YAMAHA

TW125 '99

5EK1-AE1

SERVICE MANUAL

EAS00000

TW125
SERVICE MANUAL

1st Edition, July 1998

EAS00002

NOTICE

This manual was produced by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha motorcycle has a basic understanding of the mechanical ideas and the procedures of motorcycle repair. Repairs attempted by anyone without this knowledge are likely to render the motorcycle unsafe and unfit for use.

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

NOTE:

Designs and specifications are subject to change without notice.

EAS00004

IMPORTANT INFORMATION

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

⚠	The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
⚠ WARNING	Failure to follow WARNING instructions could result in severe injury or death to the motorcycle operator, a bystander or a person inspecting or repairing the motorcycle.
CAUTION:	A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.
NOTE:	A NOTE provides key information to make procedures easier or clearer.

EAS00007

HOW TO USE THIS MANUAL

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

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 Inspections and Adjustments”), where the sub-section title(-s) appear.

(In Chapter 3, “Periodic Inspections 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.

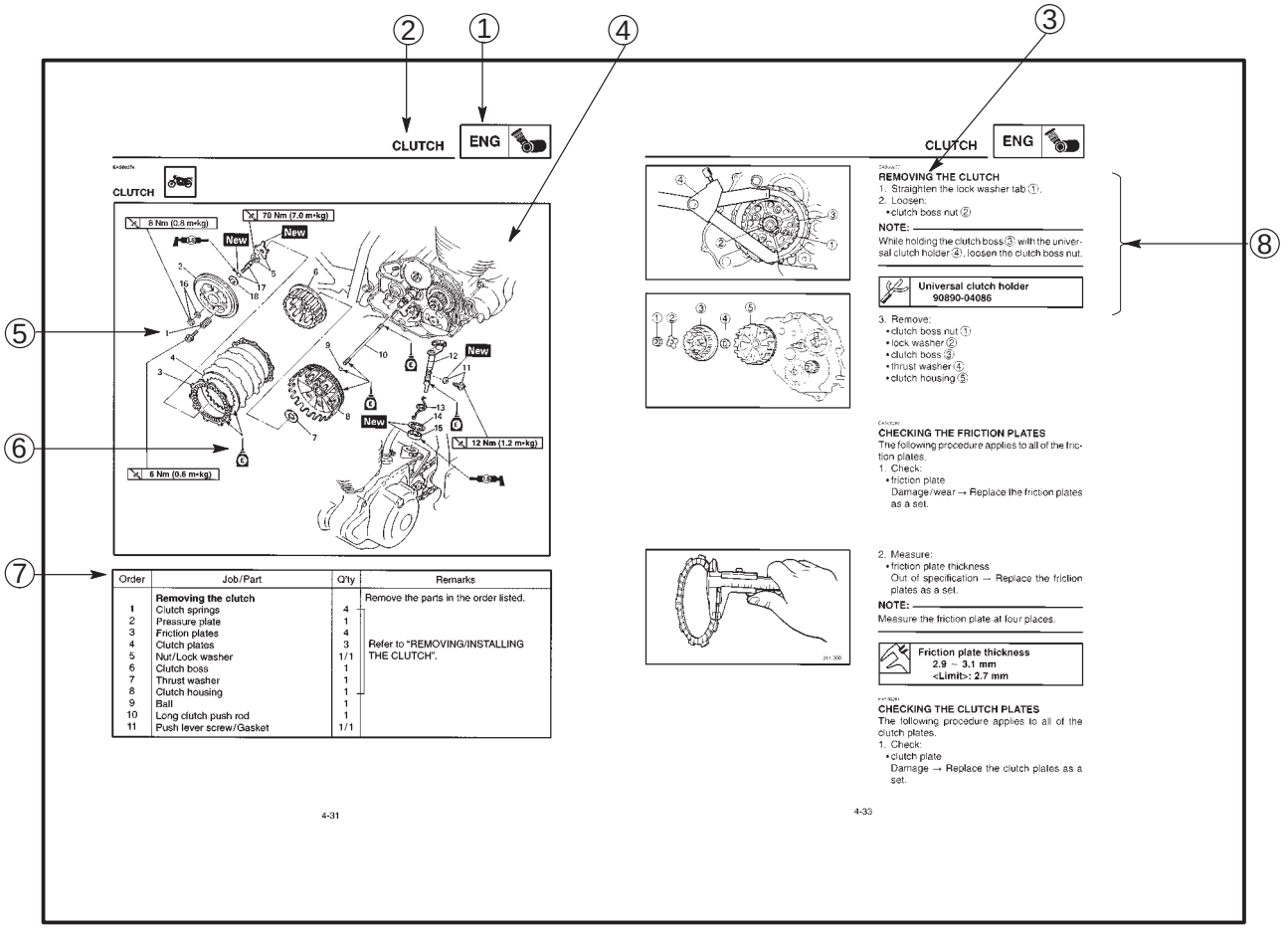
④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

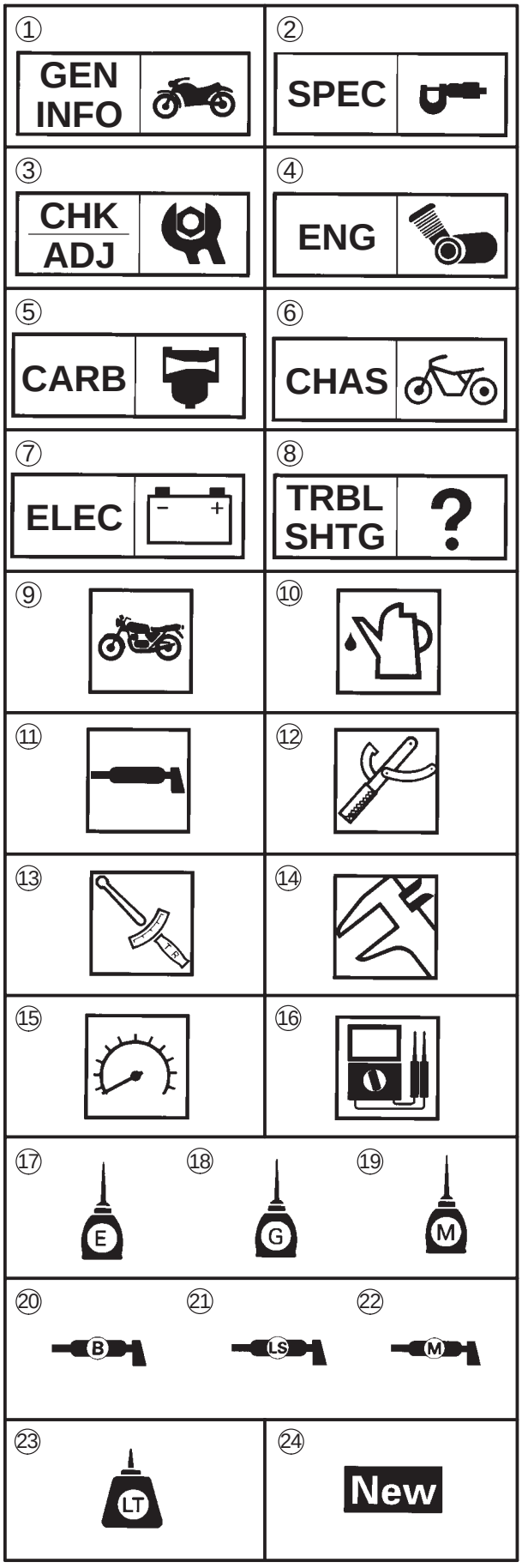
⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

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.





EAS00009

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 inspections and adjustments
④ Engine
⑤ Carburetor(-s)
⑥ Chassis
⑦ Electrical system
⑧ Troubleshooting

Symbols ⑨ to ⑯ indicate the following.

⑨ Serviceable with engine mounted
⑩ Filling fluid
⑪ Lubricant
⑫ Special tool
⑬ Tightening torque
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Electrical data

Symbols ⑰ to ㉒ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑰ Engine oil
⑱ Gear oil
⑲ Molybdenum disulfide oil
⑳ Wheel bearing grease
㉑ Lithium soap base grease
㉒ Molybdenum disulfide grease

Symbols ㉓ to ㉔ in the exploded diagrams indicate the following:

㉓ Apply locking agent (LOCTITE®)
㉔ Replace the part

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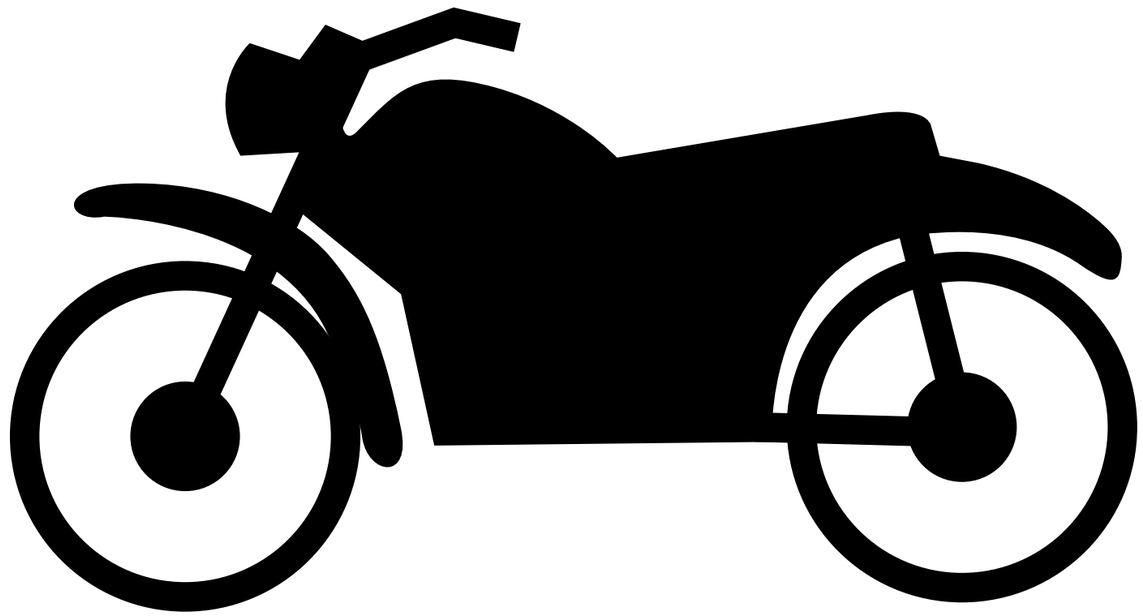
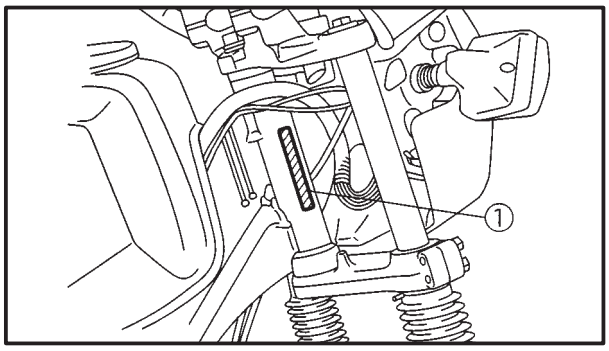


GEN INFO

1

CHAPTER 1.
GENERAL INFORMATION



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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

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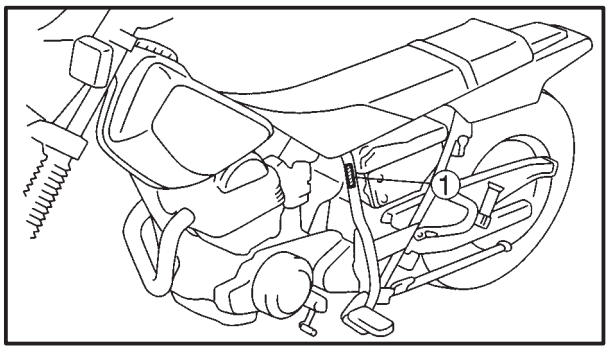
VEHICLE IDENTIFICATION NUMBER

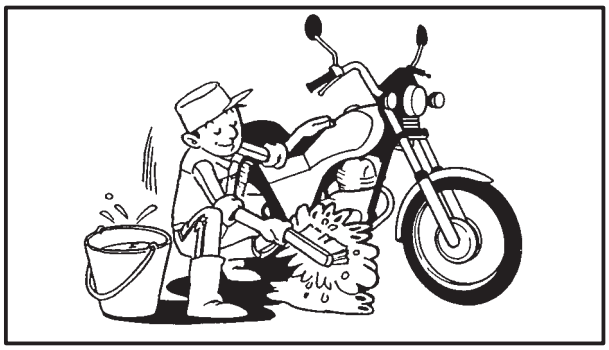
The vehicle identification number ① is stamped into the right side of the steering head.

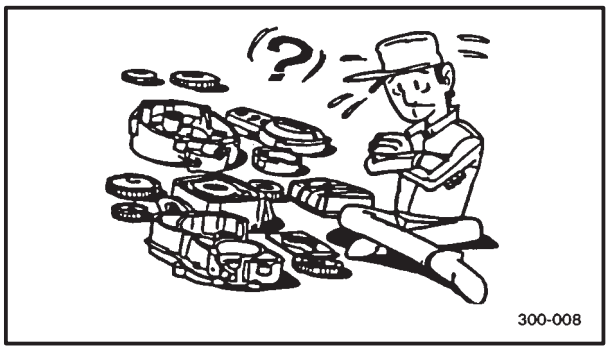


EAS00018

MODEL CODE

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



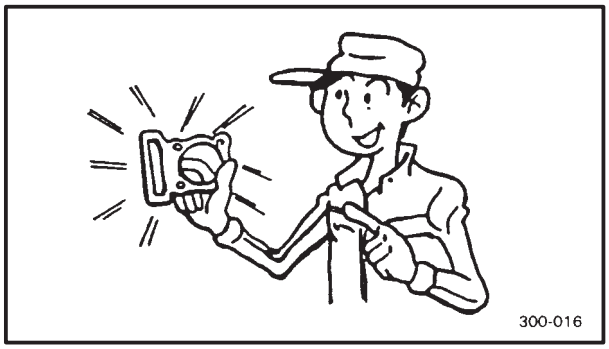


EAS00020

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

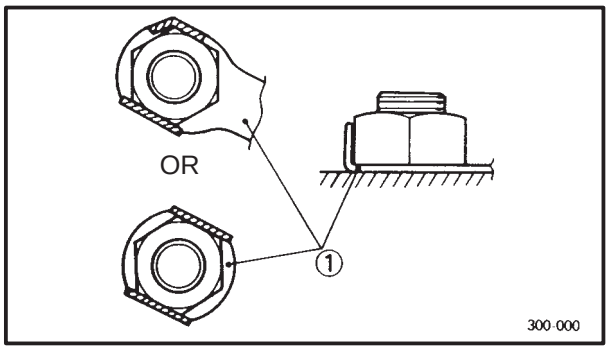
REPLACEMENT PARTS

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

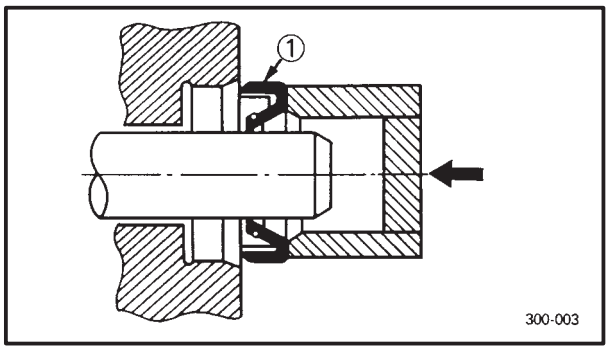
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and apply grease onto the oil seal lips.



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

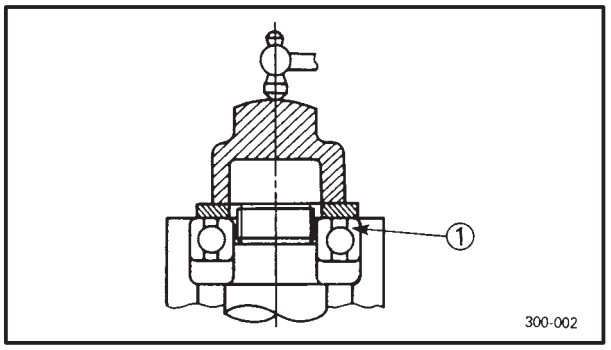
BEARINGS AND OIL SEALS

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.

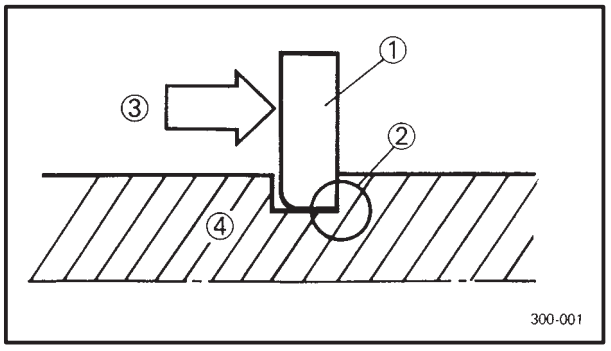
① Oil seal

CAUTION:

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



① Bearing

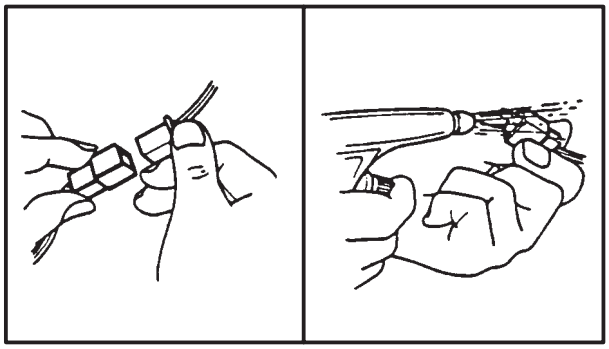


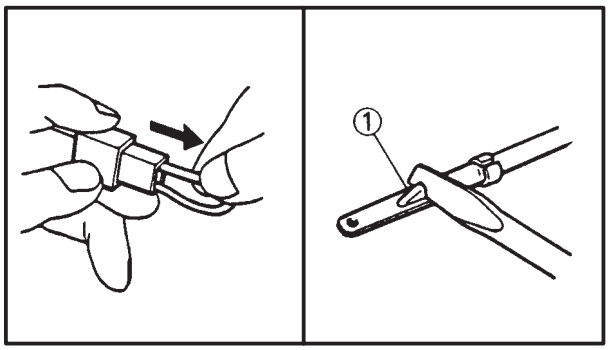
EAS00025

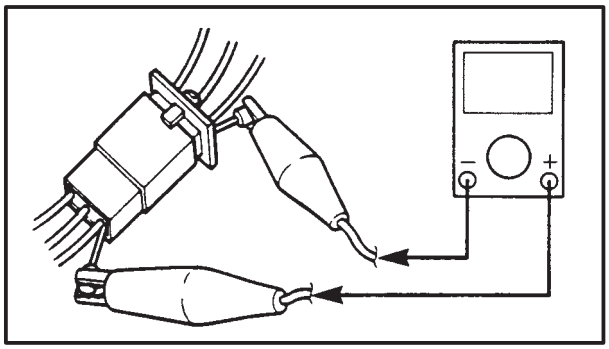
CIRCLIPS

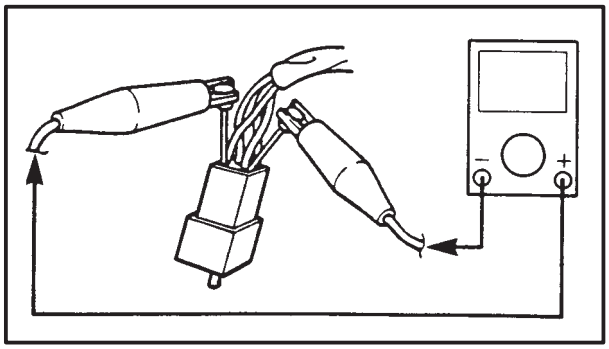
1. Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

④ Shaft









EAS00026

CHECKING THE CONNECTIONS

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

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

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

   Loose connection → Connect properly.

NOTE:

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

4. Connect:
   - lead
   - coupler
   - connector

NOTE:

Make sure that all connections are tight.

5. Check:
   - continuity

   (with a pocket tester)

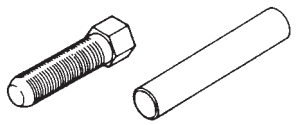
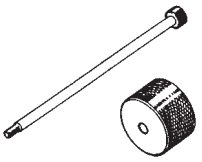
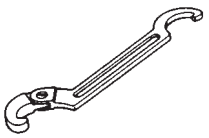
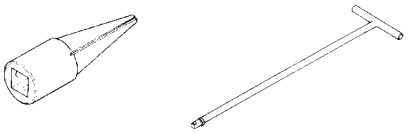
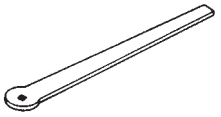
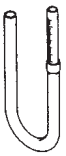
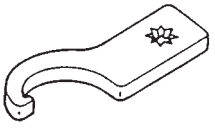
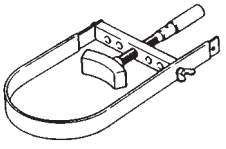
	**Pocket tester** **90890-03112**

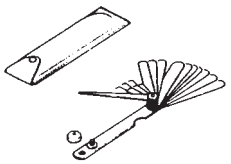
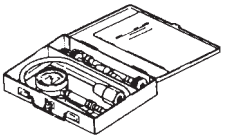
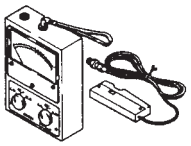
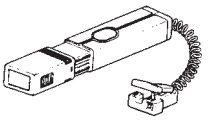
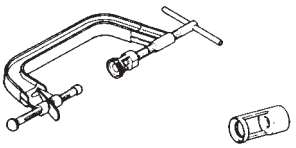
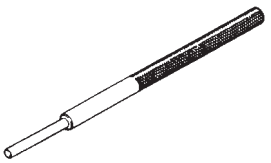
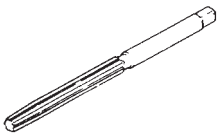
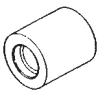
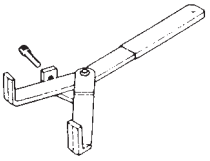
NOTE:

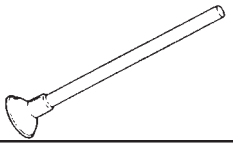
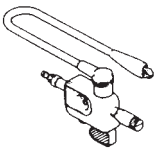
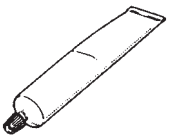
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps 1 to 3.
- As a quick remedy, use a contact revitalizer available at most part stores.

EAS00020
SPECIAL TOOLS

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

Tool No.	Tool name/Usage	Illustration
90890-01080 -04052	Rotor puller Attachment These tools are used when removing the generator rotor.	
90890-01083 -01084	Rocker arm shaft puller bolt Weight These tools are used when removing or installing the rocker arm shafts.	
90890-01268	Ringnut wrench This tool is used to loosen and tighten the exhaust and steering ringnut.	
90890-01294 -01326	Damper rod holder T-handle This tool is used for disassembling or assembling the front fork	
90890-01311	Valve adjusting tool This tool is necessary for adjusting valve clearance.	
90890-01312	Fuel level gauge This gauge is used to measure the fuel level in the float chamber.	
90890-01367 -01368	Fork seal driver weight Fork seal driver attachment (ø33 mm) This tool is used when installing the fork seal.	
90890-01403	Ring nut wrench This tool is used to loosen and tighten the steering ring nut.	
90890-01701	Sheave holder This tool is used for holding the generator rotor	

Tool No.	Tool name/Usage	Illustration
90890-03079	Thickness gauge This tool is used to measure the valve clearance.	
90890-03081 -04082	Compression gauge Adaptor These tools are used to measure the engine compression.	
90890-03112	Pocket tester These instruments are invaluable for checking the electrical system.	
90890-03113	Engine tachometer This tool is needed for detecting engine rpm.	
90890-03141	Timing light This tool is necessary for checking ignition timing.	
90890-04019 -04108	Valve spring compressor Attachment These tools are used when removing or installing the valve and the valve spring.	
90890-04064	Valve guide remover 6 mm This tool is used to remove the valve guide.	
90890-04065	Valve guide reamer 6 mm This tool is used to rebore the valve guide.	
90890-04066	Valve guide installer 6 mm This tool is needed to install the valve guides properly.	
90890-04086	Clutch holding tool This tool is used for holding the clutch boss.	

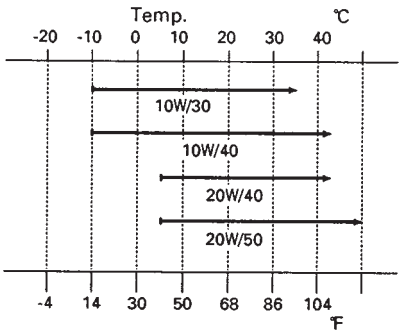
Tool No.	Tool name/Usage	Illustration
90890-04101	Valve lapper This tool is used for lapping the valve.	
90890-06754	Ignition checker This instrument is necessary for checking the ignition system components.	
90890-85505	Yamaha bond No.1215 This sealant (bond) is used for crankcase mating surface, etc.	

SPEC 2

CHAPTER 2.
SPECIFICATIONS

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	TW125
Model code:	5EK1/5EK2
Dimensions: Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance Minimum turning radius	 2,140 mm 810 mm 1,120 mm 805 mm 1,330 mm 260 mm 2,100 mm
Basic weight: With oil and full fuel tank	 125 kg
Engine: Engine type Cylinder arrangement Displacement Bore × stroke Compression ratio Compression pressure (STD) Starting system Lubrication system:	 Air-cooled 4-stroke, SOHC Forward-inclined single cylinder 0.124 L (124 cm^3) 57.0 × 48.8 mm 10.0 : 1 1,200 kPa (12.0 kg/cm^2, 12.0 bar) at 1,000 r/min Electric starter Wet sump
Oil type or grade: Engine oil  Periodic oil change With oil filter replacement Total amount	API standard: "SE" or higher grade ACEA standard: G4 or G5 1.0 L 1.1 L 1.3 L
Air filter:	Wet type element
Fuel: Type Fuel tank capacity Fuel reserve capacity	 Regular unleaded gasoline 7.0 L 1.0 L

Model	TW125
Carburetor:	
Type/quantity	Y24P/1
Manufacturer	TEIKEI
Spark plug:	
Type	DR8EA
Manufacturer	NGK
Spark plug gap	0.6 ~ 0.7 mm
Clutch type:	Wet, multiple-disc
Transmission:	
Primary reduction system	Spur gear
Primary reduction ratio	74/20 (3.700)
Secondary reduction system	Chain drive
Secondary reduction ratio	50/14 (3.571)
Transmission type	Constant mesh 5 speed
Operation	Left foot operation
Gear ratio 1st	36/16 (2.250)
2nd	31/21 (1.476)
3rd	27/24 (1.125)
4th	25/27 (0.926)
5th	23/29 (0.793)
Chassis:	
Frame type	Diamond
Caster angle	26°
Trail	95 mm
Tire:	
Type	Tube type
Size front	130/80-18 66P
rear	180/80-14 M/C 78P
Manufacture front	BRIDGESTONE
rear	BRIDGESTONE
Type front	TW31
rear	TW34
Tire pressure (cold tire):	
Maximum load-except motorcycle	180 kg
Loading condition A *	0 ~ 80 kg
front	150 kPa (1.5 kg/cm^2, 1.5 bar)
rear	150 kPa (1.5 kg/cm^2, 1.5 bar)
Loading condition B *	80 ~ 180 kg
front	150 kPa (1.5 kg/cm^2, 1.5 bar)
rear	175 kPa (1.75 kg/cm^2, 1.75 bar)
Off road riding	
front	125 kPa (1.25 kg/cm^2, 1.25 bar)
rear	125 kPa (1.25 kg/cm^2, 1.25 bar)
High speed riding	
front	150 kPa (1.5 kg/cm^2, 1.5 bar)
rear	175 kPa (1.75 kg/cm^2, 1.75 bar)

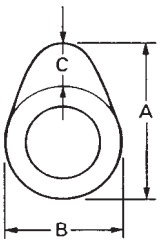
*Load is the total weight of cargo, rider, passenger, and accessories.

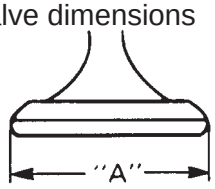
Model	TW125
Brake:	
Front brake type	Single disc brake
operation	Right hand operation
Rear brake type	Drum brake
operation	Right foot operation
Suspension:	
Front suspension	Telescopic fork
Rear suspension	Swingarm (Monocross)
Shock absorber:	
Front shock absorber	Coil spring/Oil damper
Rear shock absorber	Coil gas spring/Oil damper
Wheel travel:	
Front wheel travel	160 mm
Rear wheel travel	150 mm
Electrical:	
Ignition system	C.D.I.
Generator system	C.D.I. magneto
Battery type	GM 7CZ-3D
Battery capacity	12 V 7 AH
Headlight type:	Bulb type
Bulb wattage × quantity:	
Headlight	12 V 45 W/40 W × 1
Auxiliary light	12 V 4 W × 1
Tail/brake light	12 V 5 W/21 W × 1
Turn signal light	12 V 21 W × 4
Meter light	12 V 3.4 W × 1
High beam indicator	12 V 3.4 W × 1
Neutral indicator	12 V 3.4 W × 1
Turn signal indicator	12 V 3.4 W × 1

MAINTENANCE SPECIFICATIONS

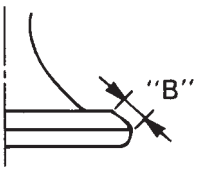
ENGINE

Item		Standard	Limit
Cylinder head:			
Warp limit		•••	0.05 mm
Cylinder:			
Bore size		57.00 ~ 57.02 mm	57.1 mm
Taper limit		•••	0.05 mm
Out of runout limit		•••	0.01 mm
Camshaft:			
Cam dimensions			
Intake	"A"	36.54 ~ 36.64 mm	36.45 mm
	"B"	30.13 ~ 30.23 mm	30.05 mm
	"C"	6.59 mm	•••
Exhaust	"A"	36.58 ~ 36.68 mm	36.49 mm
	"B"	30.21 ~ 30.31 mm	30.13 mm
	"C"	6.63 mm	•••
Camshaft runout limit		•••	0.03 mm
Cam chain:			
Cam chain type/No. of links		DID 25SH/104 EDESOLES	•••
Cam chain adjustment		Automatic	•••
Rocker arm/rocker armshaft:			
Rocker arm inside diameter		12.000 ~ 12.018 mm	12.036 mm
Rocker shaft outside diameter		11.985 ~ 11.991 mm	11.950 mm
Rocker arm-to-rocker armshaft clearance		0.009 ~ 0.033 mm	•••
Valve, valve seat, valve guide:			
Valve clearance (cold)	IN	0.05 ~ 0.09 mm	•••
	EX	0.11 ~ 0.15 mm	•••
Valve dimensions			
"A" head diameter	IN	28.9 ~ 29.1 mm	•••
	EX	23.9 ~ 24.1 mm	•••
"B" face width	IN	2.4 ~ 2.8 mm	•••
	EX	2.4 ~ 2.8 mm	•••
"C" seat width	IN	0.9 ~ 1.1 mm	•••
	EX	0.9 ~ 1.1 mm	•••
"D" margin thickness	IN	0.8 ~ 1.2 mm	•••
	EX	0.8 ~ 1.2 mm	•••
Stem outside diameter	IN	5.975 ~ 5.990 mm	5.955 mm
	EX	5.960 ~ 5.975 mm	5.940 mm

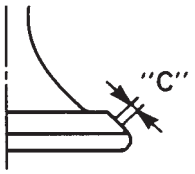




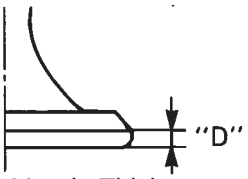
Head Dia.



Face Width

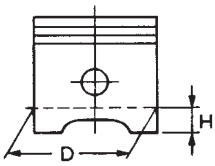


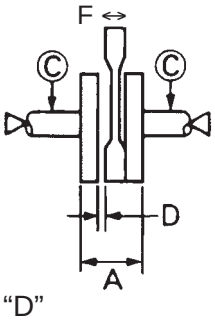
Seat Width



Margin Thickness

Item		Standard	Limit
Guide inside diameter	IN	6.000 ~ 6.012 mm	6.042 mm
	EX	6.000 ~ 6.012 mm	6.042 mm
Stem-to-guide clearance	IN	0.010 ~ 0.037 mm	0.08 mm
	EX	0.025 ~ 0.052 mm	0.10 mm
Stem runout limit		•••	0.03 mm
Valve seat width	IN	0.9 ~ 1.1 mm	1.6 mm
	EX	0.9 ~ 1.1 mm	1.6 mm
Valve spring:			
Free length (inner)	IN/EX	35.5 mm	33.5 mm
(outer)	IN/EX	37.2 mm	35.2 mm
Set length (valve closed)			
(inner)	IN/EX	30.5 mm	•••
(outer)	IN/EX	32.0 mm	•••
Compressed pressure			
(inner)	IN/EX	8.4 ~ 10.2kg	•••
(outer)	IN/EX	16.6 ~ 20.4 kg	•••
Tilt limit (inner)	IN/EX	•••	2.5°/1.5 mm
Tilt limit (outer)	IN/EX	•••	2.5°/1.6 mm
Direction of winding (inner)	IN/EX	Clockwise	•••
(outer)	IN/EX	Counterclockwise	•••
Piston:			
Piston to cylinder clearance		0.035 ~ 0.055 mm	•••
Piston size “D”		56.960 ~ 56.975 mm	•••
Piston over size (1st)		57.25 mm	•••
Piston over size (2nd)		57.50 mm	•••
Measuring point “H”		7.0 mm	•••
Piston off-set		0.5 mm	•••
Piston off-set direction		IN side	•••
Piston pin bore inside diameter		15.002 ~ 15.013 mm	15.045 mm
Piston pin outside diameter		14.987 ~ 14.992 mm	14.975 mm
Piston rings:			
Top ring:			
Type		Plane	•••
Dimensions (B × T)		2.3 × 2.5 mm	•••
End gap (installed)		0.15 ~ 0.35 mm	0.60 mm
Side clearance (installed)		0.03 ~ 0.07 mm	0.15 mm
2nd ring:			
Type		Plane	•••
Dimensions (B × T)		2.3 × 2.5 mm	•••
End gap (installed)		0.15 ~ 0.35 mm	0.60 mm
Side clearance		0.02 ~ 0.06 mm	0.15 mm
Oil ring:			
Dimensions (B × T)		2.5 × 2.8 mm	•••
End gap (installed)		0.3 ~ 0.9 mm	•••

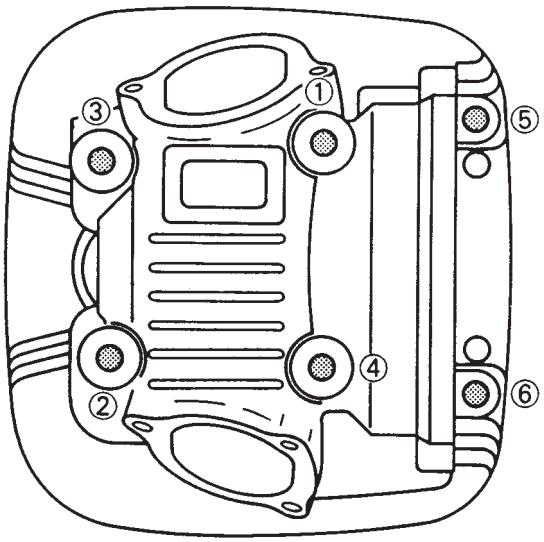
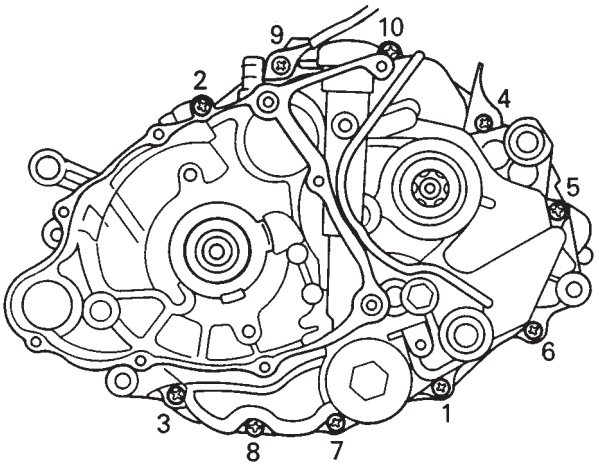


Item		Standard	Limit
Crankshaft: 			
Crank width “A”		55.95 ~ 56.00 mm	•••
Runout limit “C”		•••	0.03 mm
Big end side clearance “D”		0.35 ~ 0.65 mm	1.0 mm
Big end radial clearance		0.010 ~ 0.025 mm	•••
Small end free play “F”		0.8 ~ 1.0 mm	•••
Clutch:			
Friction plate thickness		2.9 ~ 3.1 mm	2.7 mm
Quantity		4 pcs.	•••
Clutch plate thickness		1.6 mm	0.05 mm
Quantity		3 pcs.	•••
Clutch spring free length		34.9 mm	33.9 mm
Quantity		4 pcs.	•••
Push rod bending limit		•••	0.2 mm
Transmission:			
Main axle runout limit		•••	0.08 mm
Drive axle runout limit		•••	0.08 mm
Carburetor:			
Type		Y24P	
I.D. mark		5EK1 00	•••
Main jet	(M.J)	#118	•••
Main air jet	(M.A.J)	ø1.4	•••
Jet needle	(J.N)	4C78-3/5	•••
Needle jet	(N.J)	T00	•••
Cut away	(C.A)	2.5	•••
Pilot air jet	(P.A.J)	ø1.3	•••
Pilot outlet	(P.O)	0.8	•••
Pilot jet	(P.J)	#38	•••
Bypass 1	(B.P.1)	1.0	•••
Pilot screw	(P.S)	2	•••
Valve seat size	(V.S)	ø2.0	•••
Starter jet 1	(G.S.1)	#60	•••
Starter jet 2	(G.S.2)	#60	•••
Float height	(F.H)		•••
Fuel level	(F.L)	0 ~ 2.0mm	•••
Engine idle speed		1,300 ~ 1,500 r/min	•••
Intake vacuum		195 ~ 235 mmHg	•••
Oil pump:			
Type		Trochoid type	•••
Tip clearance		0.03 ~ 0.09 mm	0.14 mm
Side clearance		0.10 ~ 0.15 mm	0.35 mm
Bypass valve setting pressure		80 ~ 120 kPa (0.8 ~ 1.2 kg/cm^2, 0.8 ~ 1.2 bar)	•••

TIGHTENING TORQUES

ENGINE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kg	
Cylinder head blind plug	Screw	M6	2	7	0.7	
Cylinder head and cylinder	Bolt	M8	4	22	2.2	E
Cylinder head (Timing chain side)	Bolt	M8	2	20	2.0	
Cam sprocket cover	Screw	M6	2	7	0.7	
Valve cover	Bolt	M6	5	10	1.0	
Camshaft retainer	Bolt	M6	2	8	0.8	
Spark plug	—	M12	1	18	1.8	
Cylinder	Bolt	M6	2	10	1.0	
Balancer driven gear	Nut	M14	1	50	5.0	
C.D.I. magneto	Bolt	M10	1	50	5.0	
Valve adjuster locknut	Nut	M6	2	14	1.4	
Cam sprocket	Bolt	M10	1	60	6.0	
Timing chain tensioner	Bolt	M6	2	10	1.0	
Timing chain guide (intake)	Bolt	M6	2	8	0.8	
Oil pump	Screw	M6	2	7	0.7	
Oil pump and crankcase	Screw	M6	3	7	0.7	
Drain plug	Bolt	M35	1	43	4.3	
Oil filter cover	Screw	M6	2	7	0.7	
Drain bolt (oil filter)	Bolt	M6	1	10	1.0	
Carburetor joint and carburetor	Bolt	M6	2	12	1.2	
Air filter case (front)	Bolt	M6	1	10	1.0	
Air filter case (rear)	Bolt	M6	2	10	1.0	
Muffler protector	Screw	M6	4	7	0.7	LT
Muffler and frame	Bolt	M8	2	20	2.0	
	Bolt	M8	1	27	2.7	
Exhaust pipe and cylinder	Bolt	M6	2	12	1.2	
Exhaust pipe and muffler	Screw	M8	1	20	2.0	LT
Crankcase (left and right)	Screw	M6	13	7	0.7	
Generator cover	Screw	M6	10	7	0.7	
Crankcase cover (left)	Screw	M4	1	2	0.2	
Clutch cover	Screw	M6	11	7	0.7	LT
Starter clutch	Bolt	M8	3	30	3.0	Stake
Primary drive gear	Nut	M14	1	50	5.0	
Clutch spring	Screw	M5	4	6	0.6	
Clutch boss	Nut	M14	1	70	7.0	
Push lever axle	Screw	M8	1	12	1.2	
Push lever adjuster	Nut	M6	1	8	0.8	
Drive sprocket	Bolt	M5	2	6	0.6	
Shift cam (Segment)	Screw	M6	1	12	1.2	LT
Shift pedal	Bolt	M6	1	10	1.0	
Pick up coil	Screw	M6	2	7	0.7	
Neutral switch	Screw	M10	1	20	2.0	
Stator coil	Screw	M6	3	7	0.7	LT
Starter motor	Screw	M6	1	7	0.7	

Item	Standard	Limit
Tightening sequence Cylinder head		
Crankcase		

CHASSIS

Item	Standard	Limit
Steering system:		
Steering bearing type (upper)	Ball bearings	•••
(lower)	Angular ball bearing	•••
No./size of steel balls (upper)	22 pcs. 0.1875 in	•••
Front suspension:		
Front fork travel	160 mm	•••
Fork spring free length	342 mm	338 mm
Fitting length	337 mm	•••
Spring rate (K1)	4.4 N /mm (0.44 kg/mm)	•••
Stroke (K1)	0 ~ 160 mm	•••
Oil capacity	0.243 L (243 cm^3)	•••
Oil level	135 mm	•••
Oil grade	Fork oil 10 WT or equivalent	•••
Inner tube vend limit	•••	0.2 mm
Rear suspension:		
Shock absorber stroke	48 mm	•••
Spring free length	193 mm	173 mm
Fitting length	185 mm	•••
Spring rate (K1)	100 N/mm (10.0 kg/mm)	•••
Stroke (K1)	0 ~ 48 mm	•••
Front wheel:		
Type	Spoke wheel	•••
Rim size	2.50 × 18	•••
Rim material	Aluminum	•••
Rim runout limit radial	•••	2 mm
lateral	•••	2 mm
Rear wheel:		
Type	Spoke wheel	•••
Rim size	14 M/C × MT 4.50	•••
Rim material	Steel	•••
Rim runout limit radial	•••	2 mm
lateral	•••	2 mm
Drive chain:		
Type/manufacturer	428HG/DAIDO	•••
No. of links	109	•••
Chain free play	35 ~ 60 mm	•••
Front brake:		
Type	Single disc	•••
Disc outside diameter	220 mm	•••
Disc thickness	3.5 mm	3.0 mm
Pad thickness (inner)	5.3 mm	0.8 mm
(outer)	5.3 mm	0.8 mm
Master cylinder inside diameter	11 mm	•••
Caliper cylinder 1 inside diameter	26.9 mm	•••
Caliper cylinder 2 inside diameter	22.2 mm	•••
Brake fluid type	DOT#4	•••

Item	Standard	Limit
Rear brake:		
Type	Leading, trailing	•••
Drum inside diameter	110 mm	111 mm
Shoe thickness	4 mm	2 mm
Shoe spring free length	50.5 mm	•••
Brake lever:		
Brake lever free play (at lever end)	2 ~ 5 mm	•••
Brake pedal:		
Brake pedal free play	20 ~ 30 mm	•••
Brake pedal position	30 mm	•••
Clutch lever:		
Clutch lever free play (at lever end)	10 ~ 15 mm	•••
Throttle cable free play	3 ~ 5 mm	•••

TIGHTENING TORQUES

CHASSIS

Part to be tightened	Thread size	Tightening torque		Remarks
		Nm	m•kg	
Handle crown and front fork	M8	23	2.3	
Handle crown and steering shaft	M14	90	9.0	
Handlebar holder (under and upper)	M8	20	2.0	
Steering ring nut	M25	18	1.8	Refer to NOTE
Master cylinder (front brake)	M6	7	0.7	
Brake hose union bolt (front brake)	M10	26	2.6	
Steering shaft and front fork	M10	30	3.0	
Engine and front engine stay	M8	33	3.3	
Front engine stay and frame	M8	33	3.3	
Engine and top engine stay	M8	33	3.3	
Top engine stay and frame	M8	33	3.3	
Engine and frame	M8	33	3.3	
Swingarm pivot shaft	M12	80	8.0	
Rear shock absorber and frame	M10	56	5.6	
Chain guide and swingarm	M5	5	0.5	
Sidestand	M10	40	4.0	
Footrest (left)	M12	60	6.0	
(right)	M10	45	4.5	
Rear footrest (left)	M8	15	1.5	
Front wheel axle and nut	M14	90	9.0	
Rear wheel axle and nut	M16	90	9.0	
Brake caliper and front fork	M10	30	3.0	
Brake disc and front wheel	M6	13	1.3	LT
Rear wheel sprocket and hub	M8	35	3.5	
Brake caliper bleed screw	M7	6	0.6	
Brake cam lever	M6	9	0.9	

NOTE:

1. When tighten the ring nut, should be steady the ball bearings and the steering shaft moving smoothly.
2. First, tighten the ring nut approximately 38 Nm (3.8 m•kg) by using the torque wrench, then loosen the ring nut one turn and retighten the ring nut to specification.

ELECTRICAL

Item	Standard	Limit
Ignition timing:		
Ignition timing (B.T.D.C.)	9° at 1,500 r/min	•••
Advanced timing	30° at 5,000 r/min	•••
Advanced type	Digital type	•••
C.D.I.:		
Pickup coil resistance/color	656 ~ 984 Ω at 20°C/ Red – White	•••
Source coil resistance/color	624 ~ 936 Ω at 20°C/ Brown – Green	•••
C.D.I. unit model/manufacturer	5EK/YAMAHA	•••
Ignition coil:		
Model/manufacturer	2JN/YAMAHA	•••
Minimum spark gap	6 mm	•••
Primary winding resistance	0.18 ~ 0.28 Ω at 20°C	•••
Secondary winding resistance	6.32 ~ 9.48 kΩ at 20°C	•••
Spark plug cap:		
Type	Resin type	•••
Resistance	10 kΩ	•••
Charging system:		
Type	C.D.I. magneto	•••
Model/manufacturer	F5BT/YAMAHA	•••
Standard output	12V 170 W/5,000 r/min	•••
Stator coil resistance/color	0.48 ~ 0.72 Ω at 20°C/ White – White	••• •••
Rectifier/regulator:		
Model/manufacturer	SH629A-12/SHINDENGEN	•••
Type (regulator)	Semi conductor-short circuit type	•••
No load regulated voltage	14.5 V	•••
Capacity (rectifier)	10 A	•••
Withstand voltage	200 V	•••
Battery:		
Specific gravity	1.280	•••
Electric starter system:		
Type	Constant mesh type	
Starter motor:		
Model/manufacturer	2JX/YAMAHA	•••
Output	0.4 kW	•••
Armature coil resistance	0.0171 ~ 0.0209 Ω at 20°C	•••
Brush overall length	10 mm	3.5 mm
Brush spring pressure	5.52 ~ 8.28 N (552 ~ 828 g)	•••
Commutator diameter	22 mm	21 mm
Mica undercut (depth)	1.5 mm	•••

Item	Standard	Limit
Starter relay:		
Model/manufacturer	MS5F/JIDECO	•••
Amperage rating	100 A	•••
Coil winding resistance	4.2 ~ 4.6 Ω at 20°C	•••
Horn:		
Model/manufacturer	YF-12/NIKKO	•••
Maximum amperage	3 A	•••
Flasher relay:		
Type	Full transistor type	•••
Model/manufacturer	FE 246 BH/DENSO	•••
Flasher frequency	85 cycle/min	•••
Circuit breaker:		
Type	Fuse	•••
Main	20 A × 1 pcs.	•••
Reserve	20 A × 1 pcs.	•••

EAS00028

CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.
Use this table to convert METRIC unit data to IMPERIAL unit data.
Ex.

METRIC		MULTIPLIER		IMP
** mm	×	0.03937	=	** in
2 mm	×	0.03937	=	0.08 in

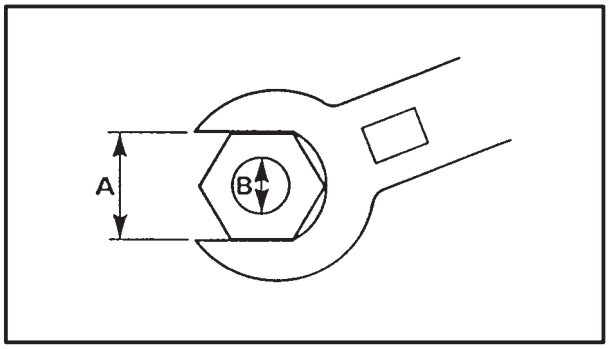
CONVERSION TABLE

METRIC TO IMP			
	Known	Multiplier	Result
Torque	m•kg m•kg cm•kg cm•kg	7.233 86.794 0.0723 0.8679	ft•lb in•lb ft•lb in•lb
Weight	kg g	2.205 0.03527	lb oz
Distance	km/hr km m m cm mm	0.6214 0.6214 3.281 1.094 0.3937 0.03937	mph mi ft yd in in
Volume/ Capacity	cc (cm^3) cc (cm^3) lit (liter) lit (liter)	0.03527 0.06102 0.8799 0.2199	oz (IMP liq.) cu•in qt (IMP liq.) gal (IMP liq.)
Miscellaneous	kg/mm kg/cm^2 Centigrade	55.997 14.2234 9/5 (°C) + 32	lb/in psi (lb/in^2) Fahrenheit (°F)

EAS00029

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.



A: Distance across flats
B: Outside thread diameter

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

LUBRICATION POINT AND GRADE OF LUBRICANT

ENGINE

Lubrication Point	Symbol
Oil seal lips (all)	LS
Bearing retainer (all)	E
Bolt (cylinder head)	E
Crank pin	E
Connecting rod (big end)	E
Piston pin	E
Piston/piston ring	E
Buffer boss	E
Valve stem/valve guide (IN, EX)	M
Valve stem end (IN, EX)	E
Rocker arm shaft	E
Cam and bearing (camshaft)	E
Rocker arm inner surface	M
Crankcase mating surfaces	Yamaha bond No.1215
O-ring (all)	LS
Starter idle gear thrust surfaces	E
Starter clutch (outer/roller)	E
Starter wheel gear inner surface	E
Push rod	E
Primary driven gear inner surface	E
Push lever axle	E
Transmission gear inner surface	M
Shift fork/guide bar/shaft	E
Shift cam	E

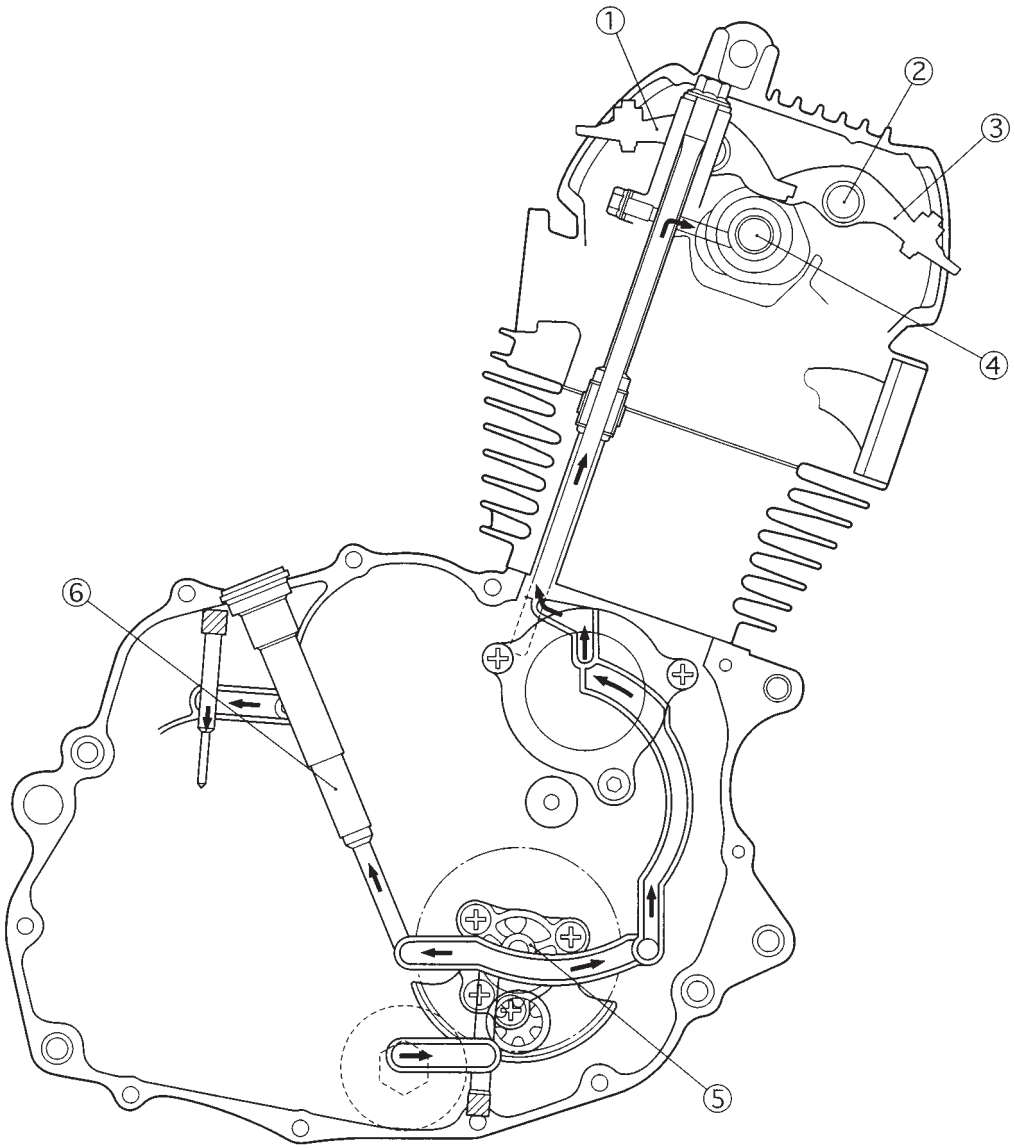
LUBRICATION POINT AND GRADE OF LUBRICANT

CHASSIS

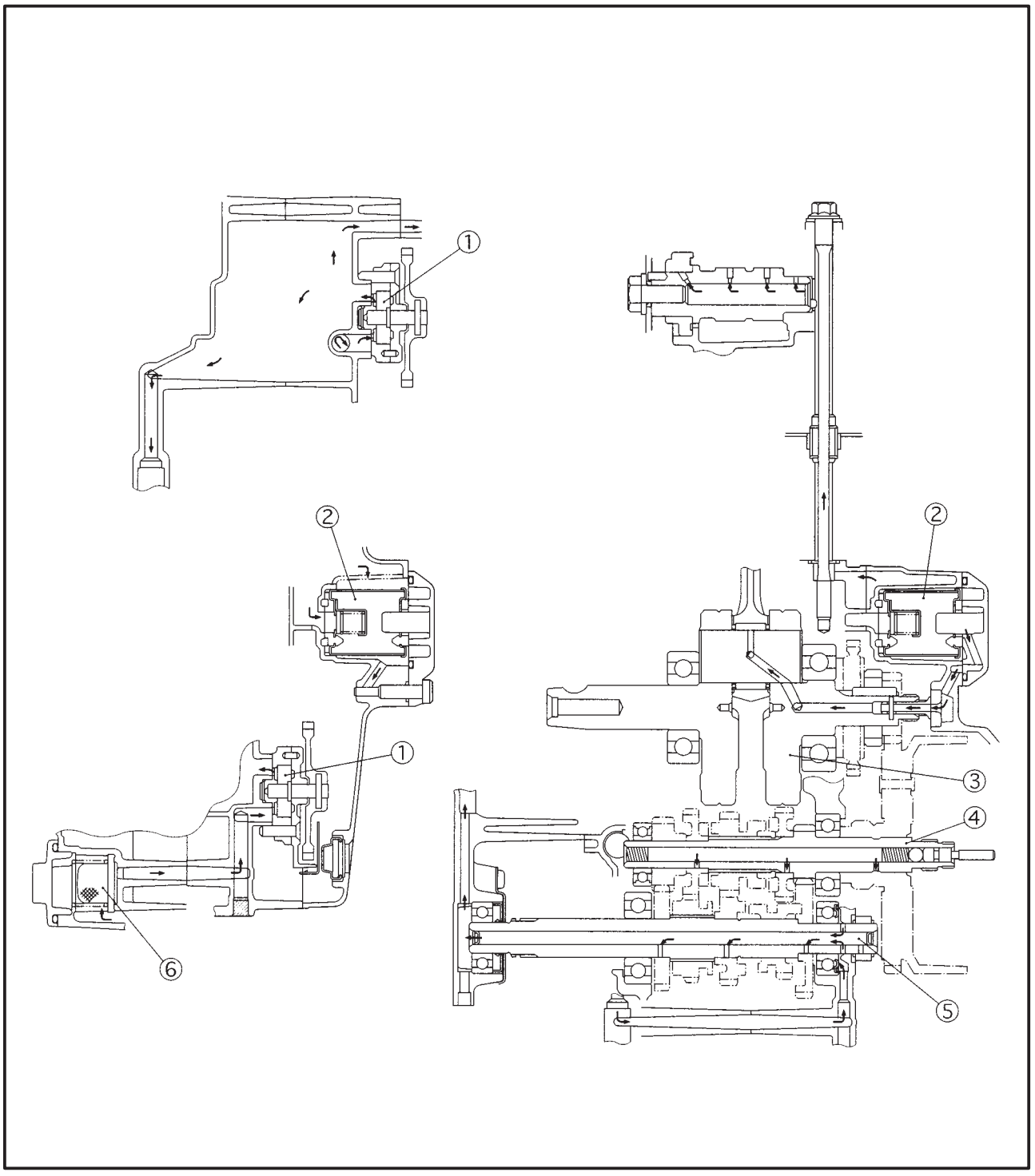
Lubrication Point	Symbol
Steering head pipe bearing (upper/lower)	LS
Front wheel oil seal lips (left/right)	LS
Rear wheel oil seal lips (left/right)	LS
Rear brake shoe plate, camshaft and pivoting pin	LS
Pivoting points (brake pedal shaft and frame)	LS
Sidestand sliding surface/mounting bolt	LS
Tube guide (throttle grip) inner surface	LS
Brake lever bolt/master cylinder sliding surface	LS
Clutch lever bolt/collar/cable sliding surface	LS
Brake pedal shaft surface	LS
Gear unit (speedometer)	LS
Swigarm insert surface/bush/thrust cover	M
Pivot shaft surface	M
Rear shock absorber lower pin surface/dust seal lips	M

LUBRICATION DIAGRAM

① Rocker arm (IN)
② Rocker shaft
③ Rocker arm (EX)
④ Camshaft
⑤ Oil pump
⑥ Push lever

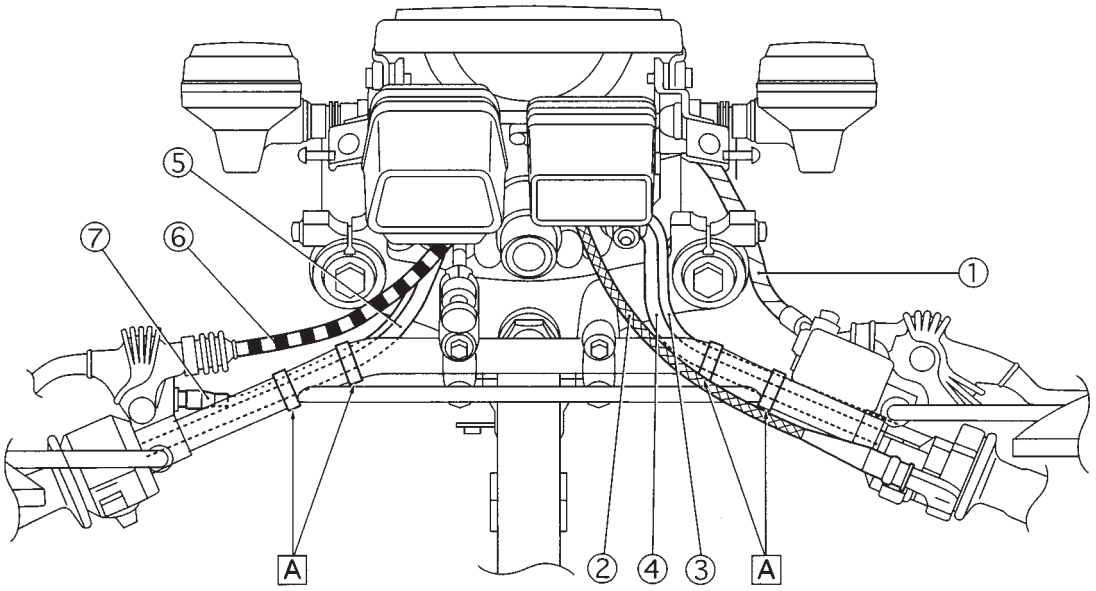


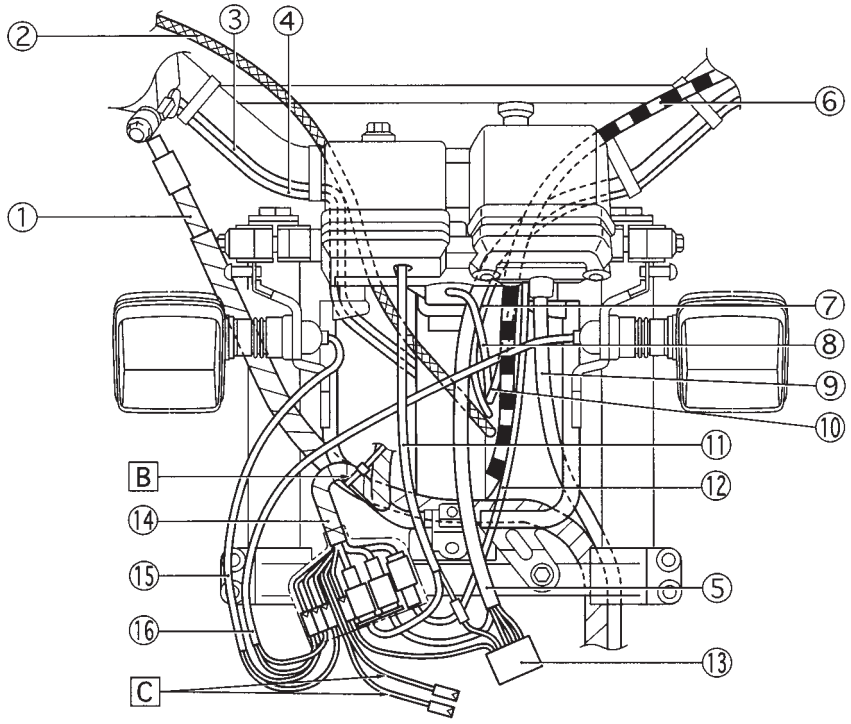
① Oil pump
② Oil filter
③ Crankshaft
④ Main axle
⑤ Drive axle
⑥ Oil strainer



CABLE ROUTING

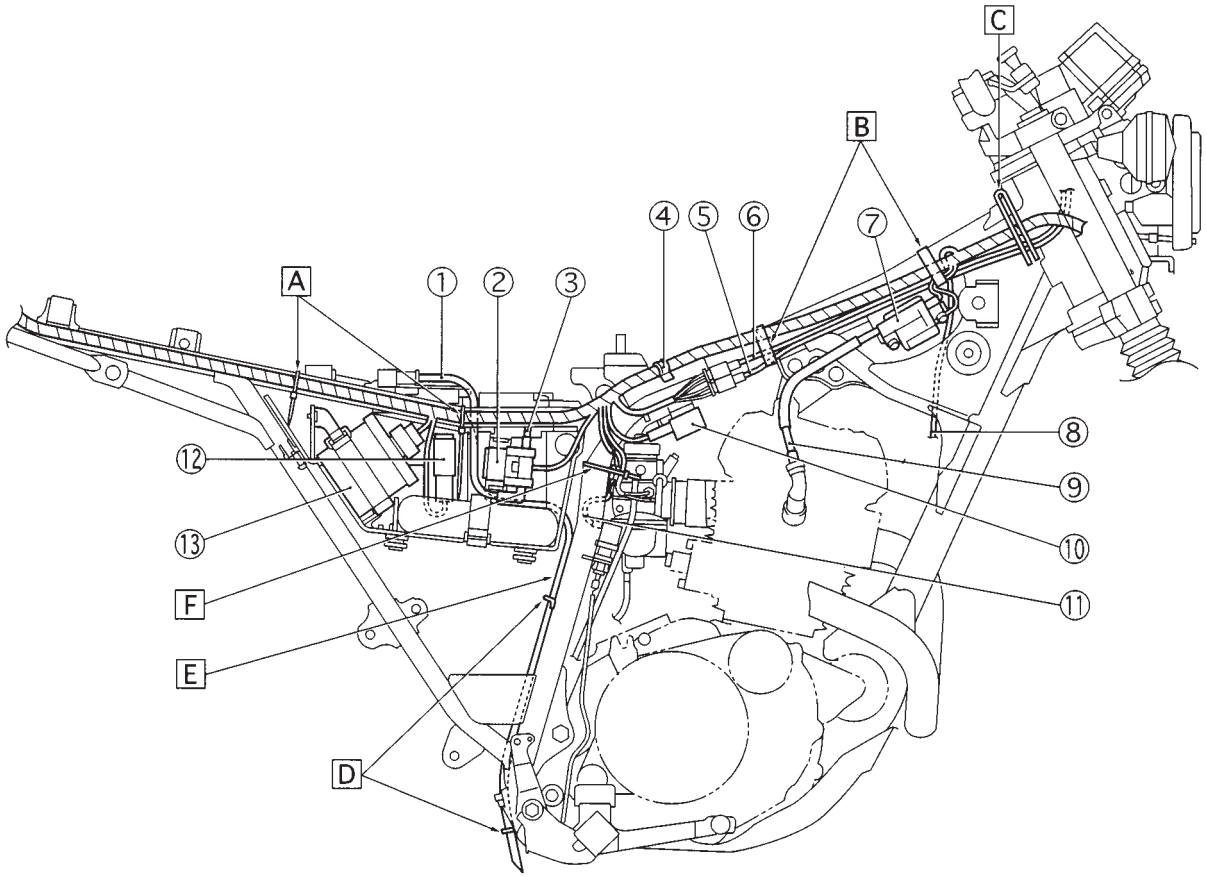
① Brake hose
② Throttle cable
③ Front brake switch lead
④ Handlebar switch lead (right)
⑤ Handlebar switch lead (left)
⑥ Clutch cable
⑦ Clutch switch lead
⑧ Main switch lead
⑨ Speedometer cable
⑩ Starter cable
⑪ Indicator light lead
⑫ Meter lead
⑬ Headlight coupler
⑭ Wireharness
⑮ Front turn signal light (right)
⑯ Front turn signal light lead (right)
A Fasten the handlebar switch lead, front brake switch lead and clutch switch lead to the handlebar with a plastic clamp.
B The end of the plastic locking tie must face down ward.
C To headlight





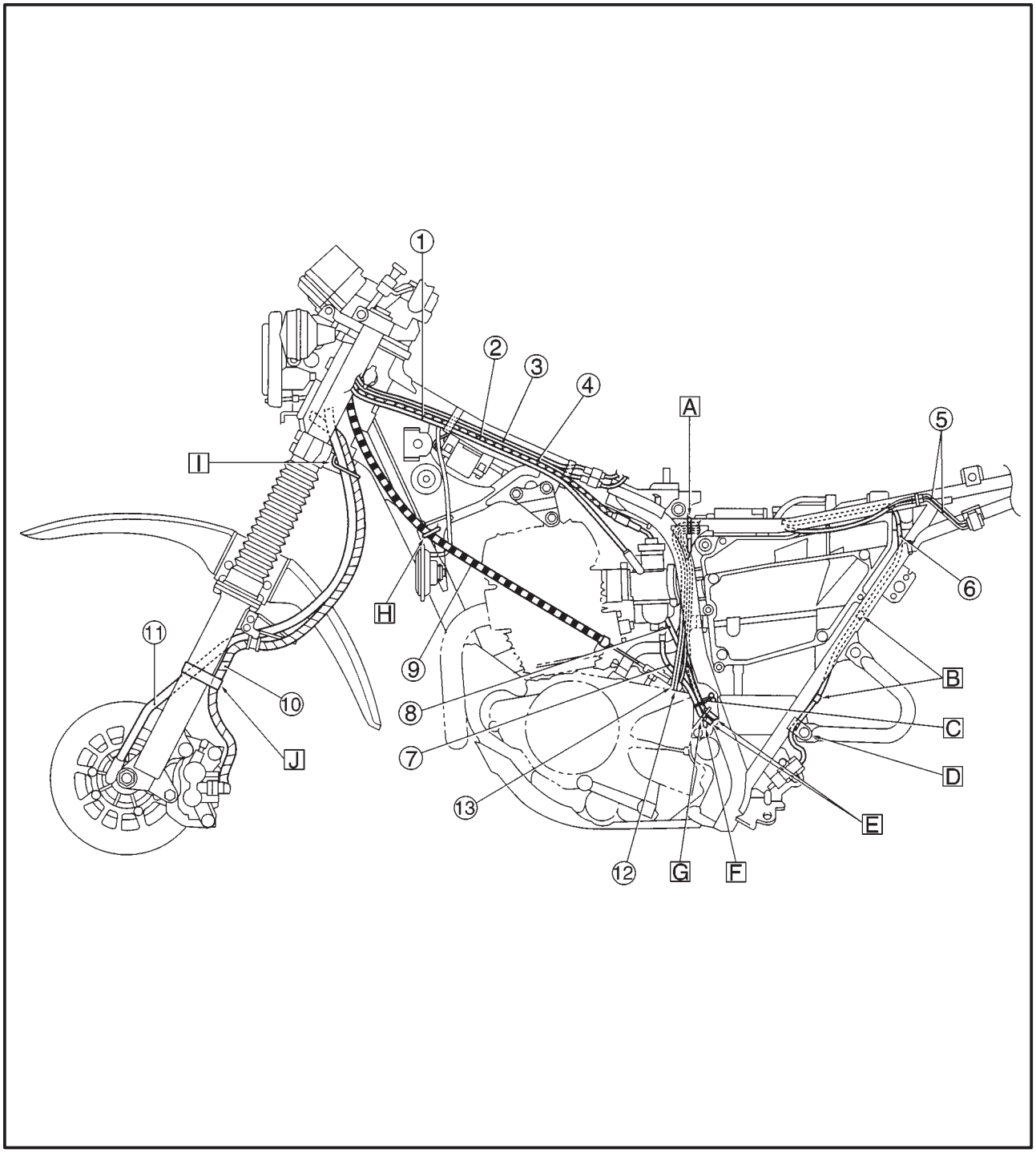
① Battery positive lead
② Starter relay
③ Starter motor lead
④ Clamp
⑤ Front brake switch lead
⑥ Handlebar switch lead (right)
⑦ Ignition coil
⑧ Horn lead
⑨ High tension cable
⑩ Flasher relay
⑪ Rear brake switch lead
⑫ Neutral relay
⑬ CDI unit

A The end of the plastic locking tie must face down ward.
B Fasten the wire harness, handlebar switch lead (right), front brake switch lead, throttle cable, starter cable, clutch switch lead and main switch lead to the frame with steel clamp.
C Route the wire harness, handlebar switch (right) and front brake switch lead through the cable guide.
D Route the battery breather hose through the cable guide.
E Route the battery breather hose through the hole of air cleaner case.
F Fasten the rear brake switch lead couplers and carburetor heater lead to the frame with a plastic locking tie.
The end of the plastic locking tie must face front side.

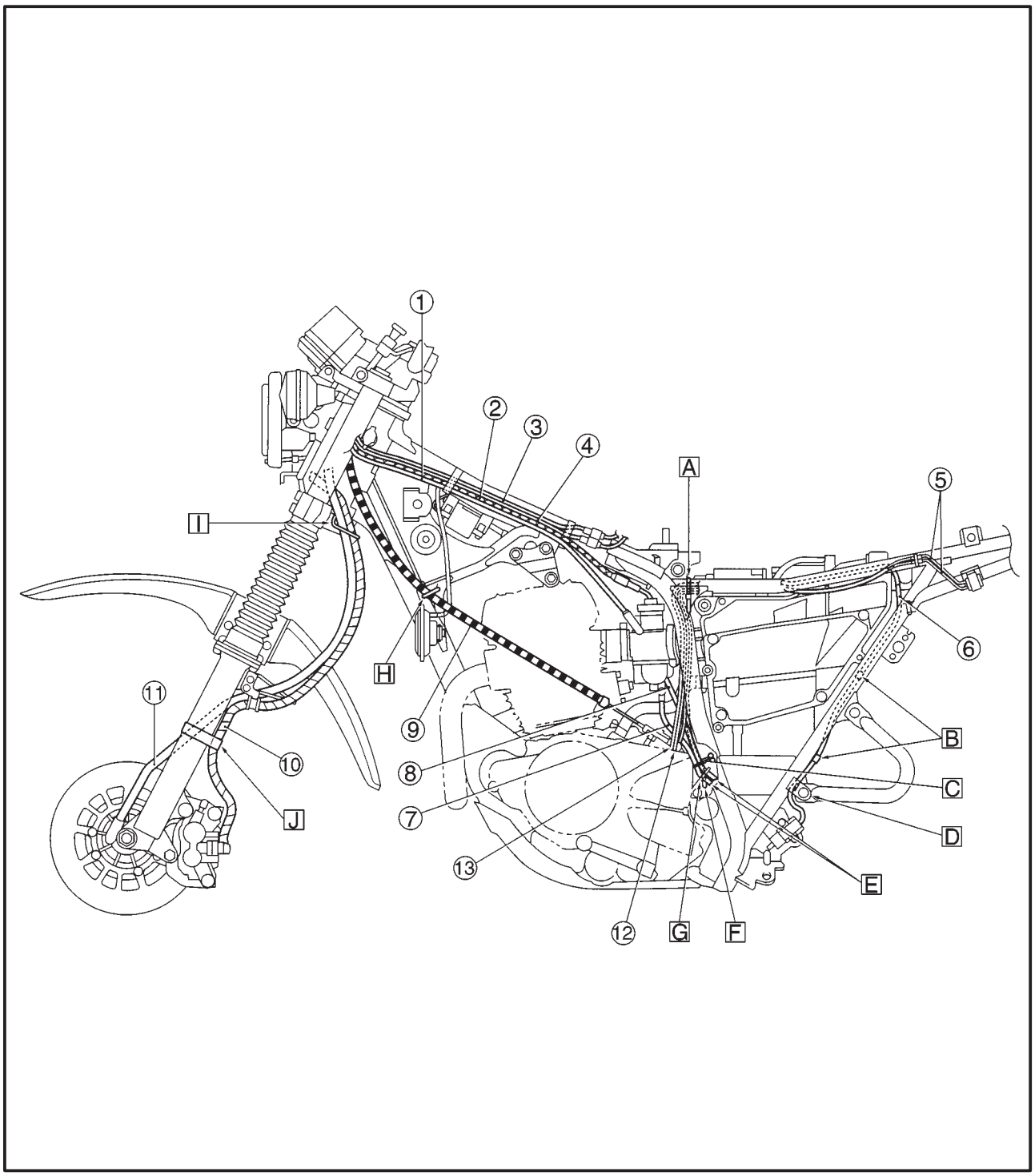


① Starter cable
② Throttle cable
③ Clutch switch lead
④ Main switch lead
⑤ Thermo switch lead
⑥ Sidestand switch lead
⑦ Carburetor over flow hose
⑧ Carburetor air vent hose
⑨ Clutch cable
⑩ Brake hose
⑪ Speedometer cable
⑫ CDI magneto leads
⑬ Neutral switch lead

[A] Fasten the CDI magneto leads, starter motor lead, neutral switch lead and ground lead to the frame stay.
The end of plastic locking tie must face down ward.
[B] Fasten the side stand switch lead with the steel clamp.
[C] Fasten the carburetor air vent hose, carburetor over flow hose and starter motor lead with a plastic clamp.
[D] Route the side stand switch lead through the guide.
[E] Route the carburetor air vent hose and carburetor over flow hose between the engine and swingarm.
[F] Route the starter motor lead between the engine and swing arm.

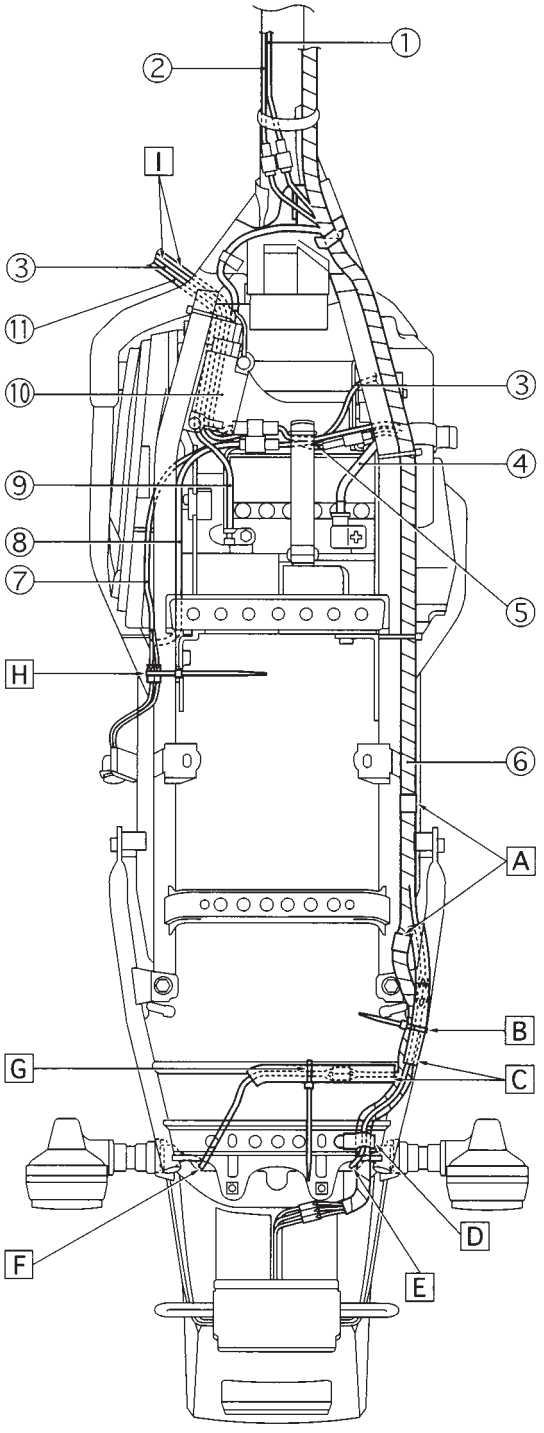


G Route the carburetor air vent hose and carburetor over flow hose through the guide.
H Route the clutch cable through the cable guide.
I Route the brake hose and speedometer cable through the cable guide.
J Fasten the brake hose and speedometer cable to the front fork outer tube with a cable holder.

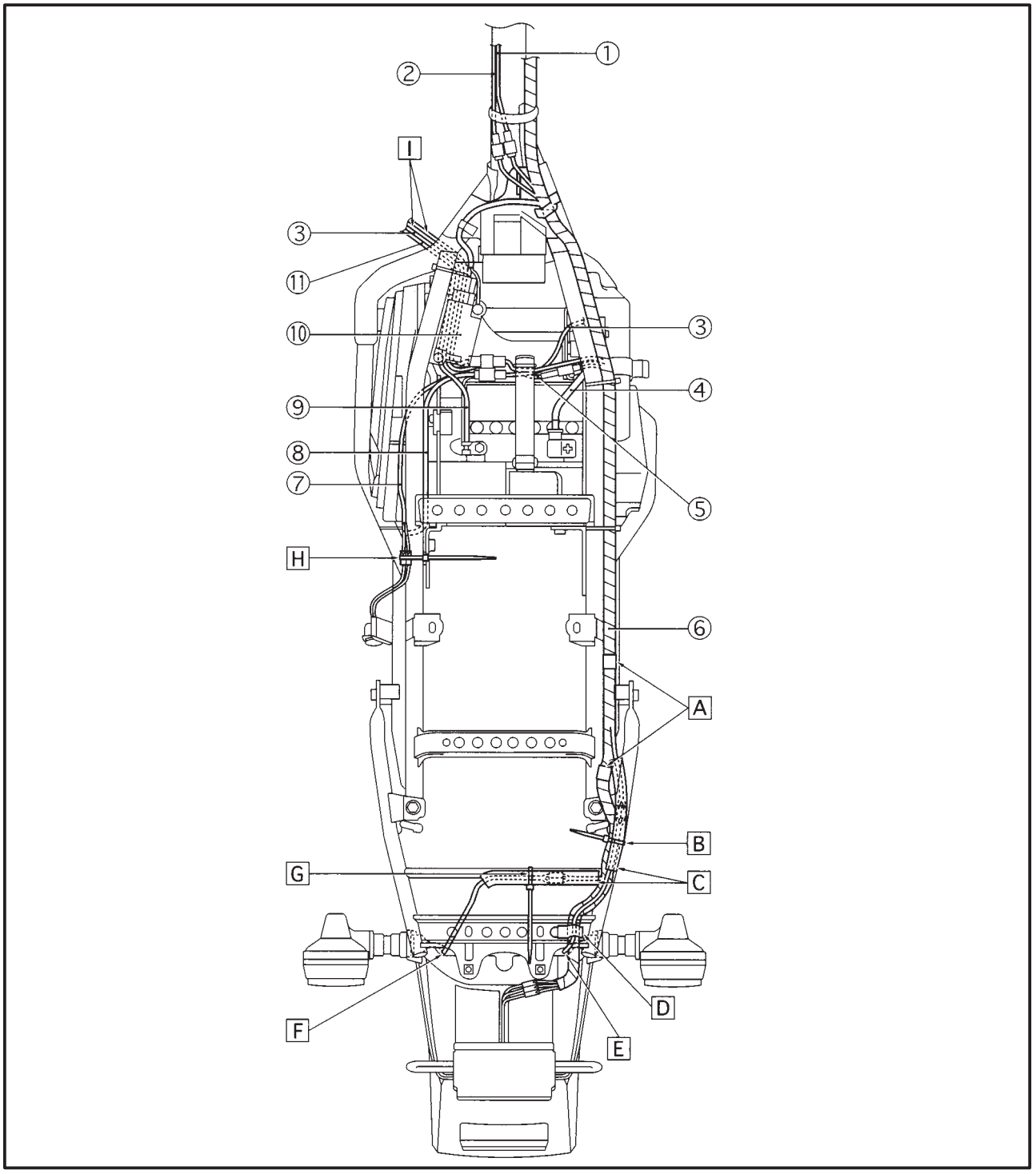


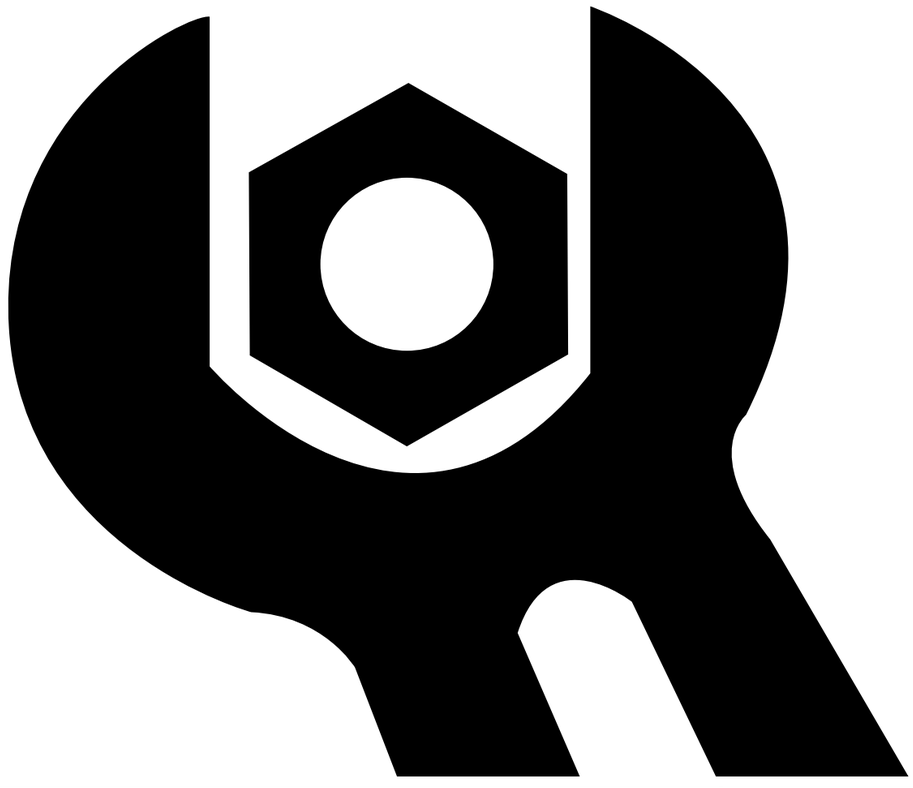
① Clutch switch lead
② Main switch lead
③ Starter motor lead
④ CDI magneto lead
⑤ Battery positive lead
⑥ Wire harness
⑦ Thermo switch lead
⑧ Sidestand switch lead
⑨ Battery negative lead
⑩ Rectifier / Regulator
⑪ Ground lead

A Fasten the wire harness with steel clamp.
B Fasten the wire harness and rear turn signal light lead to the frame with a plastic locking tie.
The end of plastic locking tie must face in side.
C Route the rear turn signal light lead inside of hose.
D Fasten the wire harness and rear turn signal light (right) with a steel clamp.
E Route the rear turn signal light lead (right) between the frame and license bracket.
F Route the rear turn signal light lead (left) between the frame and license bracket.



G Fasten the rear turn signal light (left) to the frame with a plastic locking tie.
The end of plastic locking tie must face rear ward.
H Fasten the thermo switch lead connectors to the frame with a plastic locking tie.
The end of plastic locking tie must face inside.





CHK

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CHAPTER 3.
PERIODIC INSPECTIONS AND ADJUSTMENTS

EAS00036

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. 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

No		ITEM	ROUTINE	BRAKE-IN 1,000 KM	EVERY	
					6,000 km or 6 months	12,000 km or 12 months
1	*	Fuel line	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√
2		Spark plugs	• Check condition. • Clean, regap or replace if necessary.	√	√	√
3	*	Valves	• Check valve clearance. • Adjust if necessary.	√	√	√
4		Air filter	• Clean or replace if necessary.		√	√
5	*	Battery	• Check electrolyte level and specific gravity. • Correct or recharge if necessary. • Make sure that the breather hose is properly routed.		√	√
6		Clutch	• Check operation. • Adjust or replace cable.	√	√	√
7	*	Front brake	• Check operation, fluid level and vehicle for fluid leakage. (See NOTE) • Correct accordingly. • Replace brake pads if necessary.	√	√	√
8	*	Rear brake	• Check operation. • Adjust cable and replace brake shoes if necessary.	√	√	√
9	*	Wheels	• Check balance, runout spoke tightness and for damage. • Tighten spokes and rebalance,replace if necessary.		√	√
10	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√
11	*	Wheel bearings	• Check bearing for looseness or damage. • Replace if necessary.		√	√
12	*	Swingarm	• Check Swingarm pivoting point for play. • Correct if necessary. • Lubricate with lithium soap base grease.		√	√
13		Drive chain	• Check chain slack. • Adjust if necessary. Make sure that the rear wheel is properly aligned. • Clean and lubricate.	Every 500 km and after washing the motorcycle or riding in rain		
14	*	Steering bearings	• Check bearing play and steering for roughness. • Correct accordingly. • Lubricate with lithium soap base grease every 24,000 km or 24 months (whichever comes first).		√	√

PERIODIC MAINTENACE/LUBRICATION INTERVALS

CHK / ADJ

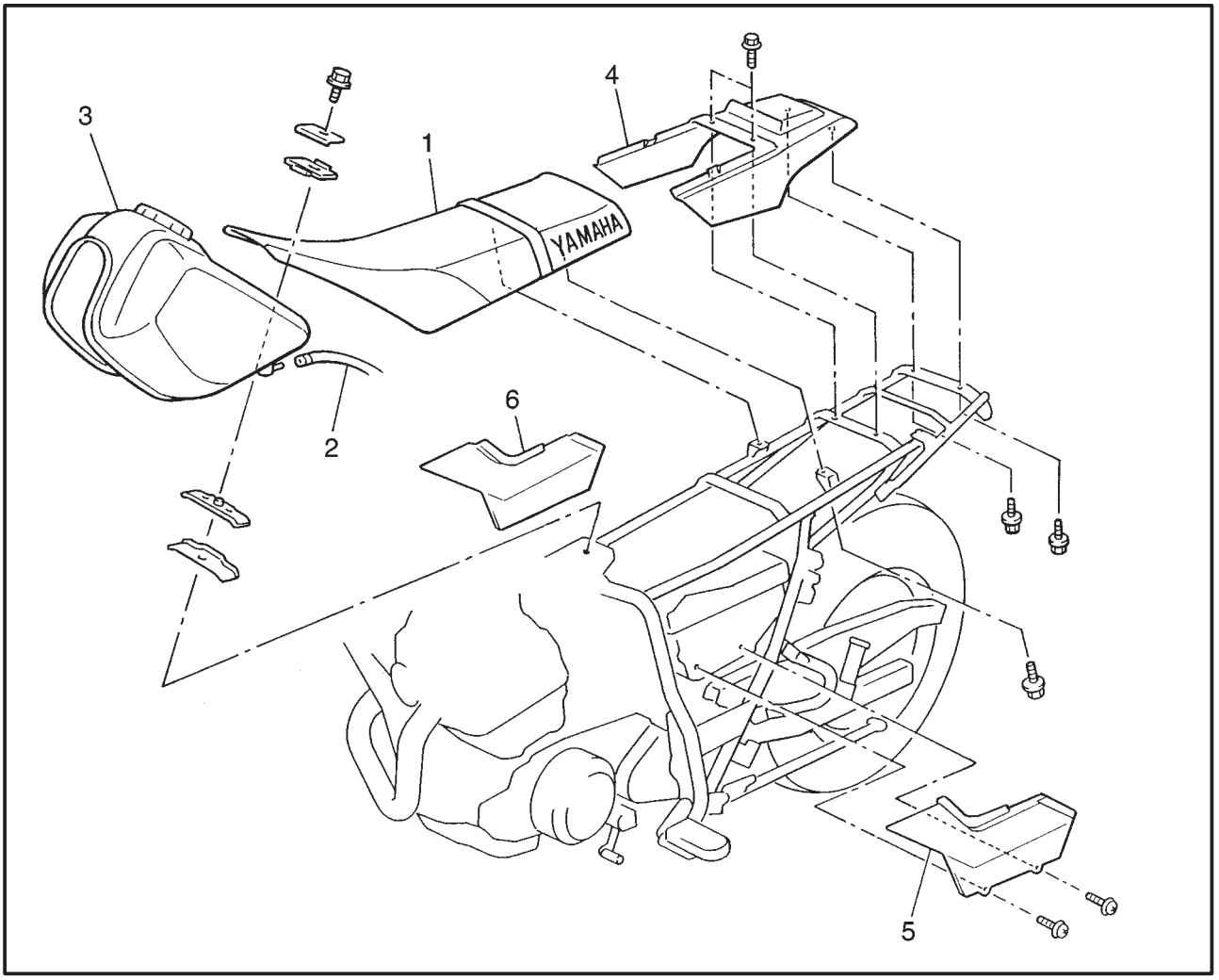
NO.		ITEM	ROUTINE	BRAKE-IN 1,000 KM	EVERY 6,000 km or 6 months	EVERY 12,000 km or 12 months
15	*	Chassis fasteners	• Make sure that all nuts, bolts and screws are properly tightened. • Tighten if necessary.		√	√
16		Sidestand	• Check operation. • Lubricate and repair if necessary.		√	√
17	*	Sidestand switch	• Check operation. • Replace if necessary.	√	√	√
18	*	Front fork	• Check operation and for oil leakage. • Correct accordingly.		√	√
19	*	Rear shock absorber assembly pivoting points	• Check operation. • Lubricate with lithium soap base grease every 24,000 km or 24 months (whichever comes first).		√	√
20	*	Carburetor	• Check engine idling speed and starter operation. • Adjust if necessary.	√	√	√
21		Engine oil	• Check oil level and vehicle for oil leakage. • Correct if necessary. • Change. (Warm engine before draining.)	√	√	√
22		Engine oil filter element	• Clean or replace if necessary.	√		√
23	*	Engine oil strainer	• Clean or replace if necessary.	√		√

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

NOTE:

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

SEAT, FUEL TANK AND SIDE COVER



Order	Job/Part	Q'ty	Remarks
	Removing the seat, fuel tank and side cover		Remove the parts in the order listed.
1	Seat	1	
2	Fuel hose	1	**NOTE:** Before disconnecting the fuel hose, turn the fuel cock off.
3	Fuel tank	1	
4	Tail cover	1	
5	Side cover (left)	1	
6	Side cover (right)	1	
			For installation, reverse the removal procedure.

EAS00049

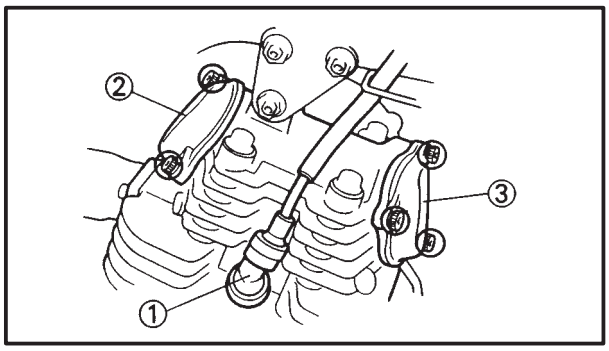
ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

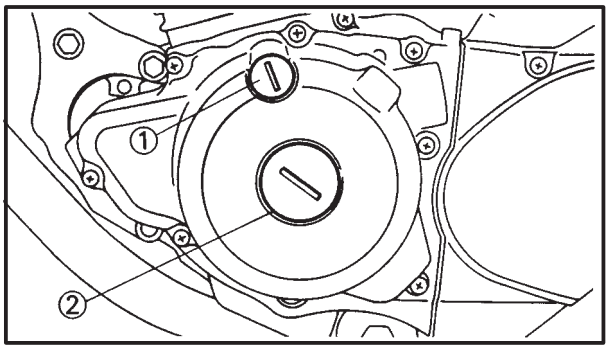
NOTE:

- 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.

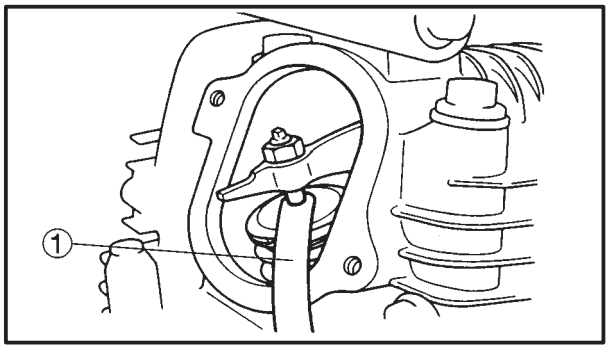


1. Remove:
   - seat
   - side cover (left and right)
   - fuel tank

   Refer to “SEAT, FUEL TANK AND SIDE COVER”.



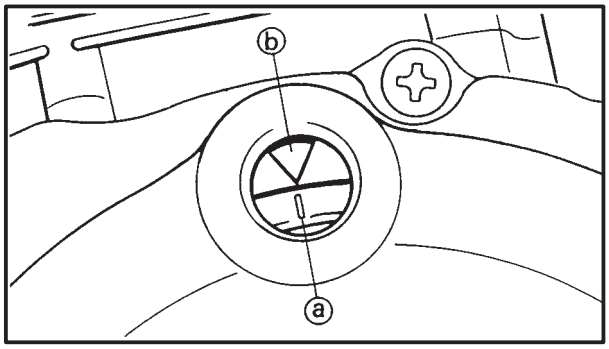
2. Remove:
   - spark plug cap ①
   - spark plug
   - valve cover (intake side) ②
   - valve cover (exhaust side) ③
3. Remove:
   - timing check plug (with O-ring) ①
   - center plug (with O-ring) ②



4. Measure:
   - valve clearance

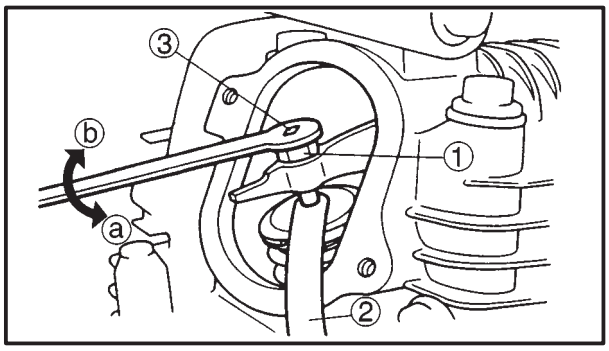
   Out of specification → Adjust.

Valve clearance (cold)
Intake valve
0.05 ~ 0.09 mm
Exhaust valve
0.11 ~ 0.15 mm



a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the mark ⓐ on the generator rotor with the stationary pointer ⓑ on the crankcase.
c. Measure the valve clearance with a thickness gauge ①.

   Out of specification → Adjust.



5. Adjust:
   • valve clearance

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a. Loosen the locknut ①.
b. Insert a thickness gauge ② between the end of the adjusting screw and the valve tip.
c. Turn the adjusting screw ③ in direction ⓐ or ⓑ until the specified valve clearance is obtained.

Direction ⓐ →	**Valve clearance is increased.**
Direction ⓑ →	**Valve clearance is decreased.**

Valve adjusting tool
90890-01311

d. Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.

Locknut
14 Nm (1.4 m•kg)

e. Measure the valve clearance again.
f. 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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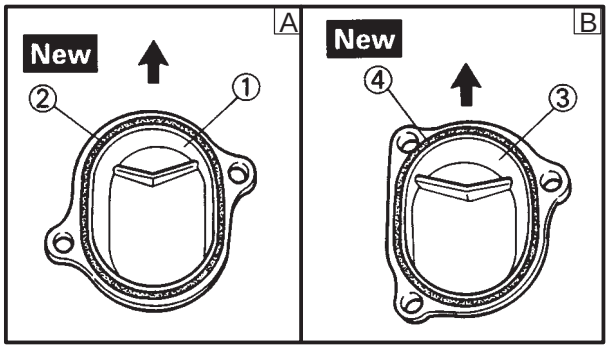
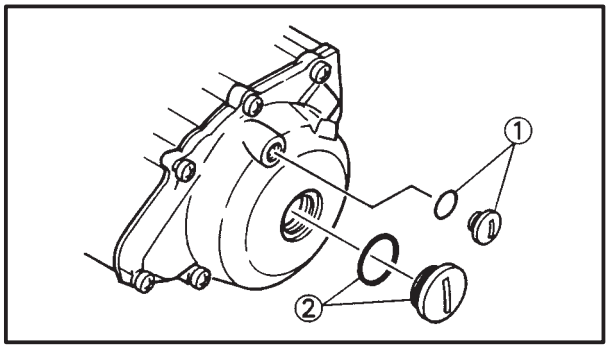
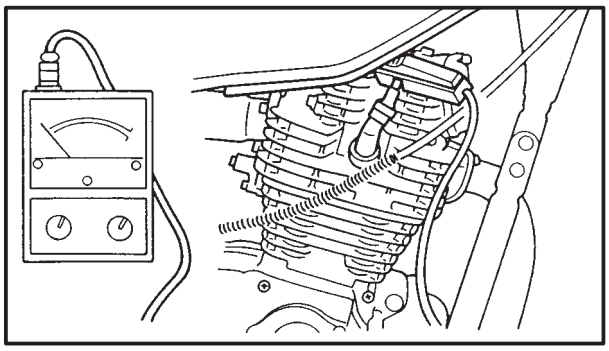


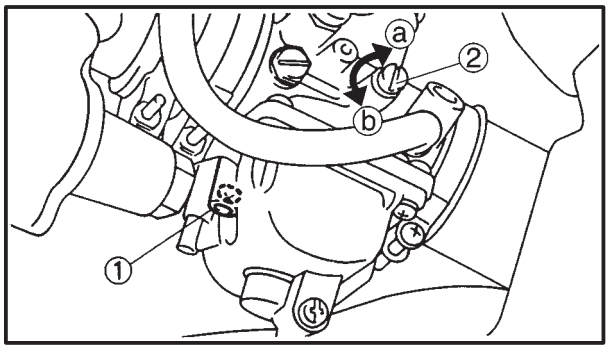
6. Install:
   • valve cover (intake side) ①
   10 Nm (1.0 m•kg)
   • o-ring ② New
   • valve cover (exhaust side) ③
   10 Nm (1.0 m•kg)
   • o-ring ④ New

A Intake side
B Exhaust side



7. Install:
   • spark plug
   18 N m (1.8 m•kg)
   • timing check plug ①
   (with O-ring)
   • center plug ②
   (with O-ring)





EAS00054

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)

	Engine tachometer **90890-03113**

3. Measure:
   - engine idling speed
     Out of specification → Adjust.

	Engine idling speed **1,300 ~ 1,500 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.

	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.**

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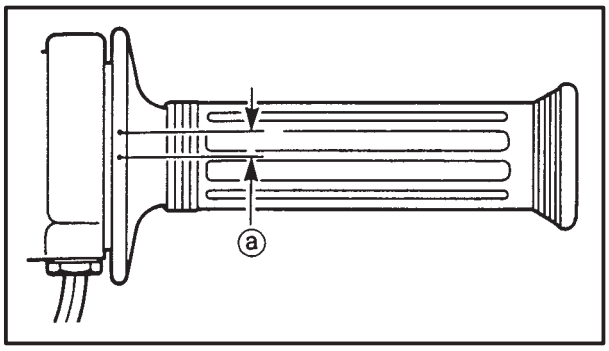
5. Adjust:
   - throttle cable free play
     Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".

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



EAS00058

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

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

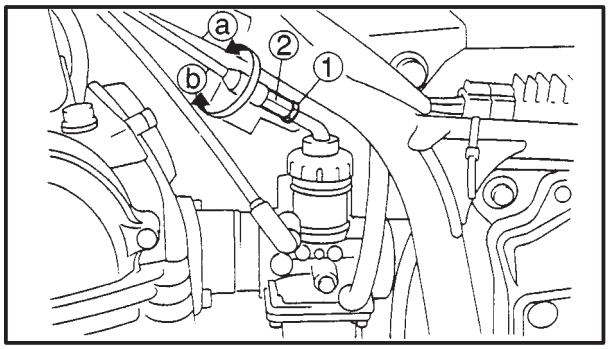
1. Check:
   - throttle cable free play ⓐ
     Out of specification → Adjust.

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

2. Adjust:
   - throttle cable free play

Carburetor side

a. Loosen the locknut ① on the throttle cable.
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.**

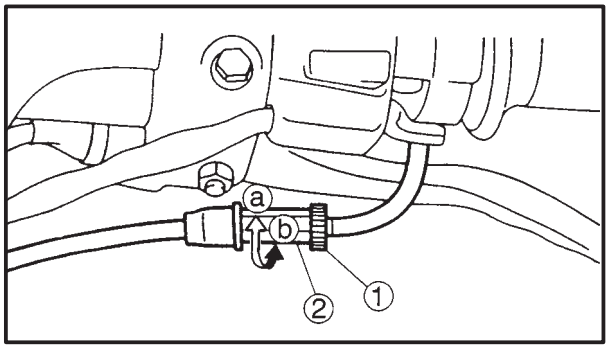
c. Tighten the locknut.

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.

EAS00060

CHECKING THE SPARK PLUG

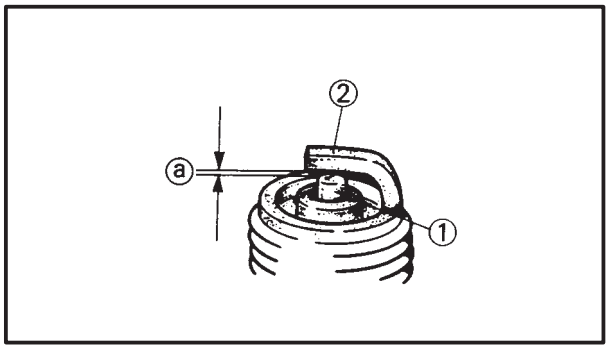
1. Disconnect:
   • spark plug cap
2. Remove:
   • spark plug

CAUTION:

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

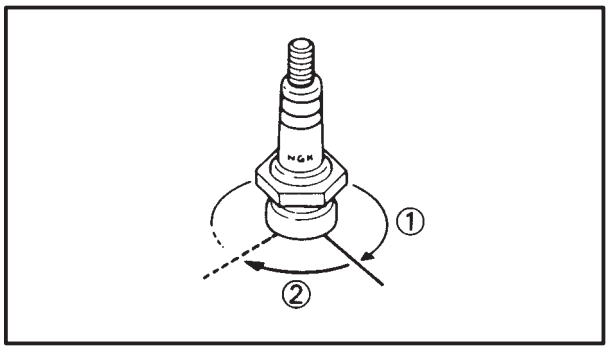
3. Check:
   • spark plug type
   Incorrect → Change.

Spark plug type (manufacturer)
DR8EA (NGK)



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
0.6 ~ 0.7 mm



7. Install:
   • spark plug

	Spark plug **18 Nm (1.8 m•kg)**

NOTE:

- Before installing the spark plug, clean the spark plug and gasket surface.
- Finger-tighten ① the spark plug before torquing to specification ②.

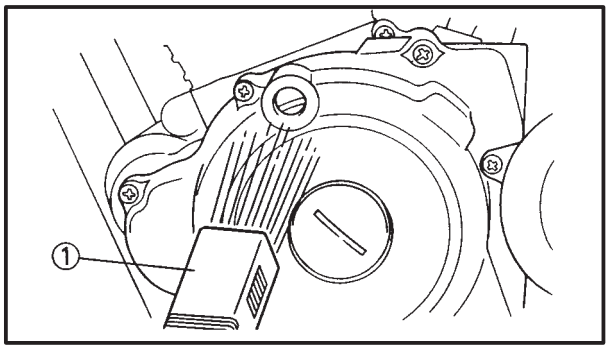
8. Connect:
   • spark plug cap

EAS00064

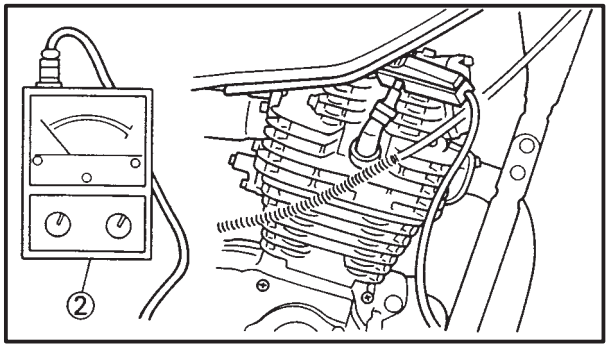
CHECKING THE IGNITION TIMING

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 check plug
2. Install:
   • timing light ①
   • engine tachometer ②
   (to the spark plug lead of cylinder #1)



	Timing light ① **90890-03141** **Engine tachometer** ② **90890-03113**

3. Check:
   • ignition timing

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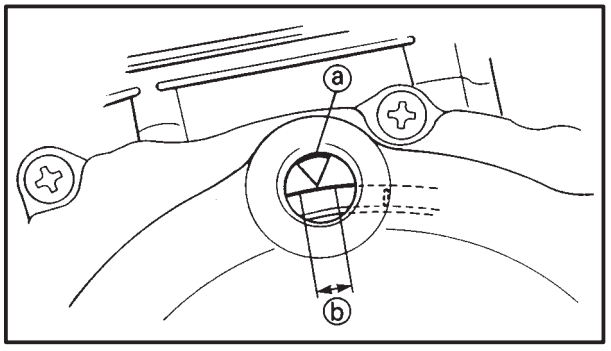
a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

	Engine idling speed **1,300 ~ 1,500 r/min**

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



NOTE:

The ignition timing is not adjustable.

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

EAS00067

MEASURING THE COMPRESSIONPRESSURE

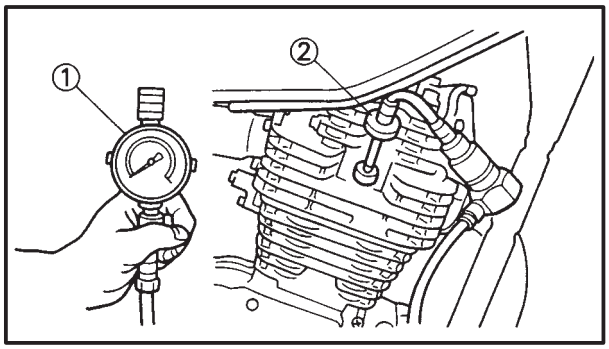
NOTE:

Insufficient compression pressure will result in a loss of performance.

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

CAUTION:

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



5. Install:
   - compression gauge ①

Compression gauge ①
90890-03081
Adapter ②
90890-04082

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 cylinder and measure again.
   - Refer to the following table.

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

Compression pressure
(at sea level)
Standard:
1,200 kPa (12.0 kg/cm², 12 bar)
Minimum:
1,100 kPa (11,0 kg/cm², 11 bar)

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 the spark plug lead before cranking the engine.

7. Install:
   • spark plug — **18 Nm (1.8 m•kg)**
8. Connect:
   • spark plug cap

EAS00069

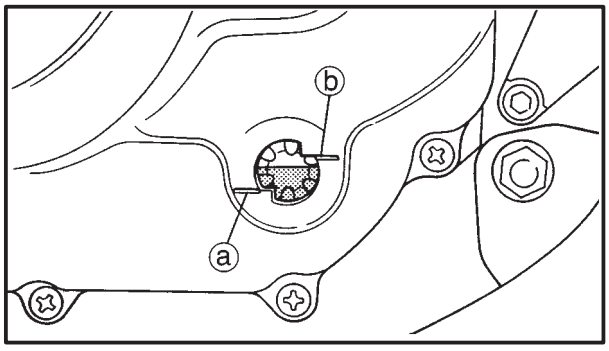
CHECKING THE ENGINE OIL LEVEL

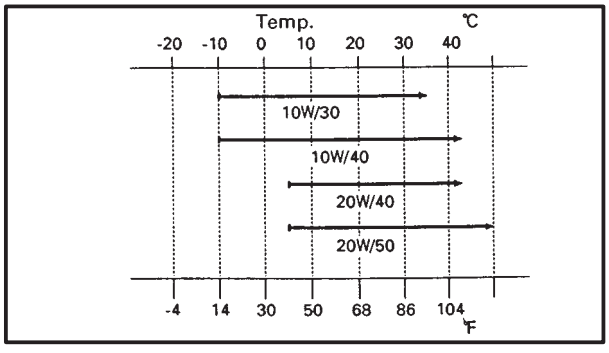
1. Stand the motorcycle on a level surface.

NOTE:

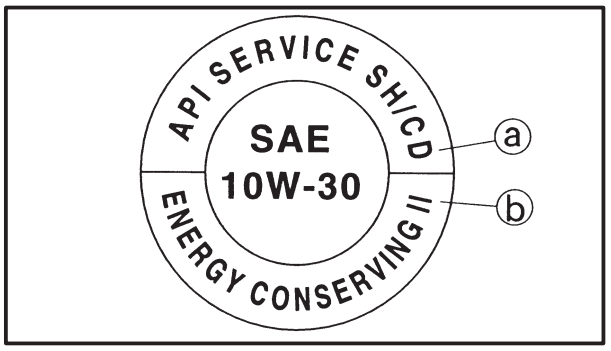
• Place the motorcycle on a suitable stand.
• Make sure that the motorcycle is upright.

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.**

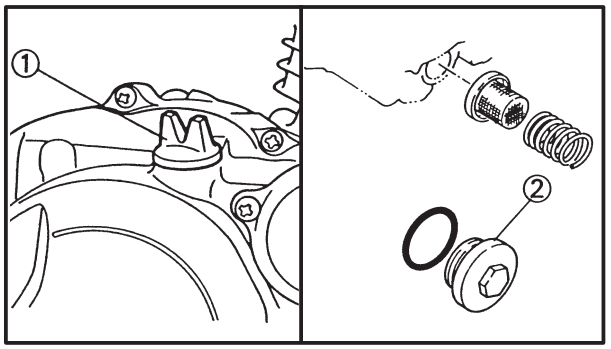
4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

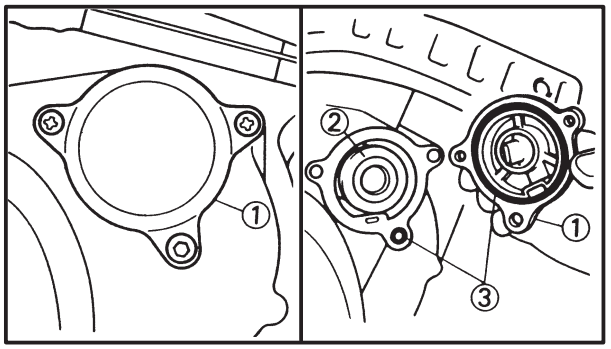
NOTE:

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

EAS00076

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
4. Drain:
   - engine oil
     (completely from the crankcase)
5. If the oil filter element is also to be replaced, perform the following procedure.

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a. Remove the oil filter element cover ① and oil filter element ②.
b. Check the O-ring ③ and replace it if it is cracked or damaged.
c. Install the new oil filter element and the oil filter element cover.

	Oil filter element cover bolt **7 Nm (0.7 m•kg)**

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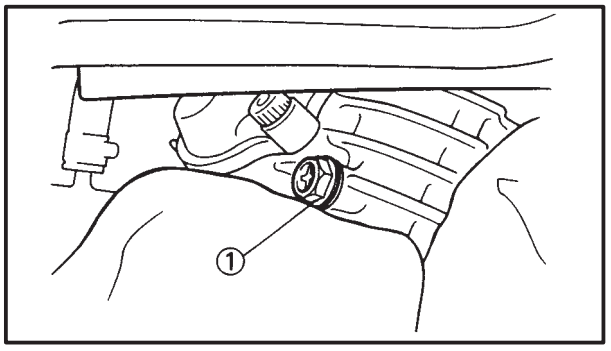
6. Check:
   - engine oil drain bolt gasket
     Damage → Replace.
7. Install:
   - engine oil drain bolt — **43 Nm (4.3 m•kg)**

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

Quantity
Total amount
1.3 L
Without oil filter element replacement
1.0 L
With oil filter element replacement
1.1 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

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a. Slightly loosen the oil gallery bolt ①.
b. Start the engine and keep it idling until the 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 engine oil passages and oil pump for damage or leakage.
d. Start the engine after solving the problem(s), and check the oil pressure again.
e. Tighten the oil gallery bolt to specification.

Oil gallery bolt:
7 Nm (0.7 m•kg)

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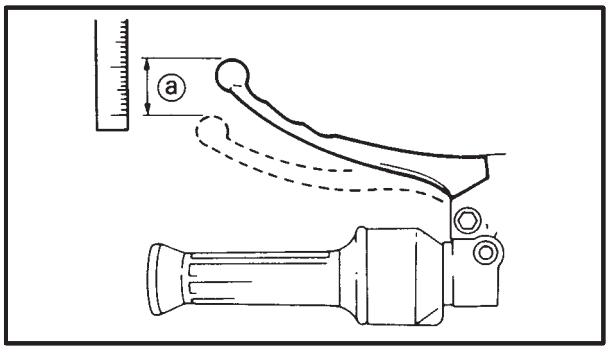
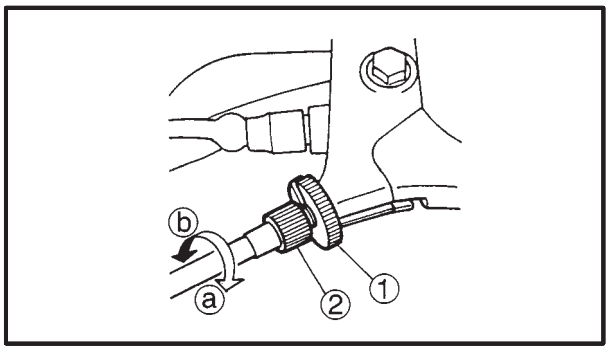


EAS00078

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

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Handlebar side

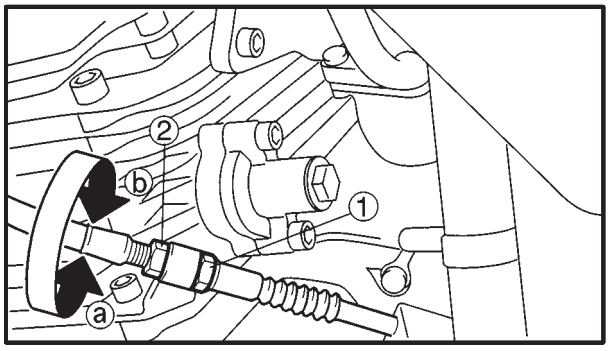
a. Loosen the locknut ①.
b. Turn the adjusting screw ② in direction ⓐ or ⓑ until the specified clutch cable free play is obtained.

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 locknut ①.
b. Turn the adjusting nut 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.

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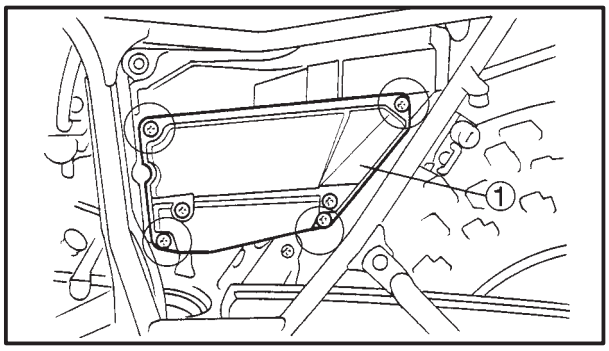
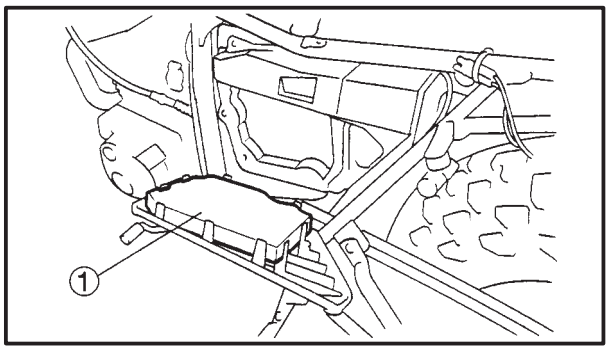


EAS00090

CLEANING THE AIR FILTER ELEMENT

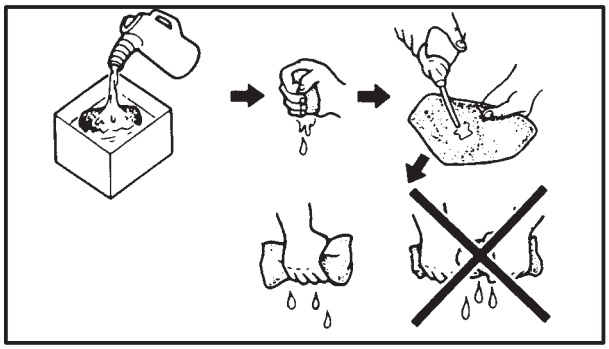
1. Remove:
   - side cover (left)
   - air filter case cover ①



2. Remove:
   - air filter element ①
3. Clean:
   - air filter element (with solvent)

NOTE:

After cleaning, carefully pat the air filter element on a clean cloth to remove the excess oil.



4. Check:
   - air filter element
     Damage → Replace.
5. Apply the recommended oil to the entire surface of the air filter element and then carefully pat the air filter element on a clean cloth to remove the excess oil. The air filter element should be wet but not dripping.

Recommended oil
Engine oil

6. Install:
   - air filter element
   - air filter case cover (along with the gasket)

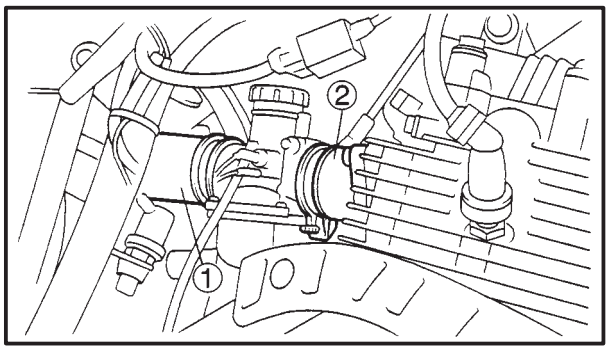
CAUTION:

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:

- Make sure that the air filter element is properly installed in the air filter case.
- The air filter screen fits into the slots ② in the air filter case.

7. Install:
   - side cover (left)



EAS00094

CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD

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

   Refer to “SEAT, FUEL TANK AND SIDE COVER”.
2. Check:
   - carburetor joint ①
   - intake manifold ②

   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 5.
3. Install:
   - fuel tank
   - side cover
   - seat

   Refer to “SEAT, FUEL TANK AND SIDE COVER”.

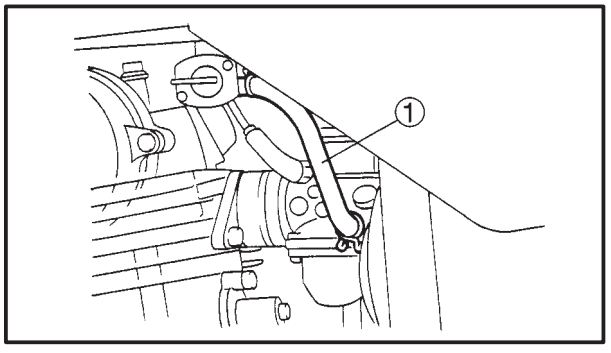
EAS00096

CHECKING THE FUEL HOSES

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

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

   Refer to “SEAT, FUEL TANK AND SIDE COVER”.



2. Check:
   - fuel hose ①

   Cracks/damage → Replace.
   Loose connection → Connect properly.
3. Install:
   - fuel tank
   - side cover
   - seat

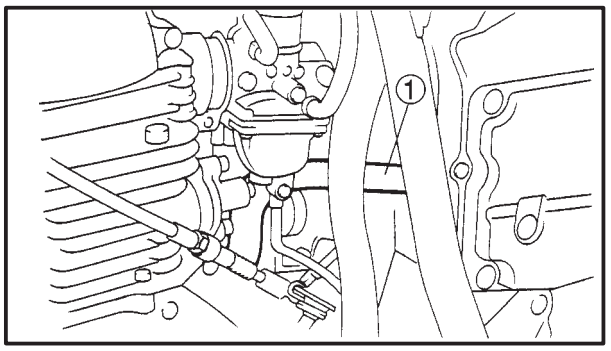
   Refer to “SEAT, FUEL TANK AND SIDE COVER”.

EAS00098

CHECKING THE CRANKCASE BREATHER HOSE

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

   Refer to “SEAT, FUEL TANK AND SIDE COVER”.



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
   - side cover
   - seat

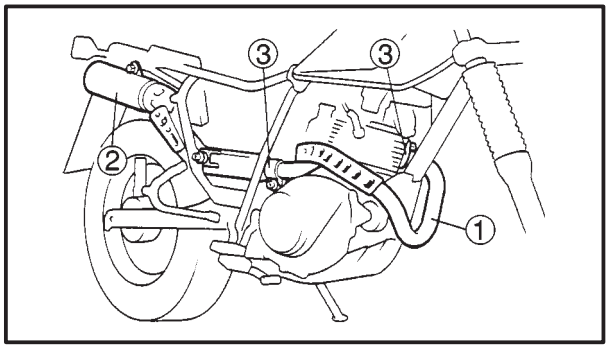
   Refer to “SEAT, FUEL TANK AND SIDE COVER”.

EAS00100

CHECKING THE EXHAUST SYSTEM

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

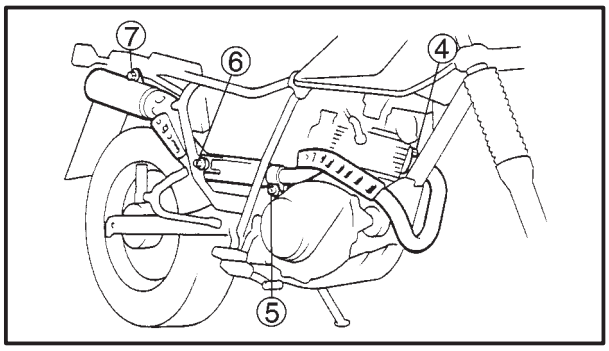
1. Remove:
   - seat
   - rear cowling
   - side cover (right)



2. Check:
   - exhaust pipe ①
   - silencer ②

   Cracks/damage → Replace.
   - gasket ③

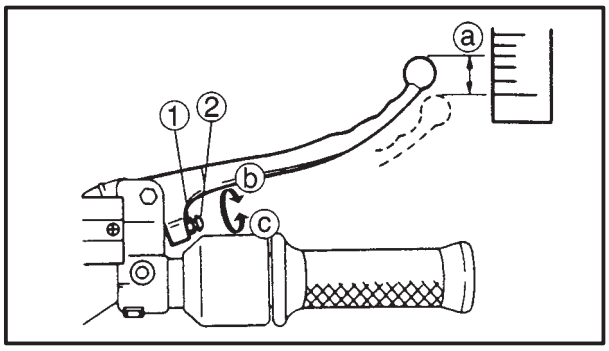
   Exhaust gas leaks → Replace.



3. Check:
   • tightening torque

Exhaust pipe ④
12 Nm (1.2 m•kg)
Exhaust pipe and muffler bolt ⑤
20 Nm (2.0 m•kg)
Muffler and muffler bracket bolt ⑥
20 Nm (2.7 m•kg)
Muffler and muffler bracket bolt ⑦
27 Nm (2.7 m•kg)

4. Install:
   • side cover (right)
   • rear cowling
   • seat



EAS00108

CHASSIS

ADJUSTING THE FRONT BRAKE

1. Check:
   • brake lever free play ⓐ
   Out of specification → Adjust.

Brake lever free play
(at the end of the brake lever):
2 ~ 5 mm

2. Adjust:
   • brake lever free play

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

Direction ⓑ →	**Brake lever free play is increased.**
Direction ⓒ →	**Brake lever free play is decreased.**

c Tighten the locknut.

⚠ WARNING

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, inspect and, if necessary, bleed the brake system.

CAUTION:

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

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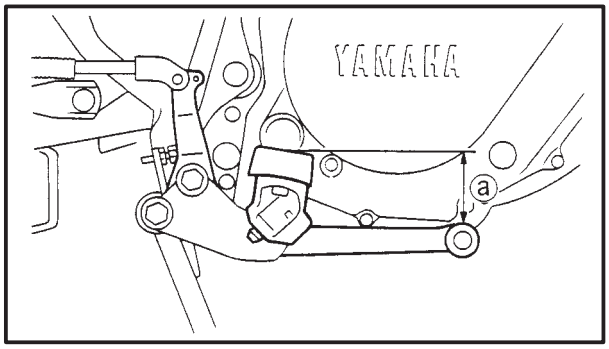
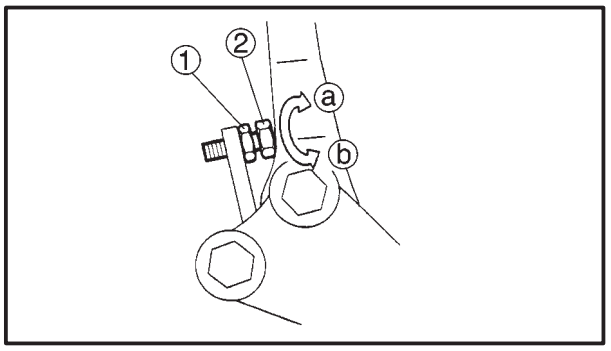


EAS00112

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 (above the top of the rider footrest)
30 mm



2. Adjust:
   • brake pedal position

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

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

c. Tighten the locknut to specification.

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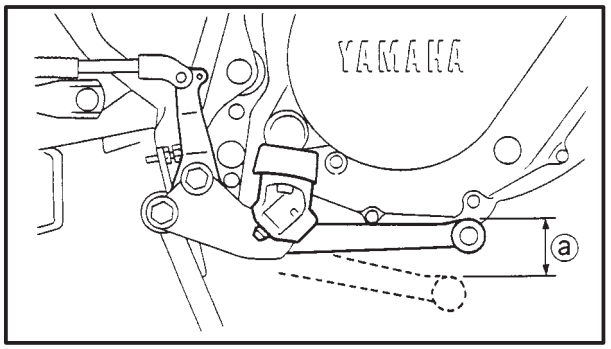
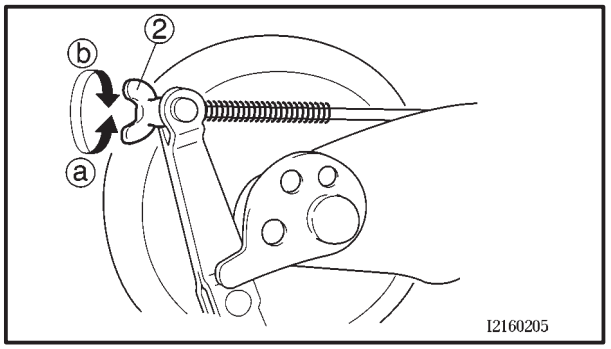


3. Measure:
   • brake pedal free play ⓐ
   Out of specification → Adjust.

	Brake pedal free play **20 ~ 30 mm**



4. Adjust:
   • brake pedal free play

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a. Turn the adjusting nut ② in direction ⓐ or ⓑ until the specified brake pedal free play is obtained.

Direction ⓐ →	**Brake pedal free play is increased.**
Direction ⓑ →	**Brake pedal free play is decreased.**

CAUTION:

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

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

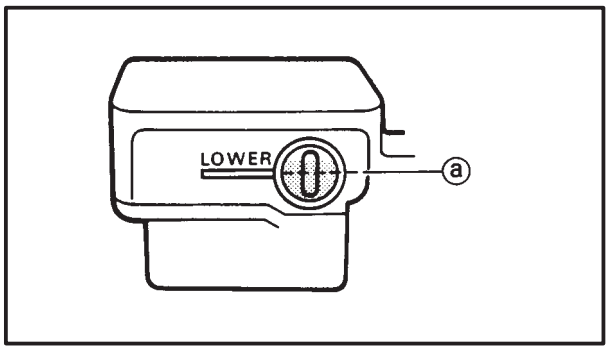
EAS00115

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

⚠ WARNING

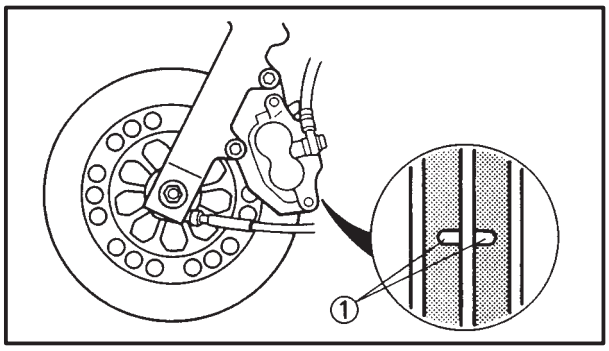
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

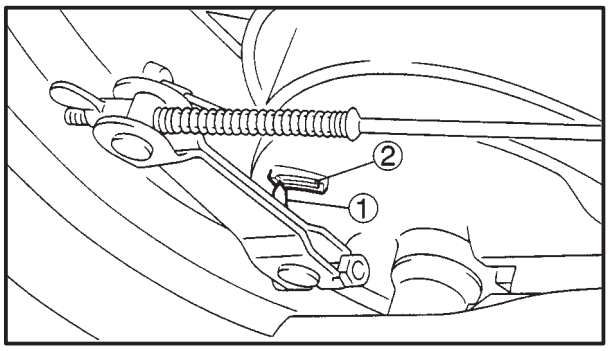


EAS00117

CHECKING THE BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - brake pad
     Wear indicators ① almost touch the brake disc → Replace the brake pads as a set.
     Refer to “FRONT BRAKE” in chapter 7.



EAS00126

CHECKING THE BRAKE SHOES

1. Operate the brake.
2. Check:
   - wear indicator ①
     Reaches the wear limit line ② → Replace the brake shoes as a set.
     Refer to “REAR WHEEL” in chapter 7.

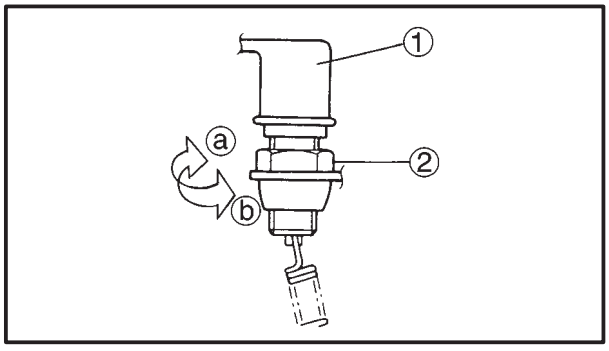
EAS00128

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.

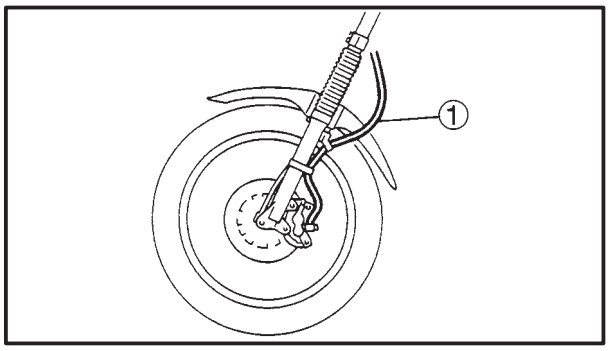
1. Check:
   - rear brake light operation timing
     Incorrect → Adjust.



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.**



EAS00129

CHECKING THE BRAKE HOSE

1. Check:
   • brake hose ①
   Cracks/damage/wear → Replace.
2. Check:
   • brake hose clamp
   Loose connection → Tighten.
3. Hold the motorcycle upright and apply the front or rear brake.
4. Check:
   • brake hose
   Activate the brake several times.
   Brake fluid leakage → Replace the damaged hose.
   Refer to “FRONT BRAKE” in chapter 6.

EAS00133

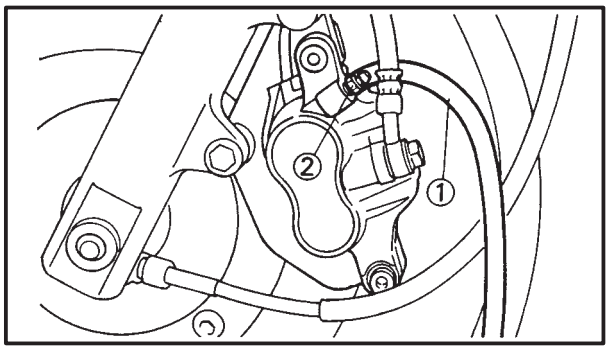
BLEEDING THE HYDRAULIC BRAKE SYSTEM

⚠ 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.**

NOTE:

- Be careful not to spill any brake fluid or allow the brake master cylinder 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.



1. Bleed:
   • hydraulic brake system

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a. Add the recommended brake fluid to the proper level.
b. Install the brake master cylinder reservoir diaphragm.
c. Connect a clear plastic hose ① tightly to the bleed screw ②.
d. Place the other end of the hose into a container.
e. Slowly squeeze the brake lever several times.
f. Fully squeeze the brake lever without releasing it.
g. Loosen the bleed screw.
   This will release the tension and cause the brake lever to contact the throttle grip.
h. Tighten the bleed screw and then release the brake lever.
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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56EAS00141

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.

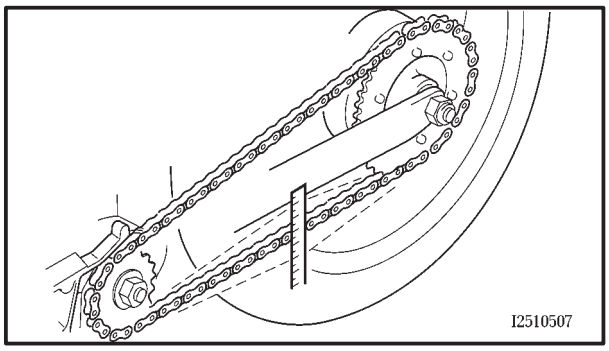
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

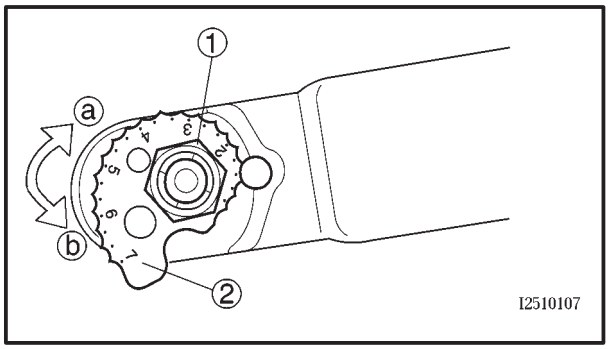
NOTE:

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. Measure:
   • drive chain slack
   Out of specification → Adjust.

Drive chain slack
35 ~ 60 mm



4. Adjust:
   • drive chain slack

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a. Loosen the wheel axle nut ①.
b. Turn the chain pullers ② in direction ⓐ or ⓑ until the specified drive chain slack is obtained.

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

NOTE:

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

c. Tighten the wheel axle nut.

Wheel axle nut
90 Nm (9.0 m•kg)

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CAUTION:

Do not loosen the wheel axle nut after tightening it to the specified torque. If the groove in the wheel axle nut is not aligned with the cotter pin hole in the wheel axle, tighten the nut further until they are aligned.

EAS00143

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. 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 non-O-ring chains.

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

EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

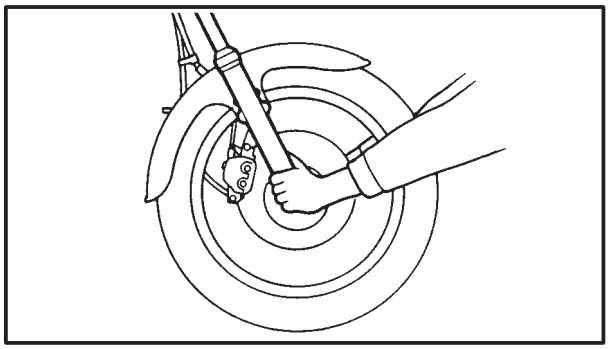
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

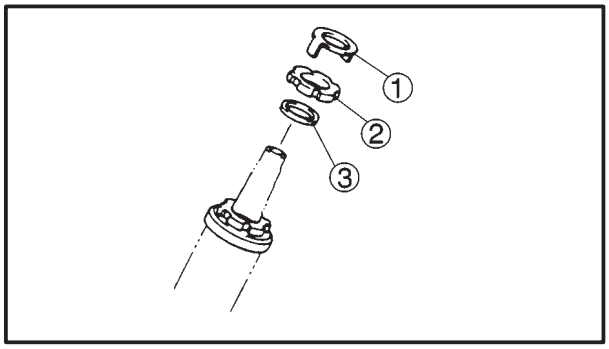
NOTE:

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:
   - handlebar
   - upper bracket



4. Adjust:
   - steering head

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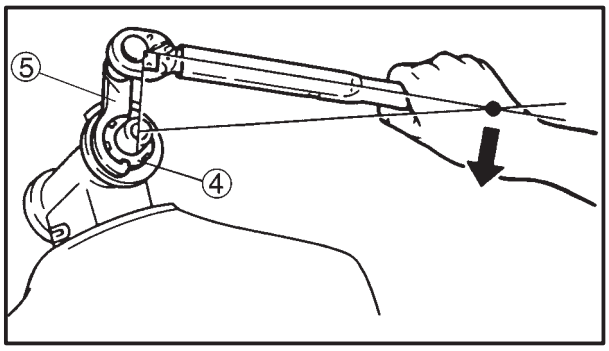
a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.



b. Loosen the lower ring nut ④ and then tighten it to specification with a ring nut wrench ⑤.

NOTE:

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

	Ring nut wrench **90890-01403**

	Lower ring nut **(initial tightening torque)** **38 Nm (3.8 m•kg)**

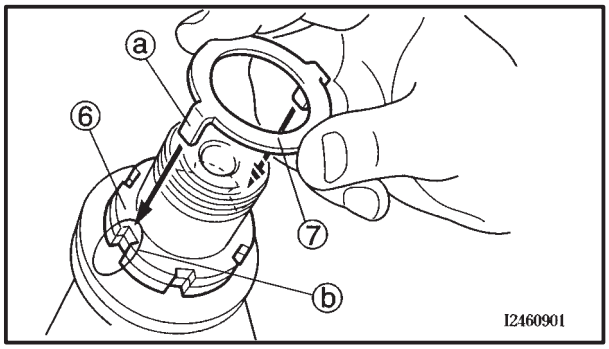
c. Loosen the lower ring nut completely, then tighten it to specification.

⚠ WARNING

Do not overtighten the lower ring nut.

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

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



NOTE:

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

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5. Install:
   • upper bracket
   • handlebar

	Steering stem nut **90 Nm (9.0 m•kg)** **Upper bracket pinch bolt** **23 Nm (2.3 m•kg)** **Handlebar holder bolt** **20 Nm (2.0 m•kg)**

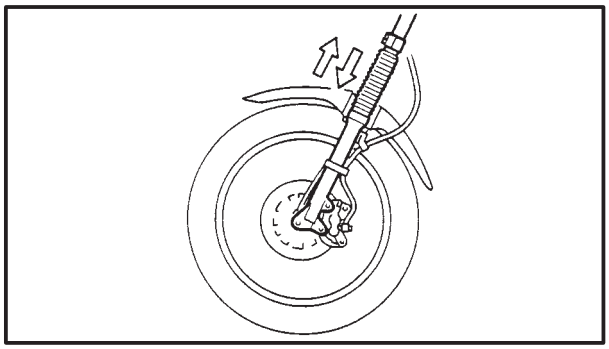
EAS00149
CHECKING THE FRONT FORK

1. Stand the motorcycle on a level surface.

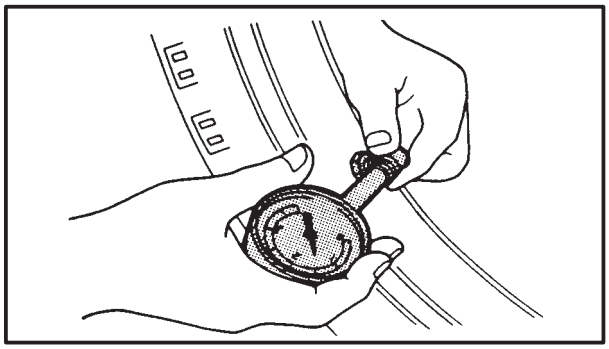
⚠ WARNING

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 6.



EAS00166
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.**

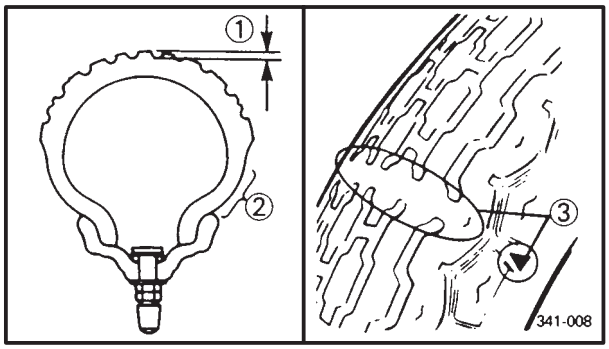
NEVER OVERLOAD THE MOTORCYCLE.

Basic weight (with oil and a full fuel tank)	**125 kg**	
Maximum load*	**180 kg**	
Cold tire pressure	**Front tire**	**Rear tire**
Up to 80 kg load*	**150 kPa (1.50kgf/cm², 1.5 bar)**	**150 kPa (1.50kgf/cm², 1.5 bar)**
80 kg ~ maximum load*	**150 kPa (1.50 kgf/cm², 1.5 bar)**	**175 kPa (1.75 kgf/cm², 1.75 bar)**
Off road riding	**125 kPa (1.25 kgf/cm², 1.25 bar)**	**125kPa (1.25 kgf/cm², 1.25 bar)**

*: 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 tube tires, 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.**

Tube wheel →	**Tube tire only**
Tubeless wheel →	**Tube or tubeless tire**

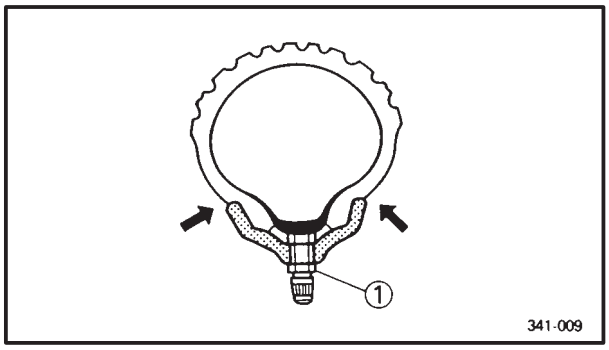
• After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved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

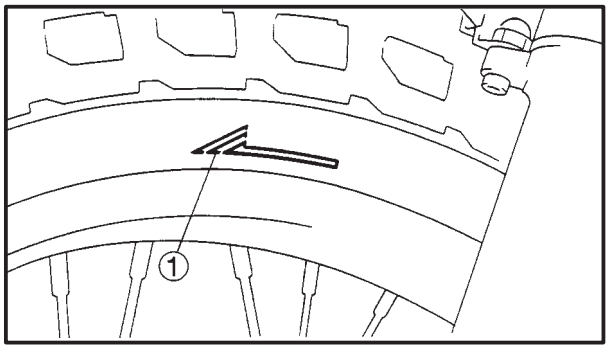
Front tire

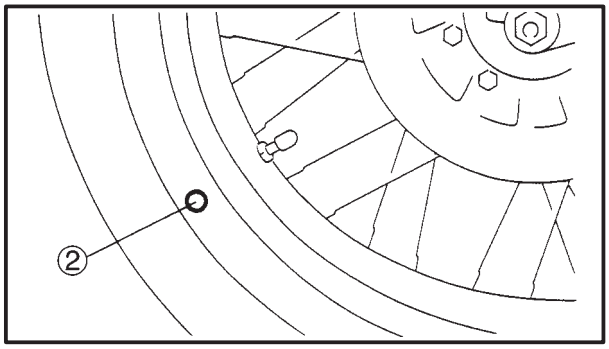
Manufacturer	Type	Size
BRIDGESTONE	TW31	130/80-18 66P

Rear tire

Manufacturer	Type	Size
BRIDGESTONE	TW34	180/80-14 M/C 78P







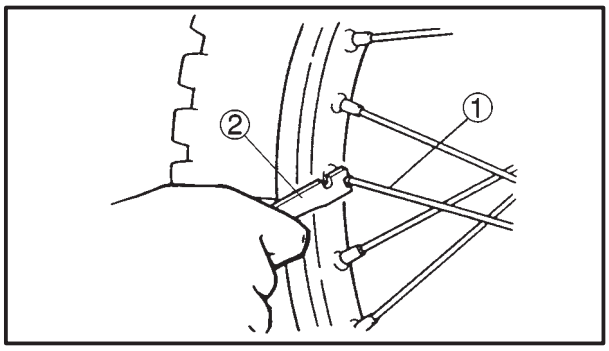
⚠ WARNING

• After mounting a new tire, ride conservatively for a while to become accustomed to the "feel" of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.
• After a tire has been repaired or replaced, be sure to tighten the tire valve stem locknut ① to specification.

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.

	Tire valve stem locknut 1.5 Nm (0.15 m•kg)



EAS00169

CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.

1. Check:
   - spoke ①
     Bends/damage → Replace.
     Loose → Tighten.
     Tap the spokes with a screwdriver.

NOTE:

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

2. Tighten:
   - spoke
     (with a spoke wrench ②)

NOTE:

Be sure to tighten the spokes before and after break-in.

Spoke nipple
2 Nm (0.2 m•kg)

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 **Engine oil**

EAS00172

LUBRICATING THE SIDESTAND

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

	Recommended lubricant **Engine oil**

EAS00174

LUBRICATING THE REAR SUSPENSION

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

	Recommended lubricant **Molybdenum disulfide oil**

EAS00176

ELECTRICAL SYSTEM

CHECKING 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.**

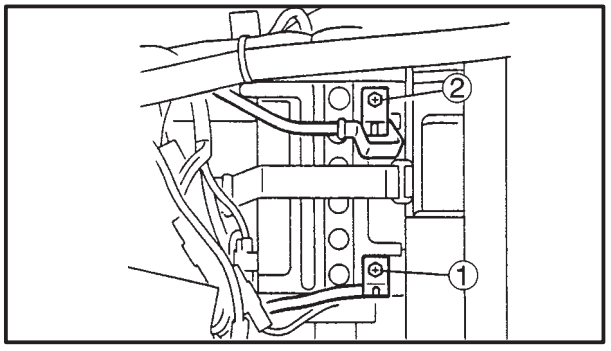
Internal

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

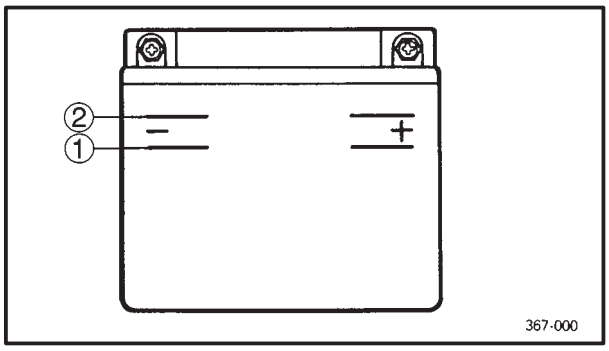
1. Remove:
   - seat
   - side cover (right)
2. Disconnect:
   - battery leads (from the battery terminals)
   - battery breather hose

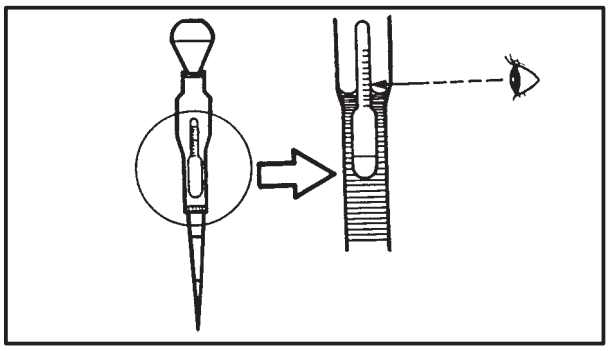
CAUTION:

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



3. Remove:
   - battery





4. Check:
   • electrolyte level
   The electrolyte level should be between the minimum level mark ① and the maximum level mark ②.
   Below the minimum level mark → Add distilled water to the proper level.

CAUTION:

Add only distilled water. Tap water contains minerals which are harmful to the battery.

5. Check:
   • specific gravity
   Less than 1.280 → Recharge the battery.

Specific gravity
1.280 at 20°C

6. Charge:
   • battery

Battery charging amperage and time
0.7 amps/10 hrs

⚠ WARNING

Do not quick charge a battery.

CAUTION:

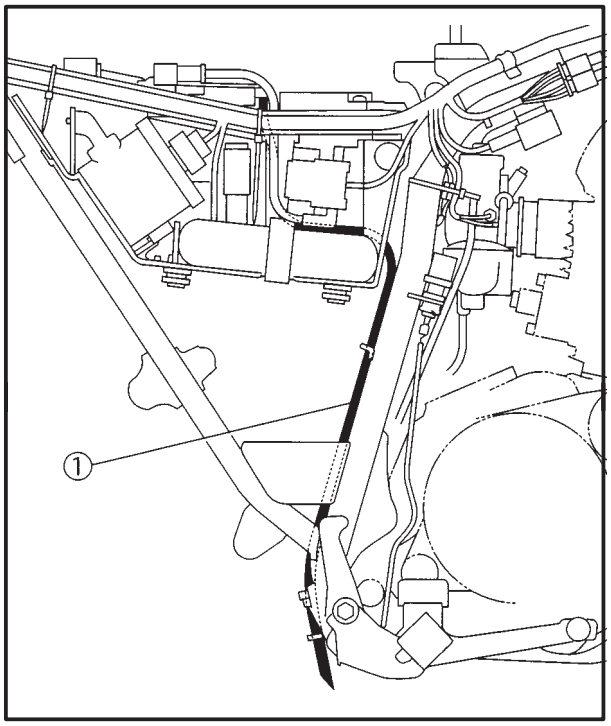
- **Loosen the battery sealing caps.**
- **Make sure that the battery breather hose and battery vent are free of obstructions.**
- **To ensure maximum performance, always charge a new battery before using it.**
- **Do not use a high-rate battery charger. They force a high-amperage current into the battery 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!**

NOTE:

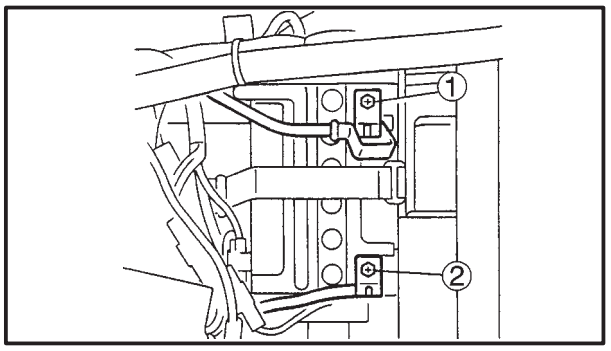
Replace the battery whenever:
- battery voltage does not rise to specification or bubbles fail to rise during charging,
- sulphation of one or more battery cells occurs (as indicated by the battery plates turning white or material accumulating in the bottom of the battery cell),
- specific gravity readings after a long, slow charge indicate that one battery cell's charge is lower than the rest,
- warpage or buckling of the battery plates or insulators is evident.

7. Check:
   - battery breather hose and battery vent
     Obstruction → Clean.
     Damage → Replace.
8. Install:
   - battery
9. Connect:
   - battery breather hose ①



CAUTION:

- **When inspecting the battery, make sure that the battery breather hose is properly attached and routed correctly. If the battery breather hose is positioned so as to allow electrolyte or hydrogen gas from the battery to contact the frame, the motorcycle and its finish may be damaged.**
- **Make sure that the battery breather hose is properly routed away from the drive chain and from below the swingarm.**



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

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

CAUTION:

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

12. Lubricate:
- battery terminals

	Recommended lubricant **Dielectric grease**

13. Install:
- side cover (right)
- seat

EAS00181

CHECKING THE FUSE

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.

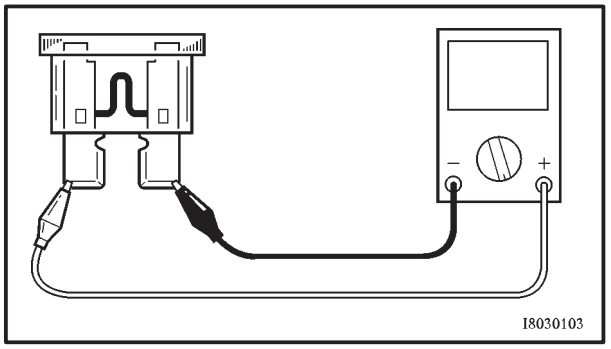
1. Remove:
- seat
- side cover (right)

2. Check:
- fuse

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

NOTE:

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



	Pocket tester **90890-03112**

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

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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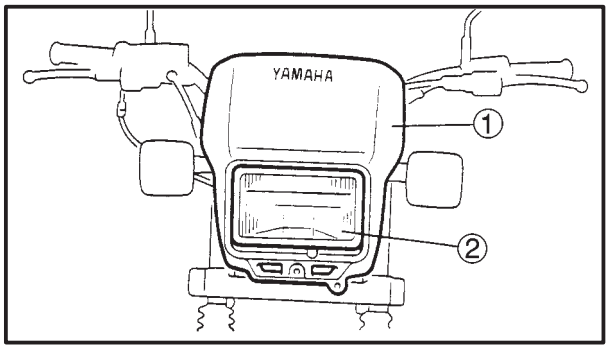
⚠ WARNING

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.

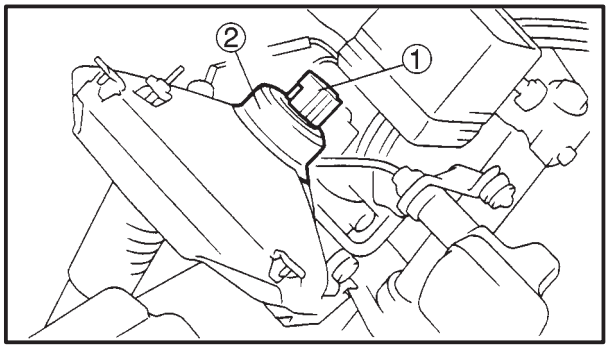
4. Install:
   • side cover (right)
   • seat



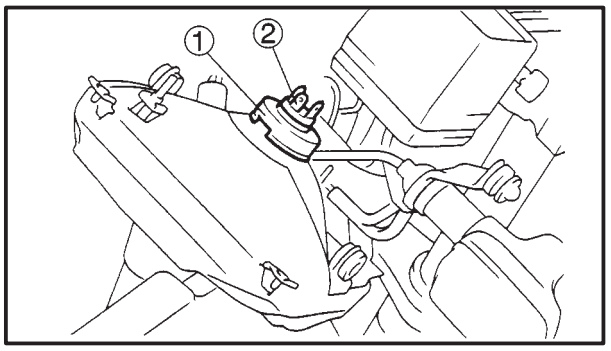
EAS00182

REPLACING THE HEADLIGHT BULB

1. Remove:
   • headlight cover ①
   • headlight unit ②



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



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

⚠ WARNING

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

4. Install:
   • headlight bulb (New)
   Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

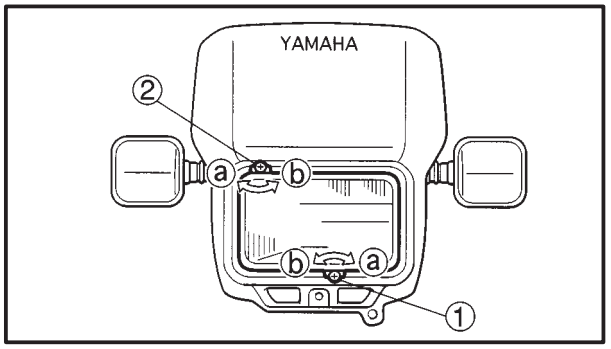
Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

5. Install:
   • headlight bulb holder
6. Connect:
   • headlight coupler
7. Install:
   • headlight unit
   • headlight cover

EAS00184

ADJUSTING THE HEADLIGHT BEAM

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.**

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2. Adjust:
   • headlight beam (horizontally)

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a. Turn the adjusting knob ② in direction ⓐ or ⓑ.

Direction ⓐ →	**Headlight beammoves to the right.**
Direction ⓑ →	**Headlight beammoves to the left.**

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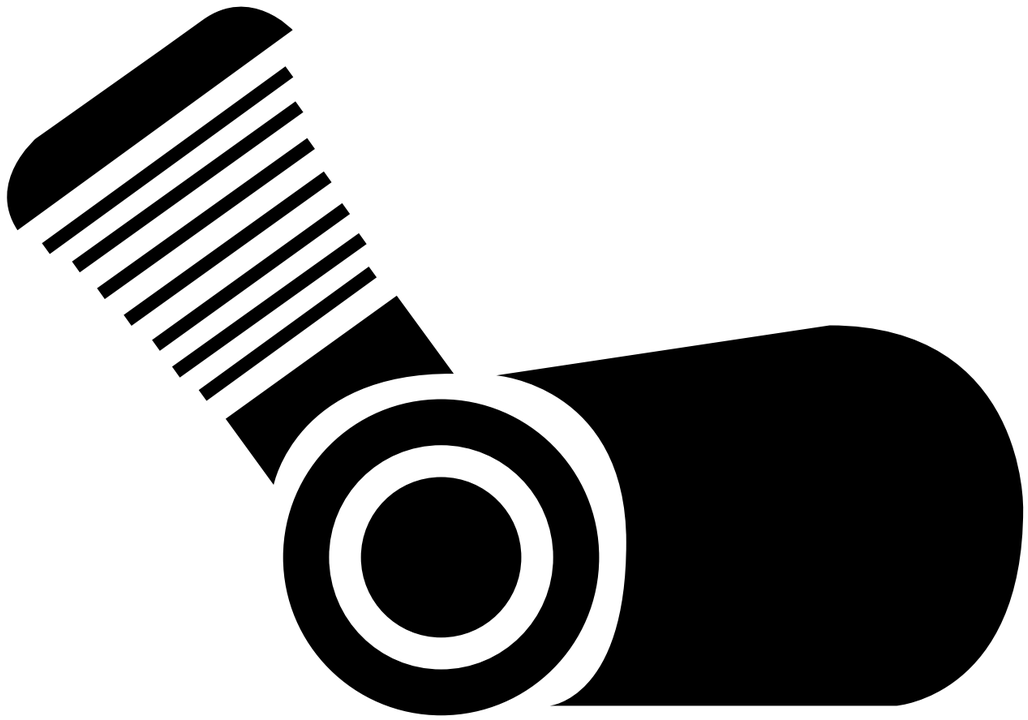


ENG

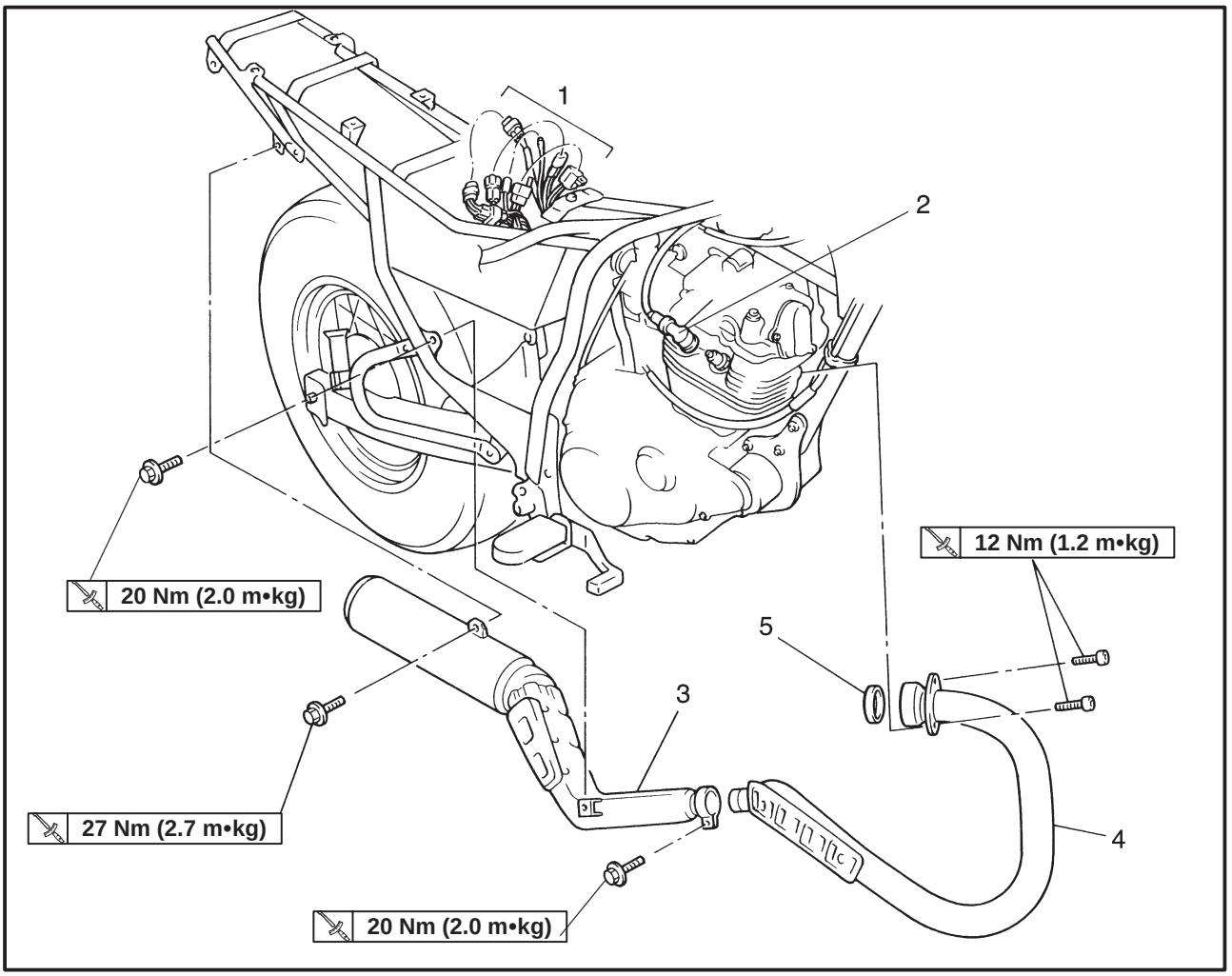
4

CHAPTER 4.
OVERHAULING THE ENGINE

EAS00188

OVERHAULING THE ENGINE

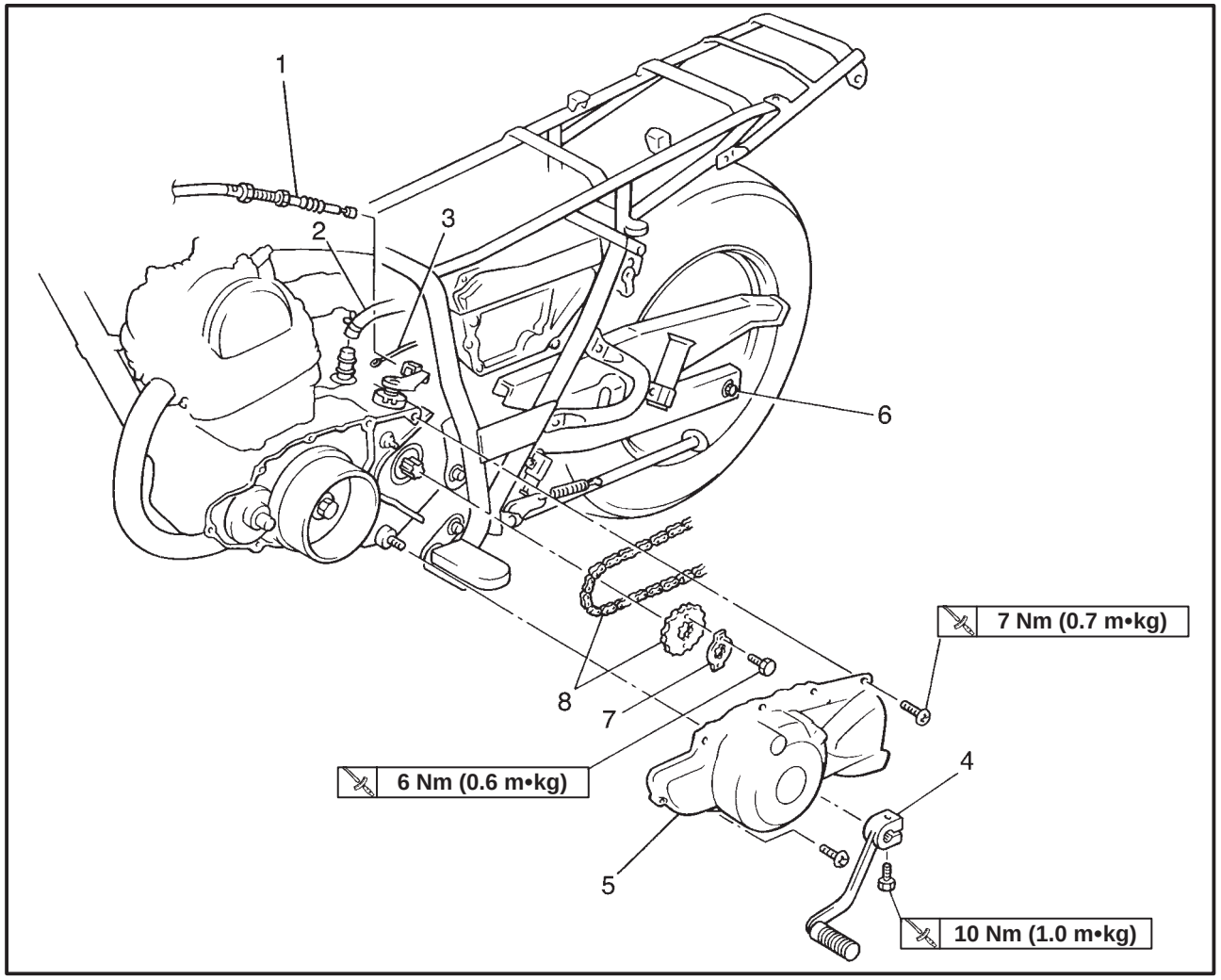
ENGINE
LEAD AND EXHAUST PIPE



Order	Job/Part	Q'ty	Remarks
	Disconnecting the leads and hoses Seat, fuel tank and side cover		Disconnect the parts in the order listed. Refer to "SEAT, FUEL TANK AND SIDE COVER" in CHAPTER 3.
	Battery lead		**CAUTION:** **First, disconnect the negative lead, then the positive lead.**
1	Generator coupler/starter motor coupler	1/1	
2	Plug cap	1	
3	Muffler	1	
4	Exhaust pipe	1	
5	Gasket	1	
			For connecting, reverse the disconnection procedure.

EAS00189

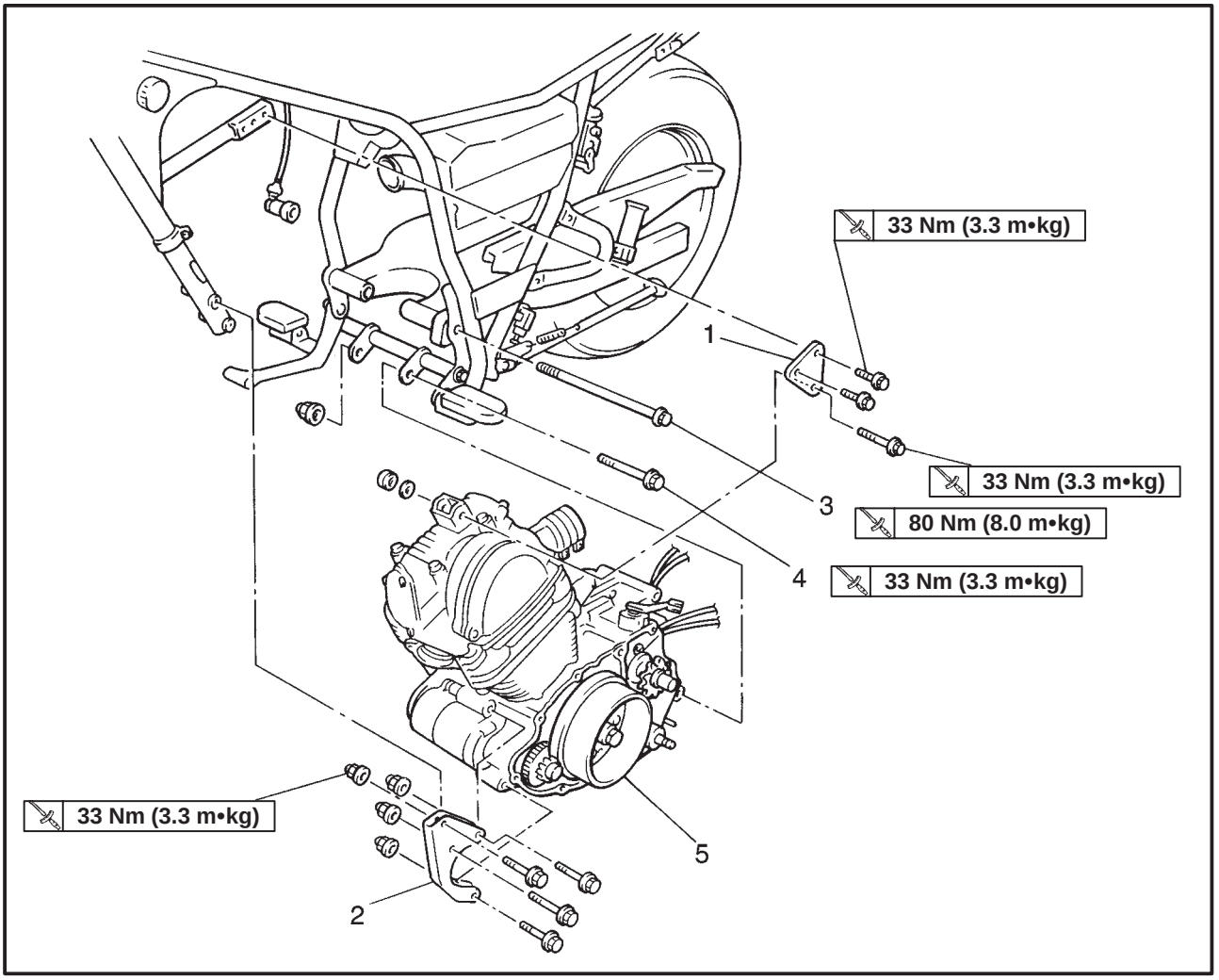
CARBURETOR AND DRIVE SPROCKET



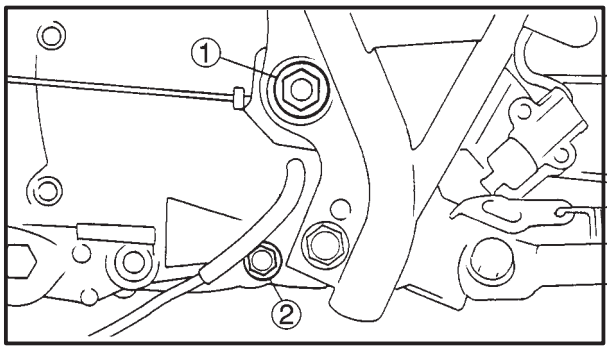
Order	Job/Part	Q'ty	Remarks
	Removing the carburetor and drive sprocket		Remove the parts in the order listed.
	Carburetor		Refer to "CARBURETOR" in CHAPTER 5.
1	Clutch cable	1	
2	Crankcase breather hose	1	
3	Ground lead	1	
4	Shift pedal	1	
5	Generator cover	1	
6	Rear wheel axle nut	1	**NOTE:** Loosen the axle nut and slacken the drive chain.
7	Sprocket holder	1	
8	Drive sprocket/drive chain	1/1	For installation, reverse the removal procedure.

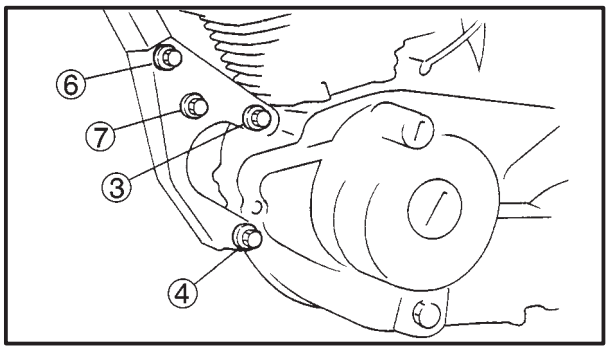
EAS00192

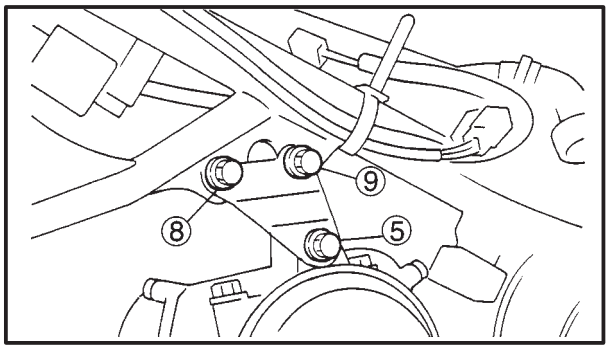
ENGINE

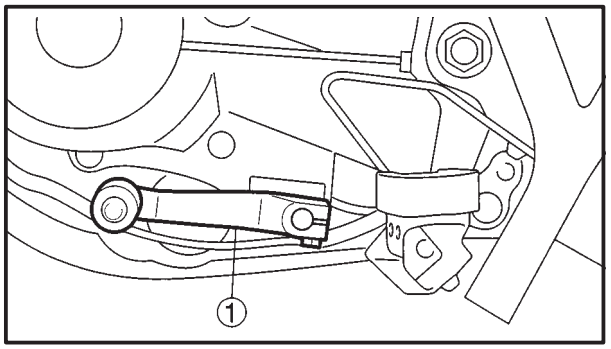


Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed. Securely support the motorcycle so there is no danger of it falling over.
1	Engine stay (top)	1	Refer to "INSTALLING THE ENGINE."
2	Front engine stay	1	
3	Pivot shaft	1	
4	Engine mount bolt (rear under)	1	
5	Engine	1	
			For installation, reverse the removal procedure.









EAS00192
INSTALLING THE ENGINE

1. Install:
   - pivot shaft ①
   - engine mount bolt (rear) ②
   - engine mount bolt (front) ③
   - engine mount bolt (front) ④
   - engine mount bolt (top) ⑤
   - engine bracket bolt (front) ⑥
   - engine bracket bolt (front) ⑦
   - engien bracket bolt (top) ⑧
   - engine bracket bolt (top) ⑨

NOTE:

Do not fully tighten the bolts.

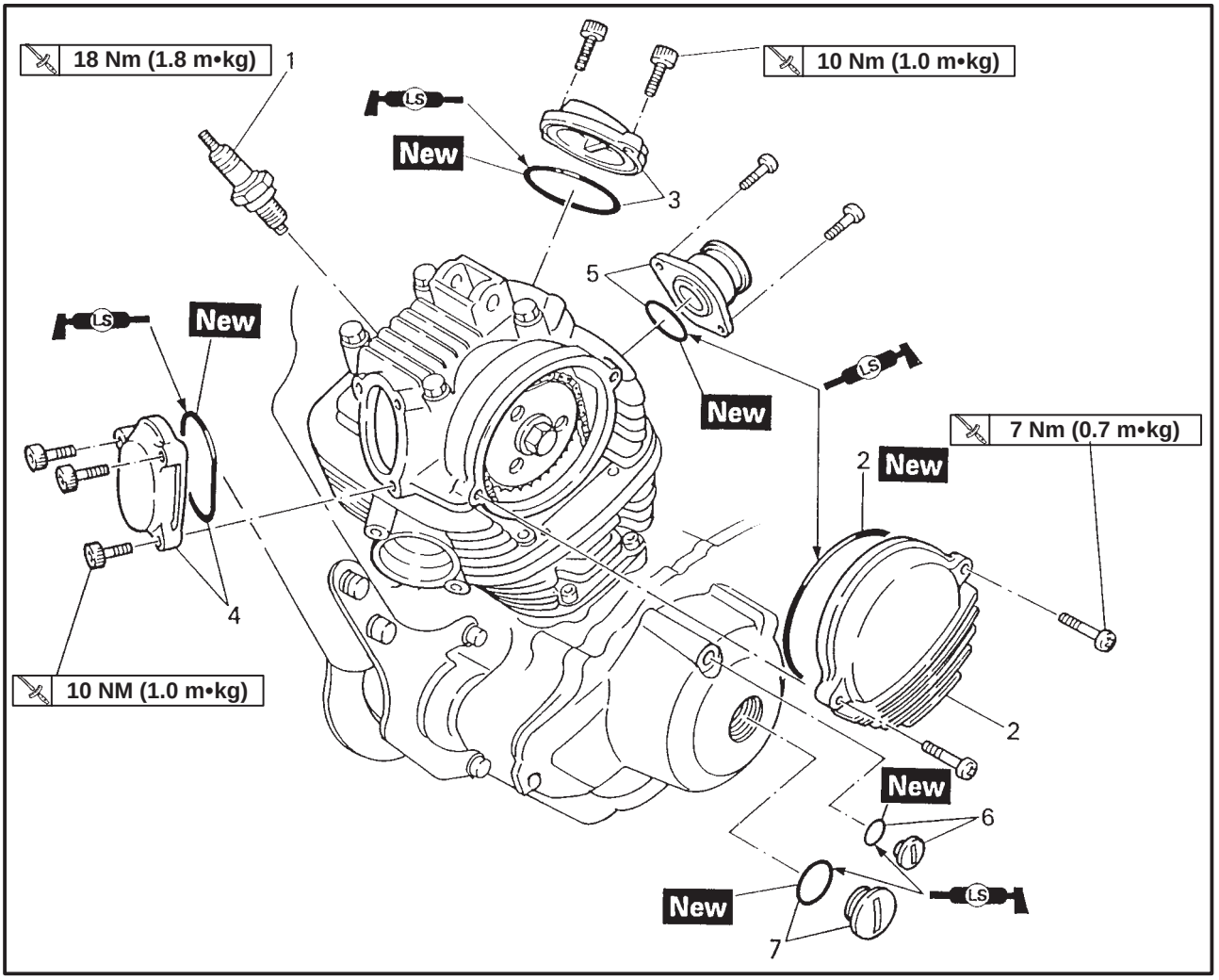
2. Tighten the bolts in the following order.

Pivot shaft ①
80 Nm (8.0 m•kg)
Engine mount bolt (rear) ②
33 Nm (3.3 m•kg)
Engine mount bolt (front) ③
33 Nm (3.3 m•kg)
Engine mount bolt (front) ④
33 Nm (3.3 m•kg)
Engine mount bolt (top) ⑤
33 Nm (3.3 m•kg)
Engine bracket bolt (front) ⑥
33 Nm (3.3 m•kg)
Engine bracket bolt (front) ⑦
33 Nm (3.3 m•kg)
Engine bracket bolt (top) ⑧
33 Nm (3.3 m•kg)
Engine bracket bolt (top) ⑨
33 Nm (3/3 m•kg)

3. Install:
   - shift pedal ①

10 Nm (1.0 m•kg)

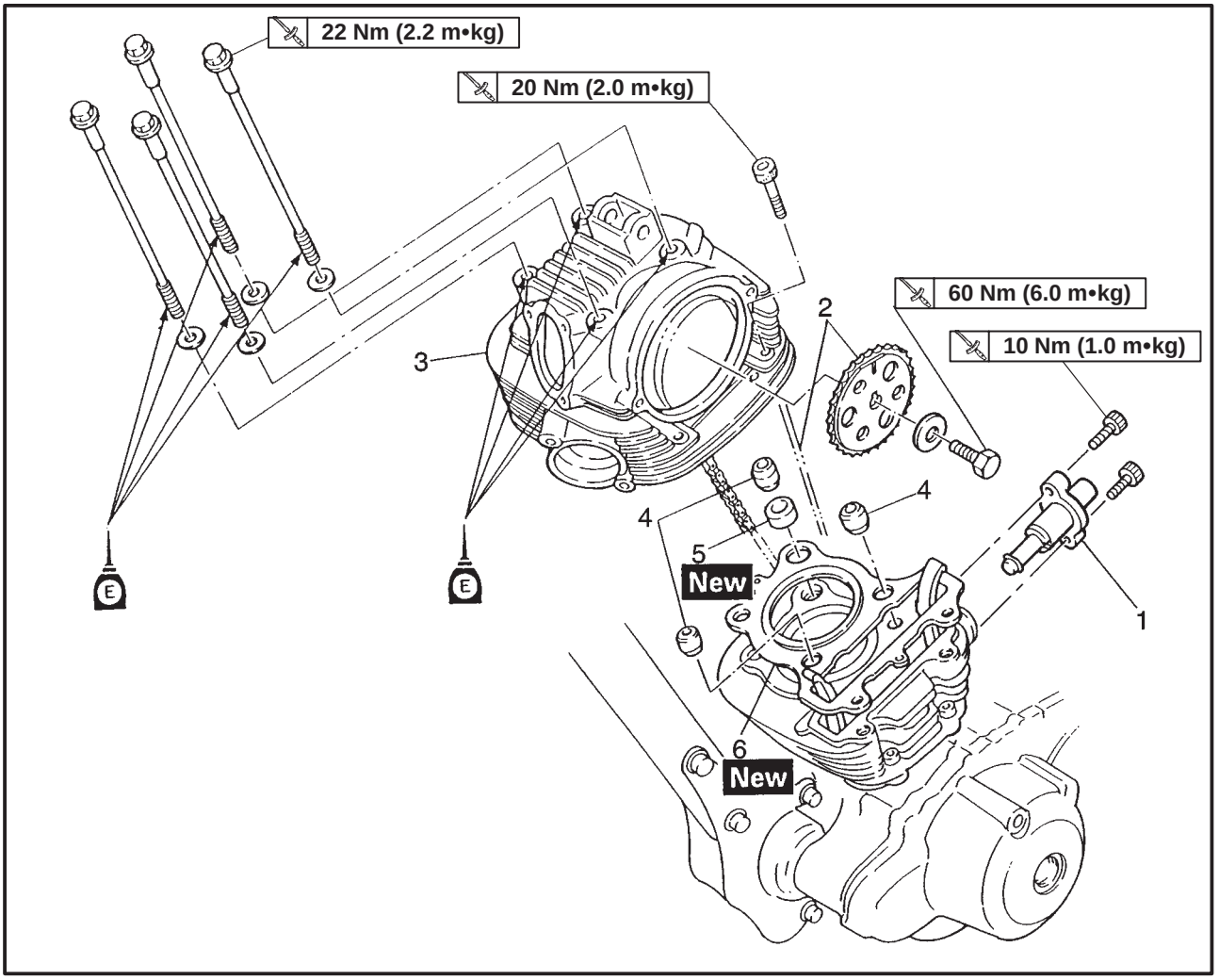
CYLINDER HEAD
CAMSHAFT SPROCKET COVER



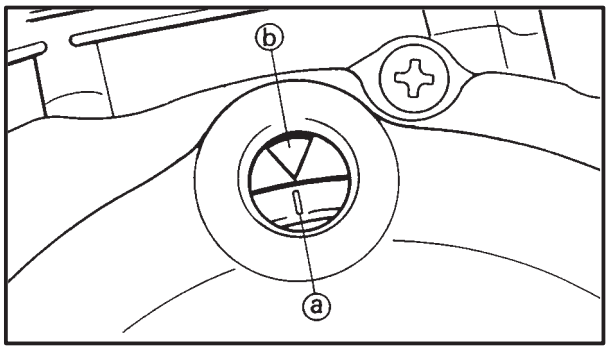
Order	Job/Part	Q'ty	Remarks
	Removing the comshaft sprocket cover		Remove the parts in the order listed.
	Side cover, seat and fuel tank		Refer to "SEAT, FUEL TANK AND SIDE COVER" in CHAPTER 3.
	Exhaust pipe assembly		Refer to "ENGINE."
	Carburetor assembly		Refer to "CARBURETOR" in CHAPTER 5.
	Engine stay (top)		Refer to "ENGINE."
1	Spark plug	1	
2	Camshaft sprocket cover/O-ring	1/1	
3	Valve cover (intake side)/O-ring	1/1	
4	Valve cover (exhaust side)/O-ring	1/1	
5	Intake manifold/O-ring	1/1	
6	Timing mark cap/O-ring	1/1	
7	Center cap/O-ring	1/1	
			For installation, reverse the removal procedure.

EAS00221

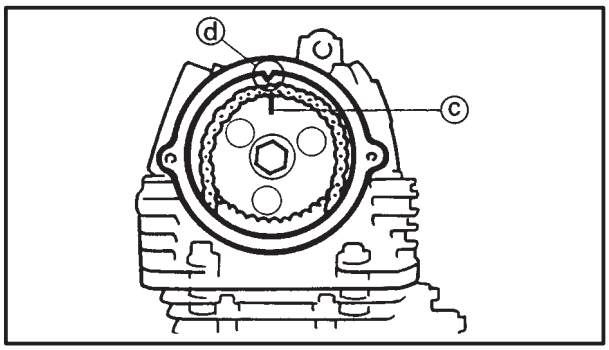
CYLINDER HEAD



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
1	Timing chain tensioner assembly	1	Refer to "REMOVEING THE CYLINDER HEAD/INSTALLING THE CAMSHAFT SPROCKET".
2	Camshaft sprocket/Timing chain	1/1	
3	Cylinder head	1	
4	Dowel pins	3	Refer to "REMOVING/INSTALLING THE CYLINDER HEAD".
5	Gasket	1	
6	Cylinder head gasket	1	
			For installation, reverse the removal procedure.



EAS00225
REMOVING THE CYLINDER HEAD
1. Align:
   • "I" mark ⓐ on the generator rotor (with the stationary pointer ⓑ on the crankcase cover)



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a. Turn the primary pulley counterclockwise.
b. When the piston is at TDC on the compression stroke, align the "I" mark ⓒ on the camshaft sprocket with the mark ⓓ on the cylinder head.
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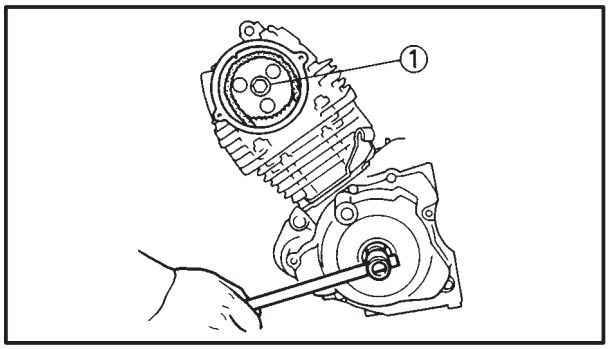
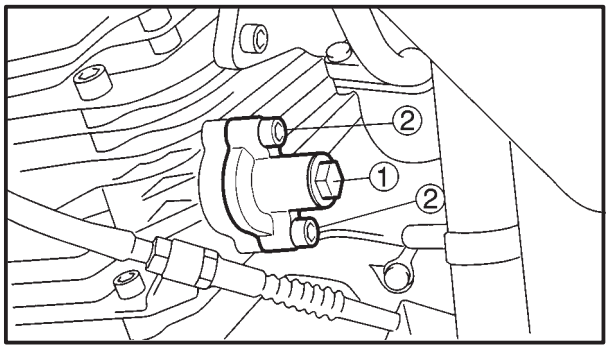
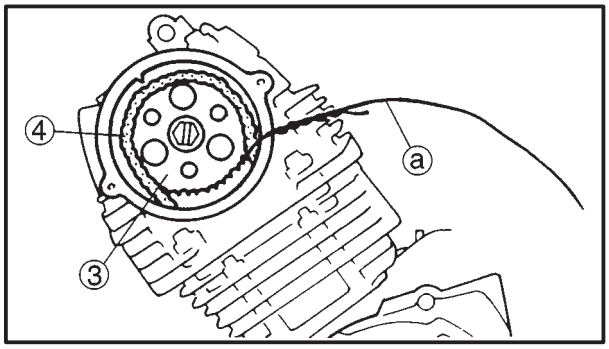


2. Loosen:
   • bolt ①

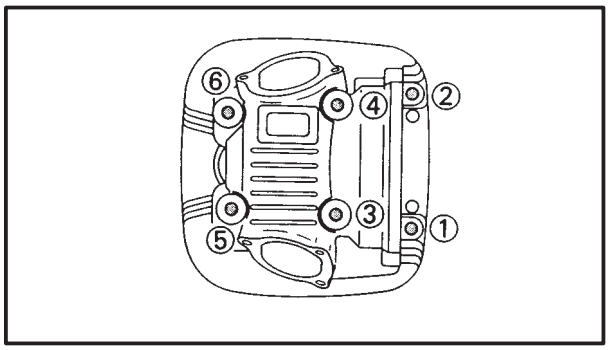


3. Remove:
   • cap bolt ①
   • timing chain tensioner ②
   (along with the gasket)



   • camshaft sprocket ③
   • timing chain ④

NOTE:
- To prevent the timing chain from falling into the crankcase, fasten it with a wire ⓐ.
- While holding the generator rotor bolt with a wrench, remove the bolt.



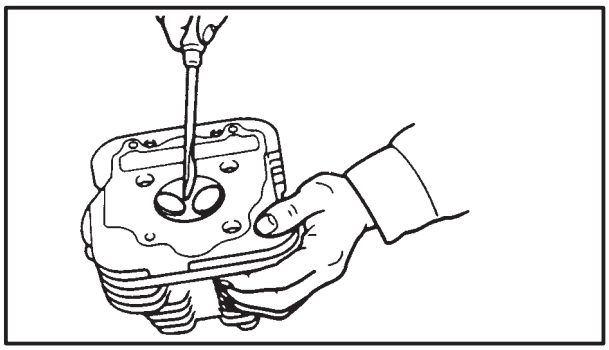
4. Remove:
   • cylinder head

NOTE:

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

EAS00227

CHECKING THE CYLINDER HEAD

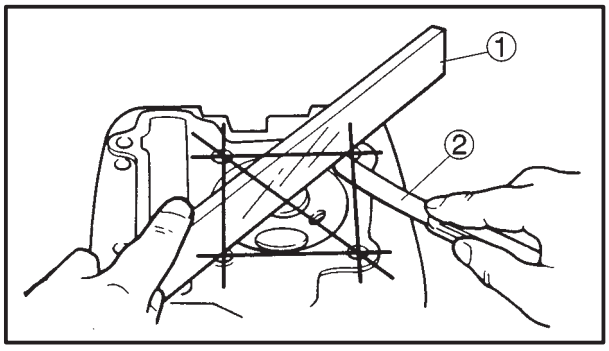


1. Eliminate:
   • combustion chamber carbon deposits (with a rounded scraper)

NOTE:

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

2. Check:
   • cylinder head
   Damage/scratches → Replace.



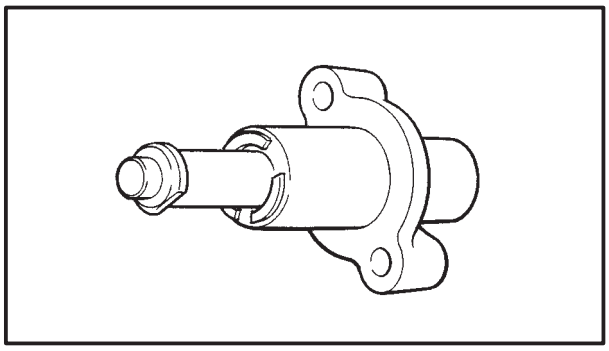
3. Measure:
   • cylinder head warpage
   Out of specification → Resurface the cylinder head.

Cylinder head warpage
Less than 0.05 mm

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

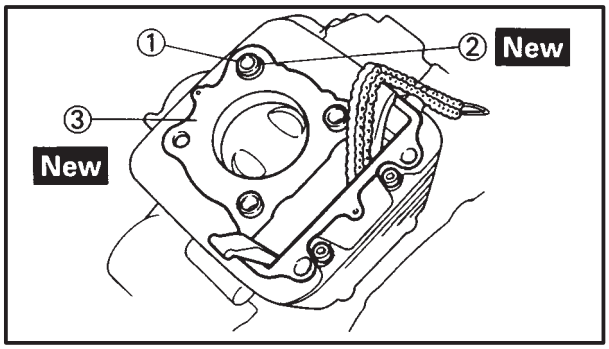
NOTE:

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



EAS00216
CHECKING THE TIMING CHAIN TENSIONER
1. Check:
   • timing chain tensioner
   Cracks/damage → Replace.

EAS00212
CHECKING THE TAPPET COVERS AND CAMSHAFT SPROCKET COVER
The following procedure applies to both of the tappet covers and O-rings.
1. Check:
• tappet cover
• camshaft sprocket cover
• O-ring
  Damage/wear → Replace the defective part(-s).

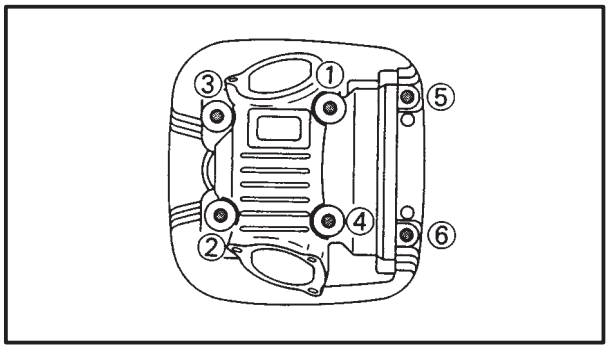


EAS00233
INSTALLING THE CYLINDER HEAD
1. Install:
   • dowel pins ①
   • O-ring ②
   • gasket (New) ③

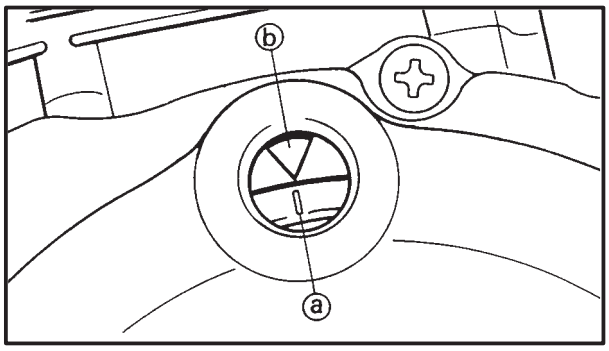
NOTE:
The "UP" mark on the gasket must face up.

2. Install:
   • cylinder head

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



Cylinder head nut
M8 (① ~ ④) 22Nm (2,2m•kg)
M8 (⑤ ~ ⑥) 20Nm (2,0m•kg)



EAS00213
INSTALLING THE CAMSHAFT SPROCKET

1. Align:
   - "I" mark on the generator rotor
     (with the mark on the generator rotor cover)

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

NOTE:

Be sure to keep the timing chain as tight as possible.

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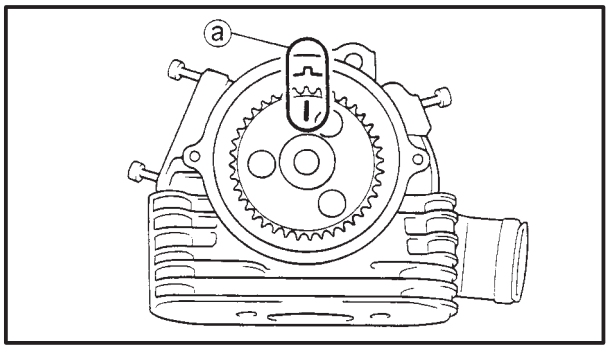


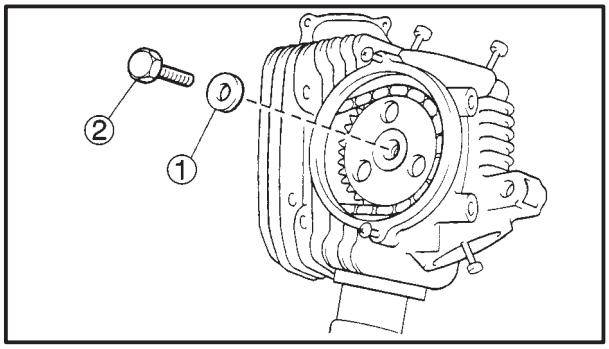
2. Install:
   - timing chain
     (onto the camshaft sprocket)
   - camshaft sprocket
     (onto the camshaft)

NOTE:

The notch ⓐ on the camshaft should face towards the intake side of the engine.
Align the camshaft marks ⓐ with the edge of the cylinder head as shown.

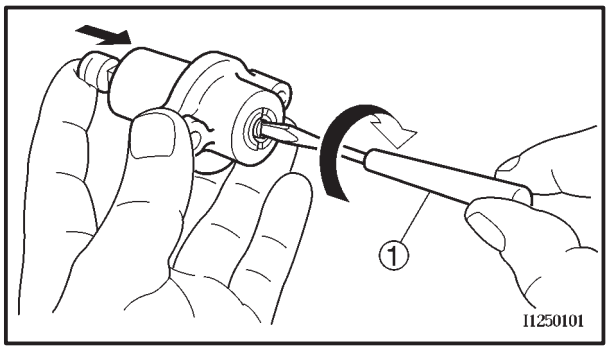
CAUTION:

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



3. Install:
   - washer ①
   - camshaft sprocket bolts ②

60 Nm (6.0 m•kg)



5. Install:
   • timing chain tensioner

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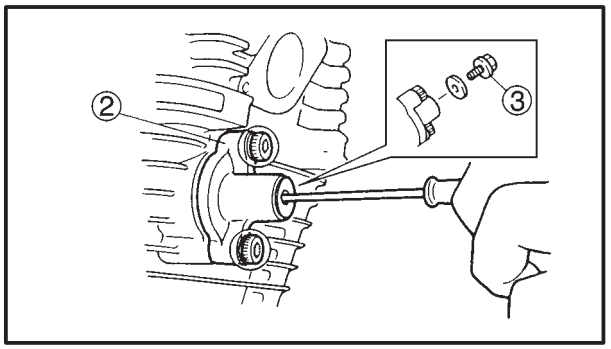
a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver ①.
b. with the timing chain tensioner rod turned all the way into the timing chain tensioner housing (with the thin screwdriver still installed),install the gasket and the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

⚠ WARNING

Always use a new gasket.

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

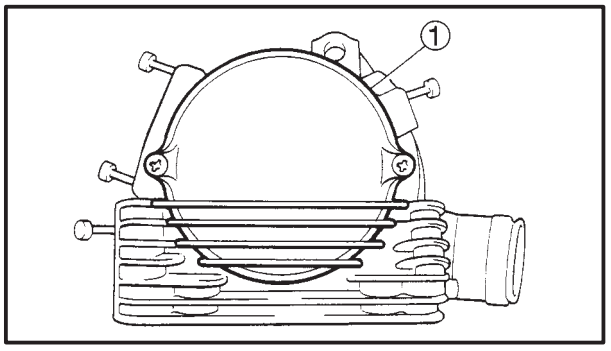
	Timing chain tensioner bolt **10 Nm (1,0 m•kg)**



d. Remove the screwdriver, make sure that the timing chain tensioner rod releases, and then tighten the cap bolt ③ to the specified torque.
6. Turn:
   • crankshaft

NOTE:

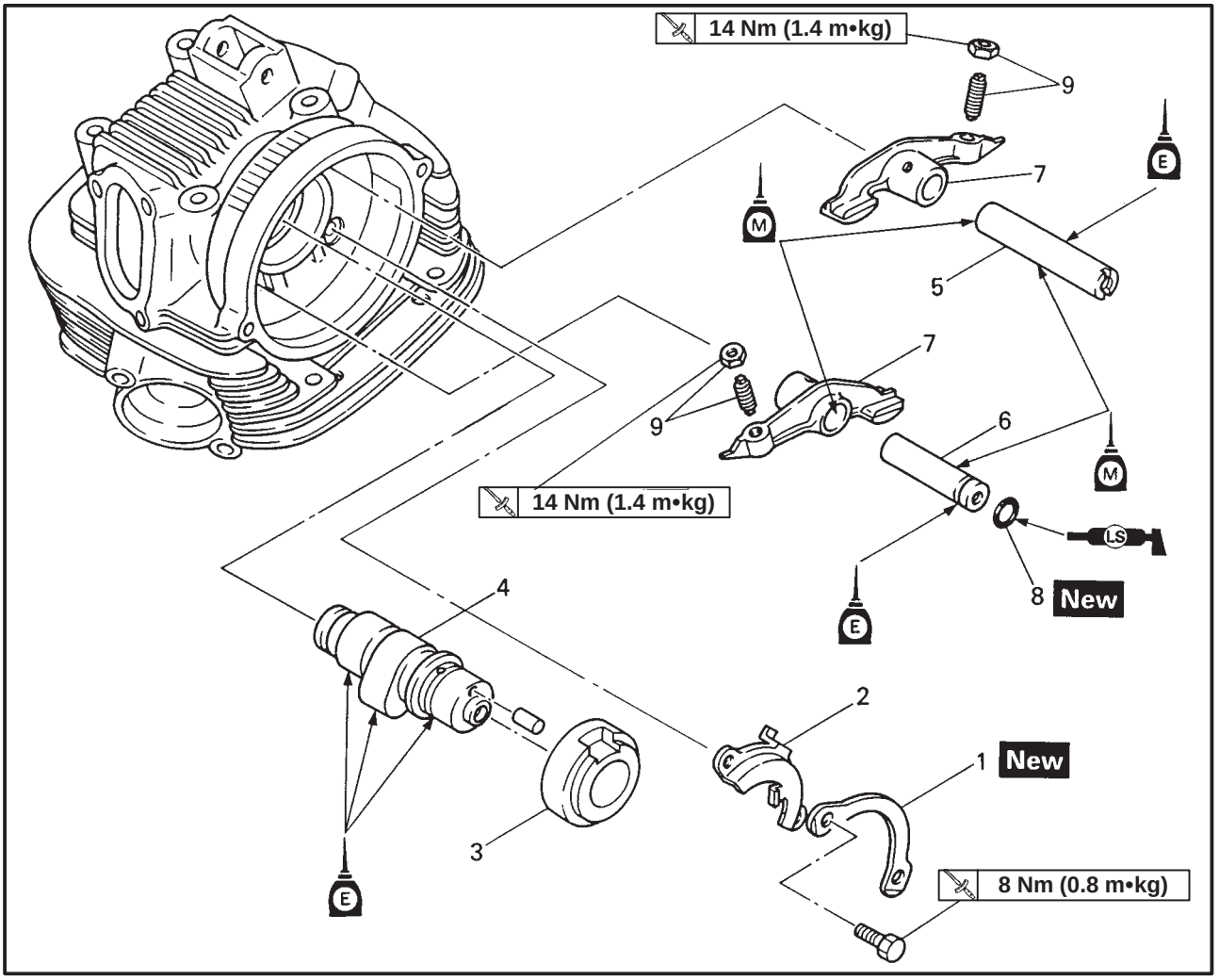
Turn the crankshaft several full turns to make sure that the camshaft is properly timed.



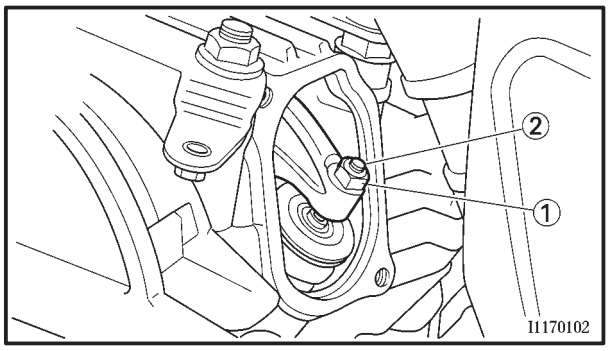
7. Install:
   • dowel pins
   • camshaft end cap ①
8. Lubricate:
   • cylinder head components

	Recommended lubricant **Engine oil**

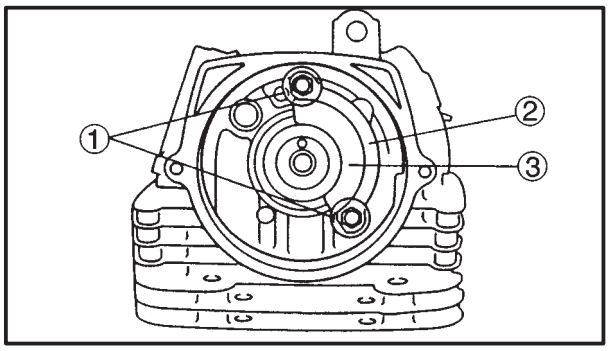
EAS00195
CAMSHAFT



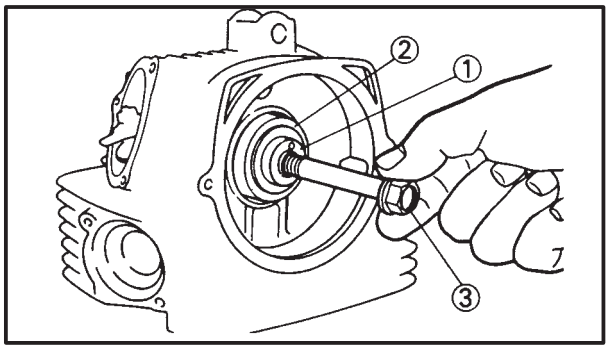
Order	Job/Part	Q'ty	Remarks
	Removing the camshaft		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Lock washer	1	Refer to "REMOVING THE ROCKER ARMS AND CAMSHAFT/INSTALLING THE CAMSHAFT AND ROCKER ARMS".
2	Camshaft retainer	1	
3	Camshaft bushing	1	
4	Camshaft	1	
5	Rocker arm shaft (intake side)	1	
6	Rocker arm shaft (exhaust side)	1	
7	Rocker arm	2	
8	O-ring	1	
9	Nut/Adjuster	2/2	
			For installation, reverse the removal procedure.



EAS00202
REMOVING THE ROCKER ARMS AND CAMSHAFT
1. Loosen:
   - locknuts ①
   - adjusting screws ②

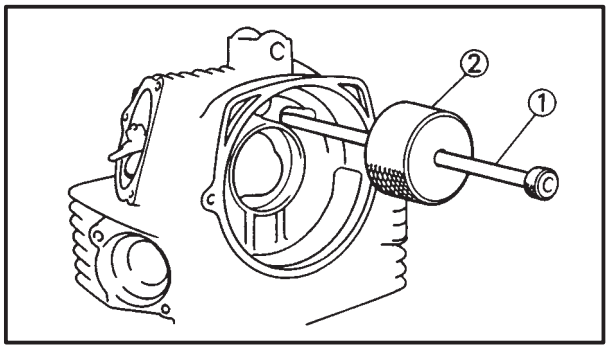


2. Remove:
   - bolt ①
   - lock washer ②
   - camshaft retainer ③



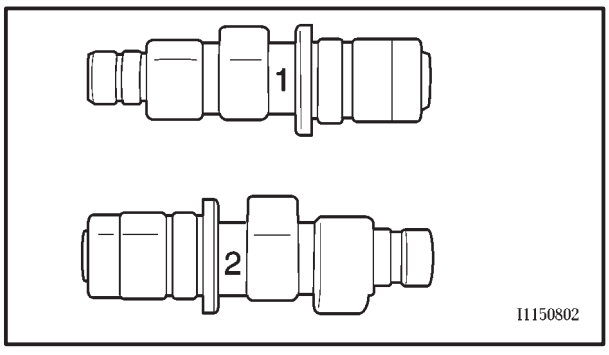
3. Remove:
   - camshaft ①
   - camshaft bushing ②

NOTE:
Screw a 10-mm bolt ③ into the threaded end of the camshaft and then pull out the camshaft.



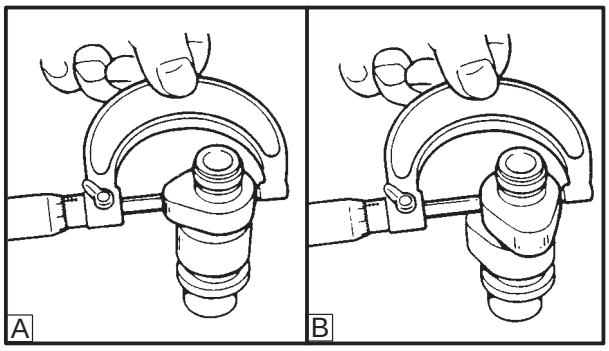
4. Remove:
   - intake rocker arm shaft
   - exhaust rocker arm shaft
   - intake rocker arm
   - exhaust rocker arm

NOTE:
Attach a rocker arm shaft puller bolt ① and weight ② to the rocker arm shaft and slide out the shaft.



Rocker arm shaft puller bolt
90890-01083
Weight
90890-01084

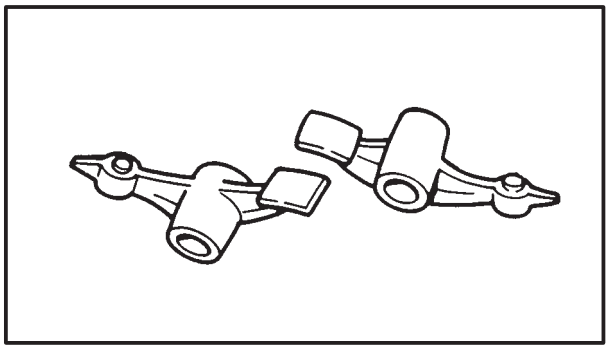
EAS00205
CHECKING THE CAMSHAFTS
1. Check:
   - camshaft bushings
     Damage/wear → Replace.
2. Check:
   - camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.

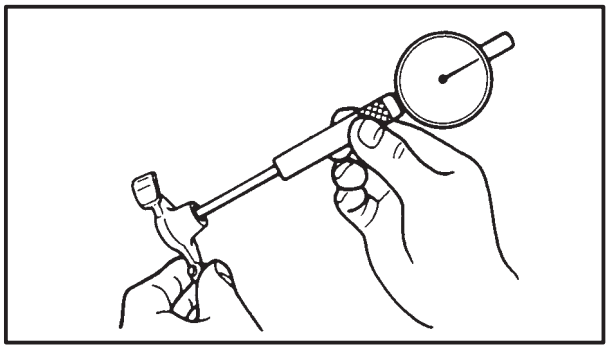


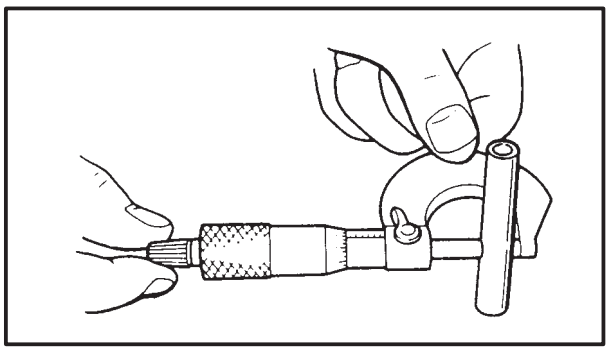
3. Measure:
   • camshaft lobe dimensions A and B
   Out of specification → Replace the camshaft.

Camshaft lobe dimension limit
Intake
A 36.45 mm
B 30.05 mm
Exhaust
A 36.49 mm
B 30.13 mm

4. Check:
   • camshaft oil passage
   Obstruction → Blow out with compressed air.







EAS00206
CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS
The following procedure applies to all of the rocker arms and rocker arm shafts.
1. Check:
   • rocker arm
   Damage/wear → Replace.
2. Check:
   • rocker arm shaft
   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Check:
   • camshaft lobe
   Excessive wear → Replace the camshaft.
4. Measure:
   • rocker arm inside diameter
   Out of specification → Replace.

Rocker arm inside diameter
12.000 ~ 12.018 mm
Limit 12.036 mm

5. Measure:
   • rocker arm shaft outside diameter
   Out of specification → Replace.

Rocker arm shaft outside diameter
11.985 ~ 11.991 mm
Limit 11.950 mm

6. Calculate:
   • rocker-arm-to-rocker-arm-shaft clearance

NOTE:

Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

Out of specification → Replace the defective part(-s).

Rocker-arm-to-rocker-arm-shaft clearance
0.009 ~ 0.033 mm

INSTALLING THE CAMSHAFT AND ROCKER ARMS

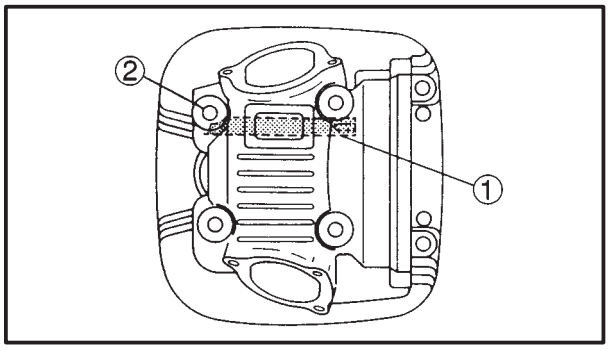
1. Lubricate:
   • rocker arm shaft

Recommended lubricant
Molybdenum disulfide oil

2. Install:
   • exhaust rocker arm
   • exhaust rocker arm shaft

NOTE:

Make sure that the exhaust rocker arm shaft is completely pushed into the cylinder head.



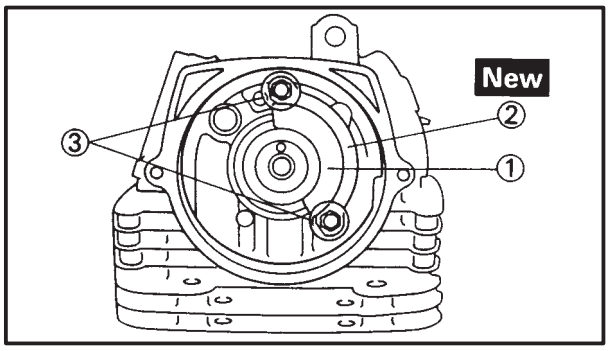
3. Install:
   • intake rocker arm
   • intake rocker arm shaft ①

NOTE:

Insert a cylinder head bolt ② into the hole in the cylinder head and the intake rocker arm shaft as shown.

4. Lubricate:
   • Camshaft

Recommended lubricant
Camshaft
Molybdenum disulfide oil
Camshaft bearing
Engine oil



5. Install:
   - camshaft retainer ①
   - Lock washer ② New
   - Bolt ③

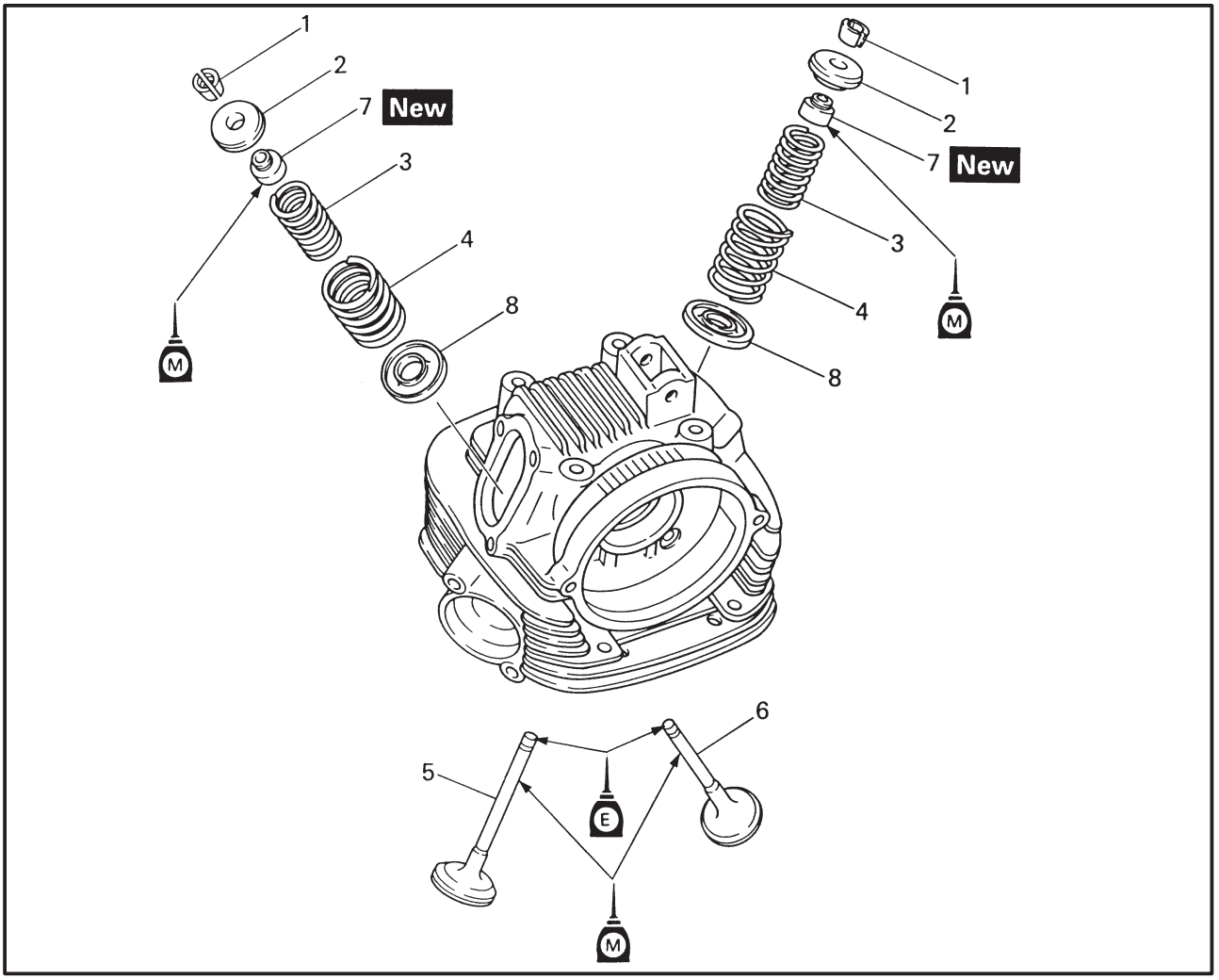
8 Nm (0.8 m•kg)

NOTE:

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

EAS00236

VALVES AND VALVE SPRINGS



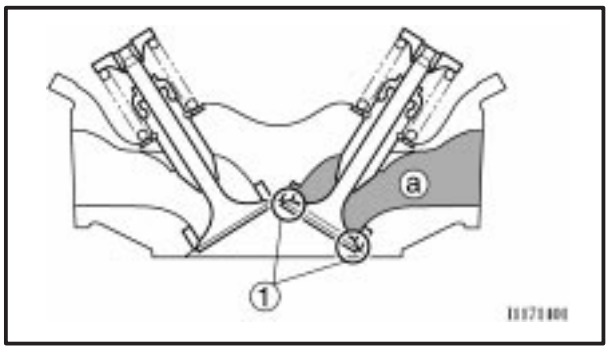
Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
	Rocker arm, Camshaft		Refer to "CAMSHAFT".
1	Valve cotters	4	Refer to "REMOVING/INSTALLING THE VALVES".
2	Spring retainer	2	
3	Valve spring (inner)	2	
4	Valve spring (outer)	2	
5	Valve (exhaust)	1	
6	Valve (intake)	1	
7	Valve guide (stem seal)	2	
8	Spring seat	2	
			For installation, reverse the removal procedure.

EAS00238
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. 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.
   There should be no leakage at the valve seat ①.

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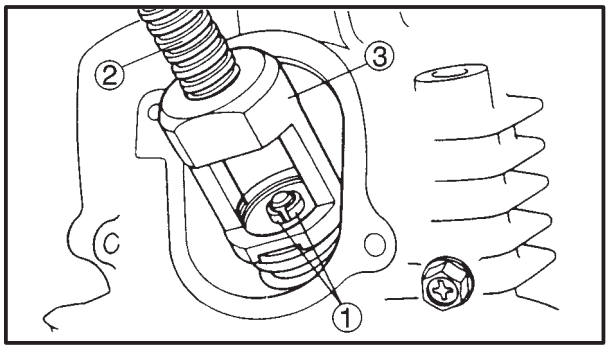
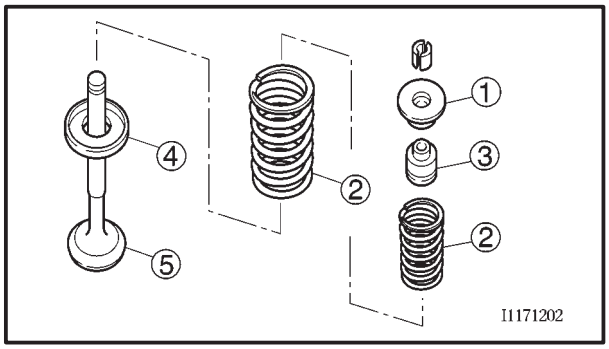


2. Remove:
   • valve cotters ①

NOTE:

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

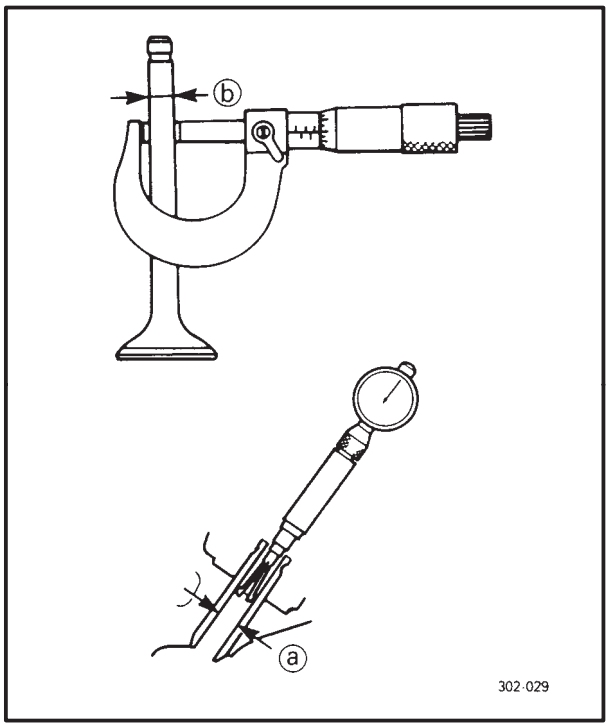
Valve spring compressor
90890-04019
Attachment
90890-04108

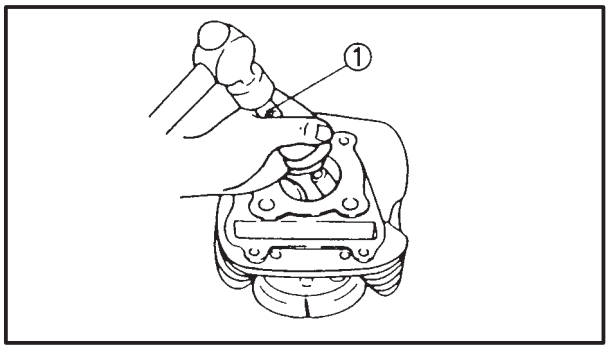


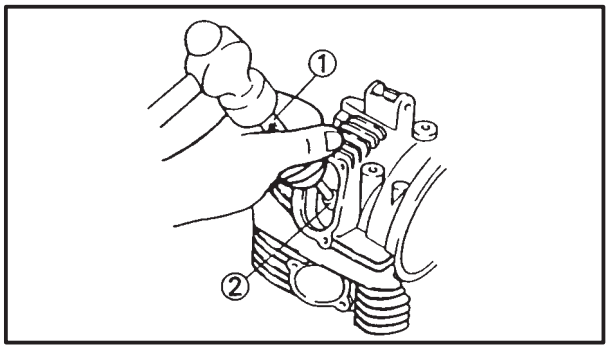
3. Remove:
   • upper spring seat ①
   • valve springs ②
   • oil seal ③
   • lower spring seat ④
   • valve ⑤

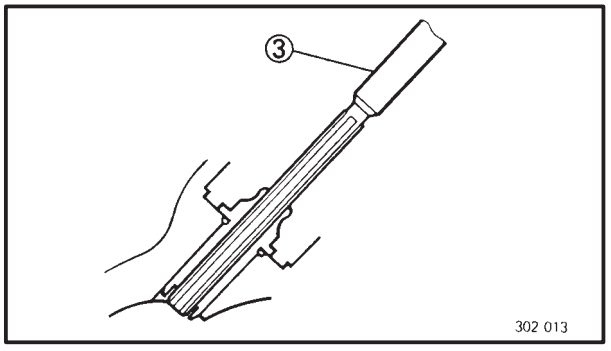
NOTE:

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 ⓐ – Valve stem diameter ⓑ

Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance
Intake
0.010 ~ 0.037 mm
Limit: 0.08 mm
Exhaust
0.025 ~ 0.052 mm
Limit: 0.10 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.

a. Remove the valve guide with a valve guide remover ①.

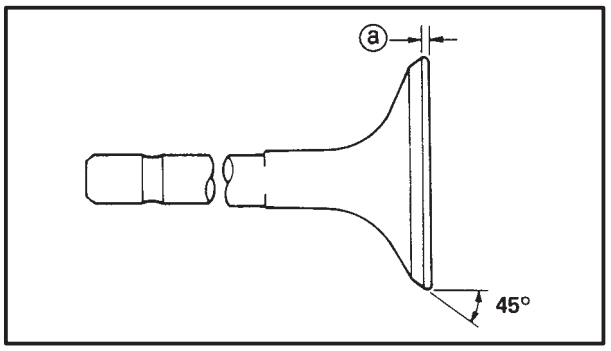
b. Install the new valve guide with a valve guide installer ② and valve guide remover ①.
c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

NOTE:

After replacing the valve guide, reface the valve seat.

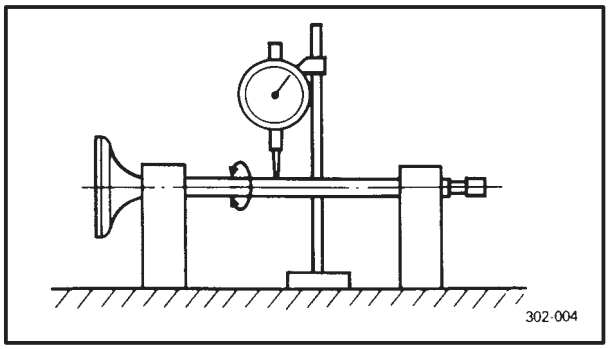
Valve guide remover (6 mm)
90890-04064
Valve guide installer (6 mm)
90890-04065
Valve guide reamer (6 mm)
90890-04066

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
0.8 ~ 1.2 mm



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

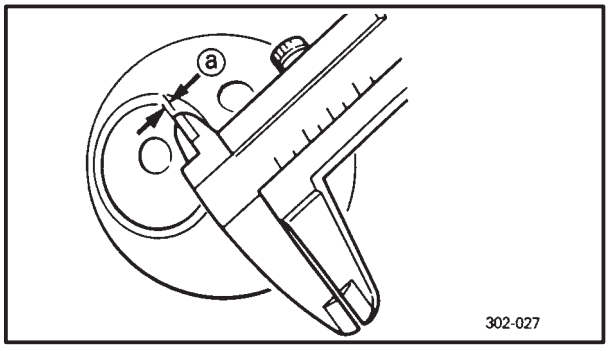
NOTE:
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
Limit: 0.03 mm

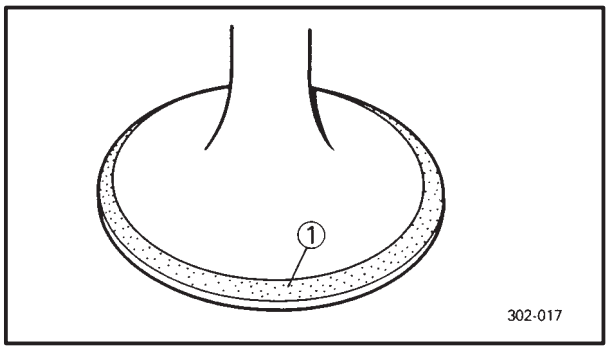
EAS00240
CHECKING THE VALVE SEATS

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
Limit: 1.6 mm
Exhaust: 0.9 ~ 1.1 mm
Limit: 1.6 mm

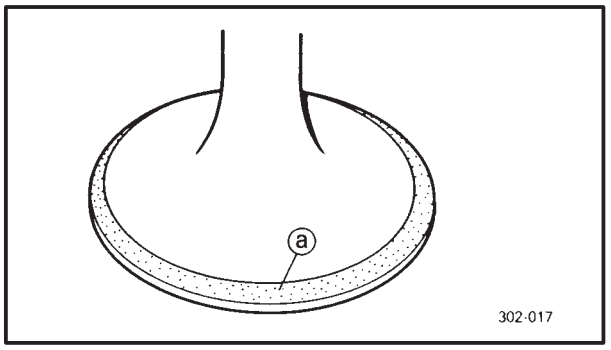


a. Apply Mechanic's blueing dye (Dykem) ① onto the valve face.
b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
d. Measure the valve seat width. Where the valve seat and valve face contacted one another, the blueing will have been removed.

4. Lap:
   • valve face
   • valve seat

NOTE:

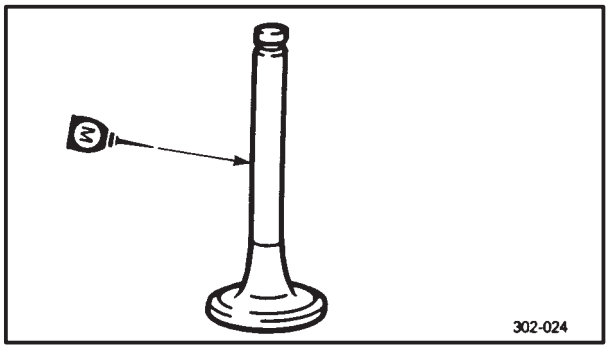
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.



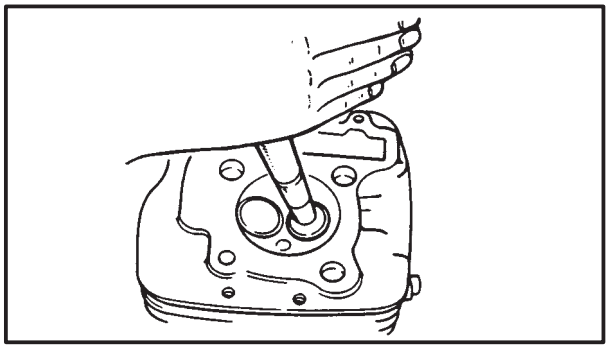
a. Apply a coarse lapping compound ⓐ to the valve face.

CAUTION:

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



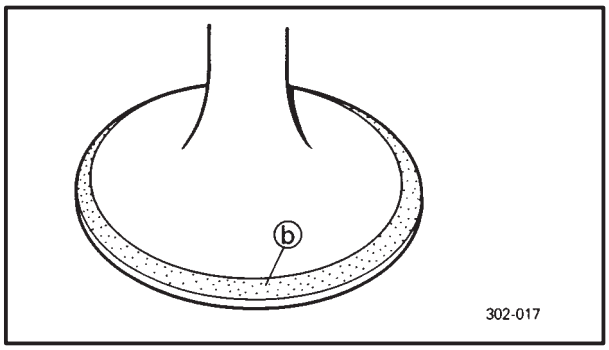
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.

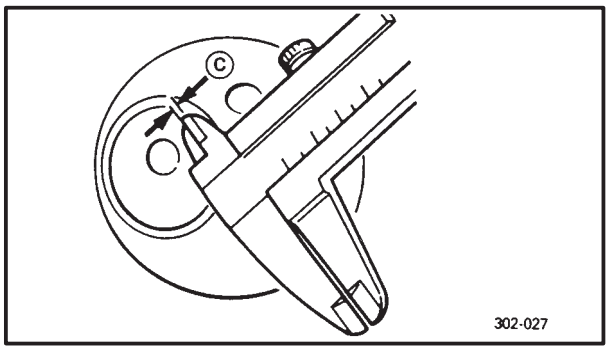


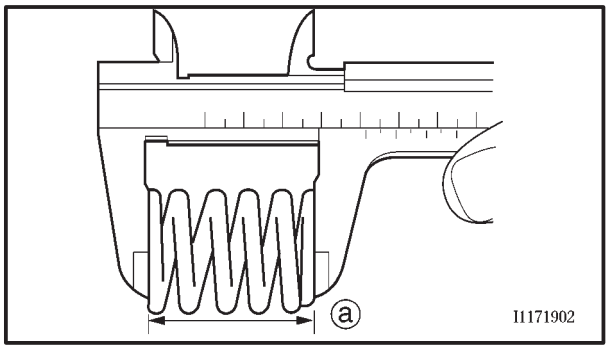
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

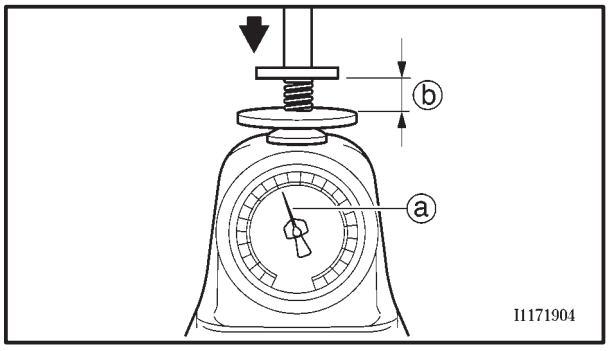
NOTE:

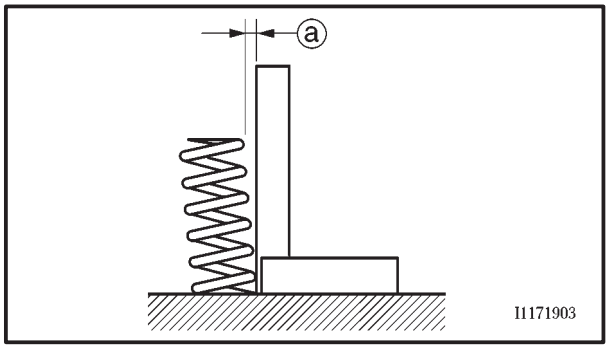
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.











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.

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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 and exhaust)
Inner spring
35.5 mm Limit: 33.5 mm
Outer spring
37.2 mm Limit: 35.2 mm

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

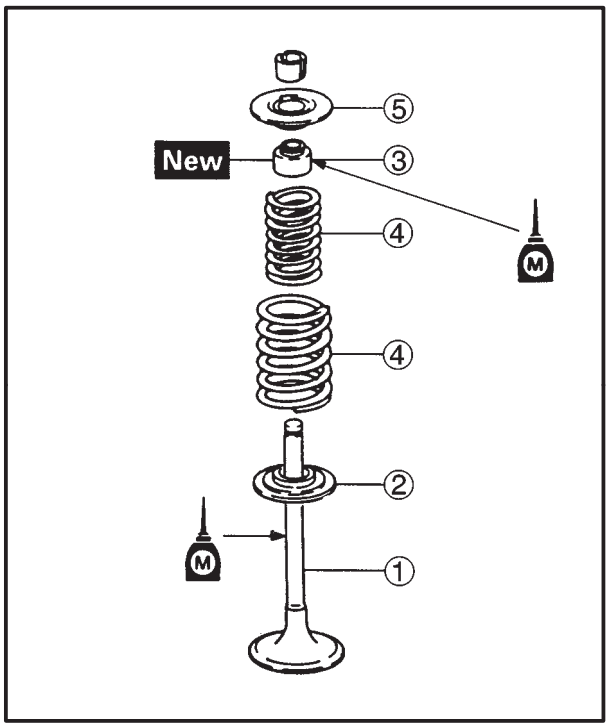
ⓑ Installed length

Compressed spring force
Intake and exhaust inner spring
8.4 ~ 10.2 kg at 30.5 mm
Intake and exhaust outer spring
16.6 ~ 20.4 kg at 32.0 mm

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

Spring tilt limit
Intake and exhaust inner spring
2.5°/1.5 mm
Intake and exhaust outer spring
2.5°/1.6 mm

EAS00246
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   • valve stem end
     (with an oil stone)

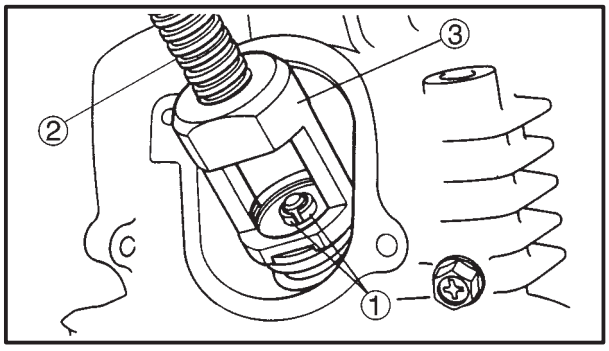


2. Lubricate:
   • valve stem
   • oil seal
     (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide oil

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

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



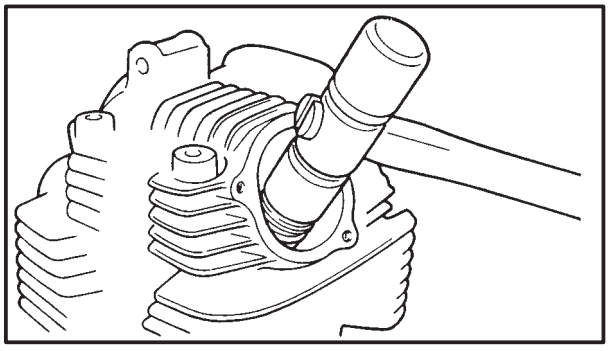
4. Install:
   • valve cotters ①

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

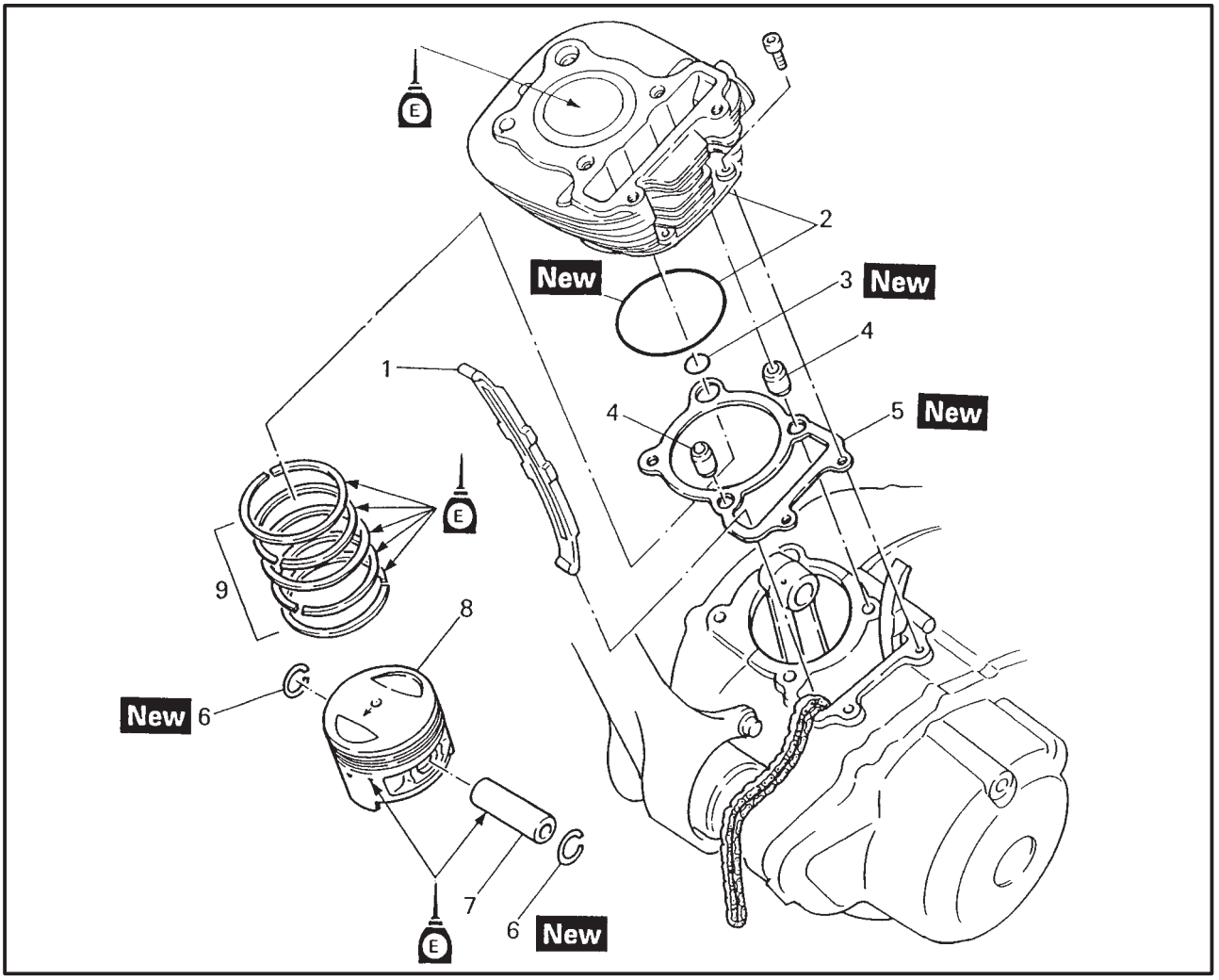
Valve spring compressor
90890-04019
Attachment
90890-04108

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

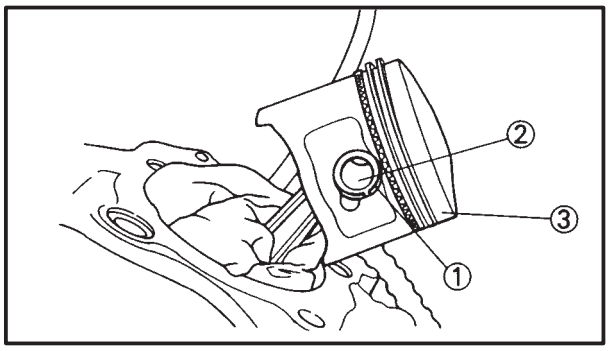
CAUTION:
Hitting the valve tip with excessive force could damage the valve.

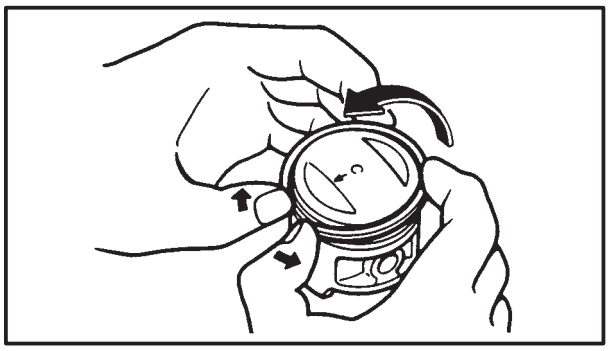


EAS00265
CYLINDER AND PISTON



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder and piston		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Timing chain guide (exhaust side)	1	
2	Cylinder/O-ring	1/1	
3	O-ring	1	Refer to "INSTALLING THE PISTON
4	Dowel pin	2	AND CYLINDER".
5	Cylinder gasket	1	
6	Piston pin circlip	2	Refer to "REMOVING THE PISTON
7	Piston pin	1	AND PISTON RINGS".
8	Piston	1	Refer to "INSTALLING THE PISTON
9	Piston ring set	1	AND CYLINDER".
			For installation, reverse the removal procedure.





YP******

REMOVING THE PISTON AND PISTON RINGS

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

NOTE:

Before removing the piston pin circlip, cover the crankcase opening with a clean towel or rag to prevent the circlip from falling into the crankcase cavity.

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

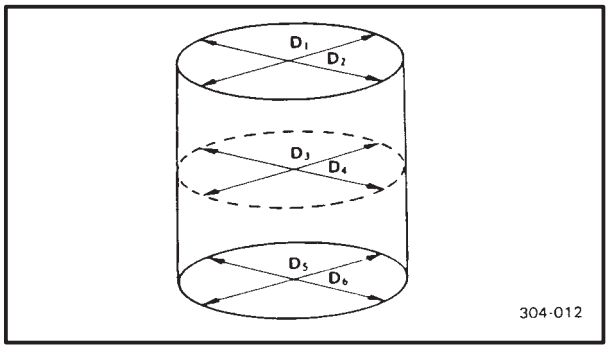
NOTE:

When removing the piston ring, open the end gap of the ring by fingers, and push up the other side of the ring.

EAS00255

CHECKING THE CYLINDER AND PISTON

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



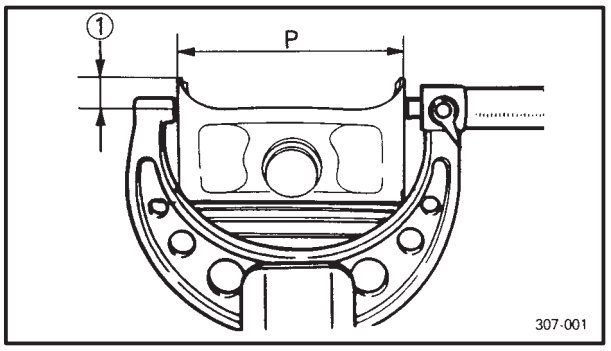
a. Measure cylinder bore “C” with the cylinder bore gauge.

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”	**57.00 ~ 57.02 mm**
Taper limit ”T”	**0.05 mm**
Out of round “R”	**0.01 mm**

”C” = Maximum D
”T” = (Maximum D_1 or D_2) – (Maximum D_5 or D_6)
”R” = (Maximum D_1, D_3 or D_5) – (Minimum D_2, D_4 or D_6)



b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter "P" with the micrometer.

① 7.0 mm from the bottom edge of the piston.

	Piston size "P"
Standard	56.960 ~ 56.975 mm
Oversize 2	57.25 mm
Oversize 4	57.50 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
0.035 ~ 0.055 mm

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

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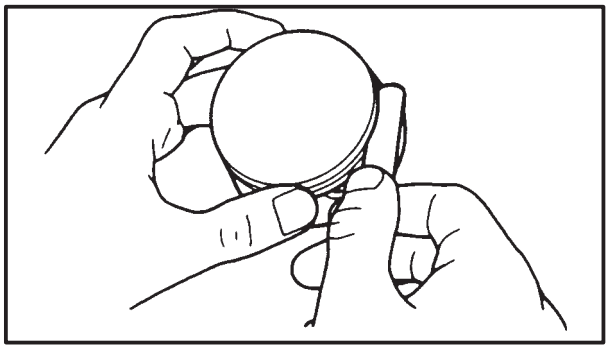


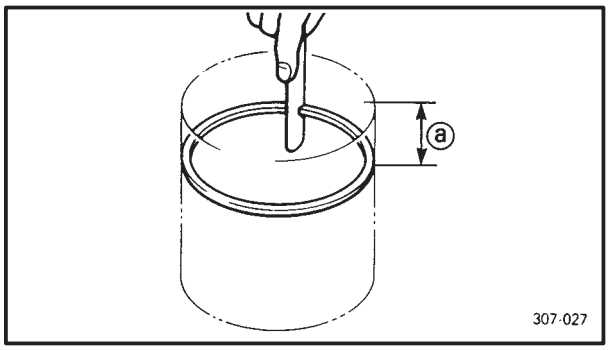
EAS00263
CHECKING THE PISTON RINGS

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
0.03 ~ 0.07 mm
<Limit>: 0.15 mm
2nd ring
0.02 ~ 0.06 mm
<Limit>: 0.15 mm



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

NOTE:

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

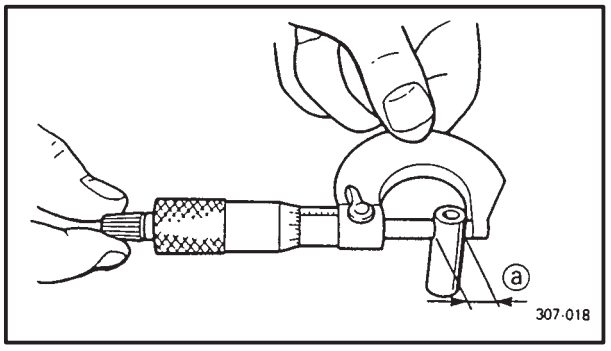
ⓐ 5.0 mm

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

NOTE:

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

Piston ring end gap
Top ring
0.15 ~ 0.35 mm
<Limit>: 0.60 mm
2nd ring
0.15 ~ 0.35 mm
<Limit>: 0.60 mm
Oil ring
0.3 ~ 0.9 mm

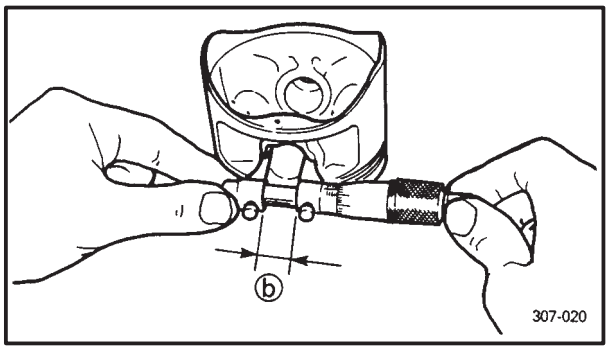


EAS00265
CHECKING THE PISTON PIN

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.

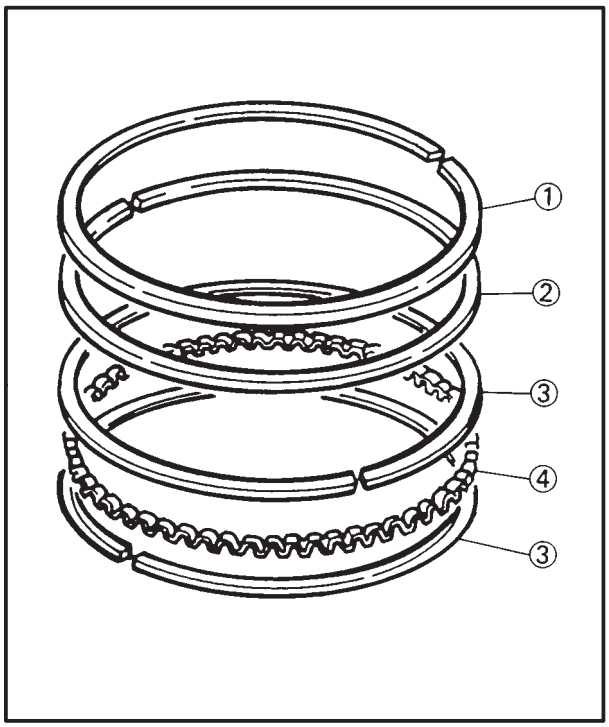
Piston pin outside diameter
14.987 ~ 14.992 mm

3. 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
0.010 ~ 0.026 mm

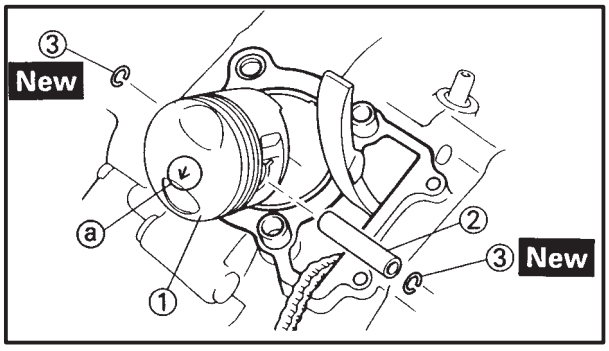


EAS00267
INSTALLING THE PISTON AND CYLINDER

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

NOTE:

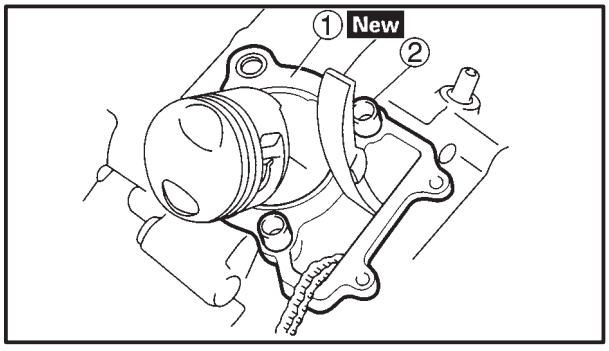
Be sure to install the piston rings so that the manufacturer's marks or numbers face up.



2. Install:
   - piston ①
   - piston pin ②
   - piston pin clip ③ New

NOTE:

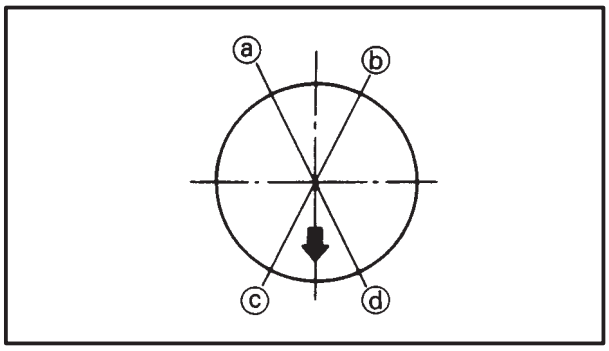
- Apply engine oil onto the poston pin.
- Make sure that the arrow mark ⓐ on the piston points towards the exhaust side of the cylinder.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.



3. Install:
   - gasket ① New
   - dowel pins ②
4. Lubricate:
   - piston
   - piston rings
   - cylinder

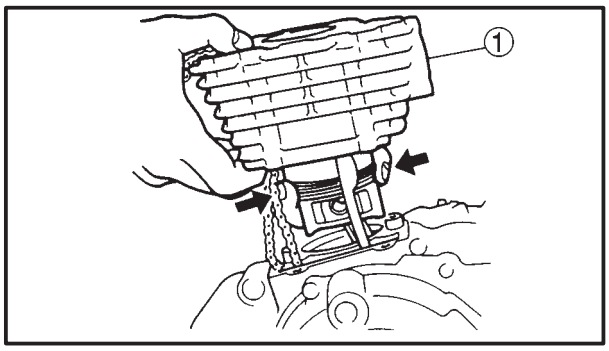
   (with the recommended lubricant)

Recommended lubricant
Engine oil



5. Offset:
   • piston ring end gaps

ⓐ Top ring
ⓑ Lower oil ring rail
ⓒ Upper oil ring rail
ⓓ 2nd ring

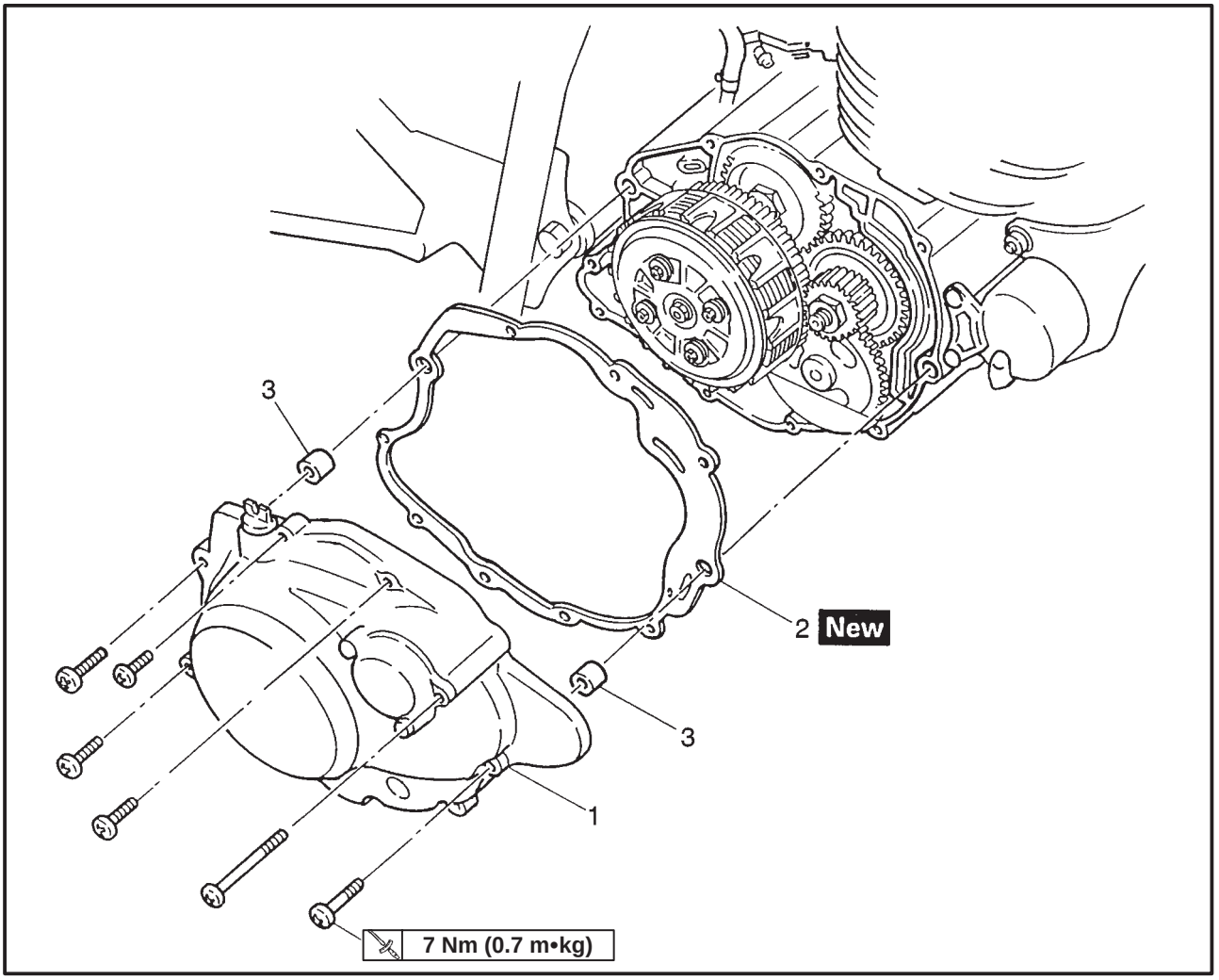


6. Install:
   • cylinder ①

NOTE:

- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

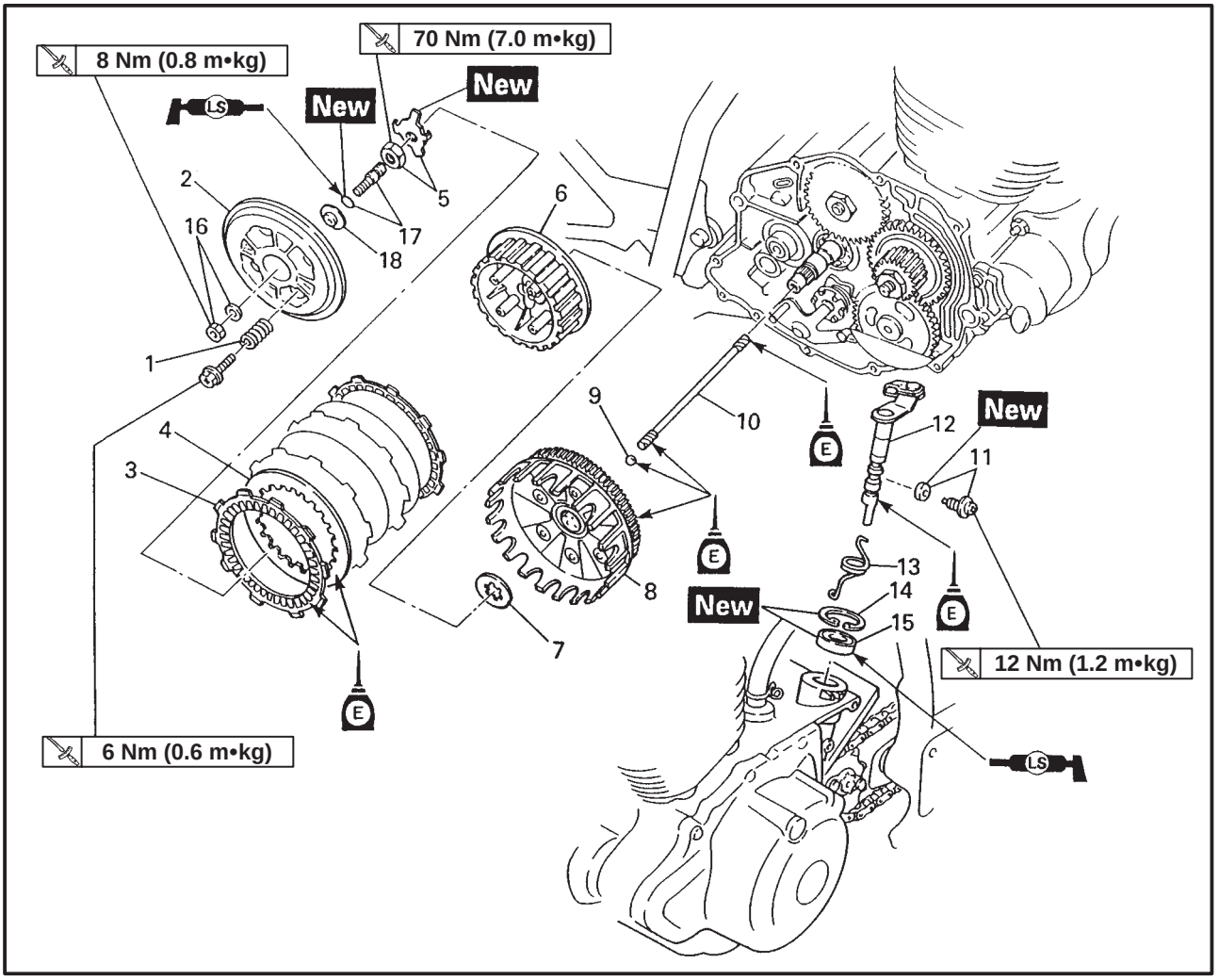
EAS00273
CLUTCH
CLUTCH COVER



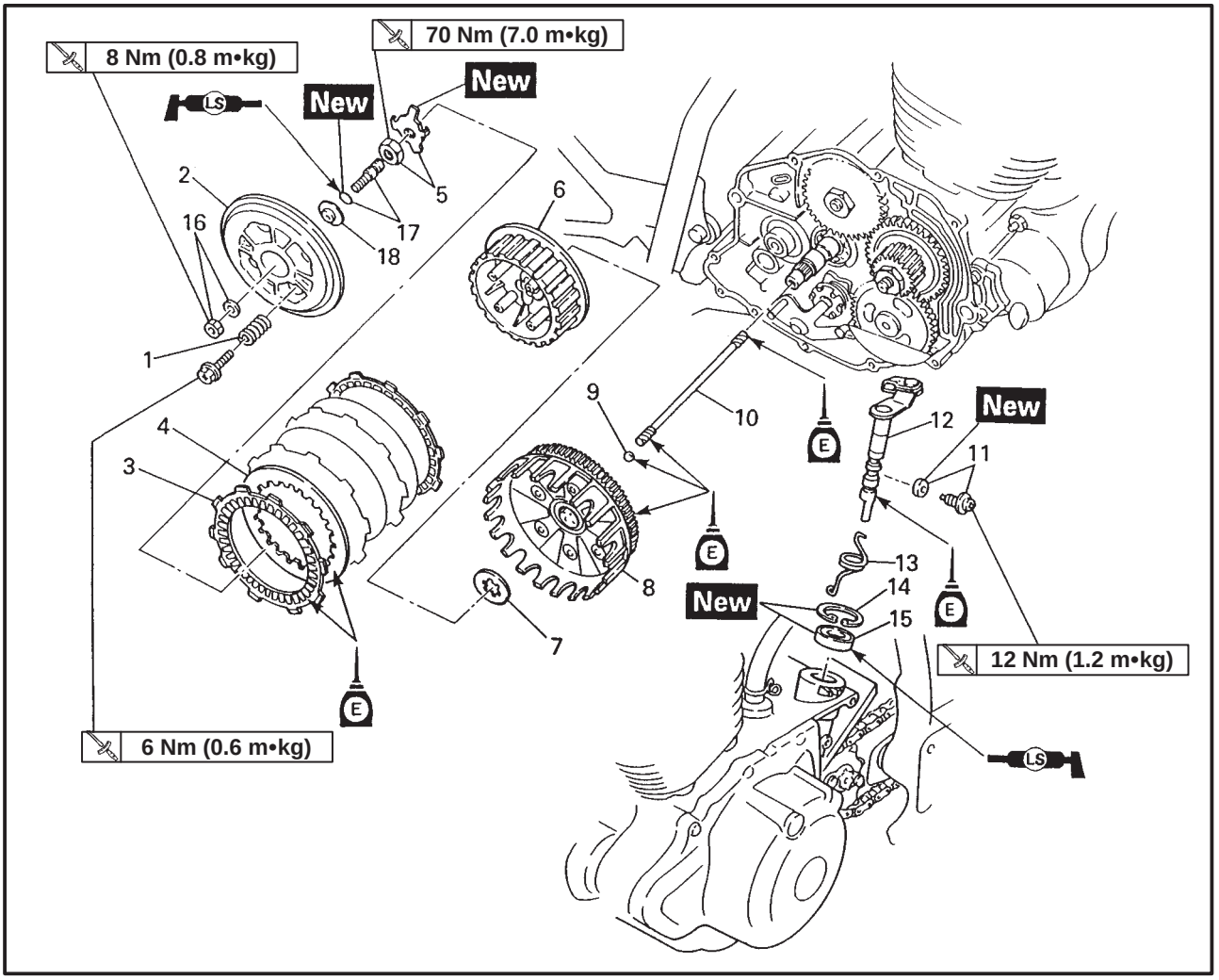
Order	Job/Part	Q'ty	Remarks
	Removing the clutch cover Drain the engine oil		Remove the parts in the order listed. Refer to "CHANGING THE ENGINE OIL" in CHAPTER 3.
1	Clutch cover	1	
2	Clutch cover gasket	1	
3	Dowel pins	2	
			For installation, reverse the removal procedure.

EAS00274

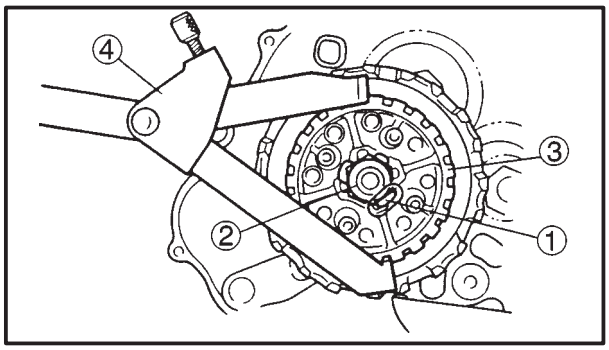
CLUTCH

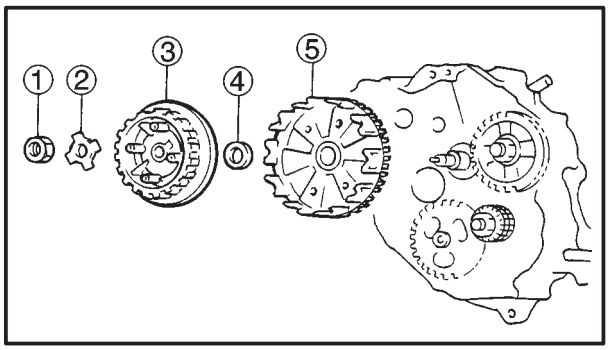


Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Clutch springs	4	Refer to "REMOVING/INSTALLING THE CLUTCH".
2	Pressure plate	1	
3	Friction plates	4	
4	Clutch plates	3	
5	Nut/Lock washer	1/1	
6	Clutch boss	1	
7	Thrust washer	1	
8	Clutch housing	1	
9	Ball	1	
10	Long clutch push rod	1	
11	Push lever screw/Gasket	1/1	



Order	Job/Part	Q'ty	Remarks
12	Push lever axle	1	Refer to "INSTALLING THE CLUTCH".
13	Torsion spring	1	
14	Circlip	1	
15	Oil seal	1	
16	Nut/Washer	1/1	Refer to "INSTALLING THE CLUTCH".
17	Short clutch push rod/O-ring	1/1	
18	Push plate	1	
			For installation, reverse the removal procedure.





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

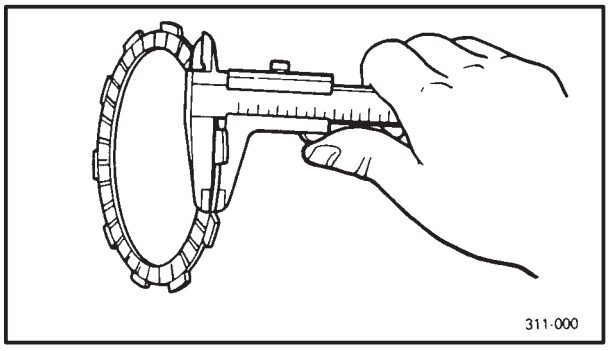
NOTE:

While holding the clutch boss ③ with the universal clutch holder ④, loosen the clutch boss nut.

Universal clutch holder
90890-04086

3. Remove:
   • clutch boss nut ①
   • lock washer ②
   • clutch boss ③
   • thrust washer ④
   • clutch housing ⑤

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



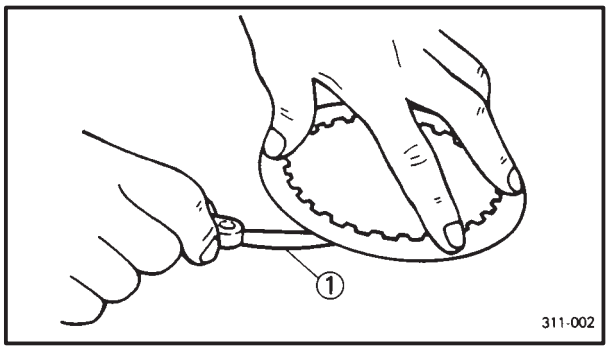
2. Measure:
   • friction plate thickness
   Out of specification → Replace the friction plates as a set.

NOTE:

Measure the friction plate at four places.

Friction plate thickness
2.9 ~ 3.1 mm
<Limit>: 2.7 mm

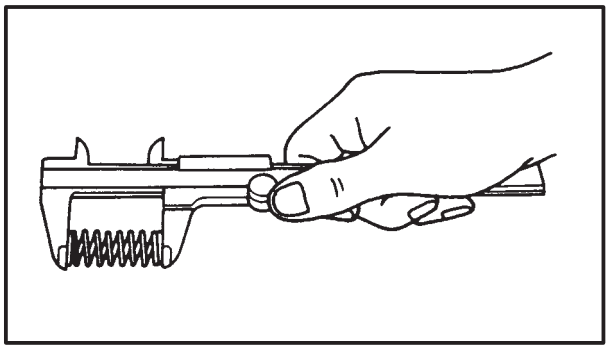
EAS00281
CHECKING THE CLUTCH PLATES
The following procedure applies to all of the clutch plates.
1. Check:
   • clutch plate
   Damage → Replace the clutch plates as a set.



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

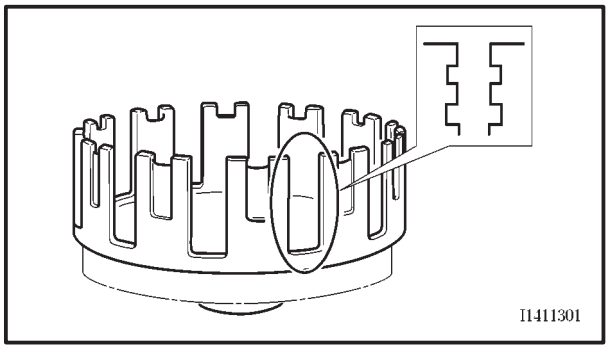
Clutch plate warpage limit
Less than 0.05 mm

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.



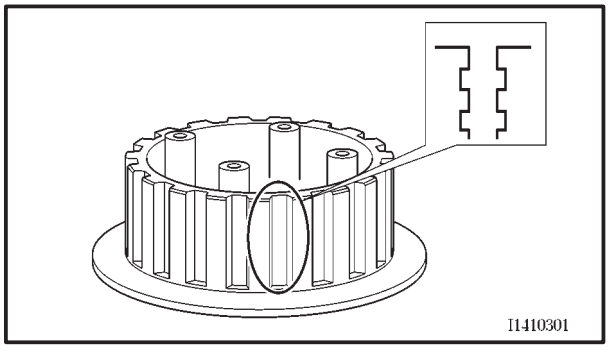
2. Measure:
   • clutch spring free length
   Out of specification → Replace the clutch springs as a set.

Clutch spring free length
34.9 mm
<Limit>: 33.9 mm



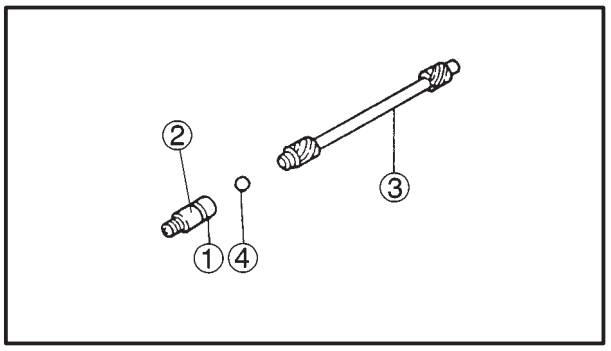
EAS00284
CHECKING THE CLUTCH HOUSING
1. Check:
   • clutch housing dogs
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

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



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.



EAS00288

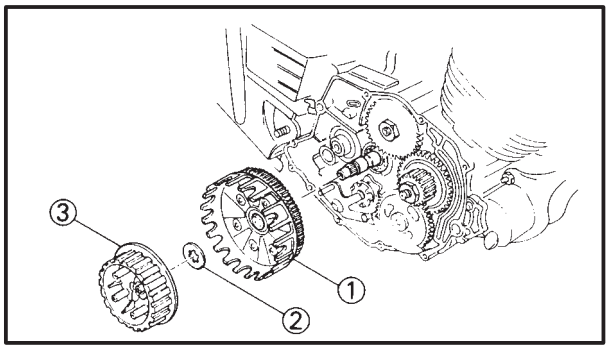
CHECKING THE CLUTCH PUSH RODS

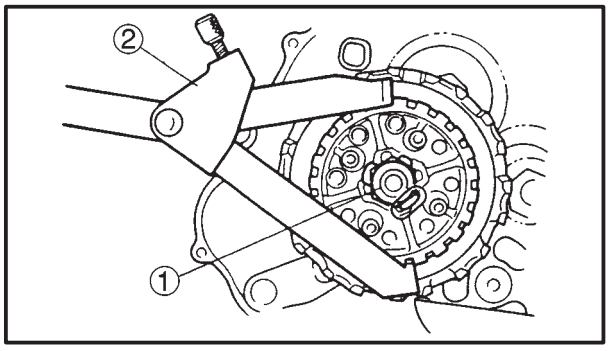
1. Check:
   - O-ring ①
   - short clutch push rod ②
   - long clutch push rod ③
   - ball ④

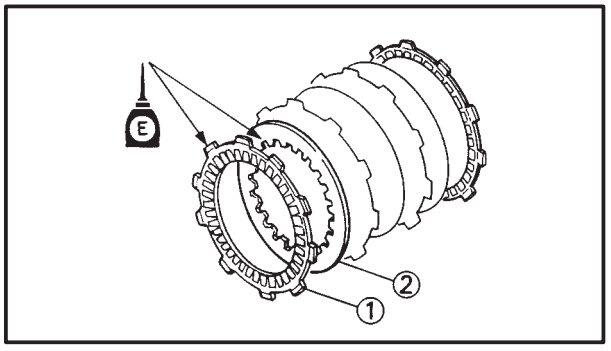
   Cracks/damage/wear → Replace the defective part(-s).
2. Measure:
   - long clutch push rod bending limit

   Out of specification → Replace the long clutch push rod.

Long clutch push rod bending limit
0.2 mm







EAS00298

INSTALLING THE CLUTCH

1. Install:
   - clutch housing ①
   - thrust washer ②
   - clutch boss ③
   - lock washer
   - clutch boss nut

NOTE:

Make sure that the teeth on the lock washer are correctly aligned with the grooves on the clutch boss.

2. Tighten:
   - clutch boss nut ①

70 Nm (7.0 m•kg)

NOTE:

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

Universal clutch holder
90890-04086

3. Bend the lock washer tab along a flat side of the nut.
4. Lubricate:
   - friction plates ①
   - clutch plates ②

   (with the recommended lubricant)

Recommended lubricant
Engine oil

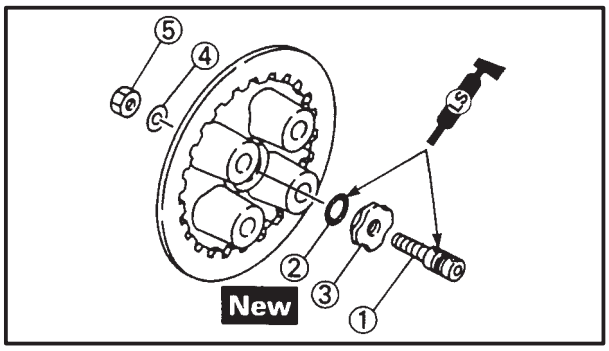
5. Install:
- friction plates
- clutch plates

NOTE:

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

6. Install:
- long clutch push rod
- ball

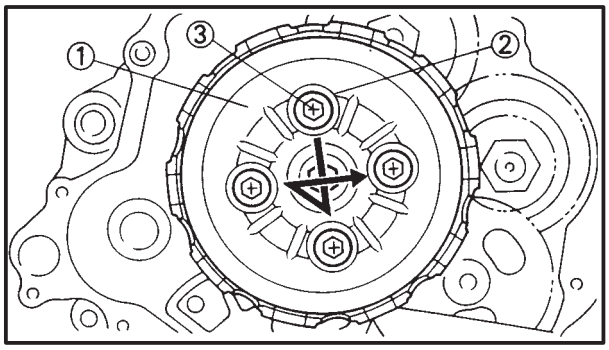
7. Install:
- short clutch push rod ①
- O-ring ② New
- push plate ③
- washer ④
- nut ⑤



8. Install:
- pressure plate ①
- clutch springs ②
- clutch spring bolts ③ 6 Nm (0.6 m•kg)

NOTE:

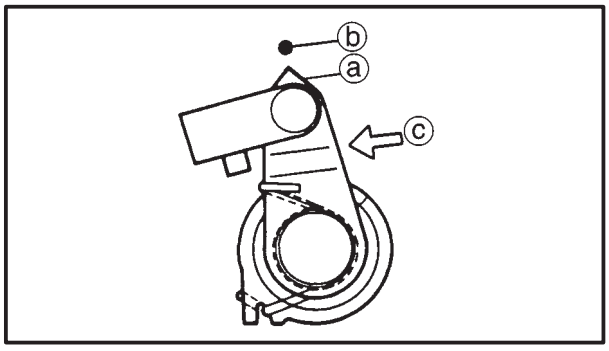
Tighten the clutch spring bolts in stages and in a crisscross pattern.



9. Check:
- push lever position
  Push lever mark ⓐ and crankcase mark ⓑ not aligned → Correct.

NOTE:

Push the push lever in direction ⓒ and make sure that the marks are aligned.



10. Adjust:
- push lever position

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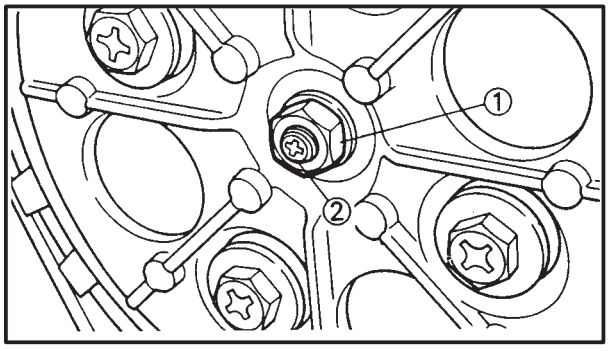
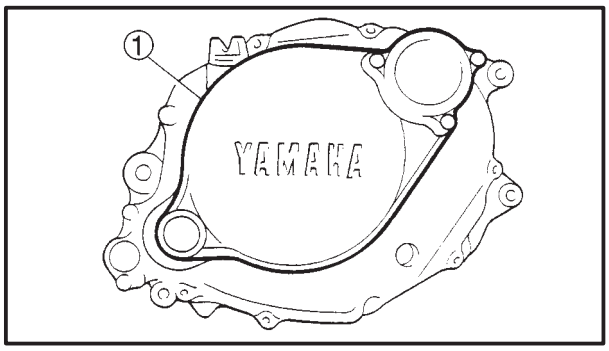
a. Loosen the locknut ①.
b. Turn the adjusting screw ② in or out until the marks are aligned.
c. Hold the adjusting screw to prevent it from moving and then tighten the locknut to specification.





CAUTION:

Do not overtighten the locknut since this will remove the free play between both push rods.

	Push lever lock nut **8Nm (0.8m•kg)**

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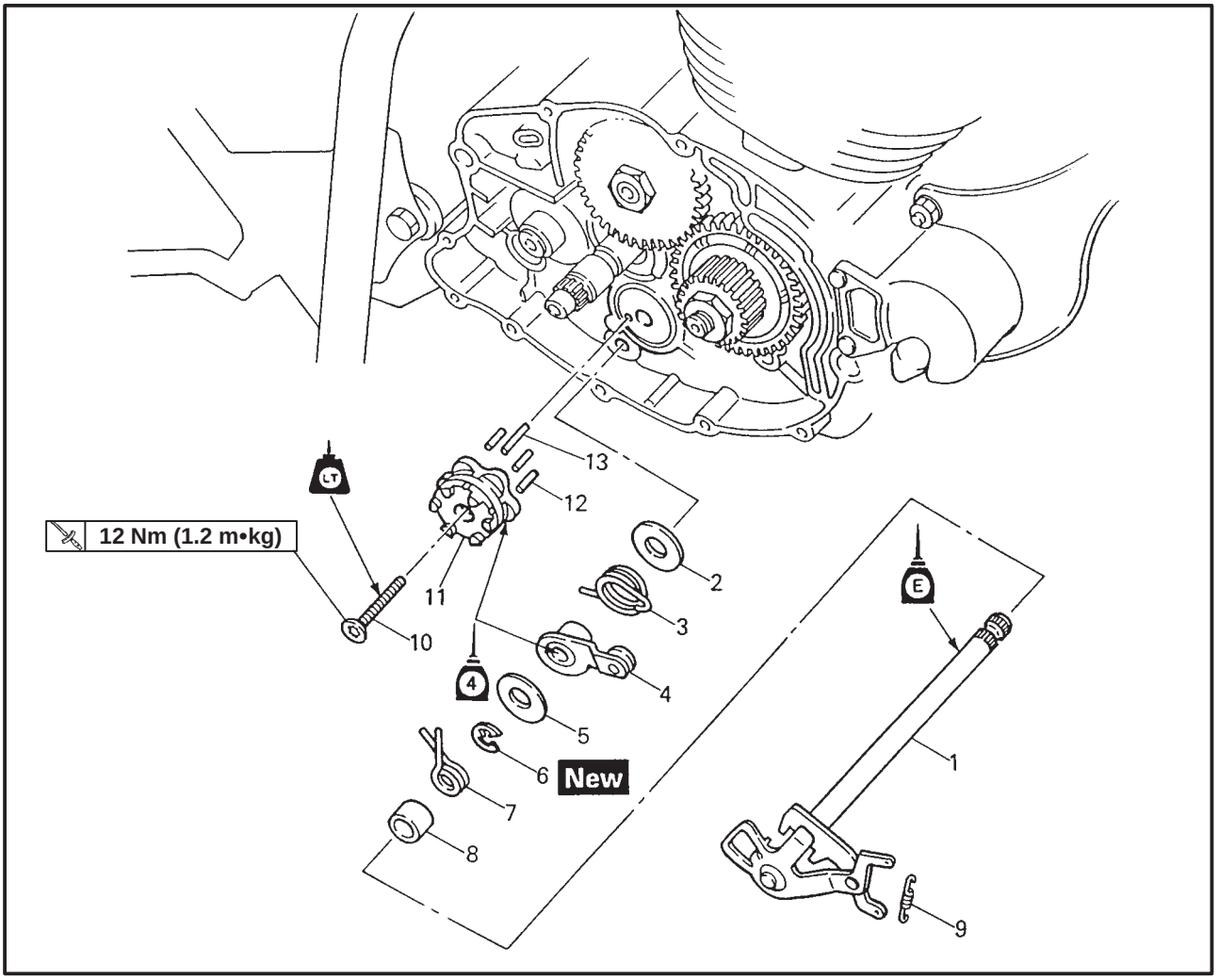
11. Install:
    • clutch cover ①

	7 Nm (0.7 m•kg)

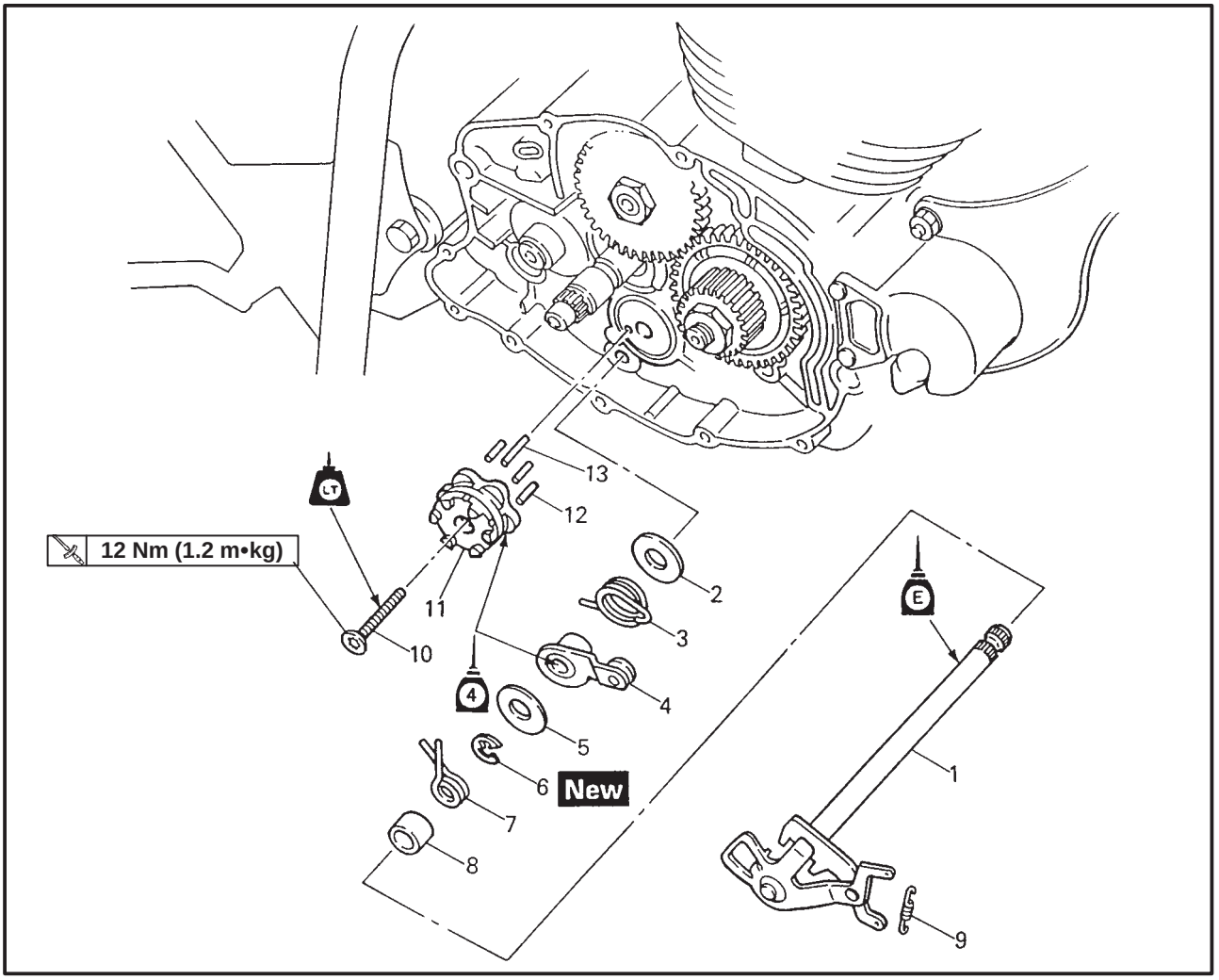
NOTE:

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

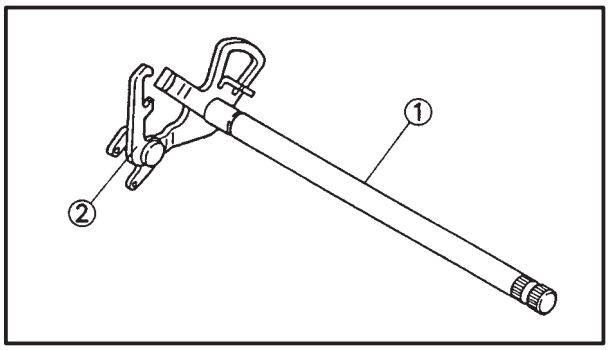
EAS00327
SHIFT SHAFT AND STOPPER LEVER



Order	Job/Part	Q'ty	Remarks
	Removing the shift shaft and stopper lever		Remove the parts in the order listed.
	Clutch		Refer to "CLUTCH".
	Shift pedal		Refer to "ENGINE".
1	Shift shaft	1	Refer to "INSTALLING THE SHIFT SHAFT "
2	Plate washer	1	
3	Torsion spring	1	
4	Stopper lever	1	
5	Plate washer	1	
6	Circlip	1	
7	Torsion spring	1	
8	Collar	1	
9	Tension spring	1	



Order	Job/Part	Q'ty	Remarks
10	Screw	1	Refer to "INSTALLING THE SEGMENT".
11	Segment	1	
12	Dowel pins (short length)	4	
13	Dowel pins (long length)	1	
			For installation, reverse the removal procedure.

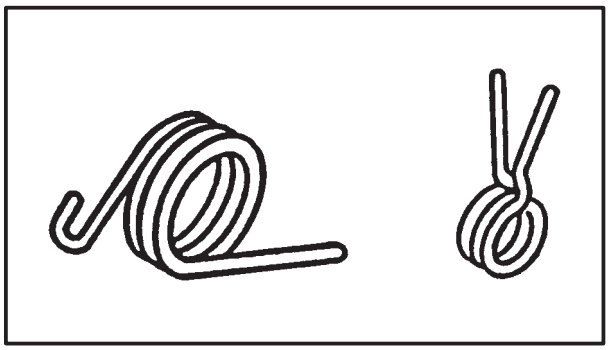


EAS00328

CHECKING THE SHIFT SHAFT

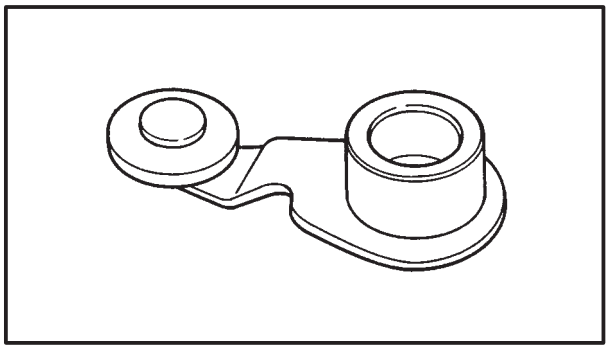
1. Check:
   - shift shaft ①
   - shift lever ②

   Bends/damage/wear → Replace.



- shift lever spring

  Damage/wear → Replace.



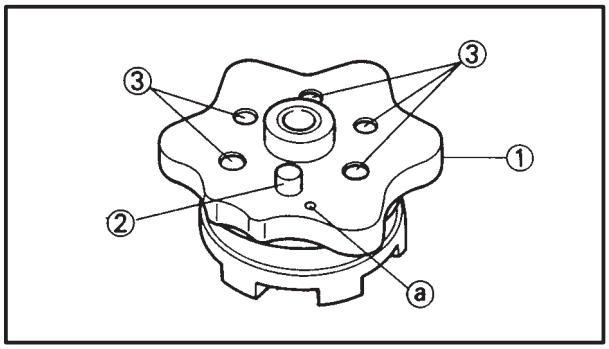
EAS00330

CHECKING THE STOPPER LEVER

1. Check:
   - stopper lever

   Bends/damage → Replace.

   Roller turns roughly → Replace the stopper lever.

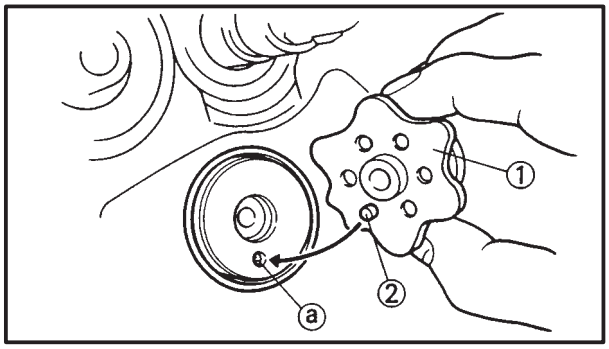


INSTALLING THE SEGMENT

1. Install:
   - segment ①
   - dowel pin ② (long length)
   - dowel pins ③ (short length)

NOTE:

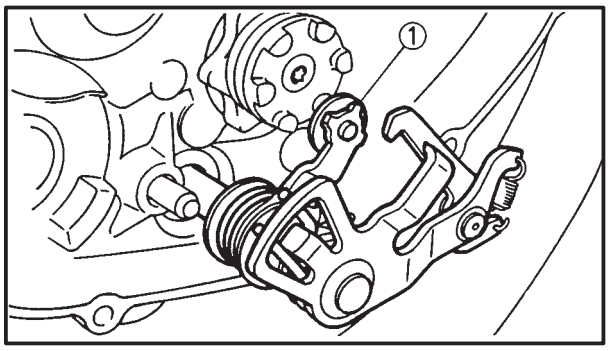
Install the dowel pin ②(long length) into the hole beside the match mark ⓐ position.

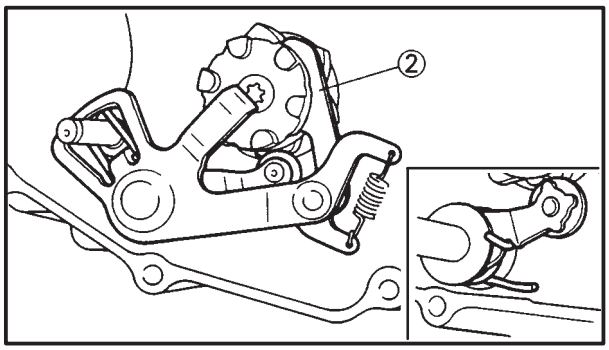


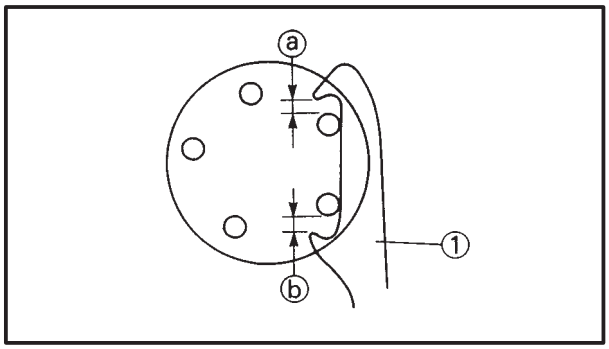
2. Install:
   - segment ①

NOTE:

Fit the dowel pin ② (long length) on the segment to the locating hole ⓐ on the sift cam and install the segment.







INSTALLING THE SHIFT SHAFT

1. Install:
   • shift shaft assembly

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a. Set the stopper lever and return spring to the shift shaft.
b. Mesh the stopper lever ① with the shift cam segment.
c. Install the shift lever ② to the shift cam segment.
d. After installing the shift shaft, check the shift cam for smooth operation by turning the shift shaft with your hand.

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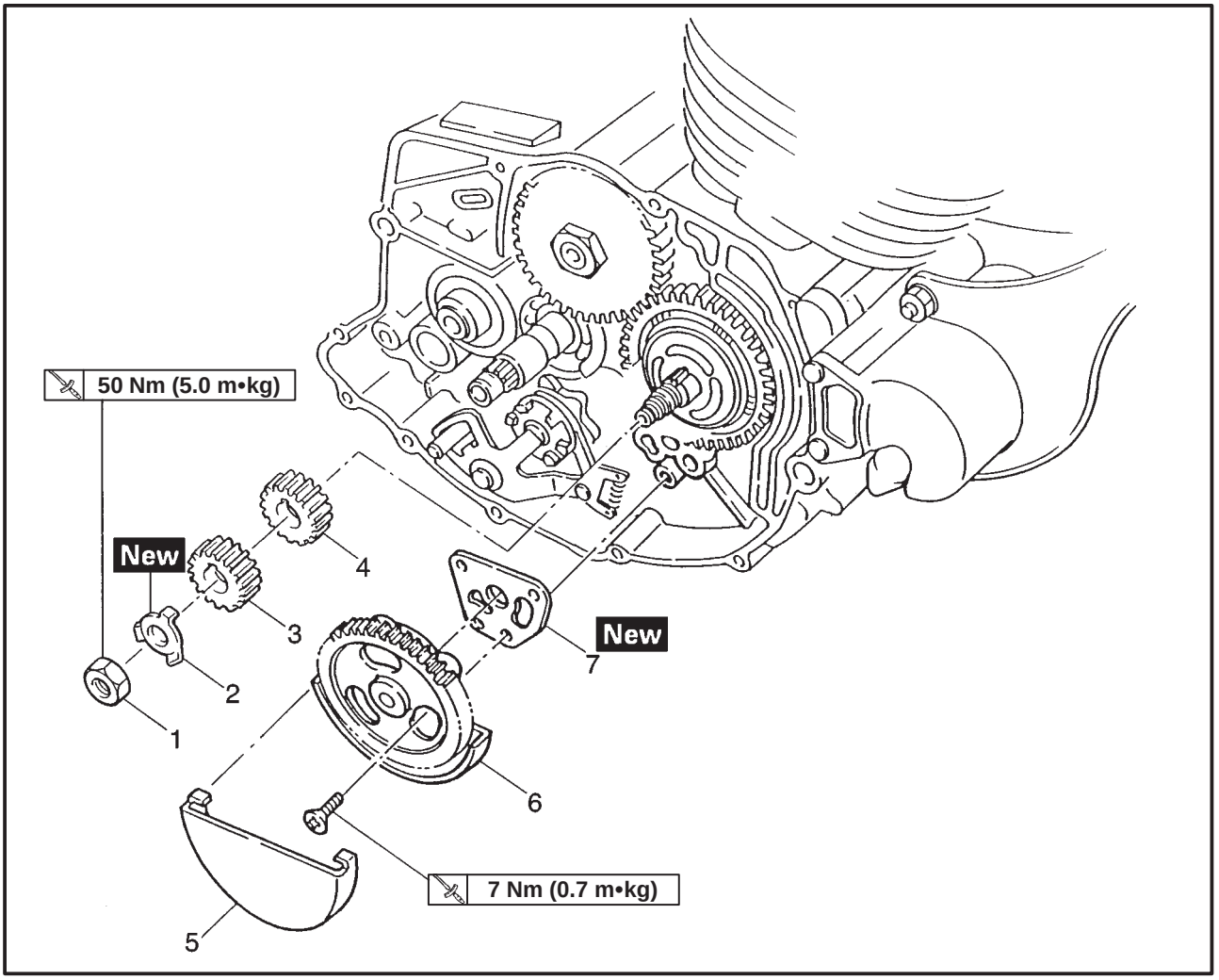
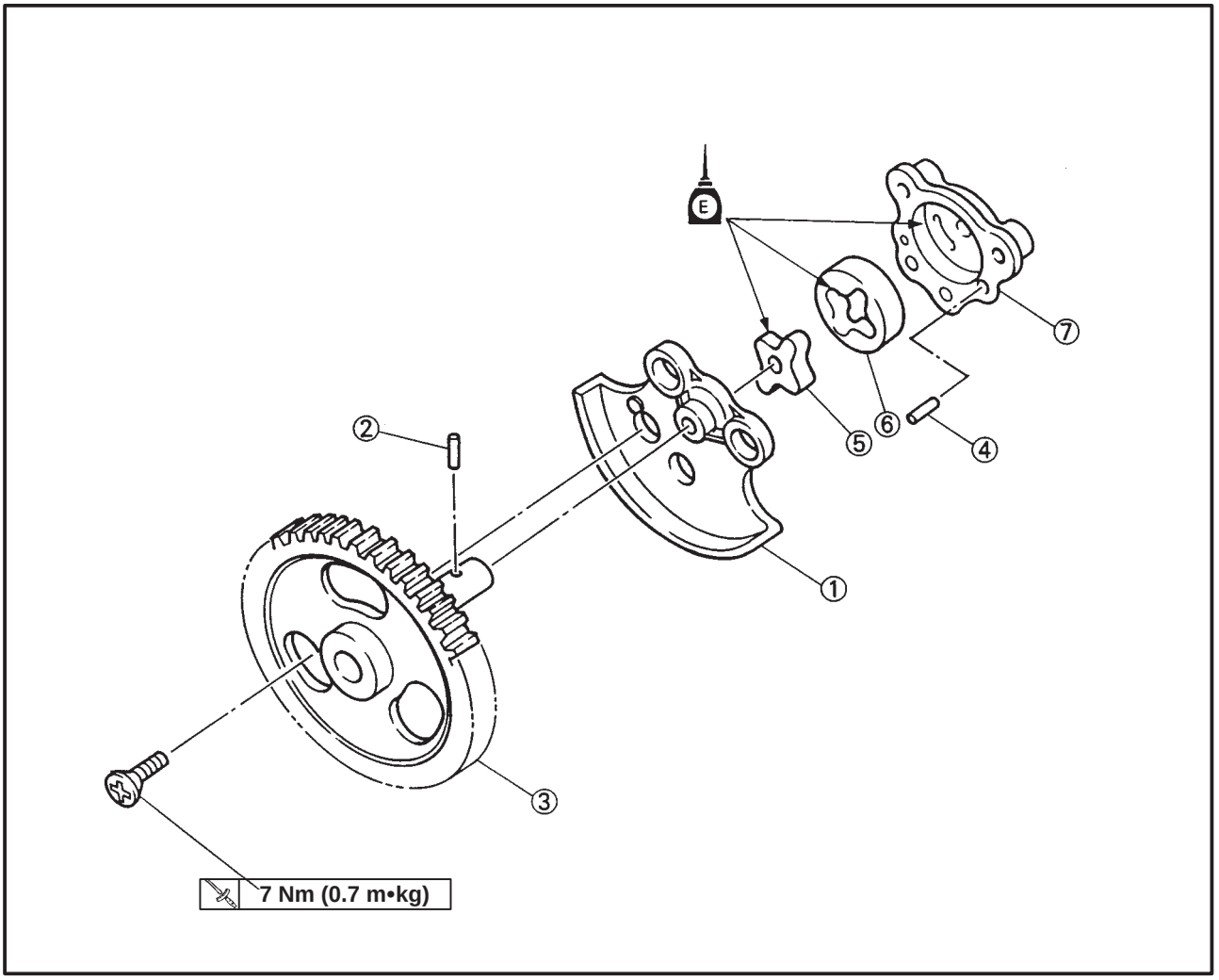
2. Check:
   • shift lever ① position
   Gaps ⓐ and ⓑ are not equal → Replace the defective parts.

EAS00357
OIL PUMP

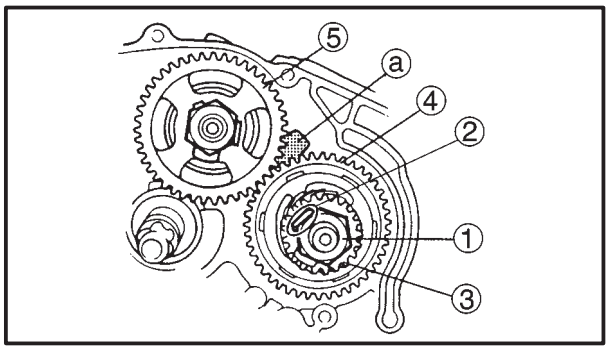


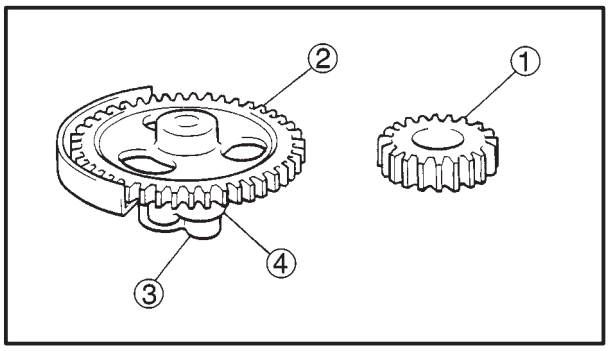
Order	Job/Part	Q'ty	Remarks
	Removing the oil pump		Remove the parts in the order listed
	Clutch		Refer to "CLUTCH".
1	Nut	1	Refer to "REMOVING/INSTALLING THE PRIMARY DRIVE GEAR".
2	Lock washer	1	
3	Primary drive gear	1	
4	Oil pump drive gear	1	
5	Oil pump cover	1	
6	Oil pump assembly	1	Refer to "INSTALLING/THE OIL PUMP".
7	Gasket (oil pump cover)	1	
			For installation, reverse the removal procedure.

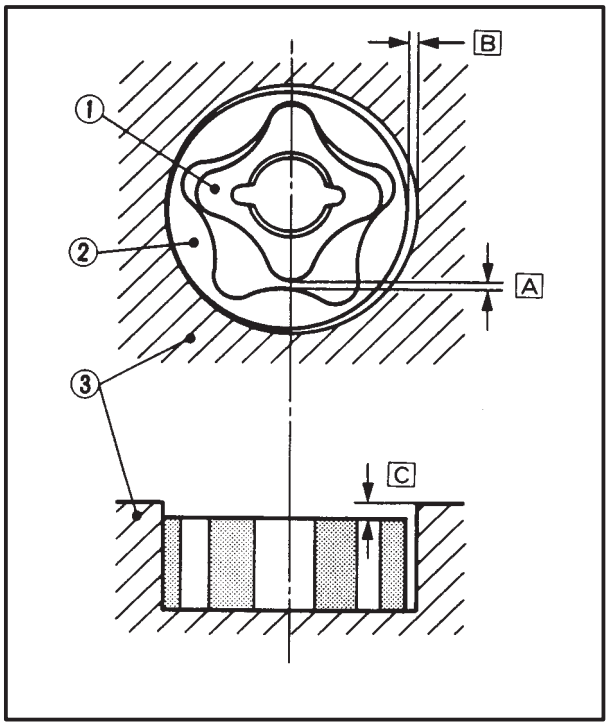
EAS00360



Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Disassemble the parts in the order listed.
1	Oil pump housing	1	
2	Dowel pin	1	
3	Oil pump driven gear	1	
4	Dowel pins	2	Refer to "ASSEMBLING THE OIL PUMP."
5	Inner rotor	1	
6	Outer rotor	1	
7	Housing	1	
			For assembly, reverse the disassembly procedure.







REMOVING THE PRIMARY DRIVE GEAR

1. Straighten the lock washer tab.
2. Remove:
   - nut (primary drive gear) ①
   - lock washer ②
   - primary drive gear ③

NOTE:

Place a folded aluminium plate or copper washer ⓐ between the teeth of the balancer drive gear ④ and balancer driven gear ⑤.

EAS00364

CHECKING THE OIL PUMP

1. Check:
   - primary drive gear ①
   - oil pump driven gear ②
   - oil pump housing ③
   - oil pump housing cover ④

   Cracks/damage/wear → Replace the defective part(-s).
2. Measure:
   - inner-rotor-to-outer-rotor-tip clearance [A]
   - outer-rotor-to-oil-pump-housing clearance [B]
   - oil-pump-housing-to-inner-rotor-and-outer-rotor clearance [C]

   Out of specification → Replace the oil pump.

① Inner rotor
② Outer rotor
③ Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance
0.03 ~ 0.09 mm
<Limit 0.14 mm>
Outer-rotor-to-oil-pump-housing clearance
0.10 ~ 0.15 mm
<Limit 0.35 mm>
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance
0.03 ~ 0.09 mm
<Limit 0.14 mm>

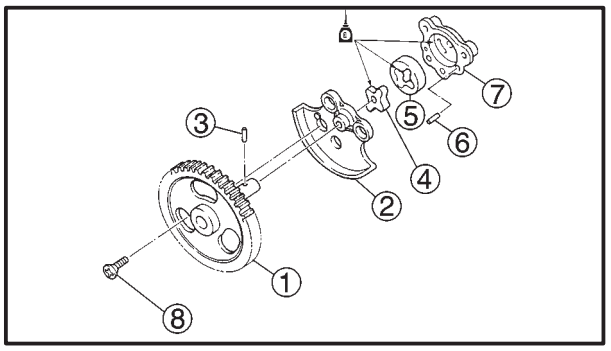
3. Check:
   - oil pump operation

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

EAS411701
ASSEMBLING THE OIL PUMP

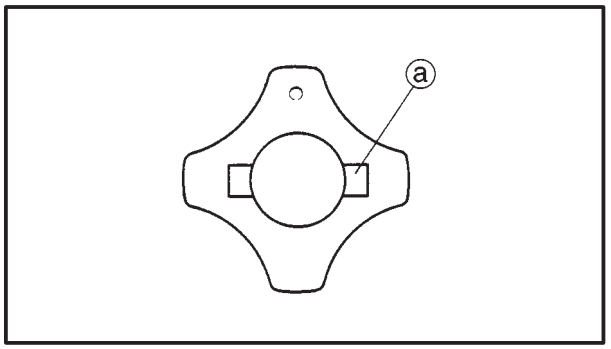
1. Lubricate:
   - inner rotor
   - outer rotor
   - oil pump shaft
     (with the recommended lubricant)

Recommended lubricant
Engine oil



2. Install:
   - oil pump shaft ①
     (to the oil pump cover ②)
   - pin ③
   - inner rotor ④
   - outer rotor ⑤
   - pin ⑥
   - oil pump housing ⑦
   - screw ⑧

7 Nm (0.7 m•kg)



NOTE:

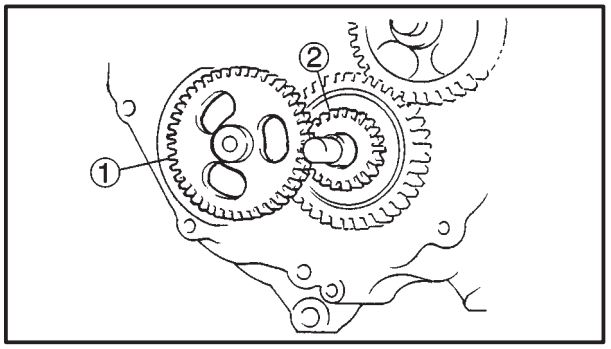
When installing the inner rotor, align the pin ③ in the oil pump shaft with the groove ⓐ on the inner rotor ④.

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

EAS00376
INSTALLING THE OIL PUMP

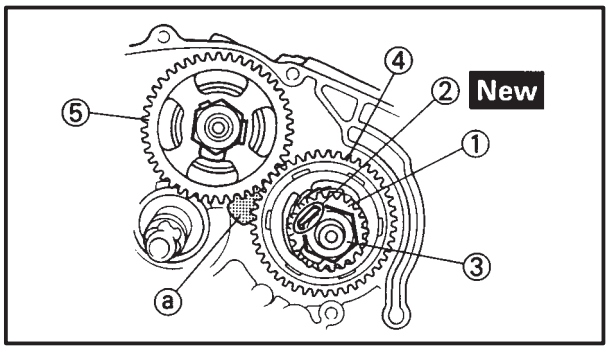
1. Install:
   - oil pump ①
   - oil pump drive gear ②

7 Nm (0.7 m•kg)



CAUTION:

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



EAS00302

INSTALLING THE PRIMARY DRIVE GEAR

1. Install:
   - primary drive gear ①
   - lock washer ② New
   - primary drive gear nut ③

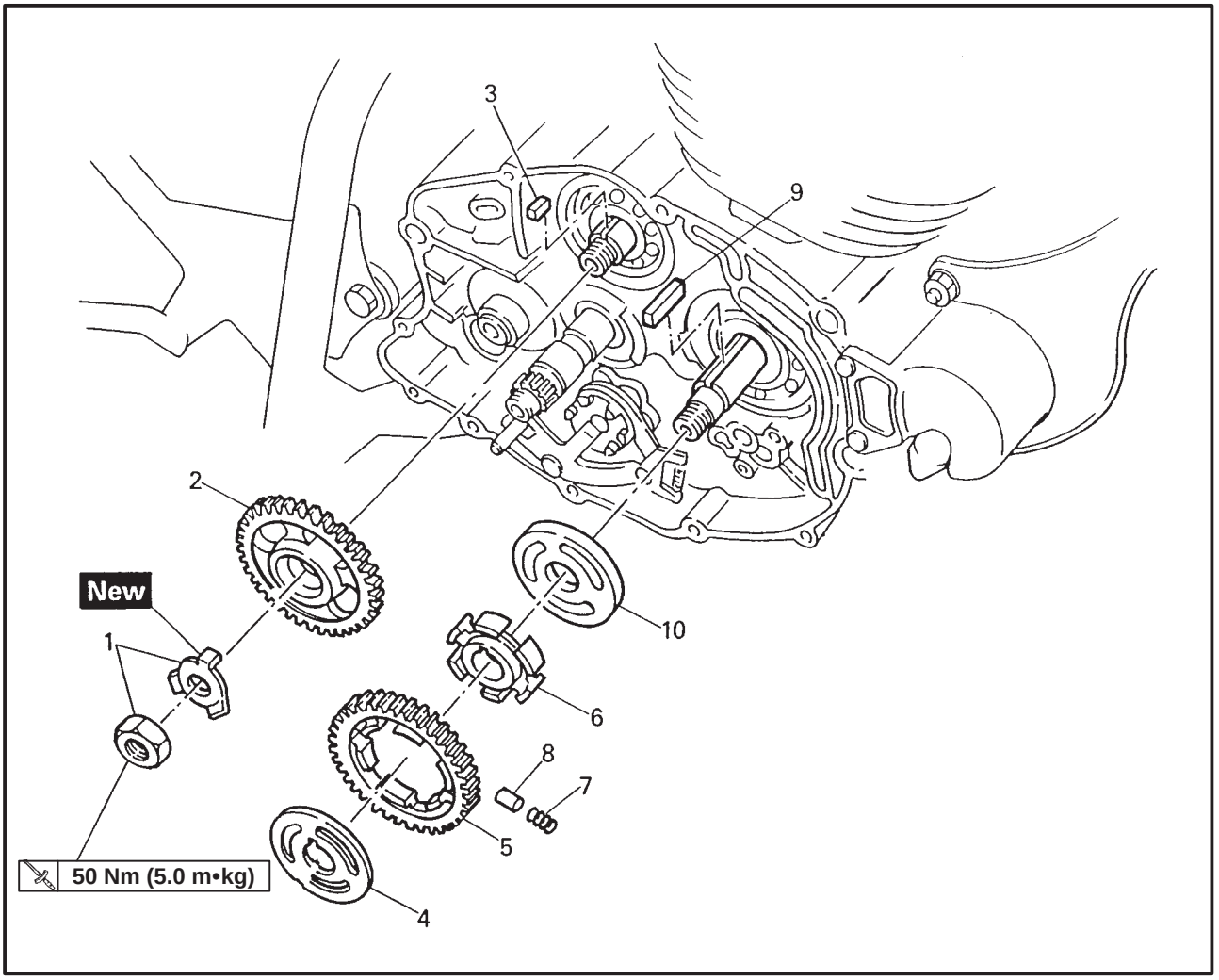
50 Nm (5.0 m•kg)

NOTE:

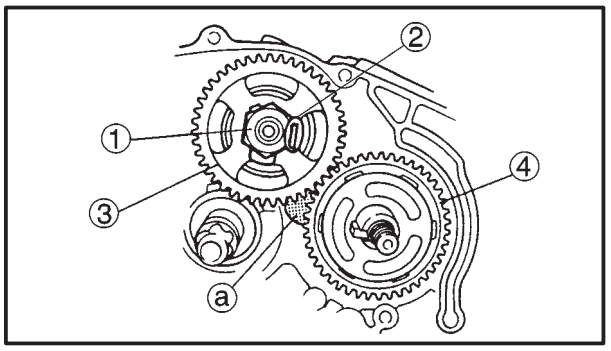
- Place a folded aluminum plate ⓐ or copper washer between the teeth of the balancer drive gear ④ and the balancer driven gear ⑤ in order to lock them.
- Do not damage the balancer drive and balancer driven gear's teeth.

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

BALANCER GEAR



Order	Job/Part	Q'ty	Remarks
	Removing the balancer gear		Remove the parts in the order listed.
	Clutch		Refer to "CLUTCH".
	Primary drive gear		Refer to "OIL PUMP".
1	Nut/Lock washer	1/1	Refer to "REMOVING/INSTALLING THE BALANCER DRIVEN GEAR".
2	Balancer driven gear	1	
3	Woodruff key	1	
4	Claw washer	1	
5	Balancer drive gear	1	Refer to "ASSEMBLING THE BALANCER DRIVE GEAR ASSEMBLY".
6	Buffer boss	1	
7	Compression spring	6	
8	Dowel pins	3	
9	Woodruff key	1	
10	Plate washer	1	
			For installation, reverse the removal procedure.



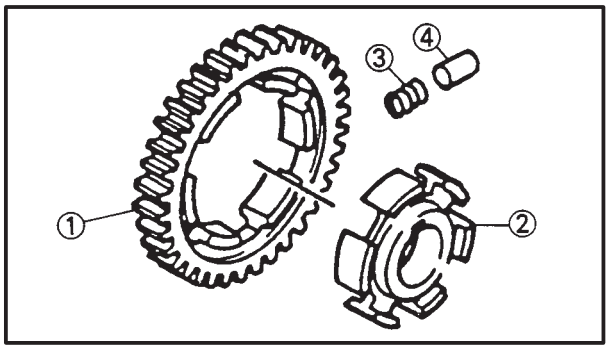
SR******

REMOVING THE BALANCER DRIVEN GEAR

1. Straighten the lock washer tab.
2. Remove:
   - nut (balancer driven gear) ①
   - lock washer ②
   - balancer driven gear ③

NOTE:

Place a folded aluminium plate or copper washer ⓐ between the teeth of the balancer drive gear ④ and balancer driven gear ③.

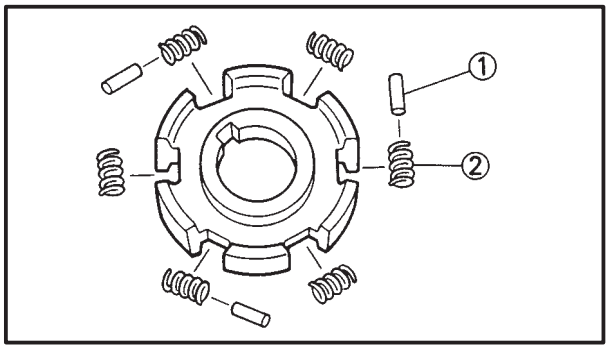


SR******

CHECKING THE BALANCER DRIVE GEAR

1. Inspect:
   - balancer drive gear ①
   - buffer boss ②
   - compression spring ③
   - dowel pins ④

   Wear / Pitting / Scratches → Replace.



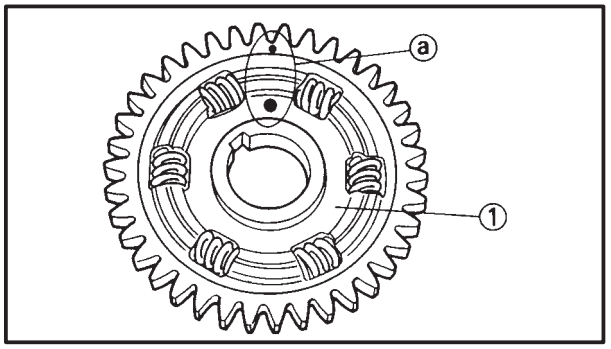
SR******

ASSEMBLING THE BALANCER DRIVE GEAR

1. Assembly:
   - dowel pins ①
   - compression springs ②

NOTE:

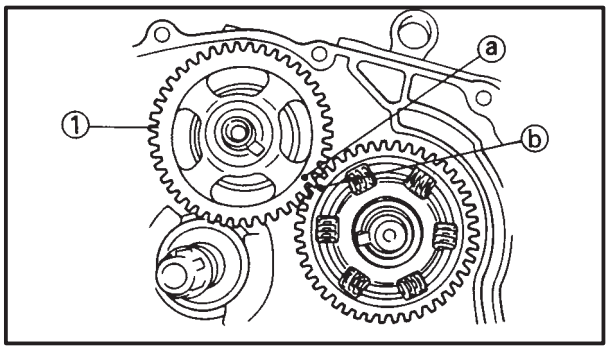
Install the dowel pins and compression springs alternately as shown as.

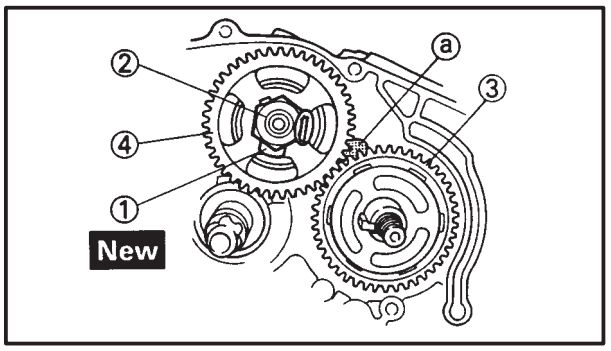


2. Install:
   - buffer boss ①

NOTE:

Align the punched mark ⓐ on the buffer boss with the one on the balancer drive gear.





SR******

INSTALLING THE BALANCER DRIVEN GEAR

1. Install:
   - balancer driven gear ①

NOTE:

Install the balancer driven gear, then mesh the balancer driven gear match mark ⓐ and balancer drive gear assembly match mark ⓑ.

2. Install:
   - lock washer ① New
   - nut (balancer drive gear) ②

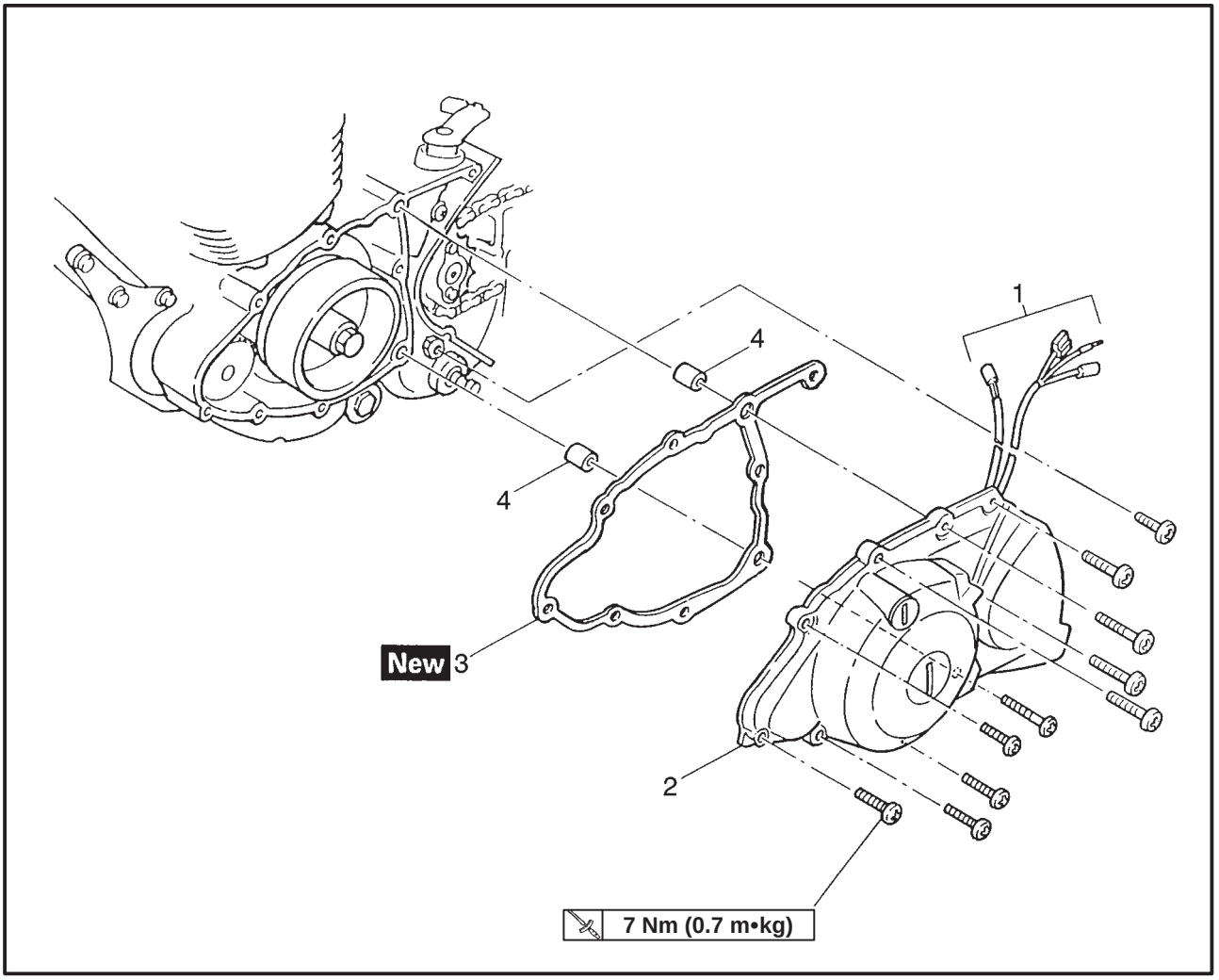
50 Nm (5.0 m•kg)

NOTE:

- Place a folded aluminium plate or copper washer ⓐ between the teeth of the balancer drive gear ③ and balancer driven gear ④.

3. Bend the lock washer tab, after tighten the nut flats.

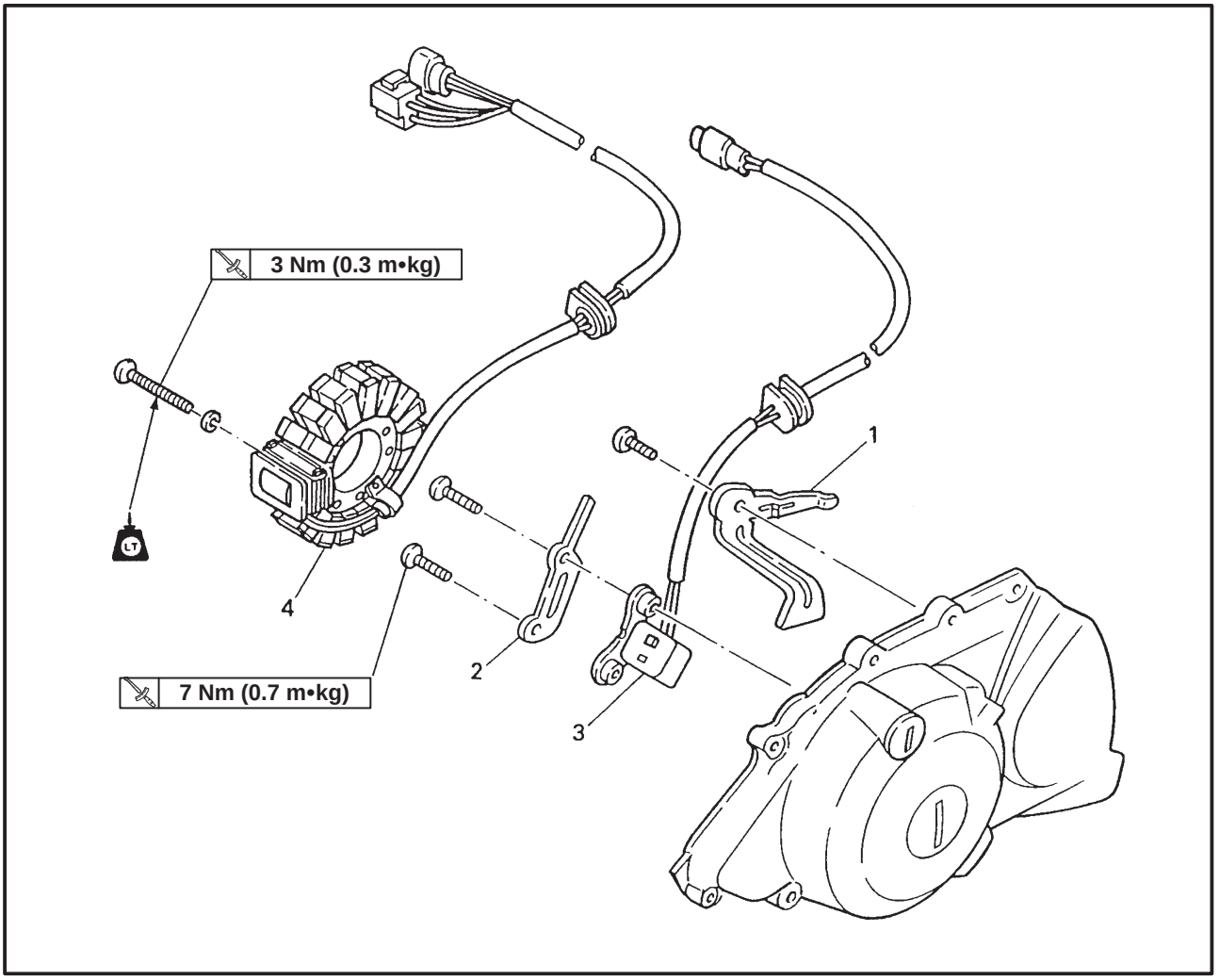
STARTER CLUTCH AND GENERATOR
GENERATOR COVER



Order	Job/Part	Q'ty	Remarks
	Removing the generator cover		Remove the parts in the orser listed.
	Drain the engine oil		Refer to "CHANGING THE ENGINE OIL" in CHAPTER 3.
	Side cover		Refer to "SEAT FUEL TANK AND SIDE COVER" in CHAPTER 3.
1	Generator lead couplers	1	
2	Generator cover	1	
3	Gasket	1	
4	Dowel pins	2	
			For installation, reverse the removal procedure.

EAS00341

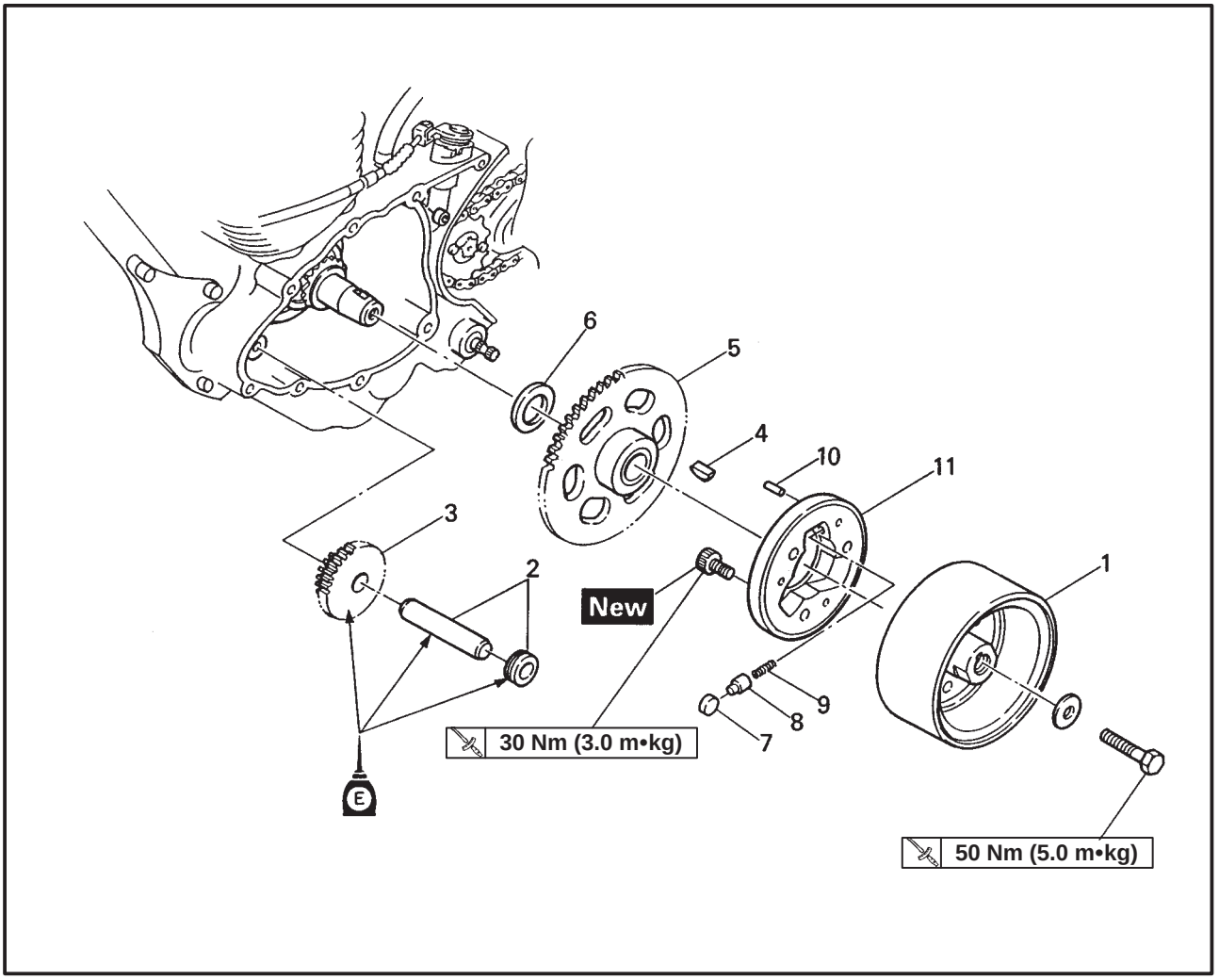
STATOR COIL



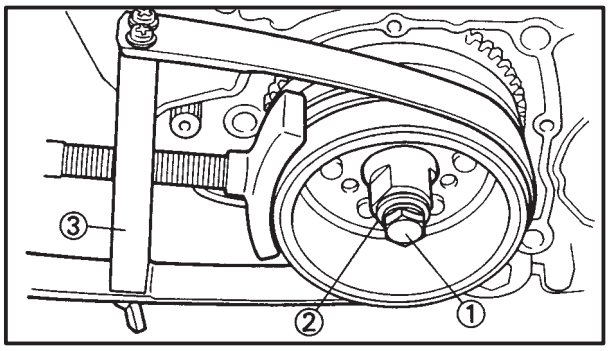
Order	Job/Part	Q'ty	Remarks
	Removing the stator coil		Remove the parts in the order listed.
1	Clamp (stator coil)	1	
2	Clamp (pickup coil)	1	
3	Pickup coil	1	
4	Stator coil	1	
			For installation, reverse the removal procedure.

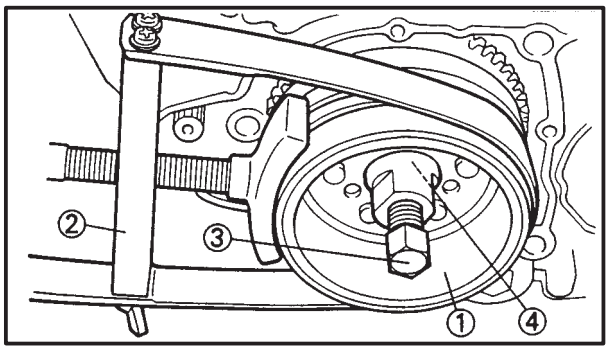
EAS00343

STARTER CLUTCH AND GENERATOR ROTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter clutch and generator rotor		Remove the parts in the order listed.
1	Generator rotor	1	Refer to "REMOVING/INSTALLING THE GENERATOR ROTOR".
2	Idle shaft/collar	1	
3	Starter idle gear	1	
4	Woodruff key	1	
5	Starter wheel gear	1	
6	Shim	1	
7	Dowel pins (Inner)	3	Refer to "INSTALLING THE STARTER CLUTCH".
8	Spring caps	3	
9	Compression springs	3	
10	Dowel pins (outer)	3	
11	Starter clutch	1	
			For installation, reverse the removal procedure.





REMOVING THE GENERATOR ROTOR

1. Remove:
   - bolt ① (magneto)
   - plain washer ②

NOTE:

- Loosen the bolt (generator rotor) ① while holding the rotor with a sheave holder ③.
- Do not allow the sheave holder to touch the projection on the rotor.

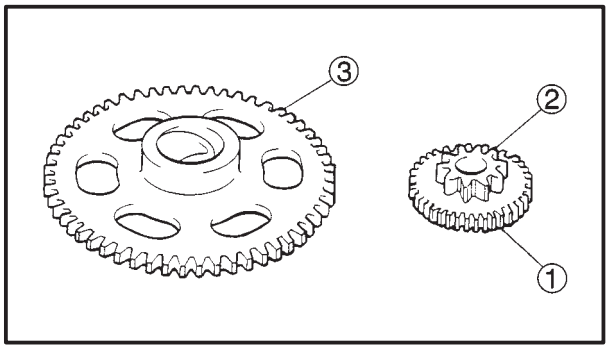
Sheave holder:
90890-01701

2. Remove:
   - generator rotor ①
   - woodruff key

NOTE:

Remove the rotor using sheave holder ②, rotor puller ③ and rotor puller attachment ④.

Rotor puller:
90890-01080
Rotor puller attachment:
90890-04052



EAS00348

CHECKING THE STARTER CLUTCH

1. Check:
   - starter clutch idle gear ①
   - starter clutch drive gear ②
   - starter clutch gear ③

   Burrs/chips/roughness/wear → Replace the defective part(-s).

2. Check:
   - starter clutch operation

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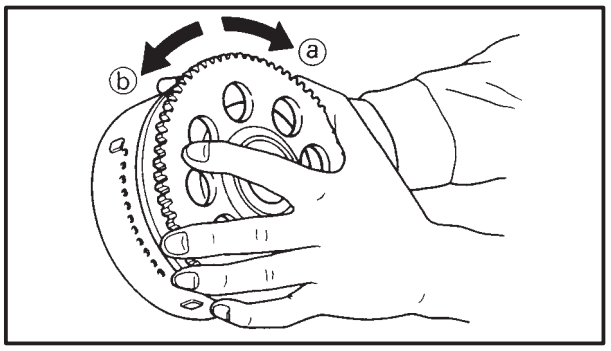
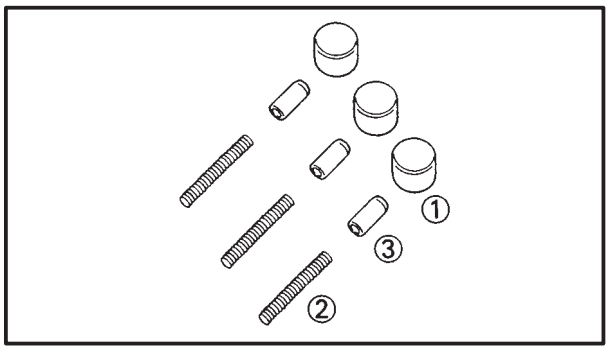
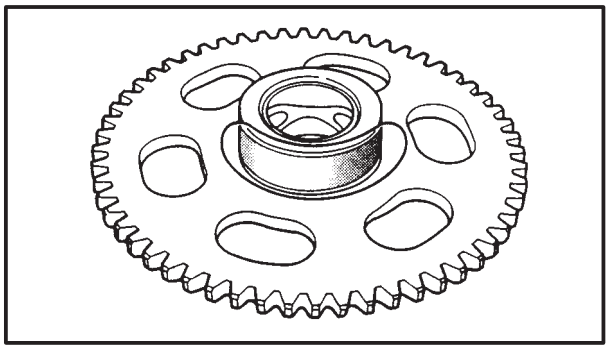
a. Hold the starter clutch.



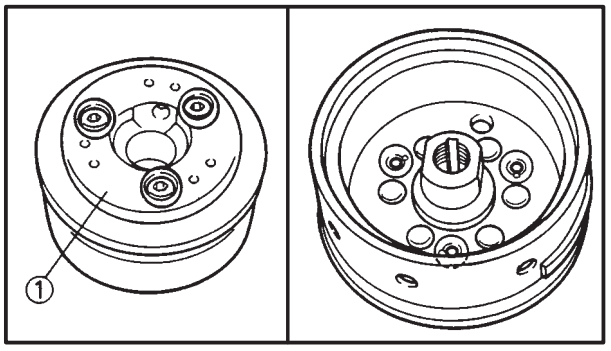
b. When turning the starter clutch gear clockwise ⓐ, the starter clutch and the starter clutch gear should engage.
If the starter clutch gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.
c. When turning the starter clutch gear counterclockwise ⓑ, it should turn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



3. Inspect:
• dowel pins ①
• compression springs ②
• spring caps ③
Wear/Damage → Replace.



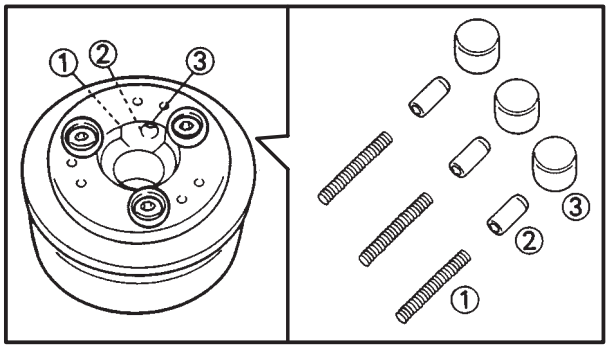
4. Inspect:
• starter wheel gear
(contacting surface)
Pitting/Wear/Damage → Replace.



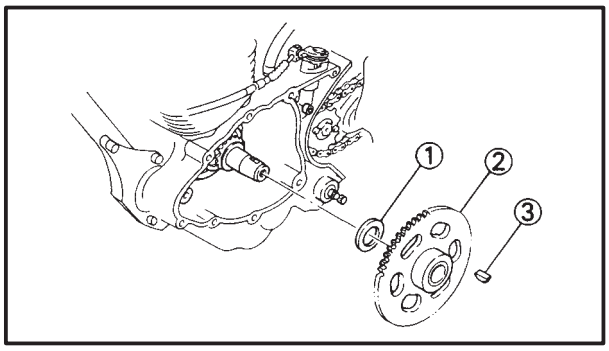
INSTALLING THE STARTER CLUTCH
1. Install:
• starter clutch assembly ①

	30 Nm (3.0 m•kg)

2. Unloosen the starter clutch assembly by using the center punch.

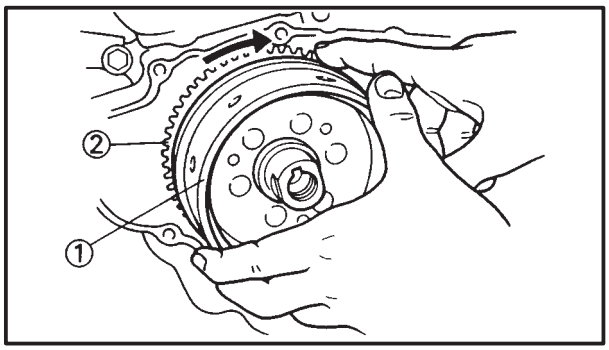


3. Install:
• compression springs ①
• spring caps ②
• dowel pins ③



INSTALLING THE GENERATOR ROTOR

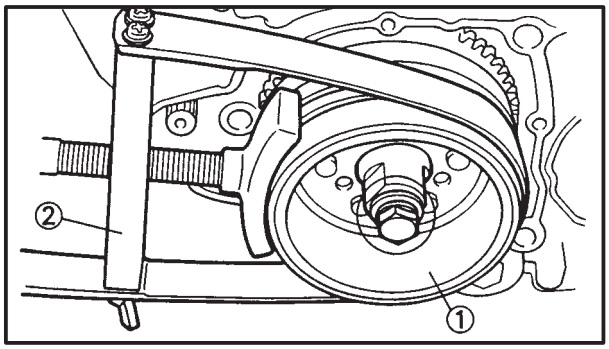
1. Install:
   - shim ①
   - starter wheel gear ②
   - woodruff key ③



2. Install:
   - generator rotor ①

NOTE:

- Clean the tapered portion of the crankshaft and the rotor hub.
- When installing the rotor, make sure the woodruff key is properly seated in the key way of the crankshaft and turning the starter wheel gear ② clockwise.



3. Tighten:
   - generator rotor ①

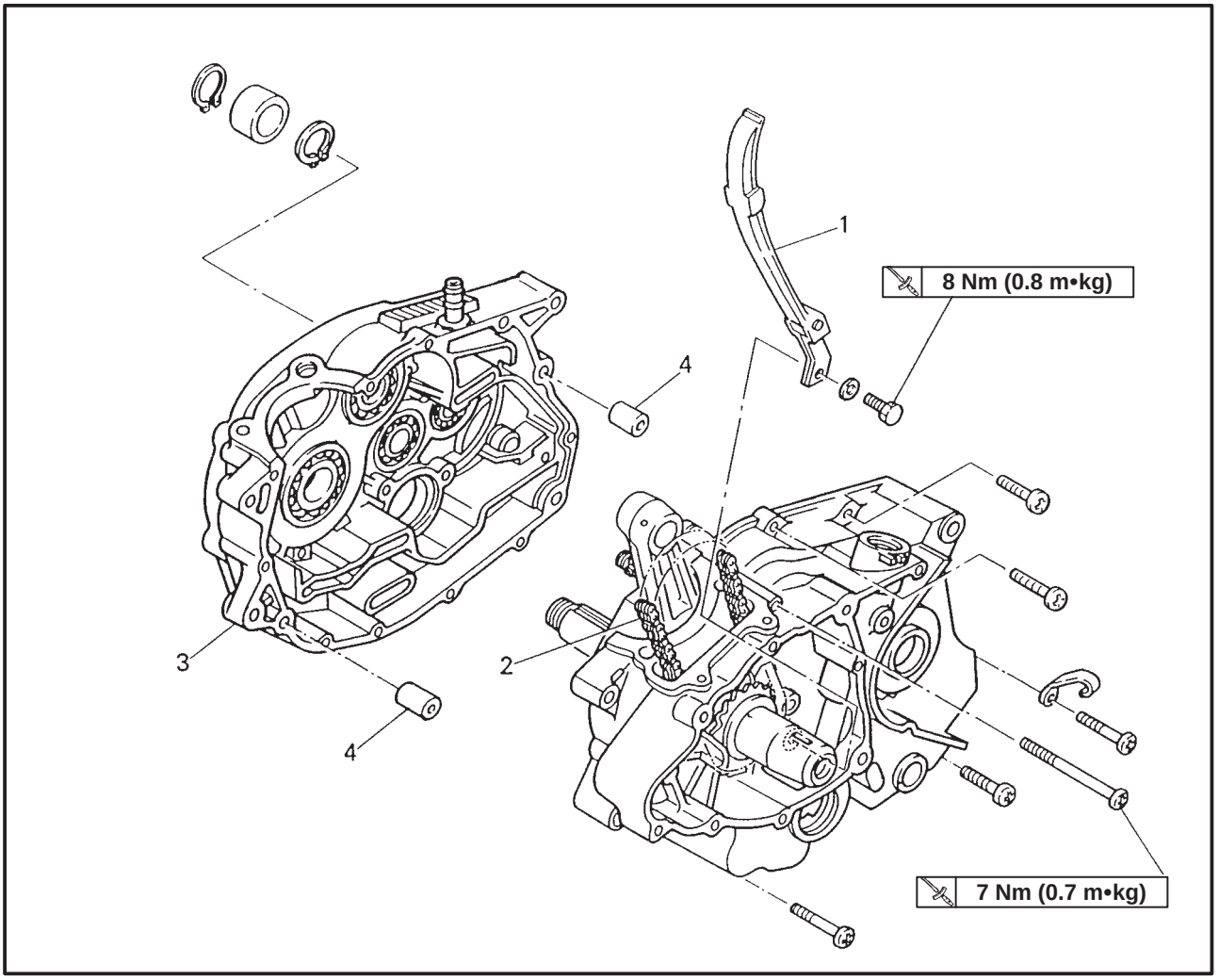
50 Nm (5.0 m•kg)

NOTE:

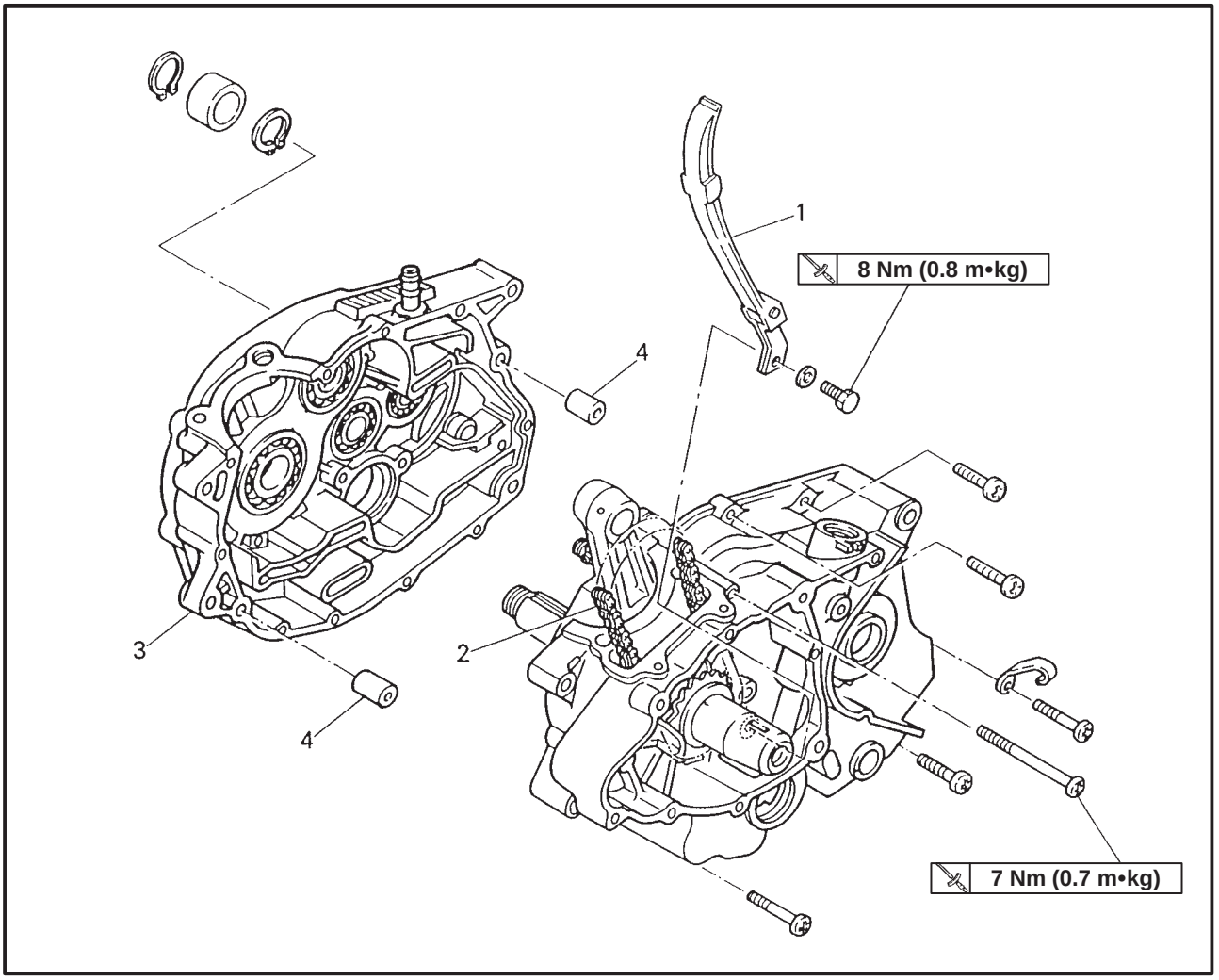
Tighten the bolt while holding the generator rotor with the sheave holder ②.

Sheave holder:
90890-01701

CRANKSHAFT
CRANKCASE

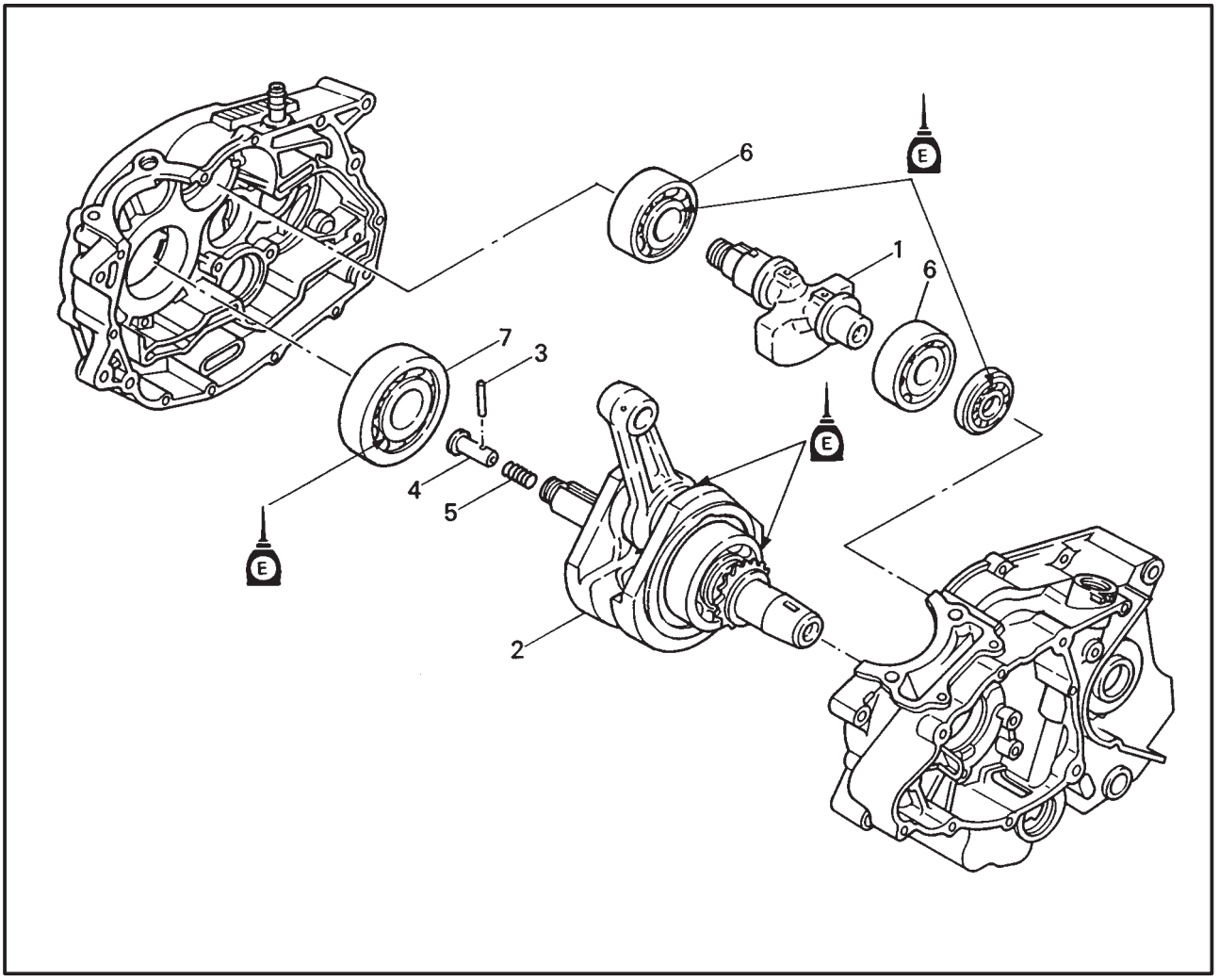


Order	Job/Part	Q'ty	Remarks
	Separation the crankcase Engine Cylinder head Cylinder and piston Clutch Primary drive gear/oil pump Balancer weight drive gear Shift shaft and segment Generator/starter clutch		Remove the parts in the order listed. Refer to "ENGINE". Refer to "CYLINDER HEAD". Refer to "CYLINDER AND PISTON". Refer to "CLUTCH". Refer to "OIL PUMP". Refer to "BALANCER DRIVE GEAR". Refer to "SHIFT SHAFT". Refer to "STARTER CLUTCH AND GENERATOR".
1	Timing chain guide (intake)	1	

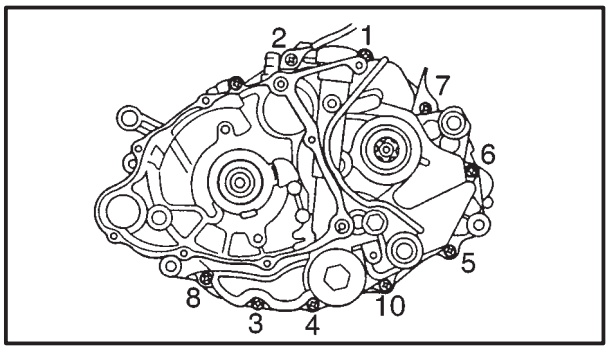


Order	Job/Part	Q'ty	Remarks
2	Timing chain	1	
3	Crankcase	1	Refer to "DISASSEMBLING/ASSEMBLING THE CRANKCASE".
4	Dowel pins	2	
			For installation, reverse the removal procedure.

CRANKSHAFT AND BALANCER WEIGHT

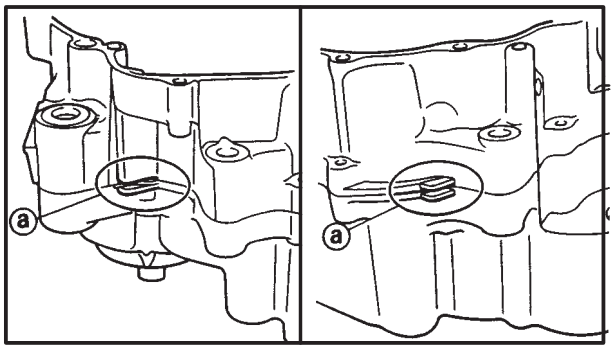


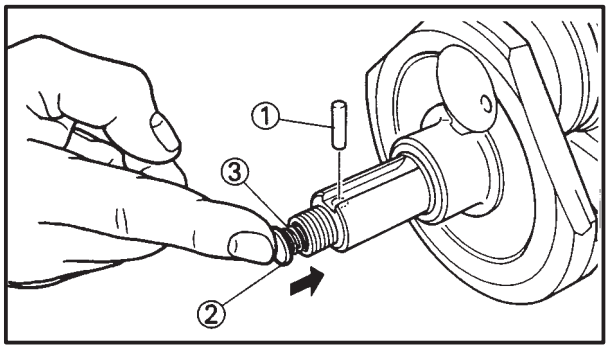
Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft and balancer weight		Remove the parts in the order listed.
1	Balancer weight	1	Refer to "INSTALLING THE CRANKSHAFT".
2	Crankshaft assembly	1	
3	Dowel pin	1	Refer to "REMOVING/INSTALLING THE PLUNGER SEAL".
4	Plunger seal	1	
5	Compression spring	1	
6	Bearings (balancer weight)	2	
7	Bearing (crankshaft right)	1	For installation, reverse the removal procedure.



EAS00386
DISASSEMBLING THE CRANKCASE
1. 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.





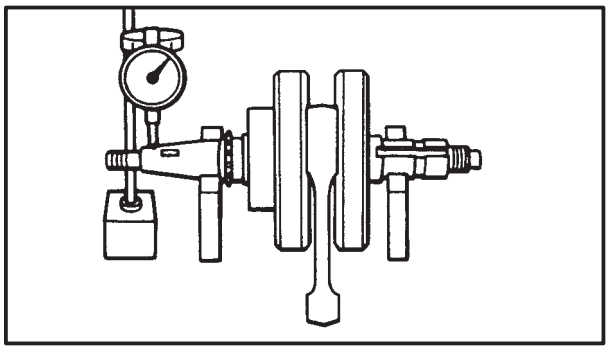
2. Remove:
   • right crankcase

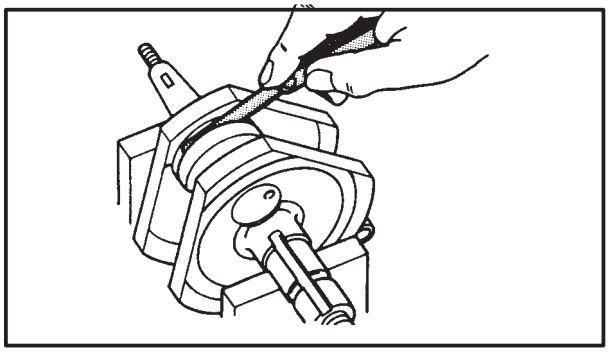
NOTE:
Set the left crankcase half under then put in the flat head screw driver to the separating slit ⓐ.

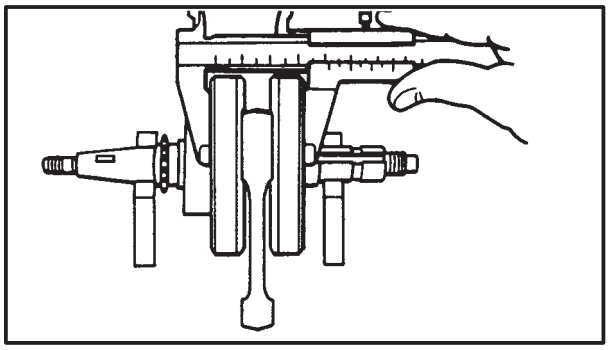
CAUTION:
- **First check that the shift drum segment's teeth and the drive axle circlip are properly positioned, then remove the right crankcase.**
- **Do not damage the crankcase mating surfaces.**

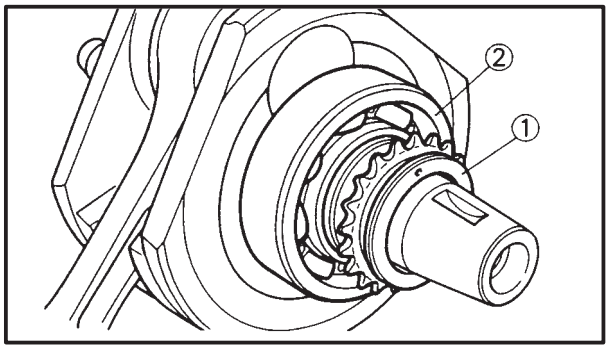
REMOVING THE PLUNGER SEAL
1. Remove:
   • Dowel pin ①
   • Plunger seal ②
   • Compression spring ③

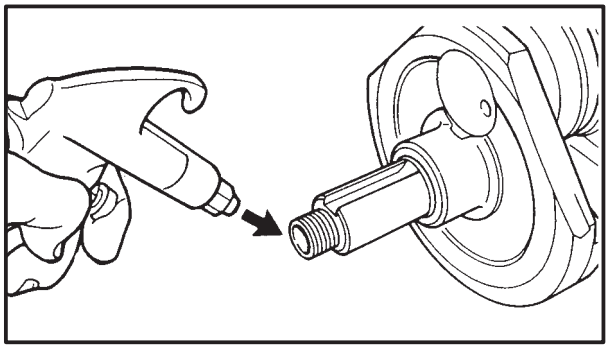
NOTE:
Remove the plunger seal and compression spring, push the plunger seal lightly and remove the dowel pin.











EAS00394

CHECKING THE CRANKSHAFT AND CONNECTING ROD

1. Measure:
   • crankshaft runout
   Out of specification → Replace the crankshaft, bearing or both.

NOTE:

Turn the crankshaft slowly.

Crankshaft runout
Less than 0.03 mm

2. Measure:
   • big end axial clearance
   Out of specification → Replace the big end bearing, crankshaft pin, or connecting rod.

Big end axial clearance
0.35 ~ 0.65 mm
Limit 1.0 mm

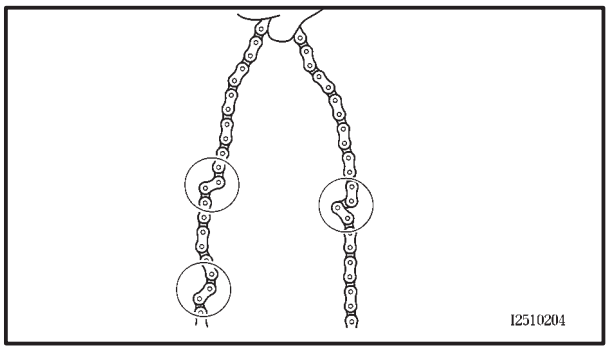
3. Measure:
   • crankshaft width
   Out of specification → Replace the crankshaft.

Crankshaft width
55.95 ~ 56.00 mm

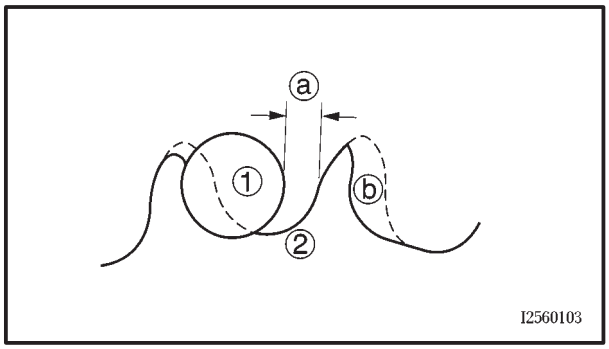
4. Check:
   • crankshaft sprocket ①
   Damage/wear → Replace the crankshaft.
   • bearing ②
   Cracks/damage/wear → Replace the crankshaft.

5. Check:
   • crankshaft journal
   Scratches/wear → Replace the crankshaft.
   • crankshaft journal oil passage
   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.

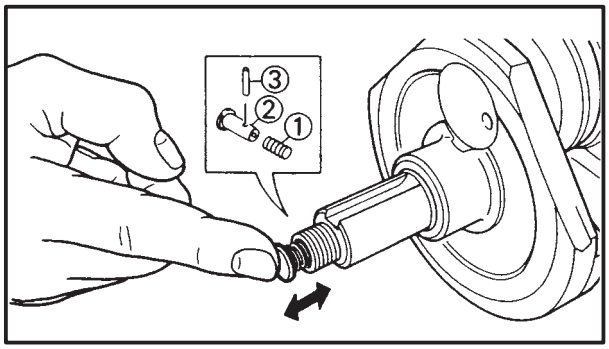


EAS00207
CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKET, AND TIMING CHAIN GUIDES
1. Check:
   • timing chain
   Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.



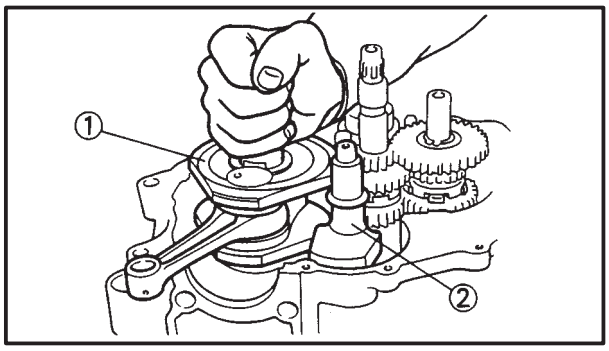
2. Check:
   • camshaft sprocket
   More than 1/4 tooth ⓐ wear → Replace the camshaft sprocket and the timing chain as a set.

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



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

SR******
INSTALLING THE PLUNGER SEAL
1. Install:
   • Compression spring ①
   • Plunger seal ②
   • Dowel pin ③
2. Check the plunger seal smooth operation pushing the plunger seal by your finger.



EAS00408

INSTALLING THE CRANKSHAFT

1. Install:
   - crankshaft assembly ①
   - balancer weight assembly ②

CAUTION:

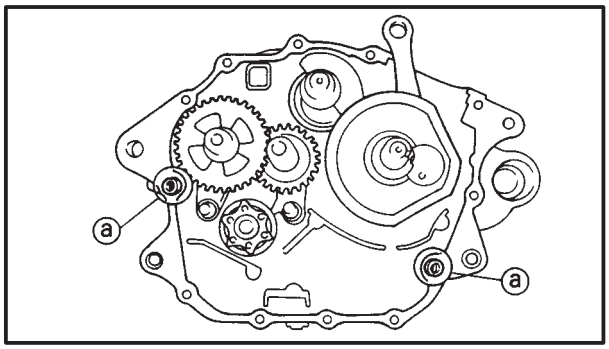
To avoid scratching the crankshaft and to ease the installation procedure, apply grease onto the oil seal lips and apply engine oil onto each bearing.

EAS00418

ASSEMBLING THE CRANKCASE

1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
   - sealant
     (onto the crankcase mating surfaces)

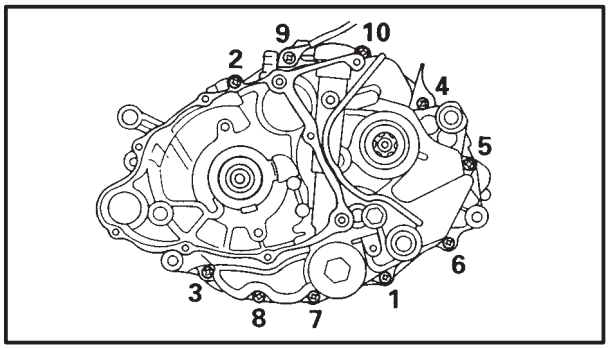
	Yamaha bond No. 1215 **90890-85505**



NOTE:

Do not allow any sealant to come into contact with the oil gallery ⓐ.

3. Install:
   - dowel pins
   - right crankcase



4. Tighten:
   - crankcase right half

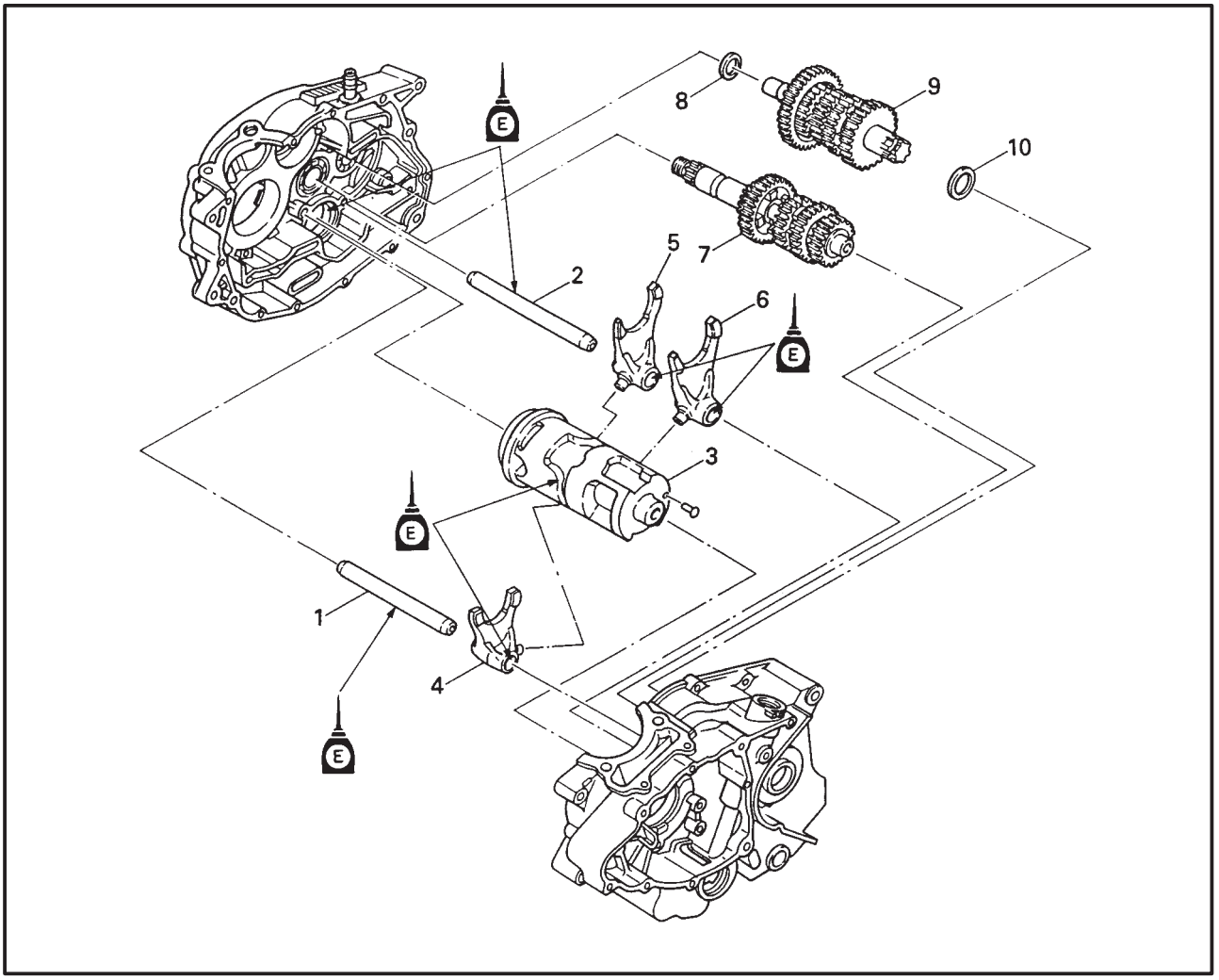
	7 Nm (0.7 m•kg)

NOTE:

Tighten the screws in decreasing numerical order (see numbers on the illustration).

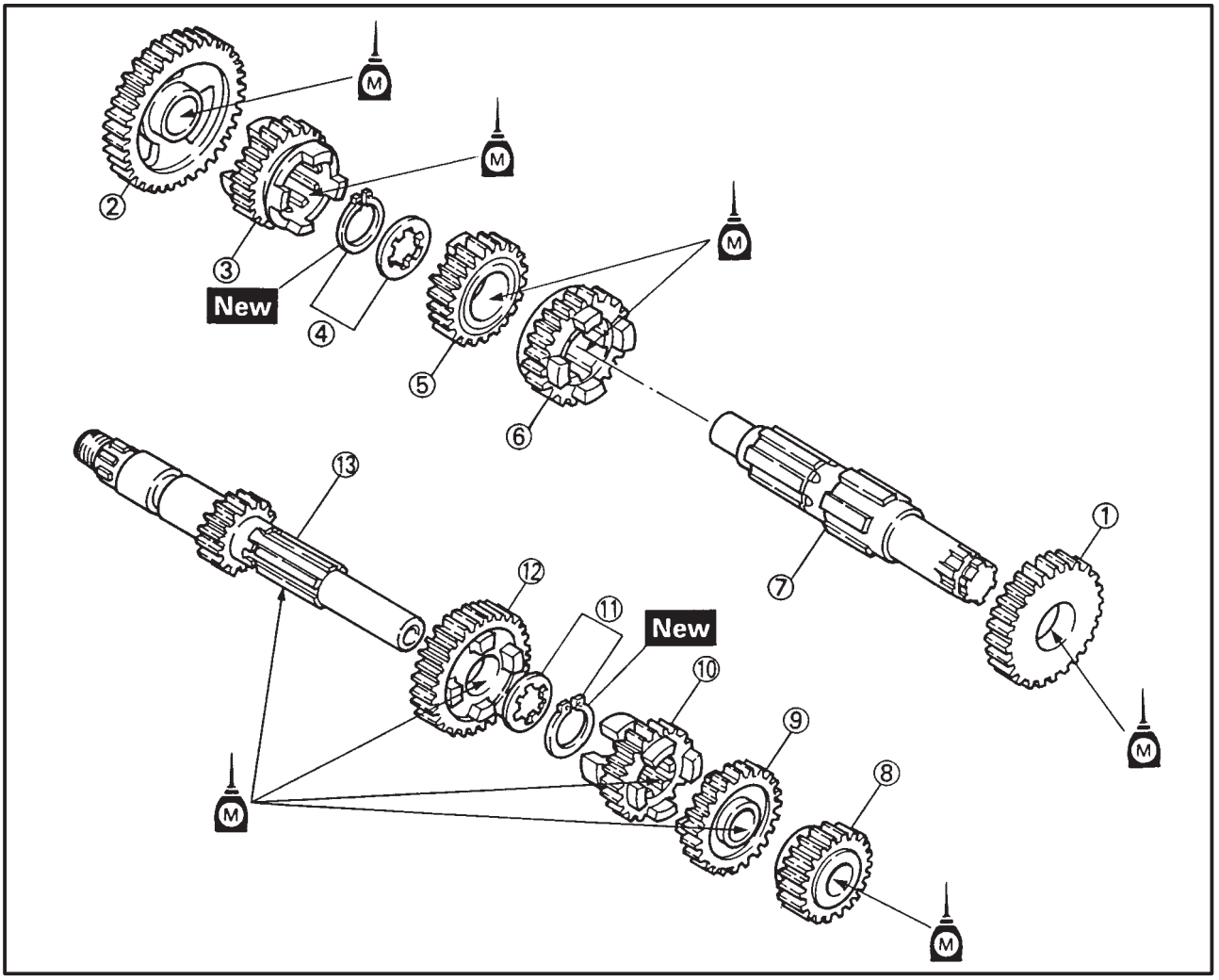
TRANSMISSION

TRANSMISSION, SHIFT DRUM ASSEMBLY AND SHIFT FORKS

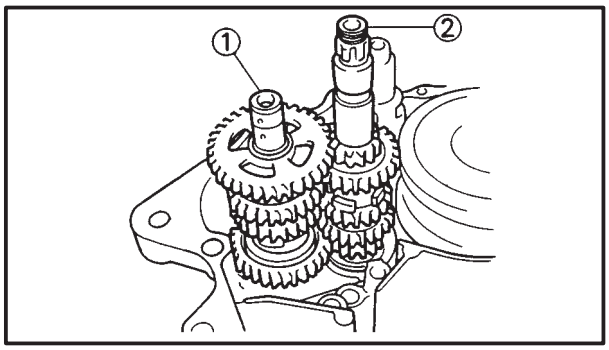


Order	Job/Part	Q'ty	Remarks
	Removing the transmission, shift drum assembly and shift forks		Remove the parts in the order listed.
	Crankcase separating		Refer to "CRANKCASE AND CRANKSHAFT".
1	Shift fork guide bar 2 (short length)	1	Refer to "INSTALLING THE TRANSMISSION, SHIFT FORK AND SHIFT DRUM ASSEMBLY".
2	Shift fork guide bar 1 (long length)	1	
3	Shift cam	1	
4	Shift fork 1 "C" (center)	1	
5	Shift fork 2 "R" (right)	1	
6	Shift fork 3 "L" (left)	1	
7	Main axle assembly	1	Refer to "REMOVING THE TRANSMISSION".
8	Plate washer	1	
9	Drive axle assembly	1	
10	Plate washer	1	
			For installation, reverse the removal procedure.

DRIVE AXLE AND MAIN AXLE



Order	Job/Part	Q'ty	Remarks
	Disassembling the drive axle and main axle		Disassemble the parts in the order listed.
①	Second wheel gear	1	
②	First wheel gear	1	
③	Fifth wheel gear	1	
④	Circlip/washer	1/1	
⑤	Third wheel gear	1	
⑥	Forth wheel gear	1	
⑦	Drive axle	1	
⑧	Second pinion gear	1	
⑨	Forth pinion gear	1	
⑩	Third pinion gear	1	
⑪	Circlip/washer	1/1	
⑫	Fifth pinion gear gear	1	
⑬	Main axle	1	
			For assembly, reverse the removal procedure.

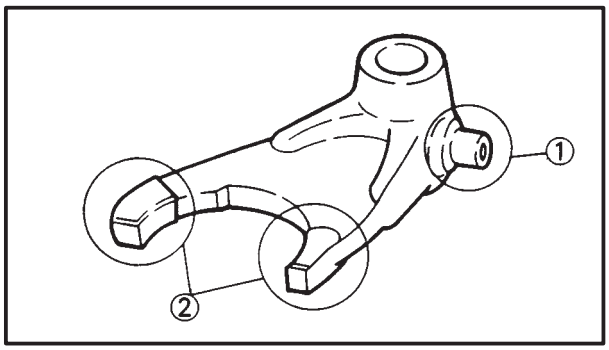


EAS00420

REMOVING THE TRANSMISSION

1. Remove:
   - Drive axle assembly ①
   - Main axle assembly ②

   Remove them at same the time.



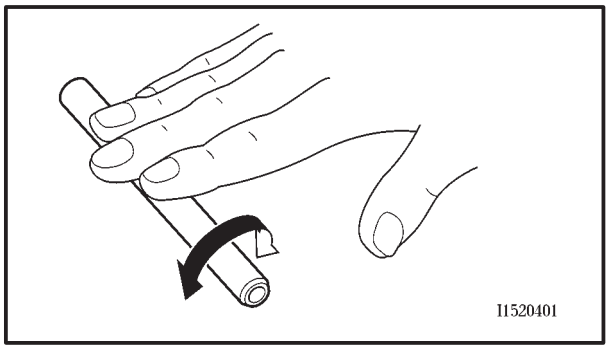
EAS00421

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.

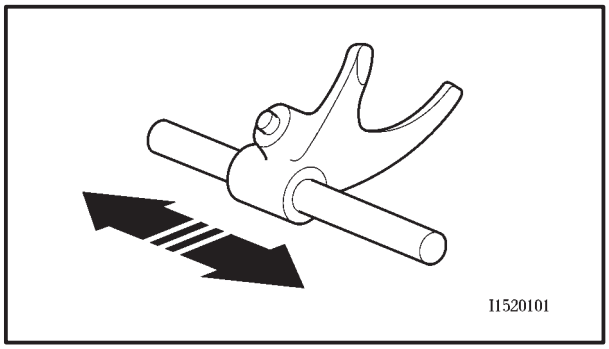


2. Check:
   - shift fork guide bar

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

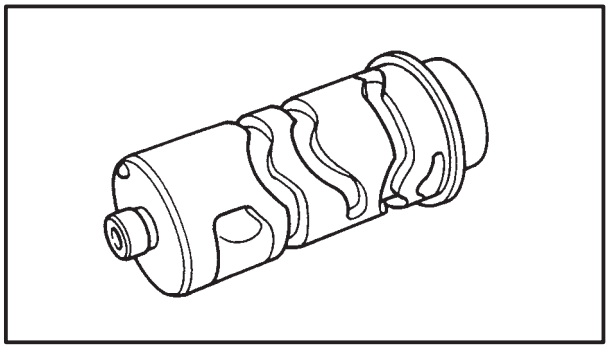
⚠ WARNING

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

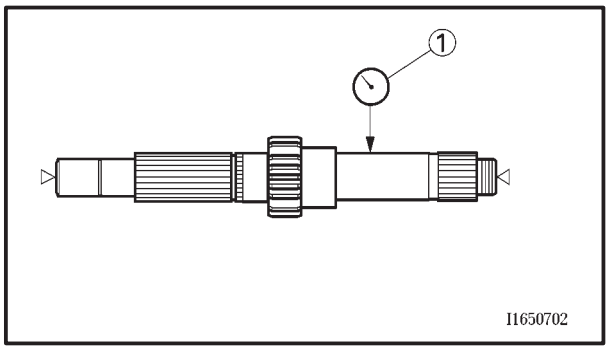
CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
   - shift drum grooves

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

     Damage/wear → Replace.
   - shift drum bearing

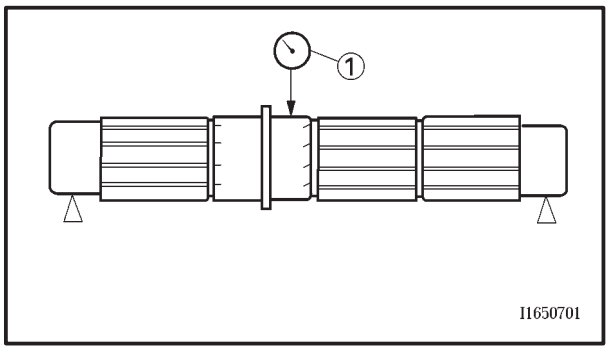
     Damage/pitting → Replace.



EAS00424
CHECKING THE TRANSMISSION

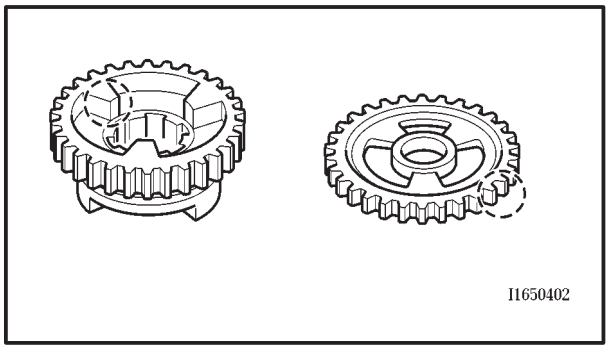
1. Measure:
   • main axle runout
   (with a centering device and dial gauge ①)
   Out of specification → Replace the main axle.

Main axle runout limit
0.08 mm

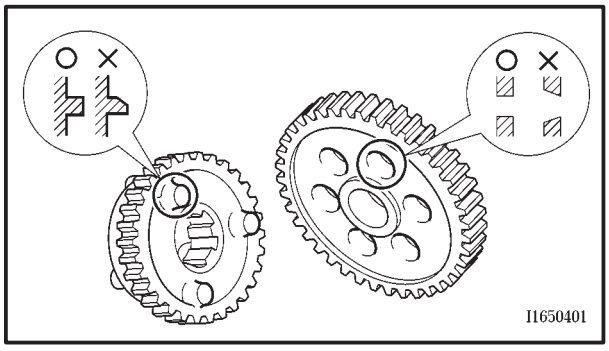


2. Measure:
   • drive axle runout
   (with a centering device and dial gauge ①)
   Out of specification → Replace the drive axle.

Drive axle runout limit
0.08 mm



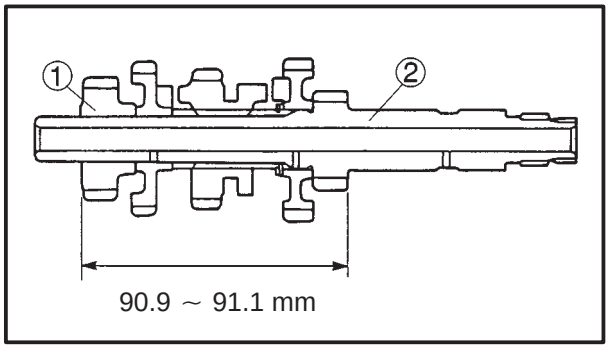
3. Check:
   • transmission gears
   Blue discoloration/pitting/wear → Replace the defective gear(-s).



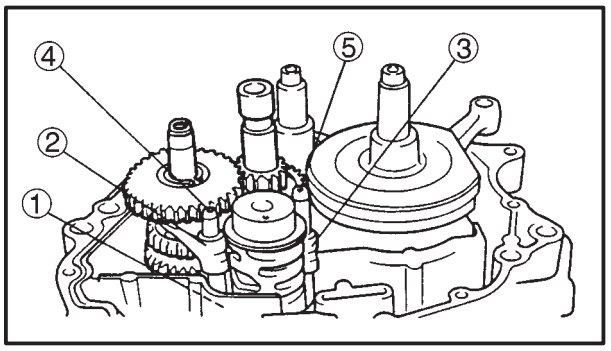
   • transmission gear dogs
   Cracks/damage/rounded edges → Replace the defective gear(-s).
4. Check:
   • transmission gear engagement
   (each pinion gear to its respective wheel gear)
   Incorrect → Reassemble the transmission axle assemblies.

NOTE:

When reassembling the main axle, press the 2nd pinion gear ① onto it ② as shown.



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



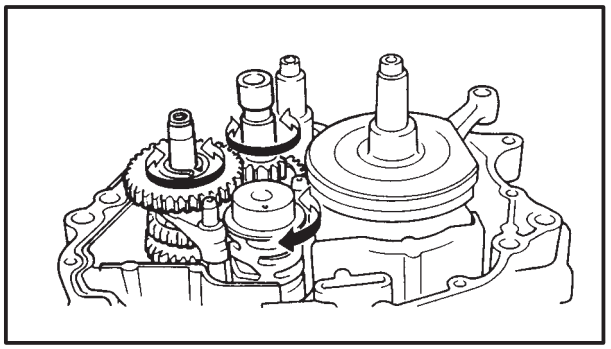
EAS00426

INSTALLING THE TRANSMISSION, SHIFT FORKS AND SHIFT DRUM ASSEMBLY

1. Install:
   - shift fork 3 “L” (left) ①
     (face the “L” side for the clutch side.)
   - shift fork 2 “R” (right) ②
     (face the “R” side for the clutch side.)
   - shift fork 1 “C” (center) ③
     (face the “C” side for the magneto side.)
   - shift fork guide bar 1 ④ (long)
   - shift fork guide bar 2 ⑤ (short)

NOTE:

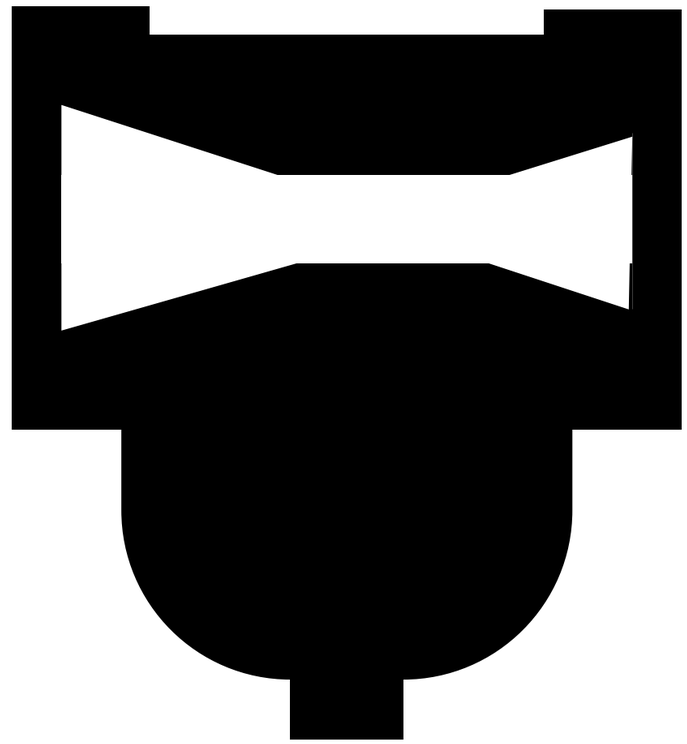
Install the shift forks with the embossed mark to the right and in sequence (R, C, L) beginning from the right.



2. Check:
   - shift cam operation
     Unsmoothy operation → Repair.

NOTE:

Check the transmission and shift forks for smooth operation by turning the shift cam with your hand.

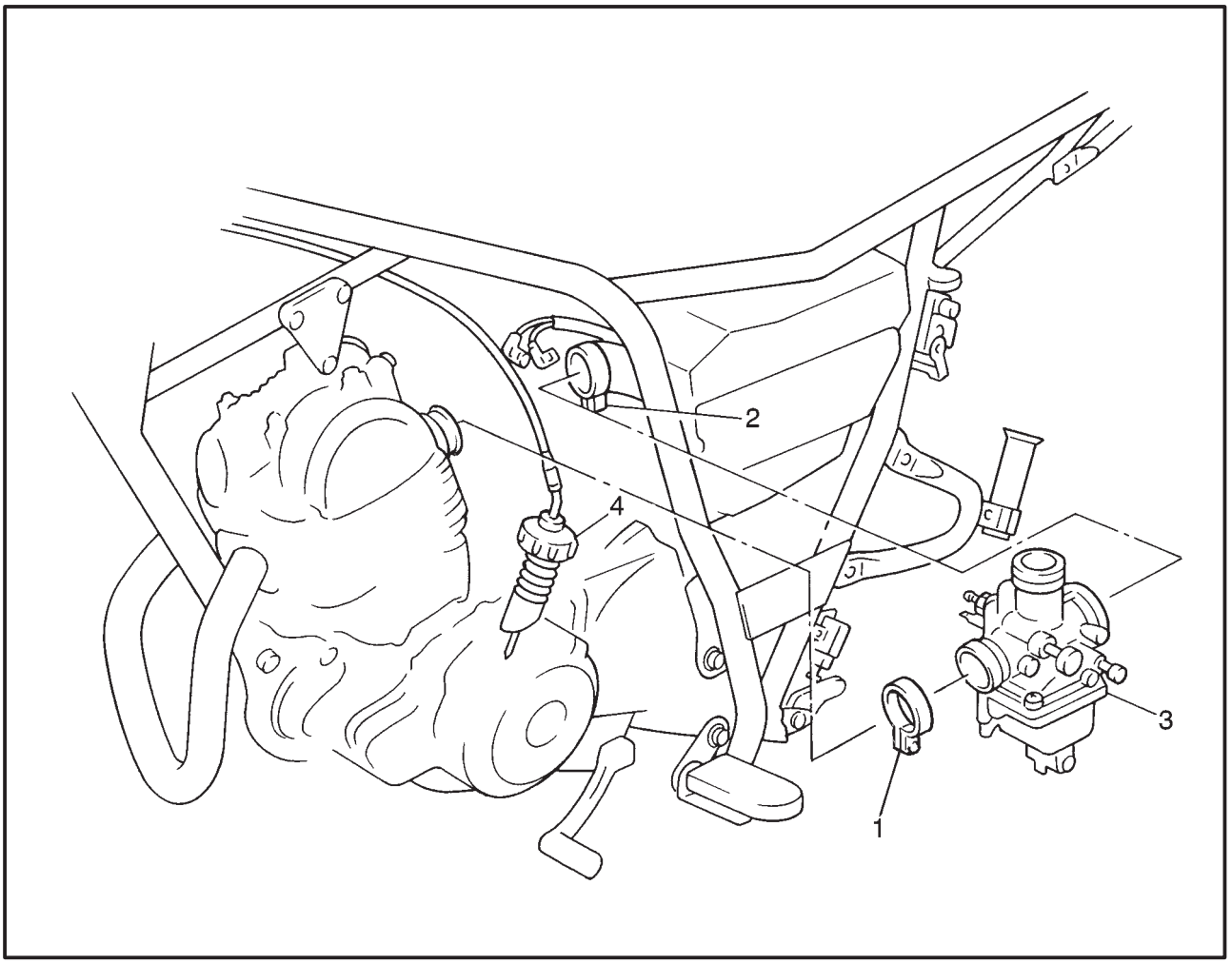


CARB 5

CHAPTER 5.
CARBURETOR

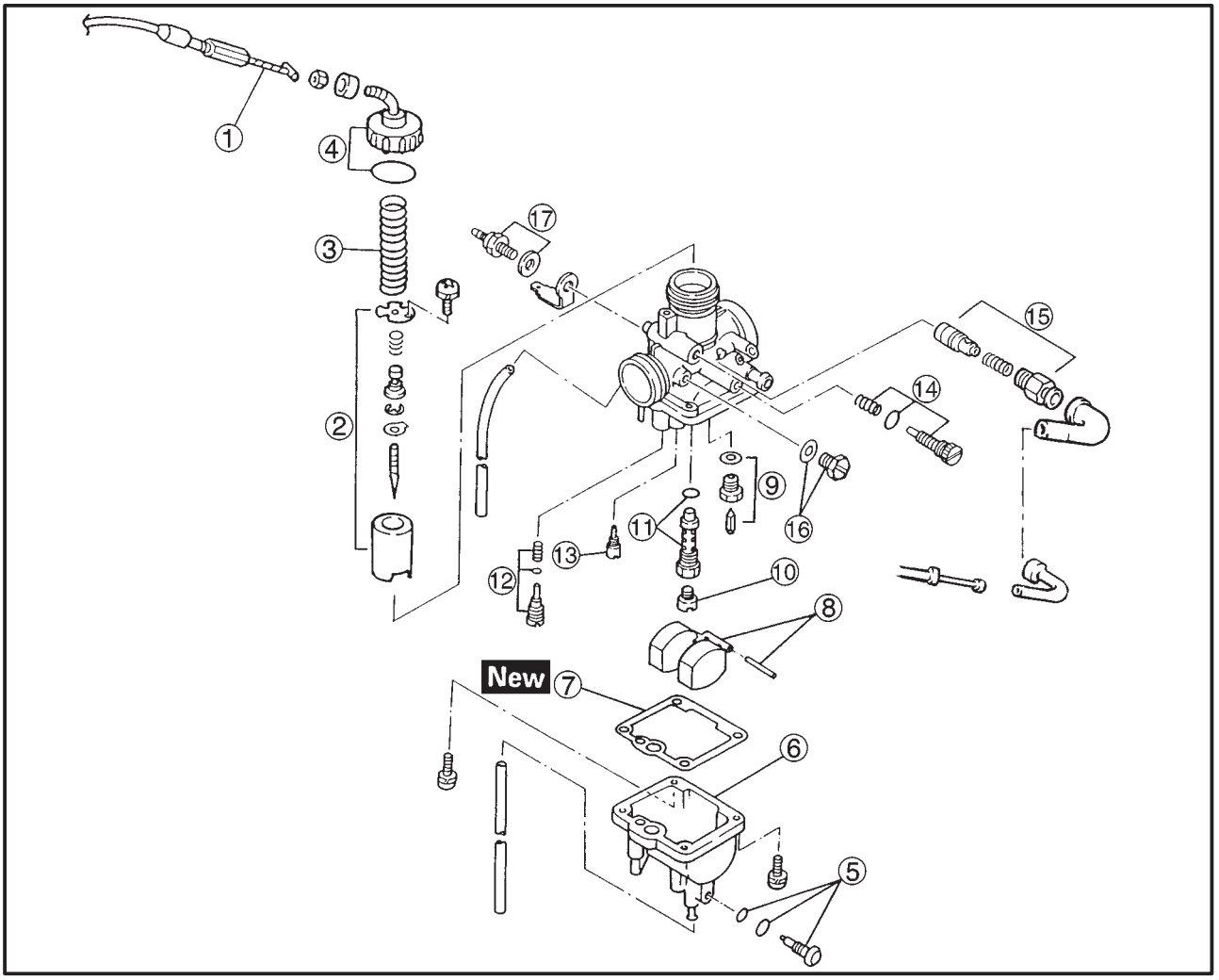
EAS00480

CARBURETOR
CARBURETOR

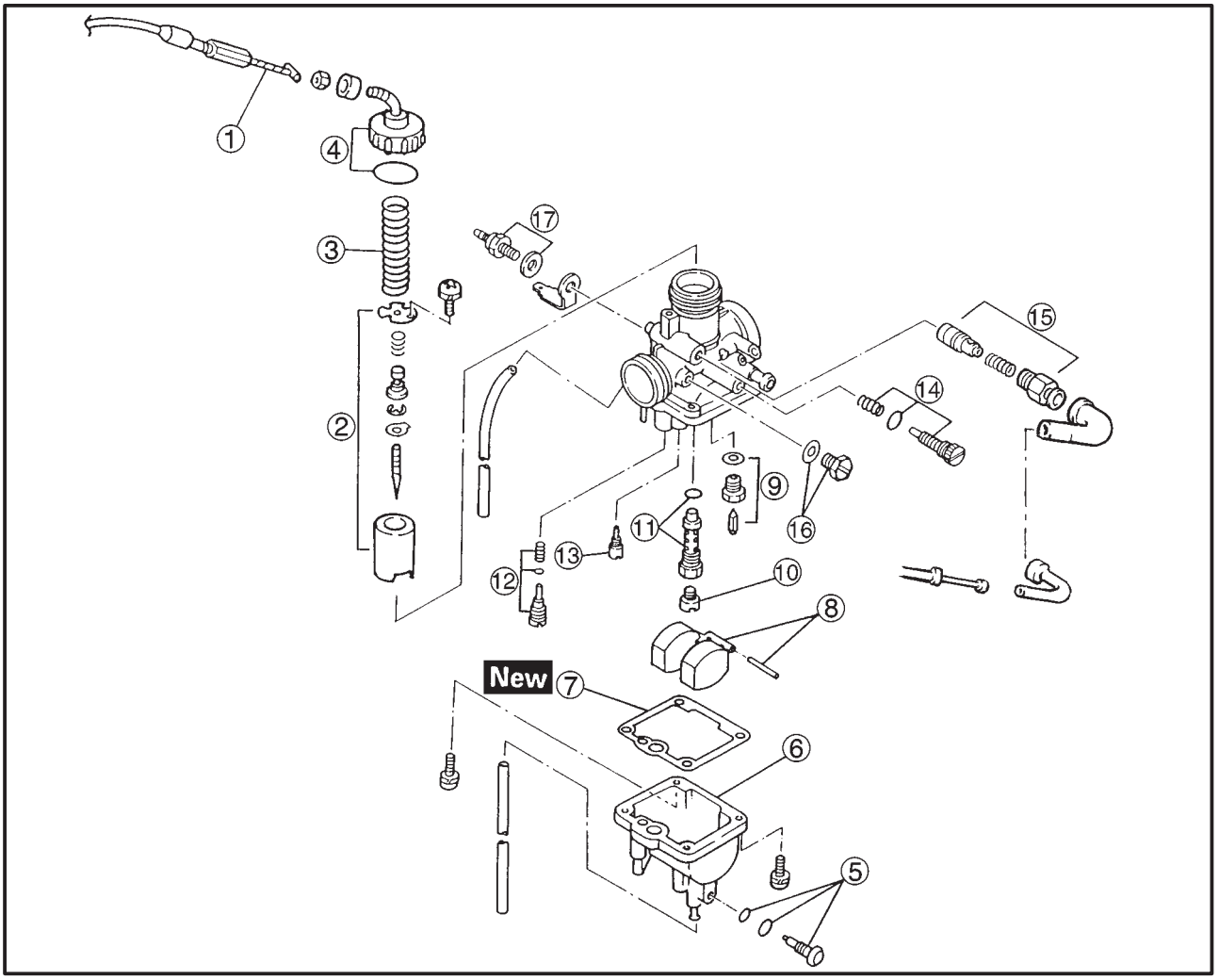


Order	Job/Part	Q'ty	Remarks
	Removing the carburetor		Remove the parts in order listed.
	Side cover Seat Fuel tank		Refer to "SEAT, FUEL TANK AND SIDE COVER" in CHAPTER 3.
	Heater unit lead		**NOTE:** Disconnect the cable from wireharness.
1	Carburetor joint clamp screw	1	**NOTE:**
2	Air filter joint clamp screw	1	Loosen.
3	Carburetor assembly	1	
4	Carburetor top	1	
			For installation, reverse the removal procedure.

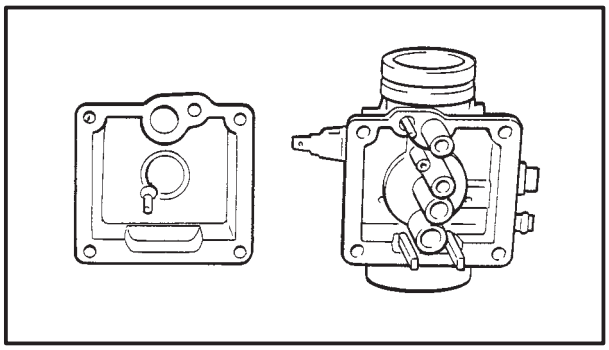
EAS00483



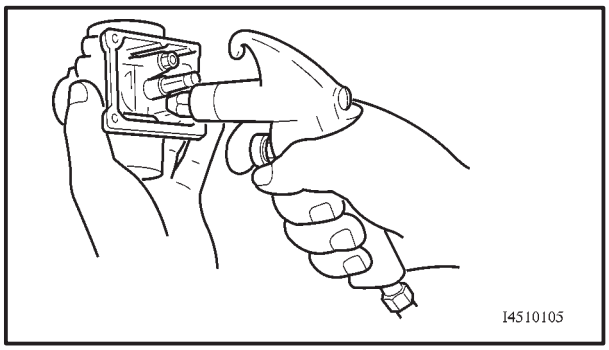
Order	Job/Part	Q'ty	Remarks
	Disassembly the carburetor		Disassemble the parts in the order listed.
①	Throttle cable	1	
②	Throttle valve assembly	1	
③	Throttle valve spring	1	
④	Mixing chamber top/O-ring	1/1	
⑤	Drain screw assembly	1	
⑥	Float chamber	1	
⑦	Gasket (float chamber)	1	
⑧	Float pin/float	1/1	Refer to "ASSEMBLYING THE CARBURETOR".
⑨	Needle valve assembly	1	
⑩	Main jet	1	
⑪	Main nozzle/O-ring	1/1	



Order	Job/Part	Q'ty	Remarks
⑫	Pilot screw assembly	1	Refer to "ASSEMBLING THE CARBURETOR".
⑬	Pilot jet	1	
⑭	Throttle stop screw assembly	1	
⑮	Starter plunger assembly	1	
⑯	Screw/gasket	1/1	
⑰	Heater unit/washer	1/1	
			For assembly, reverse the disassembly procedure.



EAS00485
CHECKING THE CARBURETOR
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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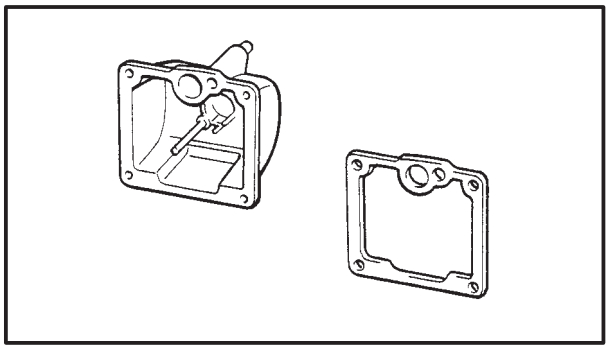
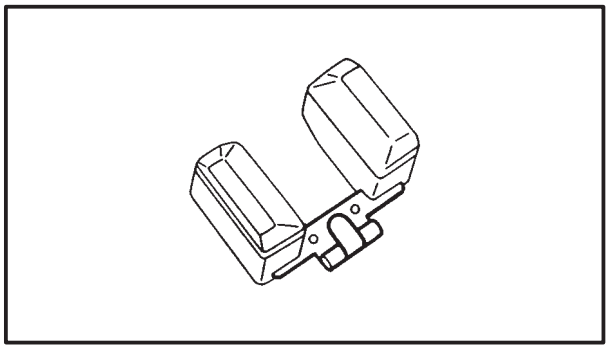
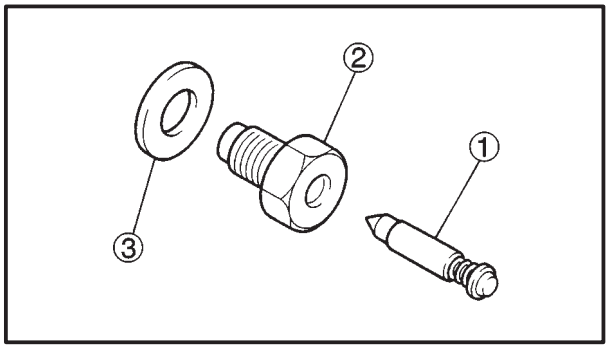


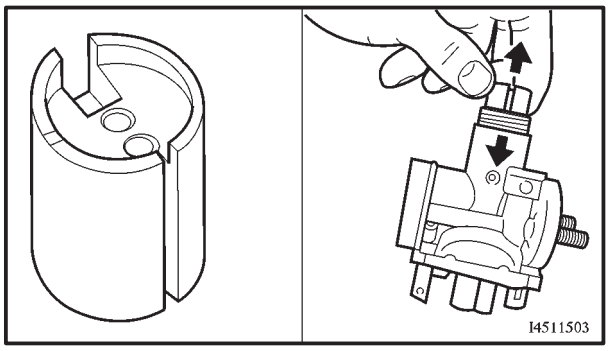
3. Check:
   • float chamber body
   Dirt → Clean.
4. Check:
   • float chamber rubber gasket
   Cracks/damage/wear → Replace.



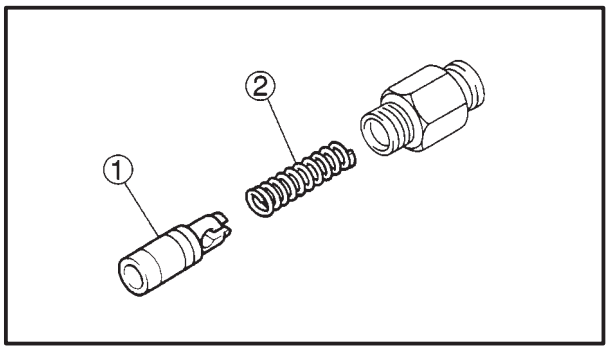
5. Check:
   • float
   Damage → Replace.



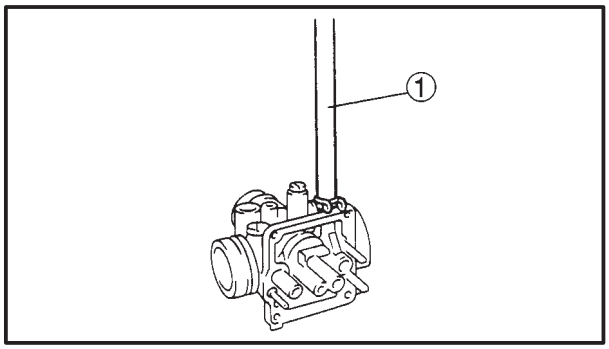
6. Check:
   • needle valve ①
   • needle valve seat ②
   Damage/obstruction/wear → Replace the needle valve, needle valve seat and O-ring as a set.
7. Check:
   • gasket ③
   Damage/wear → Replace the needle valve, needle valve seat and O-ring as a set.



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



9. Check:
   • starter plunger ①
   • starter plunger spring ②
   Bends/cracks/damage → Replace.



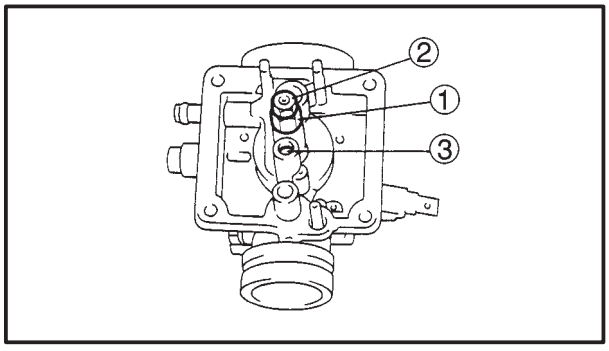
10. Check:
    • hose joints
    Cracks/damage → Replace.
11. Check:
    • fuel hoses ①
    Cracks/damage/wear → Replace.
    Obstruction → Clean.
    Blow out the hoses with compressed air.

EAS00487

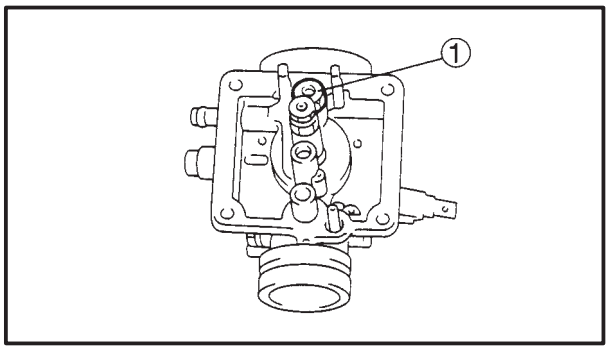
ASSEMBLING THE CARBURETOR

CAUTION:

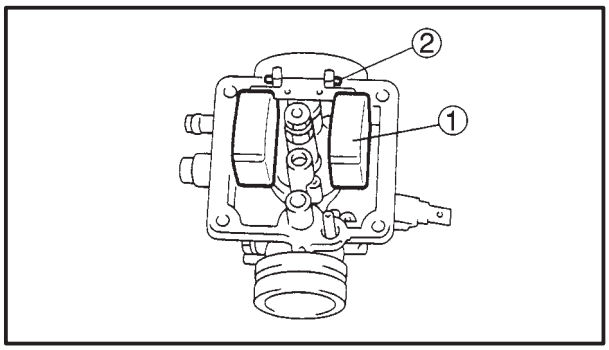
- **Before assembling the carburetor, wash all of the parts in a petroleum-based solvent.**
- **Always use a new gasket.**



1. Install:
   • main nozzle ①
   • main jet ②
   • pilot jet ③



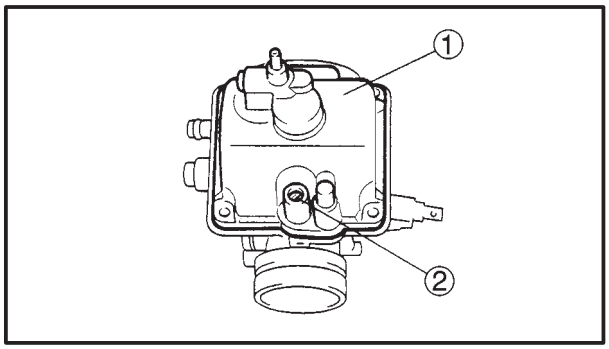
2. Install:
   • needle valve seat ①



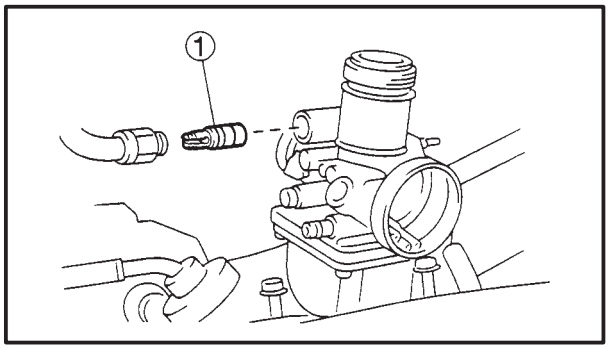
3. Install:
   • float ①
   • needle valve
   • float pin ②

NOTE:

Install the float pin from the side opposite the arrow.



4. Install:
   • float chamber ①
   • pilot screw ②



5. Install:
   • starter plunger kit ①

EAS00492
INSTALLING THE CARBURETOR

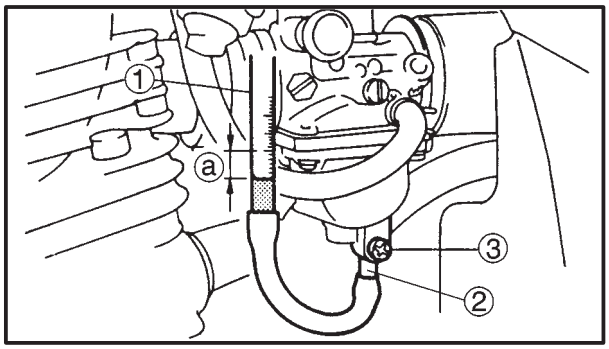
1. Adjust:
   • engine idling speed

	Engine idling speed **1,300 ~ 1,500 r/min**

   Refer to "ADJUSTING THE ENGINE IDLING SPEED" in chapter 3.
2. 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.



EAS00498
MEASURING AND ADJUSTING THE FUEL LEVEL

1. Measure:
   • fuel level ⓐ
   Out of specification → Adjust.

	Fuel level (below the float chamber mating surface) **0 ~ 2.0 mm**

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

	Fuel level gauge **90890-01312**

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

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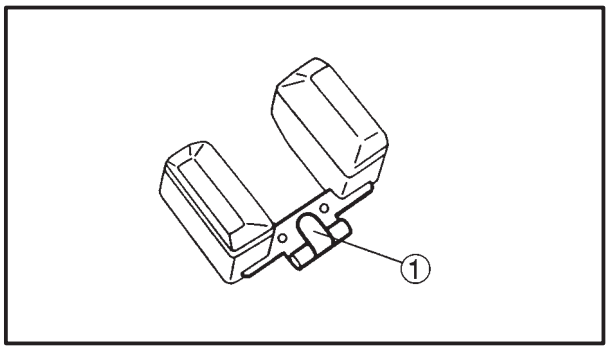

2. Adjust:
   • fuel level

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a. Remove the carburetor.
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.
f. Measure the fuel level again.
g. Repeat steps (a) to (f) until the fuel level is within specification.

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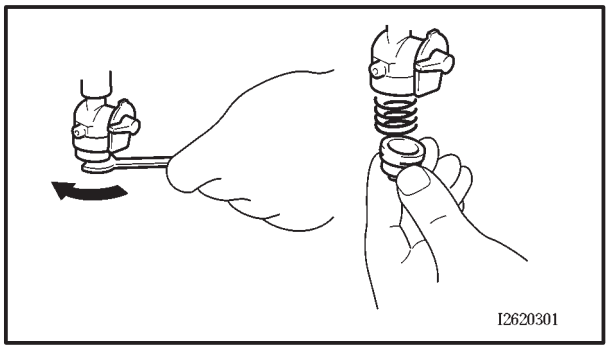
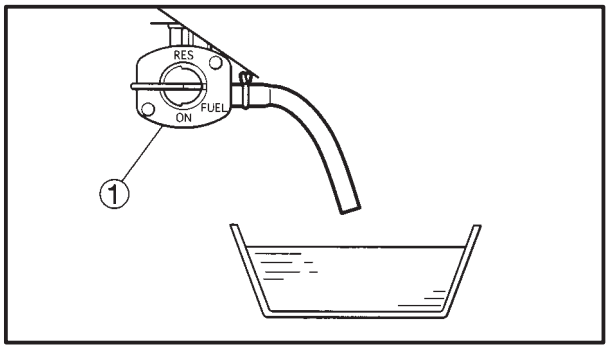


EAS00505

CHECKING THE FUEL COCK

1. Check:
   • fuel cock
   Cracks/damage/wear → Replace.
2. Check:
   • fuel cock strainer
   (with compressed air)
   Dirt/obstruction → Clean.
   Damage → Replace.



EAS00506

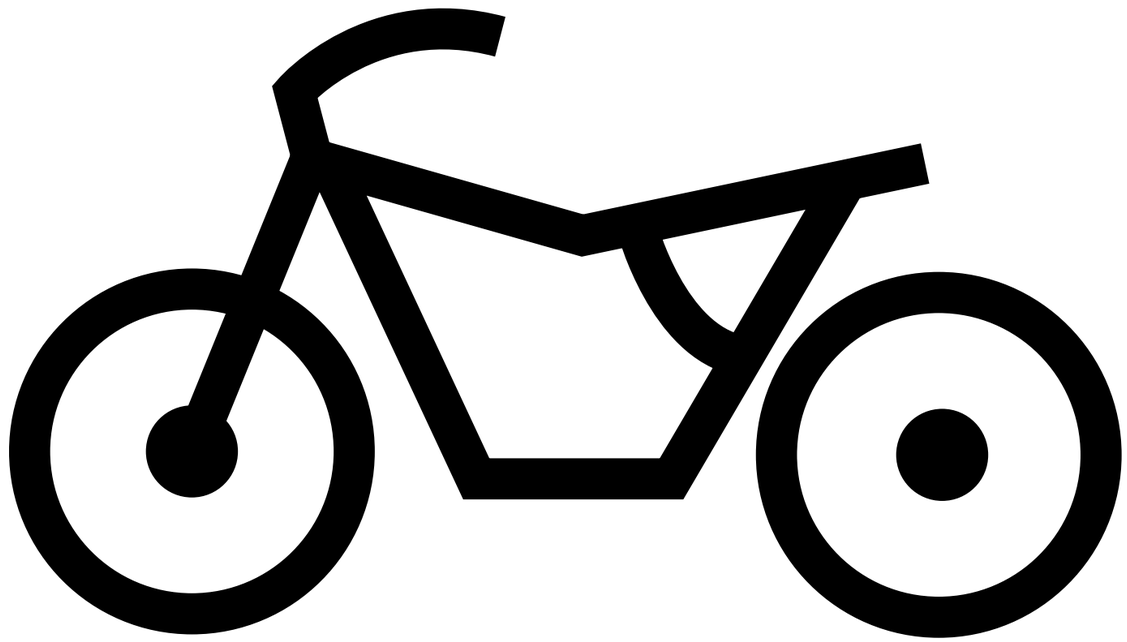
CHECKING THE FUEL COCK OPERATION

NOTE:

After installing the fuel cock, check its operation.

1. Check that the fuel cock lever is positioned to "ON" or "RESERVE".
2. Place a container under the end of the fuel hose.
3. Check:
   • fuel cock operation ①

Fuel flows.	**Fuel cock is OK.**
Fuel does not flow.	**Replace the fuel cock.**



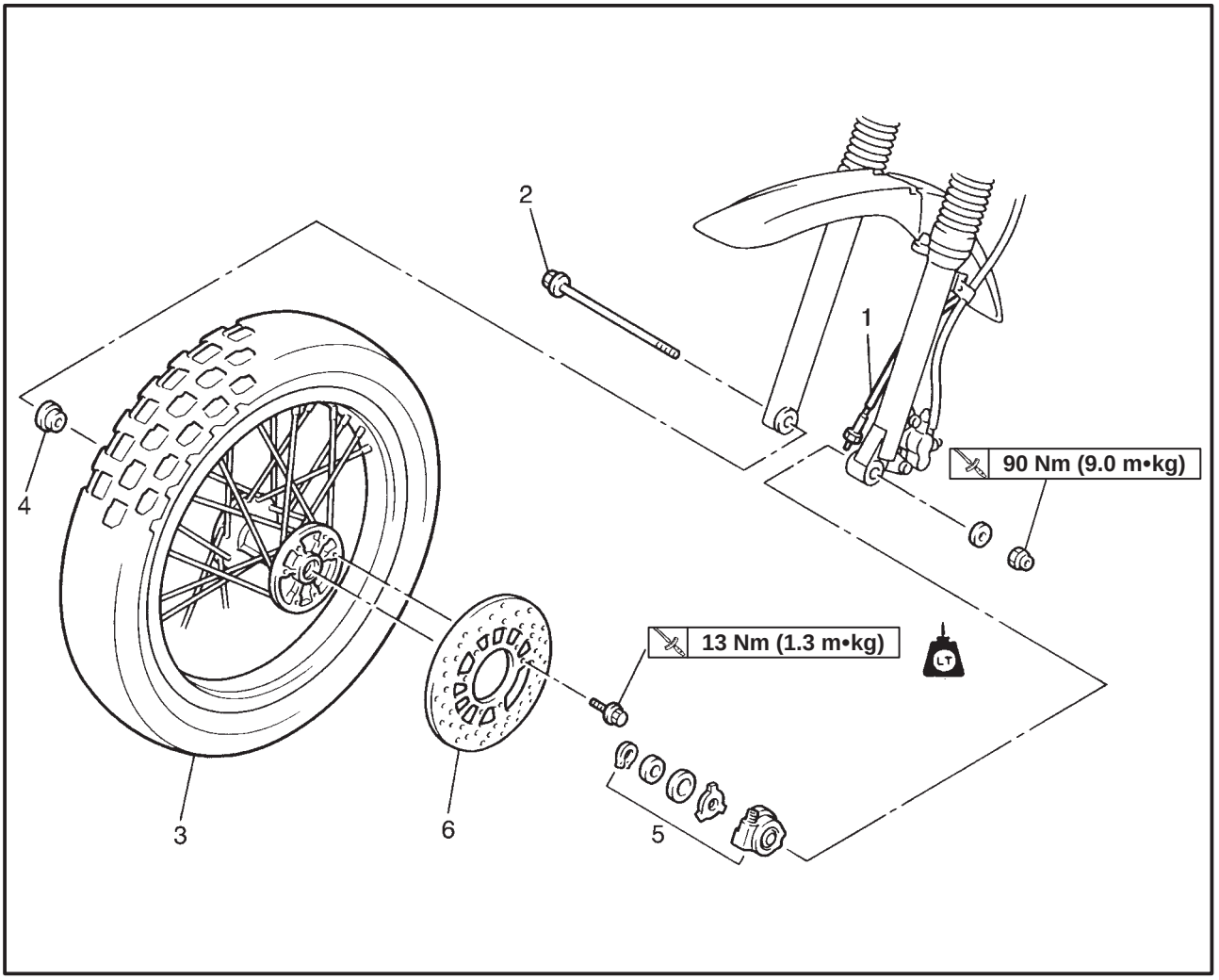
CHAS 6

CHAPTER 6.
CHASSIS

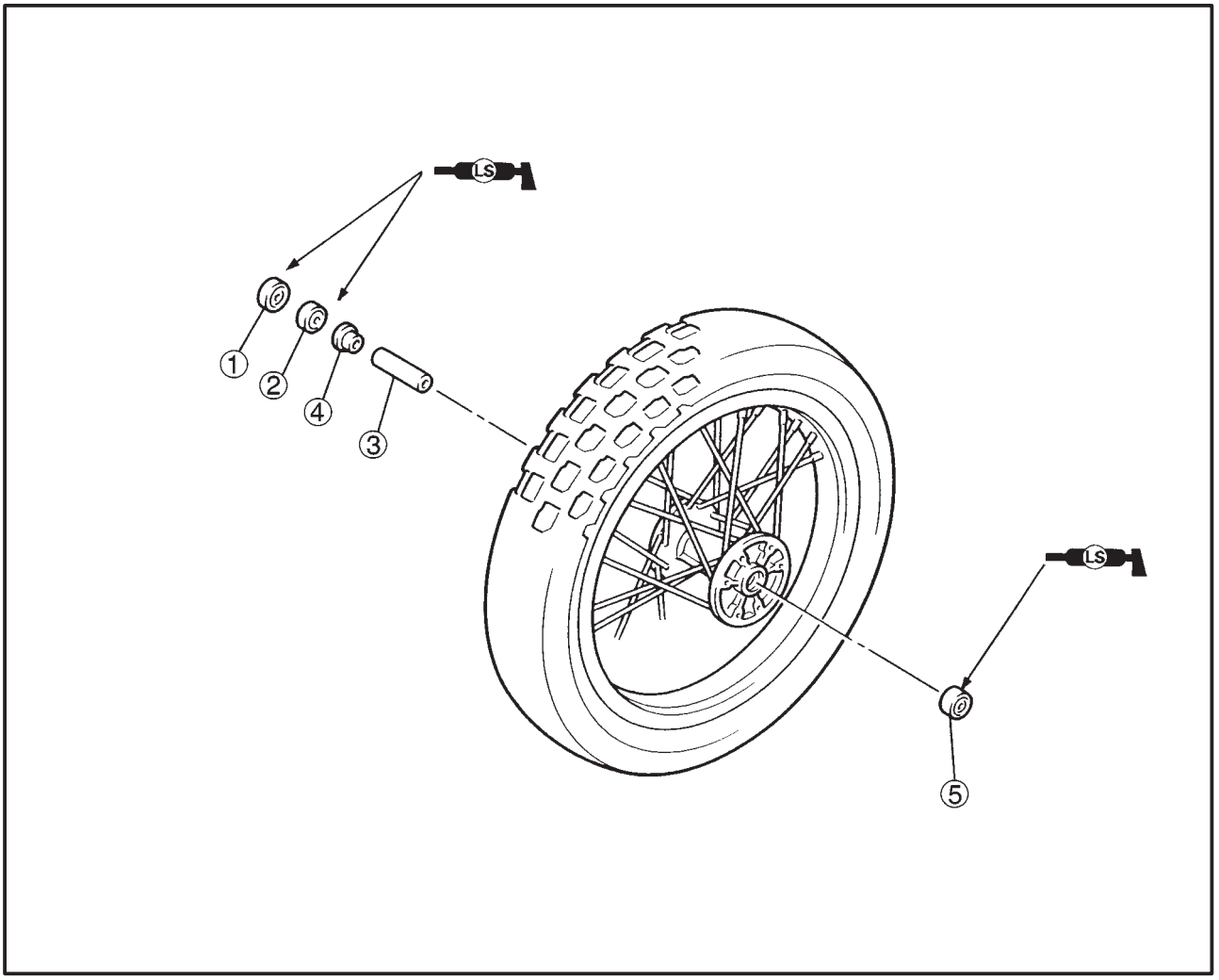
EAS00512

CHASSIS

FRONT WHEEL AND BRAKE DISC



Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake disc		Remove the parts in the order listed. **NOTE:** Place the motorcycle on a suitable stand so that the front wheel is elevated.
1	Speedometer cable	1	Refer to "REMOVING/INSTALLING THE FRONT WHEEL"
2	Wheel axle		
3	Front wheel assembly	1	
4	Collar	1	
5	Meter gear unit assembly	1	
6	Brake disc	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the front wheel		Disassemble the parts in the order listed.
①	Oil seal	1	Refer to "ASSEMBLYNG/ DISASSEMBLING THE FRONT WHEEL".
②	Bearing	1	
③	Spacer	1	
④	Spacer flange	1	
⑤	Bearing	1	
			For assembly, reverse the disassembly procedure.

EAS00519
REMOVING THE FRONT WHEEL

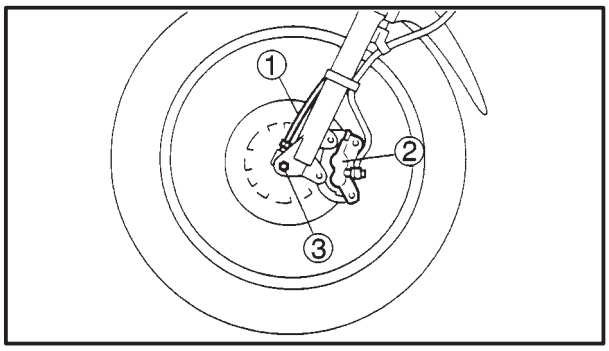
1. Stand the motorcycle on a level surface.

⚠ 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:
   - speedometer cable ①
   - brake caliper ②
   - wheel axle ③

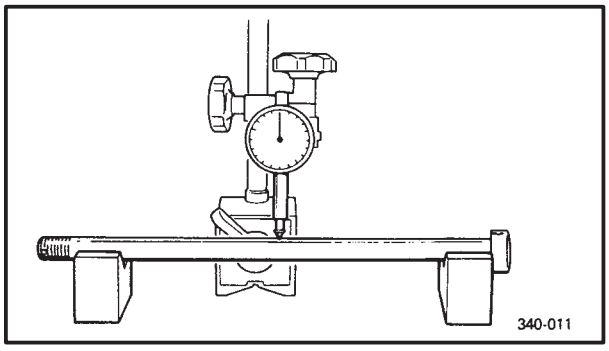
NOTE:

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

3. Elevate:
   - front wheel

NOTE:

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



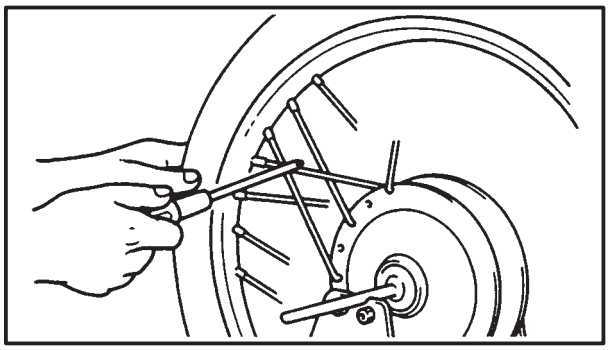
EAS00526
CHECKING THE FRONT WHEEL

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

⚠ WARNING

Do not attempt to straighten a bent wheel axle.

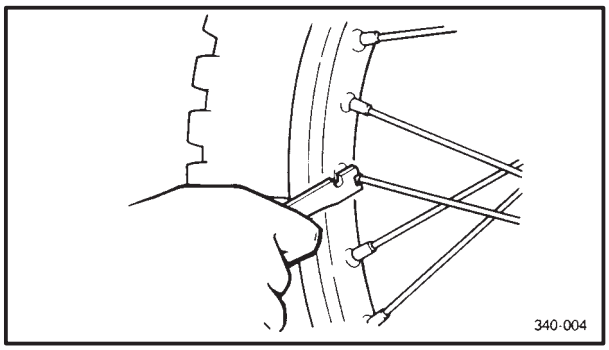
2. Check:
   - tire
   - front wheel
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” and “CHECKING THE WHEELS” in chapter 3.



3. Check:
   • spokes
   Bends/damage → Replace.
   Loose → Tighten.
   Tap the spokes with a screwdriver.

NOTE:

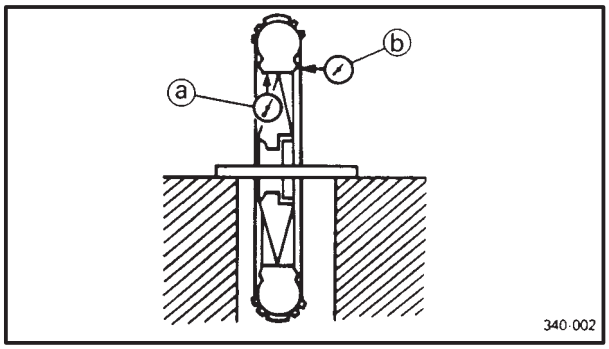
A tight spoke will emit a clear, ringing tone, a loose spoke will sound flat.



4. Tighten:
   • spokes — **2 Nm (0.2 m•kg)**

NOTE:

After tightening the spokes, measure the front wheel runout.



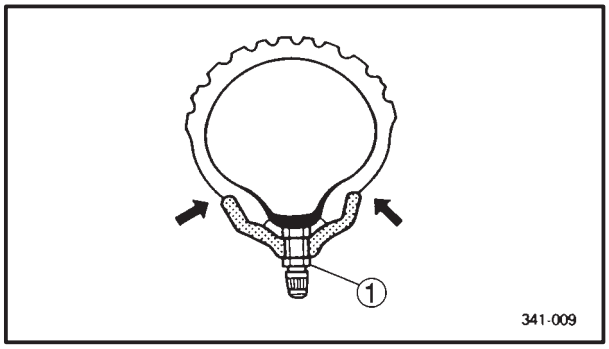
5. Measure:
   • front wheel radial runout ⓐ
   • front wheel lateral runout ⓑ
   Over the specified limits → Replace.

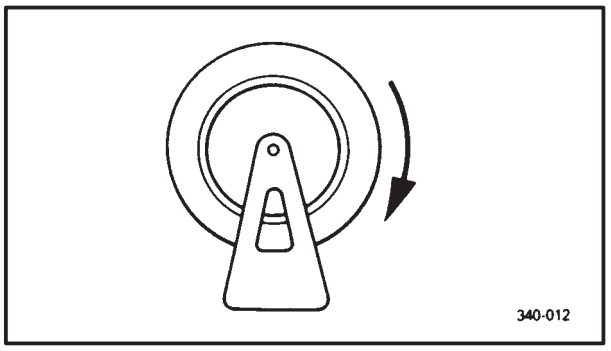
Front wheel radial runout limit
2 mm
Front wheel lateral runout limit
2 mm

6. Check:
   • collars
   Damage/wear → Replace.
   • Tire valve stem locknut — **1.5 Nm (0.15 m•kg)**

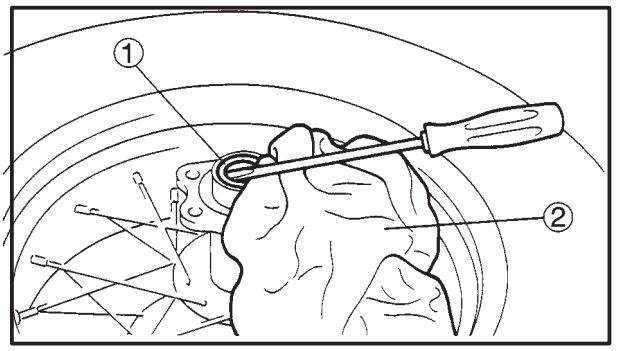
⚠ WARNING

- **After mounting a new tire, ride conservatively for a while to become accustomed to the "feel" of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.**
- **After a tire has been repaired or replaced, be sure to tighten the tire valve stem locknut ① to specification.**





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



8. Replace:
   • wheel bearings (New)
   • oil seals (New)

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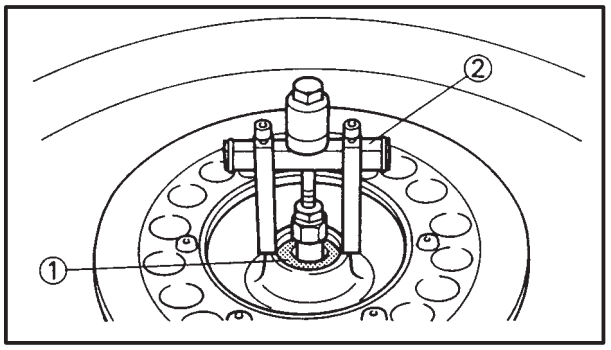
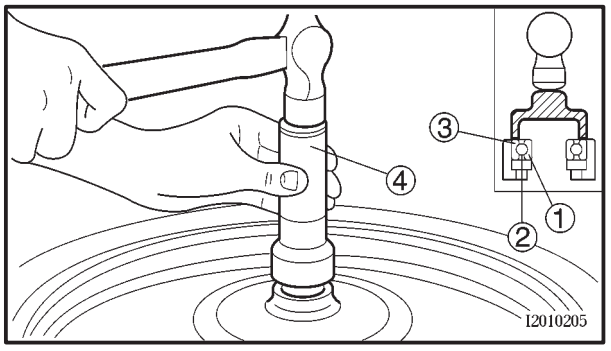
a. Clean the outside of the front wheel hub.
b. Remove the oil seals ① with a flat-head screwdriver.

NOTE:

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



c. Remove the wheel bearings ① with a general bearing puller ②.



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.

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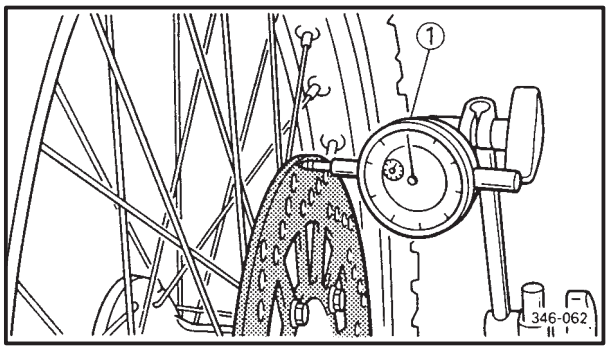

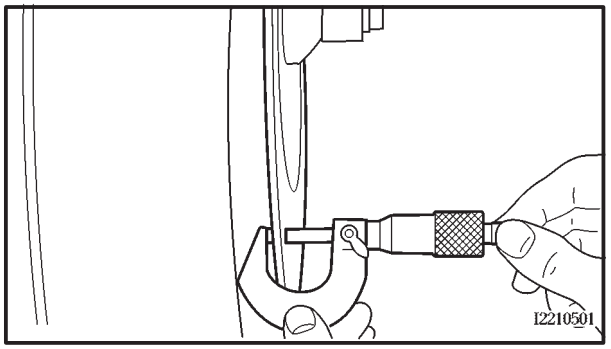

EAS00527
CHECKING THE BRAKE DISC
1. Check:
   • brake disc
   Damage/galling → Replace.
2. Measure:
   • brake disc deflection ①
   Out of specification → Correct the brake disc deflection or replace the brake disc.

Brake disc deflection limit (maximum)
0.15 mm

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

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

Brake disc thickness limit (minimum)
3 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
13 Nm (1.3 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.

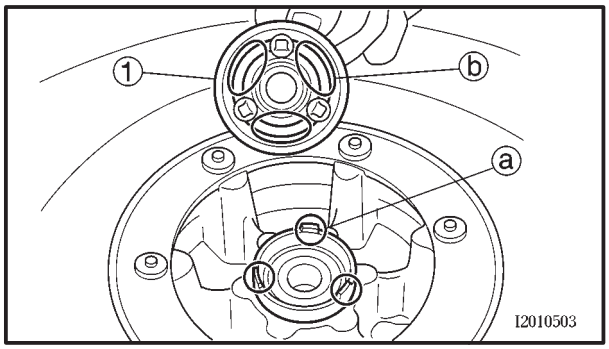
EAS00542

INSTALLING THE FRONT WHEEL

1. Lubricate:
   - wheel axle
   - wheel bearings
   - oil seal lips
   - speedometer drive gear
   - speedometer driven gear

	Recommended lubricant **Lithium soap base grease**

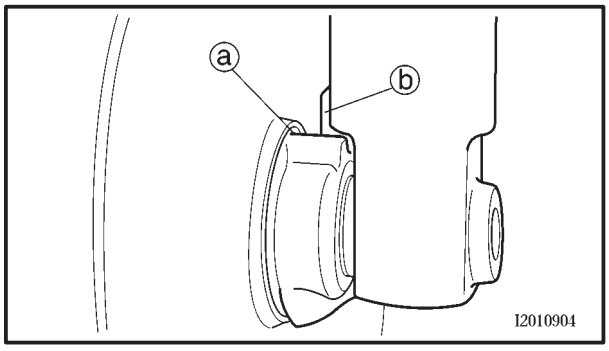
2. Install:
   - speedometer gear unit ①



NOTE:

Make sure that the speedometer gear unit and the wheel hub are installed with the three projections ⓐ meshed into the three slots ⓑ respectively.

3. Install:
   - front wheel



NOTE:

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

4. Tighten:
   - wheel axle — **90 Nm (9.0 m•kg)**
   - brake caliper bolts — **30 Nm (3.0 m•kg)**

⚠ WARNING

Make sure that the brake hose is routed properly.

CAUTION:

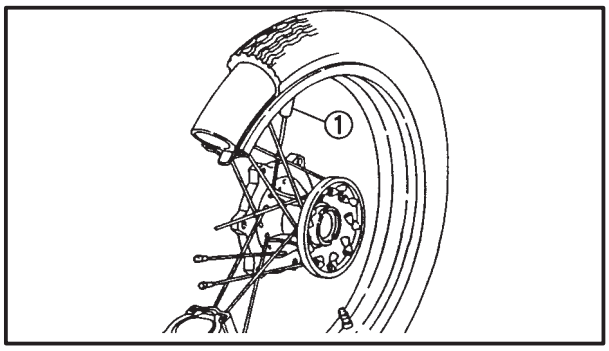
Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

EAS00548

ADJUSTING THE FRONT WHEEL STATIC BALANCE

NOTE:

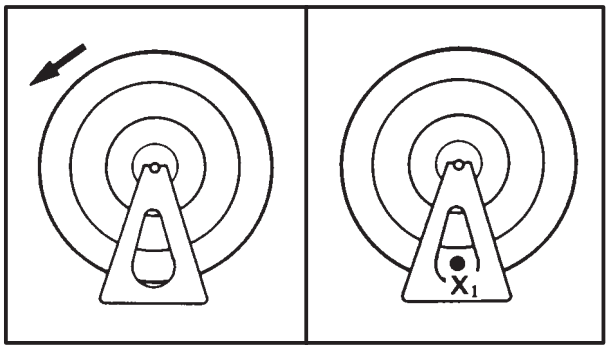
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.



1. Remove:
   - balancing weight(-s) ①

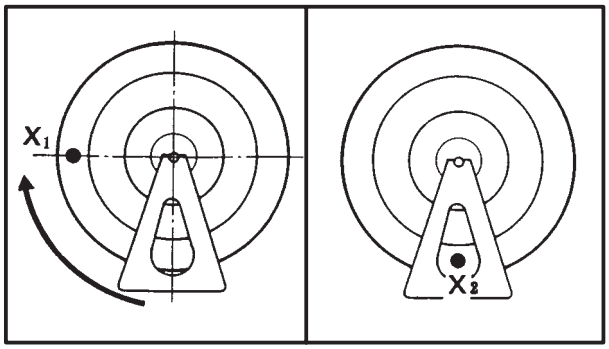
NOTE:

Place the front wheel on a suitable balancing stand.

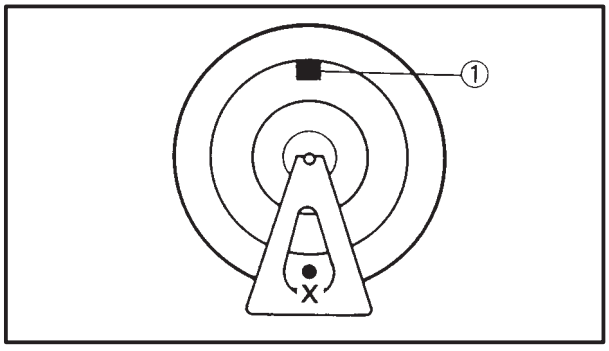


2. Find:
   - front wheel's heavy spot

a. Spin the front wheel.
b. When the front wheel stops, put an "×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".

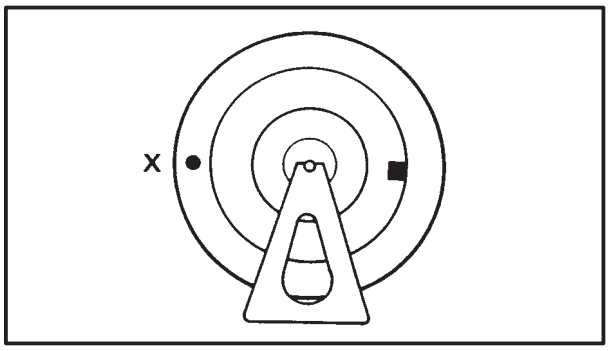


3. Adjust:
   - front wheel static balance

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

NOTE:

Start with the lightest weight.



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

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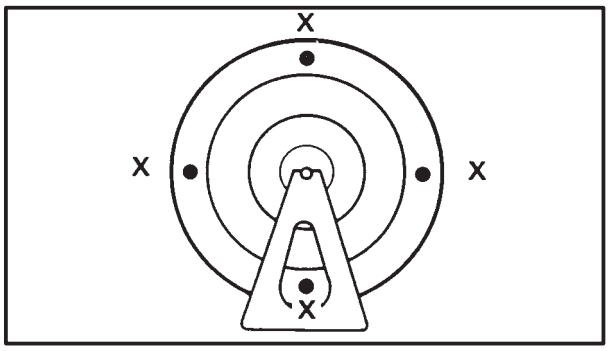

4. Check:
   • front wheel static balance

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

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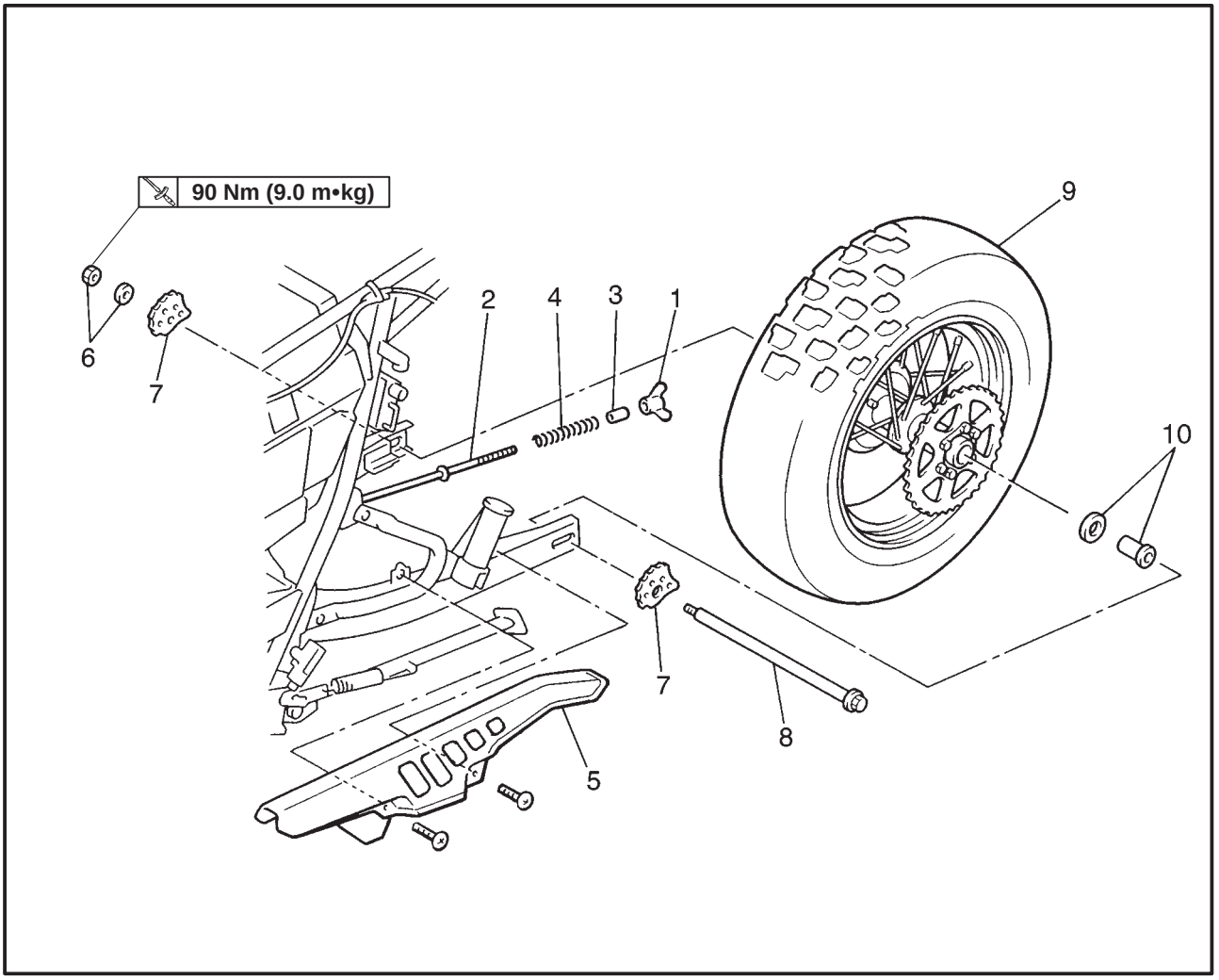
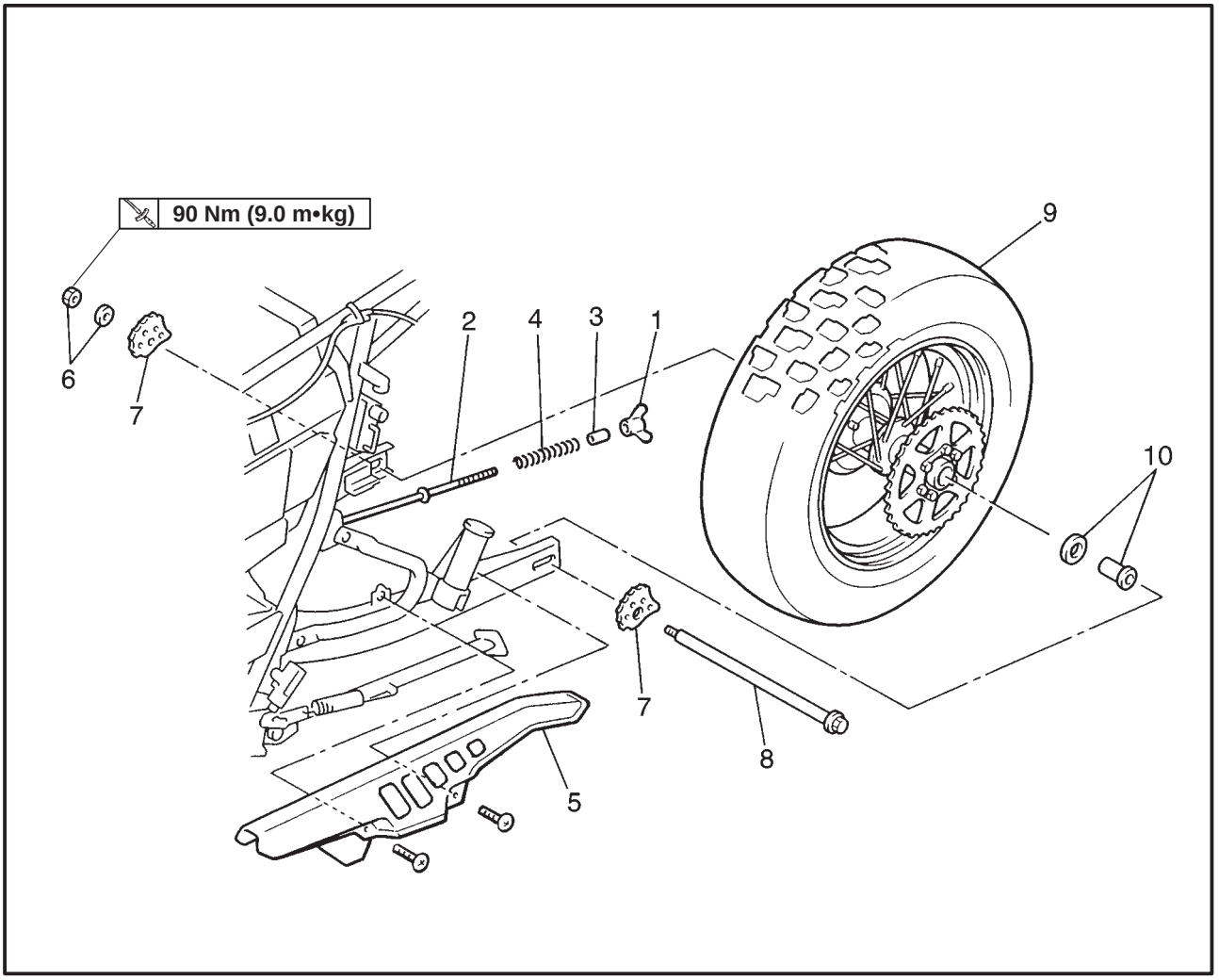
REAR WHEEL AND REAR BRAKE

REAR WHEEL

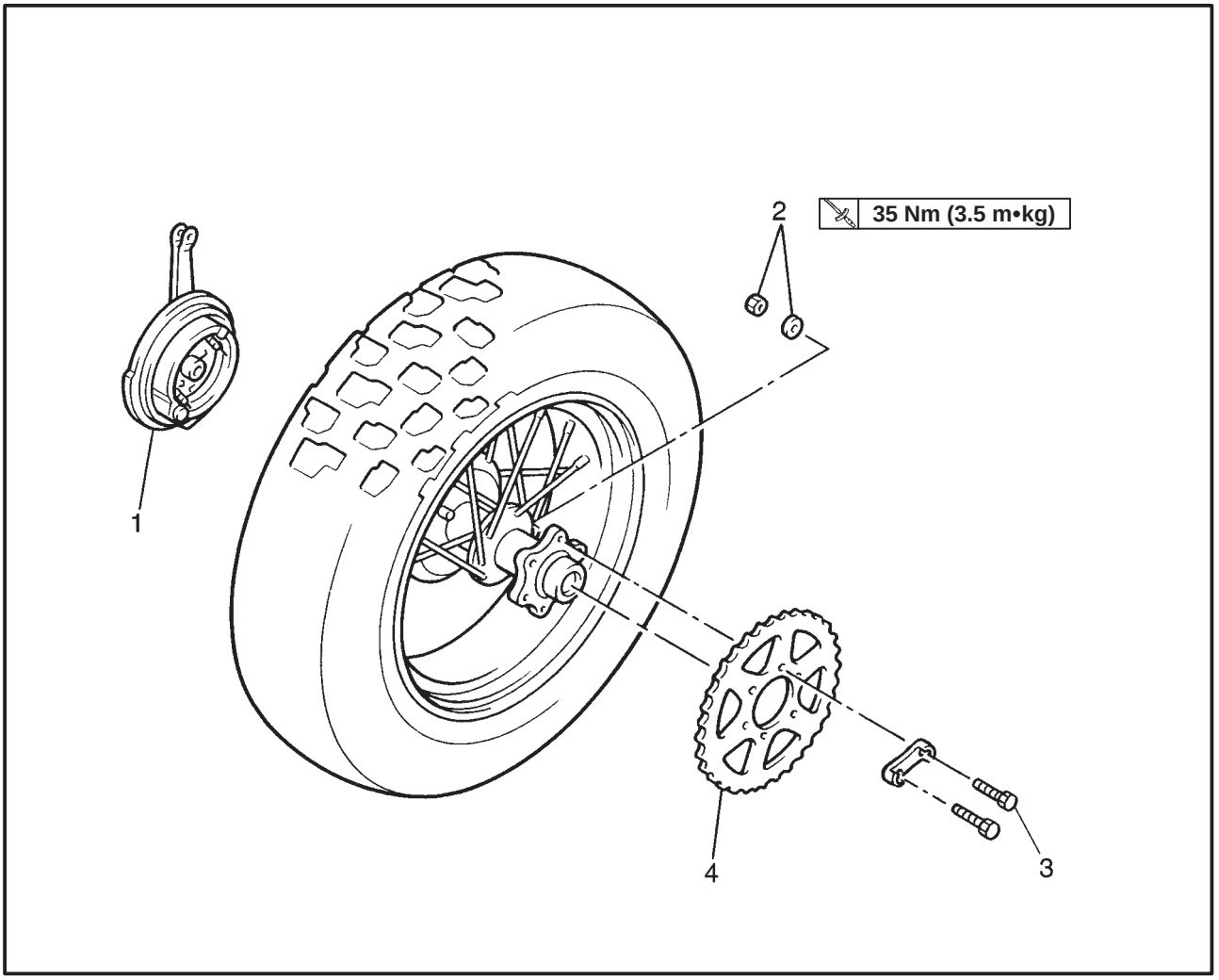


Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed. **NOTE:** Place the motorcycle on a suitable stand so that the rear wheel is elevated.
1	Adjuster	1	
2	Brake rod	1	
3	Pin	1	
4	Compression spring	1	
5	Chain case	1	
6	Axle nut/washer	1/1	
7	Chain pullers	2	
8	Wheel axle	1	Refer to"REMOVING/INSTALLING THE REAR WHEEL".

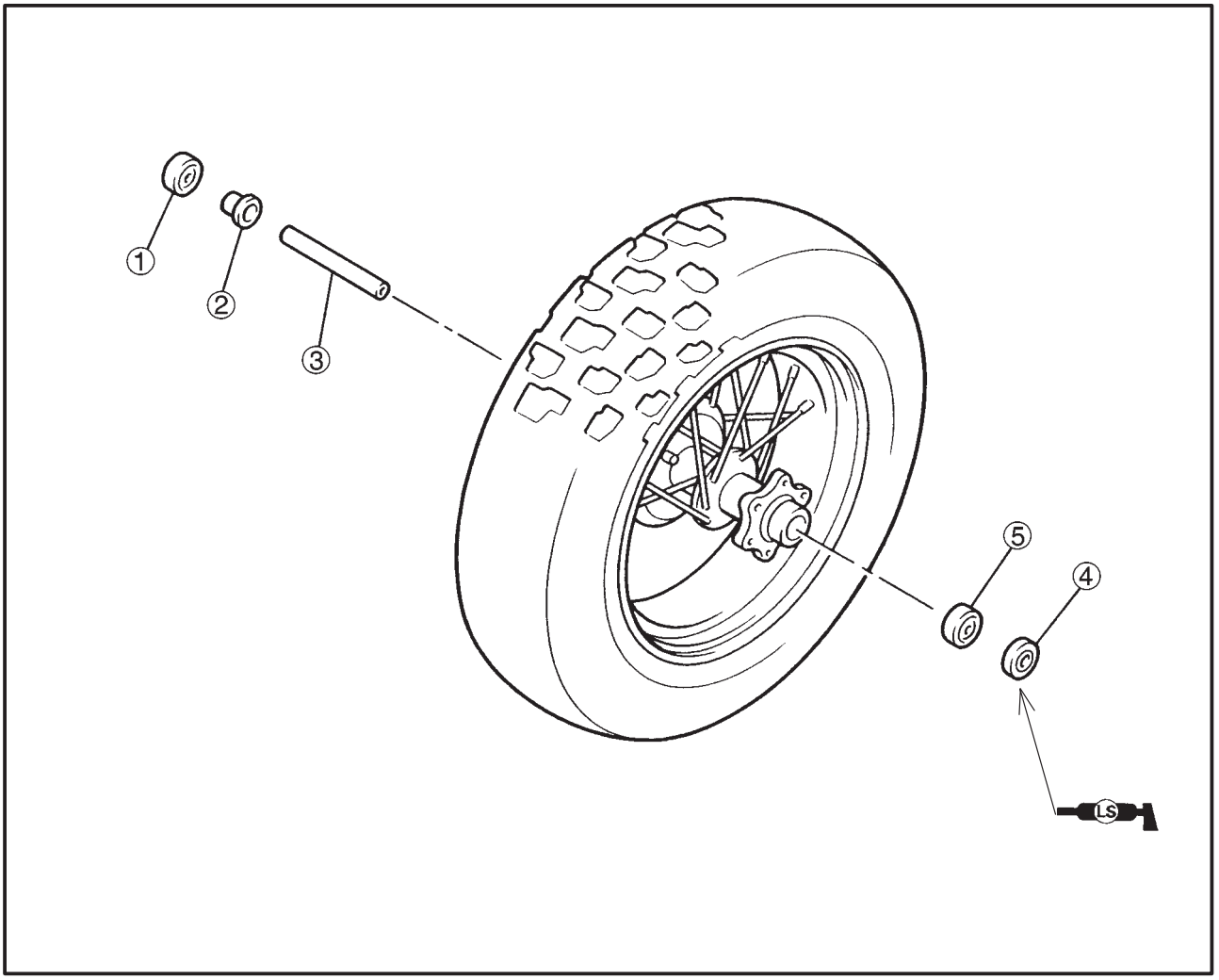


Order	Job/Part	Q'ty	Remarks
9 10	Rear wheel assembly Collar/O-ring	1 1/1	Refer to "REMOVING/INSTALLING THE REAR WHEEL." For installation, reverse the removal procedure.

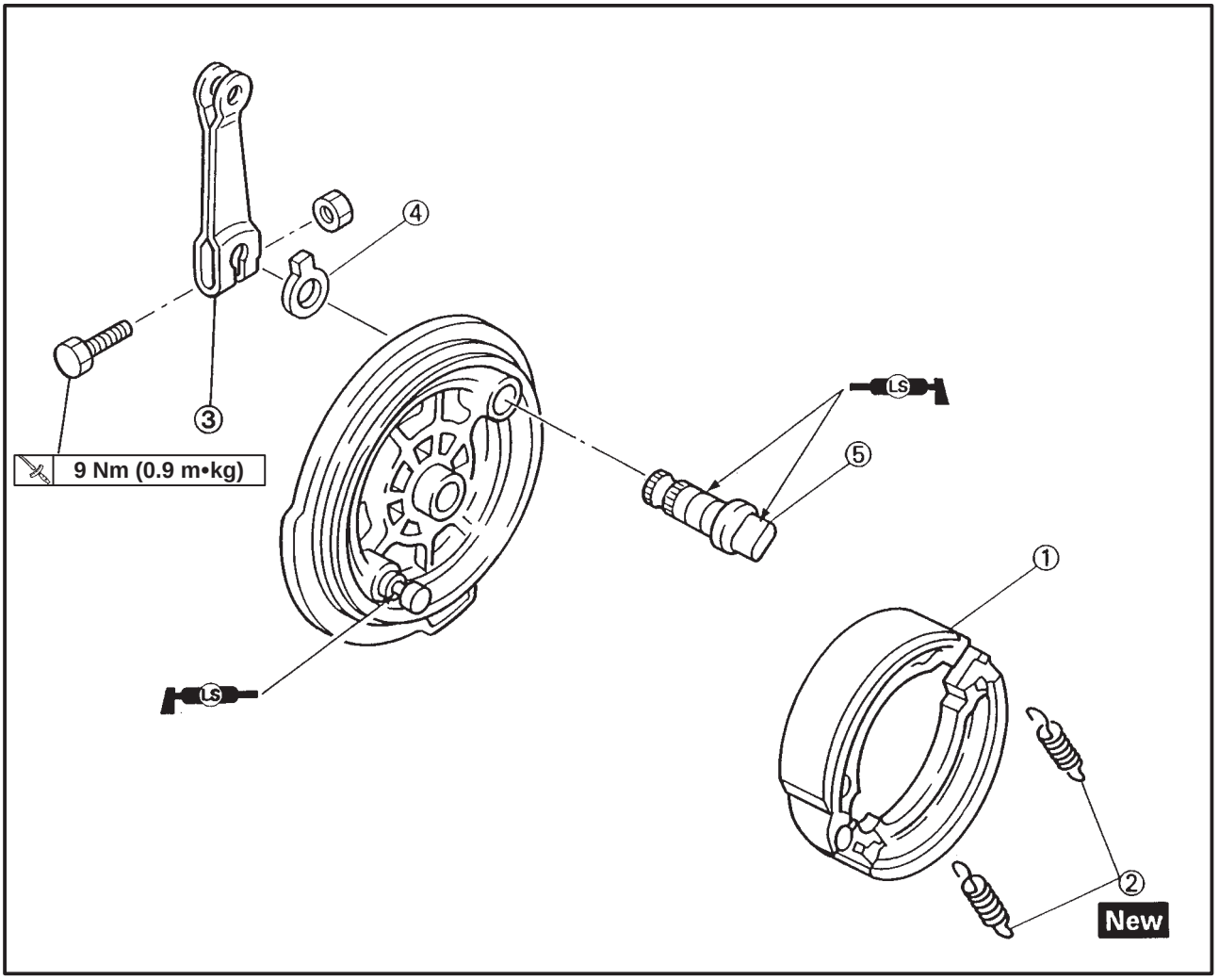
REAR BRAKE AND REAR WHEEL SPROCKET



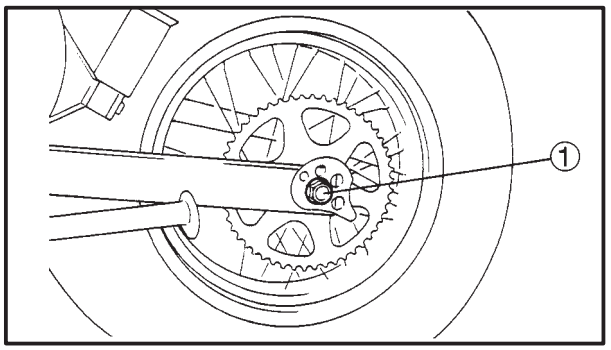
Order	Job/Part	Q'ty	Remarks
	Removing the rear brake and rear wheel sprocket		Remove the parts in the order listed.
1	Shoe plate	1	
2	Nuts/washers (driven sprocket)	6/6	Refer to "ASSEMBLYNG THE REAR WHEEL".
3	Bolts	6	
4	Driven sprocket	1	
			For installation, reverse the removal procedure.

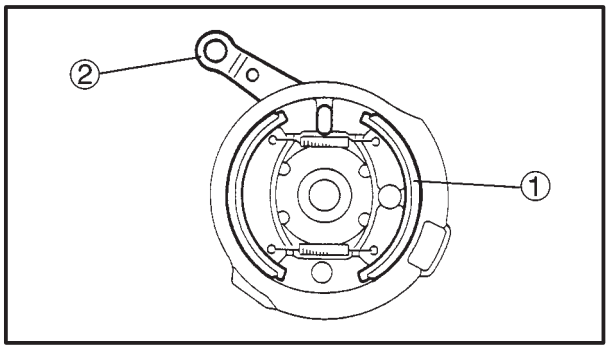


Order	Job/Part	Q'ty	Remarks
	Disassembling the rear wheel		Disassemble the parts in the order listed.
①	Bearing	1	
②	Collar	1	
③	Spacer	1	
④	Oil seal	1	
⑤	Bearing	1	
			For assembly, reverse the disassembly procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the brake shoe plate		Disassemble the parts in the order listed.
①	Brake shoe kit	2	Refer to "REMOVING THE REAR WHEEL/ASSEMBLYING THE BRAKE SHOE PLATE".
②	Tension springs	2	
③	Camshaft lever	1	
④	Indicator plate	1	
⑤	Camshaft	1	
			For assembly, reverse the disassembly procedure.





EAS00563
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:
   - wheel axle ①
   - rear wheel

NOTE:

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

3. Remove:
   - brake shoe plate
4. Remove:
   - brake shoes ①
   - brake camshaft lever ②

NOTE:

Mark the position on the brake camshaft lever where it is aligned with the punch mark on the brake camshaft.

EB701401
CHECKING THE REAR WHEEL

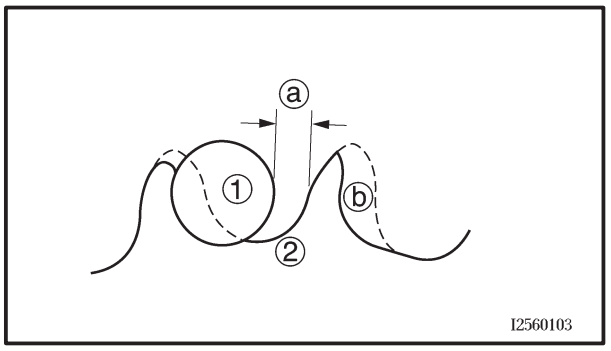
1. Check:
   - wheel axle
   - rear wheel
   - wheel bearings
   - oil seals

   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. Check:
   - spokes

   Refer to “FRONT WHEEL”.
4. Measure:
   - rear wheel radial runout
   - rear wheel lateral runout

   Refer to “FRONT WHEEL”.



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
35 Nm (3.5 m•kg)

NOTE:

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

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EAS00569

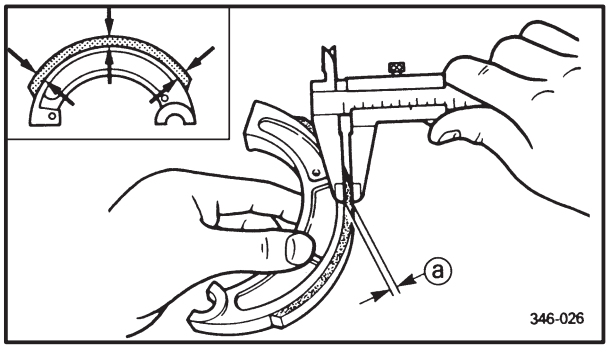
CHECKING THE BRAKE

The following procedure applies to all of the brake shoes.

1. Check:
   • brake shoe lining
   Glazed areas → Repair.
   Sand the glazed areas with course sandpaper.

NOTE:

After sanding the glazed areas, clean the brake shoe with a cloth.



2. Measure:
   • brake shoe lining thickness ⓐ
   Out of specification → Replace.

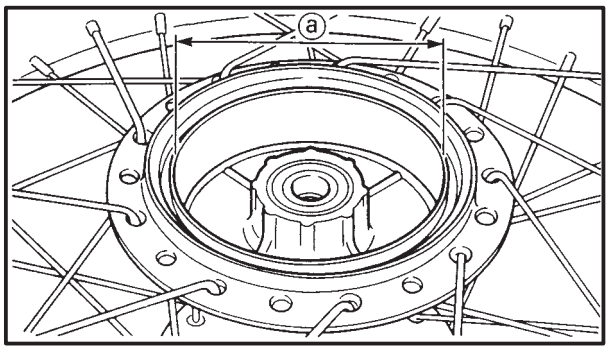
Brake shoe lining thickness limit (minimum)
2 mm

⚠ WARNING

Do not allow oil or grease to contact the brake shoes.

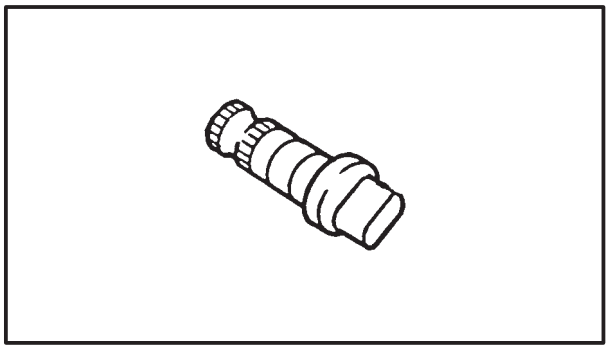
NOTE:

Replace the brake shoes as a set, if either is worn to the wear limit.

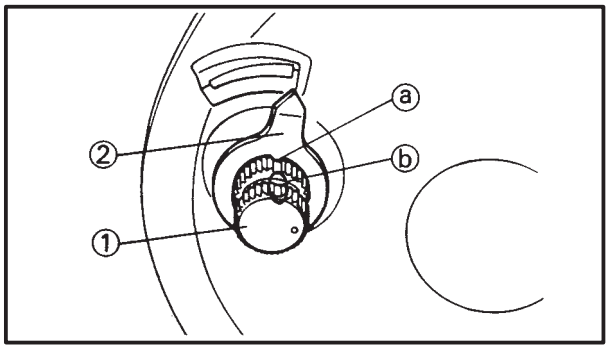


3. Measure:
   • brake drum inside diameter ⓐ
   Out of specification → Replace the wheel.

Brake drum inside diameter limit (maximum)
111 mm



4. Check:
   • brake drum inner surface
   Oil deposits → Clean.
   Remove the oil with a rag soaked in lacquer thinner or solvent.
   Scratches → Repair.
   Lightly and evenly polish the scratches with an emery cloth.
5. Check:
   • brake camshaft
   Damage/wear → Replace.



EAS00570

ASSEMBLING THE BRAKE SHOE PLATE

1. Install:
   • brake camshaft ①
   • brake shoe wear indicator ②

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a. Align the projection ⓐ on the brake shoe wear indicator with the notch ⓑ in the brake shoe camshaft.
b. Check that the brake shoes are properly positioned.

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EAS00571

INSTALLING THE REAR WHEEL

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

Recommended lubricant
Lithium soap base grease

2. Adjust:
   - drive chain slack

Drive chain slack
35 ~ 60 mm

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

3. Tighten:
   - wheel axle nut

90 Nm (9.0 m•kg)

⚠ WARNING

Make sure that the brake hose is routed properly.

EAS00575

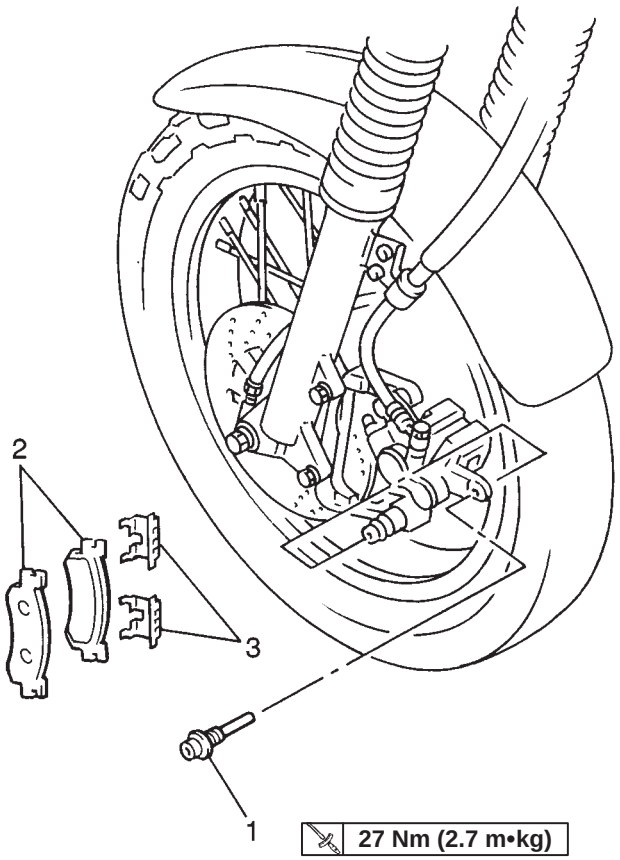
ADJUSTING THE REAR WHEEL STATIC BALANCE

NOTE:

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

1. Adjust:
   - rear wheel static balance
   Refer to "FRONT WHEEL".

FRONT BRAKE
FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake pads		Remove the parts in the order listed.
1	Bolt (caliper support bolt)	1	Refer to "REPLACING THE FRONT BRAKE PADS".
2	Brake pads	2	
3	Pad springs	1	
			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.**

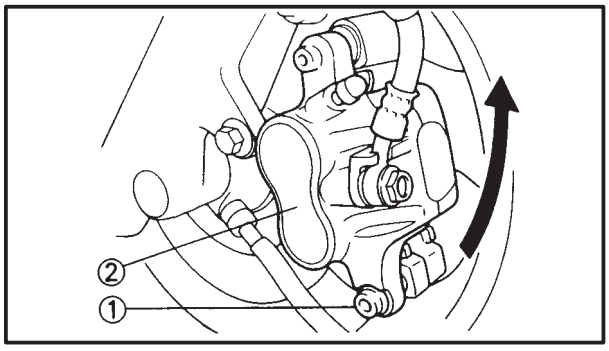
First aid for brake fluid entering the eyes:
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS00581

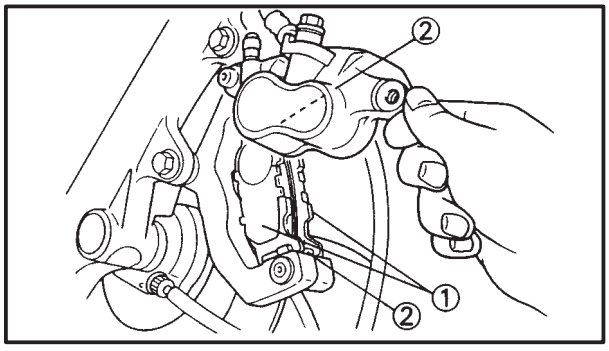
REPLACING THE FRONT BRAKE PADS

NOTE:

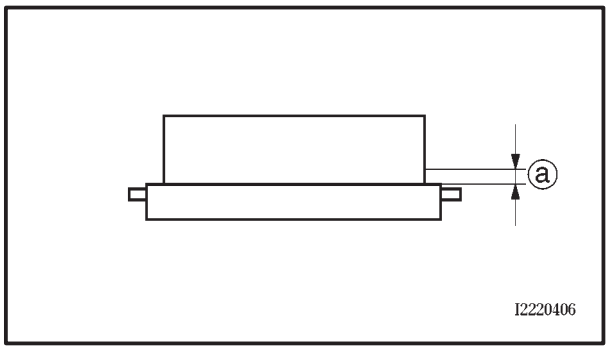
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



1. Remove:
   - caliper support bolts ①
2. Remove:
   - brake caliper ②

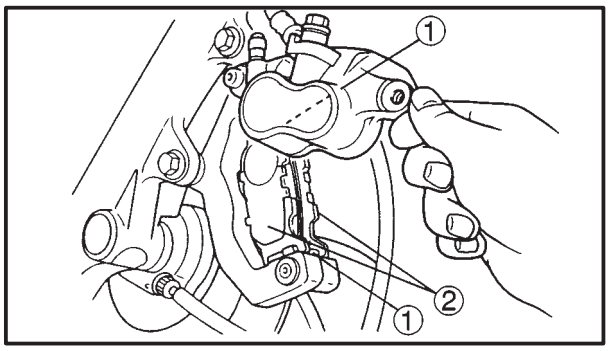


3. Remove:
   - brake pads ①
   - brake pad spring ②



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

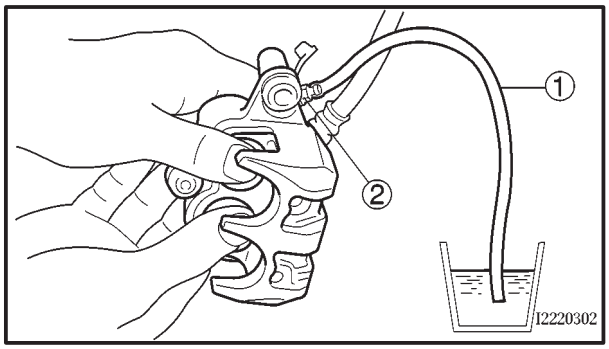
Brake pad wear limit
0.8 mm



5. Install:
   • brake pads ①
   • brake pad spring ②

NOTE:

Always install new brake pads and a new 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)

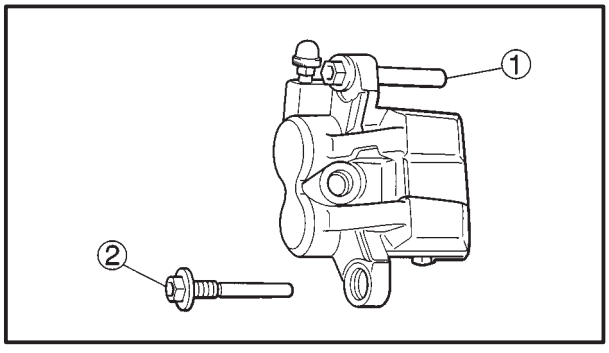
d. Install new brake pads and brake pad spring.

NOTE:

• Make sure that the brake pad spring is installed correctly as shown.

6. Lubricate:
   • brake caliper guide bar ①
   • brake pad bolts ②

Recommended lubricant
Lithium soap base grease

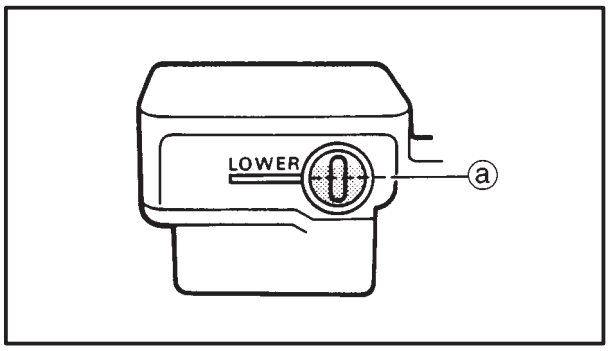


CAUTION:

- **Do not allow grease to contact the brake pads.**
- **Remove any excess grease.**

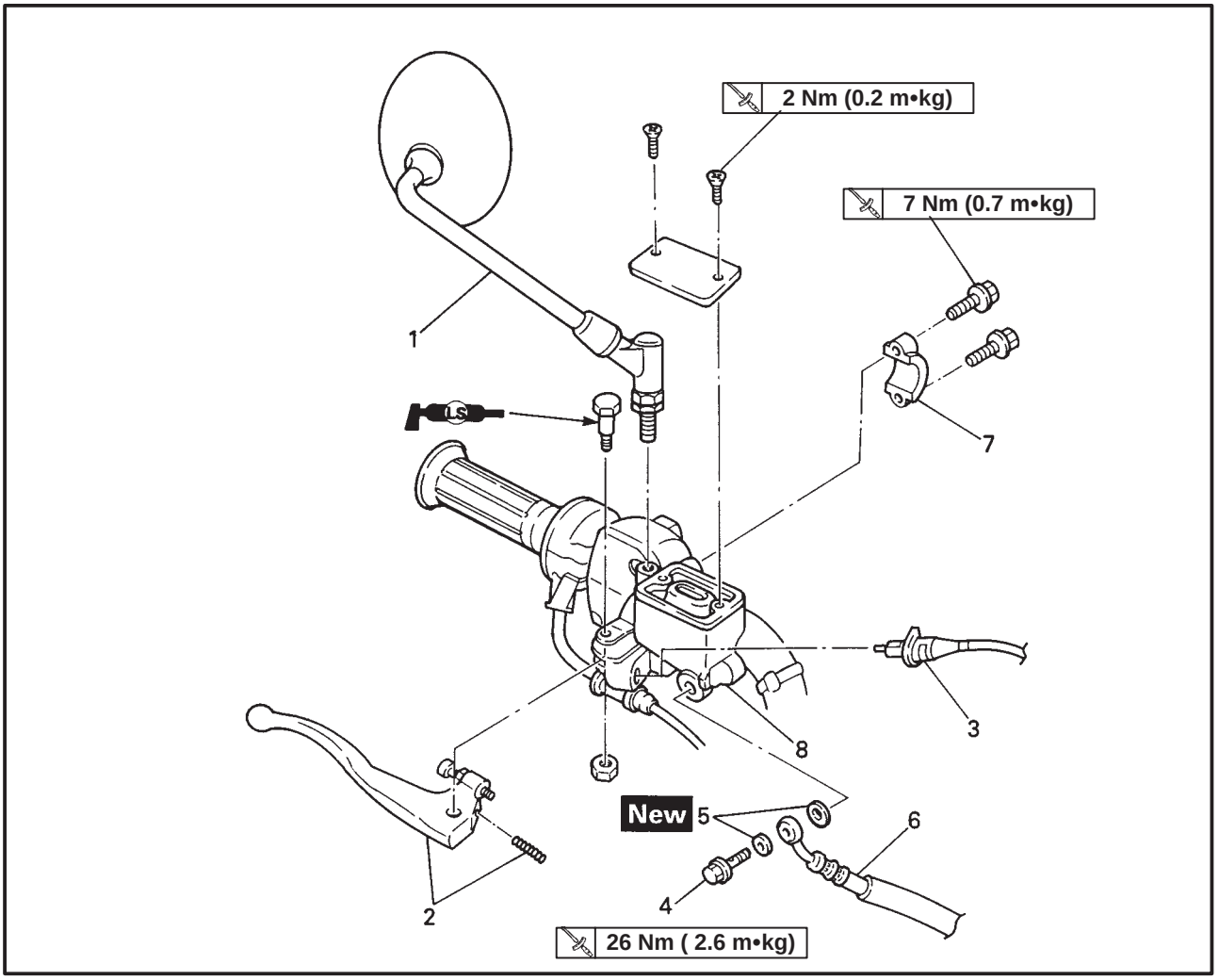
7. Install:
   • brake caliper
   • brake pad bolt

27 Nm (2.7 m•kg)

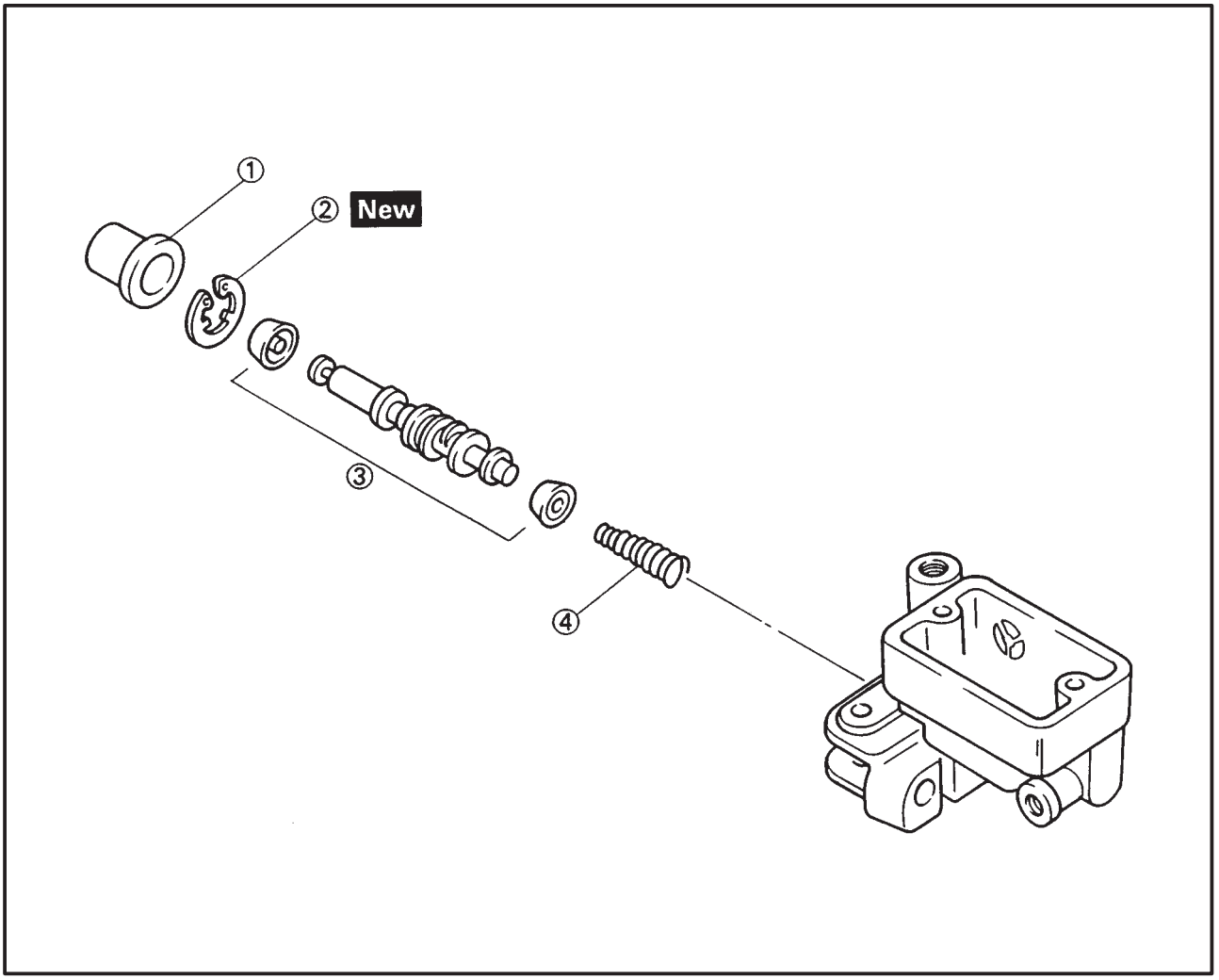


8. Check:
   • brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
9. Check:
   • brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC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

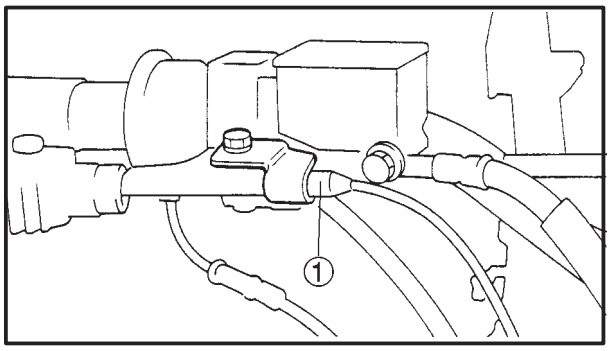
FRONT BRAKE MASTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Drain the brake fluid		
1	Rear view mirror (right)	1	
2	Brake lever/compression spring	1/1	
3	Brake switch	1	
4	Union bolt	1	Refer to "DISASSEMBLING/ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER".
5	Copper washers	2	
6	Brake hose	1	
7	Bracket (master cylinder)	1	
8	Master cylinder	1	
			For installation, reverse the removal procedure.



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

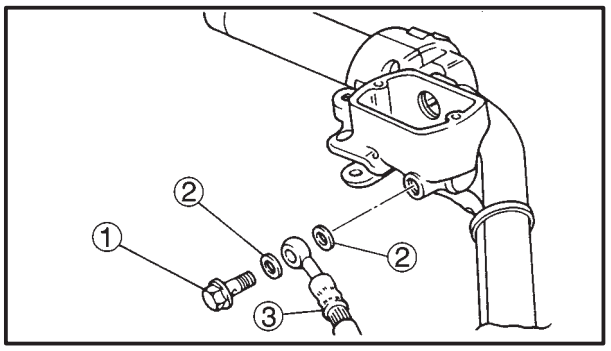


EAS00588

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE:

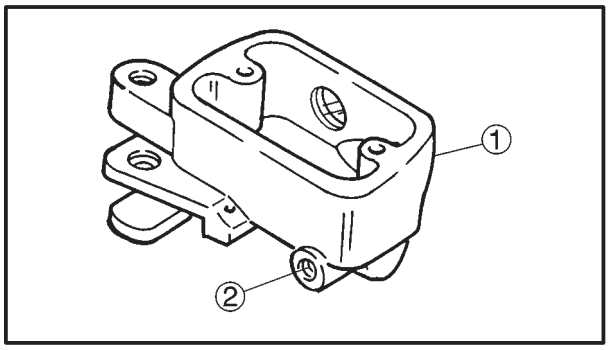
Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.



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

NOTE:

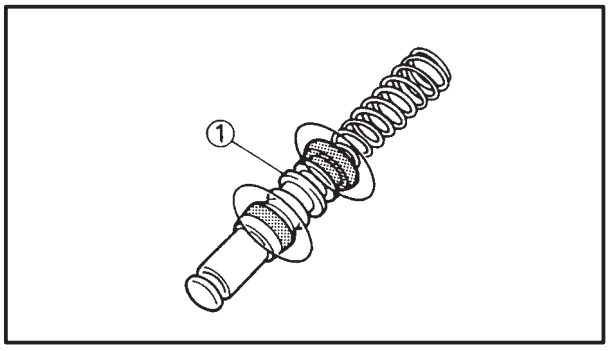
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



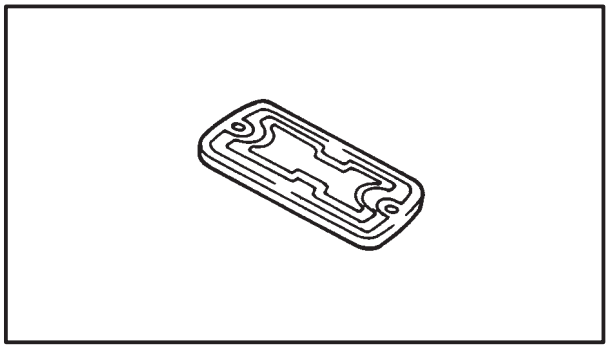
EAS00590

CHECKING THE FRONT BRAKE MASTER CYLINDER

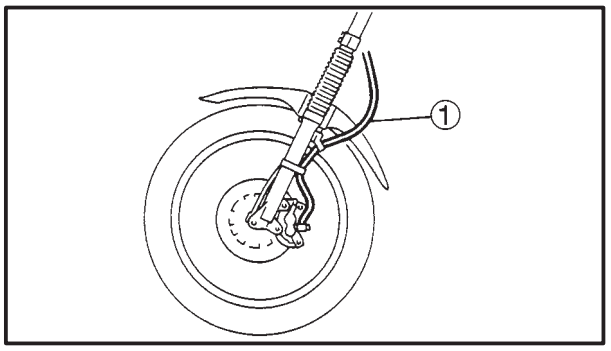
1. Check:
   - brake master cylinder ①
     Damage/scratches/wear → Replace.
   - brake fluid delivery passages ②
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.



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



3. Check:
   - brake master cylinder reservoir diaphragm
     Damage/wear → Replace.



4. Check:
   • brake hose ①
   Cracks/damage/wear → Replace.

EAS00598

ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

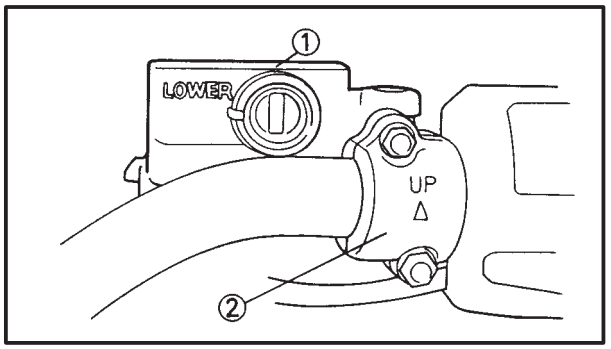
⚠ WARNING

- **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

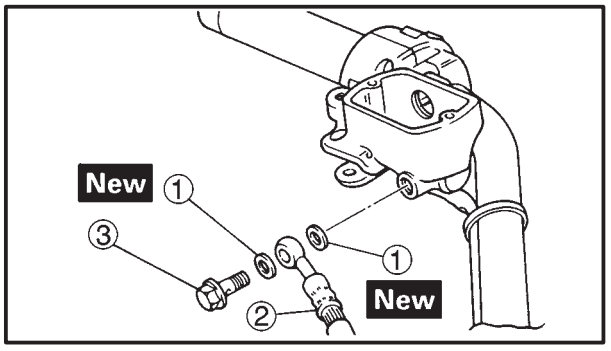
1. Install:
   • brake master cylinder ①

7 Nm (0.7 m•kg)



NOTE:

- Install the brake master cylinder holder with the "UP" mark ② facing up.
- First, tighten the upper bolt, then the lower bolt.

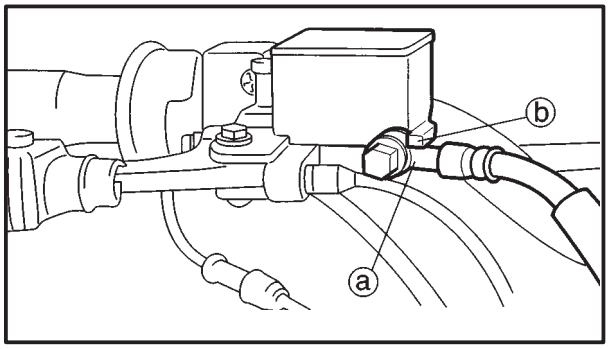


2. Install:
   • copper washers ① New
   • brake hose ②
   • union bolt ③

26 Nm (2.6 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 master cylinder,make sure that the brake pipe ⓐ touches the projection ⓑ on the master cylinder.

NOTE:

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

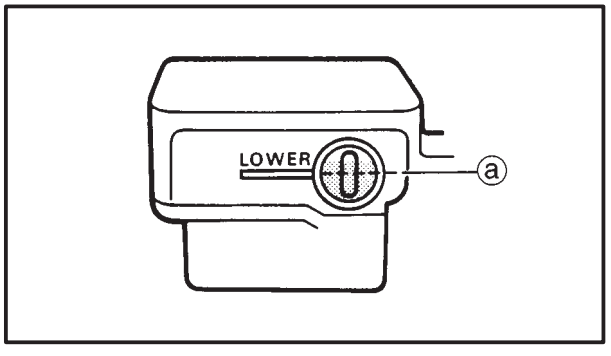
⚠ WARNING

- **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.**

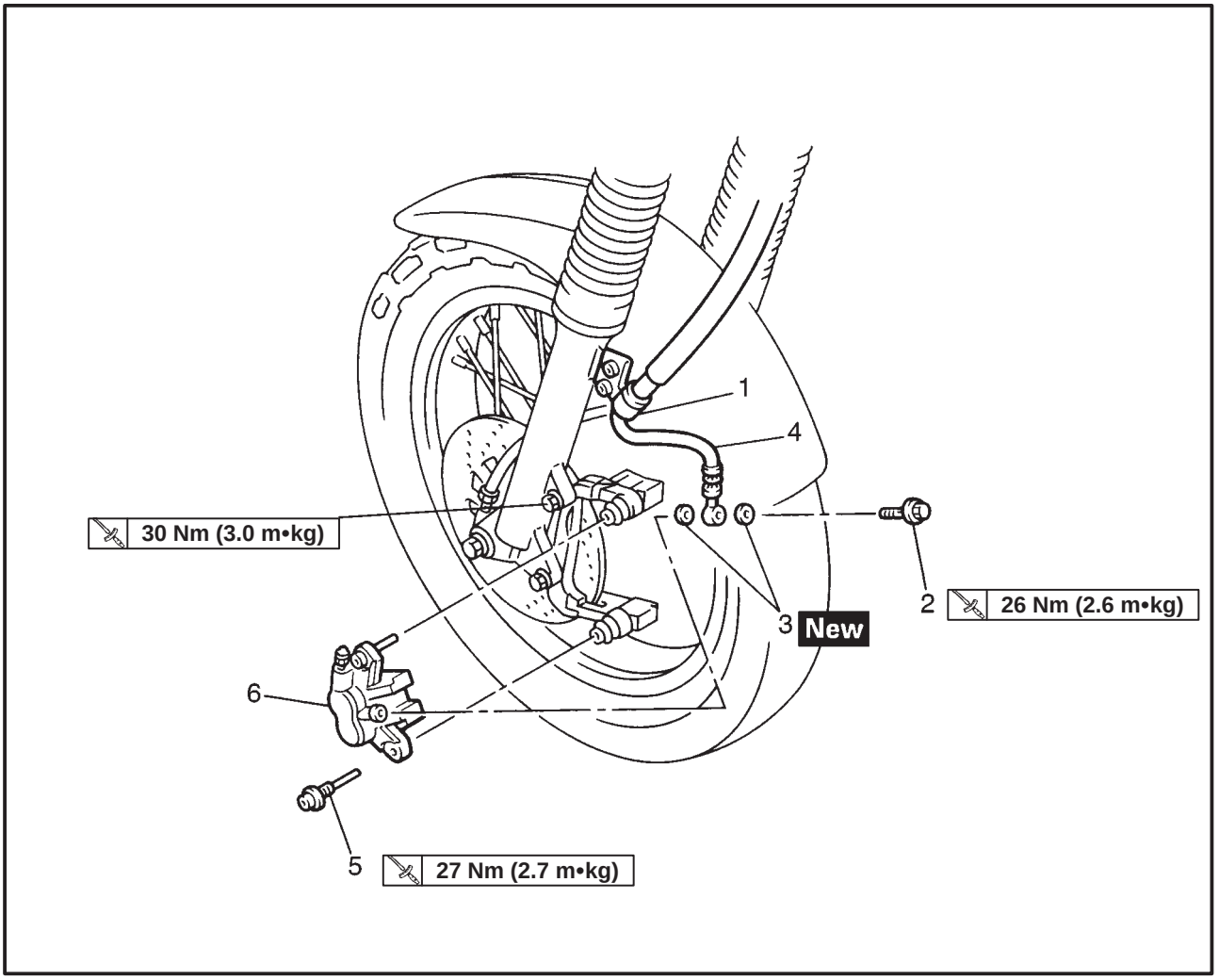
CAUTION:

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

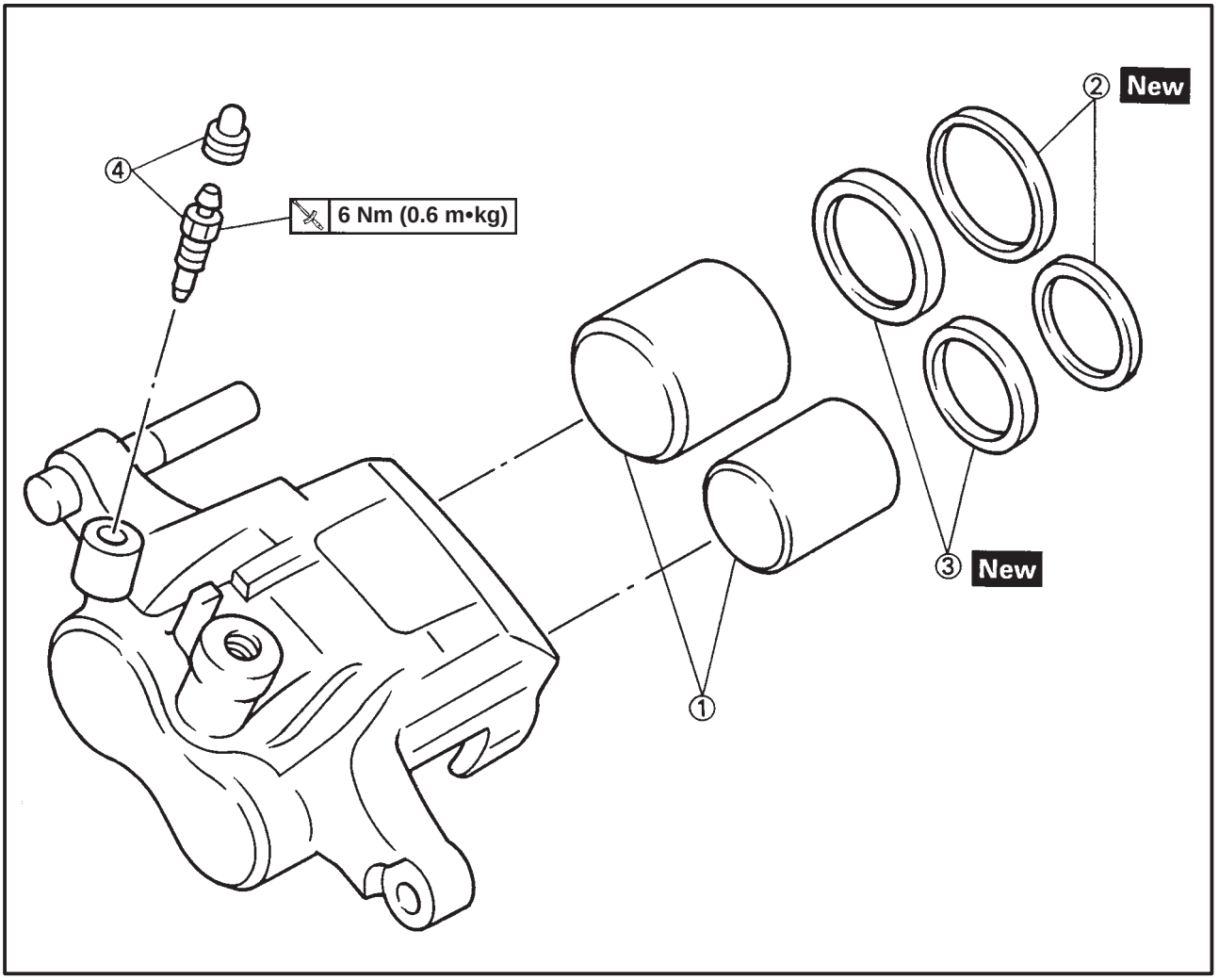
4. Bleed:
   • brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
5. Check:
   • brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
6. Check:
   • brake lever operation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



FRONT BRAKE CALIPER



Order	Job/Part	Q'ty	Remarks
	Removing the front brake caliper		Remove the parts in the order listed.
	Drain teh brake fluid		
1	Brake hose holder	1	
2	Union bolt	1	Refer to "DISASSEMBLING/ ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER" .
3	Plain washer	1	
4	Brake hose	1	
5	Caliper support bolt	1	
6	Caliper assembly	1	
			For installation, reverse the removal procedure.

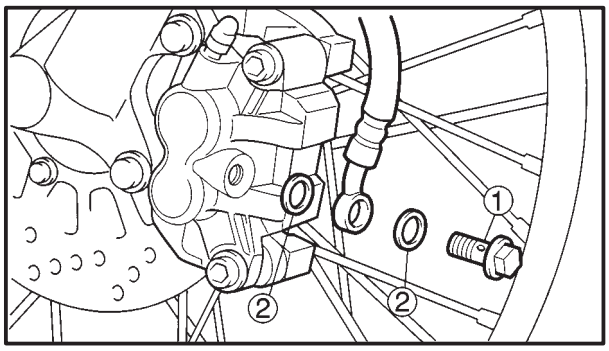


Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake caliper		Disassemble the parts in the order listed.
	Brake pad		Refer to "BRAKE PAD" section.
①	Caliper pistons	2	Refer to "DISASSEMBLING THE FRONT BRAKE CALIPER".
②	Dust seals	2	
③	Piston seals	2	
④	Bleed screw/Cap	1	
			For assembly, reverse the disassembly procedure.

EAS00619
DISASSEMBLING THE FRONT BRAKE CALIPER

NOTE:

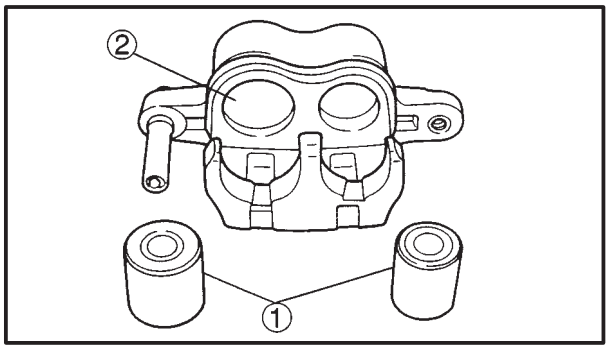
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



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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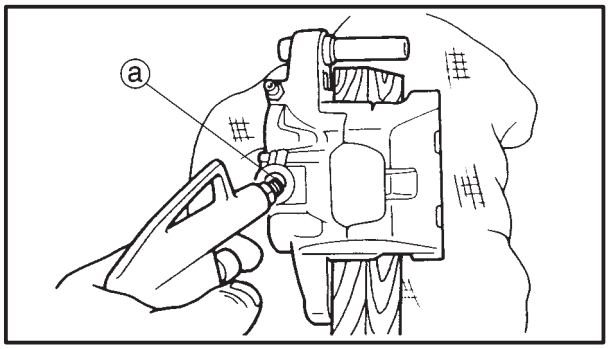
a. Blow compressed air into the brake hose joint opening ⓐ to force out the pistons from the brake caliper.

⚠ WARNING

- **Cover the brake caliper pistons with a rag. Be careful not to get injured when the pistons are expelled from the brake caliper.**
- **Never try to pry out the brake caliper pistons.**



b. Remove the brake caliper piston seals.

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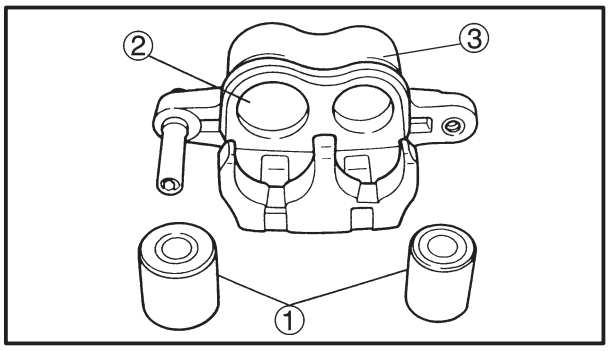
EAS00631
CHECKING THE FRONT BRAKE CALIPER

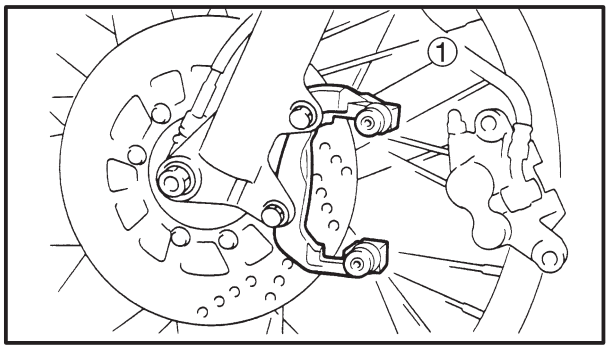
Recommended brake component replacement schedule	
Brake pads	**If necessary**
Piston seals	**Every two years**
Brake hoses	**Every two years**
Brake fluid	**Every two years and whenever the brake is disassembled.**



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

⚠ WARNING

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



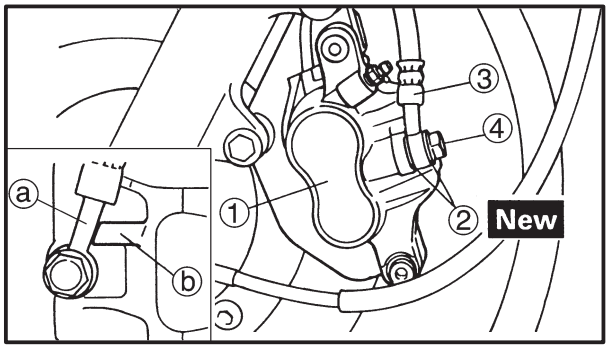
2. Check:
   - brake caliper bracket ①
     Cracks/damage → Replace.

EAS00634

ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER

⚠ WARNING

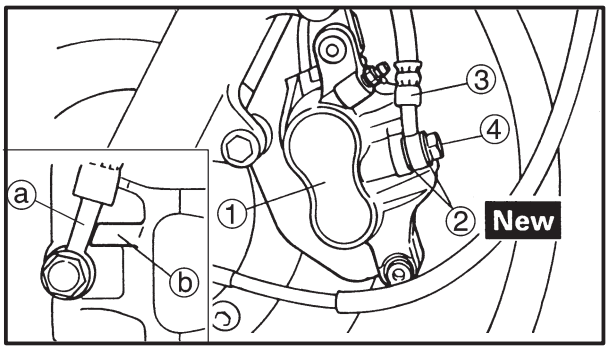
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components as they will cause the piston seals to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper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



Recommended brake fluid
DOT 4

1. Install:
   - brake caliper ① (temporarily)
   - copper washers ② New
   - brake hose ③
   - union bolt ④

26 Nm (2.6 m•kg)



⚠ WARNING

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

CAUTION:

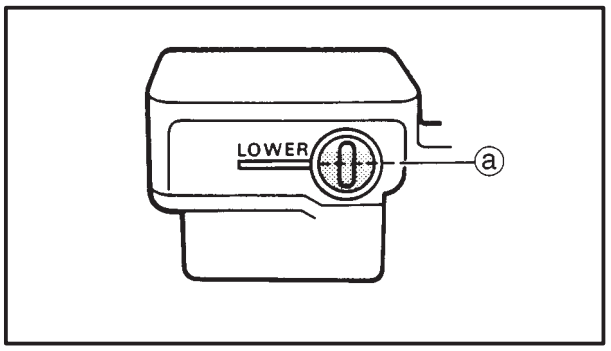
When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ⓐ touches the projection ⓑ on the brake caliper.

2. Remove:
   • brake caliper
3. Install:
   • brake pads
   • brake pad springs
   • brake caliper retaining bolt
     27 Nm (2.7 m•kg)
   • brake caliper bracket
     30 Nm (3.0 m•kg)
   • brake hose holder
     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.**

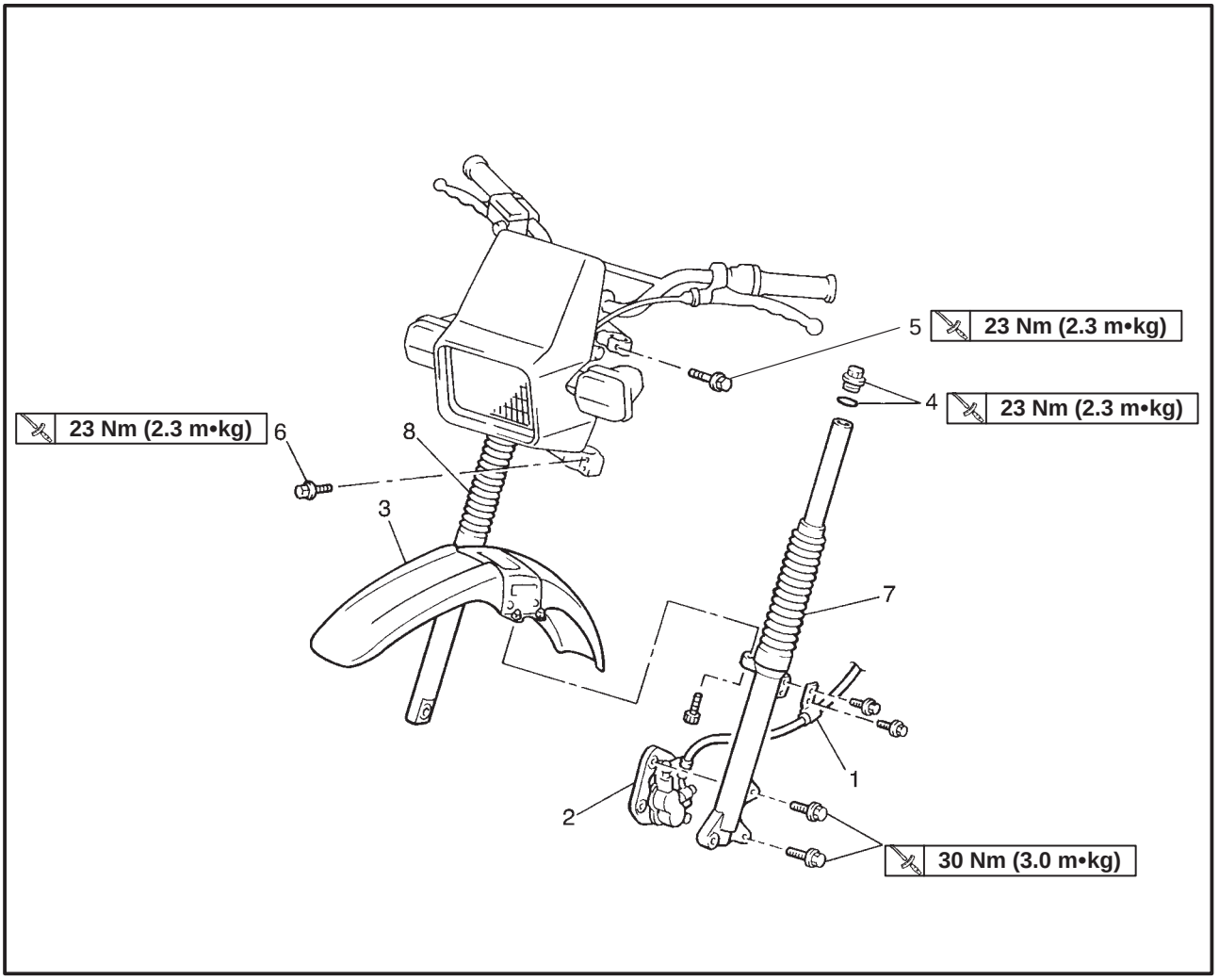


CAUTION:

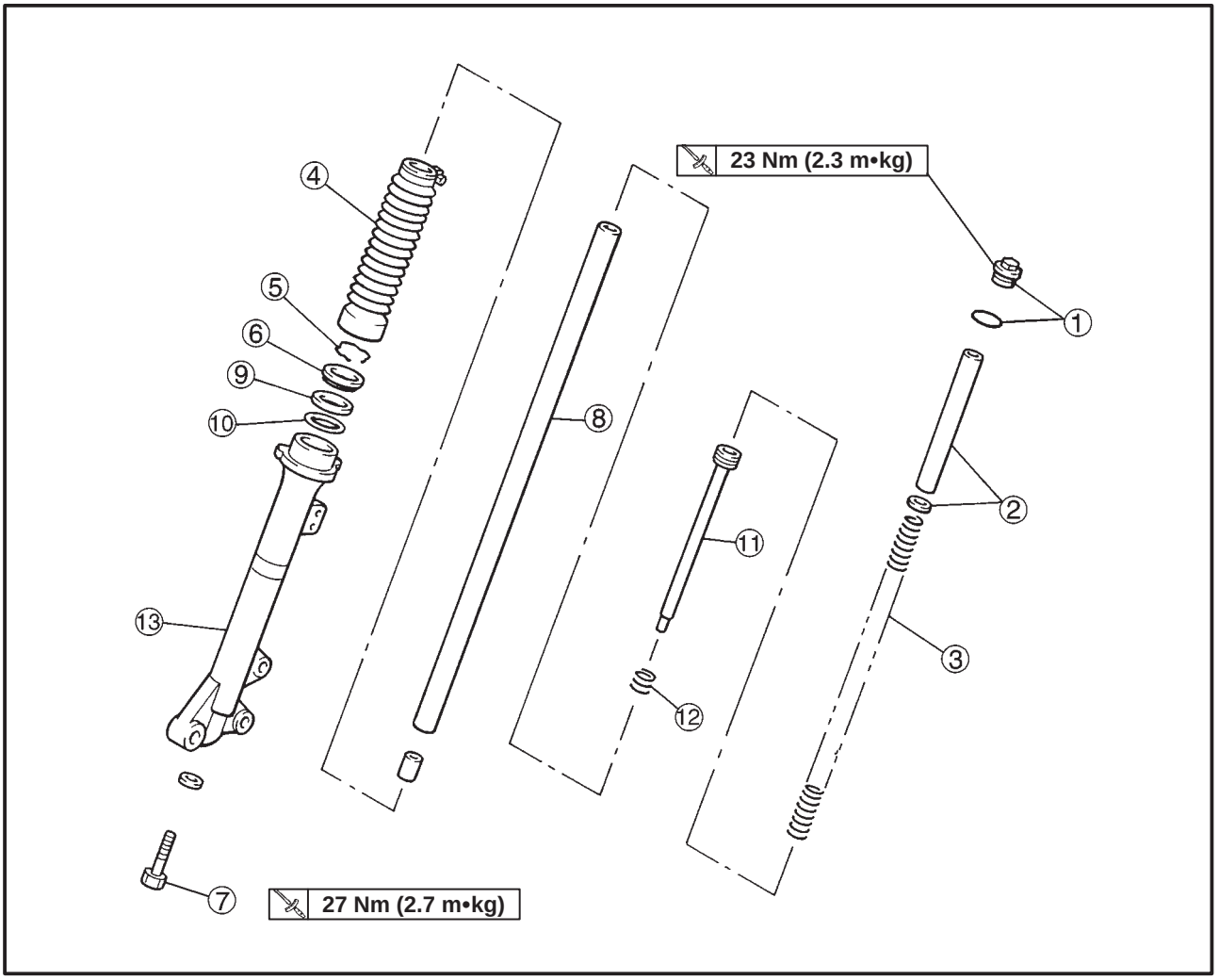
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

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.

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 DISC".
1	Brake hose holder	1	
2	Caliper	1	
3	Front fender	1	
4	Cap bolt/O-ring	1/1	Refer to "REMOVING/INSTALLING THE FRONT FORK". **NOTE:** Loosen the bolt.
5	Bolt (upper bracket)	1	
6	Bolts (under bracket)	2	
7	Front fork assembly (left)	1	
8	Front fork assembly (right)	1	
			For installation, reverse the removal procedure.



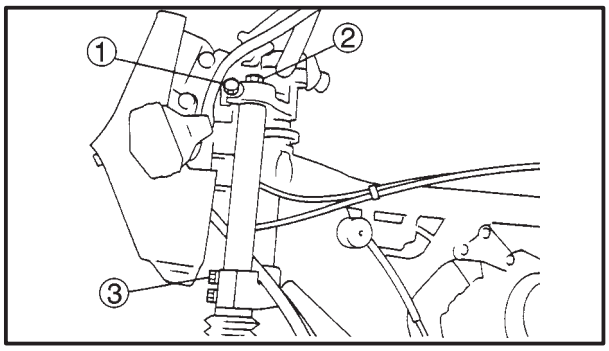
Order	Job/Part	Q'ty	Remarks
	Disassembling the front fork		Disassemble the parts in the order listed.
①	Cap bolt/O-ring	1/1	
②	Collar/washer	1/1	
③	Fork spring	1	**NOTE:**
④	Boot	1	Drain the fork oil.
⑤	Retaining clip	1	
⑥	Oil seal	1	Refer to "DISASSEMBLING/ ASSEMBLING THE FRONT FORK".
⑦	Damper rod bolt	1	
⑧	Inner tube assembly	1	
⑨	Oil seal	1	
⑩	Outer tube bushing	1	Refer to "ASSEMBLING THE FRONT FORK"
⑪	Damper rod	1	
⑫	Rebound spring	1	
⑬	Outer tube	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

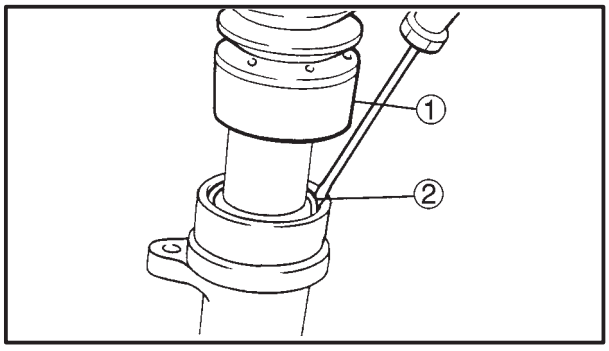
⚠ WARNING

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

3. Remove:
   - front fork leg

EAS00655
DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Drain:
   - fork oil

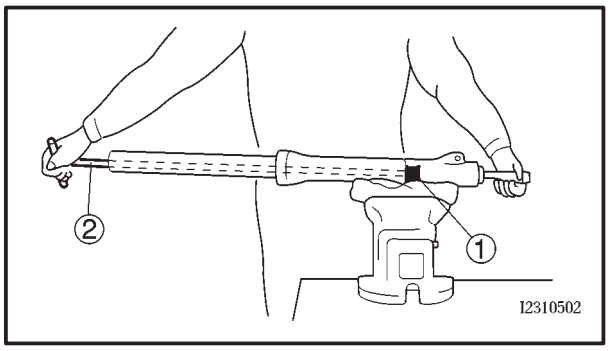
NOTE:
While stroking the inner tube several times, drain the fork oil.



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

CAUTION:

Do not scratch the inner tube.



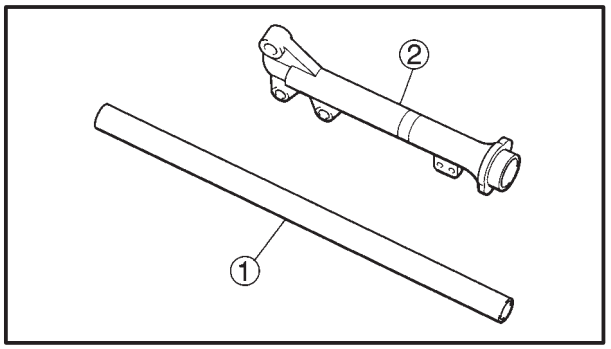
3. Remove:
   • damper rod bolt
   • copper washer

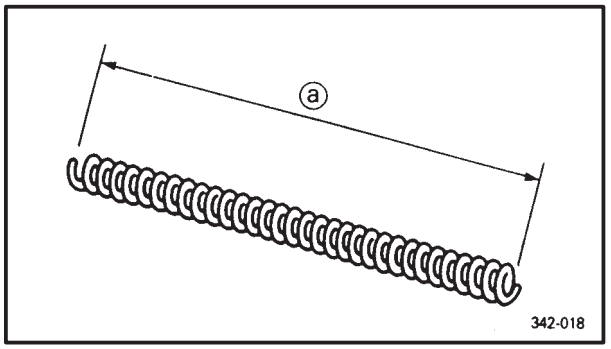
NOTE:

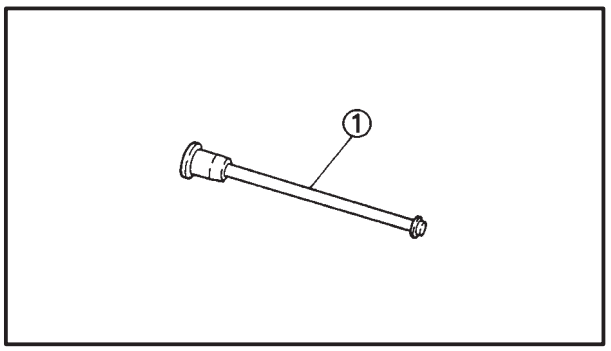
While holding the damper rod with the damper rod holder ①and T-handle ②, loosen the damper rod bolt.

Damper rod holder
90890-01294
T-handle
90890-01326

4. Remove:
   • inner tube







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
338 mm

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

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.

EAS00659

ASSEMBLING THE FRONT FORK LEGS

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

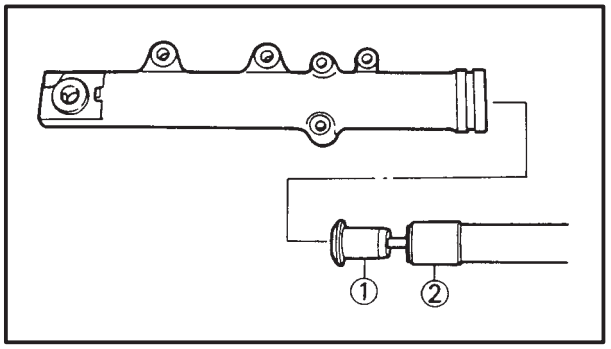
⚠ WARNING

- **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:
  -outer tube bushing
  -oil seal
- Before assembling the front fork leg, make sure that all of the components are clean.

1. Install:
   - damper rod ①
   - inner tube ②



CAUTION:

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

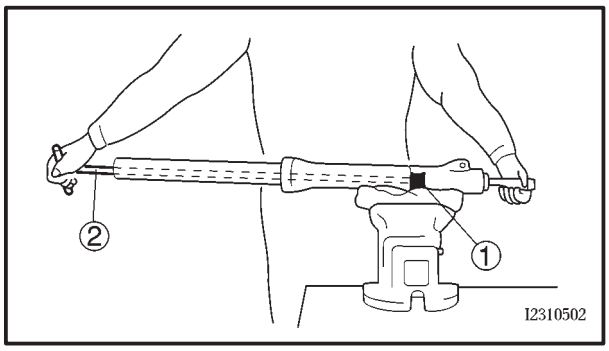
2. Lubricate:
   • inner tube's outer surface

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

3. Tighten:
   • damper rod bolt — **27 Nm (2.7 m•kg)**

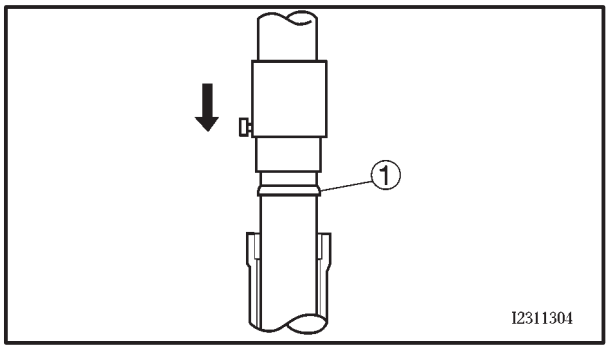
NOTE:

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



	Damper rod holder **90890-01294** **T-handle** **90890-01326**

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

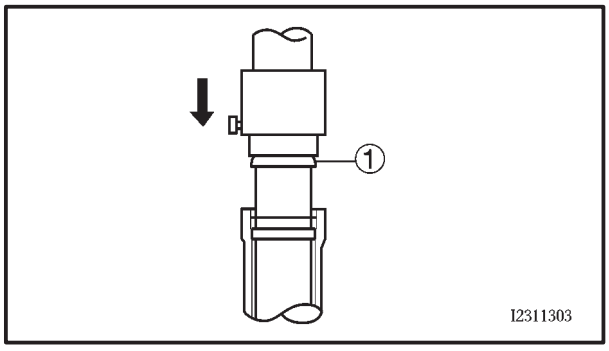


	Fork seal driver weight **90890-01367** **Adapter** **90890-01368**

5. Install:
   • oil seal ①
   (with the fork seal driver weight and adapter)

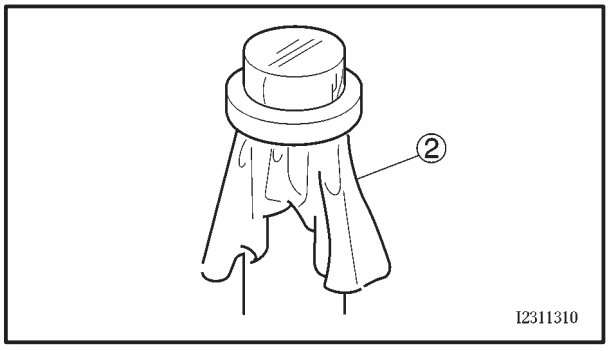
CAUTION:

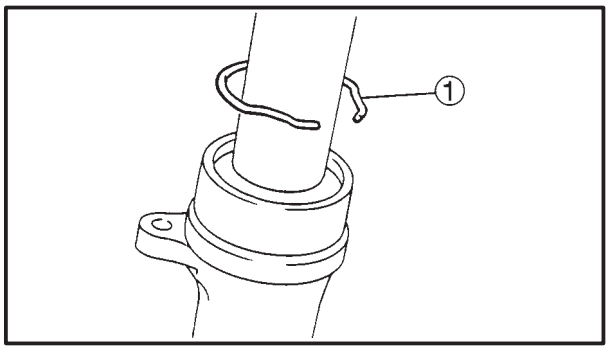
Make sure that the numbered side of the oil seal faces up.



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 ② to protect the oil seal during installation.

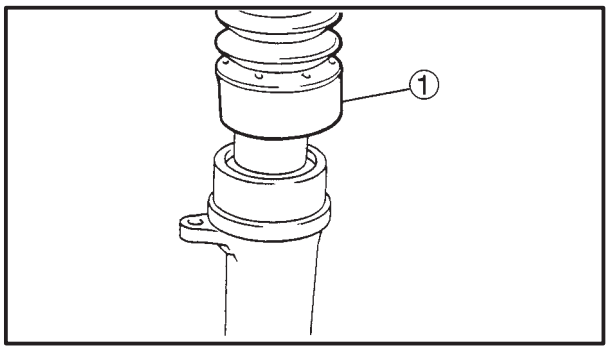




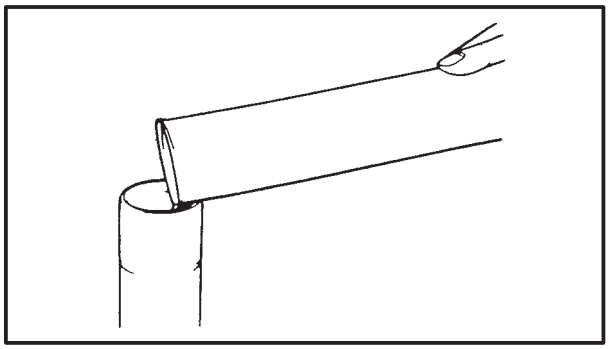
6. Install:
   • oil seal clip ①

NOTE:

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

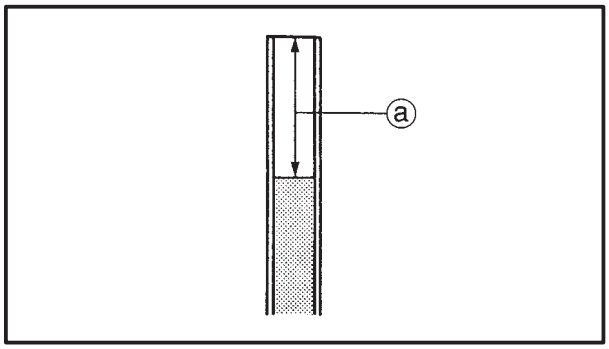


7. Install:
   • boot ①



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

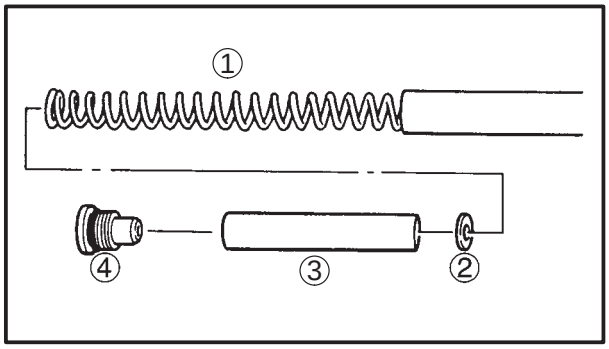
Quantity (each front fork leg)
0.243 L
Yamaha fork and shock oil 10W or equivalent.



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

NOTE:

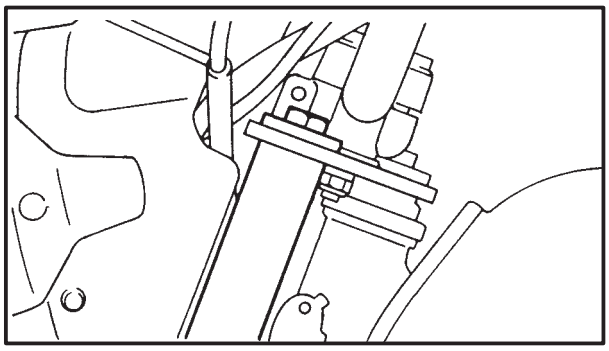
- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.

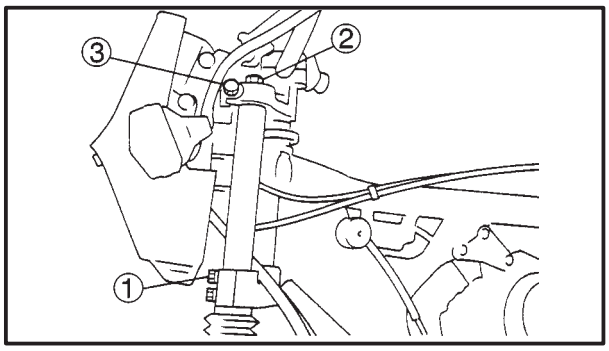


9. Install:
   • spring ①
   • spring seat ②
   • spacer ③
   • cap bolt ④

NOTE:

- Before installing the cap bolt, apply grease onto O-ring.
- Temporarily tighten the cap bolt.





EAS00662

INSTALLING THE FRONT FORK LEGS

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

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

NOTE:

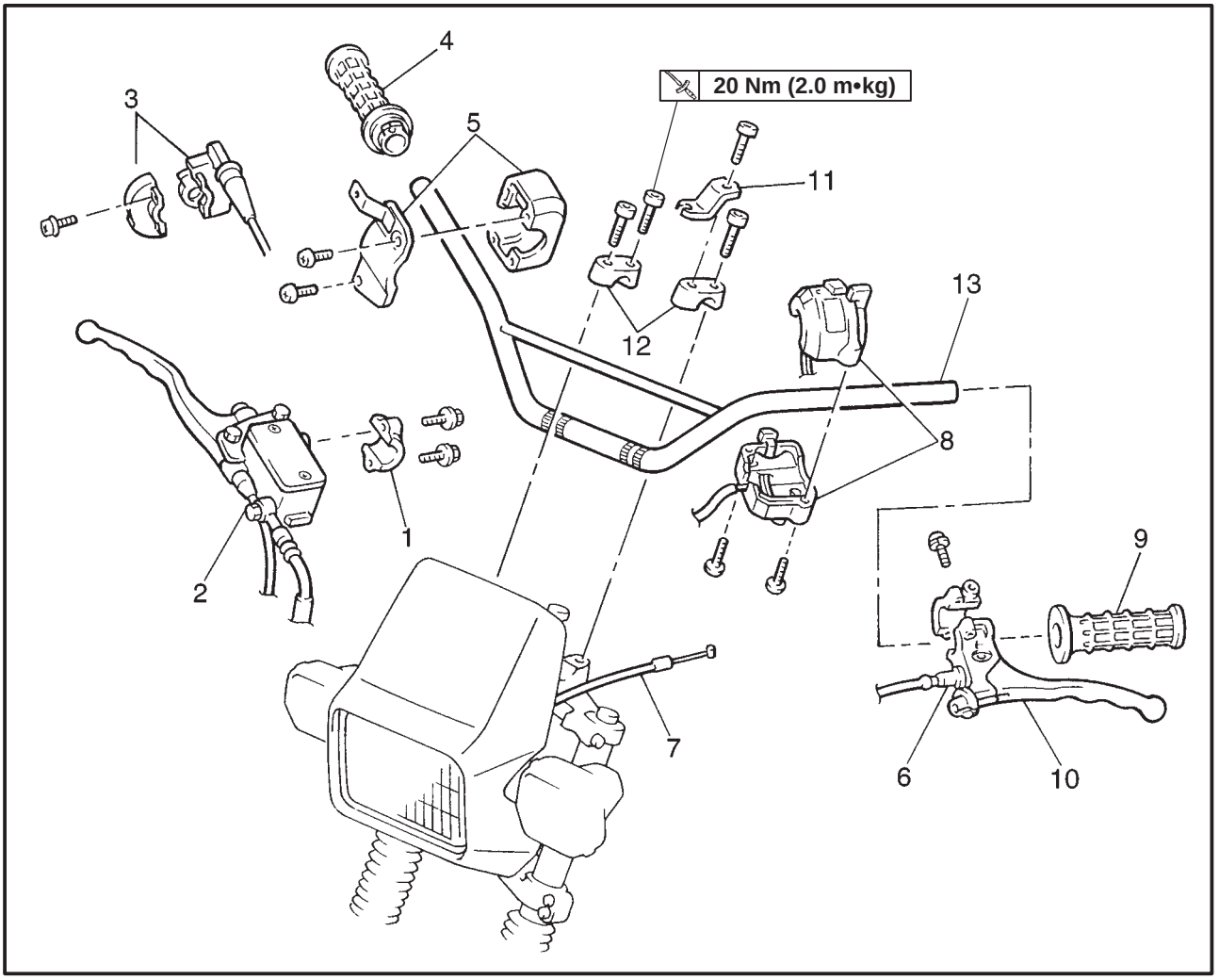
Make sure that the inner fork tube is flush with the top of the handlebar holder.

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

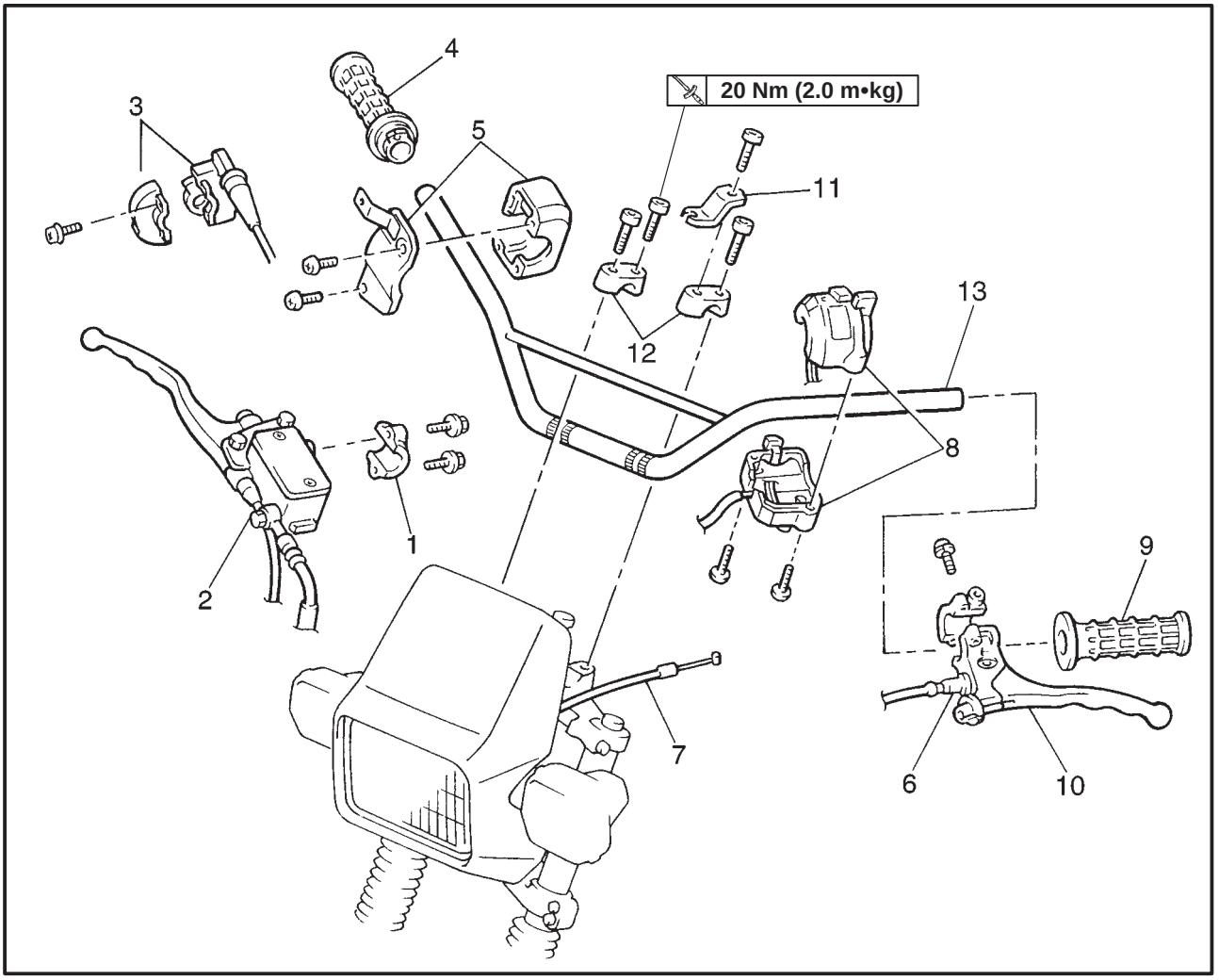
⚠ WARNING

Make sure that the brake hoses are routed properly.

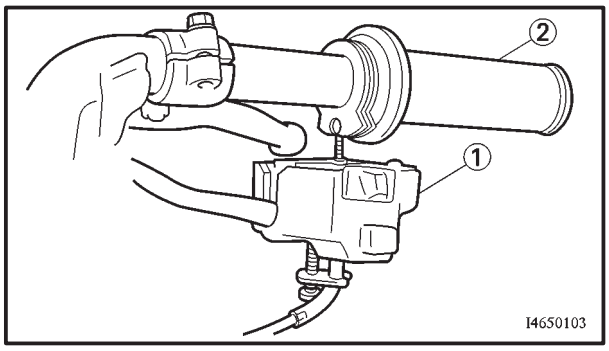
HANDLEBAR

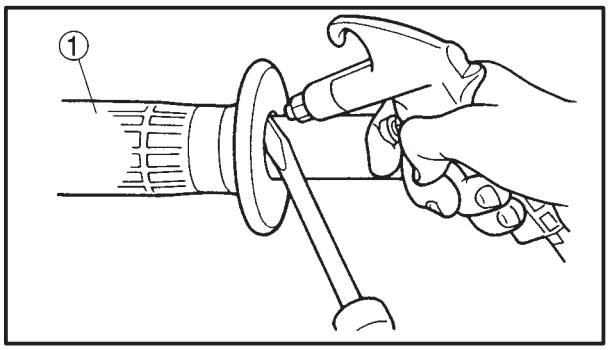


Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed.
1	Master cylinder bracket	1	Refer to "INSTALLING THE HANDLEBAR".
2	Master cylinder	1	
3	Housing (throttle grip)	1	
4	Throttle grip assembly	1	
5	Handlebar switch (right)	1	
6	Clutch switch	1	
7	Clutch cable	1	



Order	Job/Part	Q'ty	Remarks
8	Handlebar switch (left)	1	
9	Grip (left)	1	Refer to "REMOVING THE HANDLEBAR" section.
10	Clutch lever	1	
11	Starter cable holder	1	
12	Upper holders	2	Refer to "INSTALLING THE HANDLEBAR" section.
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 (left) ①

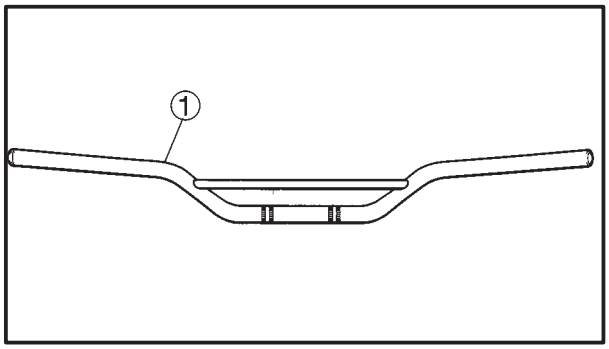
NOTE:

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 ①
     Bends/cracks/damage → Replace.

⚠ WARNING

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

3. Install:
   - handlebar grip

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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.

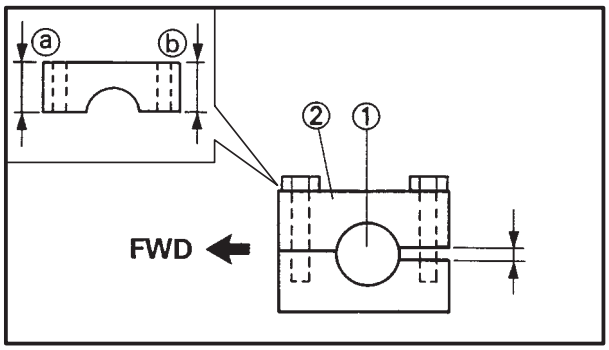
EB704700

INSTALLING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

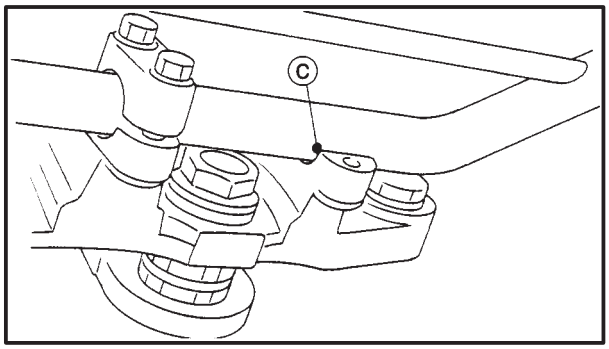
⚠ WARNING

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



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

20 Nm (2.0 m•kg)



CAUTION:

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

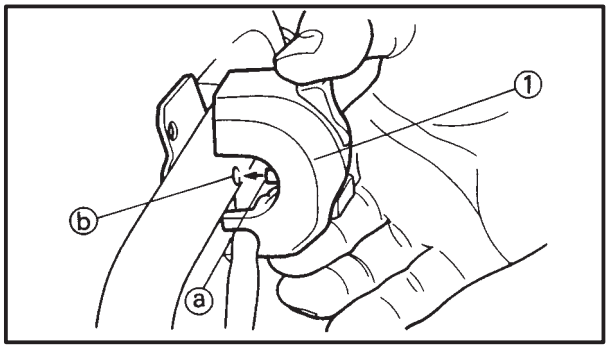
NOTE:

- The upper handlebar holders should be installed with the arrows ⓐ facing forward.

ⓐ large
ⓑ short

- Align the match marks ⓒ on the handlebar with the upper surface of the lower handlebar holders.

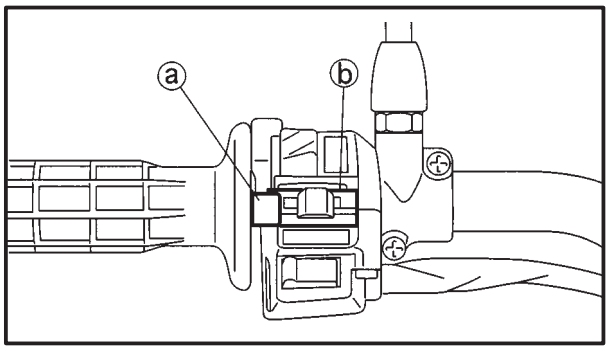
3. Install:
   - throttle grip
   - throttle cable housing
   - throttle cable



4. Install:
   - right handlebar switch ①

NOTE:

Align the pin ⓐ on the handlebar switch with the hole ⓑ in the handlebar.



5. Install:
   • left handkbar switch

NOTE:

Align the tab ⓐ on the plate with the slot ⓑ on the handkbar switch/

6. Install:
   • clutch cable
7. Connect:
   • clutch switch coupler

NOTE:

Apply a thin coat of litium soap base grease onto the end of the clutch cable.

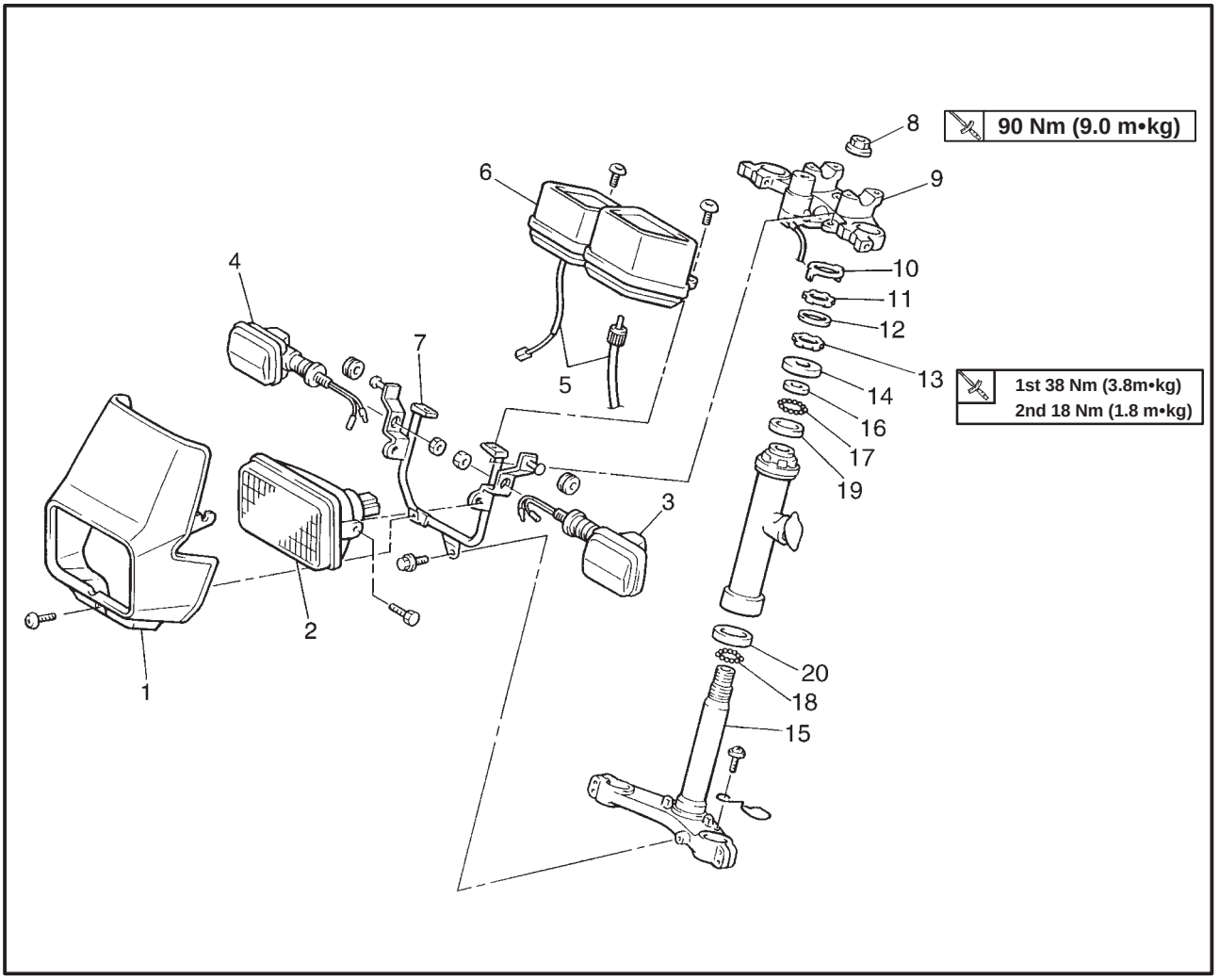
8. Adjust:
   • clutch cable free play
   Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" in chapter 3.

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

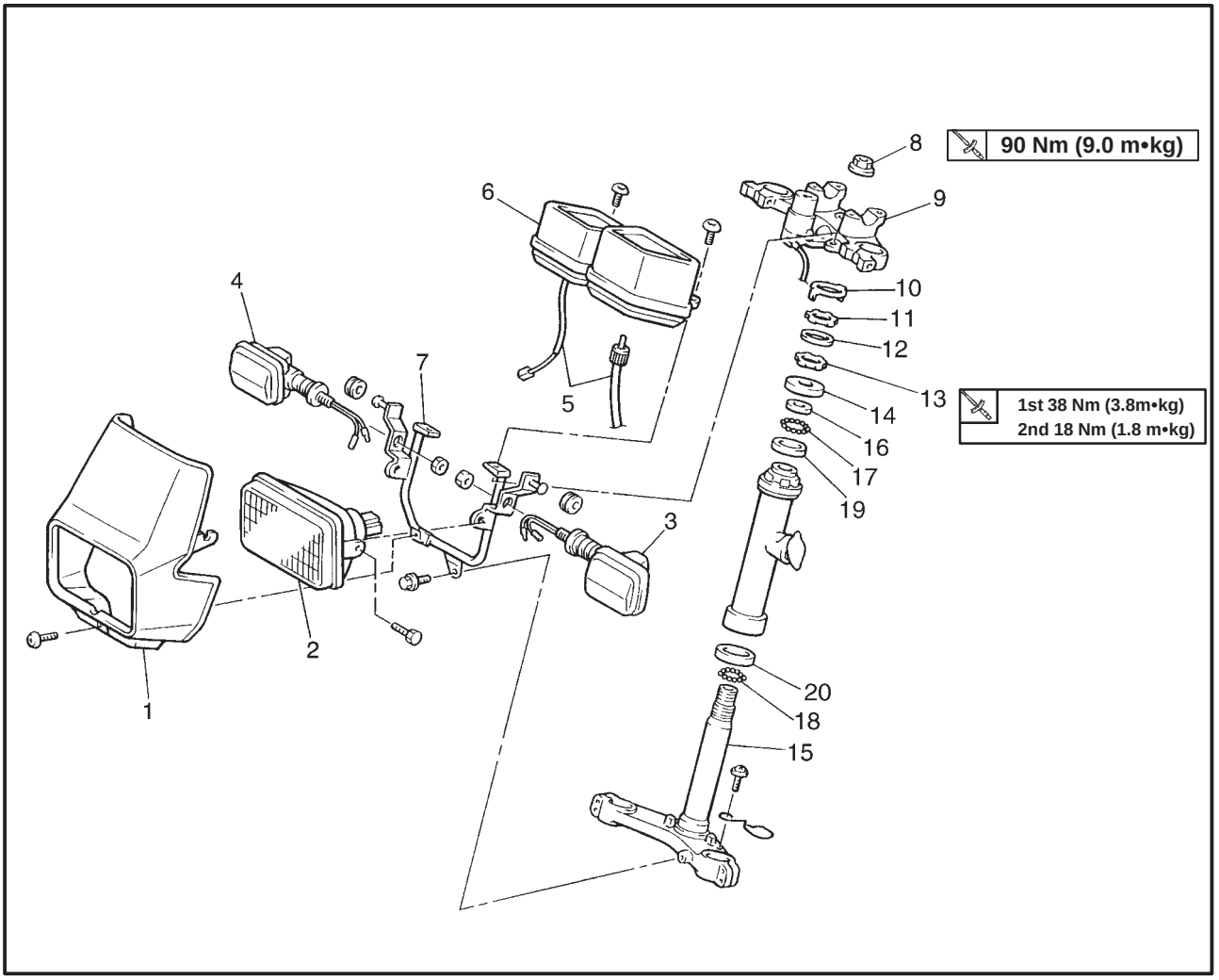
9. Adjust:
   • throttle cable free play
   Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.

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

STEERING HEAD



Order	Job/Part	Q'ty	Remarks
	Removing the lower bracket		Remove the parts in the order listed.
	Front fork		Refer to "FRONT FORK".
	Handlebar		Refer to "HANDLEBAR"
1	Headlight cover	1	
2	Headlight unit	1	
3	Flasher light assembly (left)	1	
4	Flasher light assembly (right)	1	
5	Meter cable/Meter lead	1/1	**NOTE:**
6	Meter assembly	1	Disconnect the connector.
7	Headlight stay	2	
8	Steering stem nut	1	
9	Handlebar crown	1	
10	Lock washer	1	
11	Upper ring nut	1	
12	Rubber washer	1	
13	Lower ring nut	1	Refer to "INSTALLING THE STEERING HEAD".
14	Ball race cover	1	
15	Lower bracket	1	

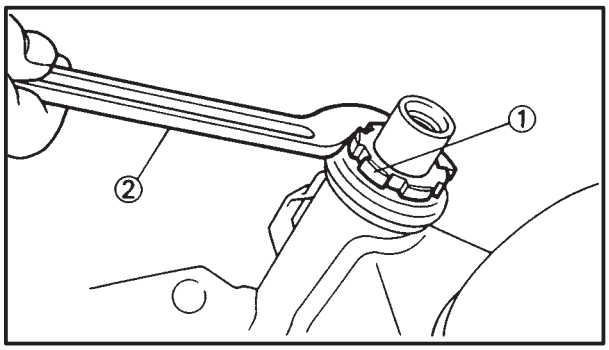


Order	Job/Part	Q'ty	Remarks
16	Ball race (upper)	1	Refer to "INSTALLING THE STEERING".
17	Ball	22	
18	Ball	19	
19	Ball race (center)	1	
20	Ball race (lower)	1	
			For installation, reverse the removal procedure.

EAS00679
REMOVING THE LOWER BRACKET
1. Stand the motorcycle on a level surface.

⚠ WARNING

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



2. Remove:
   - upper ring nut
   - rubber washer
   - lower ring nut ①

NOTE:

Hold the lower ring nut with the exhaust and steering nut wrench, then remove the upper ring nut with the ring nut wrench.

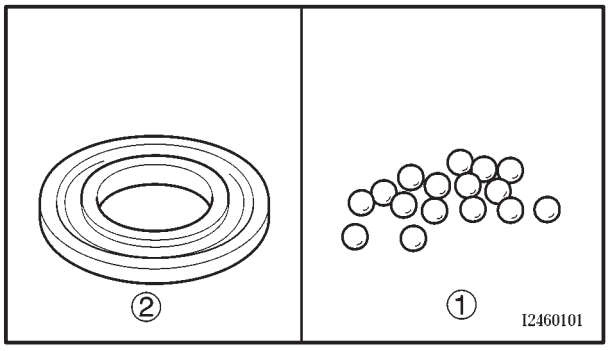
Exhaust and steering nut wrench ②
90897-01268

⚠ WARNING

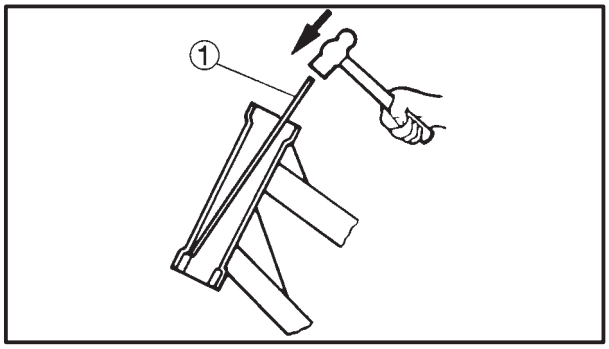
Securely support the lower bracket so that there is no danger of it falling.

EAS00682
CHECKING THE STEERING HEAD
1. Wash:
   - bearing balls
   - bearing races

Recommended cleaning solvent
Kerosine



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



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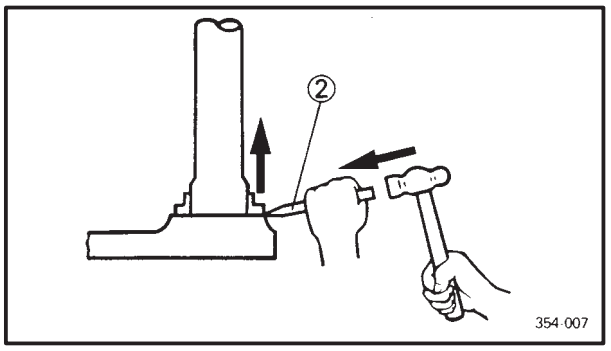
a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.



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

CAUTION:

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

NOTE:

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

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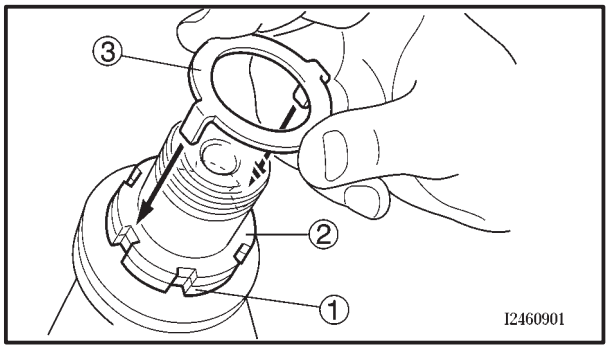
4. Check:
   - upper bracket
   - lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

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

NOTE:

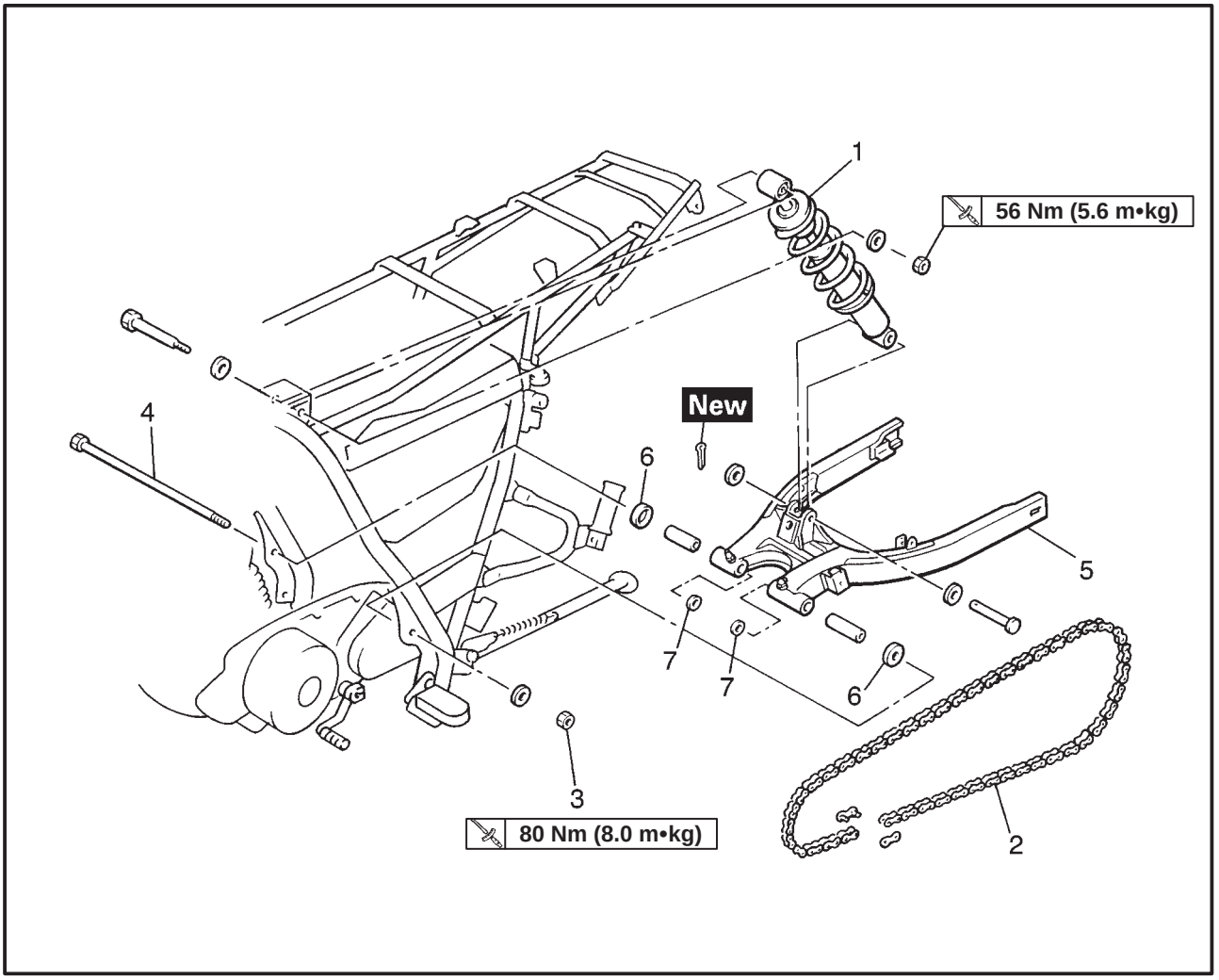
Temporarily tighten the steering stem nut.

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

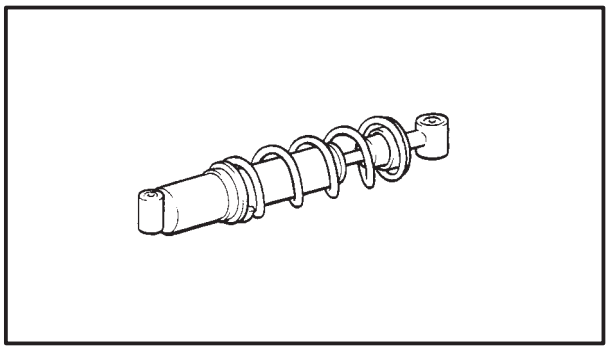
NOTE:

Temporarily tighten the upper and lower bracket pinch bolts.

REAR SHOCK ABSORBER AND SWINGARM



Order	Job/Part	Q'ty	Remarks
	Rear shock absorber and swingarm removal		Remove the parts in order.
	Rear wheel		Refer to "REAR WHEEL AND REAR BRAKE."
	Chain case		
1	Rear shock absorber	1	Refer to "REMOVING/INSTALLING THE REAR SHOCK ABSORBER"
2	Drive chain	1	Refer to "REMOVING/INSTALLING THE DRIVE CHAIN"
3	Nut	1	Refer to REMOVING/INSTALLING THE SWINGARM".
4	Pivot shaft	1	
5	Swingarm	1	
6	Cover (swingarm)	2	
7	Bush	2	
			For installation, reverse the removal procedure.



EAS00687
HANDLING THE REAR SHOCK ABSORBER

⚠ WARNING

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

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

EAS00689
DISPOSING OF A REAR SHOCK ABSORBER

a. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill 2 ~ 3mm 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.

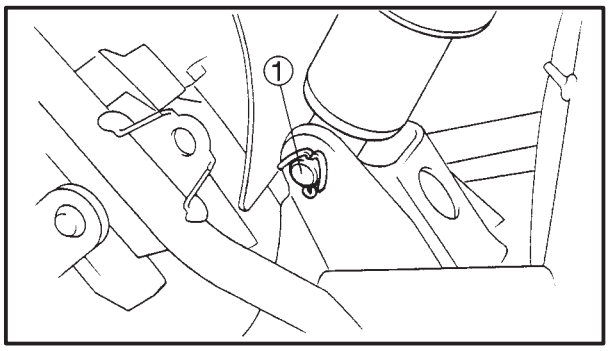
EAS00694
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

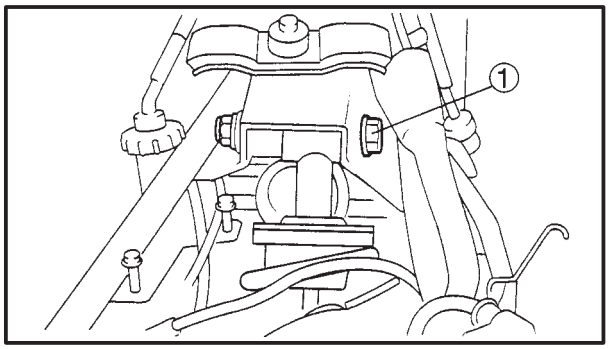
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - rear shock absorber assembly lower pin ①

NOTE:

While removing the rear shock absorber assembly lower pin, 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.

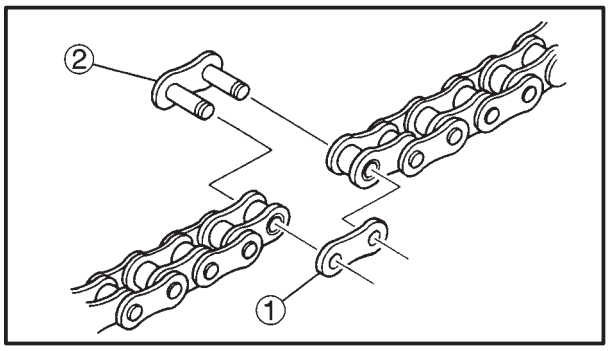
EAS00706
REMOVING THE DRIVE CHAIN
1. Stand the motorcycle on a level surface.

⚠ WARNING

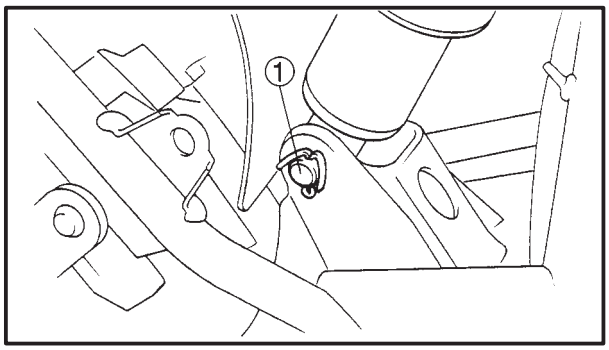
Securely support the motorcycle so that there is no danger of it falling over.

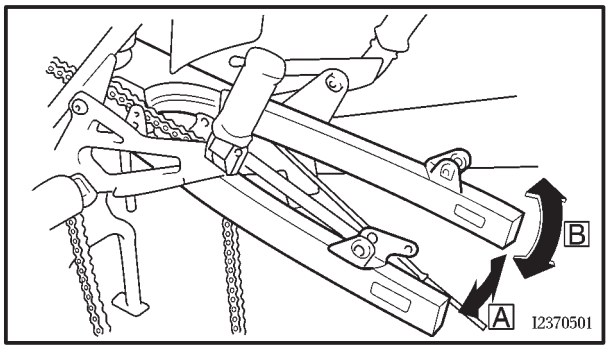
NOTE:

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



2. Remove:
   - chain cover
3. Remove:
   - master link clip
     (with interlocking slip-joint pliers)
4. Remove:
   - master link plate ①
   - master link ②
5. Remove:
   - drive chain





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:
   - rear shock absorber assembly lower pin ①

NOTE:

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

3. Check:
   - swingarm side play [A]
   - swingarm vertical movement [B]

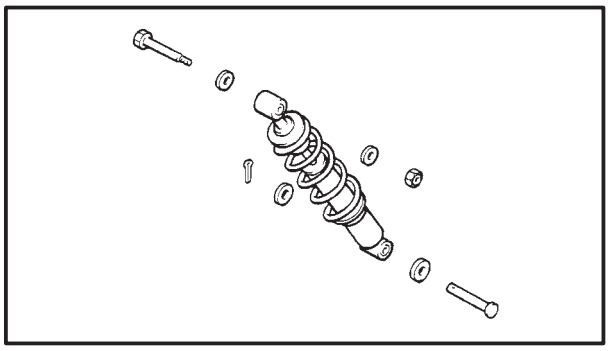
a. Check the tightening torque of the pivot shaft nut.

Pivot shaft nut
80 Nm (8.0 m•kg)

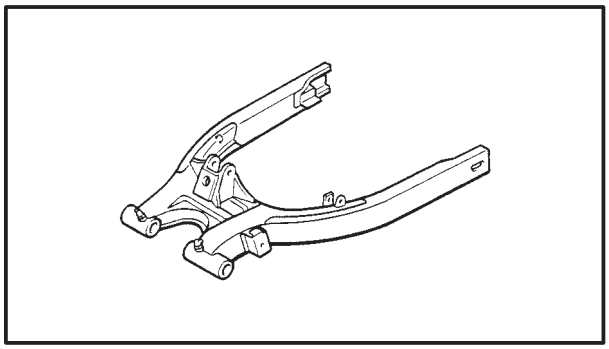
b. Check the swingarm side play [A] by moving the swingarm from side to side.
c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.

Swingarm side play (at the end of the swingarm)
1.0 mm

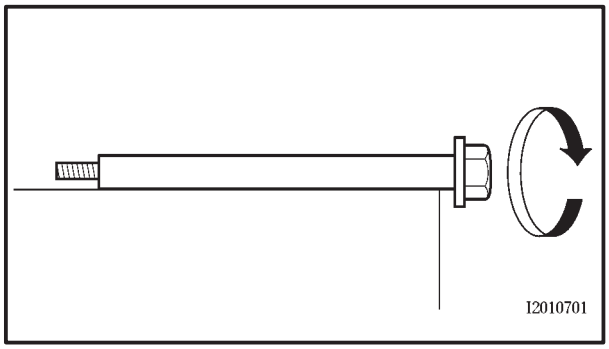
d. Check the swingarm vertical movement [B] by moving the swingarm up and down.
   If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.



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.



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



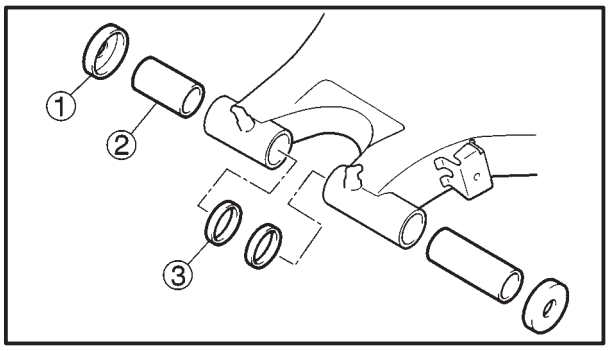
2. Check:
   - pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

⚠ WARNING

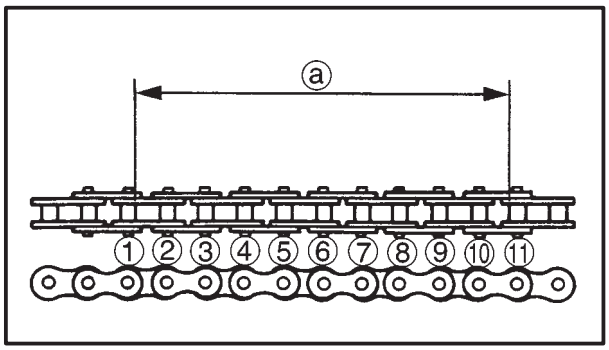
Do not attempt to straighten a bent pivot shaft.

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
     Damage/pitting → Replace.



EAS00710

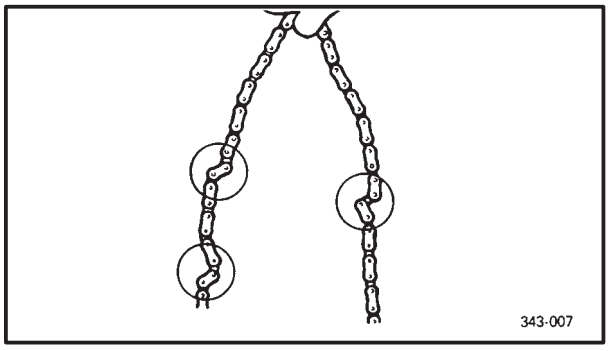
CHECKING THE DRIVE CHAIN

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

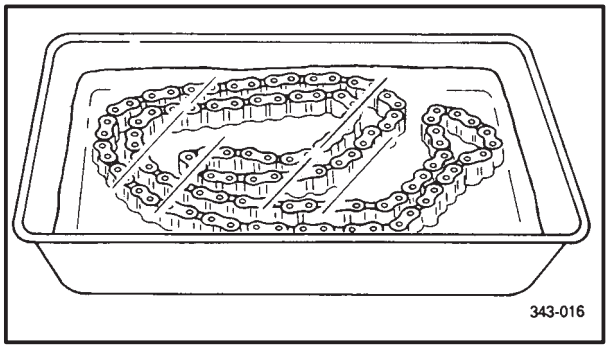
10-link drive chain section limit (maximum)
121.4 mm

NOTE:

- While measuring the 10-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.

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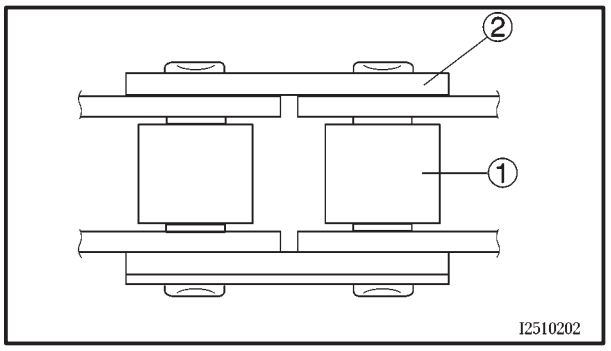
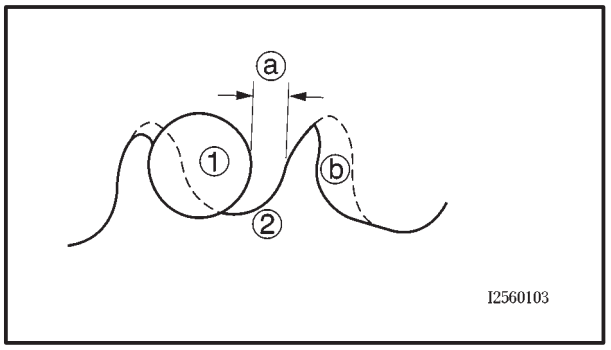


4. Check:
   • drive chain rollers ①
     Damage/wear → Replace the drive chain.
   • drive chain side plates ②
     Damage/wear → Replace the drive chain.
     Cracks → Replace the drive chain and make sure that the battery breather hose is properly routed away from the drive chain and below the swingarm.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

Recommended lubricant
Engine oil or chain lubricant suitable for non-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

EAS00697
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   • spacers
   • bearings

Recommended lubricant
Molybdenum disulfide grease

2. Install:
   • rear shock absorber assembly

56 Nm (5.6 m•kg)

NOTE:

When installing the rear shock absorber assembly, lift up the swingarm.

EAS00711
INSTALLING THE SWINGARM

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

Recommended lubricant
Molybdenum disulfide grease

2. Install:
   - Swingarm

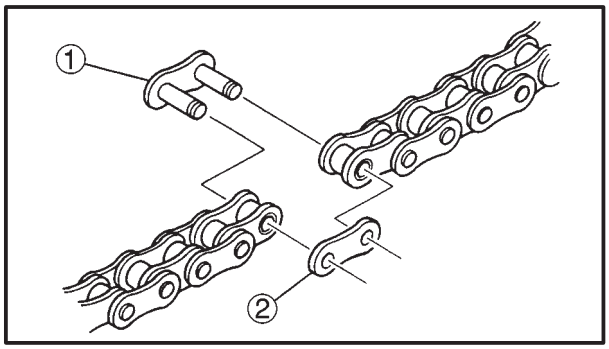
80 Nm (8.0 m•kg)

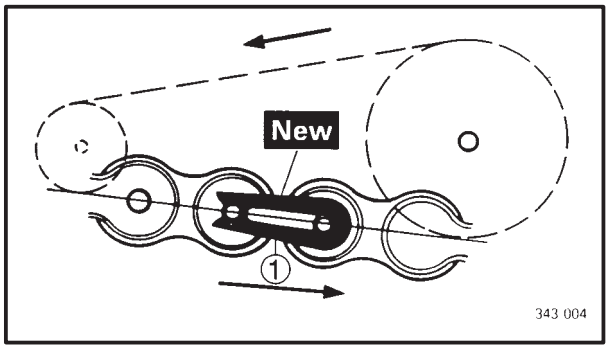
3. Install
   - rear shock absorber assembly
   - rear wheel

   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
35 ~ 60 mm





EAS00714
INSTALLING THE DRIVE CHAIN

1. Lubricate:
   - drive chain
   - master link (New)

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

2. Install:
   - master link ①
   - master link plate ②

3. Install:
   - master link clip ①

CAUTION:

- **The closed end of the master link clip must face in the direction of drive chain rotation.**
- **Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain’s life.**

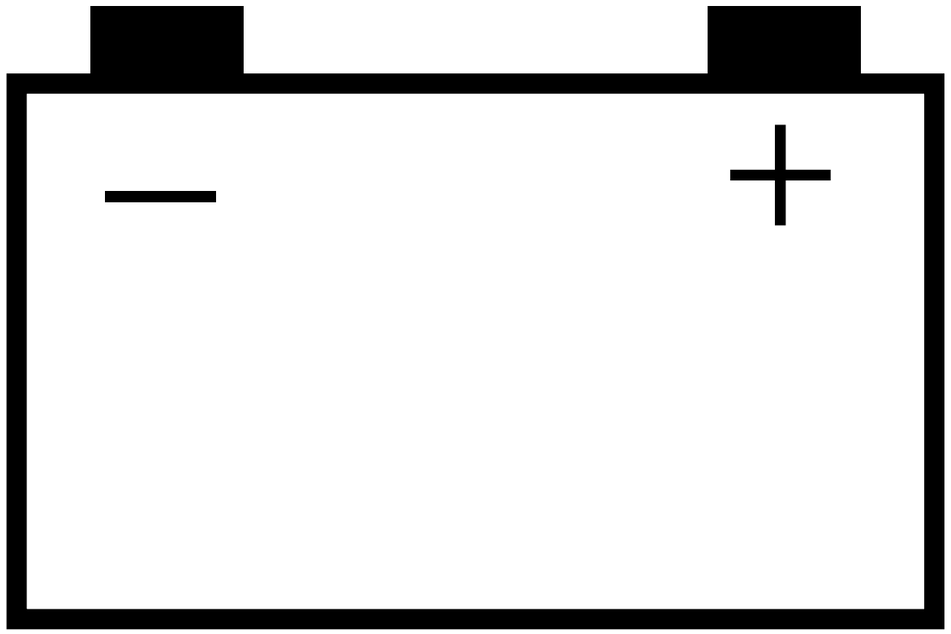
4. Adjust:
   - drive chain slack

   Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

Drive chain slack
35 ~ 60 mm

CAUTION:

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



ELEC 7

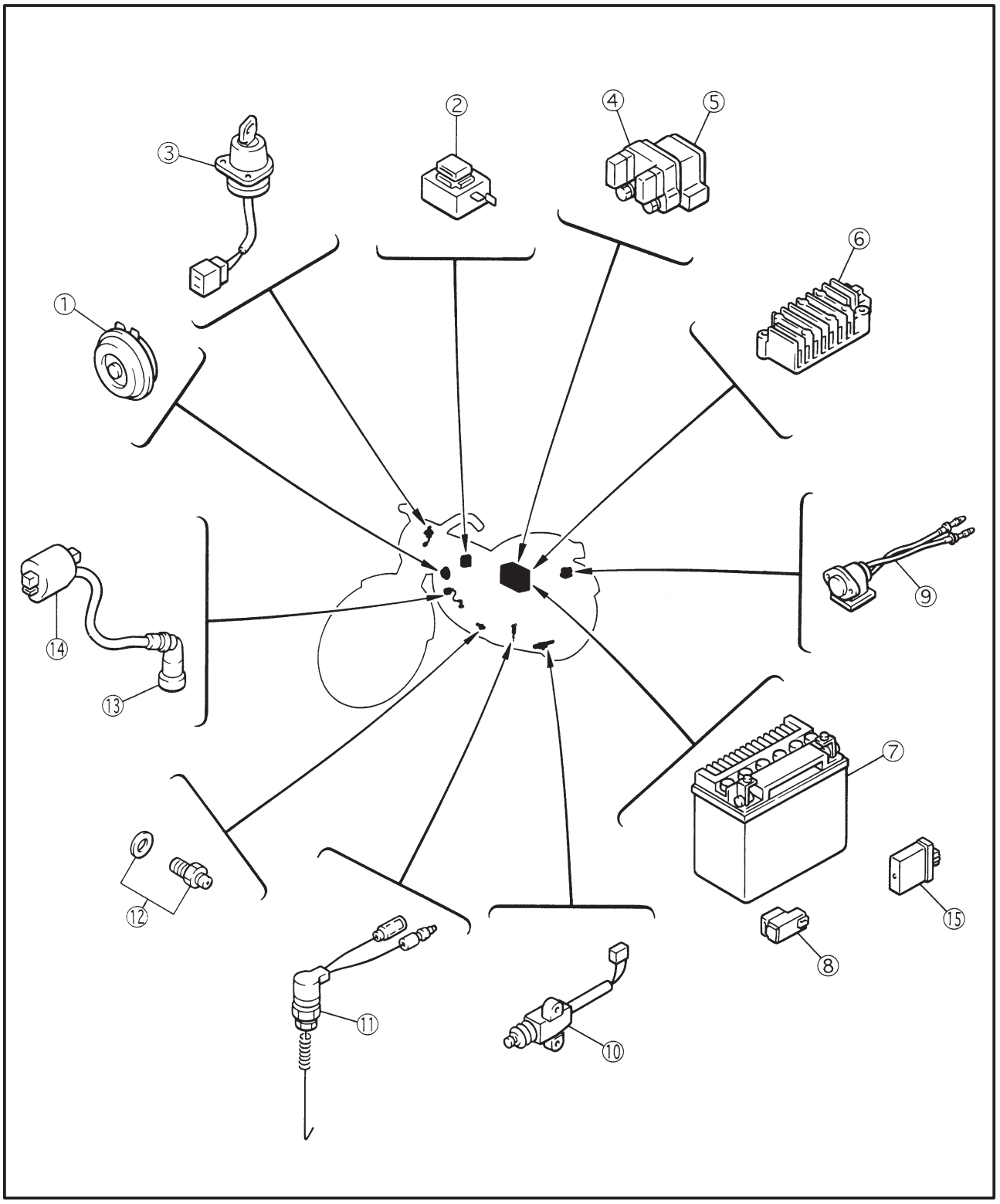
CHAPTER 7.
ELECTRICAL

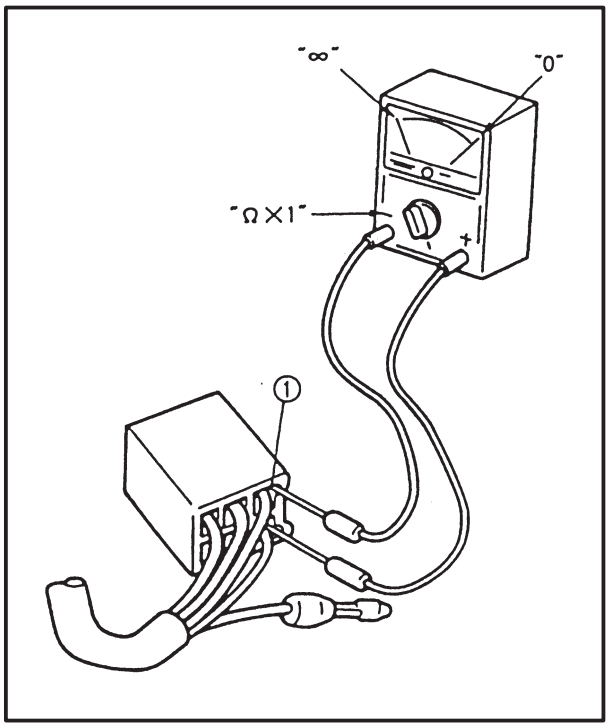
EAS00729

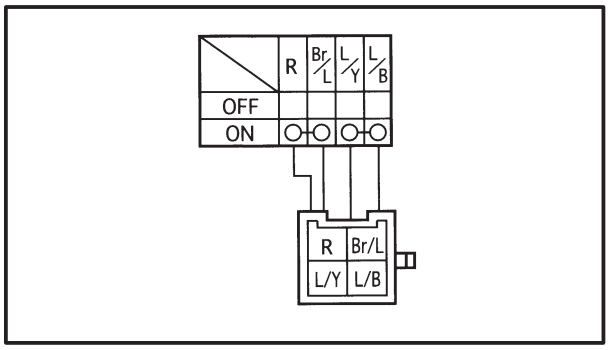
ELECTRICAL

ELECTRICAL COMPONENTS

① Horn
② Flasher relay
③ Main switch
④ Fuse holder assembly
⑤ Starter relay
⑥ Rectifier/Regulator
⑦ Battery
⑧ Neutral relay
⑨ Thermo switch
⑩ Sidestand switch
⑪ Rear brake switch
⑫ Neutral switch
⑬ Spark plug cap
⑭ Ignition coil
⑮ C.D.I. unit







EAS00730

SWITCHES

CHECKING SWITCH CONTINUITY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

CAUTION:

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

Pocket tester
90890-03112

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "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:

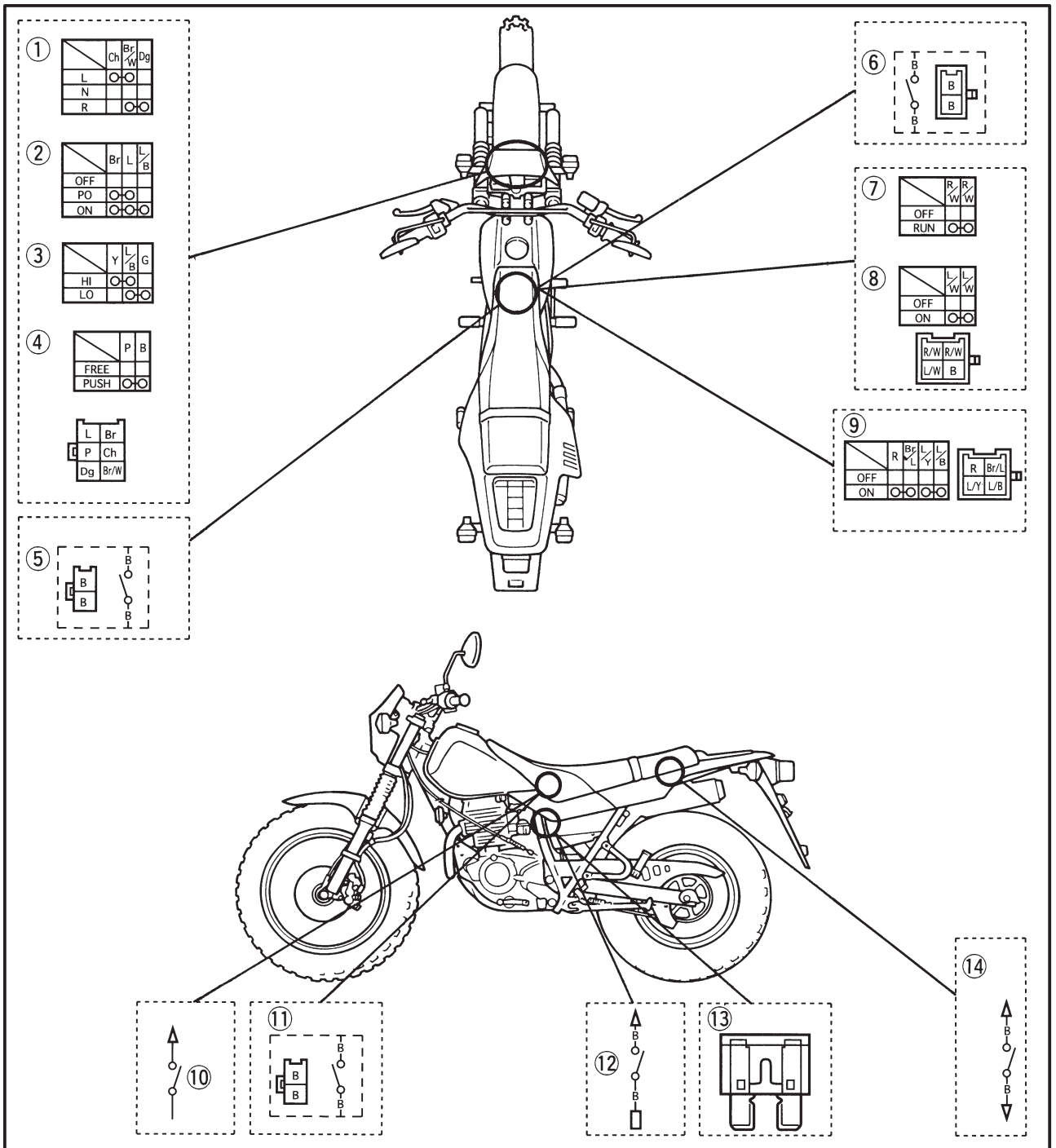
There is continuity between blue/red and red when the switch is set to "P≦".
There is continuity between blue/red and blue, between brown/blue and red, and between blue/yellow and blue/black when the switch is set to "ON".

EAS00731

SWITCH CONTINUITY INSPECTION

Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to “CHECKING SWITCH CONTINUITY”.

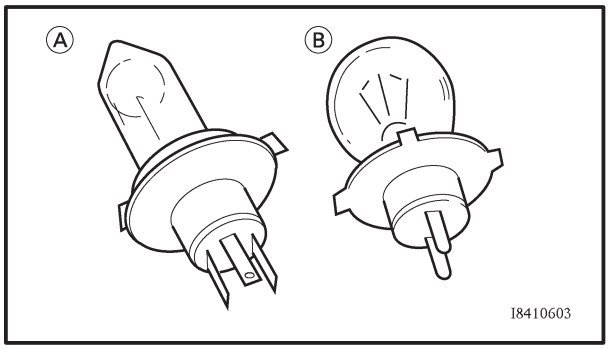
Damage/wear → Repair or replace the switch.
Improperly connected → Properly connect.
Incorrect continuity reading → Replace the switch.

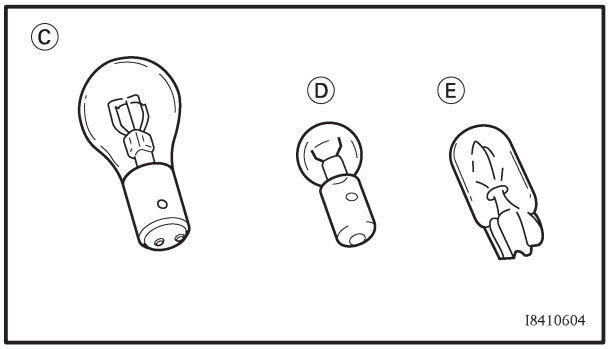


① Turn signal switch
② Lights switch
③ Dimmer switch
④ Horn switch
⑤ Clutch switch
⑥ Front brake switch
⑦ Engine stop switch
⑧ Start switch
⑨ Main switch
⑩ Neutral switch
⑪ Sidestand switch
⑫ Rear brake switch
⑬ Fuse
⑭ Thermo switch

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 Ⓐ and Ⓑ 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 Ⓓ and Ⓔ 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

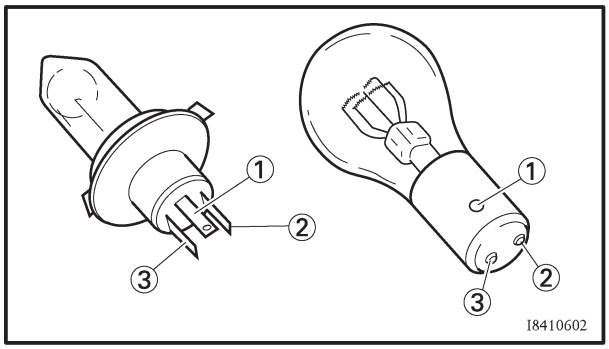
The following procedure applies to all of the bulbs.
1. Remove:
   - bulb

⚠ 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.

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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.

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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.

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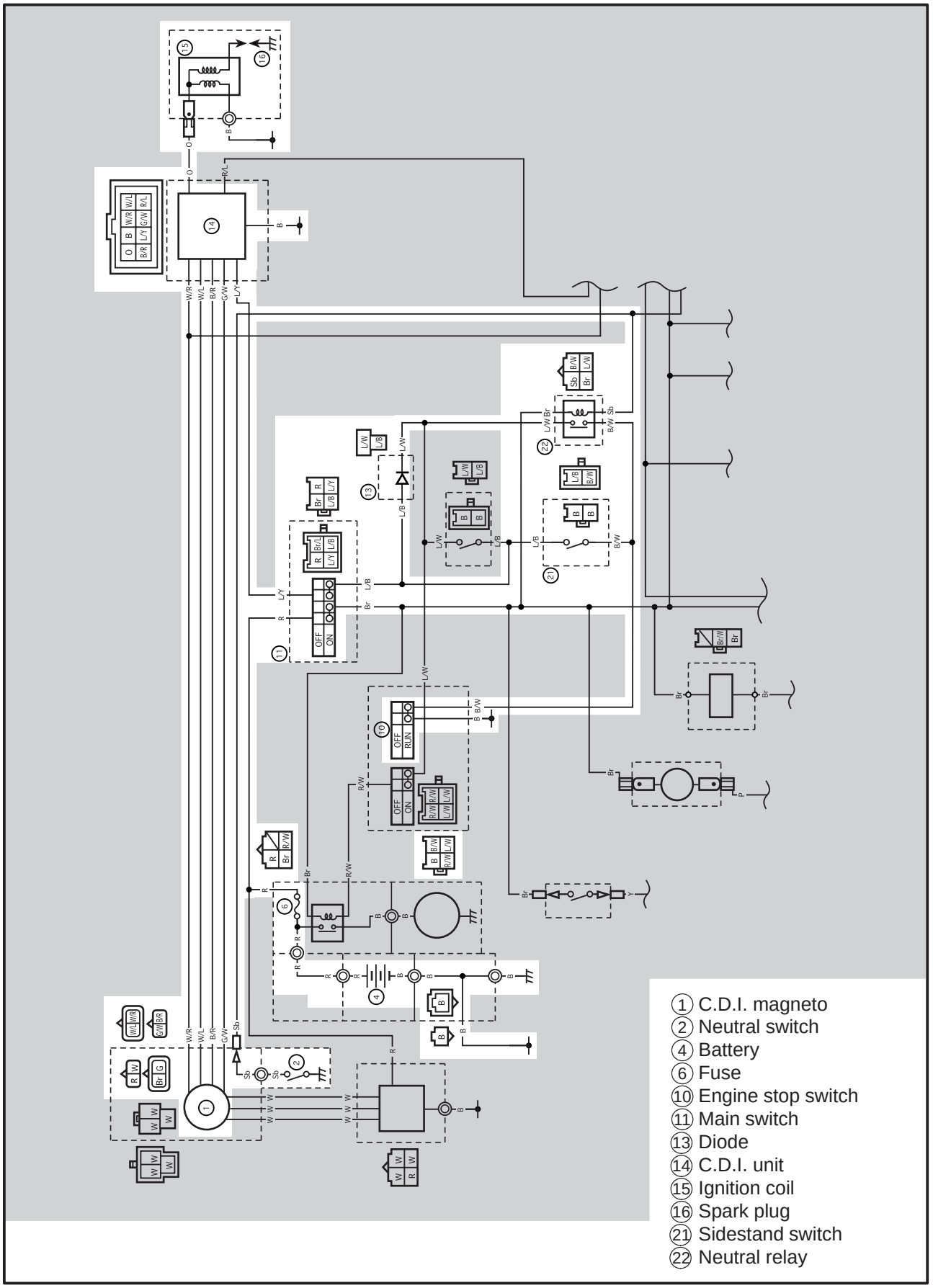
a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity.
   If any of the readings indicate no continuity, replace the bulb socket.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS00734

IGNITION SYSTEM

CIRCUIT DIAGRAM



EAS00736

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:
1. spark plug
2. ignition spark gap
3. spark plug cap resistance
4. ignition coil
5. pickup coil resistance
6. source coil resistance
7. main switch
8. engine stop switch
9. sidestand switch
10. neutral relay
11. neutral switch
12. diode
13. wiring connection (entire ignition system)

NOTE:

- Before troubleshooting, remove the following part(-s):

1) side covers (left and right)
2) seat
3) fuel tank

- Troubleshoot with the following special tool(-s).

Ignition checker
90890-06754
Pocket tester
90890-03112

EAS06740

1. Spark plug

- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
  Refer to "CHECKING THE SPARK PLUG" in CHAPTER 3.

Standard spark plug
DR8EA (NGK)
Spark plug gap
0.6 ~ 0.7 mm

- Is the spark plug in good condition, is it of the correct type, and its gap within specification?

YES ⇩

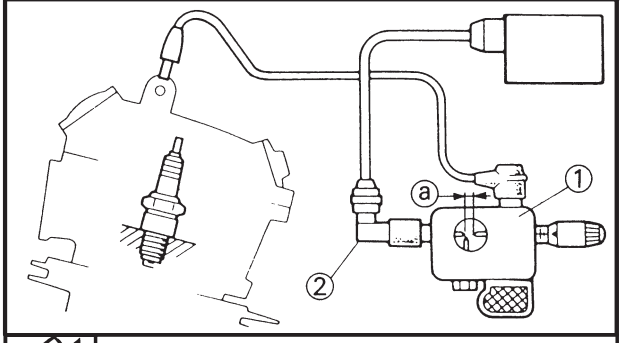
NO ⇩

Re-gap or replace the spark plug.

EAS00742

2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.
  ② Spark plug cap
- Turn the main switch to "ON".
- Measure the ignition spark gap ⓐ.
- Check the spark by pushing the starter switch, and gradually increase the spark gap until a misfire occurs.



Min. ignition spark gap
6 mm

- Is there a spark and is the spark gap within specification?

NO ⇩

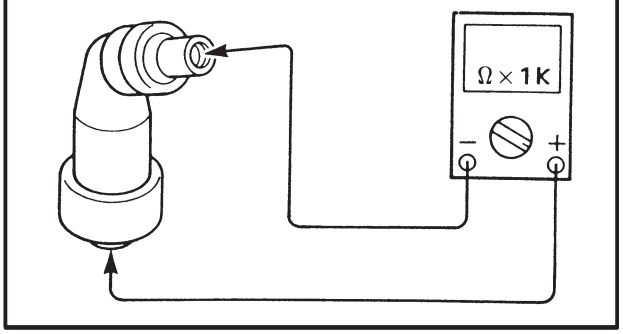
YES ⇩

The ignition system is OK.

EAS00744

3. Spark plug cap resistance

- Remove the spark plug cap.
- 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.

Secondary coil resistance
6.32 ~ 9.48 kΩ at 20°C

- Is the ignition coil OK?

YES ⇩ NO ⇩

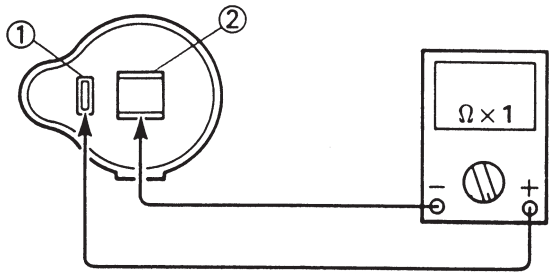
Replace the ignition coil.

EAS00746

4. Ignition coil resistance

- Disconnect the ignition coil lead from the wireharness.
- Connect the pocket tester (Ω × 1) to the ignition coil as shown.

Tester positive probe → orange ①
Tester negative probe → ground ②

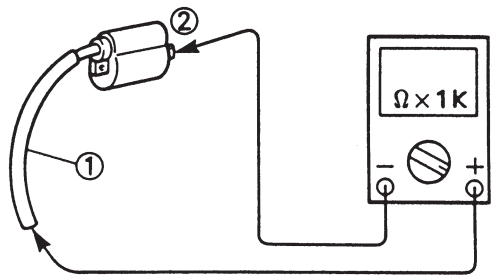


- Measure the primary coil resistance.

Primary coil resistance
0.18 ~ 0.28 Ω at 20°C

- Connect the pocket tester (Ω × 1k) to the ignition coil as shown.
- Measure the secondary coil resistance.

Tester positive probe → spark plug lead ①
Tester negative probe → orange ②

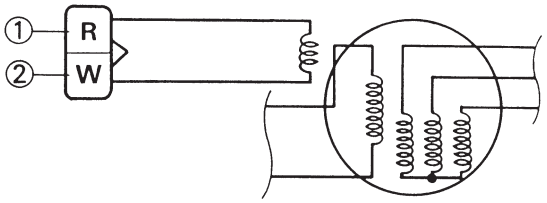


EAS00748

5. 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.

Tester positive probe → red ①
Tester negative probe → white ②



- Measure the pickup coil resistance.

Pickup coil resistance
656 ~ 984 Ω at 20°C
(between red and white)

- Is the pickup coil OK?

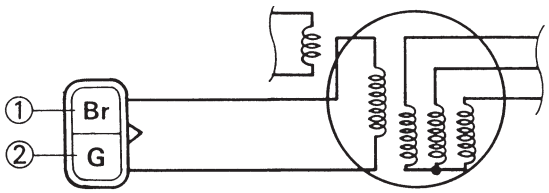
YES ⇩ NO ⇩

Replace the pickup coil.

6. Source coil resistance

- Disconnect the source coil coupler from the wireharness.
- Connect the pocket tester (Ω × 100) to the charging coil terminal as shown.

Tester positive probe → brown ①
Tester negative probe → green ②



- Measure the source coil resistance.

Source coil resistance:
624 ~ 936 Ω (20°C)
(between brown and green)

- Is the source coil OK?

YES → Replace the source coil.
NO

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.

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.

10. Neutral relay

- Check the neutral relay for continuity. Refer to "ELECTRIC STARTING SYSTEM".
- Is the neutral relay OK?

YES
NO → Replace the neutral relay.

EAS00751

11. Neutral switch

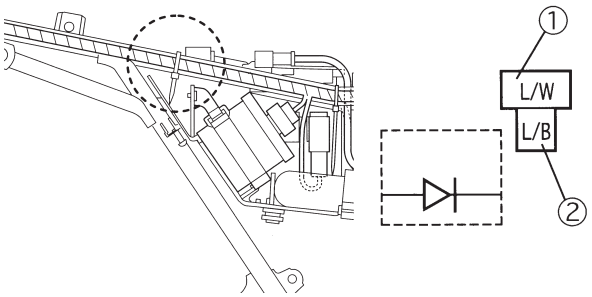
- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?

YES
NO → Replace the neutral switch.

12. Diode

- Disconnect the diode from the coupler.
- Connect the pocket tester (Ω × 1) to the diode terminals as shown.
- Measure the diode for continuity as follows.

Tester positive probe → blue/white ① **Tester negative probe → blue/black ②**	**Continuity**
Tester positive probe → blue/black ① **Tester negative probe → blue/white ②**	**No continuity**



NOTE:

When you switch the "–" and "+" leads of the digital pocket tester the readings in the above chart will be reversed.

- Are the tester readings correct?

YES

NO → Replace the relay unit.

EAS00766

13. Wiring

- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?

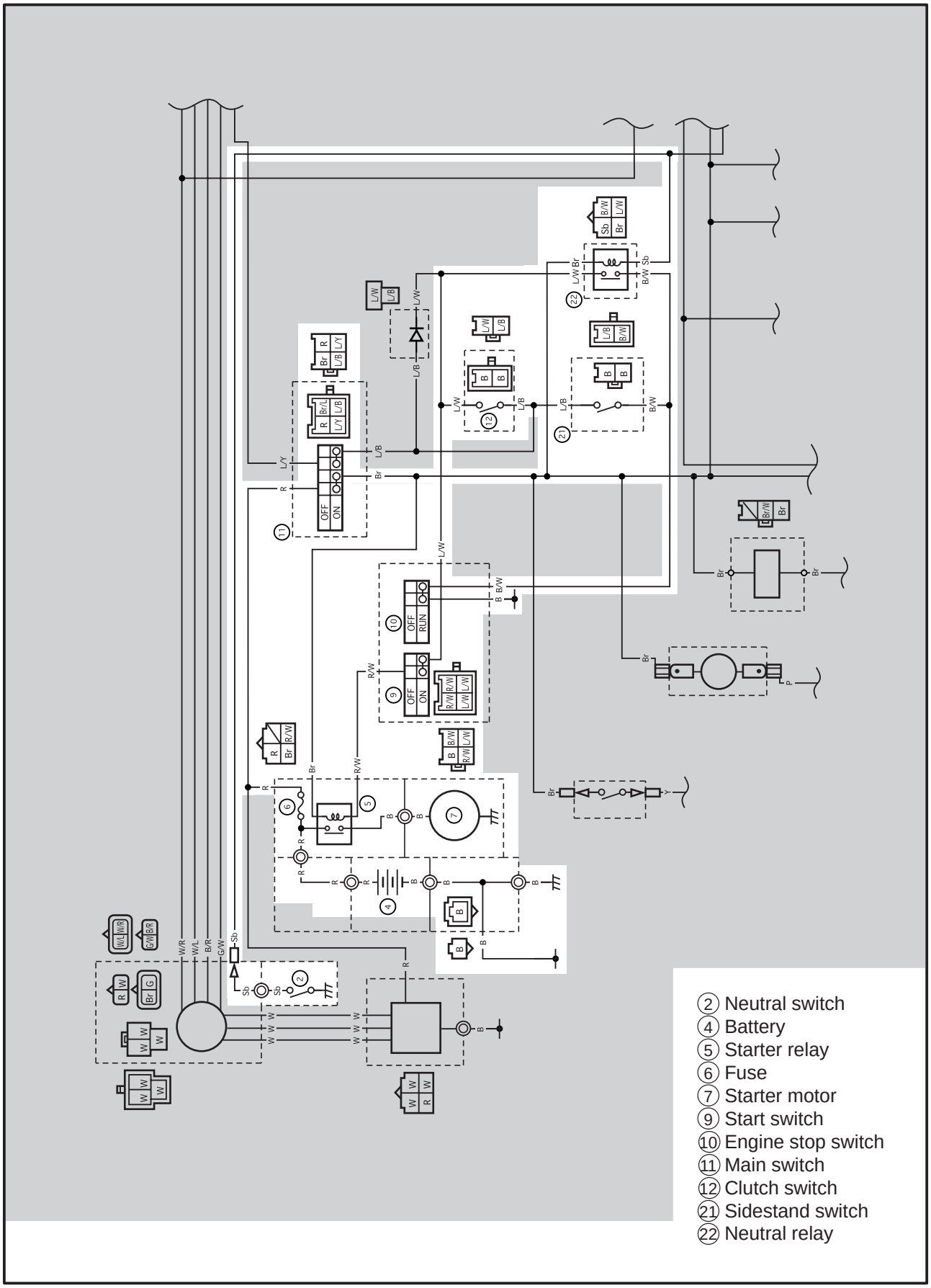
NO → Properly connect or repair the ignition system's wiring.

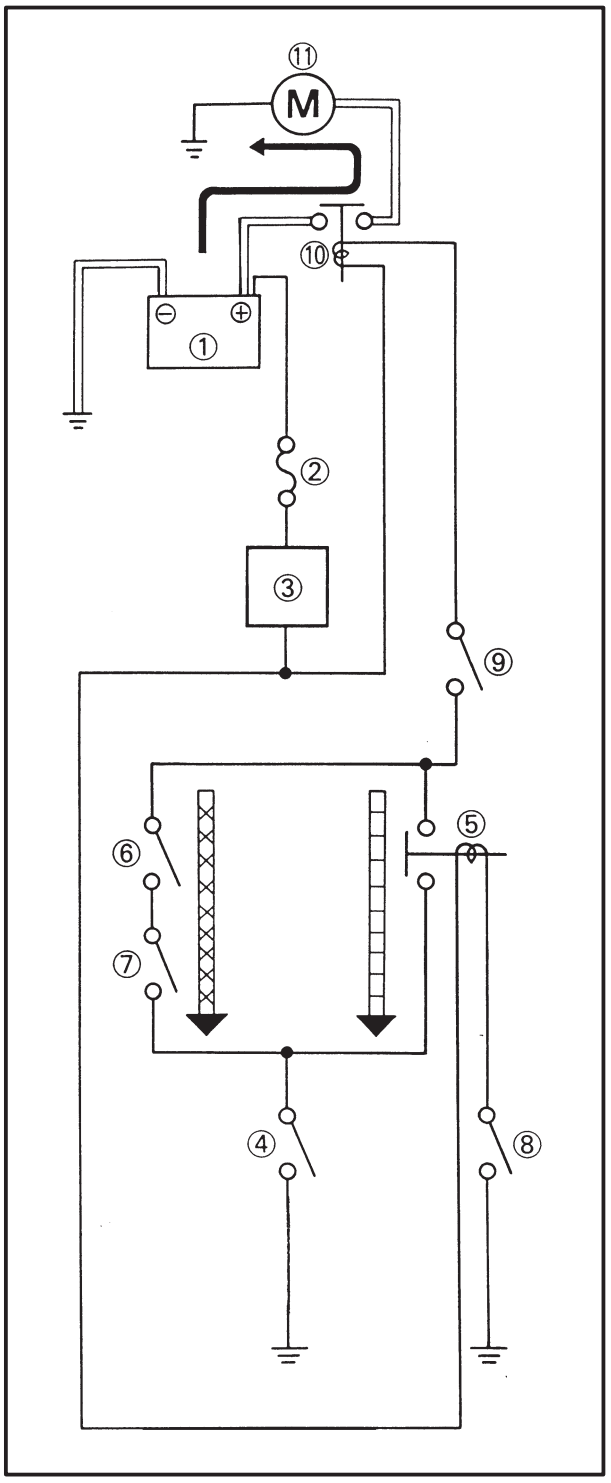
YES → Replace the CDI unit.

EAS00755

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM





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 neutral relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the neutral relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the neutral 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 Main fuse
③ Main switch
④ Engine stop switch
⑤ Neutral relay
⑥ Clutch switch
⑦ Sidestand switch
⑧ Neutral switch
⑨ Start switch
⑩ Starter relay
⑪ Starter motor

EAS00757
TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. fuse
2. battery
3. starter motor
4. neutral 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
    (of the entire starting system)

NOTE:
- Before, troubleshooting, remove the following part(-s):

1) side covers (left and right)
2) seat
3) fuel tank

- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738

1. Fuse

- Check the fuse for continuity.
  Refer to "CHECKING THE FUSES" in chapter 3.
- Is the fuse OK?

YES

NO

Replace the fuse(-s).

2. Battery

- Check the condition of the battery.
  Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.

Specific gravity:
1.280 at 20°C

- Is the battery OK?

YES

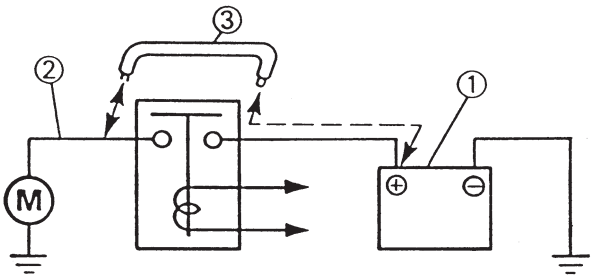
NO

- Refill the battery fluid.
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00758

3. Starter motor

- Connect the battery positive 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 of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore make sure that no flammable gas or fluid is in the vicinity.**

- Does the starter motor turn?

YES

NO

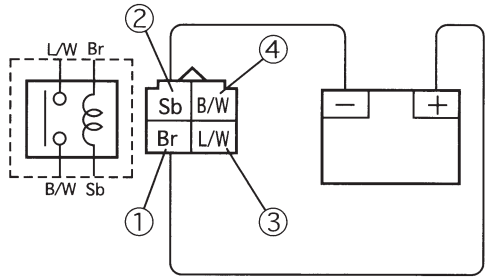
Repair or replace the starter motor.

4. Neutral relay

- Disconnect the relay unit from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the relay unit terminals as shown.

Battery positive terminal → brown ①
Battery negative terminal → sky blue ②

Tester positive probe → blue/white ③
Tester negative probe → black/white ④



- Does the starting circuit cutoff relay have continuity between black/white and blue/white?

YES → NO → Replace the relay unit.

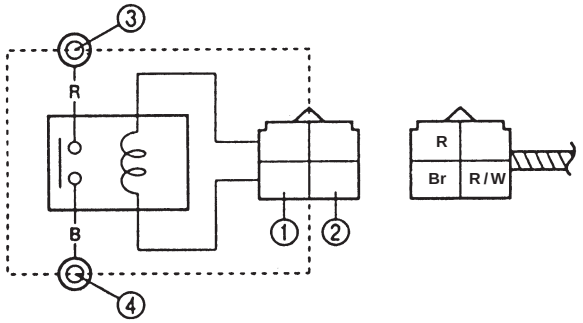
EAS00761

5. Starter relay

- Disconnect the starter relay from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starter relay coupler as shown.

Battery positive terminal → red/white ①
Battery negative terminal → brown ②

Tester positive probe → red ③
Tester negative probe → black ④



- Does the starter relay have continuity between red and check?

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

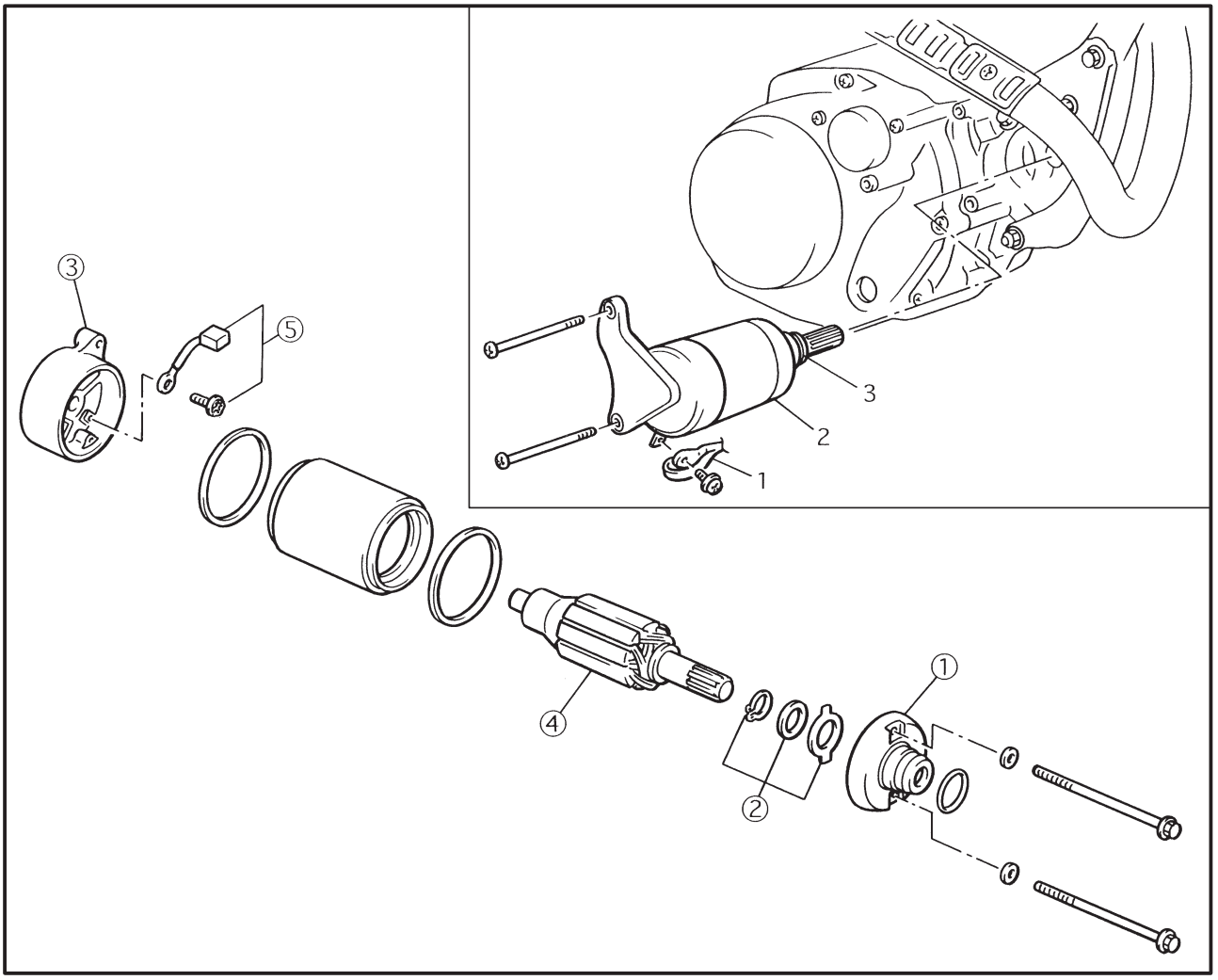
12. Wiring

- Check the entire starting system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the starting system’s wiring properly connected and without defects?

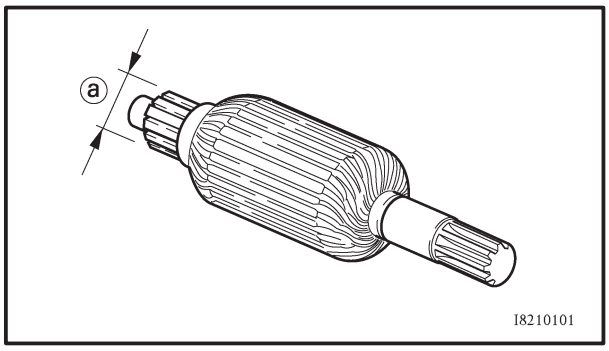
NO → Properly connect or repair the starting system’s wiring.

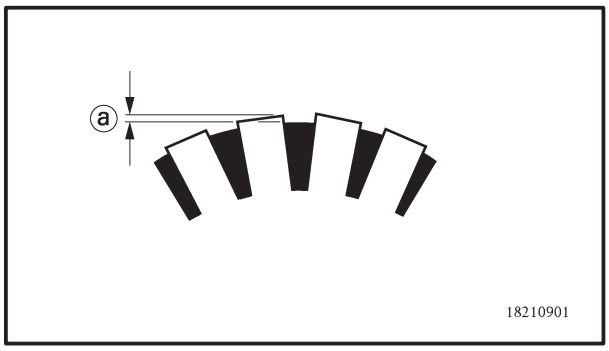
YES → The starting system circuit is OK.

STARTER MOTOR



Order	Job name/Part name	Q'ty	Remarks
	Starter motor removal Drain the engine oil		Remove the parts in order. Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 3.
1	Starter motor lead	1	
2	Starter motor	1	
3	O-ring	1	
			Reverse the removal procedure for installation.
	Starter motor disassembly		Disassemble the parts in order.
①	Front cover	1	Refer to "Assembly" section.
②	Washer set	1	
③	Rear cover	1	
④	Armature coil	1	
⑤	Brush	1	
			Reverse the disassembly procedure for assembly.





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.

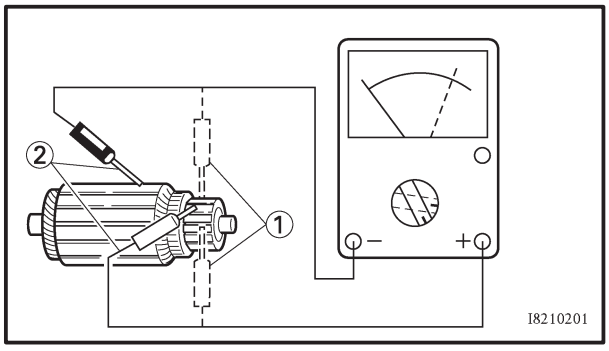
Min. commutator diameter
21 mm

3. Measure:
   • mica undercut ⓐ
   Out of specification → Scrape the mica to the proper measurement with a hacksaw blade which has been grounded to fit the commutator.

Mica undercut
1.5 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.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

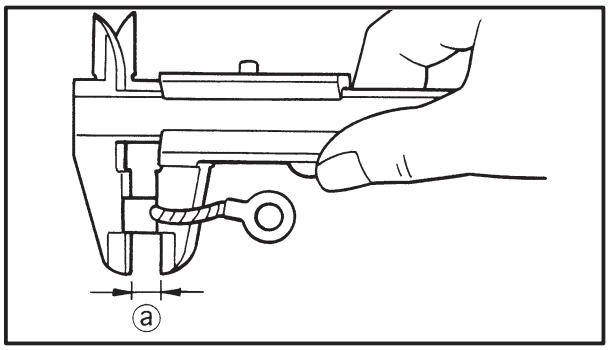
a. Measure the armature assembly resistances with the pocket tester.

Pocket tester
90890-03112

Armature assembly
Commutator resistance ①
0.0171 ~ 0.0209 Ω at 20°C
Insulation resistance ②
Above 1 MΩ at 20°C

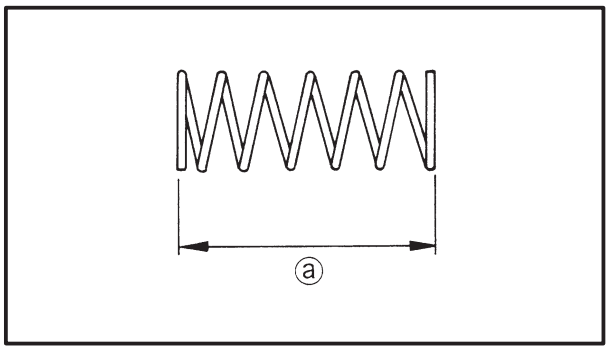
b. If any resistance is out of specification, replace the starter motor.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



5. Measure:
   • brush length ⓐ
   Out of specification → Replace the brushes as a set.

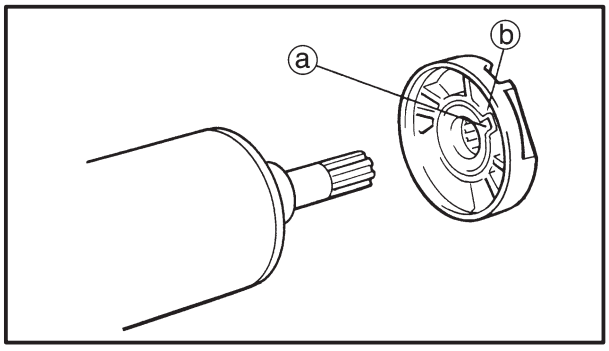
Min. brush length
3.5 mm



6. Measure:
   • brush spring free length (Compressed spring) ⓐ
   Out of specification → Replace the brush springs as a set.

Brush spring
14.5 mm

7. Check:
   • gear teeth
   Damage/wear → Replace the gear.
8. Check:
   • bearing
   • oil seal
   Damage/wear → Replace the defective part(-s).



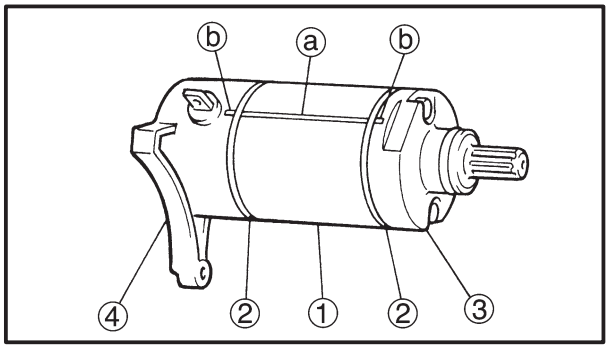
EAS00772

Assembling the starter motor

1. Install:
   • washer set

NOTE:

Align the tabs ⓐ on the washer with the slots ⓑ in the starter motor front cover.



2. Install:
   • starter motor yoke ①
   • O-rings ② New
   • starter motor front cover ③
   • starter motor rear cover ④
   • bolts

5 Nm (0.5 m•kg)

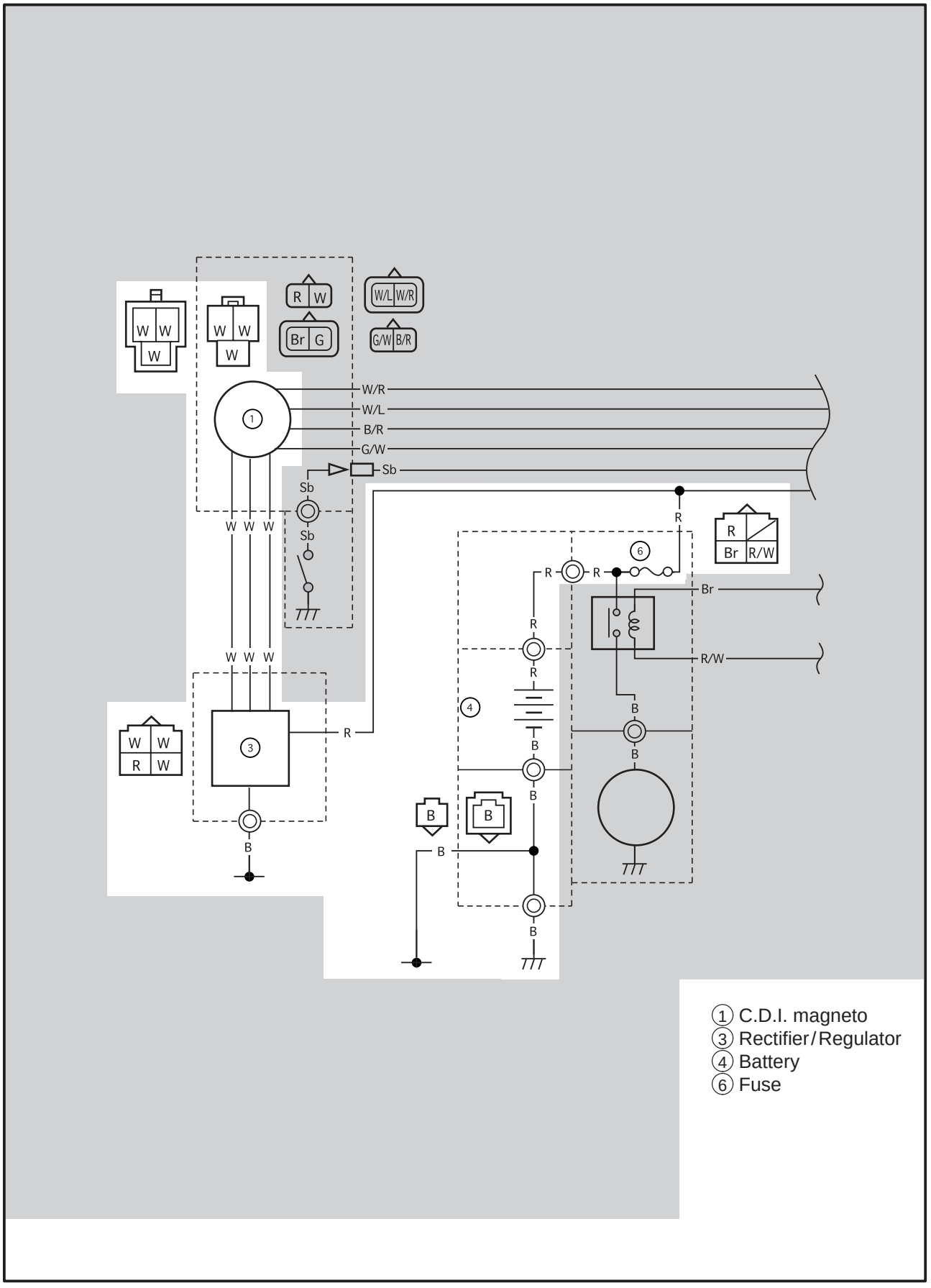
NOTE:

Align the match marks ⓐ on the starter motor yoke with the match marks ⓑ on the front and rear covers.

YP804000

CHARGING SYSTEM

CIRCUIT DIAGRAM



EAS00774
TROUBLESHOOTING

The battery is not being charged.

Check:
1. fuse
2. battery
3. charging voltage
4. stator coil assembly resistance
5. wiring
   (of the entire charging system)

NOTA:

- Before troubleshooting, remove the following part(-s):

1) side covers (left and right)
2) seat

- Troubleshoot with the following special tool(-s).

Engine tachometer
90890-03113
Pocket tester
90890-03112

EAS00738

1. Fuse

- Check the main fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
- Is the main fuses OK?

YES ⇩ NO ⇩

Replace the fuse.

2. Battery

- Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.

Specific gravity
1.280 at 20°C

- Is the battery OK?

YES ⇩ NO ⇩

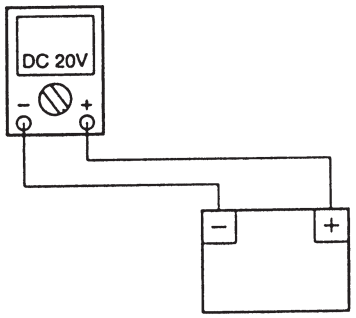
- Refill the battery fluid.
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00775

3. Charging voltage

- Connect the engine tachometer to the spark plug lead.
- Connect the pocket tester (DC 20 V) to the battery as shown.

Tester positive probe →
battery positive terminal
Tester negative probe →
battery negative terminal



- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.

Charging voltage
14.5 V at 5,000 r/min

NOTE:
Make sure that the battery is fully charged.

- Is the charging voltage within specification?

NO ⇩ YES ⇩

The charging circuit is OK.

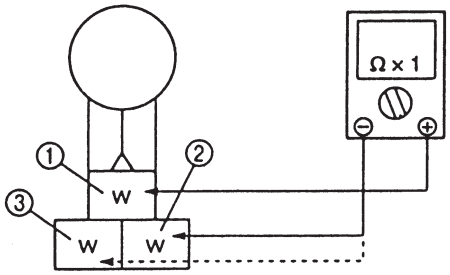
EB804401

4. Stator coil assembly resistance

- Disconnect the starter coil coupler from the wire harness.
- Connect the pocket tester (Ω × 1) to the stator coil assembly coupler as shown.

Tester positive probe → white ①
Tester negative probe → white ②

Tester positive probe → white ①
Tester negative probe → white ③



- Measure the stator coil assembly resistances.

Stator coil resistance
0.48 ~ 0.72 Ω at 20°C

- Is the stator coil assembly OK?

YES

NO → Replace the stator coil assembly.

EB804404

5. Wiring

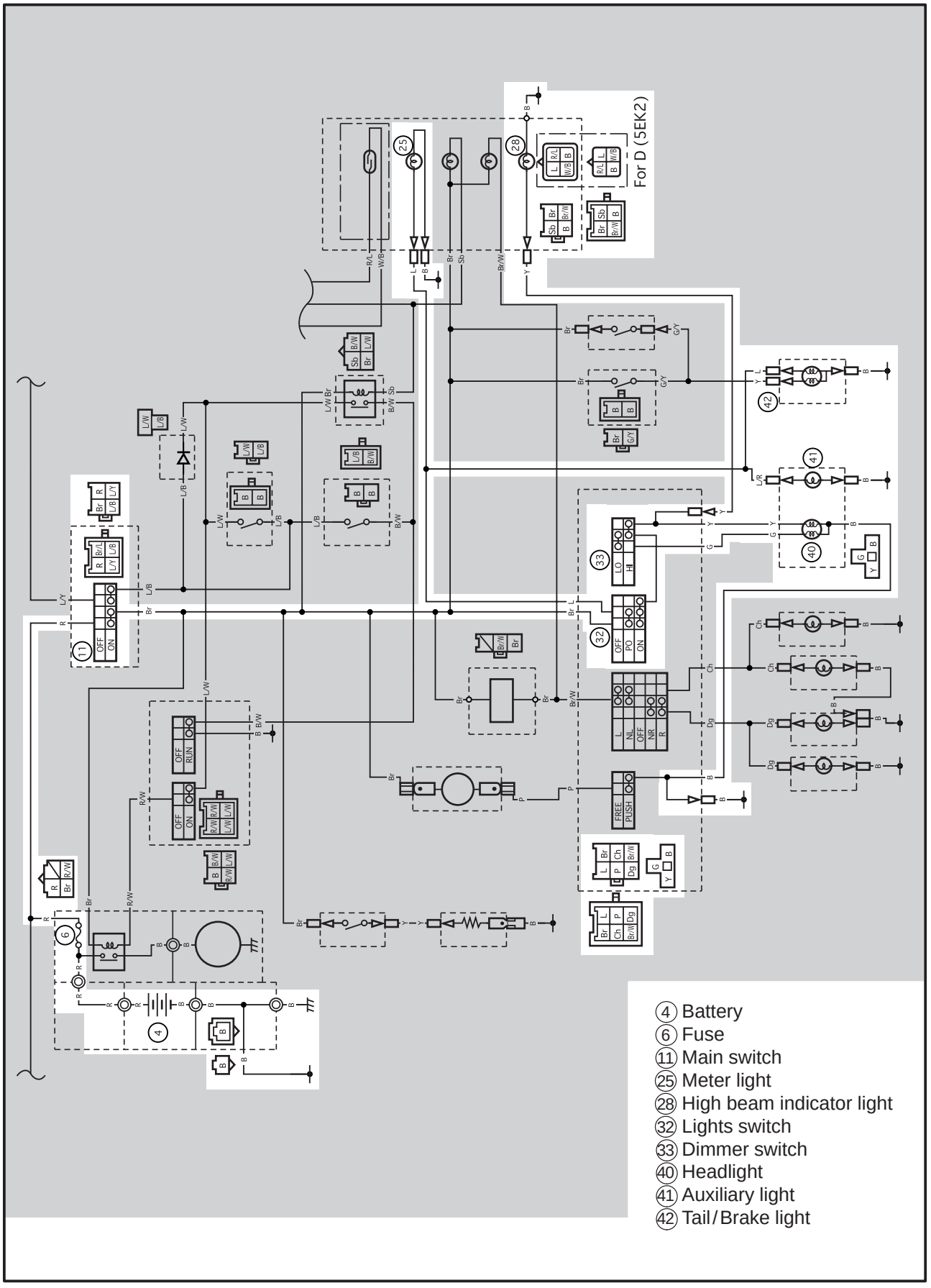
- Check the wiring connections of the entire charging system.
  Refer to “CIRCUIT DIAGRAM”.
- Is the charging system’s wiring properly connected and without defects?

NO → Properly connect or repair the charging system’s wiring.

YES → Replace the rectifier/regulator.

EB804000

LIGHTING SYSTEM
CIRCUIT DIAGRAM



EAS00781
TROUBLESHOOTING

Any of the following fail to light: head light, high beam indicator light, taillight, auxiliary light or meter light.

Check:
1. fuse
2. battery
3. main switch
4. lights switch
5. dimmer switch
6. wiring
   (of the entire charging system)

NOTE:
- Before troubleshooting, remove the following part(-s):

1) side covers (left and right)
2) seat
3) fuel tank

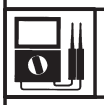
- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738
1. Fuse
- Check the fuse for continuity.
  Refer to "CHECKING THE FUSES" in chapter 3.
- Is the fuse OK?

YES → NO: Replace the fuse(-s).

2. Battery
- Check the condition of the battery.
  Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Specific gravity
1.280 at 20 °C

- Is the battery OK?

YES →

NO:
- Refill the battery fluid.
- 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. Lights switch
- Check the lights switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the lights switch OK?

YES → NO: The lights 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.

EAS00787

7. Wiring

- Check the 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 bulb and socket

- Check the headlight bulb and socket for continuity. Refer to ”CHECKING THE BULBS AND BULB SOCKETS”.
- Are the headlight bulb and socket OK?

YES

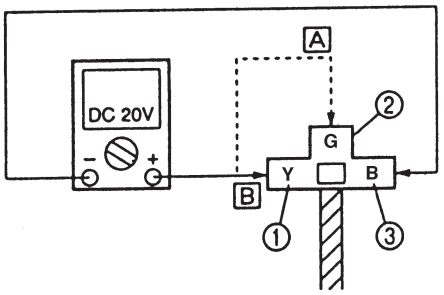
NO

Replace the headlight bulb, socket or both.

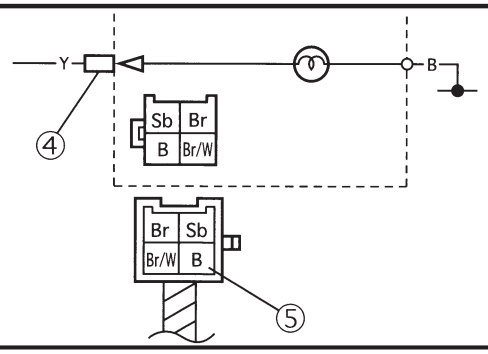
2. Voltage

- 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 “”.
B When the dimmer switch is set to “”.



Headlight
Tester positive probe →
yellow ① or green ②
Tester negative probe → black ③
High beam indicator light
Tester positive probe → yellow ④
Tester negative probe → black ⑤



- Set the main switch to "ON".
- Set the light switch to "☼".
- Set the dimmer switch to "≣D" or "≣D".
- Measure the voltage (12 V) of yellow (green) ② on the headlight coupler (headlight 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. A meter light fails to come on.

1. Meter light bulb and socket

- Check the meter light bulb and socket for continuity.
  Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the meter light bulb and socket OK?

YES

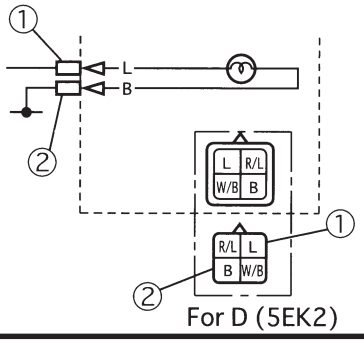
NO

Replace the meter light bulb, socket or both.

2. Voltage

- Connect the pocket tester (20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → blue ①
Tester negative probe → black ②



- Set the main switch to "ON".
- Set the light switch to "≣D" or "☼".
- Measure the voltage (12 V) of blue ① on the meter assembly 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 assembly coupler is faulty and must be repaired.

EAS00790
3. A tail/brake light fails to come on.

1. Tail/brake light bulb and socket

- Check the tail/brake light bulb and socket for continuity.
  Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the tail/brake light bulb and socket OK?

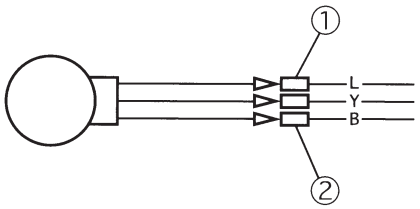
YES ⇩ NO ⇩

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.

Tester positive probe → blue ①
Tester negative probe → black ②



- Set the main switch to "ON".
- Set the light switch to "≡D ɑ≡" or "☼".
- Measure the voltage (12 V) of blue ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

YES ⇩ NO ⇩

This circuit is OK.

The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EAS00791
4. The auxiliary light fails to come on.

1. Auxiliary light bulb and socket

- Check the auxiliary light bulb and socket for continuity.
  Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the auxiliary light bulb and socket OK?

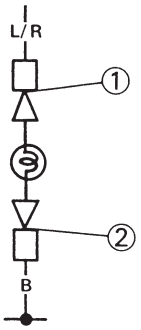
YES ⇩ NO ⇩

Replace the auxiliary light bulb, socket or both.

2. Voltage

- Connect the pocket tester (DC 20 V) to the auxiliary light couplers (wire harness side) as shown.

Tester positive probe → blue/red ①
Tester negative probe → black ②



- Set the main switch to "ON".
- Set the light switch to "≡D ɑ≡" or "☼".
- Measure the voltage (12 V) of blue/red① on the auxiliary light couplers (wire harness side).
- Is the voltage within specification?

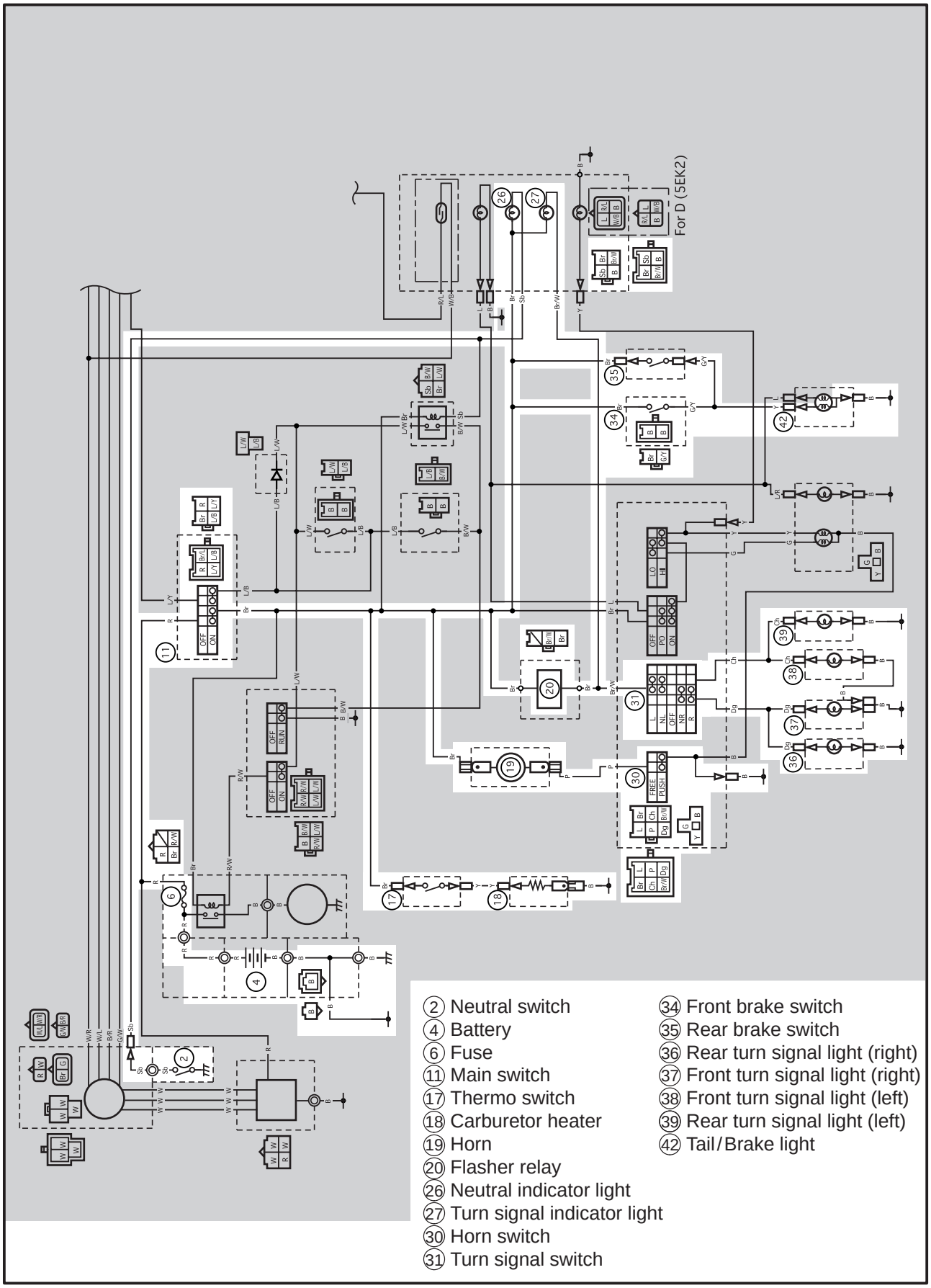
YES ⇩ NO ⇩

This circuit is OK.

The wiring circuit from the main switch to the auxiliary light connectors is faulty and must be repaired.

EB806000

SIGNAL SYSTEM
CIRCUIT DIAGRAM



(2) Neutral switch
(4) Battery
(6) Fuse
(11) Main switch
(17) Thermo switch
(18) Carburetor heater
(19) Horn
(20) Flasher relay
(26) Neutral indicator light
(27) Turn signal indicator light
(30) Horn switch
(31) Turn signal switch
(34) Front brake switch
(35) Rear brake switch
(36) Rear turn signal light (right)
(37) Front turn signal light (right)
(38) Front turn signal light (left)
(39) Rear turn signal light (left)
(42) Tail/Brake light

EAS00794
TROUBLESHOOTING

• Any of the following fail to light: turn signal light, brake light or an indicator light.
• The horn fails to sound.

Check:
1. fuse
2. battery
3. main switch
4. wiring
   (of the entire signaling system)

NOTE:
- Before troubleshooting, remove the following part(-s):

1) side covers (left and right)
2) seat
3) fuel tank

- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738
1. Fuse
- Check the fuse for continuity.
  Refer to "CHECKING AND CHARGING THE FUSES" in chapter 3.
- Is the fuse OK?

YES → NO

Replace the fuse(-s).

2. Battery
- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in chapter 3.

Specific gravity
1.280 at 20°C

- Is the battery OK?

YES → NO

- Refill the battery fluid.
- 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 signaling system's wiring.
  Refer to "CIRCUIT DIAGRAM".
- Is the signaling system's wiring properly connected and without defects?

YES → NO

Check the condition of each of the signaling system's circuits. Refer to "CHECKING THE SIGNALING SYSTEM".

Properly connect or repair the signaling system's wiring.

EAS00796

CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

1. Horn switch

- Check the horn switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the horn switch OK?

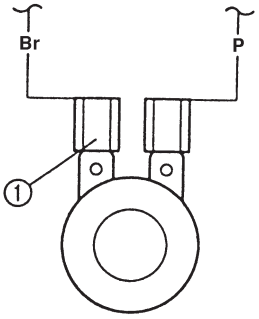
YES ⇩ NO ⇩

Replace the left handlebar switch.

2. Voltage

- Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

Tester positive probe → brown ①
Tester negative probe → ground



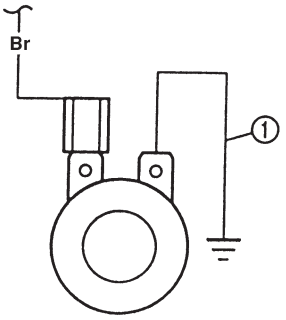
- Set the main switch to “ON”.
- Push the horn switch.
- Measure the voltage (12 V) of brown at the horn terminal.
- Is the voltage within specification?

YES ⇩ NO ⇩

The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

3. Horn

- Disconnect the pink 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?



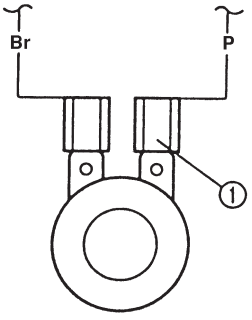
NO ⇩ YES ⇩

The horn is OK.

4. Voltage

- Connect the pocket tester (DC 20 V) to the horn connector at the black terminal as shown.

Tester positive probe → pink ①
Tester negative probe → ground



- Set the main switch to “ON”.
- Measure the voltage (12 V) of pink ① at the horn terminal.
- Is the voltage within specification?

YES ⇩ NO ⇩

Repair or replace the horn.

Replace the horn.

EAS00797
2. A tail/brake light fails to come on.

1. Tail/brake light bulb and socket
- Check the tail/brake light bulb and socket for continuity.
  Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the tail/brake light bulb and socket OK?

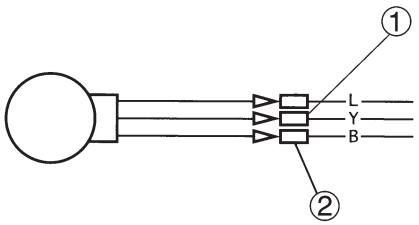
YES → 2. Brake light switches
NO → Replace the tail/brake light bulb, socket or both.

2. Brake light switches
- Check the brake light switches for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the brake light switch OK?

YES → 3. Voltage
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.

Tester positive probe → yellow ①
Tester negative 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 at 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. A turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal light bulb and socket
- Check the turn signal light bulb and socket for continuity.
  Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the turn signal light bulb and socket OK?

YES → 3. Turn signal switch
NO → Replace the turn signal light bulb, socket or both.

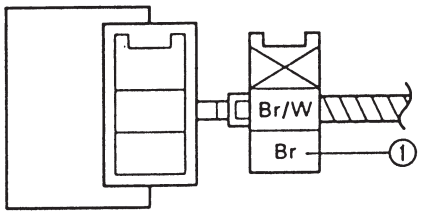
3. Turn signal switch
- Check the turn signal switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the turn signal switch OK?

YES → Replace the left handlebar switch.
NO → Replace the left handlebar switch.

4. Voltage

- Connect the pocket tester (DC V 20) to the flasher relay coupler (wire harness side) as shown.

Tester positive proble → brown ①
Tester negative proble → ground



- Set the main switch to ”ON”.
- Measure the voltage (12 V) of brown ① at the flasher relay coupler (wire harness side).
- Is the voltage within specification?

YES

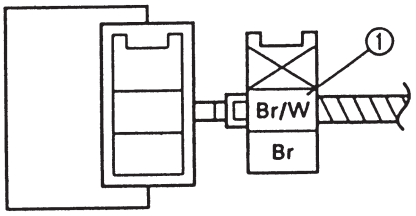
NO

The wiring circuit from the main switch to the flasher relay coupler (flasher relay side) is faulty and must be repaired.

5. Voltage

- Connect the pocket tester (DC 20 V) to the flasher relay coupler (wire harness side) as shown.

Tester positive probe → brown/white ①
Tester negative probe → ground



- Set the main switch to “ON”.
- Measure the voltage (12 V) on brown/white at the flasher relay coupler (wire harness side).
- Is the voltage within specification?

YES

NO

The flasher relay is faulty and must be replaced.

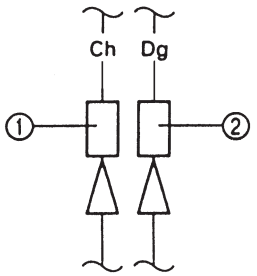
6. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal light connectors or the meter assembly coupler (wire harness side) as shown.

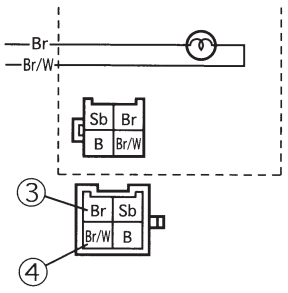
A Turn signal light
B Turn signal indicator light

Left turn signal light
Tester positive probe →
chocolate (orange) ①
Tester negative probe → ground
Right turn signal light
Tester positive probe → dark green ②
Tester negative probe → ground
Turn signal indicator light
Tester positive probe → brown ③
Tester negative probe →
brown/white ④

A



B



- Set the main switch to “ON”.
- Set the turn switch to “⇦ ” or “⇨ ”.
- Measure the voltage (12 V) of chocolate (orange) ① or dark green ② at the turn signal light connector (wire harness side).
- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the turn signal switch to the turn signal light connector is faulty and must be repaired.

EAS00800
4. The neutral indicator light fails to come on.

1. Neutral indicator light bulb and socket

- Check the neutral indicator light bulb and socket for continuity.
- Are the neutral indicator light bulb and socket OK?

YES → 2. Neutral switch

NO → Replace the neutral indicator bulb, socket or both.

2. Neutral switch

- Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the neutral switch OK?

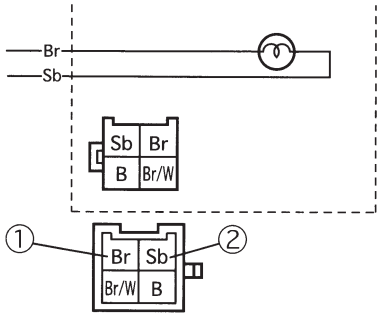
YES → This circuit is OK.

NO → Replace the neutral switch.

3. Voltage

- Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → brown ①
Tester negative probe → sky blue ②



- Set the main switch to “ON”.
- Measure the voltage (12 V) of brown ① and sky blue ② at the meter assembly coupler.
- Is the voltage within specification?

YES → This circuit is OK.

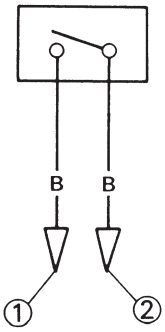
NO → The wiring circuit from the main switch to the meter light bulb coupler is faulty and must be repaired.

5. The carburetor heater fails to come on.

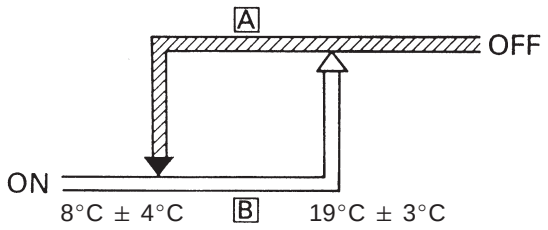
1. Thermo switch

- Disconnect the thermo switch from the wire-harness..
- Connect the pocket tester (Ω × 1) to the thermo switch lead.

Tester positive proble → black ①
Tester negative proble → black ②



• Check the thermo switch for continuity at the temperatures indicated below.



A COOL DOWN
B HEAT UP

• Does the thermo switch operated properly?

YES

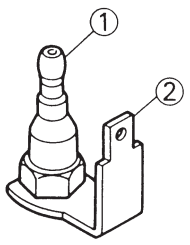
NO

Replace the thermo switch.

2. Carburetor heater

• Remove the carburetor heating element from the carburetor.
• Connect the pocket tester (Ω × 1) to the carburetor heating element.

Tester positive probe → heating element ①
Tester negative probe → heating element body ②



• Measure the carburetor heater resistance.

Carburetor heating element resistance:
6 ~ 12 Ω (20°C)

• Is the carburetor heating element OK?

YES

NO

This circuit is OK.

Replace the carburetor heater element.

TRBL SHTG 8

CHAPTER 8.
TROUBLESHOOTING

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

Cylinders and cylinder head(-s)
- Loose spark plug
- Loose cylinder head
- Damaged cylinder head gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Incorrectly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

Pistons and piston rings
- Incorrectly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter
- Incorrectly installed air filter
- Clogged air filter element

Crankcase and crankshaft
- Incorrectly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank
- Empty fuel tank
- Clogged fuel filter
- Clogged fuel tank breather hole
- Deteriorated or contaminated fuel

Fuel cock
- Clogged or damaged fuel hose

Carburetors
- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Incorrectly installed needle valve seat
- Incorrect fuel level
- Incorrectly installed pilot jet
- Clogged starter jet
- Faulty starter plunger
- Incorrectly adjusted starter cable

ELECTRICAL SYSTEMS

Battery
- Faulty battery
- Discharged battery

Fuse
- Blown, damaged or incorrect fuse
- Incorrectly installed fuse

Spark plug
- 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
- Damaged ignition coil
- Broken or shorted primary or secondary coils
- Faulty spark plug lead

Ignition system
- Faulty CDI unit
- Faulty pickup coil

Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty sidestand switch
- Faulty clutch switch
- Incorrectly grounded circuit
- Loose connections

Starting system
- Faulty starter motor
- Faulty starter relay
- Faulty neutral relay
- Faulty starter clutch

EAS00846

INCORRECT ENGINE IDLING SPEED

ENGINE

Cylinders and cylinder head
- Incorrect valve clearance
- Damaged valve train components

Air filter
- Clogged air filter element

FUEL SYSTEM

Carburetor
- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Incorrectly adjusted engine idling speed (throttle stop screw)
- Incorrect throttle cable free play
- Flooded carburetor

ELECTRICAL SYSTEMS

Battery
- Faulty battery
- Discharged battery

Spark plug
- 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
- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Damaged ignition coil

Ignition system
- Faulty CDI unit
- Faulty pickup coil

EAS00848

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING PROBLEMS”.

ENGINE

Air filter
- Clogged air filter element

FUEL SYSTEM

Carburetors
- Faulty diaphragm
- Incorrect fuel level
- Loose or clogged main jet

EAS00850

FAULTY GEAR SHIFTING

SHIFTING IS DIFFICULT

Refer to “CLUTCH DRAGS”.

SHIFT PEDAL DOES NOT MOVE

Shift shaft
- Incorrectly adjusted shift rod
- Bent shift shaft

Shift drum and shift forks
- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission
- Seized transmission gear
- Foreign object between transmission gears
- Incorrectly assembled transmission

JUMPS OUT OF GEAR

Shift shaft
- Incorrect shift pedal position
- Incorrectly returned stopper lever

Shift forks
- Worn shift fork

Shift drum
- Incorrect axial play
- Worn shift drum groove

Transmission
- Worn gear dog

EAS00851

FAULTY CLUTCH

CLUTCH SLIPS

Clutch

- Incorrectly assembled clutch
- Incorrectly adjusted clutch cable
- Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate

Engine oil

- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

CLUTCH DRAGS

Clutch

- Unevenly tensioned clutch spring
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch push rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned

Engine oil

- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

EAS00854

OVERHEATING

ENGINE

Cylinder head(-s) and piston(-s)

- Heavy carbon buildup

Engine oil

- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

FUEL SYSTEM

Carburetors

- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

Air filter

- Clogged air filter element

CHASSIS

Brakes

- Dragging brake

ELECTRICAL SYSTEMS

Spark plugs

- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system

- Faulty CDI unit

EAS00859
POOR BRAKING PERFORMANCE

Front brake
- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper piston seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

Rear brake
- Improper brake pedal adjustment
- Worn brake shoe
- Improper brake shoe contact
- Worn camshaft
- Worn brake drum
- Mud or water into brake drum inside
- Oily or greasy brake lining
- Faulty brake cable
- Broken or fatigued tension spring
- Faulty camshaft, cam lever

EAS00861
FAULTY FRONT FORK LEGS

LEAKING OIL
- Bent, damaged or rusty inner tube
- Damaged outer tube
- Incorrectly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly, bolt, or copper washer
- Damaged cap bolt O-ring

MALFUNCTION
- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube busing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS00864
UNSTABLE HANDLING

Handlebar
- Bent or incorrectly installed handlebar

Steering head components
- Incorrectly installed upper bracket
- Incorrectly installed lower bracket (incorrectly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Front fork legs
- Unevenoil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Damaged fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Swingarm
- Worn bearing or bushing
- Bent or damaged swingarm

Rear shock absorber assembly
- Faulty rear shock absorber spring
- Leaking oil or gas

Tires
- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheels
- Incorrect wheel balance
- Loose sporks
- Deformed wheel rim
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame
- Bent frame
- Damaged steering head pipe
- Incorrectly installed bearing race

EAS00866

FAULTY LIGHTING AND SIGNALING SYSTEMS

HEADLIGHT DOES NOT LIGHT
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrectly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrectly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT LIGHT
- Wrong tail/brake light bulb
- Too may electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

TAIL/BRAKE LIGHT BULB BURNT OUT
- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

TURN SIGNAL DOES NOT LIGHT
- Faulty turn signal switch
- Faulty flasher relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Incorrectly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

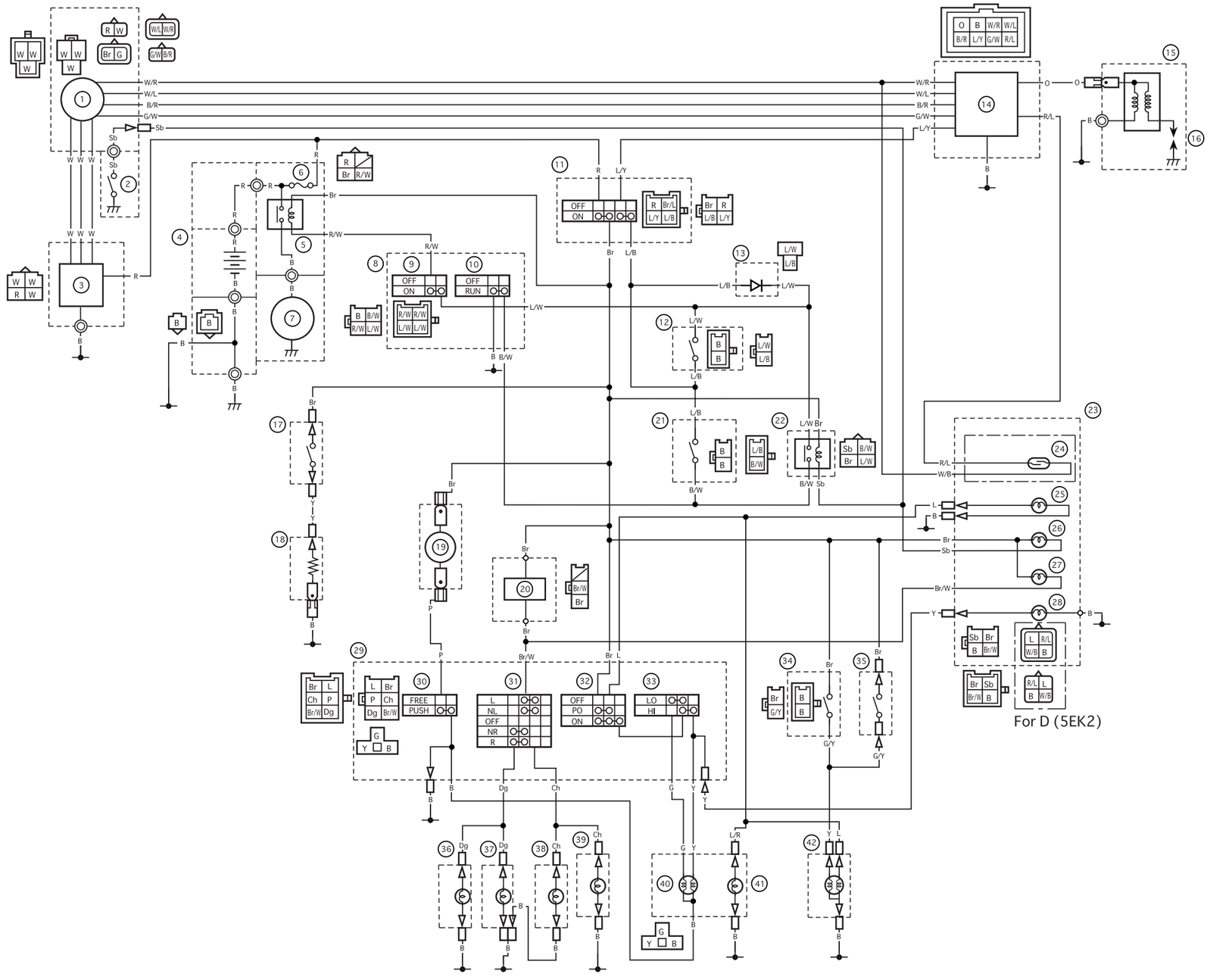
TURN SIGNAL BLINKS SLOWLY
- Faulty flasher relay
- Faulty main switch
- Faulty turn signal switch
- Wrong turn signal bulb

TURN SIGNAL REMAINS LIT
- Faulty flasher relay
- Burnt-out-turn signal bulb

TURN SIGNAL BLINKS QUICKLY
- Incorrect turn signal bulb
- Faulty flasher relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND
- Incorrectly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

TW125 '99 WIRING DIAGRAM



1. C.D.I. magneto
2. Neutral switch
3. Rectifier/Regulator
4. Battery
5. Starter relay
6. Fuse
7. Starting motor
8. Handlebar switches (right)
9. Start switch
10. Engine stop switch
11. Main switch
12. Clutch switch
13. Diode
14. C.D.I. unit
15. Ignition coil
16. Spark plug
17. Thermo switch
18. Carbuletor heater
19. Horn
20. Flasher relay
21. Sidestand switch
22. Neutral relay
23. Speedometer
24. Reed switch (for D[5EK2])
25. Meter light
26. Neutral indicator light
27. Turn signal indicator light
28. Hi-beam indicator light
29. Handlebar switches (left)
30. Horn switch
31. Turn switch
32. Lights switch
33. Dimmer switch
34. Front brake switch
35. Rear brake switch
36. Rear turn signal light (right)
37. Front turn signal light (right)
38. Front turn signal light (left)
39. Rear turn signal light (left)
40. Headlight
41. Auxiliary light
42. Tail/Brake light

COLOR CODE

B	Black	Sb	Sky blue	Br/L . .	Brown/Blue	L/W . .	Blue/White
Br	Brown	P	Pink	Br/W . .	Brown/White	L/Y . . .	Blue/Yellow
Ch . . .	Chocolate	R	Red	G/R . .	Green/Red	R/L . . .	Red/Blue
Dg . . .	Dark green	Y	Yellow	G/W . .	Green/White	R/W . .	Red/White
G	Green	W	White	G/Y . .	Green/Yellow	W/B . .	White/Black
L	Blue	B/R . . .	Black/Red	L/B . . .	Blue/Black	W/L . .	White/Blue
O	Orange	B/W . .	Black/White	L/R . . .	Blue/Red	W/R . .	White/Red