YAMAHA

XP500(N) 2001

5GJ1-AE1

SERVICE MANUAL

EAS00000

XP500 (N)
SERVICE MANUAL

First edition, September 2000

EAS00002

NOTICE

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

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

NOTE:

Designs and specifications are subject to change without notice.

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IMPORTANT INFORMATION

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

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

⚠ WARNING Failure to follow WARNING instructions could result in severe injury or death to the 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” on the following page.

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

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

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

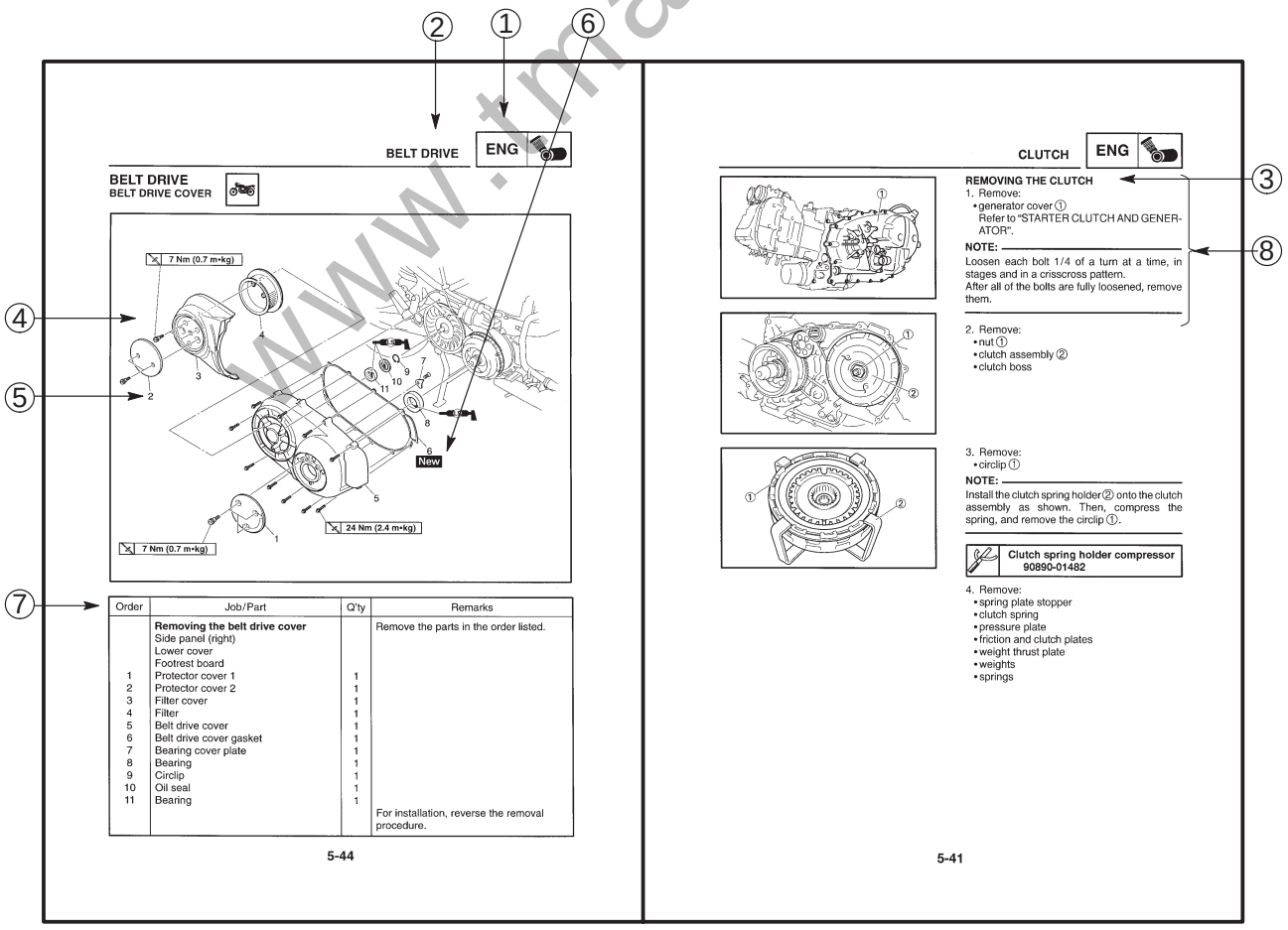
④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

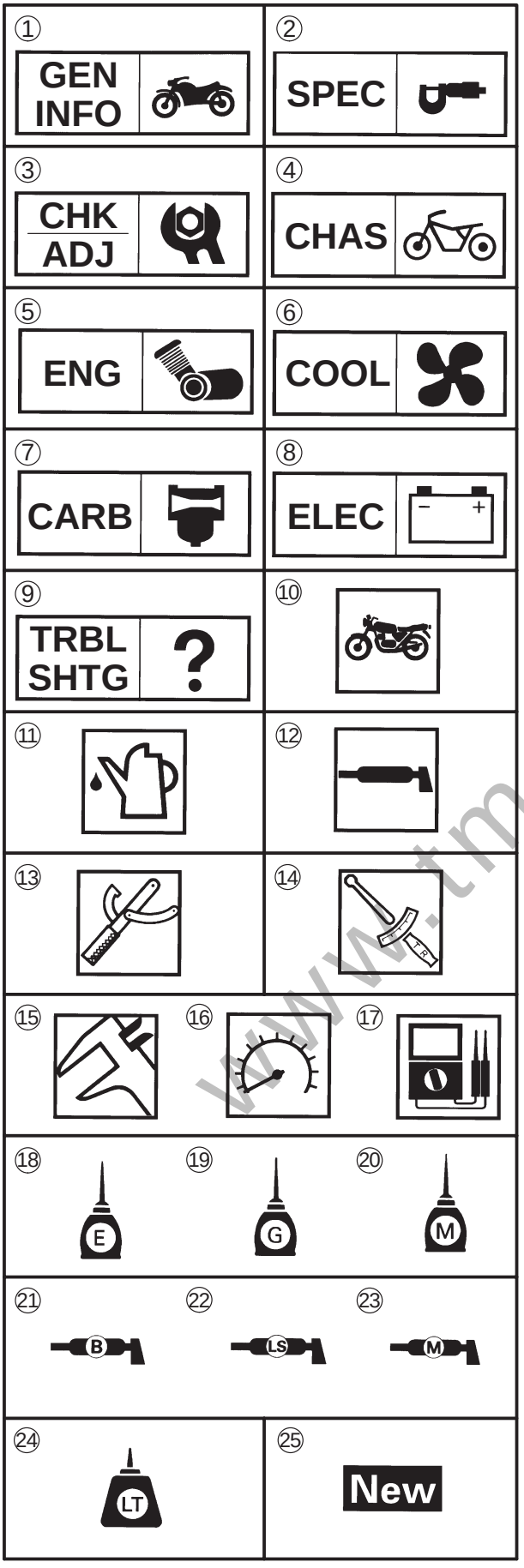
⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

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

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

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





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SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

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

Symbols ⑩ to ⑰ indicate the following.

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

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

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

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

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

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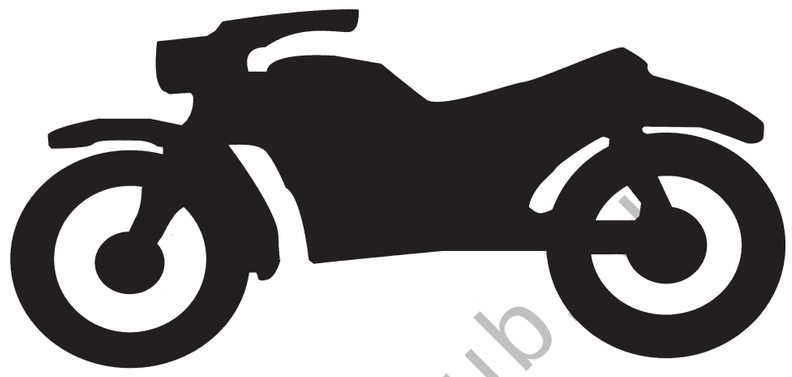
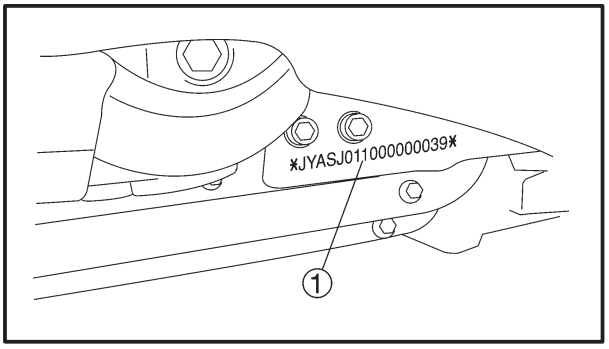


GEN INFO

1

CHAPTER 1
GENERAL INFORMATION



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GENERAL INFORMATION

SCOOTER IDENTIFICATION

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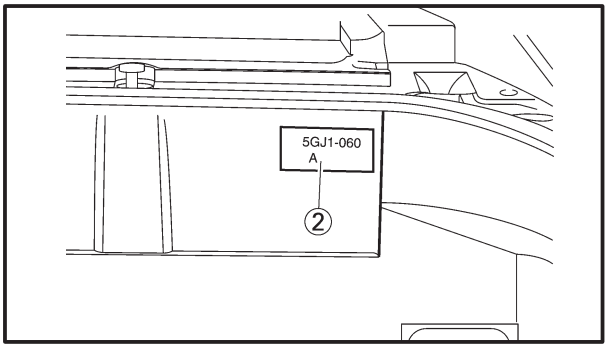
VEHICLE IDENTIFICATION NUMBER

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



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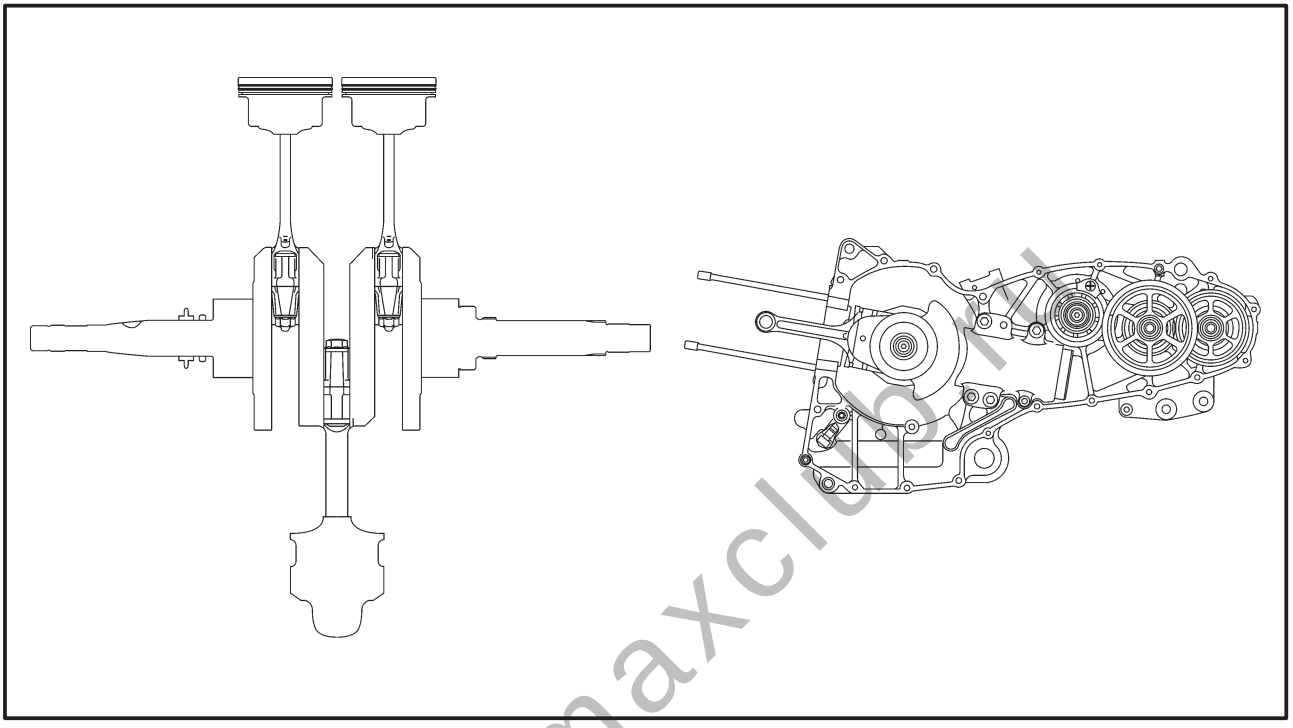
MODEL CODE

The model code label ② is affixed to the luggage Box. This information will be needed to order spare parts.

FEATURES

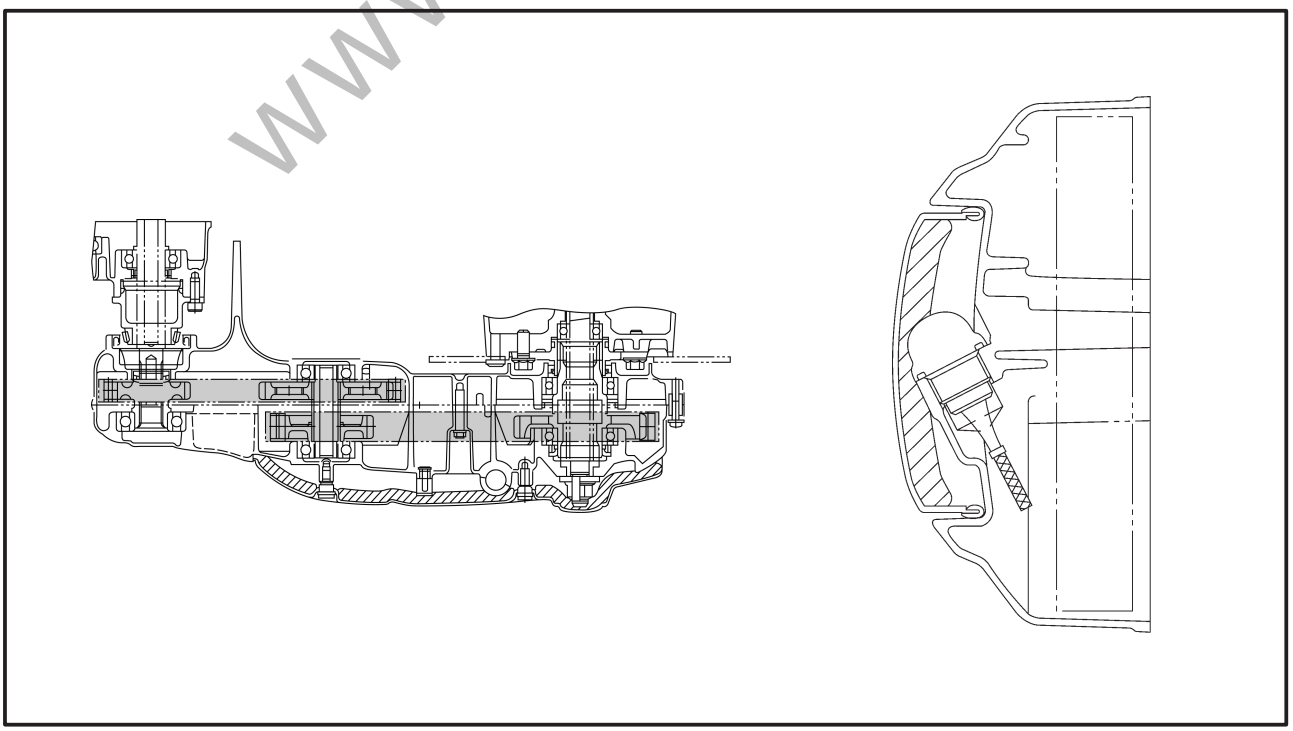
CRANKSHAFT AND BALANCER SHAFT

An integrated crankshaft of a new design is used Horizontally opposed reciprocating balancers are used. Layout free from primary inertial force, secondary inertial force, and a couple of force, and significant vibration reduction are implemented.



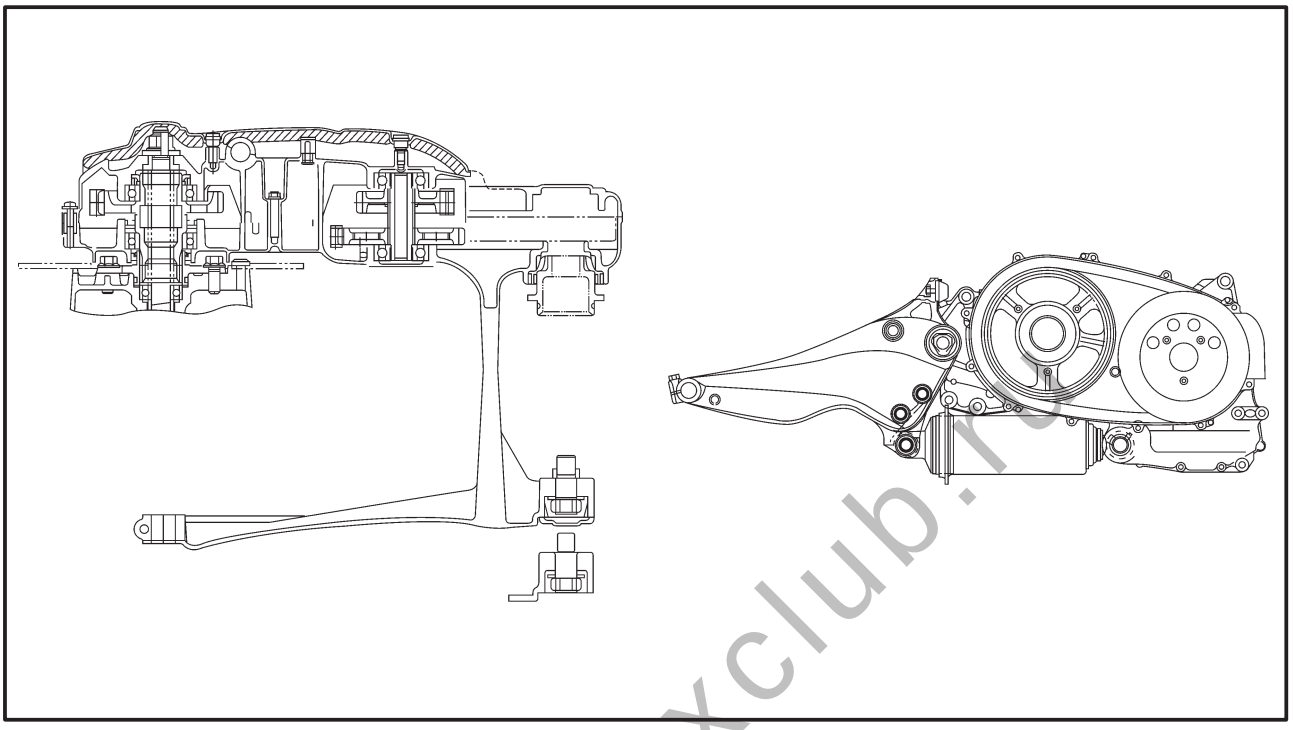
CHAIN DRIVE

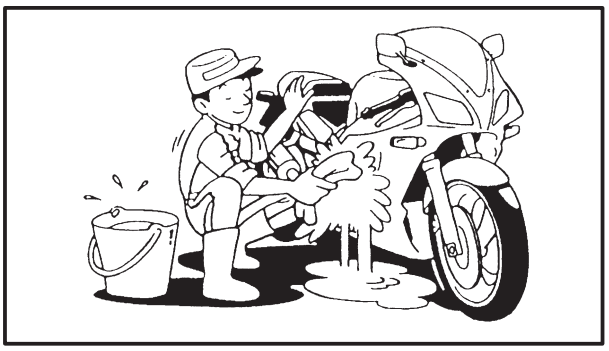
The chain drive is newly designed. A non adjustable z-stage silent chain is used. A backlash free pivot coaxial drive is used. The drive and the swingarm at the right are integrated to create rigidity. The rear wheel swing system ensures high speed stability.



SWINGARM AND REAR SUSPENSION

A newly designed swingarm is used. A pull-type monocross suspension is used. These components are located out under the engine.





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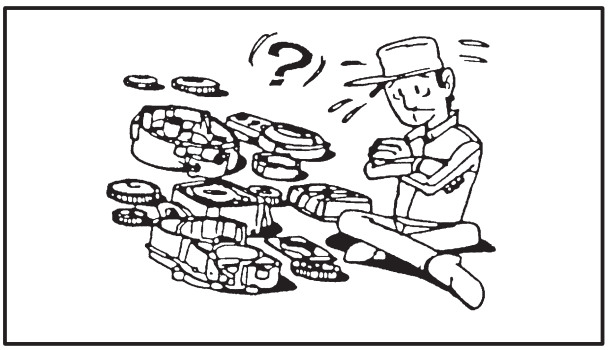
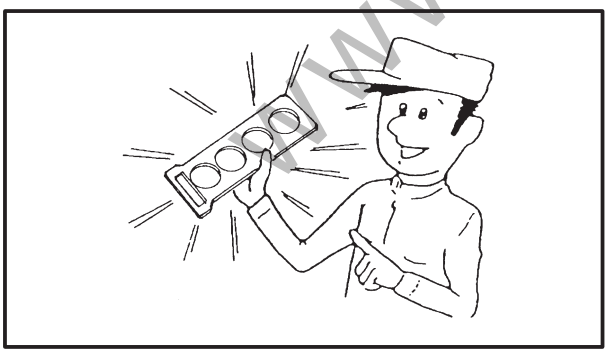
IMPORTANT INFORMATION

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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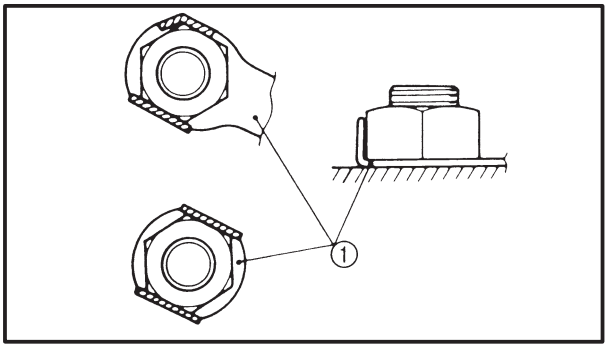
REPLACEMENT PARTS

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

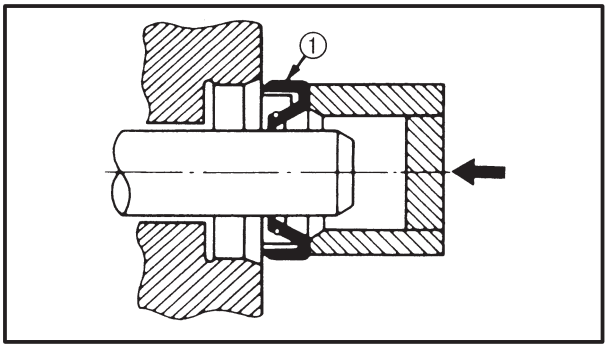
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with greace.



EAS00023

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 washer tabs and the cotter pin ends along a flat of the bolt or nut.



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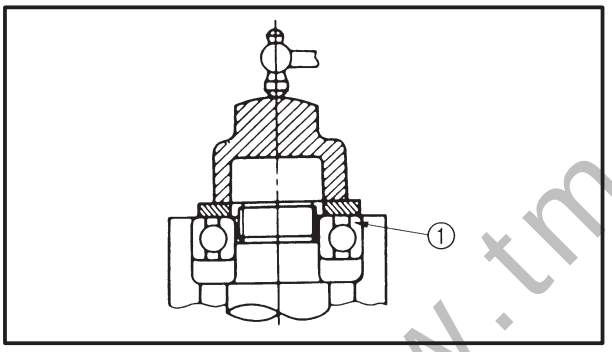
BEARINGS AND OIL SEALS

1. 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 base grease. Oil bearings liberally when installing, if appropriate.

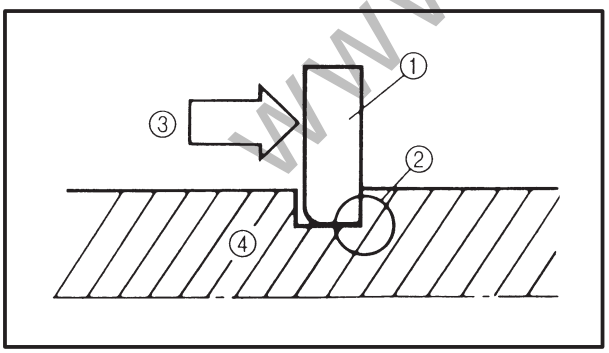
① Oil seal



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

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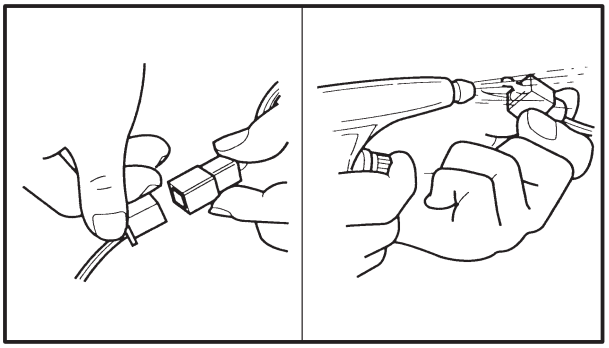
CHECKING THE CONNECTIONS

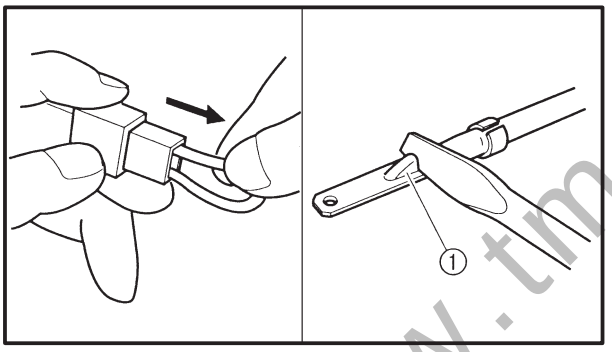
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - lead
   - coupler
   - connector



2. Check:
   - lead
   - coupler
   - connector

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

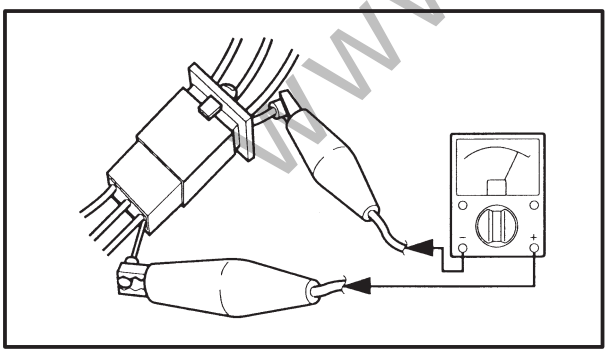


3. Check:
   - all connections

   Loose connection → Connect properly.

NOTE:

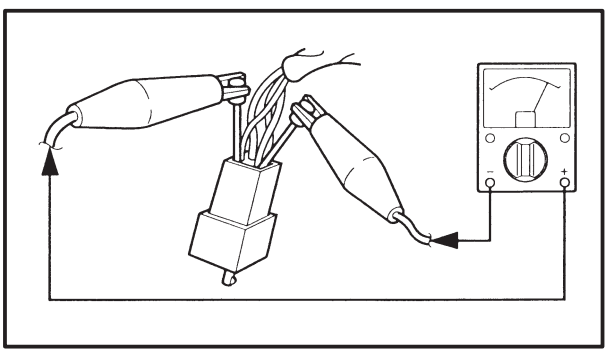
If the pin ① on the terminal is flattened, bend it up.



4. Connect:
   - lead
   - coupler
   - connector

NOTE:

Make sure all connections are tight.



5. Check:
   - continuity

   (with the pocket tester)

	Pocket tester **90890-03112**

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.

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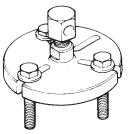
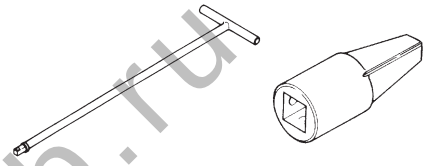
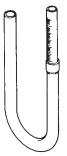
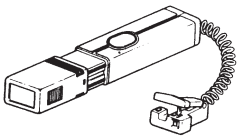
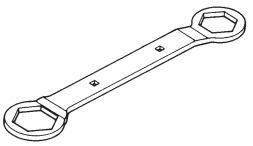
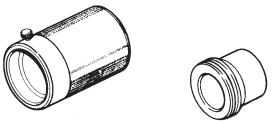
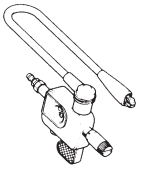
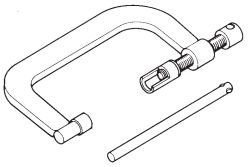
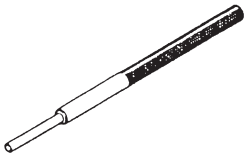
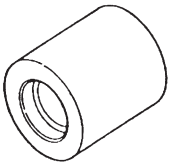
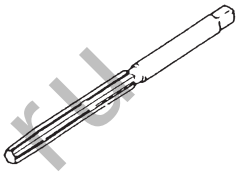
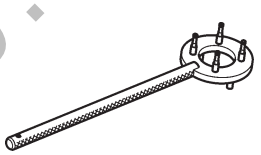
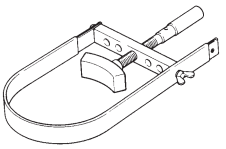
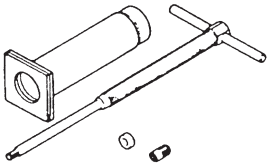
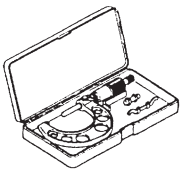
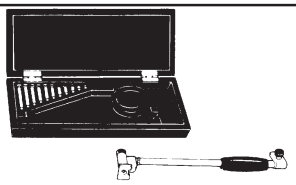
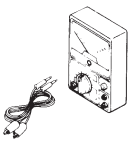
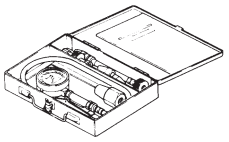
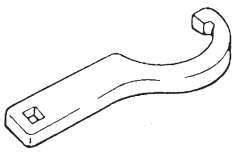
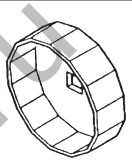
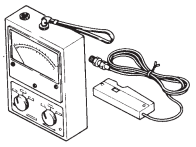
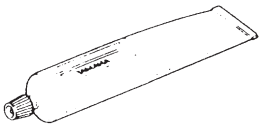
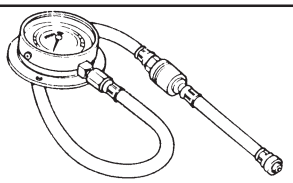
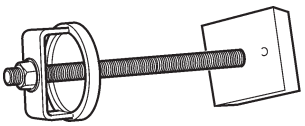
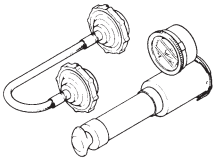
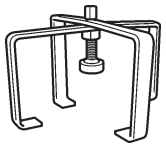
SPECIAL TOOLS

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

Tool No.	Tool name/Function	Illustration
90890-01362	Flywheel puller This tool is used to remove the generator rotor.	
T-handle 90890-01326 Damper rod holder 90890-01294	T-handle Damper rod holder These tools are used to hold the cartridge cylinder when loosening or tightening the cartridge cylinder bolt.	
90890-01312	Fuel level gauge This tool is used to measure the fuel level in the float chamber.	
90890-03141	Timing light This tool is used to check the ignition timing.	
90890-03148	Locknut wrench This tool is used to remove the sheave or install the secondary sheave nut.	
Fork seal driver weight 90890-01367 Adapter 90890-01372	Fork seal driver weight Adapter These tools are used to install the front fork's oil seal and dust seal.	
90890-06754	Ignition checker This tool is used to check the ignition system components.	
90890-04019	Valve spring compressor This tool is used to remove or install the valve assemblies.	

Tool No.	Tool name/Function	Illustration
90890-04111	Valve guide remover (4 mm) This tool is used to remove or install the valve guides.	
90890-04112	Valve guide installer This tool is used to install the valve guides.	
90890-04113	Valve guide reamer This tool is used to rebore the new valve guides.	
90890-01481	Primary/secondary sheave holder This tool is used to hold the sheave assembly when removing or installing the primary and secondary sheave.	
90890-01701	Sheave holder This tool is used for hold the generator rotor when removing or installing the generator rotor bolt, generator shaft bolt or pickup coil rotor bolt.	
90890-01304	Piston pin puller set This tool is used to remove the piston pins.	
90890-03008	Micrometer (50~75 mm) This tool is used to measure the piston skirt diameter.	
90890-03017	Cylinder bore gauge (50~100 mm) This tool is used to measure the cylinder bore.	
90890-03112	Pocket tester This tool is used to check the electrical system.	

Tool No.	Tool name/Function	Illustration
Compression gauge 90890-03081 Compression gauge adapter 90890-04082	Compression gauge These tools are used to measure engine compression.	
90890-01403	Steering nut wrench This tool is used to loosen or tighten the steering stem ring nuts.	
90890-01469	Oil filter wrench This tool is needed to loosen or tighten the oil filter cartridge.	
90890-03113	Engine tachometer This tool is used to check engine speed.	
90890-85505	Yamaha bond No. 1215 This sealant is used to seal two mating surfaces (e.g., crankcase mating surfaces).	
Oil pressure gauge 90890-03153 Adapter 90890-03124	Oil pressure gauge This tool is used to measure the engine oil pressure.	
90890-01439	Plane bearing installer/remover This tool is used to install or remove the bearing.	
Sheave spring compressor 90890-04134 Sheave fixed block 90890-04135	Sheave spring compressor Sheave fixed block This tool is used to remove spring.	
90890-01325	Radiator cap tester This tool is used to check the cooling system.	

Tool No.	Tool name/Function	Illustration
90890-01482	Clutch spring compressor This tool is used to remove or install the nut.	

SPEC 2

CHAPTER 2
SPECIFICATIONS

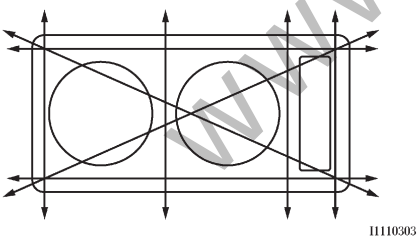
SPECIFICATIONS

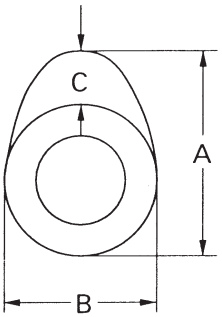
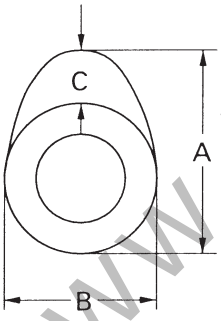
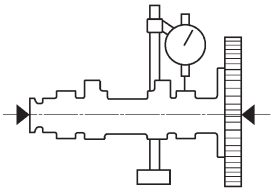
GENERAL SPECIFICATIONS

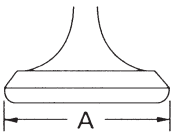
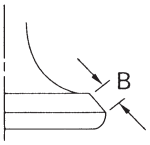
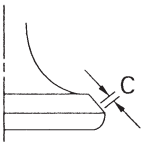
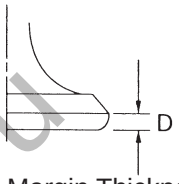
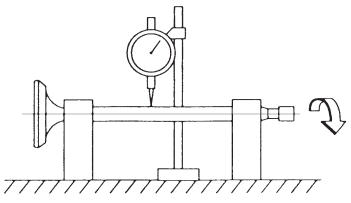
Item	Standard	Limit
Model code	XP500 (N) : 5GJ1 (EUR) 5GJ2 (GBR) 5GJ3 (OCE)	•••
Dimensions		
Overall length	2235 mm	•••
Overall width	775 mm	•••
Overall height	1410 mm	•••
Seat height	795 mm	•••
Wheelbase	1575 mm	•••
Minimum ground clearance	130 mm	•••
Minimum turning radius	2800 mm	•••
Weight		
Wet (with oil and a full fuel tank)	205 kg	•••
Dry (without oil and fuel)	197 kg	•••
Maximum load (total of cargo, rider, passenger, and accessories)	183 kg	•••

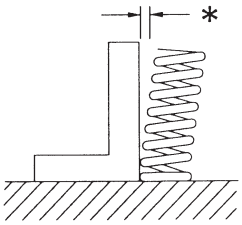
ENGINE SPECIFICATIONS

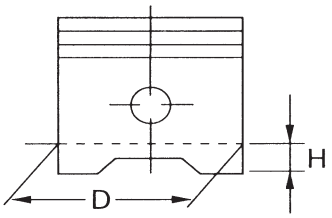
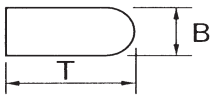
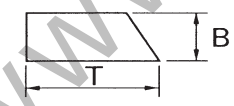
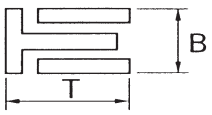
Item	Standard	Limit
Engine		
Engine tipe	Liquid-cooled, 4-stroke, DOHC	•••
Displacement	499 cm^3	•••
Cylinder arrangement		•••
Bore × stroke	66 × 73 mm	•••
Compression ratio	10.1	•••
Engine idling speed	1150 ~ 1250 r/min	•••
Vacuum pressure at engine idling speed	35 kPa (3.5 kg/cm^2)	•••
Standard compression pressure (at sea level)	1450 kPa (14.5 kg/cm^2) at 360 r/min	•••
Fuel		
Recommended fuel	Regular unleaded gasoline	•••
Fuel tank capacity		
Total (including reserve)	14L	•••
Engine oil		
Lubrication system	Dry sump	•••
Recommended oil	SAE10W30 or SAE10W40 API service SE, SF, SG type or higher	•••
Quantity		
Total amount	3.6 L	•••
Without oil filter cartridge replacement	2.8 L	•••
With oil filter cartridge replacement	2.9 L	•••
Oil pressure (hot)	150 kPa at 1200 r/min (1.50 kgf/cm^2 at 1200 r/min)	•••
Relief valve opening pressure	450 ~ 550 kPa (4.5 ~ 5.5 kgf/cm^2)	•••

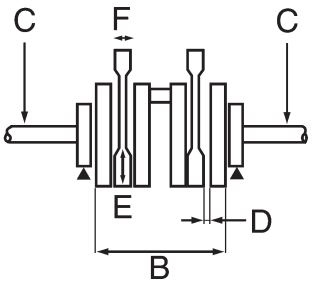
Item	Standard	Limit
Oil filter		
Oil filter type	Cartridge (paper)	•••
Bypass valve opening pressure	80 ~ 120 kPa (0.8 ~ 1.2 kgf/cm^2)	•••
Oil pump		
Oil pump type	Trochoidal	•••
Inner-rotor-to-outer-rotor-tip clearance	0.04 ~ 0.12 mm	0.20 mm
Outer-rotor-to-oil-pump-housing clearance	0.045 ~ 0.085 mm	0.15 mm
Cooling system		
Radiator capacity	1.5 L	
Radiator cap opening pressure	107.9 ~ 137.3 kPa (1.079 ~ 1.373 kgf/cm^2)	•••
Radiator core		
Width	330 mm	•••
Height	138 mm	•••
Depth	24 mm	•••
Coolant reservoir		
Capacity	0.6 L	•••
Water pump		
Water pump type	Single-suction centrifugal pump	•••
Reduction ratio	23/19 (1.210)	•••
Starting system type	Electric starter	
Spark plugs		
Model (manufacturer) × quantity	CR 7E/NGK × 2	•••
Spark plug gap	0.7 ~ 0.8 mm	•••
Cylinder head		
Max. warpage	•••	0.10 mm
 1I110303		

Item	Standard	Limit
Camshafts		
Drive system	Chain drive (left)	•••
Camshaft cap inside diameter	23.000 ~ 23.021 mm	•••
Camshaft journal diameter	22.967 ~ 22.980 mm	•••
Camshaft-journal-to-camshaftcap clearance	0.020 ~ 0.054 mm	0.08 mm
Intake camshaft lobe dimensions		
		
Measurement A	33.252 ~ 33.352 mm	33.152 mm
Measurement B	24.956 ~ 25.056 mm	24.856 mm
Measurement C	8.196 ~ 8.396 mm	•••
Exhaust camshaft lobe dimensions		
		
Measurement A	33.252 ~ 33.352 mm	33.152 mm
Measurement B	24.956 ~ 25.056 mm	24.856 mm
Measurement C	8.196 ~ 8.396 mm	•••
Max. camshaft runout	•••	0.03 mm
		

Item	Standard	Limit
Timing chain		
Model/number of links	SCR-0409SDH/132	•••
Tensioning system	Automatic	•••
Valves, valve seats, valve guides		
Valve clearance (cold)		
Intake	0.15 ~ 0.20 mm	•••
Exhaust	0.25 ~ 0.30 mm	•••
Valve dimensions		
 Head Diameter  Face Width  Seat Width  Margin Thickness		
Valve head diameter A		
Intake	24.9 ~ 25.1 mm	•••
Exhaust	21.9 ~ 22.1 mm	•••
Valve face width B		
Intake	1.14 ~ 1.98 mm	•••
Exhaust	1.14 ~ 1.98 mm	•••
Valve seat width C		
Intake	0.9 ~ 1.1 mm	1.6 mm
Exhaust	0.9 ~ 1.1 mm	1.6 mm
Valve margin thickness D		
Intake	0.6 ~ 0.8 mm	0.5 mm
Exhaust	0.6 ~ 0.8 mm	0.5 mm
Valve stem diameter		
Intake	3.975 ~ 3.990 mm	3.95 mm
Exhaust	3.960 ~ 3.975 mm	3.935 mm
Valve guide inside diameter		
Intake	4.000 ~ 4.012 mm	4.05 mm
Exhaust	4.000 ~ 4.012 mm	4.05 mm
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm	0.08 mm
Exhaust	0.025 ~ 0.052 mm	0.1 mm
Valve stem runout	•••	0.04 mm
		
Valve seat width		
Intake	0.9 ~ 1.1 mm	1.6 mm
Exhaust	0.9 ~ 1.1 mm	1.6 mm

Item	Standard	Limit
Valve springs		
Free length		
Intake	35.59 mm	33.81 mm
Exhaust	35.59 mm	33.81 mm
Installed length (valve closed)		
Intake	30.39 mm	•••
Exhaust	30.39 mm	•••
Compressed spring force (installed)		
Intake	91.1 ~ 104.9 N (9.3 ~ 10.7 kgf) at 30.4 mm	•••
Exhaust	91.1 ~ 104.9 N (9.3 ~ 10.7 kgf) at 30.4 mm	•••
Spring tilt 		
Intake (inner)	•••	2.5°/1.6 mm
Exhaust	•••	2.5°/1.6 mm
Winding direction (top view)	Clockwise	•••
Intake	Clockwise	•••
Exhaust		
Cylinders		
Cylinder arrangement	Forward-included parallel-2 cylinder	•••
Bore × stroke	66.0 × 73.0 mm	•••
Compression ratio	10.1	•••
Bore	66.00 ~ 66.01 mm	•••
Max. taper	•••	0.05 mm
Max. out-of-round	•••	0.05 mm

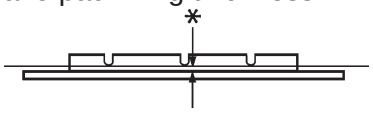
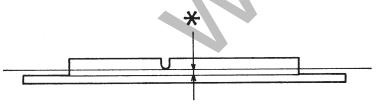
Item	Standard	Limit
Pistons		
Piston-to-cylinder clearance	0.020 ~ 0.045 mm	0.15 mm
Diameter D	65.965 ~ 65.980 mm	•••
		
Height H	9 mm	•••
Piston pin bore (in the piston)		
Diameter	16.002 ~ 16.013 mm	•••
Offset	0.5 mm	•••
Offset direction	Intake side	•••
Piston pins		
Outside diameter	15.991 ~ 16.000 mm	•••
Piston-pin-to-piston-pin-bore clearance	0.002 ~ 0.022 mm	0.072 mm
Piston rings		
Top ring		
		
Ring type	Barrel	•••
Dimensions (B × T)	0.80 × 2.45 mm	•••
End gap (installed)	0.15 ~ 0.25 mm	0.50 mm
Ring side clearance	0.030 ~ 0.065 mm	0.115 mm
2nd ring		
		
Ring type	Plain	•••
Dimensions (B × T)	0.8 × 2.5 mm	•••
End gap (installed)	0.4 ~ 0.5 mm	0.75 mm
Ring side clearance	0.020 ~ 0.055 mm	0.105 mm
Oil ring		
		
Dimensions (B × T)	1.5 × 2.0 mm	•••
End gap (installed)	0.10 ~ 0.35 mm	•••

Item	Standard	Limit
Connecting rods		
Crankshaft-pin-to-big-end-bearing clearance	0.026 ~ 0.050 mm	•••
Bearing color code	1 = Blue 2 = Black 3 = Brown 4 = Green	•••
Crankshaft 		
Width B	118.55 ~ 118.60 mm	•••
Max. runout C		0.03 mm
Big end side clearance D	0.160 ~ 0.262 mm	•••
Big end radial clearance E	0.026 ~ 0.050 mm	•••
Small end free play F	0.32 ~ 0.50 mm	•••
Crankshaft-journal-to-crankshaft-journal-bearing clearance	0.040 ~ 0.082 mm	•••
Bearing color code	1 = Blue 2 = Black 3 = Brown 4 = Green	•••
Clutch		
Clutch type	Wet, multiple disc automatic	•••
Clutch release method	Automatic	
Friction plates		
Thickness	2.75 ~ 3.05 mm	2.65 mm
Plate quantity	5	•••
Friction plate		
Thickness	1.8 ~ 2.0 mm	•••
Plate quantity	2	•••
Max. warpage	•••	1.7 mm
Clutch plate		
Thickness	1.3 ~ 1.5 mm	
Plate quantity	4	
Max. warpage	•••	0.1 mm
Clutch springs		
Free length	25.9 mm	25.4 mm
Spring quantity	6	•••
V-belt		
V-belt width	32 mm	30.5 mm

Item	Standard	Limit
Transmission		
Primary reduction system	Spur gear/helical gear	•••
Primary reduction ratio	52/32 × 36/22 (2.659)	•••
Secondary reduction system	Chain drive	•••
Secondary reduction ratio	41/25 × 40/29 (2.262)	•••
Max. main axle runout	•••	0.08 mm
Max. drive axle runout	•••	0.08 mm
Air filter type	Dry element	•••
Fuel pump		
Pump type	Electrical	•••
Model (manufacturer)	3LN (MITSUBISHI)	•••
Output pressure	8.3 ~ 12.3 kPa (0.83 ~ 0.123 kgf/cm^2)	•••
Carburetors		
Model (manufacturer) × quantity	BS30 (MIKUNI) × 2	•••
Throttle cable free play (at the flange of the throttle grip)	3 ~ 5 mm	•••
ID mark	5GJ1 00	•••
Main jet	#102.5	•••
Main air jet	#100	•••
Jet needle	4DK4-3/5	•••
Needle jet	0-OM (#893)	•••
Pilot air jet	#85	•••
Pilot air jet	#170	•••
Pilot outlet	0.8	•••
Pilot jet	#22.5	•••
Bypass 1	0.8	•••
Bypass 2	0.8	•••
Bypass 3	0.8	•••
Pilot screw turns out	2	•••
Valve seat size	1.0	•••
Fuel level (below the line on the float chamber)	5.5 ~ 6.5 mm	•••

CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Diamond	•••
Caster angle	28°	•••
Trail	95 mm	•••
Front wheel		
Wheel type	Cast wheel	•••
Rim		
Size	14 × MT3.50	•••
Material	Aluminum	•••
Wheel travel	120 mm	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm
Max. lateral wheel runout	•••	0.5 mm
Rear wheel		
Wheel type	Cast wheel	•••
Rim		
Size	14 × MT4.50	•••
Material	Aluminum	•••
Wheel travel	120 mm	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm
Max. lateral wheel runout	•••	0.5 mm
Front tire		
Tire type	Tubeless	•••
Size	120/70-14	•••
Model (manufacturer)	BRIDGESTONE HOOP B03	•••
	DUNLOP D305FA	•••
Tire pressure (cold)		
0 ~ 90 kg	200 kPa (2.0 kg/cm^2, 2.0 bar)	•••
90 ~ 197 kg	225 kPa (2.25 kg/cm^2, 2.25 bar)	•••
High-speed riding	225 kPa (2.25 kg/cm^2, 2.25 bar)	•••
Min. tire tread depth	•••	1.6 mm

Item	Standard	Limit
Rear tire		
Tire type	Tubeless	•••
Size	150/70-14	•••
Model (manufacturer)	BRIDGESTONE HOOP B02 DUNLOP D305	•••
Tire pressure (cold)		
0 ~ 90 kg	225 kPa (2.25 kg/cm^2, 2.25 bar)	•••
90 ~ 197 kg	250 kPa (2.50 kg/cm^2, 2.50 bar)	•••
High-speed riding	250 kPa (2.5 kg/cm^2, 2.5 bar)	•••
Min. tire tread depth		1.6 mm
Front brakes		
Brake type	Single-disc brake	•••
Operation	Right-hand operation	•••
Recommended fluid	DOT 4	•••
Brake discs		
Diameter × thickness	282 × 5 mm	•••
Min. thickness	•••	4.5 mm
Max. deflection	•••	0.15 mm
Brake pad lining thickness	6.0 mm	0.8 mm
		
Master cylinder inside diameter	14 mm	•••
Caliper cylinder inside diameter	30.16 mm and 33.34 mm	•••
Rear brake		
Brake type	Single-disc brake	•••
Operation	Left-hand operation	•••
Recommended fluid	DOT 4	•••
Brake discs		
Diameter × thickness	267 × 5 mm	•••
Min. thickness	•••	3.5 mm
Max. deflection	•••	0.15 mm
Brake pad lining thickness	8.3 mm	0.8 mm
		
Master cylinder inside diameter	12.7 mm	•••
Caliper cylinder inside diameter	38.1 mm	•••

Item	Standard	Limit
Front suspension		
Suspension type	Telescopic fork	•••
Front fork type	Coil spring/oil damper	•••
Front fork travel	120 mm	•••
Spring		
Free length	428.5 mm	419.9 mm
Spacer length	129.6 mm	•••
Installed length	419.5 mm	•••
Spring rate (K1)	11.8 N/mm (1.2 kgf/mm)	•••
Spring rate (K2)	15.7 N/mm (1.6kgf/mm)	•••
Spring rate (K3)	19.6 N/mm (2 kgf/mm)	•••
Spring stroke (K1)	0 ~ 19 mm	•••
Spring stroke (K2)	19 ~ 83 mm	•••
Spring stroke (K3)	83 ~ 120 mm	•••
Optional spring available	No	•••
Fork oil		
Recommended oil	Suspension oil "01" or equivalent	•••
Quantity (each front fork leg)	402 cm^3	•••
Level (from the top of the innertube, with the inner tube fullycompressed, and without thefork spring)	135 mm	•••
Steering		
Steering bearing type	Angular ball bearings	•••
Rear suspension		
Suspension type	Swingarm (link suspension)	•••
Rear shock absorber assemblytype	Coil spring/gas-oil damper	•••
Rear shock absorber assemblytravel	44.5 mm	•••
Spring		
Free length	190 mm	•••
Installed length	180 mm	•••
Spring rate (K1)	226 N/mm (23.05 kgf/mm)	•••
Spring rate (K2)	294 N/mm (29.98 kgf/mm)	•••
Spring stroke (K1)	0 ~ 30 mm	•••
Spring stroke (K2)	30.0 ~ 44.5 mm	•••
Optional spring available	No	•••
Standard spring preload gas/air pressure	4.9 kPa (0.05 kg/cm^2)	•••
Drive chain		
Model (manufacturer)	23RH303.5-82ASM (Borg warner)	•••
Link quantity	82	•••
Primary chain		
Model (manufacturer)	89HV302.5RCF-66 (Borg warner)	•••
Link quantity	66	•••

ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	•••
Ignition system		
Ignition system type	T.C.I.	•••
Ignition timing	10° BTDC at 1200 r/min	•••
Advancer type	Digital	•••
Pickup coil resistance/color	189 ~ 231 Ω/Gy-B	•••
Transistorized coil ignition unit model (manufacturer)	J4T120 (MITSUBISHI)	•••
Ignition coils		
Model	J0313	•••
Minimum ignition spark gap	6 mm	•••
Primary coil resistance	1.87 ~ 2.53 Ω	•••
Secondary coil resistance	12 ~ 18 kΩ	•••
Throttle position sensor standard resistance	4 ~ 6 kΩ	•••
Charging system		
System type	AC magneto	•••
Model (manufacturer)	F4T373 (MITSUBISHI)	•••
Nominal output	14 V/305W at 5,000 r/min	•••
Stator coil resistance	0.375 Ω	•••
Voltage regulator		
Regulator type	Semiconductor, short circuit type	•••
Model (manufacturer)	SH650A-12 (SHINDENGEN)	•••
No-load regulated voltage	14.1 ~ 14.9 V	•••
Rectifier		
Model	SH650A-12	•••
Rectifier capacity	18 A	•••
Withstand voltage	200 V	•••
Battery		
Battery type	GT9B-4	•••
Battery voltage/capacity	12 V/8 Ah	•••
Headlight type	Halogen bulb	•••
Bulbs (voltage/wattage × quantity)		
Headlight	12 V 60 W/55 W + 55 W	•••
Auxiliary light	12 V 5 W × 2	•••
Tail/brake light	12 V 5 W/21 W × 2	•••
Turn signal light (Front)	12 V 21 W/5 W × 2	•••
Turn signal light (Rear)	12 V 21 W × 2	•••

Item	Standard	Limit
License plate light	12 V 5 W × 1	•••
Meter light	12 V 1.7 W × 3	•••
High beam indicator light	12 V 1.7 W × 1	•••
Oil level indicator light	12 V 1.7 W × 1	•••
Turn signal indicator light	12 V 3.4 W × 2	•••
Electric starting system		
System type	Constant mesh	•••
Starter motor		
Model (manufacturer)	SM-13 (MITSUBA)	•••
Power output	0.7 kW	•••
Brushes		
Overall length	12 mm	4.0 mm
Spring force	7.65 ~ 10.01 N (780 ~ 1021 gf)	•••
Commutator resistance	0.0015 ~ 0.0025 Ω	•••
Commutator diameter	28 mm	27 mm
Mica undercut	0.7 mm	•••
Starter relay		
Model (manufacturer)	MS5F-561 (JIDECO)	•••
Amperage	180 A	•••
Coil resistance	4.18 ~ 4.62 Ω	•••
Horn		
Horn type	Plain	•••
Model (manufacturer) × quantity	YF-12 (NIKKO) × 2	•••
Max. amperage	3 A	•••
Flasher relay		
Relay type	Full-transistor	•••
Model (manufacturer)	FE246BH (DENSO)	•••
Self-cancelling device built-in	No	•••
Turn signal blinking frequency	75 ~ 95 cycles/min.	•••
Wattage	21 W × 2 + 3.4 W	•••
Fuel sender		
Model (manufacturer)	5GJ (NIPPON SEIKI)	•••
Resistance (Full)	4 ~ 10 Ω	•••
(Empty)	90 ~ 100 Ω	•••
Sidestand relay		
Model	ACA12115-1	•••
Coil resistance	70 ~ 90 Ω	•••
Fuel pump maximum amperage	1 A	•••
Fuel pump relay model	ACA12115 MC2	•••
Resistance	70 ~ 90 Ω	•••
Thermo switch model (manufacturer)	5GH, 5GJ (NIPPON TERMOSTAT)	•••

Item	Standard	Limit
Temperature sender		
Resistance	69 Ω at 80°C	•••
	22 Ω at 120°C	•••
Fuses (amperage × quantity)		
Main fuse	30 A × 1	•••
Headlight fuse	15 A × 1	•••
Signaling system fuse	15 A × 1	•••
Ignition fuse	10 A × 1	•••
Radiator fan fuse	15 A × 1	•••
Backup fuse (odometer)	10 A × 1	•••
Reserve fuse	30 A × 1	•••
	15 A × 1	•••
	10 A × 1	•••

EB201000

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

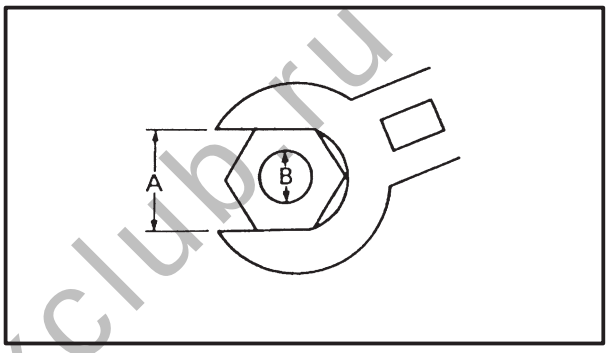
METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening torque	m•kg m•kg cm•kg cm•kg	7.233 86.794 0.0723 0.8679	ft•lb in•lb ft•lb in•lb
Weight	kg g	2.205 0.03527	lb oz
Speed	km/hr	0.6214	mph
Distance	km m m cm mm	0.6214 3.281 1.094 0.3937 0.03937	mi ft yd in in
Volume/ Capacity	cc (cm^3)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

EB202001

TIGHTENING TORQUES

GENERAL TIGHTENING TORQUES

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



A: Width across flats

B: Thread diameter

A (nut)	B (bolt)	General tightening torques	
		Nm	m•kg
10 mm	6 mm	6	0.6
12 mm	8 mm	15	1.5
14 mm	10 mm	30	3.0
18 mm	12 mm	55	5.5
19 mm	14 mm	85	8.5
22 mm	16 mm	130	13.0

ENGINE TIGHTENING TORQUES

Item	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kg	
Spark plug	–	M10	2	12.5	1.25	
Cylinder head cover	Bolt	M6	10	10	1.0	
Camshaft cap	Bolt	M6	12	10	1.0	
Cylinder head and cylinder body	Nut	M9	4	35	3.5	E
Cylinder head and cylinder body	Nut	M9	2	46	4.6	E
Cylinder head and cylinder body	Bolt	M6	2	10	1.0	
Cylinder head (exhaust pipe)	Stud bolt	M8	4	15	1.5	
Cylinder body	Bolt	M6	1	10	1.0	
Cylinder head (AI System)	Stud bolt	M6	4	7	0.7	
Connecting rod cap	Nut	M7	4	See NOTE*1		M
Connecting rod cap (balancer)	Nut	M9	2	60	6.0	
Cylinder (balancer)	Bolt	M10	4	58	5.8	
Generator rotor	Nut	M18	1	See NOTE*2		E
Chain tensioner	Bolt	M6	2	10	1.0	
Chain tensioner cap bolt	Bolt	M6	1	10	1.0	
Chain guide (intake side)	Bolt	M6	2	10	1.0	
Water pump housing cover	Bolt	M6	2	10	1.0	
Water pump assembly	Bolt	M6	2	10	1.0	
Coolant pipe	Bolt	M6	2	10	1.0	
Thermostat cover	Bolt	M6	2	10	1.0	
Oil pump assembly	Bolt	M6	3	10	1.0	
Oil strainer assembly	Bolt	M6	2	10	1.0	
Oil cooler assembly	Bolt	M20	1	63	6.3	
Oil filter	–	M20	1	17	1.7	
Oil delivery pipe	Bolt	M6	1	10	1.0	
Carburetor intake manifold	Bolt	M6	4	10	1.0	
Silencer assembly	Bolt	M6	2	8.5	0.85	
Air filter case assembly	Bolt	M6	3	8.5	0.85	
Exhaust pipe	Nut	M8	4	20	2.0	

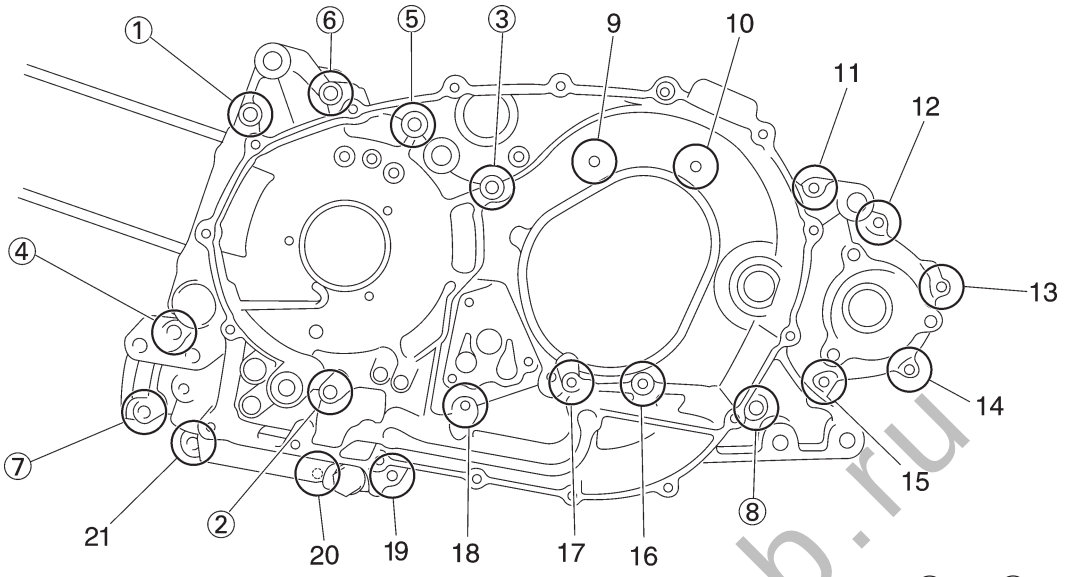
Item	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kg	
Muffler	Nut	M10	1	48	4.8	
Muffler protector	Bolt	M6	3	7	0.7	LT
A.I.System pipe	Nut	M6	4	10	1.0	
A.I.System reed valve assembly	Bolt	M6	3	10	1.0	
Air cut valve assembly	Bolt	M6	1	7	0.7	
Crankcase	Bolt	M6	13	10	1.0	
Crankcase	Bolt	M8	8	24	2.4	
Engine oil drain bolt	Bolt	M14	1	43	4.3	
Engine oil sub tank cover	Bolt	M6	7	10	1.0	
Stator coil base	Screw	M6	3	12	1.2	LT
Timing plug	Plug	M16	1	8	0.8	
Generator cover	Bolt	M6	19	10	1.0	
Belt drive cover	Bolt	M6	4	10	1.0	
Belt drive cover	Bolt	M8	6	24	2.4	
Plate	Bolt	M6	3	10	1.0	
Crankcase cover	Bolt	M8	2	24	2.4	
Protector cover	Bolt	M6	3	7	0.7	
Belt drive filter	Bolt	M6	2	7	0.7	
Starter clutch	Bolt	M8	3	30	3.0	
Clutch boss nut	Nut	M36	1	90	9.0	
Clutch housing assembly	Nut	M16	1	65	6.5	
Chian drive holder assembly	Bolt	M8	3	30	3.0	
Chian drive drain bolt	Bolt	M12	1	20	2.0	
Chian drive caes (outer)	Bolt	M6	18	10	1.0	
Chian drive case cover	Bolt	M6	2	7	0.7	
Stopper	Bolt	M5	8	6	0.6	
Primary sheave assembly	Nut	M20	1	160	16	
Secondary sheave spring seat	Nut	M36	1	90	9.0	LS
Secondary sheave assembly	Nut	M18	1	90	9.0	LS

Item	Part name	Thread size	Q'ty	Tightening torque		Remarks
				Nm	m•kg	
Primary bearing cover plate	Screw	M6	1	10	1.0	
Secondary bearing cover plate	Screw	M6	1	12	1.2	
Stator coil assembly	Bolt	M6	3	10	1.0	
Pickup coil	Bolt	M5	2	7	0.7	
Starter motor	Bolt	M6	2	10	1.0	
Thermo switch	–	M18	2	18	1.8	
Thermo unit	–	PT 1/8	1	8	0.8	
Ignitor unit	Screw	M6	2	3	0.3	

NOTE:

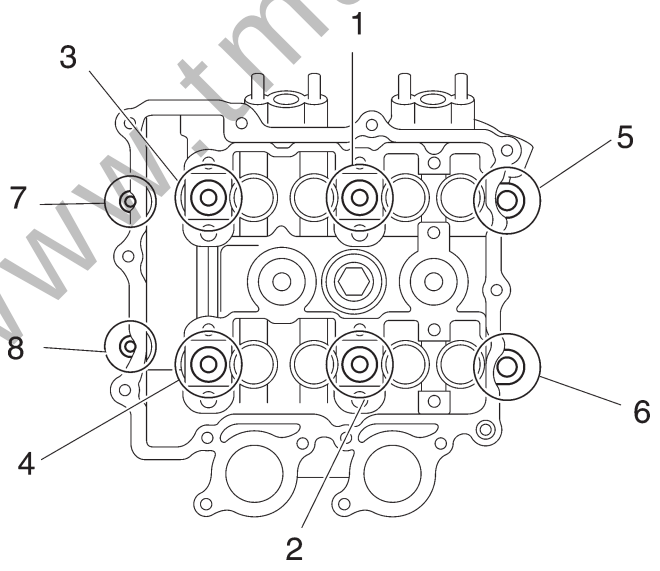
*1: After tightening to 16 Nm (1.6 m•kg), tighten another 90°.
*2: After tightening to 60 Nm (6,0 m•kg), tighten another 120°.

Crankcase tightening sequence:



① ~ ⑧ M8 Bolt
9 ~ 21 M6 Bolt

Cylinder head tightening sequence:



CHASSIS TIGHTENING TORQUES

Item	Thread size	Tightening torque		Remarks
		Nm	m•kg	
Upper bracket pinch bolt	M8	30	3.0	
Steering stem nut	M22	110	11.0	
Lower ring nut	M25	19	1.9	See NOTE
Front fork cap bolt		45	4.5	
Handlebar upper holder	M8	23	2.3	
Brake hose union bolt	M10	30	3.0	
Brake master cylinder holder	M6	10	1.0	
Master cylinder reservoir cap	M4	1	0.1	
Handlebar grip end	M16	26	2.6	
Engine mounting				
Front mounting nut (upper)	M12	87	8.7	
Front mounting bolt (lower)	M10	48	4.8	
Front wheel axle shaft	M14	59	5.9	
Front wheel axle shaft pinch bolt	M8	20	2.0	
Rear wheel axle nut	M14	104	10.4	
Rear wheel axle shaft pinch bolt	M8	17	1.7	
Front brake caliper bracket	M10	27	2.7	
Front brake caliper bolt	M10	40	4.0	
Front brake disc	M6	18	1.8	
Rear brake caliper bracket	M10	27	2.7	
Rear brake caliper bolt	M10	40	4.0	
Rear brake disc	M6	18	1.8	
Brake caliper bleed screw	M7	6	0.6	
Swingarm and pivot shaft	M22	7	0.7	
Pivot shaft and lock nut	M22	100	10.0	
Chain drive and swingarm	M10	40	4.0	
Rear shock absorber (front)	M12	67	6.7	
Rear shock absorber (rear)	M16	52	5.2	

Item	Thread size	Tightening torque		Remarks
		Nm	m•kg	
Fuel tank	M6	10	1.0	
Fuel sender	M5	4	0.4	
Grab bar	M8	15	1.5	
Seat lock	M6	7	0.7	
Box	M6	10	1.0	
Cover and panel	M8	15	1.5	
Cover and panel	M6	7	0.7	
Windshield	M5	0.4	0.04	
Coolant reservoir tank	M6	4	0.4	
Mainstand bracket	M10	55	5.5	
Mainstand	M10	55	5.5	
Sidestand (bolt and frame)	M10	8	0.8	
Sidestand (bolt and nut)	M10	40	4.0	
Rear footrest	M8	23	2.3	

NOTE:

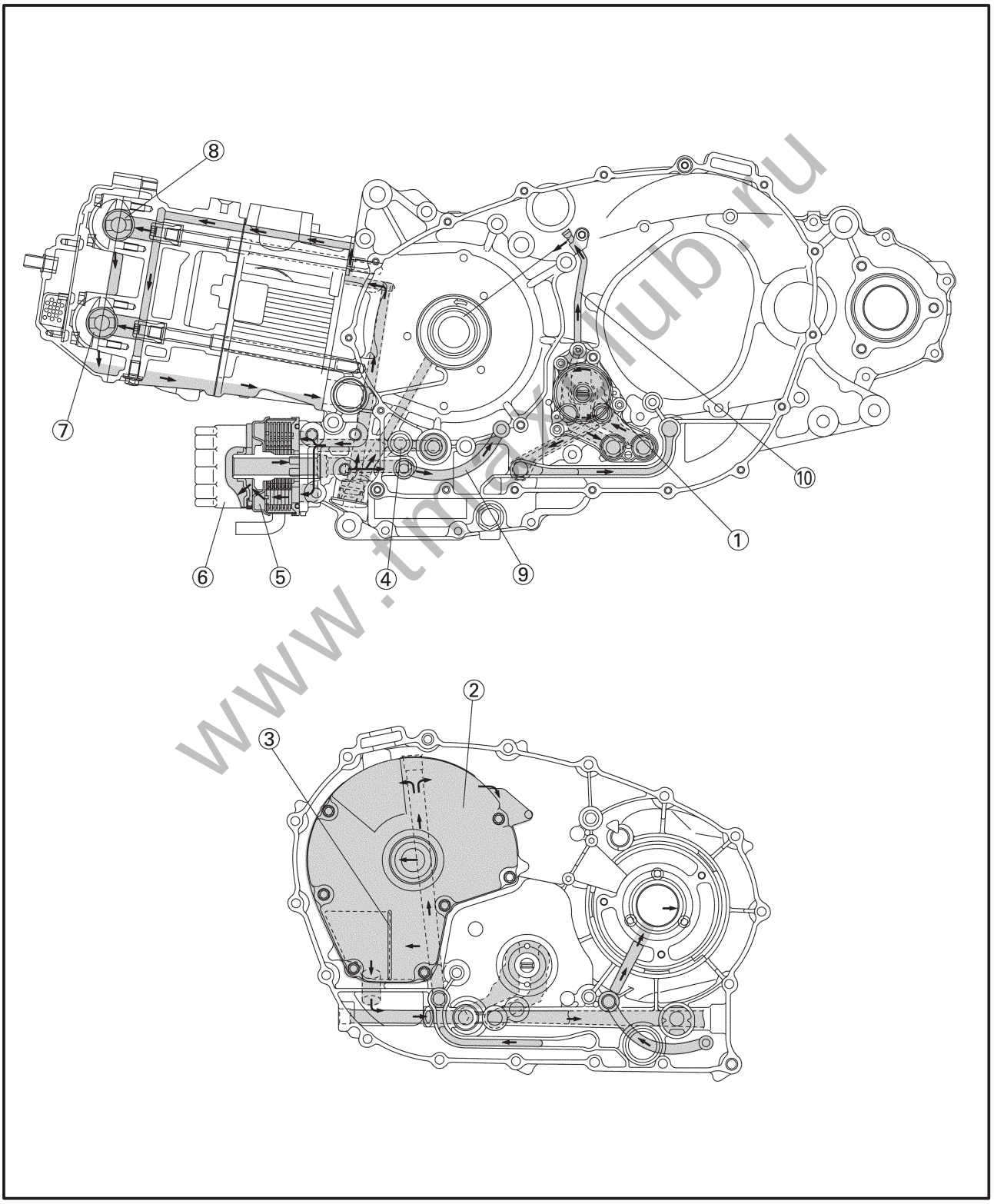
1. First, tighten the ring nut to approximately 52 Nm (5.2 m•kg) with a torque wrench, then loosen the ring nut completely.
2. Retighten the ring nut to specification.

LUBRICATION POINTS AND LUBRICANT TYPES

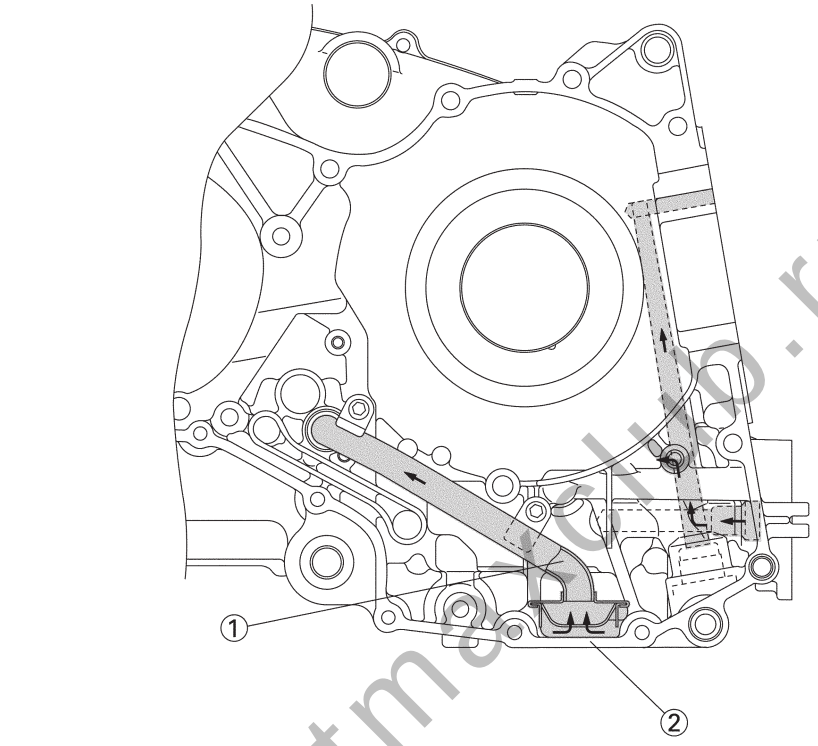
Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearing and bushes	E
Crankshaft pins	E
Piston surfaces	E
Piston pins	E
Balancer surface	E
Connecting rod bolts and nuts	M
Crankshaft journals	E
Camshaft lobs	M
Camshaft journals	M
Camshaft cap	E
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	E
Cylinder head nut	E
Oil pump shaft	M
Oil pump rotors (inner and outer)	E
Oil pump housing	E
Oil cooler union bolt	E
Starter clutch idle gear inner surface	E
Starter clutch	E
Drive axle spline	LS
Drive sprocket	LS
Primary sheave spacer	Shell BT grease 3®
Primary sheave nut	Shell BT grease 3®
Secondary sheave nut	LS
Secondary sheave	BEL-RAY assembly lube®
Swingarm pivot shaft bearing	LS
Belt drive cover bearing	LS
Crankcase mating surface	YAMAHA bond No.1215
A.C. magneto lead	YAMAHA bond No.1215

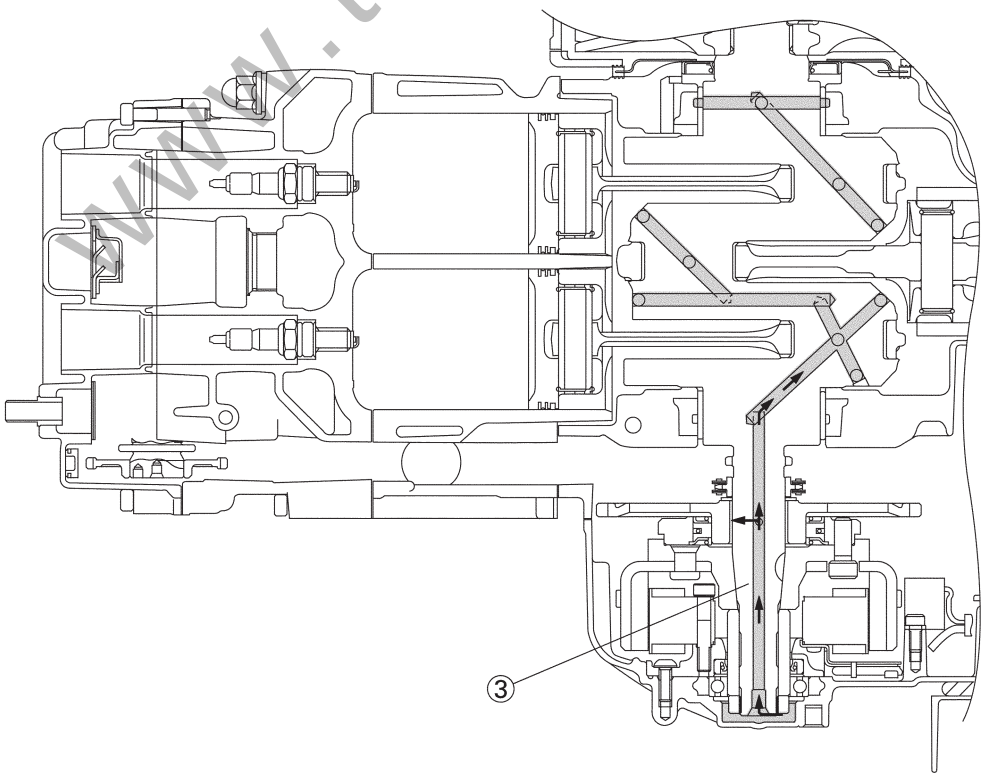
OIL FLOW DIAGRAMS

① Oil pump
② Oil tank
③ Oil strainer
④ Relief valve
⑤ Oil cooler
⑥ Oil filter
⑦ Exhaust camshaft
⑧ Intake camshaft
⑨ Oil pipe
⑩ Oil delivery pipe

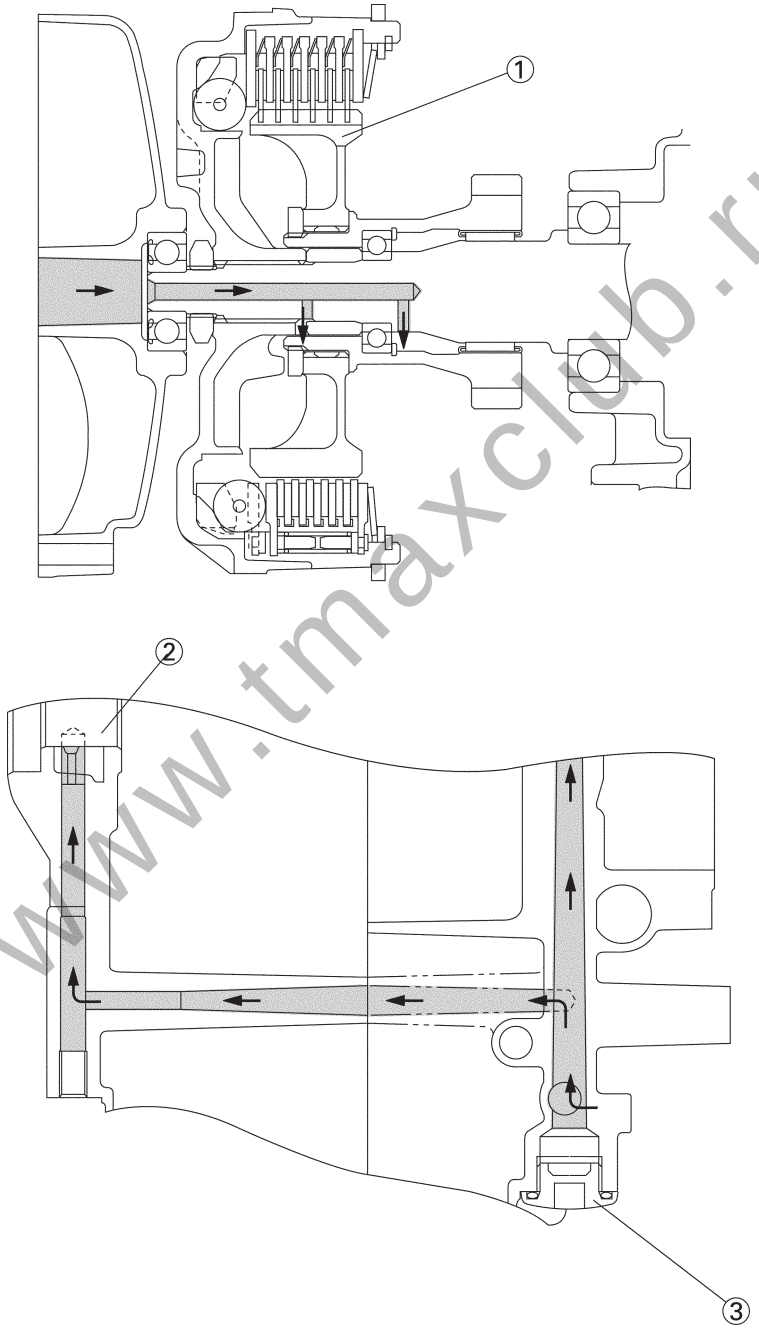


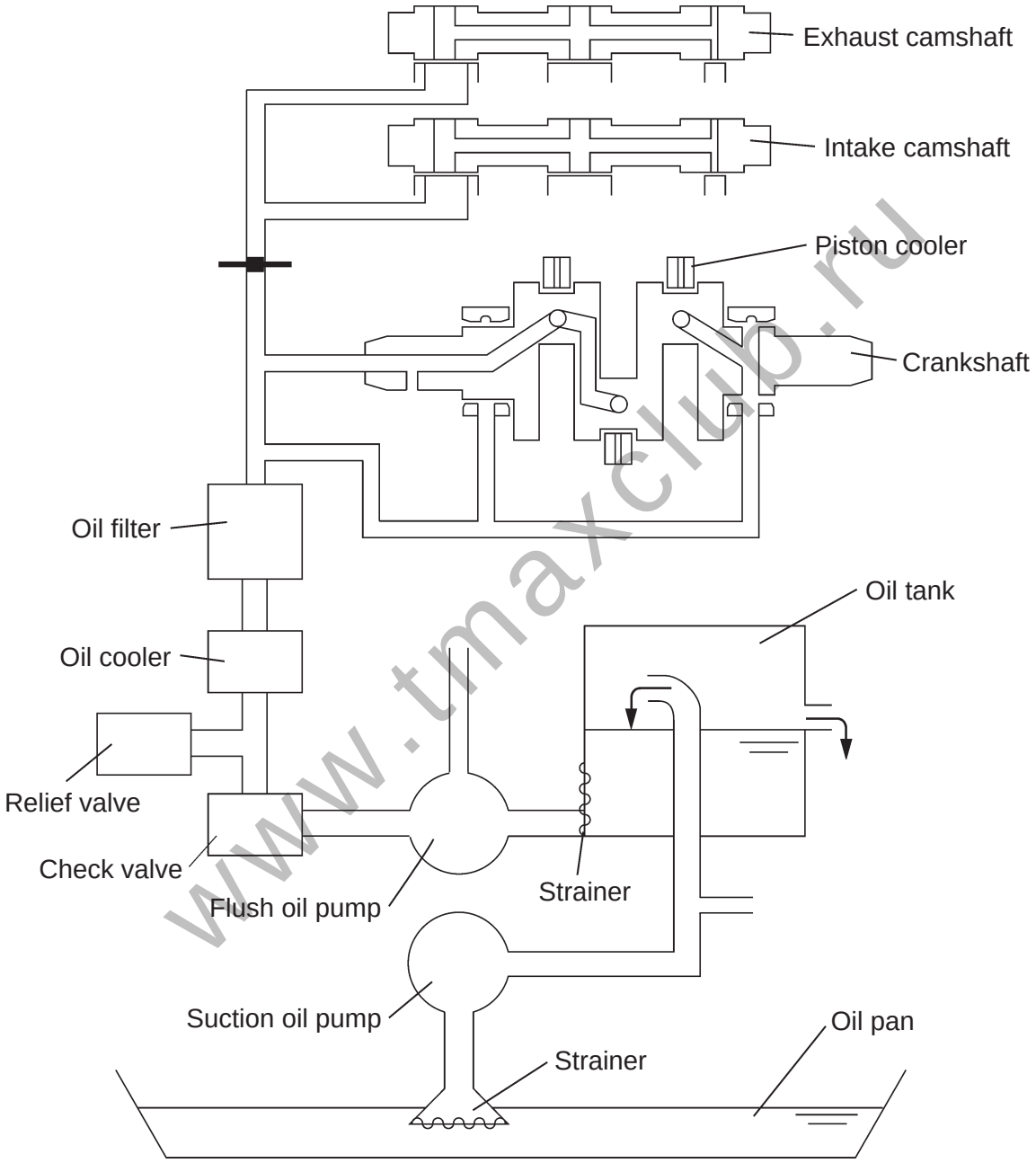
① Oil pan
② Oil strainer
③ Crankshaft





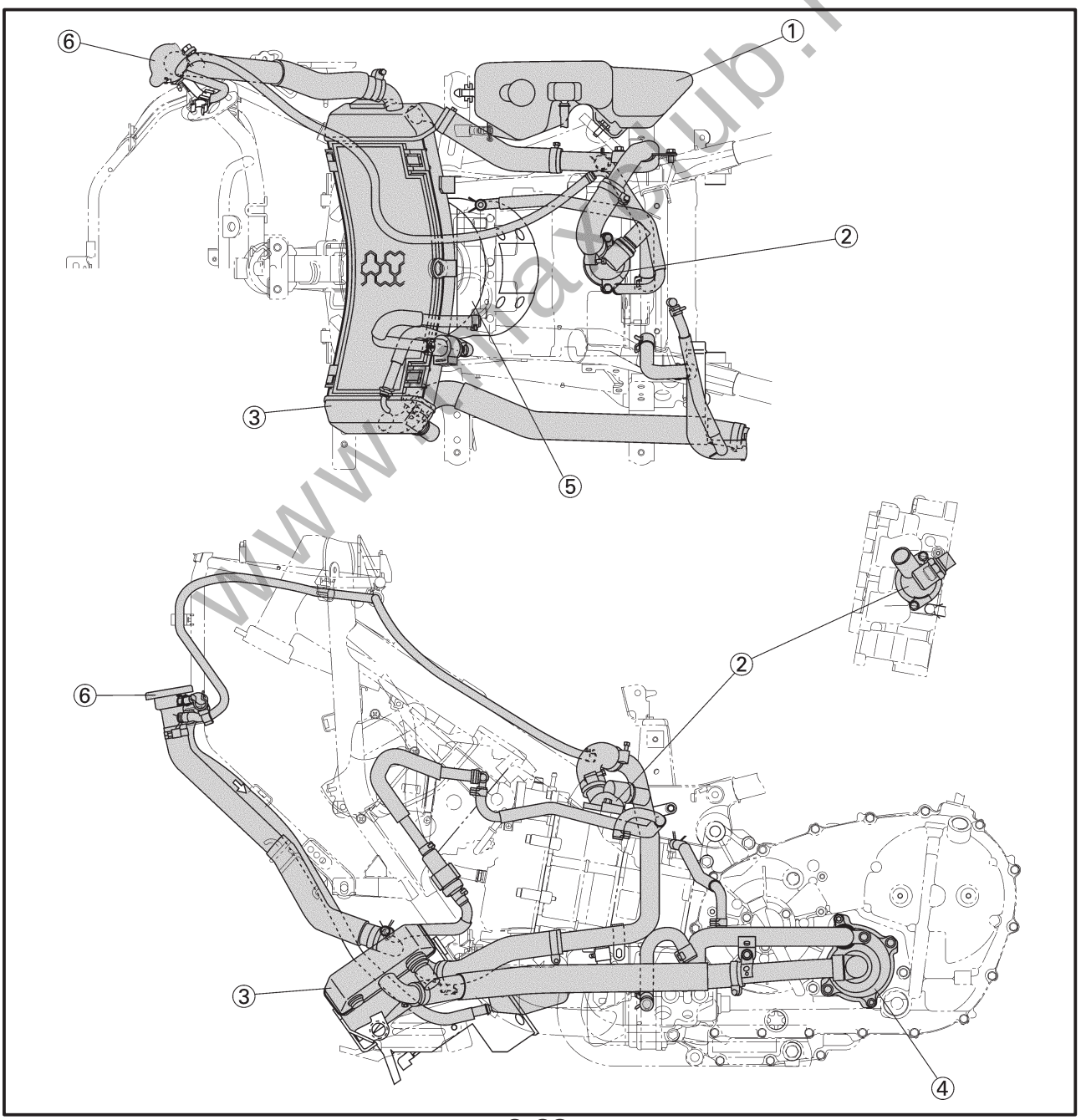
① Clutch
② Right main journal bearing
③ Main gallery bolt





COOLANT FLOW DIAGRAMS

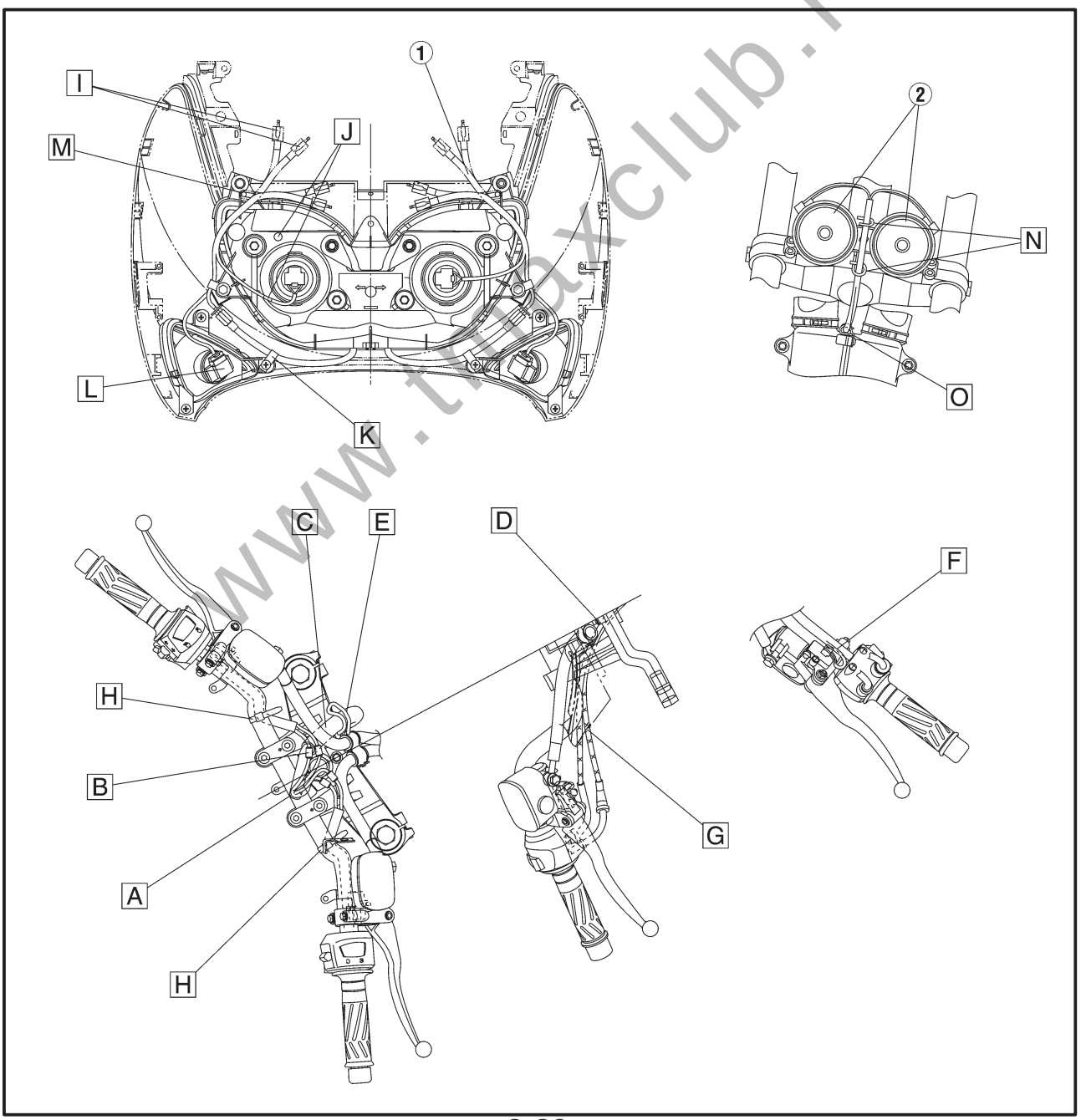
① Coolant reservoir tank
② Thermostat
③ Radiator
④ Water pump
⑤ Cooling fan
⑥ Radiator cap



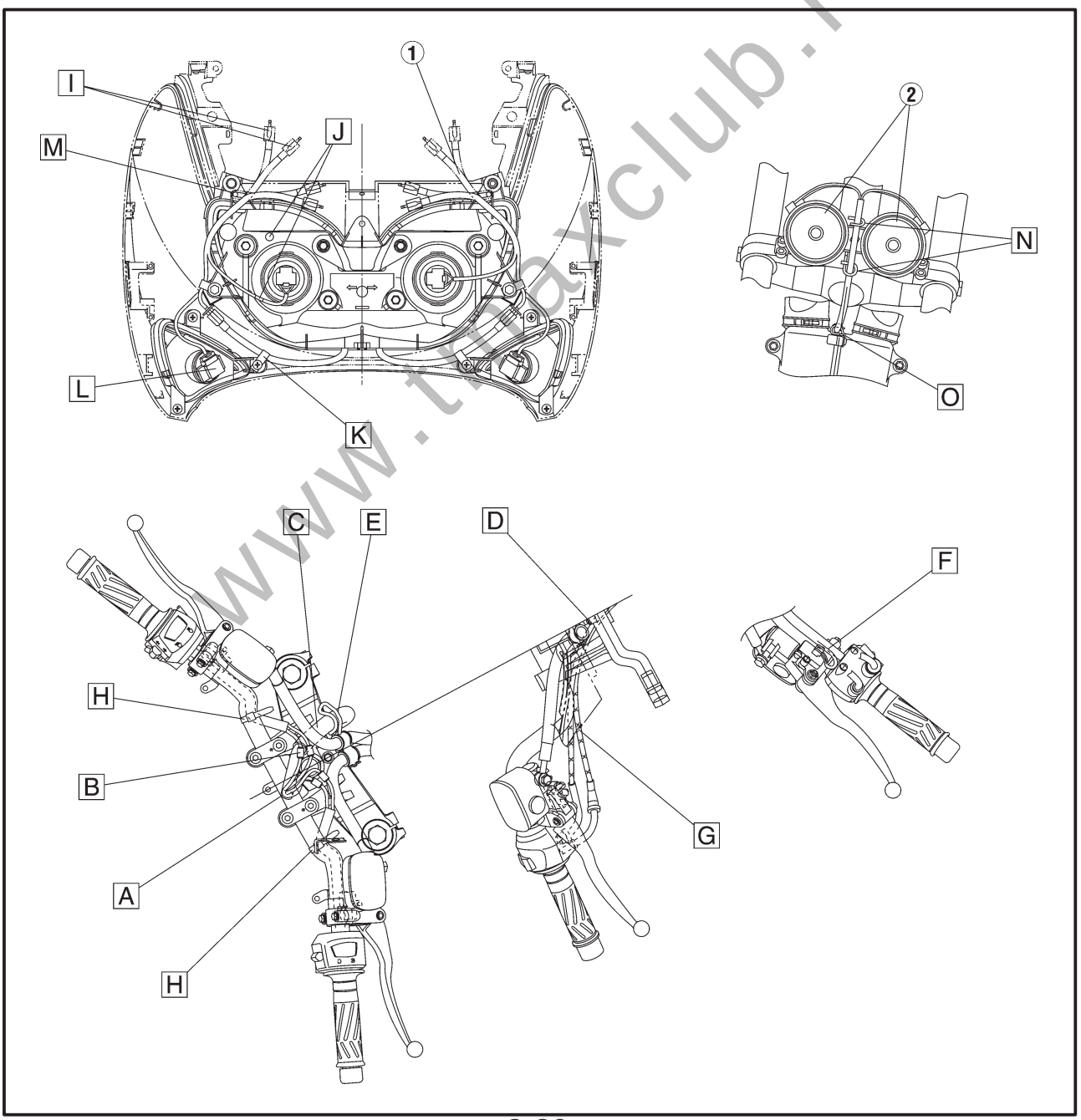
CABLE ROUTING

① Headlight lead
② Horn (H mark on the back of the horn).

A Attach the wireharness clamp (protector terminal) to the T stud.
B Install the wireharness to the top of the steering after each coupler connection.
C Route the wireharness between brake hose and upper bracket.
D Route the throttle cables between handle under cover and upper bracket.
E Install a wireharness guide to hold down the wireharness.
F Connect the brake light switch from the handlebar switch side wiring.
G Route the throttle cables through the hole of the handle under cover.
H Fasten the handlebar switch lead to the handlebar using a plastic clamp.
The fastening location is the bend area on the bottom of the handlebar.
I Connect the headlight sub-harness to the wireharness on top of the stay (left and right)
After making the connection, push the coupler between the front cowling and the air filter case.

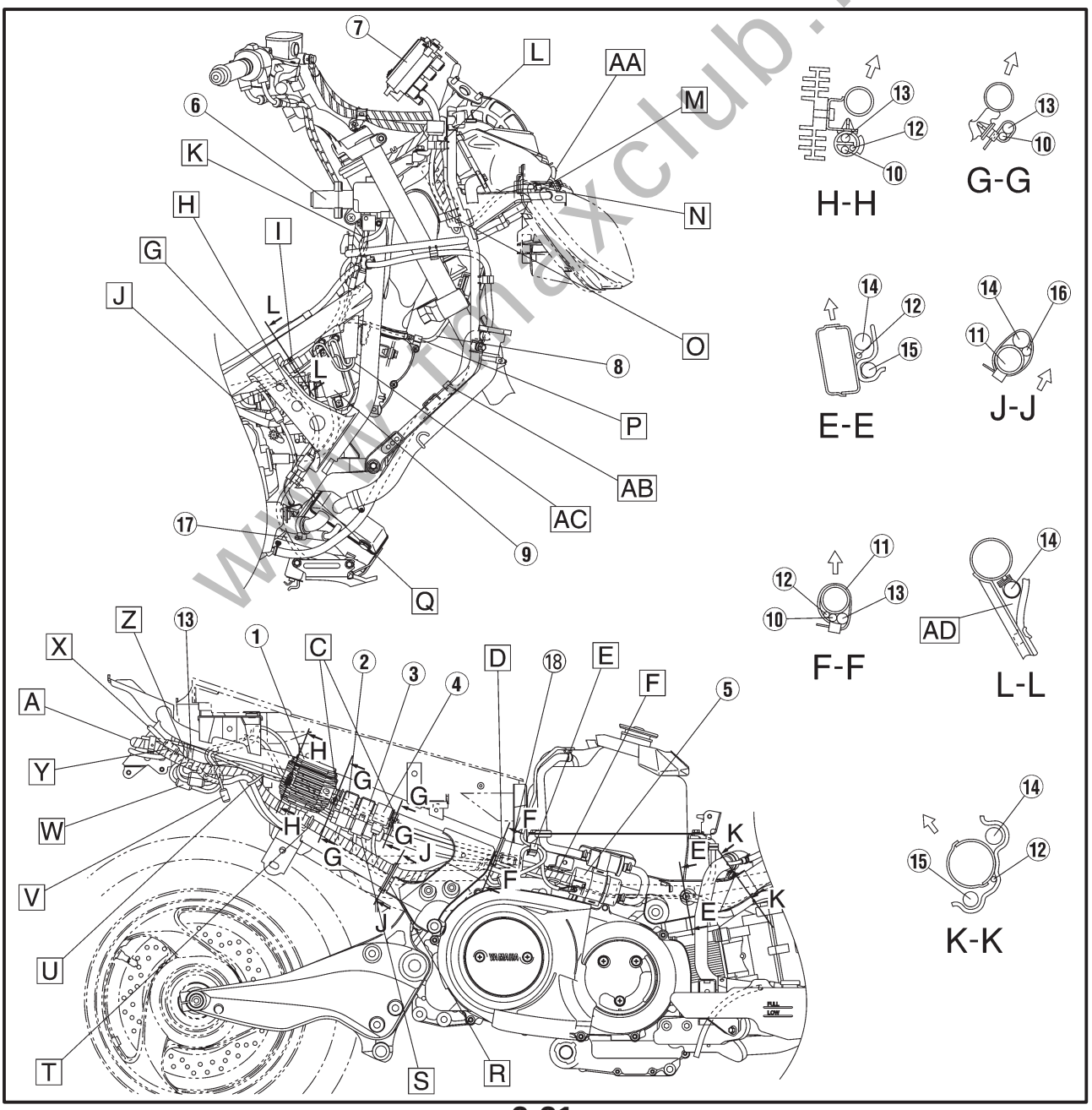


[J] Connect the taped headlight lead coupler to the headlight's white marked side (left side: high beam side).
(For UK, the right side is the high beam side.)
[K] Fasten the headlight sub-harness.
[L] Connect the turn signal light.
[M] Securely fasten the wire strap to the front cowling hook to prevent it from being pulled out by the headlight assembly.
[N] Route the horn lead through the wire guide.
[O] After passing the horn lead through the clamp, crimp the clamp.

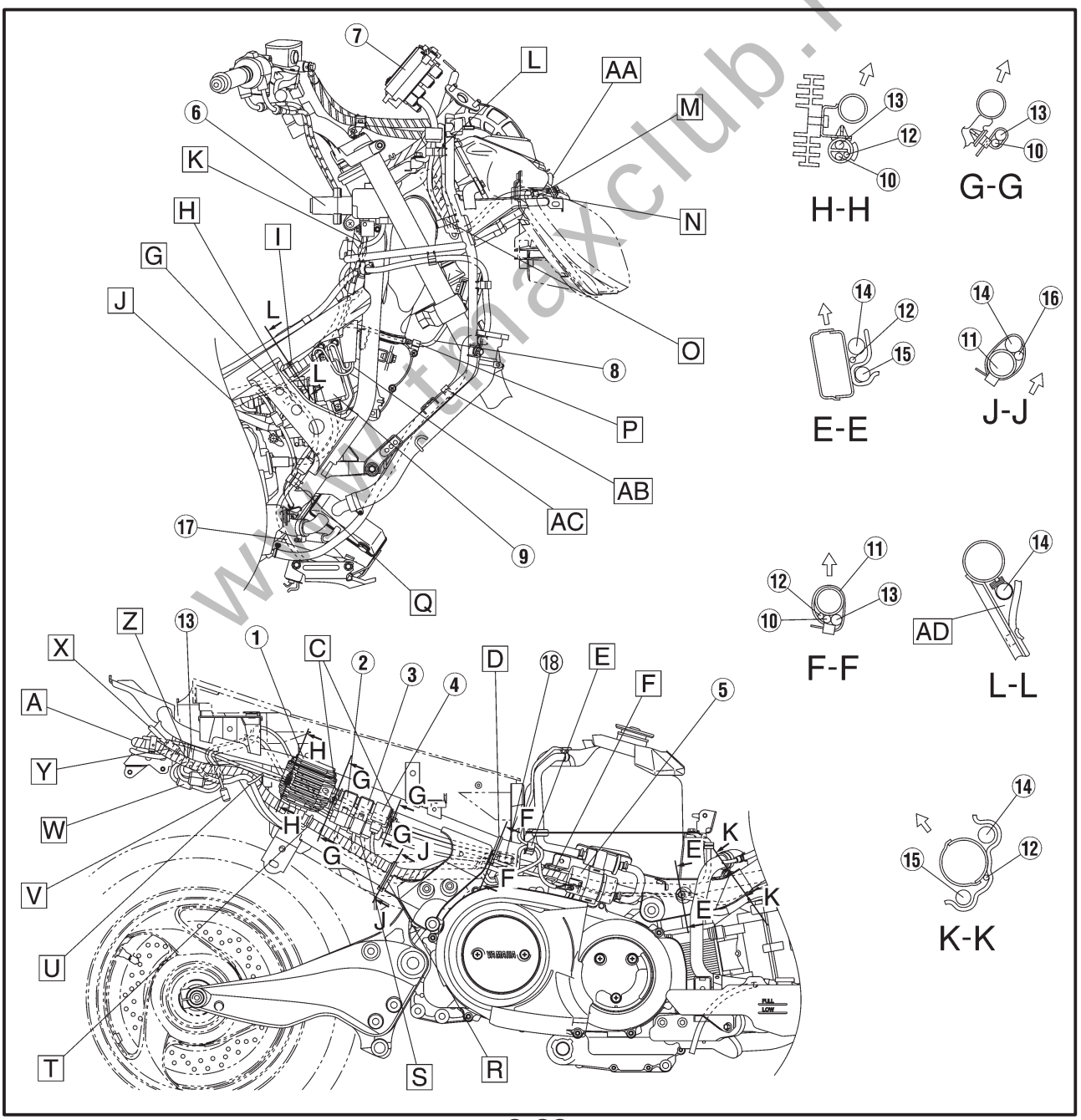


① Rectifier/regulator
② Starting circuit cut-off relay
③ Pump relay
④ Flasher relay
⑤ Fuel pump
⑥ Main switch
⑦ Meter assembly
⑧ Horn lead
⑨ Ignition coil
⑩ Battery negative lead
⑪ Frame
⑫ Seat lock cable
⑬ Starter motor lead
⑭ Wireharness
⑮ Fuel hose
⑯ Sub harness
⑰ Fan motor lead
⑱ V-belt reset coupler

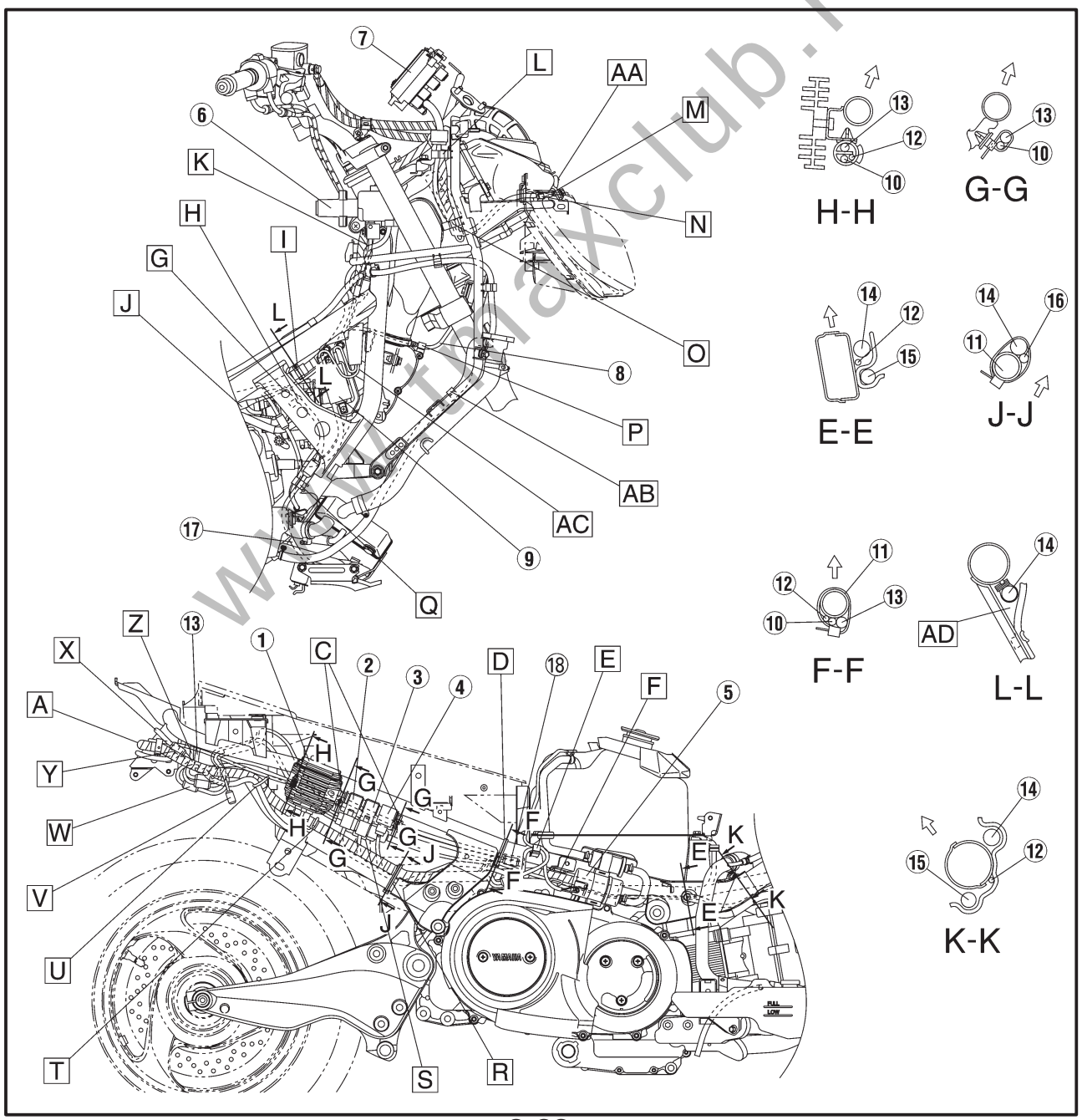
Ⓐ The wireharness pass-through is change.
Ⓑ Fasten the starter motor lead, battery negative lead and seat lock cable (right side) to the frame with a plastic clamp.
Ⓒ Fasten the starter motor lead and battery negative lead to the frame with a clamp.



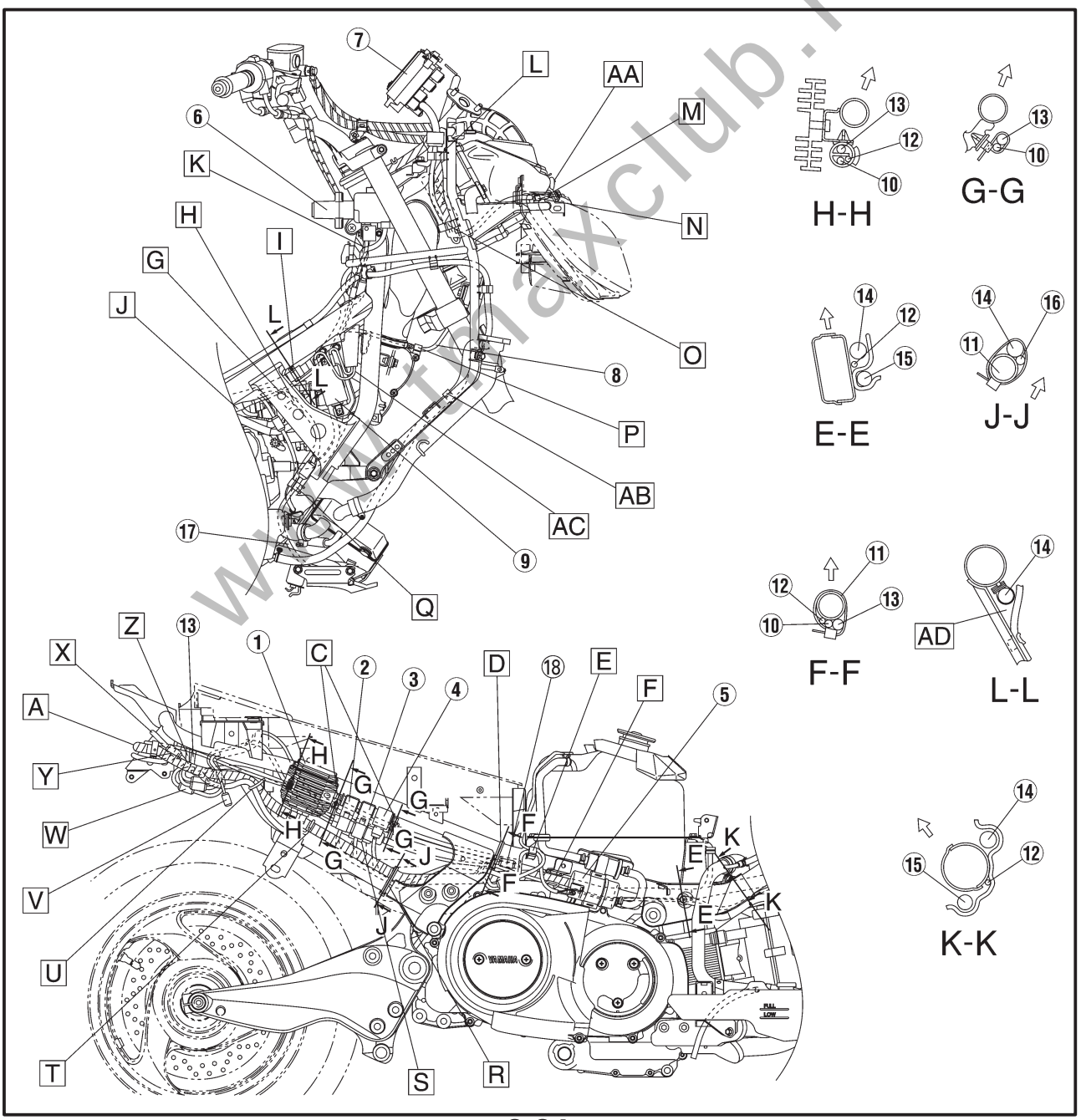
D Fasten the starter motor lead, battery negative lead, V-belt reset coupler, and seat lock cable to the frame with a plastic band.
Position the band clasp on the bottom of the frame and face the band end to the outside.
E Fasten the fuel sender lead and fuel pump lead to the frame with a plastic clamp.
F Place the wireharness and seat lock cable in the frame holder.
G Through the seat lock cable between wireharness and frame.
H Use the clamp on the back of the frame to hold the side stand switch lead and fan motor lead.
I Connect the wireharness (wire taped area) to the frame side T stud.
J After connecting the main switch lead, push it between the seat lock cable adjustment area and the frame.
K Through the main switch lead between frame and seat lock cable.
L After connecting the wireharness and meter lead, use a plastic clamp to connect them to stay 1.
M Connect to the headlight sub harness (left and right)



[N] Fasten the headlight sub harness with a plastic clamp.
[O] Fasten the igniter lead to the stay with a plastic clamp.
[P] Fasten the horn lead with a clamp.
[Q] Fasten the fan motor lead, sidestand switch lead, and thermo switch lead to the frame with a plastic clamp.
[R] Use a plastic band to connect the wireharness and relay lead to the frame.
Position the band clasp on the bottom of the frame and face the band end to the outside.
[S] Insert the seat lock cable and the cylinder mounting rubber into the frame stay.
[T] Through the wireharness to the frame wireharness holder.
[U] Route the wireharness and regulator lead through the frame wire holder.
Place the regulator lead under the wireharness.
[V] The V-belt reset coupler position is change.
[W] After making the connections, push the couplers into the space inside the frame above the mudguard.
[X] To the tail/brake light.
[Y] Insert the tail/brake light cuplers between the wireharness and the seat lock cable (left side).
[Z] To the starter relay.

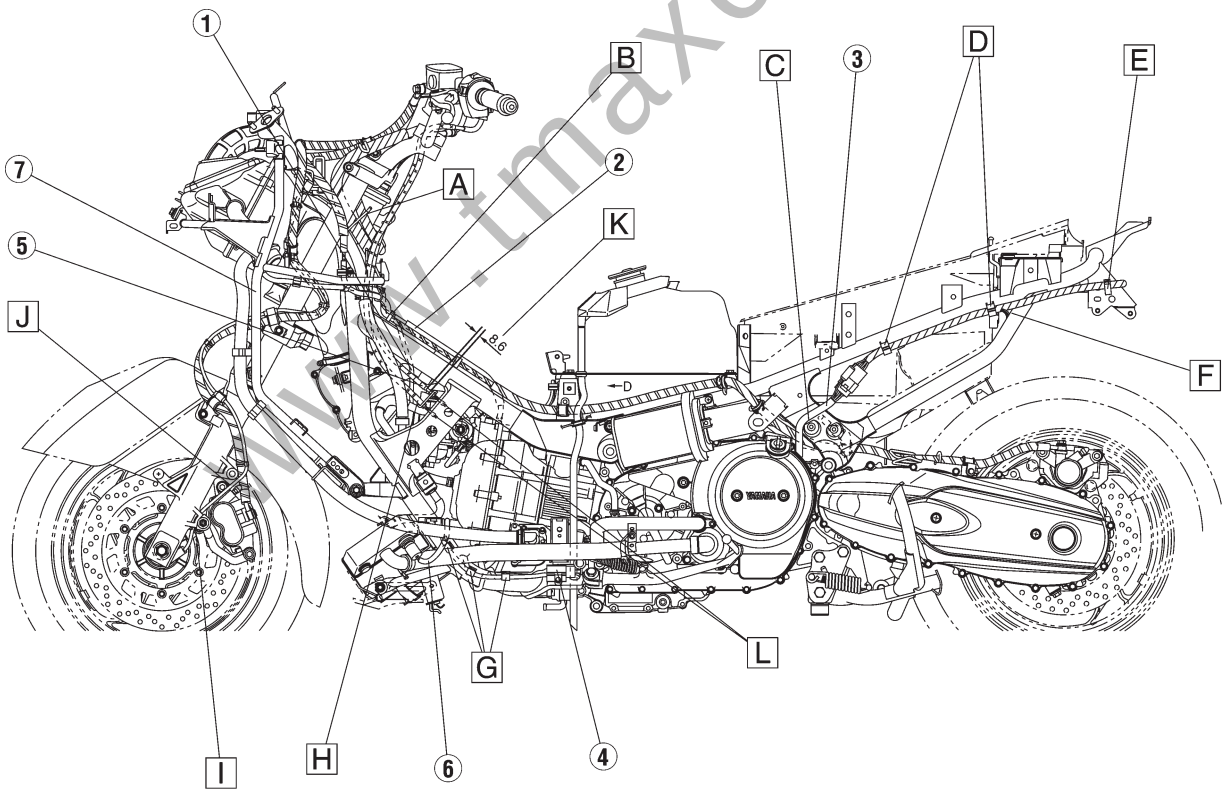


AA After connecting the left headlight sub-harness and wireharness (by matching the coupler colors), fold back the lead facing to the right and insert it into the air filter case rib.
AB Fasten the coolant reservoir hose to the stay with a plastic clamp.
AC Route the ignition coil lead through the inside of the bracket.
AD Route the seat lock cable through the frame bracket side.

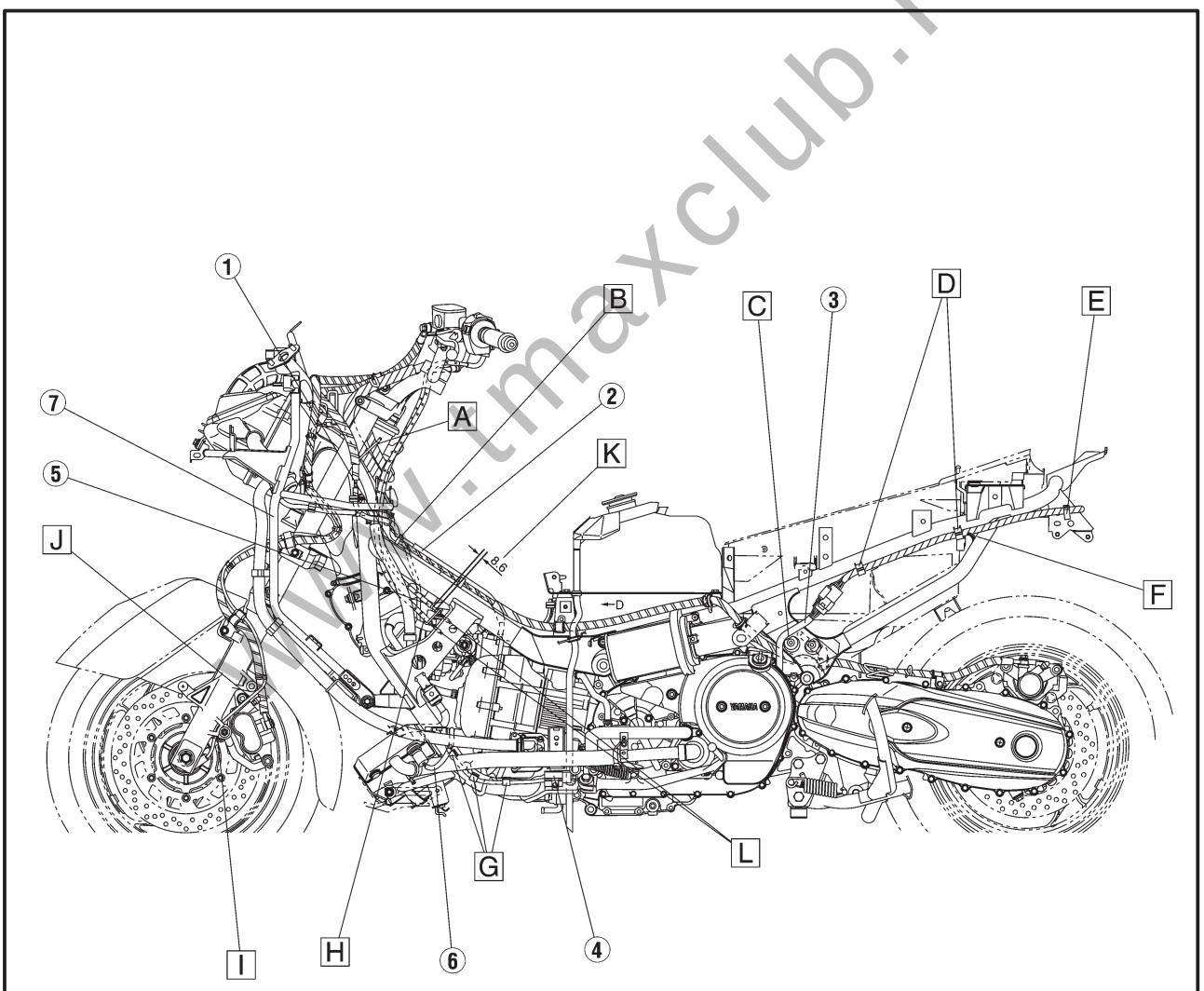


① Air vent hose
② Vacuum hose
③ A.C. magneto lead
④ Sidestand switch
⑤ Fan motor lead
⑥ Thermo switch lead
⑦ Stay 1

A Route the wireharness through the frame guide. At this time, place the protector (for the handle cover inner side) on the bottom side.
B Fasten the rear brake hose and vacuum hose with a plastic clamp.
The fastening position is 0 to 5 m from edge of the frame bracket.
C Pass the wireharness by the outside of the rear footrest mounting boss.
(When mounting the rear footrest, do not catch or pinch the A.C. magneto lead in the bracket.)

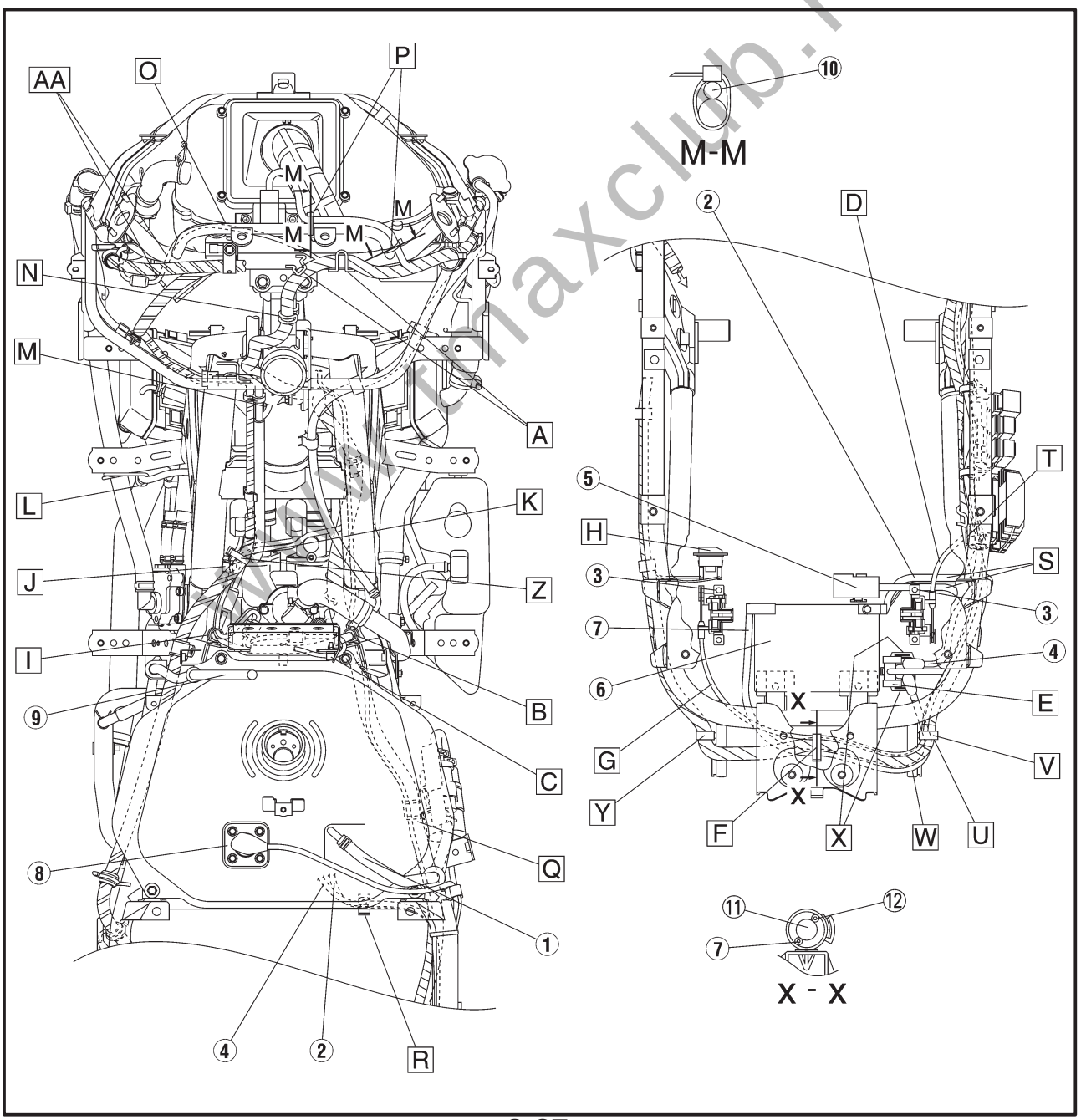


D Fasten the wireharness to the frame with a plastic clamp.
E Fasten the wireharness to the frame with a plastic clamp.
F Pass the box light lead by the front of the frame back stay pipe.
G Fasten the sidestand switch lead to the frame with a plastic clamp.
H When adjusting the throttle cable, completely tighten the hut on the throttle cable return side.
I Through the speed sensor lead to the lead holder.
J Through the speed sensor lead between front brake caliper and front brake caliper mounting bolt.
K Use this as a reference when adjusting the throttle cable.
L After adjusting the throttle cables, make sure the rubber cap is insert connectly.

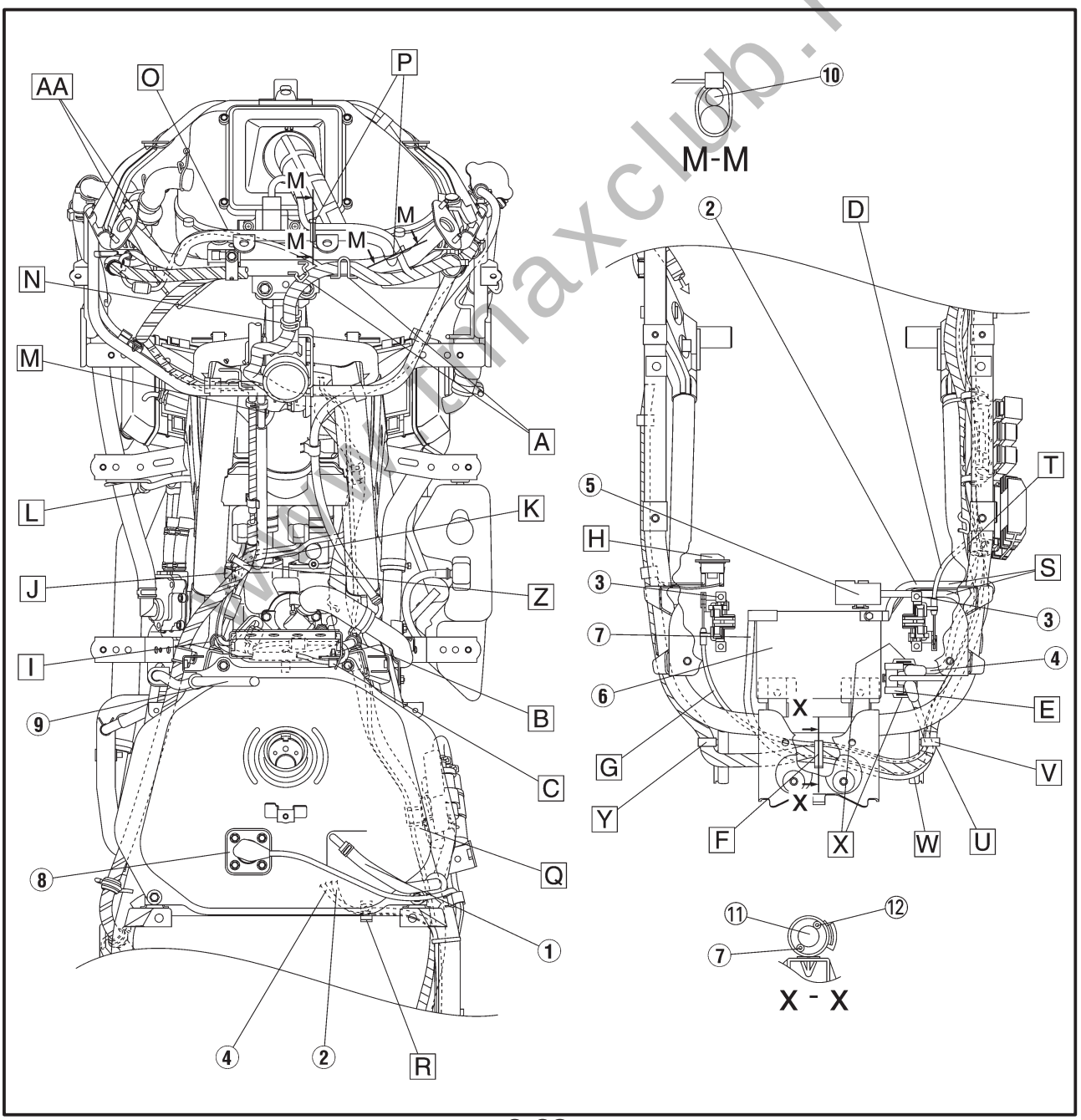


① Fuel hose
② Battery negative lead
③ Seat lock
④ Starter motor lead
⑤ Fuse box
⑥ Battery
⑦ Battery positive lead
⑧ Fuel sender
⑨ Breather hose
⑩ Lean angle cut-off switch lead
⑪ Wireharness
⑫ Seat lock cable

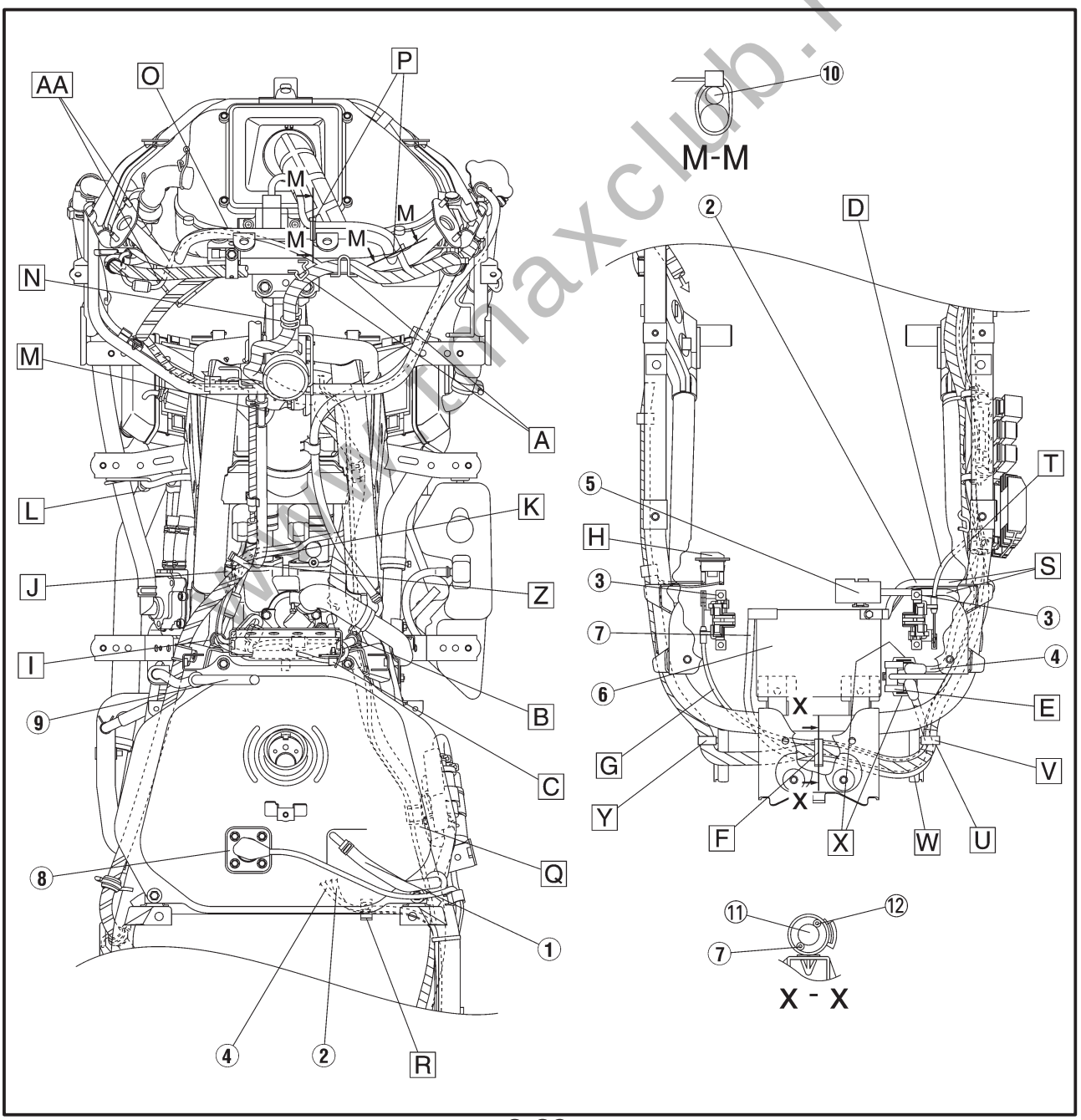
A Route the wireharness against the stay wire guide.
B Fasten the wireharness branch wiring to the frame with a plastic clamp.
C Fasten the wireharness to the frame with a plastic clamp.
D Connect the black wire on the outside of the seat lock cable to the right seat lock.
E Install the starter relay to the mad guard.
F Fasten the wireharness, battery positive lead and seat lock cable to the mad guard with a clamp.
G Connect the gray wire on the outside of the seat lock cable to the left seat lock.



[H] Install the box light to the box 1.
[I] Fasten the auto choke leads (left and right) and throttle position sensor lead to the frame with a clamp.
Leave some slack in the lead wires so that when the vacuum hose is install it does not press against them.
[J] Fasten the auto choke leads (left and right) to the frame with a plastic clamp.
[K] Pass the auto choke lead (right side) and throttle position sensor lead by the front bottom side of the vacuum hose.
[L] Route the thermo switch lead through the guide.
[M] Insert the air vent hose through the hole on the left side of the frame bracket.
[N] Route the wireharness through the guide.
[O] Place the speed sensor lead between the ribs of the air filter case.
[P] Fasten the lean angle cut-off switch lead to the stay (2 locations). Face the end of the band downward.
[Q] Hang the wireharness and seat lock cable on the wire holder on the back of the fuel pump attachment stay.
[R] Fasten the battery negative lead and the starter motor lead to the frame.
[S] Route the battery negative lead and the fuse box lead from the box opening to the bottom of the cross pipe.
[T] Pass the black seat lock cable beneath the battery negative lead and starter motor lead and out to the inside of the frame.

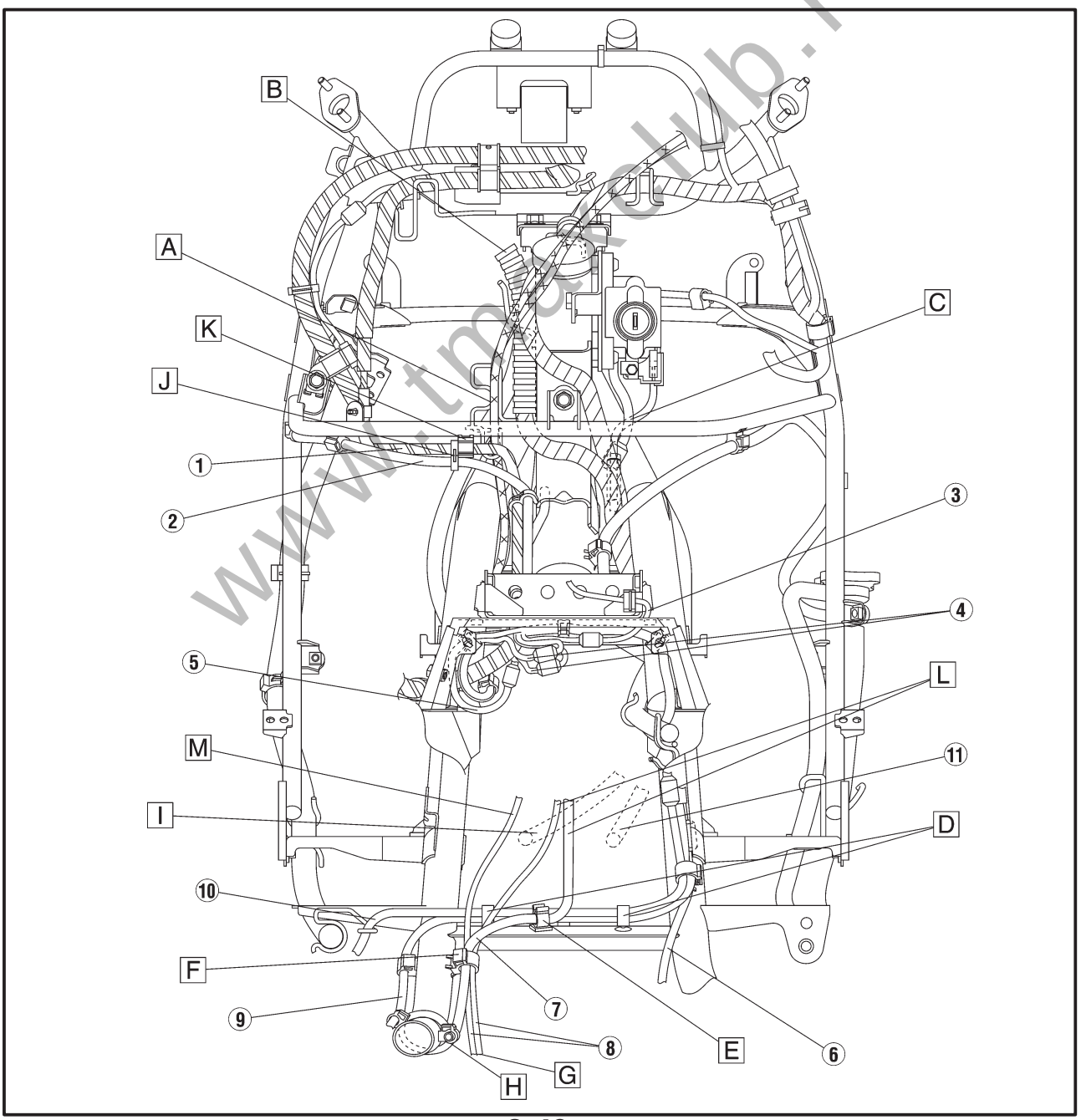


U Align the plastic clamp with the white tape on the wireharness and fasten the wireharness to the frame.
V Fasten the wireharness to the seat lock cable.
W Pass the wireharnesses past the outside of the frame bracket.
X Apply silicone when inserting the starter relay.
Y Fasten the wireharness to the frame with a plastic clamp.
Z Use a plastic band to hold the auto choke leads (left and right), throttle position sensor lead, and rear brake hose in a loose bandle. (The band should be loose enough so that it can be turned.) Pull the band end to the bottom.
AA Pass the speed sensor lead under the stay and cross pipe and then over the brake hose guide.

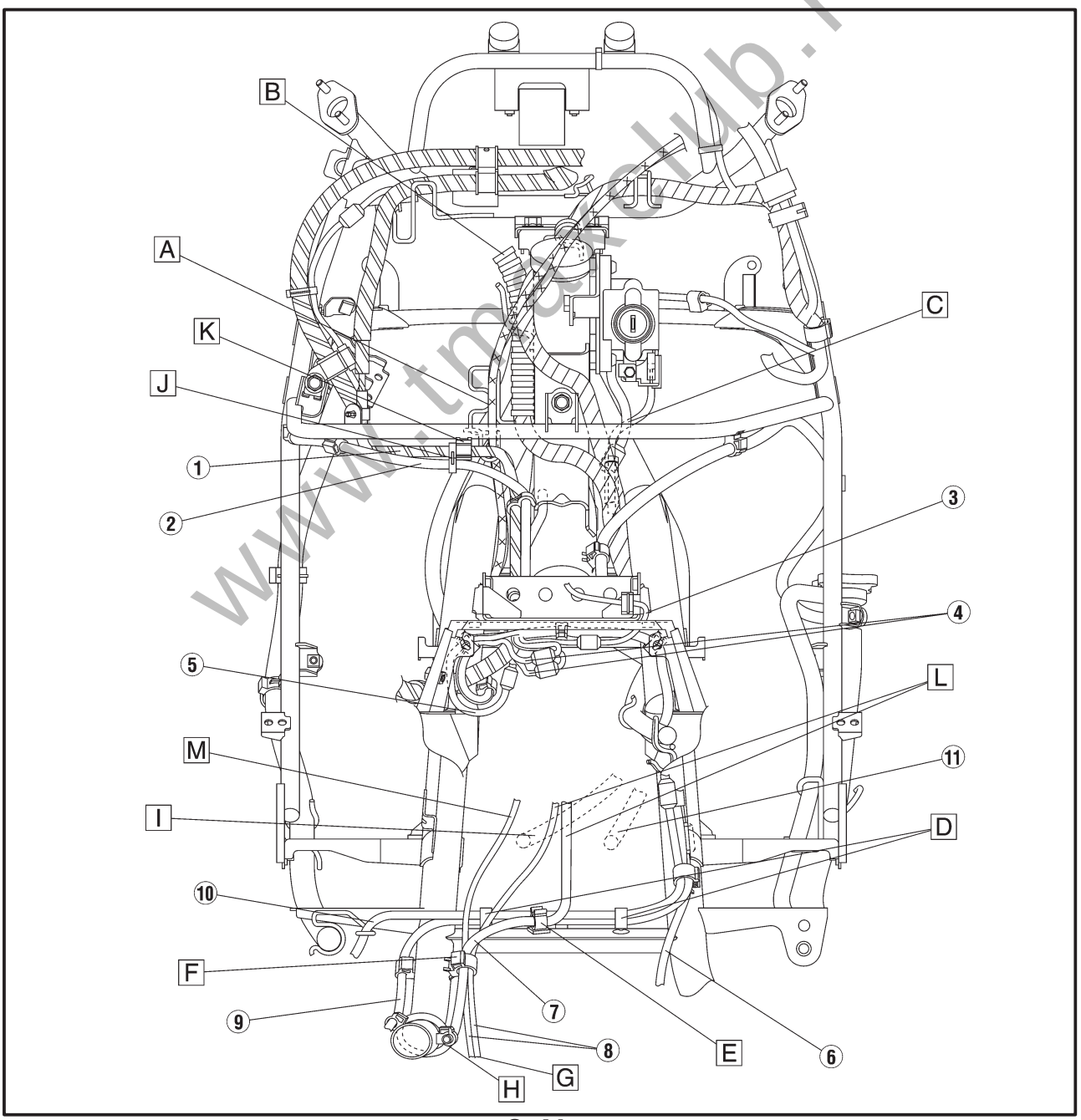


① Vacuum hose
② Rear brake hose
③ Switch assembly lead
④ Auto choke lead
⑤ Throttle position sensor lead
⑥ Fan motor lead
⑦ Air vent hose
⑧ Drain hoses
⑨ Sidestand switch lead
⑩ Thermo switch lead
⑪ High tension code

A Route the throttle cable through the cable holder.
B Into the handle cover.
C Route the main switch lead through over the seat lock cable.
D Fasten the sidestand switch lead and thermo switch lead to the frame with a plastic clamp.
E Fasten the carburetor air vent hose to the frame with a plastic clamp.
F Fasten the carburetor air vent hose and drain hoses (2 hoses) to the frame.
G Drop the carburetor drain hose.



H Fasten the rear end of the carburetor air vent hose to the frame with a plastic clamp. (The distance from the end of clamp to the frame must range from 0 to 5 mm.)
I Bundle the auto choke leads (left and right) and the throttle position sensor lead with a plastic clamp.
J Fasten the rear brake hose and vacuum hose with a plastic clamp.
K Faster the rear brake hose to the stay 1 with a plastic clamp.
L Pass the right carburetor drain hose and air vent hose between the right and left high tension cables.
M Route the left carburetor drain hose through the outside of the left high tension cable.



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CHAPTER 3
PERIODIC CHECKS AND ADJUSTMENTS

EAS00036

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.

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (×1,000 km)					ANNUAL CHECK
				1	10	20	30	40	
1	*	Fuel lilne (See page 3-29)	• Check fuel hoses and vacuum hose for cracks or damage.		✓	✓	✓	✓	✓
2	*	Fuel filter (See page 3-29)	• Check condition.			✓		✓	
3		Spark plugs (See page 3-18)	• Check condition. • Clean and regap.		✓		✓		
			• Replace.			✓		✓	
4	*	Valves (See page 3-8)	• Check valve clearance. • Adjust.	Every 40,000 km					
5		Air filter element (See page 3-27)	• Clean.		✓		✓		
			• Replace.			✓		✓	
6	*	V-belt case air filter elements (See page 3-28)	• Clean.		✓		✓		
			• Replace.			✓		✓	
7	*	Front brake (See page 3-36) (See page 3-37)	• Check operation, fluid level and vehicle for fluid leakage.	✓	✓	✓	✓	✓	✓
			• Repalce brake pads.	Whenever worn to the limit					
8	*	Rear brake (See page 3-36) (See page 3-37)	• Check operation, fluid level and vehicle for fluid leakage.	✓	✓	✓	✓	✓	✓
			• Replace brake pads.	Whenever worn to the limit					
9	*	Brake hose (See page 3-37)	• Check for cracks or damage.		✓	✓	✓	✓	✓
			• Replace.	Every 4 years					
10	*	Wheels (See page 3-47)	• Check runout and for damage.		✓	✓	✓	✓	
11	*	Tires (See page 3-45)	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		✓	✓	✓	✓	
12	*	Wheel bearings (See page 4-4)	• Check bearing for looseness or damage.		✓	✓	✓	✓	
13	*	Steering bearings (See page 3-40)	• Check bearing play and steering for roughness.	✓	✓	✓	✓	✓	
			• Lubricate with lithium-soap-based grease.	Every 20,000 km					
14	*	Chassis fasteners (See page 2-21)	• Make sure that all nuts, bolts and screws are properly tightened.		✓	✓	✓	✓	✓
15		Sidestand/centerstand (See page 3-48)	• Check operation. • Lubricate.		✓	✓	✓	✓	✓
16	*	Sidestand switch (See page 8-9)	• Check operation.	✓	✓	✓	✓	✓	✓
17	*	Front fork (See page 3-43)	• Check operation and for oil leakage.		✓	✓	✓	✓	
18	*	Rear shock absorber assembly (See page 3-49)	• Check operation and shock absorber for oil leakage.		✓	✓	✓	✓	
			• Lubricate the pivoting points with lithium-soap-based grease.			✓		✓	
19	*	Carburetors (See page 3-15)	• Adjust engine idling speed and synchronization.	✓	✓	✓	✓	✓	✓

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (×1,000 km)					ANNUAL CHECK
				1	10	20	30	40	
20		**Engine oil (See page 3-23)**	• Change.	✓	4,000 km after initial 1,000 km				
				When the oil change indicator light comes on (every 5,000 km)					
21		**Engine oil filter cartridge (See page 3-23)**	• Repalce.	✓		✓		✓	
22	*	**Cooling system (See page 3-32)**	• Check coolant level and vehicle for coolant leakage.		✓	✓	✓	✓	✓
			• Change.	Every 3 years					
23		**Chain drive oil (See page 3-39) (See page 3-40)**	• Check vehicle for oil leakage. • Change.		✓	✓	✓	✓	
24	*	**V-belt (See page 5-48)**	• Replace.	When the V-Belt replacement indication light comes on (every 20,000 km)					
25	*	**Front and rear brake switches (See page 8-9)**	• Check operation.	✓	✓	✓	✓	✓	✓
26		**Moving parts and cables (See page 3-48)**	• Lubricate.	✓	✓	✓	✓	✓	✓
27	*	**Lights, signals and switches (See page 3-57) (See page 3-58)**	• Check operation. • Adjust headlight beam.	✓	✓	✓	✓	✓	✓

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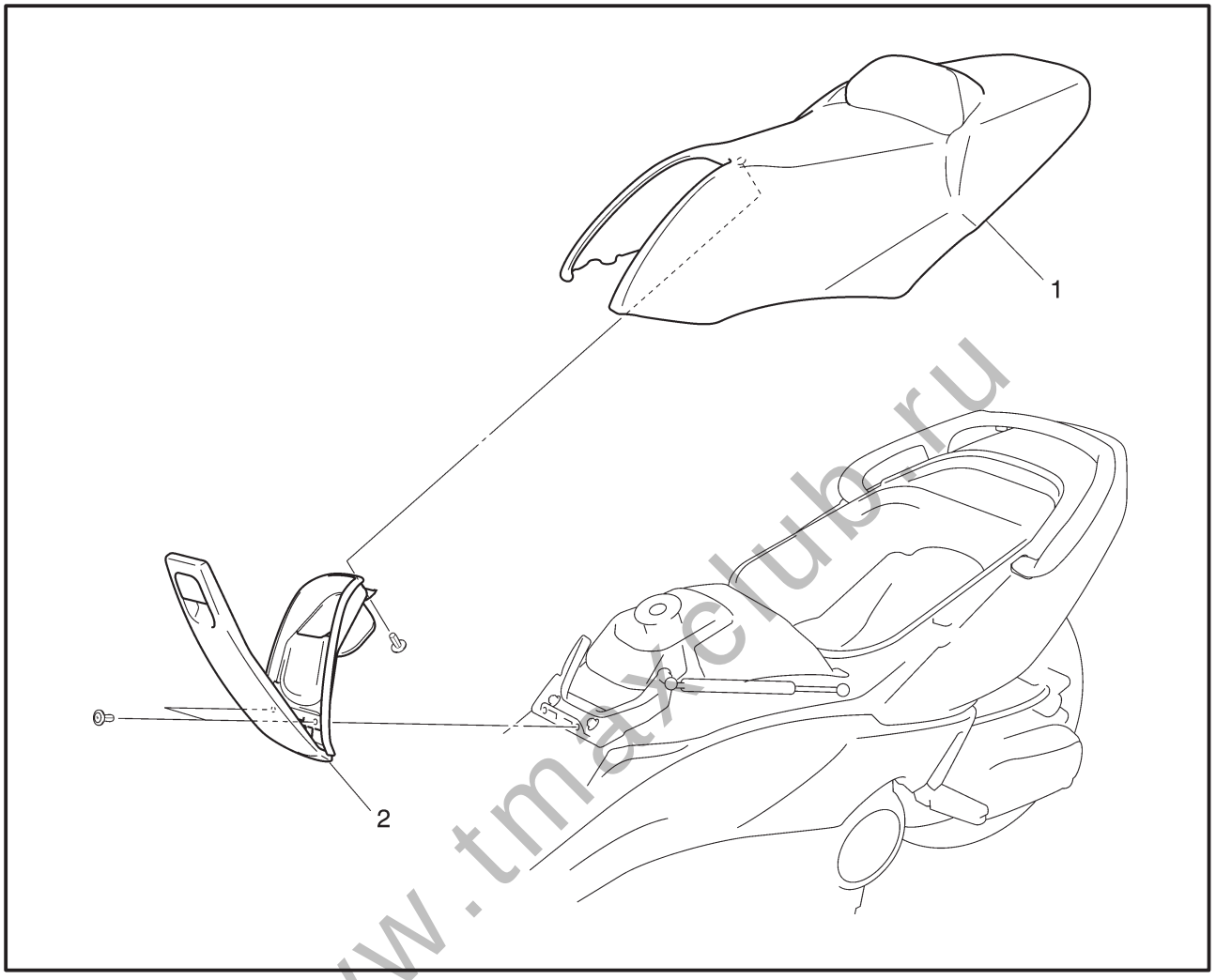
NOTE:

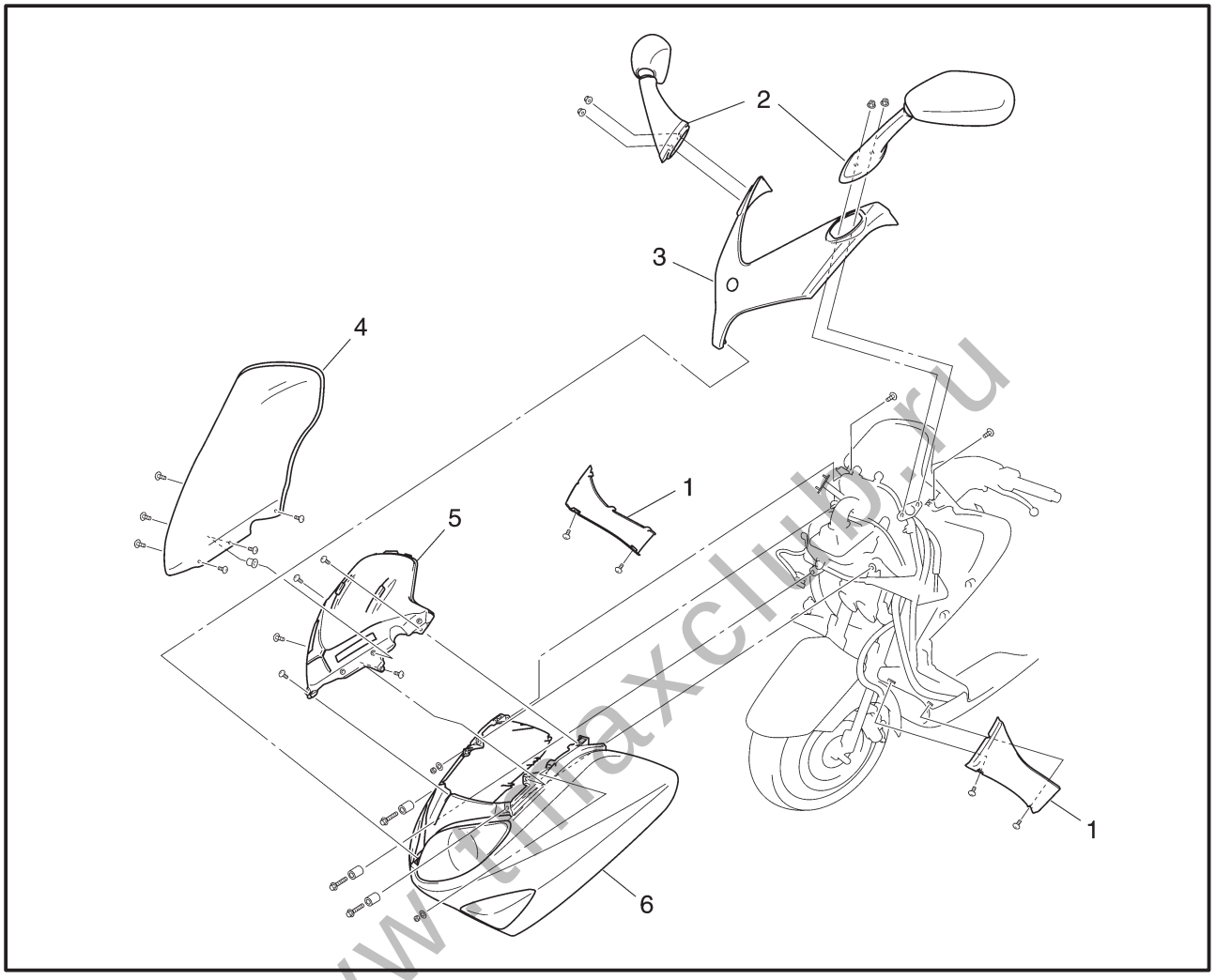
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake service
  - Regularly check and, if necessary, correct the brake fluid level.
  - Every two years replace the internal components of the brake master cylinder and caliper, and change the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

SEAT
SEAT AND FUEL LID



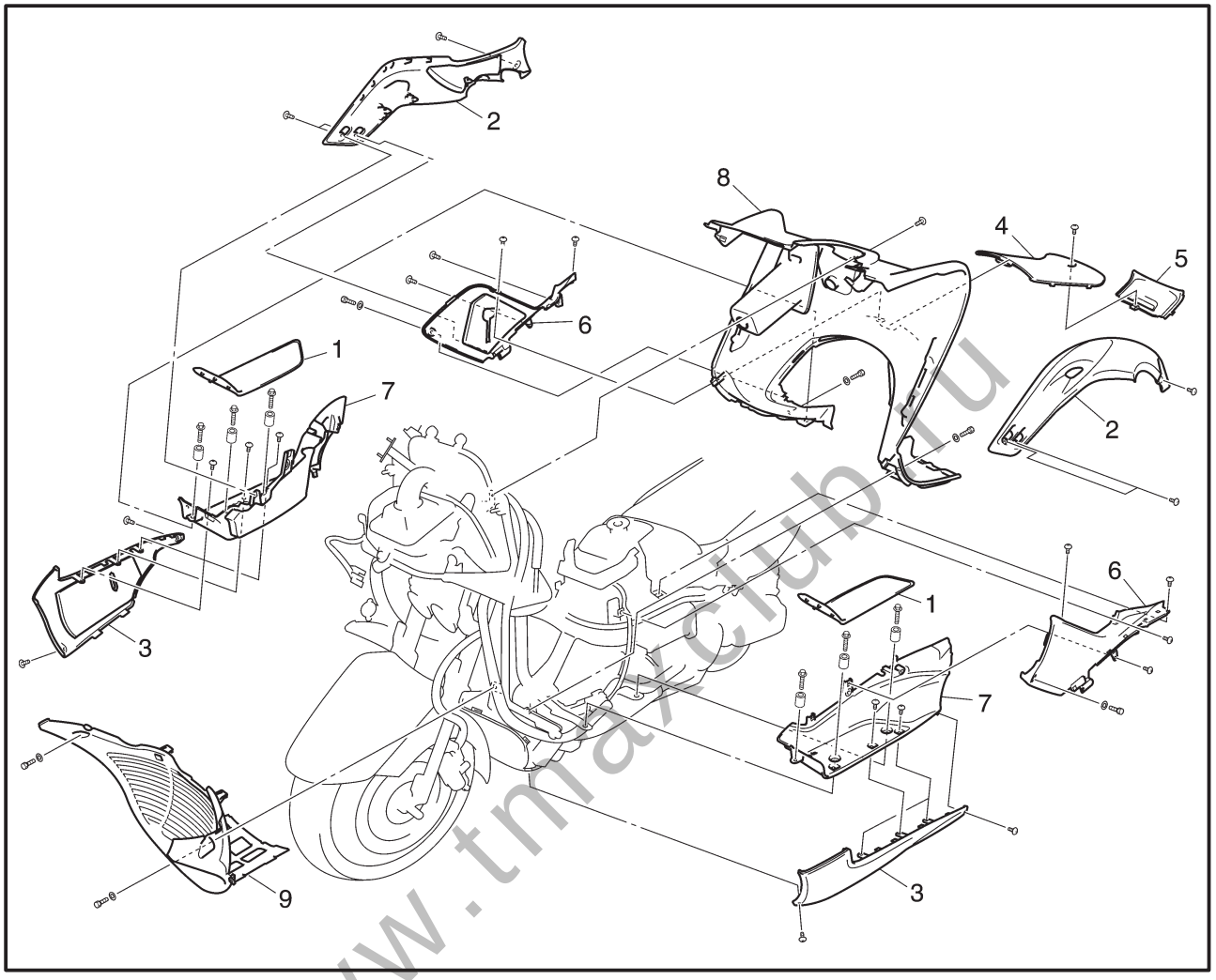
Order	Job/Part	Q'ty	Remarks
	Removing the seat and fuel lid		Removing the parts in the order listed.
1	Seat	1	
2	Fuel lid	1	
			For installation, reverse the removal procedure.

COVER AND PANEL
FRONT COWLING



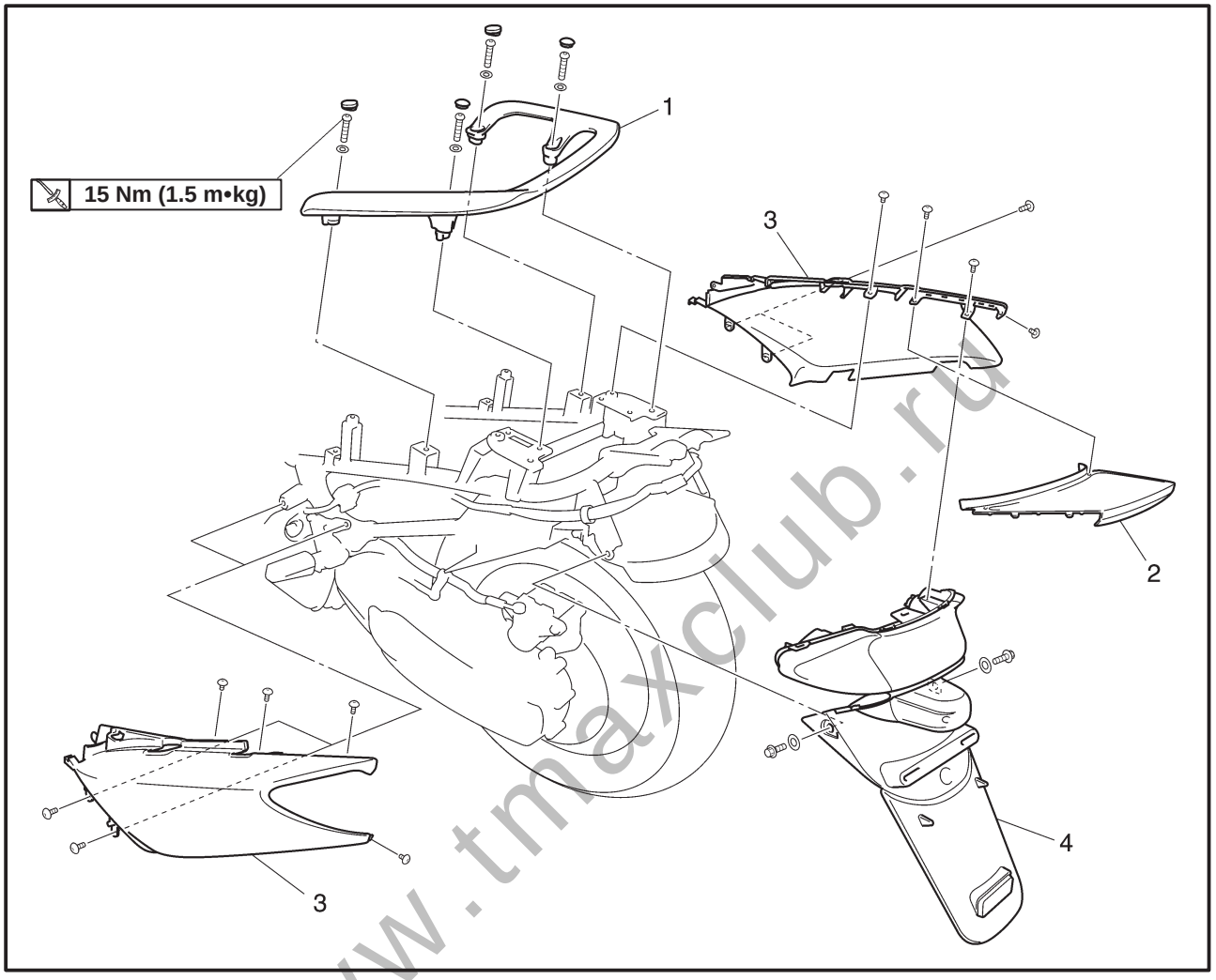
Order	Job/Part	Q'ty	Remarks
	Removing the front cowling		Refer to parts in the order listed.
1	Front side cover mole	2	
2	Rear view mirror	2	
3	Front cowling upper cover	1	
4	Windshield	1	
5	Front cowling inner panel	1	
6	Front cowling	1	
			For installation, reverse the removal procedure.

SIDE COVER MOLES



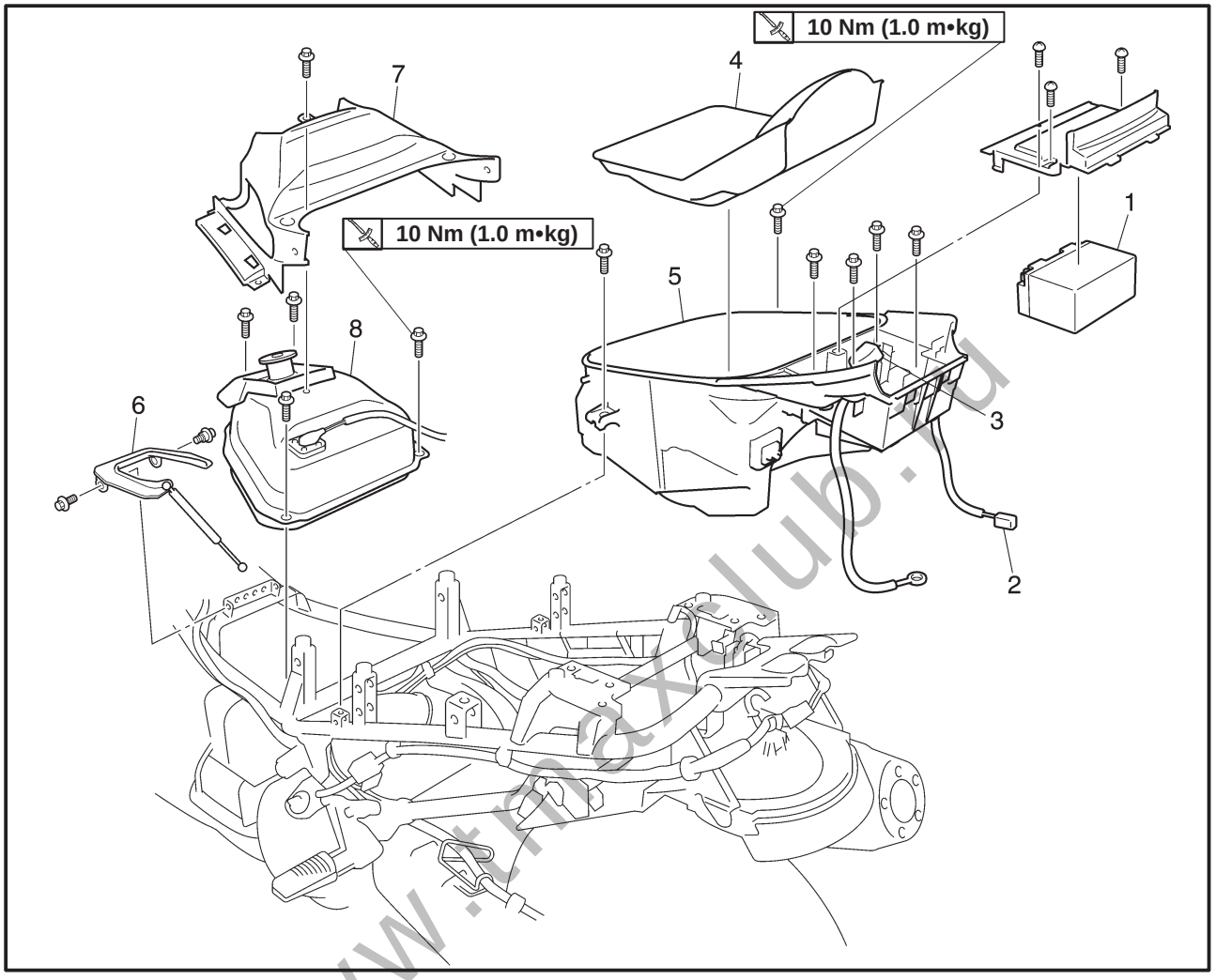
Order	Job/Part	Q'ty	Remarks
	Removing the side cover moles		Removing the parts in the order listed.
1	Mat (left and right)	2	
2	Upper side cover mole (left and right)	2	
3	Lower side cover mole (left and right)	2	
4	Center cover	1	
5	Hinge cover	1	
6	Side cover (left and right)	2	
7	Footrest board (left and right)	2	
8	Legshield	1	
9	Inner fender	1	
			For installation, reverse the removal procedure.

REAR COVERS AND TAILLIGHT



Order	Job/Part	Q'ty	Remarks
	Removing the rear covers and taillight		Removing the parts in the order listed.
1	Grab bar	1	
2	Rear cover	1	
3	Rear side cover (left and right)	2	
4	Taillight assembly	1	
			For installation, reverse the removal procedure.

FUEL TANK

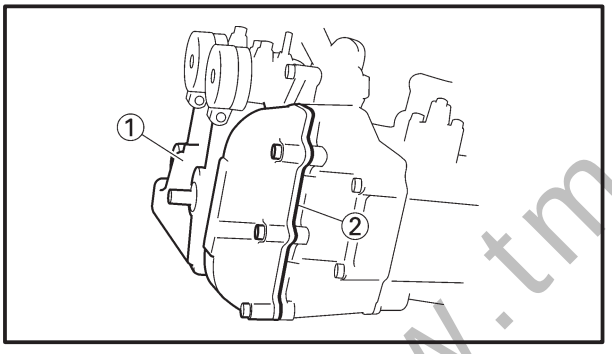


Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed.
1	Battery	1	
2	Fuse box coupler	1	Disconnect.
3	Battery positive lead	1	Disconnect.
4	Luggage box mat	1	
5	Luggage box	1	
6	Hinge and domper	1	
7	Fuel tank cover	1	
8	Fuel tank	1	
			For installation, reverse the removal procedure.

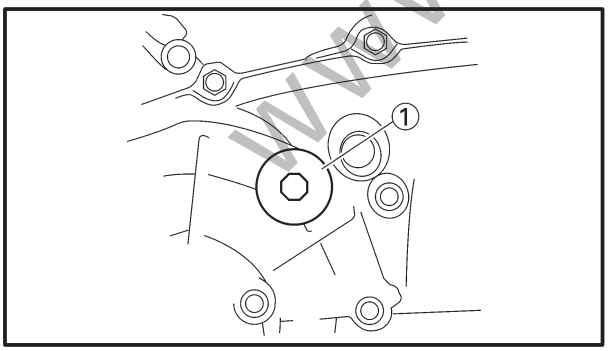
EAS00045
ENGINE
ADJUSTING THE VALVE CLEARANCE
The following procedure applies to all of the valves.

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

1. Remove:
   - footrest boards
   - front cowling
   - legshield
   Refer to “COVER AND PANEL”.
2. Remove:
   - radiator
   Refer to “RADIATOR” in chapter 6.



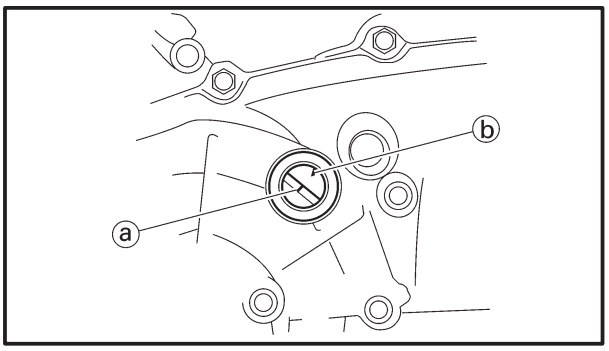
3. Remove:
   - carburetor
   - spark plug
   - cylinder head cover ①
   - cylinder head cover gasket ②
   - intake manfold
   Refer to “CARBURETORS” in chapter 7.



4. Remove:
   - timing plug ①

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

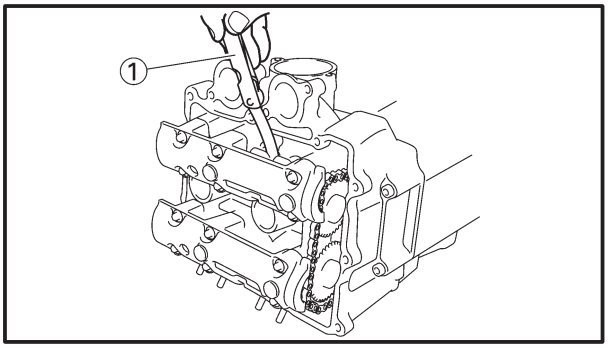
Valve clearance (cold)
Intake valve
0.15 ~ 0.20 mm
Exhaust valve
0.25 ~ 0.30 mm



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

NOTE:

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



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

NOTE:

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

d. Turn the crankshaft 360° counterclockwise and check the valve clearance of piston #2.

6. Remove:

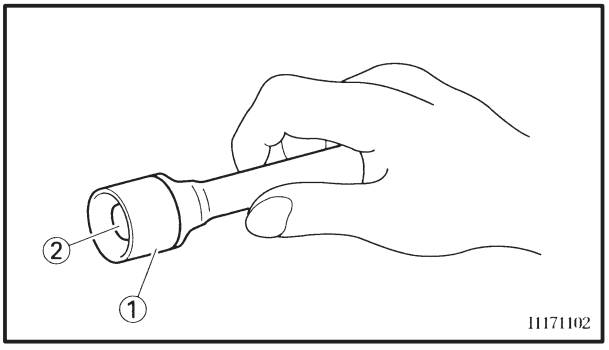
CAUTION:

When removing the camshaft from the cylinder head, first tip up the chassis front side at least 25° from the chassis level position.

- intake camshaft
- exhaust camshaft

NOTE:

- Refer to “CAMSHAFTS” in chapter 5.
- When removing the timing chain and camshafts, fasten a wire to the timing chain to retrieve it if it falls into the cramkcase.

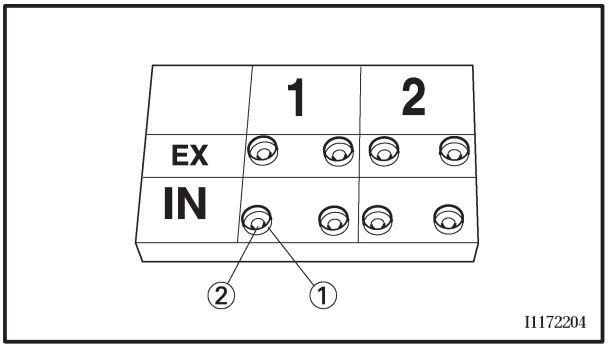


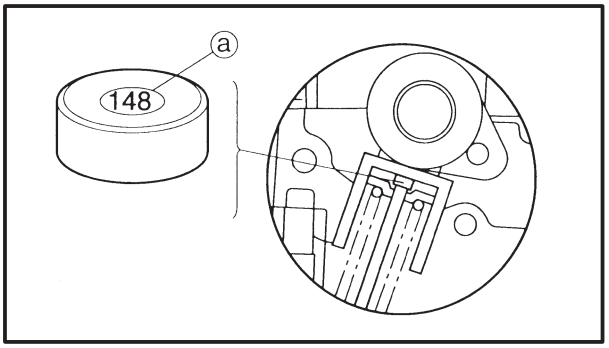
7. Adjust:
   - valve clearance

a. Remove the valve lifter ① and the valve pad ②.

NOTE:

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.





• Make a note of the position of each valve lifter ① and valve pad ② so that they can be installed in the correct place.

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

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

NOTE:
- The thickness ⓐ of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.

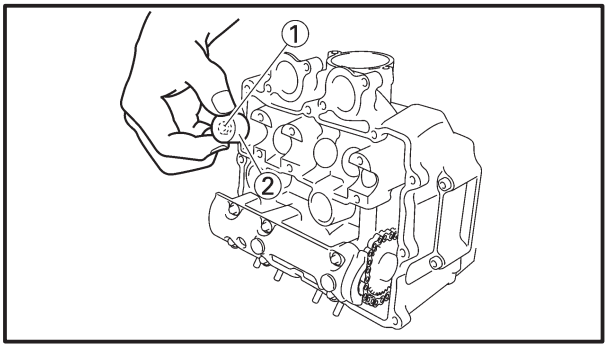
c. Round off the original valve pad number according to the following table.

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

EXAMPLE:
Original valve pad number = 148 (thickness =1.48 mm (0.058 in))
Rounded value = 150

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

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



e. Install the new valve pad ① and the valve lifter ②.

NOTE:

- Apply molybdenum disulfide to the valve pad.
- Lubricate the valve lifter with molybdenum disulfide oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.

f. Install the exhaust and intake camshafts, timing chain and camshaft caps.

Camshaft cap bolt
10 Nm (1.0 m•kg)

NOTE:

- Refer to “CAMSHAFTS” in chapter 5.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- Align the camshaft markswith the cylinder head.
- Turn the crankshaft counterclockwise several turns to seat the parts.

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

VALVE PAD SELECTION TABLE
INTAKE

B MEASURED VALVE CLEARANCE	A 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	225
0.03 ~ 0.07			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.11 ~ 0.20	C STANDARD CLEARANCE																								
0.21 ~ 0.22	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.23 ~ 0.27	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.28 ~ 0.32	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.33 ~ 0.37	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.38 ~ 0.42	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.43 ~ 0.47	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.48 ~ 0.52	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.53 ~ 0.57	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.58 ~ 0.62	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.63 ~ 0.67	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.68 ~ 0.72	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.73 ~ 0.77	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.78 ~ 0.82	185	190	195	200	205	210	215	220	225	230	235	240													
0.83 ~ 0.87	190	195	200	205	210	215	220	225	230	235	240														
0.88 ~ 0.92	195	200	205	210	215	220	225	230	235	240															
0.93 ~ 0.97	200	205	210	215	220	225	230	235	240																
0.98 ~ 1.02	205	210	215	220	225	230	235	240																	
1.03 ~ 1.07	210	215	220	225	230	235	240																		
1.08 ~ 1.12	215	220	225	230	235	240																			
1.13 ~ 1.17	220	225	230	235	240																				
1.18 ~ 1.22	225	230	235	240																					
1.23 ~ 1.27	230	235	240																						
1.28 ~ 1.32	235	240																							
1.33 ~ 1.37	240																								

Example:
Valve Clearance (cold)
0.11 ~ 0.20 mm
Rounded value 150
Measured valve clearance is 0.24 mm
Replace pad 150 with pad 160
Pad No. 150 = 1.50 mm
Pad No. 160 = 1.60 mm
Always install the valve pad with the number facing down.

EXHAUST

B MEASURED VALVE CLEARANCE	A 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
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.30	C STANDARD CLEARANCE																								
0.31 ~ 0.32	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.33 ~ 0.37	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.38 ~ 0.42	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.43 ~ 0.47	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.48 ~ 0.52	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.53 ~ 0.57	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.58 ~ 0.62	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.63 ~ 0.67	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.68 ~ 0.72	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.73 ~ 0.77	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.78 ~ 0.82	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.83 ~ 0.87	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.88 ~ 0.92	185	190	195	200	205	210	215	220	225	230	235	240													
0.93 ~ 0.97	190	195	200	205	210	215	220	225	230	235	240														
0.98 ~ 1.02	195	200	205	210	215	220	225	230	235	240															
1.03 ~ 1.07	200	205	210	215	220	225	230	235	240																
1.08 ~ 1.12	205	210	215	220	225	230	235	240																	
1.13 ~ 1.17	210	215	220	225	230	235	240																		
1.18 ~ 1.22	215	220	225	230	235	240																			
1.23 ~ 1.27	220	225	230	235	240																				
1.28 ~ 1.32	225	230	235	240																					
1.33 ~ 1.37	230	235	240																						
1.38 ~ 1.42	235	240																							
1.43 ~ 1.47	240																								

Example:
Valve Clearance (cold)
0.21 ~ 0.30 mm
Rounded value 175
Measured valve clearance is 0.35 mm
Replace pad 150 with pad 185
Pad No. 175 = 1.75 mm
Pad No. 185 = 1.85 mm
Always install the valve pad with the number facing down.

8. Install:
   • all removed parts

NOTE:

For installation, reverse the removal procedure.

EAS00051

SYNCHRONIZING THE CARBURETORS

NOTE:

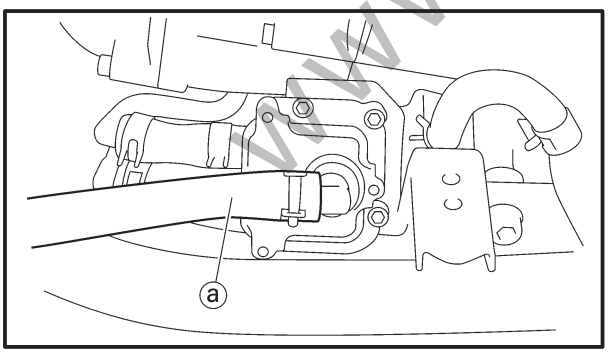
Prior to synchronizing the carburetors, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

1. Stand the scooter on a level surface.

NOTE:

Place the scooter on a suitable stand.

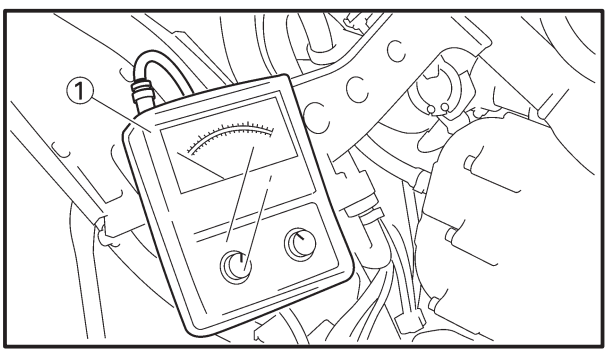
2. Remove:
   • center cover
   • side covers (left and right)
   Refer to “COVER AND PANEL”.



3. Stop air induction system operation and take ameasurement.

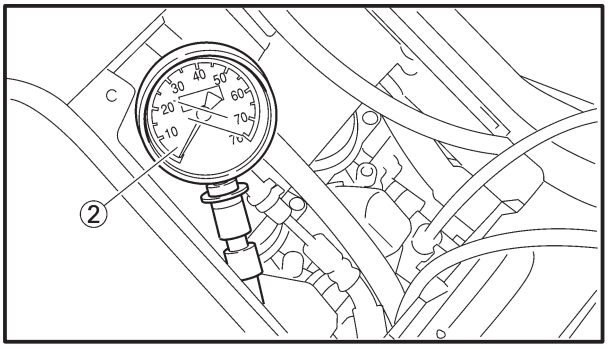
NOTE:

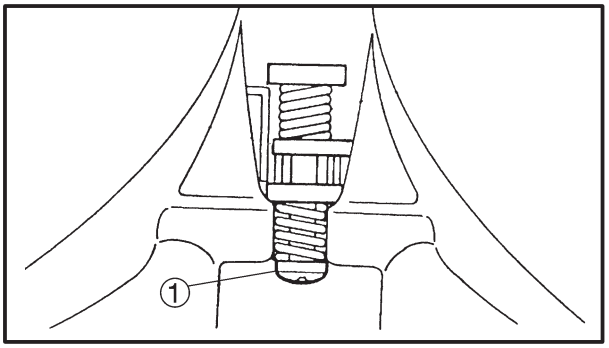
Crimp the hose ⓐ running from the lead valve to the air cut off valve to prevent the air cut off valve from operating.
Make sure not to damage the hose while crimping it.



4. Install:
   • engine tachometer ①
   (onto the spark plug lead of cylinder. #1)
   • vacuum gauge ②

Engine tachometer
90890-03113
Vacuum gauge
90890-03094





5. Start the engine and let it warm up for several minutes.
6. Check:
   • engine idling speed
   Out of specification → Adjust.
   Refer to "ADJUSTING THE ENGINE IDLING SPEED".

Engine idling speed
1150 ~ 1250 r/min

7. Adjust:
   • carburetor synchronization

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a. Synchronize carburetor #1 to carburetor #2 by turning the synchronizing screw ① in either direction until both gauges read the same.
b. Rev the engine two or three times, each time for less than a second, and check the synchronization again.

Vacuum pressure at engine idling speed
35 kPa (263 mm Hg, 10.4 in Hg)

NOTE:

The difference between the two carburetors should not exceed 1.33 kPa (10 mm Hg, 0.4 in Hg).

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8. Measure:
   • engine idling speed (adjust while the air induction system is operating)
   Out of specification → Adjust.
9. Stop the engine and remove the measuring equipment.
10. Adjust:
   • throttle cable free play
   Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".

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

11. Install:
   • side covers (left and right)
   • center cover
   Refer to "COVER AND PANEL".

EAS00052

ADJUSTING THE ENGINE IDLING SPEED

NOTE:

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

1. Start the engine and let it warm up for several minutes.
2. Remove:
   - center cover
   - side cover (left and right)
   Refer to “COVER AND PANEL”.
3. Install:
   - engine tochometer
   (onto the spark plug lead of cylinder. #1)

Engine tachometer
90890-03113

4. Measure:
   - engine idling speed
   Out of spcification → adjust

Engine idling speed
1150 ~ 1250 r/min

5. Adjust:
   - engine idling speed

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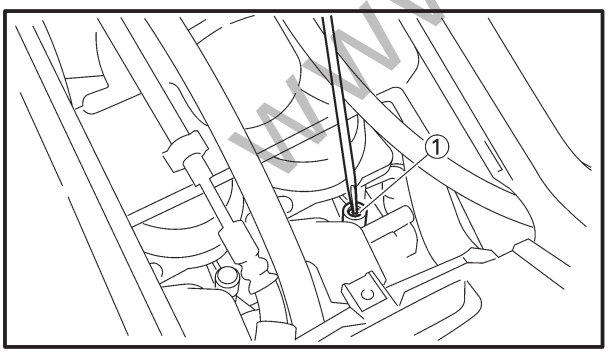
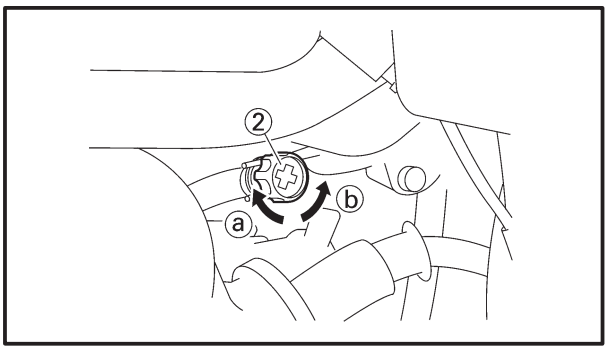
a. Turn the pilot screw ① in or out until it is lightly seated.
b. Turn the pilot screw out the specified number of turns.



Pilot screw
2 turns out



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

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

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

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

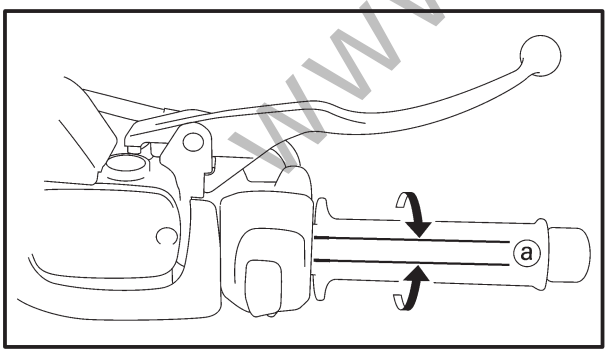
7. Install:
   • side covers (left and right)
   • center cover
   Refer to "COVER AND PANEL".

EAS00055

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

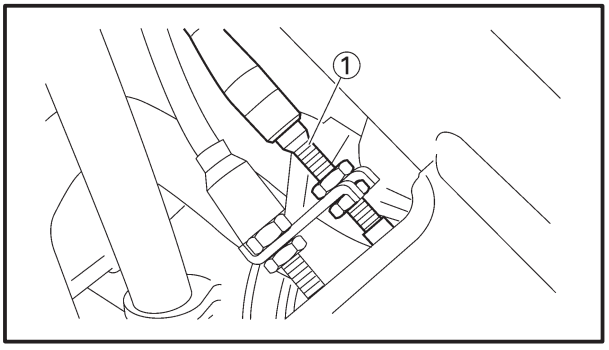
Prior to adjusting the throttle cable free play, the engine idling speed and carburetor synchronization should be adjusted properly.



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

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

2. Remove:
   • center cover
   • side cover (left)
   Refer to "COVER AND PANEL".



3. Adjust:
   • throttle cable free play

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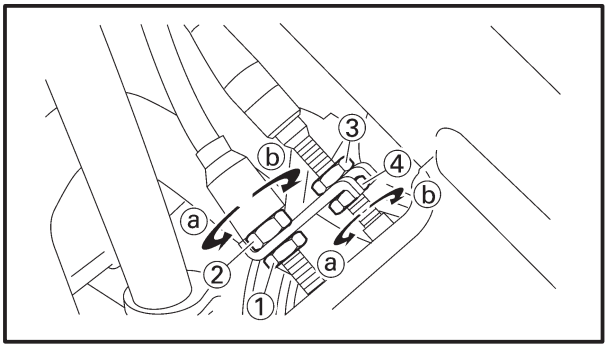
NOTE:

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



Carburetor side

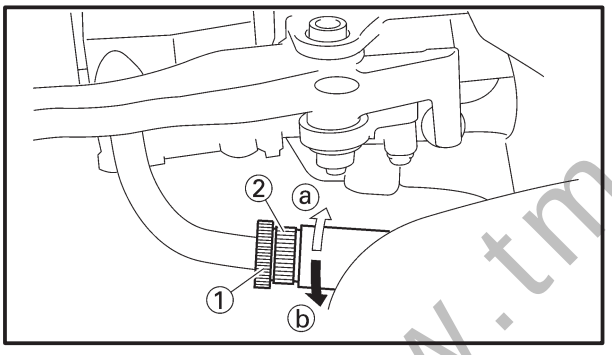
a. Loosen the locknut ① on the decelerator cable.
b. Turn the adjusting nut ② in direction ⓐ or ⓑ to take up any slack on the decelerator cable.
c. Loosen the locknut ③ on the accelerator cable.
d. Turn the adjusting nut ④ in direction ⓐ or ⓑ until the specified throttle cable free play is obtained.

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

e. Tighten the locknuts.

NOTE:

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



Handlebar side

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

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

c. Tighten the locknut ①.

⚠ WARNING

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

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4. Install:
   • side cover (left)
   • center cover
   Refer to “COVER AND PANEL”.

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
   - center cover
   - side cover (left and right)

   Refer to “COVER AND PANEL”.
2. Disconnect:
   - spark plug cap
3. Remove:
   - spark plug

CAUTION:

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

4. Check:
   - spark plug type

   Incorrect → Change.

Spark plug type (manufacturer)
CR7E (NGK)

5. Check:
   - electrode ①

   Damage/wear → Replace the spark plug.
   - insulator ②

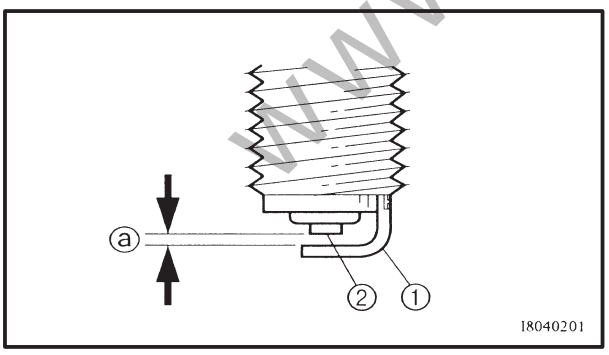
   Abnormal color → Replace the spark plug.

   Normal color is a medium-to-light tan color.
6. Clean:
   - spark plug

   (with a spark plug cleaner or wire brush)
7. Measure:
   - spark plug gap ⓐ

   (with a wire gauge)

   Out of specification → Regap.



Spark plug gap
0.7 ~ 0.8 mm

8. Install:
   - spark plug

Spark plug
12.5 Nm (1.25 m•kg)

NOTE:

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

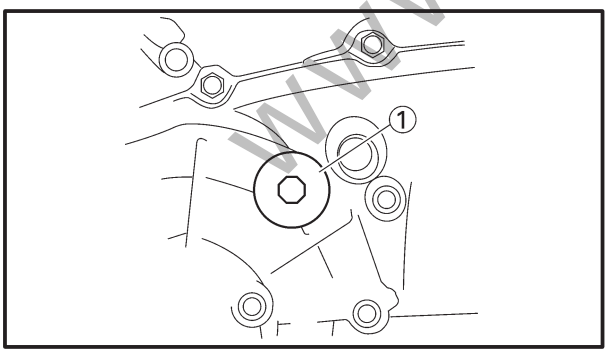
9. Connect:
   • spark plug cap
10. Install:
   • center cover
   • side cover (left and right)
   Refer to “COVER AND PANEL”.

EAS00062

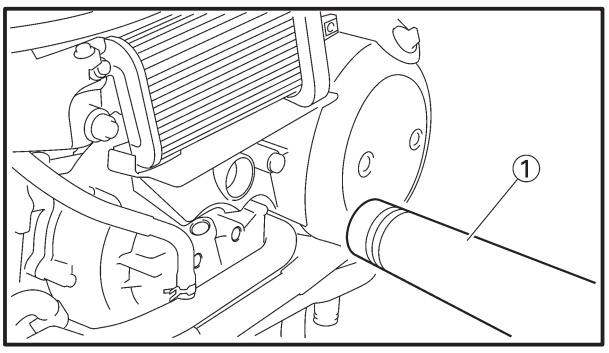
CHECKING THE IGNITION TIMING

NOTE:

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



1. Remove:
   • footrest board (left)
   • center cover
   • side cover (left)
   Refer to “COVER AND PANEL”.
2. Remove:
   • timing plug ①



3. Install:
   • timing light ①
   • engine tachometer
   (onto the spark plug lead of cylinder. #1)

Timing light
90890-03141
Engine tachometer
90890-03113

4. 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 **1150 ~ 1250 r/min**

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

NOTE:

The ignition timing is not adjustable.

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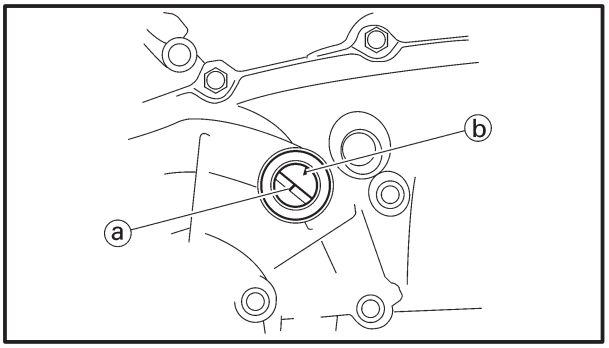


5. Install:
   • timing plug
   • footrest board (left)
   • side cover (left)
   • center cover
   Refer to “COVER AND PANEL”.

EAS00065

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE:

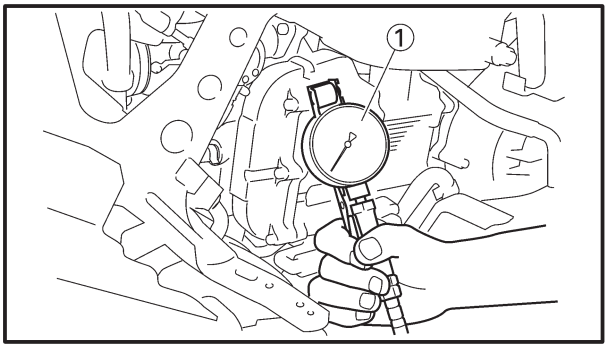
Insufficient compression pressure will result in a loss of performance.

1. Remove:
   • legshield.
   • inner fender (rear)
   Refer to “COVER AND PANEL”.
2. Measure:
   • valve clearance
   Out of specification → Adjust.
   Refer to “ADJUSTING THE VALVE CLEARANCE”.

3. Start the engine, warm it up for several minutes, and then turn it off.
4. Disconnect:
   • spark plug cap
5. Remove:
   • spark plug

CAUTION:

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



6. Install:
   • compression gauge ①

Compression gauge
90890-03081
Adapter
90890-04082

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

Compression pressure at 360 r/min (at sea level)
Minimum
1,400 kPa (14.0 kg/cm², 14.0 bar)
Standard
1,450 kPa (14.5 kg/cm², 14.5 bar)
Maximum
1,500 kPa (15.0 kg/cm², 15.0 bar)

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 all spark plug leads before cranking the engine.

NOTE:

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

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces, and piston crown for carbon deposits.
d. If the compression pressure is below the minimum specification, squirt a few drops of oil into the cylinder and measure again.

Refer to the following table.

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

8. Install:
   • spark plug — **12.5 Nm (1.25 m•kg)**
9. Install:
   • legshield

EB303070

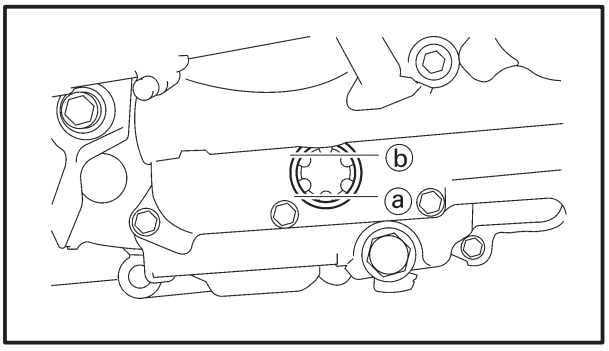
CHECKING THE ENGINE OIL LEVEL

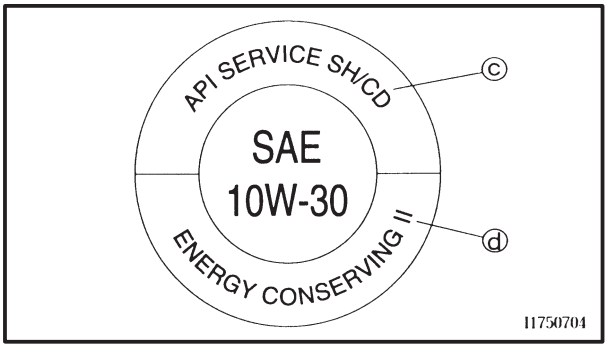
1. Stand the scooter on a level surface.

NOTE:

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

2. Start the engine when the engine is cool, let it idle for two minutes, and then stop it.
3. Wait two minutes until the oil settles, and then check the oil level through the check window located at the bottom-left side of the crankcase.
4. 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.

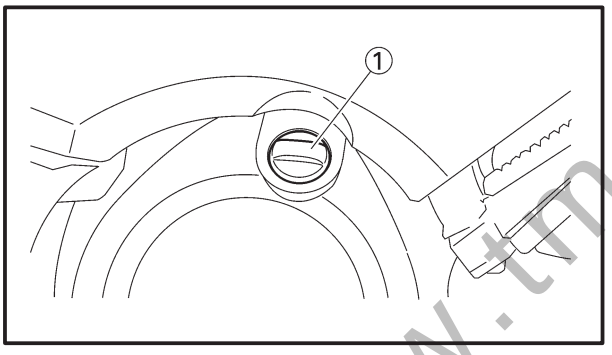


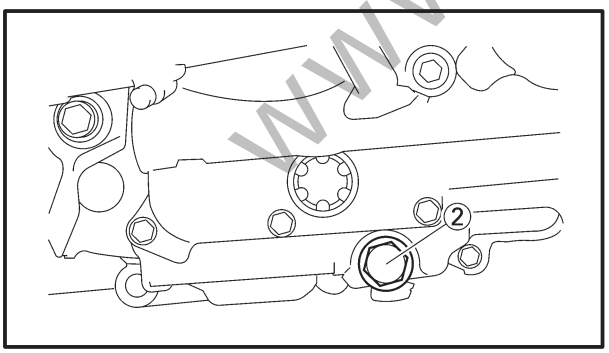


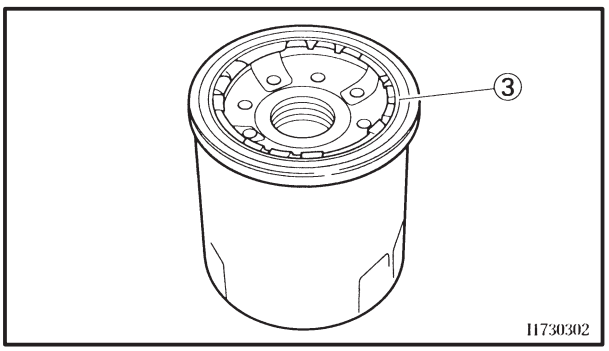
Recommended oil
SAE10W30 or SAE 10W40
API standard
SE, SF, SG or higher grade
(Non-Friction modified)

CAUTION:

- **Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD ⓒ or higher and do not use oils labeled "ENERGY CONSERVING II" ⓓ or higher.**
- **Do not allow foreign materials to enter the crankcase.**







CHANGING THE ENGINE OIL

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

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Remove the oil filter cartridge ③ with an oil filter wrench.

Oil filter wrench
90890-01469

b. Lubricate the O-ring of the new oil filter cartridge with a thin coat of engine oil.

CAUTION:

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

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

Oil filter cartridge
17 Nm (1.7 m•kg)

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

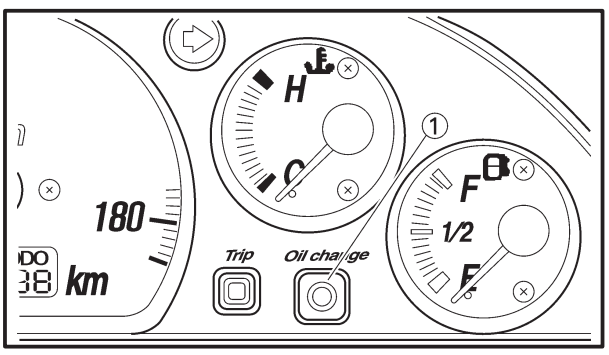
Quantity
Total amount
3.6 L
Without oil filter cartridge replacement
2.8 L
With oil filter cartridge replacement
2.9 L

9. Install:
   • engine oil filler cap
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
   • engine
   (for engine oil leaks)
12. Check:
   • engine oil level
   Refer to “CHECKING THE ENGINE OIL LEVEL”.
13. Reset:
   • Oil change indicator light perform the following procedure.

1. Turn the key to “ON”.
2. Hold the reset button pushed for two to five seconds.
3. Release the reset button ① and the oil change indicator light will go off.

NOTE:

If the engine oil is changed before the oil change indicator light comes on (i.e. before the periodic oil change interval has been reached), the indicator light must be resert after the oil change for the next periodic oil change to be indicated at the correct time. To reset the oil change indicator light before the periodic oil change interval has been reached, follow the above procedure, but note that the indicator light will come on for 1.4 seconds after releasing the reset button, otherwise repeat the procedure.



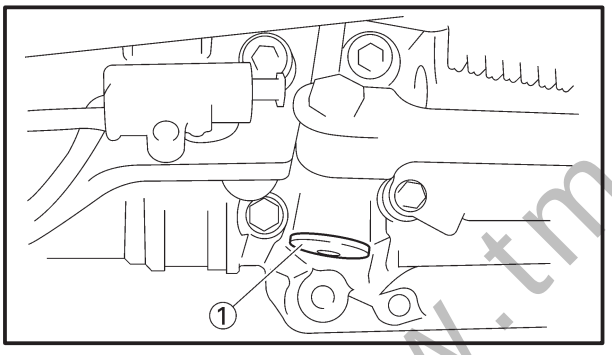
EAS00077

MEASURING THE ENGINE OIL PRESSURE

1. Check:
   • engine oil level
   Below the minimum level mark → Add the recommended engine oil to the proper level.
2. Remove:
   • lower side cover mole
   Refer to “COVER AND PANEL”.
3. Start the engine, warm it up for several minutes, and then turn it off.

CAUTION:

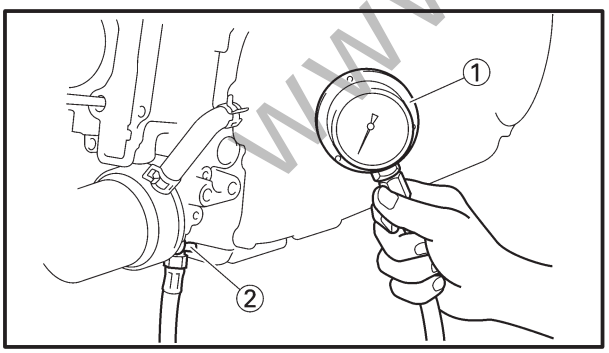
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.



4. Remove:
   • main gallery bolt ①

⚠ WARNING

The engine, muffler and engine oil are extremely hot.



5. Install:
   • oil pressure gauge ①
   • adapter ②

Oil pressure gauge
90890-03153
Adapter
90890-03124

6. Measure:
   • engine oil pressure
   (at the following conditions)
   Out of specification → Replace.

Engine oil pressure
150 kPa (1.5 kg/cm^2)
Engine speed
Approx. 1200 r/min
Engine oil temperature
80°C

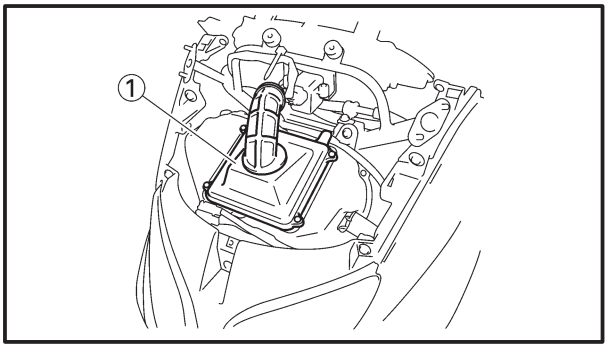
Engine oil pressure	Possible causes
Below specification	Faulty oil pump Clogged oil filter Leaking oil passage Broken or damaged oil seal
Above specification	Leaking oil passage Faulty oil filter Oil viscosity too high

7. Install:
   • main gallery bolt ① — 20 Nm (2.0 m•kg)

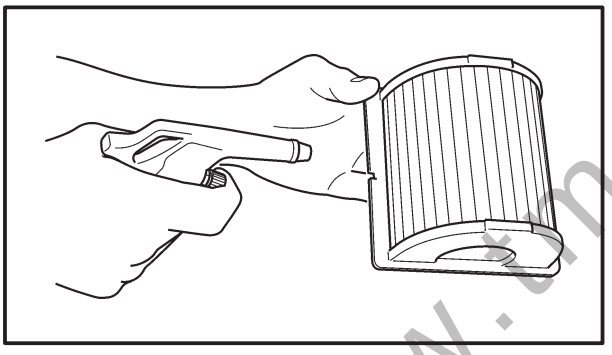
CLEANING THE AIR FILTER ELEMENT

1. Remove:
   - front cowling upper cover
   - windshield
   - front cowling inner panel

   Refer to “COVER AND PANEL”.



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



3. Clean:
   - air filter element

   Apply compressed air to the outer surface of the air filter element.
4. Check:
   - air filter element

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

CAUTION:

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

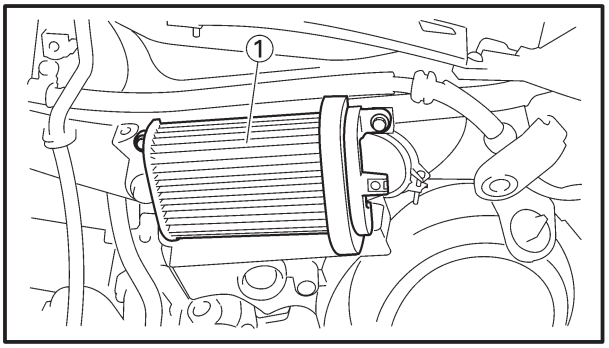
NOTE:

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

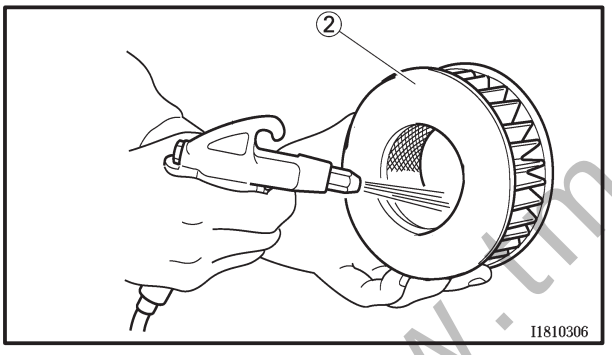
6. Install:
   - front cowling inner panel
   - windshield
   - front cowling upper cover

CLEANING THE V-BELT CASE AIR FILTER ELEMENT

1. Remove:
   - upper side cover mole (left)
   - footrest board (left)
   Refer to “COVER AND PANEL”.



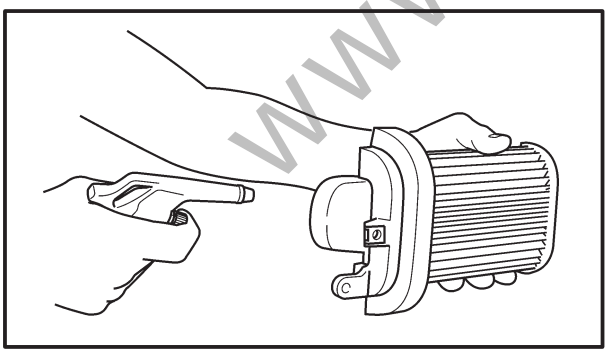
2. Remove:
   - V-velt case air filter element ① and ②
3. Clean:
   - V-velt case air filter element
   Apply compressed air to the inner surface of V-velt case air filter element.
4. Check:
   - V-velt case air filter element
   Damage → Replace.



CAUTION:

Since the V-belt case air filter element is a dry type, do not let grease or water contact it.

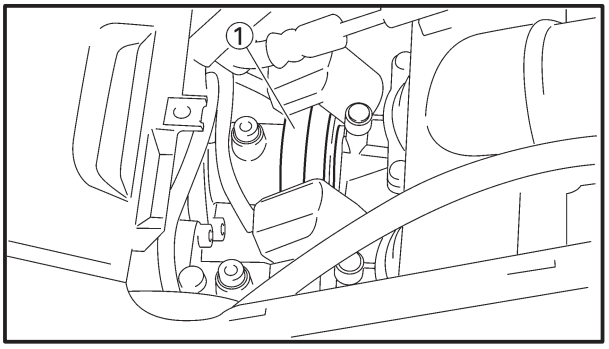
5. Install:
   - footrest board (left)
   - upper side cover mole (left)



CHECKING THE CARBURETOR JOINTS AND INTAKE MANIFOLDS

The following procedure applies to all of the carburetor joints.

1. Remove:
   - legshield
   Refer to “COVER AND PANEL”.



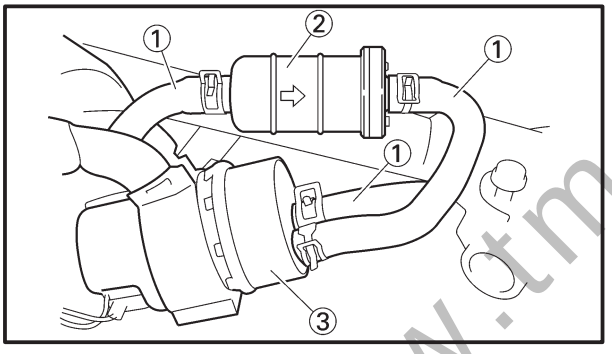
2. Check:
   • carburetor joints ①
   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 7.
3. Install:
   • legshield

EAS00097

CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

1. Remove:
   • footrest board (right)
   • upper side cover mole (right)
   Refer to “COVER AND PANEL”.



2. Check:
   • fuel hose ①
   Cracks/damage → Replace.
   • fuel filter ②
   Damage/dirt → Replace.

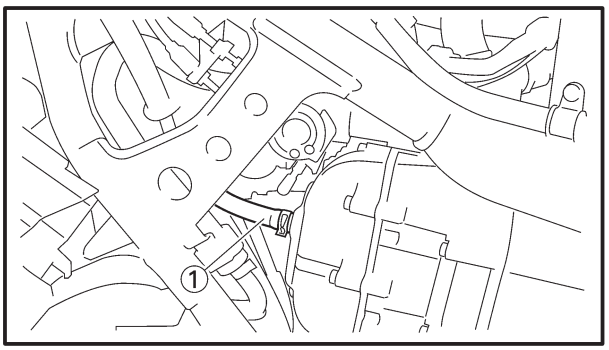
NOTE:

- Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
- The arrow mark on the fuel filter should face to the side of the fuel pump ③.

3. Install:
   • upper side cover mole (right)
   • footrest board
   Refer to “COVER AND PANEL”.

CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
   • legshield
   Refer to “COVER AND PANEL”.



2. Check:
   • crankcase breather hose ①
   Cracks/damage → Replace.
   Loose connection → Connect properly.

CAUTION:

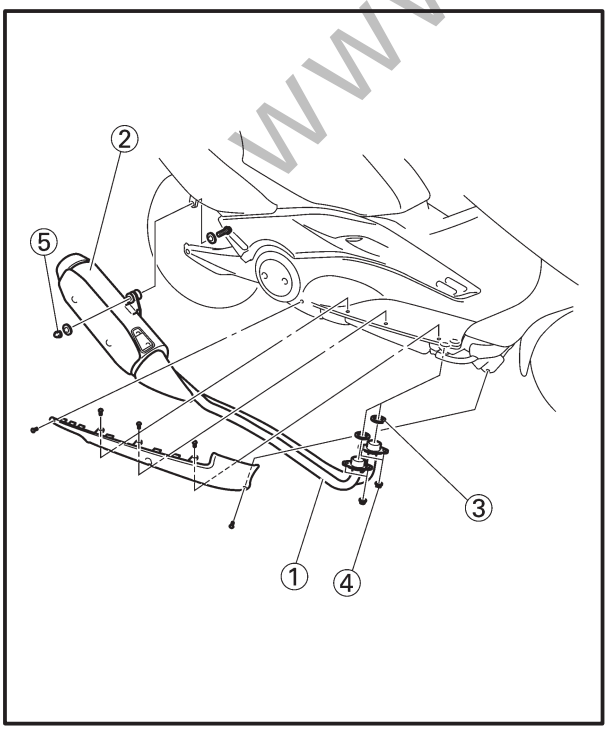
Make sure that the crankcase breather hose is routed correctly.

3. Install:
   • legshield
   Refer to “COVER AND PANEL”.

EAS00099

CHECKING THE EXHAUST SYSTEM

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



1. Remove:
   • lower side cover mole (right)
   Refer to “COVER AND PANEL”.
2. Check:
   • exhaust pipe ①
   • muffler ②
   Cracks/damage → Replace.
   • gasket ③ New
   Exhaust gas leaks → Replace.
3. Check:
   • tightening torque

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

4. Install:
   • lower side cover mole (right)
   Refer to “COVER AND PANEL”.

EAS00103

CHECKING THE COOLANT LEVEL

1. Stand the scooter on a level surface.

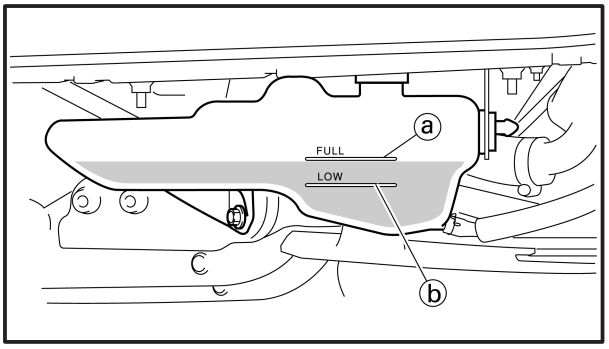
NOTE:

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

2. Remove:
   - lower side cover mole (right)
3. Check:
   - coolant level

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

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



CAUTION:

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

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

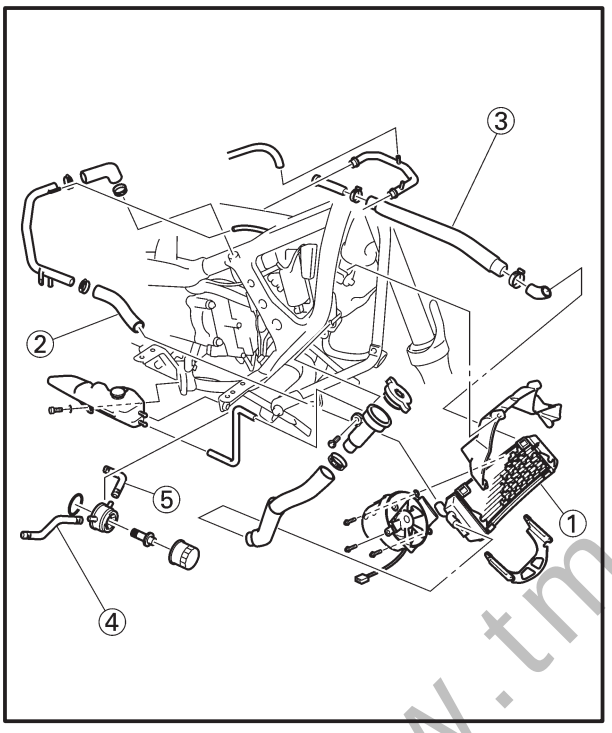
NOTE:

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

6. Install:
   - lower side cover mole (right)

CHECKING THE COOLING SYSTEM

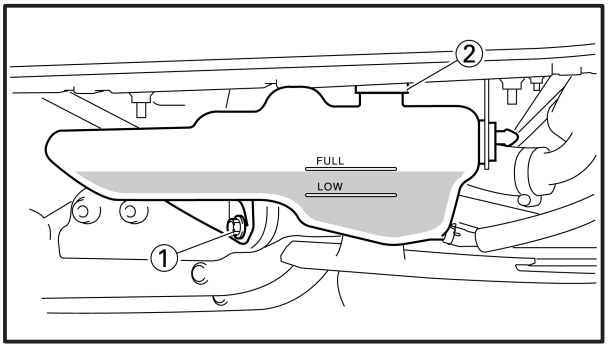
1. Remove:
   - footrest board (left and right)
   - legshield
   Refer to “COVER AND PANEL”.



2. Check:
   - radiator ①
   - radiator inlet hose ②
   - radiator outlet hose ③
   - oil cooler inlet hose ④
   - oil cooler outlet hose ⑤
   Cracks/damage → Replace.
   Refer to “COOLING SYSTEM” in chapter 6.
3. Install:
   - legshield
   - footrest board
   Refer to “COVER AND PANEL”.

CHANGING THE COOLANT

1. Remove:
   - lower side cover mole (right)
   - front side cover mole (right)
   Refer to “COVER AND PANEL”.

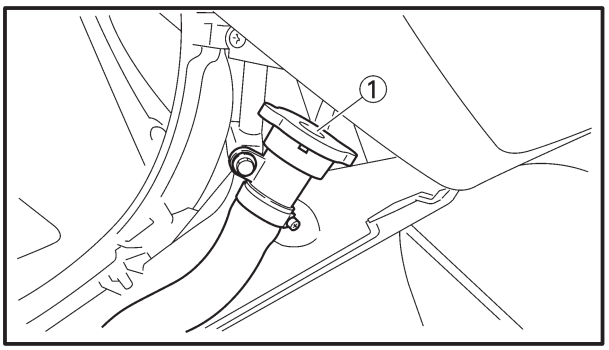


2. Disconnect:
   - coolant reservoir bolts ①
   - coolant reservoir cap ②

NOTE:

When draining the coolant from the coolant reservoir, be sure to tilt the reservoir so that coolant cannot flow through the coolant reservoir breather hose.

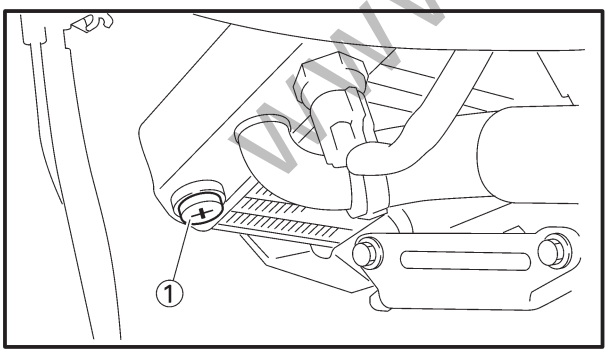
3. Drain:
   • coolant (from the coolant reservoir)
4. Install:
   • coolant reservoir bolts



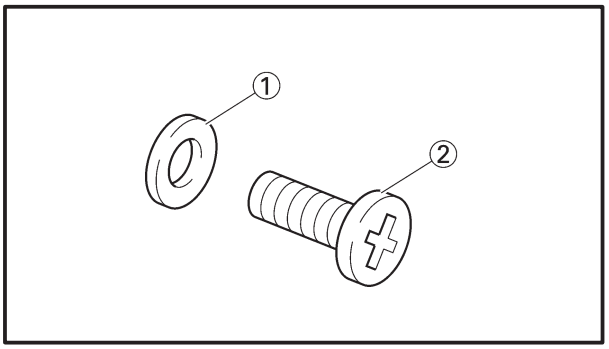
5. Remove:
   • front side cover mole (right)
     Refer to “COVER AND PANEL”.
   • radiator cap ①

⚠ WARNING

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

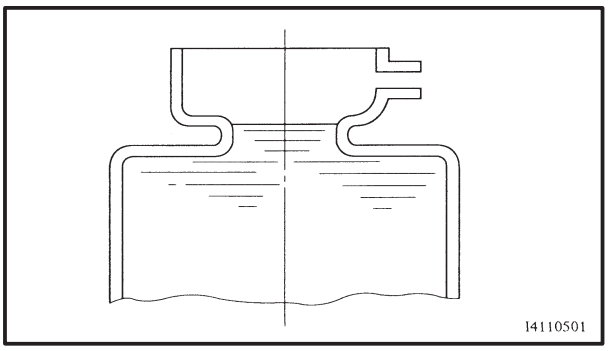


6. Remove:
   • coolant drain bolt ①
     (along with the rubber washer)
7. Drain:
   • coolant



8. Check:
   • rubber washer ①
   • drain bolt ②
9. Install:
   • drain bolt ②

10 Nm (1.0 m•kg)



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

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

Quantity
Total amount
1.5 L
Coolant reservoir capacity
0.6 L

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

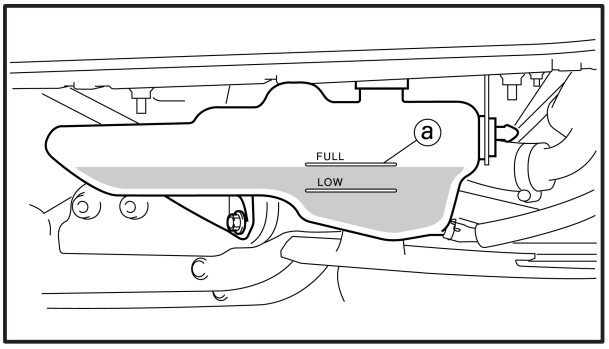
⚠ WARNING

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

CAUTION:

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

11. Install:
   • radiator cap



12. Fill:
    • coolant reservoir

(with the recommended coolant to the maximum level mark ⓐ)

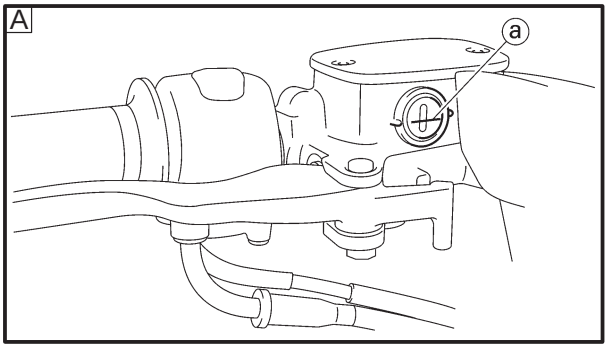
13. Install:
    • coolant reservoir cap
14. Start the engine, warm it up for several minutes, and then turn it off.
15. Check:
    • coolant level

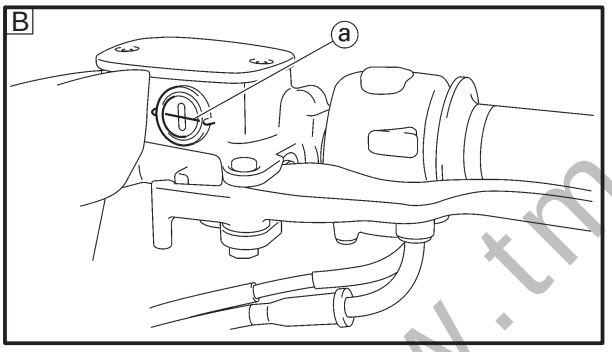
    Refer to “CHECKING THE COOLANT LEVEL”.

NOTE:

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

16. Install:
    • lower side cover mole (right)
    • side cover mole (right)





CHASSIS

EAS00116

CHECKING THE BRAKE FLUID LEVEL

1. Stand the scooter on a level surface.

NOTE:

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

2. Check:
   - brake fluid level

   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.

Recommended brake fluid
DOT 4

A Front brake
B Rear brake

⚠ WARNING

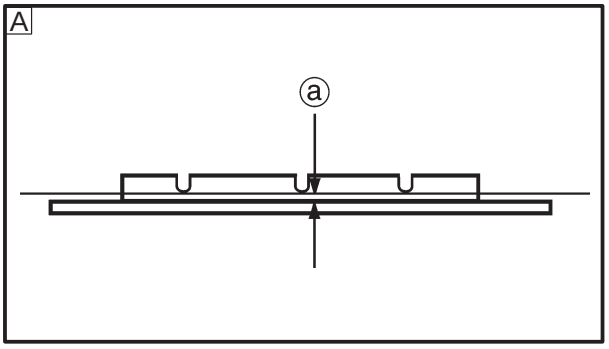
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

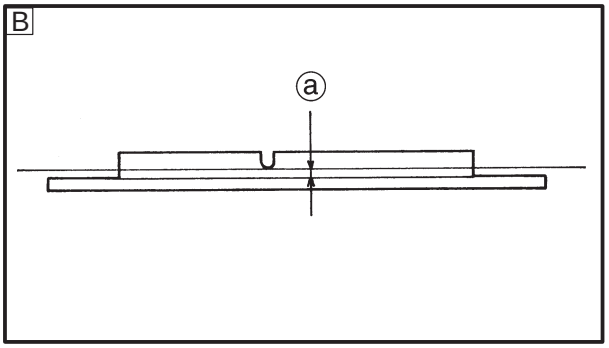
CAUTION:

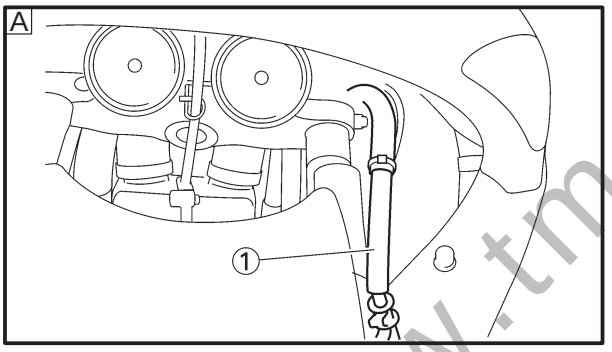
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

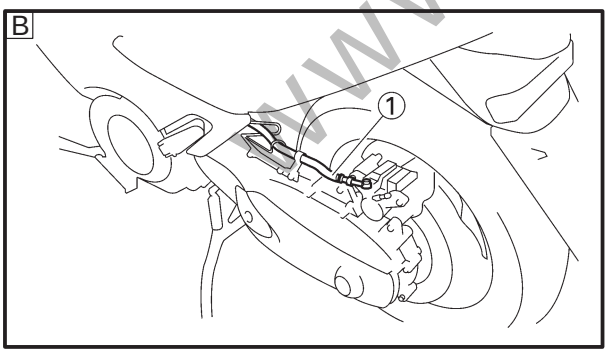
NOTE:

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









EB304032

CHECKING THE BRAKE PADS

The following procedure applies to all of the brake pads.

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

   Brake pad wear limit ⓐ
   Wear limit reached → Replace the brake pads as a set.
   Refer to "FRONT AND REAR BRAKES" in chapter 4.

Brake pad wear limit
0.8 mm

A Front brake
B Rear brake

EAS00132

CHECKING THE BRAKE HOSES

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

1. Check:
   - brake hose ①

     A Front
     B Rear

     Cracks/damage/wear → Replace.
2. Check:
   - brake hose clamp

     Loose connection → Tighten.
3. Hold the scooter upright and apply the brake.
4. Check:
   - brake hose

     Activate the brake several times.
     Brake fluid leakage → Replace the damaged hose.
     Refer to "FRONT AND REAR BRAKES" in chapter 4.

EAS00135

BLEEDING THE HYDRAULIC BRAKE SYSTEM

⚠ WARNING

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

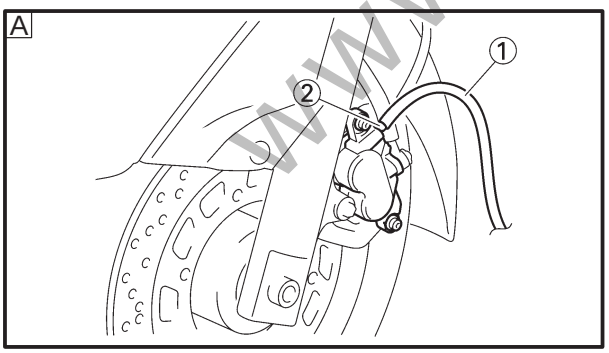
NOTE:
- Be careful not to spill any brake fluid or allow the brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably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

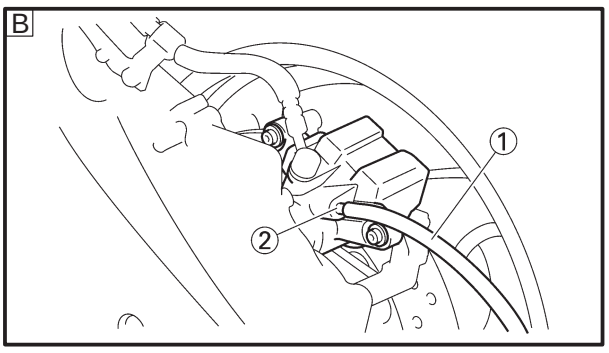
1. Bleed:
   - hydraulic brake system

a. Add the recommended brake fluid to the proper level.
b. Install the brake fluid reservoir diaphragm.
c. Connect a clear plastic hose ① tightly to the bleed screw ②.

A Front
B Rear

d. Place the other end of the hose into a container.
e. Slowly apply the brake several times.
f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
g. Loosen the bleed screw.
   This will release the tension and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.
h. Tighten the bleed screw and then release the brake lever or brake pedal.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Tighten the bleed screw to specification.





Bleed screw
6 Nm (0.6 m•kg)

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

⚠ WARNING

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

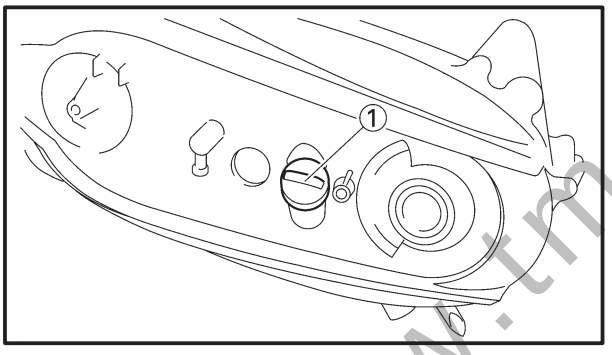
▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

CHECKING THE CHAIN DRIVE OIL LEVEL

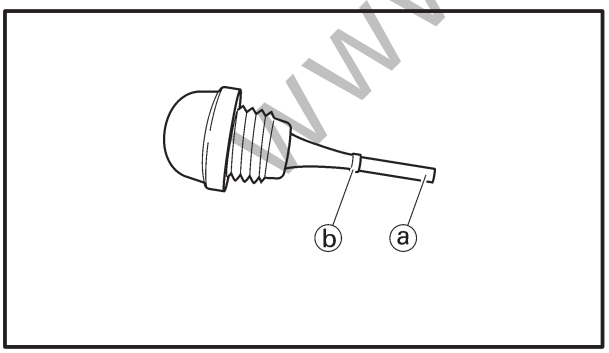
1. Stand the scooter on a level surface.

NOTE:

- Place the scooter on a suitable stand.
- Make sure that the scooter up right.



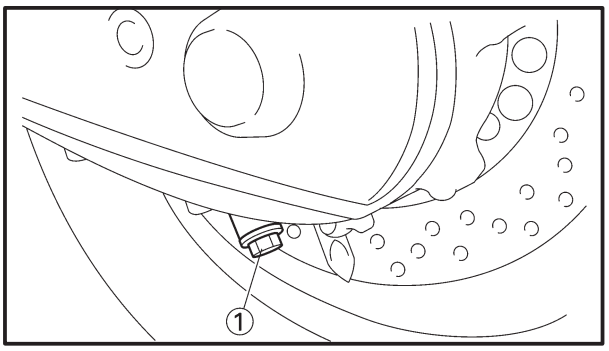
2. Remove:
   - chain drive oil filler cap ①



3. Check:
   - chain drive oil level
     The chain drive oil level should be between the minimum level mark ⓐ and maximum level mark ⓑ.
     Below the minimum level mark → Add the recommended transfer oil to the proper level.

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

4. Install:
   - chain drive oil filler cap



CHANGING THE CHAIN DRIVE OIL

1. Place a container under the chain drive.
2. Remove:
   - chain drive oil drain bolt ①
   - chain drive oil filler cap

   Completely drain the chain drive of its oil.
3. Check:
   - drain bolt gasket

   Damage → Replace.
4. Install:
   - chain drive oil drain bolt

   20 Nm (2.0 m•kg)
5. Fill:
   - chain drive oil

   (with the specified amount of the recomended chain drive oil)

	Quantity **0.7 L**

6. Check:
   - chain drive oil level

   Refer to “CHECKING THE CHAIN DRIVE OIL LEVEL”.

EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the scooter on a level surface.

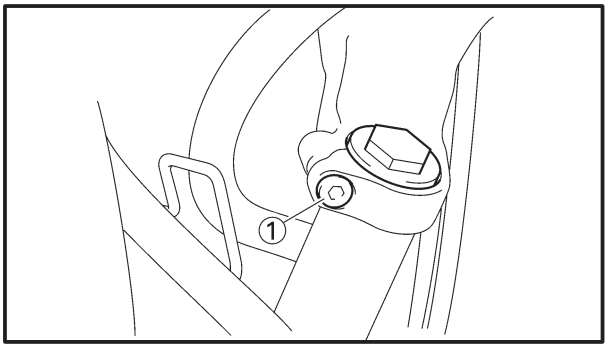
⚠ WARNING

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

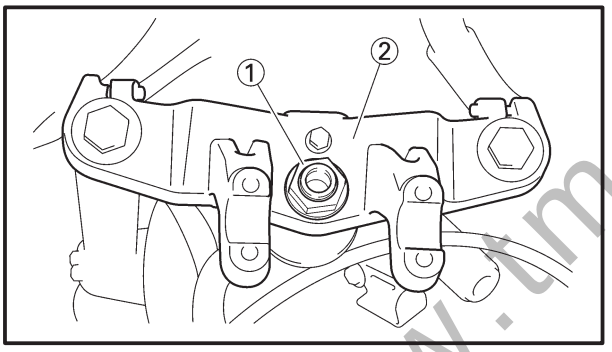
NOTE:

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.
   Looseness or binding → Adjust the steering head.
3. Remove:
   • handlebar
   Refer to “HANDLEBAR” in chapter 4.
4. Loosen:
   • upper bracket pinch bolts ①



5. Remove:
   • steering stem nut ①
   • upper bracket ②



6. Adjust:
   • steering head

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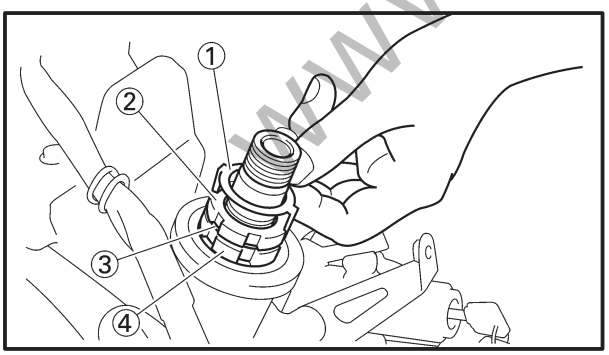
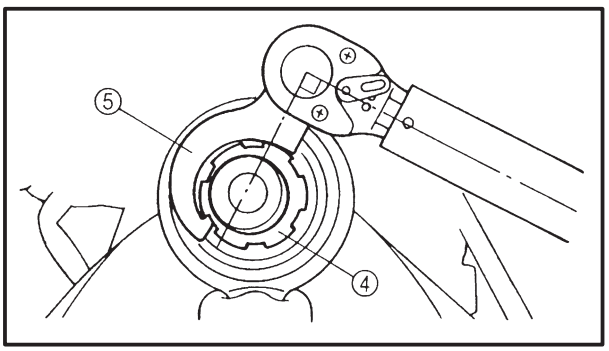
a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.
b. Loosen the lower ring nut ④ and then tighten it to specification with a ring nut wrench ⑤.

NOTE:

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





Ring nut wrench
90890-01408

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

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

⚠ WARNING

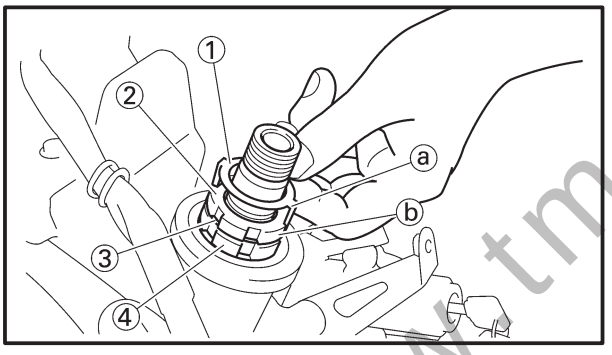
Do not overtighten the lower ring nut.

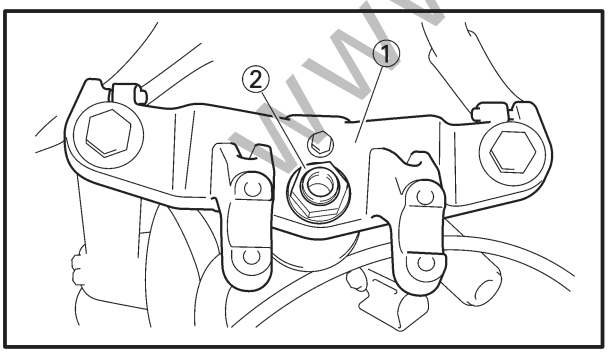
Lower ring nut (final tightening torque)
19 Nm (1.9 m•kg)

d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and inspect the upper and lower bearings.
Refer to "STEERING HEAD AND HANDLEBAR" in chapter 7.
e. Install the rubber washer ③.
f. Install the upper ring nut ②.
g. Finger tighten the upper ring nut ②, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
h. Install the lock washer ①.

NOTE:

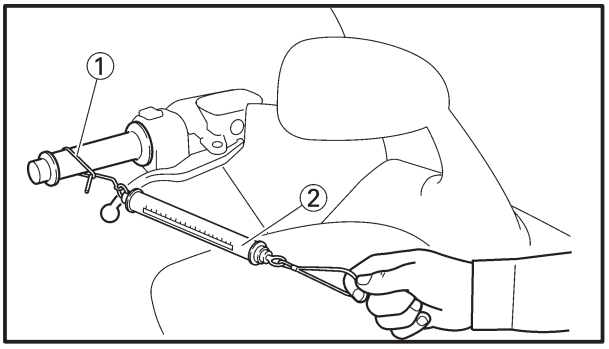
Make sure that the lock washer tabs ⓐ sit correctly in the ring nut slots ⓑ.

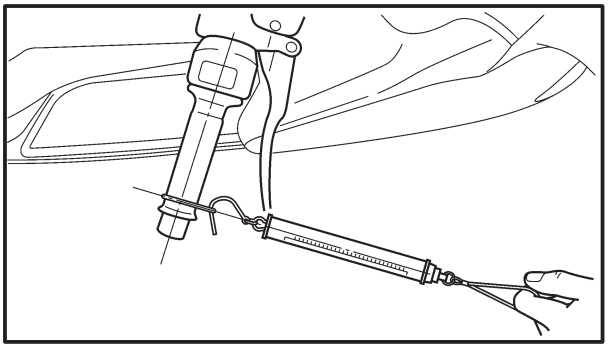




7. Install:
• upper bracket ①
• steering stem nut ②

8. Tighten:
• upper bracket pinch bolt
30 Nm (3.0 m•kg)
• steering stem nut
110 Nm (11.0 m•kg)





9. Measure:
   • steering head tension
   (with the motorcycle still on the stand)

NOTE:

Make sure that all of the cables and wires are properly routed.

a. Point the front wheel straight ahead.
b. Install a plastic locking tie ① loosely around the end of the handlebar as shown.
c. Hook a spring gauge ② onto the plastic locking tie.
d. Hold the spring gauge at a 45° angle from the handlebar, pull the spring gauge, and record the measurement when the handlebar starts to turn.

Steering head tension
200 ~ 500 g

e. Repeat the above procedure on the opposite handlebar.
f. If the steering head tension is out of specification (both handlebars should be within specification), remove the upper bracket and loosen or tighten the upper ring nut.
g. Reinstall the upper bracket and measure the steering head tension again as described above.
h. Repeat the above procedure until the steering head tension is within specification.
i. Grasp the bottom of the front fork legs and gently rock the front fork.
   Looseness or binding → Adjust the steering head.

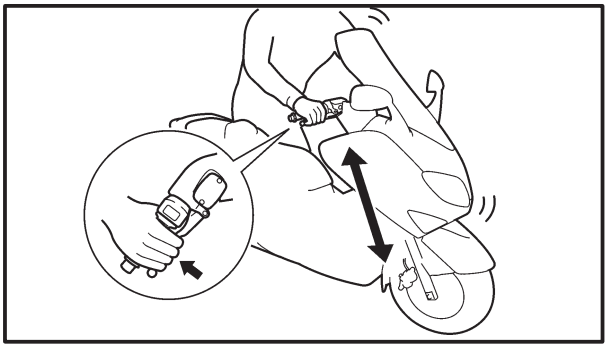
EAS00149

CHECKING THE FRONT FORK

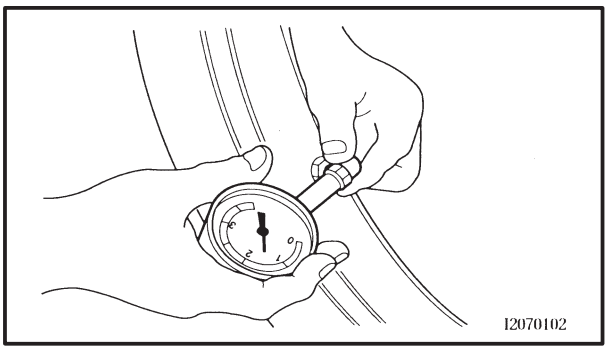
1. Stand the scooter on a level surface.

⚠ 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 motorcycle upright and apply the front brake.
4. Check:
   • operation
   Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
   Unsmooth operation → Repair.
   Refer to “FRONT FORK” in chapter 4.



EB304170

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Measure:
   - tire pressure

   Out of specification → Regulate.

⚠ WARNING

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

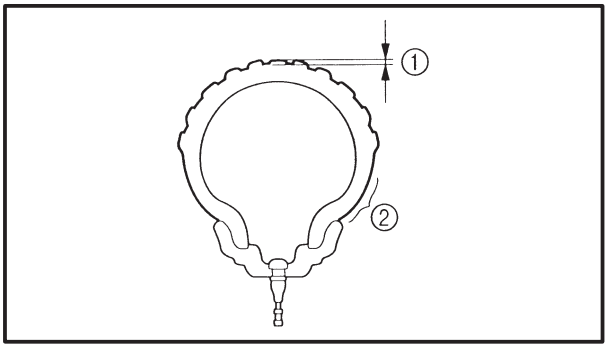
NEVER OVERLOAD THE SCOOTER.

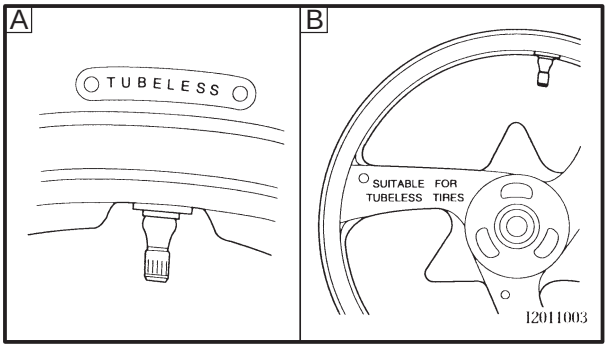
Basic weight (with oil and a full fuel tank)	**217 kg**	
Maximum load*	**372 kg**	
Cold tire pressure	**Front**	**Rear**
Up to 90 kg load*	**200 kPa (2.0 kgf/cm², 2.0 bar)**	**225 kPa (2.25 kgf/cm², 2.25 bar)**
90 kg ~ maximum load*	**225 kPa (2.25 kgf/cm², 2.25 bar)**	**250 kPa (2.5 kgf/cm², 2.5 bar)**
High-speed riding	**225 kPa (2.25 kgf/cm², 2.25 bar)**	**250 kPa (2.5 kgf/cm², 2.5 bar)**

* total of cargo, rider, passenger and accessories

⚠ WARNING

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





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

	Minimum tire tread depth 1.6 mm

① Tire tread depth
② Side wall

⚠ WARNING

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

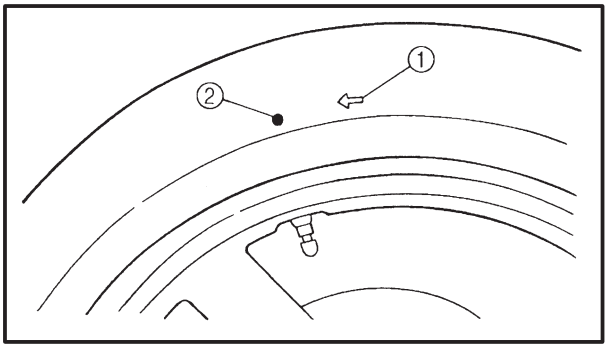
A Tire B Wheel

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

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

Front tire

Manufacturer	Size	Model
BRIDGESTONE	120/70-14 M/C 55S	HOOP BO3
DUNLOP	120/70-14 M/C 55S	D305FA



Rear tire

Manufacturer	Size	Model
BRIDGESTONE	150/70-14 M/C 66S	HOOP BO2
DUNLOP	150/70-14 M/C 66S	D305

⚠ WARNING

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

NOTE:

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

EB304180

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

⚠ WARNING

Never attempt to make any repairs to the wheel.

NOTE:

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

EAS00170

CHECKING AND LUBRICATING THE CABLES

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

⚠ WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

NOTE:

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

EB304210

LUBRICATING THE LEVERS

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

Recommended lubricant
Lithium soap base grease

EAS00173

LUBRICATING THE CENTERSTAND

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

Recommended lubricant
Engine oil

EB304220

LUBRICATING THE SIDESTAND

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

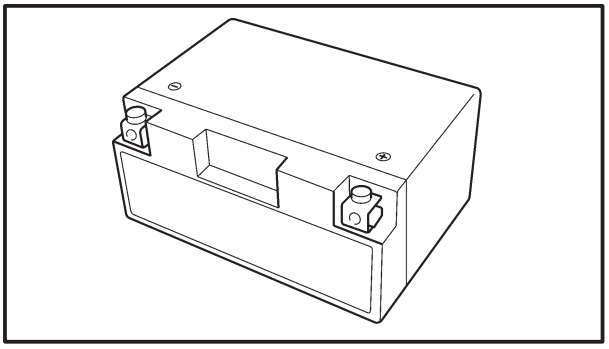
Recommended lubricant
Lithium soap base grease

EAS00174

LUBRICATING THE REAR SUSPENSION

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

	Recommended lubricant **Molybdenum disulfide grease**



EB305020

ELECTRICAL SYSTEM

CHECKING AND CHARGING THE BATTERY

⚠ WARNING

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

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

FIRST AID IN CASE OF BODILY CONTACT:
EXTERNAL

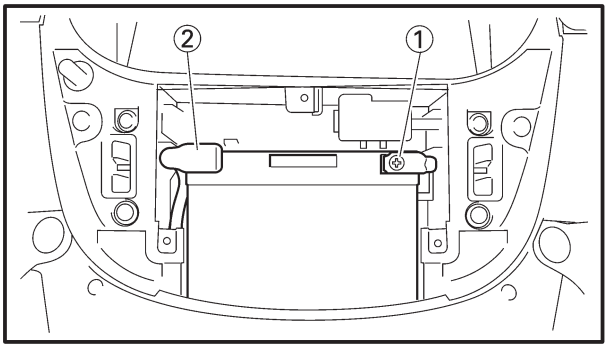
- **Skin – Wash with water**
- **Eyes – Flush with water for 15 minutes and get immediate medical attention.**

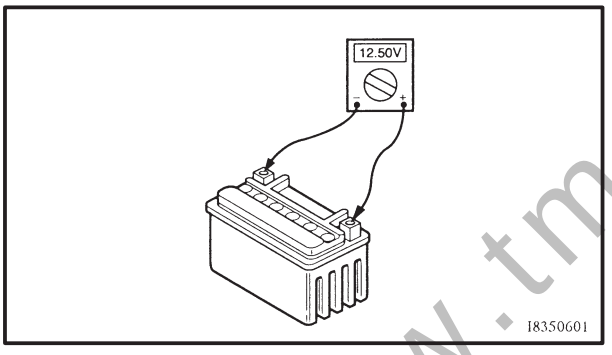
INTERNAL

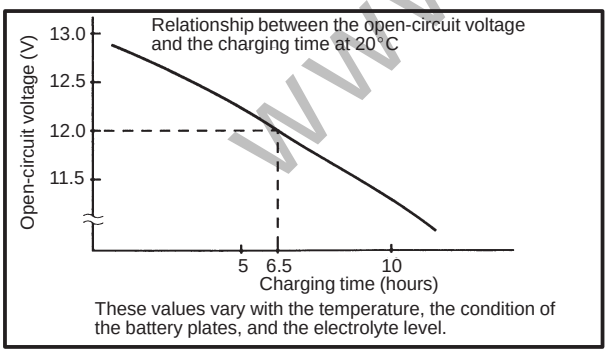
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

CAUTION:

- **This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for 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:
2. Disconnect:
   - battery leads
     (from the battery terminals)

CAUTION:

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

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

a. Connect a digital voltmeter to the battery terminals.

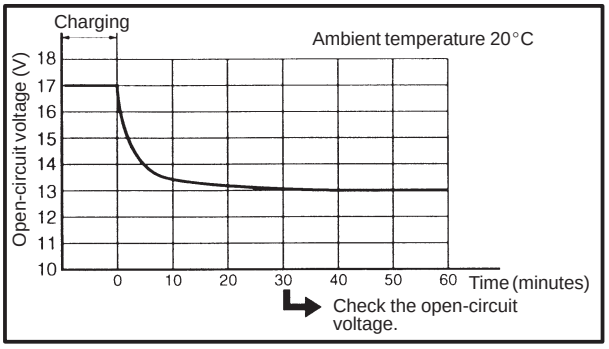
Tester positive probe → battery positive terminal
Tester negative probe → battery negative terminal

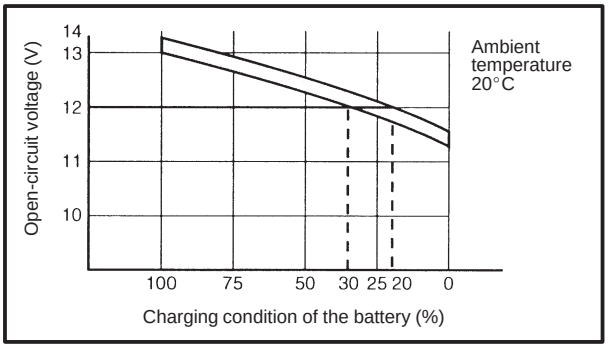
NOTE:

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





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

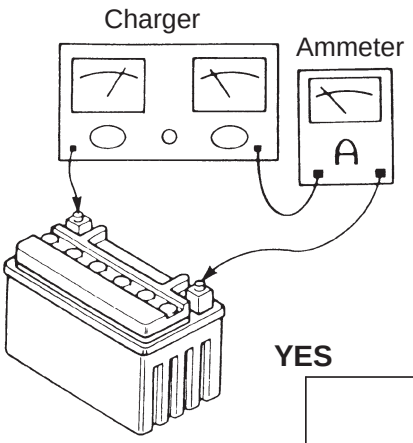
⚠ WARNING

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



Measure the open-circuit voltage prior to charging.

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

NO

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

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.)

Adjust the charging voltage to 20 ~ 25 V.

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 open-circuit 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 open-circuit 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.

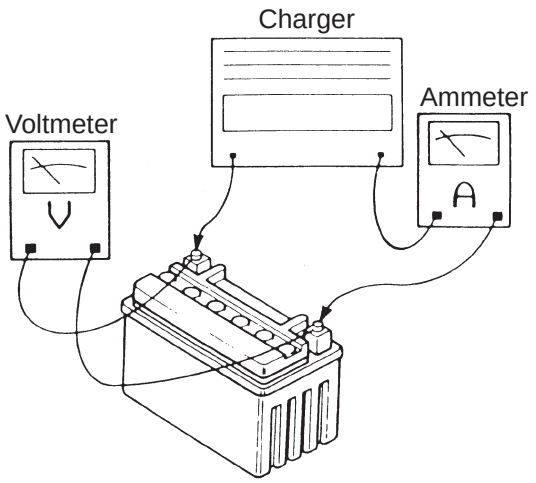
NOTE:
Set the charging time to a maximum of 20 hours.

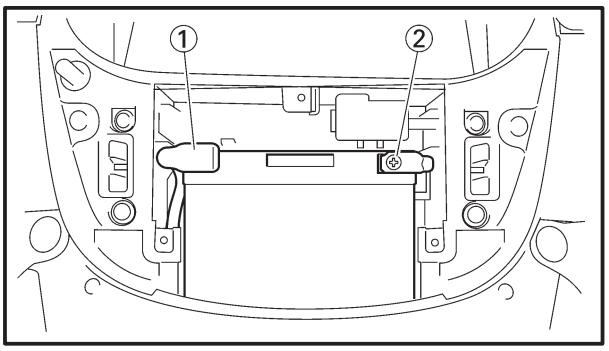
Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.
12.8 V → Charging is complete.
12.0 ~ 12.7 V → Recharging is required.
Under 12.0 V → Replace the battery.

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

NO

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





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

CAUTION:

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

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

	Recommended lubricant **Dielectric grease**

10. Install:
    • seat
    • battery cover

EB305040

CHECKING THE FUSES

The following procedure applies to all of the fuses.

CAUTION:

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

1. Remove:
   • seat
   • battery cover
2. Check:
   • continuity

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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**

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

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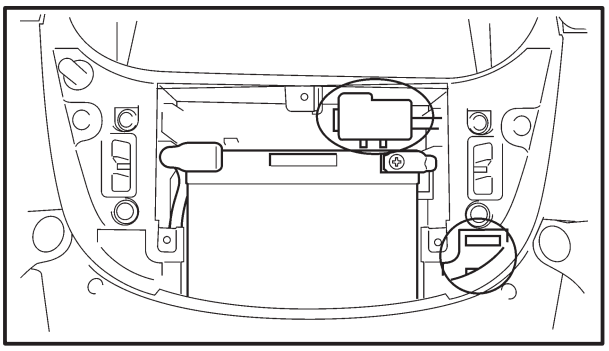

3. Replace:
   • blown fuse

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a. Set the main switch to “OFF”.
b. Install a new fuse of the correct amperage.
c. Set the main switch to “ON” and verify if the electrical circuit is operational.
d. If the fuse immediately blows again, check the electrical circuit.

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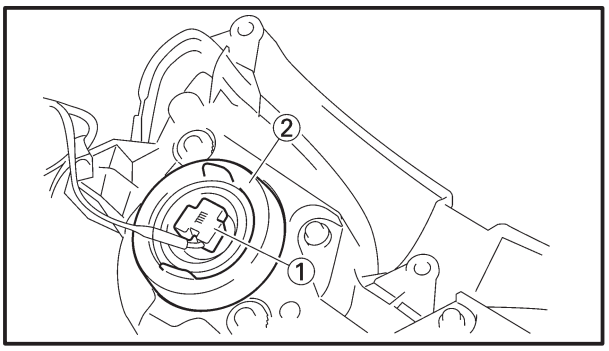
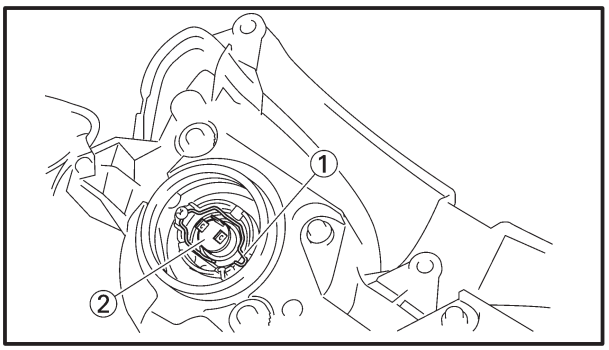
Item	Amperage	Q’ty
Main fuse	30 A	1
Headlight fuse	15 A	1
Signaling system fuse	15 A	1
Ignition fuse	10 A	1
Radiator fan motor fuse	15 A	1
Backup fuse	10 A	1

⚠ WARNING

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

4. Install:
   • battery cover
   • seat





EB305051

REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

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

2. Detach:
   - headlight bulb holder ①
3. Remove:
   - headlight bulb ②

⚠ WARNING

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

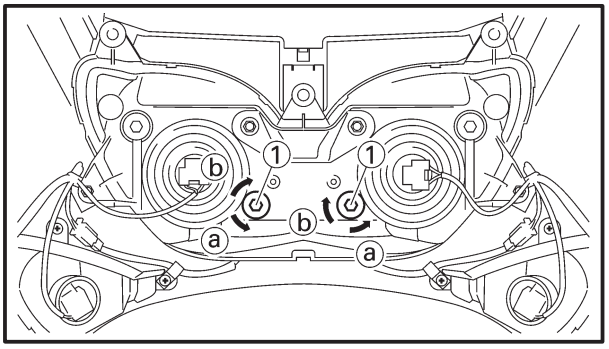
4. Install:
   - headlight bulb New

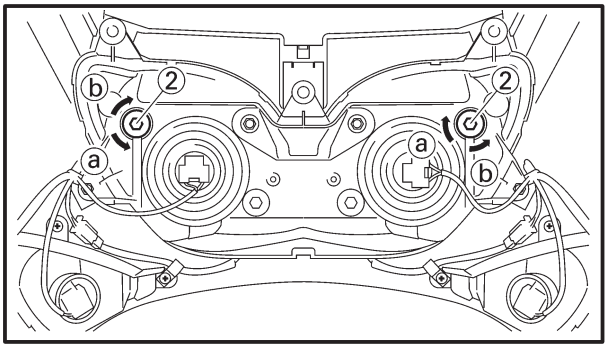
   Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

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

5. Attach:
   - headlight bulb holder
6. Install:
   - headlight bulb holder cover
7. Connect:
   - headlight coupler





EAS00184

ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
   • headlight beam (vertically)

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

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

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2. Adjust:
   • headlight beam (horizontally)

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

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

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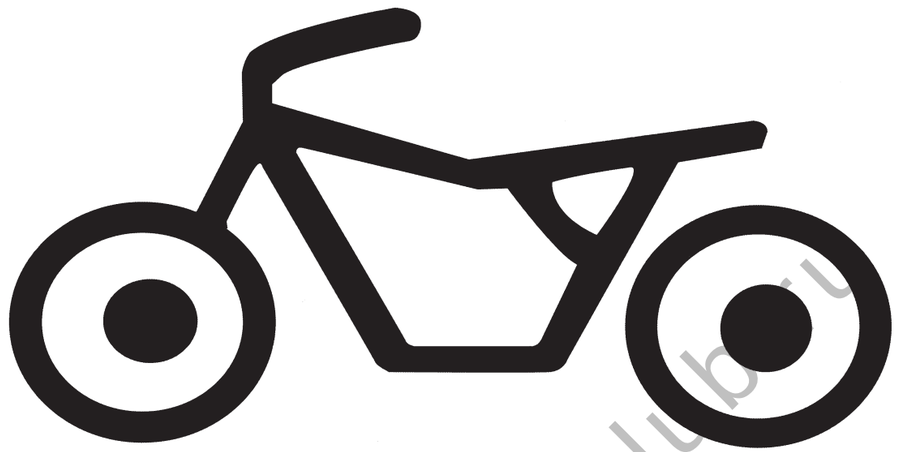
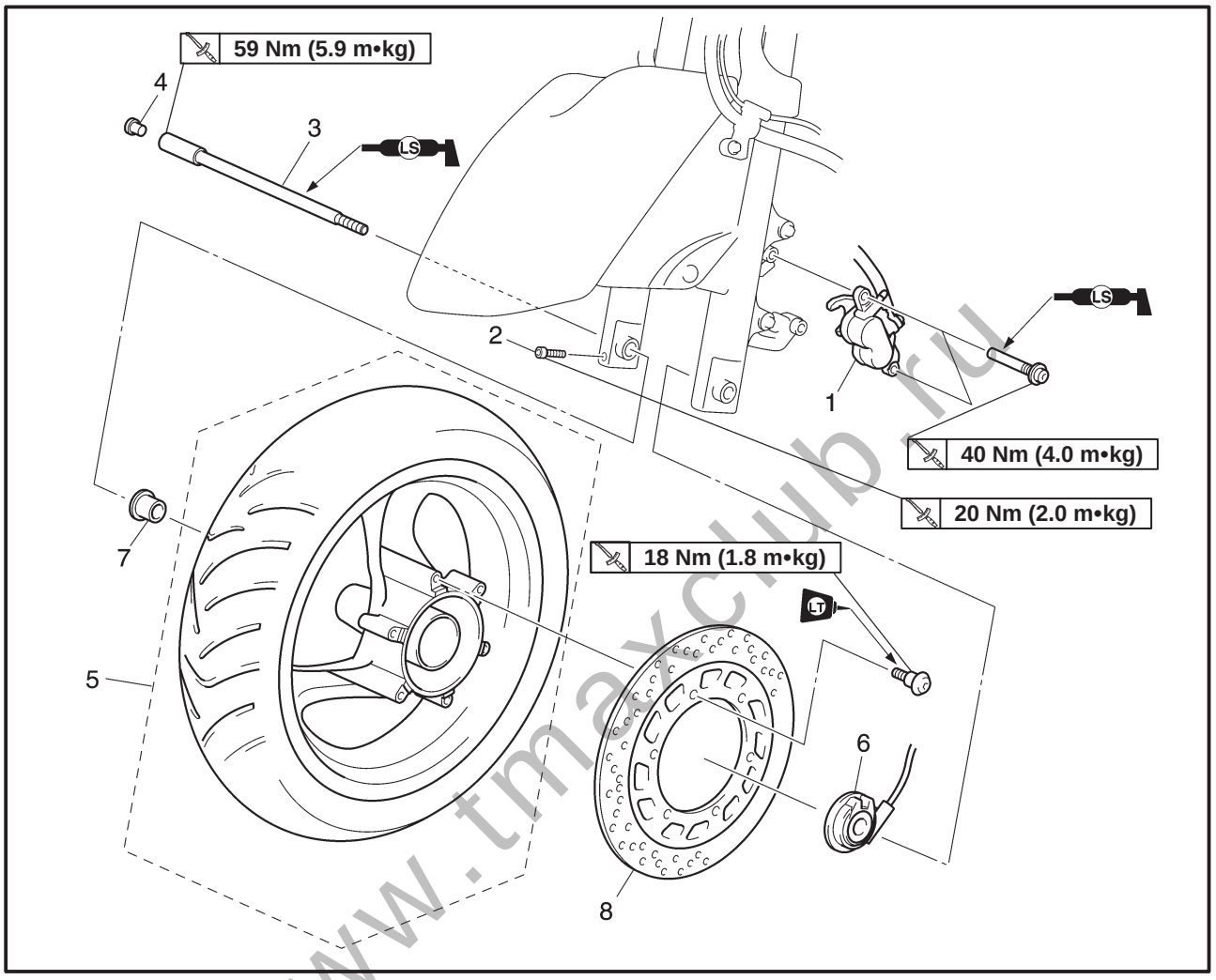


CHAS 4

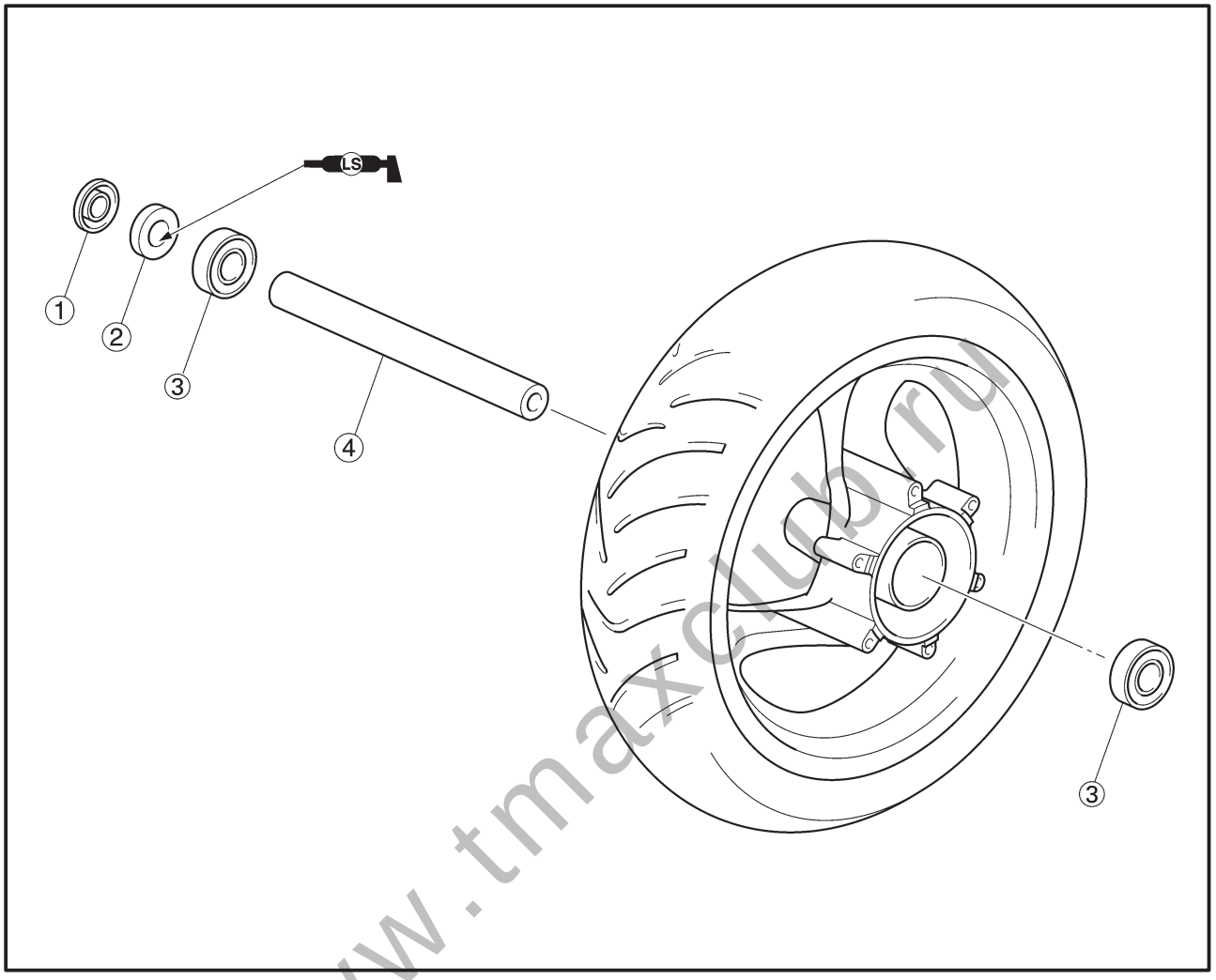
CHAPTER 4
CHASSIS

CHASSIS

FRONT WHEEL AND BRAKE DISC



Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake disc		Remove the parts in the order listed. **NOTE:** Place the scooter on a suitable stand so that the front wheel is elevented.
1	Front brake caliper	1	
2	Front wheel axle pinch bolt	1	
3	Front wheel axle	1	
4	Cap	1	
5	Front wheel assembly	1	
6	Speed sensor	1	
7	Collar	1	
8	Brake disc	1	
			For installation, reverse the removal procedure.



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

EAS00520
REMOVING THE FRONT WHEEL
1. Stand the scooter on a level surface.

⚠ WARNING

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

NOTE:

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

2. Remove:
   - front brake caliper
   - front wheel axle

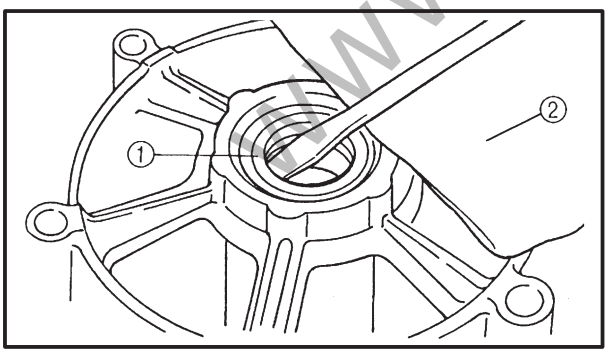
NOTE:

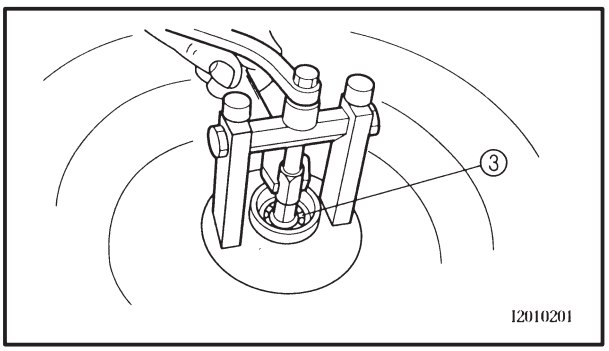
Do not squeeze the brake lever when removing the brake caliper.

3. Elevate:
   - front wheel

NOTE:

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





EB700110
DISASSEMBLING THE FRONT WHEEL
1. Remove:
   - oil seals
   - wheel bearings

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

NOTE:

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

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

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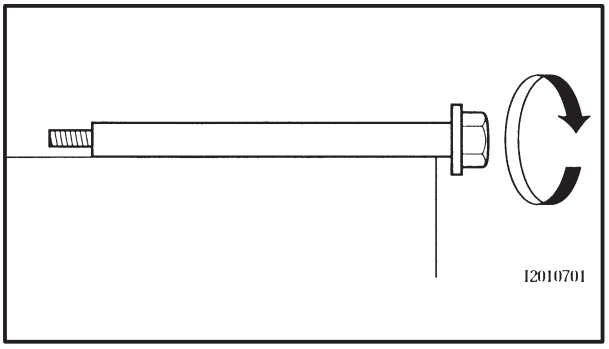


EAS00525

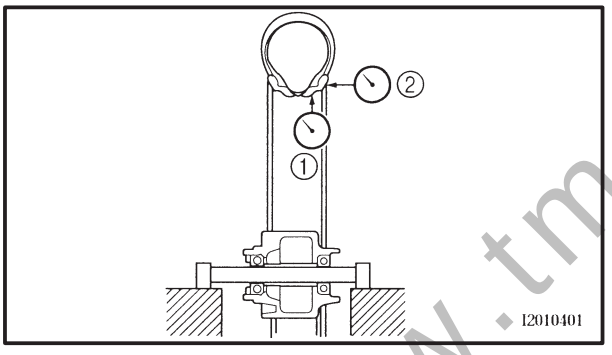
CHECKING THE FRONT WHEEL

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

⚠ WARNING

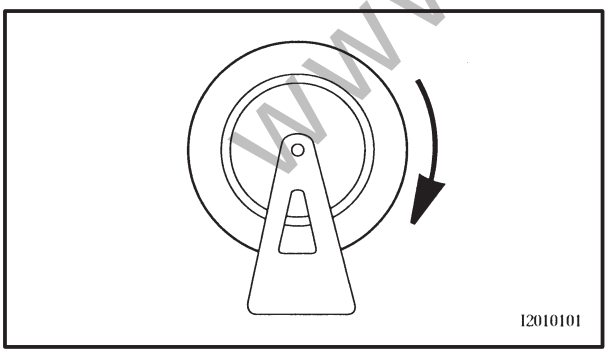
Do not attempt to straighten a bent wheel axle.

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

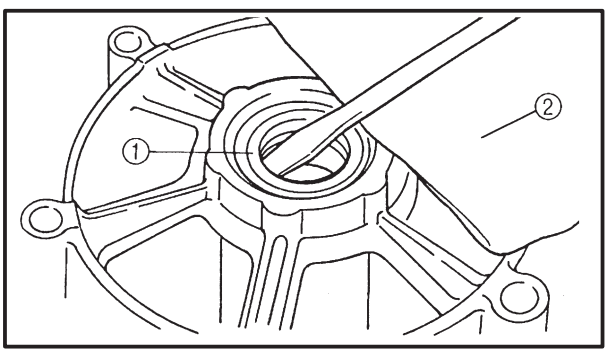


3. Measure:
   - front wheel radial runout ①
   - front wheel lateral runout ②
     Over the specified limits → Replace.

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



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

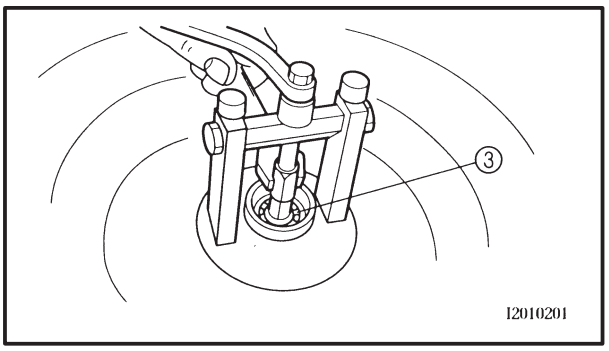


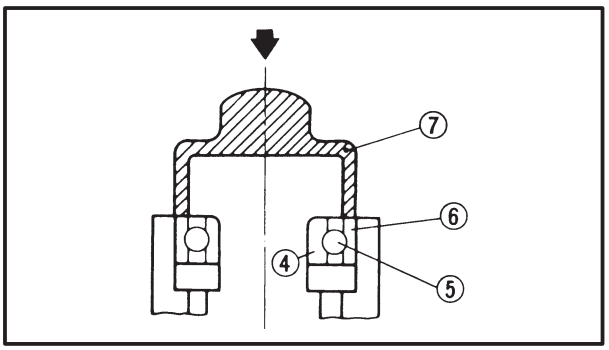
5. Replace:
   - wheel bearings New
   - oil seals New

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

NOTE:

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





c. Remove the wheel bearings ③ with a general bearing puller.
d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

CAUTION:

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

NOTE:

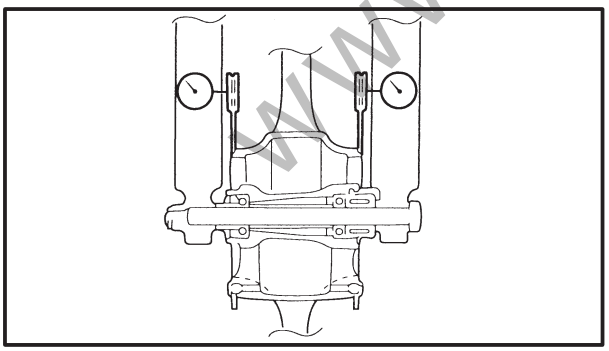
Use a socket ⑦ that matches the diameter of the wheel bearing outer race and oil seal.

EAS00528

CHECKING THE BRAKE DISC

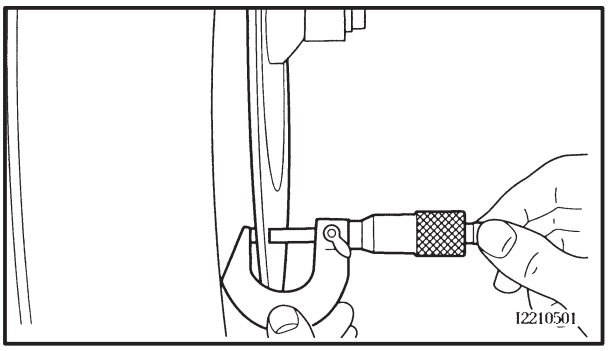
The following procedure applies to all of the brake discs.

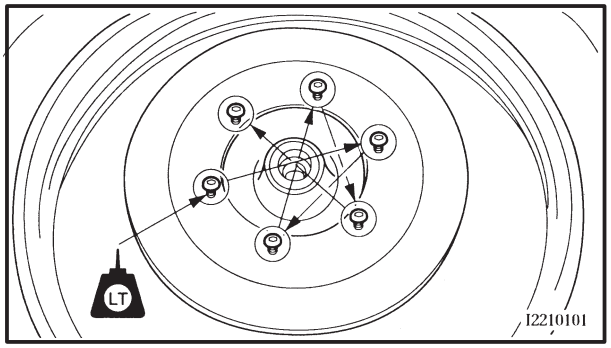
1. Check:
   - brake disc
     Damage/galling → Replace.
2. Measure:
   - brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.



Max. brake disc deflection
Front: 0.15 mm
Rear: 0.15 mm

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





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

Min. brake disc thickness
Front: 4.5 mm
Rear: 3.5 mm

4. Adjust:
   • brake disc deflection

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

NOTE:

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

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

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

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EB700711

ASSEMBLING THE FRONT WHEEL

1. Install:
   - wheel bearings

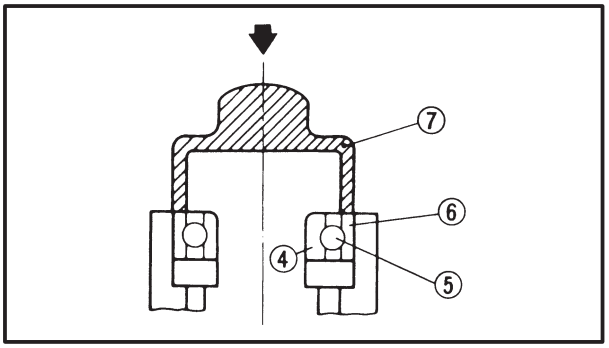
a. Install the new wheel bearings and oil seals in the reverse order of disassembly.

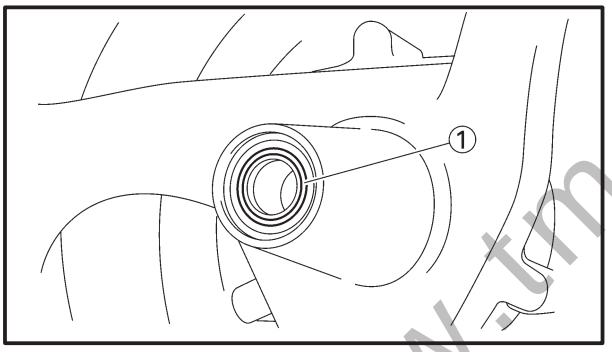
CAUTION:

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

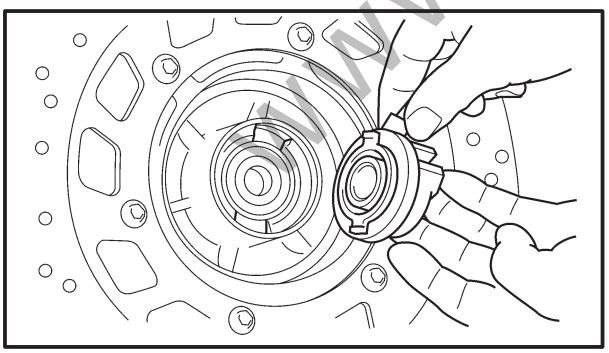
NOTE:

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





2. Install:
   - oil seal New ①

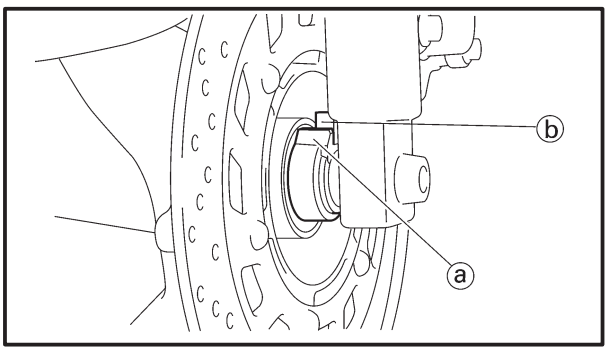


EAS00542

INSTALLING THE FRONT WHEEL

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

	Recommended lubricant **Lithium soap base grease**



2. Install:
   - speed sensor

NOTE:

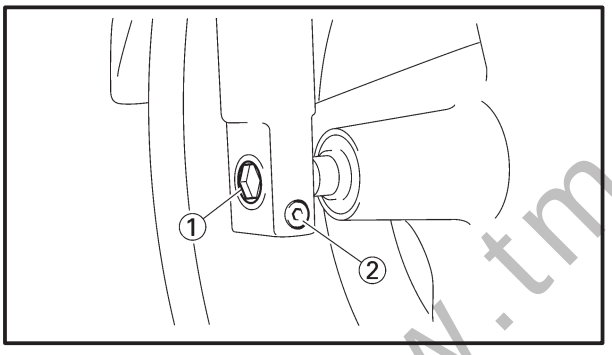
- Make sure that the speed sensor unit and the wheel hub are installed with the two projections meshed into the two slots respectively.
- Make sure that the slot ⓐ in the speed sensor fits over the stopper ⓑ on the outer tube.

3. Install:
   • brake disc
   18 Nm (1.8 m•kg)

NOTE:
- Apply LOCTITE® 648 to the threads of the brake disc bolts.
- Tighten the brake disc bolts in stages and in a crisscross pattern.

4. Install:
   • front wheel
   • front wheel axle
   • wheel axle pinch bolt

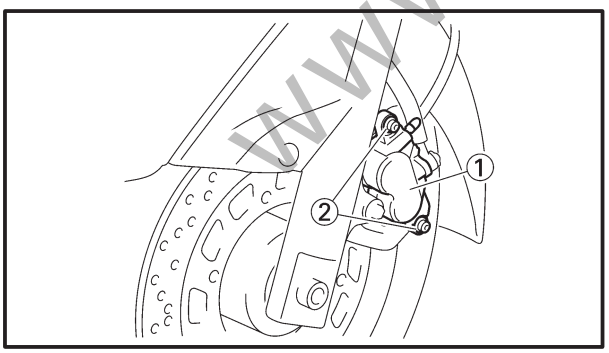
NOTE:
Make sure that the slot in the speedometer gear unit fits over the stopper on the outer tube.



5. Tighten:
   • front wheel axle ①
   59 Nm (5.9 m•kg)
   • wheel axle pinch bolt ②
   20 Nm (2.0 m•kg)

CAUTION:

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



6. Install:
   • front brake caliper ①

⚠ WARNING

Make sure that the brake cable is routed properly.

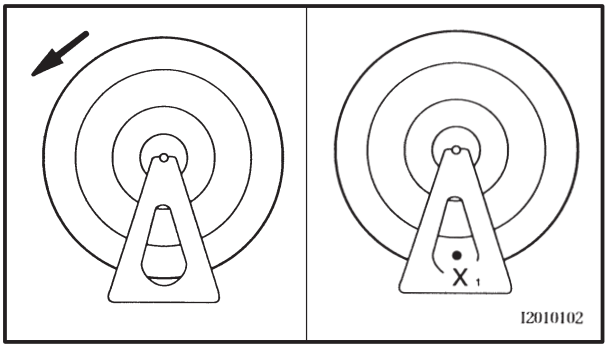
7. Tighten:
   • front brake caliper bolt ②
   40 Nm (4.0 m•kg)

EAS00548

ADJUSTING THE FRONT WHEEL STATIC BALANCE

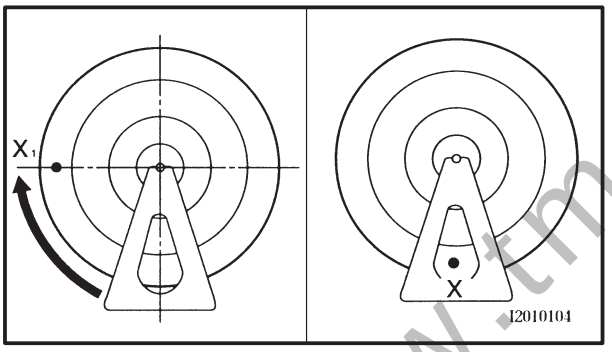
NOTE:

- 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

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

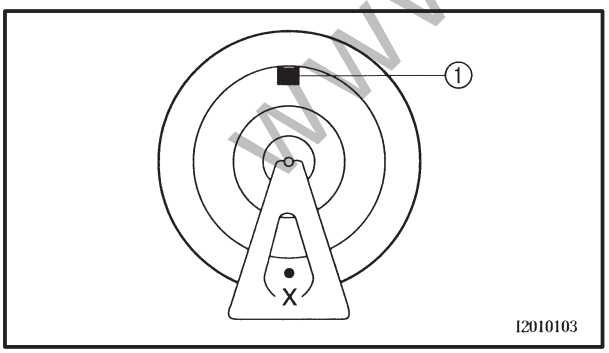


3. Adjust:
   - front wheel static balance

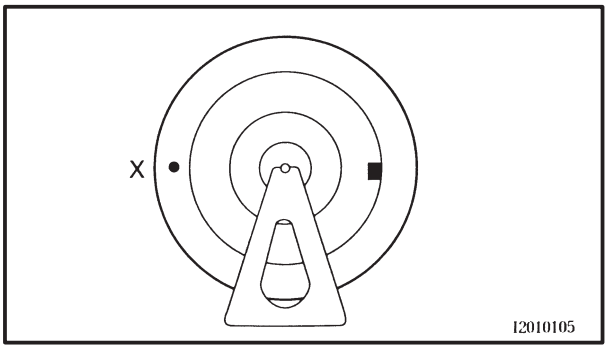
a. Install a balancing weight ① onto the rim exactly opposite the heavy spot "X".

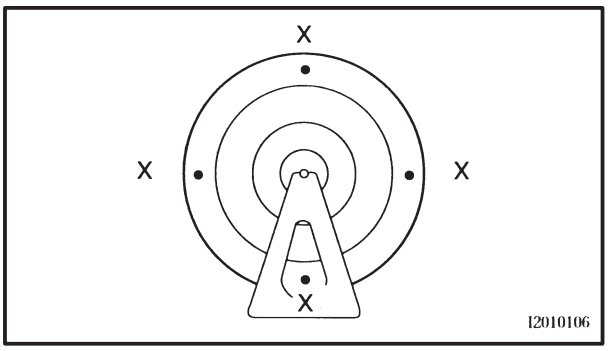
NOTE:

Start with the lightest weight.



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





4. Check:
   • front wheel static balance

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

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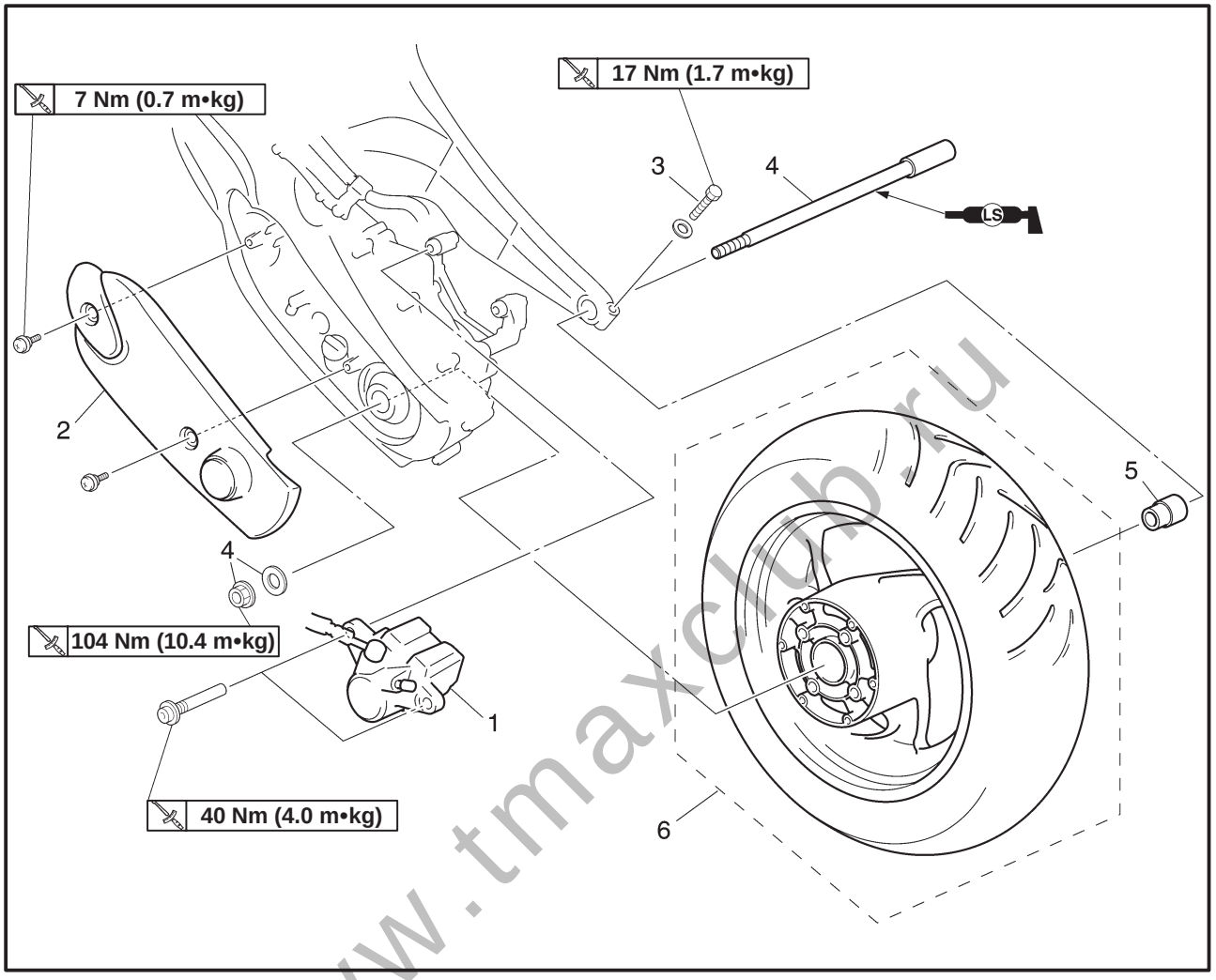
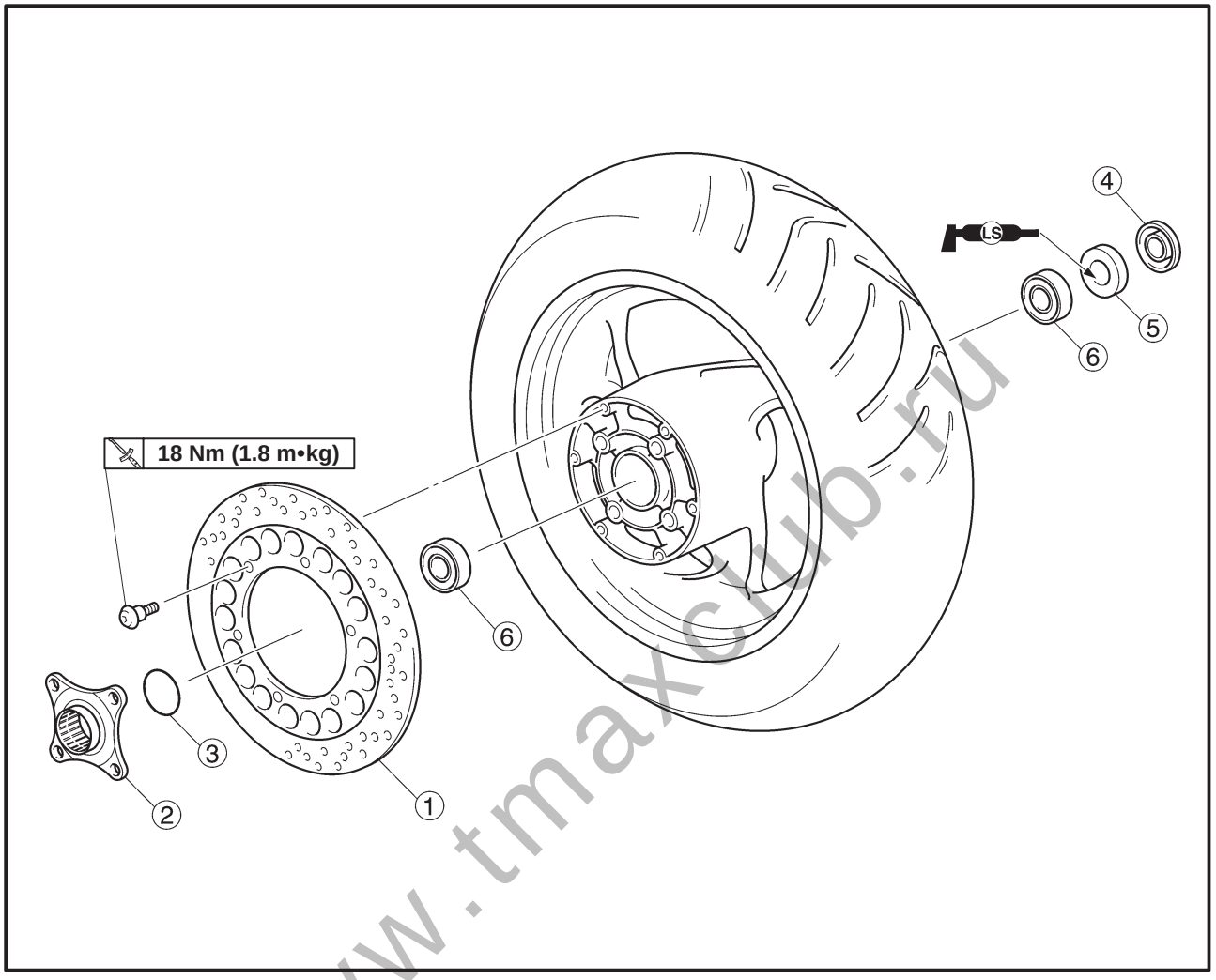
REAR WHEEL AND BRAKE DISC

REAR WHEEL



Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed. **NOTE:** Place the scooter on a suitable stand so that the rear wheel is elevated.
1	Rear brake caliper	1	
2	Chain drive case cover	1	
3	Swingarm pinch bolt	1	Loosen.
4	Rear wheel axle/nut/washer	1/1/1	
5	Collar	1	
6	Rear wheel	1	
			For installation, reverse the removal procedure.



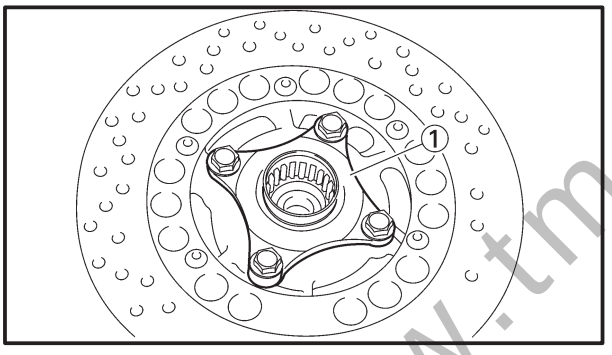
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear wheel		Disassemble the parts in the order listed.
①	Brake disc	1	
②	Rear wheel drive hub	1	
③	O-ring	1	
④	Dust seal	1	
⑤	Oil seal	1	
⑥	Bearing	2	
			For assembly, reverse the disassembly procedure.

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

   Refer to “FRONT WHEEL”.
2. Check:
   - tire
   - rear wheel

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

   Refer to “FRONT WHEEL”.



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

   Cracks/damage → Replace.

EAS00575
ADJUSTING THE REAR WHEEL STATIC BALANCE

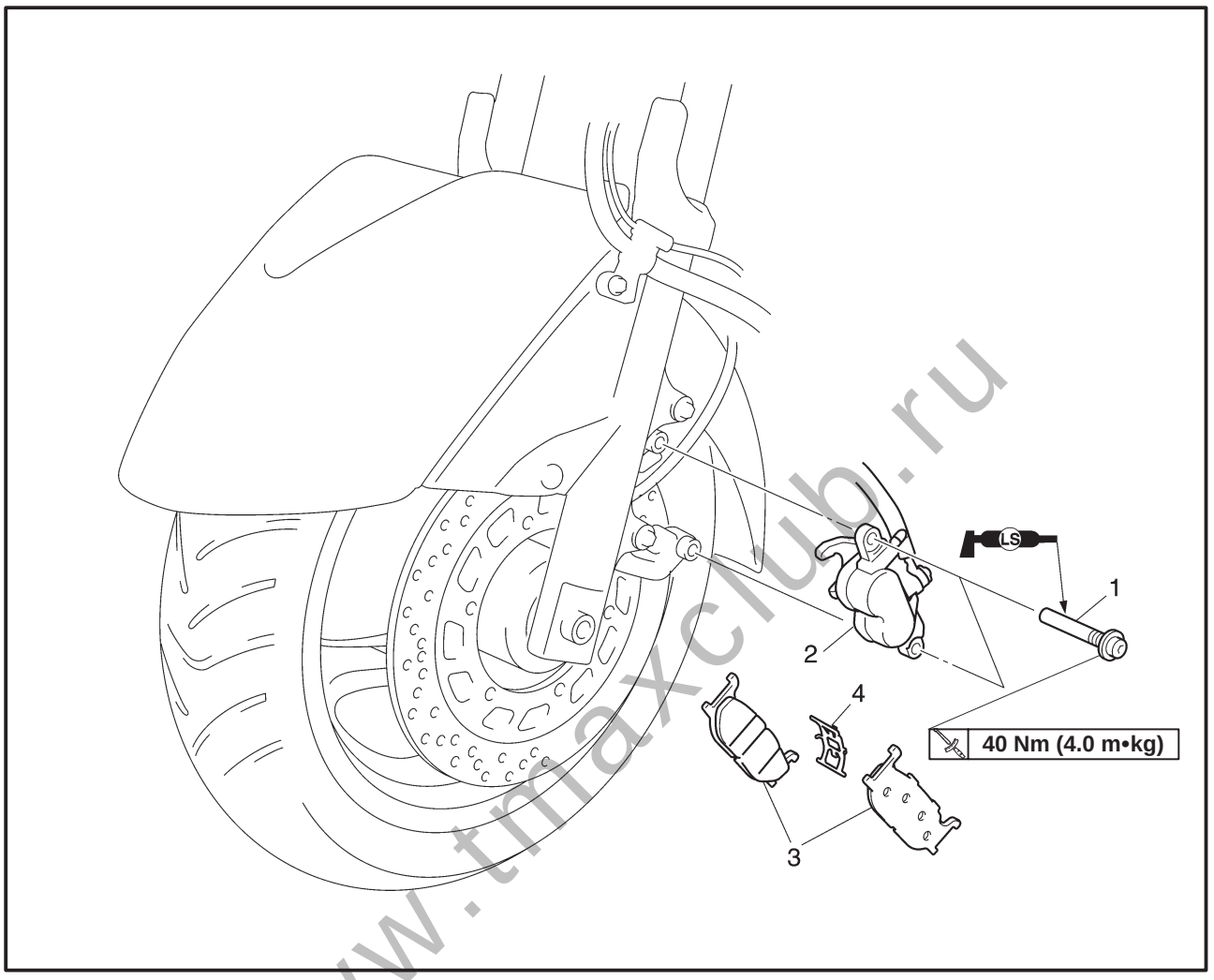
NOTE:
- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:
   - rear wheel static balance

   Refer to “FRONT WHEEL”.

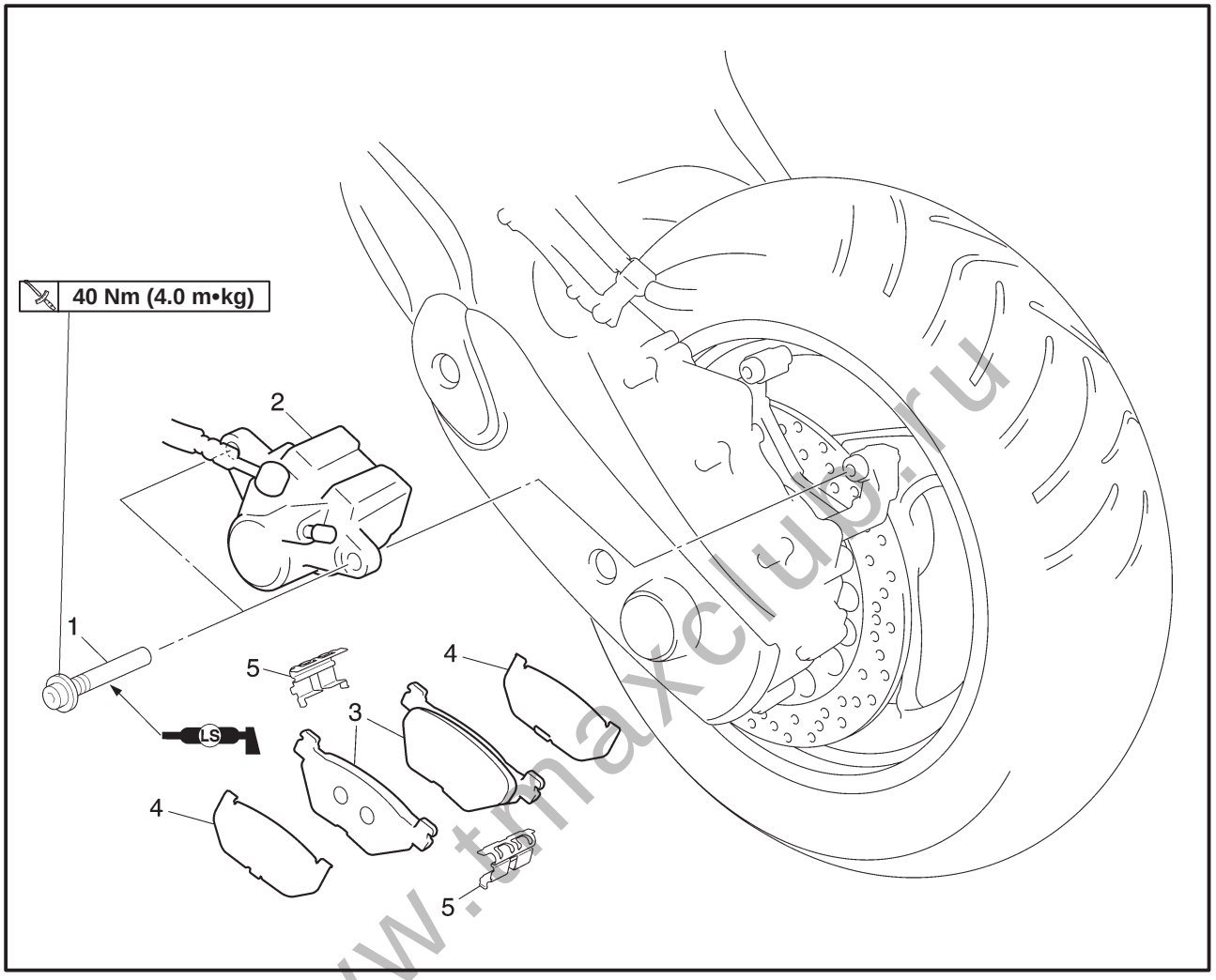
FRONT AND REAR BRAKES

FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the fornt brake pads		Remove the parts in the order listed.
1	Front brake caliper bolt	2	
2	Brake caliper	1	
3	Brake pad	2	
4	Brake pad spring	1	
			For installation, reverse the removal procedure.

REAR BRAKE PADS



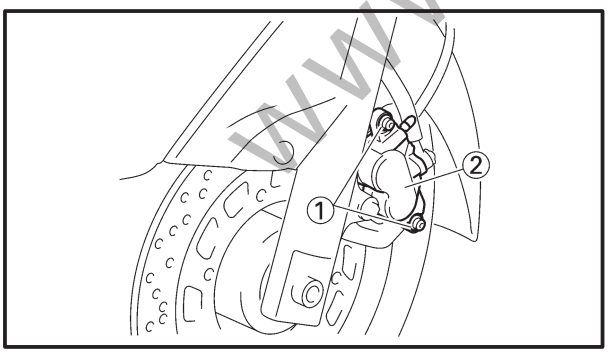
Order	Job/Part	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order listed.
1	Rear brake caliper bolt	2	
2	Brake caliper	1	
3	Brake pad	2	
4	Brake pad shim	2	
5	Brake pad spring	2	
			For installation, reverse the removal procedure.

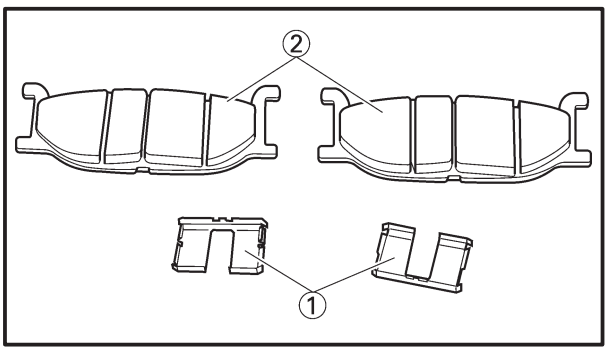
EAS00579

CAUTION:

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

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





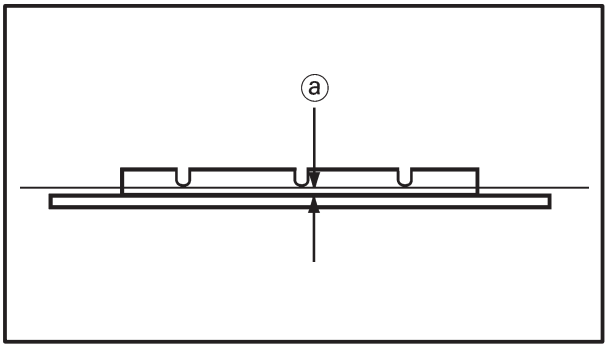
EAS00581

REPLACING THE FRONT BRAKE PADS

NOTE:

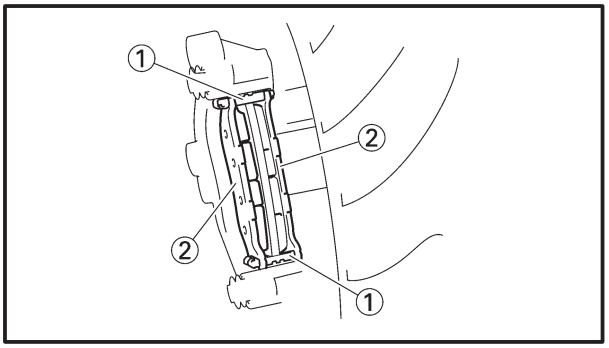
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Remove:
   - front brake caliper bolt ①
   - brake caliper ②
2. Remove:
   - brake pad spring ①
   - brake pads ②



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

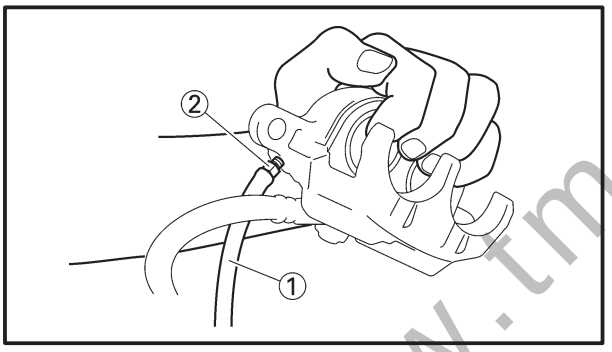
Minimum brake pad thickness
0.8 mm



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

NOTE:

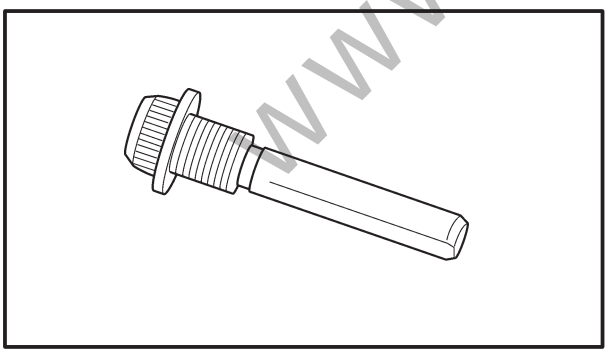
Always install new brake pads and a new brake pad shim as a set.



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

Bleed screw
6 Nm (0.6 m•kg)

d. Install new brake pads and brake pad spring.

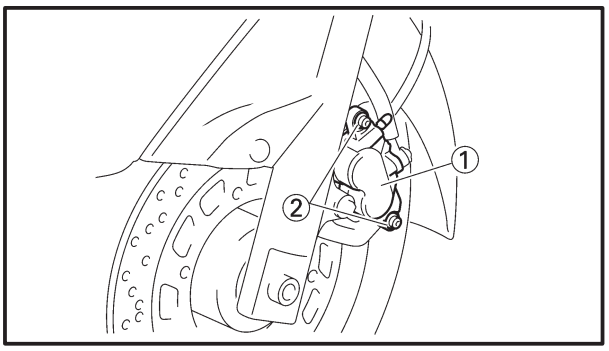


5. Lubricate:
   • brake caliper bolts

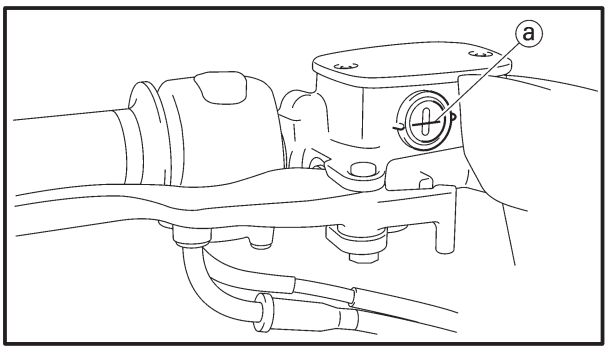
Recommended lubricant
Lithium soap base grease

CAUTION:

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



6. Install:
   • brake caliper ①
   • brake caliper bolts ② **40 Nm (4.0 m•kg)**



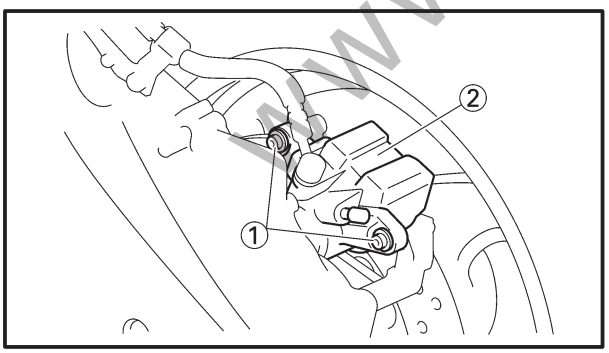
7. Check:
   • brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
8. Check:
   • brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC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

EAS00583

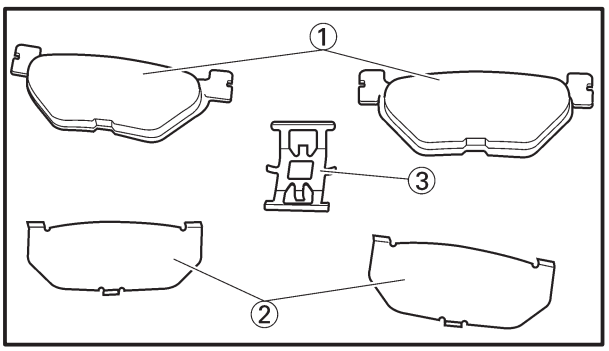
REPLACING THE REAR BRAKE PADS

NOTE:

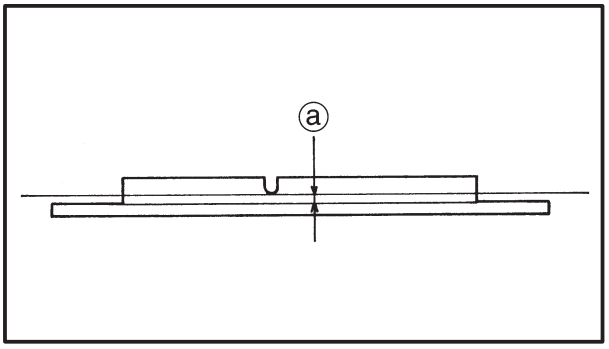
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

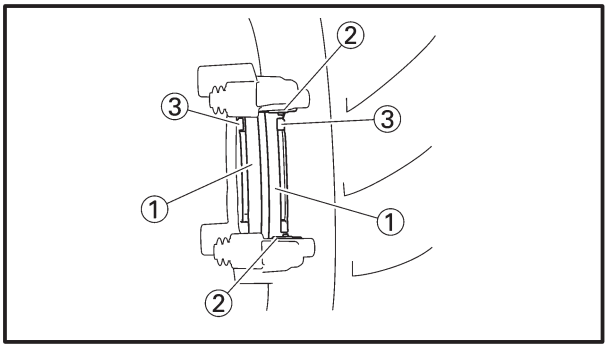


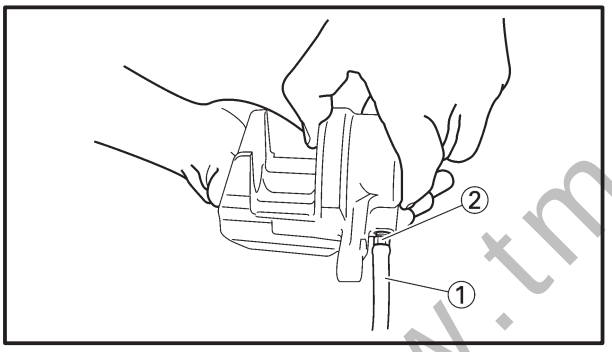
1. Remove:
   • brake caliper bolt ①
   • brake caliper ②



2. Remove:
   • brake pads ①
   • brake pad shim ②
   • brake pad spring ③







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

	Minimum brake pad thickness **0.8 mm**

4. Install:
   • brake pads ①
   • brake pad spring ②
   • brake pad shim ③

NOTE:

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

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

	Bleed screw **6 Nm (0.6 m•kg)**

d. Install new brake pads and a new brake pad spring.

5. Lubricate:
   • brake caliper bolts

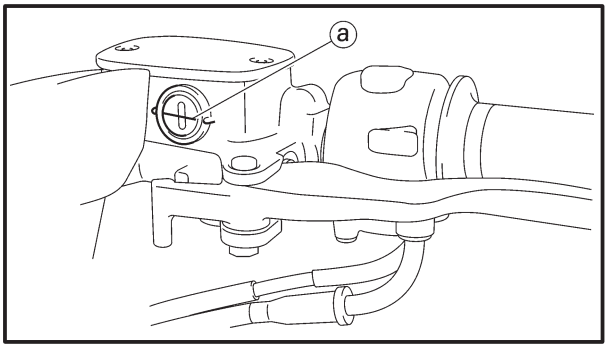
	Recommended lubricant **Lithium soap base grease**

CAUTION:

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

6. Install:
   • brake caliper
   • brake caliper bolt

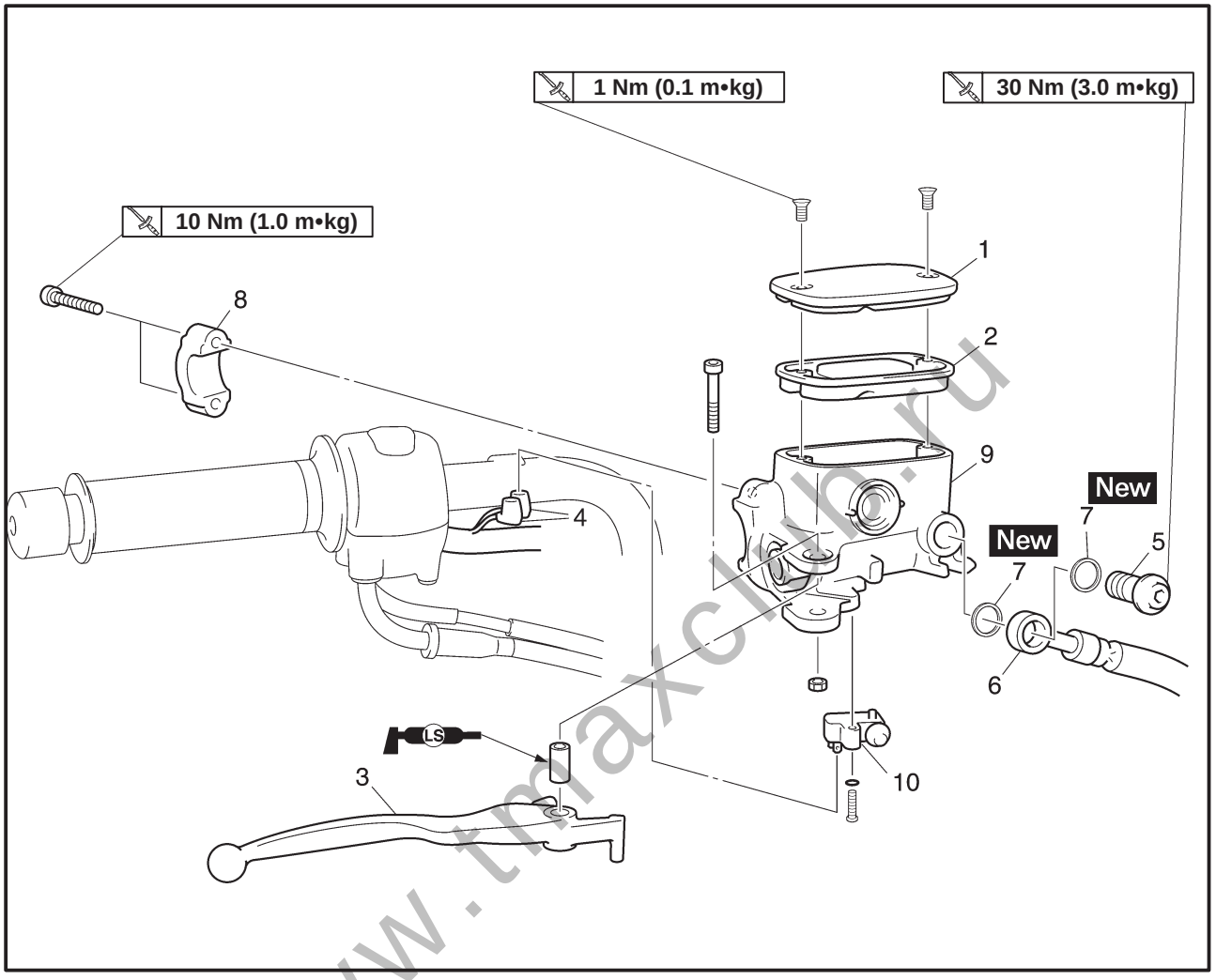
40 Nm (4.0 m•kg)



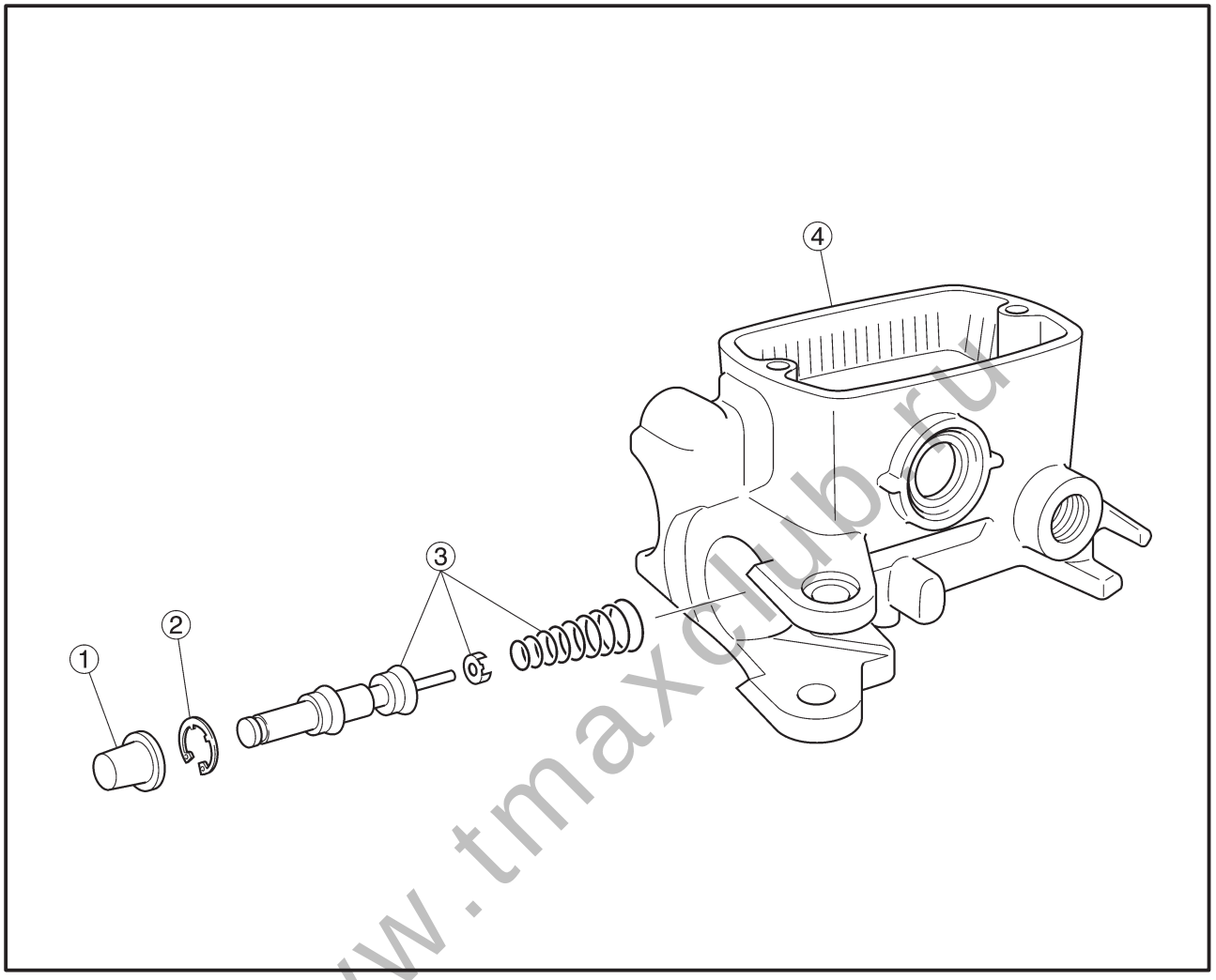
7. Check:
   • brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

8. Check:
   • brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

FRONT BRAKE MASTER CYLINDER

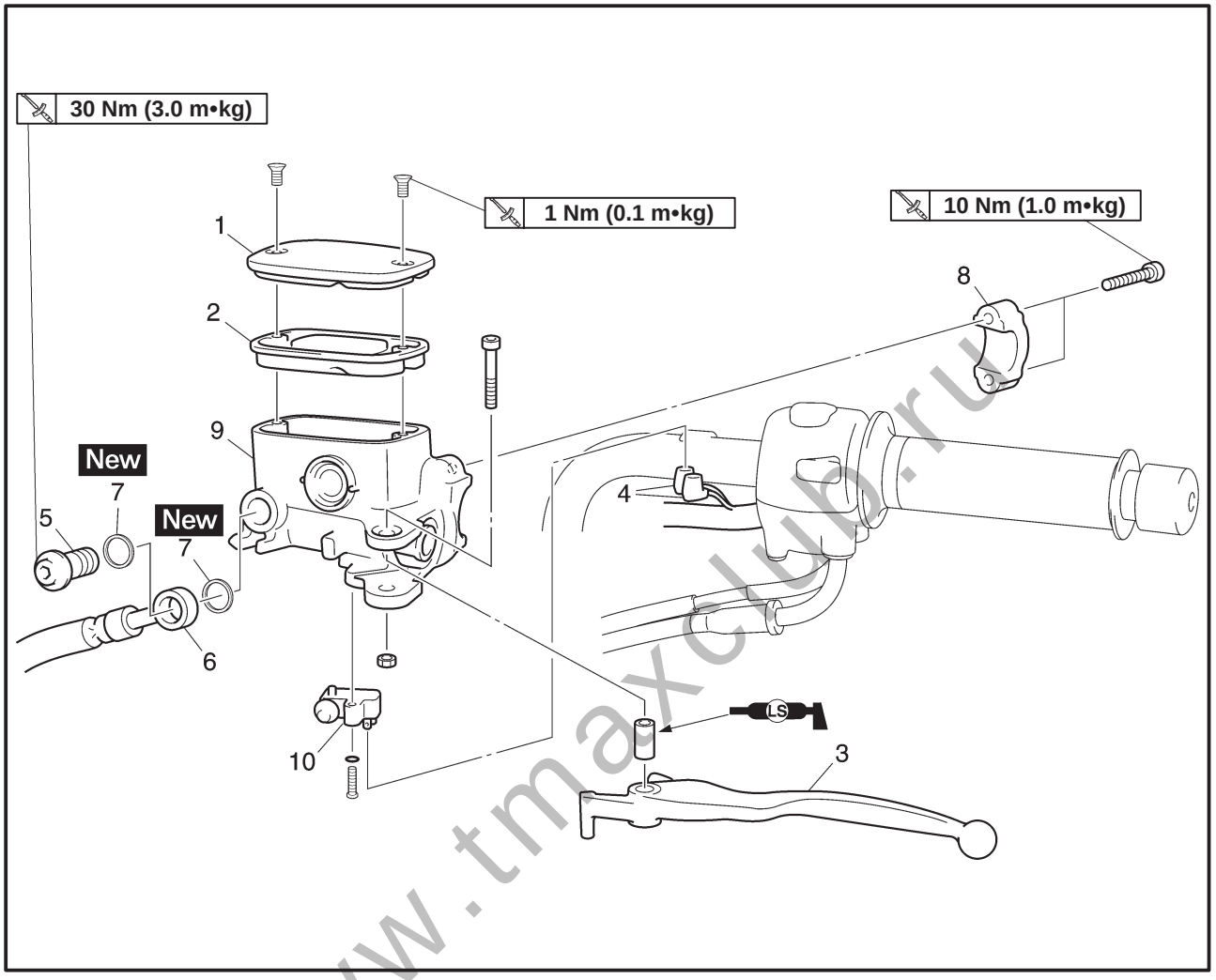


Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphram	1	
3	Brake lever	1	
4	Front brake light switch connector	2	Disconnect.
5	Union bolt	1	
6	Brake hose	1	
7	Copper washer	2	
8	Brake master cylinder holder	1	
9	Brake master cylinder	1	
10	Front brake light switch	1	
			For installation, reverse the removal procedure.

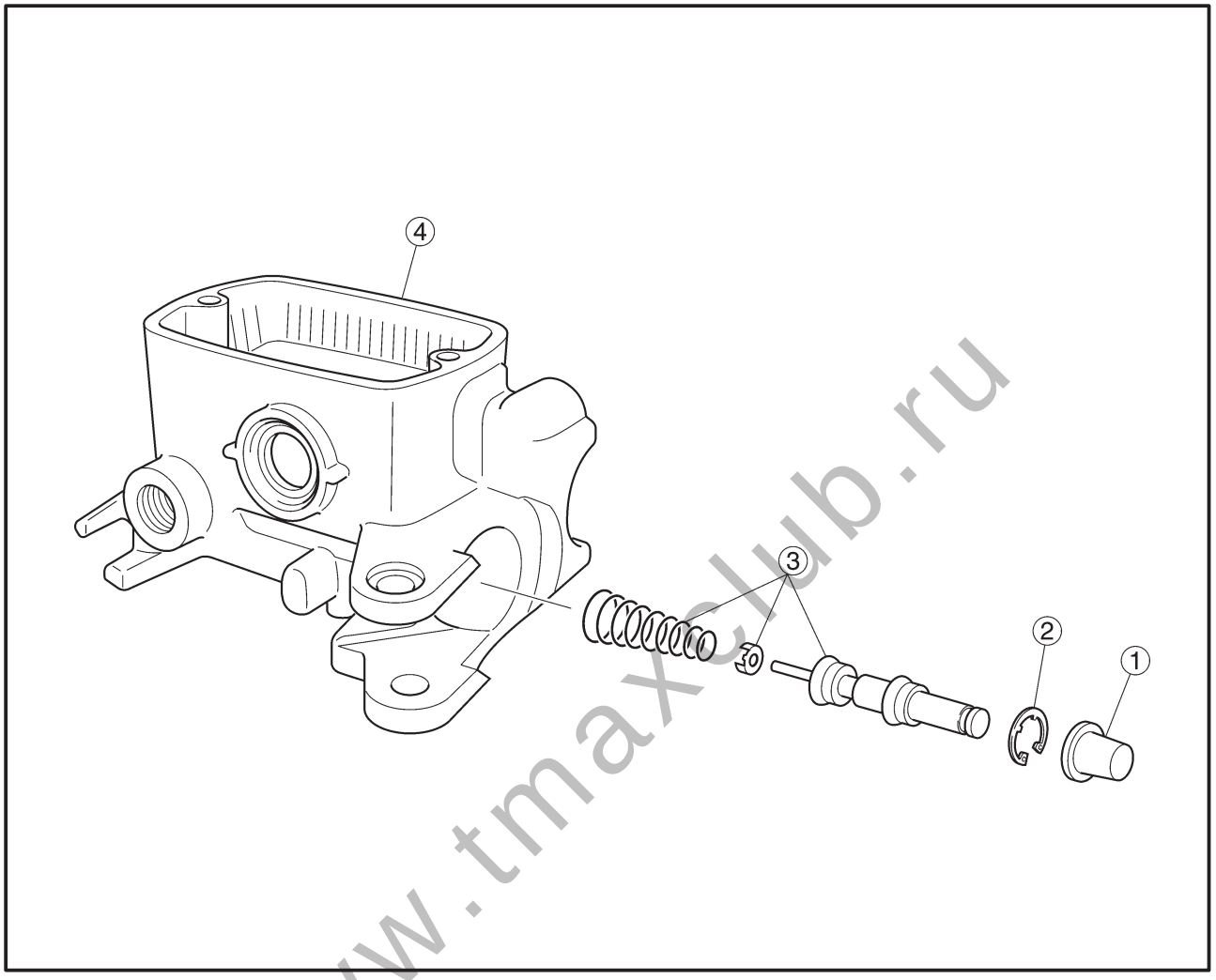


Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake master cylinder		Remove the parts in the order listed.
①	Dust boot	1	
②	Circlip	1	
③	Brake master cylinder kit	1	
④	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

REAR BRAKE MSTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphram	1	
3	Brake lever	1	
4	Rear brake light switch connector	2	Disconnect.
5	Union bolt	1	
6	Brake hose	1	
7	Copper washer	2	
8	Brake master cylinder holder	1	
9	Brake master cylinder	1	
10	Rear brake light switch	1	
			For installation, reverse the removal procedure.



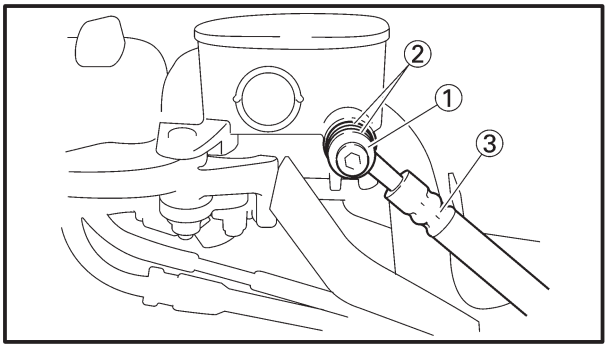
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake master cylinder		Remove the parts in the order listed.
①	Dust boot	1	
②	Circlip	1	
③	Brake master cylinder kit	1	
④	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

EAS00588

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE:

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



1. Disconnect:
   - front brake light switch connector (from the brake light switch)
2. Remove:
   - union bolt ①
   - copper washers ②
   - brake hoses ③

NOTE:

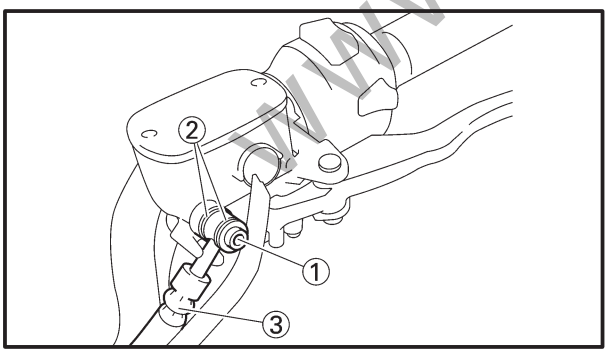
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

EAS00589

DISASSEMBLING THE REAR BRAKE MASTER CYLINDER

NOTE:

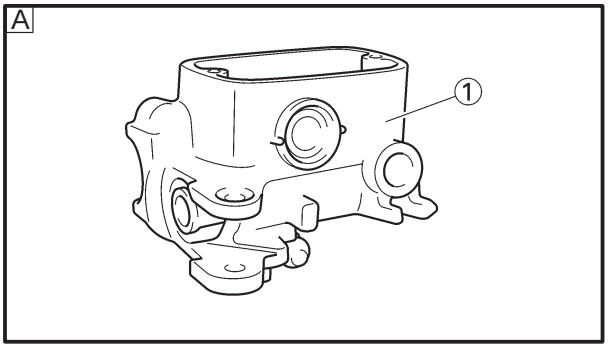
Before disassembling the rear brake master cylinder, drain the brake fluid from the entire brake system.

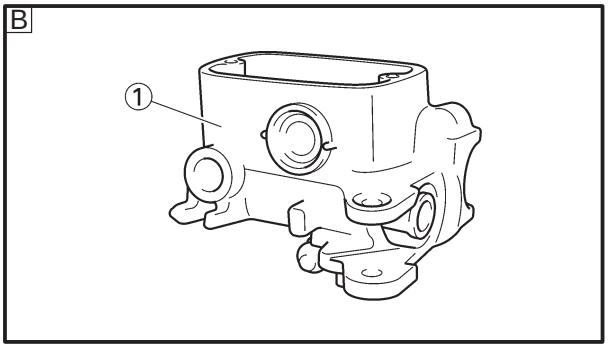


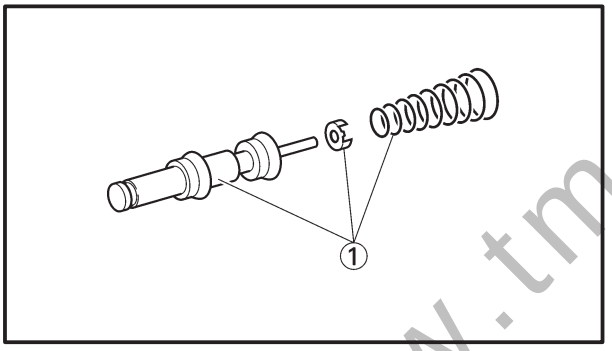
1. Disconnect:
   - rear brake light switch connector (from the brake light switch)
2. Remove:
   - union bolt ①
   - copper washers ②
   - brake hose ③

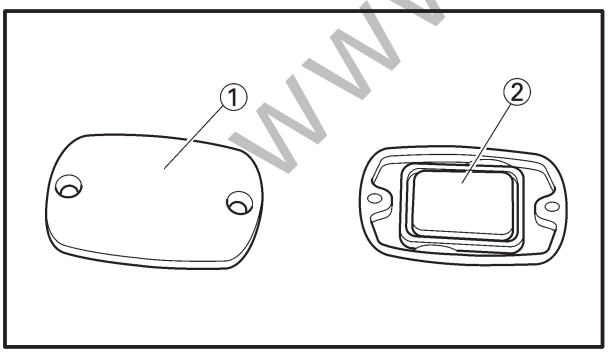
NOTE:

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









EAS00592
CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

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

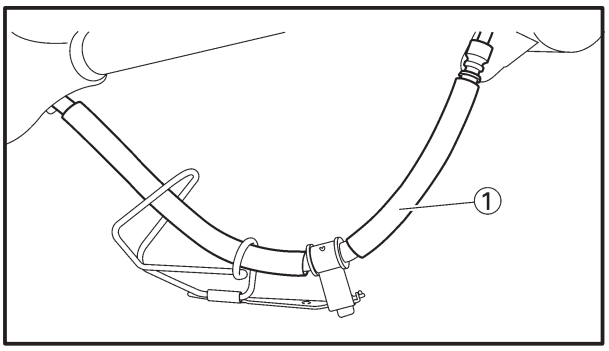
1. Check:
   - brake master cylinder ①
     Damage/scratches/wear → Replace.
   - brake fluid delivery passages (brake master cylinder body)
     Obstruction → Blow out with compressed air.

A Front
B Rear

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

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

4. Check:
   - rear brake master cylinder reservoir cap ①
     Cracks/damage → Replace.
   - rear brake master cylinder reservoir diaphragm ②
     Damage/wear → Replace.



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

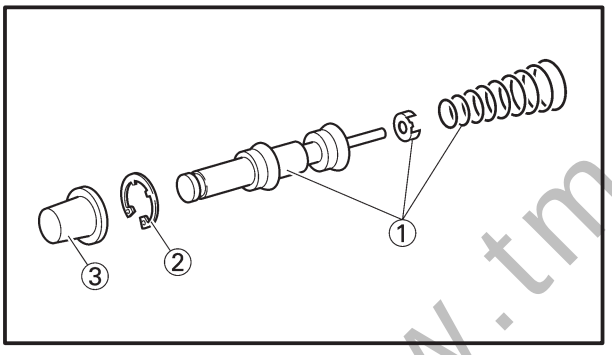
EAS00596

ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

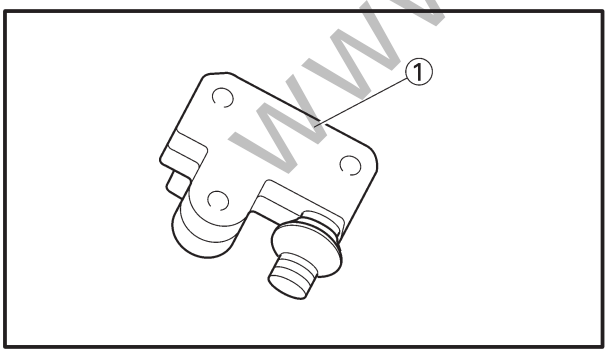
⚠ WARNING

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

Recommended brake fluid
DOT 4

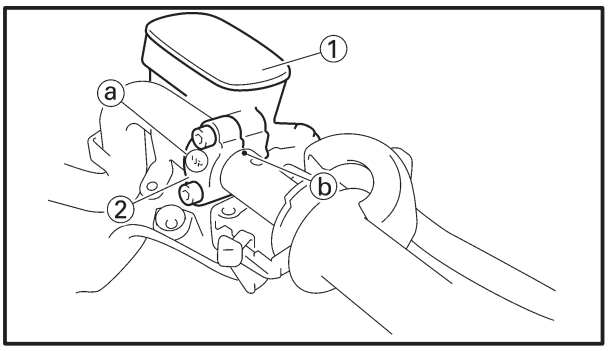


1. Install:
   • brake master cylinder kit ①
   • circlip ② New
   • dust boot ③



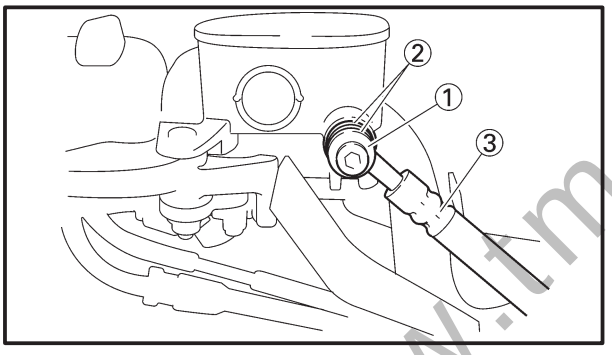
2. Install:
   • front brake light switch ①

3. Install:
   • brake lever



4. Install:
   - brake master cylinder ①
   - brake master cylinder holder ②
   - holder bolts — 10 Nm (1.0 m•kg)

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

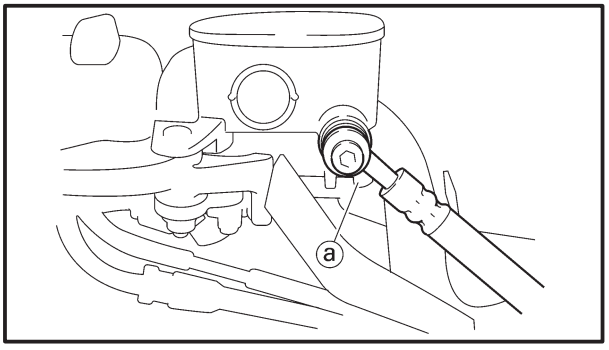


5. Install:
   - copper washers ② New
   - brake hose ③
   - union bolt ① — 30 Nm (3.0 m•kg)

⚠ WARNING

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

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



CAUTION:

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

6. Connect:
 • front brake light switch connector
7. Fill:
 • brake master cylinder reservoir
 (with the specified amount of the recommended brake fluid)

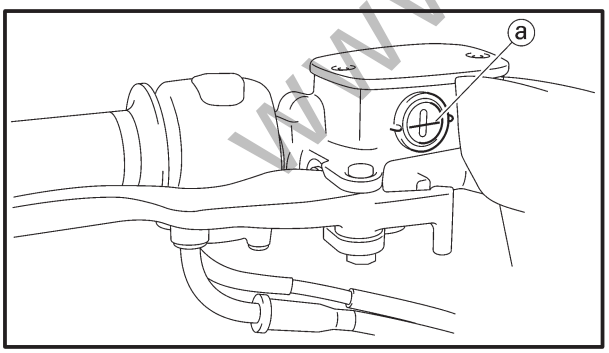
Recommended brake fluid
DOT 4

⚠ WARNING

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

CAUTION:

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



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

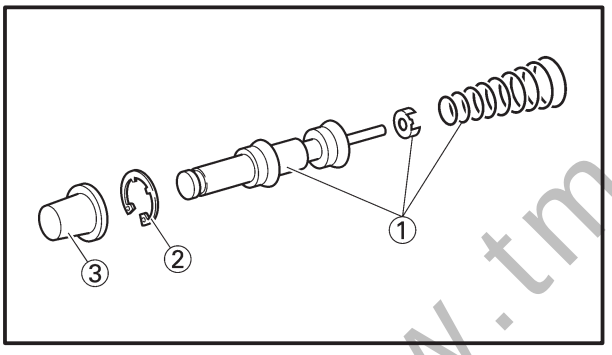
EAS00600

ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER

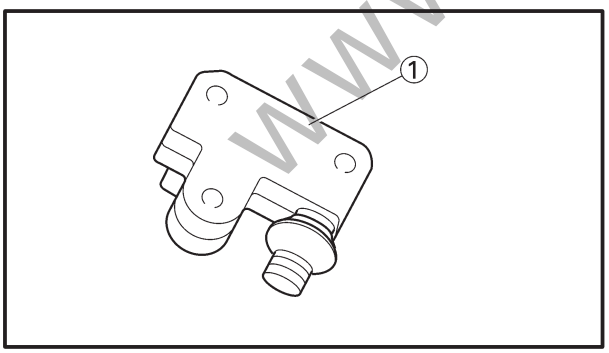
⚠ WARNING

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

Recommended brake fluid
DOT 4

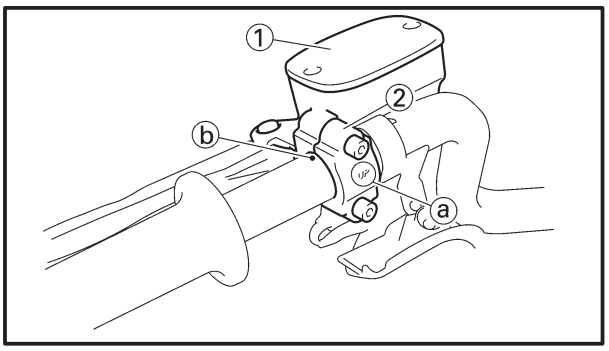


1. Install:
   - brake master cylinder kit ①
   - circlip ② New
   - dust boot ③



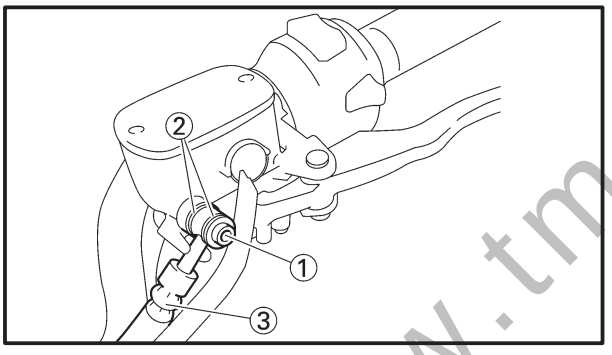
2. Install:
   - rear brake light switch ①

3. Install:
   - brake lever



4. Install:
   - brake master cylinder ①
   - brake master cylinder holder ②
   - holder bolts — 10 Nm (1.0 m•kg)

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

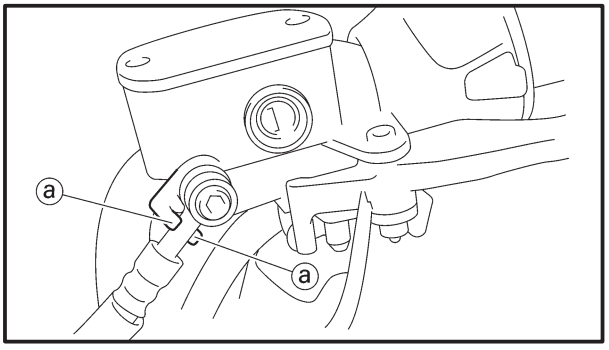


5. Install:
   - copper washer ② New
   - brake hose ③
   - union bolt ① — 30 Nm (3.0 m•kg)

⚠ WARNING

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

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



CAUTION:

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

6. Connect:
   • rear brake light switch connector
7. Fill:
   • brake master cylinder reservoir
   (with the specified amount of the recommended brake fluid)

Recommended brake fluid
DOT 4

⚠ WARNING

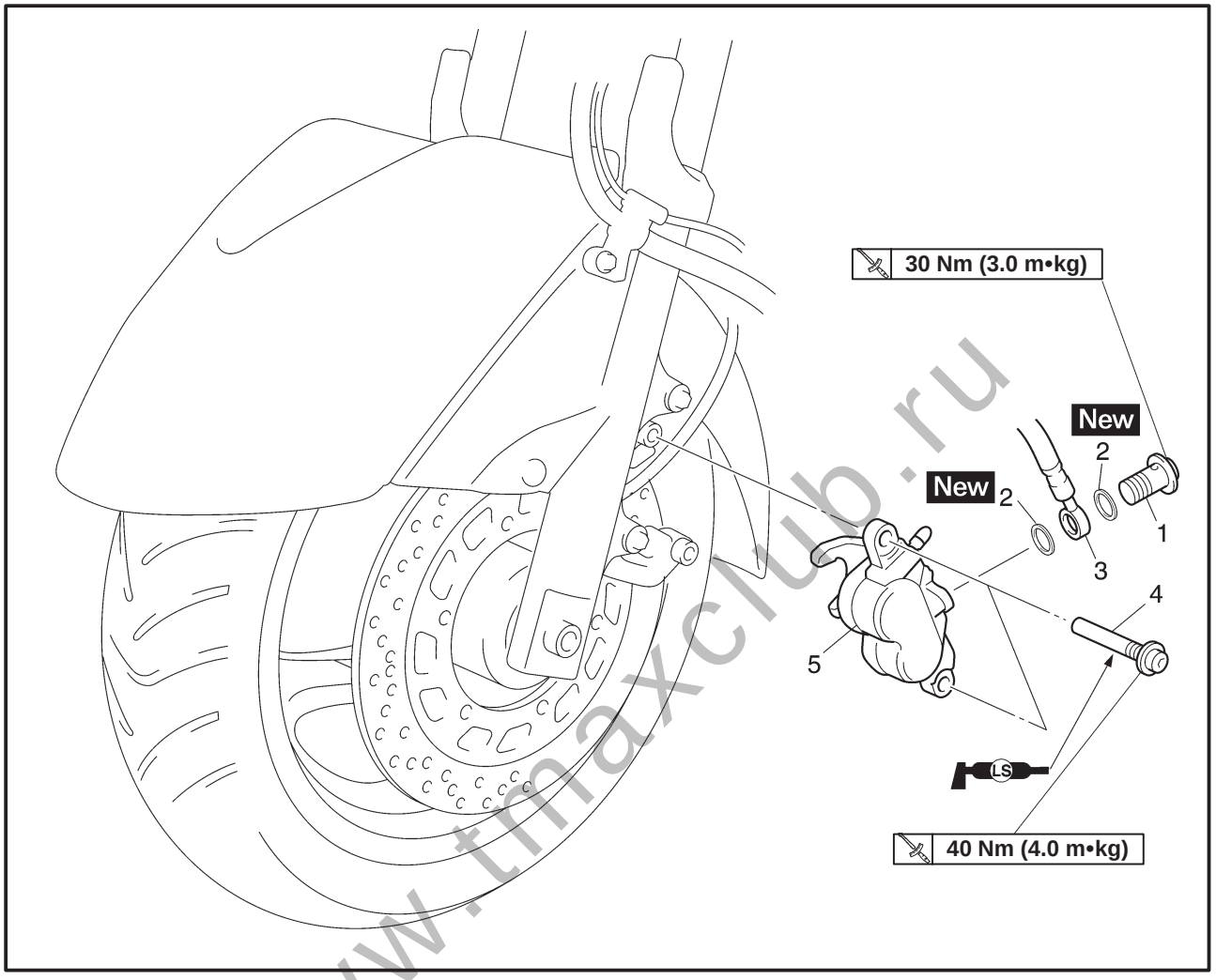
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

CAUTION:

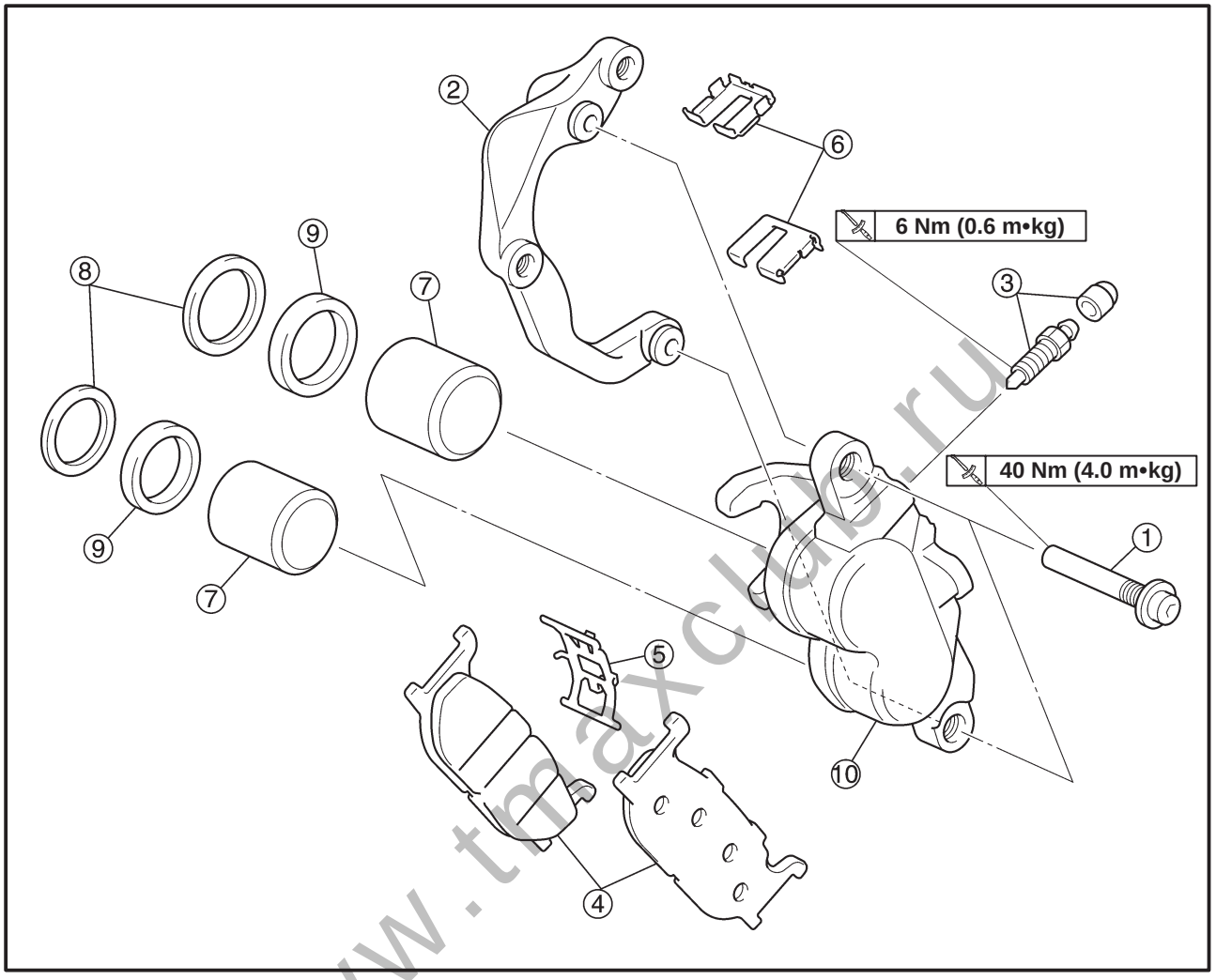
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

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

FRONT BRAKE CALIPER

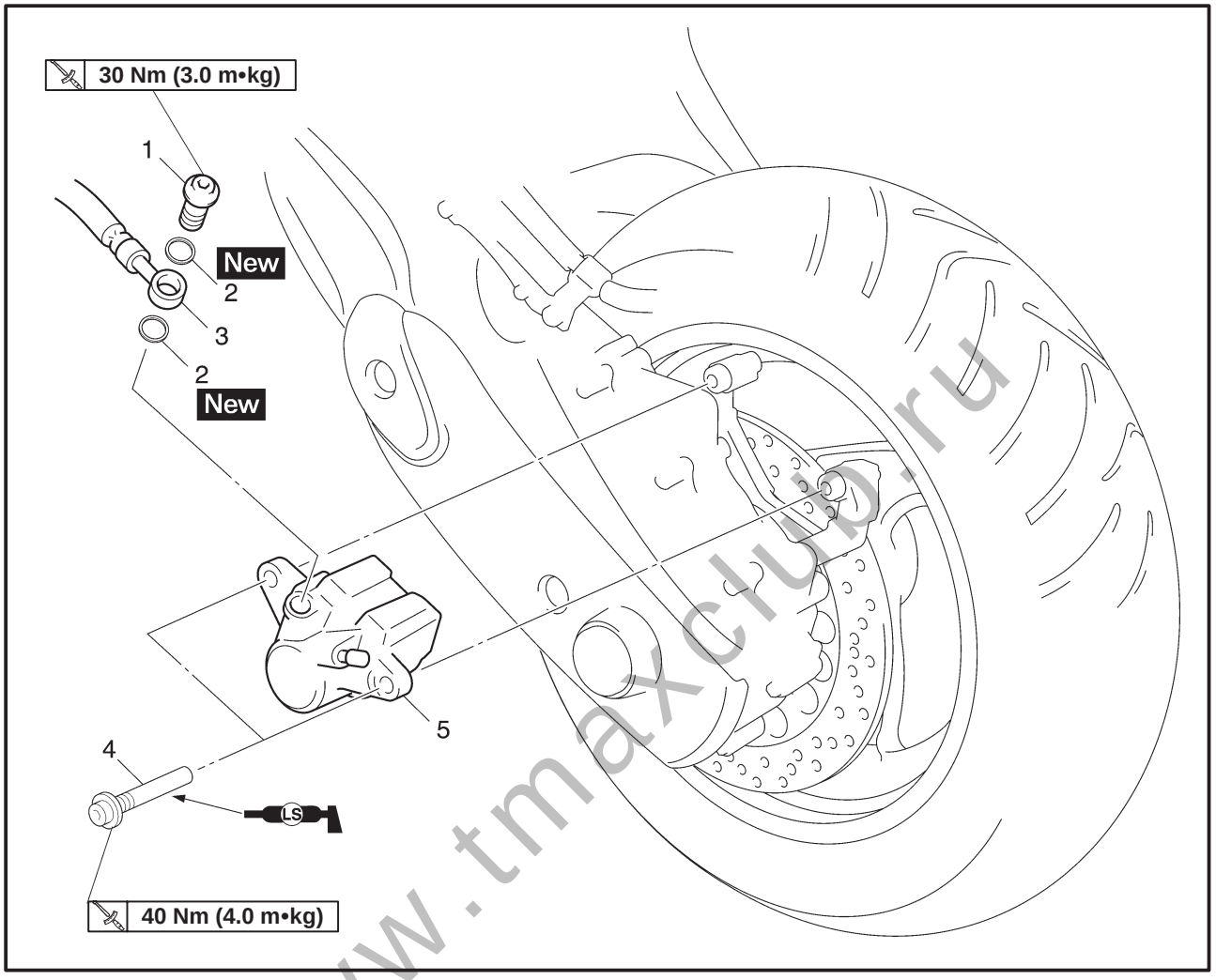


Order	Job/Part	Q'ty	Remarks
	Removing the front brake caliper		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper bolt	2	
5	Brake caliper	1	
			For installation, reverse the removal procedure.

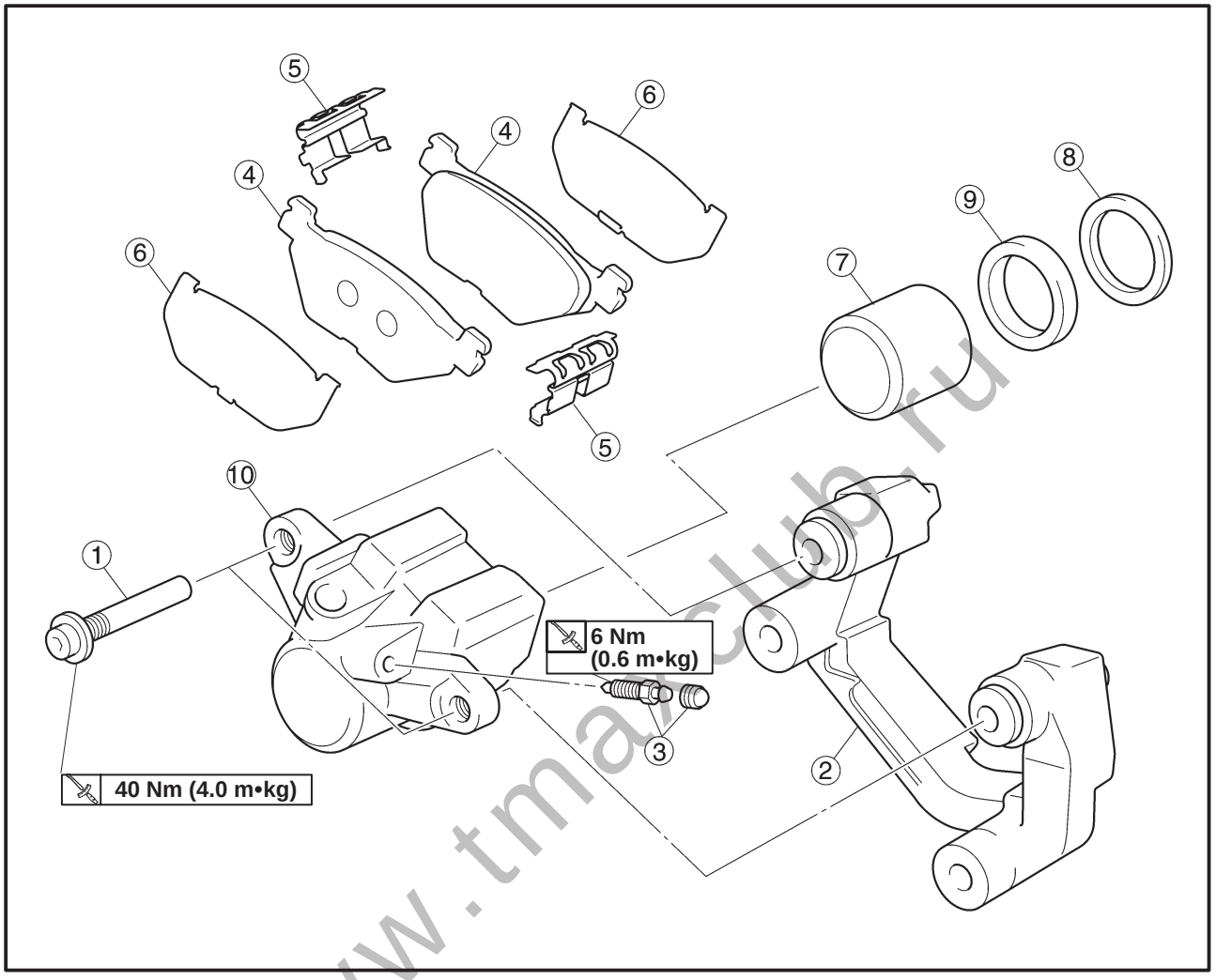


Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake caliper		Disassemble the parts in the order listed.
①	Brake caliper bolt	2	
②	Brake caliper bracket	1	
③	Bleed screw	1	
④	Brake pad	2	
⑤	Brake pad spring	1	
⑥	Brake pad crip	2	
⑦	Brake caliper piston	2	
⑧	Dust seal	2	
⑨	Piston seal	2	
⑩	Brake caliper body	1	
			For assembly, reverse the disassembly procedure.

REAR BRAKE CALIPER



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



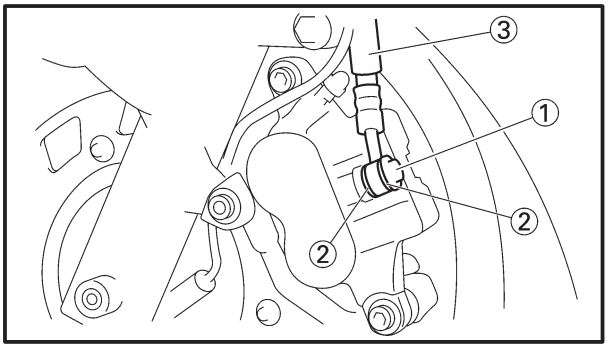
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake caliper		Disassemble the parts in the order listed.
①	Brake caliper bolt	2	
②	Brake caliper bracket	1	
③	Bleed screw	1	
④	Brake pad	2	
⑤	Brake pad spring	2	
⑥	Brake pad shim	2	
⑦	Brake caliper piston	1	
⑧	Dust seal	1	
⑨	Piston seal	1	
⑩	Brake caliper body	1	
			For assembly, reverse the disassembly procedure.

EAS00619

DISASSEMBLING THE FRONT BRAKE CALIPER

NOTE:

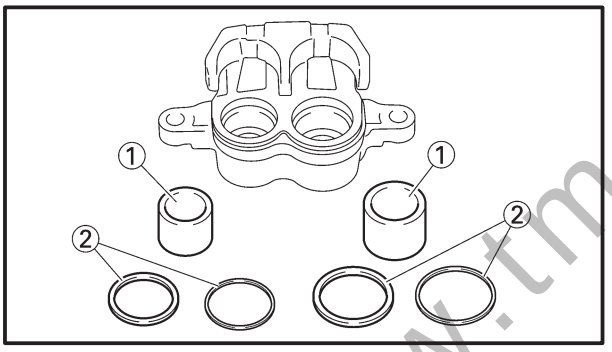
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



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

NOTE:

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

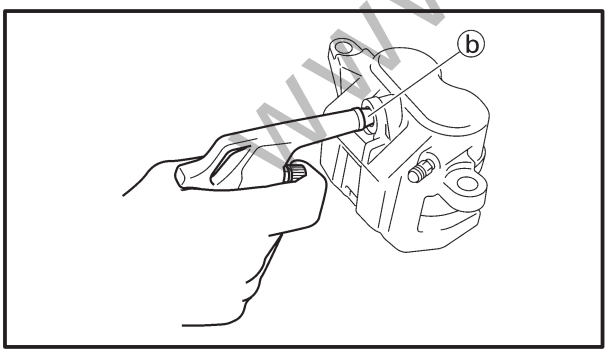


2. Remove:
   - brake caliper pistons ①
   - brake caliper piston seals ②

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

⚠ WARNING

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



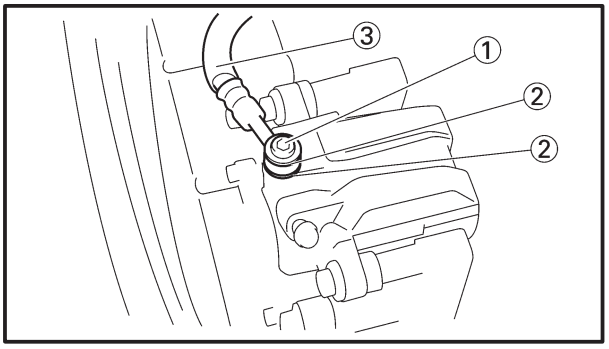
b. Remove the brake caliper piston seals.

EAS00626

DISASSEMBLING THE REAR BRAKE CALIPER

NOTE:

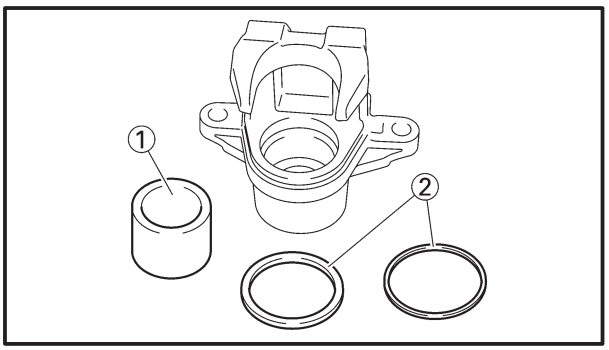
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



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

NOTE:

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

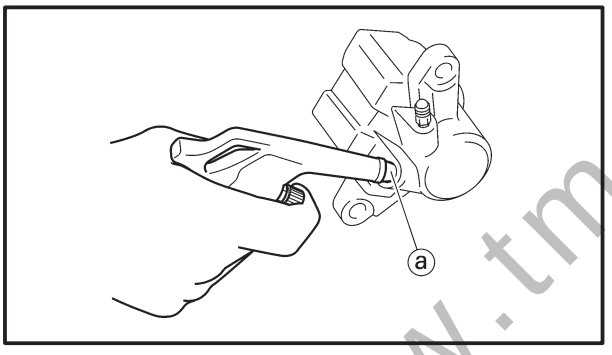


2. Remove:
   - brake caliper piston ①
   - brake caliper piston seals ②

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

⚠ WARNING

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

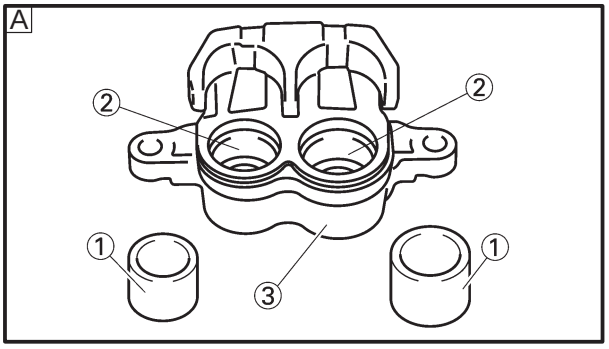


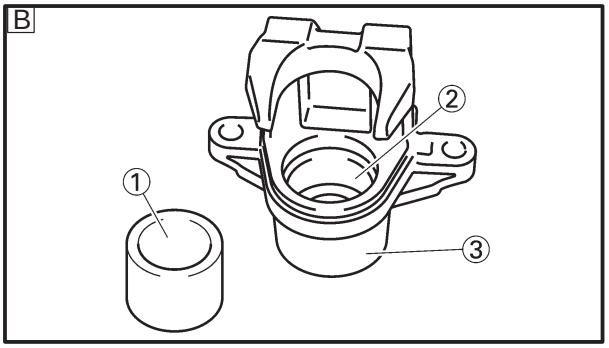
b. Remove the brake caliper piston seals.

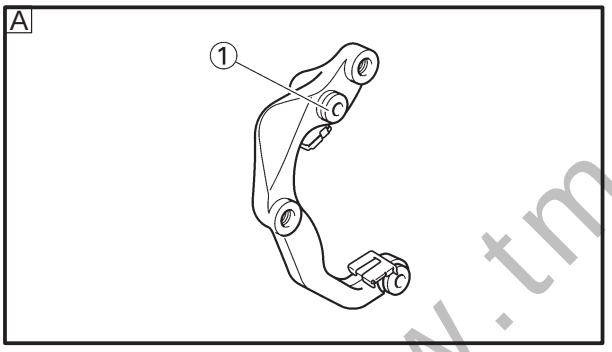
EAS00631

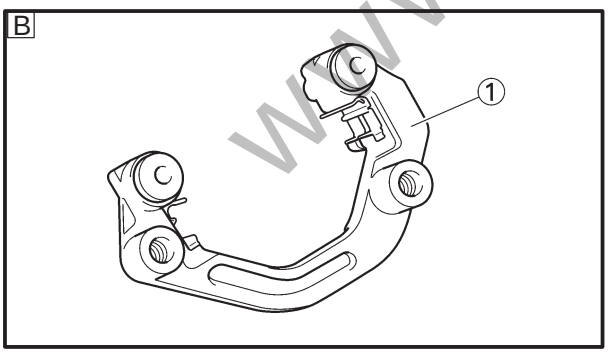
CHECKING THE FRONT AND REAR BRAKE CALIPER

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









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

⚠ WARNING

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

A Front
B Rear

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

A Front
B Rear

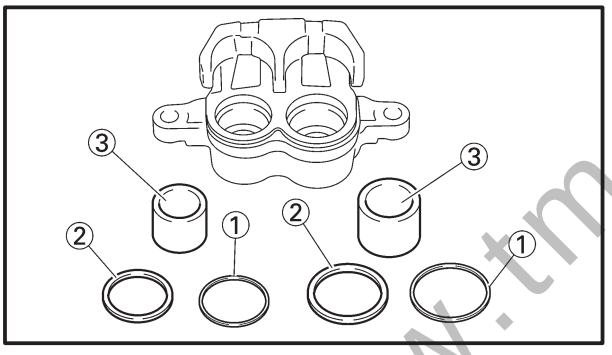
EAS00635

ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER

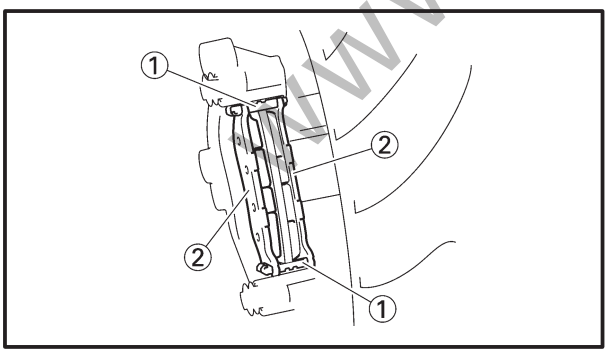
⚠ WARNING

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

Recommended brake fluid
DOT 4



1. Install:
   - bleed screw
   - piston seals ① New
   - dust seals ② New
   - caliper pistons ③

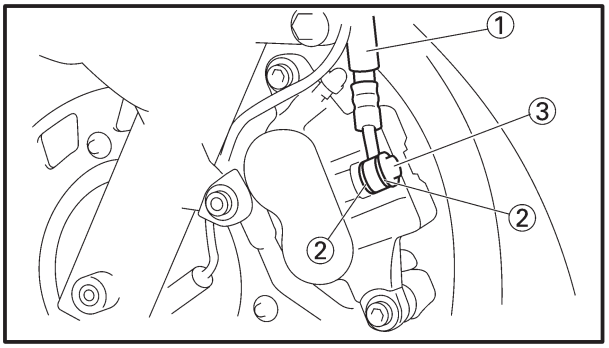


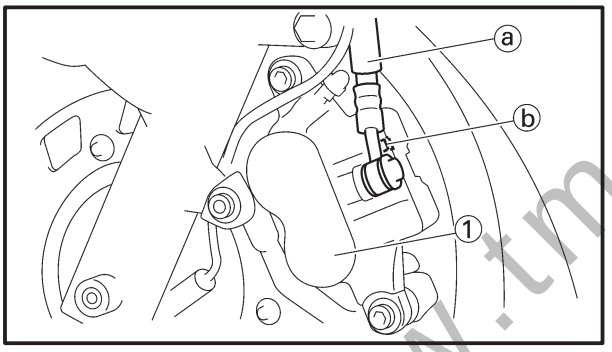
2. Install:
   - brake pad spring ①
   - brake pads ②

NOTE:

Install the brake pad with the attached brake pad spring.

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





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

⚠ WARNING

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

CAUTION:

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

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

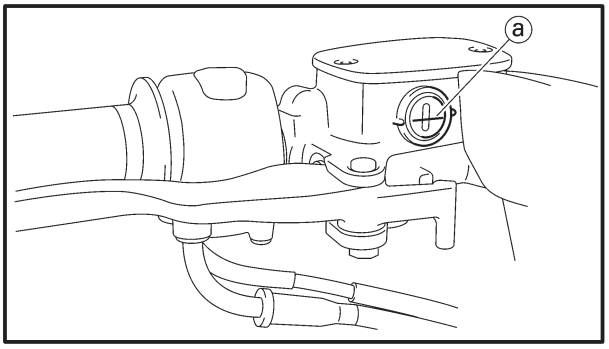
Recommended brake fluid
DOT 4

⚠ WARNING

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

CAUTION:

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



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

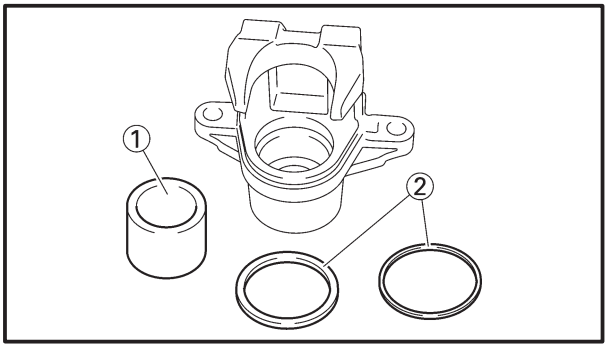
EAS00643

ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

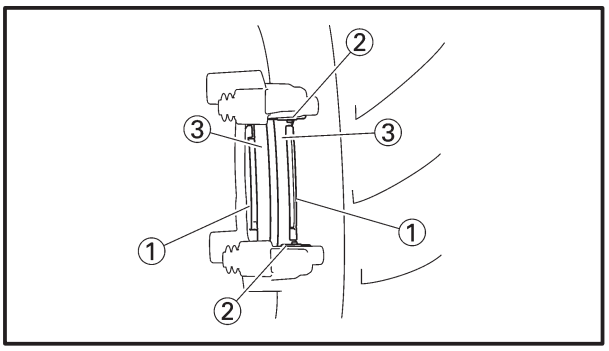
⚠ WARNING

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

Recommended brake fluid
DOT 4



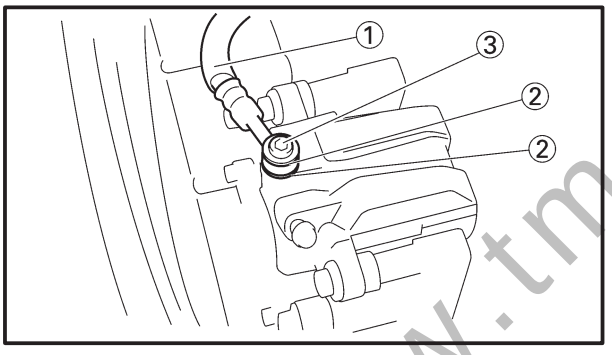
1. Install:
   • bleed screw
   • piston seals ① New
   • dust seals ② New
   • caliper piston



2. Install:
   - brake pad shim ①
   - brake pad spring ②
   - brake pad ③

NOTE:
Install the brake pad with the attached brake pad shim.

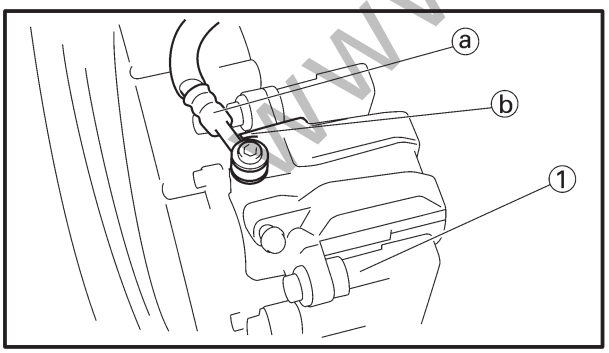
3. Install:
   - brake caliper
   - brake caliper bolt — **40 Nm (4.0 m•kg)**



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

⚠ WARNING

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



CAUTION:

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

5. Fill:
   • brake fluid reservoir
   (with the specified amount of the recommended brake fluid)

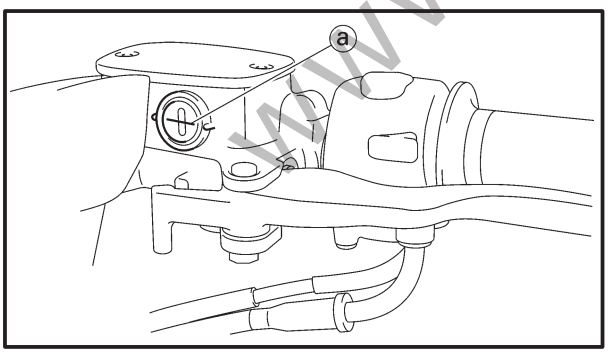
Recommended brake fluid
DOT 4

⚠ WARNING

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

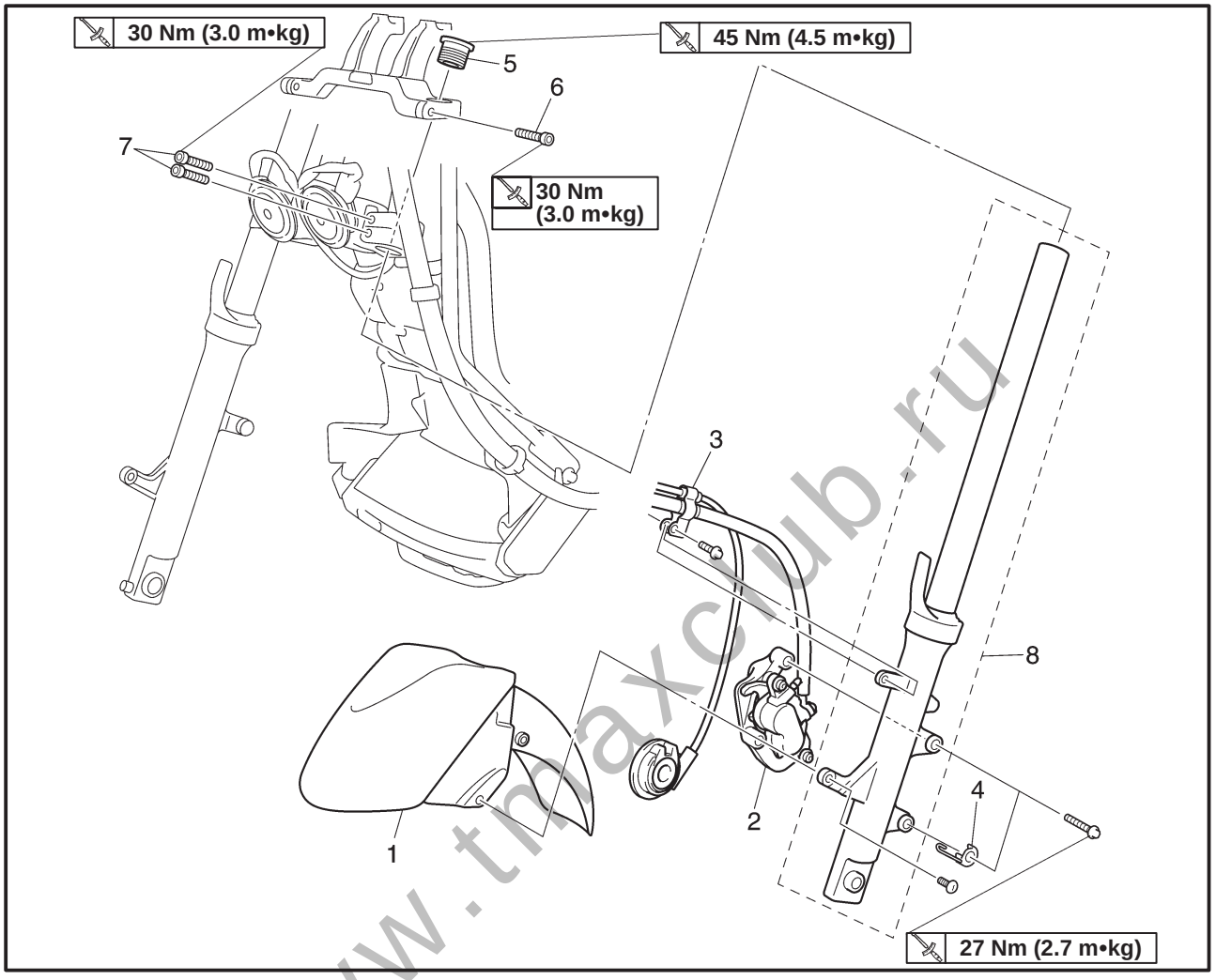
CAUTION:

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

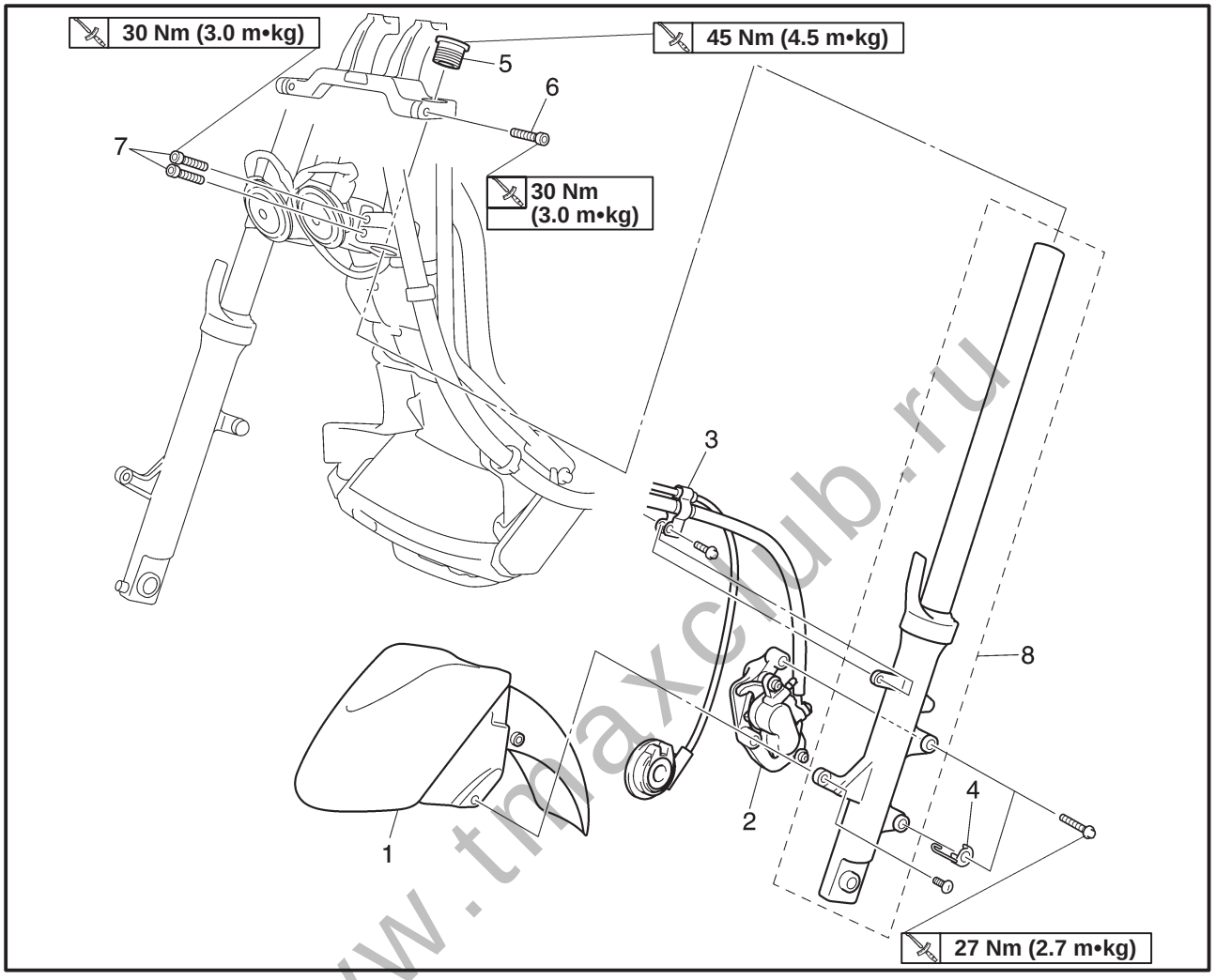


6. Bleed:
   • brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
7. Check:
   • brake fluid level
   Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
8. Check:
   • brake pedal operation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

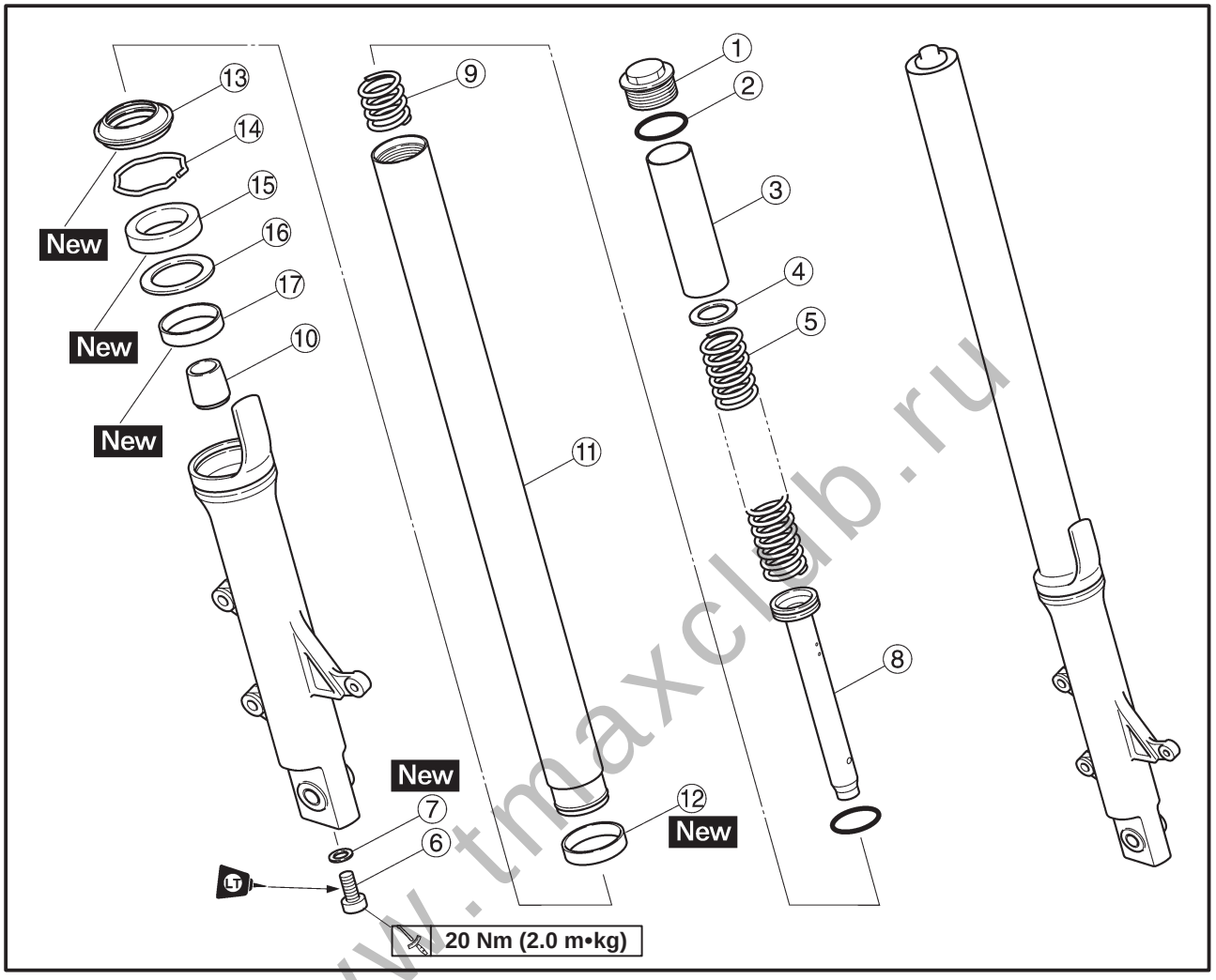
FRONT FORK



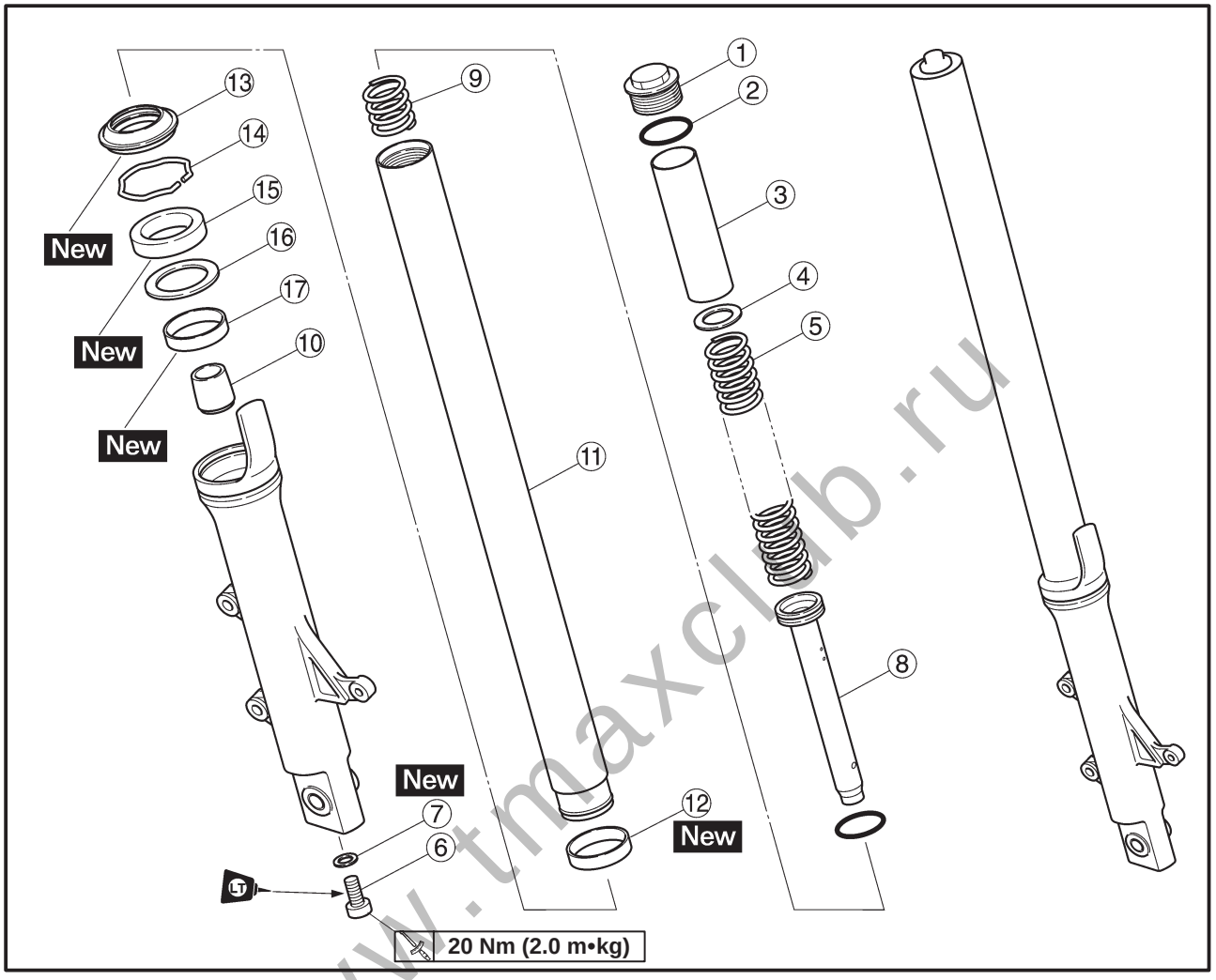
Order	Job/Part	Q'ty	Remarks
	Removing the front fork		Remove the parts in the order listed. The following procedure applies to both of the front fork legs.
	Front cowling		Refer to "COVER AND PANEL" in chapter 3.
	Handle cover (upper) Handle cover (under) Meter		Refer to "HANDLEBAR".
	Leg shield		
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISC".
1	Front fender	1	
2	Front brake caliper	1	



Order	Job/Part	Q'ty	Remarks
3	Brake hose holder	1	
4	Speed sensor holder	1	
5	Cap bolt	1	Loosen.
6	Upper bracket pinch bolt	2	Loosen.
7	Lower bracket pinch bolt	2	Loosen.
8	Front fork leg	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the front fork leg		Disassemble the parts in the order listed. The following procedure applies to both of the front fork legs.
①	Cap bolt	1	
②	O-ring	1	
③	Spacer	1	
④	Fork spring seat	1	
⑤	Fork spring	1	
⑥	Damper rod assembly bolt	1	
⑦	Copper washer	1	
⑧	Damper rod assembly	1	
⑨	Rebound spring	1	
⑩	Oil flow stopper	1	
⑪	Inner tube	1	



Order	Job/Part	Q'ty	Remarks
⑫	Inner tube bushing	1	
⑬	Dust seal	1	
⑭	Oil seal clip	1	
⑮	Oil seal	1	
⑯	Washer	1	
⑰	Outer tube bushing	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.

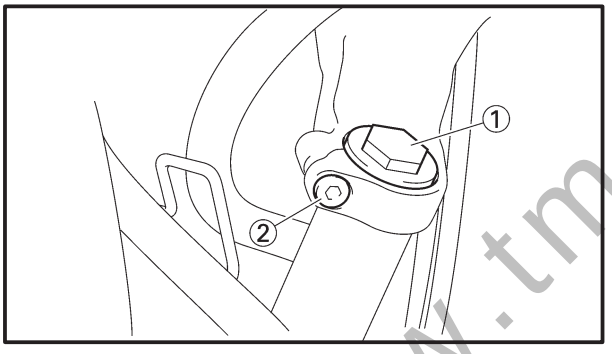
⚠ WARNING

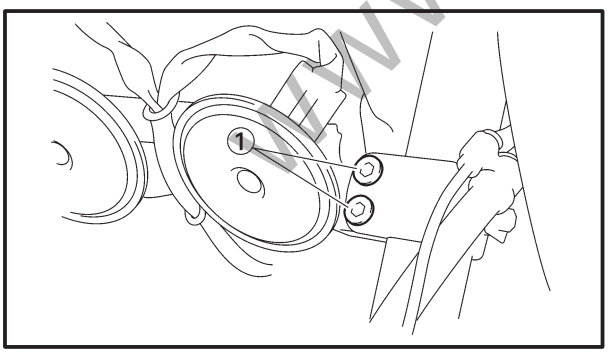
Securely support the scooter so that there is no danger of it falling over.

NOTE:

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

2. Remove:
   - front cowling
   - handle cover
   - meter
   - legshield
   - front wheel
   - front fender
3. Loosen:
   - cap bolt ①
4. Loosen:
   - upper bracket pinch bolts ②



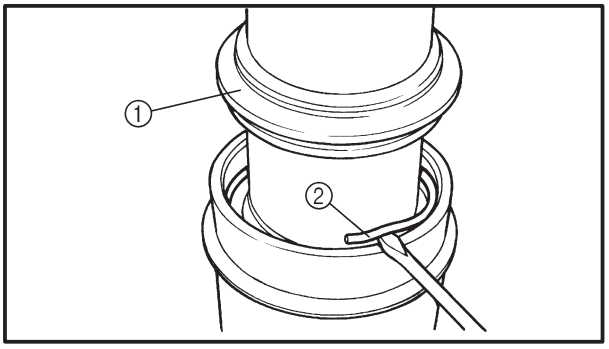


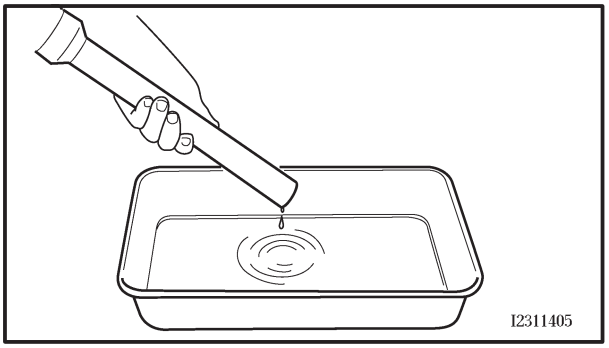
5. Loosen:
   - lower bracket pinch bolts. ①

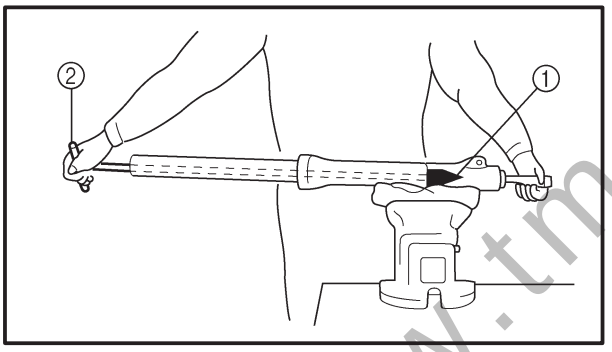
⚠ WARNING

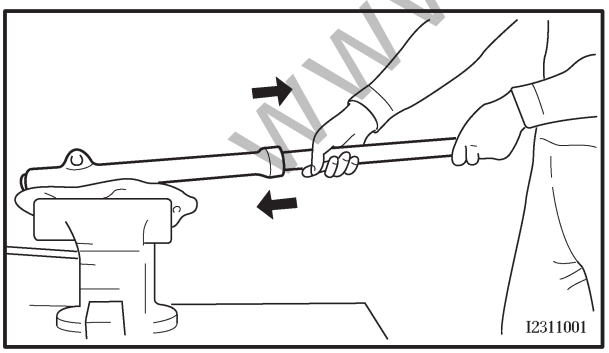
Before loosening the upper and lower bracket pinch bolts, support the front fork leg.

6. Remove:
   - front fork leg









EAS00652

DISASSEMBLING THE FRONT FORK LEGS

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

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

CAUTION:

Do not scratch the inner tube.

2. Drain:
   - fork oil

NOTE:

Stroke the outer tube several times while draining the fork oil.

3. Remove:
   - damper rod assembly bolt

NOTE:

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

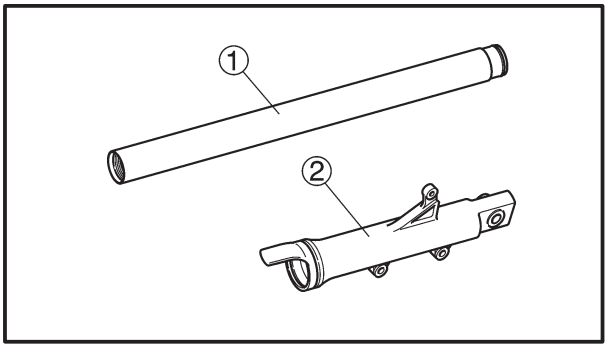
Damper rod holder
90890-01294
T-handle
90890-01326

4. Remove:
   - inner tube

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

CAUTION:

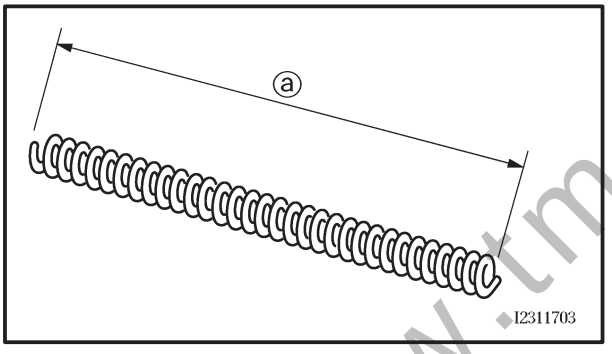
- **Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.**
- **Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.**



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.

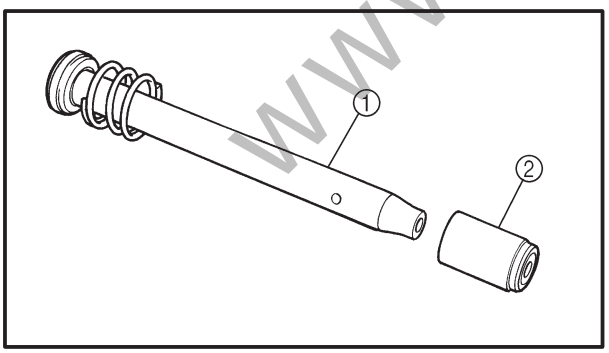
⚠ WARNING

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

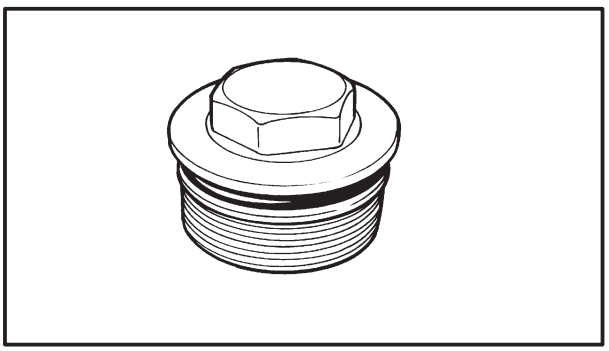


2. Measure:
   • spring free length ⓐ
   Over the specified limit → Replace.

Spring free length limit
420 mm



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



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

EAS00659

ASSEMBLING THE FRONT FORK LEGS

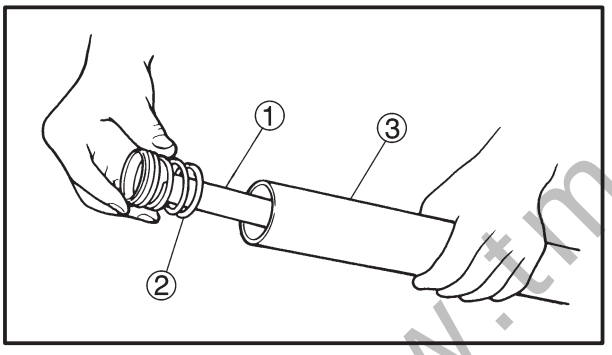
The following procedure applies to both of the front fork legs.

⚠ WARNING

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

NOTE:

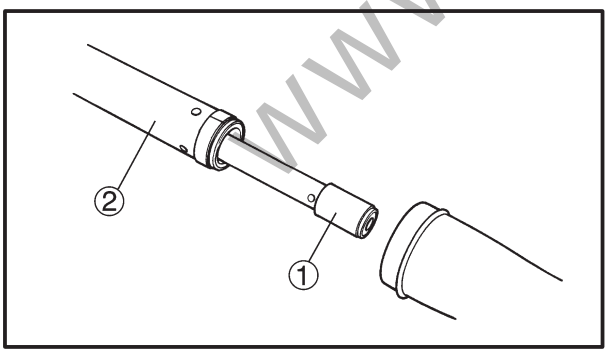
- When assembling the front fork leg, be sure to replace the following parts:
  -inner tube bushing
  -outer tube bushing
  -oil seal
  -dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.



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

CAUTION:

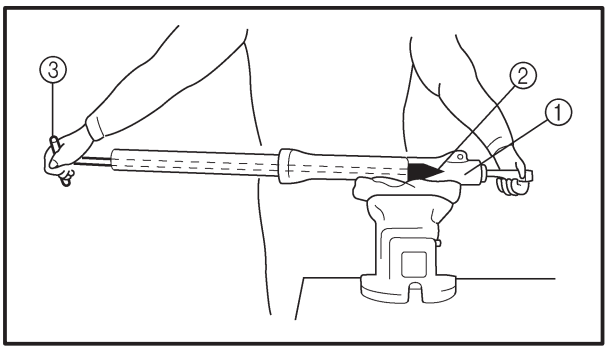
Allow the damper rod to slide slowly down the inner tube ③ until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



2. Install:
   - oil flow stopper ①
3. Lubricate:
   - inner tube's outer surface ②

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

4. Install:
   - outer tube (onto the inner tube)
   - copper washer New
   - damper rod bolt



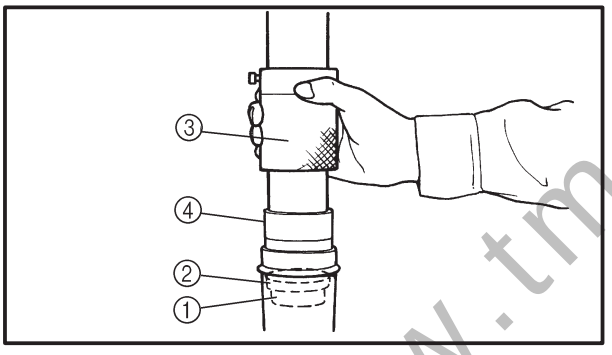
5. Tighten:
   • damper rod bolt ①

20 Nm (2.0 m•kg)

NOTE:

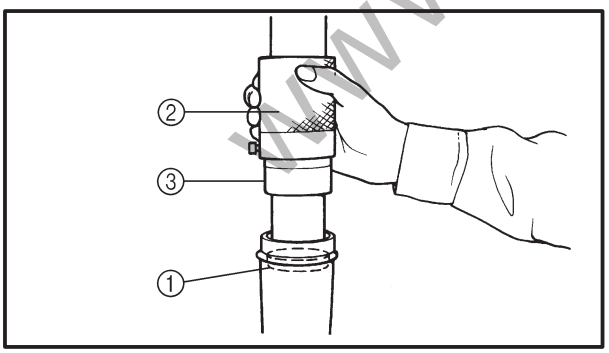
- Apply the locking agent (LOCTITE® 204) to the threads of the damper rod bolt.
- While holding the damper rod with the damper rod holder ② and T-handle ③, tighten the damper rod bolt.

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



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

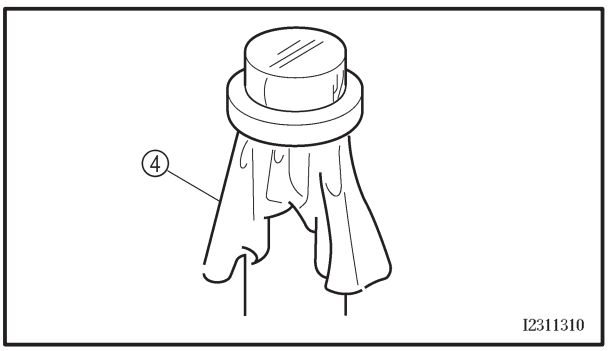
Fork seal driver weight
90890–01367
Adapter
90890–01372



7. Install:
   • Oil seal ① New
   (with the fork seal driver weight ② and adapter ③)

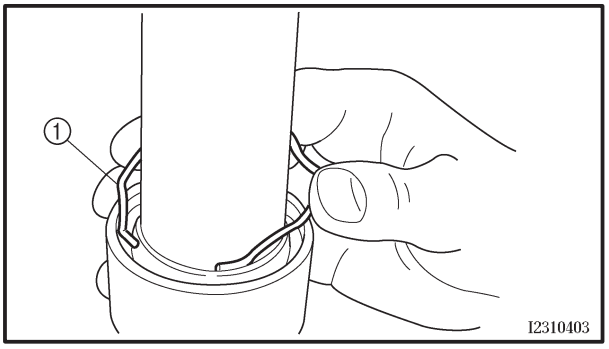
CAUTION:

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



NOTE:

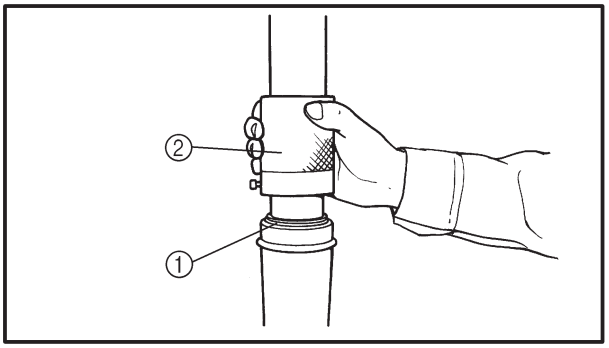
- Before installing the oil seal, apply lithium soap base grease onto its lips.
- Apply fork oil onto the outer surface of the inner tube.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag ④ to protect the oil seal during installation.



8. Install:
   • oil seal clip ①

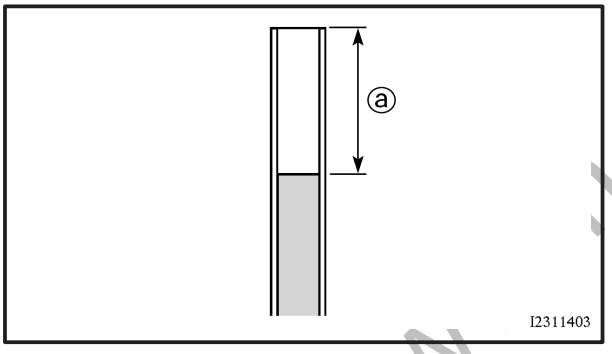
NOTE:

Adjust the oil seal clip so that it fits into the outer ①tube's groove.



9. Install:
   • dust seal ① New
   (with the fork seal driver weight)

Fork seal driver weight ②
90890–01367



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

Quantity (each front fork leg)
402 cm³
Front fork leg oil level ⓐ
(from the top of the inner tube, with the inner tube fully compressed and without the fork spring)
135 mm
Recommended oil
Yamaha fork shock oil 5 WT 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.

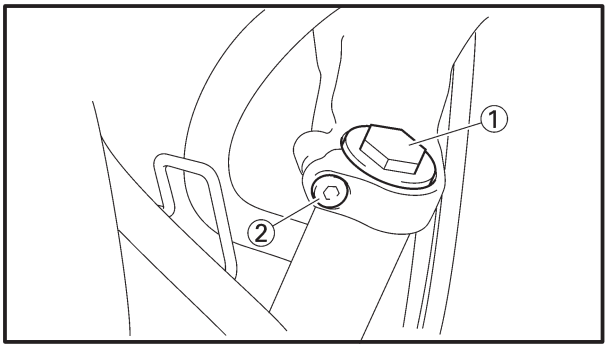
11. Install:
   • fork spring
   • spacer
   • fork spring seat
   • O-ring New

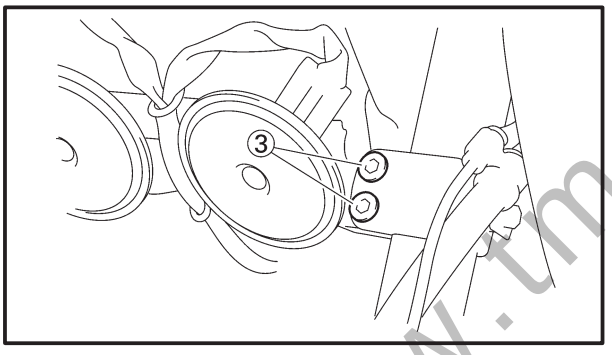
NOTE:

- Install the spring with the smaller pitch facing down.
- Before installing the cap bolt, lubricate its O-ring with grease.
- Temporarily tighten the cap bolt.

EAS00663
INSTALLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Install:
   • front fork leg

NOTE:
Pull up the inner tube until it stops.

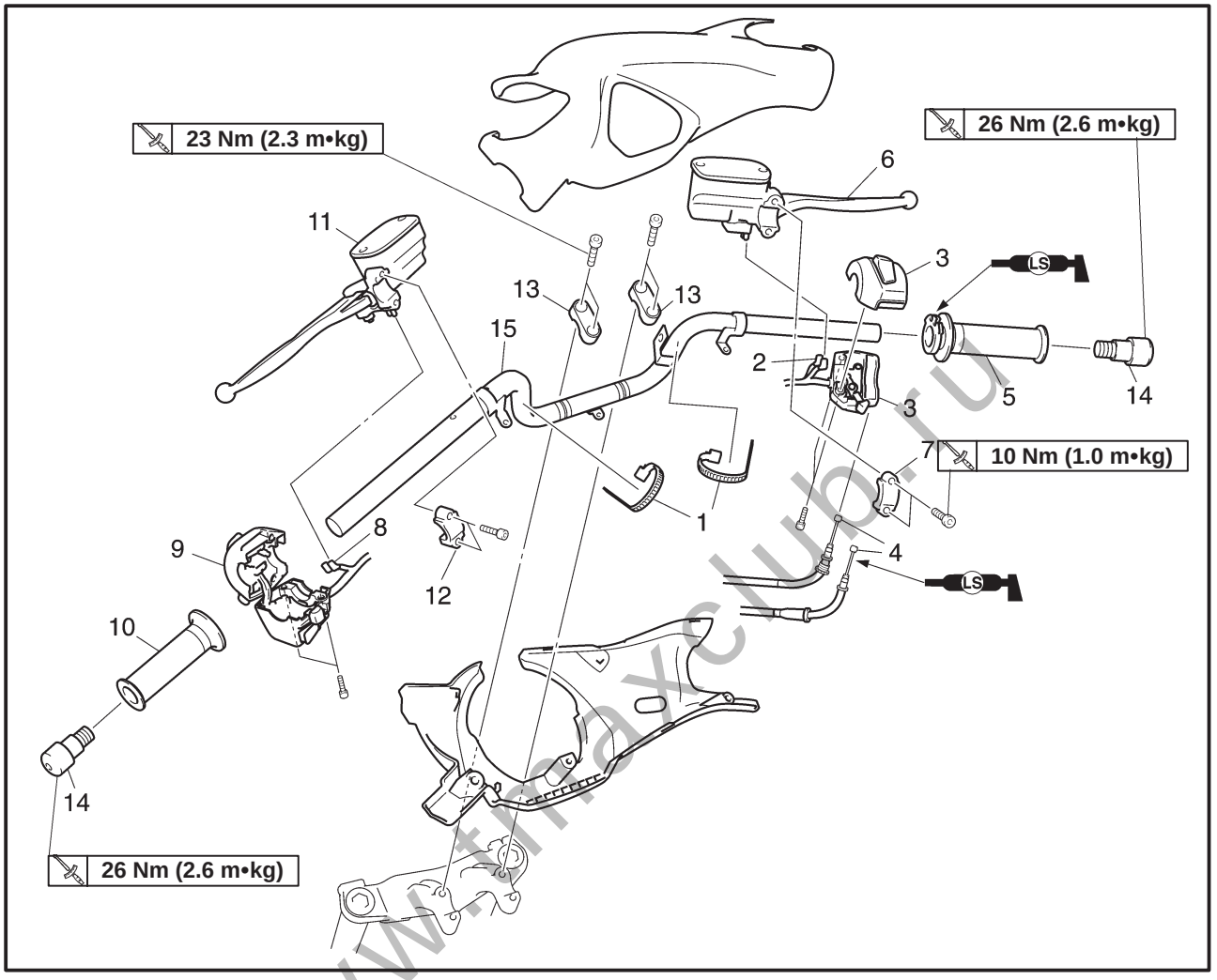




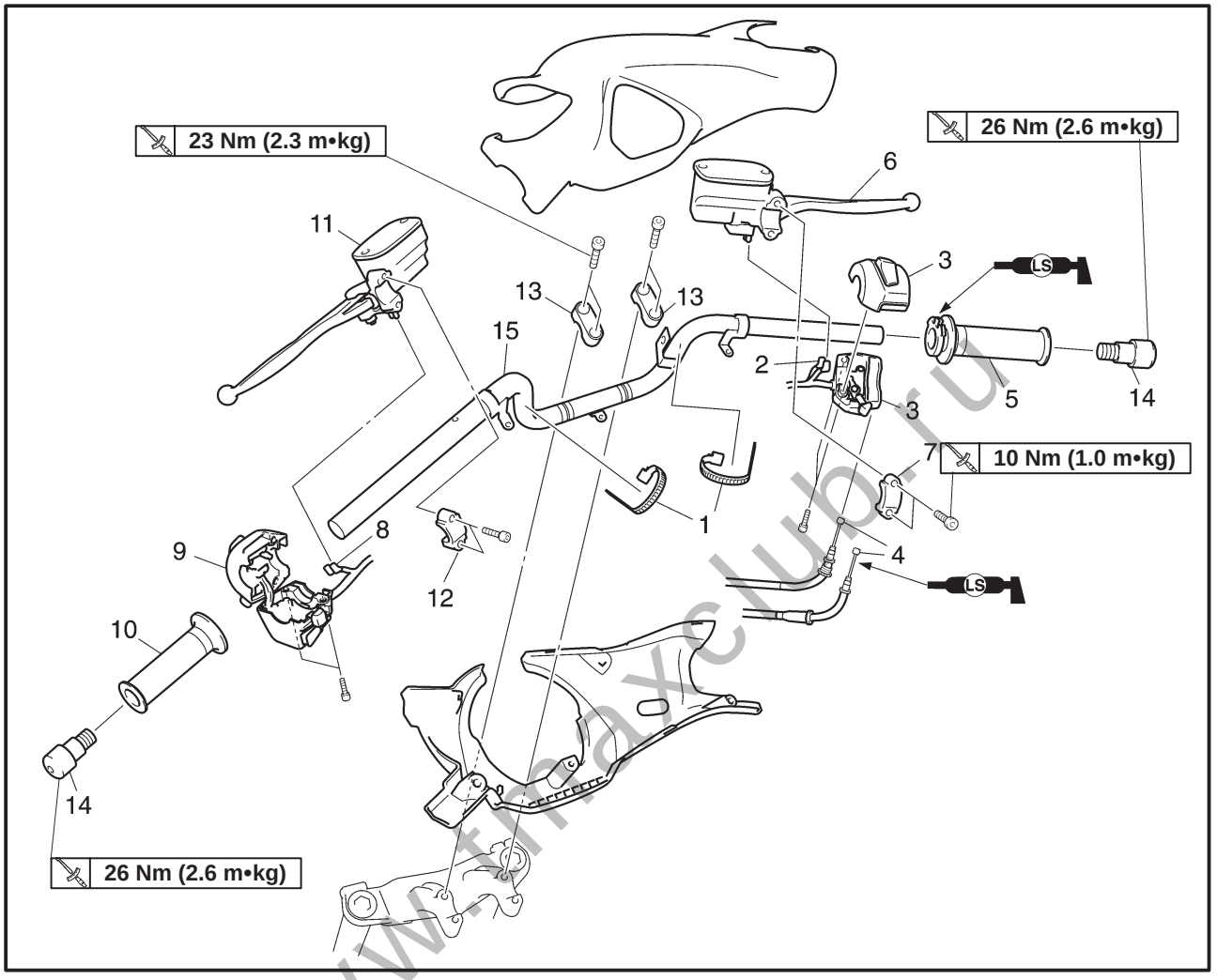
2. Tighten:
   • cap bolt ① — **45 Nm (4.5 m•kg)**
   • lower bracket pinch bolt ③ — **30 Nm (3.0 m•kg)**
   • upper bracket pinch bolt ② — **30 Nm (3.0 m•kg)**

3. Install:
   • front fender
   • legshield
   • meter
   • handle cover
   • front cowling
   • front wheel
   Refer to “FRONT WHEEL AND BRAKE DISC”.

HANDLEBAR



Order	Job/Part	Q'ty	Remarks
	Removing the handlebar Handle cover (upper) Handle cover (lower)		Remove the parts in the order listed.
1	Band	2	
2	Front brake light switch connecter	1	Disconnect.
3	Right handlebar switch	1	
4	Throttle cable	2	Disconnect.
5	Throttle grip	1	
6	Front brake master cylinder	1	
7	Front brake master cylinder holder	1	
8	Rear brake light switch connecter	1	
9	Left handlebar switch	1	
10	Left handlebar grip	1	
11	Rear brake master cylinder	1	
12	Rear brake master cylinder holder	1	



Order	Job/Part	Q'ty	Remarks
13	Handlebar upper holder	2	
14	Grip end	2	
15	Handlebar	1	
			For installation, reverse the removal procedure.

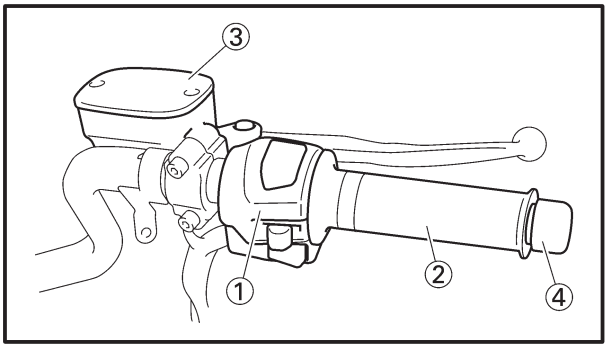
EAS00666

REMOVING THE HANDLEBAR

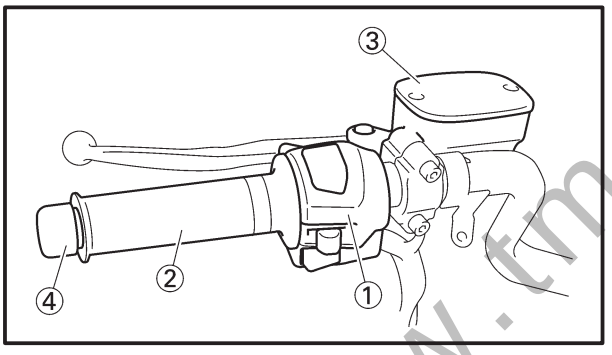
1. Stand the scooter on a level surface.

⚠ WARNING

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



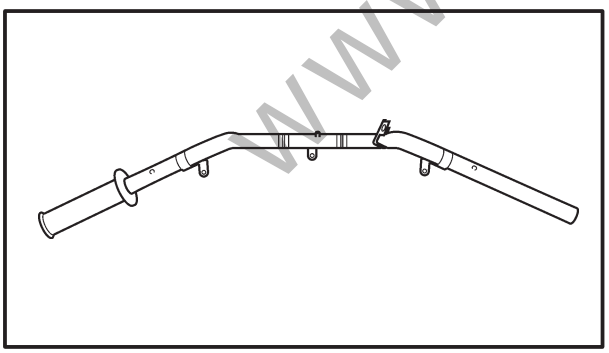
2. Remove:
   - right handlebar switch ①
   - throttle cable
   - throttle grip ②
   - front brake master cylinder ③
   - grip end ④



3. Remove:
   - left handlebar switch ①
   - left handlebar grip ②
   - rear brake master cylinder ③
   - grip end ④

NOTE:

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



CHECKING THE HANDLEBAR

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

⚠ WARNING

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

EAS00671

INSTALLING THE HANDLEBAR

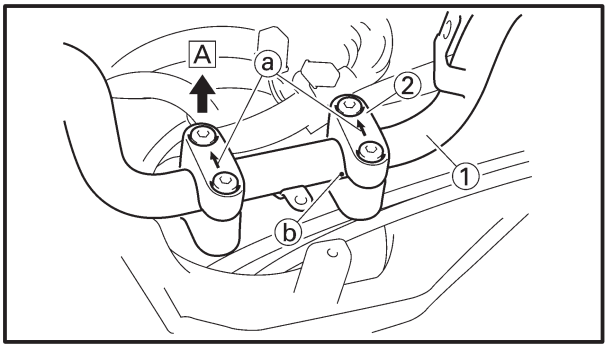
1. Stand the scooter on a level surface.

⚠ WARNING

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

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

23 Nm (2.3 m•kg)

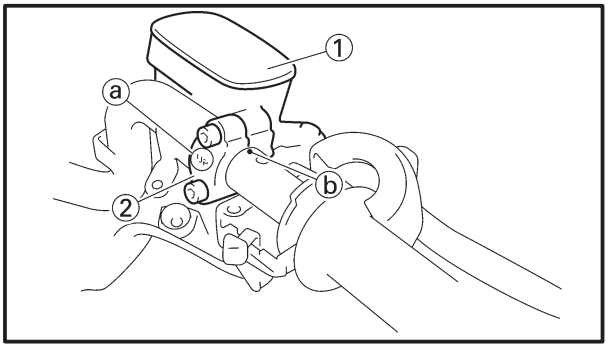


⚠ WARNING

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

NOTE:

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



3. Install:
   - front brake master cylinder ①
   - front brake master cylinder holder ②

10 Nm (1.0 m•kg)

   - holder bolt

NOTE:

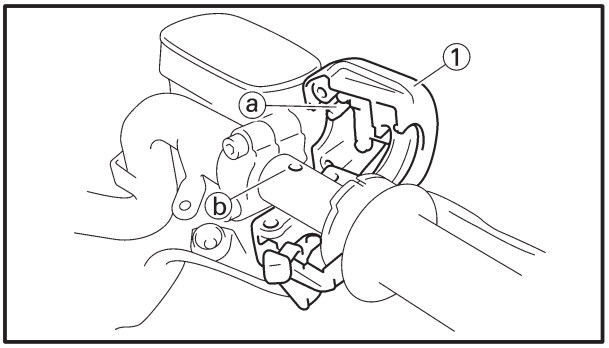
- Install the front brake master cylinder holder with the “UP” ⓐ mark facing up.

• First, tighten the upper bolt, then the lower bolt.

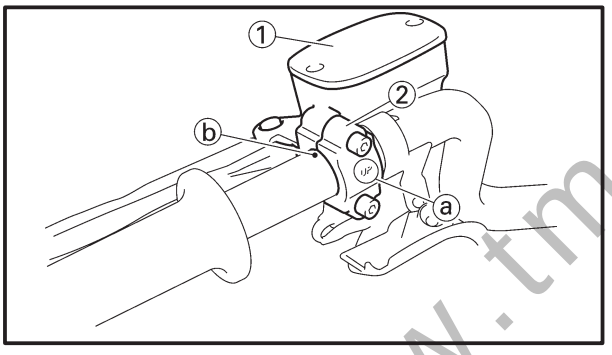
4. Install:
   • throttle cable
   • throttle grip
   • grip end
5. Install:
   • right handlebar switch ①

NOTE:

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



6. Connect:
   • front brake light switch

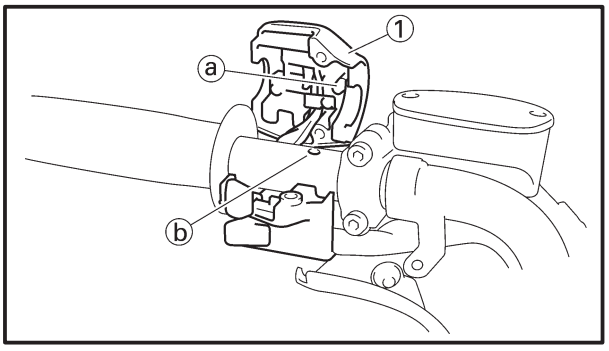


7. Install:
   • rear brake master cylinder ①
   • rear brake master cylinder holder ②

10 Nm (1.0 m•kg)

NOTE:

• Install the rear brake master cylinder holder with the “UP” mark facing up ⓐ.
• Align the end of the rear brake master cylinder holder with the punch mark ⓑ in the handlebar.
• First, tighten the upper bolt, then the lower bolt.



8. Install:
   • left handlebar switch ①

NOTE:

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

9. Install:
   • left handlebar grip
   • grip end

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Apply a thin coat of rubber adhesive onto the left end of the handlebar.
b. Slide the handlebar grip over the left end of the handlebar.
c. Wipe off any excess rubber adhesive with a clean rag.

⚠ WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

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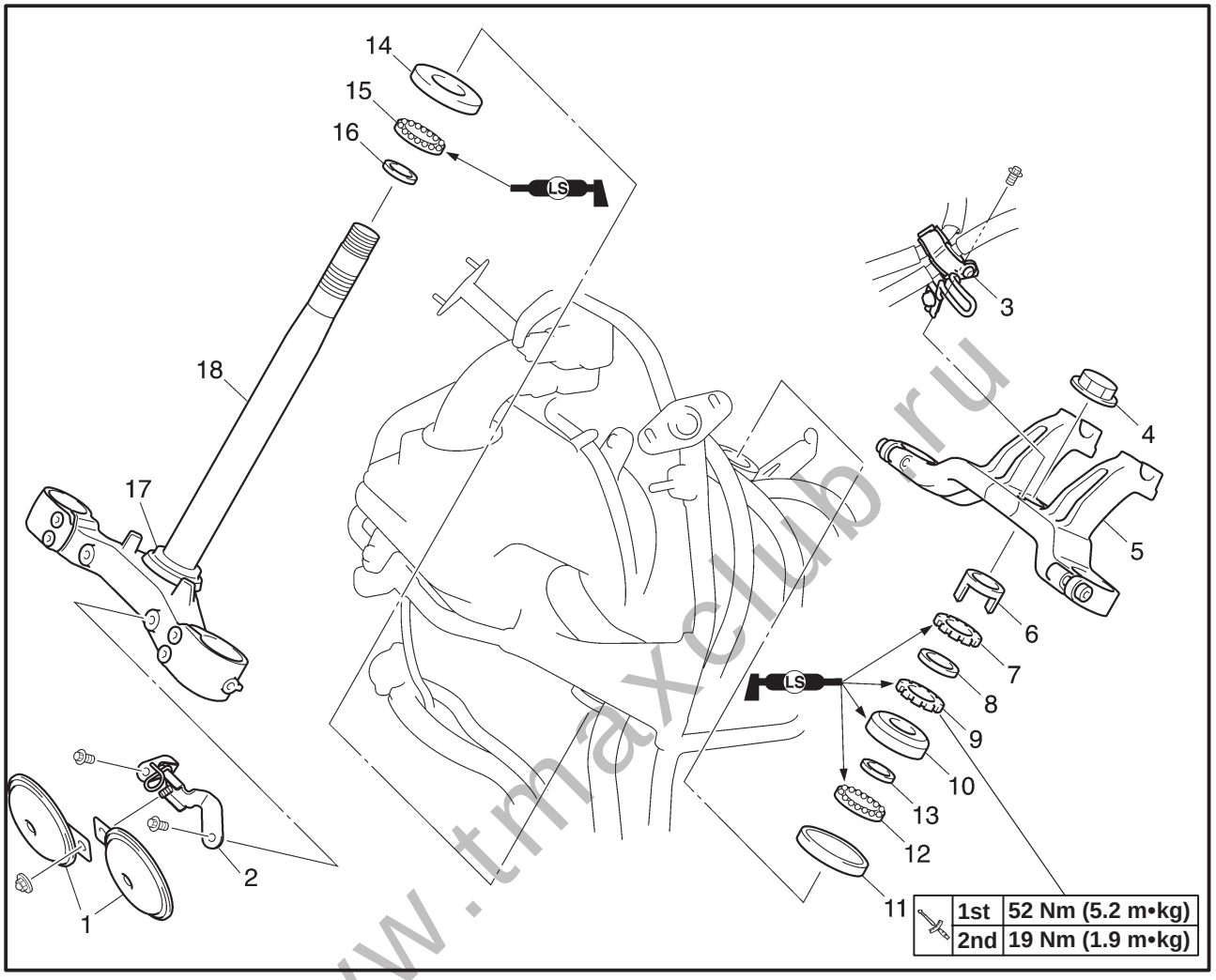
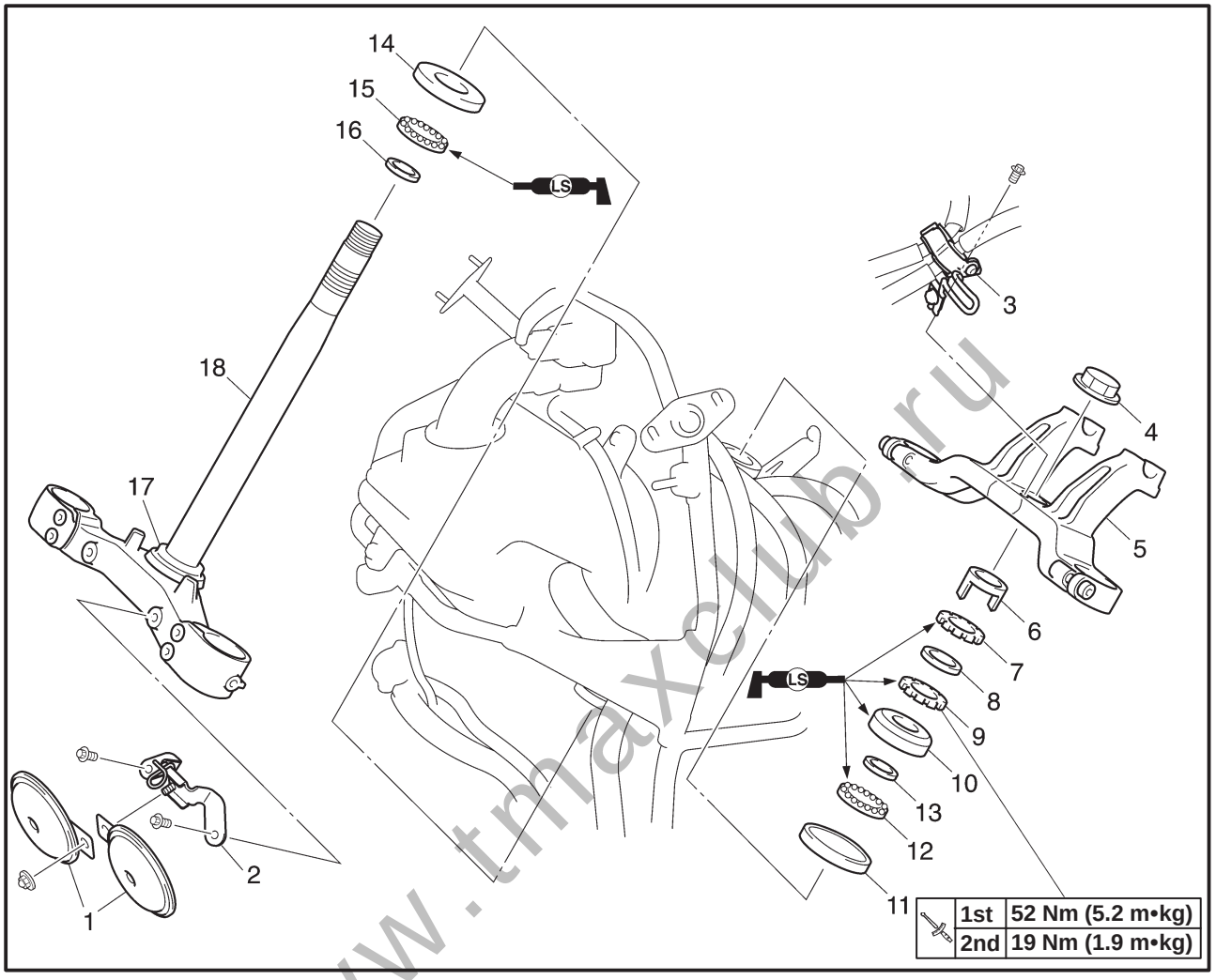
10. Connect:
    • rear brake light switch
11. Adjust:
    • throttle cable free play
      Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.

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

STEERING HEAD
LOWER BRACKET



Order	Job/Part	Q'ty	Remarks
	Removing the lower bracket		Remove the parts in the order listed.
	Front cowling		Refer to "COVER AND PANEL" in chapter 3.
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISC".
	Front fork legs		Refer to "FRONT FORK".
	HANDLEBAR		Refer to "HANDLEBAR".
1	Horn	2	
2	Horn bracket	1	
3	Brake hose holder	1	
4	Steering stem nut	1	
5	Upper bracket	1	
6	Lock washer	1	
7	Upper ring nut	1	
8	Rubber washer	1	



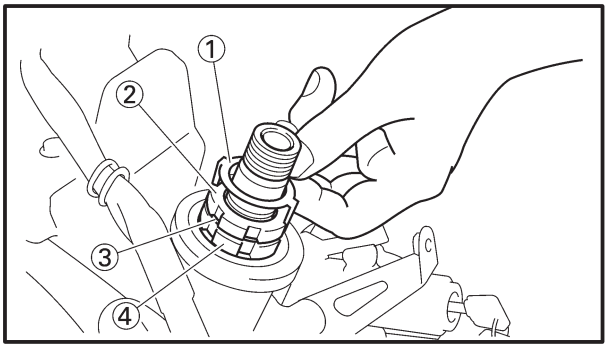
Order	Job/Part	Q'ty	Remarks
9	Lower ring nut	1	
10	Bearing cover	1	
11	Bearing inner race	1	
12	Upper bearing	1	
13	Bearing outer race	1	
14	Bearing inner race	2	
15	Lower bearing	1	
16	Bearing outer race	1	
17	Oil seal	1	
18	Lower bracket	1	
			For installation, reverse the removal procedure.

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:
   • upper bracket



3. Remove:
   • lock washer ①
   • upper ring nut ②
   • rubber washer ③
   • lower ring nut ④
   (with the special tool)

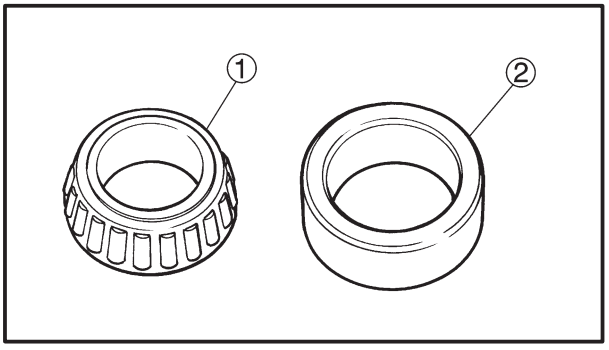
Ring nut wrench
90890–01403

⚠ WARNING

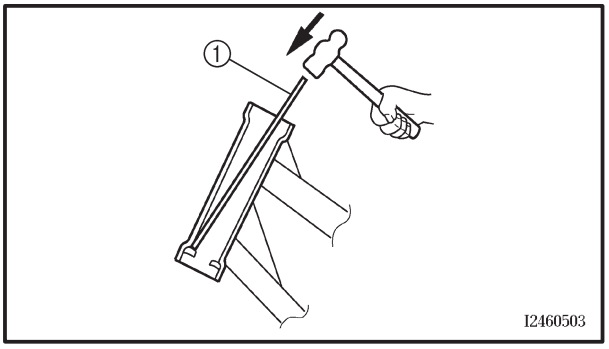
Securely support the lower bracket so that there is no danger of it falling.

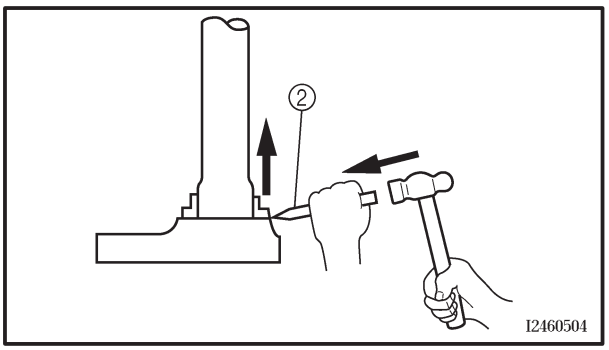
EAS00681
CHECKING THE STEERING HEAD
1. Wash:
   • bearings
   • bearing races

Recommended cleaning solvent
Kerosine



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





3. Replace:
   - bearings
   - bearing races

a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.
b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
c. Install a new rubber seal and new bearing races.

CAUTION:

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

NOTE:

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

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

EAS00684

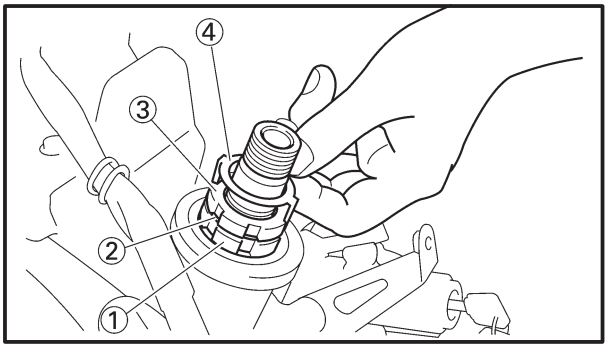
INSTALLING THE STEERING HEAD

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

Recommended lubricant
Lithium soap base grease

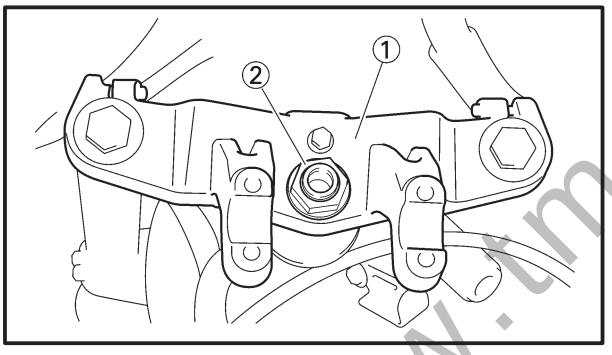
2. Install:
   - oil seal
   - lower bearing
   - outer race
3. Install:
   - lower bracket

4. Install:
   • upper bearing
   • bearing cover



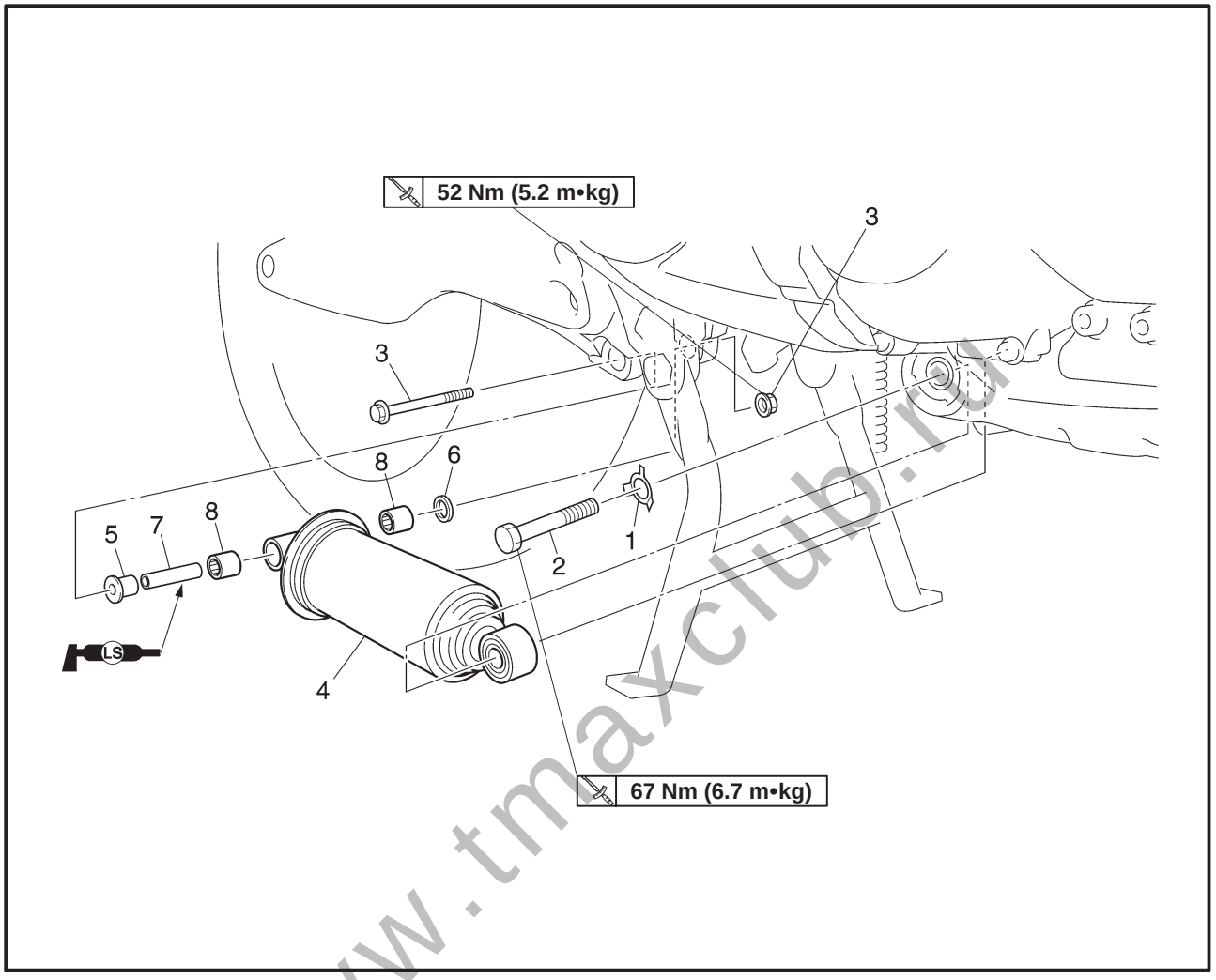
5. Install:
   • lower ring nut ①
   • rubber washer ②
   • upper ring nut ③
   • lock washer ④

   Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" in chapter 3.



6. Install:
   • upper bracket ①
   • steering stem nut ②
7. Tighten:
   • steering stem nut ② **110 Nm (11.0 m•kg)**

REAR SHOCK ABSORBER



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber assembly		Remove the parts in the order listed.
	Muffler		Refer to "MUFFLER ASSEMBLY" in chapter 5.
1	Lock washer	1	
2	Bolt	1	
3	Bolt/nut	1/1	
4	Rear shock absorber	1	
5	Bush	1	
6	Washer	1	
7	Spacer	1	
8	Bearing	2	
			For installation, reverse the removal procedure.

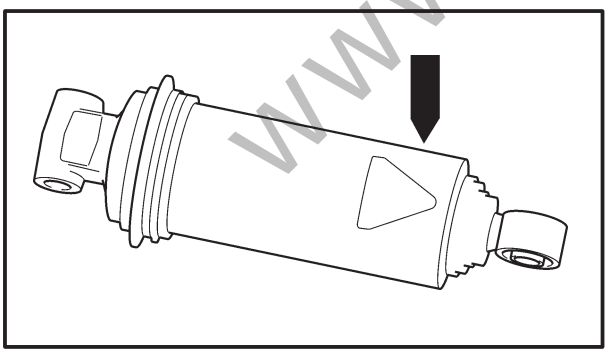
EAS00687

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

⚠ WARNING

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

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



EAS00689

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

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

⚠ WARNING

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

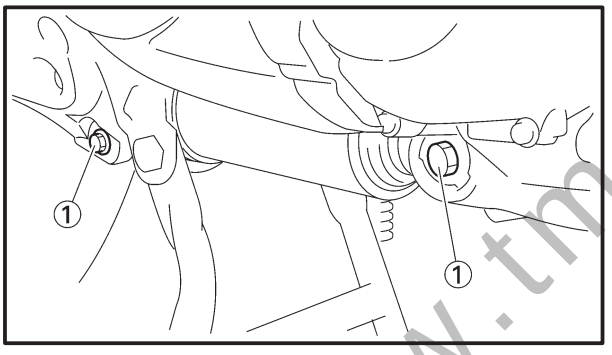
EAS00693
REMOVING THE REAR SHOCK ABSORBER
1. Stand the scooter on a level surface.

⚠ 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:
   • bolts ①

NOTE:

• When removing the bolts ①, hold the swingarm so that it does not drop down.

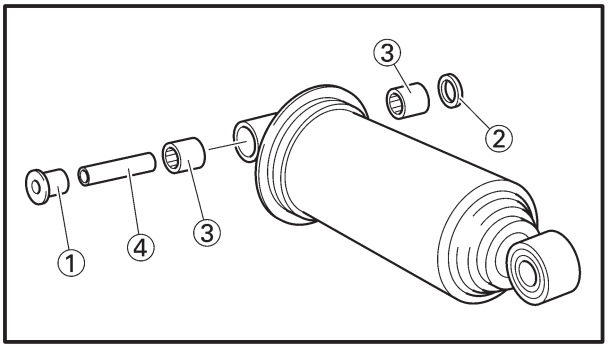
3. Remove:
   • rear shock absorber.

EAS00696
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND GAS CYLINDER
1. Check:
   • rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   • rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
   • spring
     Damage/wear → Replace the rear shock absorber assembly.
   • gas cylinder
     Damage/gas leaks → Replace.
   • bushings
     Damage/wear → Replace.
   • dust seals
     Damage/wear → Replace.
   • bolts
     Bends/damage/wear → Replace.

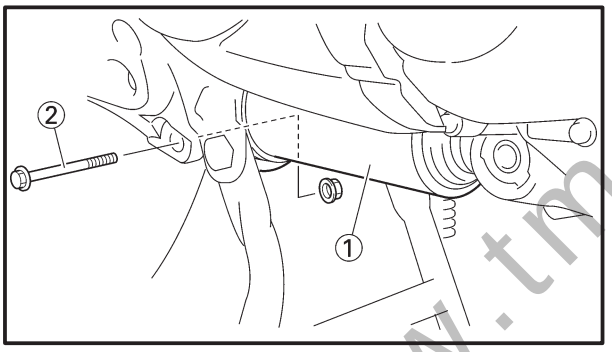
INSTALLING THE REAR SHOCK ABSORBER

1. Lubricate:
   - spacer
   - bearings

	Recommended lubricant **Molybdenum disulfide grease**

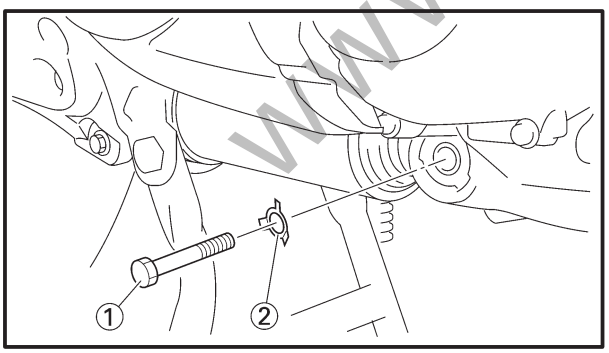


2. Install:
   - bush ①
   - washer ②
   - bearings ③
   - spacer ④



3. Install:
   - rear shock absorber ①
   - bolt (rear side) ②

52 Nm (5.2 m•kg)

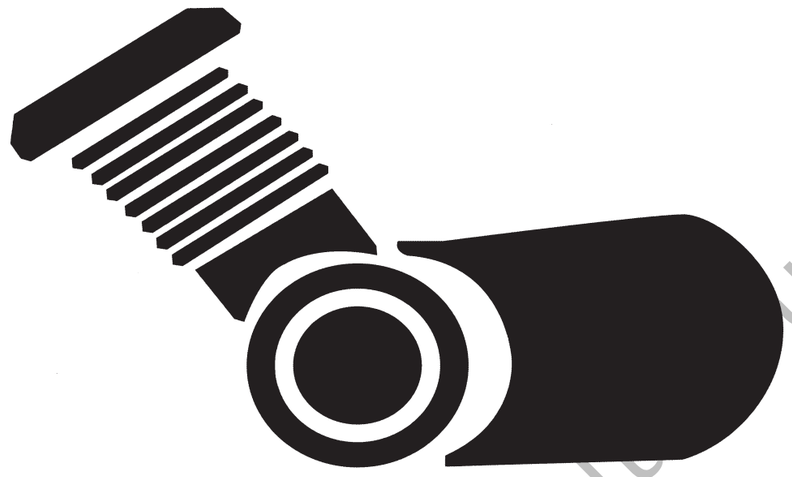


4. Install:
   - bolt (front side) ①
   - lock washer ②

67 Nm (6.7 m•kg)

NOTE:

- When installing the bolt ①, hold the swingarm so that it does not drop down.
- Bend the lock washer ② tab along a flat side of the bolt ①.



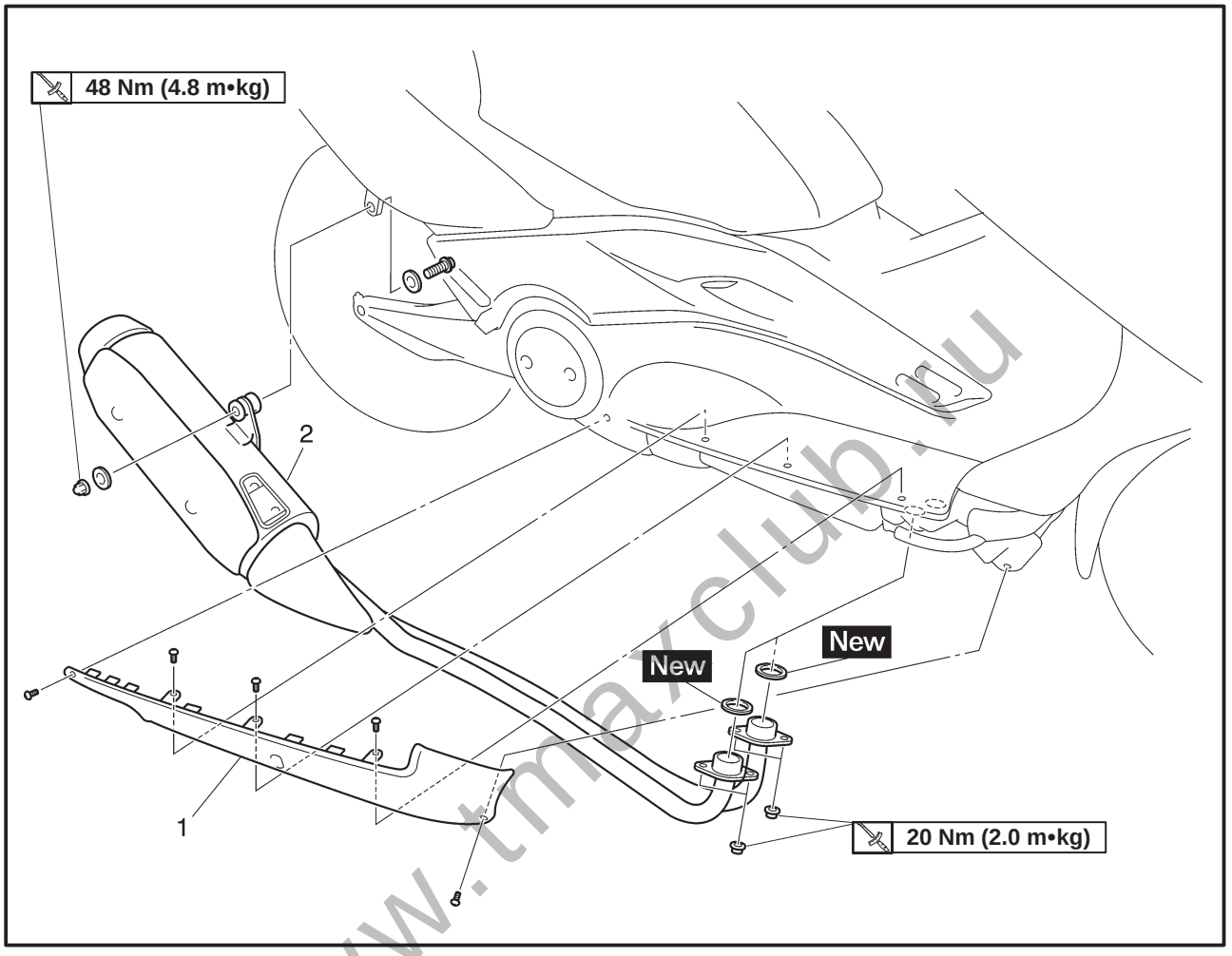
ENG 5

CHAPTER 5
OVERHAULING THE ENGINE

OVERHAULING THE ENGINE

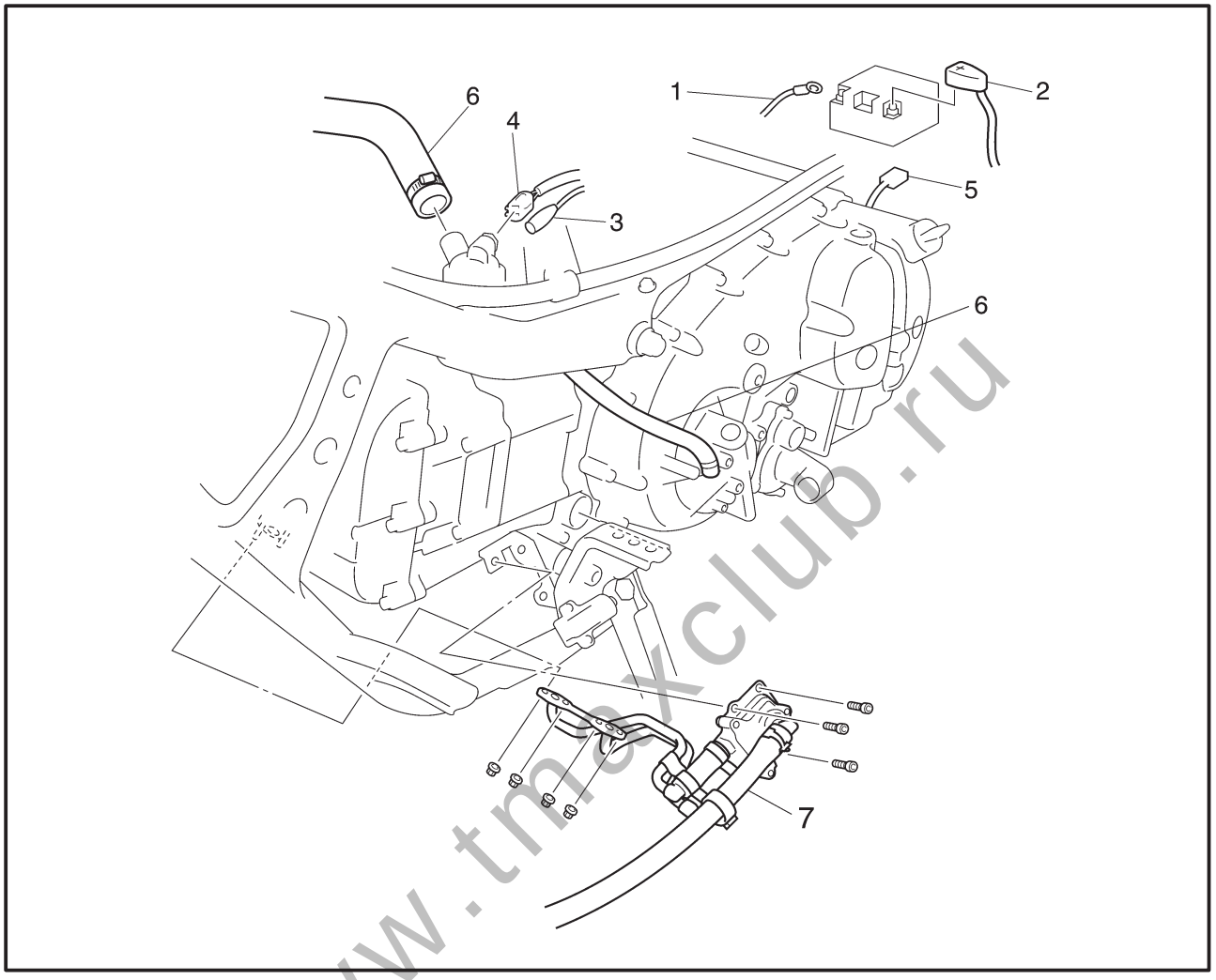
ENGINE

MUFFLER ASSEMBLY

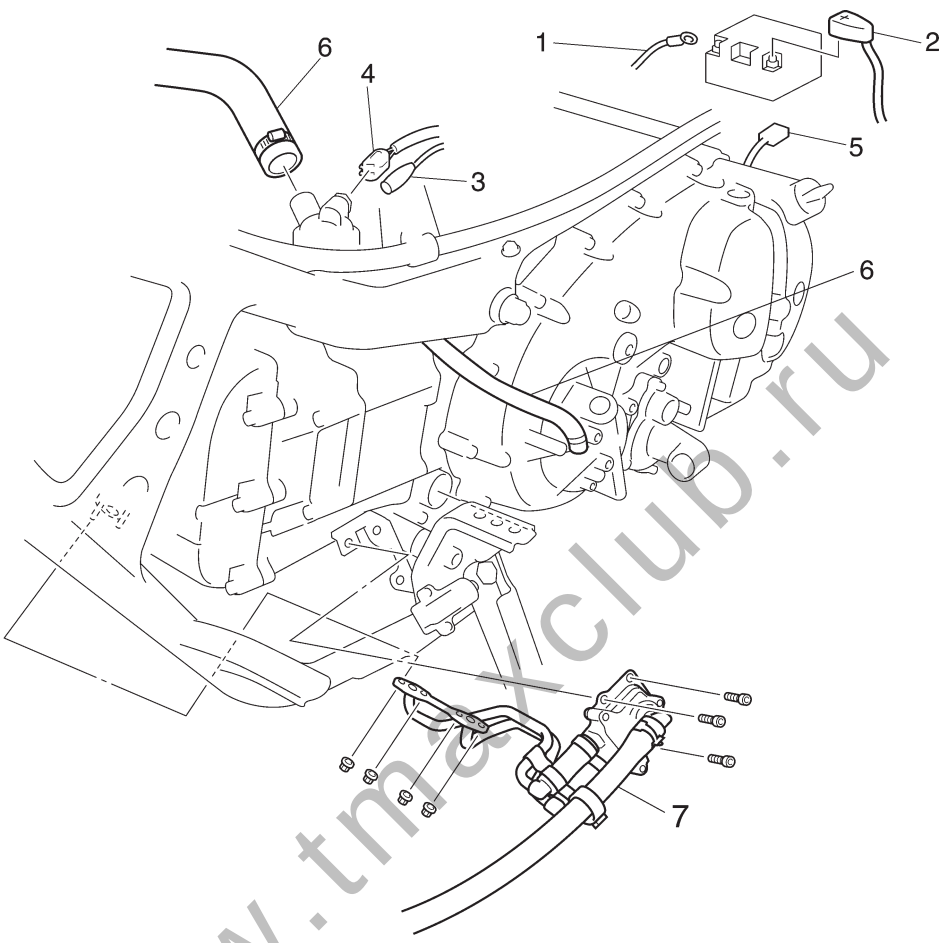


Order	Job/Part	Q'ty	Remarks
	Removing the muffler assembly		Remove the parts in the order listed.
1	Lower side cover mole (right)	1	
2	Muffler assembly	1	
			For installation, reverse the removal procedure.

LEADS AND HOSES

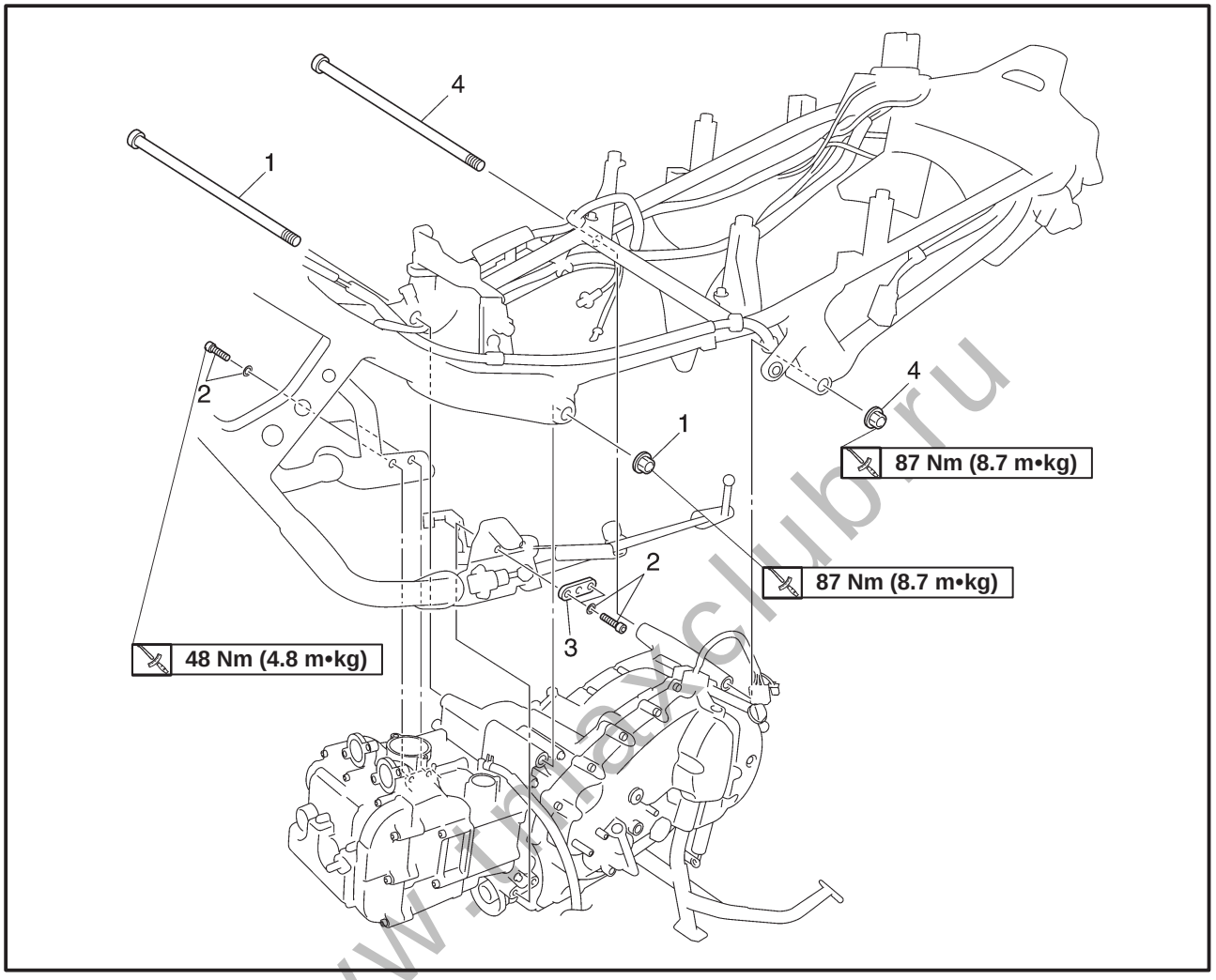


Order	Job/Part	Q'ty	Remarks
	Disconnecting the leads and hoses		Disconnect the parts in the order listed.
	Legshield		Refer to "COVER AND PANEL" in chapter 3.
	Footrest board		
	Muffler assembly		Refer to "MUFFLER ASSEMBLY".
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER" in chapter 4.
	Chain drive oil		Drain.
	Chain drive assembly		Refer to "CHAIN DRIVE".
	Coolant		Drain.
	Cooling system		Refer to "RADIATOR" in chapter 5.
	Carburetor		Refer to "CARBURETOR" in chapter 7.
	Engine oil		Drain.
1	Battery negative lead	1	
2	Battery positive lead	1	
3	Thermo unit coupler	1	
4	Thermo switch coupler	1	

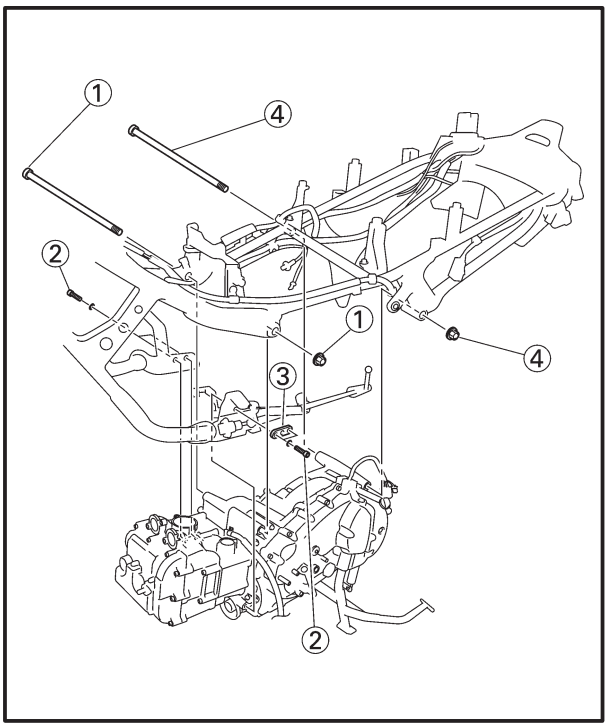


Order	Job/Part	Q'ty	Remarks
5	A.C. magneto lead	1	
6	Hose	1	
7	Air induction system	1	Refer to "AIR INDUCTION SYSTEM" in chapter 7. For installation, reverse the removal procedure.

ENGINE



Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed.
1	Upper mounting bolt/nut	1/1	
2	Lower mounting bolts/washers	4/4	
3	Collar	1	
4	Rear mounting bolt/nut	1/1	
			For installation, reverse the removal procedure.



INSTALLING THE ENGINE

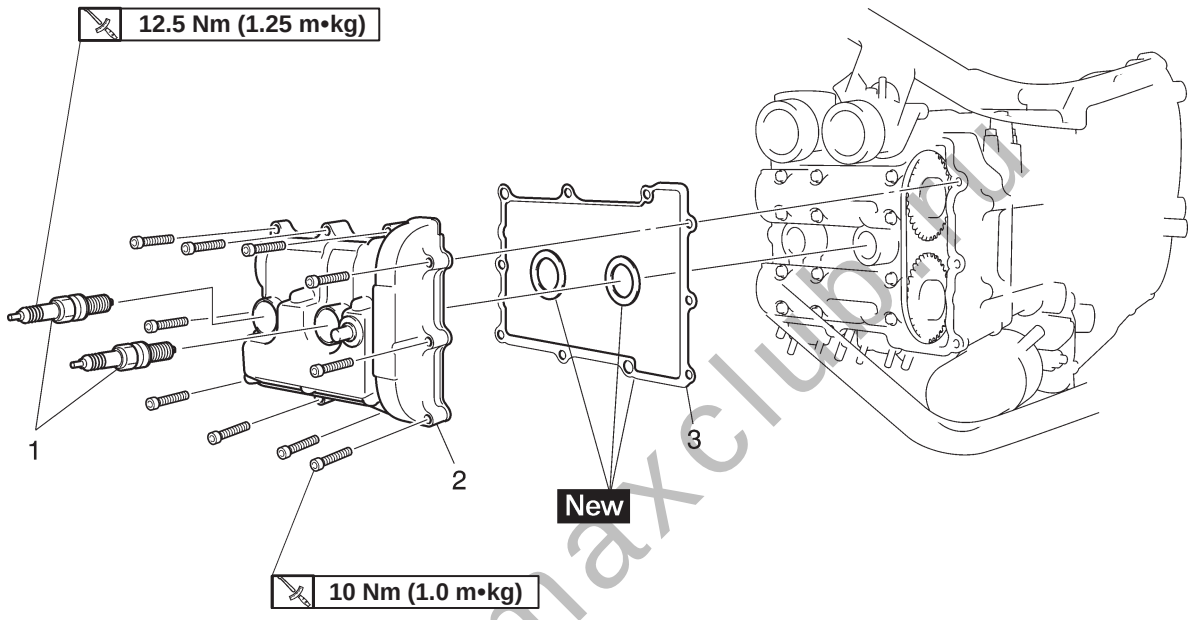
1. Install:
   - front mounting bolt/nut①
   - front mounting bolts (lower) ②
   - collar ③
   - rear mounting bolt/nut④

NOTE:

Do not fully tighten the bolts.

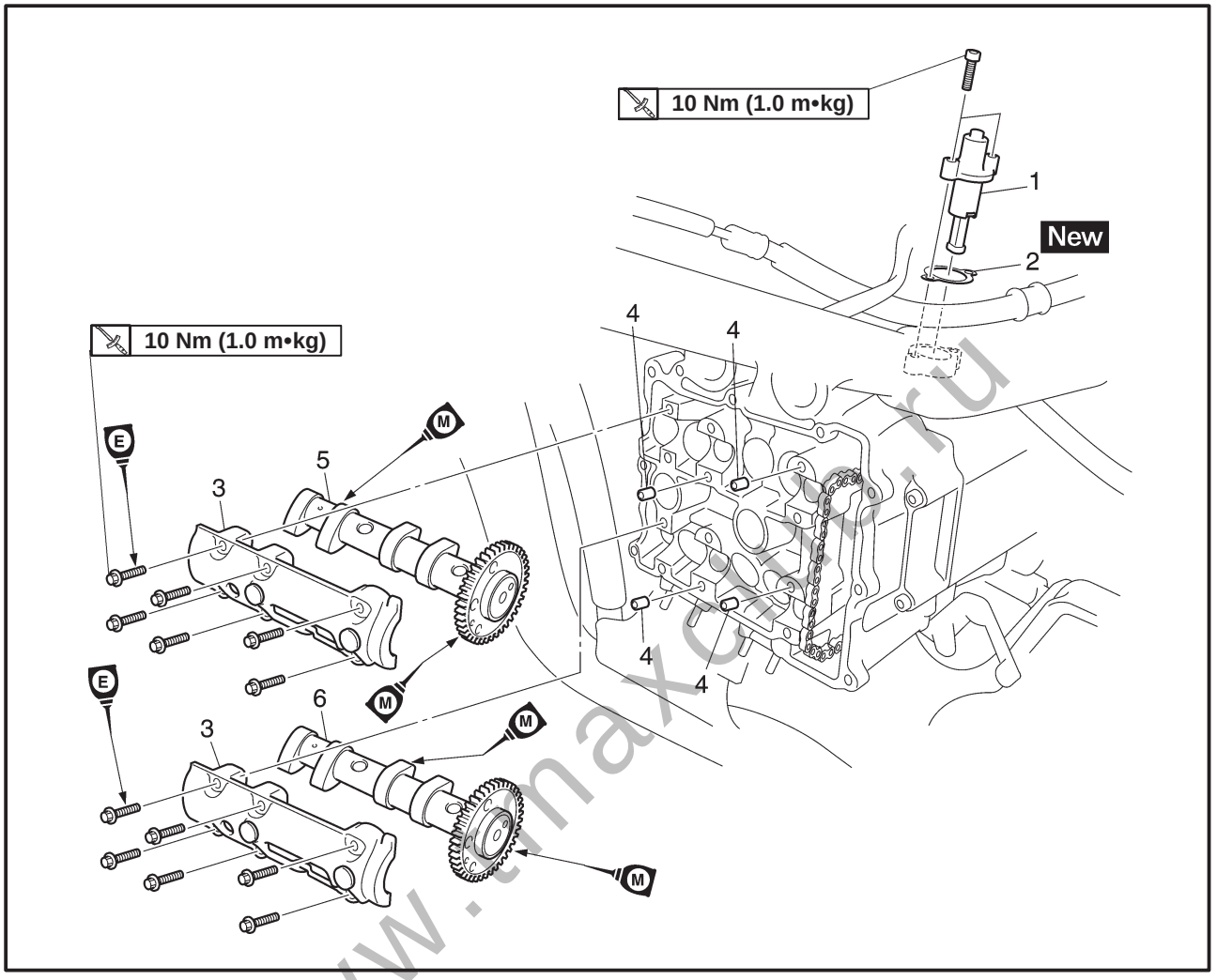
2. Tighten:
   - front mounting nut (upper) ①
     87 Nm (8.7 m•kg)
   - front mounting bolts (lower) ②
     48 Nm (4.8 m•kg)
   - rear mounting nut ④
     87 Nm (8.7 m•kg)

CAMSHAFTS
CYLINDER HEAD COVER

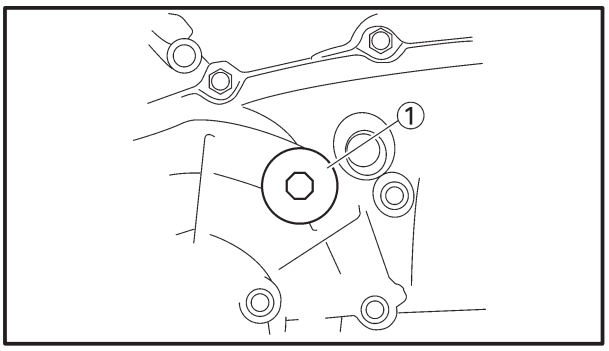


Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head cover		Remove the parts in the order listed.
	Carburetor assembly		Refer to "CARBURETOR" in chapter 7.
	Coolant		Drain.
	Radiator assembly		Refer to "RADIATOR AND OIL COOLER" in chapter 6.
1	Spark plugs	2	
2	Cylinder head cover	1	
3	Cylinder head cover gasket	1	
			For installation, reverse the removal procedure.

CAMSHAFTS

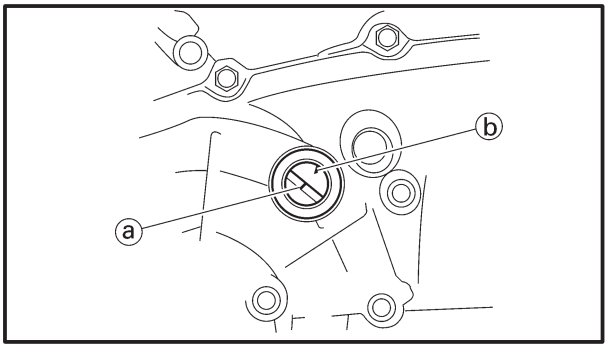


Order	Job/Part	Q'ty	Remarks
	Removing the camshafts		Remove the parts in the order listed.
1	Timing chain tensioner	1	
2	Timing chain tensioner gasket	1	
3	Camshaft caps	2	
4	Dowel pins	4	**NOTE:** During removal, the dowel pins may still be connected to the camshaft cap.
5	In take camshaft	1	
6	Exhaust camshaft	1	
			For installation, reverse the removal procedure.



REMOVING THE CAMSHAFTS

1. Remove:
   • timing plug ①



2. Align:
   • "I" mark ⓐ (with the stationary pointer ⓑ)

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

NOTE:

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

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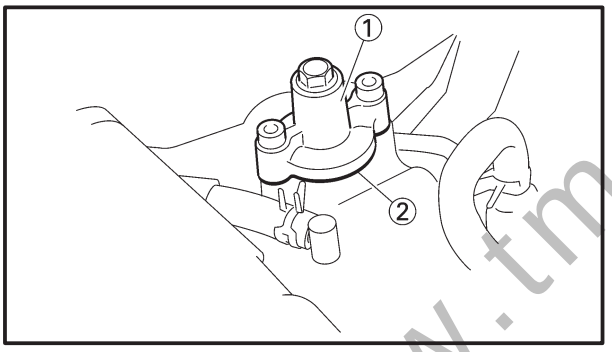
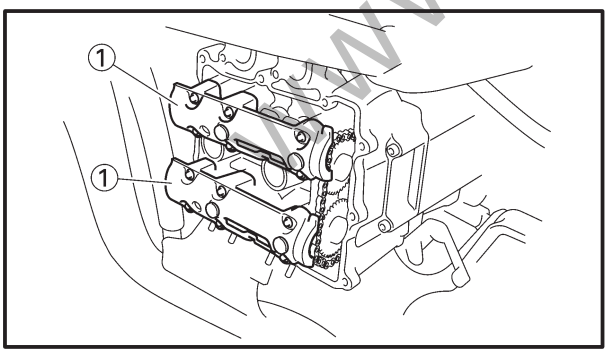


3. Remove:
   • timing chain tensioner ①
   • timing chain tensioner gasket ②
4. Remove:

CAUTION:

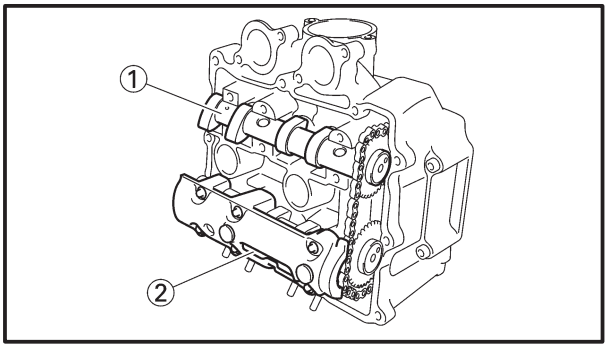
When removing the camshaft from the cylinder head, first tip up the chassis front side at least 25° from the chassis level position.



   • camshaft caps ① (intake and exhaust)
   • dowel pins

CAUTION:

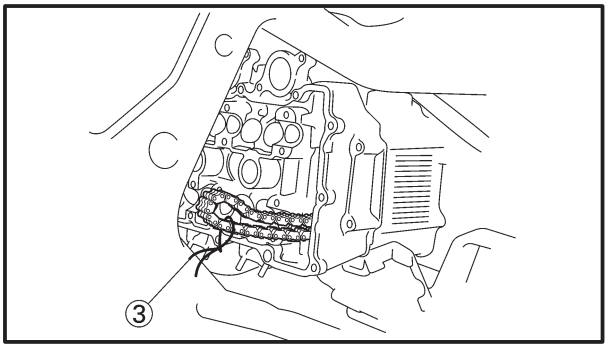
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



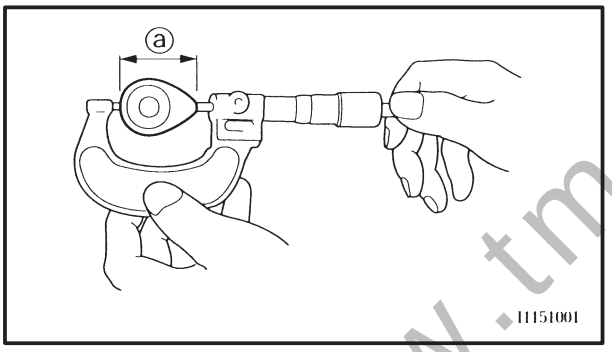
5. Remove:
   • intake camshaft ①
   • exhaust camshaft ②

NOTE:

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



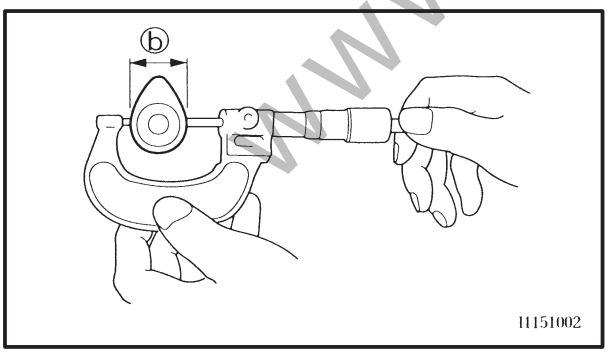
6. Remove:
   • timing chain guide (exhaust side)



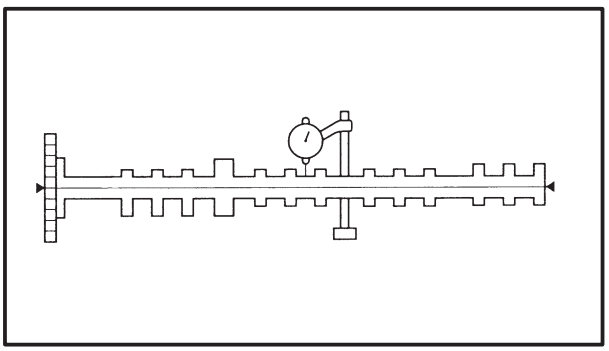
EAS00204

CHECKING THE CAMSHAFTS

1. Check:
   • camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   • camshaft lobe dimensions ⓐ and ⓑ
   Out of specification → Replace the camshaft.



Camshaft lobe dimension limit
Intake
ⓐ **33.252 ~ 33.352 mm**
ⓑ **24.956 ~ 25.056 mm**
Exhaust
ⓐ **33.252 ~ 33.352 mm**
ⓑ **24.956 ~ 25.056 mm**

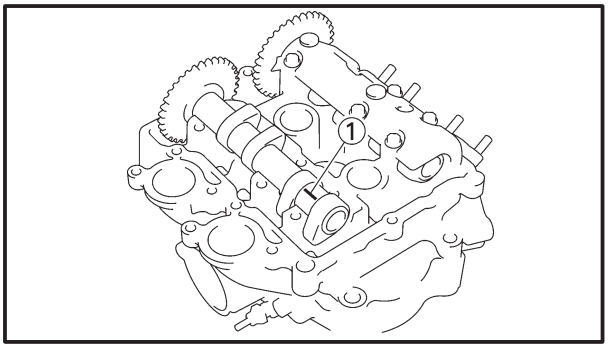


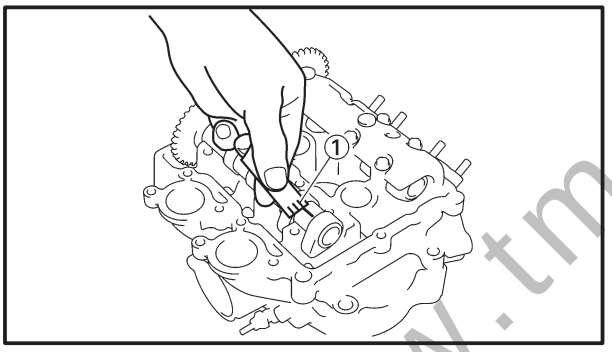
3. Measure:
   • camshaft runout
   Out of specification → Replace.

Max. camshaft runout
0.03 mm

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

Camshaft-journal-to-camshaft-cap clearance
0.020 ~ 0.054 mm



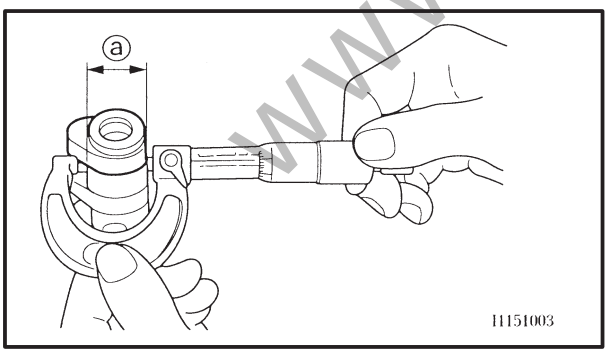


a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
b. Position a strip of Plastigauge® ① onto the camshaft journal as shown.
c. Install the dowel pins and camshaft caps.

NOTE:
- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®①.

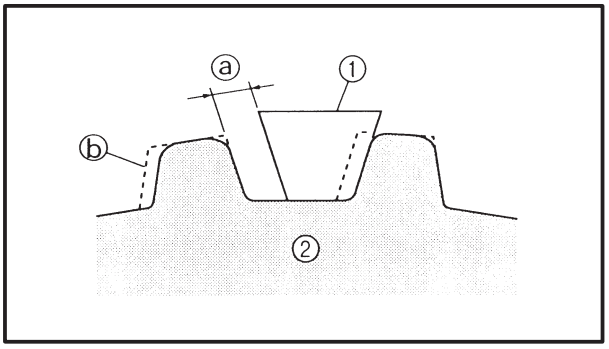
Camshaft cap bolt
10 Nm (1.0 m•kg)

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



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

Camshaft journal diameter
22,967 ~ 22,980 mm

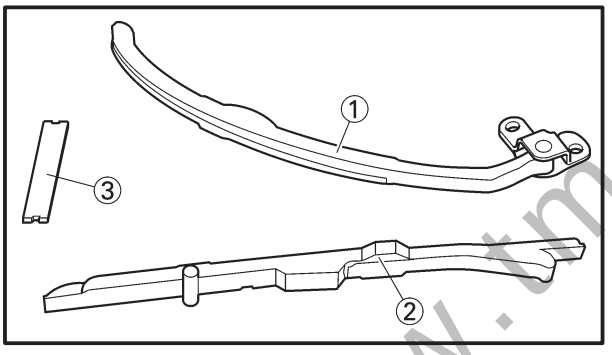


CHECKING THE CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

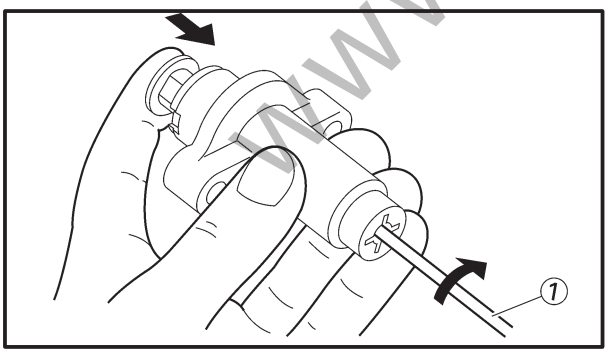
The following procedure applies to all of the camshaft sprockets and timing chain guides.

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

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



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



CHECKING THE TIMING CHAIN TENSIONER

1. Check:
   - timing chain tensioner
     Cracks/damage/rough movement → Replace.

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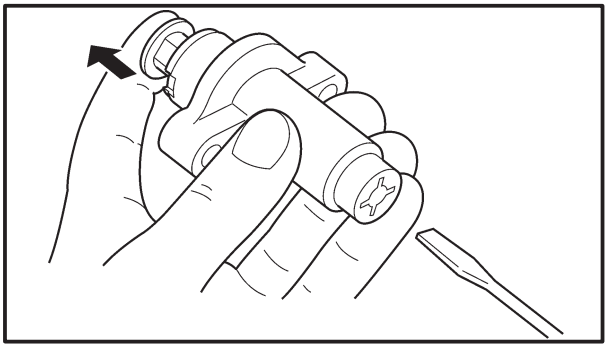
a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

NOTE:

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



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

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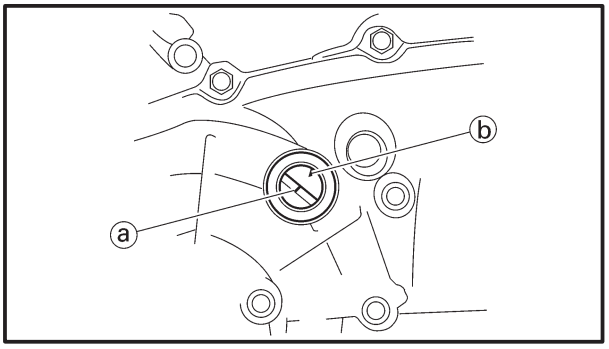

INSTALLING THE CAMSHAFTS

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

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

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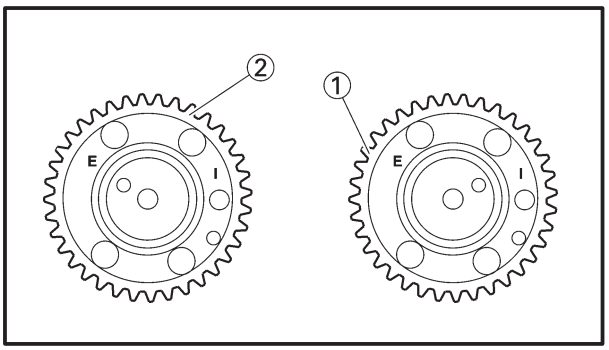
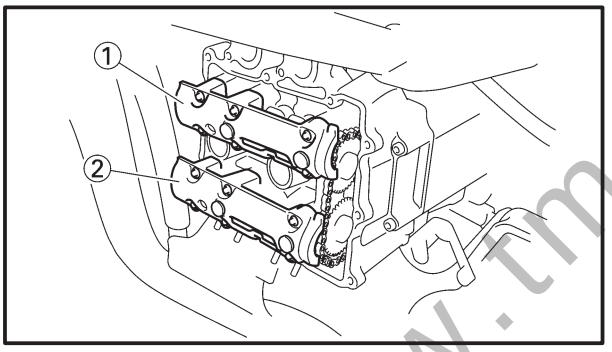


2. Install:
   - intake camshaft ①
   - exhaust camshaft ②



3. Install:
   - intake camshaft cap ①
   - exhaust camshaft cap ②

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a. Install the timing chain onto both camshaft sprockets.

CAUTION:

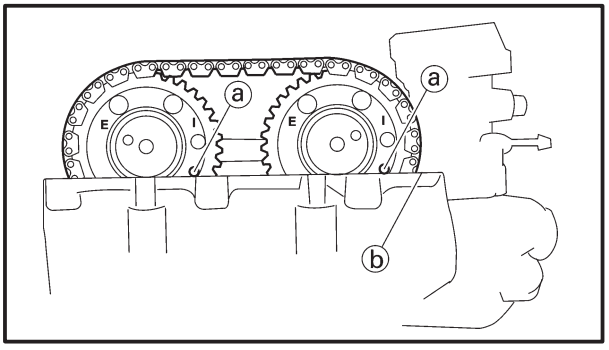
Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

b. Install the exhaust and intake camshaft cap.

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

NOTE:

Make sure that camshaft sprocket timing hole ⓐ are aligned with the cylinder head edge ⓑ.
Out of alignment → Reinstall.



c. Remove the wire from the timing chain.

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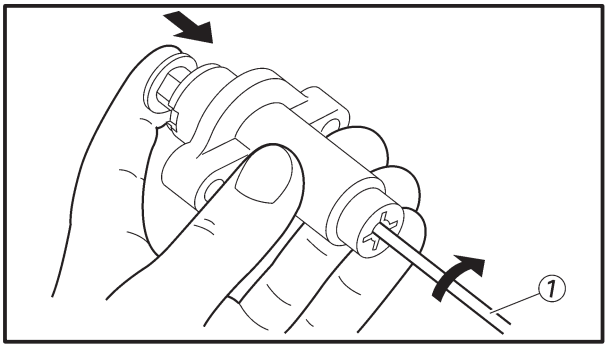

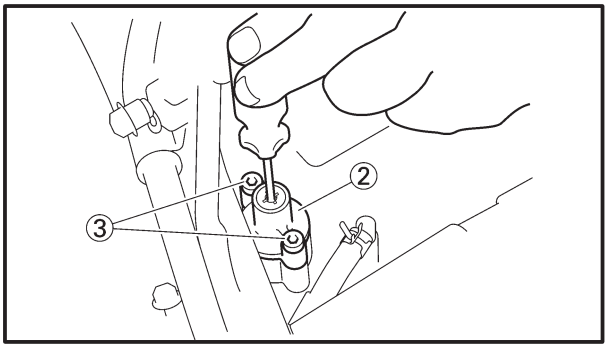

4. Install:
   - chair guide (exhaust side)
   - timing chain tensioner gasket
   - timing chain tensioner

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

⚠ WARNING

Always use a new gasket.

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

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

	Cap bolt **10 Nm (1.0 m•kg)**

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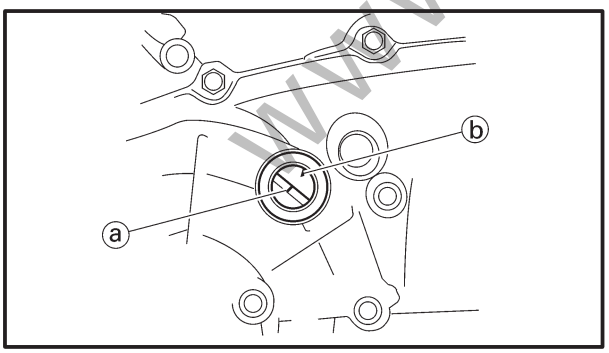
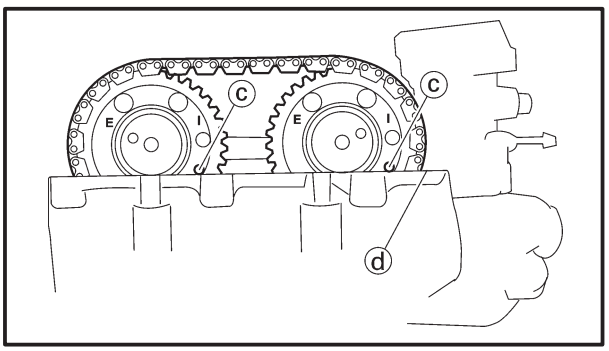




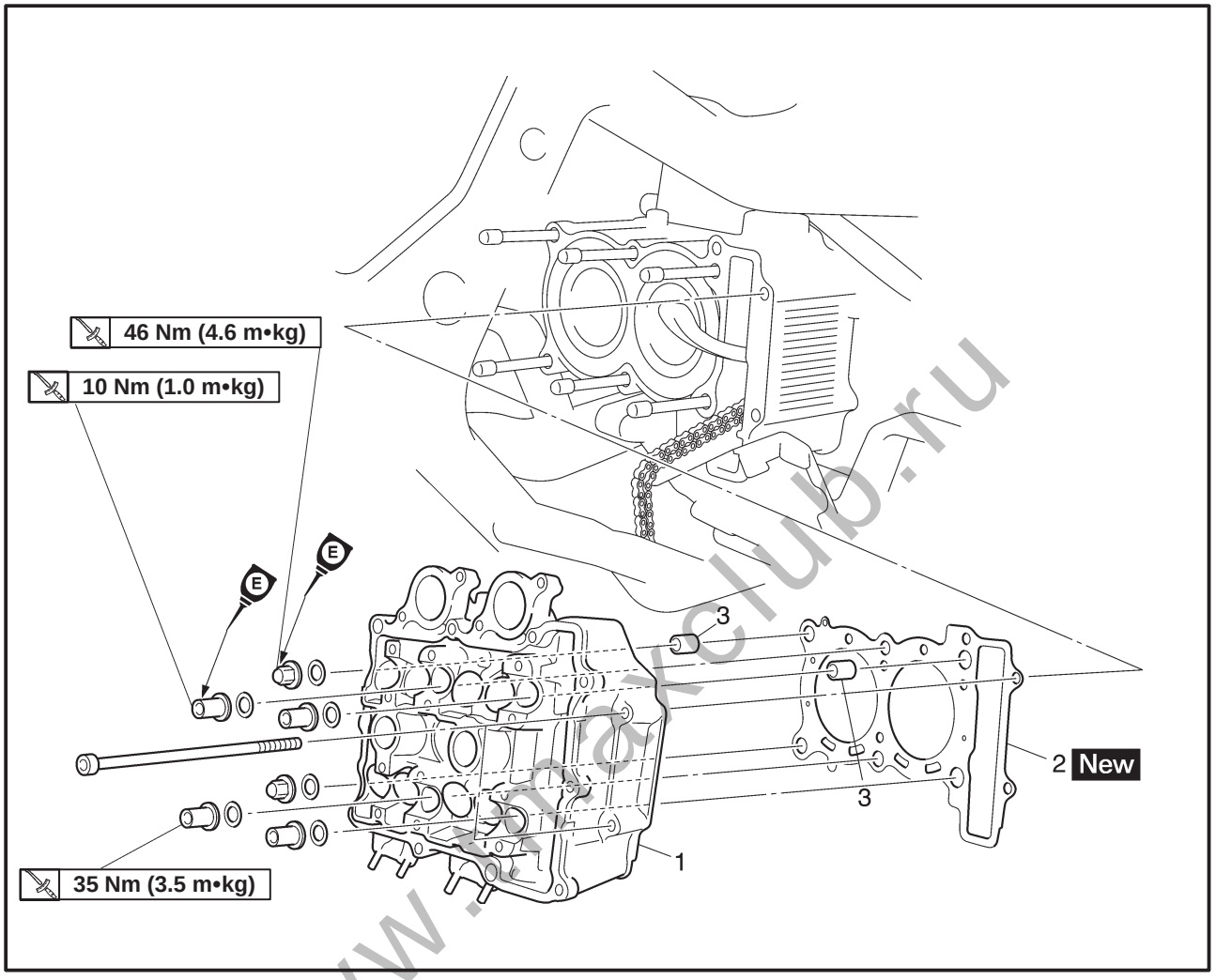
5. Turn:
   - crankshaft (several turns counterclockwise)
6. Check:
   - TDC mark ⓐ
     Make sure that the TDC mark is aligned with the crankcase mating surface ⓑ.
   - camshaft sprocket timing mark ⓒ
     Make sure that the camshaft sprocket timing mark is aligned with the cylinder head edge ⓓ.
     Out of alignment → Adjust.
     Refer to the installation steps above.
7. Measure:
   - valve clearance
     Out of specification → Adjust.
     Refer to “ADJUSTING THE VALVE CLEARANCE” in chapter 3.

8. Install:
   • cylinder head cover gasket
   • cylinder head cover

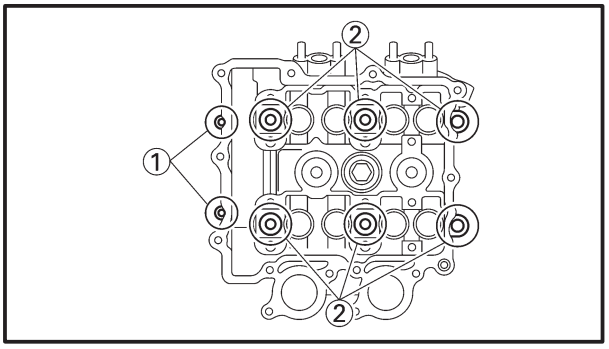
NOTE:

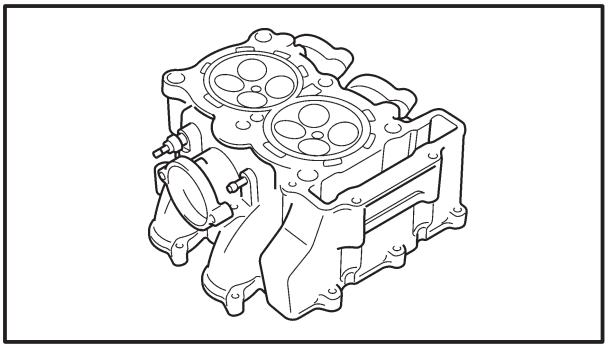
Tighten the cylinder head cover bolts in stages and in a crisscross pattern.

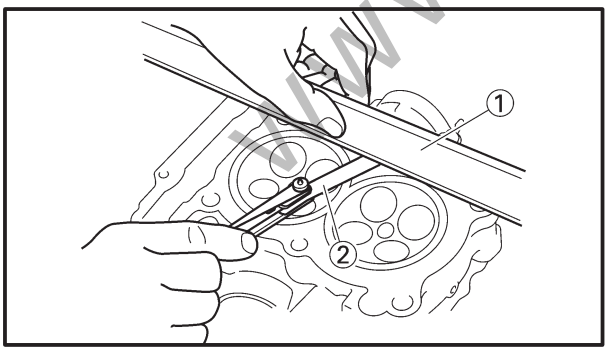
CYLINDER HEAD

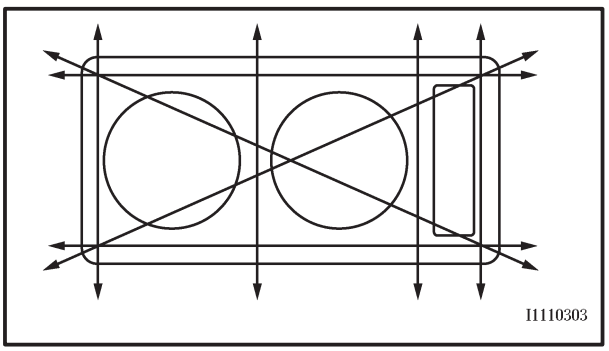


Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Legshield		
	Footrest board		Refer to "COVER AND PANEL" in chapter 3.
	Carburetors		Refer to "CARBURETOR" in chapter 7.
	Intake and exhaust camshafts		Refer to "CAMSHAFTS".
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
			For installation, reverse the removal procedure.









REMOVING THE CYLINDER HEAD

1. Remove:
   - cylinder head bolts ①
   - cylinder head nuts ②

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.

EAS00229

CHECKING THE CYLINDER HEAD

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

NOTE:

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

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

Max. cylinder head warpage
0.10 mm

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

NOTE:

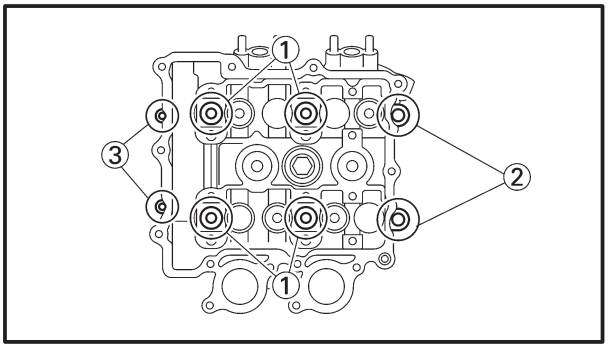
To ensure an even surface, rotate the cylinder head several times.

INSTALLING THE CYLINDER HEAD

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

NOTE:

Pass the timing chain through the timing chain cavity.



3. Tighten:
   - cylinder head nuts ① — 35 Nm (3.5 m•kg)
   - cylinder head nuts ② — 46 Nm (4.6 m•kg)
   - cylinder head bolts ③ — 10 Nm (1.0 m•kg)

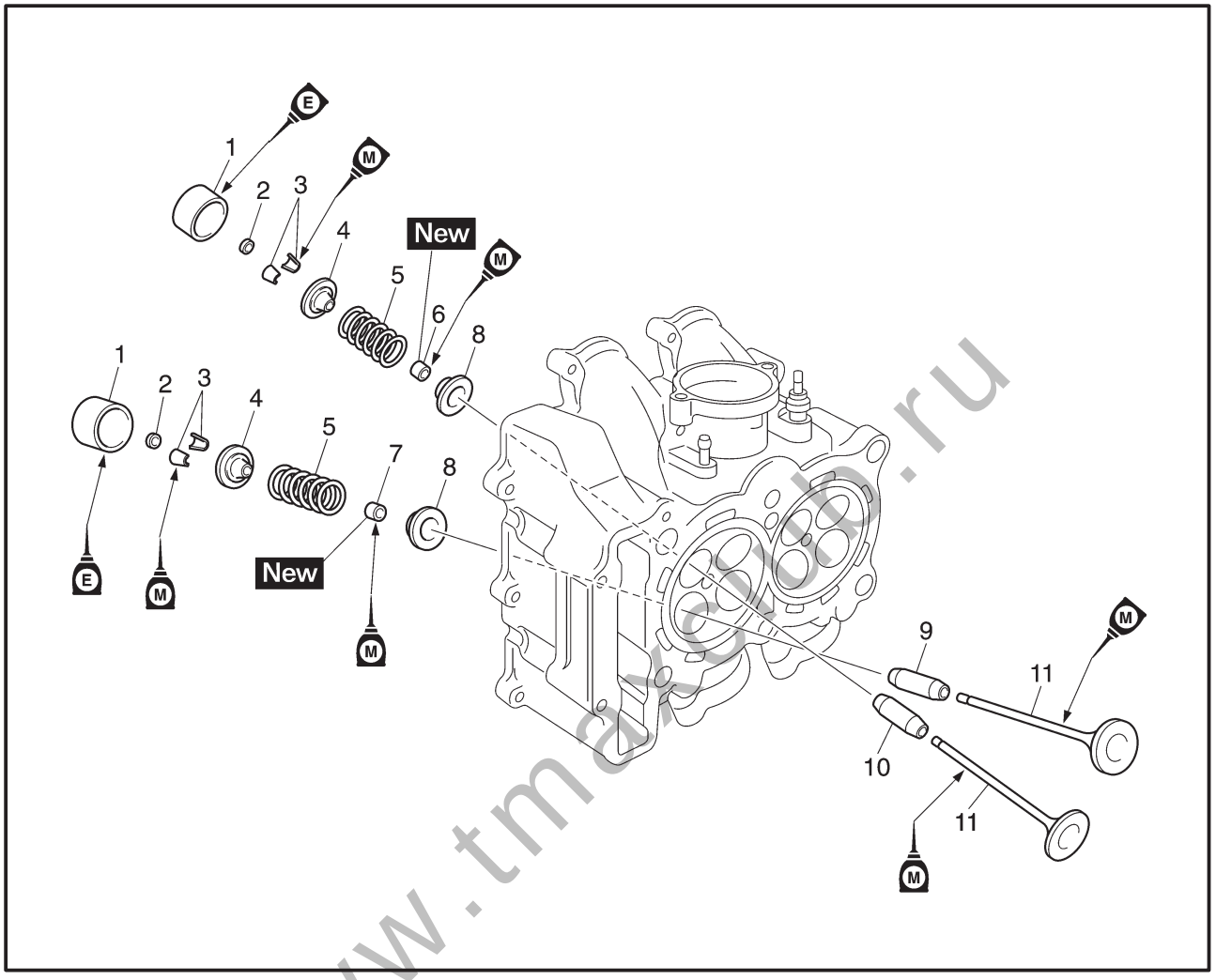
NOTE:

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

4. Install:
   - exhaust camshaft
   - intake camshaft

   Refer to “INSTALLING THE CAMSHAFTS”.

VALVES AND VALVE SPRINGS



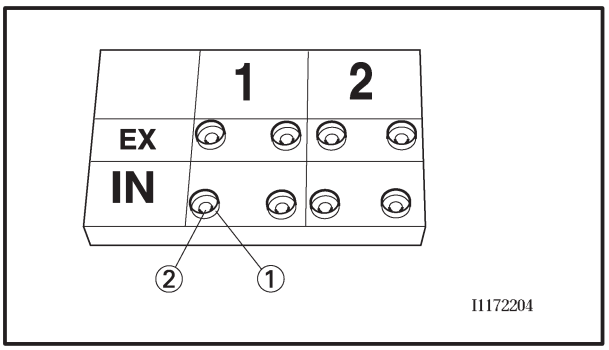
Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Valve lifter	8	
2	Valve pad	8	
3	Valve cotter	16	
4	Valve retainer	8	
5	Valve spring	8	
6	Intake valve stem seal	4	
7	Exhaust valve stem seal	4	
8	Valve spring seat	8	
9	Intake valve guide	4	
10	Exhaust valve guide	4	
11	Valve	8	
			For installation, reverse the removal procedure.

EAS00237
REMOVING THE VALVES

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

NOTE:

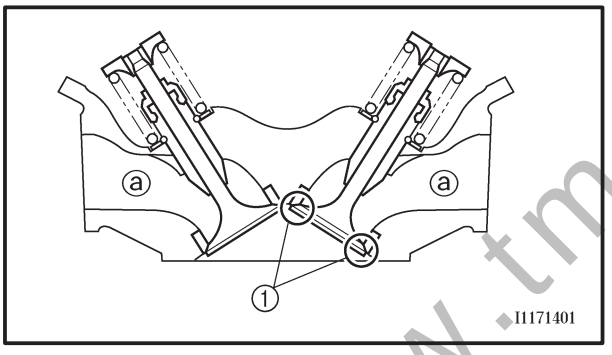
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves properly seal.



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

NOTE:

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



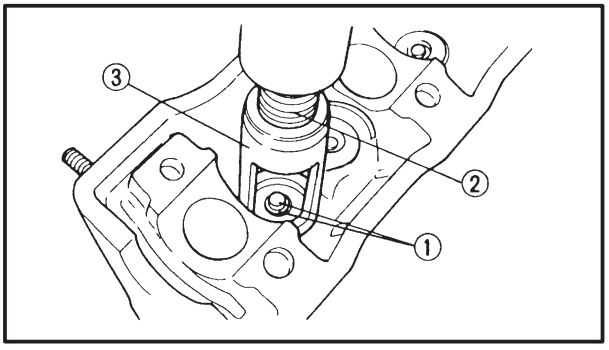
2. Check:
   - valve sealing

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

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.

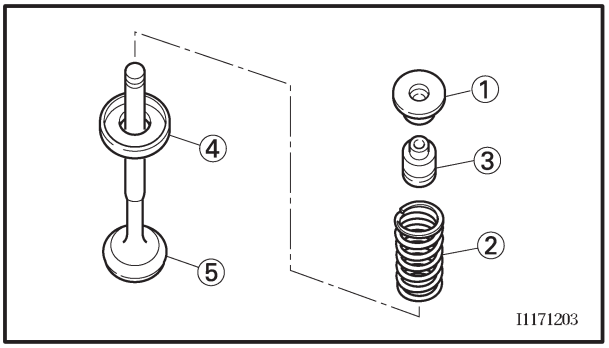


3. Remove:
   - valve cotters ①

NOTE:

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

Valve spring compressor
90890-04109
Attachment
90890-04114



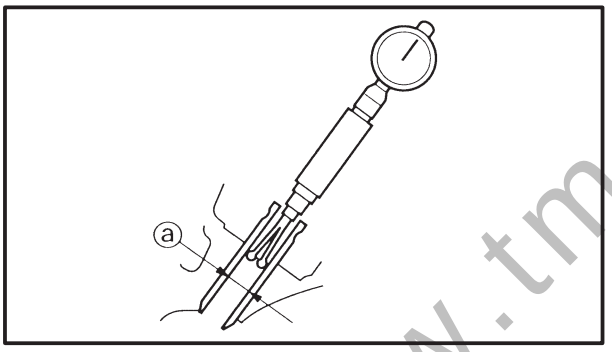
4. Remove:
   - valve retainer ①
   - valve spring ②
   - oil seal ③
   - valve spring seat ④
   - valve ⑤

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

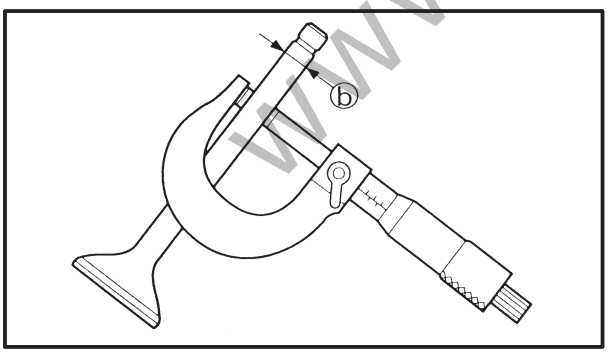
EAS00239
CHECKING THE VALVES AND VALVE GUIDES

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

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

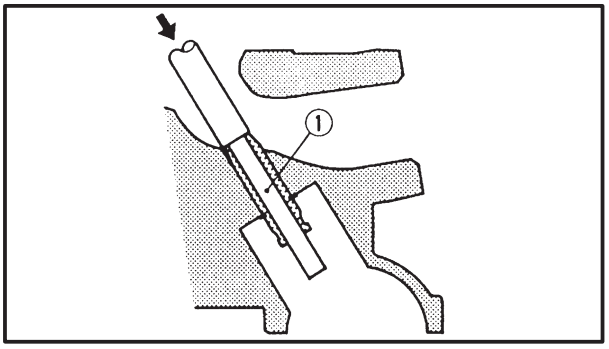


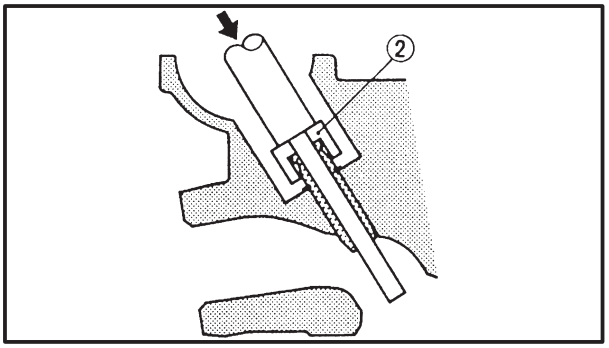
Valve-stem-to-valve-guide clearance =
Valve guide inside diameter ⓐ –
Valve stem diameter ⓑ

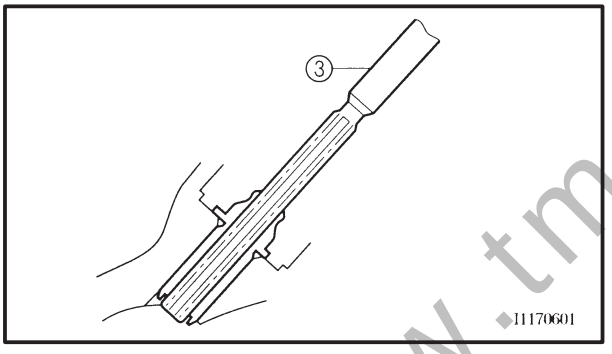


Out of specification → Replace the valve guide.

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







2. Replace:
   • valve guide

NOTE:

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

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

NOTE:

After replacing the valve guide, reface the valve seat .

Valve guide remover (4mm)
90890-04111
Valve guide installer (4mm)
90890-04112
Valve guide reamer (4mm)
90890-04113

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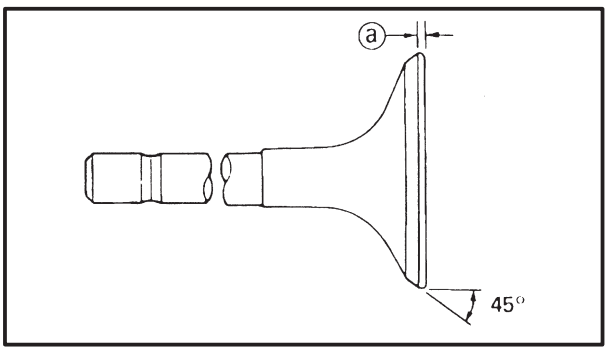
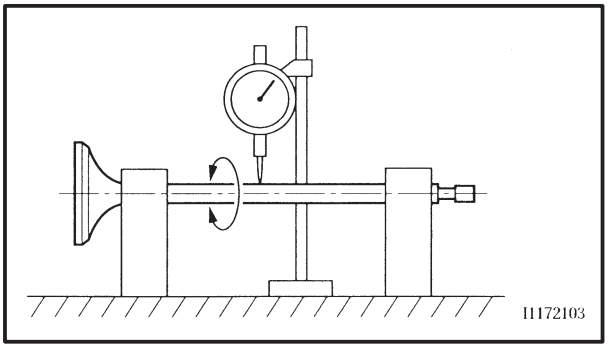
3. Eliminate:
   • carbon deposits
   (from the valve face and valve seat)
4. Check:
   • valve face
   Pitting/wear → Grind the valve face.
   • valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.



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

Valve margin thickness
0.6 ~ 0.8 mm
<Limit>: 0.5 mm



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

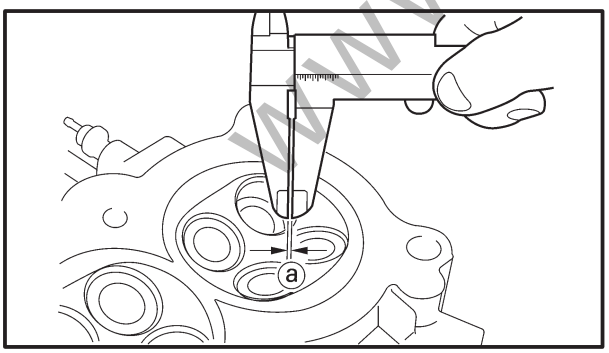
NOTE:
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
0.04 mm

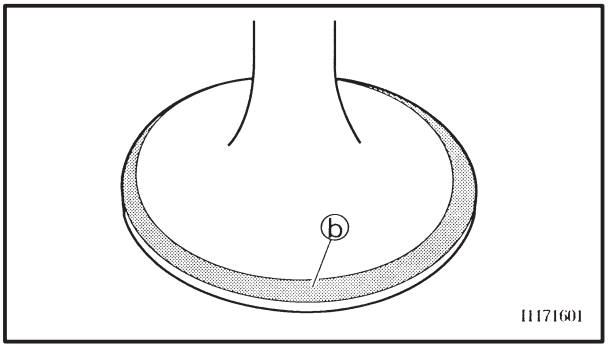
EAS00240
CHECKING THE VALVE SEATS

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

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



Valve seat width
Intake: 0.9 ~ 1.1 mm
<Limit>: 1.6 mm
Exhaust: 0.9 ~ 1.1 mm
<Limit>: 1.6 mm



a. Apply Mechanic's blueing dye (Dykem) ⓑ 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.

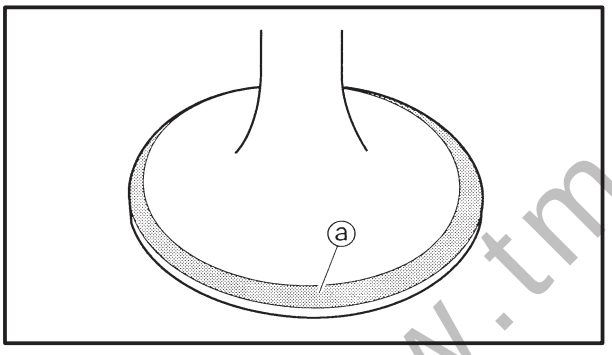
NOTE:

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

4. Lap:
   - valve face
   - valve seat

NOTE:

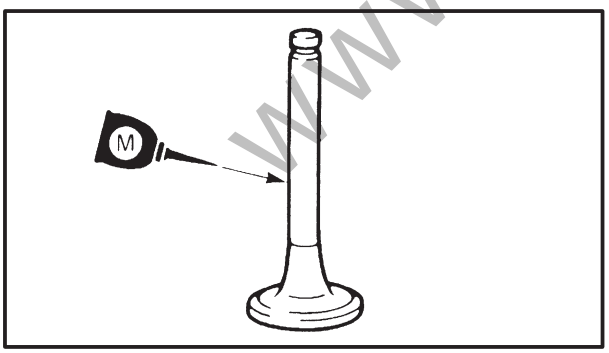
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.



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

CAUTION:

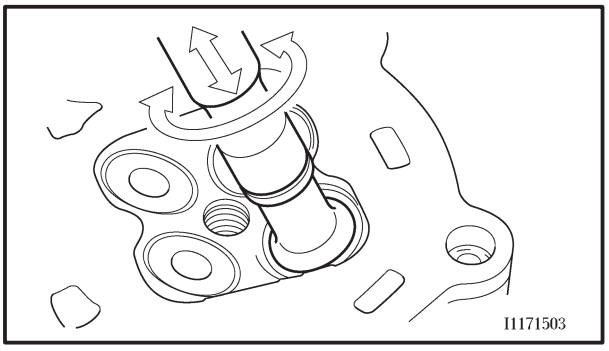
Do not let the lapping compound enter the gap between the valve stem and the valve guide.

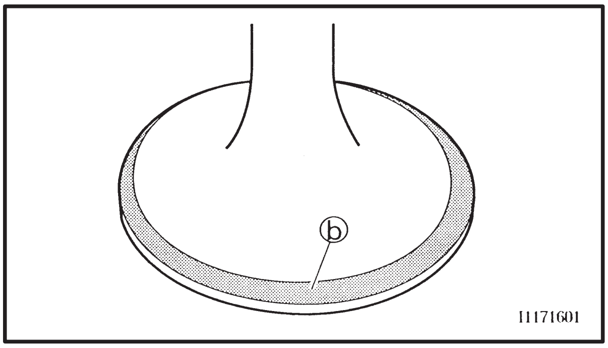


b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

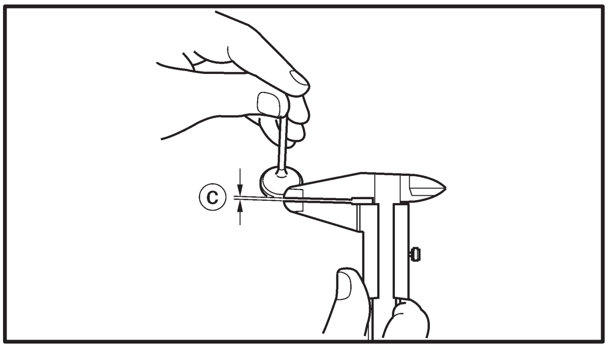
NOTE:

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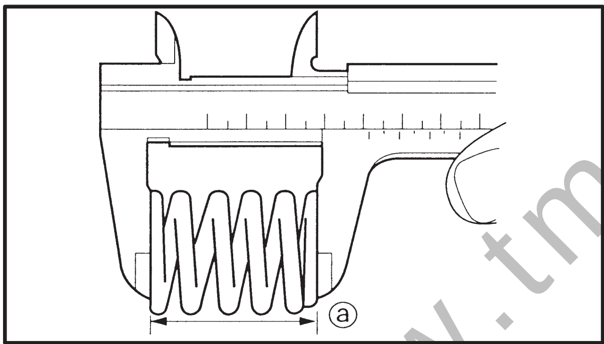


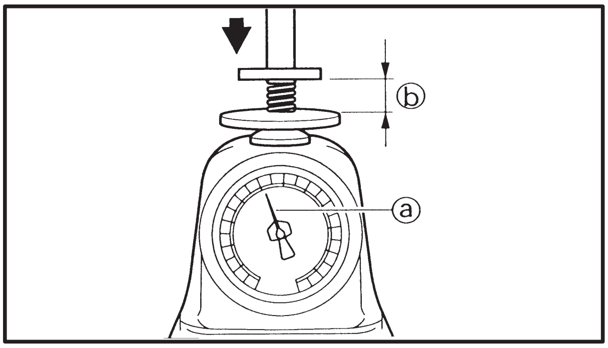
EAS00241

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.

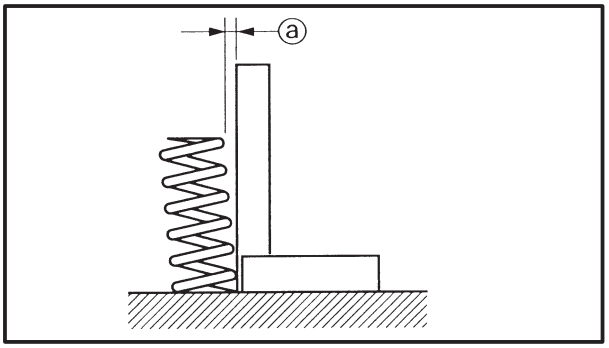
Valve spring free length (intake and exhaust) **35.59 mm** **<Limit>: 33.81 mm**



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

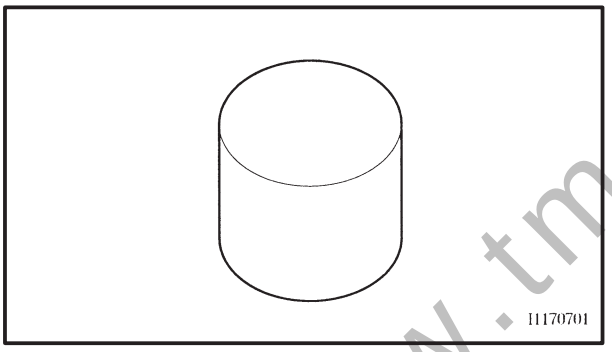
ⓑ Installed length

Compressed spring force
Intake valve spring
9.3 ~ 10.7 kg at 30.4 mm
Exhaust valve spring
9.3 ~ 10.7 kg at 30.4 mm

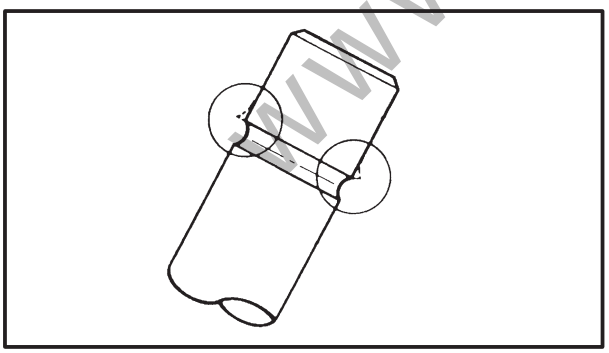


3. Measure:
   • valve spring tilt ⓐ
   Out of specification → Replace the valve spring.

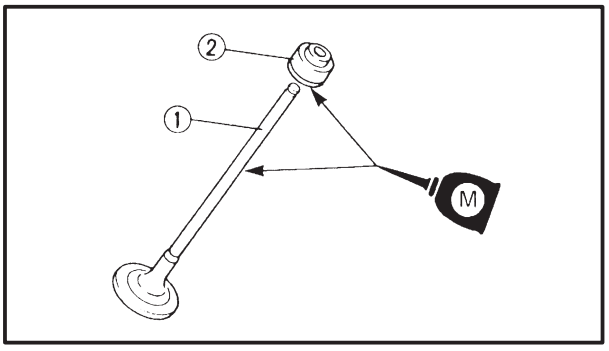
Max. spring tilt
Intake valve spring
1.6 mm
Exhaust valve spring
1.6 mm



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

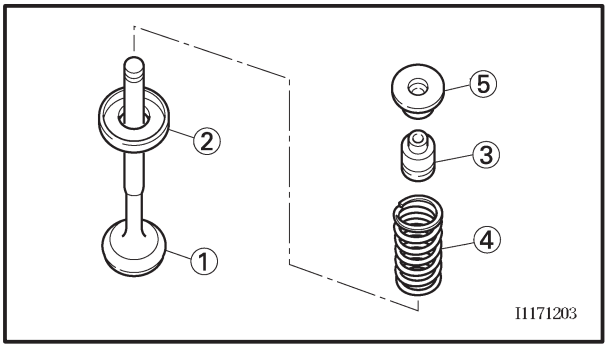


EAS00245
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   • valve stem end
   (with an oil stone)



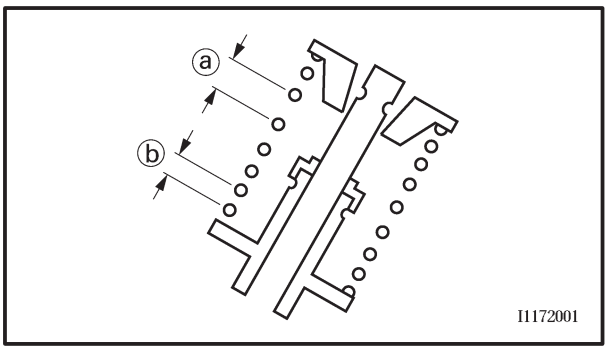
2. Lubricate:
   • valve stem ①
   • oil seal ②
   (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide oil

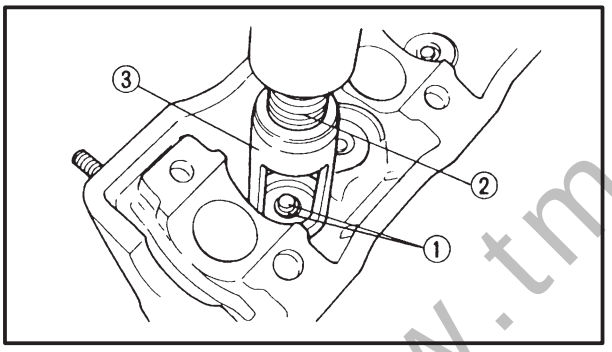


3. Install:
   - valve ①
   - valve spring seat ②
   - oil seal ③ New
   - valve spring ④
   - valve retainer ⑤
     (into the cylinder head)

NOTE:
- Make sure that each valve is installed in its original place.
- Install the valve spring with the larger pich ⓐ facing up.



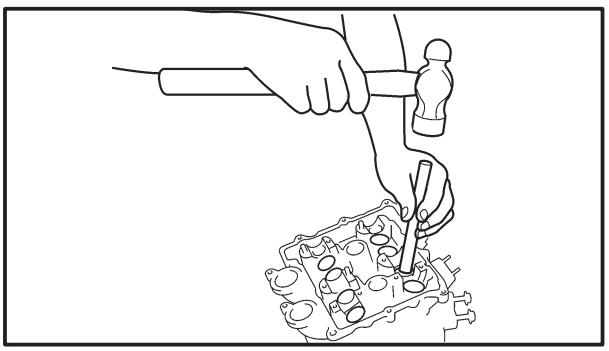
ⓑ Smaller pitch



4. Install:
   - valve cotters ①

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

Valve spring compressor
90890-04109
Attachment
90890-04114



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. Lubricate:
   • valve pad
   (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

7. Install:
   • valve pad
   • valve lifter

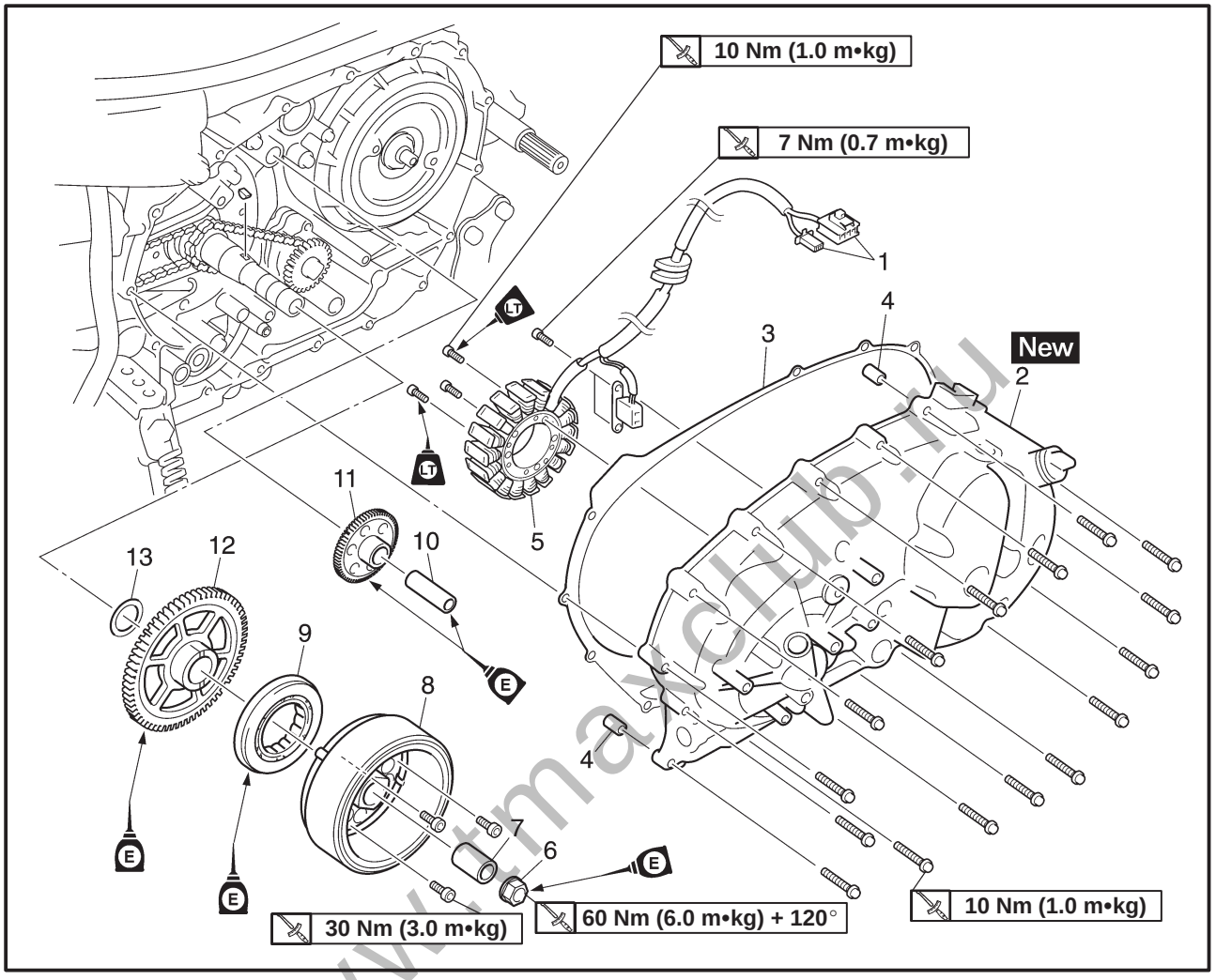
CAUTION:

After making sure that the valve pads are fully inserted, install the valve lifter taking care so that the pads do not fall.

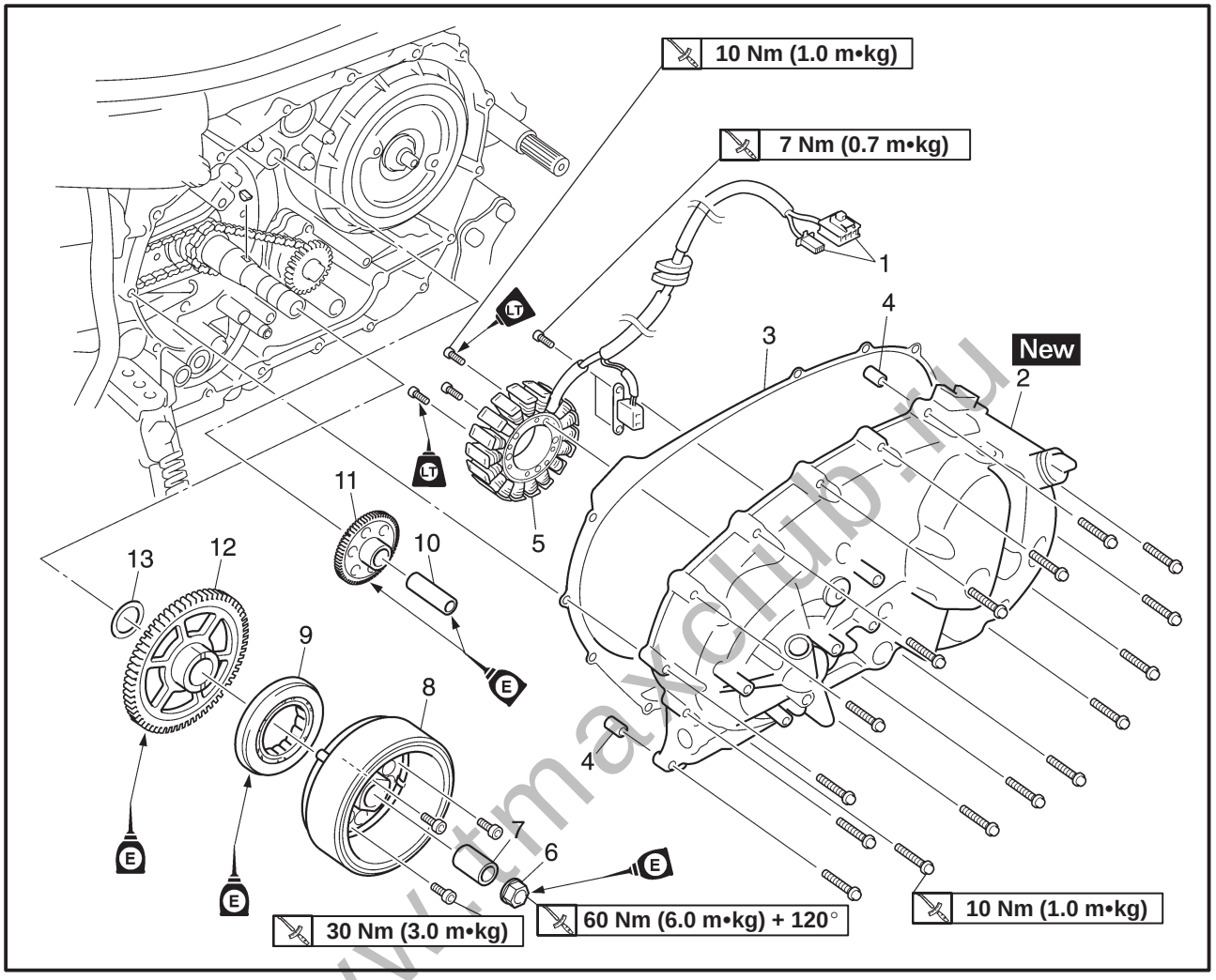
NOTE:

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

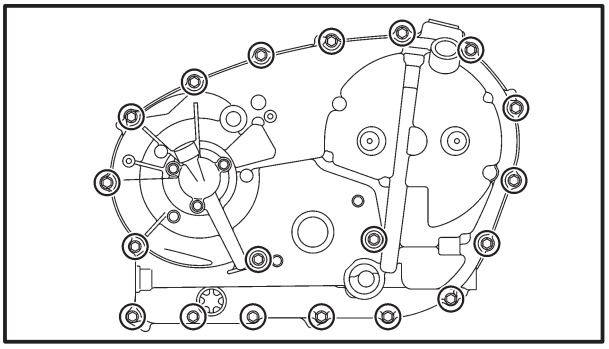
STARTER CLUTCH AND GENERATOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter clutch and generator		Remove the parts in the order listed.
	Side panel (left)		
	Lower cover		
	Footrest board		
	Water pump		Refer to "WATER PUMP" in chapter 5.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Starter coil assembly coupler	1	Disconnect.
2	Generator cover	1	Refer to "REMOVING/INSTALLING THE GENERATOR".
3	Generator cover gasket	1	
4	Dowel pin	2	



Order	Job/Part	Q'ty	Remarks
5	Starter coil assembly	1	
6	Nut	1	
7	Spacer	1	
8	Generator rotor	1	
9	Starter clutch	1	
10	Idler gear shaft	1	
11	Idler gear	1	
12	Starter clutch gear	1	
13	Washer	1	
			For installation, reverse the removal procedure.

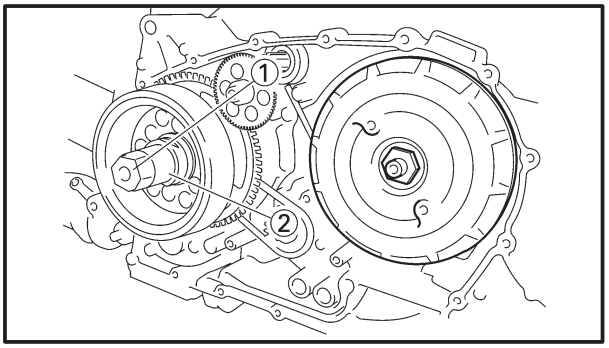


REMOVING THE GENERATOR

1. Remove:
   • generator rotor cover

NOTE:

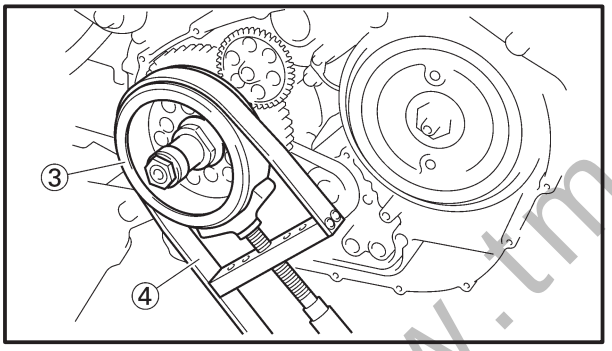
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.
After all of the bolts are fully loosend, remove them.



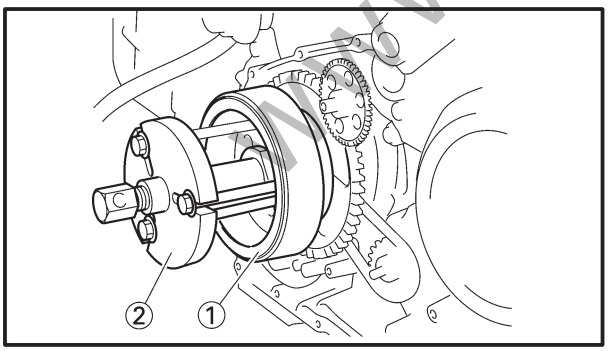
2. Remove:
   • generator rotor nut ①
   • spacer ②

NOTE:

- While holding the generator rotor ③ with the sheave holder ④, loosen the generator rotor nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.



Sheave holder
90890-01701



3. Remove:
   • generator rotor ①
     (with the flywheel puller set ②)
   • woodruff key

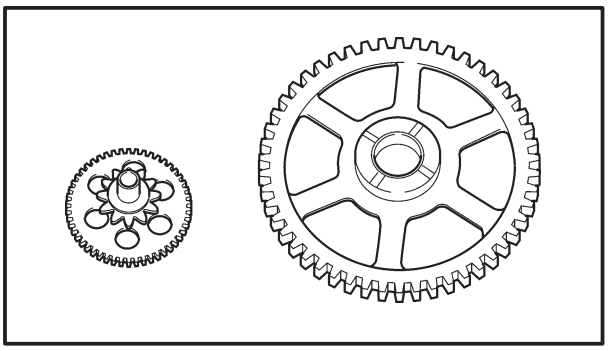
NOTE:

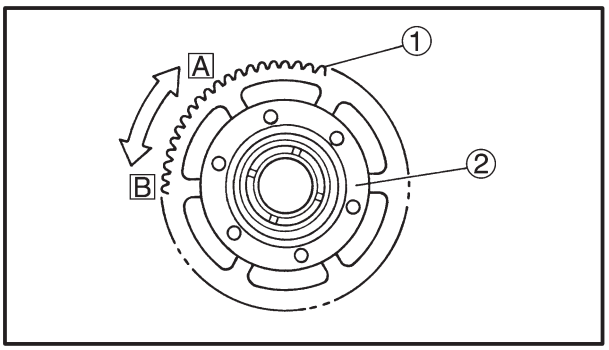
- Remove the rotor ① using the flywheel puller.
- Center the flywheel puller over the rotor.
  Make sure after installing the holding bolts that the clearance between the flywheel puller and the rotor is the same everywhere. If necessary, one holding bolt maybe turned out slightly to adjust the flywheel puuler's position.

CAUTION:

Cover the crankshaft end with the box wrench for protection.

Flywheel puller set
90890-01362





CHECKING THE STARTER CLUTCH

1. Check:
   - starter clutch
     Damage/wear → Replace.
2. Check:
   - idle gear
   - idle gear shaft
   - starter clutch gear
     Pitting/burrs/chips/roughness/wear → Replace the defective parts.

3. Check:
   - starter clutch operation

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

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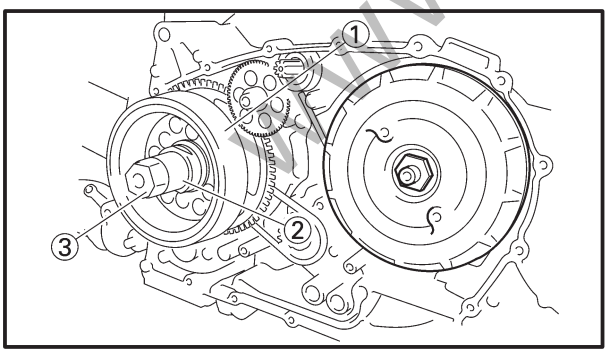
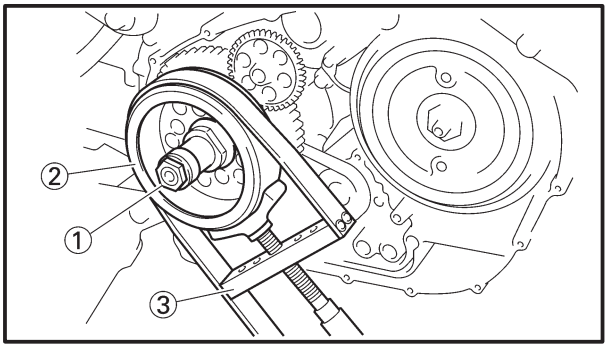


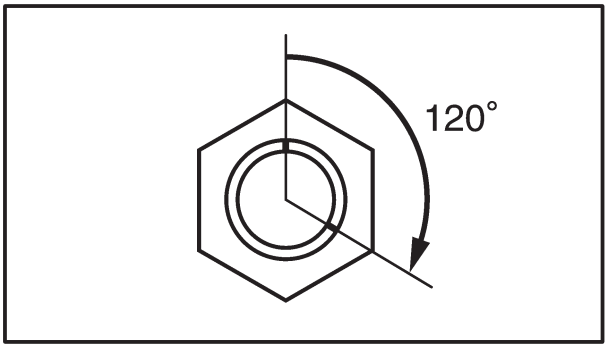
INSTALLING THE GENERATOR

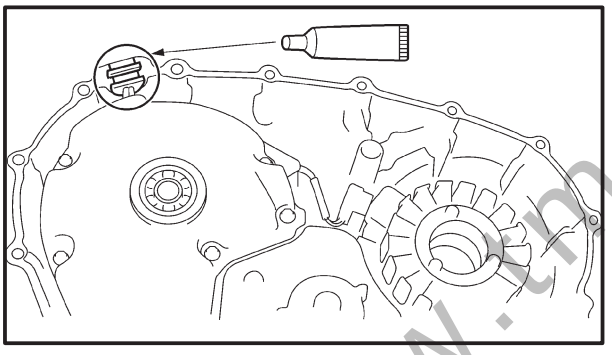
1. Install:
   - woodruff key
   - generator rotor ①
   - spacer ②
   - nut ③

NOTE:

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







2. Tighten:
   • generator rotor nut ①

	60 Nm (6.0 m•kg) + 120°

NOTE:
- While holding the generator rotor ② with the sheave holder ③, tighten the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

	Sheave holder **90890-01701**

CAUTION:
- **When tightening the generator rotor nut, be sure to use an F-type torque wrench.**
- **After tightening the generator rotor nut, to the specified torque, turn the connecting rod nut another + 120°.**

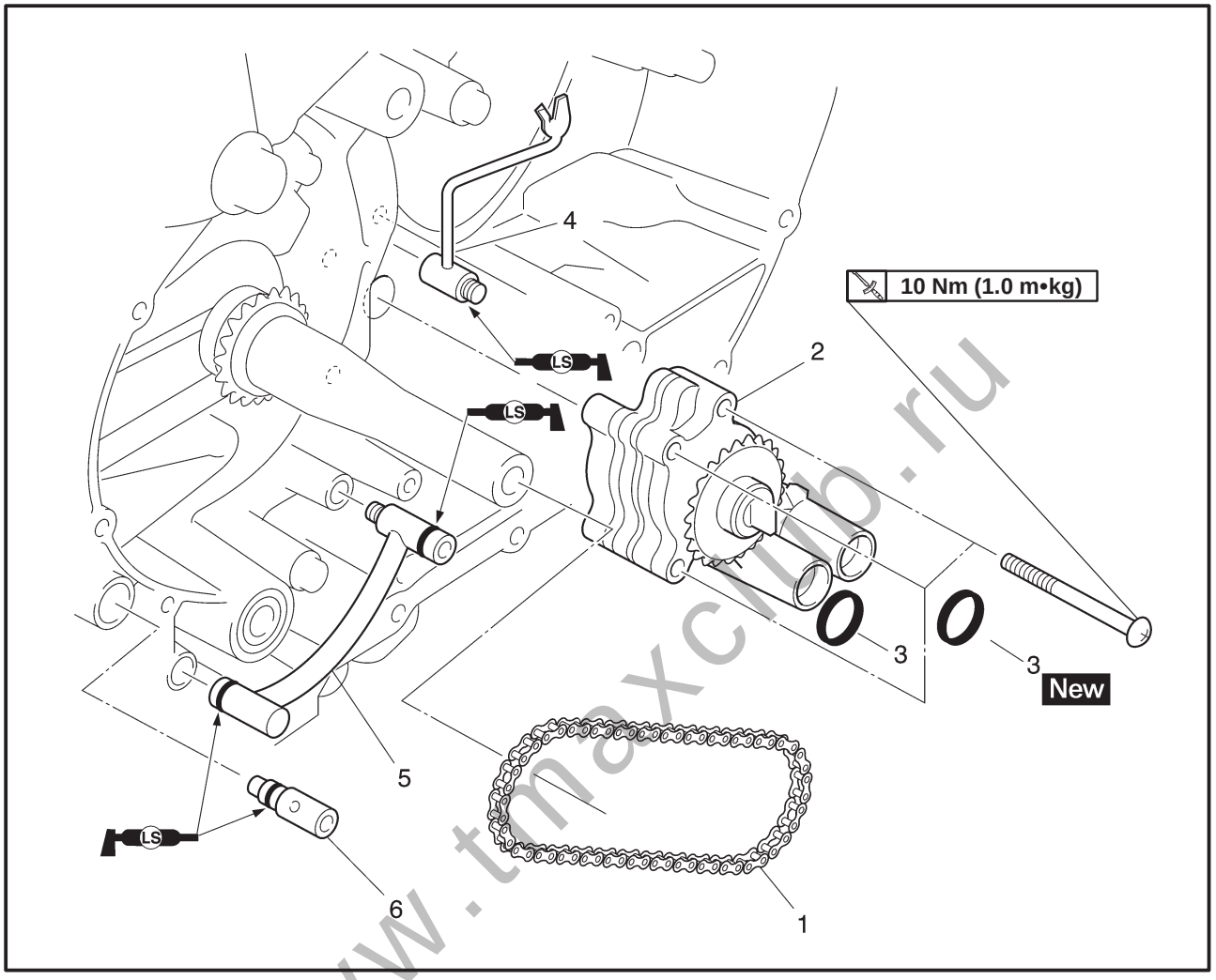
3. Apply:
   • sealant
   (onto the stator coil assembly lead grommet)

	Yamaha bond No1215 **90890-85505**

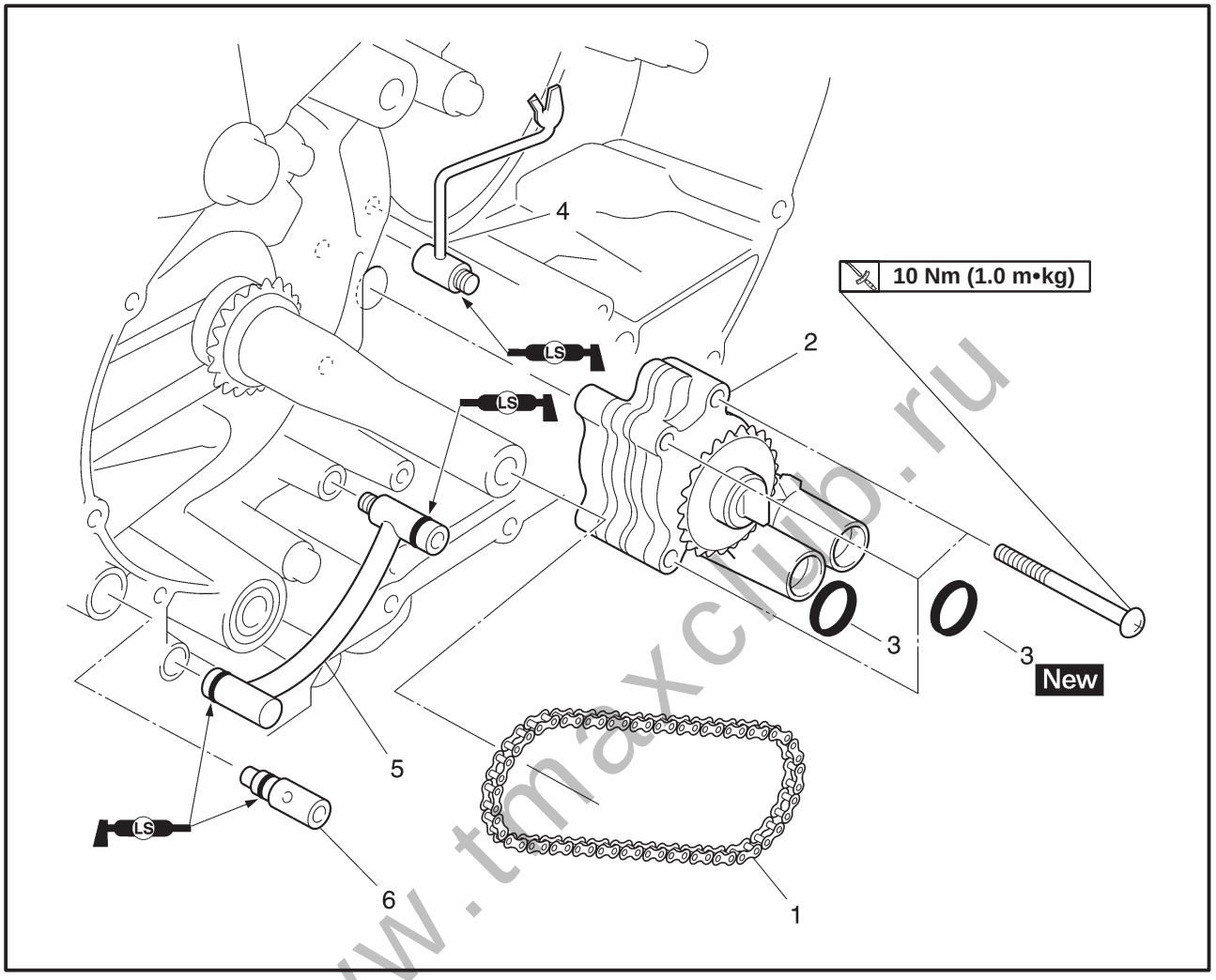
4. Install:
   • stator coil
5. Install:
   • generator rotor cover

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

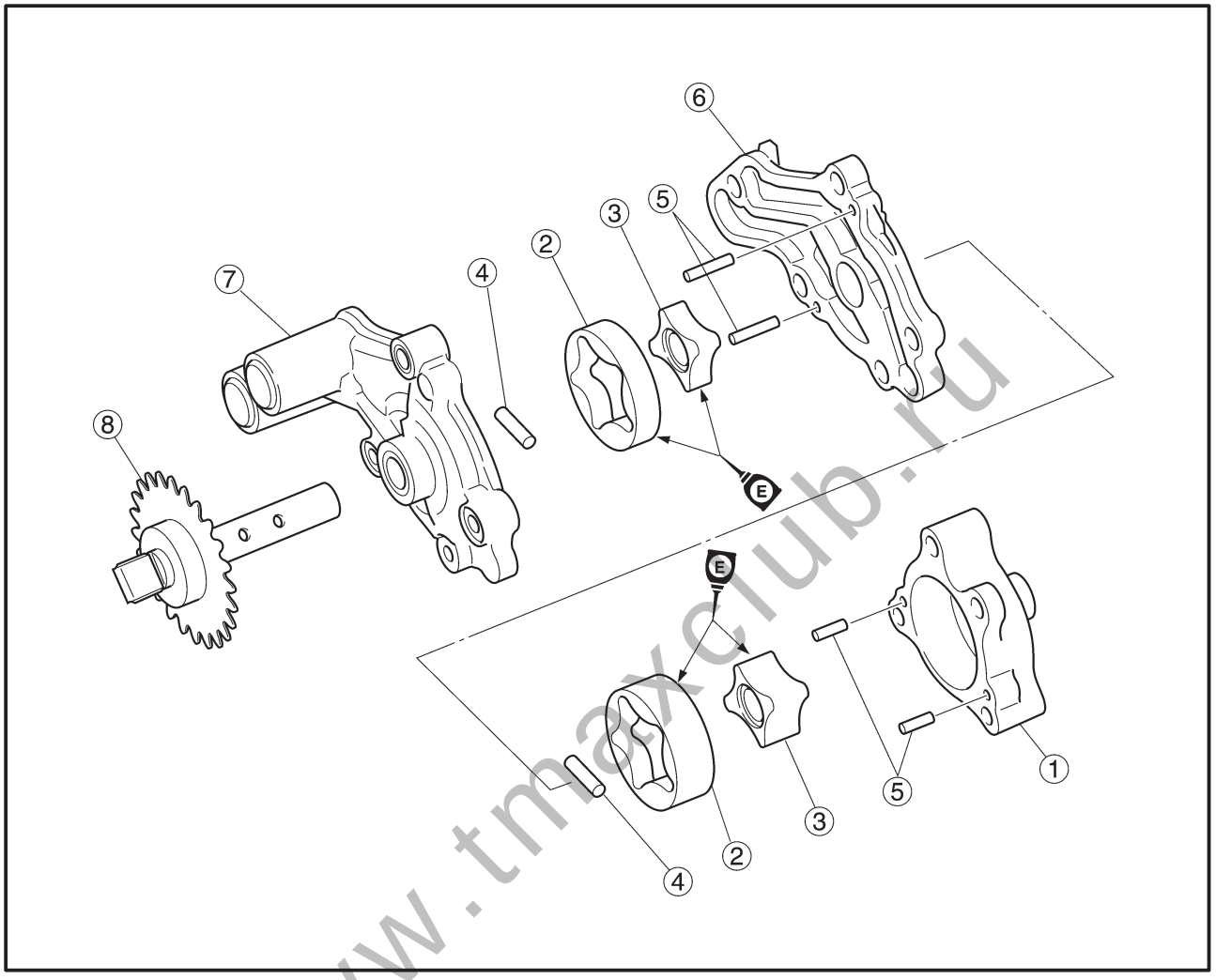
OIL PUMP



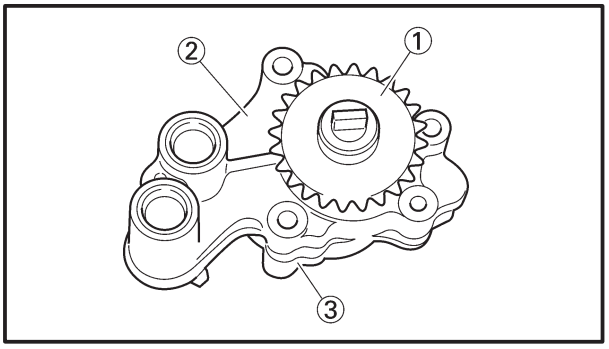
Order	Job/Part	Q'ty	Remarks
	Removing the oil pump		Removing the parts in the order listed.
	Side panel (left)		
	Lower cover		
	Footrest board		
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Generator cover		Refer to "STARTER CLUTCH AND GENERATOR".
	Starter clutch gear		
1	Oil pump drive chain	1	
2	Oil pump		



Order	Job/Part	Q'ty	Remarks
3	O-ring	2	
4	Oil pipe	1	
5	Oil pipe	1	
6	Relief valve assembly	1	
			For installation, reverse the removal procedure.



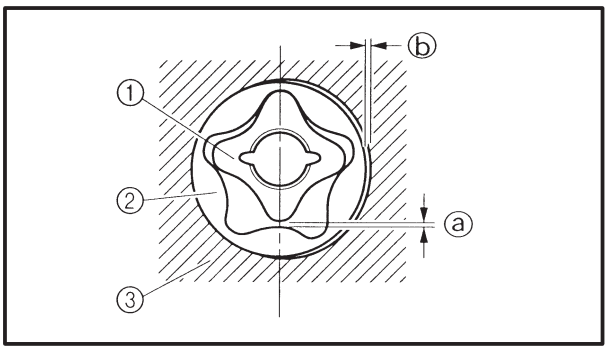
Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Disassemble the parts in the order listed.
①	Oil pump housing	1	
②	Oil pump outer rotor	2	
③	Oil pump inner rotor	2	
④	Pin	2	
⑤	Dowel pin	4	
⑥	Oil pump housing center	1	
⑦	Oil pump cover	1	
⑧	Oil pump driven gear	1	
			For assembly, reverse the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



CHECKING THE OIL PUMP

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

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

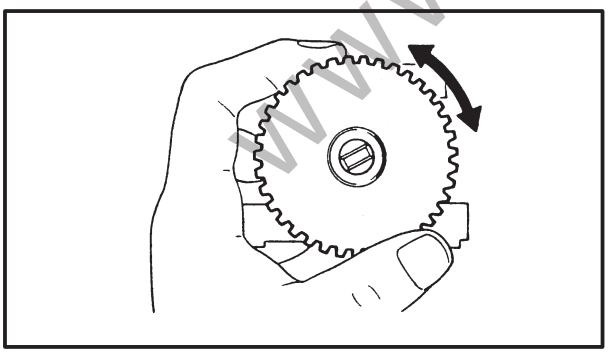


2. Measure:
   - inner-rotor-to-outer-rotor-tip clearance ⓐ
   - outer-rotor-to-oil-pump-housing clearance ⓑ

   Out of specification → Replace the oil pump.

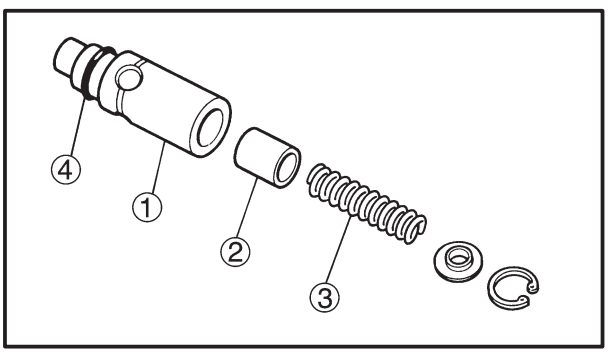
① Inner rotor
② Outer rotor
③ Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance
0.04 ~ 0.12 mm
<Limit>: 0.20 mm
Outer-rotor-to-oil-pump-housing clearance
0.045 ~ 0.085 mm
<Limit>: 0.15 mm



3. Check:
   - oil pump operation

   Unsmooth → Repear or replace the defective part(-s).

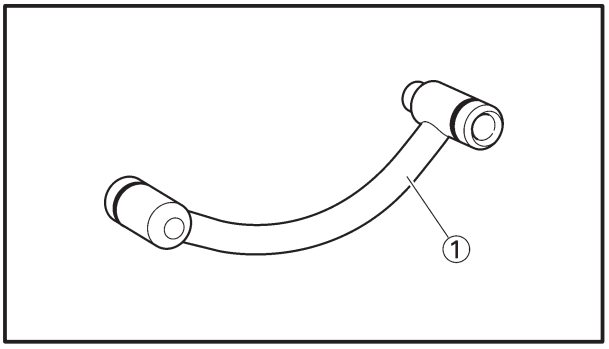


EAS00365

CHECKING THE RELIEF VALVE

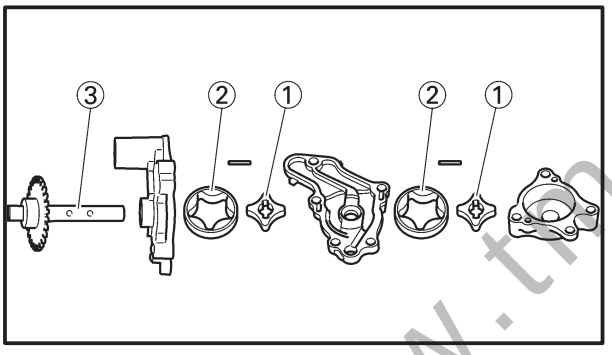
1. Check:
   - relief valve body ①
   - relief valve ②
   - spring ③
   - O-ring ④

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



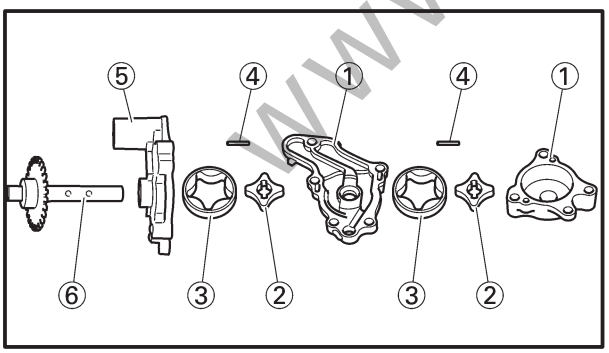
EAS00367
CHECKING THE OIL DELIVERY PIPES
The following procedure applies to all of the oil delivery pipes.
1. Check:
   • oil delivery pipe ①
   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.

EAS00368
CHECKING THE OIL STRAINER
1. Check:
   • oil strainer
   Damage → Replace.
   Contaminants → Clean with engine oil.



ASSEMBLING THE OIL PUMP
1. Lubricate:
   • inner rotor ①
   • outer rotor ②
   • oil pump driven gear ③
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

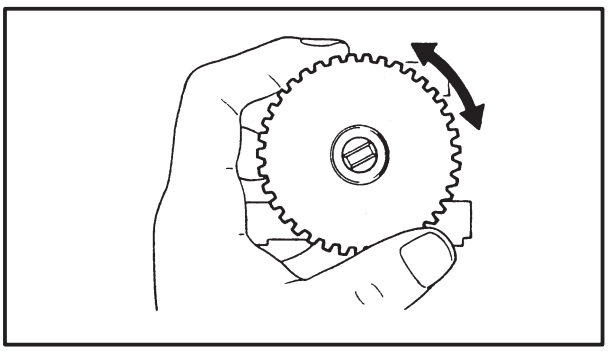


2. Install:
   • oil pump housing ①

	10 Nm (1.0 m•kg)

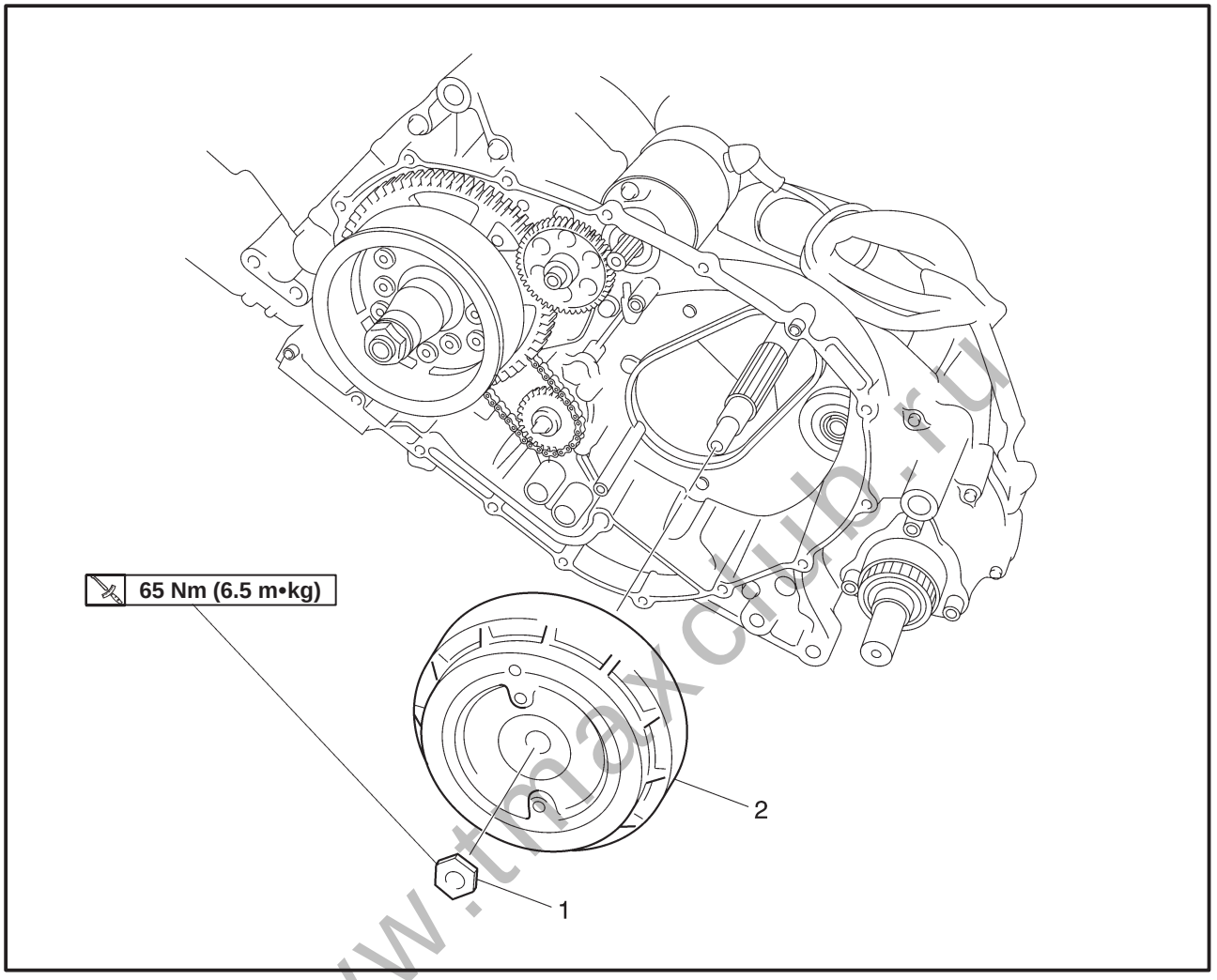
   • outer rotor ②
   • inner rotor ③
   • pins ④
   • oil pump cover ⑤
   • oil pump driven gear ⑥

NOTE:
When installing the inner rotor, align the pin ① in the oil pump shaft with the groove ② on the inner rotor ③.

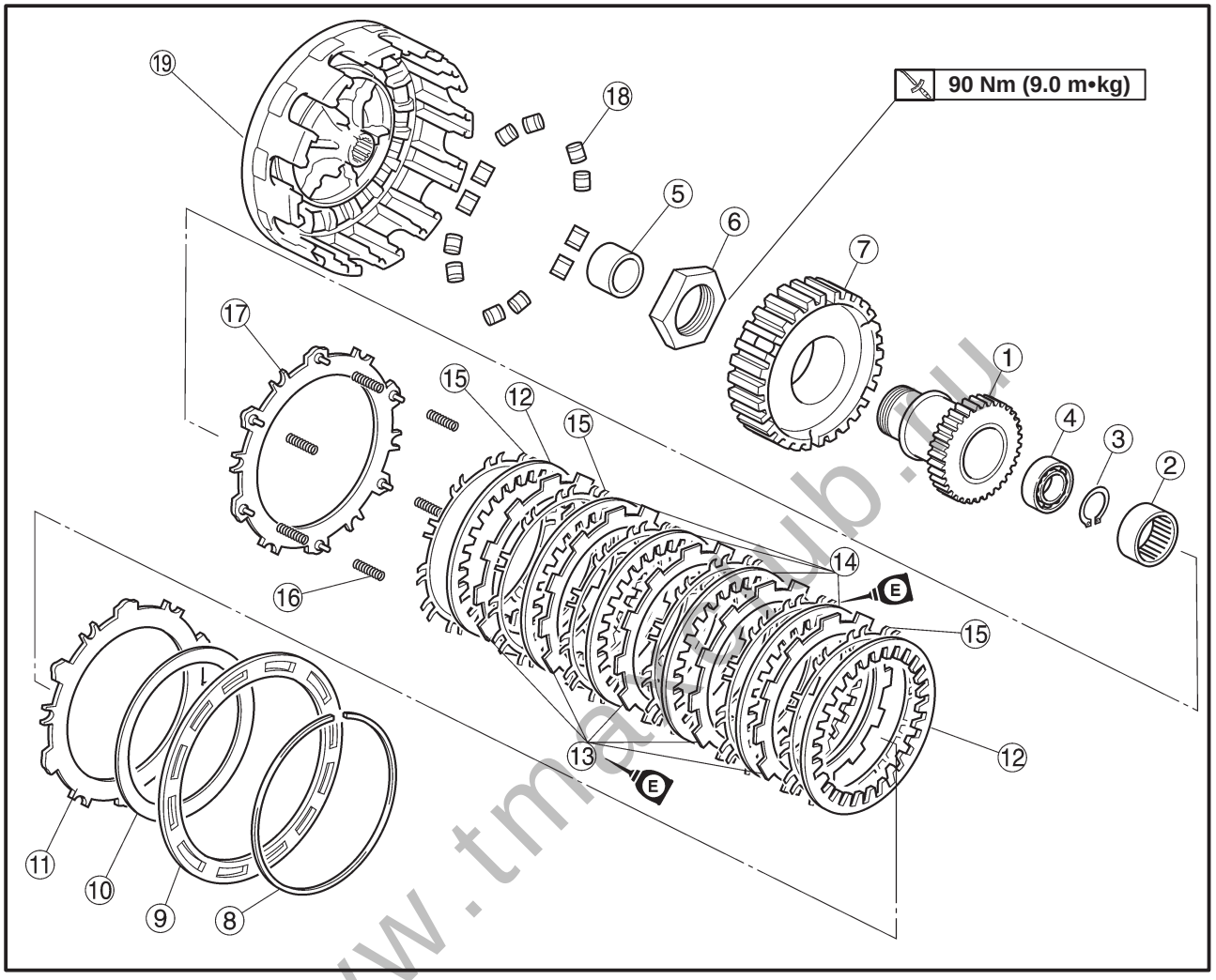


3. Check:
   • oil pump operation
   Refer to “CHECKING THE OIL PUMP”.

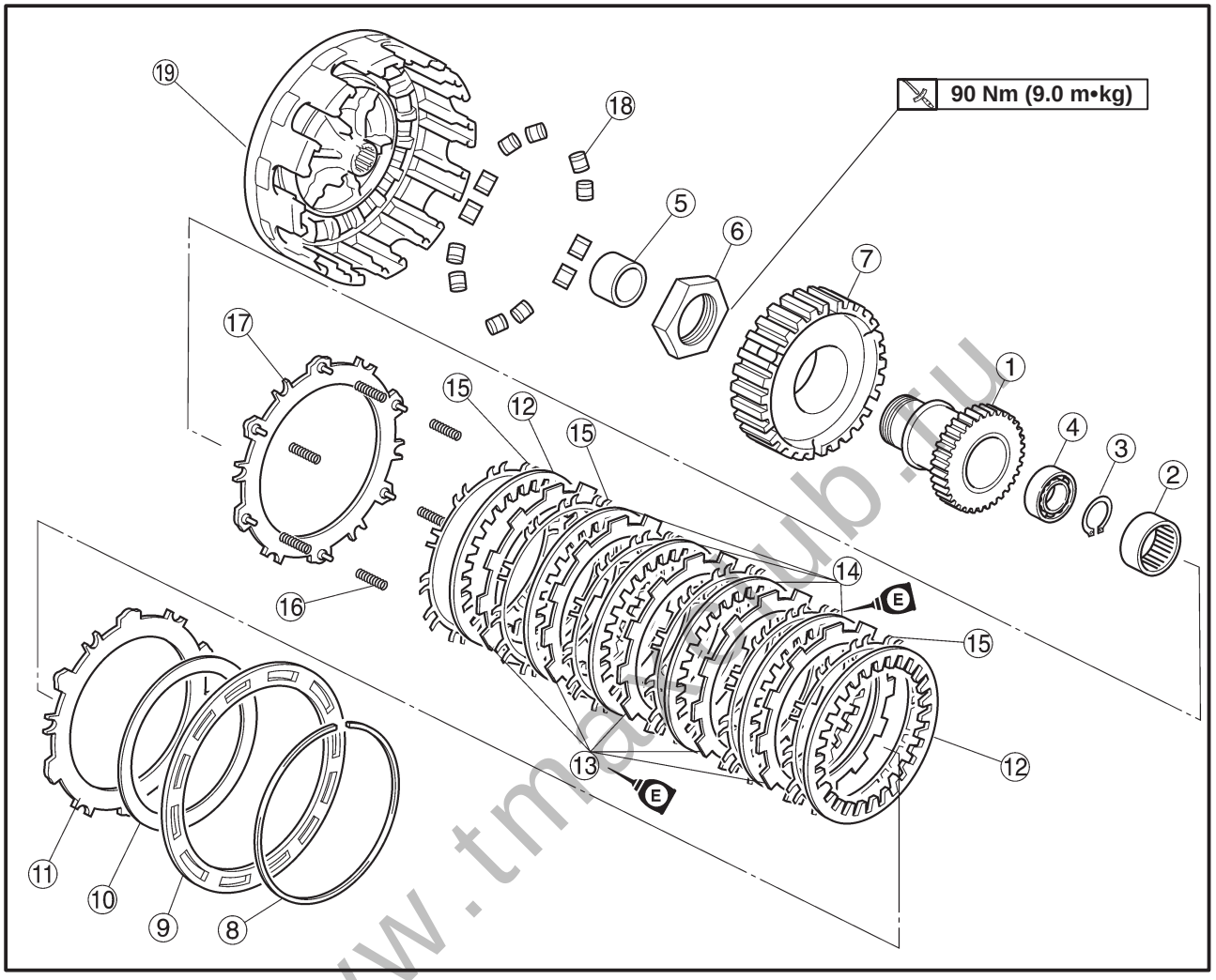
CLUTCH



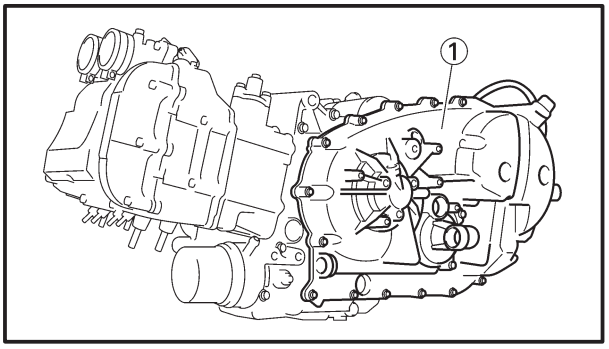
Order	Job/Part	Q'ty	Remarks
	Removing the clutch assembly Generator cover		Remove the parts in the order listed. Refer to "STARTER CLUTCH AND GENERATOR".
1	Nut	1	
2	Clutch assembly	1	
			For installation, reverse the removal procedure.

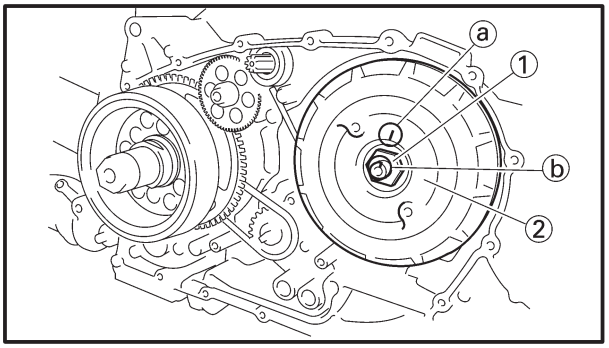


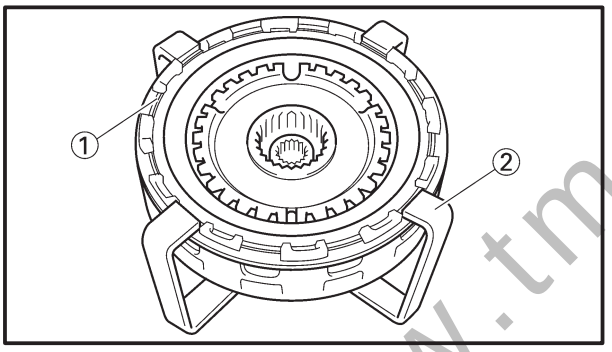
Order	Job/Part	Q'ty	Remarks
	Disassembling the clutch		Disassemble the parts in the order listed.
①	Primary drive gear	1	
②	Rollar bearing	1	
③	Circlip	1	
④	Bearing	1	
⑤	Collar	1	
⑥	Nut	1	
⑦	Clutch boss	1	
⑧	Circlip	1	
⑨	Spring plate stopper	1	
⑩	Clutch spring 2	1	
⑪	Pressure plate	1	
⑫	Clutch plate 2	2	
⑬	Friction plate	5	
⑭	Clutch plate 1	4	
⑮	Clutch spring	6	



Order	Job/Part	Q'ty	Remarks
⑯	Spring	6	
⑰	Thrust plate	1	
⑱	Weight	12	
⑲	Clutch housing	1	
			For assembly, reverse the disassembly procedure.







REMOVING THE CLUTCH

1. Remove:
   - generator cover ①
     Refer to "STARTER CLUTCH AND GENERATOR".

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:
   - nut ①
   - clutch assembly ②
   - clutch boss

NOTE:

Before removal, apply ⓐ and ⓑ alignment marks.
Align these marks during reassembly.

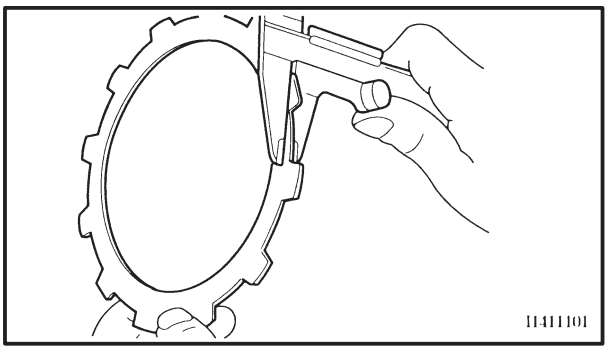
3. Remove:
   - circlip ①

NOTE:

Install the clutch spring holder ② onto the clutch assembly as shown. Then, compress the spring, and remove the circlip ①.

	Clutch spring compressor **90890-01482**

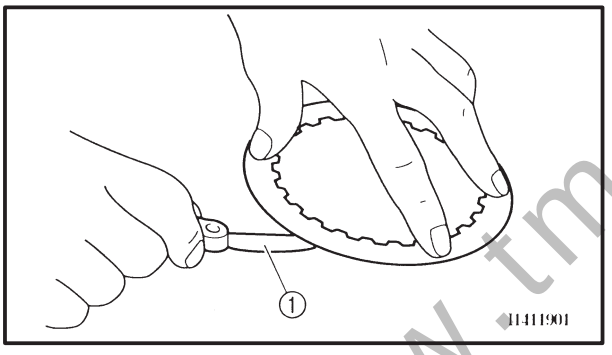
4. Remove:
   - spring plate stopper
   - clutch spring
   - pressure plate
   - friction and clutch plates
   - weight thrust plate
   - weights
   - springs



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

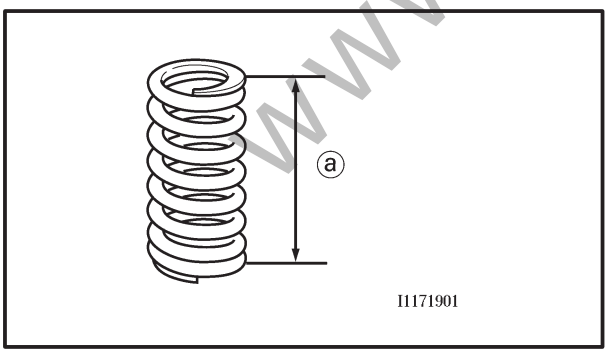
NOTE:
Measure the friction plate at four places.

Friction plate thickness
2.75 ~ 3.05 mm
<Limit>: 2.65 mm



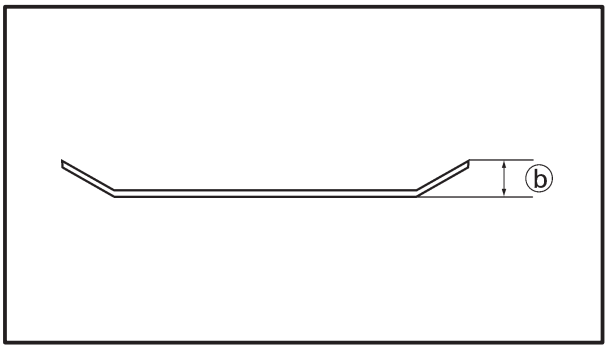
EAS00281
CHECKING THE CLUTCH PLATES
The following procedure applies to all of the clutch plates.
1. Check:
   • clutch plate
   Damage → Replace the clutch plates as a set.
2. Measure:
   • clutch plate warpage
   (with a surface plate and thickness gauge ①)
   Out of specification → Replace the clutch plates as a set.

Max. clutch plate warpage
0.1 mm



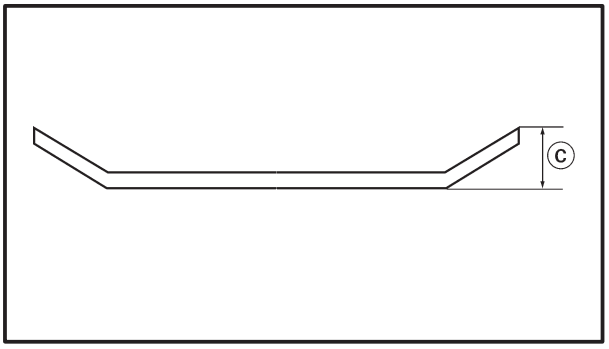
CHECKING THE SPRINGS AND CLUTCH SPRINGS
The following procedure applies to all of the springs.
1. Measure:
   • spring free length ⓐ
   Out of specification → Replace the spring.

Spring Limit
25.4 mm



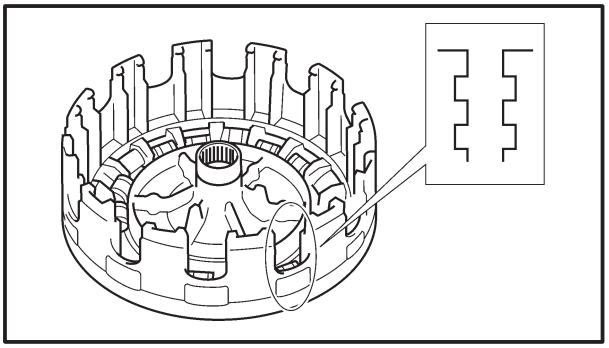
2. Measure:
   • clutch spring ⓑ
   Out of specification → Replace the clutch spring

Clutch spring limit
2.9 mm



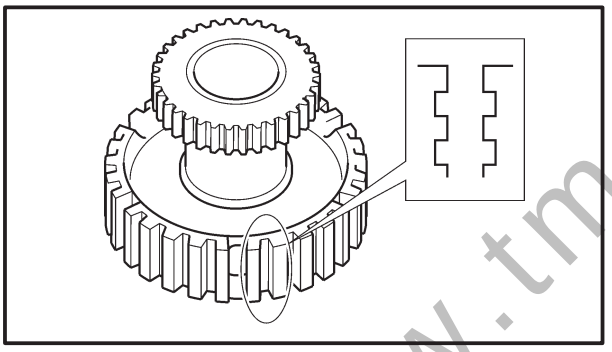
3. Measure:
   • clutch spring 2 Ⓒ
   Out of specification → Replace the clutch spring 2

Clutch spring 2 limit
4.4 mm



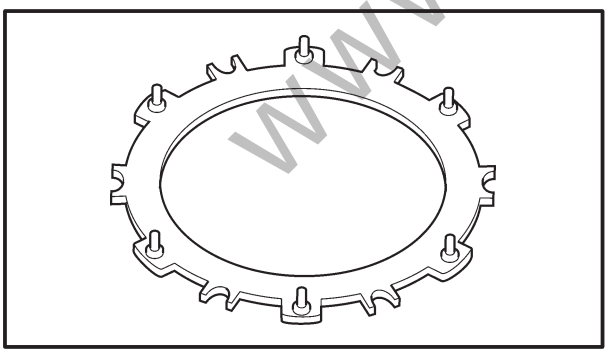
EAS00284
CHECKING THE CLUTCH HOUSING
1. Check:
   • clutch housing dogs
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

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

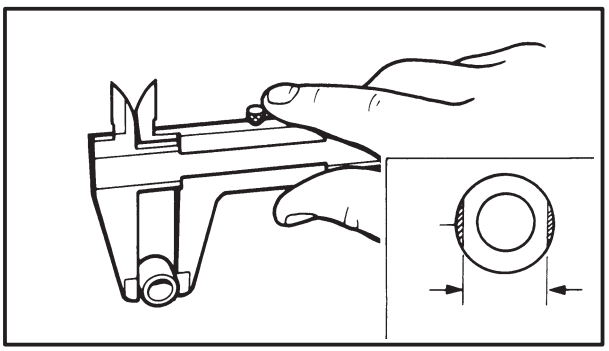


EAS00285
CHECKING THE CLUTCH BOSS
1. Check:
   • clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

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



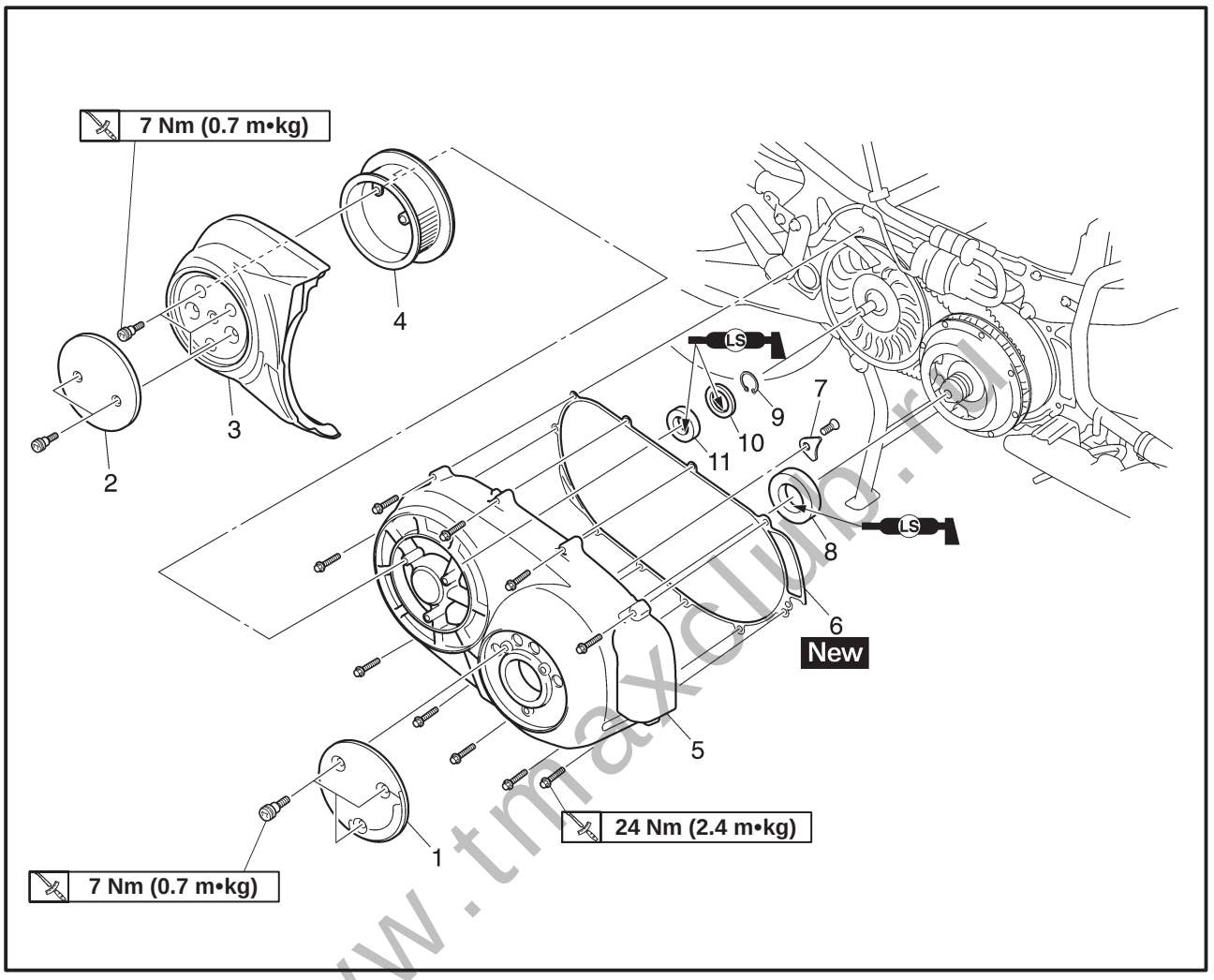
EAS00286
CHECKING THE PRESSURE PLATE
1. Check:
   • pressure plate
   • thrust plate
   Cracks/damage → Replace.



CHECKING THE WEIGHT
- Check:
  • weight
  Cracks/wear/scaling/chipping → Replace.
  Out of specification → Replace.

Weight outside diameter:
16.0 mm
<Limit>: 15.5 mm

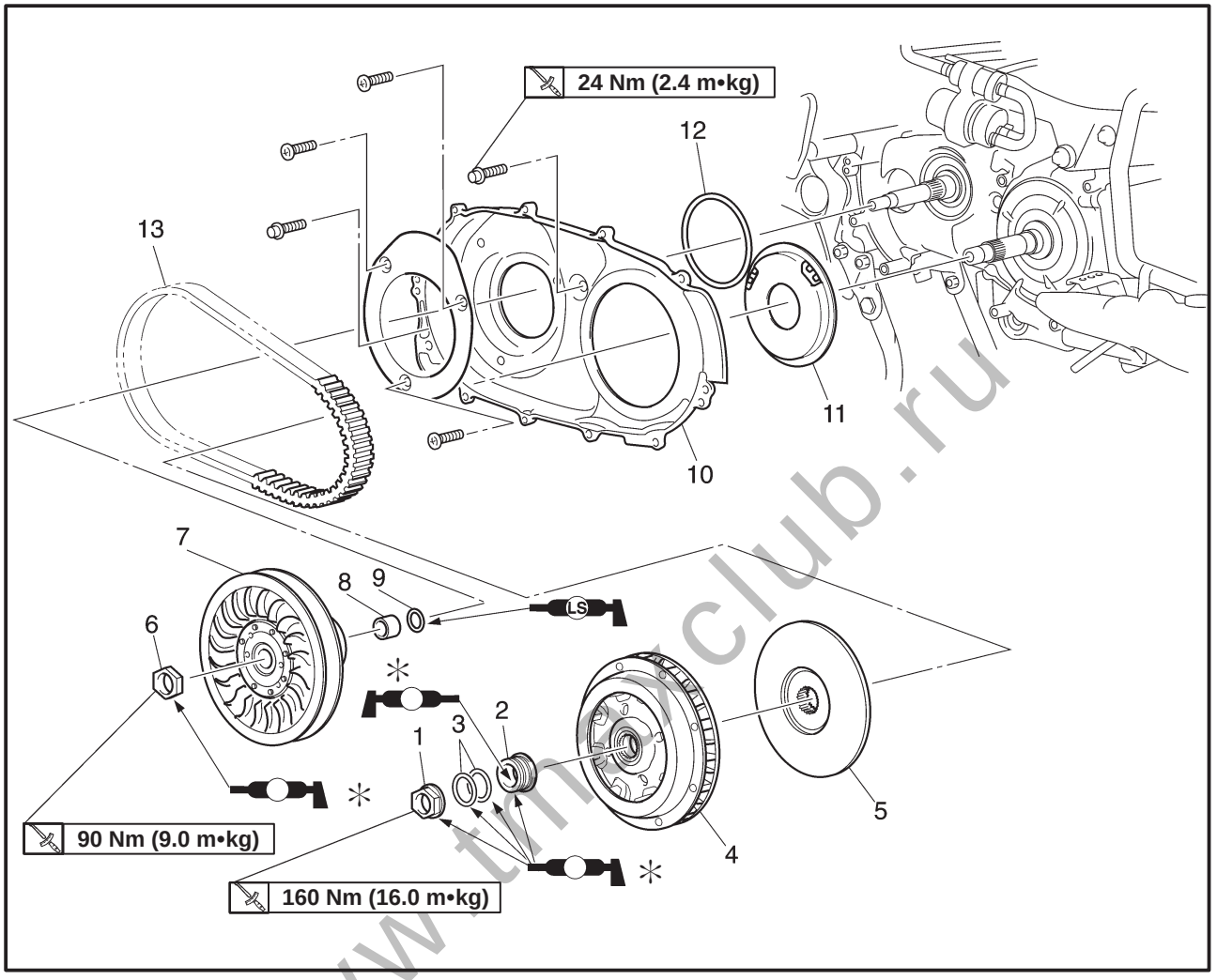
BELT DRIVE
BELT DRIVE COVER



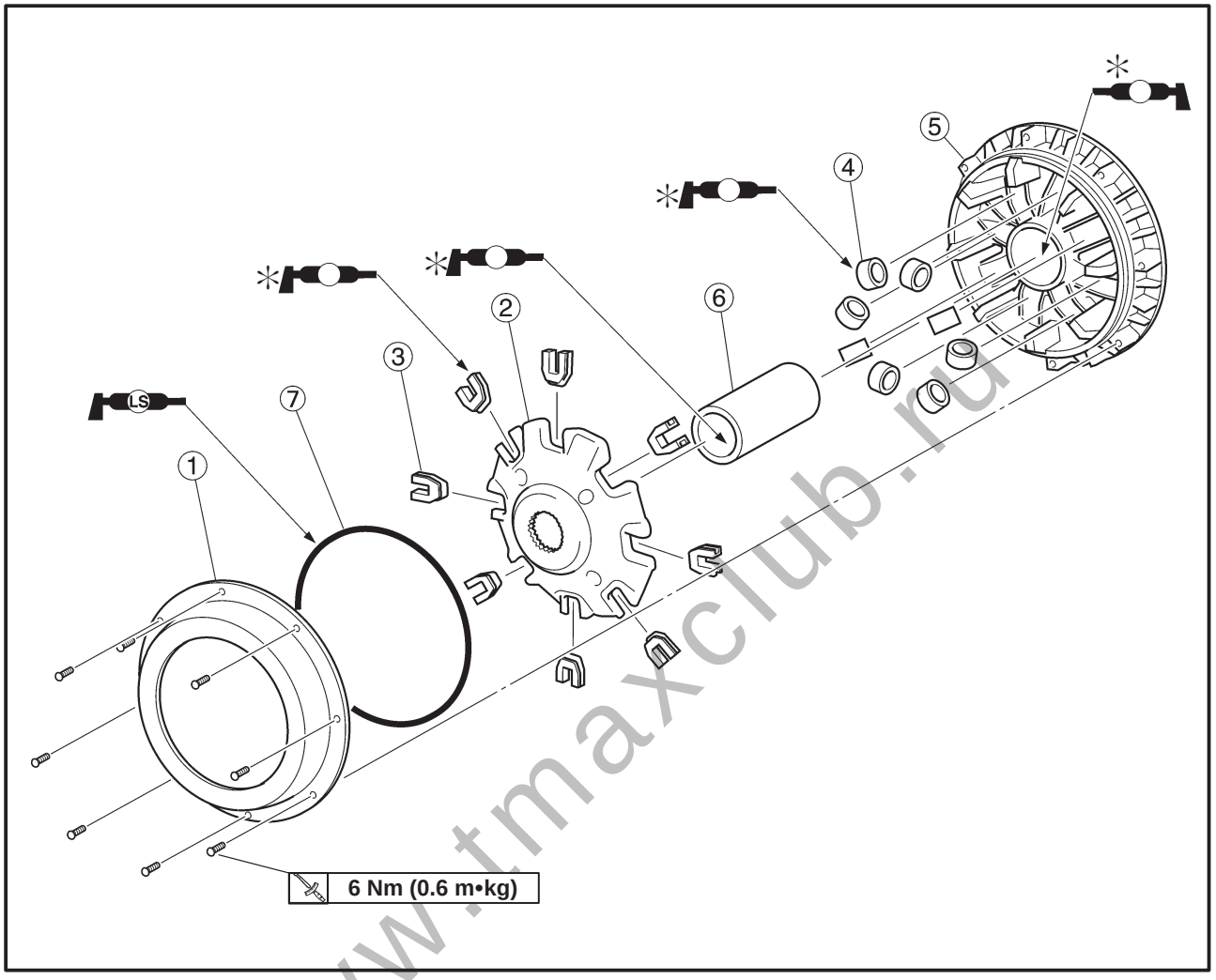
Order	Job/Part	Q'ty	Remarks
	Removing the belt drive cover		Remove the parts in the order listed.
	Side panel (right)		
	Lower cover		
	Footrest board		
1	Protector cover 1	1	
2	Protector cover 2	1	
3	Filter cover	1	
4	Filter	1	
5	Belt drive cover	1	
6	Belt drive cover gasket	1	
7	Bearing cover plate	1	
8	Bearing	1	
9	Circlip	1	
10	Oil seal	1	
11	Bearing	1	
			For installation, reverse the removal procedure.

BELT DRIVE

✻ Shell BT grease 3®

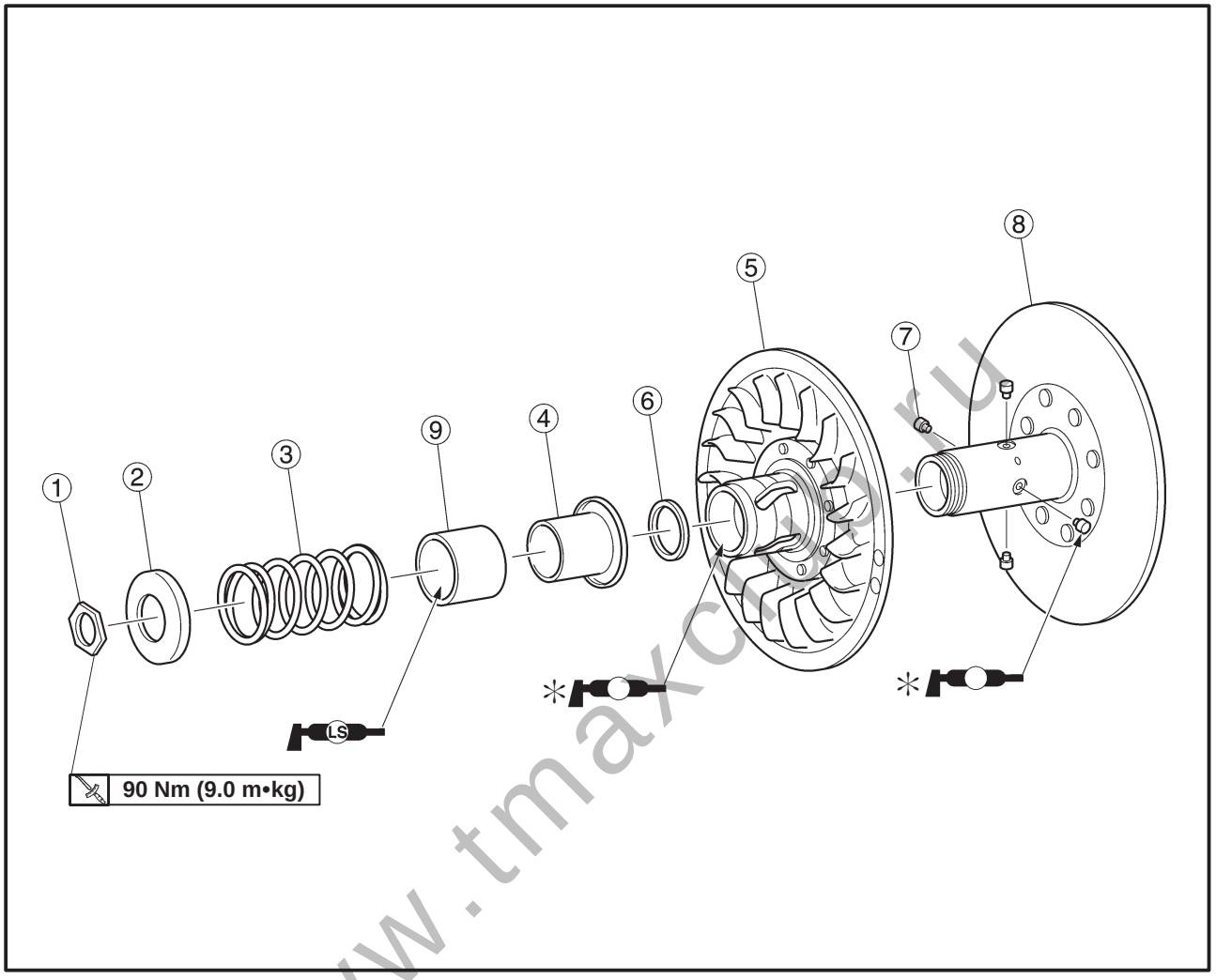


Order	Job/Part	Q'ty	Remarks
	Removing the belt drive		Remove the parts in the order listed.
1	Primary sheave nut	1	
2	Spacer	1	
3	O-ring	2	
4	Primary sheave assembly	1	
5	Primary fixed sheave	1	
6	Secondary sheave nut	1	
7	Secondary sheave assembly	1	
8	Collar	1	
9	O-ring	1	
10	Cover	1	
11	Plate	1	
12	Air duct seal	1	
13	Belt	1	
			For installation, reverse the removal procedure.

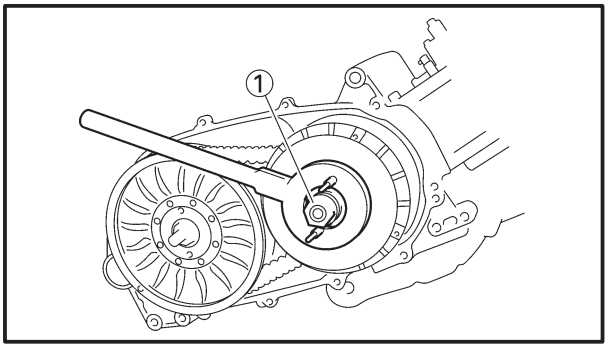


Order	Job/Part	Q'ty	Remarks
	Disassembling the primary sheave		Dissassemble the parts in the order listed.
①	Stopper	1	
②	Cam	1	
③	Slider	8	
④	Weight	8	
⑤	Primary sliding sheave	1	
⑥	Collar	1	
⑦	O ring	1	
			For assembly, reverse the disassembly procedure.

⁎ BEL-RAY assembly lube®



Order	Job/Part	Q'ty	Remarks
	Disassembly the secondary sheave		Disassemble the parts in the order listed.
①	Nut	1	
②	Upper spring seat	1	
③	Compression spring	1	
④	Spring seat	1	
⑤	Secondary sliding sheave	1	
⑥	Oil seal	1	
⑦	Guide pin	4	
⑧	Secondary fixed sheave	1	
⑨	Collar	1	
			For assembly, reverse the disassembly procedure.

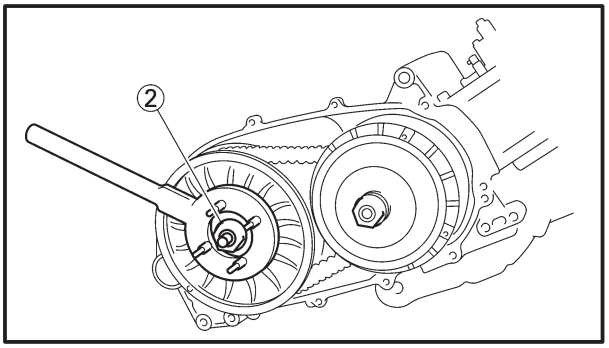


REMOVING THE PRIMARY SHEAVE ASSEMBLY, SECONDARY SHEAVE ASSEMBLY AND V-BELT

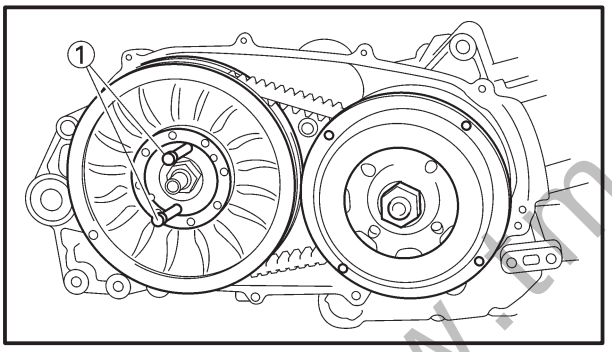
1. Remove:
   - primary sheave nut ①
   - secondary sheave nut ②

NOTE:

While holding the primary and secondary sheave with the sheave holder, loosen the nut.



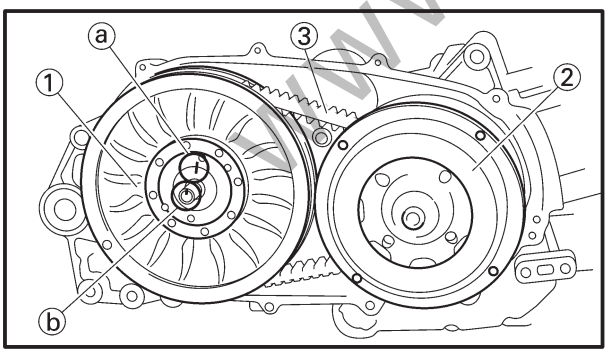
Sheave holder
90890-01481



2. Install:
   - bolts ①

NOTE:

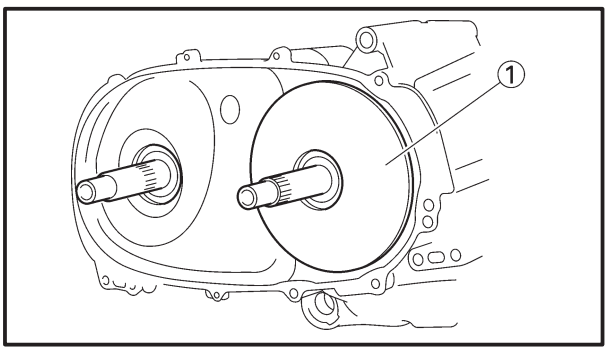
Insert M6 bolts (more than 45 mm) into the holes of the secondary sheave assembly, and then thighten the bolts to open the secondary sheave assembly.



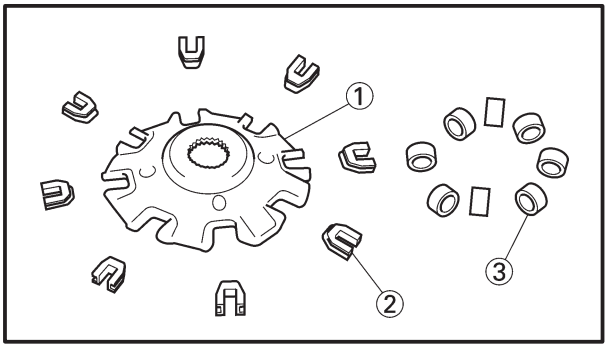
3. Remove:
   - primary sliding sheave ②
   - secondary sheave assembly ①
   - V-velt ③

NOTE:

- Before removal, apply ⓐ and ⓑ alignment marks.
  Align these marks during reassembly.
- Remove the primary sliding sheave, secondary sheave assembly and V-belt together.

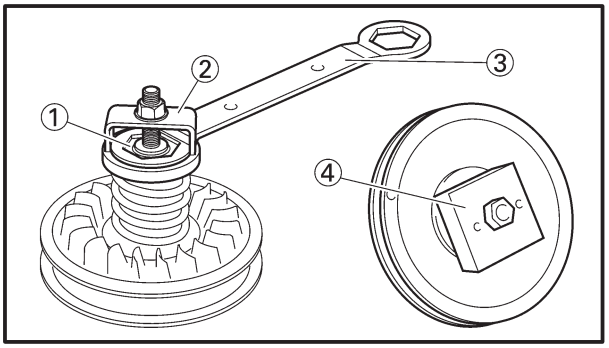


4. Remove:
   - primary fixed sheave ①



DISASSEMBLING THE PRIMARY SHEAVE

1. Remove:
   - cam ①
   - slider ②
   - weight ③



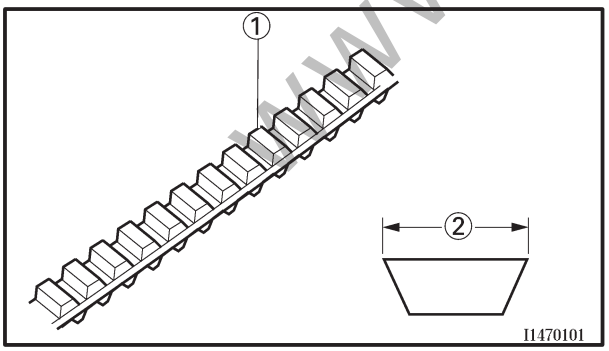
DISASSEMBLING THE SECONDARY SHEAVE

1. Remove:
   - secondary sheave nut ①

NOTE:

Install the sheave spring compresser ② onto the secondary sheave as shown. Then, compress the spring, and remove the secondary pulley nut ① with locknut wrench ③.

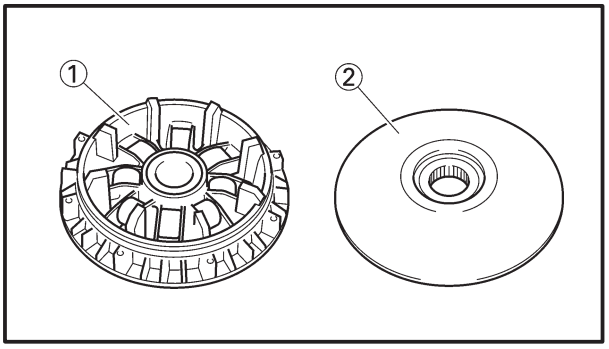
Sheave spring compressor ②
90890-04134
Locknut wrench ③
90890-01348
Sheave fixed block ④
90890-04135



CHECKING THE V-BELT

1. Check:
   - V-belt ①
     Cracks/damage/wear → Replace.
     Grease/oil → Check the primary and secondary pulleys.
2. Measure:
   - V-belt width ②
     Out of specification → Replace.

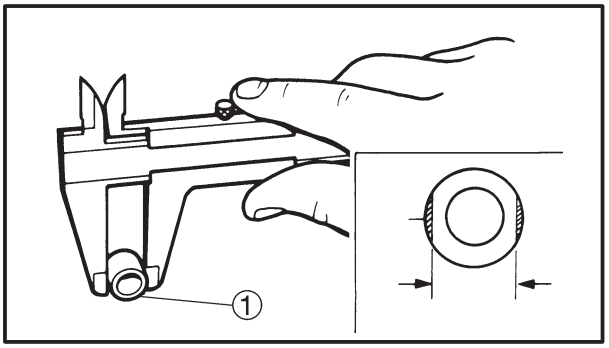
V-belt width
32 mm
<Limit>: 30.5 mm



CHECKING THE PRIMARY SHEAVE

1. Check:
   - primary sliding sheave ①
   - primary fixed sheave ②

   Cracks/damage/wear → Replace the primary sliding sheave and primary fixed sheave as a set.

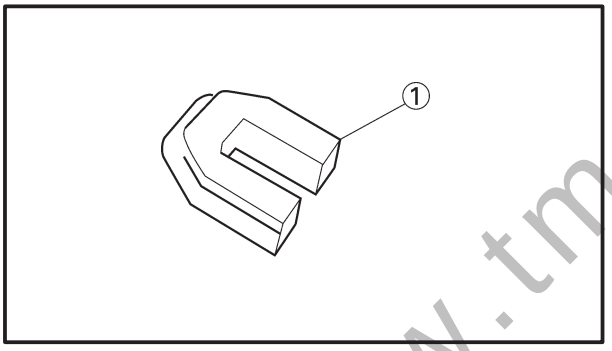


CHECKING THE WEIGHT

1. Check:
   - weight ①

   Cracks/wear/scaling/chipping → Replace.
   Out of specification → Replace.

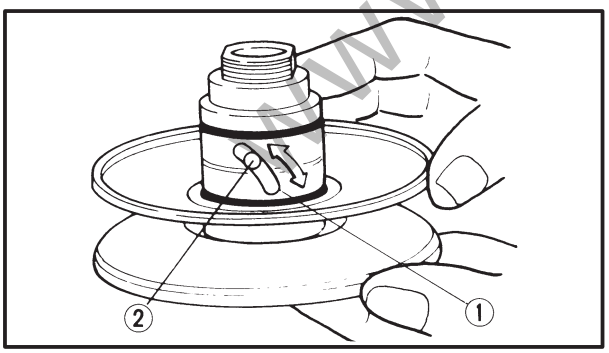
Weight outside diameter:
25.0 mm
<Limit>: 24.5 mm



CHECKING THE SLIDER

1. Check:
   - slider ①

   Cracks/damage/wear → Repalce



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

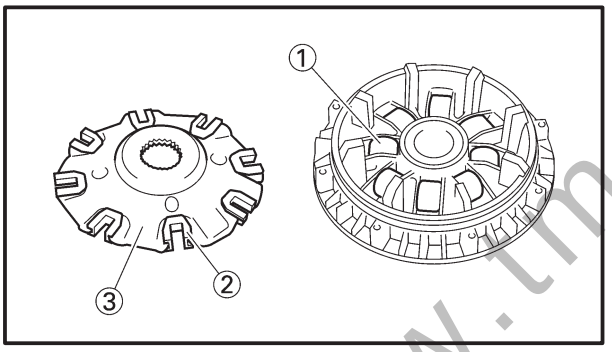
   Damage/wear → Replace the secondary fixed and sliding sheaves as a set.

ASSEMBLING THE PRIMARY SHEAVE

1. Clean:
   - primary fixed sheave
   - primary sliding sheave
   - collar
   - weight
   - slider
   - cam
   - stopper

NOTE:

Remove any excess grease.

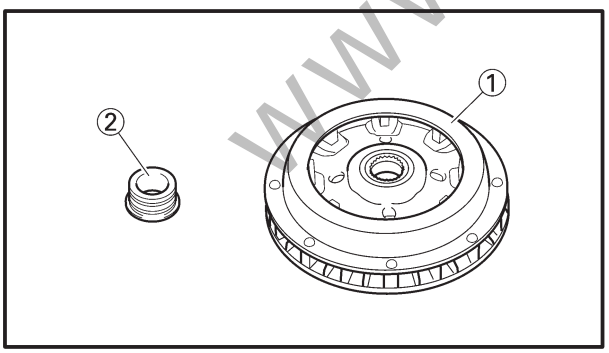


2. Install:
   - weight ①
   - slider ②
   - cam ③

NOTE:

- Before installing the weights, lubricate the inside and outside of each weight with Shell BT grease 3®.
- Put in approximately 80 g of grease.

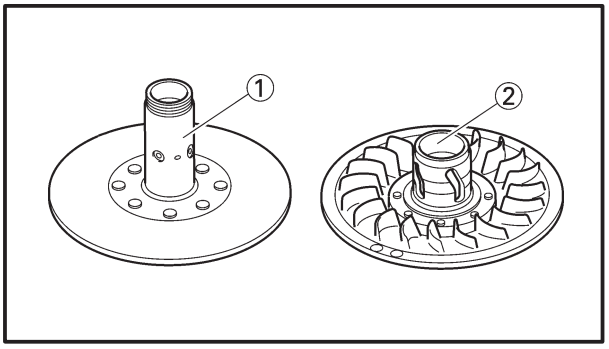
Recommended lubricant
Shell BT grease 3®

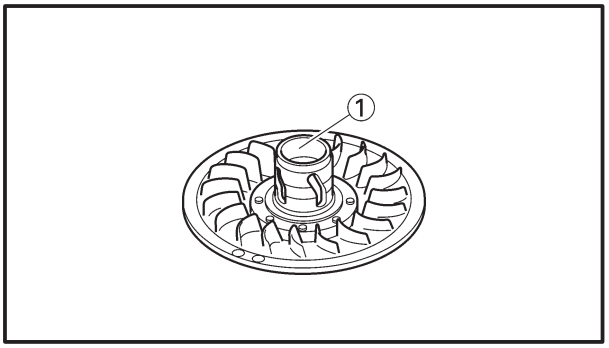


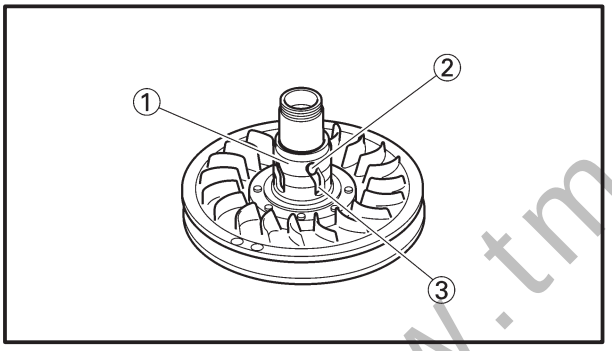
3. Install:
   - primary sliding sheave cap ①

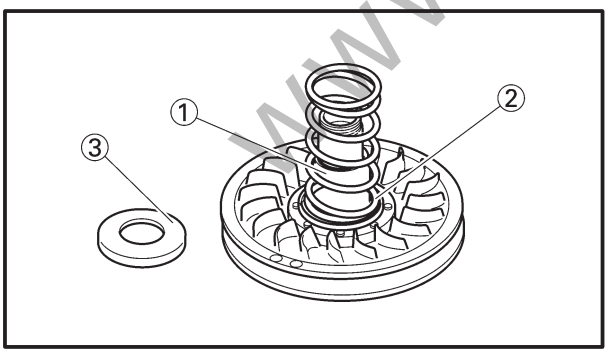
6.0 Nm (0.6 m•kg)

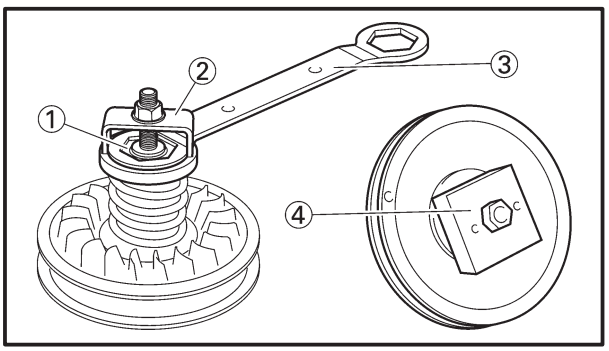
   - collar ②











EAS00324

ASSEMBLING THE SECONDARY SHEAVE

1. Lubricate:
   - secondary fixed sheave's outer and inner surface ①
   - secondary sliding sheave's outer and inner surface ②
   - grease nipple groove
   - oil seals
   - bearings

   (with the recommended lubricant)

Recommended lubricant
BEL-RAY assembly lube®

2. Install:
   - secondary sliding sheave ①

3. Install:
   - guide pin ②

4. Lubricate:
   - guide pin groove ③
   - oil seal New

   (with the recommended lubricant)

Recommended lubricant
BEL-RAY assembly lube®

5. Install:
   - spring seat ①
   - compression spring ②
   - upper spring seat ③

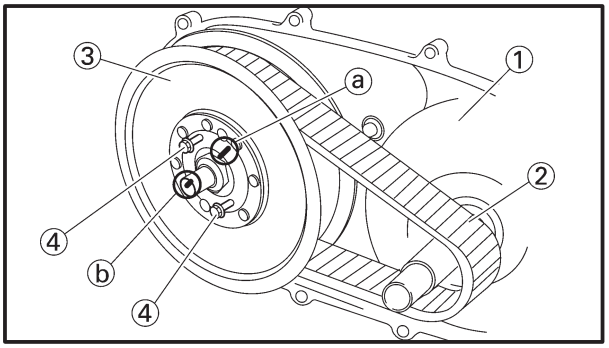
NOTE:

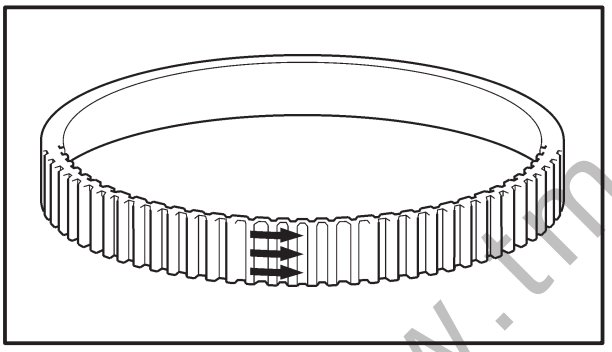
Attach the sheave spring compresser ② onto the secondary sheave as shown.
Then compress the spring, and tighten the secondary sheave nut ① with locknut wrench ③.

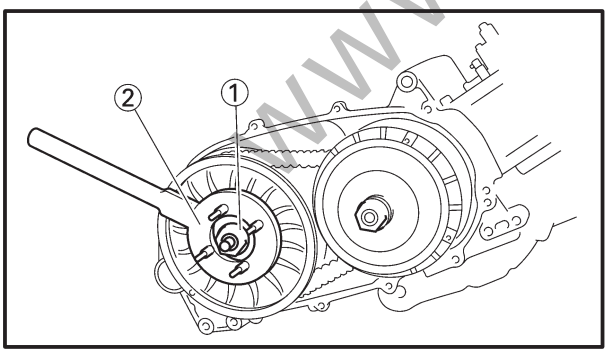
Sheave spring compresser ②
90890-04134
Locknut wrench ③
90890-01348
Sheave fixed block ④
90890-04135

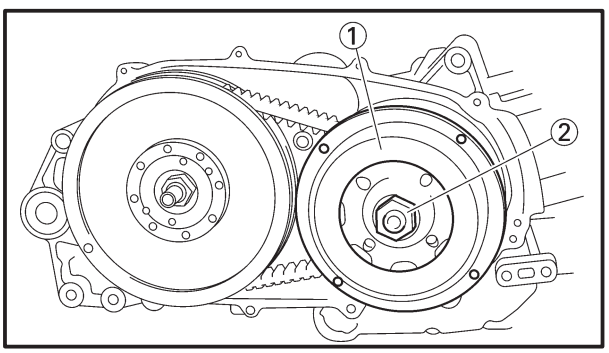
6. Tighten:
   • nut

90 Nm (9.0 m•kg)









INSTALLING THE BELT DRIVE

1. Install:
   • primary fixed sheave ①
   • V-belt ②
   • secondary sheave assembly ③

CAUTION:

Do not allow grease to contact the V-belt and secondary pulley

NOTE:

• When installing the belt, screw M6 (more than 45 mm) bolts ④ to spread apart the secondary sheave and then install the belt. Make sure the belt pullout direction is correct.
• Install the V-belt and secondary sheave assembly onto the primary sheave side.
• Align the ⓐ and ⓑ during reassembly.

2. Tighten:
   • secondary sheave nut ①

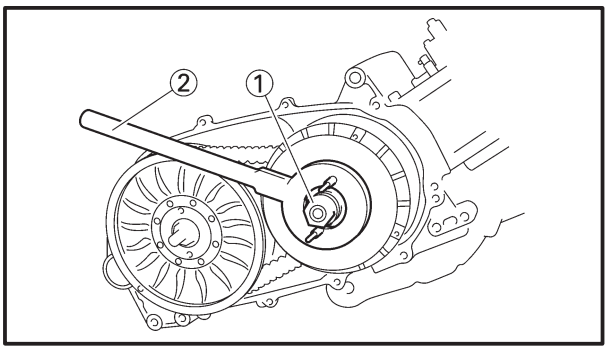
90 Nm (9.0 m•kg)

NOTE:

While holding the secondary sheave with the primary/secondary sheave holder ②, tighten the secondary sheave nut ①.

Sheave holder
90890-01481

3. Install:
   • primary sliding sheave ①
   • spacer
   • primary sheave nut ②



4. Tighten:
   • primary sheave nut ① **160 Nm (16.0 m•kg)**

CAUTION:

- **Before tightening the nut to remount the primary sheave, make sure that the serration of the cam brinells deeply into the serration of the crankshaft.**
  Also, fully tighten the nut as far as the clepths while holding down the cam so as not to allow the serration to disengage.
- **Apply grease to the thread and seat of the primary sheave nut.**

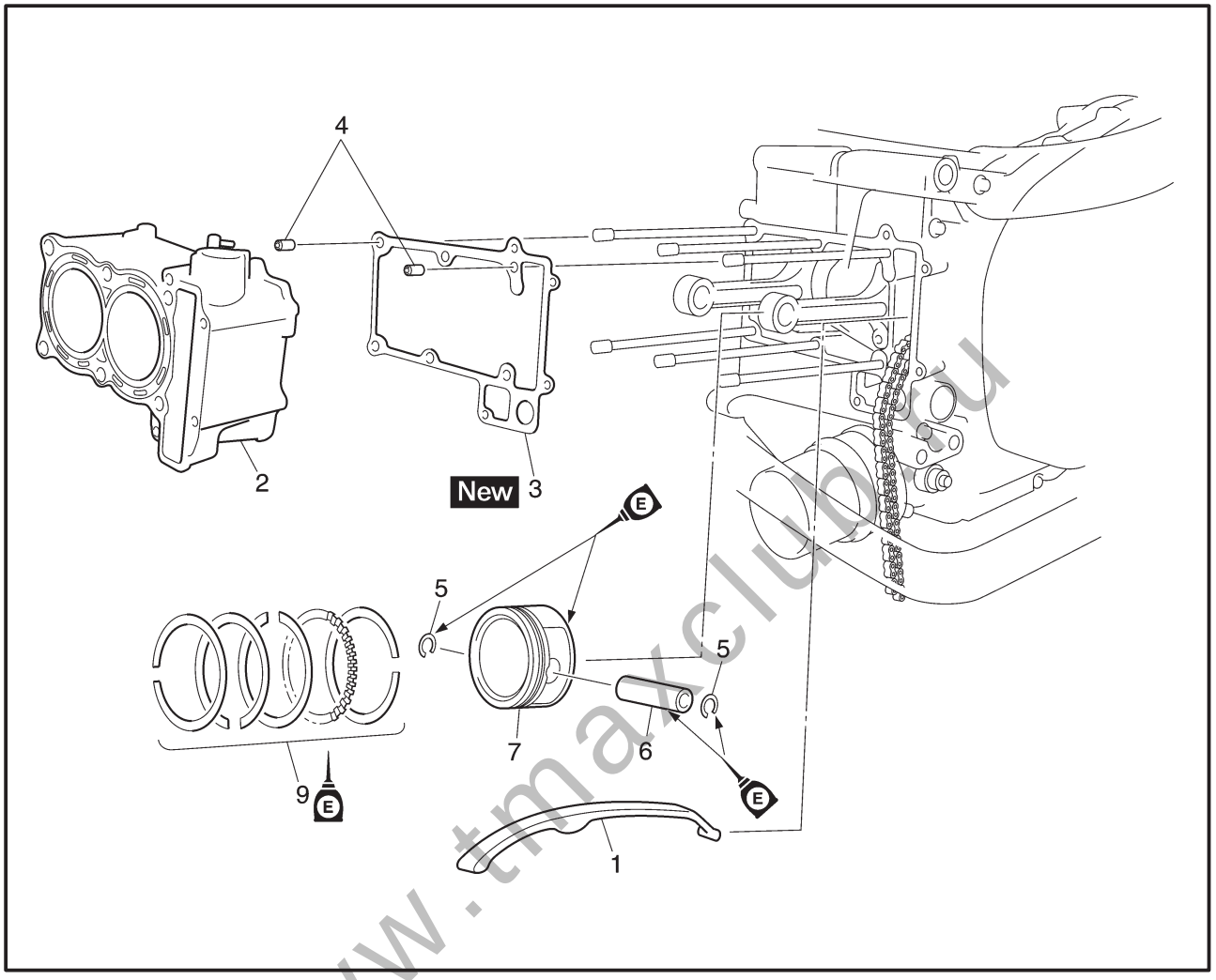
Recommended lubricant
Shell BT grease 3®

NOTE:

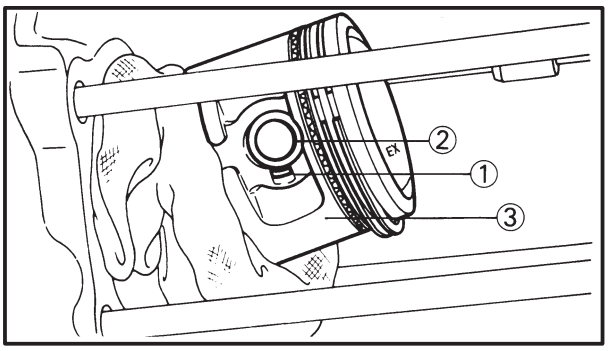
While holding the primary sheave with the primary/secondary sheave holder ②, tighten the primary sheave nut ①.

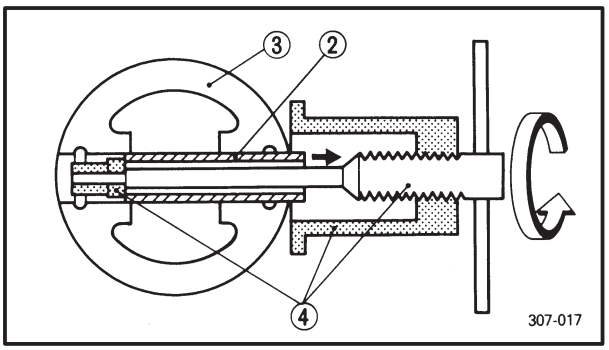
Sheave holder
90890-01481

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	Cylinder gasket	1	
4	Dowel pin	2	
5	Circlip	4	
6	Piston pin	2	
7	Piston	2	
8	Piston ring set	2	
			For installation, reverse the removal procedure.





REMOVING THE CYLINDER AND PISTON

The following procedure applies to all of the pistons.

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

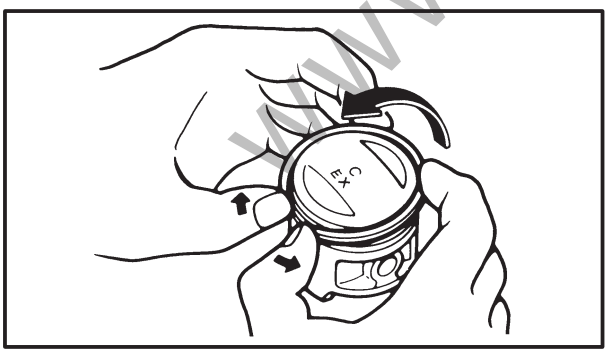
CAUTION:

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

NOTE:

- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- Before removing the piston pin, deburr the piston pin clip's groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller ④.

	Piston pin puller **90890-01304**



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

NOTE:

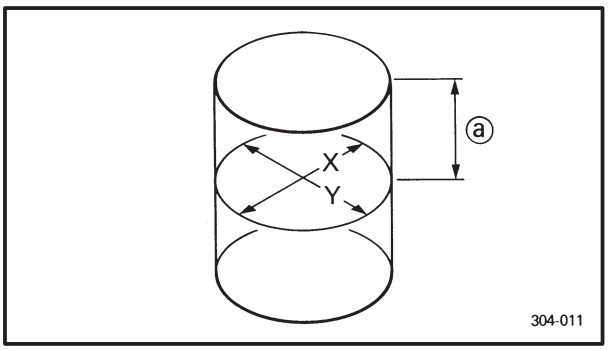
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

EAS00261

CHECKING THE CYLINDER AND PISTON

1. Check:
   - piston wall
   - cylinder wall

   Vertical scratches → Replace the cylinder, and the piston and piston rings as a set.



2. Measure:
   - piston-to-cylinder clearance

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

ⓐ 10 mm from the top of the cylinder

NOTE:

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

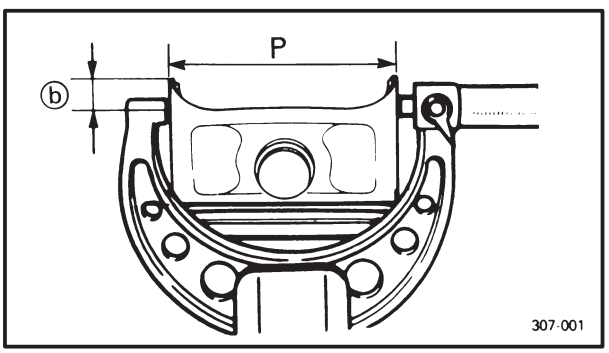
	Cylinder bore gauge **90890-03017**

Cylinder bore "C"	**66.00～66.01mm**
Max. taper "T"	**0.05 mm**
Out of round "R"	**0.05 mm**

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

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

	Micrometer **90890-03008**



b. 9 mm from the bottom edge of the piston

	Piston size "P"
Standard	**65.965 ～ 65.980 mm**

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

e. Calculate the piston-to-cylinder clearance with the following formula.

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

Piston-to-cylinder clearance
0.020 ~ 0.045 mm
<Limit>: 0.15 mm

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

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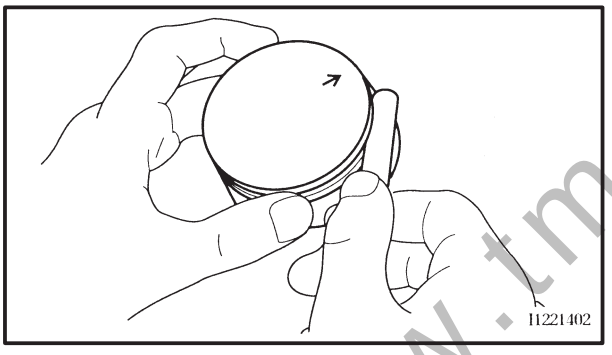


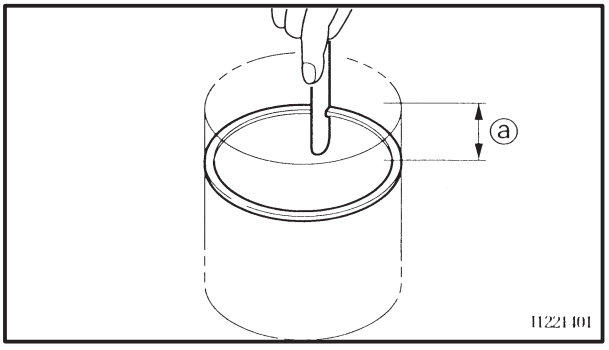
EAS00263
CHECKING THE PISTON RINGS

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

NOTE:

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

Piston ring side clearance
Top ring
0.030 ~ 0.065 mm
<Limit>: 0.115 mm
2nd ring
0.020 ~ 0.055 mm
<Limit>: 0.105 mm



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

NOTE:

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

ⓐ 10 mm

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

NOTE:

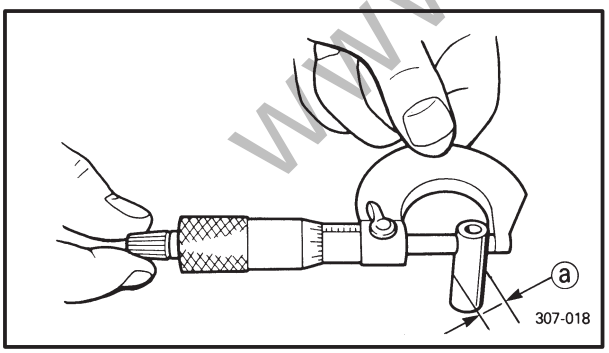
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Piston ring end gap
Top ring
0.15 ~ 0.25 mm
<Limit>: 0.5 mm
2nd ring
0.4 ~ 0.5 mm
<Limit>: 0.75 mm
Oil ring
0.10 ~ 0.35 mm

EAS00266
CHECKING THE PISTON PINS

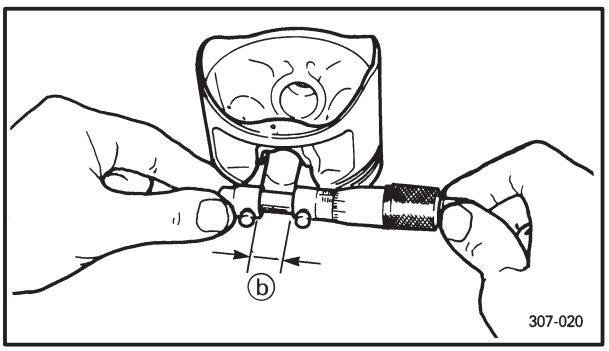
The following procedure applies to all of the piston pins.

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



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

Piston pin outside diameter ①
15.991 ~ 16.000 mm



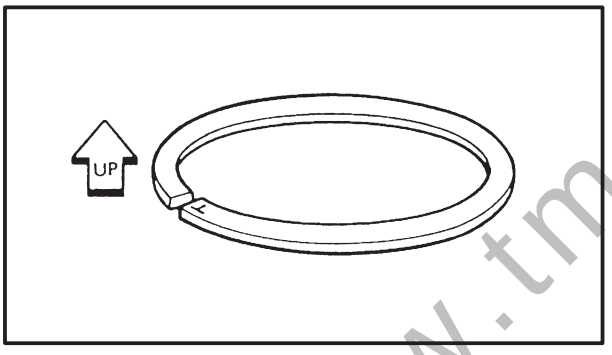
3. Measure:
   • piston pin bore diameter ⓑ (in the piston)
   Out of specification → Replace the piston pin.

Piston pin bore diameter
16.002 ~ 16.013 mm

4. Calculate:
   • piston-pin-to-piston-pin-bore clearance
   Out of specification → Replace the piston pin.

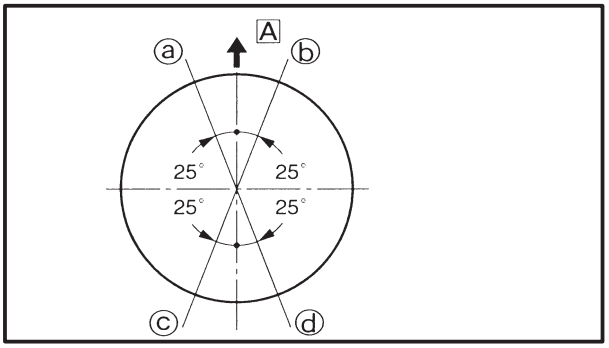
Piston-pin-to-piston-pin-bore clearance = Piston pin bore diameter (in the piston) – Piston pin outside diameter

Piston-pin-to-piston-pin-bore clearance
0.002 ~ 0.022 mm
<Limit>: 0.072 mm



EAS00271
INSTALLING THE PISTONS AND CYLINDERS
The following procedure applies to all of the pistons and cylinders.
1. Install:
   • top ring
   • 2nd ring
   • oil ring

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



2. Offset:
   • piston ring end gaps

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

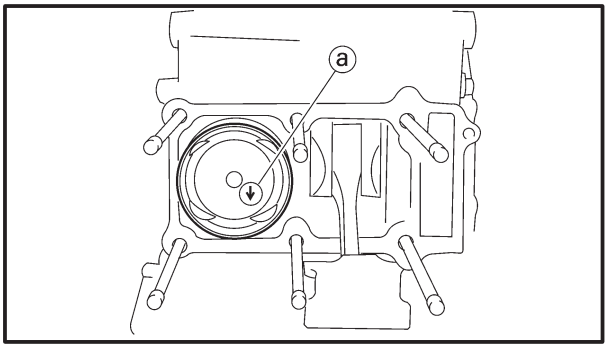
3. Lubricate:
   • piston
   • piston pin

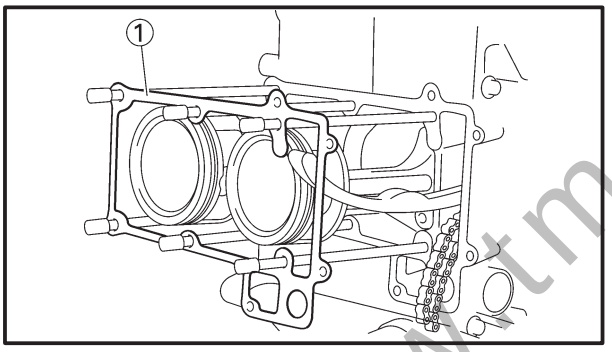
	Recommended lubricant **Engine oil**

4. Install:
   • piston ③
   • piston pin ②
   • piston pin clip New ①

NOTE:

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





5. Install:
   • gasket New ①
   • dowel pins
6. Lubricate:
   • piston
   • piston rings
   • cylinder
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

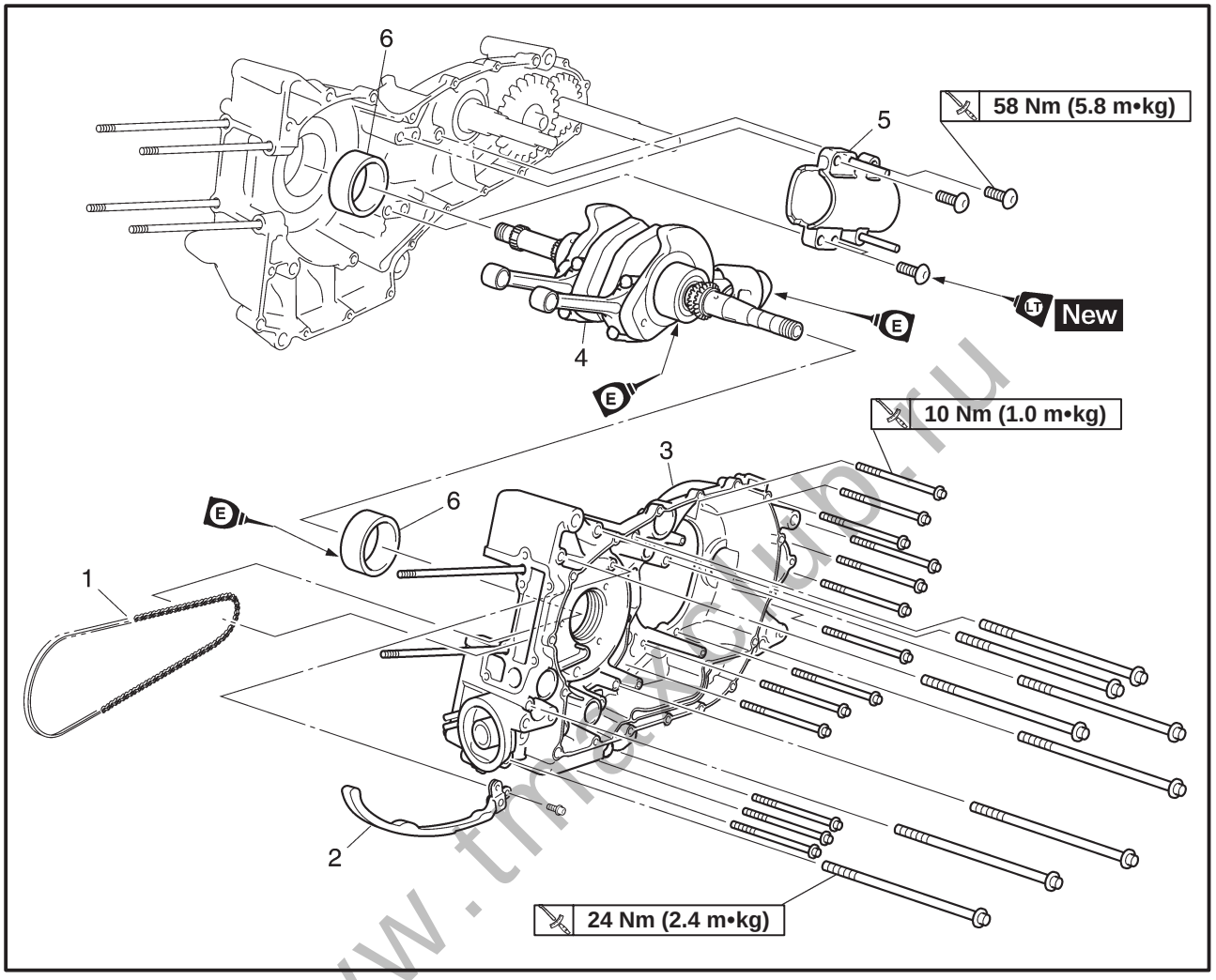
7. Install:
   • cylinder
   • timing chain guide (exhaust side)

NOTE:

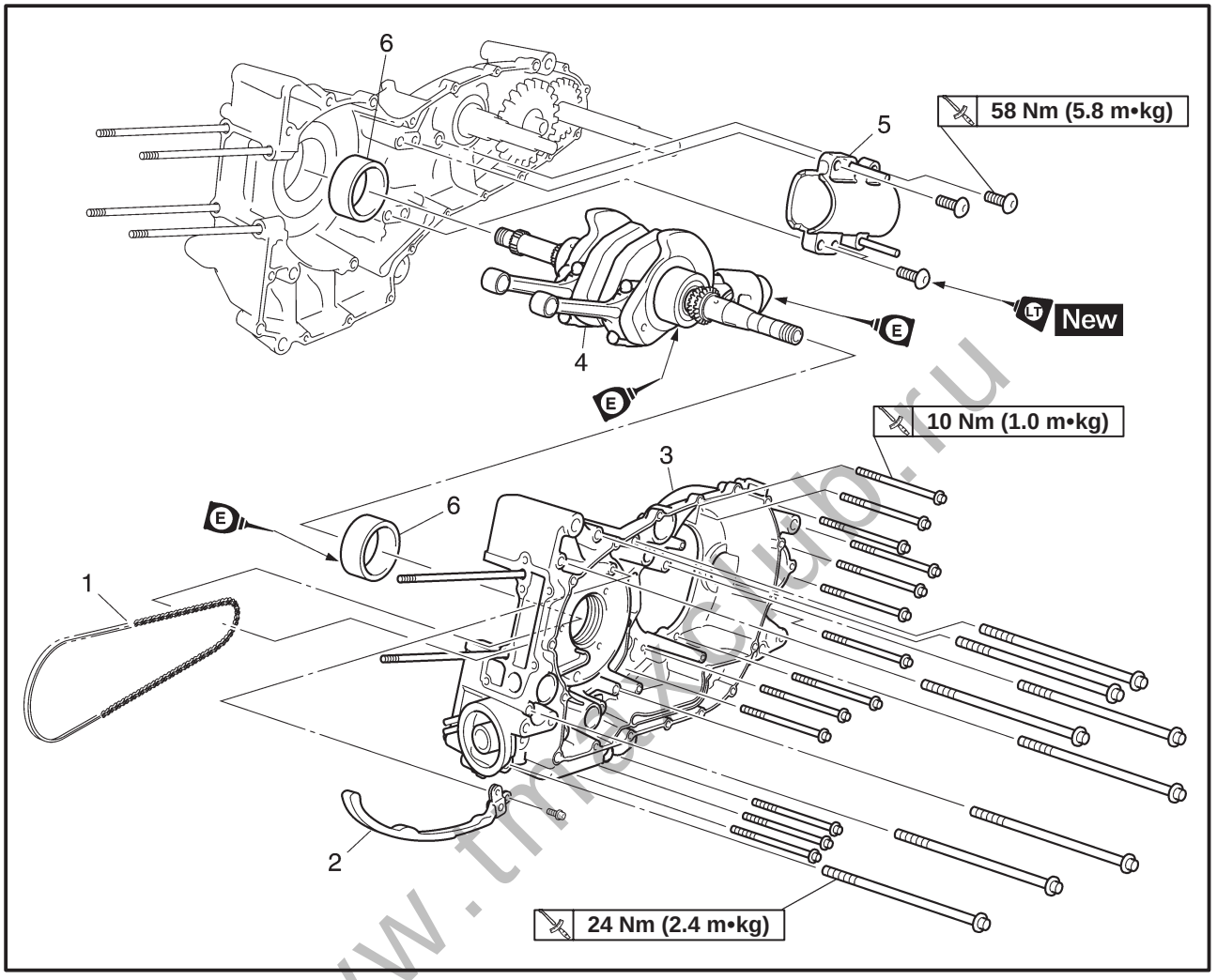
Pass the timing chain through the timing chain cavity.

CRANKCASE AND CRANKSHAFT

CRANKSHAFT ASSEMBLY

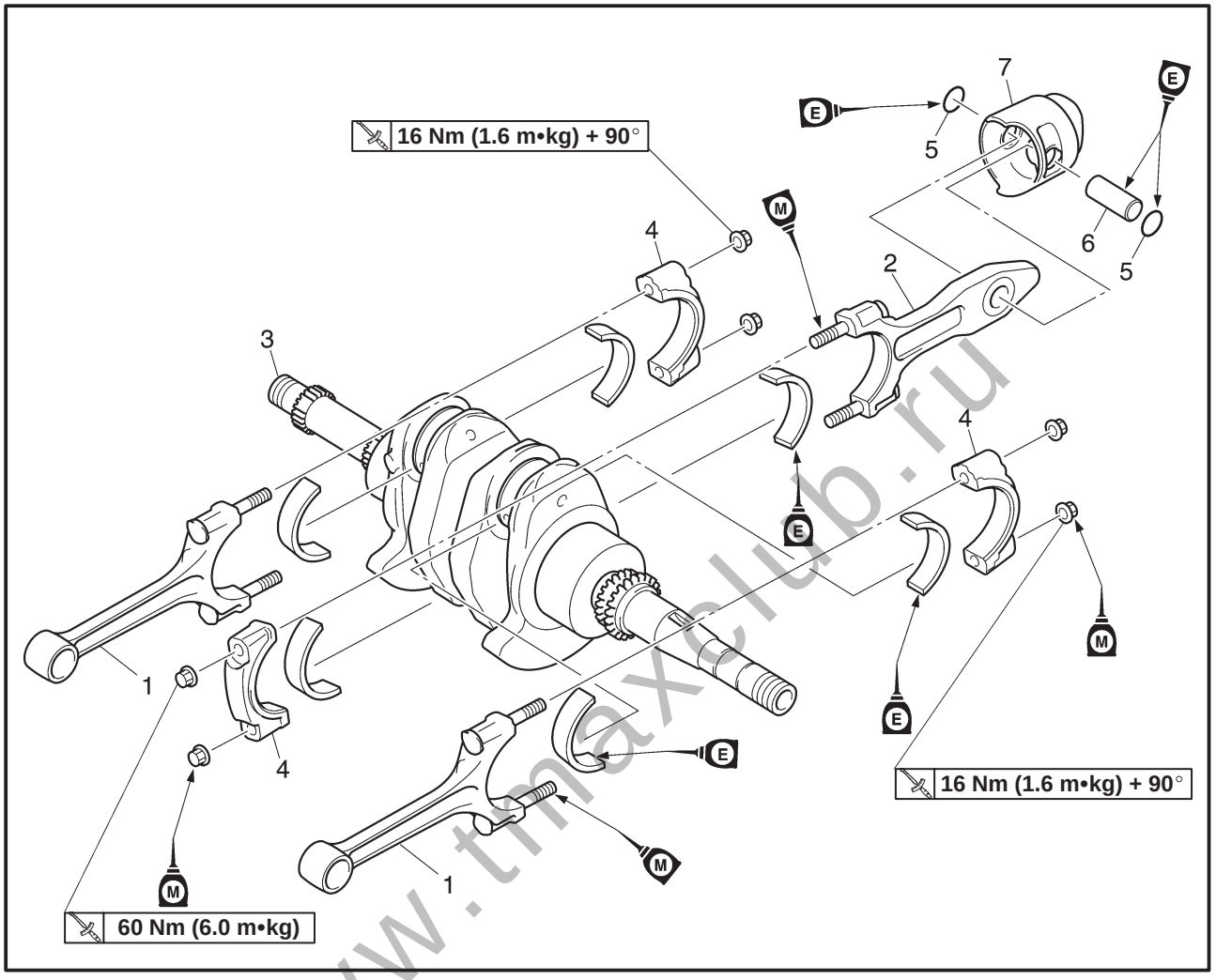


Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft assembly		Remove the parts in the order listed.
	Engine		Refer to "ENGINE".
	Cylinder head		Refer to "CYLINDER HEAD".
	Cylinder		Refer to "CYLINDER AND PISTON".
	Piston		
	Belt drive		Refer to "BELT DRIVE".
	Starter clutch		Refer to "STARTER CLUTCH AND GENERATOR".
	Generator		
	Clutch		Refer to "CLUTCH".
	Oil pump		Refer to "OIL PUMP".
1	Timing chain	1	
2	Timing chain guide (intake side)	1	

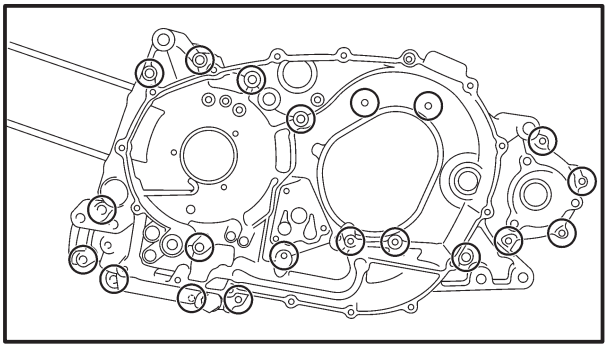


Order	Job/Part	Q'ty	Remarks
3	Crankcase (left)	1	
4	Crankshaft	1	
5	Cylinder (barancer)	1	
6	Main journal bearing	2	
			For installation, reverse the removal procedure.

CONNECTING ROD



Order	Job/Part	Q'ty	Remarks
	Removing the connecting rod		Remove the parts in the order listed.
1	Connecting rod	2	
2	Connecting rod (balancer)	1	
3	Crankshaft	1	
4	Connecting rod cap	3	
5	Circlip	2	
6	Piston pin	1	
7	Balancer piston	1	
			For installation, reverse the removal procedure.



EAS00385

DISASSEMBLING THE CRANKCASE

1. Remove:
   • crankcase bolts

NOTE:

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

2. Remove:
   • right crankcase

CAUTION:

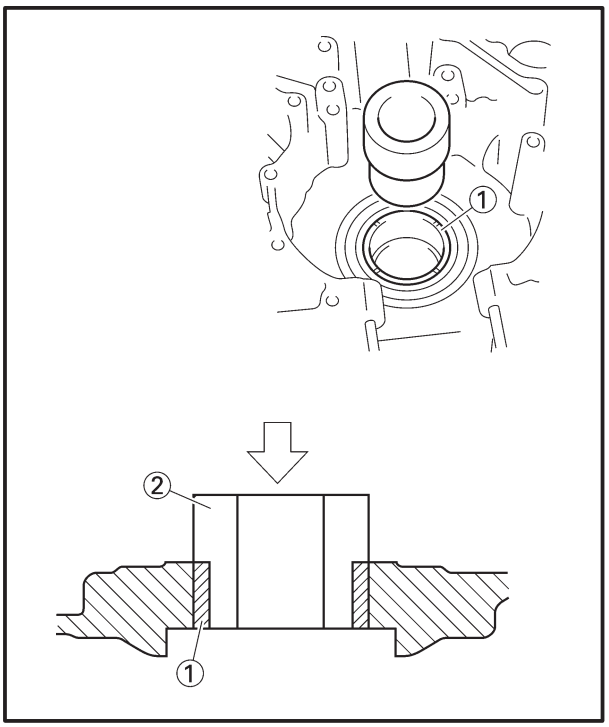
Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.

3. Remove:
   • dowel pins

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.



EAS00387

REMOVING THE CRANKSHAFT JOURNAL BEARING

1. Remove:
   - crankshaft assembly
   - crankshaft main journal bearings ①

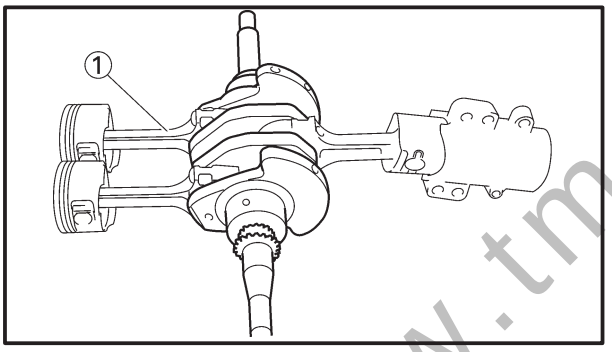
NOTE:

Remove the main journal bearing by the plane bearing installer/remover②.

Plane bearing installer/remover
90890-01439

NOTE:

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



EAS00391

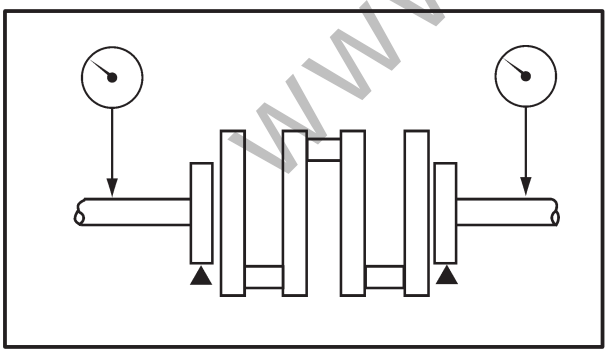
REMOVING THE CONNECTING RODS

The following procedure applies to all of the connecting rods.

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

NOTE:

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



EB413404

CHECKING THE CRANKSHAFT AND CONNECTING RODS

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

Crankshaft runout
Less than 0.05 mm

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

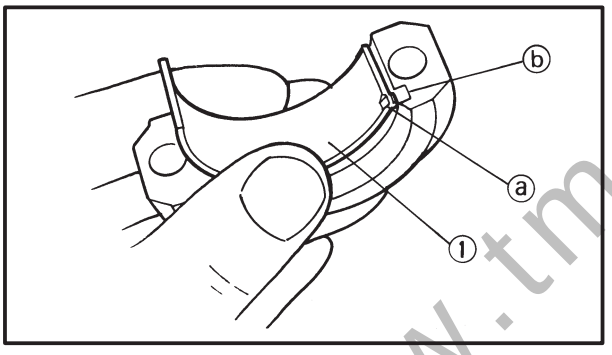
Crankshaft-pin-to-big-end-bearing clearance
0.040 ~ 0.082 mm

The following procedure applies to all of the connecting rods.

CAUTION:

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

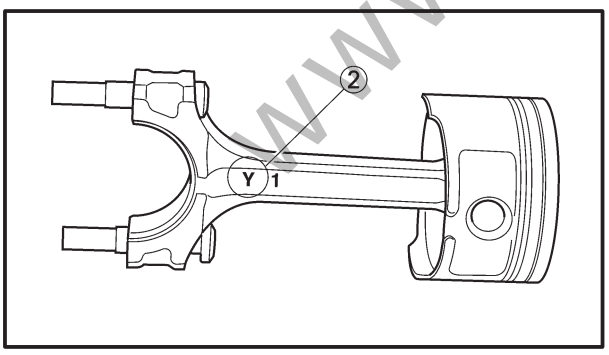
a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rod halves.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.



NOTE:

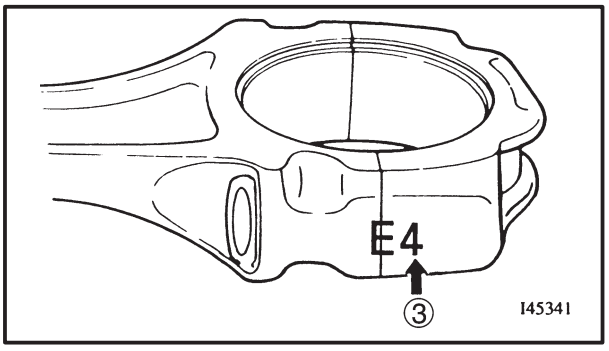
Align the projections ⓐ on the big end bearings with the notches ⓑ in the connecting rod and connecting rod cap.

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



NOTE:

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



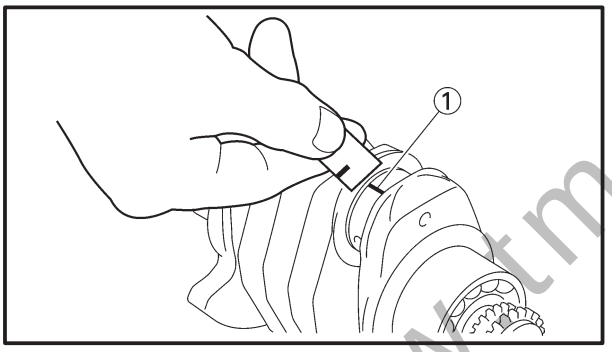
e. Tighten the connecting rod nuts.

CAUTION:

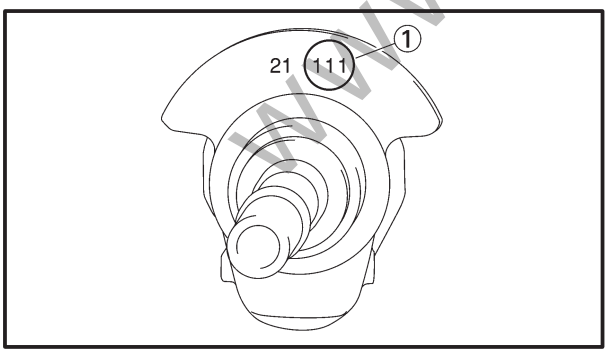
- **When tightening the connecting rod nuts, be sure to use an F-type torque wrench.**
- **After tightening the connecting rod nut to the specified torque, turn the connecting rod nut another+90°.**

Refer to "INSTALLING THE CONNECTING RODS".

	Connecting rod nut **16 Nm (1.6 m•kg)+90°**



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



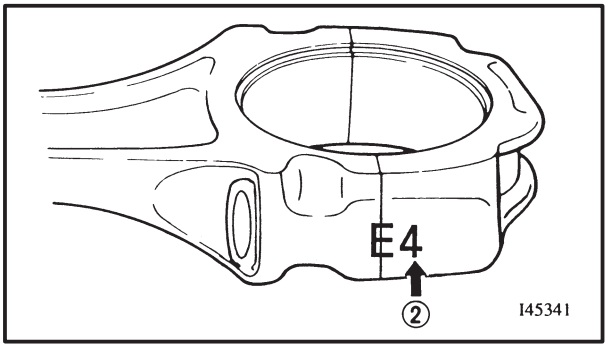
4. Select:
   - big end bearings (P_1,P_2,P_3)

NOTE:

- The numbers ① stamped into the crankshaft web and the numbers ② on the connecting rods are used to determine the replacement big end bearing sizes.
- "P_1,P_2" refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod "P_1" and the crankshaft web "P_1" numbers are "4" and "2" respectively, then the bearing size for "P_1" is:

Bearing size for "P_1":
"P_1" (connecting rod) – "P_1" (crankshaft web) =
4 – 2 = 2 (black)



BEARING COLOR CODE	
1	blue
2	black
3	brown
4	green

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

Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.04 ~ 0.082 mm

The following procedure applies to all of the journal bearing.

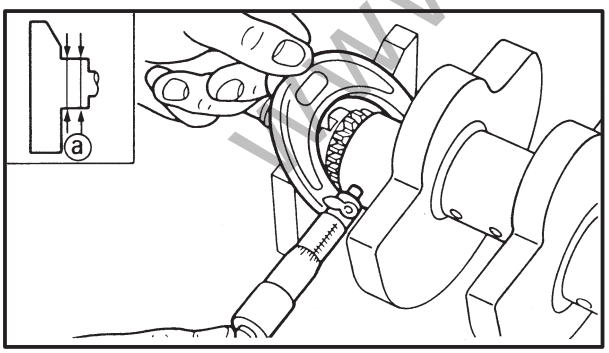
CAUTION:

On the journal, the larger value is used as a basis for calculation of the oil clearance, and on the journal bearing, the smaller value is used.

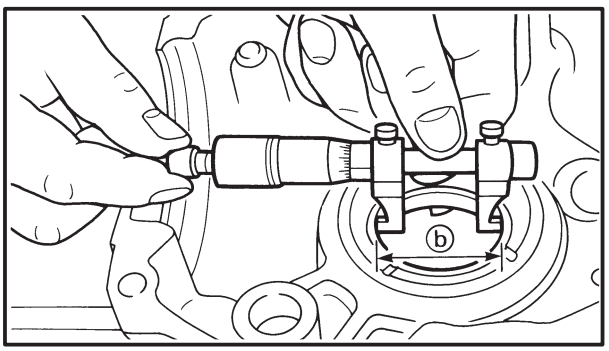
a. Clean the surface of main journal and journal bearings.
b. Check the bearing surface. If the bearing surface is worn or scratched, the bearings should be replace.

NOTE:

If either of the right or left journal bearing is worn or scratched, both bearings should be replaced as a set.



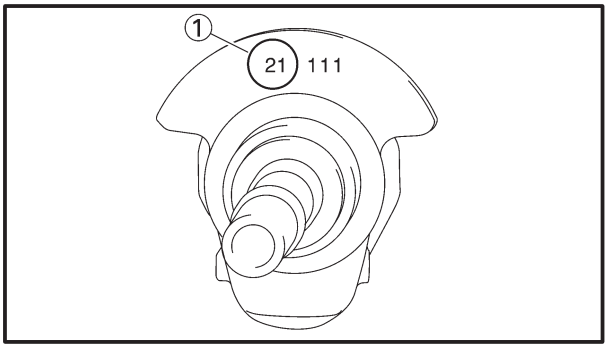
c. Measure the outside diameter ⓐ of each main journal at two places. If it is out of specification, replace the crankshaft.
d. Measure the inside diameter ⓑ of each journal bearing at two places.



e. If journal bearing inside diameter is “45.03” and crankshaft journal outside diameter is “44.98”, then the main journal oil clearance is:

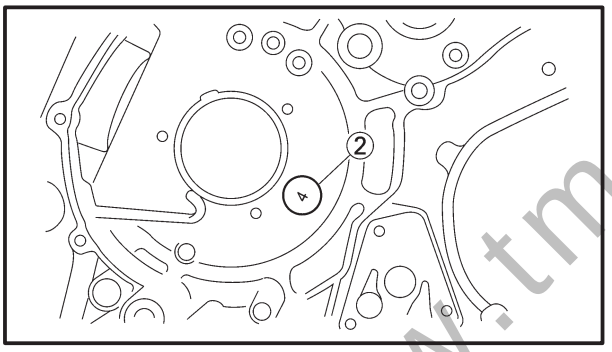
Main journal oil clearance:
Journal bearing inside diameter – Main journal outside diameter = 45.03 – 44.98 = 0.05 mm

If the oil clearance is out of specification, select a replacement bearings.



6. Select:
• crankshaft journal bearings (J_1, J_2)

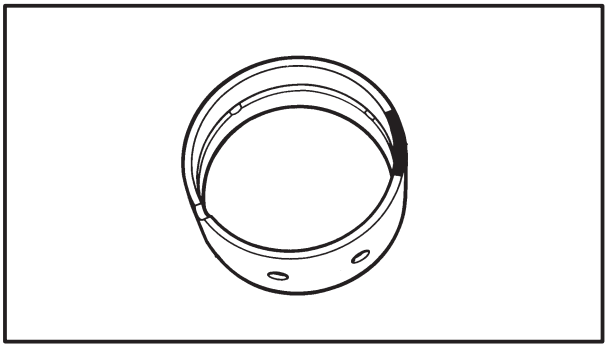
NOTE:
- The numbers ① stamped into the crankshaft web and the numbers ② on the crankcase are used to determine the replacement crankshaft journal bearing size.
- “P_1” refer to the bearings shown in the crankshaft illustration.



For example, if the crankcase “J_1” and the crankshaft web “J_1” numbers are “4” and “2” respectively, then the bearing size for “J_1” is:

Bearing size for “J_1”:
“J_1” (crankcase) – “J_1” (crankshaft web) = 4 – 2 = 2 (black)

BEARING COLOR CODE	
1	blue
2	black
3	brown
4	green



INSTALLING THE CRANKSHAFT JOURNAL BEARING

1. Attach:
   • crankshaft journal bearings

NOTE:

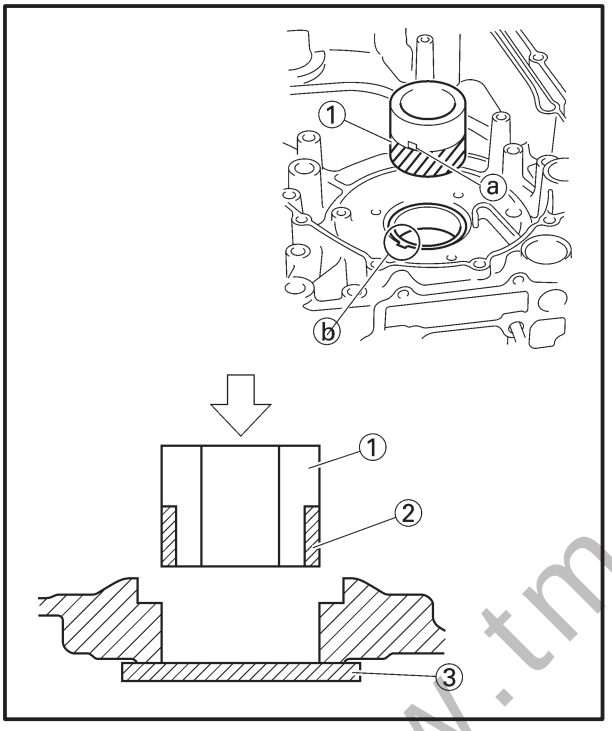
• Attach the crankshaft journal bearing to the installer ①.

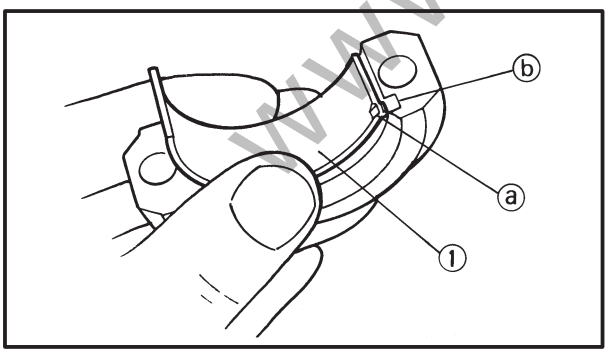
	Plane bearing installer/remover 90890-01439

2. Install:
   • crankshaft journal bearings ②

NOTE:

• align the projection ⓐ on the bearing with the projection ⓑ on the crankcase.
• Place an iron ③ plate beneath the crankcase and press fit until the end of the plain bearing installer touches the iron plate.



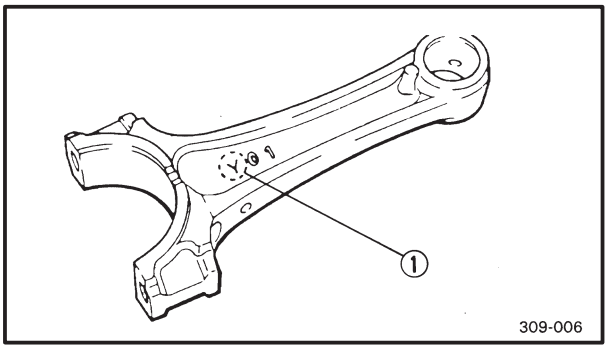


INSTALLING THE CONNECTING RODS

1. Install:
   • connecting rod bearings ①

NOTE:

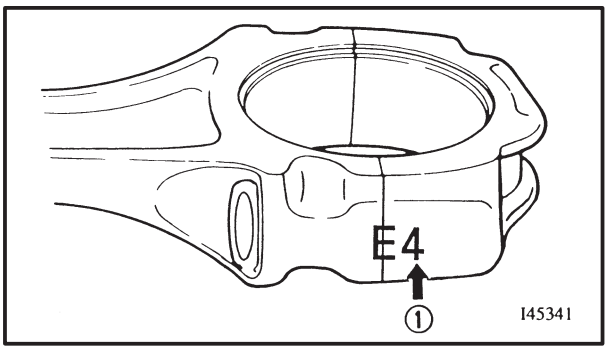
• Align the projection ⓐ of the bearings with the notches ⓑ in the connecting rod cap.
• Install each bearing in its original place.



2. Install:
   • connecting rods ①

NOTE:

• The stamped “Y” mark ⓐ on the connecting rods should face towards the left side of the crankcase.
• Install each connecting rod in its original place.



3. Install:
   • Connecting rod cap ①

NOTE:

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

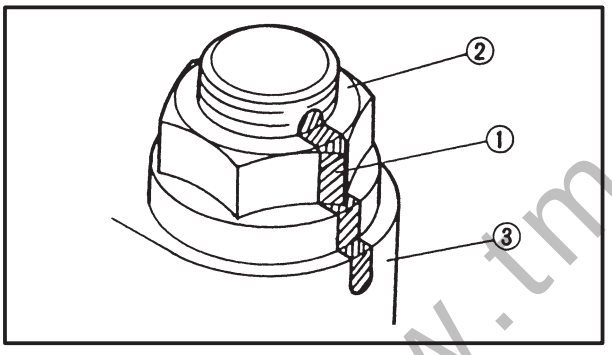
4. Tighten:
   • nuts (connecting rod cap)

16 Nm (1.6 m•kg)+90°

NOTE:

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

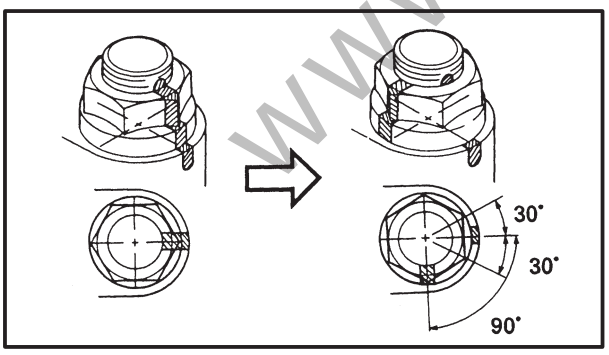
a. Replace the connecting rod bolts and nuts with new ones.



CAUTION:

Tighten the connecting rod bolts using the plastic-region tightening angle method.
Always install new bolts and nuts.

b. Clean the connecting rod bolts and nuts.
c. Tighten the connecting rod nuts.
d. Put a mark ① on the corner of the connecting rod nut ② and the connecting rod ③.
e. Tighten the nut further to reach the specified angle (90°).



⚠ WARNING

When the nut is tightened more than the specified angle, do not loosen the nut and then retighten it.
Replace the bolt with a new one and perform the procedure again.

CAUTION:

- **Do not use a torque wrench to tighten the nut to the specified angle.**
- **Tighten the nut until it is at the specified angles.**

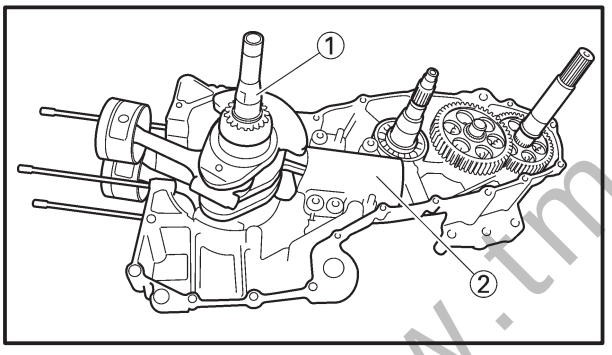
NOTE:

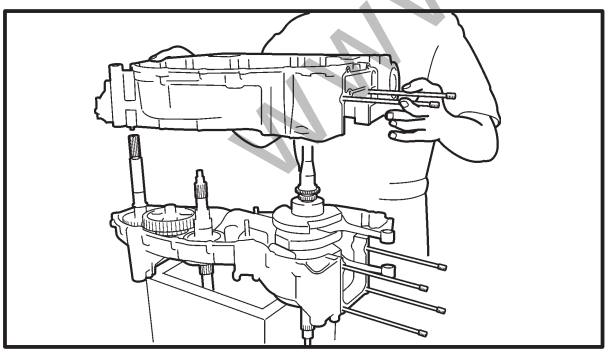
When using a hexagonal nut, note that the angle from one corner to another is 60°.

5. Install:
   • balancer connecting rod
   • connecting rod cap — 60 Nm (6.0 m•kg)

CAUTION:

- **When tightening the nuts be sure to use an F-type torque wrench.**
- **Without pausing, tighten to full torque specification. Apply continuous torque between 57 and 63 Nm (5.7 ~ 6.3 m•kg). Once you reach 57 Nm (5.7 m•kg) DO NOT STOP TIGHTENING until final torque is reached. If the tightening is interrupted between 57 and 63 Nm (5.7 ~ 6.3 m•kg) loosen the nut to less than 57 Nm (5.7 m•kg) and start again.**





INSTALLILNG THE CRANKSHAFT

1. Install:
   • crankshaft assembly ①
   • balanser piston cylinder ②

58 Nm (5.8 m•kg)

CAUTION:

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

EAS00418

ASSEMBLING THE CRANKCASE

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

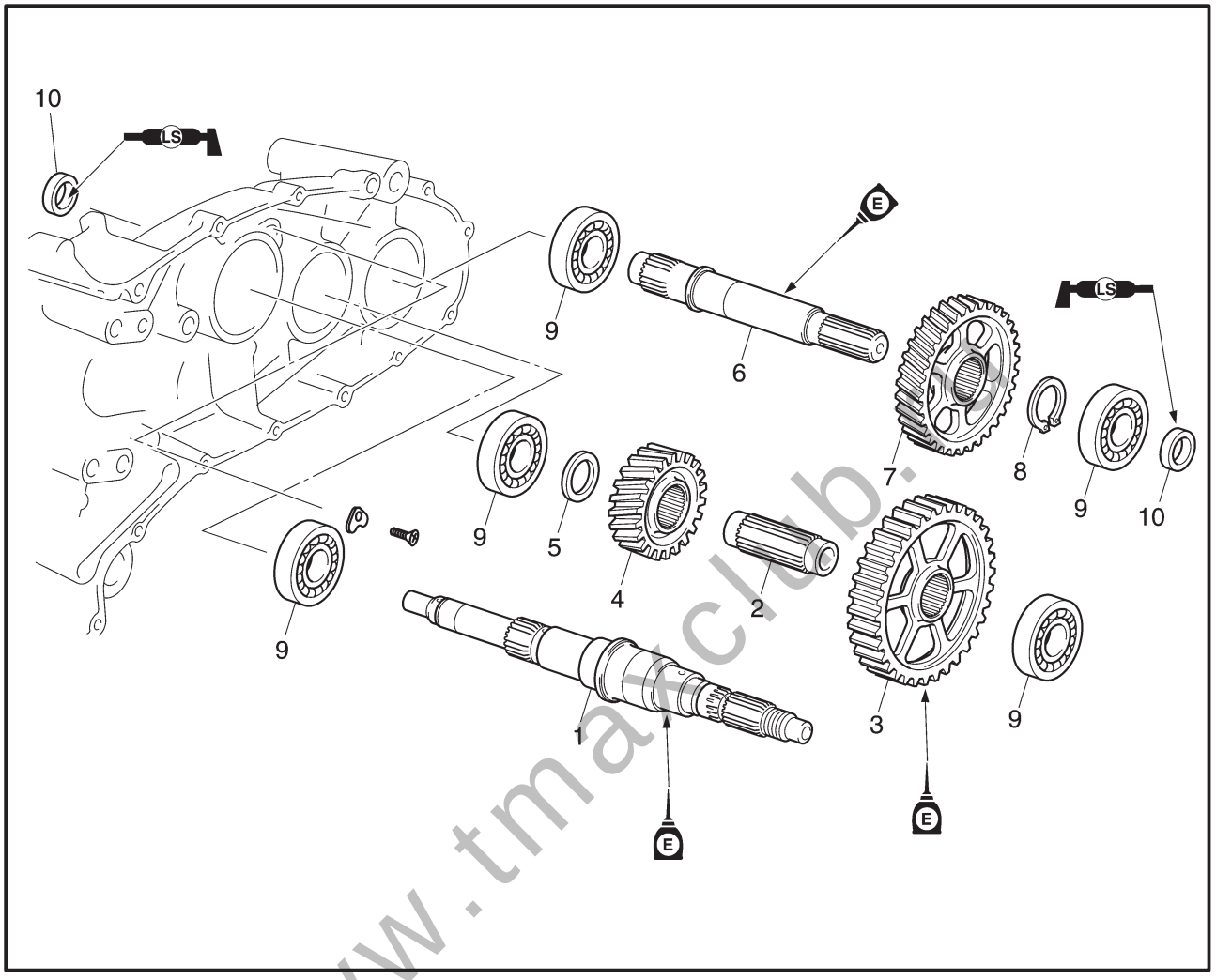
Yamaha bond No. 1215
90890-85505

NOTE:

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

3. Install:
   • dowel pins
   • crankcase (left)

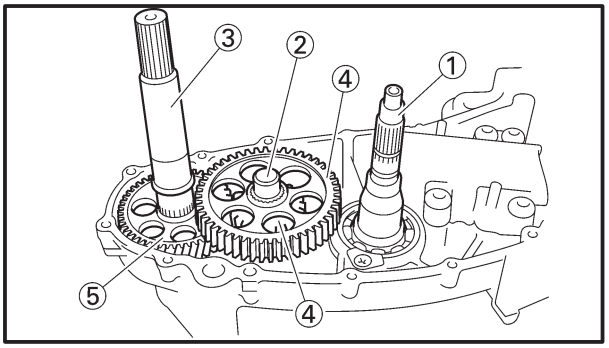
TRANSMISSION



Order	Job/Part	Q'ty	Remarks
	Removing the transmission Crankcase (left)		Remove the parts in the order listed. Refer to "CRANKCASE AND CRANKSHAFT".
1	Secondary shaft	1	
2	Main axle	1	
3	Primary driven gear	1	
4	First pinion gear	1	
5	Washer	1	
6	Drive axle	1	
7	First wheel gear	1	
8	Circlip	1	
9	Bearing	5	
10	Oil seal	2	
			For installation, reverse the removal procedure.

REMOVING THE TRANSMISSION

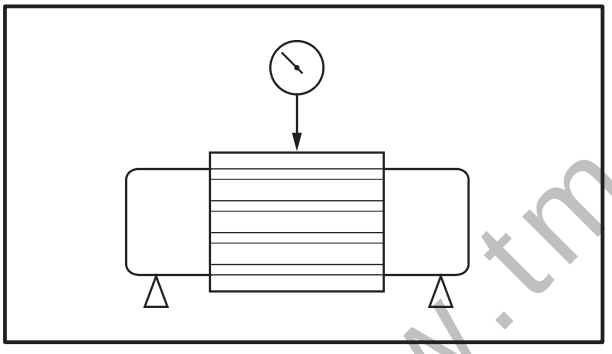
1. Remove:
   • crankcase (left)
   Refer to "CRANKCASE AND CRANKSHAFT".
2. Remove:
   • secondary shaft ①
   • main axle ②
   • drive axle ③
   • primary driven gear ④
   • first pinion gear ⑤
   • first wheel gear ⑥



EAS00425

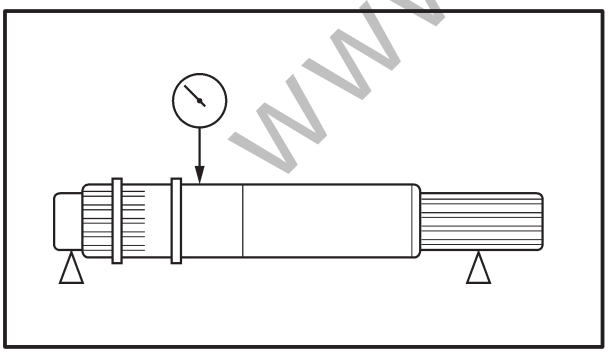
CHECKING THE TRANSMISSION

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



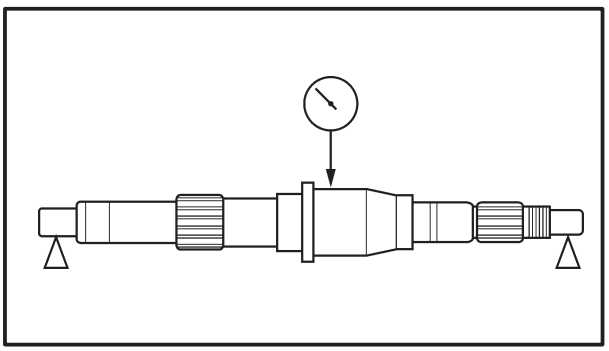
	Max. main axle runout **0.08 mm**

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

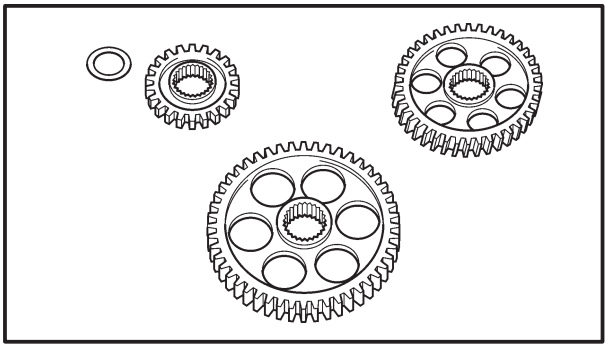


	Max. drive axle runout **0.08 mm**

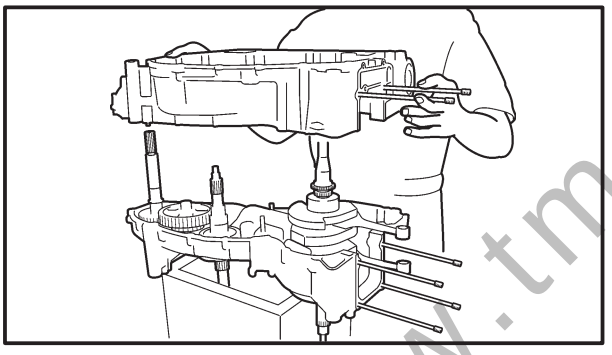
3. Measure:
   • secondary shaft runout
   (with a centering device and dial gauge ①)
   Out of specification → Replace the secondary shaft.



	Max. secondary shaft runout limit **0.08 mm**



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



EAS00418
ASSEMBLING THE CRANKCASE

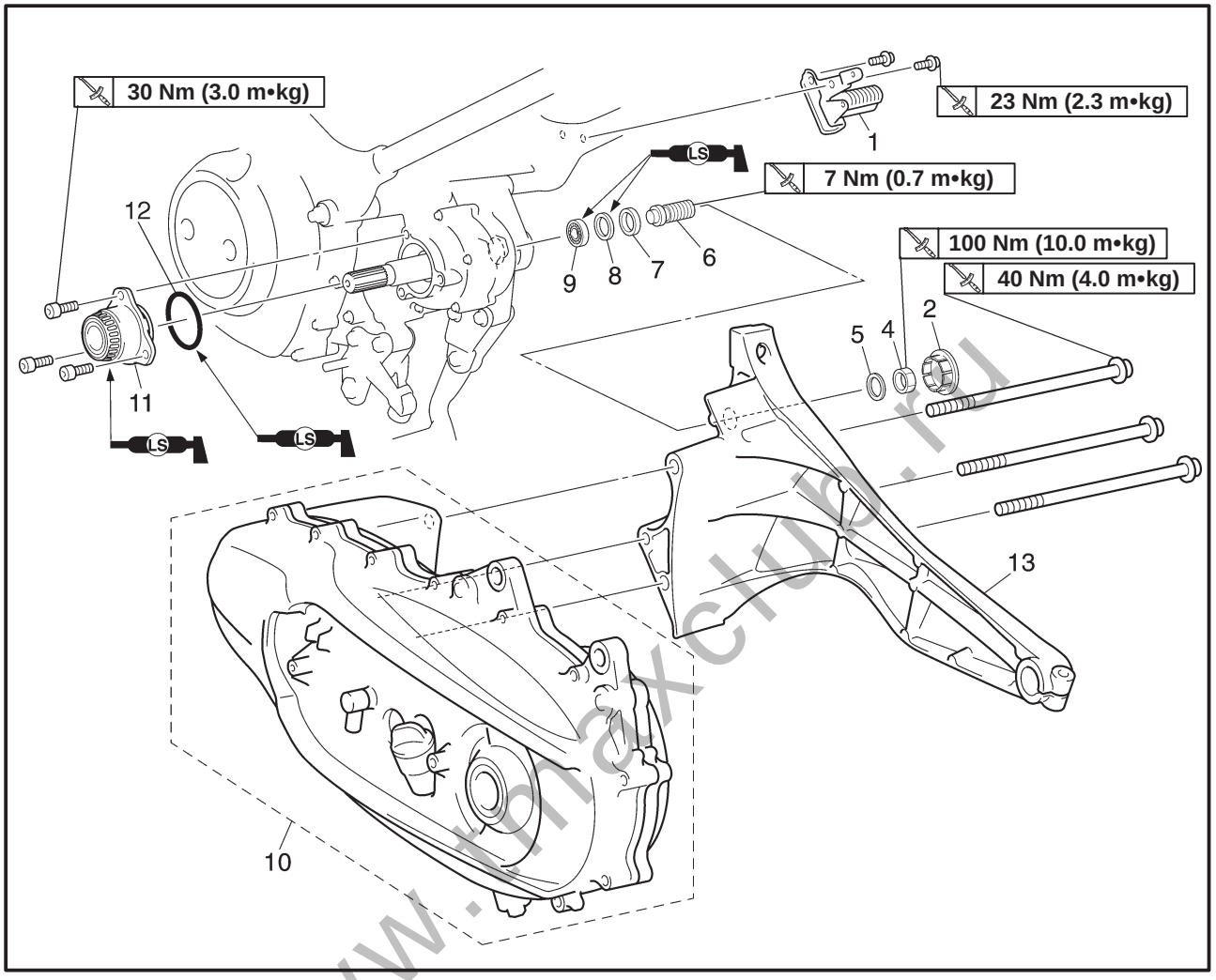
1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
   • sealant
   (onto the crankcase mating surfaces)

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

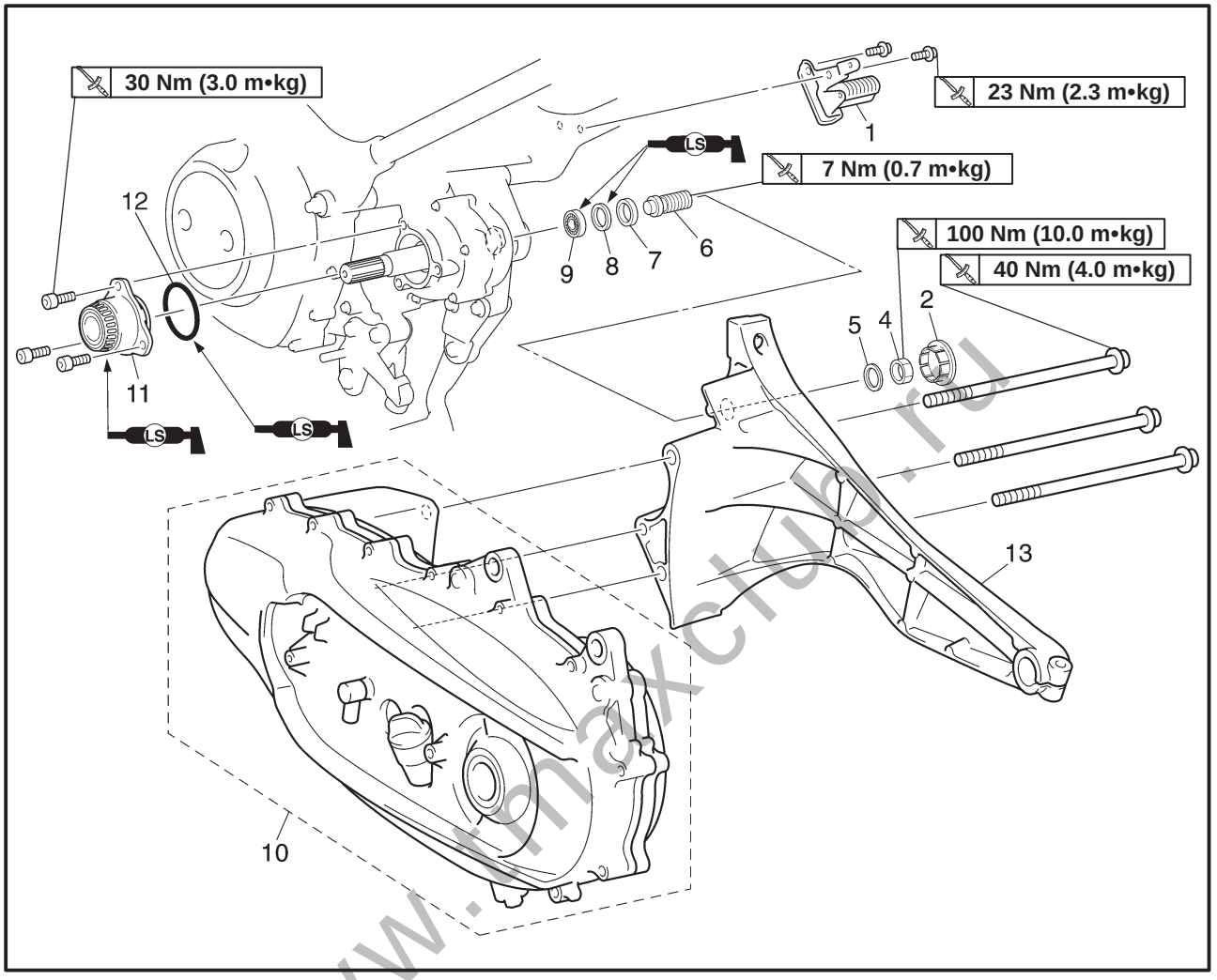
NOTE:
Do not allow any sealant to come into contact with the oil gallery.

3. Install:
   • dowel pins
   • crankcase (left)

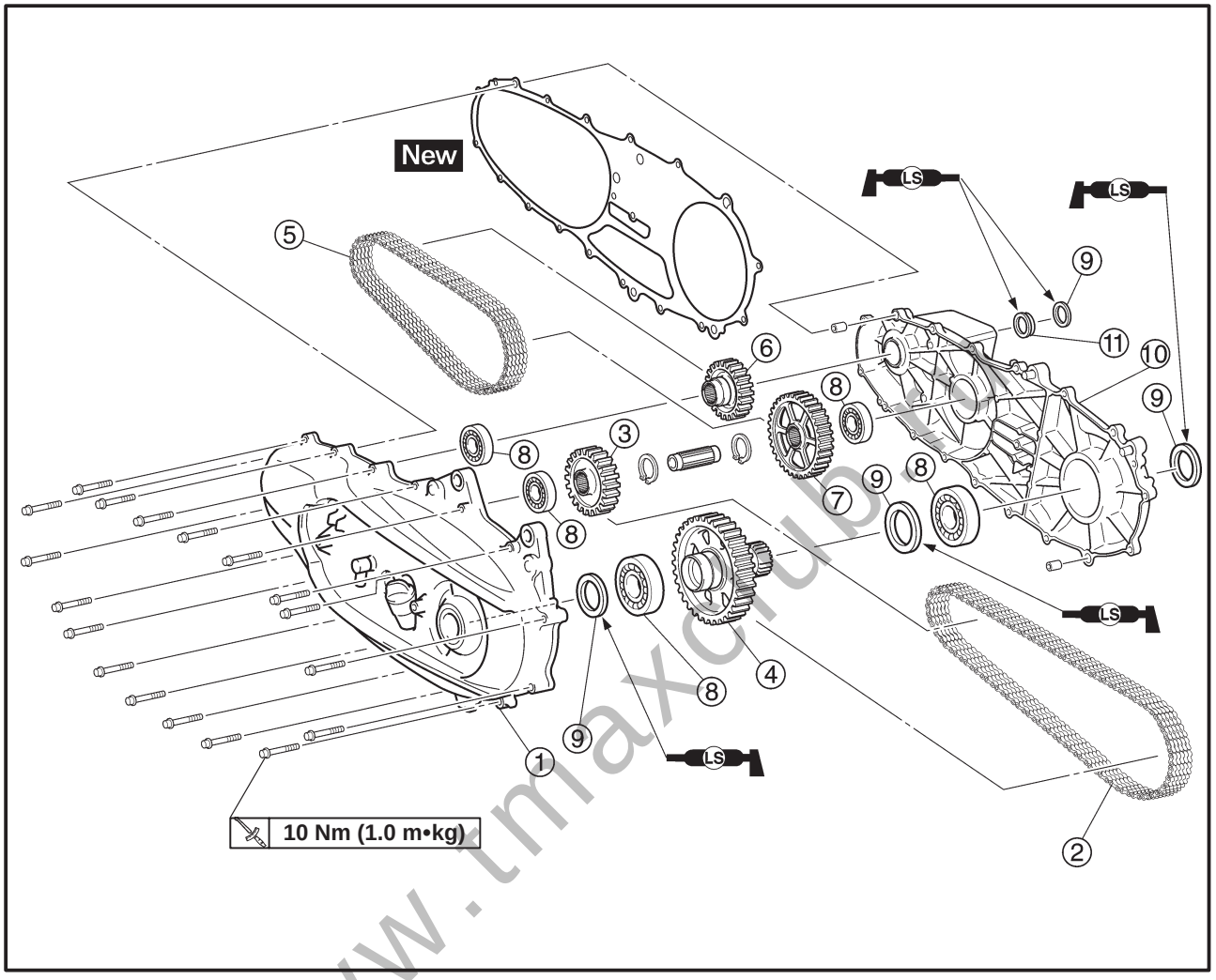
CHAIN DRIVE



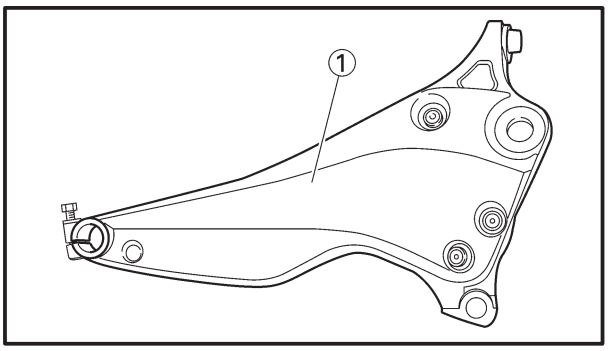
Order	Job/Part	Q'ty	Remarks
	Removing the chain drive assembly		Remove the parts in the order listed.
	Chain drive oil		Drain. Refer to "CHANGING THE TRANSFER OIL" in chapter 3.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER" in chapter 4.
	Rear wheel		Refer to "REAR WHEEL AND BRAKE DISC" in chapter 4.
1	Rear footrest (right)	1	
2	Cover	1	
3	Swingarm	1	
4	Nut	1	
5	Washer	1	
6	Pivot shaft	1	



Order	Job/Part	Q'ty	Remarks
7	Collar	1	
8	Oil seal	1	
9	Bearing	1	
10	Chain drive assembly	1	
11	Holder	1	
12	O ring	1	
			For installation, reverse the removal procedure.

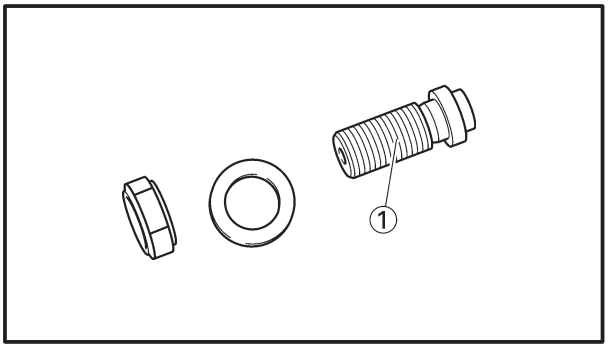


Order	Job/Part	Q'ty	Remarks
	Disassembling the chain drive assembly		Disassemble the parts in the order listed.
①	Chain drive case (outer)	1	
②	Secondary drive chain	1	
③	Secondary drive gear	1	
④	Secondary driven gear	1	
⑤	Primary drive chain	1	
⑥	Primary drive gear	1	
⑦	Primary driven gear	1	
⑧	Bearing	5	
⑨	Oil seal	4	
⑩	Chain drive case (inner)	1	
⑪	Retainer	1	
			For assembly, reverse the disassembly procedure.

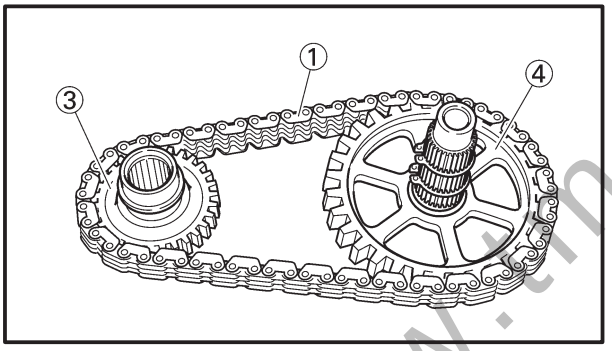


CHECKING THE SWINGARM

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

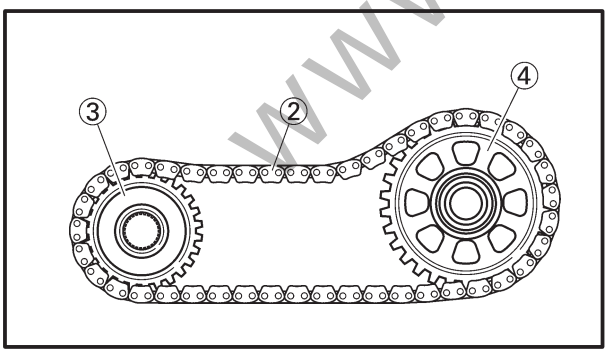


2. Check:
   - pivot shaft ①
   - collar
   - bearing
   - oil seal
     Damage/wear → Replace.

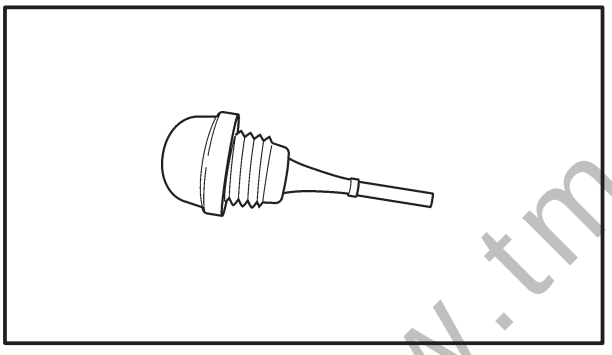


CHECKING THE CHAIN DRIVE ASSEMBLY

1. Check:
   - primary drive chain ①
   - secondary drive chain ②
     Damage/stiffness → Replace the drive chain and its respective gears as a set.



2. Check:
   - primary/secondary drive gear ③
   - primary/secondary driven gear ④
     Damage/wear → Replace the respective drive gears and respective drive chains as a set.



INSTALLING THE CHAIN DRIVE

1. Install:
   - chain drive assembly
   - swingarm
2. Tighten:
   - swingarm bolt — **40 Nm (4.0 m•kg)**
3. Adjust:
   - pivot shaft

NOTE:

- With your fingers, screw in the pivot shaft until it touches the collar and then tighten the pivot shaft to the tightening torque.
- Tighten the nut to the tightening torque.
- Install the shock absorber and rear wheel after the swingarm is installed.

4. Fill:
   - chain drive oil
5. Check:
   - chain drive oil level
     Refer to “CHECKING THE TRANSFER OIL LEVEL” in chapter 3.

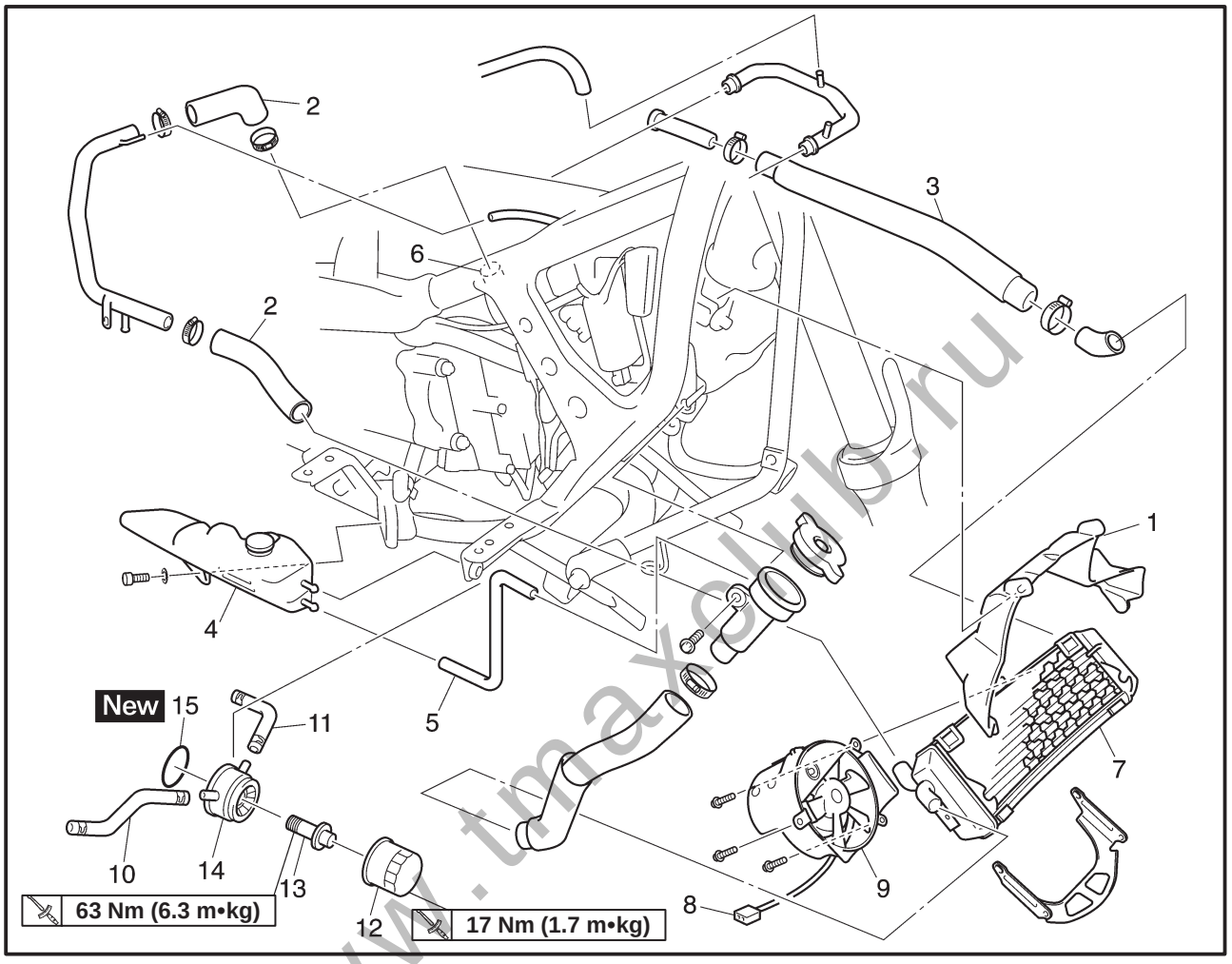
COOL 6

CHAPTER 6
COOLING SYSTEM

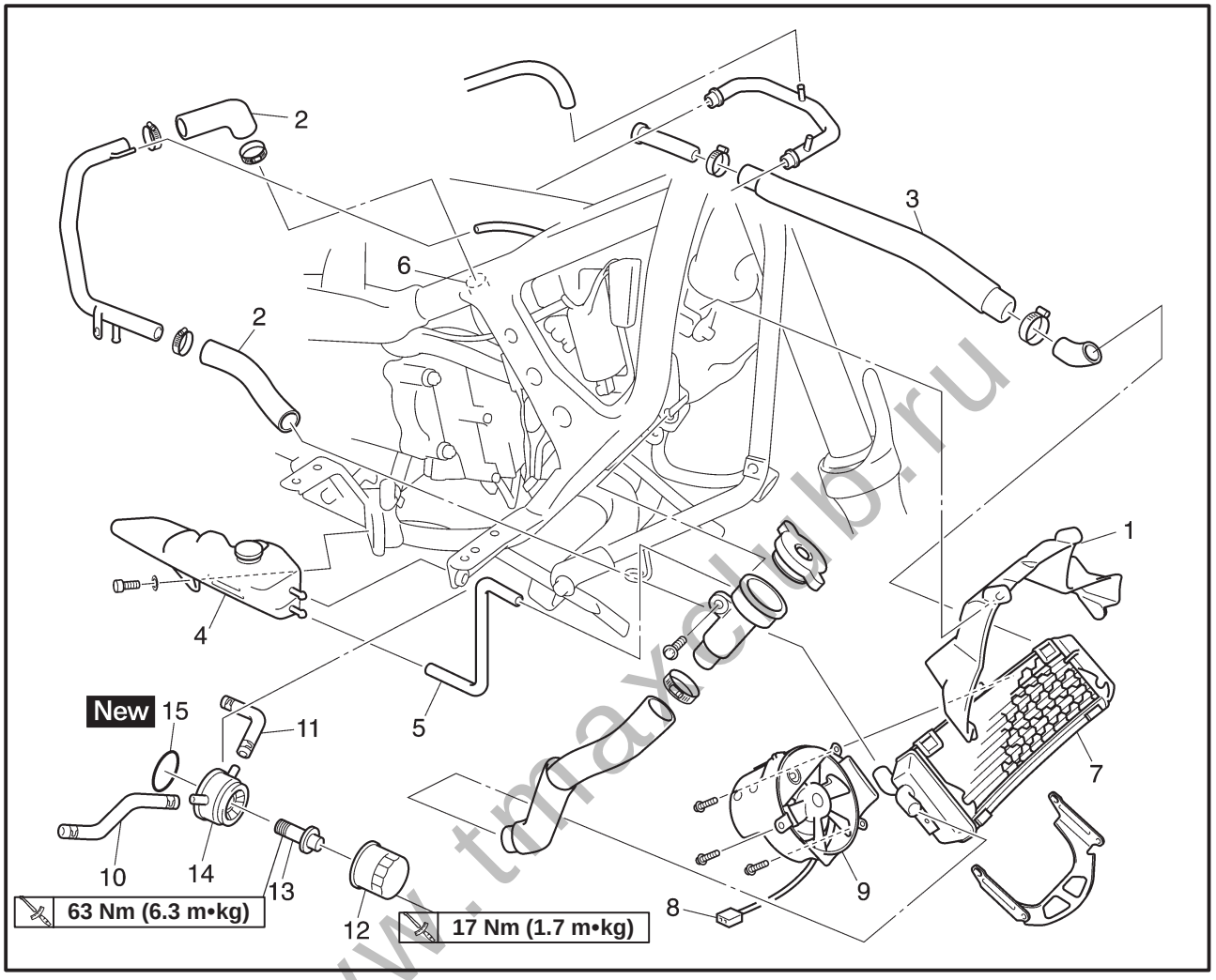
COOLING SYSTEM

RADIATOR

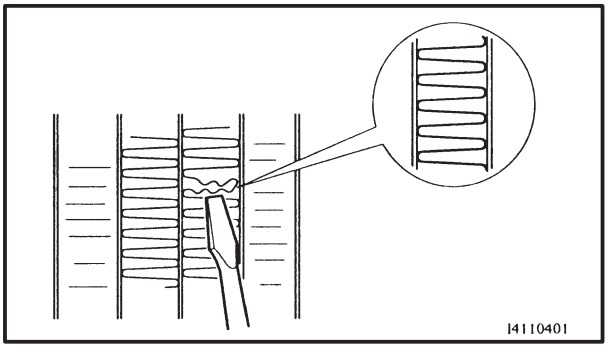
RADIATOR AND OIL COOLER



Order	Job/Part	Q'ty	Remarks
	Removing the radiator and oil cooler		Remove the parts in the order listed.
	Footrest board		Refer to "COVER AND PANEL" in chapter 3.
	Lower cover		
	Side panel		
	Leg shield		
	Coolant		Drain.
1	Inner fender (rear)	1	
2	Radiator hose	2	
3	Radiator outlet hose	1	
4	Coolant reservoir tank	1	
5	Coolant reservoir hose	1	
6	Thermo	1	



Order	Job/Part	Q'ty	Remarks
7	Radiator	1	
8	Radiator fan coupler	1	
9	Radiator fan	1	
10	Oil cooler inlet hose	1	
11	Oil cooler outlet hose	1	
12	Oil filter	1	
13	Bolt	1	
14	Oil cooler	1	
15	O-ring	1	
			For installation, reverse the removal procedure.



EAS00455
CHECKING THE RADIATOR

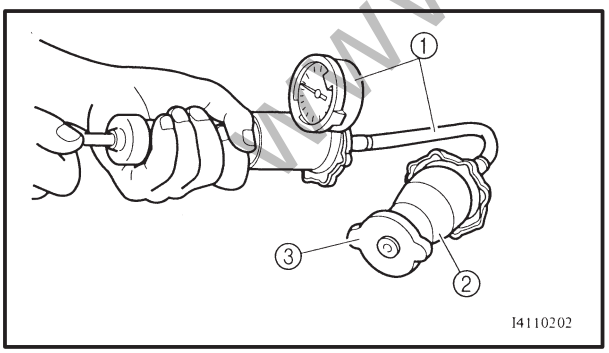
1. Check:
   • radiator fins
   Obstruction → Clean.
   Apply compressed air to the rear of the radiator.
   Damage → Repair or replace.

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

2. Check:
   • radiator hoses
   Cracks/damage → Replace.

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

Radiator cap opening pressure
107.9 ~ 137.3 kPa
(1.08 ~ 1.37 kg/cm²)



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

Radiator cap tester
90890-01325
Adapter
90890-01352

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

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

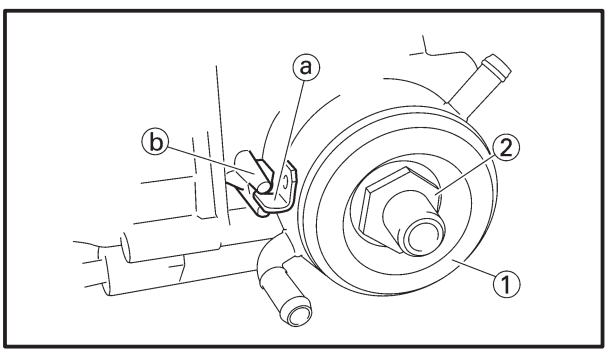
EAS00456
INSTALLING THE RADIATOR
1. Fill:
   • cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” in chapter 3.
2. Check:
   • cooling system
   Leaks → Repair or replace any faulty part.
3. Measure:
   • radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to “CHECKING THE RADIATOR”.

EAS00458
CHECKING THE OIL COOLER
1. Check:
   • oil cooler
   Cracks/damage → Replace.
2. Check:
   • oil cooler inlet hose
   • oil cooler outlet hose
   Cracks/damage/wear → Replace.

EAS00459
INSTALLING THE OIL COOLER
1. Clean:
   • mating surfaces of the oil cooler and the crankcase
   (with a cloth dampened with lacquer thinner)
2. Install:
   • O-ring New
   • oil cooler ①
   • bolt ②

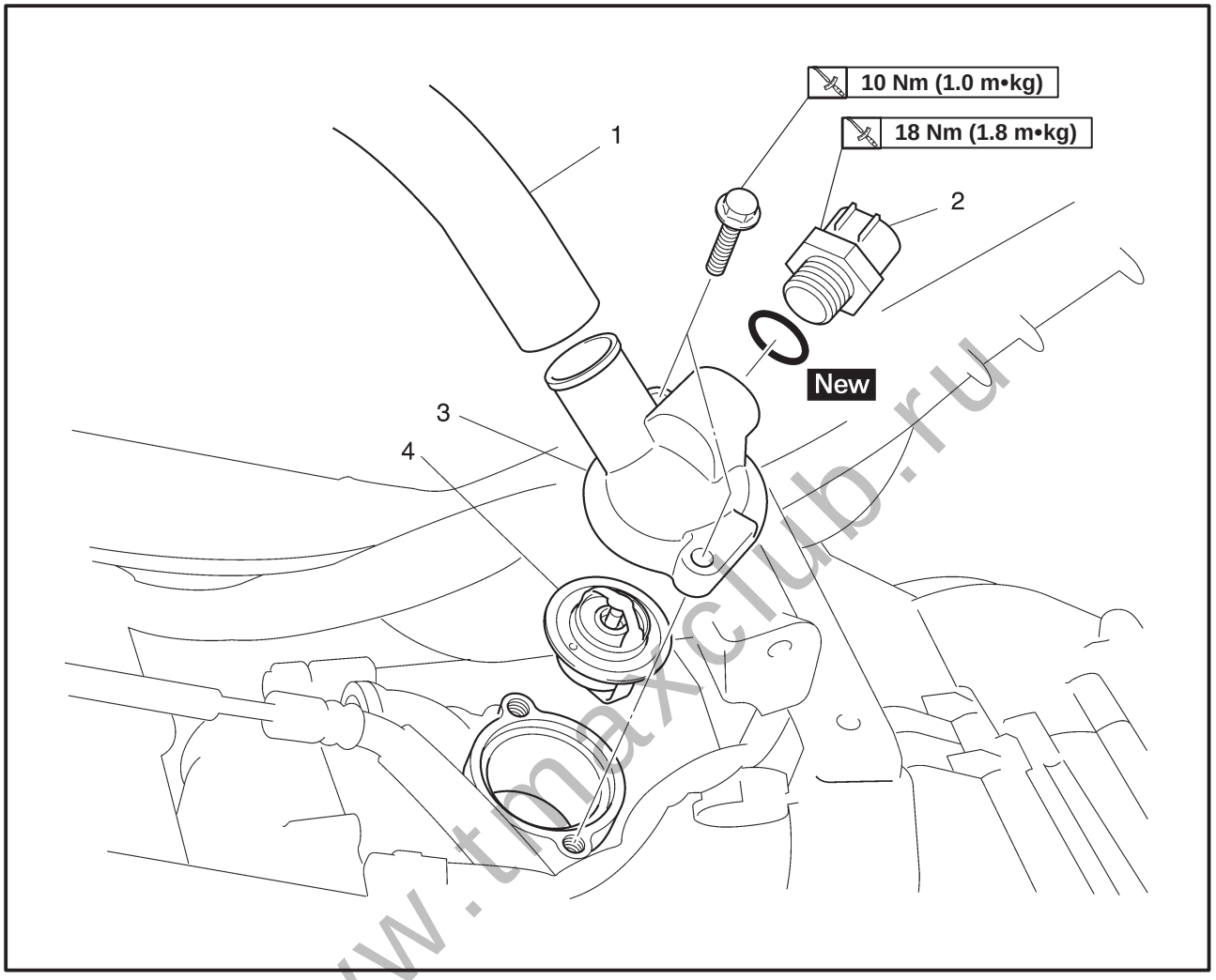
63 Nm (6.3 m•kg)

NOTE:
- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil.
- Make sure that the O-ring is positioned properly.
- Align the projection ⓐ on the oil cooler with the slot ⓑ in the crankcase.

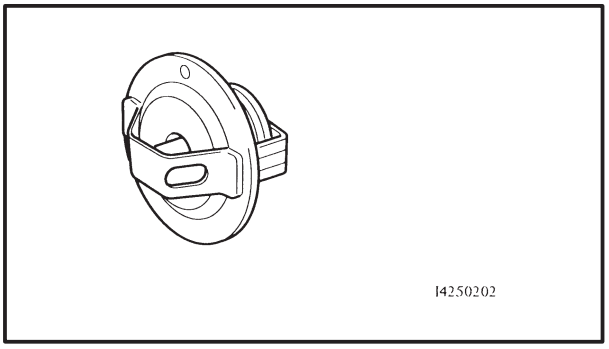


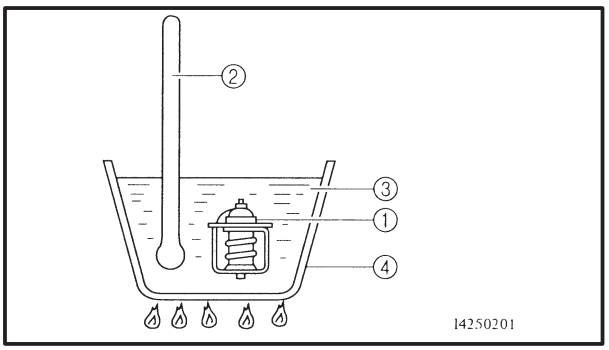
3. Bend the lock washer tab along a flat side of the bolt.
4. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” in chapter 3.
   - crankcase
     (with the specified amount of the recommended engine oil)
     Refer to “CHANGING THE ENGINE OIL” in chapter 3.
5. Check:
   - cooling system
     Leaks → Repair or replace any faulty part.
6. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR”.

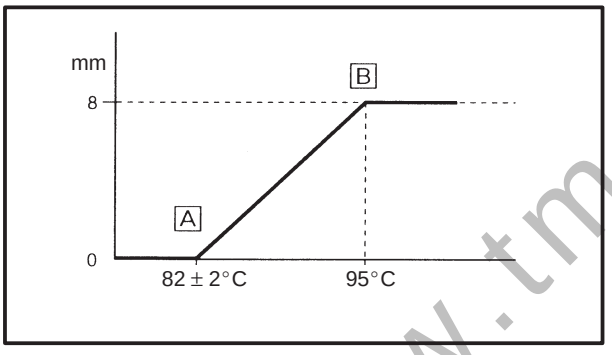
THERMOSTAT



Order	Job/Part	Q'ty	Remarks
	Removing the thermostat		Remove the parts in the order listed.
	Footrest board		
	Leg shield		Refer to "COVER AND PANEL" in chapter 3.
	Side panel		
	Lower cover		
	Coolant		Drain.
	Carburetor assembly		Refer to "CARBURETORS" in chapter 7.
1	Radiator outlet hose	1	
2	Thermo switch	1	Disconnect.
3	Thermostat cover	1	
4	Thermostat	1	
			For installation, reverse the removal procedure.







EAS00462

CHECKING THE THERMOSTAT

1. Check:
   - thermostat ①
     Does not open at 80 ~ 84°C
     → Replace.

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

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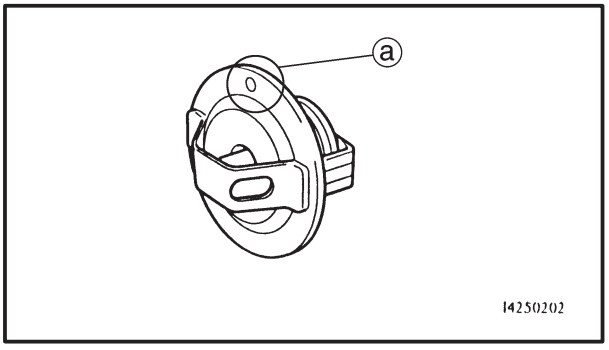
① Thermostat
② Thermometer
③ Water
④ Container
A Fully closed
B Fully opens

NOTE:

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

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



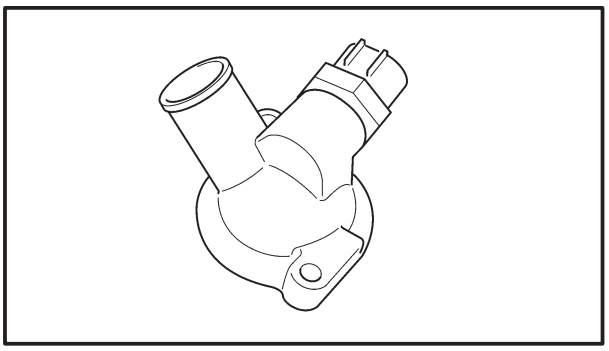
EAS00467

INSTALLING THE THERMOSTAT

1. Install:
   - thermostat

NOTE:

Install the thermostat with its breather hole ⓐ facing up.



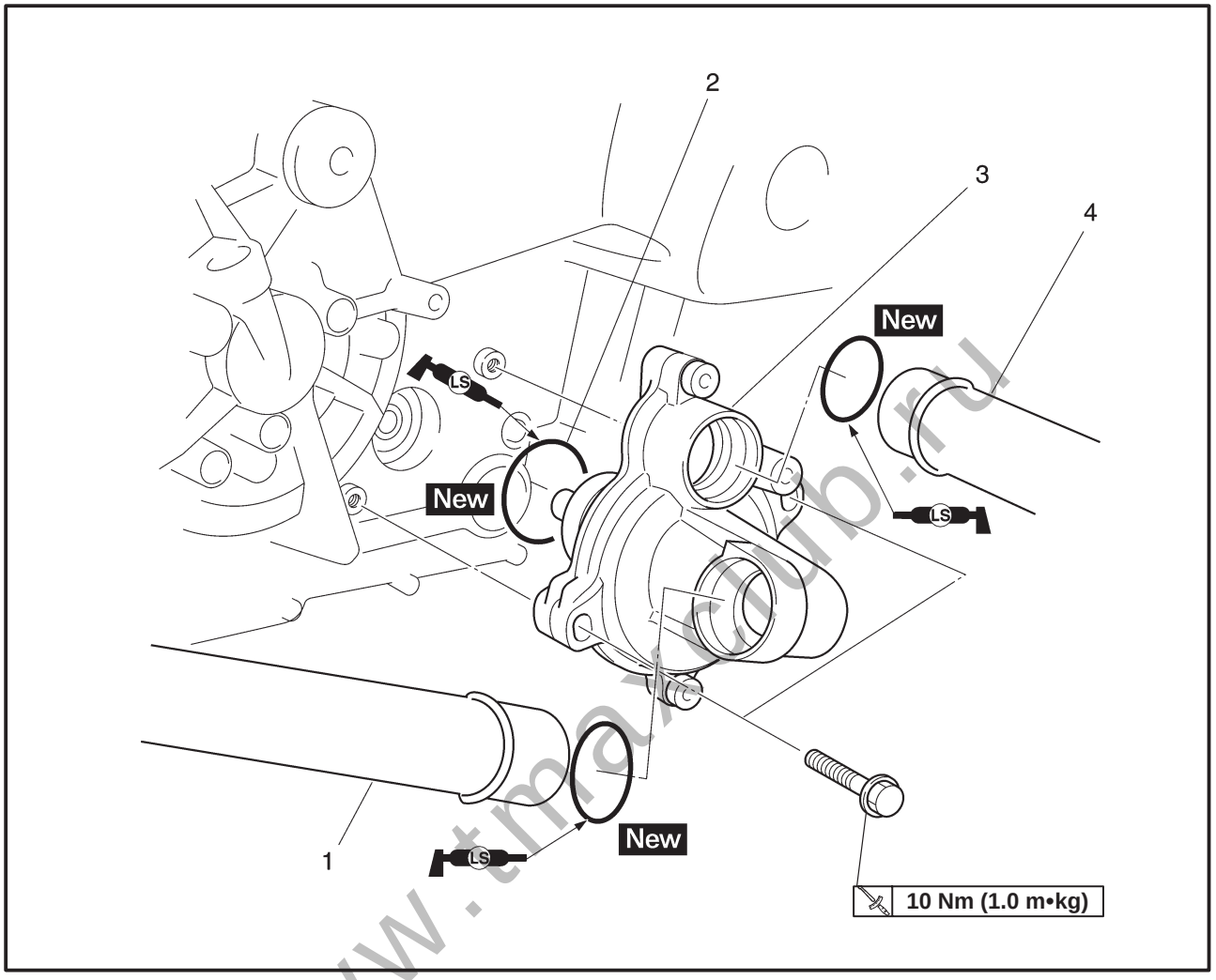
2. Install
   • thermostat cover — 10 Nm (1.0 m•kg)

NOTE:

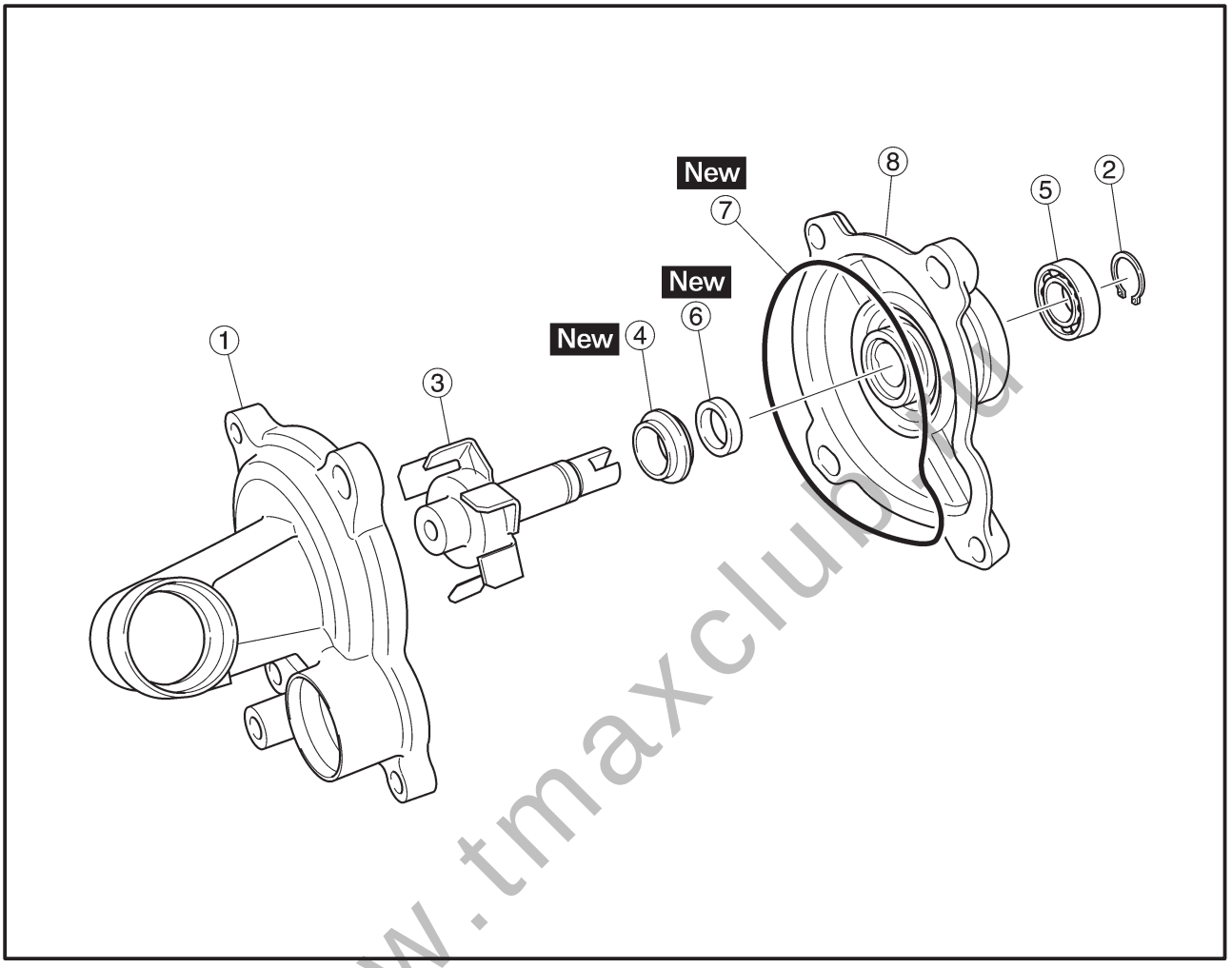
Befor installing the thermostat cover to the cylinder head, lubricate the O-ring with a thin coat of litium soap base grease.

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 any faulty part.
5. Measure:
   • radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to “CHECKING THE RADIATOR”.

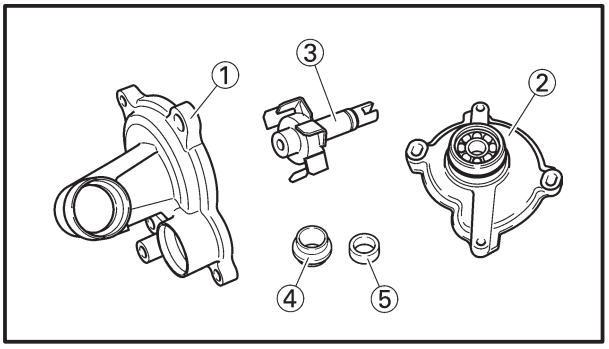
WATER PUMP



Order	Job/Part	Q'ty	Remarks
	Removing the water pump		Remove the parts in the order listed.
	Footrest board	1	
	Lower cover	1	
	Side panel (left)	1	
	Leg shield		
	Coolant		Drain.
1	Pipe 1	1	
2	O-ring	2	
3	Water pump	1	
4	Pipe 2	1	
			For installation, reverse the removal procedure.

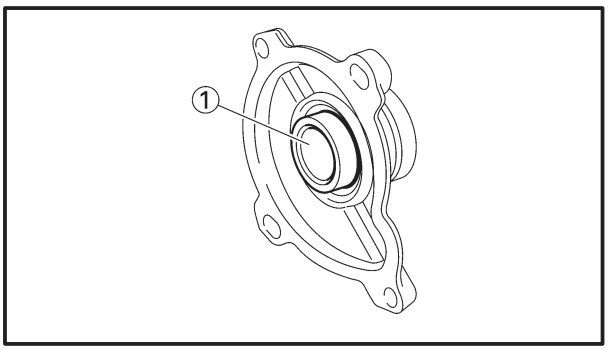


Order	Job/Part	Q'ty	Remarks
	Disassembling the water pump		Disassemble the parts in the order listed. **NOTE:** It is not necessary to remove the impeller shaft, unless the coolant level is extremely low or coolant contains to engine oil.
①	Water pump cover	1	
②	Cir clip	1	
③	Impeller shaft (along with the impeller)	1	
④	Water pump seal	1	
⑤	Bearing	1	
⑥	Oil seal	1	
⑦	O-ring	1	
⑧	Water pump housing	1	
			For assembly, reverse the disassembly procedure.



EAS00474
CHECKING THE WATER PUMP
1. Check:
   - water pump housing cover ①
   - water pump housing ②
   - impeller shaft ③
   - water pump seal ④
   - oil seal ⑤

   Cracks/damage/wear → Replace.



2. Check:
   - water pump seal ①
   - oil seal

   Cracks/damage/wear → Replace.

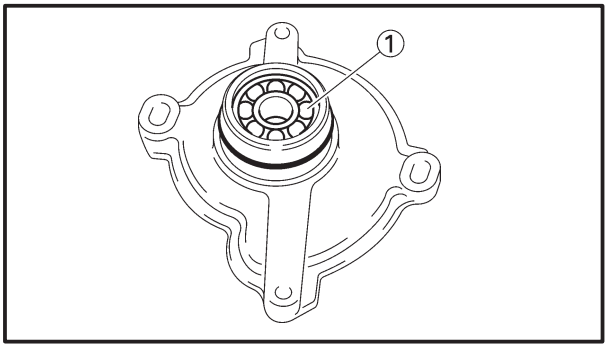
3. Check:
   - bearing

   Roughness → Replace.

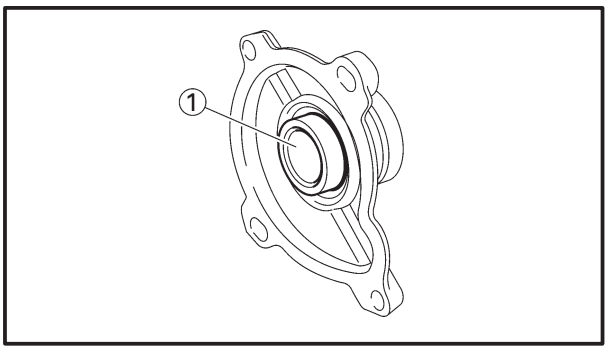
EAS00475
ASSEMBLING THE WATER PUMP
1. Install:
   - oil seal New

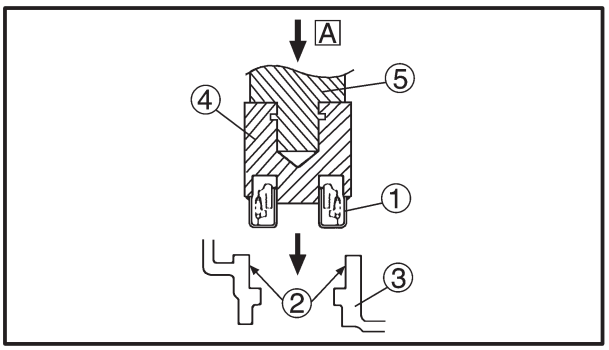
   (to the water pump housing)

NOTE:
- Install the oil seal with a socket that matches its outside diameter.
- Before installing the oil seal, apply tap water or coolant onto its outer surface.



2. Install:
   - bearing ①





3. Install:
   • water pump seal New ①

CAUTION:

Never apply oil or grease onto the water pump seal surface.

NOTE:

- Install the water pump seal with the water pump seal installers.
- Before installing the water pump seal, apply Yamaha bond No.1215 ② to the water pump housing ③.

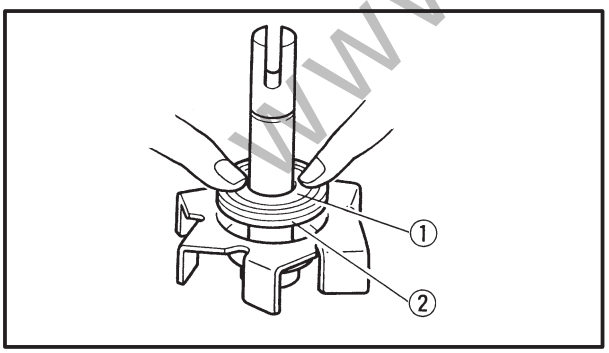
Water pump seal installer
90890-04078 ④
90890-04058 ⑤
Yamaha bond No.1215
90890-85505

A Push down

4. Install:
   • rubber damper New ①
   • rubber damper holder New ②

NOTE:

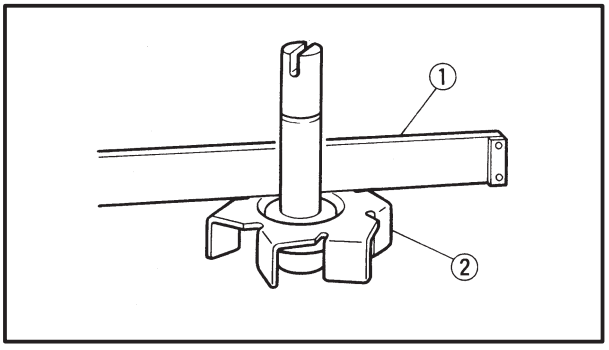
Before installing the rubber damper, apply tap water or coolant onto its outer surface.



5. Measure:
   • tilt
   Out of specification → Repeat steps (3) and (4).

CAUTION:

Make sure that the rubber damper and rubber damper holder are flush with the impeller.



Max. impeller shaft tilt
0.15 mm

① Straightedge
② Impeller

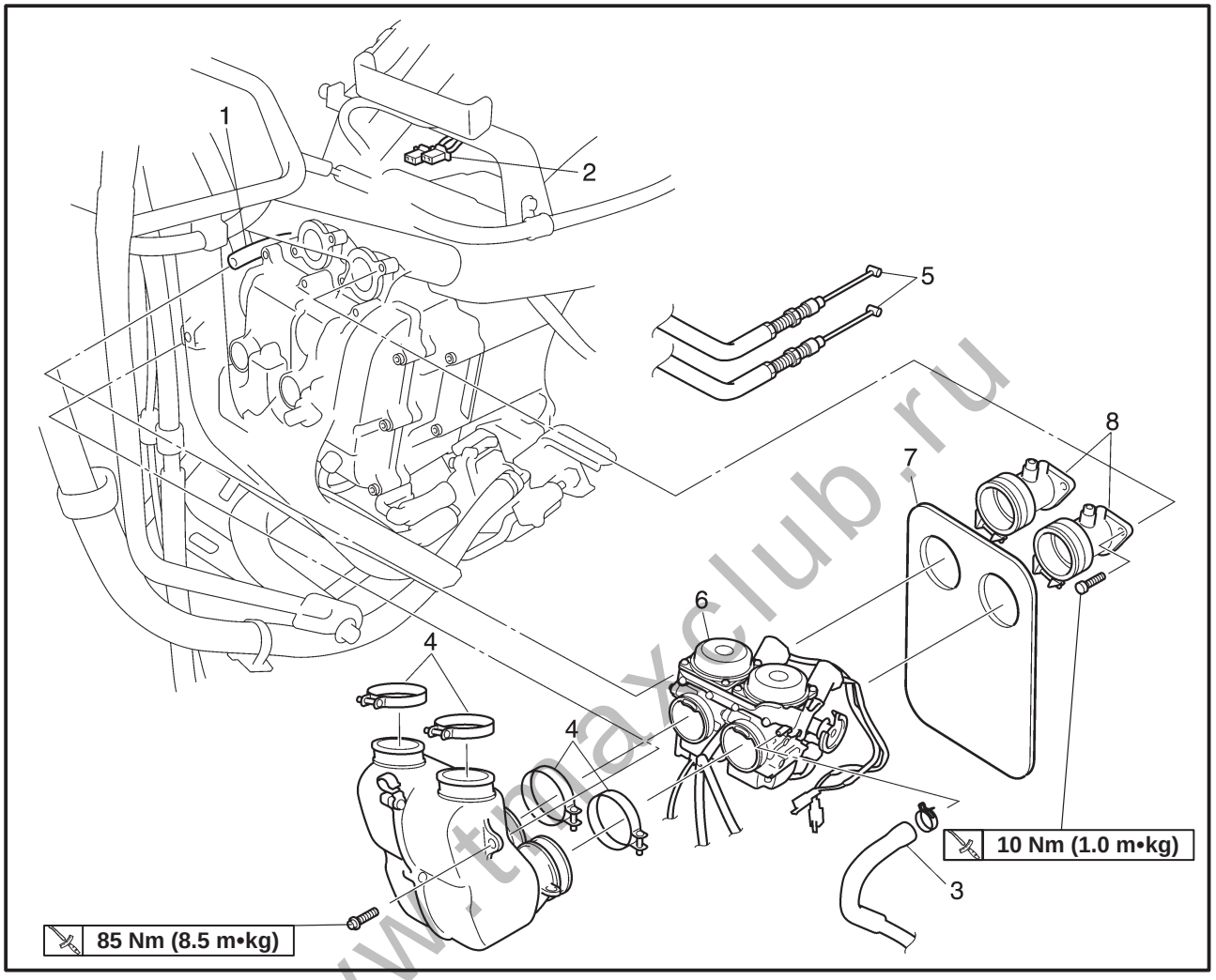
CARB

7

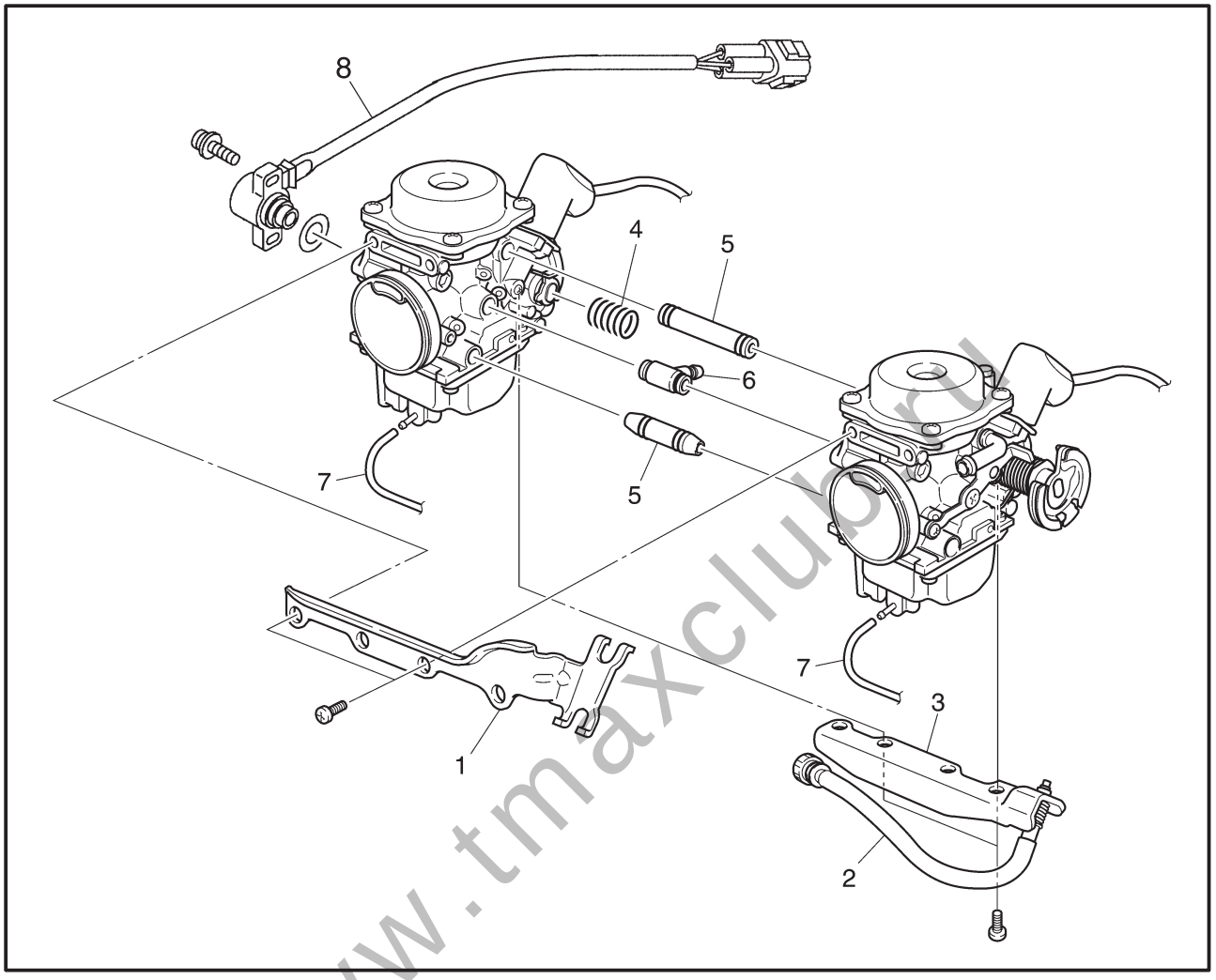
CHAPTER 7
CARBURETORS

CARBURETORS

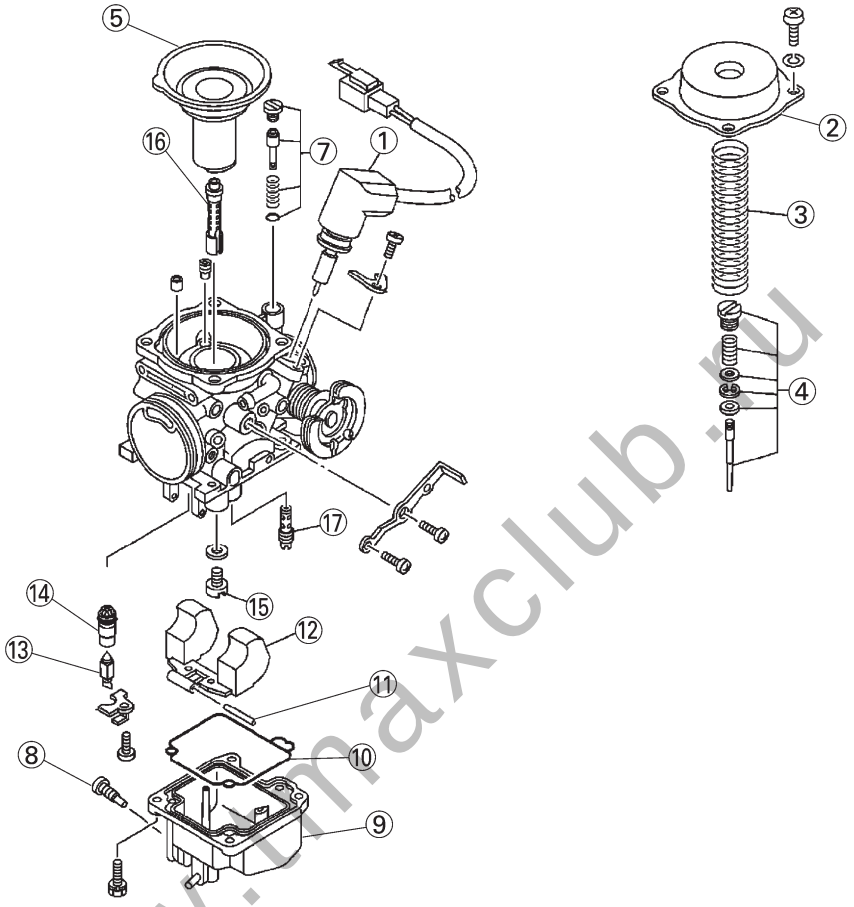
CARBURETORS



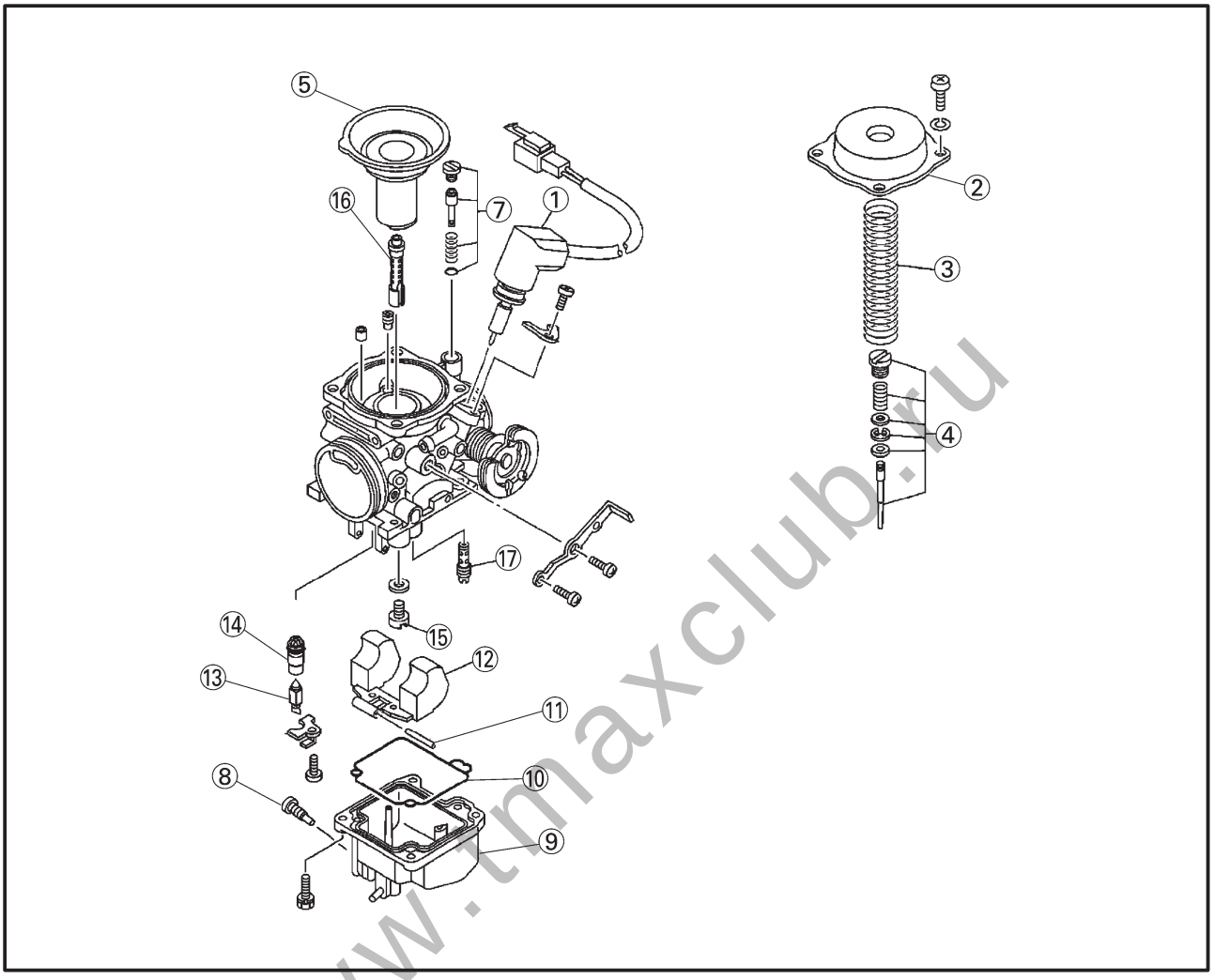
Order	Job/Part	Q'ty	Remarks
	Removing the carburetors		Remove the parts in the order listed.
	Footrest board		
	Leg shield		Refer to "COVER AND PANEL" in chapter 3.
	Center cover		
	Silencer		
1	Fuel hose	1	
2	Throttle position sensor coupler	1	Disconnect.
3	Coolant hose	1	
4	Carburetor joint cramp	4	Loosen.
5	Throttle cable	2	
6	Carburetor assembly	1	
7	Heat protector	1	
8	Intake manifold	2	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Separating the carburetors		Remove the parts in the order listed.
1	Bracket	1	
2	Throttle stop screw	1	
3	Throttle stop screw bracket	1	
4	Spring	1	
5	Pipe	2	
6	Hose joint	1	
7	Float chamber air vent hose	1	
8	Throttle position sensor	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the carburetor		Disassembly the parts in the order listed. **NOTE:** The following procedure applies to all of the carburetors.
①	Starter plunger	1	
②	Vacuum chamber cover	1	
③	Piston valve spring	1	
④	Jet needle kit	1	
⑤	Piston valve	1	
⑥	Screw plug	1	
⑦	Pilot screw	1	
⑧	Fuel drain bolt	1	
⑨	Float chamber cover	1	
⑩	Float chamber gasket	1	
⑪	Float pivot pin	1	



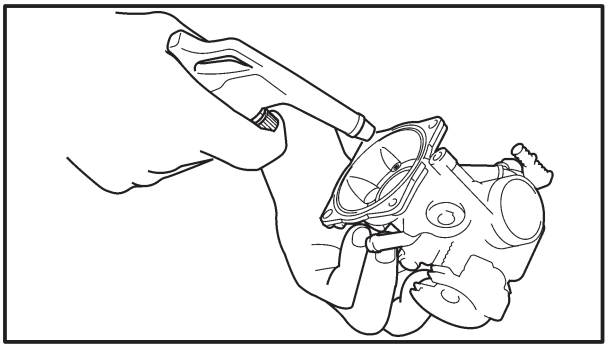
Order	Job/Part	Q'ty	Remarks
⑫	Float	1	
⑬	Needle valve	1	
⑭	Needle valve seat	1	
⑮	Main jet	1	
⑯	Main jet holder	1	
⑰	Pilot jet	1	
			For assembly, reverse the disassembly procedure.

EB600031

CHECKING THE CARBURETORS

The following procedure applies to all of the carburetors.

1. Check:
   - carburetor body
   - float chamber
   Cracks/damage → Replace.



2. Check:
   - fuel passages
   Obstruction → Clean.

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

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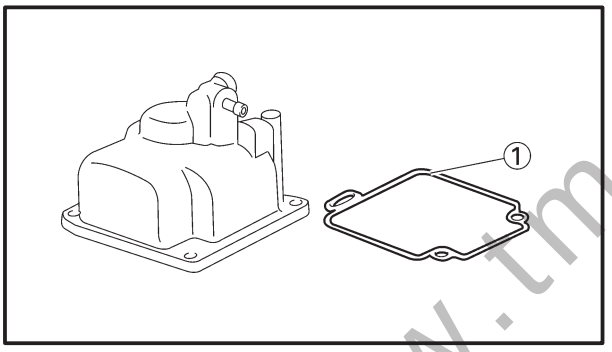
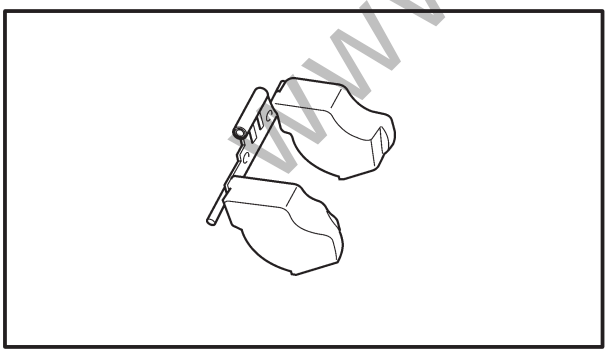
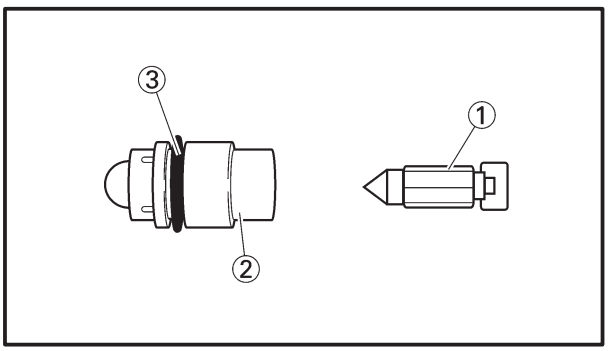


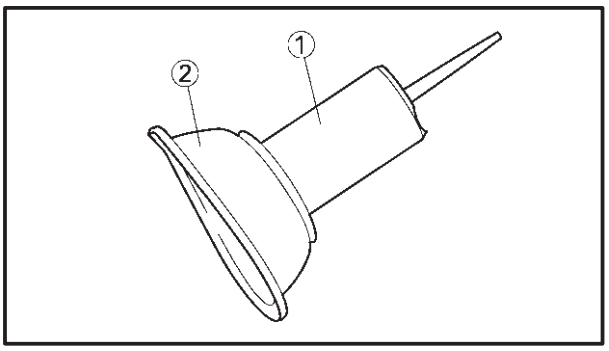
3. Check:
   - float chamber body
   Dirt → Clean.
4. Check:
   - float chamber rubber gasket ①
   Cracks/damage/wear → Replace.



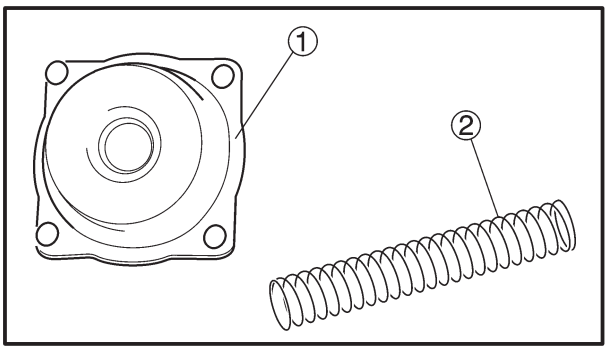
5. Check:
   - float
   Damage → Replace.



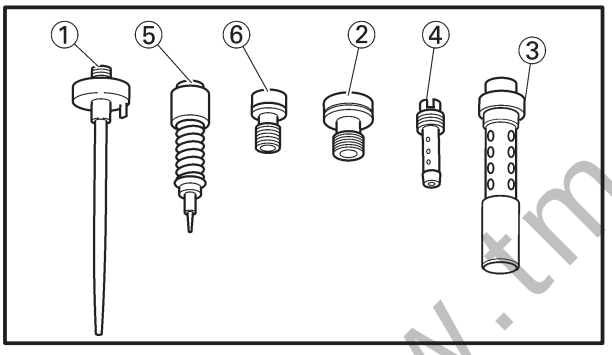
6. Check:
   - needle valve ①
   - needle valve seat ②
   Damage/obstruction/wear → Replace the needle valve, needle valve seat and O-ring as a set.
7. Check:
   - O-ring ③
   Damage/wear → Replace the needle valve, needle valve seat and O-ring as a set.



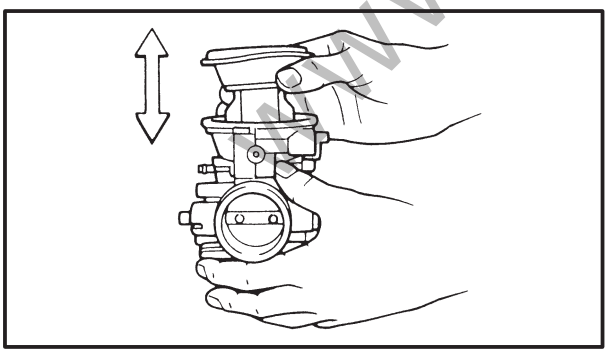
8. Check:
   • piston valve ①
     Damage/scratches/wear → Replace.
   • piston valve diaphragm ②
     Cracks/tears → Replace.



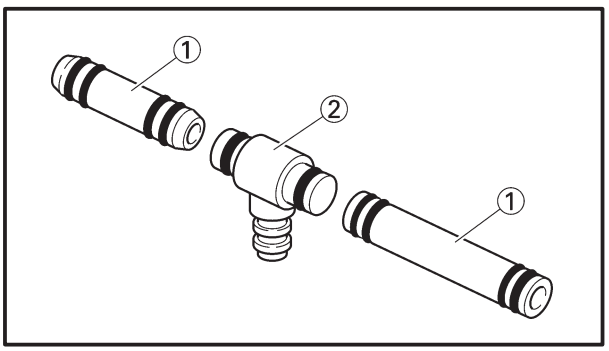
9. Check:
   • vacuum chamber cover ①
   • piston valve spring ②
   Cracks/damage → Replace.



10. Check:
   • jet needle ①
   • main jet ②
   • main jet holder ③
   • pilot jet ④
   • pilot screw ⑤
   • pilot air jet ⑥
     Bends/damage/wear → Replace.
     Obstruction → Clean.
     Blow out the jets with compressed air.



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

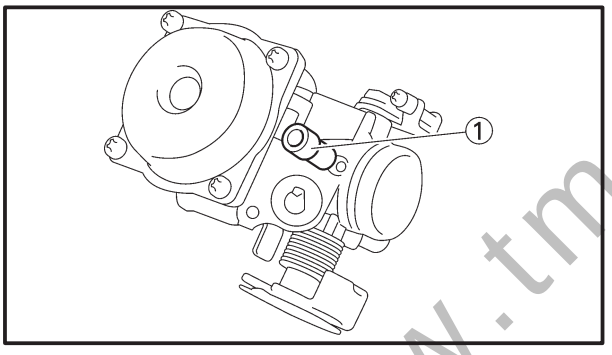


12. Check:
   • pipes ①
   • hose joints ②
     Cracks/damage → Replace.
     Obstruction → Clean.
     Blow out the pipes with compressed air.

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

EAS00488
ASSEMBLING THE CARBURETORS
The following procedure applies to all of the carburetors.

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



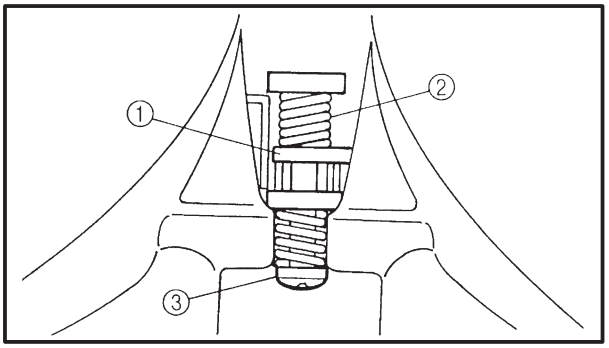
1. Install:
- O-ring New
- washer
- pilot screw spring
- pilot screw ①

Pilot screw
2 turns out

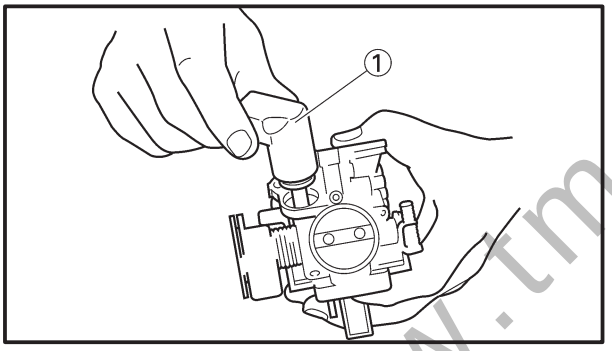
2. Install:
- piston valve
- jet needle kit
- jet needle holder
- piston valve spring
- vacuum chamber cover

NOTE:
- Insert the end of the piston valve spring onto the spring guide on the vacuum chamber cover.
- Align the tab on the piston valve diaphragm with the recess in the carburetor body.

3. Install:
   - pipe
   - fuel feed pipes
   - spring
   - float chamber air vent hoses
   - hose joint
   - copper washer
   - throttle stop screw



NOTE:
- Install the throttle valve lever ① onto carburetors #1, and #2 between the spring ② and synchronizing screw ③.



4. Install:
   - auto choke unit ①

EB600051

INSTALLING THE CARBURETORS

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

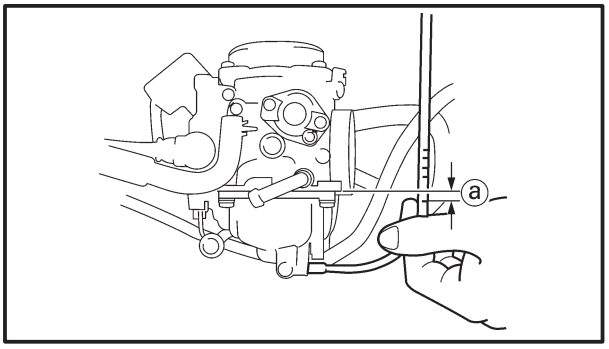
	Engine idling speed **1,150 ~ 1,250 r/min**

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

3. Adjust:
   - throttle cable free play

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

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



EAS00496

MEASURING AND ADJUSTING THE FUEL LEVEL

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

Fuel level (below the float chamber mating surface)
5.5 ~ 6.5 mm

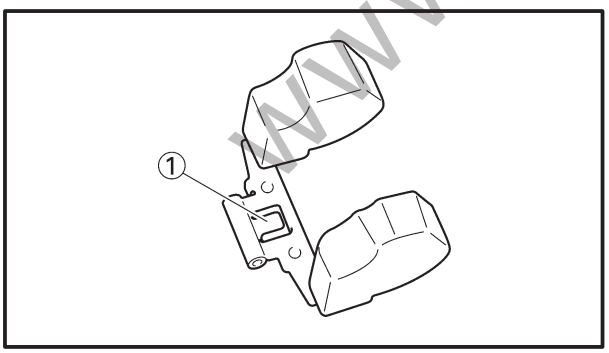
a. Stand the motorcycle on a level surface.
b. Place the motorcycle on a suitable stand to ensure that the motorcycle is standing straight up.
c. Install the fuel level gauge to the fuel drain pipe.

Fuel level gauge
90890-01312

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

NOTE:

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



2. Adjust:
   • fuel level

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

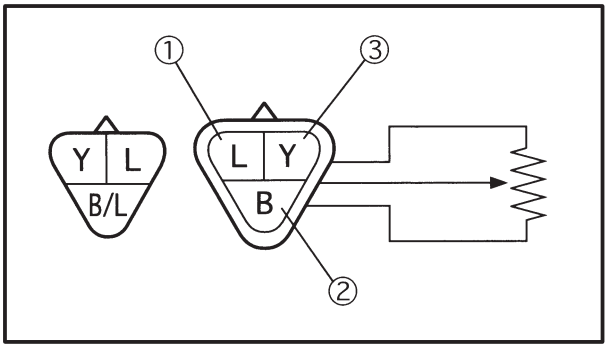
EB600071

CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE:

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

1. Check:
   - throttle position sensor



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

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

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

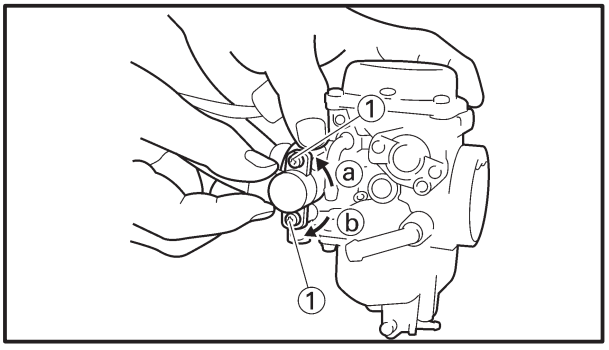
Throttle position sensor resistance "R1"
4 ~ 6 kΩ at 20°C
(blue – black)

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

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

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

Throttle position sensor resistance "R2"
0.56 ~ 0.84 kΩ to 3.01 ~ 4.51 kΩ at 20°C
(yellow – black)



2. Adjust:
   - throttle position sensor angle

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

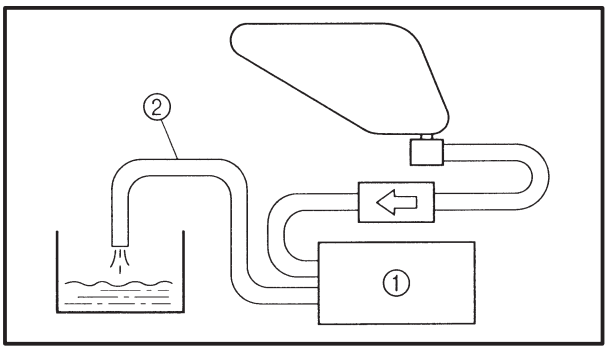
Closed-throttle resistance
0.56 ~ 0.84 kΩ at 20°C
(yellow – black)

c. Tighten the throttle position sensor screws.

NOTE:

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



CHECKING THE FUEL PUMP

1. Check:
   • fuel pump ①

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Disconnect the fuel pump to carburetor fuel hose ② from the carburetor.
b. Place a container under the end of the fuel hose.
c. Start the engine and check if fuel folws from the fuel hose ②.

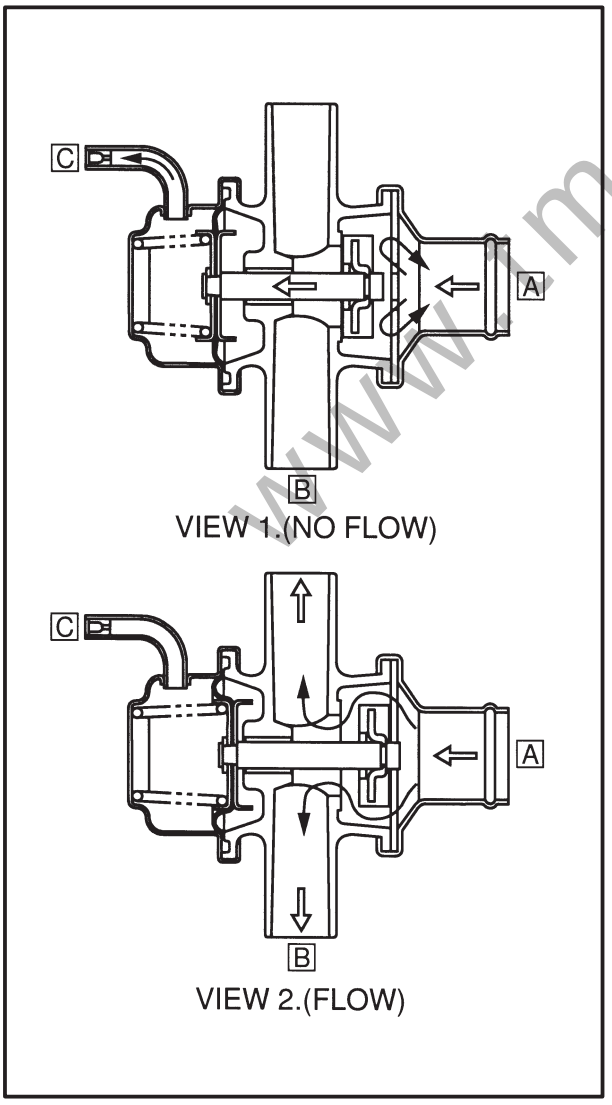
Fuel folws.	Fuel pump is OK.
Fuel does not flow.	Replace the fuel pump.

d. Stop The engine and check if the fuel stops flowing from the fuel hose ②.

Fuel stops flowing.	Fuel pump is OK.
Fuel flows.	Replace the fuel pump.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS00507
AIR INDUCTION SYSTEM
AIR INJECTION
The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons.
When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C.



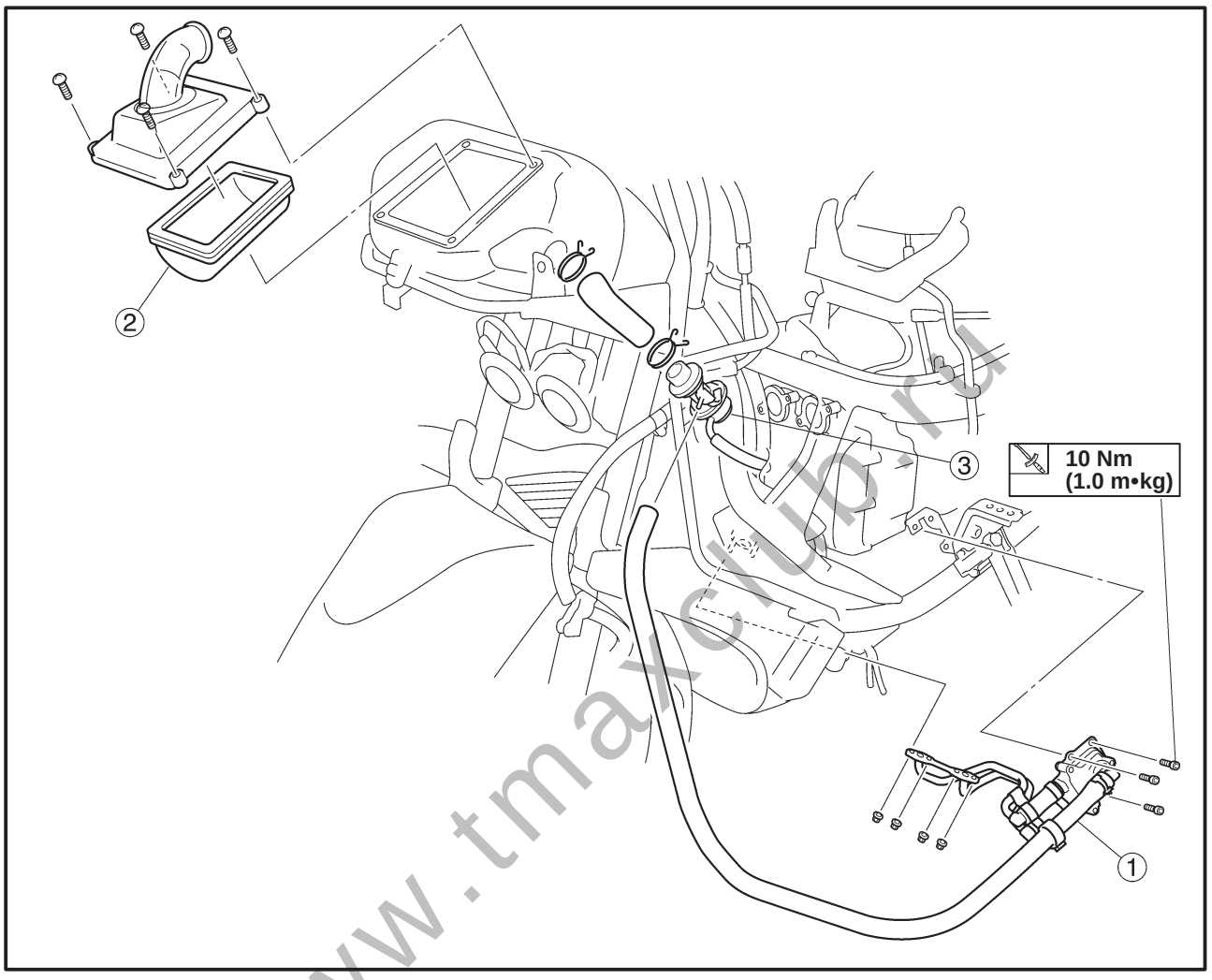
EAS00508
AIR CUTOFF VALVE
The air cutoff valve is operated by the intake gas pressure through the piston valve diaphragm. Normally, the air cutoff valve is open to allow fresh air to flow into the exhaust port. During sudden deceleration (the throttle valve suddenly closes), negative pressure is generated and the air cutoff valve is closed in order to prevent after-burning.
Additionally, at high engine speeds and when the pressure decreases, the air cutoff valve automatically closes to guard against a loss of performance due to self-EGR.
(This “low-boost close” function is the same as on the FZR600 (3HW).)

VIEW 1. (NO FLOW)
When decelerating (the throttle closes), the valve will close.
VIEW 2. (FLOW)
During normal operation the valve is open.

A From the air filter
B To the reed valve
C To the carburetor joint

EAS00509

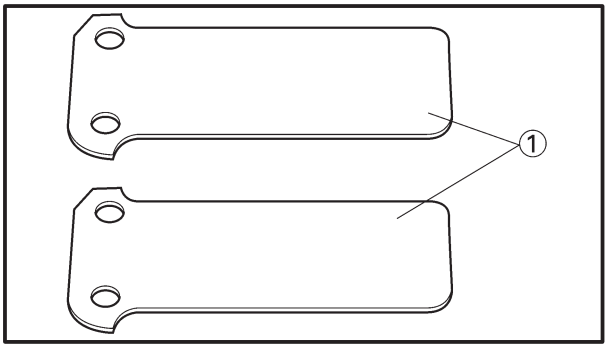
AIR INDUCTION SYSTEM DIAGRAMS



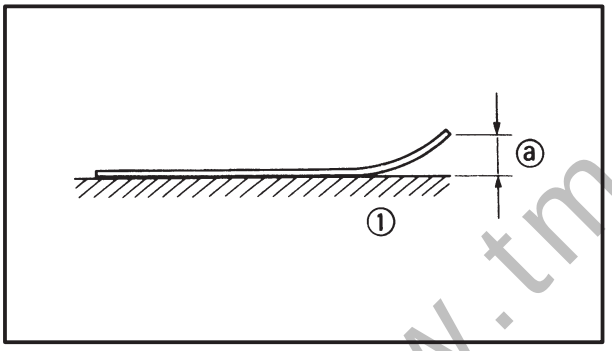
① Reed valve
② Air filter
③ Air cutoff valve

EAS00510
CHECKING THE AIR INDUCTION SYSTEM

1. Check:
   - hoses
     Loose connection → Connect properly.
     Cracks/damage → Replace.
   - pipes
     Cracks/damage → Replace.



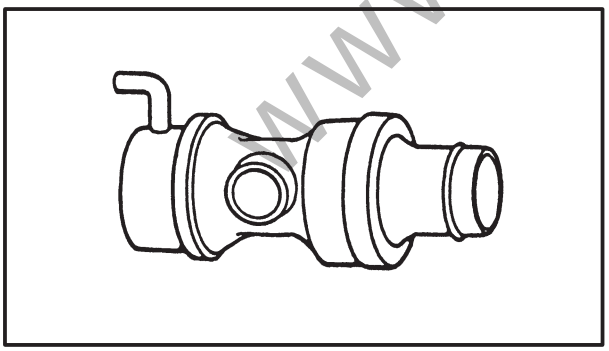
2. Check:
   - reed valve ①
   - reed valve stopper
   - reed valve seat
     Cracks/damage → Replace the reed valve.



3. Measure:
   - reed valve bending ⓐ
     Out of specification → Replace the reed valve.

Maximum reed valve bending
0.4 mm

① Surface plate



4. Check:
   - air cutoff valve
     Cracks/damage → Replace.

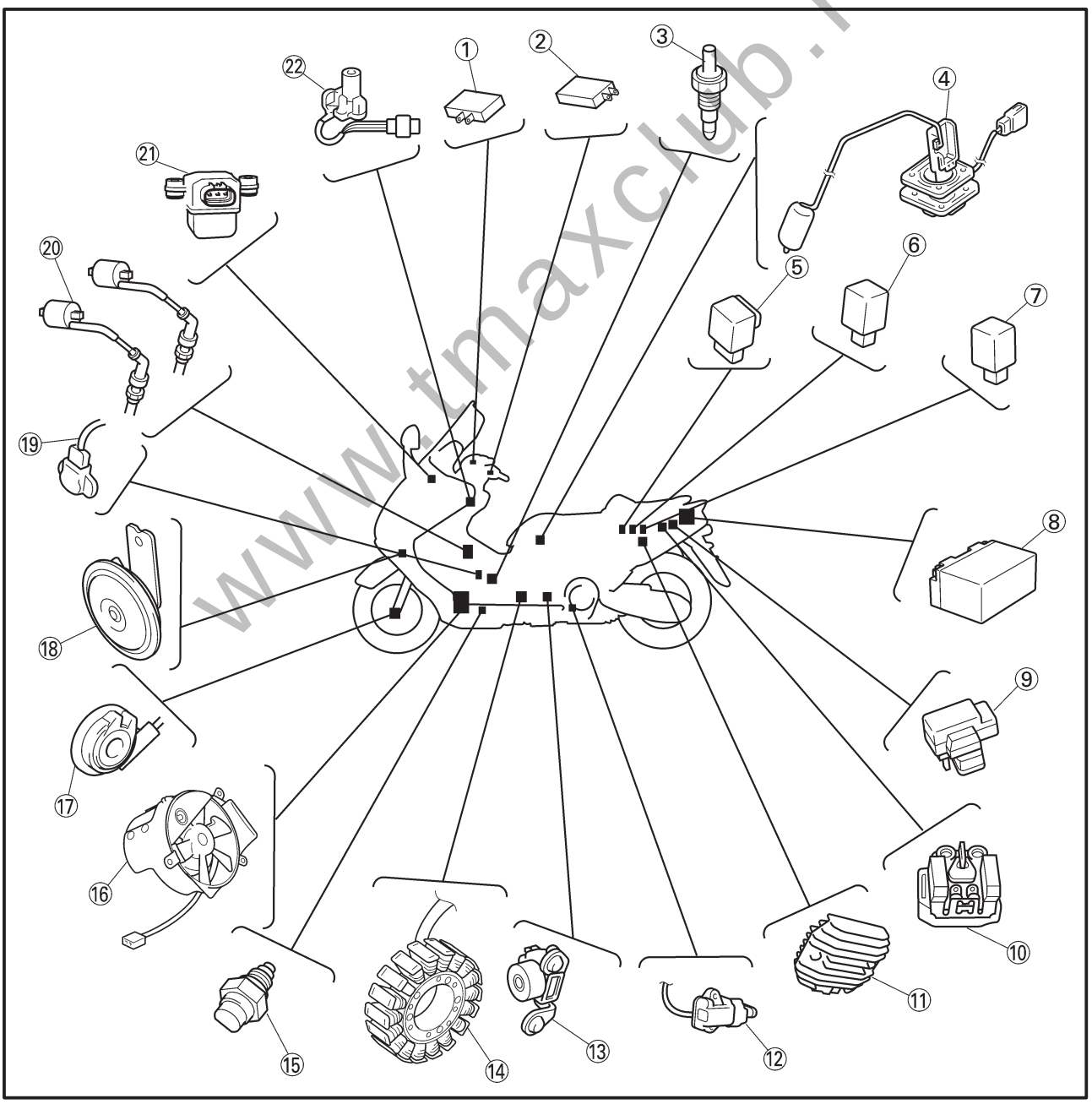
ELEC 8

CHAPTER 8
ELECTRICAL

ELECTRICAL

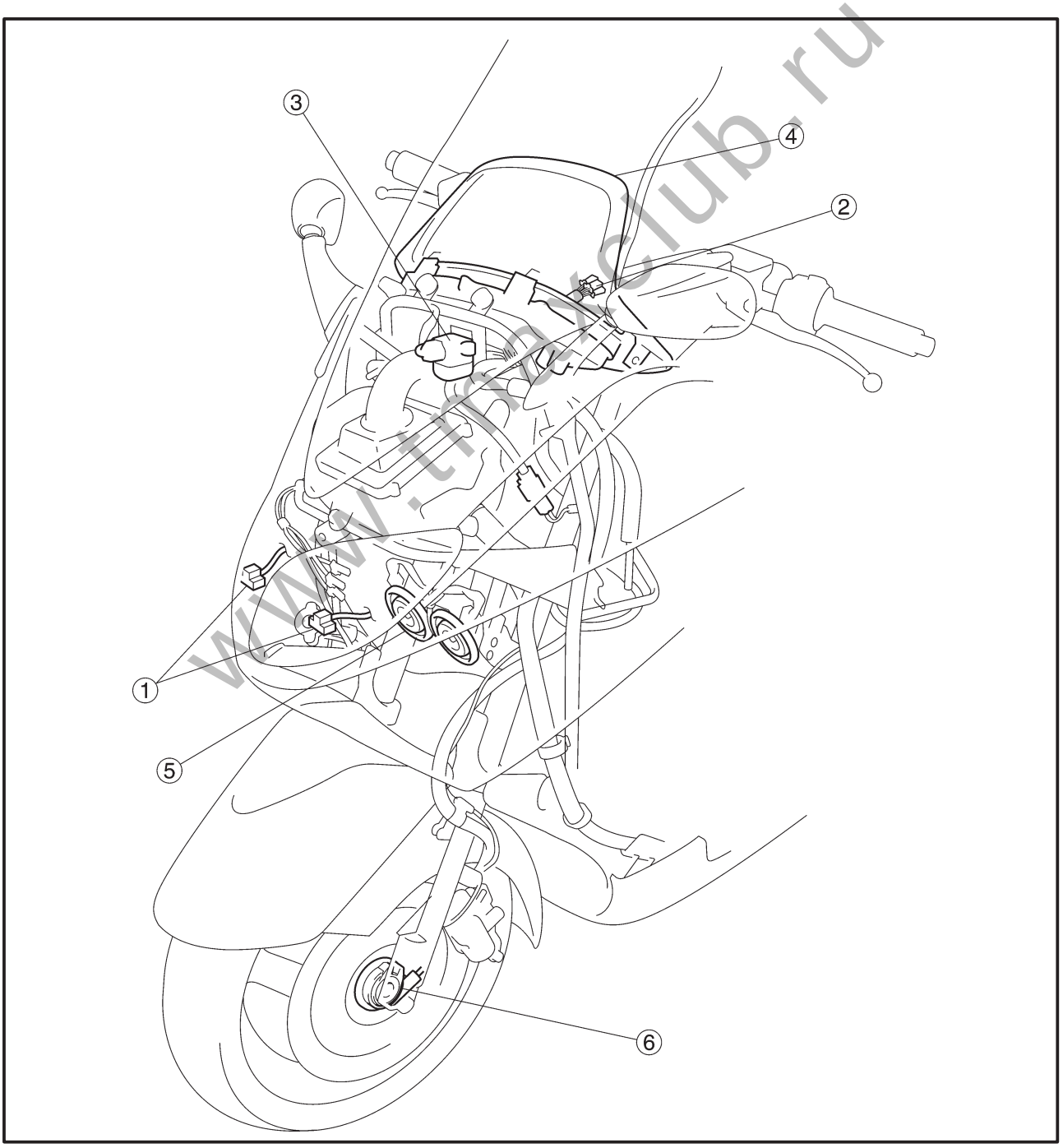
ELECTRICAL COMPONENTS

① Front brake light switch
② Rear brake light switch
③ Thermo unit
④ Fuel sender
⑤ Starting circuit cut-off relay
⑥ Fuel pump relay
⑦ Flasher relay
⑧ Battery
⑨ Fuse box
⑩ Starter relay
⑪ Rectifire/regulator
⑫ Sidestand switch
⑬ Pickup coil
⑭ Stator coil
⑮ Thermo switch
⑯ Radiator fan
⑰ Speed sensor
⑱ Horn
⑲ Throttle position sensor
⑳ Ignition coil
㉑ Lean angle cut-off switch
㉒ Main switch

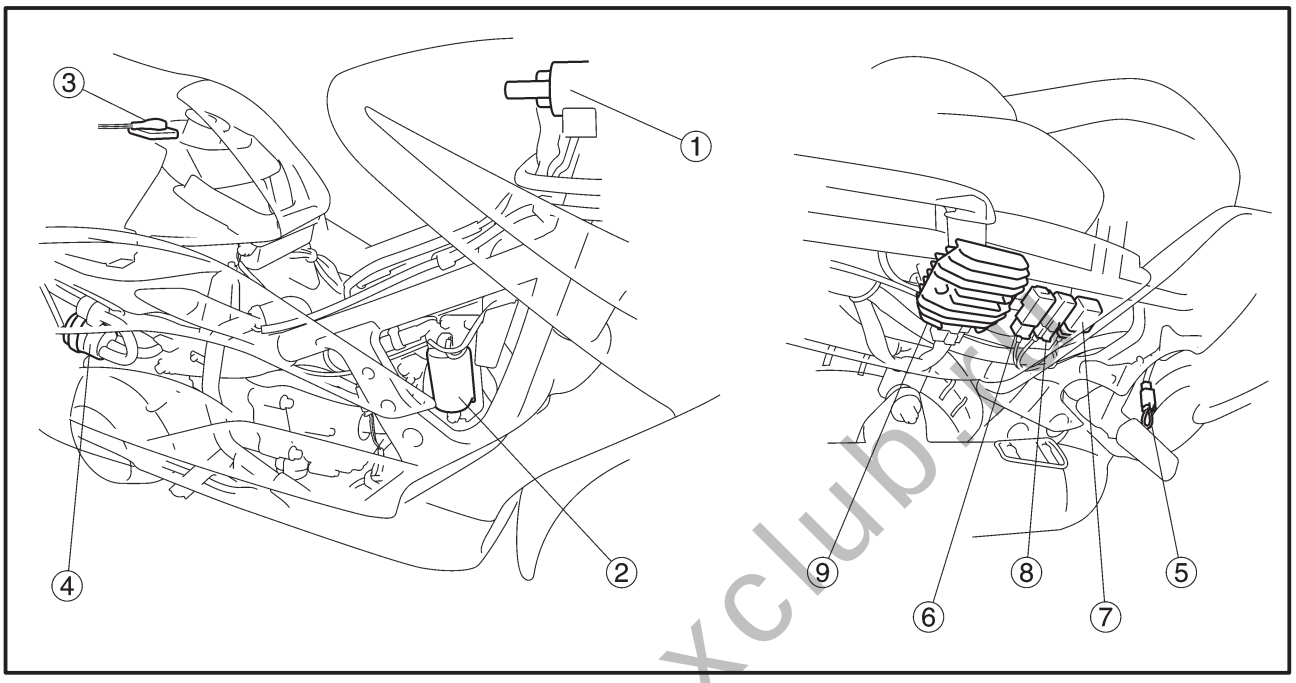


ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS

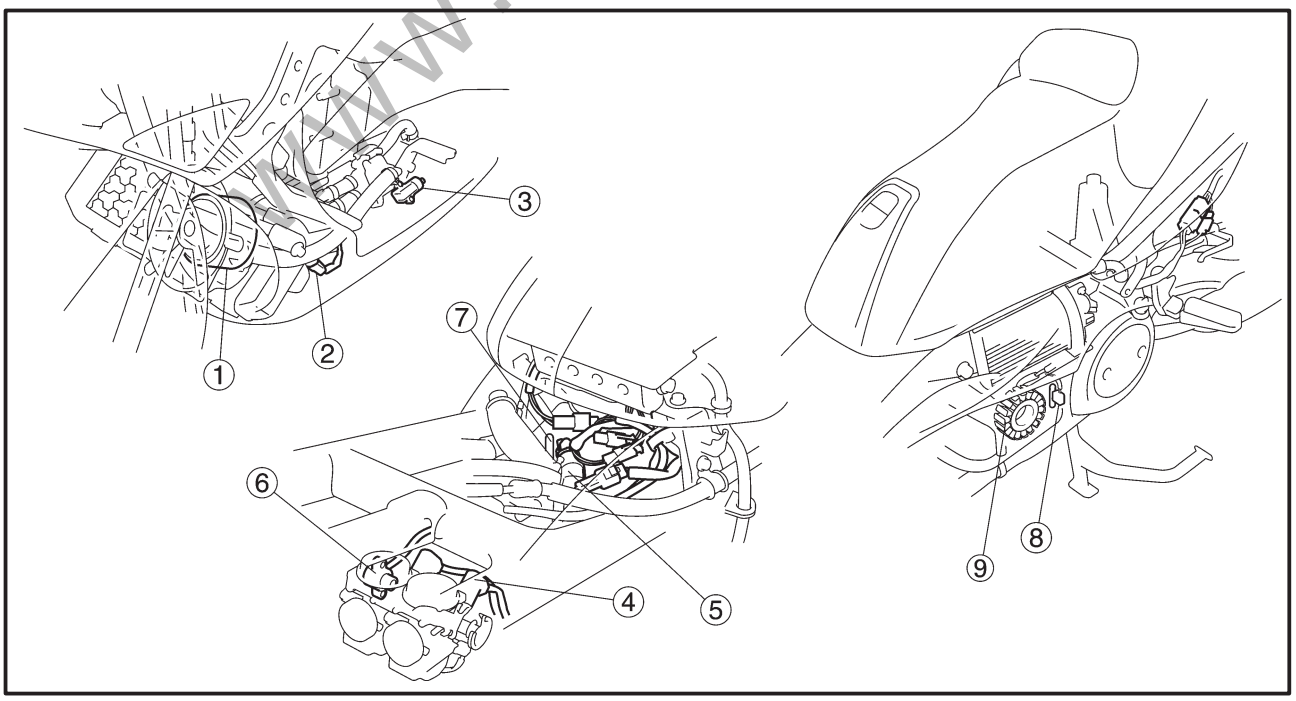
① Headlight couplers
② Handlebar switch couplers
③ Lean angle cut-off switch
④ Meter
⑤ Horns
⑥ Speed sensor



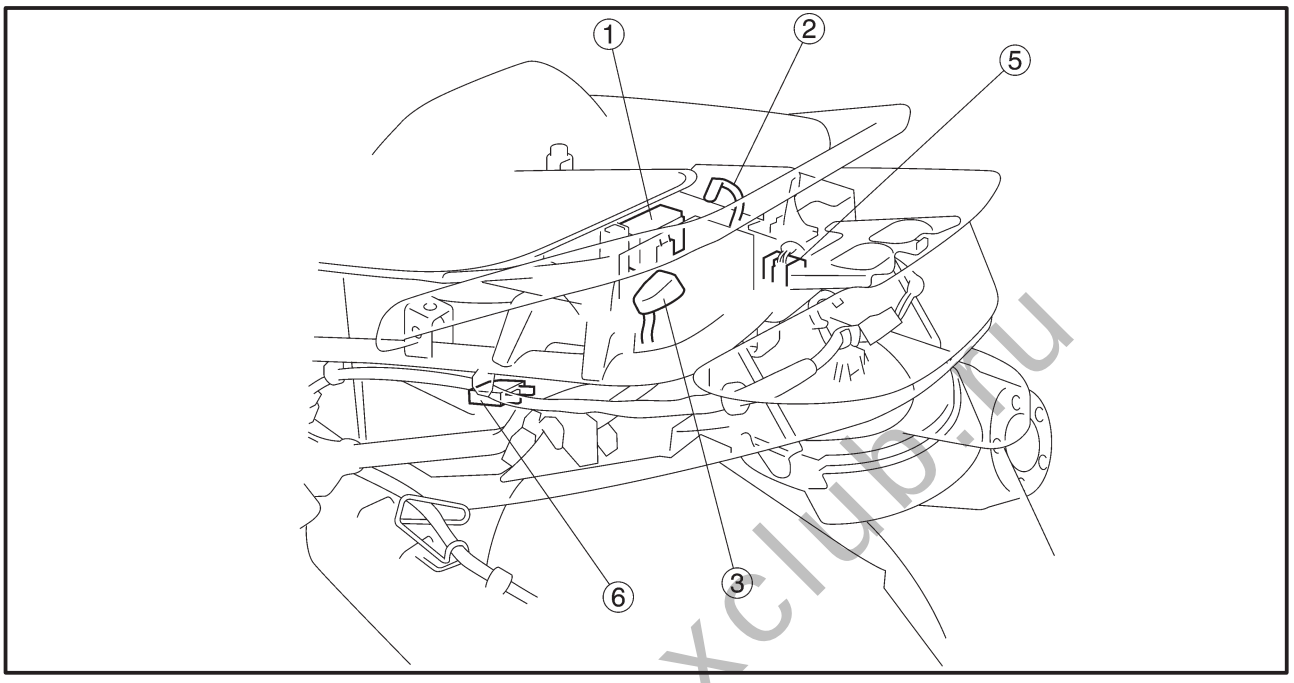
① Main switch
② Ignition coils
③ Fuel sender
④ Fuel pump
⑤ Reset coupler
⑥ Starting circuit cut-off relay
⑦ Turn signal relay
⑧ Pump relay
⑨ Rectifier/regulator

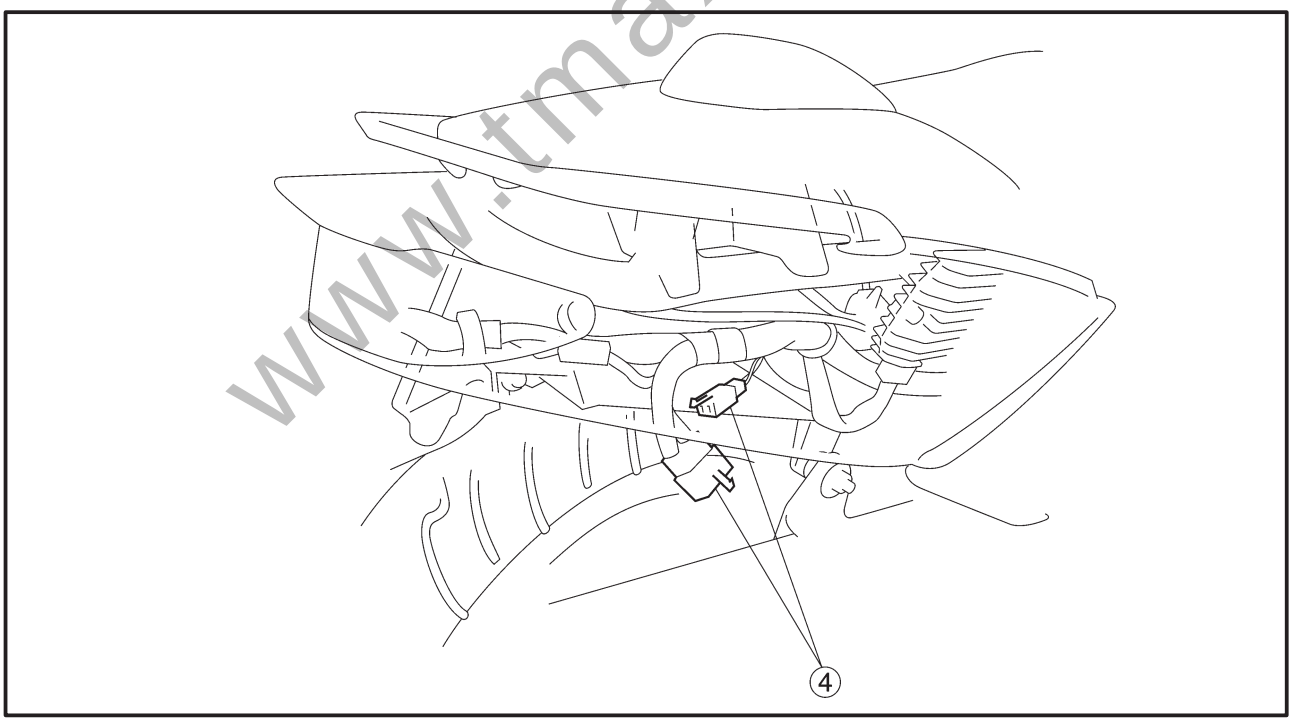


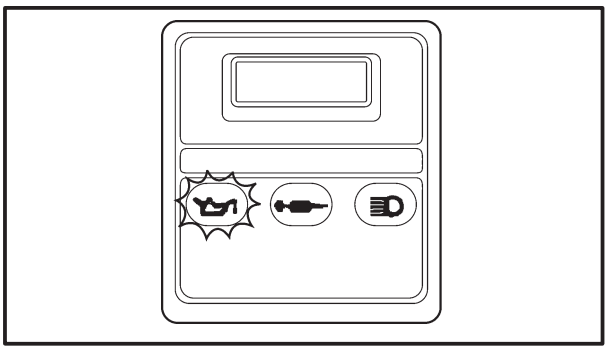
① Radiator fan motor
② Thermo switch (fan motor)
③ Sidestand switch
④ Auto chokes
⑤ Thermo switch (auto choke)
⑥ Throttle position sensor
⑦ Thermo unit
⑧ Pickup coil
⑨ A.C. magneto



① Fuse box
② Battery negative lead
③ Battery positive lead
④ Tail/brake light coupler
⑤ Starter relay
⑥ Box light







INSTRUMENT FUNCTIONS

INDICATOR LIGHTS

Engine oil change indicator light

(display functions based on the oil indicator)

The display functions based on the engine oil change indicator can be divided into three major types:

1. Bulbs disconnections confirmation (light ON) by main switch ON.
   - Main switch on activates the oil indicator for 1.4 seconds to allow the user to check if bulb disconnections have occurred.
2. Oil replacement timing notification (light on)
   - Turn the key to “ON”.
     Hold the reset botton pushed for two to five seconds.
   - Release the reset button, and the oil change indicator light will go off.

NOTE:

If the engine oil is changed before the oil change indicator light comes on (i.e. before the periodic oil change interval has been reached), the indicator light must be reset after the oil change for the next periodic oil change to be indicated at the correct time. To reset the oil change indicator light before the periodic oil change interval has been reached, follow the above procedure, but note that the indicator light will come on for 1.4 seconds after releasing the reset button, otherwise repeat the procedure.

- Setting the indicator light on distance
  The indicator initially light up at 1,000 km.
  It light up at 5,000 km next time.
  Subseguently, the indicator repeat lighting up every 5,000 km after it has been reset.
- Detection of initial reset switch on operation before arrival at 1,000 km. (When the indicator is off)
  When 2 ~ 5 second reset switch on is detected, the indicator will light on for 1.4 seconds and initial 1,000 km judgment will not occur (the indicator will not light on at 1,000 km).
- Detection of reset switch on operation during the time from initial 1,000 km judgment to arrival at 5,000 km.
  (When the indicator is light on)
  When 2 ~ 5 second reset switch on is detected, the indicator will go off.
  Cumulative distance data will not be reset.

- Detection of the second and subsequent reset switch on operations with the indicator light off when 2 ~ 5 second reset switch on is cletected, the indicator will light on for 1.4 seconds and then after it has gone off, cumulative distance data will be reset.
- Detection of the second and subsequent reset switch on operations with the indicator on when 2 ~ 5 second reset switch on is detected, the indicator will go off and cumulative distance data will be reset.

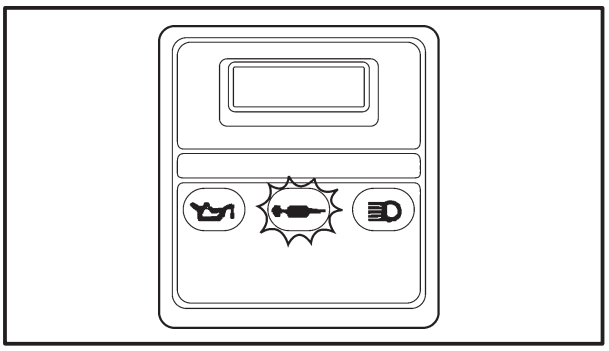
3. Fault code display (blinks) based on self diagnostics.
   - If it detects the follwing faults, the igniter will blink the display of a 5 second ON/OFF code and then blink the engine oil chamge indicator light at intervals of 3.0 seconds. If multiple faults are detected, the appropriate faults codes will be displayed in order of occurrence.

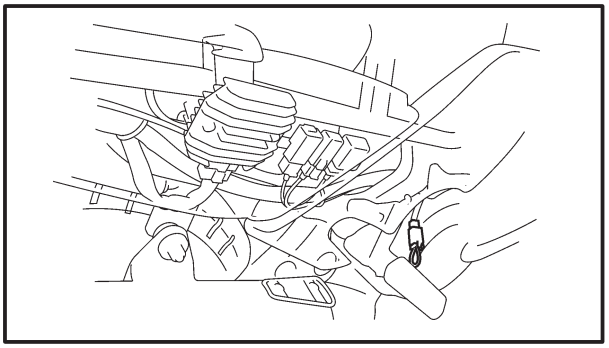
Detected fault

- Throttle position sensor
- Speed sensor
- Lean angle cutt-off switch

NOTE:

- The fault code is reset by main switch off (igniter unit power off). Also, the display off the fault code is terminated with the recovery of the circuits from the fault.

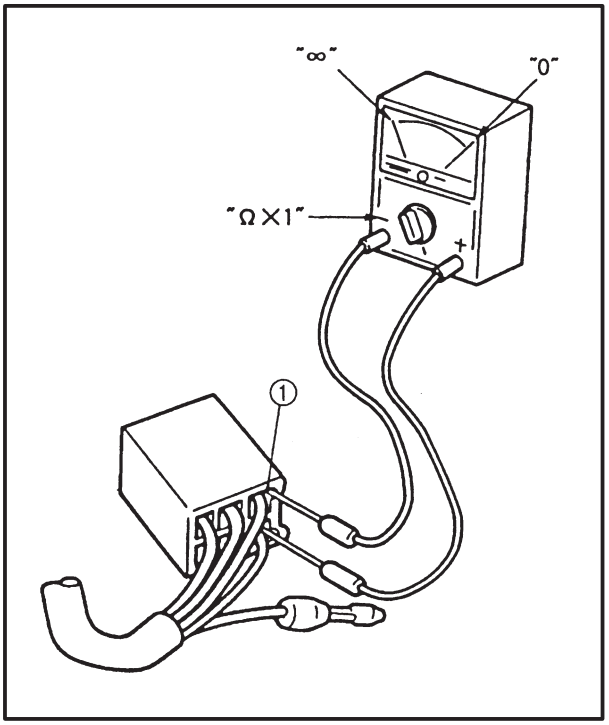


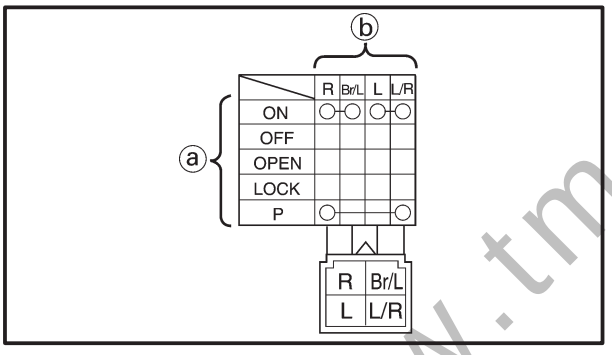


V-belt indicator light

Indicates V-belt change timing every 20,000 km (the V-belt indicator light reset connecter is located in the side cover at right).

When change the V-belt, temporarily disconnect the short connector of the double-pole for about 2 ~ 5 seconds and then reconnect the connecter to complete the resetting operation.





EAS00730

SWITCHES

CHECKING SWITCH CONTINUITY

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

CAUTION:

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

Pocket tester
90890-03112

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.
The switch positions ⓐ are shown in the far left column and the switch lead colors ⓑ are shown in the top row in the switch illustration.

NOTE:

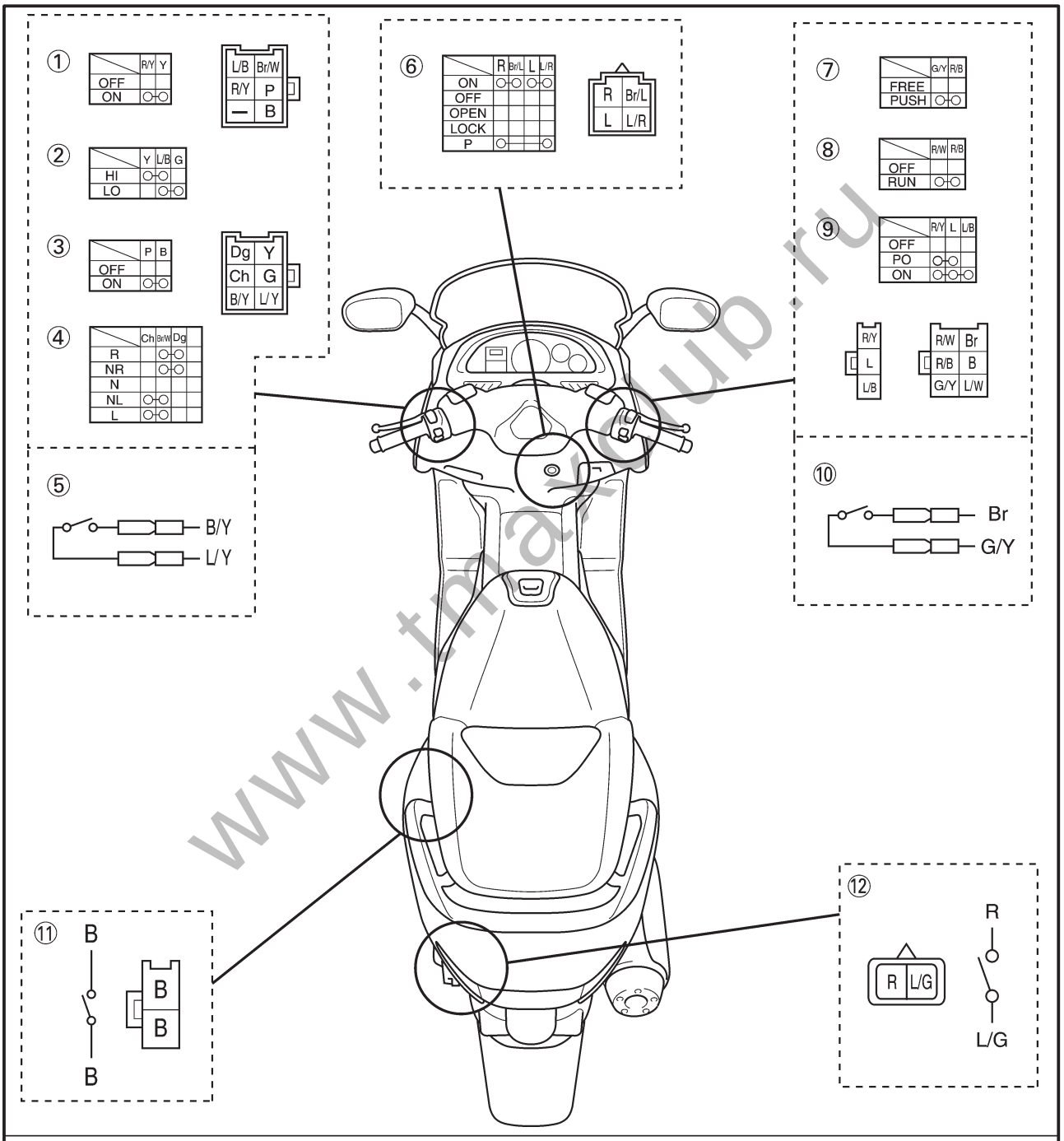
"○——○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:
There is continuity between brown/blue and red, and between blue and blue/red when the switch is set to "ON".

EAS00731
CHECKING THE SWITCHES

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

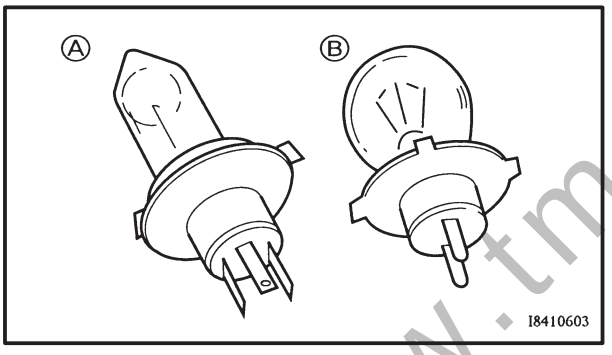
Damage/wear → Repair or replace the switch.
Improperly connected → Properly connect.
Incorrect continuity reading → Replace the switch.

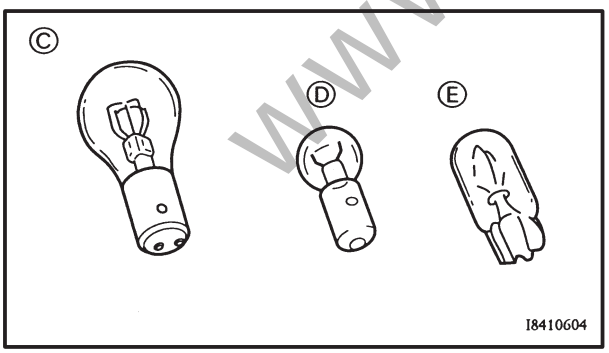


① Pass switch
② Dimmer switch
③ Horn switch
④ Turn signal switch
⑤ Rear brake light switch
⑥ Main switch
⑦ Start switch
⑧ Engine stop switch
⑨ Light switch
⑩ Front brake light switch
⑪ Sidestand switch
⑫ Box light switch

EAS00732
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
Incorrect continuity reading → Repair or replace the bulb, bulb socket or both.





TYPES OF BULBS

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

CHECKING THE CONDITION OF THE BULBS

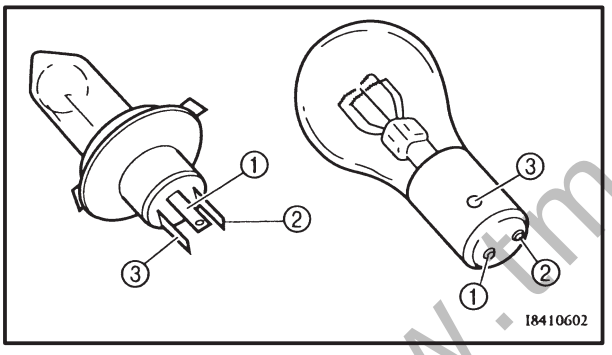
The following procedure applies to all of the bulbs.
1. Remove:
   - bulb

⚠ WARNING

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

CAUTION:

- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**



2. Check:
   - bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

Pocket tester
90890-03112

NOTE:

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.

a. Connect the tester positive probe to terminal ① and the tester negative probe to terminal ③, and check the continuity.
b. Connect the tester positive probe to terminal ① and the tester negative probe to terminal ③, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:
   - bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.

Pocket tester
90890-03112

NOTE:

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

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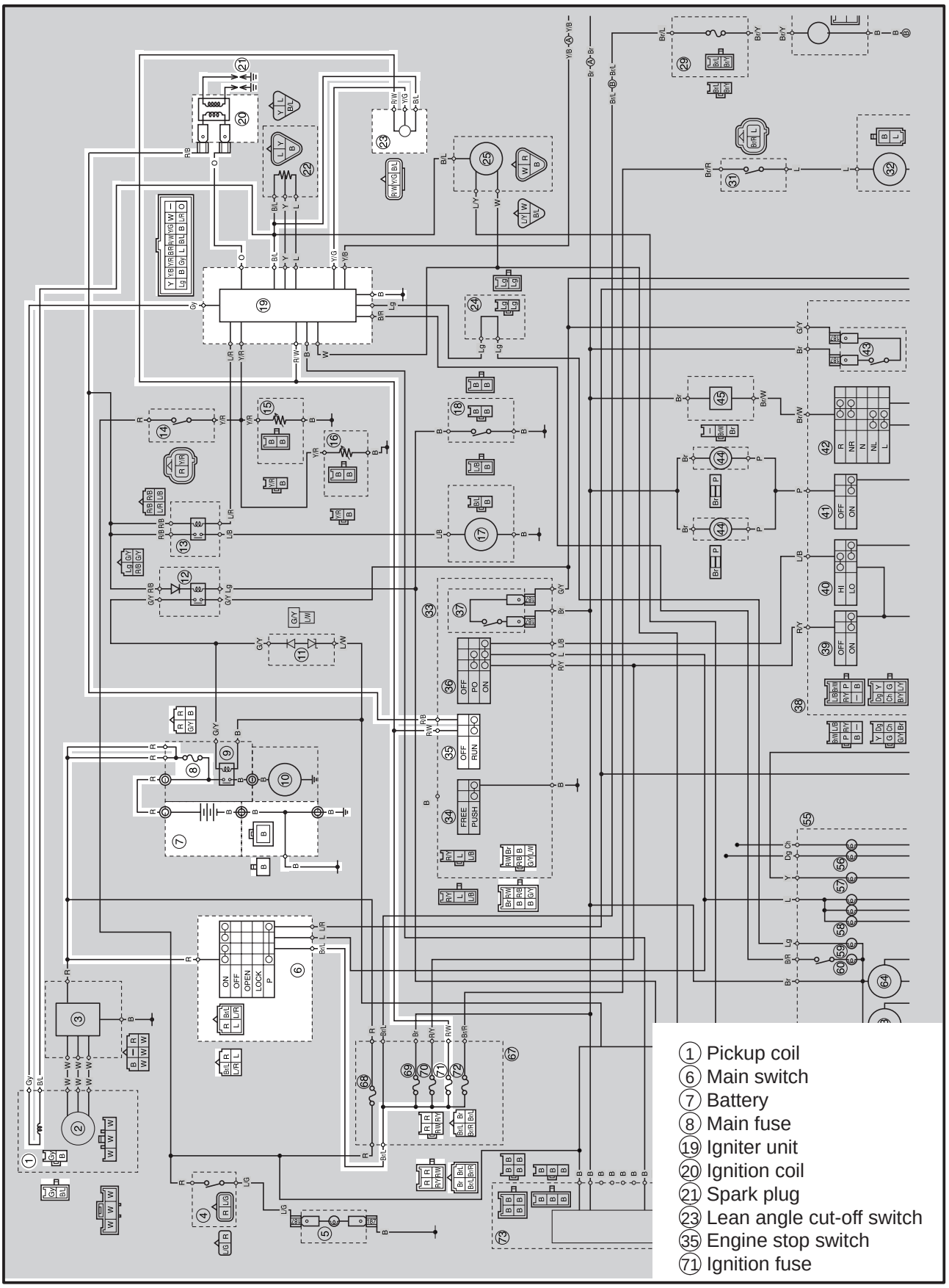
a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity.
   If any of the readings indicate no continuity, replace the bulb socket.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

DAS00734

IGNITION SYSTEM

CIRCUIT DIAGRAM



EAS00737
TROUBLESHOOTING

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

Check:
1. Main and ignition fuses
2. Battery
3. Spark plugs
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Pickup coil resistance
8. Main switch
9. Engine stop switch
10. Sidestand switch
11. Lean angle cut-off switch
12. Wiring connections
    (of the entire ignition system)

NOTE:

Before troubleshooting, remove the following part(-s):
1) Leg shield
2) Footrest board
- Troubleshoot with the following special tool(-s).

Ignition checker
90890-06754
Pocket tester
90890-03112

EAS00738
1. Main and ignition fuses

- Check the main and ignition fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the main and ignition fuses OK?

YES → NO → Replace the fuse(-s).

EAS00739
2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → NO →
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00741
3. Spark plugs

- The following procedure applies to all of the spark plugs.
- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
  Refer to "CHECKING THE SPARK PLUGS" in CHAPTER 3.

Standard spark plug
CR7E (NGK)
Spark plug gap
0.7 ~ 0.8 mm

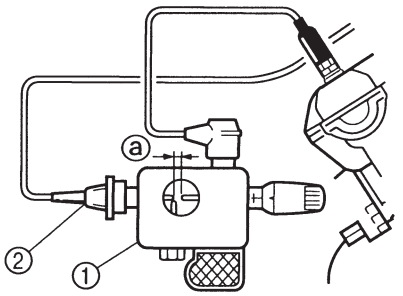
- Is the spark plug in good condition, it is of the correct type, and its gap within specification?

YES → NO → Re-gap or replace the spark plug.

EAS00743

4. Ignition spark gap

- The following procedure applies to all of the spark plugs.
- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.
- ② Spark plug cap
- Set the main switch to "ON".
- Measure the ignition spark gap ⓐ.
- Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.



I8110202

Minimum ignition spark gap
0.8 mm

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

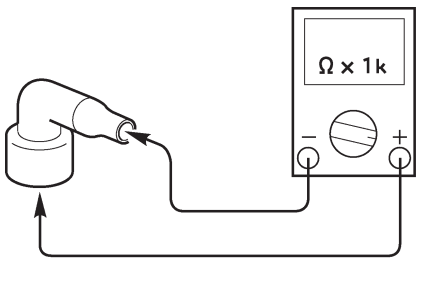
NO → The ignition system is OK.

YES

EAS00745

5. Spark plug cap resistance

- The following procedure applies to all of the spark plug caps.
- Remove the spark plug cap.
- Connect the pocket tester (Ω × 1k range) to the spark plug cap as shown.
- Measure the spark plug cap resistance.



I8040101

Spark plug cap resistance
10 kΩ at 20°C

- Is the spark plug cap OK?

YES

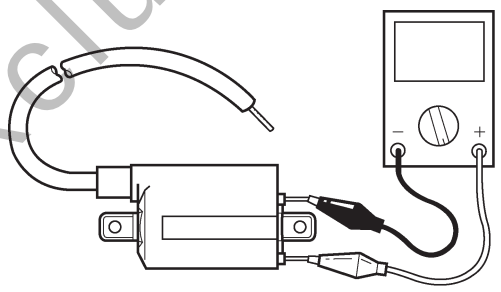
NO → Replace the spark plug cap.

EAS00747

6. Ignition coil resistance

- The following procedure applies to all of the ignition coils.
- Disconnect the ignition coil leads from the wireharness.
- Connect the pocket tester (Ω × 1) to the ignition coil as shown.

Tester positive probe → red/black
Tester negative probe → orange (gray)



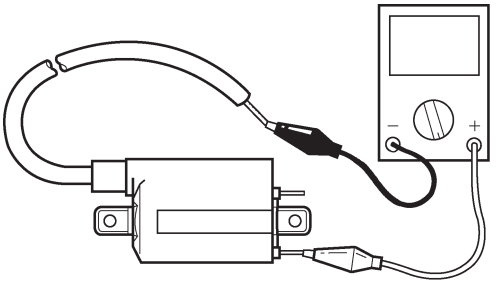
I8110104

- Measure the primary coil resistance.

Primary coil resistance
0.204 ~ 0.276 Ω at 20°C

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

Tester posltlve probe → red/black
Tester negative probe → spark plug lead



I8110104

Secondary coil resistance
12 ~ 18 kΩ at 20°C

- Is the ignition coil OK?

YES → NO

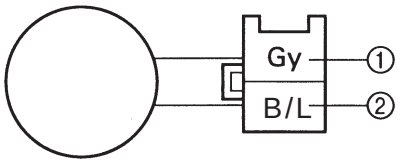
Replace the ignition coil.

EAS00748

7. Pickup coil resistance

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

Tester positive probe – gray ①
Tester negative probe – black/blue ②



- Measure the pickup coil resistance.

Pickup coil resistance
189 ~ 231 Ω at 20°C
(between gray and black/blue)

- Is the pickup coil OK?

YES → NO

Replace the pickup coil.

EAS00749

8. Main switch

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

YES → NO

Replace the main switch.

EAS00750

9. Engine stop switch

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

YES → NO

Replace the right handlebar switch.

EAS00751

10. Sidestand switch

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

YES → NO

Replace the sidestand switch.

11. Lean angle cut-off switch

- Check the lean angle cut-off switch. Refer to "SELF-DIAGNOSIS.
- 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?

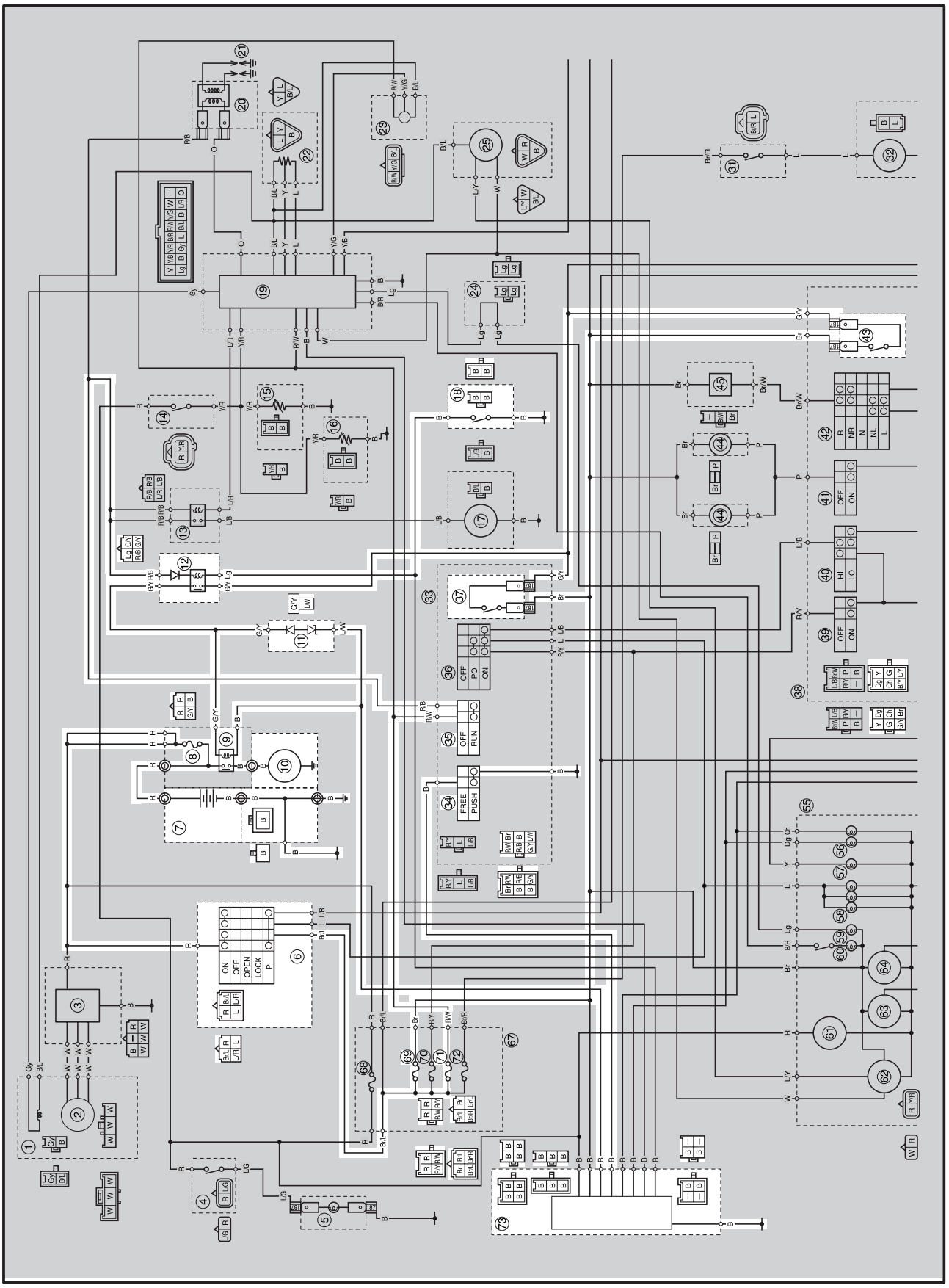
NO → Properly connect or repair the ignition system's wiring.

YES → Replace the ignitor unit.

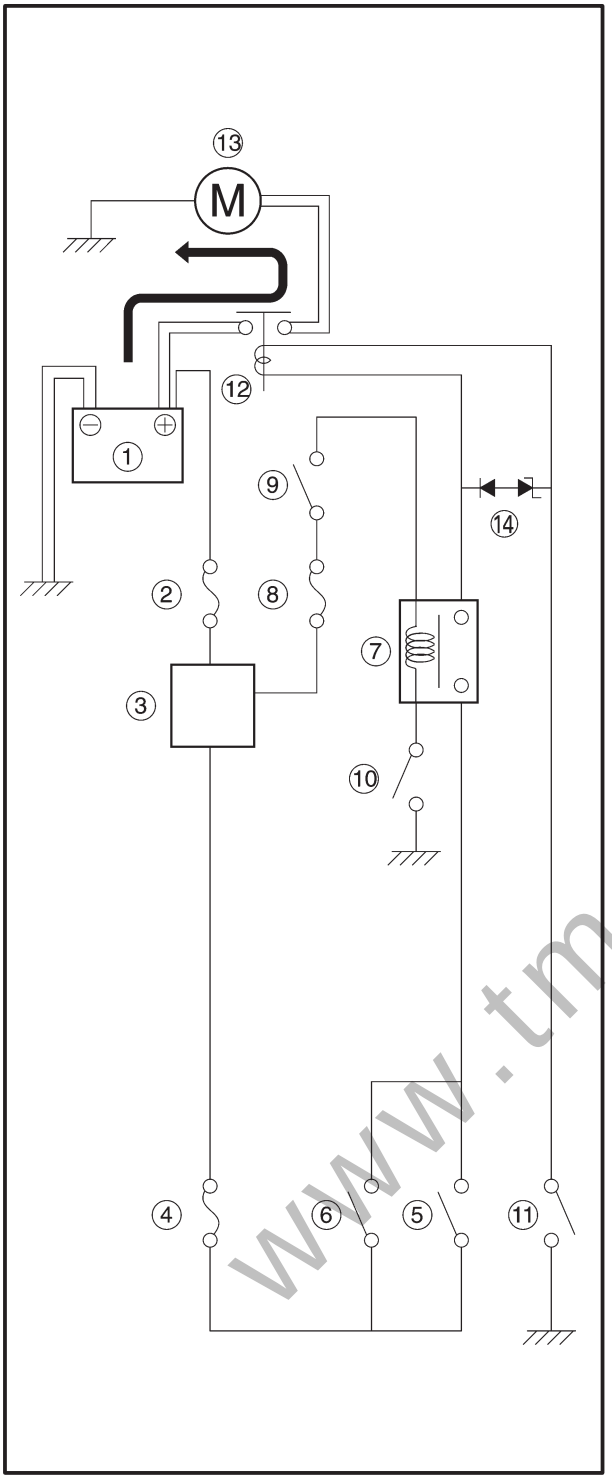
EAS00755

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM



⑥ Main switch
⑦ Battery
⑧ Main fuse
⑨ Starter relay
⑩ Starter motor
⑪ Diode
⑫ Starting circuit cut-off relay
⑱ Sidestand switch
㉞ Start switch
㉟ Engine stop switch
㊲ Front brake light switch
㊸ Rear brake light switch
㊾ Signal fuse
㉑ Ignition fuse



EAS00756

STARTING CIRCUIT CUTOFF SYSTEM OPERATION

If the engine stop switch is set to "↻" and the main switch is set to "ON" (both switches are closed), the starter motor can operate

- The brake light switch lever is pulled to the handlebar (the brake light switch switch is closed) and the sidestand is up (the sidestand switch is closed).

① Battery
② Fuse (main)
③ Main switch
④ Fuse (signal)
⑤ Front brake light switch
⑥ Rear brake light switch
⑦ Starting circuit cut-off switch
⑧ Ignition fuse
⑨ Engine stop switch
⑩ Sidestand switch
⑪ Start switch
⑫ Starter relay
⑬ Starter motor
⑭ Diode

EAS00757
TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. Main, signal and ignition fuses
2. Battery
3. Starter motor
4. Starting circuit cut-off relay
5. Starter relay
6. Main switch
7. Engine stop switch
8. Brake light switch (front and rear)
9. Sidestand switch
10. Start switch
11. Wiring connections (of the entire starting system)

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

1) Leg shield
2) Footrest board
3) Fuel tank

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

Pocket tester
90890-03112

EAS00738
1. Main, signal and ignition fuses
- Check the main, signal and ignition fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the main and ignition fuses OK?

YES
NO → Replace the fuse (-s).

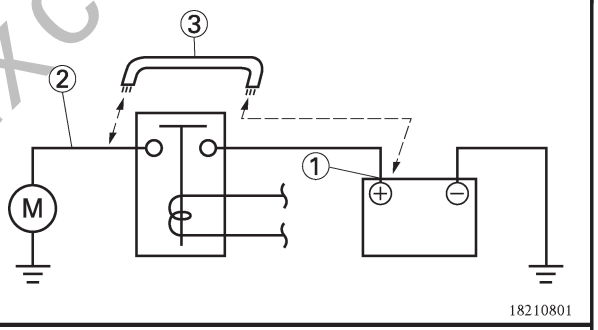
EAS00739
2. Battery
- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES
NO →
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00758
3. Starter motor
- Connect the battery positive terminal ① and starter motor lead ② with a jumper lead ③.



⚠ WARNING
- A wire that is used as a jumper lead must have the equivalent 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 that no flammable gas or fluid is in the vicinity.

- Does the starter motor turn?

YES
NO → Repair or replace the starter motor.

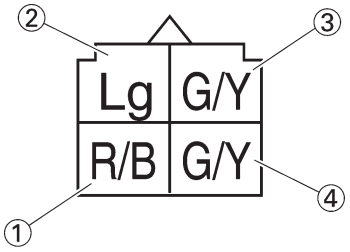
EAS00759

4. Starting circuit cut-off relay

- Disconnect the starting circuit cut-off relay coupler from the wireharness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Battery positive terminal → red/black ①
Battery negative terminal → light green ②

Tester positive probe → green/yellow ③
Tester negative probe → green/yellow ④



- Does the starting circuit cut-off relay have continuity between green/yellow ③ and green/yellow ④?

YES → NO: Replace the starting circuit cut-off relay.

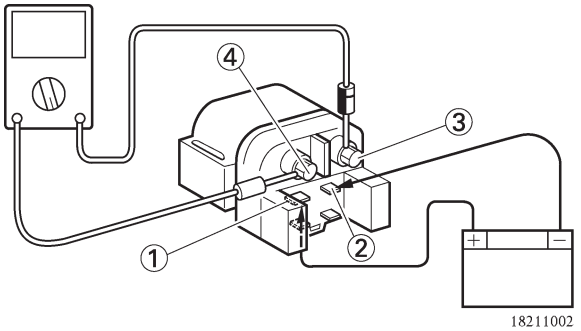
EAS00761

5. Starter relay

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

Battery positive terminal → green/yellow ①
Battery negative terminal → black ②

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



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

YES → NO: Replace the starter relay.

EAS00749

6. Main switch

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

YES → NO: Replace the main switch.

EAS00750

7. Engine stop switch

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

YES → NO: Replace the right handlebar switch.

EAS00751

8. Brake light switch (front and rear)

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

YES → NO: Replace the brake light switch.

EAS00752

9. Sidestand switch

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

YES → NO → Replace the sidestand switch.

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

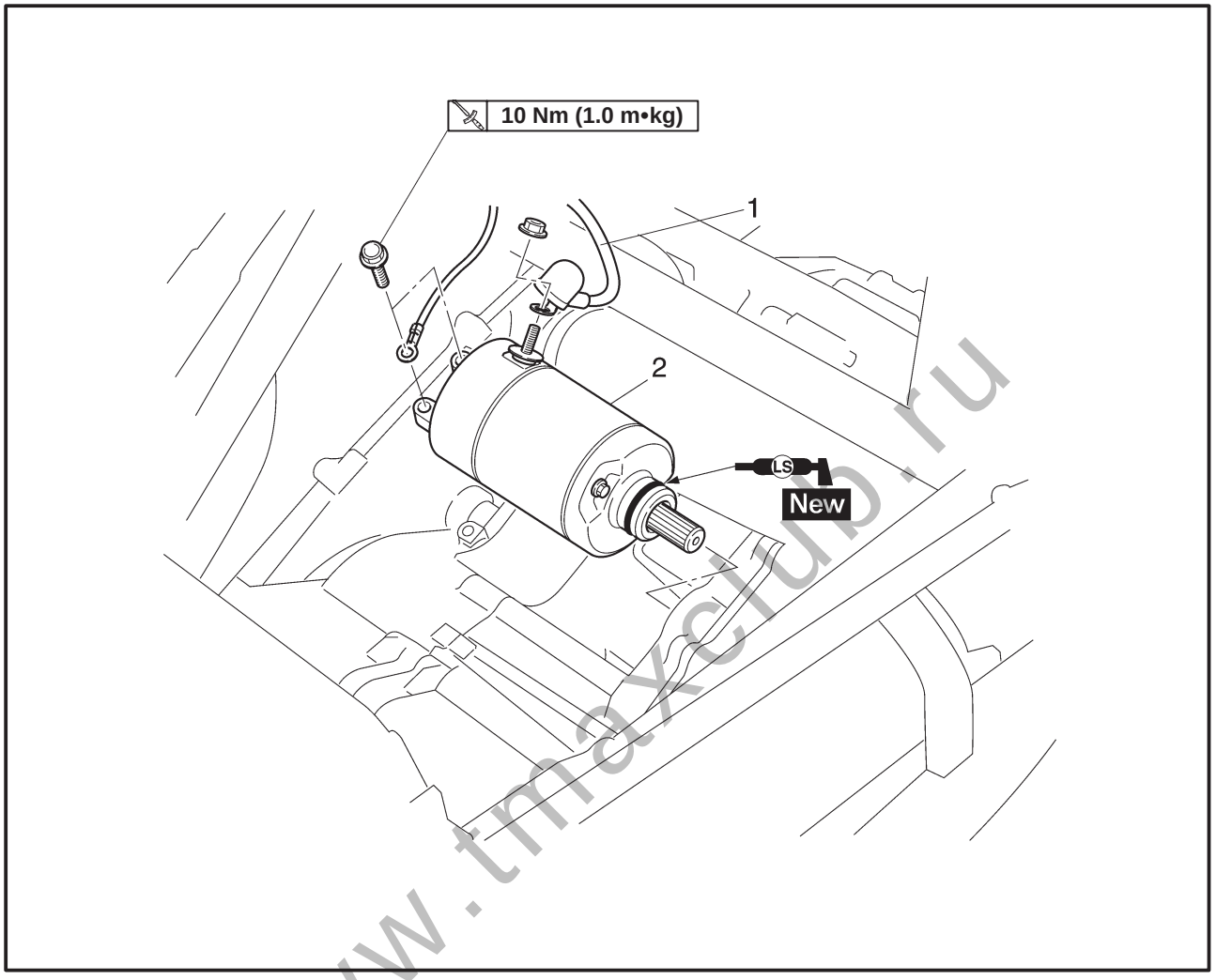
11. Wiring

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

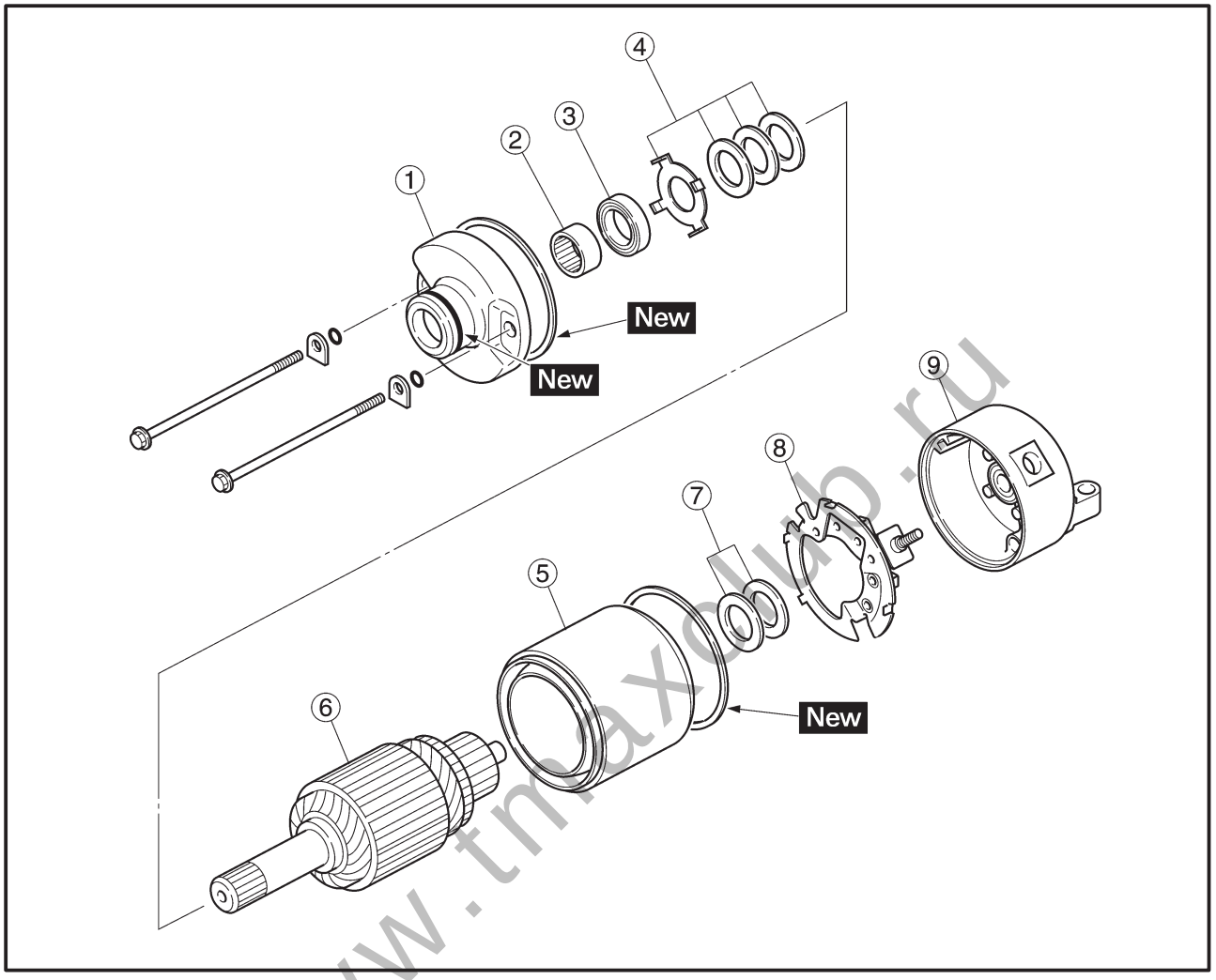
YES → The starting system circuit is OK?

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

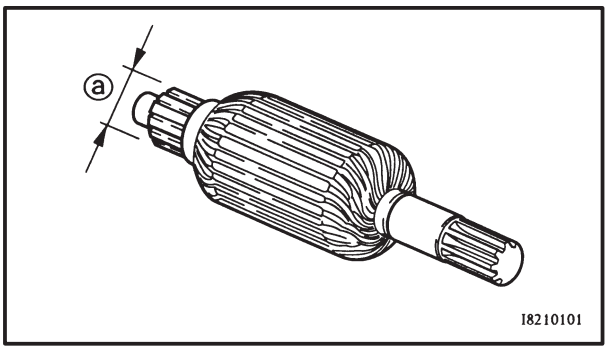
STARTER MOTOR

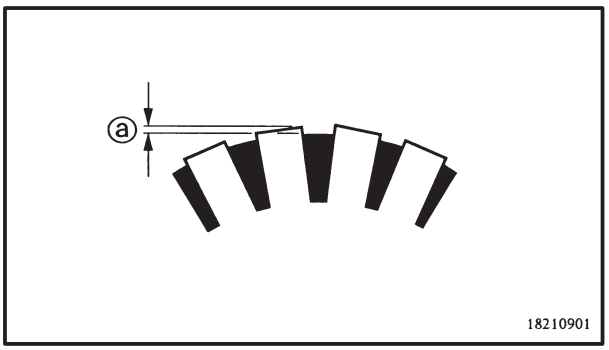


Order	Job/Part	Q'ty	Remarks
	Removing the starter motor		Remove the parts in the order listed.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Battery negative lead		
1	Starter motor lead	1	
2	Starter motor	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the starter motor		Disassemble the parts in the order listed.
①	Front bracket	1	
②	Bearing	1	
③	Oil seal	1	
④	Wahser kit	1	
⑤	Starter motor yoke	1	
⑥	Armature assembly	1	
⑦	Washer kit	1	
⑧	Brush holder	1	
⑨	Rear bracket	1	
			For assembly reverse the disassembly procedure.





EAS00770
CHECKING THE STARTER MOTOR

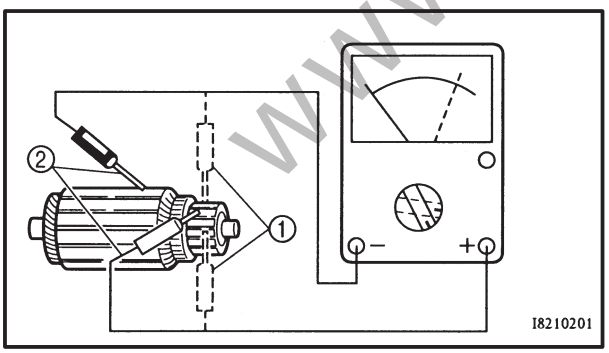
1. Check:
   • commutator
   Dirt → Clean with 600 grit sandpaper.
2. Measure:
   • commutator diameter ⓐ
   Out of specification → Replace the starter motor.

Commutator wear limit
27 mm

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

Mica (insulation) undercut
0.7 mm

NOTE:
The mica (insulation) of the commutator must be undercut to ensure proper operation of the commutator.



4. Measure:
   • armature coil resistances (continuity and insulation)
   Out of specification → Replace the starter motor.

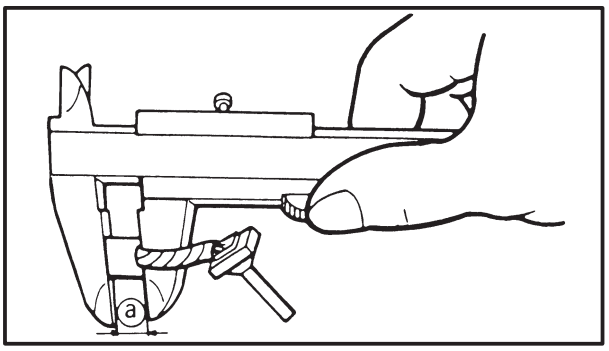
a. Check the continuity resistance ① and mica (insulation) resistances ② with a pocket tester.

Pocket tester
90890-03112

b. Measure the armature coil resistances.

Armature coil continuity resistance
0.015 ~ 0.025 Ω at 20°C
Armature coil insulation resistance
Above 1MΩ at 20°C

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



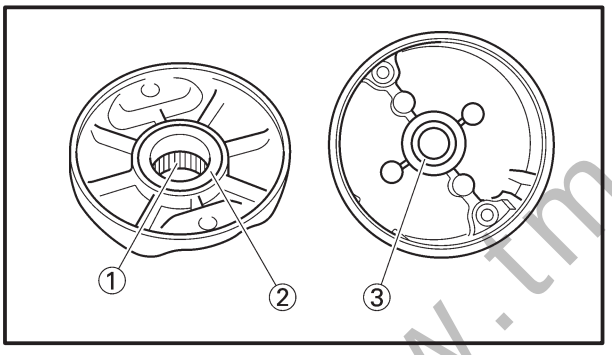
5. Measure:
   • brush length ⓐ
   Out of specification → Replace the brushes as a set.

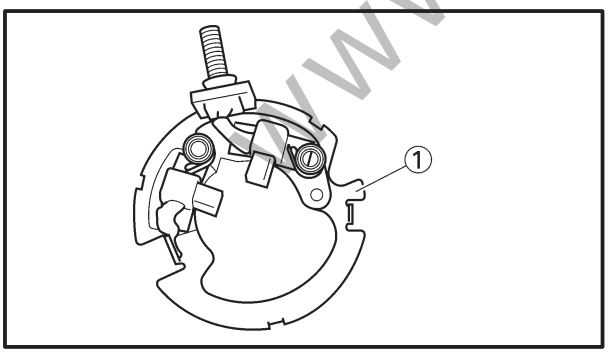
Brush length wear limit
4.0 mm

6. Measure:
   • brush spring force
   Fatigue/out of specification → Replace the brush springs as a set.

Brush spring force
7.65 ~ 10.01 N

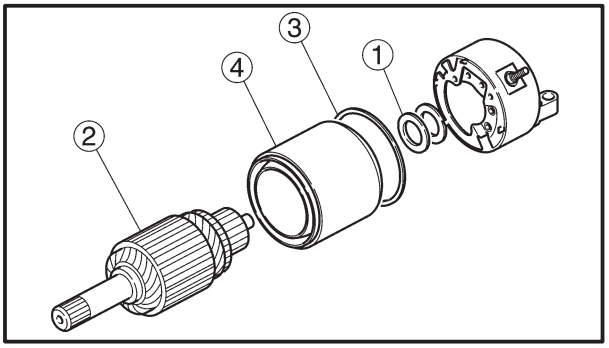
7. Check:
   • gear teeth
   Damage/wear → Replace the gear.
8. Check:
   • bearing ①
   • oil seal ②
   • bushing ③
   Damage/wear → Replace the defective part(-s).





EAS00772
ASSEMBLING THE STARTER MOTOR

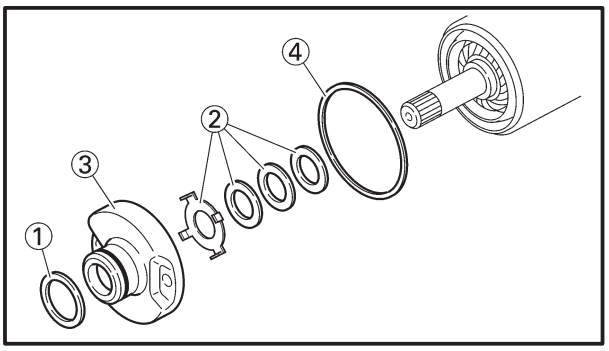
1. Install:
   • brush seat ①



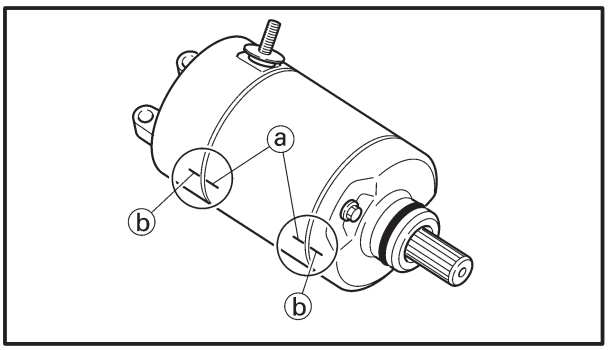
2. Install:
   • washers ①
   • armature coil ②
   • o-ring ③
   • starter motor yoke ④

NOTE:

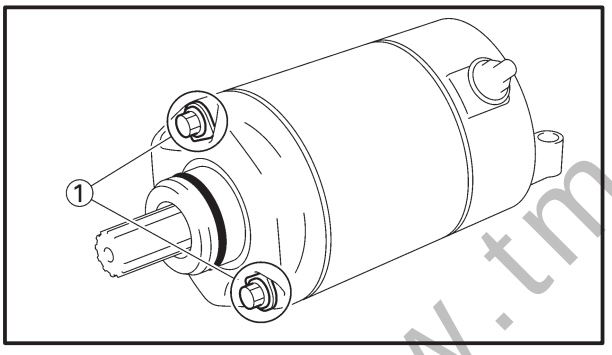
To prevent damaging the brushes during installation push down on the brush springs.



3. Install:
   - o-ring ① New
   - washers ②
   - front bracket ③
   - o-ring ④ New



NOTE:
Align the match marks ⓐ on the yoke with the match marks ⓑ on the brackets.



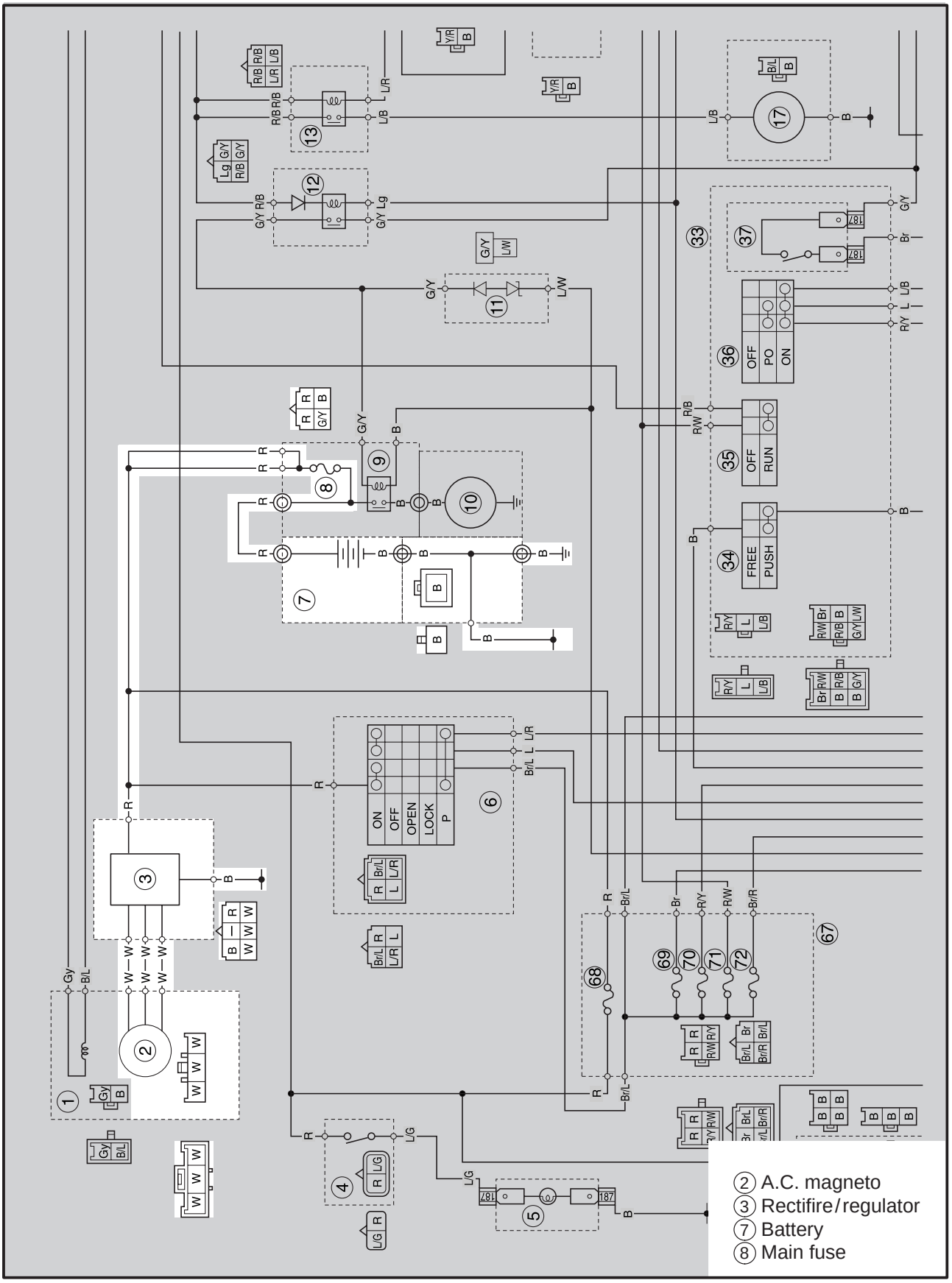
4. Install:
   - bolts ①

7 Nm (0.7 m•kg)

YP80400

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) Left side cover mole
2) Footrest board

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

Engine tachometer
90890-03113
Pocket tester
90890-03112

EAS00738
1. Main fuses
- Check the fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the fuses OK?

YES → NO → Replace the fuse (-s).

EAS00739
2. Battery
- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

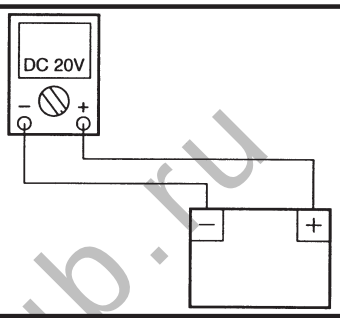
Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → NO →
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00775
3. Charging voltage
- Connect the engine tachometer to the spark plug lead of cylinder #1.
- Connect the pocket tester (20 V DC) to the battery as shown.

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



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

Charging voltage
14 V at 5,000 r/min

NOTE:
Make sure that the battery is fully charged.

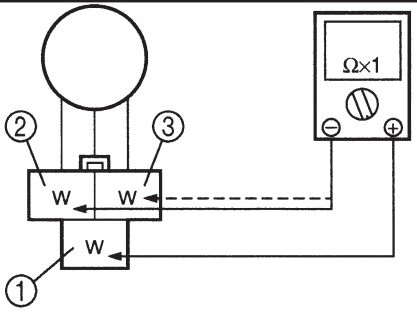
- Is the charging voltage within specification?

NO → The charging circuit is OK.
YES →

EAS00776
4. Stator coil resistance
- Remove the generator cover.
- Connect the pocket tester (Ω × 1) to the stator coils as shown.

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

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



• Measure the stator coil resistances.

Stator coil resistance
0.338 ~ 0.413 Ω at 20°C

• Is the stator coil OK?

YES

NO

Replace the stator coil assembly.

EAS00779

5. Wiring

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

YES

NO

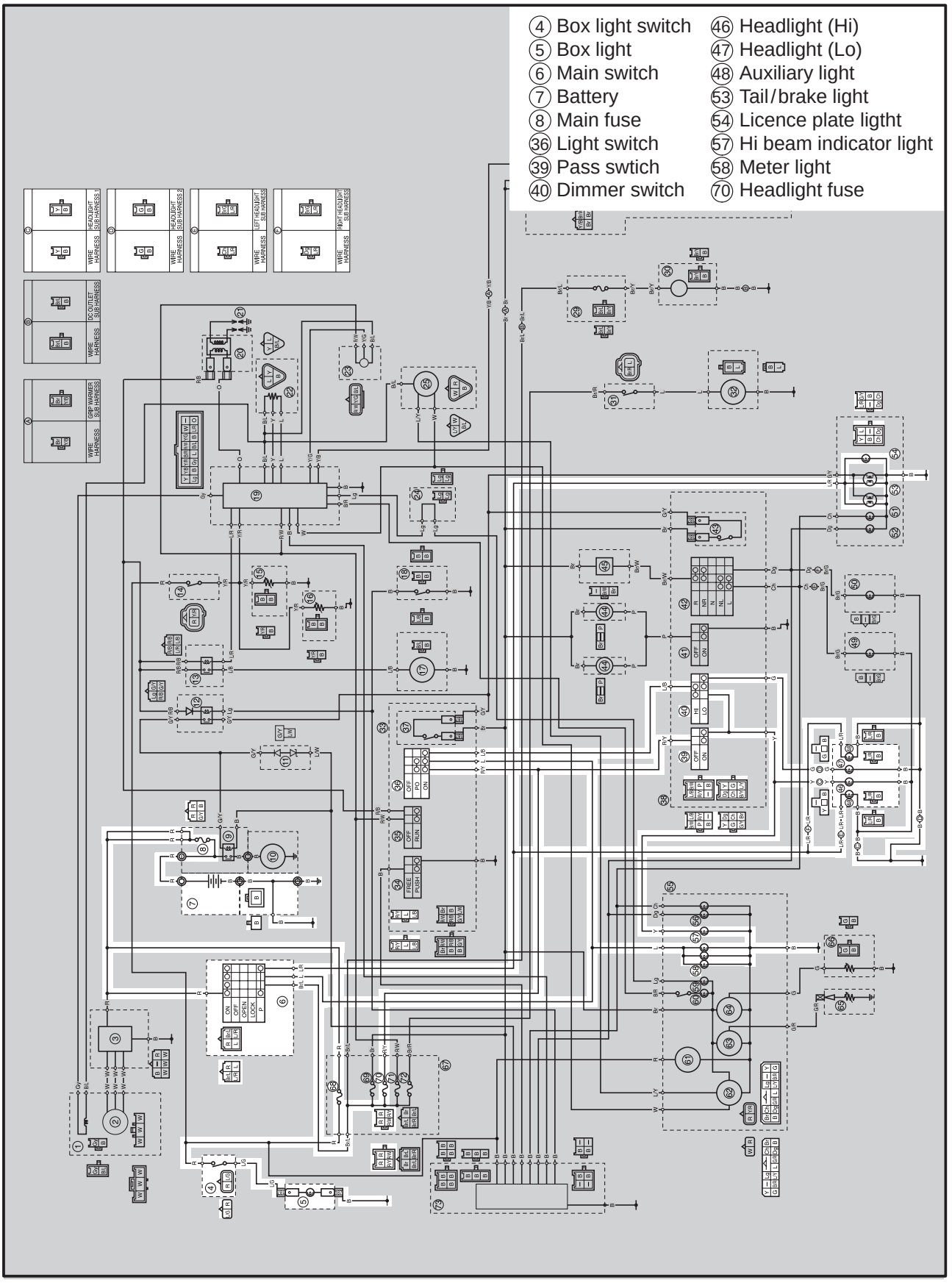
Replace the rectifier/regulator.

Properly connect or repair the charging system’s wiring.

EB804000

LIGHTING SYSTEM

CIRCUIT DIAGRAM



EB805010

TROUBLESHOOTING

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

Check:
1. Main, and headlight fuses
2. Battery
3. Main switch
4. Light switch
5. Dimmer switch
6. Pass switch
7. Box light switch
8. Wiring
   (of the entire charging system)

NOTE:

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

1) Front cawling
2) Handlebar cover

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

Pocket tester
90890-03112

EB802400

1. Main, and headlight fuses

- Check the main, and headlight fuses for continuity.
  Refer to “CHECKING THE FUSES” in chapter 3.
- Are the main, signaling system, and headlight fuses OK?

YES → NO

Replace the fuse(-s).

EB802401

2. Battery

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

Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → NO

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

EB802411

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.

EB805400

4. Light switch (for Europe)

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

YES → NO

The lights switch is faulty. Replace the right handlebar switch.

EB805401

5. Dimmer switch

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

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.

NO → The dimmer switch is faulty. Replace the left handlebar switch.

EB805403

6. Pass switch

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

YES

NO → The pass switch is faulty. Replace the left handlebar switch.

EB805403

7. Box light switch

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

YES

NO → Replace the box light swtich

EB805404

8. Wiring

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

EB805410

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 → **2. High beam indicator light bulb and socket**

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".
- Is the high beam indicator light bulb and socket OK?

YES → **3. Voltage**

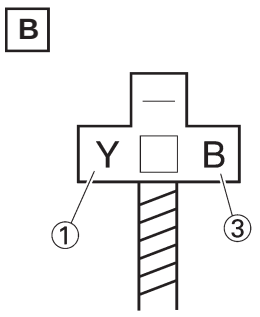
NO → Replace the high beam indicator bulb, socket or both.

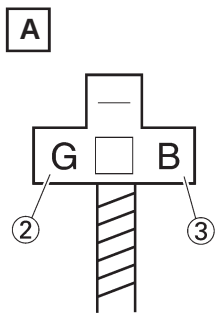
3. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.

A When the dimmer switch is set to " ≡D "
B When the dimmer switch is set to " ≡D "

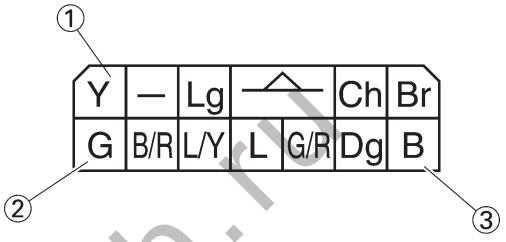
Headlight coupler (wireharness side)





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

Meter assembly coupler (wireharness side)



- Set the main switch to "ON".
- Set the light switch to " ☼ ".
- Set the dimmer switch to " ≡D " or " ≡D ".
- Measure the voltage (12 V) of yellow (green) ② on the headlight coupler (headlight side).
- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the headlight coupler is faulty and must be repaired.

EB805411

2. 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?

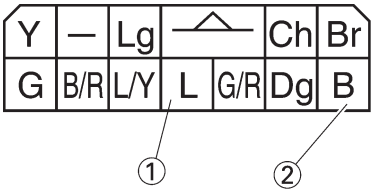
YES → Replace the meter light bulb, socket or both.

NO

2. Voltage

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

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



- Set the main switch to "ON".
- Set the light switch to " ≡D ⊄≡ " or " ☼ ".
- Measure the voltage (12 V) of blue ① on the meter assembly coupler (wireharness side).
- Is the voltage within specification?

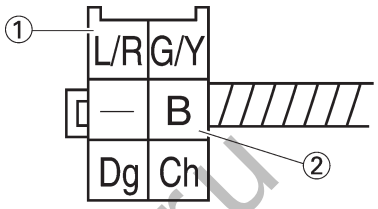
YES → This circuit is OK.

NO → The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

2. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wireharness side) as shown.

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



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

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EB805412

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

1. Tail/brake light bulb and socket

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

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

EB805413

4. The auxiliary light fails to come on. (for Europe)

1. Auxiliary light bulb and socket

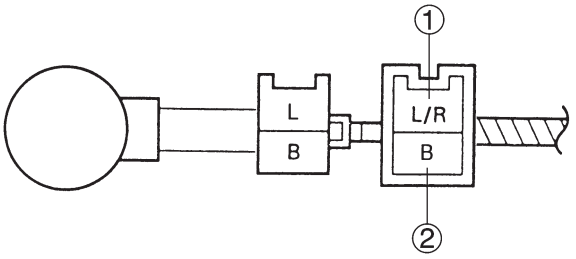
- Check the auxiliary light bulb and socket for continuity.
  Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the auxiliary light bulb and socket OK?

YES → NO → Replace the auxiliary light bulb, socket or both.

2. Voltage

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

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



- Set the main switch to "ON".
- Set the light switch to "≡D ⊄≡ " or " ☼ ".
- Measure the voltage (12 V) of blue/red ① on the auxiliary light couplers (wireharness side).
- Is the voltage within specification?

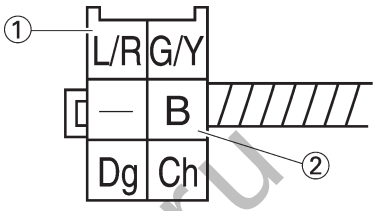
YES → This circuit is OK.

NO → The wiring circuit from the main switch to the auxiliary light coupler is faulty and must be repaired.

2. Voltage

- Connect the pocket tester (20 V) to the licence plate light coupler (wireharness side) as shown.

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



- Set the main switch to "ON".
- Measure the voltage (12 V) of blue/red ① on the meter light coupler (wireharness side).
- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the licence plate light coupler is faulty and must be repaired.

5. Licence plate light fails to come on.

1. Licence plate light bulb and socket

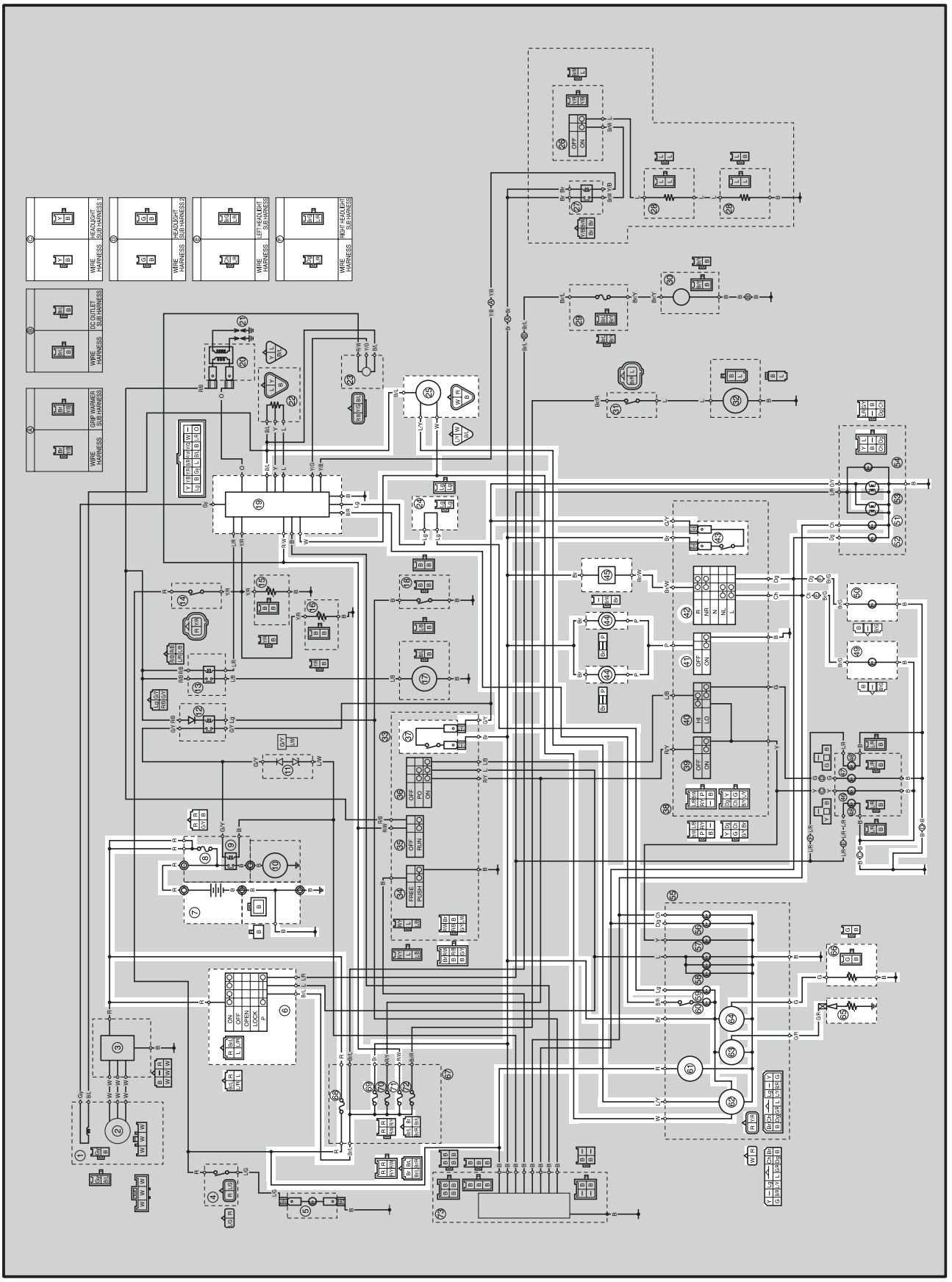
- Check the licence plate light and socket for continuity.
- Are the licence plate light bulb and socket OK?

YES

NO → Replace the licence plate light bulb, socket or both.

SIGNAL SYSTEM

CIRCUIT DIAGRAM



⑥ Main switch
⑦ Battery
⑧ Main fuse
⑲ Igniter unit
㉔ Reset coupler
㉕ Speed sensor
㊲ Front brake light switch
㊶ Horn switch
㊷ Turn signal switch
㊸ Rear brake light switch
㊹ Horn
㊺ Flasher relay
㊾ Front turn signal light (Left)
㊿ Front turn signal light (Right)
(51) Rear turn signal light (Left)
(52) Rear turn signal light (Right)
(53) Tail/brake light
(56) Turn signal indicator light
(59) V-belt indicator light
(60) Engine oil change indicator light
(61) Clock
(62) Speedometer
(63) Water temperature gauge
(64) Fuel gauge
(65) Thermo unit
(66) Fuel level sender
(68) Backup fuse
(69) Signal fuse
(71) Ignition fuse

EAS00794
TROUBLESHOOTING

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

Check:
1. Main, signal and ignition fuses
2. Battery
3. Main switch
4. Wiring connections (of the entire signal system)

NOTE:
- Before troubleshooting, remove the following part(-s):
1) Front cowling
2) Handlebar cover
- Troubleshoot with the following special tool(-s).


Pocket tester
90890-03112

EAS00738
1. Main, signal and ignition fuses
- Check the main, signal and ignition fuses for continuity. Refer to "CHECKING THE FUSES" in CHAPTER 3.
- Are the main, signal and ignition fuses OK?

YES → 2. Battery
NO → Replace the fuse (-s).

EAS00739
2. Battery
- Check the condition of the battery. Refer to "CHECKING THE BATTERY" in CHAPTER 3.


Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → 3. Main switch
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 → 4. Wiring
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 → Check the condition of each of the signal system's circuits. Refer to "CHECKING THE SIGNALING SYSTEM".
NO → Properly connect or repair the signal system's wiring.

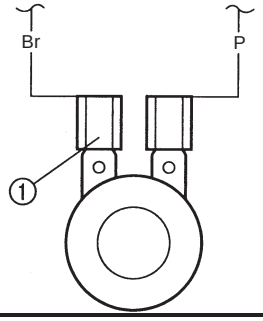
EAS00796
CHECKING THE SIGNAL SYSTEM
1. The horn fails to sound.

1. Horn switch
Refer to "CHECKING THE SWITCHES".

YES → 2. Voltage
NO → Replace the left handlebar switch.

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

Tester positive probe → brown ①
Tester negative probe → ground

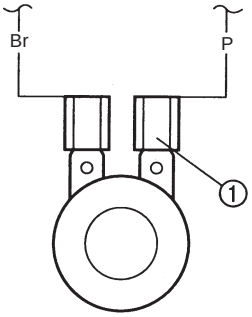


- Set the main switch to "ON".
- Measure the voltage (12 V) of the brown connecter at the horn terminal.
- Is the voltage within specification?

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

NO → Replace the horn.

Tester positive probe → pink ①
Tester negative probe → ground



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

YES → Repair or adjust the horn.

NO → Replace the horn.

EAS00797

2. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket.

- Check the tail/brake light bulb and socket for continuity.
- Are the tail/brake light bulb and socket OK?

YES → 2. Brakelight switch

NO → Replace the tail/brake light bulb, socket or both.

2. Brakelight switch

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

YES → 3. Voltage

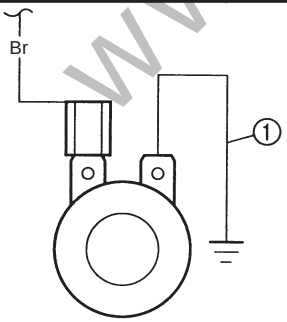
NO → Replace the brakelight switch.

3. Voltage

- Connect the pocket tester (20 V DC) to the tail/brake light coupler (wireharness side) as shown.

3. Horn

- Disconnect the P connecter at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Does the horn sound?



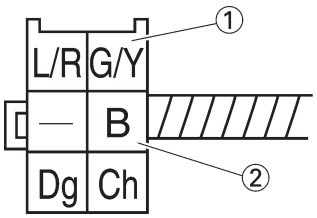
YES → 4. Voltage

NO → Replace the horn.

4. Voltage

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

Tester positive probe → green/yellow ①
Tester negative probe → black ②



- Set the main switch to "ON".
- Pull in the brake lever (front or rear).
- Measure the voltage (12 V) of green/yellow ① on the tail/brake light coupler (wireharness side).
- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the tail/brake light coupler (wireharness side) is faulty and must be repaired.

EAS00799

3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light bulb and socket

- Check the turn signal light bulb and socket for continuity.
- Are the turn signal light bulbs and socket OK?

YES

NO → Replace the turn signal light bulb, socket or both.

2. Turn signal switch

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

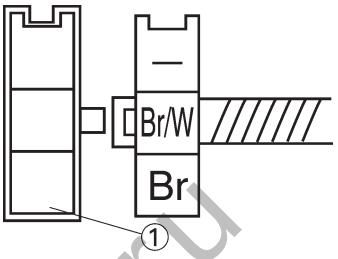
YES

NO → Replace the left handlebar switch.

3. Voltage

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

Tester positive probe → brown ①
Tester negative probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① at the flasher relay coupler (wireharness side).
- Is the voltage within specification?

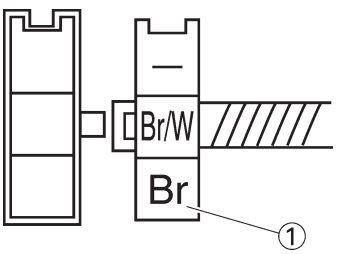
YES

NO → The wiring circuit from the main switch to the flasher relay coupler (wireharness side) is faulty and must be repaired.

4. Voltage

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

Tester positive probe → brown/white ①
Tester negative probe → ground



- Set the main switch to “ON”.
- Measure the voltage (12 V) on brown/white ① at the flasher relay coupler (wireharness side).
- Is the voltage within specification?

YES

NO

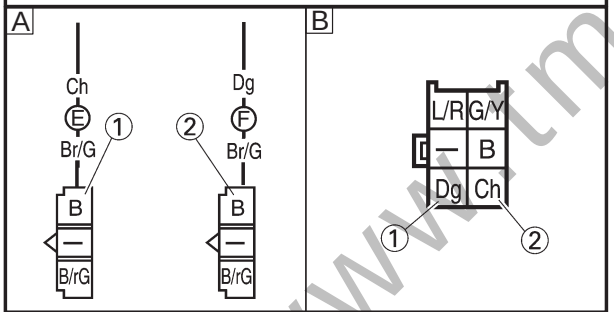
The flasher relay is faulty and must be replaced.

5. Voltage

- Connect the pocket tester (20 V DC) to the turn signal light coupler (wireharness side) as shown.

A Front turn signal light
B Rear turn signal light

Left turn signal light
Tester positive probe → chocolate ①
Tester negative probe → ground
Right turn signal light
Tester positive probe → dark green ②
Tester negative probe → ground



- Set the main switch to “ON”.
- Set the turn sighal switch to “ ⇨ ” or “ ⇦ ”.
- Measure the voltage (12 V) of the chocolate ① or dark green ② on the turn signal light coupler (wireharness side).
- Is the voltage within specification?

YES

NO

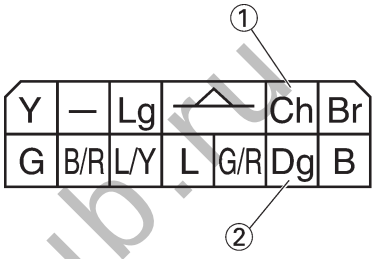
This circuit is OK.

The wiring circuit from the turn signal switch to the turn signal light connecter (wireharness side) is faulty and must be repaired.

6. Voltage

- Connect the pocket tester (20 VDC) to the meter assembly coupler (wireharness side) as shown.

Left turn signal indicator light
Tester positive probe → chocolate ①
Tester negative probe → ground
Right turn signal indicator light
Tester positive probe → dark green ②
Tester negative probe → ground



- Set the main switch to “ON”.
- Set the turn signal switch to “ ⇨ ” or “ ⇦ ”.
- Measure the voltage (12 V) of the chocolate ① or dark green ② on the meter assembly coupler (wireharness side).
- Is the voltage iwthin specification?

YES

NO

This circuit is OK.

The wiring circuit from the turn signal switch to the meter assembly coupler (wireharness side) is foulty and must be repaired.

4. The V-belt indicator light fails to come on.

1. V-belt indicator light bulb and socket
- Check the V-belt indicator light bulb and socket for continuity.
- Are the V-belt indicator light bulb and socket OK?

YES / NO

Replace the V-belt indicator light bulb, socket or both.

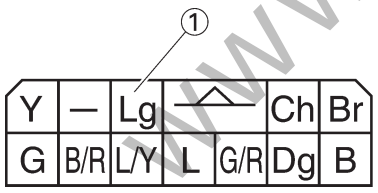
2. V-belt indicator reset coupler
- Check the V-belt indicator reset coupler for continuity.
- Is the V-belt reset coupler OK?

YES / NO

Replace the V-belt reset coupler.

3. Voltage
- Connect the pocket tester (20 V DC) to the meter assembly coupler (wireharness side) as shown.

Tester positive probe → light green ①
Tester negative probe → ground



- Set the main switch to "ON".
- Measure the voltage (12 V) of light green ① at the meter assembly coupler.
- Is the voltage within specification?

YES / NO

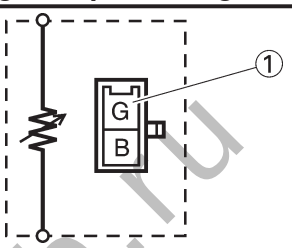
Replace the meter assembly.

The wiring circuit from the igniter unit to the meter assembly coupler (wireharness side) is faulty and must be repaired.

5. Fuel gauge fails to operate

1. Fuel sender
- Remove the fuel sender from the fuel tank.
- Disconnect the fuel sender coupler from the wireharness.
- Connect the pocket tester (Ω × 10) to the fuel sender coupler lead.

Tester positive probe → green ①
Tester negative probe → ground



- Measure the fuel sender resistance.

Float position resistance
UP → 4 ~ 10 Ω
DOWN → 90 ~ 100 Ω

- Is the fuel sender OK?

YES / NO

Replace the fuel sender.

2. Voltage
- Connect the pocket tester (20 V DC) to the meter assembly coupler (wireharness side) as shown.

Tester positive probe → brown ①
Tester negative probe → ground

- Set the main switch to “ON”.
- Measure the voltage (12 V) of brown ① at the meter assembly coupler. (wireharness side)
- Is the voltage within specification?

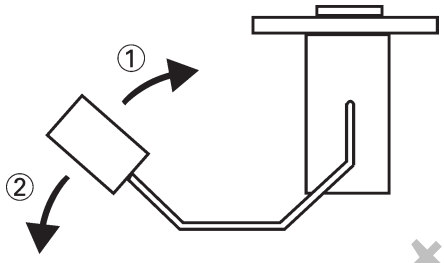
YES

NO

The wiring circuit from the signal fuse to the meter assembly coupler (wireharness side) is faulty and must be repaired.

3. Fuel gauge

- Connect the fuel sender coupler.
- Move the float to “UP” ① or “DOWN” ②.



- Set the main switch to “ON”.
- Check the fuel gauge needle moves “F” or “E”.
- Is the fuel gauge OK?

YES

NO

This circuit is OK.

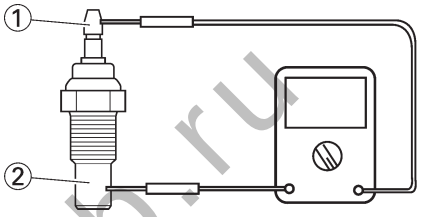
Replace the fuel gauge.

6. Water temperature gauge fails to operate

1. Thermo unit

- Remove the thermo unit from the cylinder head.
- Connect the pocket tester (Ω × 10) to the thermo unit.

Tester positive probe →
Thermo unit terminal ①
Tester negative probe →
Thermo unit body ②



- Measure the thermo unit resistance.

Thermo unit resistance:
69 Ω at 80°C
22 Ω at 120°C

- Is the thermo unit OK?

YES

NO

Thermo unit replace.

2. Voltage

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

Tester positive probe → brown ①
Tester negative probe → ground

- Set the main switch to “ON”.
- Measure the voltage (12 V) of brown ① at the meter assembly coupler. (wireharness side)
- Is the voltage within specification?

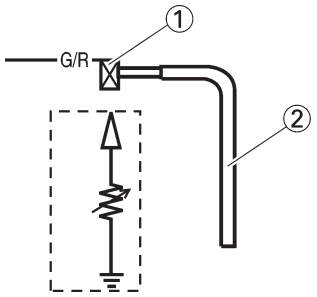
YES

NO

The wiring circuit from the signal fuse to the meter assembly coupler (wireharness side) is faulty and must be repaired.

3. Water temperature gauge

- Disconnect the thermo unit connecter.
- Set the main switch to “ON”.
- Connect the thermo unit connecter lead green/red ① and ground with a jumper lead ② as shown.



- Is the water temperature gauge OK?

YES

NO

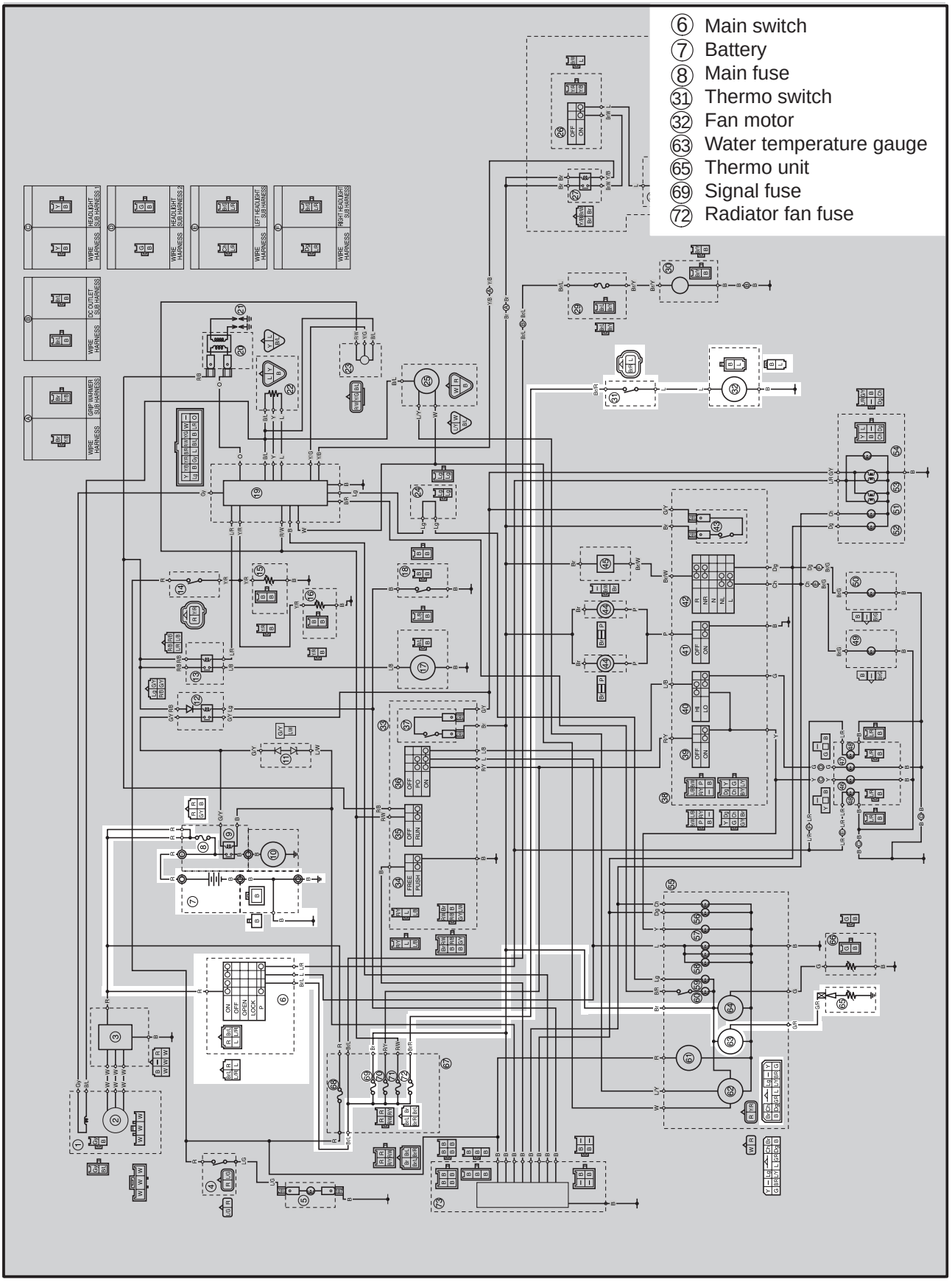
This circuit is OK.

Replace the water temperature gauge.

EB807000

COOLING SYSTEM

CIRCUIT DIAGRAM



EB807010
TROUBLESHOOTING

• The radiator fan motor fails to turn.

Check:
1. Main, and radiator fan motor fuses
2. Battery
3. Main switch
4. Radiator fan motor
5. Thermo switch
6. Wiring
   (the entire cooling system)

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

1) Footrest board
2) Legshield

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

Pocket tester
90890-03112

EB802400
1. Main, and radiator fan motor fuses

- Check the main, and radiator fan motor fuses for continuity.
  Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, and radiator fan motor fuses OK?

YES → NO

Replace the fuse(-s).

EB802401
2. Battery

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

Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → NO

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

EB802411
3. Main switch

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

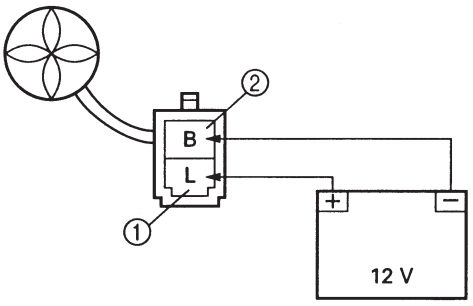
YES → NO

Replace the main switch.

EB807400
4. Radiator fan motor (test 1)

- Disconnect the radiator fan motor coupler from the wireharness.
- Connect the battery (12 V) as shown.

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



- Does the radiator fan motor turn?

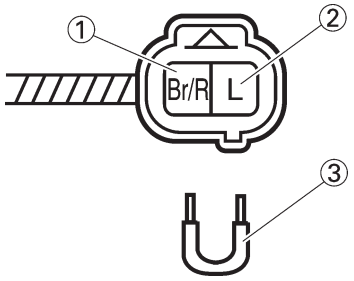
YES → NO

The radiator fan motor is faulty and must be replaced.

EB807400

5. Radiator fan motor (test 2)

- Disconnect the thermo switch coupler.
- Set the main switch to "ON".
- Connect the brown/red ① and blue ② terminals with a jumper lead ③ as shown.



- Does the radiator fan motor turn?

YES

NO

The wiring circuit from the main switch to the radiator fan motor coupler is faulty and must be repaired.

EB807402

6. Thermo switch

- Remove the thermo switch from the radiator.
- Connect the pocket tester (Ω × 1) to the thermo switch ① as shown.
- Immerse the thermo switch in a container filled with coolant ②.

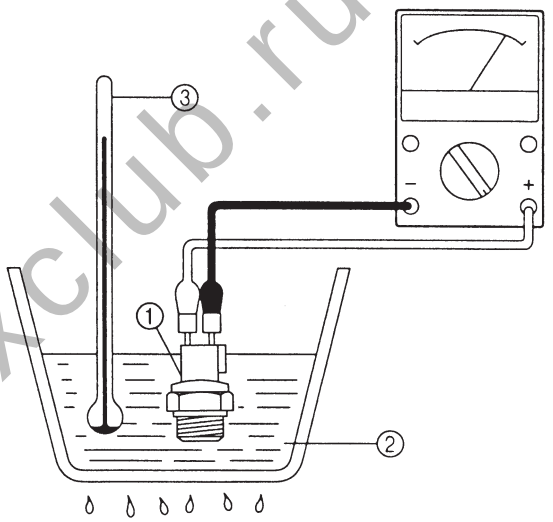
NOTE:

Make sure that the thermo switch terminals do not get wet.

- Place a thermometer ③ in the coolant.
- Slowly heat the coolant, then let it cool to the specified temperature as indicated in the table.
- Check the thermo switch for continuity at the temperatures indicated in the table.

Test step	Coolant temperature / Thermo switch	Continuity
1	0 ~ 92 ± 3°C	NO
2	More than 98 ± 3°C	YES
3*	98 ± 3°C to 92 ± 3°C	YES
4*	Less than 92 ± 3°C	NO

Test steps 1 & 2: Heating phase
Test steps 3* & 4*: Cooling phase

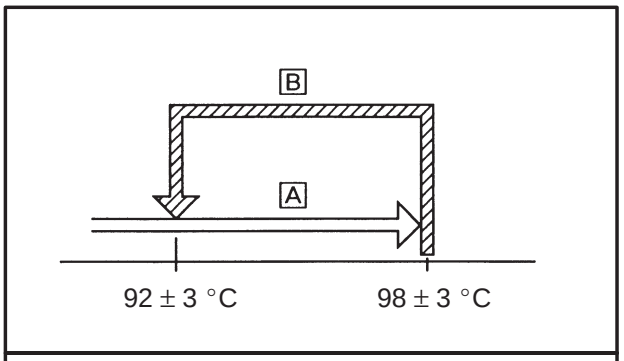


⚠ WARNING

- **Handle the thermo switch with special care.**
- **Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.**

Thermo switch
23 Nm (2.3 m•kg)
Three bond sealock® 10

A The thermo switch circuit is open and the radiator fan is off.
B The thermo switch circuit is closed and the radiator fan is on.



• Does the thermo switch operate properly as described above?

YES

NO

Replace the thermo switch.

EB807403

7. Wiring

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

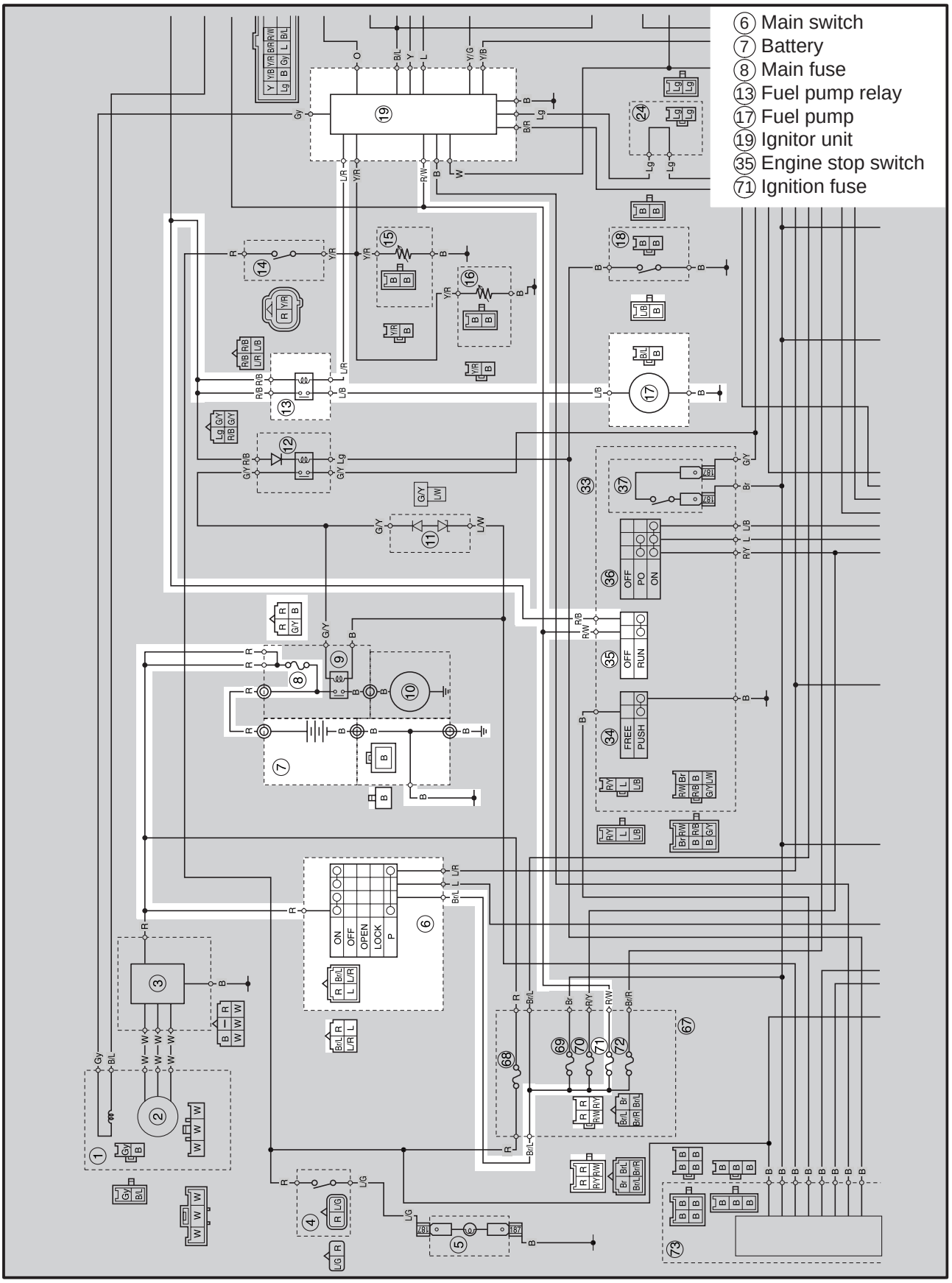
YES

NO

This circuit is OK.

Properly connect or repair the cooling system's wiring.

FUEL PUMP SYSTEM
CIRCUIT DIAGRAM

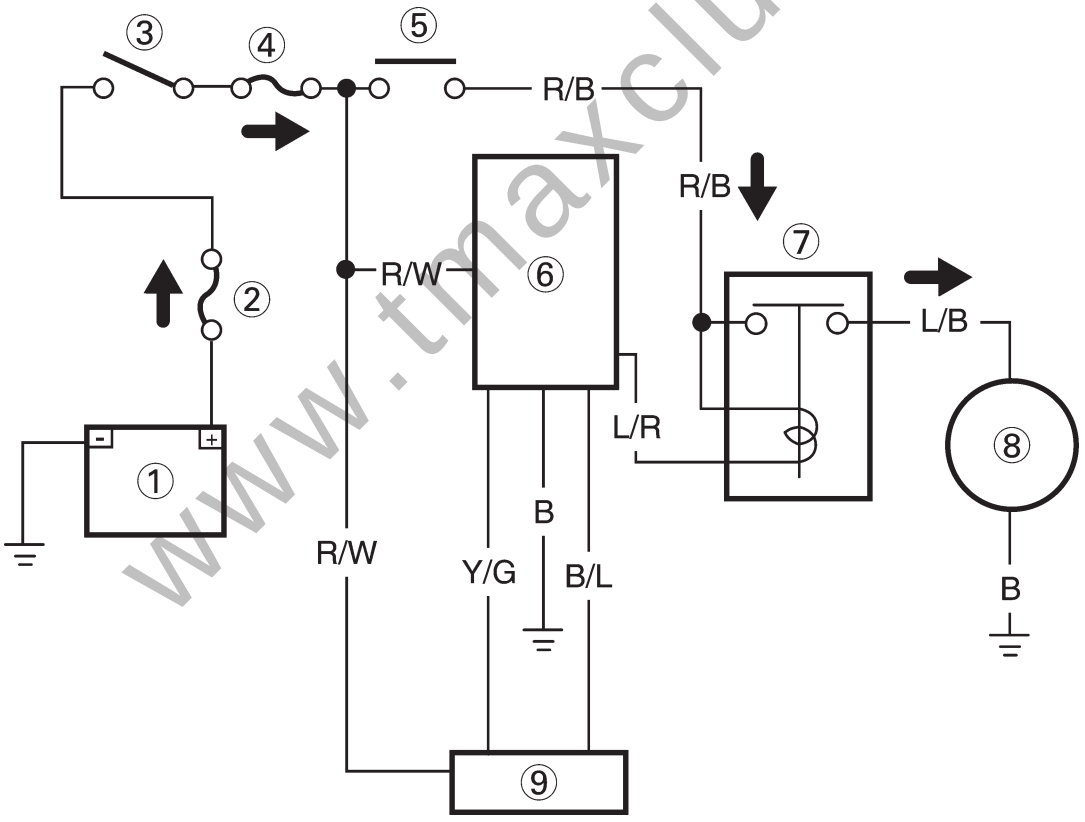


EB808010

FUEL PUMP CIRCUIT OPERATION

The fuel pump circuit consists of the fuel pump relay, fuel pump, engine stop switch and ignitor unit.
The ignitor unit includes the control unit for the fuel pump.

① Battery
② Main fuse
③ Main switch
④ Ignition fuse
⑤ Engine stop switch
⑥ Ignitor unit
⑦ Fuel pump relay
⑧ Fuel pump
⑨ Lean angle cut-off switch



EAS00816
TROUBLESHOOTING

If the fuel pump fails to operate:

Check:
1. Main and ignition fuses
2. Battery
3. Main switch
4. Engine stop switch
5. Fuel pump relay
6. Fuel pump
7. Lean angle cut-off switch
8. Wiring connections
   (the entire fuel pump system)

NOTE:

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

1) Footrest board
2) Rear side cover (right)
3) Handlebar cover

Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738

1. Main, and ignition fuses

- Check the main and ignition fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main and ignition fuses OK?

YES → NO: Replace the fuse (-s).

EAS00739

2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.

Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES → NO:
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00749

3. Main switch

- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".

- Is the main switch OK?

YES → NO: Replace the main switch.

EAS00750

4. Engine stop switch

- Check the engine stop switch for continuity.
  Refer to "CHECKING THE SWITCHES".

- Is the engine stop switch OK?

YES → NO: Replace the right handlebar switch.

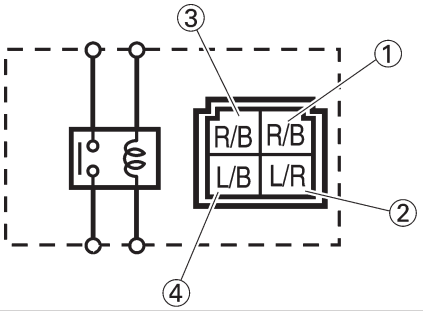
EAS00759

5. Fuel pump relay

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

Battery positive terminal → red/black ①
Battery negative terminal → blue/red ②

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



- Does the fuel pump relay have continuity between red/black and blue/black?

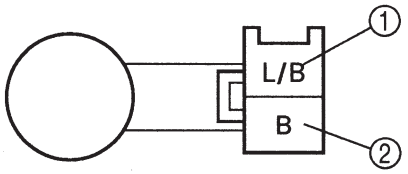
YES → NO: Replace the fuel pump relay.

EAS00817

6. Fuel pump resistance

- Disconnect the fuel pump coupler from the wireharness.
- Connect the pocket tester (Ω × 1) to the fuel pump coupler as shown.

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



- Measure the fuel pump resistance.

Fuel pump resistance
4 ~ 30 Ω at 20°C

- Is the fuel pump OK?

YES → NO

Replace the fuel pump.

7. Lean angle cut-off switch

- Check the lean angle cut -off switch. Refer to “SELF-DIAGNOSIS.
- Is the lean angle cut-off siwtch OK?

YES → NO

Replace the lean angle cut-off switch.

EAS00818

8. Wiring

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

YES → NO

Replace the ignitor unit.

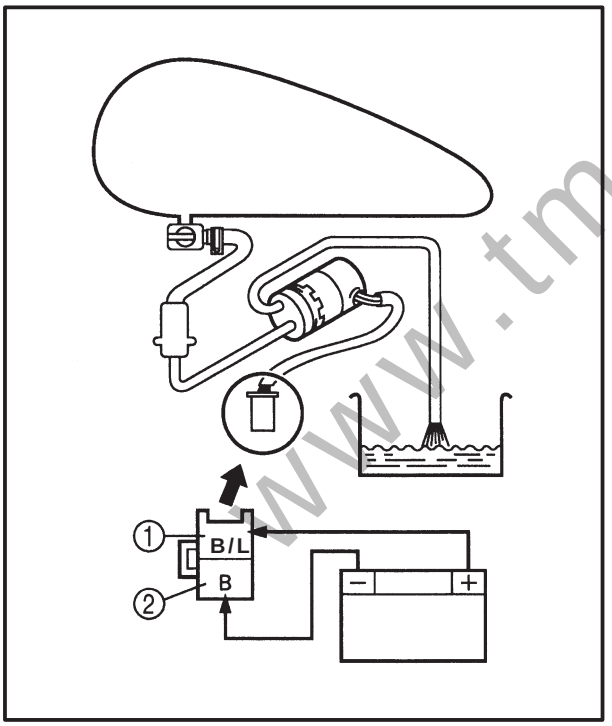
Properly connect or repair the fuel pump system’s wiring.

EAS00819

CHECKING THE FUEL PUMP

⚠ WARNING

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or fire. Be extremely careful and note the following points:
- **Stop the engine before refuelling.**
- **Do not smoke and keep away from open flames, sparks, or any other source of fire.**
- **If you do accidentally spill gasoline, wipe it up immediately with dry rags.**
- **If gasoline touches the engine when it is hot, a fire may occur. Therefore, make sure that the engine is completely cool before performing the following test.**



1. Check:
   - fuel pump operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Fill up the fuel tank.
b. Put the end of the fuel hose into an open container.
c. Connect the battery (12 V) to the fuel pump coupler as shown.

Battery positive lead → black/blue①
Battery negative lead → black②

d. If fuel flows out of the fuel hose, the fuel pump is OK.
   If fuel does not flow, replace the fuel pump.

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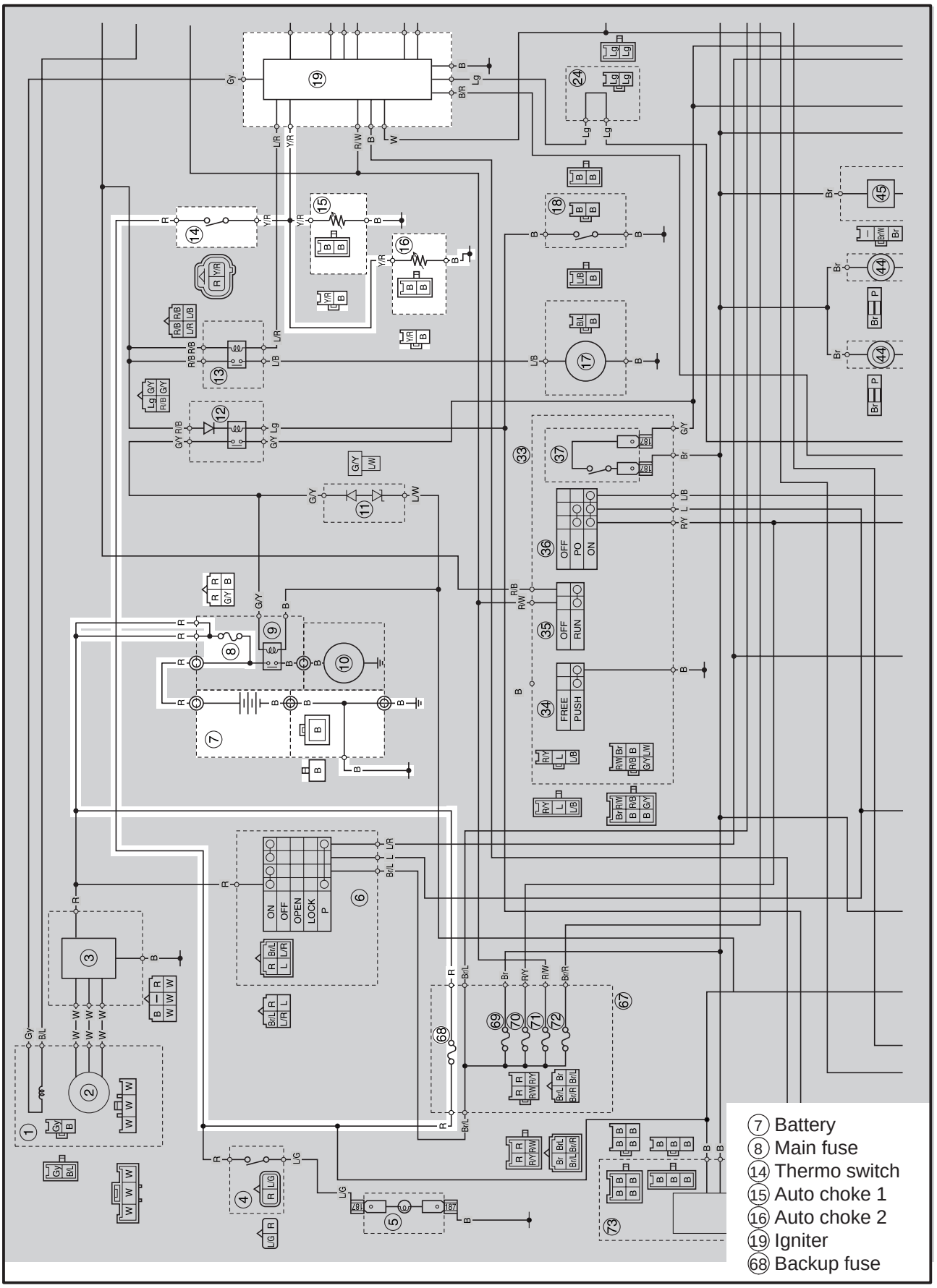
AUTO CHOKE SYSTEM

CIRCUIT DIAGRAM



EAS00821
TROUBLESHOOTING

The auto choke system fails to operate.

Check:
1. Main and backup fuses
2. Battery
3. Thermo switch
4. Auto choke 1. 2
5. Igniter unit
6. Wiring connections
   (of the entire auto choke system)

NOTE:

Before troubleshooting, remove the following part(-s):
1) Leg shield
Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00738
1. Main, and backup fuses

- Check the main and backup fuses for continuity.
  Refer to "CHECKING THE FUSES" in CHAPTER 3.

- Are the main and backup fuses OK?

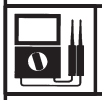
YES ⇩

NO ⇩

Replace the fuse (-s).

EAS00739
2. Battery

- Check the condition of the battery.
  Refer to "CHECKING THE BATTERY" in CHAPTER 3.



Open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES ⇩

NO ⇩

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

3. Thermo switch

- Remove the thermo switch from the thermostat housing.
- Connect the pocket tester (Ω × 1) to the thermo switch ① as shown.
- Immerse the thermo switch in a container filled with coolant ②.

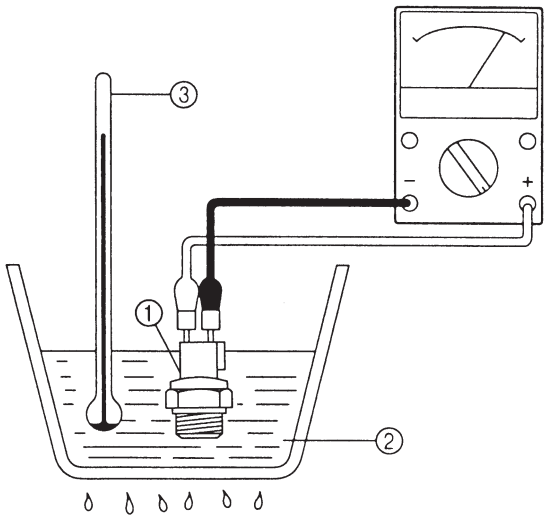
NOTE:

Make sure that the thermo switch terminals do not get wet.

- Place a thermometer ③ in the coolant.
- Slowly heat the coolant, then let it cool to the specified temperature as indicated in the table.
- Check the thermo switch for continuity at the temperatures indicated in the table.

Test step	Coolant temperature / Thermo switch	Continuity
1	0 ~ 55°C	NO
2	More than 60°C	YES
3*	60 to 55°C	YES
4*	Less than 55°C	NO

Test steps 1 & 2: Heating phase
Test steps 3* & 4*: Cooling phase

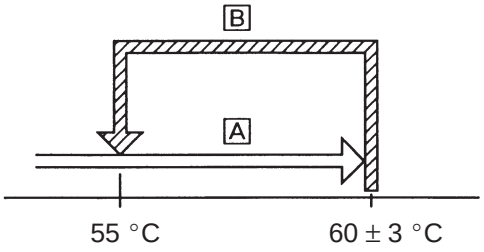


⚠ WARNING

- **Handle the thermo switch with special care.**
- **Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.**

Thermo switch
23 Nm (2.3 m•kg)
Three bond sealock® 10

A COOL DOWN
B HEAT UP



- Does the thermo switch operate properly as described above?

YES ⇩ NO ⇩

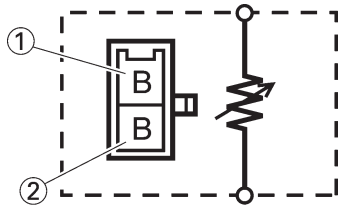
Replace the thermo switch.

EAS00825
The following procedure applies to all to the auto choke unit.

4. Auto choke unit

- Remove the auto choke unit from the carburetor.
- Connect the pocket tester to the auto choke unit coupler as shown.

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



- Measure the auto choke unit resistance.

Auto choke resistance
16 ~ 24 Ω at 20°C

- Is the auto choke OK?

YES ⇩ NO ⇩

Replace the auto choke.

5. Igniter unit

When the engine is running at a speed of at least 800 r/min.
OK if one of the auto chokes is on.

NO ⇩

Replace the igniter unit.

EAS00826

6. Wiring

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

NO ⇩

Properly connect or repair the auto choke system's wiring.

SELF-DIAGNOSIS

The XP500 features a self-diagnosing system for following circuit (-s).

1. Throttle position sensor (TPS)
2. Speed sensor
3. Lean angle cut-off switch

1. ENGINE TROUBLE INDICATOR LIGHT

When the main switch is turned to “ON”, the following items are monitored and the condition codes are displayed on the engine oil change indicator light (irrespective of whether the engine is running or not).

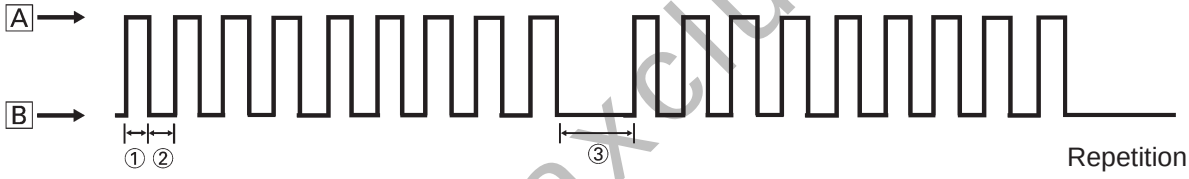
NOTE:

The XP500 features a self-diagnosing system.
In the XP500, when the main switch is turned on the “Engine oil change indicator light” in the meter assembly comes on for 0.5 seconds then goes off. However, if there is a malfunction, it comes on for 0.5 seconds, goes off and then begins flashing. (However, it is on while the engine is running.)

Item	Condition	Response	Display condition code
Throttle position sensor (TPS)	Disconnected Short-circuit Locked	• Enables the motorcycle to run so that the ignition timing is fixed when the throttle is fully opened. • Displays the condition code on the engine oil change indicator light.	Blinks in Fault code [1]
Speed sensor	Illegality pulse Disconnected Short-circuit	• Displays the condition code on the engine oil change indicator light.	Blinks in Fault code [2]
Lean angle cut-off switch	Disconnected Short-circuit	• Displays the condition code on the engine oil change indicator light.	Blinks in Fault code [3]

Display order on the engine warning light

When one item being monitored

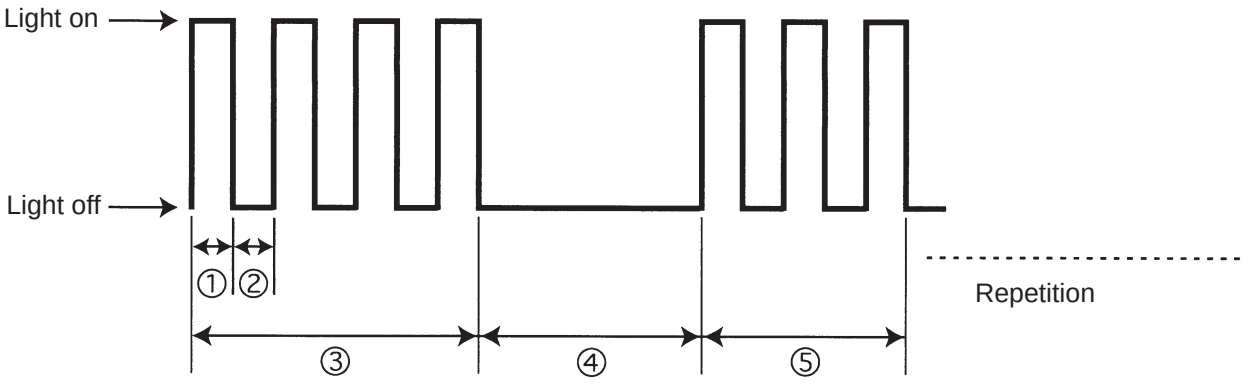
Code	Condition
[1]	
[2]	
[3]	

① 0.5 seconds
② 0.5 seconds
③ 3 seconds

A Light on
B Light off

When more than one item is being monitored

① Light on (seconds) . . . . . 0.5 seconds
② Light off (seconds) . . . . . 0.5 seconds
③ Number of blinks . . . . . Fault code [4]
④ Light off (seconds) . . . . . 3 seconds
⑤ Number of blinks . . . . . Fault code [3]



EAS00835
TROUBLESHOOTING

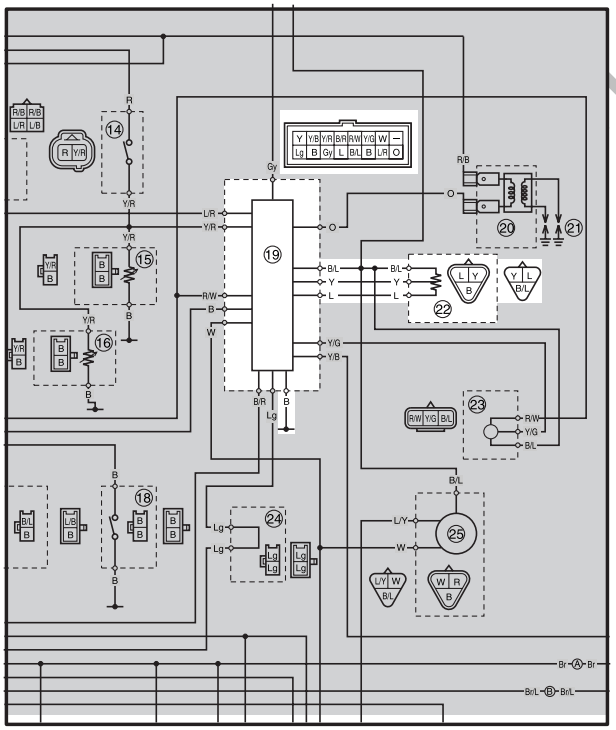
The tachometer starts to display the self-diagnosis sequence.

Check:
1. Throttle position sensor
2. Speed sensor
3. Lean angle cut-off switch

NOTE:
- Before troubleshooting, remove the following part(-s):
1) Front cowling
2) Footrest board
- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EAS00836
1. Throttle position sensor
CIRCUIT DIAGRAM



⑲ Igniter unit
㉒ Throttle position sensor

1. Wire harness
• Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”. • Is the wire harness OK?

YES ⇩ NO ⇩

Repair or replace the wire harness.

EB812401

2. Throttle position sensor
• Check the throttle position sensor for continuity. Refer to “CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR” in chapter 6. • Is the throttle position sensor OK?

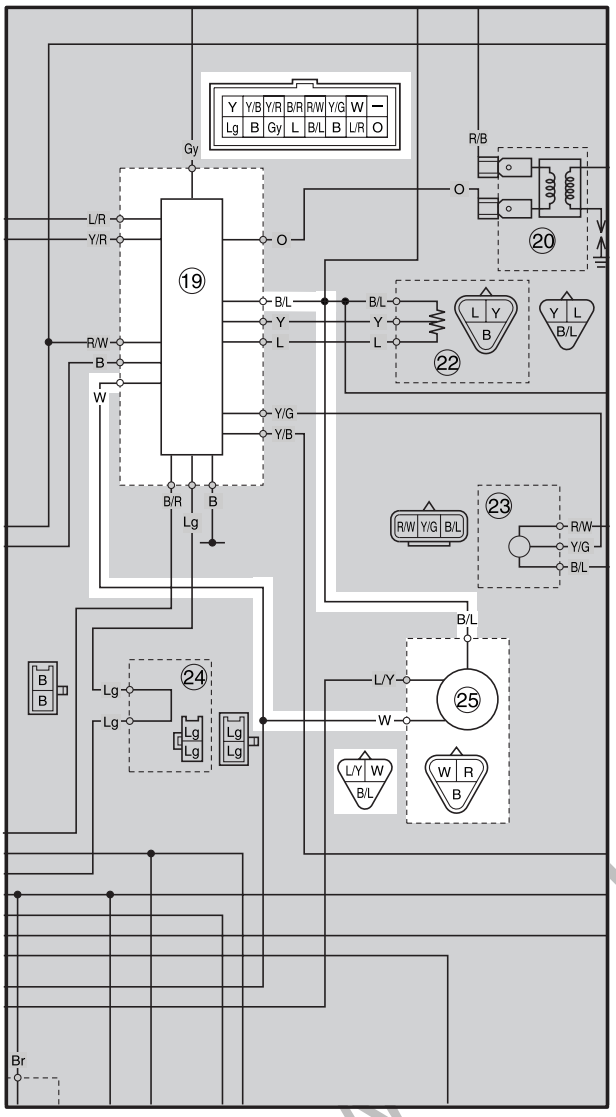
YES ⇩ NO ⇩

Replace the igniter unit.

Replace the throttle position sensor.

2. Speed sensor

CIRCUIT DIAGRAM



⑲ Igniter unit

㉕ Speed sensor

1. Wireharness
• Check the wireharness for continuity. Refer to “CIRCUIT DIAGRAM”. • Is the wireharness OK?

YES

NO

Repair or replace the wireharness.

EB812401

2. Speedometer
• Check the speedometer operation. • Is the speedometer OK?

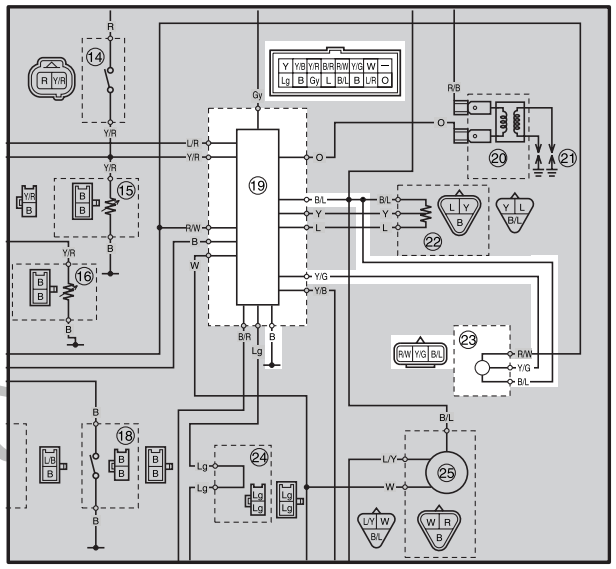
YES

NO

Replace the igniter unit.	Replace the speed sensor.

3. Lean angle cut-off switch

CIRCUIT DIAGRAM



⑲ Igniter unit

㉓ Lean angle cut-off suitch

1. Wireharness
• Check the wireharness for continuity. Refer to “CIRCUIT DIAGRAM”. • Is the wireharness OK?

YES

NO

Repair or replace the wireharness.

EB812401

2. Lean angle cut-off switch
• Replace with a lean angle cut-off switch that is operating correctly, and if the diagnosis generates a lean angle cut-off switch condition code again, replace the lean angle cut-off switch. • Is the leam angle cut-off switch OK?

⇩ YES

Replace the igniter unit.

⇩ NO

Replace the lean angle cut-off switch.

?

TRBL
SHTG

9

CHAPTER 9
TROUBLESHOOTING

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 inspection, adjustment, and replacement of parts.

STARTING FAILURE/HARD STARTING

ENGINE

Cylinder(-s) and cylinder head(-s)
- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

Piston(-s) and piston ring(-s)
- Improperly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter
- Improperly installed air filter
- Clogged air filter element

Crankcase and crankshaft
- Improperly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank
- Empty fuel tank
- Clogged fuel tank cap breather hole
- Deteriorated or contaminated fuel
- Clogged or damaged fuel hose

Fuel pump
- Faulty fuel pump
- Faulty fuel pump relay
- Damaged vacuum hose
- Improperly routed hose

Carburetor(-s)
- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Improperly installed needle valve seat
- Incorrect fuel level
- Improperly adjusted pilot air screw
- Improperly installed pilot jet
- Clogged starter jet
- Clogged emulsion tube

Autochoke unit
- Faulty starter plunger
- Improperly adjusted starter cable
- Faulty igniter unit
- Faulty thermo switch

ELECTRICAL SYSTEMS

Battery
- Improperly charged battery
- Faulty battery

Fuse(-s)
- Blown, damaged or incorrect fuse
- Improperly installed fuse

Spark plug(-s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil(-s)
- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Cracked or broken ignition coil body

Ignition system
- Faulty ignitor unit
- Faulty pickup coil
- Broken generator rotor woodruff key

Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty front, rear or both brake switches
- Faulty start switch
- Faulty sidestand switch
- 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(-s) and cylinder head(-s)
- Incorrect valve clearance
- Damaged valve train components

Air filter
- Clogged air filter element

FUEL SYSTEM

Carburetor(-s)
- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Improperly synchronized carburetors
- Improperly adjusted engine idling speed (throttle stop screw)
- Improper throttle cable free play (at the flange of the throttle grip)
- Flooded carburetor

Autochoke unit
- Faulty starter plunger
- Improperly adjusted starter cable
- Faulty ignitor unit

ELECTRICAL SYSTEMS

Battery
- Improperly charged battery
- Faulty battery

Spark plug(-s)
- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

Ignition coil(-s)
- Faulty spark plug lead

Ignition system
- Faulty ignitor unit
- Faulty pickup coil

EAS00849

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING PROBLEMS”.

ENGINE

Air filter
- Clogged air filter element

Air intake system
- Bent, clogged or disconnected carburetor air vent hose
- Clogged or leaking air duct

FUEL SYSTEM

Carburetor(-s)
- Faulty diaphragm
- Incorrect fuel level
- Loose or clogged main jet

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 gear(-s)
- Damaged transmission gear

CLUTCH SLIPS

Clutch shoe spring(-s)
- Damaged, loose or worn clutch shoe spring

Clutch shoe(-s)
- 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 shoe(-s)
- Bent, damaged or worn clutch shoe

POOR SPEED PERFORMANCE

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

Cylinder head(-s) and piston(-s)
- Heavy carbon buildup

Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

COOLING SYSTEM

Coolant
- Low coolant level

Radiator
- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fins

Water pump

Damaged or defective water pump

Thermostat

Thermostat stays closed

Oil cooler

Clogged or damaged oil cooler

Hose(-s) and pipe(-s)

Damaged hose

Improperly connected hose

Damaged pipe

Improperly connected pipe

FUEL SYSTEM

Carburetor(-s)
- Incorrect main jet setting
- Incorrect fuel level
- Air leak at carburetor joint

Air filter
- Clogged air filter element

CHASSIS

Brake(-s)
- Dragging brake

ELECTRICAL SYSTEMS

Spark plug(-s)
- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system
- Faulty ignitor unit

EAS00856
OVERCOOLING

COOLING SYSTEM

Thermostat

Thermostat stays open

EAS00857

POOR BRAKING PERFORMANCE

Disc brake

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS00861

FAULTY FRONT FORK LEGS

LEAKING OIL

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal.
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod bolt
- Damaged damper rod bolt copper washer
- Cracked or damaged cap bolt O-ring

MALFUNCTION

- Bent, deformed or damaged inner tube
- Bent, deformed 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

- Improperly installed upper bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Front fork leg(-s)

- Uneven oil levels (both front fork legs)
- Uneven fork spring tension (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Swingarm

- Worn bearing or bushing
- Bent or damaged swingarm

Rear shock absorber assembly(-ies)

- Faulty rear shock absorber spring
- Leaking oil or gas

Tire(-s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(-s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS00866
FAULTY SIGNALING SYSTEM

HEADLIGHT DOES NOT LIGHT
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrect ground
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrect ground
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TURN SIGNAL DOES NOT LIGHT
- Faulty turn signal switch
- Faulty flasher relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or defective wire harness
- Incorrect ground
- Discharged battery
- Blown, damaged or incorrect fuse

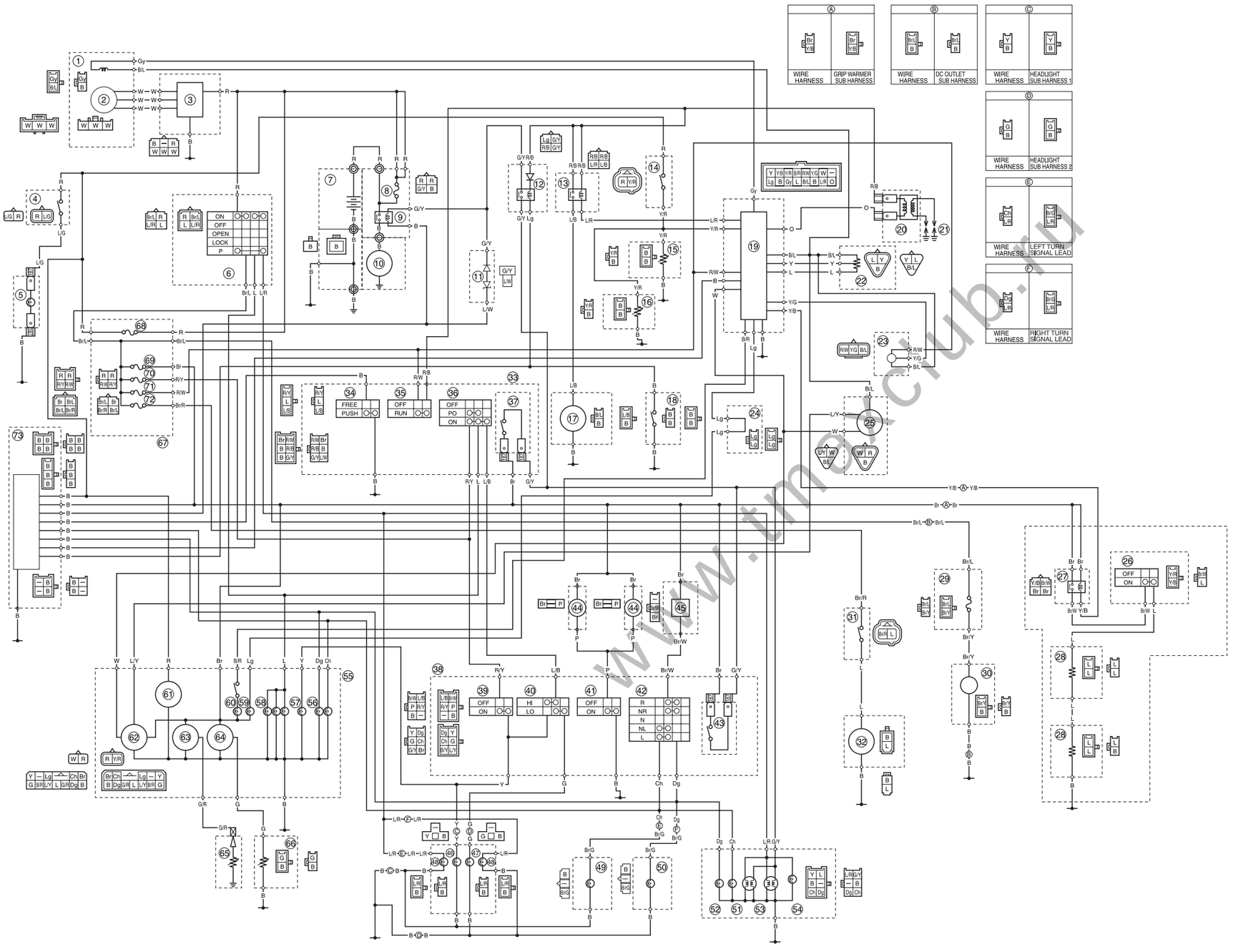
TURN SIGNAL BLINKS SLOWLY
- Faulty flasher relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

TURN SIGNAL REMAINS LIT
- Faulty flasher relay
- Burnt-out turn signal bulb

TURN SIGNAL BLINKS QUICKLY
- Incorrect turn signal bulb
- Faulty flasher relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND
- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

XP500 WIRING DIAGRAM (for EUR)

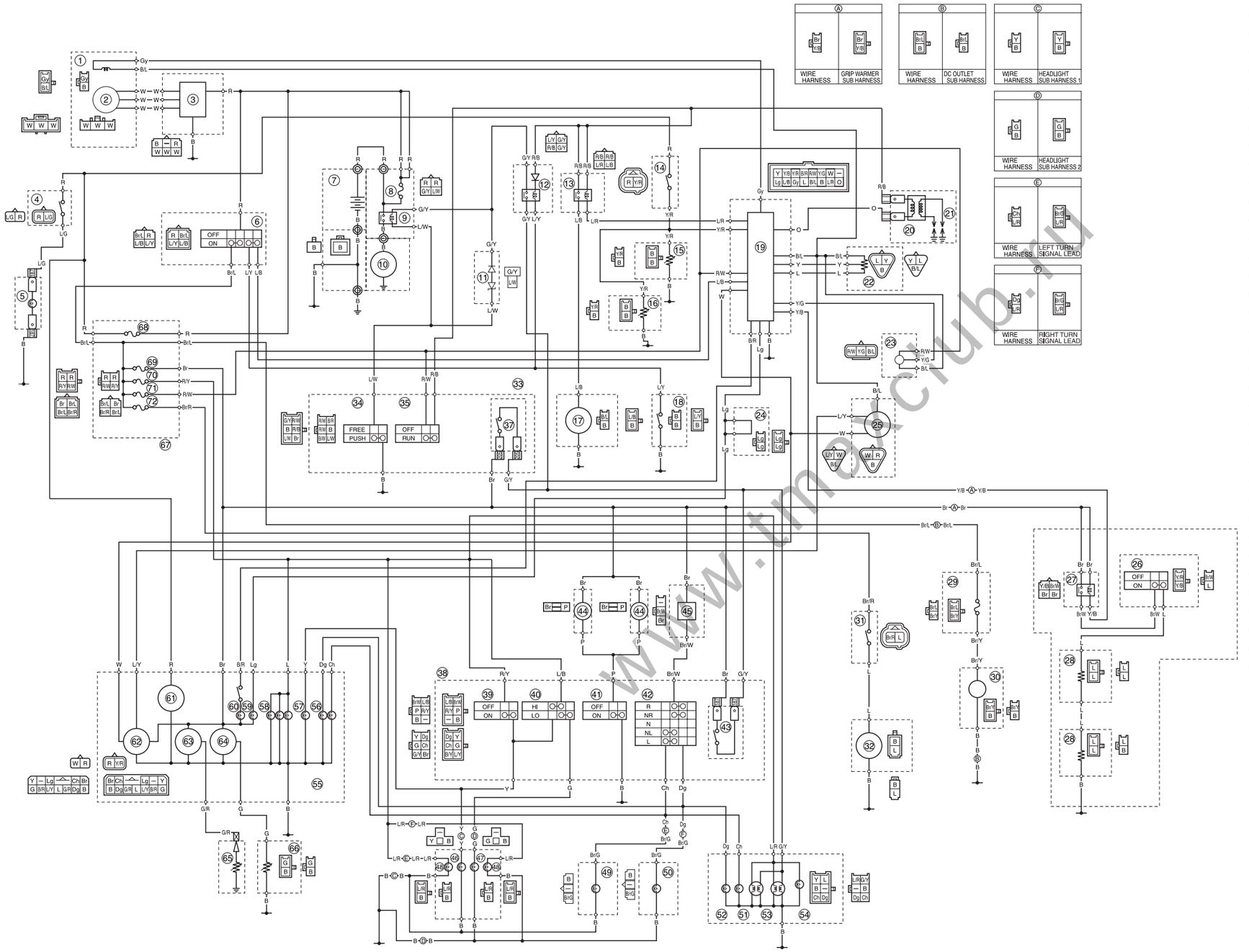


1. Pickup coil
2. A.C.magneto
3. Rectifier / regulator
4. Box light switch
5. Box light
6. Main switch
7. Battery
8. Main fuse
9. Starter relay
10. Starter motor
11. Diode
12. Starting circuit cut-off relay
13. Fuel pump relay
14. Thermo switch (Auto choke)
15. Auto choke 1
16. Auto choke 2
17. Fuel pump
18. Sidestand switch
19. Igniter unit
20. Ignition coil
21. Spark pulg
22. Throttle position sensor
23. Lean angle cut-off switch
24. Reset coupler
25. Speed sensor
26. Grip warmer switch (OPTION)
27. Grip warmer relay (OPTION)
28. Grip warmer (OPTION)
29. DC outlet fuse
30. DC outlet
31. Thermo switch (Fan)
32. Radiator fan motor
33. Right handlebar switch
34. Start switch
35. Engine stop switch
36. Light switch
37. Front brake light switch
38. Left handlebar switch
39. Pass switch
40. Dimmer switch
41. Horn switch
42. Turn signal switch
43. Rear brake light switch
44. Horn
45. Flasher relay
46. Headlight (Hi)
47. Headlight (Low)
48. Auxiliary light
49. Front turn signal light (Left)
50. Front turn signal light (Right)
51. Rear turn signal light (Left)
52. Rear turn signal light (Right)
53. Tail / brake light
54. License plate light
55. Meter assembly
56. Trun signal indicator light
57. Hi beam indicator light
58. Meter light
59. V-belt indicator light
60. Engine oil change indicator light
61. Clock
62. Speedometer
63. Water temperature gauge
64. Fuel gauge
65. Thermo unit (Water temperature)
66. Fuel level sender
67. Fuse box
68. Backup fuse
69. Signal fuse
70. Headlight fuse
71. Ignition fuse
72. Radiator fan fuse
73. Alarm (OPTION)

COLOR CODE

B	Black	Br/G	Brown/Green
Br	Brown	Br/L	Brown/Blue
Ch	Chocolate	Br/R	Brown/Red
Dg	Dark green	Br/Y	Brown/Yellow
G	Green	Br/W	Brown/White
Gy	Gray	G/R	Green/Red
L	Blue	G/Y	Green/Yellow
Lg	Light green	L/B	Blue/Black
O	Orange	L/G	Blue/Green
P	Pink	L/R	Blue/Red
R	Red	L/Y	Blue/Yellow
Y	Yellow	L/W	Blue/White
W	White	R/B	Red/Black
B/R	Black/Red	R/Y	Red/Yellow
B/Y	Black/Yellow	R/W	Red/White
B/W	Black/White	Y/B	Yellow/Black
B/L	Black/Blue	Y/R	Yellow/Red

XP500 WIRING DIAGRAM (for OCE)



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B/W	Black/White	Y/B	Yellow/Black
B/L	Black/Blue	Y/R	Yellow/Red