

Mario's Manuals
Mario's Manuals
W910.2 W910.2



YAMAHA

XVS1100 / DRAGSTAR 1100 / VSTAR 1100
1999 to 2008

HOW TO USE THIS MANUAL

MANUAL ORGANIZATION

This manual consists of chapters for the main categories of subjects. (See “Illustrated symbols”)

- 1st title ①: This is the title of the chapter with its symbol in the upper right corner of each page.
- 2nd title ②: This title indicates the section of the chapter and only appears on the first page of each section. It is located in the upper right corner of the page.
- 3rd title ③: This title indicates a sub-section that is followed by step-by-step procedures accompanied by corresponding illustrations.

EXPLODED DIAGRAMS

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

- 1. An easy-to-see exploded diagram ④ is provided for removal and disassembly jobs.
- 2. Numbers ⑤ are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
- 3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks ⑥. The meanings of the symbol marks are given on the next page.
- 4. A job instruction chart ⑦ accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- 5. For jobs requiring more information, the step-by-step format supplements ⑧ are given in addition to the exploded diagram and the job instruction chart.

② CLUTCH ① ENG

CLUTCH CRANKCASE COVER (RIGHT)

Order	Job name/Part name	Qty	Remarks
	Crankcase cover (right) removal		Remove the parts in the order below. Stand the motorcycle on a level surface. WARNING Securely support the motorcycle so there is no danger of it falling over.
	Engine oil		Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 3.
	Muffler assembly 1.2		Refer to "ENGINE REMOVAL".
1	Brake pedal link	1	
2	Oil filter cover plate	1	L=70 mm × 1, 65 mm × 1, 25 mm × 3
4	Oil filter	1	
5	Crankcase cover (right)	1	L=65 mm × 1, 55 mm × 1, 45 mm × 4, 30 mm × 4

4-34

③ CLUTCH ① ENG

CLUTCH REMOVAL

- Straighten:
 - Lock washer tab
- Loosen:
 - Nut (clutch boss) ①

NOTE:
Loosen the nut (clutch boss) ① while holding the clutch boss ② with the clutch holding tool ③.

Clutch holding tool:
90890-04086

PRIMARY DRIVE GEAR REMOVAL

- Straighten:
 - Lock washer tab
- Loosen:
 - Nut (primary drive gear) ①

NOTE:
Place a copper plate ② between the teeth of the primary drive gear ③ and primary driven gear to lock them.

CLUTCH INSPECTION

























- Inspect:
 - Friction plates
 - Wear/damage → Replace the friction plates as a set.
- Measure:
 - Friction plate thickness
 - Out of specification → Replace the friction plates as a set.
 - Measure at four places.

Thickness (friction plate):
2.9 – 3.1 mm
◀Wear limits▶ 2.6 mm

- Inspect:
 - Clutch plate
 - Damage → Replace the clutch plates as a set.
- Measure:
 - Clutch plate warpage
 - Out of specification → Replace the clutch plates as a set.
 - Use a surface plate and a feeler gauge ③.

Warp limit (clutch plate):
Less than 0.2 mm

4-38

① GEN INFO 	② SPEC 	
③ INSP ADJ 	④ ENG 	
⑤ COOL 	⑥ CARB 	
⑦ CHAS 	⑧ ELEC 	
⑨ TRBL SHTG 	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	⑰ 
⑱ 	⑲ 	⑳ 
㉑ 	㉒ 	㉓ 
㉔ 	㉕ New	

EB003000

ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑨ are printed on the top right of each page and indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic inspections and adjustments
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetion
- ⑦ Chassis
- ⑧ Electrical
- ⑨ Troubleshooting

Illustrated symbols ⑩ to ⑰ are used to identify the specifications appearing in the text.

- ⑩ Can be serviced with engine mounted
- ⑪ Filling fluid
- ⑫ Lubricant
- ⑬ Special tool
- ⑭ Torque
- ⑮ Wear limit, clearance
- ⑯ Engine speed
- ⑰ Ω, V, A








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

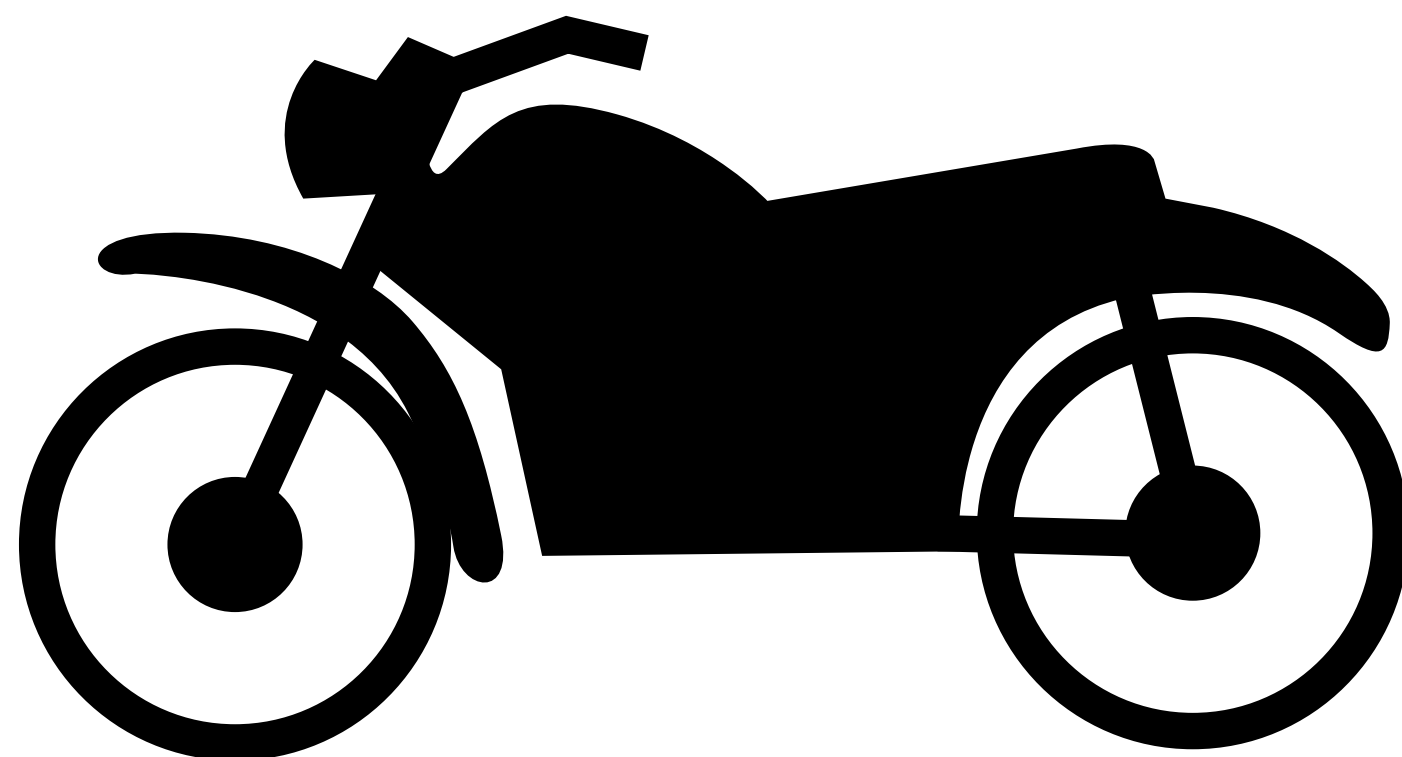
- ⑱ Apply engine oil
- ⑲ Apply gear oil
- ⑳ Apply molybdenum disulfide oil
- ㉑ Apply wheel bearing grease
- ㉒ Apply lightweight lithium-soap base grease
- ㉓ Apply molybdenum disulfide grease

Illustrated symbols ㉔ to ㉕ in the exploded diagrams indicate where to apply locking agent ㉔ and when to install new parts ㉕.

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

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	CARB 5
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	CHAS 6
ELECTRICAL	
	ELEC 7
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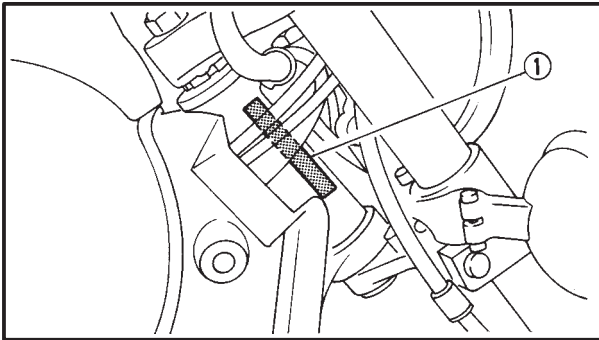


**GEN
INFO**

1

**CHAPTER 1.
GENERAL INFORMATION**

MOTORCYCLE IDENTIFICATION	1-1
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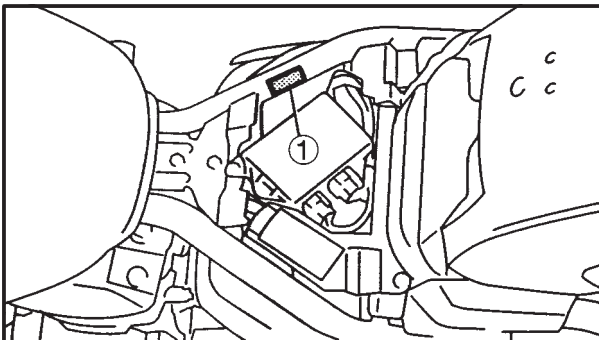
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GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EB100010

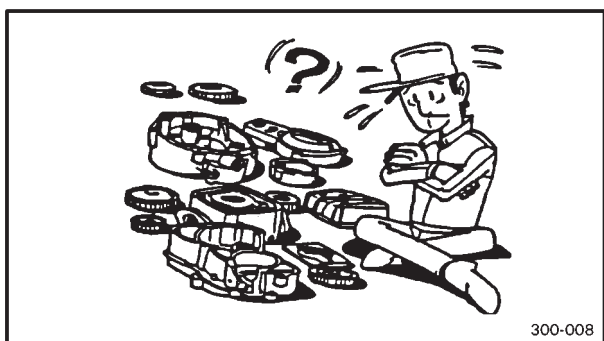
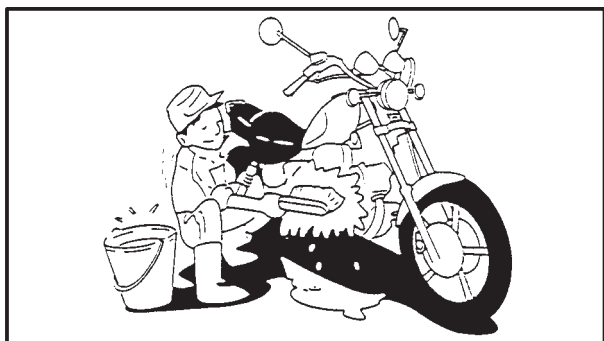
VEHICLE IDENTIFICATION NUMBER

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



MODEL LABEL

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



EB101000

**IMPORTANT INFORMATION
PREPARATION FOR REMOVAL PROCEDURES**

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to the "SPECIAL TOOLS" section.
3. When disassembling the machine, 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 machine disassembly, clean all 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.



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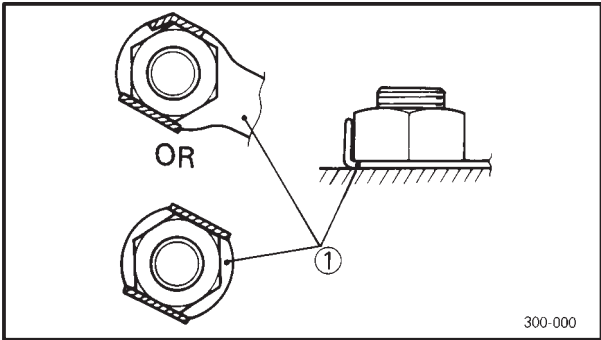
REPLACEMENT PARTS

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.

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GASKETS, OIL SEALS AND O-RINGS

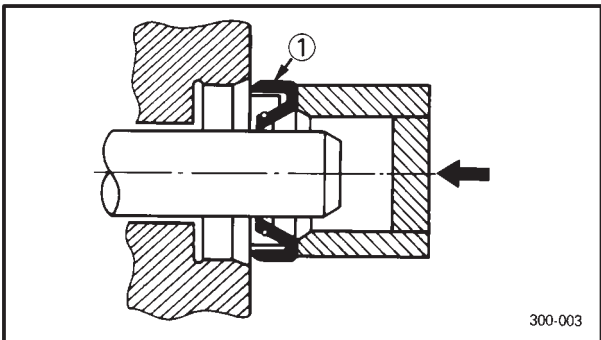
1. Replace all gaskets, seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



EB101030

LOCK WASHERS/PLATES AND COTTER PINS

1. Replace all lock washers/plates ① and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.



EB101040

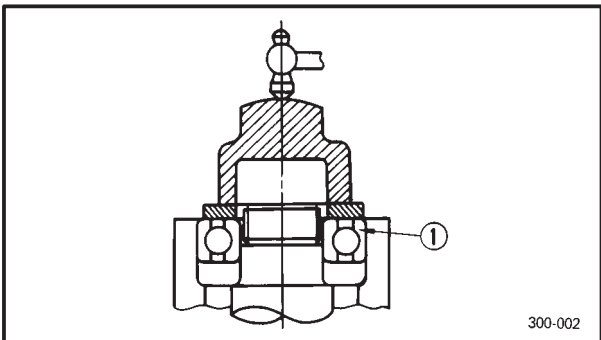
BEARINGS AND OIL SEALS

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

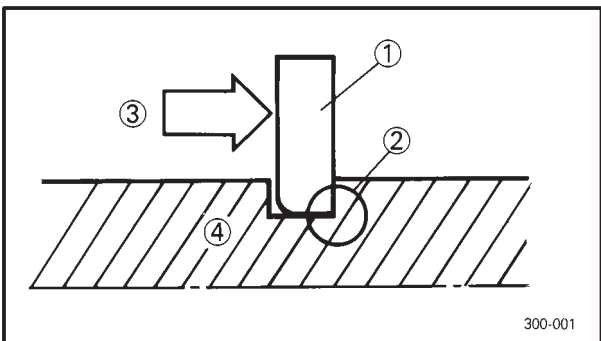
- ① Oil seal

CAUTION:

Do not use compressed air to spin the bearings dry. This will damage the bearing surfaces.



- ① Bearing

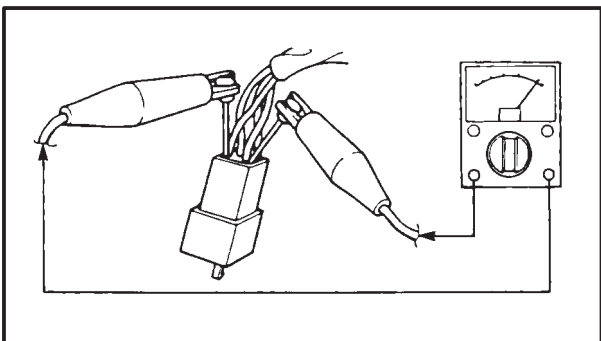
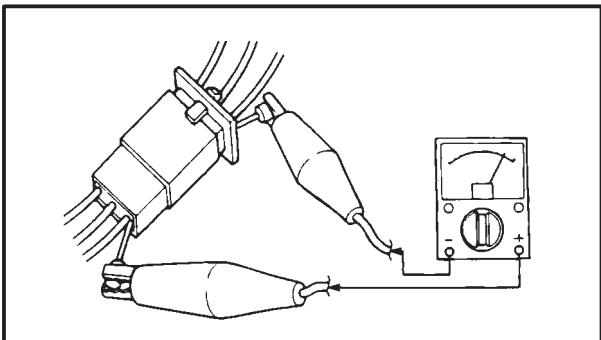
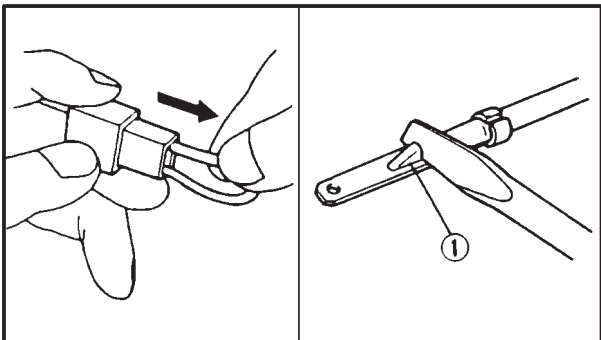
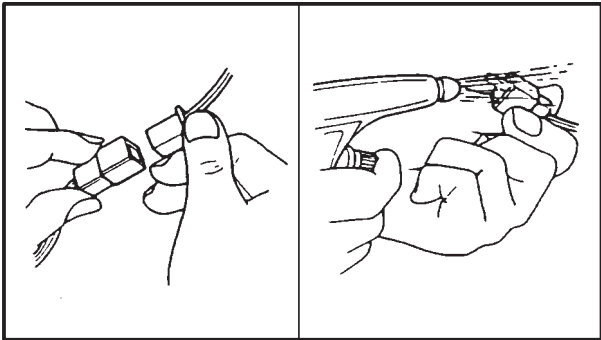


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CIRCLIPS

1. Check all circlips carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ it receives. See sectional view.

- ④ Shaft



EB801000

CHECKING OF CONNECTIONS

Check the connectors for stains, rust, moisture, etc.

1. Disconnect:
 - Connector
2. Check:
 - Connector
 - Moisture → Dry each terminal with an air blower.
 - Stains/rust → Connect and disconnect the terminals several times.
3. Check:
 - Connector leads
 - Looseness → Bend up the pin ① and connect the terminals.

4. Connect:
 - Connector terminals

NOTE: _____
The two terminals “click” together.

5. Check:
 - Continuity (using a pocket tester)

NOTE: _____
◦ If there is no continuity, clean the terminals.
◦ When checking the wire harness be sure to perform steps 1 to 3.
◦ As a quick remedy, use a contact revitalizer available at most part stores.
◦ Check the connector with a pocket tester as shown.

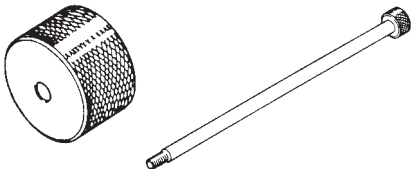
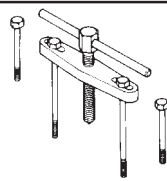
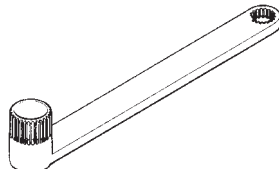
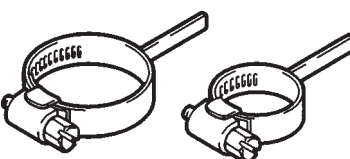
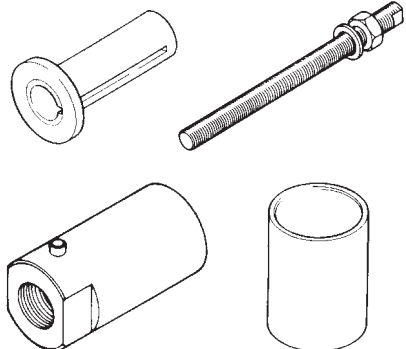
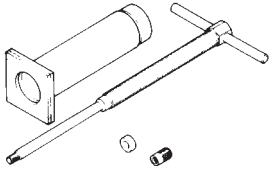
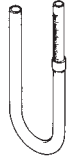


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SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools; this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools may differ by shape and part number from country to country. In such a case, two types are provided.

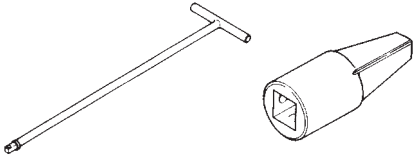
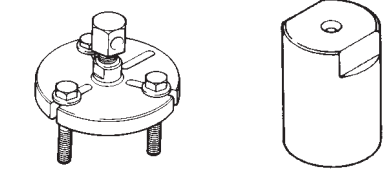
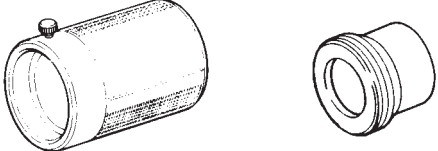
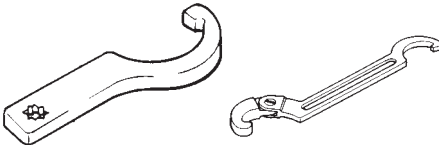
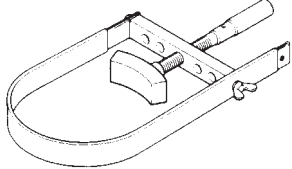
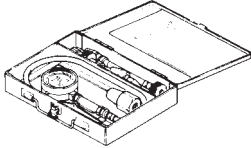
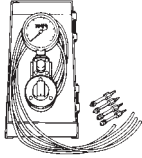
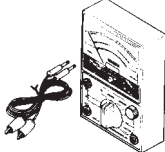
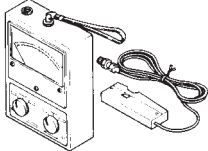
When placing an order, refer to the list provided below to avoid any mistakes.

Tool No.	Tool name/How to use	Illustration
Weight 90890-01084 Bolt 90890-01085	Slide hammer bolt/weight These tools are used to remove the rocker arm shaft.	
90890-01135	Crankcase separating tool This tool is used to remove the crankshaft.	
90890-01229	Coupling gear/Middle shaft tool This tool is needed when removing or installing the final pinion shaft nut.	
Final gear backlash band 90890-01230 Middle gear backlash band 90890-01231	Final gear backlash band This tool is needed when measuring final gear /middle gear backlash.	
Installer pot 90890-01274 Bolt 90890-01275 Adaptor 90890-04130 Spacer 90890-04060	Crankshaft installer pot/bolt/adaptor/spacer These tools are used to install the crankshaft.	
90890-01304	Piston pin puller This tool is used to remove the piston pin.	
90890-01312	Fuel level gauge This gauge is used to measure the fuel level in the float chamber.	

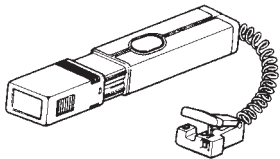
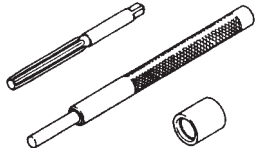
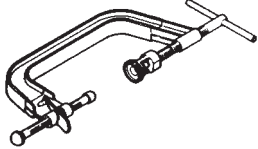
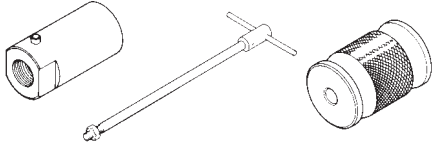
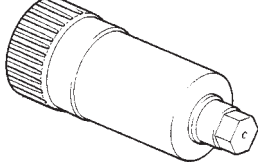
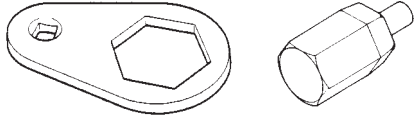
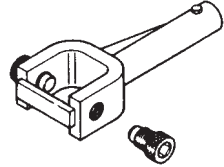
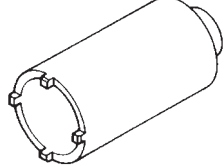
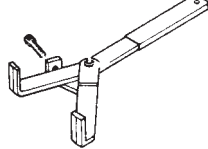
SPECIAL TOOLS

**GEN
INFO**



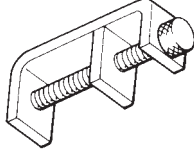
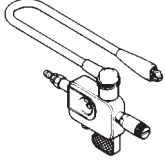
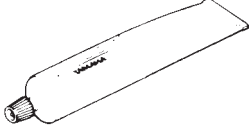
Tool No.	Tool name/How to use	Illustration
T-handle 90890-01326 Holder 90890-01460	T-handle/damper rod holder These tools are needed to loosen and tighten the damper rod holding bolt.	
Puller 90890-01362 Adapter 90890-04131	Flywheel puller/adapter These tools are needed to remove the rotor.	
Weight 90890-01367 Adapter 90890-01381	Fork seal driver weight/adapter These tools are needed when installing the slide metal, oil seal and dust seal into the fork.	
Ring nut wrench 90890-01403 Exhaust nut wrench 90890-01268	Ring nut wrench/exhaust and steering nut wrench This tool is needed to loosen and tighten the steering stem ring nut.	
90890-01701	Sheave holder This tool is needed to hold the rotor when removing or installing the rotor bolt.	
90890-03081	Compression gauge set These tools are needed to measure engine compression.	
90890-03094	Vacuum gauge This gauge is needed for carburetor synchronization.	
90890-03112	Pocket tester This instrument is needed for checking the electrical system.	
90890-03113	Engine tachometer This tool is needed for observing engine r/min.	



Tool No.	Tool name/How to use	Illustration
90890-03141	<p>Timing light</p> <p>This tool is necessary for checking ignition timing.</p>	
90890-04014	<p>Valve guide remover & installer</p> <p>This tool is needed to remove and install the valve guide.</p>	
90890-04019	<p>Valve spring compressor</p> <p>This tool is needed to remove and install the valve assemblies.</p>	
<p>Adapter 90890-01277 Shock puller 90890-01290 Weight 90890-01291</p>	<p>Crankshaft installer bolt adapter/armature shock puller/weight</p> <p>These tools are needed when removing the final pinion shaft.</p>	
90890-04137	<p>Bearing retainer wrench</p> <p>This tool is needed when removing or installing the middle drive shaft assembly.</p>	
<p>Wrench 90890-04138 Holder 90890-04055</p>	<p>Middle drive shaft nut wrench/Middle drive shaft holder</p> <p>These tools are needed when removing or installing the middle drive shaft bearing.</p>	
90890-04062	<p>Universal joint holder</p> <p>This tool is needed when removing or installing the driven pinion gear nut.</p>	
90890-04077	<p>Bearing retainer wrench</p> <p>This tool is needed when removing or installing the final drive pinion gear assembly.</p>	
90890-04086	<p>Clutch holding tool</p> <p>This tool is needed to hold the clutch when removing or installing the clutch boss nut.</p>	

SPECIAL TOOLS



Tool No.	Tool name/How to use	Illustration
<p>90890-04090</p>	<p>Damper spring compressor</p> <p>This tool is needed when removing or installing the damper spring.</p>	
<p>90890-06754</p>	<p>Dynamic spark tester Ignition checker</p> <p>This instrument is necessary for checking the ignition system components.</p>	
<p>90890-85505</p>	<p>Yamaha bond No.1215</p> <p>This sealant (bond) is used on crankcase mating surfaces, etc.</p>	



SPEC

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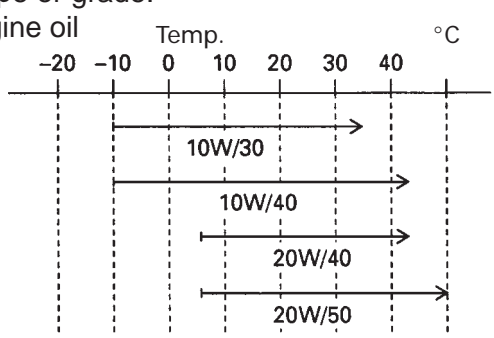
CHAPTER 2. SPECIFICATIONS

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard
Model code:	XVS1100: 5EL1 (For Europe) 5EL2 (For D, A, FIN) 5EL3 (For Australia)
Dimensions: Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance Minimum turning radius	2,405 mm 895 mm 1,095 mm 690 mm 1,640 mm 145 mm 3,200 mm
Basic weight: With oil and a full fuel tank	274 kg (5EL2 : 275kg)
Engine: Engine type Cylinder arrangement Displacement Bore × stroke Compression ratio Compression pressure (STD) Starting system	Air cooled 4-stroke, SOHC V-type 2-cylinder 1.063 L 95 × 75mm 8.3 : 1 1,000 kPa (10 kg/cm ² , 10 bar) at 400 r/min Electric starter
Lubrication system:	Wet sump
Oil type or grade: Engine oil 	API standard: "SE" or higher grade ACEA standard: G4 or G5
Final gear oil:	SAE80API "GL-4" Hypoid Gear Oil
Oil quantity: Engine oil Periodic oil change With oil filter replacement Total amount Final gear case oil Total amount	3.0 L 3.1 L 3.6 L 0.2 L
Air filter:	Dry type element
Fuel: Type Fuel tank capacity Fuel reserve amount	Regular unleaded gasoline 17 L 4.5 L

GENERAL SPECIFICATIONS

SPEC



Item	Standard
Carburetor: Type/quantity Manufacturer	BSR37/2 MIKUNI
Spark plug: Type Manufacturer Spark plug gap	BPR7ES/W22EPR-U NGK/DENSO 0.7 ~ 0.8 mm
Clutch type:	Wet, multiple-disc
Transmission: Primary reduction system Primary reduction ratio Secondary reduction system Secondary reduction ratio Transmission type Operation Gear ratio 1st 2nd 3rd 4th 5th	Spur gear 78/47 (1.660) Shaft drive 44/47 × 19/18 × 32/11 (2.875) Constant mesh 5-speed Left foot operation 40/17 (2.353) 40/24 (1.667) 36/28 (1.286) 32/31 (1.032) 29/34 (0.853)
Chassis: Frame type Caster angle Trail	Double cradle 33° 136 mm
Tire: Type Size front rear Manufacturer front rear Type front rear	With tube 110/90-18 61S 170/80-15M/C 77S BRIDGESTONE/DUNLOP BRIDGESTONE/DUNLOP EXEDRA L309/K555F EXEDRA G546/K555
Maximum load-except motorcycle:	201 kg (5EL2 : 200kg)
Tire pressure (cold tire): 0 ~ 90 kg (0 ~ 198 lb) load * front rear 90 kg (198 lb) ~ Maximum load * front rear	200 kPa (2.00 kg/cm ²) 225 kPa (2.25 kg/cm ²) 225 kPa (2.25 kg/cm ²) 250 kPa (2.50 kg/cm ²) * Load is the total weight of the cargo, rider, passenger and accessories.
Brake: Front brake type operation Rear brake type operation	Dual disc brake Right hand operation Single disc brake Right foot operation

GENERAL SPECIFICATIONS

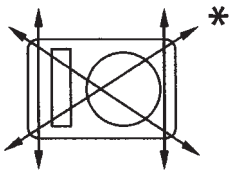
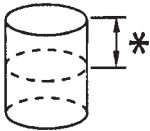
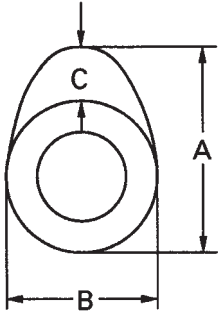
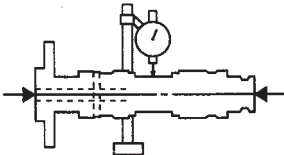
SPEC



Item	Standard
Suspension: Front suspension Rear suspension	Telescopic fork Swingarm (link suspension)
Shock absorber: Front shock absorber Rear shock absorber	Coil spring/Oil damper Coil spring/Gas-oil damper
Wheel travel: Front wheel travel Rear wheel travel	140 mm 113 mm
Electrical: Ignition system Generator system Battery type Battery capacity	T.C.I. (digital) A.C. magneto GT14B-4 12 V 12 AH
Headlight type:	Quartz bulb (halogen)
Bulb wattage × quantity: Headlight Auxiliary light Tail/brake light Turn signal Licence light Meter light Neutral indicator light High beam indicator light Turn indicator light Oil level caution light Engine warning light	12 V 60 W/55 W × 1 12 V 4 W × 1 12 V 5 W/21 W × 1 12 V 21 W × 4 12 V 5 W × 1 14 V 1.4 W × 2 12 V 1.7 W × 1 12 V 1.7 W × 1 12 V 1.7 W × 1 12 V 1.7 W × 1 12 V 1.7 W × 1

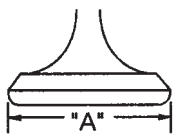
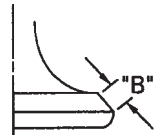
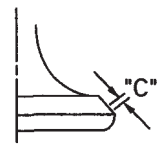
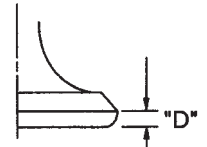


MAINTENANCE SPECIFICATIONS
ENGINE

Item	Standard	Limit
Cylinder head: Warp limit* 	...	0.03 mm
Cylinder: Bore size Measuring point* 	95.00 ~ 95.01 mm 40 mm	95.1 mm ...
Camshaft: Drive method Cam cap inside diameter Camshaft outside diameter Shaft-to-cap clearance Cam dimensions  Intake Exhaust Camshaft runout limit 	Chain drive (left & right) 25.000 ~ 25.021 mm 24.96 ~ 24.98 mm 0.020 ~ 0.061 mm "A" 39.112 ~ 39.212 mm "B" #1: 32.093 ~ 32.193 mm #2: 32.127 ~ 32.227 mm "C" 7.162 mm "A" 39.145 ~ 39.245 mm "B" 32.200 ~ 32.300 mm "C" 7.195 mm 39.012 mm #1: 31.993 mm #2: 32.027 mm 7.012 mm 39.045 mm 32.100 mm 7.045 mm 0.03 mm

MAINTENANCE SPECIFICATIONS

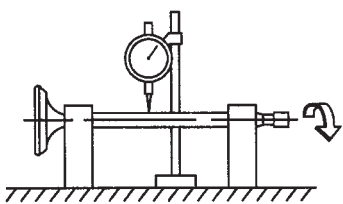
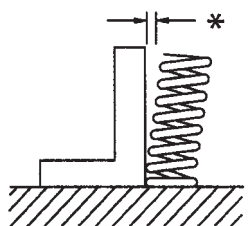
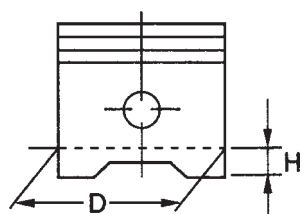
SPEC


Item	Standard	Limit	
Timing chain: Timing chain type/No. of links Timing chain adjustment method	SILENT CHAIN/98L Automatic	
Rocker arm/rocker arm shaft: Bearing inside diameter Shaft outside diameter Arm-to-shaft clearance	14.000 mm ~ 14.018 mm 13.985 mm ~ 13.991 mm 0.009 mm ~ 0.033 mm	14.036 mm 13.95 mm 0.086 mm	
Valve, valve seat, valve guide: Valve clearance (cold) IN EX	0.07 ~ 0.12 mm 0.12 ~ 0.17 mm	
Valve dimensions:			
			
Head Dia	Face width	Seat Width	Margin Thickness
"A" head diameter	IN	47.0 ~ 47.2 mm	...
	EX	39.0 ~ 39.2 mm	...
"B" face width	IN	2.1 mm	...
	EX	2.1 mm	...
"C" seat width	IN	1.2 ~ 1.4 mm	1.8 mm
	EX	1.2 ~ 1.4 mm	1.8 mm
"D" margin thickness	IN	1.1 ~ 1.5 mm	0.8 mm
	EX	1.1 ~ 1.5 mm	0.8 mm
Stem outside diameter	IN	7.975 ~ 7.990 mm	...
	EX	7.960 ~ 7.975 mm	...
Guide inside diameter	IN	8.000 ~ 8.012 mm	...
	EX	8.000 ~ 8.012 mm	...
Stem-to-guide clearance	IN	0.010 ~ 0.037 mm	0.08 mm
	EX	0.025 ~ 0.052 mm	0.10 mm

MAINTENANCE SPECIFICATIONS

SPEC

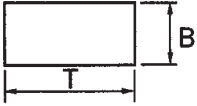
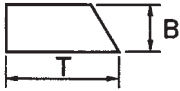
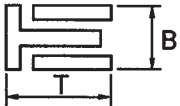
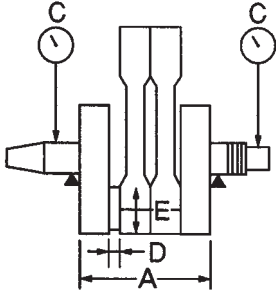


Item	Standard	Limit
Stem runout limit 	•••	0.03 mm
Valve seat width IN EX	1.2 ~ 1.4 mm 1.2 ~ 1.4 mm	2.0 mm 2.0 mm
Valve spring: Free length IN EX Set length (valve closed) IN EX Compressed pressure (installed) IN EX Tilt limit * IN EX 	44.6 mm 44.6 mm 40 mm 40 mm 160.7 N (16.4 kg) 160.7 N (16.4 kg) ••• •••	43.5 mm 43.5 mm ••• ••• ••• ••• 2.5°/1.9mm 2.5°/1.9mm
Direction of winding (top view) IN EX	Clockwise Clockwise	••• •••
Piston: Piston to cylinder clearance Piston size "D" 	0.025 ~ 0.050 mm 94.960 ~ 94.975 mm	0.15 mm •••
Measuring point "H" Piston off-set	5 mm 0 mm	••• •••

MAINTENANCE SPECIFICATIONS

SPEC



Item	Standard	Limit
Piston pin bore inside diameter Piston pin outside diameter	22.004 ~ 22.015 mm 21.991 ~ 22.000 mm
Piston rings: Top ring: <div style="text-align: center; margin: 5px 0;">  </div> Type Dimensions (B × T) End gap (installed) Side clearance (installed)	Plain 1.5 × 3.8 mm 0.3 ~ 0.5 mm 0.04 ~ 0.08 mm 0.8 mm 0.1 mm
2nd ring: <div style="text-align: center; margin: 5px 0;">  </div> Type Dimensions (B × T) End gap (installed) Side clearance	Taper 1.2 × 3.8 mm 0.30 ~ 0.45 mm 0.03 ~ 0.07 mm 0.8 mm 0.1 mm
Oil ring: <div style="text-align: center; margin: 5px 0;">  </div> Dimensions (B × T) End gap (installed)	2.5 × 3.4 mm 0.2 ~ 0.7 mm
Connecting rod: Oil clearance Color code (corresponding size)	0.044 ~ 0.073 mm ①Blue ② Black ③ Brown ④ Green ⑤ Yellow
Crankshaft: <div style="text-align: center; margin: 5px 0;">  </div> Crank width "A" Runout limit "C" Big end side clearance "D"	101.95 ~ 102.00 mm ... 0.320 ~ 0.474 mm	... 0.02 mm ...

MAINTENANCE SPECIFICATIONS

SPEC

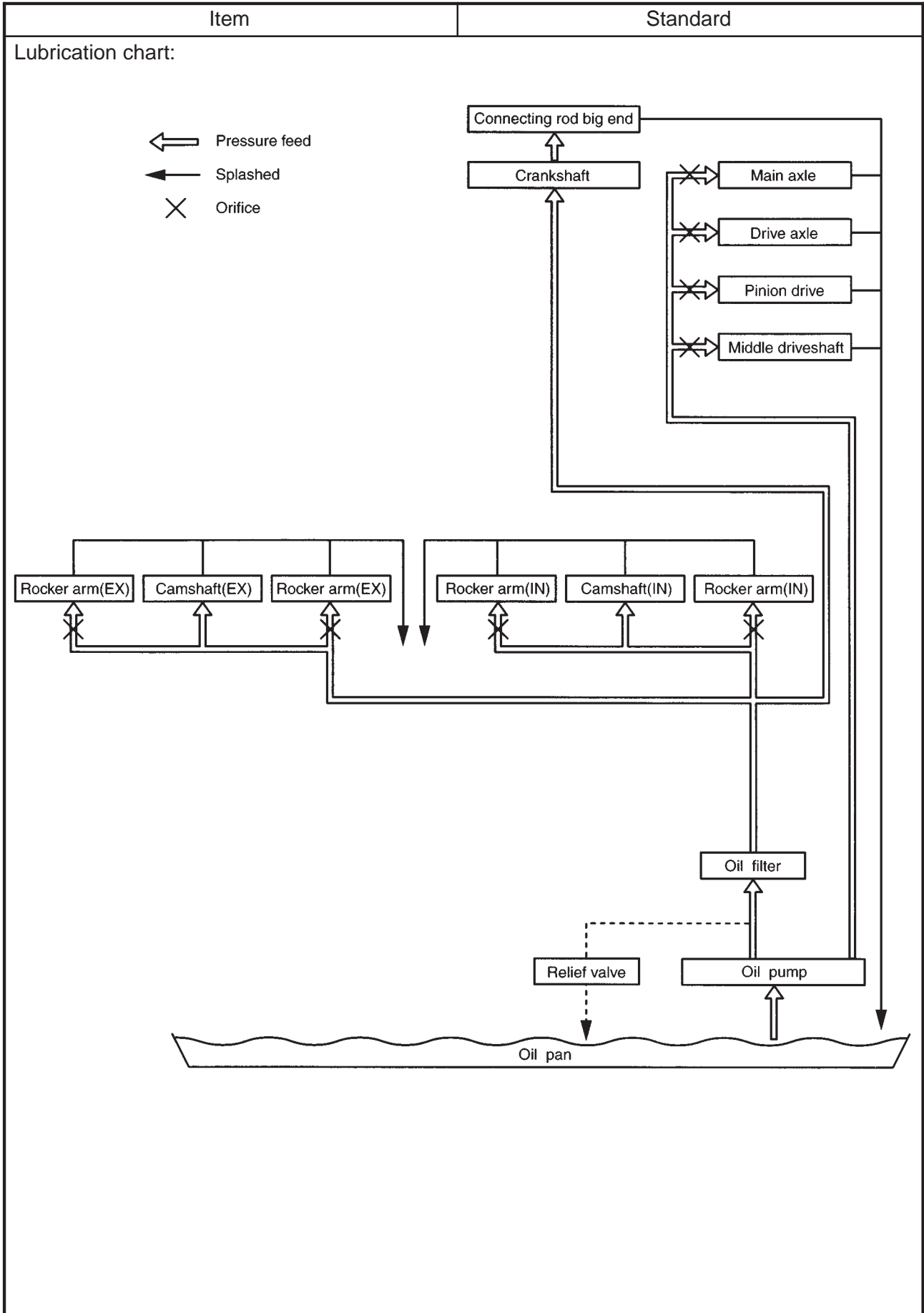

Item	Standard	Limit
Clutch:		
Friction plate thickness	2.9 ~ 3.1 mm	2.8 mm
Quantity	8	•••
Clutch plate thickness	2.5 ~ 2.7 mm	0.1 mm
Quantity	1	•••
Clutch plate thickness	1.9 ~ 2.1 mm	0.1 mm
Quantity	7	•••
Clutch spring free length	7.2 mm	6.5 mm
Quantity	1	•••
Clutch housing thrust clearance	0.05 ~ 0.40 mm	•••
Clutch housing radial clearance	0.010 ~ 0.044 mm	•••
Clutch release method	Inner push, screw push	•••
Push rod bending limit	•••	0.5 mm
Transmission:		
Main axle deflection limit	•••	0.08 mm
Drive axle deflection limit	•••	0.08 mm
Shifter:		
Shifter type	Guide bar	•••
Carburetor:		
I. D. mark	5EL1 00	•••
Main jet (M.J)	#1: #110, #2: #112.5	•••
Main air jet (M.A.J)	#55	•••
Jet needle (J.N)	#1: 5DL39-53-3/5, #2: 5DL40-53-3/5	•••
Needle jet (N.J)	P-0M	•••
Pilot air jet (P.A.J.1)	#63.8	•••
(P.A.J.2)	#145	•••
Pilot outlet (P.O)	1.0	•••
Pilot jet (P.J)	#17.5	•••
Bypass 1 (B.P.1)	0.8	•••
Bypass 2 (B.P.2)	0.8	•••
Bypass 3 (B.P.3)	0.8	•••
Pilot screw (P.S)	3	•••
Valve seat size (V.S)	1.2	•••
Starter jet (G.S.1)	#42.5	•••
Starter jet (G.S.2)	0.8	•••
Throttle valve size (Th.V)	#125	•••
Fuel level (F.L)	4~5 mm	•••
Engine idle speed	950 ~ 1,050 r/min	•••
Intake vacuum	34.7 ~ 37.3 kPa (260 ~ 280 mmHg)	•••
Engine oil temperature	75 ~ 85°C	•••
Fuel pump:		
Type	Electrical type	•••
Model/manufacturer	UC-Z6M/MITSUBISHI	•••
Consumption amperage <max>	0.8 A	•••
Output pressure	12 kPa (0.12 kg/cm ²)	•••

MAINTENANCE SPECIFICATIONS

SPEC

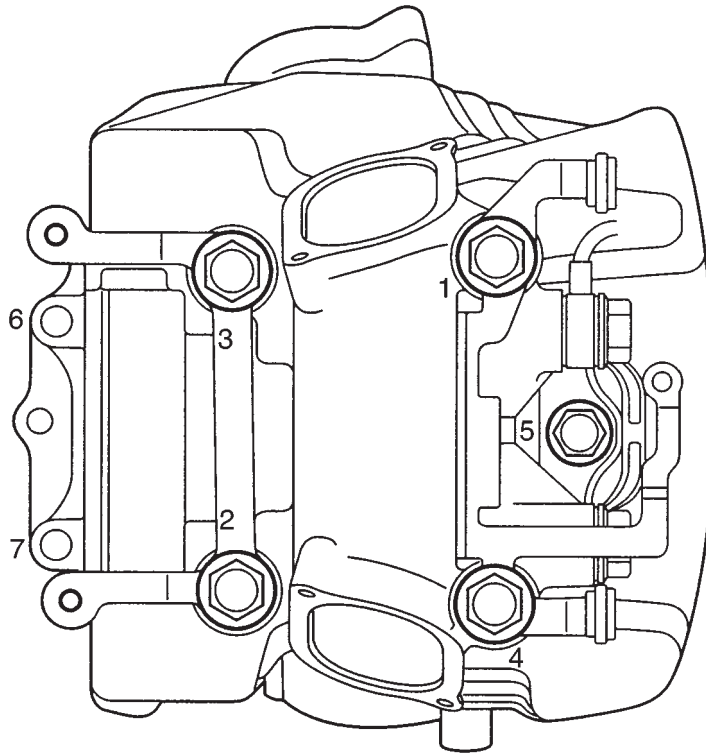


Item	Standard	Limit
Lubrication system:		
Oil filter type	Paper type	•••
Oil pump type	Trochoid type	•••
Tip clearance "A" or "B"	0.03 ~ 0.09 mm	0.15 mm
Side clearance	0.03 ~ 0.08 mm	0.15 mm
Relief valve operating pressure	450 ~ 550 kPa (4.5 ~ 5.5 kg/cm ²)	•••
Shaft drive:		
Middle gear backlash	0.1 ~ 0.2 mm	•••
Final gear backlash	0.1 ~ 0.2 mm	•••

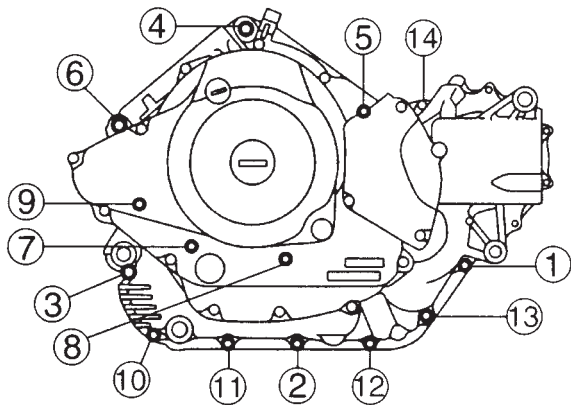




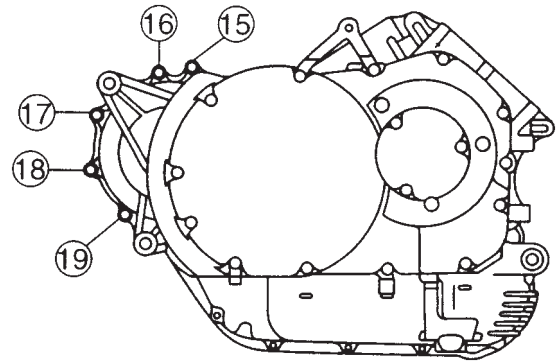
Cylinder head tightening sequence:



Crankcase tightening sequence:



Left crankcase







Right crankcase

MAINTENANCE SPECIFICATIONS

SPEC







Tightening torques

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kg	
Cylinder head	Nut	M12	8	50	5.0	 Use lock washer    Use lock washer
Cylinder head	Nut	M10	2	35	3.5	
Plate	Bolt	M8	2	20	2.0	
Cylinder head cover	Screw	M6	4	4	0.4	
Cylinder head (exhaust pipe)	Stud bolt	M8	4	12.5	1.25	
Rocker arm shaft	Union bolt	M16	2	37.5	3.75	
Camshaft sprocket cover	Bolt	M6	4	10	1.0	
Tappet cover	Bolt	M6	8	10	1.0	
Rocker arm shaft (oil passage)	Bolt	M16	4	38	3.8	
Stopper plate (camshaft)	Bolt	M8	4	20	2.0	
Spark plug	—	M14	2	20	2.0	
Cylinder	Bolt	M6	2	10	1.0	
Lower cylinder head cover	Bolt	M6	6	10	1.0	
Upper cylinder head cover	Screw	M6	8	5	0.5	
Connecting rod	Nut	M9	4	48	4.8	
Rotor	Nut	M16	1	175	17.5	
Valve adjusting locknut	Nut	M8	4	27	2.7	
Camshaft sprocket	Bolt	M10	2	55	5.5	
Timing chain tensioner	Bolt	M6	4	10	1.0	
Timing chain tensioner cap	Bolt	M6	2	8	0.8	
Timing chain guide	Bolt	M6	4	10	1.0	
Oil pump	Bolt	M6	3	10	1.0	
Oil strainer cover	Bolt	M6	3	10	1.0	
Oil filter cover	Bolt	M6	5	10	1.0	
Oil pump gear	Bolt	M6	1	12	1.2	
Oil pump cap	Bolt	M6	1	10	1.0	
Oil deliuey pipe (cylinder head)	Union bolt	M16	2	20	2.0	
(crankcase)	Union bolt	M10	1	20	2.0	
Drain bolt	—	M14	1	43	4.3	
Carburetor cover	Bolt	M5	2	7	0.7	
Air filter case stay	Bolt	M6	2	10	1.0	
Air filter case assembly	Bolt	M5	3	2	0.2	
Exhaust pipe joint and cylinder head	Nut	M8	4	20	2.0	
Exhaust pipe joint and muffler assembly	Bolt	M8	2	20	2.0	
Muffler	Bolt	M10	2	25	2.5	
Crankcase (cylinder)	Stud bolt	M12	8	24	2.4	
Crankcase (cylinder)	Stud bolt	M10	2	20	2.0	
Crankcase	Bolt	M10	3	38.5	3.85	
Crankcase	Bolt	M6	10	10	1.0	
Bearing retainer (middle drive pinion gear)	Bolt	M8	3	25	2.5	
Crankcase cover (left)	Bolt	M6	13	10	1.0	
Crankcase cover (right)	Bolt	M6	11	10	1.0	
Clamp	Bolt	M6	1	10	1.0	
One-way clutch	Bolt	M6	8	12	1.2	
Primary drive gear	Nut	M20	1	110	11.0	

MAINTENANCE SPECIFICATIONS

SPEC



Part to be tightened	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kg	
Clutch spring	Bolt	M6	6	8	0.8	
Clutch adjuster	Nut	M8	1	12	1.2	
Clutch boss	Nut	M20	1	70	7.0	Use lock washer
Push lever axle	Screw	M8	1	12	1.2	
Middle drive pinion gear	Nut	M44	1	110	11.0	Stake
Bearing retainer (middle driven shaft)	Nut	M88	1	110	11.0	Stake
Yoke (middle driven shaft)	Nut	M14	1	—	—	Stake
Bearing housing (middle drive shaft)	Bolt	M8	4	25	2.5	
Shift lever stopper	Bolt	M8	1	22	2.2	 Use lock washer
Guide bar stopper	Screw	M6	2	7	0.7	
Shift drum segment	Screw	M5	1	4	0.4	
Shift arm	Bolt	M6	1	10	1.0	
Shift pedal adjuster	Nut	M6	2	10	1.0	1 of 2 has LH thread
Stator coil	Screw	M6	3	10	1.0	
Pickup coil	Screw	M5	2	7	0.7	
Starter motor	Bolt	M6	2	10	1.0	
Neutral switch	—	M10	1	20	2.0	
Ignition coil	Screw	M5	4	2.5	0.25	
Speed sensor	Bolt	M6	1	7	0.7	

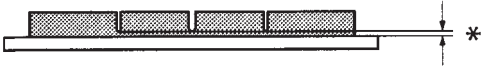


CHASSIS

Item	Standard	Limit
Steering system: Steering bearing type	Angular bearing	•••
Front suspension: Front fork travel	140 mm	•••
Fork spring free length	356.9 mm	350 mm
Fitting length	319.4 mm	•••
Collar length	183 mm	•••
Spring rate (K1)	8.8 N/mm (0.9 kg/mm)	•••
(K2)	12.7 N/mm (1.3 kg/mm)	•••
Stroke (K1)	0 ~ 77.5 mm	•••
(K2)	77.5 ~ 140 mm	•••
Optional spring	No	•••
Oil capacity	0.464 L	•••
Oil level	108 mm	•••
Oil grade	Fork oil 10W or equivalent	•••
Rear suspension: Shock absorber travel	113 mm	•••
Spring free length	179.5 mm	•••
Fitting length	163 mm	•••
Spring rate (K1)	117.7 N/mm (12 kg/mm)	•••
Stroke (K1)	0 ~ 50 mm	•••
Optional spring	No	•••
Swingarm: Free play limit end	•••	0 mm
Front wheel: Type	Spoke wheel	•••
Rim size	18 × 2.15	•••
Rim material	Steel	•••
Rim runout limit radial	•••	1.0 mm
lateral	•••	0.5 mm
Rear wheel: Type	Spoke wheel	•••
Rim size	15M/C × MT4.50	•••
Rim material	Steel	•••
Rim runout limit radial	•••	1.0 mm
lateral	•••	0.5 mm

MAINTENANCE SPECIFICATIONS

SPEC


Item	Standard	Limit
Front brake: Type Disc outside diameter × thickness Disc deflection limit Pad thickness inner Pad thickness outer  Master cylinder inside diameter Caliper cylinder inside diameter Caliper cylinder inside diameter Brake fluid type	Dual disc 298 × 5 mm ●●● 6.2 mm 6.2 mm 14.0 mm 25.4 mm 30.1 mm DOT 4	●●● 4.5 mm 0.15 mm 0.8 mm 0.8 mm ●●● ●●● ●●● ●●●
Rear brake: Type Disc outside diameter × thickness Disc deflection limit Pad thickness inner outer Master cylinder inside diameter Caliper cylinder inside diameter Brake fluid type	Single disc 282 × 6 mm ●●● 5.55 mm 5.55 mm 12.7 mm 42.9 mm DOT 4	●●● 5.5 mm 0.15 mm 0.5 mm 0.5 mm ●●● ●●●
Brake lever & brake pedal: Brake lever free play (at lever end) Brake pedal position Brake pedal free play Clutch lever free play (at lever end) Throttle grip free play	5 ~ 8 mm 81.8 mm 0 mm 5 ~ 10 mm 4 ~ 6 mm	●●● ●●● ●●● ●●● ●●●






Tightening torques

Part to be tightened	Thread size	Tightening torque		Remarks
		Nm	m•kg	
Upper bracket and inner tube	M8	20	2.0	See NOTE
Lower bracket and inner tube	M10	30	3.0	
Upper bracket and steering shaft	M22	110	11.0	
Ring nut (steering shaft)	—	18	1.8	
Handlebar holder (lower) and upper bracket	M12	32	3.2	
Handlebar holder (lower) and handlebar holder (upper)	M8	28	2.8	
Master cylinder (front brake)	M6	10	1.0	
Union bolt (brake hose)	M10	30	3.0	
Brake hose holder and lower bracket	M6	10	1.0	
Brake hose joint and brake pipe	M10	19	1.9	
Brake hose joint and brake hose holder	M6	10	1.0	
Front fender and outer tube	M8	10	1.0	
Headlight stay and lower bracket	M6	7	0.7	
Headlight stay and headlight	M6	8	0.8	
Front flasher light and lower bracket	M6	7	0.7	
Engine mounting:				
Frame and stay (front - upper)	M10	48	4.8	
Frame and stay (front - lower)	M10	48	4.8	
Stay and engine (front - upper)	M12	74	7.4	
Stay and engine (front - lower)	M10	48	4.8	
Frame and engine (rear - upper)	M10	48	4.8	
Frame and engine (rear - lower)	M10	48	4.8	
Down tube and frame	M10	48	4.8	
Ignition coil and stay	M5	4	0.4	
Muffler stay and frame	M8	30	3.0	
Rear shock absorber and relay arm	M10	48	4.8	
Rear shock absorber and frame	M10	40	4.0	
Pivot shaft and swingarm	M16	90	9.0	
Relay arm and frame	M10	48	4.8	
Connecting arm and relay arm	M12	48	4.8	
Connecting arm and swingarm	M12	48	4.8	
Final gear case and swingarm	M10	90	9.0	
Swingarm end and holder	M8	23	2.3	
Fuel tank and fuel cock	M6	7	0.7	
Fuel tank bracket and frame	M8	23	2.3	
Rider's seat	M6	7	0.7	
Passenger seat	M6	7	0.7	
Fuel tank and top cover	M5	4	0.4	
Licence bracket and rear fender stay	M6	7	0.7	
Rear fender and rear fender stay	M5	4	0.4	
Rear fender and tail/brake light	M6	6	0.6	
Rear fender stay and rear flasher light	M12	7	0.7	
Frame and rear fender	M8	26	2.6	
Side cover (left)	M6	7	0.7	
Battery cover	M6	7	0.7	
Side cover (right)	M6	7	0.7	
Starter relay and leads	M6	7	0.7	

MAINTENANCE SPECIFICATIONS

SPEC


Part to be tightened	Thread size	Tightening torque		Remarks
		Nm	m•kg	
Passenger footrest and frame	M8	26	2.6	
Sidestand bracket and frame	M10	64	6.4	
Sidestand and sidestand bracket	M10	56	5.6	
Sidestand switch	M5	4	0.4	
Brake pedal/footrest and frame	M6	7	0.7	
Rear brake master cylinder and master cylinder bracket	M8	23	2.3	
Master cylinder bracket and down tube	M8	23	2.3	
Footrest and frame	M10	64	6.4	
Front wheel axle	M16	59	5.9	
Front wheel axle pinch bolt	M8	20	2.0	
Brake caliper	M10	40	4.0	
Brake disc and front wheel	M8	23	2.3	
Caliper bleed screw	M7	6	0.6	
Rear wheel axle nut	M16	107	10.7	
Rear brake caliper and caliper bracket	M10	40	4.0	
Caliper bracket and swingarm	M10	40	4.0	
Brake hose union bolt	M10	30	3.0	
Caliper bleed screw	M8	6	0.6	
Clutch hub and damper	M10	62	6.2	
Final gear case stud bolt	M10	18	1.8	
Final gear case stud bolt	M8	9	0.9	
Bearing housing (final gear case)	M8	23	2.3	
Bearing housing (final gear case)	M10	40	4.0	
Drive pinion	M14	130	13.0	
Bearing retainer (final drive pinion gear)	M65	115	11.5	LH thread
Oil filter bolt (final gear)	M14	23	2.3	
Oil drain bolt (final gear)	M14	23	2.3	
Housing cover	M10	42	4.2	

NOTE:

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



ELECTRICAL

Item	Standard	Limit
Voltage:	12 V	...
Ignition system:		
Ignition timing (B.T.D.C.)	10° at 1,000 r/min	...
Advancer type	Digital type	...
T.C.I.:		
Pickup coil resistance/color	189 ~ 231 Ω at 20°C/Gray – Black	...
T.C.I. unit model/manufacturer	J4T101/MITSUBISHI	...
Ignition coil:		
Model/manufacturer	F6T507/MITSUBISHI	...
Primary winding resistance	3.57 ~ 4.83 Ω at 20°C	...
Secondary winding resistance	10.7 ~ 14.5 kΩ at 20°C	...
Spark plug cap:		
Type	Resin type	...
Resistance	10 kΩ	...
Charging system:		
Type	A.C. magneto	...
Model/manufacturer	F4T654/MITSUBISHI	...
Nominal output	14 V 350 W at 5,000 r/min	...
Stator coil resistance/color	0.36 ~ 0.44 Ω at 20°C/White – White	...
Voltage regulator:		
Type	Semi-conductor, short-circuit type	...
Model/manufacturer	SH650D-11/SHINDENGEN	...
No load regulated voltage	14.1 ~ 14.9 V	...
Rectifier:		
Model/manufacturer	SH650D-11/SHINDENGEN	...
Capacity	18 A	...
Withstand voltage	200 V	...
Battery:		
Specific gravity	1.320	...
Electric starter system:		
Type	Constant mesh type	...
Starter motor:		
Model/manufacturer	SM-13/MITSUBA	...
Output	0.6 kW	...
Armature coil resistance	0.026 ~ 0.034 Ω at 20°C	...
Brush overall length	12.5 mm	5 mm
Brush spring pressure	7.65 ~ 10.01 N (780 ~ 1021 g)	...
Commutator diameter	28 mm	27 mm
Mica undercut	0.7 mm	...
Starter relay:		
Model/manufacturer	MS5F-421/JIDECO	...
Amperage rating	180 A	...

MAINTENANCE SPECIFICATIONS

SPEC


Item	Standard	Limit
Horn:		
Type	Plane type	...
Quantity	1	...
Model/manufacture	YF-12/NIKKO	...
Maximum amperage	3 A	...
Flasher relay:		
Type	Full transistor type	...
Model/manufacture	FE246BH/DENSO	...
Self cancelling device	No	...
Flasher frequency	75 ~ 95 cycle/min	...
Wattage	21 W × 2 + 3.4W	...
Oil level gauge:		
Model/manufacture	5EL/DENSO	...
Starting circuit cut-off relay		
Model/manufacture	G8R-30Y-B/OMRON	...
Fuel pump relay:		
Model/manufacture	G8R-30Y-B/OMRON	...
Circuit breaker:		
Type	Fuse	...
Amperage for individual circuit		
MAIN	30 A × 1	...
HEAD LIGHT	15 A × 1	...
SIGNALS	10 A × 1	...
IGNITION	10 A × 1	...
BACK UP	5 A × 1	...
Carburetor heater	15 A × 1	...
Reserve	30 A × 1	...
Reserve	15 A × 1	...
Reserve	10 A × 1	...
Reserve	5 A × 1	...

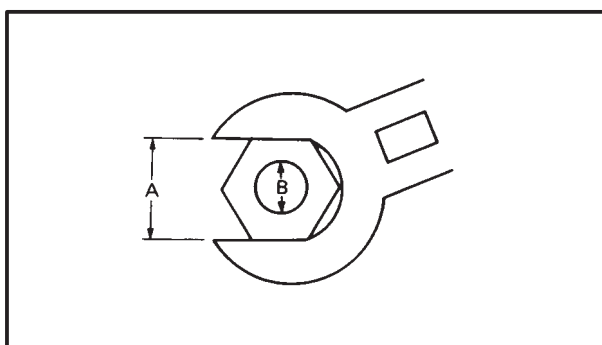
GENERAL TORQUE SPECIFICATIONS /CONVERSION TABLE



EB202001

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 provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until the specified torque is reached. Unless otherwise specified, torque specifications require clean, dry threads. Components should be at room temperature.



A: Distance between flats
B: Outside thread diameter

A (nut)	B (Bolt)	General 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

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	x 0.03937	=	** in
2 mm	x 0.03937	=	0.08 in

CONVERSION TABLE

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



EB203000

LUBRICATION POINTS AND LUBRICANT TYPES
ENGINE

Lubrication point	Symbol
Oil seal lips	
O-ring	
Bearing	
Connecting rod bolt/nut	
Connecting rod small end and big end	
Crankshaft pin	
Crankshaft journal/big end	
Piston surface	
Piston pin	
Camshaft cam lobe/journal	
Rocker arm shaft	
Valve stem (IN, EX)	
Valve stem end (IN, EX)	
Timing chain drive gear shafts/sprockets	
Oil pump rotor (inner/outer), housing	
Idle gear surface	
Starter idle gear	
Starter idle gear shaft	
Starter oneway cam	
Middle drive gear	
Primary driven gear	
Push rod 1, 2	
Transmission gear (wheel/pinion)	
Shift cam	
Shift fork/guide bar	
Shift shaft assembly	
Push rod ball	
Push lever assembly	

LUBRICATION POINTS AND LUBRICANT TYPES

SPEC



EB203010

CHASSIS

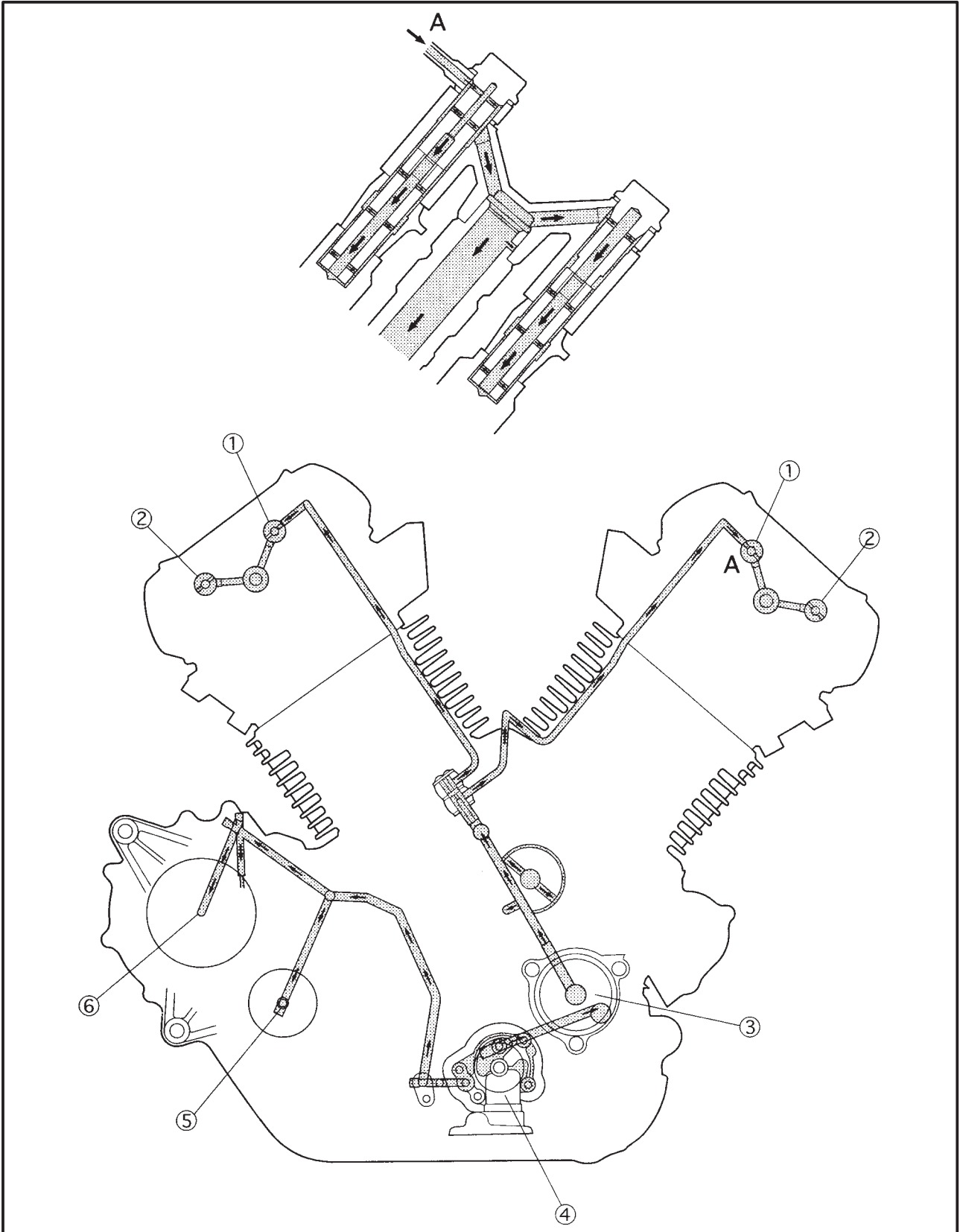
Lubrication point	Symbol
Steering head pipe (upper/lower), bearing	
Steering head pipe, bearing cover lip	
Steering head pipe, oil seal lip	
Front wheel oil seal lip (right/left)	
Rear wheel oil seal lip	
Clutch hub fitting area	
Rear brake pedal shaft	
Shift pedal shaft	
Sidestand bolt, sidestand sliding surface	
Tube guide (throttle grip) inner surface	
Brake lever pivot bolt, contact surface	
Clutch lever pivot bolt, contact surface	
Rear shock absorber (lower) oil seal lip	
Swingarm pivot bearing inner surface	
Swingarm pivot oil seal lip	
Relay arm bearing, collar and oil seal	
Drive shaft spline	
Drive shaft dust cover	



EB205000

LUBRICATION DIAGRAMS

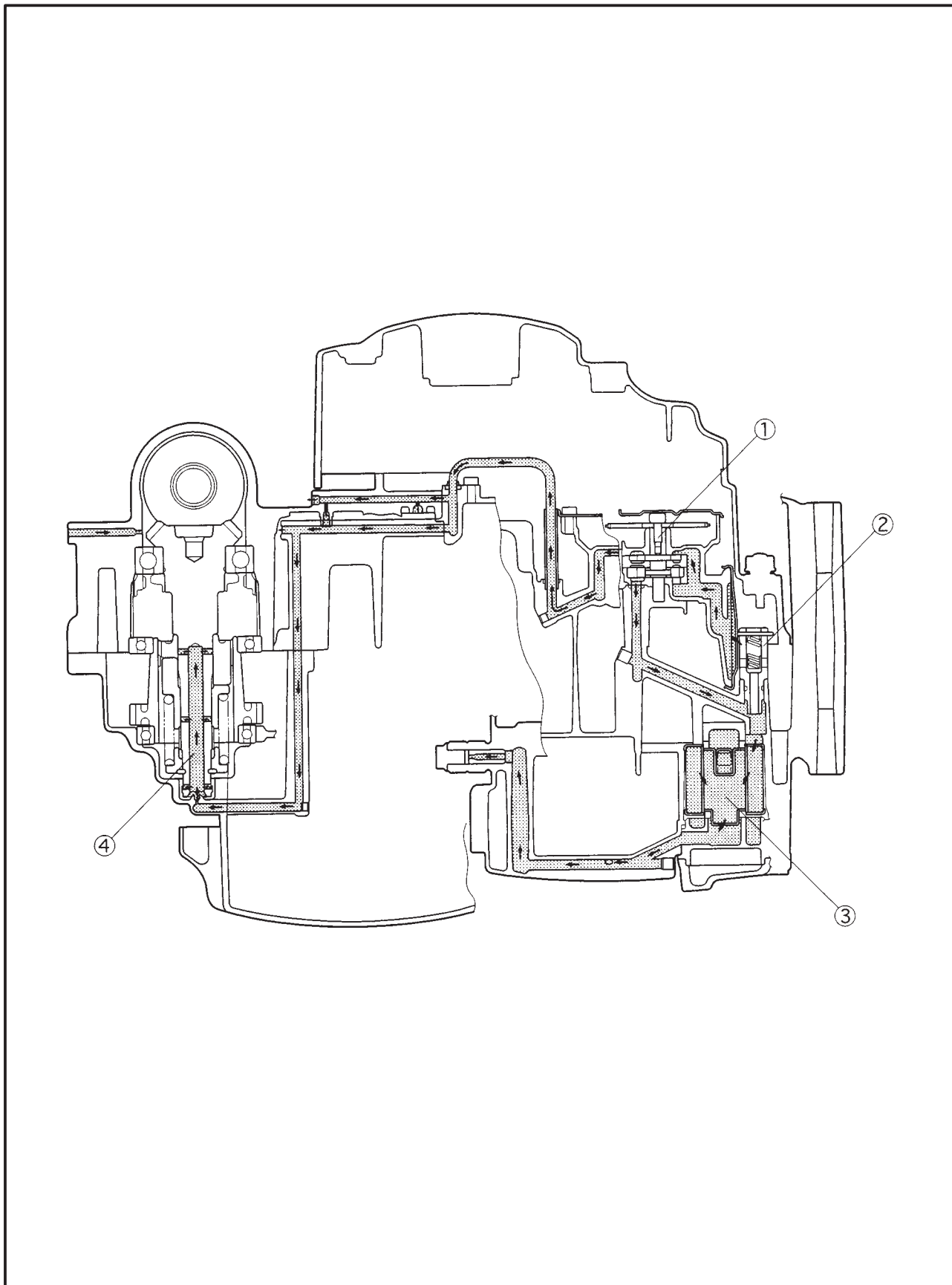
- ① Rocker arm shaft (intake)
- ② Rocker arm shaft (exhaust)
- ③ Oil filter
- ④ Oil pump
- ⑤ Drive axle
- ⑥ Middle drive shaft





- ① Oil pump
- ② Relief valve
- ③ Oil filter

- ④ Middle drive shaft

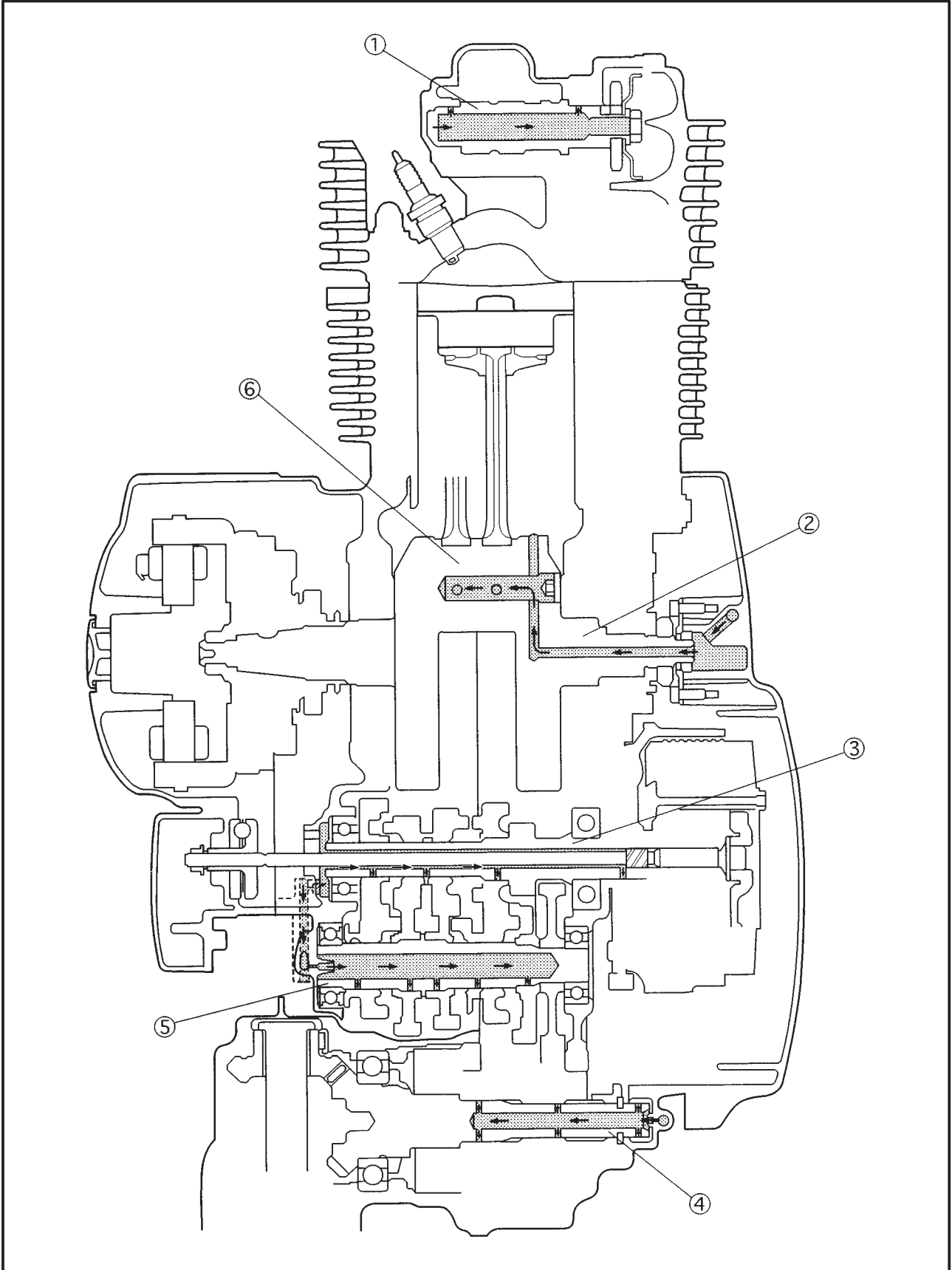


LUBRICATION DIAGRAMS

SPEC



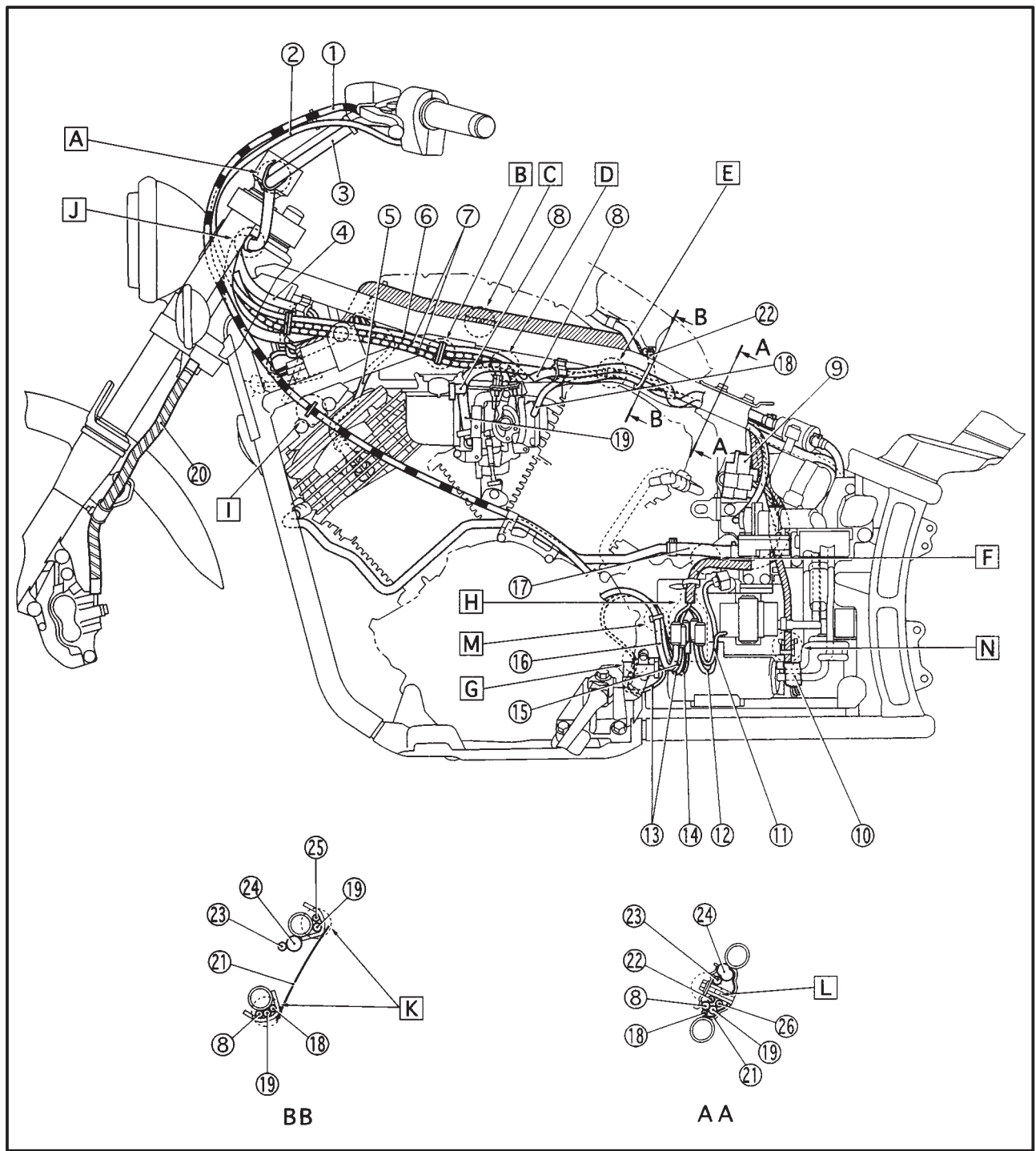
- ① Camshaft
- ② Crankshaft
- ③ Main axle
- ④ Middle drive shaft
- ⑤ Drive axle
- ⑥ Connecting rod big end



EB206000

CABLE ROUTING

- | | | |
|-------------------------------------|------------------------------------------|-----------------------------------------------------------------------|
| ① Clutch cable | ⑩ Alarm connector | ⑲ Fuel hose (carburetor-fuel pump) |
| ② Starter cable | ⑪ Fuel pump lead | ⑳ Brake hose |
| ③ Handlebar switch lead (left) | ⑫ Speed sensor lead | ㉑ Heat protector |
| ④ Handlebar switch lead (right) | ⑬ Sidestand switch lead | ㉒ Fuel breather hose (fuel tank-
roll over valve) (for California) |
| ⑤ High tension code | ⑭ Neutral switch lead | ㉓ Speedometer lead |
| ⑥ Starter cable | ⑮ Pickup coil lead | ㉔ Wireharness |
| ⑦ Throttle cable | ⑯ AC magneto lead | ㉕ Purge hose (carburetor-solenoid
valve) (for California) |
| ⑧ Fuel hose (fuel cock-fuel filter) | ⑰ Ventilation hose | |
| ⑨ Fuse box | ⑱ Sensing hose (AIS-carburetor
joint) | |

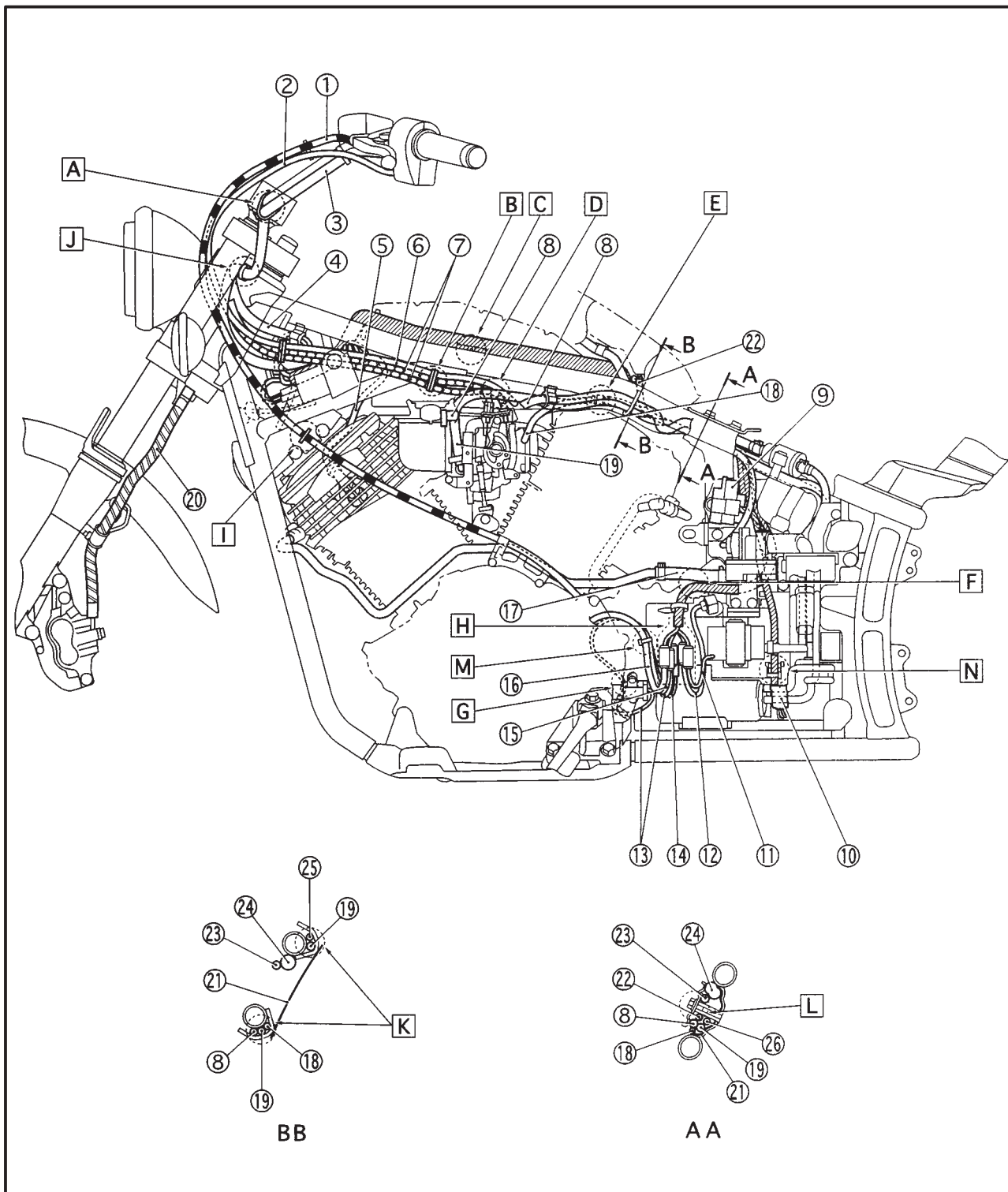


CABLE ROUTING

SPEC



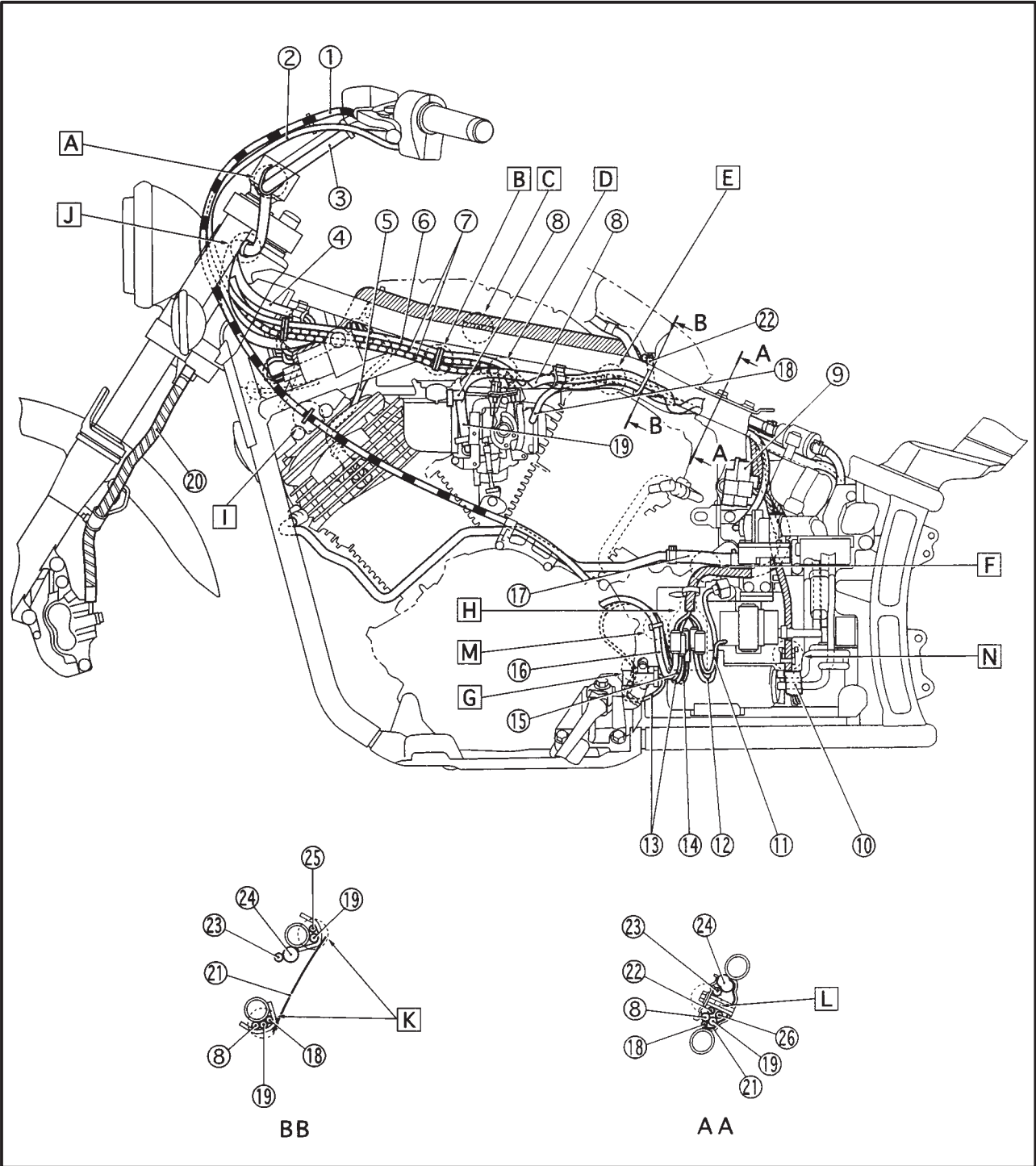
- 26 Purge hose (carburetor-solenoid valve) (for California)
- A Fasten the handlebar switch leads (left and right) to the handlebar with plastic locking tie.
- B Position the throttle cable and starter cable as shown, and clamp them with holder.
- C Clamp the wire harness with the hook of frame side.
- D When installing the pipe of throttle cables, press it inside.
- E Connect the sensing hose (carburetor joint-AIS side) with a nozzle.
- F Push the wire harness inside of the tool box plate.
- G Route the sidestand lead inside of engine cover.
- H Position the all connectors inside of the connector cover.
- I Route the clutch cable through the cable guide.



CABLE ROUTING



- J** Fasten the handlebar switch leads (left and right) under the handle crown with a plastic band. Set the band at four notches, and install it no slacking.
- K** Route the each hoses through the frame guide and do not pinch it.
- L** When installing the fitting plate, do not pinch the each hoses and wire harness.
- M** Fasten the AC magneto lead and sidestand switch lead with a plastic locking tie.
- N** Fasten the alarm lead with a plastic band on the lid.

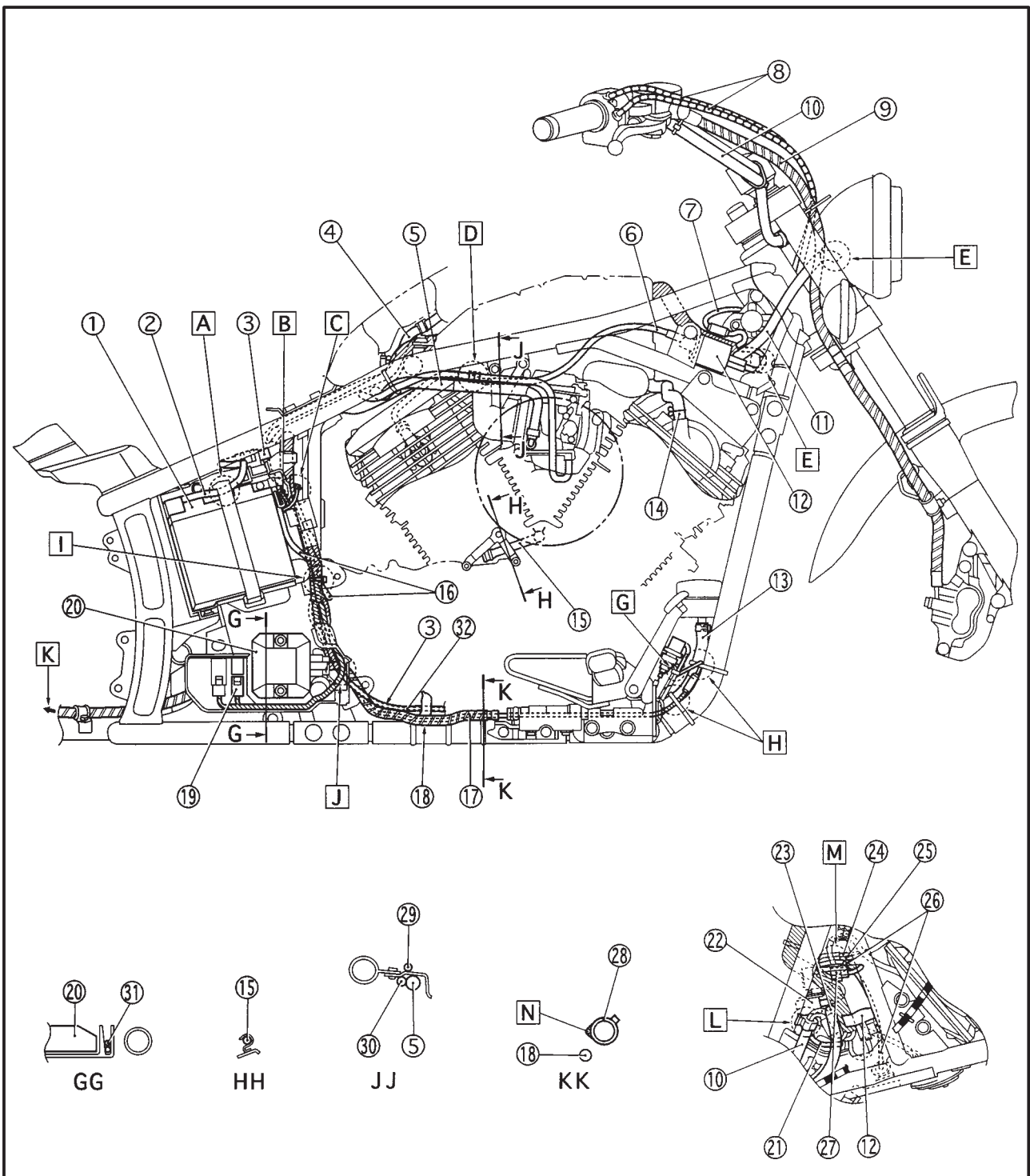


CABLE ROUTING

SPEC



- | | | |
|------------------------------------|----------------------------------|-----------------------------------------------------------|
| ① Battery | ⑫ Ignition coil | ⑳ Handlebar switch lead (left) |
| ② Battery positive (+) lead | ⑬ Master cylinder reservoir hose | ㉑ Throttle position sensor lead |
| ③ Starter motor positive (+) lead | ⑭ Breather hose | ㉒ Carburetor heater lead |
| ④ Speedometer lead | ⑮ Air filter drain hose | ㉓ Thermo switch lead |
| ⑤ Fuel hose (carburetor-fuel pump) | ⑯ Battery negative (-) lead | ㉔ Starting circuit cutoff relay |
| ⑥ High tension code | ⑰ Rear brake switch lead | ㉕ Down tube |
| ⑦ Main switch lead | ⑱ Rear brake hose | ㉖ High tension code |
| ⑧ Throttle cable | ㉚ Carburetor heater connector | ㉗ Purge hose (carburetor-solenoid valve) (for California) |
| ⑨ Brake hose | ㉛ Rectifier/regulator | ㉘ Carburetor heater lead |
| ⑩ Handlebar switch lead (right) | ㉜ Main switch lead | ㉙ Oil level switch lead |
| ⑪ Headlight lead | ㉝ Flasher relay | |

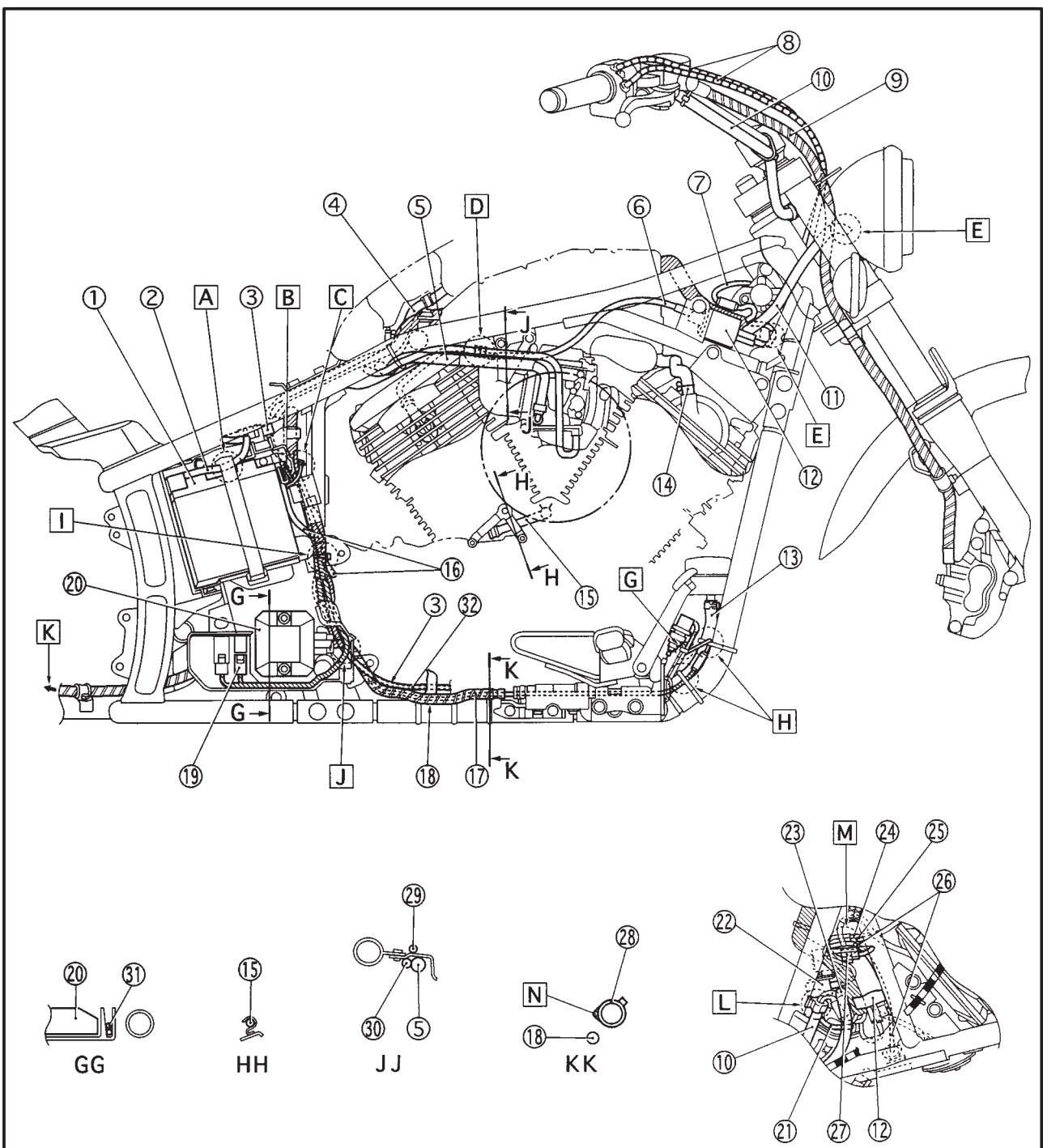


CABLE ROUTING

SPEC



- A** Clamp the battery positive (+) lead to the battery with battery band.
- B** Connect the battery negative (-) lead connector and push it into the space between battery box and battery.
- C** Route the rectifier/regulator lead, wire harness and starter motor positive (+) lead through the outside of frame bracket and fasten them to the frame with a plastic locking tie.
- D** Connect the purge hose (carburetor side-solenoid valve side) with joint. (for California)
- E** Route the front turn signal light lead and headlight lead through the rear of headlight body hole.
- F** Connect the ignition coil lead at red tape to the right side.
- G** Fasten the rear brake switch lead to the brake switch bracket with a plastic locking tie.
- H** Fasten the rear brake switch lead and master cylinder reservoir hose to the down tube with a plastic locking tie.
- I** Fasten the wire harness, starter motor positive (+) lead and battery negative (-) lead to the frame with a plastic locking tie.
- J** Route the rectifier/regulator lead and carburetor heater lead through inside of battery box hole to outside it and connect them.

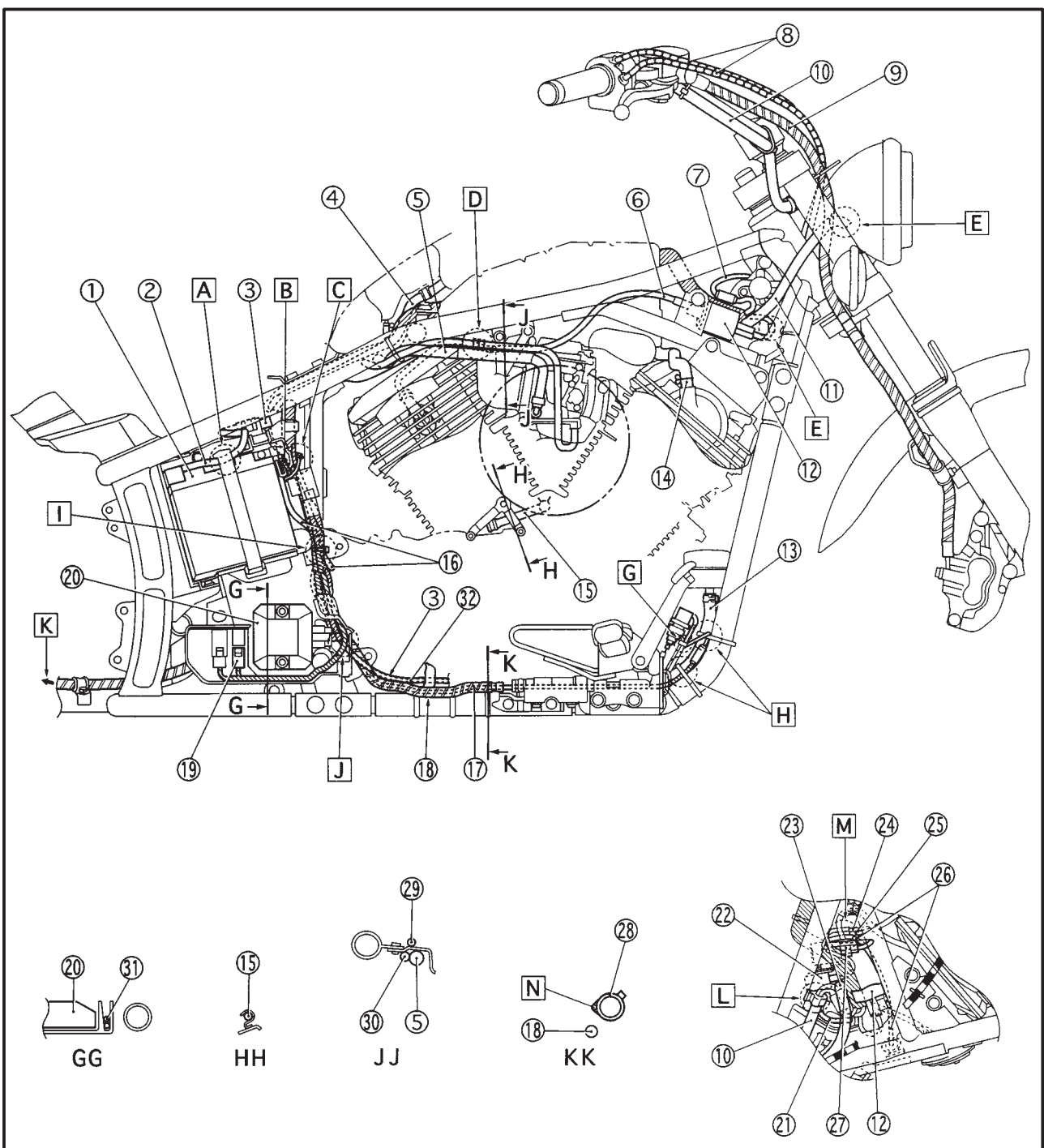


CABLE ROUTING

SPEC



- K** To rear brake caliper
- L** Clamp the handlebar switch lead (right) and main switch lead to the frame with a holder.
- M** Arrange the throttle position sensor connector, carburetor heater connector and thermo switch connector between the starting circuit cutoff relay and high tension code.
- N** Fasten the rear brake switch to the down tube with a plastic locking tie.



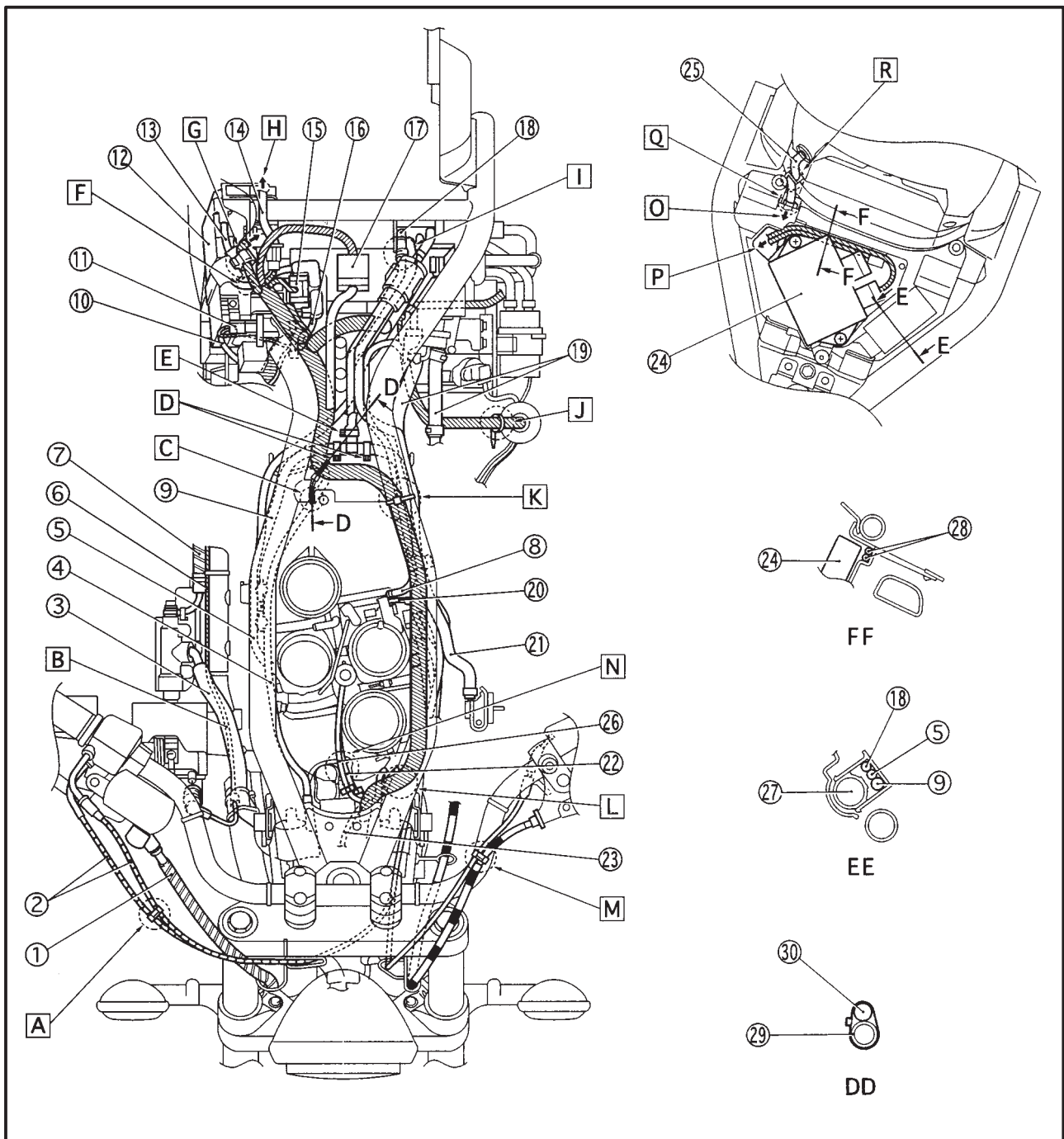
CABLE ROUTING

SPEC



- | | | |
|-----------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------|
| ① Brake hose | ⑪ Battery negative (-) lead connector | ⑳ Starter cable |
| ② Throttle cable | ⑫ Battery | ㉑ Fuel hose (fuel cock-fuel filter) |
| ③ Master cylinder reservoir hose | ⑬ Battery positive (+) lead | ㉒ Carburetor heater lead |
| ④ High tension code | ⑭ Taillight lead | ㉓ Thermo switch lead |
| ⑤ Purge hose (carburetor-solenoid valve) (for California) | ⑮ Starter relay | ㉔ Igniter unit |
| ⑥ Rear brake switch lead | ⑯ Starter motor positive (+) lead | ㉕ Taillight lead |
| ⑦ Brake hose | ⑰ Speedometer lead connector | ㉖ Throttle position sensor lead |
| ⑧ Sensing hose (AIS-carburetor joint) | ⑱ Fuel tank breather hose (fuel tank-roll over valve) (for California) | ㉗ Fuel filter |
| ⑨ Fuel hose (carburetor-fuel pump) | ⑲ Ventilation hose | ㉘ Igniter unit lead |
| ⑩ Battery negative (-) lead | | ㉙ Frame |
| | | ㉚ Wire harness |

A Clamp the throttle cables with the holder.

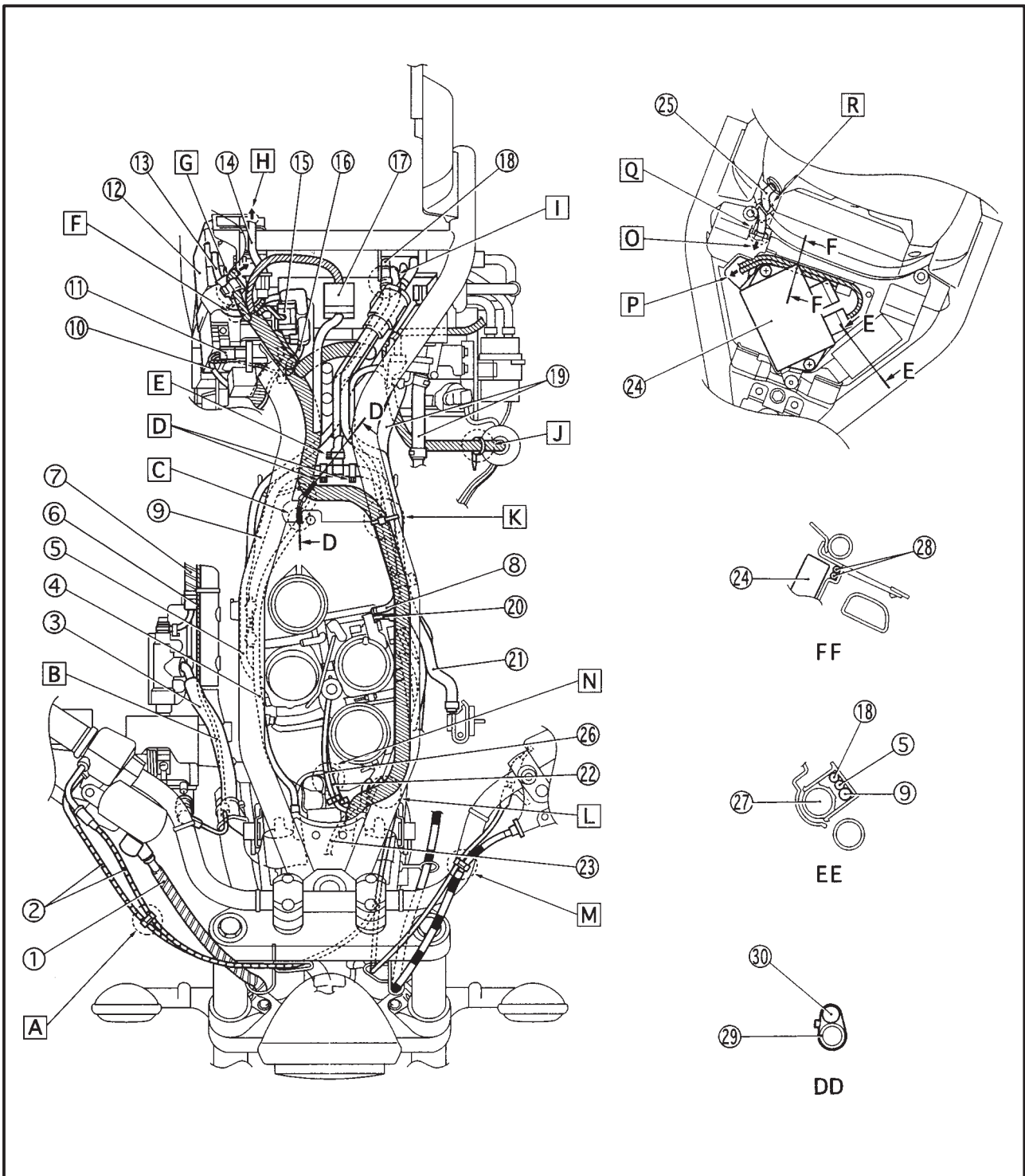


CABLE ROUTING

SPEC



- B** Route the rear brake switch lead under the master cylinder reservoir hose.
- C** Position the band end of right side bracket.
- D** Position the steel band end to forward.
- E** Position the steel band end to right side.
- F** Route the battery positive (+) lead through the slit of the battery box.
- G** Clamp the igniter unit lead to the frame with a holder.
- H** To the rear fender.
- I** Route the fuel tank breather hose under the fuel filter and connect it (fuel tank side-roll over valve side) with a joint. Position the end of clip outside.
- J** Fasten the wire harness with a band on the tool box plate.
- K** Fasten the wire harness to the frame with a plastic locking tie. Position the locking tie front of the solder.

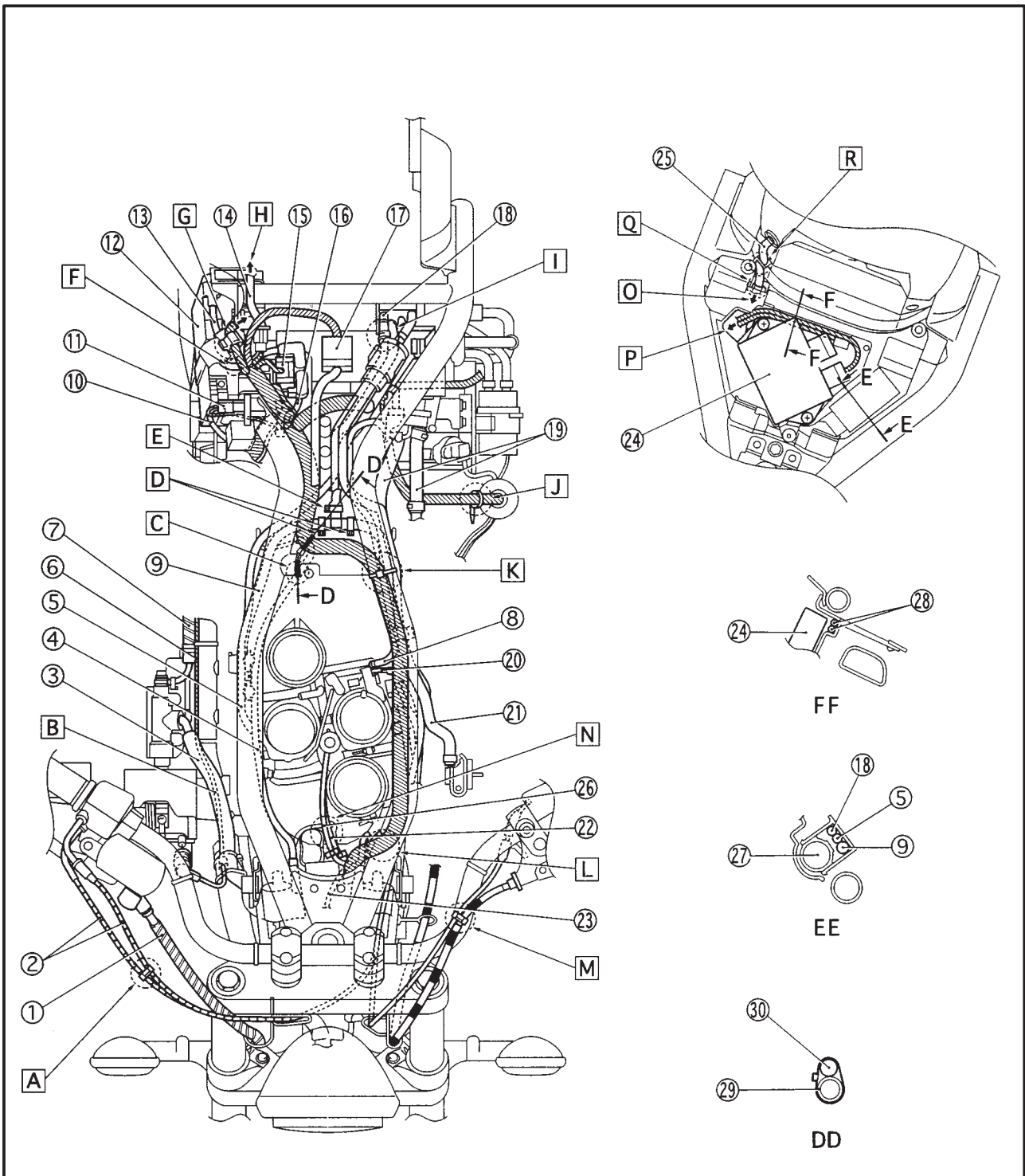


CABLE ROUTING

SPEC



- L** Route wire harness outside of the guide on the frame.
- M** Clamp the clutch cable and starter cable with a holder. Position the end of holder down side.
- N** Route the throttle position sensor lead and carburetor heater lead left side of the tappet cover.
- O** To the wire harness.
- P** Route the igniter lead through the igniter plate hole to the wire harness.
- Q** Clamp the taillight lead with mud guard clamp.
- R** Clamp the taillight lead with a holder on the mud guard.



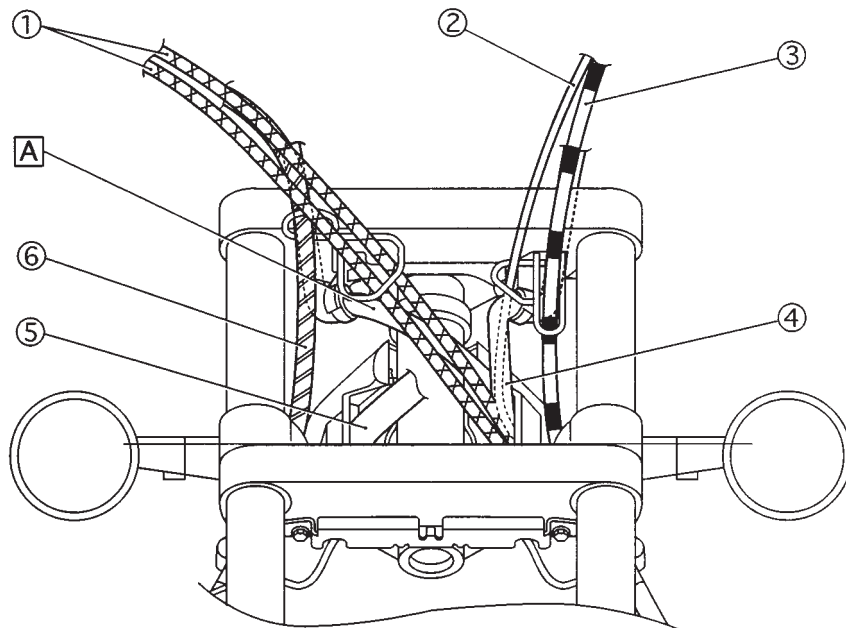
CABLE ROUTING

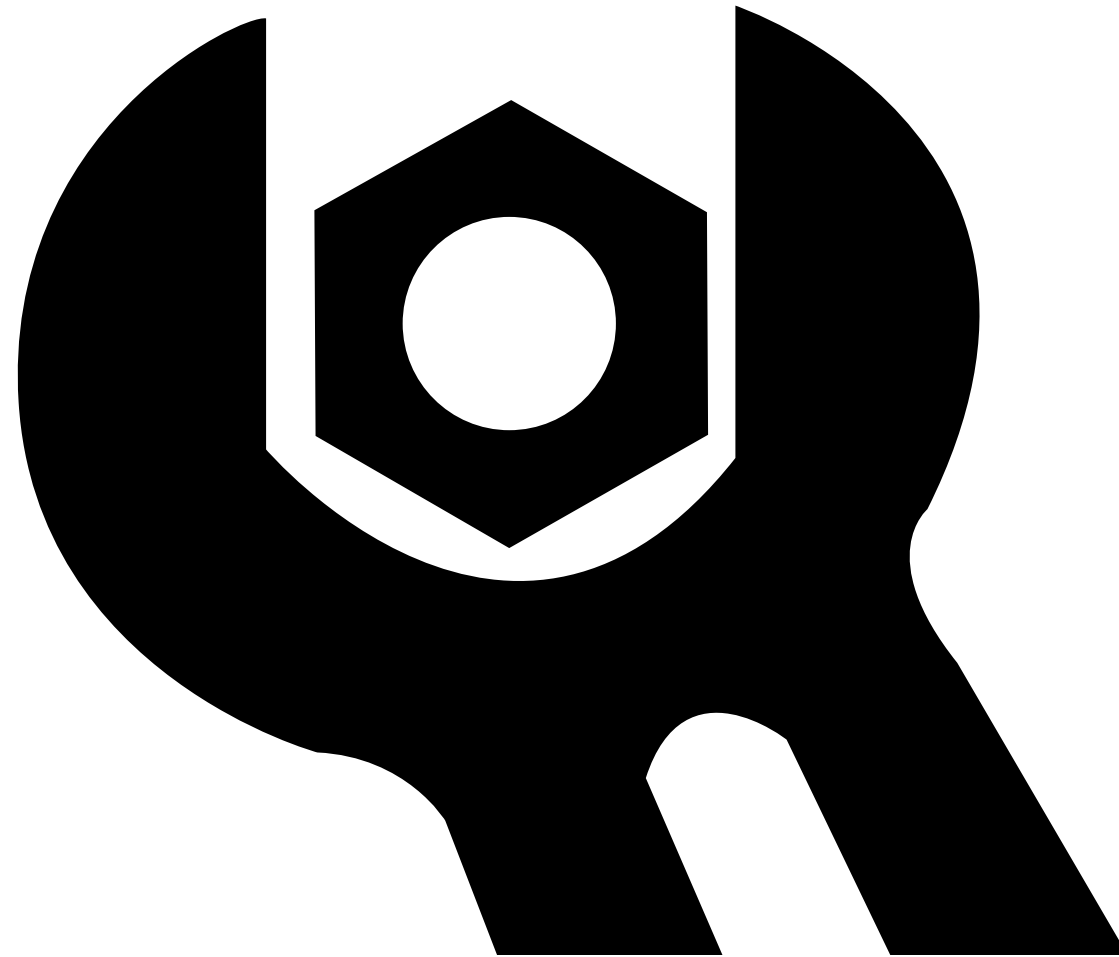
SPEC



- ① Throttle cable
- ② Starter cable
- ③ Clutch cable
- ④ Handlebar switch lead (left)
- ⑤ Headlight lead
- ⑥ Brake hose

A Route the handlebar switch lead (right) rear side of the throttle cable.





INSP

ADJ

3

CHAPTER 3

PERIODIC INSPECTIONS AND ADJUSTMENTS

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EB300000

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. 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.

EB301000

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

NO.	ITEM	CHECKS AND MAINTENANCE JOBS	Initial (1,000 km)	EVERY	
				6,000 km or 6 months (whichever comes first)	12,000 km or 12 months (whichever comes first)
1	* Fuel line (manual cock)	<ul style="list-style-type: none"> ◦ Check fuel hoses for cracks or damage. ◦ Replace if necessary. 		√	√
2	* Fuel filter	<ul style="list-style-type: none"> ◦ Check condition. ◦ Replace if necessary. 			√
3	Spark plugs	<ul style="list-style-type: none"> ◦ Check condition. ◦ Clean, regap or replace if necessary. 	√	√	√
4	* Valves (arm SOHC)	<ul style="list-style-type: none"> ◦ Check valve clearance. ◦ Adjust if necessary. 	√	√	√
5	Air filter	<ul style="list-style-type: none"> ◦ Clean or replace if necessary. 		√	√
6	Clutch	<ul style="list-style-type: none"> ◦ Check operation. ◦ Adjust or replace cable. 	√	√	√
7	* Front brake (disc)	<ul style="list-style-type: none"> ◦ Check operation, fluid level and vehicle for fluid leakage. (See NOTE.) ◦ Correct accordingly. ◦ Replace brake pads if necessary. 	√	√	√
8	* Rear brake (disc)	<ul style="list-style-type: none"> ◦ Check operation, fluid level and vehicle for fluid leakage. (See NOTE.) ◦ Correct accordingly. ◦ Replace brake pads if necessary. 	√	√	√
9	* Wheels (spoke)	<ul style="list-style-type: none"> ◦ Check balance, runout, spoke tightness and for damage. ◦ Tighten spokes and rebalance, replace if necessary. 		√	√
10	* Tires (EUR)	<ul style="list-style-type: none"> ◦ Check tread depth and for damage. ◦ Replace if necessary. ◦ Check air pressure. ◦ Correct if necessary. 		√	√
11	* Wheel bearings	<ul style="list-style-type: none"> ◦ Check bearing for looseness or damage. ◦ Replace if necessary. 		√	√
12	* Swingarm (no nipple)	<ul style="list-style-type: none"> ◦ Check swingarm pivoting point for play. ◦ Correct if necessary. ◦ Lubricate with molybdenum disulfide grease every 24,000 km or 24 months (whichever comes first). 		√	√
13	* Steering bearings	<ul style="list-style-type: none"> ◦ 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). 		√	√
14	* Chassis fasteners	<ul style="list-style-type: none"> ◦ Make sure that all nuts, bolts and screws are properly tightened. ◦ Tighten if necessary. 		√	√
15	Sidestand	<ul style="list-style-type: none"> ◦ Check operation. ◦ Lubricate and repair if necessary. 		√	√
16	* Sidestand switch	<ul style="list-style-type: none"> ◦ Check operation. ◦ Replace if necessary. 	√	√	√

PERIODIC MAINTENANCE/LUBRICATION INTERVALS



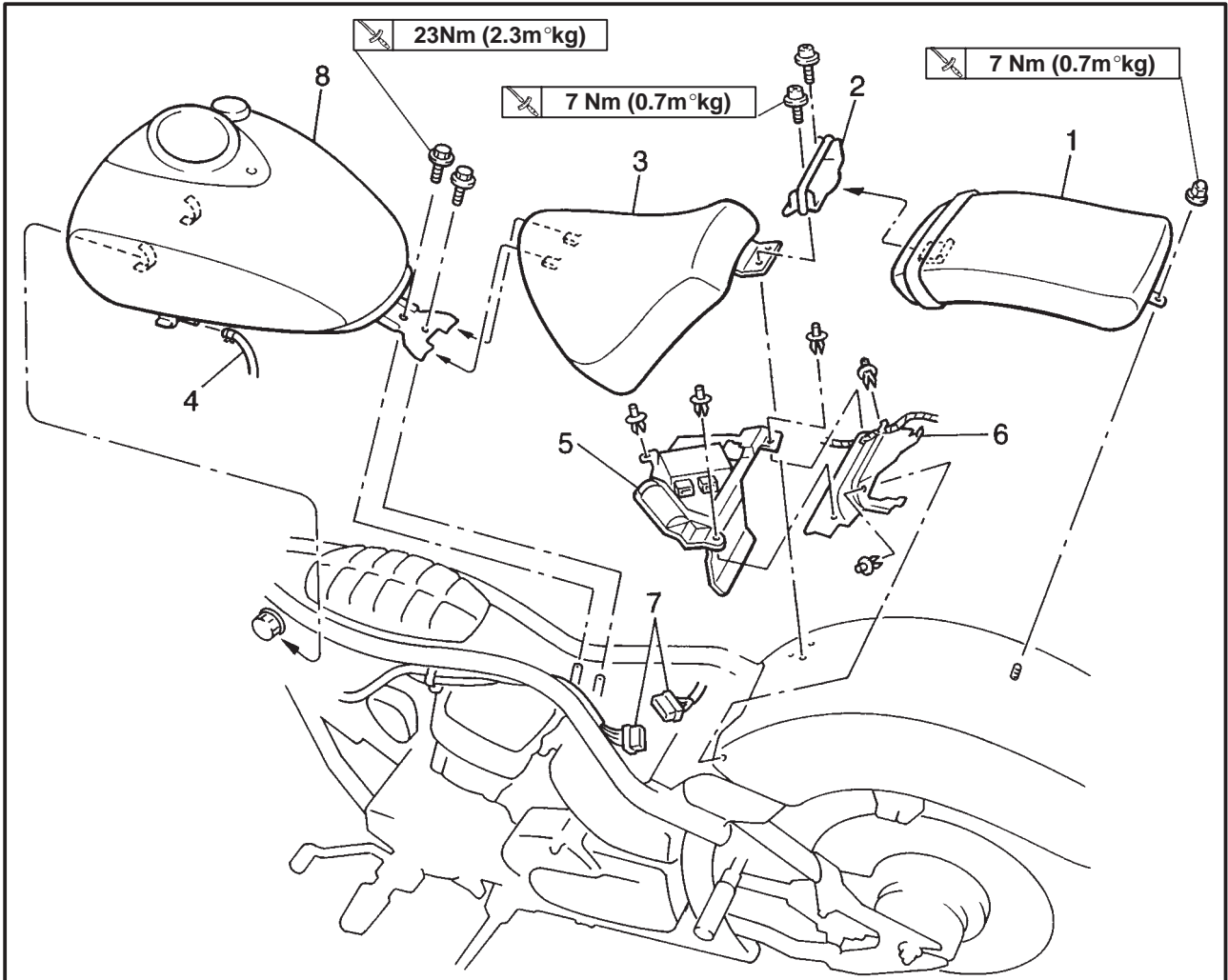
NO.	ITEM	CHECKS AND MAINTENANCE JOBS	Initial (1,000 km)	EVERY	
				6,000 km or 6 months (whichever comes first)	12,000 km or 12 months (whichever comes first)
17	* Front fork	<ul style="list-style-type: none"> ◦ Check operation and for oil leakage. ◦ Correct accordingly. 		√	√
18	* Rear shock absorber assembly	<ul style="list-style-type: none"> ◦ Check operation and shock absorber for oil leakage. ◦ Replace shock absorber assembly if necessary. 		√	√
19	* Carburetors (multi)	<ul style="list-style-type: none"> ◦ Check engine idling speed, synchronization and starter operation. ◦ Adjust if necessary. 	√	√	√
20	Engine oil	<ul style="list-style-type: none"> ◦ Check oil level and vehicle for oil leakage. ◦ Correct if necessary. ◦ Change. (Warm engine before draining.) 	√	√	√
21	* Engine oil filter element	<ul style="list-style-type: none"> ◦ Replace. 	√		√
22	Final gear oil	<ul style="list-style-type: none"> ◦ Check oil level and vehicle for oil leakage. ◦ Change oil at initial 1,000 km and thereafter every 24,000 km or 24 months (whichever comes first). 	√	√	√

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

NOTE: _____

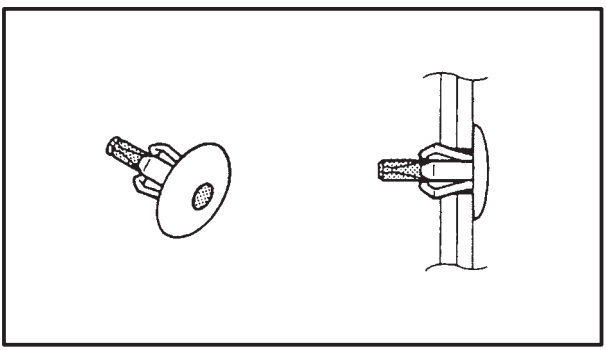
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake system
 - When disassembling the master cylinder or caliper cylinder, always replace the brake fluid. Check the brake fluid level regularly and fill as required.
 - Replace the oil seals 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.

FUEL TANK AND SEATS



Order	Job name/Part name	Q'ty	Remarks
	Fuel tank and seats removal		Remove the parts in the order below.
1	Passenger seat	1	NOTE: _____ Set the fuel cock to "OFF" before disconnecting the fuel hose.
2	Seat bracket	1	
3	Rider's seat	1	
4	Fuel hose	1	
5	Ignitor plate	1	For installation, reverse the removal procedure.
6	Mud guard	1	
7	Meter lead couper	1	
8	Fuel tank assembly	1	

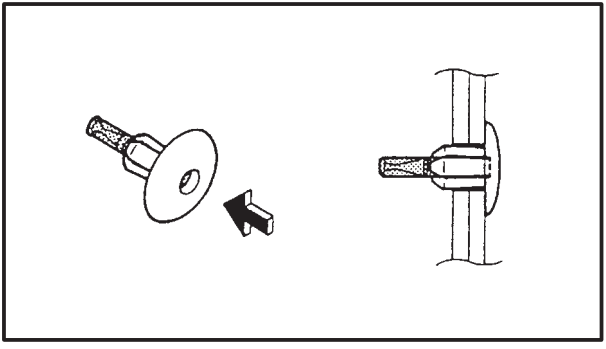
FUEL TANK AND SEATS



REMOVAL

1. Remove:
 - ° Ignitor plate

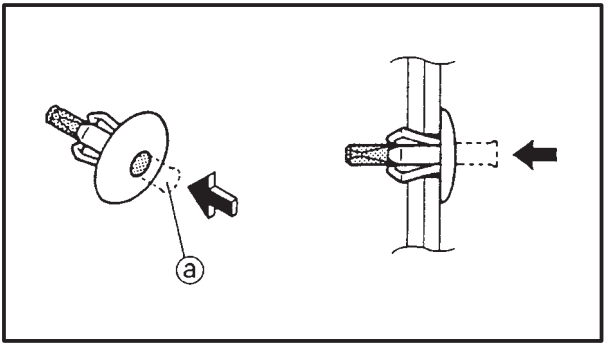
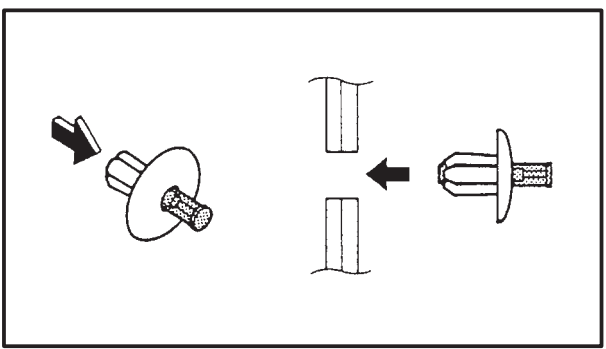
NOTE: _____
To remove the quick fastener, push its center in with a screwdriver, then pull the fastener out.



INSTALLATION

1. Install:
 - ° Ignitor plate

NOTE: _____
To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the cowling and push the pin ① in with a screwdriver. Make sure that the pin is flush with the fastener's head.



EAS00047

ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

NOTE: _____

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

1. Remove:

- ° rider's seat
- ° fuel tank

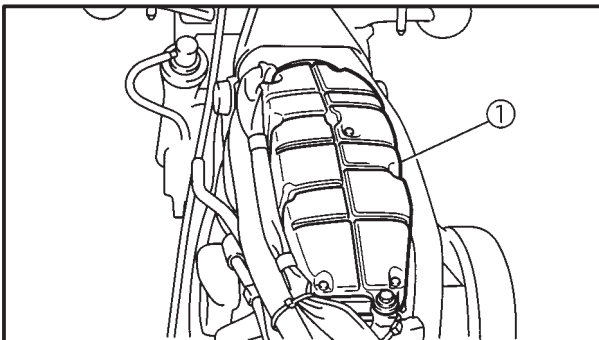
Refer to "FUEL TANK AND SEATS".

2. Disconnect:

- ° spark plug caps

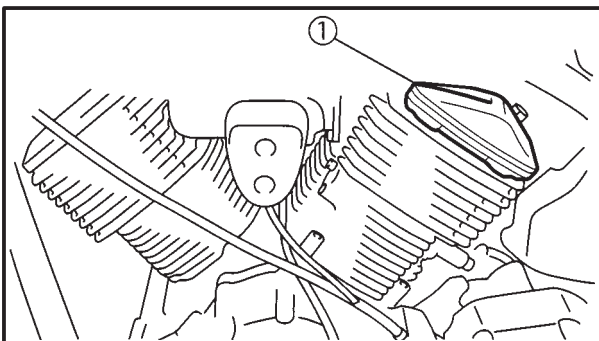
3. Remove:

- ° spark plugs



4. Remove:

- ° air intake box ①

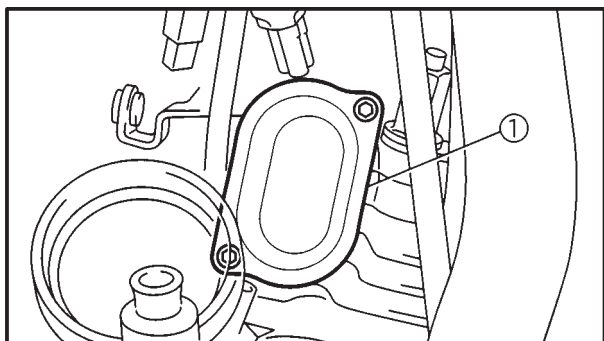


5. Remove:

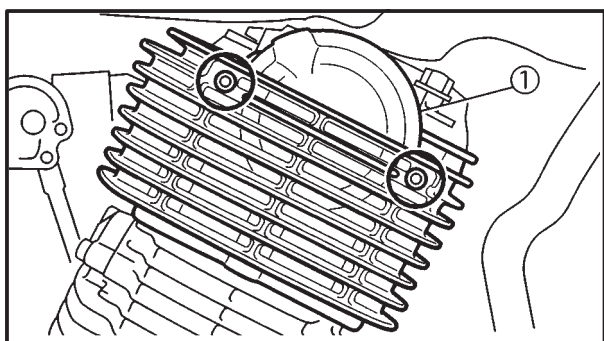
- ° cylinder head cover (rear cylinder) ①
- ° cylinder head cover (front cylinder)

ADJUSTING THE VALVE CLEARANCE

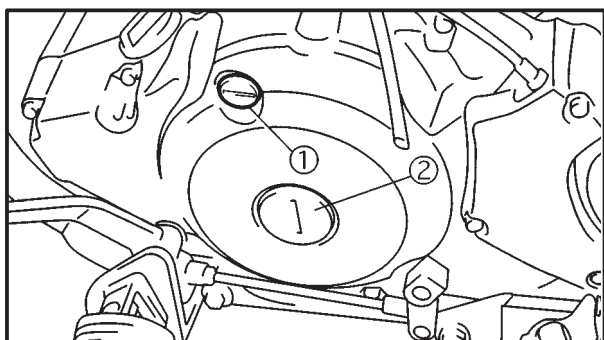
INSP
ADJ



6. Remove:
°tappet covers ①



7. Remove:
°camshaft sprocket cover (rear cylinder) ①
°camshaft sprocket cover (front cylinder)



8. Remove:
°timing plug ①
°straight plug ②

9. Measure:
°valve clearance
Out of specification → Adjust.



Valve clearance (cold):

Intake valve:

0.07 × 0.12 mm

Exhaust valve:

0.12 × 0.17 mm

ADJUSTING THE VALVE CLEARANCE/ SYNCHRONIZING THE CARBURETORS

**INSP
ADJ**



**Locknut:
27 Nm (2.7 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.

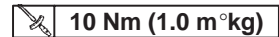


- 11. Install:
 - ° all removed parts

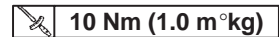
NOTE: _____

Install all removed parts in the reverse order of their disassembly. Note the following points.

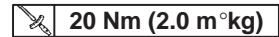
- ° camshaft sprocket covers



- ° tappet covers



- ° spark plugs



EAS00051

SYNCHRONIZING THE CARBURETORS

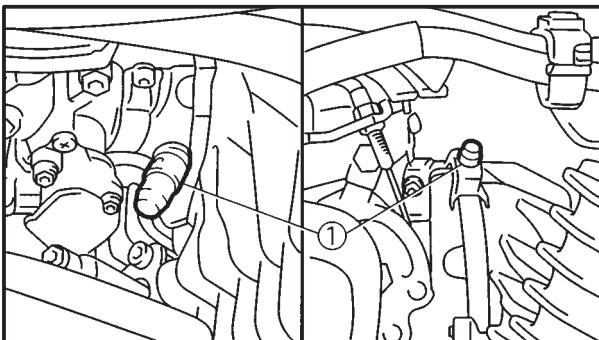
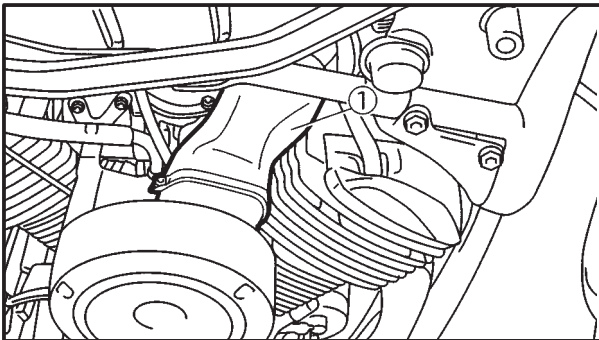
NOTE: _____

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

- 1. Stand the motorcycle on a level surface.

NOTE: _____

Place the motorcycle on a suitable stand.



- 2. Remove:
 - ° rider's seat
 - ° fuel tank
 - Refer to "FUEL TANK AND SEATS".
- 3. Remove:
 - ° air duct ①

- 4. Remove:
 - ° vacuum plugs ①

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



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

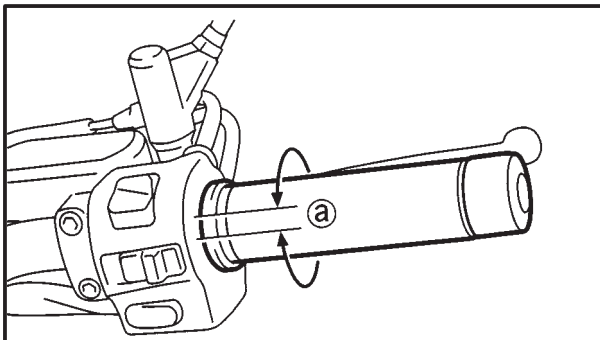
Throttle cable free play (at the flange of the throttle grip)
4 × 6 mm

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 (a)
 Out of specification → Adjust.

Throttle cable free play (at the flange of the throttle grip)
4 × 6 mm

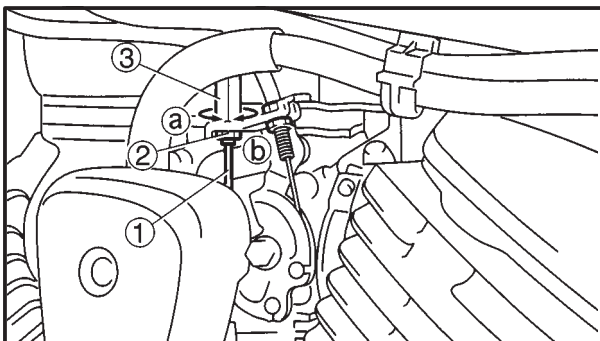
2. Remove:
 - rider's seat
 - fuel tank
 Refer to "FUEL TANK AND SEATS".

3. Adjust:
 - throttle cable free play



NOTE: _____

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



Carburetor side

- a. Loosen the locknut (2) on the accelerator cable.
- b. Turn the adjusting nut (3) in direction (a) or (b) until the specified throttle cable free play is obtained.

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

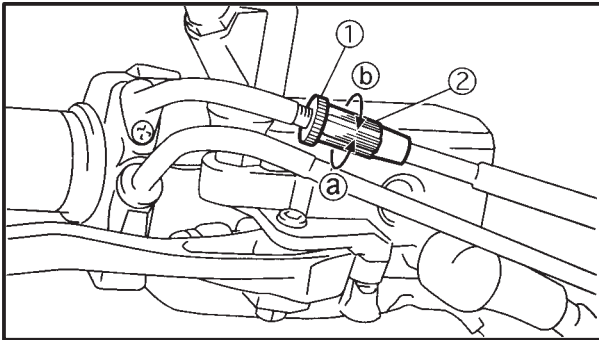
- c. Tighten the locknuts.

NOTE: _____

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

ADJUSTING THE THROTTLE CABLE FREE PLAY/ CHECKING THE SPARK PLUGS

INSP
ADJ



Handlebar side

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

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



EAS00059

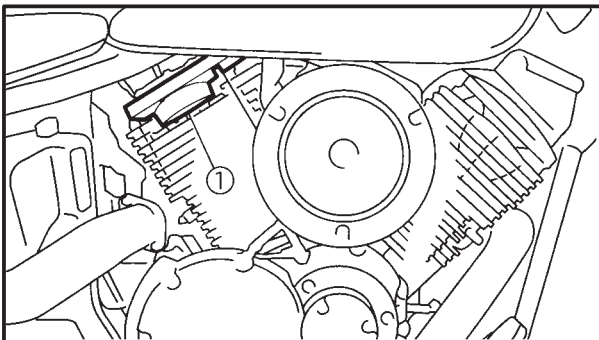
CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
 - ° cylinder head covers (1)
2. Disconnect:
 - ° spark plug cap
3. Remove:
 - ° spark plug

CAUTION:

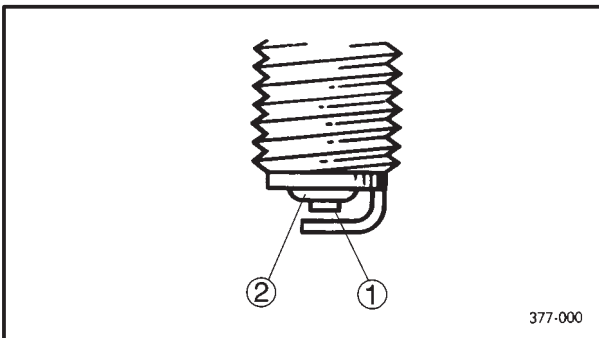
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.



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

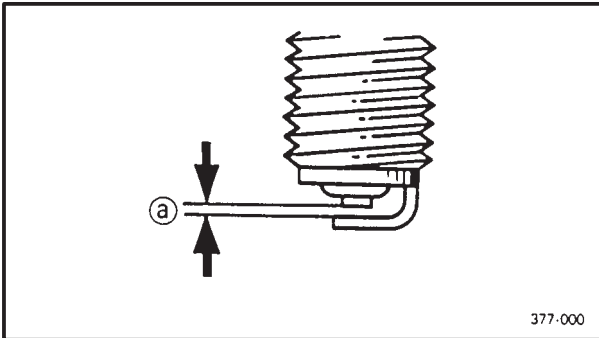
Spark plug type (manufacturer)
BPR7ES (NGK)
W22EPR-U (DENSO)

5. 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.
6. Clean:
 - ° spark plug
(with a spark plug cleaner or wire brush)



CHECKING THE SPARK PLUGS/ CHECKING THE IGNITION TIMING

**INSP
ADJ**



7. Measure:

- ° spark plug gap **a**
(with a wire gauge)
- Out of specification → Regap.



Spark plug gap
0.7 × 0.8 mm

8. Install:

- ° spark plug  **20 Nm (2.0 m°kg)**

NOTE: _____

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

9. Connect:

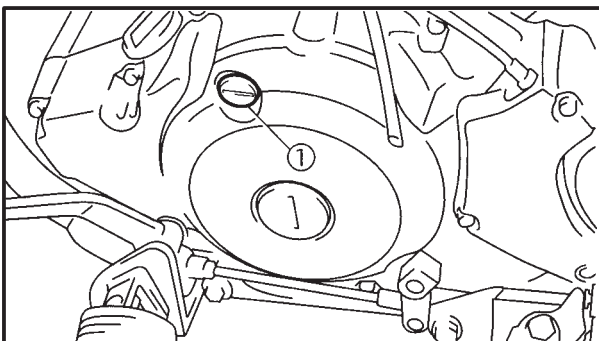
- ° spark plug cap

EAS00064

CHECKING THE IGNITION TIMING

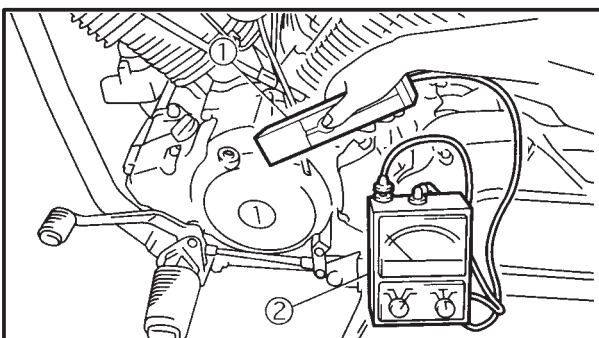
NOTE: _____

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 plug **①**



2. Install:

- ° timing light **①**
- ° engine tachometer **②**
(to the spark plug lead of cyl. #1)




Timing light:
90890-03141
Engine tachometer:
90890-03113

MEASURING THE COMPRESSION PRESSURE/ CHECKING THE ENGINE OIL LEVEL

INSP
ADJ



7. Install:
 - ° spark plug
8. Connect:
 - ° spark plug cap

 20 Nm (2.0 m°kg)

EAS00069

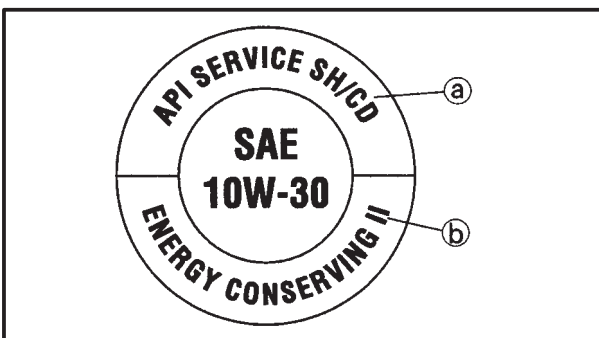
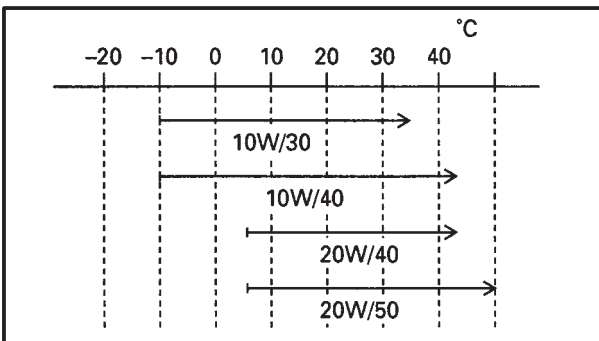
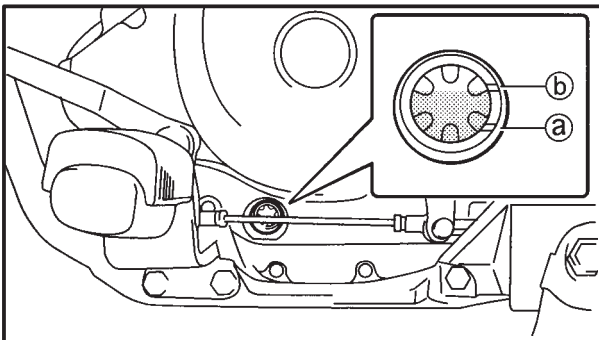
CHECKING THE ENGINE OIL LEVEL

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 (a) and maximum level marks (b).

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 (a) or higher and do not use oils labeled “ENERGY CONSERVING II” (b) or higher.
- ° Do not allow foreign materials to enter the crankcase.

CHECKING THE ENGINE OIL LEVEL/ CHANGING THE ENGINE OIL

INSP
ADJ



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

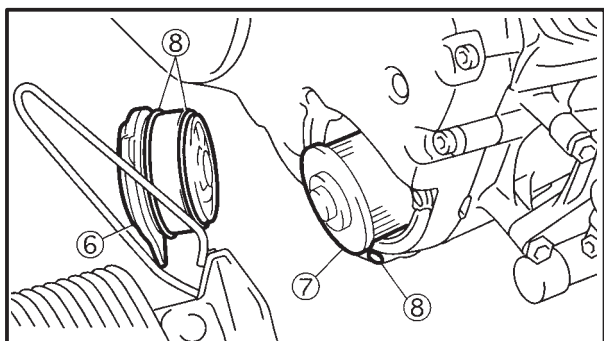
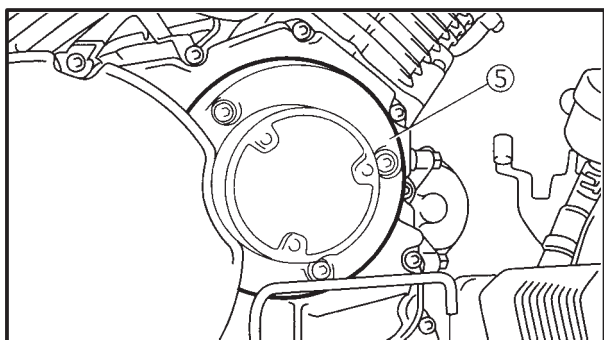
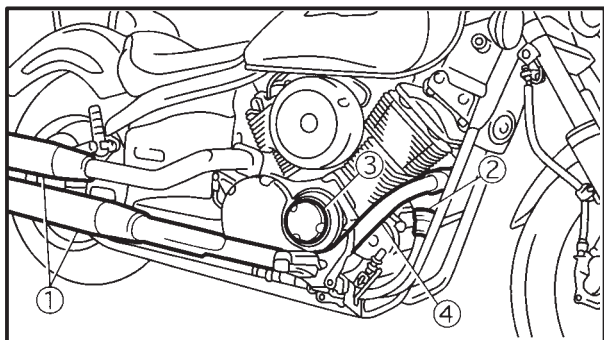
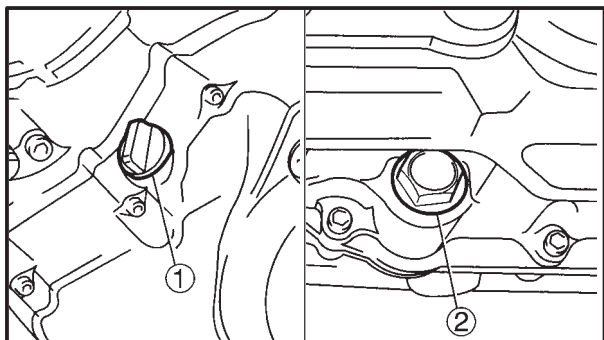
NOTE: _____

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

EAS00075

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
 - o-ring
 - engine oil drain bolt ②
 - gasket
4. Drain:
 - engine oil (completely from the crankcase)
5. If the oil filter element is also to be replaced, perform the following procedure.



▲ WARNING _____

Oil filter element replacement should be made cold exhaust pipe and muffler, at room temperature.

- a. Remove the muffler ①, rear brake reservoir tank ②, element cover ③ and exhaust pipe (front cylinder) ④.
- b. Remove the oil filter element cover plate ⑤, element cover ⑥ and oil filter element ⑦.
- c. Check the O-ring ⑧ and replace it if it is cracked or damaged.
- d. Install the new oil filter element and the element cover.



**Oil filter element cover bolt
10 Nm (1.0 m°kg)**

- e. Install the exhaust pipe (front cylinder), element cover plate, rear brake reservoir tank and muffler.
Refer to "ENGINE" in chapter 4.

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

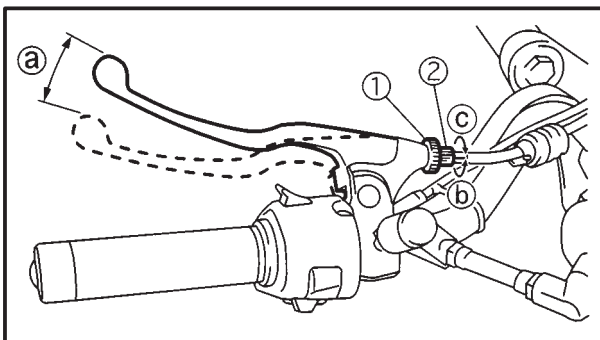
CHANGING THE ENGINE OIL/ ADJUSTING THE CLUTCH CABLE FREE PLAY

INSP
ADJ



Quantity
Total amount
 3.6 L
Without oil filter element replacement
 3.0 L
With oil filter element replacement
 3.1 L

9. Install:
 - o-ring
 - engine oil filter 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".



EAS00078

ADJUSTING THE CLUTCH CABLE FREE PLAY

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



Clutch cable free play (at the end of the clutch lever)
 5 × 10 mm

2. Adjust:
 - clutch cable free play



Handlebar side

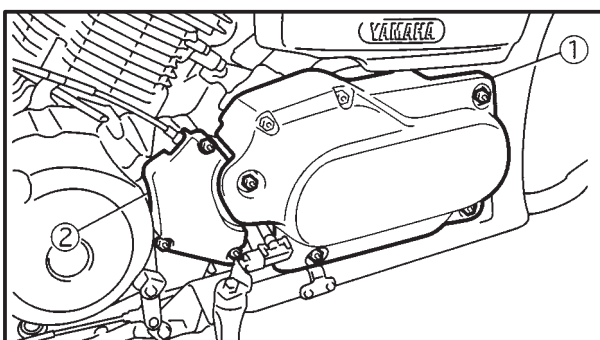
- a. Loosen the locknut (1).
- b. Turn the adjusting screw (2) in direction (b) or (c) until the specified clutch cable free play is obtained.

Direction (b)	Clutch cable free play is increased.
Direction (c)	Clutch cable free play is decreased.

- c. Tighten the locknut.

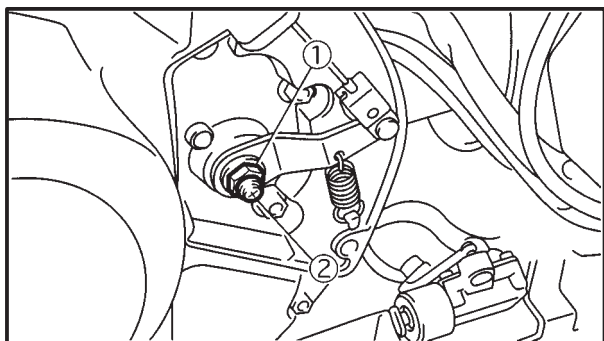
NOTE:

If the specified clutch cable free play cannot be obtained as described above, perform the mechanism adjustment procedure described below.



3. Remove:
 - left side cover (1)
 - clutch adjusting cover (2)

ADJUSTING THE CLUTCH CABLE FREE PLAY/ CLEANING THE AIR FILTER ELEMENT



- 4. Adjust:
 - ° clutch mechanism



Engine side

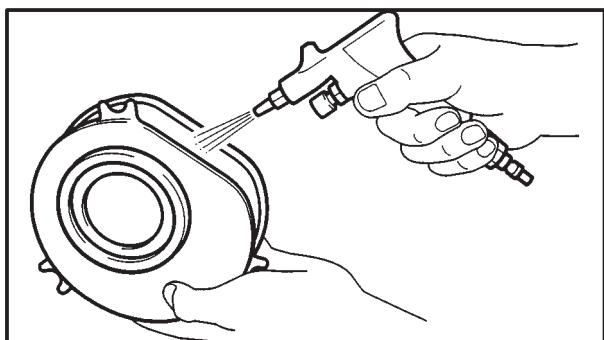
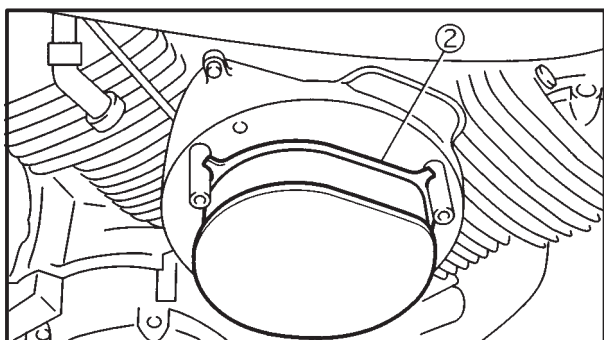
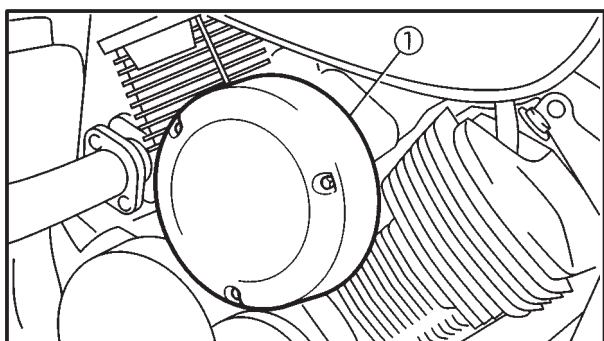
- a. Loosen the locknut ①.
- b. Turn in the adjusting screw ② until it is lightly seated.
- c. Turn the adjusting screw out 1/4 of a turn.
- d. Tighten the locknut.
- e. Check the clutch cable free play again and adjust it if necessary.



EAS00086

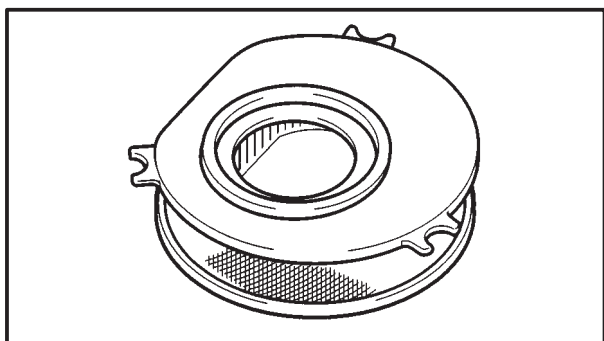
CLEANING THE AIR FILTER ELEMENT

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



- 2. Clean:
 - ° air filter element

Apply compressed air to the outer surface of the air filter element.



- 3. Check:
 - ° air filter element

Damage → Replace.
- 4. Install:
 - ° air filter element
 - ° air filter case cover

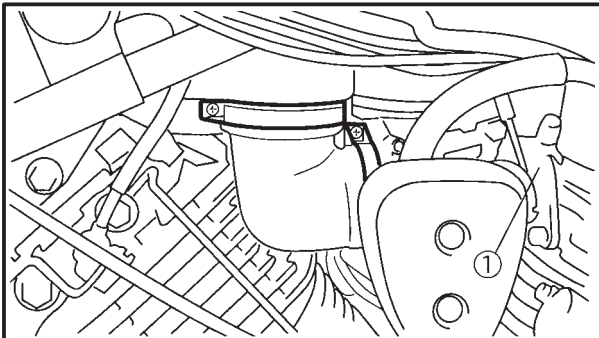


CAUTION:

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

NOTE:

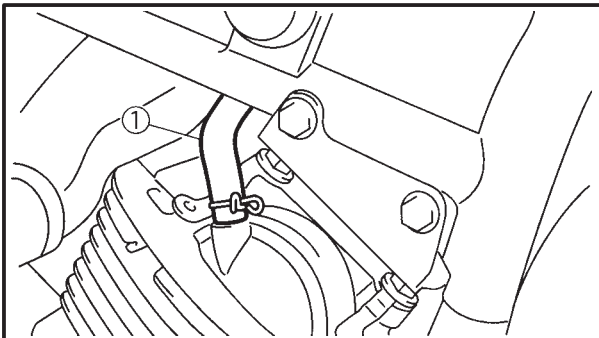
When installing the air filter element into the air filter case cover, be sure their sealing surfaces are aligned to prevent any air leaks.



EAS00094

CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD

1. Check:
 - ° carburetor joint ①
 - Cracks/damage → Replace.
 - Refer to “CARBURETOR” in chapter 6.



EAS00098

CHECKING THE BREATHER HOSE

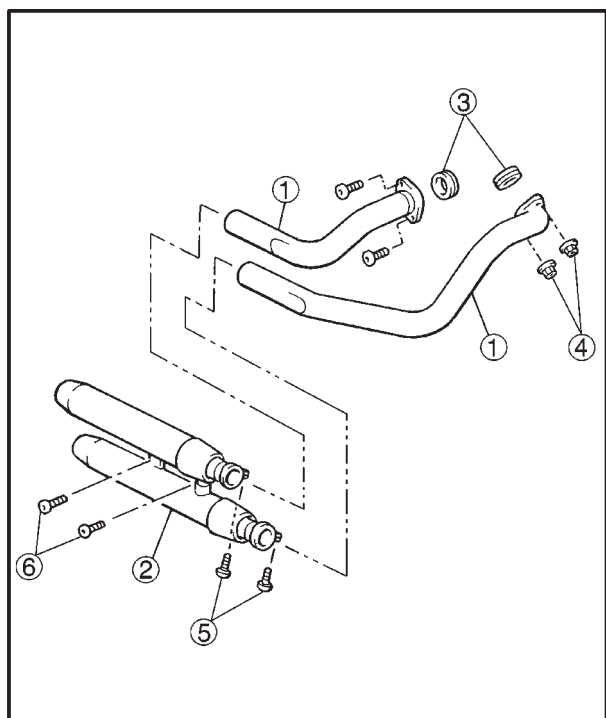
1. Remove:
 - ° cylinder head cover
2. Check:
 - ° cylinder head breather hose ①
 - Cracks/damage → Replace.
 - Loose connection → Connect properly.

CAUTION:

Make sure that the cylinder head breather hose is routed correctly.

CHECKING THE EXHAUST SYSTEM

INSP
ADJ



EAS00100

CHECKING THE EXHAUST SYSTEM

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

1. Check:

- ° exhaust pipes ①
- ° muffler ②
Cracks/damage → Replace.
- ° gaskets ③
Exhaust gas leaks → Replace.

2. Check:

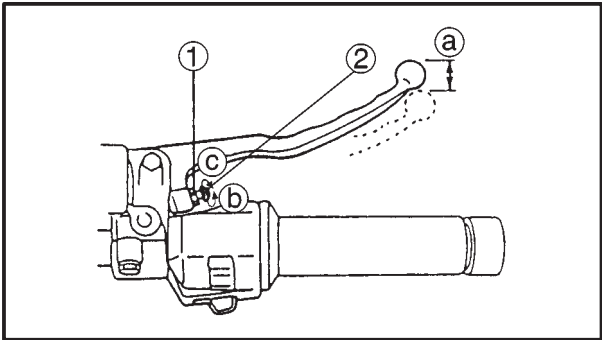
- ° tightening torque



Exhaust pipe nut ④
20 Nm (2.0 m°kg)

Exhaust pipe and muffler bolt ⑤
20 Nm (2.0 m°kg)

Muffler and muffler bracket bolt ⑥
25 Nm (2.5 m°kg)



EAS00108

CHASSIS
ADJUSTING THE FRONT BRAKE

1. Check:
 - ° brake lever free play (a)
 - Out of specification → Adjust.

	<p>Brake lever free play (at the end of the brake lever)</p> <p>5 × 8 mm</p>
-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------

2. Adjust:
 - ° brake lever free play



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

<p>Direction (b) → Brake lever free play is increased.</p>
<p>Direction (c) → Brake lever free play is decreased.</p>

- 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 free play, make sure that there is no brake drag.



CHECKING THE BRAKE FLUID LEVEL

INSP
ADJ



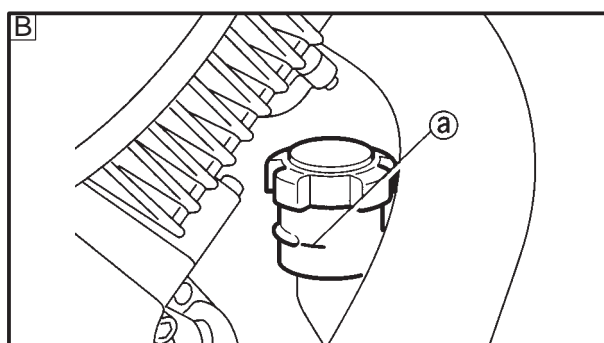
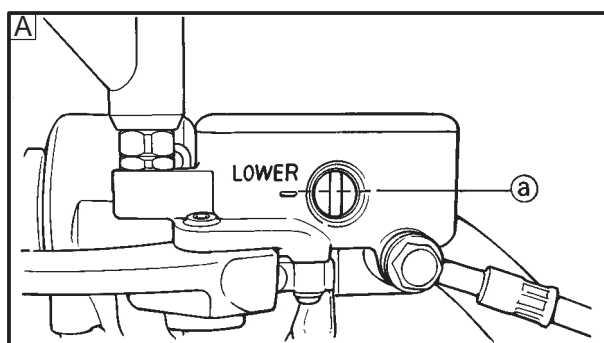
EAS00115

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



**Recommended brake fluid
DOT 4**

A Front brake

B Rear brake

⚠ WARNING

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

CAUTION:

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

NOTE:

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

EAS00134

BLEEDING THE HYDRAULIC BRAKE SYSTEM

WARNING

Bleed the hydraulic brake system whenever:

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

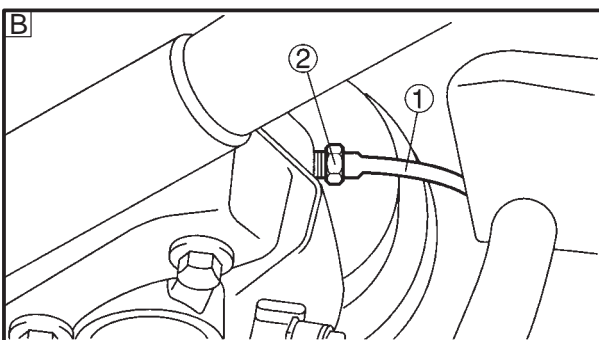
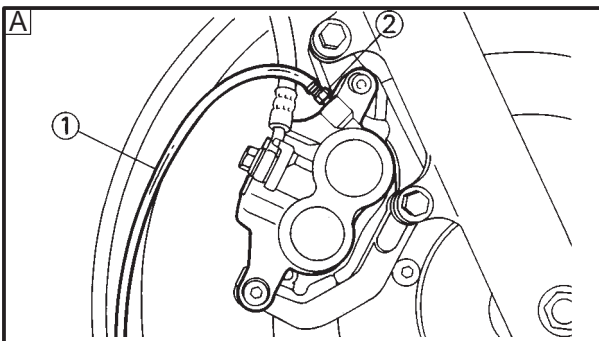
NOTE:

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

1. Stand the motorcycle on a level surface.

NOTE:

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



2. Bleed:

- ° hydraulic brake system



- a. Add the recommended brake fluid to the proper level.
 - b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
 - c. Connect a clear plastic hose ① tightly to the bleed screw ②.
- A** : Front **B** : Rear
- d. Place the other end of the hose into a container.
 - e. Slowly apply the brake several times.
 - f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
 - g. Loosen the bleed screw.

This will release the tension and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.

BLEEDING THE HYDRAULIC BRAKE SYSTEM/ ADJUSTING THE SHIFT PEDAL



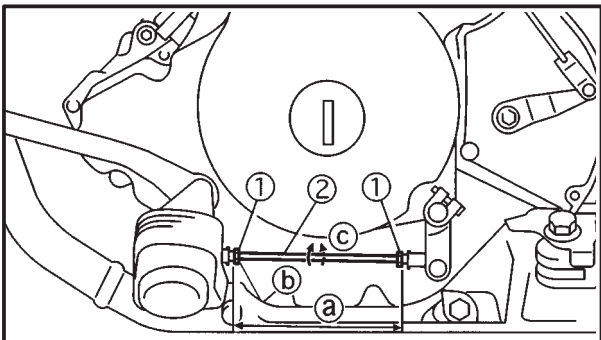
- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Tighten the bleed screw to specification.

	Bleed screw 6 Nm (0.6 m°kg)
--	----------------------------------------------

- k. Fill the reservoir to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL”.

⚠ WARNING

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



EAS00137

ADJUSTING THE SHIFT PEDAL

NOTE: _____

The shift pedal position is determined by the adjusting bolt length (a).

- 1. Measure:
 - °adjusting the length (a)
 - Incorrect → Adjust.

	Adjusting bolt length 114.7 mm
--	-------------------------------------------------

- 2. Adjust:
 - °adjusting bolt length (a)



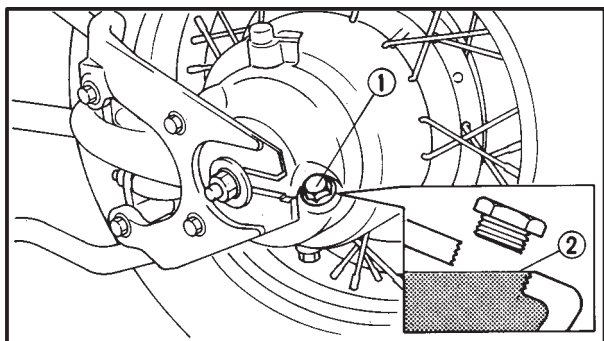
- a. Loosen both locknuts (1)
- b. Turn the adjusting bolt (2) in direction (b) or (c) to obtain the correct shift pedal position.

Direction (b) → shift pedal is raised.
Direction (c) → shift pedal is lowered.



CHECKING THE FINAL DRIVE OIL LEVEL/ CHANGING THE FINAL DRIVE OIL

INSP
ADJ



EAS00144

CHECKING THE FINAL DRIVE 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. Remove:

- ° final drive housing oil filler bolt (1)

3. Check:

- ° final drive oil level

The final drive oil level should be to the bottom brim (2) of the filler hole.

Below the bottom brim → Add the recommended final drive oil to the proper level.

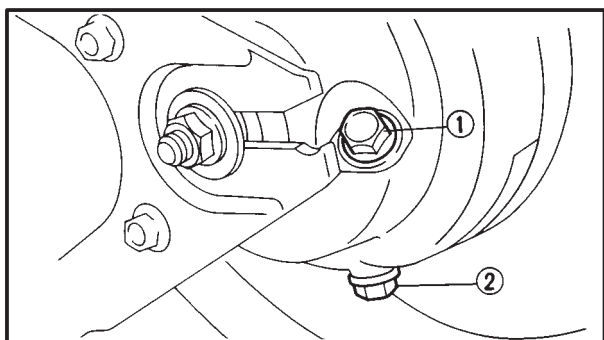


Recommended final drive oil
SAE 80 hypoid gear oil graded
“GL-4”, “GL-5” or “GL-6”
or
multi-purpose SAE 80W90
hypoid gear oil

4. Install:

- ° final drive housing oil filler bolt

23 Nm (2.3 m°kg)



EAS00145

CHANGING THE FINAL DRIVE OIL

1. Place a container under the final drive housing.

2. Remove:

- ° final drive housing oil filler bolt (1)
- ° final drive housing oil drain bolt (2)

Completely drain the final drive housing of its oil.

3. Check:

- ° final drive housing oil drain bolt gasket
- Damage → Replace.

4. Install:

- ° final drive housing oil drain bolt

23 Nm (2.3 m°kg)

5. Fill:

- ° final drive housing
(with the specified amount of the recommended final drive oil)



Quantity
0.2 L

Refer to "CHECKING THE FINAL DRIVE OIL LEVEL".

EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

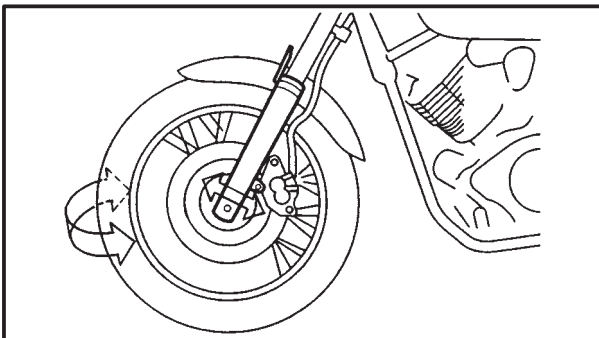
1. Stand the motorcycle on a level surface.

⚠ WARNING

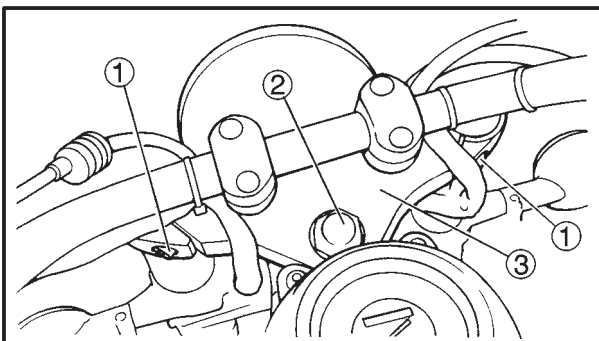
Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

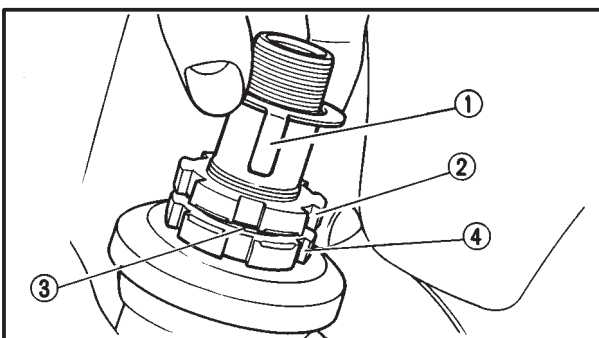
Place the motorcycle on a suitable stand so that the front wheel is elevated.



2. Check:
 - steering headGrasp the bottom of the front fork legs and gently rock the front fork.
Looseness or binding → Adjust the steering head.



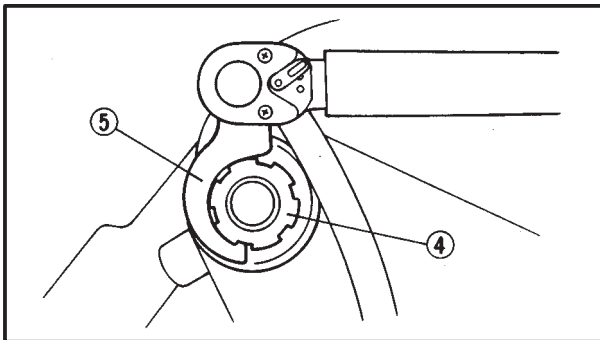
3. Remove:
 - upper bracket pinch bolt ①
 - steering stem nut ②
 - upper bracket ③



4. Adjust:
 - steering head
- a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.

CHECKING AND ADJUSTING THE STEERING HEAD

**INSP
ADJ**



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

NOTE:

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



Ring nut wrench
90890-01403



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

- c. Loosen the lower ring nut (4) completely, then tighten it to specification.

⚠ WARNING

Do not overtighten the lower ring nut.



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

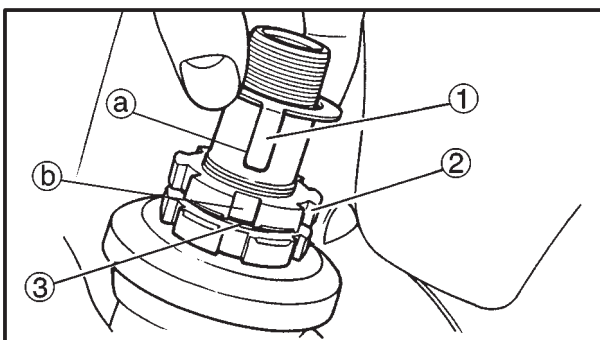
- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and inspect the upper and lower bearings.

Refer to “STEERING HEAD AND HANDLEBAR” in chapter 7.

- e. Install the rubber washer (3).
f. Install the upper ring nut (2).
g. Finger tighten the upper ring nut (2), then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
h. Install the lock washer (1).

NOTE:

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

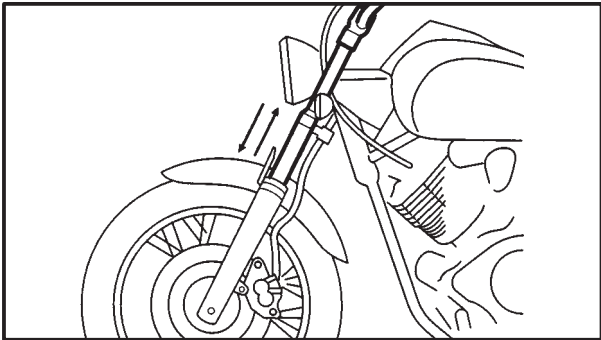


5. Install:

- ° upper bracket
- ° steering stem nut **110 Nm (11.0 m°kg)**
- ° upper bracket pinch bolt **20 Nm (2.0 m°kg)**

CHECKING THE FRONT FORK/ ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

INSP
ADJ



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 7.

EAS00159

ADJUSTING THE REAR SHOCK ABSORB- ER ASSEMBLY

⚠ WARNING

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

CAUTION:

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - spring preload

CHECKING THE TIRES

INSP
ADJ



Basic weight: (with oil and full fuel tank)	274 kg	
Maximum load*:	201 kg	
Cold tire pressure:	Front	Rear
Up to 90 kg load*	200 kPa (2.00 kgf/cm ²)	225 kPa (2.25 kgf/cm ²)
90 kg × maximum load*	225 kPa (2.25 kgf/cm ²)	250 kPa (2.50 kgf/cm ²)
High speed riding	225 kPa (2.25 kgf/cm ²)	250 kPa (2,50 kgf/cm ²)

*: total of cargo, rider, passenger and accessories

⚠ WARNING

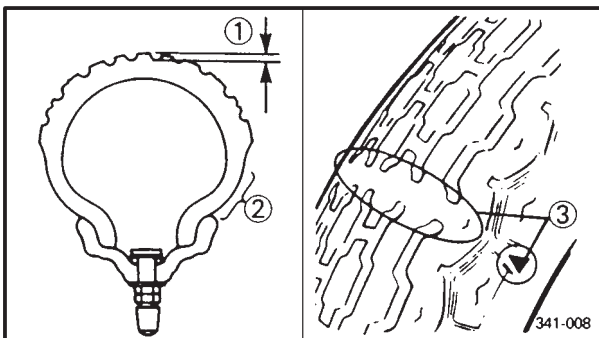
It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

2. Check:

- tire surfaces
- Damage/wear → Replace the tire.



Minimum tire tread depth
1.6 mm



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

⚠ WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using a tube tire, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.
- To avoid pinching the tube, make sure that the wheel rim band and tube are centered in the wheel groove.

CHECKING THE TIRES



- ° 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	Tubeless wheel
Tube tire only	Tube or tubeless tire

- ° After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. Then 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
BRIDGE-STONE	110/90-18 61S	EXEDRA L309
DUNLOP	110/90-18 61S	K555F

Rear tire:

Manufacturer	Type	Size
BRIDGE-STONE	170/80-15 M/C 77S	EXEDRA G546
DUNLOP	170/80-15 M/C 77S	K555

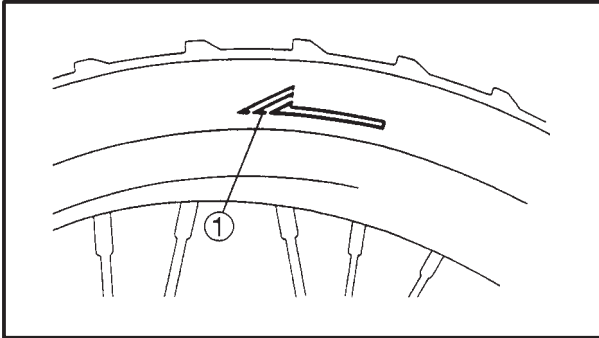
WARNING

- ° New tires have a relatively low grip on the road surface until they have been slightly worn.

Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

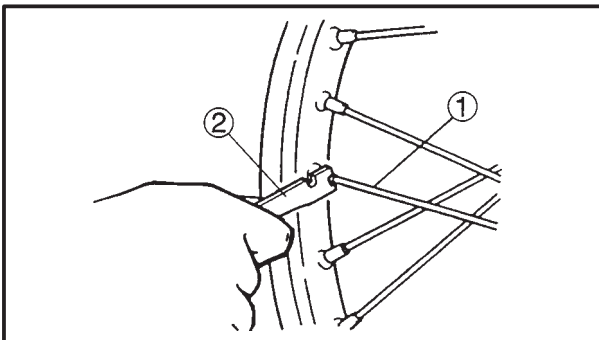
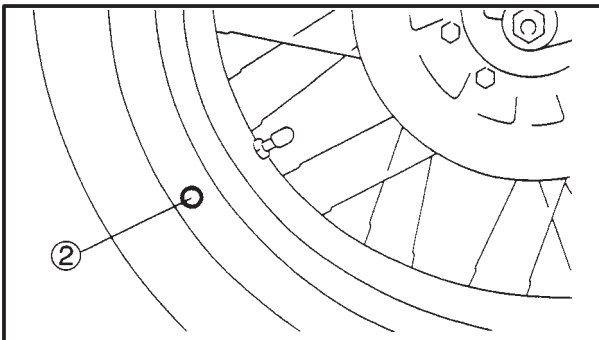
CHECKING THE TIRES/ CHECKING AND TIGHTENING THE SPOKES

INSP
ADJ



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.



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  **3 Nm (0.3 m²kg)**
(with a spoke wrench (2))

NOTE:

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

EAS00170

CHECKING AND LUBRICATING THE CABLES

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

WARNING

Damaged cable sheaths may causes 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 grease



EB305020

ELECTRICAL SYSTEM **CHECKING AND CHARGING THE BATTERY**

⚠ WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid.

Therefore, always follow these preventive measures:

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

First aid in case of bodily contact:

External

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

Internal

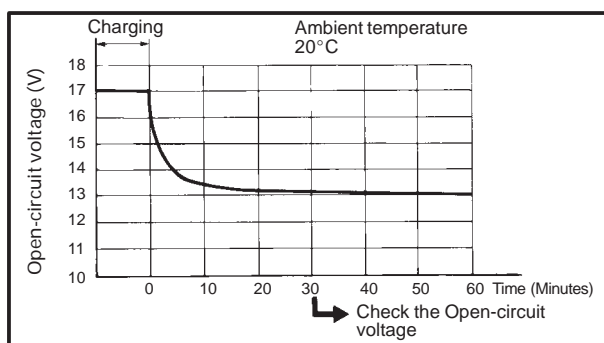
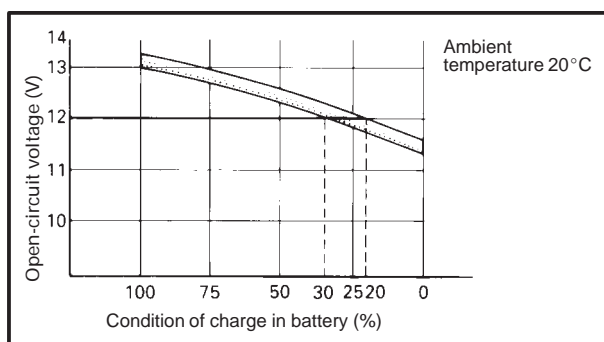
Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

CAUTION:

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

CHECKING AND CHARGING THE BATTERY

INSP
ADJ



⚠ WARNING

Do not quick charge a battery.

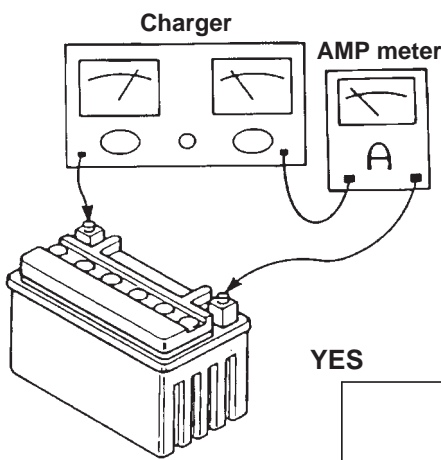
CAUTION:

- Make sure that the battery breather hose and battery vent are free of obstructions.
- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.

CHECKING AND CHARGING THE BATTERY



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



Measure the open-circuit voltage prior to charging.

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

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

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

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

YES

NO

By turning the charging voltage adjust dial, set the charging voltage at 20×25 V.

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

YES

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

NO

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

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

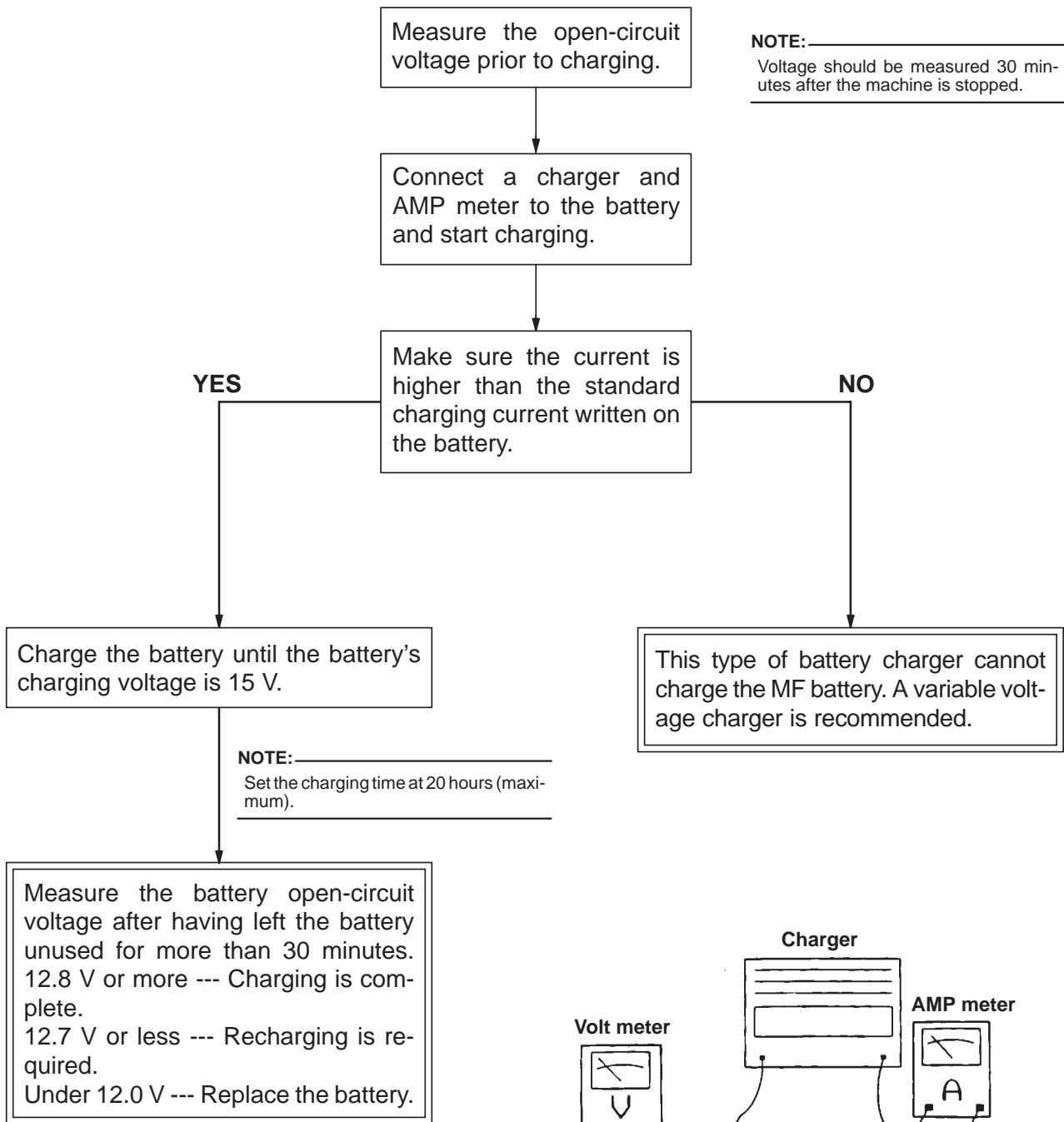
In case that charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

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

CHECKING AND CHARGING THE BATTERY



Charging method using a constant-voltage type charger



Charging method using a constant-current type charger

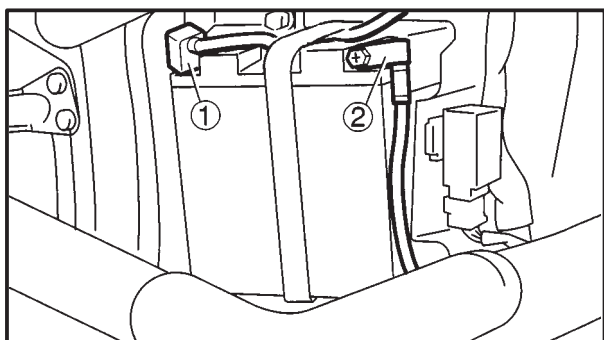
This type of battery charger cannot charge the MF battery.



6. Check:
 - battery breather hose and battery vent
 - Obstruction → Clean.
 - Damage → Replace.
7. Install:
 - battery

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.



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

CAUTION: _____

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

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



Recommended lubricant
Dielectric grease

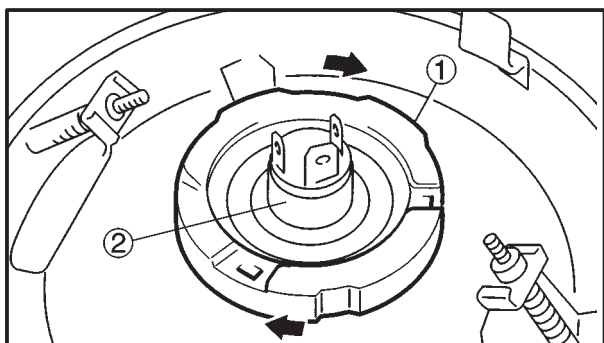
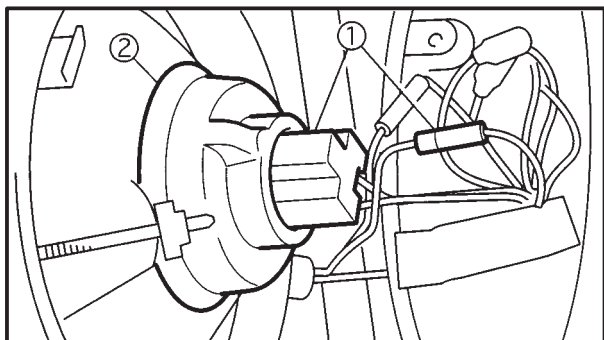
11. Install:
 - battery cover



⚠ 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:
- ° tool box cover
 - ° ignitor plate
 - ° rider's seat



EAS00182

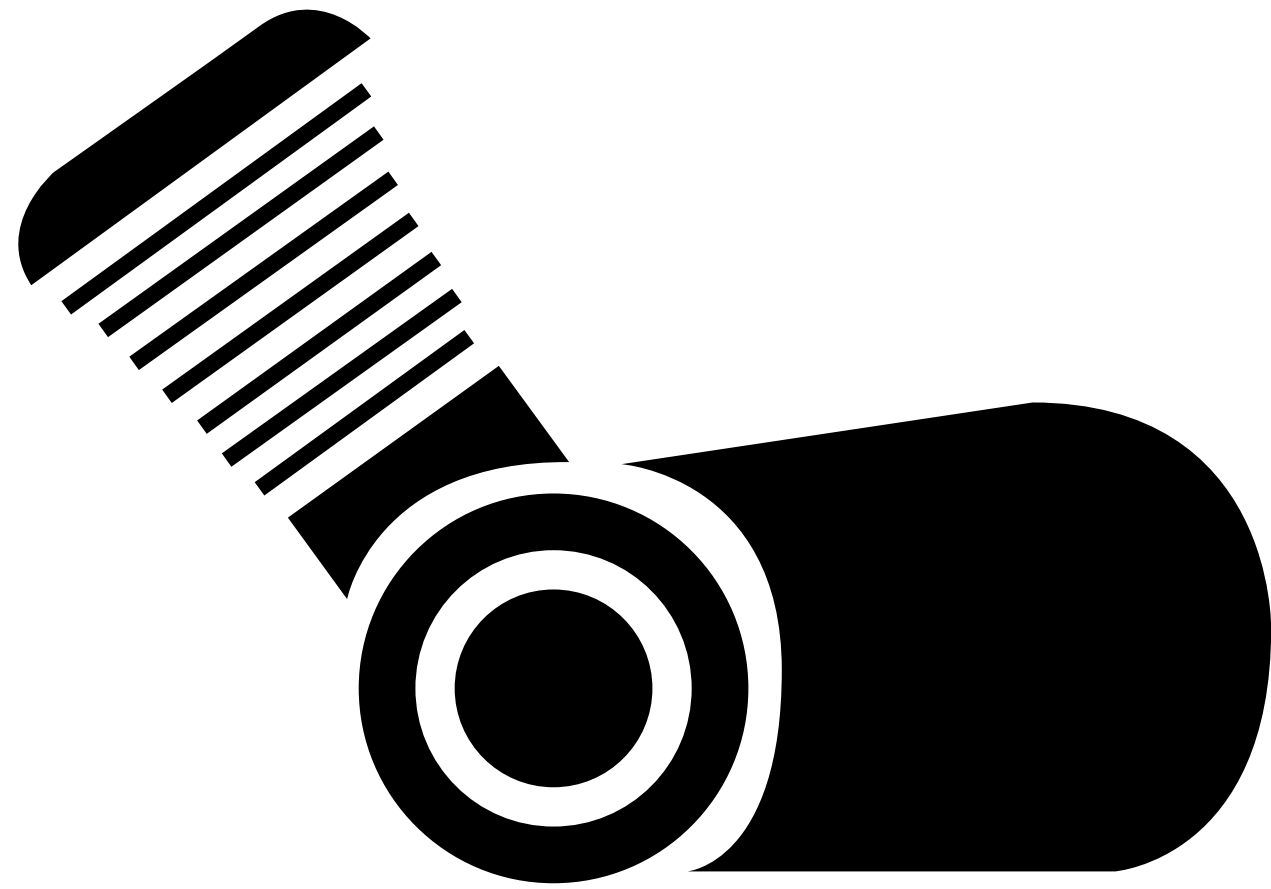
REPLACING THE HEADLIGHT BULB

1. Disconnect:
- ° connectors ①
2. Remove
- ° headlight bulb cover ②
3. Remove:
- ° headlight bulb holder ①
4. Remove:
- ° headlight bulb ②

⚠ WARNING

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

5. Install:
- ° headlight bulb (New)
- Secure the new headlight bulb with the headlight bulb holder.



ENG

4



CHAPTER 4 ENGINE

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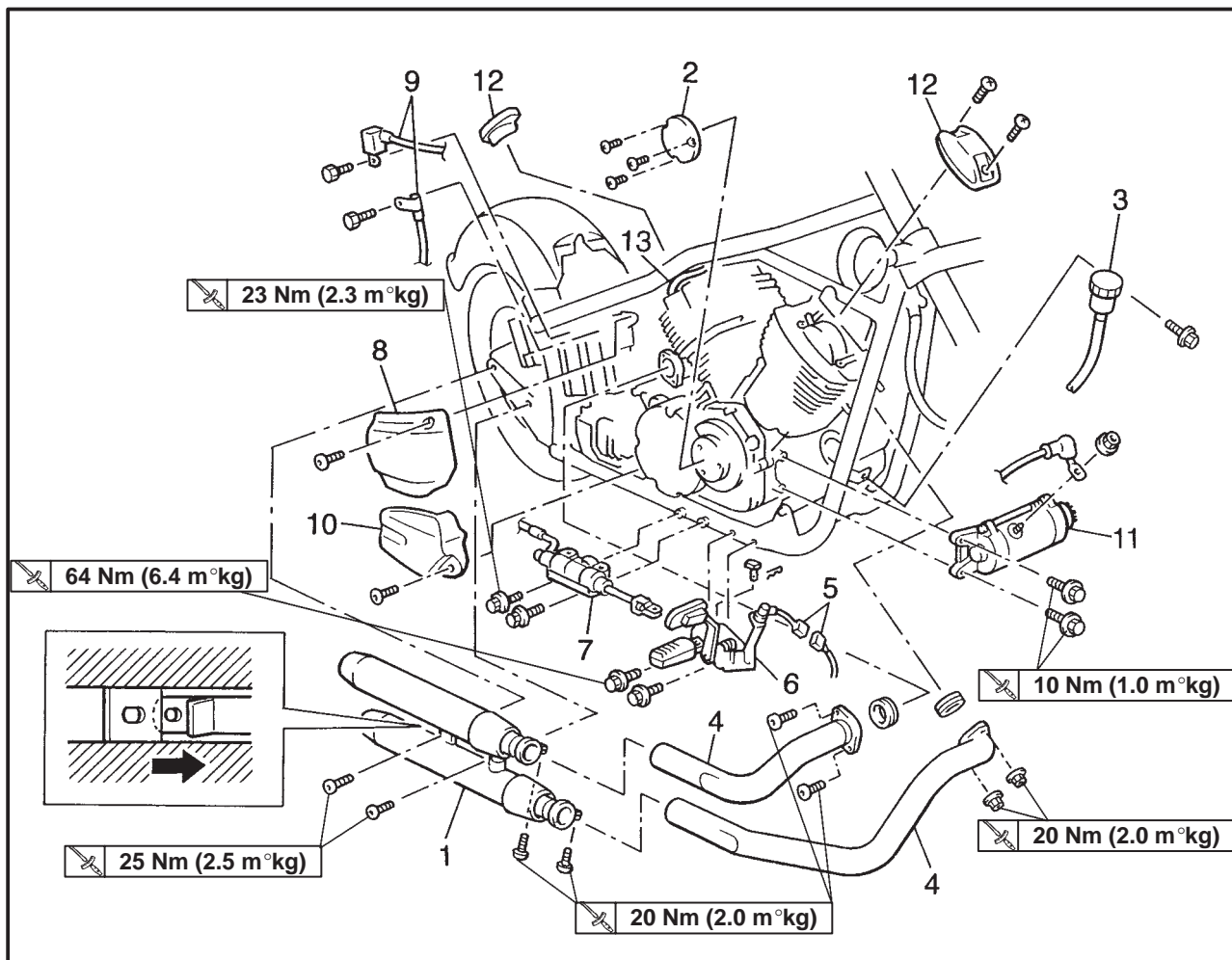
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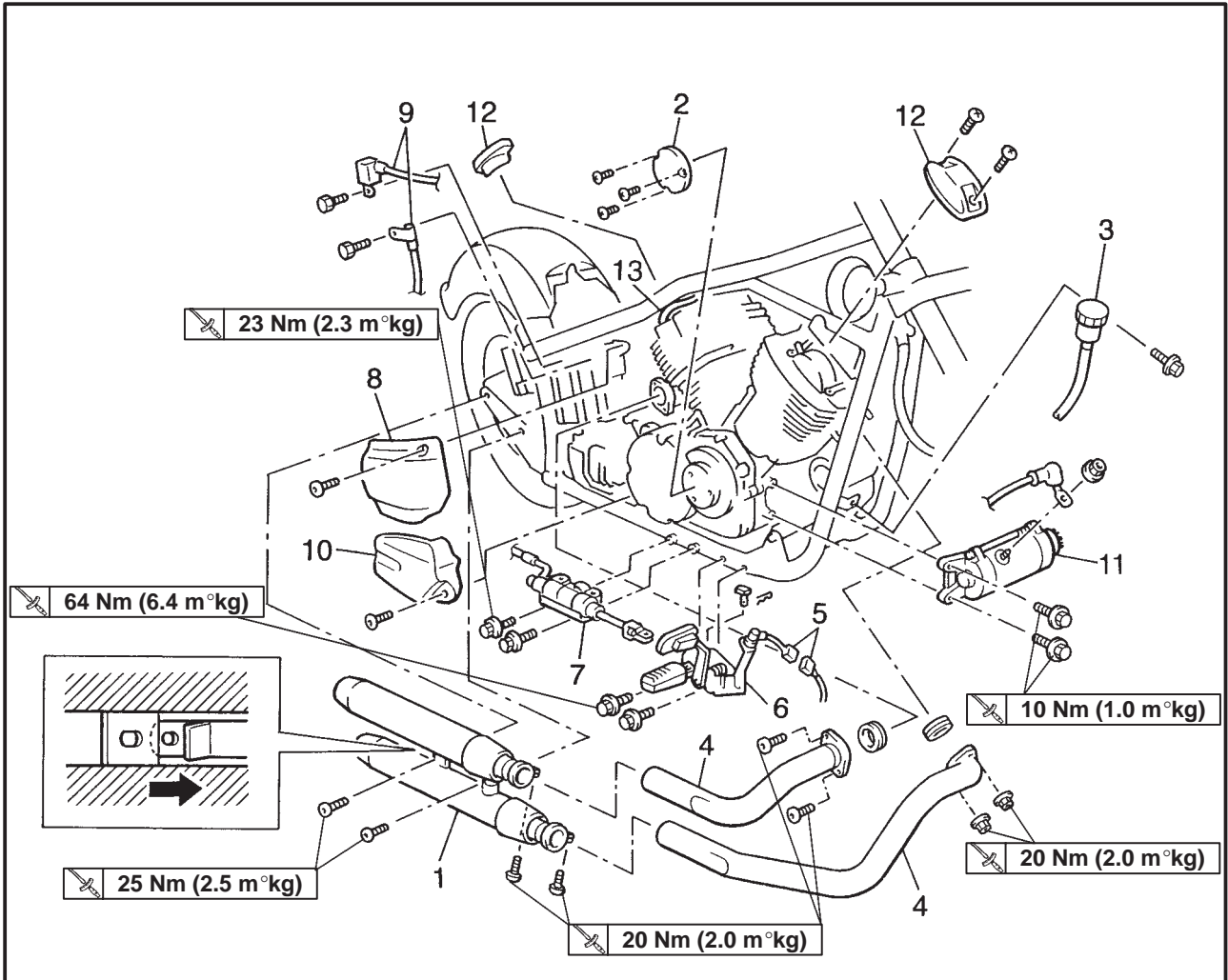
ENGINE

ENGINE REMOVAL

MUFFLERS, BRAKE PEDAL AND SIDE COVER



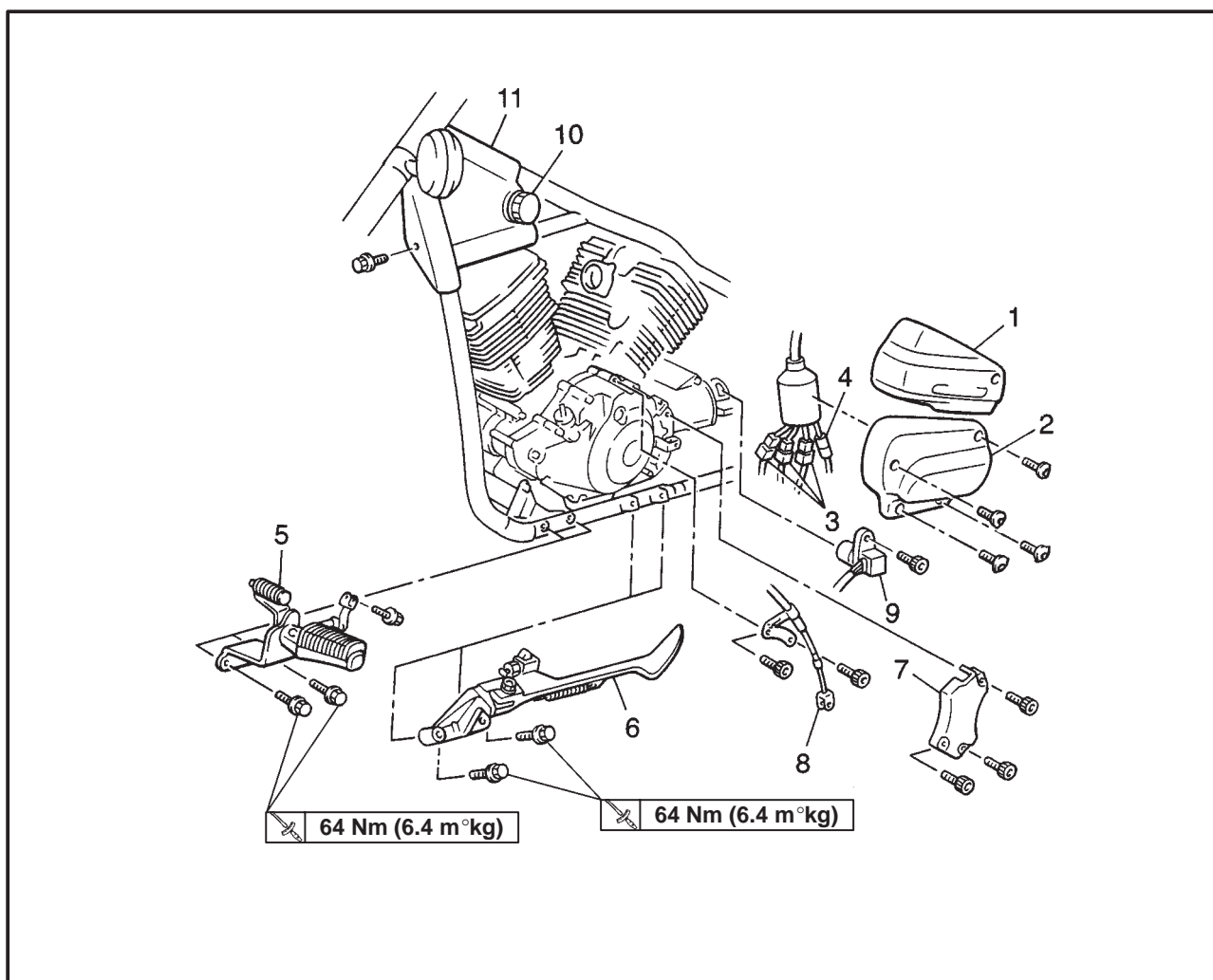
Order	Job name/Part name	Q'ty	Remarks
	Removing the muffler, brake pedal and side cover		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING _____ Securely support the motorcycle so there is no danger of it falling over. _____ Refer & "FUEL TANK AND SEATS" in Chapter 3.
	Fuel tank		Refer to "CARBURETOR" in Chapter 5.
	Air filter case assembly		
	Carburetor assembly		
1	Muffler assembly	1	
2	Cover (emblem)	1	
3	Reservoir tank	1	
4	Exhaust pipes	2	
5	Rear brake switch lead	1	Disconnect
6	Footrest/brake pedal	1/1	



Order	Job name/Part name	Q'ty	Remarks
7	Rear brake master cylinder/bracket	1/1	Disconnect NOTE: _____ First, disconnect the negative lead, then disconnect the positive lead.
8	Battery cover	1	
9	Battery leads	2	
10	Right side cover	1	Disconnect
11	Starter motor	1	
12	Cylinder head covers	4	For installation, reverse the removal procedure
13	Spark plug caps	4	



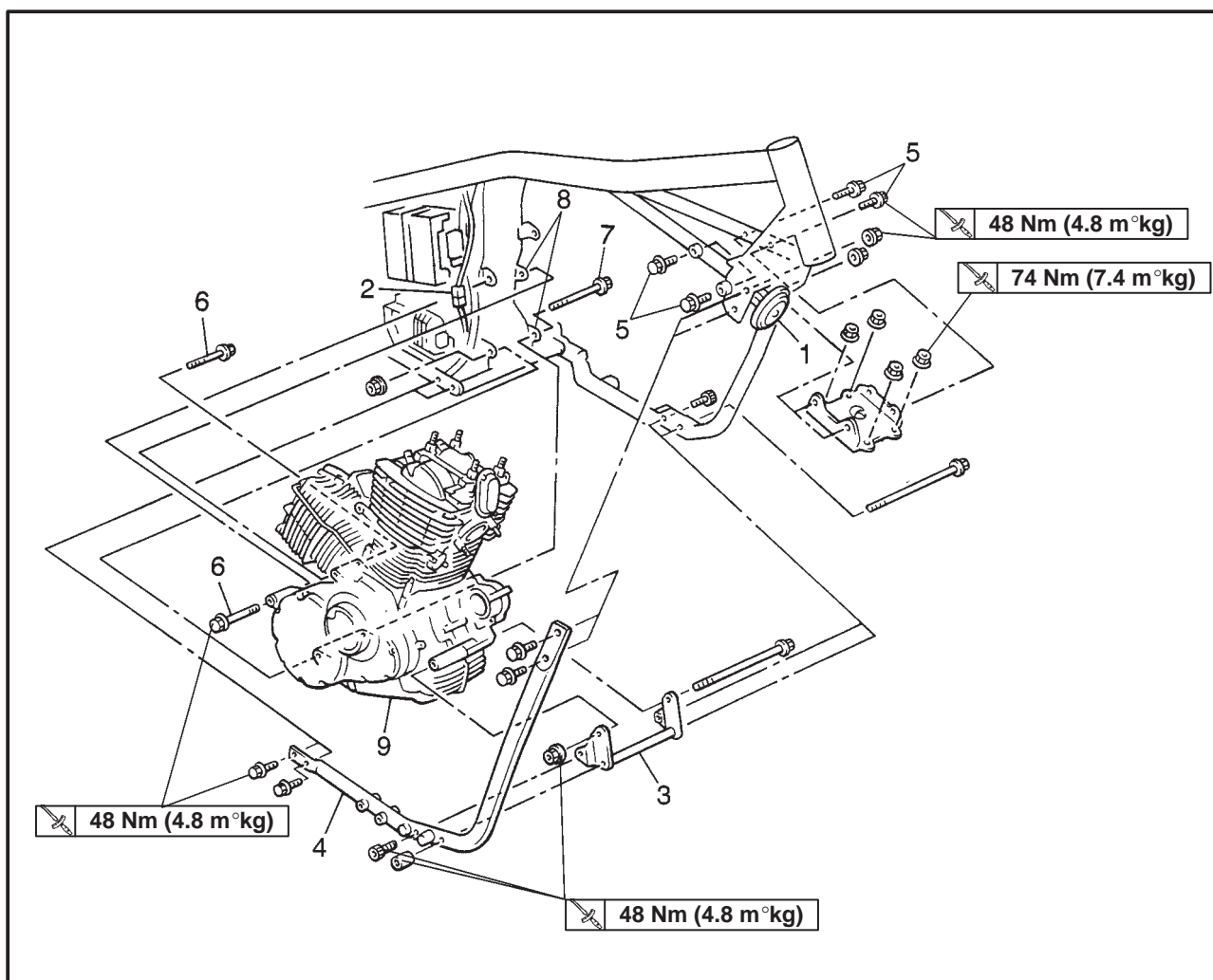
LEADS, SHIFT PEDL AND CLUTCH CABLE



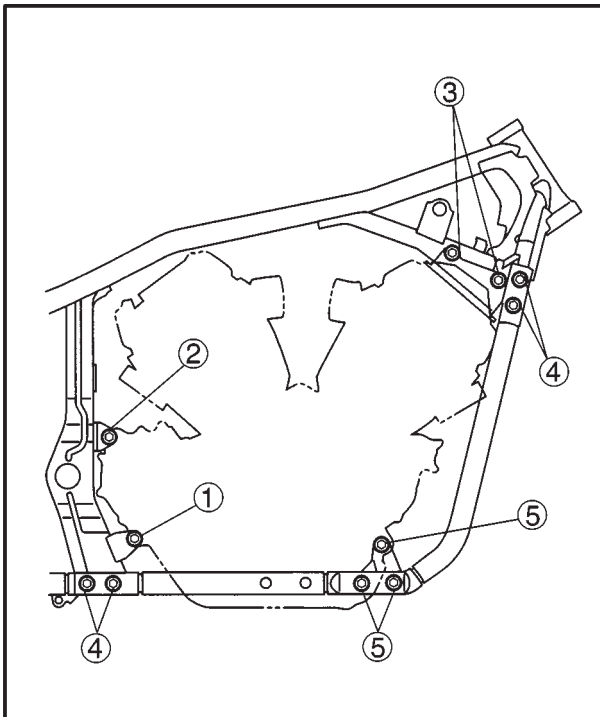
Order	Job name/Part name	Q'ty	Remarks
	Removing the leads, shift pedal and clutch cable		Remove the parts in the order listed.
1	Tool box cover	1	
2	Left side cover	1	
3	AC magneto lead/pickup lead/side stand switch lead/speed sensor lead	1/1/1	Disconnect
4	Neutral switch lead	1	Disconnect
5	Footrest/shift pedal	1/1	Refer to "INSTALLING THE ENGINE".
6	Sidestand	1	
7	Clutch adjusting cover	1	
8	Clutch cable	1	Disconnect
9	Speed sensor	1	
10	Fuel tank fitting knobs	2	
11	Steering head side covers	2	
			For installation, reverse the removal procedure.



ENGINE MOUNTING BOLTS



Order	Job name/Part name	Q'ty	Remarks
	Engine mounting bolt removal		Remove the parts in the order below. Place a suitable stand under the frame and engine.
	Left crankcase cover		Refer to "GENERATOR AND STARTER CLUTCH"
	Tool box		Refer to "REAR SHOCK ABSORBER AND SWINGARM" in Chapter 6.
1	Horn	1	Refer to "INSTALLING THE ENGINE".
2	Engine ground lead connector	1	
3	Engine stay (front-lower)	1	
4	Down tube	1	
5	Engine bracket bolts	4	
6	Engine mount bolts (rear upper)	2	
7	Engine mount bolt (rear lower)	1	
8	Engine stays (rear upper/lower)	1/1	
9	Engine assembly	1	
			For installation, reverse the removal procedure.



EAS00192

INSTALLING THE ENGINE

1. Tighten the bolts in the following order.



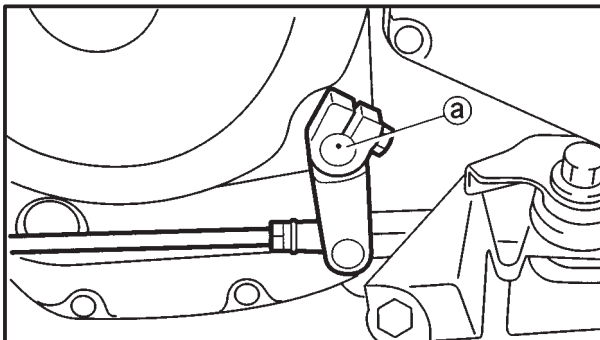
Bolt ①:
48 Nm (4.8 m°kg)

Bolt ②:
48 Nm (4.8 m°kg)

Bolt ③:
48 Nm (4.8 m°kg)

Bolt ④:
48 Nm (4.8 m°kg)

Bolt ⑤:
48 Nm (4.8 m°kg)



2. Install:

° shift arm ①

NOTE:

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

° Adjust the adjusting bolt length (b).

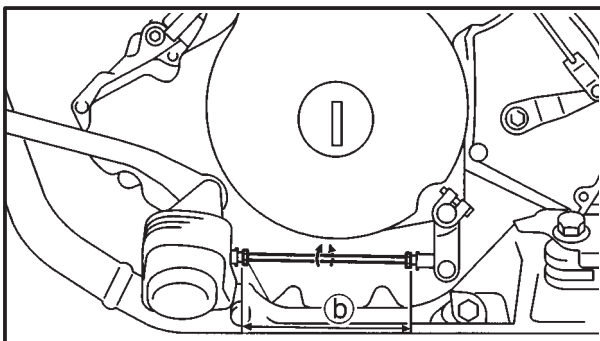
Refer to "ADJUSTING THE SHIFT PEDAL" in chapter 3.



Shift arm bolt
10Nm (1.0m°kg)

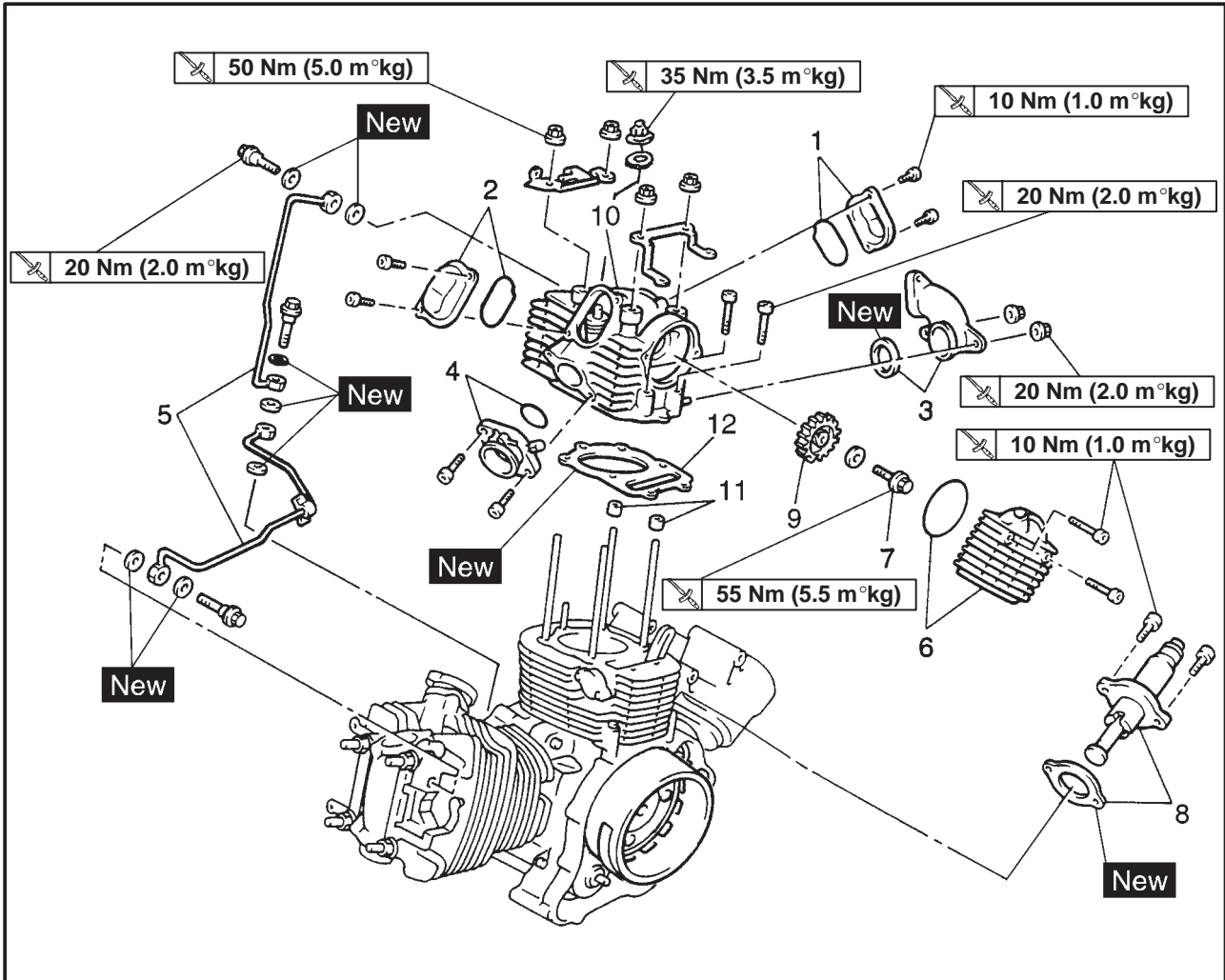


Adjusting bolt length
114.7mm

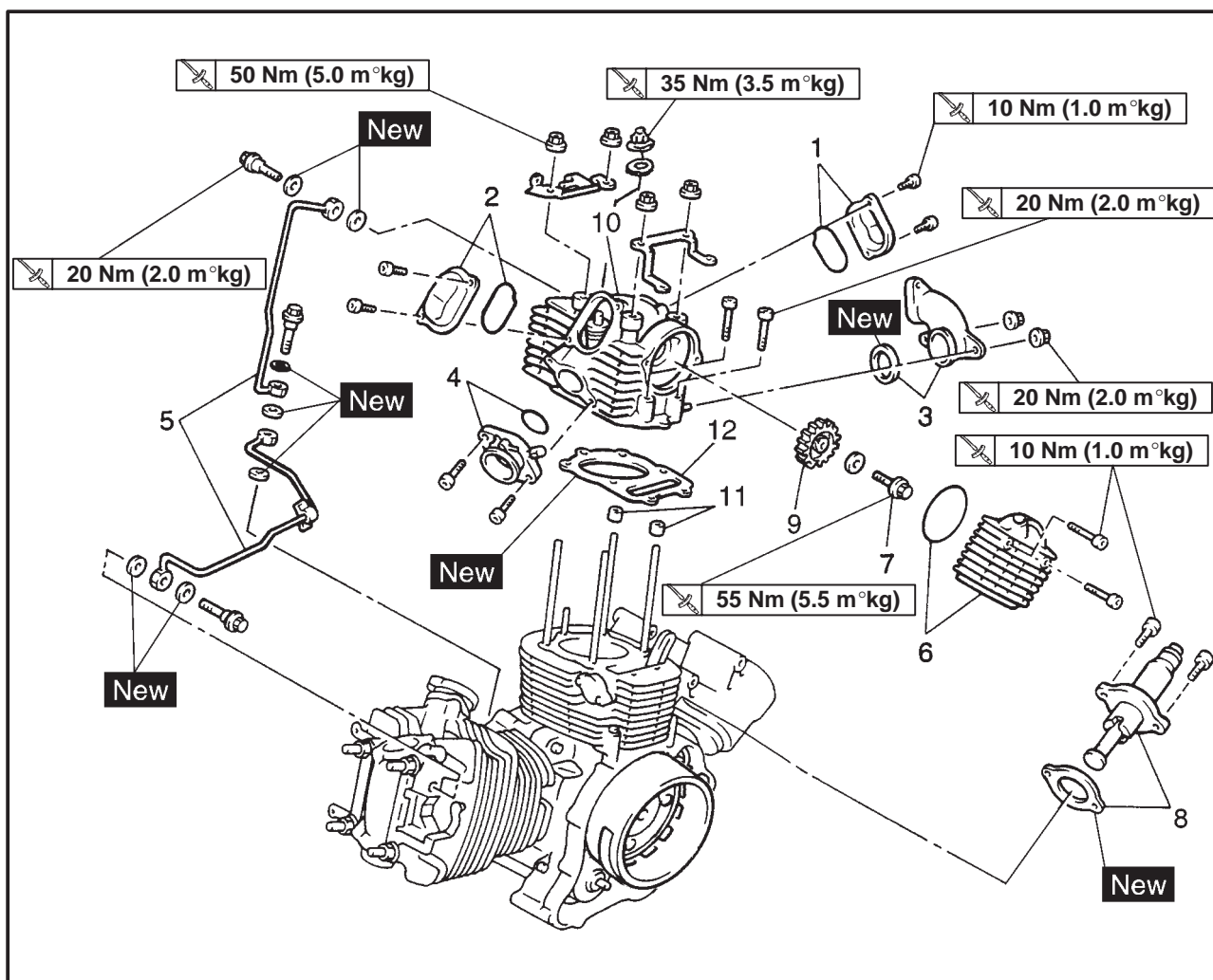




CYLINDER HEADS
REAR CYLINDER HEAD



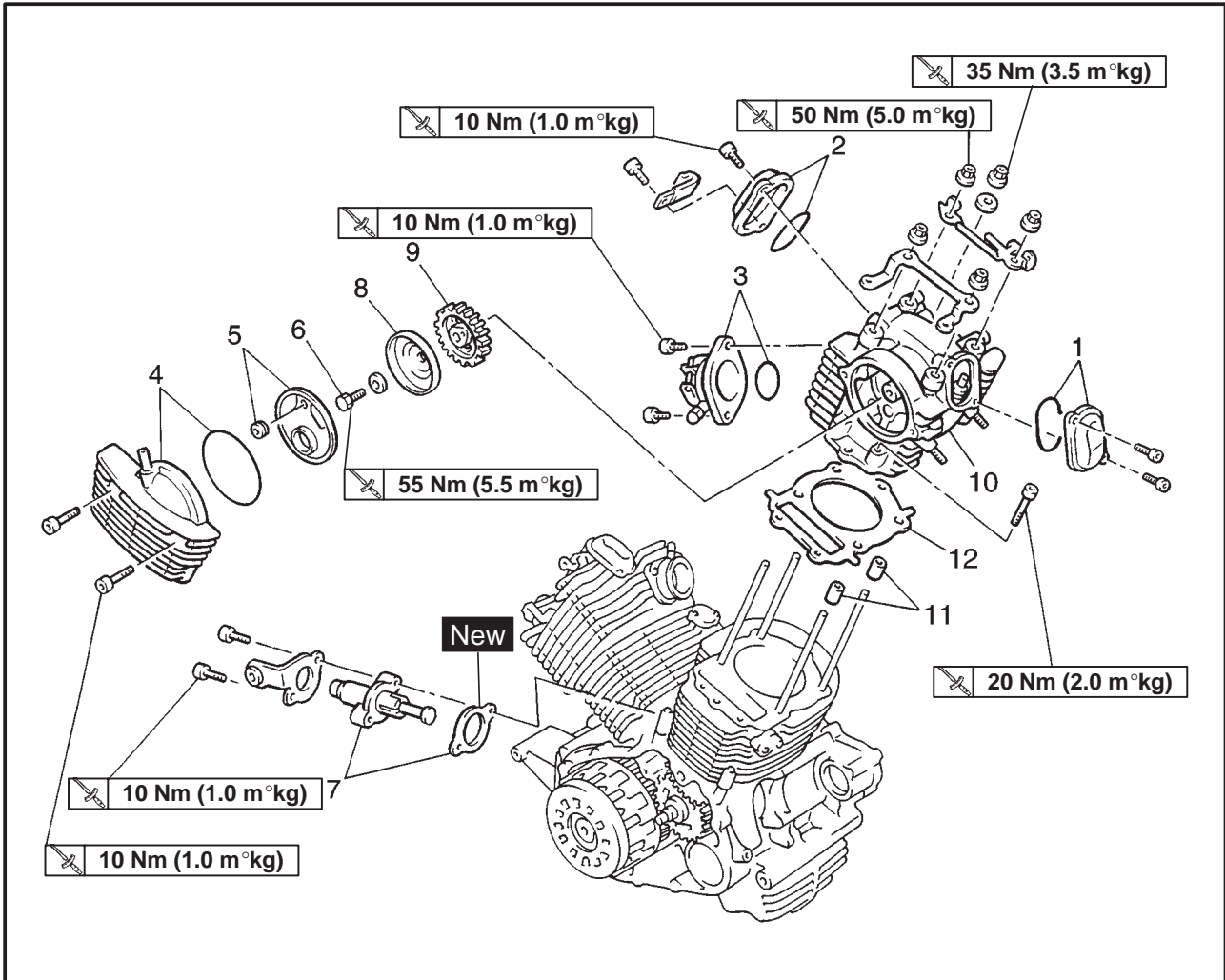
Order	Job name/Part name	Q'ty	Remarks
	Cylinder head removal		Remove the parts in the order listed. Refer to "ENGINE REMOVAL". Refer to "GENERATOR AND STARTER CLUTCH".
	Engine assembly		
	Left crankcase cover		
1	Tappet cover (exhaust)/O-ring	1/1	Refer to "INSTALLING THE CYLINDER HEADS".
2	Tappet cover (intake)/O-ring	1/1	
3	Exhaust pipe joint/gasket	1/1	
4	Carburetor joint/O-ring	1/1	
5	Oil delivery pipes	2	
6	Camshaft sprocket cover/O-ring	1/1	
7	Camshaft sprocket bolt	1	



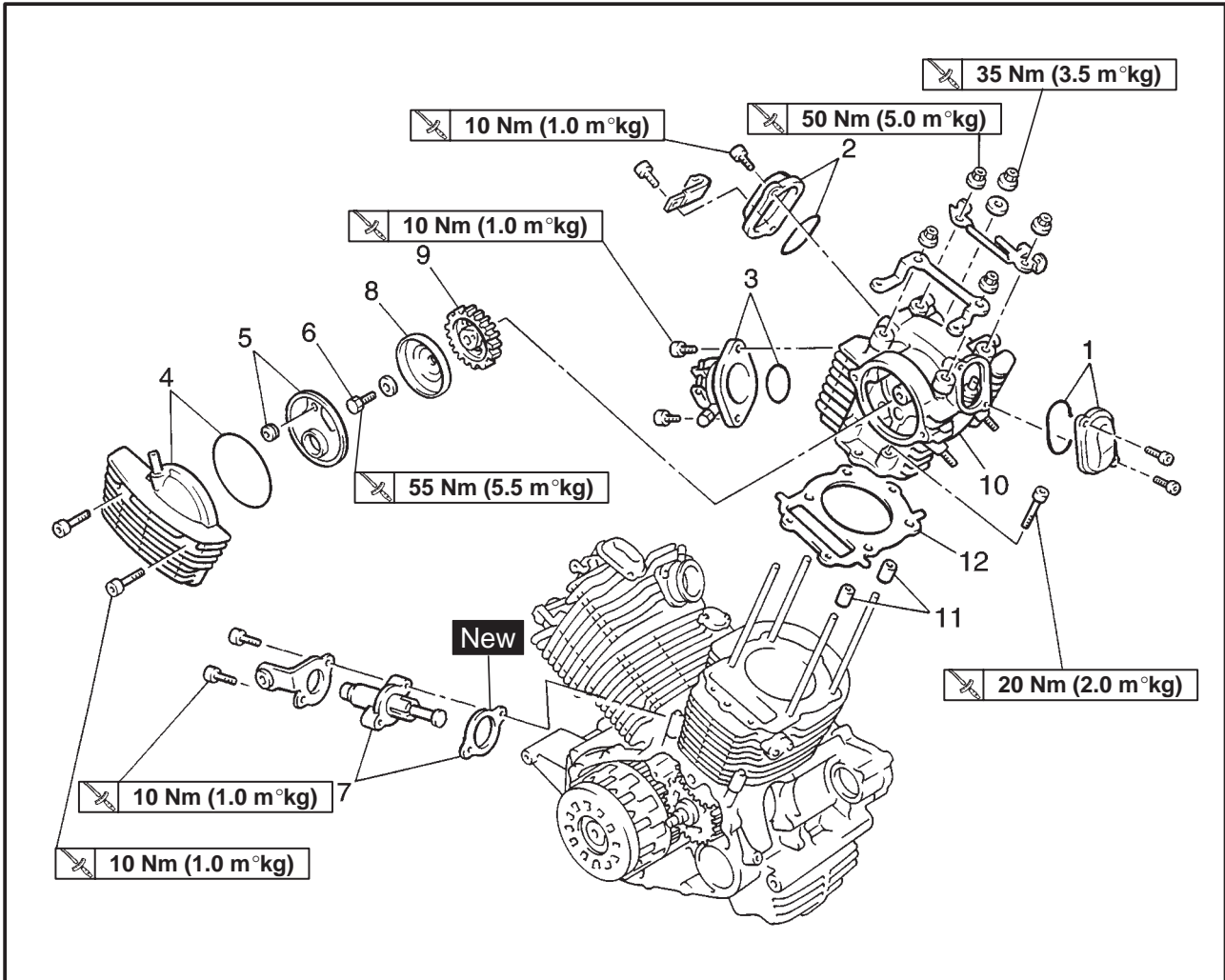
Order	Job name/Part name	Q'ty	Remarks
8	Timing chain tensioner/gasket	1/1	Refer to "REMOVING/INSTALLING THE CYLINDER HEADS". Refer to "INSTALLING THE CYLINDER HEADS". For installation, reverse the removal procedure.
9	Camshaft sprocket	1	
10	Cylinder head	1	
11	Dowel pins	2	
12	Cylinder head gasket	1	



FRONT CYLINDER HEAD



Order	Job name/Part name	Q'ty	Remarks
	Cylinder head removal		Remove the parts in the order listed.
	Engine assembly		Refer to "ENGINE REMOVAL".
	Oil delivery pipes		Refer to "REAR CYLINDER HEAD".
	Right crankcase cover		Refer to "CLUTCH".
1	Tappet cover (exhaust)/O-ring	1/1	Refer to "INSTALLING THE CYLINDER HEADS".
2	Tappet cover (intake)/O-ring	1/1	
3	Carburetor joint/O-ring	1/1	
4	Camshaft sprocket cover/O-ring	1/1	
5	Baffle plate/O-ring	1/1	
6	Camshaft sprocket bolt	1	



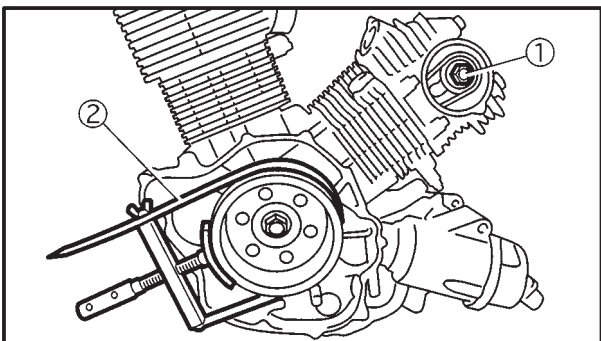
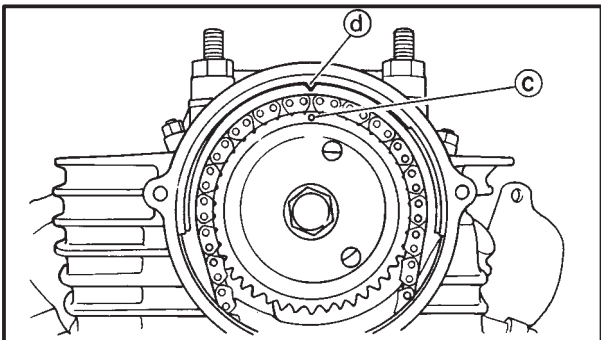
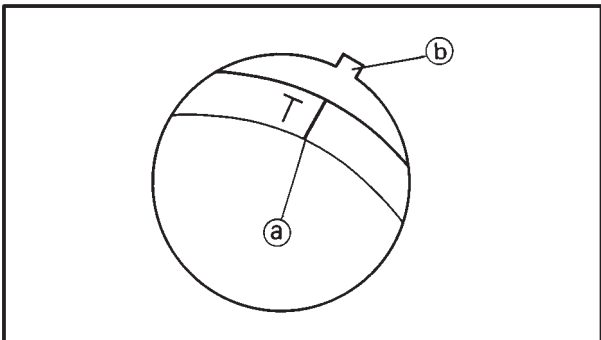
Order	Job name/Part name	Q'ty	Remarks
7	Timing chain tensioner/gasket	1/1	Refer to "REMOVING/INSTALLING THE CYLINDER HEADS".
8	Camshaft sprocket plate	1	
9	Camshaft sprocket	1	
10	Cylinder head	1	Refer to "INSTALLING THE CYLINDER HEADS". For installation reverse the removal procedure.
11	Dowel pins	2	
12	Cylinder head gasket	1	

EAS00226

REMOVING THE CYLINDER HEADS

Rear cylinder head

1. Remove:
 - ° camshaft sprocket cover
 - ° tappet covers



2. Align:
 - ° "T" mark (a) (with the stationary pointer (b))




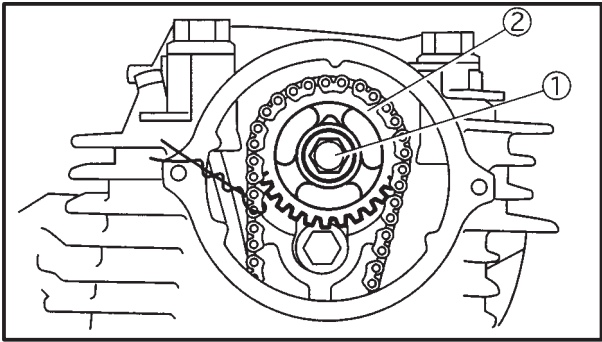
- a. Temporarily install the left crankcase cover without the pickup coil and stator coil.
- b. Turn the crankshaft clockwise.
- c. Align the "T" mark (a) with the stationary pointer (b) on the crankcase cover (left) when the rear piston is at TDC on the compression stroke.
- d. Check that the rear piston is at TDC in the compression stroke.
- e. The rear piston is at TDC on the compression stroke when there is clearance at both of the rocker arms. If there is no clearance then turn the crankshaft clockwise one full turn.
- f. When the "T" mark is aligned with the stationary pointer the punch mark (c) on the camshaft sprocket should be aligned with the stationary pointer (d) on the cylinder head.



3. Loosen:
 - ° bolt (camshaft sprocket) (1)

NOTE: _____
Use the sheave holder (2) to hold the rotor.

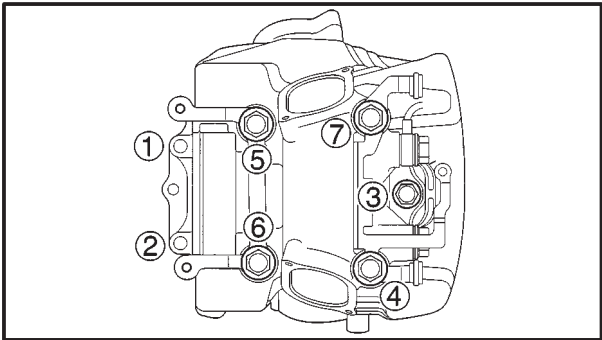
	<p>Sheave holder: 90890-01701</p>
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- 4. Remove:
 - ° timing chain tensioner
 - ° gasket
- 5. Remove:
 - ° bolt (camshaft sprocket) ①
 - ° camshaft sprocket ②

NOTE: _____

To prevent the timing chain from falling into the crankcase fasten a wire to it.



- 6. Remove:
 - ° cylinder head

NOTE: _____

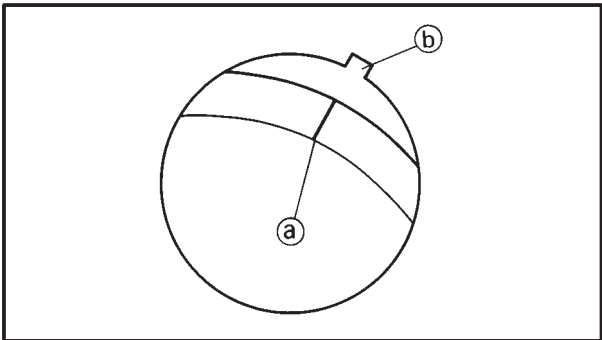
- ° Loosen the bolts and nuts in the proper sequence.
- ° Follow the numerical order shown in the illustration. Loosen each bolt 1/4 of a turn at a time until all of the bolts are loose.

Front cylinder head

NOTE: _____

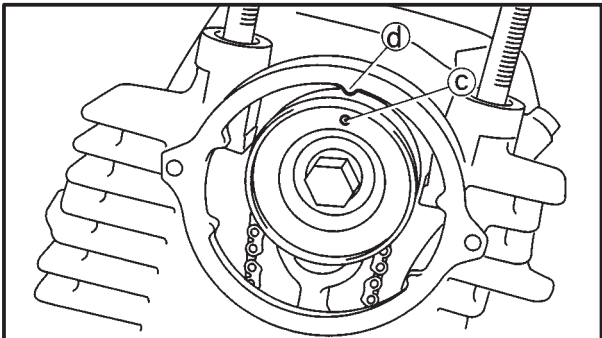
When removing the front cylinder head, repeat the rear cylinder head removal procedures. However, note the following points.

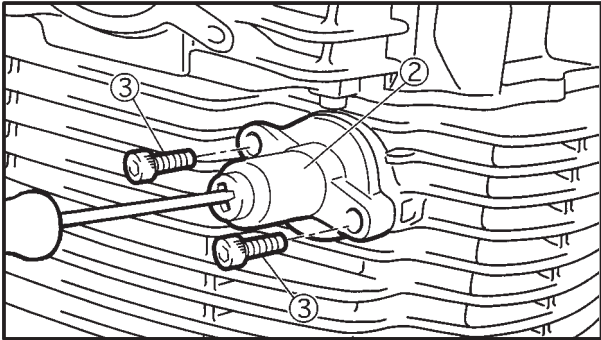
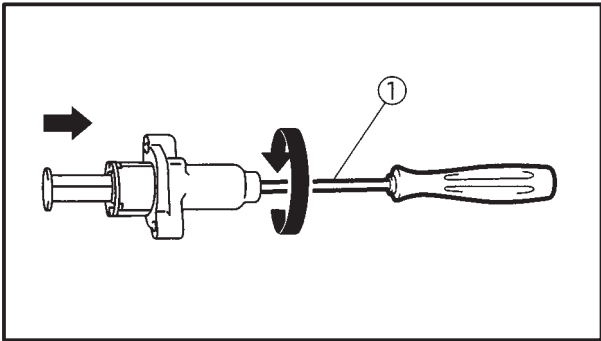
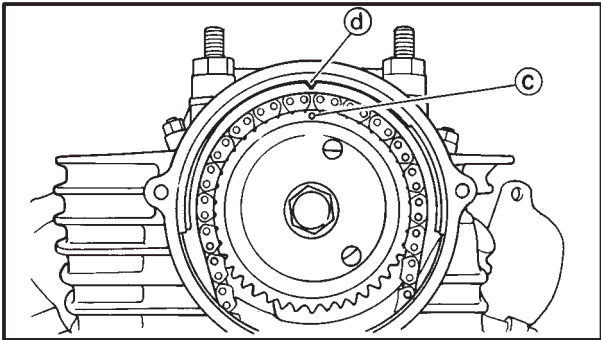
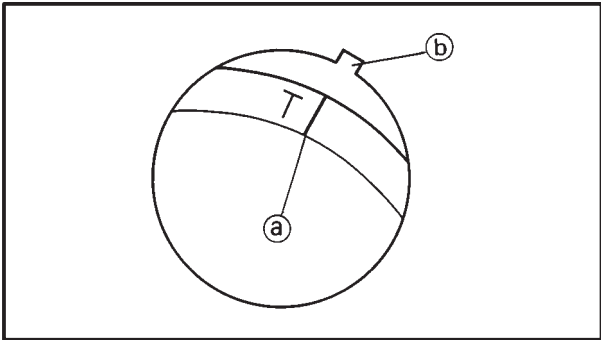
- 1. Align:
 - ° "I" mark
 - (with the stationary pointer)



Removal steps:

- ° Turn the crankshaft clockwise 290°.
- ° Align the "I" mark ① with the stationary pointer ② on the crankcase cover (left) when the front piston is at TDC on the compression stroke.
- ° When the "I" mark is aligned with the stationary pointer the punch mark ③ on the camshaft sprocket should be aligned with the stationary pointer ④ on the cylinder head.
- ° The front piston is at TDC on the compression stroke when there is clearance at both of the rocker arms.





3. Install:
◦ camshaft sprocket



- a. Temporarily install the rotor nut and left crankcase cover without the pickup coil and stator coil.
- b. Turn the crankshaft clockwise.
- c. Align the “T” mark (a) with the stationary pointer (b) on the crankcase cover (left).
- d. Install the camshaft sprocket with the timing mark (c) facing out.
- e. Turn the camshaft just enough to remove any slack from the intake side of the timing chain.
- f. Insert your finger into the hole and timing chain tensioner hole and push the timing chain guide inward.
- g. While pushing the timing chain guide, be sure that the timing mark (c) and the stationary pointer (d) are properly aligned at TDC.



4. Install:
◦ timing chain tensioner




- a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.
- b. While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver (1) until it stops.
- c. With the screwdriver still inserted into the timing chain tensioner, install the timing chain tensioner (2), and gasket. Then, tighten the timing chain tensioner bolts (3) to the specified torque.

⚠ WARNING _____

Always use a new gasket. _____

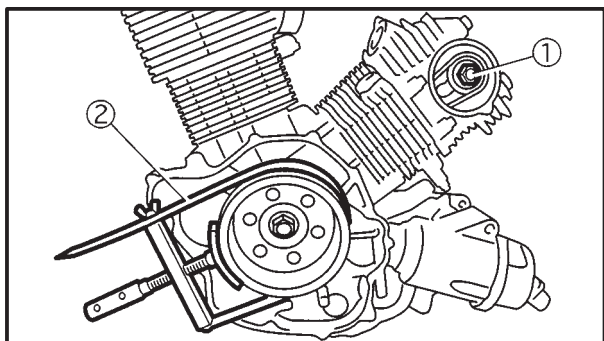
NOTE: _____

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

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

CYLINDER HEADS

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



Cap bolt
8 Nm (0.8 m°kg)



5. Install:
 - ° bolt (camshaft sprocket) ①

 **55 Nm (5.5 m°kg)**

NOTE:

- ° Be sure the projection on the camshaft sprocket plate is aligned with the hole in the sprocket.
- ° Use the sheave holder ② to hold the rotor.



Sheave holder:
90890-01701

6. Check:
 - ° alignment marks
 - If the marks do not align → Adjust.
7. Measure:
 - ° valve clearance
 - Out of specification → Adjust.
 - Refer to "ADJUSTING THE VALVE CLEARANCE" in CHAPTER 3.

Front cylinder head

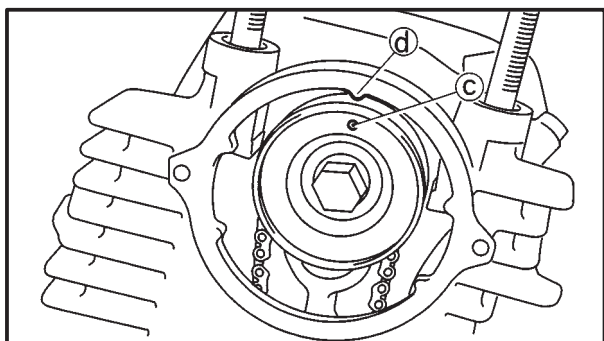
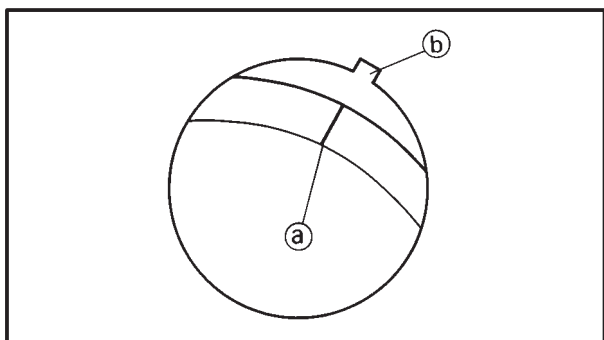
NOTE:

When installing the front cylinder head, repeat the rear cylinder head installation procedure. However, note the following points.

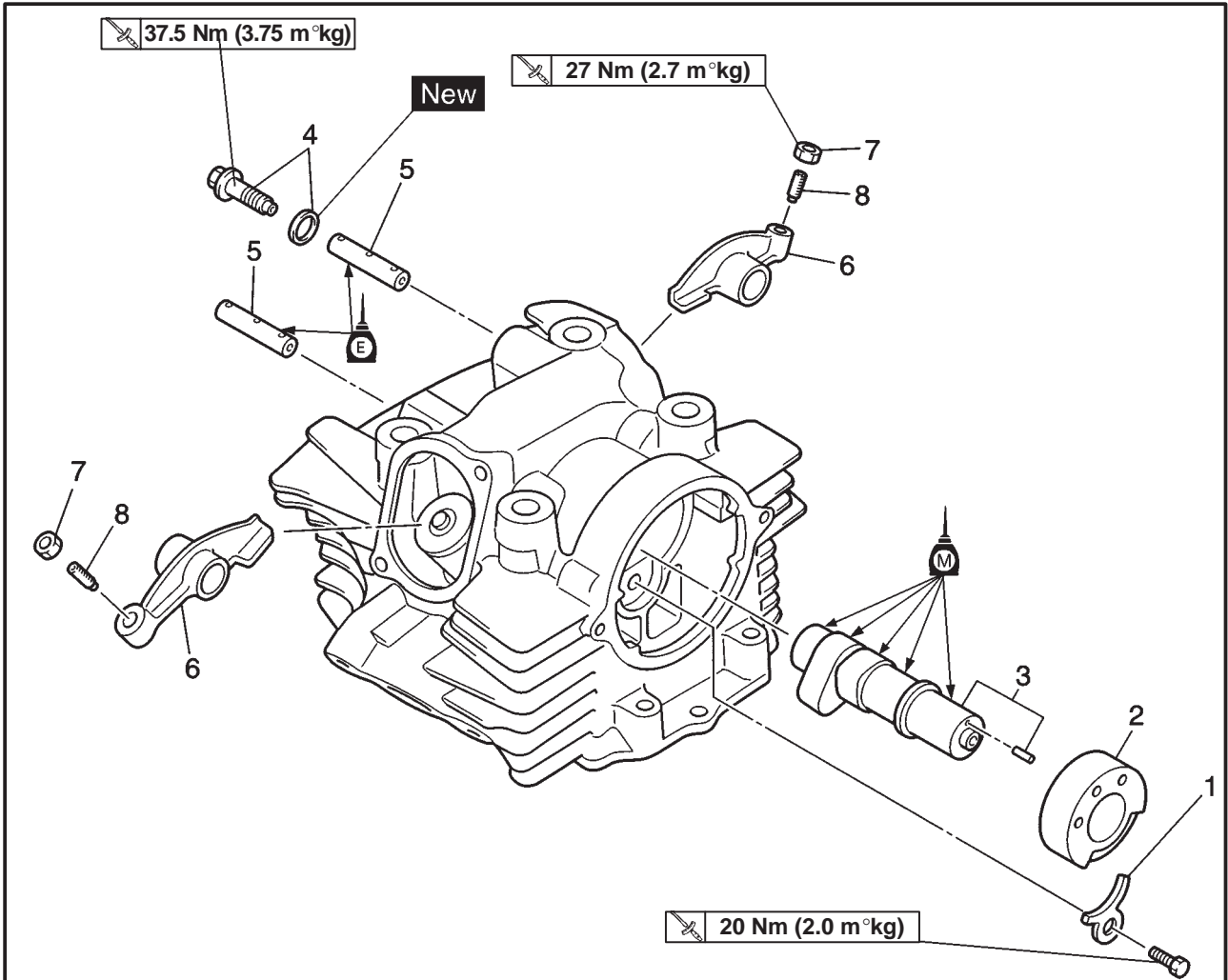
1. Install:
 - ° camshaft sprocket



- a. Turn the crankshaft clockwise 290°.
- b. Align the "I" mark ① with the stationary pointer ② on the crankcase cover (left).
- c. Install the camshaft sprocket with the timing mark ③ facing out.
- d. Turn the camshaft just enough to remove any slack from the intake side of the timing chain.
- e. Insert your finger into the hole and timing chain tensioner hole and push the timing chain guide inward.
- f. While pushing the timing chain guide, be sure that the timing mark ④ and the stationary pointer ⑤ are properly aligned at TDC.



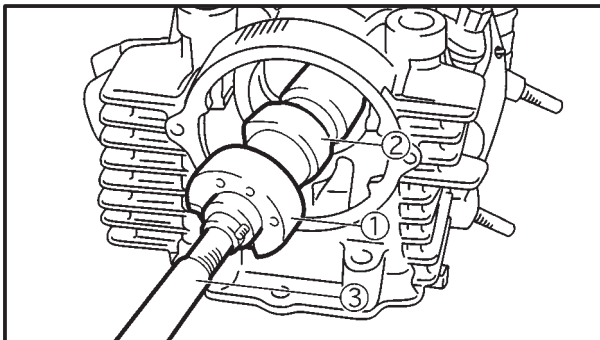
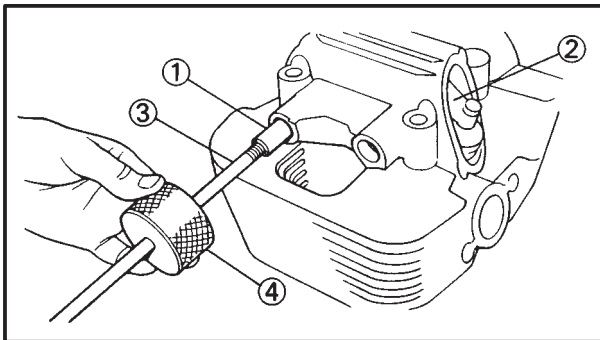
ROCKER ARMS AND CAMSHAFT



Order	Job name/Part name	Q'ty	Remarks
	Removing the rocker arm and camshaft		Remove the parts in the order listed.
	Cylinder heads		Refer to "CYLINDER HEAD".
1	Stopper plate	1	Refer to "REMOVING/INSTALLING THE ROCKER ARM AND CAMSHAFT".
2	Camshaft bushing	1	
3	Camshaft/dowel pin	1/1	
4	Union bolt/gasket	1/1	Refer to "REMOVING/INSTALLING THE ROCKER ARM AND CAMSHAFT".
5	Rocker arm shafts	2	
6	Rocker arms	2	
7	Locknuts	2	
8	Valve adjusters	2	
			For installation, reverse the removal procedure.

ROCKER ARMS AND CAMSHAFT

ENG



EAS00202

REMOVING THE ROCKER ARMS AND CAMSHAFT

- Remove:
 - rocker arm shafts (intake and exhaust) ①
 - rocker arms ②

NOTE:

Use a slide hammer ③ and weight ④ to remove the rocker arm shafts.



Slide hammer bolt (M8):

90890-01085

Weight:

90890-01084

- Remove:
 - camshaft bushing ①
 - camshaft ②

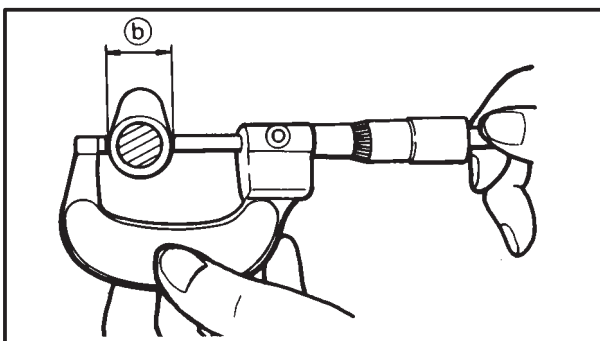
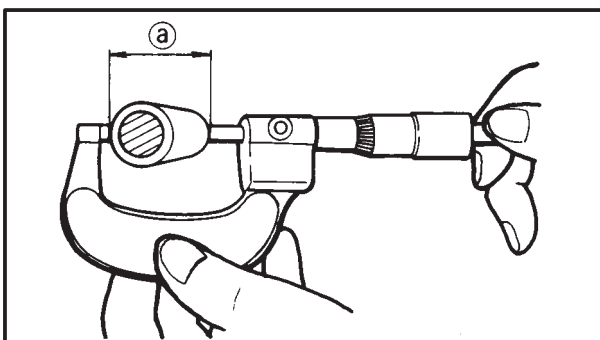
NOTE:

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

EAS00205

CHECKING THE CAMSHAFTS

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



Camshaft lobe dimension limit

Intake

① 39.012 mm

② #1: 31.993 mm

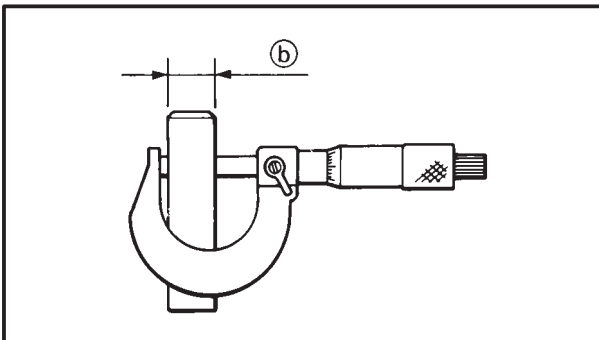
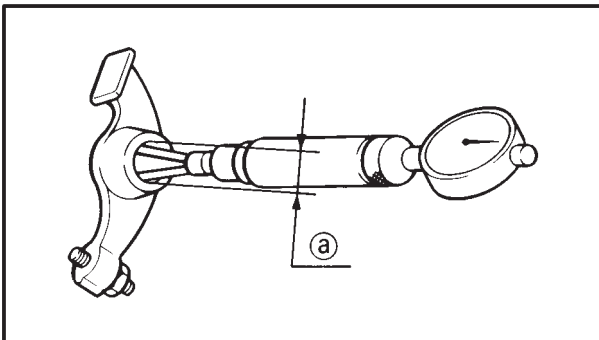
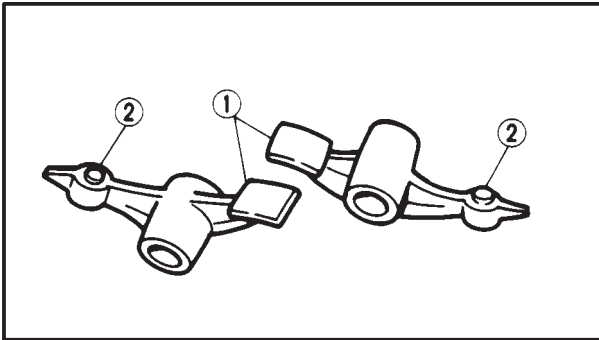
#2: 32.027 mm

Exhaust

① 39.045 mm

② 32.100 mm

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



EB401410

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.
 - ° rocker arm lobe ①
 - ° valve adjuster ②
Excessive wear → Replace.
2. Check:
 - ° rocker arm shaft
Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Measure:
 - ° rocker arm inside diameter ①
Out of specification → Replace.



Rocker arm inside diameter
14.036 mm

4. Measure:
 - ° rocker arm shaft outside diameter ②
Out of specification → Replace.



Rocker arm shaft outside diameter
13.95 mm

5. 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.

Above 0.086 mm → Replace the defective part(-s).



Rocker-arm-to-rocker-arm-shaft clearance

0.009 × 0.033 mm
<Limit> : 0.086 mm



EAS00220

INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
 - ° camshaft

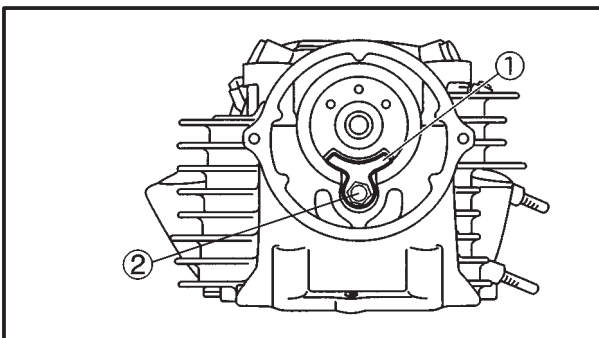
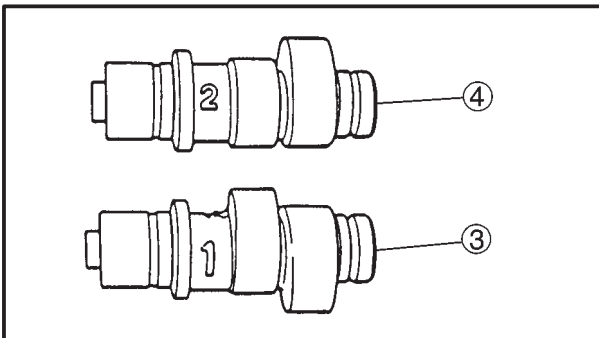
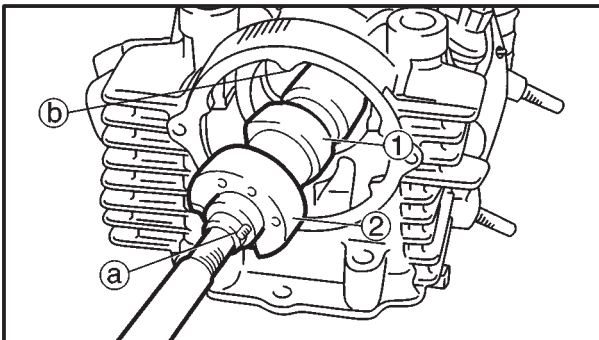


Recommended lubricant
Camshaft/Bushing
Molybdenum disulfide oil

2. Install:
 - ° camshaft ①
 - ° camshaft bushing ②

NOTE:

- ° The dowel pin ① on the end of the camshaft must align with the timing mark ② on the cylinder head.
- ° Make sure that the No.1 camshaft ③ is installed in the rear cylinder head and the No.2 camshaft ④ is installed in the front cylinder head.



3. Install:
 - ° stopper plate ①



Stopper plate bolt ②
20 Nm (2.0 m°kg)

4. Lubricate:
 - ° rocker arm shafts



Recommended lubricant
Engine oil

ROCKER ARMS AND CAMSHAFTS

ENG



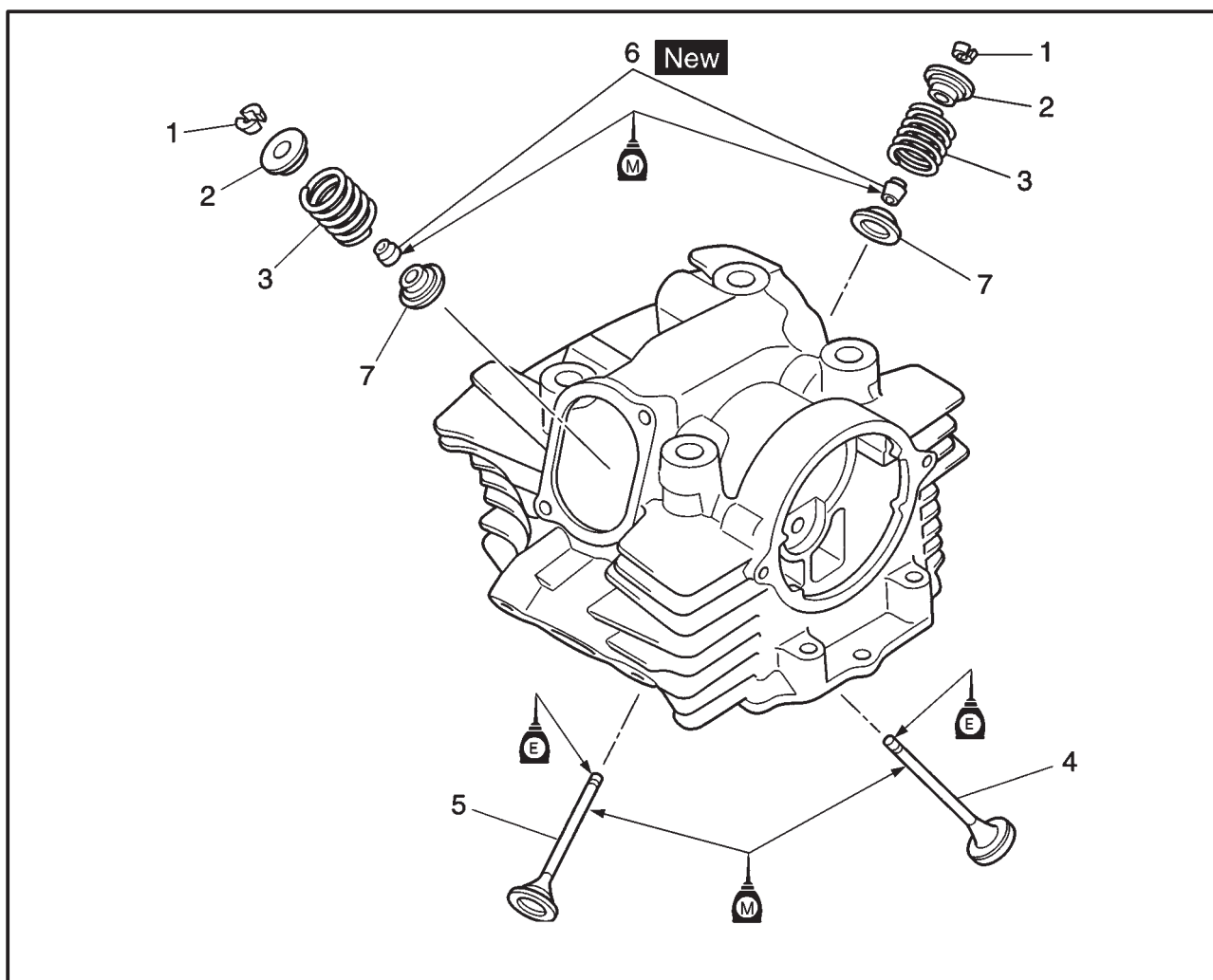
5. Install:
- ° rocker arms
 - ° rocker arm shafts

NOTE: _____

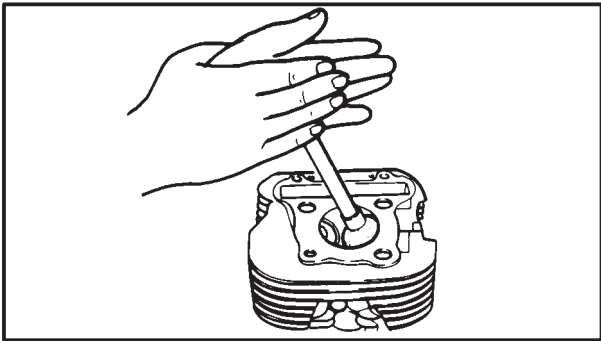
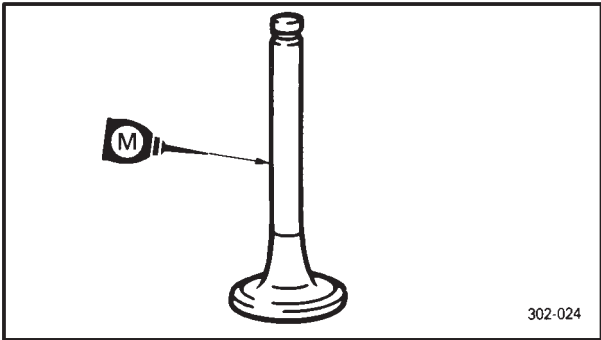
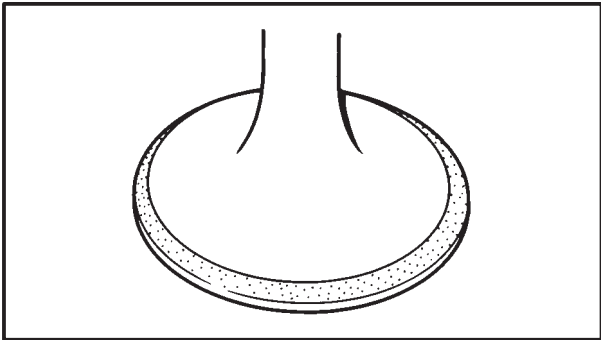
Make sure that the rocker arm shafts is completely pushed into the cylinder head.



VALVES AND VALVE SPRINGS



Order	Job name/Part name	Q'ty	Remarks
	Removing the valves and valve springs. Cylinder heads Rocker arms and camshafts		Remove the parts in the order listed. Refer to "CYLINDER HEADS". Refer to "ROCKER ARMS AND CAMSHAFT".
1	Valve cotters	4	Refer to "REMOVING/INSTALLING THE VALVES".
2	Valve spring retainers	2]
3	Valve springs	2	
4	Valve (intake)	1]
5	Valve (exhaust)	1	
6	Valve stem seals	2	Refer to "INSTALLING THE VALVES".
7	Valve spring seats	2	For installation, reverse the removal procedure.



4. Lap:
 ° valve face
 ° valve seat

NOTE: _____

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



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

CAUTION: _____

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

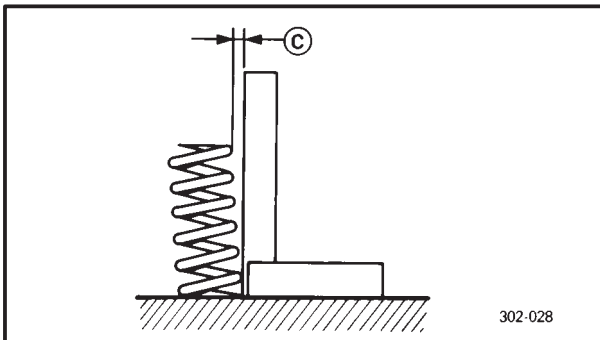
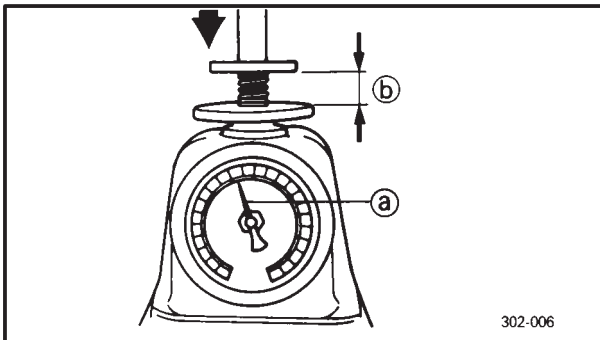
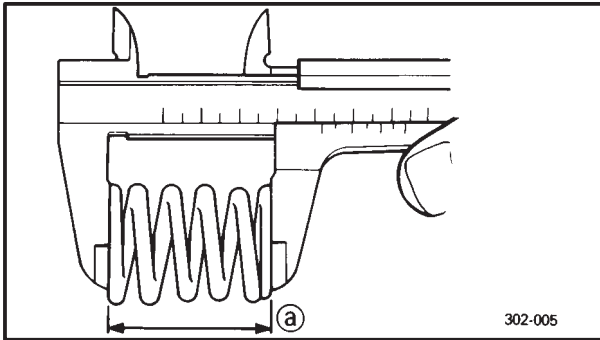
- b. Apply molybdenum disulfide oil onto the valve stem.
 c. Install the valve into the cylinder head.
 d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

NOTE: _____

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

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





EAS00241

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:

- ° valve spring free length (a)

Out of specification → Replace the valve spring.



Valve spring free length (intake and exhaust)

44.6 mm

<Limit>: 43.5 mm

2. Measure:

- ° compressed spring force (a)

Out of specification → Replace the valve spring.

(b) Installed length



Compressed spring force

Intake and exhaust spring

160.7 N (16.4 kg) at 40 mm

3. Measure:

- ° valve spring tilt (c)

Out of specification → Replace the valve spring.



Spring tilt limit

Intake and exhaust valve spring

2.5° / 1.9 mm

EAS00245

INSTALLING THE VALVES

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

1. Deburr:

- ° valve stem end
(with an oil stone)

2. Lubricate:

- ° valve stem
- ° oil seal **New**
(with the recommended lubricant)



Recommended lubricant

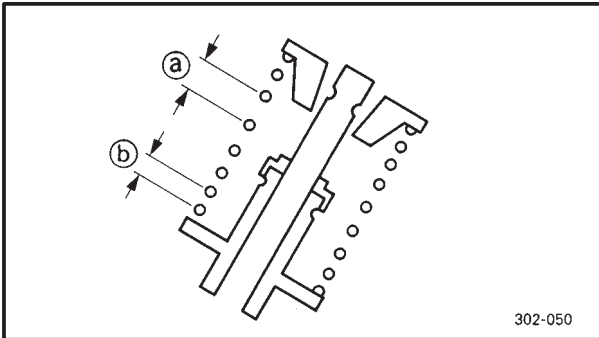
Molybdenum disulfide oil

3. Install:

- ° valve
- ° lower spring seat
- ° oil seal **New**
- ° valve spring
- ° upper spring seat
(into the cylinder head)

VALVE AND VALVE SPRINGS

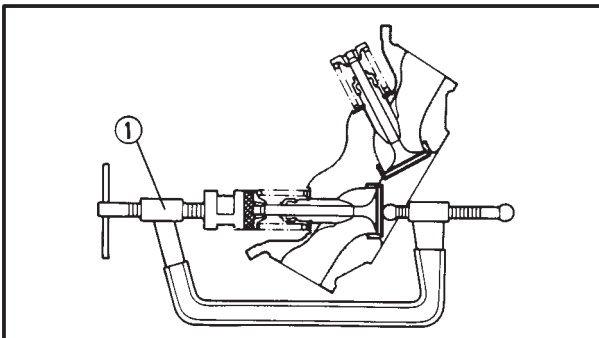
ENG



NOTE: _____

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

(b) Smaller pitch



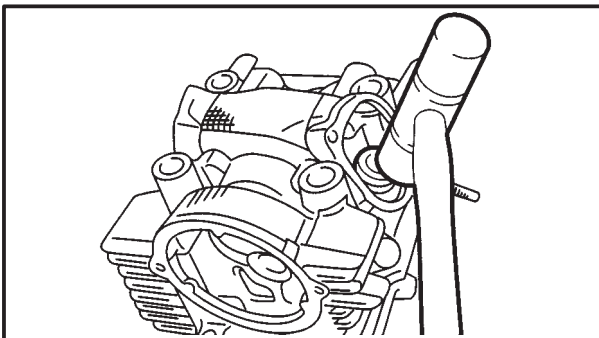
4. Install:
° valve cotters

NOTE: _____

Install the valve cotters by compressing the valve spring with the valve spring compressor (1).



Valve spring compressor
90890-04019



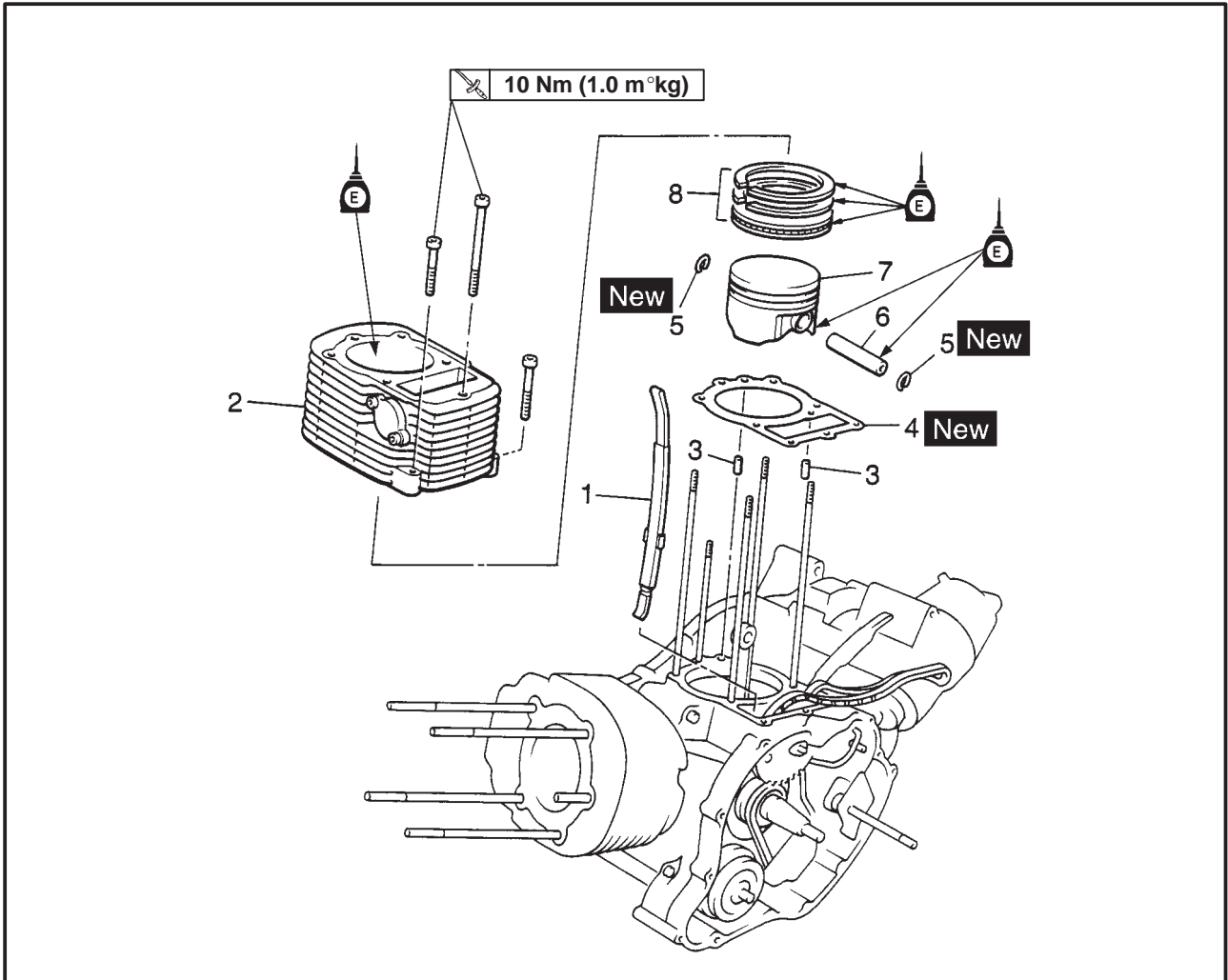
5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

CAUTION: _____

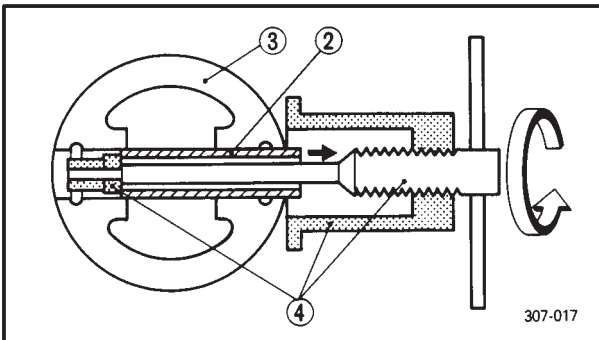
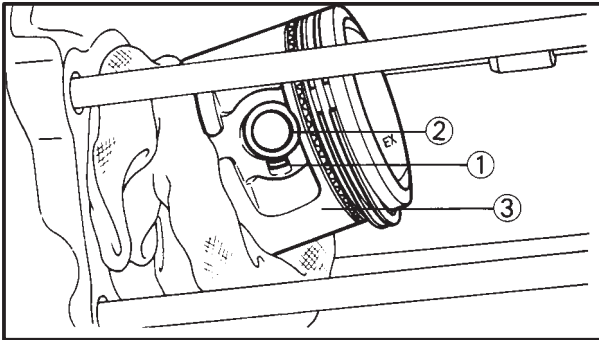
Hitting the valve tip with excessive force could damage the valve.



CYLINDERS AND PISTONS



Order	Job name/Part name	Q'ty	Remarks
	Removing the cylinders and pistons		
1	Cylinder heads Timing chain guide	1	Remove the parts in the order listed. Refer to "CYLINDER HEADS". The "5EL" mark should face towards the cylinder head.
2	Cylinder	1	Refer to "INSTALLING THE PISTONS AND CYLINDERS".
3	Dowel pins	2	
4	Cylinder gasket	1	
5	Piston pin clips	2	Refer to "REMOVING/INSTALLING THE CYLINDERS AND PISTONS".
6	Piston pin	1	
7	Piston	1	
8	Piston ring set	1	
			For installation, reverse the removal procedure.



EAS00254

REMOVING THE PISTONS

The following procedure applies to all of the pistons.

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

CAUTION:

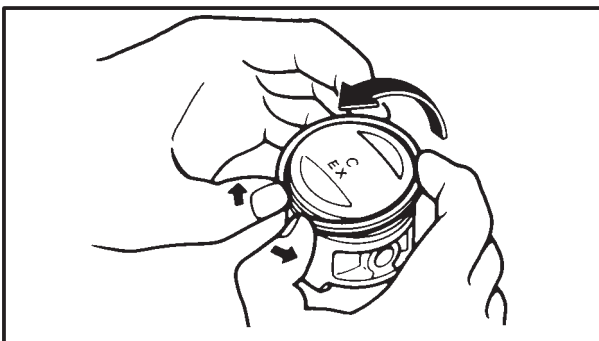
Do not use a hammer to drive the piston pin out.

NOTE:

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



Piston pin puller
90890-01304



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

NOTE:

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

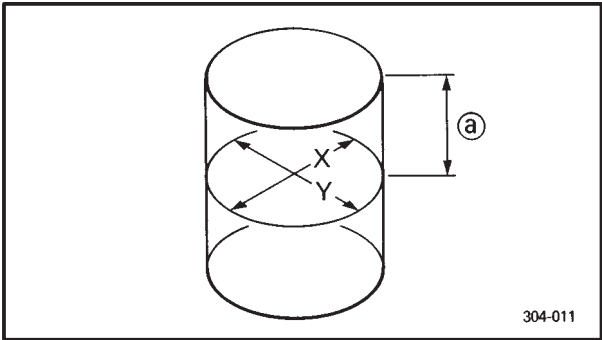
EB404405

CHECKING THE CYLINDERS AND PISTONS

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

1. Check:
 - piston wall
 - cylinder wall

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

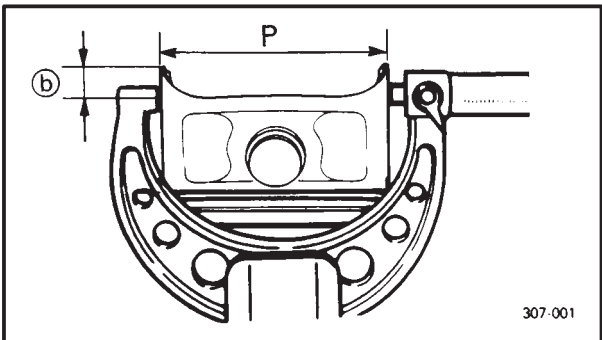



- 2. Measure:
 - ° piston-to-cylinder clearance



- a. Measure cylinder bore "C" with the cylinder bore gauge.
- ⓐ 40 mm from the top of the cylinder

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




	Standard	Wear limit
Cylinder bore C:	95.00 × 95.01 mm	95.1 mm
$C = \frac{X + Y}{2}$		

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

	Piston size P
Standard	94.960 × 94.975 mm

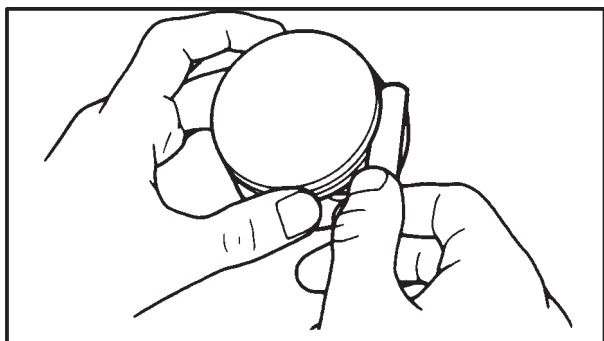
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

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

 **Piston-to-cylinder clearance**
0.025 × 0.050 mm
<Limit>: 0.15 mm

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





EB404410

CHECKING THE PISTON RINGS

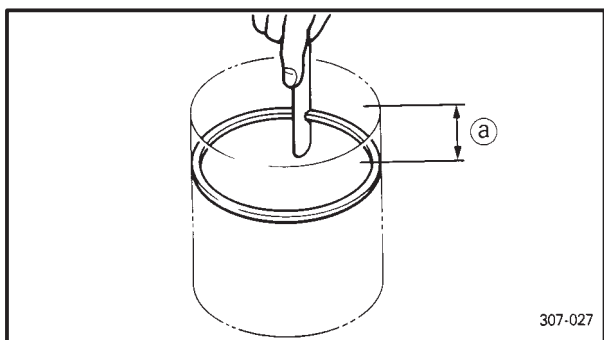
1. Measure:

° 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****0.04 × 0.08 mm****<Limit>: 0.1 mm****2nd ring****0.03 × 0.07 mm****<Limit>: 0.1 mm**

307-027

2. Install:

° piston ring

(into the cylinder)

NOTE:

Using the piston crown push the ring into the cylinder so that the ring will be at a right angle to the cylinder bore.

Ⓐ 40 mm from the top of the cylinder

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****0.3 × 0.5 mm****<Limit>: 0.8 mm****2nd ring****0.3 × 0.45 mm****<Limit>: 0.8 mm****Oil ring****0.2 × 0.7 mm**



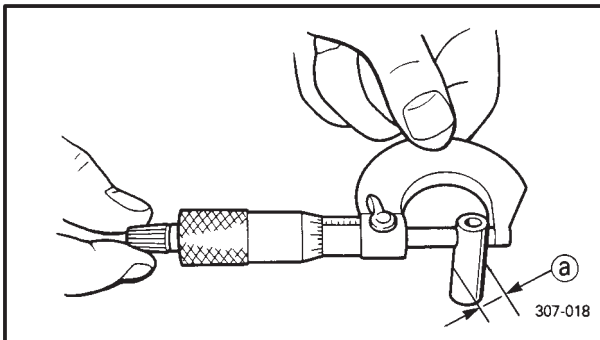
EAS00266

CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

1. CHECK:

- ° piston pin
- Blue discoloration/grooves → Replace, then inspect the lubrication system.



2. Measure:

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



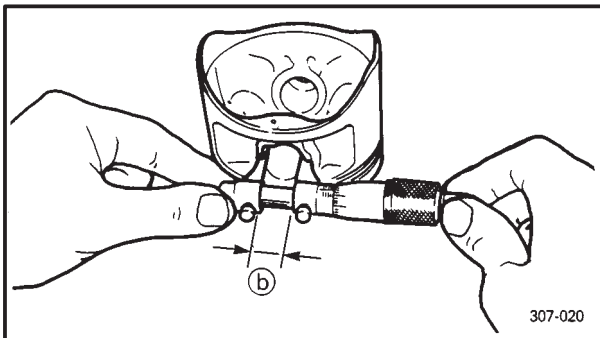
Piston pin outside diameter
21.991 × 22.000 mm

3. Measure:

- ° piston pin bore inside diameter (b)
- Out of specification → Replace the piston



Piston pin bore inside diameter
22.004 × 22.015 mm



4. Calculate:

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

Piston-pin-to-piston clearance =
Piston pin bore size (b) –
Piston pin outside diameter (a)



Piston-pin-to-piston clearance
0.004 × 0.024 mm

EB404701

INSTALLING THE PISTONS AND CYLINDERS

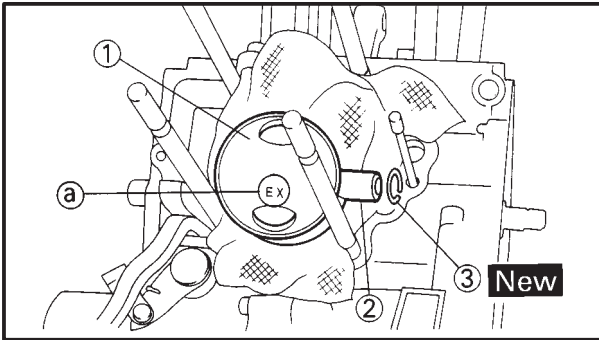
The following procedure applies to all of the pistons and cylinders.

1. Install:

- ° oil ring expander
- ° lower oil ring rail
- ° upper oil ring rail
- ° 2nd ring
- ° top ring

NOTE:

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

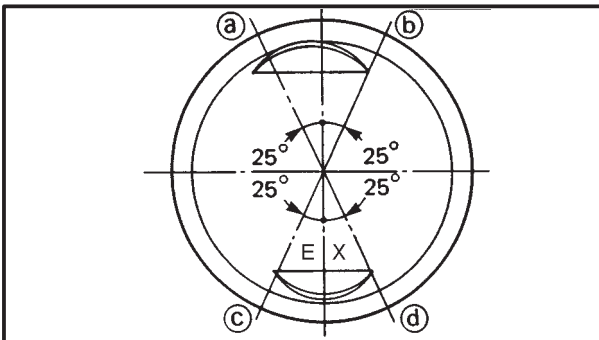


2. Install:
 - ° piston ①
 - ° piston pin ②
 - ° piston pin clip (New) ③

NOTE: _____

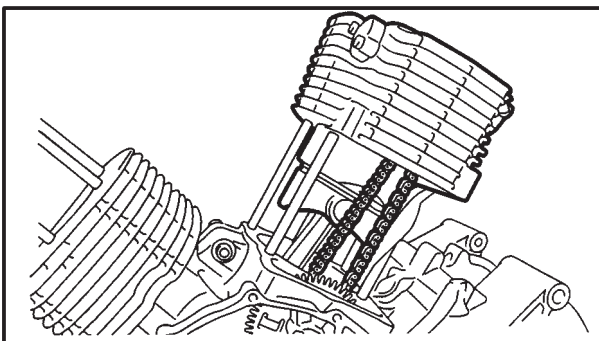
- ° Apply engine oil onto the piston pin.
- ° Make sure that the "EX" mark (a) on the piston faces towards the exhaust side of the engine.
- ° Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.

3. Install:
 - ° gasket (New)
 - ° dowel pins
4. Lubricate:
 - ° piston
 - ° piston rings
 - ° cylinder
(with the recommended lubricant)



	Recommended lubricant Engine oil
-------------------------------------------------------------------------------------	---------------------------------------------

5. Offset:
 - ° piston ring end gaps
- ① Top ring
 - ② Lower oil ring rail
 - ③ Upper oil ring rail
 - ④ 2nd ring



6. Install:
 - ° cylinder

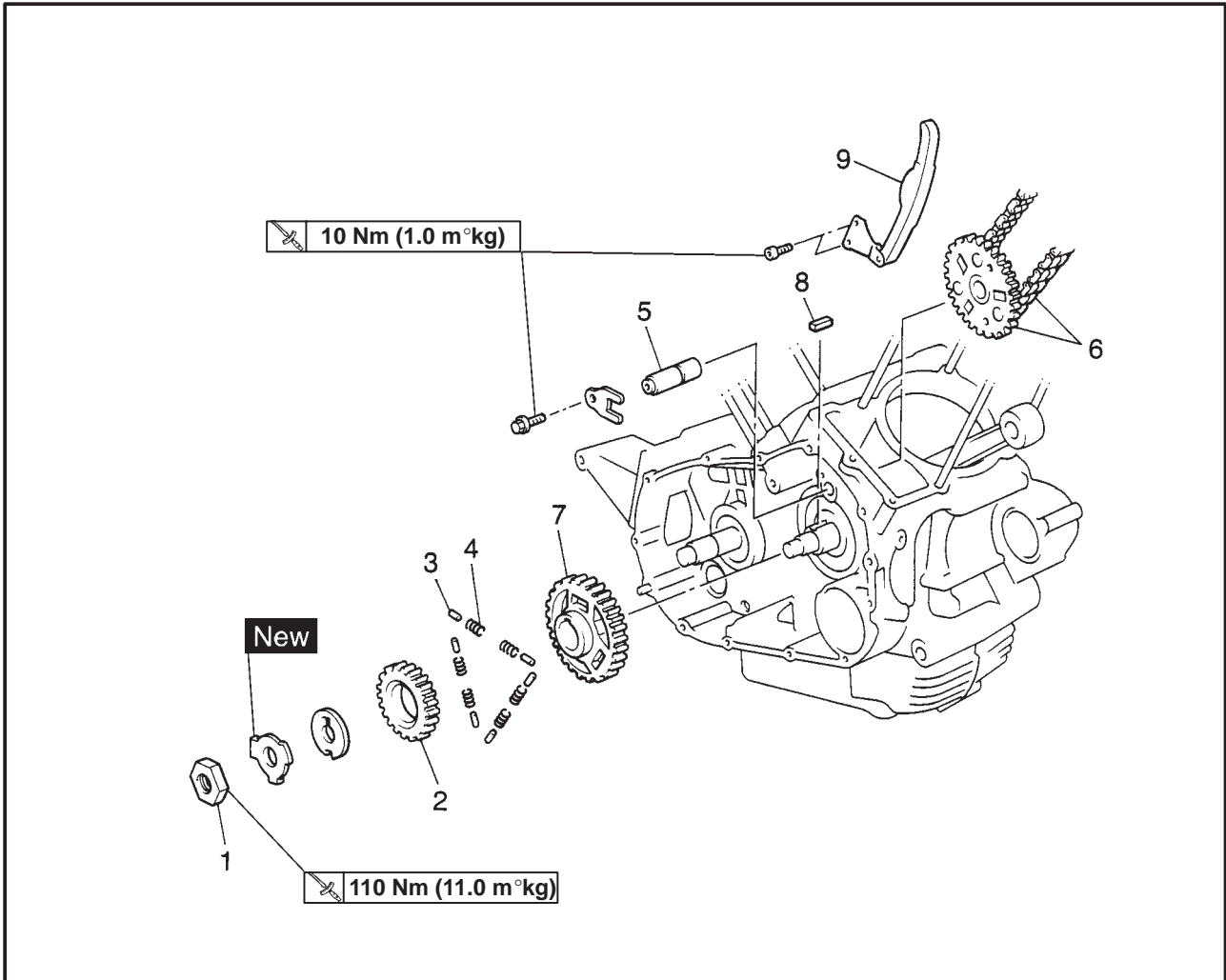
NOTE: _____

- ° 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.

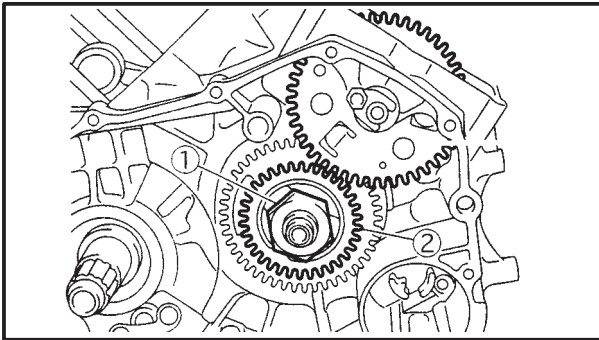
	Cylinder bolt 10 Nm (1.0 m°kg)
-------------------------------------------------------------------------------------	-------------------------------------------



TIMING GEARS



Order	Job name/Part name	Q'ty	Remarks
	Removing the timing gears		Remove the parts in the order listed. Refer to "CYLINDER HEAD".
	Cylinder heads		Refer to "CYLINDERS AND PISTONS".
	Cylinders		Refer to "CLUTCH".
	Clutch assembly		
1	Primary drive gear nut	1	Refer to "REMOVING/INSTALLING THE TIMING DRIVE GEARS".
2	Timing drive gear	1	
3	Dowel pins	6	
4	Springs	6	
5	Timing chain drive gear shaft	1	
6	Timing chain drive gear sprocket/ Timing chain	1/1	
7	Primary drive gear	1	Refer to "INSTALLING THE TIMING DRIVE GEARS".
8	Straight key	1	
9	Timing chain guide	1	
			For installation, reverse the removal procedure.



REMOVING THE TIMING DRIVE GEAR

Front cylinder

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

NOTE: _____

While holding the generator rotor with the sheave holder, loosen the primary drive gear nut.

3. Remove:
 - timing drive gear ②
 - dowel pins
 - springs

NOTE: _____

When removing the timing drive gear, the dowel pins and springs are scatter and dropping down. Do not missing them.

Rear cylinder

NOTE: _____

When removing the rear cylinder timing gear, repeat the front cylinder timing gear removal procedure. However, note the following points.

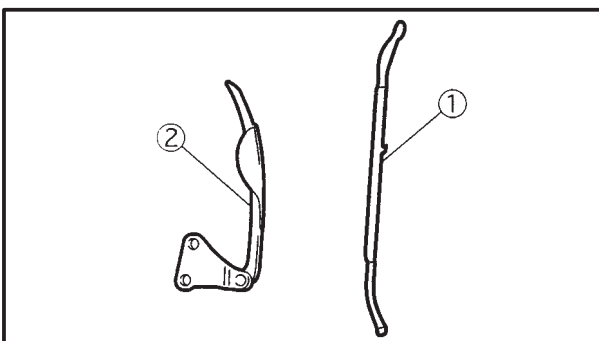
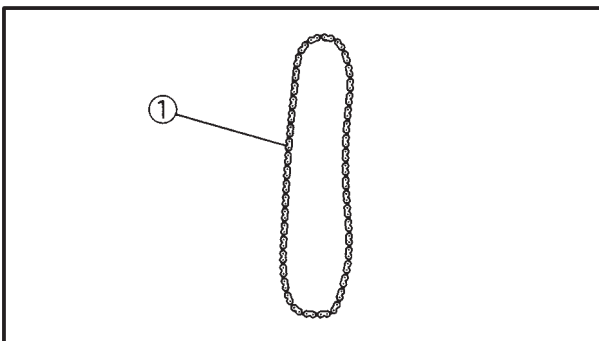
1. Remove:
 - rotor assembly
 - dowel pins
 - springs
 - timing drive gear
 Refer to "GENERATOR AND STARTER CLUTCH".

EB401422

CHECKING THE TIMING CHAINS, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

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

1. Check:
 - timing chain ①
Damage/stiffness → Replace the timing chain and its respective camshaft sprockets as a set.
2. Check:
 - camshaft sprocket
Damage/wear → Replace the respective camshaft sprockets and the respective timing chain as a set.
3. Check:
 - timing chain guide (exhaust side) ①
 - timing chain guide (intake side) ②
 - Damage/wear → Replace the defective part(-s).





EAS00292

CHECKING THE PRIMARY DRIVE

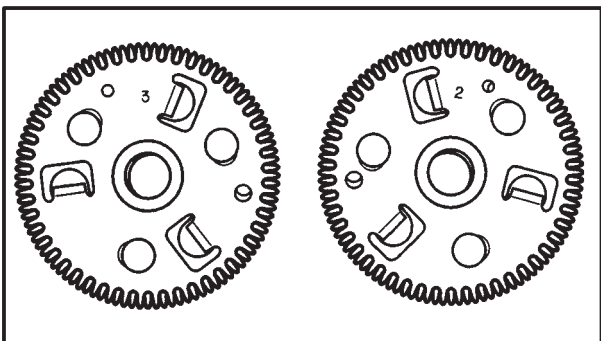
1. Check:
 - ° primary drive gear
 - ° primary driven gear
 - Damage/wear → Replace the primary drive and primary driven gears as a set.
 - Excessive noise during operation → Replace the primary drive and primary driven gears as a set.
2. Check:
 - ° primary-drive-gear-to-primary-driven-gear free play
 - Free play exists → Replace the primary drive and primary driven gears as a set.

INSTALLING THE TIMING DRIVE GEARS

1. Install:
 - ° timing chain
 - (onto the timing chain drive gear sprocket)

NOTE: _____

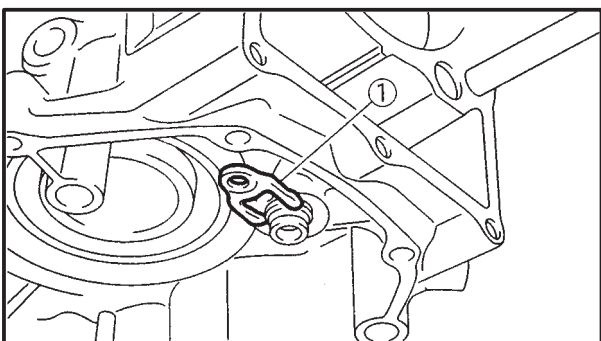
To prevent the timing chain from falling into the crankcase, fasten it with a wire.



2. Install:
 - ° timing chain drive gear sprocket
 - ° timing chain drive gear shaft

NOTE: _____

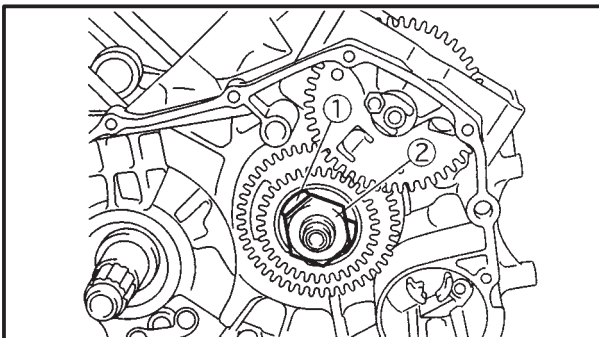
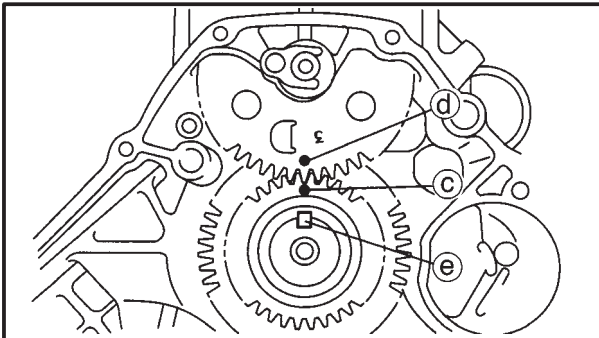
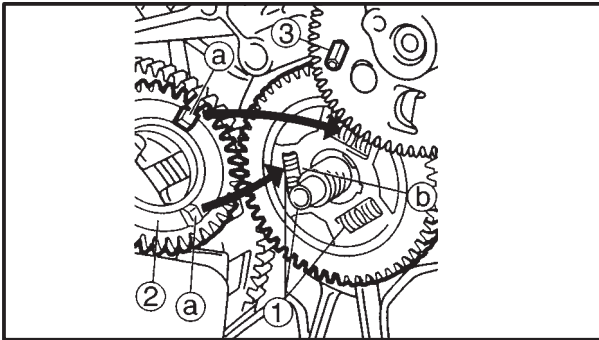
Make sure that the “2” mark on the timing chain drive gear sprocket is installed in the rear cylinder and the “3” mark on the timing chain drive gear sprocket is installed in the front cylinder.



3. Install:
 - ° stopper plate ①
 - ° stopper plate bolt 10 Nm (1.0 m°kg)

NOTE: _____

Turn the timing chain drive gear shaft so that the stopper plate fits correctly into the slot and then fasten the stopper plate with the bolt.

**Front cylinder**


1. Install:
 - ° (Front cylinder)
 - ° springs ①
 - ° dowel pins
 - ° timing drive gear ②

NOTE:

- ° Insert the suitable pin ③ into the hole of timing chain drive gear sprocket and match the gear teeth.
- ° Push the projections ① on the timing drive gear into the spaces ②.
- ° Align the punch mark ③ on the timing drive gear, the punch mark ④ on the timing chain drive gear sprocket and the key position ⑤ as shown.

2. Install:

- ° claw washer
- ° lock washer ① **New**
- ° primary drive gear nut ②

 110 Nm (11.0 m³kg)

NOTE:

While holding the generator rotor with the sheave holder, tighten the primary drive gear nut.

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

Rear cylinder**NOTE:**

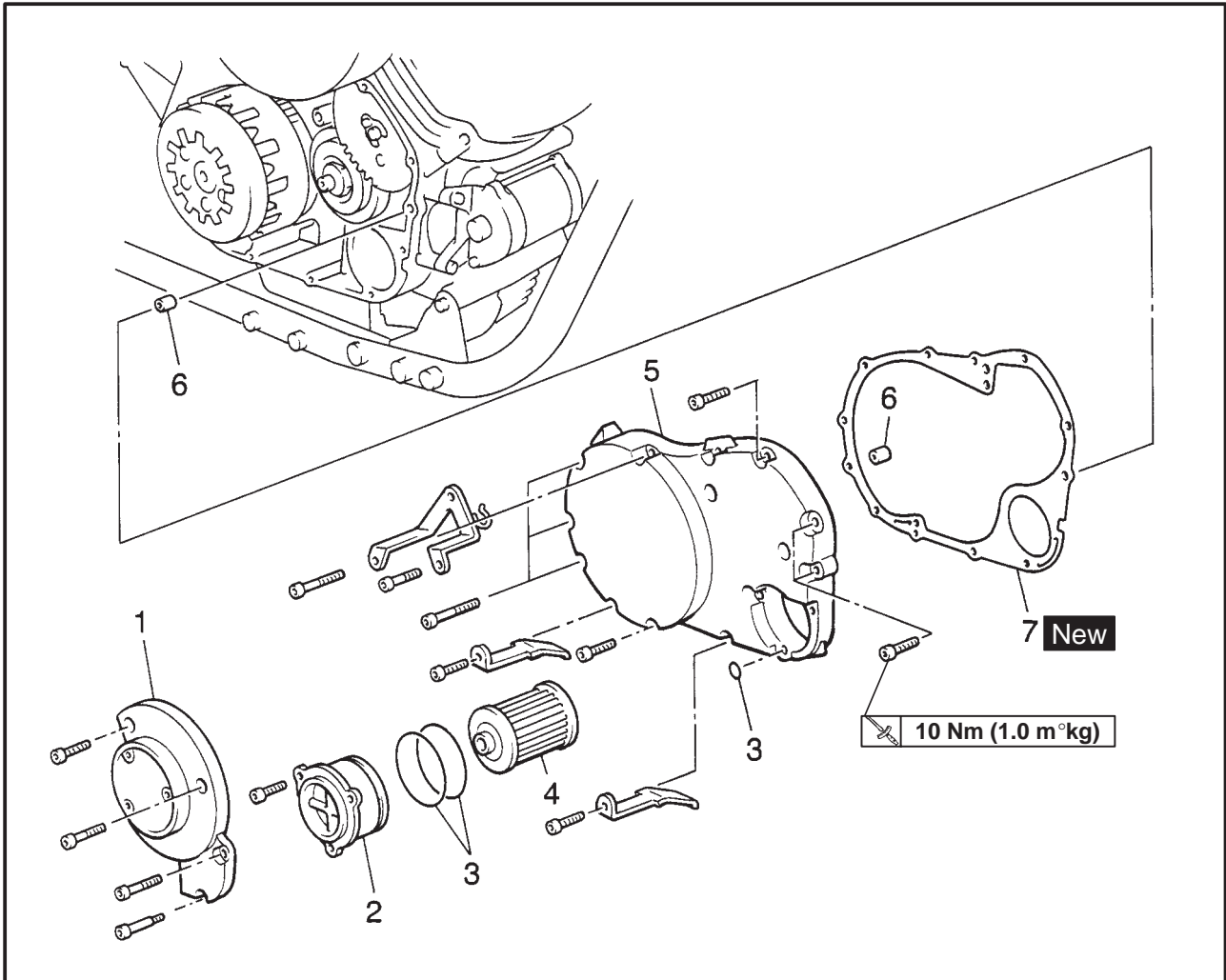
When installing the rear cylinder timing gear, repeat the front cylinder timing gear installation procedure. However, note the following points.

1. Install:

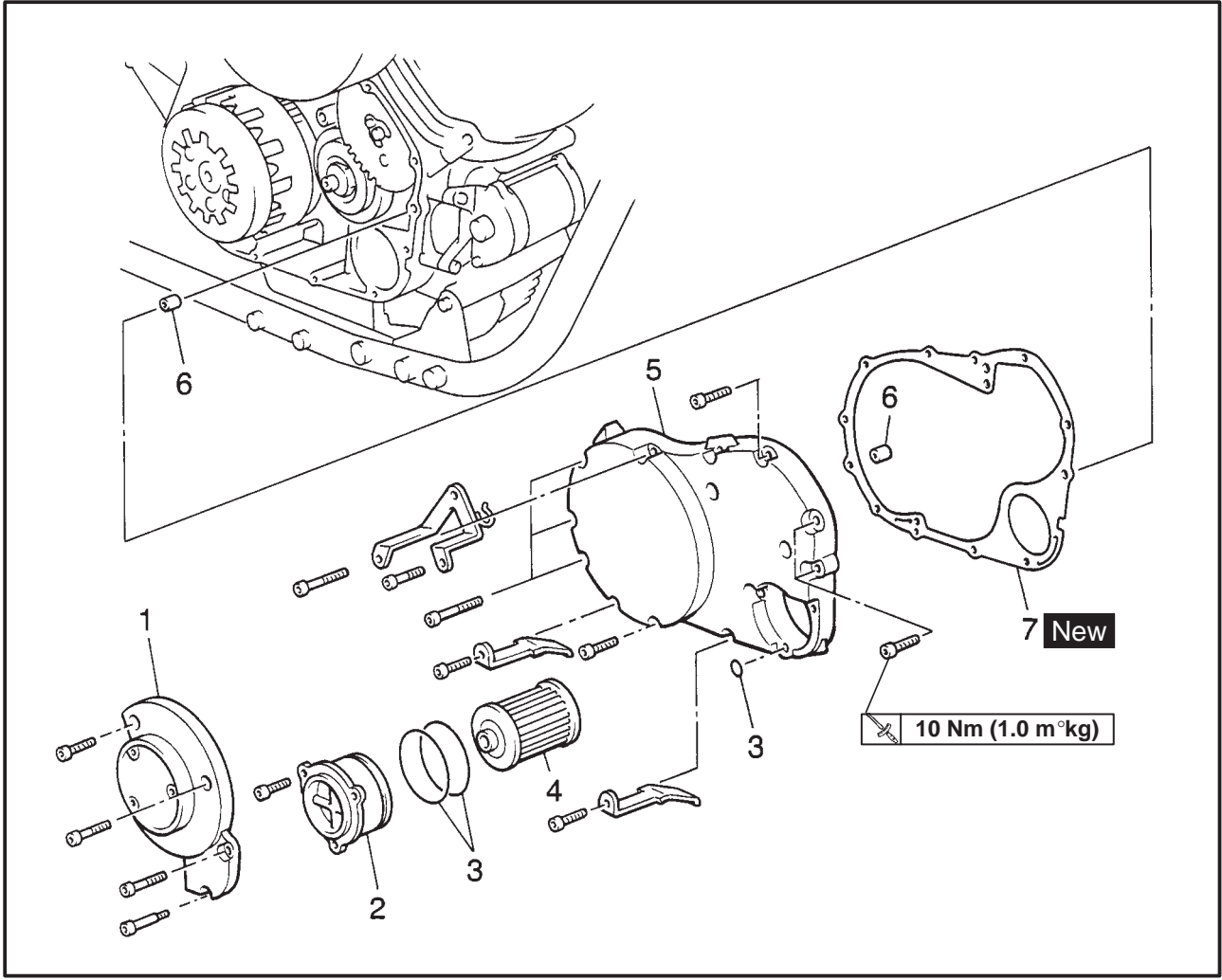
- ° springs
 - ° dowel pins
 - ° timing drive gear
 - ° rotor assembly
- Refer to "GENERATOR AND STARTER CLUTCH".



CLUTCH
RIGHT CRANKCASE COVER



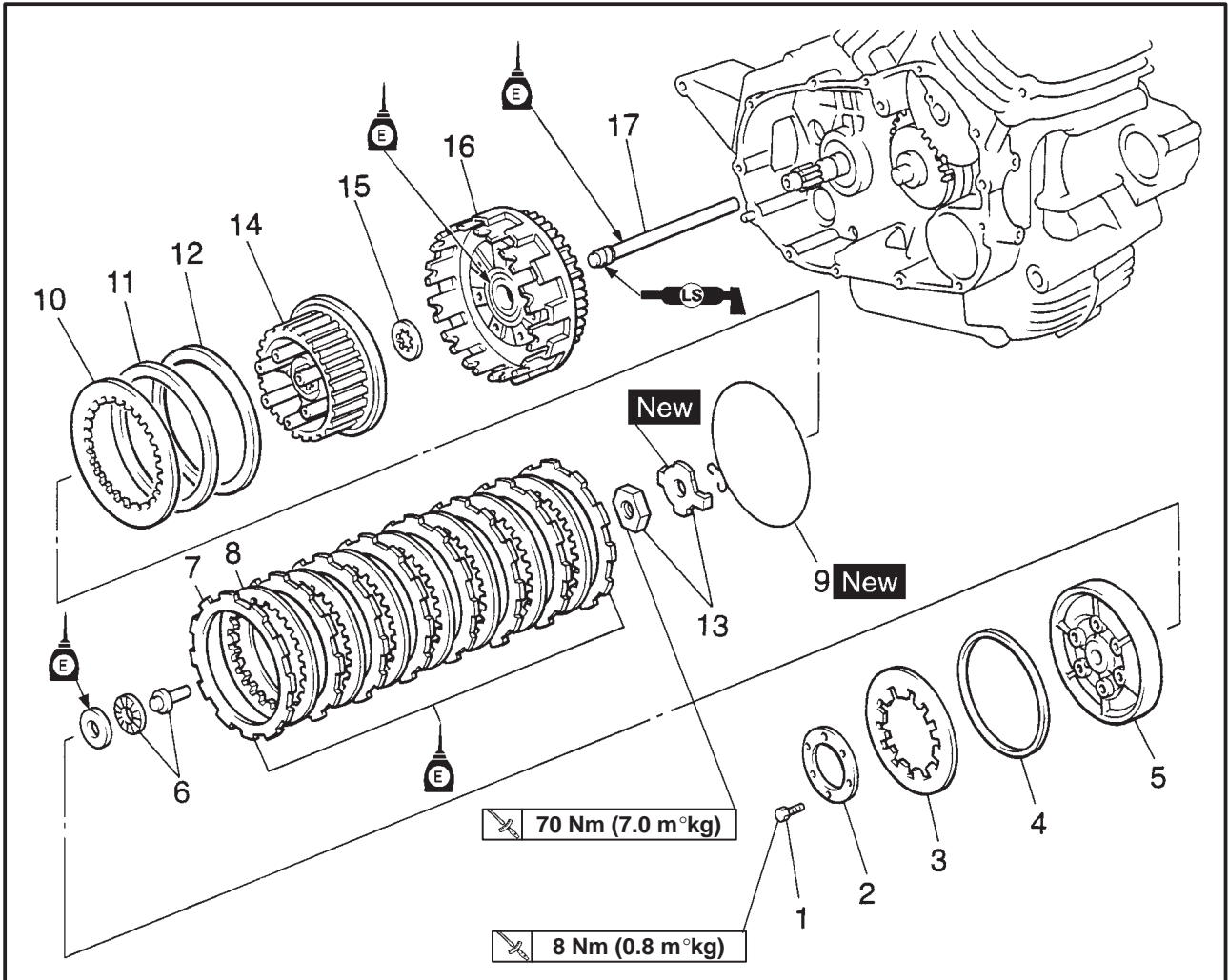
Order	Job name/Part name	Q'ty	Remarks
	Removing the right clutch cover		Remove the parts in the order listed. Stand the motorcycle on a level surface.
	Engine oil		<p>⚠ WARNING</p> <p>Securely support the motorcycle so there is no danger of it falling over.</p>
	Muffler assembly Exhaust pipes Brake pedal/Footrest Rear brake master cylinder/bracket		
			Refer to "ENGINE REMOVAL".
1	Oil filter cover plate	1	
2	Oil filter cover	1	
3	O-rings	3	
4	Oil filter	1	
5	Right crankcase cover	1	



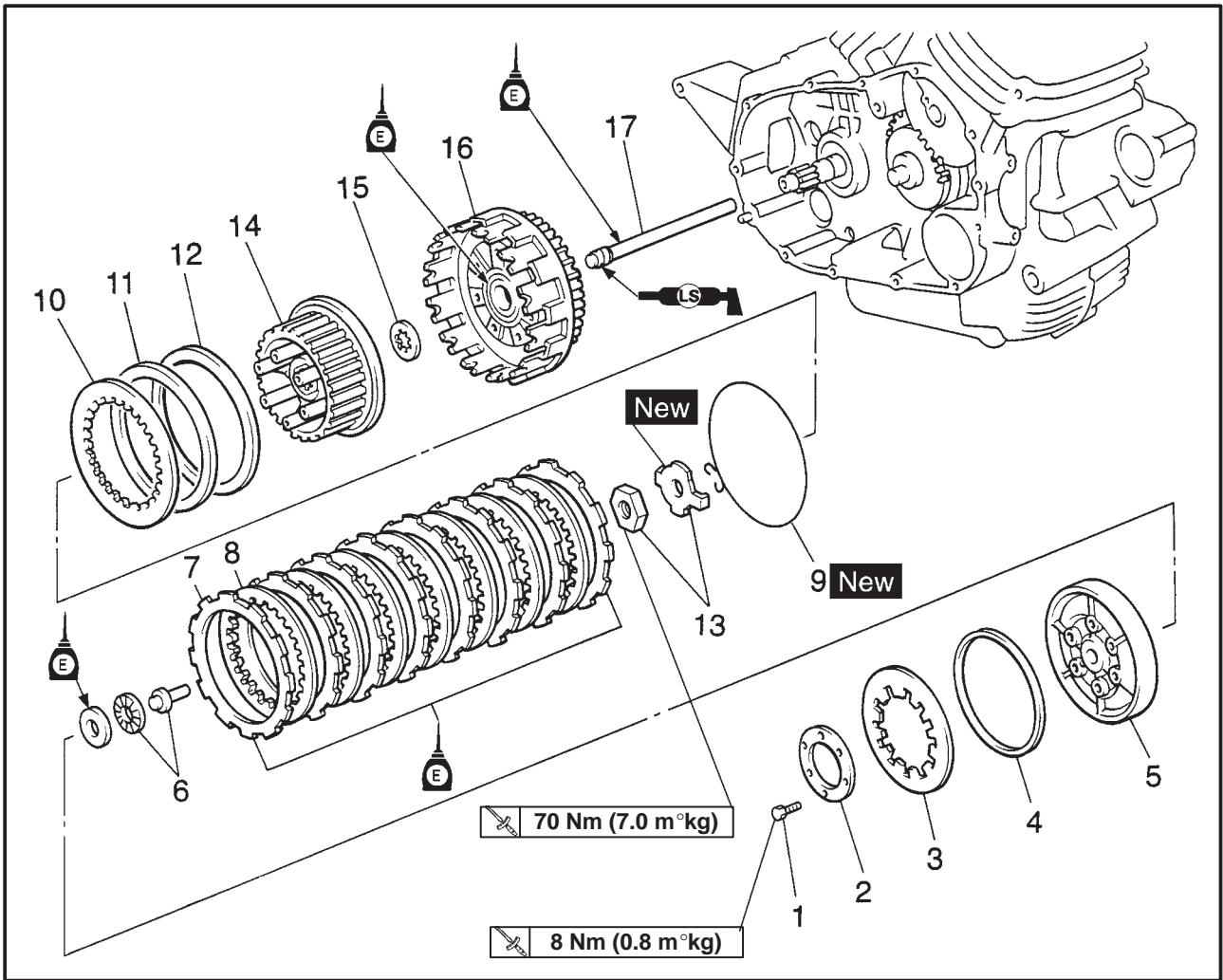
Order	Job name/Part name	Q'ty	Remarks
6	Dowel pins	2	For installation, reverse the removal procedure.
7	Crankcase cover gasket	1	



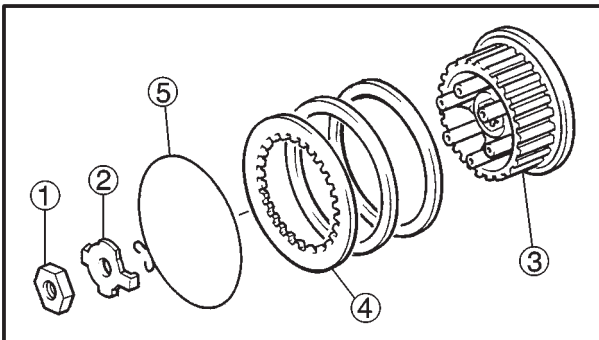
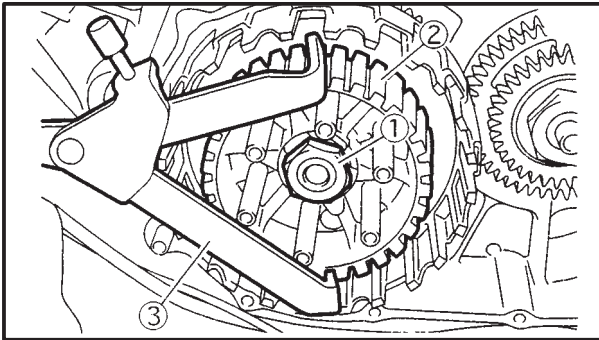
CLUTCH ASSEMBLY



Order	Job name/Part name	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Clutch spring bolts	6	Refer to "INSTALLING THE CLUTCH".
2	Clutch spring plate	1	
3	Clutch spring	1	
4	Clutch spring seat	1	
5	Clutch pressure plate	1	
6	Bearing/shaft clutch push rod	1/1	Refer to "REMOVING/INSTALLING THE CLUTCH."
7	Friction plates	6	
8	Clutch plates	5	
9	Wire circlip	1	
10	Clutch plate	1	
11	Damper	1	
12	Clutch damper plate	1	
13	Nut/lock washer	1/1	
14	Clutch boss	1	



Order	Job name/Part name	Q'ty	Remarks
15	Thrust washer	1	For installation, reverse the removal procedure.
16	Clutch housing	1	
17	Long clutch push rod	1	



EAS00278

REMOVING THE CLUTCH

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

NOTE:

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

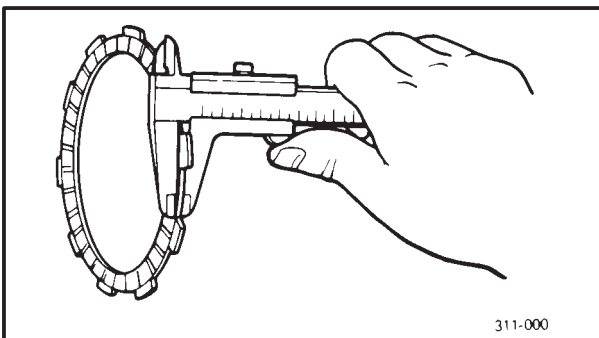


Clutch holding tool
90890-04086

3. Remove:
 - ° clutch boss nut ①
 - ° lock washer ②
 - ° clutch boss ③

NOTE:

There is a built-in damper between the clutch boss ③ and the clutch plate ④. It is not necessary to remove the wire circlip ⑤ and disassemble the built-in damper unless there is serious clutch chattering.



EAS00281

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.



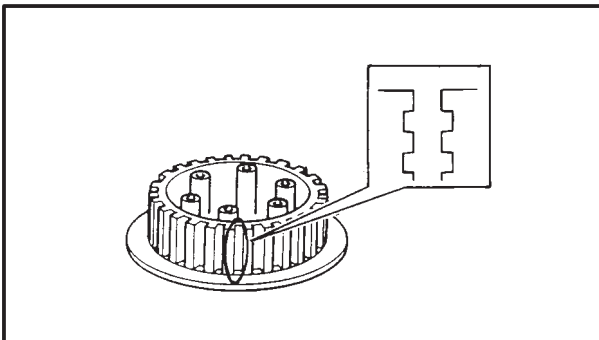
Friction plate thickness
2.9 × 3.1 mm
<Limit>: 2.8 mm



EAS00286

CHECKING THE PRESSURE PLATE

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

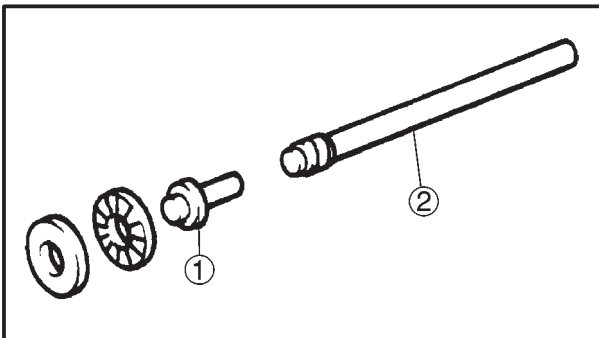


EAS00285

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:
 - ° short clutch push rod ①
 - ° long clutch push rod ②
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
0.5 mm

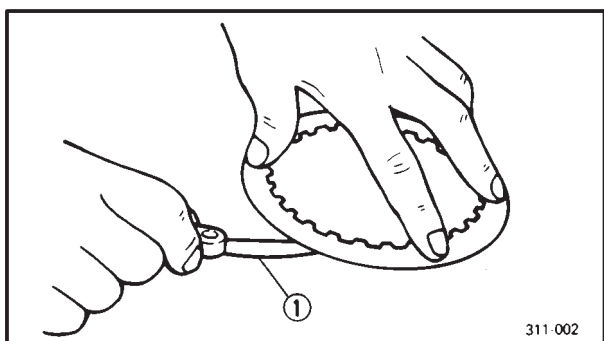


EAS00281

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.

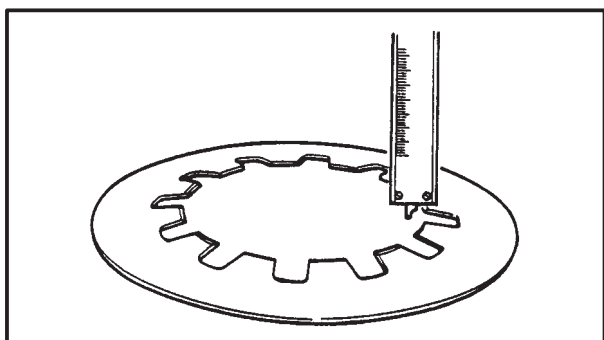


311-002

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



Clutch plate warpage limit
Less than 0.1 mm



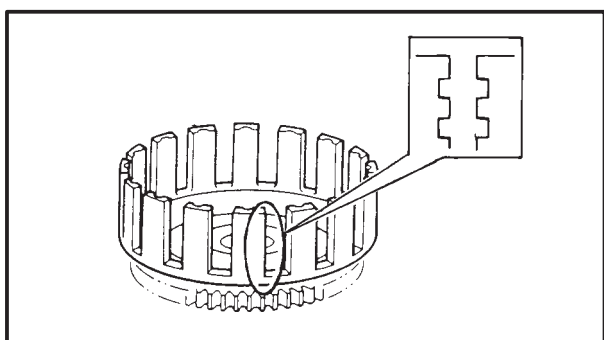
EAS00283

CHECKING THE CLUTCH SPRING AND CLUTCH SPRING SEAT PLATE

1. Check:
 - clutch spring plate
 - Damage → Replace.
2. Check:
 - clutch spring plate seat
 - Damage → Replace.
3. Measure:
 - clutch spring free height
 - Out of specification → Replace the clutch spring



Clutch spring free height
7.2 mm
<Limit>: 6.5 mm



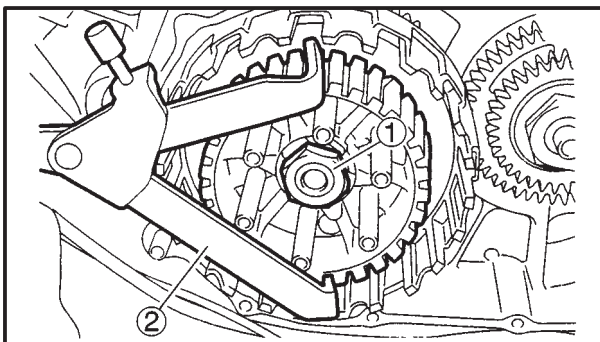
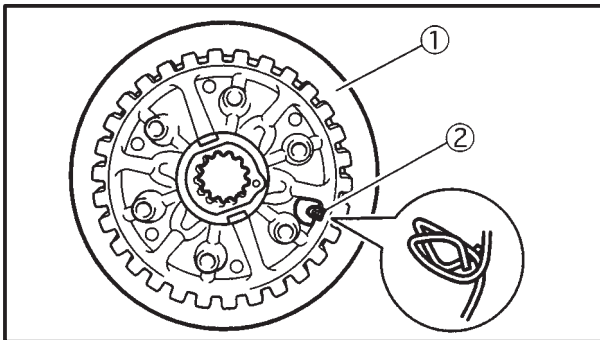
EAS00284

CHECKING THE CLUTCH HOUSING

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

NOTE:

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



EAS00295

INSTALLING THE CLUTCH

1. Install:
 - clutch housing ①

NOTE:

◦ If the wire circlip ② has been removed, carefully install a new one as shown.

2. Tighten:

- lock washer **New**
- clutch boss nut ①

	70 Nm (7.0 m°kg)
--	-------------------------

NOTE:

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



Clutch holding tool
90890-04086

3. Bend the lock washer tab along a flat side of the nut.
4. Lubricate:
 - long clutch push rod
 - short clutch push rod
 - (with the recommended lubricant)



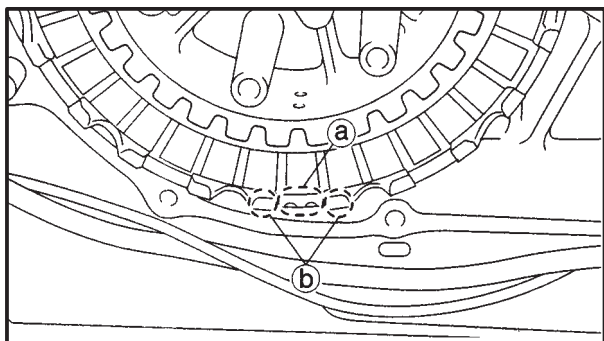
Recommended lubricant
Lithium soap base grease

5. Lubricate:
 - friction plates
 - clutch plates
 - (with the recommended lubricant)

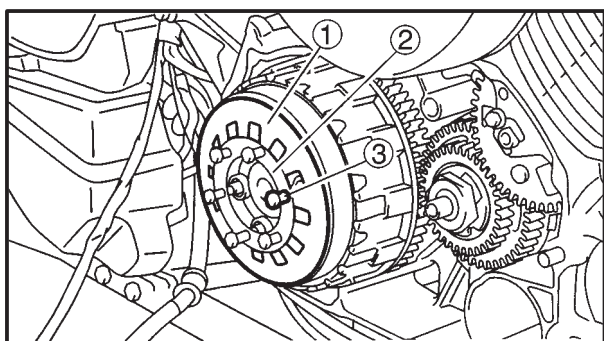


Recommended lubricant
Engine oil

6. Install:
 - friction plates
 - clutch plates
 - long clutch push rod
 - short clutch push rod
 - bearing
 - washer

**NOTE:**

Make sure that the semicircular slot (a) in the friction plate is aligned with the mark (b) on the clutch housing.



7. Install:

- ° clutch pressure plate
- ° clutch spring plate seat
- ° clutch spring ①
- ° clutch spring plate ②
- ° clutch spring bolts ③

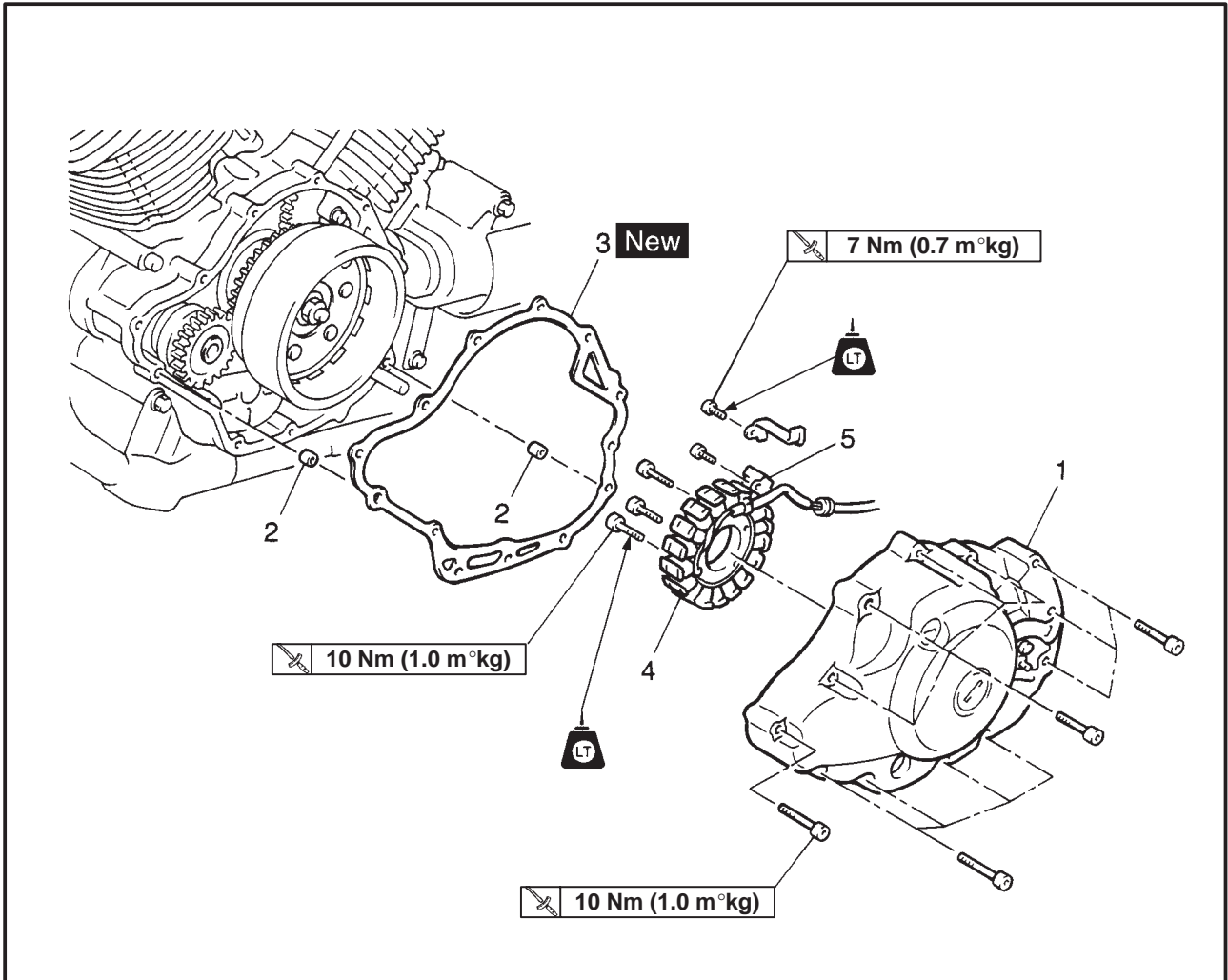
NOTE:

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



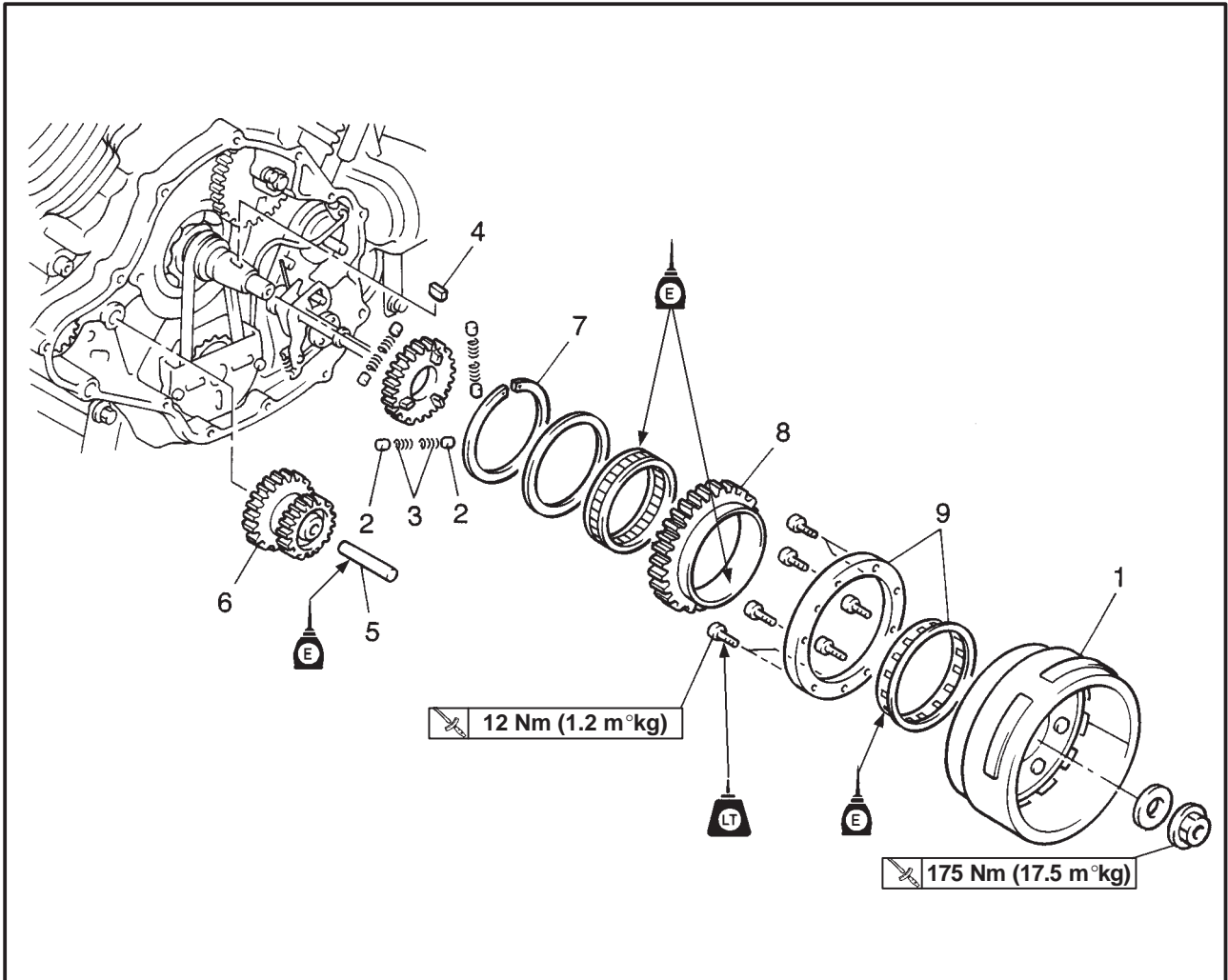
Clutch spring bolt
8 Nm (0.8 m°kg)

GENERATOR AND STARTER CLUTCH
STATOR COIL AND PICKUP COIL



Order	Job name/Part name	Q'ty	Remarks
	Removing the startor coil		Remove the parts in the order listed Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 3. Refer to "ENGINE REMOVAL". For installation, reverse the removal procedure.
	Engine oil		
	Left side cover		
	AC magneto lead/pickup lead/ sidestand switch lead		
	Footrest/shift pedal		
	Sidestand		
	Clutch adjusting cover/clutch cable		
1	Left crankcase cover	1	
2	Dowel pins	2	
3	Gasket	1	
4	Stator coil	1	
5	Pickup coil	1	

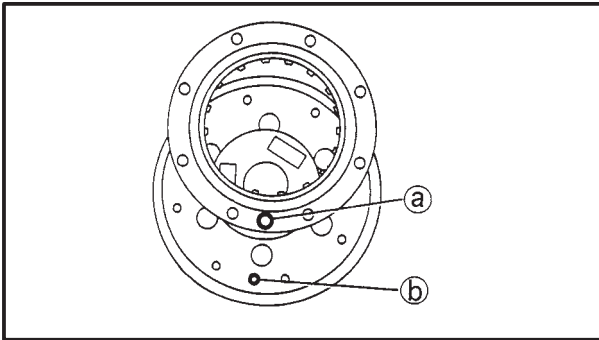
GENERATOR AND STARTER CLUTCH



Order	Job name/Part name	Q'ty	Remarks
	Removing the generator and starter clutch.		Remove the parts in the order listed
1	Rotor	1	Refer to "REMOVING/INSTALLING THE GENERATOR."
2	Dowel pins	6	
3	Springs	6	
4	Woodruff key	1	
5	Shaft	1	
6	Starter idler gear	1	
7	Circlip	1	Refer to "INSTALLING THE GENERATOR."
8	Starter clutch drive gear	1	
9	Starter clutch assembly	1	
			For installation, reverse the removal procedure.

GENERATOR AND STARTER CLUTCH

ENG



INSTALLING THE GENERATOR

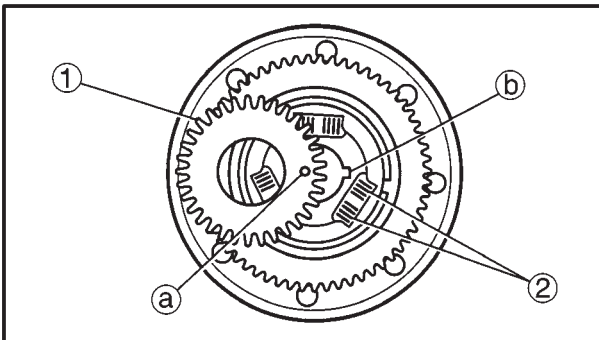
1. Install:
 - ° starter clutch assembly

NOTE:

Align the hole (a) on the starter clutch housing with the hole (b) on the rotor.



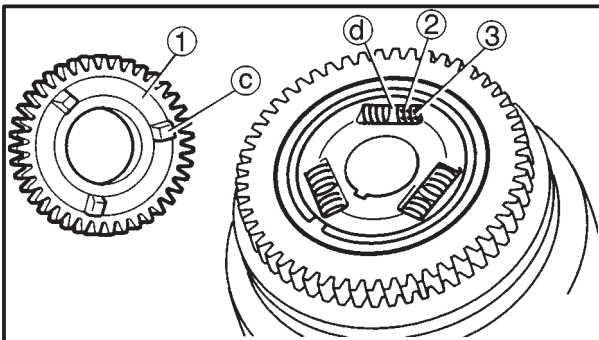
Starter clutch bolt:
12 Nm (1.2 m°kg)
LOCTITE®



2. Install:
 - ° timing drive gear (1)
 - ° springs (2)
 - ° dowel pins (3)

NOTE:

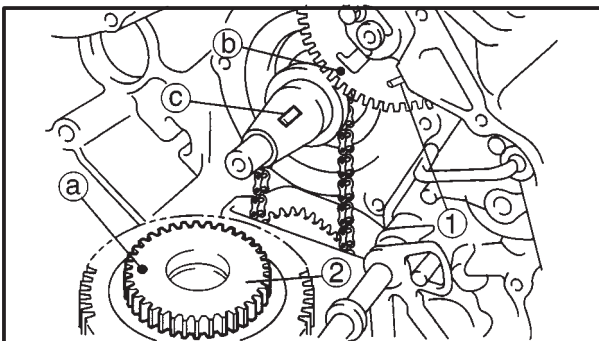
° Align the punch mark (a) on the timing drive gear with the key slide (b).
 ° Push the projections (c) on the timing drive gear into the space (d).



3. Install:
 - ° rotor assembly

NOTE:

° Insert the suitable pin (1) into the hole of timing chain drive gear sprocket and match the gear teeth.
 ° Align the punch mark (a) on the timing drive gear (2) the punch mark (b) on the timing chain drive gear sprocket and the key position (c) as shown.
 ° When installing the rotor, make sure the wood-ruff key is properly seated in the key way of the crankshaft.

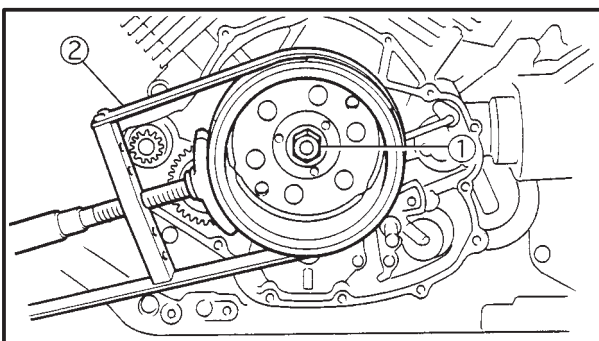


4. Tighten:
 - ° nut (rotor) (1)

175 Nm (17.5 m°kg)

NOTE:

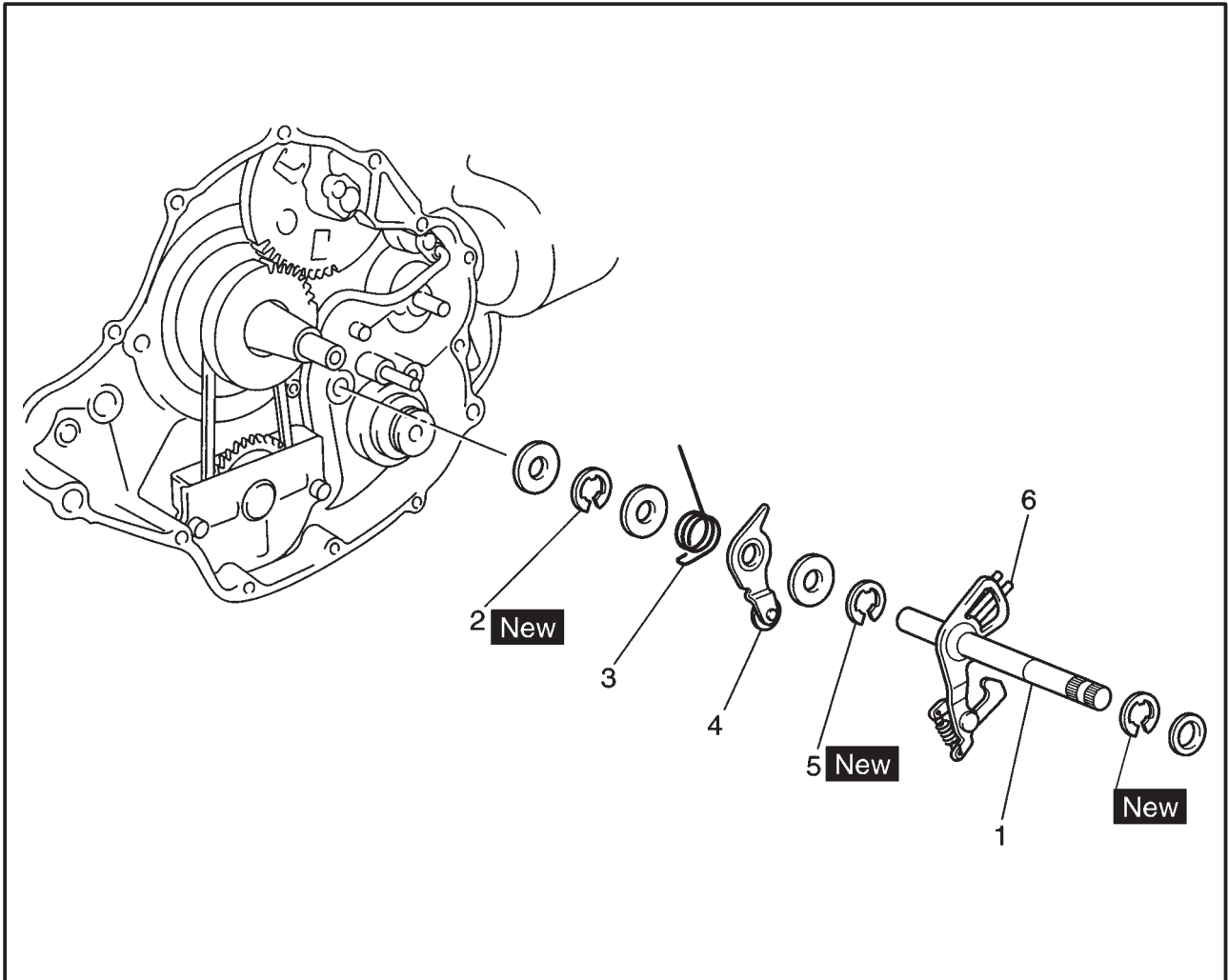
Tighten the rotor nut (1) while holding the mag-neto rotor with a sheave holder (2).



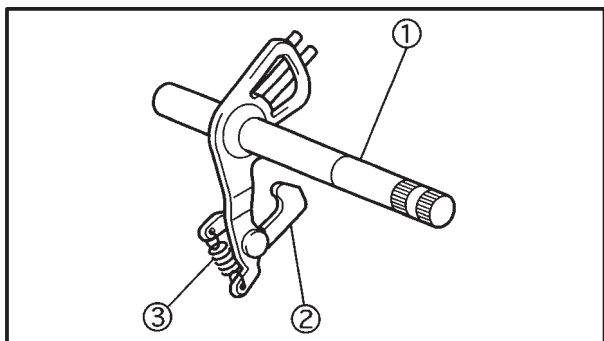
Sheave holder:
90890-01701



SHIFT SHAFT



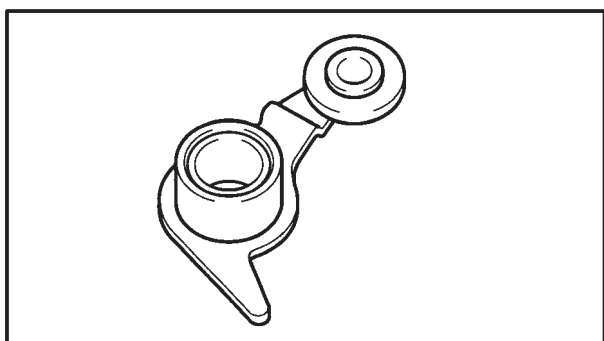
Order	Job name/Part name	Q'ty	Remarks
	Removing the shift shaft and stopper lever.		Remove the parts in the order listed.
	Engine oil		Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 3.
	Left crankcase cover		Refer to "GENERATOR AND STARTER CLUTCH".
	Rotor assembly		
1	Shift shaft	1	
2	Circlip	1	
3	Torsion spring (stopper lever)	1	Refer to "INSTALLING THE SHIFT SHAFT".
4	Stopper lever	1	
5	Circlip	1	
6	Torsion spring (shift shaft)	1	
			For installation, reverse the removal procedure.



EAS00328

CHECKING THE SHIFT SHAFT

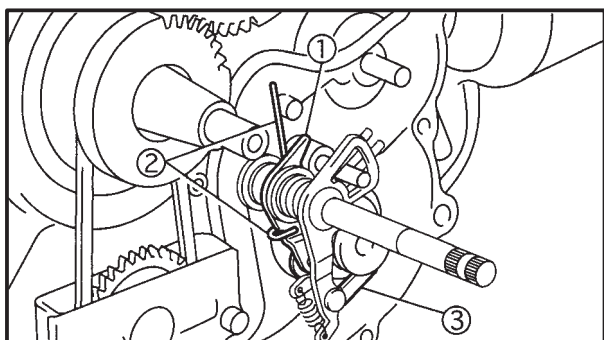
1. Check:
 - shift shaft ①
 - shift lever ②
 - Bends/damage/wear → Replace.
 - shift lever spring ③
 - Damage/wear → Replace.



EB408410

CHECKING THE STOPPER LEVER

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



EAS00331

INSTALLING THE SHIFT SHAFT

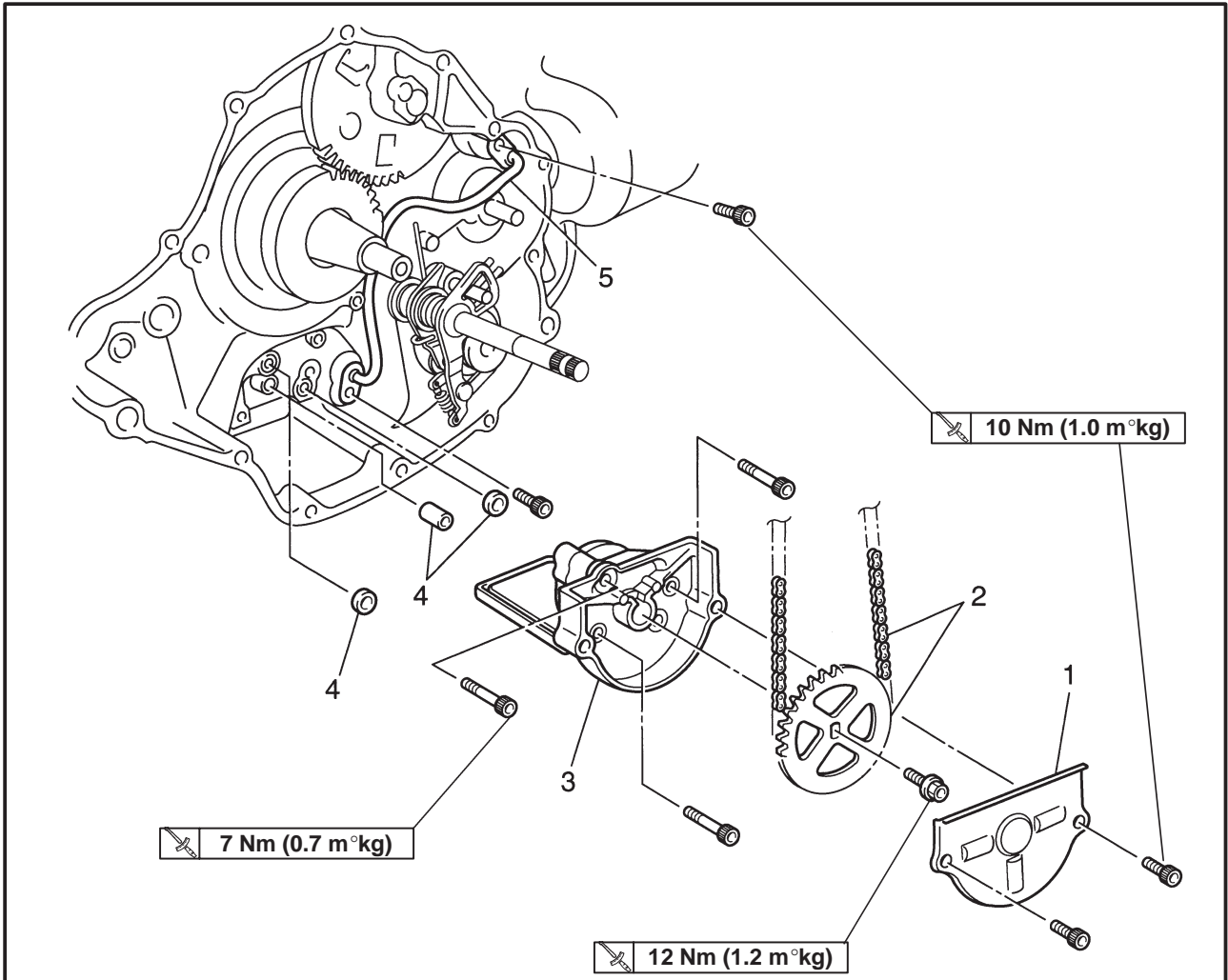
1. Install:
 - stopper lever ①
 - stopper lever spring ②
 - shift shaft lever ③

NOTE:

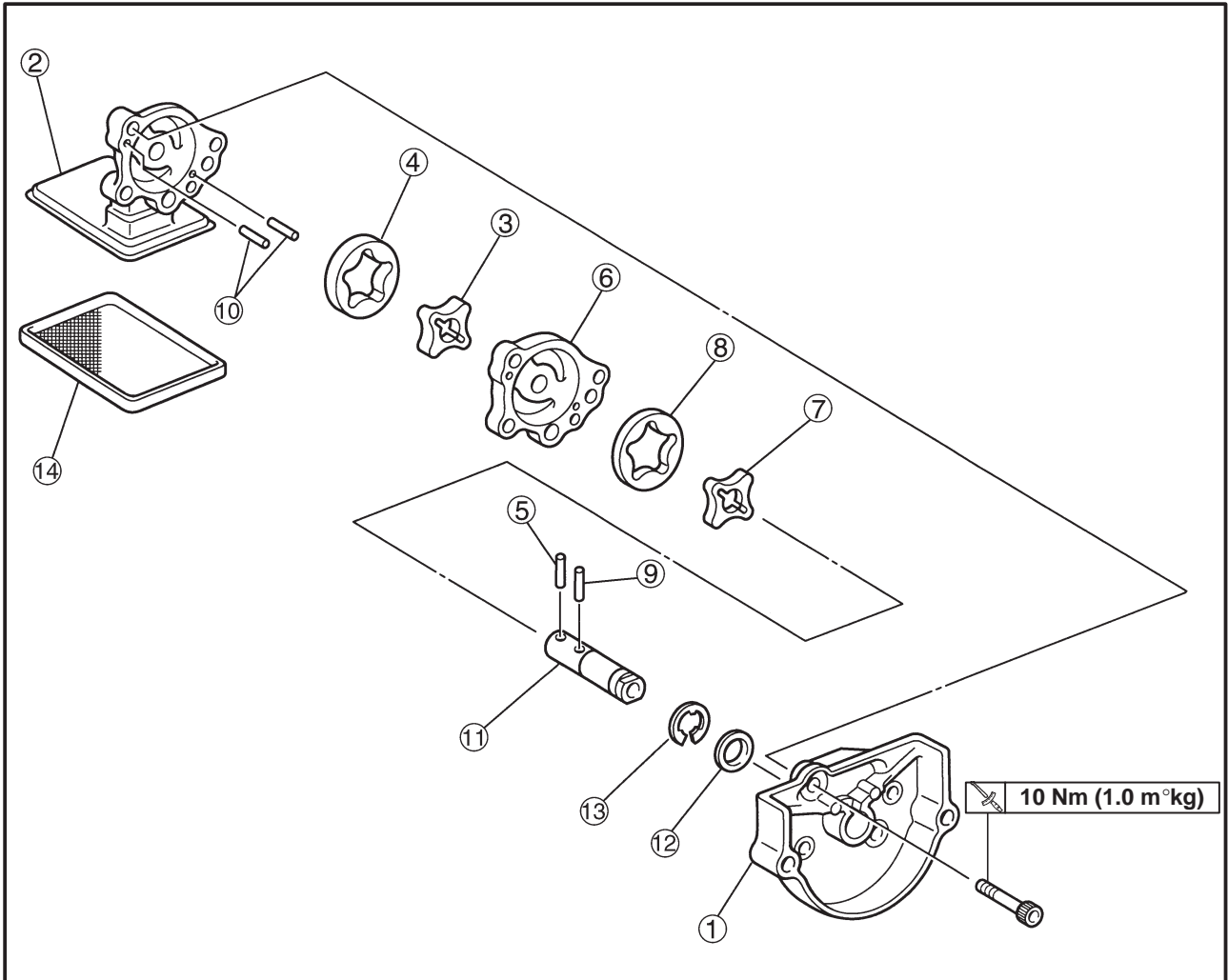
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
- Mesh the stopper lever with the shift drum segment assembly.



OIL PUMP



Order	Job name/Part name	Q'ty	Remarks
	Removing the oil pump		
	Rotor assembly		Remove the parts in the order listed. Refer to "GENERATOR AND STARTER CLUTCH".
1	Crankcase cover (right)	1	Refer to "CLUTCH".
2	Driven gear cover	1/1	
3	Driven gear (oil pump)/Oil pump drive chain	1	
4	Oil pump assembly	2/1	
5	O-rings/dowel pin	1	
	Oil delivery pipe		For installation, reverse the removal procedure.



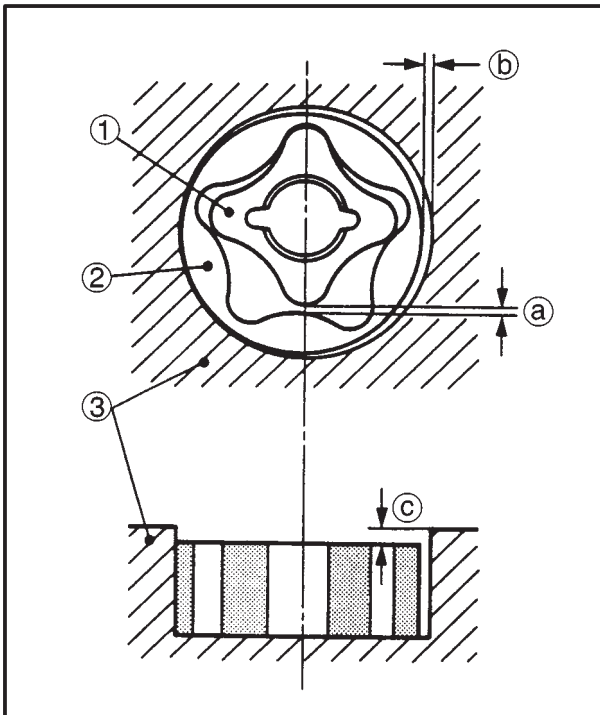
Order	Job name/Part name	Q'ty	Remarks
	Disassembling the oil pump		Disassembly the parts in the order listed.
①	Oil pump cover	1	Refer to "ASSEMBLING THE OIL PUMP".
②	Oil pump body	1	
③	Oil pump rotor (inner)	1	
④	Oil pump rotor (outer)	1	
⑤	Pin	1	
⑥	Oil pump body	1	Refer to "ASSEMBLING THE OIL PUMP".
⑦	Oil pump rotor (inner)	1	
⑧	Oil pump rotor (outer)	1	
⑨	Pin	1	
⑩	Dowel pins	2	
⑪	Oil pump shaft	1	
⑫	Washer	1	
⑬	Circlip	1	
⑭	Oil strainer	1	
			For assembly, reverse the disassembly procedure.



EAS00364

CHECKING THE OIL PUMP

1. Check:
 - ° oil pump driven gear
 - ° oil pump body
 - ° oil pump driven gear cover
 Cracks/damage/wear → Replace the defective part(-s).
2. Measure:
 - ° inner-rotor-to-outer-rotor-tip clearance (a)
 - ° outer-rotor-to-oil-pump-body-side clearance (b)
 - ° oil-pump-body-to-inner-rotor-and-outer-rotor clearance (c)
 Out of specification → Replace the oil pump.



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

0.03 × 0.09 mm
 <Limit>: 0.15 mm

Outer-rotor-to-oil-pump-body-side clearance

0.03 × 0.08 mm
 <Limit>: 0.15 mm

Oil-pump-body-to-inner-rotor and outer-rotor clearance

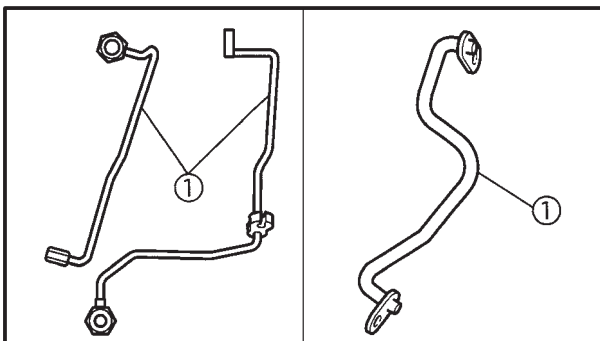
0.03 × 0.08 mm
 <Limit>: 0.15 mm

EAS00367

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

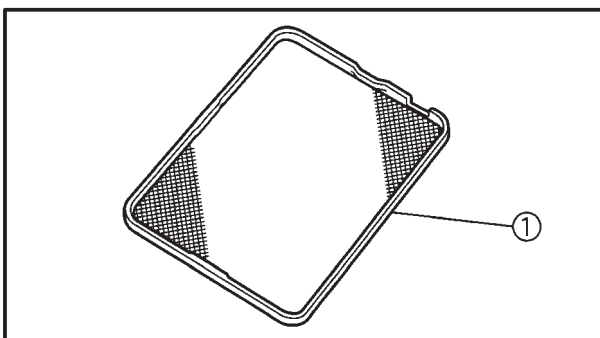
1. Check:
 - ° oil delivery pipes (1)
 Damage → Replace.
 Obstruction → Wash and blow out with compressed air.

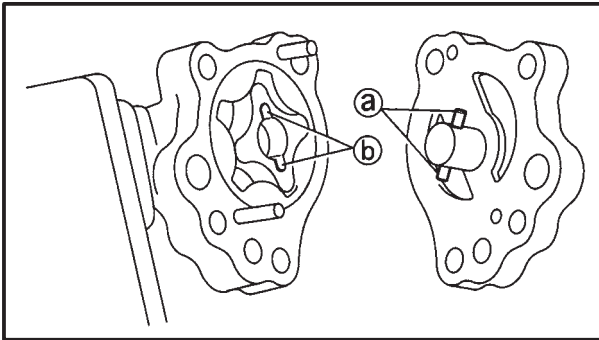


EAS00368

CHECKING THE OIL STRAINER

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






EAS00376

ASSEMBLING THE OIL PUMP

1. Assemble:
° oil pump

 **10 Nm (1.0 m°kg)****CAUTION:** _____

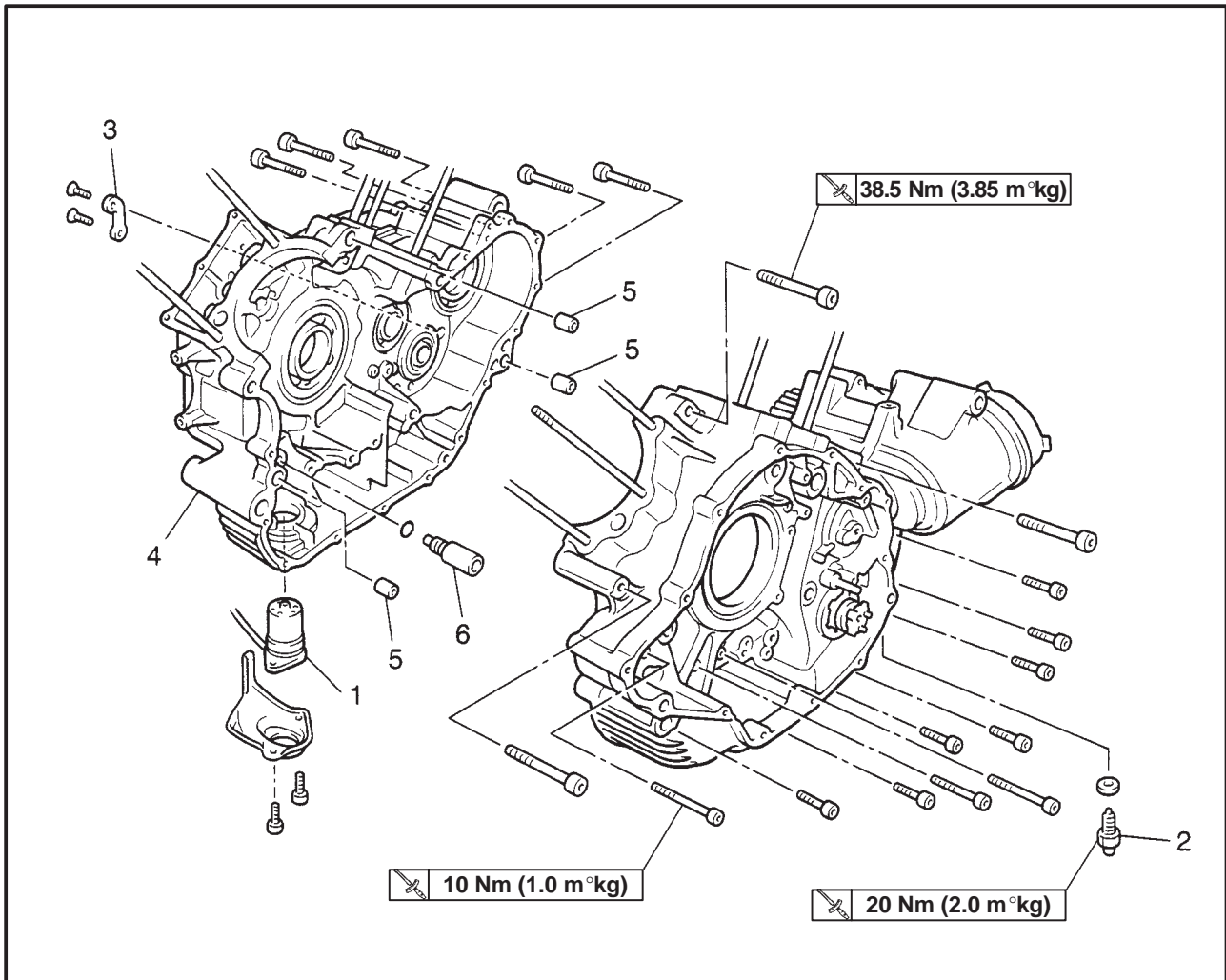
After tightening the bolts, make sure that the oil pump turns smoothly.

NOTE: _____

Align the pin (a) with the slots (b) on the inner rotor.



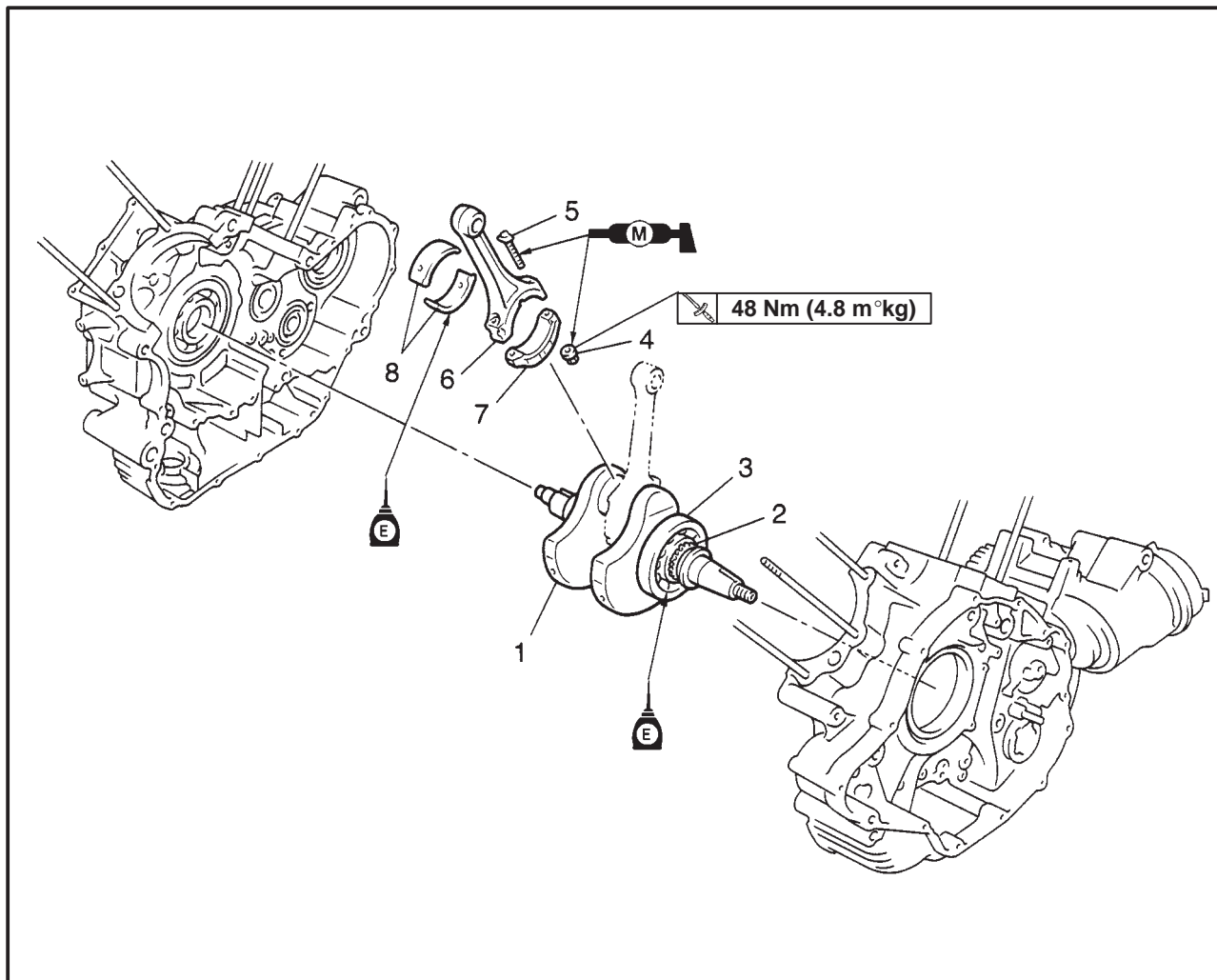
CRANKSHAFT AND CONNECTING RODS
CRANKCASE



Order	Job name/Part name	Q'ty	Remarks
	Removing the crankshaft assembly		Remove the parts in the order listed.
	Engine assembly		Refer to "ENGINE REMOVAL".
	Cylinder head		Refer to "CYLINDER HEADS".
	Cylinder and piston		Refer to "CYLINDERS AND PISTONS".
	Clutch assembly		Refer to "CLUTCH".
	AC magneto and starter clutch		Refer to "GENERATOR AND STARTER CLUTCH".
	Shift shaft		Refer to "SHIFT SHAFT".
	Oil pump assembly		Refer to "OIL PUMP".
1	Oil level gauge	1	
2	Neutral switch	1	
3	Shift shaft stopper plate	1	Refer to "ASSEMBLING THE CRANKCASE".
4	Crankcase (right)	1	Refer to "DISASSEMBLING/ASSEMBLING THE CRANKCASE".
5	Dowel pins	3	
6	Relief valve	1	
			For installation, reverse the removal procedure.



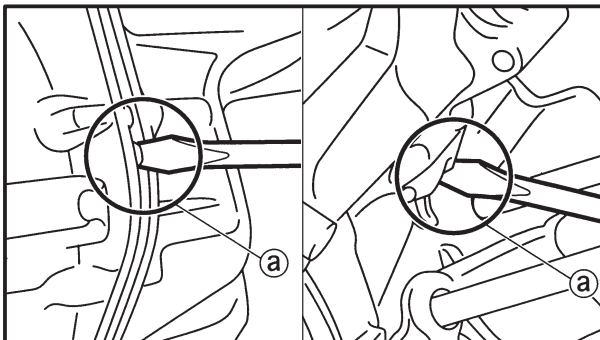
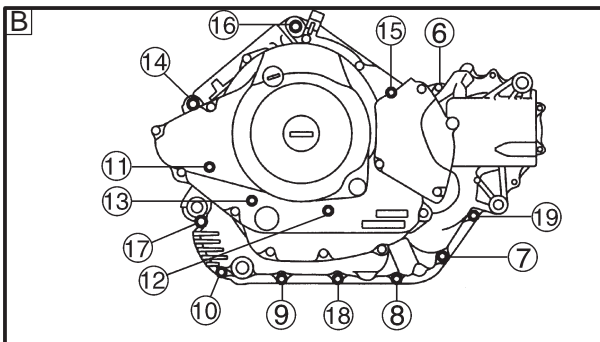
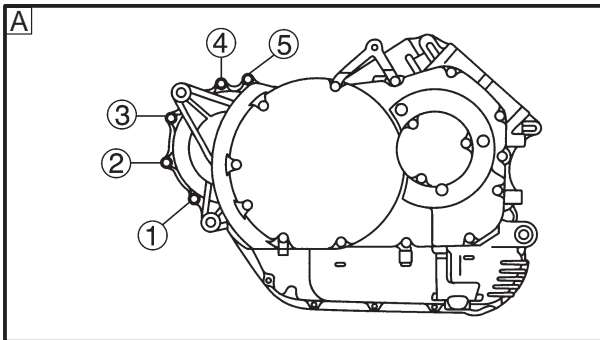
CRANKSHAFT AND CONNECTING RODS



Order	Job name/Part name	Q'ty	Remarks
	Removing the crankshaft and connecting rod		Remove the parts in the order listed.
1	Crankshaft assembly	1	Refer to "REMOVING/INSTALLING THE CRANKSHAFT".
2	Oil pump drive sprocket	1	
3	Bearing	1	
4	Nuts (connecting rod caps)	4	Refer to "INSTALLING THE CRANKSHAFT".
5	Connecting rod bolts	4	
6	Connecting rods	2	Refer to "REMOVING THE CONNECTING RODS/INSTALLING THE CRANKSHAFT".
7	Connecting rod caps	2	
8	Plain bearings	4	For installation, reverse the removal procedure.

CRANKSHAFT AND CONNECTING RODS

ENG



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.)

A Right crankcase

B Left crankcase

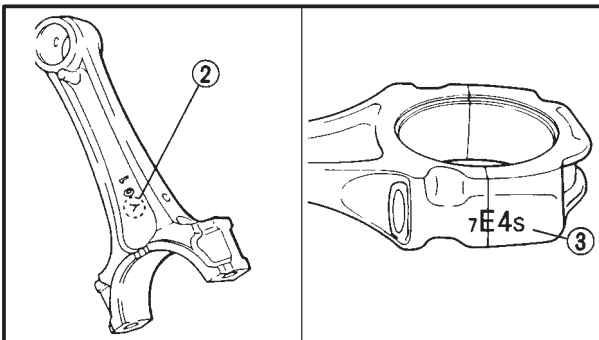
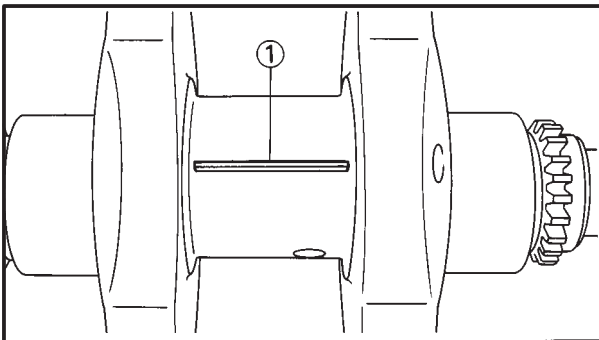
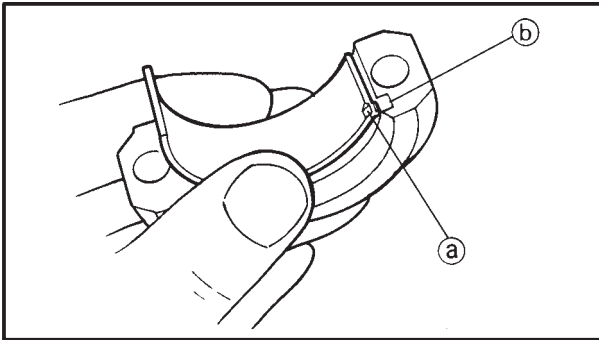
2. Remove:
 - ° right crankcase

NOTE:

For this removal, slits **a** in the crankcase can be use as shown.

CAUTION:

Use a soft hammer to tap on one side of the crankcase. Tap only on reinforced portions of the crankcase. Do not tap on the crankcase mating surfaces. Work slowly and carefully. Make sure that the crankcase halves separate evenly.



CAUTION:

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

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

NOTE:

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

- c. Put a piece of Plastigauge® (1) on the crankshaft pin.
- d. Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nut seats.
- Make sure that the “Y” mark (2) on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters (3) on both the connecting rod and connecting rod cap are aligned.

- e. Tighten the connecting rod nuts.

CAUTION:

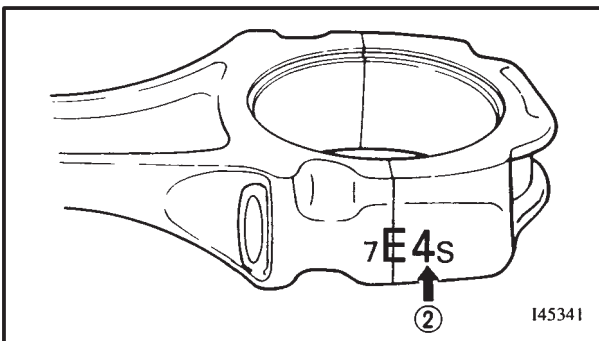
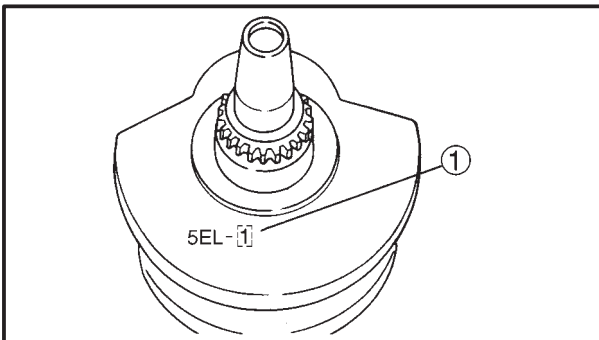
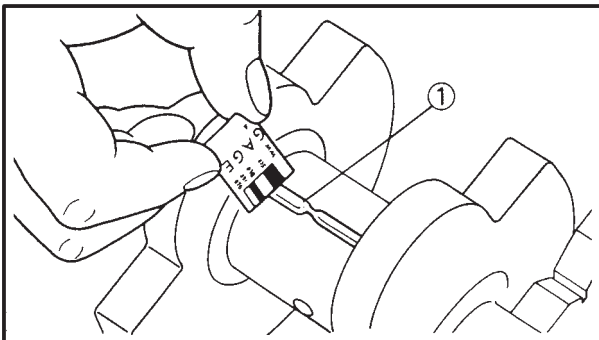
- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- Without pausing, tighten the connecting rod nuts to the specified torque. Apply continuous torque between 4.3 and 4.8 m°kg. Once you reach 4.3 m°kg, DO NOT STOP TIGHTENING until the specified torque is reached.

If the tightening is interrupted between 4.3 and 4.8 m°kg, loosen the connecting rod nut to less than 4.3 m°kg and start again.

Refer to "INSTALLING THE CONNECTING RODS".

	Connecting rod nut 48 Nm (4.8 m°kg)
-----------------------------------------------------------------------------------	------------------------------------------------------

- f. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS".
- g. Measure the compressed Plastigauge® width ① on each crankshaft pin.
If the clearance is out of specification, select replacement big end bearings.



4. Select:
°big end bearings (P₁,P₂)

NOTE:

- °The numbers ① stamped into the crankshaft web and the numbers ② on the connecting rods are used to determine the replacement big end bearing sizes.
- °"P₁,P₂" refer to the bearings shown in the crankshaft illustration.

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

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

Rear cylinder lower bearing/ Front cylinder upper and lower bearing.

BEARING COLOR CODE	
1	blue
2	black
3	brown
4	green
5	yellow

Rear cylinder upper bearing

BEARING COLOR CODE	
1	black
2	
3	brown
4	green
5	



EB412440

CHECKING THE BEARINGS AND OIL SEALS

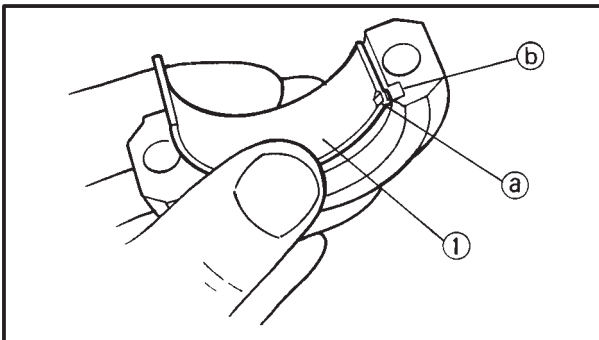
1. Check:
 - ° bearings
Clean and lubricate the bearings, then rotate the inner race with your finger
Rough movement → Replace.
2. Check:
 - ° oil seals
Damage/wear → Replace.

INSTALLING THE CRANKSHAFT

3. Install:
 - ° connecting rod bearings ①

NOTE: _____

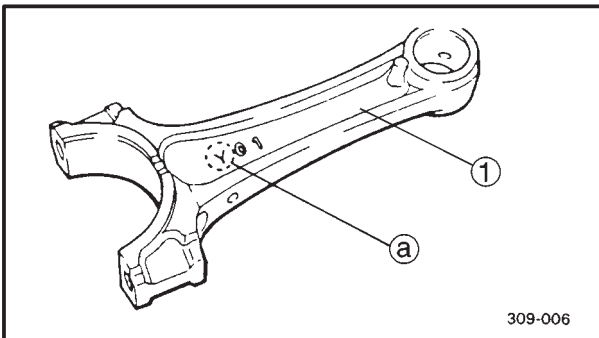
- ° Align the projection ① of the bearings with the notches ② in the connecting rod cap.
- ° Install each bearing in its original place.



4. Install:
 - ° connecting rods ①

NOTE: _____

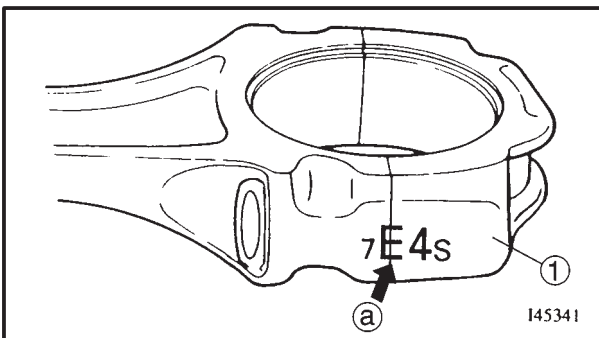
- ° The stamped "Y" mark ① on the connecting rods should face towards the left side of the crankcase.
- ° Install each connecting rod in its original place.



5. Install:
 - ° connecting rod cap ①

NOTE: _____

- Be sure that the characters ① on the side of the cap and connecting rod are aligned.

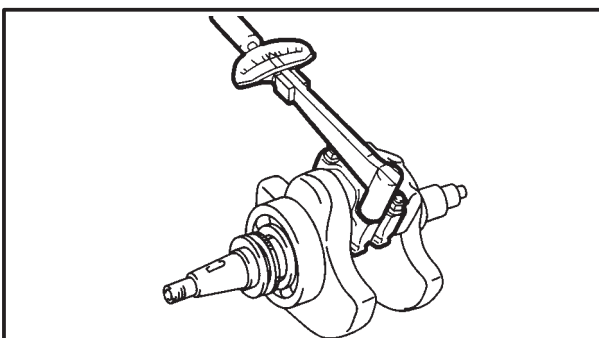


6. Tighten:
 - ° nuts (connecting rod cap)

48 Nm (4.8 m°kg)

NOTE: _____

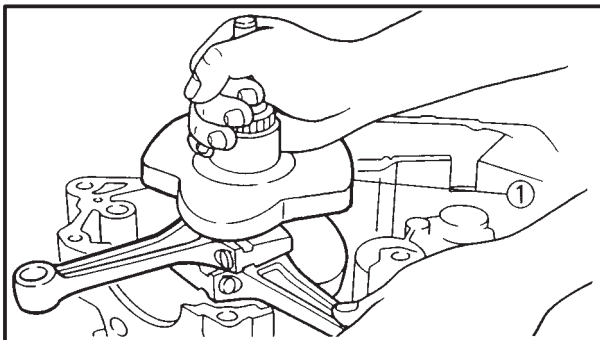
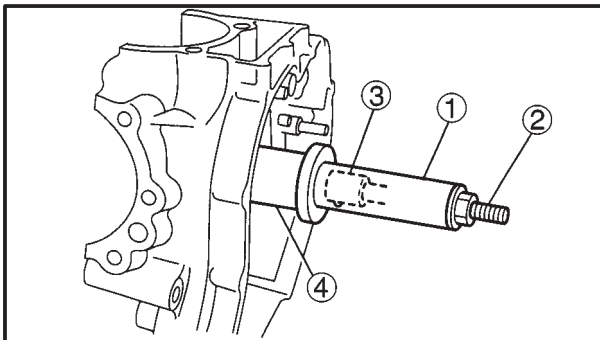
- Apply molybdenum disulfide grease to the rod cap bolt threads and nut surfaces.





CAUTION:

- When tightening the nuts be sure to use an F-type torque wrench.
- Without pausing tighten to full torque specification. Apply continuous torque between 4.3 and 4.8 m°kg. Once you reach 4.3 m°kg **DO NOT STOP TIGHTENING** until final torque is reached. If the tightening is interrupted between 4.3 and 4.8 m°kg, loosen the nut to less than 4.3 m°kg and start again.



7. Install:
- crankshaft installing tool

NOTE:
Attach the spacer to the bearing inner race.



- Crankshaft installer pot ①**
90890-01274
- Crankshaft installer bolt ②**
90890-01275
- Adapter ③**
90890-04130
- Spacer ④**
90890-04060

8. Install:
- crankshaft ①

NOTE:
Align the left connecting rod with the rear cylinder sleeve hole.

ASSEMBLING THE CRANKCASE

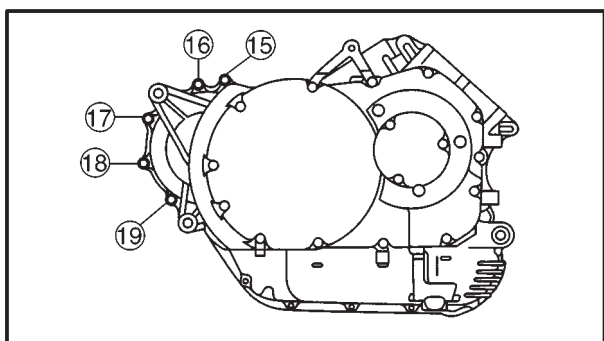
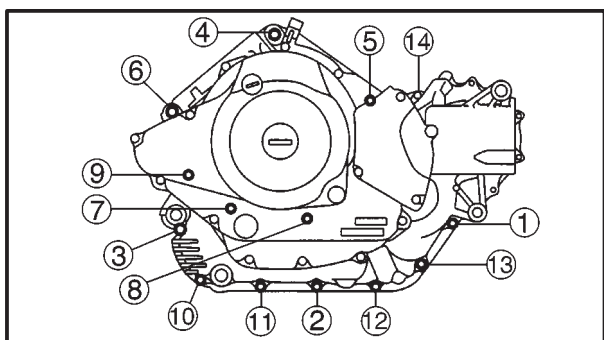
1. Apply:
- engine oil
(onto the main journal bearings)
 - sealant
(onto the crankcase mating surfaces)



- Yamaha Bond No. 1215:**
90890-85505

CRANKSHAFT AND CONNECTING RODS

ENG



2. Tighten:
 ° crankcase bolts
 (follow the proper tightening sequence)

NOTE:

The numbers embossed on the crankcase indicate the crankcase tightening sequence.

④ ~ ⑥ (M10) 38.5Nm (3.85 m°kg)

① ~ ③, ⑦ ~ ⑱ (M6)

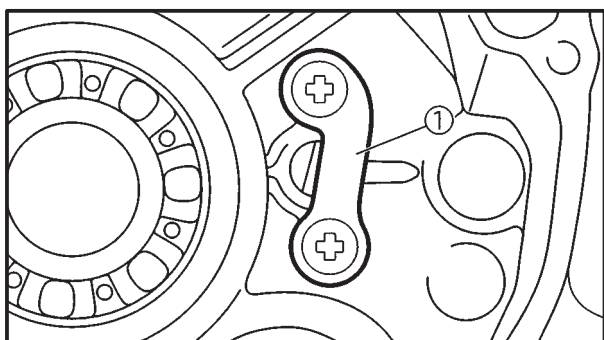
10 Nm (1.0 m°kg)

NOTE:

- ° Lubricate the bolt threads with engine oil.
 ° Tighten the bolts in increasing numerical order.

M6 × 30 mm	① ~ ③, ⑩ ~ ⑭, ⑰ ~ ⑱
M6 × 30 mm (Chromium plated bolt)	⑮, ⑯
M6 × 55 mm	⑧
M6 × 80 mm	⑦, ⑨
M10 × 60 mm	⑤
M10 × 70 mm	④
M10 × 100 mm	⑥

⑱: with engine ground lead



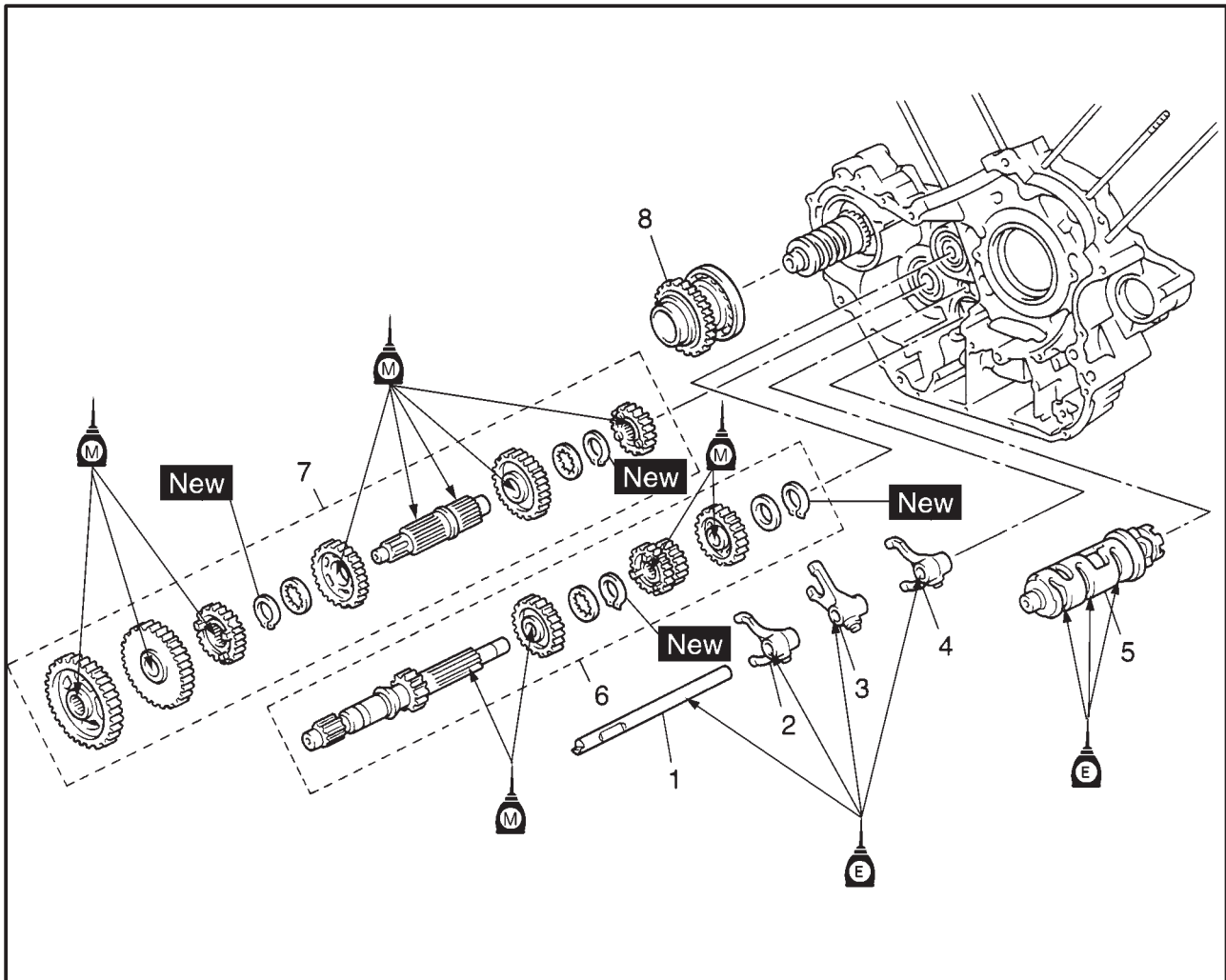
3. Install:
 ° shift shaft stopper plate ①

NOTE:

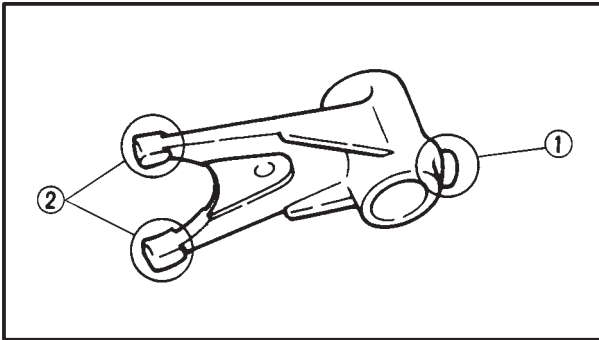
Install the shift shaft stopper plate as shown.



TRANSMISSION



Order	Job name/Part name	Q'ty	Remarks
	Transmission removal		
	Crankcase separation		Remove the parts in the order listed. Refer to "CRANKSHAFT".
1	Guide bar	1	Refer to "INSTALLING THE TRANSMISSION".
2	Shift fork 1 "R"	1	
3	Shift fork 2 "C"	1	
4	Shift fork 3 "L"	1	
5	Shift drum	1	
6	Main axle assembly	1	
7	Drive axle assembly	1	
8	Middle driven gear	1	
			For installation, reverse the removal procedure.



EAS00421

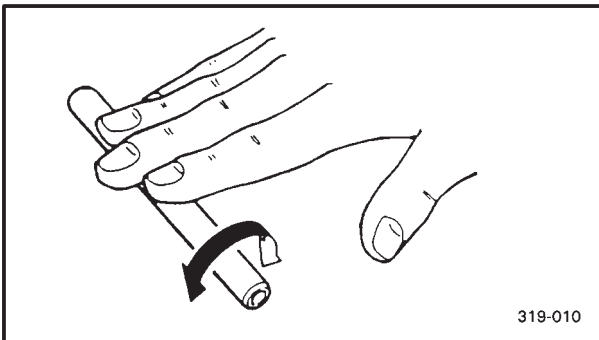
CHECKING THE SHIFT FORKS

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

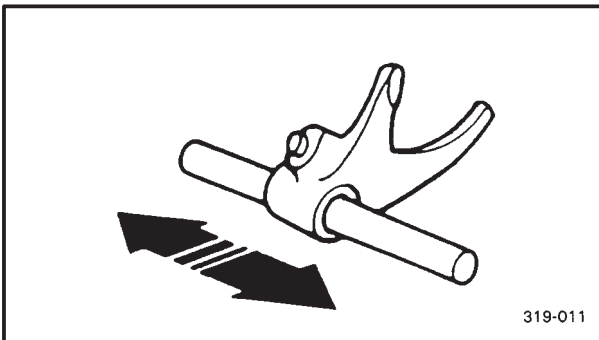
1. Check:
 - shift fork cam follower ①
 - shift fork pawl ②
 - Bends/damage/scoring/wear → Replace the shift fork.
2. Check:
 - shift fork guide bar
 - Roll the shift fork guide bar on a flat surface.
 - Bends → Replace.

⚠ WARNING

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

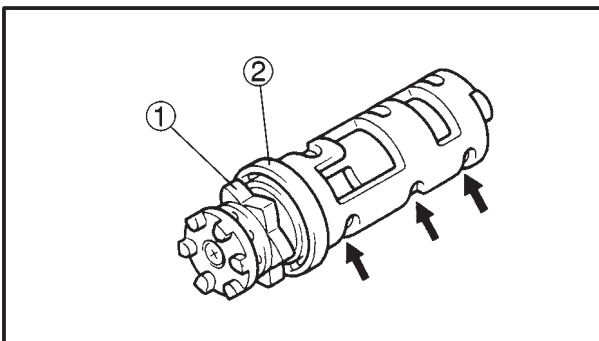


319-010



319-011

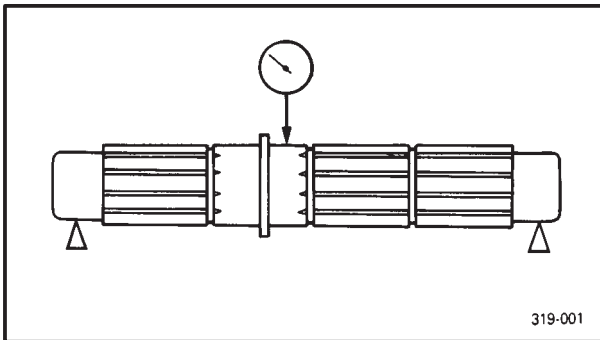
3. Check:
 - shift fork movement (on the shift fork guide bar)
 - Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS00422

CHECKING THE SHIFT DRUM ASSEMBLY

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



EAS00424

CHECKING THE TRANSMISSION

1. Measure:

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



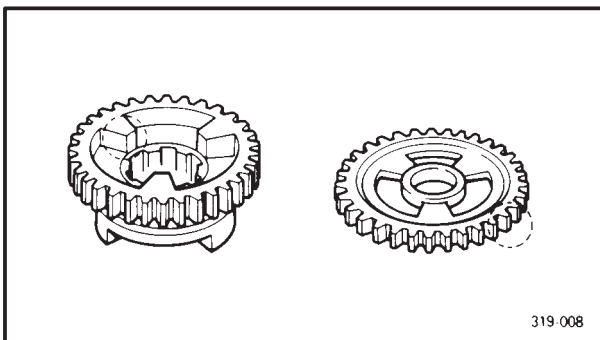
Main axle runout limit
0.08 mm

2. Measure:

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



Drive axle runout limit
0.08 mm



3. Check:

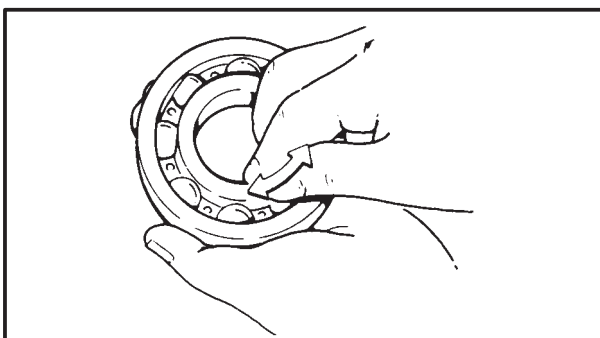
- transmission gears
Blue discoloration/pitting/wear → Replace the defective gear(-s).
- transmission gear dogs
Cracks/damage/rounded edges → Replace the defective gear(-s).

4. Check:

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

5. Check:

- washers
Damage/bends/looseness → Replace.



6. Check:

- bearings
Un smooth → Replace.



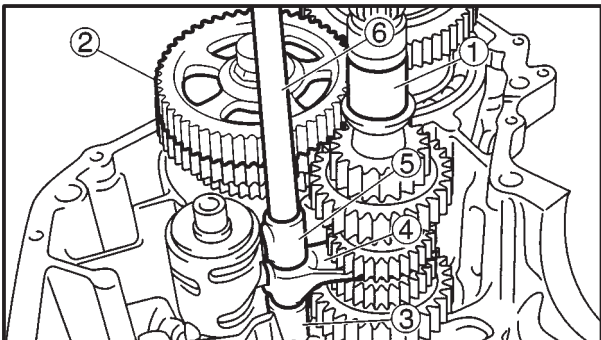
EAS00430

INSTALLING THE TRANSMISSION

1. Install:
 - ° shift drum assembly

NOTE: _____

Turn the shift drum assembly to the neutral position.



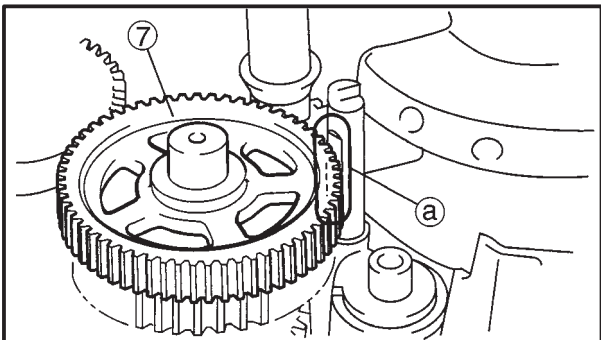
2. Install:
 - ° main axle assembly ①
 - ° drive axle assembly ②
 - ° shift fork "L" ③
 - ° shift fork "C" ④
 - ° shift fork "R" ⑤
 - ° shift fork guide bars ⑥

NOTE: _____

° The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence:

"R", "C", "L".

° When installing the middle drive gear ⑦, align the slit @ on the guide bar with the middle drive gear.



⚠ WARNING _____

Always use new circlips.

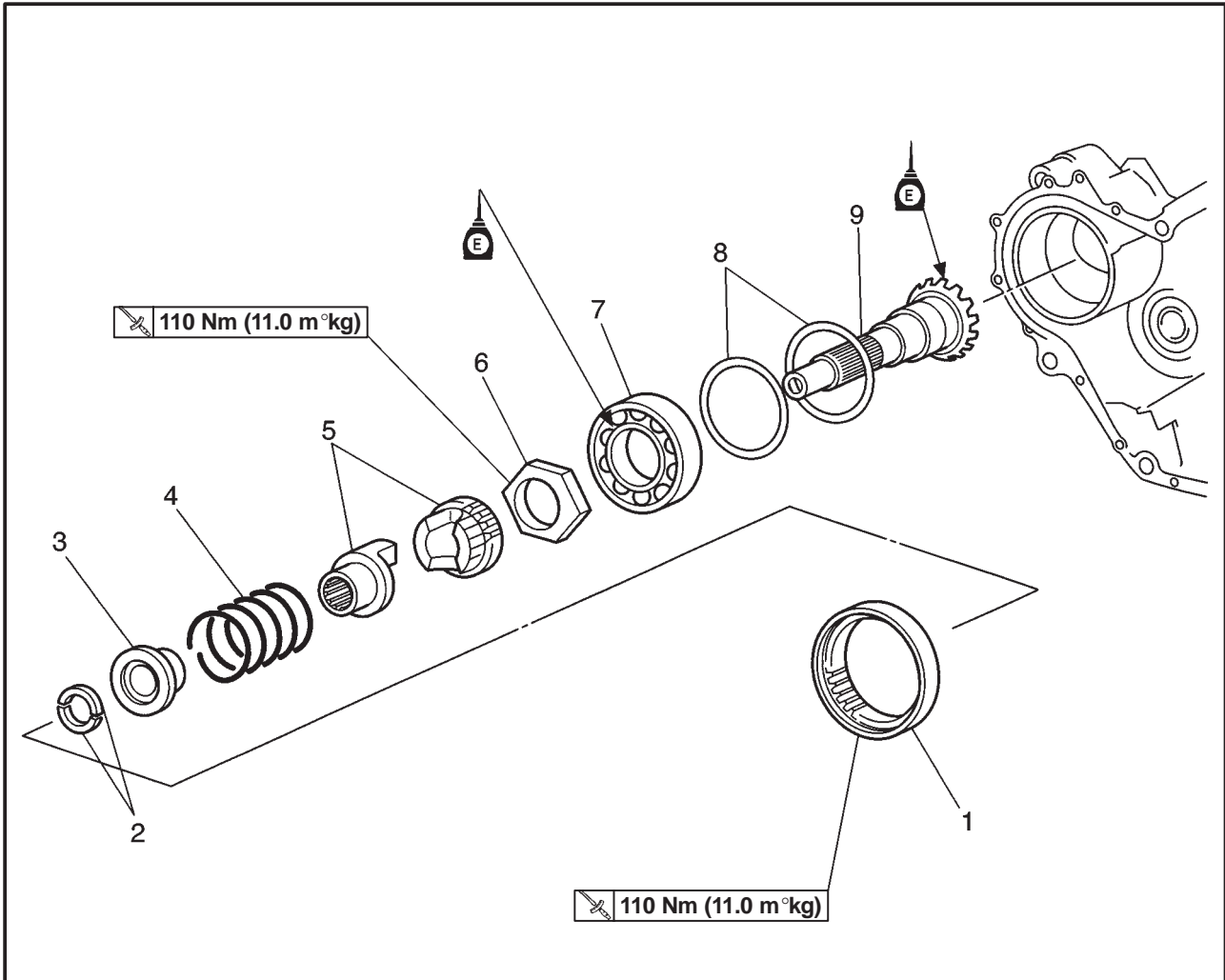
3. Check:
 - ° transmission
 - ° Rough movement → Repair.

NOTE: _____

Oil each gear, shaft, and bearing thoroughly.



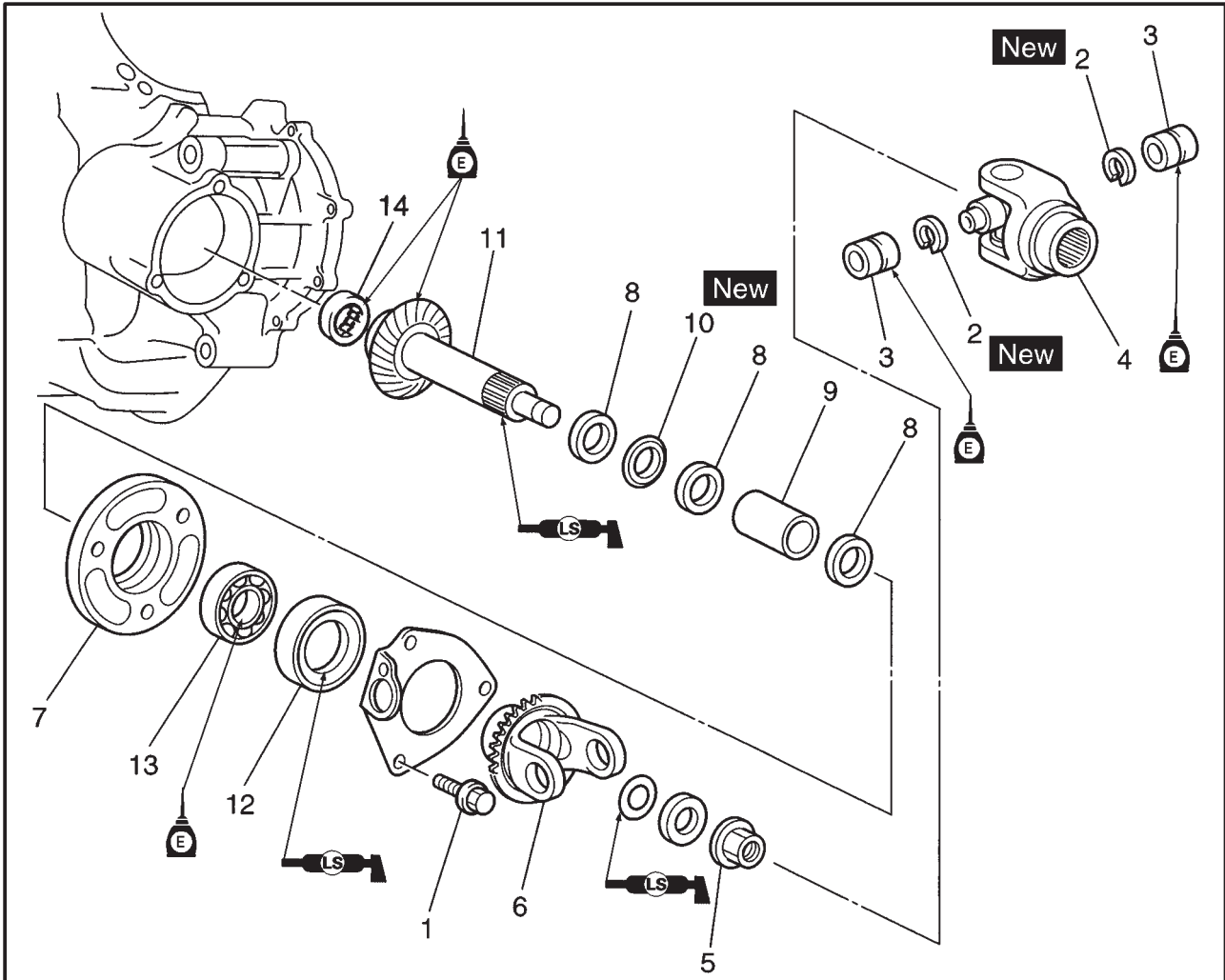
MIDDLE GEAR
MIDDLE DRIVE PINION GEAR



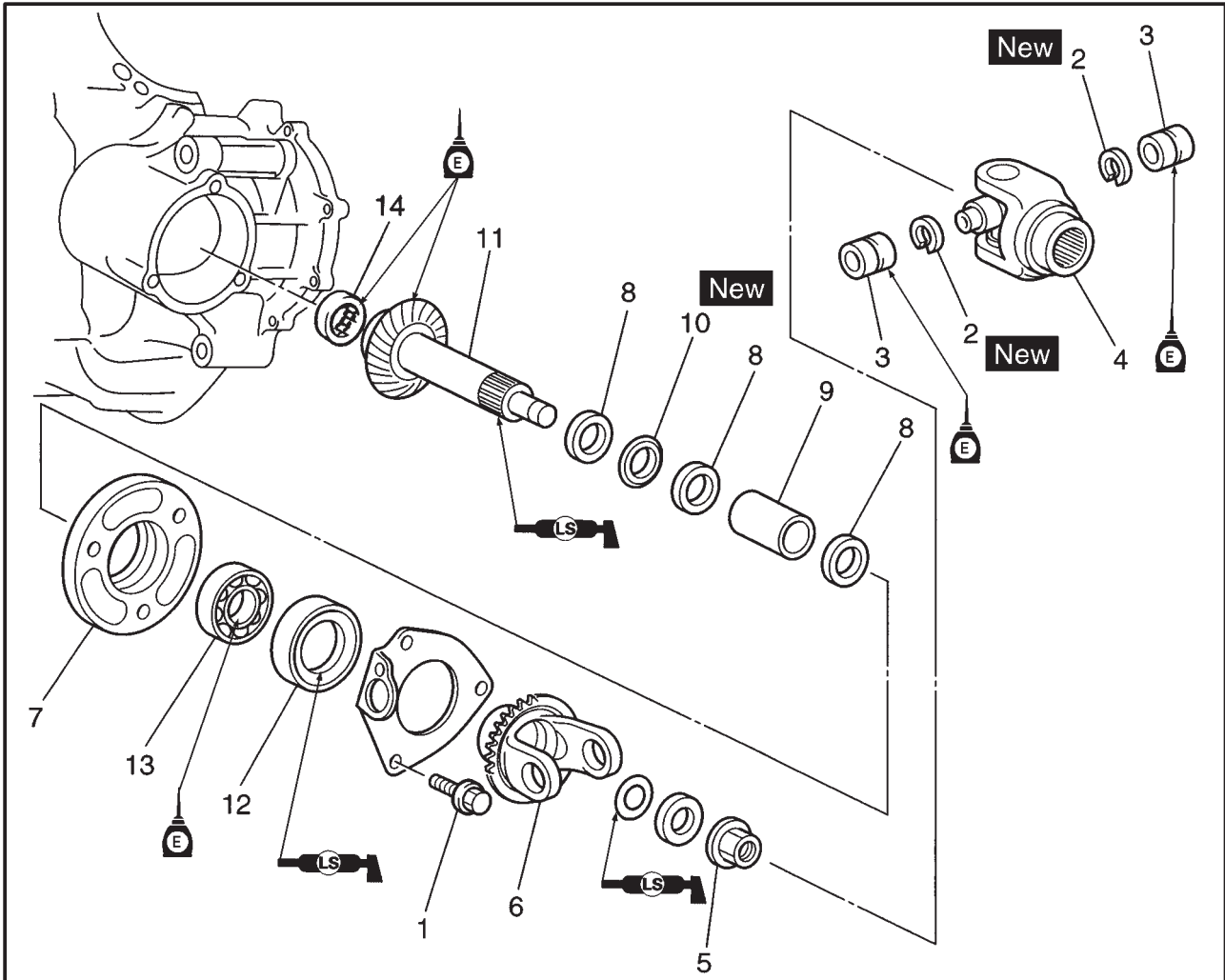
Order	Job name/Part name	Q'ty	Remarks
	Removing the middle drive pinion gear		Remove the parts in the order listed.
	Sepalate the crankcase		Refer to "CRANKSHAFT AND CONNECTING ROD."
1	Bearing retainer	1	Refer to "REMOVING THE MIDDLE DRIVE SHAFT ASSEMBLY/INSTALLING THE MIDDLE GEAR ASSEMBLY AND ADJUSTING THE BACKLASH".
2	Spring retainers	2	Refer to "DISASSEMBLING/ ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY".
3	Spring seat	1	
4	Damper spring	1	
5	Damper cams	2	
6	Nut	1	
7	Bearing	1	
8	Shim(s)	1	
9	Middle drive pinion shaft	1	



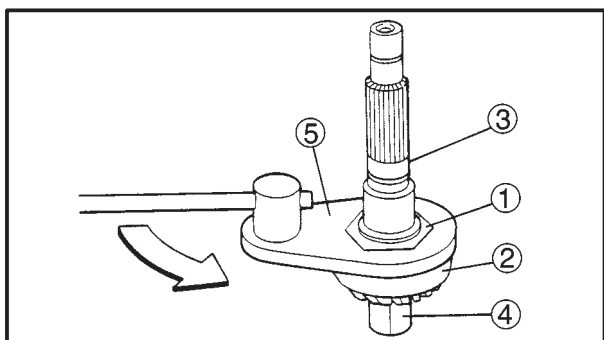
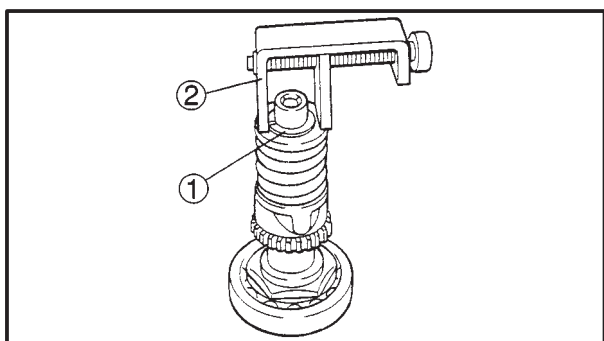
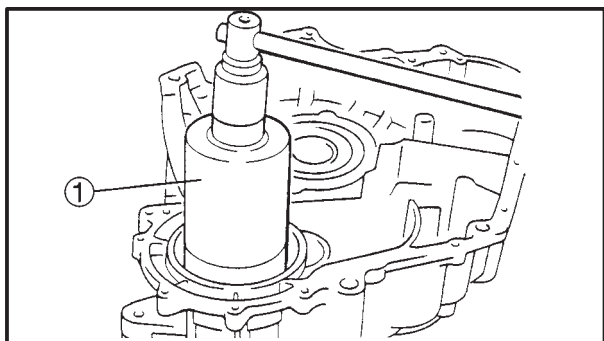
MIDDLE DRIVEN PINION GEAR



Order	Job name/Part name	Q'ty	Remarks
	Removing the middle driven pinion gear.		Remove the parts in the order listed.
1	Bolts	3	Refer to "REMOVING THE MIDDLE DRIVEN SHAFT ASSEMBLY/ INSTALLING THE UNIVERSAL JOINT".
2	Circlips	2	
3	Bearings	2	
4	Driven yoke	1	
5	Nut	1	
6	Drive yoke	1	Refer to "REMOVING THE MIDDLE DRIVEN SHAFT ASSEMBLY/INSTALLING THE MIDDLE GEAR ASSEMBLY AND ADJUSTING THE BACKLASH". Refer to "INSTALLING THE MIDDLE GEAR ASSEMBLY AND ADJUSTING THE BACKLASH".
7	Bearing housing/O-ring	1/1	
8	Washers	3	
9	Collar	1	



Order	Job name/Part name	Q'ty	Remarks
10	Collapsible collar	1	Refer to "INSTALLING THE MIDDLE GEAR ASSEMBLY AND ADJUSTING THE BACKLASH".
11	Middle driven shaft	1	
12	Oil seal	1	Refer to "ASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY".
13	Bearing	1	
14	Bearing	1	
			For installation, reverse the removal procedure.



REMOVING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Remove:
 - ° bearing retainer
 - ° middle drive shaft assembly



- a. Straighten the thread on the bearing retainer.
- b. Attach the bearing retainer wrench ①.

	Bearing retainer wrench: 90890-04137
-----------------------------------------------------------------------------------	------------------------------------------------

- c. Remove the bearing retainer and middle drive shaft assembly.



DISASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Remove:
 - ° spring retainers ①

NOTE: _____


While compressing the spring with a damper spring compressor ②, remove the spring retainers.

	Damper spring compressor 90890-04090
-------------------------------------------------------------------------------------	------------------------------------------------


2. Straighten the thread on the middle drive shaft nut.
3. Remove:
 - ° middle drive shaft nut ①
 - ° bearing ②
 - ° middle drive shaft ③



- a. Attach the middle drive shaft holder ④ onto the middle drive shaft as shown.

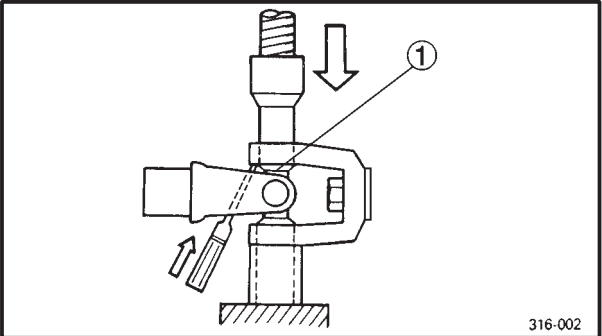
	Middle drive shaft holder 90890-04055
-------------------------------------------------------------------------------------	-------------------------------------------------

- b. Secure the middle drive shaft holder in a vice.
- c. Loosen the middle drive shaft nut with the middle drive shaft nut wrench ⑤.

	Middle drive shaft nut wrench 90890-04138
-------------------------------------------------------------------------------------	-----------------------------------------------------

- d. Remove the middle drive shaft nut and bearing.





316-002

REMOVING THE MIDDLE DRIVEN SHAFT ASSEMBLY

1. Remove:
 - ° universal joint



- a. Remove the circlips ①.
- b. Place the universal joint in a press.
- c. With a pipe of the proper diameter positioned beneath the universal joint driven yoke as shown, press the bearing into the pipe.

NOTE: _____

It may be necessary to lightly tap the universal joint driven yoke.

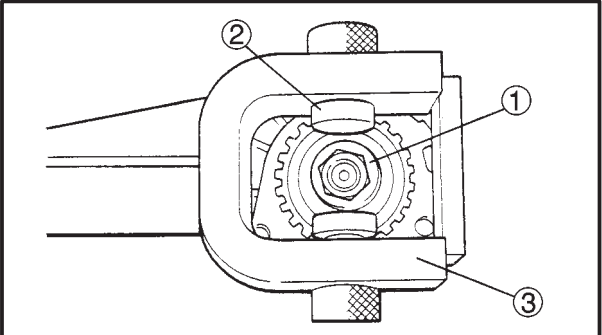
- d. Repeat the above steps to remove the opposite side's bearing.
- e. Separate the universal joint yokes.



2. Loosen:
 - ° middle driven shaft nut ①

NOTE: _____

While holding the universal joint driven yoke ② with the universal joint holder ③, loosen the middle driven shaft nut.





Universal joint holder

90890-04062

EAS00438

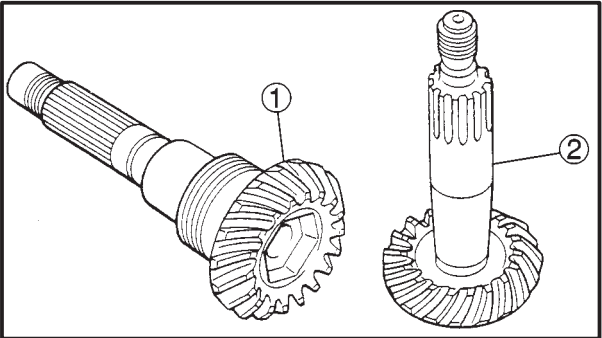
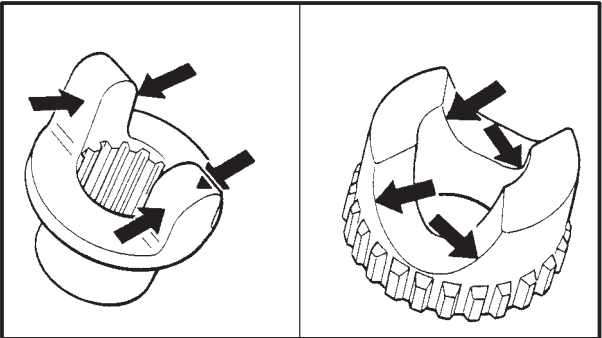
CHECKING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Check:
 - ° damper cam surface
 - Scratches/wear → Replace the damper cam.
2. Check:
 - ° spring
 - Cracks/damage → Replace.

EAS00439

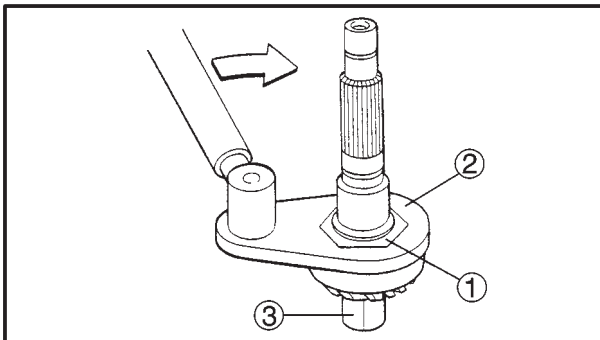
CHECKING THE MIDDLE DRIVEN SHAFT ASSEMBLY

1. Check:
 - ° middle drive gear ①
 - ° middle driven gear ②
 - Galling/pitting/wear → Replace the middle driven shaft assembly.
2. Check:
 - ° bearings
 - Damage/pitting → Replace the middle drive shaft bearing housing assembly.





3. Check:
 - ° O-ring
 - ° oil seal
 - Damage → Replace the defective part(-s).
4. Check:
 - ° universal joint movement
 - Rough movement → Replace the universal joint.



EAS00441

ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Tighten:
 - ° middle drive shaft nut (1)

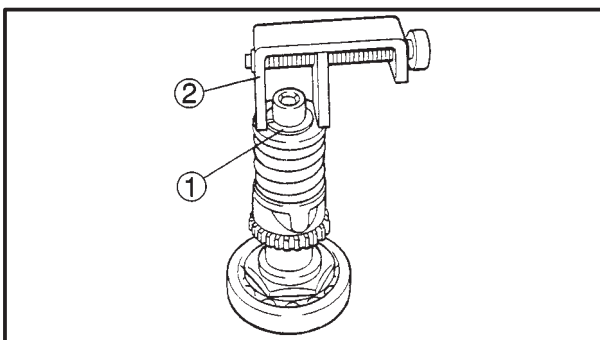
110 Nm (11.0 m³kg)

NOTE: _____

- ° Set the torque wrench at a right angle to the middle drive shaft nut wrench (2).
- ° Lock the threads on the middle drive shaft nut by staking them with a center punch.



Middle drive shaft nut wrench (2)
 90890-04138
Middle drive shaft holder (3)
 90890-04055



2. Install:
 - ° spring retainers (1)

NOTE: _____

While compress the spring with the damper spring compressor (2), and then install the spring retainers.



Damper spring compressor
 90890-04090

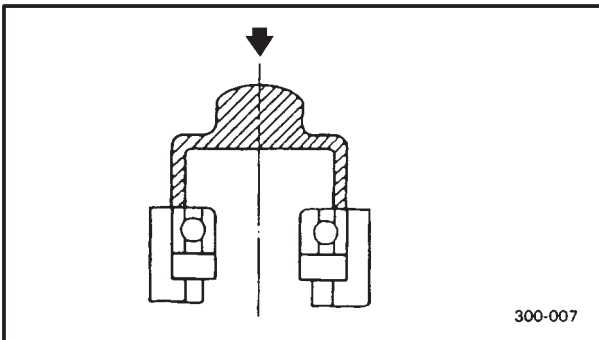


ASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

NOTE: _____

The following points are critical when assembling the middle gears:

- ° The collapsible collar must be replaced whenever the middle driven shaft assembly is removed from the middle driven shaft bearing housing.
- ° When performing this procedure for the first time, be sure to have at least one extra collapsible collar on hand.



300-007

1. Install:

- ° bearing outer race
(into the middle driven shaft bearing housing)

⚠ WARNING _____

Do not press the bearing outer race. During installation, always press the bearing inner race carefully.

2. Install:

- ° middle driven shaft nut

NOTE: _____

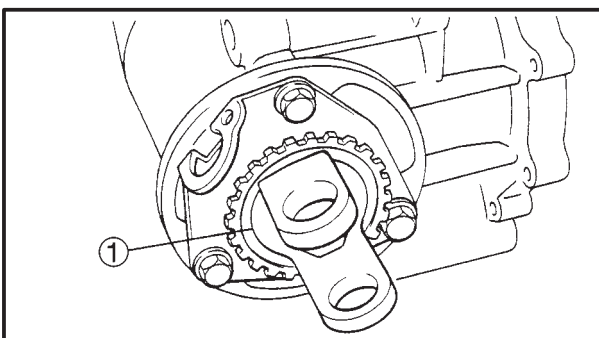
Finger tighten the middle driven shaft nut.

INSTALLING THE MIDDLE GEAR ASSEMBLY AND ADJUSTING THE BACKLASH

NOTE: _____

When installing the middle gear assembly, be sure to replace the following parts:

- collapsible collar



1. Install:

- ° middle driven shaft assembly ①

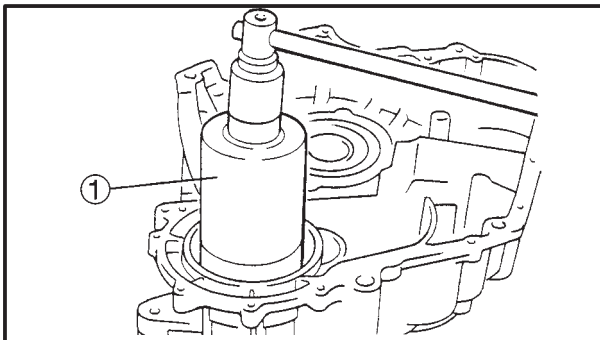
25 Nm (2.5 m°kg)

MIDDLE GEAR

ENG



- 2. Install:
 - ° shim
 - ° middle drive shaft assembly



- 3. Install:
 - ° bearing retainer

Install steps:

- ° Attach the bearing retainer wrench ①.



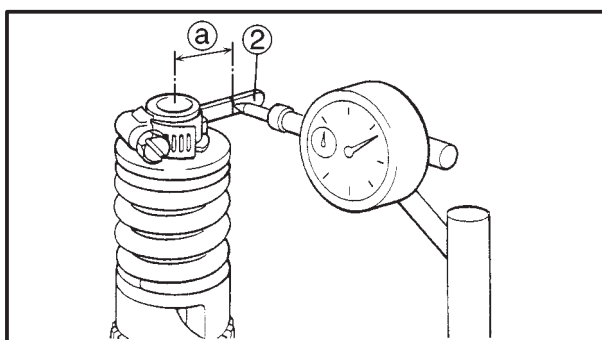
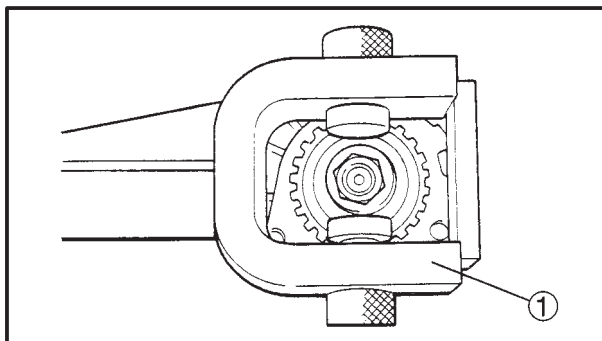
Bearing retainer wrench:
90890-04137

- ° Tighten the bearing retainer.



Bearing retainer:
110 Nm (11.0 m°kg)

- ° Lock the threads on the bearing retainer by staking them with a center punch.



- 4. Adjust:
 - ° middle gear backlash



Middle gear backlash:
0.1 × 0.2 mm

- a. Install the universal joint holder ① and middle gear backlash band ② as shown.



Universal joint holder
90890-04062
Middle gear backlash band
90890-01231

- b. Make sure that the dial gauge plunger on the middle gear backlash band as shown.
 - ① Dial-gauge-plunger contact point: 68.2 mm
- c. Remove the middle driven pinion gear nut and apply the LOCKTITE® on it.
- d. Reinstall the middle driven pinion gear nut.
- e. While measure the middle gear backlash, tighten the middle driven pinion gear nut until specific backlash.

CAUTION: _____

Do not over tighten the middle driven pinion gear nut. If over tighten the middle driven pinion gear nut, replace the collapsible collar and adjust the backlash.

- f. Stake the middle driven pinion gear shaft thread.



INSTALLING THE UNIVERSAL JOINT

- 4. Install:
 - ° universal joint driven yoke/cross joint ① (into the universal joint drive yoke)

CAUTION: _____

Do not hammer the universal joint drive yoke or the collapsible collar may be distorted. This will result in a change in the standard spinning torque, requiring replacement of the collapsible collar and reassembly of the middle driven shaft assembly.

- 2. Install:
 - ° bearings ② (onto the universal joint driven yoke/cross joint)

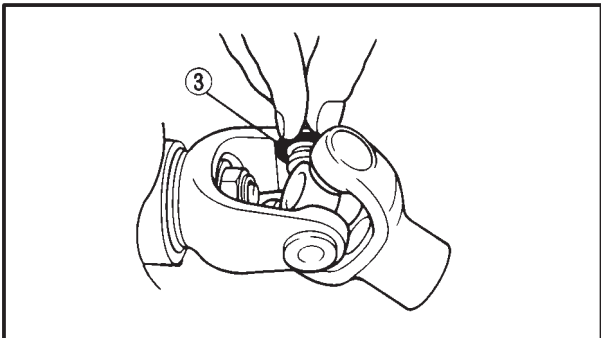
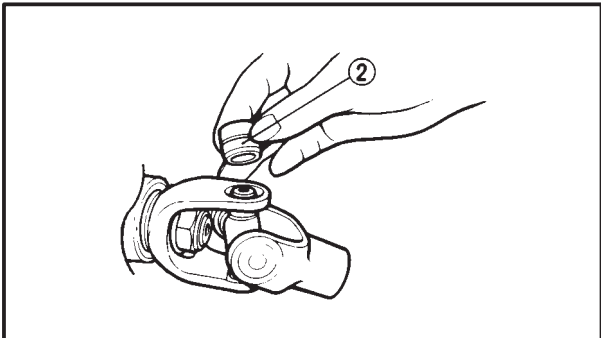
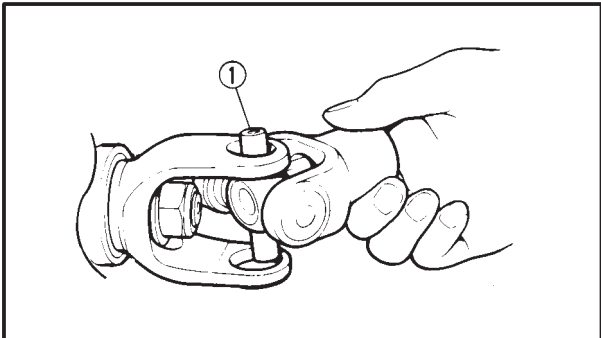
CAUTION: _____

The needles can easily fall out of their races, so check each bearing carefully. Slide the universal joint driven yoke assembly back and forth on the bearings. If a needle is out of place, the yoke will not go all the way onto the bearings.

- 3. Press each bearing into the universal joint driven yoke assembly with a socket of the proper size.

NOTE: _____

The bearings must be inserted far enough into the universal joint driven yoke assembly so that circlips ③ can be installed.



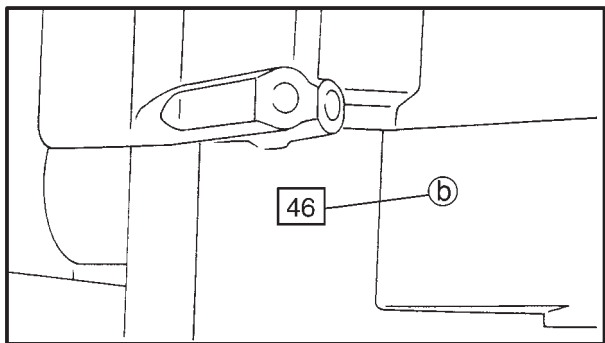
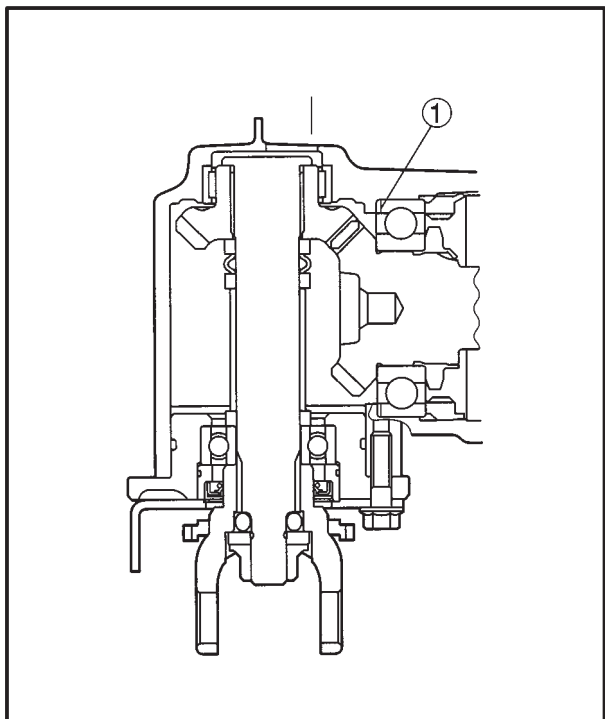
EAS00452

ALIGNING THE MIDDLE GEAR

NOTE: _____

Aligning the middle gear is necessary when any of the following parts are replaced:

- °Crankcase
- °Middle drive shaft



1. Select:

- °middle drive gear shim(-s) ①

NOTE: _____

Select the middle drive gear shim(-s) ① by calculating the middle drive gear shim thickness and then measuring the middle gear backlash.



- a. Position the middle drive gear with the appropriate shim(-s) ① that has had its respective thickness calculated from information marked on the crankcase and the end of the middle drive gear.
- b. To find middle drive gear shim thickness "A", use the following formula.

Middle drive gear shim thickness
"A" = (a) - (c)

- (a) = "43.00"
- (b) = a numeral on the upper crankcase near the main bearing selection numbers and which is added to the nominal size "42"

Example:

- (a) is 43.00
- If the upper crankcase is marked "46" (b)
- (c) is 42.46 (i.e., 42.00 + 0.46 = 42.46)
- "A" = 43.00 - 42.46 = 0.54

Round off to the hundredths digit and select the appropriate shim(-s).

NOTE: _____


In the above example, the calculated number is 0.54. The chart instructs you to round off the 4 to 5. Thus, the shim thickness is 0.55 mm.

MIDDLE GEAR

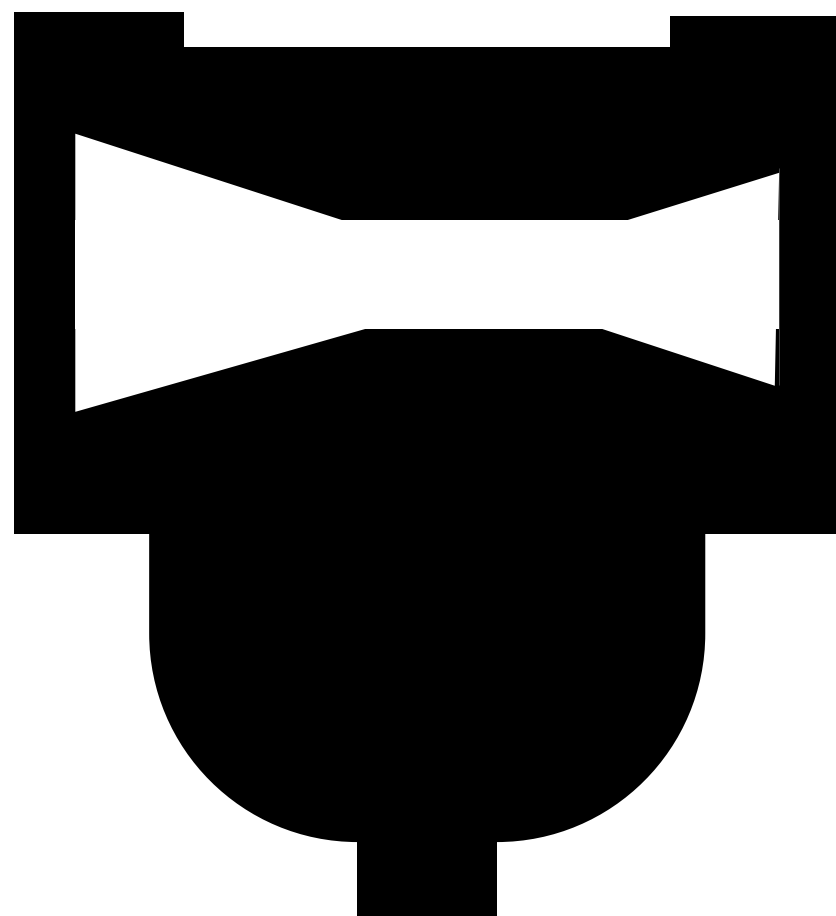


Hundredths	Rounded value
0, 1, 2	0
3, 4, 5, 6,	5
7, 8, 9	10

Shims are supplied in the following thickness.

	Middle drive pinion gear shim:
Thickness (mm)	0.10, 0.15, 0.20





CARB

5

**CHAPTER 5
CARBURETION**

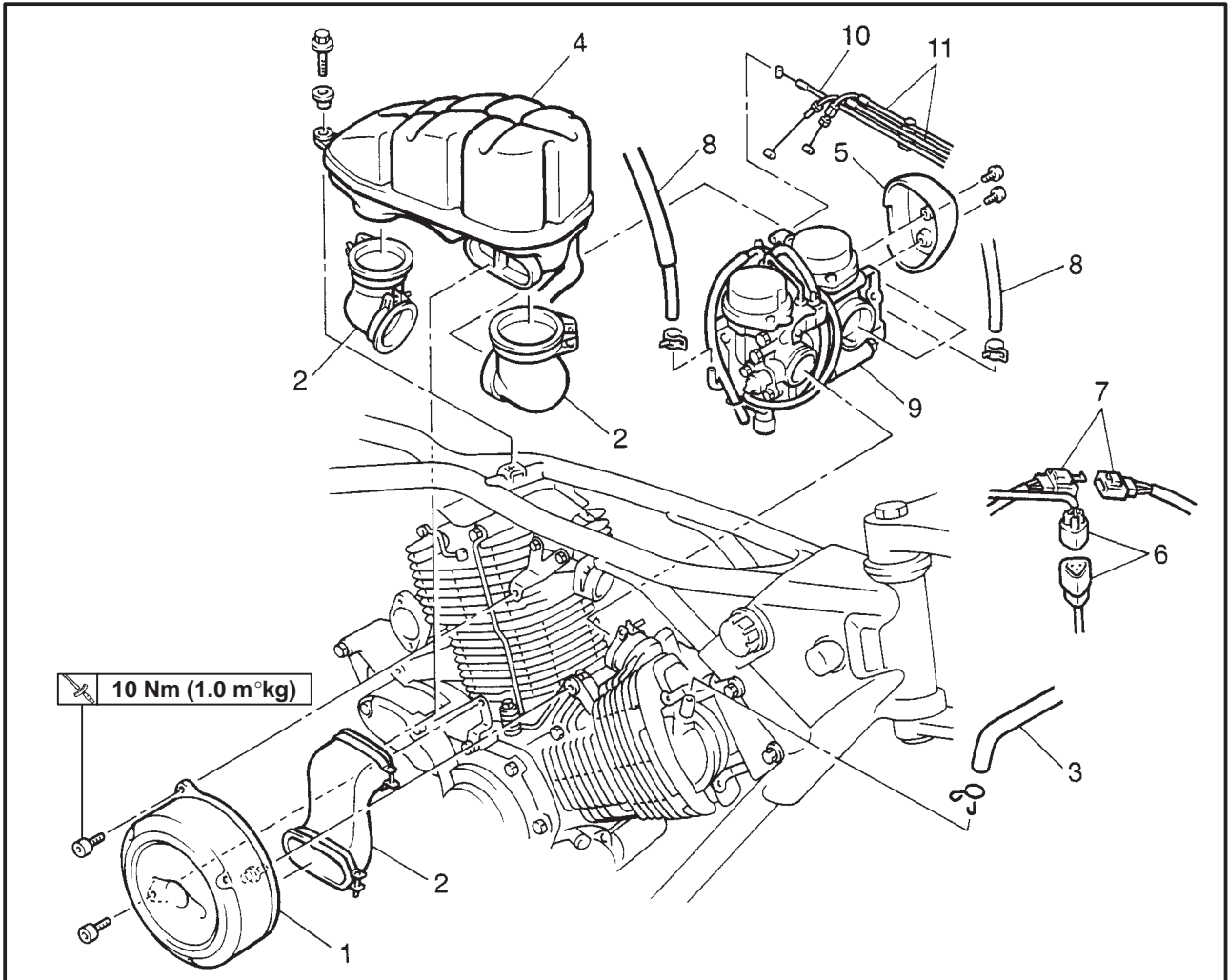
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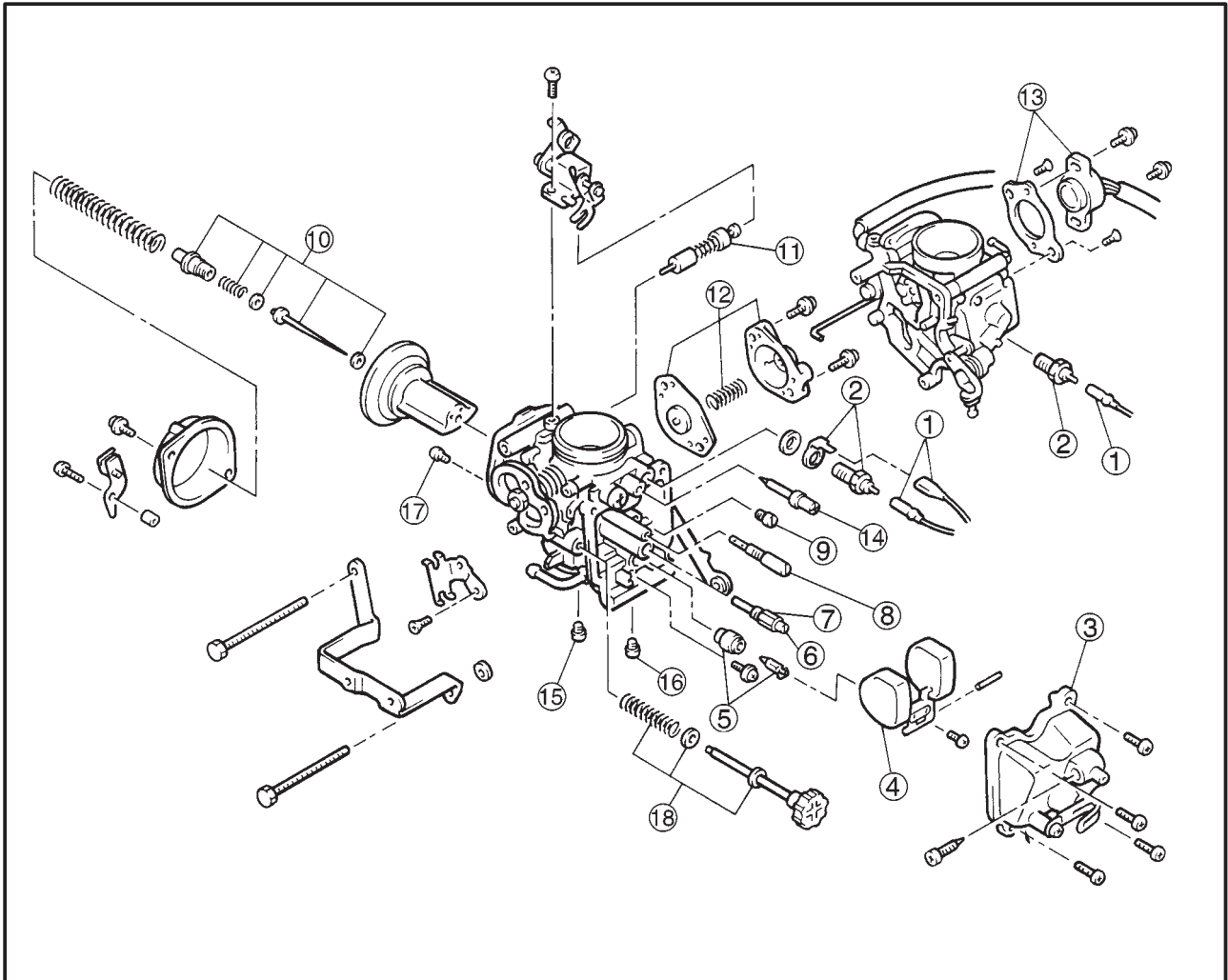
CARBURETION

CARBURETOR

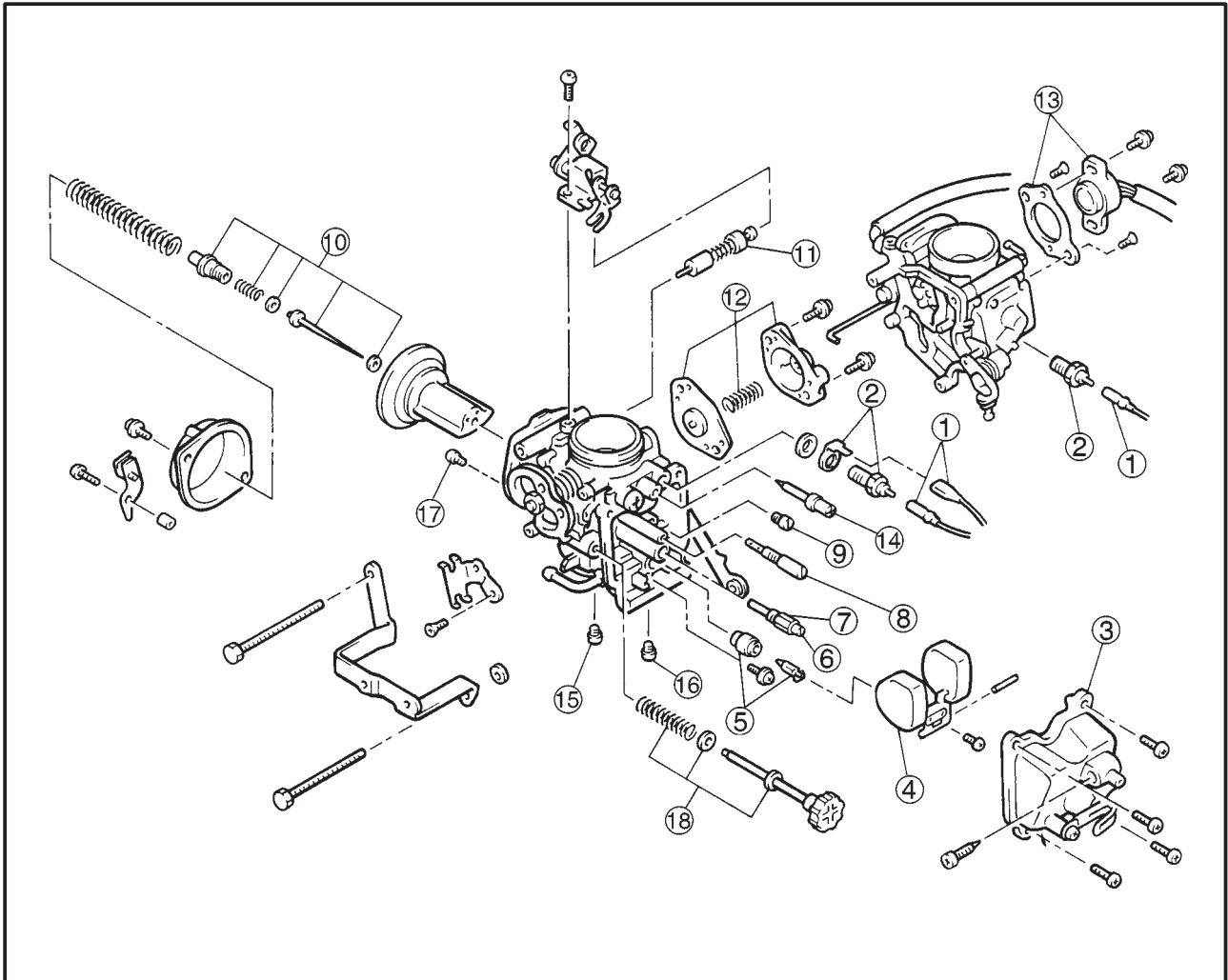


Order	Job name/Part name	Q'ty	Remarks
	Removing the carburetors		
	Fuel tank		Remove the parts in the order listed. Refer to "FUEL TANK AND SEATS" in CHAPTER 3.
1	Air filter case assembly	1	
2	Air ducts	3	
3	Cylinder head breather hose	1	Disconnect
4	Air chamber	1	
5	Cover	1	
6	Throttle position sensor lead	1	Disconnect
7	Carburetor heater lead	1	Disconnect
8	Fuel hoses	2	Disconnect
9	Carburetor assembly	1	
10	Starter cable	1	NOTE: _____
11	Throttle cables	2	After removing the carburetor assembly, remove the starter cable and throttle cables.

			For installation, reverse the removal procedure.



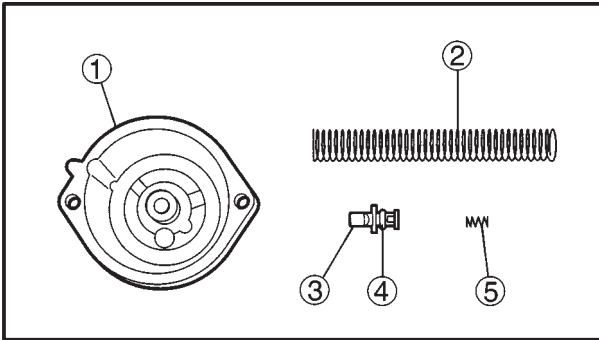
Order	Job name/Part name	Q'ty	Remarks
	Disassembling the carburetor.		Disassemble the parts in the order listed.
①	Carburetor heater leads	2	
②	Carburetor heaters	2	12V 30W
③	Float chamber/gasket	1	
④	Float	1	
⑤	Needle valve set	1	
⑥	Main jet	1	
⑦	Jet holder	1	
⑧	Pilot jet	1	
⑨	Starter jet	1	Refer to "CARBURETOR ASSEMBLY".
⑩	Jet needle set	1	
⑪	Starter plunger set	1	



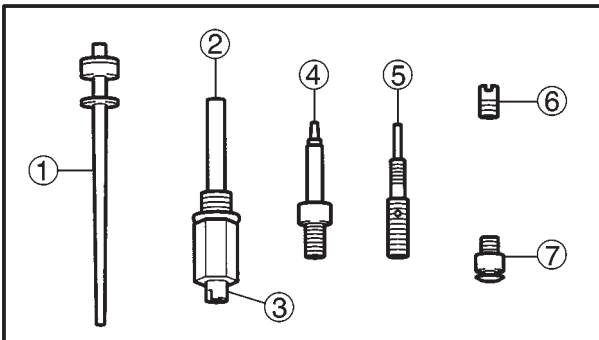
Order	Job name/Part name	Q'ty	Remarks
⑫	Diaphragm set	1	Refer to "ASSEMBLING THE CARBURETORS".
⑬	Throttle position sensor	1	Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR (TPS)".
⑭	Pilot screw	1	
⑮	Main air jet	1	
⑯	Pilot air jet 1	1	
⑰	Pilot air jet 2	1	
⑱	Throttle stop screw set	1	
			For assembly, reverse the disassembly procedure.

CARBURETOR

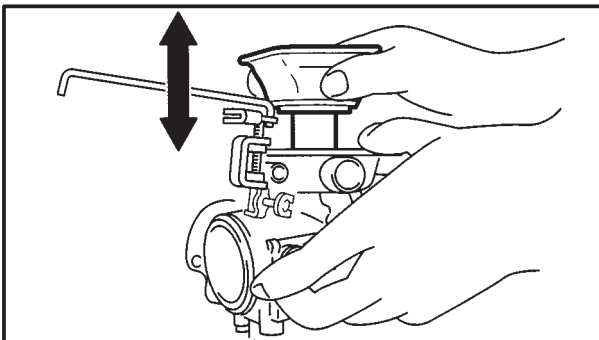
CARB



8. Check:
- ° vacuum chamber cover ①
 - ° piston valve spring ②
 - ° plastic cap ③
 - ° O-ring ④
 - ° spring ⑤
- Cracks/damage → Replace.



9. Check:
- ° jet needle ①
 - ° needle jet ②
 - ° main jet ③
 - ° pilot screw ④
 - ° pilot jet ⑤
 - ° main air jet ⑥
 - ° starter jet ⑦
- Bends/damage/wear → Replace.
Obstruction → Clean.
Blow out the jets with compressed air.



10. Check:
- ° piston valve movement
- Insert the piston valve into the carburetor body and move it up and down.
- Tightness → Replace the piston valve.

11. Check.
- ° fuel feed pipes
 - ° hose joint
- Cracks/damage → Replace.
Obstruction → Clean.
Blow out the pipes with compressed air.

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



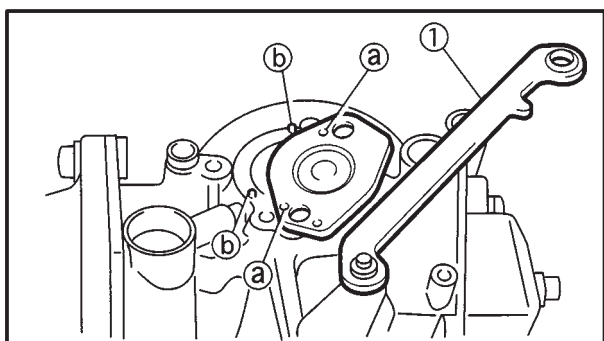
EB600042

ASSEMBLING THE CARBURETORS

The following procedure applies to both of the carburetors.

CAUTION:

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



1. Install:
 - coasting enricher diaphragm
 - coasting enricher spring
 - coasting enricher cover

NOTE:

- Align the holes (a) on the coasting enricher diaphragm with the projections (b) in the carburetor body.
- When installing the coasting enricher, position the throttle connecting arm (1) as shown.

2. Install:
 - connecting bolts

NOTE:

After installing the connecting bolts, check that the throttle cable lever and starter plunger link operate smoothly.

EB600051

INSTALLING THE CARBURETORS

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



Engine idling speed
950 × 1,050 r/min

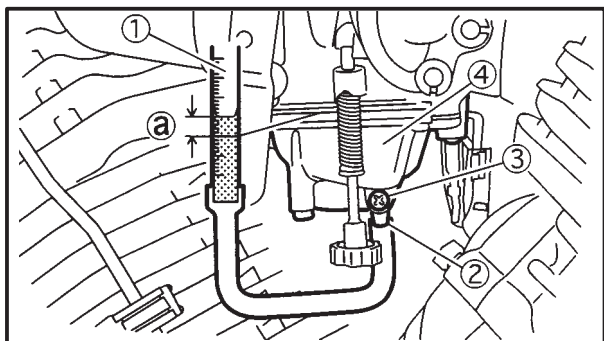
Refer to "ADJUSTING THE ENGINE IDLING SPEED" in chapter 3.

3. Adjust:
 - throttle cable free play



Throttle cable free play
(at the flange of the throttle grip)
4 × 6 mm

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



EB600063

MEASURING AND ADJUSTING THE FUEL LEVEL**1. Measure:**

° fuel level ①

Out of specification → Adjust.

**Fuel level (above the line on the float chamber)****4 × 5 mm**

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

**Fuel level gauge****90890-01312**

- Loosen the fuel drain screw ③.
- Hold the fuel level gauge vertically next to the upper face of the float chamber ④.
- Measure the fuel level ①.

NOTE: _____

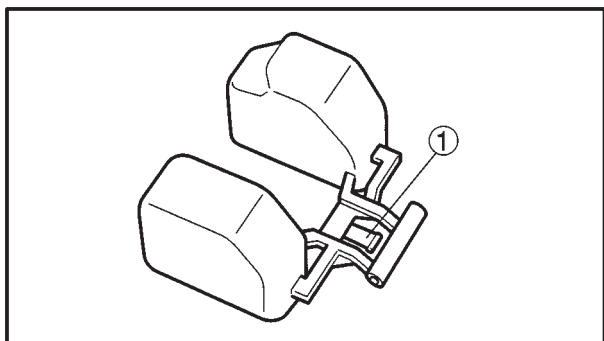
Fuel level readings should be equal on both sides of the carburetor assembly.

**2. Adjust:**

° fuel level



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





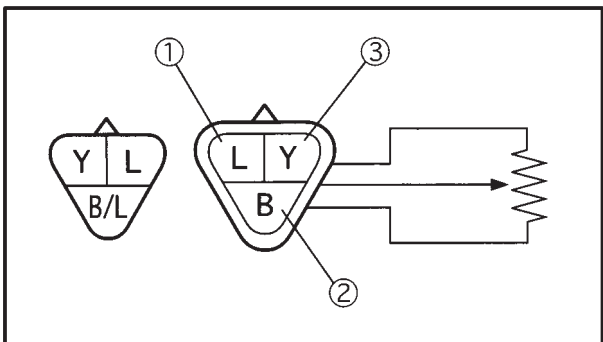
EB600071

CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE: _____

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


- 1. Inspect:
 - ° throttle position sensor



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

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


- c. Check the throttle position sensor resistance "R1".
Out of specification → Replace the throttle position sensor.

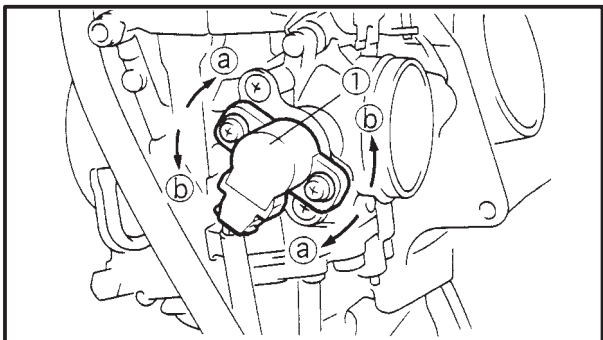
 **Throttle position sensor resistance "R1"**
4 ~ 6 k Ω at 20°C (68°F)
(blue – black)

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

Tester positive lead → yellow ③
Tester negative lead → black ②

- e. While slowly opening the throttle, check that the throttle position sensor resistance "R2" is within the specified range.
Out of specification → Replace the throttle position sensor.

 **Throttle position sensor resistance "R2"**
0.56 ~ 0.84 k Ω to 3.01 ~ 4.51 k Ω at 20°C (68°F)
(yellow – black)



- 2. Adjust:
 - ° throttle position sensor angle

- a. Loosen the throttle position sensor screws ①.
- b. Turn the throttle position sensor in direction ① or ② until the specified closed-throttle resistance is indicated on the pocket tester.

CARBURETOR

CARB



Closed-throttle resistance
0.56 × 0.84 kΩ at 20°C
(yellow – black)

c. Tighten the throttle position sensor screws.

NOTE: _____

Remove the pocket tester leads and connect the throttle position sensor coupler.





EB601000

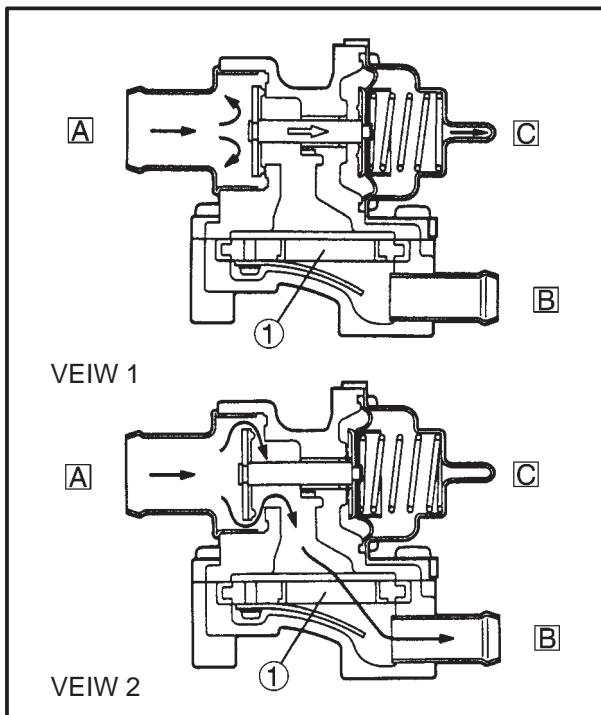
AIR INDUCTION SYSTEM (AIS)

AIR INDUCTION

This system burns the unburned exhaust gases by injecting fresh air (secondary air) at the exhaust port. This is to reduce the output of the hydrocarbons.

When there is negative pressure around the exhaust port, the reed valve opens and the secondary air flows into the exhaust port.

The required temperature for burning the unburned exhaust gases is approximately 600° to 700°C.



AIR CUT-OFF VALVE

The air cut-off valve is operated by intake gas pressure through the diaphragm. Normally, this valve is opened in order to allow fresh air to flow into the exhaust port.

When the throttle is rapidly closed, negative pressure is generated and the valve closes in order to prevent after-burning.

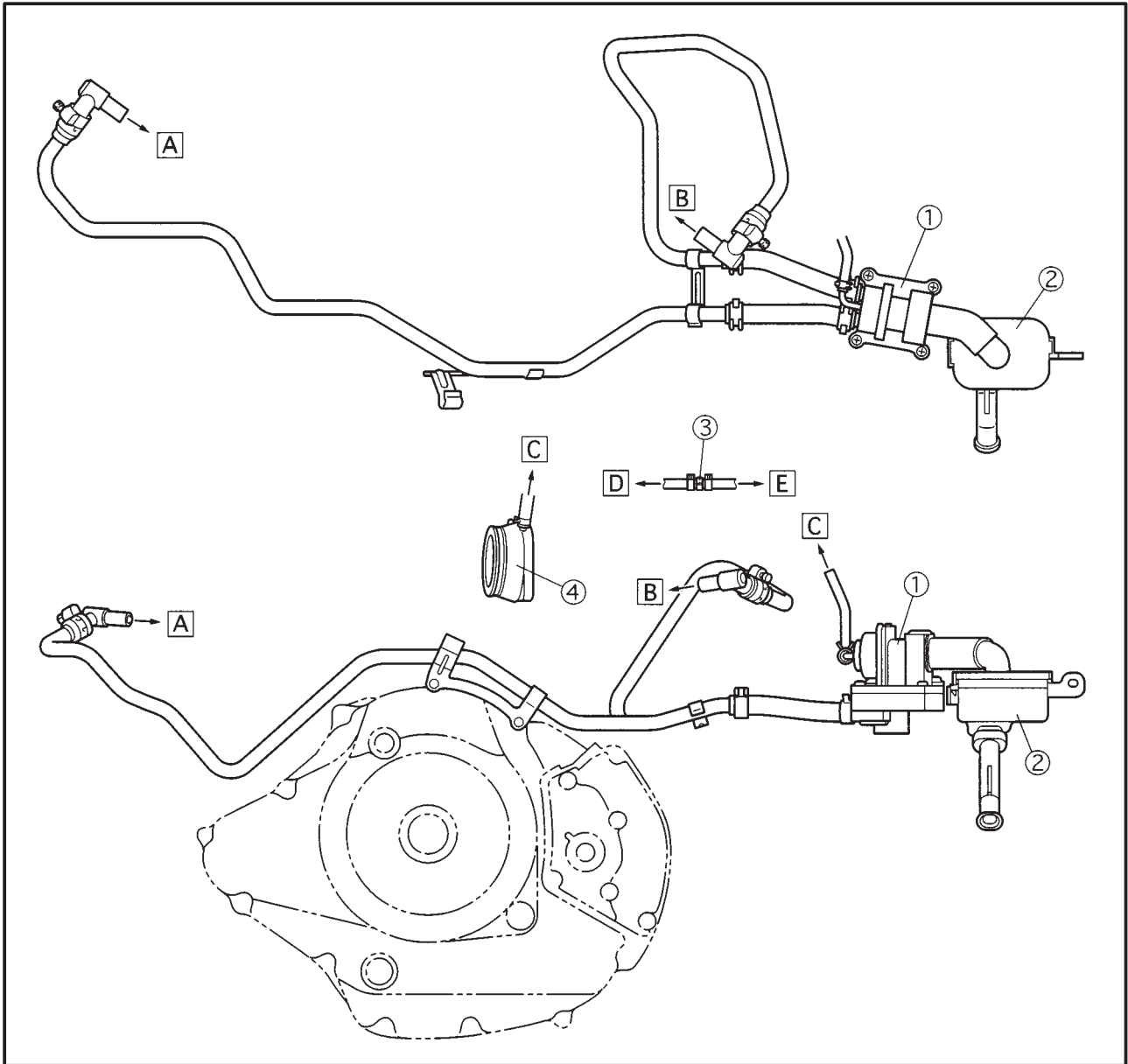
VIEW 1. (NO FLOW)

When decelerating (the throttle closes), the valve will close.

VIEW 2. (FLOW)

During normal operation the valve is open.

- A From the air filter
- B To the cylinder heads
- C To the carburetor joint
- ① Reed valve

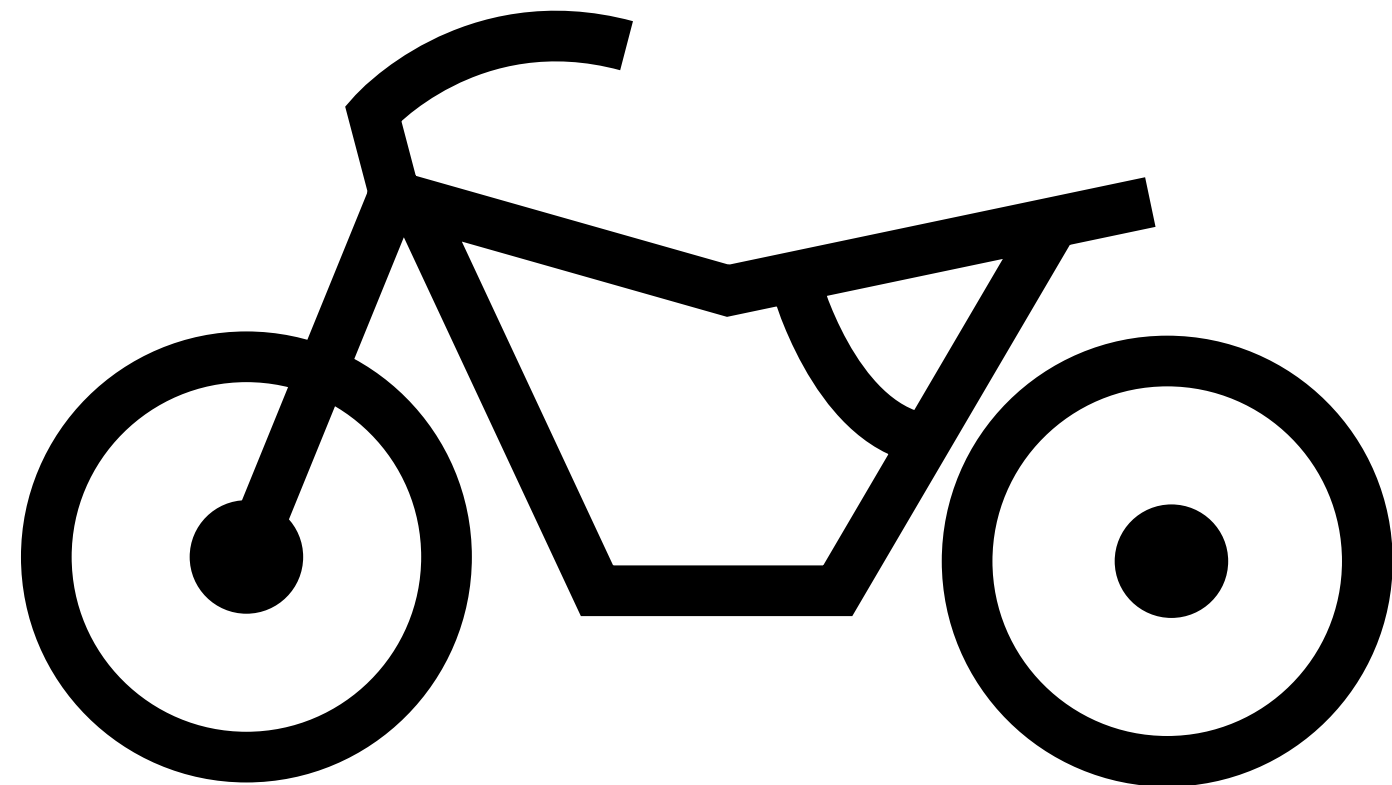


- ① Reed valve
- ② Air filter
- ③ Orifice
- ④ Carburetor joint (near cylinder)
- A To the front cylinder head
- B To the rear cylinder head
- C To the orifice
- D To the carburetor joint (rear cylinder)
- E To the AIS valve

AIR INDUCTION SYSTEM INSPECTION

1. Inspect:
 - ° hose connections
Poor connections → Properly connect.
 - ° hoses
 - ° reed valves
 - ° air cut-off valve
 - ° air filter
Cracks/damage → Replace.
Clogged → Clean.

NOTE: _____
 The orifice ③ should be installed with the arrow mark facing the AIS valve side.



CHAS

6

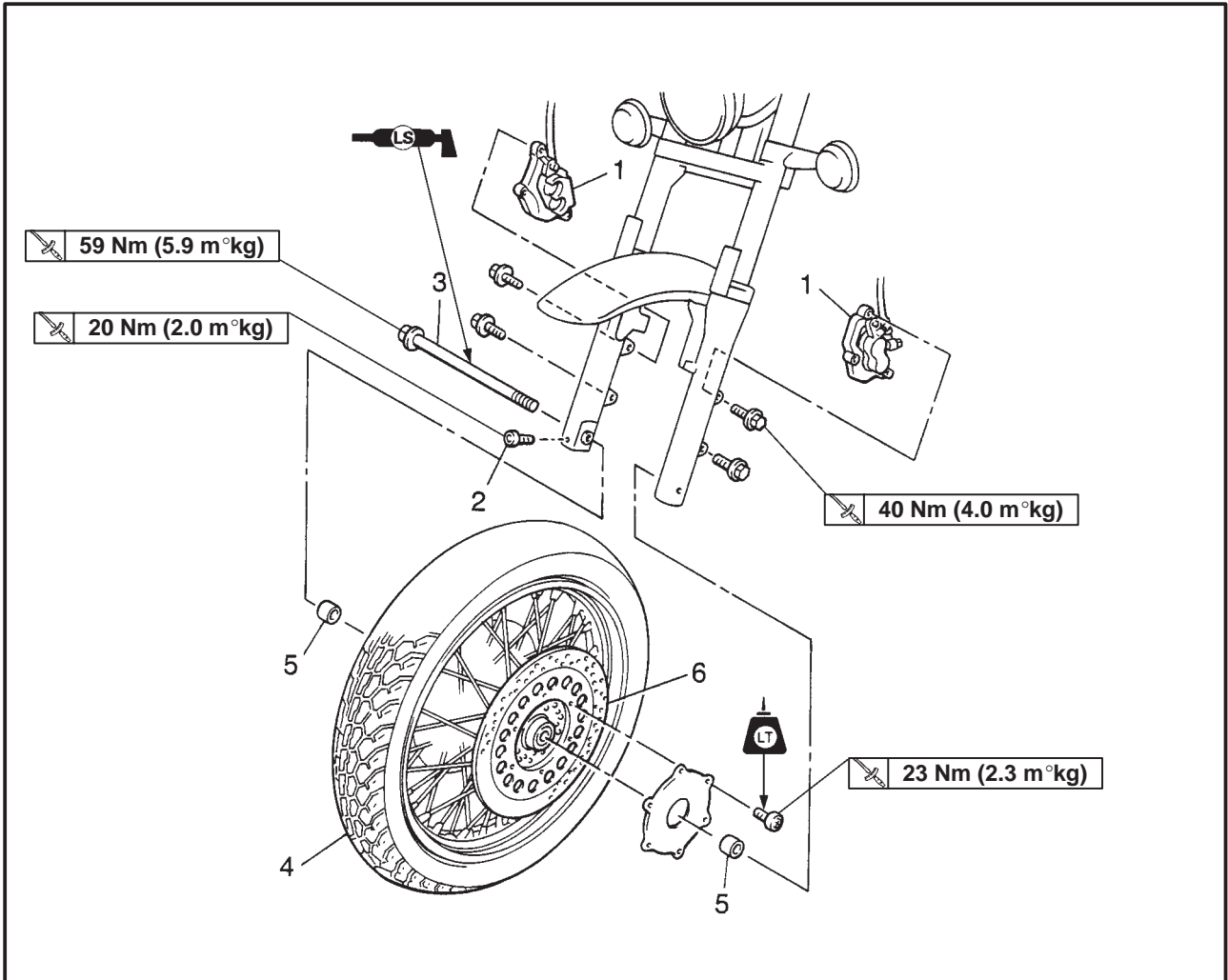
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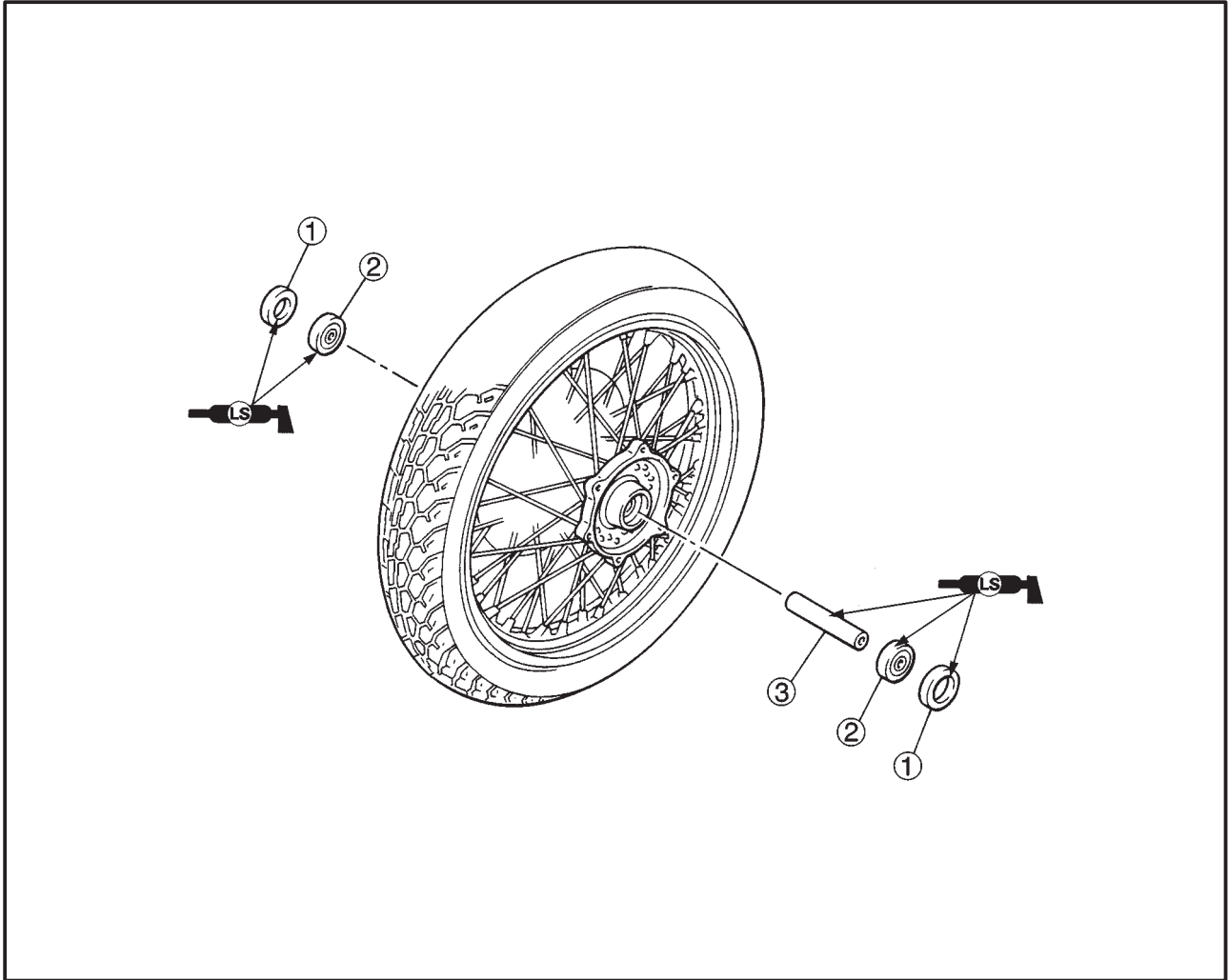
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CHASSIS

FRONT WHEEL AND BRAKE DISCS



Order	Job name/Part name	Q'ty	Remarks
	Removing the front wheel and brake discs		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so there is no danger of it falling over.
1	Brake calipers	2	Refer to "REMOVING/INSTALLING THE FRONT WHEEL". Refer to "INSTALLING THE FRONT WHEEL". For installation, reverse the removal procedure.
2	Front wheel axle pinch bolt	1	
3	Front wheel axle	1	
4	Front wheel assembly	1	
5	Collars	2	
6	Brake discs	2	



Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front wheel		Disassemble the parts in the order listed.
①	Oil seals	2	
②	Bearings	2	
③	Collar	1	
			For assembly, reverse the disassembly procedure.



EAS00521

REMOVING THE FRONT WHEEL

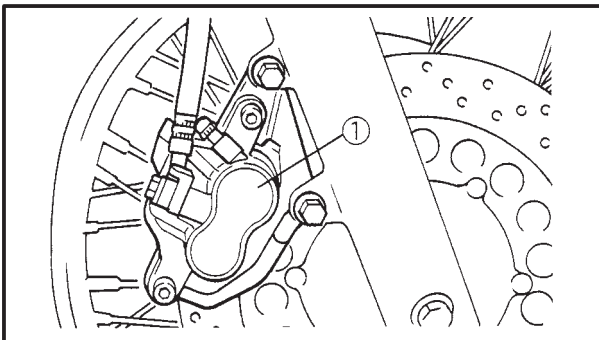
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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



2. Remove:

- brake calipers (1) (left and right)

NOTE:

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

3. Loosen:

- pinch bolt (front wheel axle) (1)

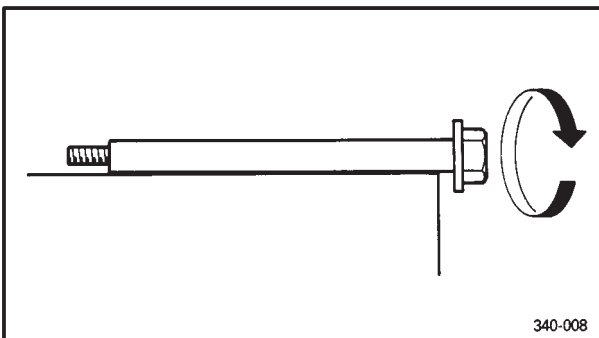
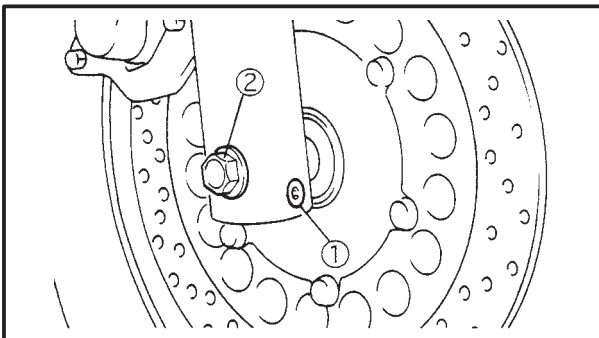
- front wheel axle (2)

4. Elevate:

- front wheel

NOTE:

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



340-008

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.

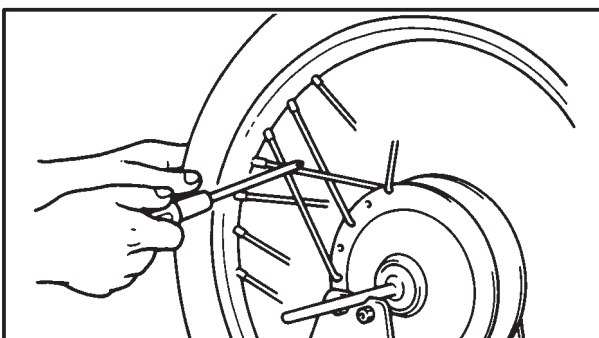
3. Check:

- 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.

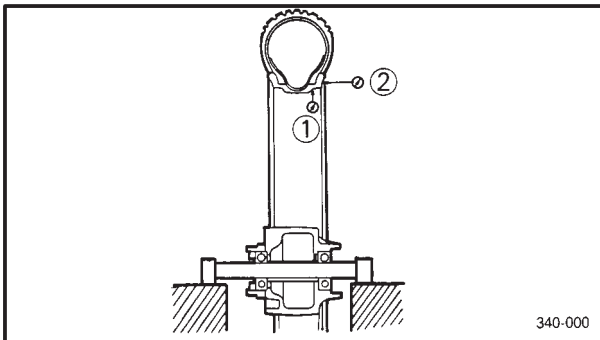
4. Tighten:

° spokes

3 Nm (0.3m°kg)

NOTE: _____

After tightening the spokes, measure the front wheel runout.



5. Measure:

° front wheel radial runout ①

° front wheel lateral runout ②

Over the specified limits → Replace.



Front wheel radial runout limit

1.0 mm

Front wheel lateral runout limit

0.5 mm

6. Check:

° collars

Damage/wear → Replace.

WARNING

° **New tires have a relatively low grip on the road surface until they have been slightly worn.**

Therefore, approximately 100 km should be traveled at normal speed before any highspeed riding is done.

7. Check

° wheel bearings

Front wheel turns roughly or is loose → Replace the wheel bearings.

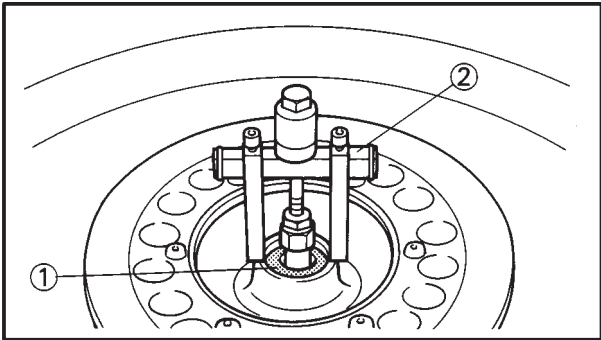
° oil seals

Damage/wear → Replace.

8. Replace:

° wheel bearings (New)

° oil seals (New)



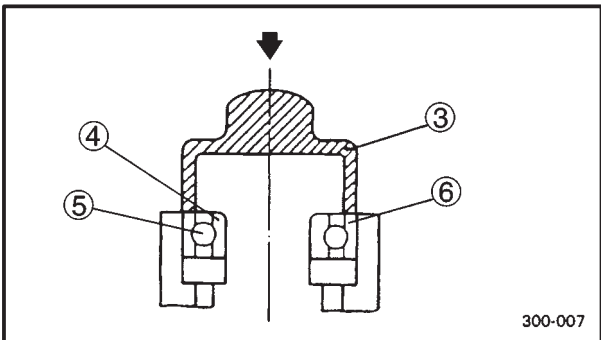
- a. Clean the outside of the front wheel hub.
- b. Remove the oil seals ① with a flat-head screwdriver.

NOTE: _____
 To prevent damaging the wheel, place a rag between the screwdriver and the wheel surface.

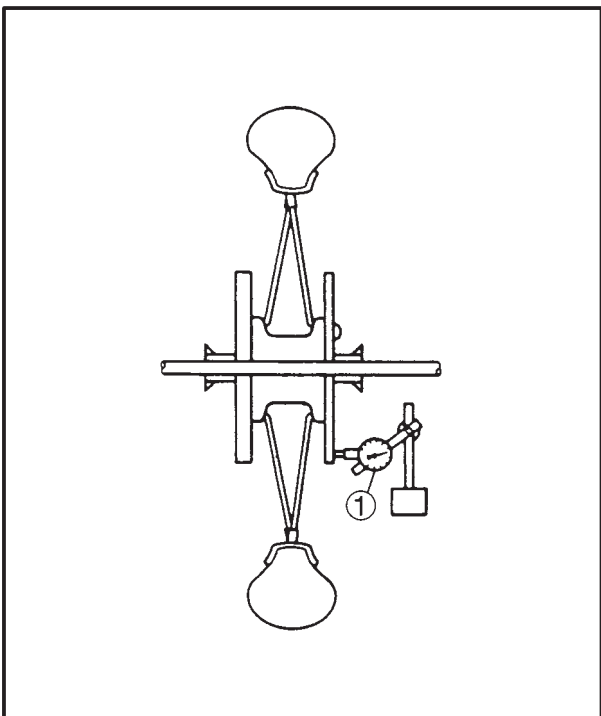
- c. Remove the wheel bearings with a general bearing puller ②.
- d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

CAUTION: _____

Do not contact the wheel bearing center race ④ or balls ⑤. Contact should be made only with the outer race ⑥.



NOTE: _____
 Use a socket ③ that matches the diameter of the wheel bearing outer race and oil seal.




EAS00531

CHECKING THE BRAKE DISCS

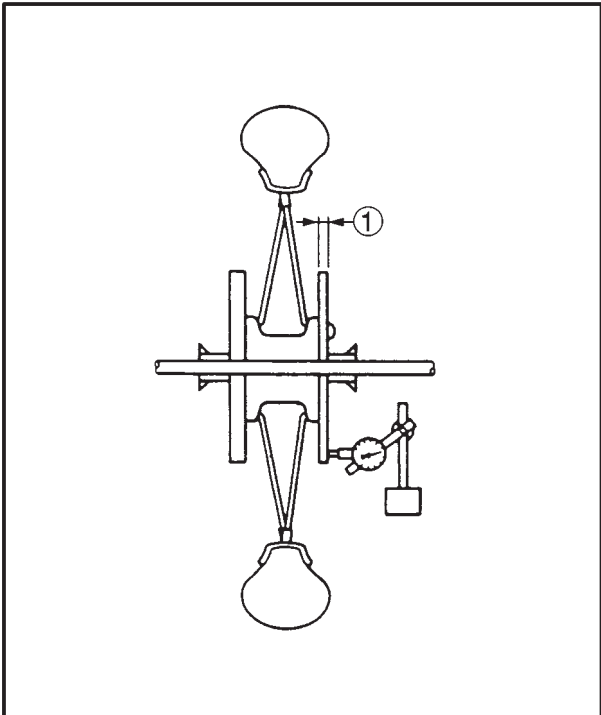
The following procedure applies to all of the brake discs.

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

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

- a. Place the motorcycle on a suitable stand so that the wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.

- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the deflection 2 – 3 mm below the edge of the brake disc.



- 3. Measure:
 - ° brake disc thickness ①
 Measure the brake disc thickness at a few different locations.
 Out of specification → Replace.

	Brake disc thickness limit (minimum)
	Front: 4.5 mm
	Rear: 5.5 mm


- 4. Adjust:
 - ° brake disc deflection



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

NOTE: _____

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

	Brake disc bolt
	23 Nm (2.3 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.



EAS00544

INSTALLING THE FRONT WHEEL

The following procedure applies to both brake discs.

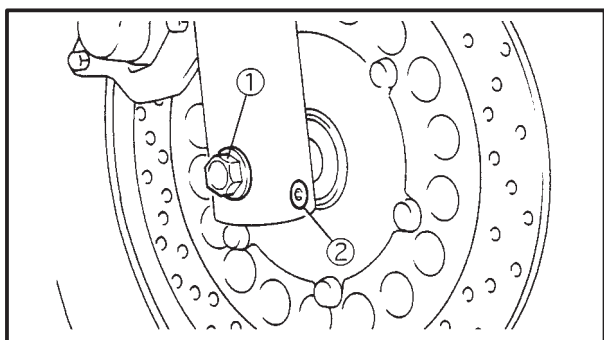
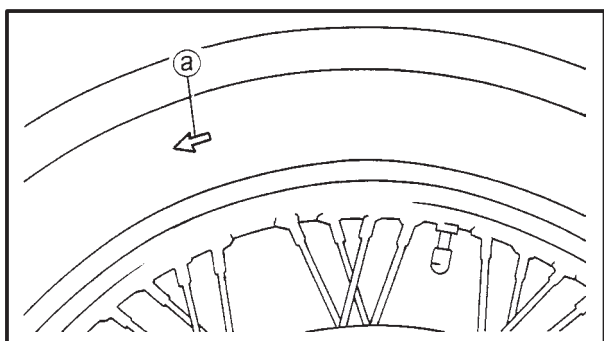
1. Lubricate:
 - ° wheel axle
 - ° oil seallips


	Recommended lubricant Lithium soap base grease
-----------------------------------------------------------------------------------	-----------------------------------------------------------------

2. Install:
 - ° front wheel assembly

NOTE: _____

The arrow mark (a) on the tire must point in the direction of the wheel.



3. Tighten:
 - ° wheel axle ①  **59 Nm (5.9 m°kg)**
 - ° wheel axle pinch bolt ②  **20 Nm (2.0 m°kg)**

CAUTION: _____

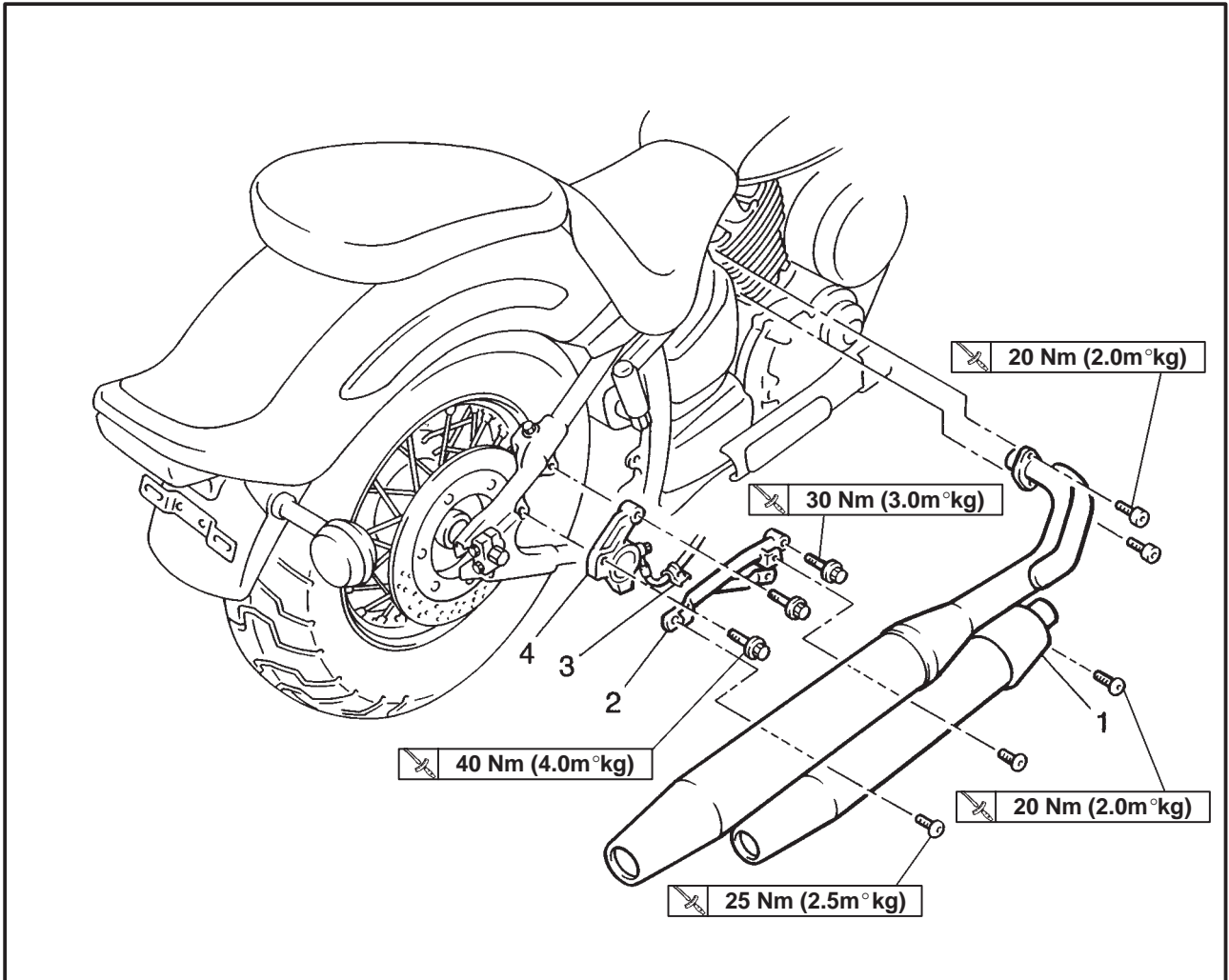
Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

4. Install:
 - ° brake caliper  **40 Nm (4.0 m°kg)**

! WARNING _____

Make sure that the brake hose is routed properly.

REAR WHEEL AND BRAKE DISC
MUFFLER AND BRAKE CALIPER

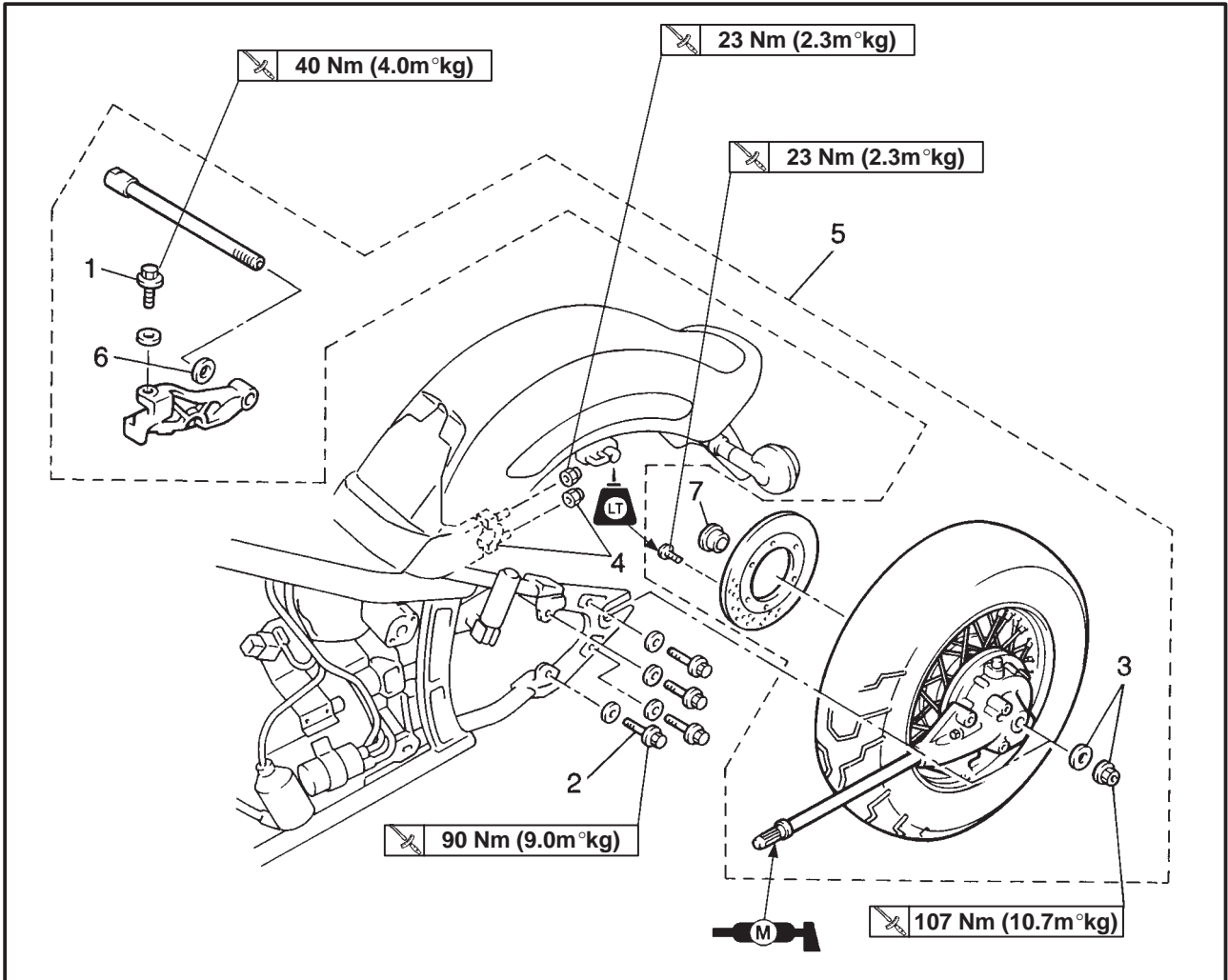


Order	Job name/Part name	Q'ty	Remarks
	Removing the muffler and brake caliper		Remove the parts in the order listed.
1	Muffler	1	
2	Muffler stay	1	
3	Brake hose holder	1	
4	Brake caliper	1	Refer to "REMOVING THE REAR WHEEL". For installation, reverse the removal procedure.

REAR WHEEL AND BRAKE DISC

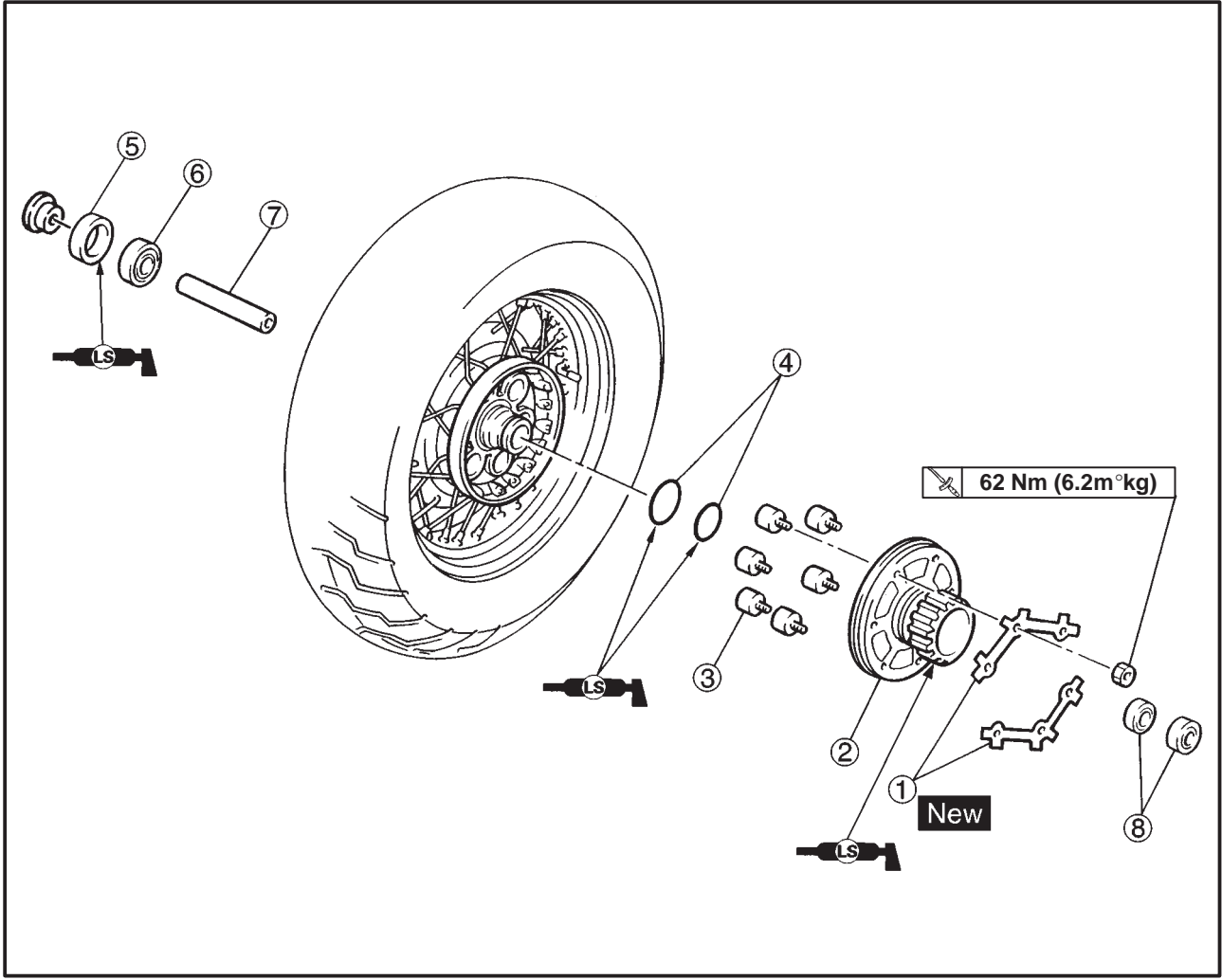


REAR WHEEL



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed. ⚠ WARNING Securely support the motorcycle so there is no danger of it falling over.
	Final gear oil		Drain Refer to "FINAL GEAR OIL REPLACEMENT" in CHAPTER 3.
	Fuel tank and seats		Refer to "FUEL TANK AND SEATS" in CHAPTER 3.
	Rear fender assembly		Loosen
1	Brake caliper bracket bolt	1	Refer to "REMOVING/INSTALLING THE REAR WHEEL".
2	Bolts	4	
3	Rear axle nut/washer	1/1	
4	Rear axle end nuts/axle holder	2/1	
5	Rear wheel assembly	1	
6	Washer	1	
7	Collar	1	
			For installation, reverse the removal procedure.

REAR WHEEL AND BRAKE DISC



Order	Job name/Part name	Q'ty	Remarks
	Rear wheel disassembly		Remove the parts in the order listed.
	Disassembling the rear wheel		
①	Lock washers	2	
②	Clutch hub	1	
③	Dampers	6	
④	O-rings	2	
⑤	Oil seal	1	
⑥	Bearing	1	
⑦	Spacer	1	
⑧	Bearing	1	
			For assembly, reverse the disassembly procedure.

EAS00562

REMOVING THE REAR WHEEL

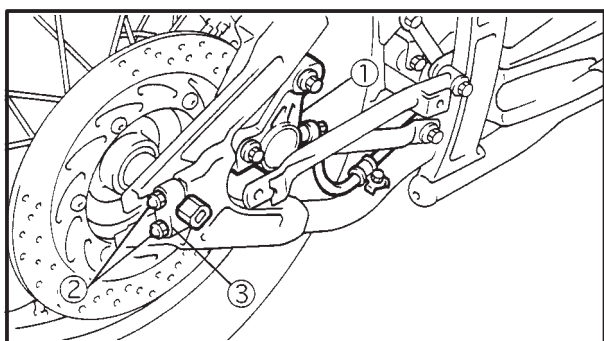
1. Stand the motorcycle on a level surface.

⚠ 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:
 - rear gear case fitting bolts
3. Remove:
 - brake caliper ①
 - brake caliper bracket bolt

NOTE:

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

4. Remove:
 - wheel axle nut
 - washer
5. Remove:
 - rear axle end nut ②
6. Remove:
 - rear axle holder ③
7. Remove:
 - rear wheel

EAS00566

CHECKING THE REAR WHEEL

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

Refer to "FRONT WHEEL AND BRAKE DISCS".
2. Check:
 - tire

Damage/wear → Replace.
Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.
3. Check:
 - spokes


Refer to "FRONT WHEEL AND BRAKE DISCS".
4. Measure:
 - rear wheel radial runout
 - rear wheel lateral runout

Refer to "FRONT WHEEL AND BRAKE DISCS".

REAR WHEEL AND BRAKE DISC




f. Tighten the rear axle holder with specified torque.

	Rear axle end nut 23 Nm (2.3 m°kg)
-----------------------------------------------------------------------------------	-----------------------------------------------------

g. Tighten the rear brake caliper bracket bolt with specified tightening torque.

	Brake caliper bracket bolt 40 Nm (4.0 m°kg)
-----------------------------------------------------------------------------------	--------------------------------------------------------------

h. Install the rear brake caliper on the bracket and tighten the bolts with specified tightening torque.

	Brake caliper bolt 40 Nm (4.0 m°kg)
-----------------------------------------------------------------------------------	------------------------------------------------------



EAS00575

ADJUSTING THE REAR WHEEL STATIC BALANCE

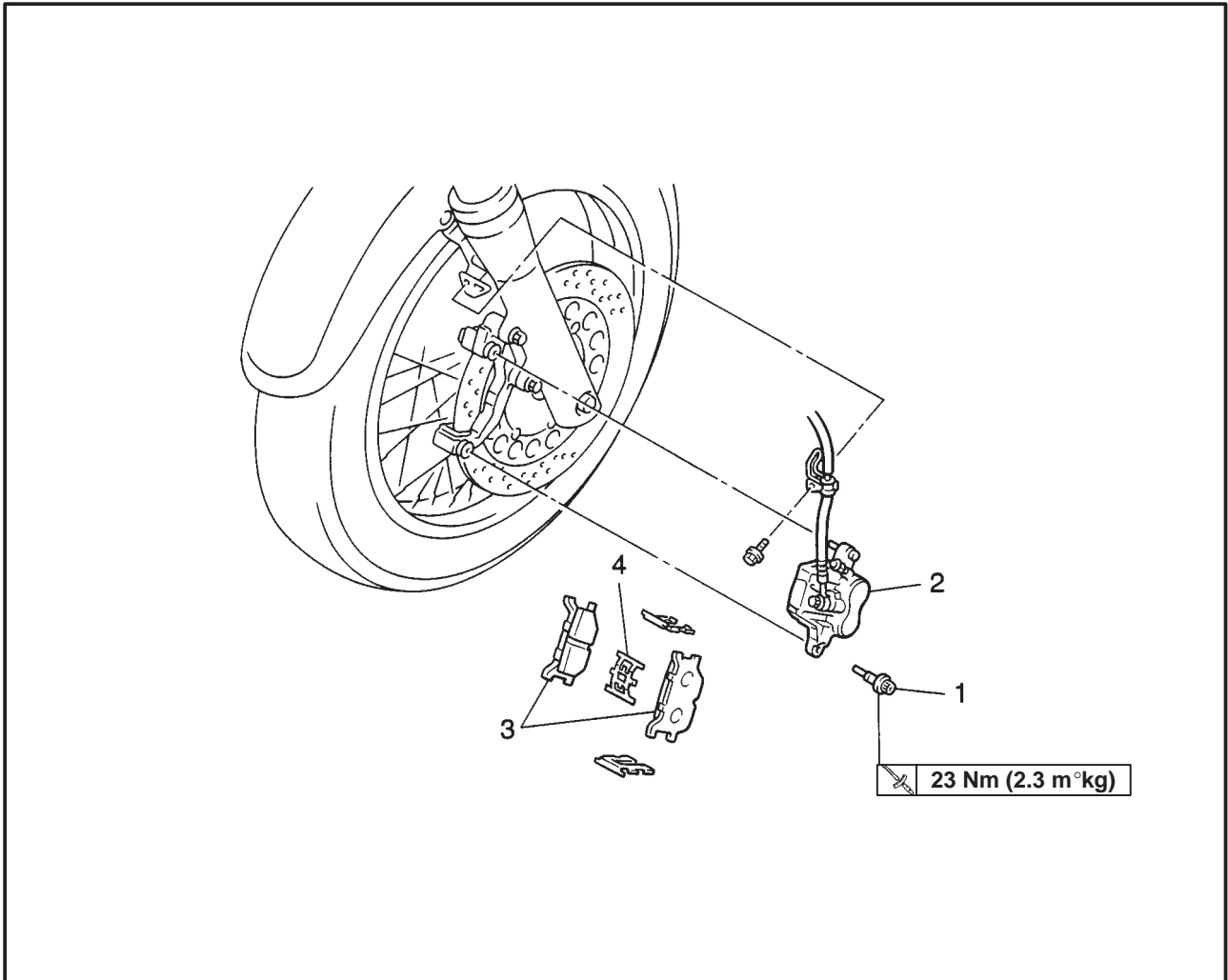
NOTE: _____

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



1. Adjust:
 - ° rear wheel static balanceRefer to “FRONT WHEEL AND BRAKE DISCS”.

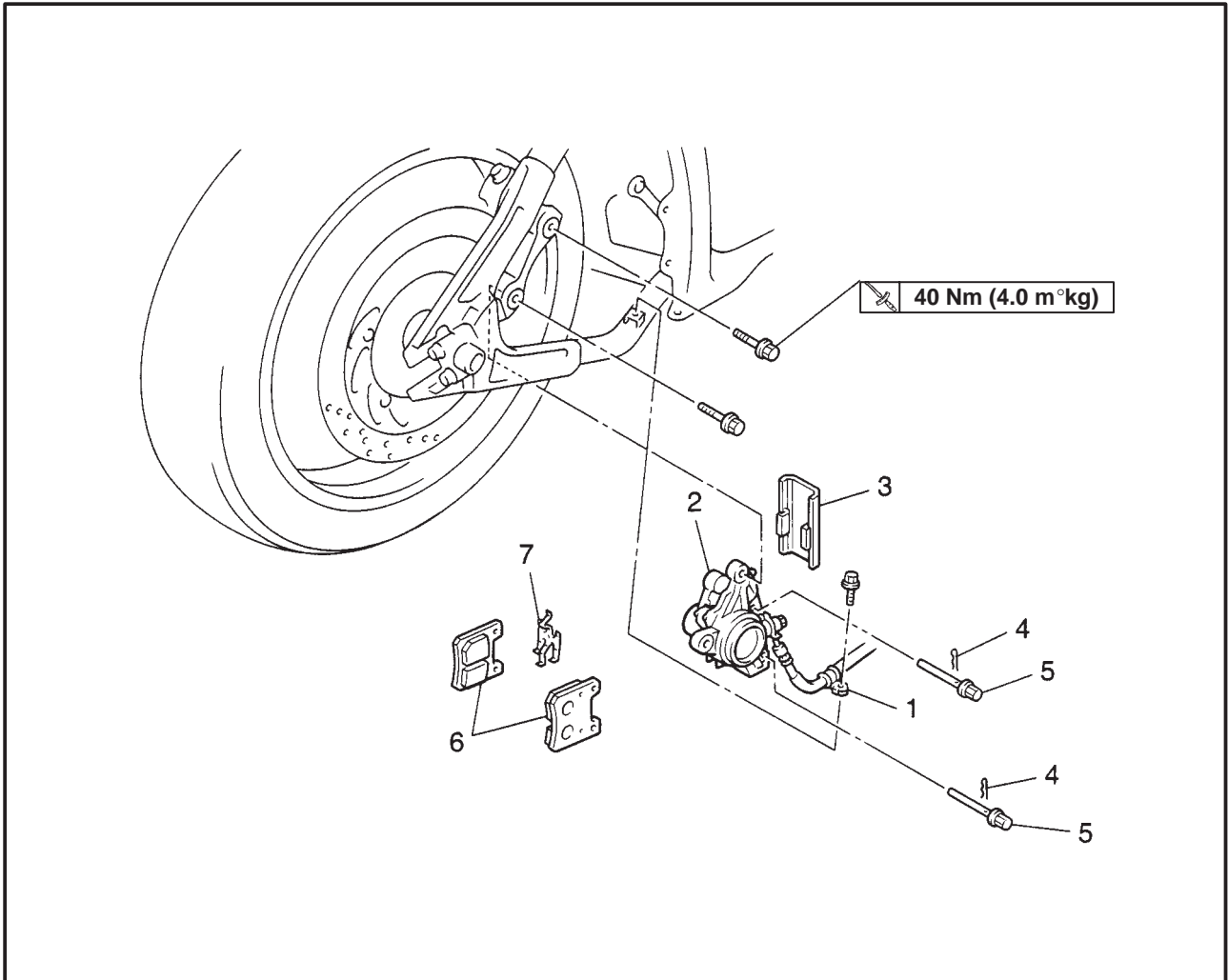
FRONT AND REAR BRAKES
FRONT BRAKE PADS



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

EAS00578

REAR BRAKE PADS



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake pads		
	Muffler		Remove the parts in the order listed. Refer to "REAR WHEEL AND BRAKE DISC".
	Muffler stay		
	Brake hose holder	1	
2	Caliper	1	Refer to "REPLACING THE REAR BRAKE PADS".
3	Cover	1	
4	Clips	2	
5	Pad pins	2	
7	Pad spring	1	
6	Brake pads	2	For installation, reverse the removal procedure.



EAS00579

CAUTION:

Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

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

First aid for brake fluid entering the eyes:

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

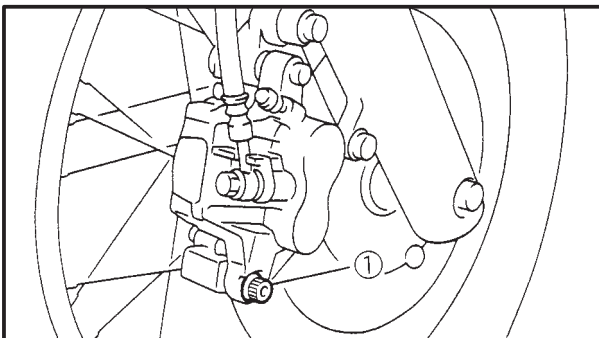
EAS00582

REPLACING THE FRONT BRAKE PADS

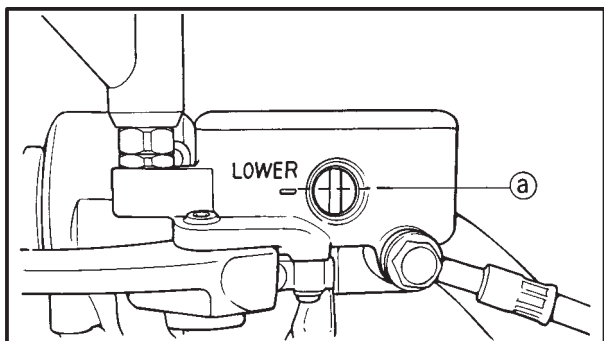
The following procedure applies to both brake calipers.

NOTE:

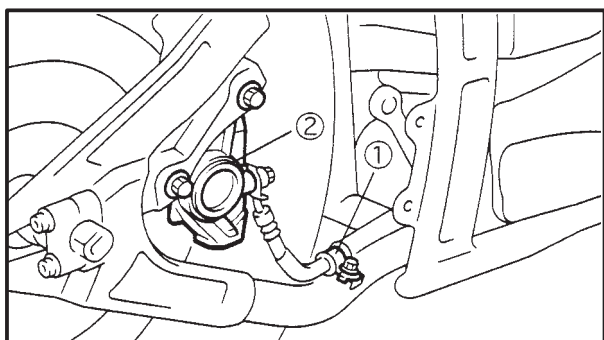
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

**1. Remove:**

- brake hose holder
- retaining bolt ①



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



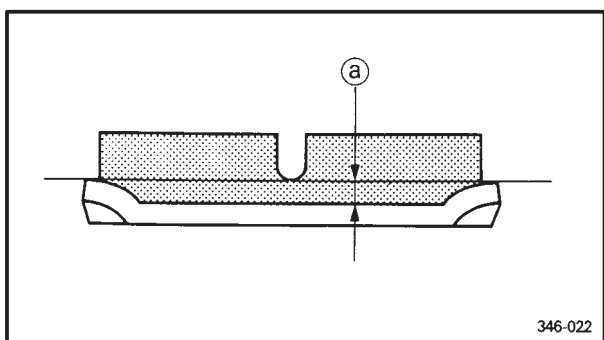
EAS00583

REPLACING THE REAR BRAKE PADS

NOTE:

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

1. Remove:
 - brake hose holder ①
 - brake caliper ②
2. Remove:
 - brake pad cover
 - brake pad clips
 - brake pad pins
 - brake pad spring
3. Remove:
 - brake pads
(along with the brake pad shims)
4. Measure:
 - brake pad wear limit (a)
Out of specification → Replace the brake pads as a set.

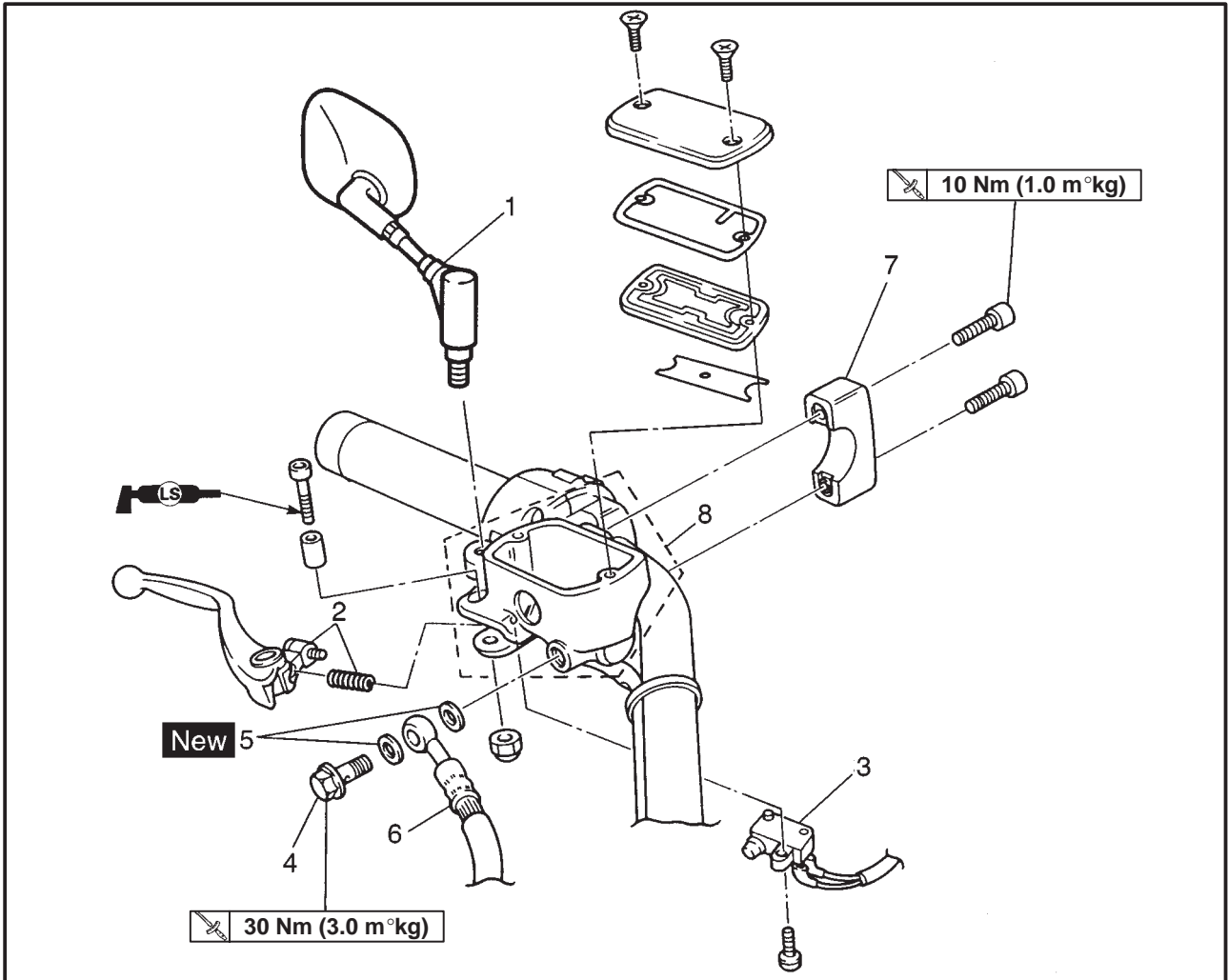


346-022

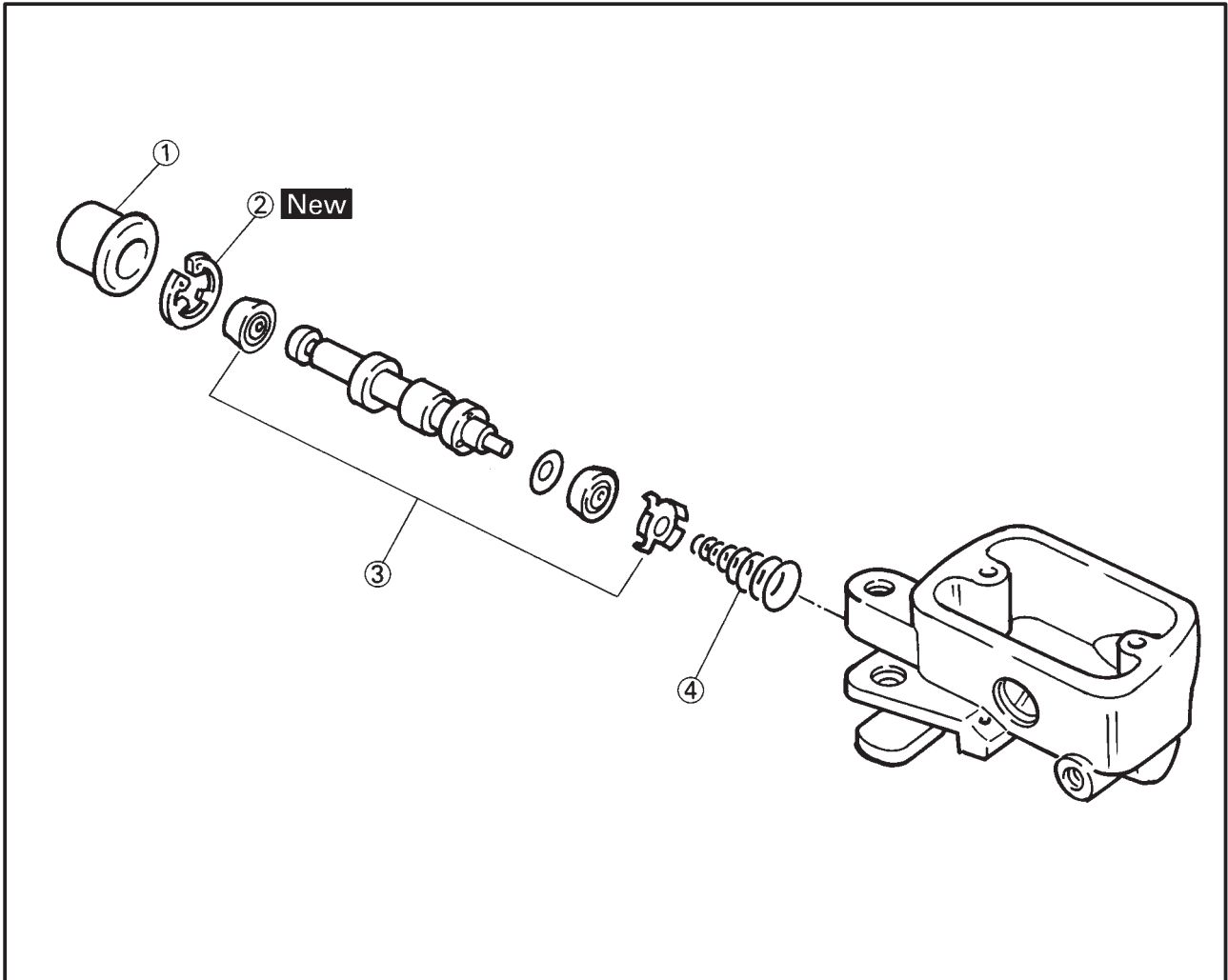


Brake pad wear limit
0.5 mm

FRONT BRAKE MASTER CYLINDER



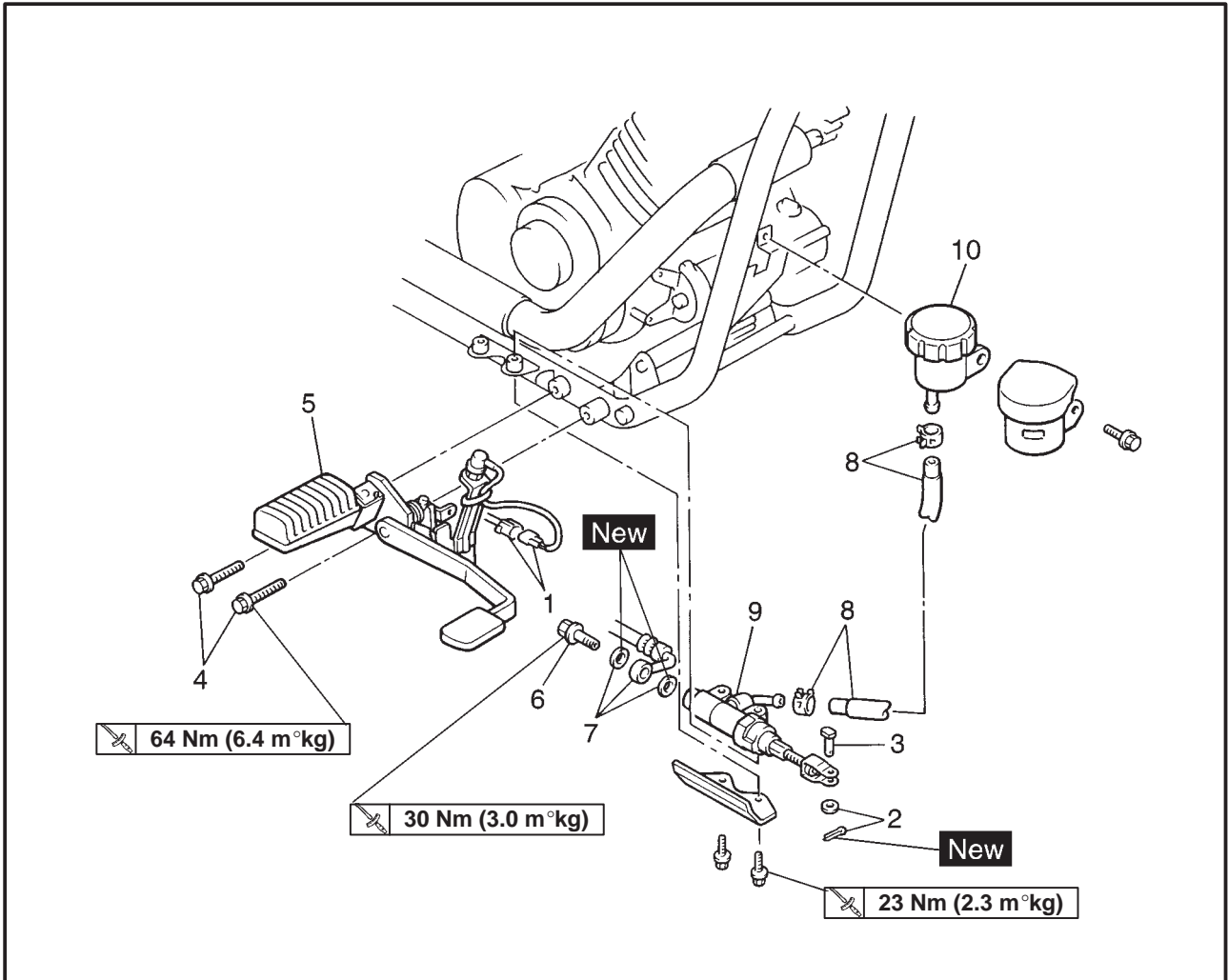
Order	Job name/Part name	Q'ty	Remarks
	Removing the front brake master cylinder.		Remove the parts in the order listed.
	Brake fluid		Drain
1	Rear view mirror (right)	1	
2	Brake lever/compression spring	1/1	
3	Front brake switch	1	
4	Union bolt	1	
5	Copper washers	2	Refer to "REMOVING/INSTALLING THE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



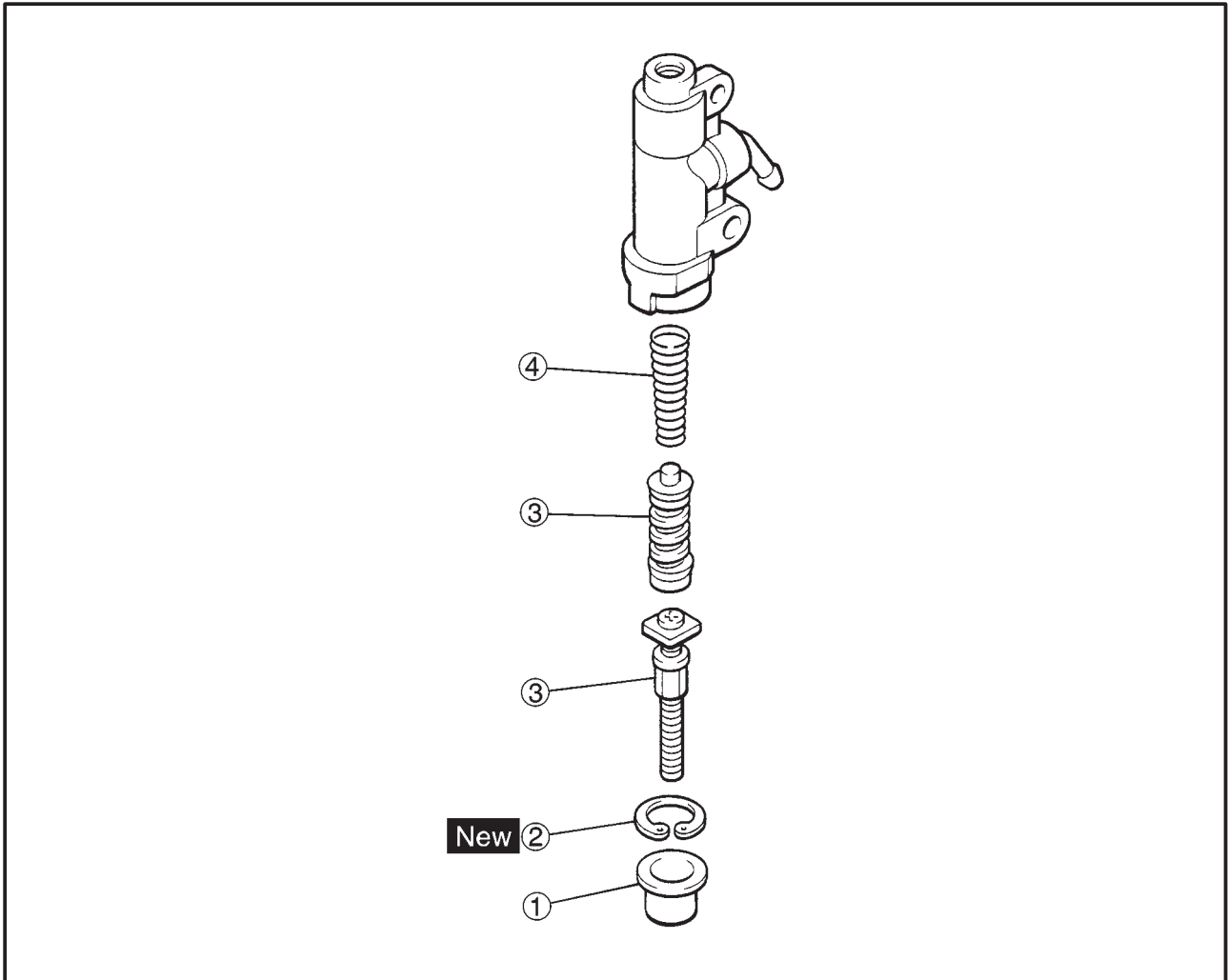
Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front brake master cylinder		Remove the parts in the order listed.
①	Dust boot	1	
②	Circlip	1	
③	Master cylinder cup	1	
④	Spring	1	
			For assembly, reverse the disassembly procedure.

EAS00586

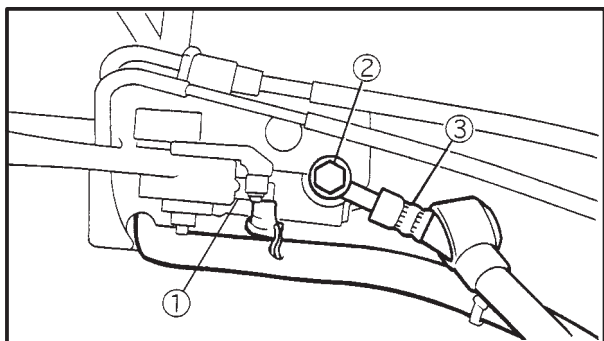
REAR BRAKE MASTER CYLINDER



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain
1	Brake switch connector	1	Disconnect
2	Cotter pin/washer	1/1	
3	Pin	1	
4	Bolts	2	
5	Brake pedal assembly	1	
6	Union bolt	1	Refer to "REMOVING/INSTALLING THE REAR BRAKE MASTER CYLINDER".
7	Copper washers/brake hose	2/1	
8	Clips/reservoir hose	2/1	
9	Master cylinder assembly	1	
10	Reservoir tank	1	For installation, reverse removal procedure.



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



EAS00588

REMOVING THE FRONT BRAKE MASTER CYLINDER

NOTE:

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

1. Remove:
 - rear view mirror (right)
 - brake lever/compression spring
 - brake switch ①
2. Remove:
 - union bolt ②
 - copper washers
 - brake hose ③

NOTE:

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

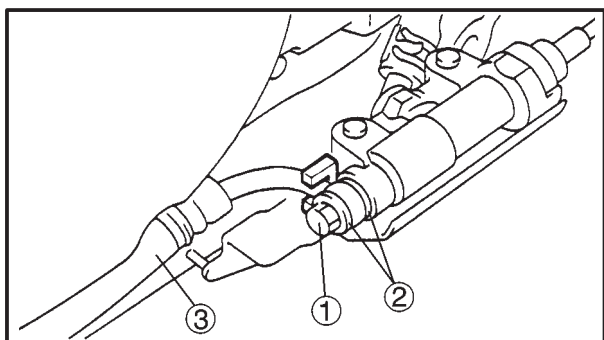
3. Remove:
 - master cylinder bracket
 - master cylinder

EAS00589

REMOVING THE REAR BRAKE MASTER CYLINDER

NOTE:

Before removing the rear brake master cylinder, drain the brake fluid from the entire brake system.

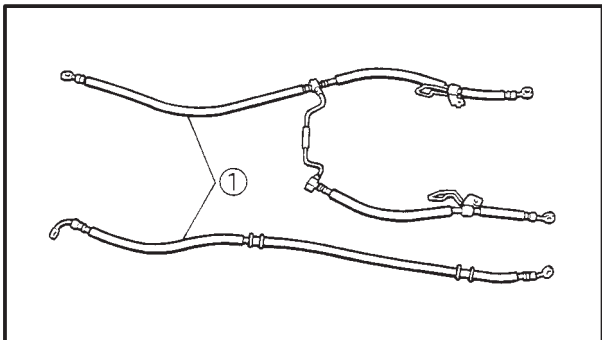
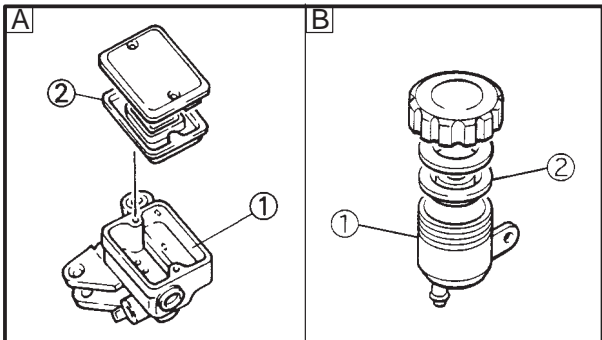
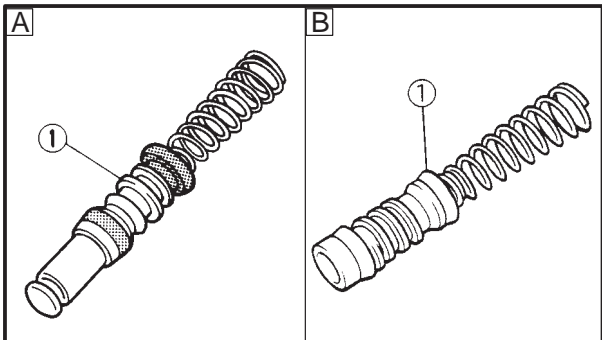
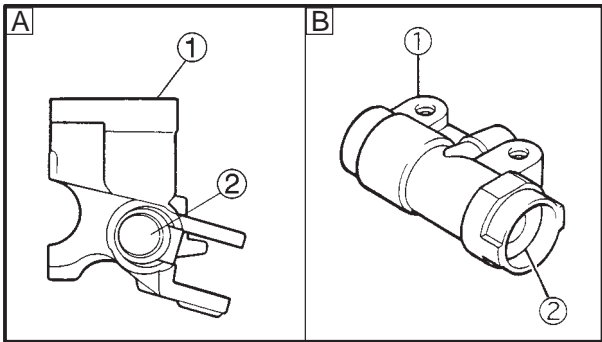


1. Remove:
 - brake switch connector
 - cotter pin/washer
 - pin
 - bolt/brake pedal assembly
2. Remove:
 - union bolt ①
 - copper washers ②
 - brake hose ③

NOTE:

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

3. Remove:
 - clips/reservoir hose
 - master cylinder assembly



EAS00592

CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

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

1. Check:

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

A Front

B Rear

2. Check:

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

A Front

B Rear

3. Check:

- brake fluid reservoir ①
Cracks/damage → Replace.
- brake fluid reservoir diaphragm ②
Cracks/damage → Replace.

A Front

B Rear

4. Check:

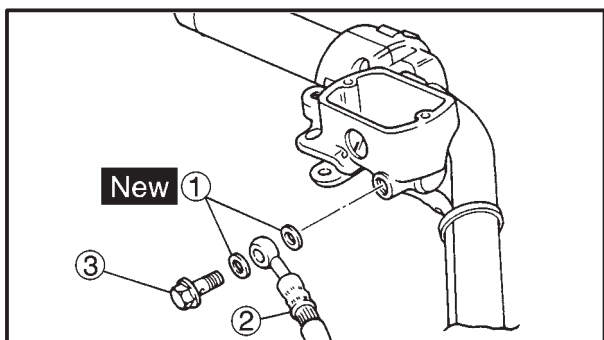
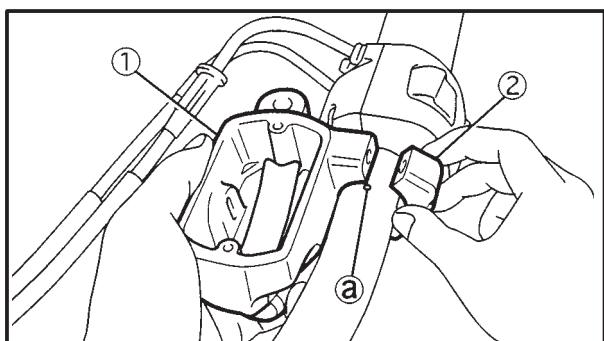
- brake hoses ①
Cracks/damage/wear → Replace.

EAS00598

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
 - brake master cylinder bracket ②

 **10 Nm (1.0 m°kg)**

NOTE:

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

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

 **30 Nm (3.0 m°kg)**

⚠ WARNING

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

NOTE:

- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebar to the left and to the right to make sure that the brake hose does not touch other parts (e. g., wire harness, cables, leads). Correct if necessary.

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

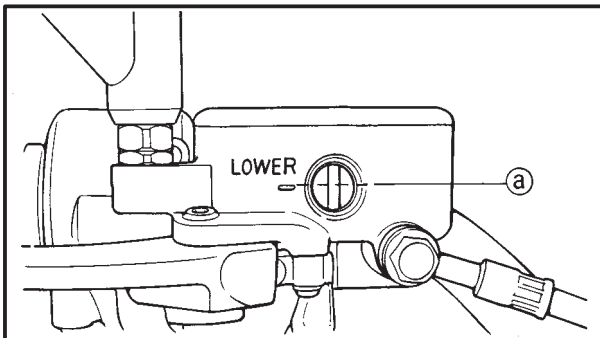
	Recommended brake fluid DOT 4
-------------------------------------------------------------------------------------	------------------------------------------

**⚠ WARNING**

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

CAUTION:

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



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



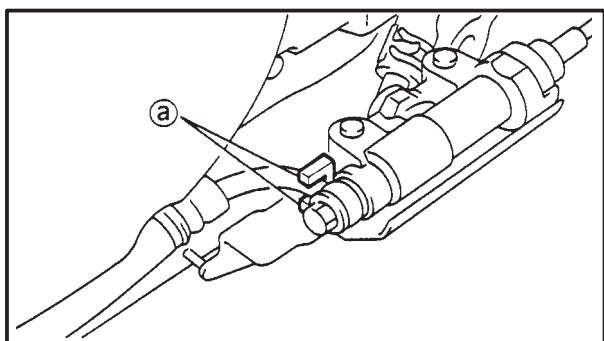
EAS00610

INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
 - copper washers (New)
 - brake hose



Union bolt
30 Nm (3.0 m°kg)



⚠ WARNING

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

CAUTION:

When installing the brake hose onto the brake master cylinder make sure that the brake pipe touches the projections (a) as shown.

2. Fill:
 - brake fluid reservoir (to the maximum level mark)



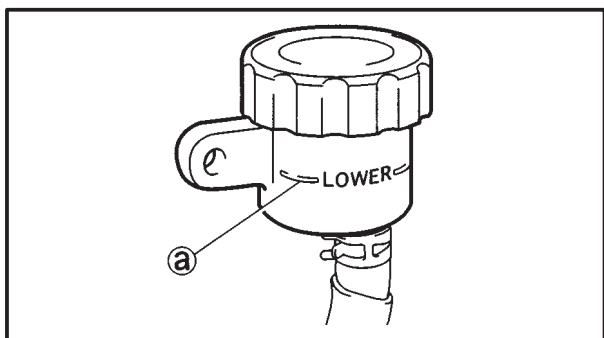
Recommended brake fluid
DOT 4

⚠ WARNING

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

CAUTION:

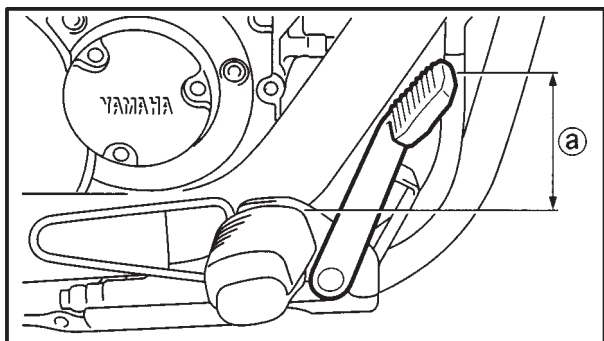
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



3. Bleed:
 - brake system

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
4. Check:
 - brake fluid level

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



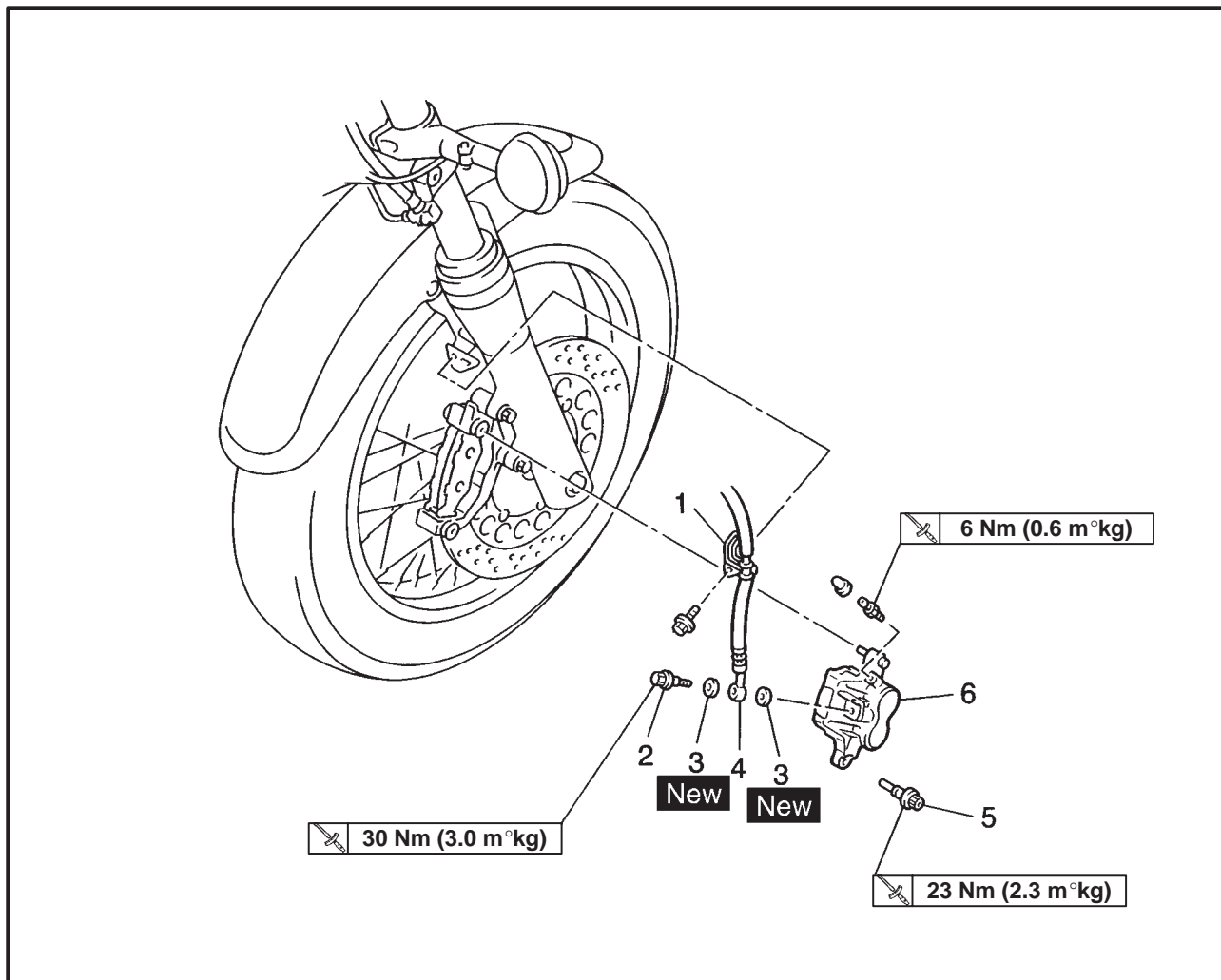
5. Adjust:
- ° brake pedal position ①
- Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.



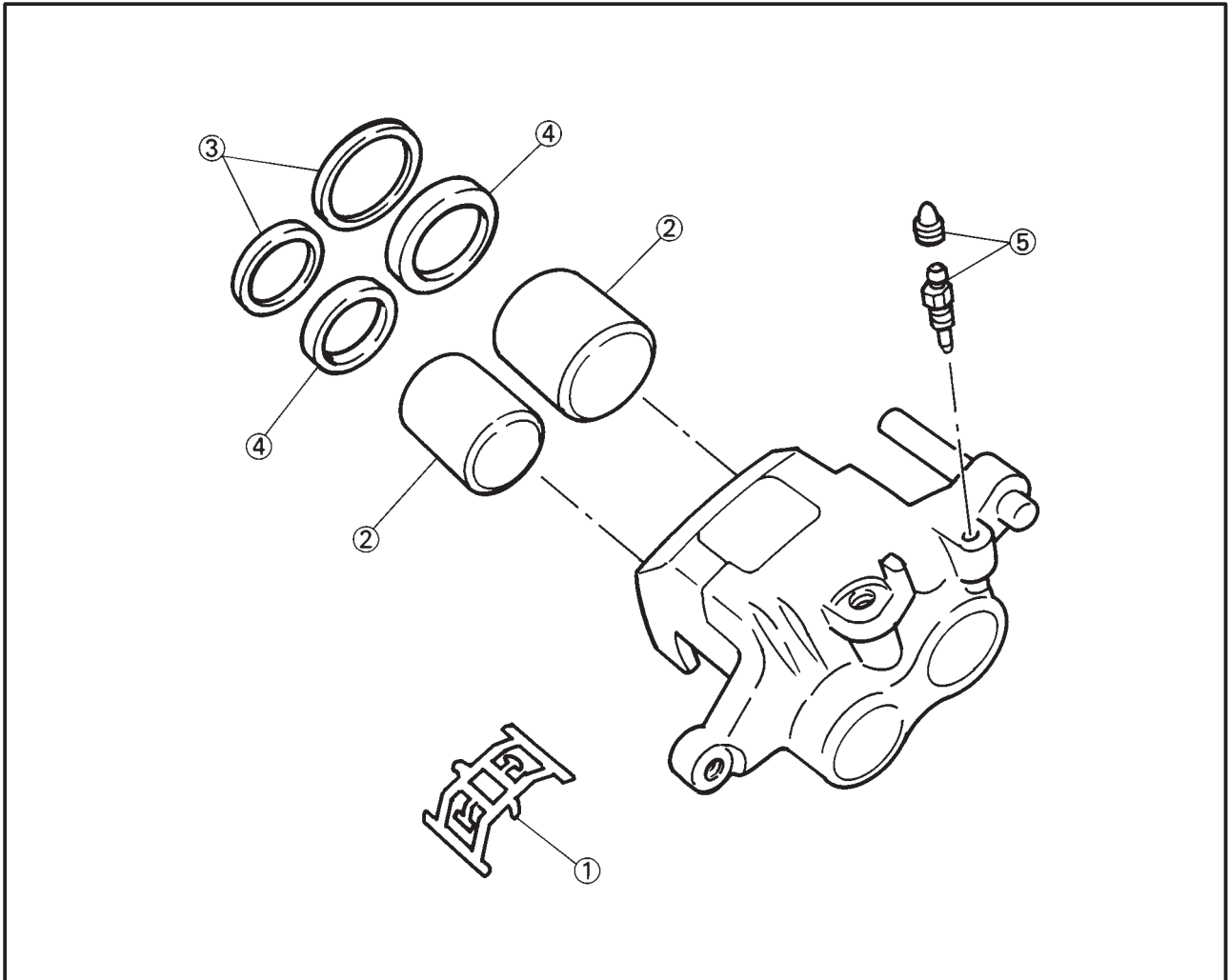
Brake pedal position (below the top of the rider footrest)
81.8 mm

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

FRONT BRAKE CALIPERS



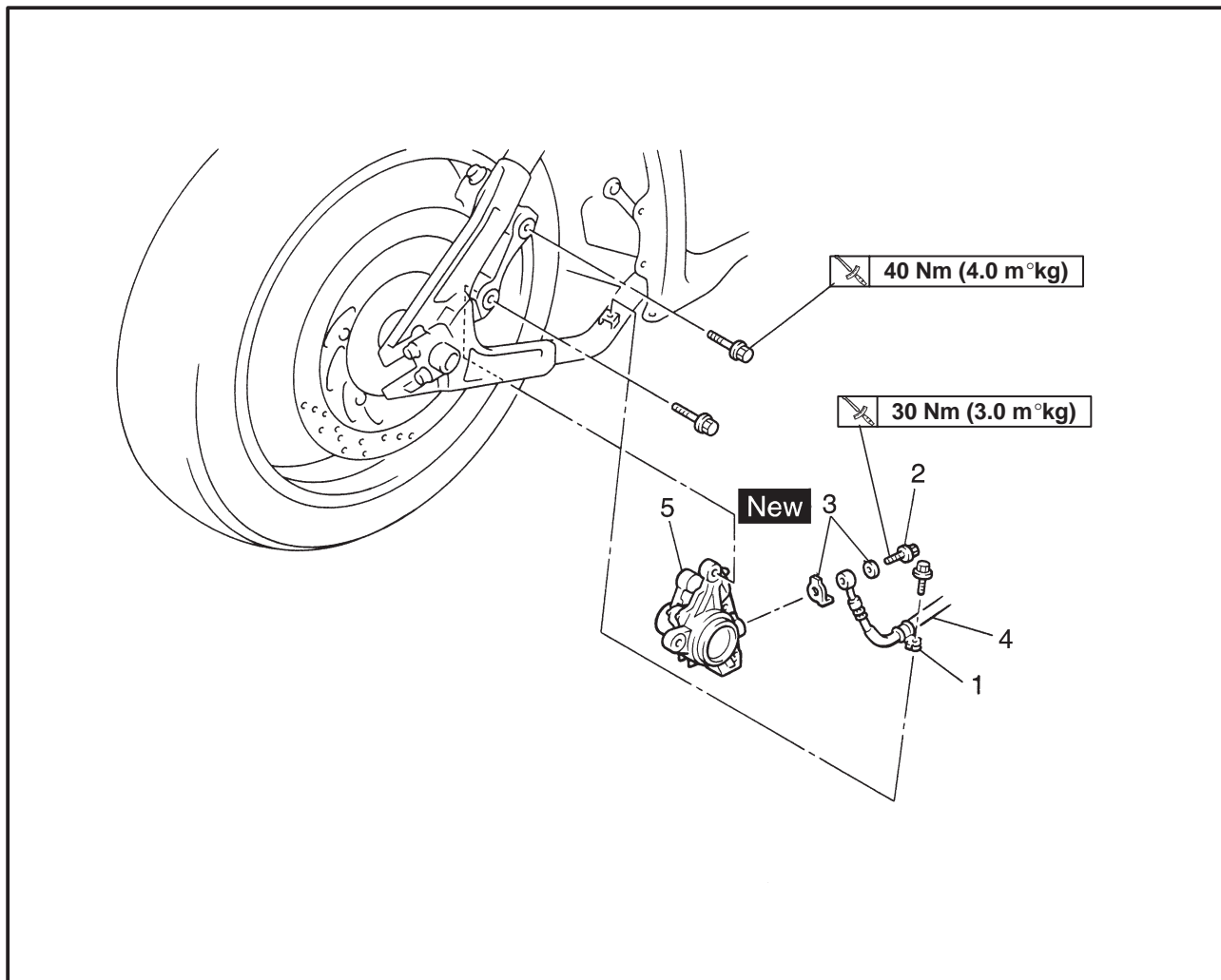
Order	Job name/Part name	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed. Drain
1	Brake fluid		
1	Brake hose holder	1	
2	Union bolt	1	Refer to "REMOVING/INSTALLING THE FRONT BRAKE CALIPERS".
3	Copper washers	2	
4	Brake hose	1	
5	Retaining bolt	1	
6	Brake caliper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



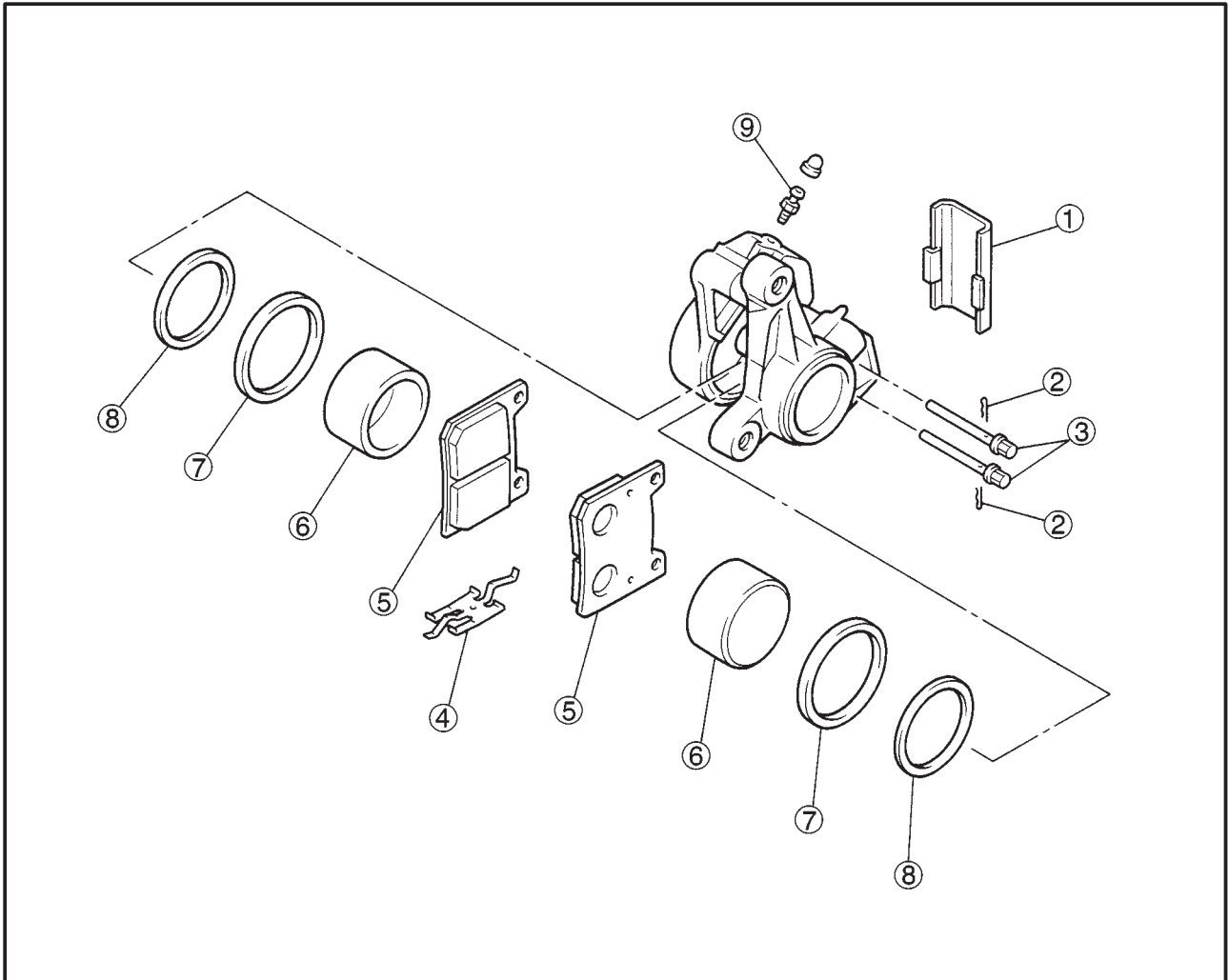
Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front brake calipers		Remove the parts in the order listed.
①	Pad spring	1	Refer to "REMOVING THE FRONT BRAKE CALIPERS".
②	Brake caliper pistons	2	
③	Dust seals	2	
④	Caliper piston seals	2	
⑤	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

ESA00616

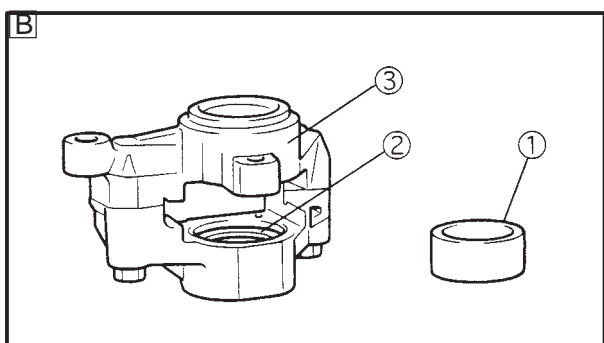
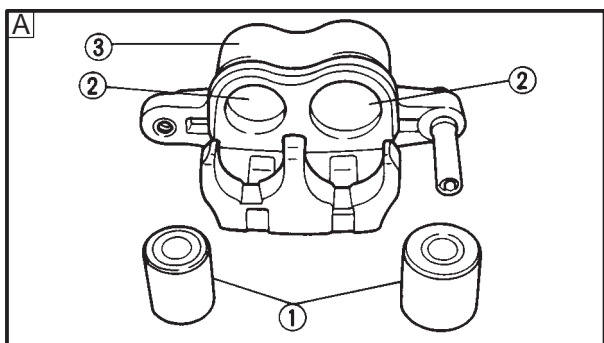
REAR BRAKE CALIPER



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order listed.
	Muffler		Refer to "REAR WHEEL AND BRAKE DISC".
	Muffler stay		
	Brake fluid		
	Drain		
1	Brake hose holder	1	Refer to "REMOVING/INSTALLING THE REAR BRAKE CALIPER".
2	Union bolt	1	
3	Copper washers	2	
4	Brake hose	1	
5	Caliper ass'y	1	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	Disassembling the rear brake caliper		Disassembly the parts in the order listed.
①	Cover	1	Refer to "DISASSEMBLING THE REAR BRAKE CALIPER". For assembly, reverse the disassembly procedure.
②	Clips	2	
③	Pad pins	2	
④	Pad spring	1	
⑤	Brake pads	2	
⑥	Caliper pistons	2	
⑦	Dust seals	2	
⑧	Piston seals	2	
⑨	Bleed screw	1	



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

⚠ WARNING

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

- A** Front
- B** Rear

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

EAS00638

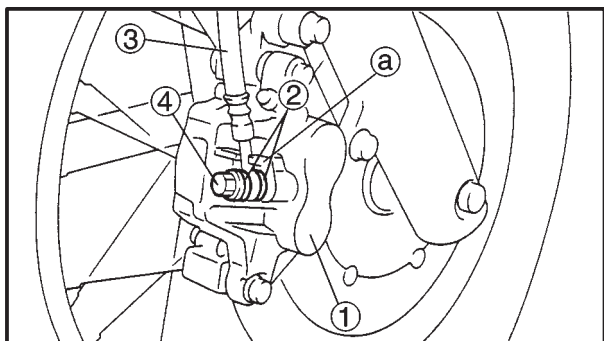
INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.


⚠ WARNING

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

	Recommended brake fluid DOT 4
-------------------------------------------------------------------------------------	------------------------------------------



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

 **30 Nm (3.0 m°kg)**


⚠ WARNING

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

CAUTION:

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

2. Install:
 - ° brake caliper retaining bolt

 **23 Nm (2.3 m°kg)**

- ° brake hose holder
- Refer to “FRONT BRAKE PADS”.

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



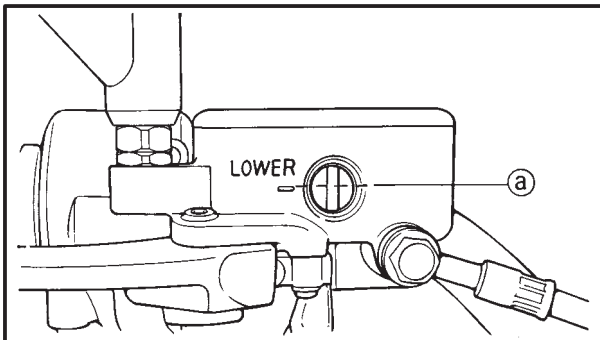
**Recommended brake fluid
DOT 4**

⚠ 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 (a) → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
6. Check:
 - brake lever operation
 - Soft or spongy feeling → Bleed the brake system.
 - Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

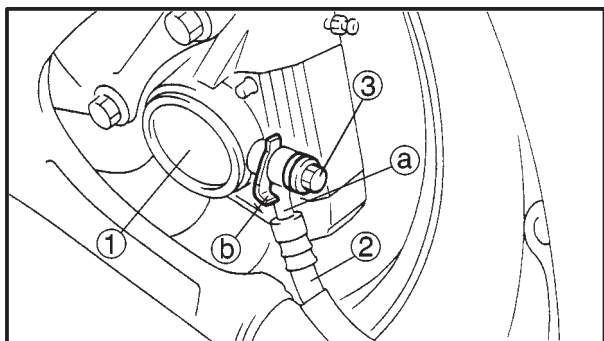
EAS00642

INSTALLING THE REAR BRAKE CALIPER**⚠ WARNING**

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



Recommended brake fluid
DOT 4



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

30 Nm (3.0 m°kg)

⚠ WARNING

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

CAUTION:

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ① touches the projection ② on the copper washer.

2. Install:
 - brake caliper 40 Nm (4.0 m°kg)
 - brake hose holder
 Refer to “REAR BRAKE PADS”.

3. Fill:
 - brake fluid reservoir (with the specified amount of the recommended brake fluid)



**Recommended brake fluid
DOT 4**

⚠ WARNING

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

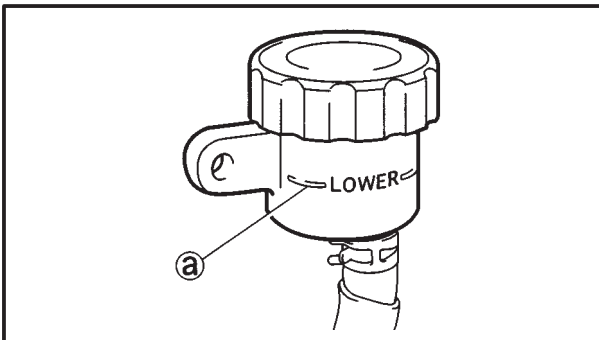
**CAUTION:**

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

4. Bleed:
° brake system

NOTE:

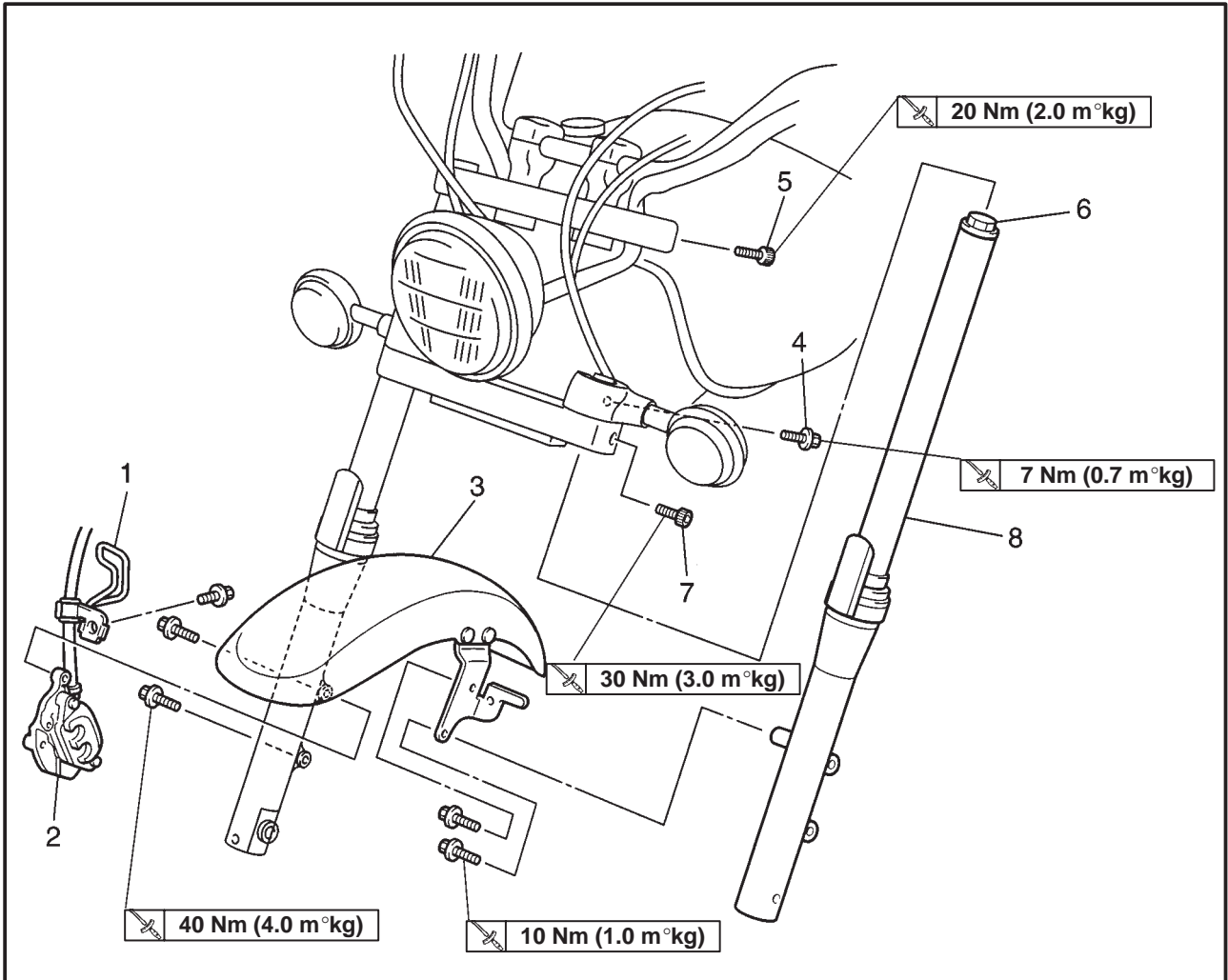
- ° Place the motorcycle on a suitable stand.
° Make sure that the motorcycle is upright.



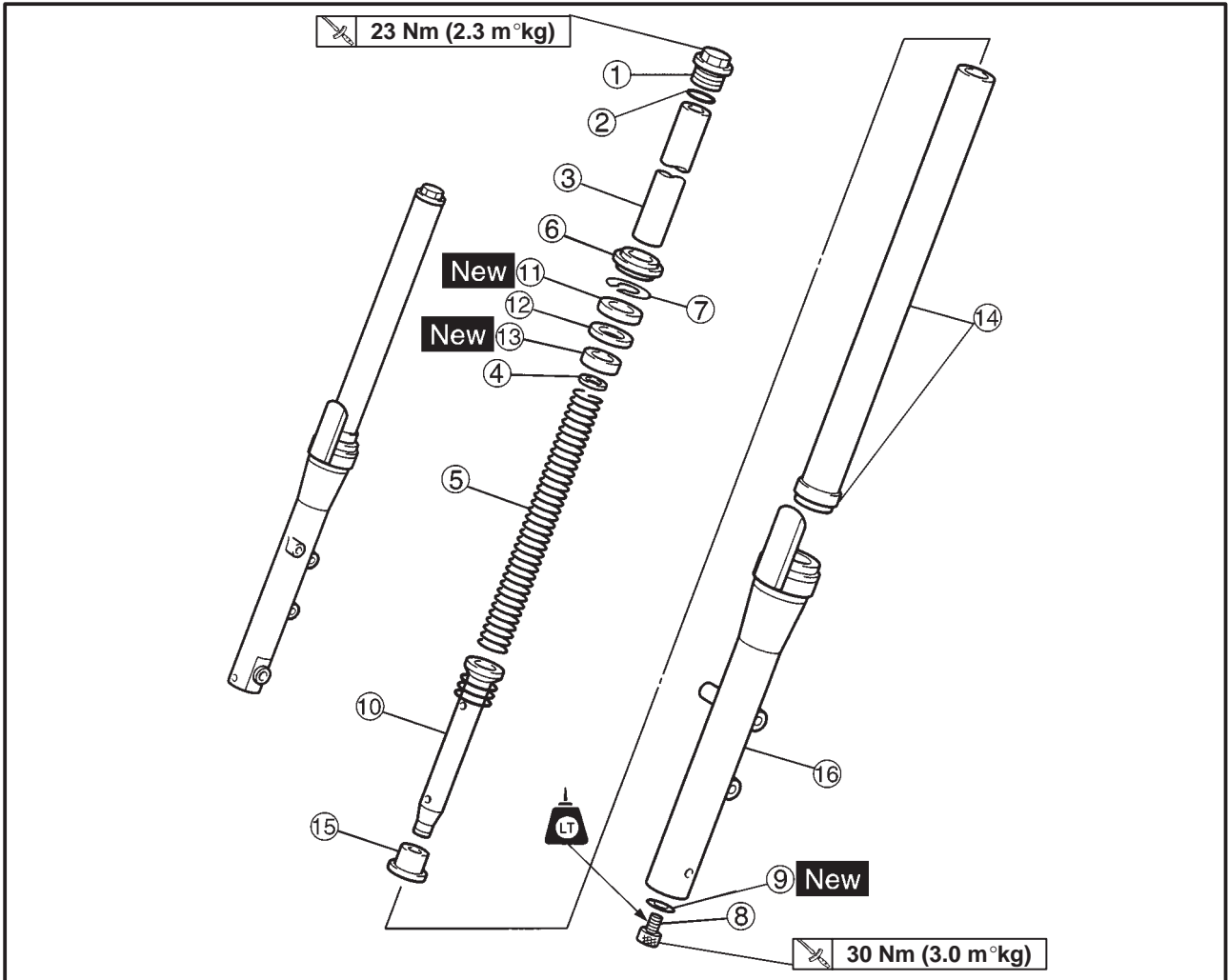
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

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

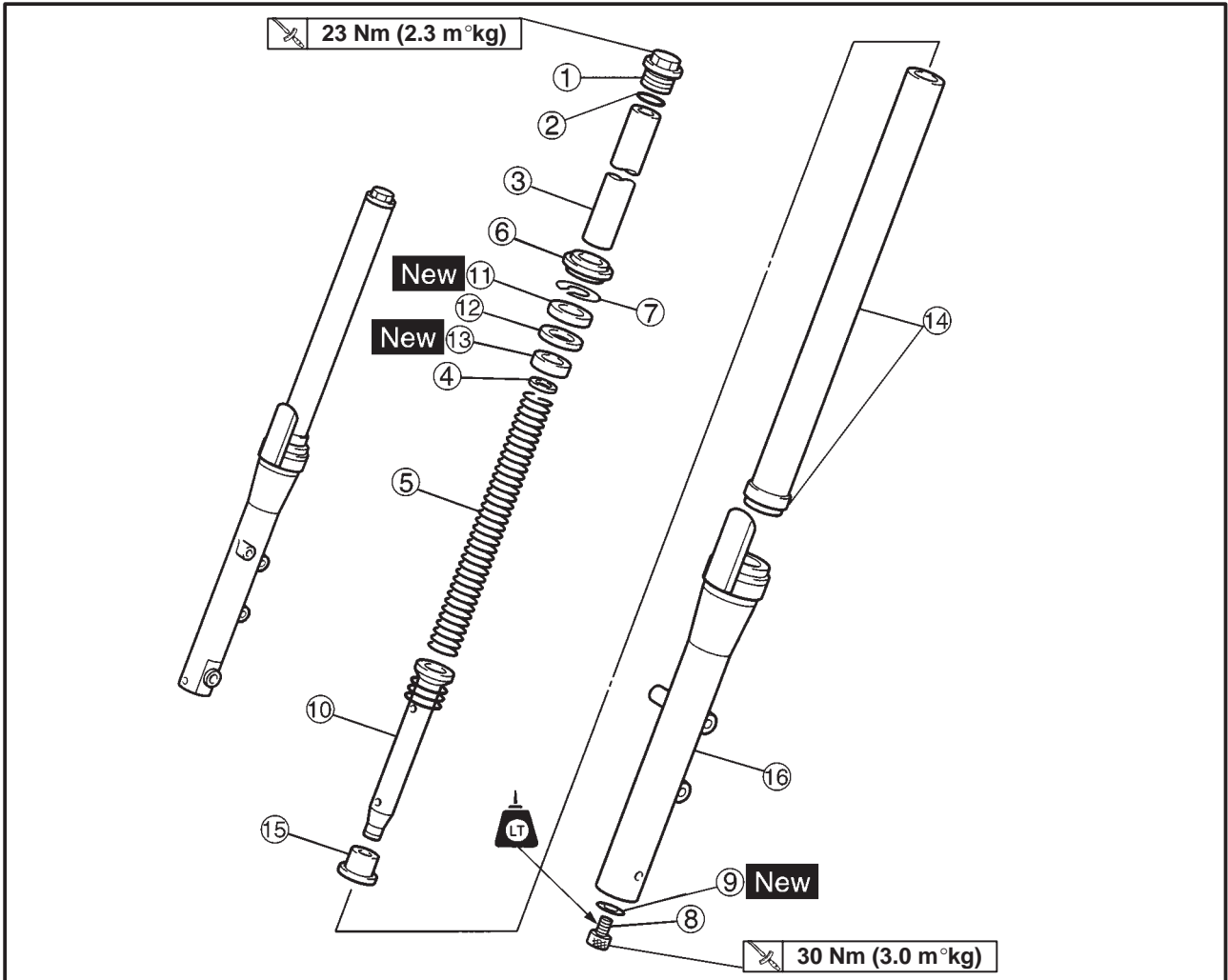
FRONT FORK



Order	Job name/Part name	Q'ty	Remarks
	Removing the front fork		
	Front wheel		Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS".
1	Brake hose holders	2	Refer to "REMOVING/INSTALLING THE FRONT FORK LEGS". For installation, reverse the removal procedure.
2	Brake caliper assembly	2	
3	Front fender	1	
4	Turn signal light bolts	2	
5	Upper bracket bolts	2	
6	Cap bolts	2	
7	Lower bracket bolts	2	
8	Front fork legs	2	



Order	Job name/Part name	Q'ty	Remarks
	Disassembling the front fork		Disassemble the parts in the order listed.
①	Cap bolt	1	Refer to "DISASSEMBLING/ASSEMBLING THE FRONT FORK LEGS".
②	O-ring	1	
③	Spacer	1	
④	Spring seat	1	
⑤	Fork spring	1	
⑥	Dust seal	1	
⑦	Oil seal clip	1	
⑧	Damper rod bolt	1	
⑨	Copper washer	1	
⑩	Damper rod/rebound spring	1/1	
⑪	Oil seal	1	



Order	Job name/Part name	Q'ty	Remarks
⑫	Seal spacer	1	Refer to "DISASSEMBLING/ASSEMBLING THE FRONT FORK LEGS".
⑬	Outer tube bushing	1	
⑭	Inner tube/inner tube bushing	1/1	
⑮	Oil lock piece	1	
⑯	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.

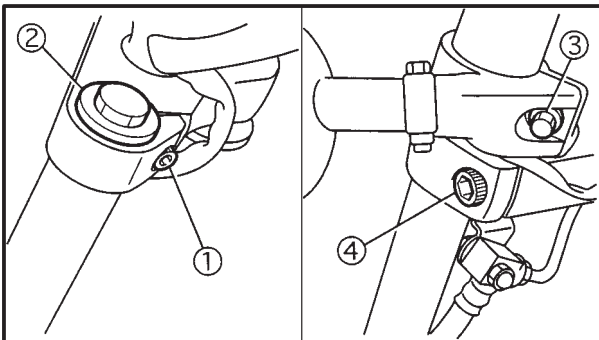
1. Stand the motorcycle on a level surface.

⚠ 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)
 - turn signal light bolt (3)
 - lower bracket pinch bolt (4)

⚠ WARNING

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

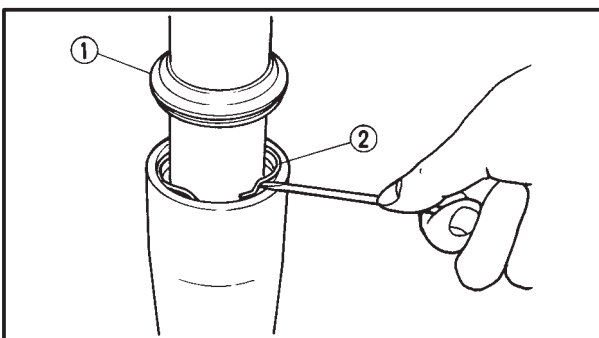
3. Remove:
 - front fork leg

EAS00653

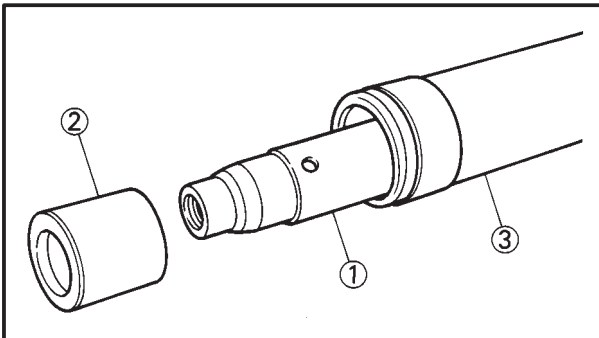
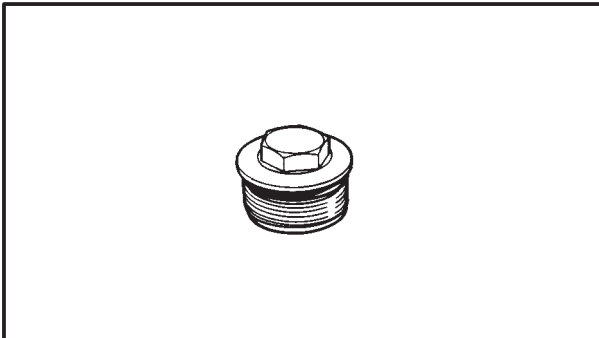
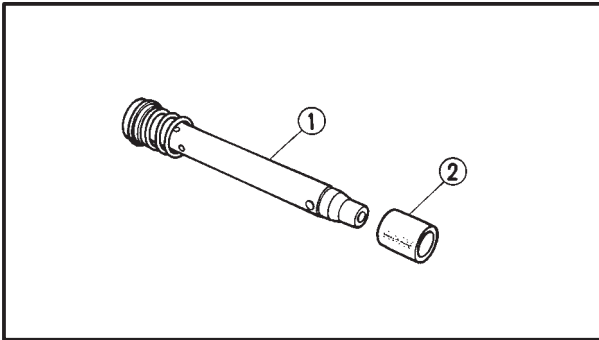
DISASSEMBLING THE FRONT FORK LEGS

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

1. Remove:
 - cap bolt
 - O-ring
 - spacer
 - spring seat
 - fork spring
2. Drain
 - fork oil
3. Remove:
 - dust seal (1)
 - oil seal clip (2)
(with a flat-head screwdriver)

**CAUTION:**

Do not scratch the inner tube.



3. Check:
 - damper rod ①
Damage/wear → Replace.
Obstruction → Blow out all of the oil passages with compressed air.
 - oil lock piece ②
Damage → Replace.

CAUTION: _____

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

NOTE: _____

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

1. Install:
 - damper rod ①
 - oil lock piece ②

⚠ WARNING _____

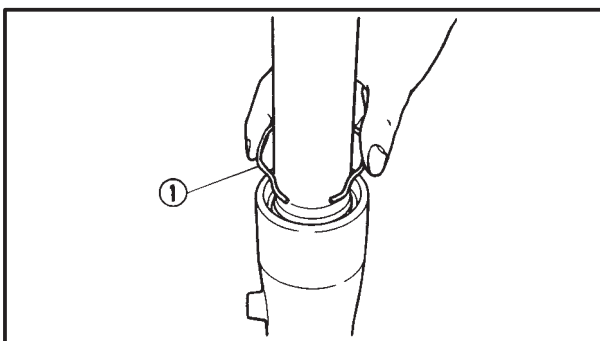
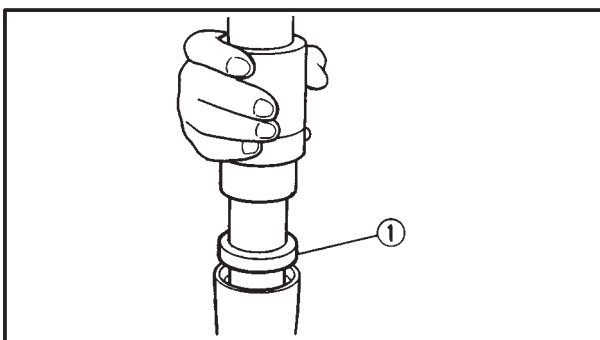
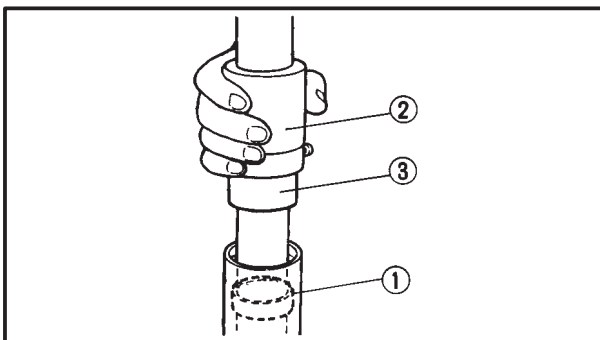
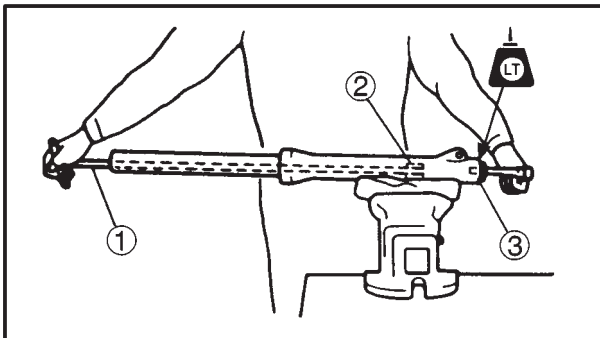
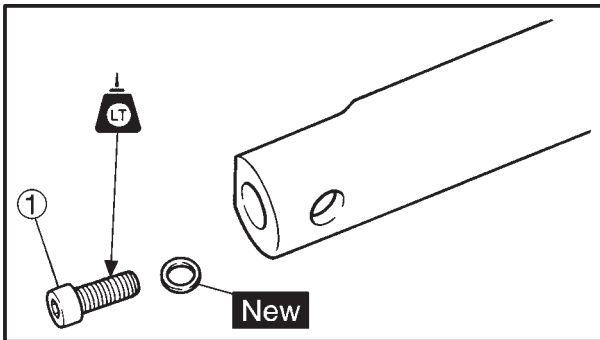
Always use new copper washers.

CAUTION: _____

Allow the damper rod to slide slowly down the inner tube ③ until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

FRONT FORK

CHAS



- Lubricate:
 - inner tube's outer surface



Recommended lubricant
Yamaha fork and shock oil
10 W or equivalent

- Tighten:
 - damper rod bolt (1)



30 Nm (3.0 m^okg)

NOTE:

While holding the damper rod with the T-handle (1) and damper rod holder (2), tighten the damper rod bolt (3).



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

- Install:
 - outer tube bushing (1)
 - seal spacer (with the fork seal driver weight (2) and adapter (3))



Fork seal driver weight
90890-01367
Adapter
90890-01381

- 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.

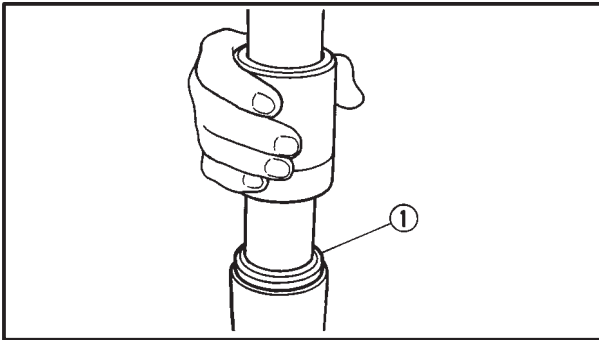
- Install:
 - oil seal clip (1)

NOTE:

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

FRONT FORK

CHAS



7. Install:
 - ° dust seal ①
(with the fork seal driver weight)
8. Fill:
 - ° front fork leg
(with the specified amount of the recommended fork oil)



Quantity (each front fork leg)
0.464 L

Recommended oil
Yamaha fork and shock oil 10W
or equivalent

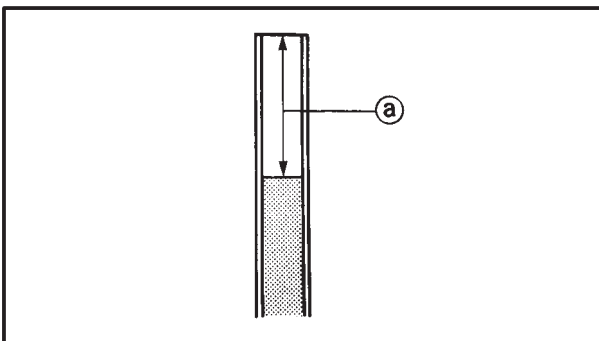
CAUTION:

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

9. After filling the front fork leg, slowly stroke the inner tube up and down (at least ten times) to distribute the fork oil.

NOTE:

Be sure to stroke the inner tube slowly because the fork oil may spurt out.



10. Measure:

- ° front fork leg oil level ②
Out of specification → Correct.



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

NOTE:

Hold the fork in an upright position.

11. Install:

- ° fork spring
- ° spring seat
- ° spacer
- ° O-ring
- ° cap bolt

**NOTE:**

- ° Install the fork spring with its smaller pitch up-word.
- ° Before installing the cap bolt, apply grease to the O-ring.
- ° Temporarily tighten the cap bolt.

EAS00662

INSTALLING THE FRONT FORK LEGS

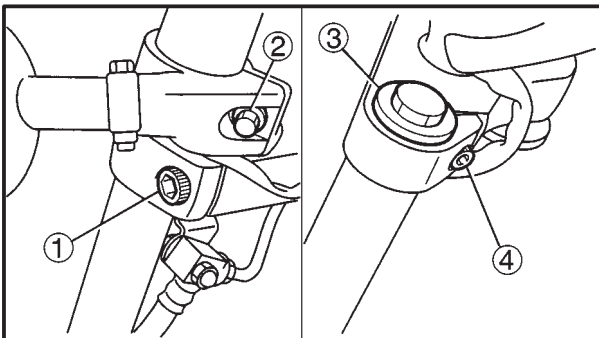
The following procedure applies to both of the front fork legs.

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 upper bracket.



2. Tighten:

- ° lower bracket pinch bolt ①

	30 Nm (3.0 m°kg)
--	-------------------------
- ° front turn signal light bolt ②

	7 Nm (0.7 m°kg)
--	------------------------
- ° cap bolt ③

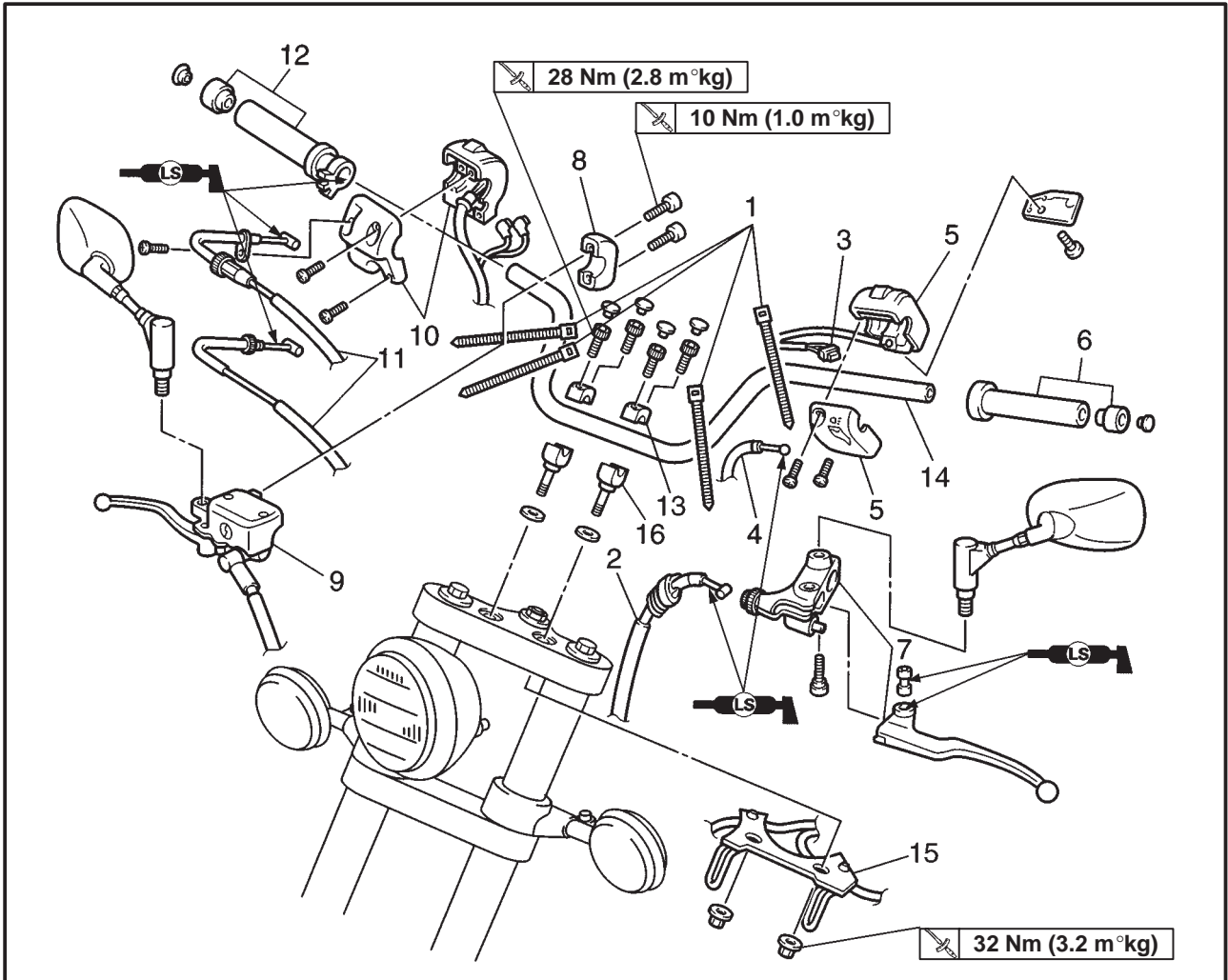
	23 Nm (2.3 m°kg)
--	-------------------------
- ° upper bracket pinch bolt ④

	20 Nm (2.0m °kg)
--	-------------------------

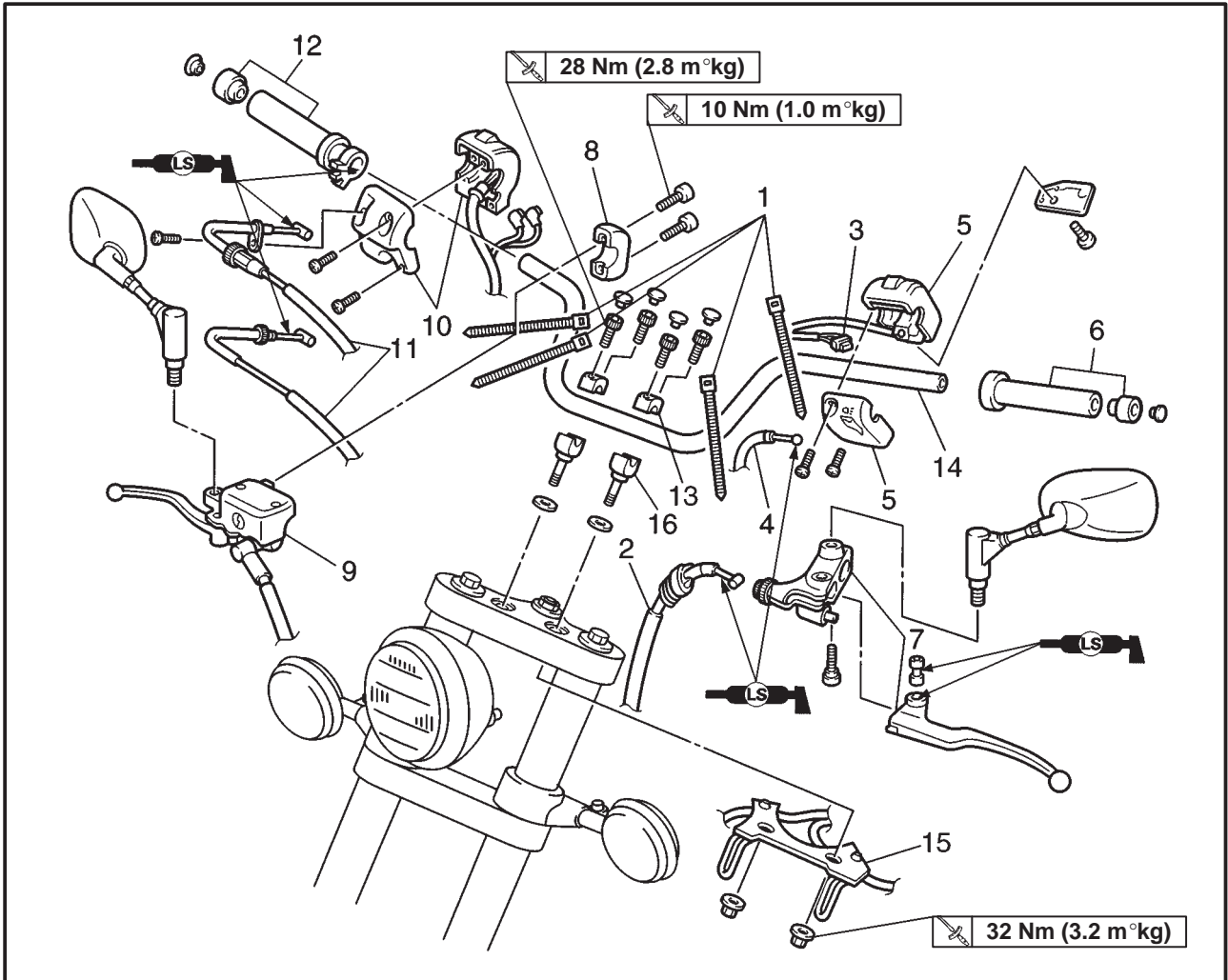
⚠ WARNING

Make sure that the brake hoses are routed properly.

HANDLEBAR



Order	Job name/Part name	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so that there is no danger of it falling over.
1	Plastic locking ties	4	
2	Clutch cable	1	
3	Clutch switch lead	1	
4	Starter cable	1	
5	Handlebar switch (left)	1	Refer to "INSTALLING THE HANDLEBAR". Refer to "REMOVING THE HANDLEBAR".
6	Grip (left)	1	
7	Clutch lever assembly	1	
8	Master cylinder bracket	1	
9	Master cylinder assembly	1	Refer to "INSTALLING THE HANDLEBAR".
10	Handlebar switch (right)	1	
11	Throttle cables	2	



Order	Job name/Part name	Q'ty	Remarks
12	Throttle grip assembly	1	Refer to "INSTALLING THE HANDLEBAR".
13	Handlebar holders (upper)	2	
14	Handlebar	1	
15	Cable guide	1	
16	Handlebar holders (lower)	2	
			For installation, reverse the removal procedure.

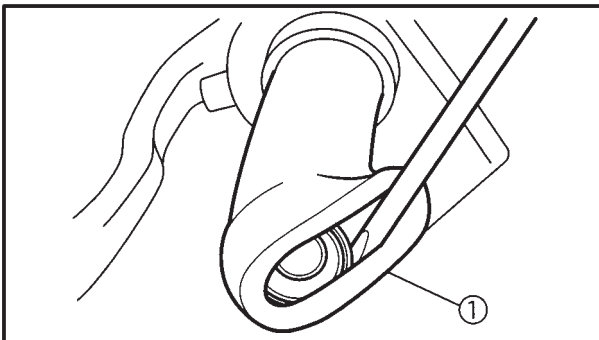
EAS00666

REMOVING THE HANDLEBAR

1. Stand the motorcycle on a level surface.

⚠ WARNING _____

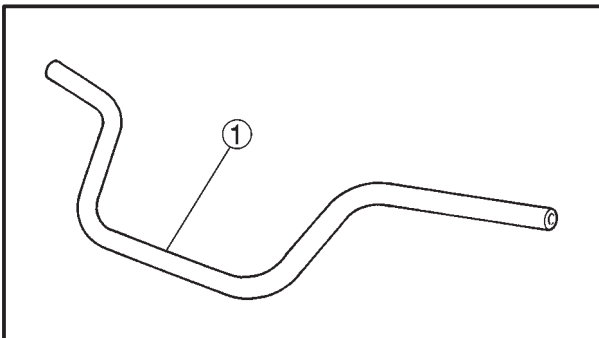
Securely support the motorcycle so that there is no danger of it falling over.



2. Remove:
 - ° 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 _____

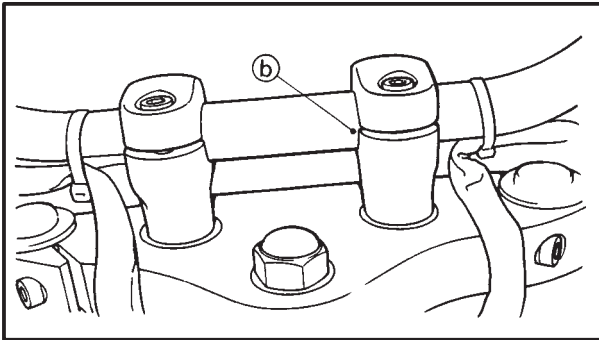
Securely support the motorcycle so that there is no danger of it falling over.

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

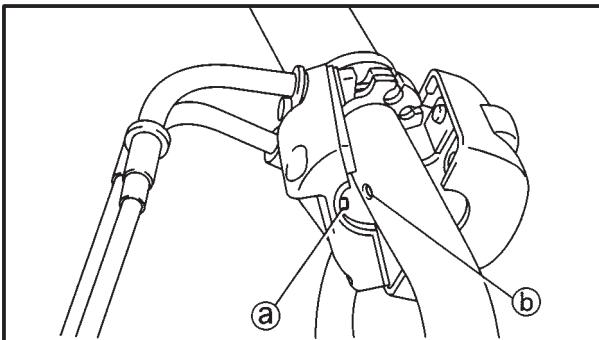


°Align the match marks (b) on the handlebar with the upper surface of the lower handlebar holders.

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

⚠ WARNING

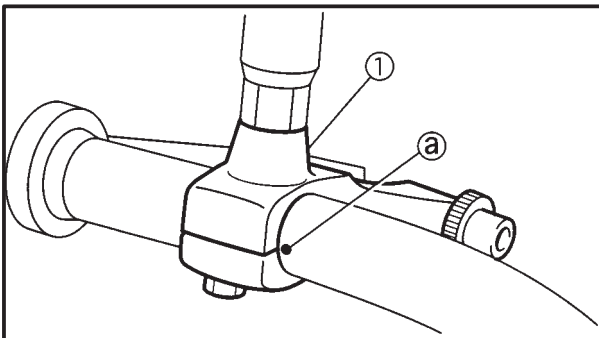
Make sure that the pin (a) on the throttle cable housing is aligned with the hole (b) in the handlebar.



4. Install:
 - ° master cylinder
 Refer to "FRONT AND REAR BRAKES".

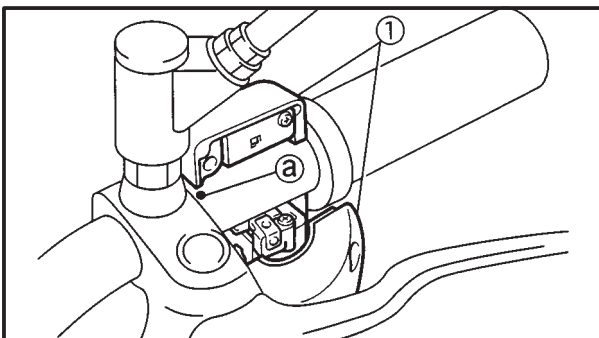
5. Install:
 - ° clutch lever holder (1)

NOTE: Align the slit in the clutch lever holder with the punch mark (a) in the handlebar.



6. Install:
 - ° left handlebar switch (1)

NOTE: Align the matching surface on the handlebar switches with the punch mark (a) on the handlebar.



7. Install:
 - ° clutch cable
8. Connect:
 - ° clutch switch coupler

NOTE: Apply a thin coat of lithium soap base grease onto the end of the clutch cable.



9. 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)

5 × 10 mm

10. Adjust:

° throttle cable free play

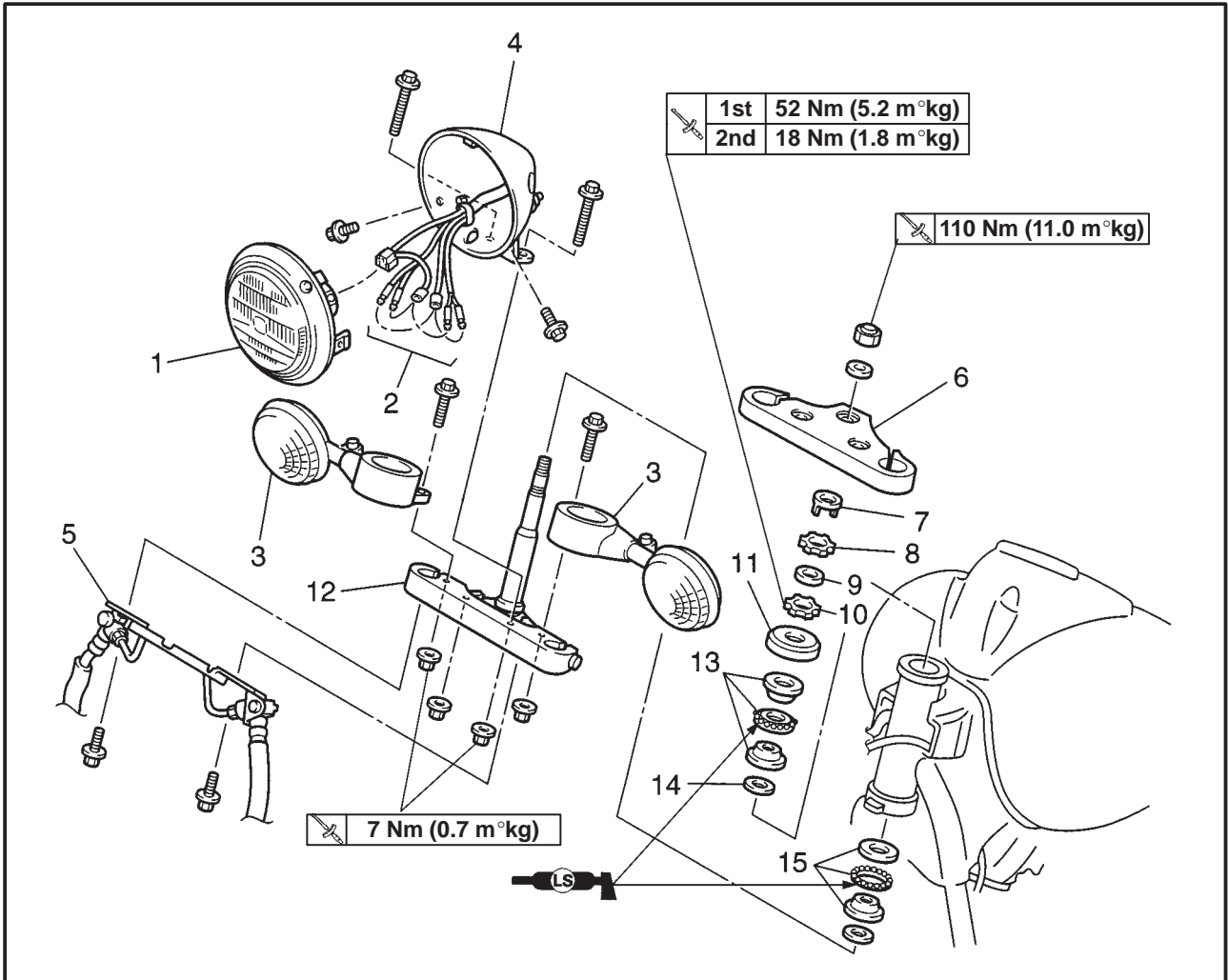
Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.



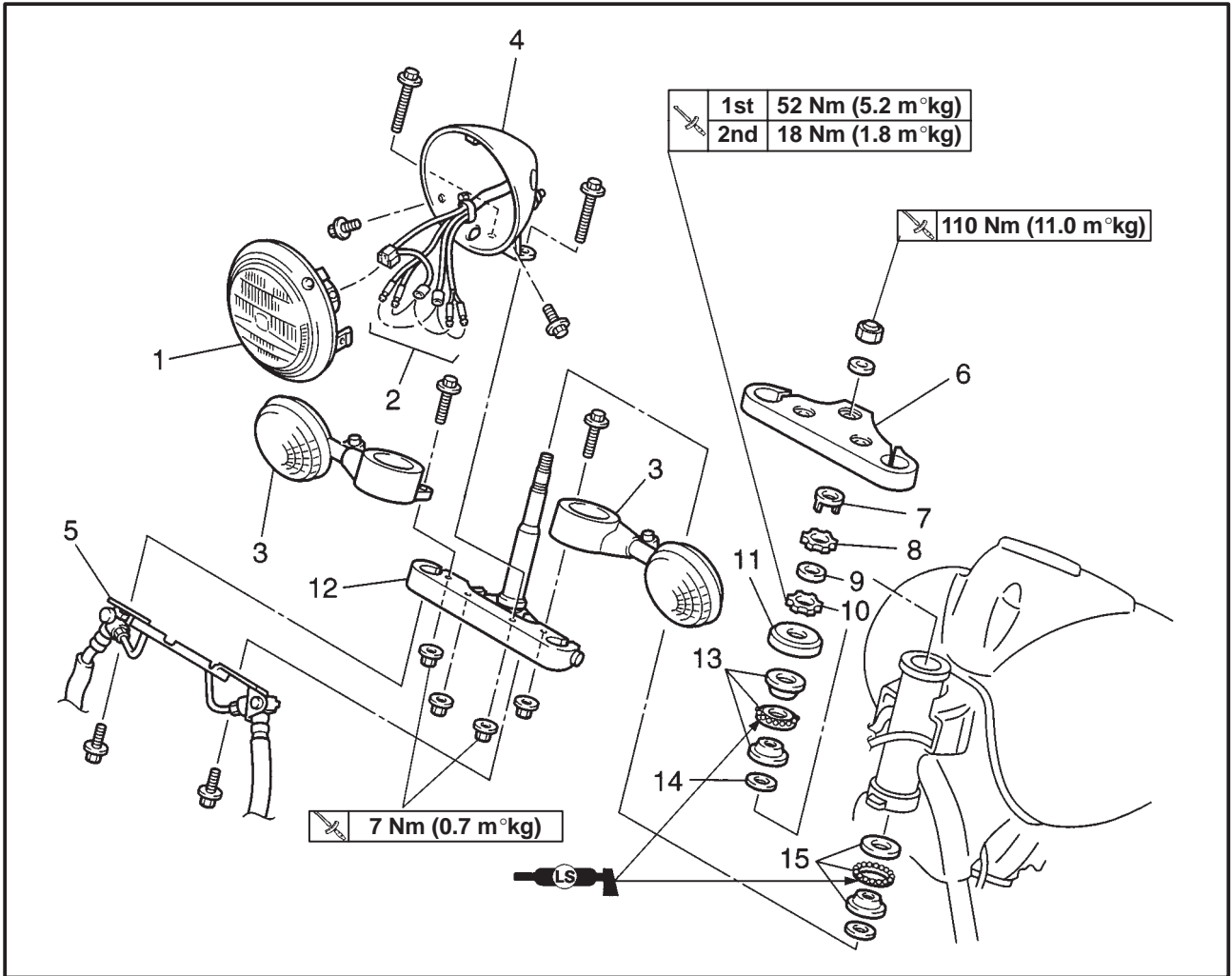
Throttle cable free play (at the flange of the throttle grip)

4 × 6 mm

STEERING HEAD



Order	Job name/Part name	Q'ty	Remarks
	Removing the lower bracket		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so that there is no danger of it falling over.
	Front fork legs		Refer to "FRONT FORK".
	Handlebar		Refer to "HANDLEBAR".
1	Headlight lens unit	1	
2	Leads (in the headlight body)	-	Disconnect
3	Front turn signal light (left/right)	1/1	
4	Headlight body	1	
5	Brake hose joint holder	1	
6	Upper bracket	1	
7	Lock washer	1	
8	Upper ring nut	1	



Order	Job name/Part name	Q'ty	Remarks
9	Rubber washer	1	Refer to "REMOVING THE LOWER BRACKET/INSTALLING THE STEERING HEAD".
10	Lower ring nut	1	
11	Bearing cover	1	
12	Lower bracket	1	
13	Bearing (upper)	1	
14	Rubber seal	1	
15	Bearing (lower)	1	
			For installaiton, reverse the removal procedure.

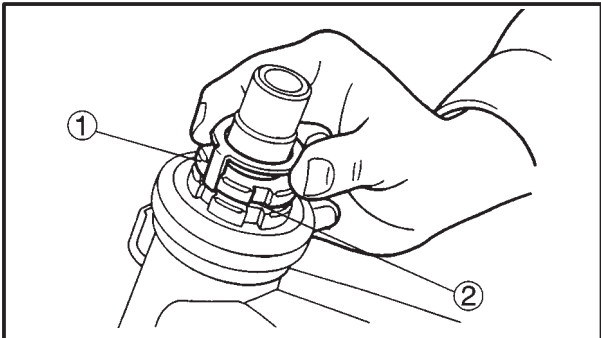
EAS00677

REMOVING THE LOWER BRACKET

1. Stand the motorcycle on a level surface.

⚠ WARNING

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



2. Remove:
 ° upper ring nut ①
 ° lower ring nut ②

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
 90890-01268
 Ring nut wrench
 90890-01403

⚠ WARNING

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

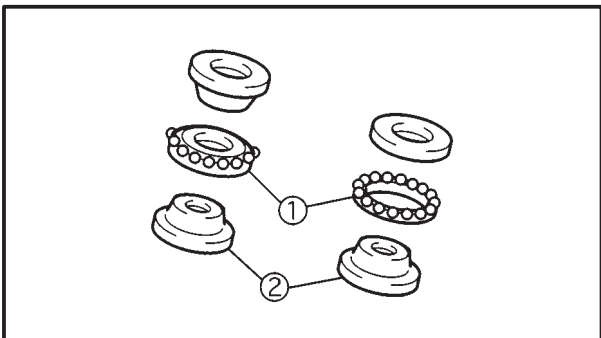
EAS00681

CHECKING THE STEERING HEAD

1. Wash:
 ° bearings
 ° bearing races



Recommended cleaning solvent
Kerosine



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

STEERING HEAD

CHAS



NOTE: _____

Temporarily tighten the steering stem nut.

4. Install:

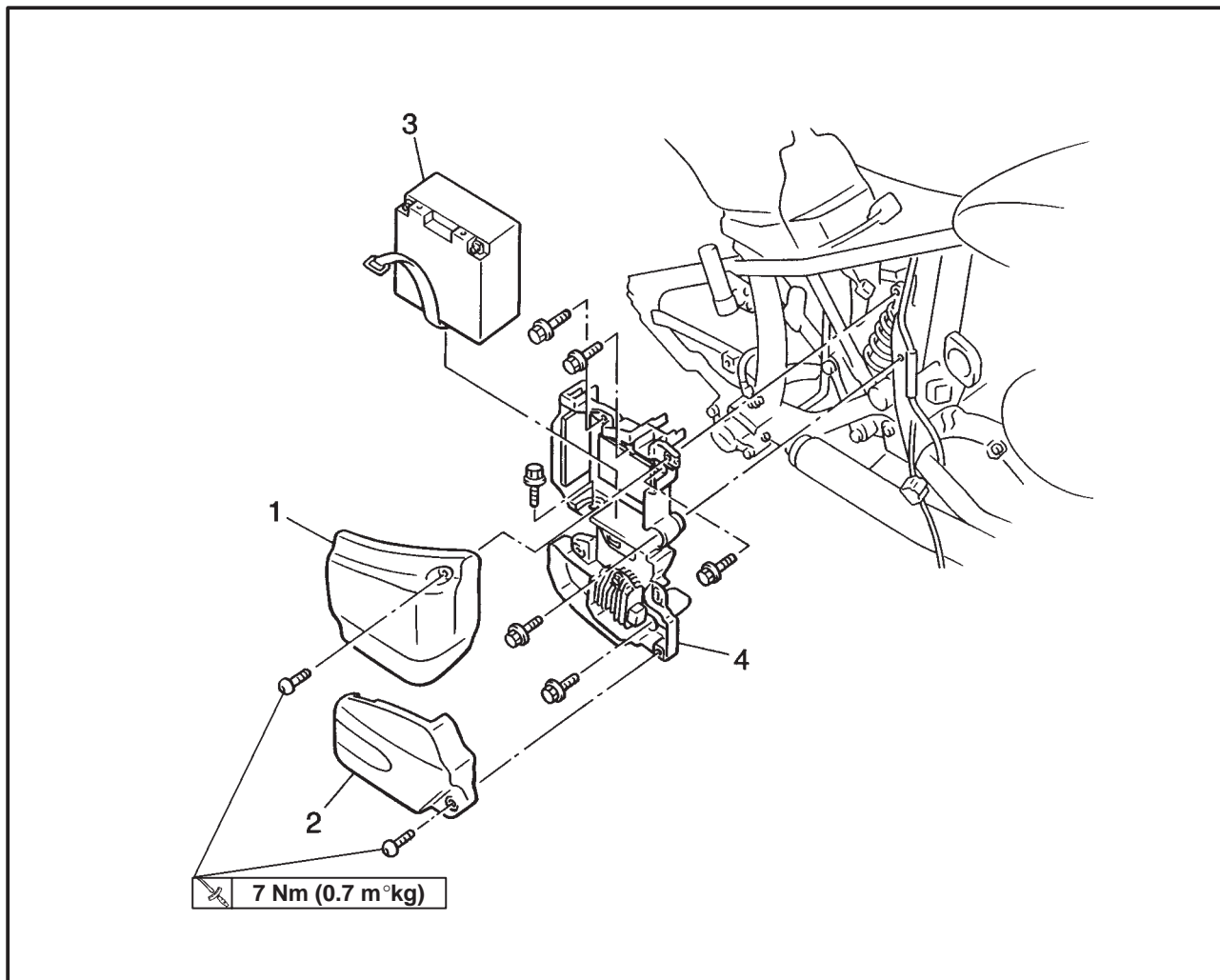
° front fork legs

Refer to "FRONT FORK"

NOTE: _____

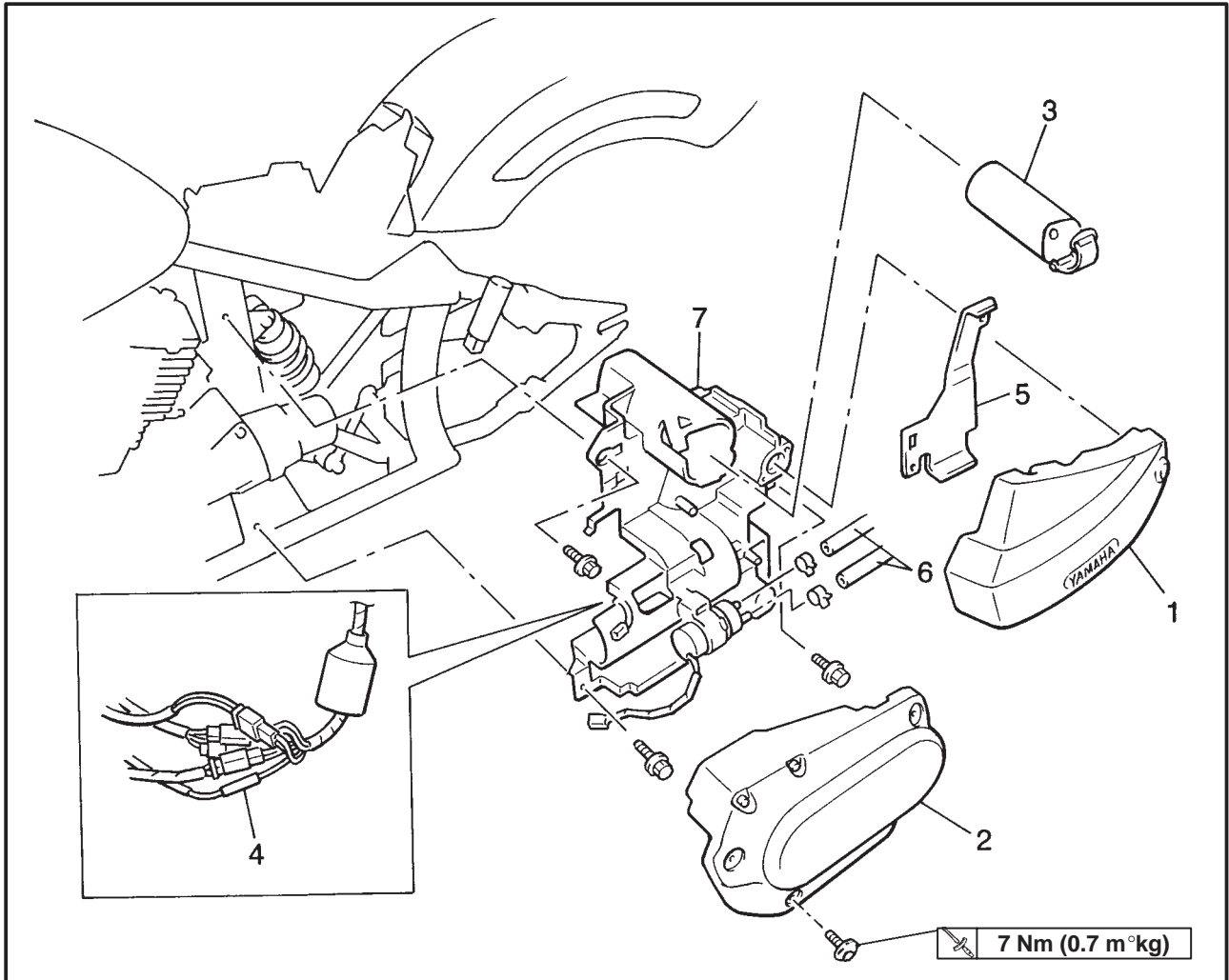
Temporarily tighten the upper and lower bracket pinch bolts.

REAR SHOCK ABSORBER AND SWINGARM
RIGHT SIDE COVER AND BATTERY BOX



Order	Job name/Part name	Q'ty	Remarks
	Removing the right side cover and battery box.		
	Seats		Remove the parts in the order listed. Stand the motorcycle on a level surface. Refer to "FUEL TANK AND SEATS" in CHAPTER 3.
	Muffler assembly		Refer to "REAR WHEEL AND BRAKE DISC".
1	Battery cover	1	
2	Right side cover	1	
3	Battery	1	Refer to "REMOVING/INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY".
4	Battery box	1	For installation, reverse the removal procedure.

LEFT SIDE COVER AND TOOL BOX

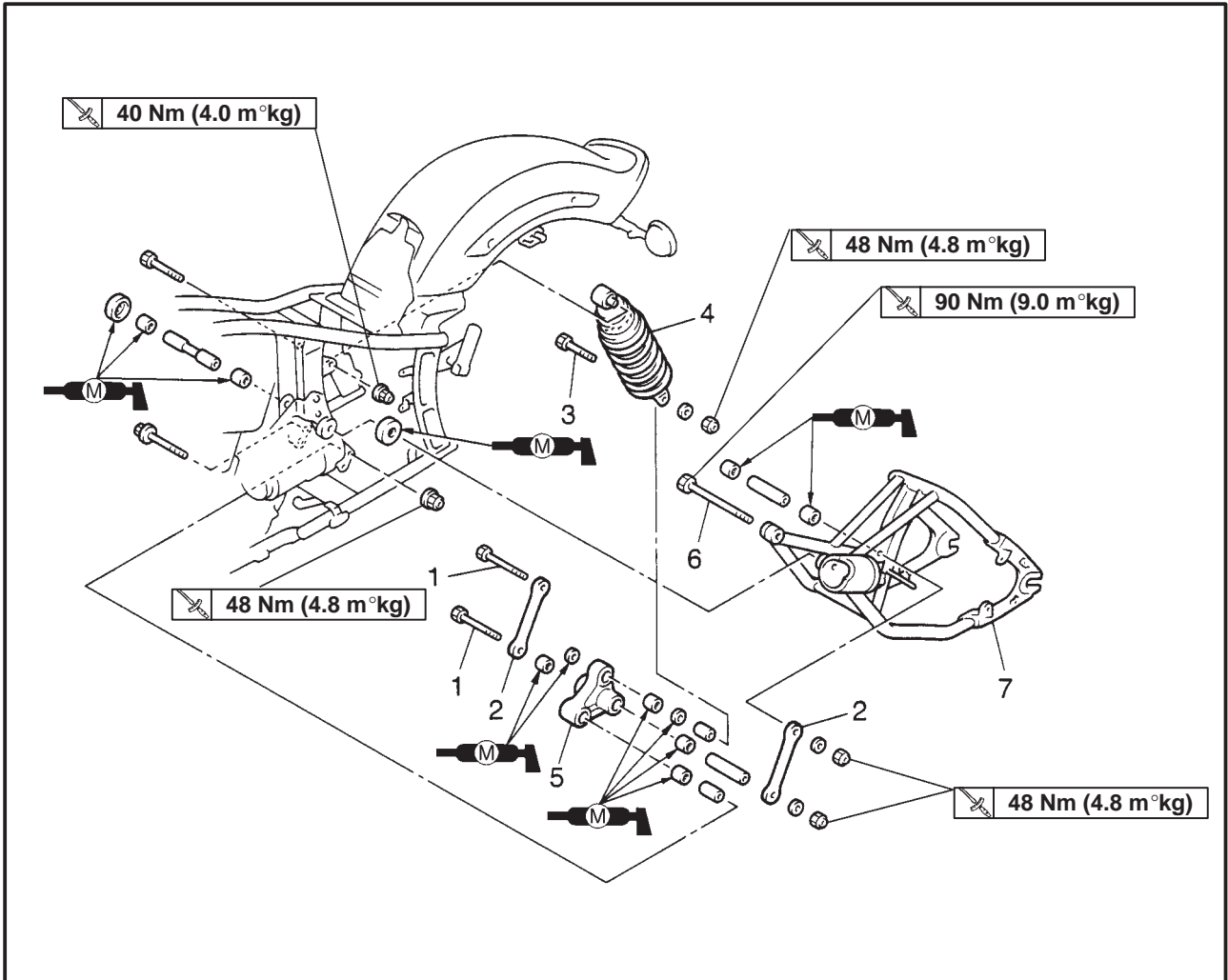


Order	Job name/Part name	Q'ty	Remarks
	Removing the left side cover and tool box		Remove the parts in order listed.
1	Tool box cover	1	
2	Left side cover	1	
3	Owner's tool kit	1	
4	Connector's	—	Disconnect
5	Fuel hose holder	1	
6	Fuel hoses	2	Disconnect
7	Tool box	1	
			For installation, reverse the removal procedure.

REAR SHOCK ABSORBER AND SWINGARM



REAR SHOCK ABSORBER AND SWINGARM



Order	Job name/Part name	Q'ty	Remarks
	Removing the rear shock absorber and swingarm		Remove the parts in order listed.
	Rear wheel		Refer to "REAR WHEEL AND BRAKE DISC".
1	Connecting arm bolts	2	Refer to "REMOVING/INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY".
2	Connecting arms	2	
3	Rear shock absorber lower bolt	1	Refer to "REMOVING/INSTALLING THE SWINGARM".
4	Rear shock absorber	1	
5	Relay arm	1	
6	Pivot shaft	1	
7	Swingarm	1	
			For installation, reverse the removal procedure.

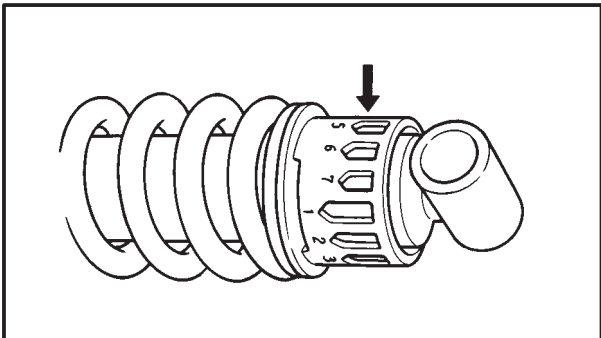
EAS00687

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

⚠ WARNING

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

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



EAS00689

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER



- a. Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, drill a 2 × 3 mm hole through the gas cylinder at a point 15 – 20 mm from its end as shown.

⚠ WARNING

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



EAS00694

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

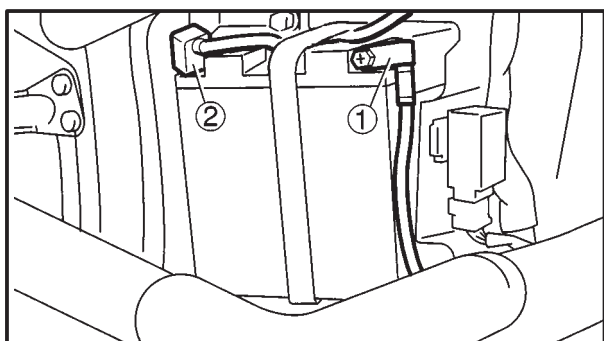
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

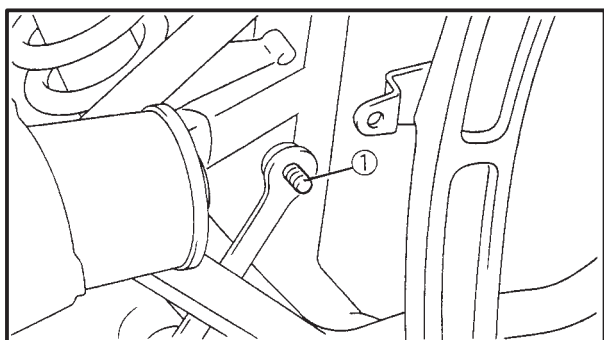
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



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

CAUTION:

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

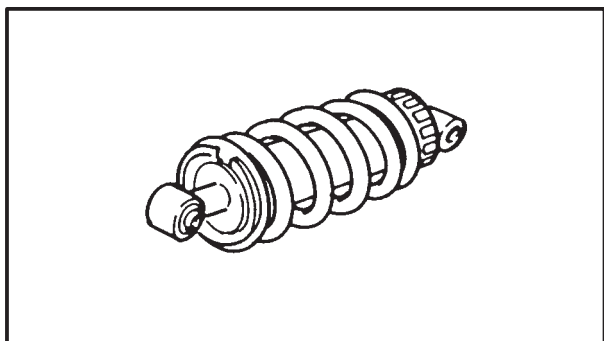


3. Remove:
 - ° connecting arm bolt (swingarm side) ①
 - ° rear shock absorber assembly lower bolt

NOTE:

While removing the connecting arm bolt (swingarm side), hold the swingarm so that it does not drop down.

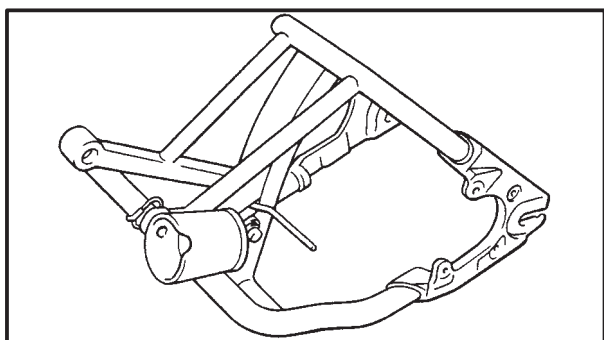
4. Remove:
 - ° rear shock absorber upper bolt
 - ° rear shock absorber



EAS00696

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND GAS CYLINDER

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

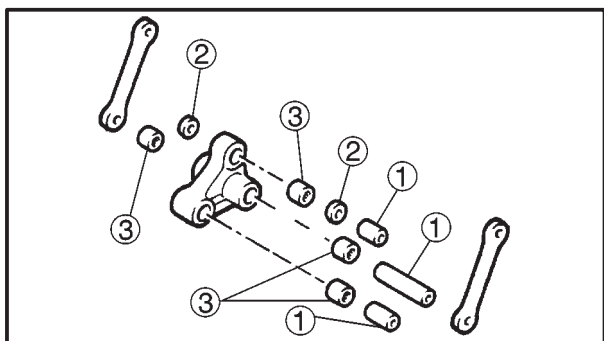


EAS00708

CHECKING THE SWINGARM

1. Check:
 - swingarm
Bends/cracks/damage → Replace.

2. Check:
 - pivot shaft
Damage/wear → Replace.



3. Check:
 - collars ①
 - oilseals ②
 - bearings ③
Damage/wear → Replace.

EAS00698

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
 - swingarm
 - Refer to "INSTALLING THE SWINGARM".
2. Lubricate:
 - spacers
 - bearings

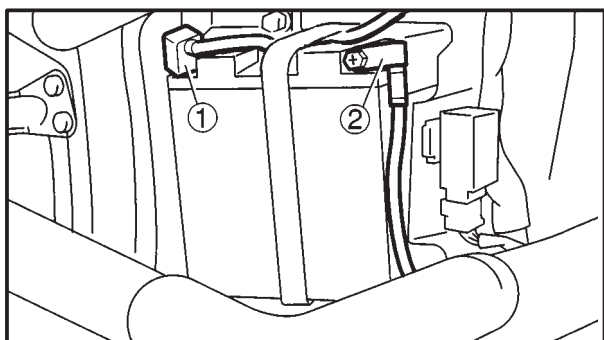


Recommended lubricant
Molybdenum disulfide grease

3. Install:
 - rear shock absorber assembly



Rear shock absorber assembly upper nut
40 Nm (4.0 m°kg)
Rear shock absorber assembly lower nut
48 Nm (4.8 m°kg)
Relay-arm-to-frame-nut
48 Nm (4.8 m°kg)



NOTE:

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

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

CAUTION:

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

EAS00712

INSTALLING THE SWINGARM

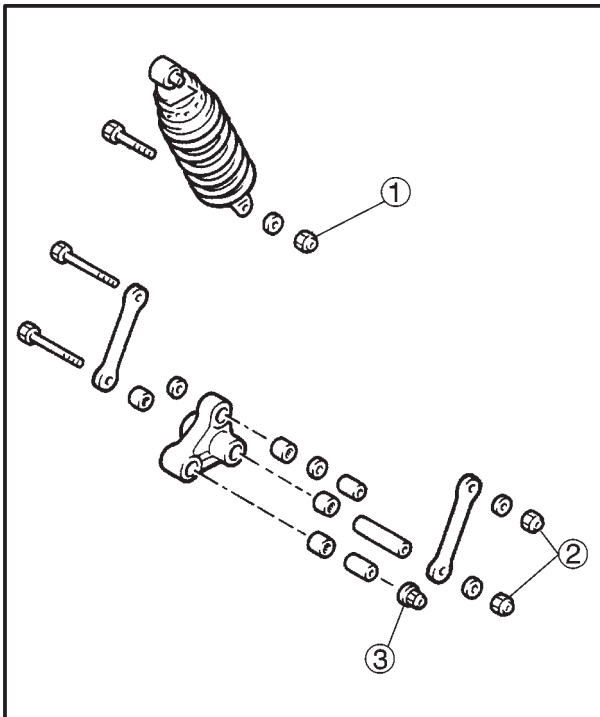
1. Lubricate:
 - bearings
 - spacers
 - oil seals



Recommended lubricant
Molybdenum disulfide grease

REAR SHOCK ABSORBER AND SWINGARM

CHAS



2. Install:
 - relay arm
 - left connecting arm
 - right connecting arm



Rear-shock-absorber-assembly

lower nut ①

48 Nm (4.8 m°kg)

Connecting arm nuts ②

48 Nm (4.8 m°kg)

Relay-arm-to-frame-nut ③

48 Nm (4.8 m°kg)

3. Install:
 - rear shock absorberReter to "INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY".
4. Install:
 - rear wheelRefer to "REAR WHEEL AND BRAKE DISC".



SHAFT DRIVE

EAS00715

TROUBLESHOOTING

The following conditions may indicate damaged shaft drive components:

A	Symptoms	B	Possible causes
	<ol style="list-style-type: none"> 1. A pronounced hesitation or jerky movement during acceleration, deceleration, or sustained speeds. (not to be confused with engine surging or transmissionrelated movements.) 2. A rolling "rumble" noticeable at low speeds, a high-pitched whine, or a "clunk" from a shaft drive component or vicinity of the shaft drive. 3. The shaft drive is locked up or no power is transmitted from the engine to the rear wheel 		<ol style="list-style-type: none"> A. Bearing damage B. Improper gear lash C. Damaged gear teeth D. Broken drive shaft E. Broken gear teeth F. Seizure due to lack of lubrication G. Small foreign objects lodged between moving parts

NOTE:

Causes A, B and C may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal operating noises. If there is reason to believe these components are damaged, remove them for individual inspection.



Inspection notes

- 1. Investigate any unusual noises.



The following noises may indicate a mechanical defect:

- a. A rolling “rumble” during coasting, acceleration, or deceleration, (increases with the rear wheel speed, but does not increase with higher engine or transmission speeds).
Diagnosis: Possible wheel bearing damage.
- b. A whining noise that varies with acceleration and deceleration.
Diagnosis: Possible incorrect reassembly or too little gear lash.

⚠ WARNING

Insufficient gear lash is extremely destructive to the gear teeth. If a test ride, following reassembly, indicates these symptoms, stop riding immediately to minimize gear damage.

- c. A slight “clunk” evident at low speed operation. (not to be confused with normal motorcycle operation)
Diagnosis: Possible broken gear teeth

⚠ WARNING

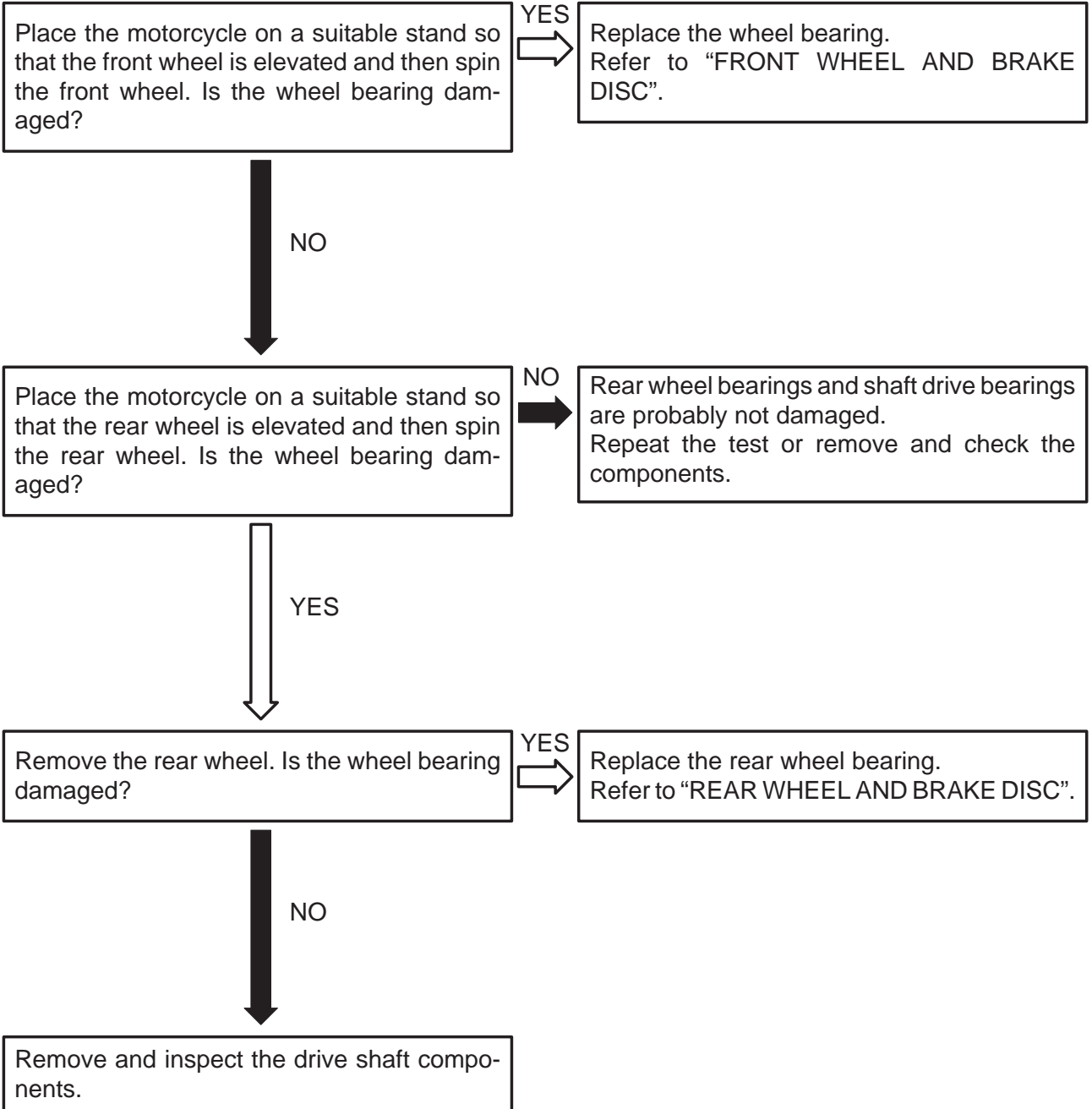
Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing a loss of control and possible injury to the rider.



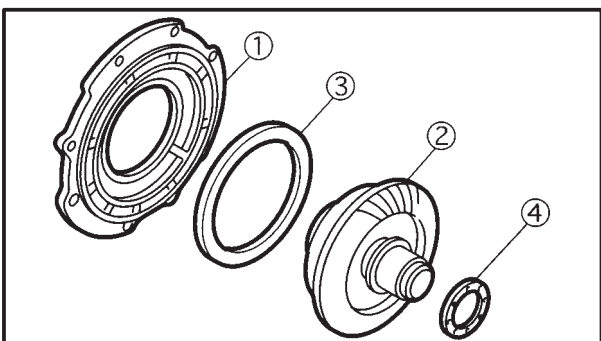
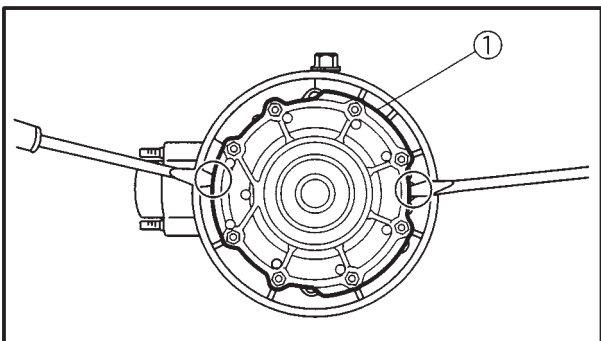
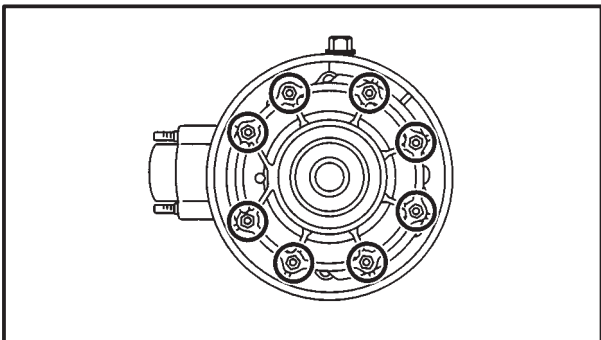
EAS00716

Troubleshooting chart

When causes A and B shown in the chart at the beginning of the “TROUBLESHOOTING” section exist, check the following points:



- g. Rotate the final drive pinion gear 90°.
- h. Reinstall the bolt, special tool, and dial gauge.
- i. Repeat steps (d) to (h) three more times (for a total of four measurements).
- j. If any of the readings are over specification, adjust the ring gear backlash.



EAS00720

ADJUSTING THE RING GEAR BACKLASH

- 1. Remove:
 - ° ring gear bearing housing nuts
 - ° ring gear bearing housing bolts

NOTE: _____

Working in a crisscross pattern, loosen each nut 1/4 of a turn. After all of the nuts are fully loosened, remove them and the bolts.


- 2. Remove:
 - ° ring gear bearing housing ①
 - ° ring gear ②
 - ° thrust washer ③
 - ° ring gear shim(-s) ④
- 3. Adjust:
 - ° ring gear backlash




- a. Use the following chart to select the suitable shim(-s) and thrust washer.

Thinner shim	Ring gear backlash is increased.
Thicker shim	Ring gear backlash is decreased.

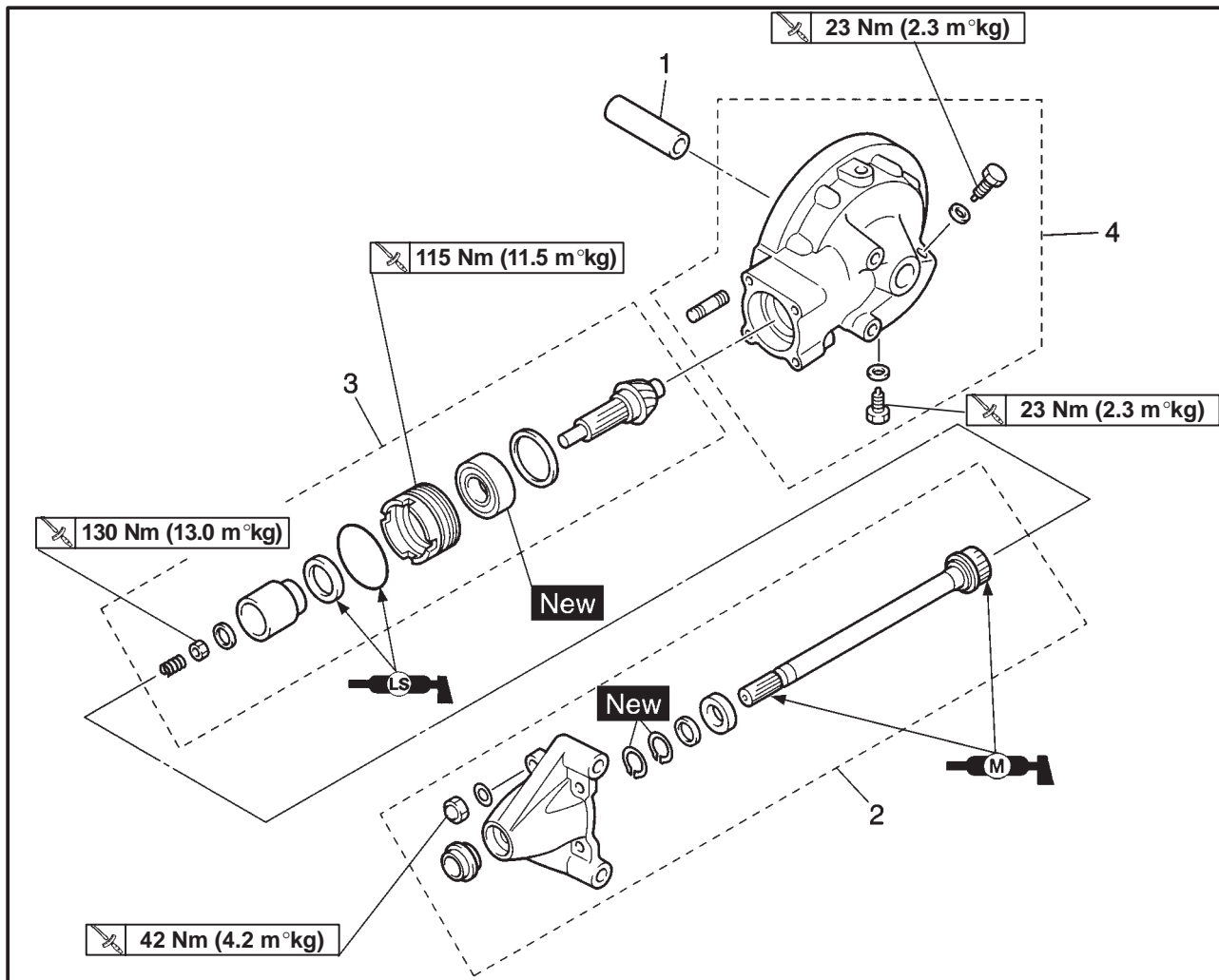
- b. If it is necessary to increase the ring gear backlash by more than 0.2 mm, reduce the thrust washer thickness by 0.2 mm for every 0.2 mm increase of ring gear shim thickness.
- c. If it is necessary to reduce the ring gear backlash by more than 0.2 mm, increase the thrust washer thickness by 0.2 mm for every 0.2 mm decrease of ring gear shim thickness.

	Rig gear shims	
	Thickness (mm)	0.25, 0.30, 0.40

	Thrust washers	
	Thickness (mm)	1.2, 1.4, 1.6, 1.8, 2.0

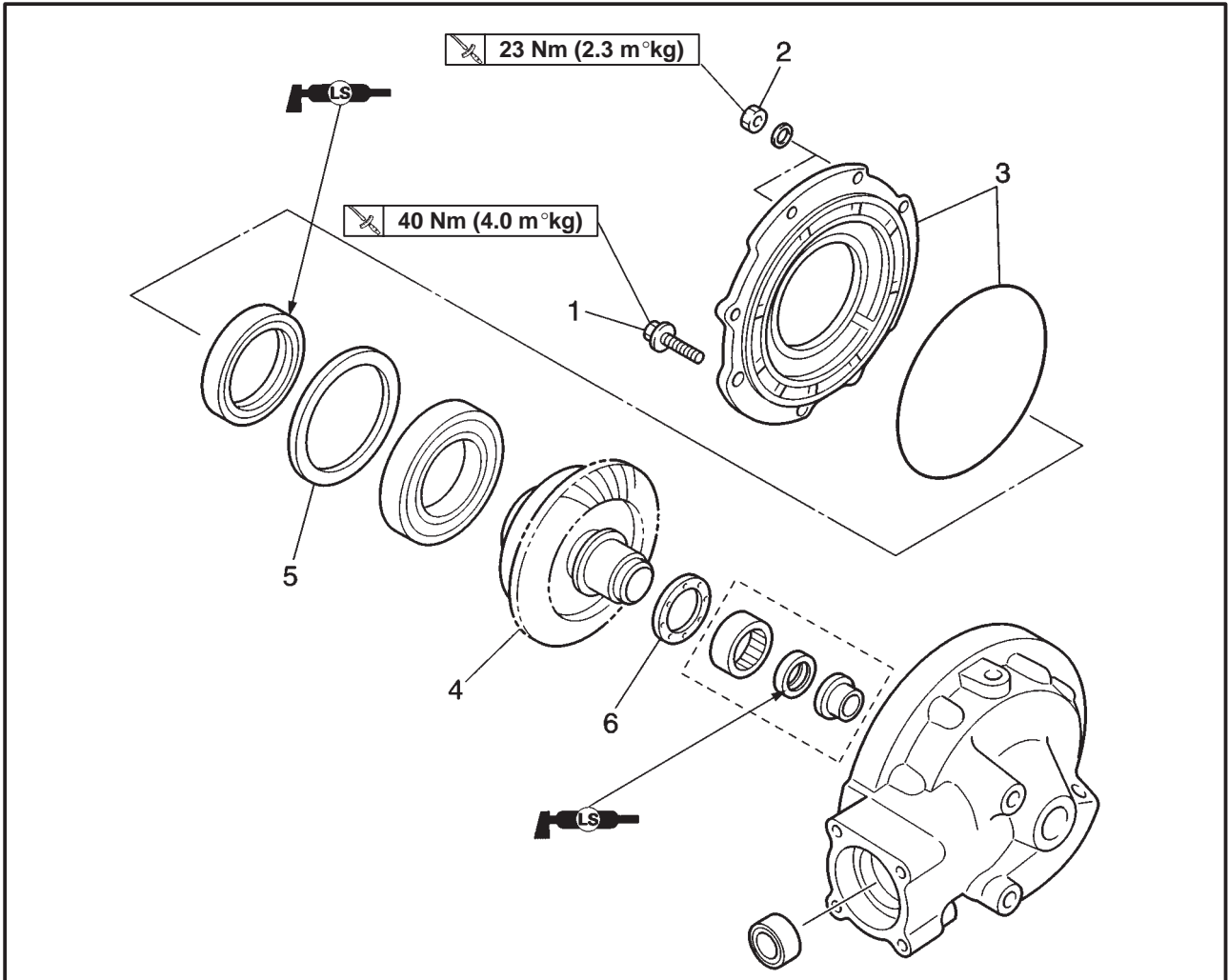


FINAL DRIVE ASSEMBLY AND DRIVE SHAFT



Order	Job name/Part name	Q'ty	Remarks
	Removing the final drive assembly and drive shaft.		Remove the parts in the order listed. Stand the motorcycle on a level surface. ⚠ WARNING Securely support the motorcycle so there is no danger of it falling over.
	Rear wheel assembly		Refer to "REAR WHEEL AND BRAKE DISC".
1	Collar	1	
2	Drive shaft assembly	1	
3	Final drive pinion gear assembly	1	Refer to "DISASSEMBLING THE FINAL DRIVE ASSEMBLY/ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR".
4	Final gear assembly	1	For installation, reverse the removal procedure.

FINAL GEAR



Order	Job name/Part name	Q'ty	Remarks
	Disassembling the final gear.		
1	Bolts (bearing housing)	2	Disassemble the parts in the order listed. NOTE: Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all the bolts and nuts are loosened, remove them.
2	Nuts (bearing housing)	6	
3	Bearing housing/O-ring	1/1	
4	Ring gear	1	
5	Shim (s)	1	
6	Thrust washer	1	
			For assembly, reverse the disassembly procedure.



EAS00724

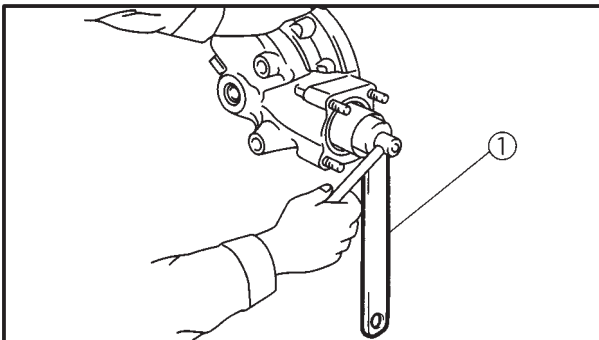
DISASSEMBLING THE FINAL DRIVE ASSEMBLY

1. Remove:

- ° ring gear bearing housing nuts
- ° ring gear bearing housing bolts

NOTE:

Working in a crisscross pattern, loosen each bolts and nuts 1/4 of a turn. After all of the bolts and nuts are fully loosened, and remove them.



2. Remove:

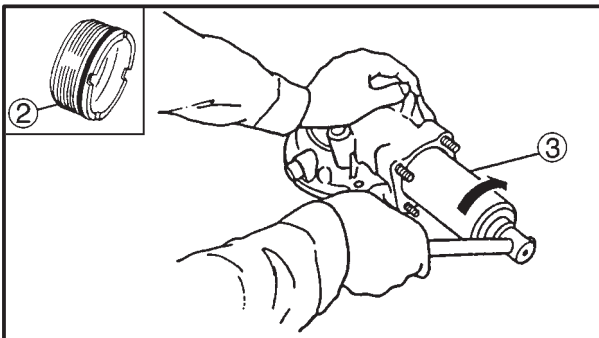
- ° self-locking nut
- ° gear coupling
(with the special tool ①)



Coupling gear/middle shaft tool
90890-01229

3. Remove:

- ° bearing retainer ②
(with the special tool ③)



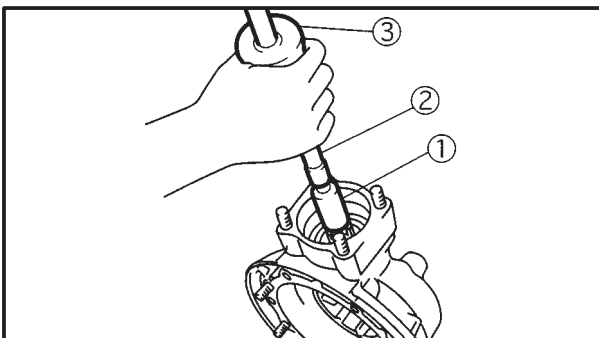
Bearing retainer wrench
90890-04077

CAUTION:

The bearing retainer has left-hand threads. To loosen the bearing retainer, turn it clockwise.

4. Remove:

- ° final drive pinion gear
(with the special tools)



Crankshaft installer bolt adapter ①

90890-01277

Armature shock puller ②

90890-01290

Weight ③

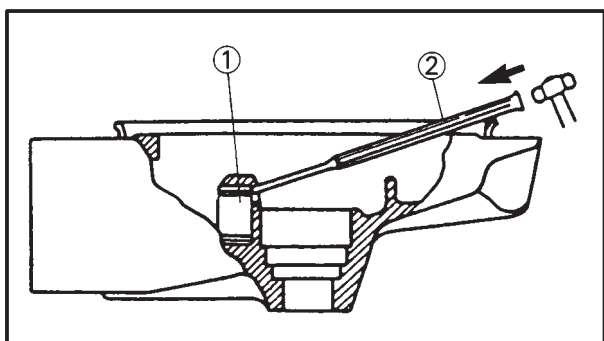
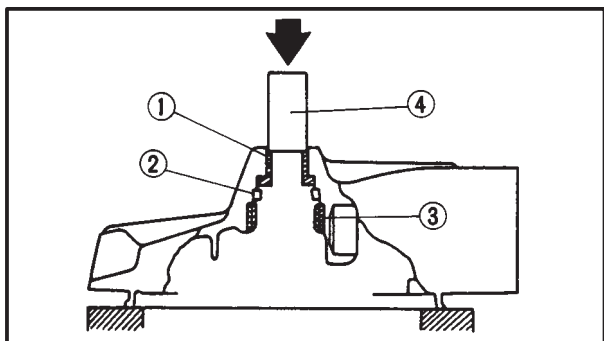
90890-01291

⚠ WARNING

Always use new bearings.

CAUTION:

The final drive pinion gear should only be removed if ring gear replacement is necessary.



EAS06725

REMOVING AND INSTALLING THE RING GEAR BEARINGS

- 1. Remove:
 - ° collar (1)
 - ° oil seal (2)
 - ° bearing (3) (with an appropriate press tool (4) and an appropriate support for the final drive housing)
 - 2. Check:
 - ° bearing
 - Damage → Replace.
 - 3. Remove:
 - ° bearing (1)
-
- a. Heat the final gear case to approximately 150 °C (302 °F).
 - b. Remove the bearing outer races with an appropriately shaped punch (2).
 - c. Remove the inner race from the final drive pinion gear.

NOTE: _____
 The removal of the final drive pinion gear bearing is a difficult procedure and is rarely necessary.

-
- 4. Install:
 - ° bearing (New)
-
- a. Heat the final gear case to approximately 150 °C (302 °F).
 - b. Install the bearing outer races with a socket or appropriate tool that matches the diameter of the races.
 - c. Install the inner race onto the final drive pinion gear.

Where:

a = a numeral (positive or negative) on the ring gear, to be divided by 100 and added to “84”
 b = a numeral on the final drive housing.


Example:

If the final drive pinion gear is marked “+ 01” and the final drive housing is marked “83.50”:

$$\begin{aligned}
 A &= (84 + 1/100) - (83.50) \\
 &= (84 + 0.01) - (83.50) \\
 &= 84.01 - 83.50 \\
 &= 0.51
 \end{aligned}$$

Therefore, the calculated final drive pinion gear shim thickness is 0.51 mm.

Shim sizes are supplied in the following thicknesses.

	Final drive pinion gear shim	
Thickness (mm)	0.30, 0.40, 0.50	

Since the final drive pinion gear shims are only available in 0.10 mm increments, round off to the hundredths digit.

Hundredths	Rounded value
0, 1, 2, 3, 4	0
5, 6, 7, 8, 9	10

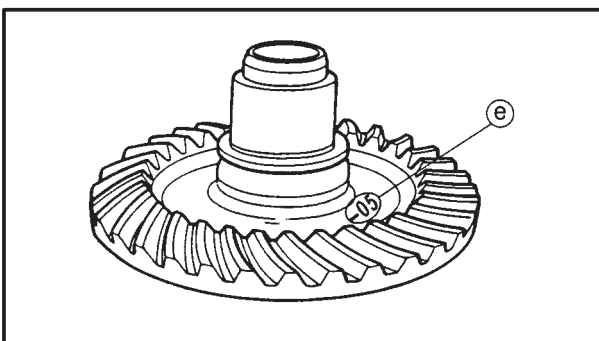
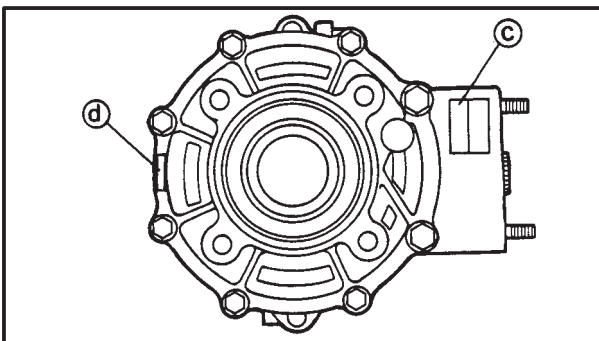
In the example above, the calculated final drive pinion gear shim thickness is 0.51 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50 mm final drive pinion gear shim.

c. To find ring gear shim thickness “B”, use the following formula:

<p>Ring gear shim thickness $B = \text{C} + \text{d} - [(35.40 + \text{e}/100) + \text{f}]$</p>

Where:

- © = a numeral on the final drive housing.
- d = a numeral usually on the outside of the ring gear bearing housing.
- © = a numeral (positive or negative) on the inside of the ring gear, to be divided by 100 and added to “35.40”.



ⓕ = the ring gear bearing thickness constant

	Ring gear bearing thickness“ⓕ” 13.00 mm
-----------------------------------------------------------------------------------	----------------------------------------------------------

Example:

If the final drive housing is marked “45.51” the ring gear bearing housing is marked “3.35” the ring gear is marked “-05”, and “f” is 13.00:

$$\begin{aligned}
 B &= 45.51 + 3.35 - [(35.40 - 5/100) + 13] \\
 &= 45.51 + 3.35 - [(35.40 - 0.05) + 13] \\
 &= 48.86 - [35.35 + 13] \\
 &= 48.86 - 48.35 \\
 &= 0.51
 \end{aligned}$$

Therefore, the calculated ring gear shim thickness is 0.51 mm.

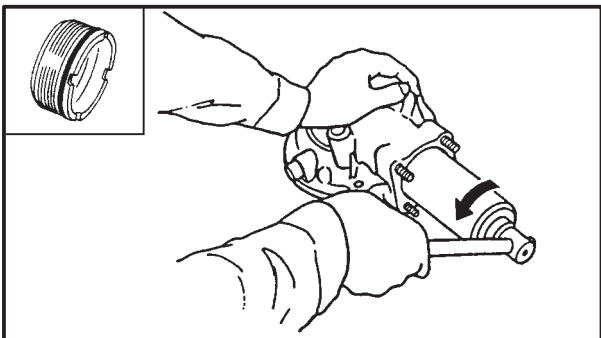
Shim sizes are supplied in the following thickness.

	Ring gear shim	
Thickness (mm)	0.30, 0.40, 0.50	


Since the ring gear shims are only available in 0.10 mm increments, round off the hundredths digit.

Hundredths	Rounded value
0, 1, 2, 3, 4	0
5, 6, 7, 8, 9	10

In the example above, the calculated final gear shim thickness is 0.51 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50 mm ring gear shim.




2. Install:

- ° shim(s) (as calculated)
- ° final drive pinion gear
- ° bearing retainer  **115Nm (11.5 m°kg)**
(with the bearing retainer wrench)


CAUTION: _____

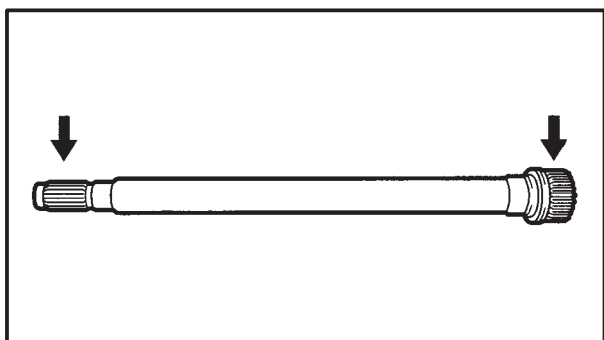
The bearing retainer has left-hand threads. To tighten the bearing retainer, turn it counterclockwise.

- g. If the ring-gear-to-thrust-washer clearance is out of specification, select the correct thrust washer as follows.
- h. Select the suitable thrust washer from the following chart.

	Thrust washer	
Thickness (mm)	1.2, 1.4, 1.6, 1.8, 2.0	

- i. Repeat the measurement steps until the ring-gear-to-thrust-washer clearance is within the specified limits.

	Ring-gear-to-thrust-washer clearance 0.2 mm
-----------------------------------------------------------------------------------	--------------------------------------------------------------



EAS00727

CHECKING THE DRIVE SHAFT

- 1. Check:
 - ° drive shaft splines
 - Damage/wear → Replace the drive shaft.


EAS00728

INSTALLING THE DRIVE SHAFT

- 1. Lubricate:
 - ° drive shaft splines

	Recommended lubricant Molybdenum disulfide grease
-------------------------------------------------------------------------------------	--------------------------------------------------------------------

- 2. Apply:
 - ° sealant
(onto both final drive housing mating surfaces)


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

- 3. Install:
 - ° drive shaft
(to the final drive pinion gear)

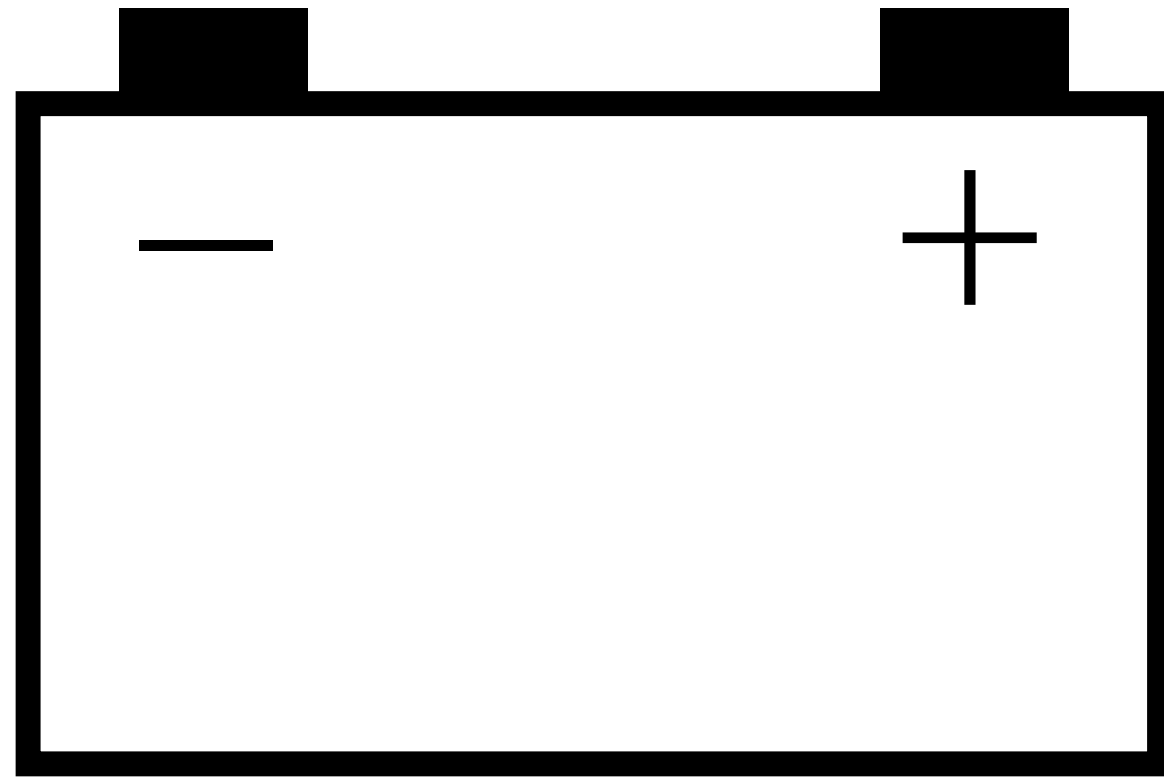
SHAFT DRIVE



4. Tighten:
 - ° final bearing housing nuts

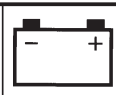
 **42 Nm (4.3 m°kg)**

5. Install:
 - ° rear wheel assemblyRefer to "REAR WHEEL AND BRAKE DISC".



ELEC

7



CHAPTER 7 ELECTRICAL

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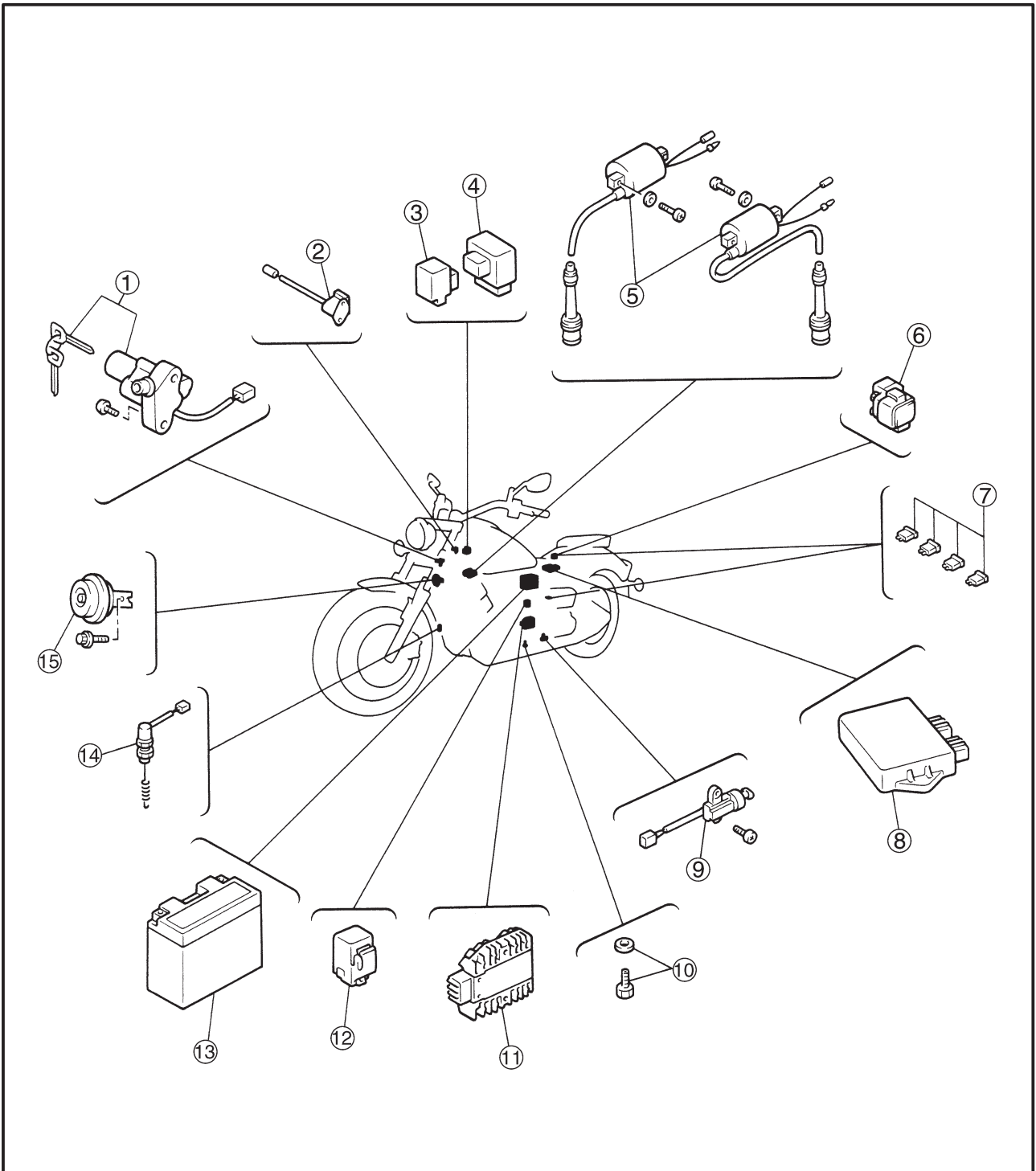
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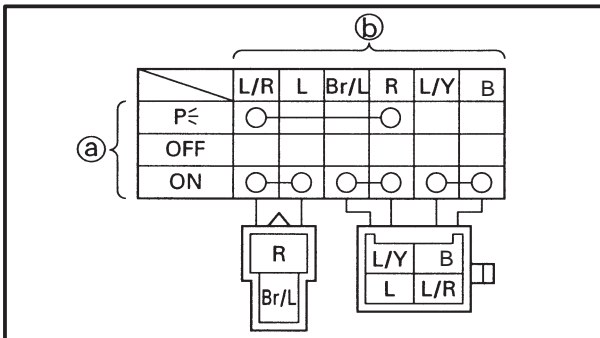
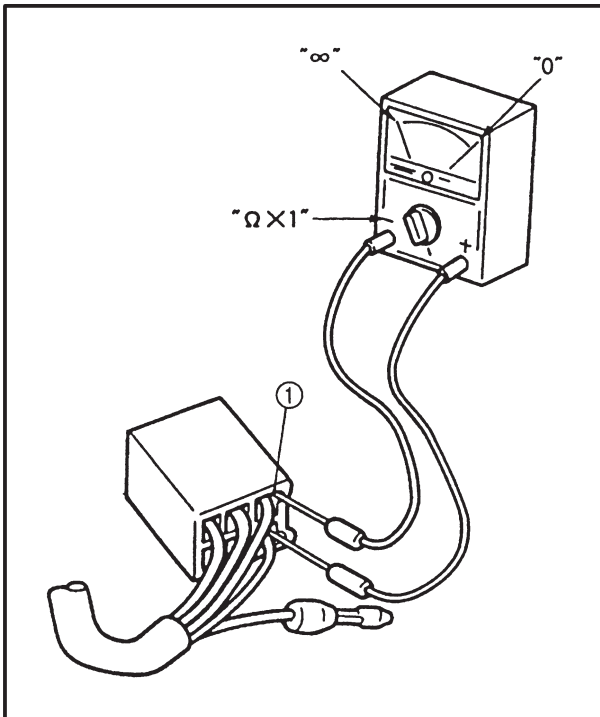
EB800000

ELECTRICAL

ELECTRICAL COMPONENTS

- ① Main switch
- ② Thermo switch
- ③ Flasher relay
- ④ Starting circuit cut off relay
- ⑤ Ignition coil
- ⑥ Starter relay
- ⑦ Fuse
- ⑧ Igniter unit
- ⑨ Side stand switch
- ⑩ Neutral switch
- ⑪ Rectifier/regulator
- ⑫ Oil lamp relay
- ⑬ Battery
- ⑭ Rear brake switch
- ⑮ Horn





EAS0010

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 (a) are shown in the far left column and the switch lead colors (b) 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 black when the switch is set to "ON".

CHECKING THE SWITCHES



EAS00731

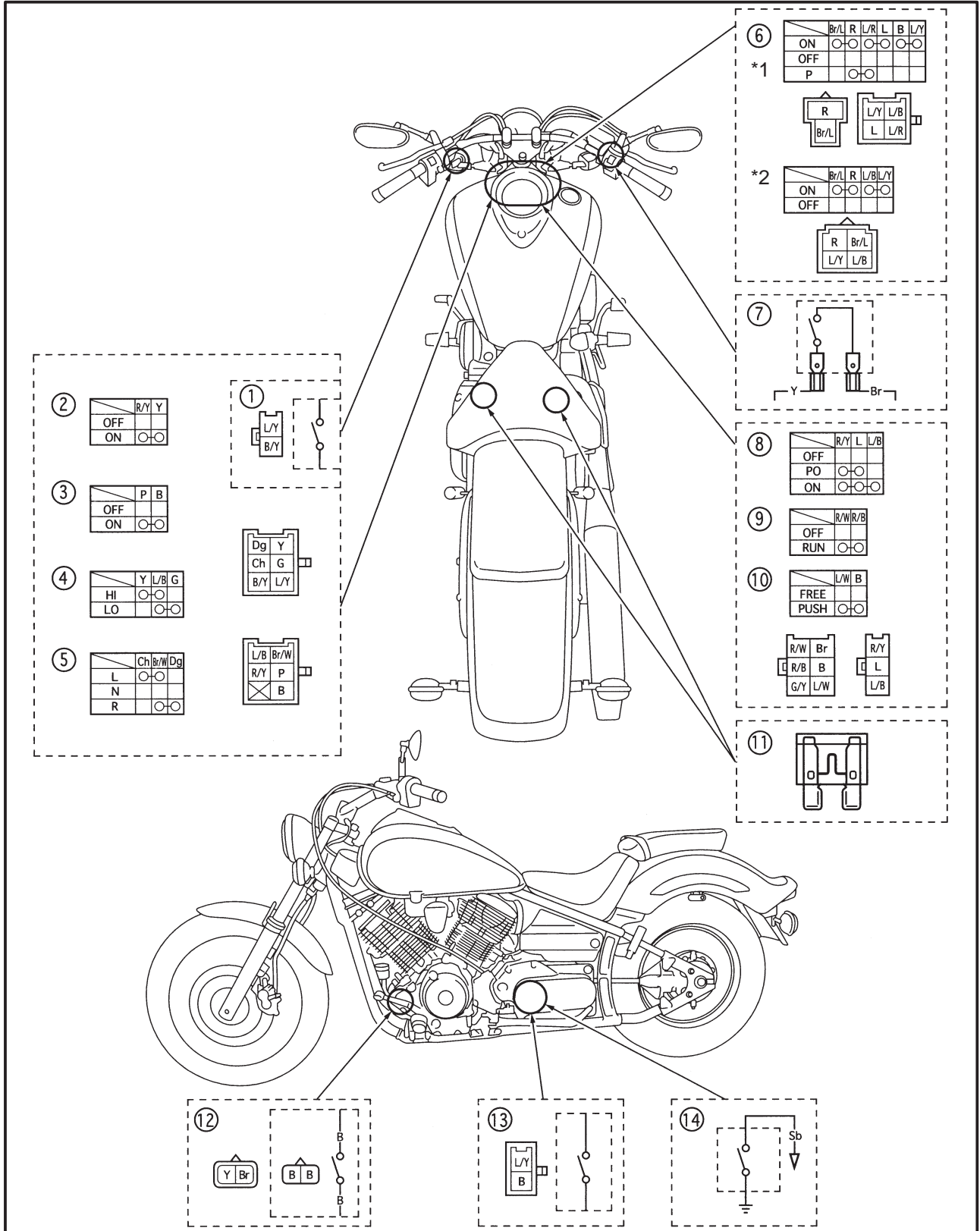
CHECKING THE SWITCHES

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

Damage/wear → Repair or replace the switch.

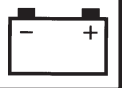
Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.

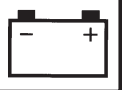


CHECKING THE SWITCHES

ELEC



- ① Clutch switch
 - ② Pass switch
 - ③ Horn switch
 - ④ Dimmer switch
 - ⑤ Turn switch
 - ⑥ Main switch
 - ⑦ Front brake switch
 - ⑧ Lights switch (for Europe)
 - ⑨ Engine stop switch
 - ⑩ Start switch
 - ⑪ Fuse
 - ⑫ Rear brake switch
 - ⑬ Sidestand switch
 - ⑭ Neutral switch
- *1: for Europe
*2: for AUS



EAS00732

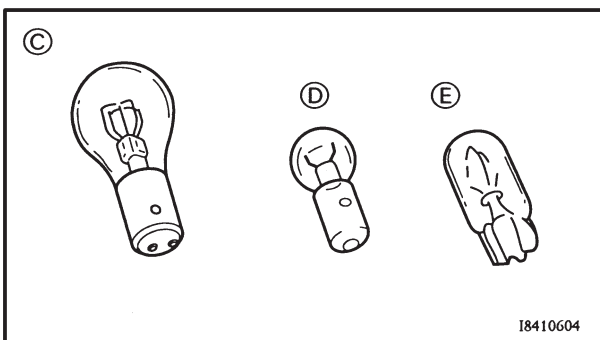
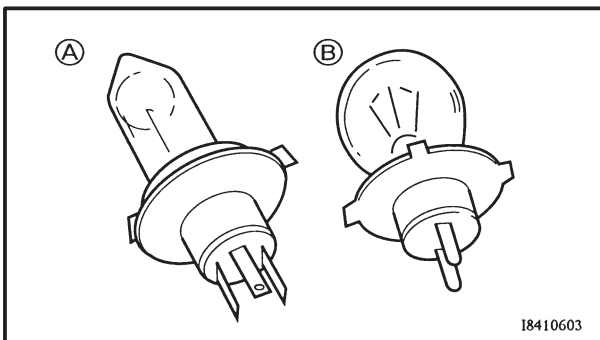
CHECKING THE BULBS AND BULB SOCKETS

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 **A** and **B** are used for headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- ° Bulb **C** is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- ° Bulbs **D** and **E** are used for meter and indicator lights and can be removed from their respective socket by turn **D** and pulling **E** them out.

CHECKING THE CONDITION OF THE BULBS

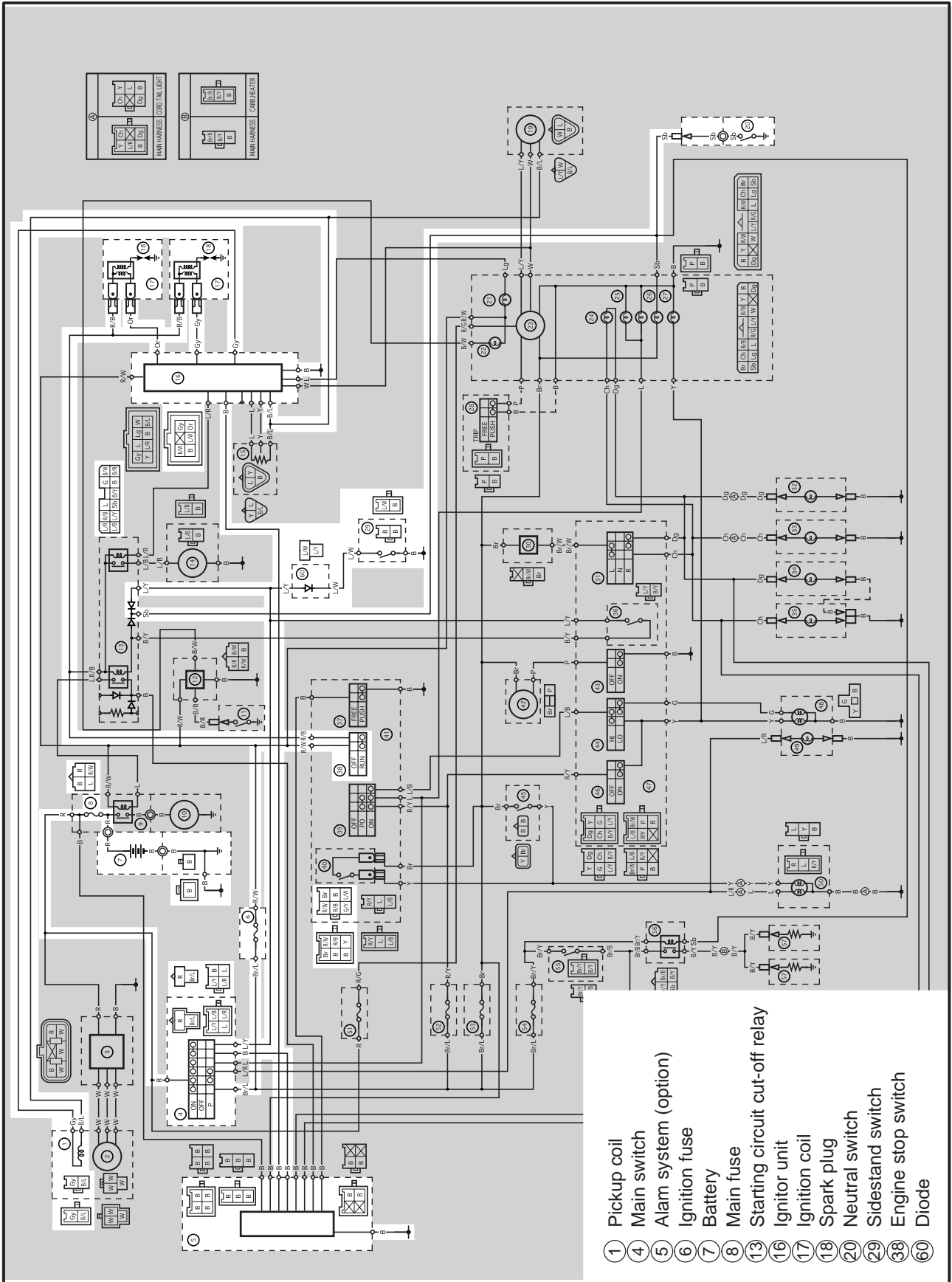
The following procedure applies to all of the bulbs.

1. Remove:
 - ° bulb



EB802000

IGNITION SYSTEM CIRCUIT DIAGRAM



- ① Pickup coil
- ④ Main switch (option)
- ⑤ Alarm system (option)
- ⑥ Ignition fuse
- ⑦ Battery
- ⑧ Main fuse
- ⑬ Starting circuit cut-off relay
- ⑯ Ignitor unit
- ⑰ Ignition coil
- ⑱ Spark plug
- ⑳ Neutral switch
- ㉑ Sidestand switch
- ㉒ Engine stop switch
- ⑥① Diode



EAS00737

TROUBLESHOOTING

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

Check:

1. main and ignition fuses
2. battery
3. spark plugs
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. pickup coil resistance
8. main switch
9. engine stop switch
10. neutral switch
11. sidestand switch
12. diode
13. starting circuit cut-off relay (diode)
14. wiring
(of the entire ignition system)

NOTE:

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

- 1) battery cover
- 2) rider's seat
- 3) fuel tank
- 4) steering head side covers
- 5) tool box cover
- 6) left side cover
- 7) cylinder head covers

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

	<p>Ignition checker 90890-06754</p> <p>Pocket tester 90890-03112</p>
--	--------------------------------------------------------------------------------------------

EAS00738

<p>1. Main and ignition fuses</p> <p>° Check the main and ignition fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.</p> <p>° Are the main and ignition fuses OK?</p>



Replace the fuse(-s).

EAS00739

2. Battery	
° Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.	
	<p>Min. open-circuit voltage 12.8 V or more at 20 °C</p>
° Is the battery OK?	



° Clean the battery terminals.
 ° Recharge or replace the battery.

EAS00741

3. Spark plugs	
The following procedure applies to all of the spark plugs.	
° Check the condition of the spark plug.	
° Check the spark plug type.	
° Measure the spark plug gap. Refer to "CHECKING THE SPARK PLUGS" in chapter 3.	
	<p>Standard spark plug BPR7ES W22EPR-U</p> <p>Spark plug gap 0.7 ~ 0.8 mm</p>
° Is the spark plug in good condition, is it of the correct type, and its gap within specification?	



Re-gap or replace the spark plug.

IGNITION SYSTEM

ELEC

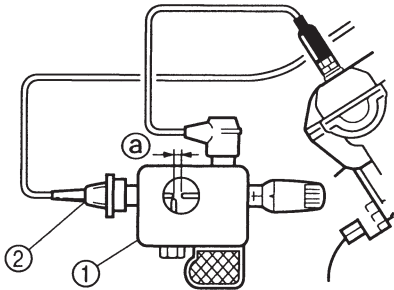


EAS00743

4. Ignition spark gap

The following procedure applies to all of the spark plugs.

- ° Disconnect the spark plug cap from the spark plug.
- ° Connect the ignition checker ① as shown.
- ° ② Spark plug cap
- ° Set the main switch to "ON".
- ° Measure the ignition spark gap (a).
- ° Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.



18110202



Min. ignition spark gap
6 mm

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

NO

YES

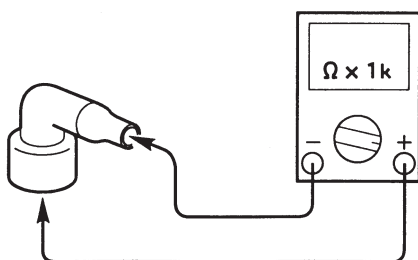
The ignition system is OK.

EAS00745

5. Spark plug cap resistance.

The following procedure applies to all of the spark plug caps.

- ° Disconnect the spark plug cap from the spark plug.
- ° Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap as shown.
- ° Measure the spark plug cap resistance.



18040101



Spark plug cap resistance
10 k Ω at 20 °C

° Is the spark plug cap OK?

YES

NO

Replace the spark plug cap.

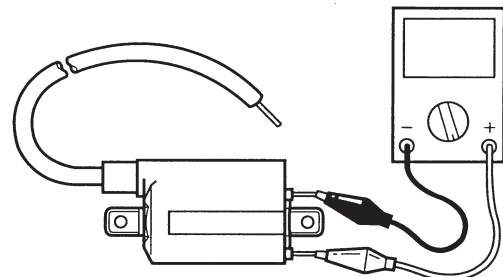
EAS00747

6. Ignition coil resistance

The following procedure applies to all of the ignition coils.

- ° Disconnect the ignition coil connectors from the ignition coil terminals.
- ° Connect the pocket tester ($\Omega \times 1$) to the ignition coil as shown.

Tester positive probe → red/black
Tester negative probe → orange (gray)



18110104

° Measure the primary coil resistance.



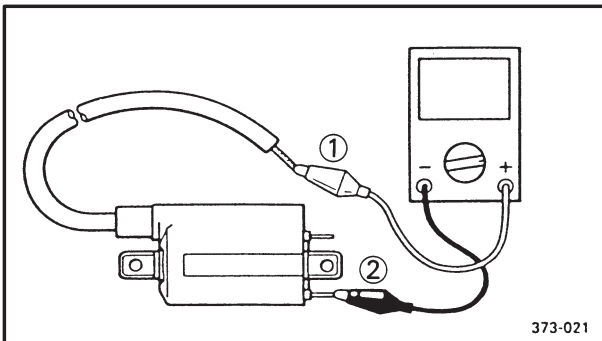
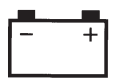
Primary coil resistance
3.57 ~ 4.83 Ω at 20 °C

- ° Connect the pocket tester ($\Omega \times 1k$) to the ignition coil as shown.
- ° Measure the secondary coil resistance.

Tester positive probe → spark plug lead ①
Tester negative probe → Orange (gray) lead ②

IGNITION SYSTEM

ELEC



373-021

Secondary coil resistance
10.7 ~ 14.5 kΩ 20 °C

° Is the ignition coil OK?

↓ YES

↓ NO

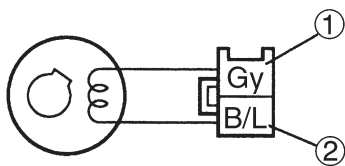
Replace the ignition coil.

EAS00748

7. Pickup coil resistance

- ° Disconnect the pickup coil coupler from the wire harness.
- ° Connect the pocket tester ($\Omega \times 100$) to the pickup coil terminal.

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



° Measure the pickup coil resistance.

Pickup coil resistance
189 ~ 231 Ω at 20 °C
(between gray and black/blue)

° Is the pickup coil OK?

↓ YES

↓ NO

Replace the pickup coil.

EAS00749

8. 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

9. 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

10. 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

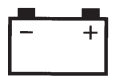
11. Sidestand switch

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

↓ YES

↓ NO

Replace the side-stand switch.



12. Diode

- Remove the diode from the wire harness.
- Check for continuity as follows:

Tester (+) lead → Blue/White ①	Continuity
Tester (-) lead → Blue/Yellow ②	
Tester (+) lead → Blue/Yellow ②	No Continuity
Tester (-) lead → Blue/White ①	

NOTE: _____
When you switch the “-” and “+” leads of the digital pocket tester the readings in the above chart will be reversed.

• Is the diode OK?



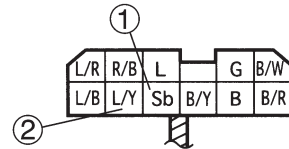
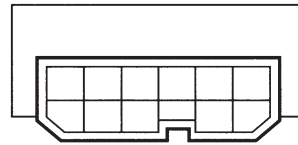
Replace the diode.

13. Starting circuit cut-off relay (diode)

- Remove the relay unit from the wire harness.
- Check for continuity as follows:
Sky blue – Blue/Yellow ②

Tester (+) lead → SKY blue ①	Continuity
Tester (-) lead → Blue/Yellow ②	
Tester (+) lead → Blue/Yellow ②	No Continuity
Tester (-) lead → Sky blue ①	

NOTE: _____
When you switch the “-” and “+” leads of the digital pocket tester the readings in the above chart will be reversed.



• Is the starting circuit cut-off relay (diode) OK?



Replace the starting circuit cut-off relay.

EAS00754

14. Wiring

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



Properly connect or repair the ignition system’s wiring.

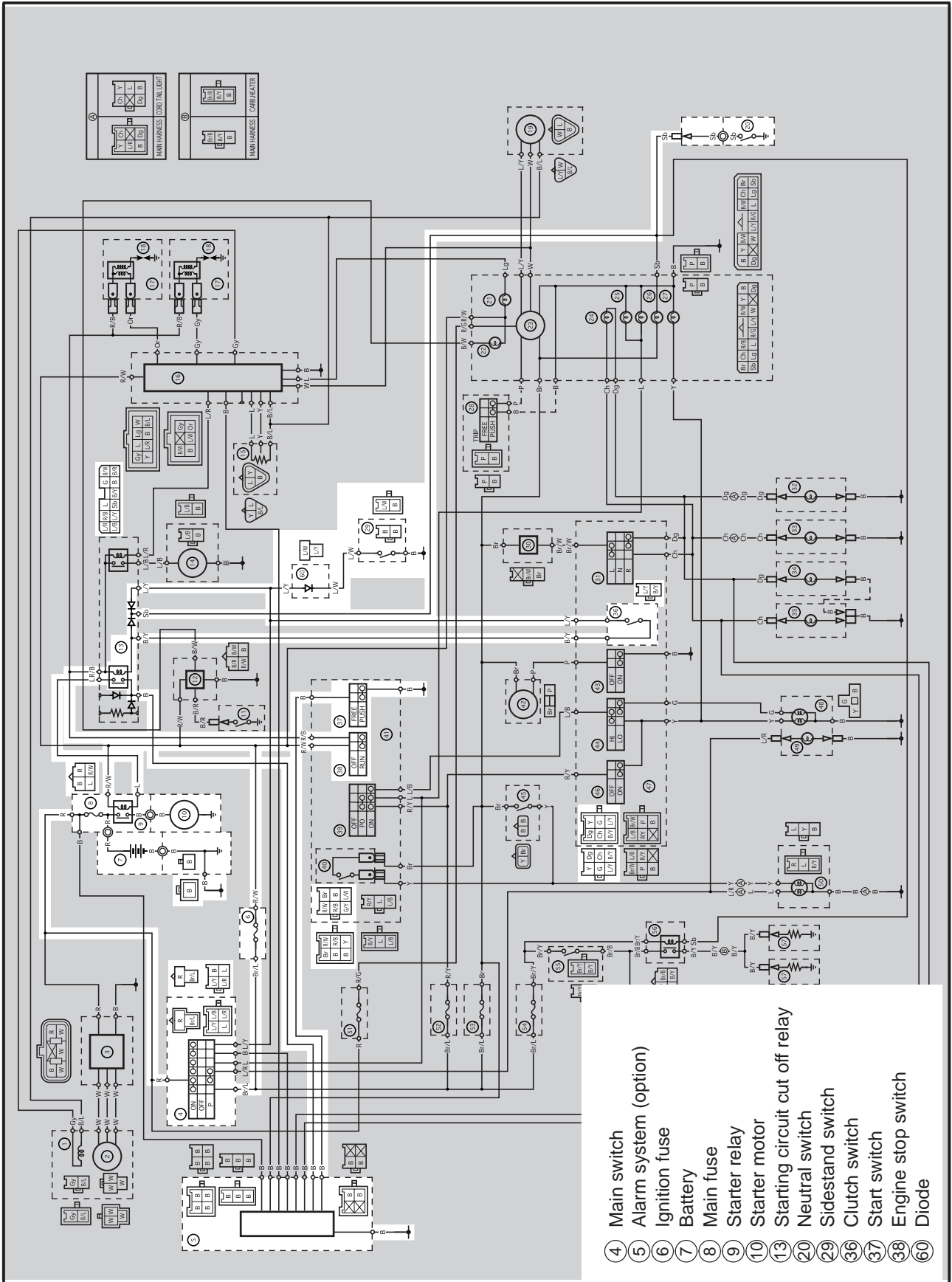
Replace the ignitor unit.

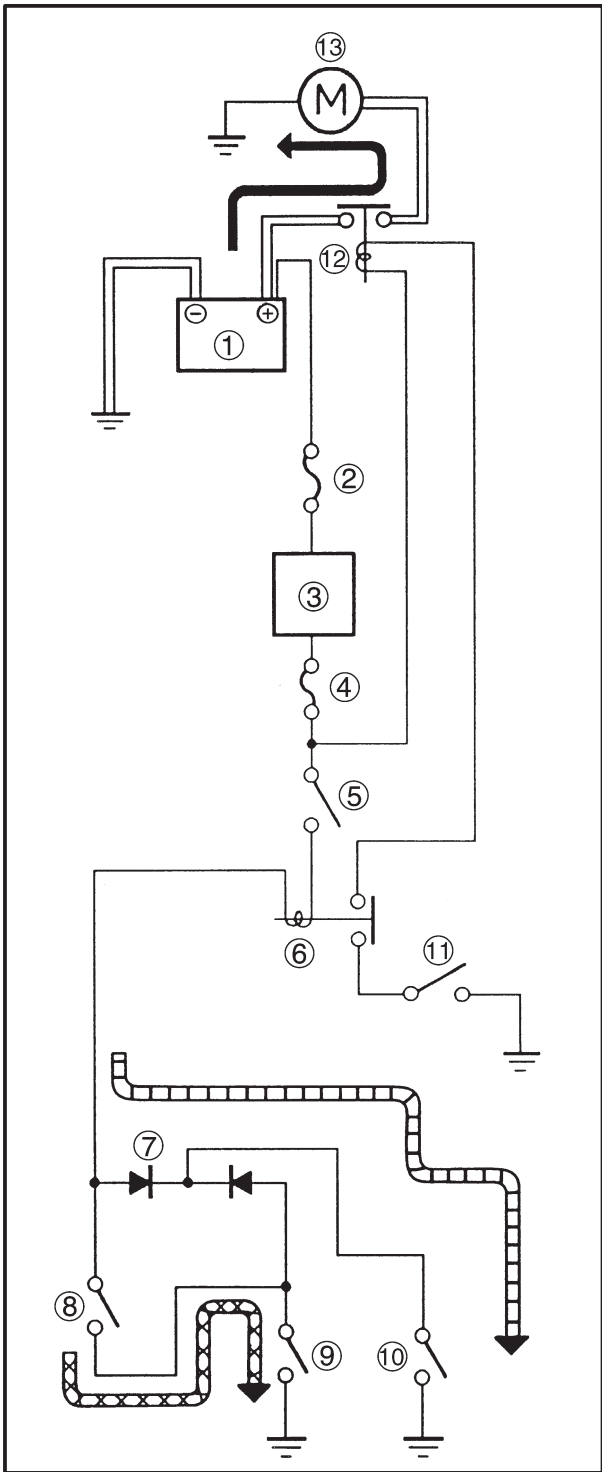
ELECTRIC STARTING SYSTEM



EB803000

ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM





EB803010

STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, and the starting circuit cut-off relay. If the engine stop switch is on "RUN" and the main switch is on "ON" (both switches are closed), the starter motor can operate only if:

- The transmission is in neutral (the neutral switch is closed).
- or if**
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter from operating when neither of these conditions have been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor.

When at least one of the above conditions have been met however, the starting circuit cut-off relay is closed, and the engine can be started by pressing the starter switch.

← WHEN THE TRANSMISSION IS IN NEUTRAL

← WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED IN

- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Ignition fuse
- ⑤ Engine stop switch
- ⑥ Starting circuit cut-off relay
- ⑦ Diode
- ⑧ Clutch switch
- ⑨ Sidestand switch
- ⑩ Neutral switch
- ⑪ Start switch
- ⑫ Starter relay
- ⑬ Starter motor



EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:

1. main and ignition fuses
2. battery
3. starter motor
4. starting circuit cutoff relay
5. starting circuit cutoff relay (diode)
6. starter relay
7. main switch
8. engine stop switch
9. neutral switch
10. sidestand switch
11. clutch switch
12. start switch
13. diode
14. wiring
(of the entire starting system)

NOTE:

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

- 1) battery cover
- 2) rider's seat
- 3) fuel tank
- 4) steering head side covers
- 5) left side cover

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



Pocket tester
90890-03112

EAS00738

1. Main and ignition fuses

- ° Check the main and ignition fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
- ° Are the main and ignition fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EAS00739

2. Battery

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



Open-circuit voltage
12.8 V or more at 20 °C

° Is the battery OK?

↓ YES

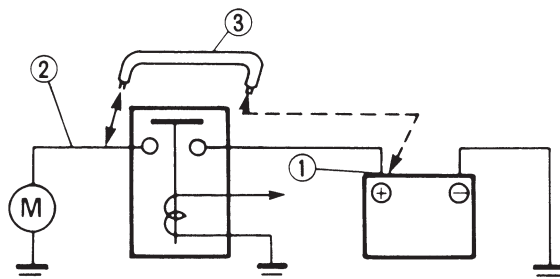
↓ NO

- ° Clean the battery terminals.
- ° Recharge or replace the battery.

EAS00758

3. Starter motor

- ° Connect the 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.

EAS00759

4. Starting circuit cutoff relay

- ° Disconnect the relay unit from the coupler.
- ° Connect the pocket tester ($\Omega \times 1$) and battery (12V) to the relay unit terminals as shown.

Battery positive terminal → **red/black** ①

Battery negative terminal → **black/yellow** ②

Tester positive probe → **blue** ③

Tester negative probe → **black** ④

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

↓ YES

↓ NO

Replace the relay unit.

EAS00760

5. Starting circuit cutoff relay (Diode)

- ° Disconnect the starting circuit cutoff relay from the coupler.
- ° Connect the pocket tester ($\Omega \times 1$) to the starting circuit cutoff relay terminals as shown.
- ° Measure the starting circuit cutoff relay for continuity as follows.

Tester positive probe → sky blue ① Tester negative probe → black/yellow ②	Continuity
Tester positive probe → black/yellow ② Tester negative probe → sky blue ①	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.



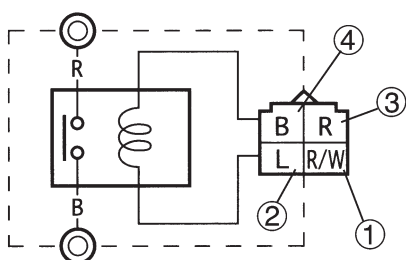
EAS00761

6. Starter relay

- ° Disconnect the starter relay from the coupler.
- ° Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starter relay coupler as shown.

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

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



- ° Does the starter relay have continuity between red and black?

↓ YES ↓ NO

Replace the starter relay.

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.

EAS00751

9. 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

10. 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

11. Clutch switch

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

↓ YES ↓ NO

Replace the clutch switch.

ELECTRIC STARTING SYSTEM



EAS00764

12. 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.

13. Diode
° Check the diode for continuity.
Refer to "IGNITION SYSTEM".
° Is the diode OK?

↓ YES

↓ NO

Replace the diode.

EAS00766

14. Wiring
° Check the entire starting system's wiring.
Refer to "CIRCUIT DIAGRAM".
° Is the starting system's wiring properly connected and without defects?

↓ NO

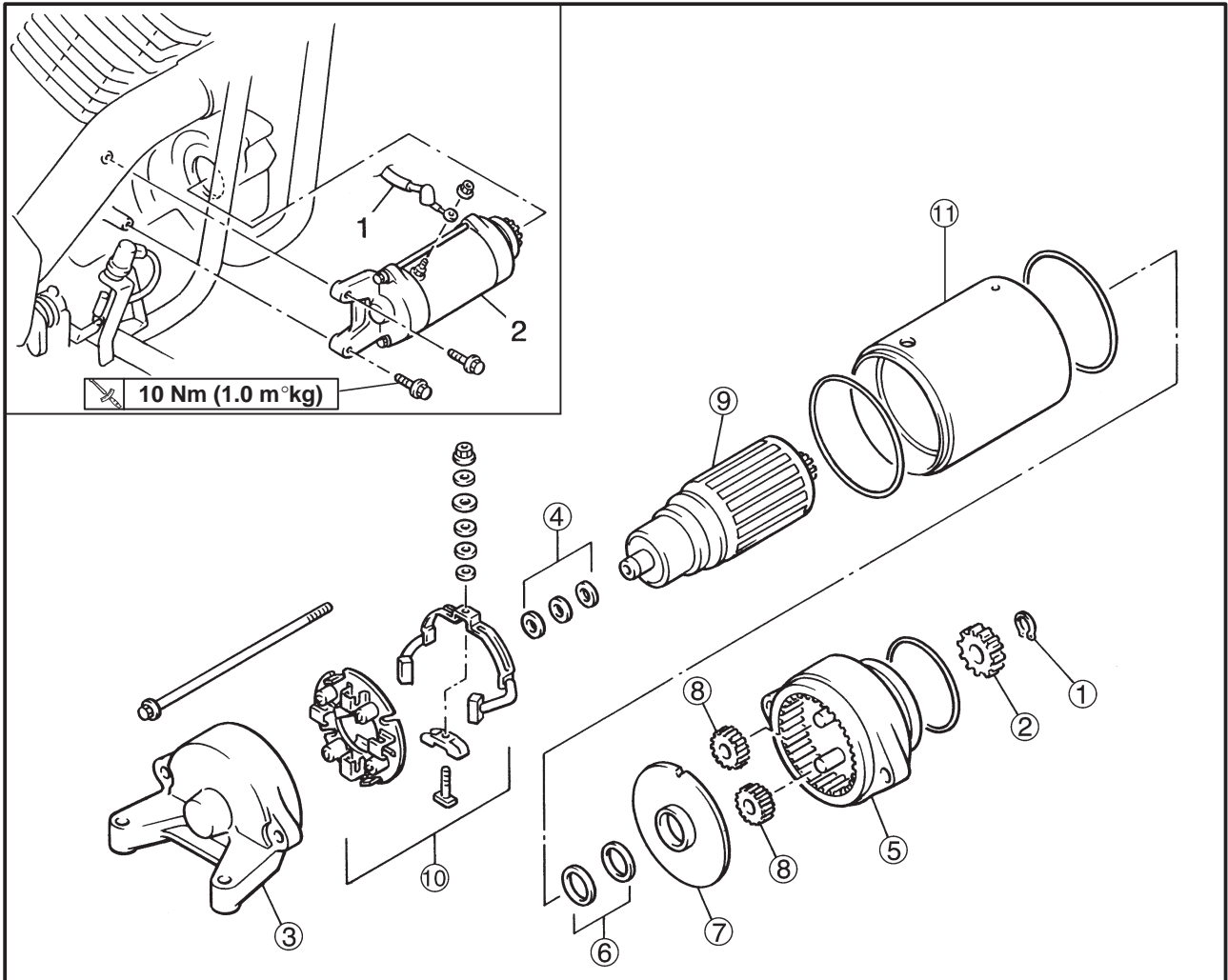
↓ YES

Properly connect or repair the starting system's wiring.

The starting system circuit is OK.



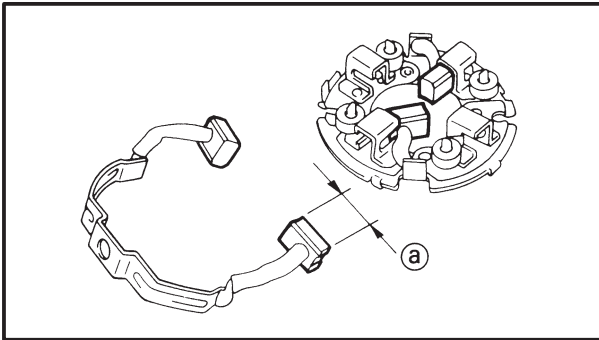
STARTER MOTOR



Order	Job name/Part name	Q'ty	Remarks
1	Removing the starter motor		
1	Starter motor lead	1	Remove the parts in the order listed.
2	Starter motor assembly	1	For installation, reverse the removal procedure.
	Disassembling the starter motor		Disassembly the parts in the order listed.
①	Circlip	1	
②	Starter motor drive gear	1	
③	Starter motor rear cover	1	Refer to "Assembling the starter motor."
④	Washer set	1	
⑤	Starter motor front cover	1	Refer to "Assembling the starter motor."
⑥	Washer set	1	
⑦	End bracket	1	Refer to "Assembling the starter motor."
⑧	Planetary gears	2	
⑨	Armature assembly	1	
⑩	Brush holder/brush	1/1	Refer to "Assembling the starter motor."
⑪	Starter motor yoke	1	
			For assembly, reverse the disassembly procedure

ELECTRIC STARTING SYSTEM

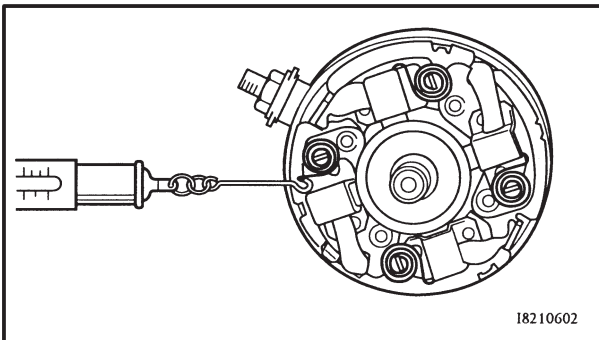
ELEC



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



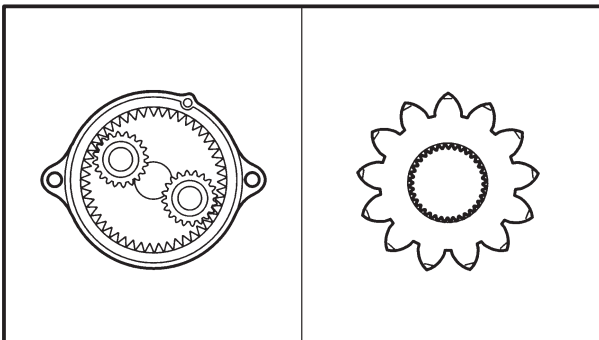
Min. brush length
5 mm



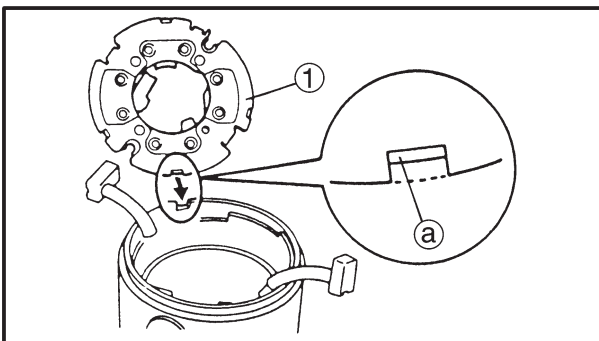
6. Measure:
 ° brush spring force
 Out of specification → Replace the brush springs as a set.



Brush spring force
7.65 ~ 10.01 N (780 ~ 1.020 g)



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

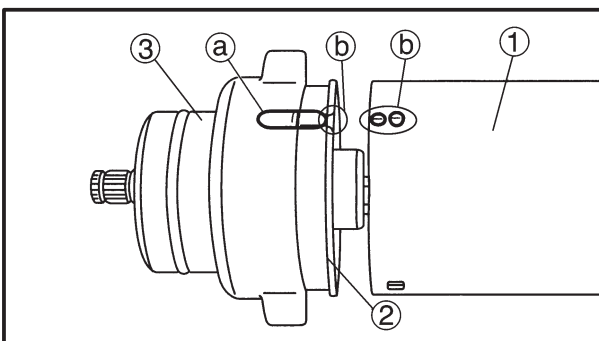


EAS00772

Assembling the starter motor

1. Install:
 ° brush holder **①**

NOTE: _____
 Align the tab **a** on the brush holder with the slot in the starter motor rear cover.

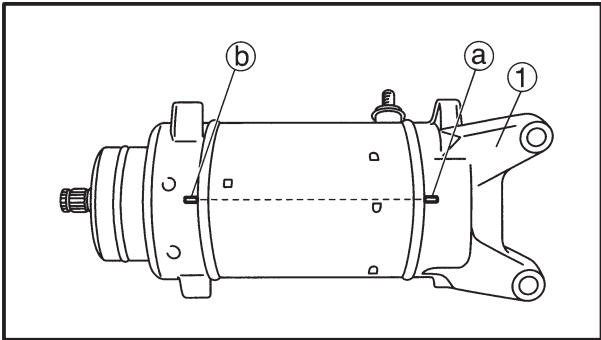
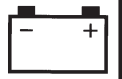


2. Install:
 ° starter motor yoke **①**
 ° end bracket **②**
 ° starter motor front cover **③**

NOTE: _____
 Align the projection **a** on the front cover with the slot **b** on the end cover and starter motor yoke.

ELECTRIC STARTING SYSTEM

ELEC



3. Install:

- Starter motor rear cover ①

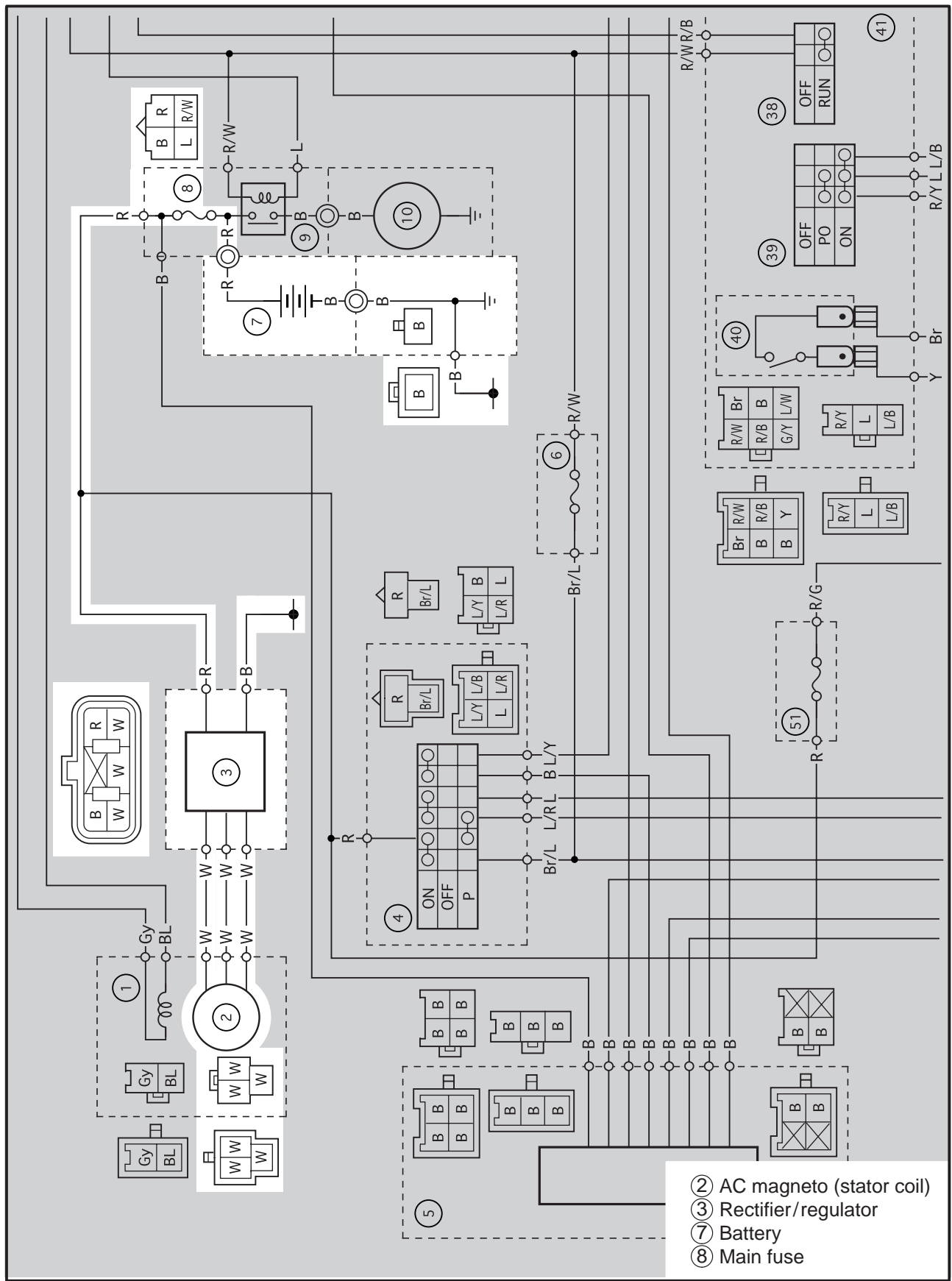
NOTE: _____

Align the match marks ① on the rear cover with the match marks ② on the front cover.

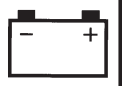


EB804000

**CHARGING SYSTEM
CIRCUIT DIAGRAM**



- ② AC magneto (stator coil)
- ③ Rectifier/regulator
- ⑦ Battery
- ⑧ Main fuse



EAS00774

TROUBLESHOOTING

The battery is not being charged.

Check:

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

NOTE: _____

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

- 1) battery cover
- 2) rider's seat
- 3) left side cover

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



Engine tachometer

90890-03113

Pocket tester

90890-03112

EAS00738

1. Main fuse

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

↓ YES

↓ NO

Replace the fuse.

EAS00739

2. Battery

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



Open-circuit voltage

12.8 V or more at 20°C

° Is the battery OK

↓ YES

↓ NO

- ° Clean the battery terminals.
- ° Recharge or replace the battery.

EAS00775

3. Charging voltage

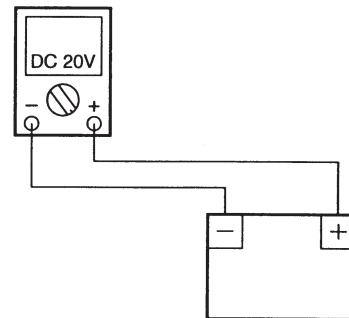
- ° Connect the engine tachometer to the spark plug lead of cylinder #1.
- ° Connect the pocket tester (DC 20 V) to the battery as shown.

Tester positive probe →

battery positive terminal

Tester negative probe →

battery negative terminal



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

- ° Measure the charging voltage.



Charging voltage

14 V at 5,000 r/min



NOTE: _____
 Make sure that the battery is fully charged.

° Is the charging voltage within specification?

↓ NO

↓ YES

The charging circuit is OK.

EAS00779

5. Wiring

° Check the wiring connections of the entire charging system.

Refer to "CIRCUIT DIAGRAM".

° Is the charging system's wiring properly connected and without defects?

↓ NO

↓ YES

Properly connect or repair the charging system's wiring.

Replace the rectifier/regulator.

EAS00776

4. Stator coil assembly resistances

° Remove the generator cover.

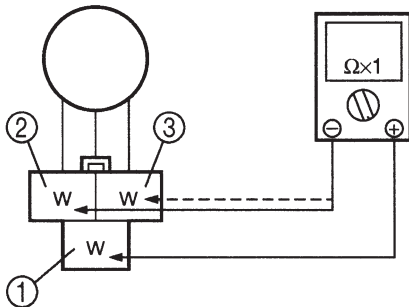
° Connect the pocket tester ($\Omega \times 1$) to the stator coil assembly coupler as shown.

Tester positive probe → **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

0.36 ~ 0.44 Ω at 20°C

° Is the stator coil assembly OK?

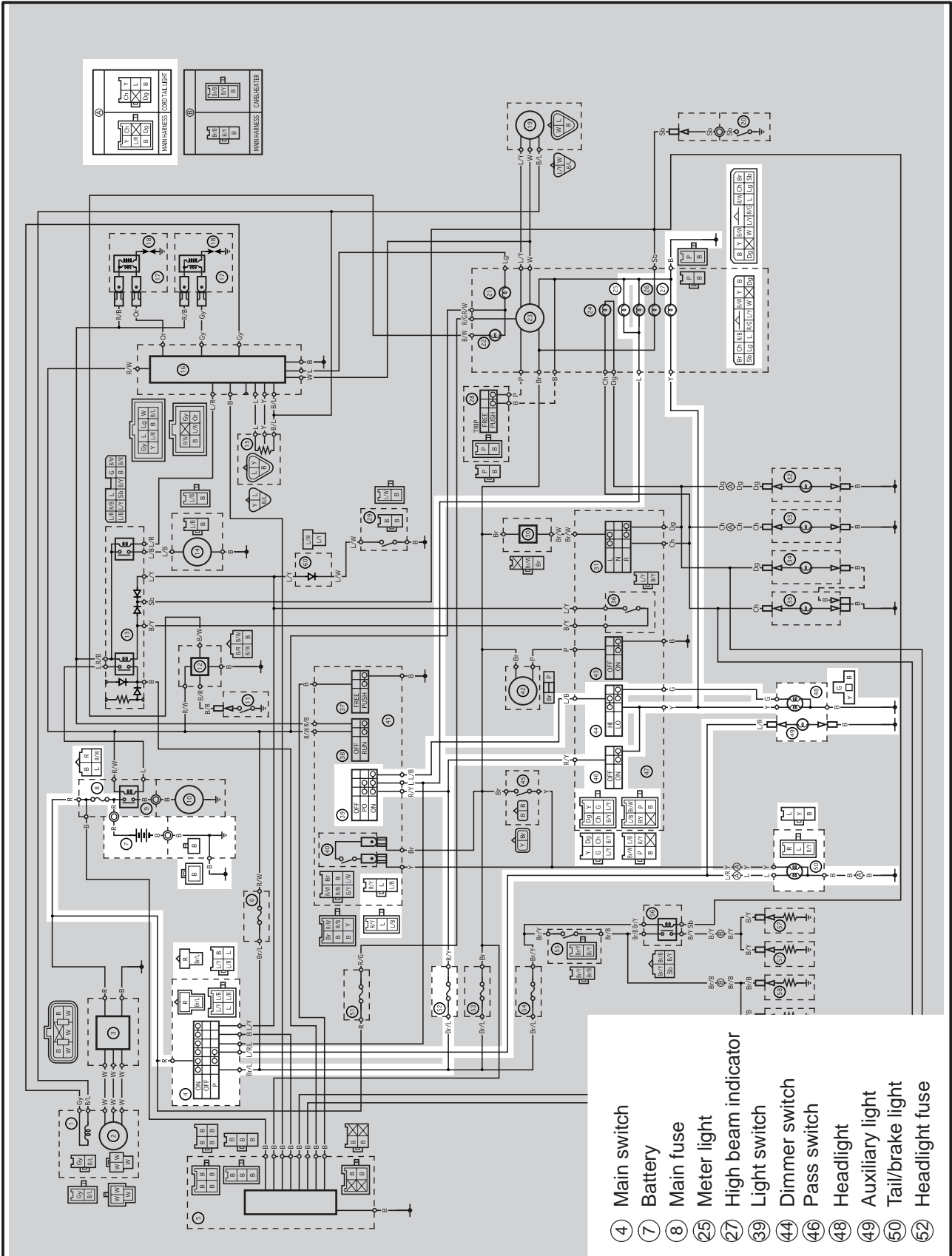
↓ YES

↓ NO

Replace the stator coil assembly.

EB805000

**LIGHTING SYSTEM
CIRCUIT DIAGRAM**



LIGHTING SYSTEM

ELEC



EAS00781

TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, auxiliary light (for Europe) or meter light.

Check:

1. main and headlight fuses
2. battery
3. main switch
4. lights switch (for Europe)
5. dimmer switch
6. pass switch
7. wiring
(of the entire charging system)

NOTE:

° Before troubleshooting, remove the following part(-s).

- 1) battery cover
 - 2) rider's seat
 - 3) fuel tank
 - 4) steering head side covers
 - 5) headlight lens unit
 - 6) tool box cover
- ° Troubleshoot with the following special tool(-s).



Pocket tester
90890-03112

EAS00738

1. Main, and headlight fuses

° Check the main, and headlight fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
° Are the main, and headlight fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EAS00739

2. Battery

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



Open-circuit voltage
12.8 V or more at 20°C

° Is the battery OK?

↓ YES

↓ NO

° Clean the battery terminals.
° Recharge or replace the battery.

EAS00749

3. Main switch

° Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
° Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EAS00783

4. Lights switch (for Europe)

° 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?



The dimmer switch is faulty. Replace the left handlebar switch.

EAS00786

6. Pass switch
 ° Check the pass switch for continuity. Refer to "CHECKING THE SWITCHES".
 ° Is the pass switch OK?



The pass 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?



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?



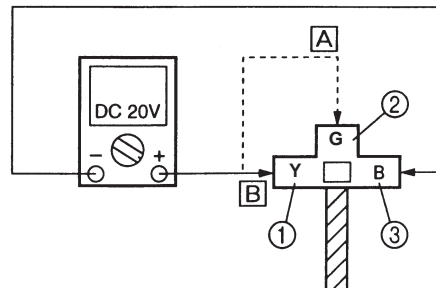
Replace the headlight bulb, socket or both.

2. Voltage
 ° Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.

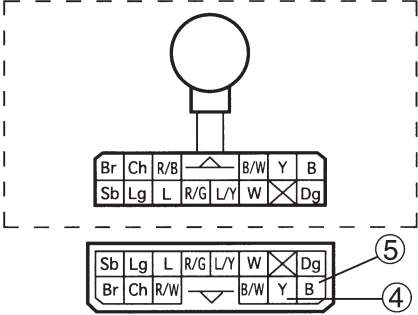
- A When the dimmer switch is set to "☰" (High beam)
- B When the dimmer switch is set to "☷" (Low beam)

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

Headlight coupler (wire harness side)



B



- Set the main switch to "ON".
- Set the light switch to "☀".
- Set the dimmer switch to "☹" or "☹".
- Measure the voltage (12 V) of yellow ① or green ② on the headlight coupler (headlight side).
- Measure the voltage (12V) of yellow ④ on the meter assembly coupler.
- Is the voltage within specification?

↓ YES ↓ NO

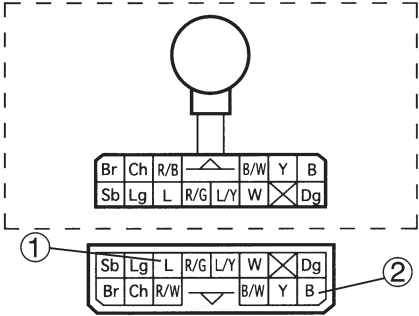
This circuit is OK.

The wiring circuit from the main switch to the headlight coupler is faulty and must be repaired.

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 "☹" or "☹".
- Measure the voltage (12 V) of blue ① on the meter assembly coupler (wire harness side).
- Is the voltage within specification?

↓ YES ↓ NO

This circuit is OK.

The wiring circuit from the main switch to the meter assembly 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.

EAS00790

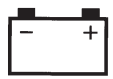
3. A tail/brake light fails to come on.

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 lightbulb, 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 "ΞD ΔΞ" or "☀".
 ° Measure the voltage (12 V) of blue/red 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.

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 "ΞD ΔΞ" or "☀".
 ° Measure the voltage (12 V) of blue/red ① 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.

EB05413

4. The auxiliary light fails to come on. (for Europe)

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?

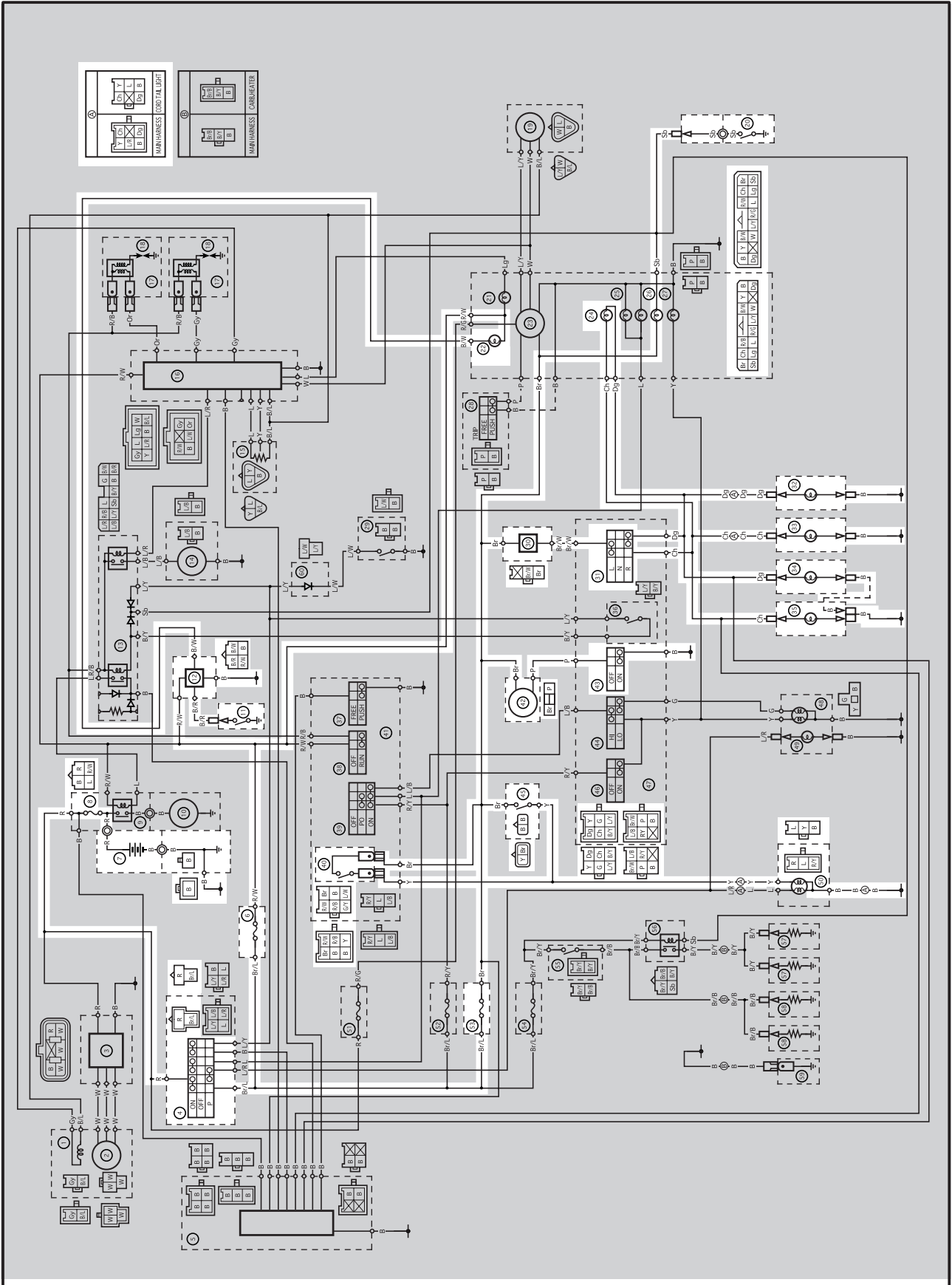
↓ YES

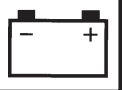
↓ NO

Replace the auxiliary light bulb, socket or both.

EB806000

SIGNAL SYSTEM
CIRCUIT DIAGRAM





- ④ Main switch
- ⑥ Ignition fuse
- ⑦ Battery
- ⑧ Main fuse
- ⑪ Oil level gauge
- ⑫ Oil lamp relay
- ⑳ Neutral switch
- ㉒ Oil warning light
- ㉔ Turn signal indicator light
- ㉖ Neutral indicator light
- ㉘ Flasher relay
- ㉙ Turn signal switch
- ㉚ Rear turn signal light (R)
- ㉛ Rear turn signal light (L)
- ㉜ Front turn signal light (R)
- ㉝ Front turn signal light (L)
- ㉞ Front brake switch
- ㉟ Horn
- ㊱ Horn switch
- ㊲ Rear brake switch
- ㊳ Tail/brake light
- ㊴ Signal fuse

SIGNALING SYSTEM



EB806010

TROUBLESHOOTING

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

Check:

1. main and signaling system fuses
2. battery
3. main switch
4. wiring
(of the entire signaling system)

NOTE:

- Before troubleshooting, remove the following part(-s):
 - 1) battery cover
 - 2) rider's seat
 - 3) fuel tank
 - 4) steering head side covers
 - 5) headlight lens unit
 - 6) tool box cover
 - 7) left side cover
- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738

1. Main, ignition and signaling system fuses

- Check the main ignition and signaling system fuses for continuity. Refer to "CHECKING AND CHARGING THE FUSES" in chapter 3.
- Are the main ignition and signaling system fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EAS00739

2. Battery

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

Open-circuit voltage
12.8 V or more at 20°C

◦ Is the battery OK?

↓ YES

↓ NO

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

EAS00749

3. Main switch

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

↓ YES

↓ NO

Replace the main switch.

EAS00795

4. Wiring

- Check the entire 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?

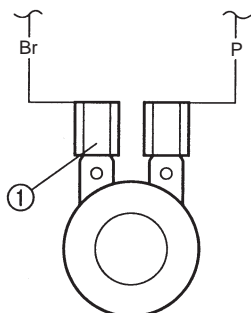


Replace the left handlebar switch.

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



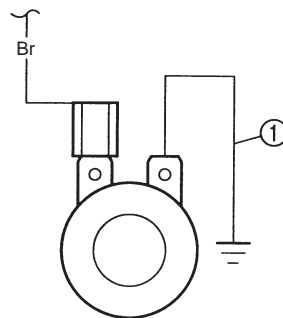
- Set the main switch to "ON".
- Measure the voltage (12 V) of brown at the horn terminal.
- Is the voltage within specification?



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

3. Horn

- Disconnect the black connector at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Does the horn sound?

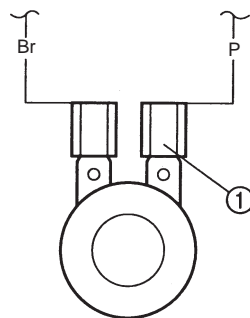


The horn is OK.

4. Voltage

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

Tester positive probe → black ①
Tester negative probe → ground



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



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

↓ NO

Replace the tail/brake lightbulb, 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

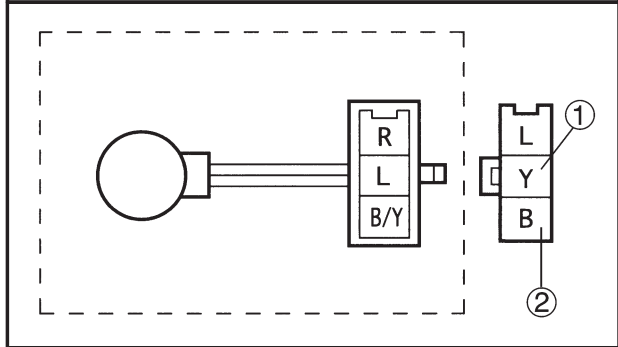
↓ NO

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

↓ NO

This circuit is OK.

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

↓ NO

Replace the turn signal light bulb, socket or both.

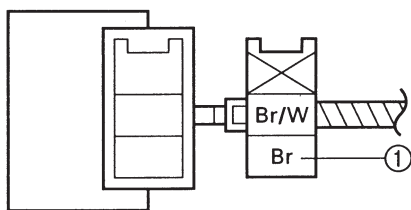
2. Turn signal switch
 ° Check the turn signal for continuity.
 Refer to “CHECKING THE SWITCHES”.
 ° Is the turn signal switch OK?



Replace the left handlebar switch.

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

Tester positive probe → brown ①
 Tester negative probe → ground



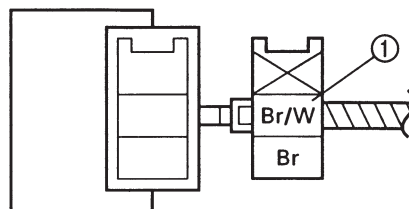
° Set the main switch to “ON”.
 ° Measure the voltage (12 V) of brown ① at the flasher relay coupler (wire harness side).
 ° Is the voltage within specification?



The wiring circuit from the main switch to the flasher relay coupler (flasher relay side) is faulty and must be repaired.

4. Voltage
 ° Connect the 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”.
 ° Set the turn signal switch to “←” or “→”.
 ° Measure the voltage (12 V) or brown/white at the flasher relay coupler (wire harness side).
 ° Is the voltage within specification?



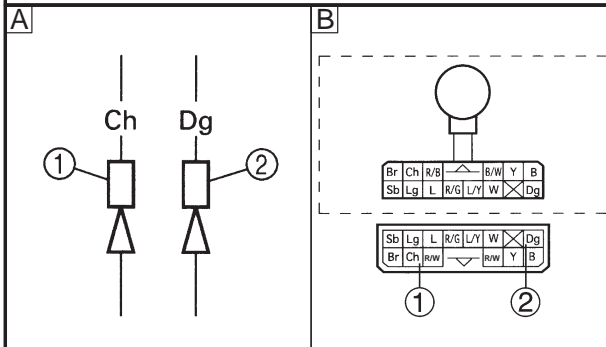
The flasher relay is faulty and must be replaced.

5. Voltage
 ° Connect the pocket tester (DC 20 V) to the turn signal light connectors or the meter assembly coupler (wire harness side) as shown.

- A Turn signal light
- B Turn signal indicator light

Left turn signal light
 Tester positive probe → chocolate ①
 Tester negative probe → ground

Right turn signal light
 Tester positive probe → daek green ②
 Tester negative probe → ground





° Set the main switch to "ON".
 ° Set the turn signal switch to "←" or "→".
 ° Measure the voltage (12 V) of chocolate ① or dark green ② at the turn signal light connector (wire harness side).
 ° Is the voltage within specification?

↓ YES

↓ NO

This circuit is OK.

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. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
 ° Are the neutral indicator light bulb and socket OK?

↓ YES

↓ NO

Replace the neutral indicator light bulb, socket or both.

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

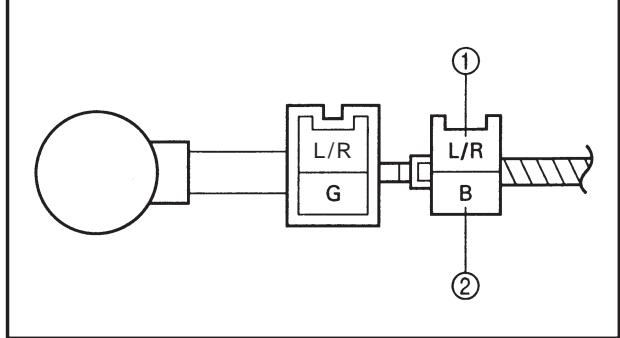
↓ YES

↓ NO

Replace the neutral switch.

3. Voltage
 ° Connect the pocket tester (DC 20V) 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 with specification?

↓ YES

↓ NO

This circuit is OK.

The wiring circuit from the main switch to the meter light bulb coupler is faulty and must be repaired.

EAS00802

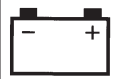
5. The oil level warning light fails to come on.

1. Oil level warning light bulb and socket
 ° Check the oil level warning light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
 ° Are the oil level warning light bulb and socket OK?

↓ YES

↓ NO

Replace the oil level warning light bulb, socket or both.



2. Oil level switch

- ° Drain the engine oil and remove the oil level switch from the oil pan.
- ° Check the oil level switch for continuity. Refer to "CHECKING THE SWITCHES".
- ° Is the oil level switch OK?



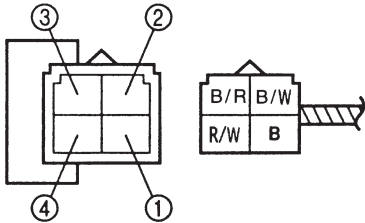
Replace the oil level switch.

3. Oil lamp relay

- ° Disconnect the oil lamp relay from the coupler.
- ° Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the oil lamp relay terminals as shown.

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

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



° Does the oil lamp relay have continuity between red/blue and black?

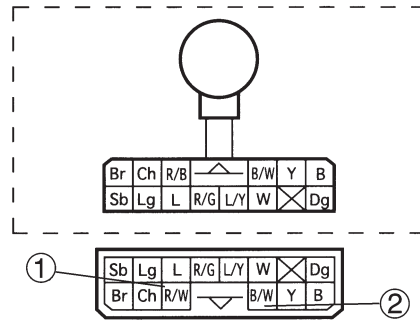


Replace the oil lamp relay.

4. Voltage

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

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



- ° Set the main switch to "ON".
- ° Measure the voltage (12 V) of brown ① and black/red at the meter assembly coupler.
- ° Is the voltage within specification?



This circuit is OK.

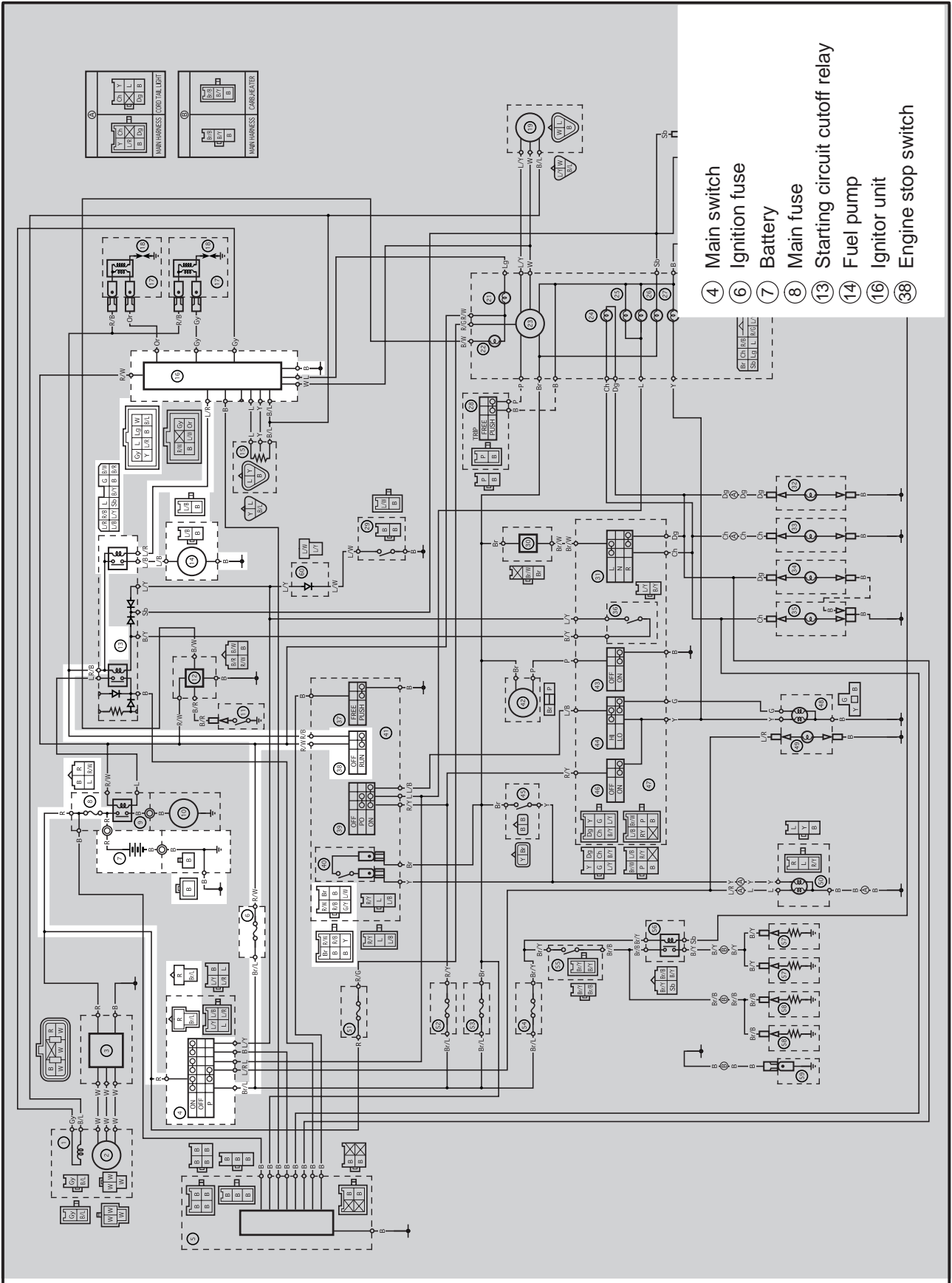
The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

FUEL PUMP SYSTEM



EB808000

FUEL PUMP SYSTEM CIRCUIT DIAGRAM



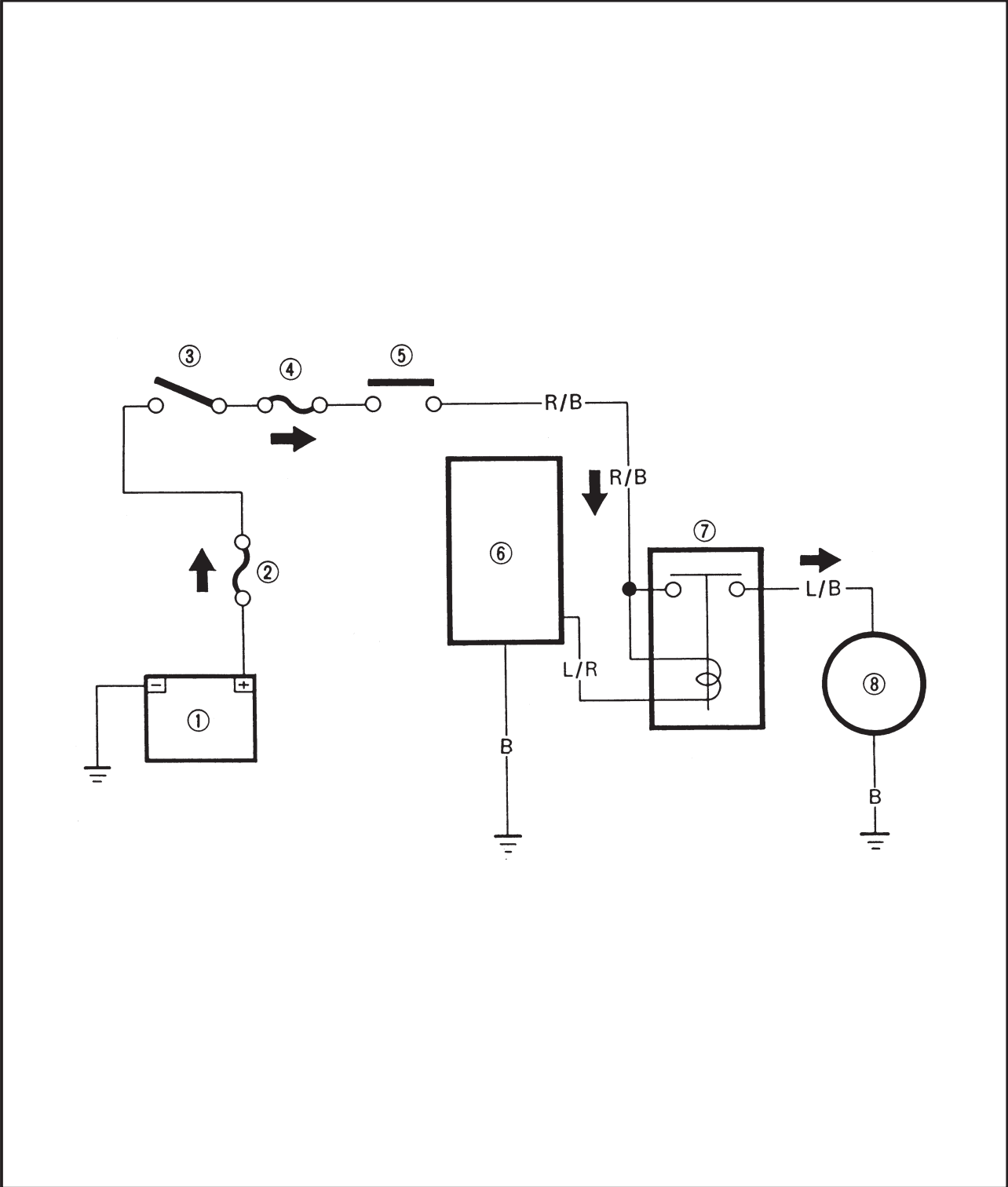
EB808010

FUEL PUMP CIRCUIT OPERATION

The fuel pump circuit consists of the fuel pump relay, fuel pump, engine stop switch and ignitor unit.

The ignitor unit includes the control unit for the fuel pump.

- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Ignition fuse
- ⑤ Engine stop switch
- ⑥ Ignitor unit
- ⑦ Fuel pump relay
- ⑧ Fuel pump





EAS00781

TROUBLESHOOTING

The fuel pump fails to operate.

Check:

1. main, and ignition fuses
2. battery
3. main switch
4. engine stop switch
5. starting circuit cutoff relay (fuel pump relay)
6. fuel pump
7. wiring
(of the entire charging system)

NOTE:

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

- 1) battery cover
- 2) rider's seat
- 3) fuel tank
- 4) tool box cover
- 5) left side cover

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



Pocket tester
90890-03112

EAS00738

1. Main, and ignition fuses

° Check the main, and ignition fuses for continuity.

Refer to "CHECKING THE FUSES" in chapter 3.

° Are the main, and ignition fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EAS00739

2. Battery

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



Open-circuit voltage

12.8 V or more at 20°C

° Is the battery OK?

↓ YES

↓ NO

° Clean the battery terminals.
° Recharge or replace the battery.

EAS00749

3. Main switch

° Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".

° Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EAS00750

4. Engine stop switch

° Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".

° Is the engine stop switch OK?

↓ YES

↓ NO

Replace the right handlebar switch.



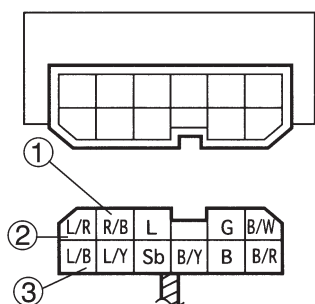
EB803023

5. Starting circuit cutoff relay (fuel pump relay)

- ° Remove the relay unit from the wire harness.
- ° Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay unit terminals.

Battery (+) terminal → Red/Black terminal ①
Battery (-) terminal → Blue/Red terminal ②

Tester (+) lead → Red/Black terminal ①
Tester (-) lead → Blue/Black terminal ③



- ° Does the fuel pump relay have continuity between red/black and blue/black?

↓ YES

↓ NO

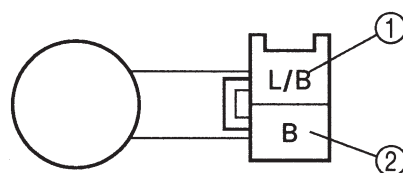
Replace the starting circuit cutoff relay.

EB808021

6. Fuel pump resistance

- ° Disconnect the fuel pump coupler from the wire harness.
- ° Connect the pocket tester ($\Omega \times 1$) to the fuel pump coupler terminals.

Tester (+) lead → Blue/Black terminal ①
Tester (-) lead → Black terminal ②



- ° Measure the fuel pump resistance.



Fuel pump resistance:
 1.6 ~ 2.2 Ω at 20°C (68°F)

- ° Is the fuel pump OK?

↓ YES

↓ NO

Replace the fuel pump.

7. Wiring

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

↓ NO

↓ YES

Properly connect or repair the fuel pump system's wiring.

Replace the ignitor unit.

EB808030

FUEL PUMP TEST

⚠ WARNING

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or combustion. Be extremely careful and note the following points:

- Stop the engine before refuelling.
- Do not smoke and keep away from open flames, sparks, or any other source of fire.
- Take care not to spill gasoline. If you do accidentally spill some, wipe it up immediately with dry rags.
- If gasoline touches the engine when the engine is still hot, there is a danger of combustion. Make sure that the engine is completely cool before performing the following test.

1. Check:

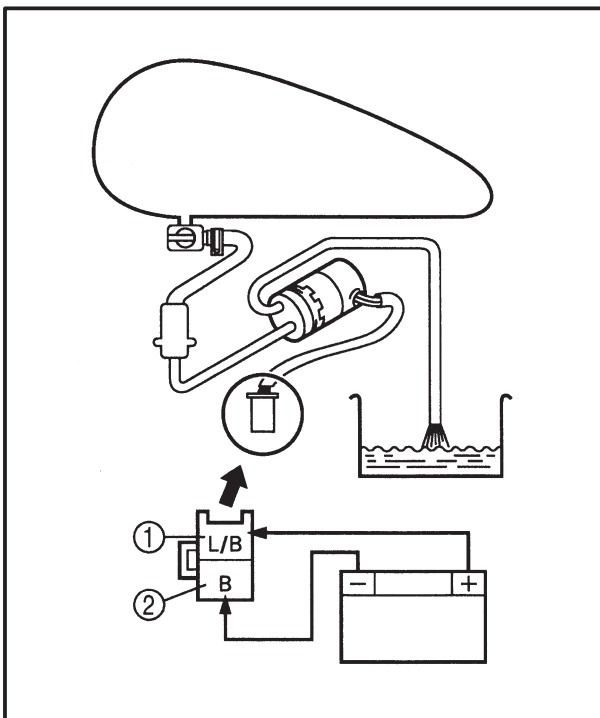
- Fuel pump operation



- a. Fill up the fuel tank.
- b. Put the end of the fuel hose into an open container.
- c. Connect the battery (12 V) to the fuel pump coupler terminals.

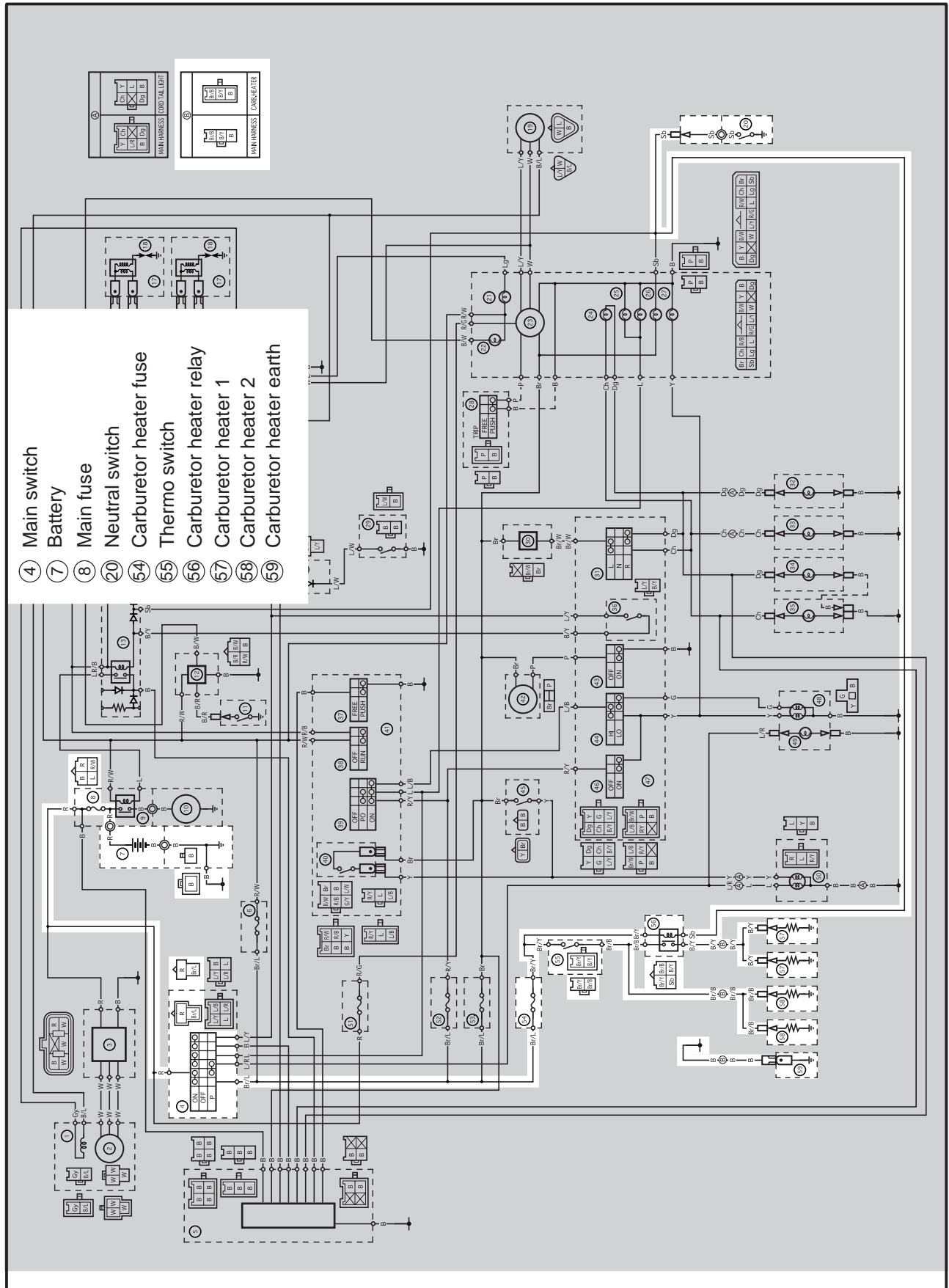
Battery (+) lead → Blue/black terminal ①
Battery (-) lead → Black terminal ②

- d. If fuel flows out from the fuel hose, the fuel pump is good. If not, replace the fuel pump assembly.





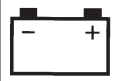
CARBURETOR HEATER SYSTEM
CIRCUIT DIAGRAM



- ④ Main switch
- ⑦ Battery
- ⑧ Main fuse
- ⑳ Neutral switch
- ⑤④ Carburetor heater fuse
- ⑤⑤ Thermo switch
- ⑤⑥ Carburetor heater relay
- ⑤⑦ Carburetor heater 1
- ⑤⑧ Carburetor heater 2
- ⑤⑨ Carburetor heater earth

CARBURETOR HEATER SYSTEM

ELEC



EAS00781

TROUBLESHOOTING

The carburetor heater fails to operate.

Check:

1. main, and carburetor heater
2. battery
3. main switch
4. neutral switch
5. carburetor heater relay
6. thermo
7. carburetor heater
8. wiring
(of the entire charging system)

NOTE:

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

- 1) battery cover
- 2) rider's seat
- 3) fuel tank
- 4) steering head side covers
- 5) tool box cover

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



Pocket tester
90890-03112

EAS00738

1. Main, and carburetor heater fuses

° Check the main, and carburetor heater fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.

° Are the main, and carburetor heater fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EAS00739

2. Battery

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



Open-circuit voltage
12.8 V or more at 20°C

° Is the battery OK?

↓ YES

↓ NO

° Clean the battery terminals.
° Recharge or replace the battery.

EAS00749

3. Main switch

° Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".

° Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EAS00751

4. Neutral switch

° Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".

° Is the neutral switch OK?

↓ YES

↓ NO

Replace the neutral switch.

CARBURETOR HEATER SYSTEM



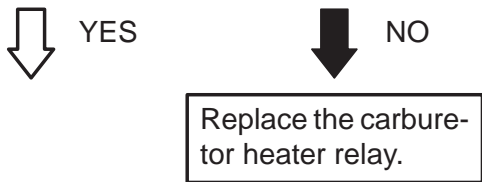
5. Carburetor heater relay

° Remove the carburetor heater relay from the wire harness.
 ° Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the carburetor heater relay terminals.

Battery (+) terminal → **Brown/Yellow terminal** ①
Battery (-) terminal → **Sky blue terminal** ②

Tester (+) lead → **Brown/Black terminal** ③
Tester (-) lead → **Black/Yellow terminal** ④

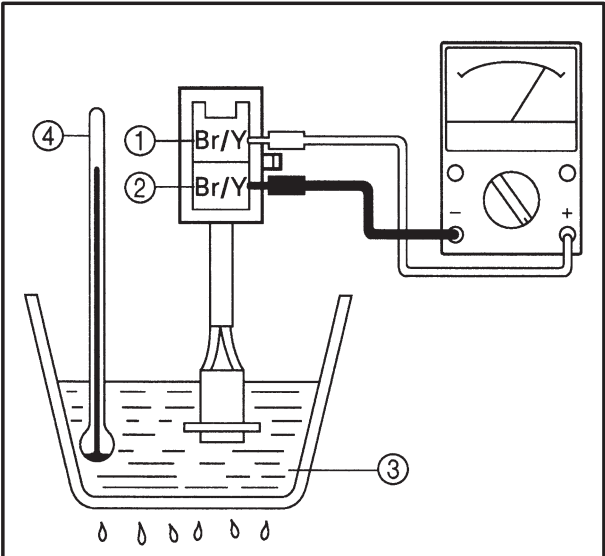
° Does the carburetor heater relay have continuity between brown/black and black/yellow?



6. Thermo switch

° Remove the thermo switch from the thermo switch plate.
 ° Connect the pocket tester to the thermo switch lead.

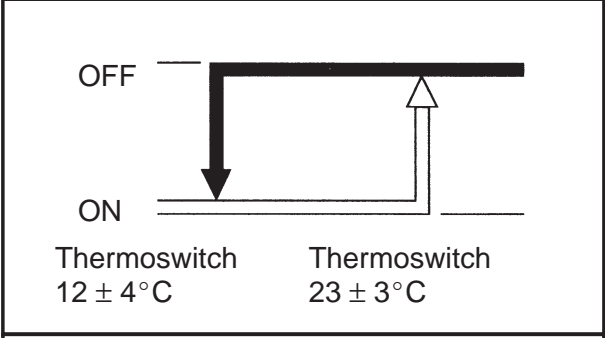
Tester (+) lead → **Brown/Yellow terminal** ①
Tester (-) lead → **Black/Yellow terminal** ②



° Immerse the thermo switch in the water ③.
 ° Check the thermo switch for continuity. Note the temperatures while heating the water with the temperature gauge ④.

Test step	Water temperature	Good condition
1	Less than $23 \pm 3^\circ\text{C}$	○
2	More than $23 \pm 3^\circ\text{C}$	×
3	More than $12 \pm 4^\circ\text{C}$	×
4	Less than $12 \pm 4^\circ\text{C}$	○

Test 1 & 2 : Heat-up test
Test 3 & 4 : Cool-down test
 ○ : Continuity × : No continuity



° Is the thermo switch OK?

CARBURETOR HEATER SYSTEM

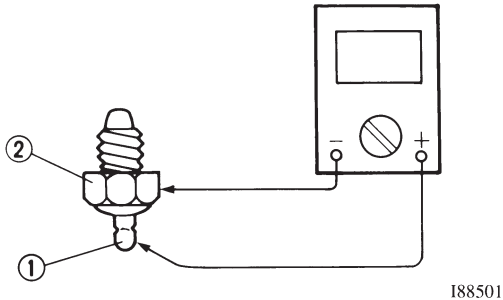
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7. Carburetor heater

- ° Remove the carburetor heater from the carburetor body.
- ° Connect the pocket tester to the carburetor heater.

Tester (+) lead → Heater terminal ①
Tester (-) lead → Heater body ②



- ° Measure the heater resistance.



Carburetor heater resistance:
12 V 30 W : 6 ~ 10 Ω at 20°C

- ° Is the carburetor heater OK?

↓ YES

↓ NO

Replace the carburetor heater.

EAS00766

8. Wiring

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

↓ NO

↓ YES

Properly connect or repair the carburetor heater system's wiring.

The carburetor heater system circuit is OK.



SELF-DIAGNOSIS

The XVS1100 features self-diagnosis.

When the main switch is turned to “ON”, the following items are monitored and the condition codes are displayed on the engine indicator light (irrespective of whether the engine is running or not).

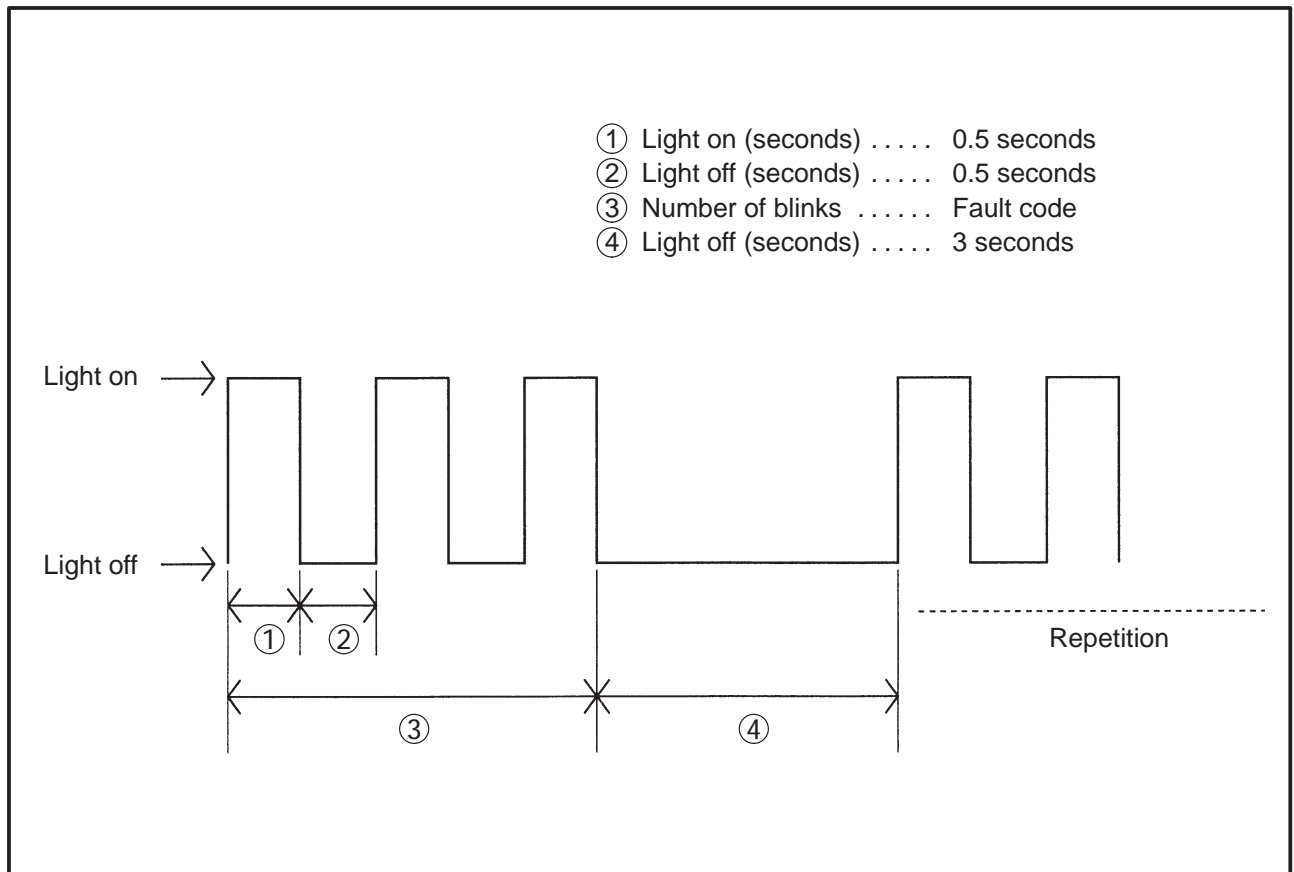
NOTE:

The XVS1100 features a self-diagnosing system.

In the XVS1100, when the main switch is turned on the “Engine indicator light” in the speedometer comes on for 1.4 seconds then goes off. However, if there is a malfunction, it comes on for 1.4 seconds, goes off and then begins flashing. (However, it is on while the engine is running.)

Item	Condition	Response	Display condition code	
			When engine is stationary	When engine is running
Throttle position sensor (TPS)	Disconnected Short-circuit Locked	° Enables the motorcycle to run so that the ignition timing is fixed when the throttle is fully opened. ° Displays the condition code on the engine indicator light.	Blinks in Fault code: 3	Light on
Speed sensor	Disconnected short-circuit	° Displays the condition code on the engine indicator light.	Blinks in Fault code: 4	Light on

Display order on the engine indicator light





EAS00835

TROUBLESHOOTING

The engine warning light starts to display the self-diagnosis sequence.

Check:

1. throttle position sensor
2. speed sensor

NOTE:

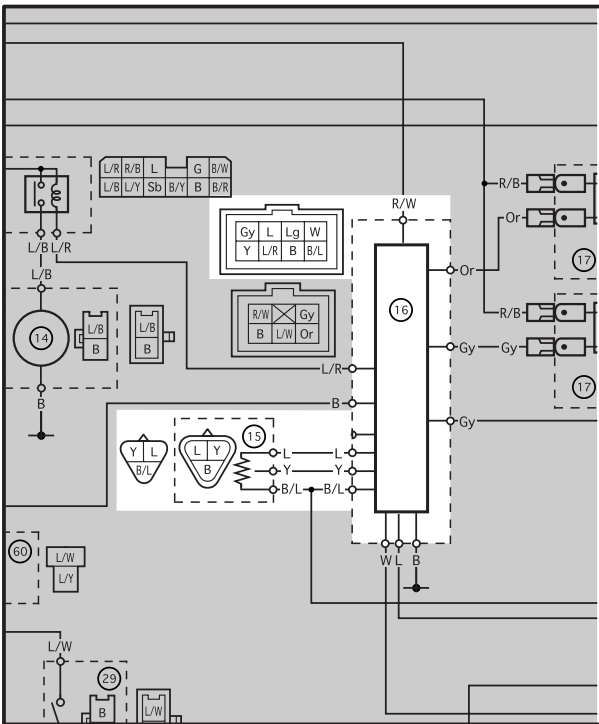
- ° Before troubleshooting, remove the following part(-s):
 - 1) rider seat
 - 2) fuel tank
 - 3) air filter case
 - 4) left side cover
- ° Troubleshoot with the following special tool(-s).



**Pocket tester
90890-03112**

EAS00836

**1. Throttle position sensor
CIRCUIT DIAGRAM**



- ⑮ Throttle position sensor
- ⑯ Ignitor unit

1. Wire harness

- ° Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- ° Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

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2. Throttle position sensor

- ° Check the throttle position sensor for continuity. Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR" in chapter 6.
- ° Is the throttle position sensor OK?



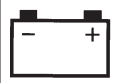
YES



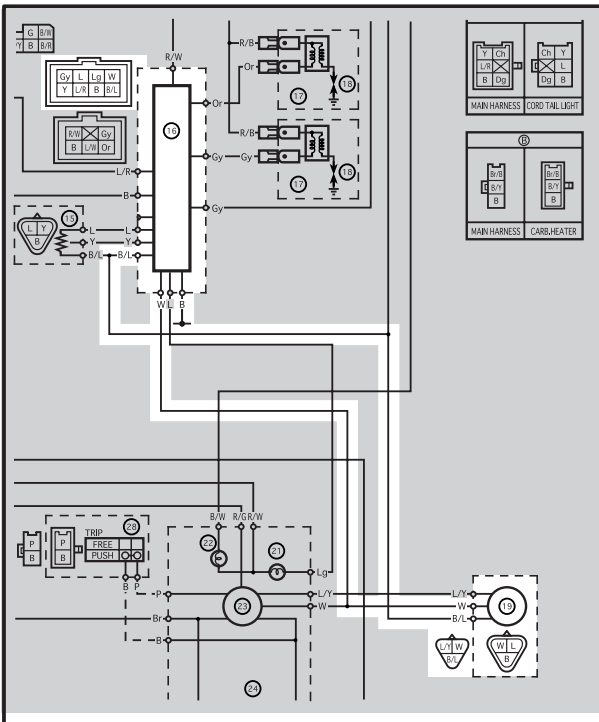
NO

Replace the ignitor unit.

Replace the throttle position sensor.



**2. Speed sensor
CIRCUIT DIAGRAM**



- ⑩ Ignitor unit
- ⑱ Speed sensor

1. Wire harness

- ° Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- ° Is the wire harness OK?

↓ YES

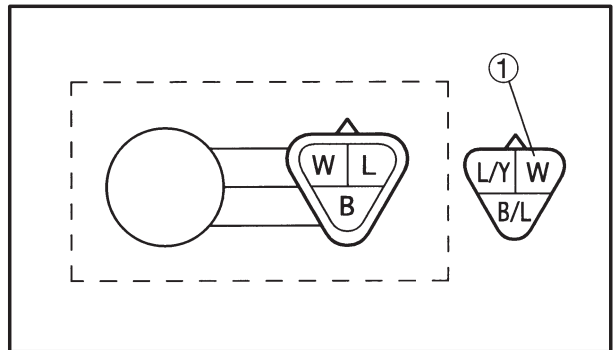
↓ NO

Repair or replace the wire harness.

2. Speed sensor

- ° Place the motorcycle on a suitable stand so that the rear wheel is elevated.
- ° Connect the pocket tester (DC 20V) to the speed sensor connector.

Tester (+) lead → White ① terminal
Tester (-) lead → Body earth



- ° Set the main switch to "ON".
- ° Turn the rear wheel slowly.
- ° Check the tester voltage (0V - 5V - 0V).
- ° Is the speed sensor OK?

↓ YES

↓ NO

Replace the ignitor

Replace the speed sensor.

?

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CHAPTER 8. TROUBLESHOOTING

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TROUBLESHOOTING

NOTE:

The following guide for troubleshooting does not cover all the possible causes of problems. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM

Fuel tank

- ° Empty
- ° Clogged fuel filter
- ° Clogged fuel strainer
- ° Clogged fuel tank drain hose
- ° Clogged roll-over valve
- ° Clogged roll-over valve breather hose
- ° Deteriorated or contaminated fuel

Fuel cock

- ° Clogged fuel hose

Carburetor

- ° Deteriorated or contaminated fuel
- ° Clogged pilot jet
- ° Clogged pilot air passage
- ° Sucked-in air
- ° Deformed float
- ° Worn needle valve
- ° Improperly sealed valve seat
- ° Improperly adjusted fuel level
- ° Improperly set pilot jet
- ° Clogged starter jet
- ° Faulty starter plunger
- ° Improperly adjusted starter cable

Air filter

- ° Clogged air filter element

Fuel pump

- ° Faulty fuel pump
- ° Faulty relay unit (fuel pump relay)

ELECTRICAL SYSTEM

Spark plug

- ° Improper plug gap
- ° Worn electrodes
- ° Wire between terminals severed
- ° Improper heat range
- ° Faulty spark plug cap

Ignition coil

- ° Broken or shorted primary/secondary
- ° Faulty spark plug lead
- ° Broken body

Full-transistor system

- ° Faulty ignitor unit
- ° Faulty pickup coil

Switch and wiring

- ° Faulty main switch
- ° Faulty engine stop switch
- ° Broken or shorted wiring
- ° Faulty neutral switch
- ° Faulty start switch
- ° Faulty sidestand switch
- ° Faulty clutch switch

Starter motor

- ° Faulty starter motor
- ° Faulty starter relay
- ° Faulty relay unit (starting circuit cut-off relay)
- ° Faulty starter clutch

**STARTING FAILURE/HARD STARTING/POOR IDLE SPEED
PERFORMANCE/POOR MEDIUM-AND HIGH-SPEED PERFORMANCE**



COMPRESSION SYSTEM

Cylinder and cylinder head

- ° Loose spark plug
- ° Loose cylinder head or cylinder
- ° Faulty cylinder head gasket
- ° Worn, damaged or seized cylinder
- ° Improperly sealed valve
- ° Improper valve-to-valve seat contact
- ° Improper valve timing
- ° Faulty valve spring

Piston and piston ring

- ° Improperly installed piston ring
- ° Worn, fatigued or broken piston ring
- ° Seized piston ring
- ° Seized or damaged piston

Crankcase and crankshaft

- ° Improperly seated crankcase
- ° Seized crankshaft

EB901000

POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE

Carburetor

- ° Improperly returned starter plunger
- ° Loose pilot jet
- ° Clogged pilot air jet
- ° Improperly synchronized carburetors
- ° Improperly adjusted idle speed (throttle stop screw)
- ° Improper throttle cable free play
- ° Flooded carburetor

Electrical system

- ° Faulty battery
- ° Faulty spark plug
- ° Faulty ignitor unit
- ° Faulty pickup coil
- ° Faulty ignition coil

Valve train

- ° Improperly adjusted valve clearance

Air filter

- ° Clogged air filter element

EB902000

POOR MEDIUM-AND HIGH-SPEED PERFORMANCE

POOR MEDIUM-AND HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURE/HARD STARTING". (Fuel system, electrical system, compression system and valve train)

Carburetor

- ° Faulty diaphragm
- ° Improperly adjusted fuel level
- ° Clogged or loose main jet

Air filter

- ° Clogged air filter element

Fuel pump

- ° Faulty fuel pump

EB903000

FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to "CLUTCH DRAGGING".

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift pedal link
- Bent shift shaft

Shift cam, shift fork

- Groove jammed with impurities
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Jammed impurities
- Incorrectly assembled transmission

JUMPS-OUT-OF GEAR

Shift shaft

- Improperly adjusted shift lever position
- Improperly returned stopper lever

Shift fork

- Worn shift fork

Shift cam

- Improper thrust play
- Worn shift cam groove

Transmission

- Worn gear dog

EB904000

CLUTCH SLIPPING/Dragging

CLUTCH SLIPPING

Clutch

- Improperly adjusted clutch cable
- Loose clutch spring
- Fatigued clutch spring
- Worn friction plate/clutch plate
- Incorrectly assembled clutch

Engine oil

- Improper oil level
- Improper viscosity (low)
- Deterioration

CLUTCH DRAGGING

Clutch

- Warped pressure plate
- Unevenly tensioned clutch springs
- Bent push rod
- Broken clutch boss
- Burnt primary driven gear bushing
- Bent clutch plate
- Swollen friction plate
- Match marks not aligned

Engine oil

- Improper oil level
- Improper viscosity (high)
- Deterioration

OVERHEATING/FAULTY BRAKE/FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION

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OVERHEATING

OVERHEATING

Ignition system

- ° Improper spark plug gap
- ° Improper spark plug heat range
- ° Faulty ignitor unit

Fuel system

- ° Improper carburetor main jet setting
- ° Improper fuel level
- ° Clogged air filter element

Compression system

- ° Heavy carbon build-up

Engine oil

- ° Improper oil level
- ° Improper oil viscosity
- ° Inferior oil quality

Brake

- ° Brake drag

EB906001

FAULTY BRAKE

POOR BRAKING PERFORMANCE

Disc brake

- ° Worn brake pad
- ° Worn disc
- ° Air in brake fluid
- ° Leaking brake fluid
- ° Faulty cylinder kit cup
- ° Faulty caliper kit seal
- ° Loose union bolt
- ° Broken brake hose
- ° Oily or greasy disc/brake pad
- ° Incorrect brake fluid level

EB907000

FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION

MALFUNCTION

- ° Bent, deformed or damaged inner tube
- ° Bent or deformed outer tube
- ° Damaged fork spring
- ° Worn or damaged slide metal
- ° Bent or damaged damper rod
- ° Improper oil viscosity
- ° Improper oil level

OIL LEAKAGE

- ° Bent, damaged or rusty inner tube
- ° Damaged or cracked outer tube
- ° Damaged oil seal lip
- ° Improperly installed oil seal
- ° Improper oil level (too high)
- ° Loose damper rod holding bolt
- ° Broken cap bolt O-ring
- ° Loose drain bolt
- ° Damaged drain bolt gasket

UNSTABLE HANDLING/ FAULTY LIGHTING AND SIGNAL SYSTEMS

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UNSTABLE HANDLING

UNSTABLE HANDLING

Handlebar

- Improperly installed or bent

Steering

- Improperly installed handlebar crown
- Bent steering stem
- Improperly installed steering shaft (improperly tightened ring nut)
- Damaged ball bearing or bearing race

Swingarm

- Worn bearing or bushing
- Bent or damaged

Rear Shock absorber

- Faulty spring
- Oil and gas leakage

Tire

- Uneven tire pressures on both sides
- Incorrect tire pressure
- Uneven tire wear

Front fork

- Uneven oil levels on both sides
- Uneven spring tension (uneven damping force adjuster position)
- Broken spring
- Twisted front fork

Wheel

- Incorrect wheel balance
- Deformed cast wheel
- Damaged bearing
- Bent or loose wheel axle
- Excessive wheel runout
- Loosed spoke

Frame

- Bent
- Damaged steering head tube
- Improperly installed bearing race

EB909000

FAULTY LIGHTING AND SIGNAL SYSTEMS

HEADLIGHT DOES NOT LIGHT

- Improper bulb
- Too many electric accessories
- Hard charging (broken stator coil wire, faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts (main or lights switch)
- Bulb life expired

FLASHER DOES NOT LIGHT

- Improperly grounded
- Discharged battery
- Faulty turn switch
- Faulty flasher relay
- Faulty wire harness
- Loosely connected coupler
- Burnt-out bulb
- Faulty fuse

FLASHER BLINKS SLOWLY

- Faulty flasher relay
- Faulty main and/or turn switch
- Improper bulb

BULB BURNT OUT

- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or lights switch
- Bulb life expired

FLASHER REMAINS LIT

- Faulty flasher relay
- Burnt-out bulb

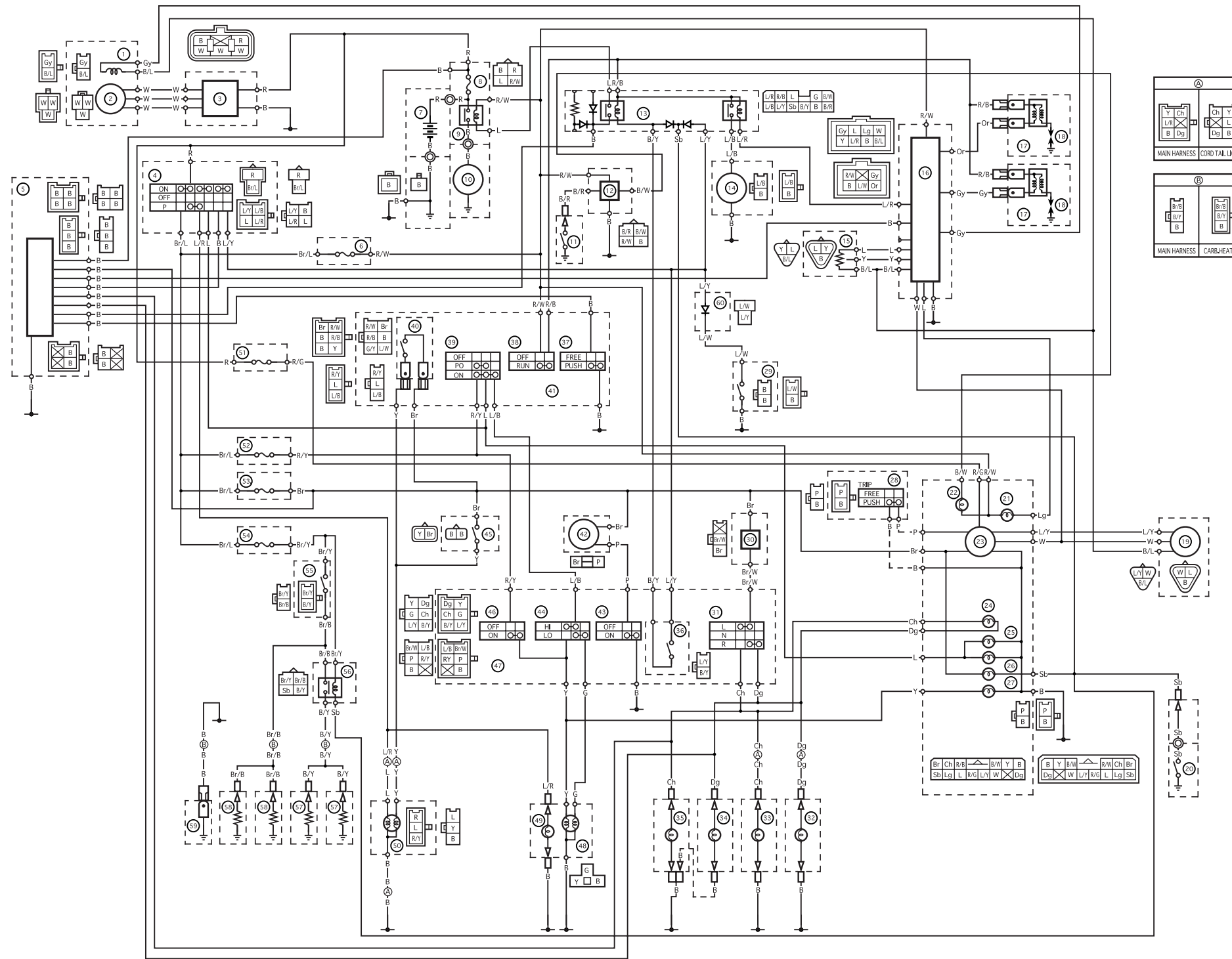
FLASHER BLINKS QUICKLY

- Improper bulb
- Faulty flasher relay
- Burnt-out bulb

HORN DOES NOT SOUND

- Faulty battery
- Faulty fuse
- Faulty main and/or horn switch
- Improperly adjusted horn
- Faulty horn
- Broken wire harness

XVS1100 WIRING DIAGRAM (for Europe)

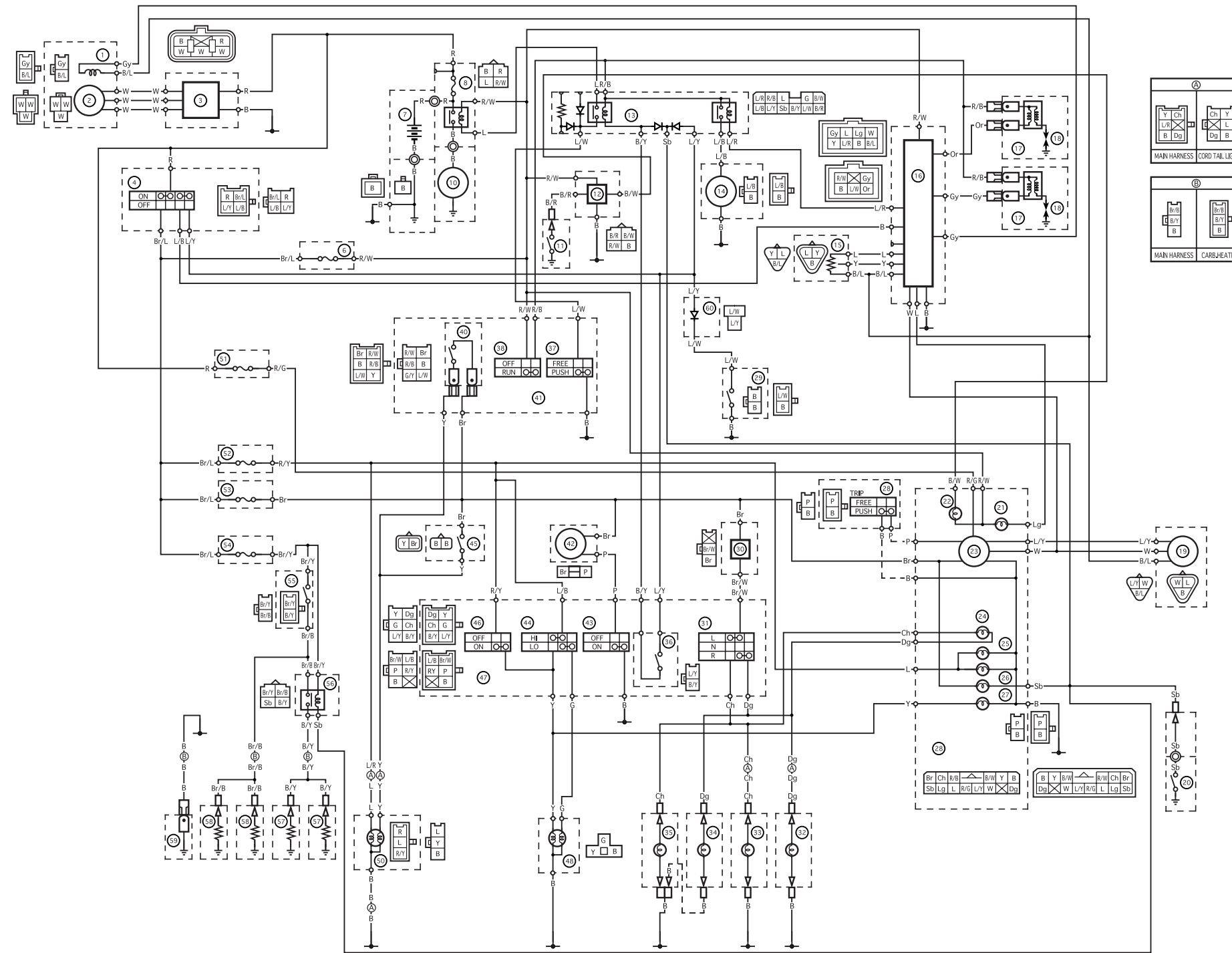


- ① Pickup coil
- ② A.C. magneto
- ③ Rectifier/regulator
- ④ Main switch
- ⑤ Alarm system (Option)
- ⑥ Ignition fuse
- ⑦ Battery
- ⑧ Main fuse
- ⑨ Starter relay
- ⑩ Starter motor
- ⑪ Oil level gauge
- ⑫ Oil lamp relay
- ⑬ Starting circuit cut-off relay
- ⑭ Fuel pump
- ⑮ Throttle position sensor
- ⑯ Igniter unit
- ⑰ Ignition coil
- ⑱ Spark plug
- ⑲ Speed sensor
- ⑳ Neutral switch
- ㉑ Engine warning light
- ㉒ Oil warning light
- ㉓ Speedometer
- ㉔ Turn signal indicator light
- ㉕ Meter light
- ㉖ Neutral indicator light
- ㉗ High beam indicator light
- ㉘ Trip switch
- ㉙ Sidestand switch
- ㉚ Flasher relay
- ㉛ Turn signal switch
- ㉜ Rear turn signal light (right)
- ㉝ Rear turn signal light (left)
- ㉞ Front turn signal light (right)
- ㉟ Front turn signal light (left)
- ㊱ Clutch switch
- ㊲ Start switch
- ㊳ Engine stop switch
- ㊴ Light switch
- ㊵ Front brake switch
- ㊶ Right handlebar switch
- ㊷ Horn
- ㊸ Horn switch
- ㊹ Dimmer switch
- ㊺ Rear brake switch
- ㊻ Pass switch
- ㊼ Left handlebar switch
- ㊽ Headlight
- ㊾ Auxiliary light
- ㊿ Tail/brake light
- 1 Backup fuse
- 2 Headlight fuse
- 3 Signal fuse
- 4 Carburetor heater fuse
- 5 Thermo switch
- 6 Carburetor heater relay
- 7 Carburetor heater 1
- 8 Carburetor heater 2
- 9 Carburetor heater earth
- 0 Diode

COLOR CODE

B Black	L Blue	W White	Br/L .. Brown/Blue	L/Y ... Blue/Yellow
Br Brown	Lg Light green	Y Yellow	Br/W . Brown/White	R/B... Red/Black
Ch ... Chocolate	O Orange	B/L... Black/Blue	Br/Y .. Brown/Yellow	R/G .. Red/Green
Dg ... Dark green	P Pink	B/W .. Black/White	L/B ... Blue/Black	R/W .. Red/White
G Green	R Red	B/Y... Black/Yellow	L/R... Blue/Red	R/Y... Red/Yellow
Gy ... Gray	Sb Sky blue	Br/B .. Brown/Black	L/W .. Blue/White	

XVS1100L WIRING DIAGRAM (for AUS)



- ① Pickup coil
- ② A.C. magneto
- ③ Rectifier/regulator
- ④ Main switch
- ⑥ Ignition fuse
- ⑦ Battery
- ⑧ Main fuse
- ⑨ Starter relay
- ⑩ Starter motor
- ⑪ Oil level gauge
- ⑫ Oil lamp relay
- ⑬ Starting circuit cut-off relay
- ⑭ Fuel pump
- ⑮ Throttle position sensor
- ⑯ Igniter unit
- ⑰ Ignition coil
- ⑱ Spark plug
- ⑲ Speed sensor
- ⑳ Neutral switch
- ㉑ Engine warning light
- ㉒ Oil warning light
- ㉓ Speedometer
- ㉔ Turn signal indicator light
- ㉕ Meter light
- ㉖ Neutral indicator light
- ㉗ High beam indicator light
- ㉘ Trip switch
- ㉙ Sidestand switch
- ㉚ Flasher relay
- ㉛ Turn signal switch
- ㉜ Rear turn signal light (right)
- ㉝ Rear turn signal light (left)
- ㉞ Front turn signal light (right)
- ㉟ Front turn signal light (left)
- ㊱ Clutch switch
- ㊲ Start switch
- ㊳ Engine stop switch
- ㊴ Front brake switch
- ㊵ Right handlebar switch
- ㊶ Horn
- ㊷ Horn switch
- ㊸ Dimmer switch
- ㊹ Rear brake switch
- ㊺ Pass switch
- ㊻ Left handlebar switch
- ㊼ Headlight
- ㊽ Tail/brake light
- ㊾ Backup fuse
- ㊿ Headlight fuse
- 1 Signal fuse
- 2 Carburetor heater fuse
- 3 Thermo switch
- 4 Carburetor heater relay
- 5 Carburetor heater 1
- 6 Carburetor heater 2
- 7 Carburetor heater earth
- 8 Diode

COLOR CODE

B Black	L Blue	W White	Br/L .. Brown/Blue	L/Y ... Blue/Yellow
Br Brown	Lg Light green	Y Yellow	Br/W . Brown/White	R/B... Red/Black
Ch ... Chocolate	O Orange	B/L... Black/Blue	Br/Y .. Brown/Yellow	R/G .. Red/Green
Dg ... Dark green	P Pink	B/W .. Black/White	L/B ... Blue/Black	R/W .. Red/White
G Green	R Red	B/Y... Black/Yellow	L/R... Blue/Red	R/Y... Red/Yellow
Gy ... Gray	Sb.... Sky blue	Br/B .. Brown/Black	L/W .. Blue/White	

CABLE ROUTING

SPEC



- A** Clamp the throttle cables with the holder. Position the end of clip downward.
- B** Route the rear brake switch lead under the master cylinder reservoir hose.
- C** Position the band end of right side bracket.
- D** Position the steel band end to forward.
- E** Position the steel band end to right side.
- F** Route the battery positive (+) lead through the slit of the battery box.
- G** Clamp the igniter unit lead to the frame with a holder.
- H** To the rear fender.
- I** Connect the wireharness to the ignitar unit through the hole of LID. 2.
- J** Route the fuel tank breather hose under the fuel filter and connect it (fuel tank sideroll over valve side) with a joint. Position the end of clip outside.

