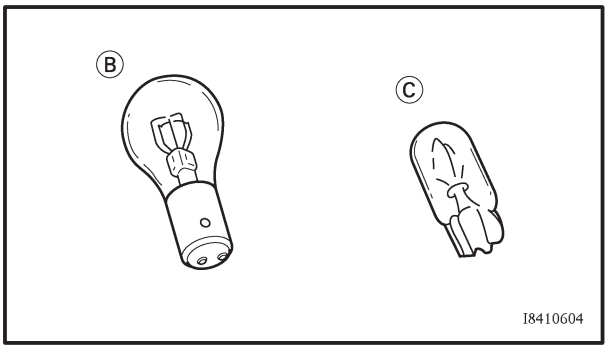


① Main switch
② Pass switch
③ Dimmer switch
④ Horn switch
⑤ Clutch switch
⑥ Hazard switch
⑦ Turn signal switch
⑧ Front brake switch
⑨ Light switch
⑩ Engine stop switch
⑪ Start switch
⑫ Rear brake switch
⑬ Fuse
⑭ Side stand switch
⑮ Neutral switch
⑯ Oil level switch

EAS00732
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
Incorrect continuity reading → Repair or replace the bulb, bulb socket or both.





TYPES OF BULBS

The bulbs used on this motorcycle are shown in the illustration on the left.

- Bulbs Ⓐ are used for headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb Ⓑ is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs Ⓒ are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:
   • bulb

⚠ WARNING

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

CAUTION:

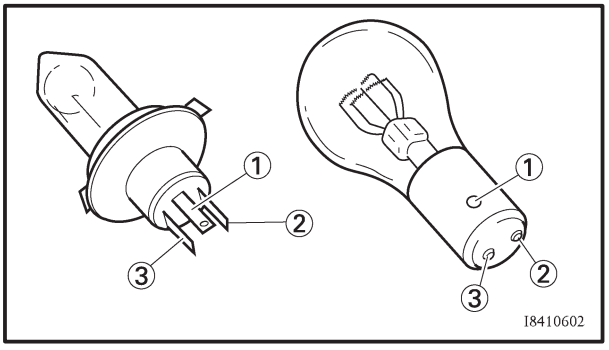
- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   • bult (for continuity)
   (with the pocket tester)
   No continuity → Replace.

Pocket tester
90890-03112

NOTE:

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.



a. Connect the tester positive probe to terminal ① and the tester negative probe to terminal ②, and check the continuity.
b. Connect the tester positive probe to terminal ① and the tester negative probe to terminal ③, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:
   - bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.

	Pocket tester **90890-03112**

NOTE:

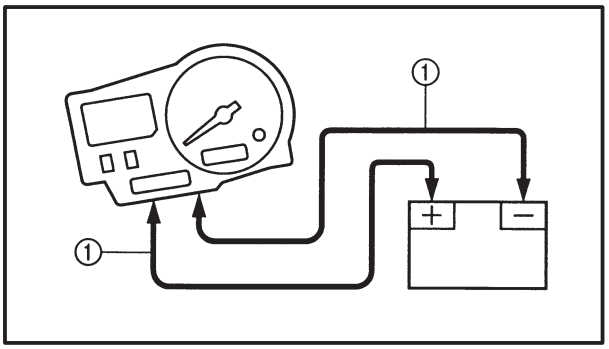
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity.
   If any of the readings indicate no continuity, replace the bulb socket.

CHECKING THE LEDs

The following procedures applies to all of the LEDs.

1. Check:
   - LED (for proper operation)
     Improper operation → Replace.



a. Disconnect the meter assembly coupler (meter assembly side).
b. Connect two jumper leads ① from the battery terminals to the respective coupler terminal as shown.

⚠ WARNING

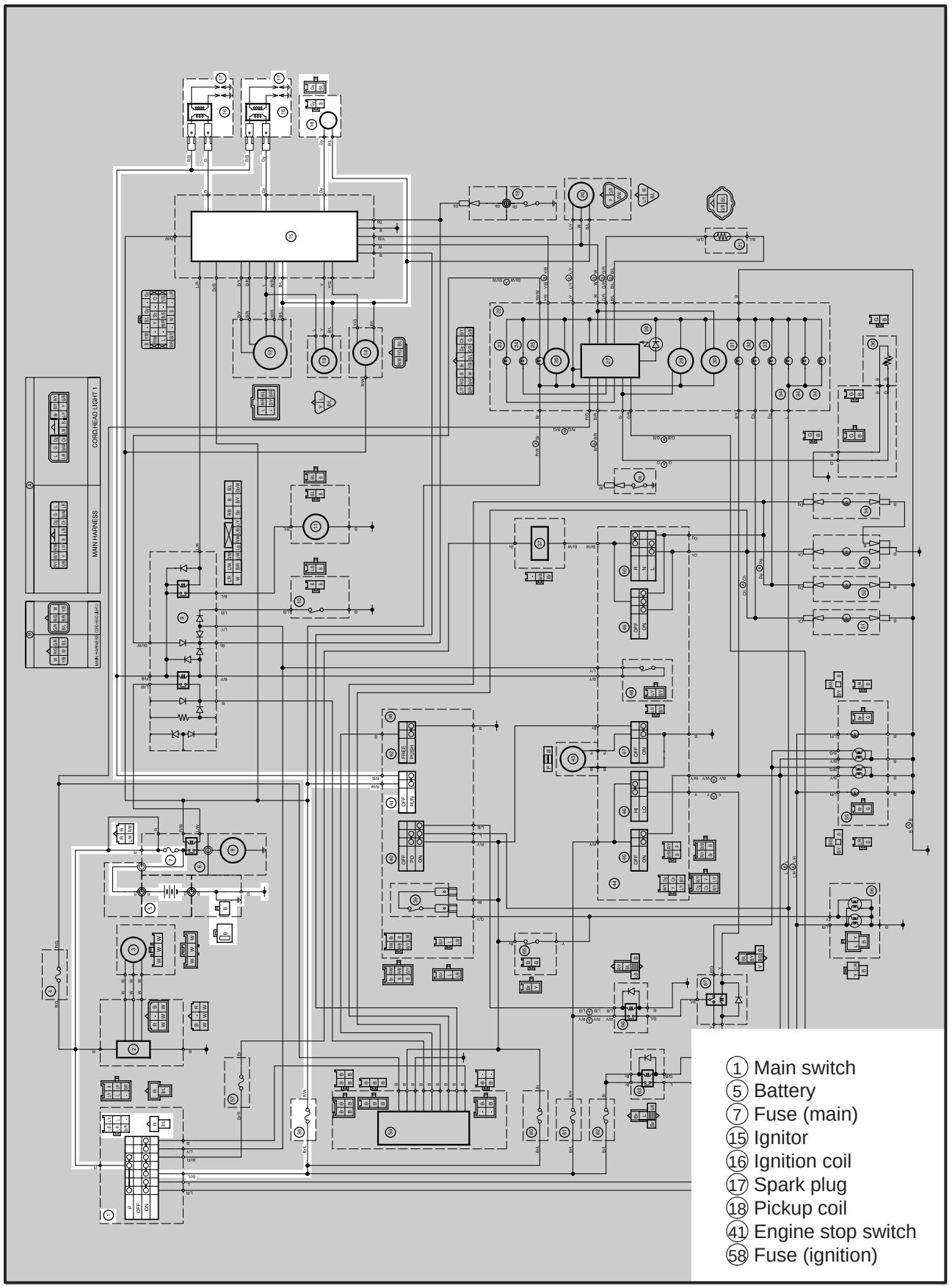
- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**

c. When the jumper leads are connected to the terminals the respective LED should illuminate.
   Does not light → Replace the meter assembly.

EAS00735

IGNITION SYSTEM

CIRCUIT DIAGRAM



EAS00737
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:
1. Main and ignition fuses
2. Battery
3. Spark plugs
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Main switch
8. Engine stop switch
9. Pickup coil resistance
10. Wiring connections
(of the entire ignition system)

NOTE:

Before troubleshooting, remove the following part(-s):
1) Seat
2) Fuel tank
3) Side cover
- Troubleshoot with the following special tool(-s).

Dynamic spark tester
YM-34487
Ignition checker
90890-60754
Pocket tester
90890-03112

EAS00738

1. Main and ignition fuses

- Check the main and ignition fuses for continuity.
Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main and ignition fuses OK?

YES

NO

Replace the fuse(s).

EAS00739

2. Battery

- Check the condition of the battery.
Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES

NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00741

3. Spark plugs

The following procedure applies to all of the spark plugs.
- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
Refer to "CHECKING THE SPARK PLUGS" in CHAPTER 3.

Standard spark plug
CR9E (NGK)
U27ESR-N (DENSO)
Spark plug gap
0.7 ~ 0.8 mm

- Is the spark plug in good condition, it is of the correct type, and is its gap within specification?

YES

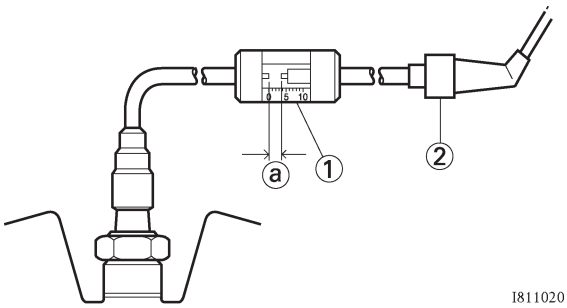
NO

Re-gap or replace the spark plug.

EAS00743

4. Ignition spark gap

The following procedure applies to all of the spark plugs.
- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ①as shown.
  ② Spark plug cap
- Set the main switch to "ON".
- Measure the ignition spark gap ⓐ.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.



Minimum ignition spark gap
6.0 mm

- Is there a spark and is the spark gap within specification?

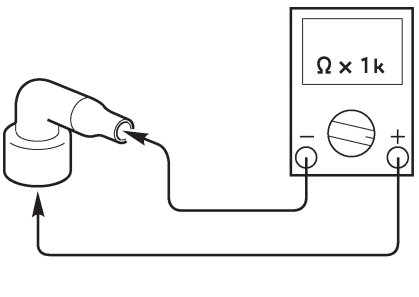
NO → The ignition system is OK.

YES

EAS00745

5. Spark plug cap resistance

The following procedure applies to all of the spark plug caps.
- Remove the spark plug cap from the spark plug lead.
- Connect the pocket tester ("Ω × 1k") to the spark plug cap as shown.
- Measure the spark plug cap resistance.



Spark plug cap resistance
10 kΩ at 20°C

- Is the spark plug cap OK?

YES

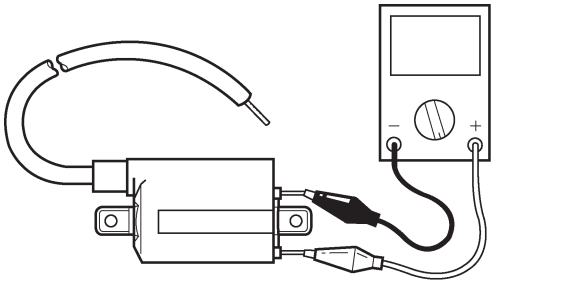
NO → Replace the spark plug cap.

EAS00747

6. Ignition coil resistance

The following procedure applies to all of the ignition coils.
- Disconnect the ignition coil leads from the wire harness.
- Connect the pocket tester (Ω × 1) to the ignition coil as shown.

Positive tester probe → red/black
Negative tester probe → orange (gray)

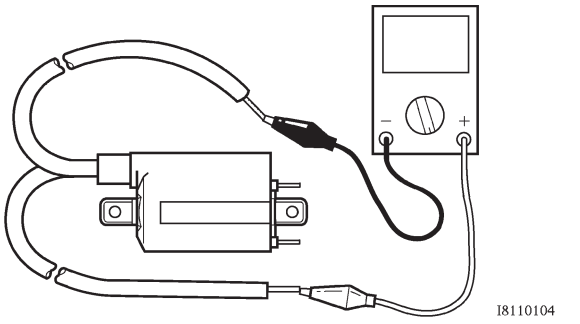


- Measure the primary coil resistance.

Primary coil resistance
1.87 ~ 2.53 Ω at 20°C

- Connect the pocket tester (Ω × 1k) to the ignition coil as shown.

Posltlve tester probe → spark plug lead
Negative tester probe → spark plug lead



- Measure the secondary coil resistance.

Secondary coil resistance
12 ~ 18 kΩ at 20°C

- Is the ignition coil OK?

YES

NO

Replace the ignition coil.

EAS00749

7. Main switch

- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

YES

NO

Replace the main switch.

EAS00750

8. Engine stop switch

- Check the engine stop switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the engine stop switch OK?

YES

NO

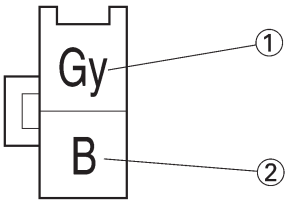
Replace the right handlebar switch.

EAS00748

9. Pickup coil resistance

- Disconnect the pickup coil coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the pickup coil terminal as shown.

Positive tester probe → gray ①
Negative tester probe → black ②



- Measure the pickup coil resistance.

Pickup coil resistance
248 ~ 372 Ω at 20°C
(between gray and black)

- Is the pickup coil OK?

YES

NO

Replace the pickup coil.

EAS00754

10. Wiring

- Check the entire ignition system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the ignition system’s wiring properly connected and without defects?

NO

YES

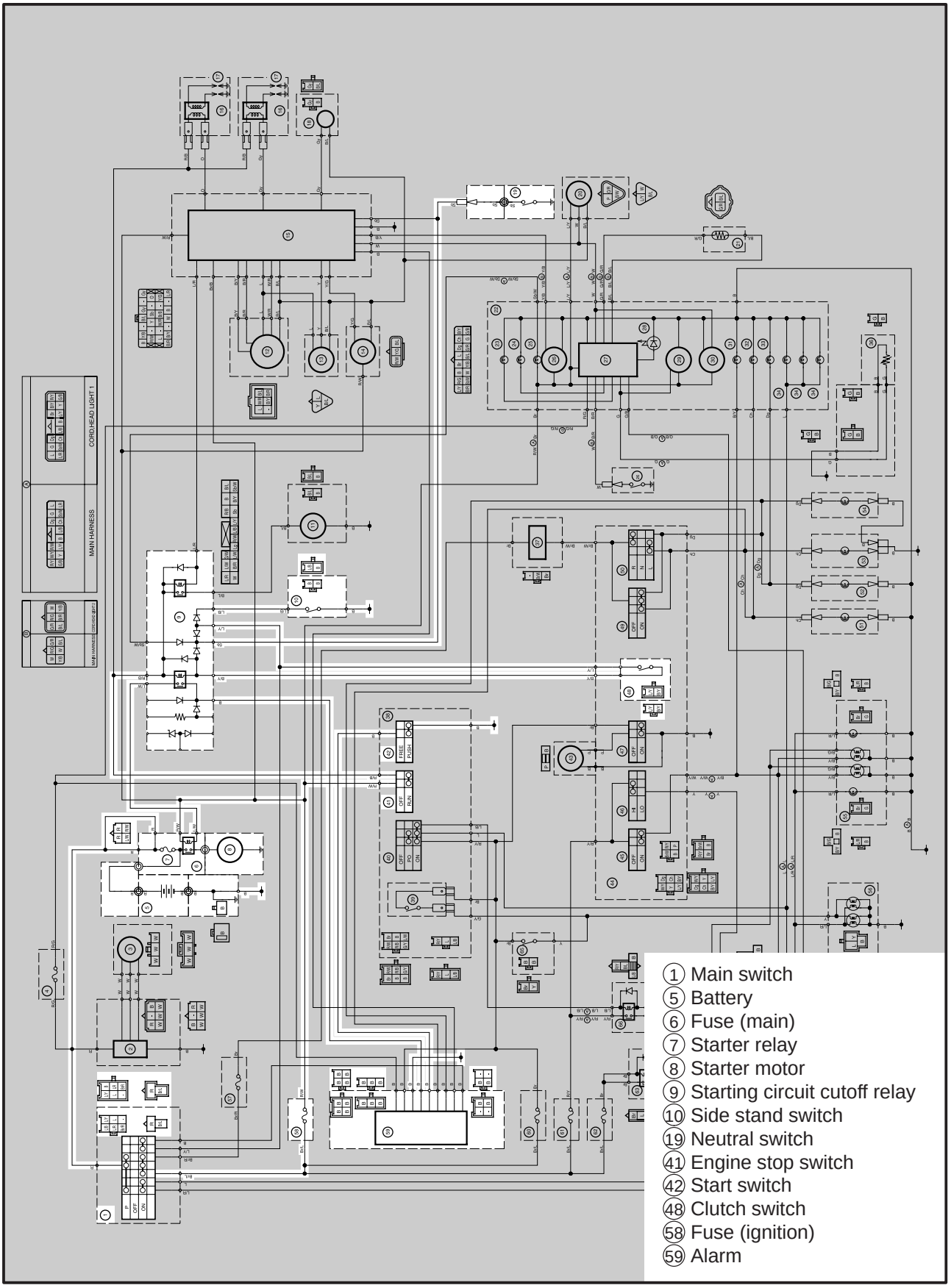
Properly connect or repair the ignition system’s wiring.

Replace the ignitor unit.

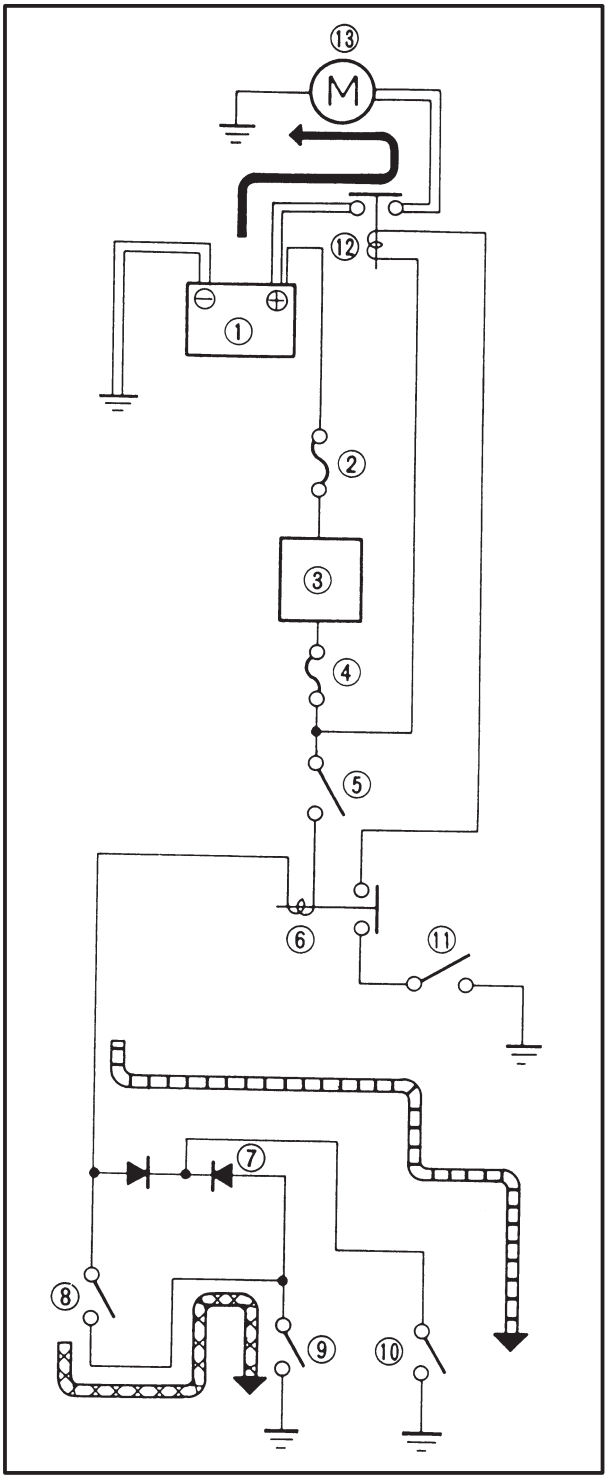
EAS00755

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM



① Main switch
⑤ Battery
⑥ Fuse (main)
⑦ Starter relay
⑧ Starter motor
⑨ Starting circuit cutoff relay
⑩ Side stand switch
⑲ Neutral switch
㊶ Engine stop switch
㊷ Start switch
㊽ Clutch switch
㊽ Fuse (ignition)
㊾ Alarm



EAS00756

STARTING CIRCUIT CUTOFF SYSTEM OPERATION

If the engine stop switch is set to "" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cutoff relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cutoff relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cutoff relay is closed and the engine can be started by pressing the start switch.

WHEN THE TRANSMISSION IS IN NEUTRAL

WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

① Battery
② Fuse (main)
③ Main switch
④ Fuse (ignition)
⑤ Engine stop switch
⑥ Starting circuit cutoff relay
⑦ Diode
⑧ Clutch switch
⑨ Sidestand switch
⑩ Neutral switch
⑪ Start switch
⑫ Starter relay
⑬ Starter motor

EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. Main and ignition fuses
2. Battery
3. Starter motor
4. Starting circuit cutoff relay
5. Starter relay
6. Main switch
7. Engine stop switch
8. Neutral switch
9. Sidestand switch
10. Clutch switch
11. Start switch
12. Wiring connections (of the entire starting system)

NOTE:

- Before troubleshooting, remove the following part(-s):

1) Seat
2) Fuel tank
3) Side cover

- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738

1. Main and ignition fuses

- Check the main and ignition fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main and ignition fuses OK?

YES

NO

Replace the fuse (s).

EAS00739

2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES

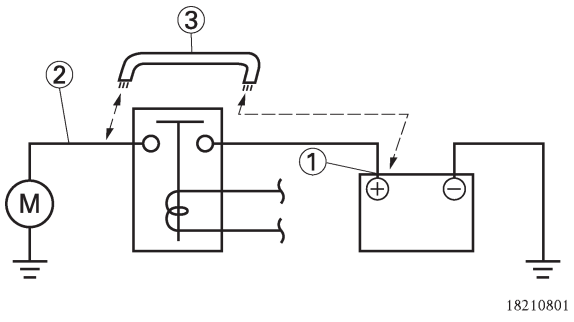
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00758

3. Starter motor

- Connect the positive battery terminal ① and starter motor lead ② with a jumper lead ③.



⚠ WARNING

- A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.

- Does the starter motor turn?

YES

NO

Repair or replace the starter motor.

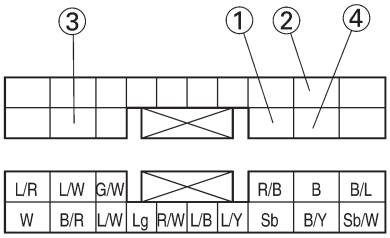
EAS00759

4. Starting circuit cutoff relay

- Disconnect the starting circuit cutoff relay coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starting circuit cutoff relay coupler as shown.

Positive battery lead → red/black ①
Negative battery lead → black/yellow ②

Positive tester probe → blue/white ③
Negative tester probe → black ④



- Does the starting circuit cutoff relay have continuity between blue/white and black?

YES → NO

Replace the starting circuit cutoff relay.

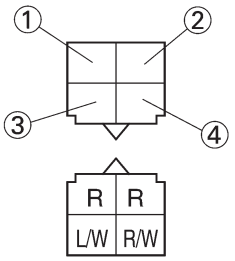
EAS00761

5. Starter relay

- Disconnect the starter relay coupler from the wireharness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starter relay coupler as shown.

Positive battery lead → blue/white ①
Negative battery lead → red/white ②

Positive tester probe → red ③
Negative tester probe → red ④



- Does the starter relay have continuity between red and red?

YES → NO

Replace the starter relay.

EAS00749

6. Main switch

- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

YES → NO

Replace the main switch.

EAS00750

7. Engine stop switch

- Check the engine stop switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the engine stop switch OK?

YES → NO

Replace the right handlebar switch.

EAS00751

8. Neutral switch

- Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the neutral switch OK?

YES → NO → Replace the neutral switch.

EAS00752

9. Sidestand switch

- Check the sidestand switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the sidestand switch OK?

YES → NO → Replace the sidestand switch.

EAS00763

10. Clutch switch

- Check the clutch switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the clutch switch OK?

YES → NO → Replace the clutch switch.

EAS00764

11. Start switch

- Check the start switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the start switch OK?

YES → NO → Replace the right handlebar switch.

EAS00766

12. Wiring

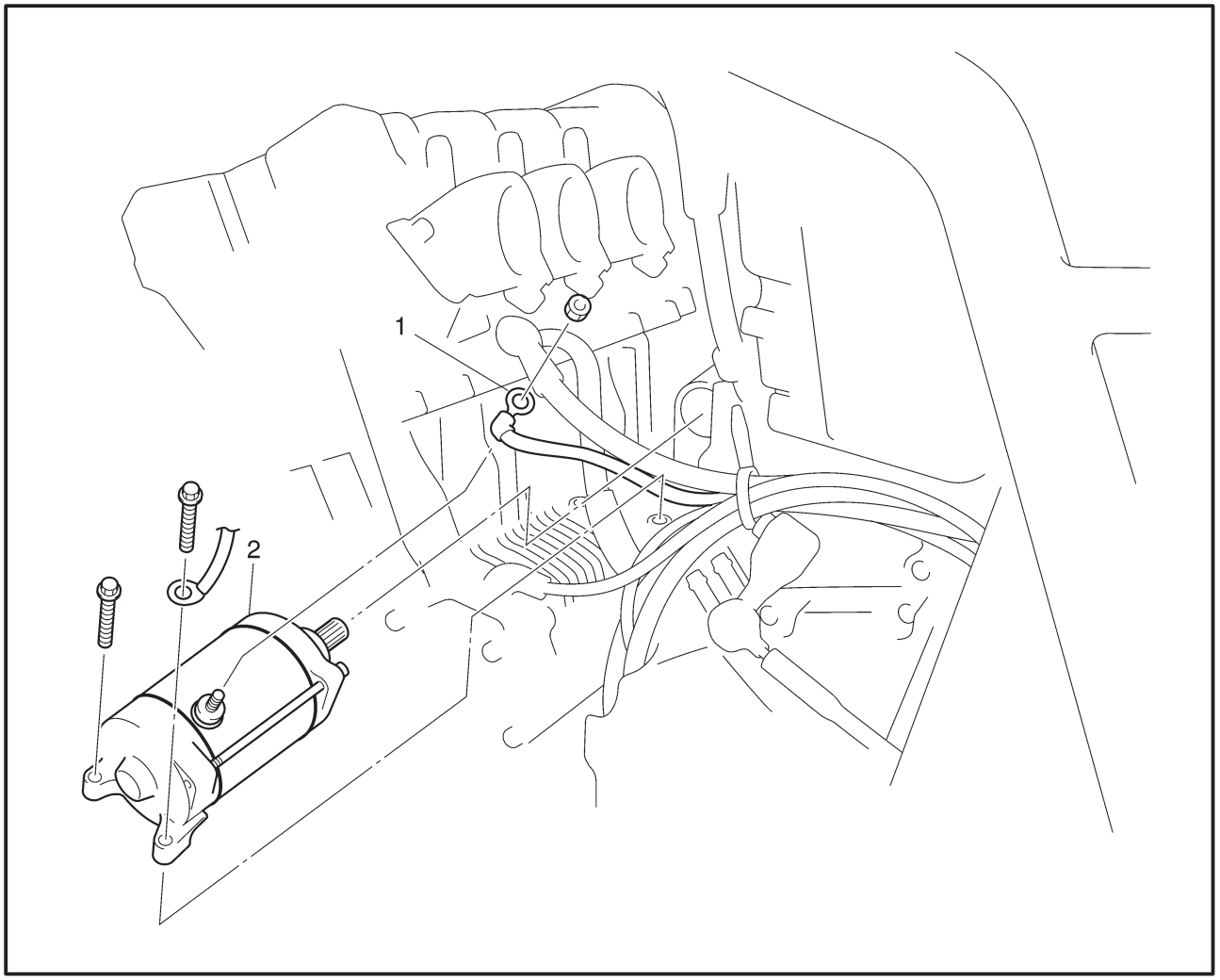
- Check the entire starting system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the starting system’s wiring properly connected and without defects?

YES → The starting system circuit is OK?

NO → Properly connect or repair the starting system’s wiring.

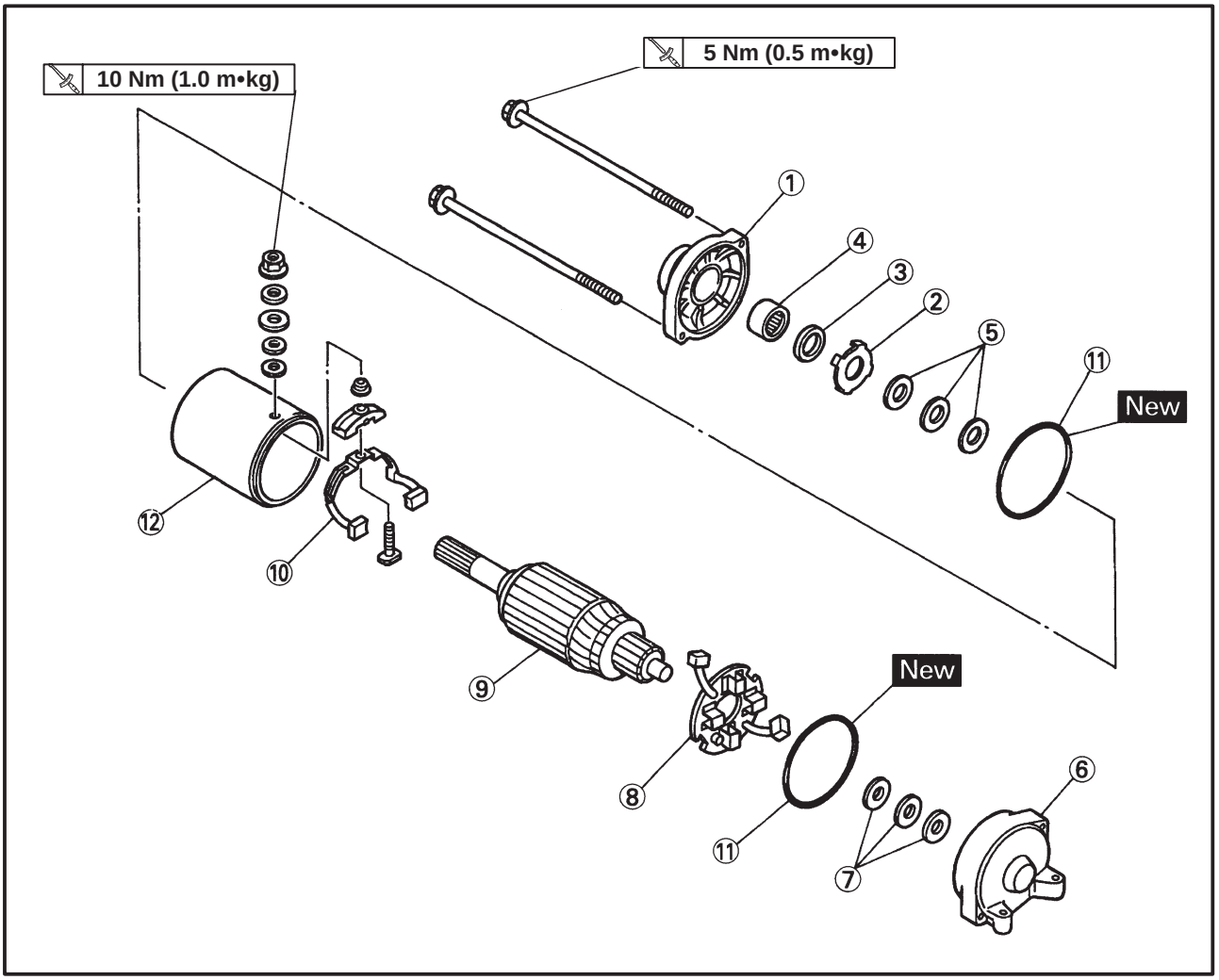
EAS00767

STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter motor		Remove the parts in the order listed.
	Carburetor		Refer to "CARBURETOR" in chapter 7.
1	Starter motor lead	1	
2	Starter motor/O-ring	1/1	
			For installation, reverse the removal procedure.

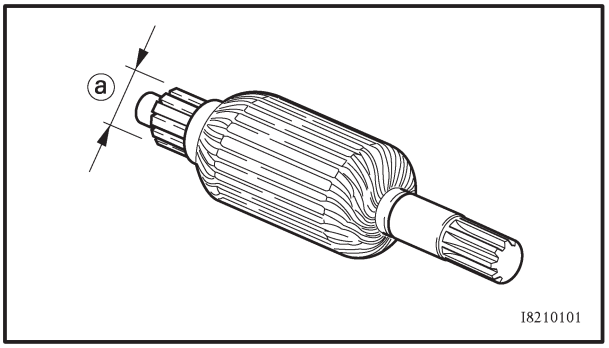
EAS00768



Order	Job/Part	Q'ty	Remarks
	Disassembling the starter motor		Disassemble the parts in the order listed.
①	Starter motor front cover	1	
②	Lock washer	1	
③	Oil seal	1	Refer to "ASSEMBLING THE STARTER MOTOR".
④	Bearing	1	
⑤	Washer set	1	**NOTE:** Be sure to remove the installation nut on brush #1 first.
⑥	Starter motor rear cover	1	
⑦	Washer set	1	
⑧	Brush seat (along with the brushes)	1	
⑨	Armature assembly	1	
⑩	Brush holder (along with the brushes)	1	
⑪	O-ring	2	
⑫	Starter motor yoke	1	
			For assembly reverse the disassembly procedure.

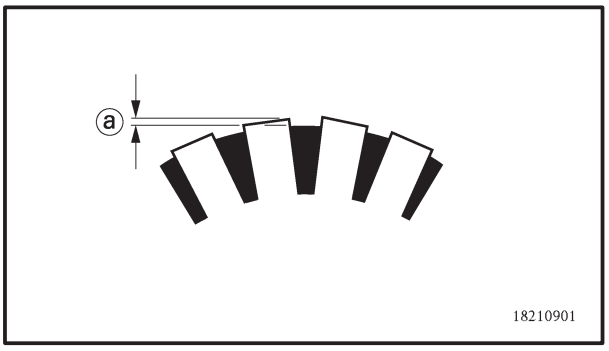
EAS00769
CHECKING THE STARTER MOTOR

1. Check:
   • commutator
   Dirt → Clean with 600-grit sandpaper.



2. Measure:
   • commutator diameter ⓐ
   Out of specification → Replace the starter motor.

Commutator wear limit
27 mm



3. Measure:
   • mica undercut ⓐ
   Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

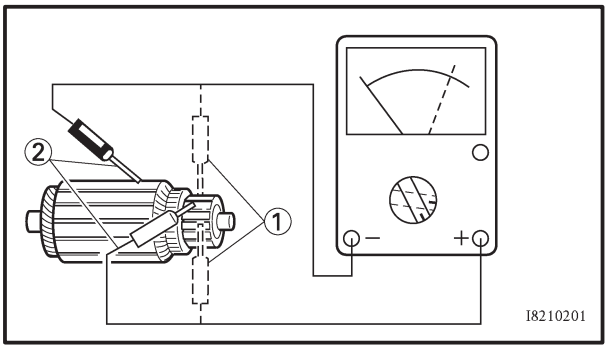
Mica undercut
0.7 mm

NOTE:

The mica must be undercut to ensure proper operation of the commutator.

4. Measure:
   • armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

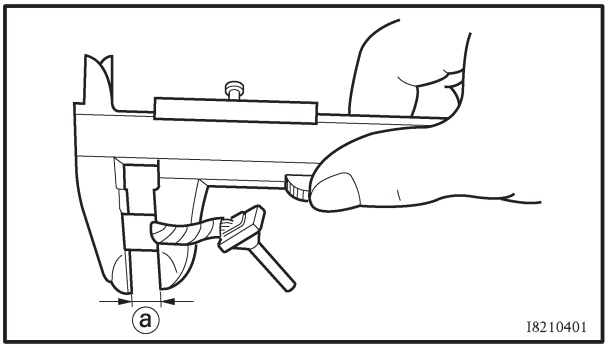
a. Measure the armature assembly resistances with the pocket tester.



Pocket tester
90890-08112

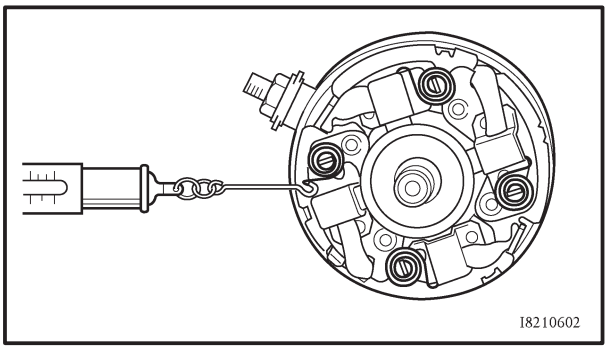
Armature coil
Commutator resistance ①
0.025 ~ 0.035 Ω at 20°C
Insulation resistance ②
Above 1M Ω at 20°C

b. If any resistance is out of specification, replace the starter motor.



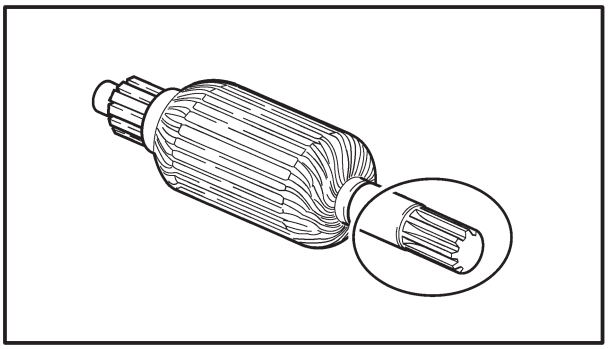
5. Measure:
   • brush length ⓐ
   Out of specification → Replace the brushes as a set.

Brush length wear limit
4 mm

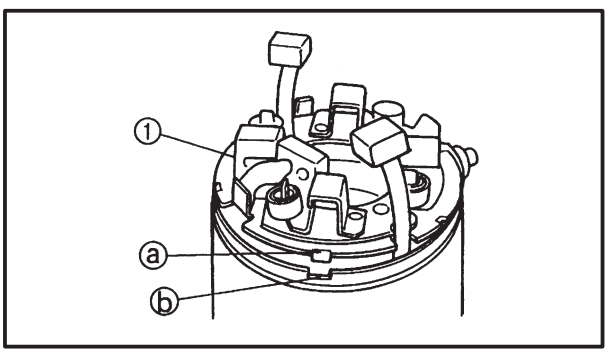


6. Measure:
   • brush spring force
   Out of specification → Replace the brush springs as a set.

Brush spring force
7.65 ~ 10.01 N



7. Check:
   • gear teeth
   Damage/wear → Replace the gear.



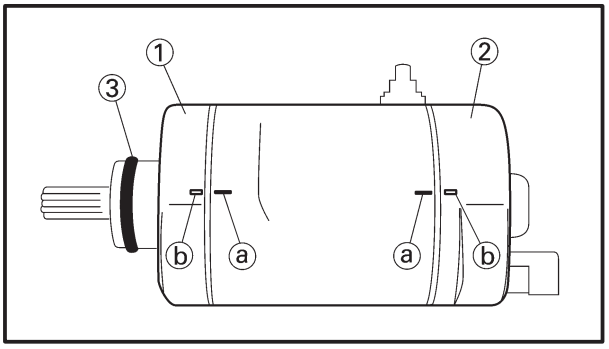
EAS00772

ASSEMBLING THE STARTER MOTOR

1. Install:
   • armature
   • brush seat ①

NOTE:

Align the tab ⓐ on the brush seat with the slot ⓑ in the starter motor rear cover.



2. Install:
   - starter motor front cover ①
   - starter motor rear cover ②
   - O-ring ③ New

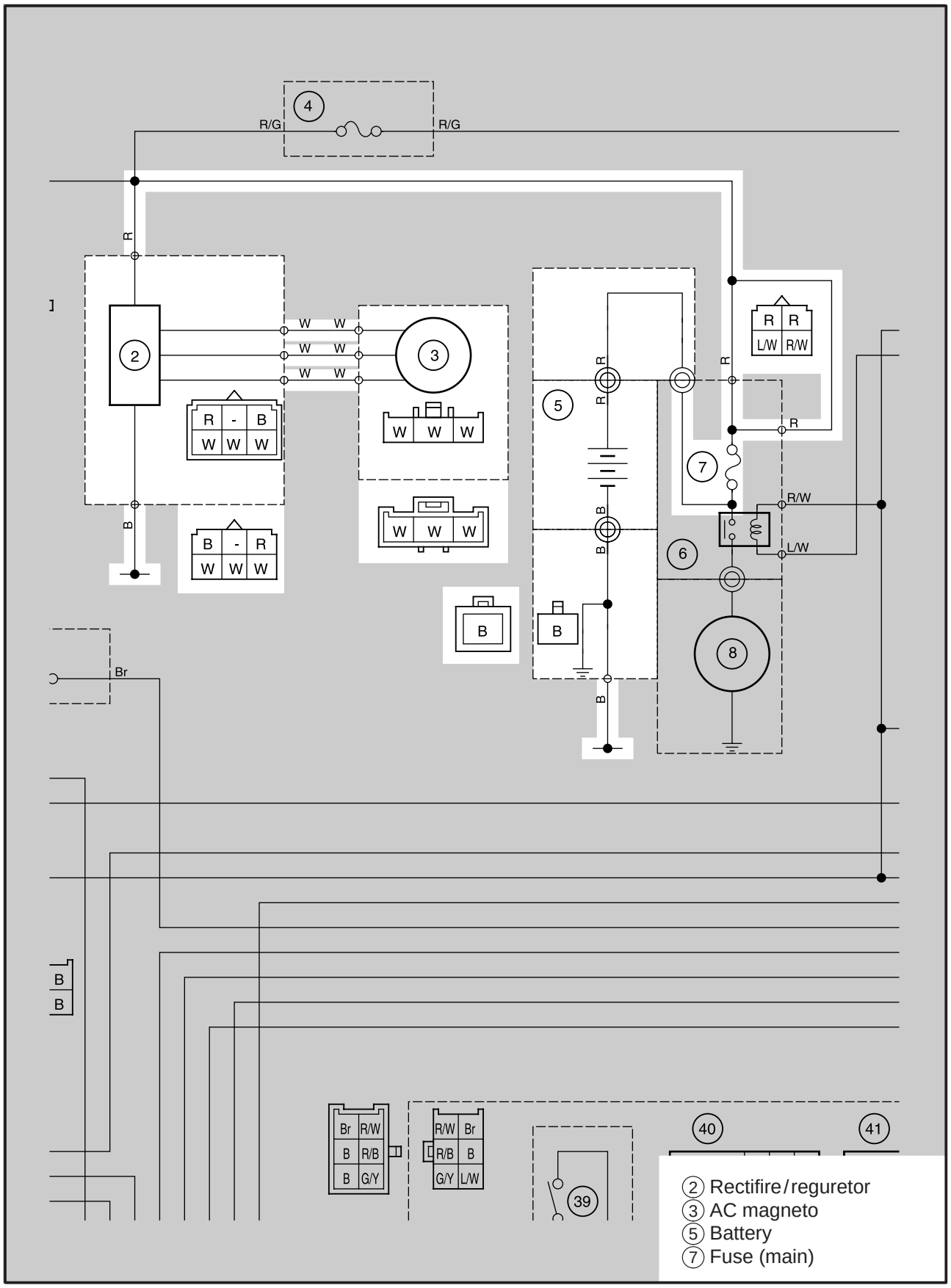
NOTE:

Align the match marks ⓐ on the starter motor yoke with the match marks ⓑ on the front and starter motor rear covers.

EAS00773

CHARGING SYSTEM

CIRCUIT DIAGRAM



EAS00774
TROUBLESHOOTING

The battery is not being charged.

Check:
1. Main fuse
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connections
   (of the entire charging system)

NOTE:
- Before troubleshooting, remove the following part(-s):

1) Seat
2) Fuel tank
3) Side cover

- Troubleshoot with the following special tool(-s).

Engine tachometer
90890-03113
Pocket tester
90890-03112

EAS00738
1. Main fuses

- Check the fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the fuses OK?

YES

NO

Replace the fuse (s).

EAS00739
2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES

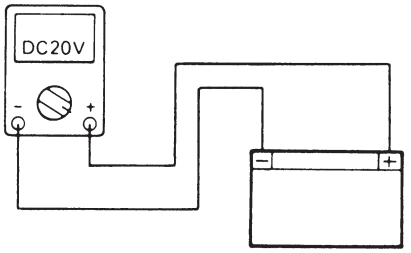
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00775
3. Charging voltage

- Connect the engine tachometer to the spark plug lead of cylinder #1.
- Connect the pocket tester (DC 20 V) to the battery as shown.

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



- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.

Charging voltage
14 V at 5,000 r/min

NOTE:
Make sure the battery is fully charged.

- Is the charging voltage within specification?

NO

YES

The charging circuit is OK.

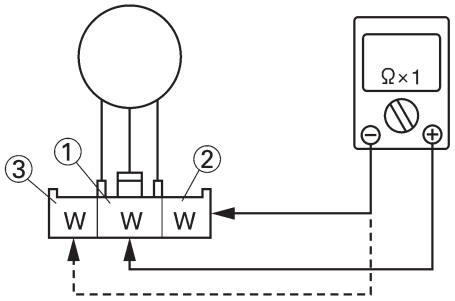
EAS00776

4. Stator coil resistance

- Remove the generator cover.
- Connect the pocket tester (Ω × 1) to the stator coils as shown.

Positive tester probe → white ①
Negative tester probe → white ②

Positive tester probe → white ③
Negative tester probe → white ①



- Measure the stator coil resistances.

Stator coil resistance
0.27 ~ 0.33 Ω at 20°C

- Is the stator coil OK?

YES → NO

Replace the stator coil assembly.

EAS00779

5. Wiring

- Check the wiring connections of the entire charging system.
  Refer to “CIRCUIT DIAGRAM”.

- Is the charging system’s wiring properly connected and without defects?

YES → Replace the rectifier/regulator.

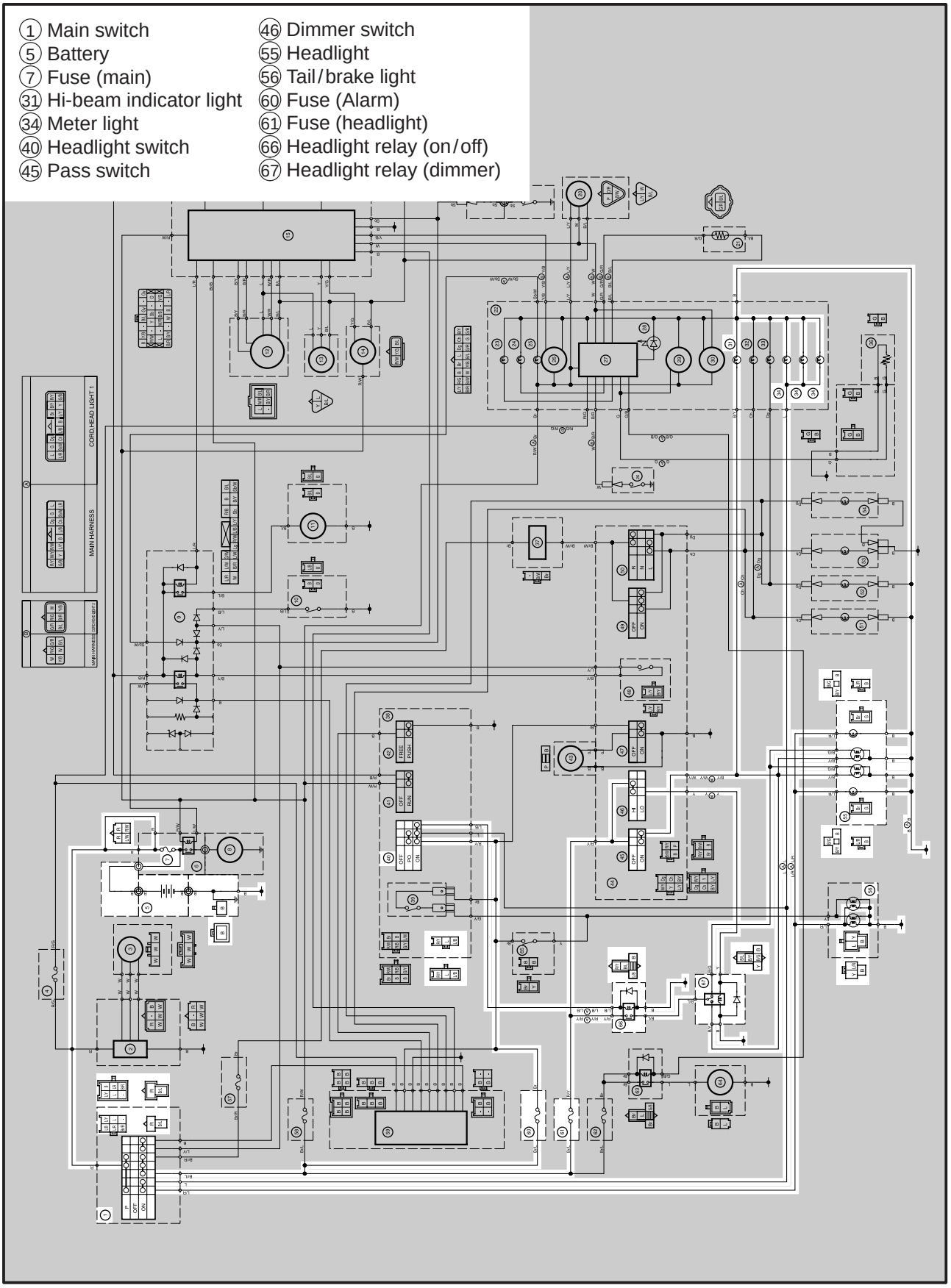
NO → Properly connect or repair the charging system’s wiring.

EAS00780

LIGHTING SYSTEM

CIRCUIT DIAGRAM

① Main switch
⑤ Battery
⑦ Fuse (main)
㉛ Hi-beam indicator light
㉞ Meter light
㊵ Headlight switch
㊺ Pass switch
㊻ Dimmer switch
㊺ Headlight
㊻ Tail/brake light
㊵ Fuse (Alarm)
㊶ Fuse (headlight)
㊻ Headlight relay (on/off)
㊼ Headlight relay (dimmer)



EAS00781
TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, auxiliary light or meter light.

Check:
1. Main, headlight and alarm fuses
2. Battery
3. Main switch
4. Headlight switch
5. Dimmer switch
6. Pass switch
7. Headlight relay (on/off) (for EUR)
8. Headlight relay (dimmer)
9. Wiring connections
   (of the entire charging system)

NOTE:
- Before troubleshooting, remove the following part(-s):

1) Seat
2) Fuel tank
3) Side cover

- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738

1. Main, headlight and alarm fuses

- Check the main, headlight and alarm fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main, headlight and alarm fuses OK?

YES

NO → Replace the fuse (s).

EAS00739

2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES

NO →
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".

- Is the main switch OK?

YES

NO → Replace the main switch.

EAS00783

4. Headlight switch

- Check the headlight switch for continuity
  Refer to "CHECKING THE SWITCHES".

- Is the headlight switch OK?

YES

NO → The headlight switch is faulty. Replace the right handlebar switch.

EAS00784

5. Dimmer switch

- Check the dimmer switch for continuity.
  Refer to "CHECKING THE SWITCHES".

- Is the dimmer switch OK?

YES

NO → The dimmer switch is faulty. Replace the left handlebar switch.

EAS00786

6. Pass switch

- Check the pass switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the pass switch OK?

YES

NO

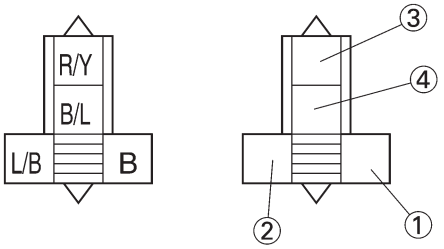
The pass switch is faulty.
Replace the left handlebar switch.

7. Headlight relay (on/off) (for EUR)

- Disconnect the headlight relay (on/off) from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the headlight relay (on/off) coupler as shown.

Positive battery lead → blue/black ①
Negative battery lead → black ②

Positive tester probe → red/yellow ③
Negative tester probe → black/blue ④



- Does the headlight relay (on/off) have continuity between red/yellow and black/blue?

YES

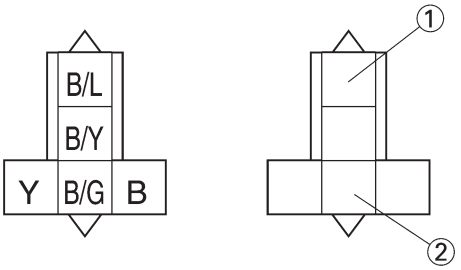
NO

Replace the headlight relay (on/off).

8. Headlight relay (dimmer)

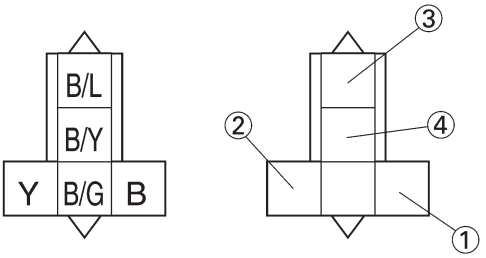
- Disconnect the headlight relay (dimmer) from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the headlight relay (dimmer) coupler as shown.

Low-beam
Positive tester probe → black/blue ①
Negative tester probe → black/green ②



Hi-beam
Positive battery lead → yellow ①
Negative battery lead → black ②

Positive tester probe → black/blue ③
Negative tester probe → black/yellow ④



- Does the headlight rrelay (dimmer) have continuity?

YES

NO

Replace the headlight relay (dimmer).

EAS00787

9. Wiring

- Check entire lighting system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the lighting system’s wiring properly connected and without defects?

YES

NO

Check the condition of each of the lighting system’s circuits. Refer to “CHECKING THE LIGHTING SYSTEM”.

Properly connect or repair the lighting system’s wiring.

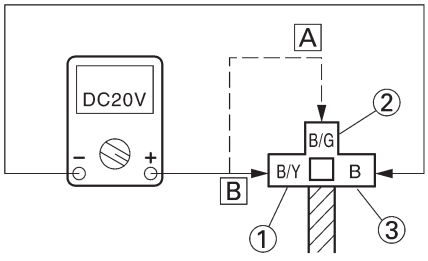
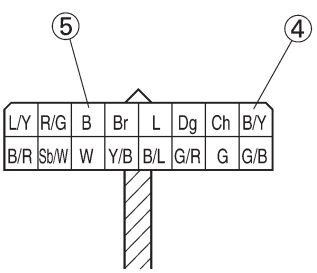
EAS00788
CHECKING THE LIGHTING SYSTEM

1. The headlight and the high beam indicator light fail to come on.

1. Headlight buld and scocket
• Check the headlight bulb and socket for continuity.
• Are the headlight bulb and socket OK?

YES → (proceed to 2. Voltage)

NO → Replace the headlight bulb, socket or both

2. Voltage
• Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.
A When the dimmer switch is set to " ≣D ". B When the dimmer switch is seto to " ≣D ".
Headlight **Positive tester probe → black/yellow① or black/green②** **Negative tester probe → black ③** **High beam indicator light** **Positive tester probe → black/yellow④** **Negative tester probe → black ⑤**
Headlight coupler (wire harness side) 
Meter light coupler (wire harness side) 

- Set the main switch to "ON".
- Set the light switch to "ON".
- Set the dimmer switch to " ≣D " or " ≣D ".
- Measure the voltage (12 V) (wire harness side).

• Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the headlight coupler is faulty and must be repaired.

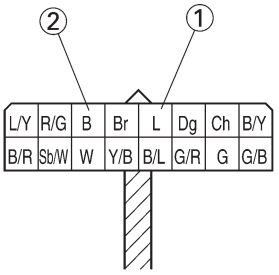
EAS00789

2. The meter light fails to come on.

1. Meter light bulb and socket
• Check the meter light bulb and socket for continuity.
• Are the meter light bulb and socket OK?

YES → (proceed to 2. Vollage)

NO → Replace the meter light bulb, socket of both.

2. Vollage
• Connect the pocket tester (DC 20 V) to the meter light coupler (wire harness side) as shown.
Positive tester probe → blue ① **Negative tester probe → black ②**


- Set the main switch to “ON”.
- Set the light switch to “PO” or “ON”.
- Measure the voltage (12 V) of blue ① on the meter light coupler (wire harness side).

- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the meter light coupler is faulty and must be repaired.

- Set the main switch to “ON”.
- Set the light switch to “PO” or “ON”.
- Measure the voltage (12 V) of blue/red ① on the tail/brake light coupler (tail/brake light side).

- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EAS00790
3. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket

- Chek the tail/brake light bulb and socket for continuity.

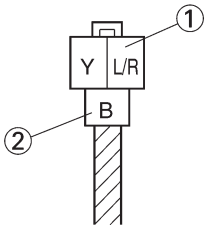
- Are the tail/brake light bulb and socket OK?

YES → NO → Replace the tail/brake light bulb, socket or both.

2. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

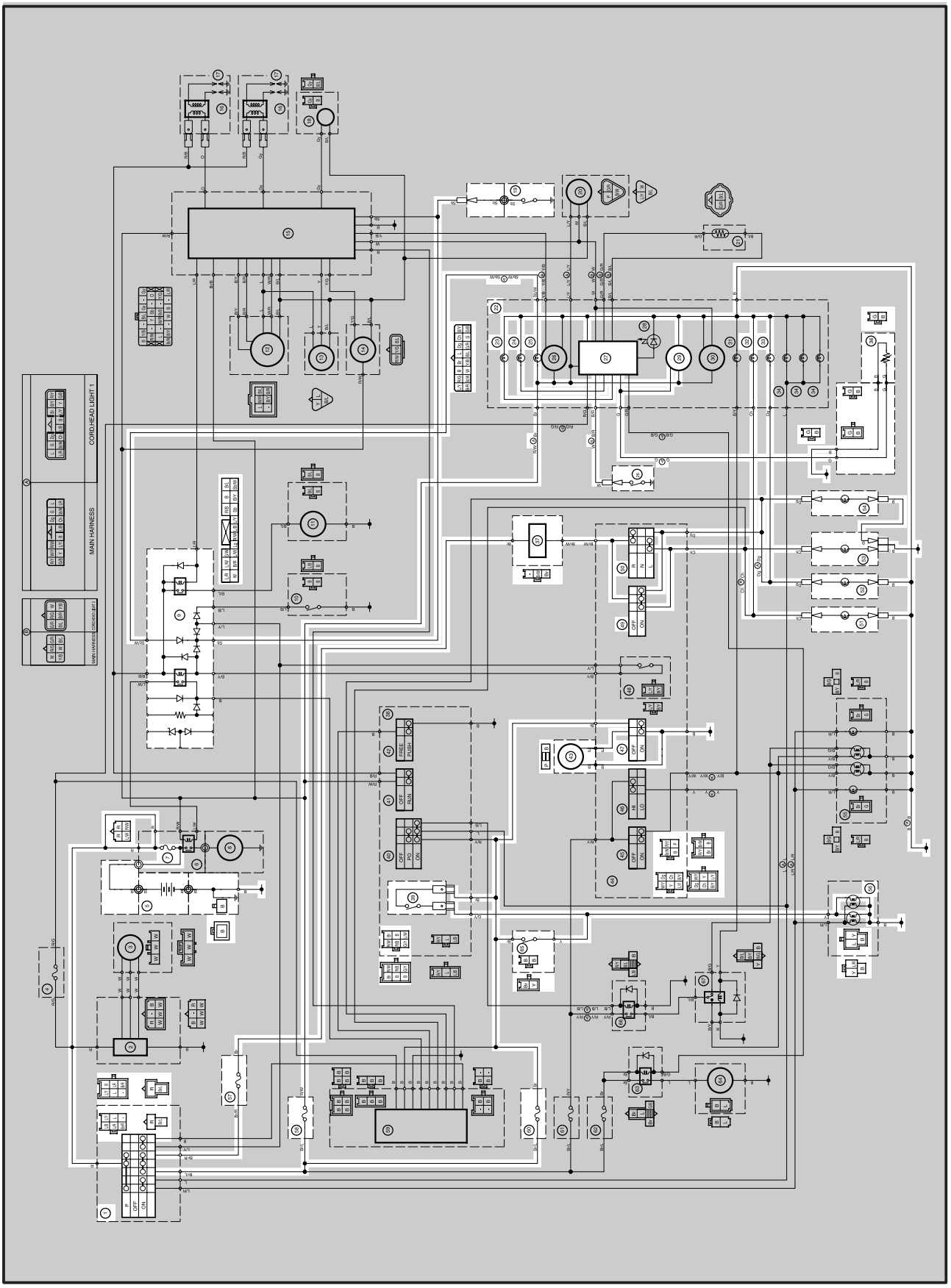
Positive tester probe → blue/red ①
Negative tester probe → black ②



EAS00793

SIGNAL SYSTEM

CIRCUIT DIAGRAM



① Main switch
⑤ Battery
⑦ Fuse (main)
⑨ Starting circuit cutoff relay
⑲ Neutral switch
㉓ Fuel level warning light
㉔ Oil level warning light
㉕ Neutral indicator light
㉗ Combination meter
㉙ Fuel gauge
㉜ Turn signal indicator light (left)
㉝ Turn signal indicator light (right)
㉟ Oil level gauge
㊱ Fuel sender
㊲ Turn signal relay
㊴ Front brake light switch
㊸ Horn
㊼ Horn switch
㊾ Hazard switch
㊿ Turn signal switch
(51) Front turn signal light (left)
(52) Front turn signal light (right)
(53) Rear turn signal light (left)
(54) Rear turn signal light (right)
(56) Tail/brake light
(57) Fuse (turn signal)
(58) Fuse (ignition)
(60) Fuse (alarm)
(65) Rear brake light switch

EAS00794
TROUBLESHOOTING

- Any of the following fail to come on: turn signal light, brake light or indicator light.
- The horn fails to sound.

Check:
1. Main, signal, alarm and clock fuses
2. Battery
3. Main switch
4. Wiring connections (of the entire signal system)

NOTE:

- Before troubleshooting, remove the following part(s):

1) Seat
2) Fuel tank
3) Front cowling
4) Side cover

- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00738

1. Main, signal, alarm and ignition fuses

- Check the main, signal, alarm and ignition fuses for continuity. Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main, signal, alarm and ignition fuses OK?

YES ⇩ NO ⇩

Replace the fuse (s).

EAS00739

2. Battery

- Check the condition of the battery. Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES ⇩ NO ⇩

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the main switch OK?

YES ⇩ NO ⇩

Replace the main switch.

EAS00795

4. Wiring

- Check the entire signal system's wiring. Refer to "CIRCUIT DIAGRAM".

- Is the signaling system's wiring properly connected and without defects?

YES ⇩ NO ⇩

Check the condition of each of the signaling system's circuits. Refer to "CHECKING THE SIGNALING SYSTEM".

Properly connect or repair the signaling system's wiring.

EAS00796
CHECKING THE SIGNAL SYSTEM

1. The horn fails to sound.

1. Horn switch

- Check the horn switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the horn switch OK?

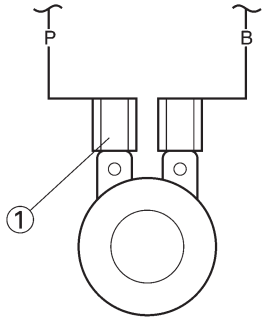
YES ⇩ NO ⇩

Replace the left handlebar switch.

2. Voltage

- Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

Positive tester probe → pink ①
Negative tester probe → black



- Set the main switch to "ON".
- Push the horn switch.
- Measure the voltage (12 V) of pink at the horn terminal.

- Is the voltage within specification?

YES

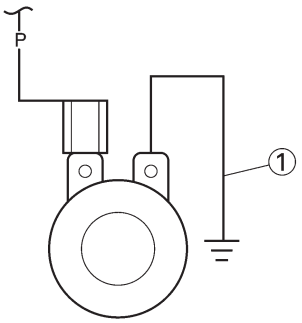
NO

The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

3. Horn

- Disconnect the black connector at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Push the horn switch.

- Does the horn sound?



NO

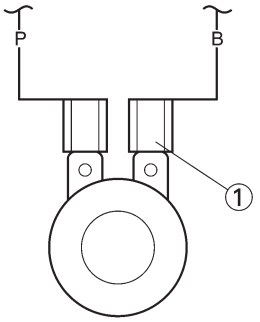
YES

The horn is OK.

4. Voltage

- Connect the pocket tester (DC 20 V) to the horn connector at the black terminal as shown.

Positive tester probe → black ①
Negative tester probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of black ① at the horn terminal.

- Is the voltage within specification?

YES

NO

Repair or replace the horn.

Replace the horn.

EAS00797

2. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket.

- Check the tail/brake light bulb and socket for continuity.

- Are the tail/brake light bulb and socket OK?

YES

NO

Replace the tail/brake light bulb, socket or both.

2. Brake switches

- Check the brake light switches for continuity. Refer to "CHECKING THE SWITCHES".

- Is the brake light switch OK?

YES

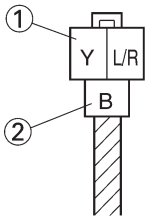
NO

Replace the brake light switch.

3. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Positive tester probe → yellow ①
Negative tester probe → black ②



- Set the main switch to "ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (12 V) of yellow ① on the tail/brake light coupler (wire harness side).

- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EAS00799

3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light bulb and socket

- Check the turn signal light bulb and socket for continuity.

- Are the turn signal light bulbs and socket OK?

YES

NO → Replace the turn signal light bulb, socket or both.

2. Turn signal switch

- Check the turn signal switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the turn signal switch OK?

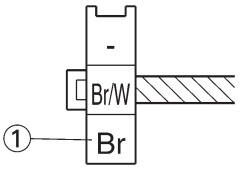
YES

NO → Replace the left handlebar switch.

3. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown.

Positive tester probe → brown ①
Negative tester probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) on brown ① at the turn signal relay coupler (wire harness side).

- Is the voltage within specification?

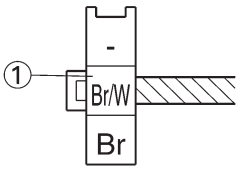
YES

NO → The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.

4. Voltage

- Connect the pocket tester (DC 20 V) to the flasher relay coupler (wire harness side) as shown.

Positive tester probe → brown/white ①
Negative tester probe → ground



- Set the main switch to "ON".
- Set the turn signal switch to " ⇨ " or " ⇦ ".
- Measure the voltage (12 V) on brown/white ① at the turn signal relay coupler (wire harness side).

- Is the voltage within specification?

YES

NO

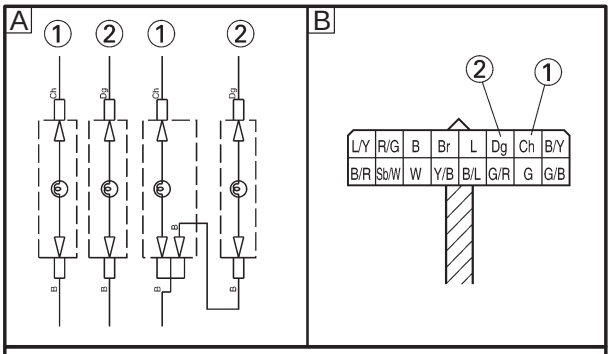
The turn signal relay is faulty and must be replaced.

5. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal light connector (wire harness side) as shown.

A Rear turn signal light
B Turn signal indicator light

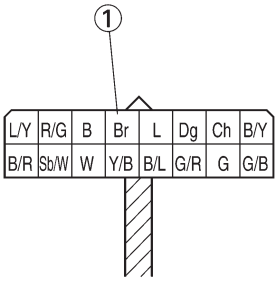
Left turn signal light
Positive tester probe → chocolate ①
Negative tester probe → ground
Right turn signal light
Positive tester probe → dark green ②
Negative tester probe → ground


A
① ② ① ②
Ch
Dg
B
B
B

3. Voltage

- Connect the pocket tester (DC 20 V) to the meter light bulb coupler (wire harness side) as shown.

Positive tester probe → brown ①
Negative tester probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V).

- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the meter light bulb coupler is faulty and must be repaired.

EAS00802
5. The oil level warning light fails to come on.

1. Oil level warning light bulb and socket

- Check the oil level warning light bulb and socket for continuity.

- Are the oil level warning light bulb and socket OK?

YES

NO → Replace the oil level warning light bulb, socket or both.

2. Engine oil level switch

- Drain the engine oil and remove the engine oil level switch from the oil pan.
- Check the engine oil level switch for continuity.
  Refer to "CHECKING THE SWITCHES".

- Is the engine oil level switch OK?

YES

NO → Replace the engine oil level switch.

EAS00795

3. Wiring

- Check the entire signal system's wiring.
  Refer to "CIRCUIT DIAGRAM".

- Is the signaling system's wiring properly connected and without defects?

YES → Replace the meter unit.

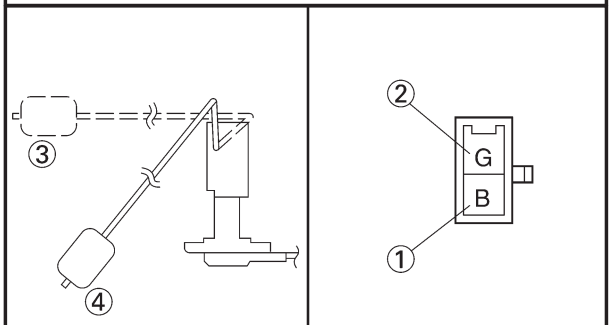
NO → Properly connect or repair the signaling system's wiring.

EAS00804
5. The fuel level gauge fails to operate.

1. Fuel sender

- Remove the fuel sender from the fuel tank.
- Connect the pocket tester to the fuel sender coupler (wire harness side) as shown.

Positive tester probe → green ①
Negative tester probe → black ②



- Measure the fuel sender resistances.

Fuel sender resistance (up position ③) (Ω × 1)
4 ~ 10 Ω at 20°C
Fuel sender resistance (down position ④) (Ω × 10)
90 ~ 100 Ω at 20°C

- Is the fuel sender OK?

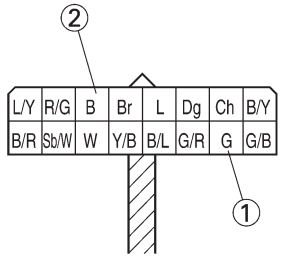
YES → NO

Replace the fuel sender.

2. Voltage

- Connect the pocket tester (DC 20 V) to the meter light coupler (wire harness side) as shown.

Positive tester probe → brown ①
Negative tester probe → black ②



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① on the meter light coupler (wire harness side).

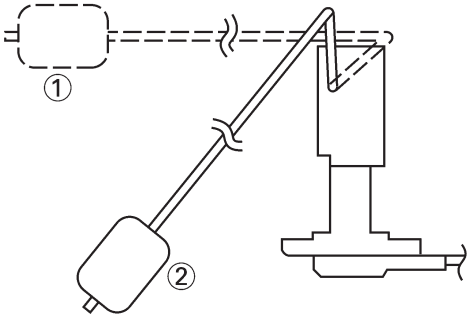
- Is the voltage within specification?

YES → NO

Check the wiring connections of the entire signaling system.

3. Fuel level gauge

- Set the main switch to "ON".
- Move the float up ① or down ②.
- Check that the fuel level gauge needle moves to "F" or "E".



NOTE:
Before reading the fuel level gauge, leave the float in one position (either up or down) for at least three minutes.

- Does the fuel level gauge needle move appropriately?

YES → NO

Replace the fuel level gauge.

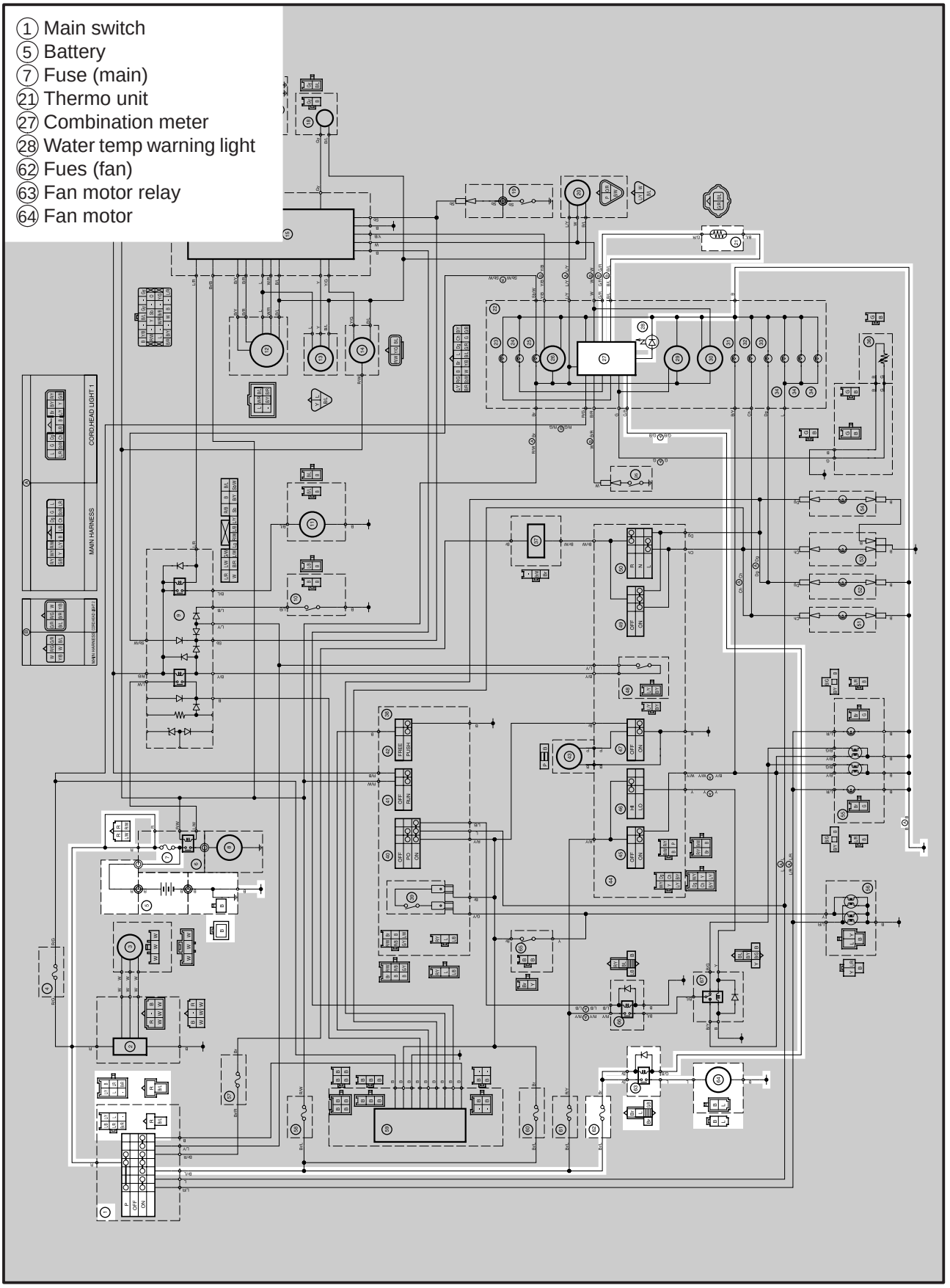
4. Wiring

- Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM".

EAS00807

COOLING SYSTEM

CIRCUIT DIAGRAM



EAS00808
TROUBLESHOOTING

• The radiator fan motor fails to turn.
• The water temperature gauge needle fails to move when the engine is warm.

Check:
1. Main and radiator fan motor fuses
2. Battery
3. Main switch
4. Radiator fan motor
5. Thermo unit
6. Wiring connections
   (the entire cooling system)

NOTE:
- Before troubleshooting, remove the following part(-s).

1) Seat
2) Fuel tank

- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00738

1. Main and radiator fan motor fuses

- Check the main and radiator fan motor fuses for continuity.
  Refert to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main and radiator fan motor fuses OK?

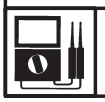
YES ⇩ NO ⇩

Replace the fuse (s).

EAS00739

2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.



Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES ⇩ NO ⇩

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".

- Is the main switch OK?

YES ⇩ NO ⇩

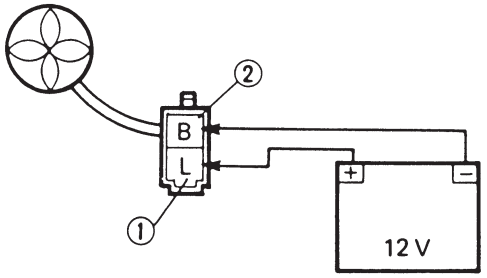
Replace the main switch.

EAS00809

4. Radiator fan motor

- Disconnect the rediator fan motor coupler from the wire harness.
- Connect the battery (12 V) as shown.

Positive battery lead → blue ①
Negative battery lead → black ②



- Does the rediator fan motor turn?

YES ⇩ NO ⇩

The radiator fan motor is faulty and must be replaced.

EAS00812

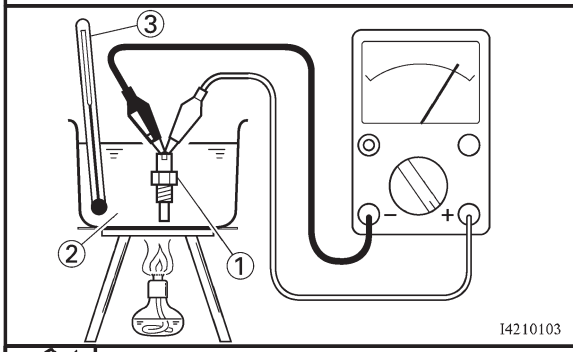
5. Thermo unit

- Remove the thermo unit from the thermostat housing.
- Connect the pocket tester (Ω × 1) to the termo unit ①as shown.
- Immerse the termo unit in a container filled with coolant ②.

NOTE:

Make sure the termo unit terminals do not get wet.

- Place a thermometer ③ in the coolant.
- Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
- Check the thermo unit for continuity at the temperatures indicated in the table.



Termo unit resistance
80°C: 3.41 ~ 4.00 Ω
105°C: 1.65 ~ 1.86 Ω

⚠ WARNING

- Handle the termo unit with special care.
- Never subject the thermo unit to strong shocks. If the thermo unit is dropped, replace it.

Thermo unit
15 Nm (1.5 m•kg)
Three bond sealock® 10

- Does the thetmo unit operate properly?

YES → This circuit is OK.

NO → Replace the thermo unit.

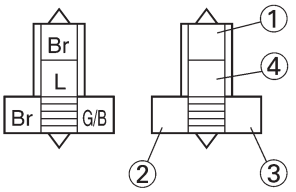
EAS00759

6. Fan motor relay

- Disconnect the fan motor relay coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the fan mtor relay coupler as shown.

Positive battery terminal → brown ①
Negative battery terminal → green/black②

Positive tester probe → brown ③
Negative tester probe → blue ④



- Does the fan motor relay have continuity between brown and blue?

YES → Replace the fan motor relay.

NO

EAS00813

7. Wiring

- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".

- Is the cooling system's wiring properly connected and without defects?

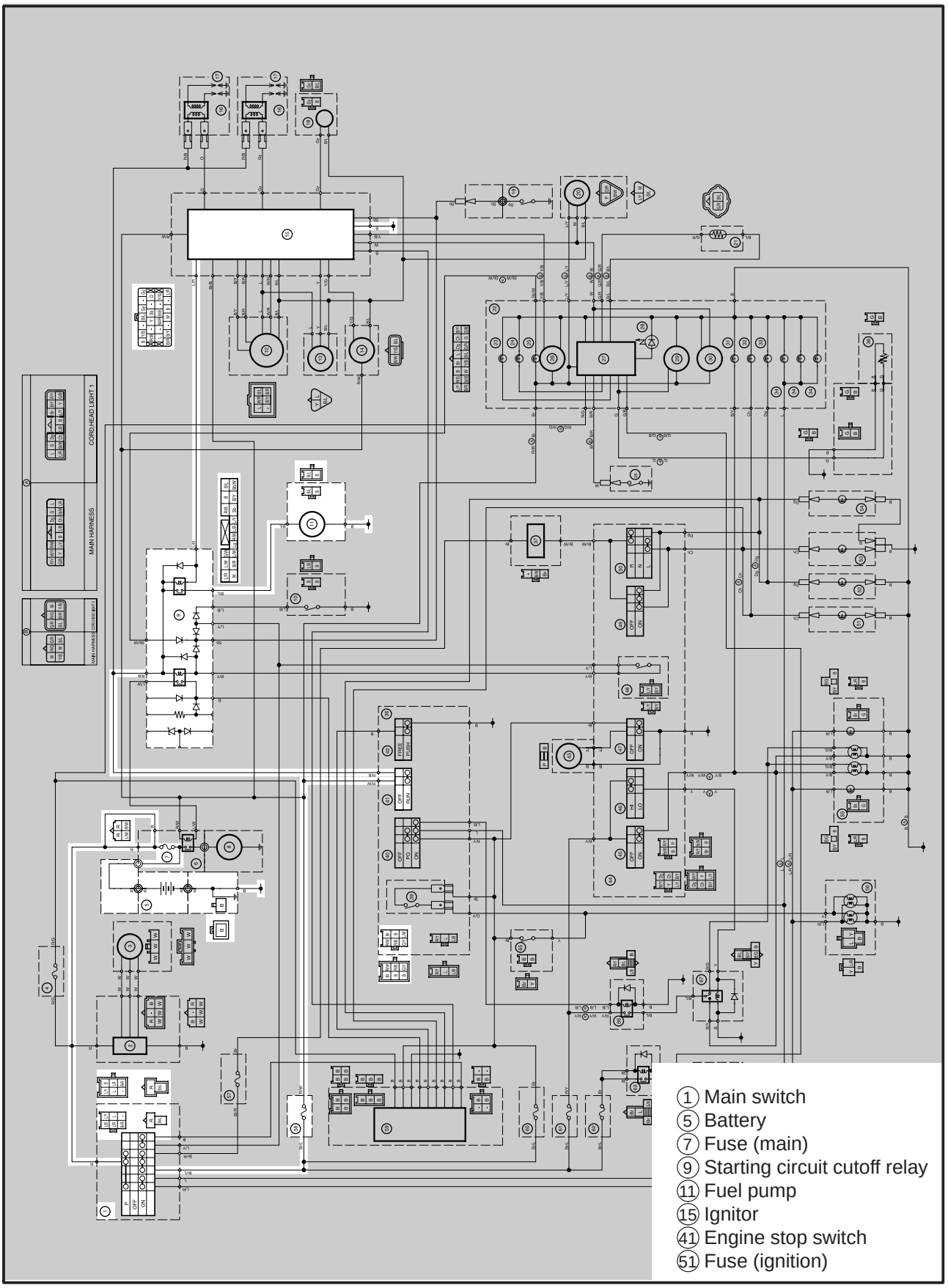
YES → Properly connect or repair the cooling system's wiring.

NO

EAS00814

FUEL PUMP SYSTEM

CIRCUIT DIAGRAM

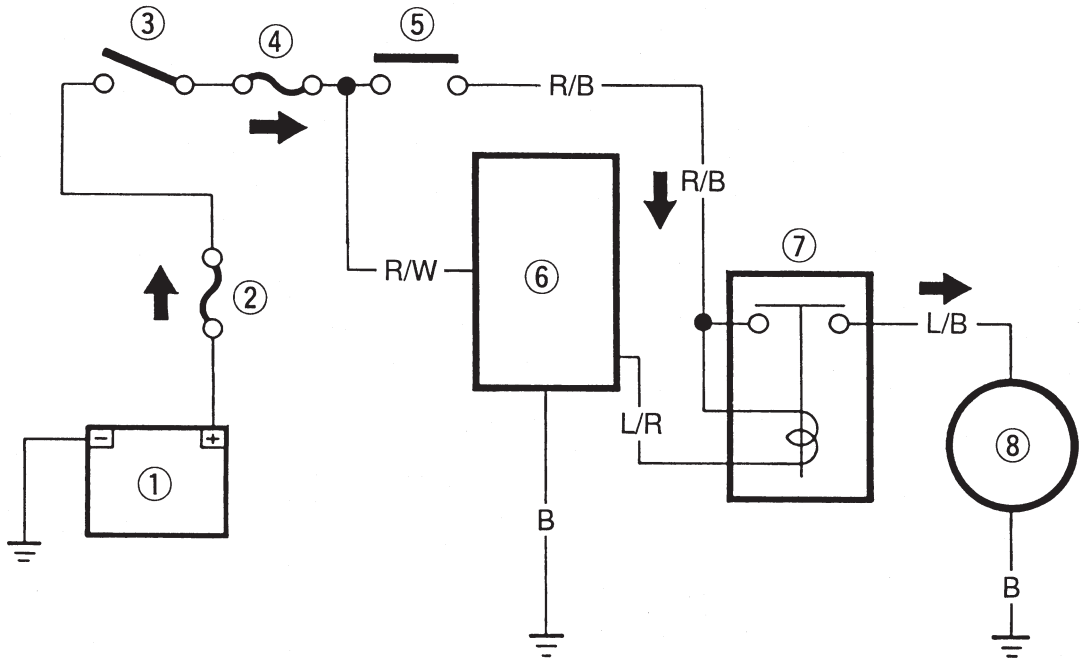


EAS00815

FUEL PUMP CIRCUIT OPERATION

The ignitor unit includes the control unit for the fuel pump.

① Battery
② Main fuse
③ Main switch
④ Ignition fuse
⑤ Engine stop switch
⑥ Ignitor unit
⑦ Fuel pump relay
⑧ Fuel pump



EAS00816
TROUBLESHOOTING

If the fuel pump fails to operate.

Check:
1. Main and ignition fuses
2. Battery
3. Main switch
4. Engine stop switch
5. Starting circuit cutoff relay (the fuel pump relay)
6. Fuel pump
7. Wiring connections (the entire fuel system)

NOTE:
- Before troubleshooting, remove the following part(-s):

1) Seat
2) Fuel tank
3) Side cover

Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00738
1. Main, and ignition fuses

- Check the main and ignition fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the main and ignition fuses OK?

YES → NO

Replace the fuse (s).

EAS00739
2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → NO

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749
3. Main switch

- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

YES → NO

Replace the main switch.

EAS00750
4. Engine stop switch

- Check the engine stop switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?

YES → NO

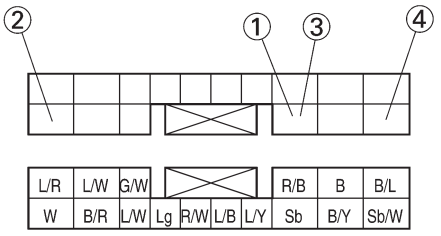
Replace the right handlebar switch.

EAS00759
5. Starting circuit cutoff relay

- Disconnect the starting circuit cutoff relay coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starting circuit cutoff relay coupler as shown.

Positive battery lead → red/black ①
Negative battery lead → blue/red ②

Positive tester probe → red/black ③
Negative tester probe → black/blue ④



- Does the starting circuit cutoff relay have continuity between red/black and black/blue?

YES → NO

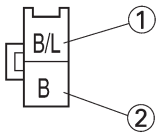
Replace the starting circuit cutoff relay.

EAS00817

6. Fuel pump resistance

- Disconnect the fuel pump coupler from the wire harness.
- Connect the pocket tester (Ω × 1) to the fuel pump coupler as shown.

Positive tester probe → black/blue①
Negative tester probe → black ②



- Measure the fuel pump resistance.

Fuel pump resistance
4 ~ 30 Ω at 20°C

- Is the fuel pump OK?

YES

NO → Replace the fuel pump.

EAS00818

7. Wiring

- Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the fuel system's wiring properly connected and without defects?

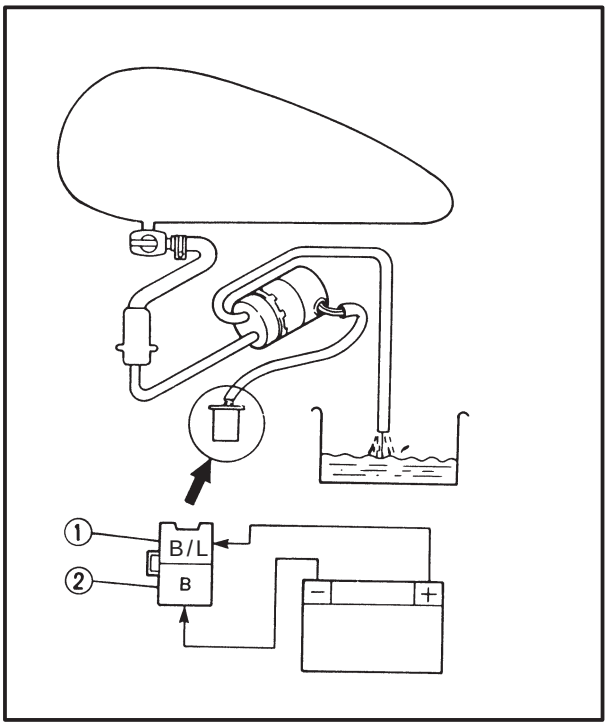
YES → Replace the ignitor unit.

NO → Properly connect or repair the fuel system's wiring.

EAS00819
CHECKING THE FUEL PUMP

⚠ WARNING

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or fire. Be extremely careful and note the following points:
- **Stop the engine before refuelling.**
- **Do not smoke, and keep away from open flames, sparks, or any other source of fire.**
- **If you do accidentally spill gasoline, wipe it up immediately with dry rags.**
- **If gasoline touches the engine when it is not, a fire may occur. Therefore, make sure that the engine is completely cool before performing the following test.**



1. Check:
   - fuel pump operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Fill the fuel tank.
b. Put the end of the fuel hose into an open container.
c. Turn the fuel cock to “ON”.
d. Connect the battery (12 V) to the fuel pump coupler as shown.

Positive battery lead → black/blue ①
Negative battery lead → black ②

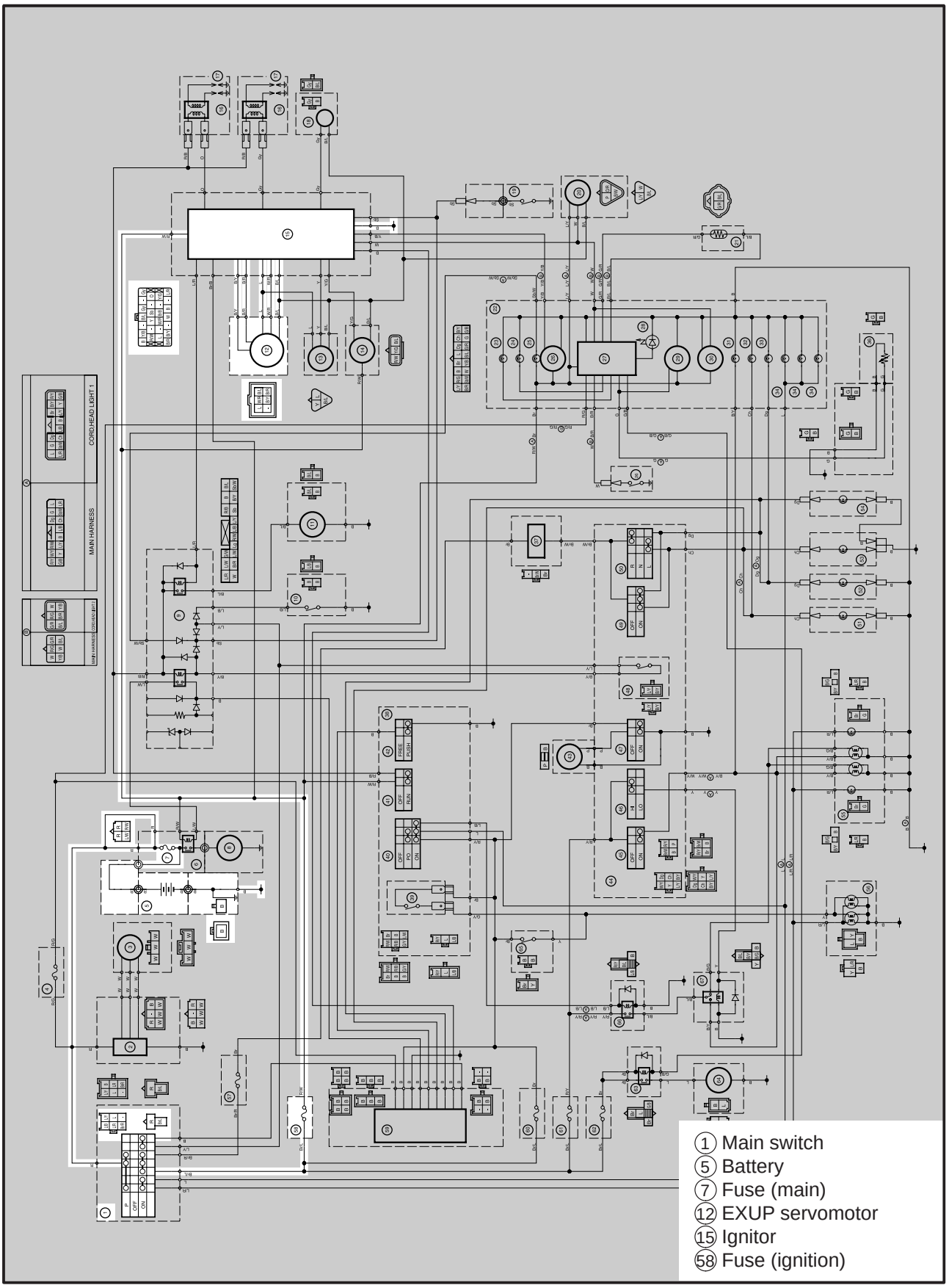
e. If fuel flows out of the fuel hose, the fuel pump is OK.
   If fuel does not flow, replace the fuel pump.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS00827

EXUP SYSTEM

CIRCUIT DIAGRAM



EAS00828
TROUBLESHOOTING

When the engine speed changes, the EXUP servomotor does not operate.

Procedure 1
Check:
1. EXUP servomotor operation (with the EXUP servomotor coupler connected to the wire harness)
2. Voltage
3. EXUP servomotor operation (with the EXUP servomotor coupler disconnected from the wire harness)
4. EXUP servomotor resistance (potentiometer resistance)
5. Wiring connections (the entire EXUP system)

Procedure 2
Check:
1. Main and turn signal fuses
2. Battery
3. Main switch
4. Neutral switch
5. Engine stop switch
6. Wiring connections (the entire EXUP system)

NOTE:
- Before troubleshooting, remove the following part(s):
1) Seat
2) Fuel tank
- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00829
Procedure 1

1. EXUP servomotor operation (with the EXUP servomotor coupler connected to the wire harness)

- Disconnect the EXUP cables at the EXUP servomotor pulley side.
- Start the engine and rev it to 5,000 r/min.

- Does the EXUP servomotor pulley turn?

YES ⇩

NO ⇩

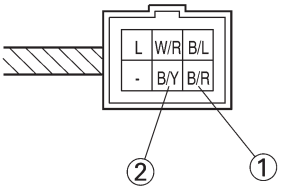
Check that the EXUP cables are properly installed.
If the connections are correct, check the EXUP valve and cables. Refer to "EXHAUST SYSTEM" in chapter 5.

EAS00830

2. Voltage

- Connect the pocket tester (DC 20 V) to the EXUP servomotor coupler as shown.

Positive tester probe → black/red ①
Negative tester probe → black/yellow ②



- Set the main switch to "ON".
- Measure the voltage (12 V) between black/red ① and black/yellow ② .

- Is the voltage within specification?

YES ⇩

NO ⇩

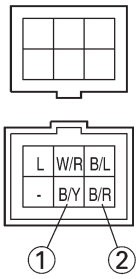
Go to Procedure 2.

EAS00831

3. EXUP servomotor operation (with the servomotor coupler disconnected to the wire harness)

- Disconnect the EXUP cables from the EXUP servomotor pulley.
- Disconnect the EXUP servomotor coupler from the wire harness.
- Connect the battery leads to the EXUP servomotor coupler as shown.

Positive battery lead → black/yellow ①
Negative battery lead → black/red ②



- Check that the EXUP servomotor pulley rotates several times.

CAUTION:

To prevent damaging the EXUP servomotor, perform this test within a few seconds of connecting the battery.

- Does the EXUP servomotor pulley turn?

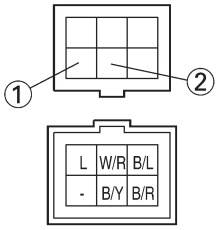
YES

NO → Replace the EXUP servomotor.

EAS00832

4. EXUP servomotor resistance (potentiometer resistance)

- Disconnect the EXUP servomotor coupler from the wire harness.
- Connect the pocket tester (Ω × 1 k) to the EXUP servomotor coupler.



Positive tester probe → blue ①
Negative tester probe → white/red ②

- While slowly turning the EXUP servomotor pulley, measure the EXUP servomotor resistance.

EXUP servomotor resistance (when the pulley is turned once)
0 ~ approximately 7.5 k Ω
(blue – white/red)

- Is the EXUP servomotor OK?

YES

NO → The EXUP servomotor is faulty and must be replaced.

EAS00833

5. Wiring

- Check the entire EXUP system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the EXUP system's wiring properly connected and without defects?

YES → Replace the ignitor unit.

NO → Properly connect or repair the EXUP system's wiring.

Procedure 2

EAS00738

1. Main and ignition fuses

- Check the main and ignition fuses for continuity.
  Refer to “CHECKING THE FUSES” in chapter 3.

- Are the main and ignition fuses OK?

YES ⇩

NO ⇩

Replace the fuse(s).

EAS00739

2. Battery

- Check the condition of the battery.
  Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES ⇩

NO ⇩

- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
  Refer to “CHECKING THE SWITCHES”.

- Is the main switch OK?

YES ⇩

NO ⇩

Replace the main switch.

EAS00750

4. Engine stop switch

- Check the engine stop switch for continuity.
  Refer to “CHECKING THE SWITCHES”.

- Is the engine stop switch OK?

YES ⇩

NO ⇩

Replace the right handlebar switch.

EAS00833

5. Wiring

- Check the entire EXUP system’s wiring.
  Refer to “CIRCUIT DIAGRAM”.

- Is the EXUP system’s wiring properly connected and without defects?

YES ⇩

Replace the ignitor unit.

NO ⇩

Properly connect or repair the EXUP system’s wiring.

SELF-DIAGNOSIS

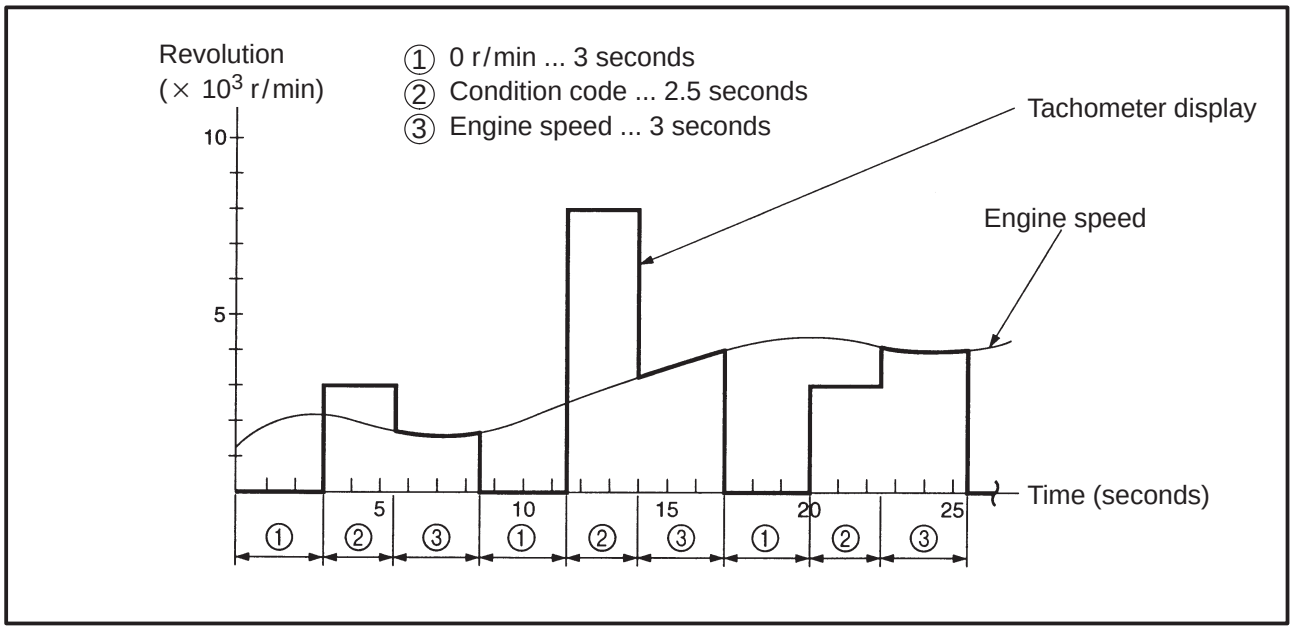
The FZS1000 features a self-diagnosing system for the following circuit(-s):

- Throttle position sensor
- EXUP
- Speed sensor
- Emargency stop switch

If any of these circuits are defective, their respective condition codes will be displayed on the tachometer when the main switch is set to “ON” (irrespective of whether the engine is running or not)

Circuit	Defect(-s)	System response	Condition code
Throttle position sensor	• Disconnected • Short-circuit • Locked	• The ignitor unit stays set to the wide-open throttle ignition timing. The motorcycle can be ridden. • The tachometer displays the condition code.	3,000 r/min
EXUP	• Improper connection • Short-circuit	• The EXUP valve stays in the open position for three seconds and then the servomotor shuts off. The motorcycle can be ridden. • The tachometer displays the condition code.	7,000 r/min
	• Servomotor is locked.	• The servomotor’s power supply is constantly inteerupted so that it will not burn out. The motorcycle can be ridden. • The tachometer displays the condition code.	
Speed sensor	• Improper connection	• The tachometer displays the condition code.	4,000 r/min
Emargency stop switch	• Disconnected • Short-circuit • Fail angle	• The tachometer displays the condition code. • Ignition system cutoff.	9,000 r/min

Tachometer display sequence



When more than one item is being monitored, the tachometer needle displays the condition codes in ascending order, cycling through the sequence repeatedly.
If the engine is stopped, the engine speed ③ is 0 r/min.

TROUBLESHOOTING

The tachometer starts to display the self-diagnosis sequence.

Check:
1. Throttle position sensor
2. EXUP
3. Speed sensor
4. Emargency stop switch

NOTE:

- Before troubleshooting, remove the following part(-s):

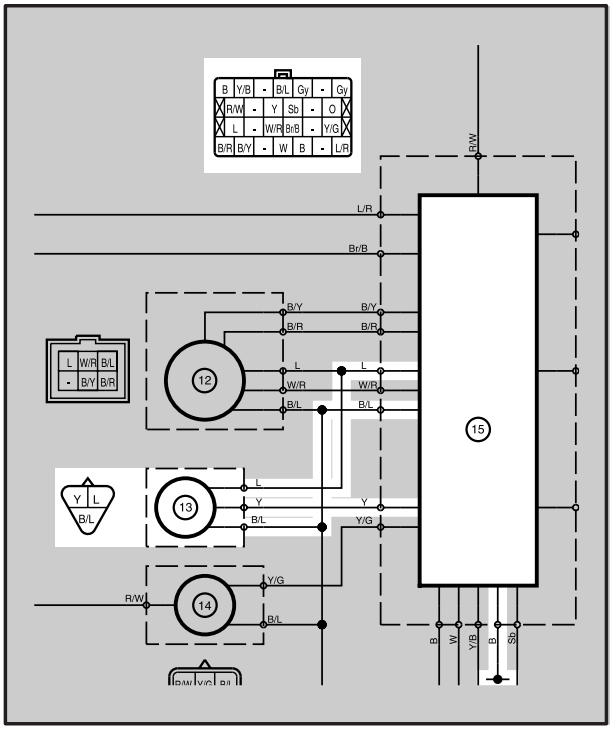
1) Rider seat
2) Fuel tank
3) Air filter case

- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

1. Throttle position sensor

CIRCUIT DIAGRAM



⑬ Throttle position sensor
⑮ Ignitor unit

1. Wire harness
• Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”. • Is the wire harness OK?

YES ⇩ NO ⇩

Repair or replace the wire harness.

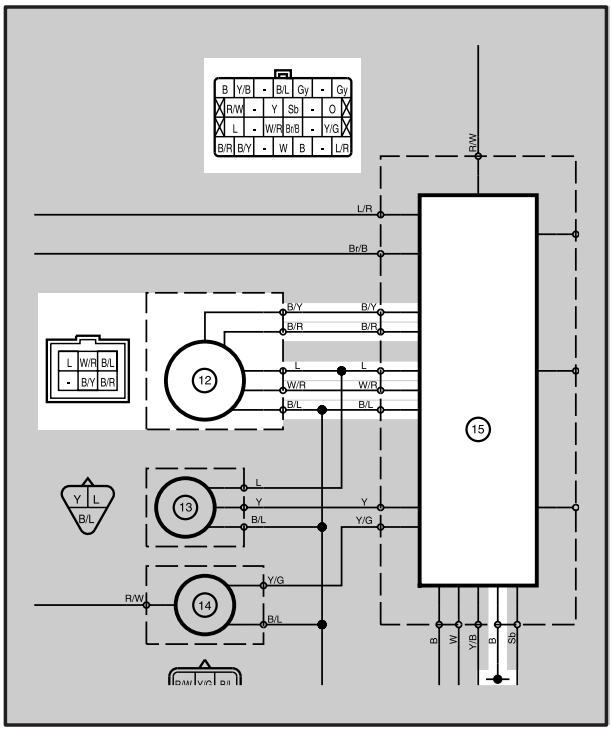
2. Throttle position sensor
• Check the throttle position sensor for continuity. Refer to “CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR” in chapter 6. • Is the throttle position sensor OK?

YES ⇩ NO ⇩

Replace the ignitor unit.	Replace the throttle position sensor.

2. EXUP

CIRCUIT DIAGRAM



⑫ EXUP servomotor
⑮ Ignitor unit

1. Wire harness
• Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”. • Is the wire harness OK?

⇩ YES

⇩ NO

Repair or replace the wire harness.

2. EXUP servomotor
• Check the EXUP servomotor for continuity. Refer to “EXUP SYSTEM”. • Is the EXUP servomotor OK?

⇩ YES

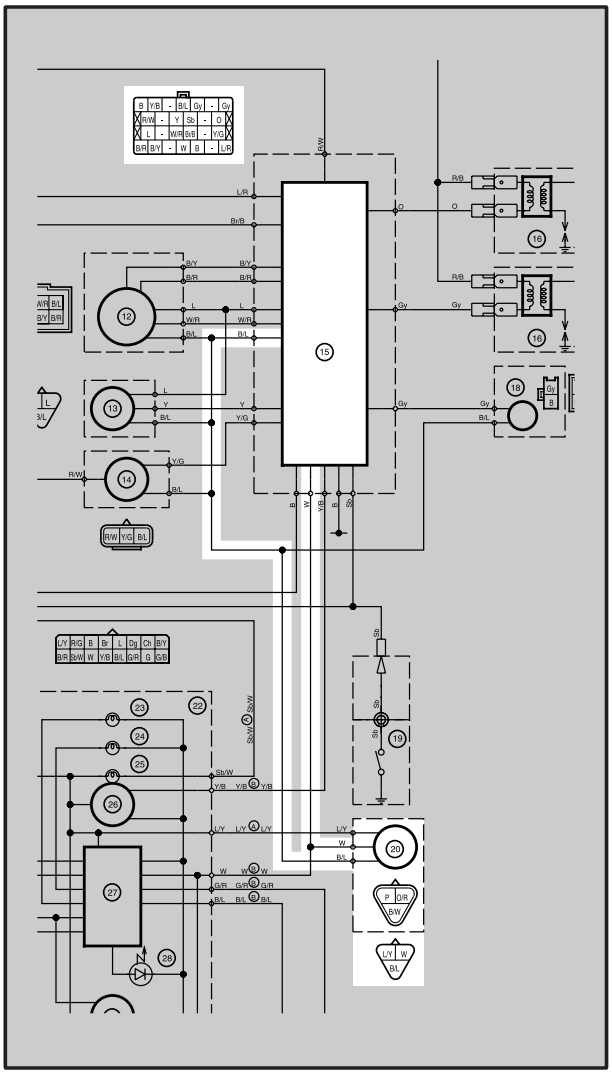
Replace the ignitor unit.

⇩ NO

Replace the EXUP servomotor.

3. Speed sensor

CIRCUIT DIAGRAM



⑮ Ignitor unit
⑳ Speed sensor

1. Wire harness
• Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.
• Is the wire harness OK?

YES

Replace the speed sensor.

BAD

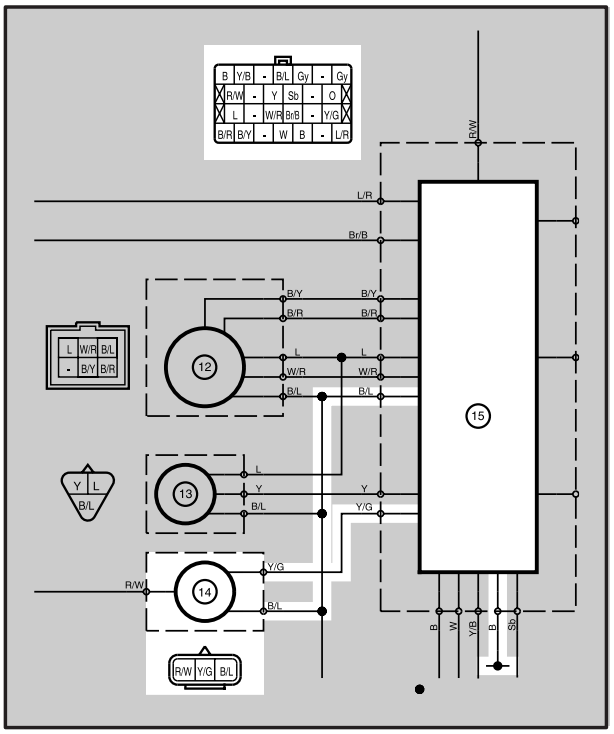
Replace the ignitor unit.

NO

Repair or replace the wire harness.

4. Emargency stop switch

CIRCUIT DIAGRAM



⑭ Emargency stop switch
⑮ Ignitor unit

1. Wire harness
• Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.
• Is the wire harness OK?

YES

Replace the emargency stop switch.

BAD

Replace the ignitor unit.

NO

Repair or replace the wire harness.

?

TRBL SHTG 9

TRBL SHTG ?

CHAPTER 9
TROUBLESHOOTING

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EAS00844

TROUBLESHOOTING

NOTE:

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

STARTING PROBLEMS

ENGINE

Cylinder(s) and cylinder head(s)
- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

Piston(s) and piston ring(s)
- Improperly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter
- Improperly installed air filter
- Clogged air filter element

Crankcase and crankshaft
- Improperly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank
- Empty fuel tank
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel tank drain hose
- Clogged rollover valve
- Clogged rollover valve hose
- Deteriorated or contaminated fuel

Fuel pump
- Faulty fuel pump
- Faulty fuel pump relay

Fuel cock
- Clogged or damaged fuel hose

Carburetor(s)
- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Improperly installed needle valve seat
- Incorrect fuel level
- Improperly installed pilot jet
- Clogged starter jet
- Faulty starter plunger
- Improperly adjusted starter cable

ELECTRICAL SYSTEMS

Battery
- Discharged battery
- Faulty battery

Fuse(s)
- Blown, damaged or incorrect fuse
- Improperly installed fuse

Spark plug(s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil(s)
- Cracked or broken ignition coil
- Broken or shorted primary or secondary coils
- Faulty spark plug lead

Ignition system
- Faulty ignitor unit
- Faulty pickup coil
- Broken generator rotor woodruff key

Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty sidestand switch
- Faulty clutch switch
- Improperly grounded circuit
- Loose connections

Starting system
- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cutoff relay
- Faulty starter clutch

EAS00846
INCORRECT ENGINE IDLING SPEED

ENGINE

Cylinder(s) and cylinder head(s)
- Incorrect valve clearance
- Damaged valve train components

Air filter
- Clogged air filter element

FUEL SYSTEM

Carburetor(s)
- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Improperly synchronized carburetors
- Improperly adjusted engine idling speed (throttle stop screw)
- Improper throttle cable free play
- Flooded carburetor
- Faulty air induction system

ELECTRICAL SYSTEMS

Battery
- Discharged battery
- Faulty battery

Spark plug(s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil(s)
- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Cracked or broken ignition coil

Ignition system
- Faulty ignitor unit
- Faulty pickup coil
- Broken generator rotor woodruff key

EAS00848
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE
Refer to “STARTING PROBLEMS”.

ENGINE
Air filter
- Clogged air filter element

FUEL SYSTEM
Carburetor(s)
- Faulty diaphragm
- Incorrect fuel level
- Loose or clogged main jet

Fuel pump
- Faulty fuel pump

EAS00850
FAULTY GEAR SHIFTING
SHIFTING IS DIFFICULT
Refer to “CLUTCH DRAGS”.

SHIFT PEDAL DOES NOT MOVE
Shift shaft
- Improperly adjusted shift rod
- Bent shift shaft.

Shift drum and shift forks
- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission
- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

JUMPS OUT OF GEAR
Shift shaft
- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks
- Worn shift fork

Shift drum
- Incorrect axial play
- Worn shift drum groove

Transmission
- Worn gear dog

EAS00851
FAULTY CLUTCH

CLUTCH SLIPS

Clutch
- Improperly assembled clutch
- Improperly adjusted clutch cable
- Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate

Engine oil
- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

CLUTCH DRAGS

Clutch
- Unevenly tensioned clutch springs
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch push rod
- Broken clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned

Engine oil
- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

EAS00855
OVERHEATING

ENGINE

Clogged coolant passages
- Cylinder head(s) and piston(s)
- Heavy carbon buildup

Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

COOLING SYSTEM

Coolant
- Low coolant level

Radiator
- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fin

Water pump
- Damaged or faulty water pump
- Thermostat
- Thermostat stays closed
- Oil cooler
- Clogged or damaged oil cooler
- Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose
- Damaged pipe
- Improperly connected pipe

FUEL SYSTEM

Carburetor(s)
- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

Air filter
- Clogged air filter element

CHASSIS

Brake(s)
- Dragging brake

ELECTRICAL SYSTEMS

Spark plug(s)
- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system
- Faulty ignitor unit

EAS00856
OVERCOOLING
COOLING SYSTEM
Thermostat
- Thermostat stays open

EAS00857
POOR BRAKING PERFORMANCE
- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS00861
FAULTY FRONT FORK LEGS
LEAKING OIL
- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod bolt
- Damaged damper rod bolt copper washer
- Cracked or damaged cap bolt O-ring

MALFUNCTION
- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS00862
UNSTABLE HANDLING

Handlebar
- Bent or improperly installed handlebar

Steering head components
- Improperly installed upper bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Front fork leg(s)
- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Swingarm
- Worn bearing or bushing
- Bent or damaged swingarm

Rear shock absorber assembly(-ies)
- Faulty rear shock absorber spring
- Leaking oil or gas

Tire(s)
- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)
- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame
- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS00866
FAULTY LIGHTING OR SIGNALING SYSTEM

HEADLIGHT DOES NOT LIGHT
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT LIGHT
- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

TAIL/BRAKE LIGHT BULB BURNT OUT
- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

TURN SIGNAL DOES NOT LIGHT
- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

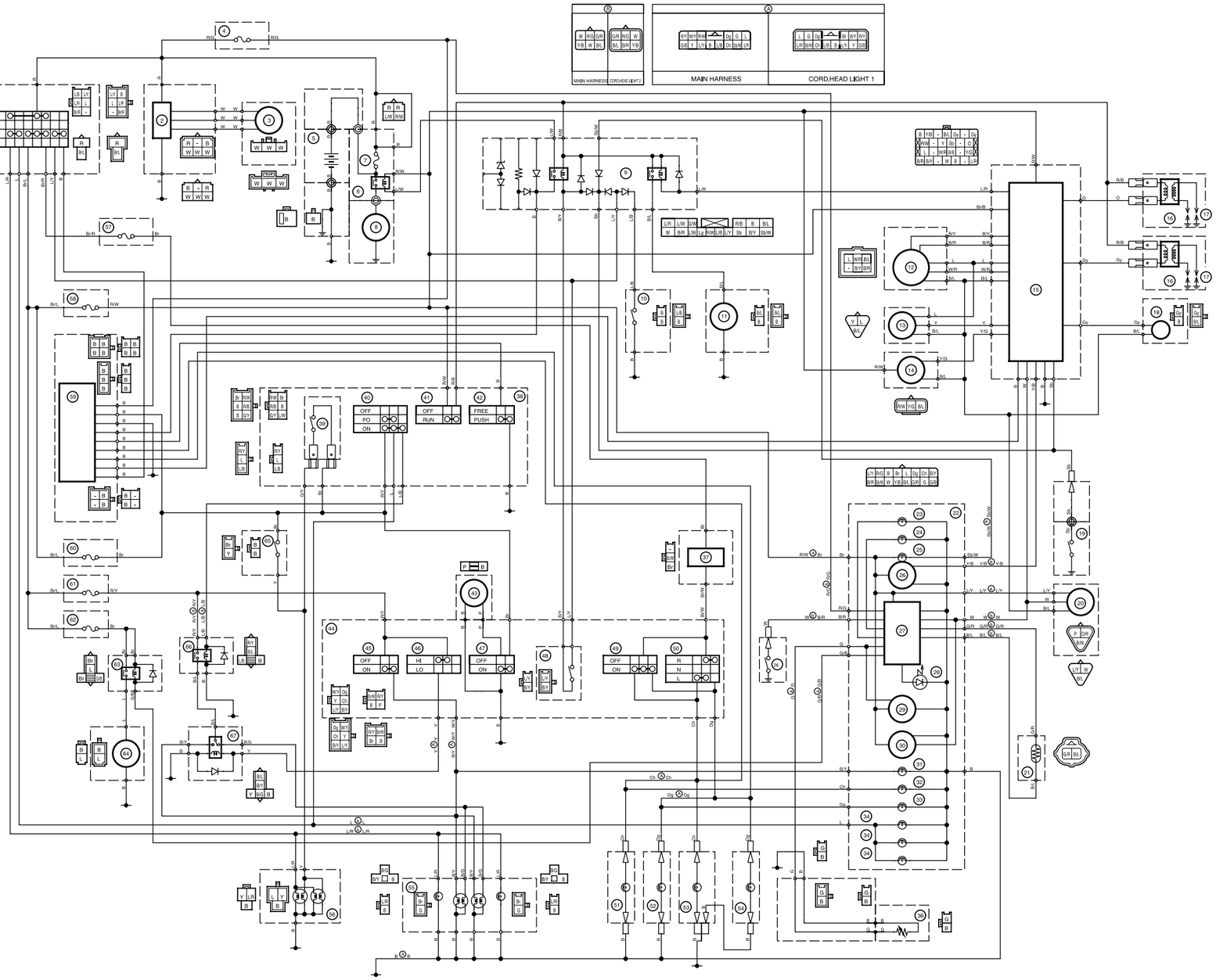
TURN SIGNAL BLINKS SLOWLY
- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

TURN SIGNAL REMAINS LIT
- Faulty turn signal relay
- Burnt-out turn signal bulb

TURN SIGNAL BLINKS QUICKLY
- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND
- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

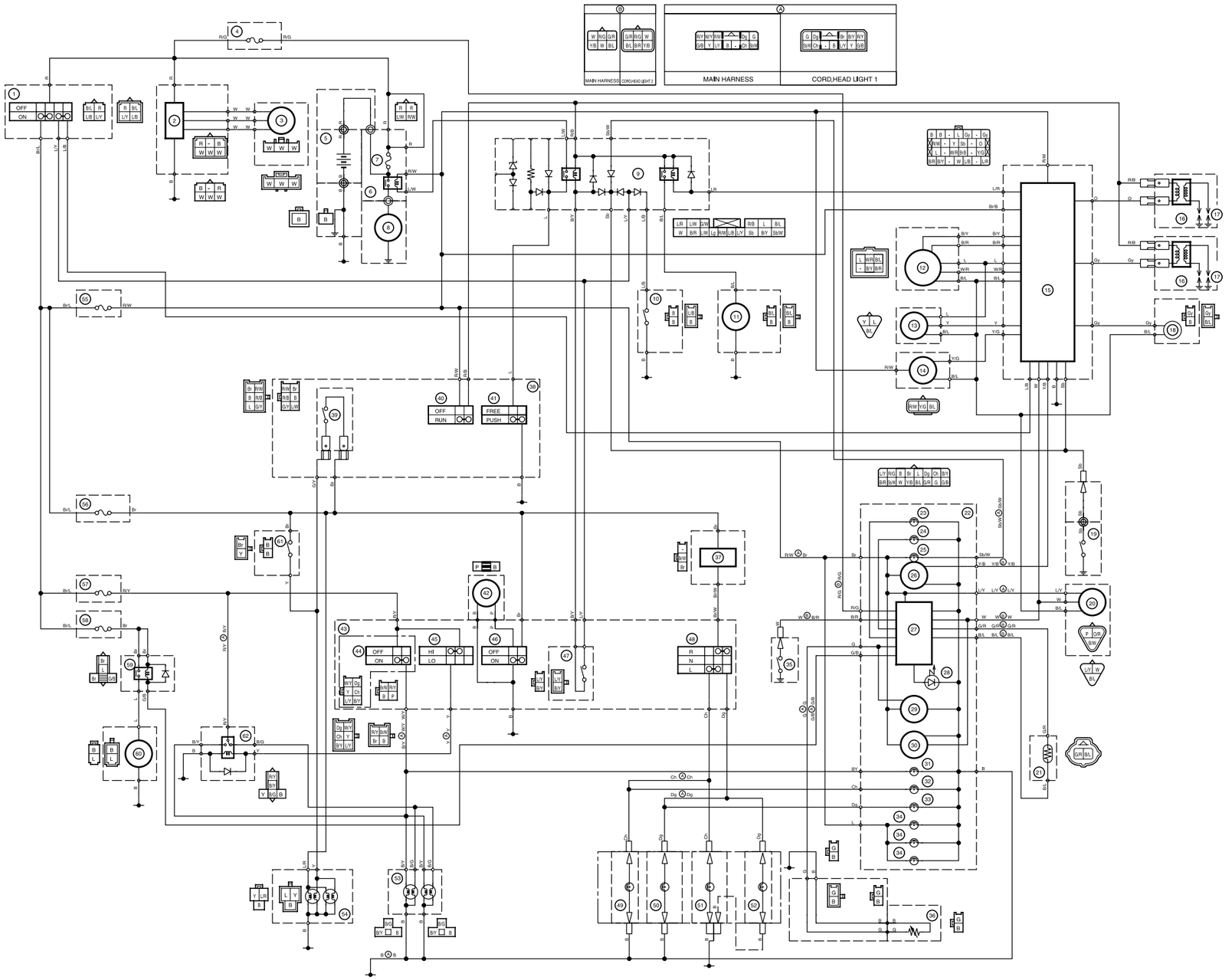
FZS1000 2001 WIRING DIAGRAM (EUR)



1. Main switch
2. Rectifier/regulator
3. AC magneto
4. Fuse (back up)
5. Battery
6. Starter relay
7. Fuse (main)
8. Starter motor
9. Starting circuit cutoff relay
10. Sidestand switch
11. Fuel pump
12. EXUP servo motor
13. T.P.S.
14. Emargency stop switch
15. Igniter
16. Ignition coil
17. Spark plug
18. Pickup coil
19. Neutral switch
20. Speed sensor
21. Thermo unit
22. Meter assembly
23. Fuel level warning light
24. Oil level warning light
25. Neutral indicator light
26. Tacho meter
27. Combination meter
28. Water temp warning light
29. Fuel gauge
30. Speedometer
31. Hi-beam indicator light
32. Turn signal indicator light (left)
33. Turn signal indicator light (right)
34. Meter light
35. Oil level gauge
36. Fuel sender
37. Turn signal relay
38. Handlebar switch (right)
39. Front brake light switch
40. Headlight switch
41. Engine stop switch
42. Start switch
43. Horn
44. Handlebar switch (left)
45. Pass switch
46. Dimmer switch
47. Horn switch
48. Clutch switch
49. Hazard switch
50. Turn signal switch
51. Front turn signal light (left)
52. Front turn signal light (right)
53. Rear turn signal light (left)
54. Rear turn signal light (right)
55. Headlight
56. Tail/brake light
57. Fuse (turn signal)
58. Fuse (ignition)
59. Alarm
60. Fuse (alarm)
61. Fuse (headlight)
62. Fuse (fan)
63. Fan motor relay
64. Fan motor
65. Rear brake light switch
66. Headlight relay (on/off)
67. Head light relay (dimmer)

B	Black	Br/R	Brown/Red
Br	Brown	Br/W	Brown/White
Ch	Chocolate	G/B	Green/Black
Dg	Dark green	G/R	Green/Red
G	Green	G/W	Green/White
Gy	Gray	G/Y	Green/Yellow
L	Blue	L/B	Blue/Black
Lg	Light green	L/R	Blue/Red
O	Orange	L/W	Blue/White
P	Pink	L/Y	Blue/Yellow
R	Red	O/R	Orange/Red
Sb	Sky blue	R/B	Red/Black
W	White	R/G	Red/Green
Y	Yellow	R/W	Red/White
B/G	Black/Green	R/Y	Red/Yellow
B/L	Black/Blue	Sb/W	Sky blue/White
B/R	Black/Red	W/R	White/Red
B/W	Black/White	W/Y	White/Yellow
B/Y	Black/Yellow	Y/B	Yellow/Black
Br/B	Brown/Black	Y/G	Yellow/Green
Br/L	Brown/Blue		

FZS1000 N 2001 WIRING DIAGRAM (OCE)



1. Main switch
2. Rectifier/regulator
3. AC magneto
4. Fuse (back up)
5. Battery
6. Starter relay
7. Fuse (main)
8. Starter motor
9. Starting circuit cutoff relay
10. Sidestand switch
11. Fuel pump
12. EXUP servo motor
13. T.P.S.
14. Emargency stop switch
15. Igniter
16. Ignition coil
17. Spark plug
18. Pickup coil
19. Neutral switch
20. Speed sensor
21. Thermo unit
22. Meter assembly
23. Fuel level warning light
24. Oil level warning light
25. Neutral indicator light
26. Tacho meter
27. Combination meter
28. Water temp warning light
29. Fuel gauge
30. Speedometer
31. Hi-beam indicator light
32. Turn signal indicator light (left)
33. Turn signal indicator light (right)
34. Meter light
35. Oil level gauge
36. Fuel sender
37. Turn signal relay
38. Handlebar switch (right)
39. Front brake light switch
40. Engine stop switch
41. Start switch
42. Horn
43. Handlebar switch (left)
44. Pass switch
45. Dimmer switch
46. Horn switch
47. Clutch switch
48. Turn signal switch
49. Front turn signal light (left)
50. Front turn signal light (right)
51. Rear turn signal light (left)
52. Rear turn signal light (right)
53. Headlight
54. Tail/brake light
55. Fuse (ignition)
56. Fuse (turn signal)
57. Fuse (headlight)
58. Fuse (fan)
59. Fan motor relay
60. Fan motor
61. Rear brake light switch
62. Head light relay (dimmer)

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
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B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W ...	Brown/White
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/R	Orange/Red
R/B	Red/Black
R/G	Red/Green
R/W	Red/White
R/Y	Red/Yellow
Sb/W ...	Sky blue/White
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green