YAMAHA

XF50W

SERVICE MANUAL

LIT-11616-20-58

3B3-F8197-10

EAS00000

XF50W 2006
SERVICE MANUAL
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LIT-11616-20-58

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NOTICE

This manual was produced by the Yamaha Motor Taiwan Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.
Yamaha Motor Taiwan Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

NOTE:

Designs and specifications are subject to change without notice.

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IMPORTANT MANUAL INFORMATION

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

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠WARNING Failure to follow WARNING instructions could result in severe injury or death to the scooter operator, a bystander or a person checking or repairing the scooter.

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

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

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HOW TO USE THIS MANUAL

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

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

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

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

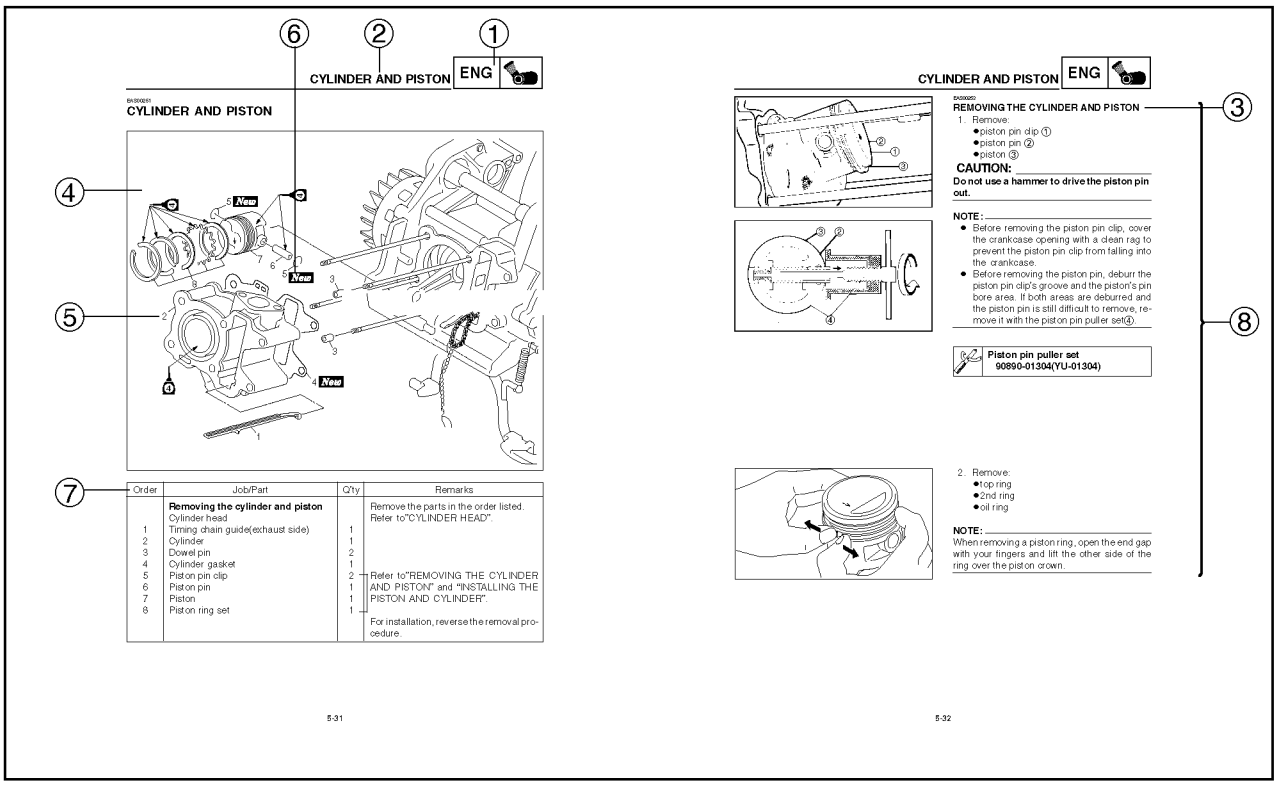
④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

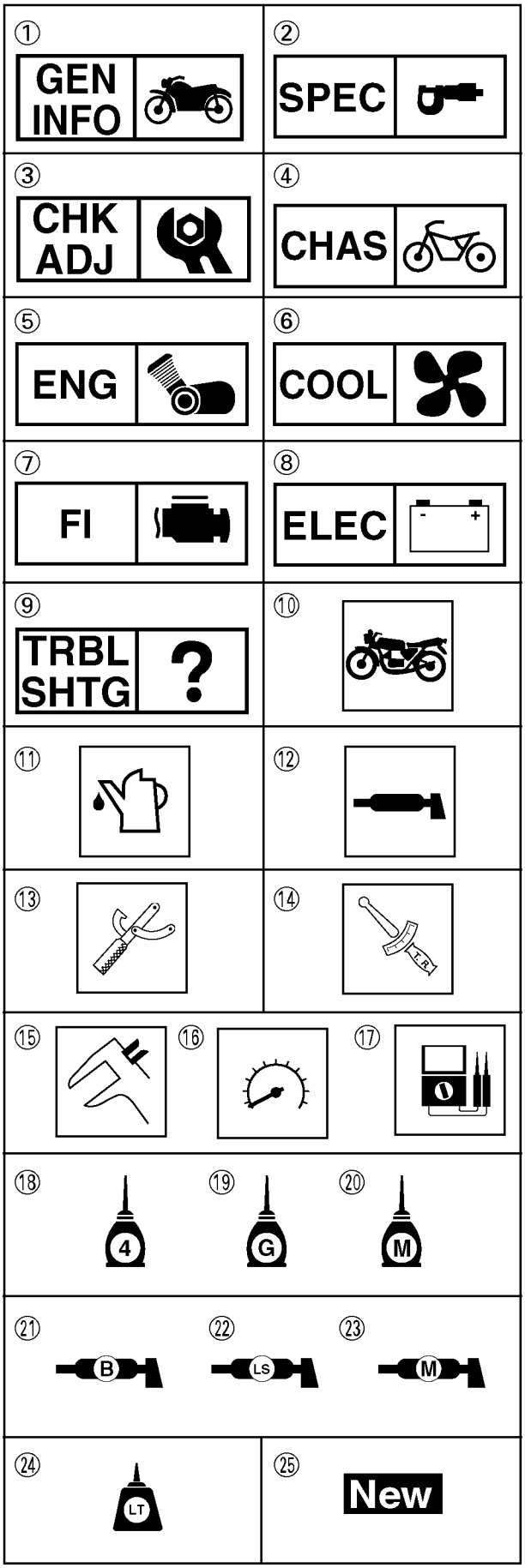
⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

⑥ Symbols indicate parts to be lubricated or replaced. Refer to “SYMBOLS”.

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

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





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SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

① General information
② Specifications
③ Periodic checks and adjustments
④ Chassis
⑤ Engine
⑥ Cooling system
⑦ Fuel injection system
⑧ Electrical system
⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

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

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

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

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

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

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CHAPTER 1
GENERAL INFORMATION

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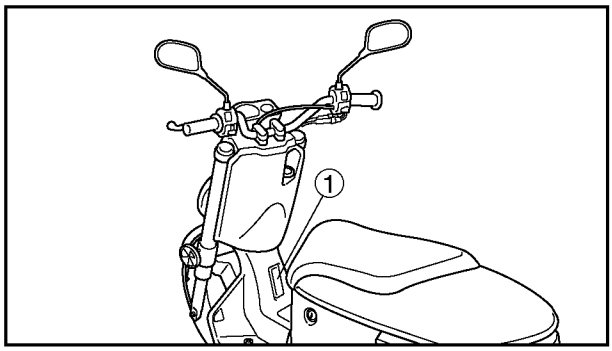

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GENERAL INFORMATION

SCOOTER IDENTIFICATION

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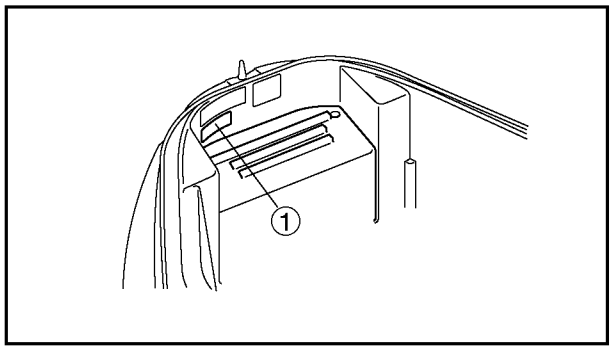
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the frame.



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MODEL LABEL

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

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FEATURES

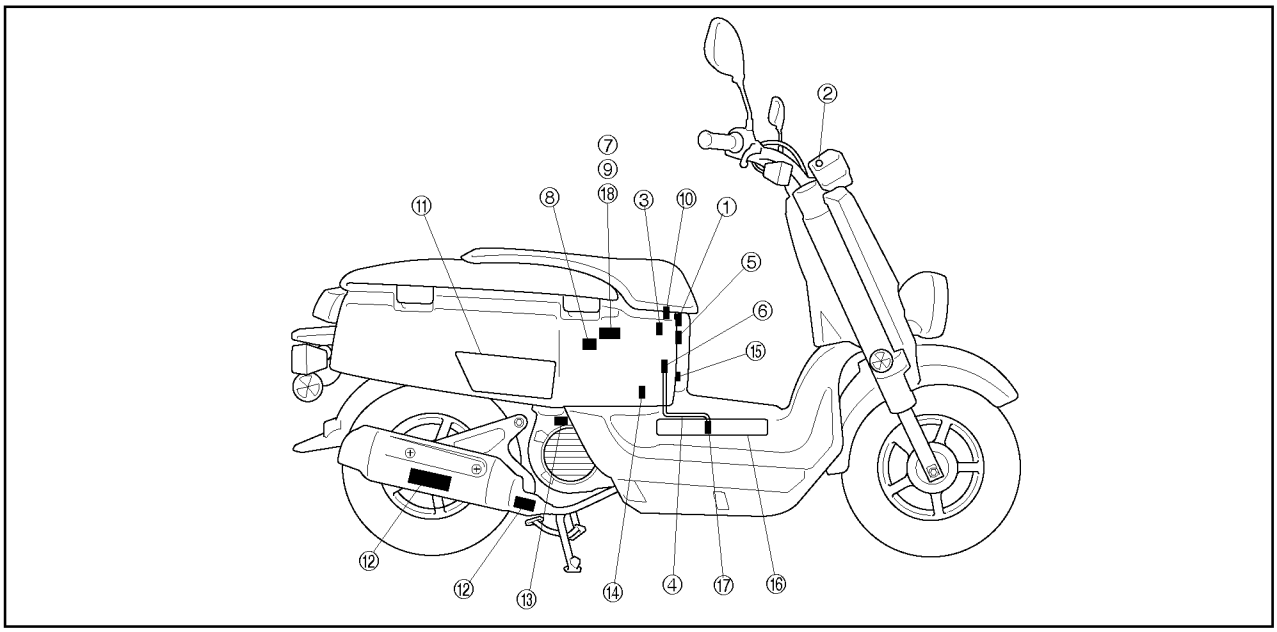
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies by the engine operating conditions, such as acceleration, deceleration, or operation under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection(FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.



① ECU
② Engine trouble warning light
③ Lean angle cut-off switch
④ Fuel hose
⑤ Ignition coil
⑥ Fuel injector
⑦ Intake air pressure sensor
⑧ ISC(idle speed control) valve
⑨ Intake air temperature sensor
⑩ Battery
⑪ Air filter case
⑫ Catalytic converter
⑬ Crankshaft position sensor
⑭ Coolant temperature sensor
⑮ Spark plug
⑯ Fuel tank
⑰ Fuel pump
⑱ Throttle position sensor

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FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 250 kPa (2.5 kg/cm^2, 35.6 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the crankshaft position sensor, intake air pressure sensor, intake temperature sensor and engine temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

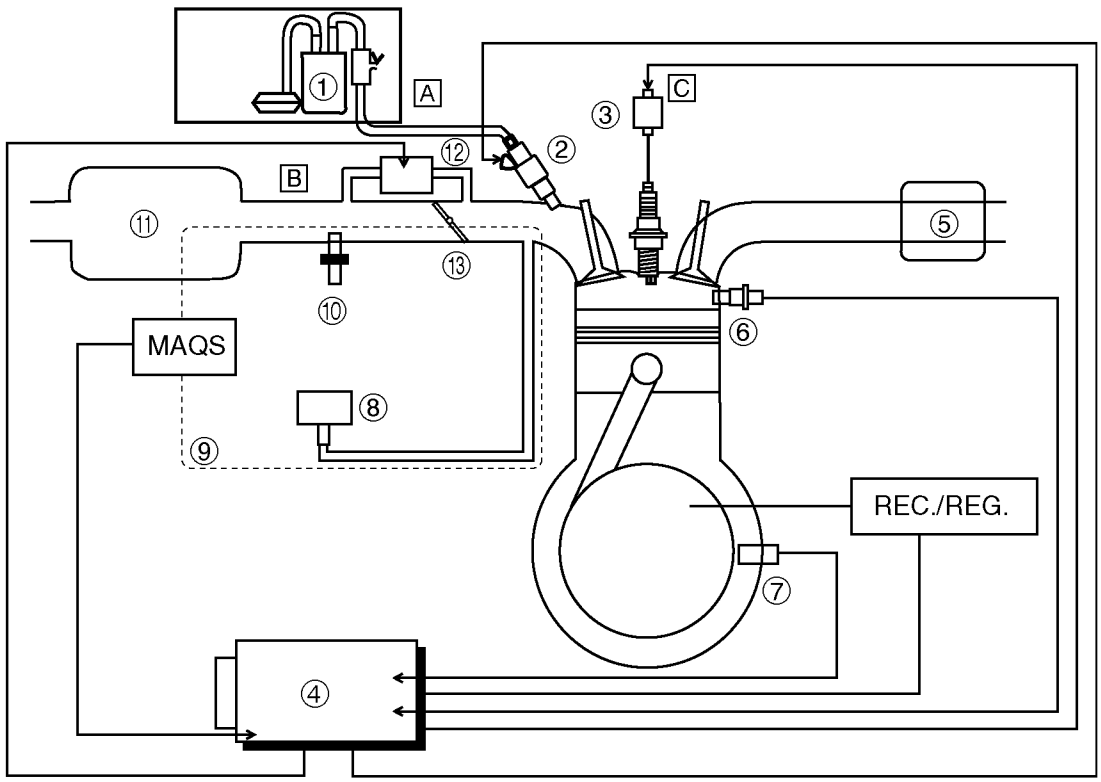
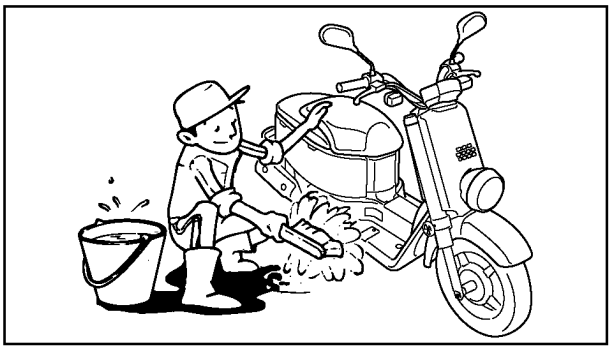


Illustration is for reference only.

① Fuel pump
② Fuel injector
③ Ignition coil
④ ECU
⑤ Catalytic converter
⑥ Coolant temperature sensor
⑦ Crankshaft position sensor
⑧ Intake air pressure sensor
⑨ Throttle body assembly
⑩ Intake air temperature sensor
⑪ Air filter case
⑫ ISC (idle speed control) valve
⑬ Throttle position sensor
A Fuel system
B Air system
C Control system



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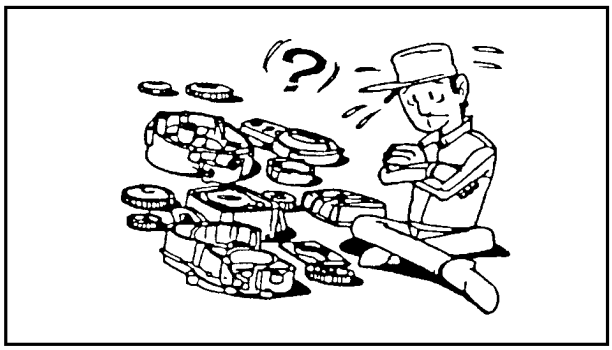
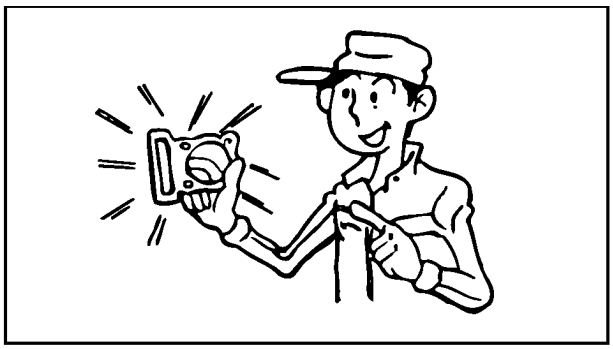
IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.



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



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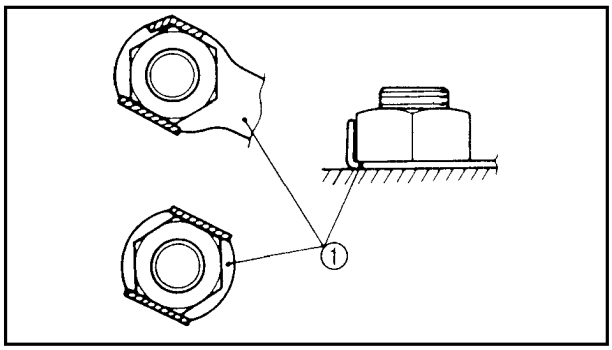
REPLACEMENT PARTS

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

EAS00022

GASKETS, OIL SEALS AND O-RINGS

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



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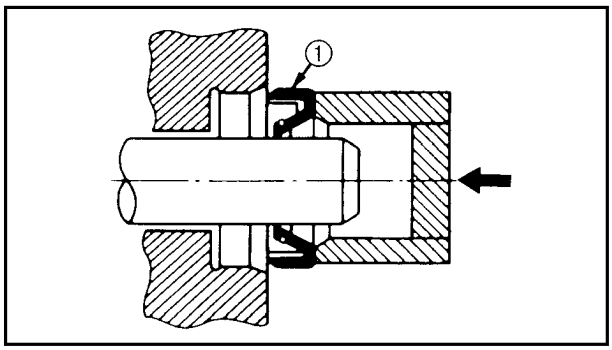
LOCK WASHERS/PLATES AND COTTER PINS

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

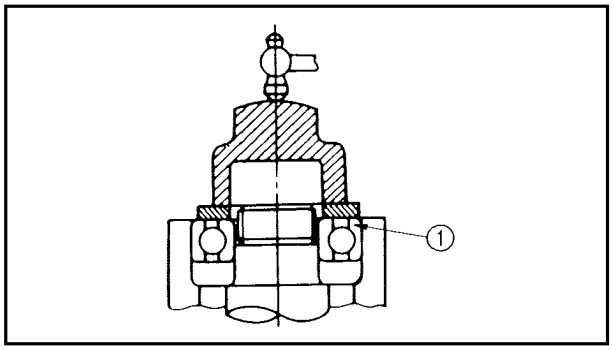


EAS00024

BEARINGS AND OIL SEALS

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

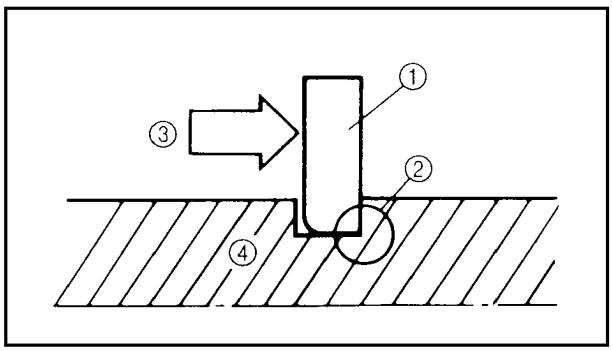
① Oil seal



CAUTION:

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

① Bearing



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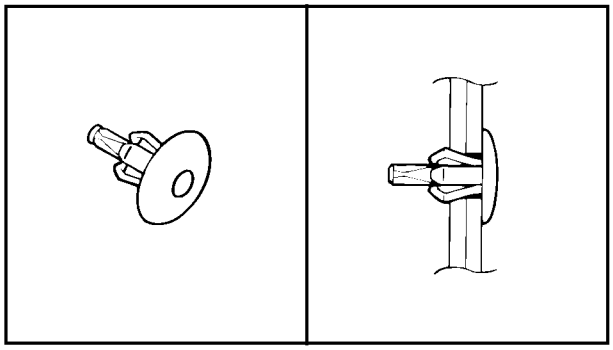
CIRCLIPS

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

④ Shaft

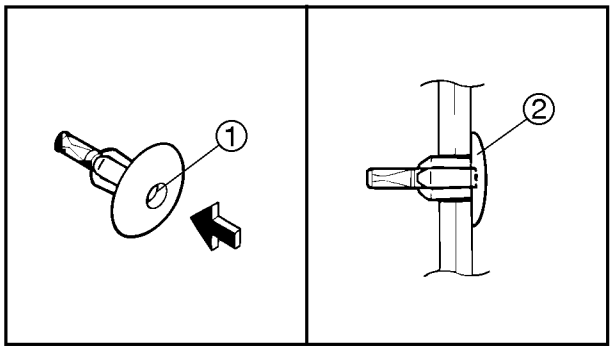


EAS00021

EQUIPMENT PREPARATION

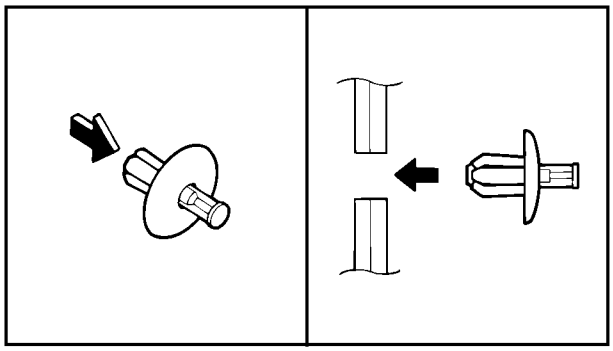
Push Rivet (Push type)

Assembly status of the push rivet(push type).



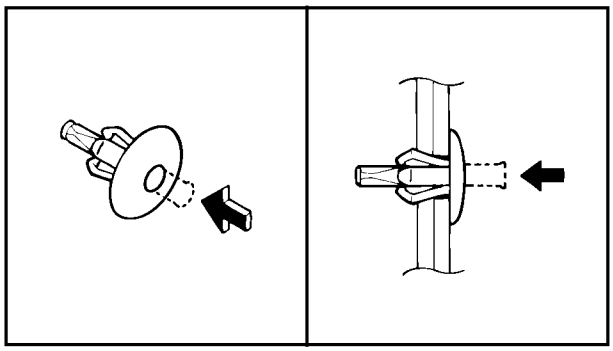
Dissembling

1. Press center pin① inward to release the lock.
2. Remove the push rivet main body②.



Assembling

1. Restore the center pin, replace the push rivet main body.



2. Push in the center pin until leveling off with the surface position of the push rivet main body.

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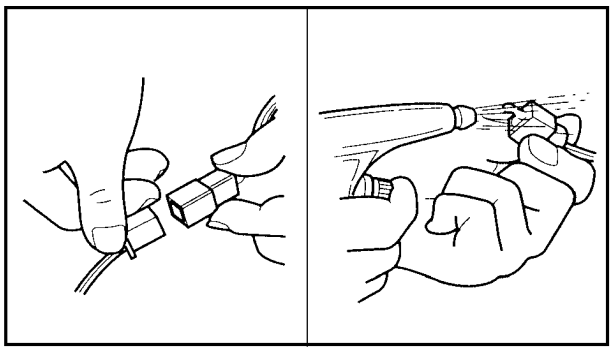
CHECKING THE CONNECTIONS

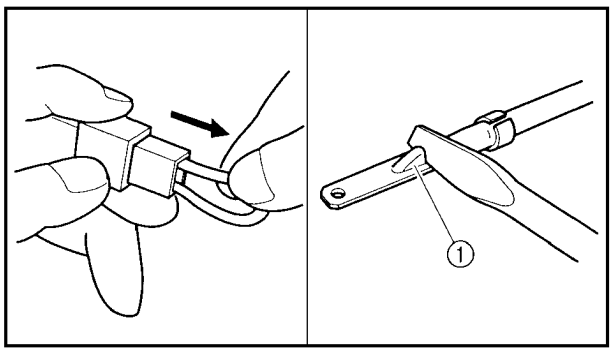
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - lead
   - coupler
   - connector



2. Check:
   - lead
   - coupler
   - connector

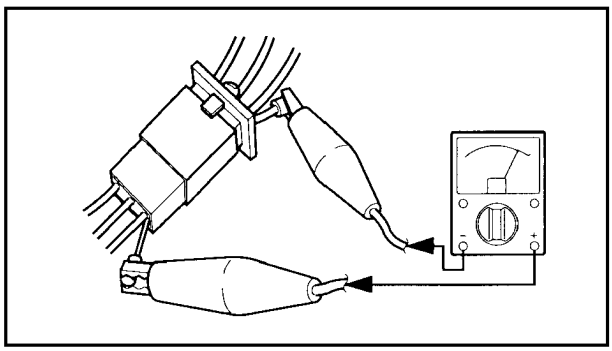
   Moisture → Dry with an air blower.
   Rust/stains → Connect and disconnect several times.



3. Check:
   - all connections

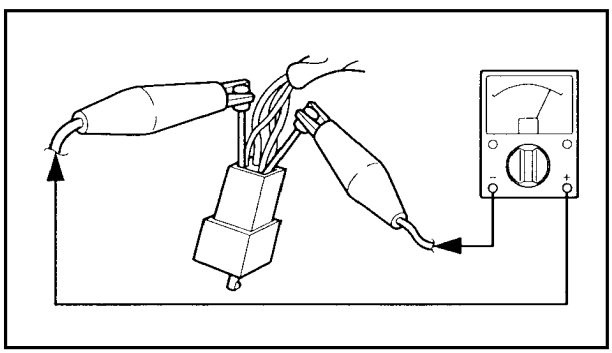
   Loose connection → Connect properly.

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



4. Connect:
   - lead
   - coupler
   - connector

NOTE:
Make sure all connections are tight.



5. Check:
   - continuity

   (with the pocket tester)

	Pocket tester **90890-03112(YU-03112-C)**

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

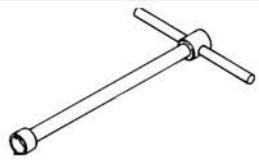
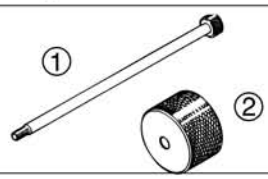
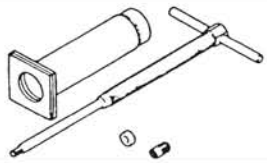
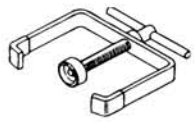
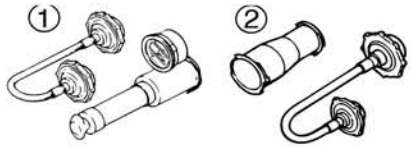
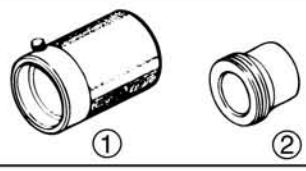
EAS00027

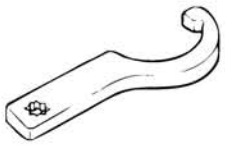
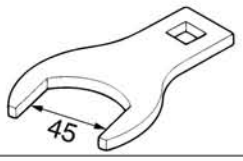
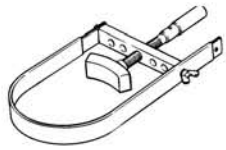
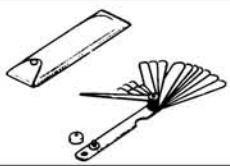
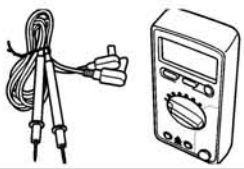
SPECIAL TOOLS

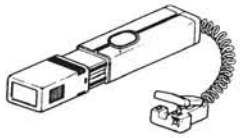
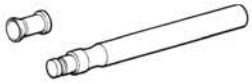
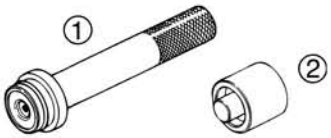
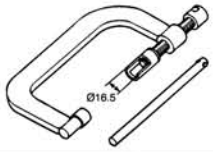
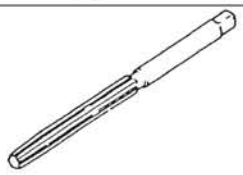
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

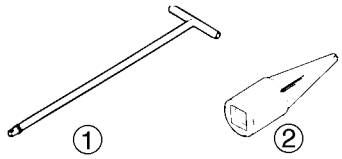
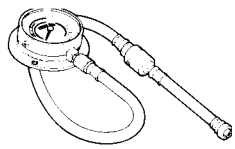
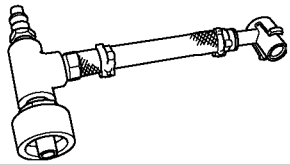
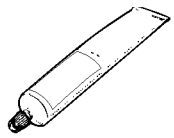
NOTE:

- For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
- For others, use part number starting with "90890-".

Tool NO.	Tool name / Function	Illustration
90890-01052	Meter gear bush tool This tool is used when removing or installing the meter gear.	
90890-01085 YU-01083-2 90890-01084 YU-01083-3	Slide hammer bolt(8mm)① Weight② These tools are needed to remove the camshaft.	
90890-01235 YU-01235	Rotor holding tool This tool is used to hold the primary fixed sheave and secondary sheave assembly.	
90890-01268 YU-01268	Ring nut wrench This tool is used to loosen and tighten the exhaust and steering ring nut.	
90890-01304 YU-01304	Piston pin puller set This tool is used to remove the piston pin.	
90890-01337 YM-33285 YM-33285-6	Clutch spring holder These tool are used for removing the nut with holding the compression spring.	
90890-01325 YU-24460-01 90890-01352 YU-33984	Radiator cap tester① Radiator cap tester adapter② This tester and its adapter are needed for checking the cooling system.	
90890-01367 YM-A9409-7 90890-01400 YM-A9409-3	Fork seal driver weight① Fork seal driver attachment② This tool is used when installing the fork seal.	

Tool NO.	Tool name / Function	Illustration
90890-01384 YM-33299	Oil seal guide This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.	
90890-01403 YU-A9472	Steering nut wrench This tool is used to loosen and tighten the steering ring nut.	
90890-01444 YM-A9409-7	Steering nut wrench(45mm) This tool is used to loosen and tighten the upper bearing inner race.	
90890-01468 YU-33270-B	Flywheel puller set This tool is used to remove the AC magneto rotor.	
90890-01493	Socket wrench(39mm) This tool is used when removing or installing the secondary sheave nut.	
90890-01701 YS-01880-A	Sheave holder This tool is used for holding the secondary sheave.	
90890-03079 YM-34483	Thickness gauge This tool is used to measure the valve cleanance.	
90890-03081 YU-33223	Compression gauge This tool is used to measure the engine compression.	
90890-03112 YU-03112-C	Pocket tester This instrument is invaluable for checking the electrical system.	
90890-03174 90890-03141 YU-03141	Digital circuit tester This instrument is invaluable for checking the electrical system.	

Tool NO.	Tool name / Function	Illustration
90890-03141 YU-03141	Timing light This tool is used to check the ignition timing.	
90890-03182 YU-03182	FI diagnostic tool Execute CO adjustment, confirm fault Code, self diagnosis tool	
90890-04101	Valve lapper This tool is needed to remove and install the valve lifters.	
90890-04058 YM-04058 90890-04145	Middle driven shaft bearing driver① Mechanical seal installer② There tools are used to install the water pump seal.	
90890-04019 YM-04019 90890-04148 YM-04148	Valve spring compressor Compressor adapter(Ø16.5mm) These tools are used when removing or installing the valve and the valve spring.	
90890-06760	Digital tachometer This tool is needed for detecting engine rpm.	
90890-06754 YM-34487	Ignition checker This tool is used to check the ignition system components.	
90890-04111 YM-04111	Valve guide remover(4.0mm) This tool is used to remove or install the valve guides.	
90890-04112 YM-04112	Valve guide installer(4.0mm) This tool is used to install the valve guides.	
90890-04113 YM-04113	Valve guide remover(4.0mm) This tool is used to rebore the new valve guides.	

Tool NO.	Tool name / Function	Illustration
90890-01326 YM-01326 90890-01294 YM-01300-1	T-handle① Damper rid holder② These tools are used to hold the damper rod when removing or installing the damper rod.	
90890-03153 YU-03153	Pressure gauge This tool is used to measure fuel pressure.	
90890-03181	Fuel pressure adapter This tool is used to measure fuel pressure.	
90890-85505 ACC-11001-05-01	Yamaha bond NO.1215 Sealant (Quick Gasket®) This sealamt (bond) is used on crankcase mating surfaces(e.g., crankcase mating surfaces).	

CHAPTER 2
SPECIFICATIONS

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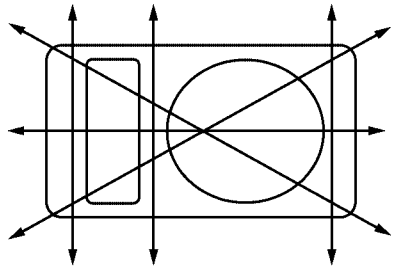
SPECIFICATIONS

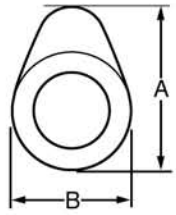
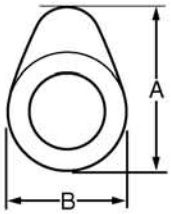
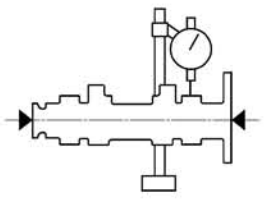
GENERAL SPECIFICATIONS

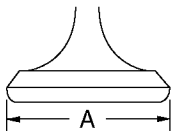
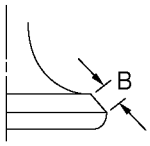
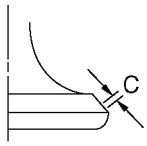
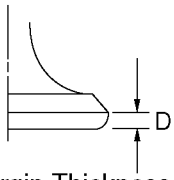
Item	Standard	Limit
Model code		
	3B32(USA)	...
	3B33(CAN)	...
Dimensions		
Overall length	1905mm(75.00in)	...
Overall width	685mm(26.97in)	...
Overall height	1045mm(41.14in)	...
Seat height	735mm(28.94in)	...
Wheelbase	1280mm(50.39in)	...
Minimum ground clearance	115mm(4.53in)	...
Minimum turning radius	2000mm(78.74in)	...
Weight		
Wet(without oil and a full fuel tank)	90kg(198lb)	...
Dry(without oil and fuel)	85kg(187lb)	...
Maximun load(total of cargo, rider, passenger, and accessories)	175kg(386lb)	...

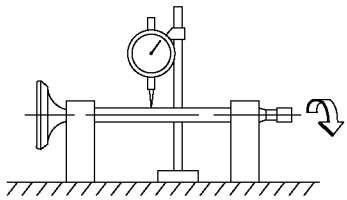
ENGINE SPECIFICATIONS

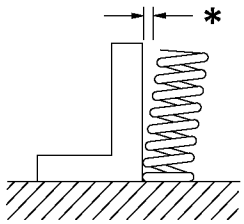
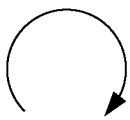
Item	Standard	Limit
Engine		
Engine type	Liquid-cooled, 4-stroke, SOHC	...
Displacement	0.049L(49cm^3, 2.99cu-in)	...
Cylinder arrangement	Forward inclined single cylinder	...
Bore×stroke	38.0×43.5mm(1.496×1.713in)	...
Compression ratio	12:1	...
Engine idle speed	2000~2200r/min	...
Vacuum pressure at engine idle speed	34.7kPa(260mmHg,10.24inHg)	...
Standard compression pressure(at sea level)	1450kPa(14.5kg/cm^2) at 700r/min	...
Fuel		
Recommended fuel	Unleaded gasoline only(USA) Regular unleaded gasoline only(CAN)	... ...
Fuel tank capacity		
Total	4.5L(0.98 Imp gal, 1.18 US gal)	...
Engine oil		
Lubrication system	Wet sump	...
Recommended oil	YAMALUBE4, SAE10W30 or SAE20W40 API service SG type or higher JASO stand MA	...
Quantity		
Periodic oil change	0.73~0.83L(0.67~0.76 Imp qt, 0.80~0.90 US qt)	...
Total amount	0.80~0.90L(0.74~0.83 Imp qt, 0.87~0.98 US qt)	...
Final gear oil		
Recommended oil	SAE10W30 hypoid gear oil	...
Periodic oil change	0.09~0.11L(0.08~0.10 Imp qt, 0.10~0.12 US qt)	...
Total amount	0.11~0.13L(0.10~0.12 Imp qt, 0.12~0.14 US qt)	...
Oil filter		
Oil filter type	Wire mesh	...

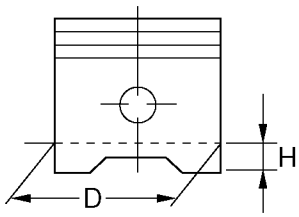
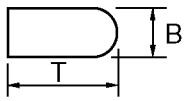
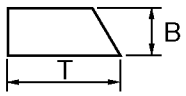
Item	Standard	Limit
Oil pump		
Oil pump type	Trochoid	…
Inner rotor to outer rotor tip clearance	0.15mm(0.006in) or less	0.23mm (0.009in)
Outer rotor to pump housing clearance	0.13~0.18mm(0.005~0.007in)	0.25mm (0.010in)
Oil pump housing to inner rotor and outer rotor clearance	0.07~0.12mm(0.003~0.005in)	0.19mm (0.008in)
Cooling system		
Radiator capacity	0.26L(0.23 Imp gal, 0.28 US gal)	…
Radiator cap opening pressure	107.9~137.3kPa (1.1~1.4kg/cm^2, 15.6~19.9psi)	…
Valve relief pressure	1.1kPa(0.01kg/cm^2, 0.16psi)	…
Radiator core		
Width	127.4mm(5.016in)	…
Height	87mm(3.425in)	…
Depth	16mm(0.630in)	…
Coolant reservoir		
Capacity(up to the maximum level mark)	0.25L(0.22 Imp gal, 0.27 US gal)	…
<From low to full level>	0.15L(0.13 Imp gal, 0.16 US gal)	…
Water pump		
Water pump type	Single-suction centrifugal pump	…
Max. impeller shaft tilt	…	0.15mm (0.0059in)
Starting system type	Electric and kick starter	…
Electric fuel injection		
Type	3B3	…
Manufacturer	AISAN	…
Spark plug		
Model(manufacturer)×quantity	CR7E(NGK)×1	…
Spark plug gap	0.7~0.8mm(0.028~0.031in)	…
Cylinder head		
Volume	3.1~3.5cm^3(0.19~0.21cu-in)	…
Maximum warpage	…	0.05mm (0.0020in)
 I1110304		

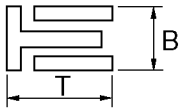
Item	Standard	Limit
Camshaft		
Drive system	Chain drive(left)	…
Intake camshaft lobe dimensions		
		
Measurement A	30.158~30.258mm (1.1873~1.1913in)	30.058mm (1.1834in)
Measurement B	25.082~25.182mm (0.9875~0.9914in)	24.982mm (0.9835in)
Exhaust camshaft lobe dimensions		
		
Measurement A	30.158~30.258mm (1.1873~1.1913in)	30.058mm (1.1834in)
Measurement B	25.020~25.120mm (0.9850~0.9890in)	24.920mm (0.9811in)
Maximum camshaft runout	…	0.03mm (0.0012in)
		

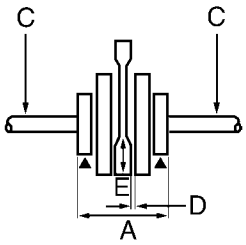
Item	Standard	Limit
Timing chain		
Model/number of links	Morse 92RH2005/82	...
Tensioning system	Automatic	...
Valve, valve seats, valve guides		
Valve clearance(cold)		
Intake	0.10~0.16mm (0.0039~0.0063in)	...
Exhaust	0.18~0.24mm (0.0071~0.0094in)	...
Valve dimensions		
 Head Diameter	 Face Width	 Seat Width	 Margin Thickness	
Valve head diameter A		
Intake	15.4~15.6mm (0.6063~0.6142in)	...
Exhaust	16.4~16.6mm (0.6457~0.6535in)	...
Valve face width B		
Intake	1.48~2.19mm (0.0583~0.0862in)	...
Exhaust	1.48~2.19mm (0.0583~0.0862in)	...
Valve seat width C		
Intake	0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)
Exhaust	0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)
Valve margin thickness D		
Intake	0.70mm(0.0276in)	...
Exhaust	0.70mm(0.0276in)	...
Valve stem diameter		
Intake	3.975~3.990mm (0.1565~0.1571in)	3.945mm (0.1553in)
Exhaust	3.975~3.990mm (0.1565~0.1571in)	3.930mm (0.1547in)
Valve guide inside diameter		
Intake	4.000~4.012mm (0.1575~0.1580in)	4.050mm (0.1594in)
Exhaust	4.000~4.012mm (0.1575~0.1580in)	4.050mm (0.1594in)

Item	Standard	Limit
Valve stem to valve guide clearance		
Intake	0.010~0.037mm (0.0004~0.0015in)	0.080mm (0.0031in)
Exhaust	0.025~0.052mm (0.0010~0.0020in)	0.100mm (0.0039in)
Valve stem runout	…	0.010mm (0.0004in)
		
Valve seat width		
Intake	0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)
Exhaust	0.9~1.1mm (0.0354~0.0433in)	1.6mm (0.0630in)

Item	Standard	Limit
Valve springs		
Free length		
Intake	39.35mm(1.5492in)	37.38mm (1.4717in)
Exhaust	41.57mm(1.6366in)	39.49mm (1.5547in)
Installed length(valve closed)		
Intake	28.0mm(1.1024in)	…
Exhaust	30.0mm(1.1811in)	…
Compressed spring force(installed)		
Intake	91.1~104.9N (9.3~10.7kg, 20.48~23.58lb)	…
Exhaust	107.9~124.1N (11.0~12.7kg, 24.26~27.90lb)	…
Spring tilt 		
Intake	…	2.5°/1.7mm (2.5°/0.0669in)
Exhaust	…	2.5°/1.8mm (2.5°/0.0709in)
Winding direction(top view)		
Intake	Clockwise	…
Exhaust	Clockwise 	…
Valve seat reformed	Yes	…
Cylinder		
Cylinder arrangement	Forward inclined single cylinder	…
Bore×stroke	38.0×43.5mm(1.496×1.713in)	…
Compression ratio	12:1	…
Bore	38.000~38.010mm (1.496~1.497in)	…
Maximum taper	…	0.05mm (0.0020in)
Maximum out-of-round	…	0.05mm (0.0020in)

Item	Standard	Limit
Piston		
Piston-to-cylinder clearance	0.010~0.035mm (0.0004~0.0014in)	0.150mm (0.0059in)
Diameter D	37.975~37.990mm (1.4951~1.4957in)	…
		
Height H	5.0mm(0.1969in)	…
Piston pin bore(in the piston)		
Diameter	10.002~10.013mm (0.3938~0.3942in)	10.043mm (0.3954in)
Offset	0.35~0.65mm (0.0138~0.0256in)	…
Offset direction	Intake side	…
Piston pin		
Outside diameter	9.996~10.000mm (0.3935~0.3937in)	9.976mm (0.3928in)
Piston rings		
Top ring		
Ring type	Barrel	…
Dimensions(B×T)	0.8×1.65mm (0.0315×0.0650in)	…
		
End gap(installed)	0.05~0.15mm (0.0020~0.0059in)	0.40mm (0.0157in)
Ring side clearance	0.03~0.07mm (0.0012~0.0028in)	0.12mm (0.0047in)
2nd ring		
		
Ring type	Taper	…
Dimensions(B×T)	0.8×1.5mm (0.0315×0.0591in)	…
End gap(installed)	0.05~0.17mm (0.0020~0.0067in)	0.52mm (0.0205in)
Ring side clearance	0.02~0.06mm (0.0008~0.0024in)	0.12mm (0.0047in)

Item	Standard	Limit
Oil ring 		
Dimensions(B×T)	1.5×1.6mm (0.0591×0.0630in)	…
End gap(installed)	0.2~0.7mm (0.0079~0.0276in)	…
Ring side clearance	0.03~0.15mm (0.0012~0.0059in)	…

Item	Standard	Limit
Rocker arm/rocker arm shaft		
Rocker arm inside diameter	10.000~10.015mm (0.3937~0.3943in)	10.030mm (0.3949in)
Rocker arm shaft outside diameter	9.981~9.991mm (0.3930~0.3933in)	9.950mm (0.3917in)
Arm-to-shaft clearance	0.009~0.034mm (0.0004~0.0013in)	…
Connecting rod		
Connecting rod length	79.95~80.05mm (3.1476~3.1516in)	…
Small end inside diameter	10.015~10.028mm (0.3943~0.3948in)	…
Crankshaft		
 Width A	42.45~42.50mm (1.671~1.673in)	…
Maximum runout C	…	0.03mm (0.0012in)
Big end side clearance D	0.15~0.45mm (0.006~0.018in)	1.00mm (0.0394in)
Big end radial clearance E	0~0.010mm (0~0.0004in)	…

Item	Standard	Limit
Clutch		
Clutch type	Automatic centrifugal	…
Clutch shoe thickness	3.7mm(0.146in)	2.0mm (0.079in)
Clutch shoe spring free length	30.1mm(1.185in)	…
Clutch housing inside diameter	107mm(4.213in)	107.5mm (4.232in)
Compression spring free length	76.4mm(3.008in)	…
Weight outside diameter	15.0mm(0.591in)	14.5mm (0.571in)
Clutch-in revolution	3050~3450r/min	…
Clutch-stall revolution	5000~6000r/min	…
V-belt		
V-belt width	17.9mm(0.705in)	16.1mm (0.634in)
Transmission		
Transmission type	V-belt automatic	…
Primary reduction system	Helical gear	…
Primary reduction ratio	50/13(3.846)	…
Secondary reduction system	Helical gear	…
Secondary reduction ratio	43/12(3.583)	…
Single speed automatic	3.087~0.945:1	…
Maximum main axle runout	…	0.04mm (0.002in)
Maximum drive axle runout	…	0.04mm (0.002in)
Air filter type	Wet element	…
Fuel pump		
Pump type	Electrical	…
Model(manufacturer)	3B3(AISAN)	…
Output pressure	250kPa(2.5kg/cm^2, 35.6psi)	…
Throttle body		
Throttle cable free play (at the flange of the throttle grip)	1.5~3.5mm(0.06~0.14in)	…
ID mark	3B31 00	…

CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Steel tube backbone	…
Caster angle	26°	…
Trail	84mm(3.31in)	…
Front wheel		
Wheel type	Cast wheel	…
Rim		
Size	J10×MT3.00	…
Material	Aluminum	…
Wheel travel	58mm(2.28in)	…
Wheel runout		
Maximum radial wheel runout	…	1.0mm (0.04in)
Maximum lateral wheel runout	…	1.0mm (0.04in)
Wheel axle bending limit	…	0.25mm (0.01in)
Rear wheel		
Wheel type	Cast wheel	…
Rim		
Size	J10×MT3.00	…
Material	Aluminum	…
Wheel travel	56mm(2.20in)	…
Wheel runout		
Maximum radial wheel runout	…	1.0mm (0.04in)
Maximum lateral wheel runout	…	1.0mm (0.04in)
Front tire		
Tire type	Tubeless	…
Size	120/90-10 57J	…
Model(manufacturer)	C-6022(CHENG SHIN)	…
Tire pressure(cold)		
0~175kg(0~386lb)	175kPa(1.75kgf/cm², 25psi)	…
Minimum tire tread depth	…	0.8mm (0.03in)

Item	Standard	Limit
Rear tire		
Tire type	Tubeless	…
Size	120/90-10 57J	…
Model(manufacturer)	C-6022(CHENG SHIN)	…
Tire pressure(cold)		
0~175kg(0~386lb)	175kPa(1.75kgf/cm², 25psi)	…
Minimum tire tread depth	…	0.8mm (0.03in)
Front brake		
Brake type	Drum brake	…
Operation	Right-hand operation	…
Brake lever free play(at lever end)	10~20mm(0.39~0.79in)	…
Brake drum inside diameter	110mm(4.33in)	110.5mm (4.35in)
Lining thickness	4.0mm(0.16in)	2.0mm (0.08in)
Rear brake		
Brake type	Drum brake	…
Operation	Left-hand operation	…
Brake lever free play(at lever end)	10~20mm(0.39~0.79in)	…
Brake drum inside diameter	110mm(4.33in)	110.5mm (4.35in)
Lining thickness	4.0mm(0.16in)	2.0mm (0.08in)
Front suspension		
Suspension type	Telescopic fork	…
Front fork type	Coil spring	…
Front fork travel	65mm(2.56in)	…
Spring		
Free length	202.2mm(7.96in)	198.2mm (7.80in)
Installed length	188.2mm(7.41in)	…
Spring rate(K1)	10.1N/mm(1.03kg/mm)	…
Spring stroke(K1)	0~65mm(0~2.56in)	…
Optional spring available	No	…
Fork oil		
Recommended oil	Fork oil 10W or equivalent	…
Quantity(each front fork leg)	0.042L(0.038lmp qt, 0.046 US qt)	…
Inner tube outer diameter	26mm(1.02in)	…
Inner tube bending limit	…	0.2mm (0.01in)

Item	Standard	Limit
Steering system		
Steering bearing type	Angular bearing	...
Lock-to-lock angle(left)	46°	...
Lock-to-lock angle(right)	46°	...
Rear suspension		
Suspension type	Unit swing	...
Rear shock absorber assembly type	Coil spring	...
Rear shock absorber assembly travel	45mm(1.77in)	...
Spring		
Free length	176.5mm(6.95in)	...
Installed length	162.5mm(6.40in)	...
Spring rate(K1)	28.03N/mm (2.85kg/mm, 159.59lb/in)	...
Spring rate(K2)	42.18N/mm (4.30kg/mm, 240.79lb/in)	...
Spring stroke(K1)	0~17mm(0~0.67in)	...
Spring stroke(K2)	17~45mm(0.67~1.77in)	...
Optional spring available	No	...

ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12V	...
Ignition system		
Ignition system type	Transistorized coil ignition	...
Ignition timing	5° BTDC at 2000~2200r/min	...
Advancer type	Digita	...
Crankshaft position sensor resistance/color	248~372Ω at 20°C(68°F)/ white/red-white/blue	...
Ignition coil		
Model(manufacturer)	3B3 00(T-MORIC)	...
Minimum ignition spark gap	6mm(0.24in)	...
Primary coil resistance	2.16~2.64Ω at 20°C(68°F)	...
Secondary coil resistance	8.64~12.96kΩ at 20°C(68°F)	...
Spark plug cap		
Material	Resin	...
Resistance	4~6kΩ at 20°C(68°F)	...
Charging system		
System type	AC magneto	...
Model(manufacturer)	F3B3(T-MORIC)	...
Nominal output	14V 130W/5000r/min	...
Stator coil resistance/color	0.28~0.42Ω at 20°C(68°F)/ white-white	...
Rectifier/regulator		
Regulator type	Semiconductor, short circuit	...
Model(manufacturer)	SH745-AA(SHINDENGEN)	...
No load regulated voltage	13.0~14.0V	...
Rectifier capacity	24A	...
Withstand voltage	200V	...
Battery		
Battery type(manufacturer)	GTX5L-BS(GS)	...
Battery voltage/capacity	12V/4AH	...
Specific gravity	1.330	...
Ten hour rate amperage	0.4A	...
Headlight type	Halogen bulb	...
Indicator light(voltage/wattage×quantity)		
Turn signal indicator light	14V 3.0W×1	...
High beam indicator light	12V 1.7W×1	...
Engine trouble warning light	12V 1.7W×1	...
Water temperature indicator light	14V 1.7W×1	...

Item	Standard	Limit
Bulbs(voltage/wattage×quantity)		
Headlight	12V 35/35W×1	...
Tail/brake light	12V 5/21W×1	...
Front turn signal light	12V 10W×2	...
Rear turn signal light	12V 10W×2	...
License plate light	12V 5W×1	...
Speedometer light	12V 1.7W×1	...
Electric starting system		
System type	Constant mesh	...
Starter motor		
Model(manufacturer)	3B3 00(T-MORIC)	...
Suction voltage	12V	...
Power output	0.25kW	...
Brushes		
Overall length	7.0mm(0.28in)	3.5mm (0.14in)
Quantity	2	...
Spring force	3.92~5.88N (400~600gf, 14.11~21.16oz)	...
Commutator diameter	17.6mm(0.69in)	16.6mm (0.65in)
Commutator resistance	0.0378~0.0462Ω at 20°C(68°F)	...
Mica undercut(depth)	1.35mm(0.05in)	...
Starter relay		
Model(manufacturer)	5WC 00(OMRON)	...
Amperage	50A	...
Coil resistance	90-110Ω	...
Suction voltage	More than DC10V	...
Horn		
Horn type	Plane	...
Model(manufacturer)	GF-127(NIKKO)	...
Maximum amperage	1.0A	...
Performance	95~115dB/2m	...
Coil resistance	3.96~4.10W at 20°C(68°F)	...
Turn signal relay		
Relay type	Condenser	...
Model(manufacturer)	FZ222SD(DENSO)	...
Self-cancelling device built-in	NO	...
Turn signal blinking frequency	75~95cycles/minute	...
Wattage	10W×2+3.4W	...

Item	Standard	Limit
Fuse(amperage×quantity)		
Main fuse	15A×1	...
Fuel gauge		
Model(manufacturer)	3B3(AISAN)	...
Sender unit resistance-full	4~10Ω	...
Sender unit resistance-empty	90~100Ω	...
Starting circuit cut-off relay		
Model(manufacturer)	4HC1(MATSU SHITA)	...
Coil resistance	72~88Ω	...
Diode	YES	...
Radiator fan		
Model(manufacturer)	5ST1(LUNTAI)	...
Running rpm	10000r/min or less	...
Thermostat		
Type(manufacture)	4BA1(NIPPON THERMOSTAT)	...
Valve opening temperature	83~87°C	...
Valve full open temperature	100°C	...
Valve lift-full open	3.5mm	...
Coolant temperature sensor		
Model(manufacturer)	5YP1(DENSO)	...
Coil resistance at 20°C(68°F)	2.32~2.59kΩ	...
Coil resistance at 80°C(176°F)	0.310~0.326kΩ	...
Intake air pressure sensor		
Output voltage	0.789~4.0V	...
Intake air temperature sensor		
Coil resistance/color	5.7~6.3kΩ at 20°C(68°F)/ brown-white/black-blue	...
Speed sensor		
Output voltage		
When sensor is on	DC 4.8V or more	...
When sensor is off	DC 0.6V or less	...
Throttle position sensor		
Voltage/color	5V/blue-black/blue	...
Output voltage(closed position)/color	0.63~0.73V/yellow-black/blue	...
ISC(idle speed control) valve		
Resistance/color	18~22Ω at 20°C(68°F)/ pink-green/yellow or gray-sky blue	...
Lean angle cut-off switch		
Voltage		
Less than 65°	0.4~1.4V	...
More than 65°	3.7~4.4V	...

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.

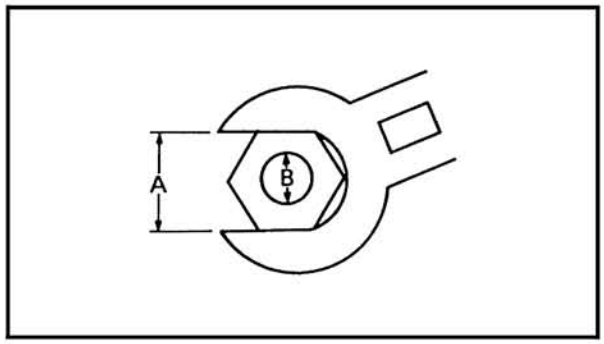
METRIC	MULTIPLIER	IMPERIAL
** mm	0.03937	** in
2 mm	0.03937	0.08 in

CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening 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
Speed	km/hr	0.6214	mph
Distance	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.)
Misc.	kg/mm	55.997	lb/in
	kg/cm^2	14.2234	psi (lb/in^2)
	Centigrade (°C)	9/5+32	Fahrenheit (°F)

EAS00030
GENERAL TIGHTENING TORQUE SPECIFICATIONS

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



A: Width across flats
B: Thread diameter

A (nut)	B (bolt)	General tightening torques		
		Nm	m•kg	ft•lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

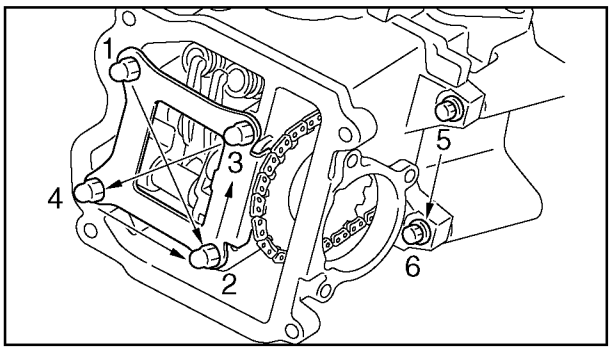
TIGHTENING TORQUES

ENGINE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Exhaust pipe stud bolt	-	M8	2	13	1.3	9.4	
Oil check bolt	-	M6	1	7	0.7	5.1	
Cylinder head cover	Bolt	M6	4	10	1.0	7.2	
Cylinder head and cylinder	Nut	M6	4	10	1.0	7.2	④
Cylinder head(timing chain side)	Bolt	M6	2	10	1.0	7.2	
Spark plug	-	M10	1	13	1.3	9.4	
Camshaft sprocket	Bolt	M8	1	30	3.0	21.7	
Timing chain tensioner(body)	Bolt	M6	2	9	0.9	6.5	
Guide stopper2	Bolt	M6	1	7	0.7	5.1	
Timing chain tensioner(plug)	plug	M8	1	8	0.8	5.8	
Water pump assembly	Bolt	M6	3	10	1.0	7.2	
Thermostat cover air bleed bolt	-	M6	1	10	1.0	7.2	
Thermostat cover	Bolt	M6	2	10	1.0	7.2	
Fan case	Bolt	M6	4	10	1.0	7.2	
Fan	Bolt	M6	3	9	0.9	6.5	
Radiator drain bolt	-	M10	1	1	0.1	0.7	
Radiator cover	Screw	6	3	2	0.2	1.5	
Oil pump assembly	Screw	M5	2	4	0.4	2.9	
Engine oil drain plug	-	M35	1	32	3.2	23.1	
Intake manifold	Bolt	M6	2	10	1.0	7.2	
Air filter assembly	Bolt	M6	2	10	1.0	7.2	
Injector	Bolt	M6	1	12	1.2	8.7	
Intake manifold side band	Band	M4	1	3	0.3	2.2	
Air filter assembly side band	Band	M4	1	3	0.3	2.2	
Protector	Screw	M6	2	9	0.9	6.5	When fastened, apply screw retaining compound.
Exhaust pipe	Nut	M8	2	13	1.3	9.4	
Stay fender	Bolt	M8	2	10	1.0	7.2	
Muffler	Bolt	M8	2	31	3.1	22.4	
Reed valve and holder	Bolt	M6	1	14	1.4	10.1	
AI filter case	Bolt	M6	1	7	0.7	5.1	
Oil guide	Nut	M6	2	10	1.0	7.2	
Crankcase(left and right)	Bolt	M6	8	10	1.0	7.2	
Cylinder stud bolt	-	M6	4	13	1.3	9.4	
Drain bolt(transmission oil fill bolt)	-	M8	1	23	2.3	16.6	
V-belt case cover	Bolt	M6	6	10	1.0	7.2	
Drain bolt(transmission oil)	Bolt	M6	1	13	1.3	9.4	
Transmission case	Bolt	M6	6	11	1.1	8.0	
Transmission case	Bolt	M6	2	10	1.0	7.2	
Cover1(starter clutch)	Bolt	M6	7	10	1.0	7.2	
Hold lead plate bolt	-	M6	1	10	1.0	7.2	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Drain bolt(engine oil)	-	M8	1	23	2.3	16.6	
Centerstand spring	Hook	M6	1	7	0.7	5.1	
Starter clutch	Nut	M22	1	90	9.0	65.1	Left-hand thread
Kickstarter	Bolt	M6	1	12	1.2	8.7	
Primary fixed sheave	Nut	M10	1	30	3.0	21.7	
Clutch housing	Nut	M10	1	40	4.0	28.9	
Stator coil	Bolt	M5	3	4	0.4	2.9	LT
Pulser coil	Screw	M6	2	7	0.7	5.1	
AC magneto rotor	Nut	M12	1	43	4.3	31.1	
Starter motor assembly	Bolt	M6	2	13	1.3	9.4	
Ignition coil	Bolt	M6	2	7	0.7	5.1	
Coolant temperature sensor	-	M12	1	22	2.2	15.9	

Cylinder head tightening sequence
(1→2→3→4→2→5→6)

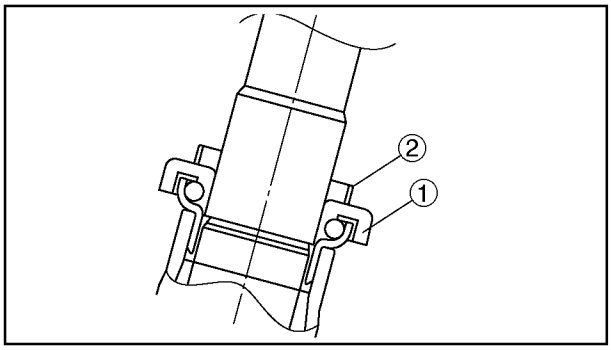


CHASSIS

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m•kg	ft•lb	
Frame and engine bracket3	M10	46	4.6	33.1	
Engine bracket3 and engine	M10	58	5.8	42.0	
Handlebar bracket and steering shaft	M10	60	6.0	43.4	
Rear shock absorber and frame	M10	30	3.0	21.7	
Rear shock absorber and engine	M8	16	1.6	11.6	
Steering shaft and upper bearing inner race	BC1	7	0.7	5.1	See"NOTE"
Steering shaft and ring nut	BC1	30	3.0	21.7	See"NOTE"
Front fork and lower bracket	M10	30	3.0	21.7	
Handlebar bracket and handlebar lower holder	M10	48	4.8	34.7	
Handlebar lower holder and handlebar upper holder	M8	28	2.8	20.3	
Throttle cable and holder lever2	M5	4	0.4	2.9	
Throttle cable and throttle body	M5	5	0.5	3.6	
Front reflector	M5	7	0.7	5.1	
Fuel tank	M6	10	1.0	7.2	
Fuel pump	M5	4	0.4	2.9	
Single seat lock assembly	M6	12	1.2	8.7	
Trunk	M6	12	1.2	8.7	
Bottom plate and single seat lock bracket	M6	7	0.7	5.1	
Bottom plate and frame(single seat)	M6	10	1.0	7.2	
Single seat and frame(single seat)	M6	10	1.0	7.2	
Single seat lock assembly and trunk	M6	7	0.7	5.1	
Resin part and resin cover	About M5	2	0.2	1.5	
Footrest board	M6	7	0.7	5.1	
License bracket	M6	7	0.7	5.1	
Rear turn signal light	M6	4	0.4	2.9	
License light	About M5	2	0.2	1.5	
Front wheel shaft	M10	48	4.8	34.7	
Front brake camshaft lever	M6	8	0.8	5.8	
Rear wheel shaft	M14	120	12.0	86.8	
Rear brake camshaft lever	M6	10	1.0	7.2	
Rear brake pin pivot	M8	16	1.6	11.6	
Speedometer cable	M12	5	0.5	3.6	
Main switch and headlight stay bracket	M6	7	0.7	5.1	
Headlight body and headlight unit	M5	4	0.4	2.9	
Headlight stay bracket and headlight body	M6	10	1.0	7.2	
Lower bracket and headlight stay bracket	M8	23	2.3	16.6	
Handlebar bracket and headlight stay bracket	M8	23	2.3	16.6	
ECU and trunk	M6	7	0.7	5.1	
Rear reflector and license bracket	M5	2	0.2	1.5	
Taillight underside	M6	2	0.2	1.5	

NOTE :

1. First,tighten the upper bearing inner race approximately 7Nm(0.7m•kg, 5.1ft•lb) by using the torque wrench and check turn steering shaft smoothly.
2. Second,hold the upper bearing inner race and tighten the ring nut 30Nm(3.0m•kg, 21.7ft•lb) by using the torque wrench.
3. Final,operate the steering shaft together with the steering stem nut now.



① Upper bearing inner race
② Ring nut

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LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

Lubrication Point	Lubricant
Oil seal lips	LS
O-rings(except V-belt drive unit)	LS
O-ring(fuel injector assembly)	4
Cylinder head tightening nut mounting surface	4
Cylinder head stud bolt thread	4
Cylinder head gasket dowel pin	4
Crankshaft pin outside surface	4
Connecting rod	4
Piston outside and ring groove	4
Piston pin outside surface	4
surface and bolt thread	4
Crankshaft journal	4
Piston(balancer) outside surface	4
Piston pin(balancer) outside surface	4
Camshaft lobe	M
Camshaft profile journal	M
Valve stems(intake and exhaust)	M
Valve stem seals(intake and exhaust)	M
Valve pads(intake and exhaust)	M
Valve stem ends(intake and exhaust)	4
Oil pump assembly inside surface	4
Oil pipe union bolt thread and surface	4
Starter clutch pin and weight	M
Kick pinion gear and kick pinion gear clip thrust surface	M
Idle gear 1 thrust surface	4
Idle gear2	4
Main and drive axle serration(sprocket)	G

LUBRICATION POINTS AND LUBRICANT TYPES

SPEC

Lubrication Point	Lubricant
Drive axle taper rollor bearing	G
Transmission bearings	G
Secondary fixed sheave inner surface	BEL-RAY asembly lube®
Secondary sliding sheave torque cam ditch	BEL-RAY asembly lube®
Crankcase mating surfaces	Sealant

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CHASSIS

Lubrication Point	Lubricant
Front wheel oil seal lips	LS
Steering bearing and bearing races(upper and lower)	LS
Frame head pipe dust seal lips(lower)	LS
Tube guide(throttle grip) inner surface	LS
Brake lever and lever holder bolt sliding surface	LS
Centerstand pivoting point and sliding surface	LS
Single seat lock cable inner surface	LS
Engine bracket and engine mound bolt sliding surface	LS

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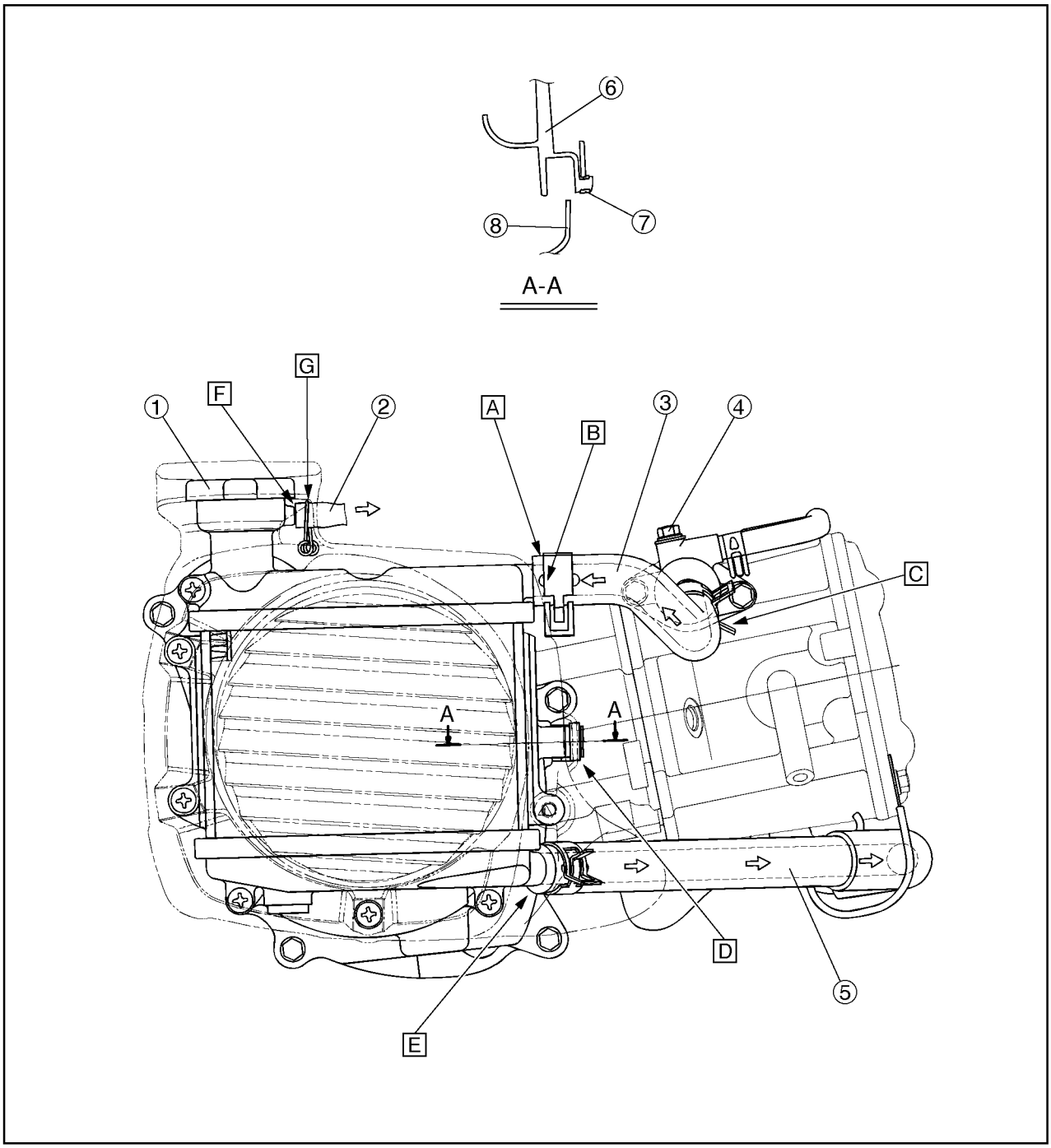
COOLING SYSTEM DIAGRAMS

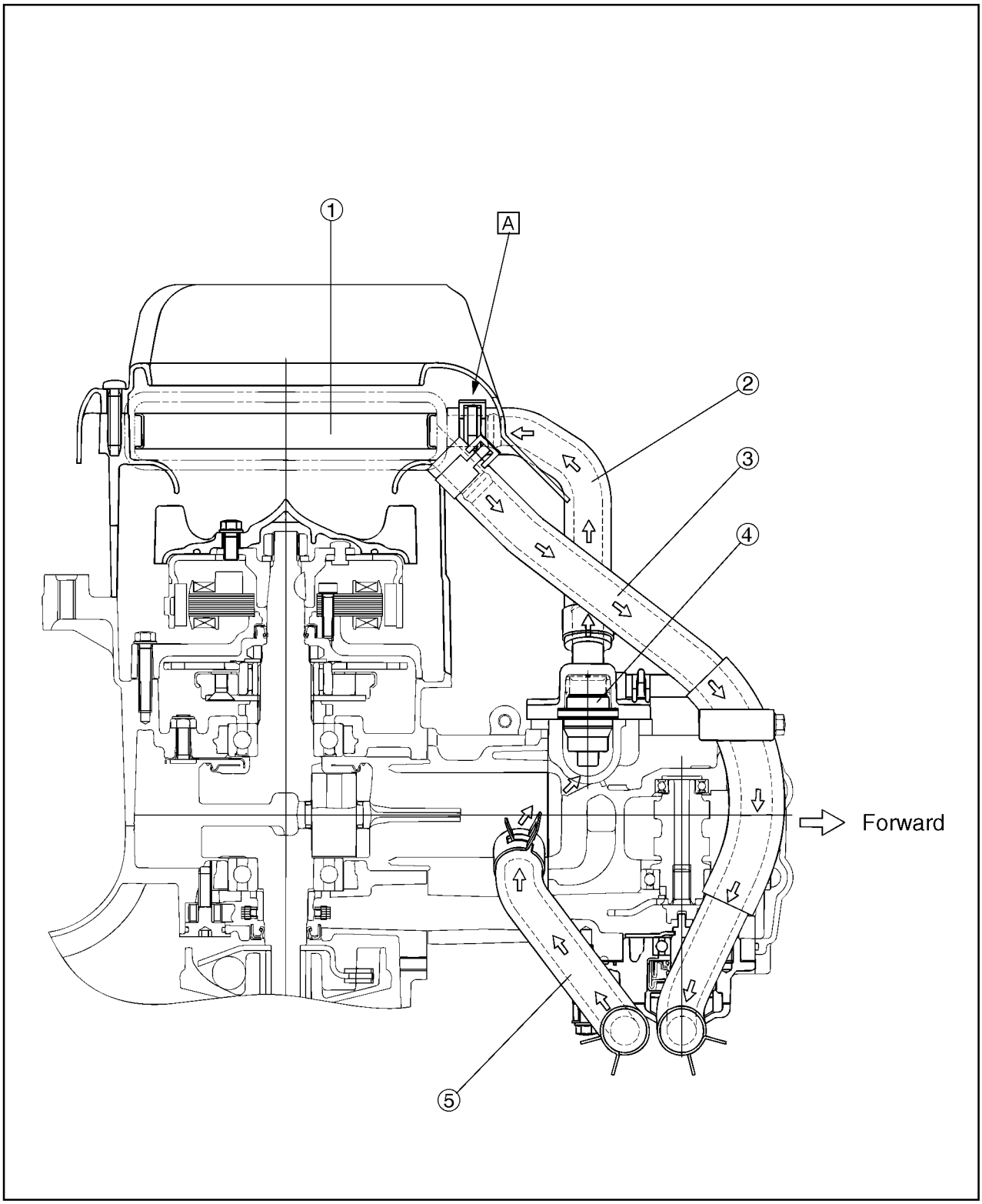
① Raidator cap
② Coolant reservoir hose
③ Radiator inlet hose
④ Air bleed bolt
⑤ Radiator outlet hose
⑥ Fan case
⑦ Damper
⑧ Raidator cover

[A] Insert until contacting with the latch of radiator tank.
[B] Install white paint marck of pipe 3 toward the direction of radiator cover.
[C] Install clip for the turning knob to face forward.
[D] Hand and fix the claw of fan case 1 on the radiator cover.
[E] Insert to the bent part of radiator pipe.
[F] Make sure that hose is inserted to the bottom.
[G] Install clip for the turning knob to face downward.



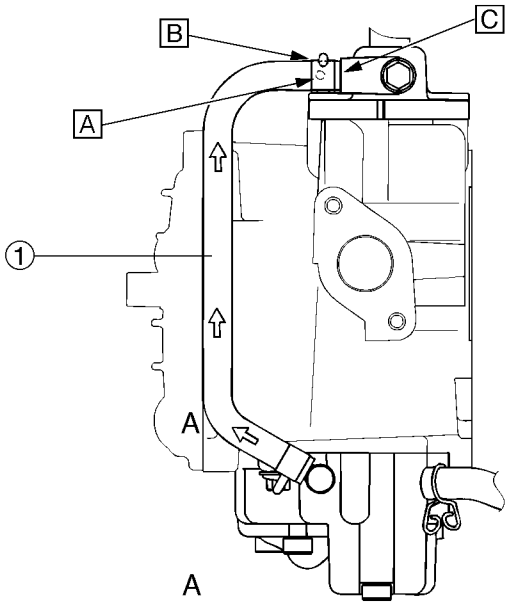
① Radiator
② Radiator inlet hose
③ Radiator outlet hose
④ Thermostat
⑤ Water pump outlet hose

[A] Install clip for the turning knob to face downward.



① Thermostat assembly inlet breather hose
② Breather hose
③ Water pump outlet hose
④ Radiator outlet hose
⑤ Water pump

A Install the paint mark of hose facing up.
B Install clip for the turning knob to face downward.
C Make sure that hose is inserted to the bottom.
D Align the paint mark of pipe 7 to the stopper of water pump Ass'y.
E Insert until contacting with the stopper.



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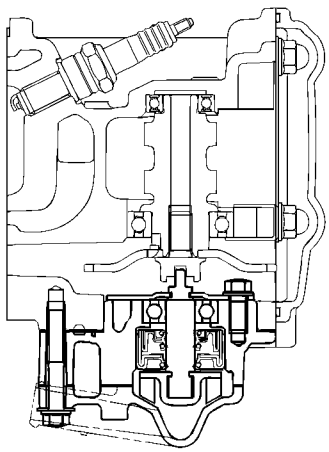
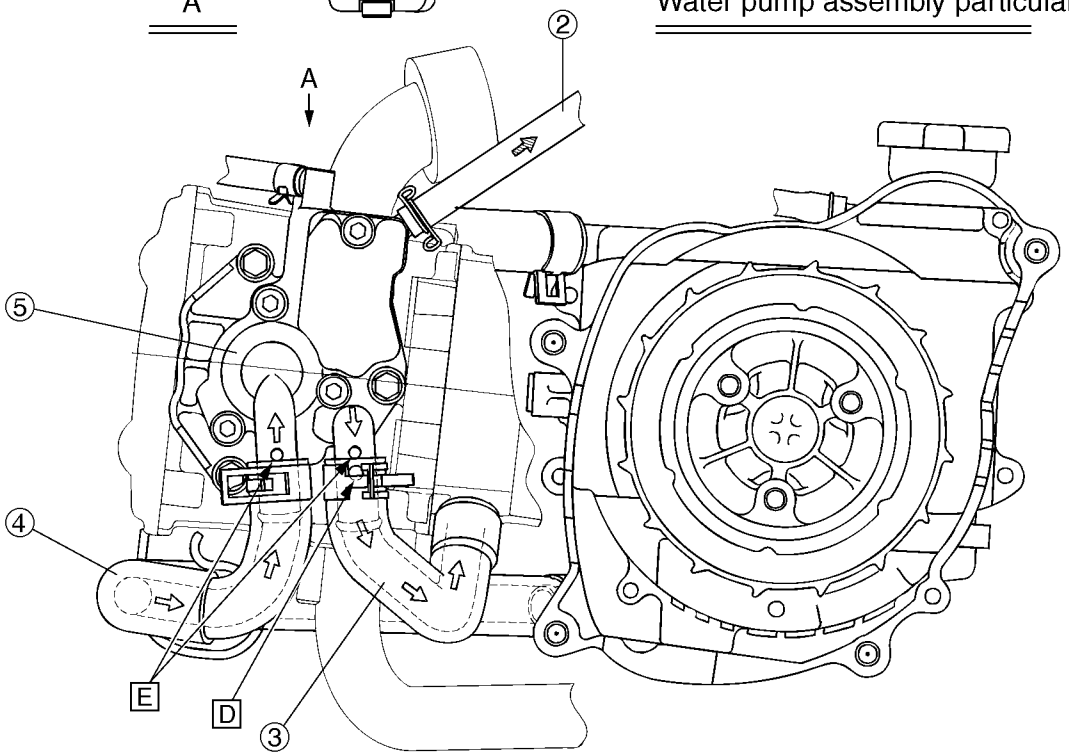


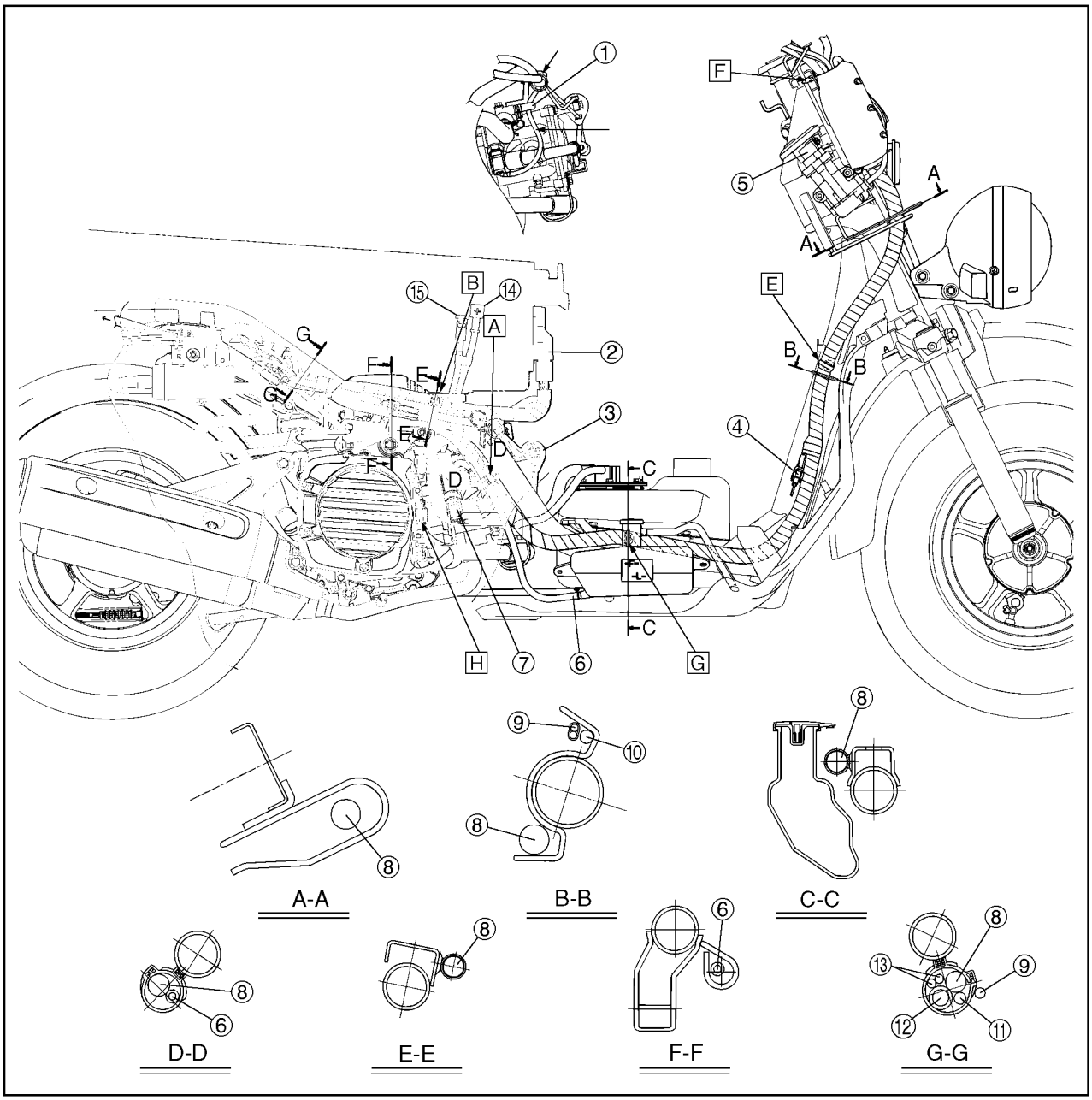
Water pump assembly particular



EAS00035

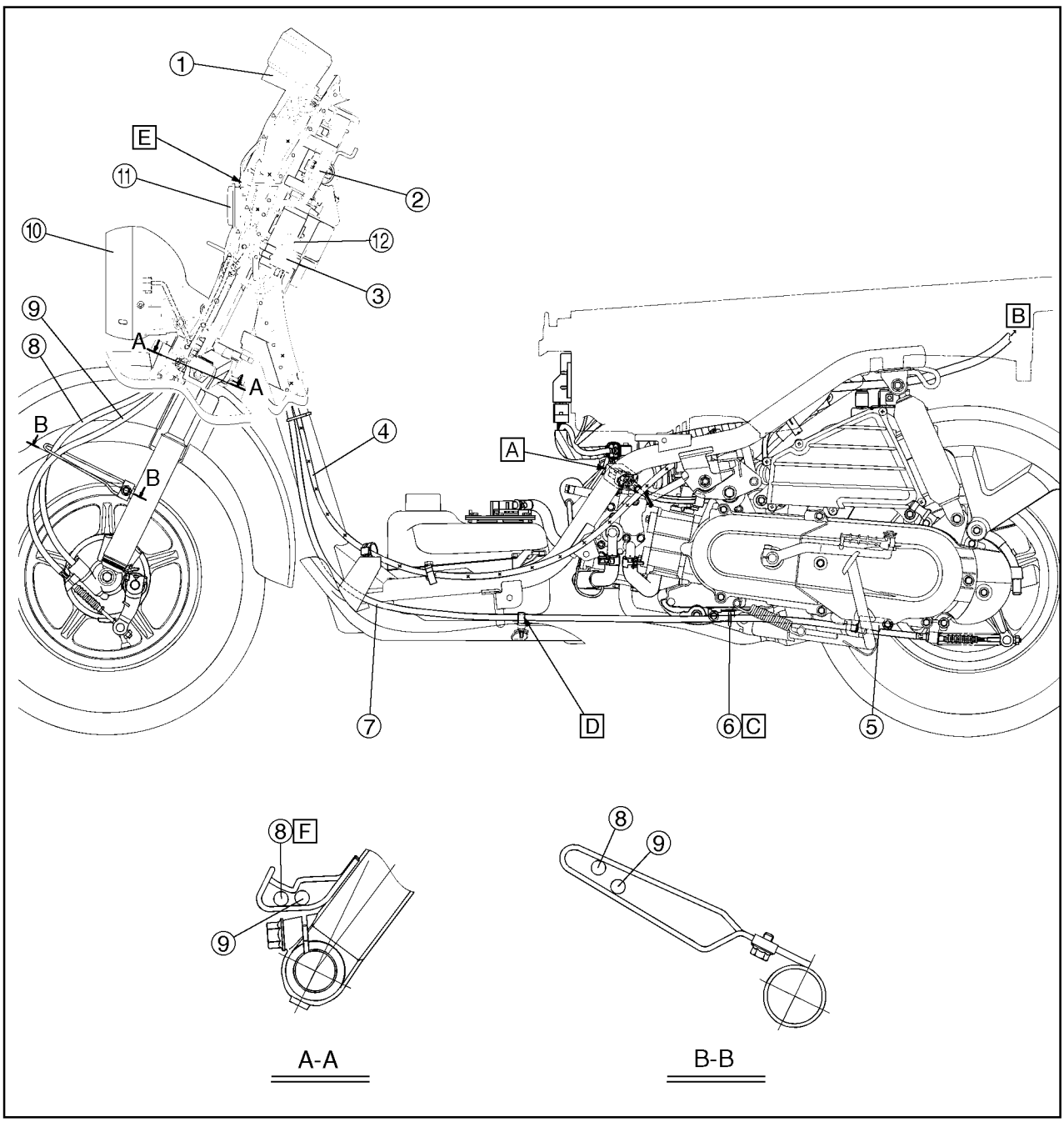
CABLE ROUTING

① Hose3
② ECU
③ Ignition coil
④ Sidestand switch lead
⑤ Main switch
⑥ Hose
⑦ Coolant temperature sensor
⑧ Wiring harness
⑨ Throttle cable kit
⑩ Rear brake cable
⑪ AC magneto lead
⑫ Hose5
⑬ Starter motor lead
⑭ Battery positive lead
⑮ Wire lead cover
[A] Assemble cramp on the T-stud at the right of back stay.
[B] Install the protruding part of cable strap of electrical wire harmess Ass'y on the hole of box bracket 1.
[C] Install crap on the hols of stay 1.
[D] Penetrate thermo unit lead through the rear of hose 3.
[E] Install the protruding part of cable strap of electrical wire harmess Ass'y on the hole of down tube 1.
[F] Fix connector cover on the head light stay.
[G] Install the protruding part of cable strap of electrical wire harmess Ass'y on the hole of fuel tank bracket 2.
[H] Connect AC magnet lead on the cramp of fan case 1.

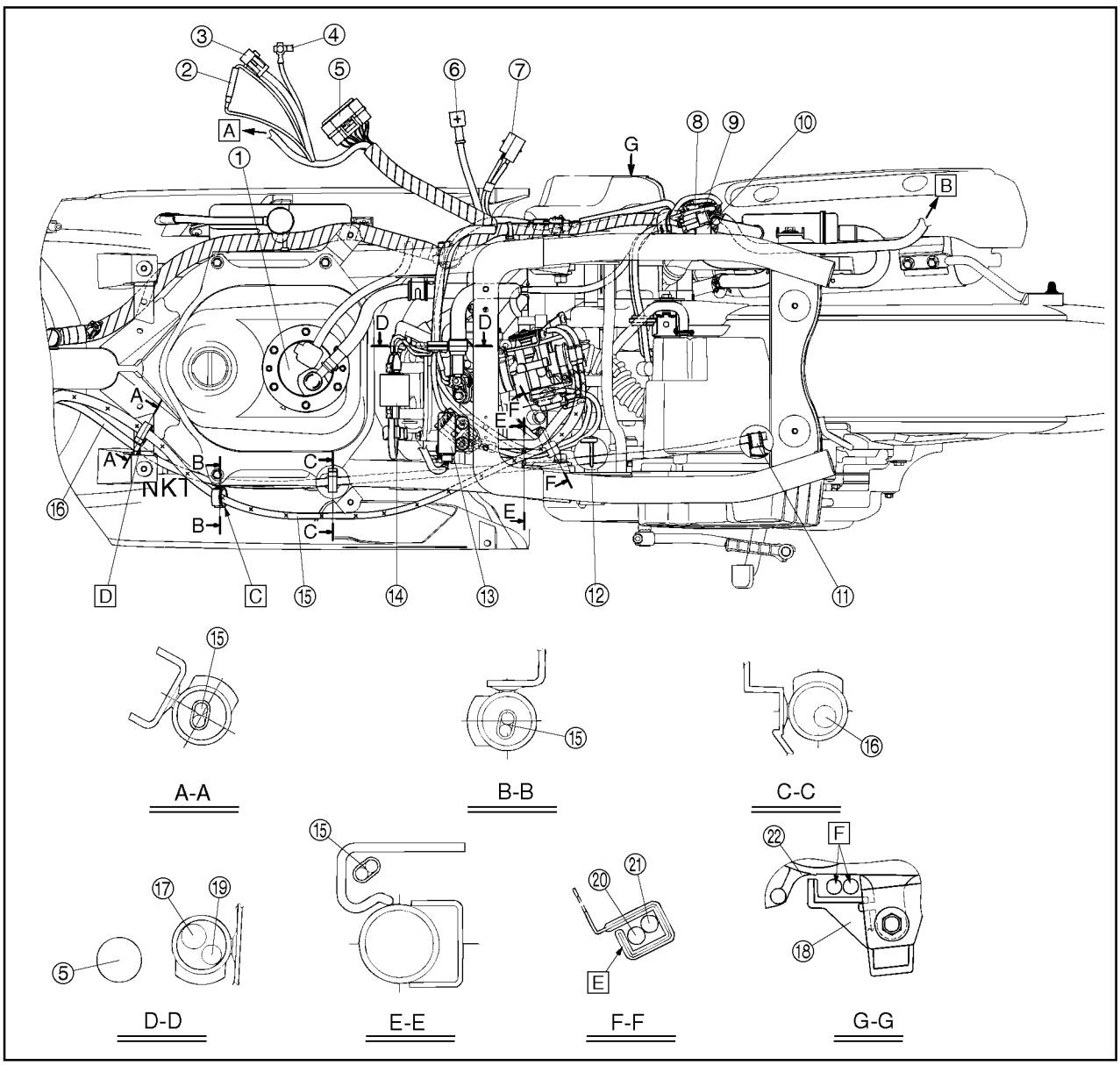


① Speedometer
② Rectifier/Regulator
③ Turn signal relay
④ Throttle cable Ass'y
⑤ Holder
⑥ Cable holder
⑦ Rear brake cable
⑧ Speedometer cable
⑨ Front brake cable
⑩ Headlight
⑪ Horn
⑫ Starting circuit cut-off relay

[A] After wiring the cover, cover the coupler.
[B] Enter tail/brake light.
[C] After fixing the rear brake cable, fix crank case 1. When locking, make sure that the stopper at the front of holder touches the position of crank case 1.
[D] After fixing the rear brake cable, install the protruding part of cramp on the hole of under cover.
[E] Install the horn of coupler accotding to the direction shown in the drawing, and make sure that it is not loosen easily.
[F] Penetrate through the speed meter cable.

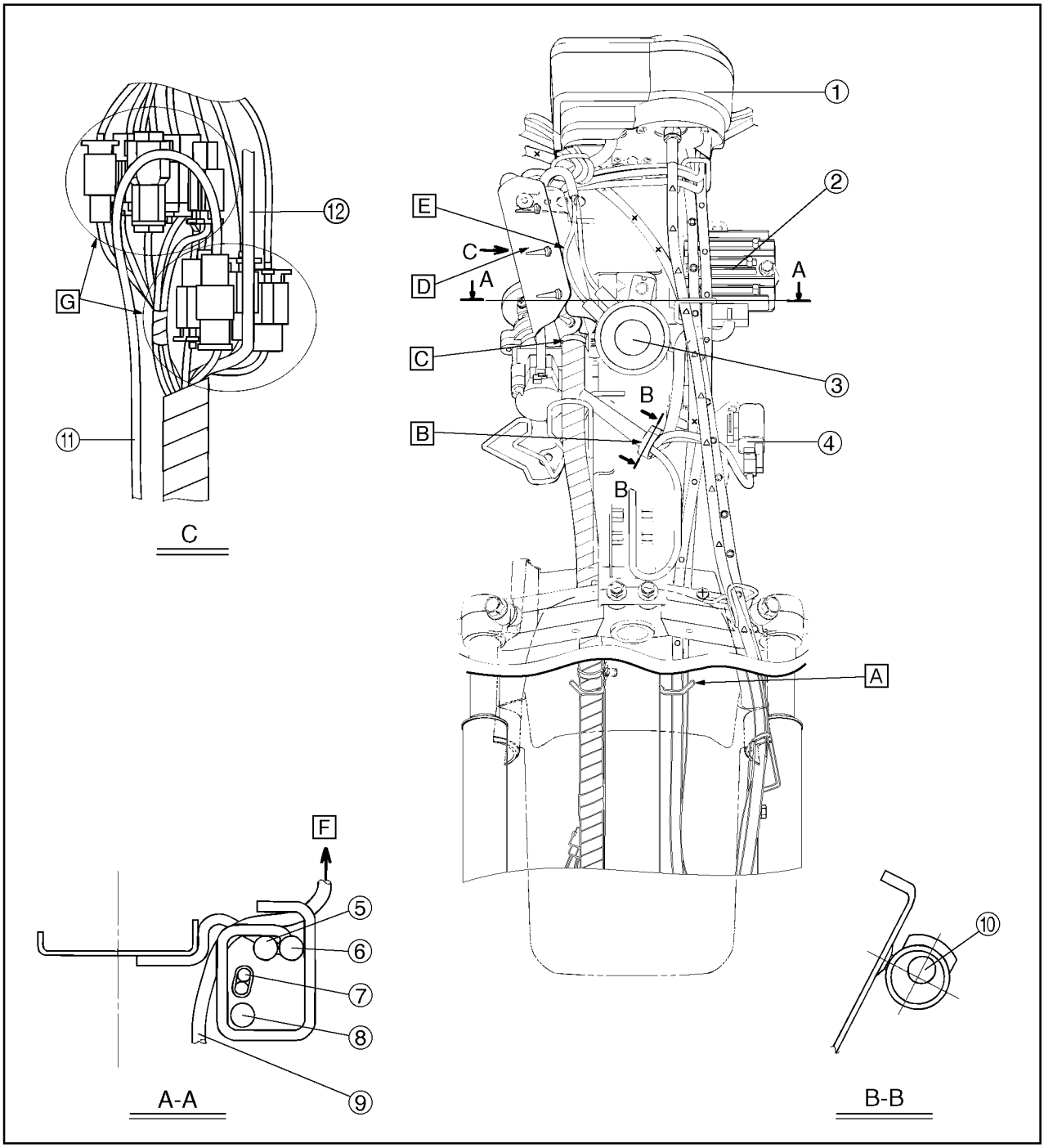


① Fuel pump
② FI diagnostic tool connector
③ Fuse box
④ Battery negative lead
⑤ ECU lead
⑥ Battery positive lead
⑦ Starter relay
⑧ AC magneto lead
⑨ Tail/brake light lead
⑩ Starter motor lead
⑪ Holder
⑫ Cable holder
⑬ Lean angle cut-off switch
⑭ Ignition coil
⑮ Throttle cable Ass'y
⑯ Rear brake cable
⑰ Wiring harness
⑱ Rear fender
⑲ Fuel injector lead
⑳ Sub-wire harness lead
㉑ ISC(idle speed control) valve lead
㉒ Crankcase2
[A] Enter slant angle of sensor.
[B] Enter tail/brake light.
[C] Fix throttle cable Ass'y. Install the protruding part of cramp on the hole of fuel tank bracket.
[D] Fix throttle cable Ass'y. Install the protruding part of cramp on the hole of foot rest bracket.
[E] Put the idle speed control lead and wire sub lead in, and then close the cramp.
[F] Wire the starting device of the rear fender of rear motor lead and crank case 2. Do not clip the lead in.

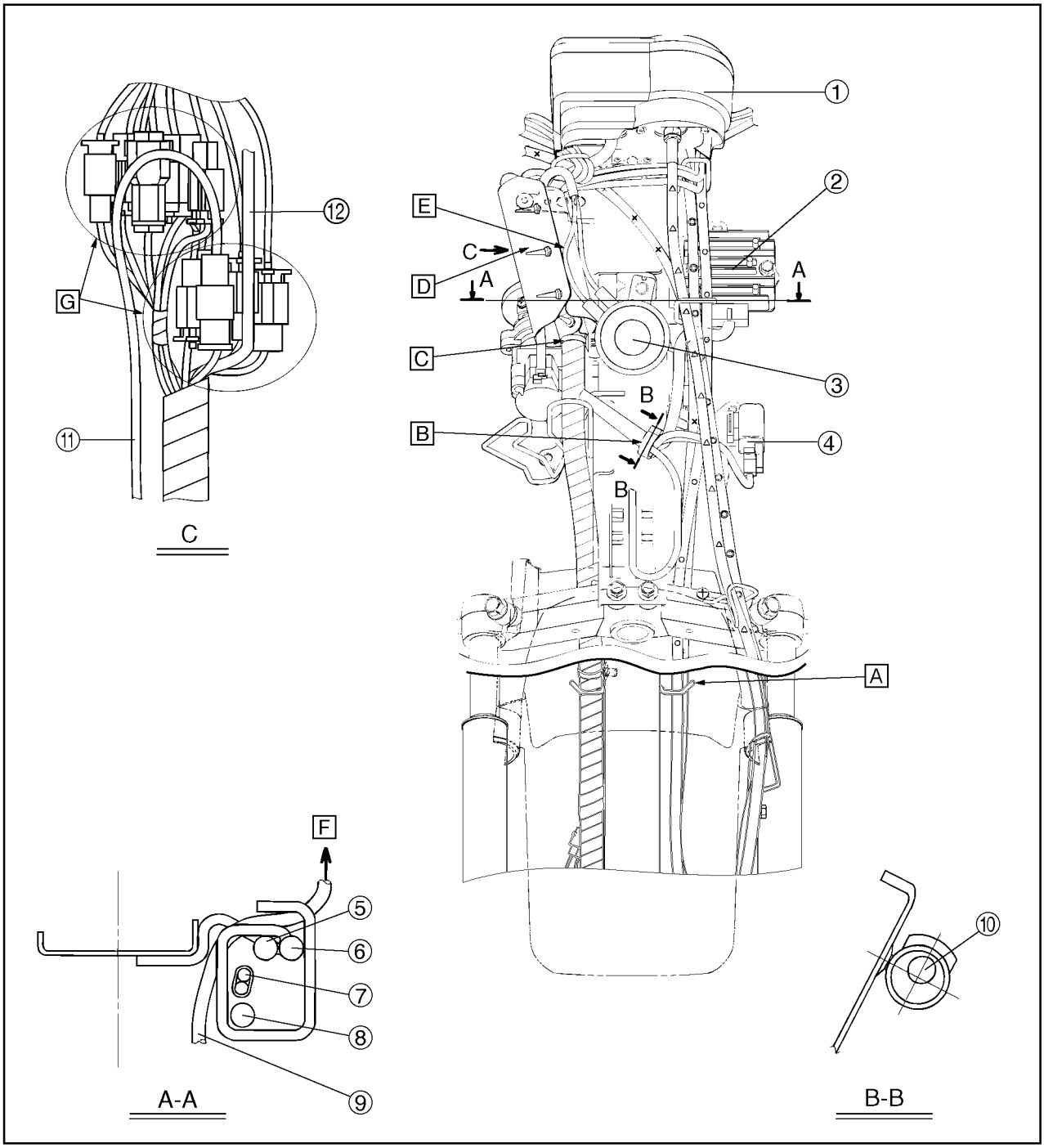


① Speedometer
② Rectifier/Regulator
③ Horn
④ Turn signal relay
⑤ Front brake cable
⑥ Rear brake cable
⑦ Throttle cable Ass'y
⑧ Speedometer cable
⑨ Rectifier/Regulator lead
⑩ Wiring harness
⑪ Main switch lead
⑫ Horn lead

[A] Penetrate the rear brake cable and throttle cable through the left side of car body.
[B] Make sure to install the cramp on the head light stay.
[C] Install the protruding part of cable strap of electrical wire harmess Ass'y on the hole of head light stay.
[D] Penetrate the main switch Comp. Lead into the connector cover.
[E] Penetrate horn cable through the connector cover without sticking out horn cable.
[F] Enter rectifier and regulator Ass'y.

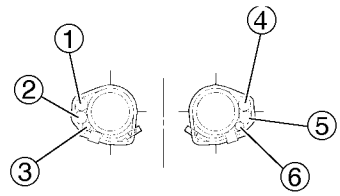


[G] Let the left and right flasher lights, meter, and right lead wire of handle bar switch to face upward, let the main switch, front and rear brake switchand left lead wire of handle bar switch to face downward, connect to the coupler, and then store in the connector cover.



① Turn signal light lead(right)
② Handlebar switch lead(right)
③ Front brake light switch lead
④ Turn signal light lead(left)
⑤ Handlebar switch lead(left)
⑥ Rear brake light switch
⑦ Throttle cable Ass'y
⑧ Front brake cable
⑨ Rear brake cable
⑩ Backward screw
⑪ Forward screw

[A] Penetrate the rear brake cable and throttle cable through the left side of car body.
[B] Make sure to install the cramp on the head light stay.
[C] Install the protruding part of cable strap of electrical wire harmess Ass'y on the hole of head light stay.
[D] Penetrate the main switch Comp. Lead into the connector cover.
[E] Penetrate horn cable through the connector cover without sticking out horn cable.
[F] Enter rectifier and regulator Ass'y.
[G] First, tighting the backward screw and tighting the forward screw.



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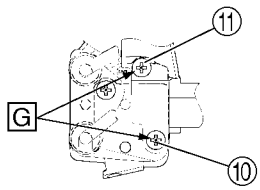

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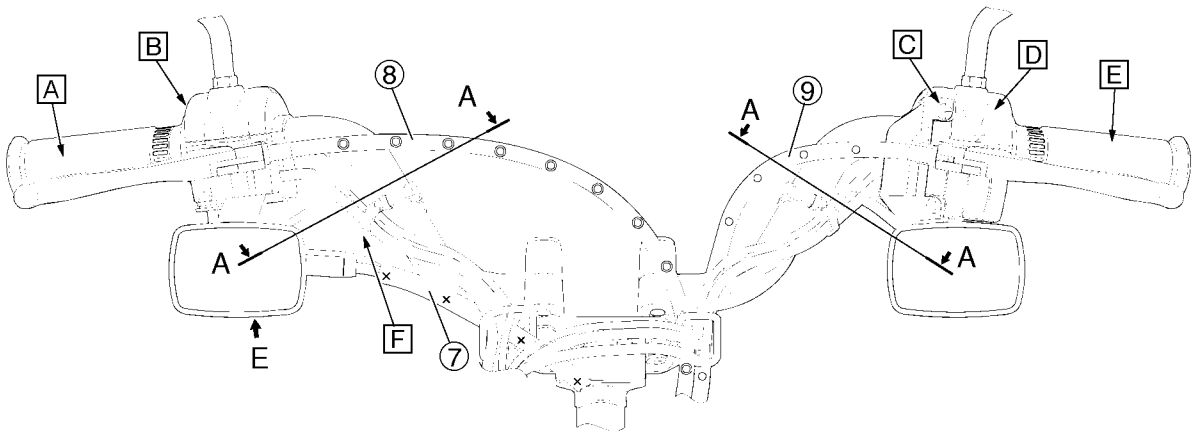

CHAPTER 3
PERIODIC CHECKS AND ADJUSTMENTS

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PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

NOTE:

The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.

From 30,000 km, repeat the maintenance intervals starting from 6,000 km.

Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

PERIODIC MAINTENANCE AND MINOR REPAIR

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

NO.		ITEM	ROUTINE	INITIAL	ODOMETER READING				
				600 mi (1,000 km) or 1 month	2,000 mi (4,000 km) or 6 months	4,000 mi (7,000 km) or 12 months	6,000 mi (10,000 km) or 18 months	8,000 mi (13,000 km) or 24 months	10,000 mi (16,000 km) or 30 months
1	*	**Fuel line**	• Check fuel and vacuum hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2		**Spark plug**	• Check condition. • Adjust gap and clean. • Replace at 4000 mi (7000 km) or 12 months and thereafter every 4000 mi (6000 km) or 12 months.		√	Replace.	√	Replace.	√
3	*	**Valve clearance**	• Check and adjust valve clearance when engine is cold.	√	Every 6000 mi (10000 km)				
4	*	**Crankcase breather system**	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5	*	**Fuel injection**	• Check engine idle speed.	√	√	√	√	√	√
6	*	**Exhaust system**	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		√	√	√	√	√
7	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts.		√	√	√	√	√

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

GENERAL MAINTENANCE AND LUBRICATION CHART

NO.		ITEM	ROUTINE	INITIAL	ODOMETER READING				
				600 mi (1,000 km) or 1 month	2,000 mi (4,000 km) or 6 months	4,000 mi (7,000 km) or 12 months	6,000 mi (10,000 km) or 18 months	8,000 mi (13,000 km) or 24 months	10,000 mi (16,000 km) or 30 months
1	*	Air filter element	• Replace.		√	√	√	√	√
2	*	Front brake	• Check operation. • Adjust cable and replace brake shoes if necessary.	√	√	√	√	√	√
3	*	Rear brake	• Check operation. • Adjust cable and replace brake shoes if necessary.	√	√	√	√	√	√
4	*	Wheels	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
5	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
6	*	Wheel bearings	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
7	*	Steering bearings	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease every 8000 mi (13000 km) or 24 months.	√	√	√	√	Repack.	√
8	*	Chassis fasteners	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
9		Front and rear brake lever pivot	• Apply lithium-soap-based grease (all-purpose grease) lightly.		√	√	√	√	√
10		Centerstand	• Check operation. • Lubricate.		√	√	√	√	√
11	*	Front fork	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
12	*	Shock absorber assembly	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
13		Engine oil	• Change (warm engine before draining). • Check oil level and vehicle for oil leakage.	√	√	√	√	√	√
14		Engine oil strainer	• Clean.	√		√		√	
15	*	Cooling system	• Check coolant level and vehicle for coolant leakage.		√	√	√	√	√
			• Change.	Every 3 years					
16		Final transmission oil	• Check vehicle for oil leakage. • Change.	√		√		√	
17	*	V-belt	• Replace.	Every 6250 mi (10000 km)					
18	*	Front and rear brake switches	• Check operation.	√	√	√	√	√	√
19	*	Control and meter cables	• Apply Yamaha chain and cable lube or engine oil 10W-30 thoroughly.	√	√	√	√	√	√
20	*	Throttle grip housing and cable	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.		√	√	√	√	√
21	*	Lights, signals and switches	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE:

From 12000mi(19000km) or 36 months, repeat the maintenance intervals starting from 4000mi(7000km) or 12 months.

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NOTE:

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

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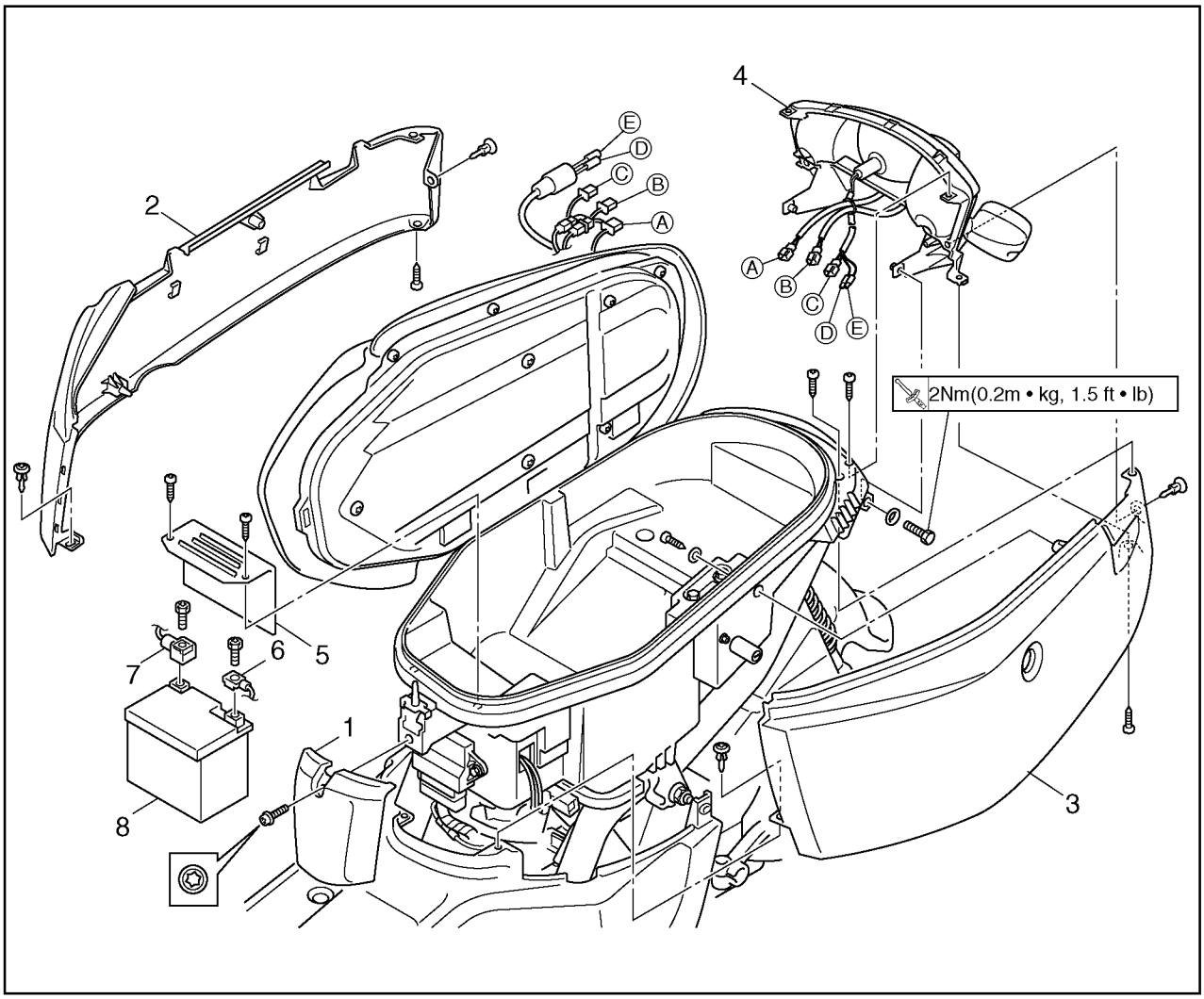
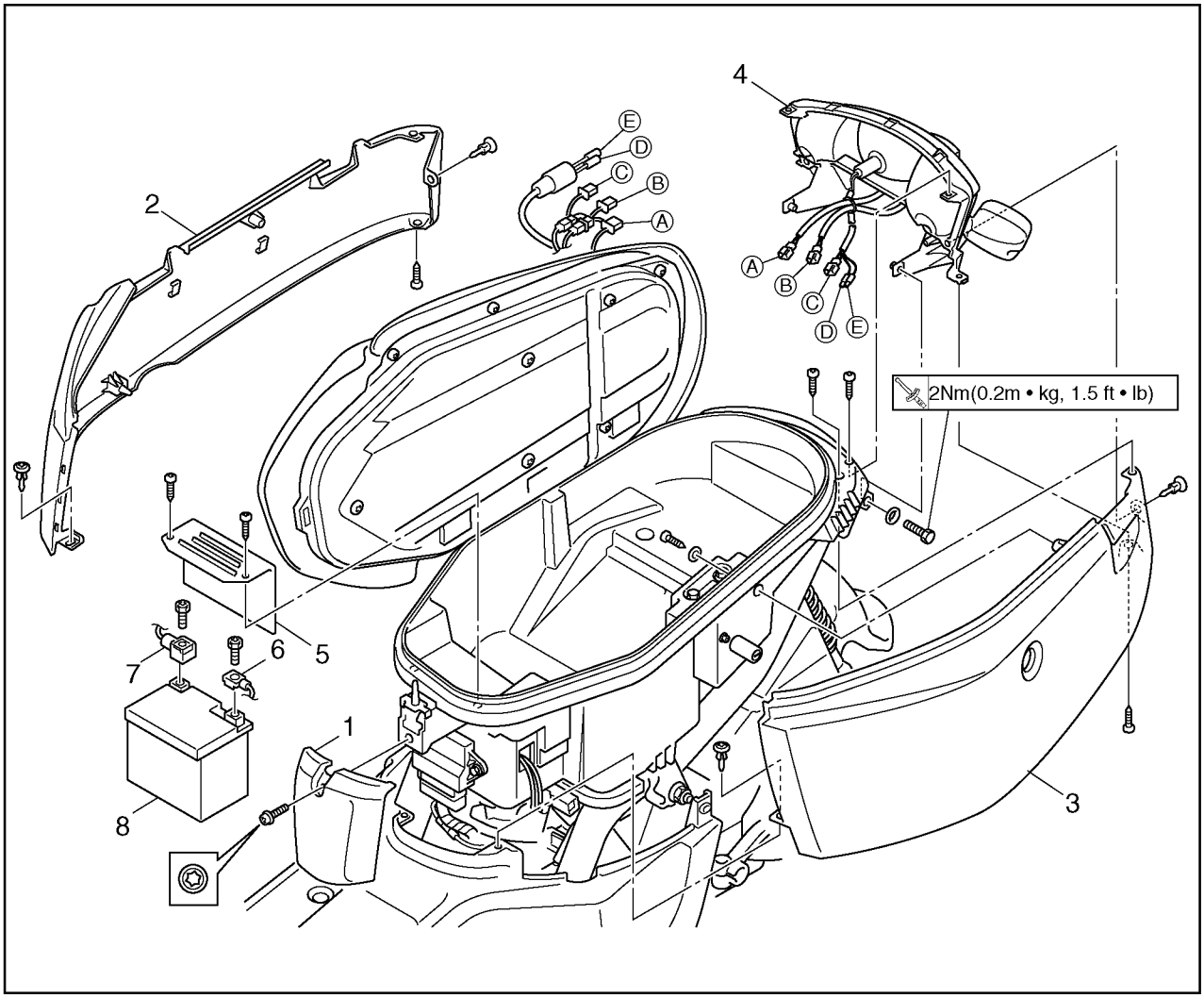
COVER AND PANEL

SIDE COVERS AND TAIL/BRAKE LIGHT

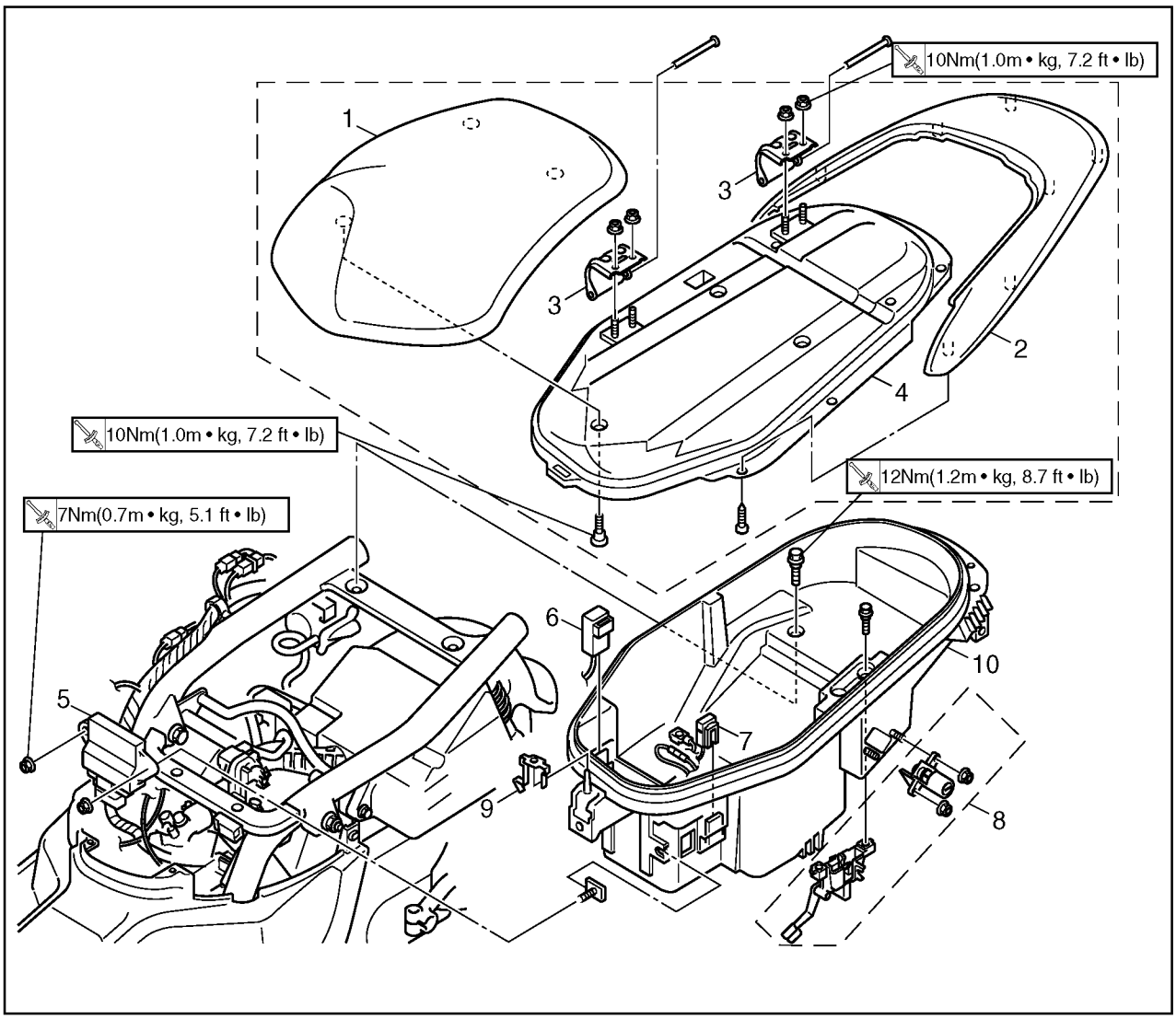


Order	Job/Part	Q'ty	Remarks
	Removing the side covers and tail/brake light		Remove the parts in the order listed.
1	Front cover	1	
2	Side cover(left)	1	
3	Side cover(right)	1	
4	Tail/brake and rear turn signal light(left and right)	1	
5	Battery cover	1	
6	Battery negative lead	1	**CAUTION:**
7	Battery positive lead	1	**● First, disconnect the negative battery lead, and then the positive battery lead.**
8	Battery	1	**● After installing the battery be sure to turn the main switch from "ON" to "OFF" three times in 3 seconds intervals to initialize the idle speed**



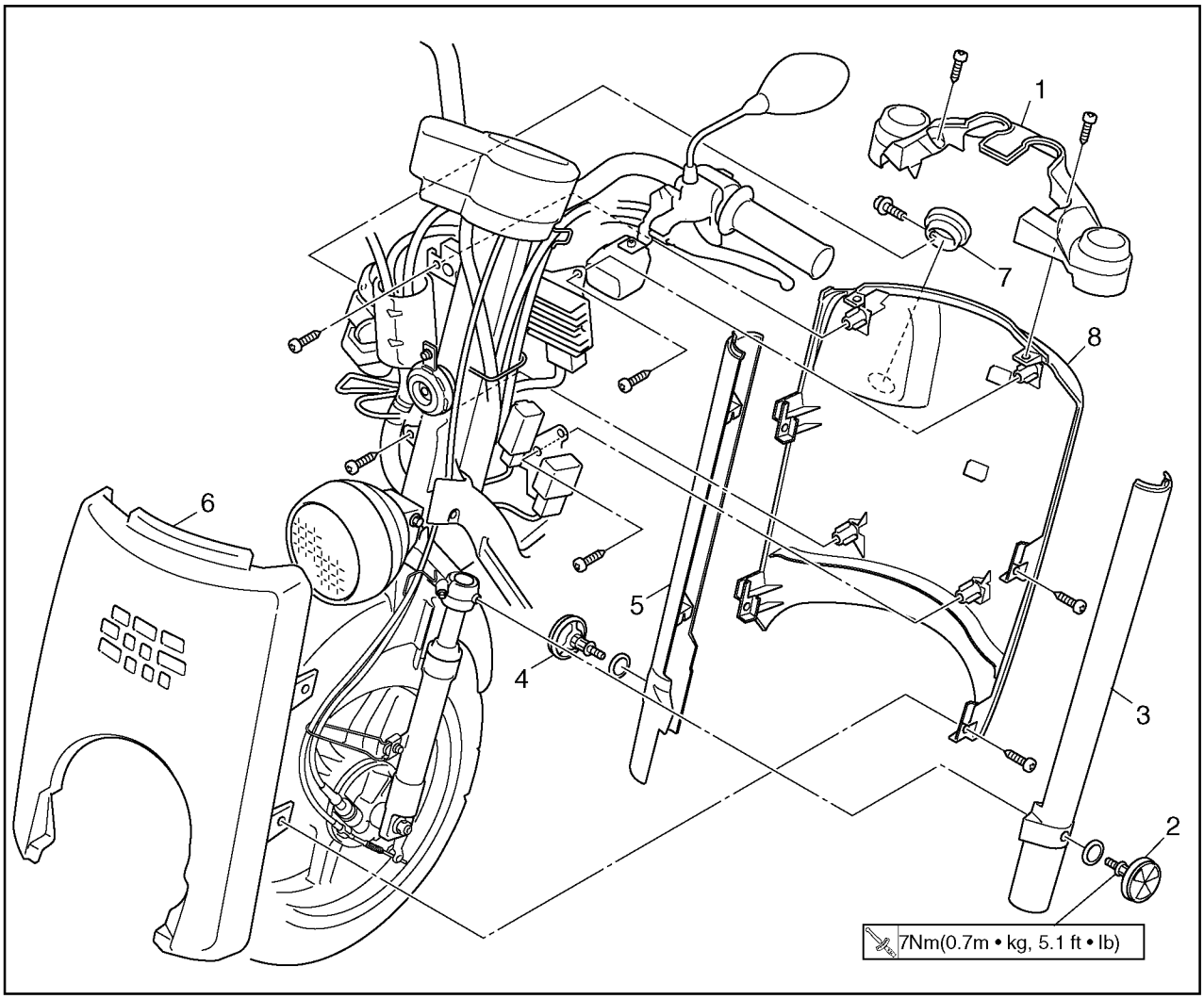
Order	Job/Part	Q'ty	Remarks
			control system. For installation, reverse the removal procedure.

SINGLE SEAT AND TRUNK



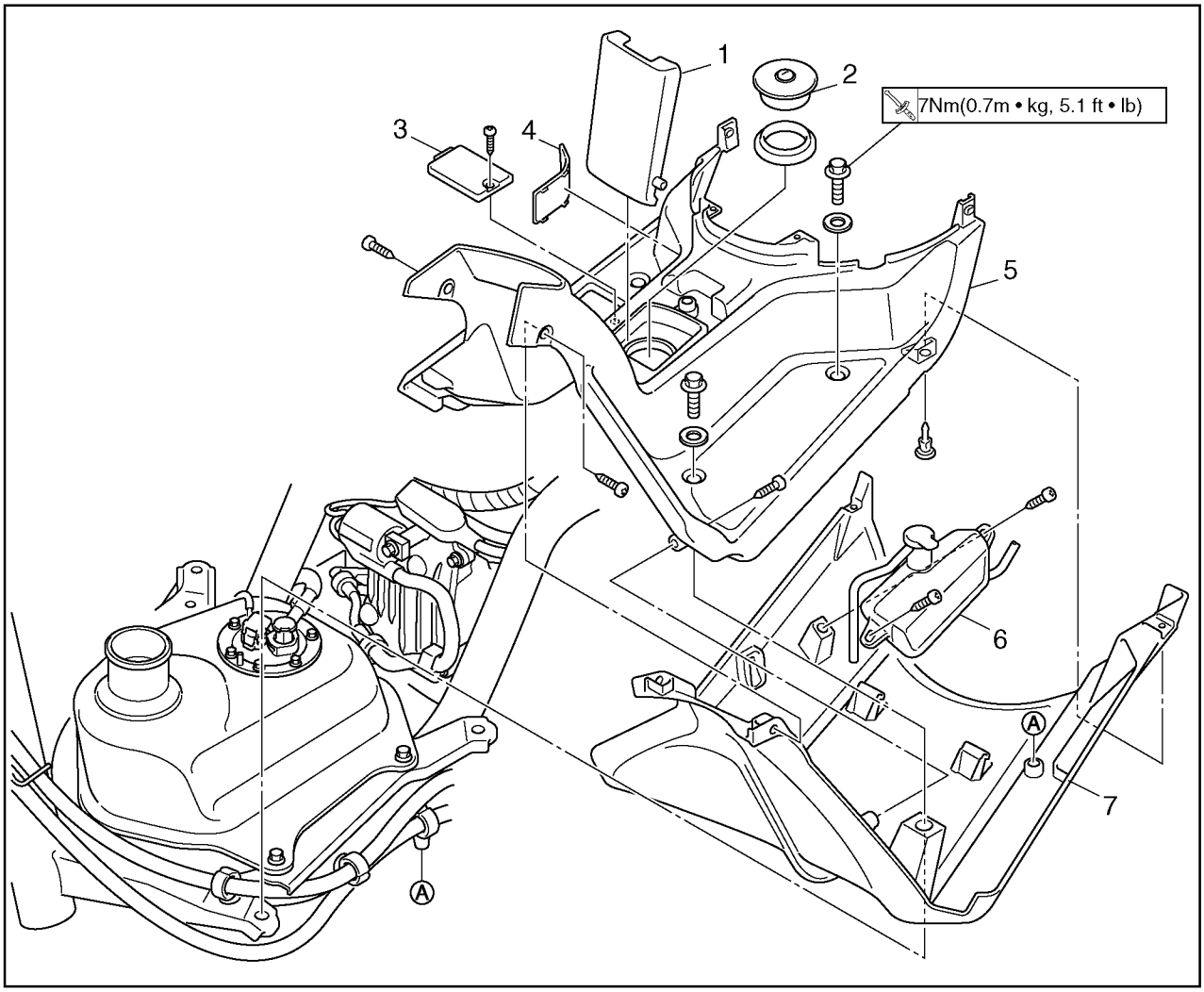
Order	Job/Part	Q'ty	Remarks
	Removing the single seat and trunk		Remove the parts in the order listed.
	Side cover(left and right)		Refer to "SIDE COVERS AND TAIL/ BRAKE LIGHT".
1	Single seat	1	
2	Single seat upper cover	1	
3	Bottom plate	2	
4	Frame(single seat)	1	
5	ECU	1	Disconnect.
6	Starter relay	1	Disconnect.
7	Main fuse	1	Disconnect.
8	Single seat lock assembly	1	
9	Helmet holder	1	
10	Trunk	1	
			For installation, reverse the removal procedure.

LEG SHIELD1,2



Order	Job/Part	Q'ty	Remarks
	Removing the leg shield1,2		Remove the parts in the order listed.
1	Front fork upper cover	1	**NOTE:**
2	Reflector(left)	1	Caution, do not damage the claw while
3	Front fork cover(left)	1	removing.
4	Reflector(right)	1	
5	Front fork cover(right)	1	
6	Leg shield1	1	
7	Main switch cover	1	
8	Leg shield2	1	
			For installation, reverse the removal procedure.

FOOTREST BOARD AND INNER FENDER



Order	Job/Part	Q'ty	Remarks
	Removing the footrest board and inner fender		Remove the parts in the order listed.
	Single seat/trunk		Refer to "SINGLE SEAT AND TRUNK ".
1	Fuel tank cap cover	1	
2	Fuel tank cap	1	**NOTE:**
3	Coolant reservoir cap cover	1	When installing the fuel tank cap, align it
4	Panel	1	cap end and the mark on the car body.
5	Footrest board	1	
6	Coolant reservoir	1	Disconnect.
7	Inner fender	1	
			For installation, reverse the removal procedure.

EAS00049

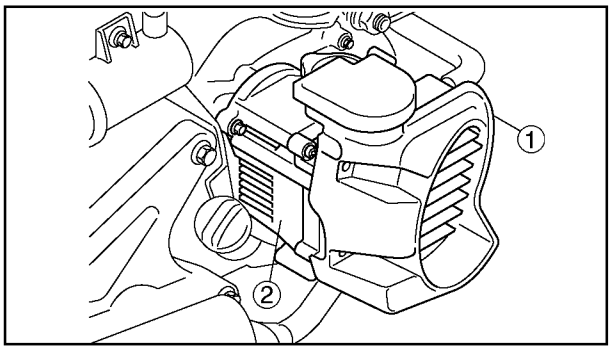
ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

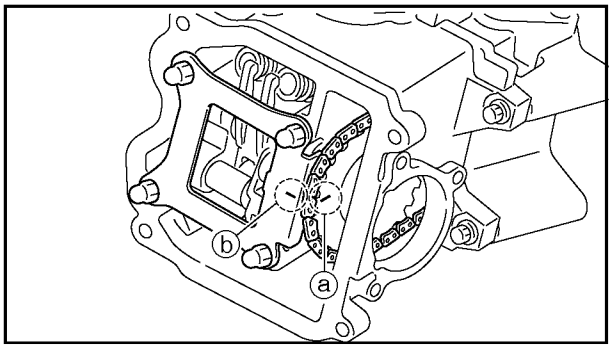
NOTE:

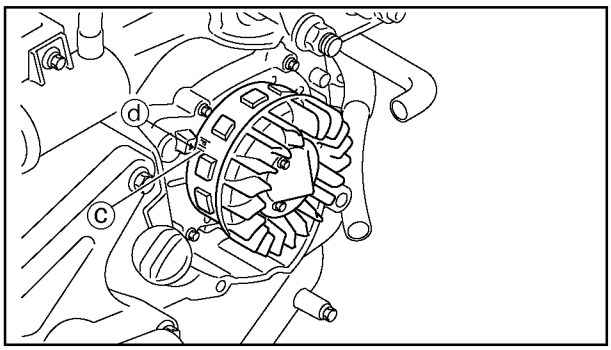
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

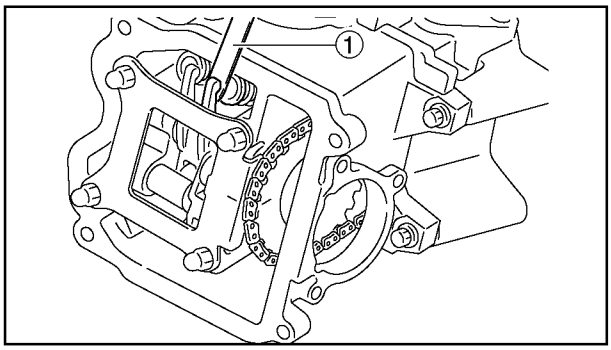


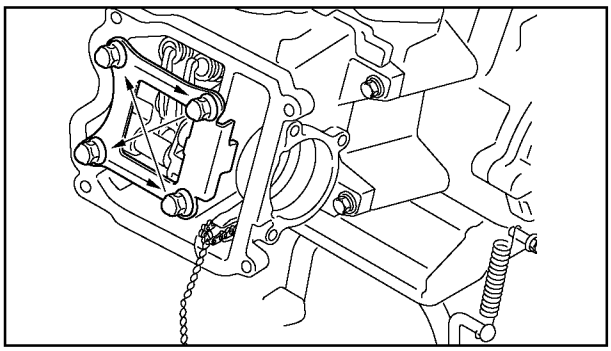
1. Remove:
   - front cover
   - side cover(left and right)
   - battery /battery cover
   - single seat/trunk
   - footrest board
   - Refer to"COVER AND PANEL".
2. Drain:
   - coolant
     (completely from the radiator)
3. Remove:
   - radiator cover①
   - radiator
   - fan case②
     Refer to"RADIATOR"in chapter 6.
4. Remove:
   - spark plug cap
   - spark plug
   - ignition coil
   - cylinder head cover
5. Remove:
   - water pump
     Refer to"WATER PUMP"in chapter 6.
6. Measure:
   - valve clearance
     Out of specification → Adjust.

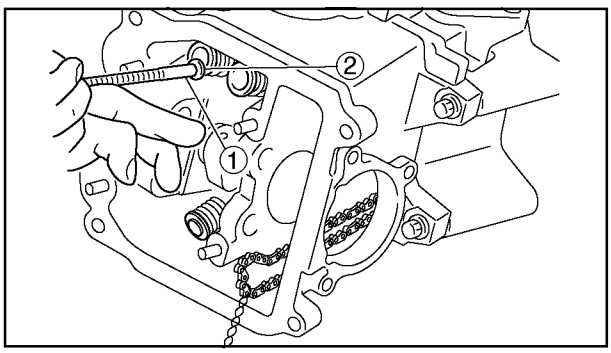
Valve clearance (cold)
Intake valve
0.10 ~ 0.16mm(0.0039 ~ 0.0063in)
Exhaust valve
0.18 ~ 0.24mm(0.0071 ~ 0.0094in)











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a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the punch mark ⓐ in the camshaft sprocket with the stationary ⓑ on the plate.
c. Align the TDC mark ⓒ on the AC magneto rotor with the stationary pointer ⓓ on the crankcase cover.
d. Measure the valve clearance with a thickness gauge ①.
   Out of specification → Adjust.

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7. Adjust:
   valve clearance

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a. Remove the timing chain tensioner and camshaft sprocket.
b. Remove the head nuts, bolts and plate.
c. Remove the rocker arm shaft, rocker arm and collar.
d. Remove the valve pad② with a magnetic bar①.

NOTE:

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve pad so that they can be installed in the correct place.

e. Select the proper valve pad from the following table.

Valve pad thickness range		Available valve pads
Nos. 120 ~ 240	1.20 (0.0472in) ~ 2.40 mm (0.0945 in)	25 thicknesses in 0.05 mm (0.002 in) increments

f. Round off the original valve pad number according to the following table.

Last digit	Rounded value
0 or 2	0
5	5
8	10

EXAMPLE:
Original valve pad number =148(thickness =1.48mm(0.0583in))

Rounded value =150

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

NOTE:
The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

h. Install the new valve pad .

NOTE:
- Lubricate the valve pad with molybdenum disulfide oil.
- Install the valve pad in the correct place.

i. Install the rocker arm, collar and rocker arm shaft.
j. Install the plate and cylinder head nuts

10Nm(1.0m • kg, 7.2ft • lb)

k. Install the cylinder head bolts .

10Nm(1.0m • kg, 7.2ft • lb)

l. Install the camshaft sprocket.

30Nm(3.0m • kg, 21.7ft • lb)

m. Install the timing chain tensioner and gasket.

9Nm(0.9m • kg, 6.5ft • lb)

n. Install the timing chain tensioner spring and cap bolt .

	8Nm(0.8m • kg, 5.8ft • lb)

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

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INTAKE

MEASURED CLEARANCE	ORIGINAL VALVE PAD NUMBER ↓																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00~0.04			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.05~0.09		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.10~0.16																									
0.17~0.21	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
➡ 0.22~0.26	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.27~0.31	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.32~0.36	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.37~0.41	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.42~0.46	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.47~0.51	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.52~0.56	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.57~0.61	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.62~0.66	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.67~0.71	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.72~0.76	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.77~0.81	185	190	195	200	205	210	215	220	225	230	235	240													
0.82~0.86	190	195	200	205	210	215	220	225	230	235	240														
0.87~0.91	195	200	205	210	215	220	225	230	235	240															
0.92~0.96	200	205	210	215	220	225	230	235	240																
0.97~1.01	205	210	215	220	225	230	235	240																	
1.02~1.06	210	215	220	225	230	235	240																		
1.07~1.11	215	220	225	230	235	240																			
1.12~1.16	220	225	230	235	240																				
1.17~1.21	225	230	235	240																					
1.22~1.26	230	235	240																						
1.27~1.31	235	240																							
1.32~1.36	240																								

VALVE CLEARANCE(cold):
0.10~0.16mm(0.0039~0.0063in)
Example:175 pad is installed
Measured clearance is 0.24mm(0.0094in)
Replace pad 175 with pad 185
Pad number: (example)
Pad No.175=1.75mm(0.0689in)
Pad No.185=1.85mm(0.0728in)

EXHAUST

MEASURED CLEARANCE	ORIGINAL VALVE PAD NUMBER ↓																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00~0.02					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.03~0.07				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.08~0.12			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.13~0.17		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.18~0.24																									
0.25~0.29	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
➡ 0.30~0.34	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.35~0.39	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.40~0.44	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.45~0.49	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.50~0.54	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.55~0.59	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.60~0.64	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.65~0.69	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.70~0.74	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.75~0.79	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.80~0.84	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.85~0.89	185	190	195	200	205	210	215	220	225	230	235	240													
0.90~0.94	190	195	200	205	210	215	220	225	230	235	240														
0.95~0.99	195	200	205	210	215	220	225	230	235	240															
1.00~1.04	200	205	210	215	220	225	230	235	240																
1.05~1.09	205	210	215	220	225	230	235	240																	
1.10~1.14	210	215	220	225	230	235	240																		
1.15~1.19	215	220	225	230	235	240																			
1.20~1.24	220	225	230	235	240																				
1.25~1.29	225	230	235	240																					
1.30~1.34	230	235	240																						
1.35~1.39	235	240																							
1.40~1.44	240																								

VALVE CLEARANCE(cold):
0.18~0.24mm(0.0071~0.0094in)
Example:175 pad is installed
Measured clearance is 0.32mm(0.0126in)
Replace pad 175 with pad 185
Pad number: (example)
Pad No.175=1.75mm(0.0689in)
Pad No.185=1.85mm(0.0728in)

8. Install:
   - all removed parts

NOTE:
For installation, reverse the removal procedure.

9. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to"CHANGING THE COOLANT".

EAS00054

CHECKING THE ENGINE IDLING SPEED

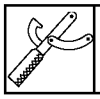
NOTE:

Prior to adjusting the engine idling speed, the air filter element should be clean, and the engine should have adequate compression.

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

   Refer to"FOOTREST BOARD AND INNER FENDER".
3. Connect:
   - digital circuit tester

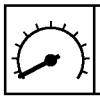
   (onto the spark plug lead of cylinder)



Digital circuit tester
90890-06760

4. Check:
   - engine idling speed

   Out of specification → Replace the throttle body assembly.



Engine idling speed
2000~2200r/min

5. Install:
   - panel

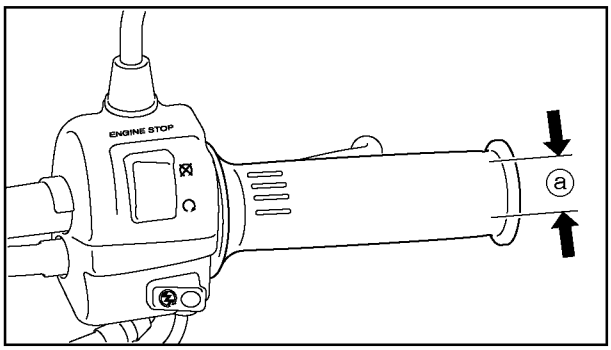
   Refer to"FOOTREST BOARD AND INNER FENDER".

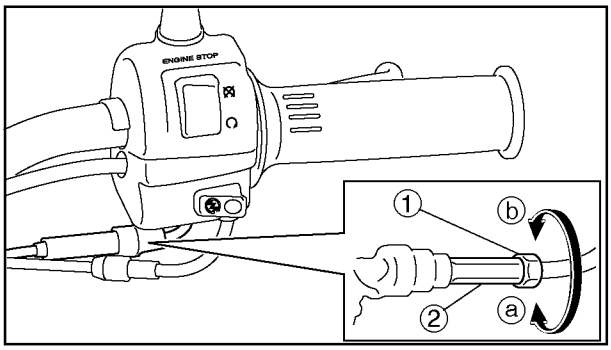
EAS00056

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

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





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

Throttle cable free play (at the flange of the throttle grip)
1.5~3.5mm (0.06~0.14in)

2. Adjust:
   - throttle cable free play

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Handlebar side

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

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

c. Tighten the locknut.

⚠WARNING

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

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EAS00060
CHECKING THE SPARK PLUG

1. Remove:
   - panel
     Refer to"FOOTREST BOARD AND INNER FENDER".
2. Disconnect:
   - spark plug cap

⚠WARNING

Remove the spark plug cap, the engine is extremely hot.

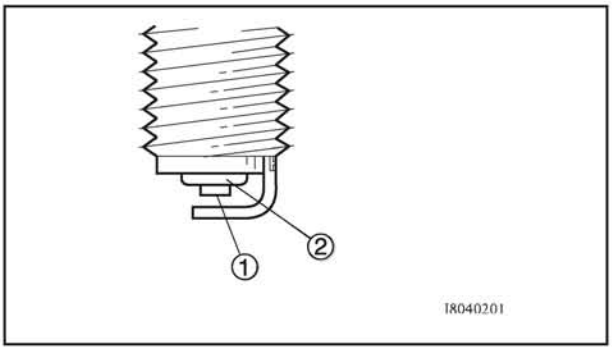
3. Remove:
   - spark plug

CAUTION:

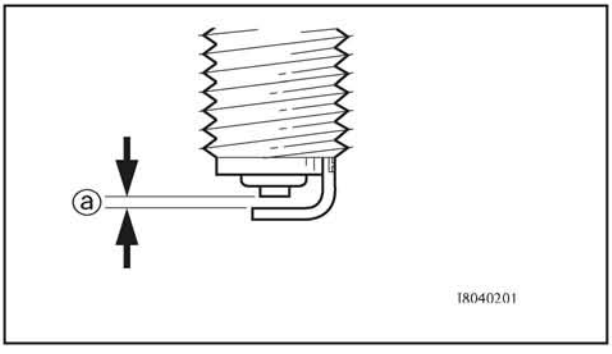
Before removing the spark plug, blow away any dirt accumulated in the spark plug well with compressed air to prevent it from falling into the cylinder.

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

Spark plug type (manufacturer)
CR7E(NGK)



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



7. Measure:
   - spark plug gap ⓐ
     (with a wire Thickness gauge)
     Out of specification → Regap.

Spark plug gap
0.7 ~0.8mm(0.028 ~0.031in)

8. Install:
   - spark plug

	13Nm(1.3m • kg, 9.4ft • lb)

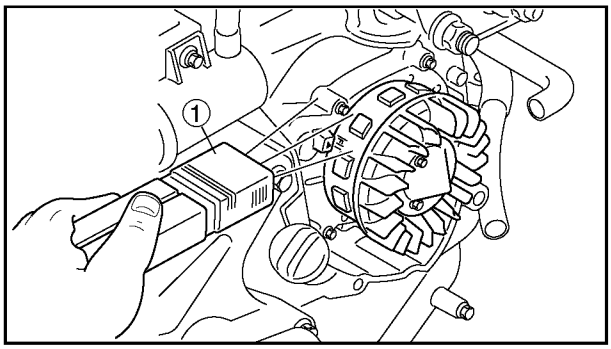
NOTE:
Before installing the spark plug, clean the spark plug and gasket surface.

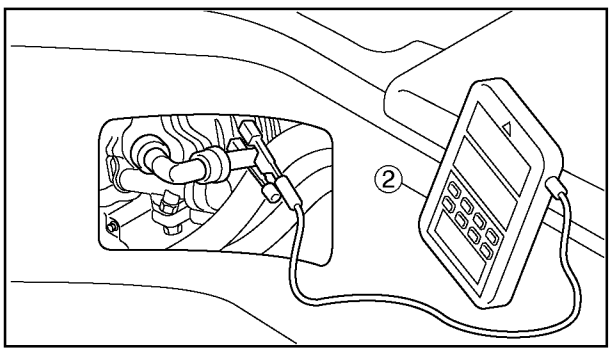
9. Connect:
   - spark plug cap
10. Install:
   - panel
     Refer to"FOOTREST BOARD AND INNER FENDER".

EAS00062
CHECKING THE IGNITION TIMING

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

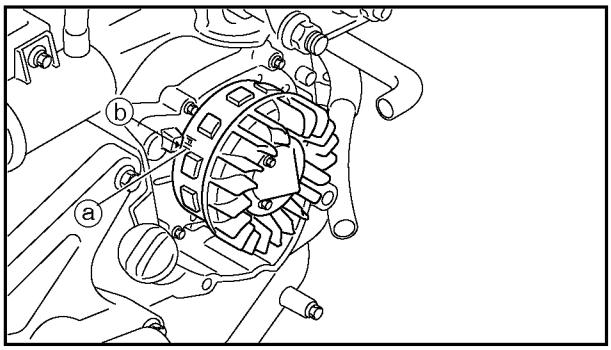
1. Remove:
   - front cover
   - side cover(left and right)
   - battery /battery cover
   - single seat/trunk
   Refer to"COVER AND PANEL".
2. Drain:
   - coolant
   (completely from the radiator)
3. Remove:
   - radiator cover
   - radiator
   - fan case
   Refer to"RADIATOR"in chapter 6.





4. Attach:
   - timing light ①
   - digital circuit tester②
   (onto the spark plug lead of cylinder)

Timing light
90890-03141
YU-03141
Digital circuit tester
90890-06760



5. Check:
   - ignition timing

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

	Engine idling speed **2000 ~ 2200r/min**

b. Check that the mark ⓐ on the AC magneto rotor is within the firing range ⓑ on the right crankcase cover.
   Incorrect firing range → Check the ignition system.

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NOTE:
The ignition timing is not adjustable.

6. Remove:
   - timing light
   - digital circuit tester
7. Install:
   - fan case
   - radiator
   - radiator cover
     Refer to"RADIATOR"in chapter 6.
8. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to"CHANGING THE COOLANT".
9. Install:
   - single seat/trunk
   - battery /battery cover
   - side cover(left and right)
   - front cover
     Refer to"COVER AND PANEL".

EAS00067

MEASURING THE COMPRESSION PRESSURE

NOTE:

Insufficient compression pressure will result in a loss of performance.

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

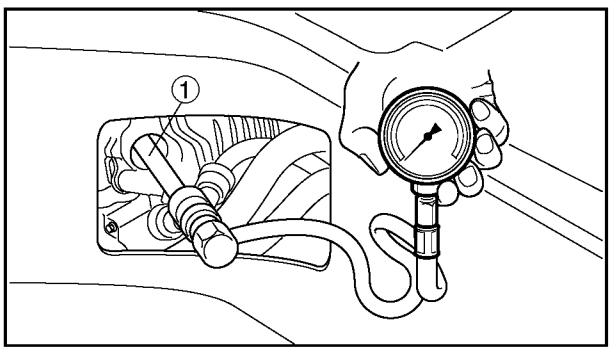
⚠WARNING

Remove the spark plug cap, the engine is extremely hot.

5. Remove:
   - spark plug

CAUTION:

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



6. Install:
   - compression gauge ①

Compression gauge
90890-03081
YU-33223

7. Measure:
   - compression pressure
     Out of specification → Refer to steps (c) and (d).

Compression pressure (at sea level)
Minimum
1262kPa(12.62kg/cm², 179.7psi)
Standard
1450kPa(14.5kg/cm², 206.5psi)
Maximum
1624kPa(16.24kg/cm², 231.3psi)

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

⚠WARNING

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

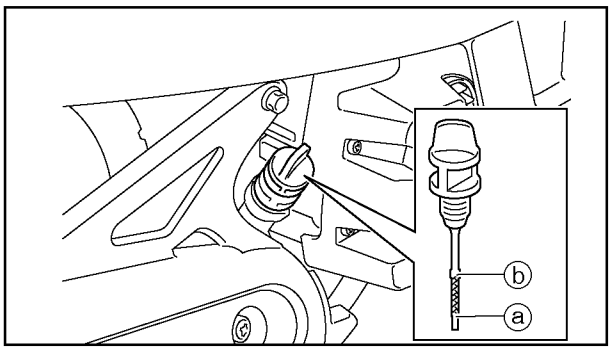
c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces, and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful engine of oil into the spark plug bore and measure again.
   Refer to the following table.

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

8. Remove:
   - compression gauge
9. Install:
   - spark plug

	13Nm(1.3m • kg9.4ft • lb)

10. Connect:
    - spark plug cap
11. Install:
    - panel
      Refer to"FOOTREST BOARD AND INNER FENDER".



EAS00069

CHECKING THE ENGINE OIL LEVEL

1. Stand the scooter on a level surface.

NOTE:

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

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

     The engine oil level should be between the minimum level mark ⓐ and maximum level mark ⓑ.

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

Recommended engine oil type
YAMALUBE 4, SAE10W30 or SAE20W40
Recommended engine oil grade
API service SG type or higher
JASO standard MA

CAUTION:

- **Do not allow foreign materials to enter the crankcase.**

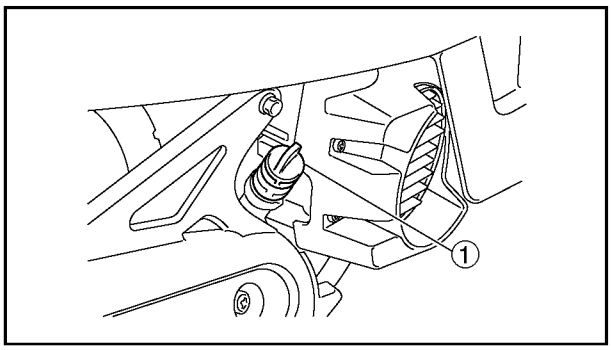
NOTE:

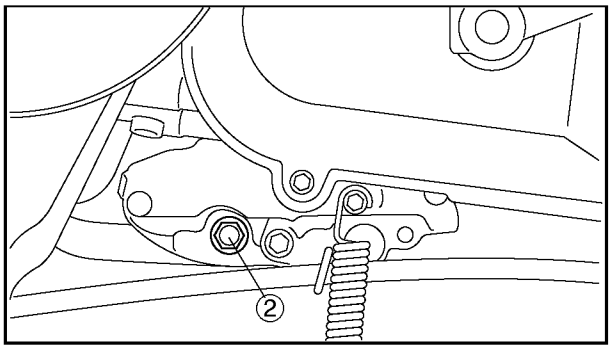
Before checking the engine oil level, wait a few minutes until the oil has settled.

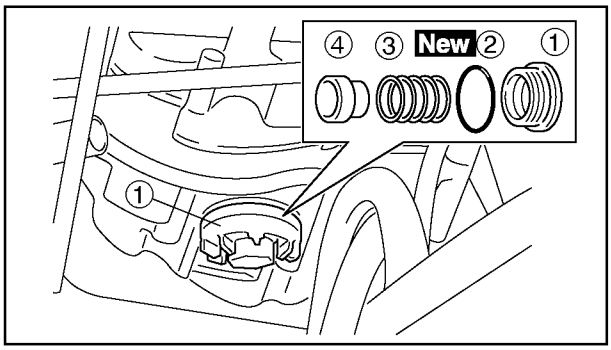
4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

NOTE:

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







EAS00076

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   - engine oil filler cap ①
   - engine oil drain bolt ②
     (along with the gasket)
4. Drain:
   - engine oil
     (completely from the crankcase)
5. If the oil filter element is also to be replaced or cleaned, perform the following procedure.

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   a. Remove the oil strainer cover ①,spring③ and oil filter element ④.
   b. Replace the O-ring New ②
   c. Install the new or clean oil filter element and the oil strainer cover.

T.R.	**Oil strainer cover** **32Nm(3.2m • kg, 23.1ft • lb)**

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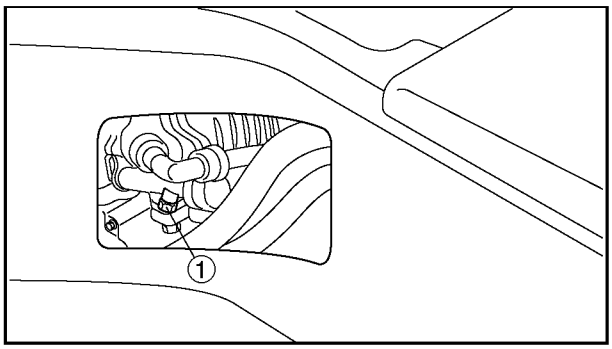
6. Install:
   - engine oil drain bolt
     (along with the gasket)

	23Nm(2.3m • kg, 16.6ft • lb)

7. Fill:
   - crankcase
     (with the specified amount of the recommended engine oil)

	Quantity **Total amount** **0.8~0.9L(0.74~0.83 Imp qt, 0.87~0.98 US qt)** **Periodic oil change** **0.73~0.83L(0.67~0.76 Imp qt, 0.80~0.90 US qt)**



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

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

	Oil gallery bolt **7Nm (0.7m • kg, 5.1ft • lb)**

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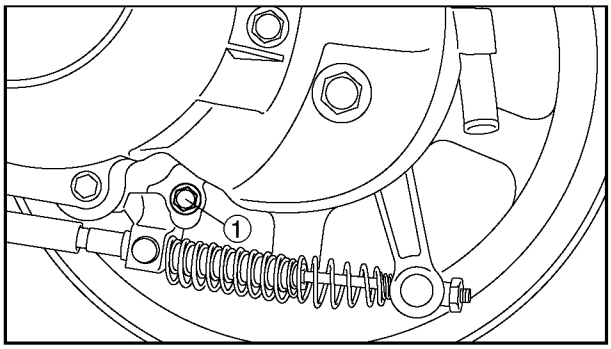
CHANGING THE TRANSMISSION OIL

1. Stand the scooter on a level surface.

NOTE:
- Stand the scooter on a suitable stand.
- Make sure that the scooter upright.

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



4 Remove:
- transmission oil fill bolt (along with the gasket)
- transmission oil drain bolt①

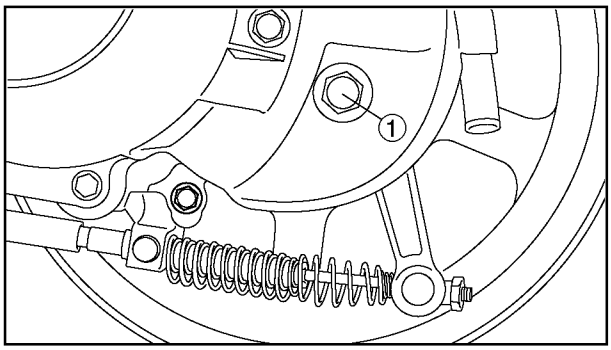
5. Drain:
- transmission oil (completely from the transmission case)

6. Install:
- transmission oil drain bolt

13Nm(1.3m • kg, 9.4ft • lb)

7. Fill:
- transmission case (with the specified amount of the recommended transmission oil)

Recommended oil
SAE10W30 hypoid gear oil
Total amount
0.11~0.13L(0.10~0.12 Imp qt, 0.12~0.14 US qt)
Periodic oil change
0.09~0.11L(0.08~0.10 Imp qt, 0.10~0.12 US qt)



8. Install:
- transmission oil fill bolt① (along with the gasket)

23Nm(2.3m • kg, 16.6ft • lb)

9. Start the engine for several minutes to warm it up and check for the oil leakage.
10. Check:
- transmission case (for transmission oil leaks)

EAS00077

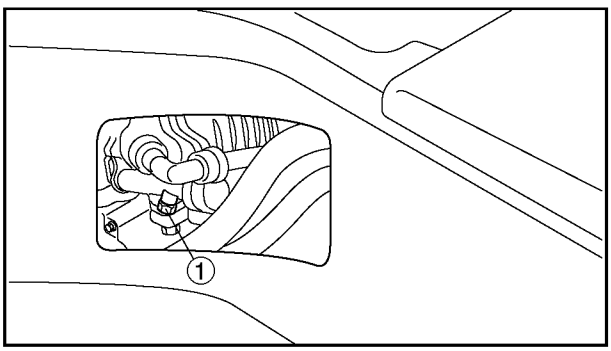
MEASURING THE ENGINE OIL PRESSURE

1. Check:
   - engine oil level
     Below the minimum level mark → Add the recommended engine oil to the proper level.
     Refer to"CHECKING THE ENGINE OIL LEVEL".
2. Start the engine, warm it up for several minutes, and then turn it off.

CAUTION:

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

3. Remove:
   - panel
     Refer to"FOOTREST BOARD AND INNER FENDER".



4. Lossen:
   - oil gallery bolt ①

⚠WARNING

The engine, muffler and engine oil are extremely hot.

5. Check:
   - engine oil pressure

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

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6. Install:
   - oil gallery bolt

	7Nm(0.7m • kg, 5.1ft • lb)

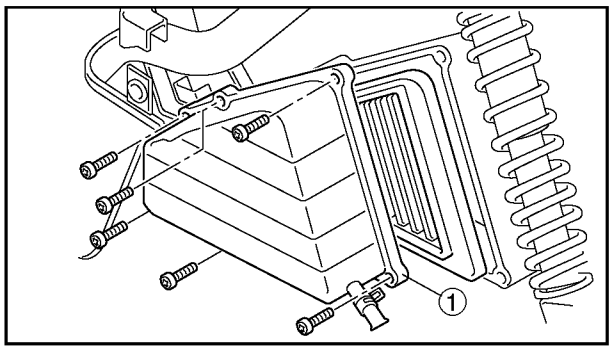
7. Install:
   - panel
     Refer to"FOOTREST BOARD AND INNER FENDER".

EAS00086

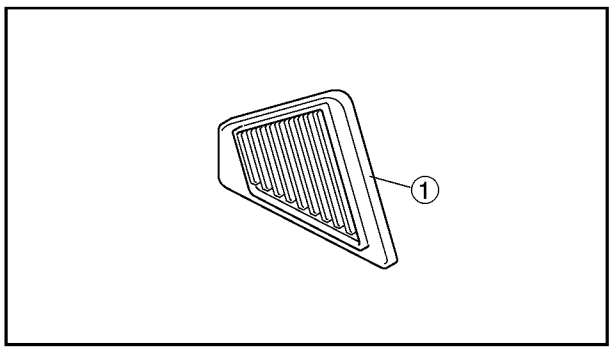
REPLACING THE AIR FILTER ELEMENT

1. Remove:
   - front cover
   - side cover(left)

   Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT".



2. Remove:
   - air filter case cover①
   - air filter element



3. Check:
   - air filter element①

   Damage/dirty→ Replace.

NOTE:

- Replace the air filter element every 4000km(2000mi) .
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

4. Install:
   - air filter element
   - air filter case cover

	10Nm(1.0m • kg, 7.2ft • lb)

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 throttle body tuning, leading to poor engine performance and possible overheating.

NOTE:

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

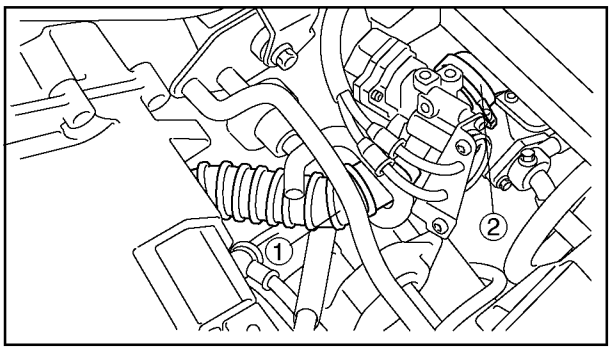
5. Install:
   - side cover(left)
   - front cover

   Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT".

EAS00094
CHECKING THE THROTTLE BODY JOINT AND INTAKE MANIFOLD

1. Remove:
   - front cover
   - side cover(left and right)
   - single seat/trunk

   Refer to"COVER AND PANEL".



2. Check:
   - throttle body joint ①
   - intake manifold ②

   Cracks/damage → Replace.
   Refer to "FUEL INJECTION SYSTEM" in chapter 7.
3. Install:
   - single seat/trunk
   - side cover(left and right)
   - front cover

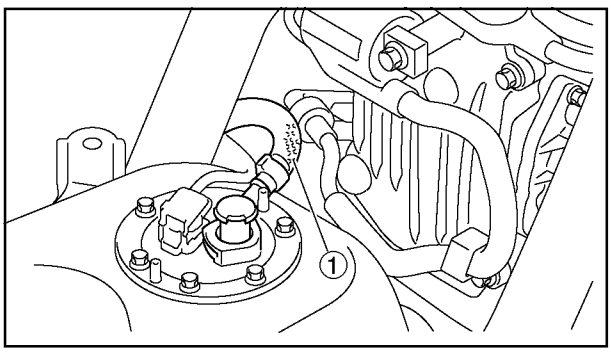
   Refer to"COVER AND PANEL".

EAS00096
CHECKING THE FUEL HOSE

The following procedure applies to all of the fuel hose.

1. Remove:
   - front cover
   - side cover(left and right)
   - single seat/trunk
   - footrest board

   Refer to"COVER AND PANEL".



2. Check:
   - fuel hose ①

   Cracks/damage → Replace.
   Loose connection → Connect properly.
3. Install:
   - footrest board
   - single seat/trunk
   - side cover(left and right)
   - front cover

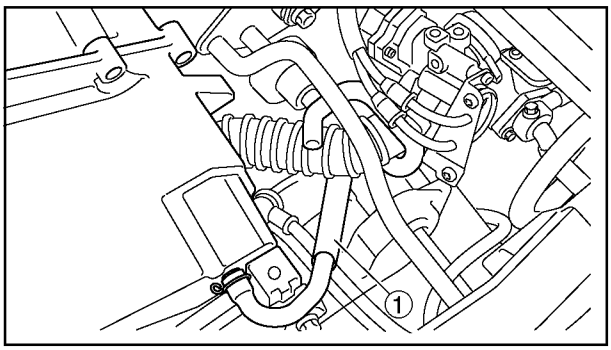
   Refer to"COVER AND PANEL".

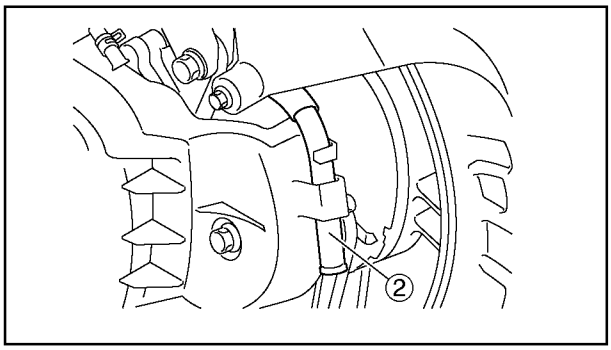
EAS00098

CHECKING THE BREATHER HOSES

1. Remove:
   - front cover
   - side cover(left and right)
   - single seat/trunk

   Refer to"COVER AND PANEL".





2. Check:
   - breather hose ①
   - transmission case breather hose ②

   Cracks/damage → Replace.
   Loose connection → Connect properly.

CAUTION:

Make sure the breather hoses are routed correctly.

3. Install:
   - single seat/trunk
   - side cover(left and right)
   - front cover

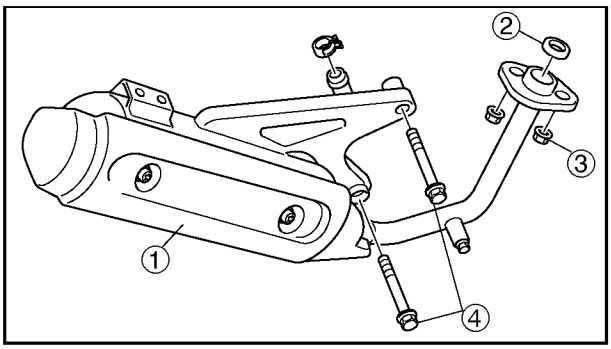
   Refer to"COVER AND PANEL".

EAS00099

CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the muffler assembly and gasket.

1. Remove:
   - muffler assembly
     Refer to"ENGINE REMOVAL"in chapter 5.



2. Check:
   - muffler assembly ①
     Crack/damage → Replace.
   - gasket ②
     Exhaust gas leak → Replace.
3. Check:
   - tightening torque

Exhaust pipe nut ③
13Nm(1.3m • kg, 9.4ft • lb)
Muffler and rear arm bolt ④
31Nm(3.1m • kg, 22.4ft • lb)

4. Install:
   - muffler assembly
     Refer to"ENGINE REMOVAL"in chapter 5.

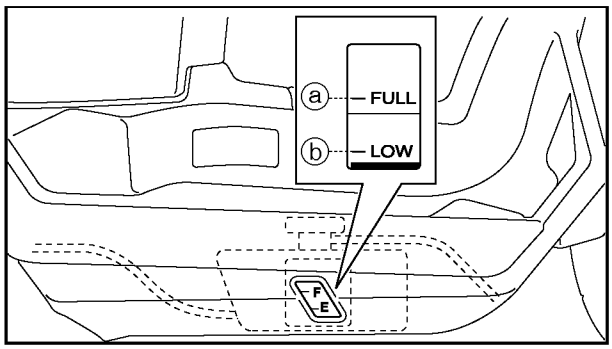
EAS00103

CHECKING THE COOLANT LEVEL

1. Stand the scooter on a level surface.

NOTE:

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



2. Check:
   - coolant level

   The coolant level should be between the maximum level mark ⓐ and minimum level mark ⓑ.

   Below the minimum level mark → Add the recommended coolant to the proper level.

CAUTION:

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

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

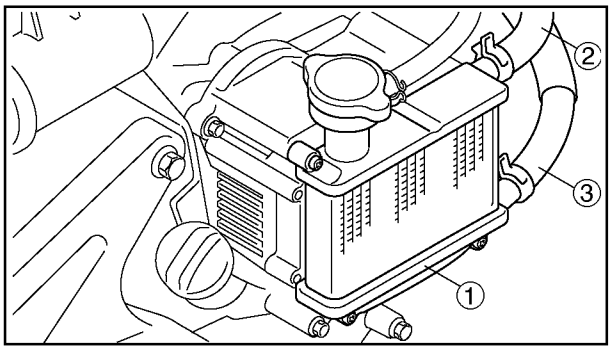
NOTE:

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

EAS00104

CHECKING THE COOLING SYSTEM

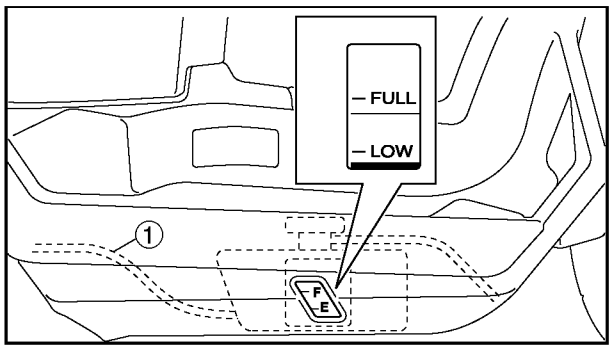
1. Remove:
   - front cover
   - side cover(left and right)
   - battery /battery cover
   - single seat/trunk
   - footrest board
     Refer to"COVER AND PANEL".
   - radiator cover
     Refer to"RADIATOR"in chapter 6.



2. Check:
   - radiator ①
   - radiator inlet hose ②
   - radiator outlet hose ③
     Cracks/damage → Replace.
     Refer to "COOLING SYSTEM" in chapter 6.
3. Install:
   - radiator cover
     Refer to"RADIATOR"in chapter 6.
   - footrest board
   - single seat/trunk
   - battery /battery cover
   - side cover(left and right)
   - front cover
     Refer to"COVER AND PANEL".

EAS00105
CHANGING THE COOLANT

1. Remove:
   - front cover
   - side cover(right)
   - coolant reservoir cap cover
     Refer to"COVER AND PANEL".
   - radiator cover
     Refer to"RADIATOR"in chapter 6.



2. Disconnect:
   - coolant reservoir hose ①
3. Drain:
   - coolant
     (from the coolant reservoir)
   - coolant
     (from the radiator under drain bolt)
4. Remove:
   - radiator cap
   - coolant reservoir cap

⚠WARNING

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

5. Connect:
   - coolant reservoir hose
6. Install:
   - radiator under drain bolt

	1Nm(0.1m • kg, 0.7ft • lb)

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

Recommended antifreeze
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
Mixing ratio
4:6(antifreeze:water)
Quantity
Total amount
0.50L(0.46 Imp qt, 0.53 US qt)
Coolant reservoir capacity
0.26L(0.23 Imp qt, 0.28 US qt)
Up to the maximum level mark

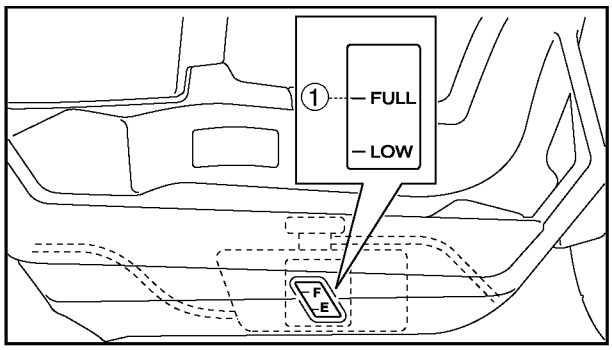
NOTE:
The specified amount of coolant is a standard amount. Fill the cooling system with coolant until coolant comes out of the air bleed bolt hole.

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

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

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

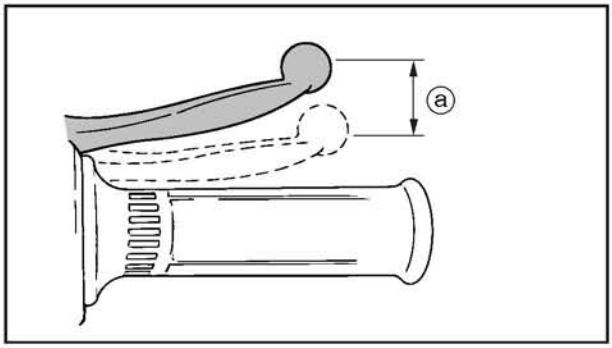
8. Install:
   - radiator cap

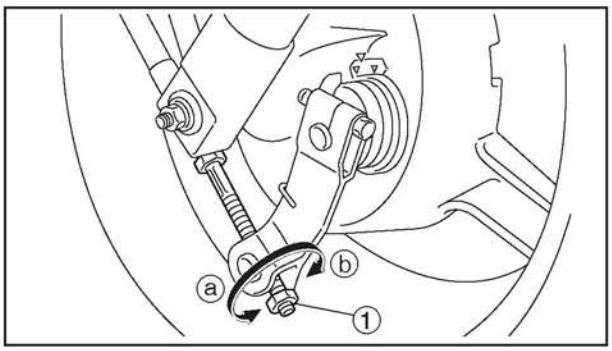


9. Fill:
   - coolant reservoir
     (with the recommended coolant to the maximum level mark ①)
10. Install:
    - coolant reservoir cap
11. Start the engine, warm it up for several minutes, and then stop it.
12. Check:
    - coolant level
      Refer to "CHECKING THE COOLANT LEVEL".

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

13. Install:
    - radiator cover
      Refer to"RADIATOR"in chapter 6.
    - coolant reservoir cap cover
    - side cover(right)
    - front cover
      Refer to"COVER AND PANEL".





EAS00109

CHASSIS

ADJUSTING THE FRONT BRAKE

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

Brake lever free play (at the end of the brake lever)
10~20mm(0.39~0.79in)

2. Adjust:
   - brake lever free play

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a. Turn the adjusting nut ① in direction ⓐ or ⓑ until the specified brake lever free play is obtained.

Direction ⓐ	Brake lever free play is increased.
Direction ⓑ	Brake lever free play is decreased.

CAUTION:

After adjusting the brake lever free play, make sure there is no brake drag.

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EAS00114

ADJUSTING THE REAR BRAKE

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

Brake lever free play
10~ 20mm(0.39~ 0.79in)

2. Adjust:
   - brake lever free play

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a. Turn the adjusting nut ① in direction ⓐ or ⓑ until the specified brake lever free play is obtained.

Direction ⓐ	Brake lever free play is increased.
Direction ⓑ	Brake lever free play is decreased.

CAUTION:

After adjusting the brake lever free play, make sure there is no brake drag.

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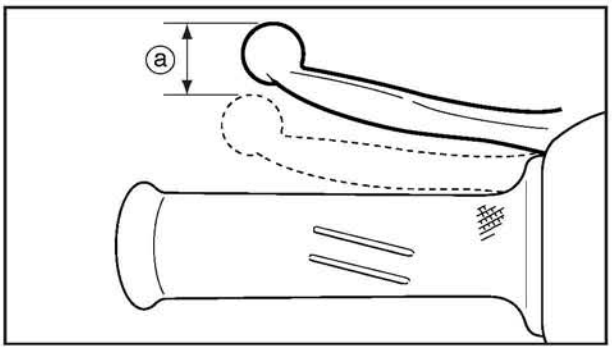
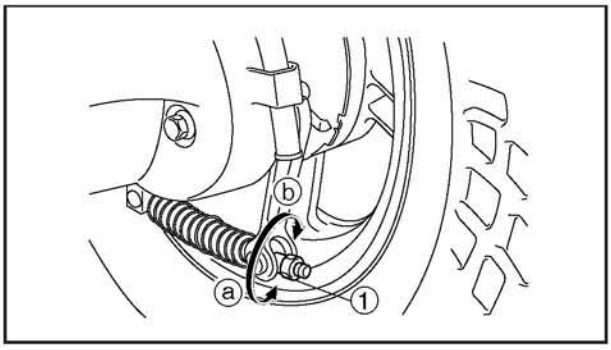
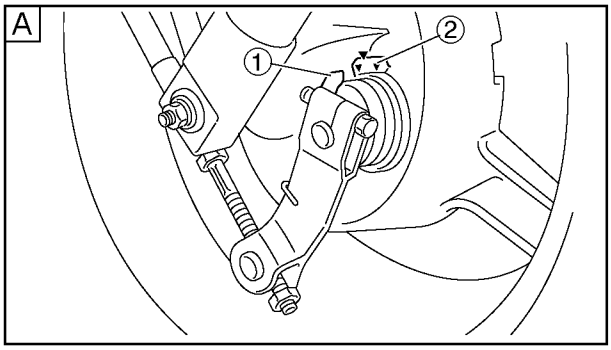
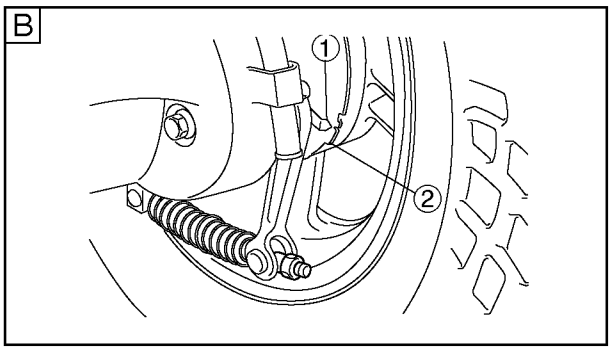






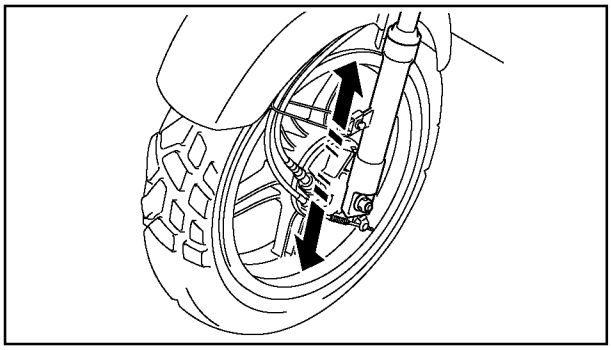


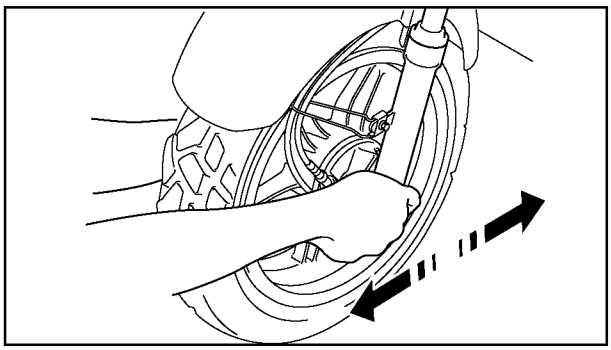
EAS00127

CHECKING THE FRONT AND REAR BRAKE SHOES

1. Operate the brake.
2. Check:
   - wear indicator ①
     Reaches the wear limit line ② → Replace the brake shoes as a set.
     Refer to "FRONT WHEEL AND BRAKE" and "REAR WHEEL AND BRAKE" in chapter 4.

A Front brake
B Rear brake





EAS00148

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the scooter on a level surface.

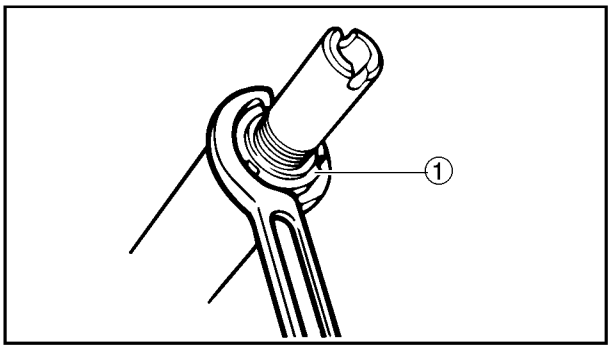
⚠WARNING

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

NOTE:

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

2. Check:
   - steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Binding/looseness → Adjust the steering head.
3. Remove:
   - front fork upper cover
   - front fork cover(left, right)
   - leg shield1,2
     Refer to"LEG SHIELD1,2".
   - headlight stay bracket
     Refer to"HANDLE BRACKET AND HEADLIGHT STAY BRACKET"in chapter 4.



4. Adjust:
   - steering head

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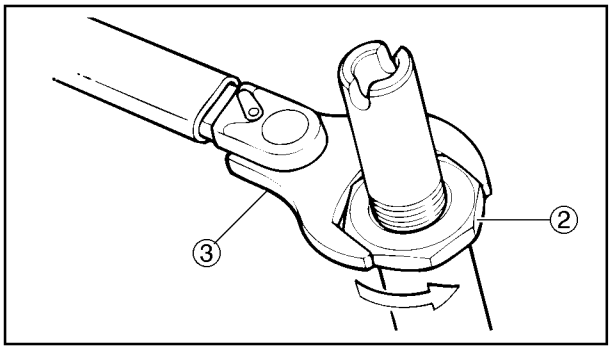
a. Loosen the steering nut ① and then tighten it to specification with the ring nut wrench.

NOTE:

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

Ring nut wrench
90890-01268
YU-01268



b. Loosen the upper bearing inner race② completely and then tighten it to specification with a steering nut wrench③ .

Steering nut wrench
90890-01444
YM-A9409-7

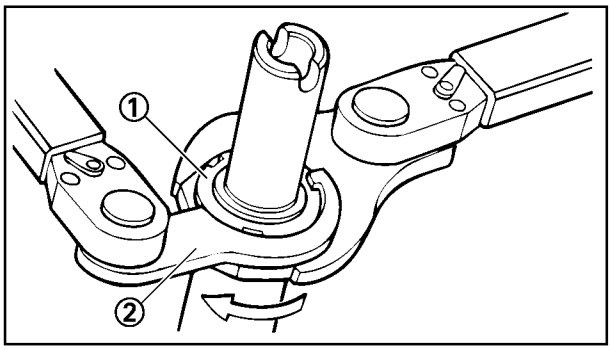
⚠WARNING

Do not overtighten the upper bearing inner race.

Upper bearing inner race(final tightening torque)
7Nm(0.7m • kg, 5.1ft • lb)

c. 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 check the bearing race .

Refer to “STEERING HEAD” in chapter 4.



d. Hold the upper bearing inner race with a steering nut wrench and tighten the steering nut① with a steering nut wrench②.

Steering nut wrench
90890-01403
YU-A9472

Steering nut
30Nm(3.0m • kg, 21.7ft • lb)

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5. Install:
   - ●headlight stay bracket
     Refer to”HANDLE BRACKET AND HEADLIGHT STAY BRACKET”in chapter 4.
   - ●leg shield1,2
   - ●front fork cover(left, right)
   - ●front fork upper cover
     Refer to”LEG SHIELD1,2".

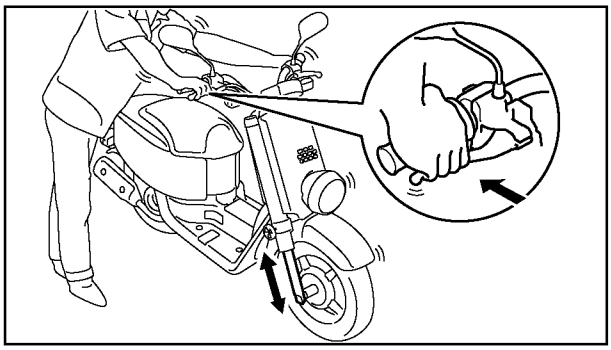
EAS00151
CHECKING THE FRONT FORK

1. Stand the scooter on a level surface.

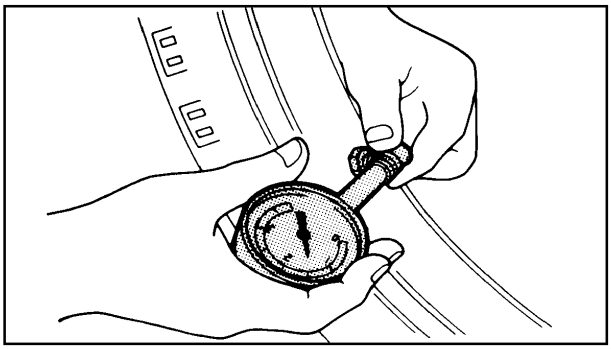
⚠ WARNING

Securely support the scooter 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 scooter upright and apply the front
   - brake.



4. Check:
   - front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Rough movement → Repair.
     Refer to “FRONT FORK” in chapter 4.



EAS00163
CHECKING THE TIRES
The following procedure applies to both of the tires.

1. Check:
   - tire pressure

   Out of specification → Regulate.

⚠ WARNING

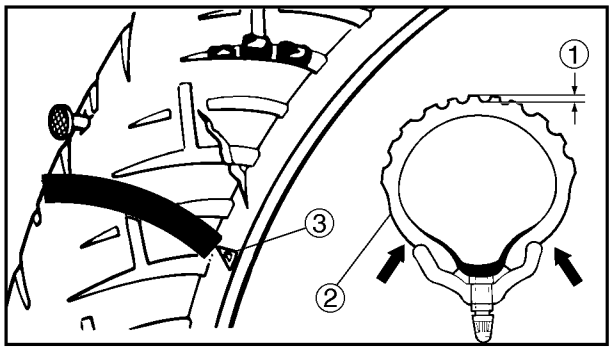
- **The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.**
- **The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.**
- **Operation of an overloaded scooter could cause tire damage, an accident or an injury.**
- **NEVER OVERLOAD THE SCOOTER.**

Basic weight (with oil and a full fuel tank)	90 kg (198 lb)	
Maximum load*	175 kg (386 lb)	
Cold tire pressure	Front	Rear
Up to 55 kg	175 kPa (1.75 kgf/cm², 25 psi)	175 kPa (1.75 kgf/cm², 25 psi)
55 kg ~ 175 kg	175 kPa (1.75 kgf/cm², 25 psi)	175 kPa (1.75 kgf/cm², 25 psi)

* Total weight of rider, passenger, cargo 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.



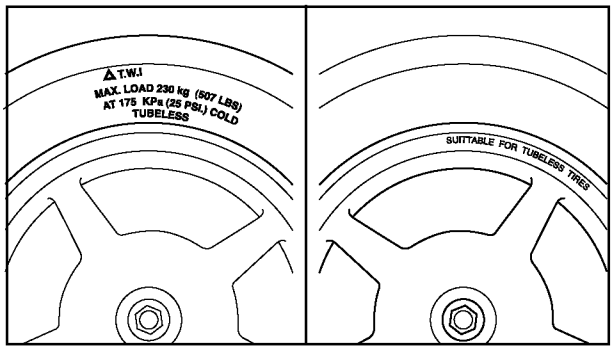
2. Check:
   - tire surfaces
     Damage/wear → Replace the tire.

	Minimum tire tread depth 0.8mm(0.03in)

① Tire tread depth
② Sidewall
③ Wear indicator

⚠WARNING

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



Ⓐ Tire
Ⓑ Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

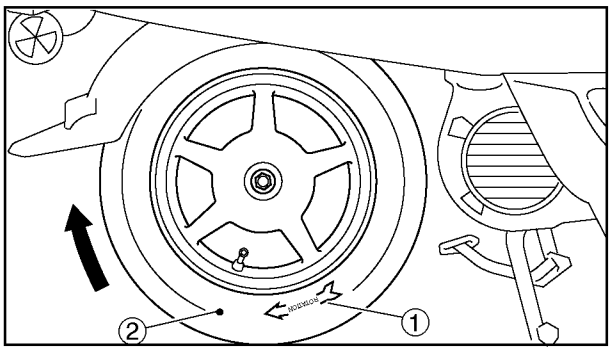
- **After extensive tests, the tires listed below have been approved by Yamaha Motor Taiwan Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than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

Front tire

Manufacturer	Model	Size
CHENG SHIN	C6022	120/90-10 57J

Rear tire

Manufacturer	Model	Size
CHENG SHIN	C6022	120/90-10 57J



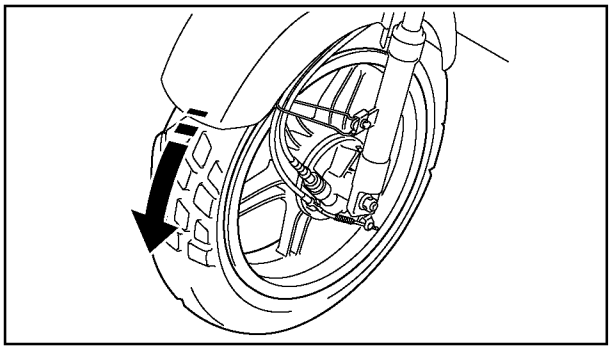
⚠WARNING

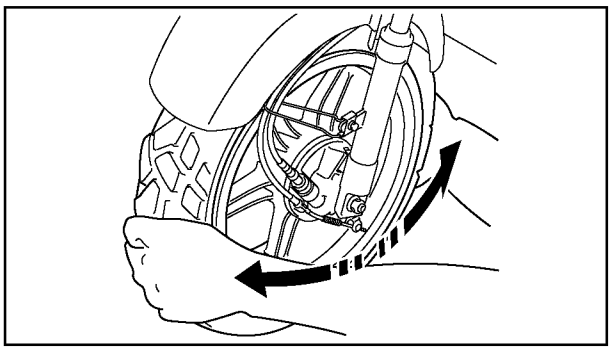
New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

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 mark② with the valve installation point.





EAS00168
CHECKING THE WHEELS
The following procedure applies to both of the wheels.

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

⚠WARNING

Never attempt to make any repairs to the wheel.

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

EAS00170
CHECKING AND LUBRICATING THE CABLES
The following procedure applies to all of the inner and outer cables.

⚠WARNING

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

1. Check:
   - outer cable
     Damage → Replace.
2. Check:
   - cable operation
     Rough movement → 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 lubricating device.

EAS00171

LUBRICATING THE LEVERS AND PEDALS

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

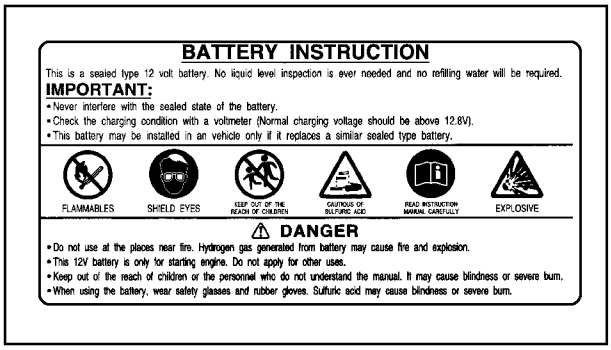
	Recommended lubricant **Lithium-soap-based grease**

EAS00173

LUBRICATING THE CENTERSTAND

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

	Recommended lubricant **Lithium-soap-based grease**



EAS00179

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

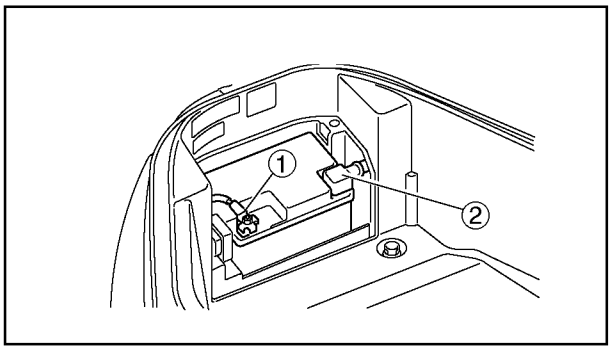
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

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 an MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

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

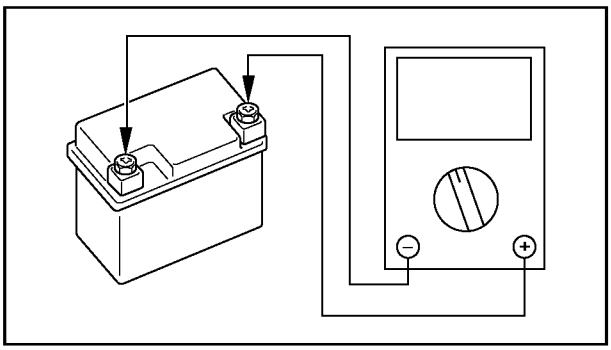
1. Remove:
   - battery cover
     Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT".



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

CAUTION:
First, disconnect the negative battery lead ①, and then the positive battery lead ②.

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



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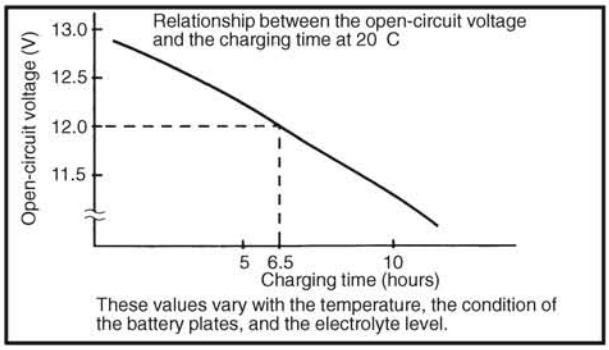
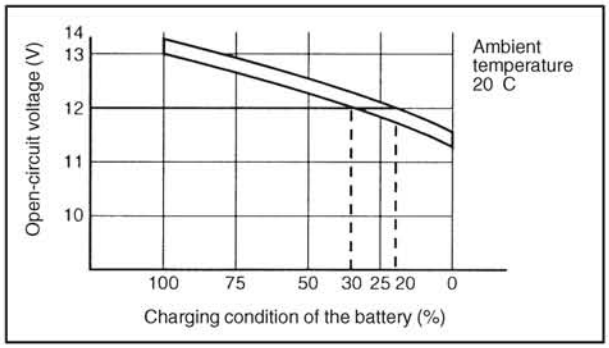
a. Connect a digital circuit tester to the battery terminals.

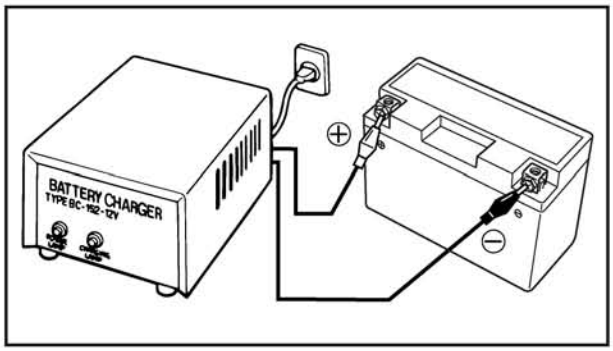
	Digital circuit tester **90890-03174**

Positive tester probe → positive battery terminal
Negative tester probe → negative battery terminal

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







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

Example

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

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

⚠WARNING

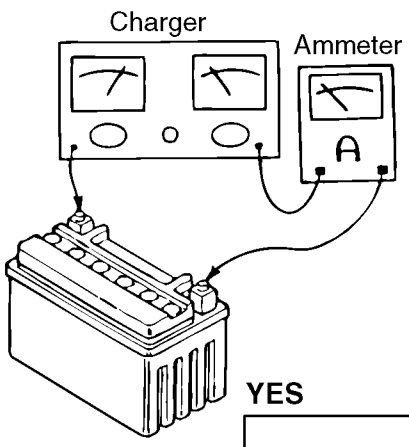
Do not quick charge a battery.

CAUTION:

- **Never remove the MF battery sealing caps.**
- **Do not use a high-rate battery charger since it forces 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 scooter. (If charging has to be done with the battery mounted on the scooter, disconnect the negative battery 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 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 an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.

Charging method using a variable-current (voltage) charger



Measure the open-circuit voltage prior to charging.

NOTE:
Leave the battery unused for more than 30 minutes before measuring its opencircuit voltage.

Connect a charger and ammeter to the battery and start charging.

NOTE:
Set the charging voltage to 16-17 V. (If the charging voltage is lower charging will be insufficient, if it is higher, the battery will be over-charged.)

Is the amperage higher than the standard charging amperage written on the battery?

YES

NO

Adjust the char ging voltage to 20 ~ 25V.

Monitor the amperage for 3 ~ 5 minutes. Is the standard charging amperage exceeded?

YES

NO

Adjust the voltage to obtain the standard charging amperage.

Set the timer to the charging time determined by the opencircuit voltage.
Refer to “CHECKING AND CHARGING THE BATTERY”.

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

If the required charging time exceeds 5 hours, it is advisable to check the charging amperage after 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging amperage.

Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.
12.8 V ~ Charging is complete.
12.0 ~ 12.7 V ~ Recharging is required.
Under 12.0 V ~ Replace the battery.

Charging method using a constant voltage charger

Measure the open-circuit voltage prior to charging.

NOTE:
Leave the battery unused for more than 30 minutes before measuring its opencircuit voltage.

Connect a charger and ammeter to the battery and start charging.

Is the amperage higher than the standard charging amperage written on the battery?

YES

Charge the battery until the charging voltage reaches 15 V.

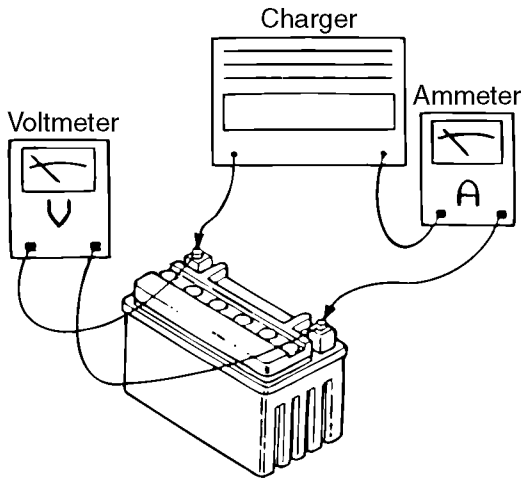
NOTE:
Set the charging time to a maximum of 20 hours.

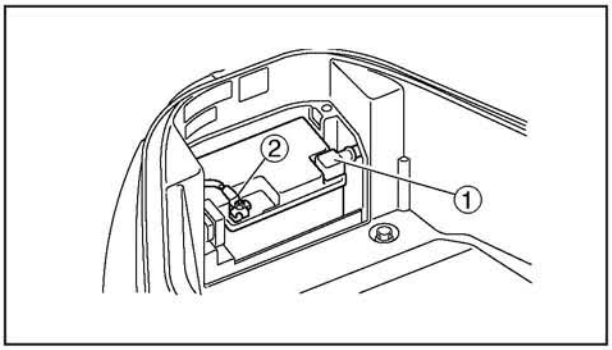
Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.
12.8 V ~ Charging is complete.
12.0 ~ 12.7 V ~ Recharging is required.
Under 12.0 V ~ Replace the battery.

NO

This type of battery charger cannot charge an MF battery. A variablevoltage charger is recommended.

CAUTION:
Constant amperage chargers are not suitable for charging MF batteries.





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

CAUTION:

- **First, connect the positive battery lead 1, and then the negative battery lead 2.**
- **After installing the battery, be sure to turn the main switch from "ON" to "OFF" three times in 3 seconds intervals to initialize the idle speed control system.**

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

	Recommended lubricant **Dielectric grease**

10. Install:
    - battery cover
      Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT".

EAS00181

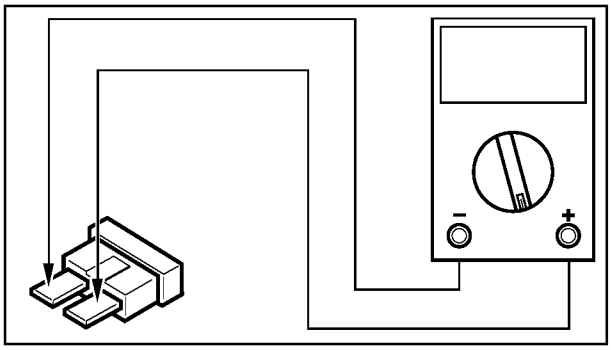
CHECKING THE FUSE

The following procedure applies to all of the fuse.

CAUTION:

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

1. Remove:
   - battery cover
     Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT".



2. Check:
   - fuse

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

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

	Pocket tester **90890-03112(YU-03112-C)**

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

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3. Replace:
   - blown fuse

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Set the main switch to "OFF".
b. Install a new fuse of the correct amperage rating.
c. Set on the switches to verify if the electrical circuit is operational.
d. If the fuse immediately blows again, check the electrical circuit.

Fuse	Amperage rating	Q'ty
Main	15A	1

⚠WARNING

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

CAUTION:

After removing and installing the main fuse, be sure to turn the main switch from "ON" to "OFF" three times in 3 seconds intervals to initialize the idle speed control system.

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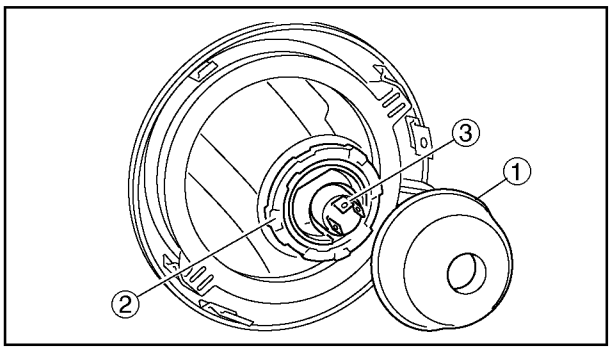
4. Install:
   - battery cover
     Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT".

EAS00182

REPLACING THE HEADLIGHT BULB

1. Remove:
   - headlight unit



2. Disconnect:
   - headlight lead coupler
3. Remove:
   - dust boot①
   - headlight bulb holder②
   - headlight bulb③

⚠WARNING

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

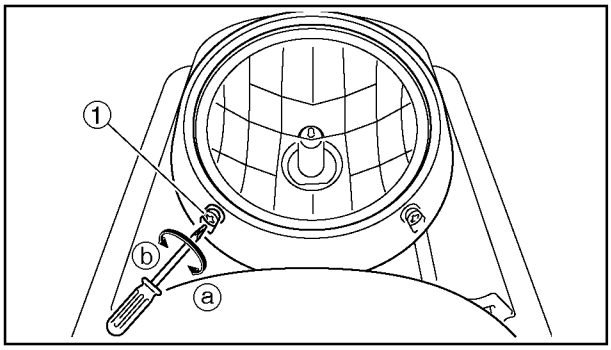
4. Install:
   - headlight bulb **New**

     Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

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

5. Install :
   - headlight bulb holder
6. Install:
   - dust boot
7. Connect:
   - headlight lead coupler
8. Install:
   - headlight unit



EAS00184

ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
   headlight beam (vertically)

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

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

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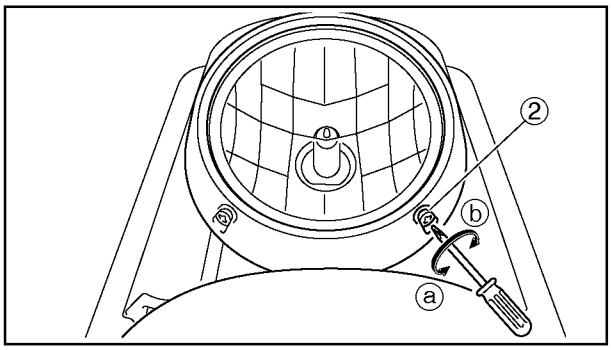

2. Adjust:
   headlight beam (horizontally)

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a. Turn the adjusting screw② in direction ⓐ or ⓑ.

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

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CHAPTER 4
CHASSIS

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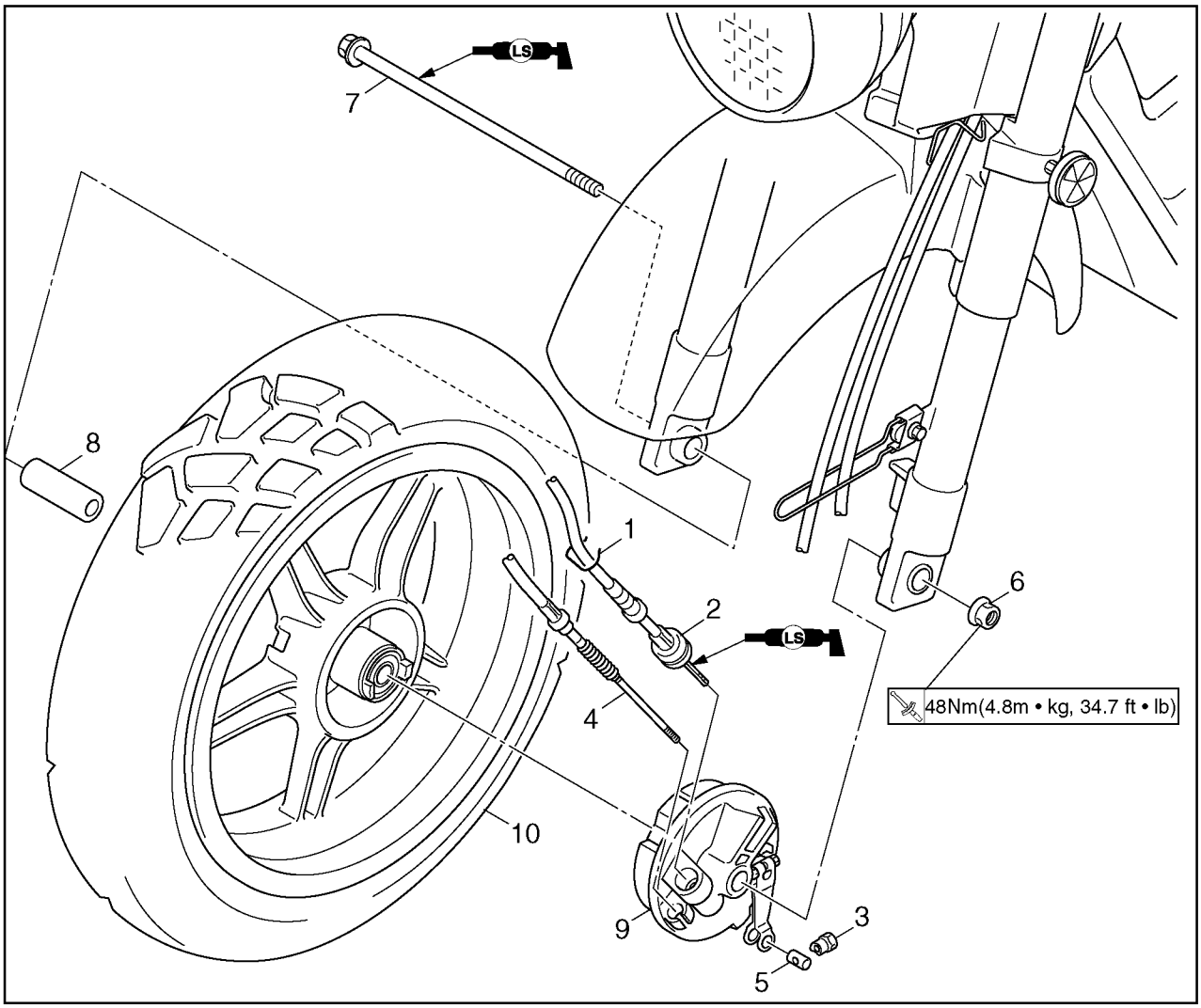
EAS00517

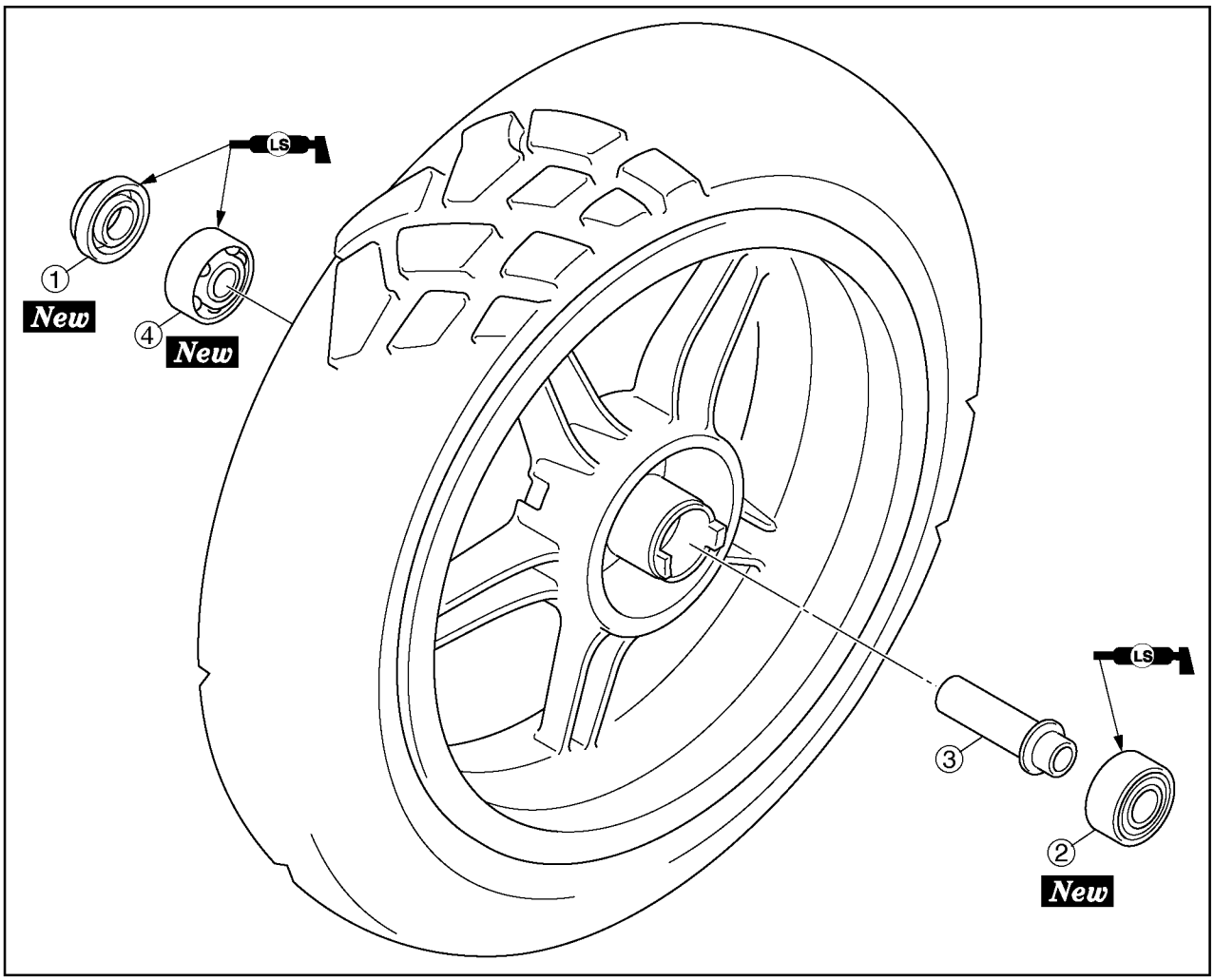
CHASSIS

FRONT WHEEL AND BRAKE



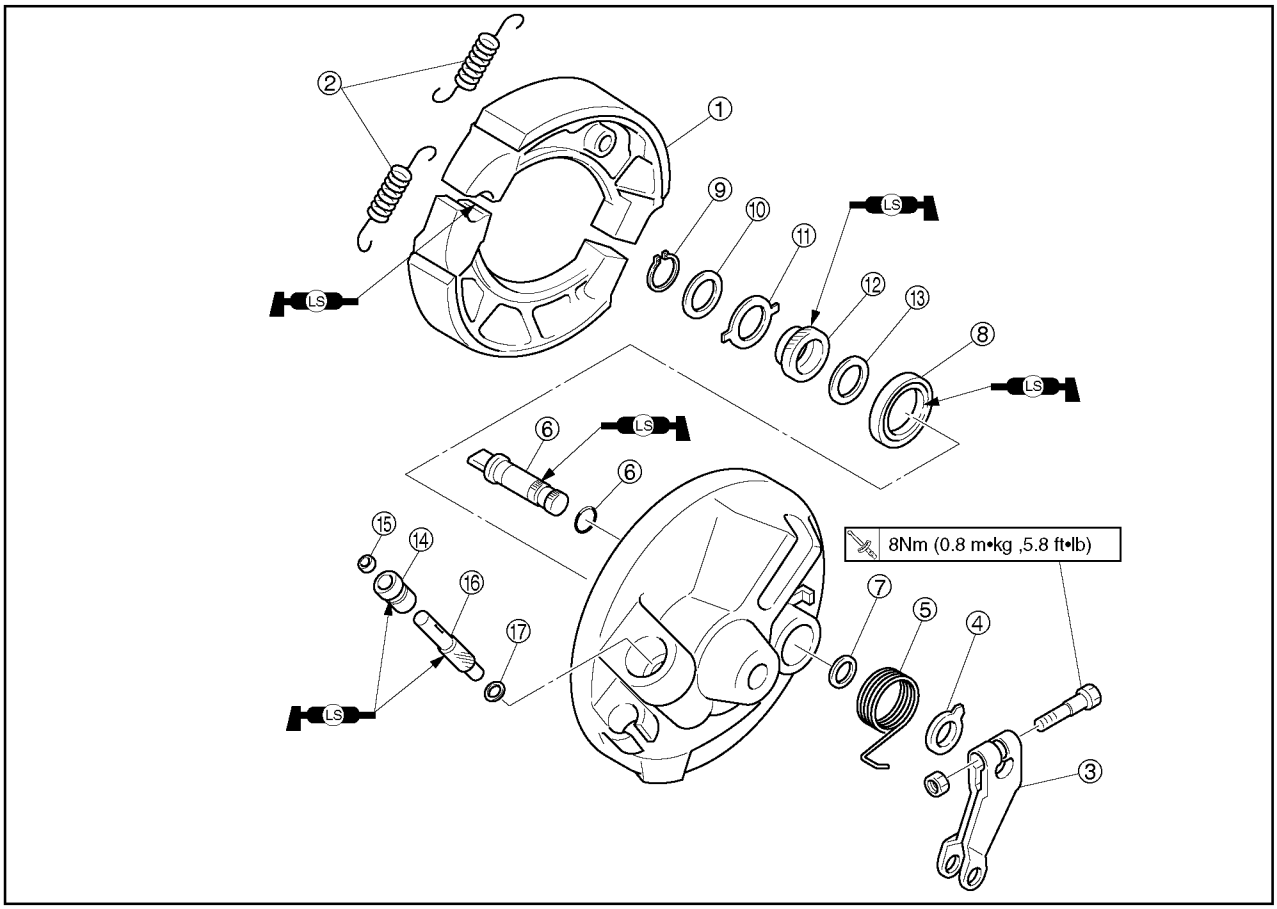
Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake		Remove the parts in the order listed. **NOTE:** Place the scooter on a suitable stand so that the front wheel is elevated.
1	Stop ring	1	
2	Speedometer cable	1	
3	Brake adjuster	1	
4	Front brake cable	1	
5	Adjusting pin	1	Refer to"REMOVING THE FRONT WHEEL and INSTALLING THE FRONT WHEEL".
6	Wheel axle nut	1	
7	Wheel axle	1	
8	Collar	1	
9	Front brake shoe plate	1	
10	Front wheel	1	
			For installation, reverse the removal procedure.

EAS00518
FRONT WHEEL



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

FRONT BRAKE SHOE PLATE



Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake shoe plate		Remove the parts in the order listed.
①	Brake shoe kit	1	
②	Tension spring	2	
③	Camshaft lever	1	
④	Brake shoe wear indicator	1	
⑤	Return spring	1	
⑥	Brake camshaft/O-ring	1/1	
⑦	Oil seal	1	Refer to"DISASSEMBLING THE
⑧	Oil seal	1	BRAKE SHOE PLATE" and "ASSEM-
⑨	Circlip	1	BLING THE BRAKE SHOE PLATE".
⑩	Plate washer	1	
⑪	Speedometer clutch	1	
⑫	Speedometer drive gear	1	
⑬	Plate washer	1	
⑭	Bushing	1	
⑮	Oil seal	1	
⑯	Speedometer driven gear	1	
⑰	Plate washer	1	
			For assembly, reverse the disassembly procedure.

EAS00520
REMOVING THE FRONT WHEEL

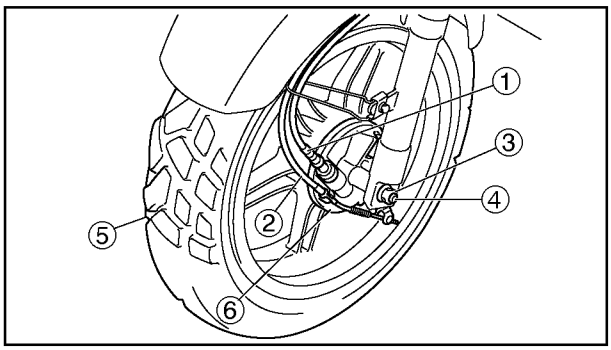
1. Stand the scooter on a level surface.

⚠ WARNING

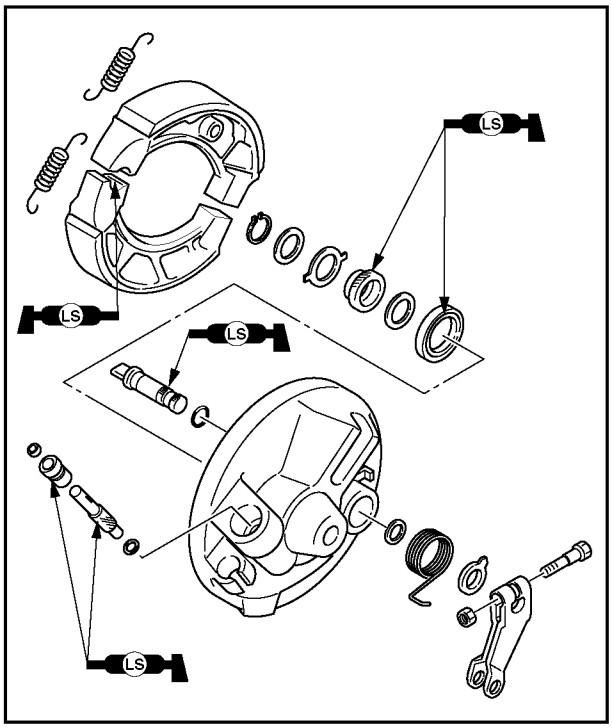
Securely support the scooter so that there is no danger of it falling over.

NOTE:

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



2. Remove:
   - speedometer cable①
   - front brake cable②
   - front wheel axle nut③
   - front wheel axle④
   - collar
   - front wheel⑤
   - front brake shoe plate⑥



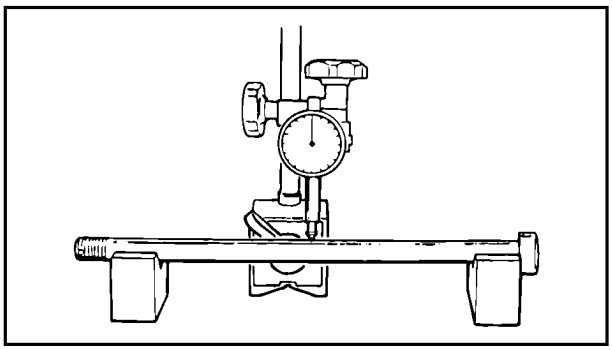
EAS00524
DISASSEMBLING THE BRAKE SHOE PLATE

1. Remove:
   - front brake shoe kit
   - camshaft lever
   - brake shoe wear indicator
   - return spring
   - brake camshaft
2. Remove:
   - circlip
   - plate washer
   - speedometer clutch
   - speedometer drive gear
   - plate washer
3. Remove:
   - bushing
     (with the special tool)
   - speedometer driven gear
   - plate washer

	Meter gear bush tool **90890-01052**

NOTE:

Remove the bushing from the brake shoe plate with the meter gear bush tool.



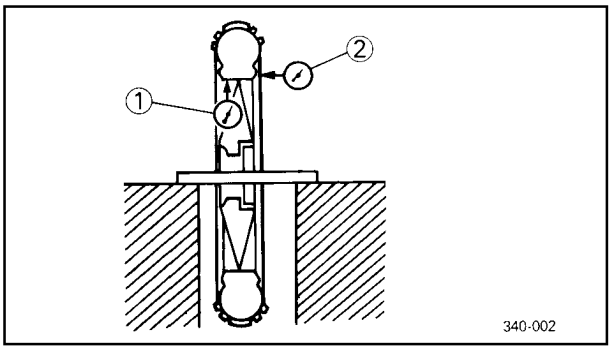
EAS00525
CHECKING THE FRONT WHEEL

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

⚠WARNING

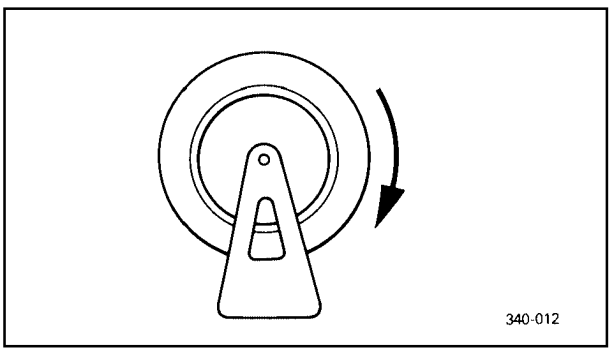
Do not attempt to straighten a bent wheel axle.

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

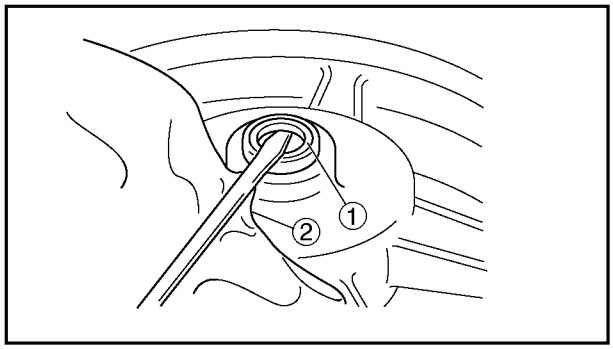


3. Measure:
   - radial wheel runout ①
   - lateral wheel runout ②
     Over the specified limits → Replace.

Radial wheel runout limit
1.0 mm (0.04 in)
Lateral wheel runout limit
1.0 mm(0.04 in)



4. Check:
   - wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - oil seal
     Damage/wear → Replace.
5. Replace:
   - wheel bearings **New**
   - oil seal **New**



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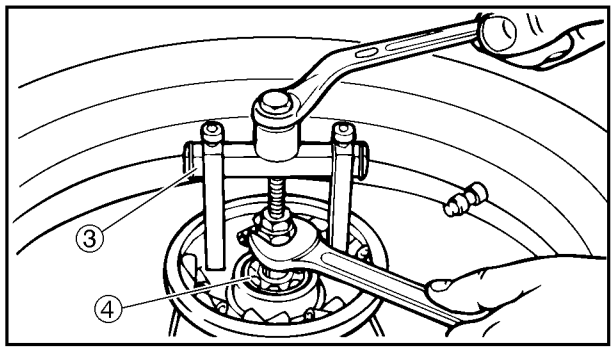
a. Clean the outside of the front wheel hub.
b. Remove the oil seal ① with a flat-head screwdriver.

NOTE:

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



c. Remove the wheel bearings ④ with a general bearing puller③.
d. Install the new wheel bearings and oil seal in the reverse order of disassembly.

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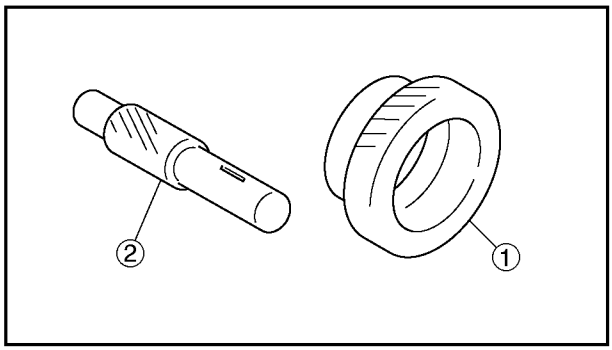
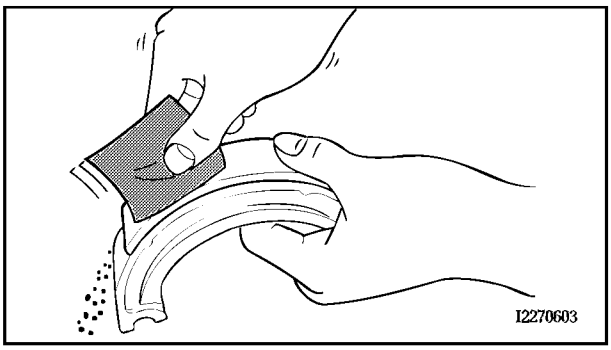
EAS00535

CHECKING THE SPEEDOMETER GEAR UNIT

1. Check:
   - speedometer clutch
     Bends/damage/wear → Replace.



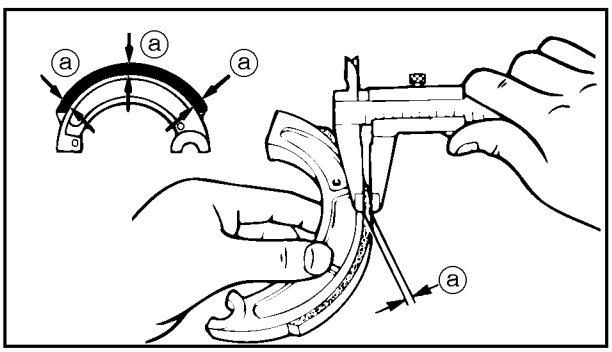
2. Check:
   - speedometer drive gear ①
   - speedometer driven gear ②
     Damage/wear → Replace.



EAS00536
CHECKING THE BRAKE
The following procedure applies to all of the brake shoes.

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

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

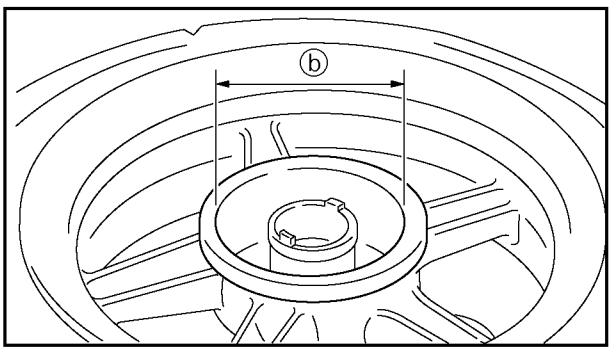


2. Measure:
   - brake shoe lining thickness ⓐ
     Out of specification →Replace.

Brake shoe lining thickness limit (minimum)
2.0 mm (0.08 in)

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

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



3. Measure:
   - brake drum inside diameter ⓑ
     Out of specification →Replace the wheel.

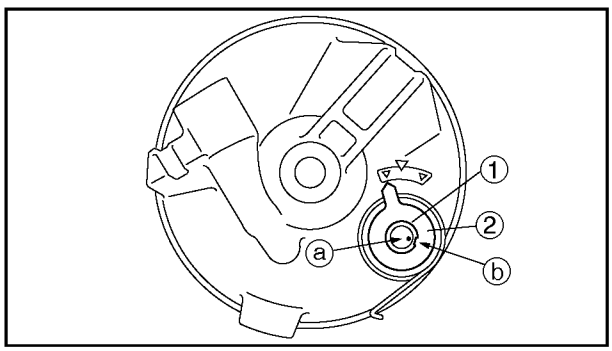
Brake drum inside diameter limit (maximum)
110.5 mm (4.35 in)

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

EAS00537
ASSEMBLING THE BRAKE SHOE PLATE

1. Lubricate:
   - brake camshaft

	Recommended lubricant **Lithium-soap-based grease**



2. Install:
   - brake camshaft ①
   - spring
   - brake shoe wear indicator ②

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a. Install the brake camshaft so its punch mark ⓐ is positioned as shown.
b. Align the projection ⓑ on the brake shoe wear indicator with the notch in the brake camshaft.
c. Check that the brake shoes are properly positioned.

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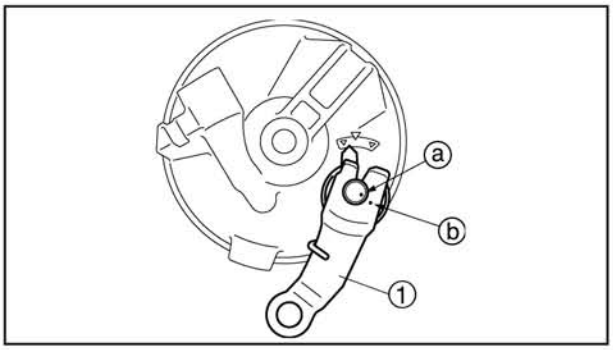

3. Install:
   - camshaft lever ①

8Nm(0.8m • kg, 5.8ft • lb)

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a. Align the camshaft punch mark ⓐ and camshaft lever punch mark ⓑ is positioned as shown.

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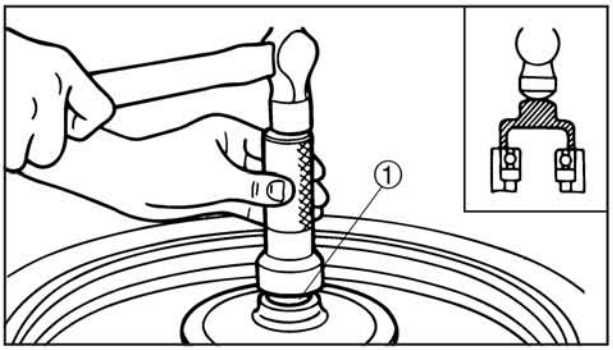
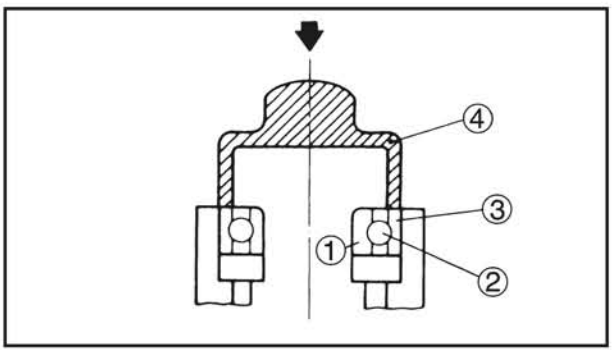
4. Install:
   - plate washer
   - speedometer driven gear
   - bushing
     (with the special tool)

	Meter gear bush tool **90890-01052**





EAS00538

ASSEMBLING THE FRONT WHEEL

1. Install:
   - wheel bearing(right)① **New**
   - spacer
   - wheel bearing(left) **New**
   - oil seal **New**

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

CAUTION:

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

NOTE:

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

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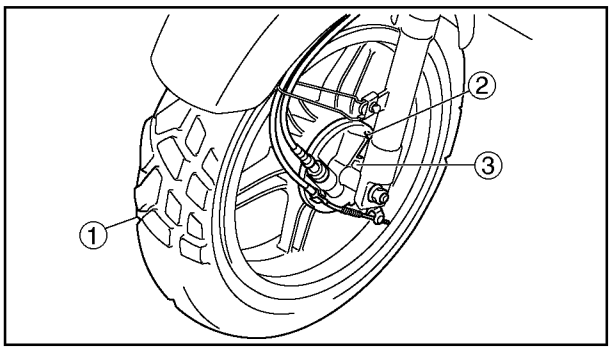
2. Install:
   - brake shoe plate
     Align the tab on the speedometer clutch with the slot in the wheel hub.



EAS00540
INSTALLING THE FRONT WHEEL

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

	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - front wheel①

NOTE:
Make sure the slot② in the brake shoe plate fits over the stopper③ on the outer tube.

3. Tighten:
   - wheel axle nut

	48 Nm (4.8 m • kg, 34.7 ft • lb)

⚠WARNING
Make sure the brake cable is routed properly.

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

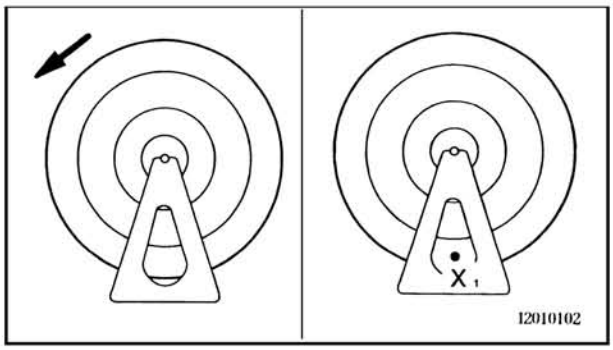
EAS00548

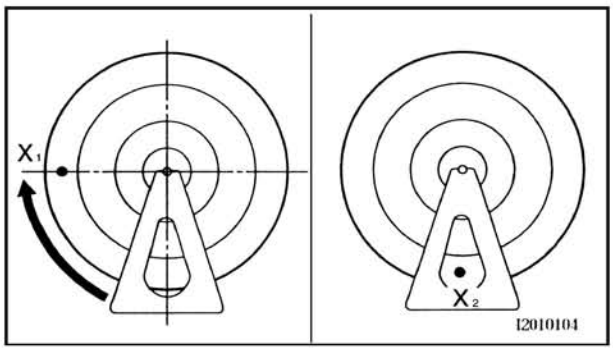
ADJUSTING THE FRONT WHEEL STATIC BALANCE

NOTE:

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

1. Remove:
   - balancing weight(s)





2. Find:
   - front wheel's heavy spot

NOTE:

Place the front wheel on a suitable balancing stand.

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a. Spin the front wheel.
b. When the front wheel stops, put an "X_1" mark at the bottom of the wheel.
c. Turn the front wheel 90° so that the "X_1" mark is positioned as shown.
d. Release the front wheel.
e. When the wheel stops, put an "X_2" mark at the bottom of the wheel.
f. Repeat steps (d) through (f) several times until all the marks come to rest at the same spot.
g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

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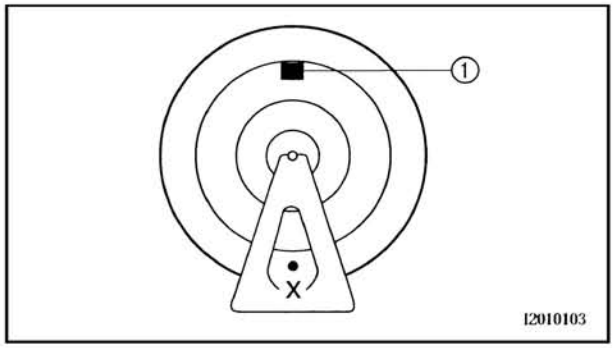

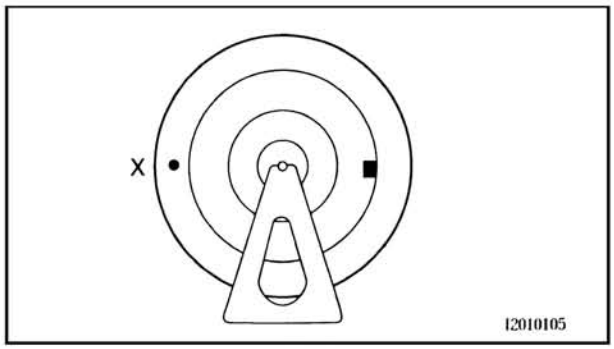

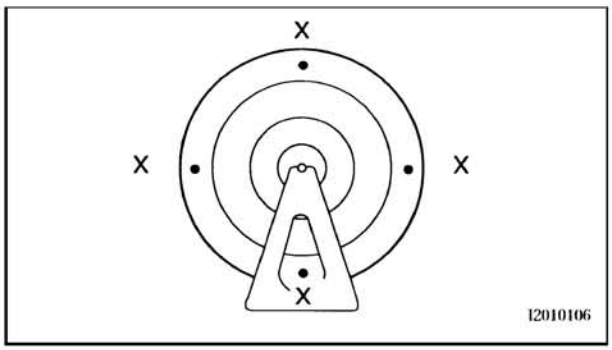

3. Adjust:
   - front wheel static balance

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

NOTE:
Start with the lightest weight.

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

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4. Check:
   - front wheel static balance

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

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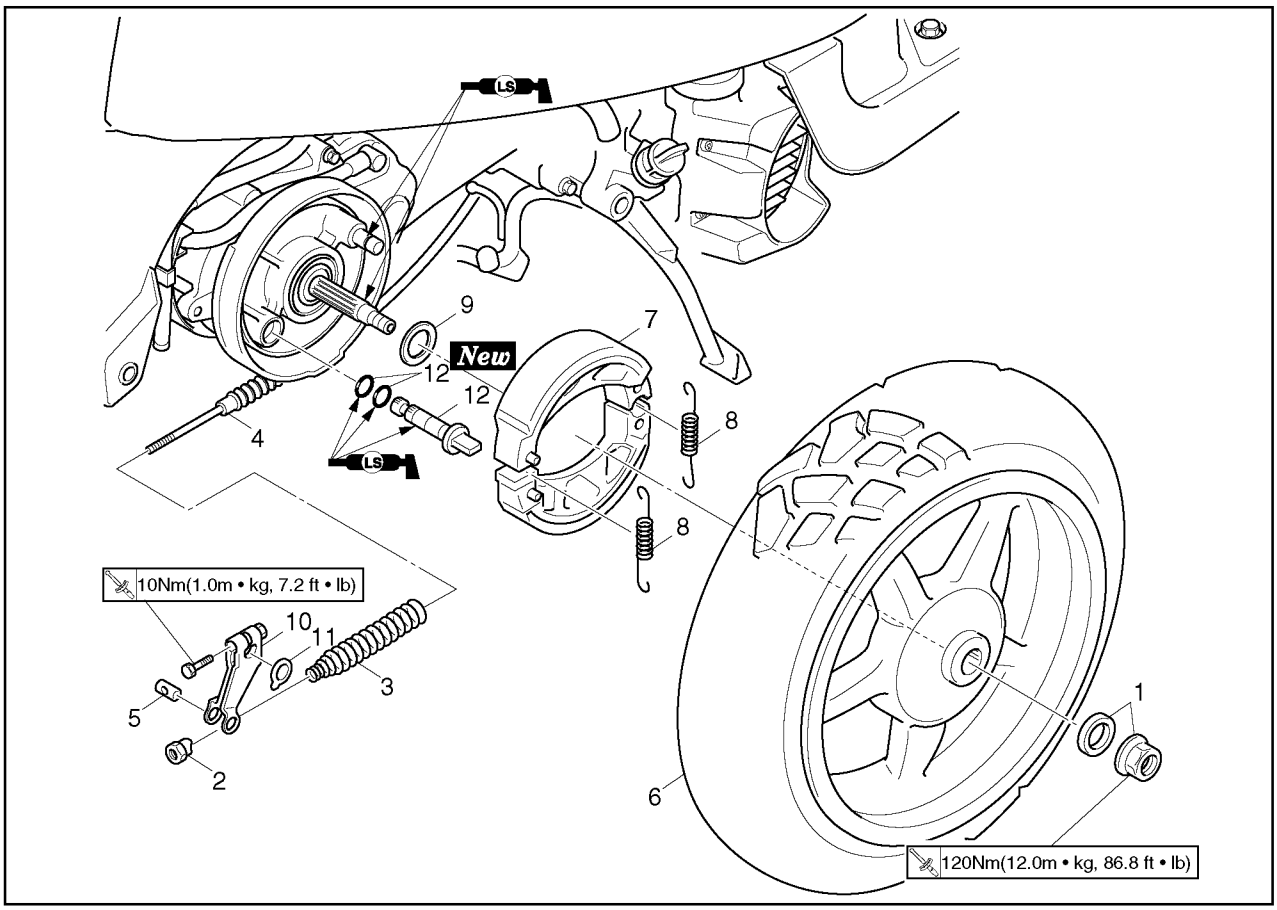
EAS00555

REAR WHEEL AND BRAKE



Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel and brake		Remove the parts in the order listed. **NOTE:** Place the scooter on a suitable stand so that the front wheel is elevated.
	Muffler		Refer to"ENGINE REMOVAL"in chapter 5.
1	Self lock nut/Plate washer	1/1	
2	Brake adjuster	1	
3	Spring	1	
4	Rear brake cable	1	Disconnect.
5	Adjusting pin	1	
6	Rear wheel	1	
7	Brake shoe kit	1	
8	Tension spring	2	
9	Plate washer	1	
10	Camshaft lever	1	
11	Indicator plate	1	
12	Brake camshaft/O-ring	1/2	
			For installation, reverse the removal procedure.

EAS00564
REMOVING THE REAR WHEEL

1. Stand the scooter on a level surface.

⚠ WARNING

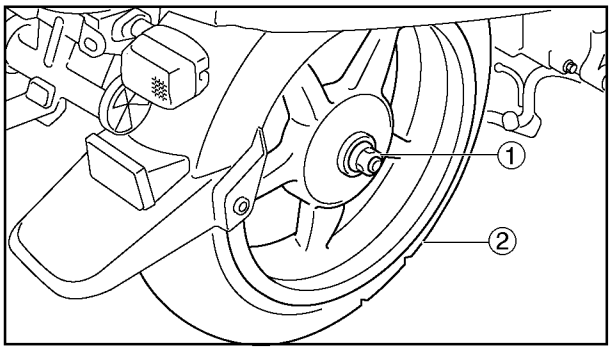
Securely support the scooter so that there is no danger of it falling over.

NOTE:

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

2. Remove:
   - muffler

   Refer to"ENGINE REMOVAL"in chapter 5.
3. Loosen:
   - brake adjuster



4. Remove:
   - wheel axle nut ①
   - plate washer
   - rear wheel②

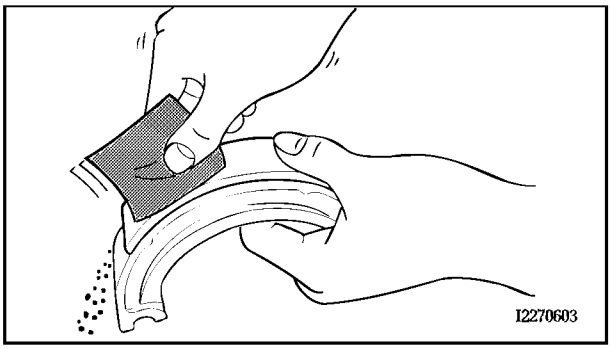
EAS00565
CHECKING THE REAR WHEEL

1. Check:
   - tire
   - rear wheel

   Damage/wear → Replace.
   Refer to"CHECKING THE TIRES "and" CHECKING THE WHEELS" in chapter 3.
2. Measure:
   - radial wheel runout
   - lateral wheel runout

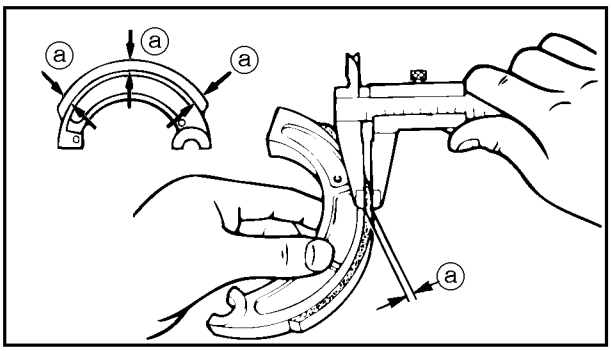
   Refer to"CHECKING THE FRONT WHEEL".

EAS00567
CHECKING THE REAR WHEEL DRIVE HUB
1. Check:
   - rear wheel drive hub
     Cracks/damage → Replace.



EAS00569
CHECKING THE BRAKE
The following procedure applies to all of the brake shoes.
1. Check:
   - brake shoe lining
     Glazed areas → Repair.
     Sand the glazed areas with course sandpaper.

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

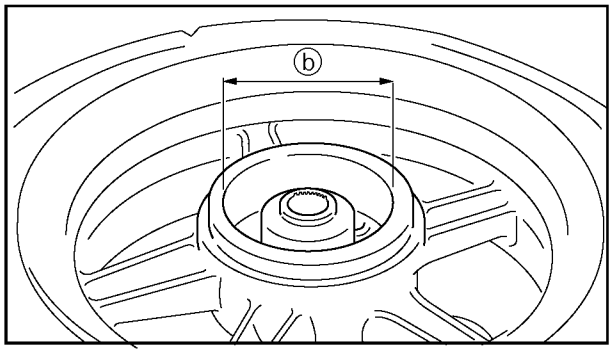


2. Measure:
   - brake shoe lining thickness ⓐ
     Out of specification → Replace.

Brake shoe lining thickness limit (minimum)
2.0 mm(0.08 in)

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

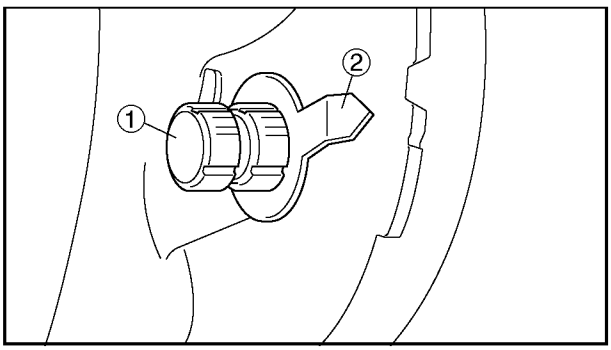
NOTE:
Replace the brake shoes as a set, if either is worn to the wear limit.

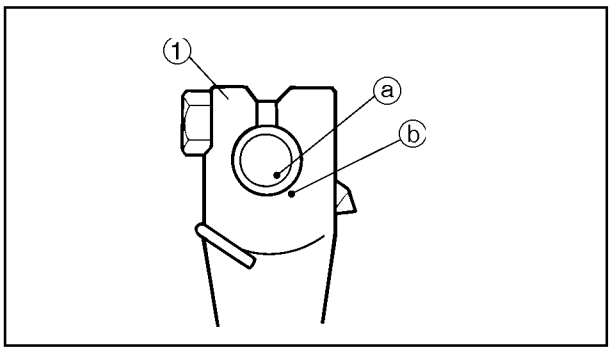


3. Measure:
   - brake drum inside diameter ⓑ
     Out of specification → Replace the wheel.

Brake drum inside diameter limit (maximum)
110.5 mm(4.35 in)

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





EAS00570
ASSEMBLING THE BRAKE SHOE PLATE

1. Install:
   - brake camshaft ①
   - o-rings **New**
   - brake shoe wear indicator ②

NOTE:
Lubricate the brake camshaft and o-rings with lithium-soap-based grease.

⚠WARNING
After installing the brake camshaft and o-rings, remove any excess grease.

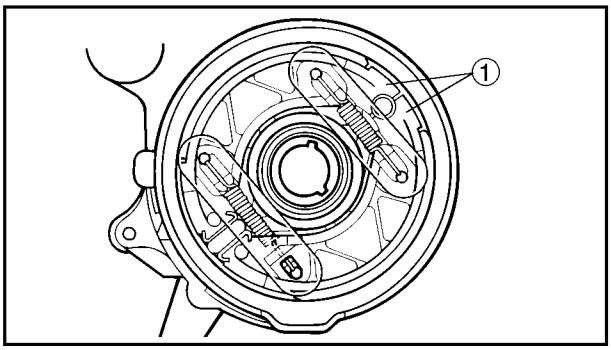
▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

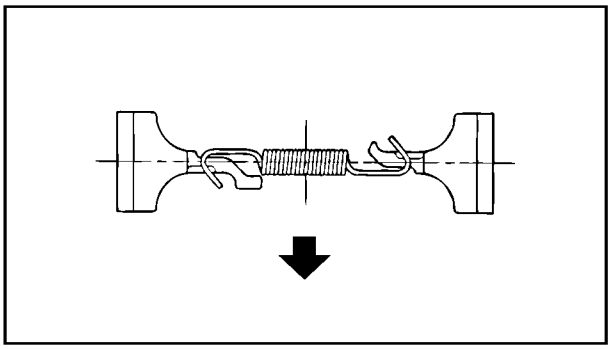
a. Install the brake camshaft ① so its punch mark ⓐ is positioned as shown.
b. Align the projection ⓑ on the brake shoe wear indicator with the notch in the brake shoe camshaft.
c. Check that the brake shoes are properly positioned.

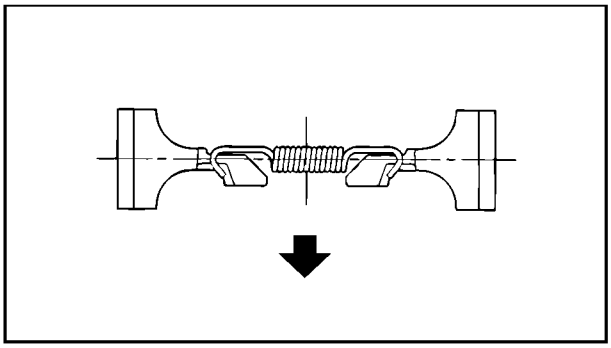
▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2. Tighten:
   - brake camshaft bolt

10Nm(1.0m • kg, 7.2ft • lb)







3. Install:
   - brake shoe kit①
   - tension springs

CAUTION:

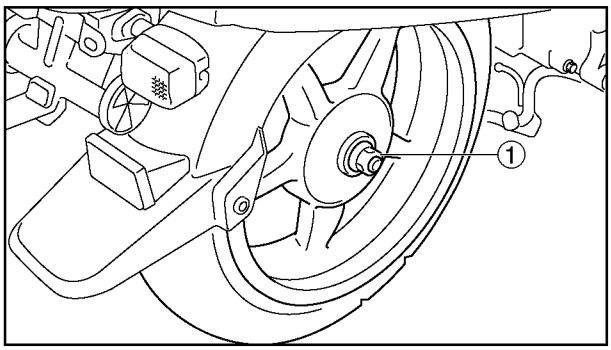
- **Do not put lubricating oil on the brake lining.**
- **Change the tension spring at the same time of changing the brake shoe.**
- **Refer to the direction in the illustration when assembling the brake shoe and spring.**
- **Refer to the illustration with regards to the assembly direction of tension spring, and do not let the spring hook and coil to be damaged by the pliers.**

EAS00574
INSTALLING THE REAR WHEEL

1. Lubricate:
   - wheel axle

	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - rear wheel



3. Tighten:
   - plate washer
   - wheel axle nut①

	120Nm(12.0m • kg, 86.8ft • lb)

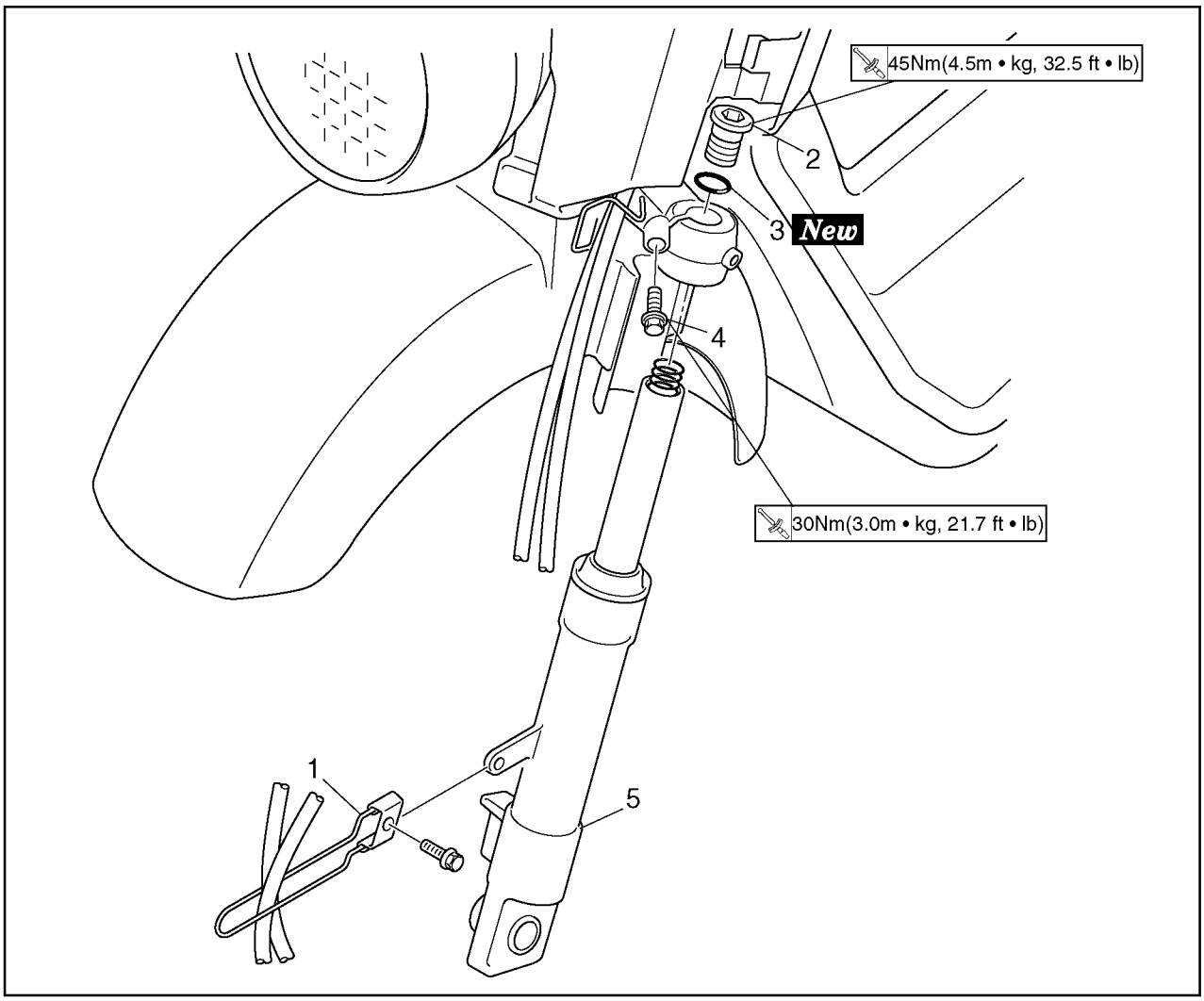
4. Install:
   - muffler
   Refer to"ENGINE REMOVAL"in chapter 5.
5. Adjust:
   - brake lever free play
   Refer to"ADJUSTING THE REAR BRAKE" in chapter 3.

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 rear wheel drive hub installed.

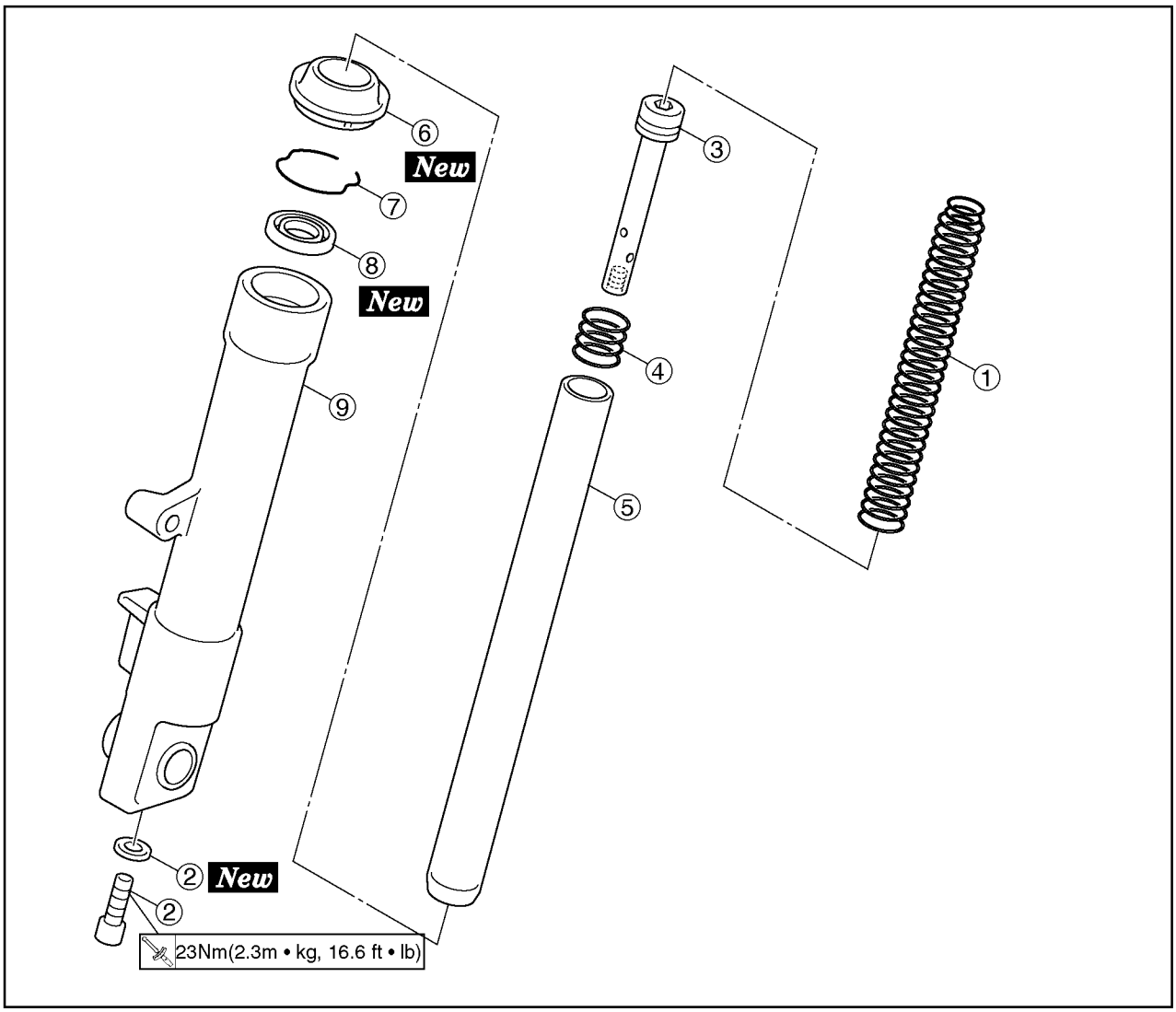
1. Adjust:
   - rear wheel static balance
   Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE".

EAS00646
FRONT FORK



Order	Job/Part	Q'ty	Remarks
	Removing the front fork legs		Remove the parts in the order listed.
	Front fork upper cover		Refer to"LEG SHIELD1,2 " in chapter 3.
	Reflector		
	Front fork cover(left and right)		
	Front wheel		Refer to"FRONT WHEEL AND BRAKE".
1	Cable guide	1	Refer to"REMOVING THE FRONT FORK LEGS" and "INSTALLING THE FRONT FORK LEGS"
2	Cap bolt	1	
3	O-ring	1	
4	Lower bracket pinch bolt	1	
5	Front fork leg	1	
			For installation, reverse the removal procedure.

EAS00648



Order	Job/Part	Q'ty	Remarks
	Disassembling the front fork legs		Remove the parts in the order listed.
	Fork oil		Drain.
①	Fork spring	1	Refer to"DISASSEMBLING THE FRONT FORK LEGS" and "ASSEMBLING THE FRONT FORK LEGS"
②	Damper rod bolt/Copper washer	1/1	
③	Damper rod	1	
④	Rebound spring	1	
⑤	Inner tube	1	
⑥	Dust seal	1	
⑦	Oil seal clip	1	
⑧	Oil seal	1	
⑨	Outer tube	1	
			For assembly, reverse the disassembly procedure.

EAS00651
REMOVING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Stand the scooter on a level surface.

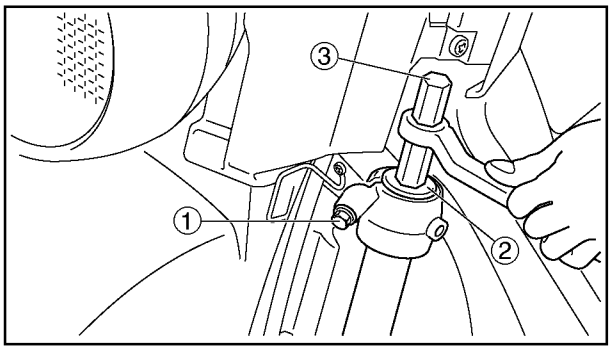
⚠WARNING

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

NOTE:

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

2. Remove:
   - ●front fork upper cover
   - ●front fork cover (left and right)
     Refer to "LEG SHIELD1,2"in chapter 3.
   - ●front wheel
     Refer to "FRONT WHEEL AND BRAKE".

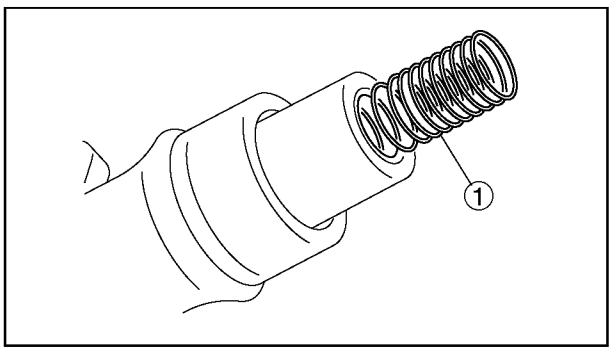


3. Loosen:
   - ●lower bracket pinch bolt ①
4. Remove:
   - ●cap bolt ②
     (with a 10 -mm hexagonal wrench③)

⚠WARNING

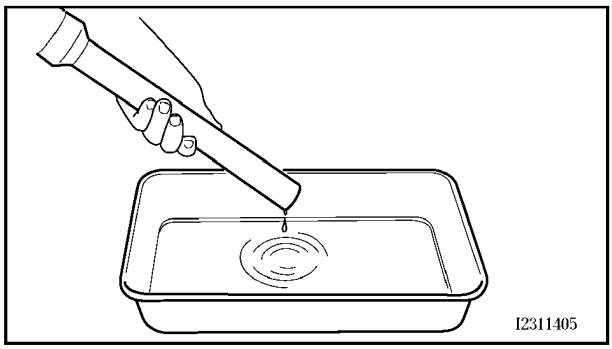
Before loosening the lower bracket pinch bolt, support the front fork leg.

5. Remove:
   - ●front fork leg

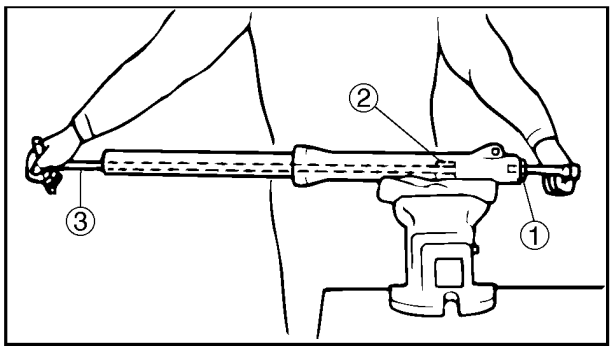


EAS00653
DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Remove:
   - ● fork spring①



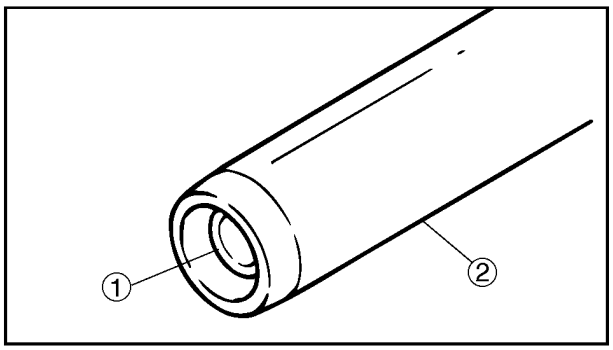
2. Drain:
   - fork oil



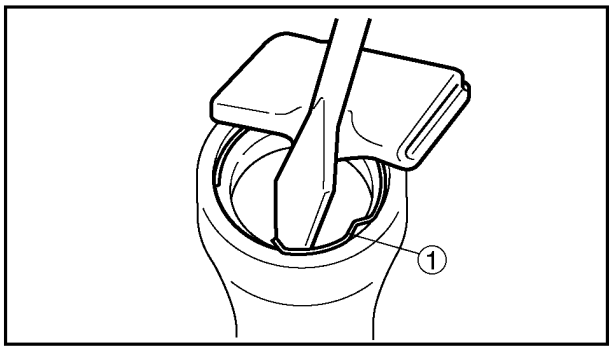
3. Remove:
   - damper rod assembly bolt①

NOTE:
While holding the damper rod with the damper rod holder ② and T-handle③, loosen the damper rod assembly bolt.

Damper rod holder
90890-01294(YM-01300-1)
T-handle
90890-01326(YM-01326)

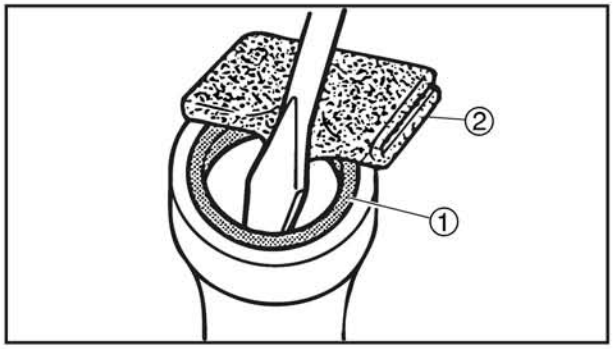


4. Remove:
   - damper rod①
   - spring
   - inner tube②



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

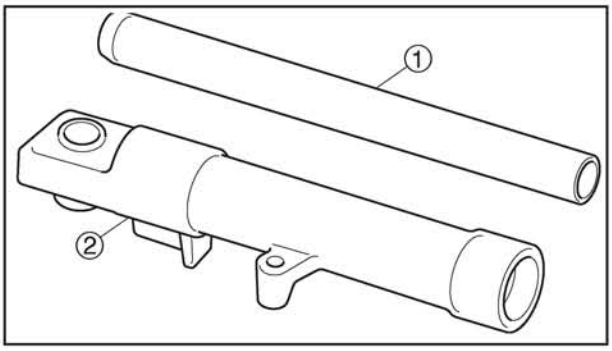
CAUTION:
Do not scratch the inner tube.



6. Remove:
   - oil seal①

CAUTION:
Never reuse the oil seal.

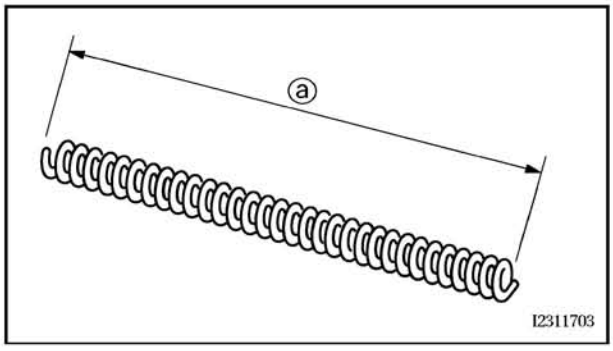
   - Rag②



EAS00656
CHECKING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

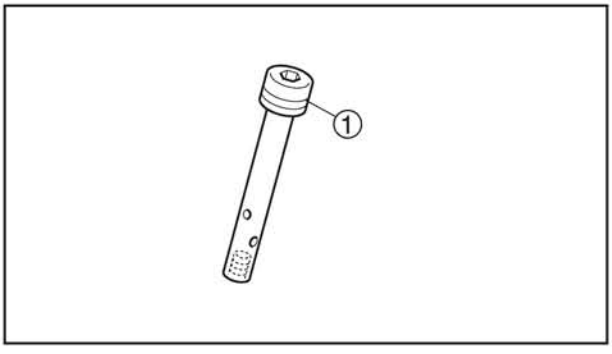
1. Check:
   - inner tube ①
   - outer tube ②
   Bends/damage/scratches → Replace.

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

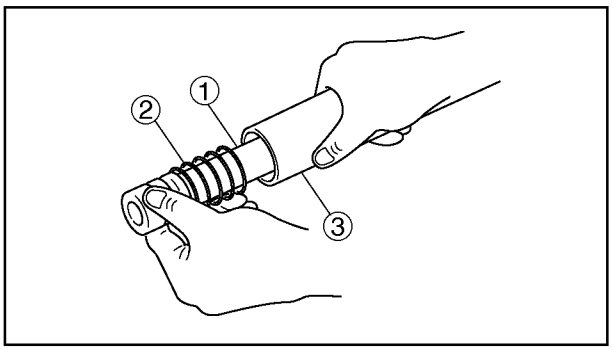


2. Measure:
   - spring free length ⓐ
   Out of specification → Replace.

Spring free length
202.2mm(7.96in)
<Limit> :198.2mm(7.80in)



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



EAS00658
ASSEMBLING THE FRONT FORK LEGS

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

NOTE:

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

1. Install:
   - damper rod assembly①
   - rebound spring ②

CAUTION:

Allow the damper rod assembly to slide slowly down the inner tube③ until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

2. Lubricate:
   - inner tube's outer surface

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

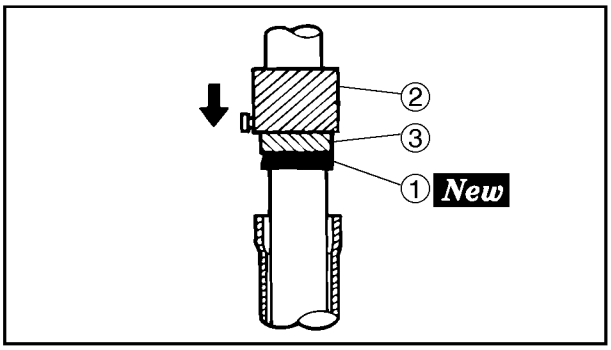
3. Tighten:
   - Copper washer **New**
   - damper rod assembly bolt ①

	23 Nm (2.3 m • kg, 16.6 ft • lb)

NOTE:

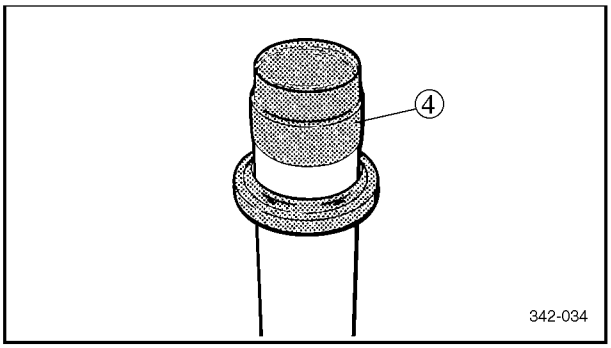
While holding the damper rod assembly with the damper rod holder ② and T-handle ③, tighten the damper rod assembly bolt.

	Damper rod holder **90890-01294(YM-01300-1)** **T-handle** **90890-01326(YM-01326)**



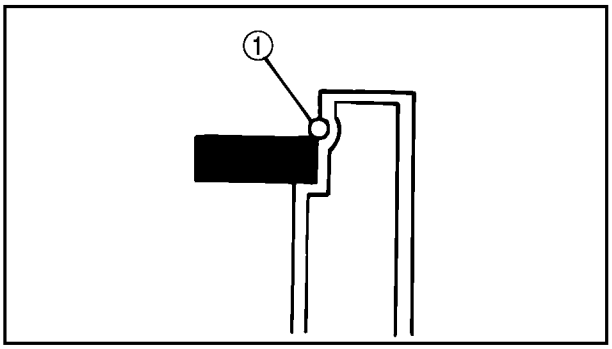
4. Install:
   - oil seal ① New
     (with the fork seal driver weight ② and adapter ③)

Fork seal driver weight
90890-01367(YM-A9409-7)
Adapter
90890-01400(YM-A9409-3)



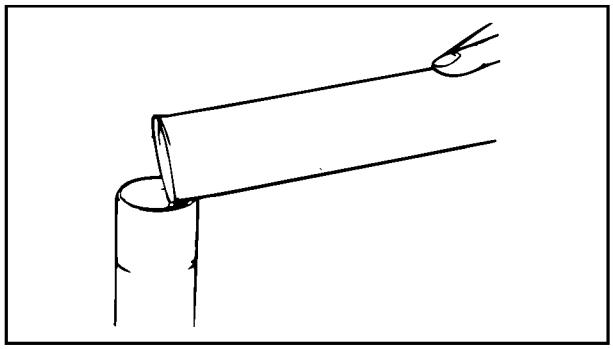
CAUTION:
Make sure the numbered side of the oil seal faces up.

NOTE:
- Before installing the oil seal, lubricate its lips with lithium soap base grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag ④ to protect the oil seal during installation.



5. Install:
   - oil seal clip ①

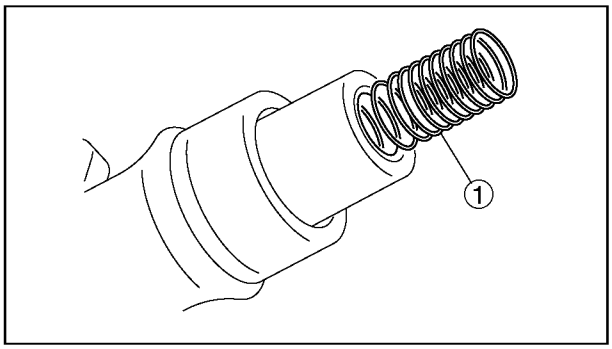
NOTE:
Adjust the oil seal clip so that it fits into the outer tube's groove.



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

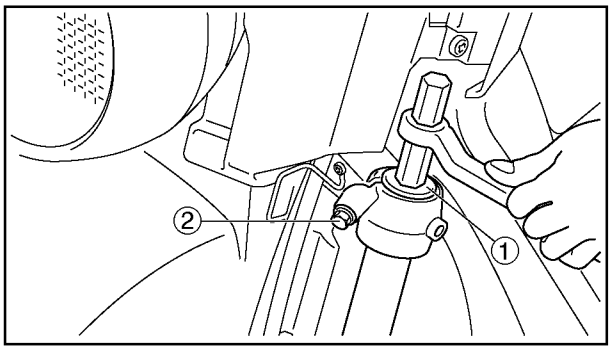
Quantity (each front fork leg)
0.042 L (0.038 Imp qt, 0.046 US qt)
Recommended oil
Fork oil 10W or equivalent

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



7. Install:
   - fork spring ①

NOTE:
- Install the spring with the smaller pitch facing down .



EAS00663
INSTALLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Install:
   - front fork leg
   - o-ring **New**
   - cap bolt

NOTE:
Pull up the inner tube until it stops, then install the cap bolt .

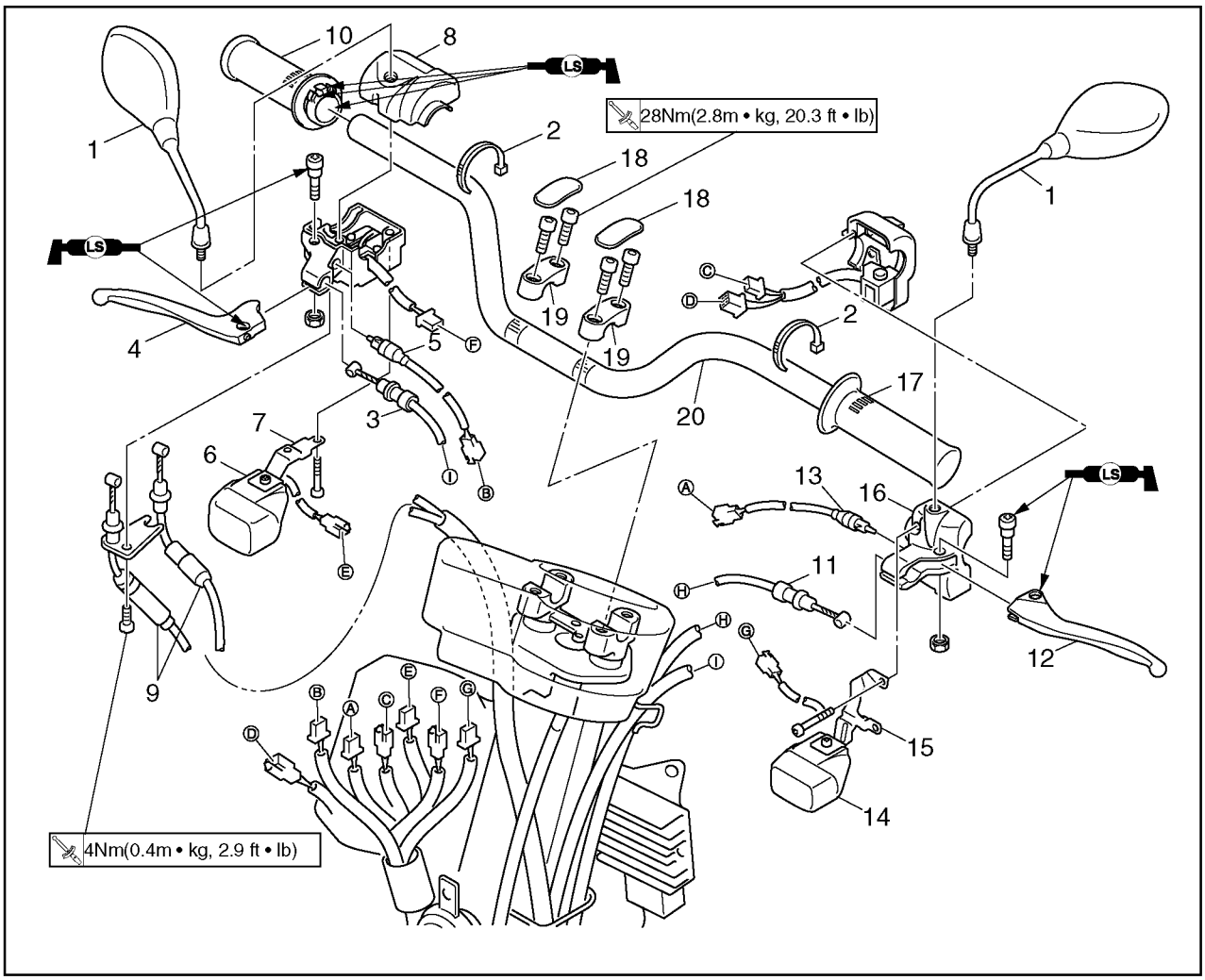
2. Tighten:
   - cap bolt ①

	45 Nm (4.5 m • kg, 32.5 ft • lb)

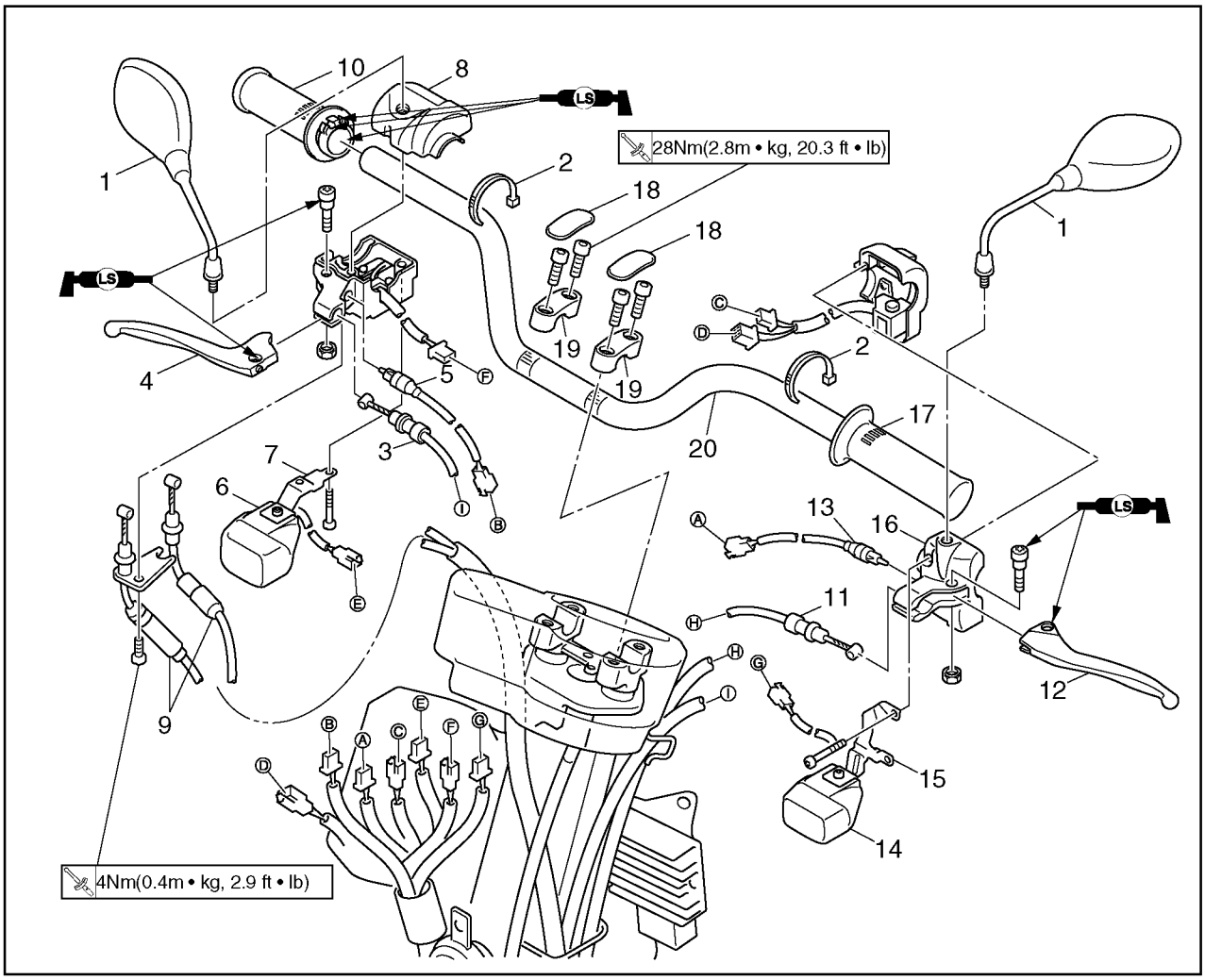
   - lower bracket pinch bolt ②

	30Nm(3.0m • kg, 21.7ft • lb)

EAS00664
HANDLEBAR



Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed.
	Front fork upper cover		Refer to"LEG SHIELD1,2"in chapter 3.
	Front fork cover(left and right)		
	Leg shield1,2		
1	Rear view mirror(left and right)	1/1	
2	Band	2	
3	Front brake cable	1	Disconnect.
4	Brake lever(right)	1	
5	Front brake switch	1	
6	Front turn signal light(right)	1	
7	Front turn signal light bracket(right)	1	
8	Handlebar switch(right)	1	
9	Throttle cable	2	Disconnect.
10	Throttle grip assembly	1	
11	Rear brake cable	1	Disconnect.
12	Brake lever(left)	1	
13	Rear brake switch	1	



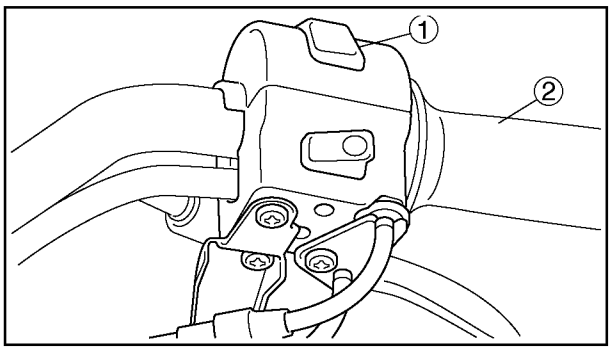
Order	Job/Part	Q'ty	Remarks
14	Front turn signal light(left)	1	
15	Front turn signal light bracket(left)	1	
16	Handlebar switch(left)	1	
17	Handlebar grip	1	
18	Cap	2	
19	Handlebar upper holder	2	
20	Handlebar assembly	1	
			For installation, reverse the removal procedure.

EAS00666
REMOVING THE HANDLEBAR

1. Stand the scooter on a level surface.

⚠ WARNING

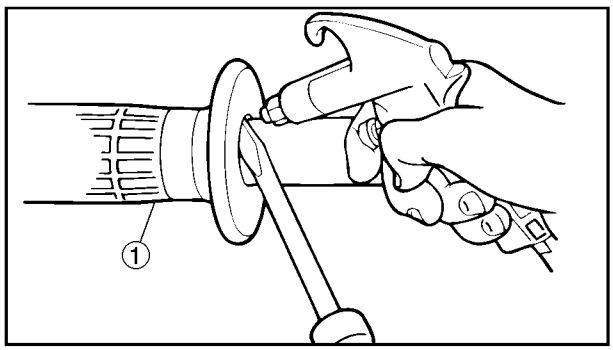
Securely support the scooter so that there is no danger of it falling over.



2. Remove:
   - handlebar switch(right)①
   - throttle grip assembly②

NOTE:

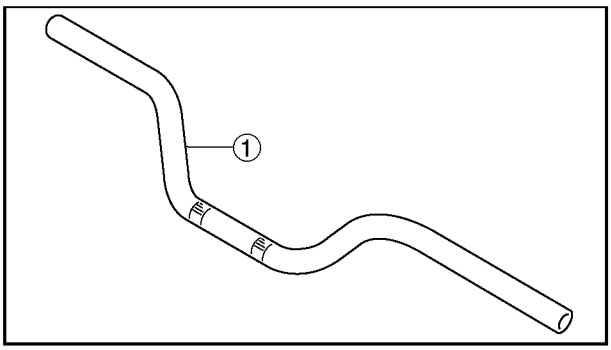
While removing the handlebar holder assembly (right), pull back the rubber cover.



3. Remove:
   - handlebar switch(left)
   - handlebar grip ①
   - handlebar upper holder

NOTE:

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



EAS00668
CHECKING THE HANDLEBAR

1. Check:
   - handlebar ①

   Bends/cracks/damage → Replace.

⚠ WARNING

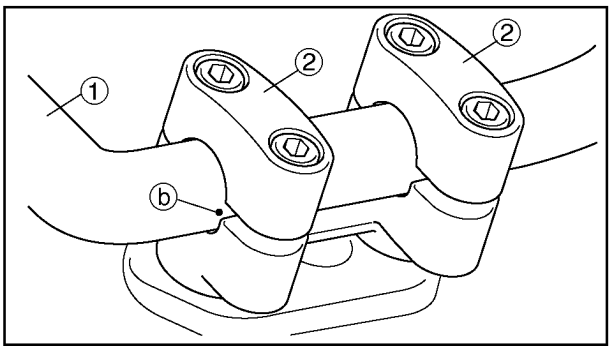
Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

EAS00673
INSTALLING THE HANDLEBAR

1. Stand the scooter on a level surface.

⚠WARNING

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

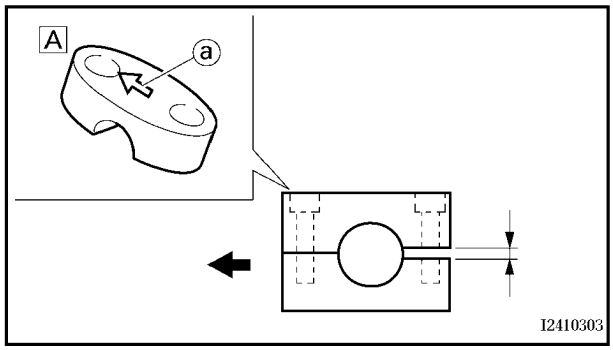


2. Install:
   - handlebar ①
   - handlebar upper holders ②

28Nm(2.8m • kg, 20.3ft • lb)

CAUTION:

First, tighten the bolts on the front side of the handlebar holders, and then on the rear side.



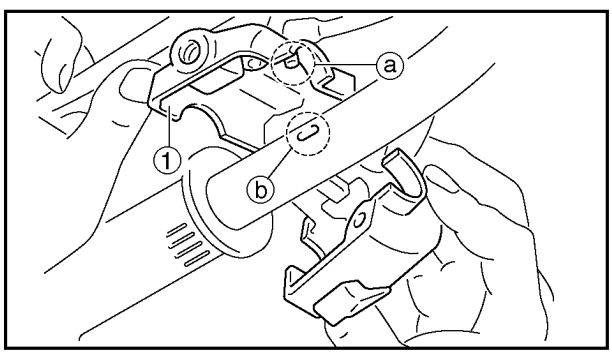
NOTE:

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

3. Install:
   - handlebar grip

NOTE:

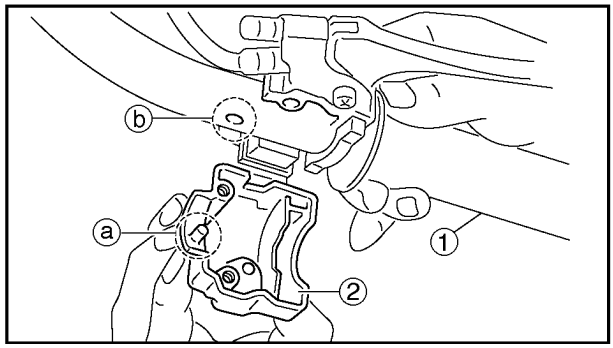
Before installing the handlebar grip, apply the bond.

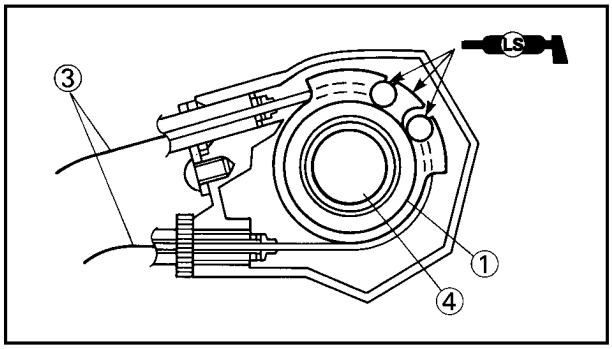


4. Install:
   - left handlebar switch ①

NOTE:

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





5. Install:
   - throttle grip assembly①
   - right handlebar switch②
   - throttle cables ③

NOTE:
- Align the projection ⓐ on the right handlebar switch with the hole ⓑ on the handlebar.
- Lubricate the inside of the throttle grip with a thin coat of lithium-soap-based grease and install it onto the handlebar④.

⚠WARNING

Make sure the throttle grip operates smoothly.

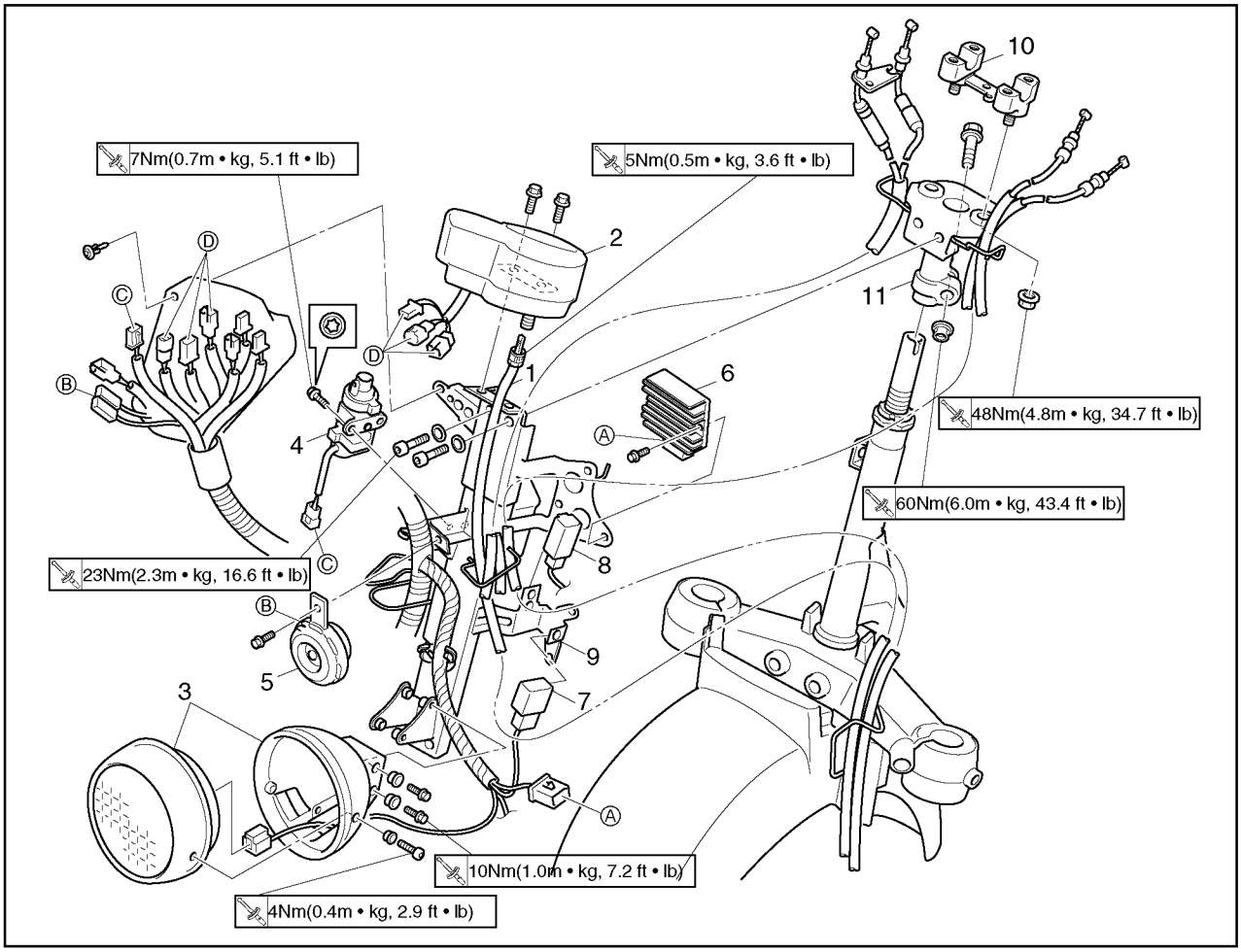
6. Adjust:
   - throttle cable free play
     Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.

Throttle cable free play (at the flange of the throttle grip)
1.5~3.5mm(0.06~0.14in)

EAS00675

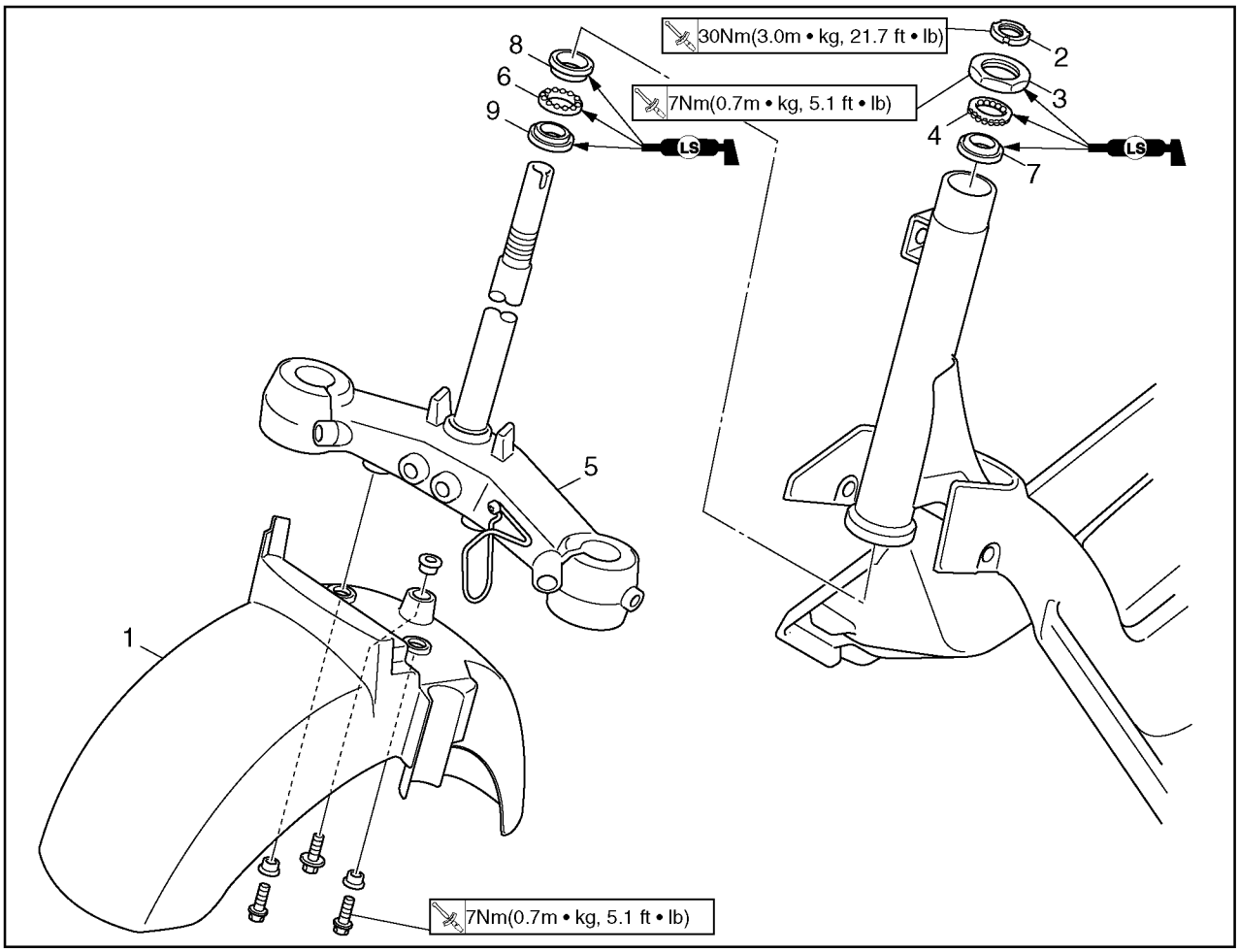
STEERING HEAD

HANDLEBAR BRACKET AND HEADLIGHT STAY BRACKET

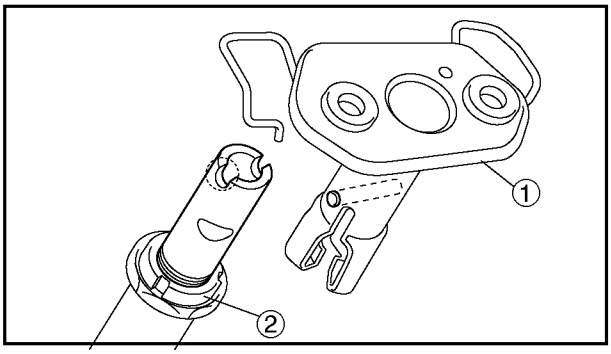


Order	Job/Part	Q'ty	Remarks
	Removing the handlebar bracket and headlight stay bracket		Remove the parts in the order listed.
	Front fork upper cover		
	Front fork cover(left and right)		Refer to"LEG SHIELD1,2"in chapter 3.
	Leg shield1,2		
	Handlebar assembly		Refer to"HANDLEBAR".
1	Speedometer cable	1	
2	Speedometer	1	
3	Headlight unit/Headlight body	1/1	
4	Main switch	1	
5	Horn	1	
6	Rectifier/regulator	1	
7	Turn signal relay	1	Disconnect.
8	Starting circuit cut-off relay	1	Disconnect.
9	Headlight stay bracket	1	
10	Handlebar lower holder	1	
11	Handlebar bracket	1	
			For installation, reverse the removal procedure.

LOWER BRACKET



Order	Job/Part	Q'ty	Remarks
	Removing the lower bracket		Remove the parts in the order listed.
	Front fork upper cover		
	Front fork cover(left and right)		Refer to"LEG SHIELD1,2"in chapter 3.
	Leg shield1,2		
	Front wheel		Refer to"FRONT WHEEL AND BRAKE".
	Front fork legs		Refer to"FRONT FORK"
	Handlebar assembly		Refer to"HANDLEBAR".
	Headlight stay bracket		Refer to"HANDLEBAR BRACKET AND
	Handlebar bracket		HEADLIGHT STAY BRACKET"
1	Front fender	1	
2	Ring nut	1	
3	Upper bearing inner race	1	
4	Upper bearing	1	Refer to"REMOVING THE LOWER
5	Lower bracket	1	BRACKET" and "INSTALLING THE
6	Lower bearing	1	STEERING HEAD".
7	Upper bearing outer race	1	
8	Lower bearing outer race	1	
9	Lower bearing inner race	1	
			For installation, reverse the removal procedure.



EAS00678
REMOVING THE LOWER BRACKET

1. Stand the scooter on a level surface.

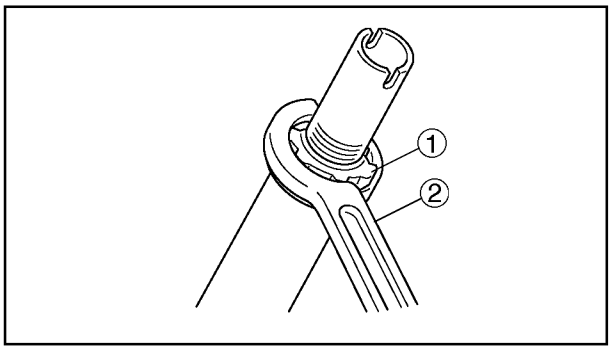
⚠WARNING

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

2 . Remove:
- handlebar bracket①

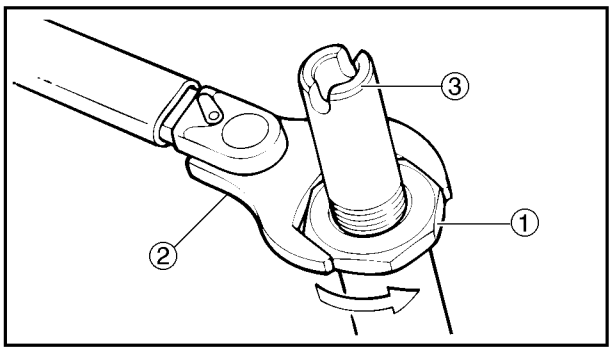
NOTE:

Remove the handlebar bracket by loosening the ring nut② gradually.



3. Remove:
- ring nut ①
  (with the ring nut wrench ②)

Ring nut wrench
90890-01268
YU-01268



4 . Remove:
- upper bearing inner race①
  (with the steering nut wrench②)

Steering nut wrench
90890-01444
YM-A9409-7

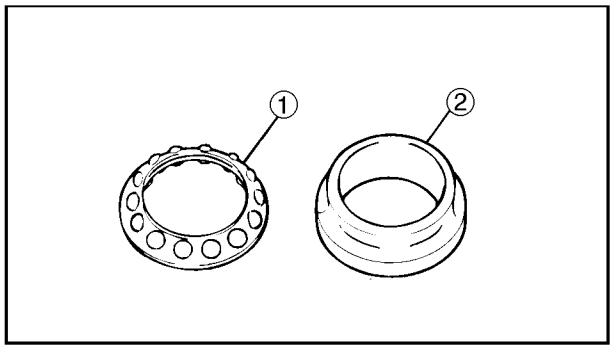
⚠WARNING

Securely support the lower bracket③ so that there is no danger of it falling.

EAS00682
CHECKING THE STEERING HEAD

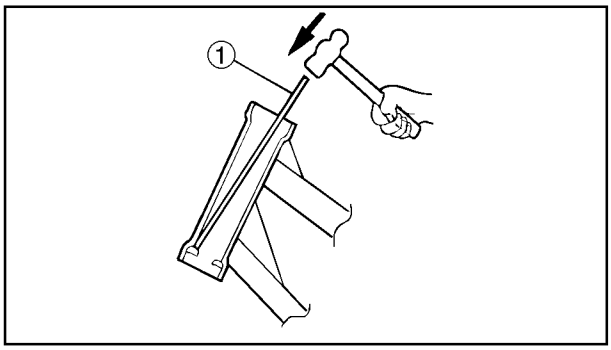
1. Wash:
   - bearing balls
   - bearing races

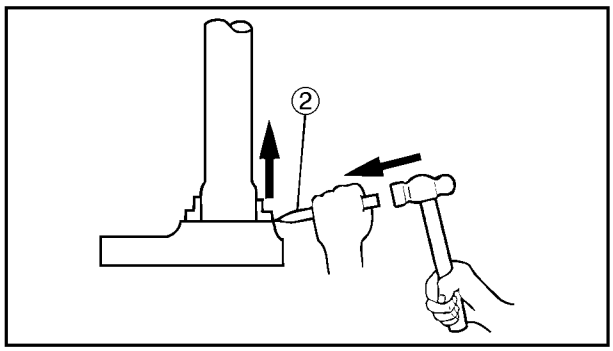
	Recommended cleaning solvent **Kerosene**



2. Check:
   - bearing balls ①
   - bearing races ②

   Damage/pitting → Replace.





3. Replace:
   - bearing balls
   - bearing races

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.
b. Remove the bearing race from the front fork assembly with a floor chisel ② and hammer.
c. Install a new bearing races.

CAUTION:

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

NOTE:

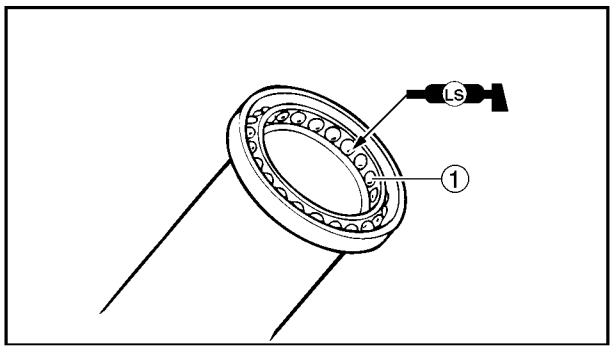
Always replace the balls and bearing races as a set.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

4. Check:
   - lower bracket

   (along with the steering stem)

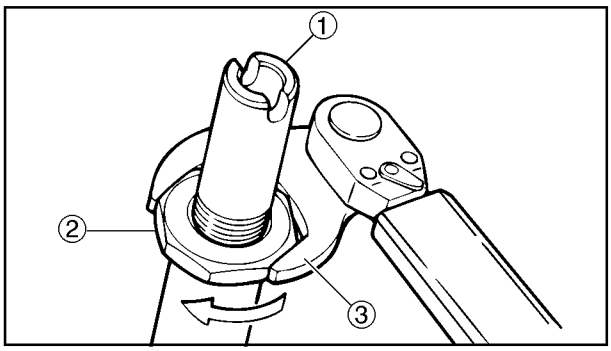
   Bends/cracks/damage → Replace.



EAS00684
INSTALLING THE STEERING HEAD

1. Lubricate:
   - bearing balls ①
   - bearing races

	Recommended lubricant **Lithium-soap-based grease**

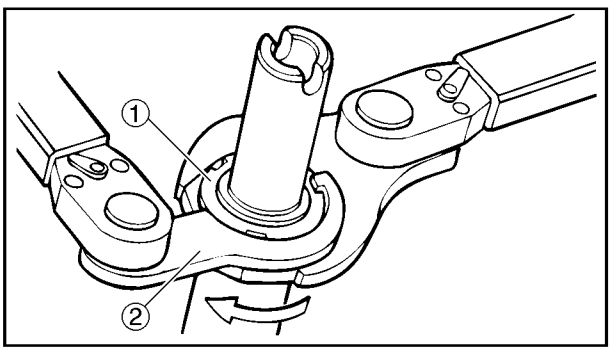


2. Install:
   - lower bracket ①
   - upper bearing inner race②

   (with the steering nut wrench③)

	Upper bearing inner race **7Nm(0.7m • kg, 5.1ft • lb)**

	Steering nut wrench **90890-01444** **YM-A9409-7**

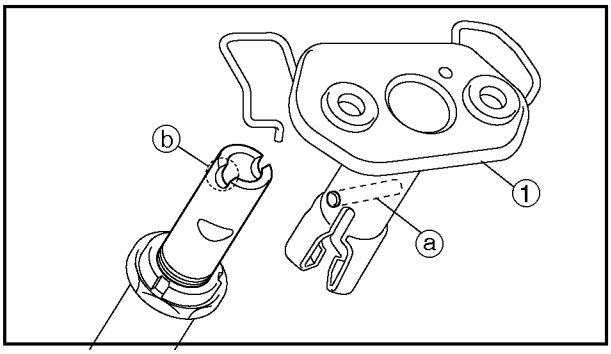


3. Install:
   - ring nut ①

   (with the steering nut wrench②)

	Ring nut **30Nm(3.0m • kg, 21.7ft • lb)**

	Steering nut wrench **90890-01403** **YU-A9472**



4. Install:
   - handlebar bracket①

NOTE:

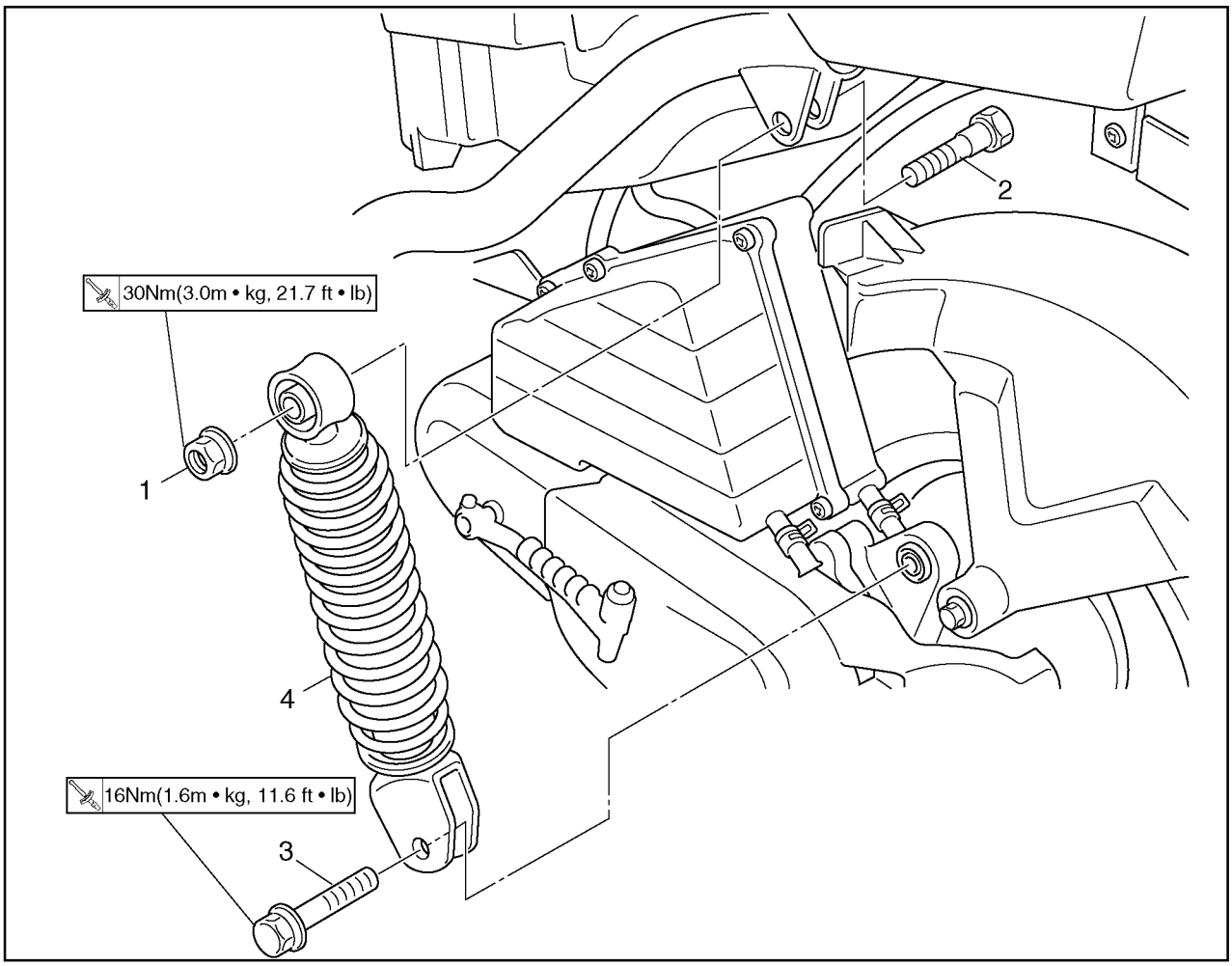
Align the handlebar bracket across rod ⓐ on the lower bracket concave ⓑ .

5. Tighten:
   - handlebar bracket nut

	60Nm(6.0m • kg, 43.4ft • lb)

EAS00685

REAR SHOCK ABSORBER ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber assembly		Remove the parts in the order listed.
	Front cover Side cover(left)		Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT"in chapter 3.
1	Rear shock absorber assembly upper nut	1	
2	Rear shock absorber assembly upper bolt	1	
3	Rear shock absorber assembly lower bolt	1	
4	Rear shock absorber assembly	1	For installation, reverse the removal procedure.

EAS00692
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the scooter on a level surface.

⚠ WARNING

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

NOTE:

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

2. Remove:
   - front cover
   - side cover(left)

   Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT"in chapter 3.
3. Remove:
   - rear shock absorber nut(upper)
   - rear shock absorber bolt(upper)
   - rear shock absorber bolt(lower)

EAS00695
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - rear shock absorber rod

     Bend/damage → Replace the rear shock absorber assembly.
   - rear shock absorber

     Oil leak → Replace the rear shock absorber assembly.
   - spring

     Damage/wear → Replace the rear shock absorber assembly.
   - bushing

     Damage/wear → Replace.
   - dust seal

     Damage/wear → Replace.
   - bolts

     Bends/damage/wear → Replace.

EAS00698

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
   - rear shock absorber assembly
2. Tighten:
   - rear shock absorber assembly upper nut

	30Nm(3.0m • kg, 21.7ft • lb)

   - rear shock absorber assembly lower bolt

	16Nm(1.6m • kg, 11.6ft • lb)

3. Install:
   - side cover(left)
   - front cover

   Refer to"SIDE COVERS AND TAIL/ BRAKE LIGHT"in chapter 3.

CHAPTER 5
ENGINE

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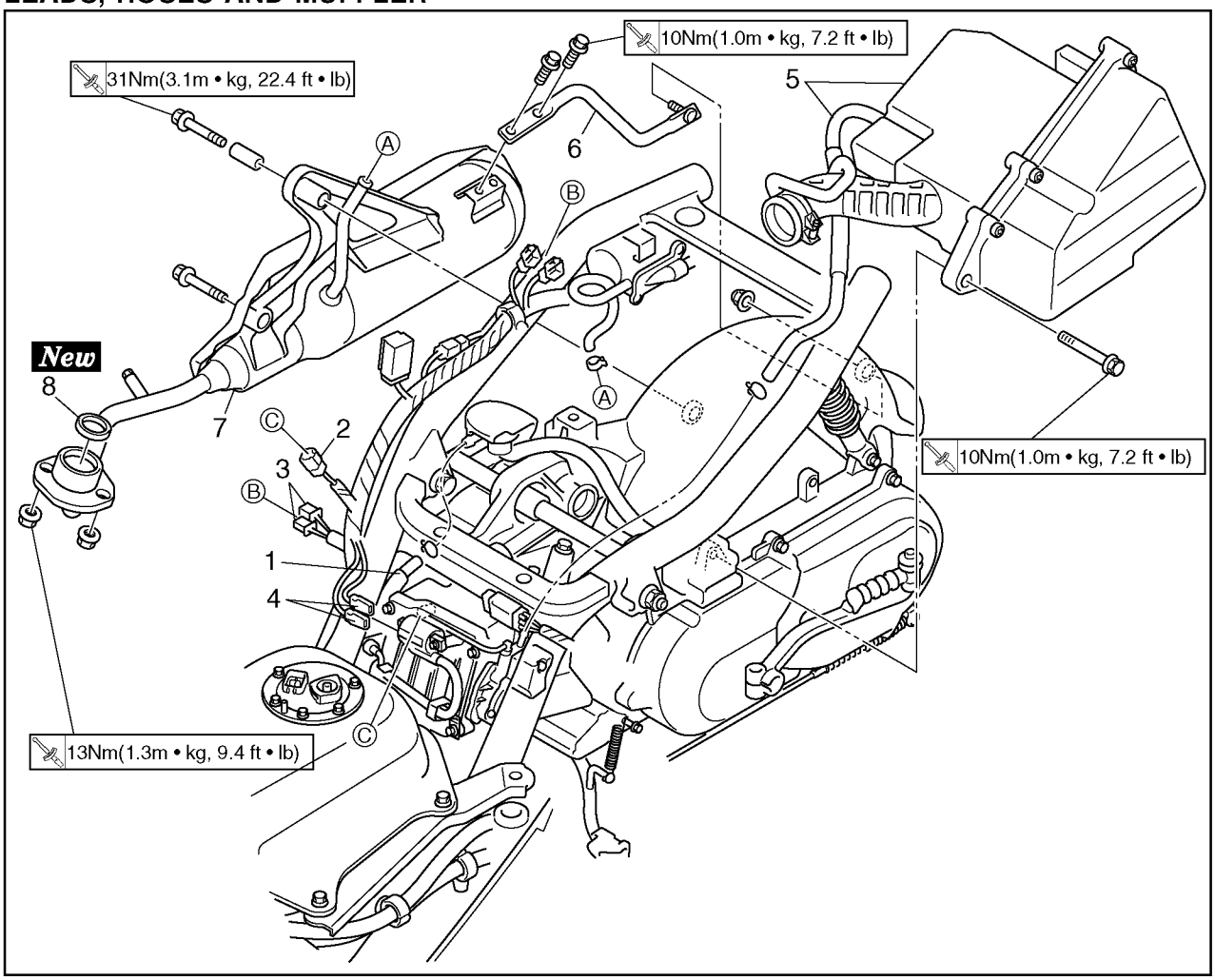
EAS00188

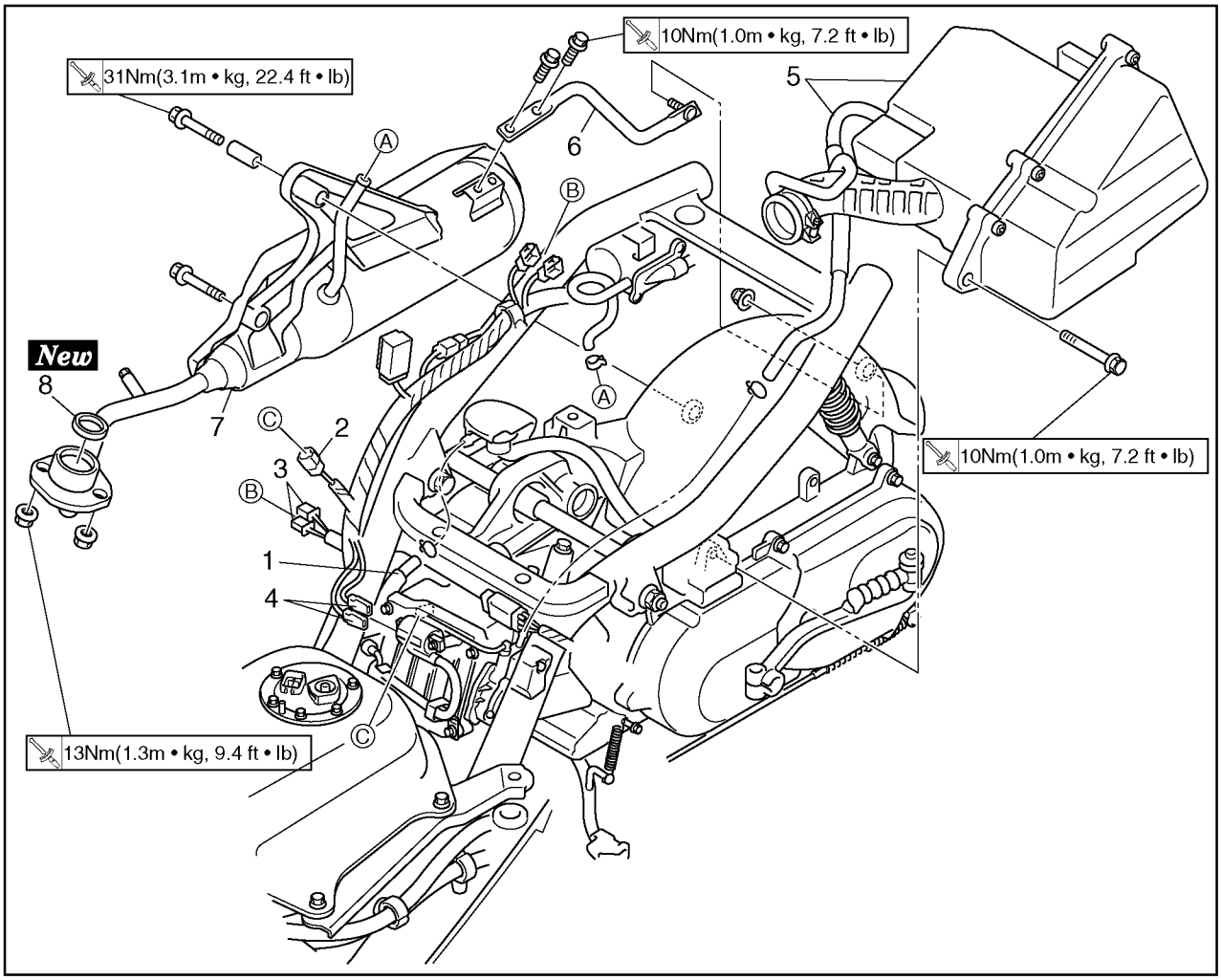
ENGINE

ENGINE REMOVAL

LEADS, HOSES AND MUFFLER

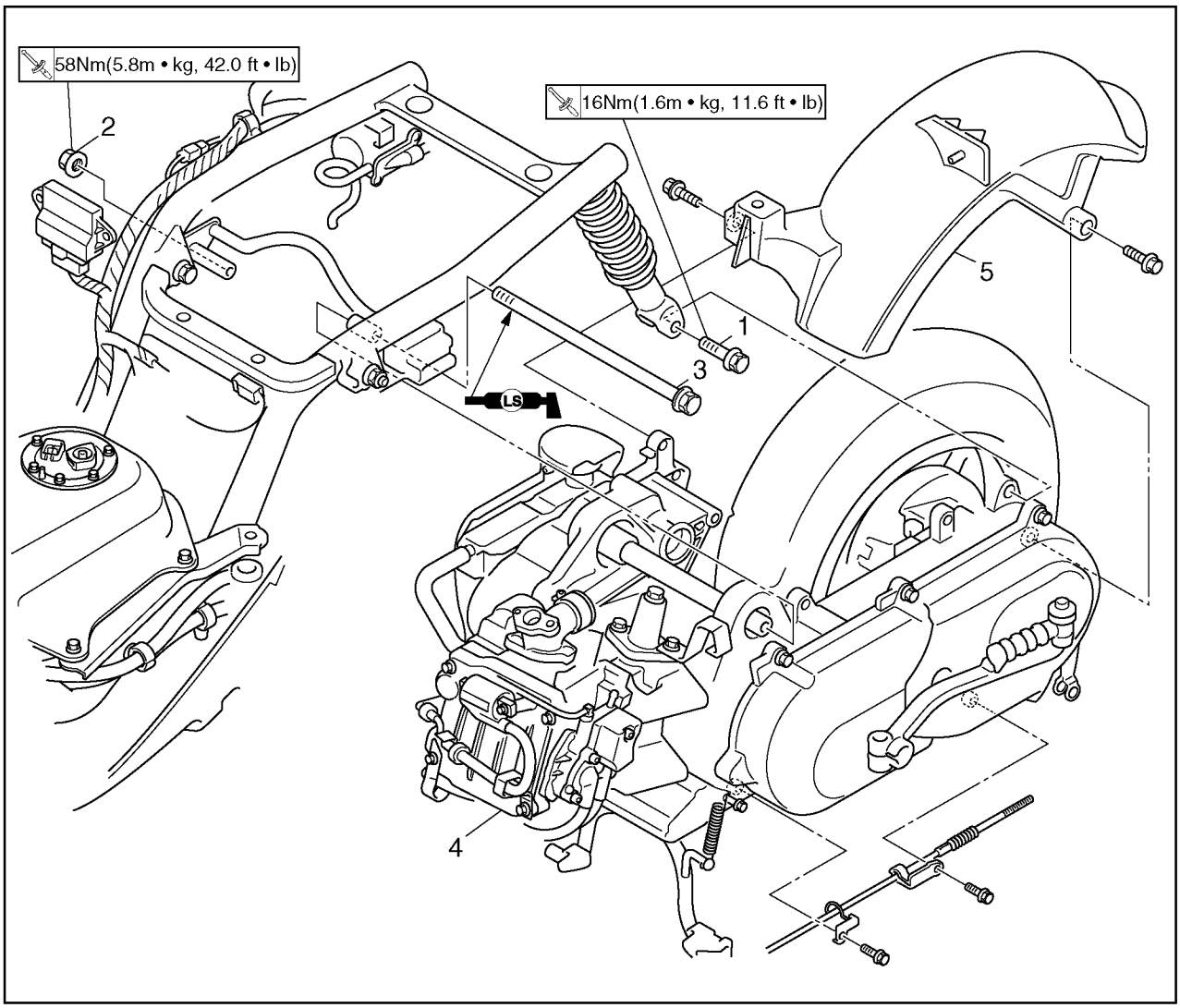


Order	Job/Part	Q'ty	Remarks
	Removing the leads, hoses and muffler		Remove the parts in the order listed.
	Front cover/Single seat/Trunk Battery cover/Battery Side cover(left and right) Footrest board		Refer to"COVER AND PANEL"in chapter 3.
	Coolant		Drain. Refer to"CHANGING THE COOLANT"in chapter 3.
	Rear brake cable/Adjuster/Pin		Refer to"REAR WHEEL AND BRAKE"in chapter 4.
	Throttle body and fuel injector		Refer to"THROTTLE BODY AND FUEL INJECTOR"in chapter 7.
	Starter motor		Refer to"STARTER MOTOR"in chapter 8.
1	Conduit hose	1	Disconnect.
2	Coolant temperature sensor coupler	1	Disconnect.

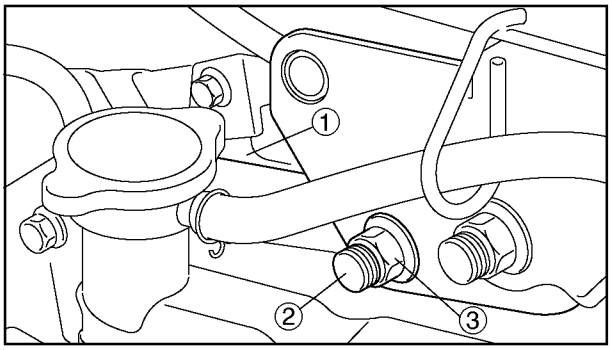


Order	Job/Part	Q'ty	Remarks
3	Crankshaft position sensor/Stator assembly coupler	1/1	Disconnect.
4	Ignition primary coil coupler	1	Disconnect.
5	Air filter assembly/Breather hose	1/1	
6	Bracket	1	
7	Muffler	1	
8	Gasket	1	
			For installation, reverse the removal procedure.

EAS00191
ENGINE



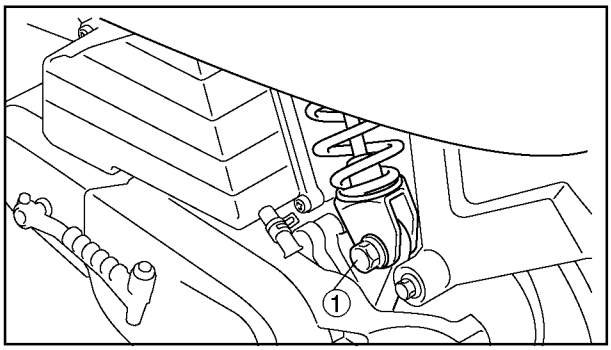
Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed. **NOTE:** Place a suitable stand under the frame and engine.
1	Rear shock absorber assembly lower bolt	1	
2	Engine mounting nut	1	Refer to"INSTALLING THE ENGINE".
3	Engine mounting bolt	1	
4	Engine	1	
5	Rear fender	1	
			For installation, reverse the removal procedure.



EAS00192
INSTALLING THE ENGINE

1. Install:
   - engine①
   - engine mounting bolt②
   - engine mounting nut③

NOTE:
- Apply lithium-soap-based grease to the unthreaded portion of the engine mounting bolt shaft.
- Do not fully tighten the engine mounting bolt..



2. Install:
   - rear shock absorber assembly lower bolt①

NOTE:
Do not fully tighten the bolt.

3. Tighten:
   - engine mounting bolt

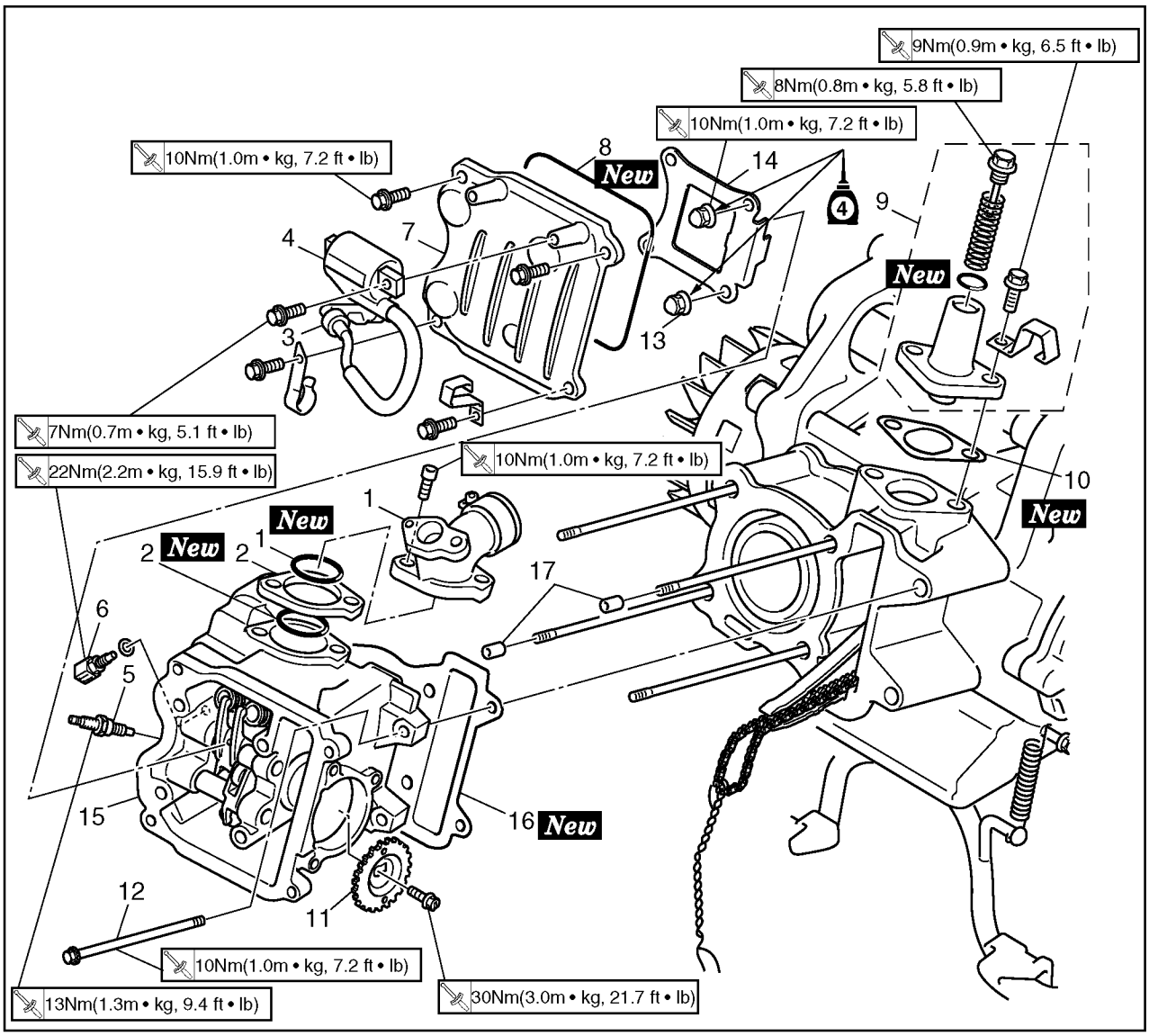
	58Nm(5.8m • kg, 42.0ft • lb)

   - rear shock absorber assembly lower bolt

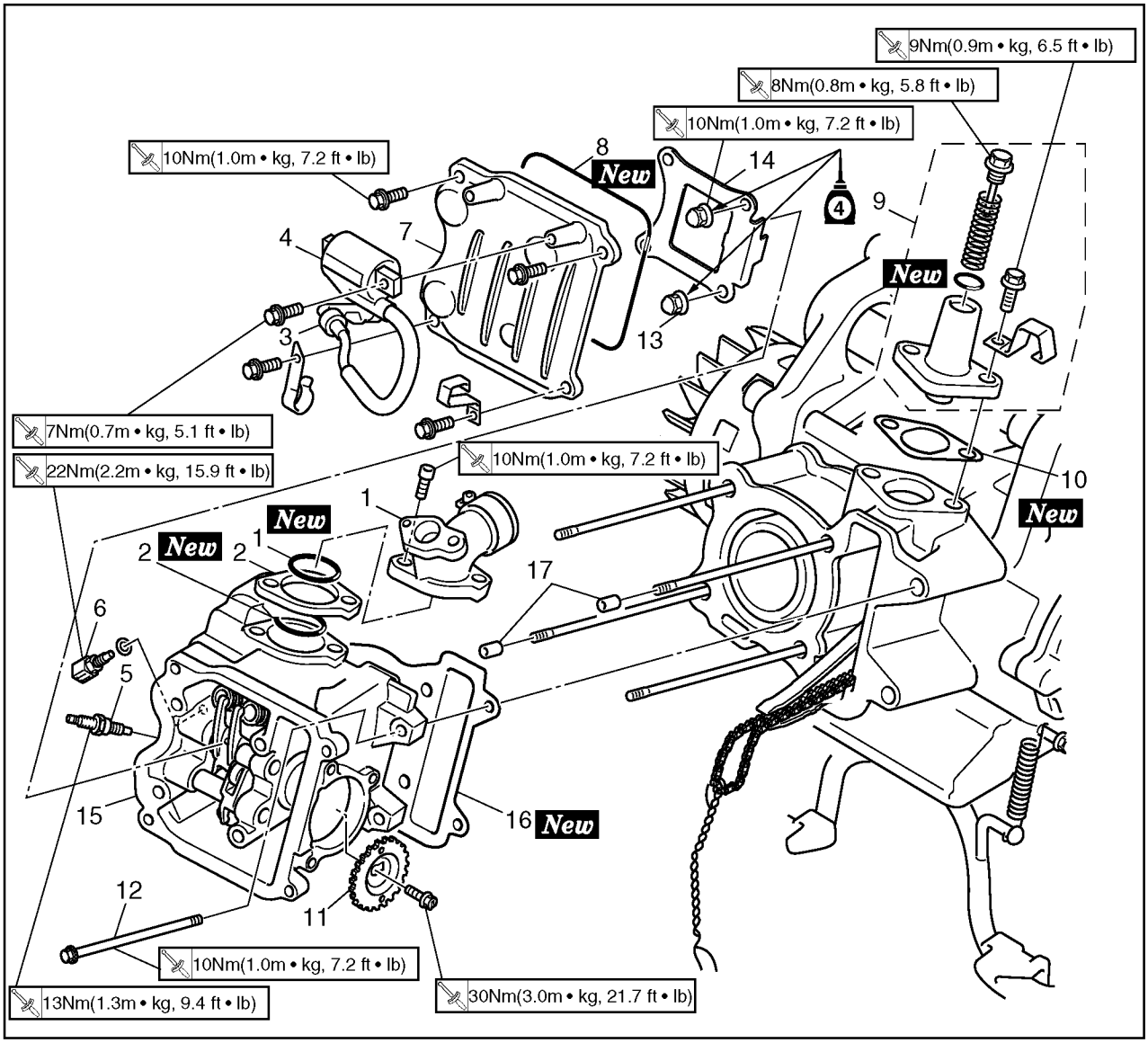
	16Nm(1.6m • kg, 11.6ft • lb)

EAS00221

CYLINDER HEAD



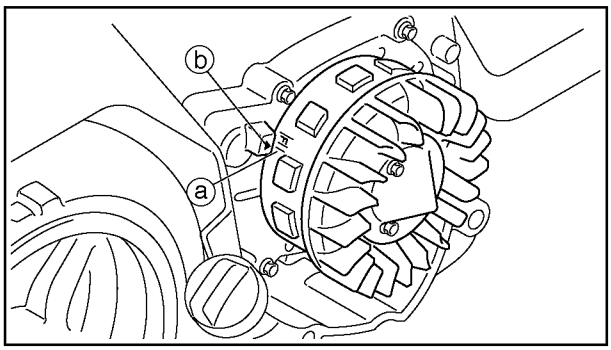
Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Radiator		Refer to"COOLING SYSTEM"in chapter 6.
	Thermostat		
	Water pump		
	Muffler/Bracket		Refer to"ENGINE REMOVAL".
1	Intake manifold/O-ring	1/1	
2	Joint/O-ring	1/1	
3	Spark plug cap	1	
4	Ignition coil	1	
5	Spark plug	1	
6	Coolant temperature sensor	1	
7	Cylinder head cover	1	
8	O-ring	1	
9	Timing chain tensioner	1	



Order	Job/Part	Q'ty	Remarks
10	Timing chain tensioner gasket	1	
11	Camshaft sprocket	1	Refer to"REMOVING THE CYLINDER HEAD" and "INSTALLING THE CYLINDER HEAD".
12	Bolt	2	
13	Nut	4	
14	Plate	1	
15	Cylinder head	1	
16	Cylinder head gasket	1	
17	Dowel pin	2	
			For installation, reverse the removal procedure.

EAS00225
REMOVING THE CYLINDER HEAD

1. Remove :
   - V-belt case cover
   - Refer to “BELT DRIVE”.
   - cylinder head cover



2. Align:
   - “I” mark ⓐ on the AC magneto rotor (with the stationary pointer ⓑ on the crankcase cover)

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a. Turn the primary fixed sheave counterclockwise.
b. When the piston is at TDC on the compression stroke, align the “I” mark ⓒ on the camshaft sprocket with the mark ⓓ on the plate.

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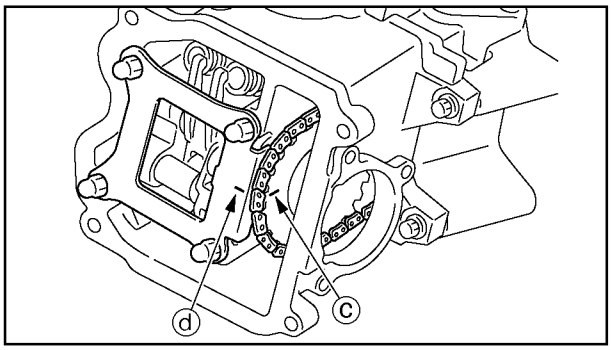
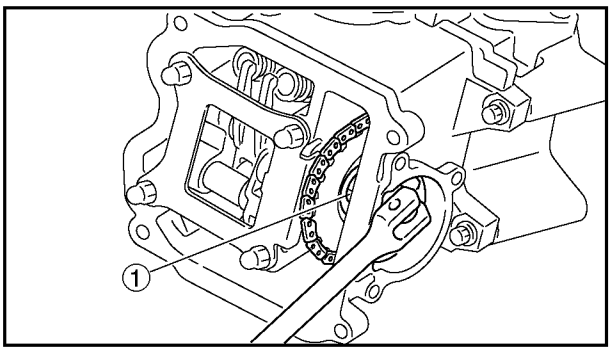
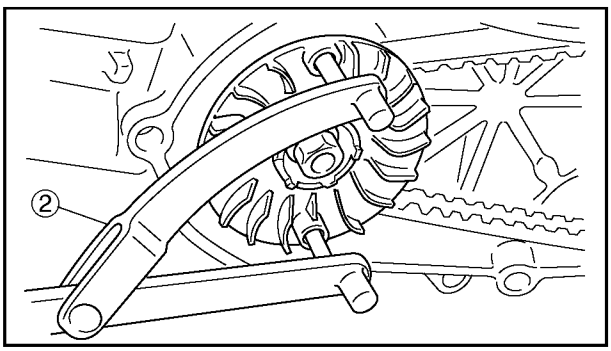


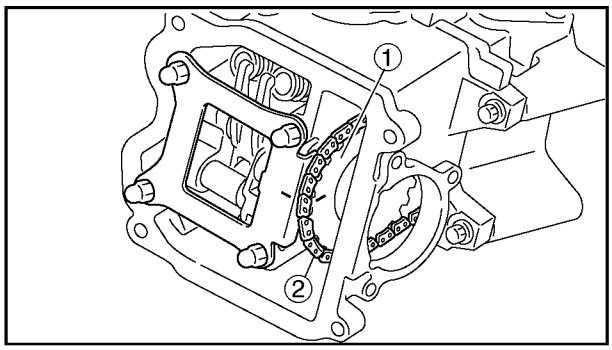


3. Loosen:
   - timing chain tensioner cap bolt
   - camshaft sprocket bolt ①

   While holding the crank bolt with a wrench②, remove the camshaft sprocket bolt.

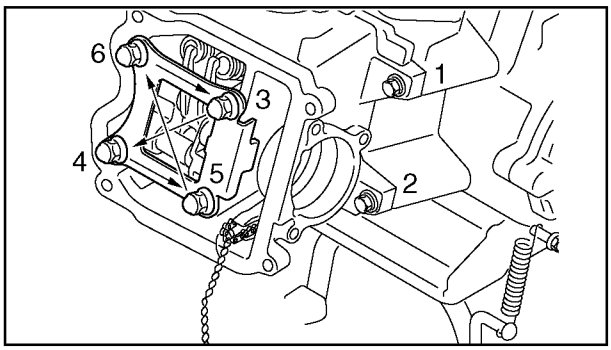
Rotor holding tool
90890-01235
YU-01235





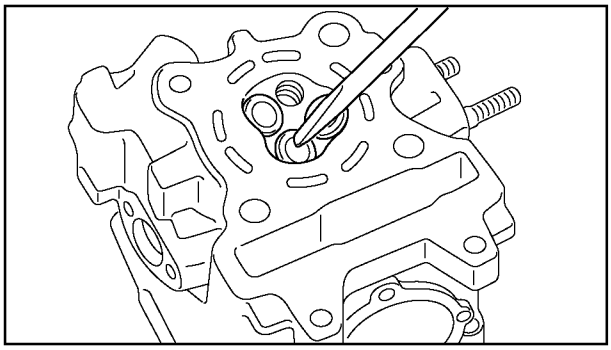
4. Remove:
   - timing chain tensioner (along with the gasket)
   - camshaft sprocket ①
   - timing chain ②

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



5. Remove:
   - cylinder head

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

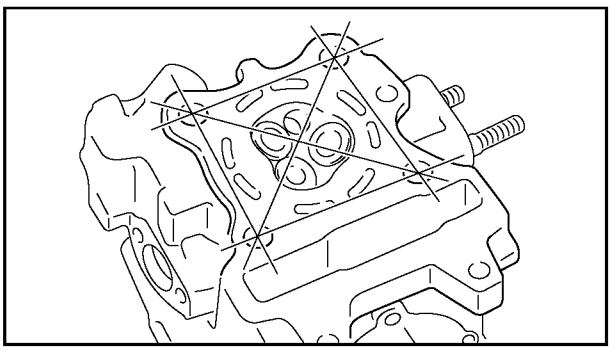


EAS00227
CHECKING THE CYLINDER HEAD

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

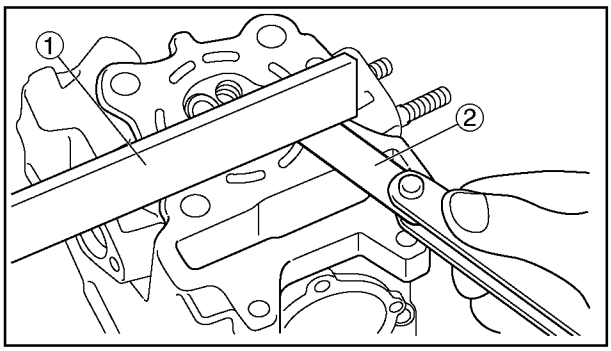
NOTE:
Do not use a sharp instrument to avoid damaging or scratching:
- spark plug bore thread
- valve seats

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



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

Maximum cylinder head warpage
0.05 mm (0.0020 in)



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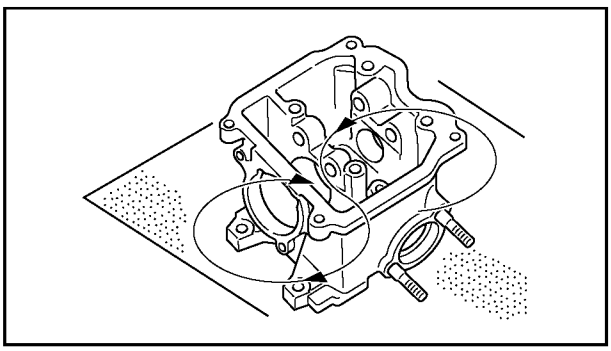
a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

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



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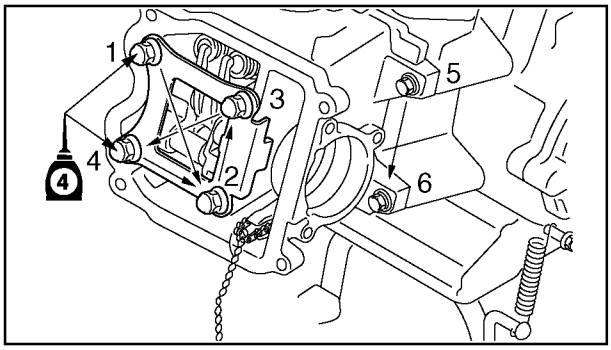


EAS00231
INSTALLING THE CYLINDER HEAD

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

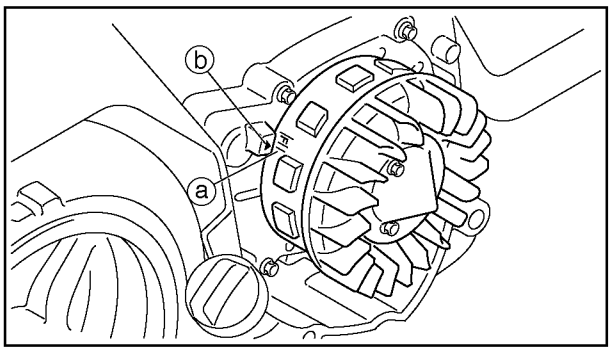
	10 Nm (1.0 m • kg, 7.2 ft • lb)

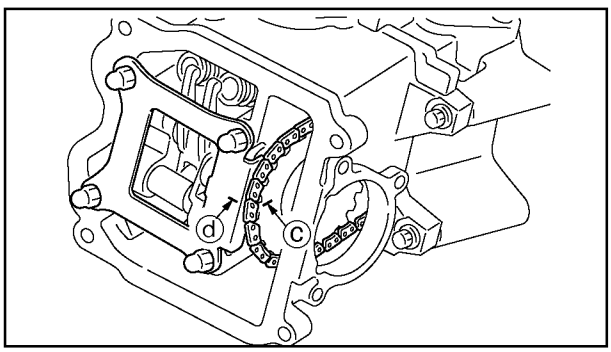
   - cylinder head bolts

	10 Nm (1.0 m • kg, 7.2 ft • lb)

NOTE:

- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages
  - cylinder head tightening sequence (1→2→3→4→2→5→6)





4. Install:
   - camshaft sprocket
   - timing chain

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a. Turn the primary pulley counterclockwise.
b. Align the "I" mark ⓐ on the AC magneto rotor with the stationary pointer ⓑ on the crankcase cover.
c. Align the "I" mark ⓒ on the camshaft sprocket with the stationary pointer ⓓ on the plate.
d. Install the timing chain onto the camshaft sprocket, and then install the camshaft sprocket onto the camshaft.

NOTE:

- When installing the camshaft sprocket, be sure to keep the timing chain as tight as possible on the exhaust side.
- Align the slot on the camshaft with the tab in the camshaft sprocket.

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

e. While holding the camshaft, temporarily tighten the camshaft sprocket bolt.
f. Remove the wire from the timing chain.

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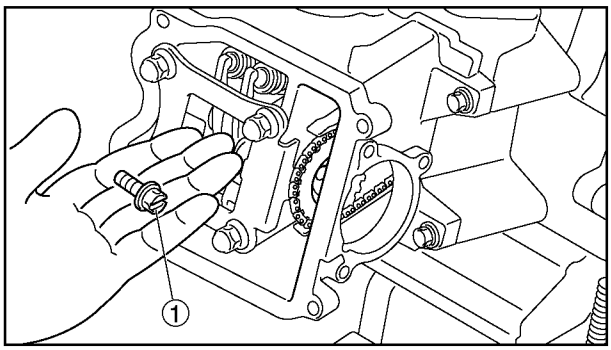
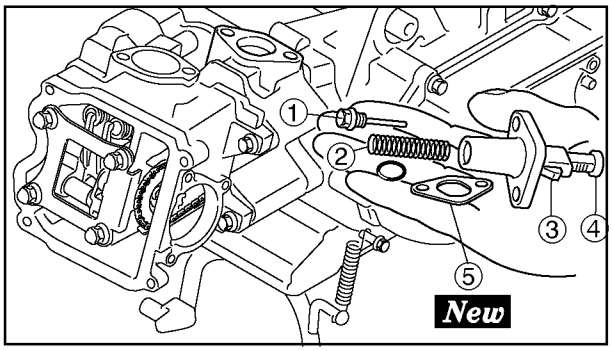


5. Install
   ●camshaft sprocket bolt ①



6. Install:
   ●timing chain tensioner gasket **New**
   ●timing chain tensioner

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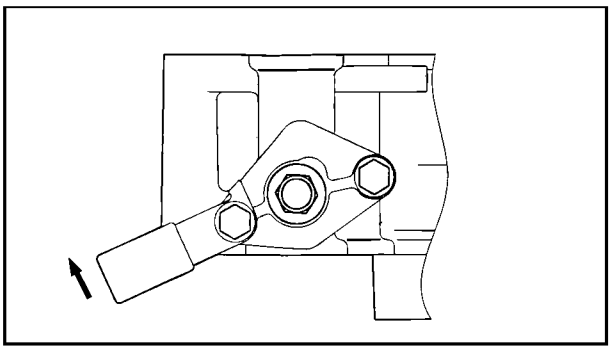
a. Remove the cap bolt ① and spring ②.
b. Release the timing chain tensioner one-way cam ③ and push the timing chain tensioner rod ④ all the way into the timing chain tensioner housing.
c. Install the timing chain tensioner and gasket ⑤ onto the cylinder.



	Timing chain tensioner bolt **9 Nm (0.9 m • kg, 6.5 ft • lb)**

d. Install the springs ② and cap bolt ①.

	Cap bolt **8 Nm (0.8 m • kg, 5.8 ft • lb)**

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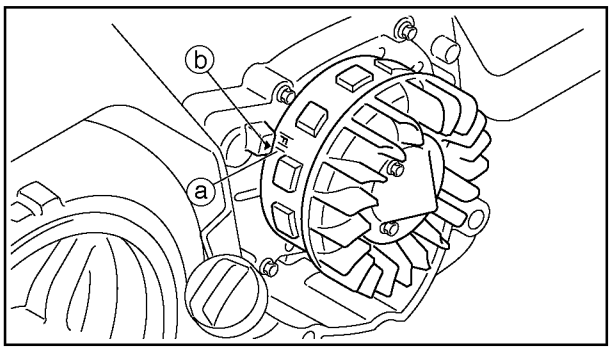
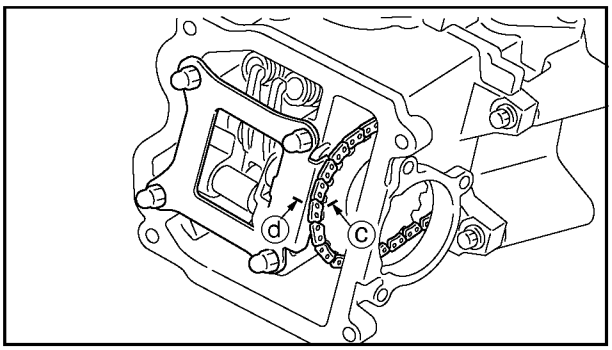
7. Turn:
   - crankshaft
     (several turns counterclockwise)





8. Check:
   - "I" mark ⓐ
     Align the "I" mark on the AC magneto rotor with the stationary pointer ⓑ on the crankcase cover.
   - "I" mark ⓒ
     Align the "I" mark on the camshaft sprocket with the stationary pointer ⓓ on the plate.
     Out of alignment → Correct.
     Refer to the installation steps above.

9. Tighten:
   - camshaft sprocket bolt

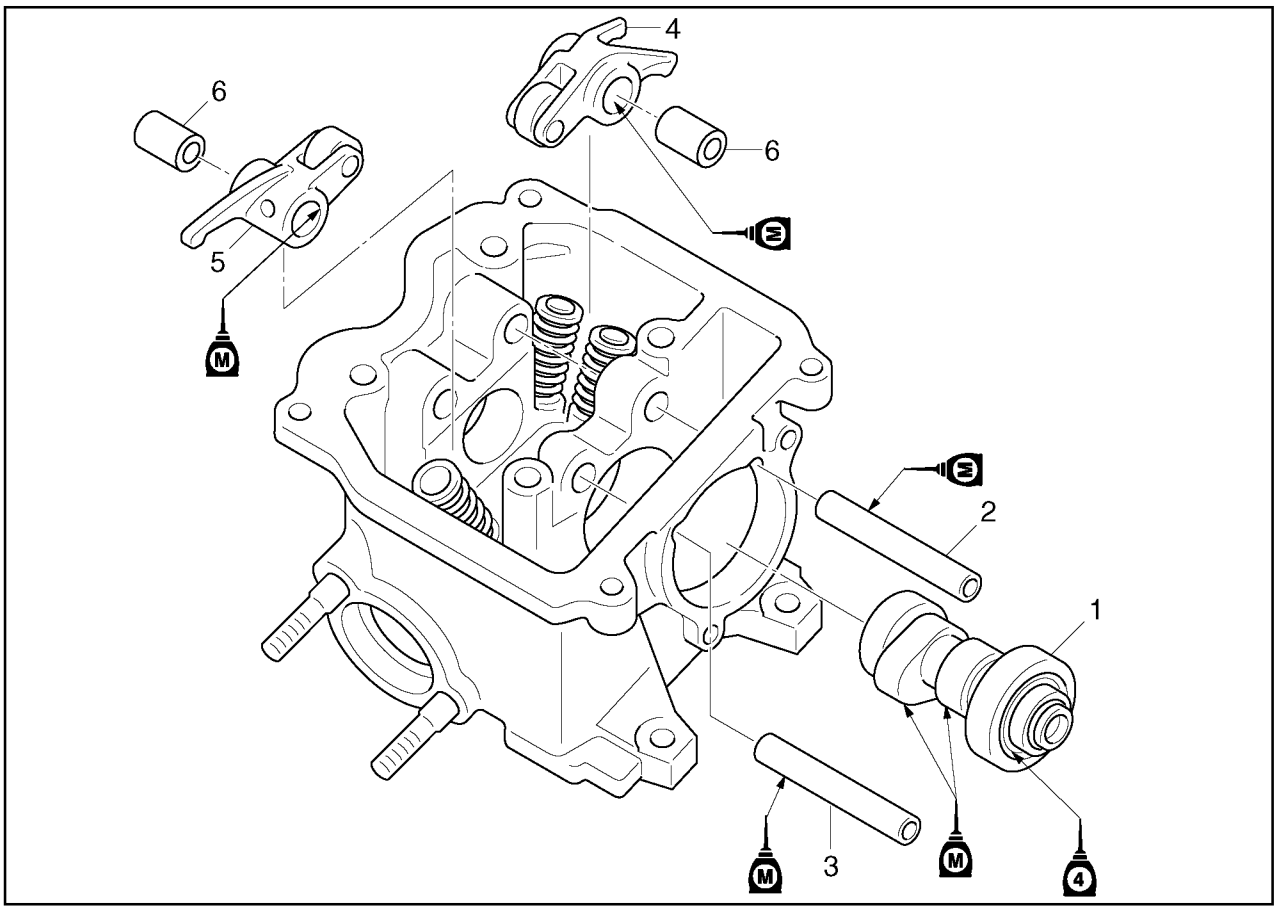
	30 Nm (3.0 m • kg, 21.7 ft • lb)

CAUTION:

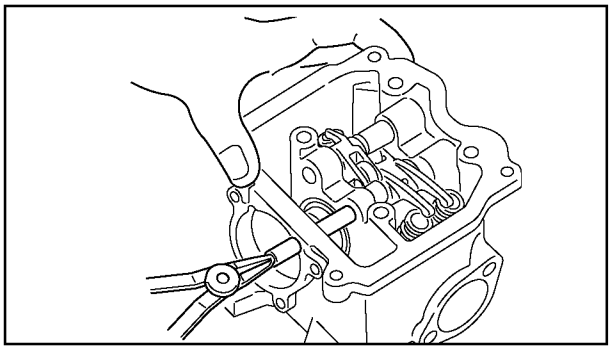
Be sure to tighten the camshaft sprocket bolt to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

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

THE ROCKER ARMS AND CAMSHAFT



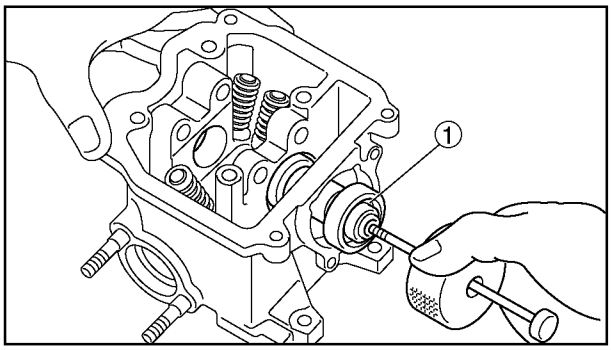
Order	Job/Part	Q'ty	Remarks
	Removing the rocker arms and camshaft		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Camshaft	1	
2	Rocker arm shaft(intake)	1	
3	Rocker arm shaft(exhaust)	1	
4	Rocker arm(intake)	1	
5	Rocker arm(exhaust)	1	
6	Collar	2	
			For installation, reverse the removal procedure.



EAS00202
REMOVING THE ROCKER ARMS AND CAMSHAFT

1. Remove:
   - intake rocker arm shaft
   - exhaust rocker arm shaft
   - intake rocker arm
   - exhaust rocker arm
   - collar

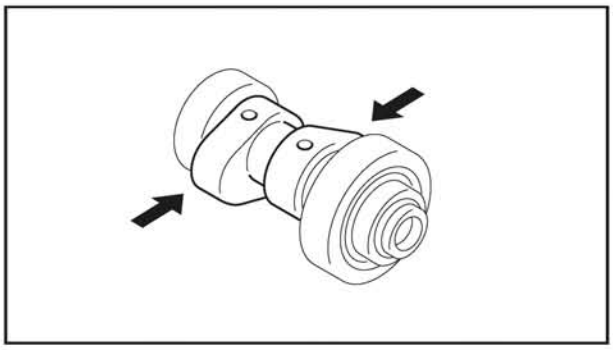
NOTE:
Remove the rocker arm shafts with the clip plier.



2. Remove:
   - camshaft ①

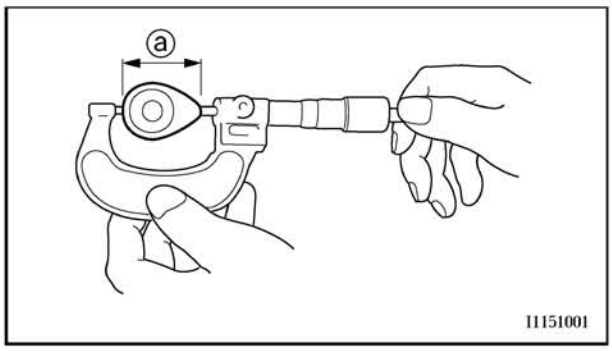
NOTE:
Remove the camshaft with the slide hammer bolt.

Slide hammer bolt
90890-01085
YU-01083-2
Weight
90890-01084
YU-01083-3

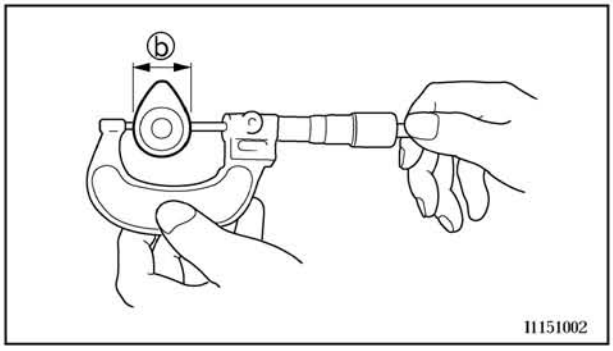


EAS00205
CHECKING THE CAMSHAFT

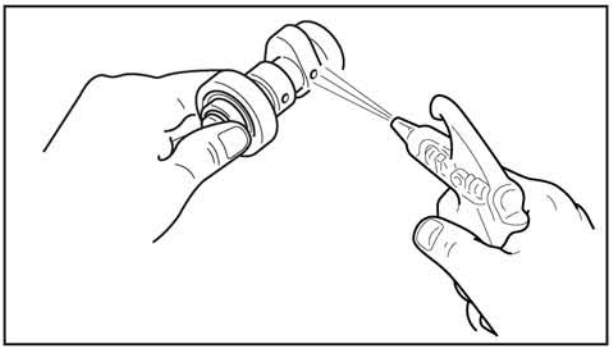
1. Check:
   - camshaft bushings
     Damage/wear → Replace.
2. Check:
   - camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.



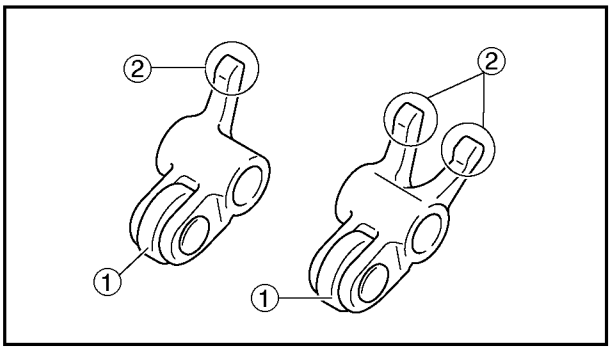
3. Measure:
   - camshaft lobe dimensions ⓐ and ⓑ
     Out of specification → Replace the camshaft.



Camshaft lobe dimension limit
Intake
ⓐ30.158~30.258mm (1.1873~1.1913 in)
<Limit>:30.058mm (1.1834 in)
ⓑ25.082~25.182mm (0.9875~0.9914 in)
<Limit>:24.982mm (0.9835 in)
Exhaust
ⓐ30.158~30.258mm (1.1873~1.1913 in)
<Limit>:30.058mm (1.1834 in)
ⓑ25.020~25.120mm (0.9850~0.9890 in)
<Limit>:24.920mm (0.9811 in)



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



EAS00206

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

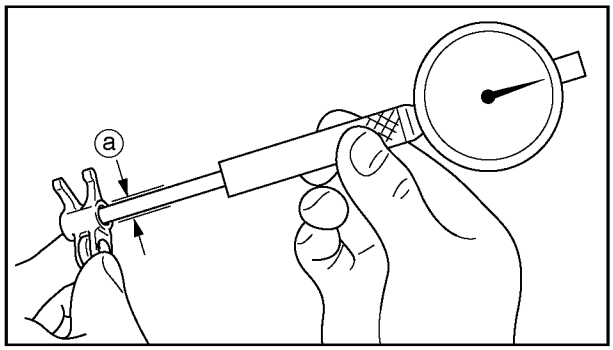
The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:
   - ●rocker arm (camshaft touch surface①)
   - ●rocker arm (valve touch surface②)

   Damage/wear → Replace.
2. Check:
   - ●rocker arm shaft

   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Check:
   - ●camshaft lobe

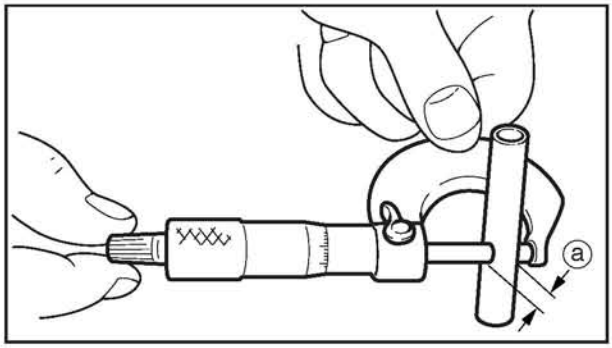
   Excessive wear → Replace the camshaft.



4. Measure:
   - ●rocker arm inside diameter ⓐ

   Out of specification → Replace.

Rocker arm inside diameter
10 ~ 10.015 mm (0.3937 ~ 0.3943 in)
<Limit>:10.030mm (0.3949 in)



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

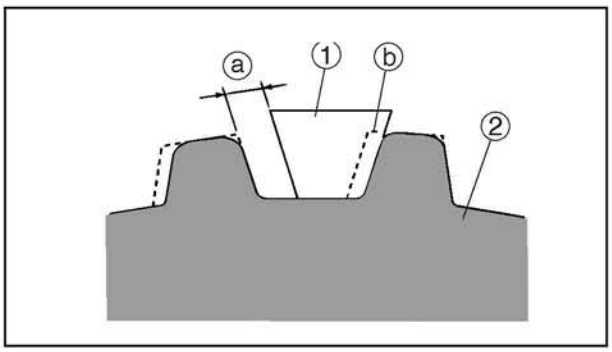
Rocker arm shaft outside diameter
9.981 ~ 9.991 mm (0.3930 ~ 0.3933 in)
<Limit>:9.950mm (0.3917 in)

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

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

Above 0.034 mm (0.0013 in) → Replace the defective part(s).

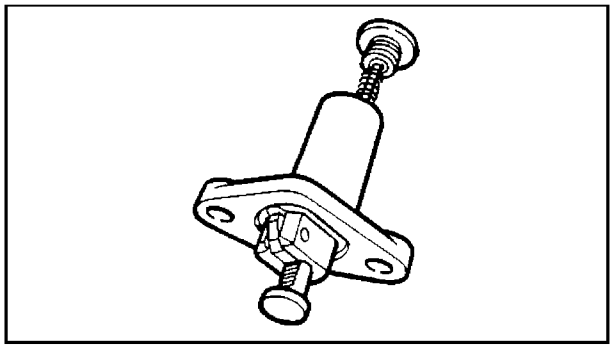
Rocker-arm-to-rocker-arm-shaft clearance
0.009 ~ 0.034 mm (0.0004 ~ 0.0013 in)



EAS00207
CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKET, AND TIMING CHAIN GUIDES

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

   ⓐ 1/4 tooth
   ⓑ Correct
   ① Timing chain roller
   ② Camshaft sprocket
3. Check:
   - timing chain guide (exhaust side)
   - timing chain guide (intake side)
     Damage/wear → Replace the defective part(s).



EAS00210
CHECKING THE TIMING CHAIN TENSIONER

1. Check:
   - timing chain tensioner
     Cracks/damage → Replace.
2. Check:
   - one-way cam operation
     Rough movement → Replace the timing chain tensioner.
3. Check:
   - cap bolt
   - o-ring **New**
   - spring
   - one-way cam
   - gasket **New**
   - timing chain tensioner rod
     Damage/wear → Replace the defective part(s).

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a. Removing the spring and cap bolt.
b. Return cam chain tensioner one way cam. Press tensioner rod to the cam chain tensioner housing.
c. Installing the spring and cap bolt.
d. Loosen the front end of cam chain tensioner slowly.
e. Make sure to return to the front end of cam chain tensioner.

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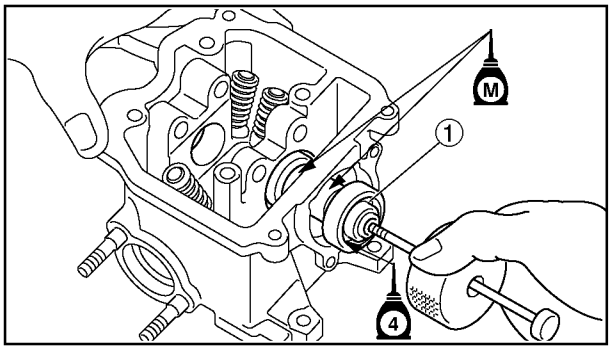
Rough movement → Replace the timing chain tensioner.



EAS00220

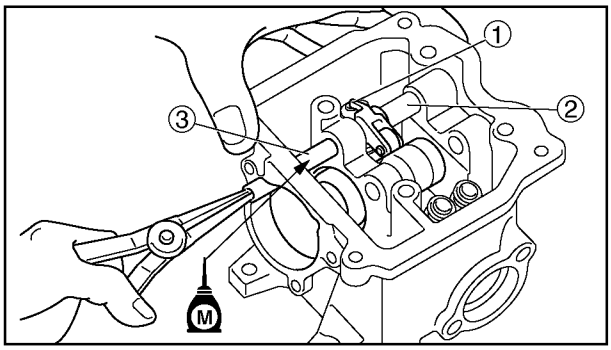
INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
   - camshaft ①

	Recommended lubricant **Camshaft** **Molybdenum disulfide oil** **Camshaft bearing** **Engine oil**

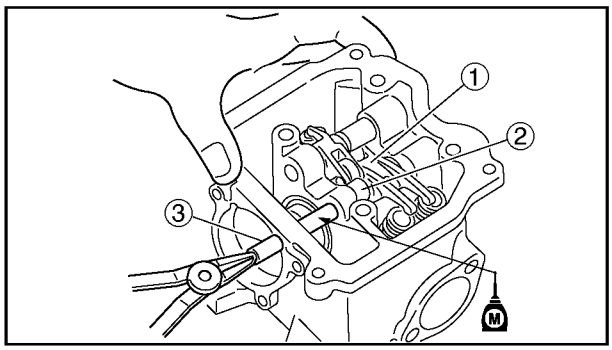
2. Lubricate:
   - rocker arm shafts

	Recommended lubricant **Molybdenum disulfide oil**



3. Install:
   - exhaust rocker arm ①
   - collar②
   - exhaust rocker arm shaft ③

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

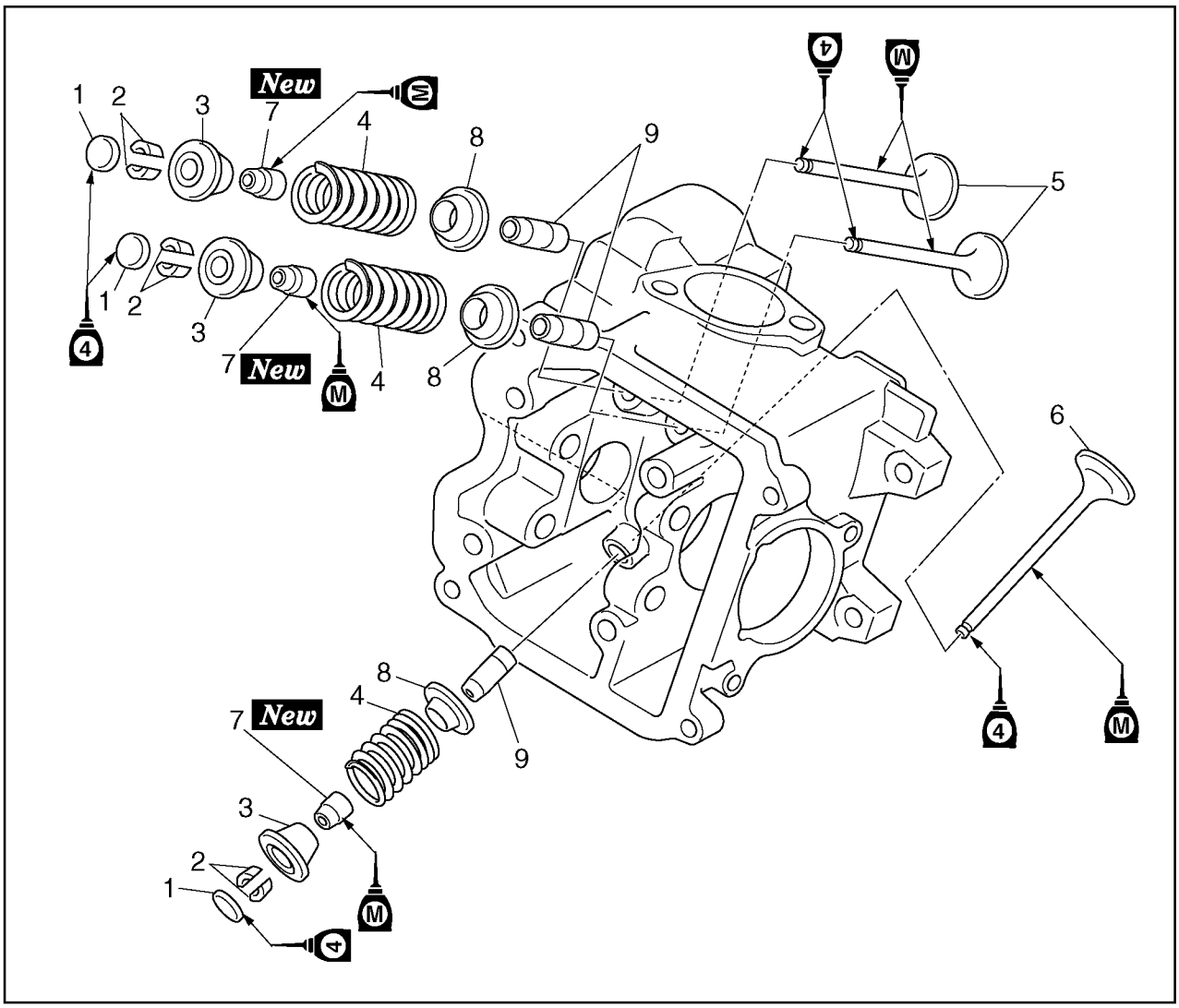


4. Install:
   - intake rocker arm ①
   - collar②
   - intake rocker arm shaft ③

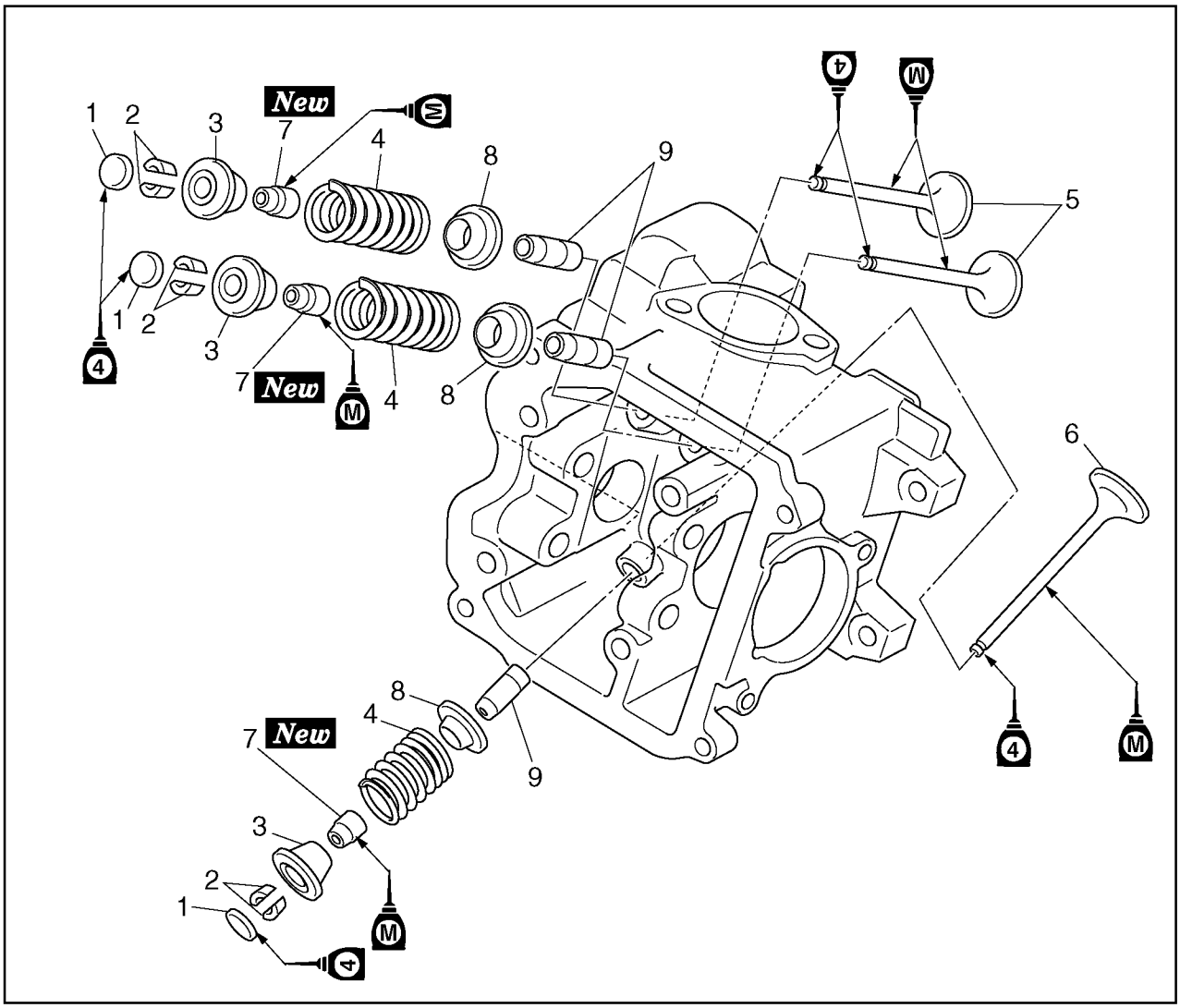
NOTE:
Make sure the intake rocker arm shaft is completely pushed into the cylinder head.

EAS00236

VALVES AND VALVE SPRINGS



Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Cylinder head		Refer to"CYLINDER HEAD".
	Rocker arms		Refer to"REMOVING THE ROCKER ARMS AND CAMSHAFT" and "INSTALLING THE CAMSHAFT AND ROCKER ARMS".
	Rocker arm shafts		
	Camshaft		
1	Valve pad	3	
2	Valve cotter	6	
3	Valve spring retainer	3	
4	Valve spring	3	
5	Valve(intake)	2	Refer to"REMOVING THE VALVES" and "INSTALLING THE VALVES".
6	Valve(exhaust)	1	
7	Valve stem seal	3	
8	Valve stem seat	3	
9	Valve guide	3	

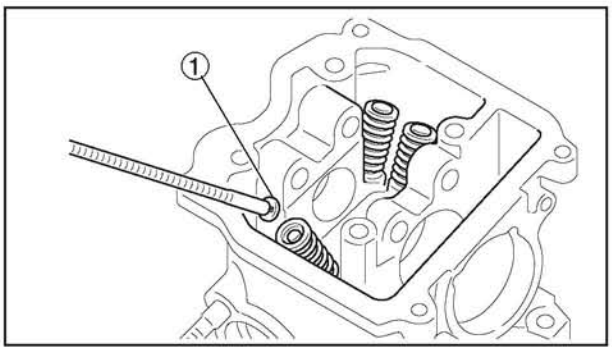


Order	Job/Part	Q'ty	Remarks
			For installation, reverse the removal procedure.

EAS00237
REMOVING THE VALVES

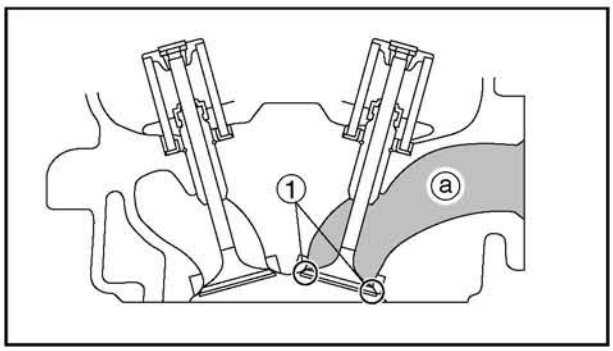
The following procedure applies to all of the valves and related components.

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



1. Remove:
   - valve pad ①

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



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

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a. Pour a clean solvent ⓐ into the intake and exhaust ports.
b. Check that the valves properly seal.

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

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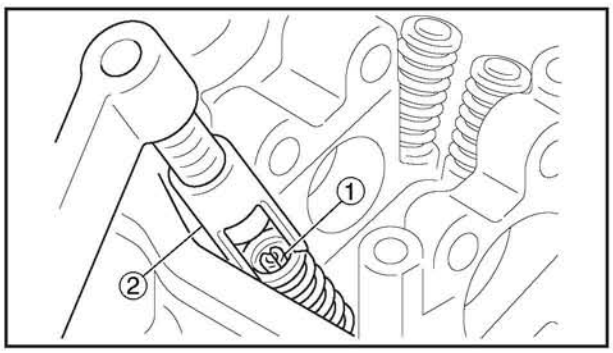
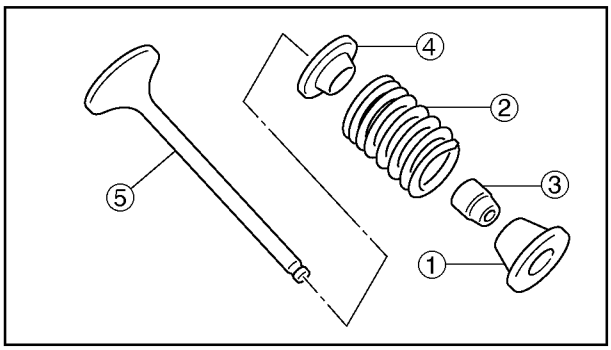


3 . Remove:
   valve cotters ①

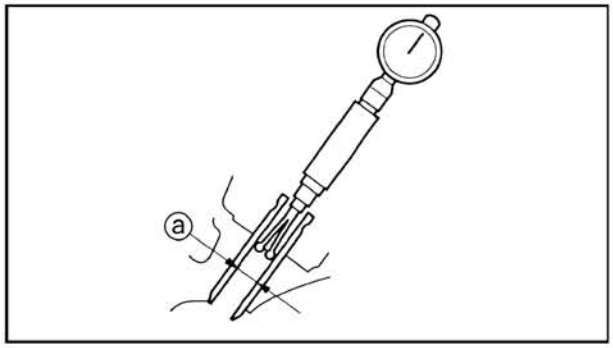
NOTE:
Remove the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment ②.

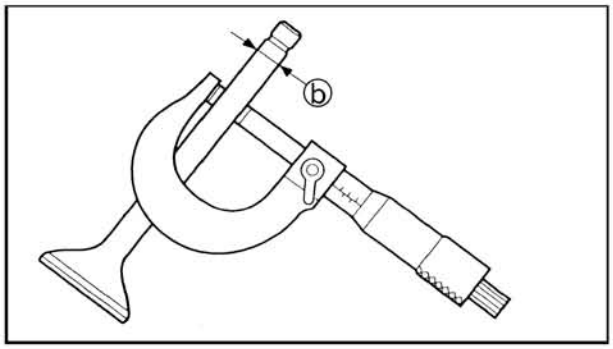
Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04148
YM-04148

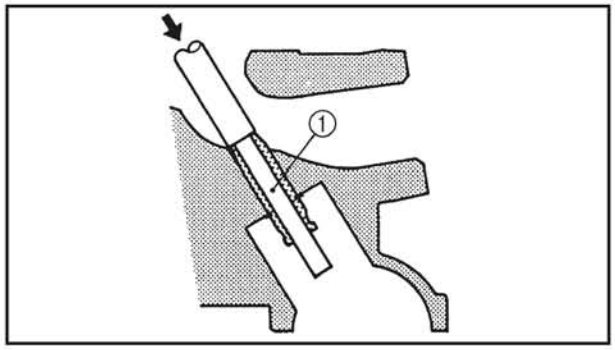


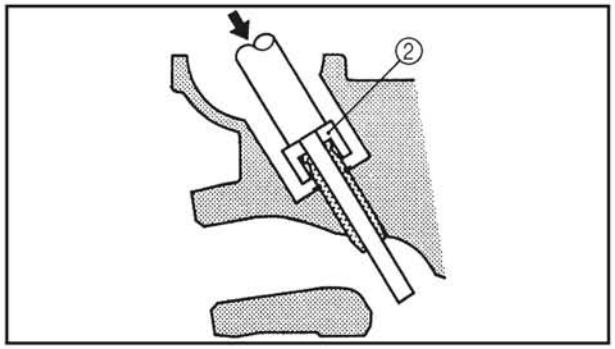
4 . Remove:
- valve spring retainer ①
- valve spring ②
- valve stem seal ③
- valve spring seat ④
- valve ⑤

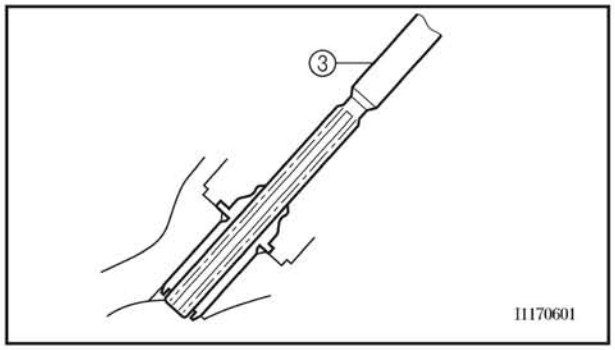
NOTE:
Identify the position of each part very carefully so that it can be reinstalled in its original place.











EAS00239

CHECKING THE VALVES AND VALVE GUIDES

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

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

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

Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance
Intake
0.010 ~ 0.037 mm(0.0004~0.0015 in)
<Limit>: 0.08 mm(0.0031 in)
Exhaust
0.025 ~ 0.052 mm(0.001~0.002 in)
<Limit>: 0.10 mm(0.0039 in)

2. Replace:
   - valve guide

NOTE:

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C (212°F) in an oven.

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

NOTE:

After replacing the valve guide, reface the valve seat.

Valve guide remover (4.0 mm)
90890-04111(YM-04111)
Valve guide installer (4.0 mm)
90890-04112(YM-04112)
Valve guide reamer (4.0 mm)
90890-04113(YM-04113)

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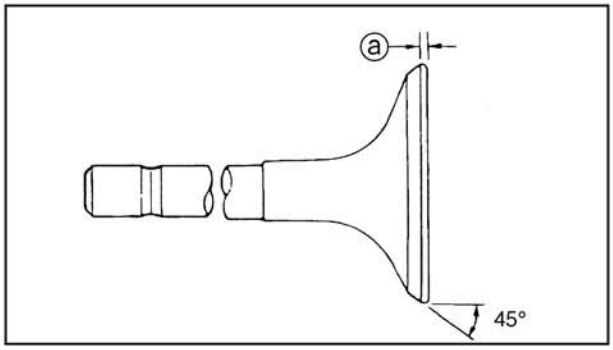
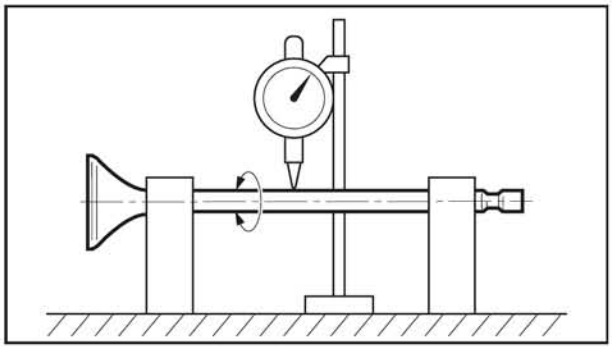
3. Eliminate:
   - carbon deposits
     (from the valve face and valve seat)
4. Check:
   - valve face
     Pitting/wear → Grind the valve face.
   - valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.





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

	Valve margin thickness **0.9~1.1mm(0.0354~0.0433in)**

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

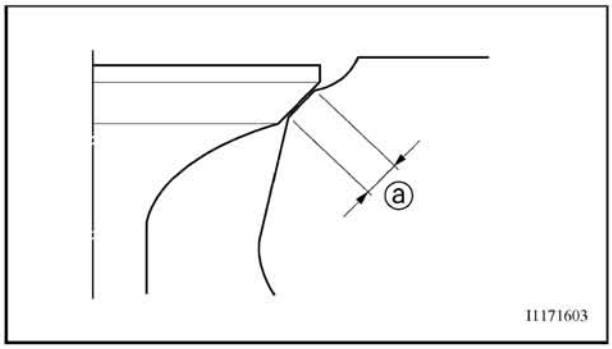
NOTE:
- If the valve is removed or replaced, always replace the oil seal.

	Valve stem runout **0.01 mm(0.0004 in)**

EAS00240
CHECKING THE VALVE SEATS

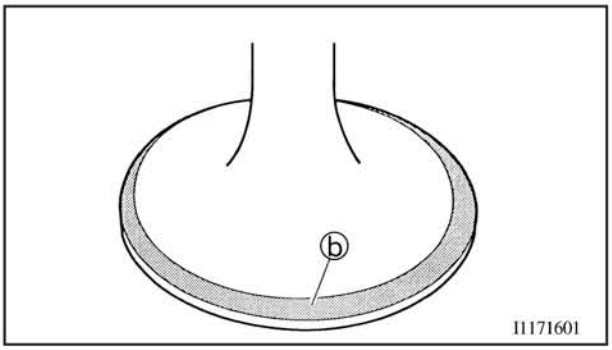
The following procedure applies to all of the valves and valve seats.

1. Eliminate:
   - carbon deposits
     (from the valve face and valve seat)
2. Check:
   - valve seat
     Pitting/wear → Replace the cylinder head.



3. Measure:
   - valve seat width ⓐ
     Out of specification → Replace the cylinder head.

Valve seat width
Intake: 0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)
<Limit>: 1.6 mm(0.063 in)
Exhaust: 0.9 ~1.1 mm (0.0354~0.0433 in)
<Limit>: 1.6 mm(0.063 in)



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

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

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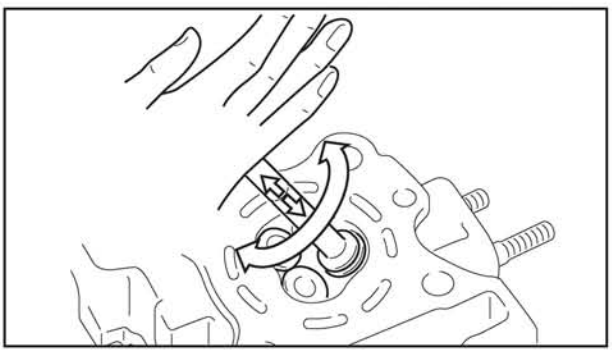
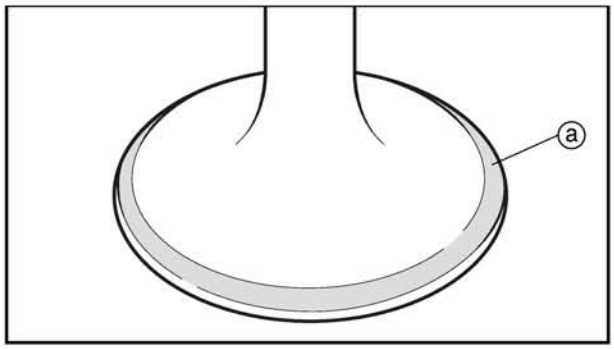
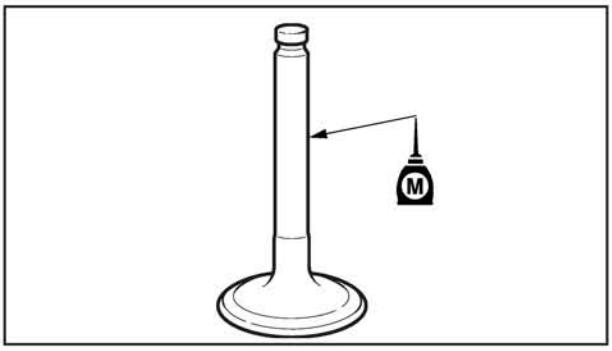
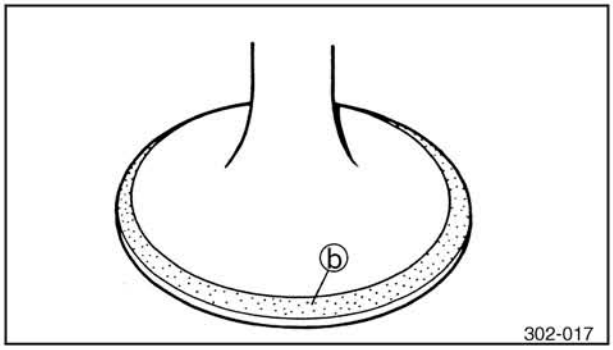


4. Lap:
   - valve face
   - valve seat

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







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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 hands.

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

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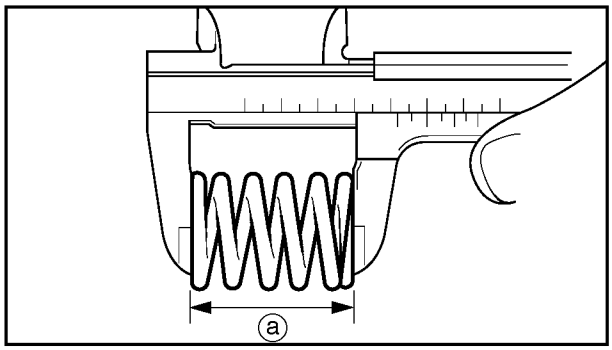
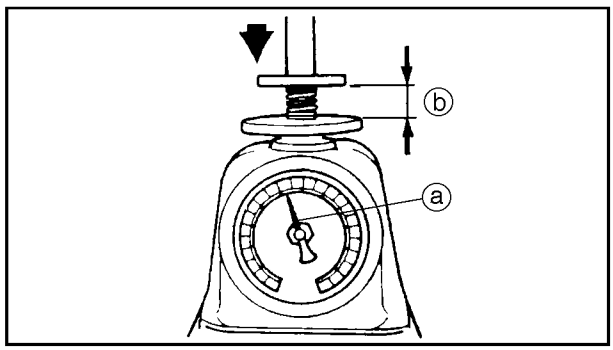


EAS00241
CHECKING THE VALVE SPRINGS
The following procedure applies to all of the valve springs.

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

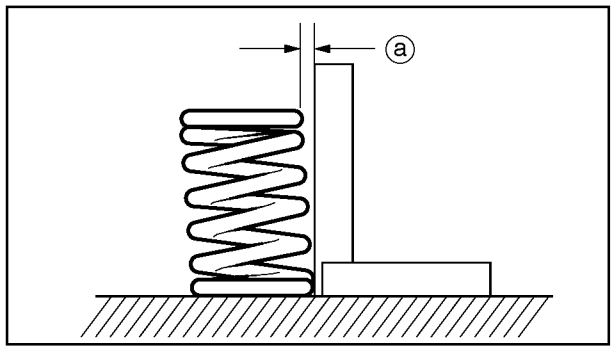
Valve spring free length
Intake valve spring
39.35 mm (1.5492 in)
<Limit>: 37.38 mm (1.4717 in)
Exhaust valve spring
41.57 mm (1.6366 in)
<Limit>: 39.49 mm (1.5547 in)



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

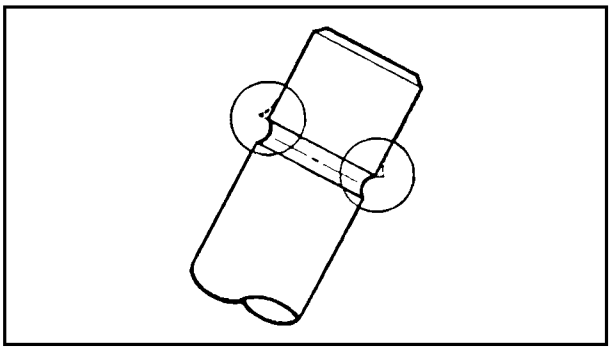
ⓑ Installed length

Compressed valve spring force (installed)
Intake valve spring
91.1~104.9N(9.3~10.7kg, 20.48~23.58lb) at 28mm(1.1024in)
Exhaust valve spring
107.9~124.1N(11.0~12.7kg, 24.26~27.90lb) at 30mm(1.1811in)



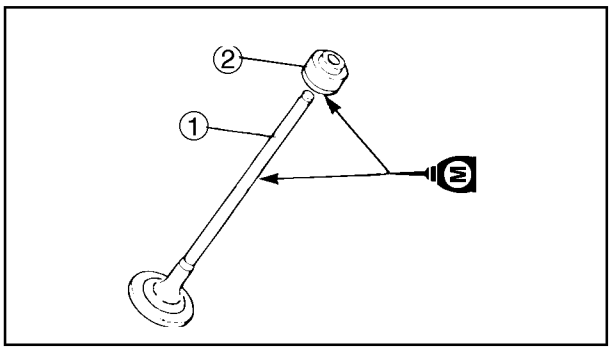
3. Measure:
   - valve spring tilt ⓐ
     Out of specification → Replace the valve spring.

Spring tilt limit
Intake valve spring
1.7 mm (0.0669 in) (2.5°)
Exhaust valve spring
1.8 mm (0.0709 in)(2.5°)



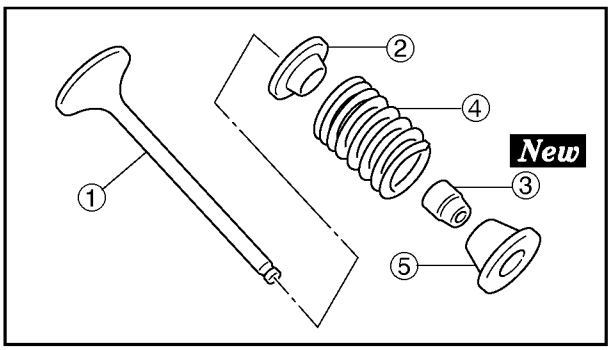
EAS00245
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.

1. Deburr:
   - valve stem end
     (with an oil stone)



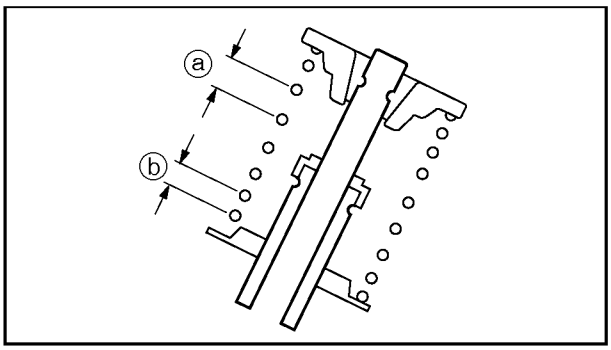
2. Lubricate:
   - valve stem ①
   - valve stem seal ②
     (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

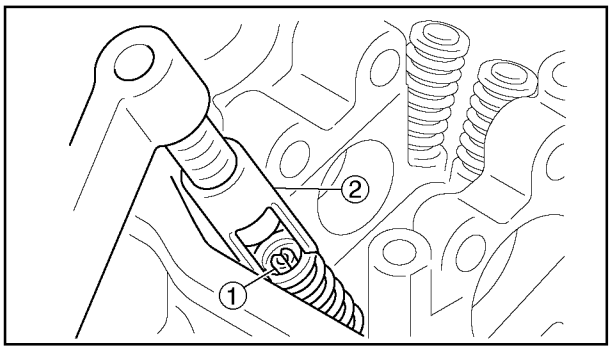


3. Install:
   - valve ①
   - valve spring seat ②
   - valve stem seal ③ New
   - valve spring ④
   - valve spring retainer ⑤
     (into the cylinder head)

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



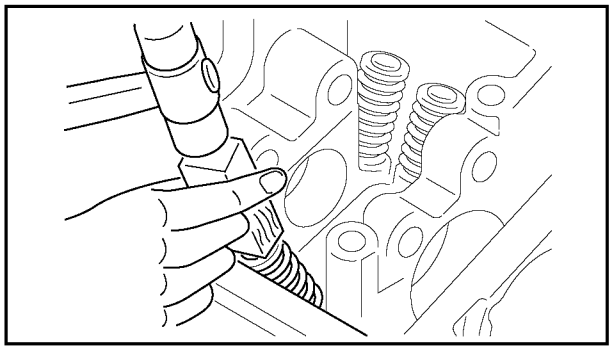
ⓑ Smaller pitch



4. Install:
   - valve cotters ①

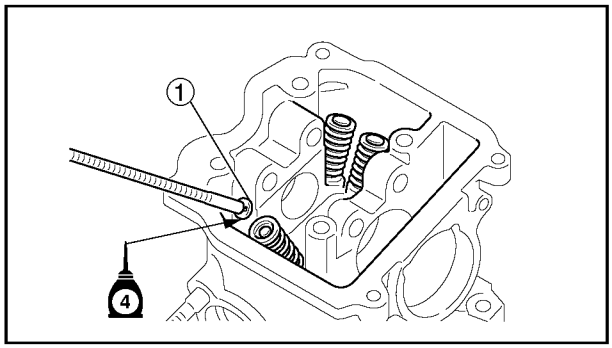
NOTE:
Install the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment ②.

Valve spring compressor
90890-04019(YM-04019)
Valve spring compressor attachment
90890-04148(YM-04148)



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

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

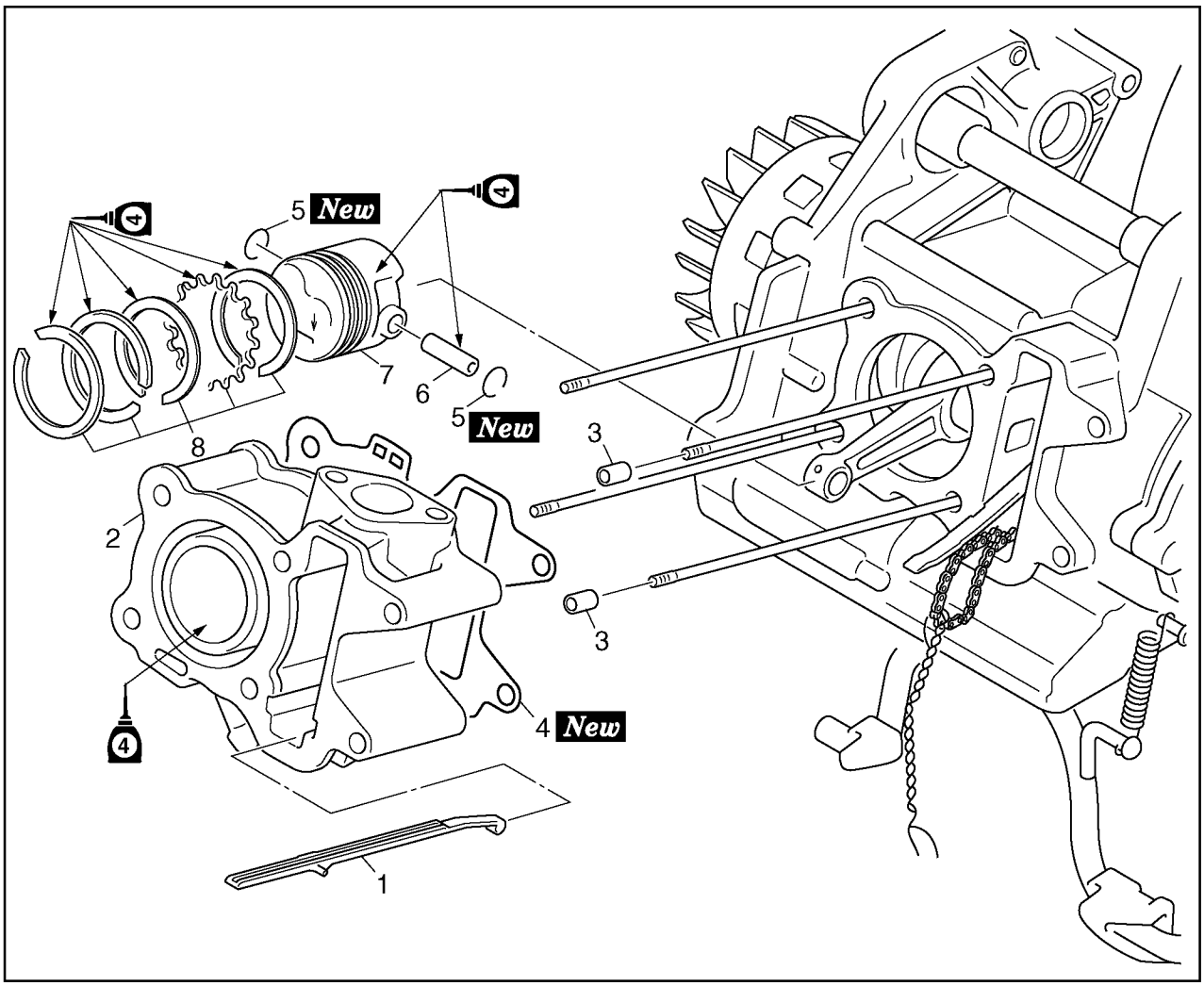


6. Install:
   valve pad ①

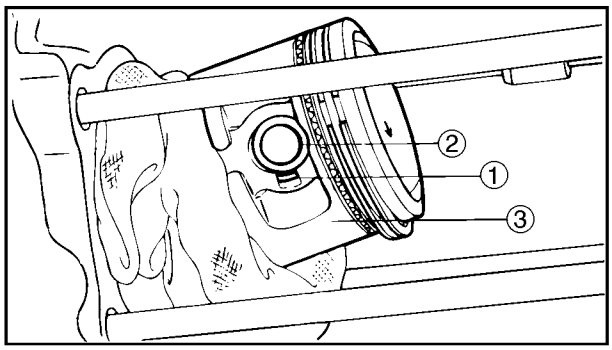
NOTE:
- Lubricate the valve pad with engine oil.
- Valve pad must be reinstalled in its original position.

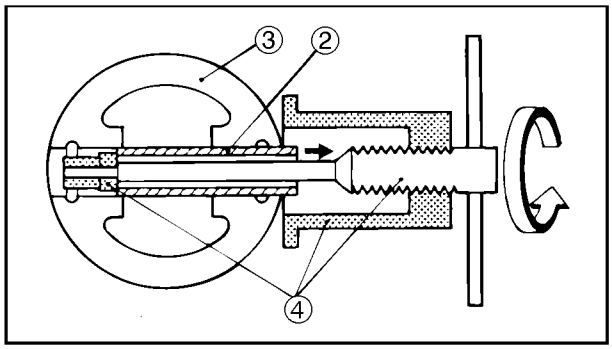
EAS00251

CYLINDER AND PISTON



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





EAS00253

REMOVING THE CYLINDER AND PISTON

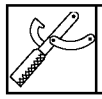
1. Remove:
   - piston pin clip ①
   - piston pin ②
   - piston ③

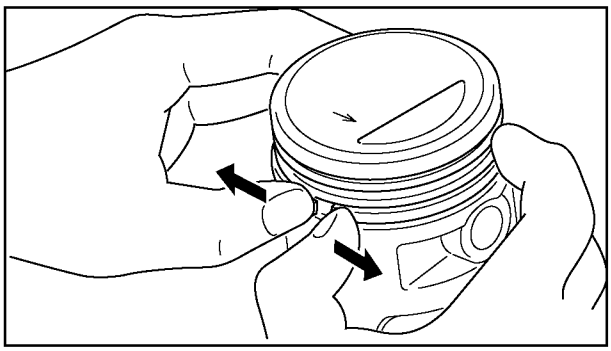
CAUTION:

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.
- 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 set④.

	**Piston pin puller set** **90890-01304(YU-01304)**



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

NOTE:

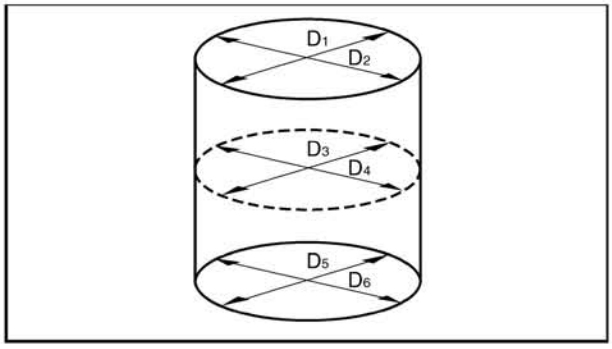
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

EAS00255

CHECKING THE CYLINDER AND PISTON

1. Check:
   - piston wall
   - cylinder wall

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



2. Measure:
   piston-to-cylinder clearance

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

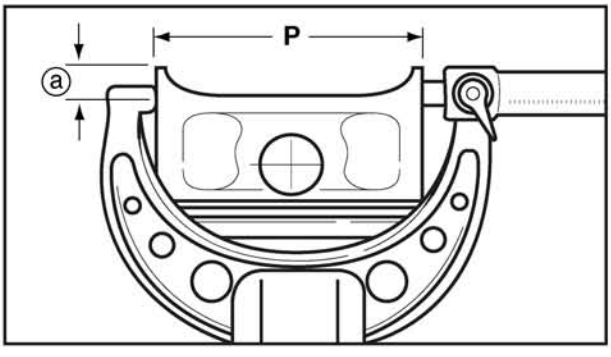
a. Measure cylinder bore "C" with the cylinder bore gauge.

NOTE:

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

Cylinder bore "C"	38.000 ~ 38.010mm (1.4961 ~ 1.4965in)
Taper limit "T"	0.05mm (0.0020in)
Out-of-round "R"	0.05mm (0.0020in)
"C" = maximum of D_1 ~ D_2	
"T" = maximum of D_1 or D_2 - maximum of D_5 or D_6	
"R" = maximum of D_1, D_3 or D_5 - minimum of D_2, D_4 or D_6	

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



ⓐ 5mm(0.1969in) from the bottom edge of the piston

	Piston size "P"
Standard	37.975 ~ 37.990mm (1.4951 ~ 1.4957in)

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 **0.010 ~ 0.035mm(0.0004 ~ 0.0014in)** **<Limit>:0.15mm(0.0059in)**

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

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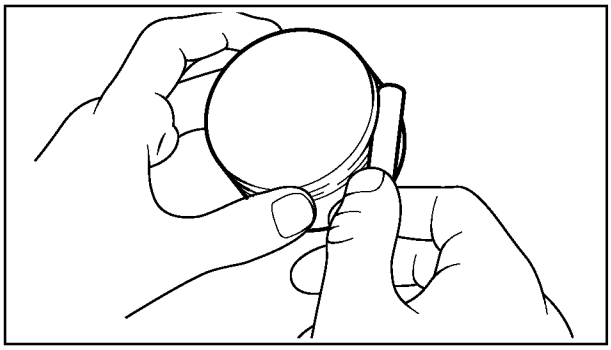
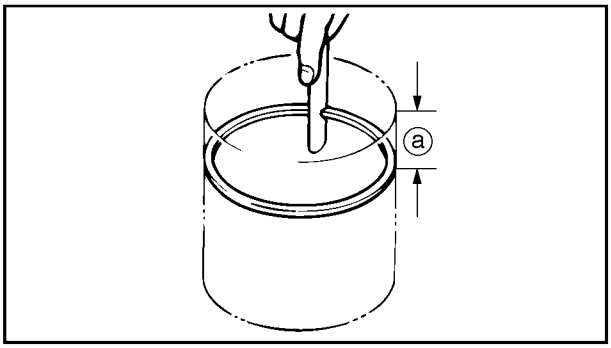


EAS00263
CHECKING THE PISTON RINGS

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

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

Piston ring side clearance
Top ring
0.03 ~ 0.07 mm(0.0012~0.0028 in)
<Limit>: 0.12mm(0.0047 in)
2nd ring
0.02 ~ 0.06 mm(0.0008~0.0024 in)
<Limit>:0.12 mm(0.0047 in)



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

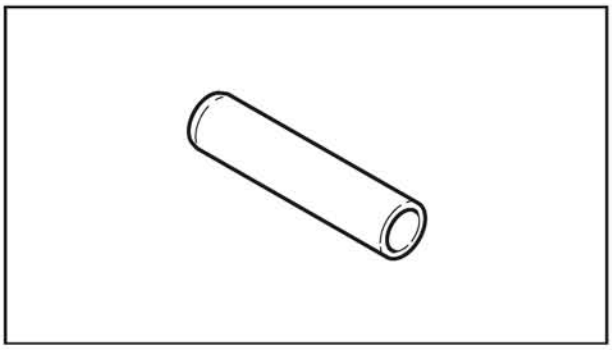
NOTE:
Level the piston ring into the cylinder with the piston crown.

ⓐ 10 mm (0.3937 in)

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

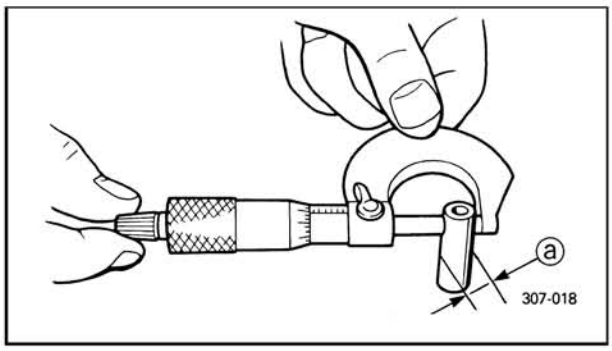
NOTE:
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Piston ring end gap
Top ring
0.05 ~ 0.15 mm (0.0020 ~ 0.0059 in)
<Limit>: 0.40 mm (0.0157 in)
2nd ring
0.05 ~ 0.17 mm (0.0020 ~ 0.0067 in)
<Limit>: 0.52 mm (0.0205 in)
Oil ring
0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in)



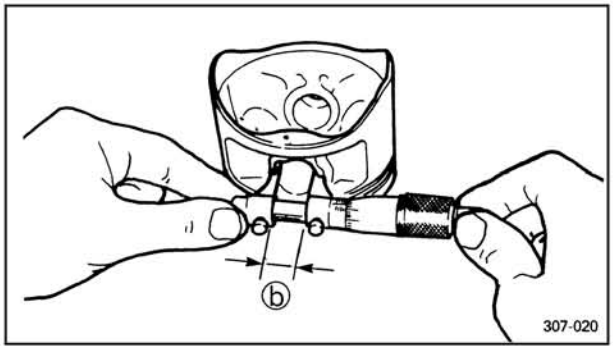
EAS00265
CHECKING THE PISTON PIN

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



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

Piston pin outside diameter
9.996 ~ 10.000 mm (0.3935 ~ 0.3937 in)
<Limit>:9.976 mm (0.3928 in)



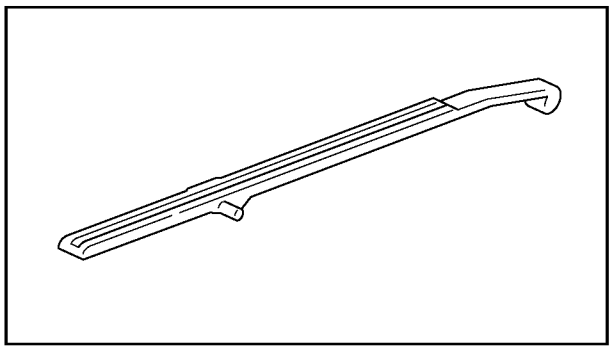
3. Measure:
   - piston pin bore diameter ⓑ
     Out of specification→ Replace the piston.

Piston pin bore diameter
10.002 ~ 10.013 mm (0.3938 ~ 0.3942 in)
<Limit>:10.043 mm (0.3954 in)

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

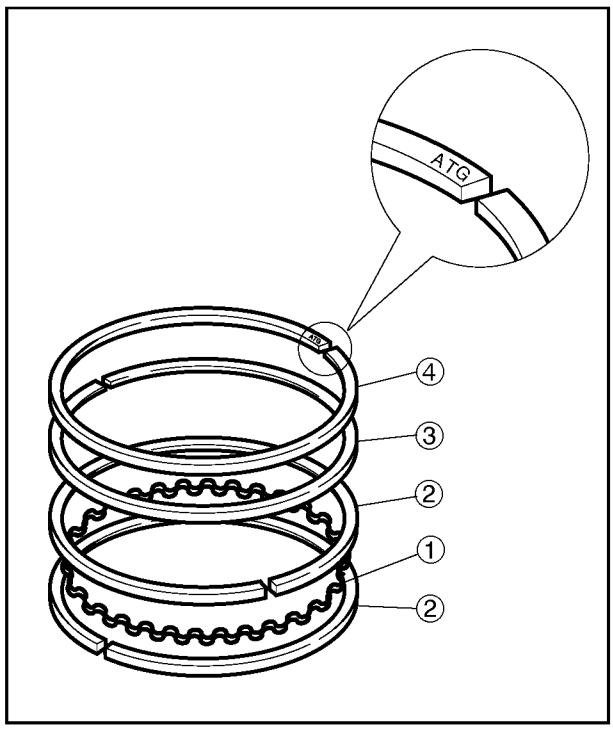
Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter ⓑ -
Piston pin outside diameter ⓐ

Piston-pin-to-piston clearance
0.002 ~ 0.017 mm (0.0001 ~ 0.0007 in)



CHECKING THE TIMING CHAIN GUIDE

1. Check:
   - timing chain guide (exhaust side)
     Damage/wear → Replace



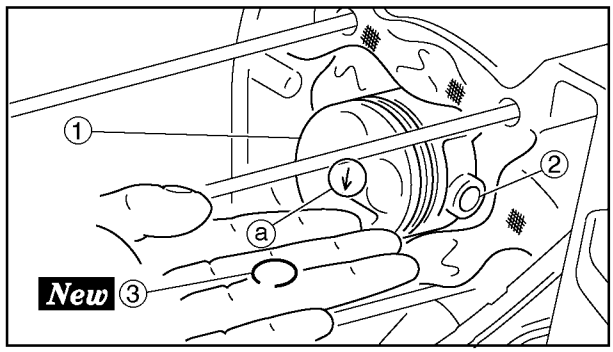
EAS00267

INSTALLING THE PISTON AND CYLINDER

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

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

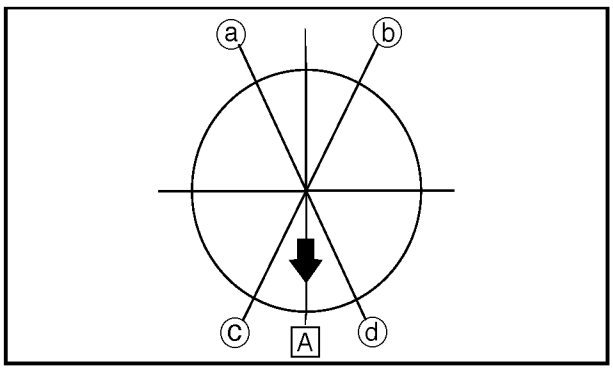
NOTE:

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

3. Install:
   - gasket **New**
   - dowel pins

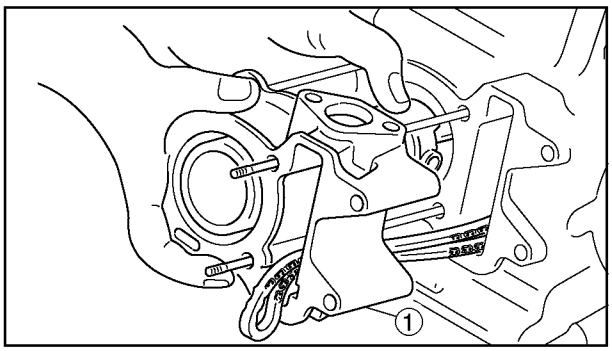
4. Lubricate:
   - piston
   - piston rings
   - cylinder
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**



5. Offset:
   - piston ring end gaps

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



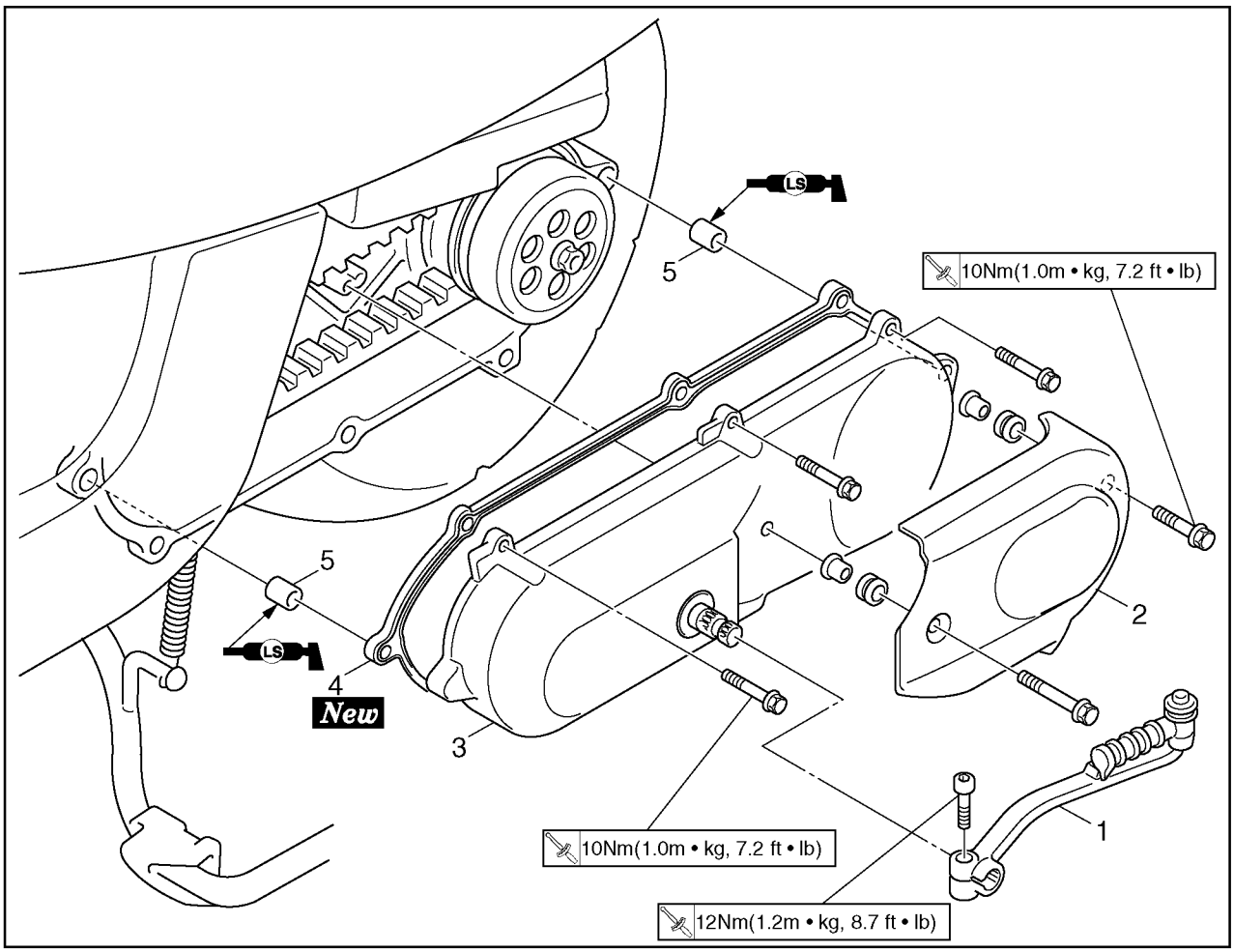
6. Install:
   - cylinder ①
   - timing chain guide(exhaust side)

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.

EAS00316

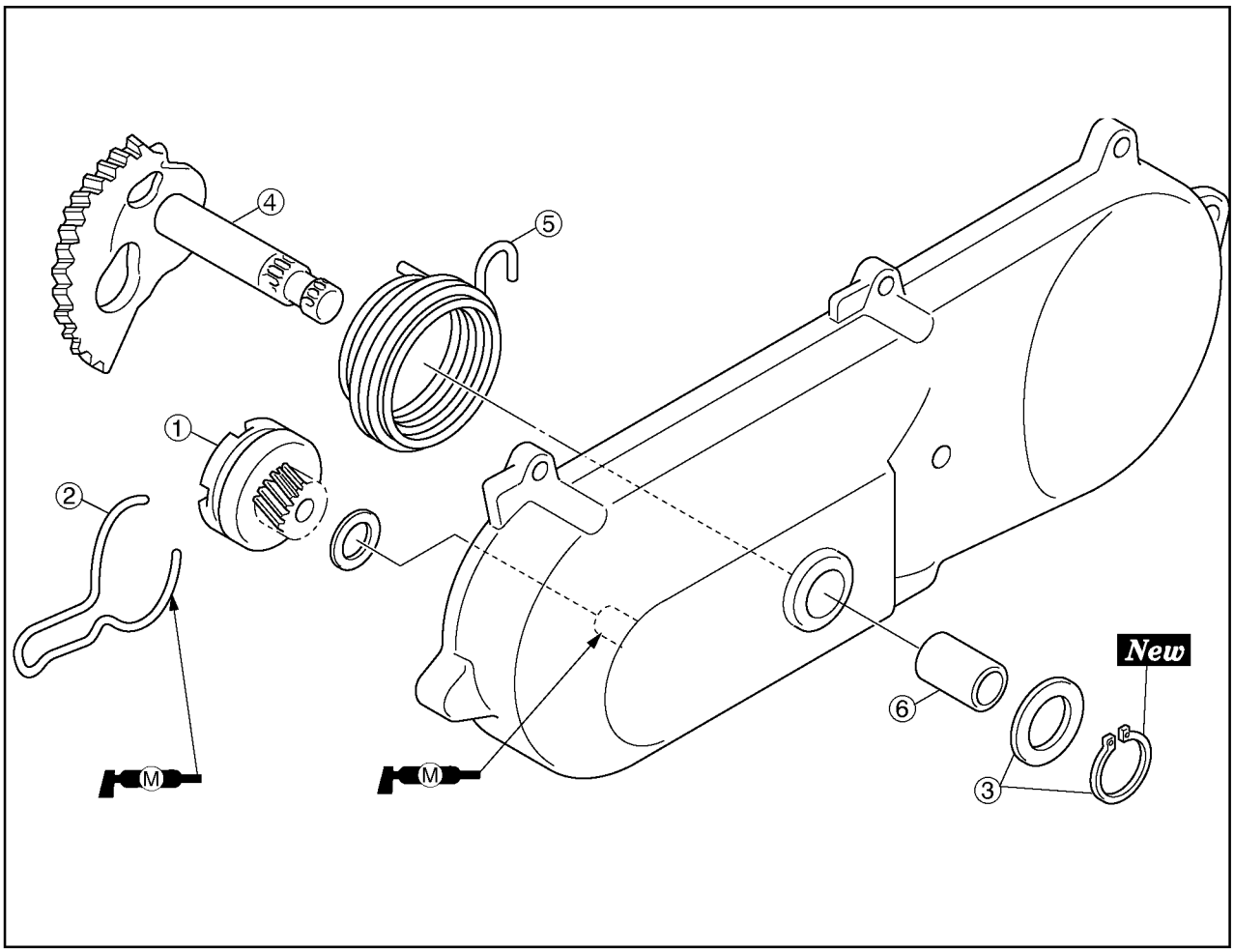
BELT DRIVE

V-BELT CASE COVER

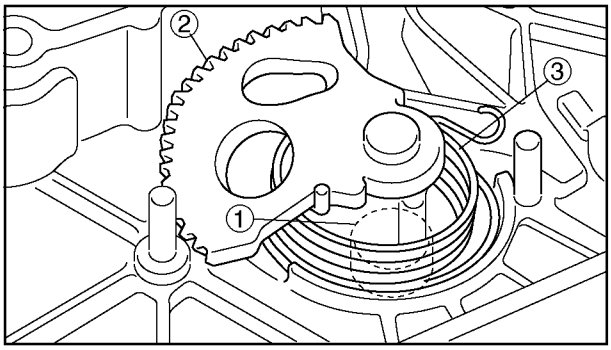


Order	Job/Part	Q'ty	Remarks
	Removing the V-belt case cover		Remove the parts in the order listed.
1	Kickstarter	1	
2	Cover	1	
3	V-belt case cover	1	
4	V-belt case cover gasket	1	
5	Dowel pin	2	
			For installation, reverse the removal procedure.

EAS00338
KICKSTARTER

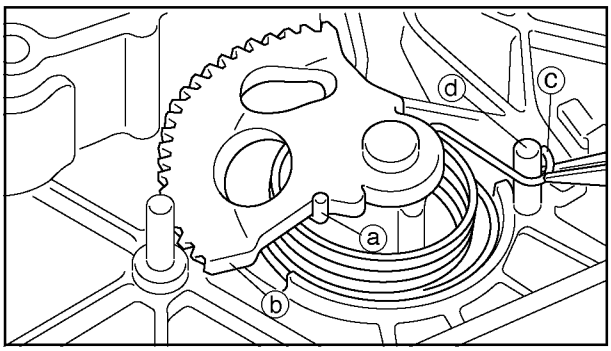


Order	Job/Part	Q'ty	Remarks
	Disassembling the kickstarter		Remove the parts in the order listed.
	V-belt case cover		Refer to"V-BELT CASE COVER".
①	Kick pinion gear	1	
②	Kick pinion gear clip	1	
③	Circlip/Plate washer	1/1	Refer to"INSTALLING THE KICKSTARTER".
④	Kickstarter shaft	1	
⑤	Torsion spring	1	
⑥	Solid bush	1	
			For assembly, reverse the disassembly procedure.



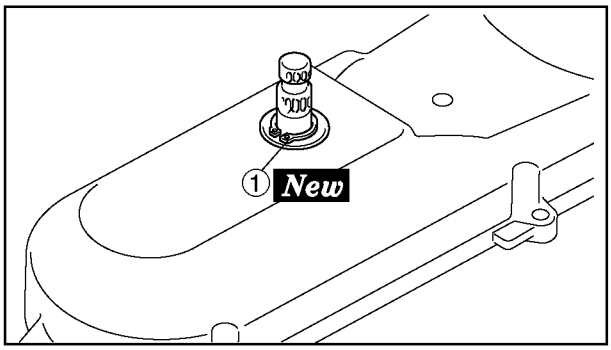
EAS00340
INSTALLING THE KICKSTARTER

1. Install:
   - solid bush①
   - kick shaft assembly②
   - torsion spring③

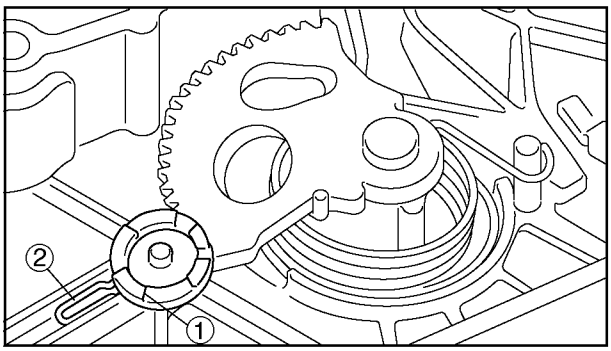


2. Hook:
   - torsion spring

NOTE:
Hook the spring end ⓐ on the kickstarter shaft ⓑ as shown, and hook the other end ⓒ on the projection ⓓ .



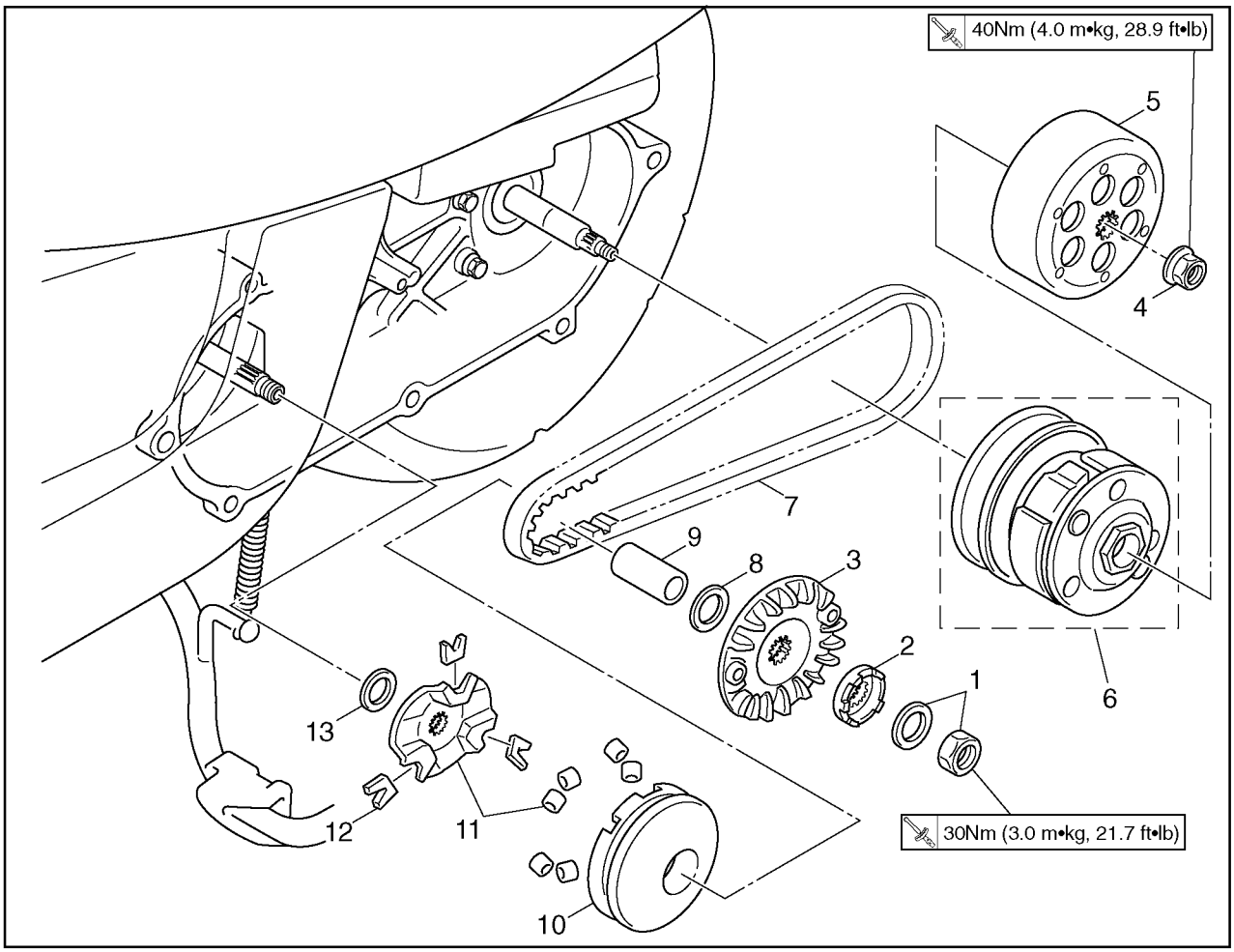
3. Install:
   - plain washer
   - circlip① **New**



4. Install:
   - kick pinion gear①
   - kick pinion gear clip②

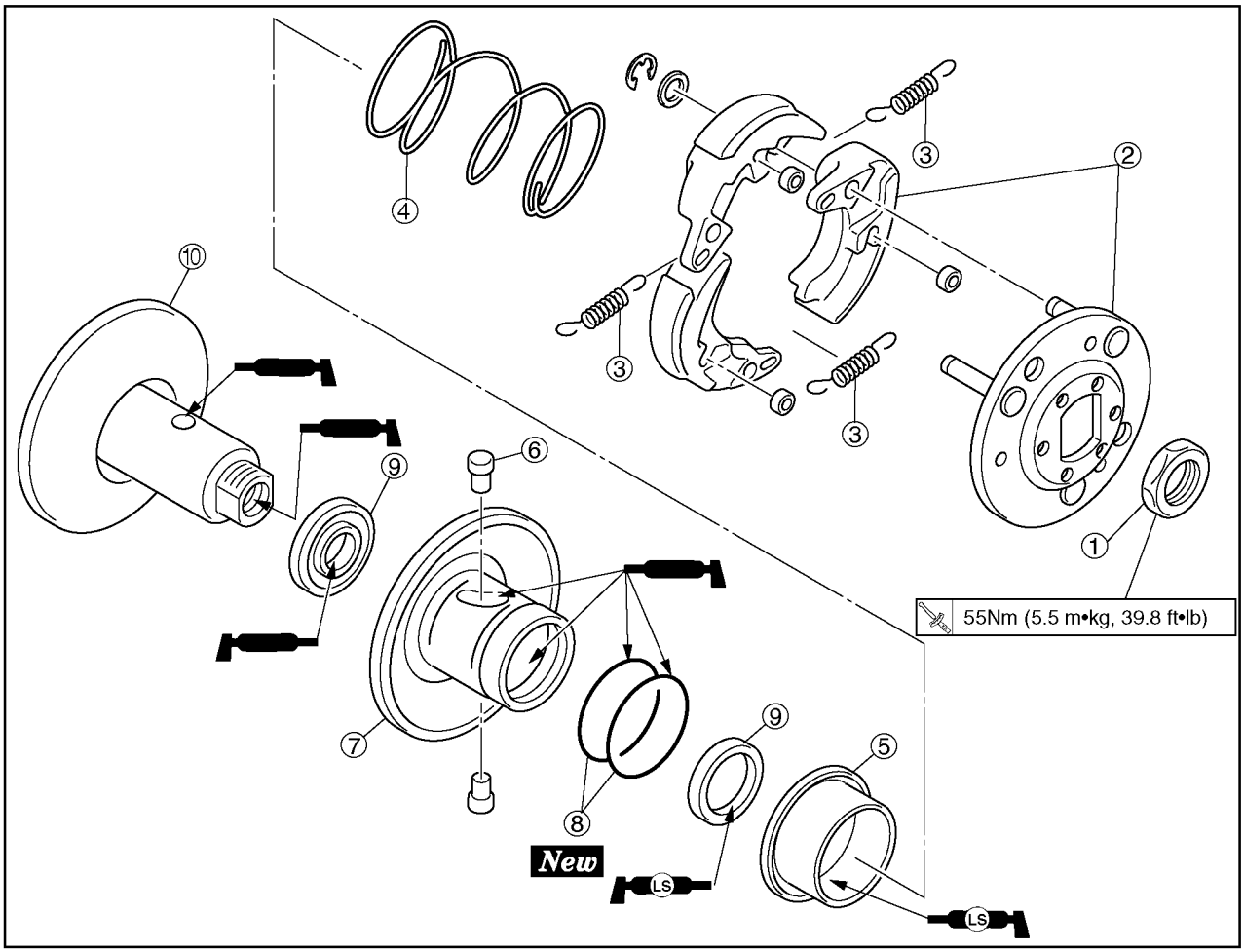
NOTE:
- Lubricate the kick pinion gear clip and shaft with molybdenum disulfide oil.
- Install the kick pinion gear clip at the position shown.

V-BELT AND PRIMARY/SECONDARY SHEAVE

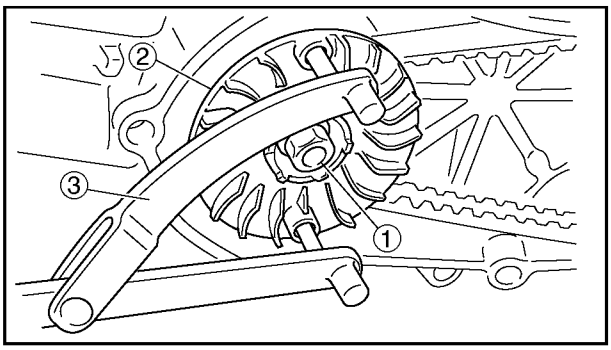


Order	Job/Part	Q'ty	Remarks
	Removing the V-belt and primary/secondary sheave		Remove the parts in the order listed.
1	Primary sheave nut/Plate washer	1/1	Refer to"REMOVING THE PRIMARY SHEAVE" and "INSTALLING THE SECONDARY SHEAVE, V-BELT AND PRIMARY SHEAVE" .
2	Oneway clutch	1	
3	Primary fixed sheave	1	
4	Secondary sheave nut	1	
5	Clutch housing	1	
6	Secondary sheave	1	
7	V-belt	1	
8	Plate washer	1	
9	Collar	1	
10	Primary sliding sheave	1	
11	Cam/Weight	1/6	
12	Slider	3	
13	Plate washer	1	
			For installation, reverse the removal procedure.

SECONDARY SHEAVE



Order	Job/Part	Q'ty	Remarks
	Disassembling the secondary sheave		Disassemble the parts in the order listed.
①	Clutch carrier nut	1	Refer to"DISASSEMBLING THE SECONDARY SHEAVE" and "ASSEMBLING THE SECONDARY SHEAVE".
②	Clutch carrier	1	
③	Clutch shoe spring	3	
④	Compression spring	1	
⑤	Secondary spring seat	1	Refer to"ASSEMBLING THE SECONDARY SHEAVE" .
⑥	Guide pin	2	
⑦	Secondary sliding sheave	1	
⑧	O-ring	2	
⑨	Oil seal	2	
⑩	Secondary fixed sheave	1	
			For assembly, reverse the disassembly procedure.



EAS00317

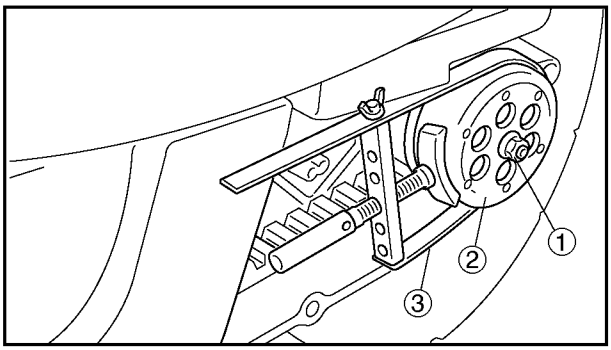
REMOVING THE PRIMARY SHEAVE

1. Remove:
   - primary sheave nut ①
   - plate washer
   - oneway clutch
   - primary fixed sheave ②

NOTE:

While holding the primary fixed sheave with the rotor holding tool ③, loosen the primary fixed sheave nut.

	Rotor holding tool **90890-01235 (YU-01235)**



EAS00318

REMOVING THE SECONDARY SHEAVE AND V-BELT

1. Remove:
   - secondary sheave nut ①
   - clutch housing ②

NOTE:

While holding the clutch housing with the sheave holder ③, loosen the secondary sheave nut.

	Sheave holder **90890-01701 (YS-01880-A)**

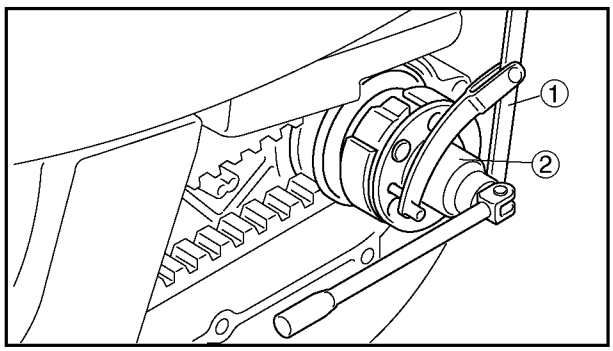
2. Loosen:
   - clutch carrier nut

CAUTION:

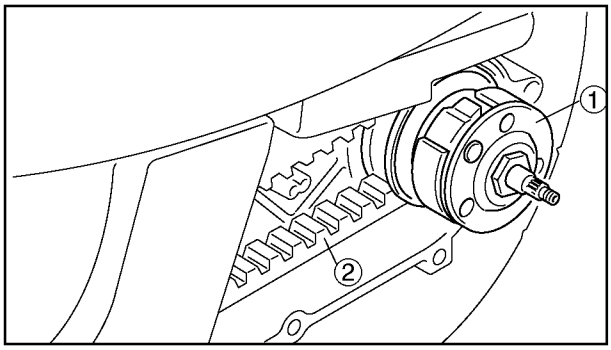
Do not remove the clutch carrier nut at this stage.

NOTE:

While holding the clutch carrier with the rotor holding tool ①, loosen the clutch carrier nut one full turn with the socket wrench ②.

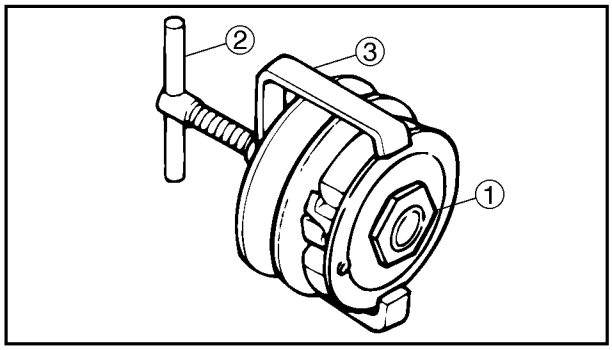


	Rotor holding tool **90890-01235** **YU-01235** **Socket wrench(39mm)** **90890-01493**



3. Remove:
   - secondary sheave ①
   - V-belt ②

NOTE:
Remove the V-belt and secondary sheave from the primary sheave side.

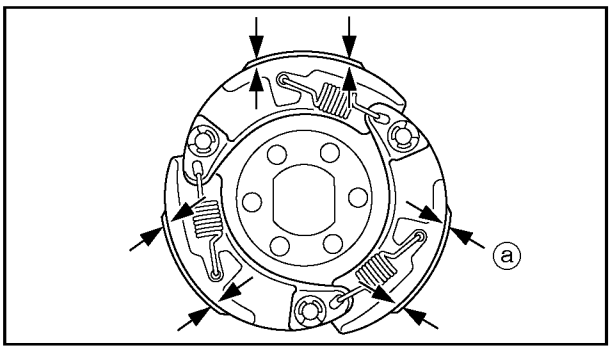


EAS00319
DISASSEMBLING THE SECONDARY SHEAVE

1. Remove:
   - clutch carrier nut ①

NOTE:
Install the clutch spring holder ② and clutch spring holder arm ③ onto the secondary sheave as shown. Then, compress the spring, and remove the clutch carrier nut ①.

Clutch spring holder
90890-01337
YM-33285
YM-33285-6



CHECKING THE CLUTCH SHOES

The following procedure applies to all of the clutch shoes.

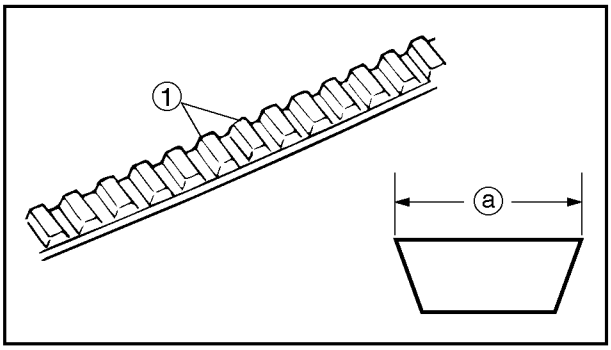
1. Check:
   - clutch shoe
     Damage/wear → Replace the clutch shoes and springs as a set.
     Glazed areas →Sand with coarse sandpaper.

NOTE:
After sanding the glazed areas, clean the clutch with a cloth.

2. Measure:
   - clutch shoe thickness
     Out of specification → Replace the clutch shoes and springs as a set.

Clutch shoe thickness
3.7mm(0.146in)
<Limit>:2.0mm(0.079in)

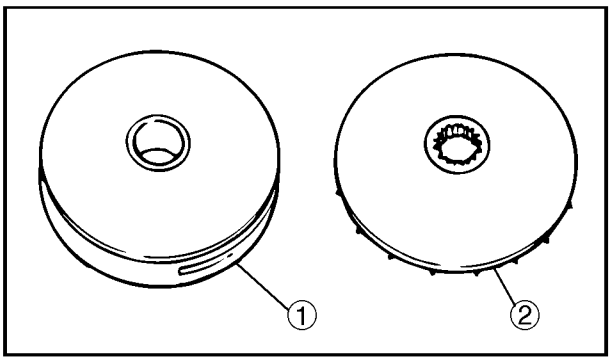
NOTE:
- Inspect clutch shoes ⓐ.
- After removing the clutch shoe spring, do not use them again.
- Replace the all three as a set.



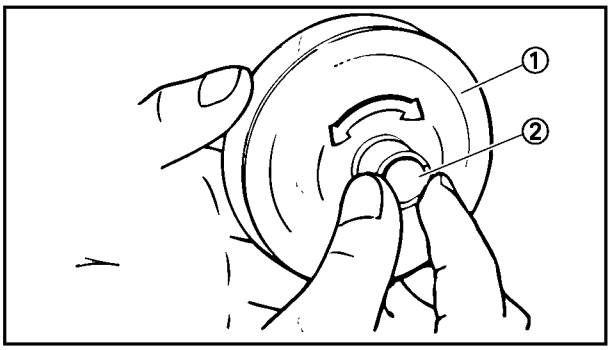
EAS00320
CHECKING THE V-BELT
1. Check:
   - V-belt ①
     Cracks/damage/wear → Replace.
     Grease/oil → Clean the primary and secondary sheave.

2. Measure:
   - V-belt width ⓐ
     Out of specification → Replace.

V-belt width
17.9 mm (0.705 in)
<Limit>: 16.1 mm (0.634 in)

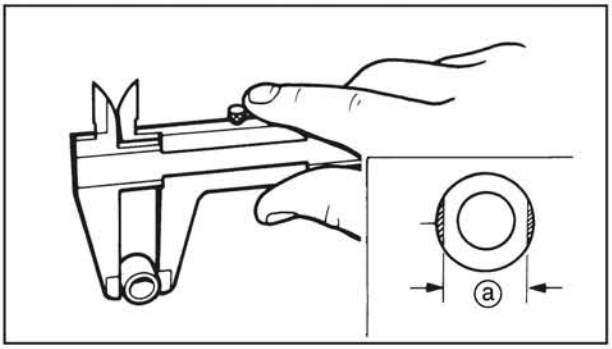


CHECKING THE PRIMARY SHEAVE
1. Check:
   - primary sliding sheave①
   - primary fixed sheave②
     Cracks/damage/wear → Replace the primary sliding sheave, primary fixed sheave and V-belt.



2. Check:
   - free movement
     Stick or excessive play → Replace the primary sliding sheave or collar.

NOTE:
Insert the collar② into the primary sliding sheave①, and check for free movement.



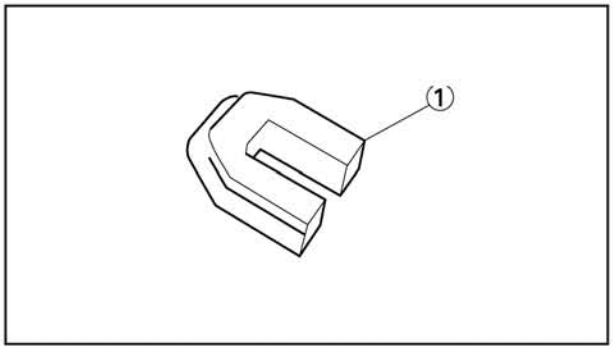
EAS00321
CHECKING THE PRIMARY SHEAVE WEIGHTS

The following procedure applies to all of the primary sheave weights.

1. Check:
   - primary sheave weight
     Cracks/damage/wear → Replace.

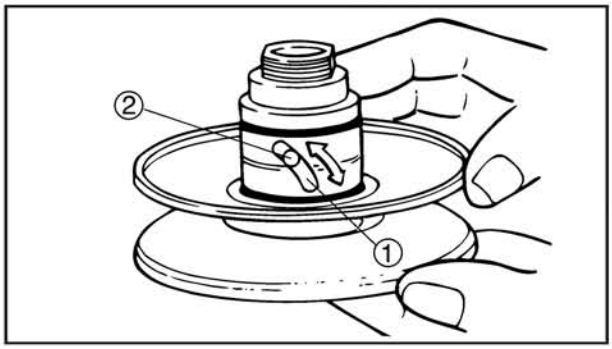
2. Measure:
   - primary sheave weight outside diameter ⓐ
     Out of specification → Replace.

Primary sheave weight outside diameter
15 mm (0.591 in)
<Limit>: 14.5 mm (0.571 in)



CHECKING THE SLIDER

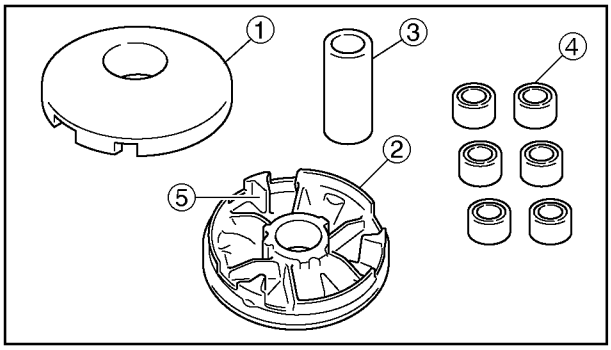
1. Check:
   - slider ①
     Damage/wear→ Replace

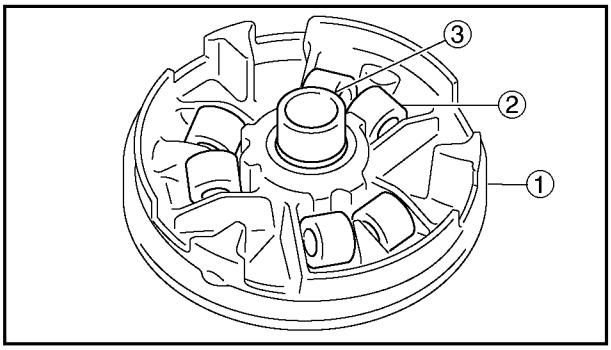


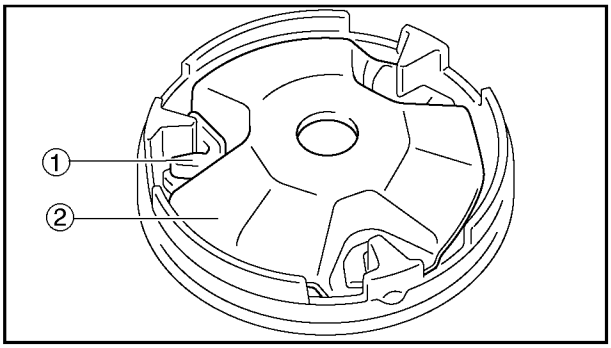
EAS00322
CHECKING THE SECONDARY SHEAVE

1. Check:
   - secondary fixed sheave
   - secondary sliding sheave
     Cracks/damage/wear → Replace the secondary fixed and sliding sheaves as a set.

2. Check:
   - torque cam groove ①
     Damage/wear → Replace the secondary fixed and sliding sheaves as a set.
3. Check:
   - guide pin ②
     Damage/wear → Replace the secondary fixed and sliding sheaves as a set.







EAS00323

ASSEMBLING THE PRIMARY SHEAVE

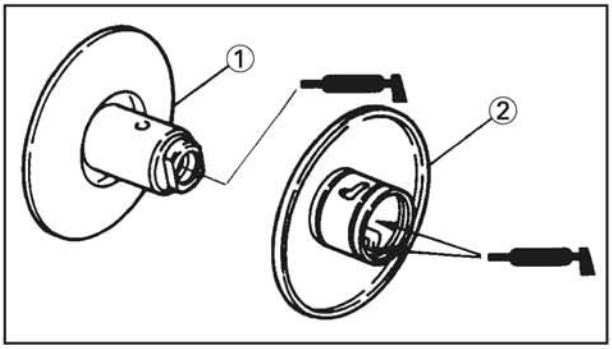
1. Clean:
   - primary fixed sheave ①
   - primary sliding sheave ②
   - collar ③
   - primary sheave weights ④

NOTE:

Use thinner to clean up grease, dirt on the primary sliding sheave cam side ⑤.

2. Install:
   - primary sliding sheave ①
   - primary sheave weights ②
   - collar ③

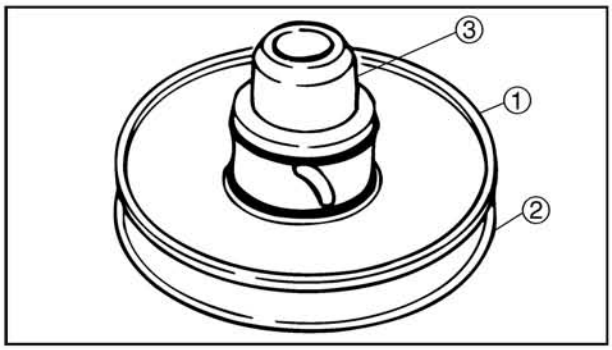
3. Install:
   - sliders ①
   - cam ②



EAS00324
ASSEMBLING THE SECONDARY SHEAVE

1. Lubricate:
   - secondary fixed sheave's inner surface ①
   - secondary sliding sheave's inner surface ②
   - oil seals
   - bearings
   (with the recommended lubricant)

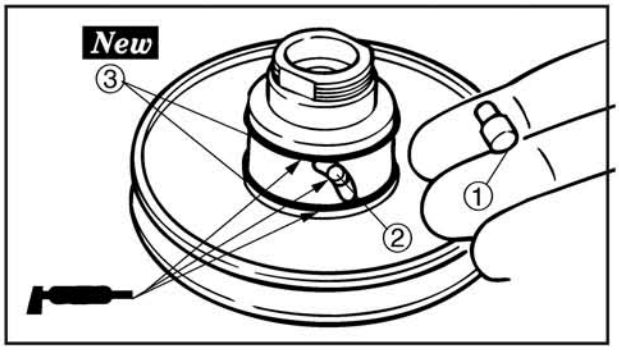
	Recommended lubricant **BEL-RAY assembly lube®**



2. Install:
   - secondary sliding sheave ①

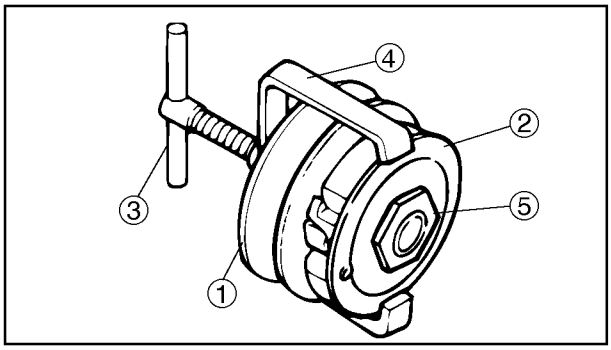
NOTE:
Install the secondary sliding sheave onto the secondary fixed sheave ② with the oil seal guide ③.

	Oil seal guide **90890-01384 (YM-33299)**



3. Install:
   - guide pin ①
4. Lubricate:
   - guide pin groove ②
   - o-ring New ③
   (with the recommended lubricant)

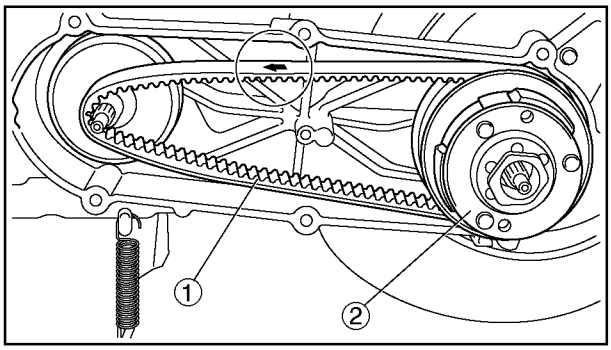
	Recommended lubricant **BEL-RAY assembly lube®**



5. Install:
   - secondary sheave ①
   - spring
   - clutch carrier ②

NOTE:
Attach the clutch spring holder ③ and clutch spring holder arm ④ onto the secondary sheave as shown. Then, compress the spring, and tighten the clutch carrier nut ⑤.

	Clutch spring holder **90890-01337 (YM-33285)** **(YM-33285-6)**

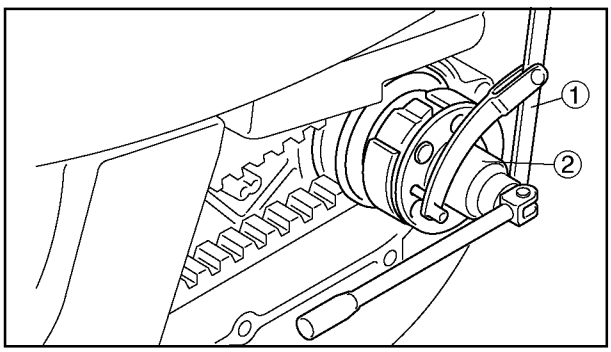


EAS00325
INSTALLING THE SECONDARY SHEAVE, V-BELT AND PRIMARY SHEAVE

1. Install:
   - V-belt ①
   - secondary sheave ②

CAUTION:
Do not allow grease to contact the V-belt, secondary sheave assembly.

NOTE:
- Install the V-belt onto the primary sheave side.
- Install the V-belt with printed arrow mark on the V-belt facing in the direction shown in the illustration.

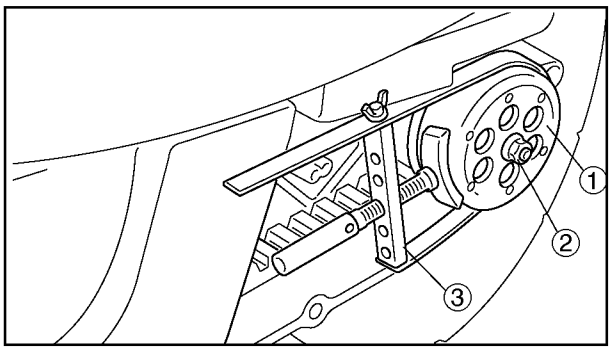


2. Tighten:
   - clutch carrier nut

	55Nm(5.5m • kg, 39.8ft • lb)

NOTE:
While holding the clutch carrier with the rotor holding tool ①, tighten the clutch carrier nut with the socket wrench②.

Rotor holding tool
90890-01235
YU-01235
Socket wrench(39mm)
90890-01493

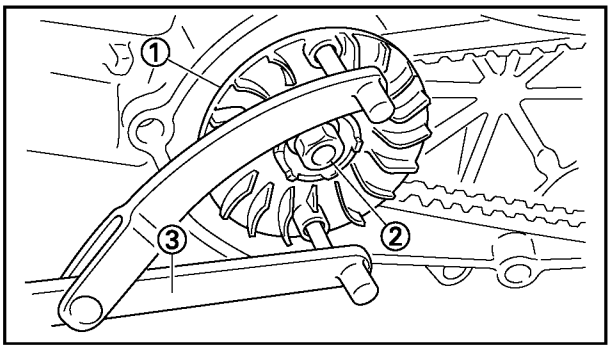


3. Install:
   - clutch housing ①
   - secondary sheave nut②

40Nm(4.0m • kg, 28.9ft • lb)

NOTE:
Tighten the secondary sheave nut with the sheave holder ③.

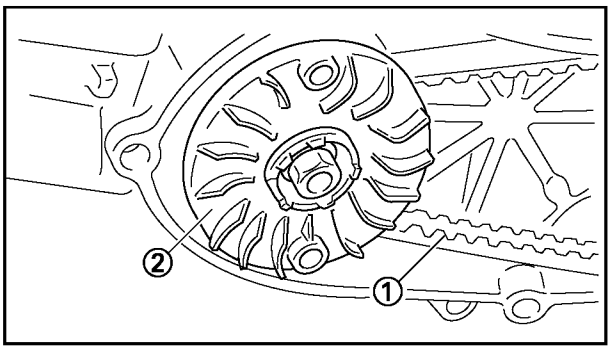
Sheave holder
90890-01701
YS-01880-A

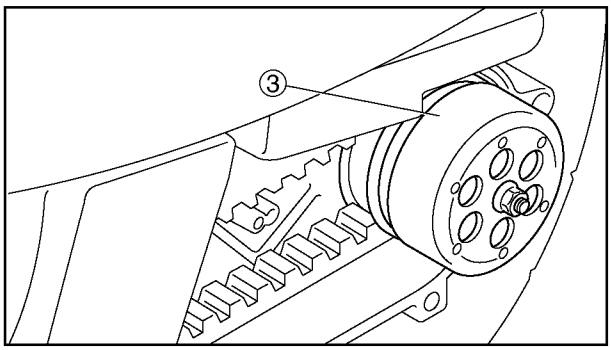


4. Install:
   - primary fixed sheave①
   - oneway clutch
   - plate washer
   - primary sheave nut②

30Nm(3.0m • kg, 21.7ft • lb)

NOTE:
While holding the primary fixed sheave with the rotor holding tool③, tighten the primary fixed sheave nut.





5. Position:
   - V-belt ①

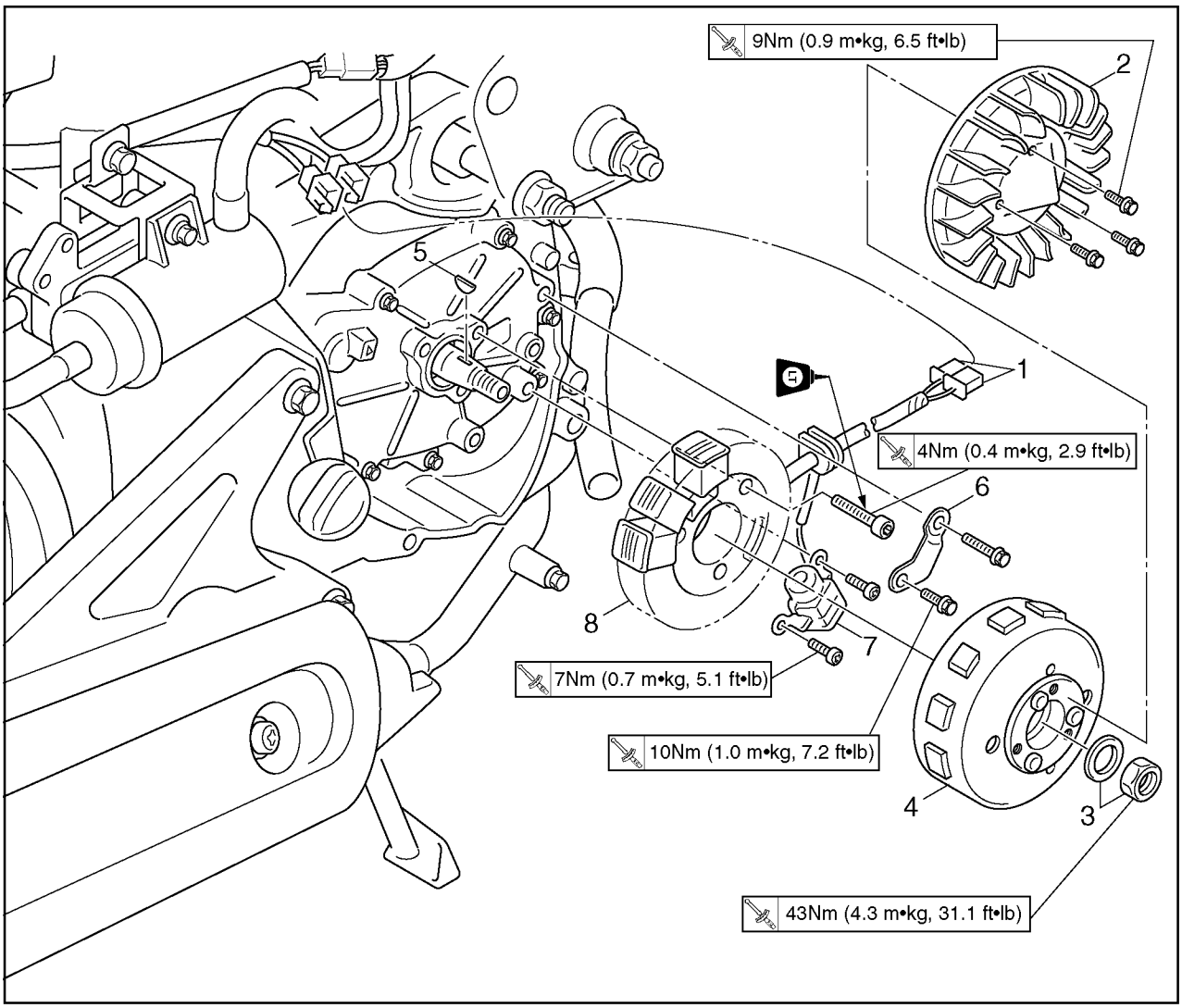
NOTE:

Position the V-belt in the primary sheave ② (when the pulley is at its widest position) and in the secondary sheave ③ (when the pulley is at its narrowest position), and make sure the V-belt is tight.

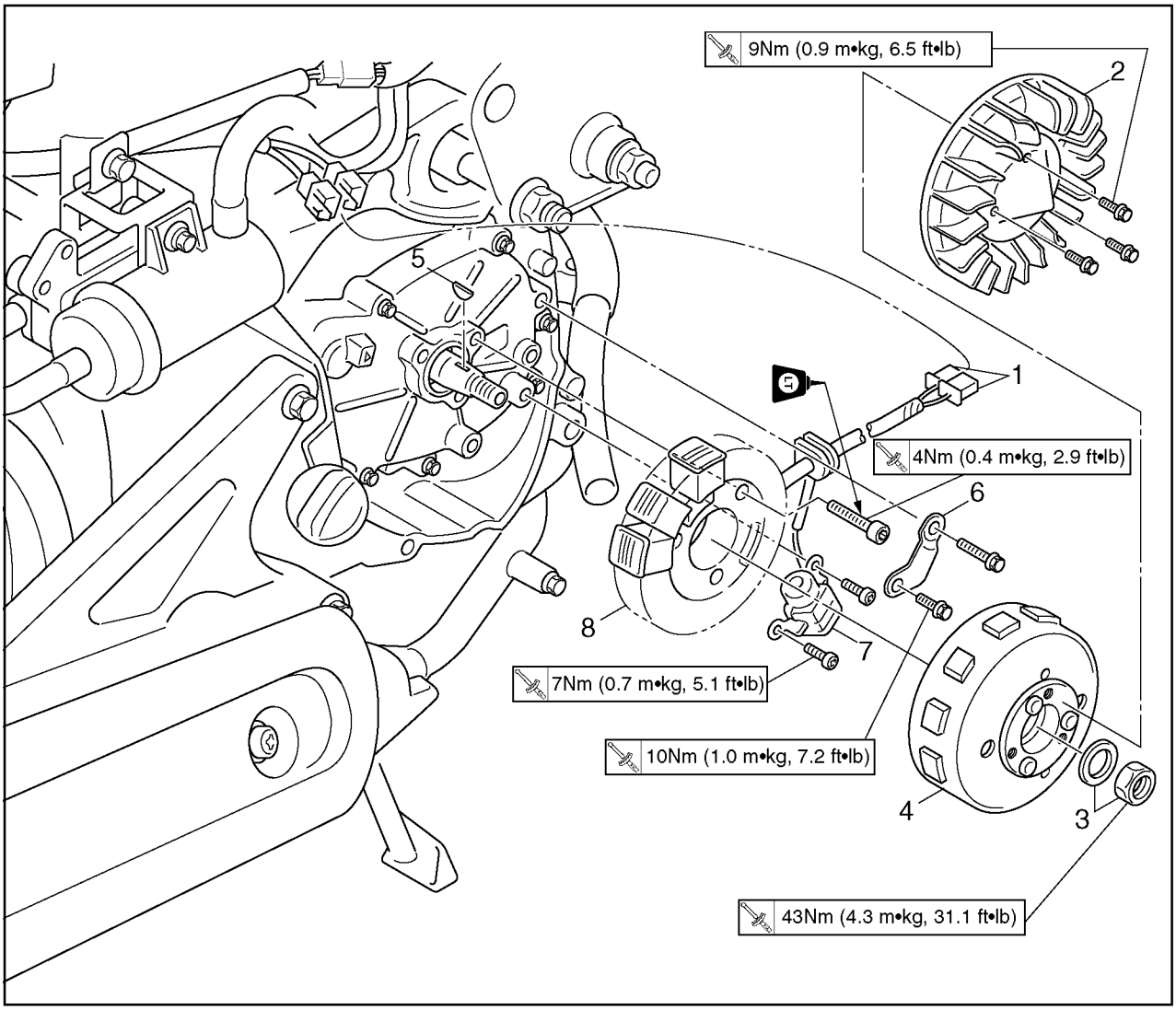
EAS00341

STARTER CLUTCH AND AC MAGNETO

STATOR COIL ASSEMBLY

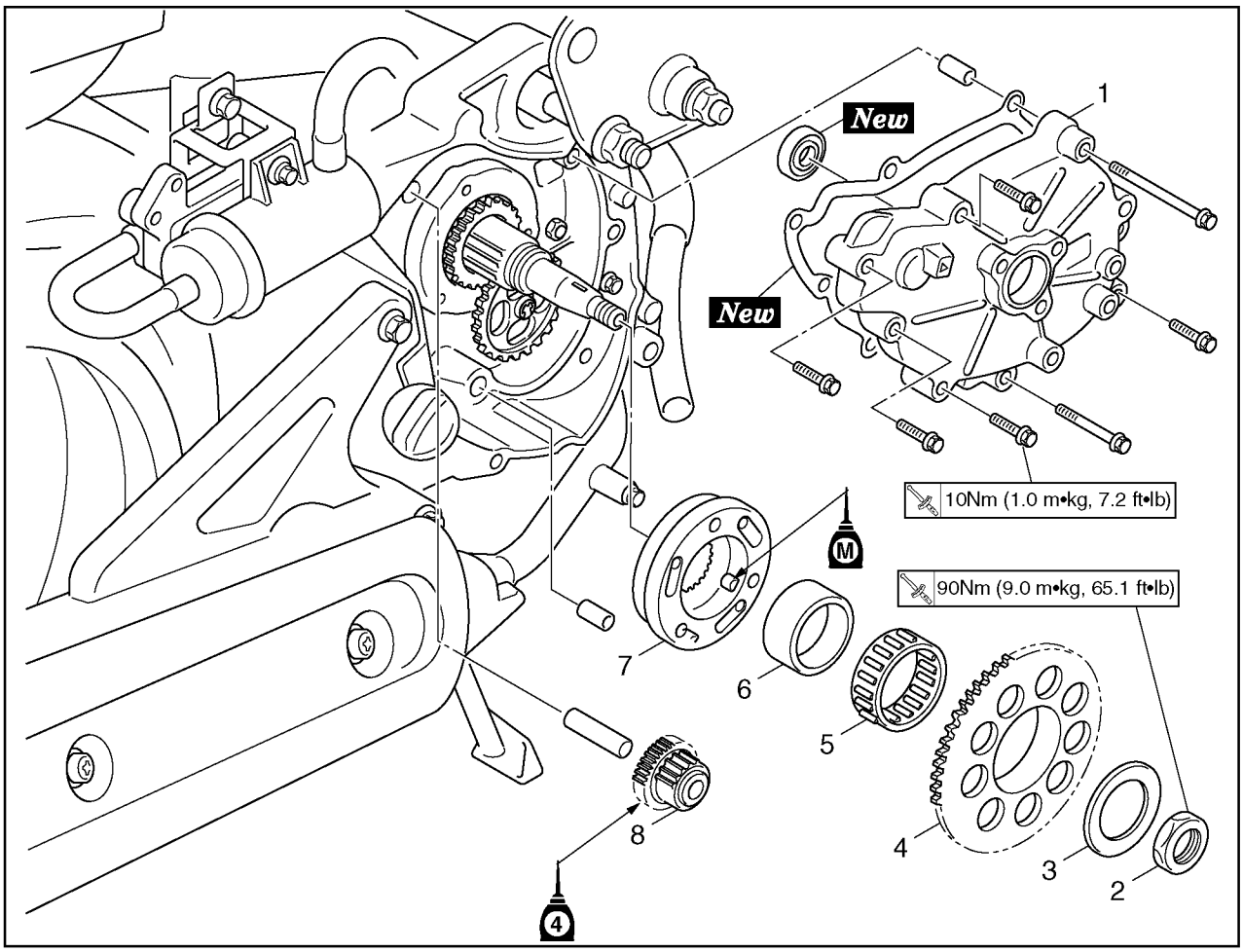


Order	Job/Part	Q'ty	Remarks
	Removing the stator coil assembly		Remove the parts in the order listed.
	Coolant		Drain. Refer to"CHANGING THE COOLANT"in chapter 3.
	Single seat/Trunk		Refer to"COVER AND PANEL"in chapter 3.
	Front cover		
	Side cover(left and right)		
	Battery cover/Battery		
	Footrest board		
	Radiator		Refer to"RADIATOR"in chapter 6.
1	Crankshaft position sensor coupler/Stator coil assembly coupler	1/1	Disconnect.
2	Fan	1	
3	Nut/Plate washer	1/1	
4	AC magneto rotor	1	
5	Woodruff key	1	

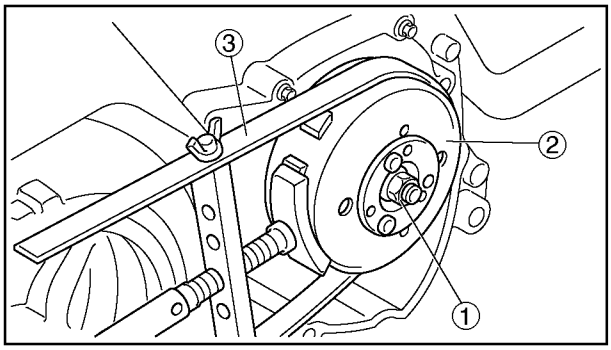


Order	Job/Part	Q'ty	Remarks
6	Lock plate	1	
7	Crankshaft position sensor	1	
8	Stator coil assembly	1	
			For installation, reverse the removal procedure.

EAS00342
STARTER CLUTCH



Order	Job/Part	Q'ty	Remarks
	Removing the starter clutch		Remove the parts in the order listed.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL"in chapter 3.
	AC magneto rotor		Refer to"REMOVING THE AC MAGNETO" and "INSTALLING THE AC MAGNETO".
	Stator coil assembly		
1	Crankcase cover(right)	1	
2	Starter clutch nut	1	**CAUTION:**
3	Washer	1	**The starter clutch nut is left-hand thread.**
4	Starter wheel gear	1	
5	Roller	1	
6	Collar	1	
7	Starter clutch	1	Refer to"REMOVING THE STARTER CLUTCH" and "INSTALLING THE STARTER CLUTCH" .
8	Idle gear	1	
			For installation, reverse the removal procedure.



EAS00347

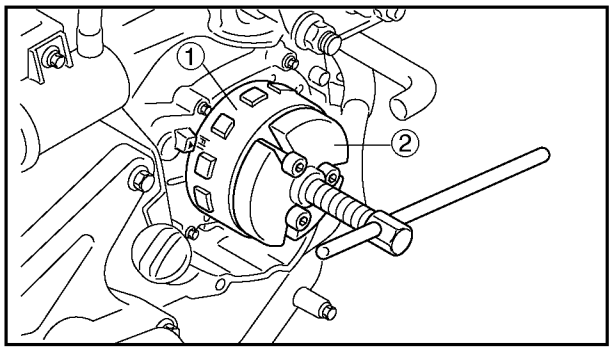
REMOVING THE AC MAGNETO

1. Remove:
   - AC magneto rotor nut①
   - washer

NOTE:

- While holding the AC magneto rotor ② with the sheave holder ③, loosen the AC magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

Sheave holder
90890-01701
YS-01880-A



2. Remove:
   - AC magneto rotor ①
     (with the flywheel puller set ②)
   - woodruff key

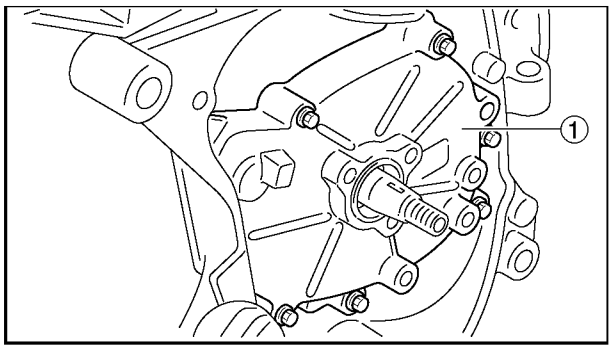
CAUTION:

To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set's center bolt and the crankshaft.

NOTE:

Make sure the flywheel puller is centered over the AC magneto rotor.

Flywheel puller set
90890-01468
YU-33270-B



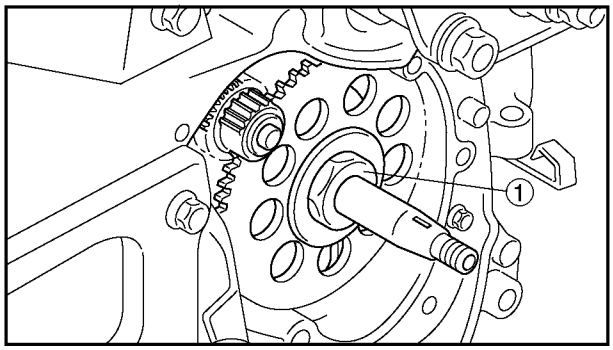
EAS00344

REMOVING THE STARTER CLUTCH

1. Remove:
   - crankcase cover (right)①

NOTE:

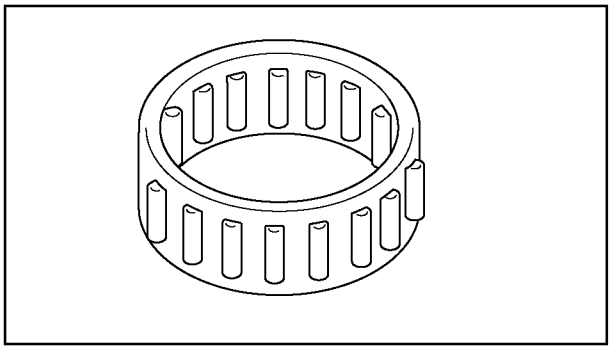
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

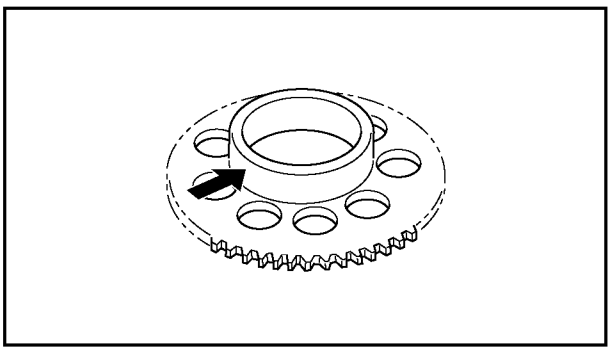


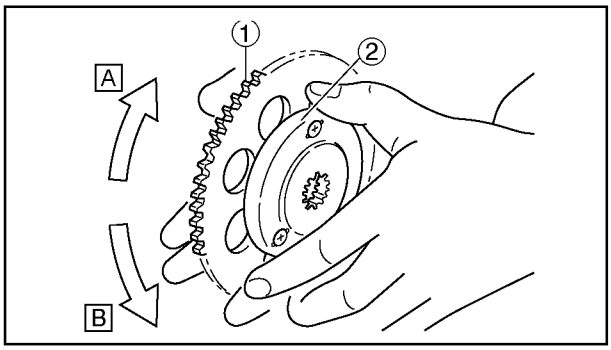
2. Remove:
   - starter clutch nut①
   - washer
   - starter wheel gear
   - roller
   - collar
   - starter clutch
   - idle gear

NOTE:

The starter clutch nut is left-hand thread.







EAS00351
CHECKING THE STARTER CLUTCH

1. Check:
   - ●starter clutch roller
     Damage/wear → Replace.
2. Check:
   - ●starter clutch idle gear
   - ●starter wheel gear
     Burrs/chips/roughness/wear → Replace the defective part(s).

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

4. Check:
   - ●starter clutch operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Install the starter wheel gear ①onto the starter clutch ② and hold the starter clutch.
b. When turning the starter wheel gear clockwise [A], the starter clutch and the starter wheel gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter wheel gear counterclockwise [B], it should turn freely, otherwise the starter clutch is faulty and must be replaced.

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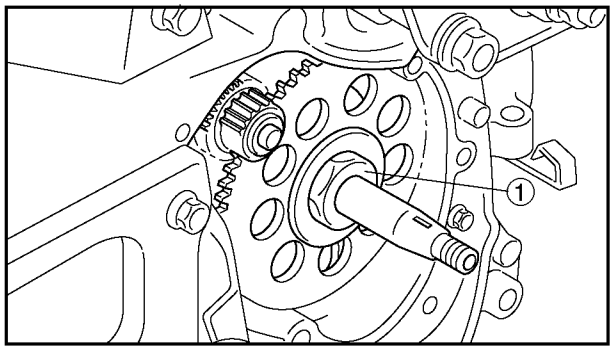


EAS00355

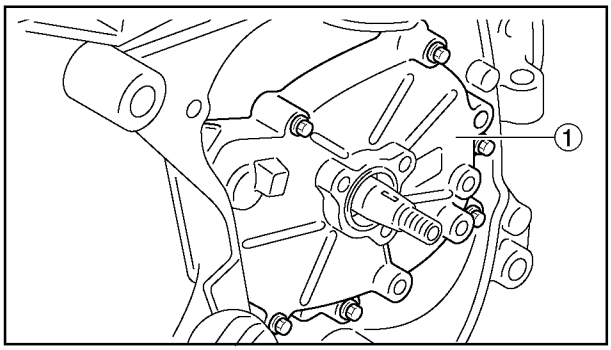
INSTALLING THE STARTER CLUTCH

1. Install:
   - idle gear
   - starter clutch
   - collar
   - roller
   - starter wheel gear
   - washer
   - starter clutch nut①

	90 Nm (9.0 m • kg, 65.1 ft • lb)

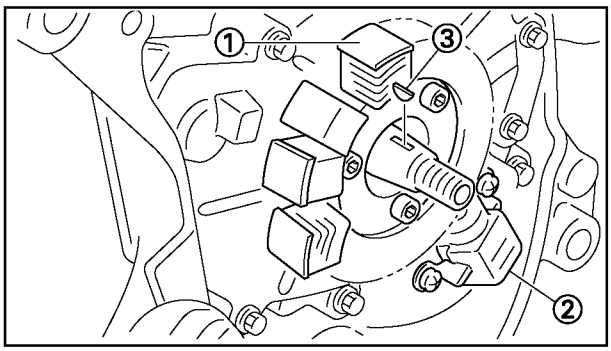
NOTE:

The starter clutch nut is left-hand thread.



2. Install:
   - gasket **New**
   - crankcase cover (right)①

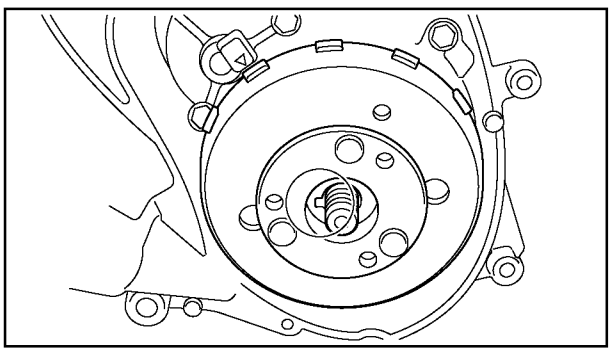
	10 Nm (1.0 m • kg, 7.2 ft • lb)



EAS00354

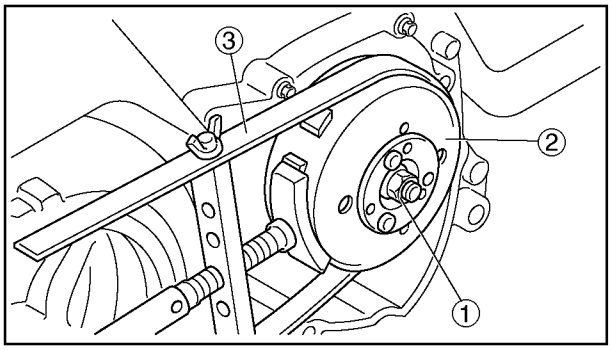
INSTALLING THE AC MAGNETO

1. Install:
   - stator coil assembly①
   - crankshaft position sensor②
   - woodruff key③
   - AC magneto rotor
   - washer
   - AC magneto rotor nut



NOTE:

- Clean the tapered portion of the crankshaft and the AC magneto rotor hub.
- When installing the AC magneto rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.



2. Tighten:
   - AC magneto rotor nut ①

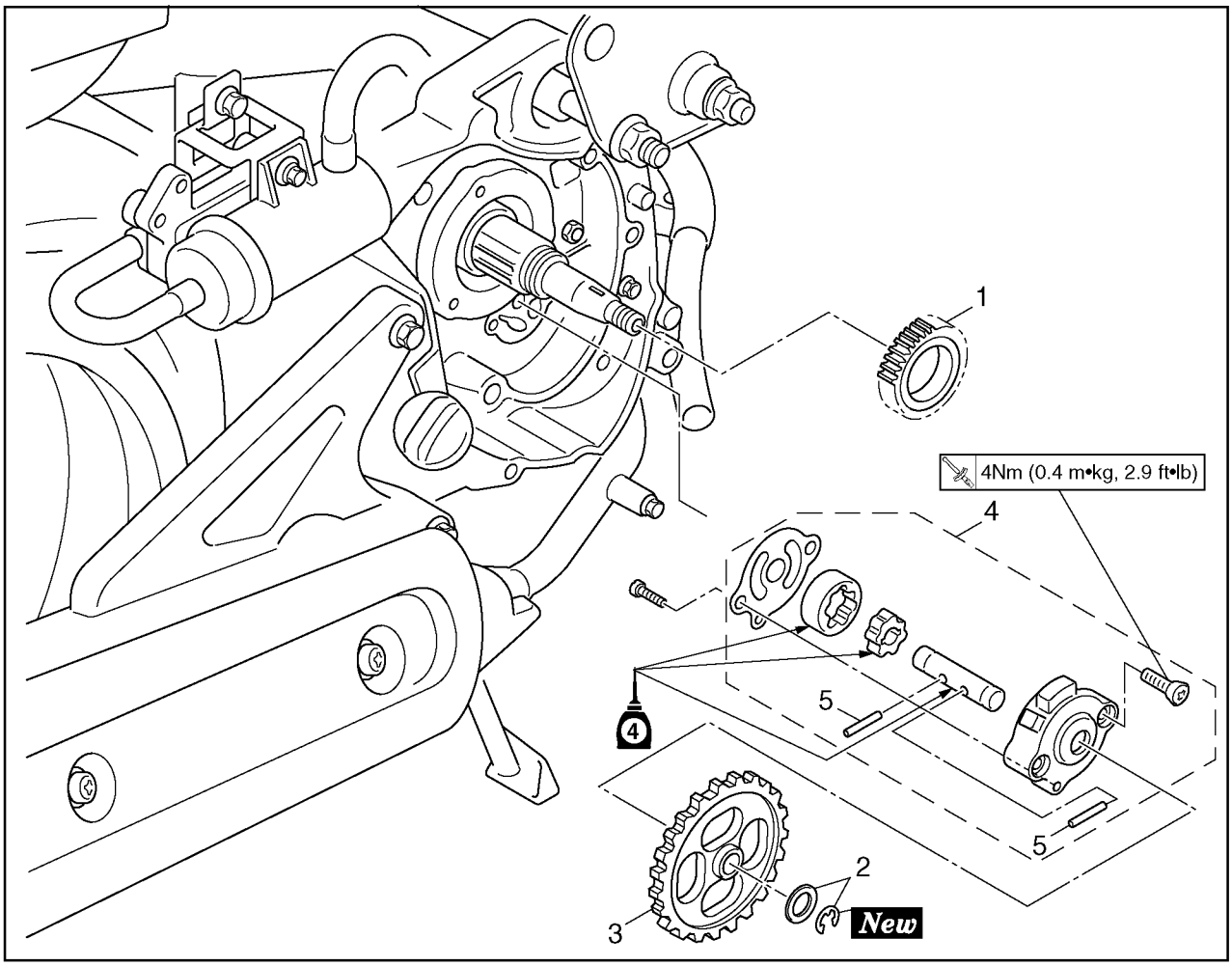
	43 Nm (4.3 m • kg, 31.1 ft • lb)

NOTE:

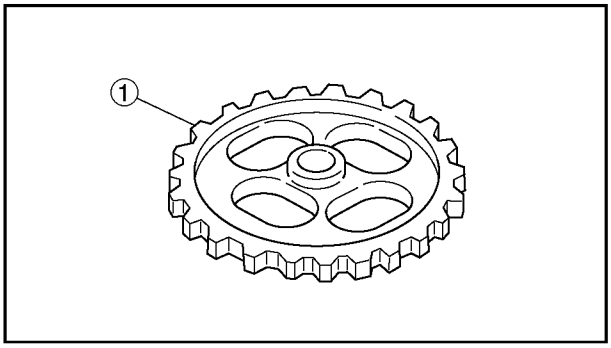
- While holding the AC magneto rotor ②with the sheave holder ③, tighten the AC magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

	Sheave holder **90890-01701** **YS-01880-A**

EAS00360
OIL PUMP



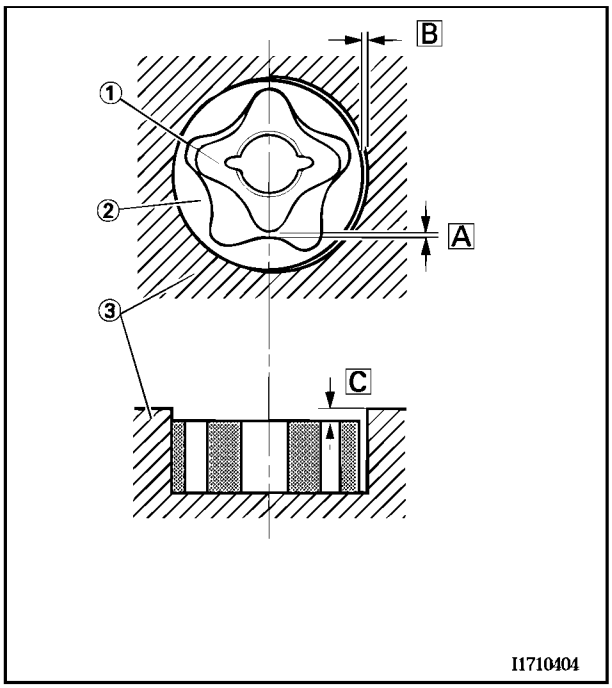
Order	Job/Part	Q'ty	Remarks
	Removing the oil pump		Remove the parts in the order listed.
	Radiator		Refer to"RADIATOR"in chapter 6.
	AC magneto		Refer to"STARTER CLUTCH AND AC MAGNETO" .
	Starter clutch		
1	Drive gear	1	
2	Circlip/Plate washer	1/1	
3	Oil pump driven gear	1	
4	Dowel pin	2	
5	Oil pump	1	
			For installation, reverse the removal procedure.



EAS00364
CHECKING THE OIL PUMP

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

   Cracks/damage/wear → Replace the defective part(s).



2. Measure:
   - inner-rotor-to-outer-rotor-tip clearance A
   - outer-rotor-to-oil-pump-housing clearance B
   - oil-pump-housing-to-inner-rotor-and-outer-rotor clearance C

   Out of specification → Replace the oil pump.

① Inner rotor
② Outer rotor
③ Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance
0.15 mm (0.006 in) or less
<Limit>: 0.23 mm (0.009 in)
Outer-rotor-to-oil-pump-housing clearance
0.13 ~ 0.18 mm (0.005 ~ 0.007 in)
<Limit>: 0.25mm (0.010 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance
0.07 ~ 0.12 mm (0.003 ~ 0.005 in)
<Limit>: 0.19 mm (0.008 in)

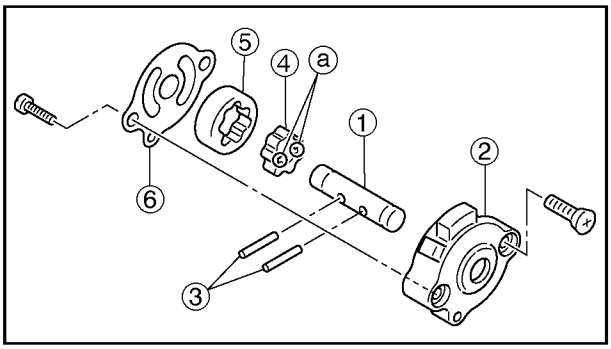
3. Check:
   - oil pump operation

   Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

EAS00375
ASSEMBLING THE OIL PUMP

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

	Recommended lubricant **Engine oil**

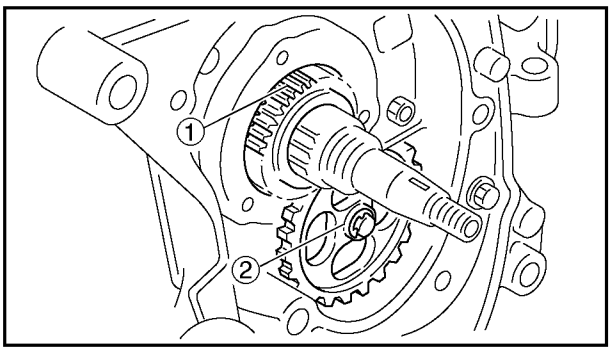


2. Install:
   - oil pump shaft ①
     (to the oil pump housing②)
   - pin ③
   - inner rotor ④
   - outer rotor⑤
   - oil pump housing cover⑥
   - oil pump housing screw

	4 Nm (0.4 m • kg, 2.9 ft • lb)

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

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



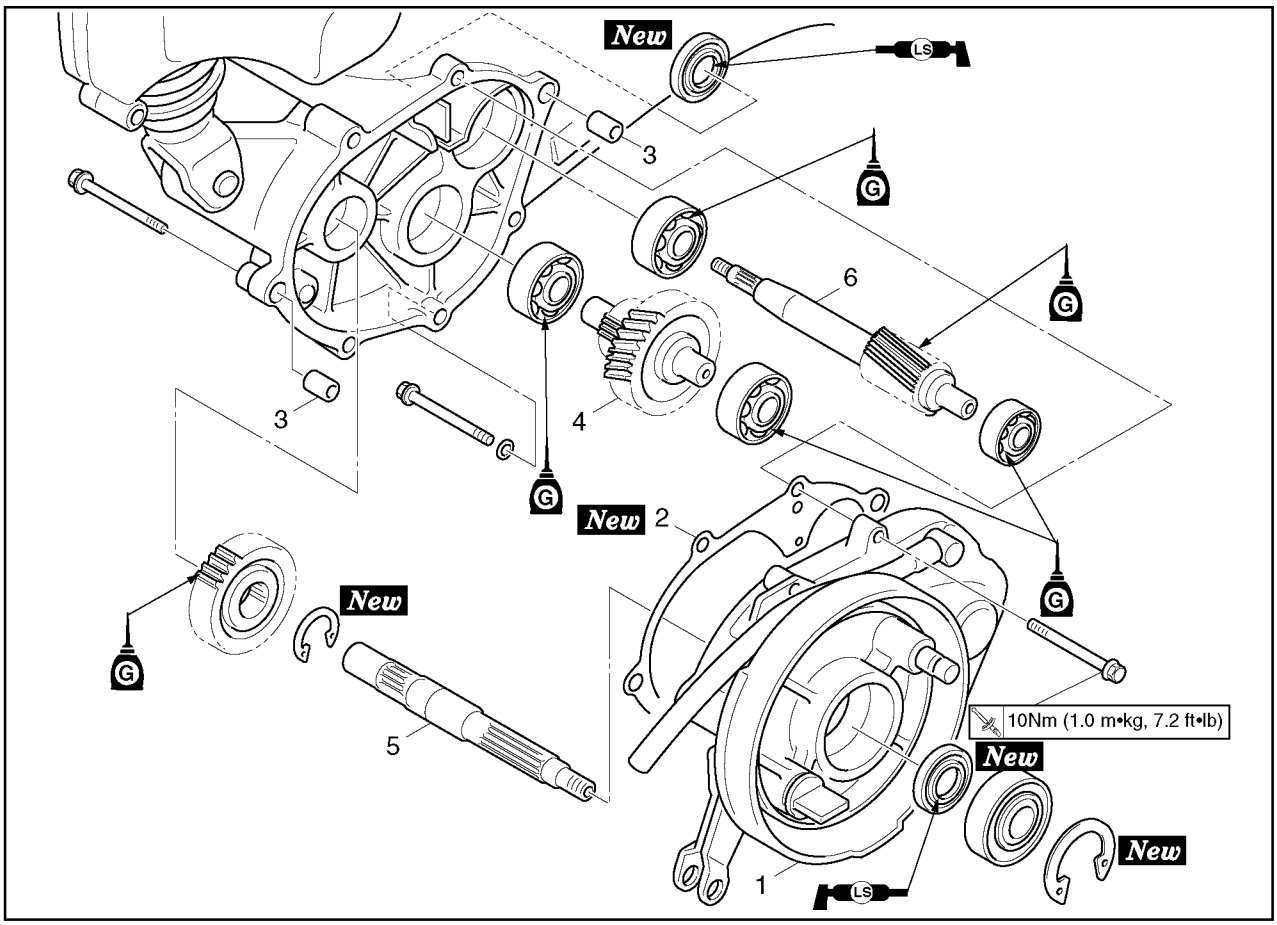
EAS00376
INSTALLING THE OIL PUMP

1. Install:
   - oil pump drive gear ①
   - gasket **New**
   - oil pump②
   - oil pump bolt

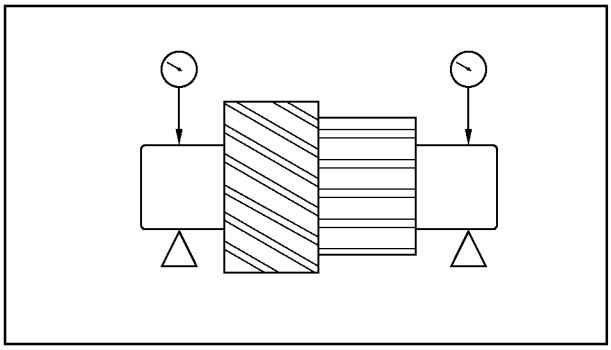
	4 Nm (0.4 m • kg, 2.9 ft • lb)

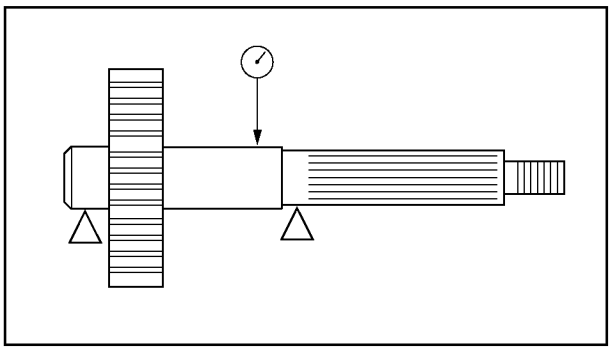
CAUTION:
After tightening the bolts, make sure the oil pump turns smoothly.

EAS00419
TRANSMISSION



Order	Job/Part	Q'ty	Remarks
	Removing the transmission		Remove the parts in the order listed.
	Transmission oil		Drain. Refer to"CHANGING THE TRANSMISSION OIL" in chapter 3.
	Muffler/Bracket		Refer to"ENGINE REMOVAL".
	Rear wheel		Refer to"REAR WHEEL AND BRAKE" in chapter 4.
	V-belt case cover Secondary sheave		Refer to"BELT DRIVE".
1	Transmission cover	1	
2	Transmission cover gasket	1	
3	Dowel pin	2	
4	Main axle	1	
5	Drive axle	1	
6	Primary drive gear	1	
			For installation, reverse the removal procedure.





EAS00425

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
0.04 mm (0.002 in)

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

Primary drive gear shaft runout limit
0.04 mm (0.002 in)

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

4 . Check:
   - transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.

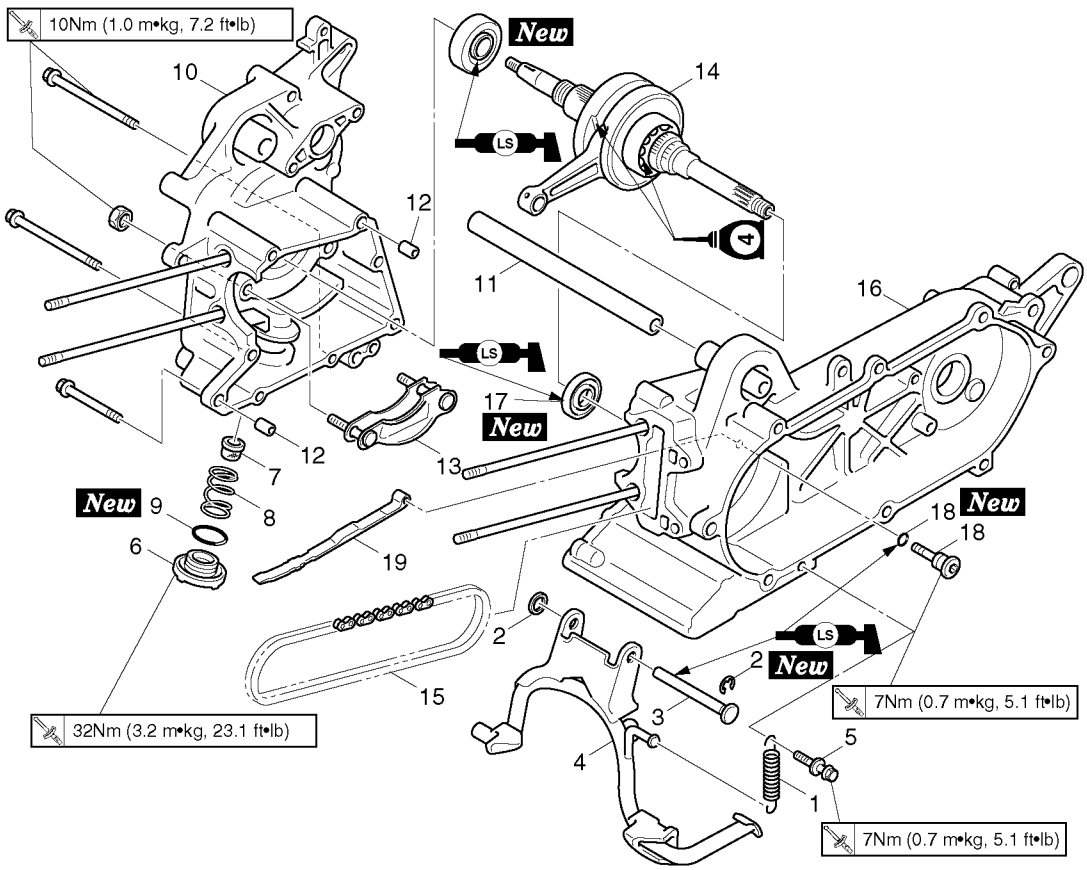
5 . Check:
   - transmission gear movement
     Rough movement → Replace the defective part(s).

6 . Check:
   - circlip
     Bends/damage/looseness → Replace.

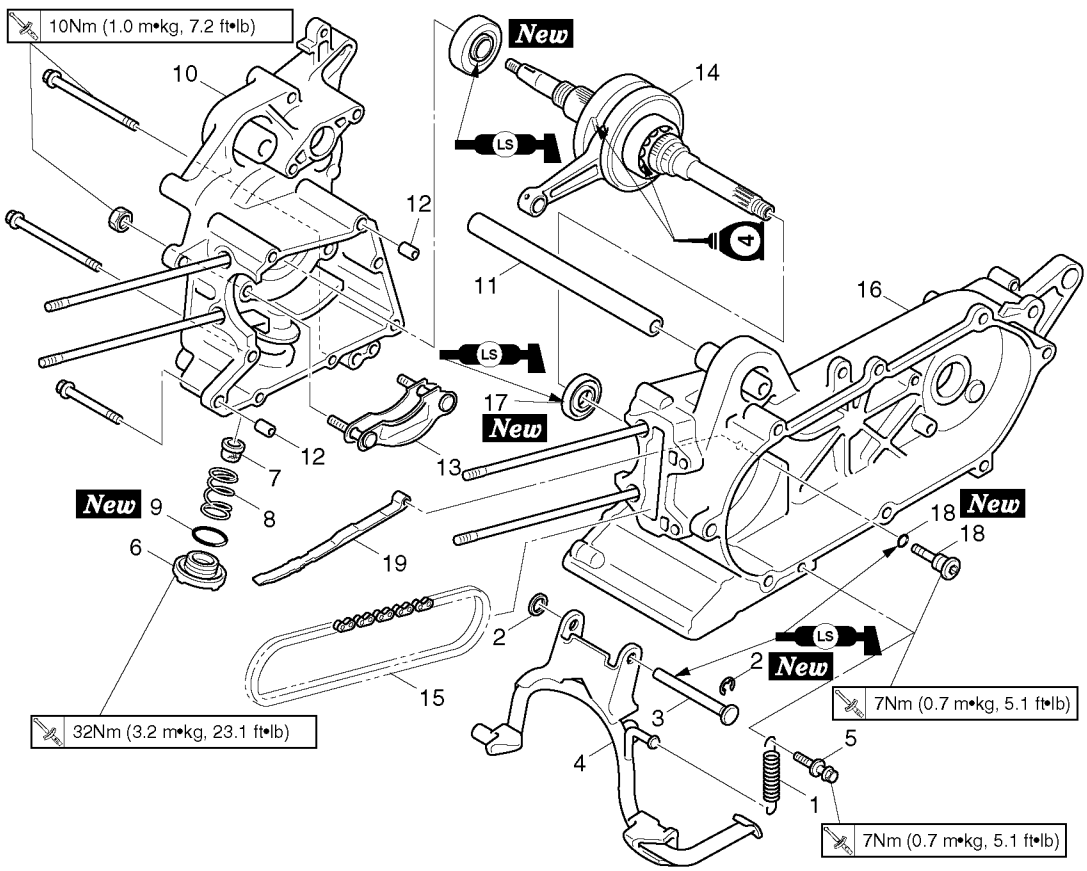
EAS00381

CRANKSHAFT

CRANKSHAFT ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft assembly		Remove the parts in the order listed.
	Engine		Refer to"ENGINE REMOVAL" .
	Cylinder head		Refer to"CYLINDER HEAD".
	Cylinder and piston		Refer to"CYLINDER AND PISTON".
	V-belt case cover		Refer to"BELT DRIVE".
	V-belt and primary/secondary sheave		
	Radiator		Refer to"COOLING SYSTEM"in chapter 6.
	Water pump		
	Starter clutch		Refer to"STARTER CLUTCH AND AC MAGNETO".
	AC magneto		
	Oil pump		Refer to"OIL PUMP".
	Transmission		Refer to"TRANSMISSION".
	Rear wheel		Refer to"REAR WHEEL AND BRAKE"in chapter 4.
1	Tension spring	1	
2	Circlip/Plate washer	1/1	
3	Pin	1	
4	Centerstand	1	

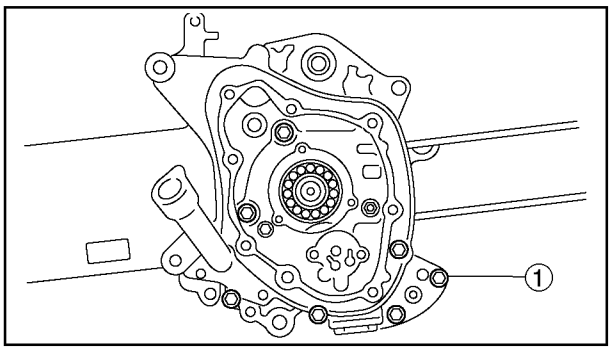


Order	Job/Part	Q'ty	Remarks
5	Hook	1	
6	Drain plug	1	
7	Oil strainer	1	
8	Compression spring	1	
9	O-ring	1	
10	Crankcase(right)	1	Refer to"DISASSEMBLING THE CRANKCASE" and "ASSEMBLING THE CRANKCASE".
11	Spacer	1	
12	Dowel pin	2	
13	Guide	1	
14	Crankshaft	1	Refer to"REMOVING THE CRANKSHAFT ASSEMBLY" and "INSTALLING THE CRANKSHAFT ASSEMBLY".
15	Timing chain	1	
16	Crankcase(left)	1	
17	Oil seal	1	
18	Bolt/O-ring	1/1	
19	Timing chain guide (intake side)	1	
			For installation, reverse the removal procedure.

EAS00385

DISASSEMBLING THE CRANKCASE

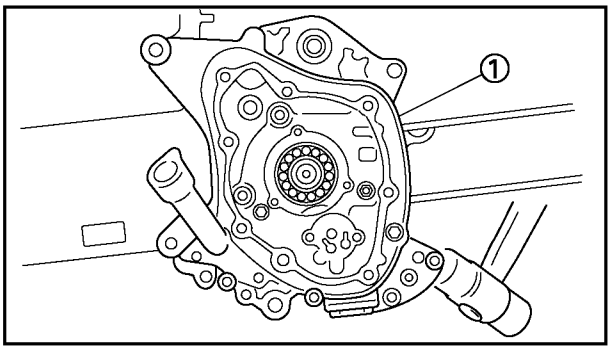
1. Remove:
   - centerstand assembly



2. Remove:
   - crankcase bolts①

NOTE:

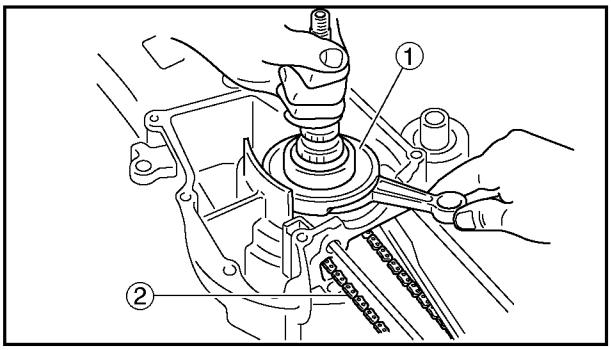
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



3. Remove:
   - right crankcase①
   - spacer

CAUTION:

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



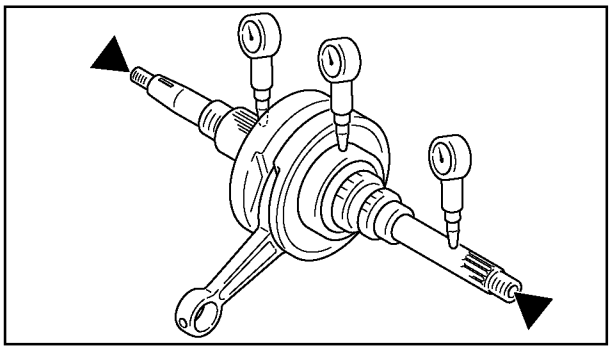
EAS00389

REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
   - crankshaft assembly①
   - timing chain②
   - timing chain guide(intake side)

NOTE:

- Before removing the crankshaft assembly, remove the timing chain from the crankshaft sprocket.
- The crankshaft assembly cannot be removed if the timing chain is attached onto the crankshaft sprocket.



EAS00394

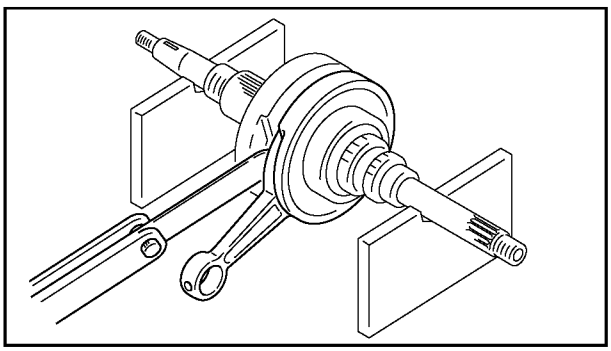
CHECKING THE CRANKSHAFT AND CONNECTING ROD

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

NOTE:

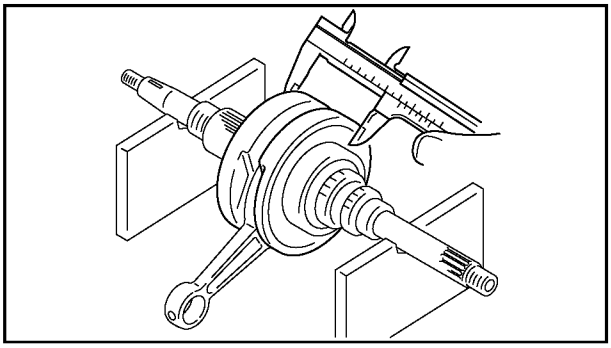
Turn the crankshaft slowly.

	Maximum crankshaft runout 0.03mm(0.0012in)



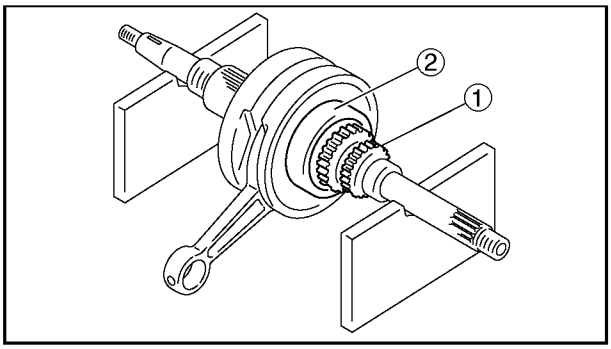
2. Measure:
   - big end side clearance
     Out of specification → Replace the big end bearing, crankshaft pin, or connecting rod.

	Big end side clearance 0.15~0.45mm(0.006~0.018in)



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

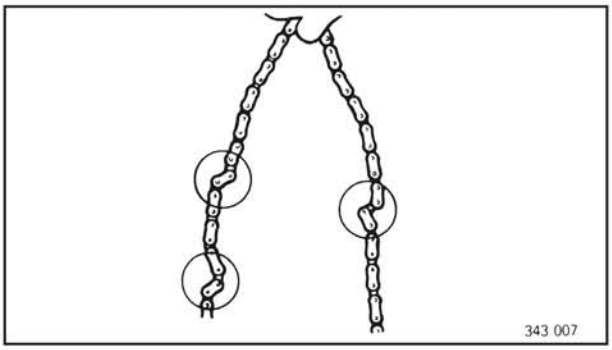
Crankshaft width
42.45~42.50mm(1.671~1.673in)



4. Check:
   - crankshaft sprocket ①
     Damage/wear →Replace the crankshaft.
   - bearing ②
     Cracks/damage/wear → Replace the crankshaft.
   - oil pump drive gear
     Damage/wear → Replace the crankshaft.
5. Check:
   - crankshaft journal
     Scratches/wear → Replace the crankshaft.
   - crankshaft journal oil passage
     Obstruction → Blow out with compressed air.

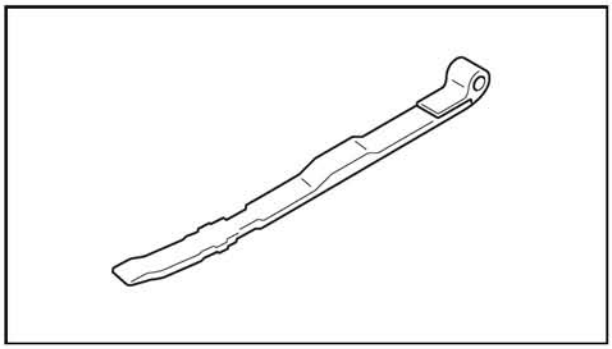
EAS00399
CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
   - crankcase
     Cracks/damage → Replace.
   - oil delivery passages
     Obstruction → Blow out with compressed air.



EAS00207
CHECKING THE TIMING CHAIN AND TIMING CHAIN GUIDE(INTAKE SIDE)

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



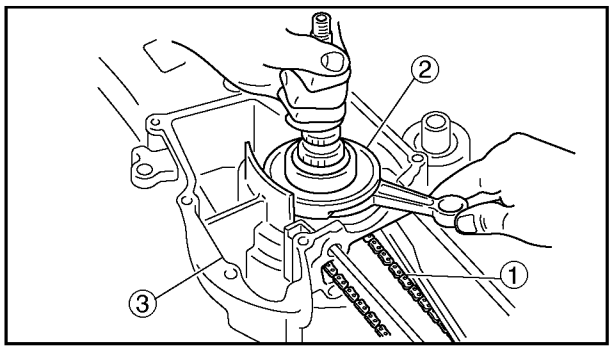
2. Check:
   - timing chain guide (intake side)
     Damage/wear → Replace.

EAS00401
CHECKING THE BEARINGS AND OIL SEALS

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

EAS00402
CHECKING THE CIRCLIPS AND WASHERS

1. Check:
   - circlips
     Bends/damage/looseness → Replace.
   - washers
     Bends/damage → Replace.



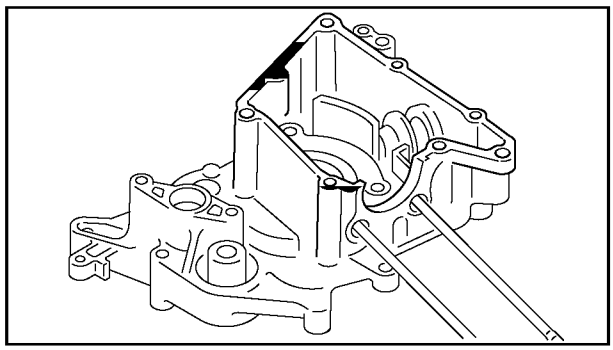
EAS00408
INSTALLING THE CRANKSHAFT

1. Install:
   - timing chain guide (intake side)
   - timing chain①
   - crankshaft assembly②

NOTE:
Install the timing chain so it is not visible through the opening in the left crankcase ③.

CAUTION:
To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease and each bearing with engine oil.

NOTE:
Put the timing chain in parallel into the crankcase, then use hands to place the crankshaft assembly into the crankcase. Manually rotate the crankshaft to check whether it is tightly engaged with the timing chain. (if not, install again)

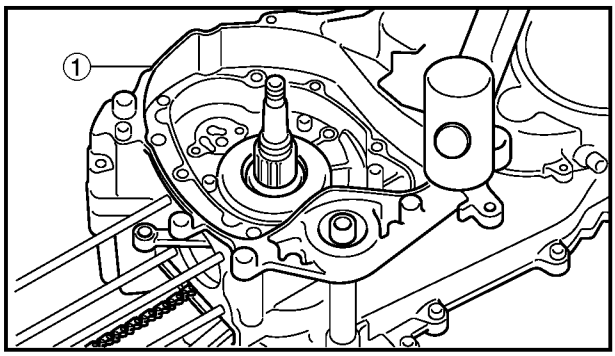


EAS00418
ASSEMBLING THE CRANKCASE

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

Yamaha bond No. 1215
90890-85505
Sealant (Quick Gasket®)
ACC-11001-05-01

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



3. Install:
   - dowel pins
   - spacer
   - right crankcase①

NOTE:
Tap lightly on the right crankcase with a soft-face hammer.

4. Tighten:
   - crankcase bolts

	10Nm(1.0m • kg, 7.2ft • lb)

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

5. Apply:
   - engine oil
     (onto the crankshaft pin, bearing and oil delivery hole)
6. Check:
   - crankshaft operation
     Rough movement→Repair.

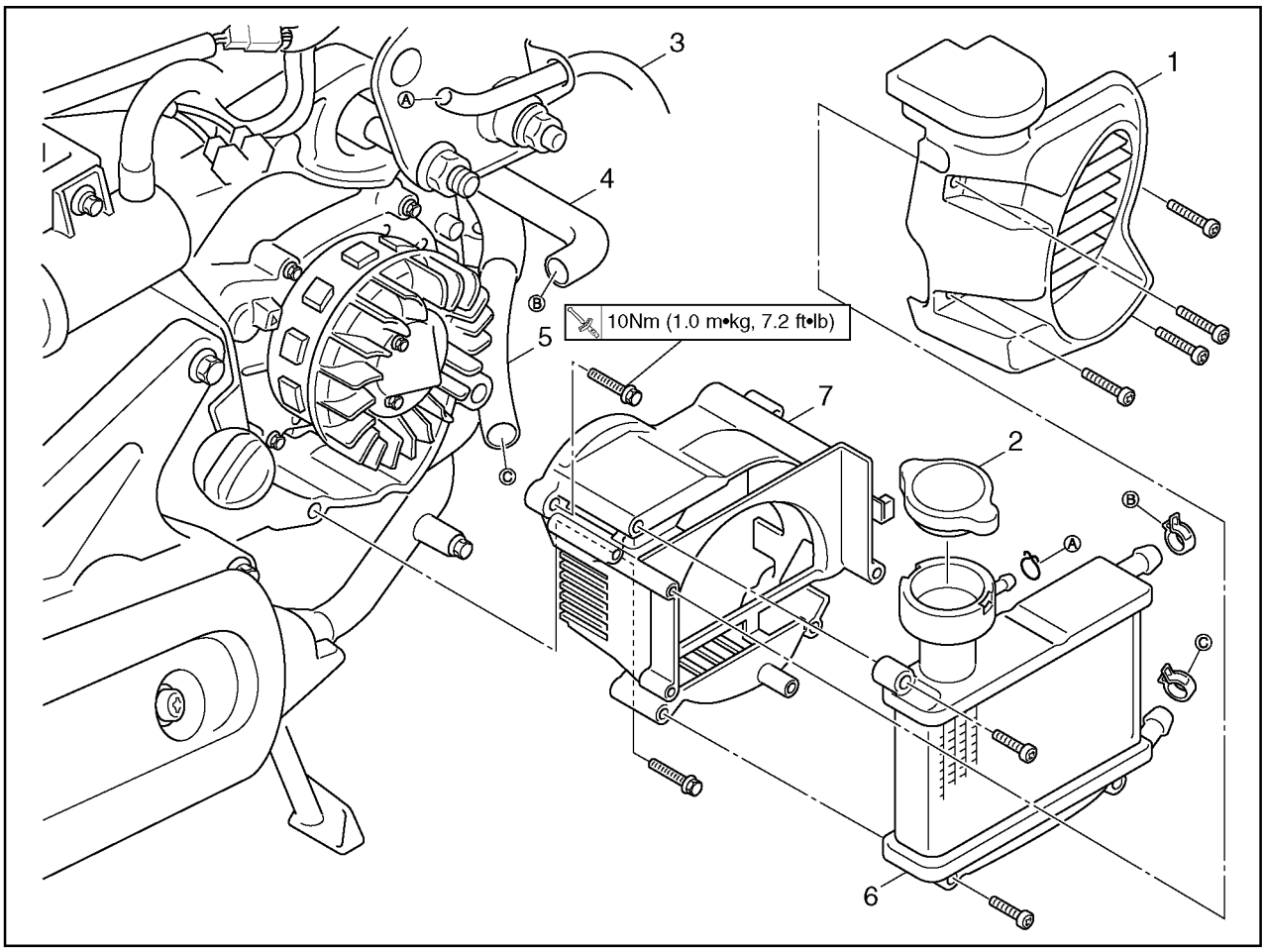
CHAPTER 6
COOLING SYSTEM

RADIATOR 6-1
CHECKING THE RADIATOR 6-2
INSTALLING THE RADIATOR 6-3
THERMOSTAT 6-4
CHECKING THE THERMOSTAT 6-5
INSTALLING THE THERMOSTAT 6-6
WATER PUMP 6-7
DISASSEMBLING THE WATER PUMP 6-9
CHECKING THE WATER PUMP 6-9
ASSEMBLING THE WATER PUMP 6-10
INSTALLING THE WATER PUMP 6-11

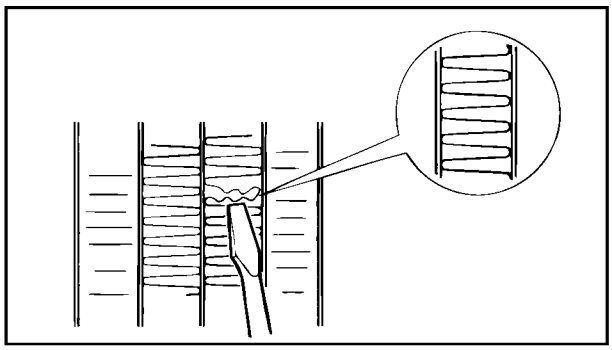
EAS00454

COOLING SYSTEM

RADIATOR



Order	Job/Part	Q'ty	Remarks
	Removing the radiator		Remove the parts in the order listed.
	Front cover Side cover(left and right) Single seat/Trunk Footrest board		Refer to"COVER AND PANEL"in chapter 3.
	Coolant		Drain. Refer to"CHANGING THE COOLANT"in chapter 3.
1	Radiator cover	1	
2	Radiator cap	1	
3	Conduit hose	1	Disconnect.
4	Radiator inlet hose	1	Disconnect.
5	Radiator outlet hose	1	Disconnect.
6	Radiator	1	
7	Fan case	1	
			For installation, reverse the removal procedure.

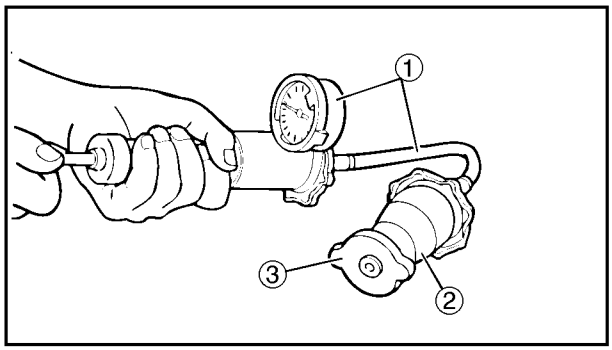


EAS00455
CHECKING THE RADIATOR

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

NOTE:
Straighten any flattened fins with a thin, flat-head screwdriver.

2. Check:
   - radiator inlet hose
   - radiator outlet hose
   - conduit hose
     Cracks/damage → Replace.



3. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Radiator cap opening pressure
107.9 ~ 137.3kPa
(1.1 ~ 1.4kg/cm², 15.6 ~ 19.9psi)

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

Radiator cap tester
90890-01325
YU-24460-01
Radiator cap tester adapter
90890-01352
YU-33984

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

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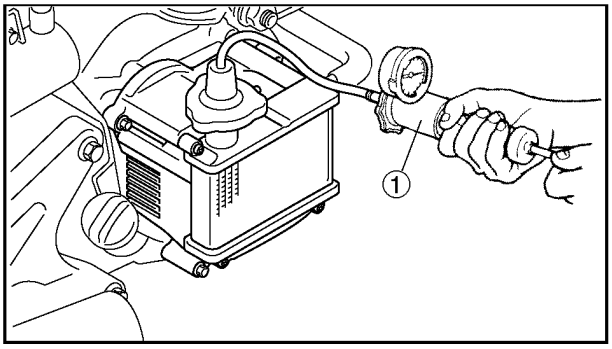
4. Check:
   - radiator fan
     Damage → Replace.
     Malfunction → Check and repair.

EAS00456
INSTALLING THE RADIATOR

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



2. Check:
   - cooling system
     Leaks → Repair or replace any faulty part.

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

Radiator cap tester
90890-01325, YU-24460-01
Radiator cap tester adapter
90890-01352, YU-33984

b. Apply 100 kPa (1.0 kg/cm^2, 14.22 psi) of pressure.
c. Measure the indicated pressure with the gauge.

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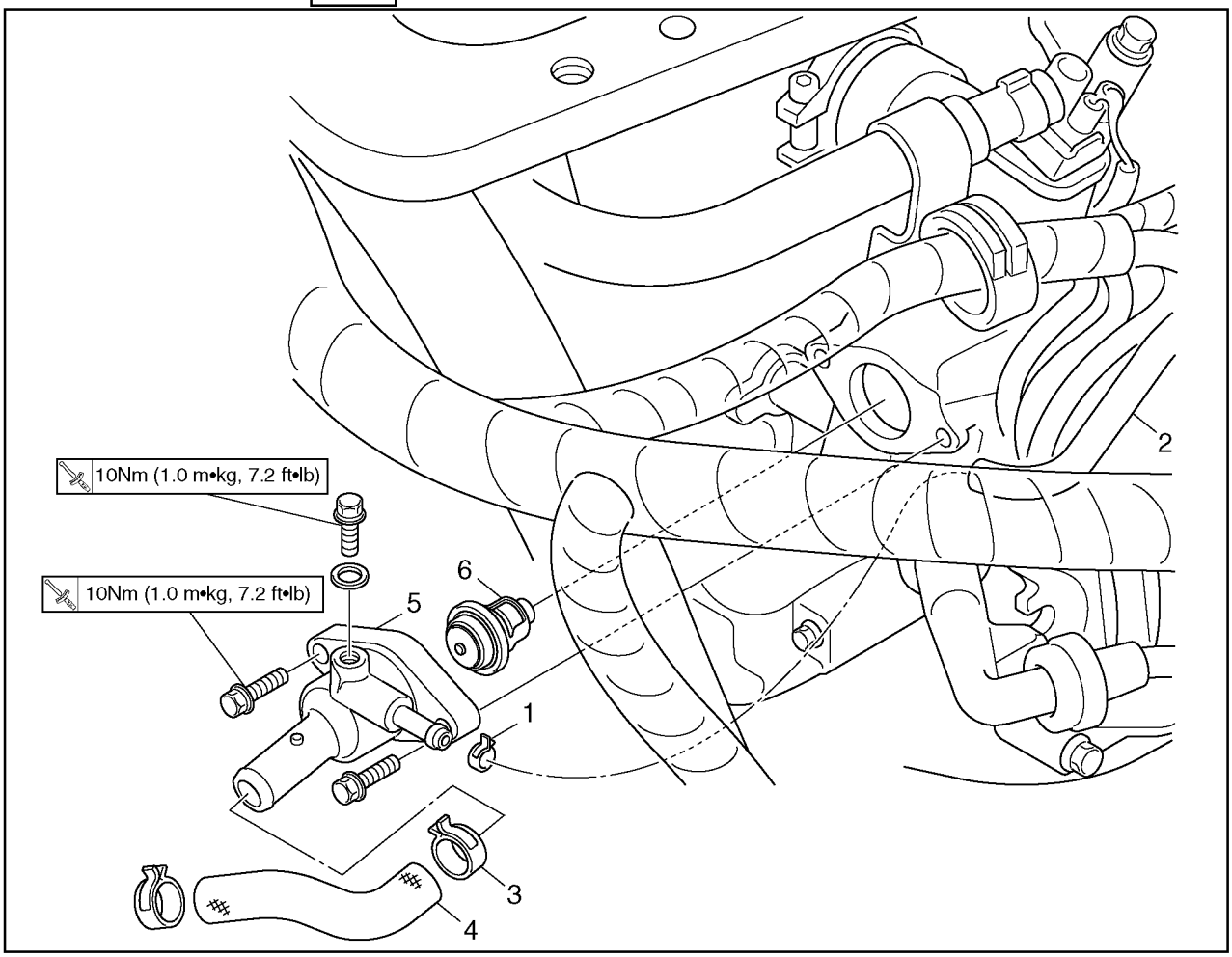
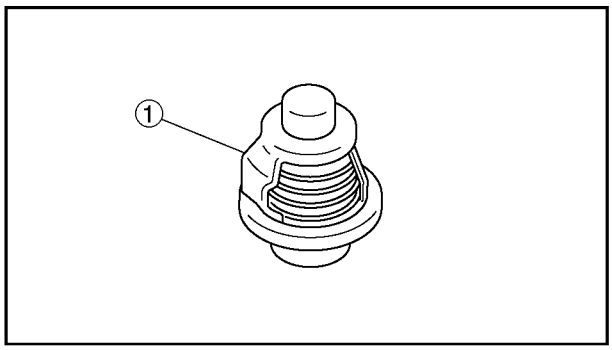
3. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to "CHECKING THE RADIATOR".

EAS00460
THERMOSTAT



Order	Job/Part	Q'ty	Remarks
	Removing the thermostat		Remove the parts in the order listed.
	Front cover Side cover(left and right) Single seat/Trunk Footrest board		Refer to"COVER AND PANEL"in chapter 3.
	Coolant		Drain. Refer to"CHANGING THE COOLANT"in chapter 3.
1	Clip	1	
2	Thermostat inlet hose	1	Disconnect.
3	Clip	1	
4	Thermostat outlet hose	1	Disconnect.
5	Thermostat cover	1	
6	Thermostat	1	
			For installation, reverse the removal procedure.



EAS00462
CHECKING THE THERMOSTAT

1. Check:
   - thermostat ①
     Does not open at 85 ~100°C (185 ~212°F)
     → Replace.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Suspend the thermostat in a container filled with water.
b. Slowly heat the water.
c. Place a thermometer in the water.
d. While stirring the water, observe the thermostat and thermometer's indicated temperature.

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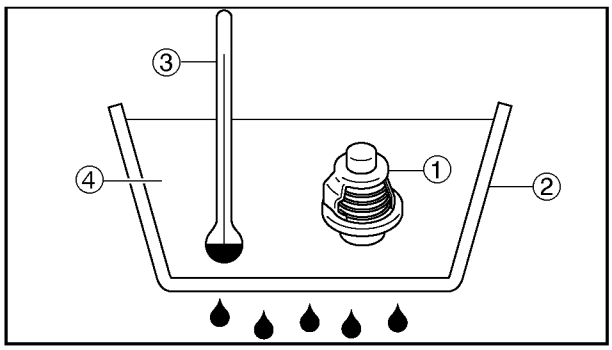
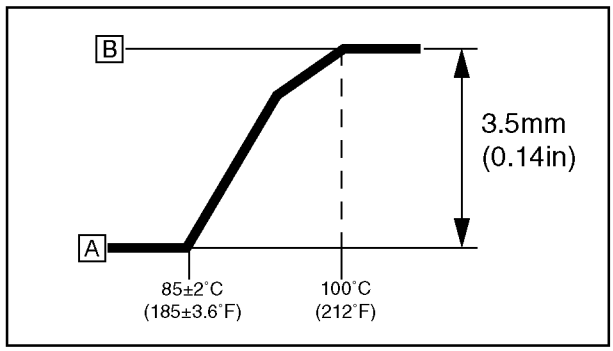
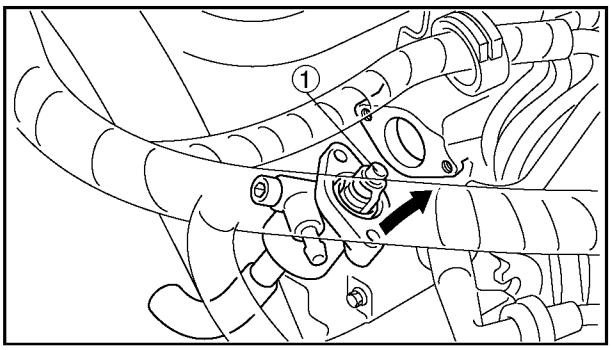




① Thermostat
② Container
③ Thermometer
④ Water
[A] Fully closed
[B] Fully open

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

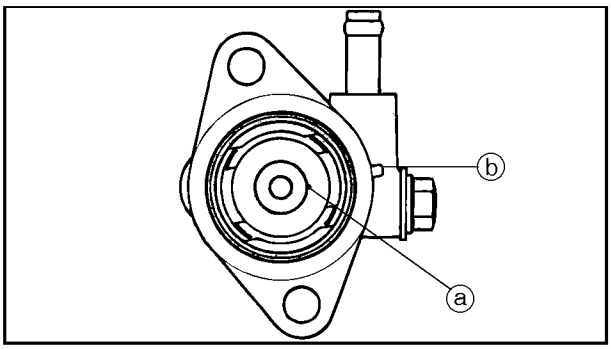
2. Check:
   - thermostat cover
     Cracks/damage → Replace.
3. Check:
   - thermostat inlet hose
   - thermostat outlet hose
     Cracks/damage → Replace.



EAS00466
INSTALLING THE THERMOSTAT

1. Install:
   - thermostat①
   - thermostat cover

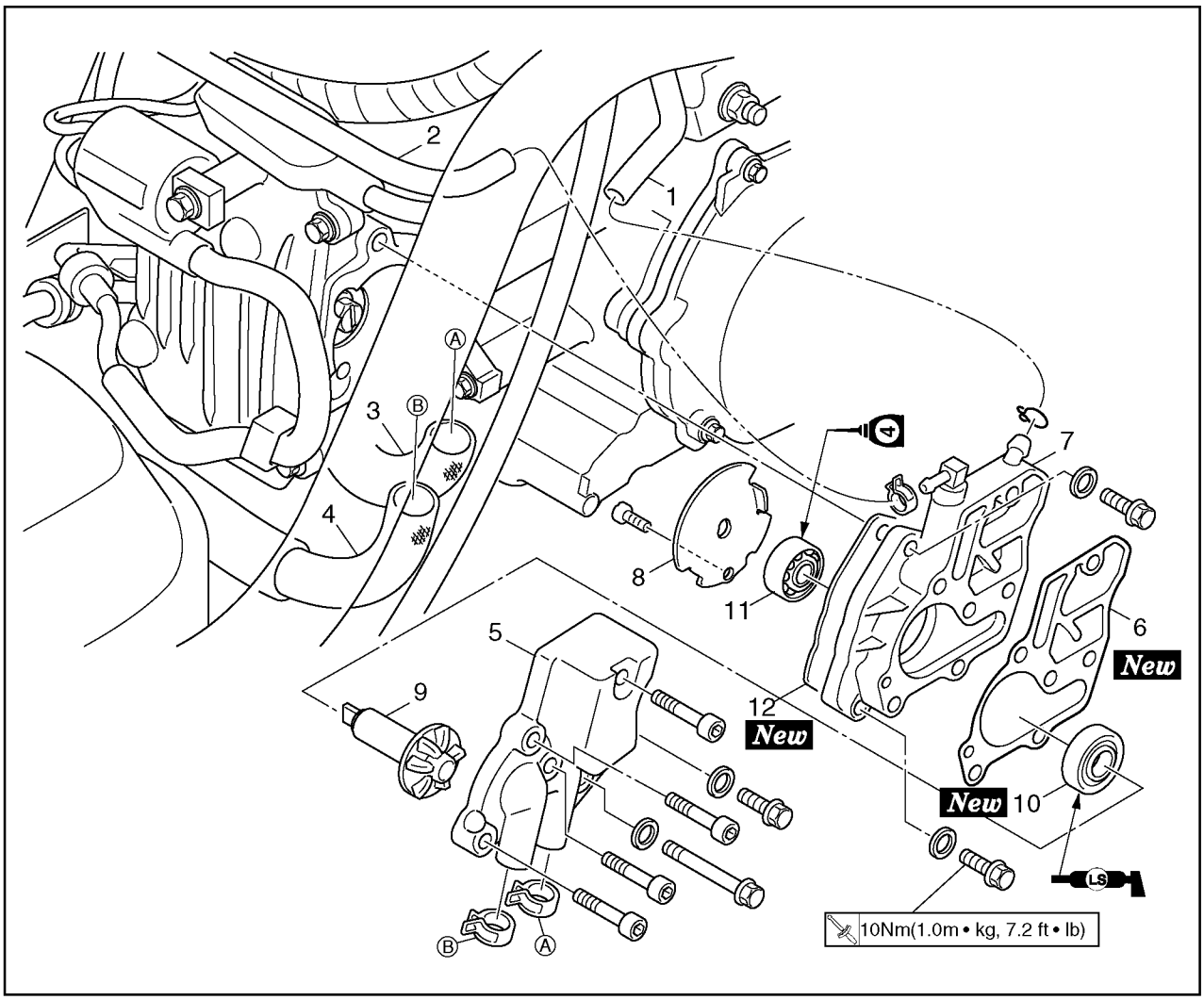
	10Nm(1.0m • kg, 7.2ft • lb)



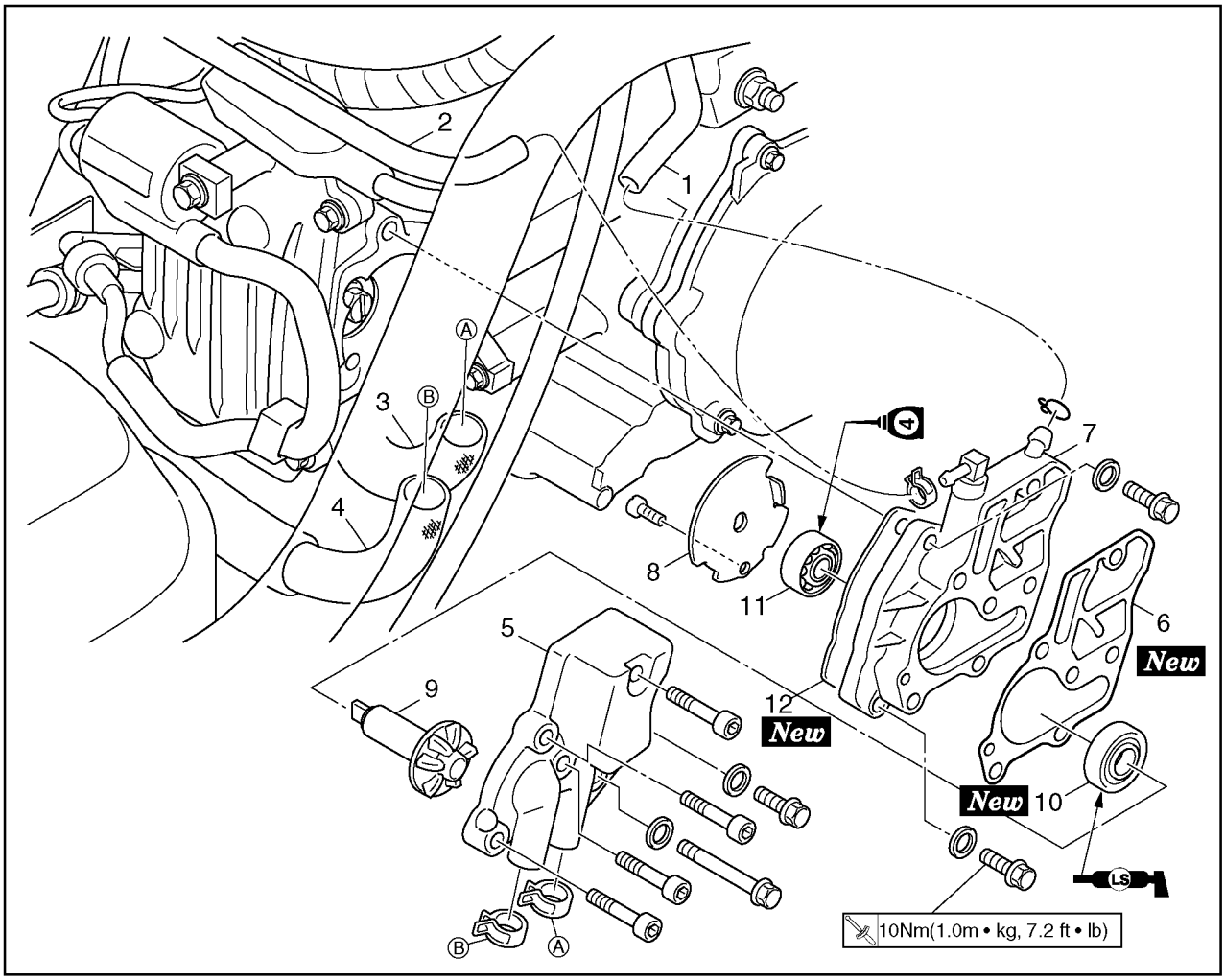
NOTE:
Align the breather ⓐ of thermostat to mark ⓑ of thermosat before installation.

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

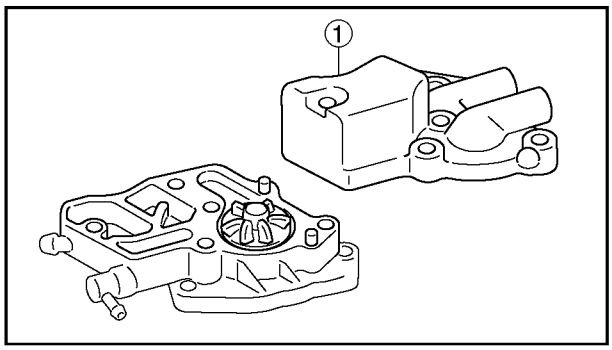
EAS00468
WATER PUMP



Order	Job/Part	Q'ty	Remarks
	Removing the water pump		Remove the parts in the order listed.
	Front cover Side cover(left and right) Single seat/Trunk Footrest board		Refer to"COVER AND PANEL"in chapter 3.
	Coolant		Drain. Refer to"CHANGING THE COOLANT"in chapter 3.
1	Breather hose	1	Disconnect.
2	Thermostat inlet hose	1	Disconnect.
3	Water pump outlet hose	1	Disconnect.
4	Radiator outlet hose	1	Disconnect.
5	Water pump housing cover	1	
6	Gasket	1	
7	Water pump housing	1	
8	Plate	1	
9	Impeller shaft	1	

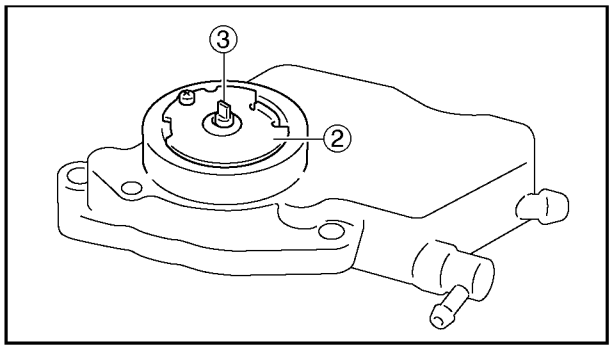


Order	Job/Part	Q'ty	Remarks
10	Oil seal	1	
11	Bearing	1	
12	Gasket	1	
			For installation, reverse the removal procedure.



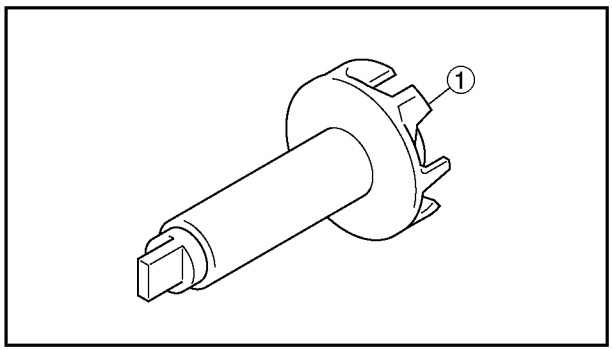
EAS00471
DISASSEMBLING THE WATER PUMP

1. Remove:
   - ●water pump housing cover①
   - ●dowel pin
   - ●gasket



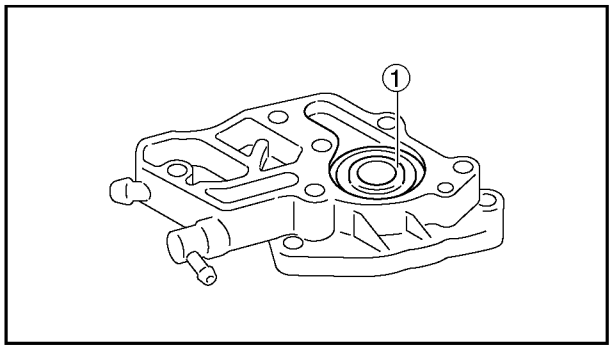
2. Remove:
   - ●plate ②
   - ●impeller shaft ③
   - ●gasket
   - ●oil seal
     (with a thin, flat-head screwdriver)
   - ●bearing

NOTE:
- Remove the oil seal from the inside of the water pump housing.
- Remove the bearing from the inside of the water pump housing.

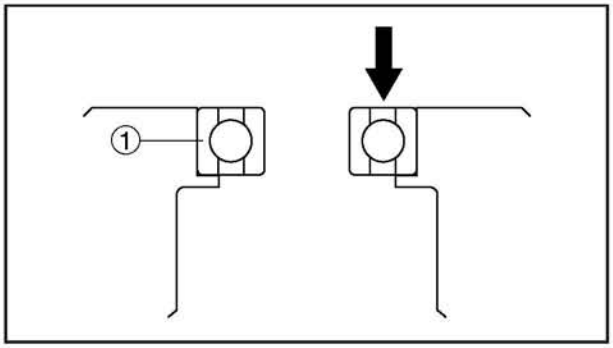


EAS00474
CHECKING THE WATER PUMP

1. Check:
   - ●water pump housing cover
   - ●water pump housing
   - ●impeller ①
     Cracks/damage/wear → Replace.



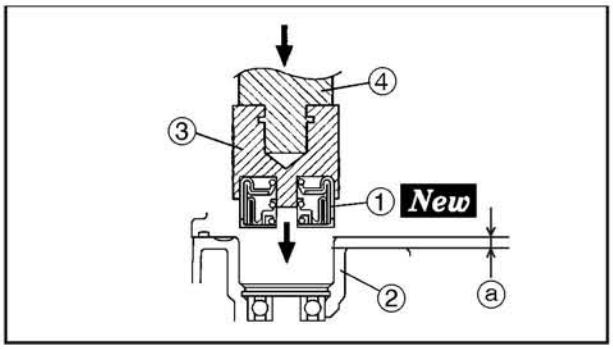
2. Check:
   - ●water pump seal ①
     Cracks/damage/wear → Replace.
3. Check:
   - ●bearing
     Rough movement → Replace.
4. Check:
   - ●radiator outlet hose
     Cracks/damage/wear → Replace.



EAS00475
ASSEMBLING THE WATER PUMP

1. Install:
   - bearing①

NOTE:
- Before installing the oil seal, apply tap water or coolant onto its out surface.
- Install the oil seal with a socket that matches its outside diameter.

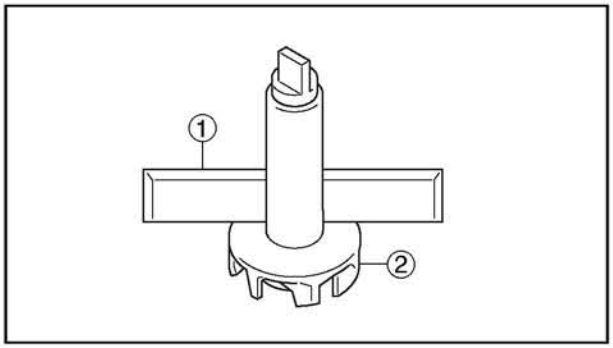


2. Install:
   - water pump seal New ①
     (into the water pump housing ②)

CAUTION:
Never lubricate the water pump seal surface with oil or grease.

NOTE:
- Install the water pump seal with the special tools.
- Press in depth of water pump and oil seal is 5.5~6.0mm ⓐ.

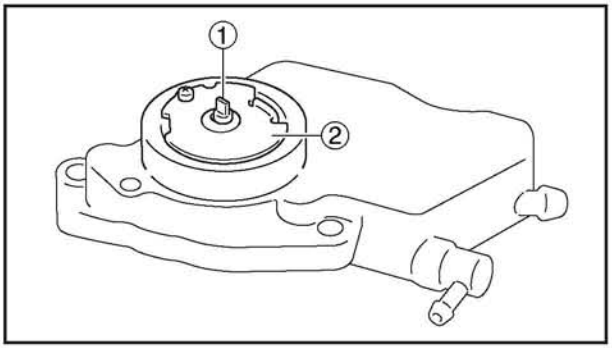
Mechanical seal installer
90890-04145 ③
Middle driven shaft bearing driver
90890-04058 ④
YM-04058



3. Measure:
   - impeller shaft tilt
     Out of specification → Replace the impeller shaft .

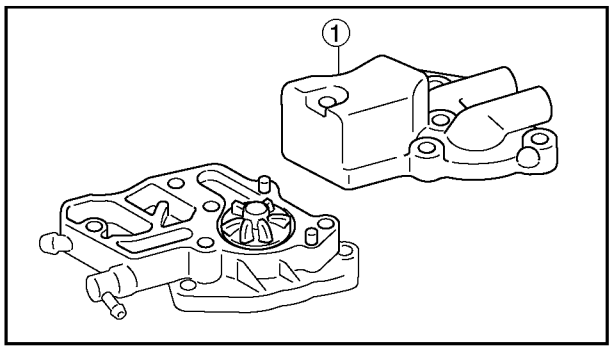
Impeller shaft tilt limit
0.15mm(0.0059in)

① Straightedge
② Impeller

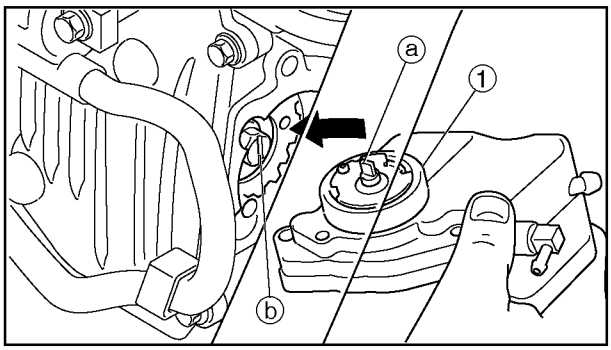


4. Install:
   - impeller shaft①
   - plate②

CAUTION:
After installation, check that the impeller shaft rotates smoothly.



5. Install:
   - gasket **New**
   - water pump housing cover ①



EAS00478

INSTALLING THE WATER PUMP

1. Install:
   - water pump assembly ①

	10Nm(1.0m • kg, 7.2ft • lb)

NOTE:

Align the slit ⓐ on the impeller shaft with the projection ⓑ on the camshaft sprocket bolt.

2. Install:
   - breather hose
   - thermostat inlet hose
   - water pump outlet hose
   - radiator outlet hose
3. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" in chapter 3.
4. Check:
   - cooling system
     Leaks → Repair or replace the faulty part.
5. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to "CHECKING THE RADIATOR".

CHAPTER 7
FUEL INJECTION SYSTEM

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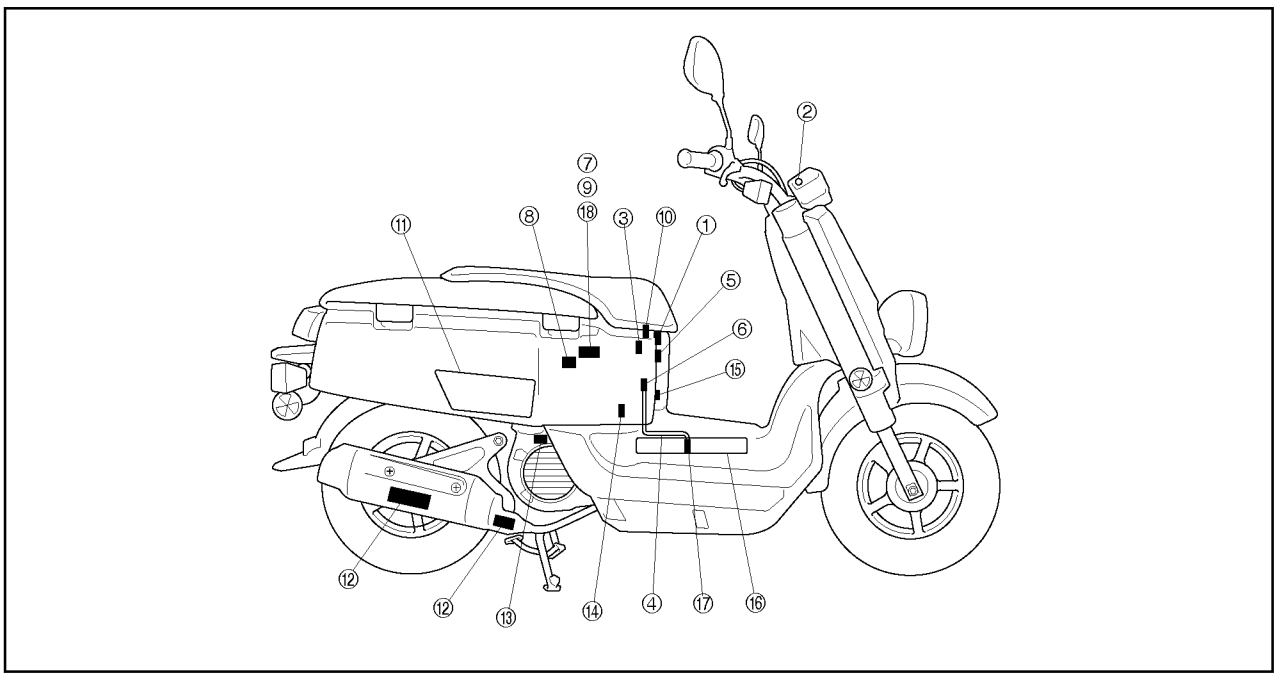
EAS00894

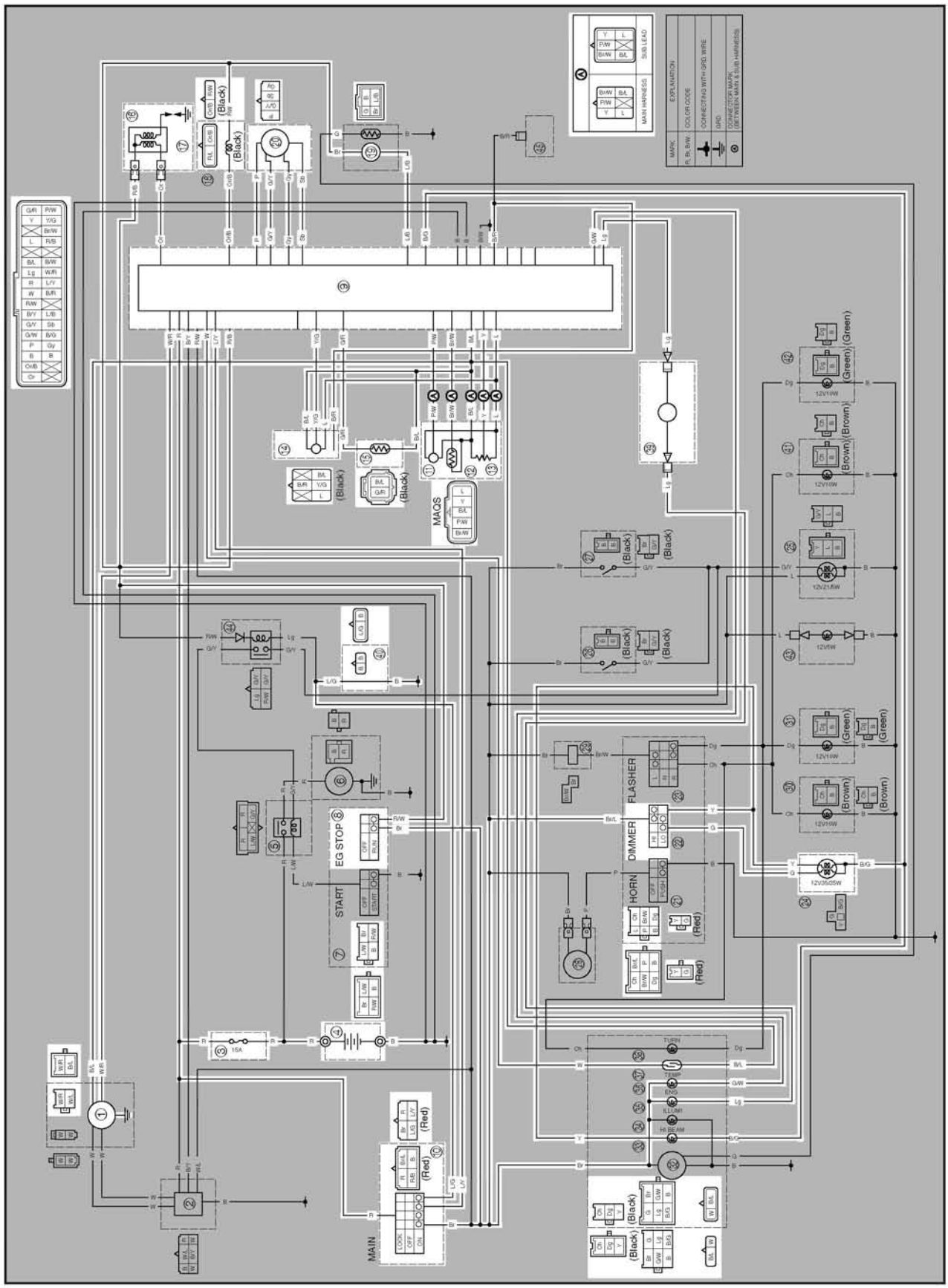
FUEL INJECTION SYSTEM

FUEL INJECTION SYSTEM

① ECU
② Engine trouble warning light
③ Lean angle cut-off switch
④ Fuel hose
⑤ Ignition coil
⑥ Fuel injector
⑦ Intake air pressure sensor
⑧ ISC(idle speed control) valve
⑨ Intake air temperature sensor
⑩ Battery
⑪ Air filter case
⑫ Catalytic converter
⑬ Crankshaft position sensor
⑭ Coolant temperature sensor
⑮ Spark plug
⑯ Fuel tank
⑰ Fuel pump
⑱ Throttle position sensor



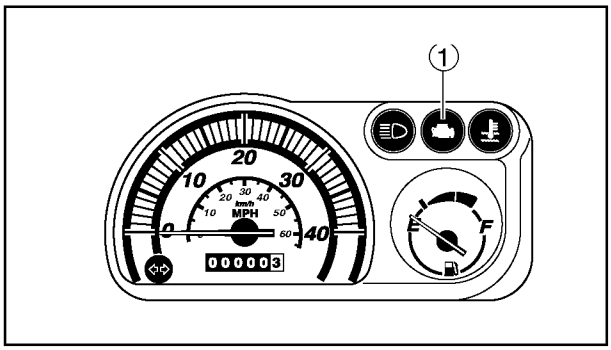
WIRING DIAGRAM



① AC magneto
③ Main fuse
④ Battery
⑧ Engine stop switch
⑨ ECU
⑩ Main switch
⑪ Intake air pressure sensor
⑫ Intake air temperature sensor
⑬ Throttle position sensor
⑭ Lean angle cut-off switch
⑮ Coolant temperature sensor
⑯ Ignition coil
⑰ Spark plug
⑱ Fuel injector
⑲ Fuel pump
⑳ ISC (idle speed control) valve
㉒ Dimmer switch
㉔ Headlight
㉝ High beam indicator light
㉟ Engine trouble warning light
㊱ Coolant temperature indicator light
㊲ Speed sensor
㊴ FI diagnostic tool (optional)
㊵ Sidestand switch (optional)

ECU'S SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the engine control system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

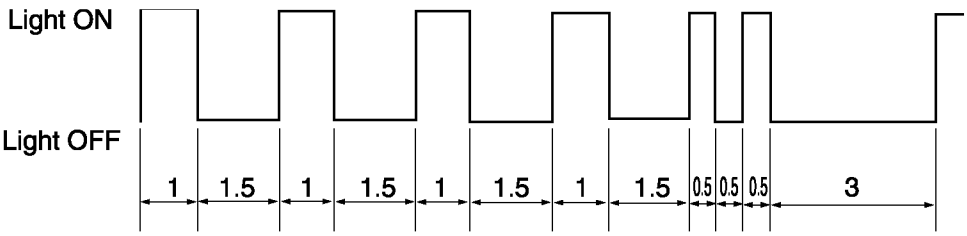


① Engine trouble warning light

- To inform the rider that the fuel injection system is not functioning correctly, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, this mode provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the engine trouble warning light (or displayed on the FI diagnostic tool). It remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light fault code indication

Digit of 10: Cycles of 1 see. ON and 1.5 sec. OFF.
Digit of 1: Cycles of 0.5 sec, ON and 0.5 sec. OFF.
<Example> 42



EAS00900

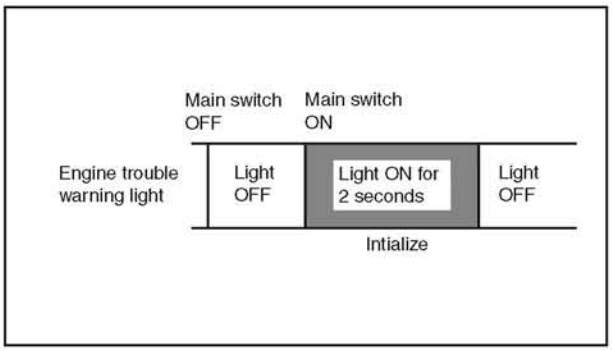
Engine trouble warning light indication and FI system operating condition

Engine condition	Warning light indication	FI operation	Vehicle operation
Operate (cranking with electric starter)	Flashing	Operation stopped	Unable
	Remains ON	Operated with substitute characteristics in accordance with the description of the malfunction	Able
Stop	Flashing (indicate the fault code)	–	–

EAS00901

CHECKING FOR A DEFECTIVE ENGINE TROUBLE WARNING LIGHT BULB

The engine trouble warning light comes on for 2 seconds after the main switch has been turned "ON" and when the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.



EAS00902

SELF-DIAGNOSTIC FANCTION TABLE

If the ECU detects an abnormal signal from a sensorwhile the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

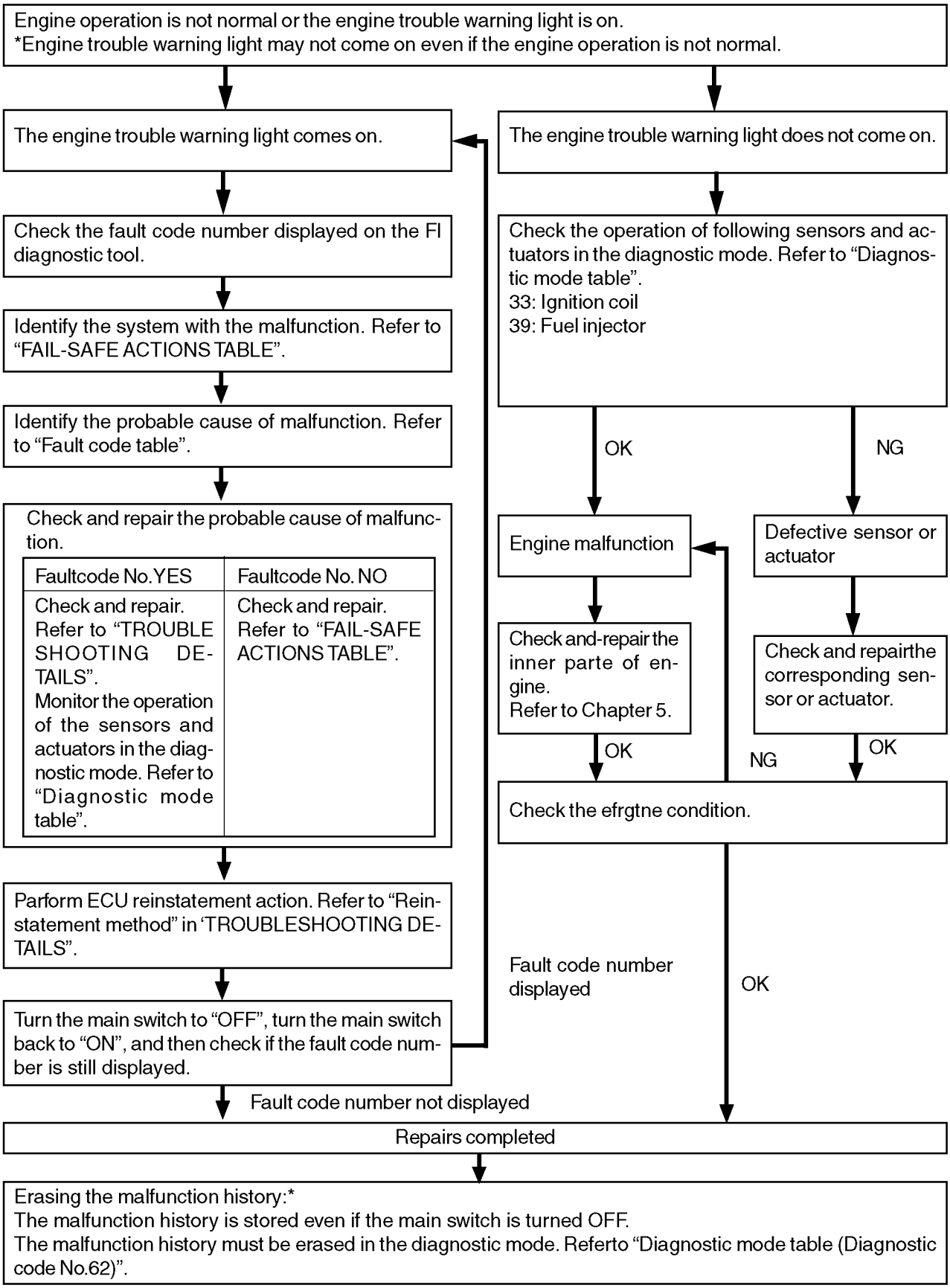
Self-diagnostic fanction table

Fault code No.	Item	Symptom	Engine startability	Vehicle driveability
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13 14	Intake air pressure sensor (open or short circuit) (pipe system)	Intake air pressure sensor-open or short circuit detected. Faulty intake air pressure sensor pipe system.	Able	Able
15 16	Throttle position sensor (open or short circuit)(stuck)	Throttle position sensor-open or short circuit detected. A stuck throttle position sensor is detected.	Able	Able
19	Broken or disconnected blue/yellow lead of the ECU	Open circuit in the input line (blue/yellow lead) of the ECU is detected.	Unable	Unable
21	Coolant temperature sensor	Coolant temperature sensor-open or short circuit is detected.	Able	Able
22	Intake temperature sensor	Intake temperature sensor-open or short circuit is detected.	Able	Able
33	Faulty ignition	Open circuit detected in the primary lead of the ignition coil.	Unable	Unable
37	ISC (idle speed control) valve (stuck fully open)	Engine speed is high when the engine is idling.	Able	Able

Fault code No.	Item	Symptom	Engine startability	Vehicle driveability
39	Fuel injector	Fuel injector open or short circuit is detected.	Unable	Unable
30 41	Lean angle cut-off switch (latch up detected) (open or short circuit)	The vehicle has overturned. Lean angle cut-off switch-open or short circuit is detected.	Unable	Unable
42	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
43	Fuel system voltage (monitoring voltage)	Power supply to the fuel injector, fuel pump and ignition coil are not normal.	Able	Able
44	Error in reading from or writing on E2PROM	An error is delected while reading from or writing on E2PROM (CO adjustment value).	Able	Able
46	Vehicle system power supply (monitoring voltage)	Power supply to FI system is not normal. (red lead)	Able	Able
50	ECU internal malfunction (memory check error)	Faulty ECU memory. When this malfunction is detected, the code number might not appear on the engine trouble warning light or displayed on FI diagnostic tool.	Unable	Unable
61	ISC (idle speed control) valve unit (open or short circuit)	ISC (idle speed control) valve unit-open or short circuit detected.	Able	Able
_	Start unable warning Engine trouble warning light flashes when the start switch is turned ON.	Relay is not activated even if the crank signal is input while the start switch is pushed.	Unable	Unable

EAS00904

TROUBLESHOOTING CHART



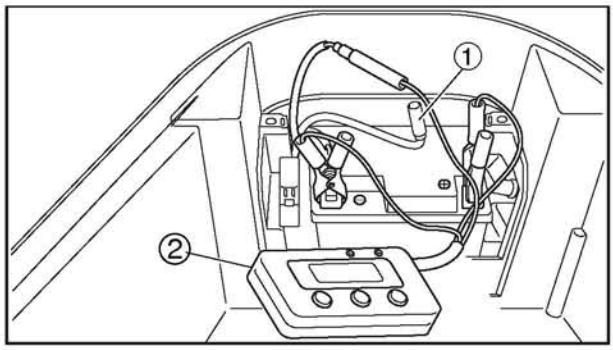
* Operated when the engine trouble warning light is on.

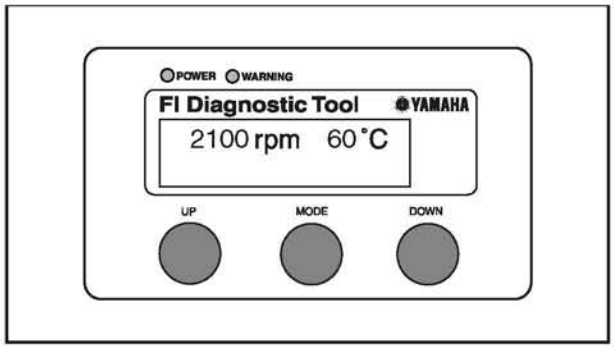
EAS00905

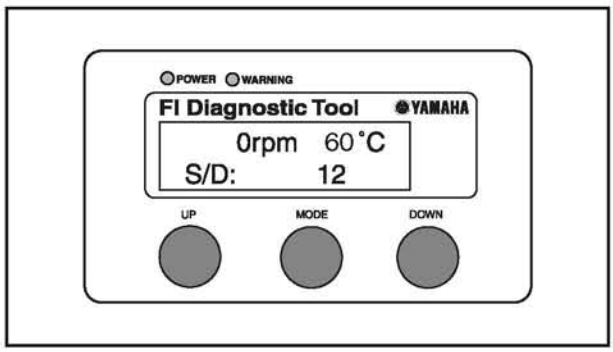
DIAGNOSTIC MODE

It is possible to monitor the sensor output data or check the activation of actuators with connecting the FI diagnostic tool to the normal mode or the diagnostic monitoring mode.

	FI diagnostic tool **90890-03182** **YU-03182**







Setting the normal mode

NOTE:

The engine speed, engine temperature, and fault code, if detected, can be displayed on the LCD of the FI diagnostic tool when the tool is connected to the vhicle and is set to the normal mode.

1. Turn the main switch to "OFF" and the engine stop switch to "RUN".
2. Disconnect the self diag signal connector ①, and then connect the FI diagnostic tool ② as shown.
3. Turn the main switch to "ON" and start the engine.

NOTE:

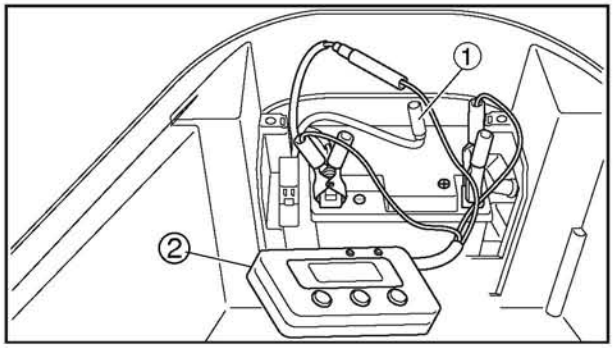
- Engine temperature and engine revolution appears on the LCD of the FI diagnostic tool.
- "POWER" LED (Green) comes on.
- If a malfunction is detected in the system, "WARNING" LED (Orange) comes on. How ever the fault code is not appears on the LCD of FI diagnostic tool.

4. Stop the engine.

NOTE:

If a malfunction is detected in the system, the fault code appears on the LCD of the FI diagnostic tool. And also, "WARNING" LED(Orange) comes on.

5. Turn the main switch to "OFF" to cancel the normal mode.
6. Disconnect the FI diagnostic tool and connect the self diag signal connector.



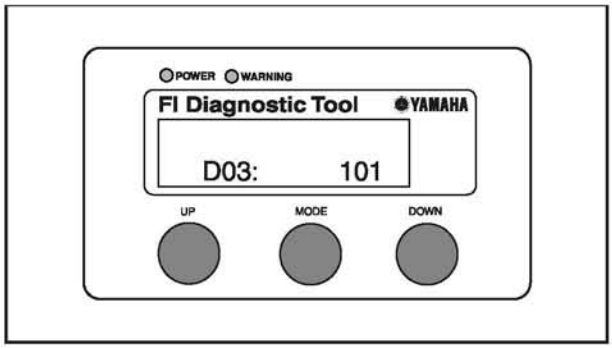
Setting the diagnostic mode

1. Turn the main switch to "OFF" and the engine stop switch to "RUN"..
2. Disconnect the self diag signal connector ①, and then connect the FI diagnostic-tool ② as shown.
3. While press the "MODE" button, turn the main switch to "ON".

NOTE:

- "DIAG" appears on the LCD of the FI diagnostic tool.
- "POWER" LED (Green) comes on.

4. Press the "UP" button to select the CO adjustment mode "CO" or the diagnostic mode "DIAG".
5. After selecting "DIAG", press the "MODE" button.
6. Select the diagnostic code number that applies to the item that was verified with the fault code number by pressing the "UP" and "DOWN" buttons.



NOTE:

- The diagnostic code number appears on the LCD (D01-D70).
- To decrease the selected diagnostic code number, press the "DOWN" button. Press the "DOWN" button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "UP" button. Press the "UP" button for 1 second or longer to automatically increase the diagnostic code numbers.

7. Verify the operation of the sensor or actuator.
   - Sensor operation
     The data representing the operating conditions of the sensor appears on the LCD.
   - Actuator operation
     Press the "MODE" button to.operate the actuator.
8. Turn the main switch to "OFF" to cancel the diagnostic mode.
9. Disconnect the FI diagnostic tool and connect the self diag signal connector.

Fault code table

Fault codeNo.	Symptom	Probable cause of malfunction	Diagnostic code
12	No normal signals are received from the crankshaft position sensor.	• Open or short circuit in wiring harness. • Defective crankshaft position sensor. • Malfunction in pickup rotor. • Improperly installed sensor lead connector in the coupler.	–
13	Intake air pressure sensor-open or short circuit detected.	• Open or short circuit in wiring sub lead. • Open orshort circuit in wiring harness. • Defective intake air pressure sensor. • Improperly installed sendor lead connector in the coupler.	D03
14	Faulty intake air pressure sensor pipe system	• Intake air pressure sensor is disconnected or clogged.	D03
15	Throttle position sensor-open or short circuit detected.	• Open or short circuit in wiring sub lead. • Open or short circuit in wiring harness. • Defective throttle position sensor. • Improperly installed throttle'position sensor lead connector in the coupler.	D01
16	A stuck throttle position sensor is detected.	• Stuck throttle position sensor. • Defective throttle position sensor.	D01
19	Open circuit in the input line (blue/yellow lead) of ECU is detected when the start switch is pressed.	• Open circuit in wiring harness (ECU coupler).	D20
21	Coolant temperature sensor-open or short circuit detected.	• Open or short circuit in wiring harness. • Defective coolant temperature sensor. • Improperly installead sensor lead connector in the coupler.	D06
22	Intake air temperature sensor-open or short circuit detected.	• Open or short circuit in wire sub lead. • Open or short circuit in wiring harness. • Defective intake temperature sensor. • Improperly installed sensor lead connector in the coupler.	D06
30	The vehicle has overturned.	• Overturned condition.	D08
33	Open circuit is detected in the primary lead of the ignition coil.	• Open circuit in wiring harness. • Malfunction in ignition coil. • Improperly installed primary lead connector in the coupler.	D30
37	The ISC (idle speed control) valve is stuck fully open.	• Malfunction in throttle body. • Malfunction in throttle cables. • ISC (idle speed control) valve is stuck fully open.	D54
39	Fuel injector open or short circuit is detected.	• Open or short circuit in wiring harness. • Defective fuel injector. • Improperly installed lead connector in the coupler.	D36
41	Lean angle cut-off switch-open or short circuit detected.	• Open or short circuit in wiring harness. • Defective lean angle cut-off switch. • Improperly installed lead connector in the coupler.	D08
42	No normal signals are received from the speed sensor.	• Open or short circuit in wiring harness. • Defective speed sensor. • Improperly installead lead connector in the coupler.	D07
43	Power supply to the fuel injector, fuel pump and ignition coil are not normal.	• Open or short circuit in wiring harness.	D09
44	An error is detected while reading or writing on E2PROM.	• Malfunction in ECU. (The CO adjustment value, code reregistering key code, and throttle valve fully closed notification value are not properly written on or read from the internal memory.)	D60
46	Power supply to FI system is not normal.(red lead)	• Malfunction in charging system.	–
50	Faulty ECU memory. When this malfunction is detected, the code number might not appear on the meter.	• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)	–
61	ISC (idle speed control) valve open or short circuit is detected.	• Open or short circuit in wiring harness. • Improperly installed lead connector in the coupler.	D54

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Diagnostic mode table

NOTE:

- Check the intake air temperature and coolant temprature as close as possible to the intake air temperature sensor and the coolant temperature sensor respectively.
- If it is not possible to check the intake air temperature, use the ambient temperature as reference.

Diagnostic code	Item	Description of action	Data displayed on FI diagnostic tool (reference value)
D01	Throttle angle	Displays the throttle angle. • Check with throttle fully closed. • Check with throttle fully open.	0-125 degrees • Fully closed position (14-20) • Fully open position (97-107)
D03	Intake air pressure	Displays the intake air pressure. • Check the pressure in the intake manifold.	Compare it to the value displayed on the FI diagnostic tool.
D05	Intake air temperature	Displays the intake air temperature. • Check the temperature in the intake manifold.	Compare it to the value displayed on the FI diagnostic tool.
D06	Coolant temperature	Displays the coolant temperature. • Check the temperature of the coolant.	Compare it to the value displayed on the FI diagnostic tool.
D07	Vehicle speed pulse	Displays the accumulation of the vehicle pulses that are generated when the tire is spun.	(0-999; resets to 0 after 999) OK if the numbers appear on the FI diagnostic tool.
D08	Lean angle cut-off switch	Displays the lean angle cut-off switch values.	Upright: 0.4-1.4 V Overturned: 3.7-4.4V
D09	Fuel system voltage (battery voltage)	Displays the fuel system voltage (battery voltage).	0-18.7 V Normally, approximately 12.0 V
D20	Sidestand switch (Option)	Displays that the switch is ON or OFF.	Stand retracted: ON Stand extended: OFF
D30	Ignition coil	When the “MODE” button is pressed, the ignition coil is actuated five times per second and the “WARNING” LED (orange) comes on. • Connect an ignition checker.	Check that spark is generated, 5 times with the “MODE” button press.
D36	Fuel injector	When the “MODE”-button is pressed, the fuel injector is actuated five times per second and the “WARNING” LED (orange) comes on.	Check the operating sound of the fuel injector five times with “MODE” button press.
D52	Headlight	When the “MODE” button is pressed, the headlight is actuated five times every 5 seconds and the engine trouble warning light comes on. (ON 2 seconds, OFF 3 seconds)	Check the headlight operating 5 times with the “MODE” button is pressed.
D54	ISC (idle speed control) valve	When the the “MODE” button is pressed, the ISC (idle speed control) valve fully closes, and then it opens until it is at the standby opening position when the engine is started. This operation takes approximately 3 seconds until it is completed.	The ISC (idle speed control) valve unit vibrates when the ISC (idle speed control) valve operates.
D60	E2PROM fault code display.	• Transmits the abnormal portion of the data in the E2PROM that has been detected as a fault code 44. • If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated.	01 CO adjustment value is detected. (00) Displays when there is no malfunction.
D61	Malfunction history code display	• Displays the codes of the history of the self-diagnosis malfunctions (i.e., a code of a malfunction that occurred once and which has been corrected). • If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated.	12-61 (00) Displays when there is no malfunction.
D62	Malfunction history code erasure	• Displays the total number of codes that are being detected through self diagnosis and the fault codes in the past history. • Erases only the history codes when the “MODE” button is pressed.	00-18 (00) Dispiays when there is no malfunction.
D70	Control number	Displays the program control number.	00-254

Communication error with the FI diagnostic tool

LCD Display	Sympton	Probable cause of malfunction
Waiting for connection...	No signals are received from the ECU.	• Improper installed lead connector in the coupler. • The main switch is OFF position. • Malfunction in FI diagnostic tool. • Malfunction in ECU.
ERROR 4	Commands from the FI diagnostic tool are not accepted by the ECU.	• Turn the main switch to "OFF" once, and then turn it back to CO adjustment mode or diagnostic mode. • Vehicle battery is insufficiently charged. • Malfunction in FI diagnostic tool. • Malfunction in ECU.

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TROUBLESHOOTING DETAILS

This section describes the countermeasures per fault code number displayed on the FI diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioned part has been completed, reset the FI diagnostic tool display according to the "Reinstatement method".

Fault code No.:

Fault code number displayed on the FI diagnostic tool when the engine failed to work normally. Refer to "Fault code table".

Diagnostic code No.:

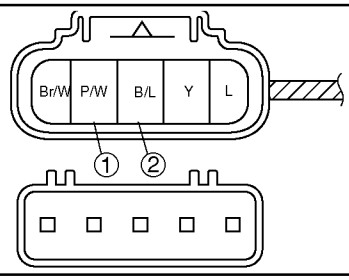
Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE".

Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.
Used diagnostic code No. --			

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of sensor.	Check the installed area for looseness or pinching.	Reinstated by cranking the engine.
2	Connected condition of connector. Inspect the coupler for any pins that may have pulled out. Check that the coupler is connected securely. **NOTE:** Set the main switch to OFF before connecting or disconnecting the connector.	If there is a malfunction, repair it and connect it securely. Crankshaft position sensor coupler Main wiring harness ECU coupler	
3	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit between the main wiring harnesses. Between sensor coupler and ECU coupler. white/red black/blue	
4	Defective crankshaft position sensor.	Replace if defective. Refer to “IGNITION SYSTEM” in chapter 8.	

Fault code No.	13	Symptom	Intake air pressure sensor-open or short circuit detected.

Used diagnostic code No. D03 (intake air pressure sensor)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler. **NOTE:** Set the main switch to OFF before connecting or disconnecting the connector.	If there is a malfunction, reper it and connect it securely. Intake air pressure sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harnes and /or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler black/blue - black/blue pink/white - pink/whte blue- blue	
3	Defective intake air pressure sensor.	Execute the diagnostic mode (code No. D03) Replace the throttle body. **NOTE:** Do not remove the sensor assembly (MAQS). 1. Connect the digital circuit tester to the intake air pressure sensor coupler as shown. **Positive tester probe → pink/white ①** **Negative tester prove → black/blue ②**  2. Set the main switch to “ON”. 3. Measure the intake air pressure sensor output voltage. **Intake air pressure sensor output voltage** **3.9~4.1V** 4. Is the intake air pressure sensor OK?	

Fault code No.	14	Symptom	Intake air pressure sensor-hose system malfunction (clogged or detached hose).

Used diagnostic code No. D03 (intake air pressure sensor)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected state of connector Intake air pressure sensor coupler Main wirring harness ECU coupler Sub-wire harness coupler	Check the coupler for any pins that may have pulled out. Check that the coupler is connected securely. If there is a malfunction, repair it and connect it securely.	Reinstated by starting the engine and operating it at idle.
2	Defective intake air pressure sensor.	Execute the diagnostic mode (code No. D03) Replace the throttle body. **NOTE:** Do not remove the sensor assembly (MAQS). Refer to "Fault code No. 13".	

Fault code No.	15	Symptom	Throttle position sensor-open or short circuit detected.

Used diagnostic code No. D01 (throttle position sensor)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to "THROTTLE BODY AND FUEL INJECTOR".	Reinstated by turning the main switch ON.
2	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Throttle position sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	
3	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler black/blue - black/blue yellow - yellow blue -blue	
4	Defective throttle position sensor.	Execute the diagnostic mode (code No. D01) Replace the throttle body. **NOTE:** Do not remove the sensor assembly (MAQS). Refer to "THROTTLE BODY AND FUEL INJECTOR".	

Fault code No.	16	Symptom	Stuck throttle position sensor detected.

Used diagnostic code No. D01 (throttle position sensor)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to "THROTTLE BODY AND FUEL INJECTOR".	Reinstated by starting the engine, operating it at idle, and then racing it.
2	Defective throttle position sensor	Execute the diagnostic mode (code No. 01) Replace the throttle body. **NOTE:** Do not remove the sensor assembly (MAQS). Refer to "THROTTLE BODY AND FUEL INJECTOR".	
3	When fault code No.15 has been detected	Refer to "Fault code No.15".	Refer to "Fault code No. 15".

Fault code No.	19	Symptom	Open circuit in the input line of ECU (blue/yellow lead) detected.

Used diagnostic code No. D20 (sidestand switch :option)

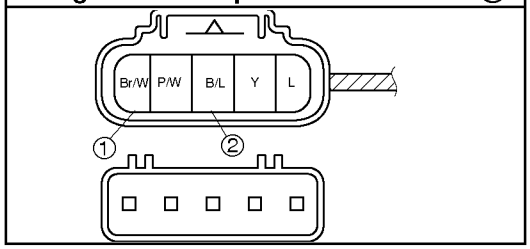
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected state of connector Main wiring harness ECU coupler (blue/yellow connector)	Execute the diagnostic mode (code No. D20) Check the coupler for any pins that may have pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect it securely.	Reinstated by reconnecting the wiring and retracting the sidestand.
2	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open circuit. Between main switch coupler and ECU coupler. blue/yellow - blue/yellow Sidestand switch signal input line of main switch coupler. blue/green - blue/green	

Fault code No.	21	Symptom	Coolant temperature sensor open or short circuit is detected.
Used diagnostic code No. D06 (coolant temperature sensor)			

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by turning the main switch ON.
2	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Coolant temperature sensor coupler Main wiring harness ECU coupler	
3	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler black/blue-black/blue green/red - green/red	
4	Defective coolant temperature sensor.	Execute the diagnostic mode (code No.D06) Replace if defective. Refer to “COOLING SYSTEM” in chapter 8.	

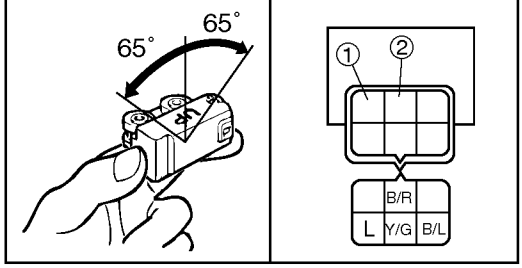
Fault code No.	22	Symptom	Intake temperature sensor open or short circuit is detected.

Used diagnostic code No. D05 (intake air temperature sensor)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by turning the main switch ON.
2	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Intake air temperature sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	
3	Open or short circuit in wireing harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler black/blue - black/blue brown/white - brown/white	
4	Defective intake air temperature sensor.	Execute the diagnostic mode (code No. D05) Replace the throttle body. **NOTE:** Do not remove the sensor assembly (MAQS). 1. Connect the digital circuit tester to the intake air temperature sensor terminal as shown. **Positive tester probe → brown/white ①** **Negative tester probe → black/blue ②**  2. Measure the intake air temperature sensor resistance. **Intake air temperature sensor resistance** **2.4~2.9kΩ at 20°C (68°F)** **⚠WARNING** ● **Handle the intake air temperature sensor with special care.** ● **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.** 3. Is the intake air temperature sensor OK?	

Fault code No.	30	Symptom	The vehicle has overturned.

Used diagnostic code No. D08 (lean angle cut-off switch)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	The vehicle has overturned.	Raise the vehicle upright.	Reinstated by turning the main switch ON (however, the engine cannot be restarted unless the main switch is first turned OFF).
2	Installed condition of the lean angle cut-off switch	Check the installed area for looseness or pinching.	
3	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Lean angle cut-off switch coupler Main wiring harness ECU coupler	
4	Defective lean angle cut-off switch	Execute the diagnostic mode (code No. D08) Replace if defective. 1. Remove the lean angle cut-off switch from the vehicle. 2. Connect the lean angle cut-off switch coupler to the wire harness. 3. Connect the digital circuit tester to the lean angle cut-off switch terminals as shown. **Positive tester probe → bleu ①** **Negative tester probe → yellow/green ②**  4. When turning the lean angle cut-off switch approximately 65°, the voltage reading change from 0.4 V to 4.4 V. 5. Is the lean angle cut-off switch OK?	

Fault codeNo.	33	Symptom	Open circuit detected in the primary lead of the ignition coil.

Used diagnostic code No. D30

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Ignition coil primary side coupler - orange Main wiring harness ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Open or short circuit in lead.	Repair or replace if there is an open or short circuit. Between ignition coil coupler and ECU coupler/main harness orange - orange	
3	Defective ignition coil (test the primary and secondary coils for continuity).	Execute the diagnostic mode (code No. D30) Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.	

Fault code No.	37	Symptom	Engine speed is high when the engine is idling.

Used diagnostic code No. D54 (ISC (idle speed control) valve)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Incorrect speed sensor signal	Check the speed sensor. Check the speed sensor leads. Check the speed sensor coupler.	Reinstated if the engine idle speed is within specification after starting the engine.
2	Throttle valve does not fully close	Check the throttle body. Refer to "THROTTLE BODY ASSEMBLY AND FUEL INJECTOR ASSEMBLY". Check the throttle cables. Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.	
3	ISC (idle speed control) valve stuck fully open	The ISC (idle speed control) valve is stuck fully open if it does not operate when the main switch is set to OFF. (Touch the ISC (idle speed control) valve unit with your hand and check if it is vibrating to confirm if the ISC (idle speed control) valve is operating.) **NOTE:** Do not remove the ISC (idle speed control) valve unit.	
4	ISC (idle speed control) valve not moving correctly	Execute the diagnostic mode (code No. D54) After the ISC (idle speed control) valve is fully closed, it opens until it is at the standby opening position when the engine is started. This operation takes approximately 3 seconds until it is completed. Start the engine. If the error recurs, replace the throttle body assembly.	

Fault code No.	39	Symptom	Fuel injector open or short circuit is detected.

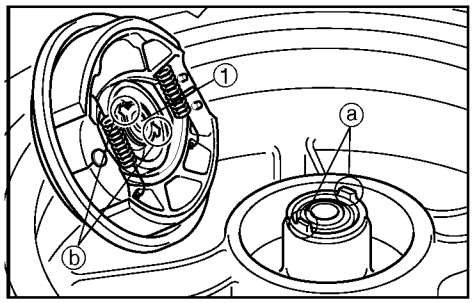
Used diagnostic code No. D36 (fuel injector)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Fuel injector coupler - orange/black Main wiring harness ECU coupler	Reinstated by starting the engine.
2	Open or short circuit in lead wire.	Repair or replace if there is an open or short circuit. Between fuel injector coupler and ECU coupler/main harness orange/black - orange/black	
3	Defective fuel injector	Execute the diagnostic mode (code No. D36) Replace if defective.	

Fault code No.	41	Symptom	Lean angle cut-off switch open or short circuit is detected.

Used diagnostic code No. D08 (lean angle cut-off switch)

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. Lean angle cut-off switch coupler Main wiring harness ECU coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between switch coupler and ECU coupler black/blue - black/blue yellow/green - yellow/green blue- blue	
3	Defective lean angle cut-off switch	Execute the diagnostic mode (code No. D08) Replace if defective. Refer to Fault code No. 30.	

Fault code No.	42	Symptom	No normal signals are received from the speed sensor.	
Used diagnostic code No. D07 (speed sensor)				
Order	Inspection operation item and probable cause		Operation item and countermeasure	Reinstatement method
1	Connected condition of speedometer connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.		If there is a malfunction, repair it and connect it securely. Speedometer coupler Main wiring harness ECU coupler	Reinstated by inputting the vehicle speed signals by turning the front wheel.
2	Open or short circuit in speedometer lead.		Repair or replace if there is an open or short circuit. Between speedometer coupler and ECU coupler white - white black/blue - black/blue	
3	Breakage speedometer cable or speedometer gear unit.		Execute the diagnostic mode (code No.D07) Checking the speedometer cable breakage and loose connection. Checking the movement of the speedometer gear unit ①. Checking the breakage of the speedometer clutch projections ⓐ and speedometer gear unit slots ⓑ. 	
4	Defective speed sensor.		Execute the diagnostic mode (code No. D07) Replace the meter assembly.	

Fault code No.	43	Symptom	Power supply to the fuel injector, fuel pump and ignistion coil are not normal.
Used diagnostic code No. D09 (fuel system voltage)			

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Faulty battery	Replace or charge the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.	
3	Open or short circuit in wiring harness.	Execute the diagnostic mode (code No. D09) **NOTE:** When the leads are disconnected, the voltage check by the code No. D09 is impossable. Repair or replace if there is an open or short circuit. ● Between battery and main switch red-red ● Between main switch and handlebar switch (engine stop switch) brown-brown ● Between handlebar switch (engine stop switch) and ECU red/white-red/black	

Fault code No.	44	Symptom	Error is detected while reading from or writing on EEROM (code re-registering key code and throttle valve fully closed notification valve).
Used diagnostic code No. D60 (EEPROM improper cylinder indication)			

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Malfunction in ECU	Execute the diagnostic mode (code No. D60) ● 01 is displayed on meter. Readjust the CO of the displayed cylinder. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" in chapter 3. Replace ECU if defective.	Reinstated by turning the main switch ON.

Fault code No.	46	Symptom	Power supply to FI system is not normal. (red lead)
Used diagnostic code No. --			

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Faulty battery	Replace or charge the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.	
3	Malfunction in rectifier/ regulator	Replace if defective. Refer to "CHARGING SYSTEM" in chapter 8.	
4	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between battery and ECU red-red	

Fault code No.	50	Symptom	Faulty ECU memory. (when this malfunction is detected in the ECU, the fault code number might not appear on the meter.)
Used diagnostic code No. --			

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Malfunction in ECU	Replace the ECU.	Reinstated by turning the main switch ON.

Fault code No.	61	Symptom	ISC (idle speed control) valve open or short circuit is detected.

Used diagnostic code No. --

Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.	If there is a malfunction, repair it and connect it securely. ISC (idle speed control) valve coupler Main wiring harness ECU coupler	Reinstated by setting the main switch to ON, The ISC (idle speed control) valve fully closes, and then it opens until it is at the standby opening position when the engine is started.
2	Open or short circuit in lead.	Repair or replace if there is an open or short circuit. Between ISC (idle speed control) valve and ECU coupler/main harness pink- pink green/yellow-green/yellow gray - gray sky blue-sky blue	
3	Detective ISC (idle speed control) valve	Execute diagnostic mode (code No.D54) Replace the throttle body. **NOTE:** Do not remove the ISC (idle speed control) valve. Refer to "THROTTLE BODY AND FUEL INJECTOR".	

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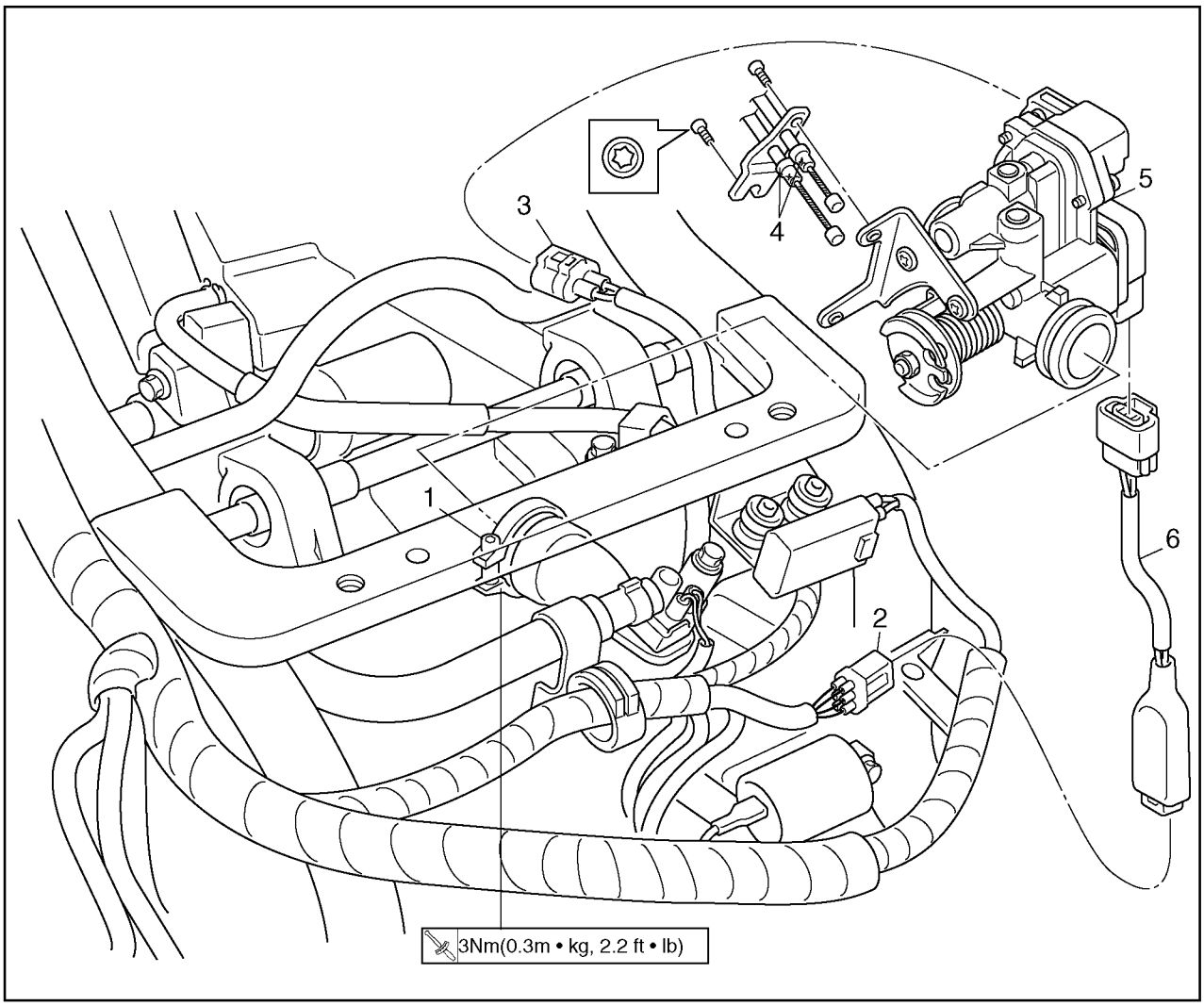
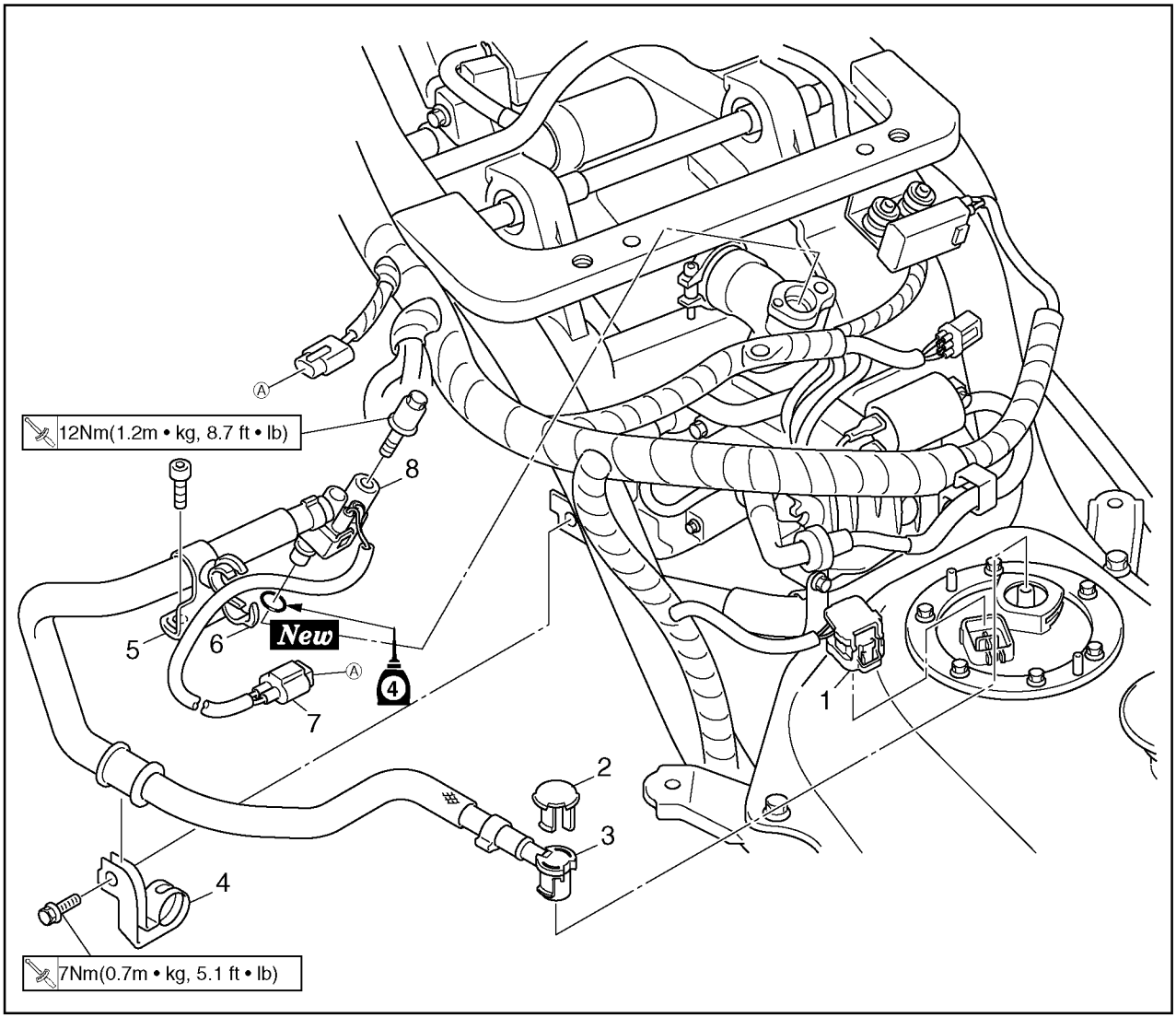
THROTTLE BODY AND FUEL INJECTOR

THROTTLE BODY



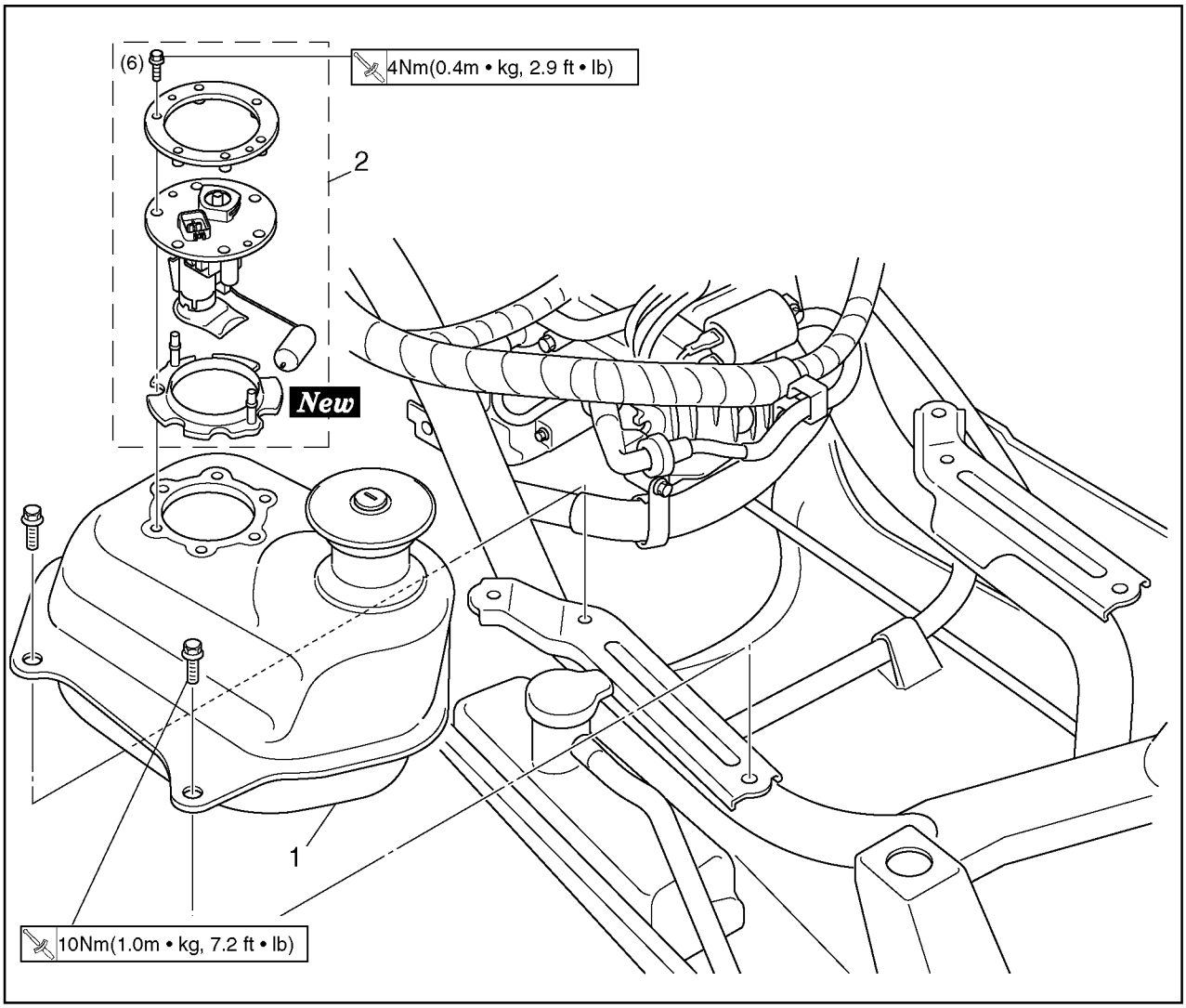
Order	Job/Part	Q'ty	Remarks
	Removing the throttle body		Remove the parts in the order listed.
	Side cover(left and right)		Refer to "COVER AND PANEL"in chapter 3.
	Single seat/Trunk		
	Air filter assembly		Refer to"ENGINE REMOVAL" in chapter 5.
1	Throttle body clamp screw	1	Lossen.
2	MAQS(modulated air quantity sensor) coupler	1	Disconnect.
3	ISC (idle speed control) valve coupler	1	Disconnect.
4	Throttle cable	2	Disconnect.
5	Throttle body	1	
6	Sub-wire harness	1	
			For installation, reverse the removal procedure.

FUEL INJECTOR AND FUEL HOSE

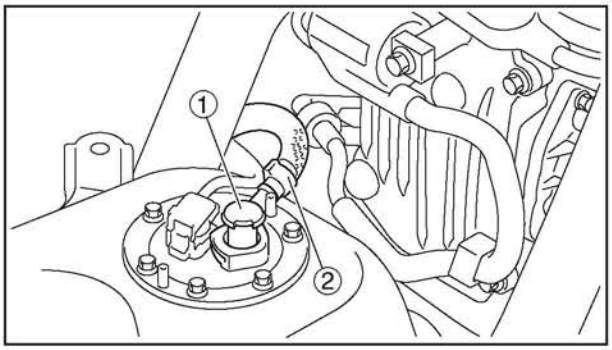


Order	Job/Part	Q'ty	Remarks
	Removing the fuel injector and fuel hose		Remove the parts in the order listed.
	Footrest board		Refer to"COVER AND PANEL"in chapter 3.
1	Fuel pump coupler	1	Disconnect.
2	Fuel hose connector cover	1	
3	Fuel hose connector	1	
4	Fuel hose holder(to frame)	1	
5	Fuel hose holder(to intake manifold)	1	
6	Clamp	1	Open lock.
7	Fuel injector coupler	1	Disconnect.
8	Fuel injector	1	
			For installation, reverse the removal procedure.

FUEL TANK



Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed. **NOTE** Place the scooter on a suitable stand.
	Fuel hose		Refer to "FUEL INJECTOR AND FUEL HOSE".
1	Fuel tank	1	Refer to "REMOVING THE FUEL HOSE".
2	Fuel pump	1	Refer to "REMOVING THE FUEL PUMP"and "INSTALLING THE FUEL PUMP". For installation, reverse the removal procedure.



REMOVING THE FUEL HOSE

1. Extract the fuel in the fuel tank through the fuel tank filler hole with a pump.
2. Remove:
   - fuel hose connector cover ①
3. Disconnect:
   - fuel hose ②

CAUTION:

- **Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.**
- **Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.**
- **Do not disconnect the fuel hose from the fuel hose connector. Disconnect the connector from the fuel pump.**

NOTE:

Before removing the hose, place a few rags in the area under where it will be removed.

3. Remove:
   - fuel tank

REMOVING THE FUEL PUMP

1. Disconnect:
   - fuel pump coupler
   - fuel hose
2. Remove:
   - fuel pump

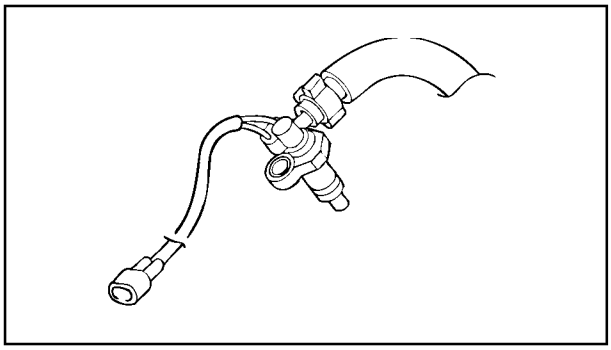
CAUTION:

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**

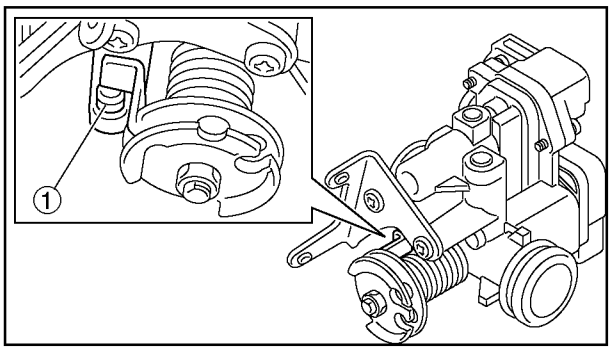
EAS00911

CAUTION:

The fuel pump should not be disassembled.

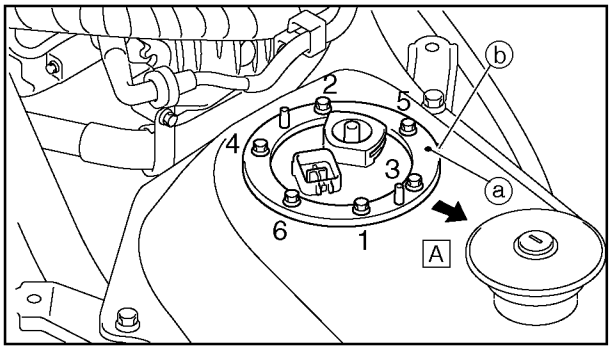


EAS00912
CHECKING THE FUEL INJECTOR
1. Check:
   - fuel injector
     Damage → Replace.



EAS00913
CHECKING THE THROTTLE BODY
1. Check:
   - throttle body
     Cracks/damage → Replace the throttle body.
2. Check:
   - butterfly valve
     Damage/scratches/wear → Replace.

CAUTION:
- **Do not adjust the stop screw ①**
- **Do not clean the throttle body using carburetor cleaner or compressed air.**
- **When replace the throttle body, the main switch is operated three times turn ON and OFF position.**
  (ON position : 3 seconds more, OFF position : 3seconds more). And then, start the engine and keep idling at 10 minutes more.



INSTALLING THE FUEL PUMP

1. Install:
   - fuel pump

	4Nm(0.4m•kg, 2.9ft•lb)

NOTE:

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Align the projection ⓐ on the fuel pump with the alignment mark ⓑ on the fuel tank.
- Tighten the fuel pump bolts in the proper tightening sequence as shown and torque them in two stages.

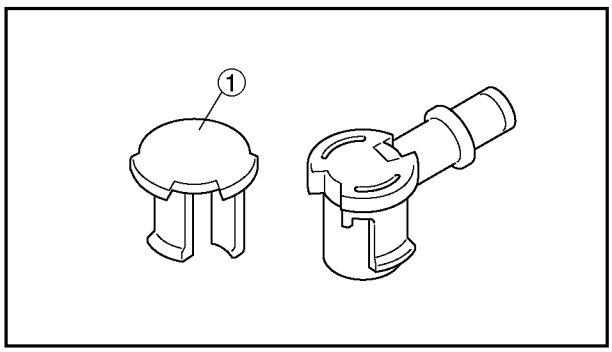
A Forward

INSTALLING THE FUEL HOSE

1. Install:
   - fuel hose
   - fuel hose connector cover

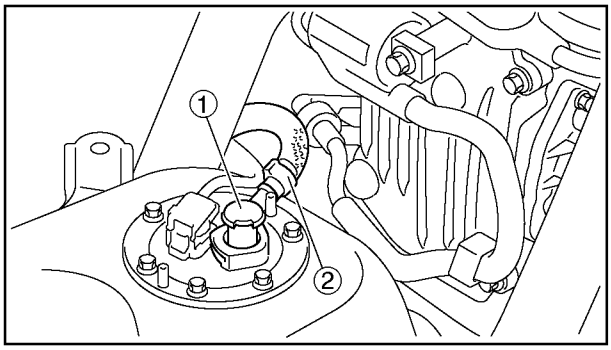
CAUTION:

Be sure to connect the fuel hose securely and install the fuel hose connector cover in the correct position, otherwise the fuel hose will not be properly installed.



NOTE:

- Install the fuel hose connector securely onto the fuel tank until a distinct “click” is heard, and then make sure that it does not come loose.
- After installing the fuel hose connector cover ①, make sure that it is installed securely.



EAS00915

CHECKING THE FUEL PUMP AND PRESSURE REGULATOR OPERATION

1. Check:
   - pressure regulator operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

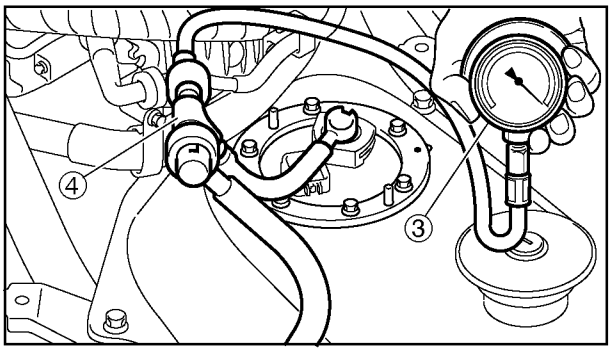
a. Remove the footrest board.
   Refer to "COVER AND PANEL" in chapter 3.
b. Remove the fuel hose connector cover ① and disconnect the fuel hose ② from the fuel pump.

CAUTION:

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

NOTE:

Before removing the hose, place a few rags in the area under where it will be removed.



c. Connect the pressure gauge ③ and adapter ④ onto the fuel hose.

Pressure gauge
90890-03153
YU-03153
Adapter
90890-03181

d. Start the engine.
e. Measure the fuel pressure.

Fuel pressure
246 ~ 254 kPa
(2.46 ~ 2.54 kg/cm², 35.0 ~ 36.1 psi)

Faulty → Replace the fuel pump.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

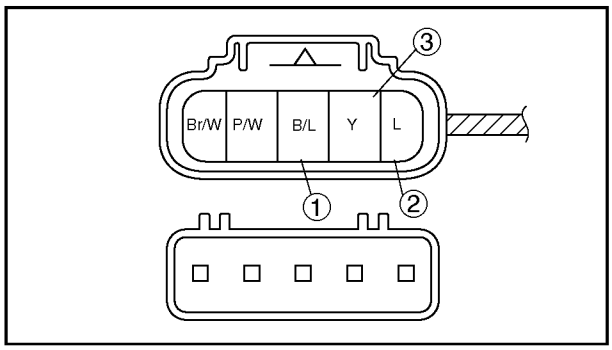
EAS00916

CHECKING THE THROTTLE POSITION SENSOR

1. Check:
   - throttle position sensor

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Connect the digital circuit tester to the terminals of the throttle position sensor.



Positive tester probe → blue terminal ①
Negative tester probe → black/blue terminal ②

Digital circuit tester
90890-03174

b. Measure the throttle position sensor voltage.
Out of specification → Replace or repair the wire harness.

Throttle position sensor voltage
5V
(blue-black/blue)

c. Connect the digital circuit tester to the terminals of the throttle position sensor.

Positive tester probed →
yellow terminal ③
Negative tester probe →
black/blue terminal ②

d. While slowly opening the throttle, check that the throttle position sensor voltage is increased.
Voltage does not change or it changes abruptly → Replace the throttle body.
Out of specification (closed position) → Replace the throttle body.

Throttle position sensor voltage
(closed position)
0.63 ~ 0.73 V
(yellow-black/blue)

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS00916

CHECKING THE ISC (IDLE SPEED CONTROL) VALVE

NOTE:

Do not remove the ISC (idle speed control) valve unit completely from the throttle body assembly.

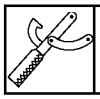
1. Check:
   - ISC (idle speed control) valve

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Disconnect the ISC (idle speed control) valve coupler from the ISC (idle speed control) valve.
b. Connect the digital circuit tester to the terminals of the ISC (idle speed control) valve.

Positive tester probe → pink terminal ①
Negative tester probe → green/yellow terminal ②

Positive tester probe → gray terminal ③
Negative tester probe → sky blue terminal ④



Digital circuit tester
90890-03174

c. Measure the ISC (idle speed control) valve resistance.
   Out of specification → Replace the throttle body.

ISC (idle speed control) valve resistance
18 ~ 22 Ω at 20°C(68°F)

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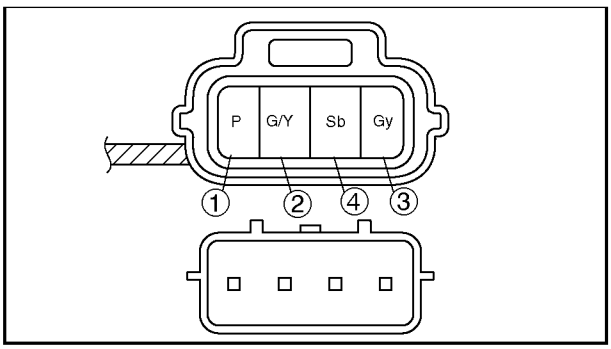


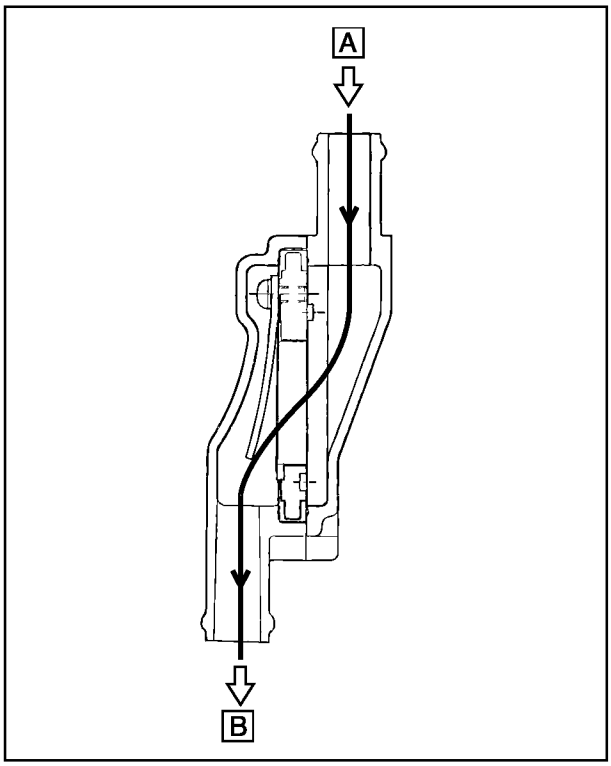
EAS00507

AIR INDUCTION SYSTEM

AIR INJECTION

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust pipe reducing the emission of hydrocarbons.

When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The resuired temperature for burning the unburned exhaust gases is approximately 600 to 700 °C (1,112 to 1,292 °F)



EAS00917

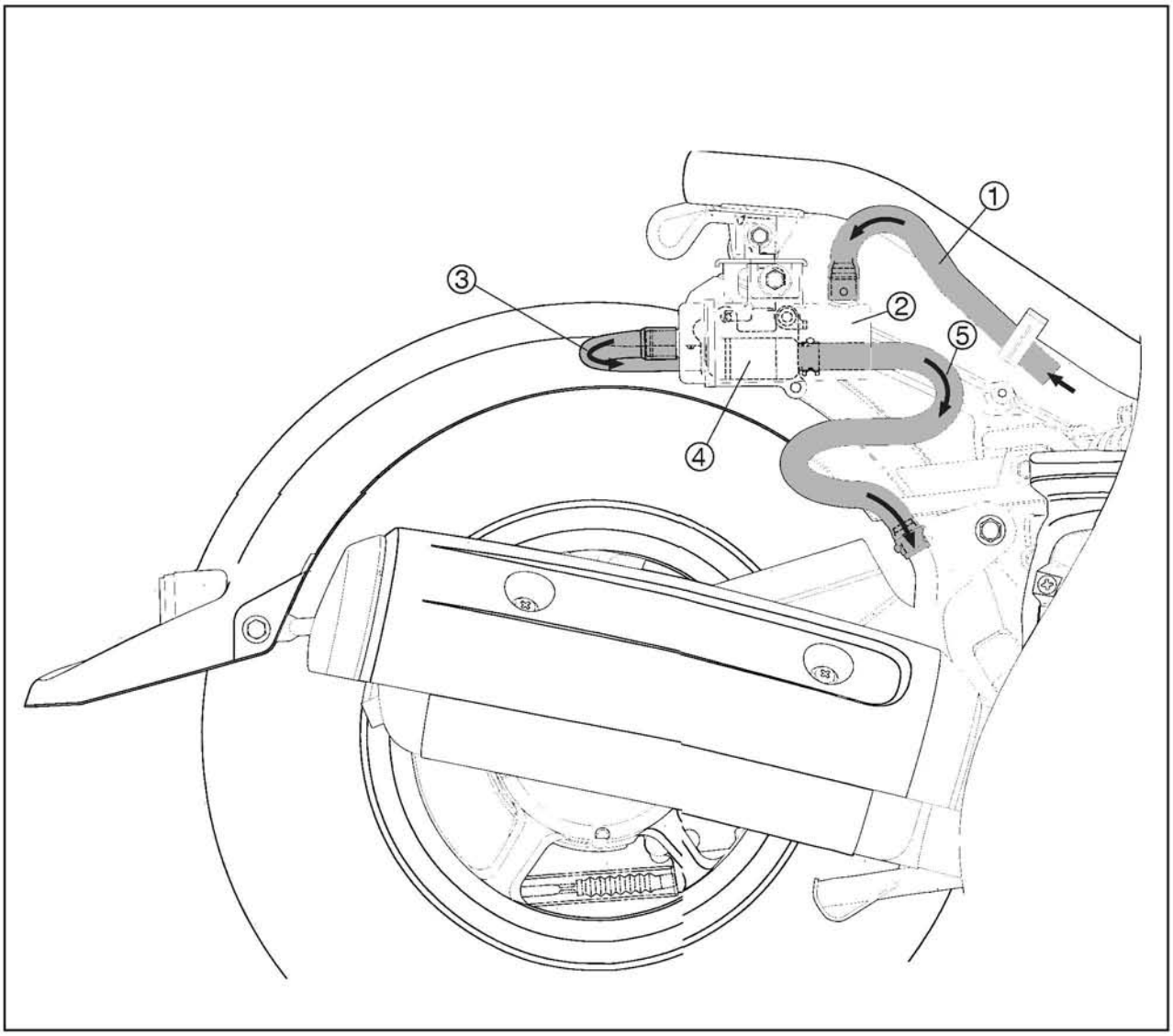
AIR CUT-OFF VALVE

The air cut-off valve prevents air backflow from the exhaust pipe to the air filter.

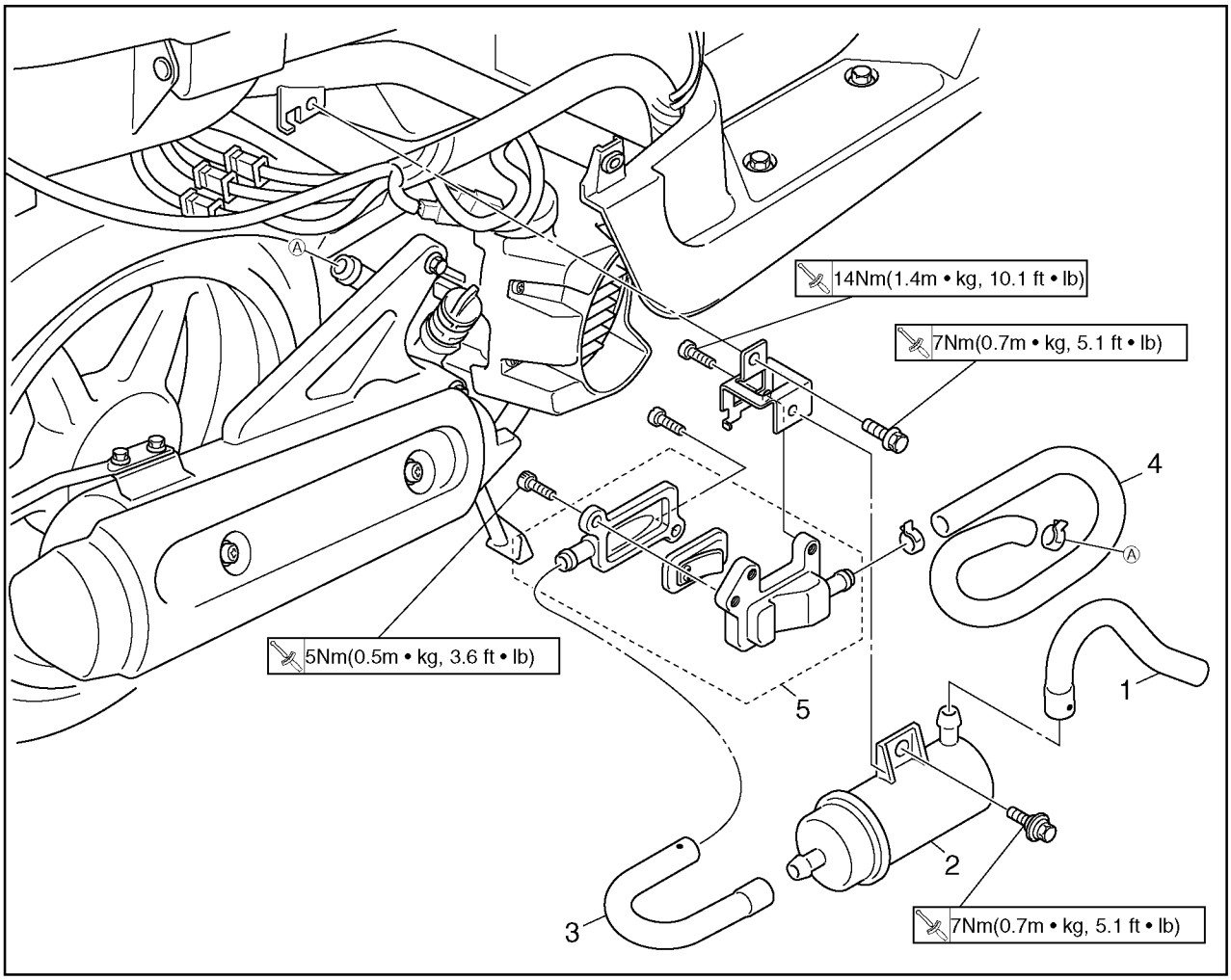
A From the air filter
B To the exhaust pipe ass'y

EAS00509
AIR INDUCTION SYSTEM DIAGRAMS

① Air induction system hose
② Air filter case
③ Air induction system hose (air filter case to air cut-off valve)
④ Air cut-off valve
⑤ Air induction system hose (air cut-off valve to exhaust pipe)



AIR CUT-OFF VALVE AND AIR FILTER CASE



Order	Job/Part	Q'ty	Remarks
	Removing the air cut-off valve and air filter case		Remove the parts in the order listed.
	Front cover Side cover(right)		Refer to"COVER AND PANEL"in chapter 3.
1	Hose(to air filter case)	1	
2	Air filter case	1	
3	Hose(air cut-off valve to air filter case)	1	
4	Hose(air cut-off valve assembly to exhaust pipe)	1	
5	Air cut-off valve	1	
			For installation, reverse the removal procedure.

EAS00918

CHECKING THE AIR INDUCTION SYSTEM

1. Check:
   - hoses
     Loose connection → Connect properly.
     Cracks/damage → Replace.
2. Check:
   - reed valve
   - reed valve stopper
   - reed valve seat
     Cracks/damage → Replace the reed valve.
3. Check:
   - air cut-off valve
     Cracks/damage → Replace.

CHAPTER 8
ELECTORICAL

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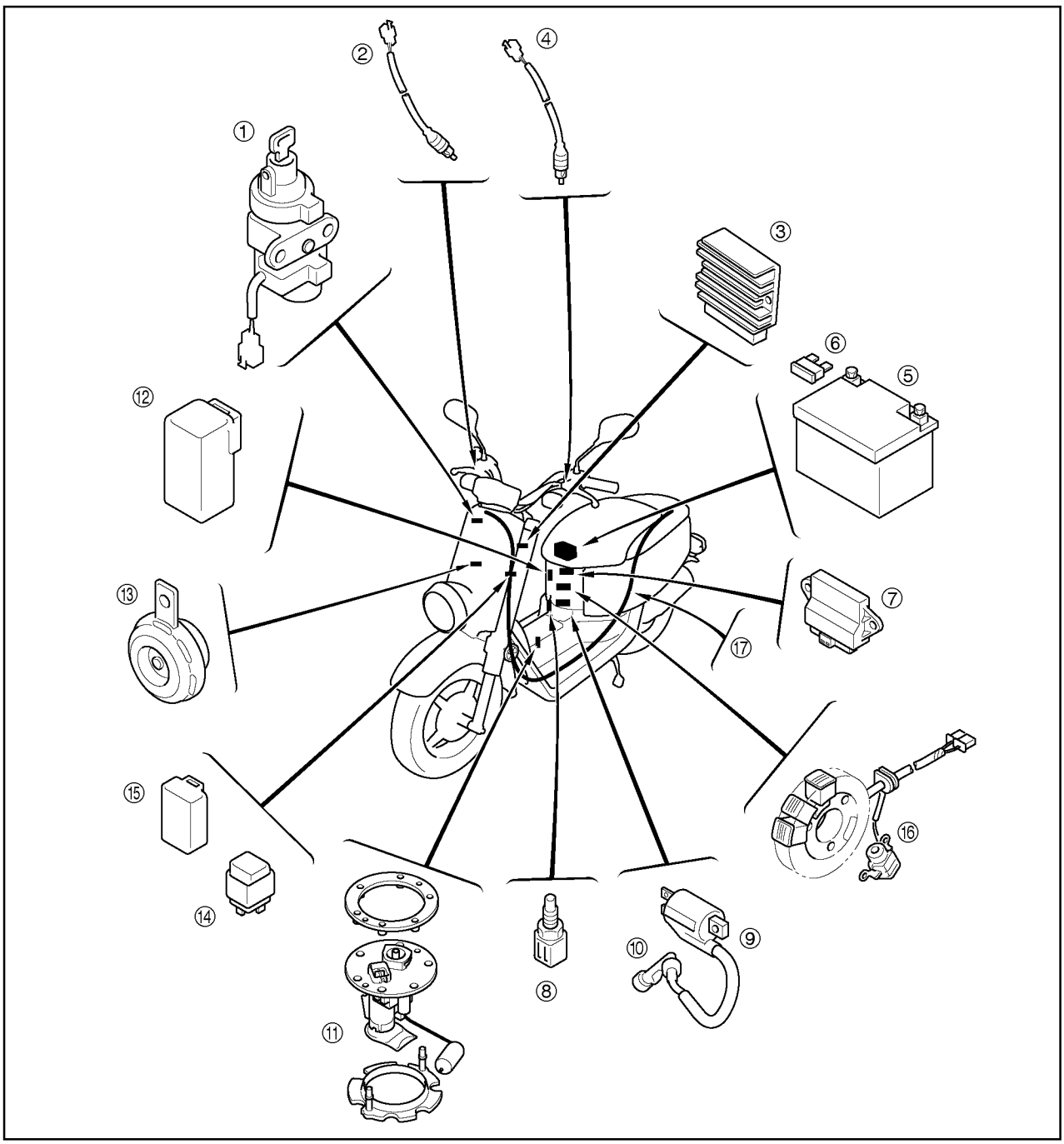
EAS00729

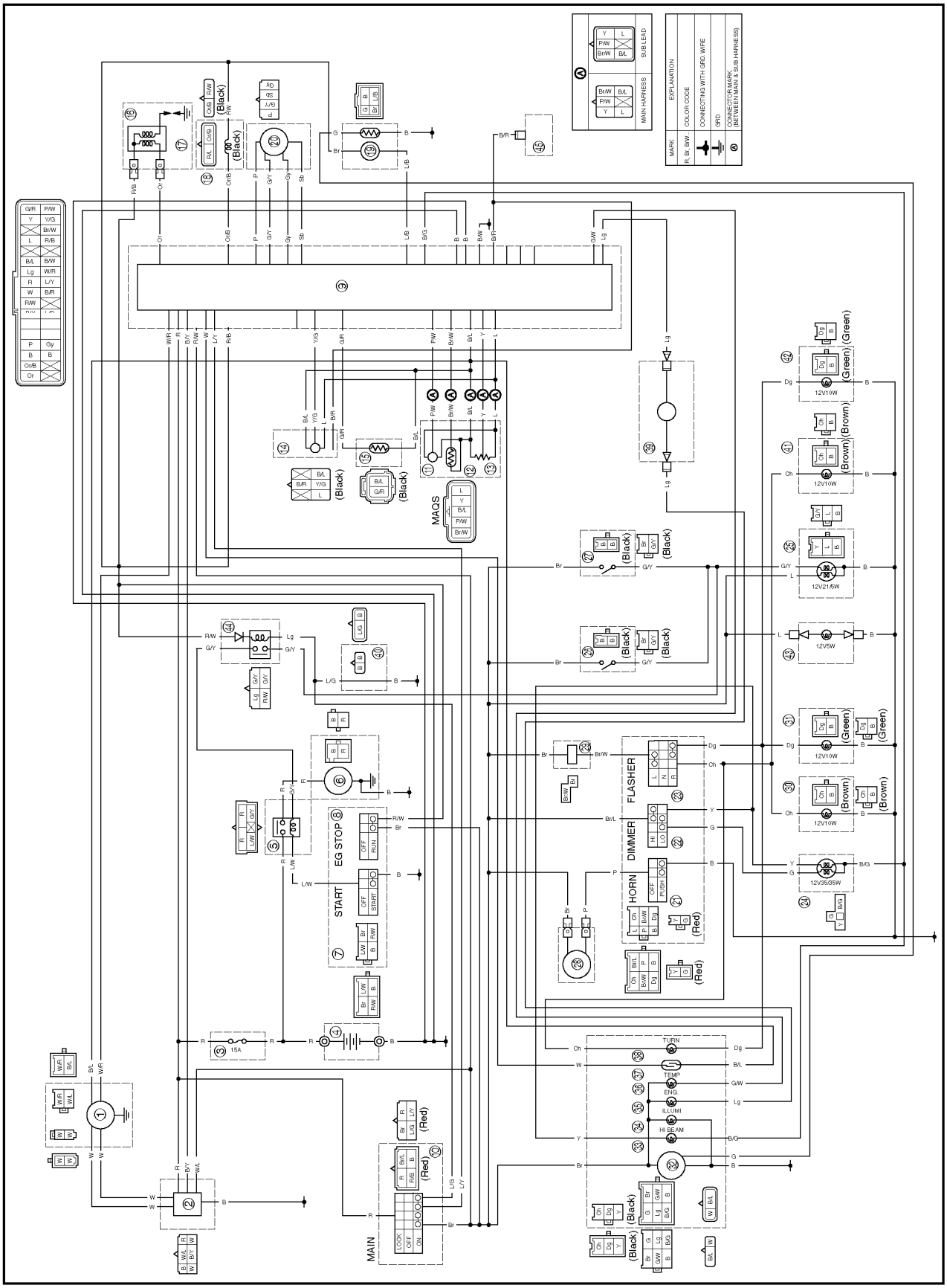
ELECTRICAL

ELECTRICAL COMPONENTS

① Main switch
② Front brake light switch
③ Rectifier/regulator
④ Rear brake light switch
⑤ Battery
⑥ Main fuse
⑦ ECU
⑧ Coolant temperature sensor
⑨ Ignition coil
⑩ Spark plug cap
⑪ Fuel pump
⑫ Starter relay
⑬ Horn
⑭ Turn signal relay
⑮ Starting circuit cut-off relay
⑯ Stator coil
⑰ Wire harness



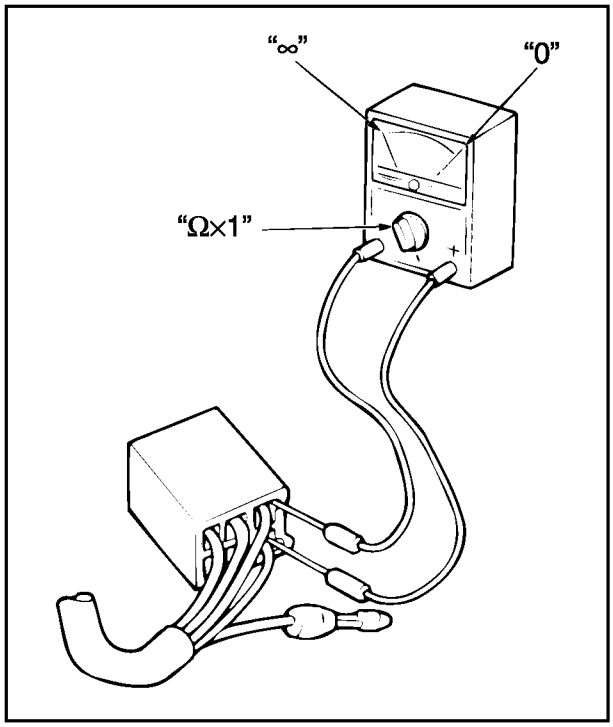
WIRING DIAGRAM

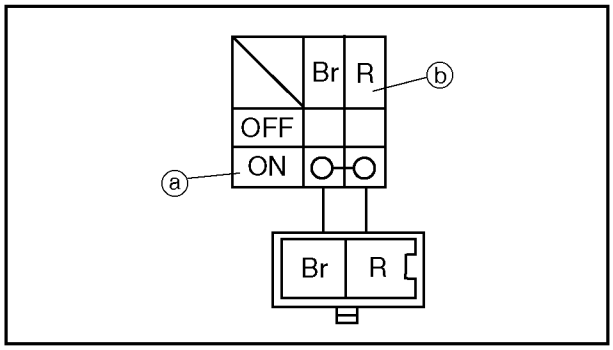


① AC magneto
② Rectifier/regulator
③ Main fuse
④ Battery
⑤ Starter relay
⑥ Starter motor
⑦ Start switch
⑧ Engine stop switch
⑨ ECU
⑩ Main switch
⑪ Intake air pressure sensor
⑫ Intake air temperature sensor
⑬ Throttle position sensor
⑭ Lean angle cut-off switch
⑮ Coolant temperature sensor
⑯ Ignition coil
⑰ Spark plug
⑱ Fuel injector
⑲ Fuel pump
⑳ ISC(idle speed control) valve
㉑ Horn switch
㉒ Dimmer switch
㉓ Turn signal switch
㉔ Headlight
㉕ Tail/brake light
㉖ Front brake light switch
㉗ Rear brake light switch
㉘ Horn
㉙ Turn signal relay
㉚ Front turn signal light(left)
㉛ Front turn signal light(right)
㉜ Fuel level meter
㉝ High beam indicator light
㉞ Speedometer light
㉟ Engine trouble warning light
㊱ Coolant temperature indicator light
㊲ Speed sensor
㊳ Turn signal indicator light
㊴ FI diagnostic tool(optional)
㊵ Sidestand switch (optional)
㊶ Rear turn signal light(left)
㊷ Rear turn signal light(right)
㊸ License plate light
㊹ Starting circuit cut-off relay
㊺ Connector

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
Or	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/L	Black/Blue
B/G	Black/Green
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
G/R	Green/Red
G/Y	Green/Yellow
G/W	Green/White
L/B	Blue/Black
L/G	Blue/Green
L/W	Blue/White
L/Y	Blue/Yellow
Or/B	Orange/Black
P/W	Pink/White
R/B	Red/Black
R/L	Red/Blue
R/W	Red/White
W/L	White/Blue
W/R	White/Red
Y/G	Yellow/Green
Br/W	Brown/White
Br/L	Brown/Blue





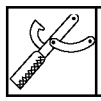
EAS00730

CHECKING SWITCH CONTINUITY

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

CAUTION:

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



Pocket tester
90890-03132 (YU-03112-C)

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.
The switch positions ⓐ are shown in the far left column and the switch lead colors ⓑ are shown in the top row in the switch illustration.

NOTE:

"O-O" 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:

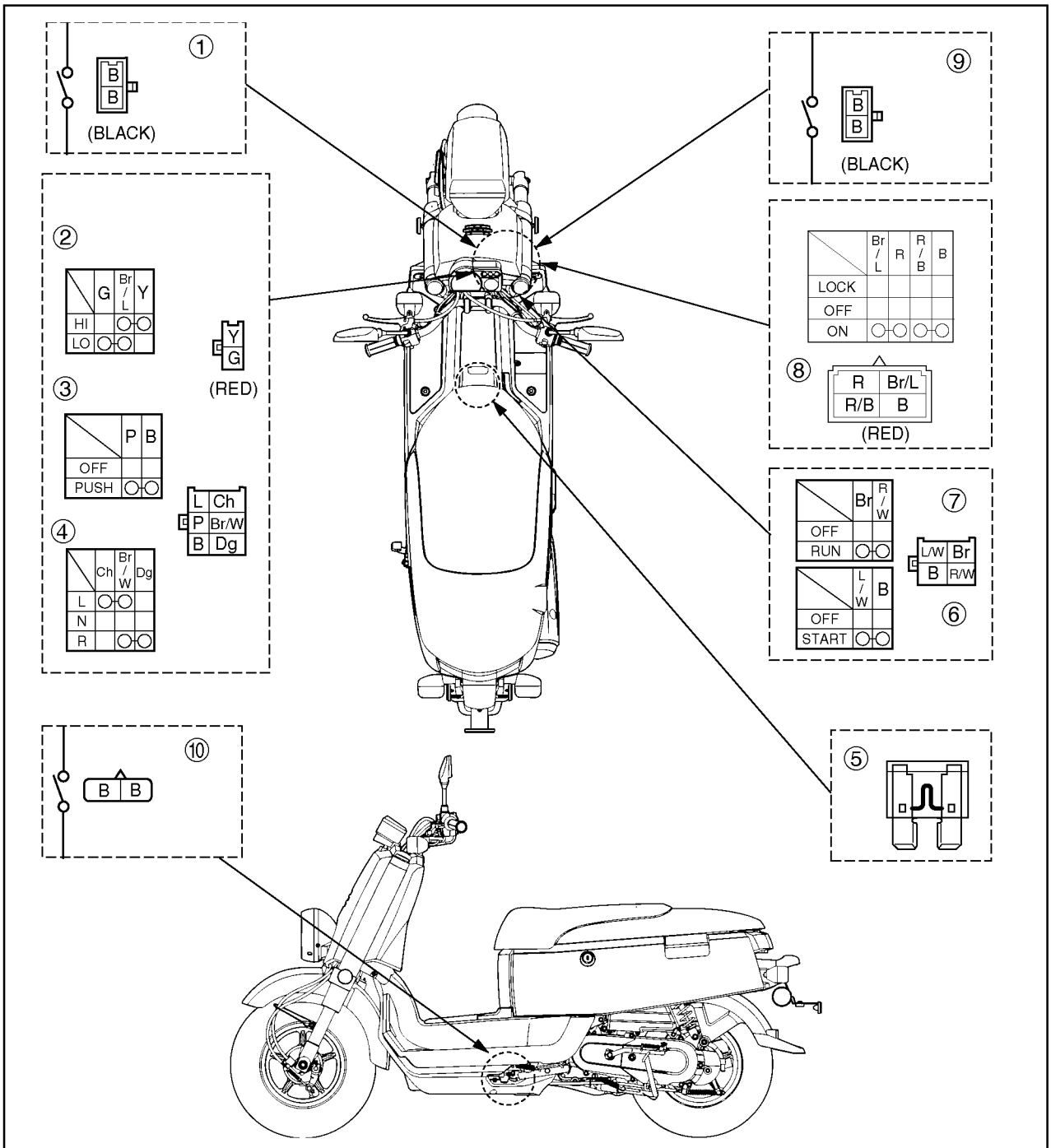
There is continuity between black and black/white when the switch is set to "OFF".
There is continuity between red and brown when the switch is set to "ON".

EAS00731

CHECKING THE SWITCHES

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

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



①	Rear brake light switch	⑤	Main fuse	⑨	Front brake light switch
②	Dimmer switch	⑥	Start switch	⑩	Sidestand switch (optional)
③	Horn switch	⑦	Engine stop switch		
④	Turn signal switch	⑧	Main switch		

EAS00733

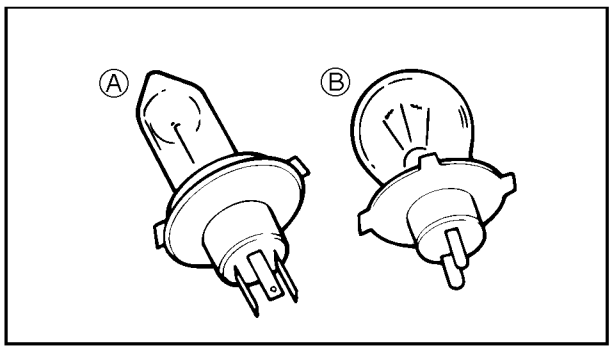
CHECKING THE BULBS AND BULB SOCKETS

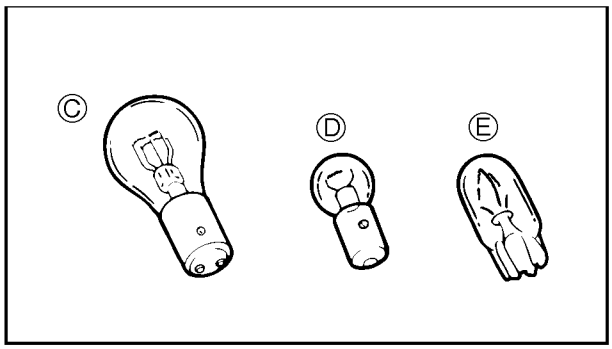
Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.





TYPES OF BULBS

The bulbs used on this scooter are shown in the illustration on the left.

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

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:
   - bulb

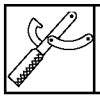
⚠WARNING

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

CAUTION:

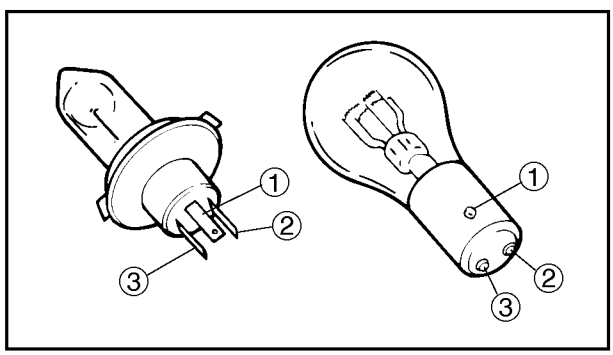
- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   - bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

	**Pocket tester** **90890-03112 (YU-03112-C)**

NOTE:

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.



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a. Connect the positive tester probe to terminal ① and the negative tester probe to terminal ②, and check the continuity.
b. Connect the positive tester probe to terminal ① and the negative tester probe to terminal ③, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

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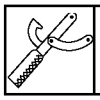
CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:
   - bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.



Pocket tester
90890-03112 (YU-03112-C)

NOTE:

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

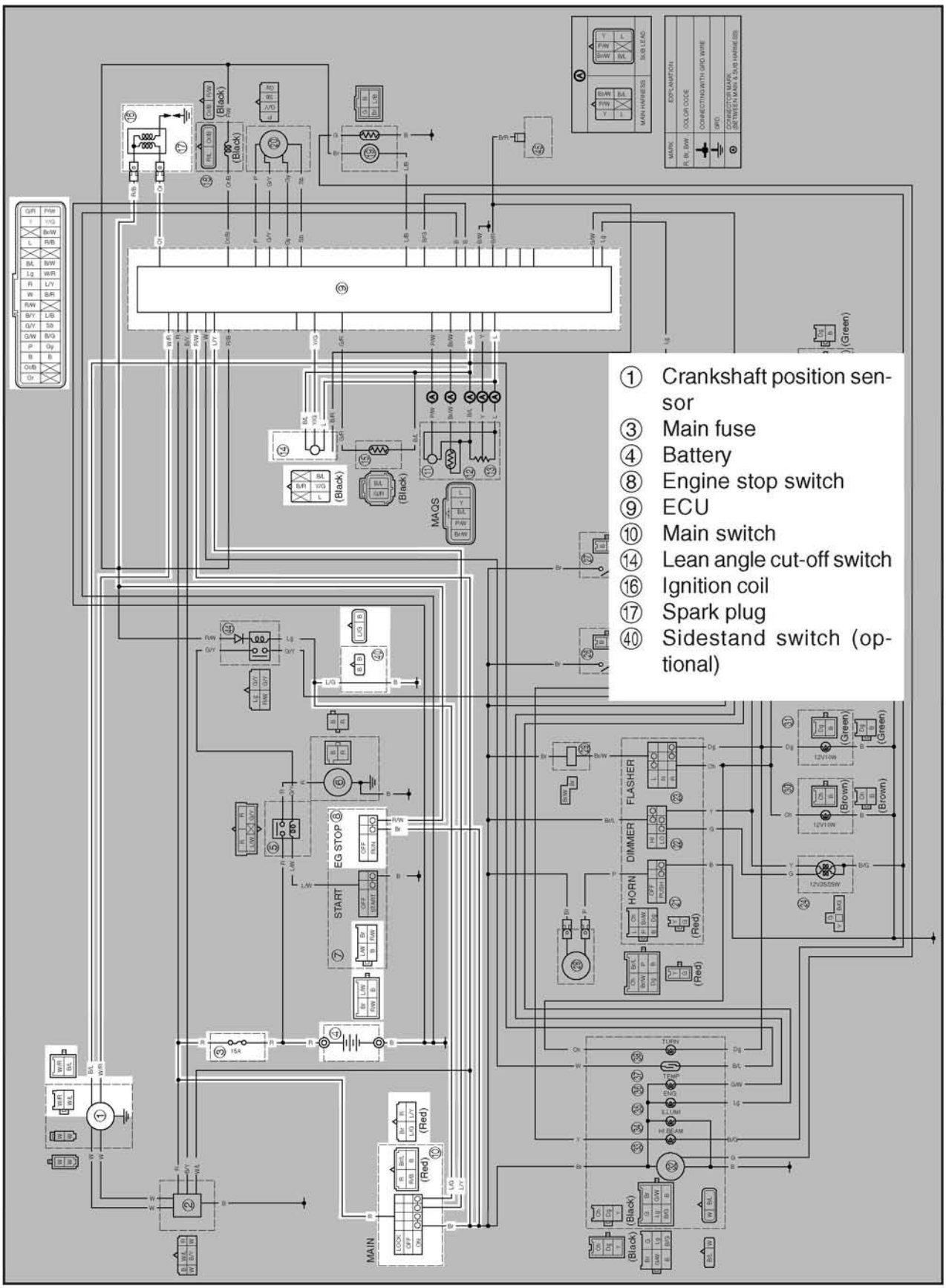
a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS00734

IGNITION SYSTEM

CIRCUIT DIAGRAM



EAS00736
TROUBLESHOOTING

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

Check:
1. main fuse
2. battery
3. spark plug
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. crankshaft position sensor resistance
8. main switch
9. engine stop switch
10. sidestand switch(optional)
11. lean angle cut-off switch
12. wiring connections (of the entire ignition system)

NOTE:
- Before troubleshooting, remove the following part(s):
1. Battery cover
2. Front cover
3. Side cover (right)
- Troubleshoot with the following special tool(s).

Ignition checker
90890-06754
YM-34487
Pocket tester
90890-03112
YU-03112-C

EAS00738
1. Main Fuse
- Check the fuse for continuity.
  Refer to "CHECKING THE FUSE" in chapter 3.
- Is the 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.

Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

- Is the battery OK?

YES ⇩ NO ⇩

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

EAS00740
3. Spark plug
- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
  Refer to "CHECKING THE SPARK PLUG" in chapter 3.

Standard spark plug
CR7E (NGK)
Spark plug gap
0.7 ~ 0.8 mm(0.028 ~ 0.031 in)

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

YES ⇩ NO ⇩

Re-gap or replace the spark plug.

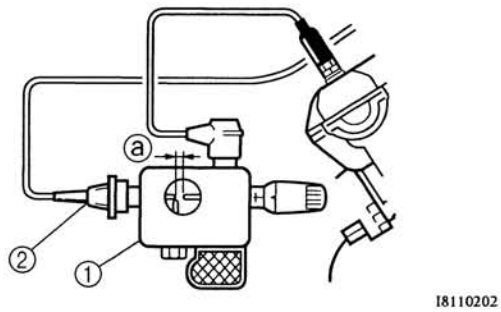
EAS00742

4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.

②Spark plug cap

- Set the main switch to "ON".
- Measure the ignition spark gap ⓐ.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.



Minimum ignition spark gap
6 mm(0.24 in)

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

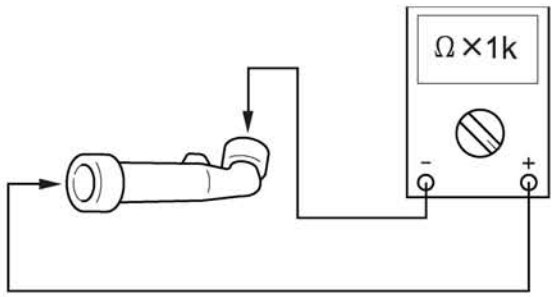
NO → The ignition system is OK.

YES → Replace the spark plug cap.

EAS00744

5. Spark plug cap resistance

- Remove the spark plug cap from the spark plug lead.
- Connect the pocket tester ("Ω ×1k" range) to the spark plug cap as shown.
- Measure the spark plug cap resistance.



Spark plug cap resistance
4~6 kΩ at 20°C(68°F)

- Is the spark plug cap OK?

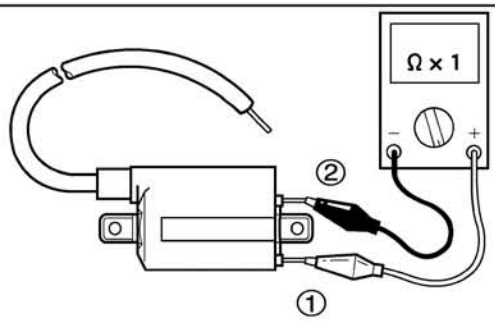
YES → NO → Replace the spark plug cap.

EAS00746

6. Ignition coil resistance

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

Positive tester probe → orange ①
Negative tester probe → red/black ②

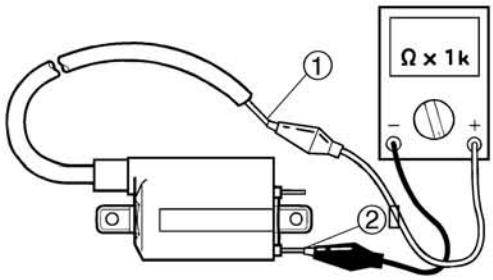


- Measure the primary coil resistance.

Primary coil resistance
2.16 ~ 2.64 Ω at 20°C(68°F)

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

Negative tester probe g orange ②
Positive tester probe g spark plug lead ①



- Measure the secondary coil resistance.

Secondary coil resistance
8.64 ~ 12.96 kΩ at 20°C(68°F)

- Is the ignition coil OK?

YES

NO

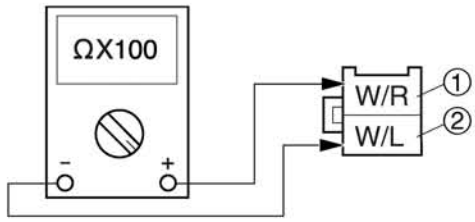
Replace the ignition coil.

EAS00748

7. Crankshaft position sensor resistance

- Disconnect the crankshaft position sensor coupler from the wire harness.
- Connect the pocket tester (Ω ×100) to the crankshaft position sensor coupler as shown.

Positive tester probe g white/red ①
Negative tester probe g white/blue②



- Measure the crankshaft position sensor resistance.

Crankshaft position sensor resistance
248 ~ 372Ω at 20°C(68°F)
(between white/red and white/blue)

- Is the crankshaft position sensor OK?

YES

NO

Replace the crankshaft position sensor/stator assembly.

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.

EAS00752

10. Sidestand switch(optional)

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

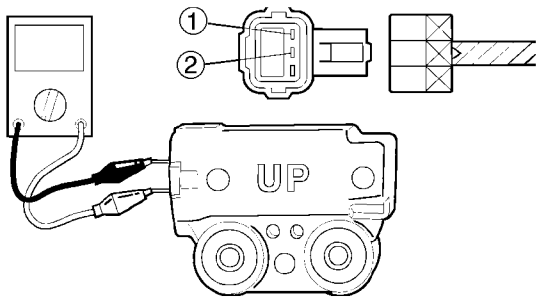
YES → NO

Replace the sidestand switch.

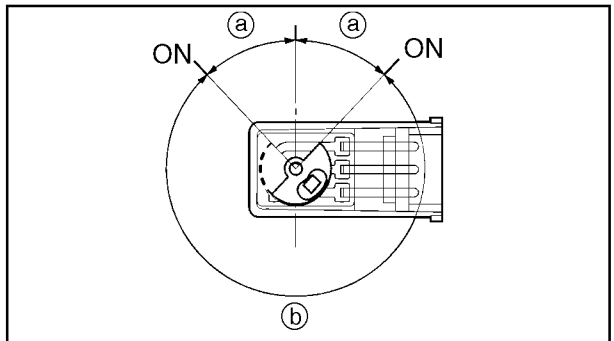
11. Lean angle cut-off switch

- Remove the lean angle cut-off switch.
- Connect the pocket tester(Ω ×1) to the lean angle cut-off switch terminals as shown.

Positive tester probe → blue ①
Negative tester probe → yellow/green②



Lean angle cut-off switch voltage
Less than 65°ⓐ→ 0.4~1.4V
More than 65° ⓑ →3.7~4.4V



- Is the lean angle cut-off switch OK?

YES → NO

Replace the lean angle cut-off switch.

EAS00754

12. Wiring

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

YES → NO

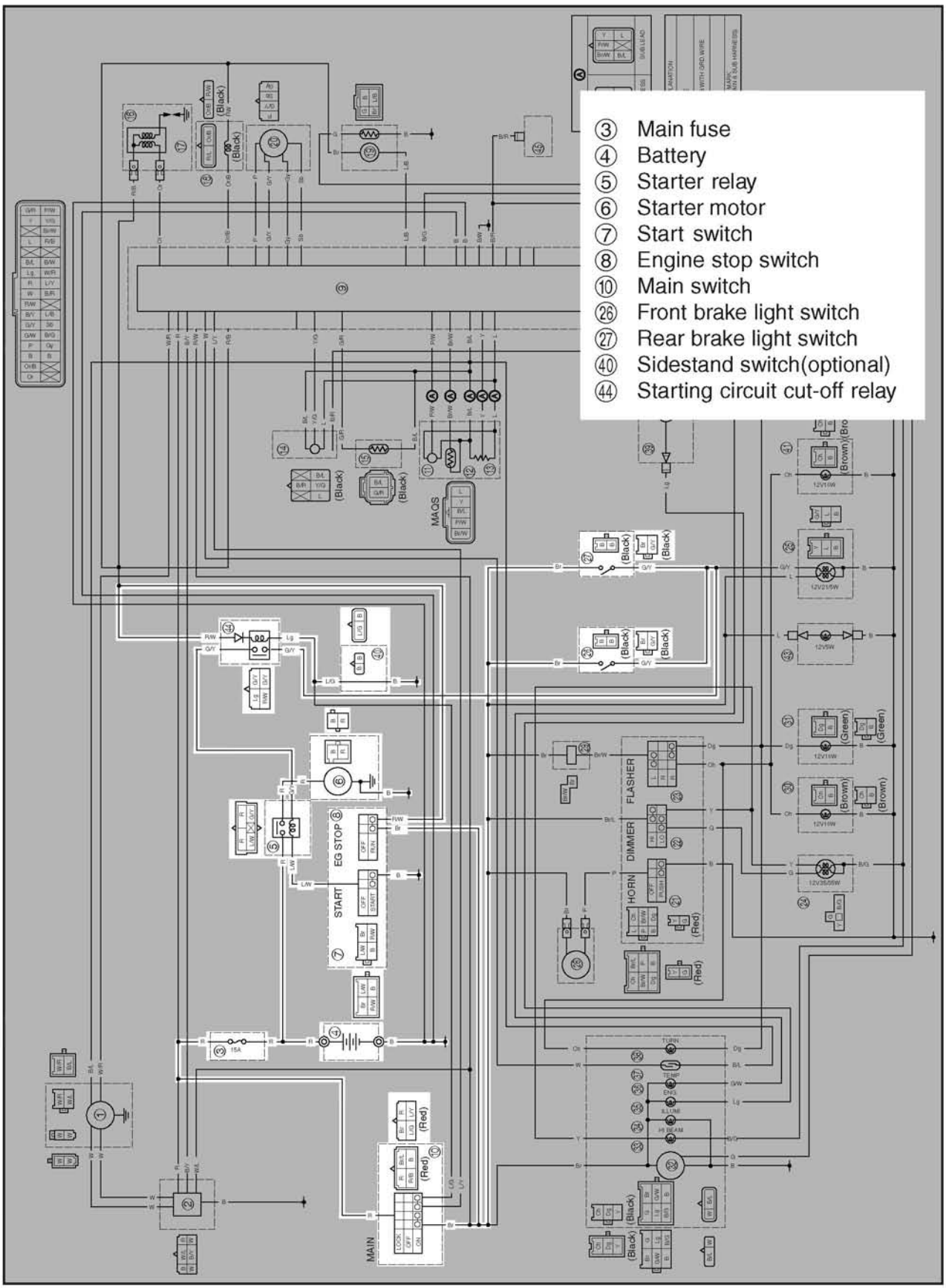
Replace the ECU.

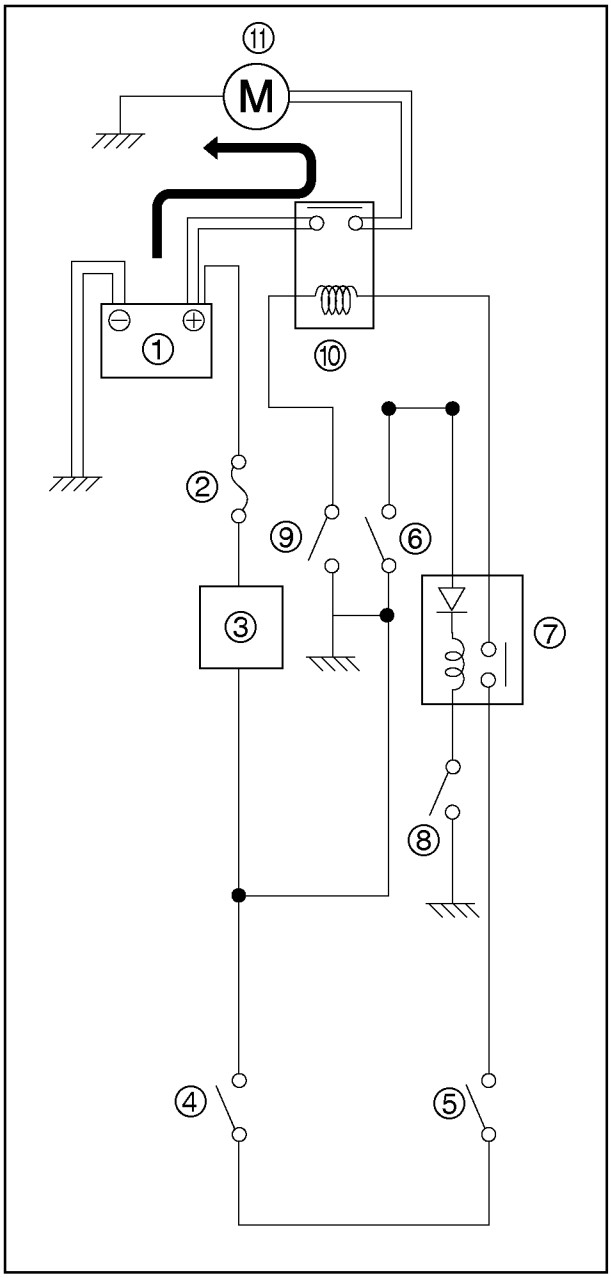
Properly connect or repair the ignition system’s wiring.

EAS00755

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM





EAS00756

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to "" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The brake lever(front or rear) is pulled to the handlebar(the brake light switch is closed) and the sidestand(optional) is up(the sidestand switch(optional) is closed).

① Battery
② Main fuse
③ Main switch
④ Front brake light switch
⑤ Rear brake light switch
⑥ Engine stop switch
⑦ Starting circuit cut-off relay
⑧ Sidestand switch(optional)
⑨ Start switch
⑩ Starter relay
⑪ Starter motor

EAS00757
TROUBLESHOOTING

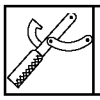
The starter motor fails to turn.

Check:
1. main fuse
2. battery
3. starter motor
4. starting circuit cut-off relay
5. starter relay
6. main switch
7. brake light switch(front and rear)
8. engine stop switch
9. sidestand switch(optional)
10. start switch
11. wiring connections
    (of the entire starting system)

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

1. battery cover/front cover
2. side cover(left and right)
3. front fork upper cover
4. front fork cover(left and right)
5. leg shield1
6. air filter assembly

- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112 (YU-03112-C)

EAS00738

1. Main Fuse

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

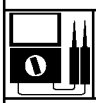
YES ⇩ NO ⇩

Replace the fuse.

EAS00739

2. Battery

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



Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

- Is the battery OK?

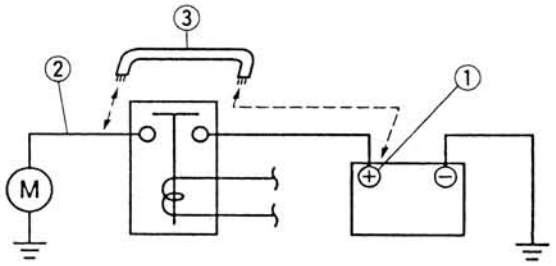
YES ⇩ NO ⇩

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

EAS00758

3. Starter motor

- Connect the positive battery terminal ① and starter motor lead ② with a jumper lead③.



⚠WARNING

- **A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.**

- Does the starter motor turn?

YES ⇩

NO ⇩

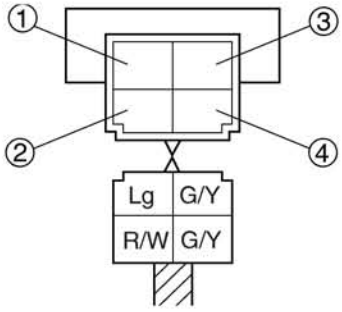
Repair or replace the starter motor.

EAS00759

4. Starting circuit cut-off relay

- Remove the starting circuit cut-off relay.
- Connect the pocket tester (Ω ×1) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Positive battery terminal → red/white①
Negative battery terminal → light green ②
Positive tester probe → green/yellow③
Negative tester probe → green/yellow④



- Does the starting circuit cut-off relay have continuity between green/yellow and green/yellow?

YES ⇩

NO ⇩

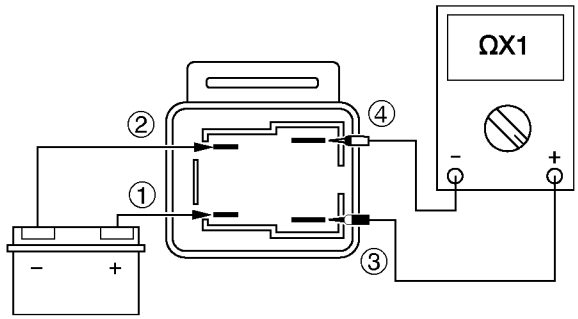
Replace the starting circuit cut-off relay

EAS00761

5. Starter relay

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

Positive battery terminal →green/yellow①
Negative battery terminal →blue/white②
Positive tester probe → red ③
Negative tester probe →red ④



- Does the starter relay have continuity between red③ and red ④?

YES → Replace the starter relay.

NO

EAS00749

6. Main switch

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

YES

NO → Replace the main switch.

EAS00751

7. Brake light switch(front and rear)

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

YES

NO → Replace the brake light switch(es).

EAS00750

8. Engine stop switch

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

YES

NO → Replace the right handlebar switch.

EAS00752

9. Sidestand switch(optional)

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

YES

NO → Replace the sidestand switch.

EAS00764

10. Start switch

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

YES

NO → Replace the right handlebar switch.

EAS00766

11. Wiring
• Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM". • Is the starting system's wiring properly connected and without defects?

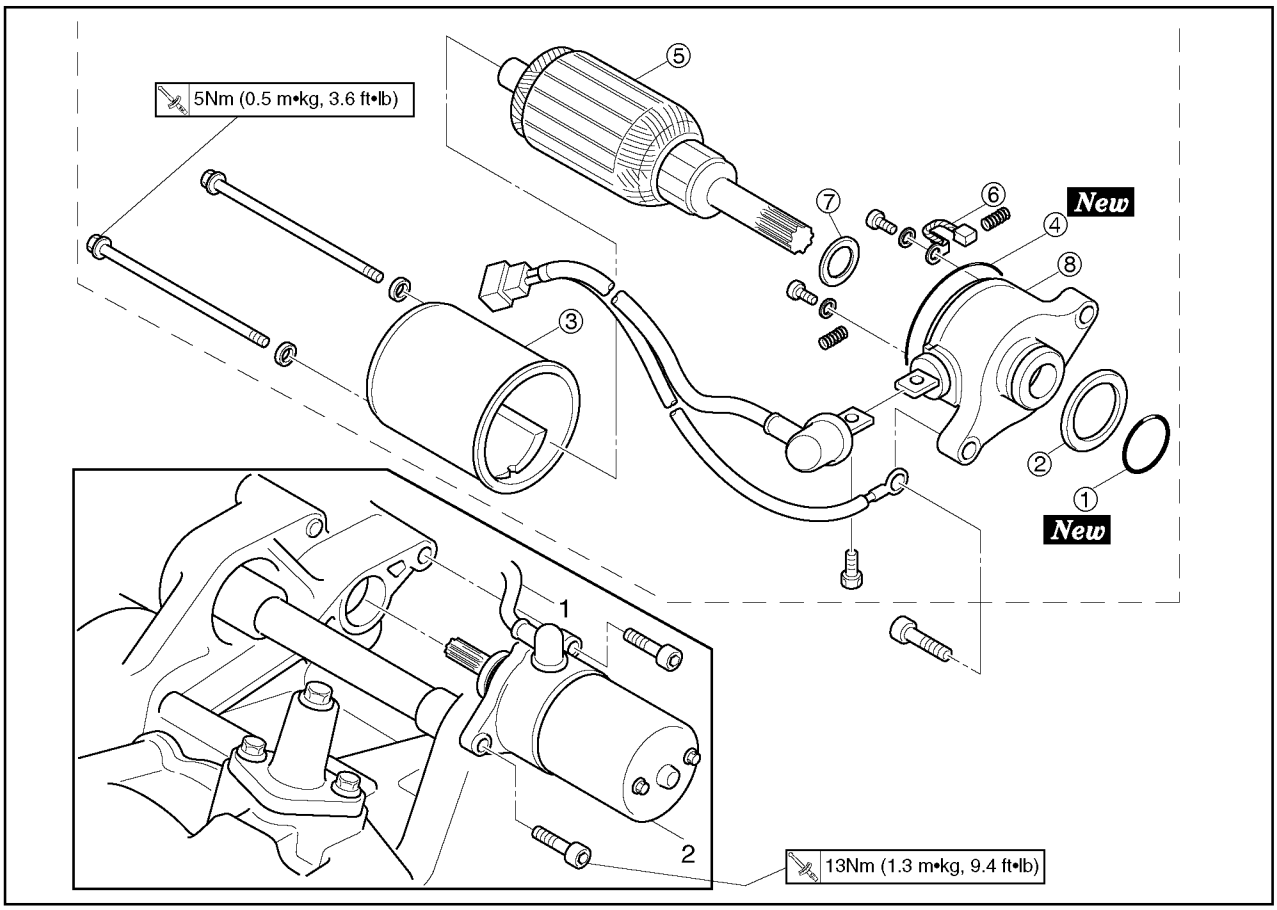
⇩ YES

The starting system circuit is OK.

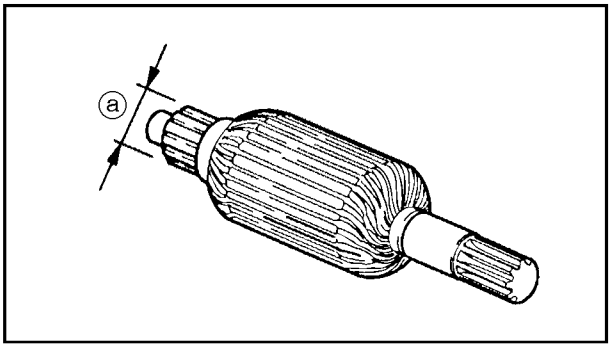
⬇ NO

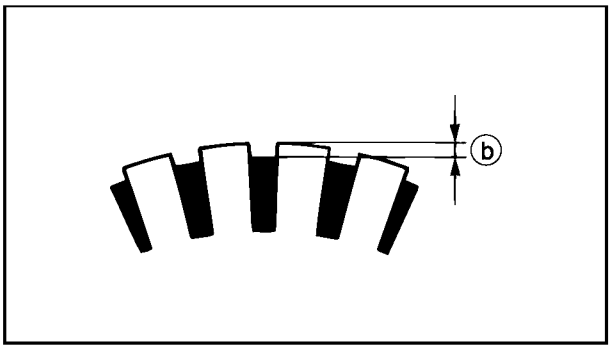
Properly connect or repair the starting system's wiring.

EAS00767
STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter motor		Remove the parts in the order listed.
	Front cover		Refer to "COVER AND PANEL"in chapter 3.
	Single seat/Trunk		
	Air filter assembly		Refer to"ENGINE REMOVAL"in chapter 5.
1	Starter motor lead coupler	1	Disconnect.
2	Starter motor	1	
			For installation, reverse the removal procedure.
	Disassembling the starter motor		Disassemble the parts in the order listed.
①	O-ring	1	
②	Gasket	1	
③	Stator assembly	1	Refer to"ASSEMBLING THE STARTER MOTOR".
④	O-ring	1	
⑤	Armature coil	1	
⑥	Brush	2	
⑦	Plate washer	1	
⑧	Bracket	1	
			For assembly, reverse the disassembly procedure.





EAS00769
CHECKING THE STARTER MOTOR

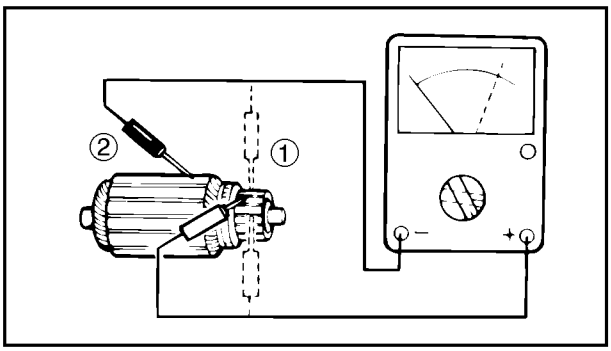
1. Check:
   - commutator
     Dirt → Clean with 600-grit sandpaper.
2. Measure:
   - commutator diameter ⓐ
     Out of specification → Replace the starter motor.

Commutator wear limit
16.6 mm (0.65 in)

3. Measure:
   - mica undercut ⓐ
     Out of specification → Scrape the mica to the proper measurement with a hack-saw blade that has been grounded to fit the commutator.

Mica undercut
1.35 mm (0.05 in)

NOTE:
The mica of the commutator must be undercut to ensure proper operation of the commutator.



4. Measure:
   - armature assembly resistances (commutator and insulation)
     Out of specification → Replace the starter motor.

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

Pocket tester
90890-03112 (YU-03112-C)

Armature coil
Commutator resistance ①
0.0378 ~ 0.0462 Ω at 20°C (68°F)
Insulation resistance ②
Above 1 MΩ at 20°C(68°F)

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

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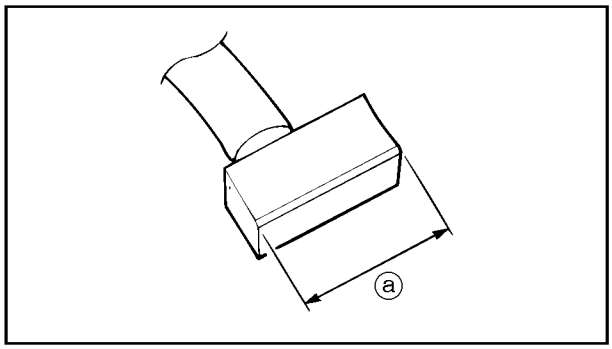
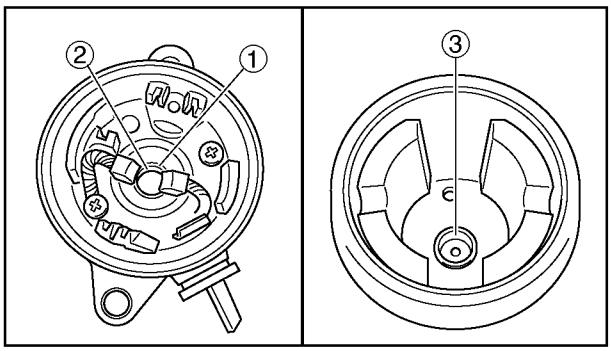


5. Measure:
   - brush length ⓐ
     Out of specification → Replace the brushes as a set.

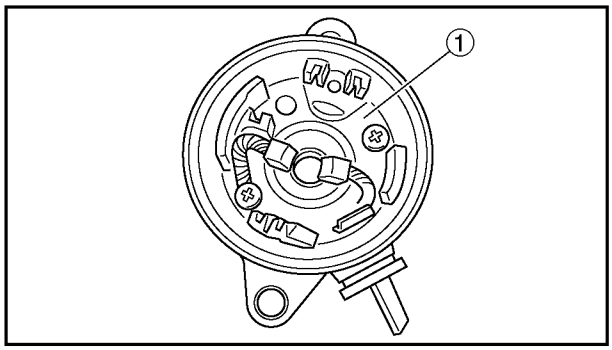
	Brush length wear limit **3.5 mm (0.14 in)**

6. Measure:
   - brush spring force
     Out of specification → Replace the brush springs as a set.

	Brush spring force **3.92 ~ 5.88N(400 ~ 600gf, 14.11 ~ 21.16oz)**

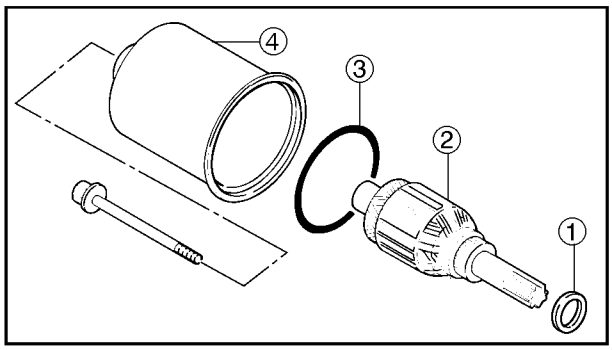


7. Check:
   - gear teeth
     Damage/wear → Replace the gear.
8. Check:
   - bearing①
   - oil seal②
   - bush③
     Damage/wear → Replace.

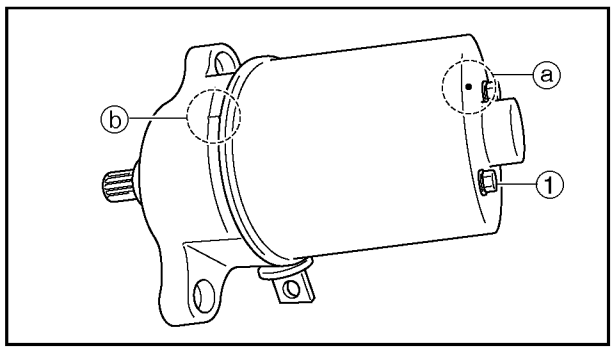


EAS00772
ASSEMBLING THE STARTER MOTOR

1. Install:
   - brush seat ①



2. Install:
   - washer①
   - armature coil ②
   - o-ing New ③
   - stator assembly④



3 . Install:
   - bracket
   - bolts ①

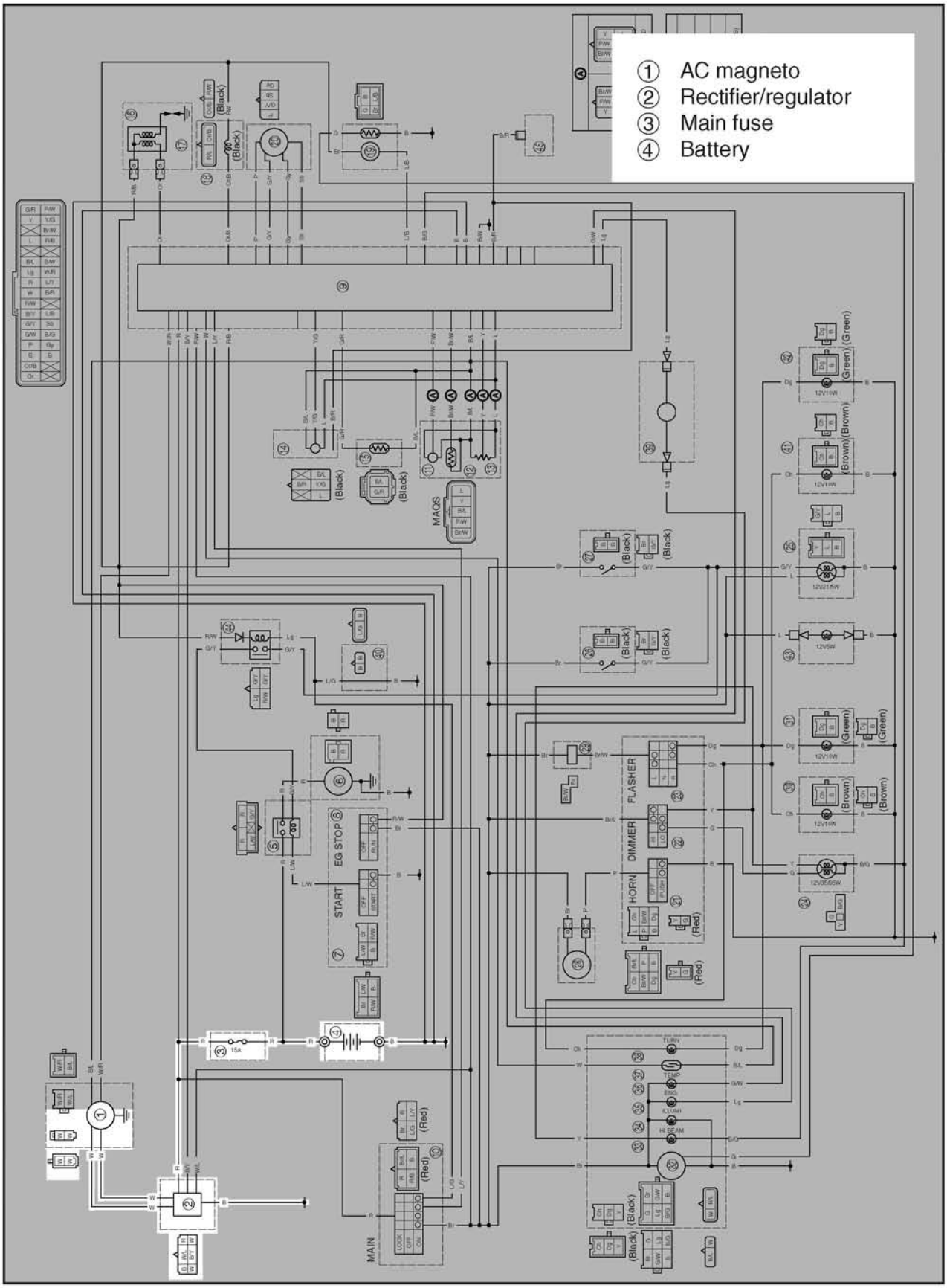
	5 Nm (0.5 m • kg, 3.6 ft • lb)

NOTE:
Align the match marks ⓐ on the starter motor yoke with the match marks ⓑ on the bracket.

EAS00773

CHARGING SYSTEM

CIRCUIT DIAGRAM



EAS00774
TROUBLESHOOTING

The battery is not being charged.

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

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

1. battery cover/front cover
2. side cover(right)
3. front fork upper cover
4. front fork cover(left and right)
5. leg shield1

- Troubleshoot with the following special tool(s).

Digital tachometer
90890-06760
Pocket tester
90890-03112
YU-03112-C

EAS00738
1. Main fuse

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

Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

- Is the battery OK?

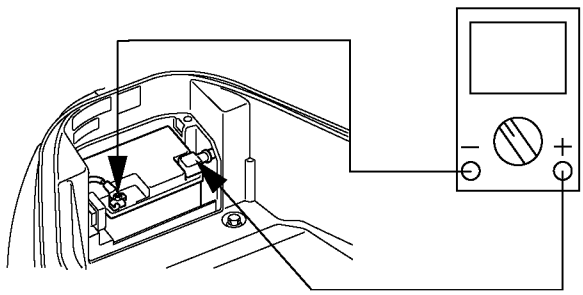
⇩ YES ➡ NO

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

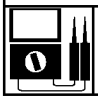
EAS00775
3. Charging voltage

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

Positive tester probe → positive battery terminal
Negative tester probe → negative battery terminal



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



Charging voltage
14 V at 5000r/min

NOTE:
Make sure the battery is fully charged.

- Is the charging voltage within specification?

NO

YES

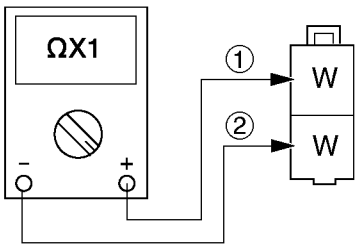
The charging circuit is OK.

EAS00776

4. Stator coil resistance

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

Positive tester probe →white ①
Negative tester probe → white ②



- Measure the stator coil resistances.

Stator coil resistance
0.28 ~ 0.42 Ω at 20°C (68°F)

- Is the stator coil OK?

YES

NO

Replace the crankshaft position sensor/ stator coil assembly.

EAS00779

5. Wiring

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

YES

NO

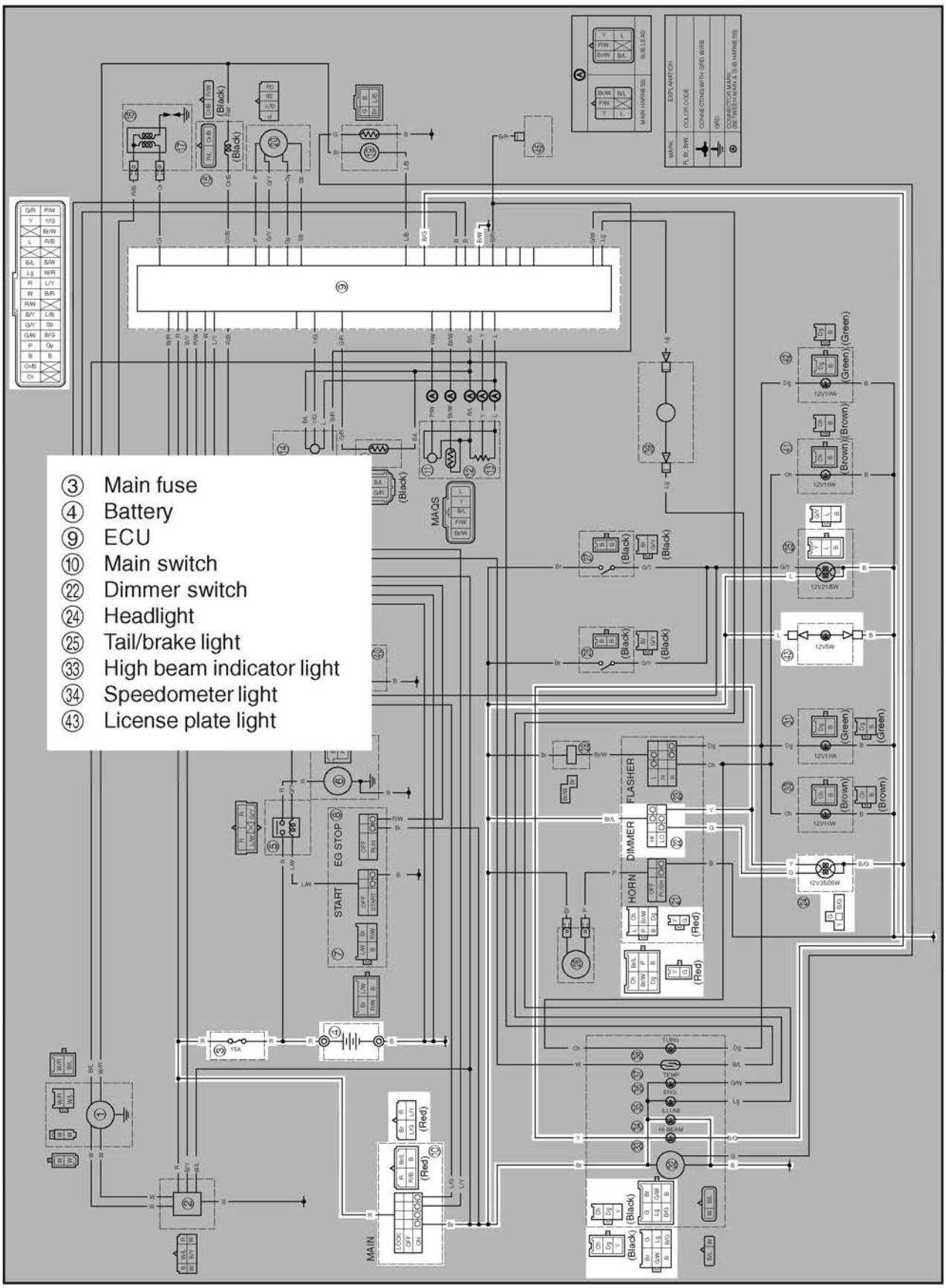
Replace the rectifier/regulator.

Properly connect or repair the charging system's wiring.

EAS00780

LIGHTING SYSTEM

CIRCUIT DIAGRAM



EAS00781
TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, license plate light or meter light.

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

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

1. battery cover/front cover
2. side cover(right)
3. front fork upper cover
4. front fork cover(left and right)
5. leg shield1

- Troubleshoot with the following special tool(s).

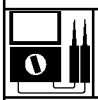
Pocket tester
90890-03112
YU-03112-C

EAS00738
1. Main fuse
- Check the fuse for continuity.
  Refer to "CHECKING THE FUSE" in chapter 3.
- Is the 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.



Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

- 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.

EAS00784
4. Dimmer switch
- Check the dimmer switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the dimmer switch OK?

YES → NO

The dimmer switch is faulty. Replace the left handlebar switch.

EAS00787

5. Wiring

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

YES

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

NO

Properly connect or repair the lighting system's wiring.

EAS00788
CHECKING THE LIGHTING SYSTEM

1. The headlight and the high beam indicator light fail to come on.

1. Headlight bulb and socket
• Check the headlight bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS" • Are the headlight bulb and socket OK?

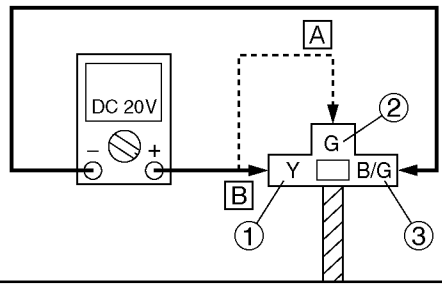
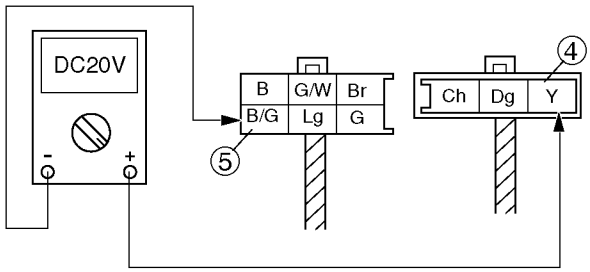
⇩ YES ⬇ NO

Replace the headlight bulb, socket or both.

2. High beam indicator light bulb and socket
• Check the high beam indicator light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS" • Are the high beam indicator light bulb and socket OK?

⇩ YES ⬇ NO

Replace the high beam indicator light bulb , socket or both.

3. Voltage
• Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.
Ⓐ When the dimmer switch is set to "≡D" Ⓑ When the dimmer switch is set to "≡D"
Headlight **Positive tester probe → yellow ① or green ②** **Negative tester probe → black/green ③**
Headlight coupler 
High beam indicator light **Positive tester probe → yellow ④** **Negative tester probe → black/green ⑤**
Meter assembly coupler 
• Set the main switch to "ON". • Start the engine. • Set the dimmer switch to "≡D" or "≡D". • Measure the voltage (DC 12 V) of yellow①(green ②) on the headlight coupler and yellow④ on the meter assembly coupler(wire harness side). • Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the headlight coupler or meter assembly coupler is faulty and must be repaired.
Refer to "CIRCUIT DIAGRAM".

EAS00789

2. The meter light fails to come on.

1. Meter light bulb and socket

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

YES

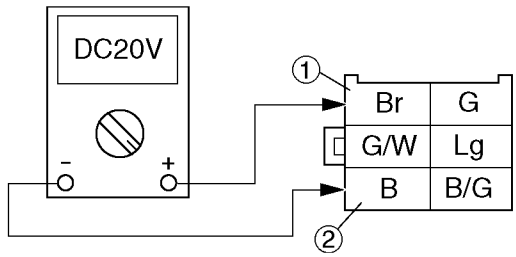
NO

Replace the meter light bulb, socket or both.

2. Voltage

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

Positive tester probe → brown ①
Negative tester probe→ black ②



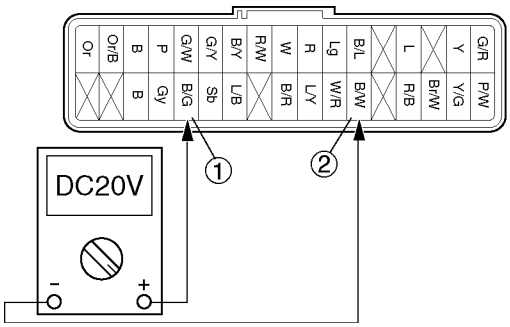
- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of brown ① on the meter light coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the meter light coupler is faulty and must be repaired.
Refer to "CIRCUIT DIAGRAM".

3. Voltage
• Connect the pocket tester (DC 20 V) to the ECU coupler (wire harness side) as shown.
Positive tester probe → black/green ① **Negative tester probe → black/white ②**

• Set the main switch to “ON”. • Measure the voltage (DC 12 V) of black/green① on the ECU coupler (wire harness side). • Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the ECU coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

EAS00790

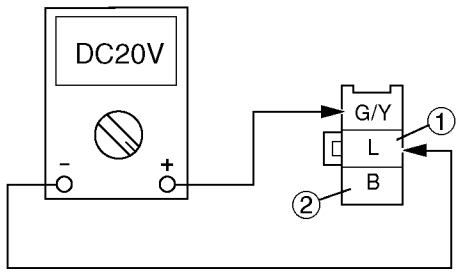
3. The tail/brake light fails to come on.

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

YES

NO

Replace the tail/brake light bulb, socket or both.

2. Voltage
• Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.
Positive tester probe → blue ① **Negative tester probe → black ②**

• Set the main switch to “ON”. • Measure the voltage (DC 12 V) of blue ① on the tail/brake light coupler (tail/brake light side). • Is the voltage within specification?

YES

This circuit is OK.

NO

wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

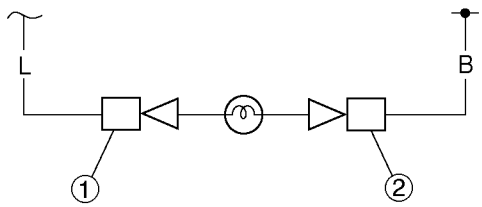
EAS00792

4. The license plate light fails to come on.

1. License plate light bulb and socket
• Check the license plate light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS” • Are the license plate light bulb and socket OK?

⇩ YES ⬇ NO

Replace the license plate light bulb, socket or both.

2. Voltage
• Connect the pocket tester (DC 20 V) to the license plate light coupler (license plate light side) as shown.
Positive tester probe → blue ① **Negative tester probe → black ②**

• Set the main switch to “ON”. • Measure the voltage (DC 12 V) of blue ① on the license plate light coupler (license plate light side). • Is the voltage within specification?

⇩ YES ⬇ NO

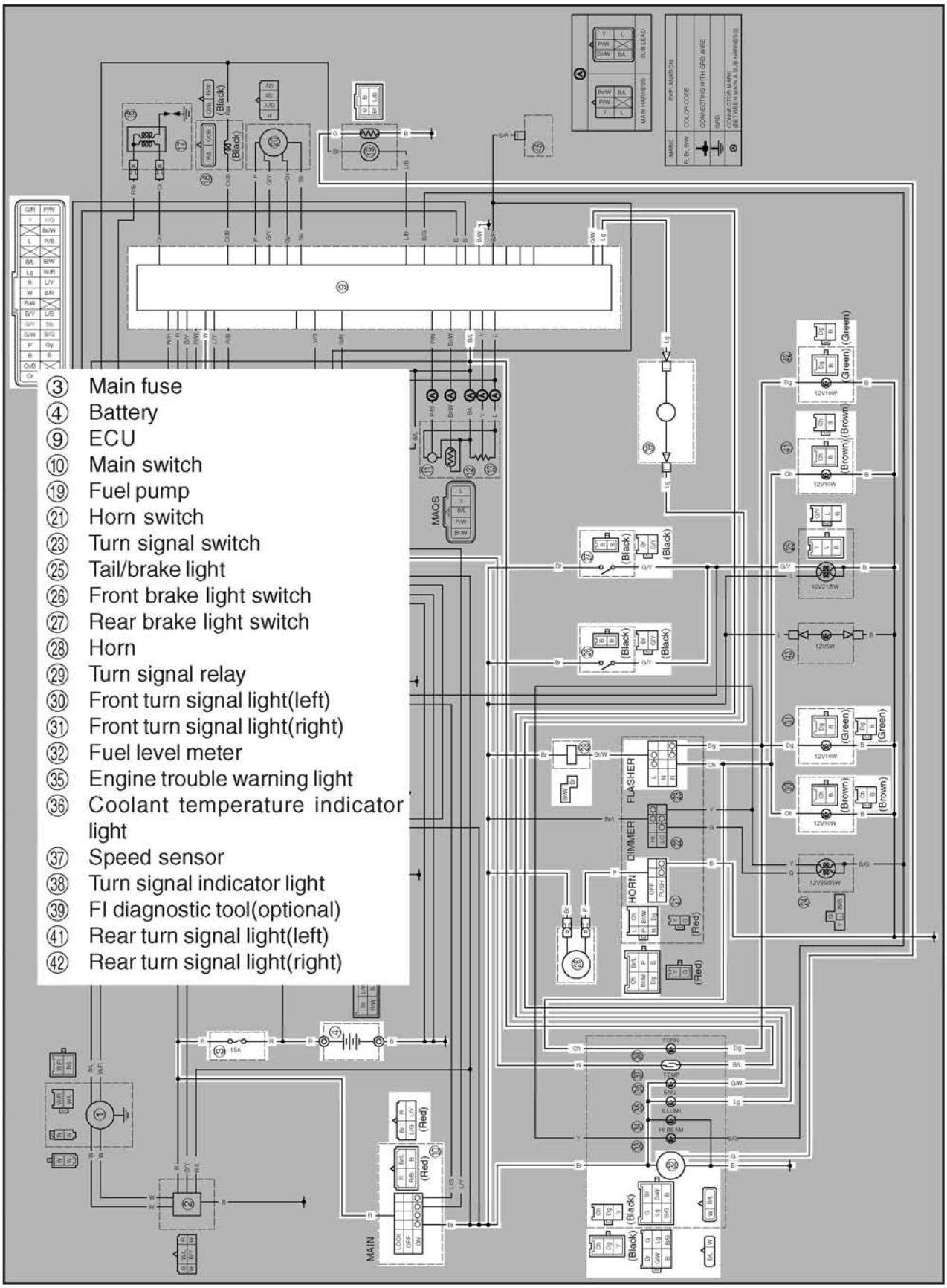
This circuit is OK.

The wiring circuit from the main switch to the license plate light coupler is faulty and must be repaired.
Refer to “CIRCUIT DIAGRAM”.

EAS00793

SIGNALING SYSTEM

CIRCUIT DIAGRAM



EAS00794
TROUBLESHOOTING

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

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

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

1. battery cover/front cover
2. side cover(left and right)
3. front fork upper cover
4. front fork cover(left and right)
5. leg shield1,2
6. footrest board

- Troubleshoot with the following special tool(s).

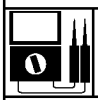
Pocket tester
90890-03112
YU-03112-C

EAS00738
1. Main fuse
- Check the main fuse for continuity.
  Refer to "CHECKING THE FUSE" in chapter 3.
- Is the 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.



Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

- Is the battery OK?

⇩ YES ➡ NO

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

EAS00749
3. Main switch
- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

⇩ YES ➡ NO

Replace the main switch.

EAS00795
4. Wiring
- Check the entire signal system's wiring.
  Refer to "CIRCUIT DIAGRAM".
- Is the signaling system's wiring properly connected and without defects?

⇩ YES ➡ NO

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

Properly connect or repair the signaling system's wiring.

EAS00796
CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

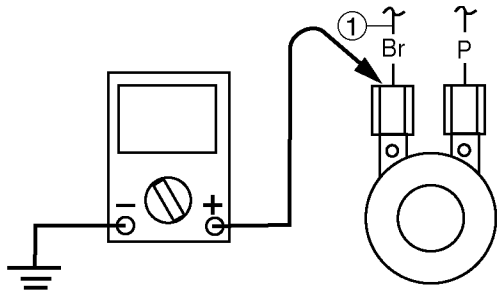
1. Horn switch
- Check the horn switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the horn switch OK?

YES

NO → Replace the left handlebar switch.

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

Positive tester probe →brown ①
Negative tester probe → ground

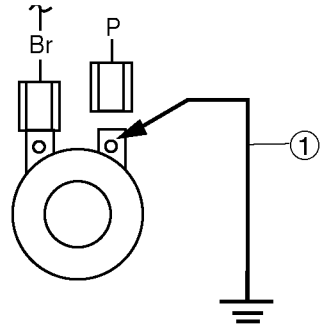


- Set the main switch to "ON".
- Push the horn switch.
- Measure the voltage (DC 12 V) of brown at the horn terminal.
- Is the voltage within specification?

YES

NO → The wiring circuit from the main switch to the horn connector is faulty and must be repaired. Refer to "CIRCUIT DIAGRAM".

3. Horn
- Disconnect the pink connector at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Push the horn switch.
- Does the horn sound?

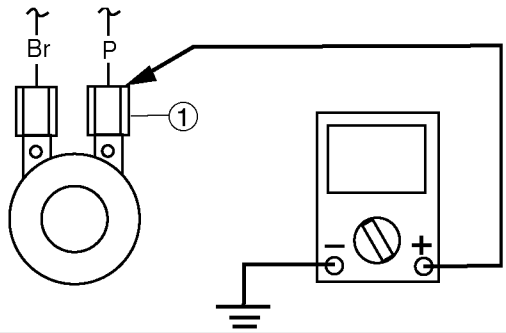


NO

YES → The horn is OK.

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

Positive tester probe → pink ①
Negative tester probe → ground



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

YES → Repair or replace the horn.

NO → Replace the horn.

EAS00798

2. The tail/brake light fails to come on.

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

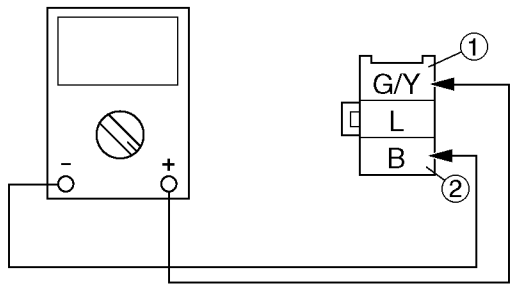
⇩ YES ⬇ NO

Replace the tail/brake light bulb, socket or both.

2. 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(es).

3. Voltage
• Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.
Positive tester probe → green/ yellow ① **Negative tester probe → black ②**

• Set the main switch to "ON". • Pull in the brake levers. • Measure the voltage (DC 12 V) of green/ yellow 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.
Refer to "CIRCUIT DIAGRAM".

EAS00799

3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light bulb and socket

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

⇩ YES ⬇ NO

Replace the turn signal indicator light bulb, socket or both.

2. 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.

3. Turn signal switch

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

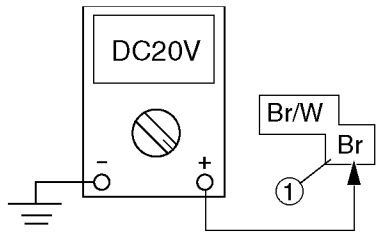
⇩ YES ⬇ NO

Replace the left handlebar switch.

4. Voltage

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

Positive tester probe → brown ①
Negative tester probe → ground



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) on brown ①at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?

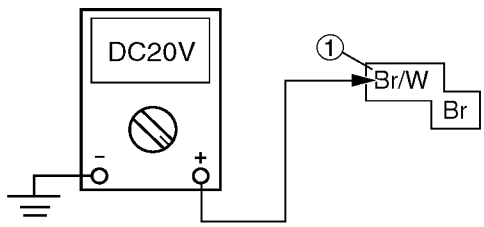
⇩ YES ⬇ NO

The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.
Refer to "CIRCUIT DIAGRAM".

5. Voltage

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

Positive tester probe→ brown/white ①
Negative tester probe → ground



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) on brown/white ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?

YES

NO

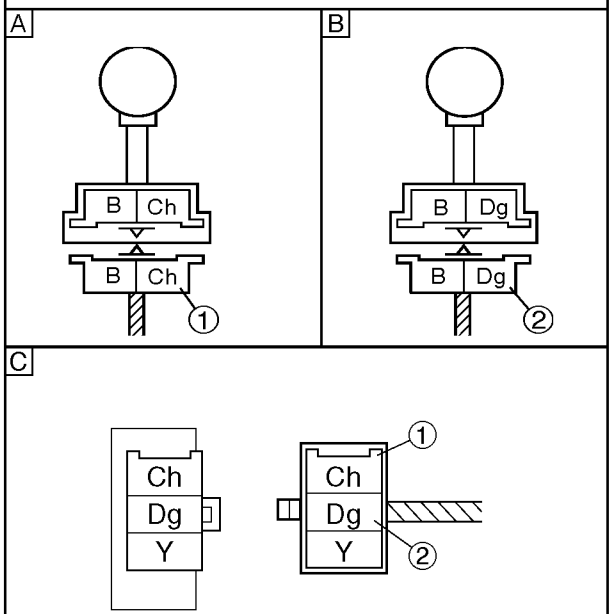
The turn signal relay is faulty and must be replaced.

6. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal light connector or meter assembly coupler (wire harness side) as shown.

A Left turn signal light(front and rear)
B Right turn signal light(front and rear)
C Turn signal indicator light

Left turn signal light
Positive tester probe → chocolate ①
Negative tester probe → ground
Right turn signal light
Positive tester probe → dark green ②
Negative tester probe → ground



- Set the main switch to "ON".
- Set the turn signal switch to "⇦" or "⇨".
- Measure the voltage (DC 12 V) of the 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.

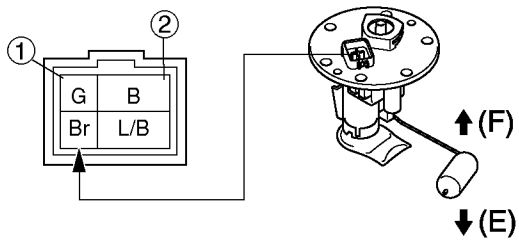
EAS00804

4. The fuel level meter fails to operate.

1. Fuel sender

- Remove the fuel pump from the fuel tank.
- Connect the pocket tester (Ω ×1) to the fuel sender coupler (wire harness side) as shown.

Positive tester probe → green ①
Negative tester probe → black ②



- Measure the fuel sender resistances.

Fuel sender resistance (up position "F")(Ω × 1)
4~10Ω at 20°C (68°F)
Fuel sender resistance (down position "E")(Ω × 10)
90~100 Ω at 20°C (68°F)

- Is the fuel sender OK?

YES

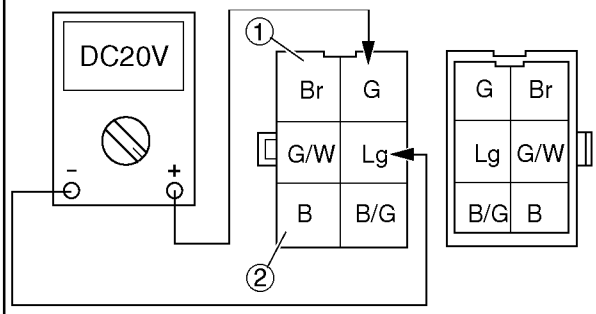
NO

Replace the fuel pump.

2. Voltage

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

Positive tester probe → brown ①
Negative tester probe → black ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of brown ① on the meter light coupler (wire harness side).
- Is the voltage within specification?

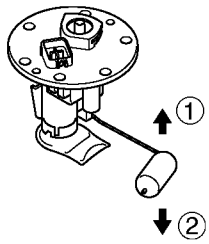
YES

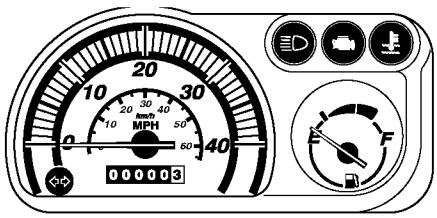
NO

Check the wiring connections of the entire signaling system.
Refer to "CIRCUIT DIAGRAM".

3. Fuel level meter

- Set the main switch to “ON”.
- Move the float up ① or down ②.





- Check that the fuel level meter needle moves to “F” or “E”.

NOTE:
Before reading the fuel level meter, leave the float in one position (either up or down) for at least three minutes.

- Does the fuel level meter needle move appropriately?

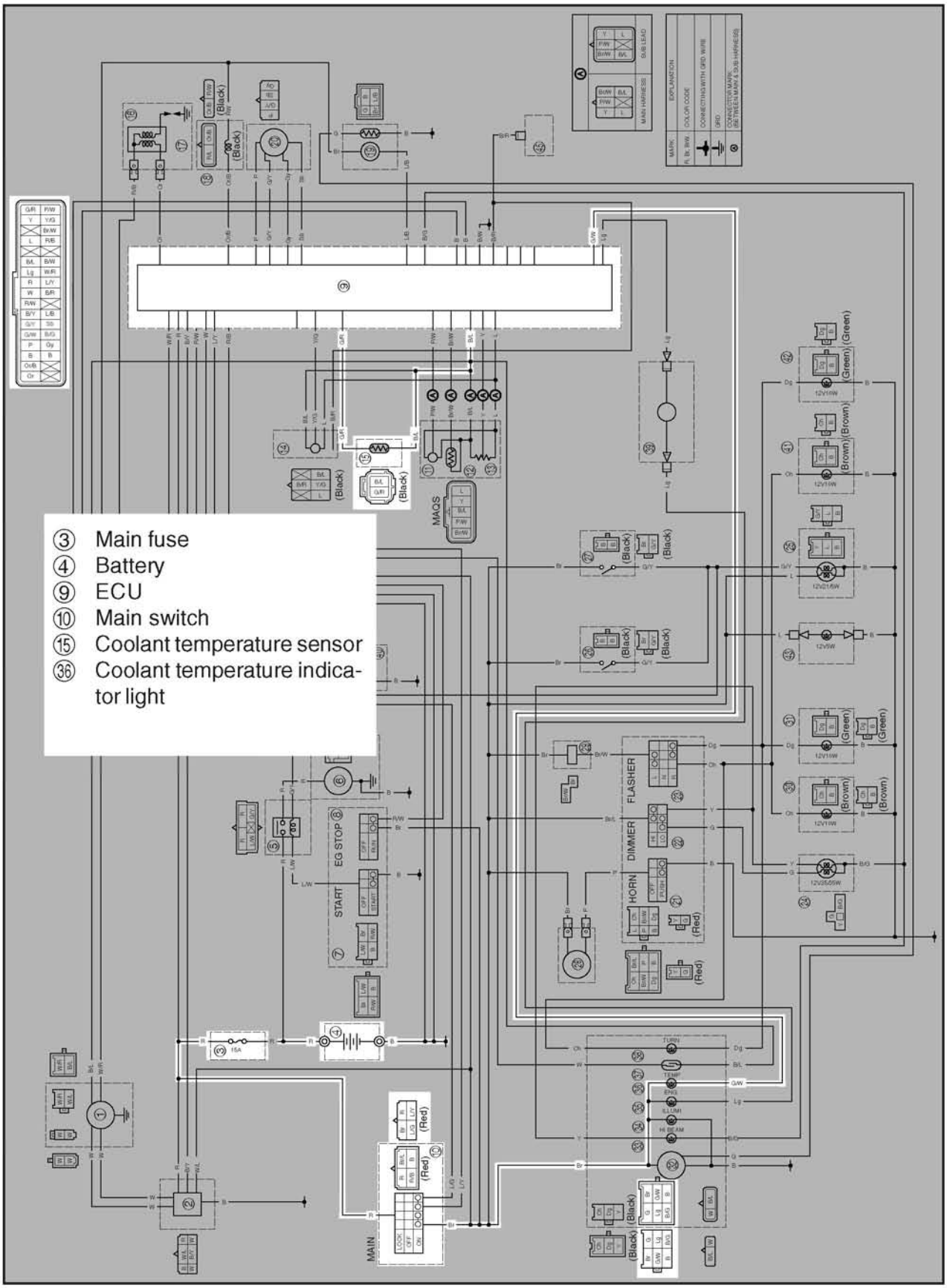
YES ⇩ This circuit is OK.

NO ⇩ Replace the speedo meter.

EAS00807

COOLING SYSTEM

CIRCUIT DIAGRAM



EAS00808
TROUBLESHOOTING

- **The coolant temperature indicator light fails to indicate.**
- **The coolant temperature indicator light fails to indicate when the engine is warm.**

Check:
1. main fuse
2. battery
3. main switch
4. coolant temperature sensor
5. wiring connections
   (the entire cooling system)

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

1. battery cover/front cover
2. side cover(right)
3. front fork upper cover
4. front fork cover(left and right)
5. leg shield1,2
6. footrest board

- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112
YU-03112-C

EAS00738
1. Main fuse
- Check the fuse for continuity.
  Refer to "CHECKING THE FUSE" in chapter 3.
- Is the 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.

Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

- 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.

EAS00812

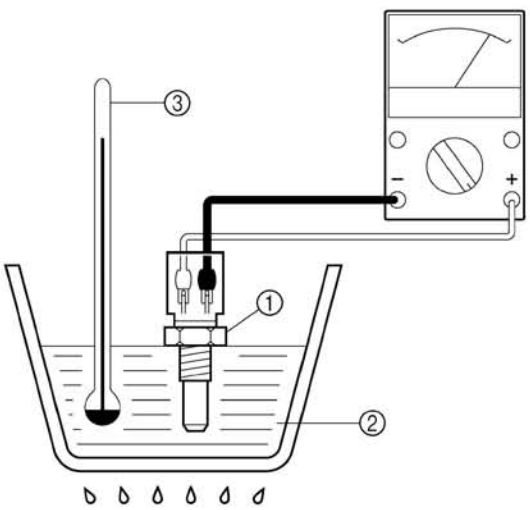
4. Coolant temperature sensor

- Remove the coolant temperature sensor from the cylinder head.
- Connect the pocket tester ($\Omega \times 1k$) to the coolant temperature sensor①as shown.
- Immerse the coolant temperature sensor in a container filled with coolant②.

NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

- Place a thermometer③ in the coolant.
- Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
- Check the thermo switch for continuity at the temperatures indicated below.



Coolant temperature sensor resistance
20°C (68°F): 2.32 ~2.59k Ω
80°C (176°F): 0.310 ~0.326k Ω

⚠WARNING

- **Handle the coolant temperature sensor with special care.**
- **Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.**

Coolant temperature sensor
22 Nm (2.2 m • kg, 15.9 ft • lb)

- Does the coolant temperature sensor operate properly?

YES ⇩

NO ⇩

Replace the coolant temperature sensor.

EAS00813

5. Wiring

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

YES ⇩

Replace the ECU.

NO ⇩

Properly connect or repair the cooling system's wiring.

CHECKING THE COOLING SYSTEM

1. The coolant temperature indicator light fails to come on.

1. Coolant temperature indicator light bulb and socket

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

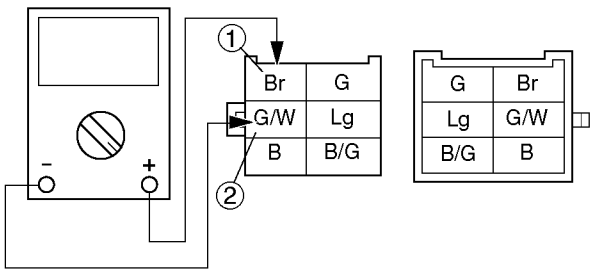
YES

NO → Replace the coolant temperature indicator light bulb, socket or both.

2. Voltage

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

Positive tester probe → brown ①
Negative tester probe→green/white②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of brown 1 on the meter light coupler (wire harness side).
- Is the voltage within specification?

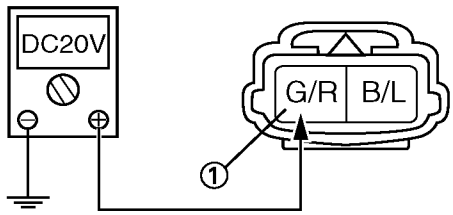
YES

NO → The wiring circuit from the main switch to the meter light coupler is faulty and must be repaired.

3. Voltage

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

Positive tester probe → green/red ①
Negative tester probe→ground



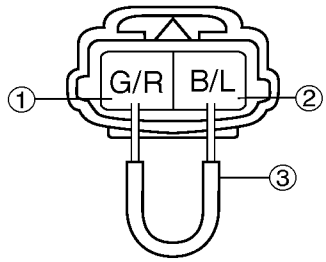
- Set the main switch to "ON".
- Measure the voltage (DC 12V) of green/red① on the coolant temperature sensor coupler (wire harness side).
- Is the voltage with in specification?

YES

NO → The wiring circuit from the main switch to the coolant temperature sensor coupler is faulty and must be repaired.
Refer to "CIRCUIT DIAGRAM".

4. Coolant temperature indicator light

- Disconnect the coolant temperature sensor coupler at the coolant temperature sensor.
- Connect the green/red① and black/blue② with a jumper lead③.
- Set the main switch to “ON”.



- Is the coolant temperature indicator light OK?

YES → This circuit is OK.

NO → Replace the coolant temperature indicator light.

CHAPTER 9
TROUBLE SHOOTING

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EAS00845

TROUBLESHOOTING

NOTE:
The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

STARTING FAILURE/HARD STARTING

ENGINE

Cylinder and cylinder head
- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

Piston and piston ring
- Improperly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter
- Improperly installed air filter
- Clogged air filter element

Crankcase and crankshaft
- Improperly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank
- Empty fuel tank
- Clogged fuel tank cap breather hole
- Deteriorated or contaminated fuel
- Clogged or damaged fuel hose

Fuel pump
- Faulty fuel pump
- Improperly routed hose

Throttle body
- Deteriorated or contaminated fuel
- Sucked-in air

ELECTRICAL SYSTEMS

Battery
- Discharged battery
- Faulty battery

Fuse
- Blown, damaged or incorrect fuse
- Improperly installed fuse

Spark plug
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil
- Cracked or broken ignition coil body
- Broken or shorted primary or secondary coil
- Faulty spark plug lead

Ignition system
- Faulty ECU
- Faulty crankshaft position sensor
- Broken AC magneto rotor woodruff key

Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty front, rear or both brake light switches
- Faulty start switch
- Faulty sidestand switch(optional)
- Improperly grounded circuit
- Loose connections

Starting system
- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cut-off relay
- Faulty starter clutch

EAS00847
INCORRECT ENGINE IDLING SPEED

ENGINE
Cylinder and cylinder head
- Incorrect valve clearance
- Damaged valve train components

Air filter
- Clogged air filter element

FUEL SYSTEM
Throttle body
- Damaged or loose throttle body joint
- Improperly ISC(idle speed control) valve
- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

ELECTRICAL SYSTEMS
Battery
- Discharged battery
- Faulty battery

Spark plug
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil
- Faulty spark plug lead

Ignition system
- Faulty ECU
- Faulty crankshaft position sensor

EAS00848

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURE/HARD STARTING".

ENGINE

Air filter

- Clogged air filter element

FUEL SYSTEM

Throttle body

- Faulty diaphragm

Fuel pump

- Faulty fuel pump

EAS00853

FAULTY CLUTCH

ENGINE OPERATES BUT SCOOTER WILL NOT MOVE

V-belt

- Bent, damaged or worn V-belt
- Slipping V-belt

Primary pulley cam and primary pulley slider

- Damaged or worn primary pulley cam
- Damaged or worn primary pulley slider

Clutch spring(s)

- Damaged clutch spring

Transmission gears

- Damaged transmission gear

CLUTCH SLIPS

Clutch shoe springs

- Damaged, loose or worn clutch shoe spring

Clutch shoes

- Damaged or worn clutch shoe

Primary sliding sheave

- Seized primary sliding sheave

POOR STARTING PERFORMANCE

V-belt

- V-belt slips
- Oil or grease on the V-belt

Primary sliding sheave

- Faulty operation
- Worn pin groove
- Worn pin

Clutch shoes

- Bent, damaged or worn clutch shoe

POOR SPEED PERFORMANCE

V-belt
- Worn V-belt
- Oil or grease on the V-belt

Primary pulley weight(s)
- Faulty operation
- Worn primary pulley weight

Primary fixed sheave
- Worn primary fixed sheave

Primary sliding sheave
- Worn primary sliding sheave

Secondary fixed sheave
- Worn secondary fixed sheave

Secondary sliding sheave
- Worn secondary sliding sheave

EAS00855
OVERHEATING

ENGINE

Clogged coolant passages
- Heavy carbon buildup

Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

COOLING SYSTEM

Coolant
- Low coolant level

Radiator
- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fan

Water pump
- Damaged or faulty water pump

Thermostat
- Thermostat stays closed

Oil cooler
- Clogged or damaged oil cooler

Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose
- Damaged pipe
- Improperly connected pipe

FUEL SYSTEM

Throttle body
- Damaged or loose throttle body joint

Air filter
- Clogged air filter element

CHASSIS

Brake(s)
- Dragging brake

ELECTRICAL SYSTEMS

Spark plug
- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system
- Faulty coolant temperature sensor
- Faulty ECU

EAS00856
OVERCOOLING

COOLING SYSTEM

Thermostat
- Thermostat stays open

EAS00859

POOR BRAKING PERFORMANCE

Drum brake

- Worn brake shoe
- Worn or rusty brake drum
- Incorrect brake lever position
- Incorrect brake lever free play
- Incorrect brake camshaft lever position
- Incorrect brake shoe position
- Damaged or fatigued brake shoe spring
- Oil or grease on the brake shoe
- Oil or grease on the brake drum

EAS00861

FAULTY FRONT FORK LEGS

LEAKING OIL

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

MALFUNCTION

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS00862

UNSTABLE HANDLING

Handlebar

- Bent or improperly installed handlebar

Steering head components

- Improperly installed handlebar bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Front fork leg(s)

- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Rear shock absorber assembly

- Faulty rear shock absorber spring
- Leaking oil

Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS00866

FAULTY LIGHTING OR SIGNALING SYSTEM

HEADLIGHT DOES NOT COME ON
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT COME ON
- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

TAIL/BRAKE LIGHT BULB BURNT OUT
- Wrong tail/brake light bulb
- Faulty battery
- Tail/brake light bulb life expired

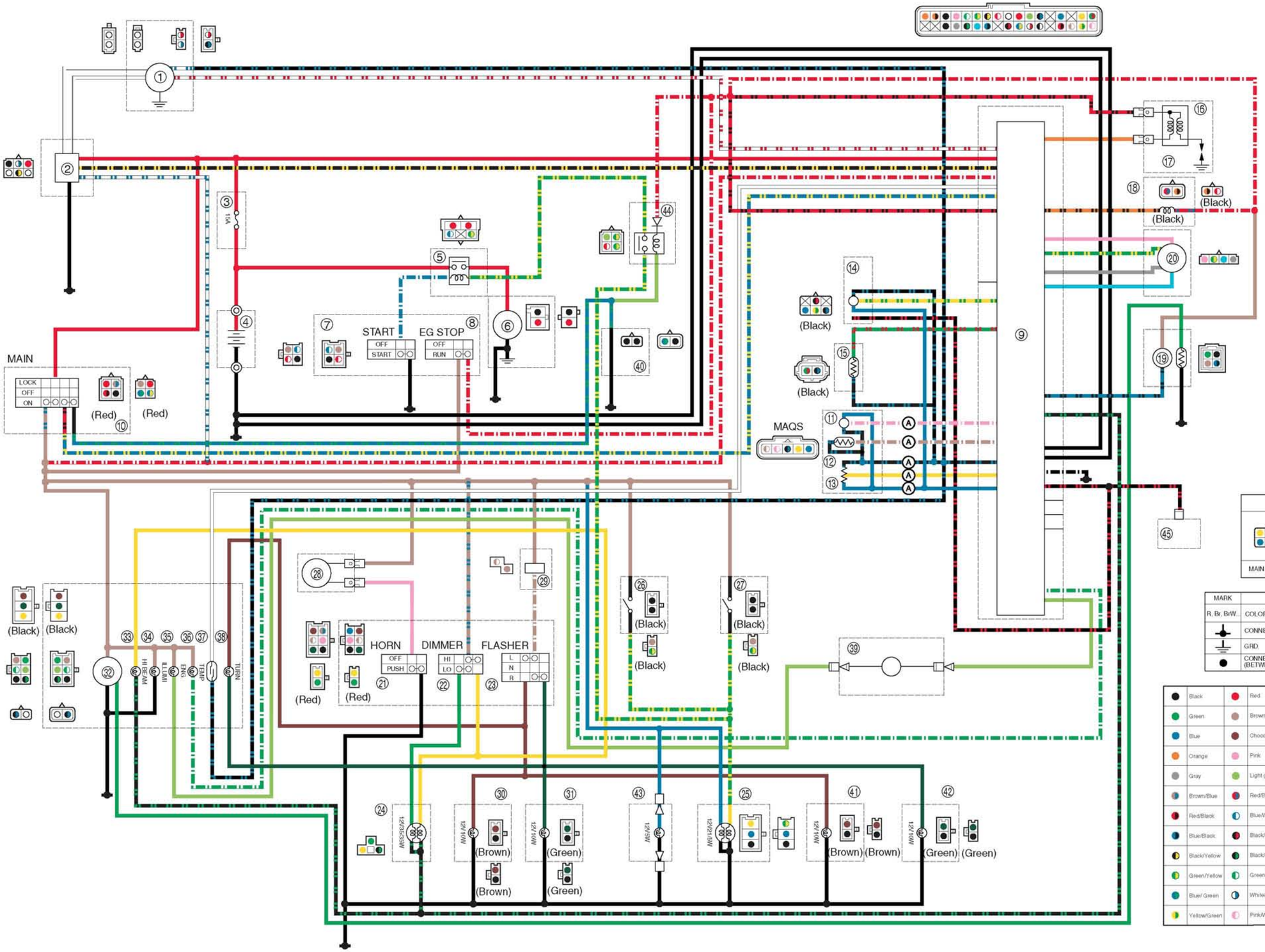
TURN SIGNAL DOES NOT COME ON
- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

TURN SIGNAL BLINKS SLOWLY
- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb
- Faulty battery

TURN SIGNAL REMAINS LIT
- Faulty turn signal relay
- Burnt-out turn signal bulb

TURN SIGNAL BLINKS QUICKLY
- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND
- Improperly adjusted horn
- Damaged or faulty horne=
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

YAMAHA MOTOR TAIWAN CO., LTD

XF50W WIRING DIAGRAM