YAMAHA



Manual Clutch and Automatic

T135SE
T135S

T135 SERVICE MANUAL

Sniper / Jupiter MX / Spark 135 / Exciter / 135LC

YamahaT135.COM **03212007** **5YP-F8197-E0**

EAS00000

T135SE/T135S
SERVICE MANUAL
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NOTICE

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

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

NOTE:

Designs and specifications are subject to change without notice.

EAS00004

IMPORTANT MANUAL INFORMATION

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

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

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

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

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

EASF0001

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See “Illustrated symbols”)
1st title ①:This is a chapter with its symbol on the upper right of each page.
2nd title ②:This title appears on the upper of each page on the left of the chapter symbol. (For the chapter “Periodic inspection and adjustment” the 3 rd title appears.)
3rd title ③:This is a final title.

MANUAL FORMAT

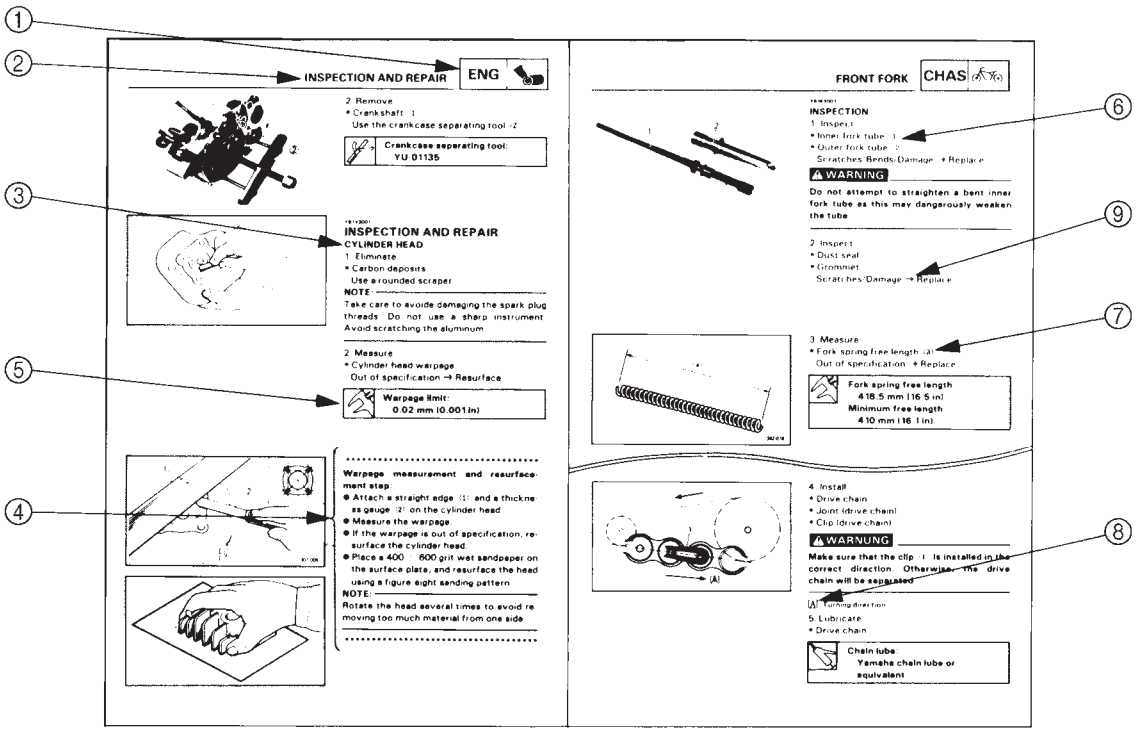
All of the procedures in this manual are organized in a sequential, step - by - step format. The information has been compiled to provide the mechanic with a easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.
A set of particularly important procedure ④ is placed between a line of mark “▼” or “▲” with each procedure preceded by “●”.

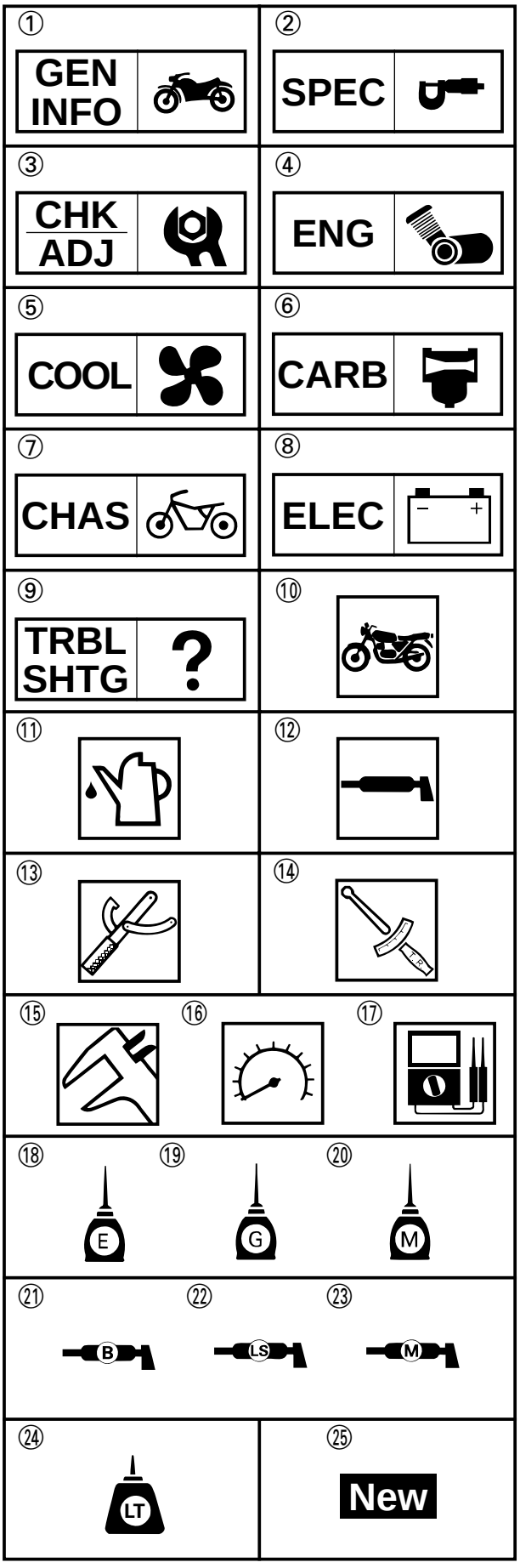
IMPORTANT FEATURES

- ●Data and a special tool are framed in a box preceded by a relevant symbol ⑤ .
- ●An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter date or an alignment mark ⑦, the others being indicated by an alphabetical letter in a box ⑧ .
- ●A condition of a faulty component will precede an arrow symbol and the course of action required the symbol ⑨ .

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.





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 Engine
⑤ Cooling system
⑥ Carburetor
⑦ Chassis
⑧ Electrical system
⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

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

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

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

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

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

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TROUBLESHOOTING	TRBL SHTG 9

GEN INFO 

CHAPTER 1
GENERAL INFORMATION

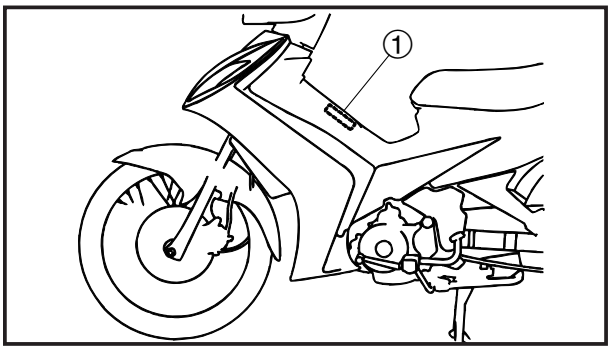
VEHICLE IDENTIFICATION 1-1
VEHICLE IDENTIFICATION NUMBER 1-1
ENGINE SERIAL NUMBER 1-1

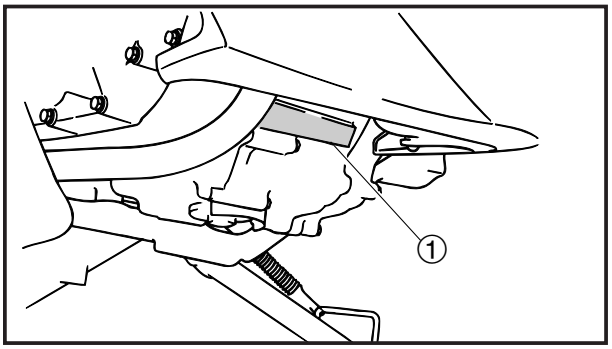
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GENERAL INFORMATION

VEHICLE IDENTIFICATION

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VEHICLE IDENTIFICATION NUMBER

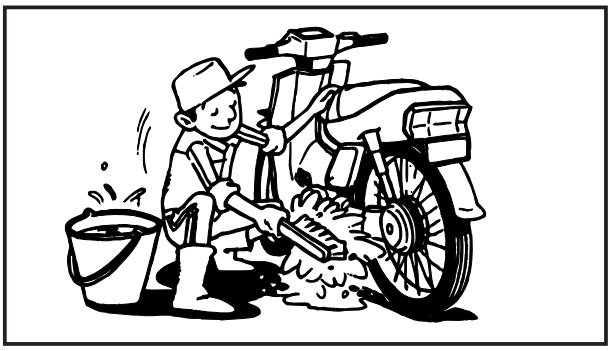
The number ① is stamped into the center of the frame.

ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the crankcase.

NOTE:

Designs and specifications are subject to change without notice.



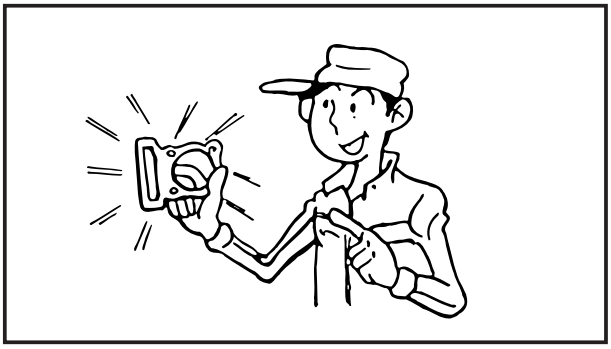


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IMPORTANT INFORMATION

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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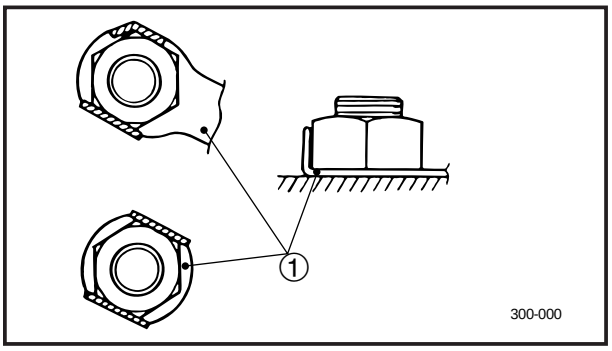
REPLACEMENT PARTS

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.

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GASKETS, OIL SEALS AND O-RINGS

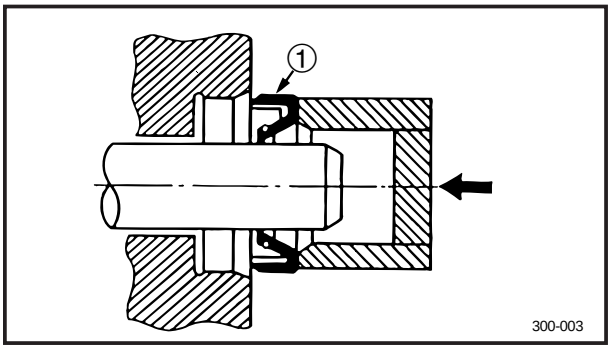
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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LOCK WASHERS/PLATES AND COTTER PINS

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



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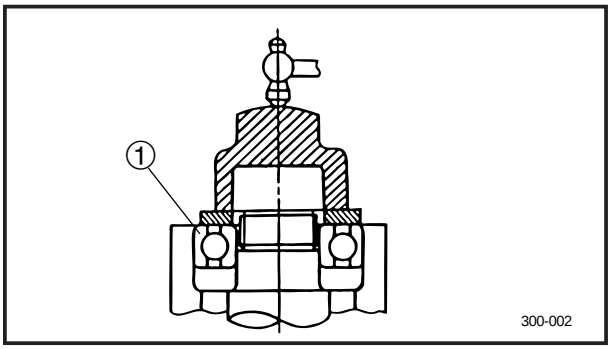
BEARINGS AND OIL SEALS

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

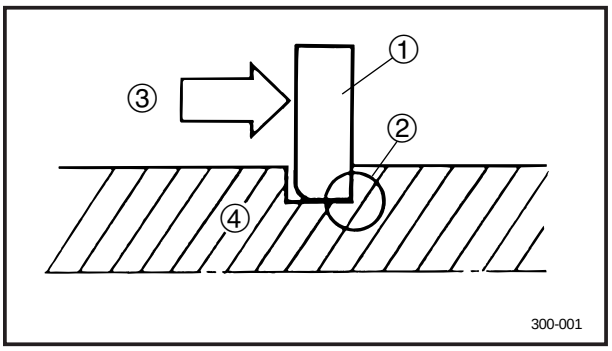
① Oil seal

CAUTION:

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



① Bearing



EAS00025

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.

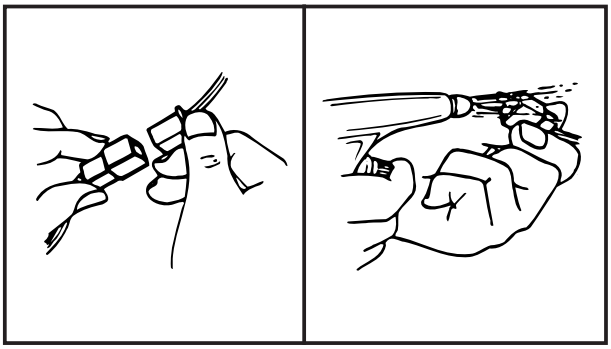
1. Disconnect:
   - lead
   - coupler
   - connector
2. Check:
   - lead
   - coupler
   - connector

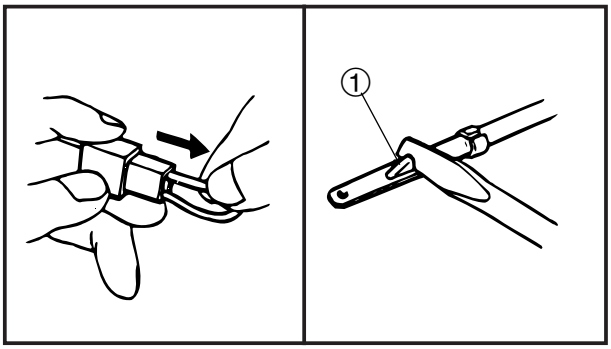
   Moisture → Dry with compressed air.
   Rust/stains → Connect and disconnect several times.
3. Check:
   - all connections

   Loose connection → Connect properly.

NOTE:

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

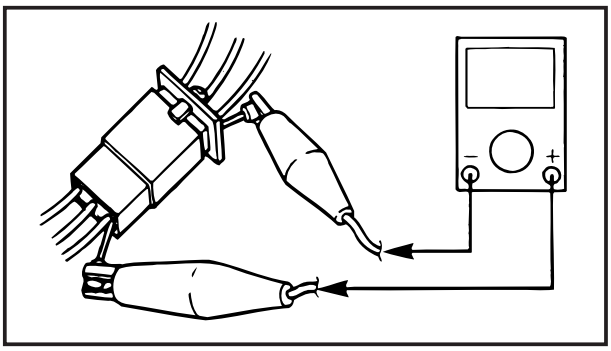




4. Connect:
   - lead
   - coupler
   - connector

NOTE:

Make sure all connections are tight.



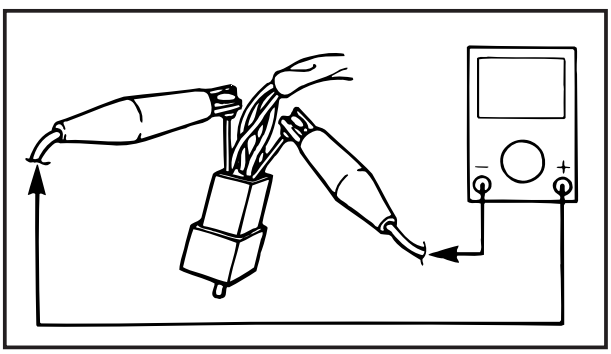
5. Check:
   - continuity

   (with the pocket tester)

	Pocket tester **90890-03112**

NOTE:

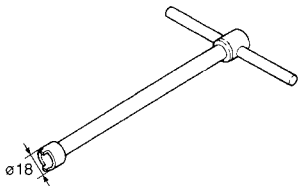
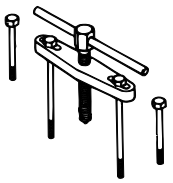
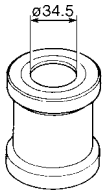
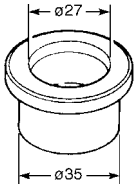
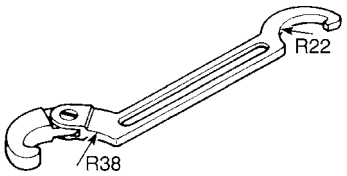
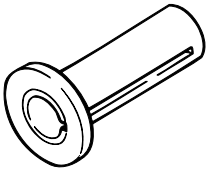
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

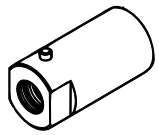
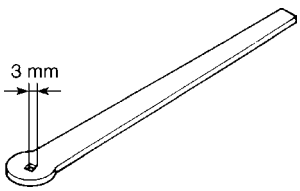
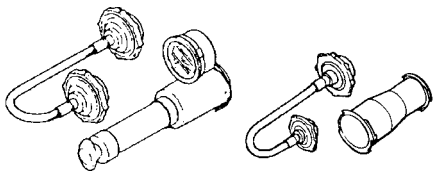
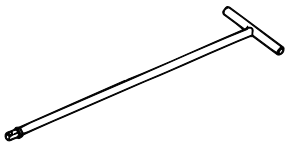
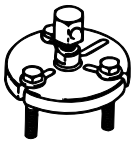
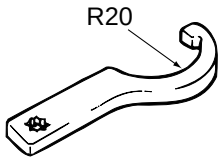
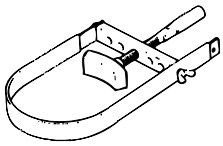
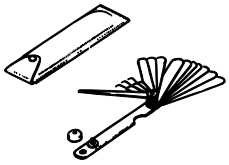


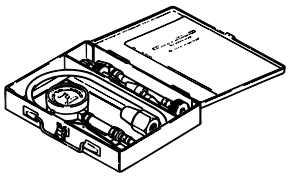
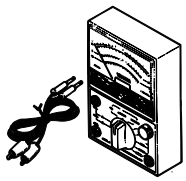
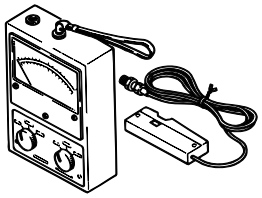
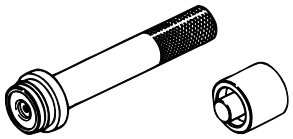
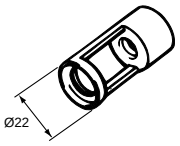
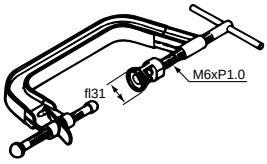
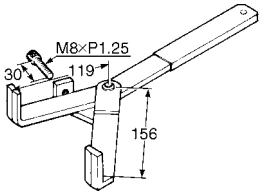
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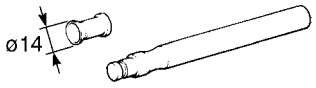
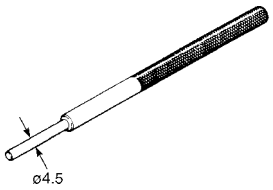
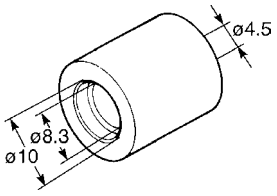
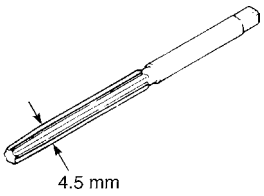
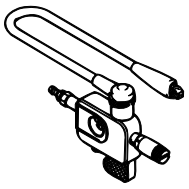
SPECIAL TOOLS

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/Usage	Illustration
90890-01052	Meter gear bush tool This tool is used to remove or install the bushing.	
90890-01135	Crankcase separating tool This tool is necessary for separating the crankcase.	
90890-01184	Fork seal driver weight This tool is used for to install the oil seal.	
90890-01186	Fork seal driver attachment This tool is used to install the oil seal.	
90890-01268	Ring nut wrencht This tool is used to loosen and tighten the steering ring nut	
90890-01274	Crankshaft instoller pot This tool is necessary for installing the crankshaft.	
90890-01275	Crankcase installer bolt This tool is necessary for installing the crankshaft.	

Tool No.	Tool name/Usage	Illustration
90890-01278	Adoptor (M12) This tool is necessary for installing the crankshaft.	
90890-01311	Tappet adjusting tool This tool is necessary for adjusting valve clearance.	
Radiator cap tester 90890-01325 Radiator cap tester adapter 90890-01352	Radiator cap tester Radiator cap tester adapter These tools are used to check the cooling syatem.	
90890-01326	T-handle This tool is used for holding the damper rod holder when removing or installing the damper rod holder.	
90890-01362	Flywheel puller This tool is used for removing the roter.	
90890-01403	Steering nut wrencht This tool is used to loosen and tighten the steering ring nut	
90890-01701	Sheave holder This tool is used for holding the generator roter.	
90890-03079	Thickness gauge This tool is used to measure the valve clearance.	

Tool No.	Tool name/Usage	Illustration
90890-03081	Compression gauge These tools are used to measure the engine compression.	
90890-03112	Pocket tester This instrument is necessary for checking the electrical system.	
90890-03113	Engine tachometer This tool is needed for detecting engine rpm.	
Middle driven shaft bearing driver 90890-04058 Mechanical seal installer 90890-04145	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the water pump seal.	
90890-04108	Valve spring compressor Attachment This tool is used when removing or installing the valve and valve spring.	
90890-04019	Valve spring compressor This tool is used when removing or installing the valve and valve spring.	
90890-04081	Spacer This tool is necessary for insatlling the crankshaft.	
90890-04086	Universal clutch holder This tool is needed to hold the clutch when removing or installing the clutch boss nut.	

Tool No.	Tool name/Usage	Illustration
90890-04101	Valve lapper This tool is used for removeing and installing the lifter and for lapping the valve.	
90890-04116	Valve guide remover (4.5 mm) This tool is needed to remove and installing the valve guide.	
90890-04117	Valve guide installer (4.5 mm) This tool is needed to install the valve guide.	
90890-04118	Valve guide reamer (4.5 mm) This tool is needed rebore the new valve guide.	
90890-06754	Ignition checker This instrument is necessary for checking the ignition system components.	

SPEC

CHAPTER 2
SPECIFICATIONS

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	T135SE/T135S
Model code	5YP1 (T135SE) 5YP2 (T135S)
Dimensions	
Overall length	1,945 mm (76.6 in)
Overall width	705 mm (27.8 in)
Overall height	1,065mm (41.9 in)
Seat height	770 mm (30.3 in)
Wheelbase	1,245 mm (49.0 in)
Minimum ground clearance	140 mm (5.51 in)
Minimum turning radius	1,900 mm (74.8 in)
Weight	
Wet (with oil and full fuel tank)	109 kg (240 lb)
Engine	
Engine type	Liquid-cooled 4-stroke, SOHC
Cylinder arrangement	Forward-inclined single cylinder
Displacement	134.4 cm^3 (8.20 cu.in)
Bore × stroke	54.0 × 58.7 mm (2.13 × 2.31 in)
Compression ratio	10.9 : 1
Compression pressure (STD)	560 kPa (80 psi) (5.6 kgf/cm^2) at 500 r/m/ with electric starter
Starting system	Kick and electric starter
Lubrication system	Wet sump
Engine idling speed	1,300 – 1,500 r/min
Oil type or grade	
Engine oil	SAE 20W40 type SF or higher grade motor oil
Periodic oil change amount	0.8 L (0.70 Imp.qt, 0.85 US qt)
Total amount	1.15 L (1.01 Imp.qt, 1.22 US qt)
Oil filer	Paper
Oil pump	Gear pump
Cooling system	
Coolant	YAMAHA GENUINE COOLANT
Coolant reservoir capacity (up to the maximum level mark)	0.28L (0.25 Imp.qt, 0.30 US qt)
Radiator capacity (include all routes)	0.62L (0.55 Imp.qt, 0.66 US qt)
Air filter	Dry type paper element
Fuel	
Recommended fuel	Regular gasoline
Fuel tank capacity	4.0 L (0.88 Imp.gal, 1.06 US gal)

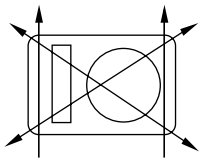
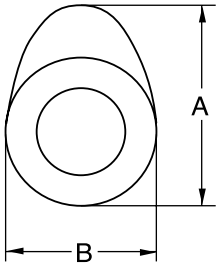
Model		T135SE/T135S
Carburetor		
Type/quantity		VM22/1
Manufacturer		MIKUNI
Spark plug		
Type		CPR8EA-9
Manufacturer		NGK
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)
Clutch type		Wet, multiple-disc and centrifugal automatic
Transmission		
Primary reduction system		Spur gear
Primary reduction ratio		69/24 (2.875)
Secondary reduction system		Chain drive
Secondary reduction ratio		39/15 (2.600)
Transmission type		Constant mesh 4 speed
Operation		Left foot operation
Gear ratio	1st	34/12 (2.833)
	2nd	30/16 (1.875)
	3rd	23/17 (1.353)
	4th	23/22 (1.045)
Chassis		
Frame type		Diamond
Caster angle		25.3°
Trail		73.0 mm (2.87 in)
Tire		
Type		With tube
Size	front	60/100-17M/C 33P
	rear	80/90-17M/C 44P
Model (manufacturer)	front	IRC/NF63B, Vee Rubber/V304
	rear	IRC/NR78Y, Vee Rubber/V304
Min. tire tread depth	front	0.8 mm (0.03 in)
	rear	0.8 mm (0.03 in)
Tire pressure (cold tire)		
Maximum load*-except vehicle		110 kg (243 lb)
	front	200 kPa (29 psi) (2.00 kgf/cm^2)
	rear	225 kPa (33 psi) (2.25 kgf/cm^2)

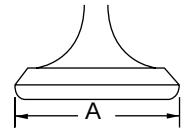
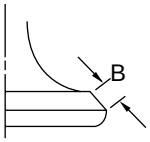
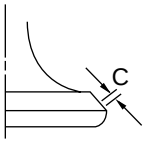
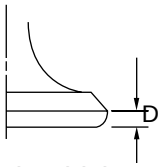
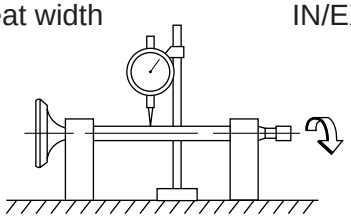
* Load is the total weight of cargo, rider, passenger,and accessories.

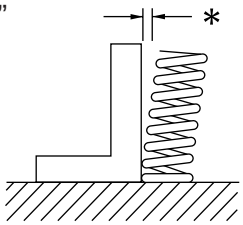
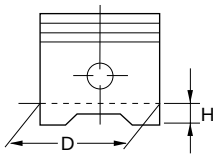
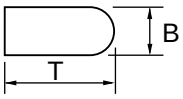
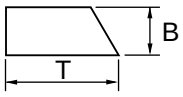
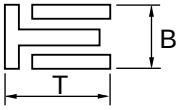
Model		T135SE/T135S
Brake		
Front brake	type	Single disc brake
	operation	Right hand operation
Rear brake	type	Drum brake
	operation	Right foot operation
Suspension		
Front suspension		Telescopic fork
Rear suspension		Swingarm (monocross)
Shock absorber		
Front shock absorber		Coil spring/oil damper
Rear shock absorber		Coil spring/oil damper
Wheel travel		
Front wheel travel		100 mm (3.94 in)
Rear wheel travel		90 mm (3.54 in)
Electrical		
Ignition system		DC. C.D.I.
Generator system		A.C. magneto
Battery type/manufacturer		GM5Z-3B/LOCAL MADE
Battery capacity		12 V 5 AH
Headlight type		Krypton bulb
Bulbs (voltage/wattage × quantity)		
Headlight		12 V 32 W/32 W × 1
Auxiliary light		12 V 5 W × 2
Tail/brake light		12 V 5 W/21 W × 1
Front turn signal light		12 V 10 W × 2
Rear turn signal light		12 V 10 W × 2
Meter light		12 V 1.7 W × 1
High beam indicator light		12 V 1.7 W × 1
Neutral indicator light		12 V 1.7 W × 1
Turn signal indicator light		12 V 1.7 W × 1
Coolant temperature warning light		12 V 1.7 W × 1
Gear position indicator light		12 V 1.7 W × 4

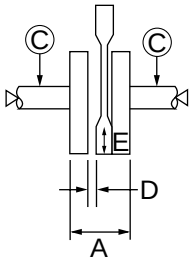
MAINTENANCE SPECIFICATIONS

ENGINE

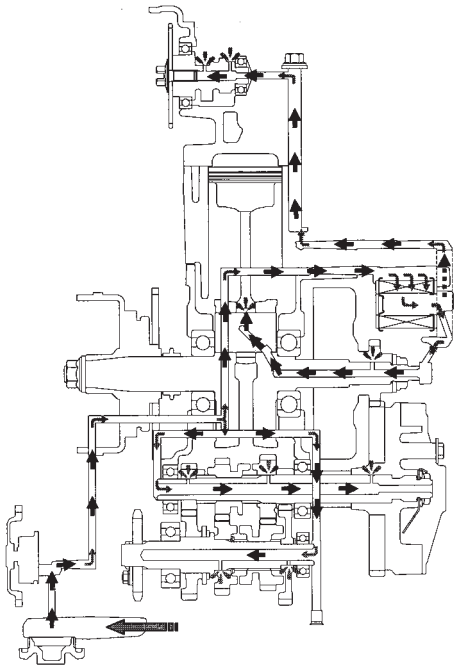
Item	Standard	Limit
Cylinder head		
Max. warpage "*" 	----	0.03 mm (0.0012 in)
Cylinder		
Bore	54.000 – 54.010 mm (2.1260 – 2.1264 in)	54.1 mm (2.1299 in)
Out of round limit	----	0.05 mm (0.002 in)
Camshaft		
Drive Method	Chain drive (left)	
Cam dimensions 		
Intake "A"	29.643 – 29.743 mm (1.1670 – 1.1710 in)	29.613 mm (1.1659 in)
"B"	25.073 – 25.173 mm (0.9871 – 0.9911 in)	25.043 mm (0.9859 in)
Exhaust "A"	29.942 – 30.042 mm (1.1788 – 1.1828 in)	29.912 mm (1.1776 in)
"B"	25.019 – 25.119 mm (0.9850 – 0.9889 in)	24.989 mm (0.9838 in)
Camshaft runout limit	----	0.03 mm (0.0012 in)
Timing chain		
Timing chain type/No. of links	SILENT CHAIN/96	----
Tensioning system	Automatic	----
Rocker arm/rocker arm shaft		
Rocker arm inside diameter	9.985 – 10.000 mm (0.3931 – 0.3937 in)	10.030 mm (0.0012 in)
Rocker arm shaft outside diameter	9.966 – 9.976 mm (0.3924 – 0.3928 in)	9.950 mm (0.3917 in)
Rocker-arm-to-rocker-arm-shaft clearance	0.009 – 0.034 mm (0.0004 – 0.0130 in)	0.08 mm (0.0031 in)

Item		Standard	Limit
Valve, valve seat, valve guide			
Valve clearance (cold)	IN	0.10 – 0.14 mm (0.0039 – 0.0055 in)	----
	EX	0.16 – 0.20 mm (0.0063 – 0.0079 in)	----
Valve dimensions			
 Head Diameter		 Face Width	 Seat Width
 Margin Thickness			
“A” head diameter	IN	19.40 – 19.60 mm (0.7638 – 0.7717 in)	----
	EX	16.90 – 17.10 mm (0.6654 – 0.6732 in)	----
“B” face width	IN	1.583 – 2.138 mm (0.060 – 0.0842 in)	----
	EX	1.538 – 2.138 mm (0.0606 – 0.0842 in)	----
“C” seat width	IN	0.9 – 1.1 mm (0.035 – 0.043 in)	1.6 mm (0.0630 in)
	EX	0.9 – 1.1 mm (0.035 – 0.043 in)	1.6 mm (0.0630 in)
“D” margin thickness	IN	0.5 – 0.9 mm (0.20 – 0.36 in)	----
	EX	0.5 – 0.9 mm (0.20 – 0.36 in)	----
Valve stem outside diameter	IN	4.475 – 4.490 mm (0.1762 – 0.1768 in)	4.450 mm (0.1752 in)
	EX	4.460 – 4.475 mm (0.1756 – 0.1762 in)	4.435 mm (0.1746 in)
Guide inside diameter	IN	3.950 – 4.050 mm (0.1555 – 0.1594 in)	4.542 mm (0.1788 in)
	EX	3.950 – 4.050 mm (0.1555 – 0.1594 in)	4.542 mm (0.1788 in)
Valve-stem-to-guide clearance	IN	0.0010 – 0.037mm (0 – 0.0015 in)	0.080 mm (0.0032 in)
	EX	0.025 – 0.052 mm (0.0010 – 0.0020 in)	0.100 mm (0.0039 in)
Valve stem runout limit		----	0.01 mm (0.0004 in)
Valve seat width	IN/EX	0.9 – 1.1 mm (0.035 – 0.043 in)	1.6 mm (0.0630 in)
			

Item		Standard	Limit
Valve spring			
Free length	IN/EX	47.33 mm (1.86 in)	44.96 mm (1.77 in)
Installed length (valve closed)	IN/EX	35.30 mm (1.39 in)	----
Compressed spring force	IN/EX	135.6 – 156.0 N (13.8 – 15.8 kgf) at 35.3 mm (1.39 in)	----
Tilt limit “*” 	IN/EX	----	2.0 mm (0.08 in)
Winding direction	IN/EX	Clockwise	----
Piston			
Piston-to-cylinder clearance		0.015 – 0.048 mm (0.0006 – 0.0019 in)	0.150 mm (0.0059 in)
Piston size “D” 		53.962 – 53.985 mm (2.1245 – 2.1254 in)	----
Measuring point “H”		5.0 mm (0.1969 in)	----
Offset		0.25 mm (0.0098 in)	----
Offset direction		Intake side	----
Piston pin bore inside diameter		14.002 – 14.013 mm (0.5513– 0.5517 in)	14.043 mm (0.5529 in)
Piston pin outside diameter		13.995 – 14.000 mm (0.5510– 0.5512 in)	13.975 mm (0.5502 in)
Piston rings			
Top ring			
Ring type		Barrel	----
Dimensions (B × T) 		0.80 × 1.90 mm (0.03 × 0.07 in)	----
End gap (installed)		0.10 – 0.25 mm (0.0098 in) (0.00-0.01 in)	0.40 mm (0.0157 in)
Ring side clearance (installed)		0.030 – 0.065 mm (0.0012-0.0026 in)	0.10 mm (0.0039 in)
2nd ring			
Ring type		Taper	----
Dimensions (B × T) 		0.80 × 2.15 mm (0.03 × 0.08 in)	----
End gap (installed)		0.10 – 0.25 mm (0.0098 in) (0.00-0.01 in)	0.40 mm (0.0157 in)
Ring side clearance		0.020 – 0.055 mm (0.0008-0.0022 in)	0.10 mm (0.0039 in)
Oil ring 			
Dimensions (B × T)		1.50 × 1.95 mm (0.06 × 0.08 in)	----
End gap (installed of oil ring rails)		0.20 – 0.70 mm (0.01 – 0.03 in)	----

Item	Standard	Limit
Crankshaft 		
Crank width “A”	45.95 – 46.00 mm (1.81-1.81 in)	----
Max. runout limit “C”	----	0.03 mm (0.0012 in)
Big end side clearance “D”	0.11 – 0.41 mm (0.0403 – 0.016 in)	----
Big end radial clearance “E”	0.004 – 0.014 mm (0.10 – 0.11 in)	----
Clutch		
Friction plate #1		
Thickness	2.5 – 2.7 mm (0.10 – 0.11 in)	2.4 mm (0.09 in)
Plate quantity	3	----
Friction plate #2		
Thickness	2.5 – 2.7 mm (0.10 – 0.11 in)	2.4 mm (0.09 in)
Plate quantity	1	----
Clutch plates		
Thickness	1.59 – 1.68 mm (0.06-0.07 in)	----
Plate quantity	3	----
Max. warpage	----	0.05 mm (0.0020 in)
Clutch springs		
Free length	40.5 mm (1.60 in)	38.5 mm (1.52 in)
Spring quantity	4	----
Clutch release method	Inner push, cam push	----
Clutch shoe thickness	2.0 mm (0.08 in)	----
Clutch shoe groove depth	1.0 mm (0.04 in)	0.1 mm (0.0039 in)
Clutch housing inside diameter	116 mm (4.57 in)	117 mm (4.6063 in)
Weight outside diameter	116 mm (4.57 in)	115 mm (4.5276 in)
Clutch - in revolution	1,750 – 2,150 r/min	----
Clutch - stall revolution	2,930 – 3,430 r/min	----
Push rod bending limit	----	0.5 mm (0.02 in)
Transmission		
Main axle runout limit	----	0.03 mm (0.0012 in)
Drive axle runout limit	----	0.03 mm (0.0012 in)

Item		Standard	Limit
Kickstarter			
Kickstarter type		Ratchet type	----
Spring free length		15.5 mm (0.61 in)	----
Carburetor			
Type		VM22	----
I.D. mark		5YP1 00	----
Main jet	(M.J)	#105	----
Main air jet	(M.A.J)	ø1.2	----
Jet needle	(J.N)	5 K010	----
Needle jet	(N.J)	N-9M	----
Pilot outlet	(P.O)	ø1	----
Pilot jet	(P.J)	#20	----
Pilot air screw turns out		1-5/8	----
Pilot air jet 1		#55	----
Valve seat size		ø2	----
Throttle valve size		#2.0	----
Float height		9.2 mm (0.3622 in)	----
Oil pump			
Oil pump type		Trochoid type	----
Inner-rotor-to-outer-rotor-tip clearance		0.15 mm (0.0059 in)	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump housing clearance		0.06 – 0.11 mm (0.0024 – 0.0043 in)	0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance		0.06 – 0.11 mm (0.0024 – 0.0043 in)	0.15 mm (0.0059 in)

Model	T135SE/T135S
Lubrication chart	

TIGHTENING TORQUES

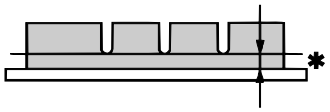
ENGINE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Cylinder head	Bolt	M8	4	22	2.2	16	
Cylinder head (timing chain side)	Bolt	M6	2	10	1.0	7.2	
Cylinder head (oil check)	Screw	M6	1	7	0.7	5.0	
Spark plug	—	M10	1	13	1.3	9.5	
Cylinder head cover	Bolt	M6	5	10	1.0	7.2	
Reed valve assembly	Bolt	M6	2	10	1.0	7.2	
Water pump assembly	Bolt	M6	3	10	1.0	7.2	
Stud bolt (cylinder head)	Bolt	M8	2	15	1.5	11	
Cylinder (coolant water drain)	Bolt	M6	1	7	0.7	5.0	
Generator rotor	Nut	M12	1	70	7.0	50	
Timing chain guide (intake side)	Screw	M6	1	10	1.0	7.2	
Valve adjusting screw locknut (intake and exhaust side)	Nut	M5	4	7	0.7	5.0	
Camshaft sprocket	Bolt	M8	1	30	3.0	22	
Camshaft retainer	Bolt	M6	2	7	0.7	5.0	LT
Timing chain tensioner assembly	Bolt	M6	2	10	1.0	7.2	
Thermostat cover	Bolt	M6	2	10	1.0	7.2	LT
Oil pump assembly	Bolt	M5	2	7	0.7	5.0	
Element cover	Bolt	M6	3	10	1.0	7.2	
Engine oil drain bolt	Bolt	M35	1	32	3.2	23	
Oil pump cover plate	Bolt	M6	2	10	1.0	7.2	
Intake manifold (engine side)	Bolt	M6	2	10	1.0	7.2	
Carburetor assembly	Bolt	M6	2	10	1.0	7.2	
Resonator	Bolt	M6	1	10	1.0	7.2	
Exhaust pipe	Nut	M8	2	15	1.5	11	
Muffler and muffler bracket	Bolt	M8	1	17	1.7	13	
Muffler and passenger footrest	Bolt	M10	1	38	3.8	28	
Air filter assembly	Bolt	M6	2	10	1.0	7.2	
Crankcase	Bolt	M6	14	10	1.0	7.2	
Crankcase cover (left)	Bolt	M6	8	10	1.0	7.2	
Drive sprocket cover	Bolt	M6	2	7	0.7	5.0	
Crankcase cover (right)	Bolt	M6	10	10	1.0	7.2	
Center plug	—	M32	1	7	0.7	5.0	
Timing check plug	—	M14	1	3	0.3	2.2	
Kick crank assembly	Bolt	M10	1	50	5.0	36	
Ratchet wheel guide	Bolt	M6	2	12	1.2	9.0	LT
Starter clutch	Bolt	M6	3	14	1.4	10.1	stake
Clutch shoe housing	Nut	M12	1	50	5.0	36	
Clutch pressure plate	Bolt	M6	4	12	1.2	9.0	
Clutch boss	Nut	M14	1	70	7.0	50.4	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Drive sprocket	Bolt	M6	1	10	1.0	7.2	
Main axle bearing retainer	Screw	M6	2	7	0.7	5.0	LT
Clutch release adjusting locknut	Nut	M6	1	8	0.8	6.0	
Shift pedal	Bolt	M8	1	18	1.8	13	
Shift drum segment	Bolt	M6	1	12	1.2	9.0	LT
Shift drum stopper lever	Bolt	M6	1	10	1.0	7.2	LT
Shift lever stopper screw	Screw	M8	1	10	1.0	7.2	LT
Pickup coil	Bolt	M6	2	10	1.0	7.2	LT
Stator coil	Bolt	M6	3	10	1.0	7.2	LT
Neutral switch	Screw	M5	2	4	0.4	2.9	LT
Starter motor	Bolt	M6	2	10	1.0	7.2	

CHASSIS

Item		Standard	Limit
Steering system			
Steering bearing type		Ball and race bearing	----
Lock-to-lock angle (left/right)		45°	----
Front suspension			
Front fork travel		100 mm (3.94 in)	----
Fork spring free length		295.3 mm (11.63 in)	289.4 mm (11.39 in)
Installed length		288.3 mm (11.35 in)	----
Spring rate	(K1)	3.60 N/mm (0.37 kgf/mm, 20.56 lb/in)	----
	(K2)	8.50 N/mm (0.87 kgf/mm, 48.54 lb/in)	----
Stroke	(K1)	0 – 65.0 mm (0.00 – 2.56 in)	----
	(K2)	65 – 100 mm (2.56 – 3.94 in)	----
Optional spring available		No	----
Oil capacity		0.064 L (64 cm^3)	----
Oil level		104.5 mm (4.11 in)	----
Recommended oil		Fork oil 10W or equivalent	----
Inner tube outer diameter		26 mm (1.02 in)	----
Inner tube bend limit		----	0.2 mm (0.0079 in)
Rear suspension			
Shock absorber stroke		27.5 mm (1.0827 in)	----
Spring free length		115.4 mm (4.54 in)	113.1 mm (4.4528 in)
Installed length		106.4 mm (4.19 in)	----
Spring rate	(K1)	220 N/mm (22.43 kgf/mm, 1256.2 lb/in)	----
	(K2)	316 N/mm (32.22 kgf/mm, 1804.36 lb/in)	----
Stroke	(K1)	0.0 – 8.0 mm (0.00 – 0.31 in)	----
	(K2)	8.0 – 27.5 mm (0.31 – 1.08 in)	----
Optional spring available		No	----
Front wheel			
Type		Spoke wheel	----
Rim size		17 × 1.20	----
Rim material		Steel	----
Max. radial wheel runout		----	1.0 mm (0.04 in)
Max. lateral wheel runout		----	0.5 mm (0.02 in)

Item	Standard	Limit
Rear wheel		
Type	Spoke wheel	----
Rim size	17 × 1.60	----
Rim material	Steel	----
Max. radial wheel runout	----	1.0 mm (0.04 in)
Max. lateral wheel runout	----	0.5 mm (0.02 in)
Drive chain		
Type/manufacturer	428/DAIDO	----
Link quantity	112	----
Drive chain slack	25 – 35 mm (0.98 – 1.38 in)	----
Front brake		
Disc brake type	Single	----
Disc outside diameter × thickness	220.0 × 3.5 mm(8.66 × 0.14 in)	3.0 mm (0.12 in)
Pad thickness inner	5.3 mm (0.21 in)	0.8 mm (0.03 in)
Pad thickness outer	5.3 mm (0.21 in)	0.8 mm (0.03 in)
		
Master cylinder inside diameter	11 mm (0.43 in)	----
Caliper cylinder inside diameter	33.3 mm (1.31 in)	----
Brake fluid type	DOT 3 or 4	----
Rear brake		
Drum brake type	Leading, trailing	----
Rear brake pedal free play (pedal end)	25 – 35 mm (0.98 – 1.38 in)	----
Drum inside diameter	130 mm (5.12 in)	131.0 mm (5.16 in)
Lining thickness	4 mm (0.16 in)	2 mm (0.08 in)
Shoe spring free length 1	52 mm (2.05 in)	61.2 mm (2.41 in)
Shoe spring free length 2	48 mm (1.89 in)	56.5 mm (2.22 in)
Throttle cable free play	3.0 – 7.0 mm (0.12 – 0.28 in)	----

TIGHTENING TORQUES

CHASSIS

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Handlebar bracket and lower bracket	M10	53	5.3	39	
Handlebar and handlebar bracket	M8	23	2.3	13	
Brake hose and brake master cylinder	M10	26	2.6	19	
Brake hose and brake caliper	M10	26	2.6	19	
Brake master cylinder and holder	M6	11	1.1	8.0	
Brake master cylinder and brake lever	M6	7	0.7	5.0	
Rear view mirror (left and right)	M10	32	3.2	23	
Front wheel axle nut	M10	40	4.0	29	
Brake hose holder	M6	7	0.7	5.0	
Front fork and brake caliper	M10	35	3.5	25	
Bleed screw	M8	6	0.6	4.3	
Front fork cap bolt	M20	50	5.0	36	
Lower bracket pinch bolt	M10	43	4.3	31	
Damper rod bolt	M8	23	2.3	17	
Upper ring nut	M25	75	7.5	54	See NOTE
Lower ring nut	M25	30	3.0	22	See NOTE
Brake disc and wheel hub	M8	23	2.3	17	
Brake camshaft and brake camshaft lever	M6	7	0.7	5.0	
Driven sprocket and rear wheel drive hub	M8	30	3.0	22	
Rear wheel axle nut	M12	60	6.0	43	
Rear shock absorber and frame	M10	46	4.6	33	
Rear shock absorber and swingarm	M10	46	4.6	33	
Swingarm pivot nut	M12	66	6.6	48	
Engine mounting nut	M8	34	3.4	25	
Engine mounting nut	M10	72	7.2	52	
Swingarm and drive chain case	M6	7	0.7	5.0	
Drive chain adjuster locknut	M6	7	0.7	5.0	
Swingarm and brake torque rod	M8	16	1.6	12	
Brake shoe plate and brake torque rod	M8	19	1.9	14	
Rider footrest and crankcase	M8	23	2.3	17	
Passenger footrest and frame	M8	30	3.0	22	
Sidestand and rider footrest (bolt)	M8	26	2.6	19	
Sidestand and rider footrest (nut)	M8	17	1.7	12	
Front cowling bracket and crankcase cover (left and right)	M6	7	0.7	5.0	
Main switch and frame	M6	10	1.0	7.2	
Ignition coil and frame	M6	7	0.7	5.0	

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Fuel tank and frame	M6	7	0.7	5.0	
Fuel cock and fuel tank	M6	7	0.7	5.0	
Seat and seat bracket	M6	7	0.7	5.0	

NOTE:

1. First tighten the lower ring nut 30 Nm (3.0 m • kg, 22 ft • lb) by using a torque wrench, then loosen the ring nut 1/4 turn.
2. Then, hold the lower ring nut and tighten the upper ring nut 75 Nm (7.5 m • kg, 54 ft • lb) by using a torque wrench.

ELECTRICAL

Item		Standard	Limit
System voltage		12 V	----
Ignition system			
Ignition timing (B.T.D.C.)		10° at 1,400 r/min	----
Advanced type		Digital	----
DC-C.D.I			
Pickup coil resistance/color		248 – 372 Ω at 20 °C (68 °F)/R–W	----
C.D.I. unit model/manufacturer		5YP/PT MORIC	----
Ignition coil			
Model/manufacturer		4ST/PT MORIC	----
Minimum ignition spark gap		6 mm	----
Primary coil resistance		0.32 – 0.48 Ω at 20 °C (68 °F)	----
Secondary coil resistance		5.68 – 8.52 kΩ at 20 °C (68 °F)	----
Spark plug cap			
Material		Resin	----
Resistance		5.0 kΩ	----
Charging system			
Type		A.C. magneto	----
Model/manufacturer		F5YP/PT MORIC	----
Nominal output		14 V 105 W at 5,000 r/min	----
Lighting coil resistance/color		0.29 – 0.43 Ω at 20 °C (68 °F)/Y–B	----
Charging coil resistance/color		0.38 – 0.58 Ω at 20 °C (68 °F)/W–B	----
Rectifier/regulator			
Regulator type		Semiconductor short-circuit	----
Model/manufacturer		SH656A-12/THA-SHINDENGEN	----
No load regulated voltage	(DC)	14.1 – 14.9 V	----
	(AC)	12.3 – 13.3 V	----
Rectifier capacity	(DC)	8 A	----
	(AC)	12 A	----
Withstand voltage		600 V	----
Battery			
Specific gravity		1.280	----

Item	Standard	Limit
Electric starting system (T135SE)		
Type	Constant mesh	----
Starter motor		
Model/manufacturer	5YP/PT MORIC	----
Operation voltage	12 V	----
Power output	0.20 kW	----
Armature coil resistance	0.032 – 0.039 Ω at 20 °C (68 °F)	----
Brush overall length	7.0 mm (0.28 in)	3.5 mm (0.14 in)
Spring force	3.92 – 5.88 N (400-600 gf, 14.11 – 21.17 oz)	3.92 N (400 gf)
Commutator diameter	17.6 mm (0.69 in)	16.6 mm (0.65 in)
Mica undercut (depth)	1.35 mm (0.05 in)	----
Starter relay (T135SE)		
Model/manufacturer	G4R/THA-OMRON	----
Amperage rating	50 A	----
Coil resistance	54 – 66 Ω at 20 °C (68 °F)	----
Horn		
Type	Plane	----
Quantity	1	----
Model/manufacturer	GF-12/THA-NIKKO	----
Max. amperage	1.5 A	----
Performance	95 – 105 db (2 m)	----
Coil resistance	4.30 – 4.80 Ω at 20 °C (68 °F)	----
Turn signal relay		
Relay type	Condenser	----
Model/manufacturer	FZ222SD/THA-DENSO	----
Self-canceling device built-in	No	----
Flasher frequency	75 – 95 cycle/min	----
Wattage	10 W × 2 + 3.4 W	----
Fuel gauge		
Model/manufacturer	5YP/THA-NIPPON SEIKI	----
Sender unit resistance- full	4 – 10 Ω at 20 °C (68 °F)	----
- empty	90 – 100 Ω at 20 °C (68 °F)	----
Circuit breaker		
Circuit breaker type	Fuse	----
Main	10 A	----
Reserve	10 A	----

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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 lip.) 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)

EAS00029

GENERAL TIGHTENING TORQUE SPECIFICATIONS

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

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

LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
Bearings	E
O-rings	LS
Cylinder head tightening washer and bolt thread	E
Rocker arm inner surfaces	M
Rocker arm shaft	E
Camshaft	M
Valve stem (IN, EX)	M
Valve stem guide (IN, EX)	M
Piston pin	E
Piston outside and ring groove	E
Piston ring	E
Cylinder inner surface	E
Starter clutch gear inner surface	E
Starter idle gear inner surface	M
Kickstarter ratchet wheel and ratchet wheel guide	M
Kickstarter gear inner surface	M
Kickstarter shaft	M
Primary driven gear and primary drive gear 2 inner surface	E
Clutch push rod #1, #2, ball and main axle inside surface	E
Clutch housing inside surface and crankshaft outer surface	E
Clutch boss housing, clutch plate and friction plate inside surface	E
Clutch boss nut and lock washer contact surface	E
Clutch shoe housing inner surface	E
Cage	E
Clutch shoe housing boss	E
Oil pump assembly	E
Shift guide inner surface	E
Shift fork guide bar	E
Shift shaft thrust surface	E
Shift lever inner surface	E
Shift shaft stopper lever inner surface	E
Timing chain	E
Transmission wheel gears inner surface	M

LUBRICATION POINTS AND LUBRICANT TYPES

SPEC

Lubrication point	Lubricant
Transmission side plate inner surface	M
Transmission pinion gears inner surface	M
Generator lead grommet	Yamaha bond No.1215
Crankcase mating surface	Yamaha bond No.1215
Timing chain tensioner bolts	Yamaha bond No.1215

LUBRICATION POINTS AND LUBRICANT TYPES

SPEC

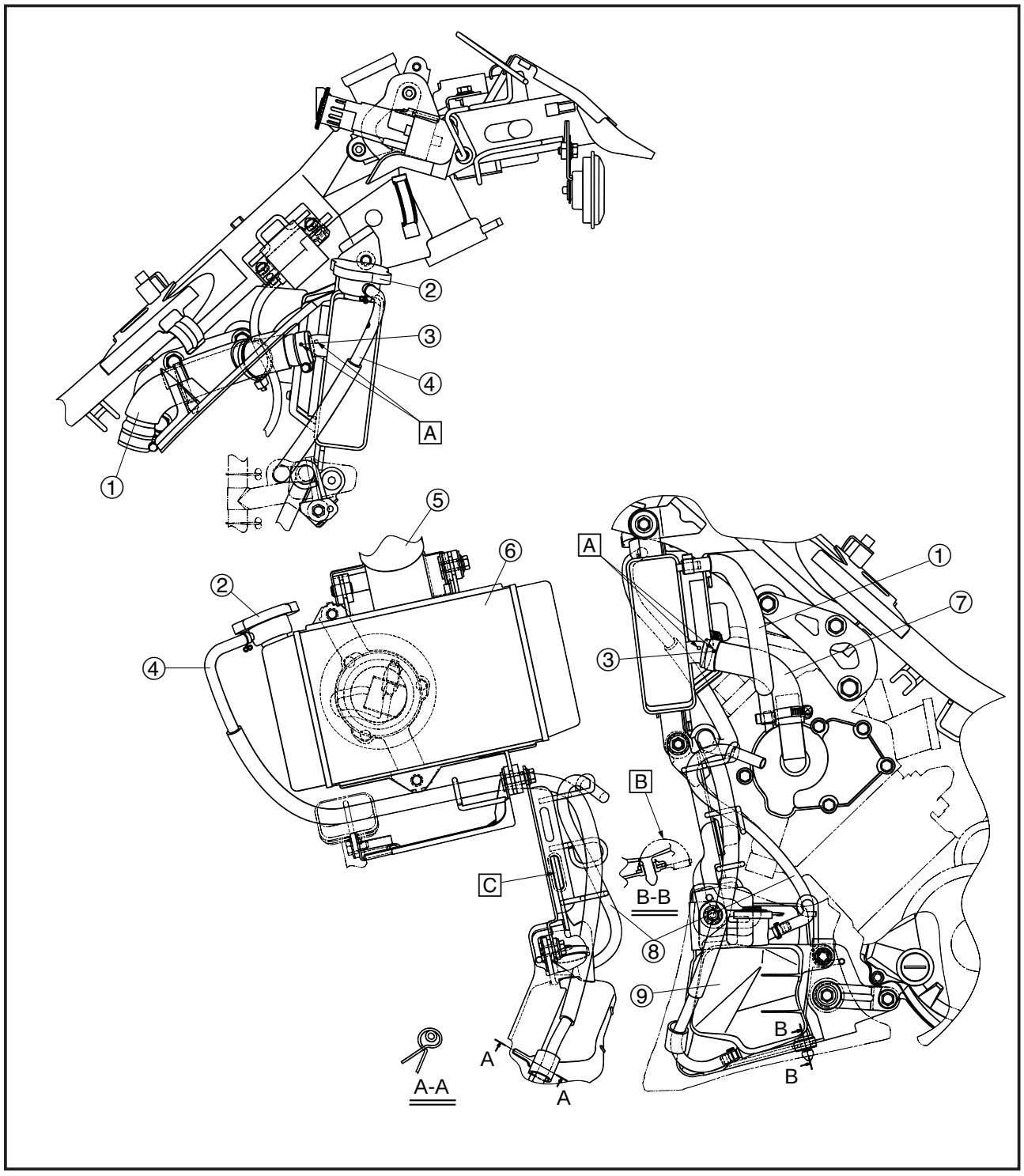
CHASSIS

Lubrication point	Lubricant
Front wheel oil seal lips	LS
Speedometer gear unit inner surface	LS
Rear wheel oil seal lips	LS
Rear brake camshaft	LS
Brake torque rod bolt	LS
Front wheel axle	LS
Rear wheel axle	LS
Upper brake caliper retaining bolt	LS
Lower brake caliper retaining bolt	LS
Throttle grip tube guide inner surface	LS
Brake lever pivot bolt	LS
Steering head bearing inner race	LS
Steering head bearing outer race	LS
Steering head upper bearing	LS
Steering head lower bearing	LS
Sidestand pivot bolt	LS
Swingarm pivot shaft	LS
Centerstand pivot shaft	LS

COOLING SYSTEM DIAGRAMS

① Radiator inlet hose
② Radiator cap
③ Hose clamp
④ Coolant reservoir hose
⑤ Frame cross pipe
⑥ Radiator
⑦ Radiator outlet hose
⑧ Over flow hose
⑨ Coolant reservoir tank

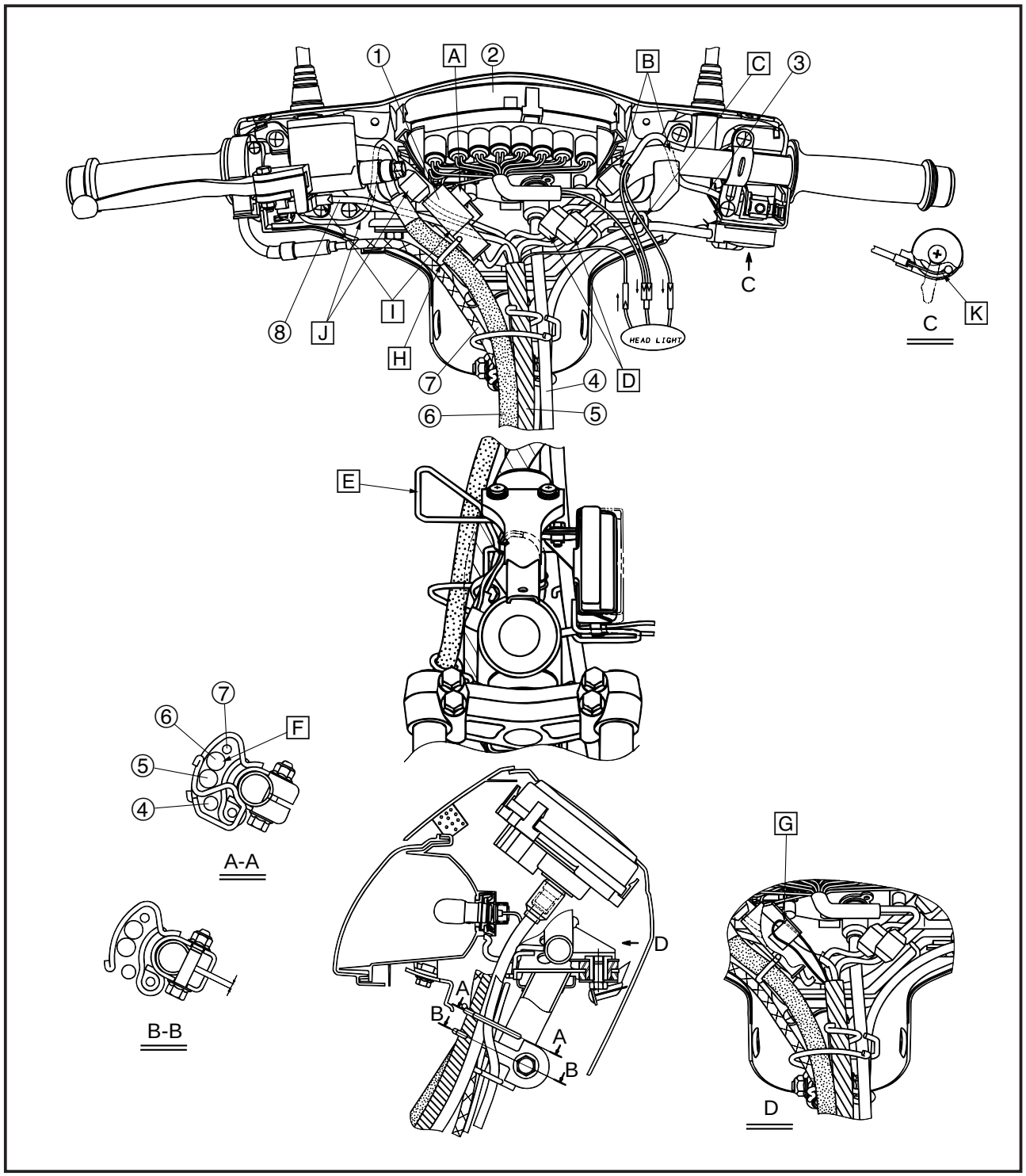
[A] Align the white paint mark on the clamp with the white paint mark on the radiator.
[B] Band the end of the cover, before install the projection of the reservoir tank.
[C] Install the hook of the cover end into the slit of the bracket.



CABLE ROUTING

① Turn signal light relay
② Meter assembly
③ Left handlebar switch lead
④ Speedometer cable
⑤ Wireharness
⑥ Brake hose
⑦ Throttle cable
⑧ Front brake light switch lead

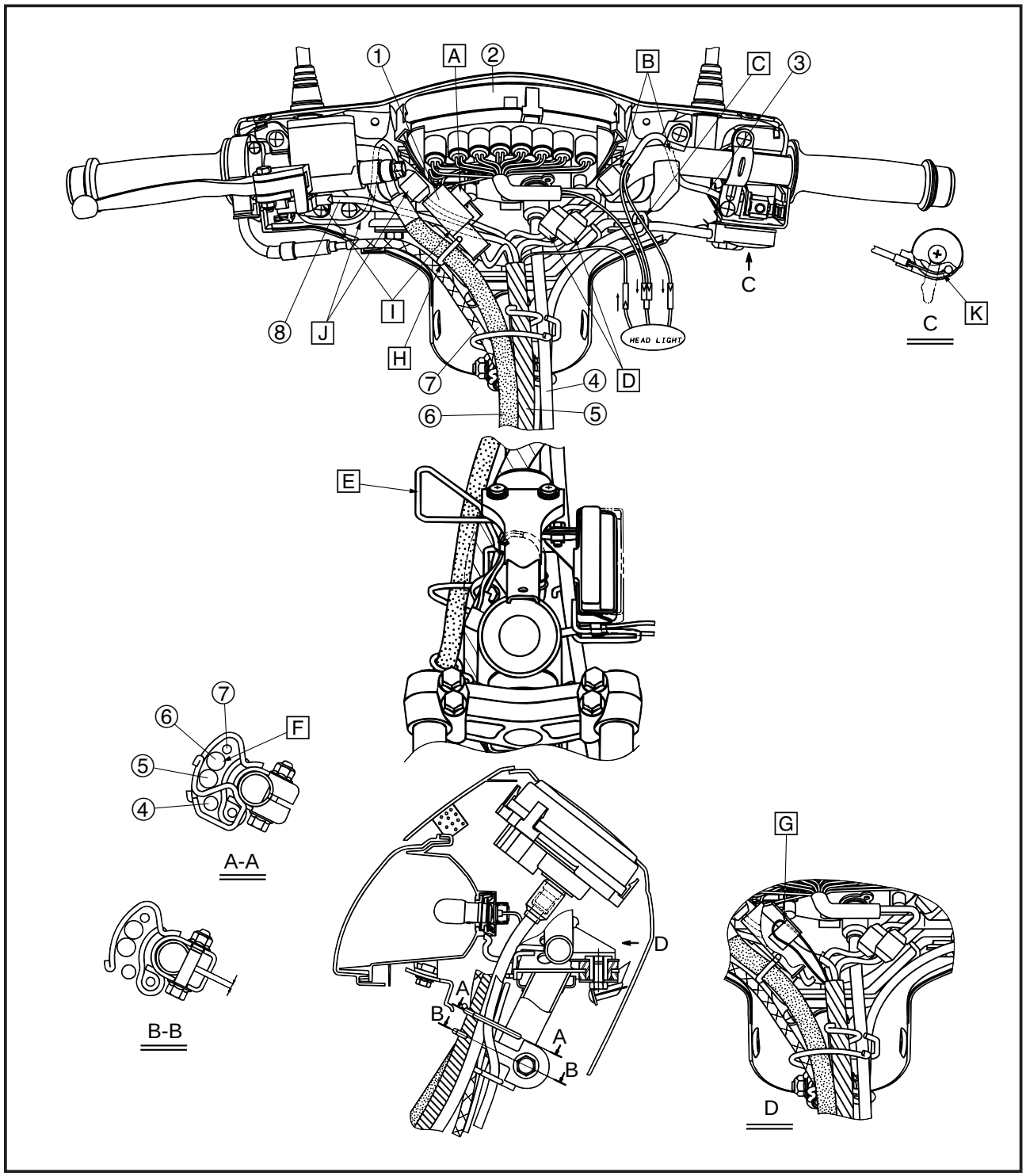
A Install the turn signal relay onto the bracket.
B Connect the left handlebar switch lead coupler in front of the handlebar left.
C Pass through the choke cable into the wireharness.
D Connect the couplers in front of the handlebar left side.
E Do not pass the brake hose into the bracket.
F Pass through into the wire guide, follow the routing order. Brake hose, throttle cable and wireharness.
G Hook the strap of the wireharness onto the bracket.
H Pass through the brake hose into the wire guide on the handlebar bracket.



I Pass the wireharness behind the turn signal relay and brake hose, and then connect the front brake switch.

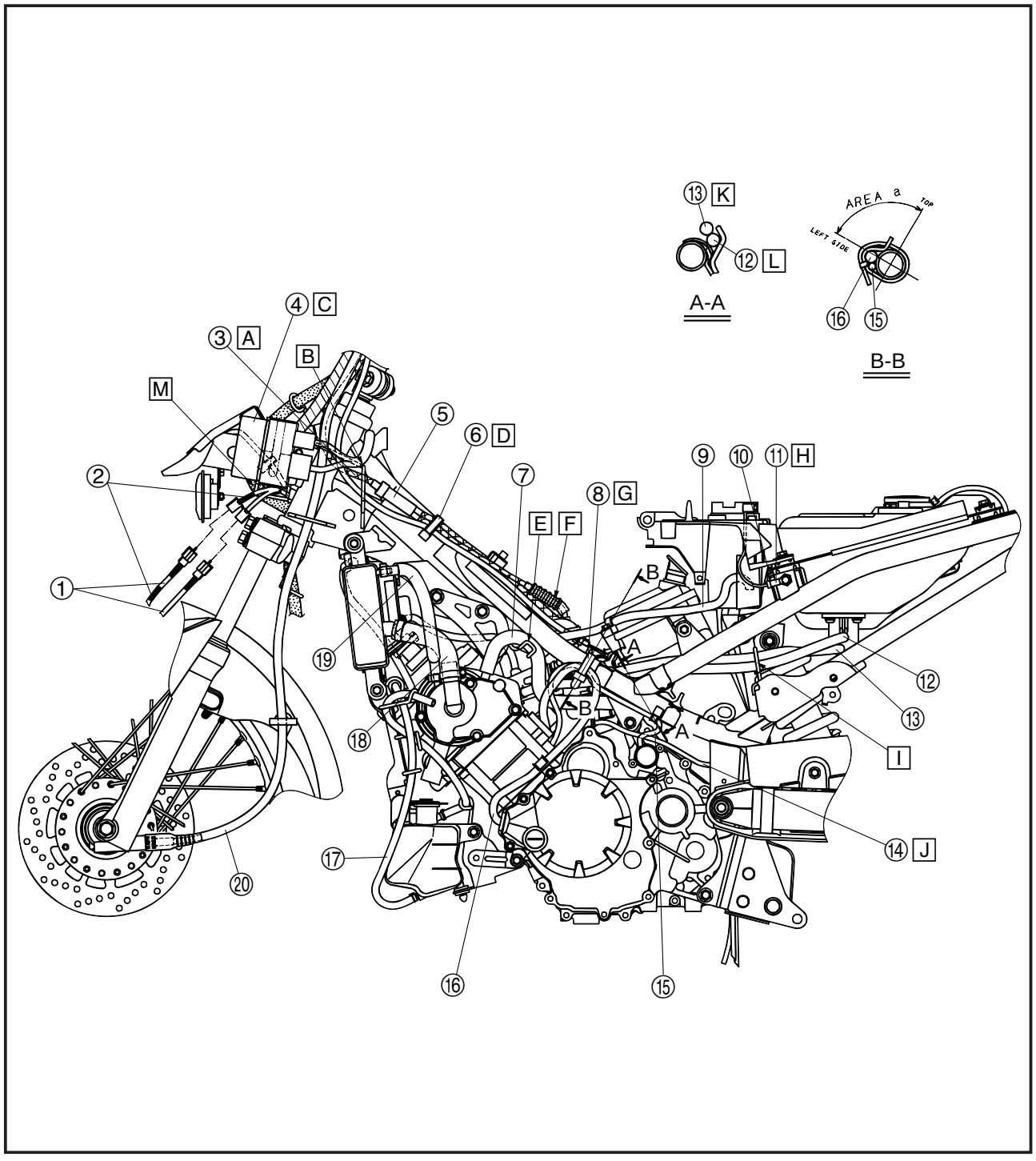
J Route the right handlebar switch lead behind the handlebar and connect the coupler with handlebar right side, and then set the turn signal light relay.

K Take care not to bend the choke cable when installing.

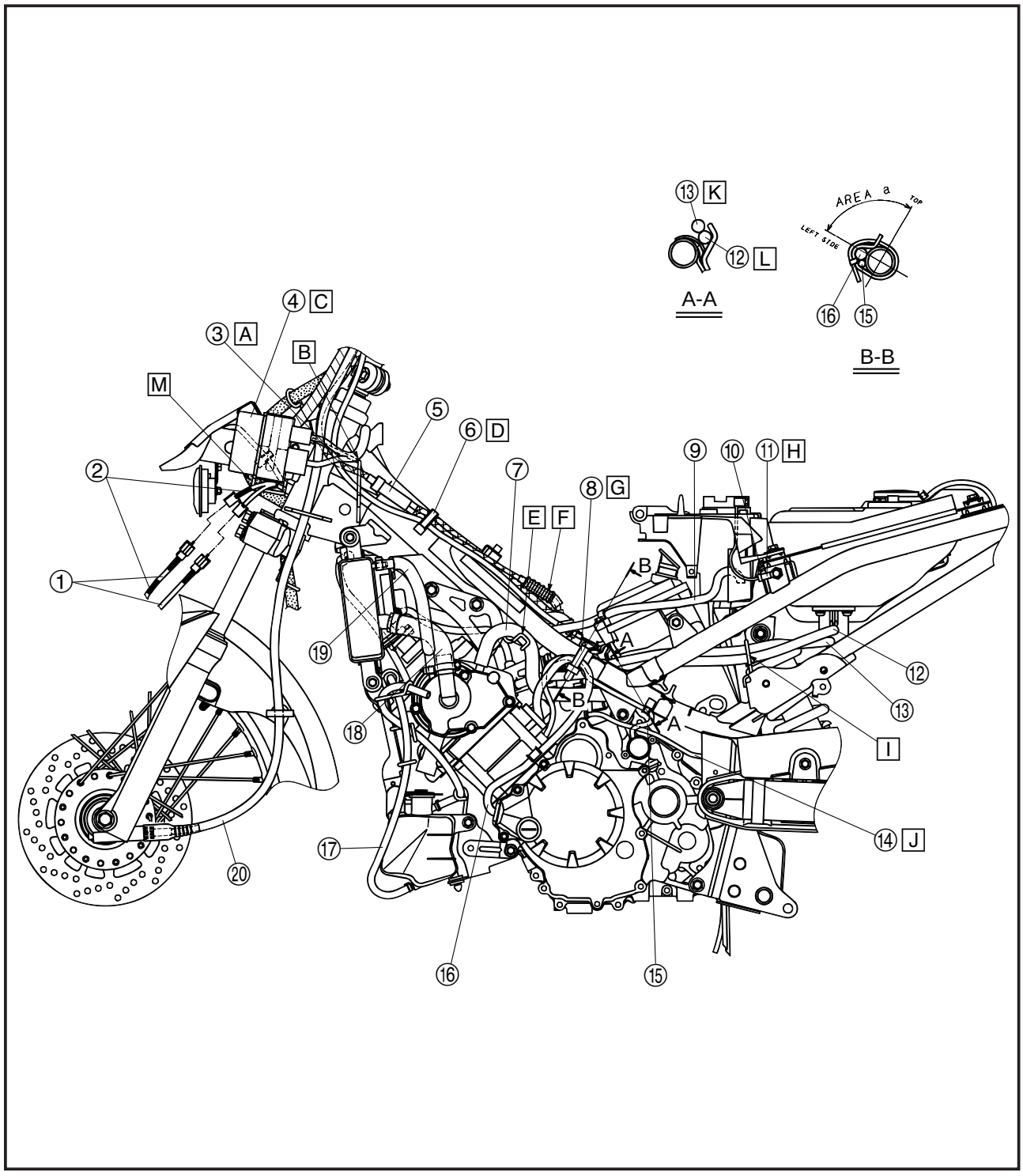


① Front turn signal light lead
② Fitting tape (red)
③ Throttle cable
④ C.D.I. unit
⑤ Case
⑥ Clamp
⑦ Breather pipe
⑧ Band
⑨ Air vent pipe
⑩ Stopper
⑪ Negative lead
⑫ Fuel hose
⑬ Vacuum hose
⑭ Overflow pipe
⑮ Neutral switch lead
⑯ A.C. magneto lead
⑰ Coolant reservoir hose
⑱ Water pump inlet hose
⑲ Radiator outlet hose
⑳ Speedometer cable

[A] Route inside of the choke cable.
[B] Pass through the throttle cable, choke cable and speedometer cable into the cable guide.
[C] Pass through the C.D.I. unit lead in front of the stay.
[D] Check that the connection of the acceleration pump cable from case, after adjusting and clamp the throttle cable and acceleration pump cable.
[E] Clamp the breather pipe.
[F] Cover the throttle cable adjusting nut completely.
[G] Clamp the neutral switch lead and A.C. magneto lead with clamp.

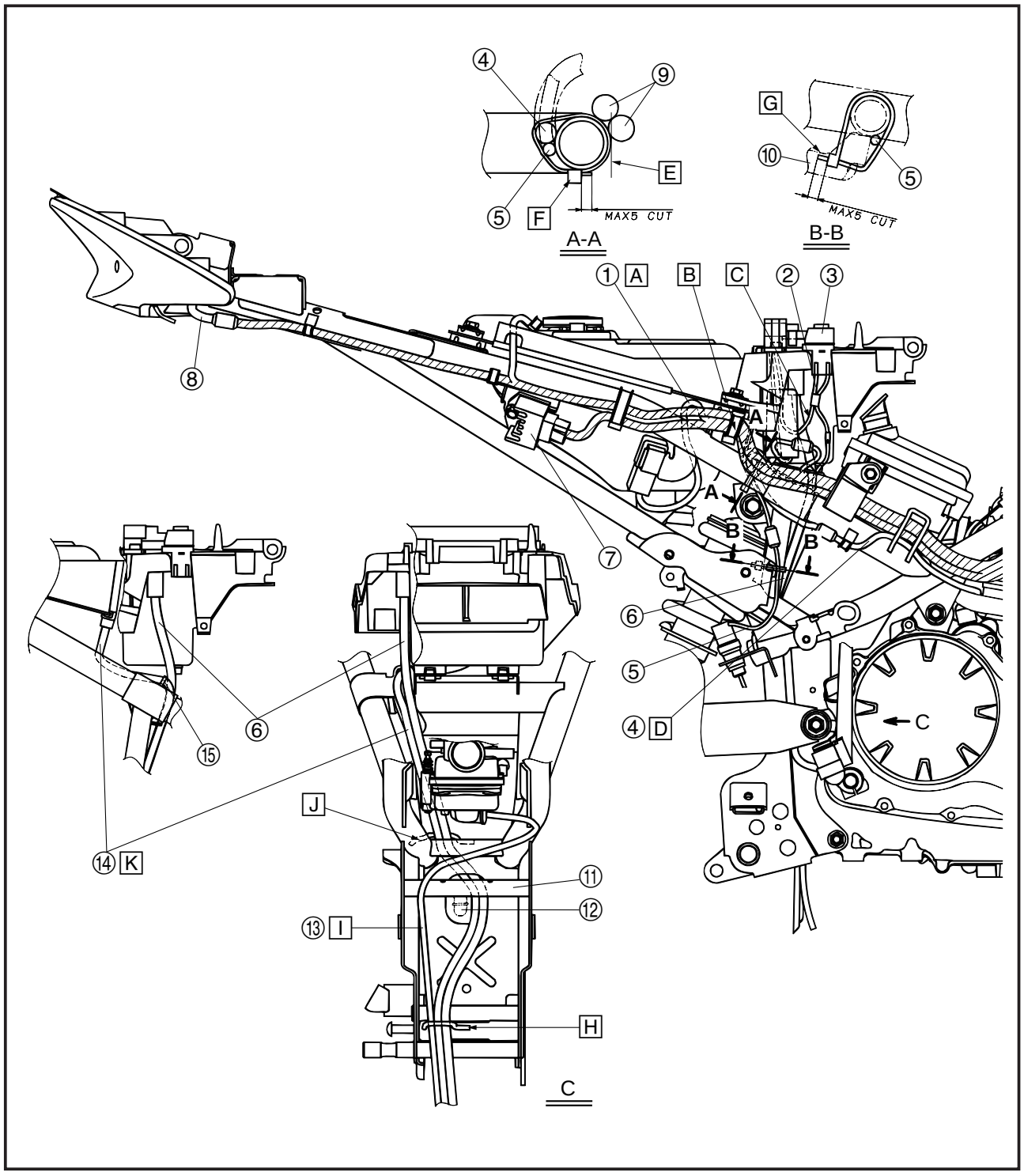


H Install the negative lead, should be stopped.
I Pass through the fuel hose and vacuum hose into the cable guide.
J Route the overflow pipe to the left side of the engine and inside of the neutral switch lead.
K Route the vacuum hose onto the fuel hose.
L Route the fuel hose onto the cable guide.
M Pass through the turn signal light lead into the guide.

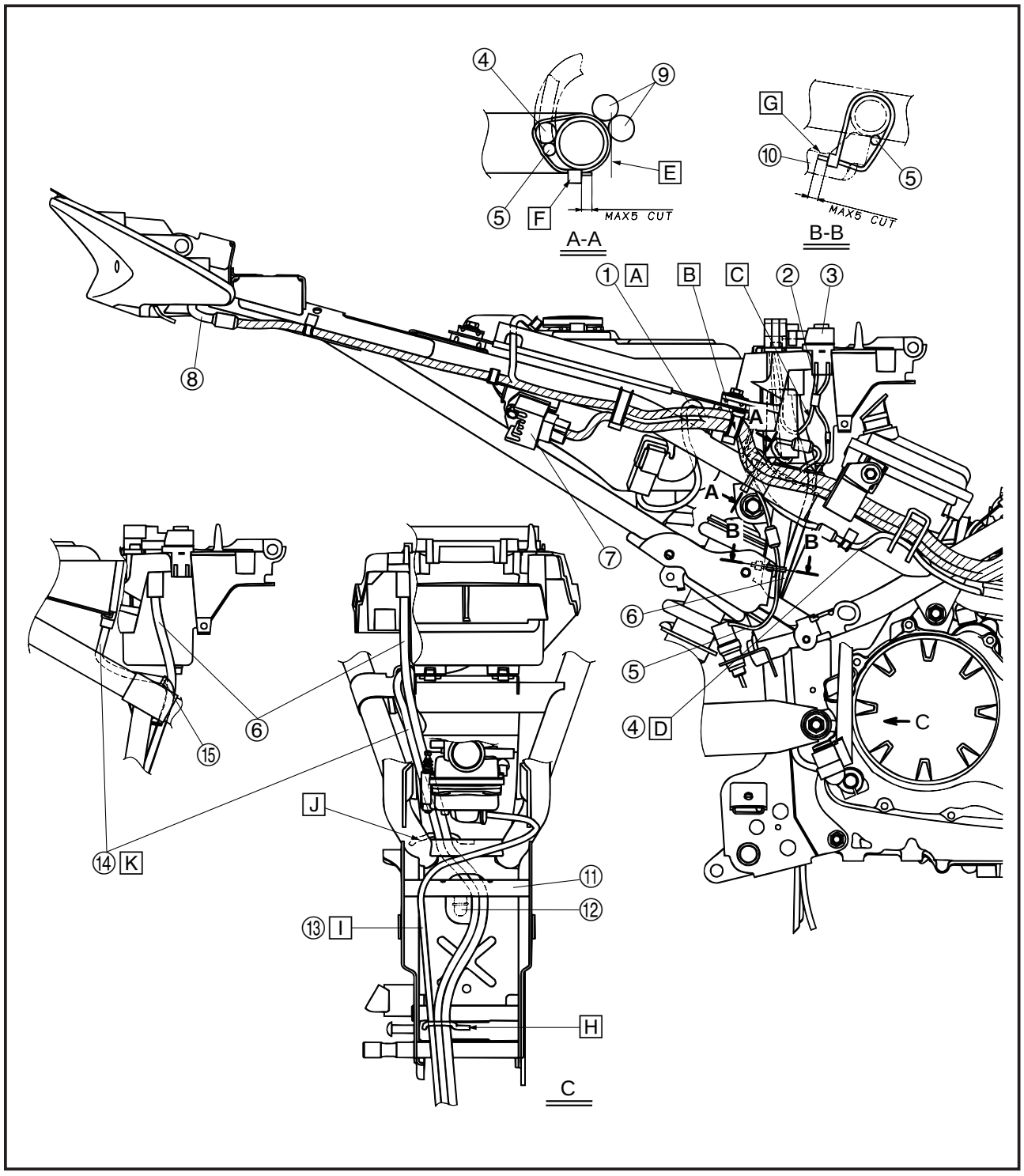


① Fan relay lead
② Positive lead
③ Fuse box
④ Starter motor lead (T135SE)
⑤ Rear brake switch lead
⑥ Battery breather pipe
⑦ Rectifier/regulator
⑧ Tail/brake light lead
⑨ Wireharness
⑩ Bracket
⑪ Frame
⑫ Air filter assembly
⑬ Overflow pipe
⑭ Drain hose
⑮ Protector

[A] Pass through the fan relay lead into the frame pipe and fuel tank.
[B] Close the clamp end until stop contact to the fuel tank.
[C] Pass through the positive lead into the starter relay and breather pipe. (T135SE)
[D] Pass through the starter motor lead under the wireharness. (T135SE)
[E] Outside of the frame.
[F] Be sure does not over the outside of the frame.
[G] Set in the connected point to the bracket, after behind them.
[H] Pass through the drain hose, battery breather pipe and over flow pipe into the cable guide.

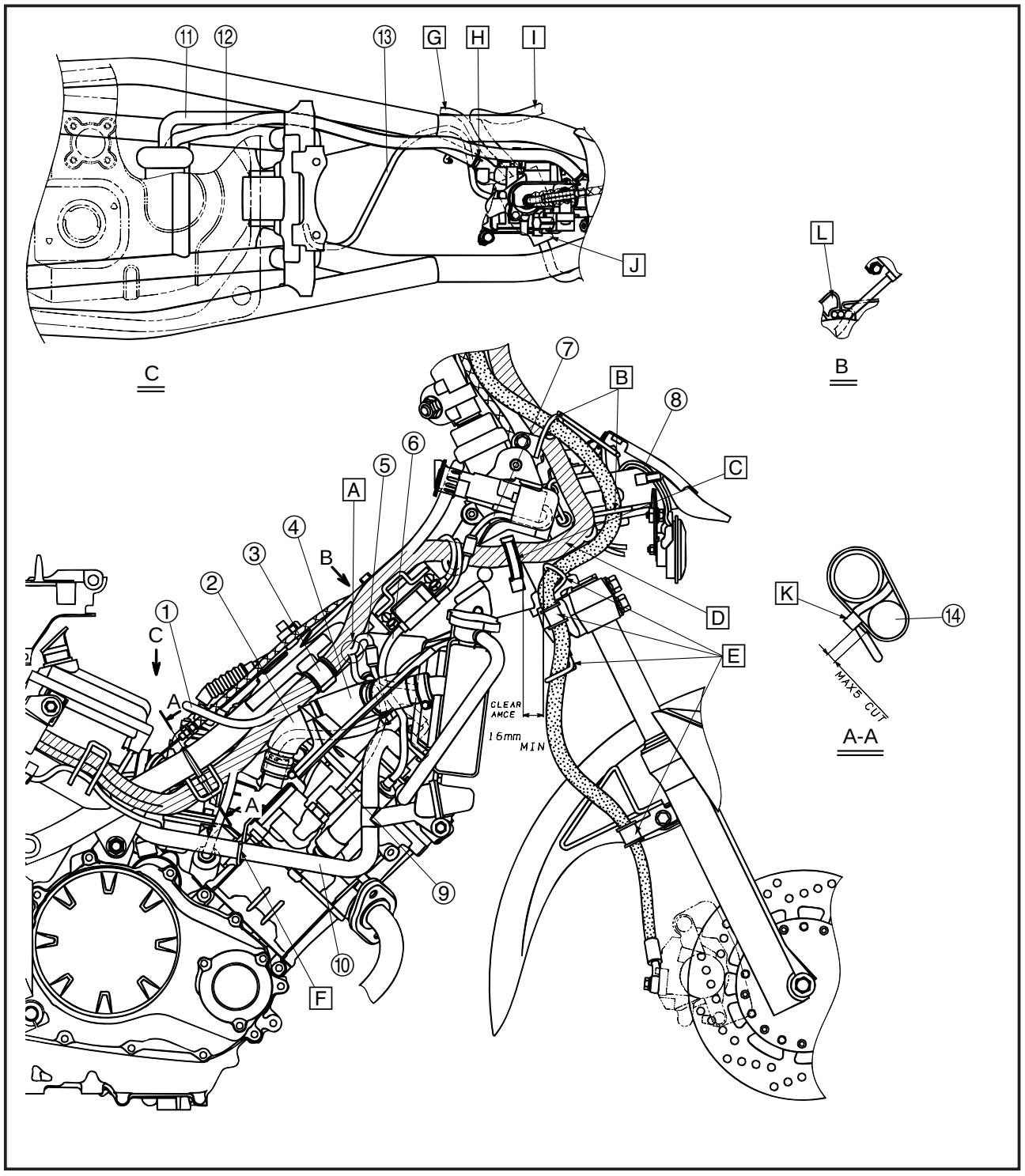


I Route the overflow pipe in front of the cross pipe frame.
J Pass through the drain hose and battery breather pipe into the guide.
K Pass through the drain hose into the hole of the protector.

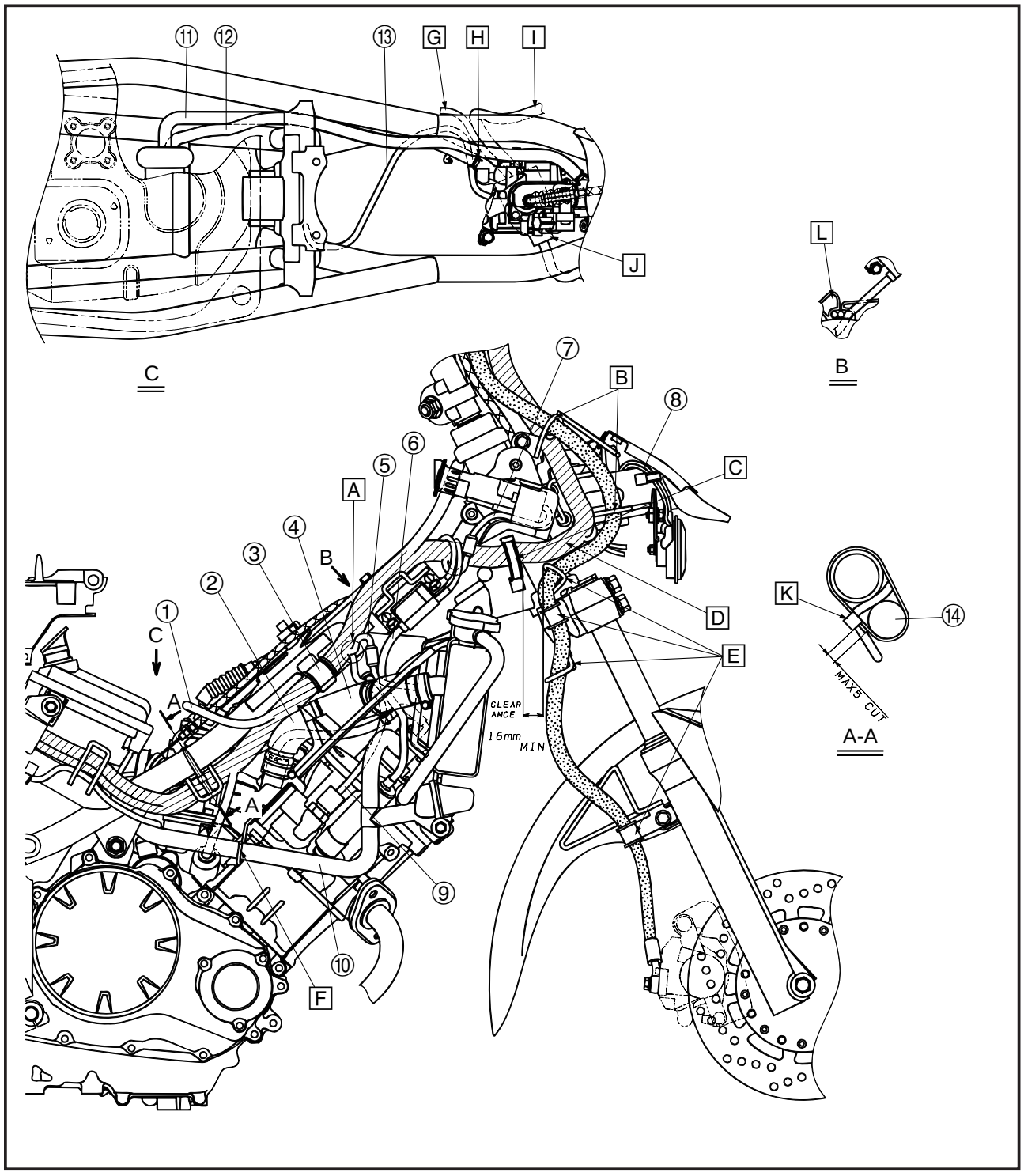


① Throttle position sensor lead
② Radiator inlet hose
③ Grommet
④ Plate
⑤ Fan motor lead
⑥ High tension cord
⑦ Main switch lead
⑧ Horn lead
⑨ Thermo switch lead
⑩ Bend hose
⑪ Fuel hose
⑫ Vacuum hose
⑬ Overflow pipe
⑭ Wireharness

[A] Turn the downward of the separate part.
[B] Route the brake hose through as shown.
[C] Close the clamp certainly.
Wireharness and cable guide clearance is wit in 16 mm, when straight the steering condition.
[D] Pass through the wireharness into the main switch and cable guide.
Pass through the hone lead and turn signal light lead under the wireharness.
[E] Route the brake hose as shown.
[F] Clamp the bend hose.
[G] To the neutral switch.
[H] Turn the clip inside without contact the vacuum hose.

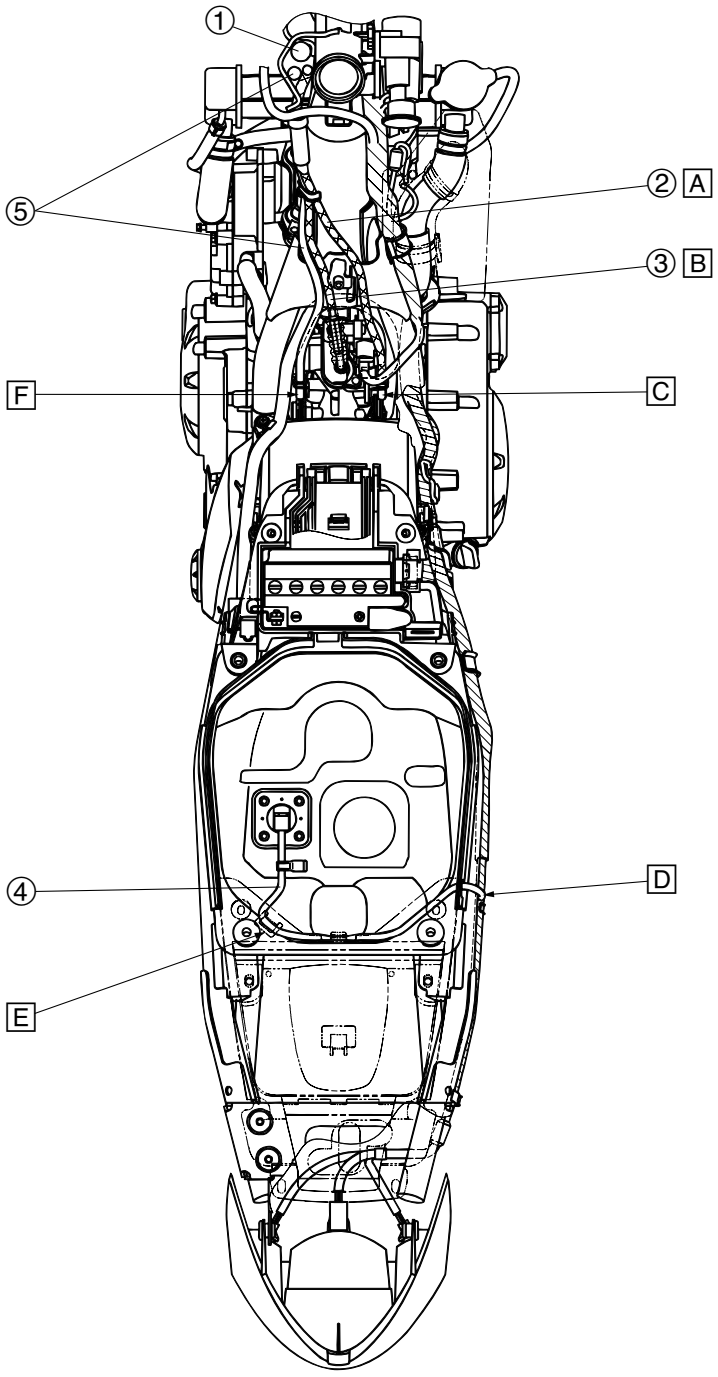


I To the A.C. magneto.
J Cover the protector completely , after the coupler connected.
K Set the connected point below the pipe end.
L Pass through the high tension cord, fan motor lead and thermo sensor lead into the cut part on the plate.



① Speedometer cable
② Acceleration pump cable
③ Throttle cable
④ Fuel sender lead
⑤ Choke cable

A Route the acceleration pump cable into the right side of the stay.
B Route the throttle cable into the left side of the stay.
C Black plating joint.
D Pass through the fuel sender lead in to the side hole of the fuel tank.
E Clamp the fuel sender lead onto the hook of the box.
F White plating joint.



CHK ADJ

CHAPTER 3
PERIODIC CHECKS AND ADJUSTMENTS

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PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

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PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1000 km)					ANNUAL CHECK
				1	6	12	18	24	
1	*	Fuel line	• Check fuel and vacuum hoses for cracks or damage.		√	√	√	√	√
2		Spark plug	• Check condition. • Clean and regap.		√		√		
			• Replace.			√		√	
3	*	Valves	• Check valve clearance. • Adjust.		√	√	√	√	
4		Air filter element	• Clean.		√		√		
			• Replace.			√		√	
5	*	Battery	• Check electrolyte level and specific gravity. • Make sure that the breather hose is properly routed.		√	√	√	√	√
6	*	Front brake	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
7	*	Rear brake	• Check operation and adjust brake pedal free play.	√	√	√	√	√	√
			• Replace brake shoes.	Whenever worn to the limit					
8	*	Brake hose	• Check for cracks or damage.	√	√	√	√	√	√
			• Replace.	Every 4 years					
9	*	Wheels	• Check runout, spoke tightness and for damage. • Tighten spokes if necessary.		√	√	√	√	
10	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
11	*	Wheel bearings	• Check bearing for looseness or damage.		√	√	√	√	
12	*	Swingarm	• Check operation and for excessive play.		√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 24000 km					
13		Drive chain	• Check chain slack, alignment and condition. • Adjust and thoroughly lubricate chain with engine oil.	Every 500 km and after washing the motorcycle or riding in the rain					
14	*	Steering bearings	• Check bearing play and steering for roughness.	√	√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 24000 km					
15	*	Chassis fasteners	• Make sure that all nuts, bolts and screws are properly tightened.		√	√	√	√	√
16		Sidestand, centerstand	• Check operation. • Lubricate.		√	√	√	√	√
17	*	Front fork	• Check operation and for oil leakage.		√	√	√	√	
18	*	Shock absorber assembly	• Check operation and shock absorber for oil leakage.		√	√	√	√	
19	*	Carburetor	• Check starter (choke) operation. • Adjust engine idling speed.	√	√	√	√	√	√
20		Engine oil	• Change. • Check oil level and vehicle for oil leakage.	√	√	√	√	√	√
21		Engine oil filter element	• Replace.	√		√		√	

PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

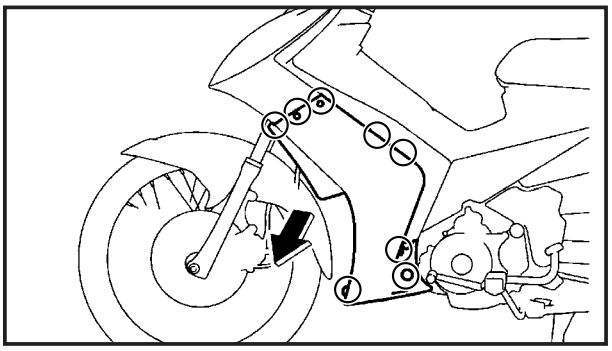
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NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (× 1000 km)					ANNUAL CHECK
				1	6	12	18	24	
22	*	**Cooling system**	• Check coolant level and vehicle for coolant leakage.		√	√	√	√	√
			• Change the YAMAHA GENUINE COOLANT.	Every 3 years					
23	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
24		**Moving parts and cables**	• Lubricate.		√	√	√	√	√
25	*	**Throttle grip housing and cable**	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.		√	√	√	√	√
26	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts if necessary.		√	√	√	√	√
27	*	**Lights, signals and switches**	• 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.



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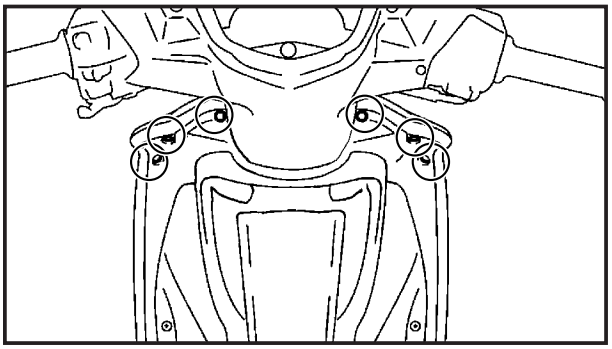
COVERS

REMOVING THE SIDE COWLINGS

1. Remove:
   - screws
   - bolts
   - side cowlings (left and right)

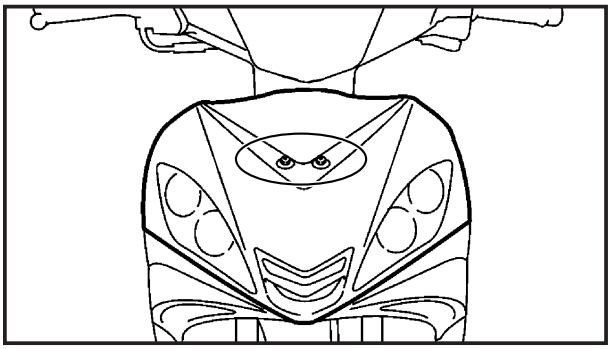
INSTALLING THE SIDE COWLINGS

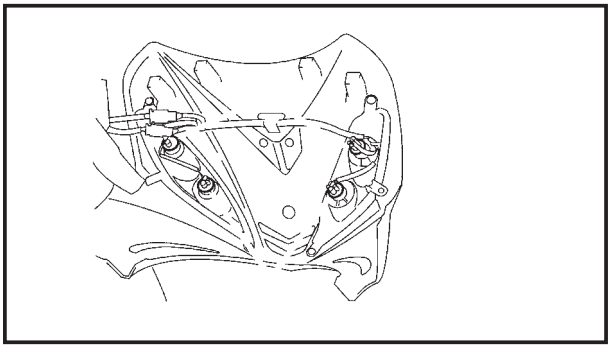
For installation, reverse the removal procedure.



REMOVING THE FRONT COWLING

1. Remove:
   - screws
   - front cowling

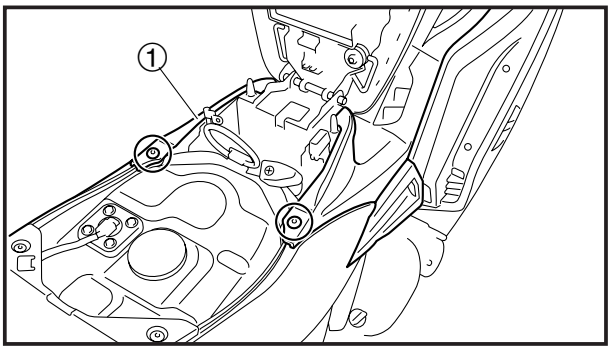




2. Disconnect:
   - turn signal light couplers

INSTALLING THE FRONT COWLING

For installation, reverse the removal procedure.

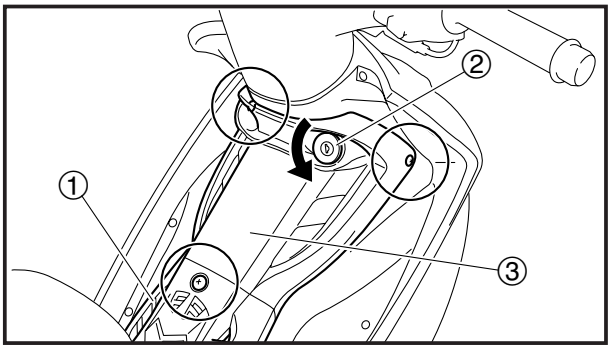


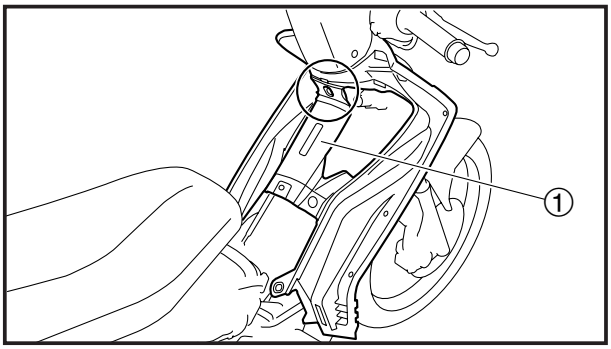
REMOVING THE CENTER PANELS

1. Remove:
   - screws
   - center panel (lower) ①
   - main switch cover ②
   - screws
   - center panel (upper) ③

NOTE:

Remove the main switch cover by turning it in the direction of the arrow shown.

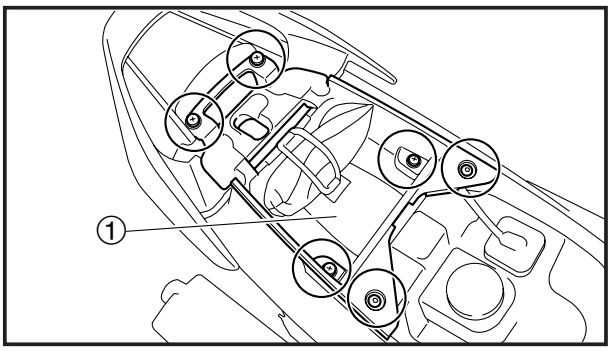




2. Remove:
   - screw
   - inner panel ①

INSTALLING THE CENTER PANELS

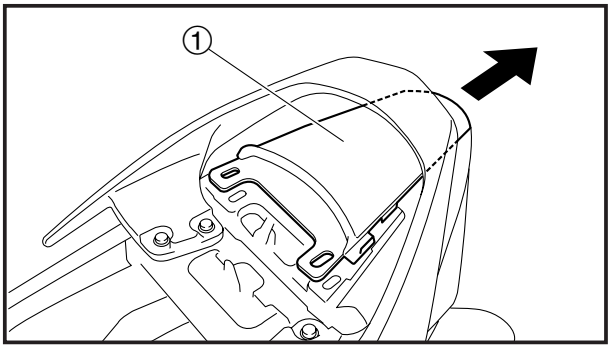
For installation, reverse the removal procedure.



REMOVING THE REAR COWLINGS

1. Remove:
   - screws
   - center panel (lower)

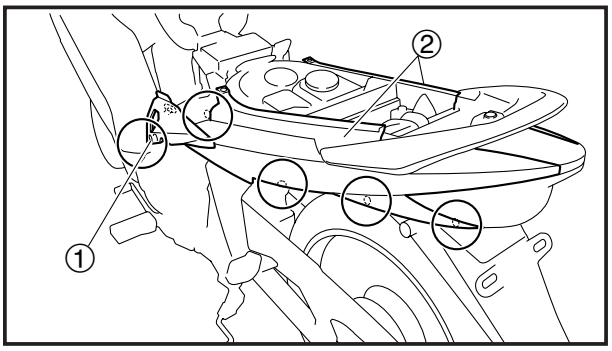
2. Remove:
   - screws
   - storage compartment ①



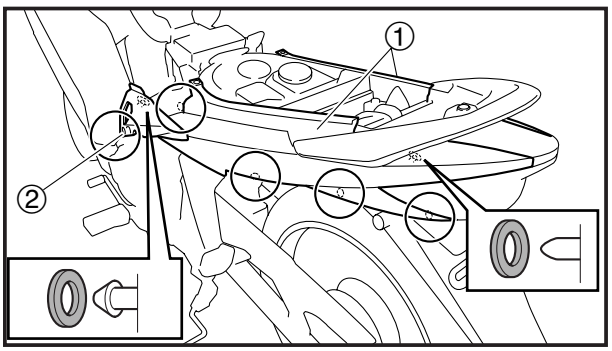
3. Remove:
   - rear panel ①

NOTE:

Remove the rear panel by sliding it in the direction shown.



4. Remove:
   - screws
   - screw (with washer) ①
   - screws
   - rear cowlings (left and right) ②

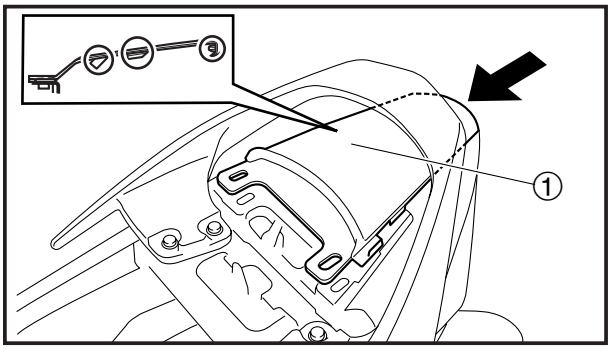


INSTALLING THE REAR COWLINGS

1. Install:
   - rear cowlings (left and right) ①
   - screws
   - screw (with washer) ②

NOTE:

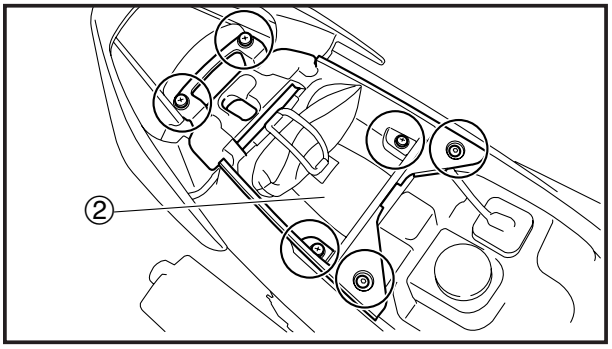
Before tightening the rear cowling screws, make sure that all projections (left and right) are securely fitted.

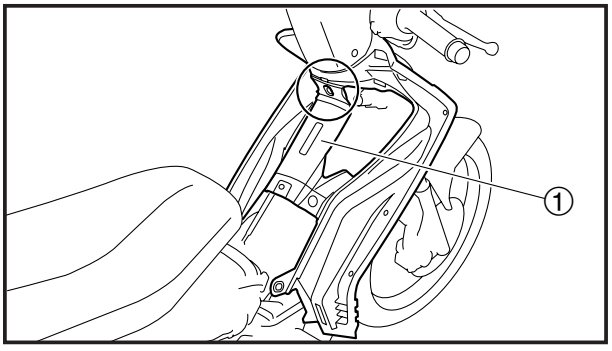


2. Install:
   - rear panel ①
   - storage compartment ②
   - screws

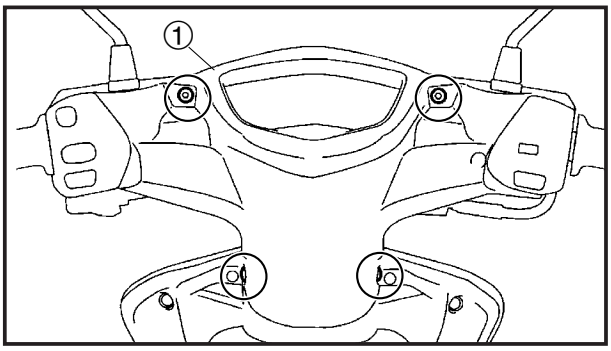
NOTE:

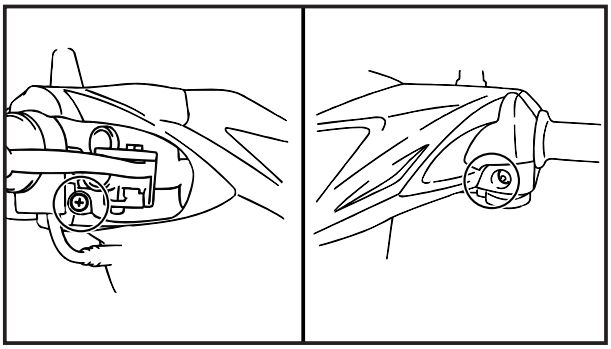
Make sure that all projections are securely fitted.

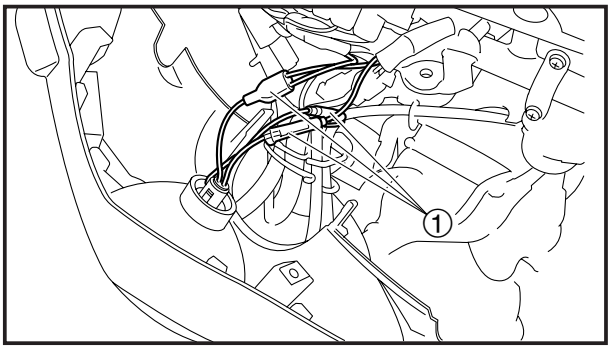




3. Install:
   - center panel (upper) ①
   - screw





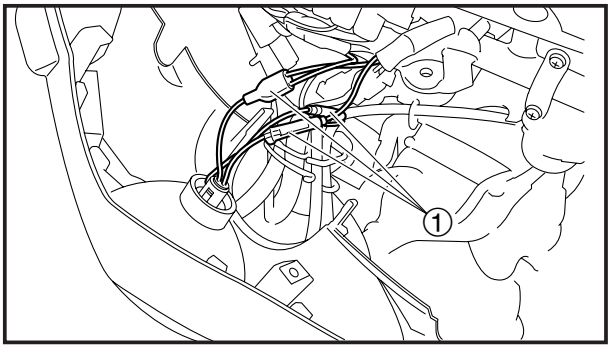


REMOVING THE HEADLIGHT ASSEMBLY

1. Remove:
   - screws
   - headlight assembly ①
2. Disconnect:
   - headlight connectors ①

INSTALLING THE HEADLIGHT ASSEMBLY

1. Connect:
   - headlight connectors ①
2. Install:
   - headlight assembly
   - screws



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ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

NOTE:

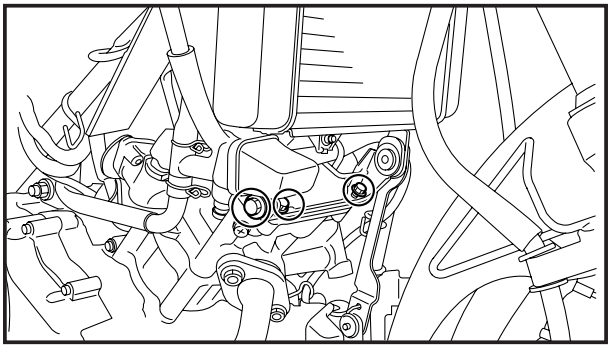
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

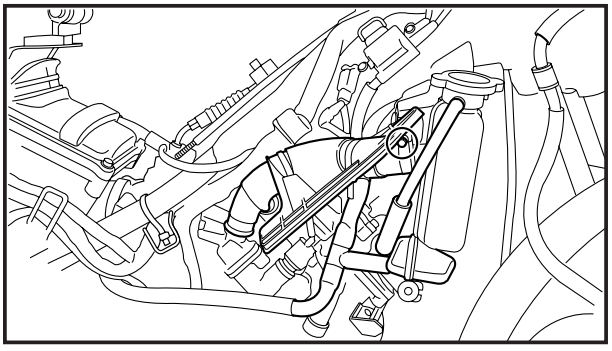
1. Remove:
   - side cowlings (left and right)
   - front cowling

   Refer to “REMOVING THE SIDE COWLINGS” AND “REMOVING THE FRONT COWLING”.

2. Drain:
   - cooling system

   Refer to “CHANGING THE COOLANT”.





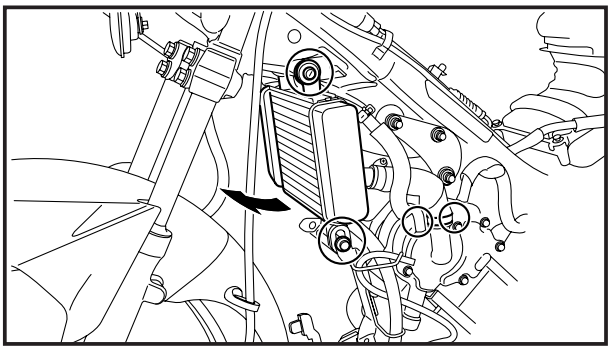
3. Remove:
   - AIS resonator mount bolt
   - AIS resonator
   - spark plug
   - bracket

   Refer to “CHANGING THE COOLANT”.

CAUTION:

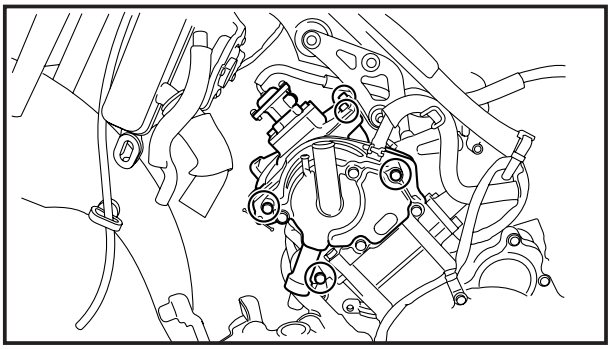
Be sure to remove the AIS hose, before removing the AIS resonator, otherwise to brake the AIS resonator mount.

4. Disconnect:
   - radiator inlet hose
   - radiator outlet hose
   - water pump inlet hose

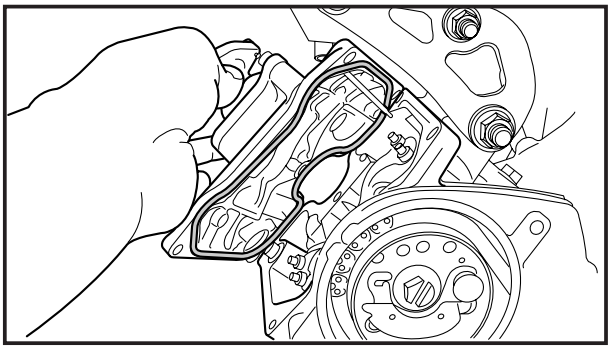


5. Move:
   - radiator assembly

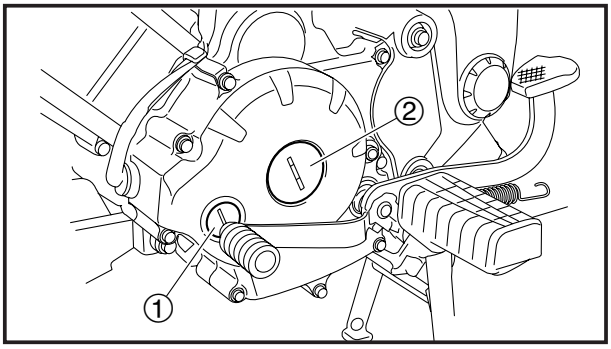
   To swing the radiator assembly toward the front side.



6. Remove:
   - water pump assembly
   - O-rings



7. Remove:
   - cylinder head cover
   - gasket

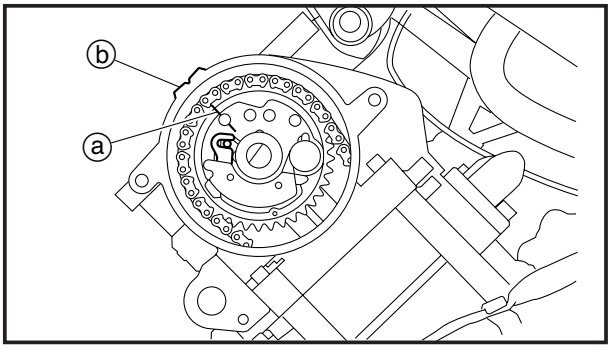


8. Remove:
   - timing check plug ①
     (with O-ring)
   - center plug ②
     (with O-ring)

9. Measure:
   - valve clearance

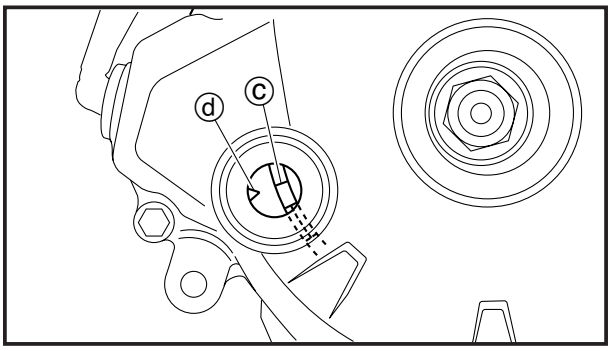
   Out of specification → Adjust.

Valve clearance (cold)
Intake valve
0.10–0.14 mm (0.0039–0.0055 in)
Exhaust valve
0.16–0.20 mm (0.0063–0.0079 in)

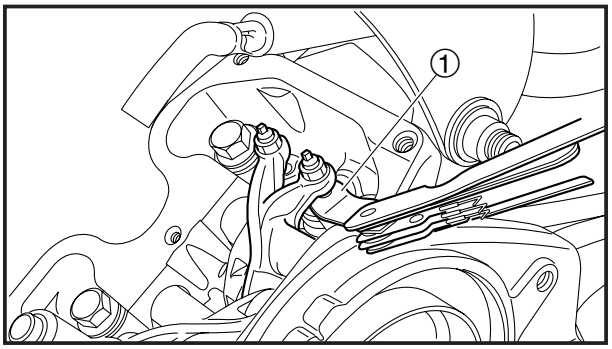


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a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the "I" mark ⓐ on the camshaft sprocket with the stationary pointer ⓑ on the cylinder head.

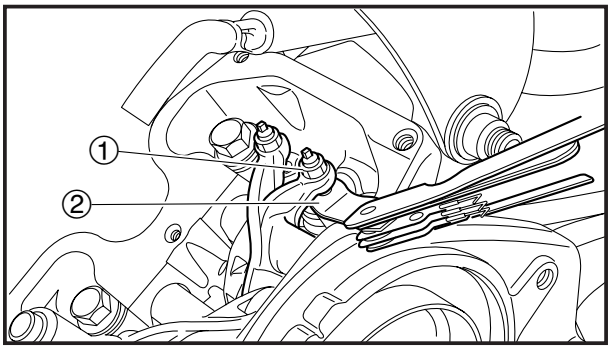


c. Align the TDC mark ⓒ on the generator rotor with the stationary pointer ⓓ on the crankcase cover.



d. Measure the valve clearance with a thickness gauge ①
Out of specification → Adjust.

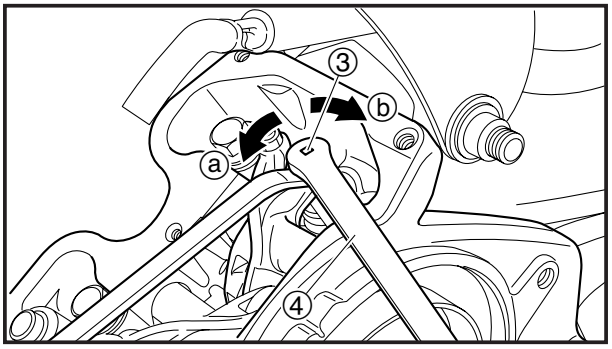
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10. Adjust:
•valve clearance

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



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

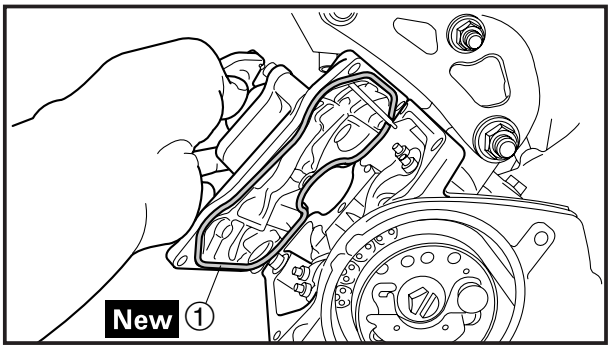
Tappet adjusting tool ④
90890-01311

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

Locknut
7 Nm (0.7 m·kg, 5.0 ft·lb)

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

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11. Install:
    - O-ring **New**
    - timing check plug (with O-ring) **7 Nm (0.7 m•kg, 5.0 ft•lb)**
    - center plug (with O-ring) **7 Nm (0.7 m•kg, 5.0 ft•lb)**

12. Install:
    - gasket ① **New**
    - cylinder head cover **10Nm (1.0 m•kg, 7.2 ft•lb)**

13. Install:
    - O-ring **New**
    - water pump assembly **10Nm (1.0 m•kg, 7.2 ft•lb)**

14. Connect
    - water pump inlet hose
    - radiator outlet cover
    - radiator inlet hose

15. Install:
    - AIS resonator
    - AIS resonator mount bolt
    - spark plug **12.5Nm (1.25 m•kg, 9.0 ft•lb)**

16. Fill:
    - cooling system
      Refer to “CHANGING THE COOLANT”.

17. Install:
    - front cowling
    - side cowlings (left and right)
      Refer to “INSTALLING THE SIDE COWLINGS” and “INSTALLING THE FRONT COWLING”.

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ADJUSTING THE ENGINE IDLING SPEED

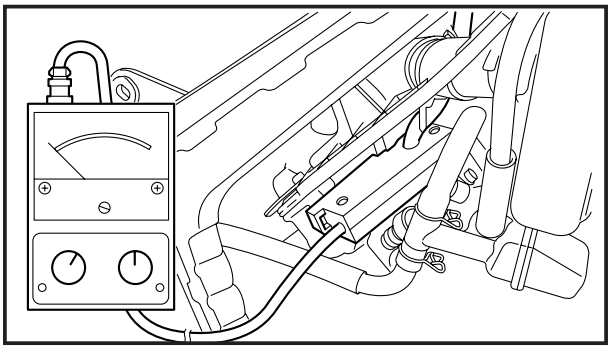
NOTE:

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

1. Remove:
   - side cowlings (left and right)
   - front cowling
   - rear cowling (left)

   Refer to "REMOVING THE SIDE COWLINGS", "REMOVING THE FRONT COWLING" and "REMOVING THE REAR COWLINGS".
2. Start the engine and let it warm up for several minutes.
3. Connect:
   - engine tachometer

   (onto the spark plug lead)



	Engine tachometer **90890-03113**

4. Check:
   - engine idling speed

   Out of specification → Adjust.

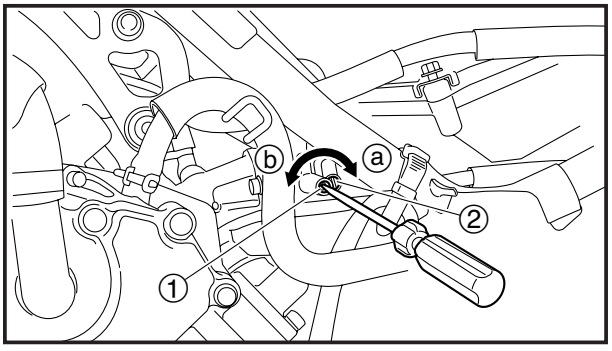
	Engine idling speed **1,300–1,500 r/min**

5. Adjust:
   - engine idling speed

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

Pilot air screw setting **1-5/8 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".

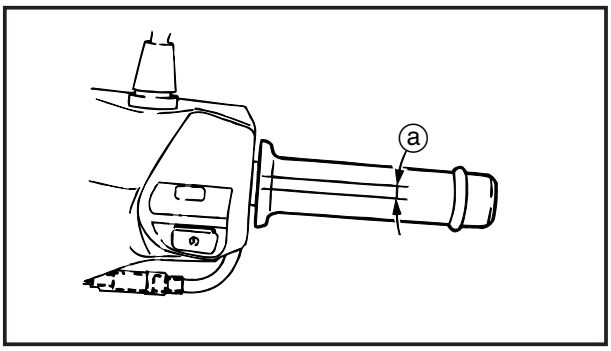
Throttle cable free play (at the flange of the throttle grip)
3–7 mm (0.12–0.28 in)

7. Install:
   • rear cowling (left)
   • front cowling
   • side cowlings (left and right)
   Refer to "INSTALLING THE REAR COWLINGS", "INSTALLING THE FRONT COWLING" and "INSTALLING THE REAR COWLINGS".

EAS00058

ADJUSTING THE THROTTLE CABLE FREE PLAY

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



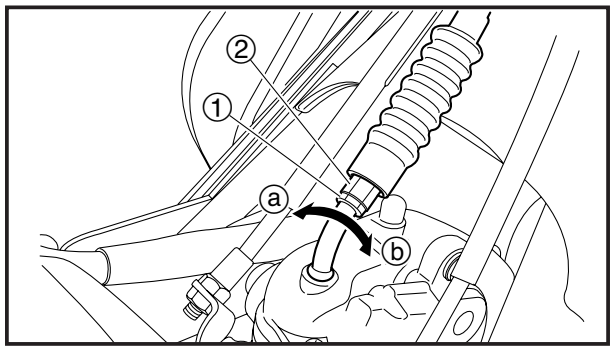
1. Check:
   • throttle cable free play ⓐ
   Out of specification → Adjust.

Throttle cable free play (at the flange of the throttle grip)
3–7 mm (0.12–0.28 in)

2. Remove:
   • center panel (lower)
   Refer to "REMOVING THE CENTER PANELS".

ADJUSTING THE THROTTLE CABLE FREE PLAY

CHK ADJ



3. Adjust:
   - throttle cable free play

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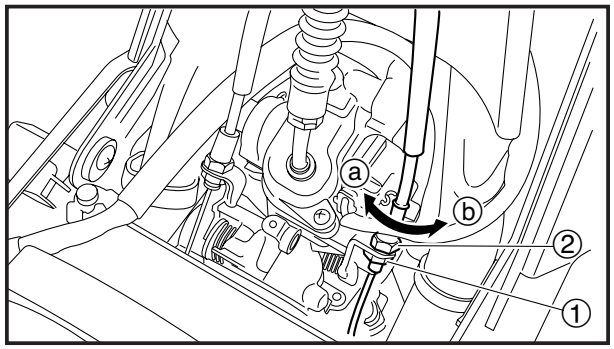
a. Pull back the adjusting nut cover.
b. Loosen the locknut ①
c. Turn the adjusting nut ② in direction ⓐ or ⓑ until the specified throttle cable free play is obtained.

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

d. Tighten the locknut.
e. Slide the adjusting nut cover to its original position.

⚠WARNING

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



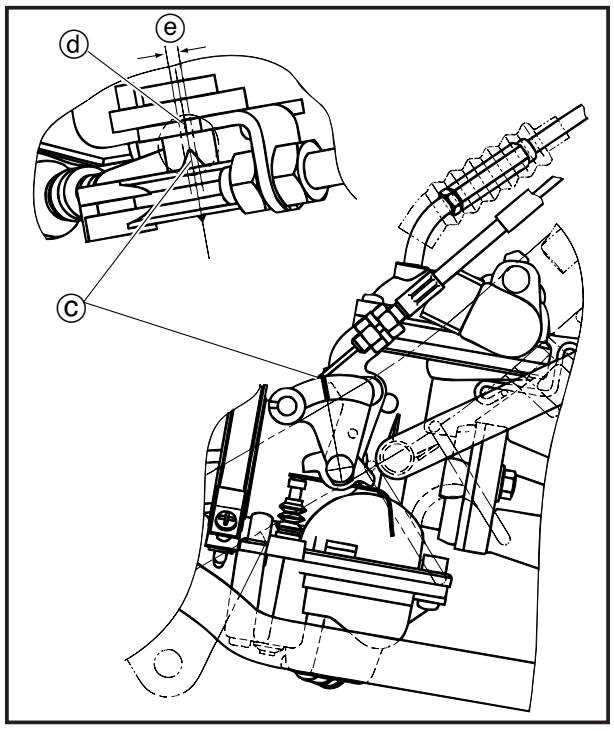
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4. Adjust:
   - accelerator pump cable

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a. Loosen the locknut ①
b. Turn the adjusting nut ② in direction ⓐ or ⓑ until align the projection ⓒ on the accelerator pump lever with projection ⓓ on the bracket. (ⓔ: within ± 1mm)
c. Tighten the locknut.

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EAS00060

CHECKING THE SPARK PLUG

1. Remove:
   - side cowling (right)
     Refer to “REMOVING THE SIDE COWLINGS”.
   - AIS resonator

CAUTION:

Be sure to remove the AIS hose, before removing the AIS resonator, otherwise to brake the AIS resonator mount.

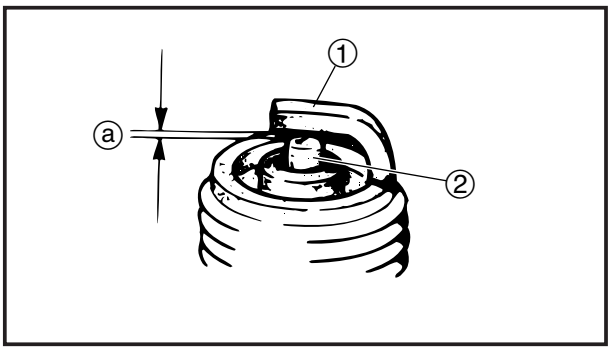
2. Disconnect:
   - spark plug cap
3. Remove:
   - spark plug

CAUTION:

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

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

Spark plug type (manufacturer)
CPR8EA-9 (NGK)



5. Check:
   - electrode ①
     Damage/wear → Replace the spark plug.
   - insulator ②
     Abnormal color → Replace the spark plug.
     Normal color is medium-to-light tan.
6. Clean:
   - spark plug
     (with a spark plug cleaner or wire brush)
7. Measure:
   - spark plug gap ⓐ
     (with a wire thickness gauge)
     Out of specification → Regap.

Spark plug gap
0.8–0.9 mm (0.031–0.035 in)

8. Install:
   - spark plug — 13 Nm (1.3 m•kg, 9.5 ft•lb)

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

9. Connect:
   - spark plug cap
10. Install:
   - AIS resonator
   - center panel (lower)
     Refer to “INSTALLING THE CENTER PANELS”.

EAS00067

MEASURING THE COMPRESSION PRESSURE

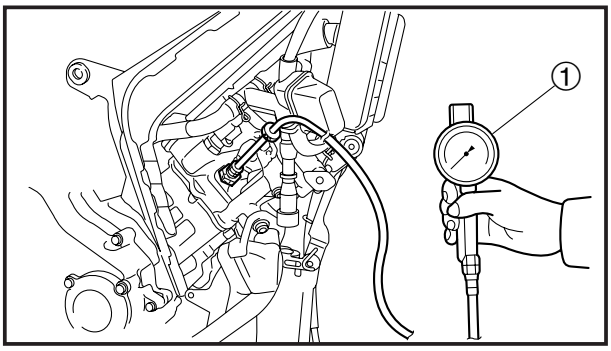
NOTE:
Insufficient compression pressure will result in a loss of performance.

1. Remove:
   - side cowling (right)
     Refer to “REMOVING THE SIDE COWLING”.
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 plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

MEASURING THE COMPRESSION PRESSURE

CHK ADJ



6. Install:
   • compression gauge ①

	Compression gauge **90890-03081**

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

	Compression pressure **(at sea level)** **Minimum** **490 kPa (4.9 kg/cm², 70 psi)/at 500 r/min** **Standard** **560 kPa (5.6 kg/cm², 80 psi)/at 500 r/min** **Maximum** **630 kPa (6.3 kg/cm², 90 psi)/at 500 r/min**

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

⚠WARNING

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

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

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

8. Install:
   - spark plug — **13 Nm (1.3 m•kg, 9.5 ft•lb)**
9. Connect:
   - spark plug cap
10. Install:
    - side cowling (right)

    Refer to “INSTALLING THE SIDE COWLINGS”.

EAS00070

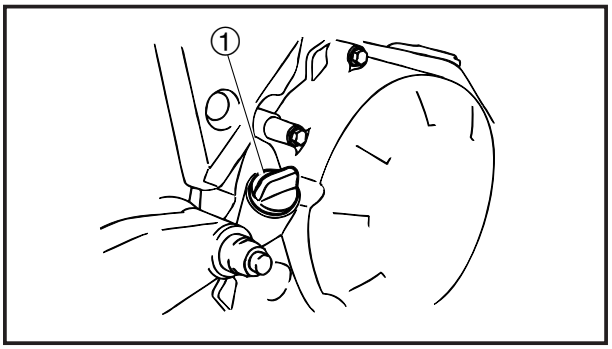
CHECKING THE ENGINE OIL LEVEL

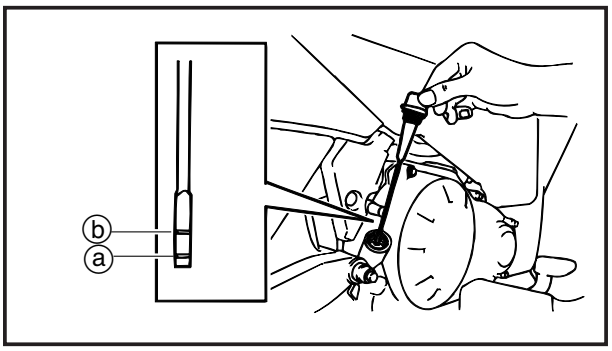
1. Stand the vehicle on a level surface.

NOTE:

Make sure the vehicle is upright.

2. Start the engine, warm it up for several minutes, and then turn it off.





3. Remove:
   - oil level plug ①
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
SAE 20W40 type SF or SAE 20W50 motor oil

CAUTION:

Do not allow foreign materials to enter the crankcase.

NOTE:

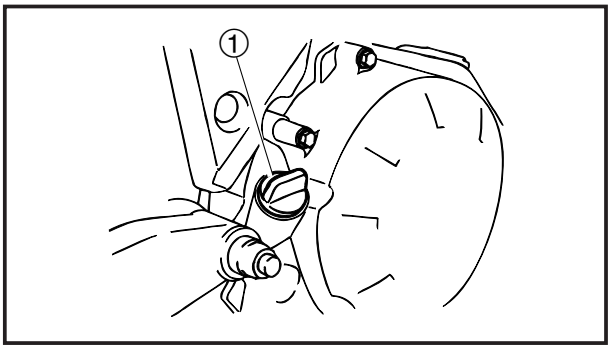
- Insert the oil level plug back into the oil filler hole (without screwing it in), and then remove it again to check the oil level.
- Before checking the engine oil level, wait a few minutes until the oil has settled.

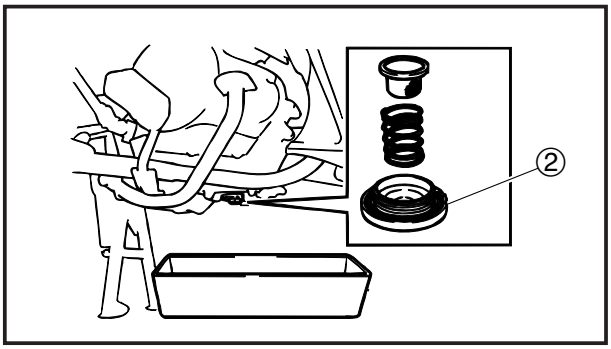
5. Start the engine, warm it up for several minutes, and then turn it off.
6. Check the engine oil level again.

EAS00075

CHANGING THE ENGINE OIL

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



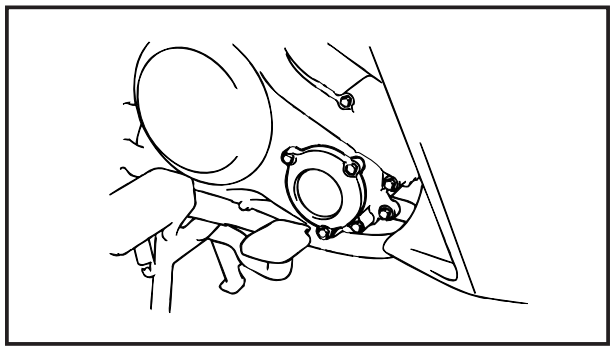


3. Remove:
   - oil level plug ①
   - engine oil drain plug ②
     (with O-ring)
   - spring
   - oil strainer
4. Drain:
   - engine oil
     (completely from the crankcase)
5. Check:
   - oil strainer
     Clog → Clean.
     Damage → Replace.
6. Install:
   - oil strainer
   - spring
   - O-ring **New**
   - engine oil drain plug

     32 Nm (3.2 m•kg, 23 ft•lb)
7. Fill:
   - crankcase
     (with the specified amount of the recommended engine oil)

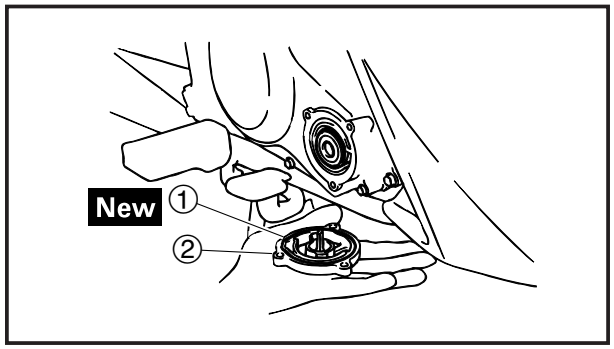
Quantity
Total amount
1.15 L (1.22 US qt, 1.01 Imp gt)
Periodic oil change amount
0.8 L (0.85 US qt, 0.70 Imp gt)

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



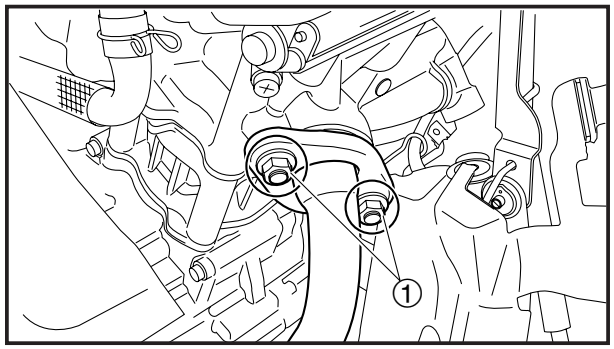
CHECKING THE OIL FILTER

1. Remove:
   - oil filter element cover
   - O-ring
   - oil filter element
2. Check:
   - oil filter element
     Dirt or clog → Replace.



3. Install:
   - oil filter element
   - O-ring ① New
   - oil filter element cover

10 Nm (1.0 m•kg, 7.2 ft•lb)

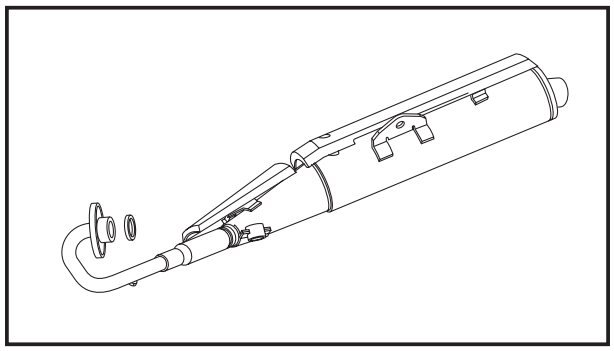


CHECKING THE EXHAUST SYSTEM

1. Check:
   - exhaust pipe nuts ①
     Loose/damage → Tighten/replace.

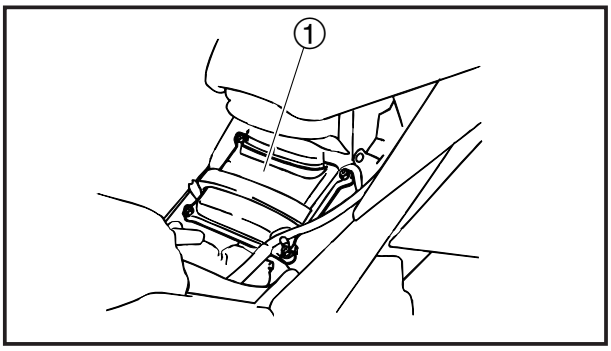
15 Nm (1.5 m•kg, 11 ft•lb)

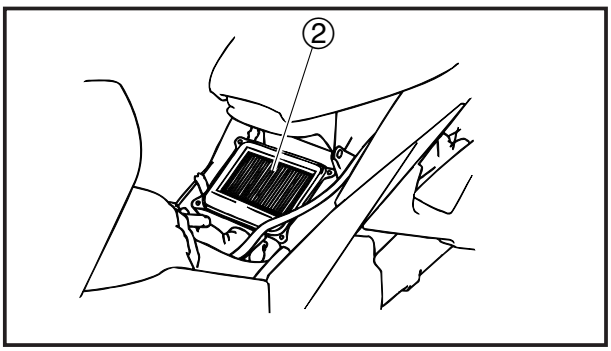
   - exhaust pipe gasket
     Exhaust gas leaks → Tighten/replace.

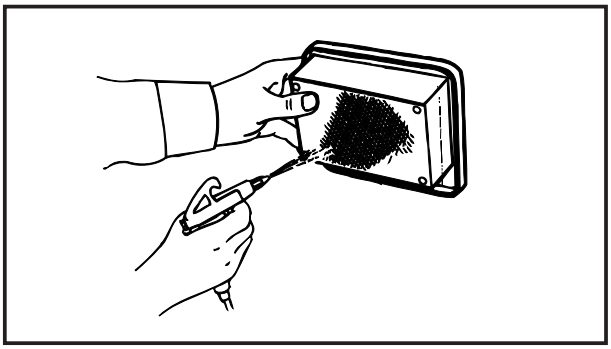


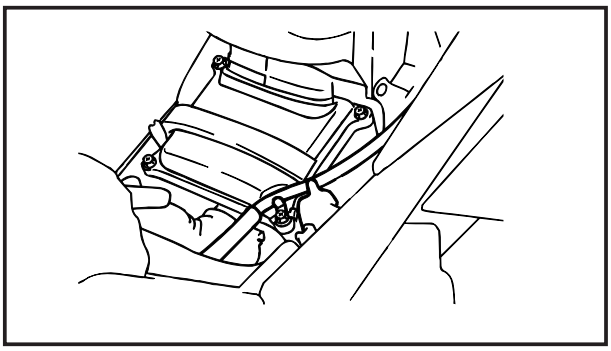
CLEANING THE AIR FILTER ELEMENT

CHK ADJ









EAS00086

CLEANING THE AIR FILTER ELEMENT

1. Remove:
   - center panel (lower)
     Refer to “REMOVING THE CENTER PANELS”.

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

3. Clean:
   - air filter elements
     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
   - breather hose

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.

NOTE:

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

6. Install:
   - center panel (lower)
   Refer to “INSTALLING THE CENTER PANELS”.

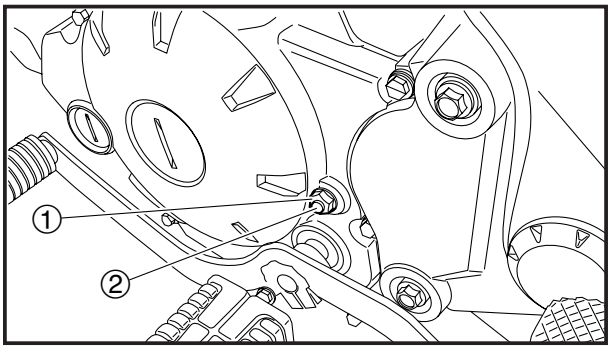
EAS00086

ADJUSTING THE CLUTCH RELEASE SYSTEM

1. Adjust:
   - clutch release system

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a. Loosen the locknut ①.
b. Turn the adjusting screw ② in completely, then turn the adjusting screw out the specified number of turns.



Adjusting screw:
1/8 turns out

c. Tighten the locknut.

8 Nm (0.8 m•kg, 6.0 ft•lb)

NOTE:

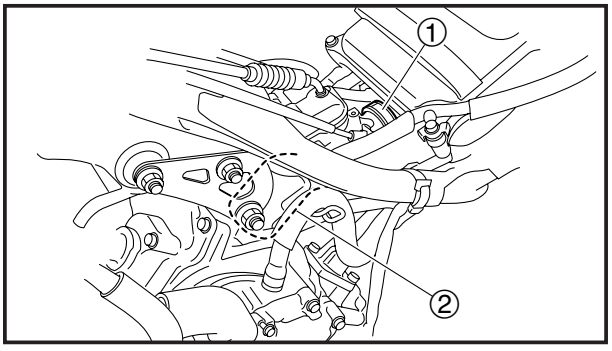
Hold the adjusting screw and tighten the locknut.

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EAS00094

CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD

1. Remove:
   - side cowlings (left and right)
   - center panels (upper and lower)
   - front cowling
   - rear cowlings (left and right)
   - inner panel
   Refer to “COVERS”.



2. Check:
   - carburetor joint ①
   - intake manifold ②
   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 6.

3. Install:
   - inner panel
   - rear cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - side cowlings (left and right)

   Refer to “COVERS”.

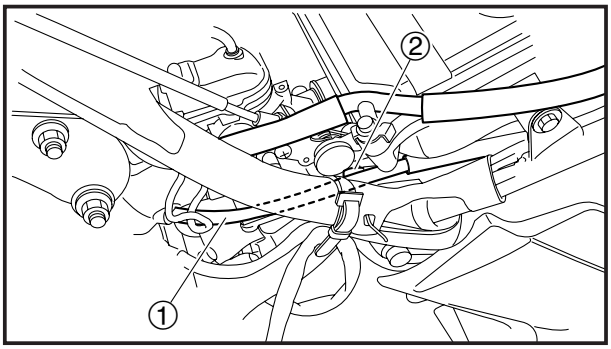
EAS00096

CHECKING THE FUEL AND VACUUM HOSES

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

1. Remove:
   - side cowlings (left and right)
   - center panels (upper and lower)
   - front cowling
   - rear cowlings (left and right)
   - inner panel

   Refer to “COVERS”.



2. Check:
   - fuel cock vacuum hose ①
   - fuel hose ②

   Cracks/damage → Replace.
   Loose connection → Connect properly.
3. Install:
   - inner panel
   - rear cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - side cowlings (left and right)

   Refer to “COVERS”.

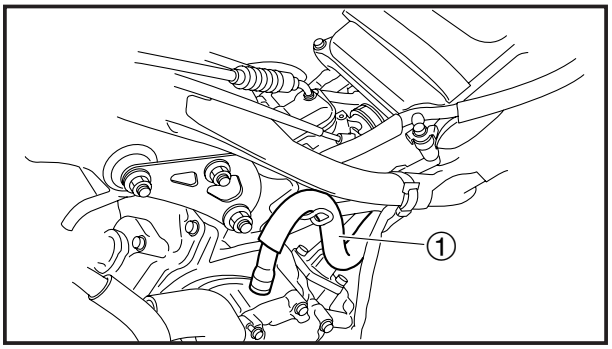
EAS00098

CHECKING THE CRANKCASE BREATHER PIPE

1. Remove:
   - side cowlings (left and right)
   - center panels (upper and lower)
   - front cowling
   - rear cowlings (left and right)
   - inner panel

   Refer to “COVERS”.
2. Check:
   - crankcase breather pipe ①

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



CAUTION:

Make sure the crankcase breather pipe is routed correctly.

3. Install:
   - inner panel
   - rear cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - side cowlings (left and right)

   Refer to “COVERS”.

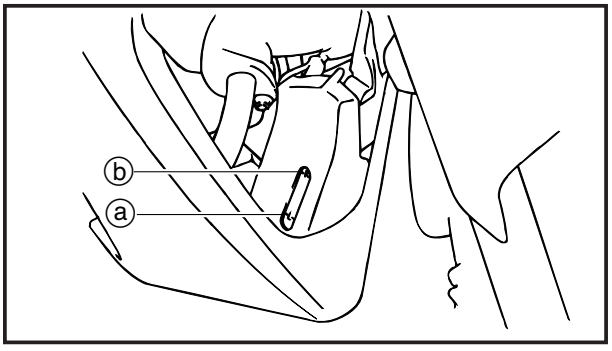
EAS00103

CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

NOTE:

Make sure the vehicle is upright.



2. Check:
   - coolant level

   The coolant level should be between the minimum level mark ⓐ and maximum level mark ⓑ.
   Below the minimum level mark → Add the recommended coolant to the proper level.

CAUTION:

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

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

NOTE:

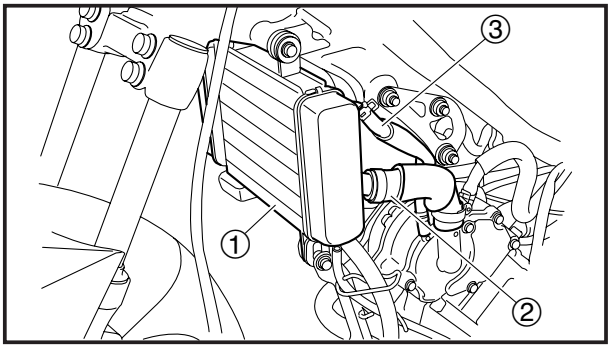
Before checking the coolant level, wait a few minutes until it settles.

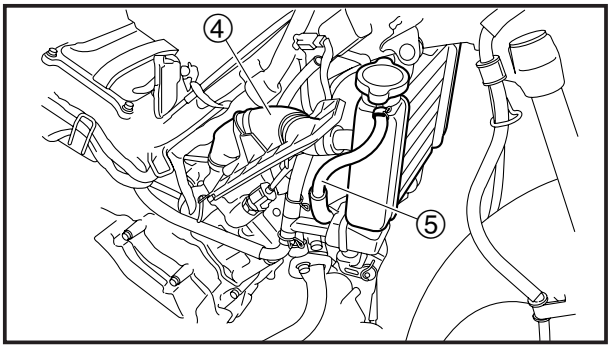
EAS00104

CHECKING THE COOLING SYSTEM

1. Remove:
   - side cowlings (left and right)
   - front cowling

   Refer to “REMOVING THE SIDE COWLINGS” and “REMOVING THE FRONT COWLING”.





2. Check:
   - radiator ①
   - water pump inlet hose ②
   - radiator outlet hose ③
   - radiator inlet hose ④
   - thermostat outlet hose ⑤

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

3. Install:
   - front cowling
   - side cowlings (left and right)

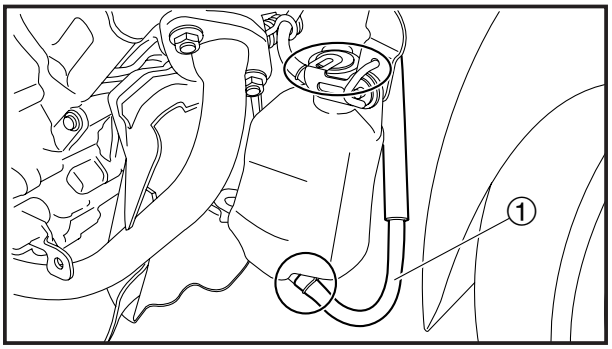
   Refer to “REMOVING THE FRONT COWLING” and “REMOVING THE SIDE COWLINGS”.

EAS00105

CHANGING THE COOLANT

1. Remove:
   - side cowlings (left and right)
   - front cowling

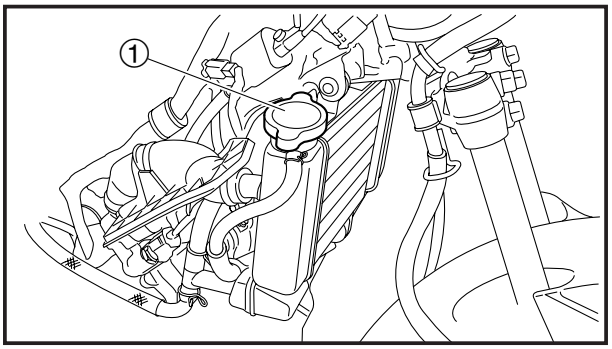
   Refer to “REMOVING THE SIDE COWLINGS” and “REMOVING THE FRONT COWLING”.



2. Remove:
   - coolant reservoir tank cover
   - coolant reservoir cap
3. Disconnect:
   - coolant reservoir hose ①

4. Drain:
   - coolant

   (from the coolant reservoir)



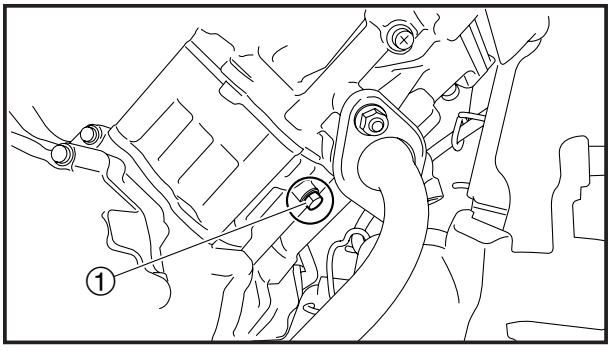
5. Remove:
   - radiator cap ①

⚠WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape.

When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.



6. Remove:
   - coolant drain bolt ①

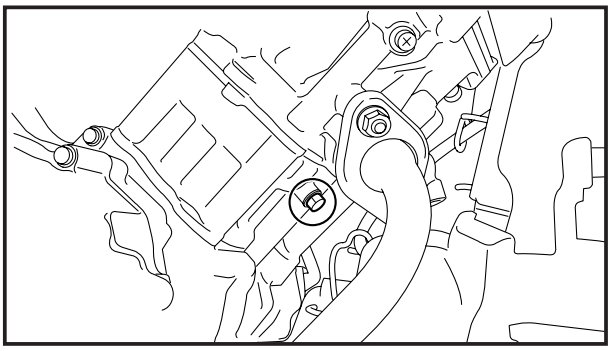
   (along with the copper washer)

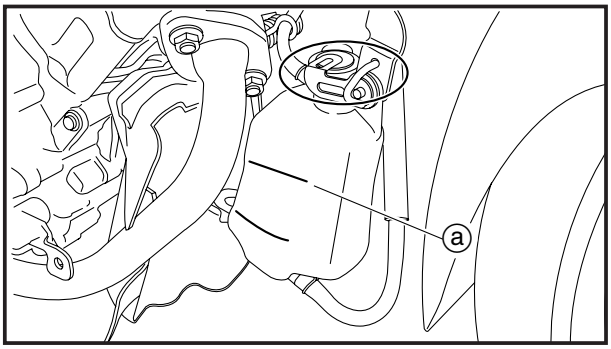
7. Drain:
   - coolant

   (from the engine and radiator)

CHANGING THE COOLANT

CHK ADJ





8. Install:
   - copper washer **New**
   - coolant drain bolt

   7 Nm (0.7 m•kg, 5.0 ft•lb)
9. Connect:
   - coolant reservoir hose

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

Recommended antifreeze
YAMAHA GENUINE COOLANT
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
Mixing ratio
1:1 (antifreeze:water)
Quantity
Radiator capacity
0.62 L (0.55 Imp qt, 0.66 US qt)
Coolant reservoir capacity
0.28 L (0.25 Imp qt, 0.30 US qt)
Up to the maximum level mark ⓐ

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

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

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

CAUTION:

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

11. Install:
    - radiator cap
    - coolant reservoir cap
    - coolant reservoir tank cover

12. Start the engine, warm it up for several minutes, and then stop it.

13. Check:
    - coolant level

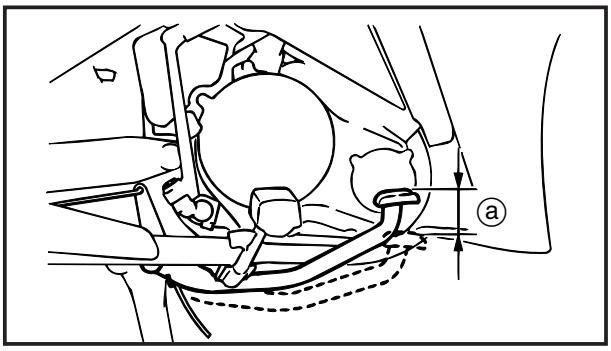
    Refer to “CHECKING THE COOLANT LEVEL”.

NOTE:

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

14. Install:
    - front cowling
    - side cowlings (left and right)

    Refer to “REMOVING THE FRONT COWLING” and “REMOVING THE SIDE COWLINGS”.



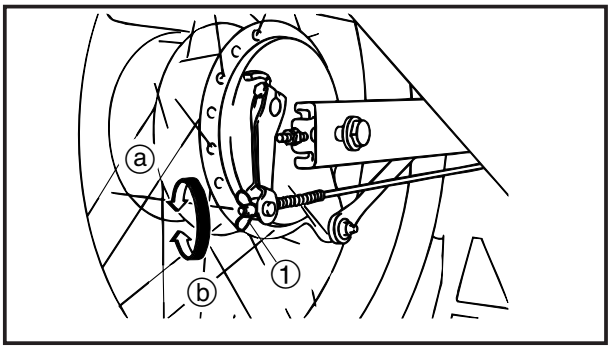
CHASSIS

EAS00113

ADJUSTING THE REAR BRAKE

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

Brake pedal free play (at the end of the brake pedal)
25–35 mm (0.98–1.38 in)



2. Adjust:
   - brake pedal free play

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a. Turn the adjuster ① in direction ⓐ or ⓑ until the specified brake pedal free play is obtained.

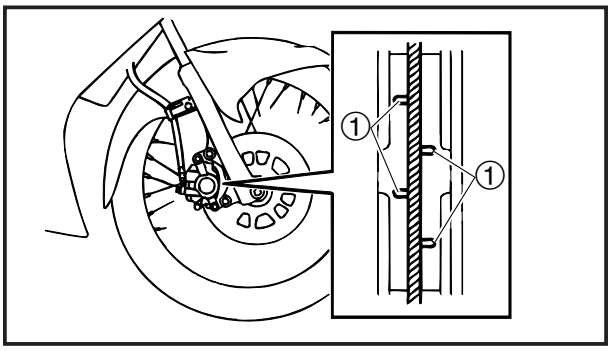
Direction ⓐ	**Brake pedal free play is increased.**
Direction ⓑ	**Brake pedal free play is decreased.**

CAUTION:

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

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



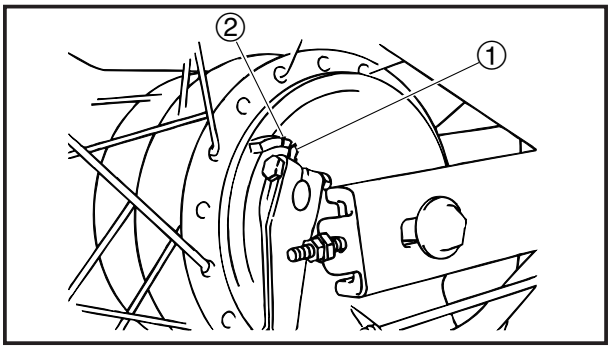
EAS00120

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

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

   Wear indicator groove ① almost disappeared → Replace the brake pads as a set.
   Refer to "REPLACING THE FRONT BRAKE PADS" in chapter 7.



EAS00126

CHECKING THE REAR BRAKE SHOES

1. Operate the brake.
2. Check:
   - wear indicator ①

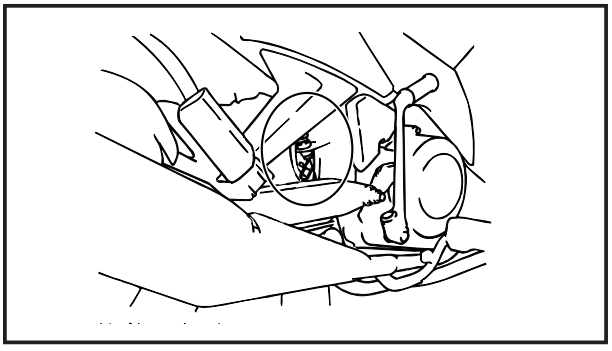
   Reaches the wear limit line ② → Replace the brake shoes as a set.
   Refer to "REAR WHEEL AND BRAKE" in chapter 7.

EAS00128

ADJUSTING THE REAR BRAKE LIGHT SWITCH

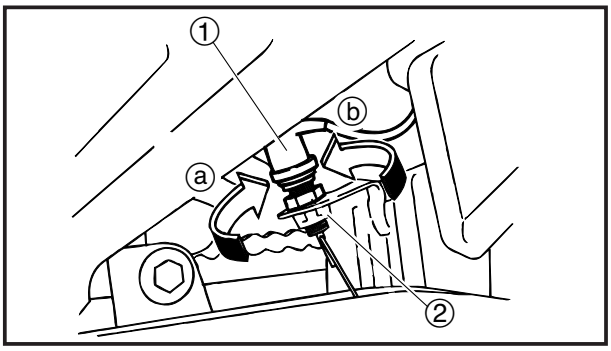
NOTE:

The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.



1. Check:
   - rear brake light operation timing

   Incorrect → Adjust.



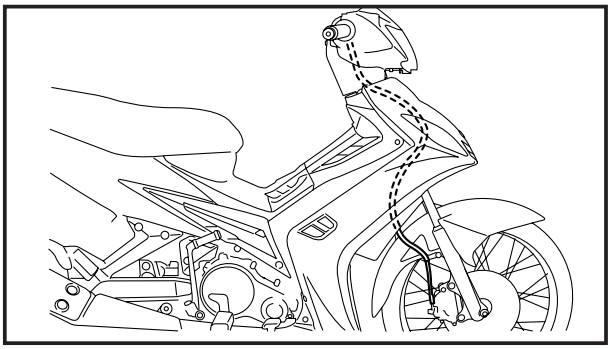
2. Adjust:
   • rear brake light operation timing

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a. Hold the main body ① of the rear brake light switch so that it does not rotate and turn the adjusting nut ② in direction ⓐ or ⓑ until the rear brake light comes on at the proper time.

Direction ⓐ	**Brake light comes on sooner.**
Direction ⓑ	**Brake light comes on later.**

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EAS00129

CHECKING THE FRONT BRAKE HOSE

1. Check:
   • brake hose
   Cracks/damage/wear → Replace.
2. Check:
   • brake hose clamp
   Loose Connection → Tighten the clamp bolt.
3. Hold the vehicle upright and apply the front brake several times.
4. Check:
   • brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to “FRONT BRAKE” in chapter 7.

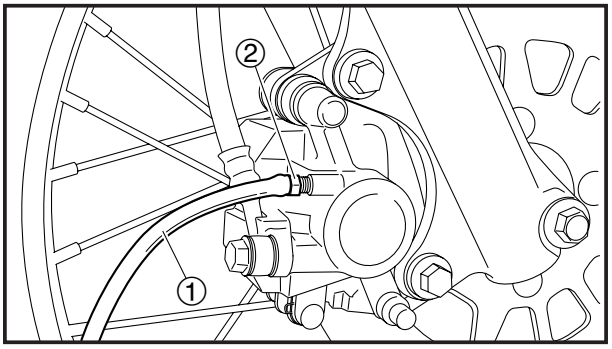
EAS00133

BLEEDING THE HYDRAULIC BRAKE SYSTEM

⚠WARNING

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

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



1. Bleed:
   - hydraulic brake system

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a. Fill the brake master cylinder reservoir to the proper level with the recommended brake fluid.
b. Install the brake master cylinder reservoir diaphragm.
c. Connect a clear plastic hose ① tightly to the bleed screw ②.
d. Place the other end of the hose into a container.
e. Slowly apply the brake lever several times.
f. Fully pull the brake lever without releasing it.
g. Loosen the bleed screw.

NOTE:

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip.

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



Bleed screw
6 Nm (0.6 m·kg, 4.3 ft·lb)

k. Fill the brake master cylinder reservoir to the proper level with the recommended brake fluid.
Refer to “CHECKING THE BRAKE FLUID LEVEL”.

⚠WARNING

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

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EAS00140

ADJUSTING THE DRIVE CHAIN SLACK

NOTE:

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

CAUTION:

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

ADJUSTING THE DRIVE CHAIN SLACK

CHK ADJ

1. Stand the vehicle on a level surface.

⚠WARNING

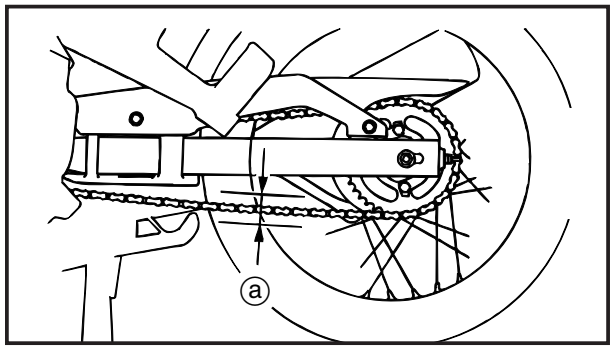
Securely support the vehicle so that there is no danger of it falling over.

NOTE:

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

2. Spin the rear wheel several times and find the tightest position of the drive chain.
3. Check:
   - drive chain slack ⓐ
     Out of specification → Adjust.

	Drive chain slack **25–35 mm (0.93–1.38 in)**

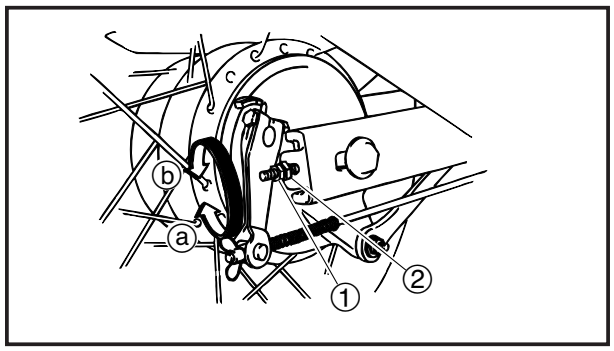


4. Adjust:
   - drive chain slack

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a. Loosen the wheel axle nut.
b. Loosen both locknuts ①.
c. Turn both adjusting nuts ② in direction ⓐ or ⓑ until the specified drive chain slack is obtained.

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



NOTE:

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

d. Tighten both locknuts to specification.

	Locknut **7 Nm (0.7 m·kg, 5.0 ft·lb)**

e. Tighten the wheel axle nut to specification.

	Wheel axle nut **60 Nm (6.0 m·kg, 43 ft·lb)**

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EAS00143

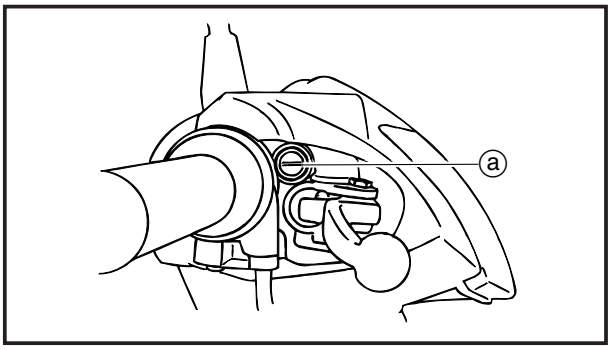
LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.

Use only kerosene to clean the drive chain.

Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for non-O-ring chains.

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



EAS00115

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

NOTE:

Make sure the vehicle is upright.

2. Check:
   - brake fluid level

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

Recommended brake fluid
DOT3 or 4

⚠WARNING

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

CAUTION:

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

NOTE:

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

EASF0010

CHECKING AND ADJUSTING THE STEERING HEAD

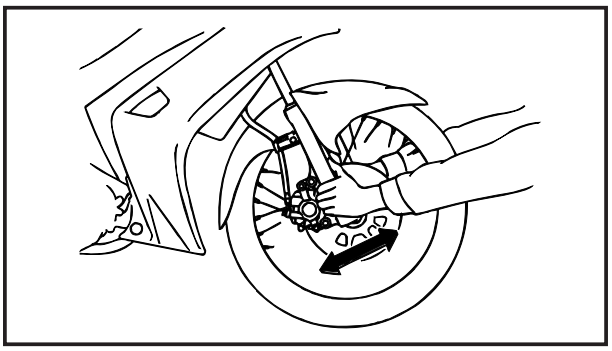
1. Stand the vehicle on a level surface.

⚠WARNING

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

NOTE:

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

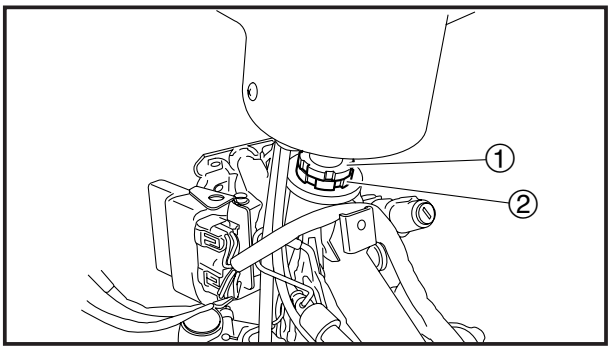


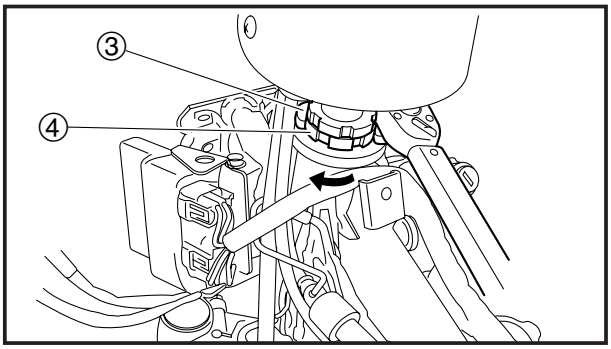
2. Check:
   - steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Binding/looseness → Adjust the steering head.

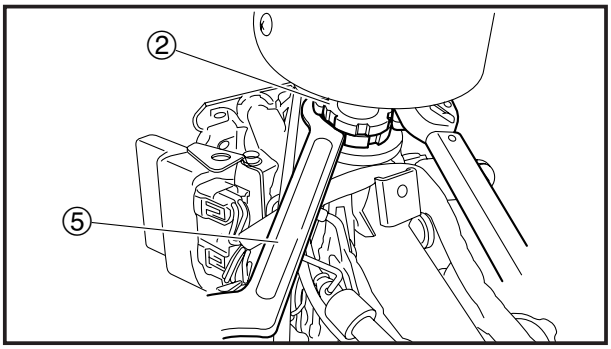
3. Remove:
   - side cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - inner panel
     Refer to “COVERS”.

CHECKING AND ADJUSTING THE STEERING HEAD

CHK ADJ







4. Adjust:
   - steering head

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a. Loosen the upper ring nut ①.
b. Loosen the lower ring nut ② and then tighten it to specification with a steering nut wrench ③.

NOTE:

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

	**Steering nut wrench** **90890-01403**

	**Lower ring nut** **30 Nm (3.0 m·kg, 22 ft·lb)**

d. Loosen the lower ring nut counterclockwise 1/4 of a turn.
e. Hold the lower ring nut with a ring nut wrench ④ and tighten the upper ring nut ② with a steering nut wrench.

⚠WARNING

Do not overtighten the lower ring nut.

	**Ring nut wrench** **90890-01268**

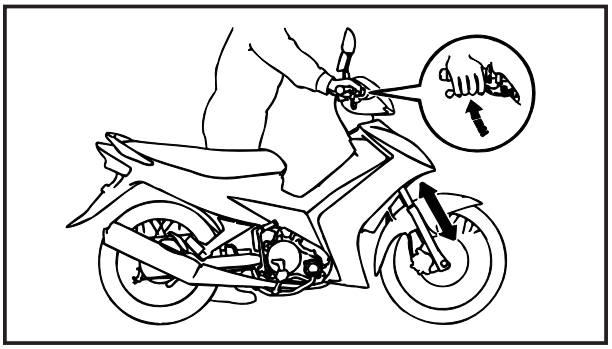
	**Upper ring nut** **75 Nm (7.5 m·kg, 54 ft·lb)**

f. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to “STEERING HEAD” in chapter 7.
g. Slide the rubber cover to its original position.

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5. Install:
   - front cowlings (left and right)
   - center panel

   Refer to “INSTALLING THE FRONT COWLINGS”.



EAS00149

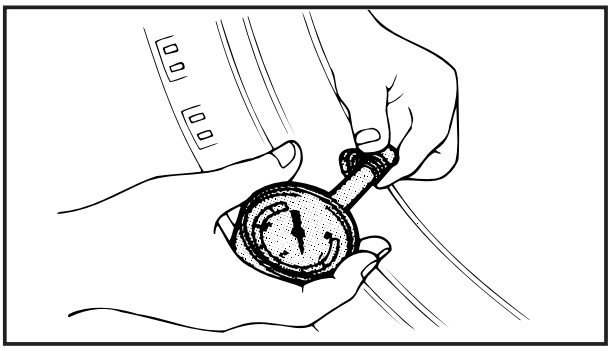
CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

⚠WARNING

Securely support the vehicle 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 vehicle upright and apply the front brake.
4. Check:
   - front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Rough movement → Repair.
     Refer to “FRONT FORK” in chapter 7.



EASF0015

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
   - tire pressure

     Out of specification → Regulate.

⚠WARNING

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

NEVER OVERLOAD THE VEHICLE.

Basic weight (with oil and a full fuel tank)	**109 kg (240 lb)**	
Maximum load*	**110 kg (243 lb)**	
Cold tire pressure	**Front**	**Rear**
	200 kPa (2.00 kgf/cm² 29 psi)	**225 kPa (2.25 kgf/cm²) 33 psi)**

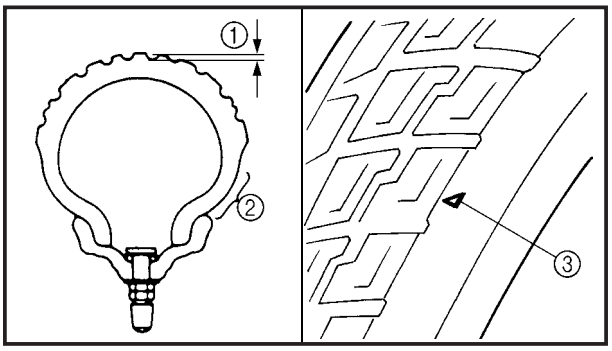
* Total weight of rider, passenger, cargo and accessories

⚠WARNING

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

CHECKING THE TIRES

CHK ADJ



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

	Minimum tire tread depth 0.8 mm (0.03 in)

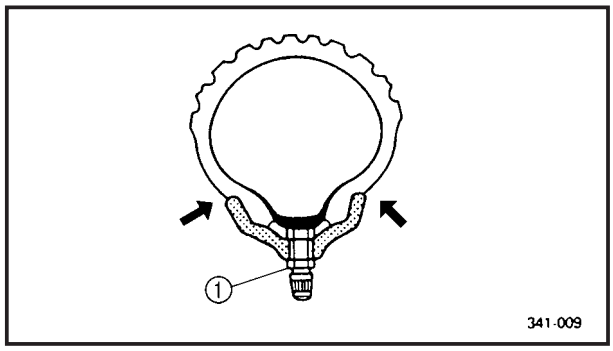
① Tire tread depth
② Sidewall
③ Wear indicator

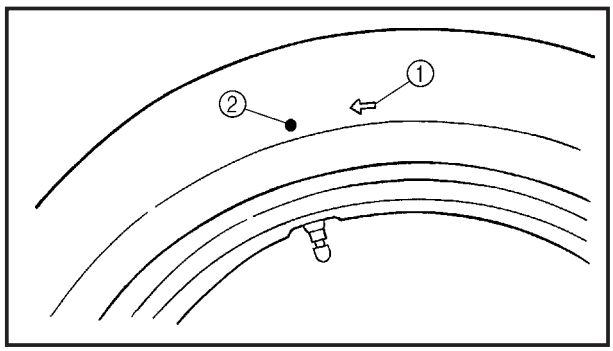
⚠WARNING

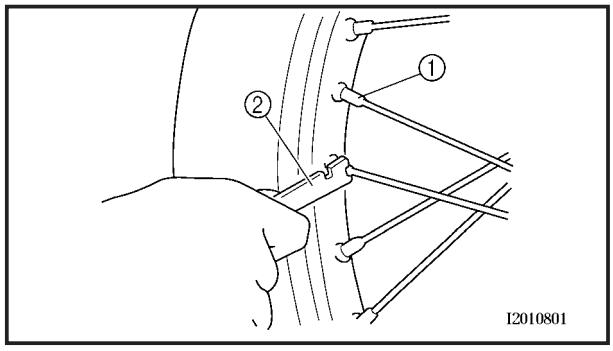
- **Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.**
- **When using tube tires, be sure to install the correct tube.**
- **Always replace a new tube tire and a new tube as a set.**
- **To avoid pinching the tube, make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

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 vehicle.**







⚠WARNING

- **New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.**
- **After a tire has been repaired or replaced, be sure to tighten the tire air valve stem locknut ① to specification.**

NOTE:

For tires with a direction of rotation mark ①:

- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark ② with the valve installation point.

EAS00169

CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.

1. Check:
   - spoke ①

   Bends/damage → Replace.
   Loose → Tighten.
   Tap the spokes with a screwdriver.

NOTE:

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

2. Tighten:
   - spoke

   (with a spoke wrench ②)

3 Nm (0.3 m•kg, 2.2 ft•lb)

NOTE:

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

EAS00170

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

⚠WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

NOTE:

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

EAS00171

LUBRICATING THE LEVER AND PEDALS

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

Recommended lubricant
Lithium-soap-based grease

EAS00172

LUBRICATING THE SIDESTAND

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

Recommended lubricant
Lithium-soap-based grease

EAS00173

LUBRICATING THE CENTERSTAND

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

Recommended lubricant
Lithium-soap-based grease



EAS00176

ELECTRICAL SYSTEM

CHECKING AND CHARGING THE BATTERY

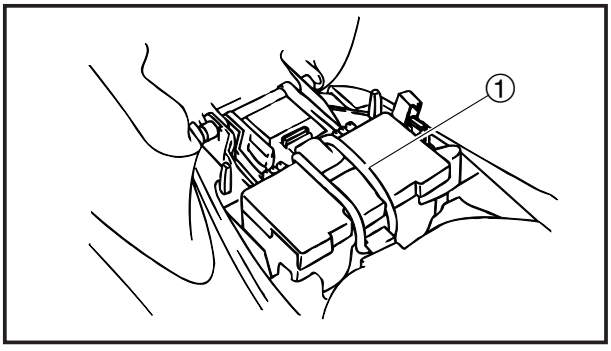
⚠WARNING

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.**

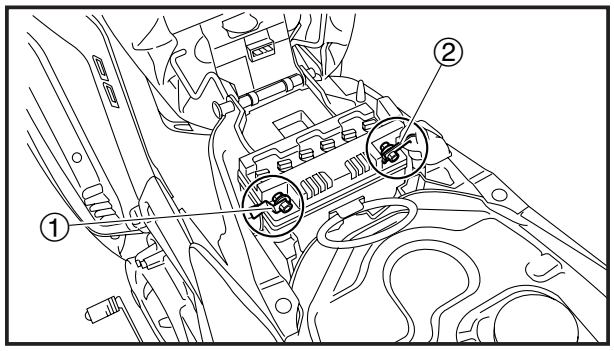
1. Open the seat and battery cover.

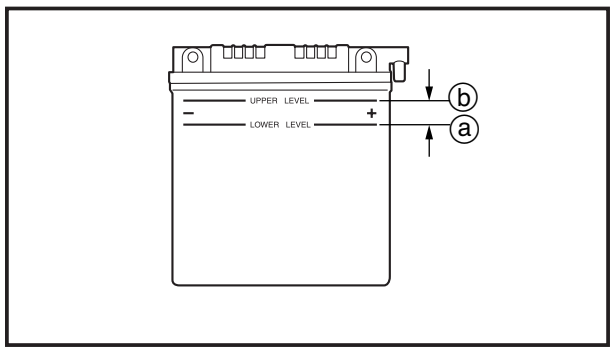


2. Remove
   - battery band ①

CHECKING AND CHARGING THE BATTERY

CHK ADJ





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

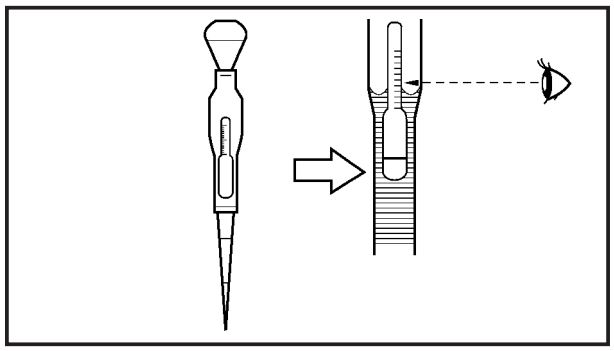
CAUTION:

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

4. Disconnect:
   - battery breather hose
5. Remove:
   - battery
6. Check:
   - electrolyte level
     The electrolyte level should be between the minimum level mark ⓐ and the maximum level mark ⓑ.
     Below the minimum level mark → Add distilled water to the proper level.

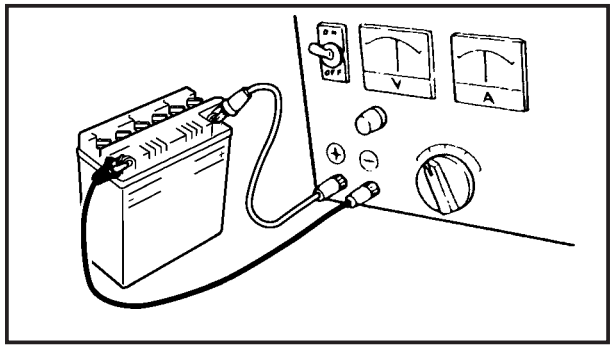
CAUTION:

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



7. Check:
   - specific gravity
     Less than 1.280 → Recharge the battery.

Specific gravity
1.280 at 20 ˚C (68 ˚F)



8. Charge:
   - battery

Battery charging amperage and time
0.5 amps/10 hrs

⚠WARNING

Do not quick charge a battery.

CHECKING AND CHARGING THE BATTERY

CHK ADJ

CAUTION:

- **Loosen the battery sealing caps.**
- **Make sure the battery breather hose and battery vent are free of obstructions.**
- **To ensure maximum performance, always charge a new battery before using it.**
- **Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.**
- **If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.**
- **When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, 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 the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**

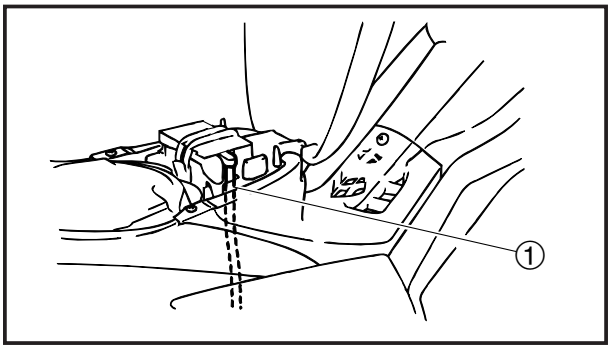
NOTE:

Replace the battery whenever:

- battery voltage does not rise to specification or bubbles fail to rise during charging,
- sulfation of one or more battery cells occurs (as indicated by the battery plates turning white or material accumulating in the bottom of the battery cell),
- specific gravity readings after a long, slow charge indicate that the charge of one battery cell is lower than the rest,

•warpage or buckling of the battery plates or insulators is evident.

9. Check:
   •battery breather hose and battery vent
   Obstruction → Clean.
   Damage → Replace.
10. Install:
   •battery

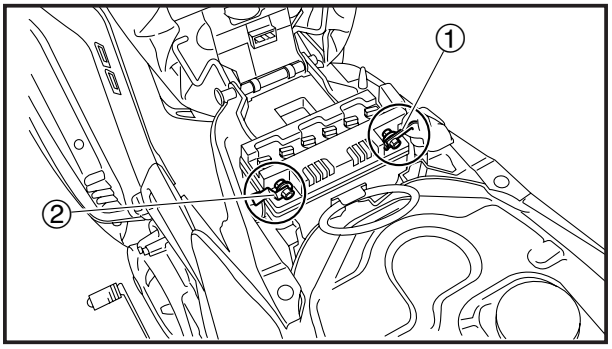


11. Connect:
   •battery breather hose ①

CAUTION:

•When checking the battery, make sure the battery breather hose is properly installed and routed correctly. If the battery breather hose is positioned so as to allow electrolyte or hydrogen gas from the battery to contact the frame, the vehicle and its finish may be damaged.
•Make sure the battery breather hose is properly routed away from the drive chain and from below the swingarm.

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



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

CAUTION:

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

14. Lubricate:
   •battery terminals

	Recommended lubricant **Dielectric grease**

15. Install:
   •battery band

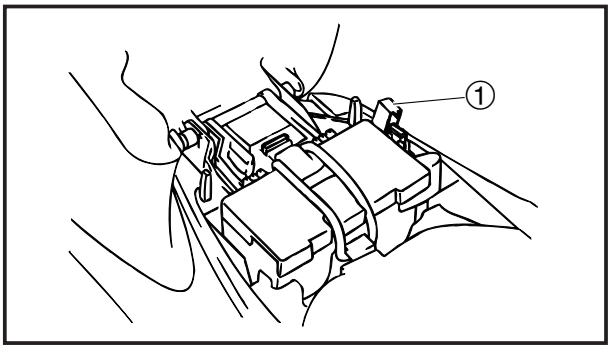
EASF0017

CHECKING THE FUSE

CAUTION:

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

1. Open the seat and battery cover.
2. Remove:
   - fuse holder ①
3. Check:
   - fuse

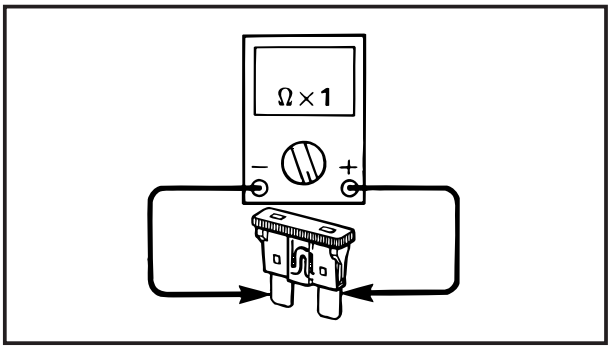


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a. Connect the pocket tester to the fuse and check the continuity.

NOTE:

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



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

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

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4. Replace:
   - blown fuse

⚠WARNING

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

5. Install:
   - fuse holder

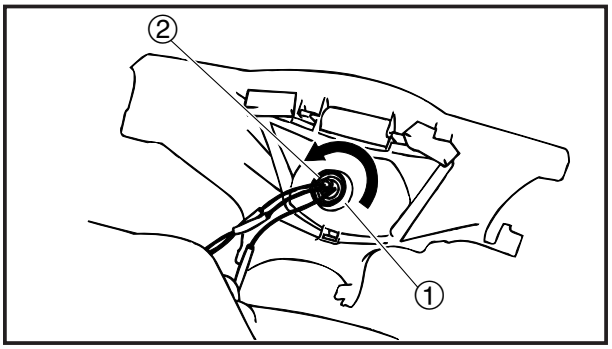
EAS00183

REPLACING THE HEADLIGHT BULBS

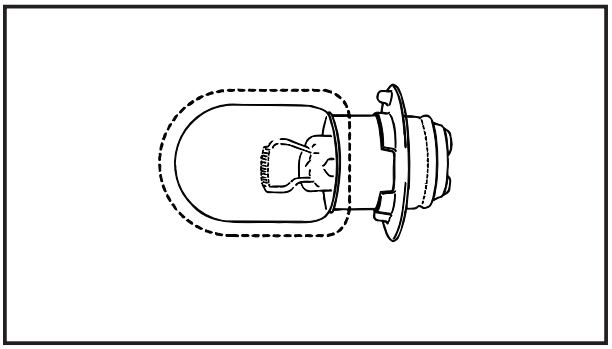
The following procedure applies to both of the headlight bulbs.

1. Remove:
   - headlight assembly

   Refer to “REMOVING THE HEADLIGHT ASSEMBLY”.



2. Remove:
   - headlight bulb holder ①



3. Remove:
   - headlight bulb

⚠WARNING

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

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

   Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

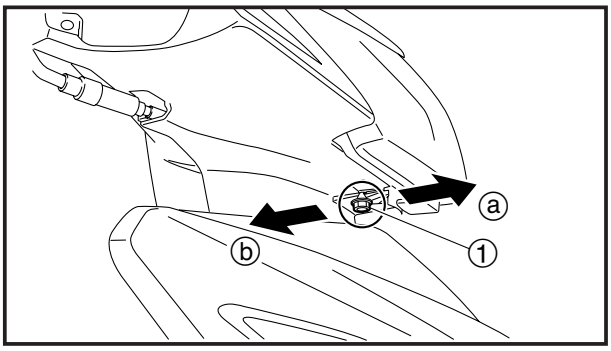
Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

5. Install:
   - headlight bulb holder
6. Install:
   - headlight bulb cover
   - headlight assembly

   Refer to “INSTALLING THE HEADLIGHT ASSEMBLY”.

ADJUSTING THE HEADLIGHT BEAM

CHK ADJ



EAS00186

ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
   - headlight beam (vertically)

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Loosen the bolt ①.
b. Slide the bottom of the headlight unit forward ⓐ or backward ⓑ.

Slide forward ⓐ	**Headlight beam is raised.**
Slide backward ⓑ	**Headlight beam is lowered.**

c. Tighten the bolt ①.

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ENGINE

REMOVING THE ENGINE

NOTE:

It is not necessary to remove the engine in order to remove the following components.

- Cylinder head
- Cylinder
- Piston
- Clutch
- Shift shaft
- Oil pump
- Generator
- Starter clutch

1. Remove:
   - side cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - rear cowlings (left and right)

   Refer to “COVERS” in chapter 3.
   - drive sprocket

   Refer to “DRIVE CHAIN AND SPROCKETS” in chapter 7.

COOLING SYSTEM

1. Drain:
   - coolant

   (completely from the water jacket)

   Refer to “CHANGING THE COOLANT” in chapter 3.
2. Remove:
   - radiator assembly
   - water pump assembly

   Refer to “RADIATOR” and “WATER PUMP” in chapter 5.

ENGINE OIL

1. Drain:
   - engine oil

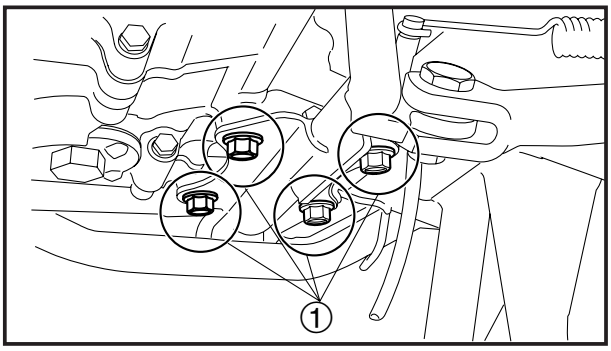
   (completely from the crankcase)

   Refer to “CHANGING THE ENGINE OIL” in chapter 3.

CARBURETOR

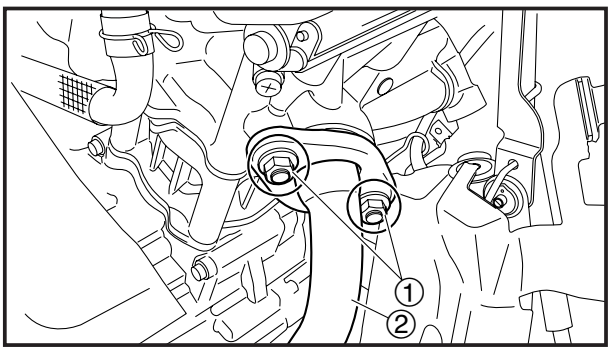
1. Remove:
   - carburetor assembly

   Refer to “CARBURETOR” in chapter 6.



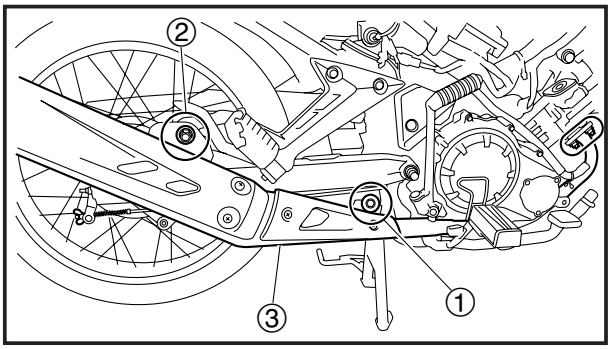
FOOTREST

1. Remove:
   - footrest bolts ①
   - footrest



MUFFLER

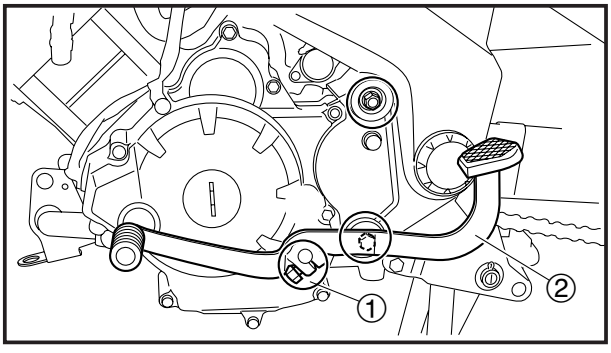
1. Remove:
   - exhaust pipe nuts ①
   - exhaust pipe ②



2. Remove:
   - lower muffler bolt ①
   - washer
   - upper muffler bolt ②
   - washers
   - nut
   - muffler ③

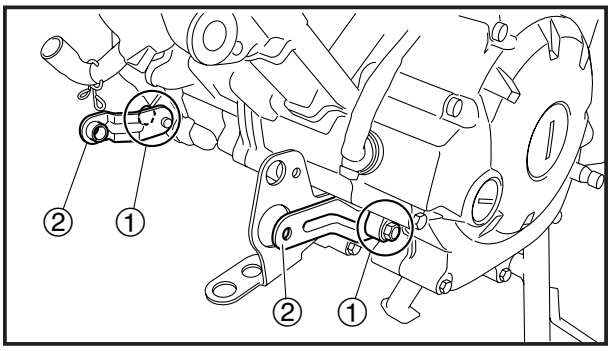
BRAKE PEDAL

1. Remove:
   - rear brake light switch spring
   - brake pedal spring
   - cotter pin
   - brake pedal



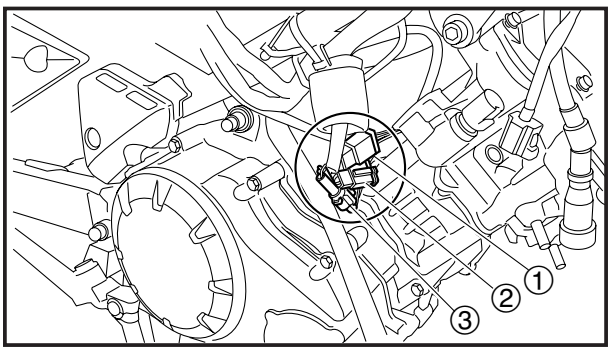
SHIFT PEDAL

1. Remove:
   - shift pedal bolt ①
   - shift pedal ②
   - sprocket cover



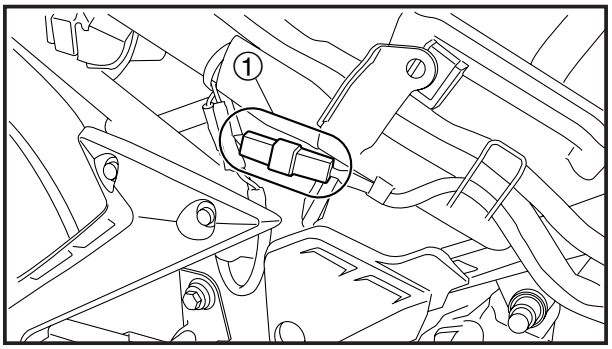
SIDE COWLING BRACKET

1. remove:
   - side cowling bracket bolts ①
   - side cowling bracket ②



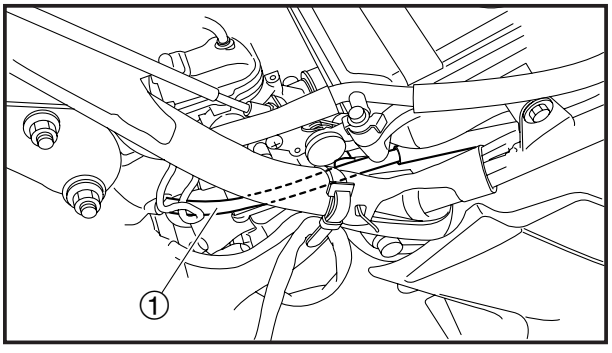
WIRE, CABLE AND HOSE

1. Disconnect:
   - neutral switch lead coupler ①
   - stator coil lead coupler ②
   - pick up coil lead coupler ③
   - crankcase breather pipe

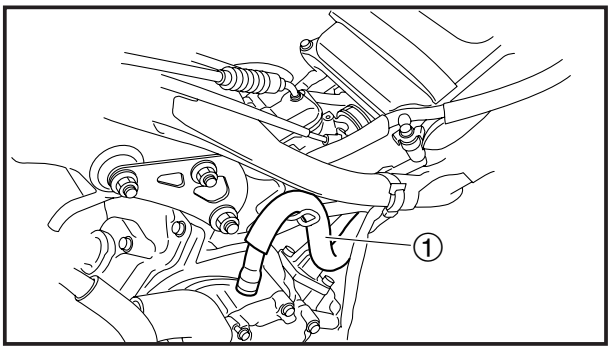


2. Remove:
   - starter motor lead coupler (T135SE)

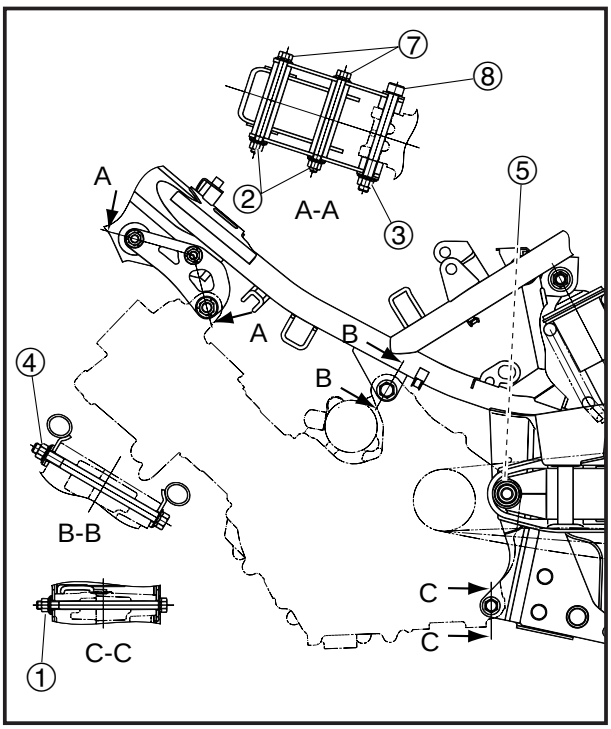
3. Remove:
   - spark plug cap

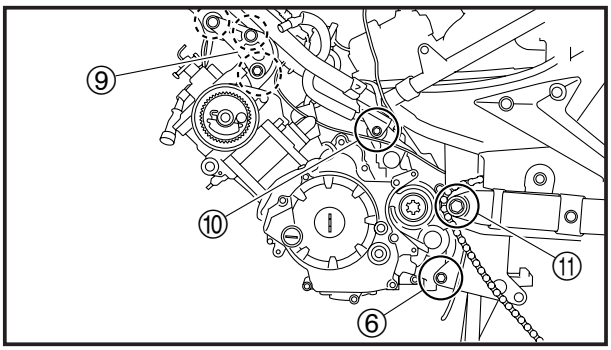


4. Remove:
   - fuel cock vacuum hose ①



5. Remove:
   - crankcase breather pipe ①





ENGINE ASSEMBLY

1. Loosen:
   - rear lower mounting nut ①
   - plate nuts (front and rear) ②
   - front mounting nut ③
   - rear upper mounting nut ④
   - pivot shaft nut ⑤

2. Remove:
   - rear lower mounting nut ①
   - washer
   - rear lower mounting bolt ⑥
   - plate nuts (front and rear) ②
   - washers (front and rear)
   - plate bolts (front and rear) ⑦
   - front mounting nut ③
   - washer
   - front mounting bolt ⑧
   - plate (left and right) ⑨
   - rear upper mounting nut ④
   - washer
   - rear upper mounting bolt ⑩
   - pivot shaft nut ③
   - washer
   - pivot shaft ⑪
   - engine assembly

⚠WARNING

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

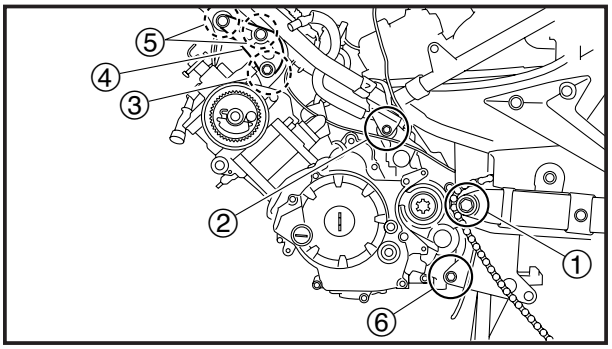
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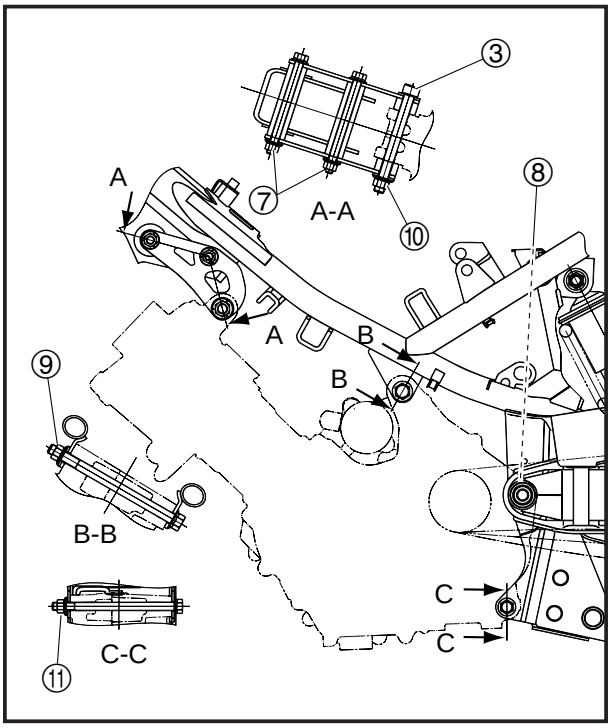
INSTALLING THE ENGINE

ENGINE ASSEMBLY

⚠WARNING

Securely support the vehicle so there is no danger of it falling over when installing engine.





1. Install:
   - engine assembly
   - pivot shaft ①
   - washer
   - pivot shaft nut
   - rear upper mounting bolt ②
   - washer
   - rear upper mounting nut
   - front mounting bolt ③
   - washer
   - front mounting nut
   - plate (left and right) ④
   - plate bolts (front and rear) ⑤
   - washers (front and rear)
   - plate nuts (front and rear)
   - rear lower mounting bolt ⑥
   - washer
   - rear lower mounting nut
2. Temporary tighten:
   - plate nuts (front and rear) ⑦

     10 Nm (1.0 m·kg, 7.2 ft•lb)
3. Tighten:
   - pivot shaft nut ⑧

     66 Nm (6.6 m•kg, 48 ft•lb)
   - rear upper mounting nut ⑨

     72 Nm (7.2 m·kg, 52 ft•lb)
   - front mounting nut ⑩

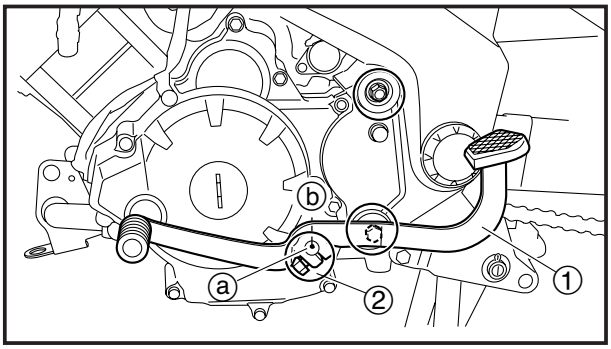
     72 Nm (7.2 m·kg, 52 ft•lb)
   - plate nuts (front and rear) ⑦

     34 Nm (3.4 m·kg, 25 ft•lb)
   - rear lower mounting nut ⑪

     34 Nm (3.4 m·kg, 25 ft•lb)

WIRE, CABLE AND HOSE

1. Connect:
   - starter motor lead coupler (T135SE)
   - neutral switch lead coupler
   - pickup coil lead coupler
   - stator coil lead coupler
2. Install:
   - crankcase breather pipe
   - fuel cock vacuum hose
   - spark plug cap



SIDE COWLING BRACKET

1. Install:
   - side cowling bracket
   - side cowling bracket bolts

7 Nm (0.7 m·kg, 5.0 ft•lb)

SHIFT PEDAL

1. Install:
   - sprocket cover
   - shift pedal ① **10 Nm (1.0 m•kg, 7.2 ft•lb)**
   - shift pedal bolt ② **18 Nm (1.8 m·kg, 13 ft•lb)**

NOTE:

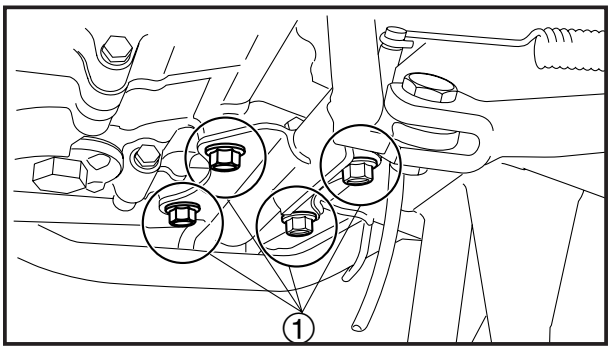
Align the punch mark ⓐ in the shift pedal with the punch mark ⓑ in the shift shaft.

BRAKE PEDAL

1. Install:
   - brake pedal
   - circlip **New**
   - brake pedal spring
   - rear brake light switch spring

MUFFLER

1. Install:
   - muffler
   - washers
   - nut
   - upper muffler bolt **38 Nm (3.8 m•kg, 27 ft•lb)**
   - washer
   - lower muffler bolt **17 Nm (1.7 m•kg, 13 ft•lb)**
2. Install:
   - exhaust pipe nuts **15 Nm (1.5 m•kg, 11 ft•lb)**



FOOTREST

1. Install:
   - footrest
   - footrest bolts ①

23 Nm (2.3 m·kg, 17 ft•lb)

CARBURETOR

1. Install:
   - carburetor assembly

   Refer to “CARBURETOR” in chapter 6.
2. Adjust:
   - throttle cable free play
   - rear brake light operation timing

   Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” and “ADJUSTING THE REAR BRAKE LIGHT SWITCH” in chapter 3.

Throttle cable free play
(at the flange of the throttle grip)
3 – 7 mm (0.12 – 0.28 mm)

COOLING SYSTEM

1. Install:
   - water pump assembly
   - radiator assembly

   Refer to “RADIATOR” and “WATER PUMP” in chapter 5.
2. Fill:
   - coolant

   Refer to “CHANGING THE COOLANT” in chapter 3.

ENGINE OIL

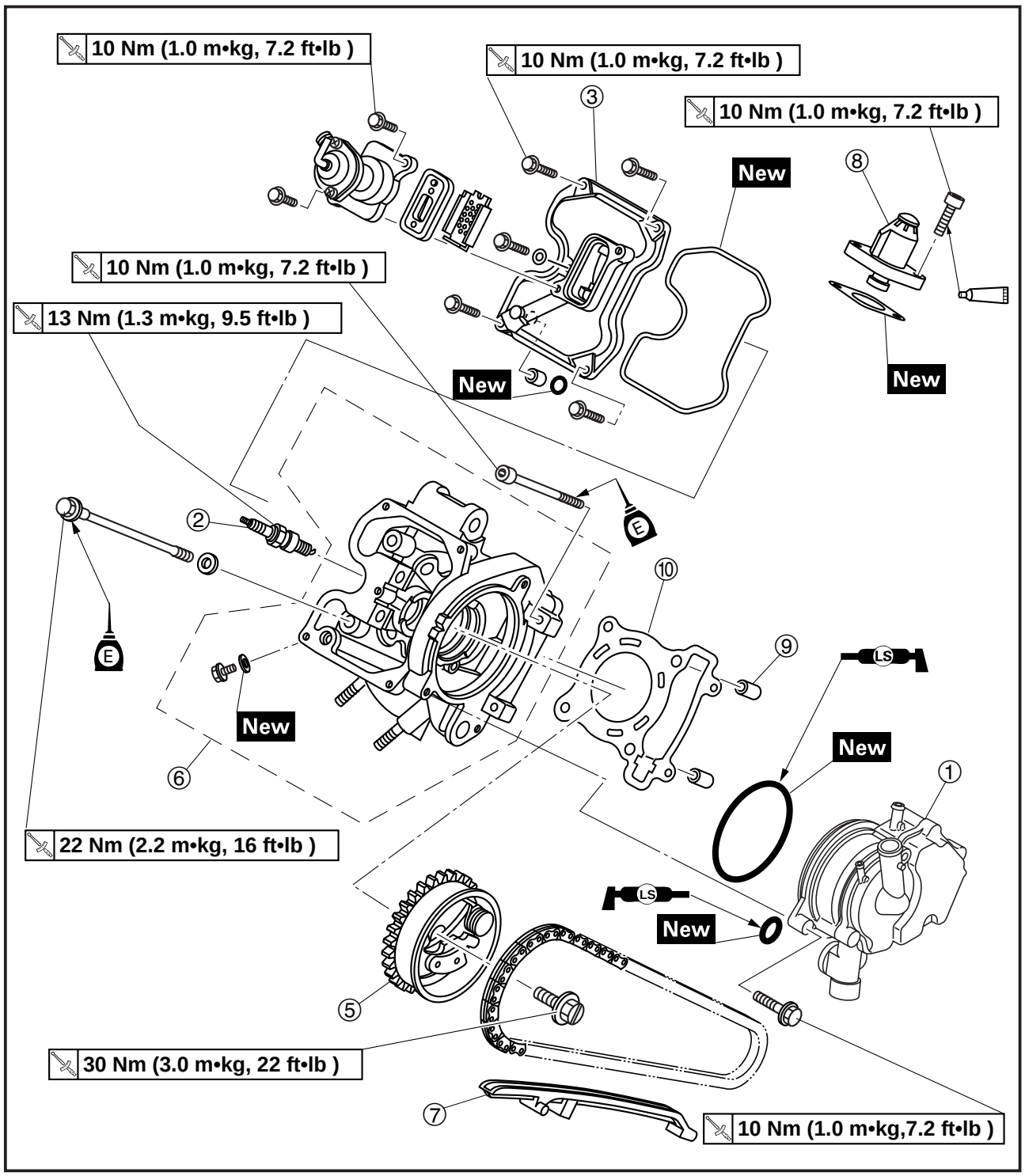
1. Fill:
   - engine oil

   Refer to “CHANGING THE ENGINE OIL” in chapter 3.

EASF0023

CYLINDER HEAD

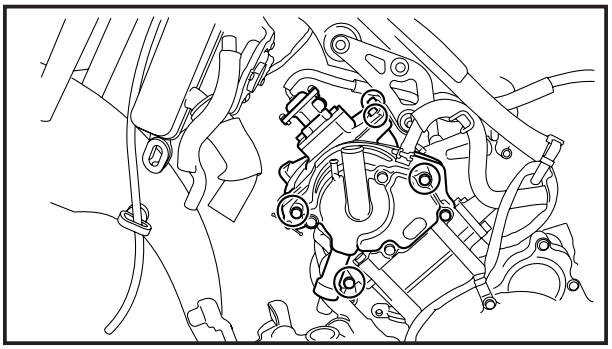
① Water pump
② Spark plug
③ Cylinder head cover
④ Dowel pin
⑤ Camshaft sprocket
⑥ Cylinder head
⑦ Timing chain guide (exhaust side)
⑧ Timing chain tensioner
⑨ Dowel pin
⑩ Gasket



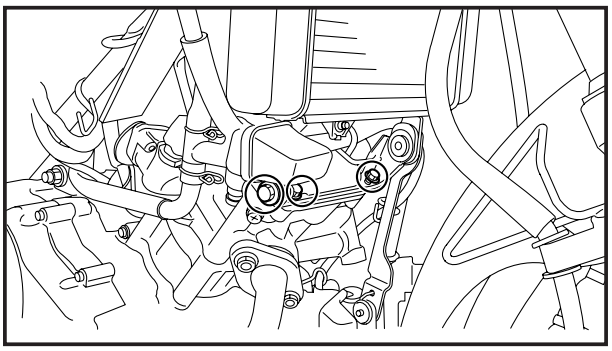
EAS00222

REMOVING THE CYLINDER HEAD

1. Remove
   - side cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - rear cowlings (left and right)
     Refer to “COVERS” in chapter 3.
   - carburetor assembly
     Refer to “CARBURETOR” in chapter 6.
   - muffler
     Refer to “REMOVING THE ENGINE”.
2. Drain:
   - cooling system
     Refer to “CHANGING THE COOLANT” in chapter 3.

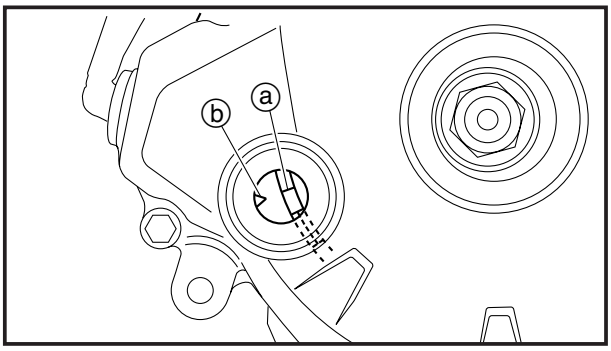


3. Remove:
   - water pump assembly bolts
   - water pump assembly
   - O-rings



4. Remove:
   - spark plug cap ①
   - spark plug ②

5. Remove:
   - cylinder head cover bolts
   - cylinder head cover
   - gasket
   - dowel pin
   - O-ring

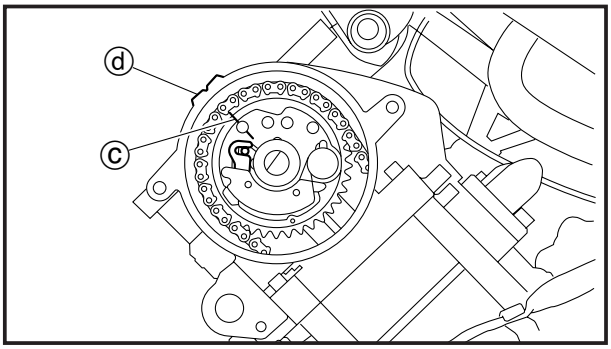


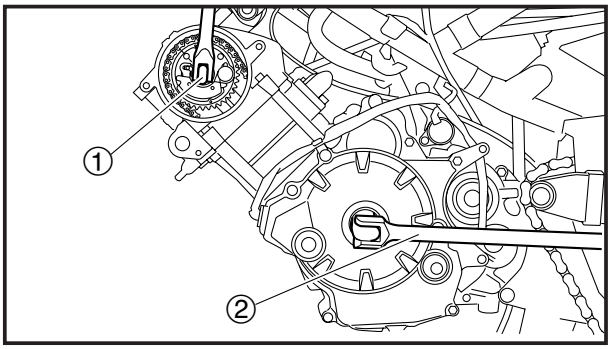
6. Align:
   - "I" mark ⓐ on the generator rotor (with the stationary pointer ⓑ on the crankcase)

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

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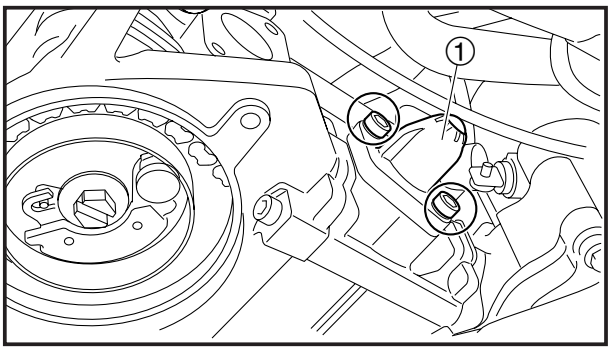




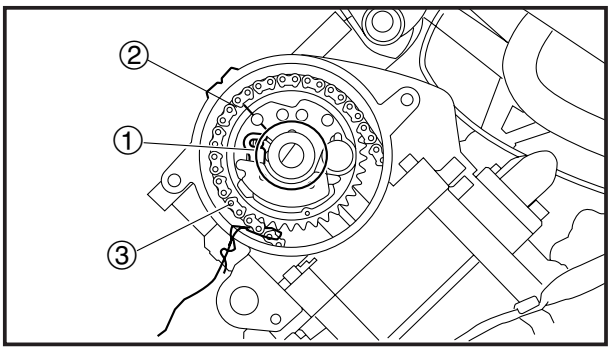
7. Loosen:
   - camshaft sprocket bolt ①

NOTE:

While holding the generator rotor with a wrench ②, loosen the camshaft sprocket bolt.



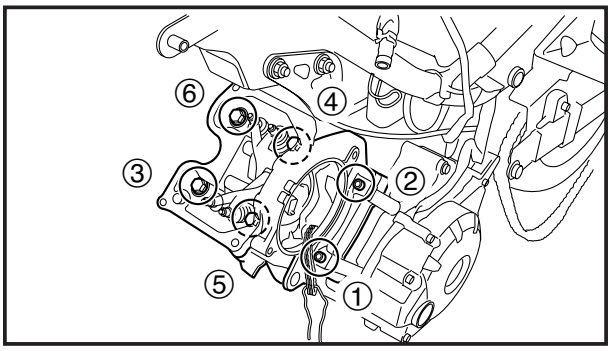
8. Remove:
   - timing chain tensioner cap bolt
   - timing chain tensioner bolts
   - timing chain tensioner ①
   - gasket

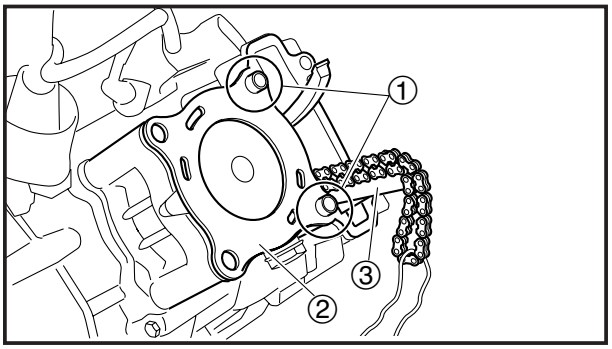


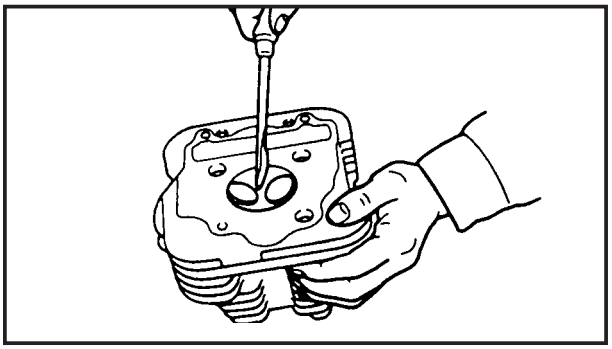
9. Remove:
   - camshaft sprocket bolt ①
   - camshaft sprocket ②
   - timing chain ③

NOTE:

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







10. Remove:
    - engine mount nut
    - washer
    - engine mount bolt
    - cylinder head bolts
    - cylinder head bolts
    - washers
    - cylinder head

NOTE:

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

11. Remove:
    - dowel pins ①
    - gasket ②
    - timing chain guide (exhaust side) ③

EAS00227

CHECKING THE CYLINDER HEAD

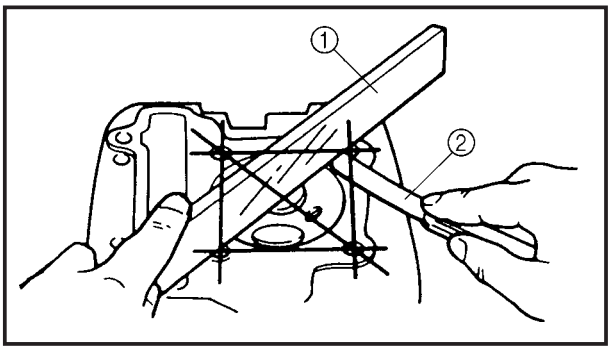
1. Eliminate:
    - combustion chamber carbon deposits (with a rounded scraper)

NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- spark plug bore threads
- valve seats

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



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

Maximum cylinder head warpage
0.03 mm (0.0012 in)

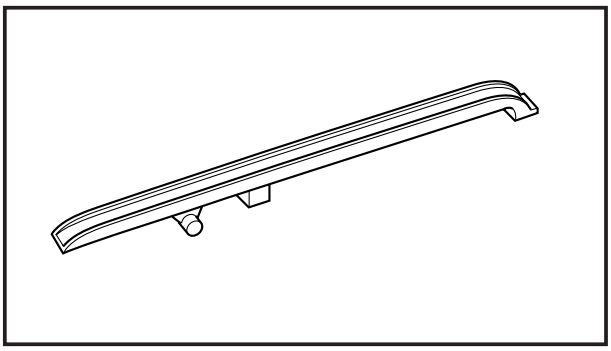
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a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the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

NOTE:

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

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CHECKING TIMING CHAIN GUIDE

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

EAS00210

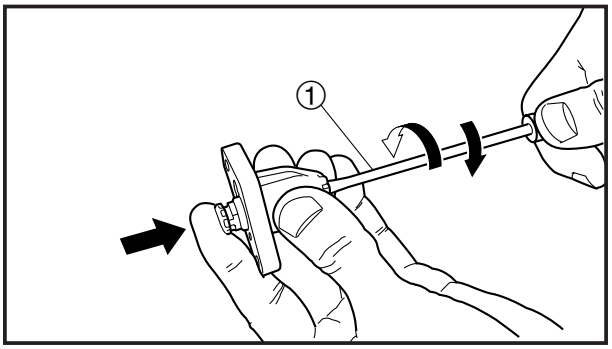
CHECKING THE TIMING CHAIN TENSIONER

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

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a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver ①.
b. 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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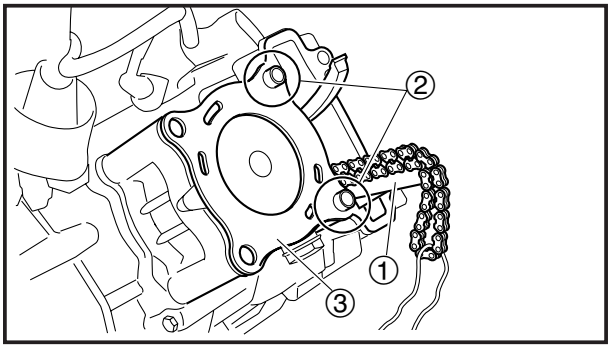


2. Check:
   - cap bolt
   - one-way cam
   - timing chain tensioner rod
     Damage/wear → Replace the defective part(s).

EAS00232

INSTALLING THE CYLINDER HEAD

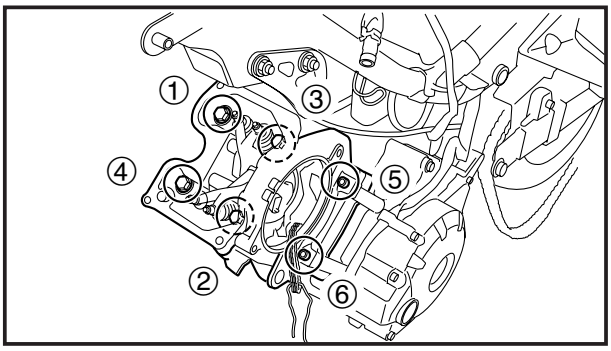
1. Install:
   - timing chain guide (exhaust side) ①
   - dowel pins ②
   - gasket ③ **New**

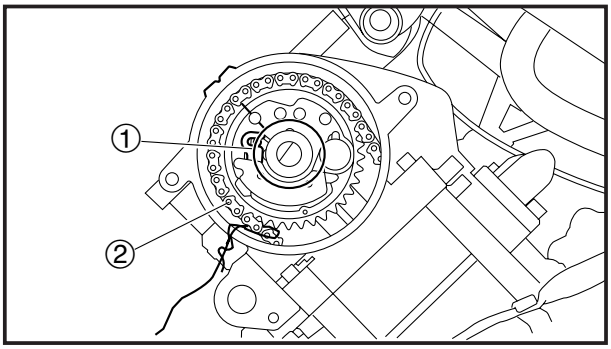


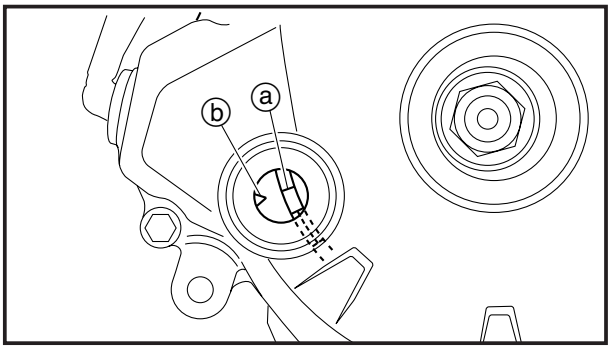
2. Install:
   - cylinder head
   - washers
   - cylinder head bolts
   - cylinder head bolts
   - engine mount bolt
   - washer
   - engine mount nut

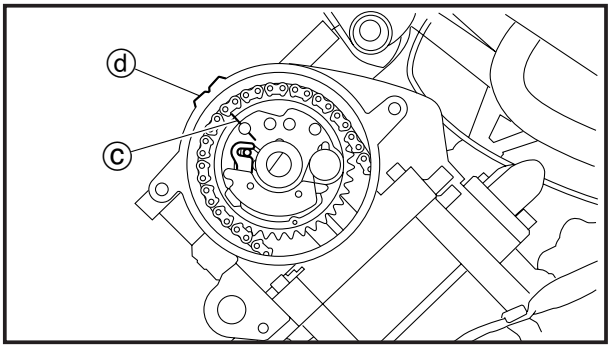
NOTE:

Pass the timing chain through the timing chain cavity.









3. Tighten:
   - cylinder head bolts
     22 Nm (2.2 m·kg, 16 ft•lb)
   - cylinder head bolts
     10 Nm (1.0 m•kg, 7.2 ft•lb)
   - engine mount nut
     72 Nm (7.2 m•kg, 52 ft•lb)

NOTE:
- Lubricate the cylinder head bolts with engine oil.
- Tighten the cylinder head bolts in the proper tightening sequence as shown and torque them in two stages.

4. Install:
   - camshaft sprocket ①
   - timing chain ②

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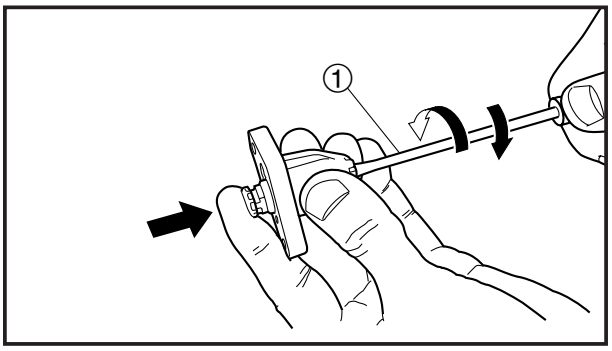
a. Turn the crankshaft clockwise.
b. Align the "I" mark ⓐ on the generator rotor with the stationary pointer ⓑ on the crankcase.
c. Align the "I" mark ⓒ on the camshaft sprocket with the stationary pointer ⓓ on the cylinder head.
d. Install the timing chain onto the camshaft sprocket, and then install the camshaft sprocket onto the camshaft.

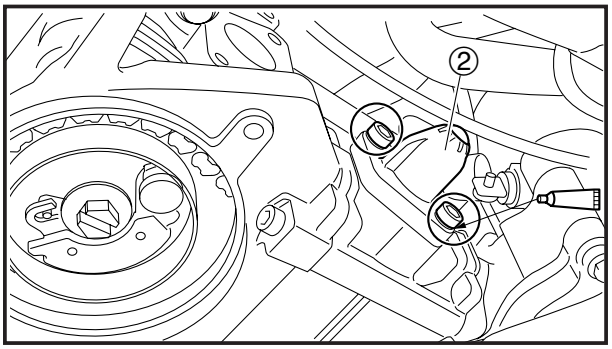
NOTE:
- When installing the camshaft sprocket, be sure to keep the timing chain as tight as possible on the exhaust side.
- Align the projection ⓒ on the camshaft sprocket with the slot in the camshaft.

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

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

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5. Install:
   •timing chain tensioner

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a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver ①.

NOTE:

Make sure that the tensioner rod has been fully set clockwise.

b. Install the gasket and the timing chain tensioner ② onto the cylinder.

⚠WARNING

Always use a new gasket.

NOTE:

Apply the YAMAHA bond 1215 onto the bolts.

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

	Timing chain tensioner bolt **10 Nm (1.0 m·kg, 7.2 ft•lb)**

c. Turn the timing chain tensioner rod counterclockwise with a thin screwdriver ①, make sure it releases, and then tighten the cap bolt to specification.

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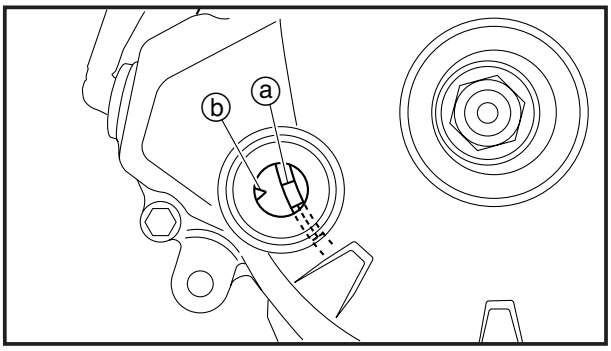
6. Tighten:
   •camshaft sprocket bolt

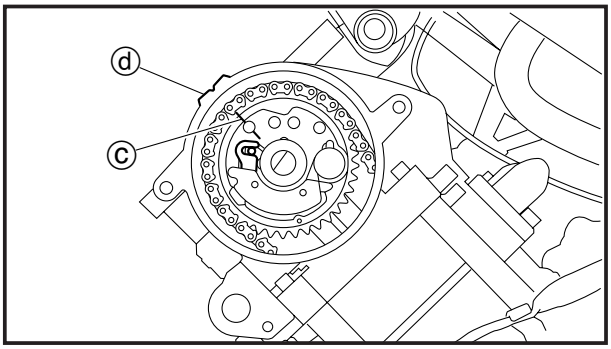
30 Nm (3.0 m•kg, 22 ft•lb)

CAUTION:

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

7. Turn:
   •crankshaft
   (several turns clockwise)





8. Check:
   - "I"mark ⓐ
     Align the "I" mark on the generator rotor with the stationary pointer ⓑ on the crankcase.
   - "I"mark ⓒ
     Align the "I"mark on the camshaft sprocket with the stationary pointer ⓓ on the cylinder head.
     Out of alignment → Correct.
     Refer to the installation steps above.
9. Measure:
   - valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.
10. Install:
    - O-rings **New**
    - water pump assembly
    - water pump assembly bolts

      10 Nm (1.0 m•kg, 7.2 ft•lb)
11. Install:
    - spark plug

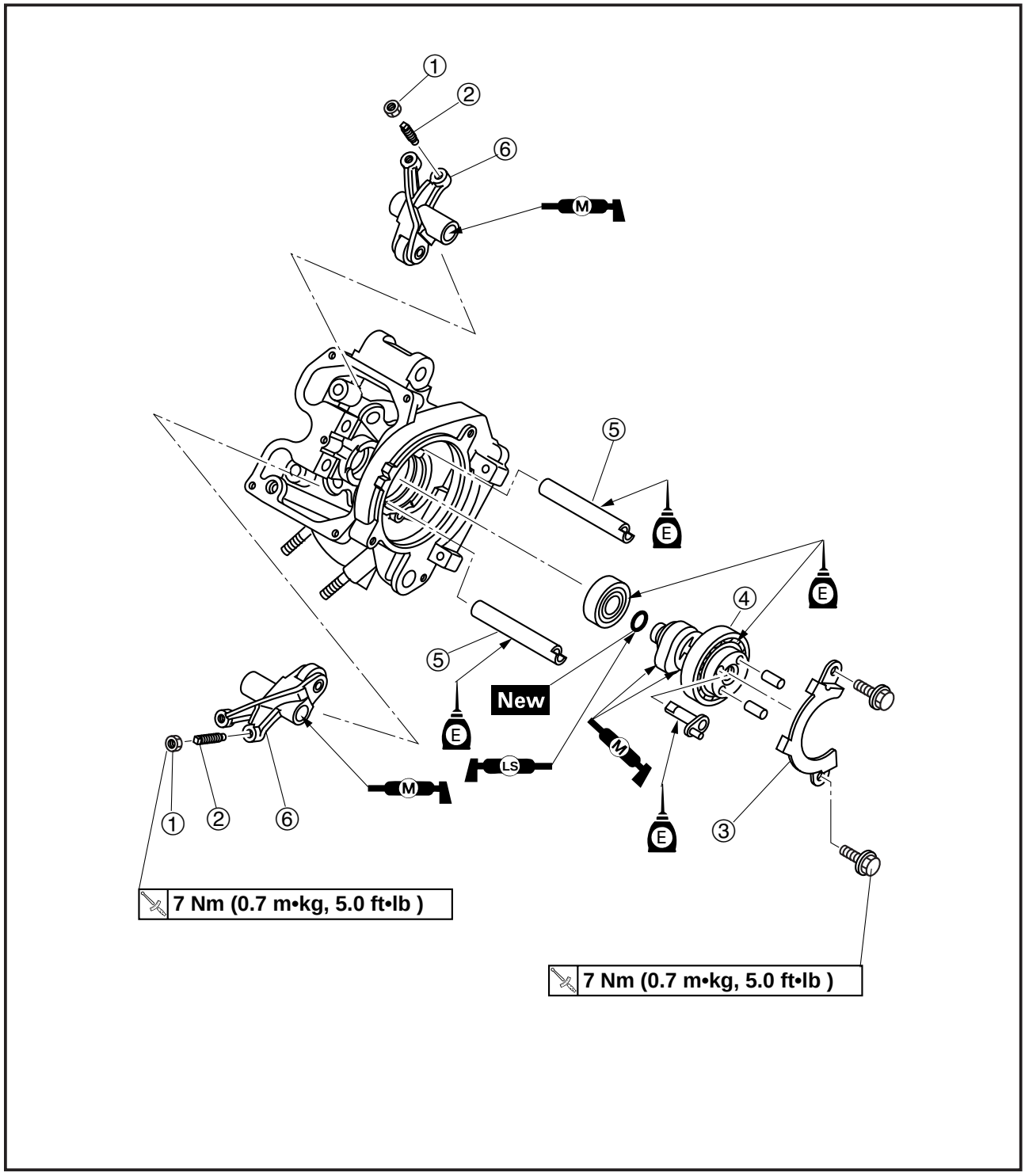
      13 Nm (1.3 m•kg, 9.5 ft•lb)
12. Install:
    - intake manifold bolts
    - intake manifold with carburetor

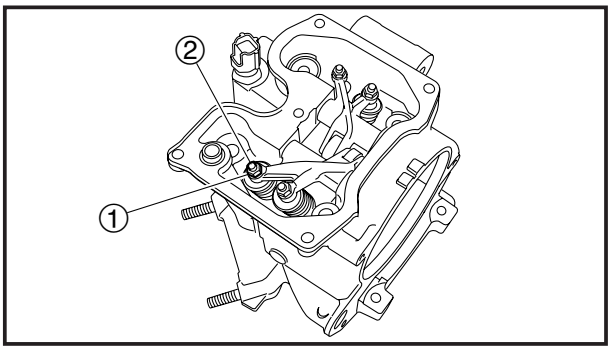
      10 Nm (1.0 m•kg, 7.2 ft•lb)

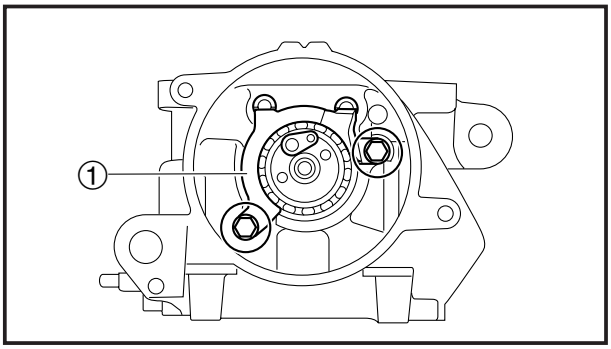
EASf0020

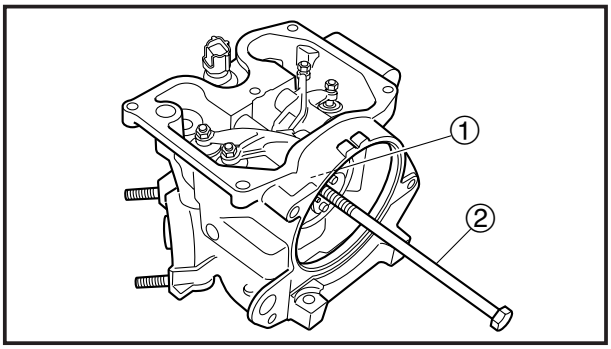
CAMSHAFT

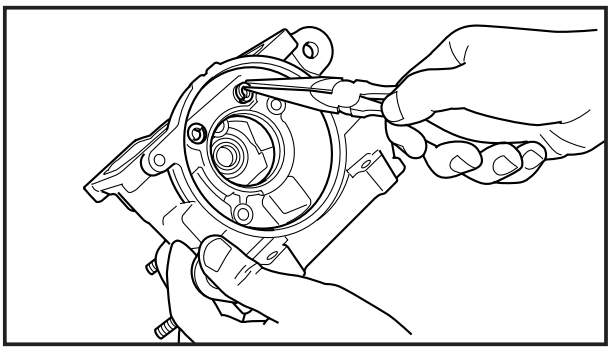
① Locknut
② Adjusting screw
③ Camshaft retainer
④ Camshaft
⑤ Rocker arm shaft
⑥ Rocker arm











EASF0022

REMOVING THE ROCKER ARMS AND CAMSHAFT

NOTE:

Prior to remove the rocker arms and camshaft, remove the cylinder head.

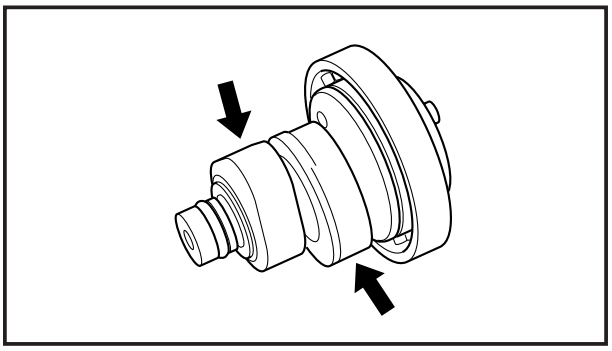
1. Loosen:
   - locknuts ①
   - adjusting screws ②
2. Remove:
   - camshaft retainer ①

3. Remove:
   - camshaft ①

NOTE:

Screw an 8 mm bolt ② into the threaded end of the camshaft and then pull out the camshaft.

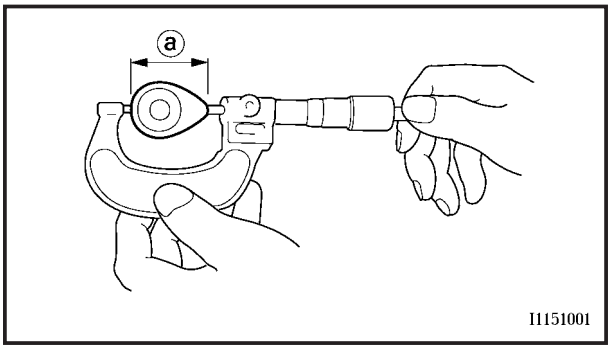
4. Remove:
   - rocker arm shafts
   - rocker arms



EAS00205

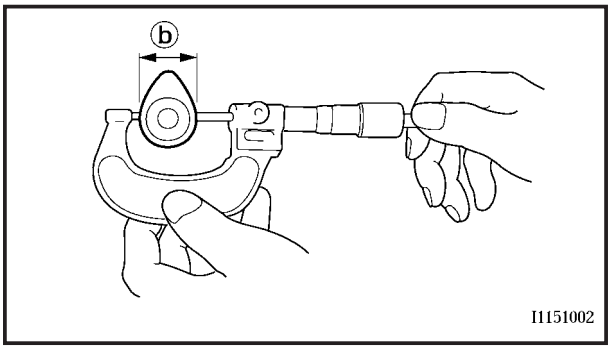
CHECKING THE CAMSHAFT

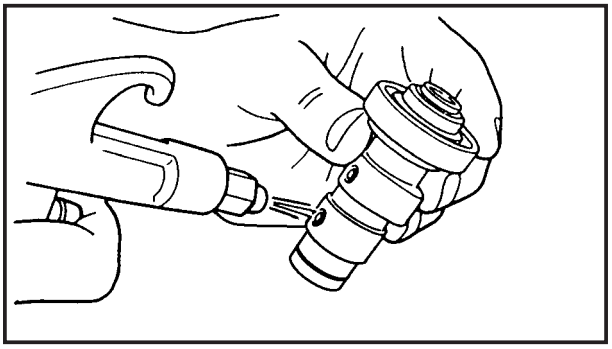
1. Check:
   - camshaft lobes
     Blue discoloration/pitting/scratches
     → Replace the camshaft.



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

Camshaft lobe dimension limit
Intake
ⓐ 29.613 mm (1.1659 in)
ⓑ 25.043 mm (0.9859 in)
Exhaust
ⓐ 29.912 mm (1.1776 in)
ⓑ 24.989 mm (0.9838 in)





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

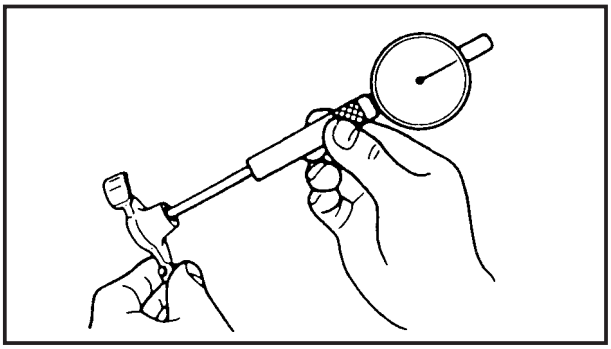
EAS00206

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

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

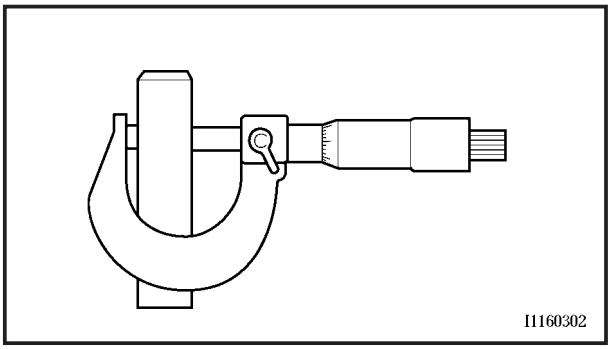
1. Check:
   - rocker arm
     Damage/wear → Replace.

2. Check:
   • rocker arm shaft
   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.



3. Measure:
   • rocker arm inside diameter
   Out of specification → Replace.

Rocker arm inside diameter
9.985 – 10.000 mm
(0.3931 – 0.3937 in)
<Limit>: 9.950 mm (0.3917 in)



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

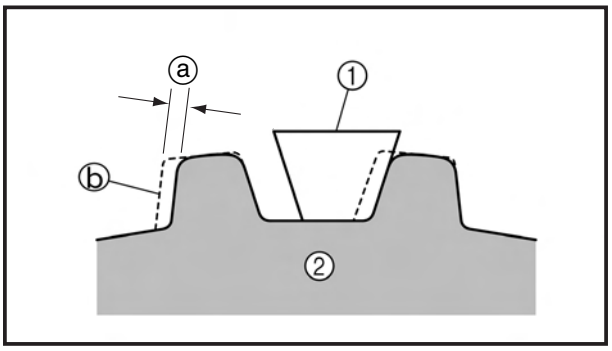
Rocker arm shaft outside diameter
9.966 – 9.976 mm
(0.3924 – 0.3928 in)
<Limit>: 9.950 mm (0.3917 in)

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

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

Above 0.08 mm → Replace the rocker arm and rocker arm shaft as a set.

Rocker-arm-to-rocker-arm-shaft clearance
0.009 – 0.034 mm
(0.0004 – 0.0013 in)
<Limit>: 0.080 mm (0.0031 in)



EAS00207

CHECKING THE CAMSHAFT SPROCKET

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

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

EAS00219

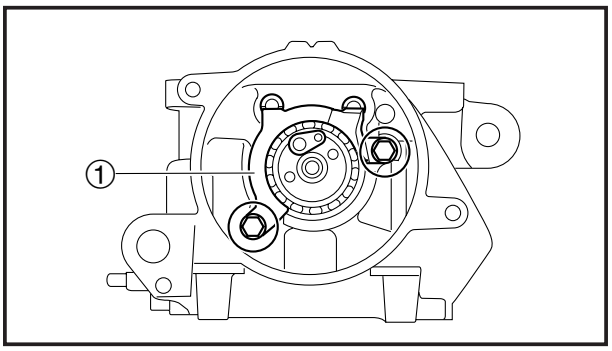
INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
   - camshaft journals

	Recommended lubricant **Engine oil**

2. Lubricate:
   - rocker arm inside surface
   - camshaft oil passage

	Recommended lubricant **Molybdenum disulfide grease**



3. Install:
   - camshaft retainer ①
   - camshaft retainer bolt

7 Nm (0.7 m•kg, 5.0 ft•lb)

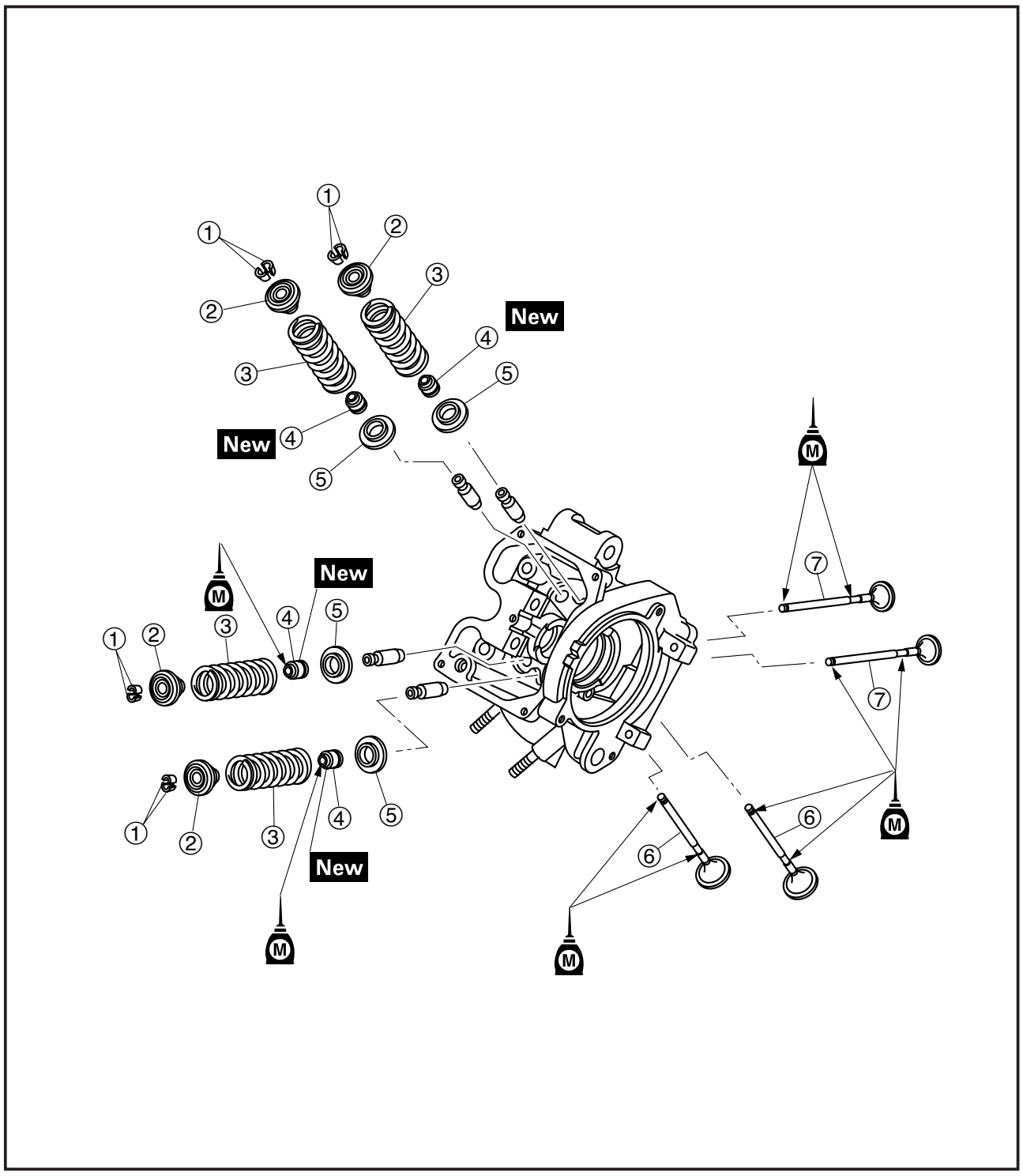
NOTE:

Install the camshaft retainer with the bent ends facing inward.

EASF0024

VALVES AND VALVE SPRINGS

① Valve cotter
② Upper spring seat
③ Valve spring
④ Valve stem seal
⑤ Lower spring seat
⑥ Intake valve
⑦ Exhaust valve



EASF0025

REMOVING THE VALVES

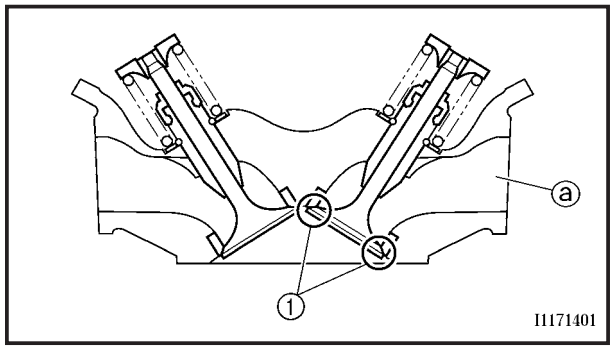
NOTE:

Prior to remove the valves, remove the cylinder head, camshaft and rocker arms.

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

NOTE:

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



1. Check:
   - valve sealing

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

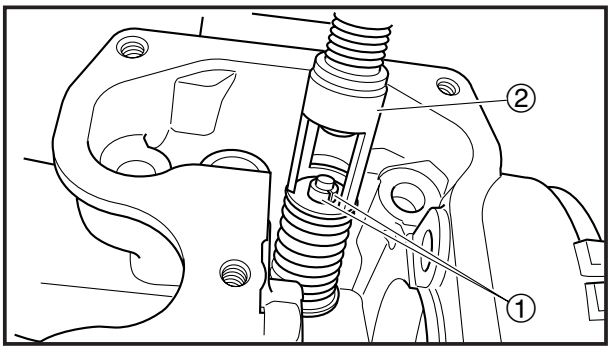
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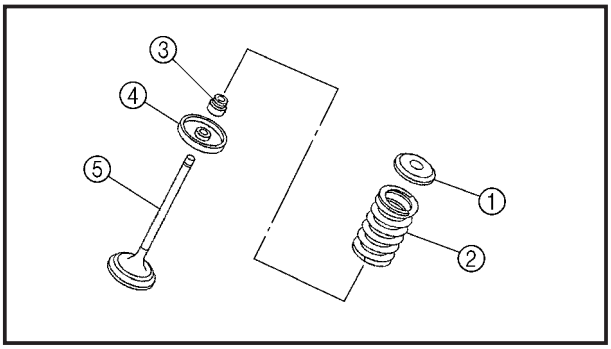
a. Pour a clean solvent ⓐ into the intake and exhaust ports.
b. Check that the valves properly seal.

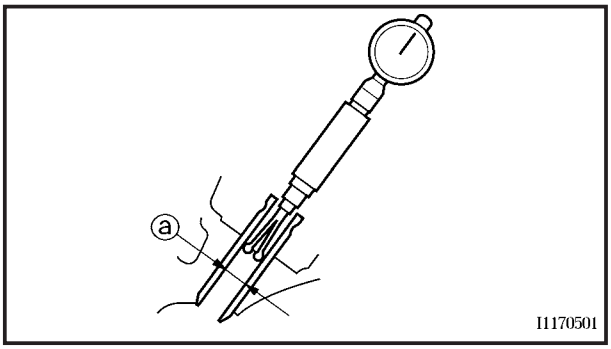
NOTE:

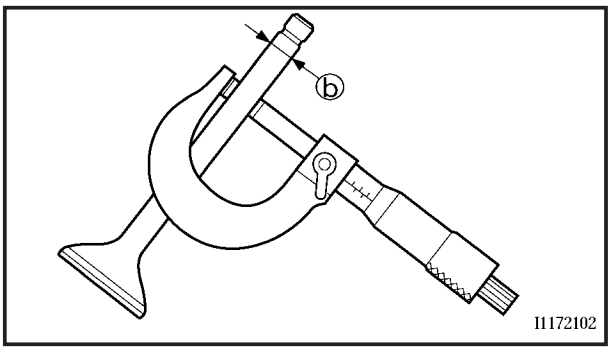
There should be no leakage at the valve seat ①.

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2. Remove:
   - valve cotters ①

NOTE:

Remove the valve cotters by compressing the valve spring with the valve spring compressor ②.



Valve spring compressor
90890-04019
Valve spring compressor attachment
90890-04108

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

NOTE:

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

EAS00239

CHECKING THE VALVES AND VALVE GUIDES

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

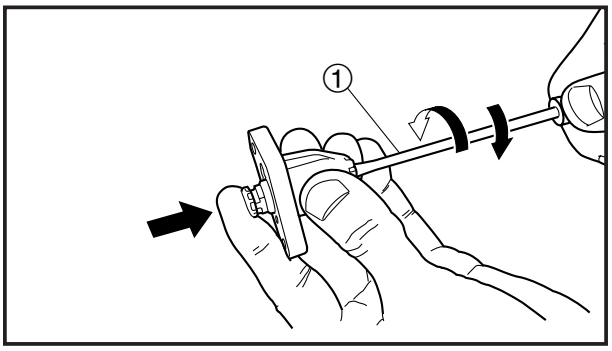
1. Measure:
   - valve-stem-to-valve-guide clearance

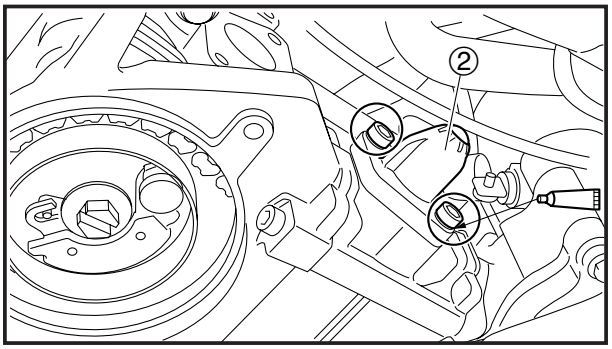
Valve-stem-to-valve-guide clearance = Valve guide inside diameter ⓐ – Valve stem diameter ⓑ

Out of specification → Replace the valve guide.



Valve-stem-to-valve-guide clearance
Intake
0.010 – 0.037 mm
(0.0004 – 0.0015 in)
<Limit>: 0.08 mm (0.0032 in)
Exhaust
0.025 – 0.052 mm
(0.001 – 0.002 in)
<Limit>: 0.10 mm (0.0039 in)





5. Install:
   •timing chain tensioner

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver ①.

NOTE:

Make sure that the tensioner rod has been fully set clockwise.

b. Install the gasket and the timing chain tensioner ② onto the cylinder.

⚠WARNING

Always use a new gasket.

NOTE:

Apply the YAMAHA bond 1215 onto the bolts.

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

	Timing chain tensioner bolt **10 Nm (1.0 m·kg, 7.2 ft•lb)**

c. Turn the timing chain tensioner rod counterclockwise with a thin screwdriver ①, make sure it releases, and then tighten the cap bolt to specification.

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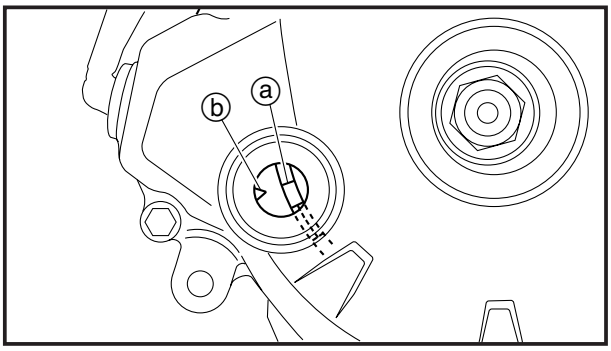
6. Tighten:
   •camshaft sprocket bolt

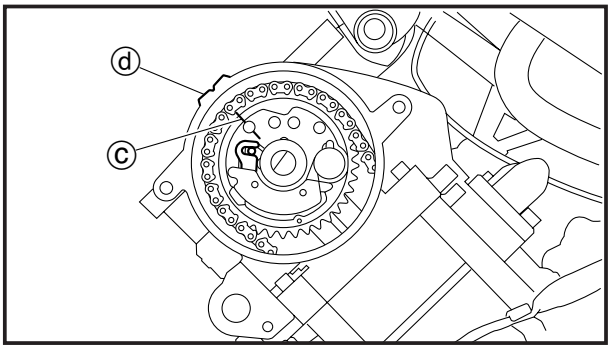
30 Nm (3.0 m•kg, 22 ft•lb)

CAUTION:

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

7. Turn:
   •crankshaft
   (several turns clockwise)





8. Check:
   - "I"mark ⓐ
     Align the "I" mark on the generator rotor with the stationary pointer ⓑ on the crankcase.
   - "I"mark ⓒ
     Align the "I"mark on the camshaft sprocket with the stationary pointer ⓓ on the cylinder head.
     Out of alignment → Correct.
     Refer to the installation steps above.
9. Measure:
   - valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.
10. Install:
    - O-rings **New**
    - water pump assembly
    - water pump assembly bolts

      10 Nm (1.0 m•kg, 7.2 ft•lb)
11. Install:
    - spark plug

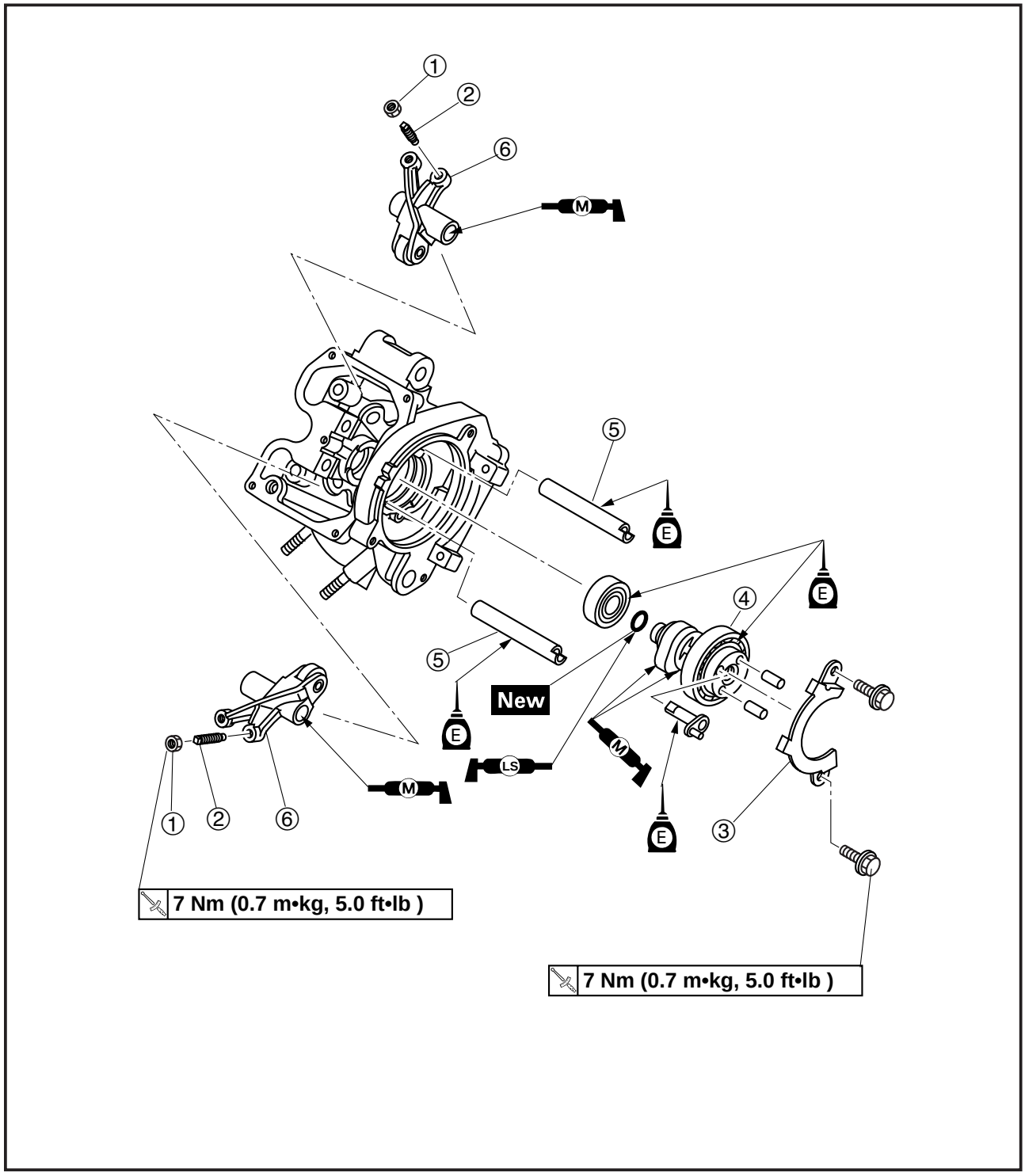
      13 Nm (1.3 m•kg, 9.5 ft•lb)
12. Install:
    - intake manifold bolts
    - intake manifold with carburetor

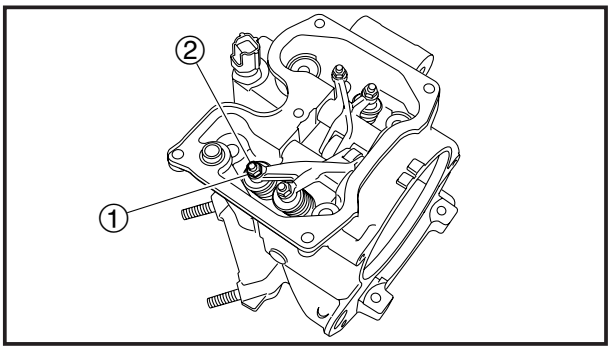
      10 Nm (1.0 m•kg, 7.2 ft•lb)

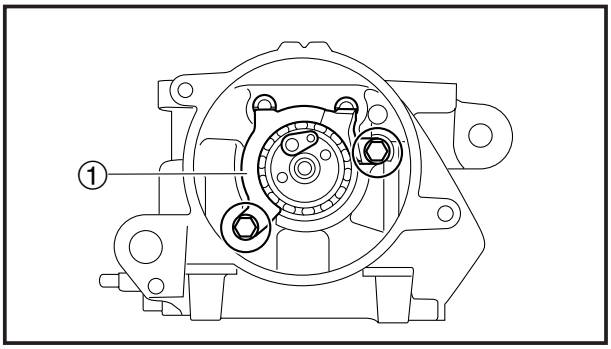
EASf0020

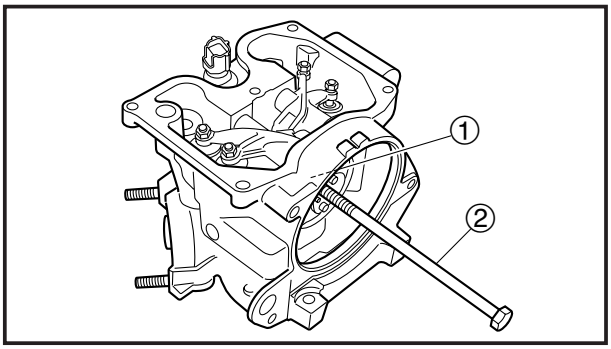
CAMSHAFT

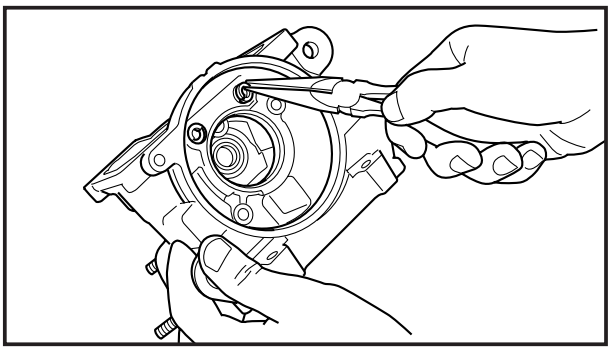
① Locknut
② Adjusting screw
③ Camshaft retainer
④ Camshaft
⑤ Rocker arm shaft
⑥ Rocker arm











EASF0022

REMOVING THE ROCKER ARMS AND CAMSHAFT

NOTE:

Prior to remove the rocker arms and camshaft, remove the cylinder head.

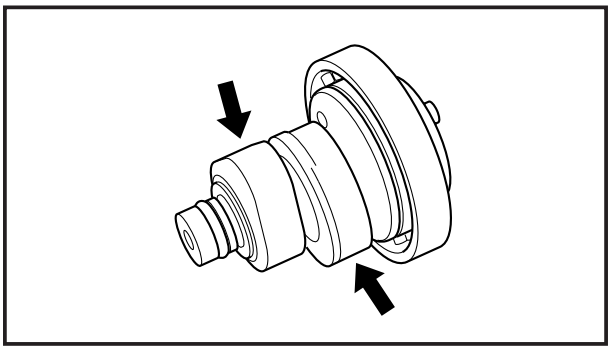
1. Loosen:
   - locknuts ①
   - adjusting screws ②
2. Remove:
   - camshaft retainer ①

3. Remove:
   - camshaft ①

NOTE:

Screw an 8 mm bolt ② into the threaded end of the camshaft and then pull out the camshaft.

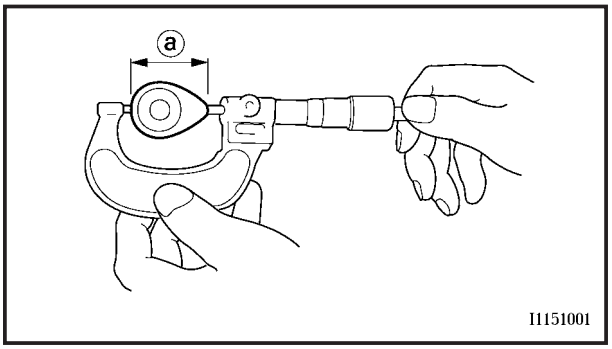
4. Remove:
   - rocker arm shafts
   - rocker arms



EAS00205

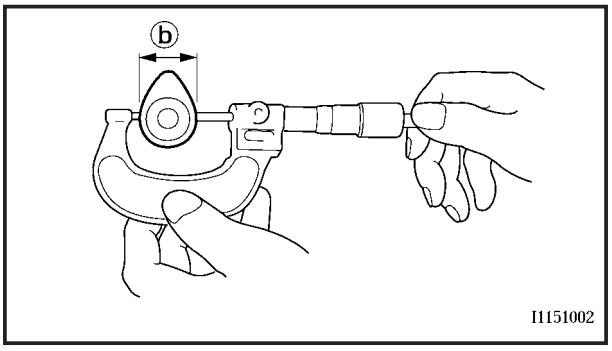
CHECKING THE CAMSHAFT

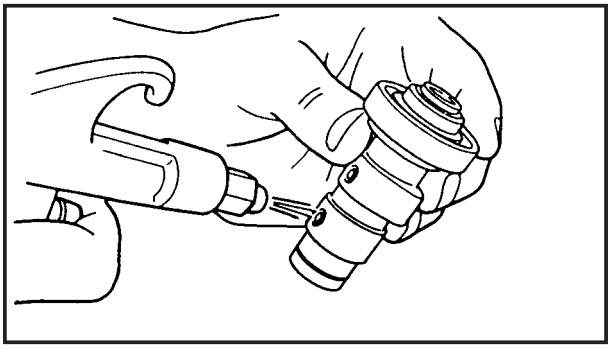
1. Check:
   - camshaft lobes
     Blue discoloration/pitting/scratches
     → Replace the camshaft.



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

Camshaft lobe dimension limit
Intake
ⓐ 29.613 mm (1.1659 in)
ⓑ 25.043 mm (0.9859 in)
Exhaust
ⓐ 29.912 mm (1.1776 in)
ⓑ 24.989 mm (0.9838 in)





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

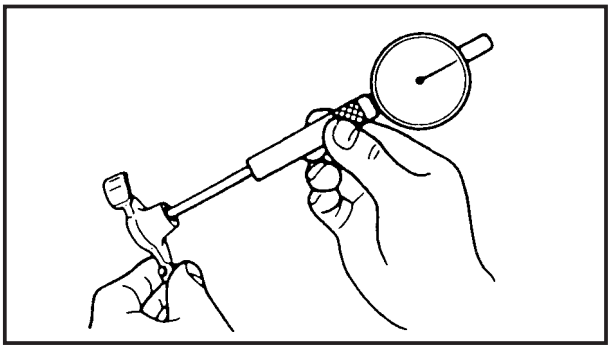
EAS00206

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

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

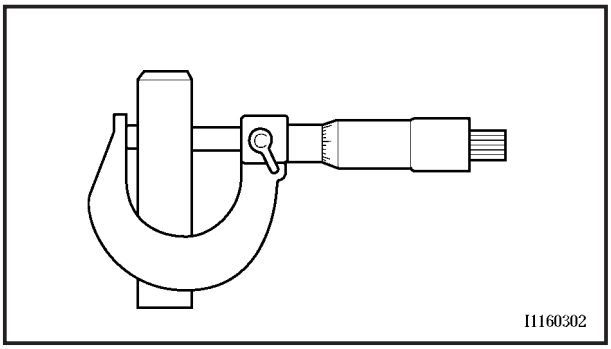
1. Check:
   - rocker arm
     Damage/wear → Replace.

2. Check:
   • rocker arm shaft
   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.



3. Measure:
   • rocker arm inside diameter
   Out of specification → Replace.

Rocker arm inside diameter
9.985 – 10.000 mm
(0.3931 – 0.3937 in)
<Limit>: 9.950 mm (0.3917 in)



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

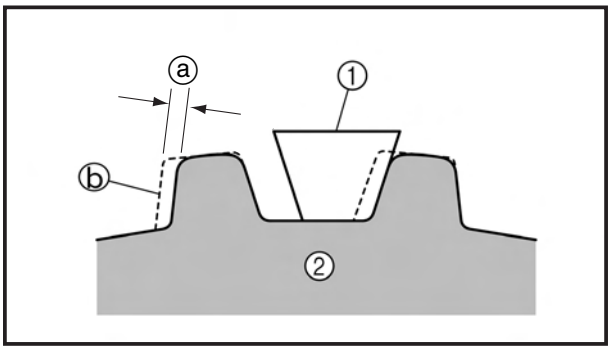
Rocker arm shaft outside diameter
9.966 – 9.976 mm
(0.3924 – 0.3928 in)
<Limit>: 9.950 mm (0.3917 in)

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

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

Above 0.08 mm → Replace the rocker arm and rocker arm shaft as a set.

Rocker-arm-to-rocker-arm-shaft clearance
0.009 – 0.034 mm
(0.0004 – 0.0013 in)
<Limit>: 0.080 mm (0.0031 in)



EAS00207

CHECKING THE CAMSHAFT SPROCKET

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

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

EAS00219

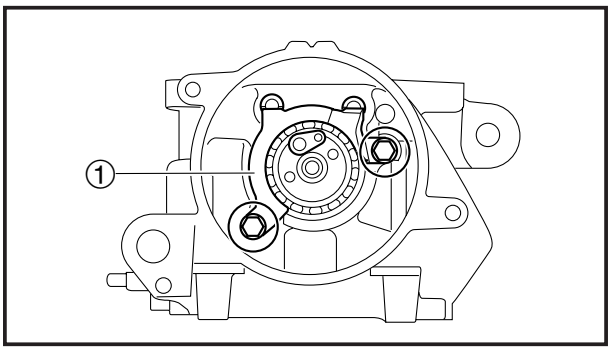
INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
   - camshaft journals

	Recommended lubricant **Engine oil**

2. Lubricate:
   - rocker arm inside surface
   - camshaft oil passage

	Recommended lubricant **Molybdenum disulfide grease**



3. Install:
   - camshaft retainer ①
   - camshaft retainer bolt

7 Nm (0.7 m•kg, 5.0 ft•lb)

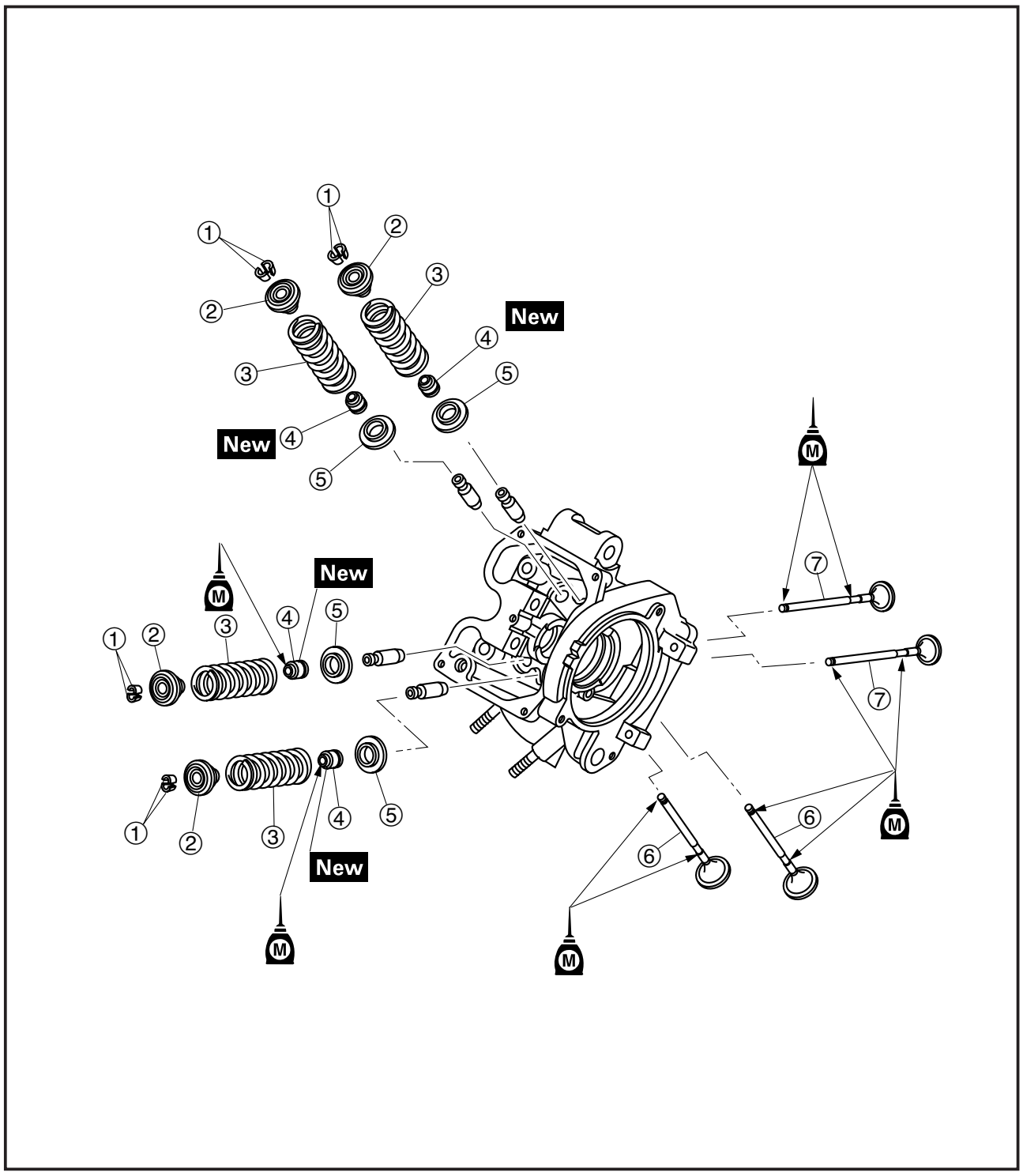
NOTE:

Install the camshaft retainer with the bent ends facing inward.

EASF0024

VALVES AND VALVE SPRINGS

① Valve cotter
② Upper spring seat
③ Valve spring
④ Valve stem seal
⑤ Lower spring seat
⑥ Intake valve
⑦ Exhaust valve



EASF0025

REMOVING THE VALVES

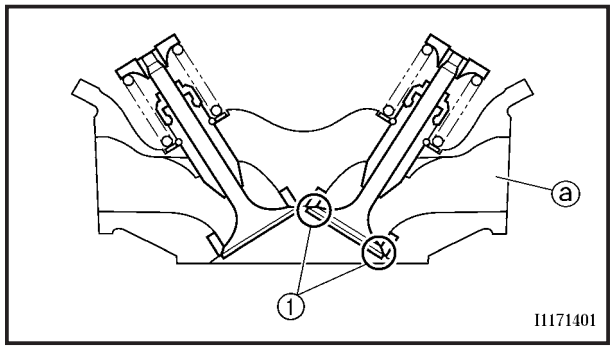
NOTE:

Prior to remove the valves, remove the cylinder head, camshaft and rocker arms.

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

NOTE:

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



1. Check:
   - valve sealing

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

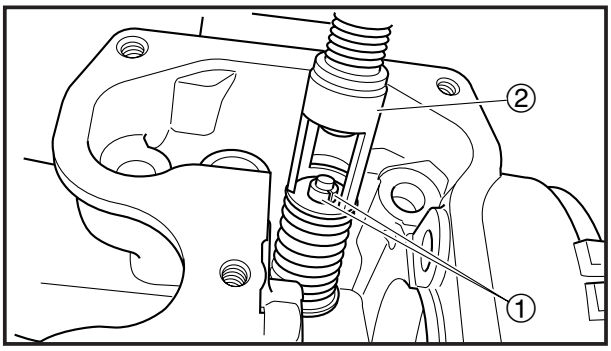
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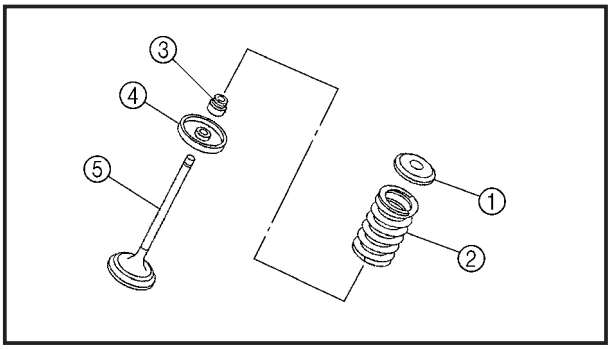
a. Pour a clean solvent ⓐ into the intake and exhaust ports.
b. Check that the valves properly seal.

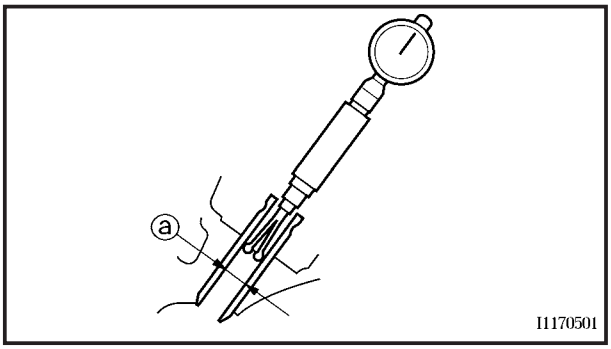
NOTE:

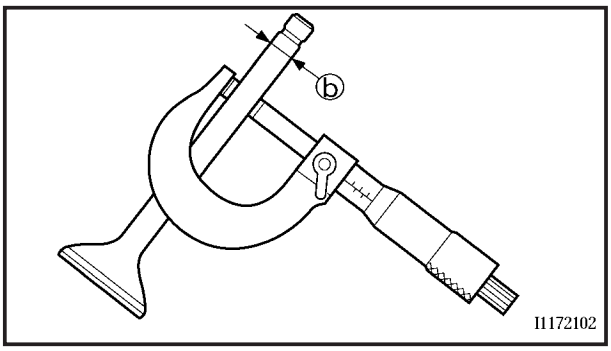
There should be no leakage at the valve seat ①.

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2. Remove:
   - valve cotters ①

NOTE:

Remove the valve cotters by compressing the valve spring with the valve spring compressor ②.



Valve spring compressor
90890-04019
Valve spring compressor attachment
90890-04108

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

NOTE:

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

EAS00239

CHECKING THE VALVES AND VALVE GUIDES

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

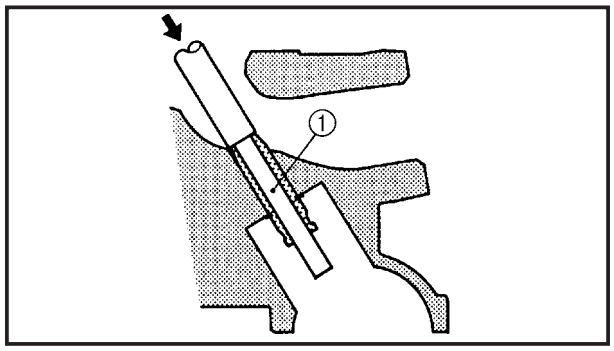
1. Measure:
   - valve-stem-to-valve-guide clearance

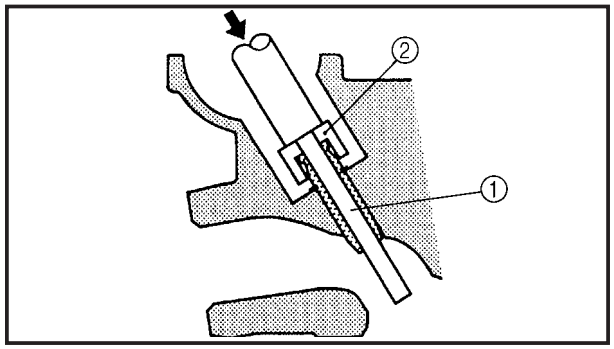
Valve-stem-to-valve-guide clearance = Valve guide inside diameter ⓐ – Valve stem diameter ⓑ

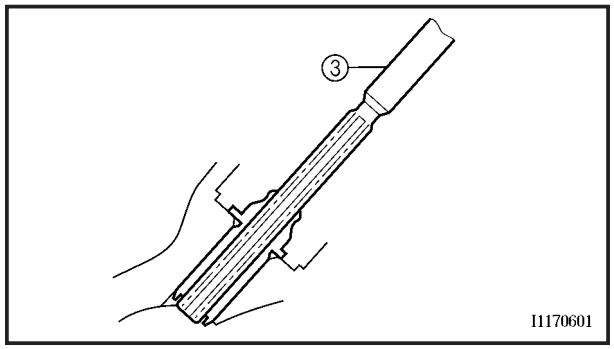
Out of specification → Replace the valve guide.



Valve-stem-to-valve-guide clearance
Intake
0.010 – 0.037 mm
(0.0004 – 0.0015 in)
<Limit>: 0.08 mm (0.0032 in)
Exhaust
0.025 – 0.052 mm
(0.001 – 0.002 in)
<Limit>: 0.10 mm (0.0039 in)







2. Replace:
   - valve guide

NOTE:

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

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

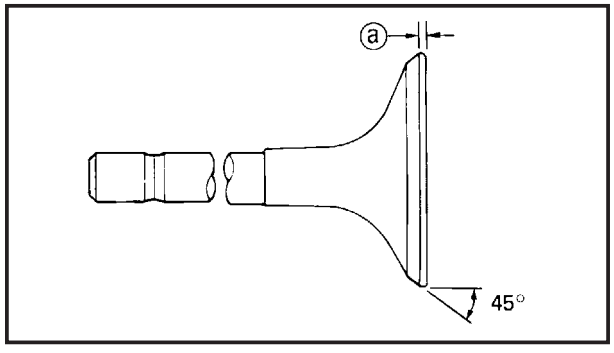
NOTE:

After replacing the valve guide, reface the valve seat.

Valve guide remover (4.5 mm)
90890-04116
Valve guide installer (4.5 mm)
90890-04117
Valve guide reamer (4.5 mm)
90890-04118

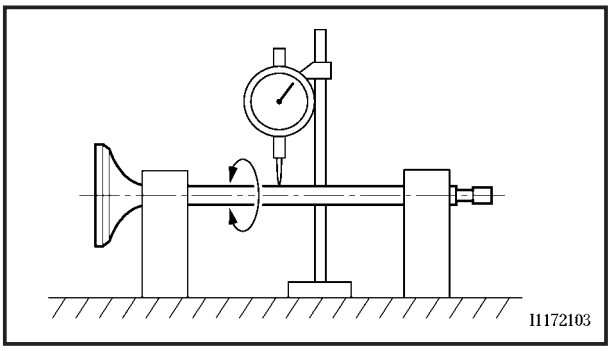
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3. Eliminate:
   - carbon deposits
     (from the valve face and valve seat)
4. Check:
   - valve face
     Pitting/wear → Grind the valve face.
   - valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the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



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

Valve margin thickness
Intake: 0.5 – 0.9 mm
(0.0197 – 0.0433 in)
Exhaust: 0.5 – 0.9 mm
(0.0197 – 0.0433 in)



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 valve stem seal.

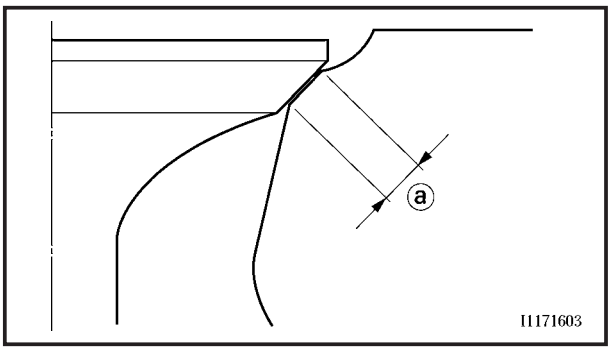
Valve stem runout limit
0.01 mm (0.0004 in)

EAS00240

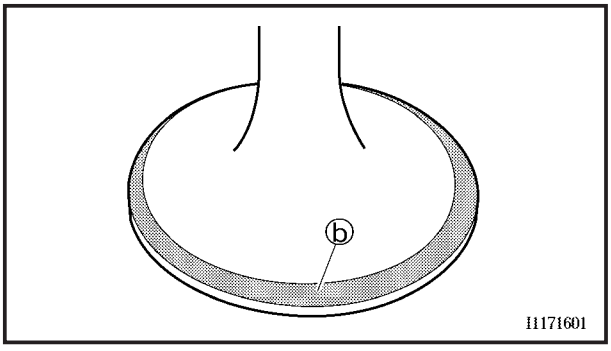
CHECKING THE VALVE SEATS

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

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



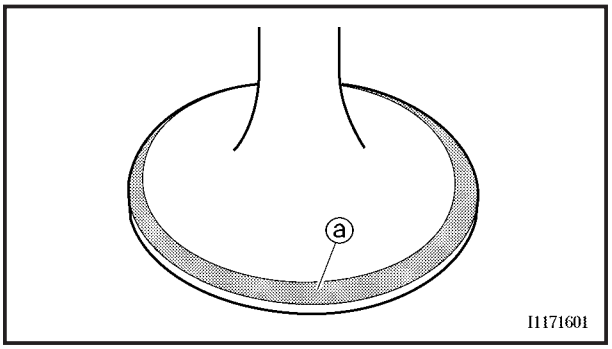
Valve seat width
Intake: 0.9 – 1.1 mm
(0.0354 – 0.0433 in)
Exhaust: 0.9 – 1.1 mm
(0.0354 – 0.0433 in)
<Limit>: 1.6 mm

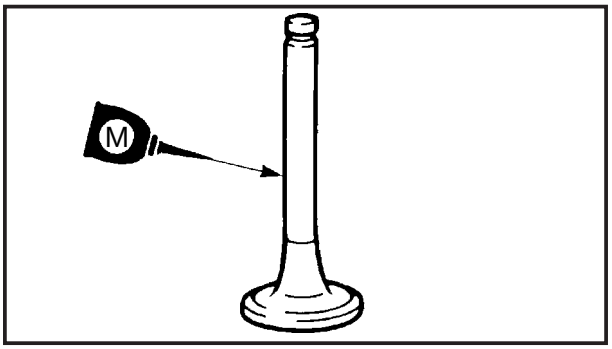


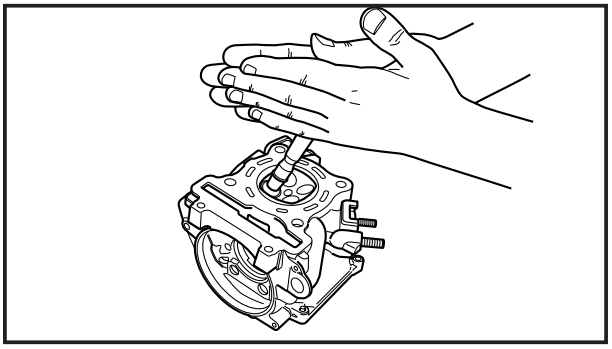
a. Apply Mechanic's blueing dye (Dykem) ⓑ onto the valve face.
b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
d. Measure the valve seat width.

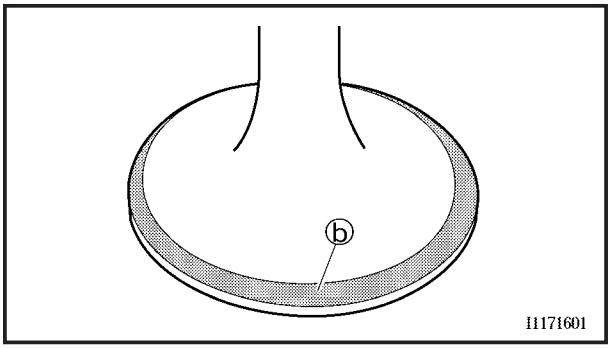
NOTE:
Where the valve seat and valve face contacted one another, the blueing will have been removed.

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4. Lap:
   - valve face
   - valve seat

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

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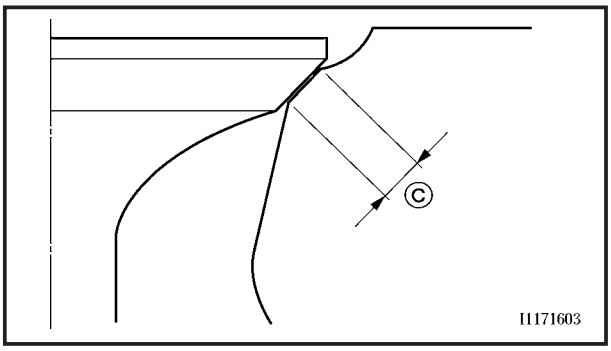
a. Apply a coarse lapping compound ⓐ to the valve face.

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

b. Apply molybudenium 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.

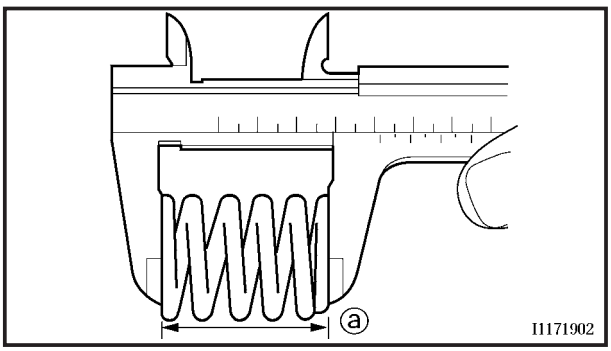
NOTE:
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

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

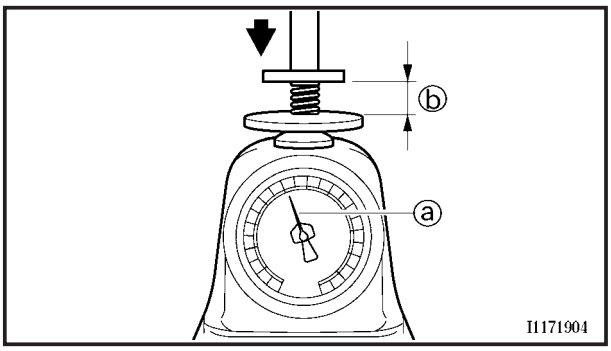
CHECKING THE VALVE SPRINGS

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 valve springs
47.33 mm (1.86 in)
<Limit>: 44.96 mm (1.77 in)

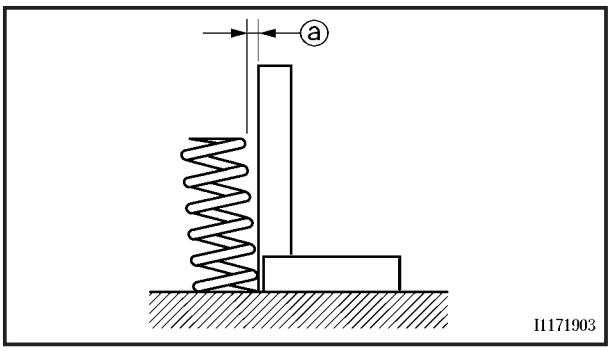


2. Measure:
   - compressed valve spring force ⓐ

   Out of specification → Replace the valve spring.

ⓑ Installed length

Compressed valve spring force (installed)
Intake and exhaust valve springs
135.6 – 156.0 N
(13.83 – 15.91 kgf) at 24.2 mm



3. Measure:
   - valve spring tilt ⓐ

   Out of specification → Replace the valve spring.

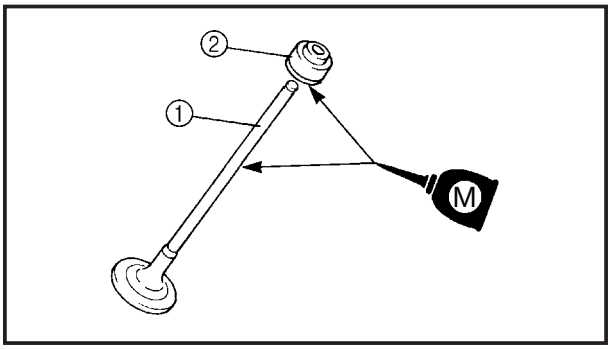
Spring tilt limit
Intake and exhaust valve springs
2.0 mm (0.08 in)

EAS00245

INSTALLING THE VALVES

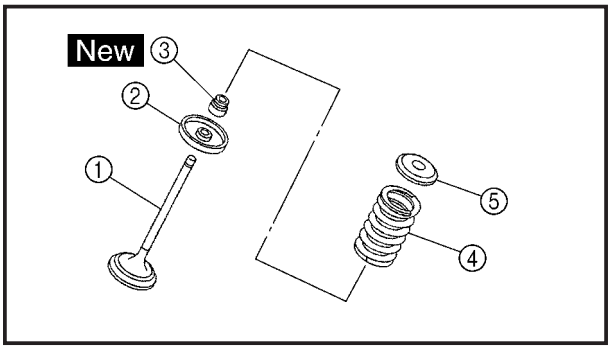
The following procedure applies to all of the valves and related components.

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



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

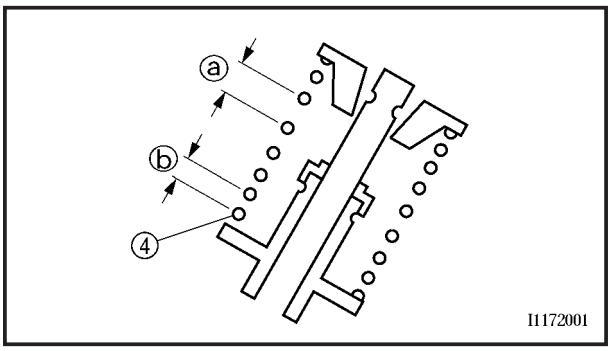
	Recommended lubricant **Molybudemium oil**



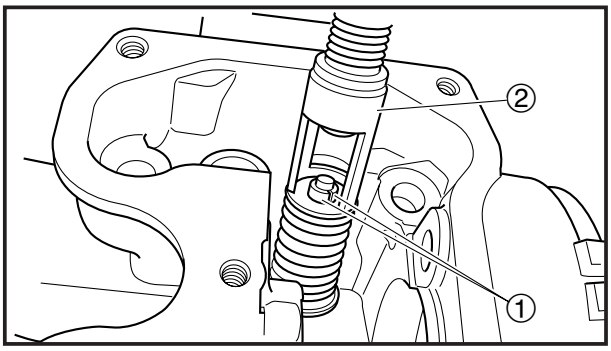
3. Install:
   - valve ①
   - lower spring seat ②
   - valve stem seal ③
   - valve spring ④
   - upper spring seat ⑤
     (into the cylinder head)

NOTE:

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



ⓑ Smaller pitch

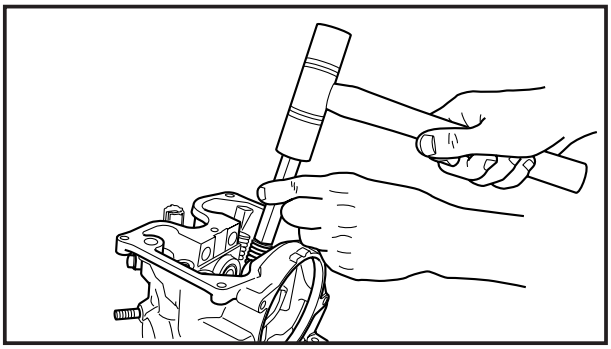


4. Install:
   - valve cotters ①

NOTE:

Install the valve cotters by compressing the valve spring with the valve spring compressor ②

Valve spring compressor
90890-04019
Valve spring compressor attachment
90890-04108



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

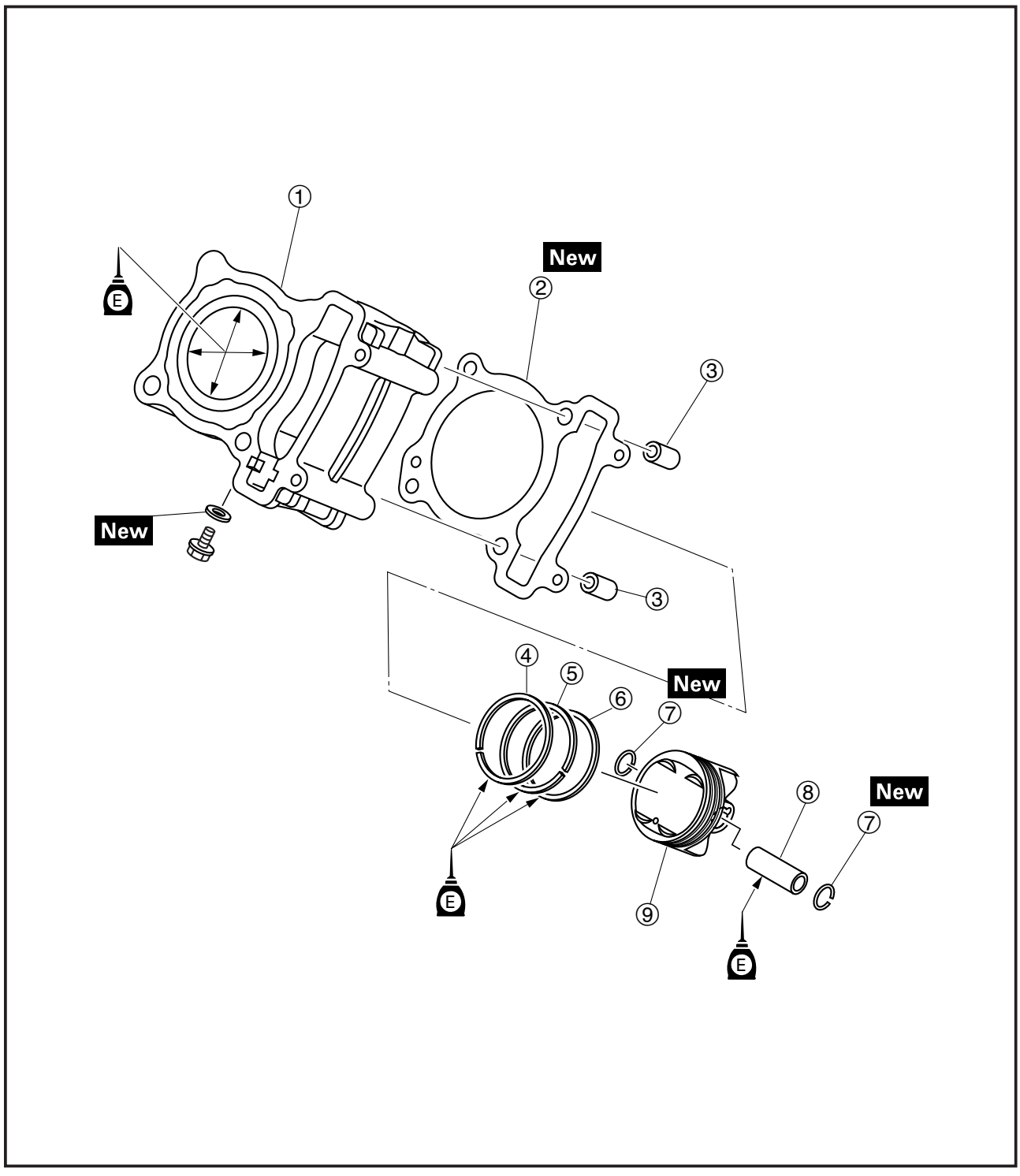
CAUTION:

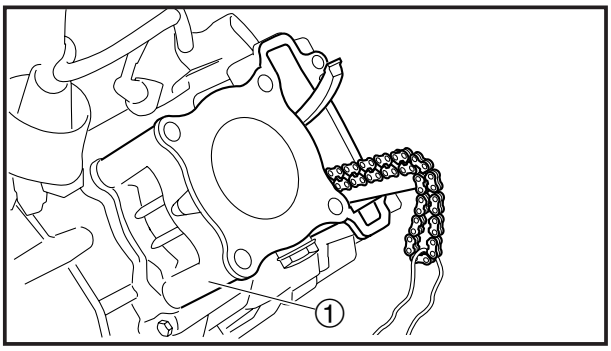
Hitting the valve tip with excessive force could damage the valve.

EASF0027

CYLINDER AND PISTON

① Cylinder
② Cylinder gasket
③ Dowel pin
④ Top ring
⑤ 2nd ring
⑥ Oil ring
⑦ Piston pin clip
⑧ Piston pin
⑨ Piston





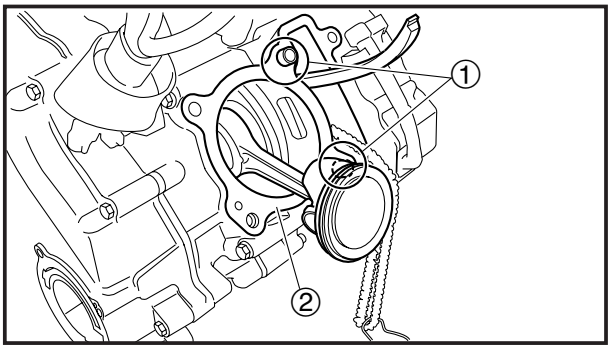
EASF0028

REMOVING THE CYLINDER AND PISTON

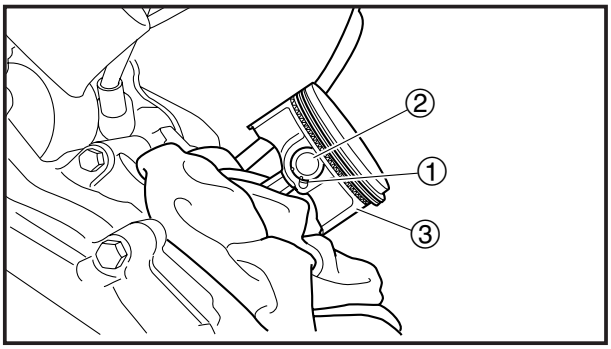
NOTE:

Prior to removing the cylinder and piston, remove the cylinder head.

1. Remove:
   - cylinder ①



2. Remove:
   - dowel pins ①
   - gasket ②



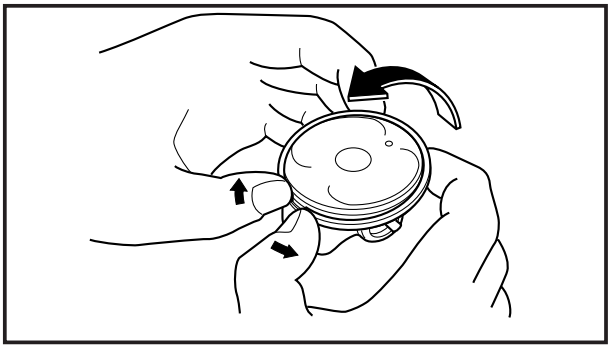
3. Remove:
   - piston pin clip ①
   - piston pin ②
   - piston ③

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 groove and the piston pin bore area of the piston. If both areas are deburred and the piston pin is still difficult to remove, remove it with a piston pin puller set.



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

NOTE:

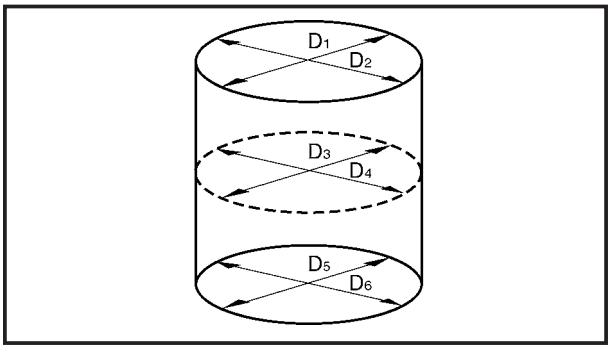
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

EAS00255

CHECKING THE CYLINDER AND PISTON

1. Check:
   - piston surface
   - cylinder wall

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



2. Measure:
   - piston-to-cylinder clearance

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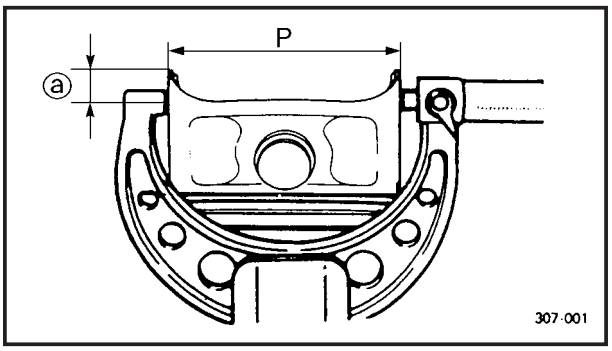
a. Measure cylinder bore "C" with the cylinder bore gauge.

NOTE:

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

Cylinder bore "C"	**54.000 – 54.010 mm (2.1260 – 2.1264 in)**
Limit	**54.100 mm (2.1299 in)**
Taper limit "T"	**0.05 mm (0.002 in)**
Out-of-round "R"	**0.05 mm (0.002 in)**

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



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

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

ⓐ 5 mm from the bottom edge of the piston

	Piston size "P"
Standard	**53.962 – 53.985 mm (2.1245 – 2.1254 in)**

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

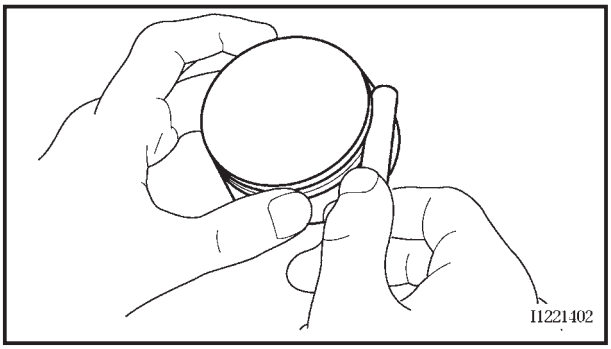
e. Calculate the piston-to-cylinder clearance with the following formula.

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

Piston-to-cylinder clearance
0.0015 – 0.048 mm
(0.0006 – 0.0019 in)
<Limit>: 0.15 mm (0.0059)

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

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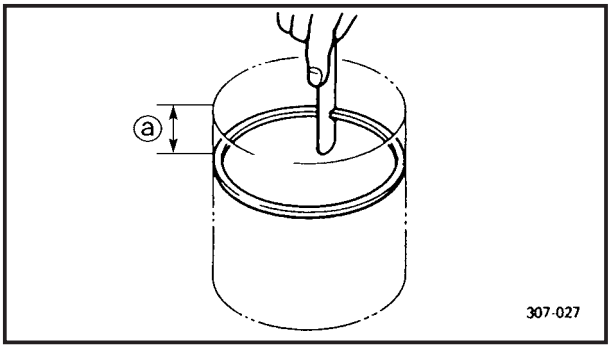


EAS00263
CHECKING THE PISTON RINGS

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

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

Piston ring side clearance
Top ring
0.030 – 0.065 mm
(0.0012 – 0.0026 in)
<Limit>: 0.1 mm (0.0039 in)
2nd ring
0.020 – 0.055 mm
(0.0008 – 0.0022 in)
<Limit>: 0.1 mm (0.0039 in)



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

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

ⓐ 40 mm

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

NOTE:

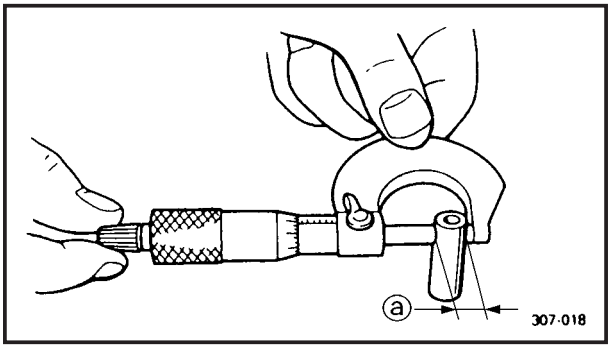
The end gap of the oil ring expander cannot be measured. If the end gaps of the oil ring rails are excessive, replace all three piston rings.

Piston ring end gap
Top ring
0.10 – 0.25 mm
(0.0039 – 0.0098 in)
<Limit>: 0.4 mm (0.0157 in)
2nd ring
0.10 – 0.25 mm
(0.0039 – 0.0098 in)
<Limit>: 0.4 mm (0.0157 in)
Oil ring rails
0.20 – 0.70 mm (0.01 – 0.03 in)

EAS00265

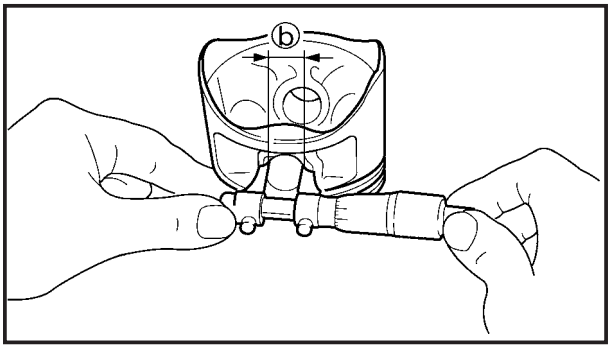
CHECKING THE PISTON PIN

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



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

Piston pin outside diameter
13.995 – 14.000 mm
(0.5510 – 0.5512 in)
<Limit>: 13.975 mm (0.5502 in)



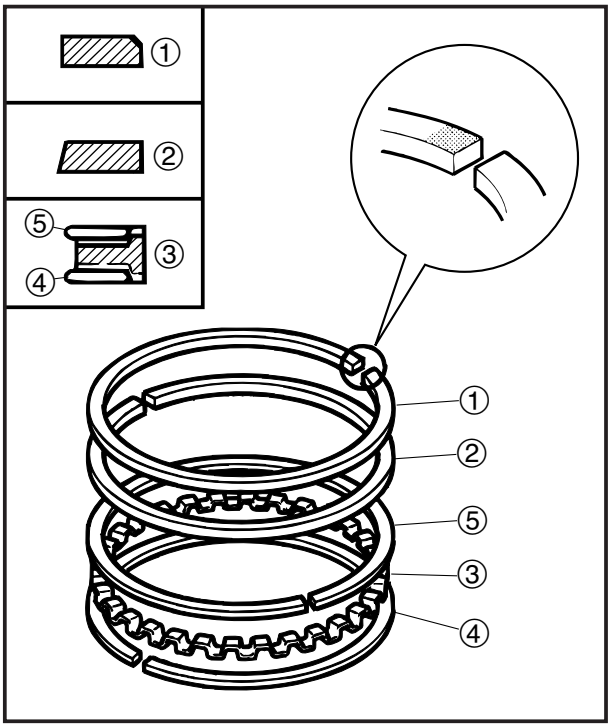
3. Measure:
   • piston pin bore diameter (of the piston) ⓑ
   Out of specification → Replace the piston.

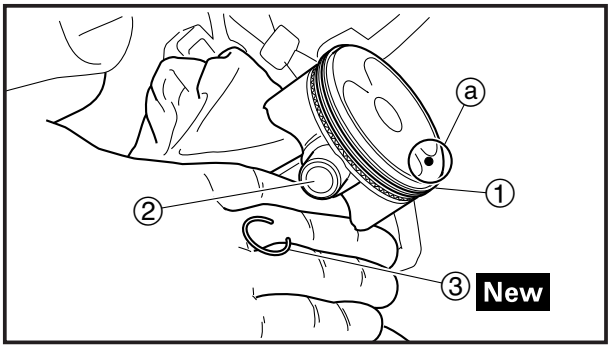
Piston pin bore diameter (of the piston)
14.002 – 14.013 mm
(0.5513 – 0.5517 in)
<Limit>: 14.043 mm (0.5529 in)

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

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

Piston-pin-to-piston-pin-bore clearance
0.002 – 0.018 mm
(0.0001 – 0.0007 in)
<Limit>: 0.068 mm (0.027 in)





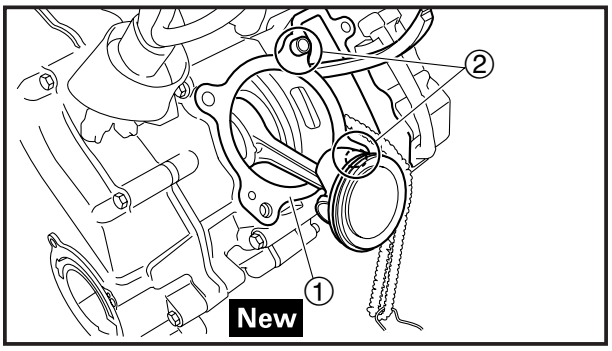
EAS00267
INSTALLING THE PISTON AND CYLINDER

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

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

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

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



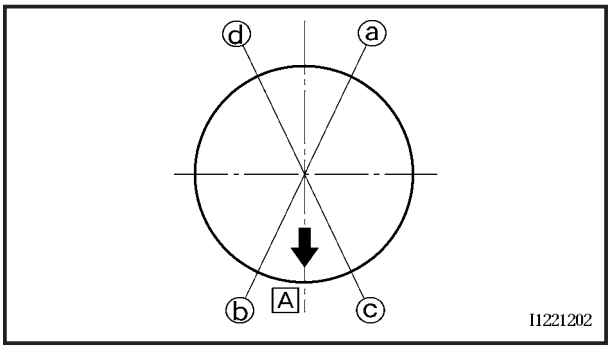
3. Install:
   - gasket ① **New**
   - dowel pins ②
4. Lubricate:
   - piston
   - piston rings
   - cylinder

   (with the recommended lubricant)

NOTE:

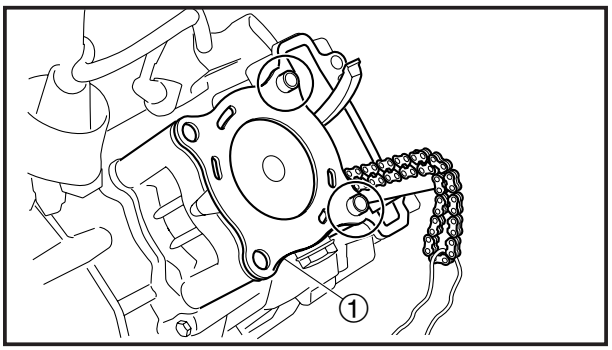
Be sure to apply enough engine oil onto them.

	Recommended lubricant **Engine oil**



5. Offset:
   - piston ring end gaps

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



6. Install:
   - cylinder ①

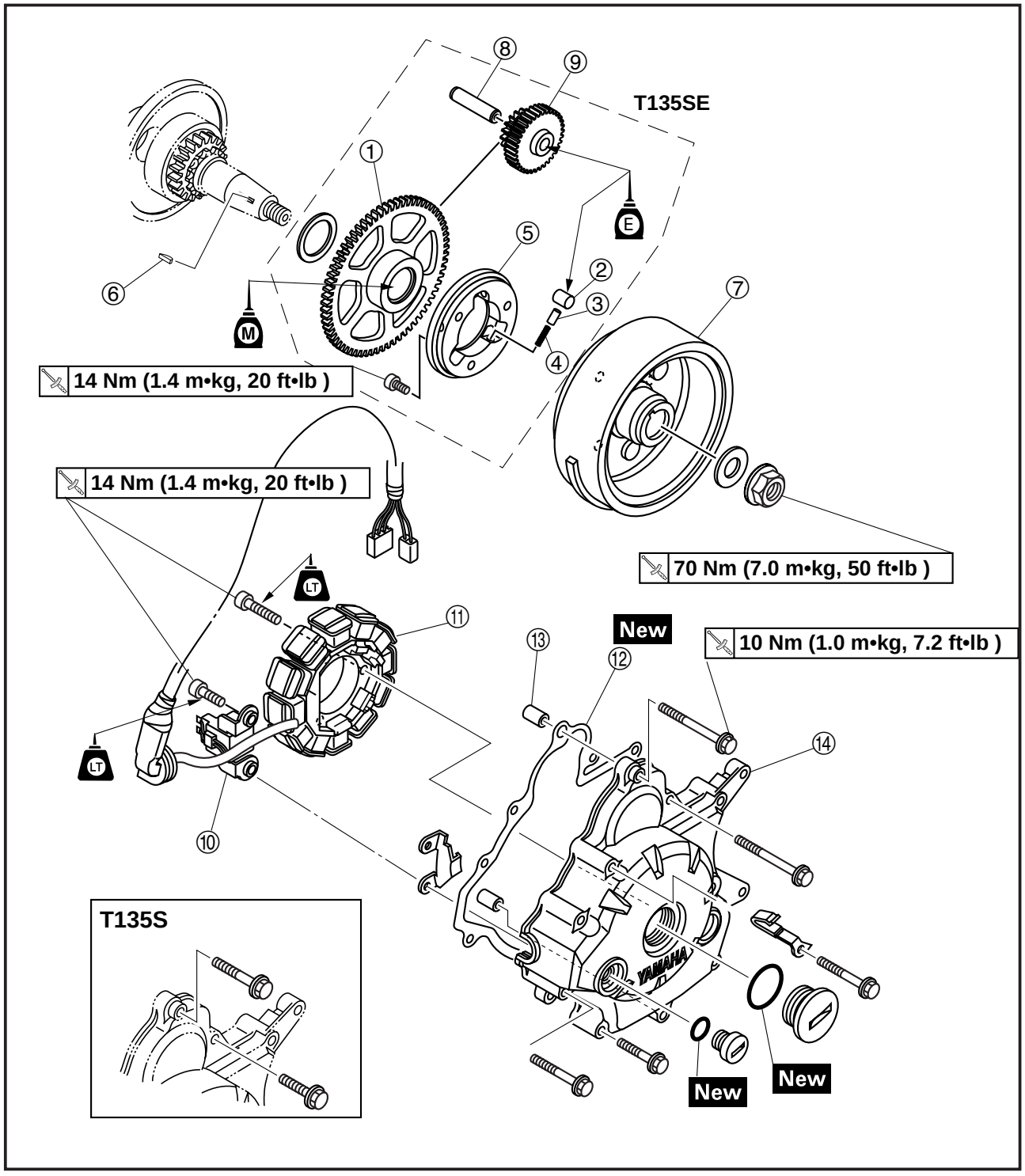
NOTE:

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

EASF0034

GENERATOR AND STARTER CLUTCH

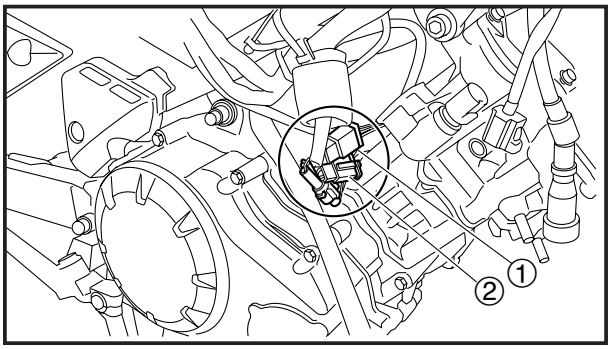
① Starter clutch gear
② Starter clutch roller
③ Starter clutch spring cap
④ Starter clutch spring
⑤ Starter clutch
⑥ Woodruff key
⑦ Generator rotor
⑧ Starter clutch idle gear shaft
⑨ Starter clutch idle gear
⑩ Pickup coil
⑪ Stator coil
⑫ Gasket
⑬ Dowel pin
⑭ Crankcase cover (left)



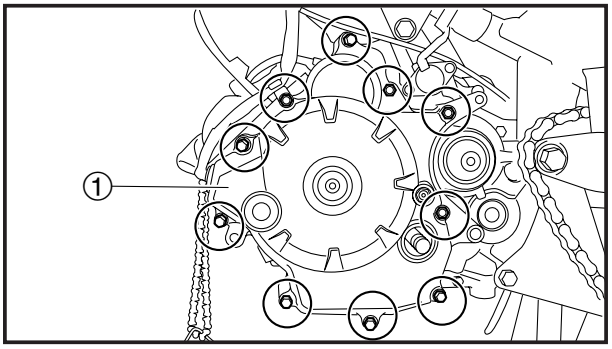
EAS00346

REMOVING THE GENERATOR

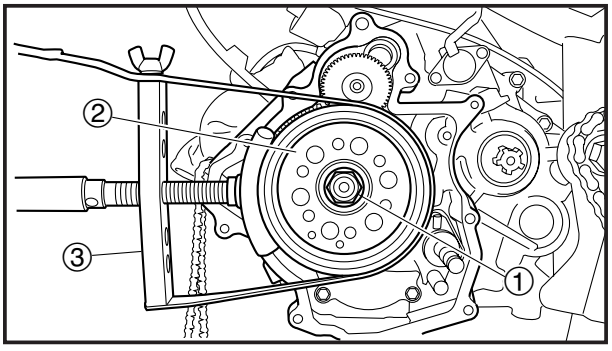
1. Drain:
   - engine oil
     (completely from the crankcase)
     Refer to “CHANGING THE ENGINE OIL” in chapter 3.
2. Remove:
   - side cowling (left)
     Refer to “REMOVING THE SIDE COWLINGS” in chapter 3.
   - shift pedal
   - drive sprocket cover
     Refer to “REMOVING THE DRIVE CHAIN AND SPROCKETS” in chapter 6.



3. Disconnect:
   - stator coil coupler ①
   - pickup coil coupler ②



4. Remove:
   - crankcase cover (left) ①
   - gasket
   - dowel pins



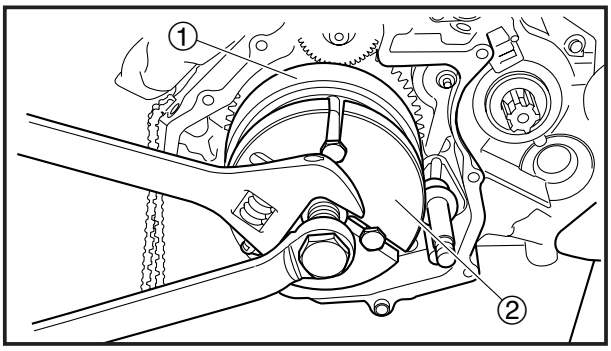
5. Remove:
   - generator rotor nut ①
   - washer

NOTE:

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

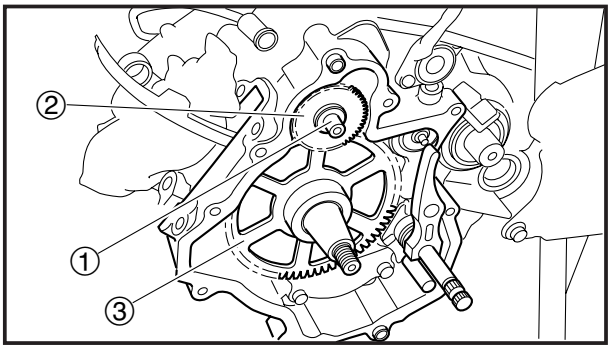


Sheave holder
90890-01701



6. Remove:
   - generator rotor ①
     (with the flywheel puller ②)
   - woodruff key

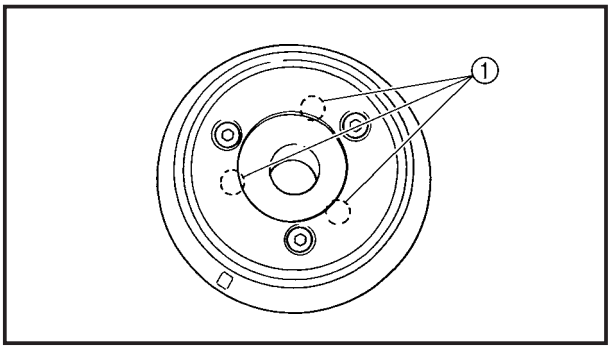
	Flywheel puller **90890-01362**



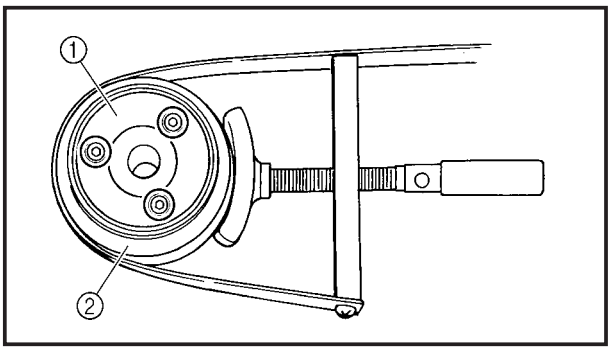
EAS00344

REMOVING THE STARTER CLUTCH (T135SE)

1. Remove:
   - starter clutch idle gear shaft ①
   - starter clutch idle gear ②
   - starter clutch gear ③
   - washer



2. Remove:
   - starter clutch rollers ①
   - starter clutch spring caps
   - starter clutch springs

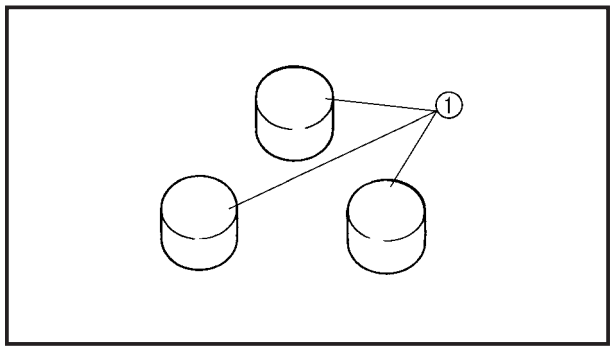


3. Remove:
   - starter clutch bolt
   - starter clutch ①

NOTE:

- While holding the generator rotor ② with the sheave holder, remove the starter clutch bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

	Sheave holder **90890-01701**

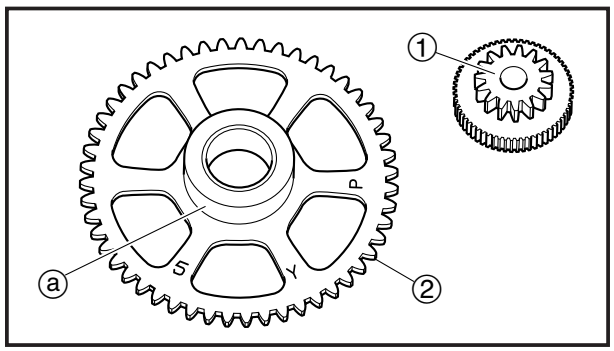


EAS00351

CHECKING THE STARTER CLUTCH (T135SE)

1. Check:
   - starter clutch rollers ①

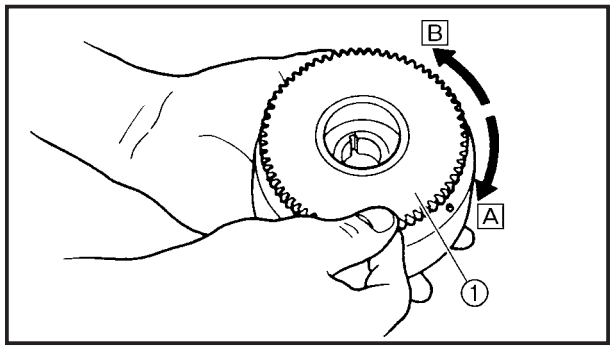
   Damage/wear → Replace.



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

   Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   - starter clutch gear contacting surfaces ⓐ

   Damage/pitting/wear → Replace the starter clutch gear.

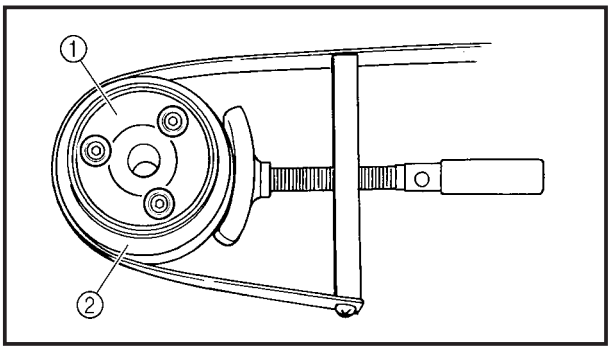


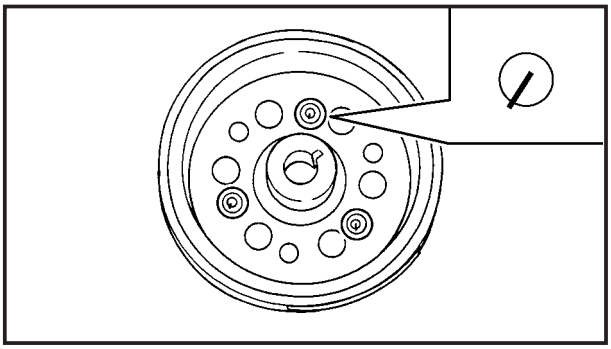
4. Check:
   - starter clutch operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲





EAS00355

INSTALLING THE STARTER CLUTCH (T135SE)

1. Install:
   - starter clutch ①

14 Nm (1.4 m•kg, 10 ft•lb)

NOTE:

- While holding the generator rotor ② with the sheave holder, tighten the starter clutch bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.
- Lock the threads on the starter clutch bolts by staking them with a center punch.

Sheave holder
90890-01701

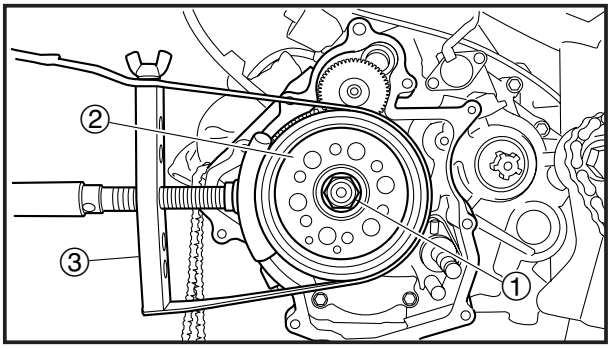
EAS00353

INSTALLING THE GENERATOR

1. Install:
   - woodruff key
   - generator rotor
   - generator rotor nut

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 sealed in the key-way of the crankshaft.



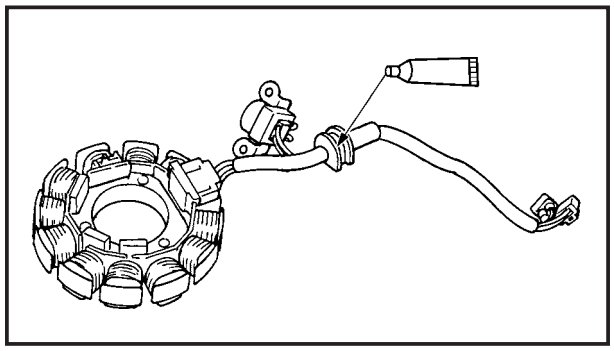
2. Tighten:
   - generator rotor nut ①

70 Nm (7.0 m•kg, 50 ft•lb)

NOTE:

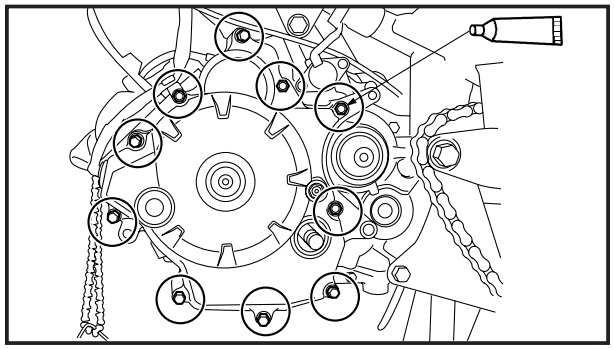
- While holding the generator rotor ② with the sheave holder ③, tighten the generator rotor nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.

Sheave holder
90890-01701



3. Apply:
   • sealant
   (on to the generator lead grommet)

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



4. Apply:
   • sealant

NOTE:
Be sure to apply the sealant onto the crankcase cover bolt thread as shown one.

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

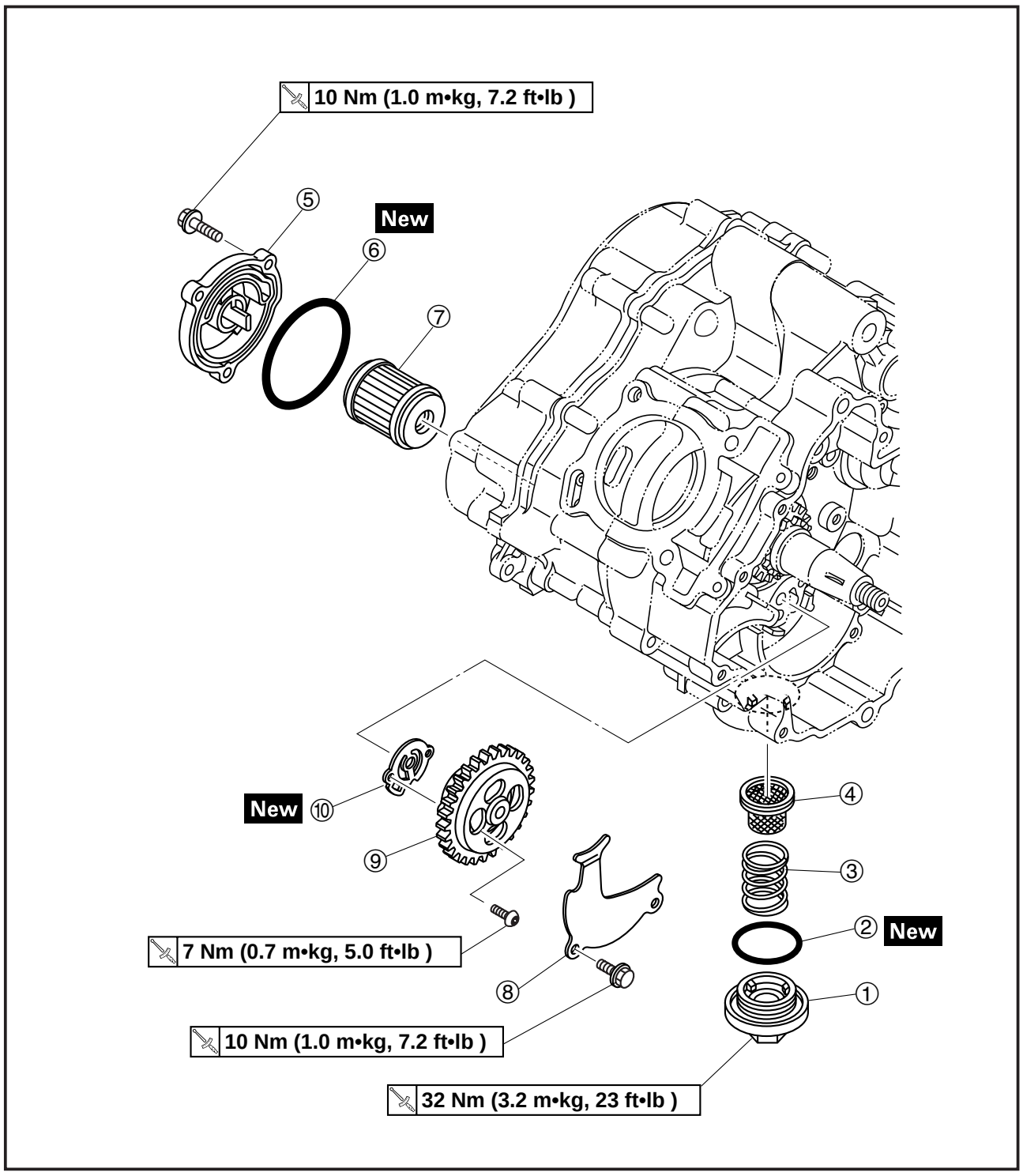
5. Install:
   • gasket **New**
   • crankcase cover

10 Nm (1.0 m•kg, 7.2 ft•lb)

EASF0035

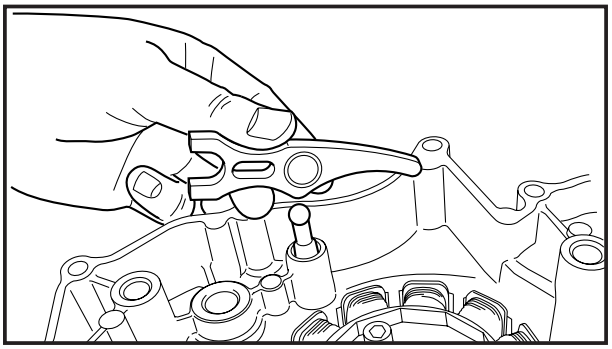
OIL PUMP

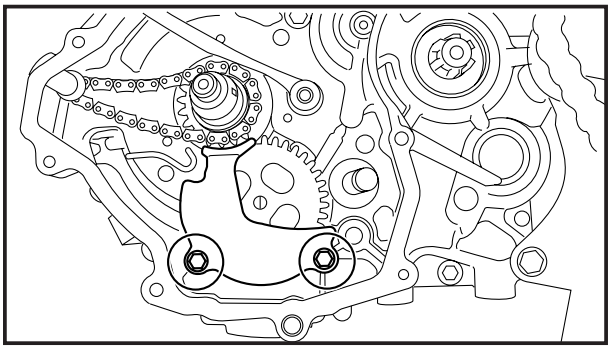
① Oil drain bolt
② O-ring
③ Spring
④ Oil strainer
⑤ Oil filter cover
⑥ O-ring
⑦ Oil filter
⑧ Gear cover
⑨ Oil pump assembly
⑩ Gasket



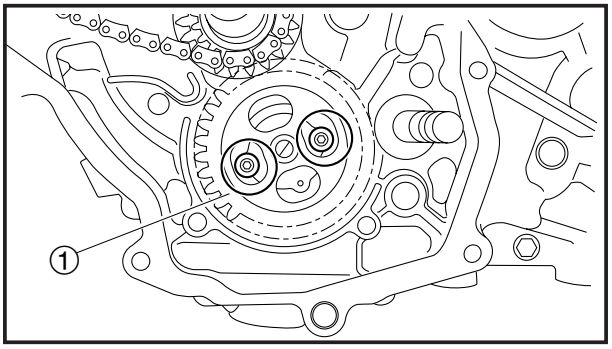
REMOVING THE OIL PUMP

1. Drain:
   - engine oil
     (completely from the crankcase)
     Refer to “CHANGING THE ENGINE OIL” in chapter 3.
2. Remove:
   - generator
     Refer to “GENERATOR AND STARTER CLUTCH”.
3. Remove:
   - clutch release shift arm

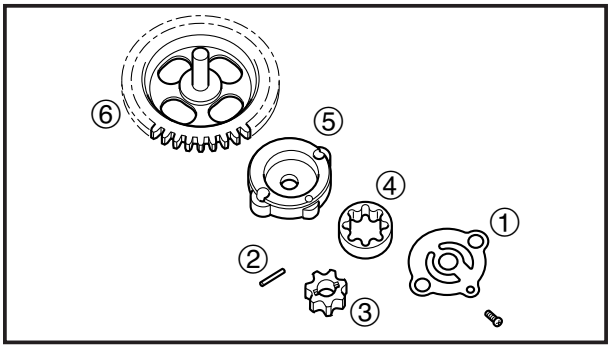




4. Remove:
   - gear cover

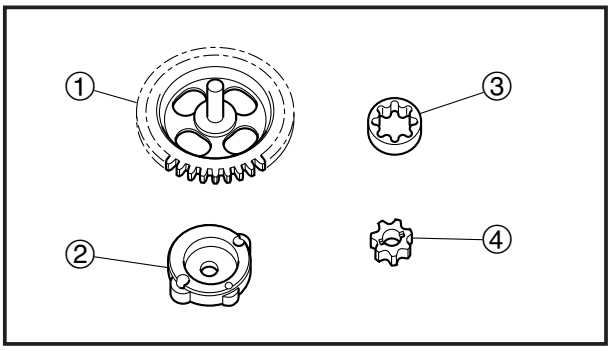


5. Remove:
   - oil pump assembly ①
   - gasket



DISASSEMBLING THE OIL PUMP

1. Remove:
   - screw
   - pump cover ①
   - pin ②
   - inner rotor ③
   - outer rotor ④
   - oil pump housing ⑤
   - oil pump driven cover ⑥

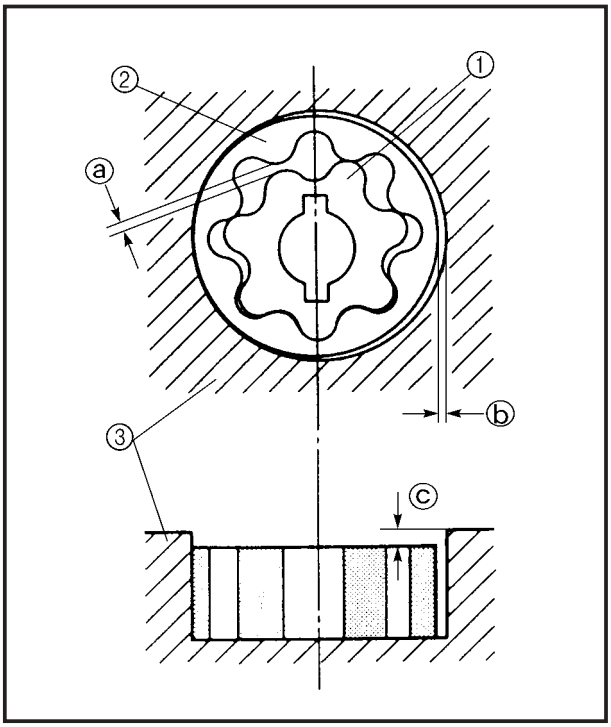


EAS00364

CHECKING THE OIL PUMP

1. Check:
   - oil pump driven gear ①
   - oil pump housing ②
   - outer rotor
   - inner rotor

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

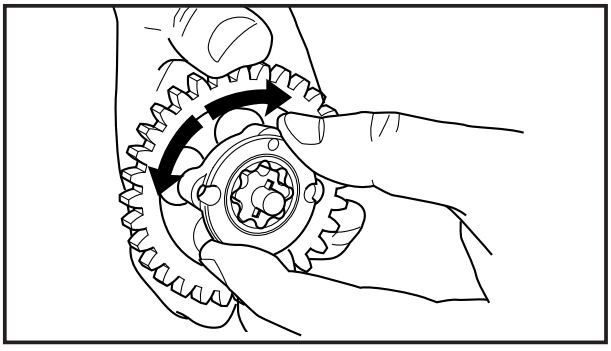


2. Measure:
   - inner-rotor-to-outer-rotor-tip clearance ⓐ
   - outer-rotor-to-oil-pump-housing clearance ⓑ
   - oil-pump-housing-to-inner-rotor-and-outer-rotor clearance ⓒ

   Out of specification → Replace the oil pump.

① Inner rotor
② Outer rotor
③ Oil pump housing

Inner-rotor-to-outer-rotor-tip clearance
0.15 mm (0.0059 in)
<Limit>: 0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.06 – 0.11 mm
(0.0024 – 0.0043 in)
<Limit>: 0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance
0.06 – 0.11 mm
(0.0024 – 0.0043 in)
<Limit>: 0.15 mm (0.0059 in)



3. Check:
   - oil pump operation

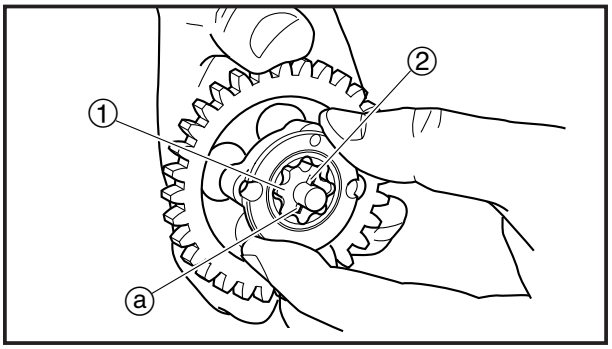
   Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

EAS00375

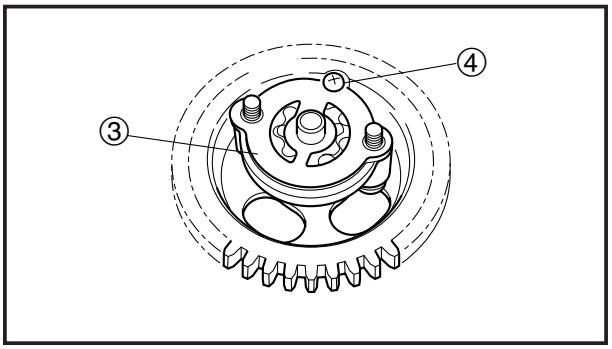
ASSEMBLING THE OIL PUMP

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

	Recommended lubricant **Engine oil**



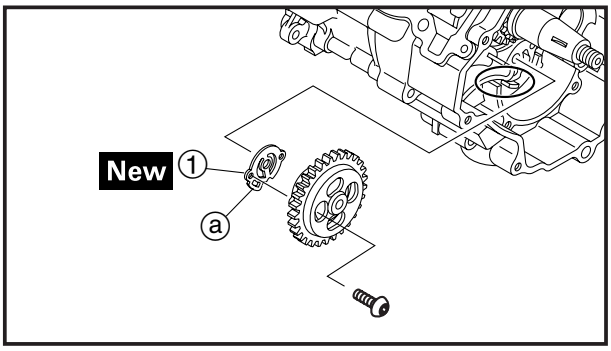
2. Install:
   - oil pump shaft
   (to the oil pump housing)
   - inner rotor ①
   - outer rotor
   - pin ②
   - oil pump housing cover ③
   - screw ④ — **1 Nm (0.1 m•kg, 0.7 ft•lb)**



NOTE:

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

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



EAS00376

INSTALLING THE OIL PUMP

1. Install:
   - gasket ① **New**
   - oil pump assembly

7 Nm (0.7 m•kg, 5.0 ft•lb)

NOTE:

Install the gasket with section ⓐ in the position as shown in the illustration.

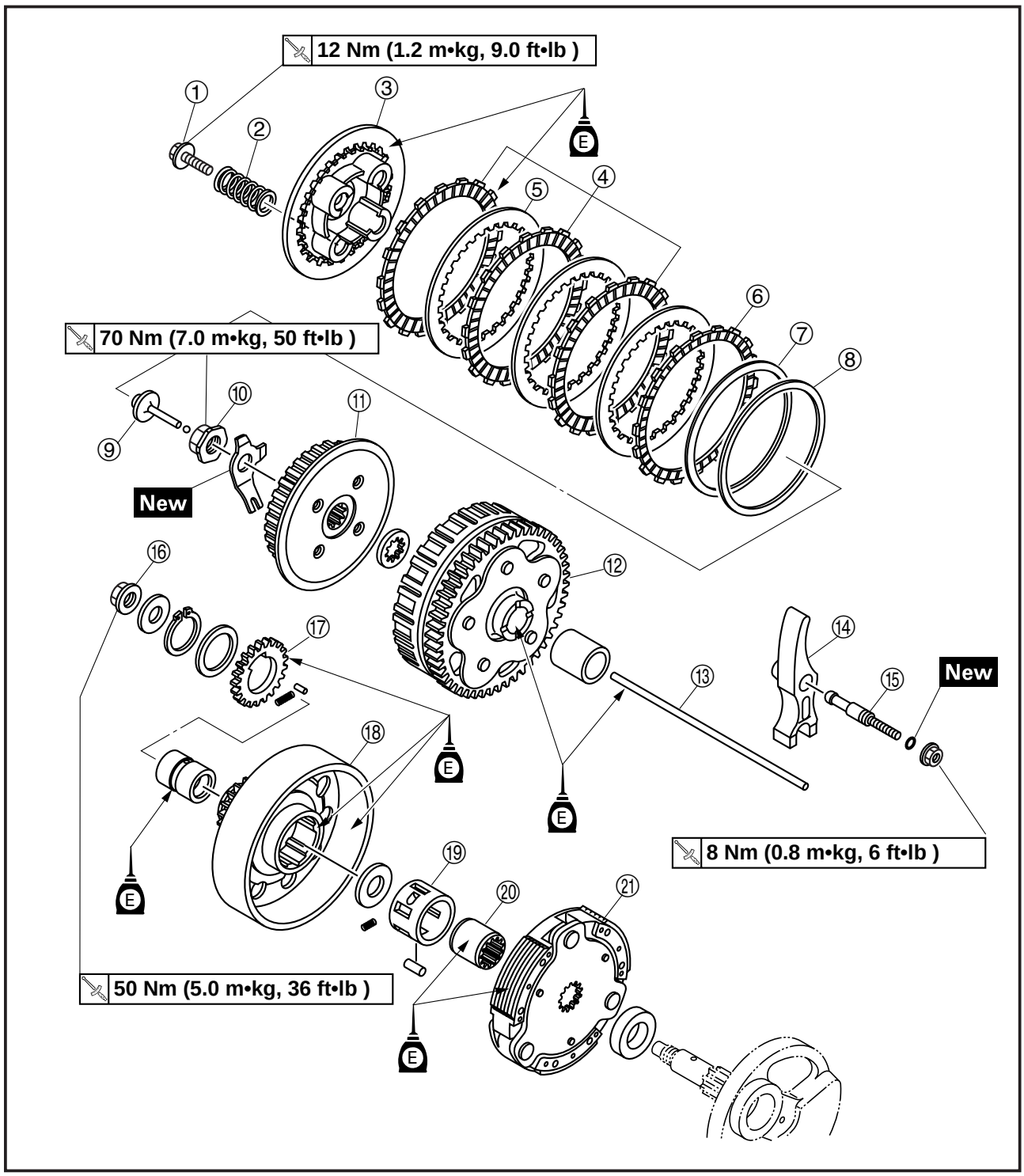
CAUTION:

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

EASF0029

CLUTCH

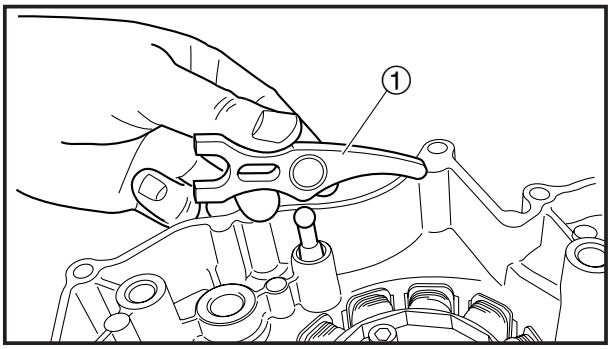
① Clutch pressure plate bolt
② Clutch spring
③ Clutch pressure plate
④ Friction plate #1
⑤ Clutch plate
⑥ Friction plate #2
⑦ Cushion ring
⑧ Seat plate
⑨ Clutch push rod #1
⑩ Clutch boss nut
⑪ Clutch boss
⑫ Clutch housing
⑬ Clutch push rod #2
⑭ Clutch release shift arm
⑮ Clutch release adjusting screw
⑯ Clutch shoe housing nut
⑰ Primary drive gear
⑱ Clutch shoe housing
⑲ Cage
⑳ Clutch shoe housing boss
㉑ Clutch shoe



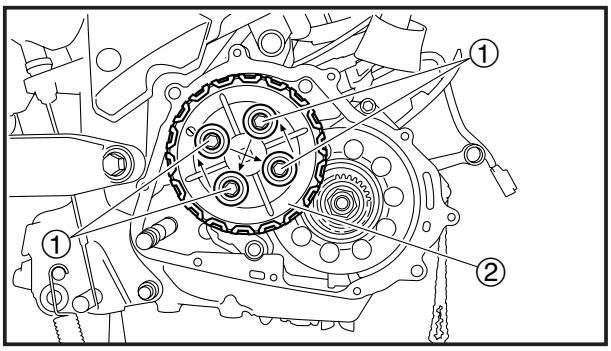
EAS00277

REMOVING THE CLUTCH

1. Drain:
   - engine oil
     (completely from the crankcase)
     Refer to “CHANGING THE ENGINE OIL” in chapter 3.
2. Remove:
   - side cowlings (left and right)
     Refer to “REMOVING THE SIDE COWLINGS” in chapter 3.
   - muffler
   - footrest
   - brake pedal
     Refer to “REMOVING THE ENGINE”.
   - kickstarter lever
     Refer to “KICKSTARTER”.
   - crankcase cover (left)
     Refer to “GENERATOR AND STARTER CLUTCH”.



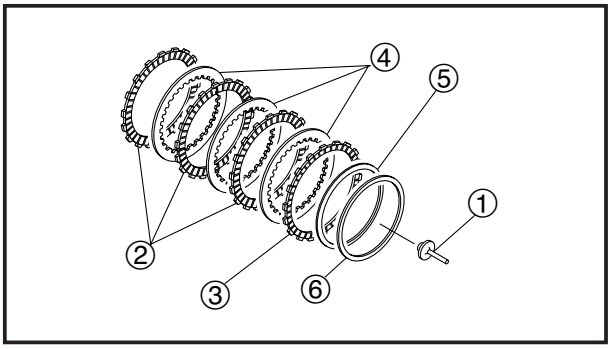
3. Remove:
   - clutch release shift arm ①



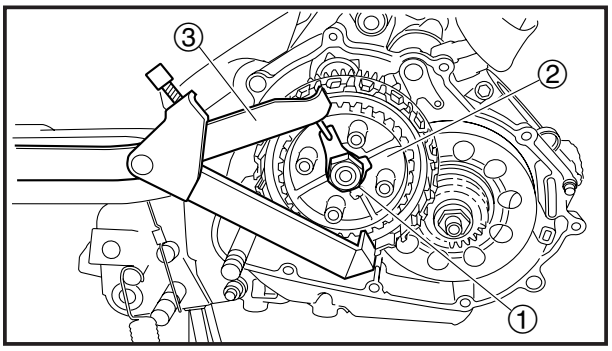
4. Remove:
   - crankcase cover (right)
5. Remove:
   - clutch pressure plate bolts ①
   - clutch springs
   - clutch pressure plate ②

NOTE:

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



6. Remove:
   - clutch push rod #1 ①
   - friction plates #1 ②
   - friction plates #2 ③
   - clutch plate ④
   - cushion ring ⑤
   - seat plate ⑥

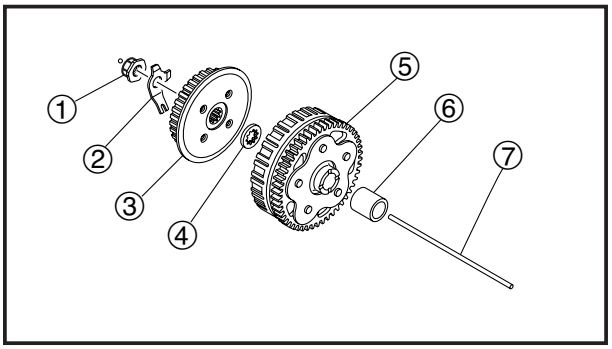


7. Straighten the lock washer tab.
8. Loosen:
   - clutch boss nut ①

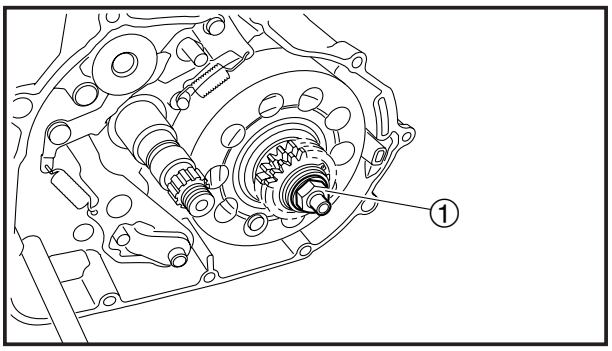
NOTE:

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

	Universal clutch holder **90890-04086**



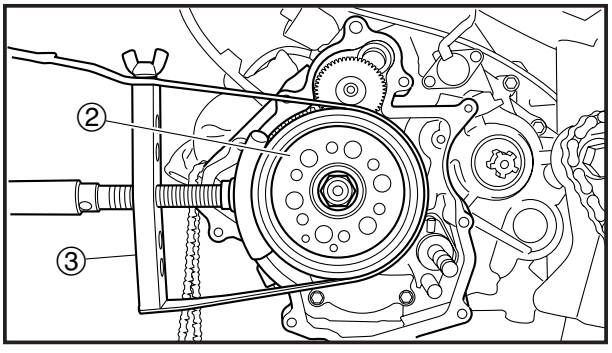
9. Remove:
   - clutch boss nut ①
   - lock washer ②
   - clutch boss ③
   - washer ④
   - clutch housing ⑤
   - spacer ⑥
   - clutch push rod #2 ⑦



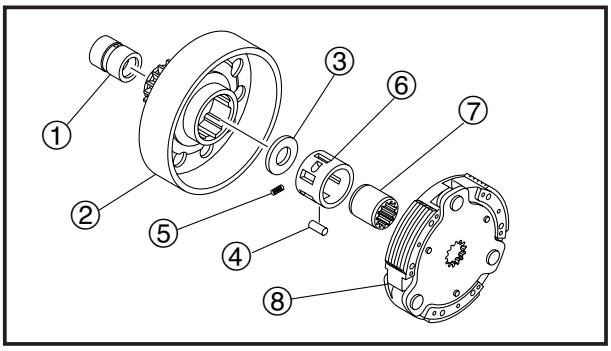
10. Remove:
    - clutch shoe housing nut ①
    - washer

NOTE:

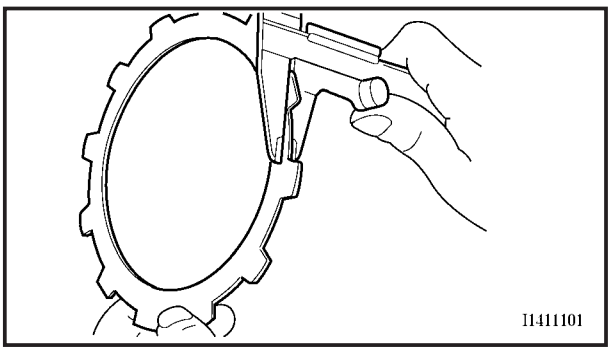
- Loosen the clutch shoe housing nut while holding the generator rotor ② with the sheave holder ③.
- Do not allow the sheave holder to touch the projection on the generator rotor.



	Sheave holder **90890-01701**



11. Remove:
    - collar ①
    - clutch shoe housing ②
    - washer ③
    - rollers ④
    - cage springs ⑤
    - cage ⑥
    - clutch shoe housing boss ⑦
    - clutch shoe ⑧



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
2.5 – 2.7 mm (0.010 – 0.11 in)
<Limit>: 2.4 mm (0.0945 in)

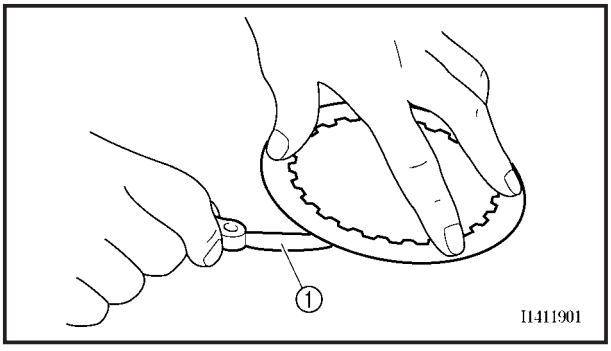
EAS00281

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
    - clutch plate

      Damage → Replace the clutch plates as a set.

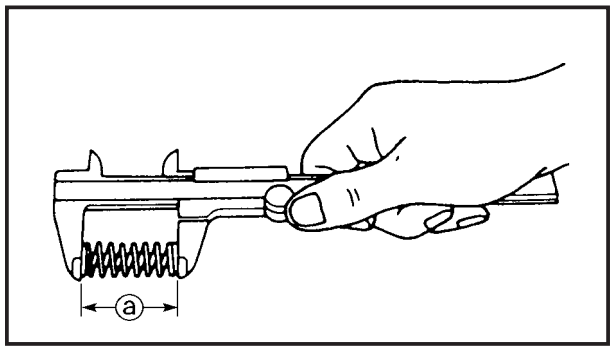


2. Measure:
    - clutch plate warpage

      (with a surface plate and thickness gauge ①)

      Out of specification → Replace the clutch plates as a set.

Clutch plate warpage limit
0.05 mm (0.0020 in)



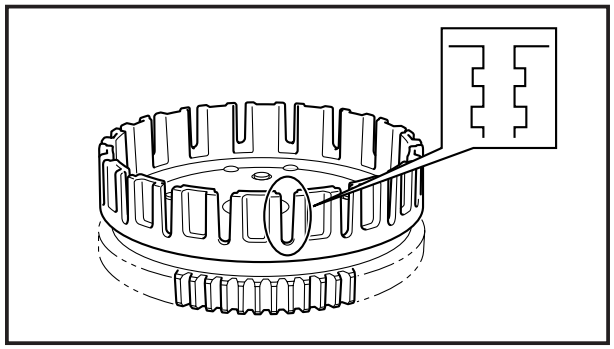
EAS00282

CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:
   - clutch spring
     Damage → Replace the clutch springs as a set.
2. Measure:
   - clutch spring free length ⓐ
     Out of specification → Replace the clutch springs as a set.

Clutch spring free length
40.5 mm (1.59 in)
<Limit>: 38.5 mm (1.52 in)



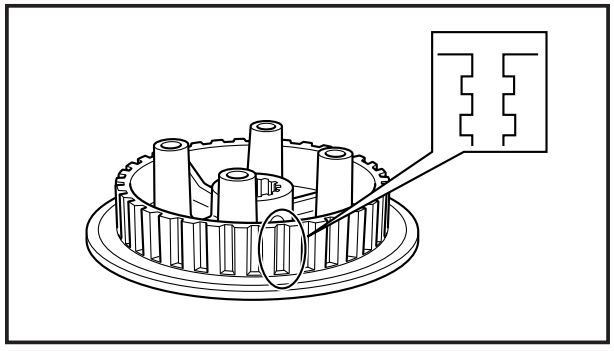
EAS00284

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.



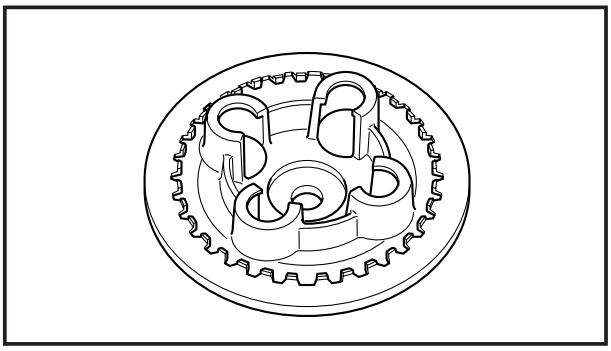
EAS00285

CHECKING THE CLUTCH BOSS

1. Check:
   - clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

NOTE:

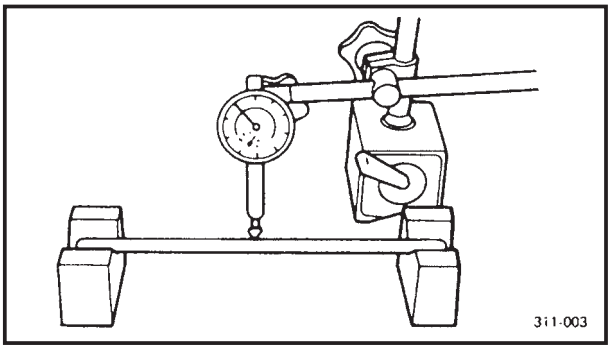
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS00286

CHECKING THE CLUTCH PRESSURE PLATE

1. Check:
   - clutch pressure plate
     Cracks/damage → Replace.

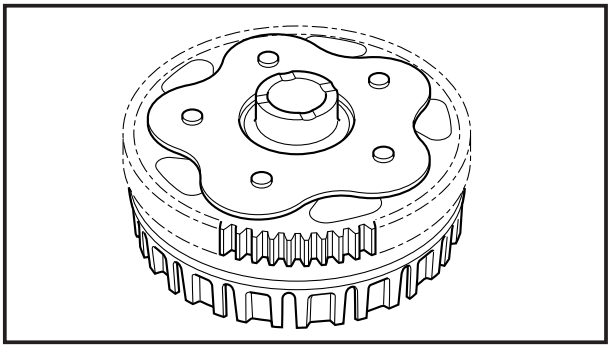


EAS00288

CHECKING THE CLUTCH PUSH RODS

1. Check:
   - clutch push rod #1
     Cracks/damage/wear → Replace the clutch push rod #1.
   - clutch push rod #2
     Cracks/damage/wear → Replace the clutch push rod #2.
2. Measure:
   - clutch push rods bending limit
     Out of specification → Replace the clutch push rod.

Clutch push rods bending limit
0.5 mm (0.0197 in)



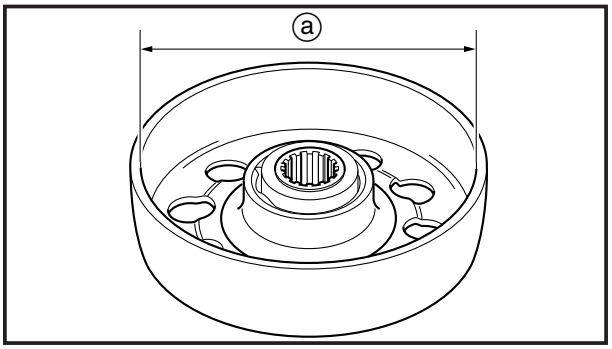
EAS00292

CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
   - primary drive gear
     (on the clutch shoe housing)
   - primary driven gear
     (on the clutch housing)
     Damage/wear → Replace the clutch shoe housing and clutch housing as a set.
     Excessive noise during operation → Replace the clutch shoe housing and clutch housing as a set.

CHECKING THE CLUTCH SHOE HOUSING

1. Check:
   - clutch shoe housing
     Damage/wear → Replace.

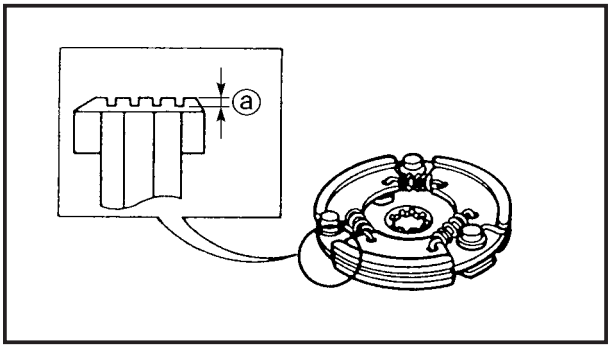


2. Measure:
   - clutch shoe housing inside diameter ⓐ
     Out of specification → Replace.

Clutch shoe housing inside diameter
116 mm (4.57 in)
<Limit>: 117 mm (4.61 in)

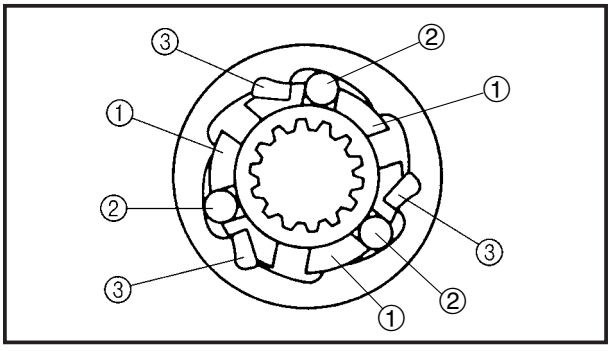
CHECKING THE CLUTCH SHOE

1. Check:
   - clutch shoe
     Scratches → Smooth using coarse sandpaper.
     Damage/wear → Replace.



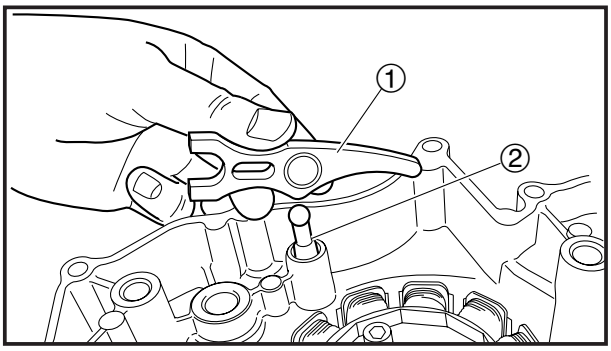
2. Measure:
   - clutch shoe groove depth ⓐ
     Groove is worn away → Replace.

Clutch shoe groove depth
1.0 mm (0.04 in)
<Limit>: 0.1 mm (0.004 in)



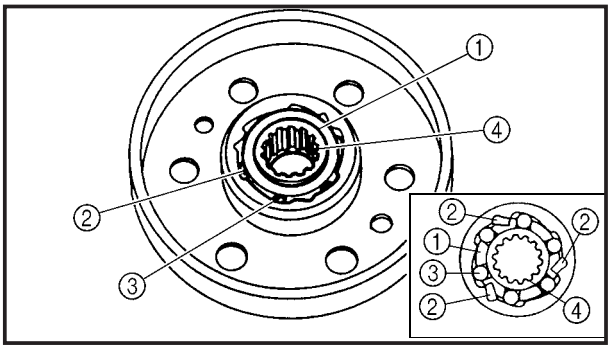
CHECKING THE CAGE

1. Check:
   - cage ①
     Damage/wear/cracks → Replace.
   - rollers ②
     Wear/bend → Replace.
   - cage springs ③
     Wear → Replace.



CHECKING THE CLUTCH RELEASE SHIFT ARM

1. Check:
   - clutch release shift arm ①
     Damage/wear → Replace.
   - clutch release adjusting screw ②
     Damage/wear → Replace.



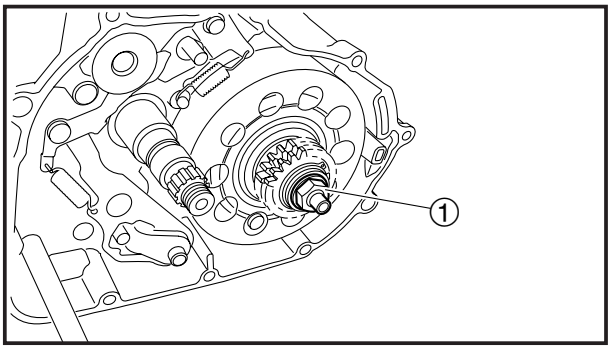
EAS00293

INSTALLING THE CLUTCH

1. Install:
   - washer
   - cage ①
   - cage springs ②
   - rollers ③
   - clutch shoe housing boss ④

NOTE:

After installing the cage ①, cage springs ② and rollers ③, check that the there are right position to turn the lateral direction. And then take care comes off to install them onto the crankshaft.

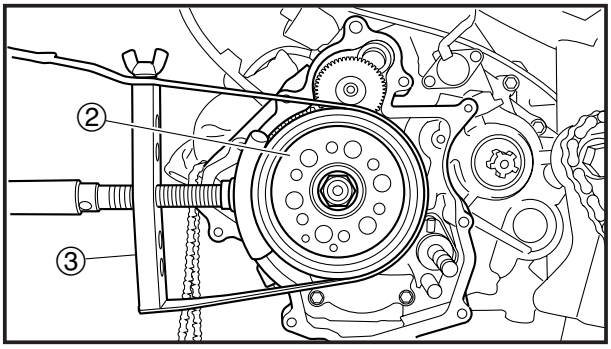


2. Tighten:
   - clutch shoe housing nut ①

50 Nm (5.0 m•kg, 30 ft•lb)

NOTE:

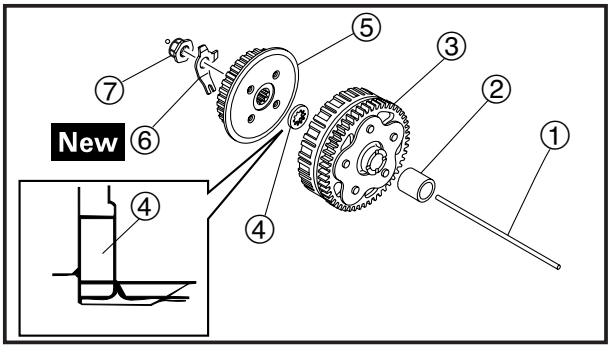
- While holding the generator rotor ② with the sheave holder ③, tighten the clutch shoe housing nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.





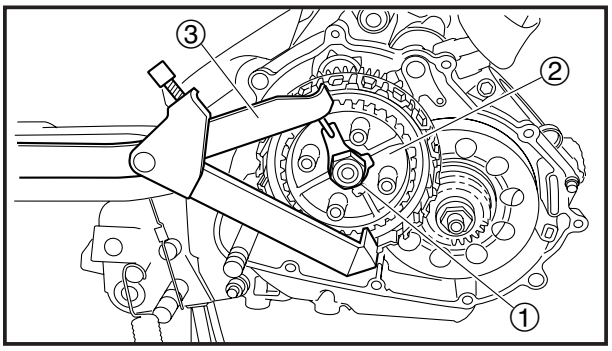
Sheave holder
90890-01701

3. Install:
   - clutch push rod #2 ①
   - spacer ②
   - clutch housing ③
   - washer ④
   - clutch boss ⑤
   - lock washer ⑥ **New**
   - clutch boss nut ⑦



NOTE:

Face the press dropped side toward the clutch housing, and then install the washer ④.



4. Tighten:
   - clutch boss nut ①

70 Nm (7.0 m•kg, 50 ft•lb)

NOTE:

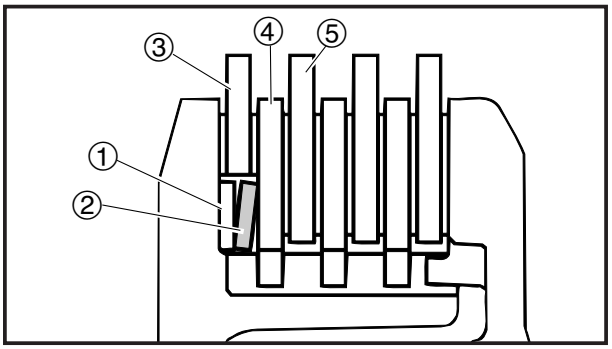
While holding the clutch boss ② with the universal clutch holder ③, tighten the clutch boss nut.

Universal clutch holder
90890-04086

5. Bend the lock washer tab along a flat side of the nut.
6. Lubricate:
   - seat plate
   - cushion ring
   - friction plates #1
   - friction plate #2
   - clutch plates

   (with the recommended lubricant)

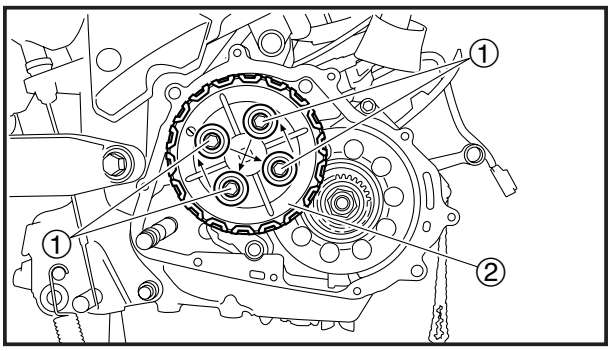
Recommended lubricant
Engine oil



7. Install:
   - seat plate ①
   - cushion ring ②
   - friction plate #2 ③
   - clutch plates ④
   - friction plates #1 ⑤

NOTE:

- Make sure to face the cushion ring ② toward as shown illustration, and then install it onto the clutch boss.
- First, install the seat plate, cushion ring and then alternate between a clutch plate and a friction plate.

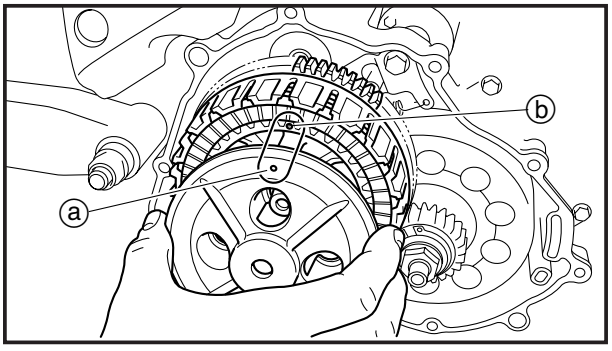


8. Install:
   - clutch springs
   - clutch pressure plate ①
   - clutch pressure plate bolts ②

12 Nm (1.2 m•kg, 9.0 ft•lb)

NOTE:

- Align the punch mark ⓐ on the pressure plate with clutch housing mark ⓑ.
- Tighten the clutch pressure plate bolts in stages and in a crisscross pattern.



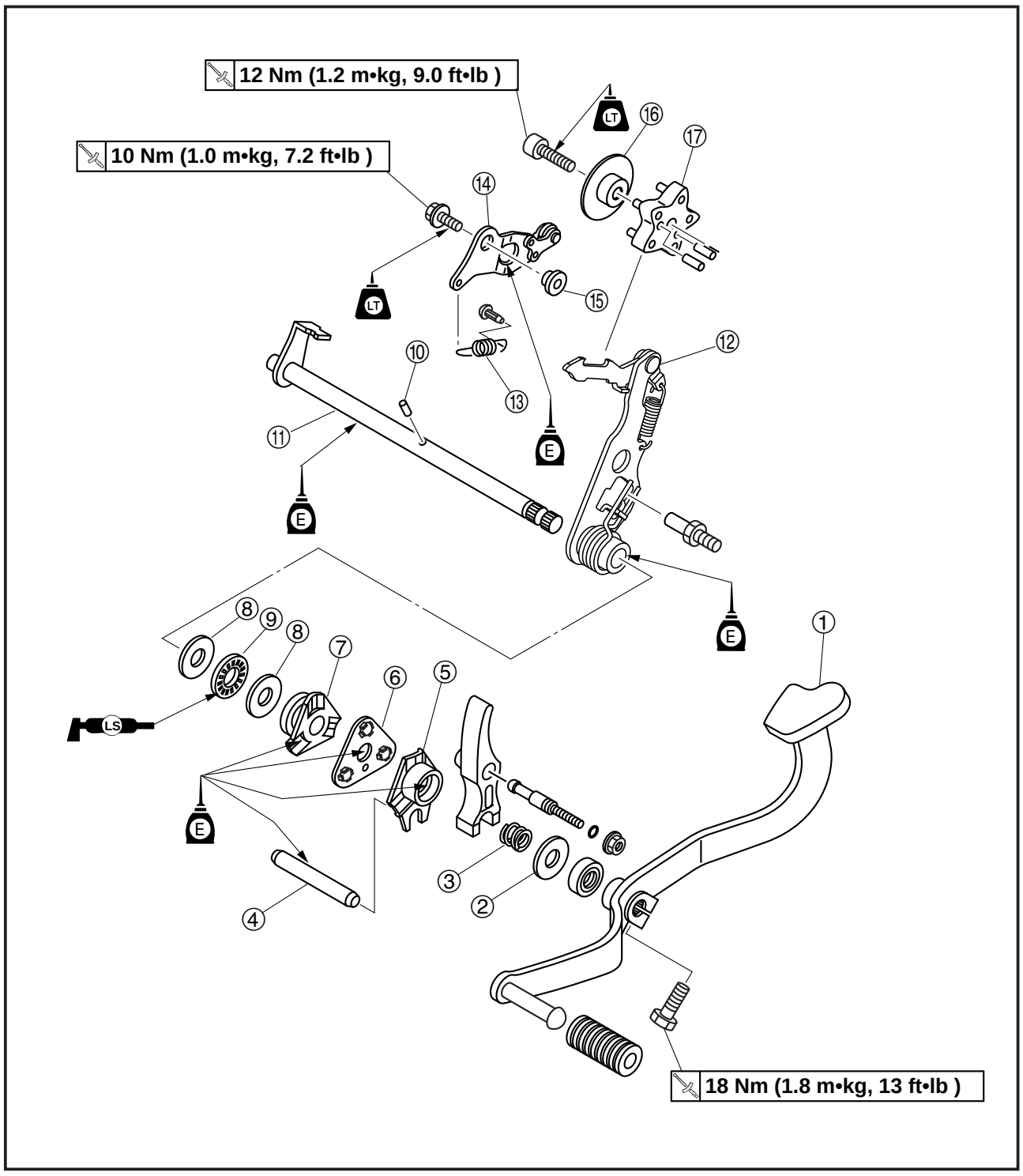
9. Adjust:
   - clutch release system

   Refer to “ADJUSTING THE CLUTCH RELEASE SYSTEM” in chapter 3.

EASF0032

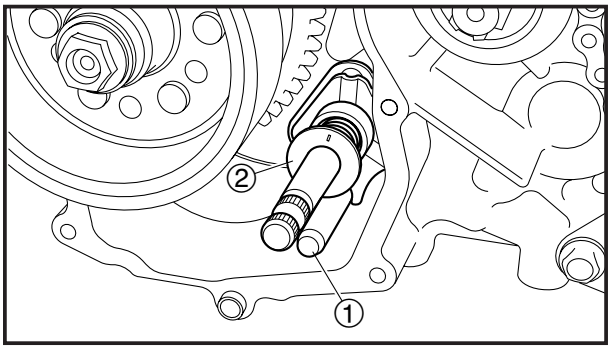
SHIFT SHAFT

① Shift pedal
② Washer
③ Spring
④ Shift fork guide bar
⑤ Shift guide
⑥ Pawl holder
⑦ Guide
⑧ Washer
⑨ Thrust bearing
⑩ Dowel pin
⑪ Shift shaft
⑫ Shift lever assembly
⑬ Stopper lever spring
⑭ Stopper lever assembly
⑮ Collar
⑯ Plate
⑰ Shift drum segment

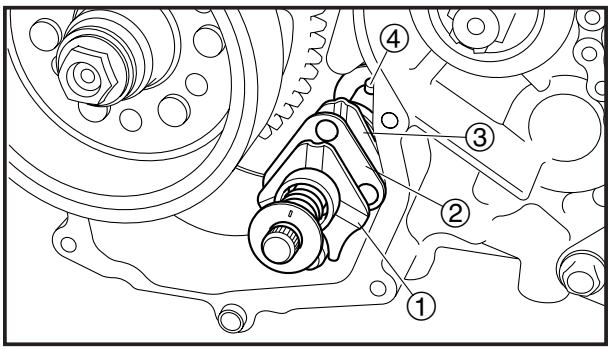


REMOVING THE SHIFT SHAFT

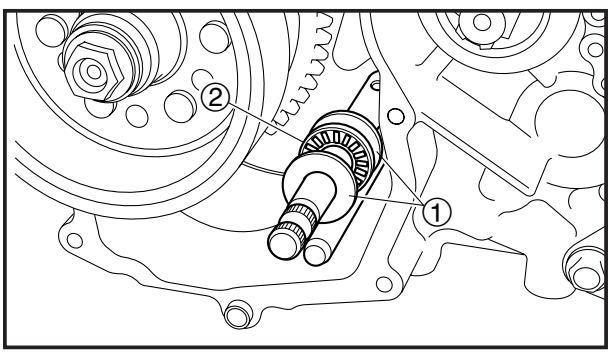
1. Drain:
   - engine oil
     (completely from the crankcase)
     Refer to “CHANGING THE ENGINE OIL” in chapter 3.
2. Remove:
   - clutch
     Refer to “CLUTCH”.
3. Remove:
   - shift pedal
   - crankcase cover bolts
   - crankcase cover (left)



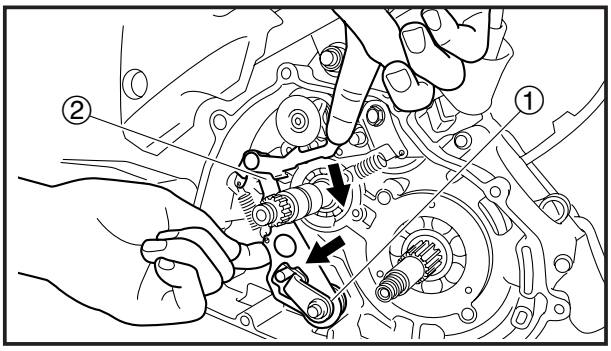
4. Remove:
   - shift fork guide bar ①
   - washer ②
   - shift guide spring



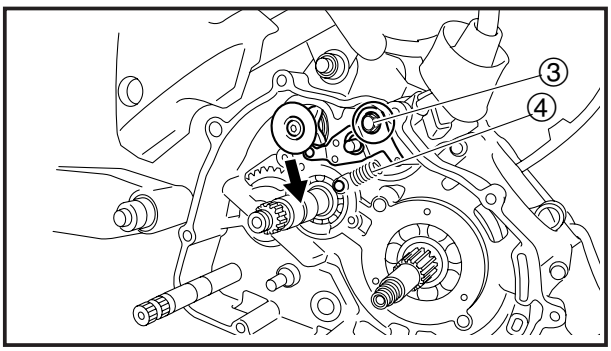
5. Remove:
   - shift guide ①
   - pawl holder ②
   - guide ③
   - dowel pin ④



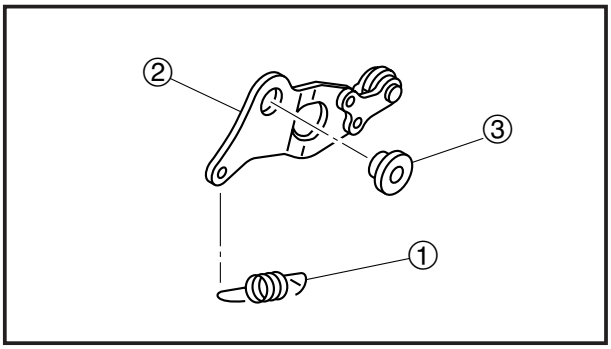
6. Remove:
   - washers ①
   - thrust bearing ②



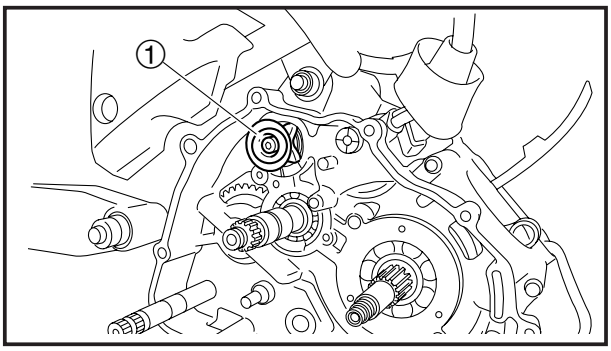
7. Remove:
   - shift shaft assembly ①
   - shift lever assembly ②



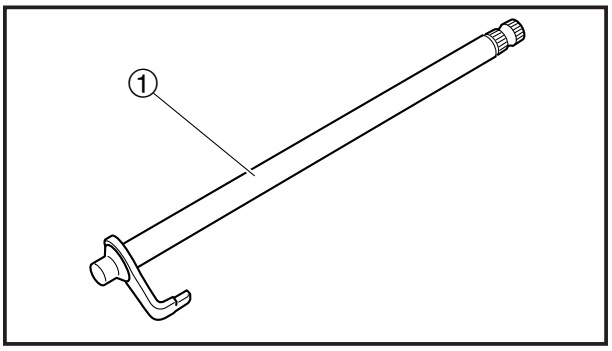
8. Remove:
   - stopper lever assembly ③
   - stopper lever spring ④
   - collar



9. Remove:
   - stopper lever spring ①
   - stopper lever ②
   - collar ③



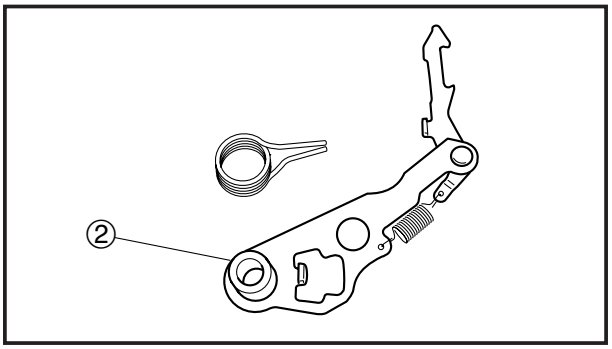
10. Remove:
    - plate
    - shift drum segment ①

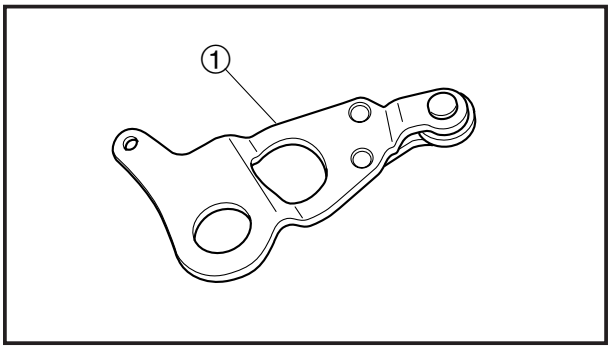


EAS00328

CHECKING THE SHIFT SHAFT

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

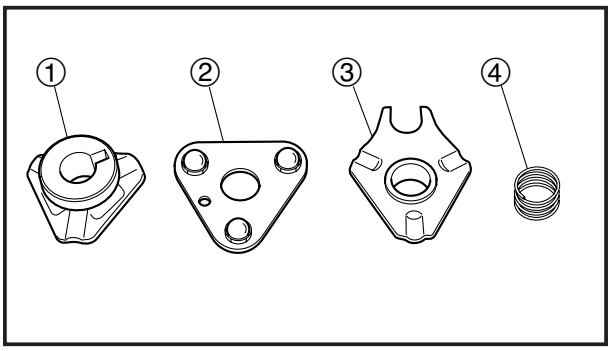




EAS00330

CHECKING THE STOPPER LEVER

1. Check:
   - stopper lever ①
     Bends/damage → Replace.
     Roller turns roughly → Replace.
   - stopper lever spring
     Damage/wear → Replace.

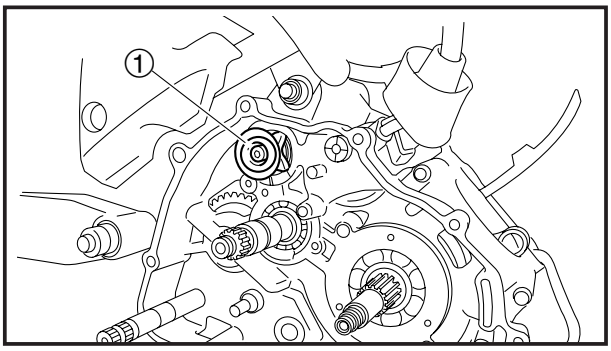


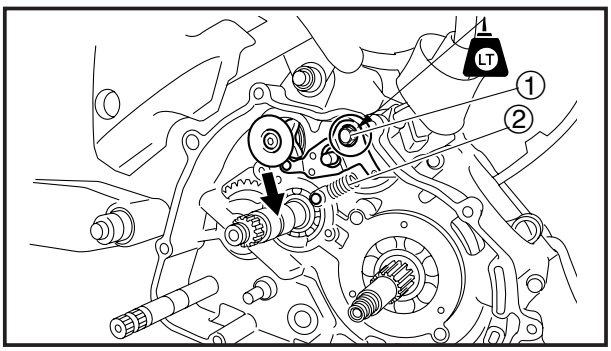
CHECKING THE SHIFT GUIDE

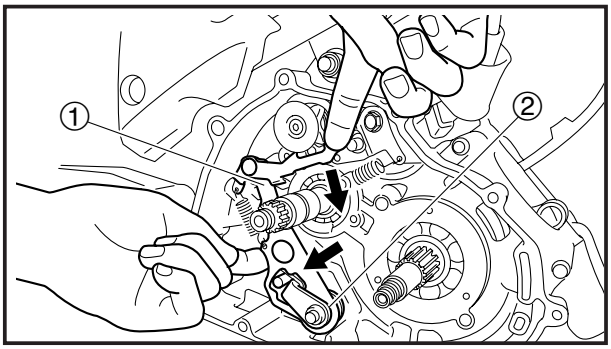
1. Check:
   - shift guide ①
   - pawl holder ②
   - guide ③
     Bends/damage → Replace.
   - shift guide spring ④
     Damage/wear → Replace.

CHECKING THE OIL SEAL

1. Check:
   - oil seal
     Damage/wear → Replace.







EAS00331

INSTALLING THE SHIFT SHAFT

1. Install:
   - shift drum segment ①
   - plate

12 Nm (1.2 m•kg, 9.0 ft•lb)

NOTE:

Apply locking agent (LOCTITE®) to the threads of shift drum segment screw.

2. Install:
   - collar
   - stopper lever ① LT
   - stopper lever spring ②

NOTE:

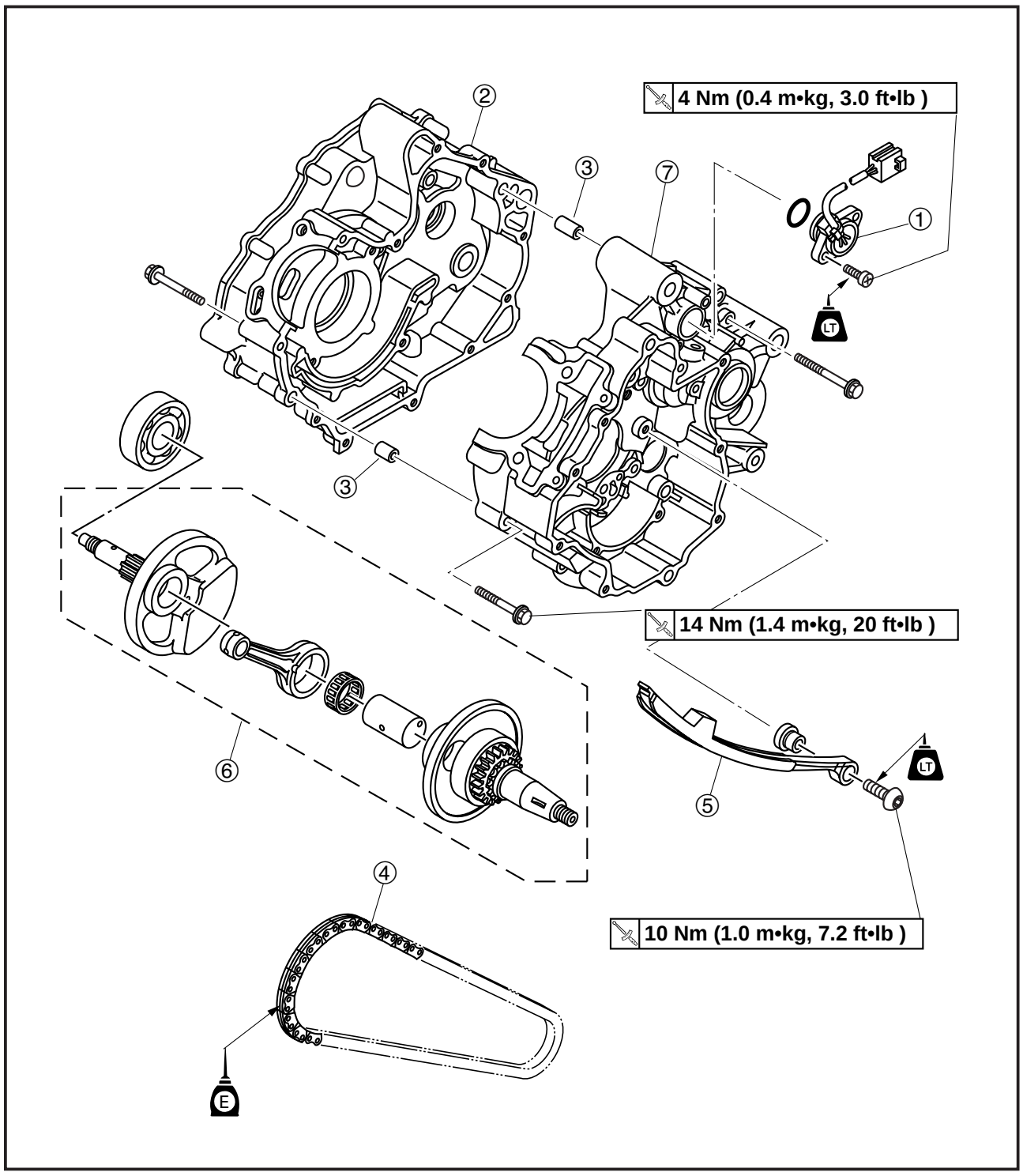
- Apply locking agent (LOCTITE®) to the stopper lever bolt.
- Hook the ends ③ of the stopper lever spring onto the stopper lever and the crankcase boss.
- Mesh the stopper lever with the shift drum segment assembly.

3. Install:
   - shift lever assembly ①
   - shift shaft assembly ②

EASF0037

CRANKCASE AND CRANKSHAFT

① Neutral switch
② Right crankcase
③ Dowel pin
④ Timing chain
⑤ Timing chain guide (intake side)
⑥ Crankshaft assembly
⑦ Left crankcase



EAS00385

DISASSEMBLING THE CRANKCASE

1. Remove:
   - engine

   Refer to “REMOVING THE ENGINE”.

2. Remove:
   - starter motor lead (T135SE)
   - starter motor (T135SE)

   Refer to “STARTER MOTOR (T135SE)” in chapter 8.
3. Remove:
   - cylinder head

   Refer to “CYLINDER HEAD”.
   - cylinder
   - piston

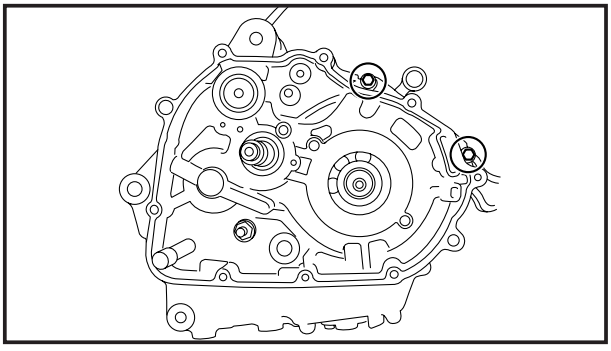
   Refer to “CYLINDER AND PISTON”.
   - clutch

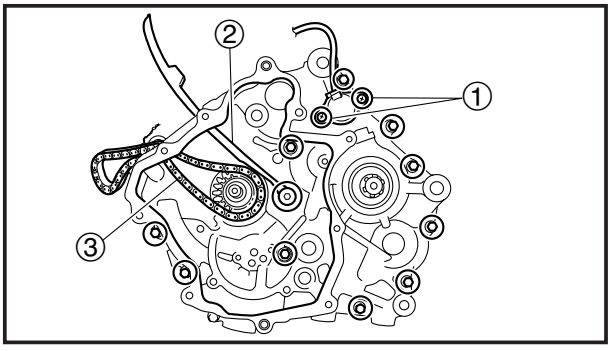
   Refer to “CLUTCH”.
   - shift shaft

   Refer to “SHIFT SHAFT”.
   - generator
   - starter clutch

   Refer to “GENERATOR AND STARTER CLUTCH”.
   - oil pump assembly

   Refer to “OIL PUMP”.
4. Remove:
   - neutral switch ①
   - timing chain guide (intake side) bolts
   - timing chain guide (intake side) ②
   - timing chain ③





5. Remove:
   - crankcase bolts

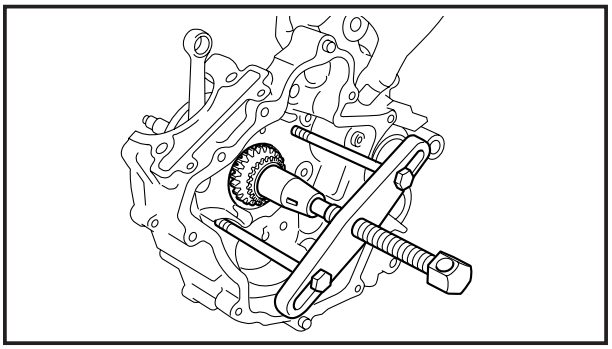
NOTE:

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.

6. Remove:
   - right crankcase
   - dowel pins

CAUTION:

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



7. Remove:
   - crankshaft assembly

NOTE:

Use the crankcase separating tool.

	Crankcase separating tool: 90890-01135

⚠WARNING

Never use the hammer to tapping and removing the crankshaft directory.

EAS00394

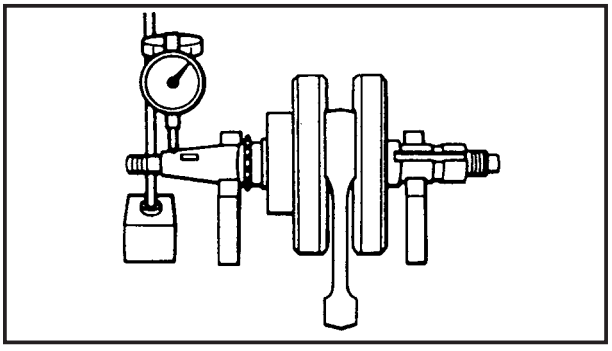
CHECKING THE CRANKSHAFT AND CONNECTING ROD

1. Measure:
   - crankshaft runout

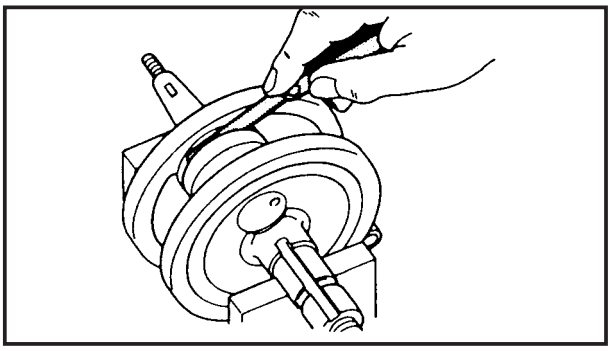
   Out of specification → Replace the crankshaft, bearing or both.

NOTE:

Turn the crankshaft slowly.

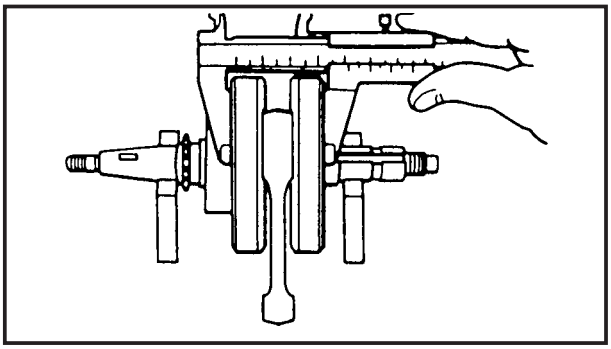


	Maximum crankshaft runout 0.03 mm (0.0012 in)



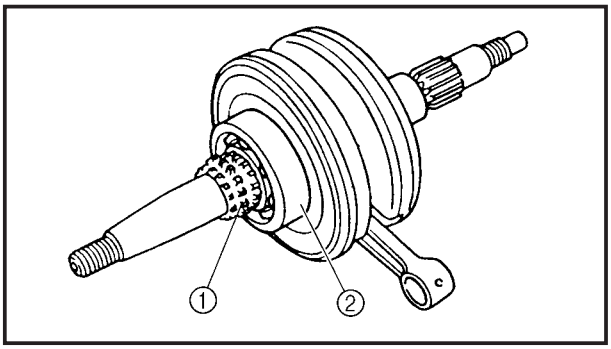
2. Measure:
   • big end side clearance
   Out of specification → Replace the crankshaft.

Big end side clearance
0.11 – 0.41 mm
(0.0043 – 0.0161 in)



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

Crankshaft width
45.95 – 46.00 mm
(1.809 – 1.811 in)



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

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

EAS00399

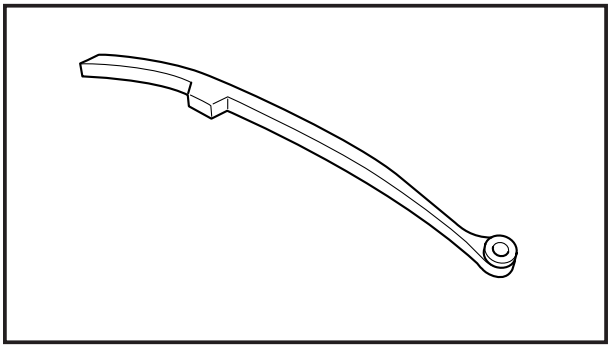
CHECKING THE CRANKCASE

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
     Obstructions → Blow out with compressed air.

EAS00401

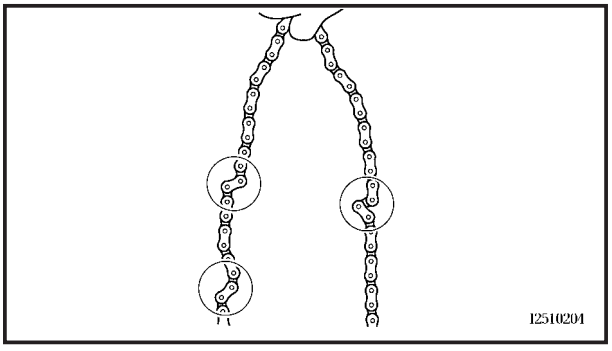
CHECKING THE BEARINGS

1. Check:
   - bearings
     Clean and lubricate the bearings, then rotate the inner race with your finger.
     Rough movement → Replace.



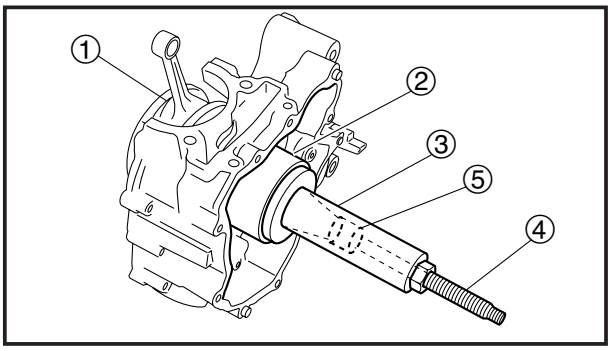
CHECKING THE TIMING CHAIN GUIDE

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



CHECKING THE TIMING CHAIN

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



EAS00408

INSTALLING THE CRANKSHAFT

1. Install:
   - crankshaft assembly ①

NOTE:

Use the crankshaft installing tool (spacer ②, installer pot ③, installer bolt ④, adaptor ⑤) to install the crankcase (left).

CAUTION:

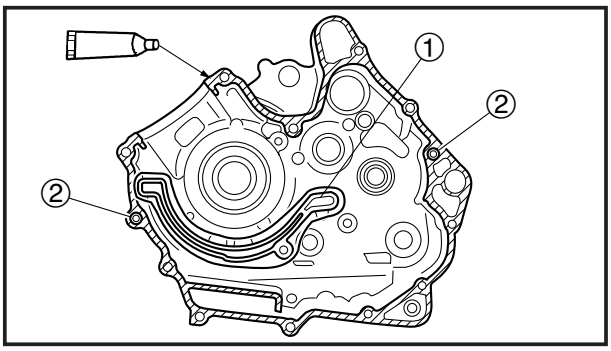
To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease and each bearing with engine oil.

⚠WARNING

- **Hold the connecting rod at top dead center with one hand while turning the nut of the installing tool with the other.**
- **Operate the installing tool until the crankshaft bottoms against the bearing .**



Crank pot spacer ② :
90890-04081
Crank shaft installer pot ③ :
90890-01274
Crank shaft installer bolt ④ :
90890-01275
Adaptor ⑤:
90890-01278



EAS00416

ASSEMBLING THE CRANKCASE

1. Apply:
   - sealant
     (onto the crankcase mating surfaces)



Yamaha bond No. 1215
90890-85505

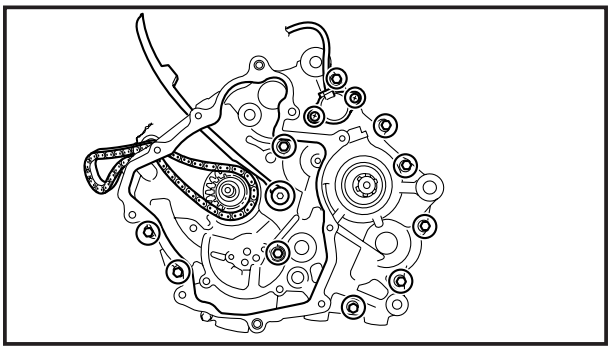
NOTE:

Do not allow any sealant to come into contact with the oil gallery ①.

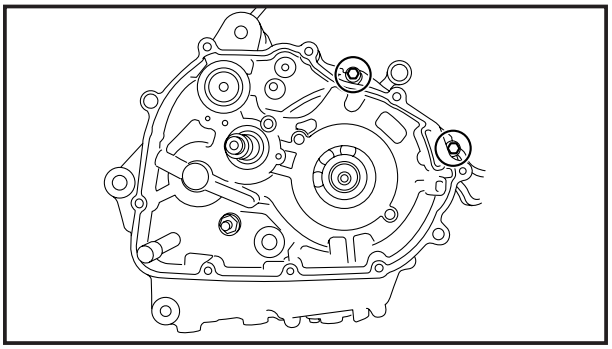
2. Install:
   - dowel pins ②
3. Install:
   - right crankcase
     (onto the left crankcase)

NOTE:

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



4. Install:
   - neutral switch — **4 Nm (0.4 m•kg, 3.0 ft•lb)**
   - crankcase bolts — **10 Nm (1.0 m•kg, 7.2 ft•lb)**



5. Apply:
   - engine oil
     (onto the crankshaft bearings and oil delivery holes)
6. Check:
   - crankshaft and transmission operation
     Rough movement → Repair.
7. Install:
   - timing chain
   - timing chain guide (intake side)
   - timing chain guide (intake side) bolts — **10 Nm (1.0 m•kg, 7.2 ft•lb)**

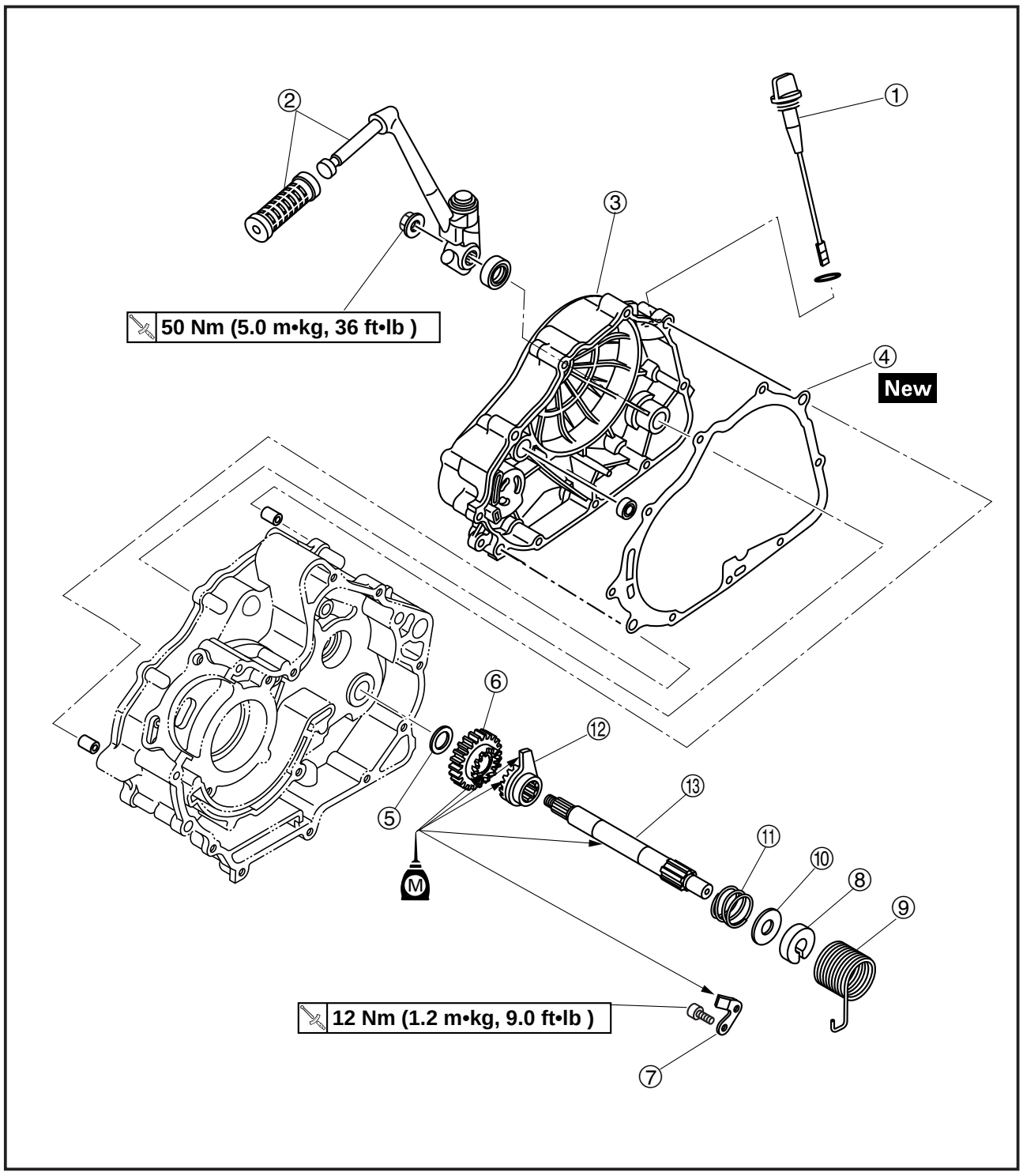
NOTE:

Apply locking agent (LOCTITE®) to the threads of timing chain guide (intake side) bolts.

EASF0033

KICKSTARTER

① Oil level plug
② Kickstarter lever
③ Crankcase cover (right)
④ Gasket
⑤ Washer
⑥ Kickstarter gear
⑦ Guide stopper
⑧ Collar
⑨ Kickstarter spring
⑩ Washer
⑪ Spring
⑫ Kickstarter ratchet gear
⑬ Kickstarter shaft

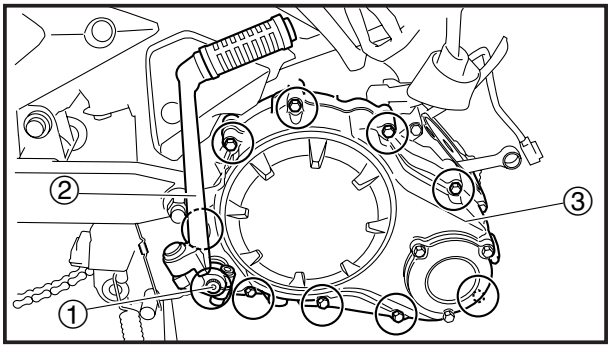


REMOVING THE KICKSTARTER

1. Drain:
   - engine oil
     (completely from the crankcase)
     Refer to “CHANGING THE ENGINE OIL” in chapter 3.
   - coolant
     (completely from the water jacket)
     Refer to “CHANGING THE COOLANT” in chapter 3.

2. Remove:
   - side cowlings (left and right)
   - front cowling
   - center panels (upper and lower)
   - rear cowlings (left and right)
     Refer to “COVERS” in chapter 3.
   - carburetor assembly
     Refer to “CARBURETOR” in chapter 6.
   - muffler
   - footrest
   - Brake pedal
     Refer to “REMOVING THE ENGINE”.

3. Remove:
   - cylinder head
     Refer to “CYLINDER HEAD”.
   - cylinder
   - piston
     Refer to “CYLINDER AND PISTON”.
4. Remove:
   - kickstarter nut ①
   - kickstarter lever ②



5. Remove:
   - oil level plug
   - crankcase cover bolts
   - crankcase cover (right) ③
   - gasket
   - dowel pins

NOTE:
Be sure to remove the oil level plug first when remove the crankcase (right).

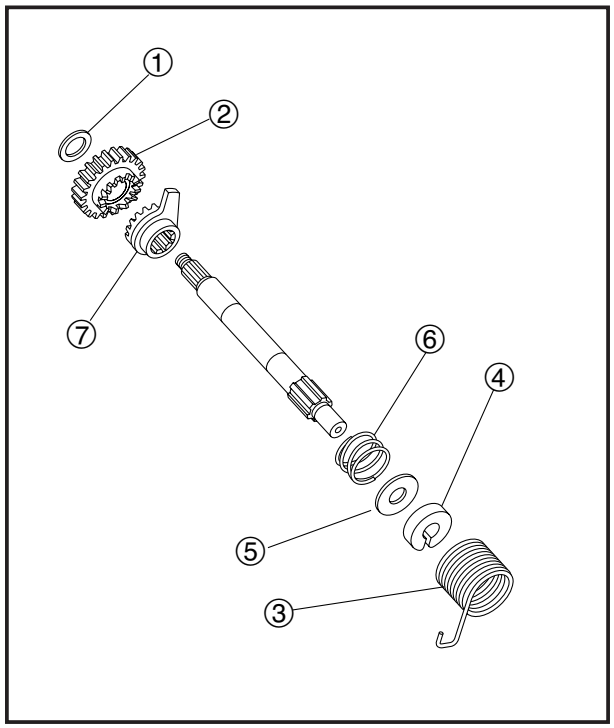
6. Remove:
   - clutch
     Refer to “CLUTCH”.
   - shift shaft
     Refer to “SHIFT SHAFT”.
   - oil pump assembly
     Refer to “SOIL PUMP”.
   - generator
   - starter clutch
     Refer to “GENERATOR AND STARTER CLUTCH.

7. Remove:
   - starter motor (T135SE)
     Refer to “STARTER MOTOR” in chapter 8.

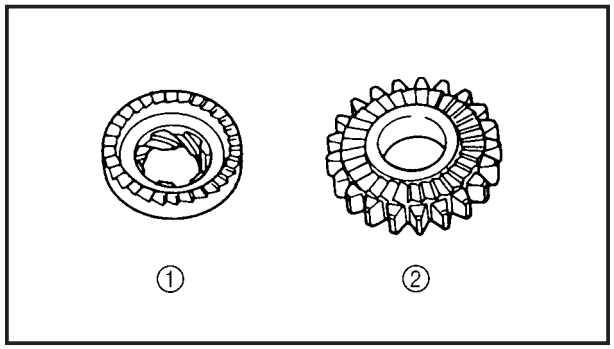
8. Remove:
   - engine
     Refer to “REMOVING THE ENGINE”.

9. Separate:
   - crankcase
     Refer to “CRANKCASE”.

10. Remove:
    - guide stopper
    - kickstarter shaft assembly



11. Remove:
    - washer ①
    - kickstarter gear ②
    - kickstarter spring ③
    - collar ④
    - washer ⑤
    - spring ⑥
    - kickstarter ratchet gear ⑦
    - kickstarter shaft

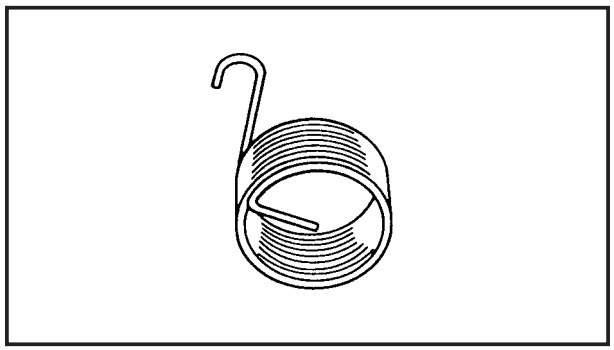


EAS00339

CHECKING THE KICKSTARTER

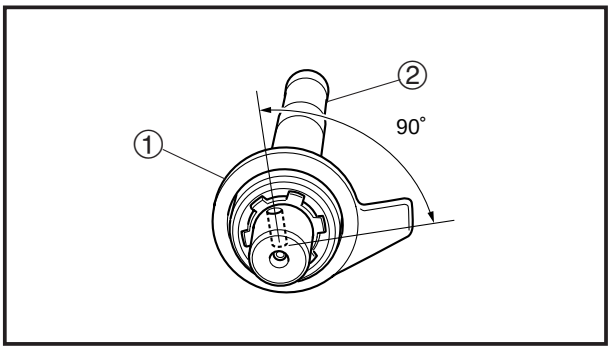
1. Check:
    - kickstarter ratchet gear ①
    - kickstarter gear ②

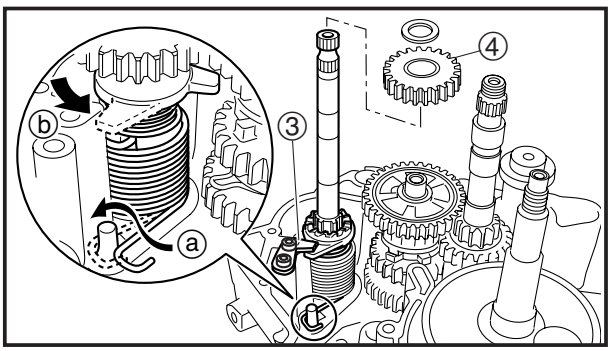
    Damage/wear → Replace.



2. Check:
    - kickstarter spring

    Damage/wear → Replace.





INSTALLING THE KICKSTARTER

1. Install:
   - kickstarter ratchet gear ①
     (on to the kickstarter shaft)
   - kickstarter shaft ②
   - kickstarter spring

NOTE:

- Offset the kickstarter ratchet gear as shown, and then align the spline to install the kickstarter ratchet gear.
- Hook the kickstarter spring end onto the pin ⓐ in the crankcase, and then turn the kickstarter shaft counter-clockwise to 3/4 turns ⓑ.

2. Install:
   - guide stopper ③
   - guide stopper bolts

     12 Nm (1.2 m•kg, 9.0 ft•lb)
   - kickstarter gear ④
3. Install:
   - crankcase
     Refer to “CRANKCASE”.
4. Install:
   - engine
     Refer to “REMOVING THE ENGINE”.
5. Install:
   - starter motor (T135SE)
     Refer to “STARTER MOTOR (T135SE)” in chapter 8.
6. Install:
   - oil pump assembly
     Refer to “OIL PUMP”.
   - generator
     Refer to “GENERATOR AND STARTER CLUTCH”.
   - shift shaft
     Refer to “SHIFT SHAFT”.
   - clutch
     Refer to “CLUTCH”.
7. Install:
   - gasket
   - dowel pins
   - crankcase cover bolts
   - crankcase cover (right)
   - oil level plug
8. Install:
   - kickstarter lever
   - kickstarter lever nut

9. Install:
   - piston
   - cylinder
     Refer to “CYLINDER AND PISTON”.
   - cylinder head
     Refer to “CYLINDER HEAD”.
   - radiator assembly
     Refer to “RADIATOR” in chapter 5.
   - cylinder head
     Refer to “CYLINDER HEAD”.

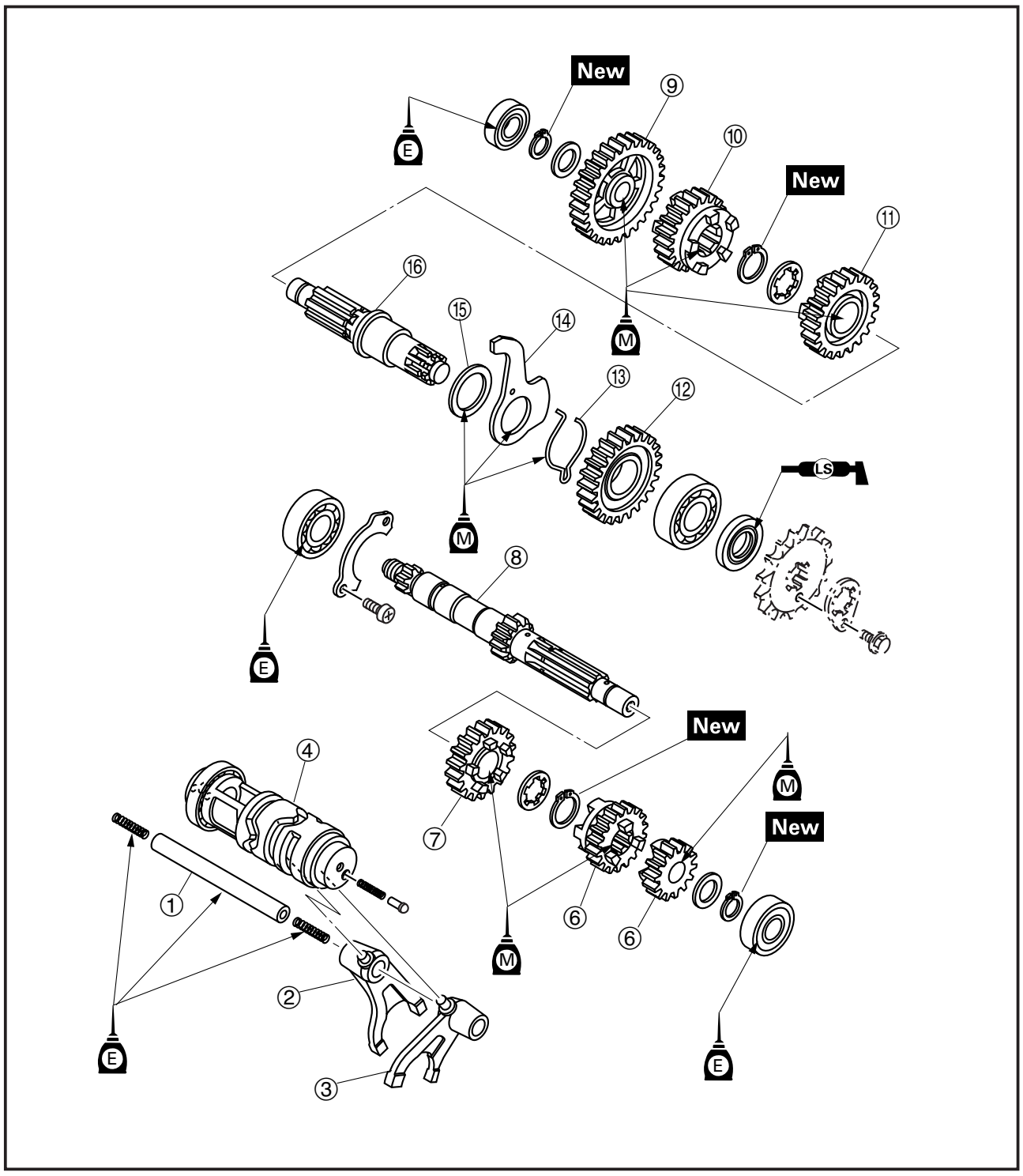
10. Install:
    - muffler
    - footrest
    - brake pedal
      Refer to “REMOVING THE ENGINE”.
    - inner panel
    - center panels (left and right)
    - front cowling
    - side cowlings (left and right)
      Refer to “COVERS” in chapter 3.

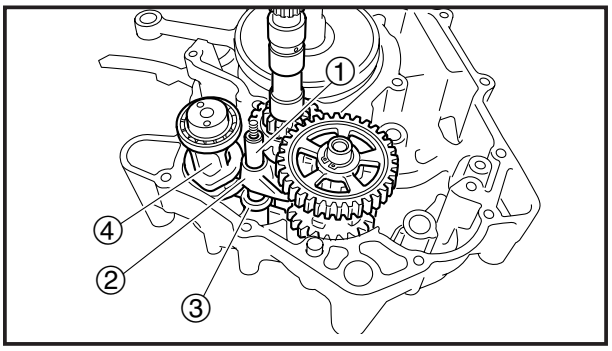
11. Fill:
    - coolant
      (completely from the water jacket)
      Refer to “CHANGING THE COOLANT” in chapter 3.
    - engine oil
      (completely from the crankcase)
      Refer to “CHANGING THE ENGINE OIL” in chapter 3.

EASF0041

TRANSMISSION

① Shift fork guide bar
② Shift fork “R”
③ Shift fork “L”
④ Shift drum
⑤ 2nd pinion gear
⑥ 3rd pinion gear
⑦ 4th pinion gear
⑧ Main axle/1st pinion gear
⑨ 1st wheel gear
⑩ 4th wheel gear
⑪ 3rd wheel gear
⑫ 2nd wheel gear
⑬ Side plate spring
⑭ Side plate
⑮ Washer
⑯ Drive axle





EASF0042

REMOVING THE TRANSMISSION

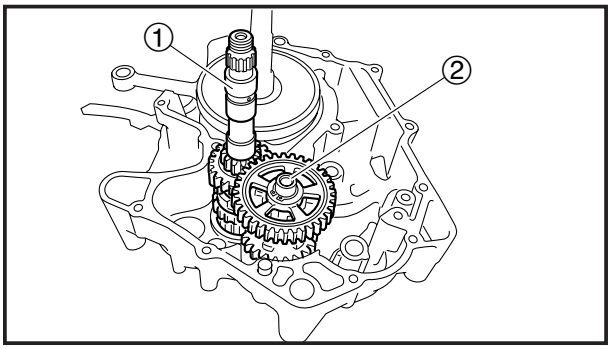
NOTE:

Prior to removing the transmission, separate the crankcase.

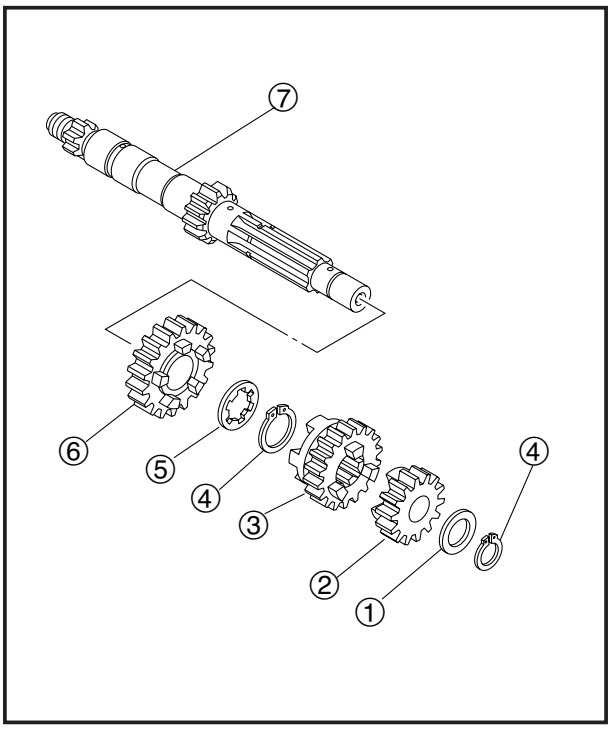
1. Remove:
   - shift fork guide bar ①
   - shift fork guide bar springs
   - shift fork “R” ②
   - shift fork “L” ③
   - shift drum ④

NOTE:

Note the position of each part. Pay particular attention to location and direction of shift forks.

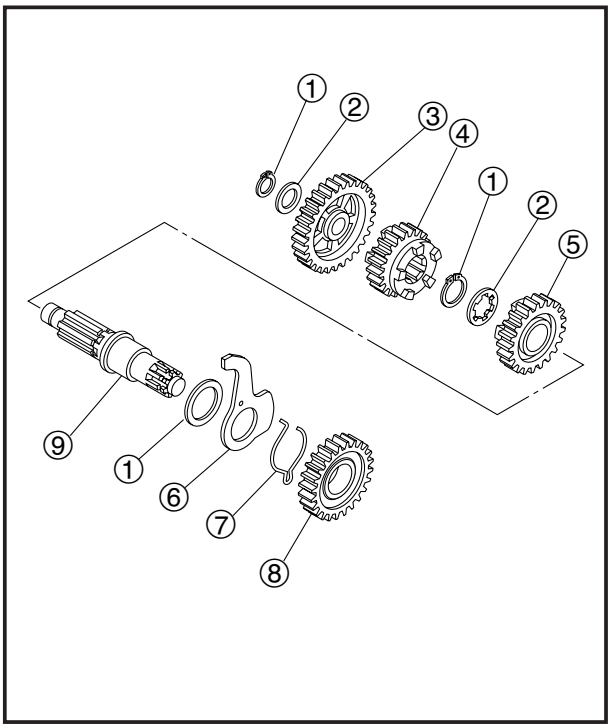


2. Remove:
   - main axle assembly ①
   - drive axle assembly ②

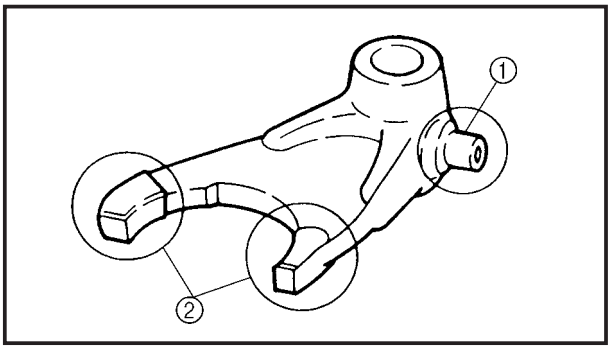


DISASSEMBLING THE TRANSMISSION

1. Remove:
   - washer ①
   - 2nd pinion gear ②
   - 3rd pinion gear ③
   - circlip ④
   - washer ⑤
   - 4th pinion gear ⑥
   - main axle/1st pinion gear ⑦



2. Remove:
   - circlips ①
   - washers ②
   - 1st wheel gear ③
   - 4th wheel gear ④
   - 3rd wheel gear ⑤
   - side plate ⑥
   - side plate spring ⑦
   - 2nd wheel gear ⑧
   - drive axle ⑨



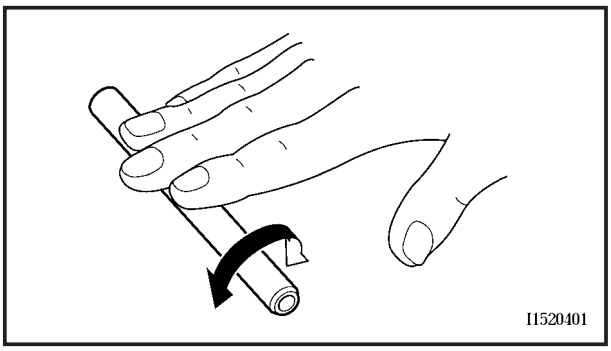
EAS00421

CHECKING THE SHIFT FORKS

The following procedure applies to both of the shift forks.

1. Check:
   - shift fork cam follower ①
   - shift fork pawl ②

   Bends/damage/scoring/wear → Replace the shift fork.



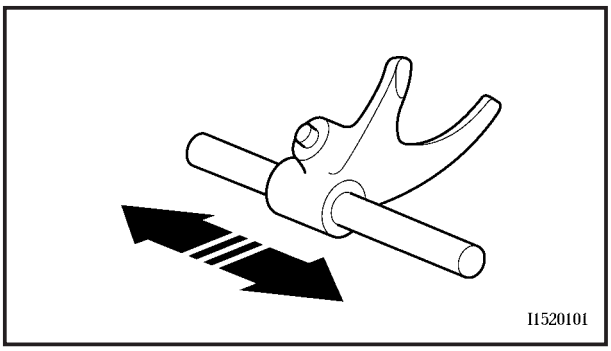
2. Check:
   - shift fork guide bar

   Roll the shift fork guide bar on a flat surface.

   Bends → Replace.

⚠WARNING

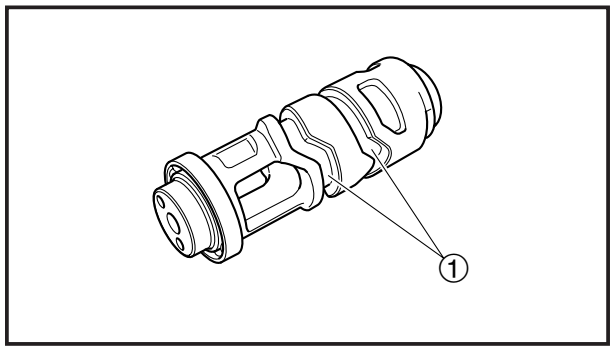
Do not attempt to straighten a bent shift fork guide bar.



3. Check:
   - shift fork movement

   (along the shift fork guide bar)

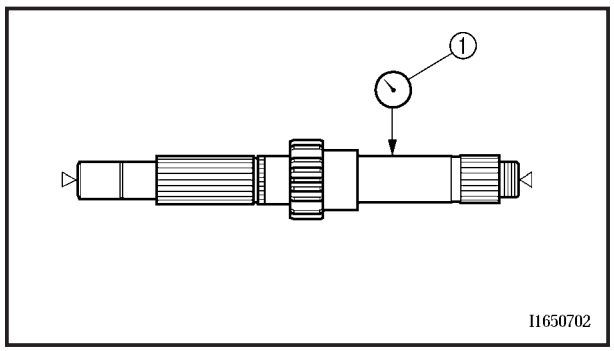
   Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS00422

CHECKING THE SHIFT DRUM ASSEMBLY

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

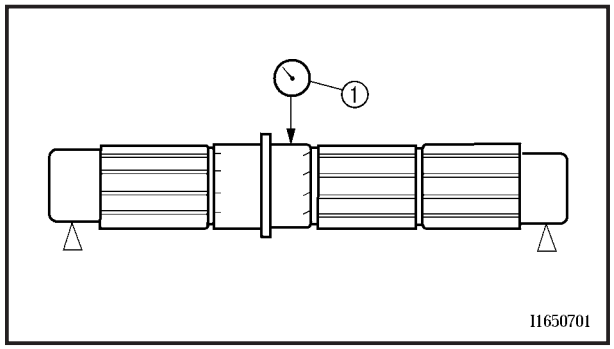


EAS00424

CHECKING THE TRANSMISSION

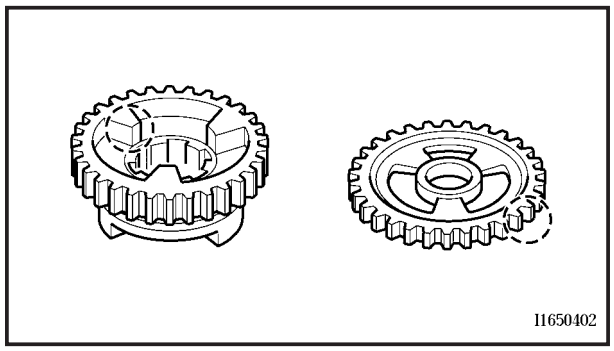
1. Measure:
   - main axle runout
     (with a centring device and dial gauge ①)
     Out of specification → Replace the main axle.

Main axle runout limit
0.03 mm (0.0012 in)

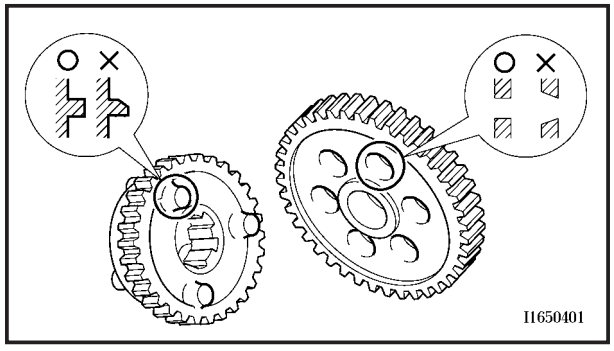


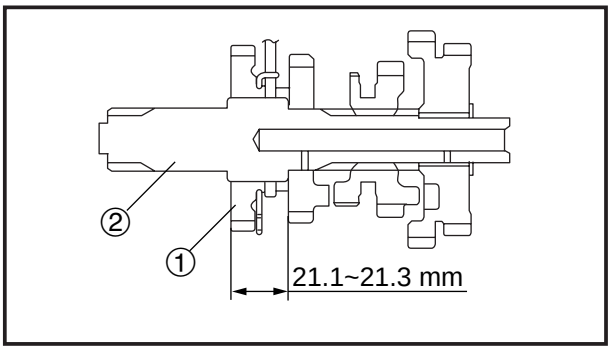
2. Measure:
   - drive axle runout
     (with a centring device and dial gauge ①)
     Out of specification → Replace the drive axle.

Drive axle runout limit
0.03 mm (0.0012 in)



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



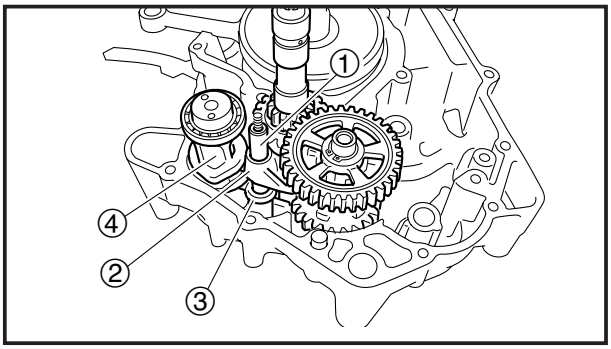


4. Check:
   - transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.

NOTE:

When reassembling the drive axle, press the 2nd wheel gear ① onto the drive axle ② as shown.

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



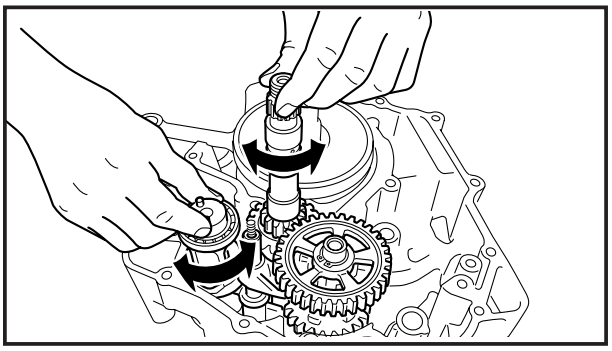
EAS00426

INSTALLING THE TRANSMISSION

1. Install:
   - shift fork guide bar ①
   - shift fork “R” ②
   - shift fork “L” ③
   - shift drum ④

NOTE:

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence : “R”, “L”.
- Be sure install the side plate into the slot on the shift drum.



2. Check:
   - transmission
   - shift drum
   - shift forks

   Rough movement → Repair.

NOTE:

- Oil each gear, shaft, and bearing thoroughly.
- Before assembling the crankcase, be sure that the transmission is in neutral and that the gears turn freely.


ENG

COOL

CHAPTER 5
COOLING SYSTEM

RADIATOR 5-1

WATER PUMP 5-2
REMOVING THE RADIATOR 5-3
CHECKING THE RADIATOR 5-4
CHECKING THE THERMOSTAT 5-6
DISASSEMBLING THE WATER PUMP 5-6
CHECKING THE WATER PUMP 5-7
ASSEMBLING THE WATER PUMP 5-8
INSTALLING THE THERMOSTAT 5-8
INSTALLING THE WATER PUMP 5-9
INSTALLING THE RADIATOR 5-9

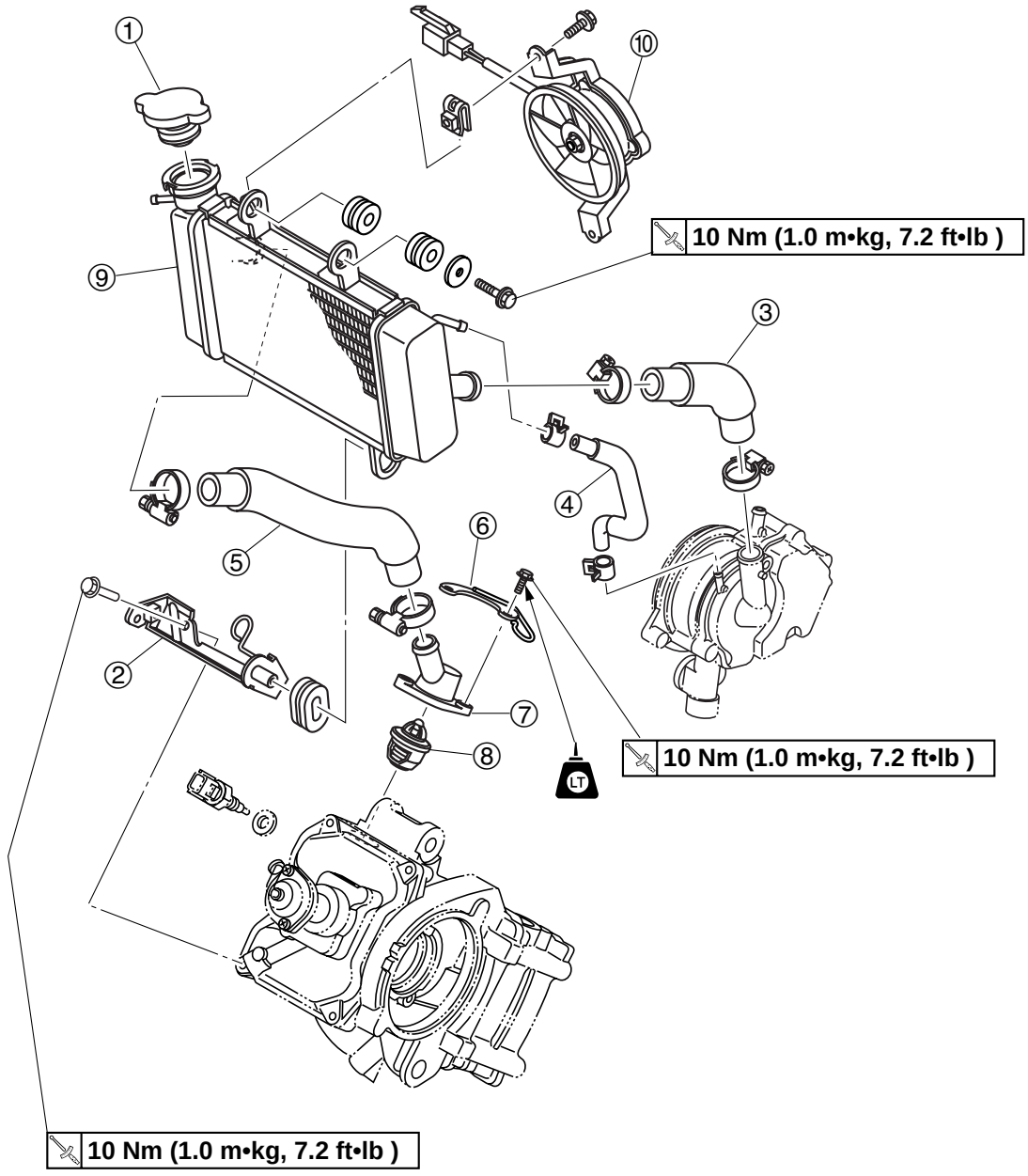

COOL

EAS00454

COOLING SYSTEM

RADIATOR

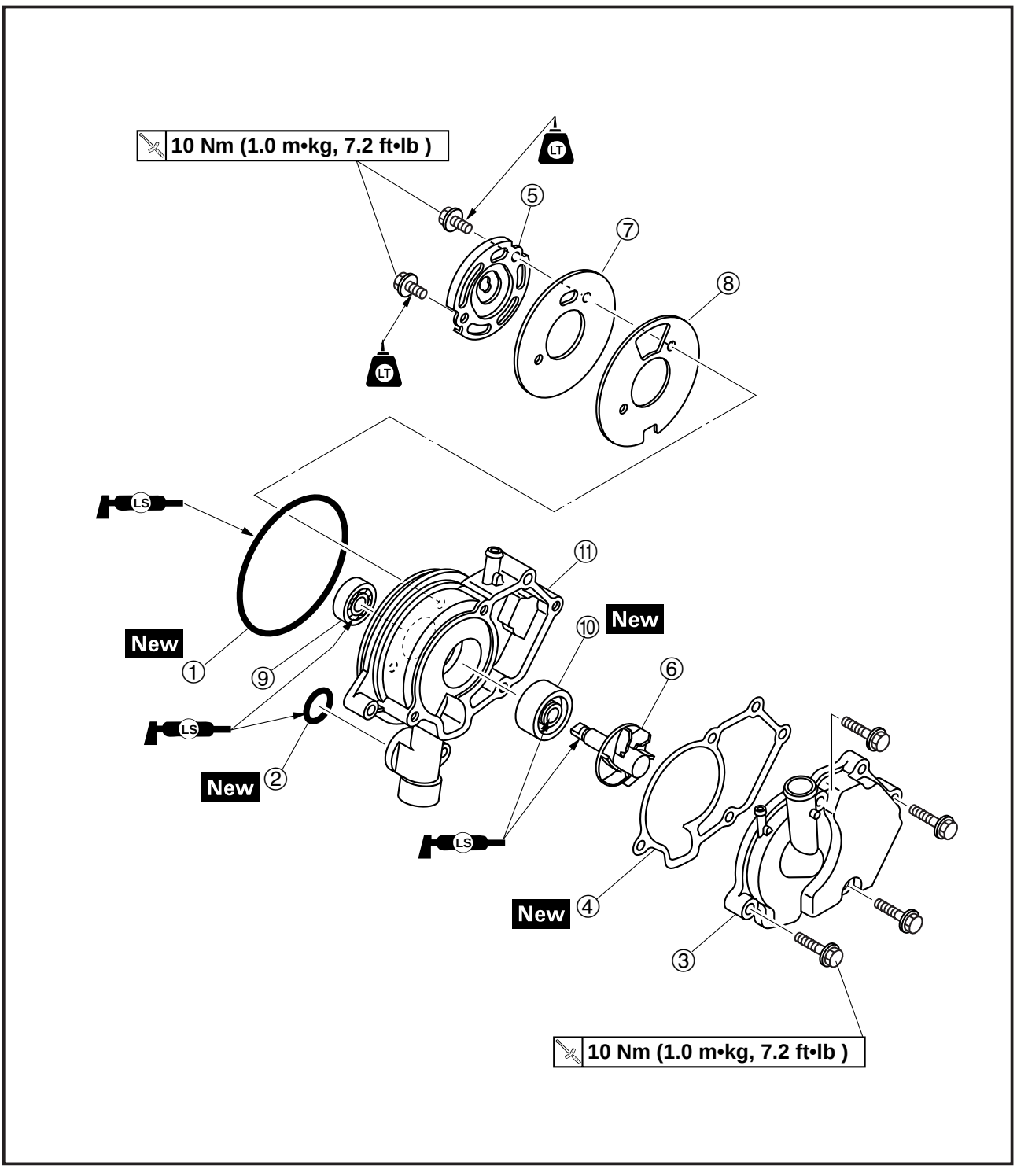
① Radiator cap
② Bracket
③ Water pump inlet hose
④ Radiator outlet hose
⑤ Radiator inlet hose
⑥ Bracket
⑦ Thermostat housing cover
⑧ Thermostat
⑨ Radiator assembly
⑩ Fan motor assembly



EAS00468

WATER PUMP

① O-ring
② O-ring
③ Water pump cover
④ Gasket
⑤ Plate
⑥ Impeller
⑦ Plate
⑧ Housing cover gasket
⑨ Bearing
⑩ Water pump seal
⑪ Water pump housing



REMOVING THE RADIATOR

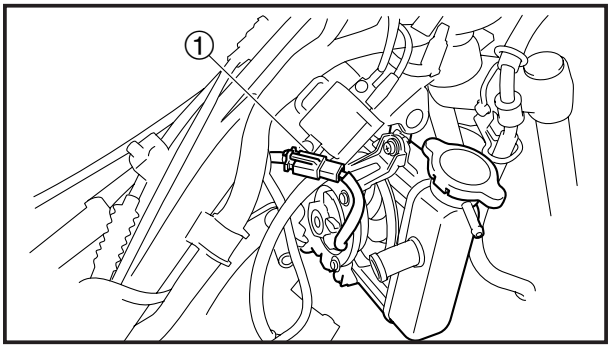
⚠WARNING

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

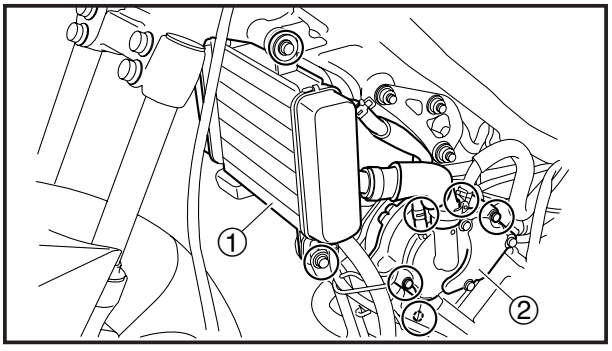
1. Remove:
   - side cowlings (left and right)
   - front cowling
   - center panels
   - seat assembly with battery box
   - inner panel

   Refer to “REMOVING THE FRONT COWLINGS” in chapter 3.
2. Drain:
   - cooling water

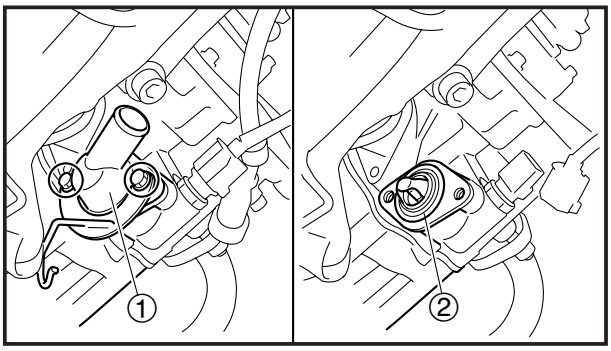
   Refer to “CHANGING THE COOLANT” in chapter 3.



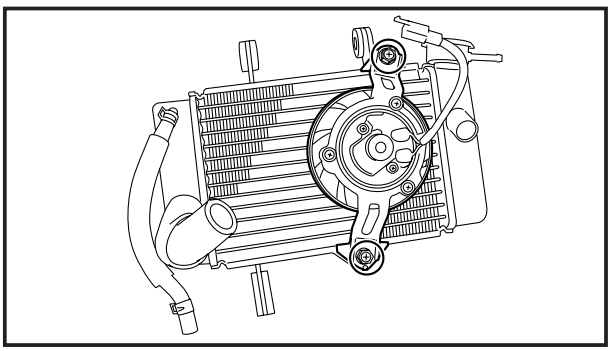
3. Disconnect:
   - radiator inlet hose
   - radiator outlet hose
   - radiator outlet pipe
   - fan motor coupler ①



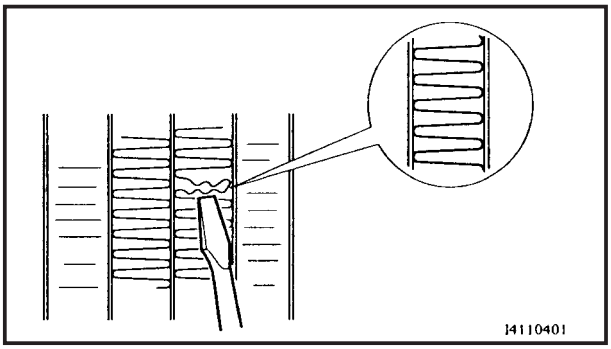
4. Remove:
   - radiator assembly ①
   - water pump assembly ②
   - O-rings



5. Remove:
   - bracket
   - thermostat cover ①
   - thermostat ②



6. Remove:
   - fan motor



EAS00455

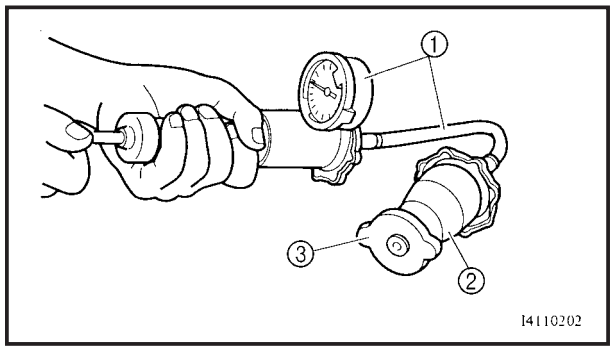
CHECKING THE RADIATOR

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

NOTE:

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

2. Check:
   - radiator hoses
   - radiator pipes
     Cracks/damage → Replace.



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

Radiator cap opening pressure
93.2 – 122.6 kPa
(0.93 – 1.23 kg/cm², 13.5 – 17.8 psi)

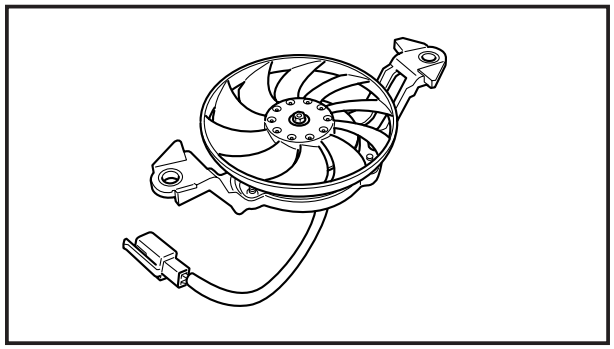
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a. Install the radiator cap tester ① and radiator cap tester adapter ② to the radiator cap ③.

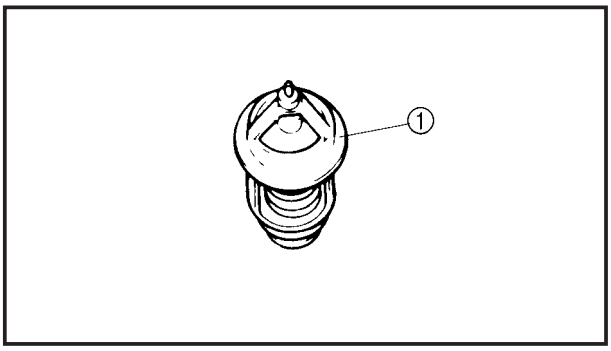
Radiator cap tester ①
90890-01325
Radiator cap tester adapter ②
90890-01352

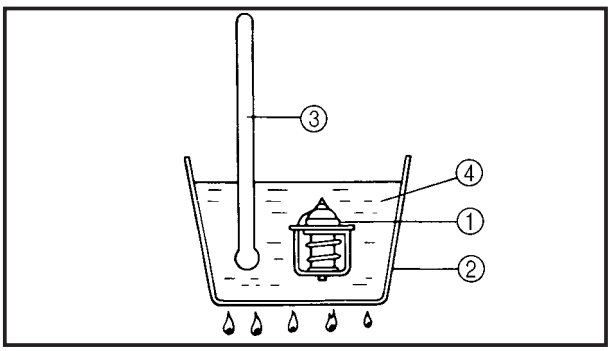
b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

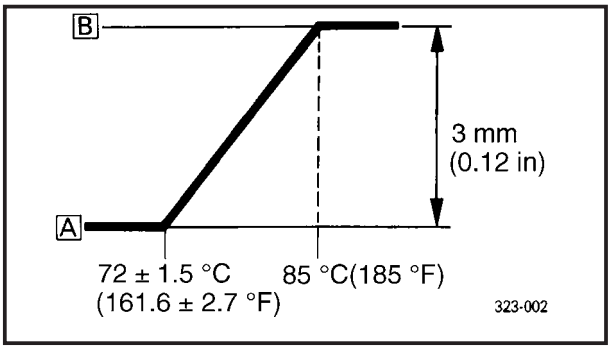
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4. Check:
   • radiator fan motor
   Damage → Replace.
   Malfunction → Check and repair.
   Refer to “COOLING SYSTEM” in chapter 8.







EAS00462

CHECKING THE THERMOSTAT

1. Check:
   - thermostat ①
     Does not open at 80.5 – 83.5°C (176.9 – 182.3°F) → Replace.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

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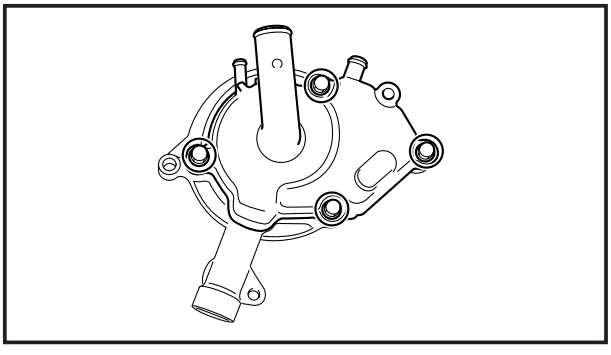
① Thermometer
② Water
③ Thermostat
④ Container

A Fully closed
B Fully open

NOTE:

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

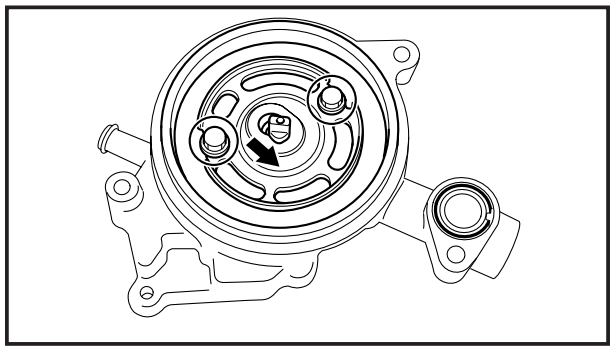
2. Check:
   - thermostat housing cover
   - thermostat housing
     Cracks/damage → Replace.



EAS00470

DISASSEMBLING THE WATER PUMP

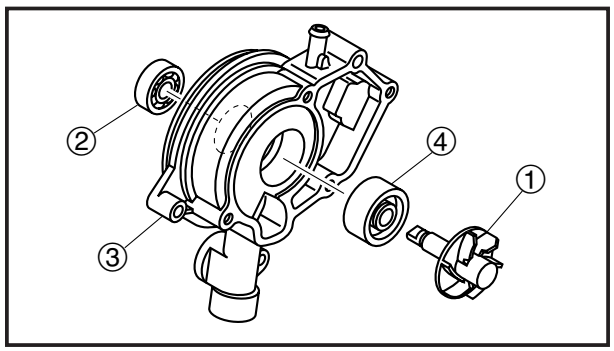
1. Remove:
   - water pump cover
   - gasket
   - O-ring



2. Remove:
   - plate

NOTE:

Slide the plate as shown, and then remove the plate from the water pump housing.



3. Remove:
   - impeller ①
   - bearing ②

NOTE:

Remove the bearing from the outside of the water pump housing.

③ Water pump housing

4. Remove:
   - water pump seal ④

NOTE:

Remove the water pump seal from the inside of the water pump housing.

EAS00473

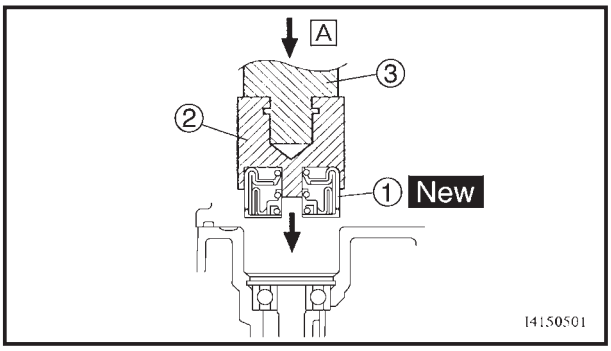
CHECKING THE WATER PUMP

1. Check:
   - water pump housing cover
   - water pump housing
   - impeller
   - rubber damper
   - rubber damper holder
   - water pump seal
   - oil seal

   Cracks/damage/wear → Replace.

2. Check:
   - bearing

   Rough movement → Replace.



EAS00475

ASSEMBLING THE WATER PUMP

1. Install:
   - water pump seal ① **New**

NOTE:

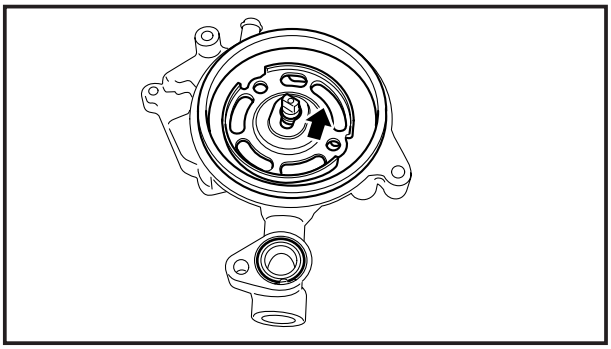
Install the water pump seal with the special tools.

Mechanical seal installer
90890-04145 ②
Middle driven shaft bearing driver
90890-04058 ③

A Push down.

2. Lubricate:
   - water pump seal ①

Recommended lubricant
Lithium soap base grease

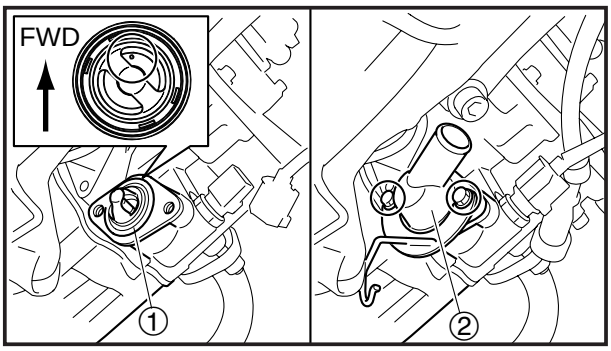


3. Install:
   - impeller
   - plate

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

- Align the slit in the impeller shaft with the slot of the plate.
- After installation, check that the impeller shaft rotates smoothly.



EAS00467

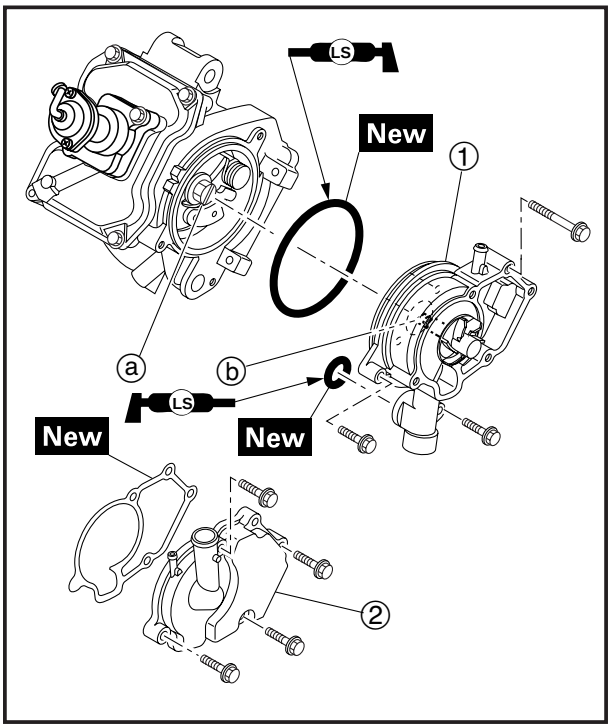
INSTALLING THE THERMOSTAT

1. Install:
   - thermostat ①
   - thermostat cover ②
   - bracket

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE:

Face the hole toward to the forward to install.



EAS00478

INSTALLING THE WATER PUMP

1. Install:
   - O-rings **New**
   - water pump housing ①

10 Nm (1.0 m•kg, 7.2 ft•lb)

⚠WARNING

Always use a new O-ring.

NOTE:

- Align the projection ⓐ on the impeller shaft with the slit ⓑ on the camshaft.
- Lubricate the O-ring with a thin coat of lithium-soap-based grease.

2. Install:
   - water pump housing cover ②

10 Nm (1.0 m•kg, 7.2 ft•lb)

   - water pump inlet hose
   - water pump outlet hose

EAS00456

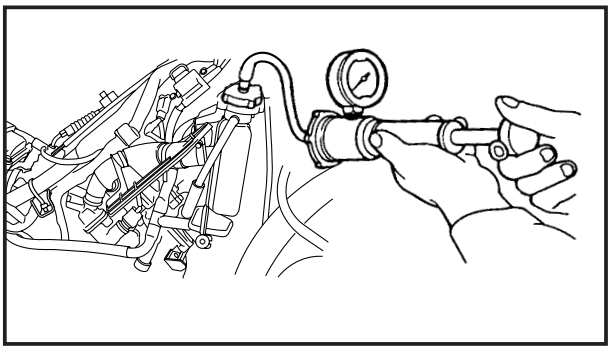
INSTALLING THE RADIATOR

1. Install:
   - radiator assembly

10 Nm (1.0 m•kg, 7.2 ft•lb)

2. Connect:
   - fan motor coupler
   - radiator outlet pipe
   - radiator outlet hose
   - radiator inlet hose

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



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

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



Radiator cap tester
90890-01325
Radiator cap tester adapter
90890-01352

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

5. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR”.
6. Install:
   - inner panel
   - seat assembly with battery box
   - center panels
   - front cowling
   - side cowlings (left and right)
     Refer to “REMOVING THE FRONT COWLINGS” in chapter 3.

CARB

CHAPTER 6
CARBURETOR

CARBURETOR 6-1
REMOVING THE CARBURETOR 6-2
DISASSEMBLING THE CARBURETOR 6-5
CHECKING THE CARBURETOR 6-6
ASSEMBLING THE CARBURETOR 6-9
INSTALLING THE CARBURETOR 6-10
CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR 6-11
CHECKING THE FUEL COCK OPERATION 6-13

AIR INDUCTION SYSTEM 6-14
AIR INJECTION 6-14
AIR CUT-OFF VALVE 6-14
AIR INDUCTION SYSTEM DIAGRAMS 6-15
REMOVING THE AIR INDUCTION SYSTEM 6-16
CHECKING THE AIR INDUCTION SYSTEM 6-16
INSTALLING THE AIR INDUCTION SYSTEM 6-16

CARB

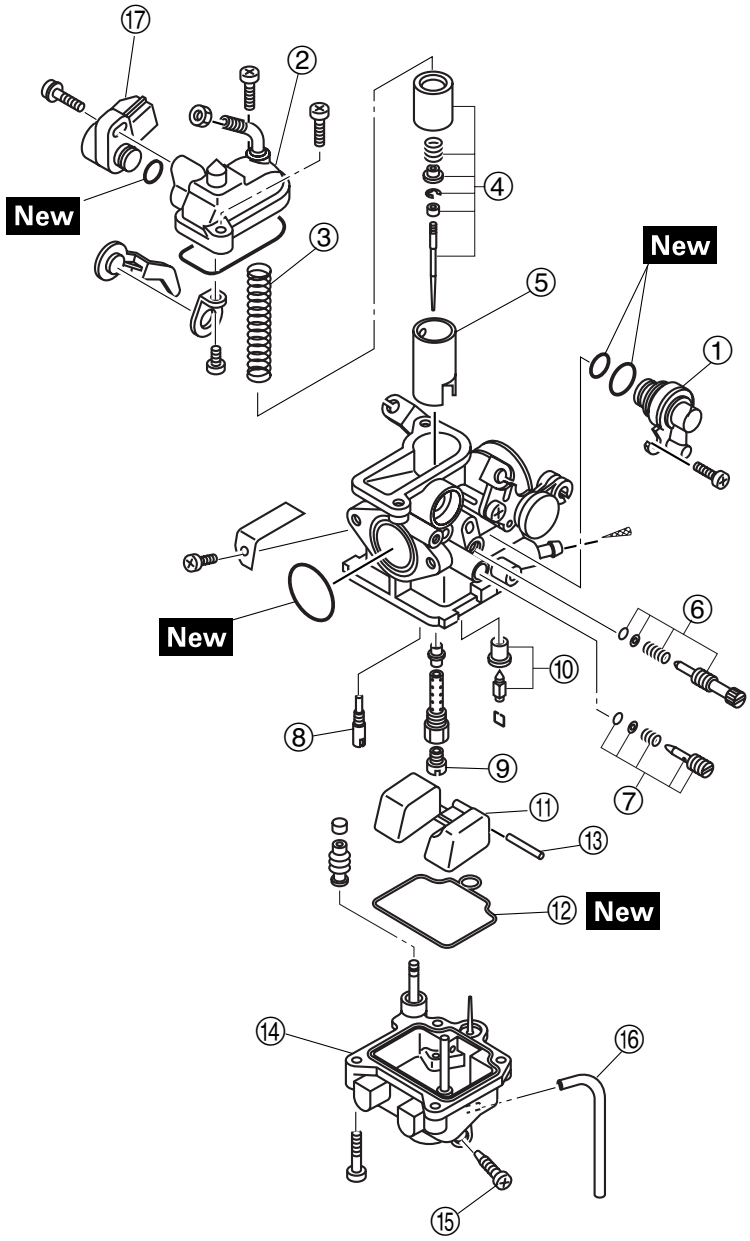


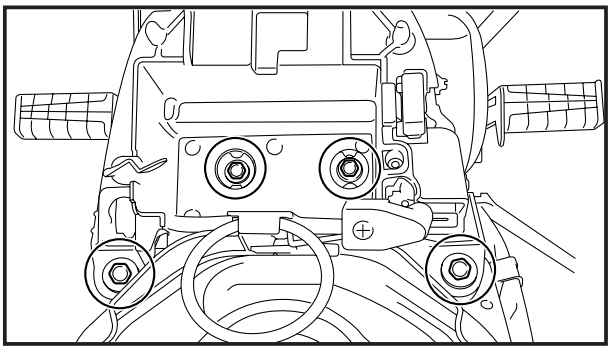
EASF0043

CARBURETOR

CARBURETOR

① Coasting enricher assembly
② Carburetor top cover
③ Throttle valve spring
④ Needle set
⑤ Throttle valve
⑥ Throttle stop screw set
⑦ Pilot air screw set
⑧ Needle jet
⑨ Main jet
⑩ Needle valve assembly
⑪ Float
⑫ Float chamber rubber gasket
⑬ Float pivot pin
⑭ Float chamber
⑮ Fuel drain screw
⑯ Carburetor overflow hose
⑰ Throttle position sensor



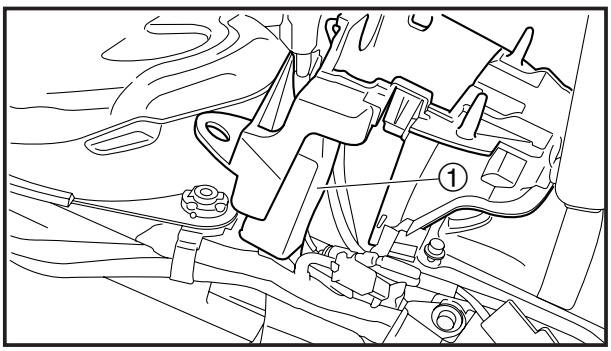


REMOVING THE CARBURETOR

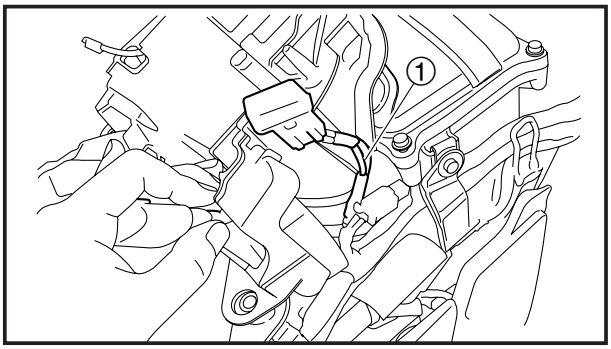
⚠WARNING

Gasoline is highly flammable.
Avoid spilling fuel on the hot engine.

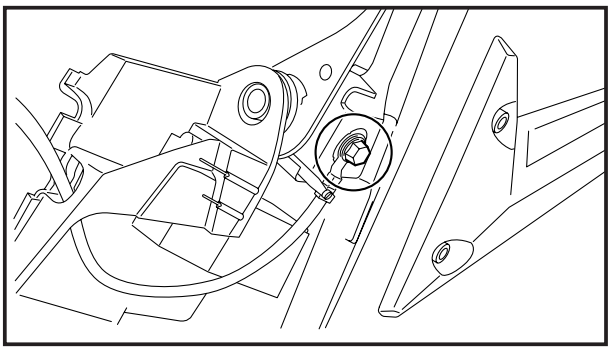
1. Remove:
   - battery
   - seat assembly with battery box



2. Remove:
   - starter relay ① (T135SE)

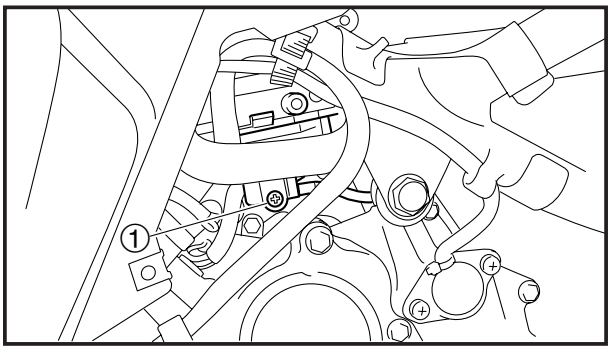


3. Remove:
   - positive lead ①
     (from the battery box)

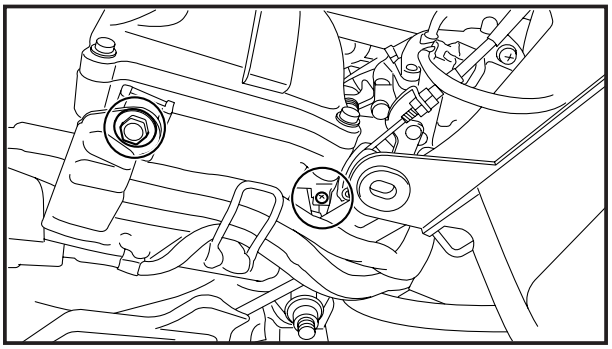


4. Remove:
   - negative lead
     (from the frame)

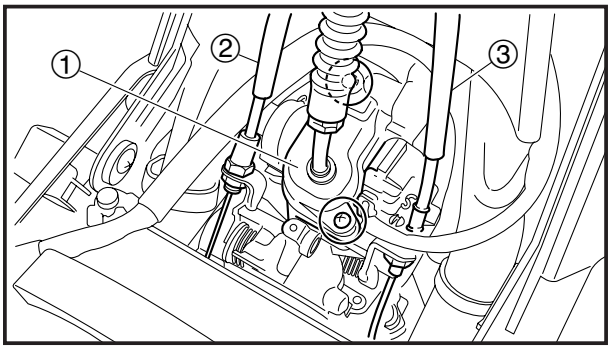
5. Loosen:
   - rear cowling (left)
     Refer to “REMOVING THE REAR COWLINGS” in chapter 3.



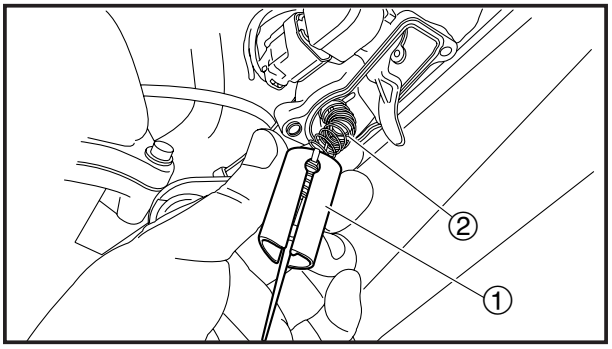
6. Loosen:
   - fuel drain screw ①
7. Drain:
   - fuel (from float chamber)



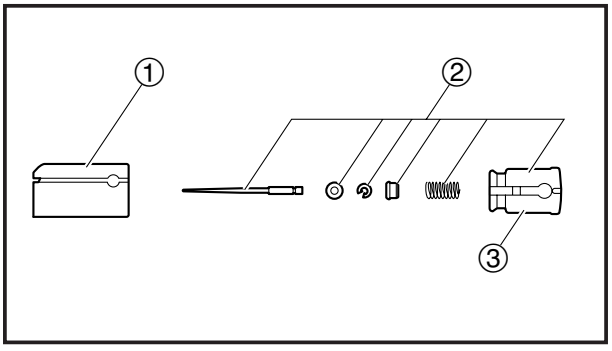
8. Loosen:
   - clamp screw
   - air filter assembly bolt



9. Remove:
   - carburetor top cover ①
   - o-ring
   - choke cable ②
   - accelerator pump cable ③



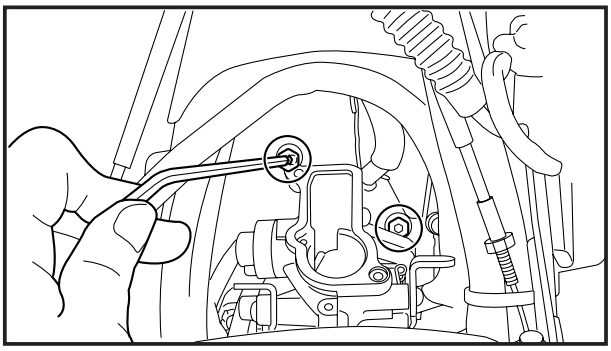
10. Remove:
    - throttle valve assembly ①
    - throttle valve spring ②



11. Remove:
    - throttle valve ①
    - jet needle set ②
    - holder ③

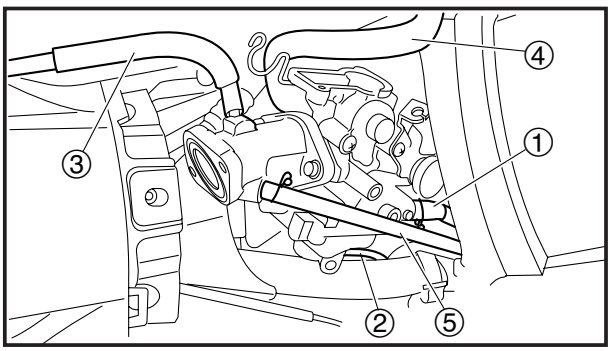
CAUTION:

Do not make a burr when remove the holder ③ from throttle valve ①.



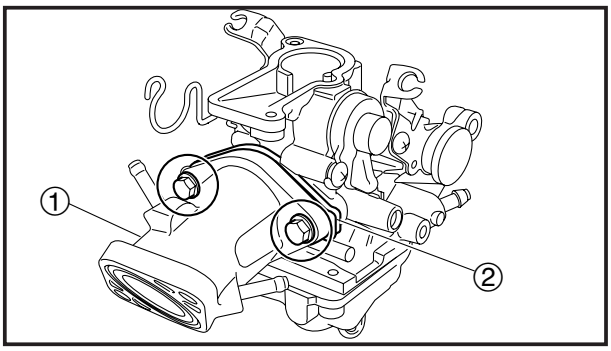
12. Remove:
    - carburetor assembly

NOTE:
Use the ball point hexagon wrench to loosen the bolts.



13. Disconnect:
    - fuel hose ①
    - carburetor overflow hose ②
    - vacuum sensing hose ③
    - air vent hose ④
    - vacuum sensing hose ⑤

14. Remove:
    - carburetor assembly



15. Remove:
    - intake manifold bolt
    - intake manifold ①
    - joint ②

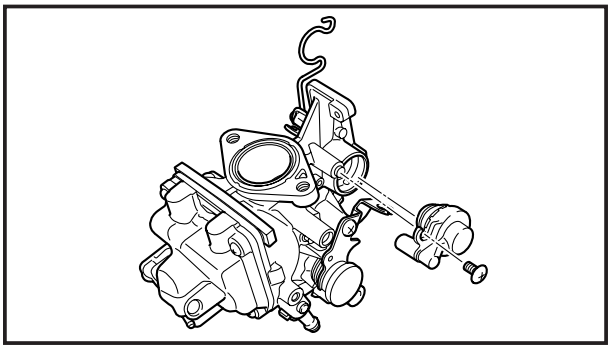
16. Move:
    - air filter assembly

DISASSEMBLING THE CARBURETOR

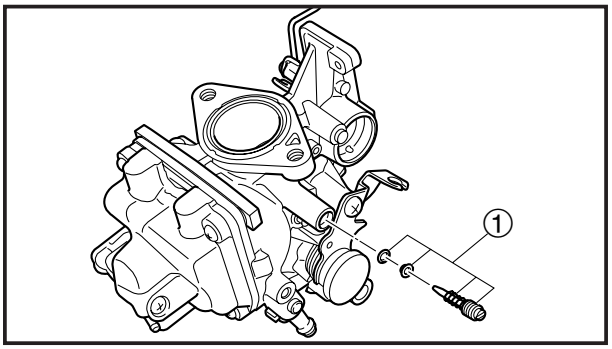
NOTE:

The following parts can be cleaned and inspected without disassembly.

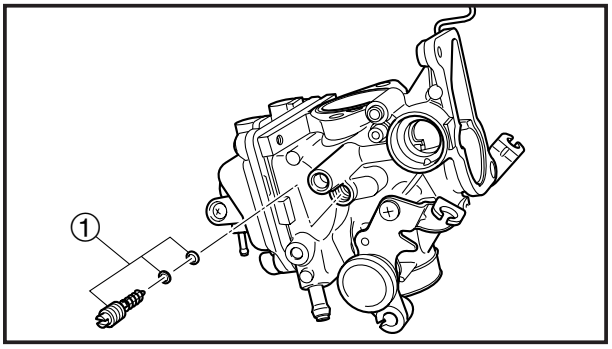
- Coasting enricher
- Throttle stop screw
- Pilot air screw



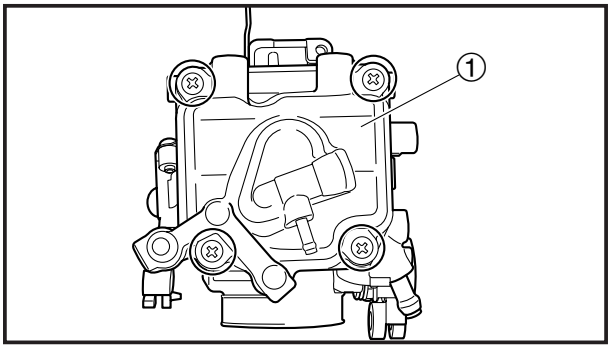
1. Remove:
   - coasting enricher assembly
   - o-ring



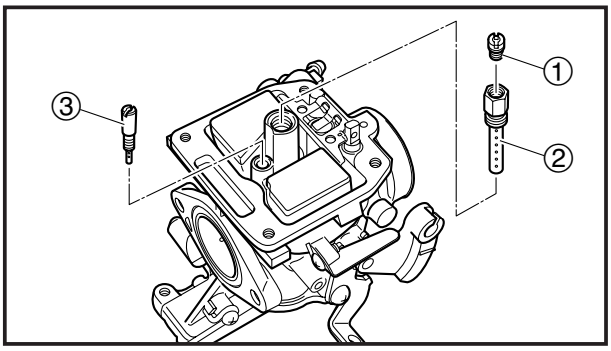
2. Remove:
   - pilot air screw set ①



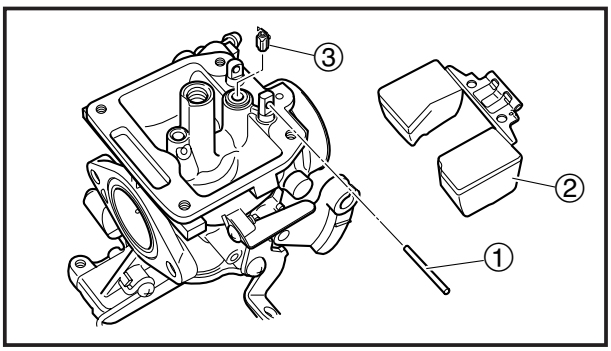
3. Remove:
   - throttle stop screw set ①



4. Remove:
   - float chamber ①
   - float chamber rubber gasket



5. Remove:
   - main jet ①
   - needle jet ②
   - pilot jet ③



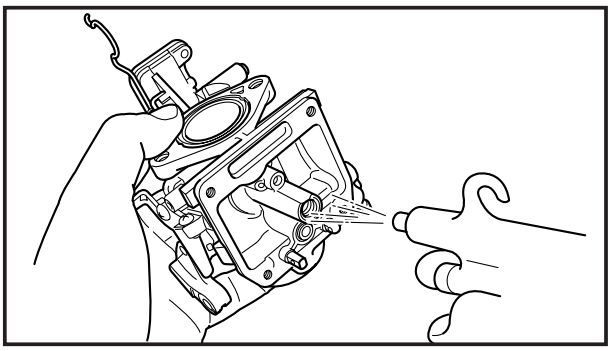
6. Remove:
   - float pivot pin ①
   - float ②
   - needle valve ③

EAS00485

CHECKING THE CARBURETOR

1. Check:
   - carburetor body
   - float chamber

   Cracks/damage → Replace.



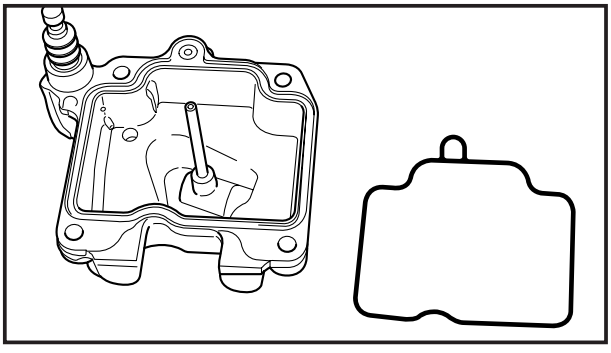
2. Check:
   - fuel passages

   Obstructions → Clean.

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a. Wash the carburetor in a petroleum-based solvent. Do not use any caustic carburetor cleaning solution.
b. Blow out all of the passages and jets with compressed air.

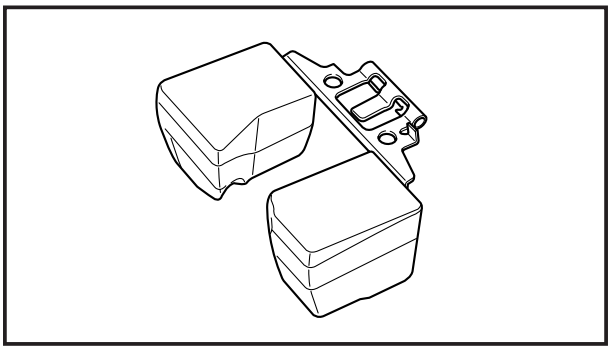
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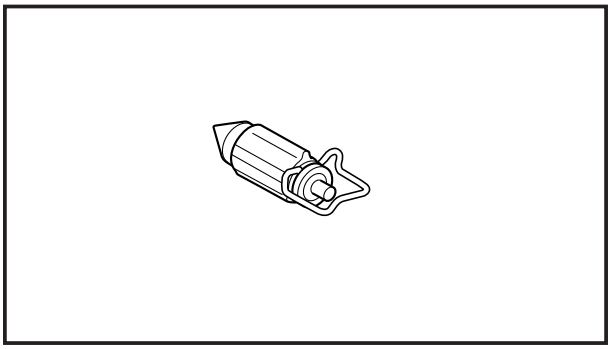
3. Check:
   - float chamber body

   Dirt → Clean.
4. Check:
   - float chamber rubber gasket

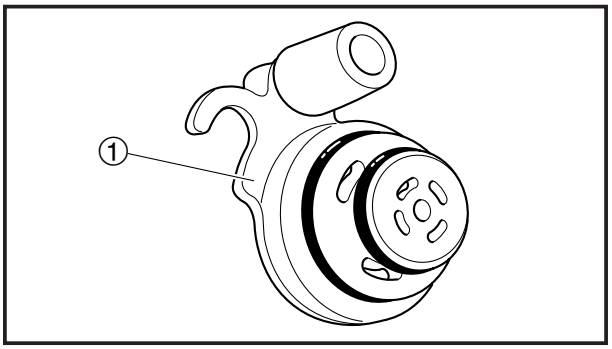
   Cracks/damage/wear → Replace.



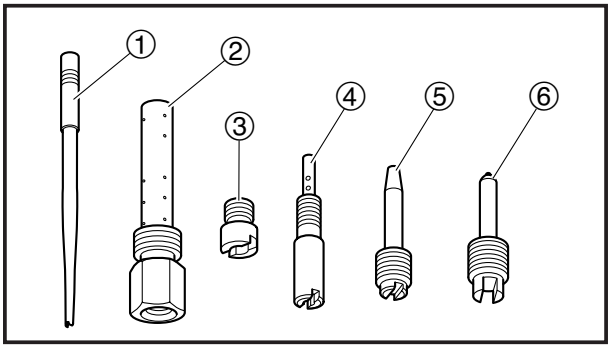
5. Check:
   - float
     Damage → Replace.



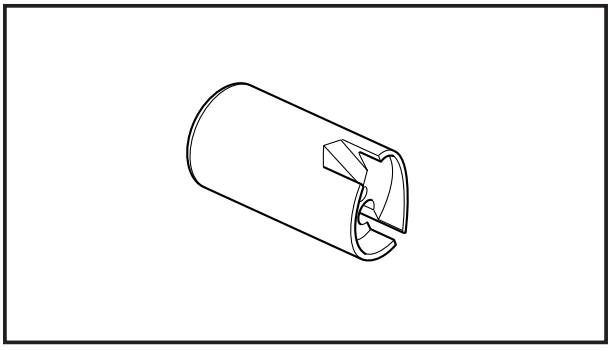
6. Check:
   - needle valve
     Damage/wear → Replace.



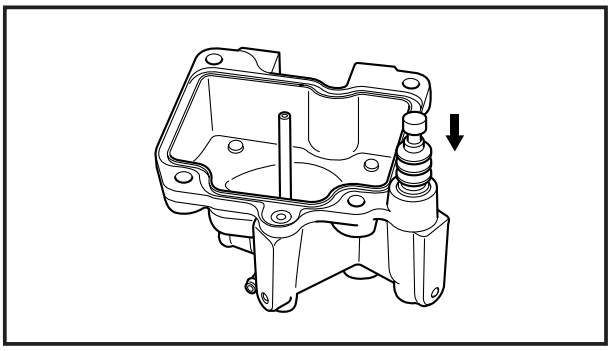
7. Check:
   - coasting enricher assembly ①
     Cracks/damage → Replace.



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



9. Check:
   - throttle valve
     Damage/scratches/wear → Replace.



10. Check:
    - accelerator pump
      stuck or unsmooth operation → Replace the float chamber.

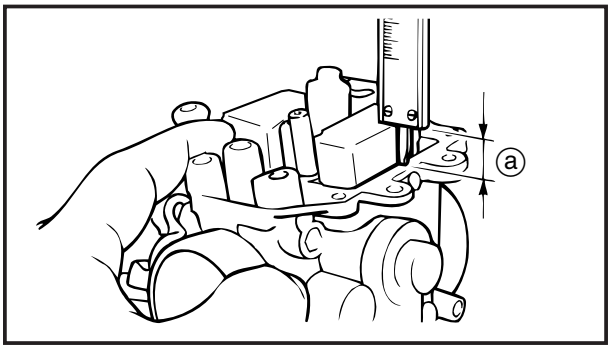
11. Check:
    - air vent hose
    - fuel hoses
      Cracks/damage/wear → Replace.
      Obstructions → Clean.
      Blow out the hoses with compressed air.

EAS00487

ASSEMBLING THE CARBURETOR

CAUTION:

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



1. Measure:
   - float height ⓐ

   Out of specification → Adjust.

Float height
9.2 mm (0.36 in)

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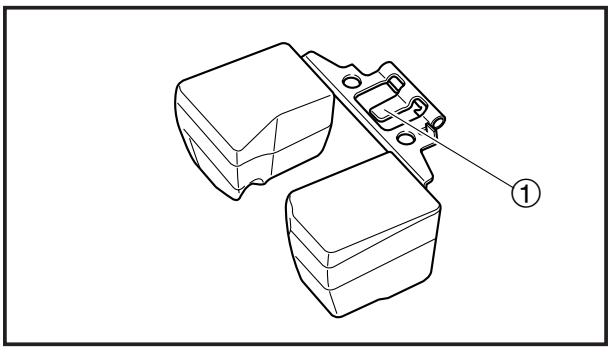
a. Hold the carburetor upside down.
b. Measure the distance from the mating surface of the float chamber (with the gasket removed) to the top of the float.

NOTE:

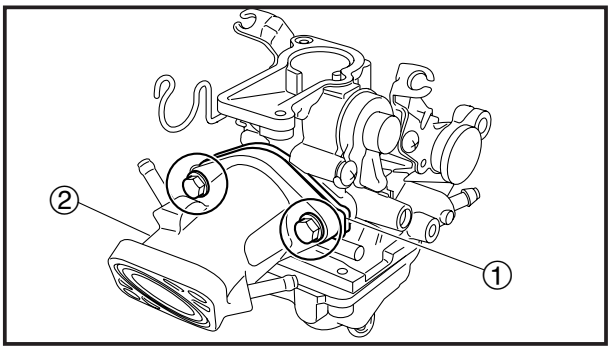
The float arm should rest on the needle valve without depressing it.

c. If the float height is not within specification, check the needle valve seat and needle valve.
d. If either the needle valve seat or needle valve is worn, replace them both.
e. If both the needle valve seat and needle valve are fine, adjust the float height by bending the float tang ①.
f. Check the float height again.

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2. Install:
   - coasting enricher assembly
   - o-ring



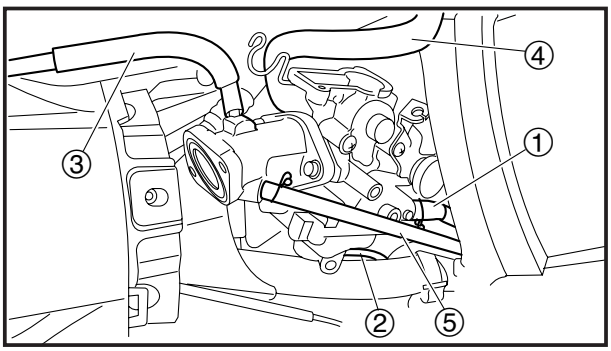
EAS00492

INSTALLING THE CARBURETOR

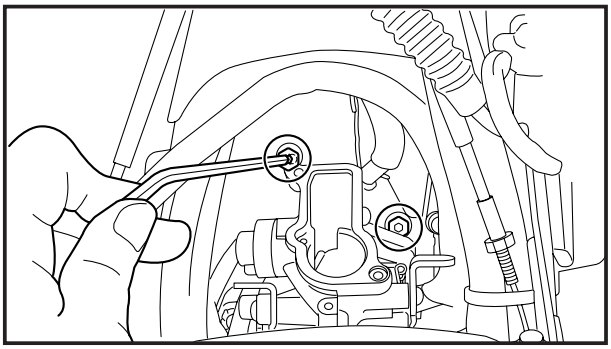
1. Install:
   - needle set

2. Install:
   - joint ①
   - intake manifold ②

10 Nm (1.0 m·kg, 7.2 ft·lb)



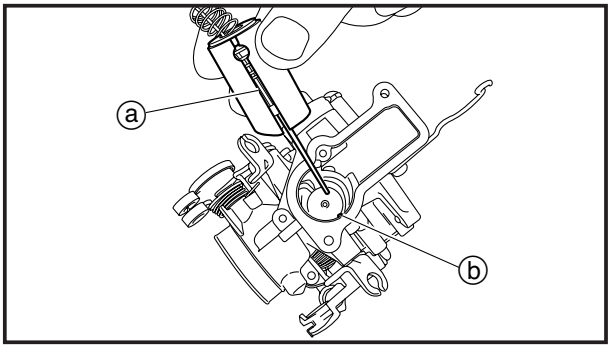
3. Connect:
   - fuel hose ①
   - carburetor overflow hose ②
   - vacuum sensing hose ③
   - air vent hose ④
   - vacuum sensing hose ⑤



4. Install:
   - carburetor assembly
   - intake manifold bolts

10 Nm (1.0 m·kg, 7.2 ft·lb)

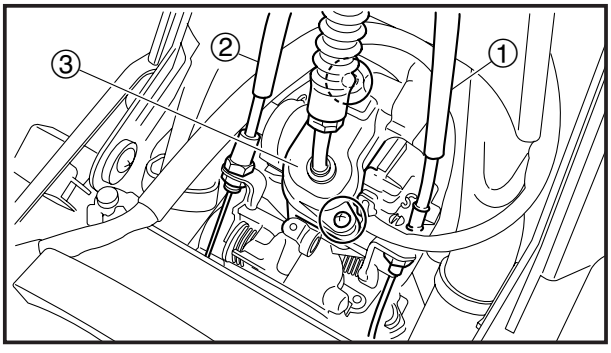
   - clamp screw



5. Install:
   - throttle valve assembly

NOTE:

- Align the slit ⓐ of the throttle valve with the tab ⓑ of the carburetor body.
- Be careful to fall off the O-ring on the carburetor top cover when installing the throttle valve assembly.



6. Install:
   - accelerator pump cable ①
   - choke cable ②
   - o-ring
   - carburetor top cover ③

7. Adjust:
   • engine idling speed

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

Refer to “ADJUSTING THE ENGINE IDLING SPEED” in chapter 3.

8. Adjust:
   • throttle cable free play

	Throttle cable free play (at the flange of the throttle grip) **3–7 mm (0.12–0.18 in)**

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

EAS00916

CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

NOTE:

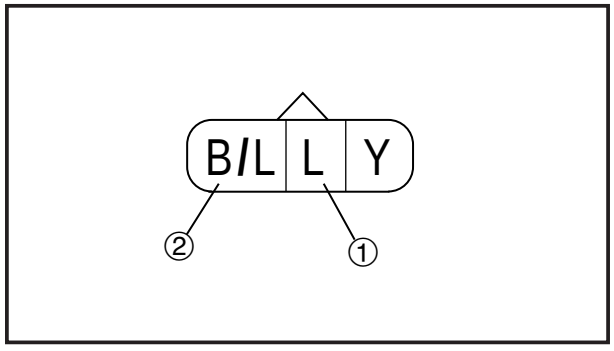
- Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.
- Be sure to adjust the angle when removed the throttle position sensor.

1. Check:
   • throttle position sensor

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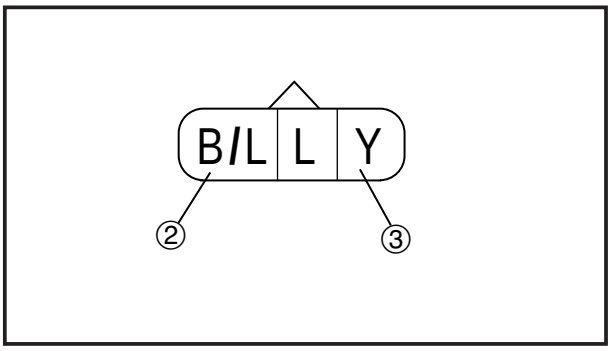
a. Connect the pocket tester (Ω × 1k) to the terminals of the throttle position sensor.

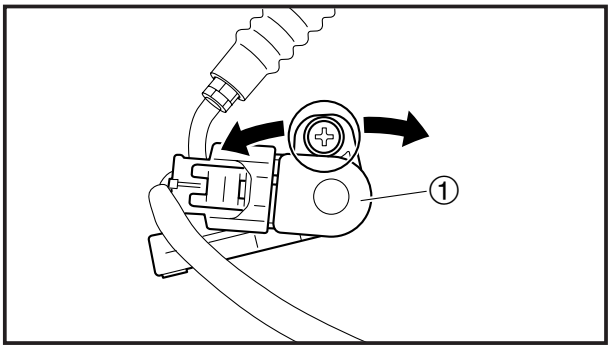
Positive (+) pocket tester probe → blue terminal ①
Negative (-) pocket tester probe → black/blue terminal ②

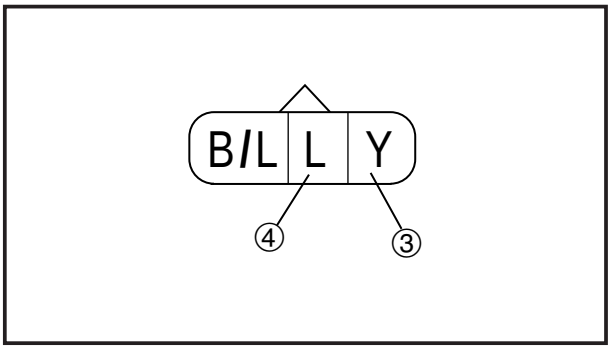


b. Measure the throttle position sensor resistance.
   Out of specification → Replace the throttle position sensor.

	Maximum throttle position sensor resistance **3–7 kΩ at 20 °C** **(blue-black/blue)**







c. Connect the pocket tester (DC20V) to the terminals of the throttle position sensor.

Positive (+) pocket tester probe → yellow terminal ③
Negative (-) pocket tester probe → black/blue terminal ②

Throttle position sensor input voltage
5V at 20 °C
(yellow-black/blue)

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2. Adjust:
- throttle position sensor angle

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a. Connect the digital circuit tester to the throttle position sensor ①.

Positive (+) digital circuit tester probe → blue terminal ④
Negative (-) digital circuit tester probe → yellow terminal ③

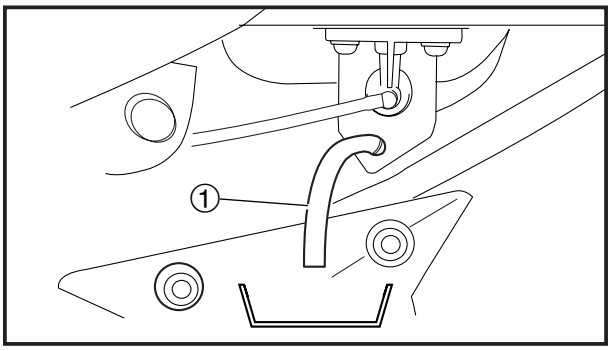
Digital circuit tester
90890-03174

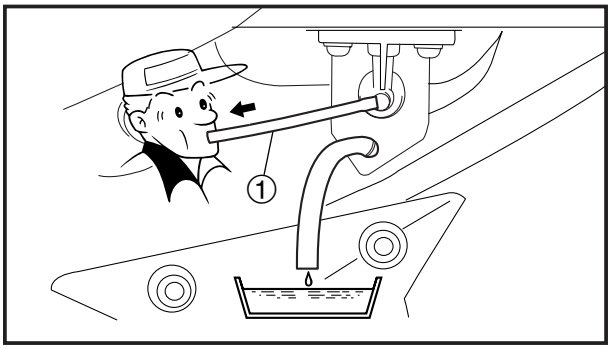
b. Measure the throttle position sensor voltage.
c. Adjust the throttle position sensor angle so that the voltage is within the specified range.

Throttle position sensor voltage
0.5 V (blue-yellow)

d. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.

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EAS00506

CHECKING THE FUEL COCK OPERATION

1. Remove:
   - rear cowling (left)
   Refer to “REMOVING THE REAR COWLINGS” in chapter 3.
2. Place a container under the end of the fuel hose ①.
3. Check:
   - fuel cock operation

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a. Suck on the end of the vacuum hose ①.

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

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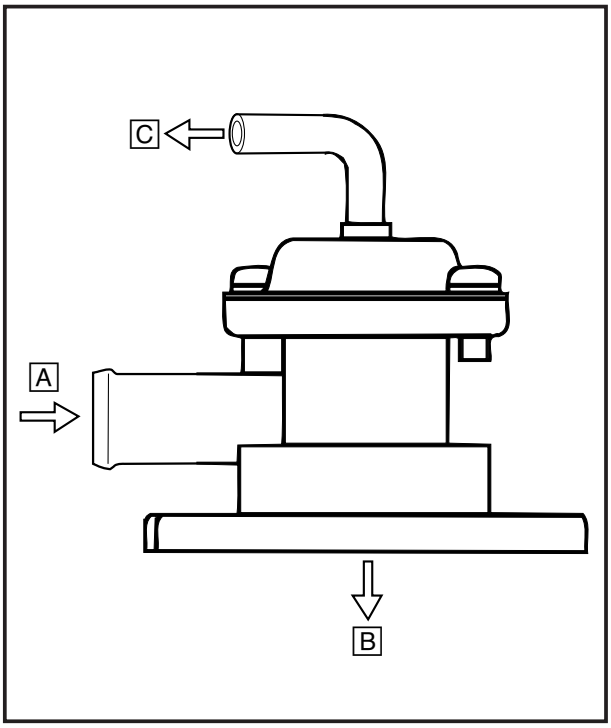
4. Install:
   - rear cowling (left)
   Refer to “INSTALLING THE REAR COWLINGS” in chapter 3.

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.



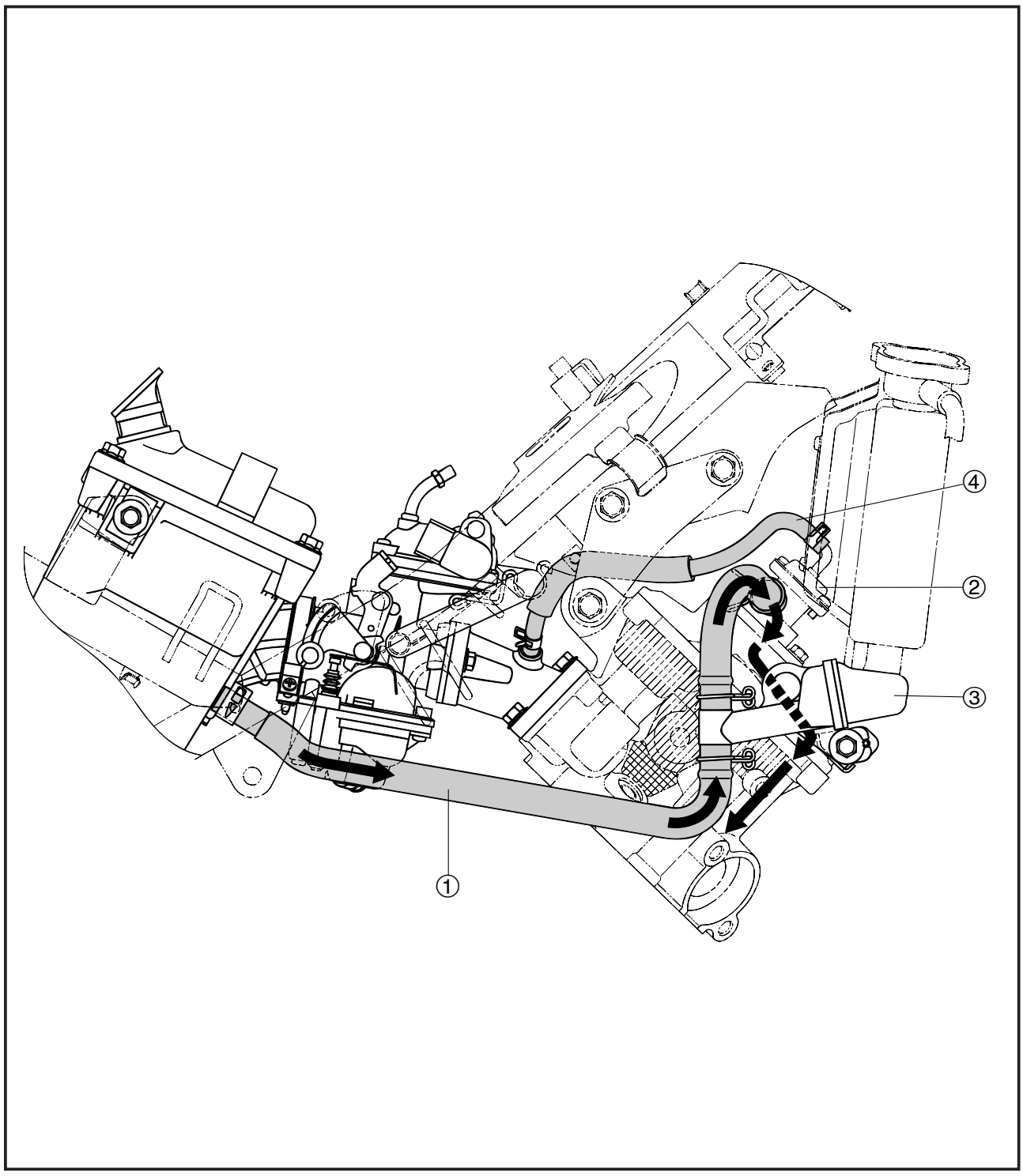
AIR CUT-OFF VALVE

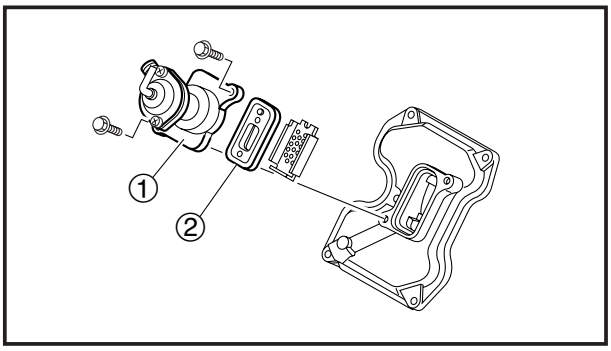
The air cutoff valve is operated by the intake gas pressure through the piston valve diaphragm. Normally, the air cut-off valve is open to allow fresh air to flow into the exhaust port (A to B). During sudden deceleration (the throttle valve suddenly closes), negative pressure (C) is generated and the air cutoff valve is closed in order to prevent after-burning. Additionally, at high engine speeds and when the pressure decreases, the air cut-off valve automatically closes to guard against a loss of performance.

A From the air filter
B To the cylinder head
C To the intake manifold

AIR INDUCTION SYSTEM DIAGRAMS

① Bend hose (air filter case to air cut-off valve)
② Air cut-off valve
③ AIS resonator
④ Vacuum sensing hose



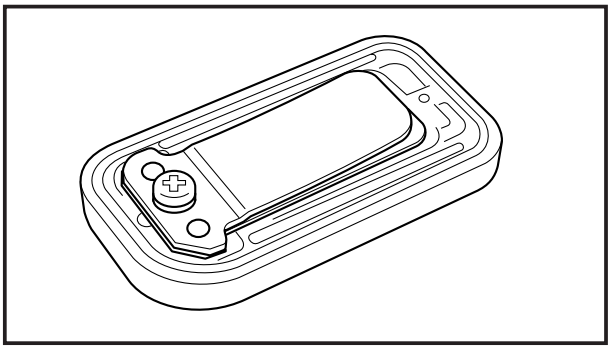


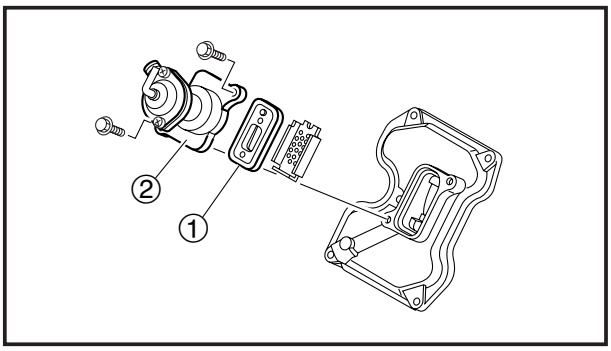
REMOVING THE AIR INDUCTION SYSTEM

1. Disconnect:
   - vacuum sensing hose
   - bend hose
2. Remove:
   - air cut cut-off valve assembly ①
   - reed valve assembly ②

CHECKING THE AIR INDUCTION SYSTEM

1. Check:
   - hoses
     Loose connections → Connect properly.
     Cracks/damage → Replace.
   - pipes
     Cracks/damage → Replace.
2. Check:
   - reed valve
   - reed valve stopper
   - reed valve seat
     Cracks/damage → Replace the reed valve.
3. Check:
   - air cut-off valve
     Cracks/damage → Replace.





INSTALLING THE AIR INDUCTION SYSTEM

1. Install:
   - reed valve assembly ①
   - air cut cut-off valve assembly ②

   10 Nm (1.0 m·kg, 7.2 ft·lb)
2. Connect:
   - vacuum sensing hose
   - bend hose

CHAPTER 7
CHASSIS

FRONT WHEEL AND BRAKE DISC 7-1
REMOVING THE FRONT WHEEL 7-2
CHECKING THE FRONT WHEEL 7-3
CHECKING THE BRAKE DISC 7-5
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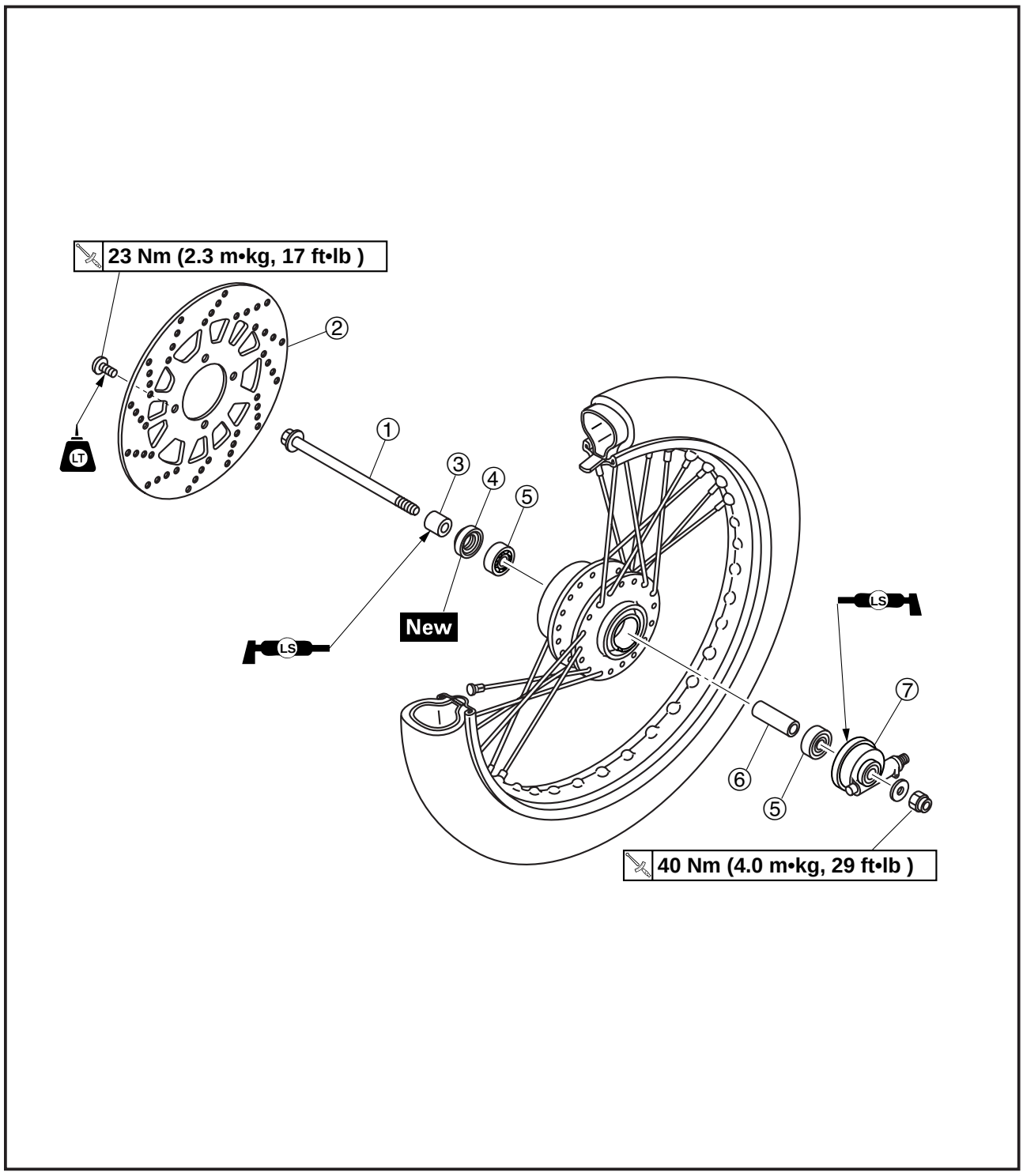
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EASF0044

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FRONT WHEEL AND BRAKE DISC

① Front wheel axle
② Brake disc
③ Spacer
④ Oil seal
⑤ Bearing
⑥ Spacer
⑦ Speedometer gear unit



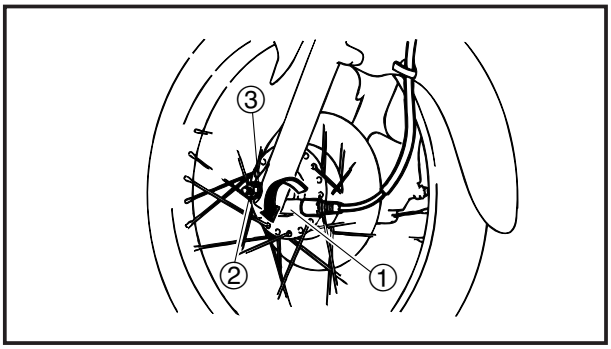
EAS00519

REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

⚠WARNING

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

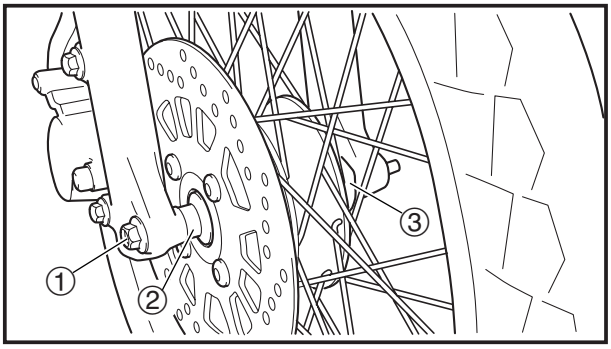


2. Remove:
   - speedometer cable ①
   - axle nut ②
   - washer ③

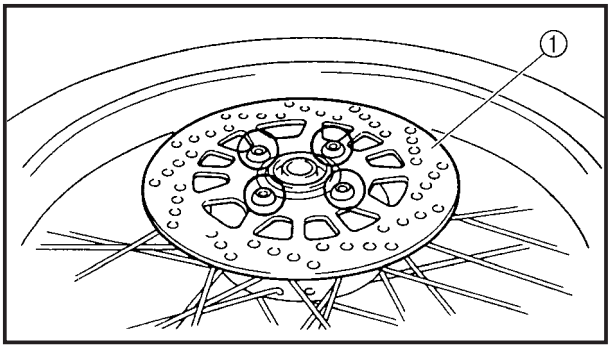
3. Elevate:
   - front wheel

NOTE:

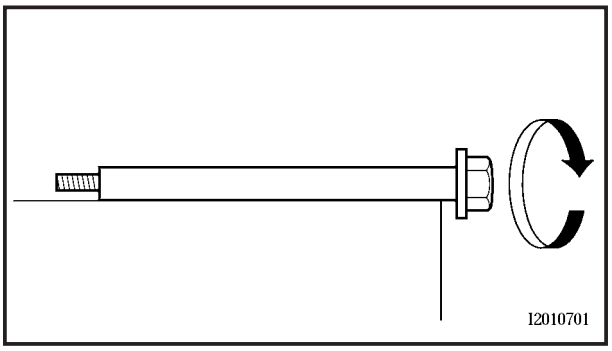
Place the vehicle on a suitable stand so that the front wheel is elevated.



4. Remove:
   - front wheel axle ①
   - spacer ②
   - speedometer gear unit ③
   - front wheel



5. Remove:
   - brake disc ①



EAS00526

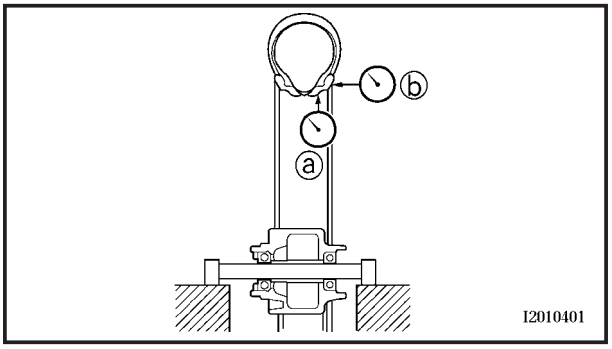
CHECKING THE FRONT WHEEL

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

⚠WARNING

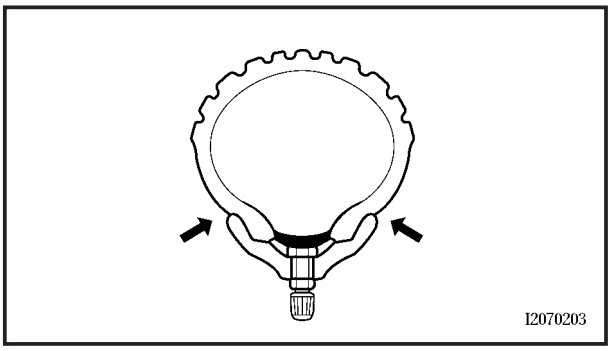
Do not attempt to straighten a bent wheel axle.

2. Check:
   - tire
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” in chapter 3.
3. Check:
   - spokes
     Bends/damage → Replace.
     Loose → Tighten.
     Tap the spokes with a screwdriver.
     Refer to “CHECKING AND TIGHTENING THE SPOKES” in chapter 3.



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

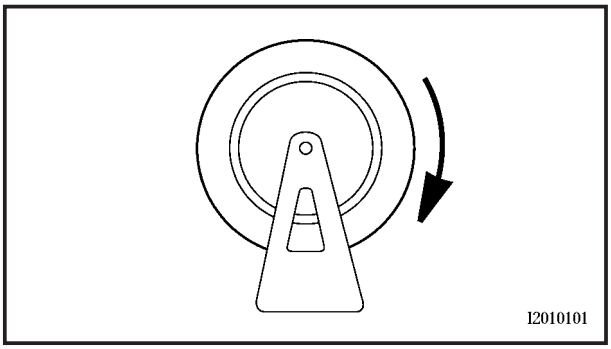
Front wheel radial runout limit
1.0 mm (0.04 in)
Front wheel lateral runout limit
0.5 mm (0.02 in)



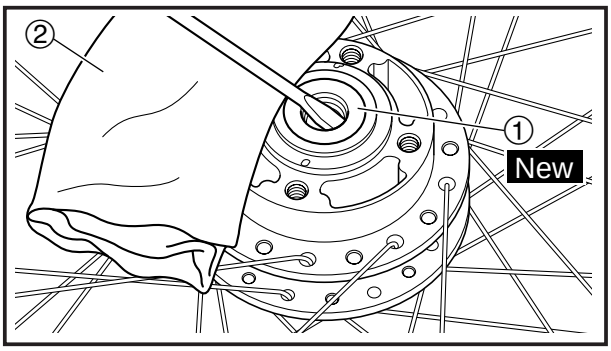
5. Check:
   - spacers
     Damage/wear → Replace.

⚠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 vehicle.
- **After a tire has been repaired or replaced, be sure to tighten the tire air valve stem locknut ① properly.**



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



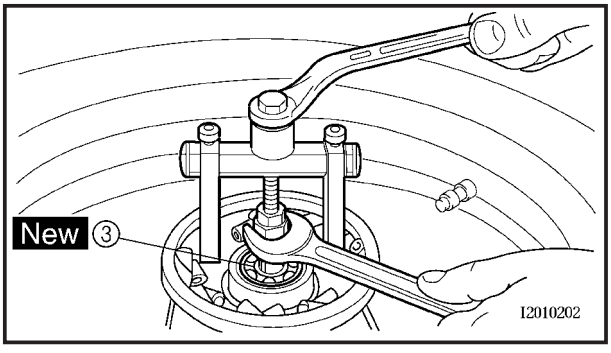
7. Replace:
   - wheel bearings **New**
   - oil seals **New**

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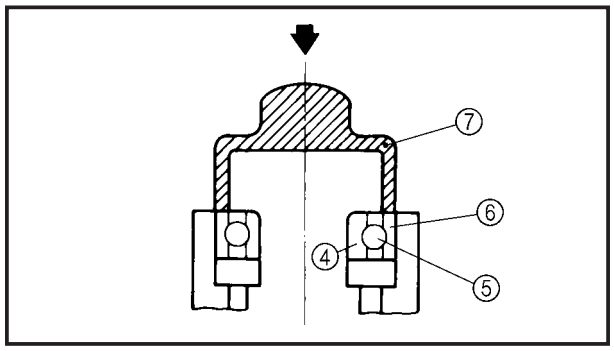
a. Clean the outside of the front wheel hub.
b. Remove the oil seals ① with a flat-head screwdriver.

NOTE:

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



c. Remove the wheel bearings ③ with a general bearing puller.



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

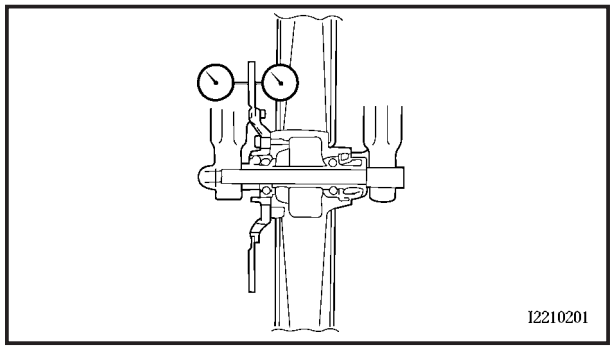
CAUTION:

Do not contact the wheel bearing inner 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.

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EAS00527

CHECKING THE BRAKE DISC

1. Check:
   - brake disc

   Damage/galling → Replace.
2. Measure:
   - brake disc deflection

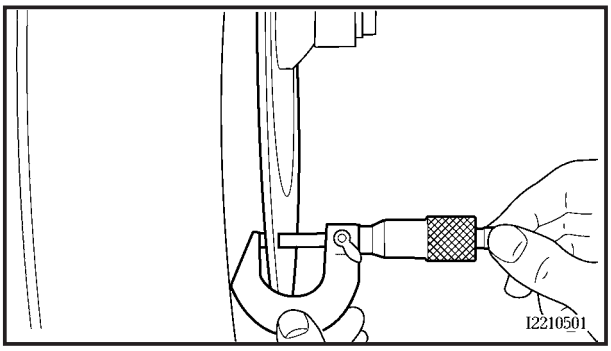
   Out of specification → Correct the brake disc deflection or replace the brake disc.

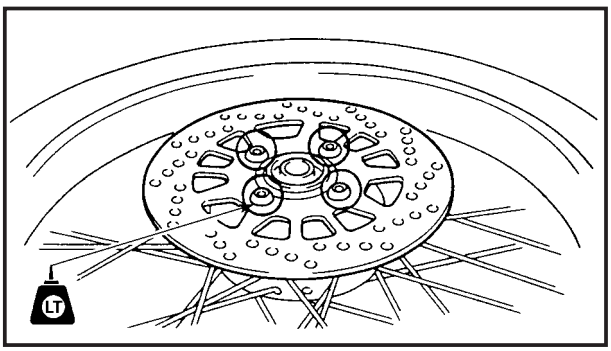
Brake disc deflection limit (maximum)
0.15 mm (0.0059 in)

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a. Place the vehicle 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 5–10 mm below the edge of the brake disc.

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

Brake disc thickness limit (minimum)
3.0 mm (0.12 in)

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
23 Nm (2.3 m·kg, 17 ft·lb)
LOCTITE®

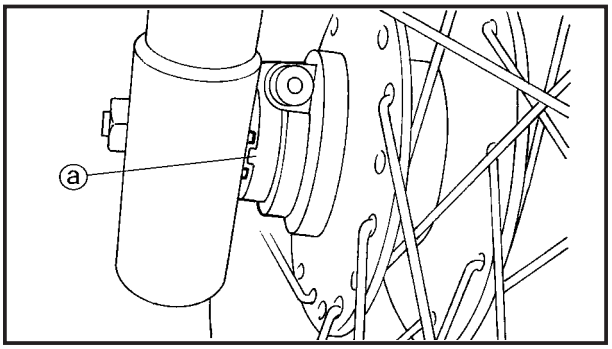
d. Measure the brake disc deflection.
e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
f. If the brake disc deflection cannot be brought within specification, replace the brake disc.

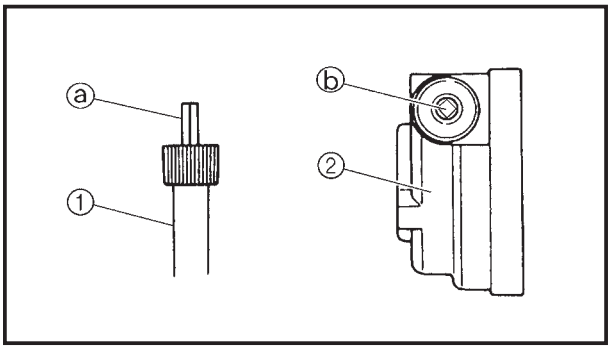
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EAS00535

CHECKING THE SPEEDOMETER GEAR UNIT

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





EAS00542

INSTALLING THE FRONT WHEEL

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

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

2. Install:
   - brake disc
   - front wheel

   Refer to “CHECKING THE BRAKE DISC”.

NOTE:

Make sure the projection ⓐ on the speedometer gear unit fits between the projections on the outer tube.

3. Tighten:
   - wheel axle nut **40 Nm (4.0 m·kg, 29 ft·lb)**
4. Connect:
   - speedometer cable ①

NOTE:

Be sure that slit ⓐ on the speedometer cable meshes with the projection ⓑ on the speedometer gear unit ②.

⚠WARNING

Make sure the brake cable is routed properly.

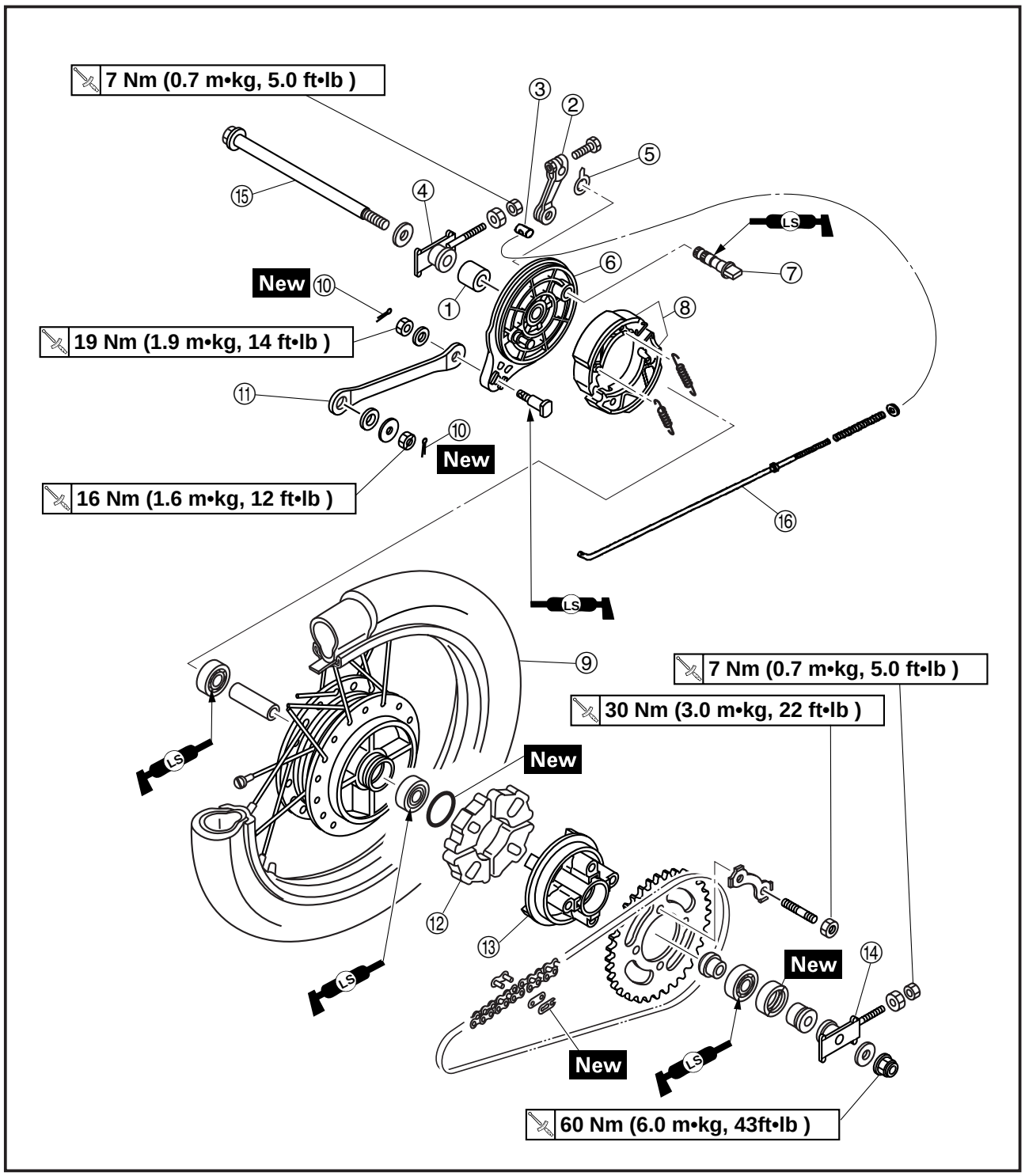
CAUTION:

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

EASF0049

REAR WHEEL AND BRAKE

① Collar
② Brake camshaft lever
③ Pin
④ Drive chain puller (right)
⑤ Brake shoe wear indicator
⑥ Brake shoe plate
⑦ Brake camshaft
⑧ Brake shoe
⑨ Rear wheel
⑩ Cotter pin
⑪ Brake torque rod
⑫ Rear wheel drive hub damper
⑬ Rear wheel drive hub
⑭ Drive chain puller (left)
⑮ Rear wheel axle
⑯ Brake rod



EAS00563

REMOVING THE REAR WHEEL

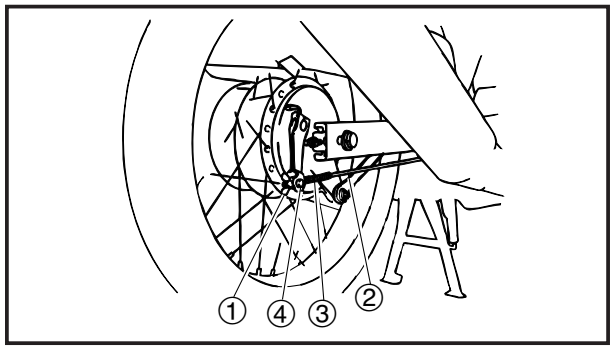
1. Stand the vehicle on a level surface.

⚠WARNING

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

NOTE:

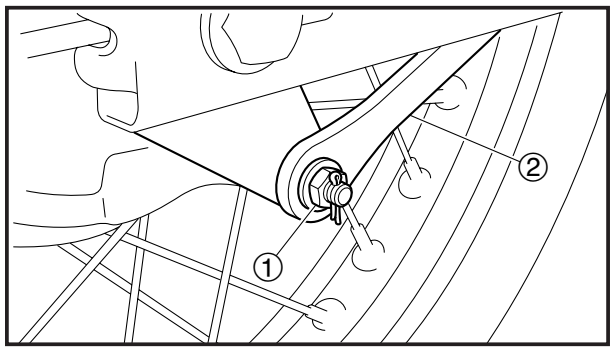
Place the vehicle on a suitable stand so that the rear wheel is elevated.



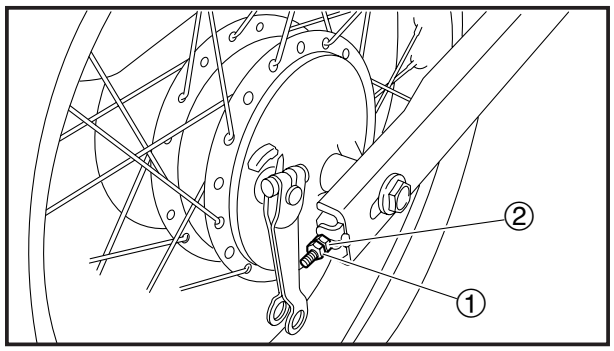
2. Remove:
   - brake rod adjusting nut ①
   - brake rod ②
   - compression spring ③
   - washer
   - pin ④

NOTE:

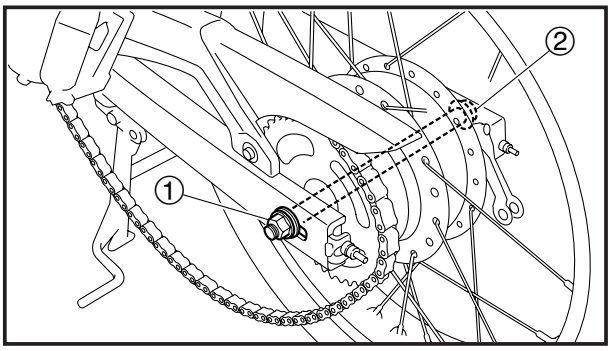
Press down on the brake pedal to remove the pin from the brake rod.



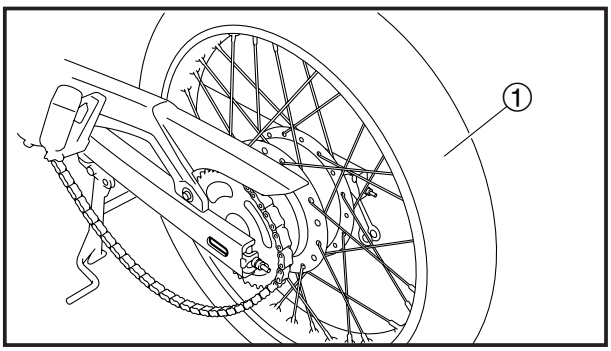
3. Remove:
   - cotter pin
   - brake torque rod nut ①
   - washer
   - brake torque rod bolt
   - brake torque rod ②



4. Loosen:
   - chain puller locknuts (left and right) ①
   - chain puller adjusting nuts (left and right) ②



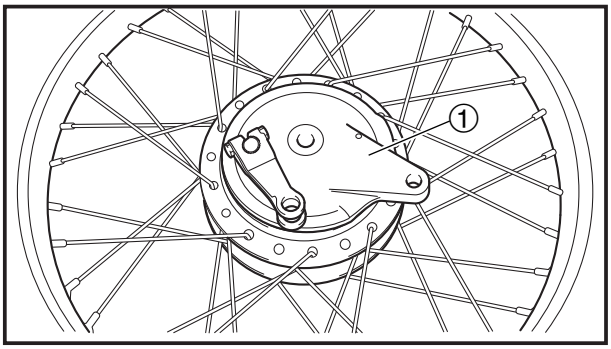
5. Remove:
   - rear wheel axle nut ①
   - washer
   - rear wheel axle ②
   - washer
   - collar



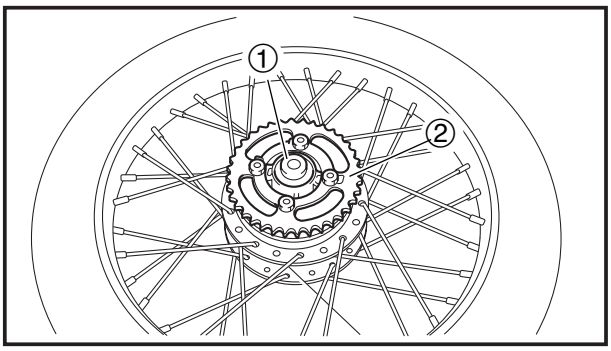
6. Remove:
   - rear wheel assembly ①

NOTE:

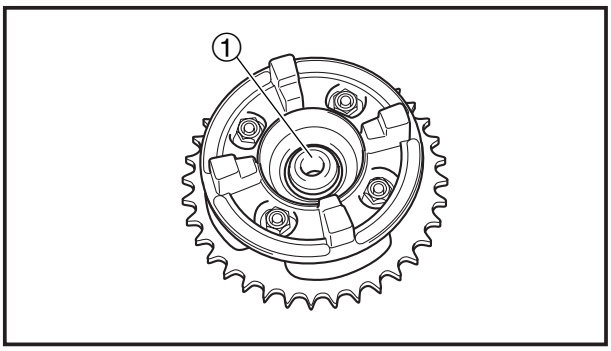
Push the rear wheel forward and remove the drive chain from the driven sprocket.



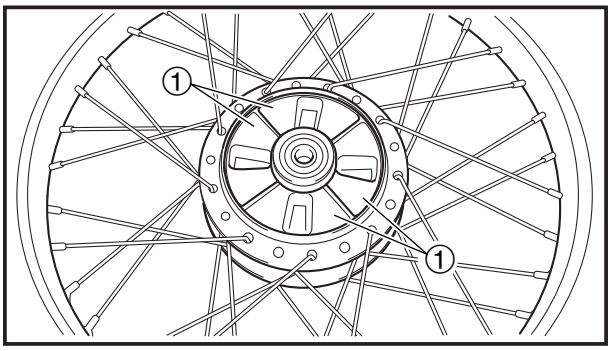
7. Remove:
   - brake shoe plate assembly ①



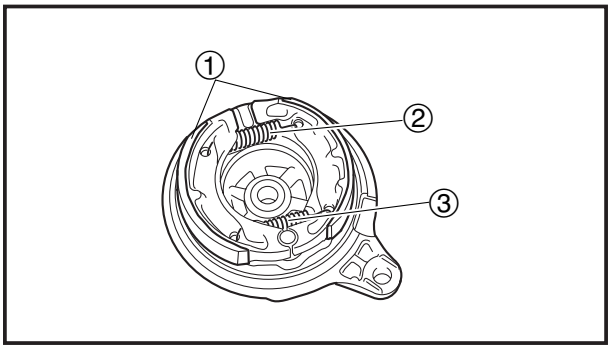
8. Remove:
   - collar ①
   - rear wheel drive hub assembly ②



9. Remove:
   - spacer ①

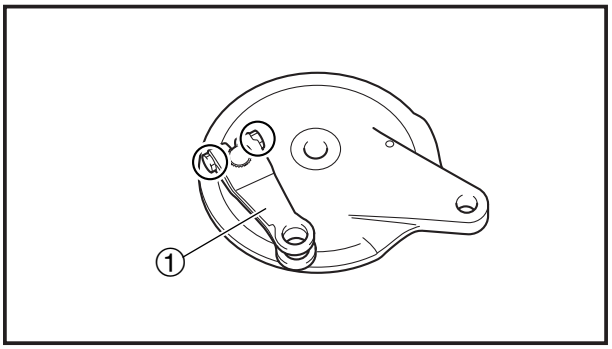


10. Remove:
    - O-ring
    - rear wheel drive hub dampers ①



DISASSEMBLING THE BRAKE SHOE PLATE

1. Remove:
    - brake shoes ①
    - brake shoe springs ② (48 mm, 1.89 in)
    - brake shoe springs ③ (52 mm, 2.01 in)



2. Remove:
    - brake camshaft lever nut
    - brake camshaft lever bolt
    - brake camshaft lever ①
    - brake shoe wear indicator
    - brake camshaft

NOTE:

When removing the brake camshaft lever, mark the position on the brake camshaft lever where it is aligned with the punch mark in the brake camshaft.

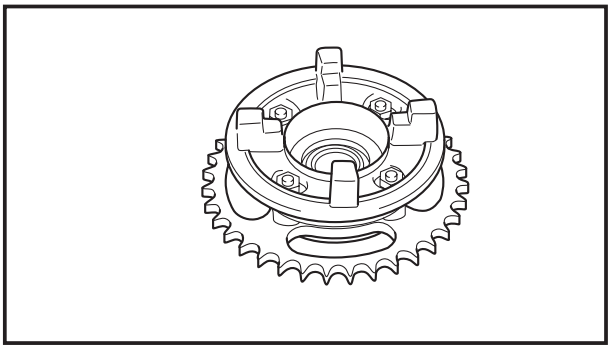
EAS00566

CHECKING THE REAR WHEEL

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

    Refer to “FRONT WHEEL AND BRAKE DISC”.

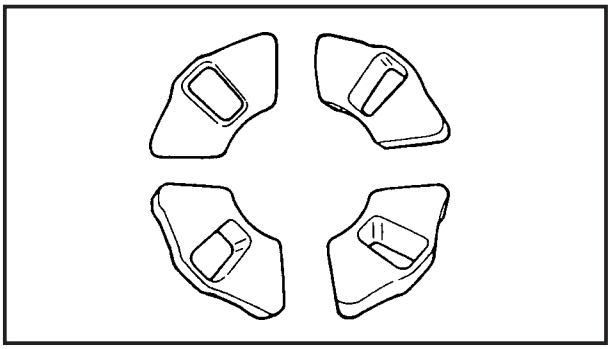
2. Check:
   • tire
   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” in chapter 3.
3. Measure:
   • radial wheel runout
   • lateral wheel runout
   Refer to “FRONT WHEEL AND BRAKE DISC”.



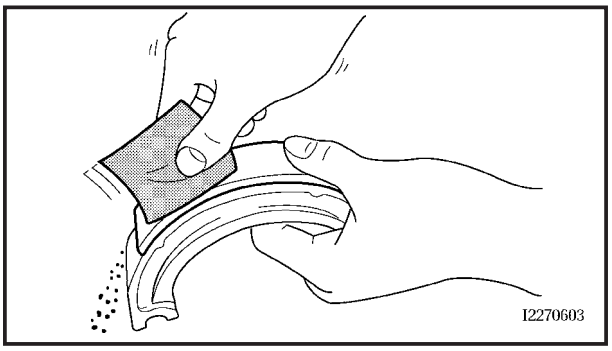
EAS00567

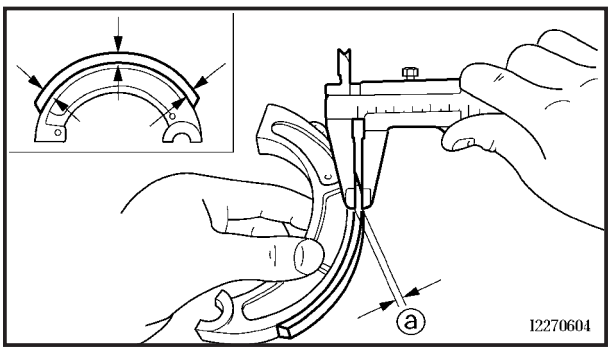
CHECKING THE REAR WHEEL DRIVE HUB

1. Check:
   • rear wheel drive hub
   Cracks/damage → Replace.



   • rear wheel drive hub dampers
   Damage/wear → Replace.





EAS00539

CHECKING THE BRAKE

The following procedure applies to all of the brake shoes.

1. Check:
   - brake shoe lining

   Glazed areas → Repair.

   Sand the glazed areas with course sandpaper.

NOTE:

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

2. Measure:
   - brake shoe lining thickness ⓐ

   Out of specification → Replace.

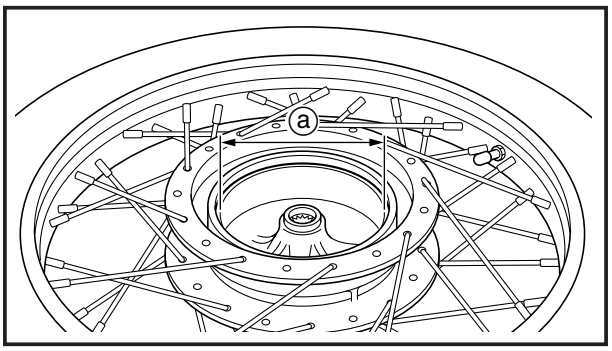
Brake shoe lining thickness limit (minimum)
2.0 mm (0.08 in)

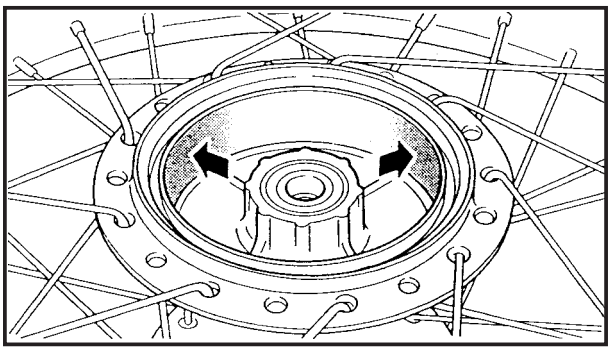
⚠WARNING

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

NOTE:

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





3. Measure:
   - brake drum inside diameter ⓐ

   Out of specification → Replace the wheel.

Brake drum inside diameter limit (maximum)
131 mm (5.16 in)

4. Check:
   - brake drum inner surface

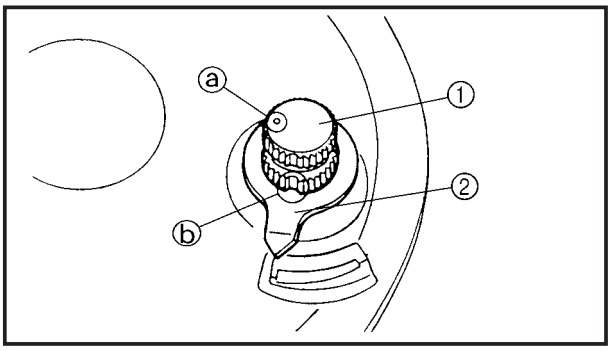
   Oil deposits → Clean.

   Remove the oil with a rag soaked in lacquer thinner or solvent.

   Scratches → Repair.

   Lightly and evenly polish the scratches with an emery cloth.
5. Check:
   - brake camshaft

   Damage/wear → Replace.



EAS00570

ASSEMBLING THE BRAKE SHOE PLATE

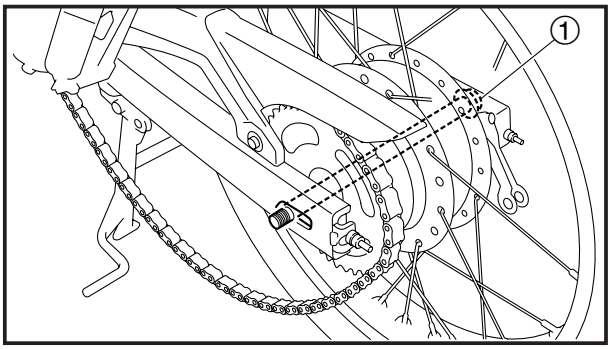
1. Install:
   - brake camshaft ①
   - brake shoe wear indicator ②
   - brake camshaft lever

7 Nm (0.7 m·kg, 5.0 ft·lb)

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

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EAS00571

INSTALLING THE REAR WHEEL

1. Lubricate:
   - spacer
   - collar
   - wheel axle ①
   - wheel bearings
   - rear brake camshaft
   - brake torque rod bolt
   - oil seal lips

Recommended lubricant
Lithium-soap-based grease

2. Install:
   - brake torque rod (to brake shoe plate)

19 Nm (1.9 m·kg, 14 ft·lb)

   - washer
   - cotter pin **New**
3. Install:
   - pin
   - washer
   - compression spring
   - brake rod
   - brake rod adjusting nut

NOTE:

Press down on the brake pedal to install the brake rod.

4. Adjust:
   • drive chain slack



Drive chain slack
25–35 mm (0.98–1.38 in)

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

5. Tighten:
   • wheel axle nut **60 Nm (6.0 m·kg, 43 ft·lb)**

CAUTION:

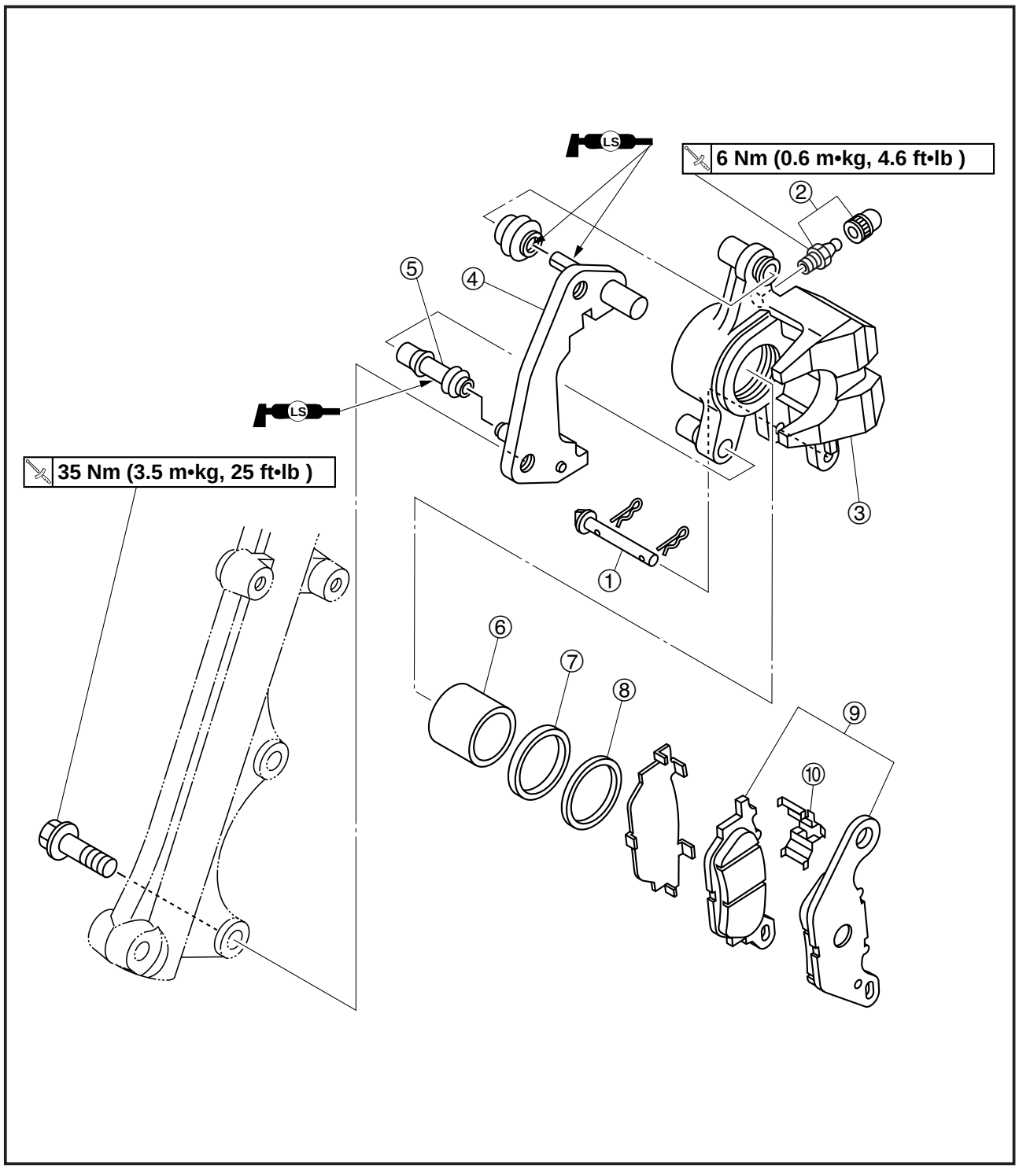
Do not loosen the wheel axle nut after tightening it to the specified torque.

FRONT BRAKE

EASF0052

FRONT BRAKE CALIPER

① Brake pad retaining pin
② Air bleed screw
③ Brake caliper
④ Brake caliper bracket
⑤ Lower brake caliper retaining bolt
⑥ Brake caliper piston
⑦ Brake caliper dust seal
⑧ Brake caliper piston seal
⑨ Brake pad
⑩ Brake pad spring



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 brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**

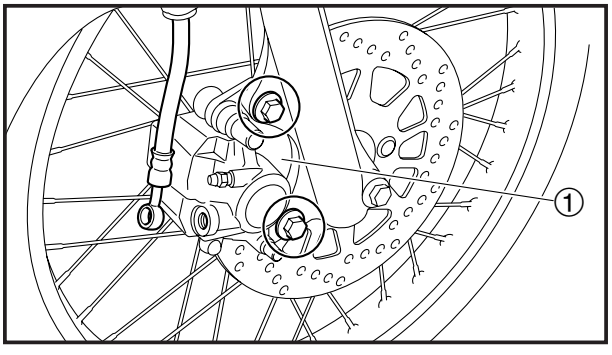
FIRST AID FOR BRAKE FLUID ENTERING THE EYES:
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS00581

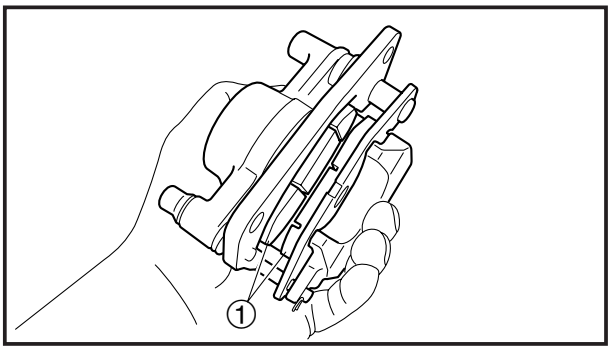
REPLACING THE FRONT BRAKE PADS

NOTE:

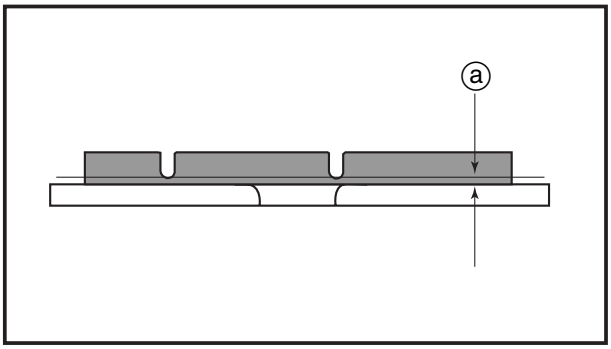
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



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



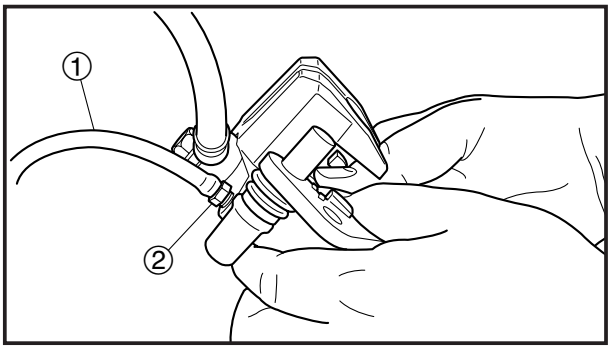
2. Remove:
   - clips
   - brake pad retaining pin
   - brake pads ①
   - brake pad spring



3. Measure:
   - brake pad wear limit ⓐ

   Out of specification → Replace the brake pads as a set.

	Brake pad wear limit **0.8 mm (0.03 in)**



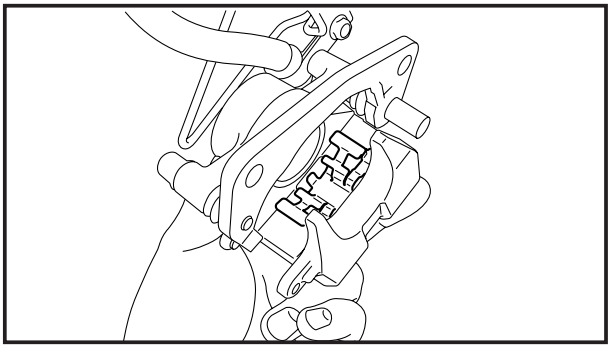
4. Install:
   - brake pad spring
   - brake pads

NOTE:

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

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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, 4.3 ft·lb)**

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

NOTE:

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

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5. Lubricate:
   - brake pad retaining pin

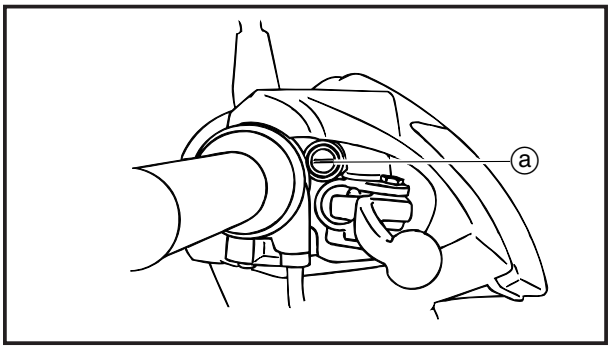
	Recommended lubricant **Lithium-soap-based grease**

CAUTION:

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

6. Install:
   - brake caliper bolts

35 Nm (3.5 m·kg, 25 ft·lb)



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.

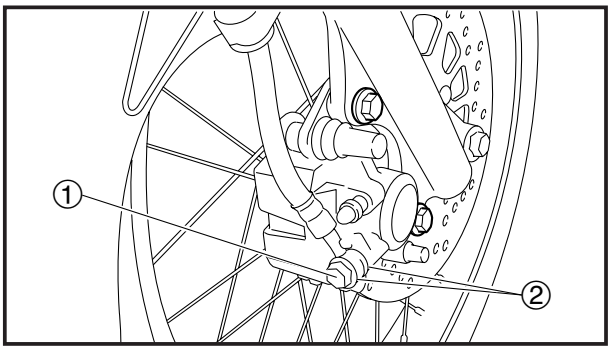
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

EAS00619

DISASSEMBLING THE FRONT BRAKE CALIPER

NOTE:

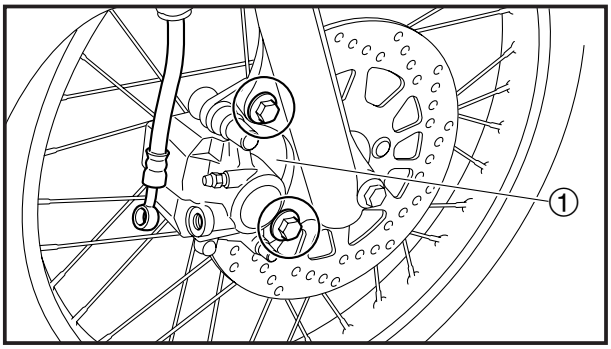
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.



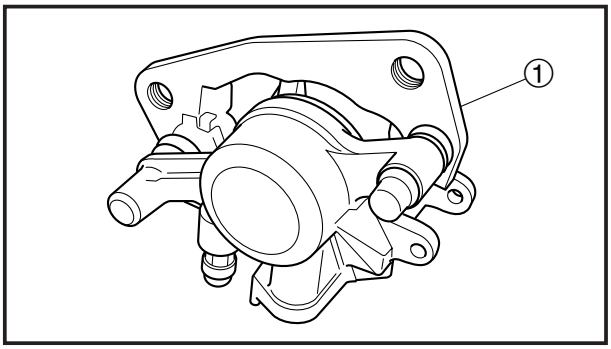
1. Remove:
   - union bolt ①
   - copper washers ②
   - brake hose

NOTE:

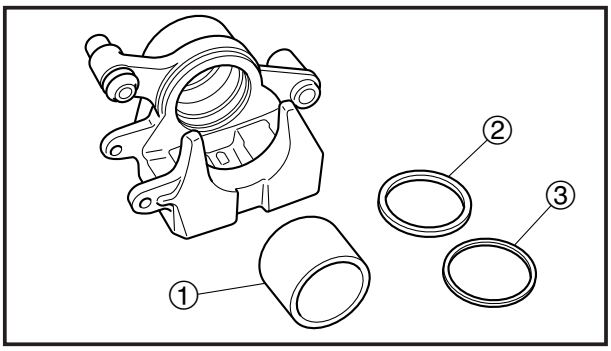
Put the end of the brake hose into a container and pump out the brake fluid carefully.



2. Remove:
   - brake caliper ①
   - pin
   - brake pad retaining pin
   - brake pads
   - brake pad spring



3. Remove:
   - brake caliper bracket ①



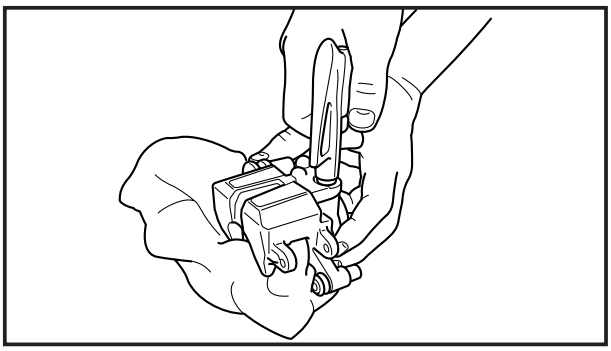
4. Remove:
   - brake caliper piston ①
   - brake caliper piston seal ②
   - brake caliper dust seal ③

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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 are expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**



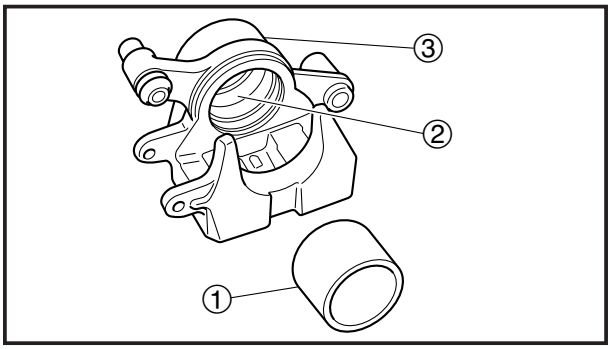
b. Remove the brake caliper piston seal and brake caliper dust seal.

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EAS00631

CHECKING THE FRONT BRAKE CALIPER

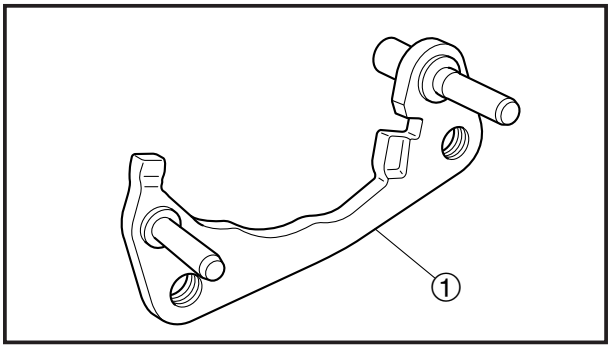
Recommended brake component replacement schedule	
Brake pads	**If necessary**
Piston seal	**Every two years**
Brake hose	**Every four years**
Brake fluid	**Every two years and whenever the brake is disassembled**



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

⚠WARNING

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



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

EAS00634

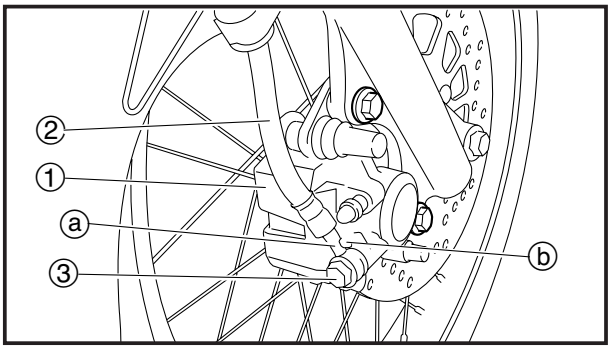
ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER

⚠WARNING

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

Recommended brake fluid
DOT 3 or 4

1. Install:
   - brake caliper ①
     (temporarily)
   - copper washers **New**
   - brake hose ②
   - union bolt ③ **26 Nm (2.6 m·kg, 19 ft·lb)**



⚠WARNING

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

CAUTION:

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

2. Remove:
   - brake caliper
3. Install:
   - brake pad springs
   - brake pads
   - brake pad retaining pin
   - brake caliper **35 Nm (3.5 m·kg, 25 ft·lb)**
     Refer to "REPLACING THE FRONT BRAKE PADS".
4. Remove:
   - headlight assembly
     Refer to "REMOVING THE HEADLIGHT ASSEMBLY" in chapter 3.

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

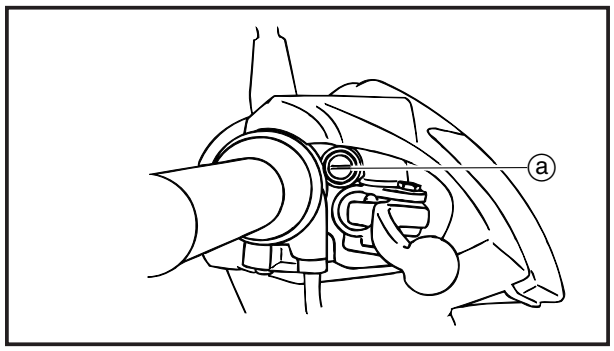
	Recommended brake fluid **DOT 3 or 4**

⚠WARNING

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

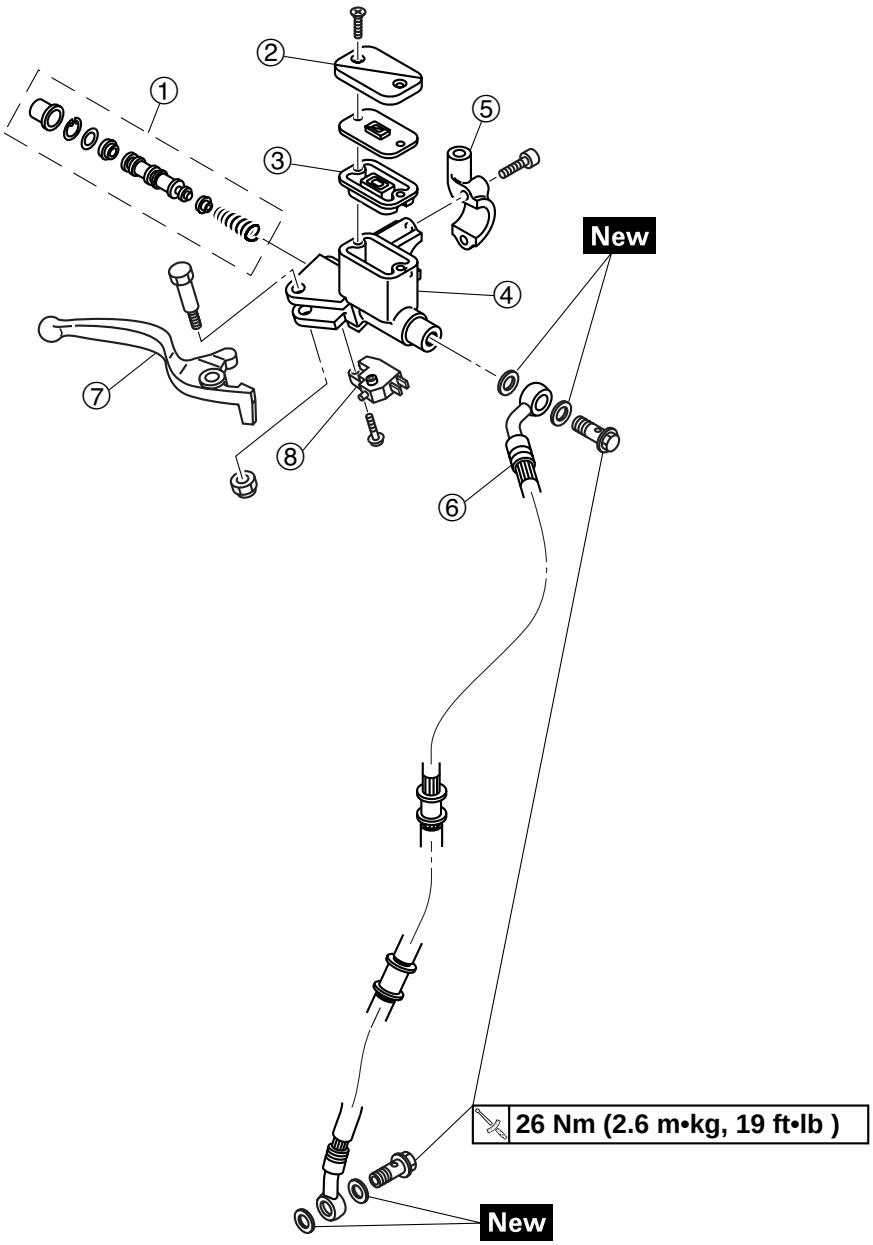


6. Bleed:
   - brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
7. Check:
   - brake fluid level
     Below the minimum level mark ⓐ → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
8. Check:
   - brake lever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

EASF0050

FRONT BRAKE MASTER CYLINDER

① Brake master cylinder kit
② Brake master cylinder reservoir cap
③ Brake master cylinder reservoir diaphragm
④ Brake master cylinder
⑤ Brake master cylinder holder
⑥ Brake hose
⑦ Brake lever
⑧ Front brake light switch



EAS00588

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

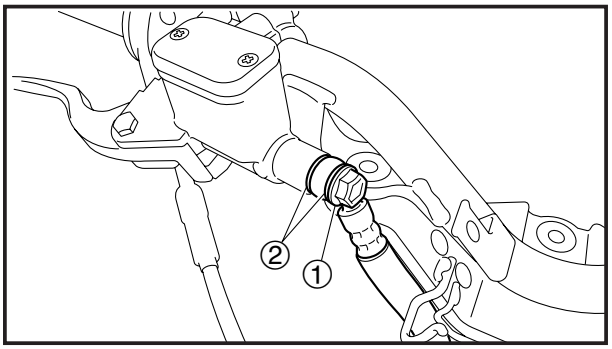
NOTE:

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

1. Remove:
   - side cowlings (left and right)
   - front cowling

   Refer to “REMOVING THE SIDE COWLINGS” and “REMOVING THE FRONT COWLING” in chapter 3.
   - headlight assembly

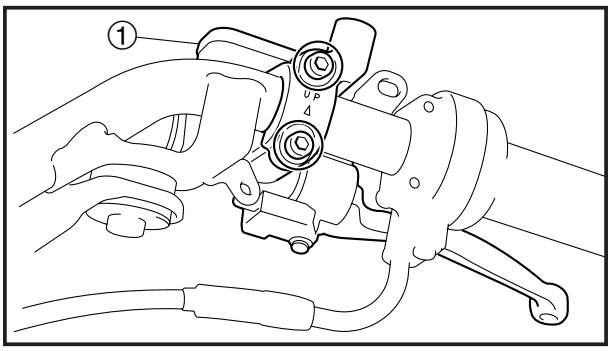
   Refer to “REMOVING THE HEADLIGHT ASSEMBLY” in chapter 3.



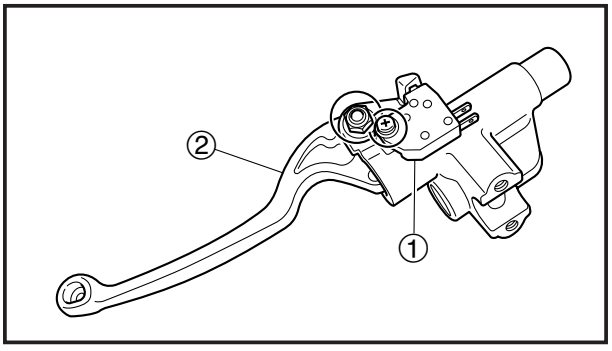
2. Remove:
   - union bolt ①
   - copper washers ②
   - brake hose

NOTE:

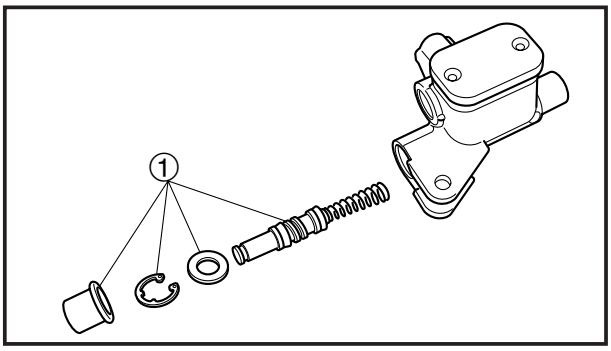
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



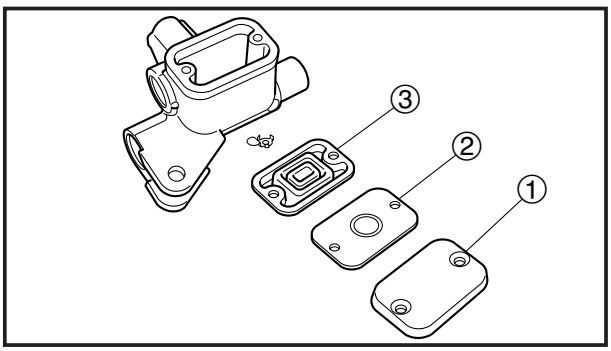
3. Remove:
   - brake master cylinder assembly ①



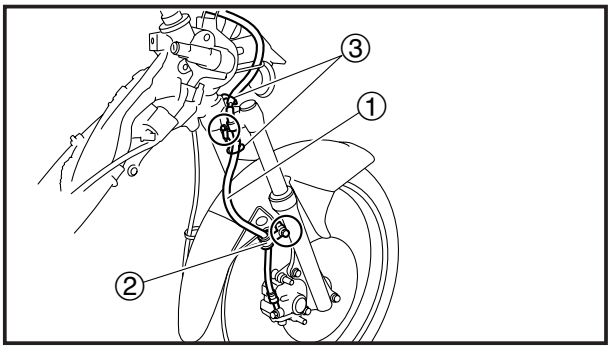
4. Remove:
   - brake light switch ①
   - brake lever ②



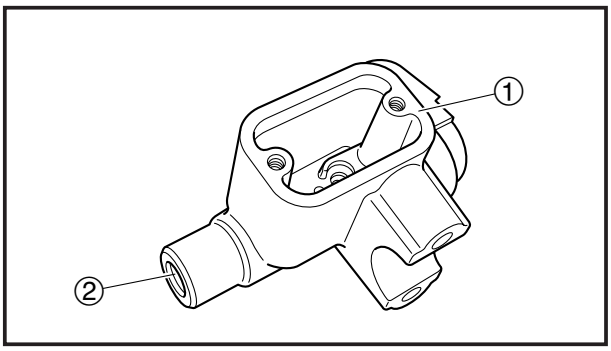
5. Remove:
   - brake master cylinder kit ①



6. Remove:
   - brake master cylinder reservoir cap ①
   - brake master cylinder reservoir diaphragm holder ②
   - brake master cylinder reservoir diaphragm ③



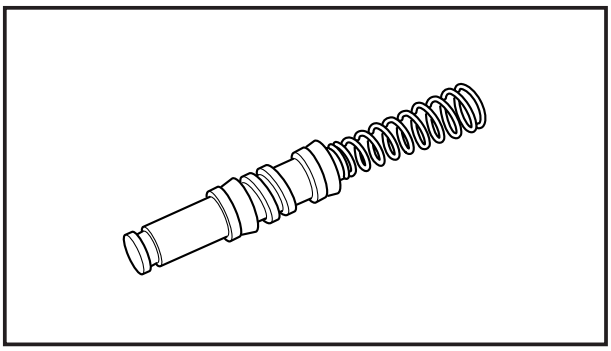
7. Remove:
   - brake hose ①
   - brake hose clamp ②
   - brake hose holder ③



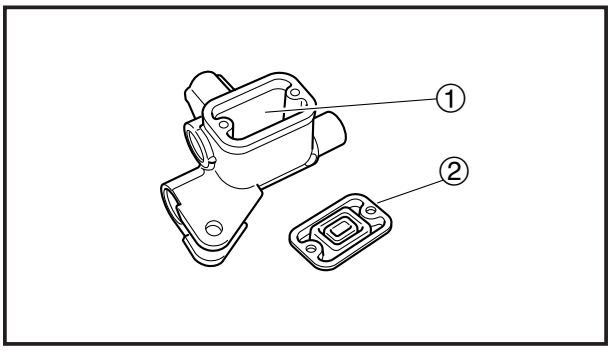
EAS00590

CHECKING THE FRONT BRAKE MASTER CYLINDER

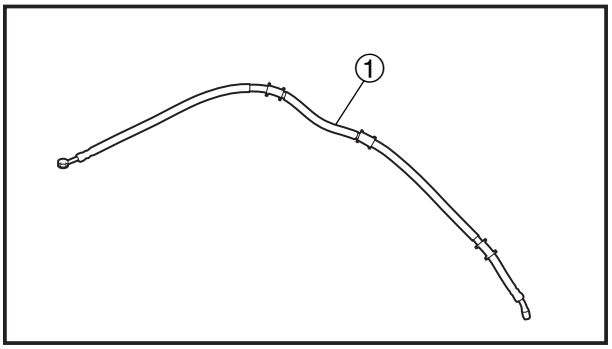
1. Check:
   - brake master cylinder ①
     Damage/scratches/wear → Replace.
   - brake fluid delivery passages ②
     (brake master cylinder body)
     Obstructions → Blow out with compressed air.



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



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



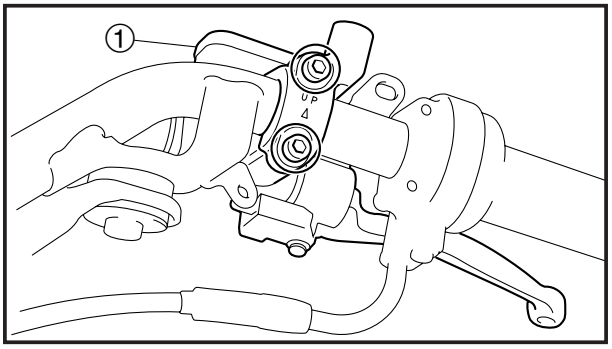
4. Check:
   - brake hose ①
     Cracks/damage/wear → Replace.

EAS00598

ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

⚠WARNING

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



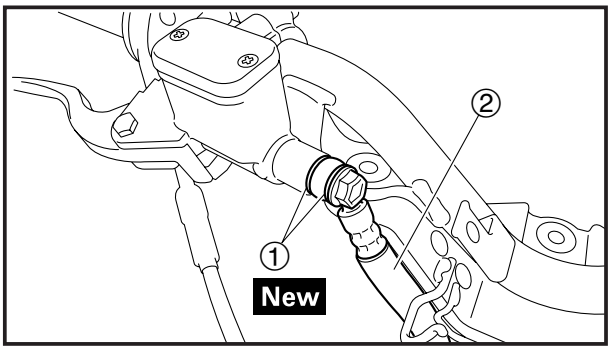
Recommended brake fluid
DOT 3 or 4

1. Install:
   - brake master cylinder ①

11 Nm (1.1 m·kg, 8.0 ft·lb)

NOTE:

- Install the brake master cylinder holder with the mark facing up.
- Adjust the brake master cylinder to the proper angle.
- First, tighten the upper bolt, then the lower bolt.



2. Install:
   - copper washers ① **New**
   - brake hose ②
   - union bolt — **26 Nm (2.6 m·kg, 19 ft·lb)**

⚠WARNING

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

NOTE:

Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.

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

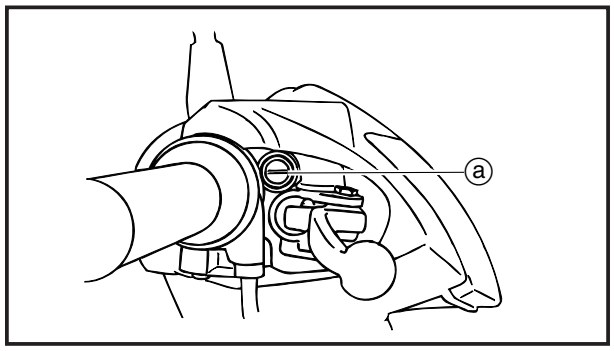
Recommended brake fluid
DOT 3 or 4

⚠WARNING

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

CAUTION:

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



4. Bleed:
   - brake system

   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
5. Check:
   - brake fluid level

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

   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
6. Check:
   - brake lever operation

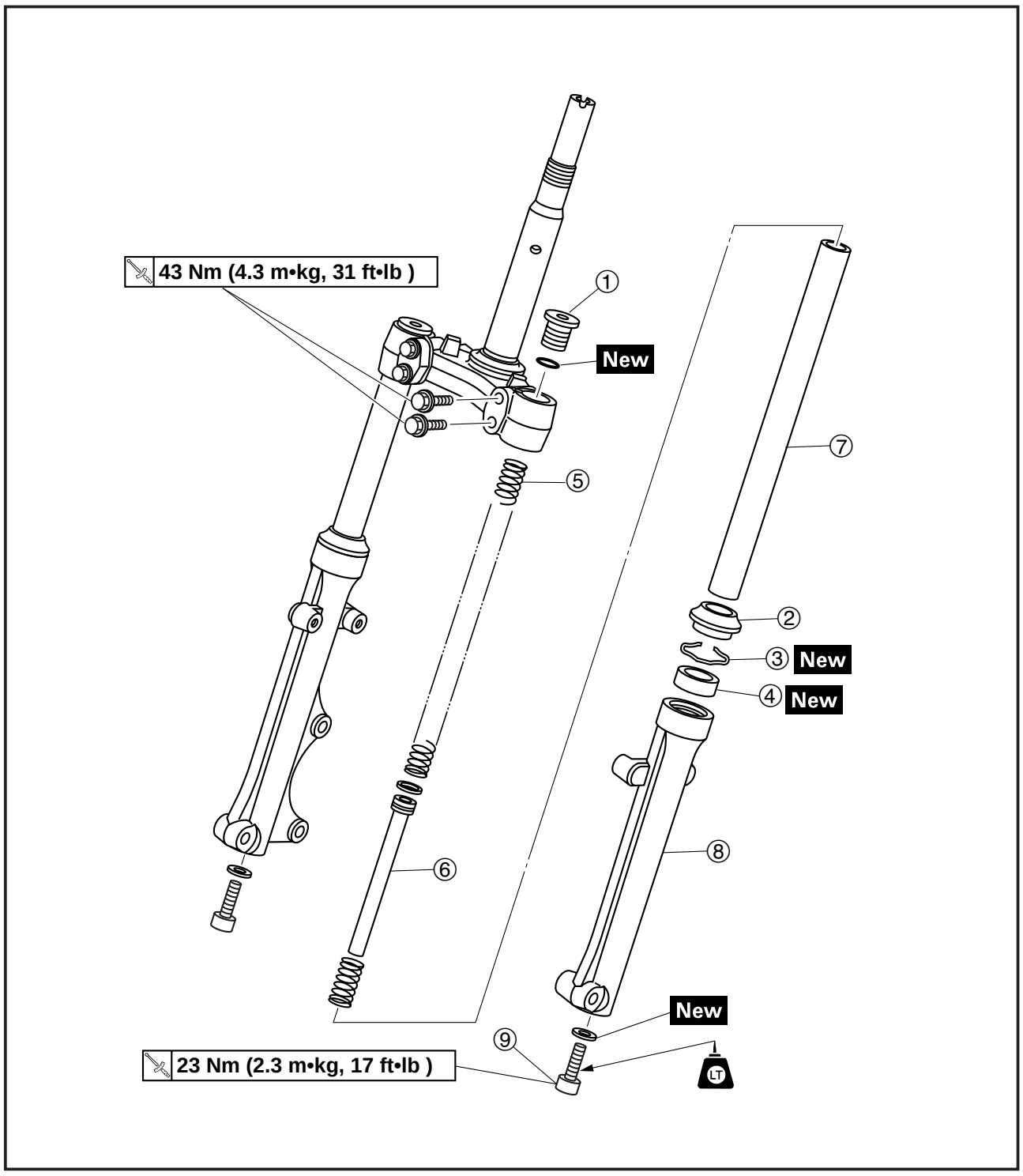
   Soft or spongy feeling → Bleed the brake system.

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

EASF0054

FRONT FORK

① Front fork cap bolt
② Dust seal
③ Oil seal clip
④ Oil seal
⑤ Fork spring
⑥ Damper rod
⑦ Inner tube
⑧ Outer tube
⑨ Damper rod bolt



EAS00649

REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

⚠WARNING

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

NOTE:

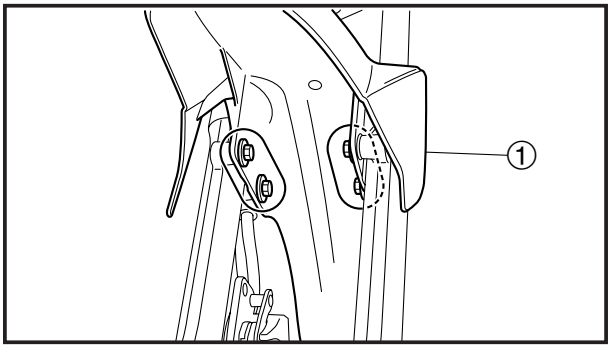
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Remove:
   - side cowlings (left and right)
   - front cowling
   - center panels
   - inner panel

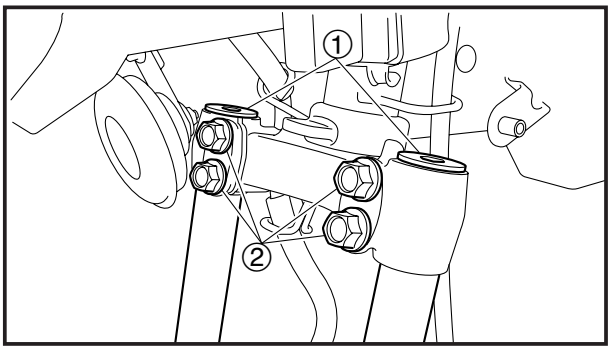
   Refer to “COVERS” in chapter 3.
3. Remove:
   - brake caliper assembly
   - brake hose clamp

   Refer to “FRONT BRAKE”.
   - front wheel

   Refer to “FRONT WHEEL AND BRAKE DISC”.



4. Remove:
   - front fender bolts
   - washers
   - collars
   - front fender ①



5. Remove:
   - front fork cap bolt ①
     (with a 10-mm hexagonal wrench)
6. Loosen:
   - lower bracket pinch bolt ②

⚠WARNING

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

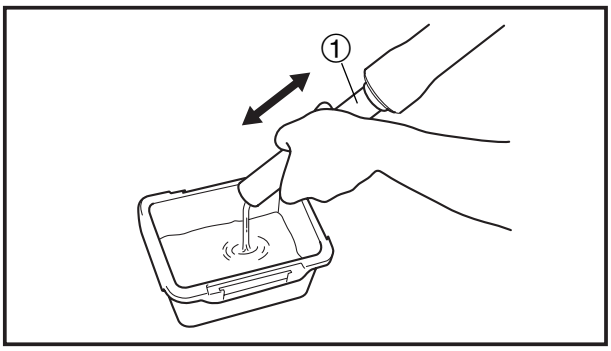
7. Remove:
   - front fork leg

EAS00655

DISASSEMBLING THE FRONT FORK LEGS

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

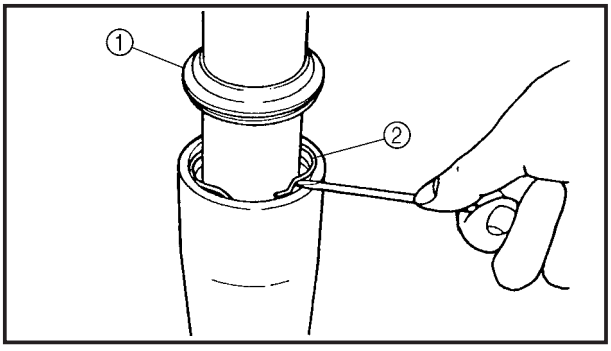
1. Remove:
   - fork spring



2. Drain:
   - fork oil

NOTE:

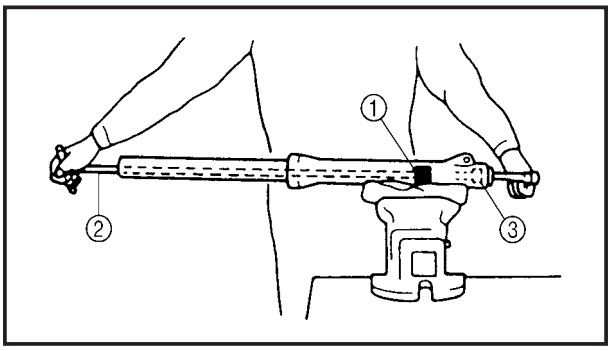
Stroke the inner tube ① several times while draining the fork oil.



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

CAUTION:

Do not scratch the inner tube.



4. Remove:
   - damper rod assembly bolt
   - copper washer

NOTE:

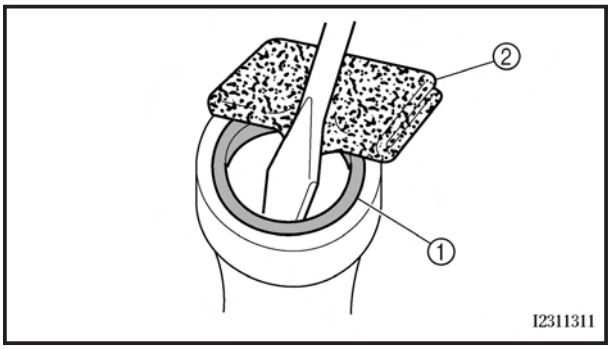
While holding the damper rod assembly with a 10 mm hexagon nut/socket wrench ① and the T-handle ②, loosen the damper rod assembly bolt ③.

	T-handle **90890-01326**

5. Remove:
   - inner tube
   - rebound spring
   - damper rod

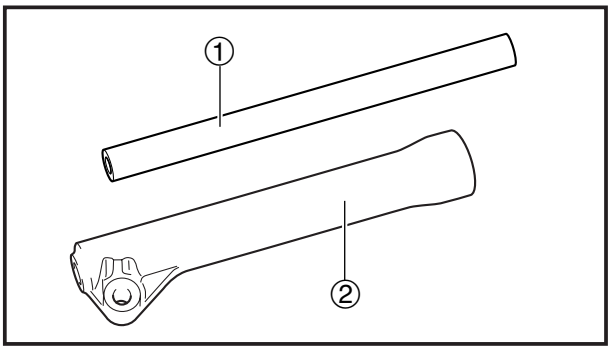
NOTE:

Pull out the inner tube and damper rod together.



6. Remove:
   - oil seal ①

② Rag



EAS00657

CHECKING THE FRONT FORK LEGS

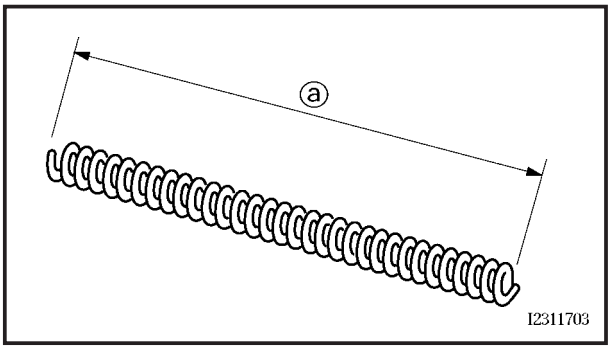
The following procedure applies to both of the front fork legs.

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

   Bends/damage/scratches → Replace.

⚠WARNING

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

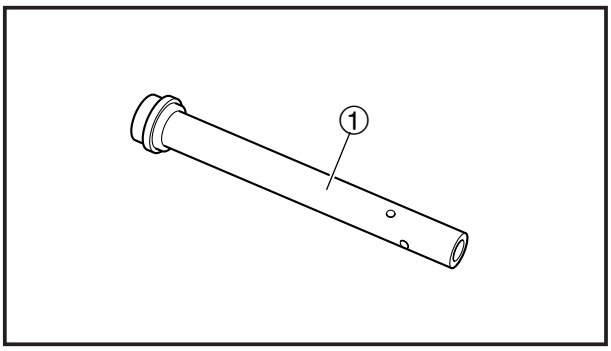


2.Measure:

- spring free length ⓐ

  Out of specifications → Replace.

Spring free length
295.3 mm (11.63 in)
<Limit>: 289.4 mm (11.39 in)



3. Check:
   - damper rod ①

   Damage/wear → Replace.

   Obstructions → Blow out all of the oil passages with compressed air.

CAUTION:

- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

EAS00659

ASSEMBLING THE FRONT FORK LEGS

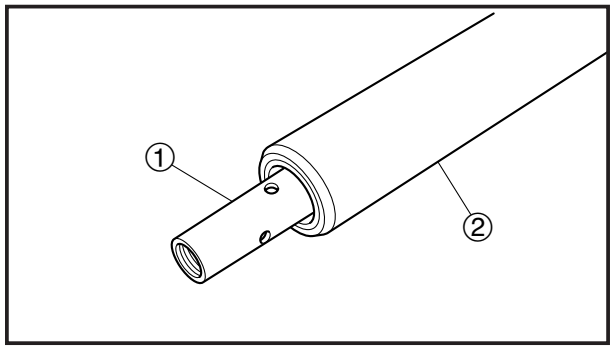
The following procedure applies to both of the front fork legs.

⚠WARNING

- **Make sure 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 oil seal.
- Before assembling the front fork leg, make sure all of the components are clean.



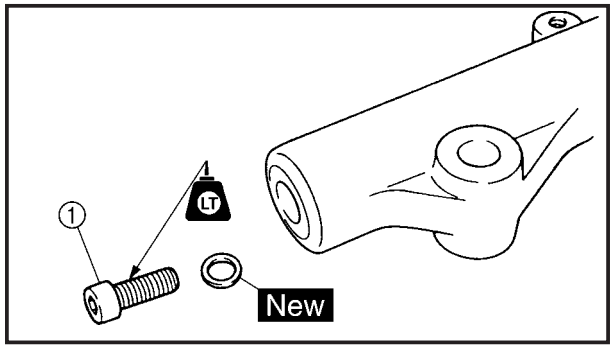
1. Install:
   - damper rod ①
   - rebound spring
   - inner tube ②

CAUTION:

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

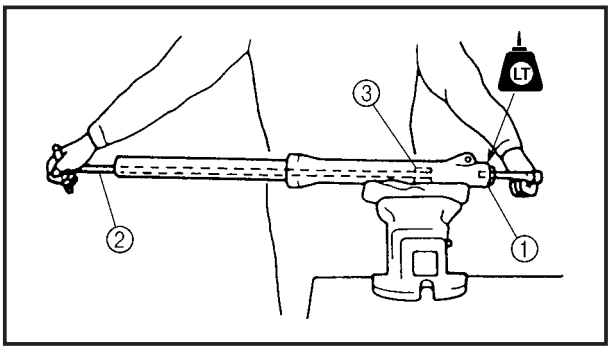
2. Lubricate:
   - inner tube outer surface

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



3. Tighten:
   - damper rod assembly bolt ①

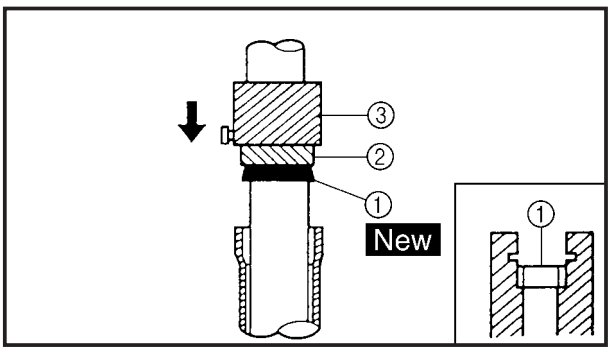
	23 Nm (2.3 m·kg, 17 ft·lb) **LOCTITE®**



NOTE:

Tighten the damper rod assembly bolt ① while holding the damper rod with the T-handle ② and a 10 mm hexagon nut/socket wrench ③.

	**T-handle** **90890-01326**

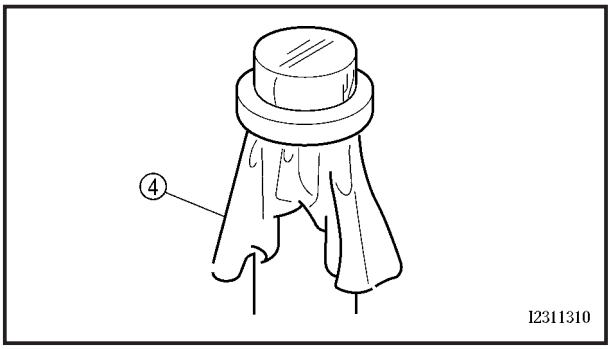


4. Install:
   - oil seal ① **New**
     (with the fork seal driver weight ② and fork seal driver attachment ③)

	**Fork seal driver weight** **90890-01184** **Fork seal driver attachment** **90890-01186**

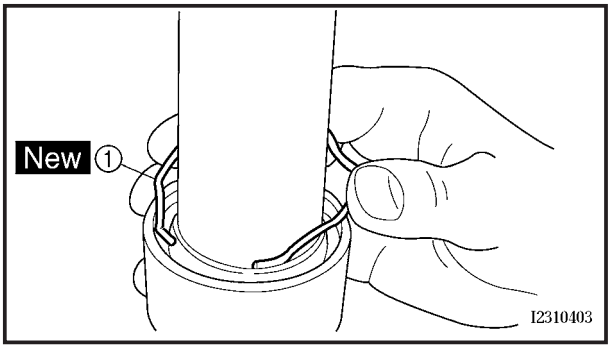
CAUTION:

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



NOTE:

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



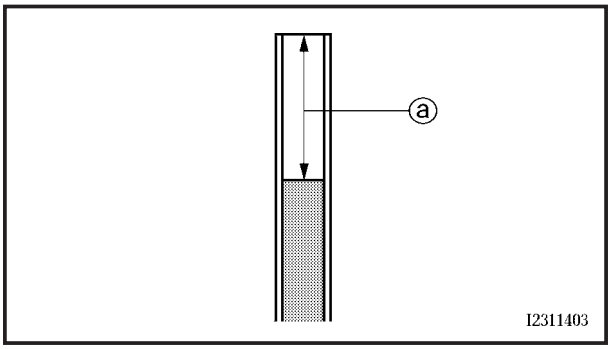
5. Install:
   - oil seal clip ① **New**

NOTE:

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

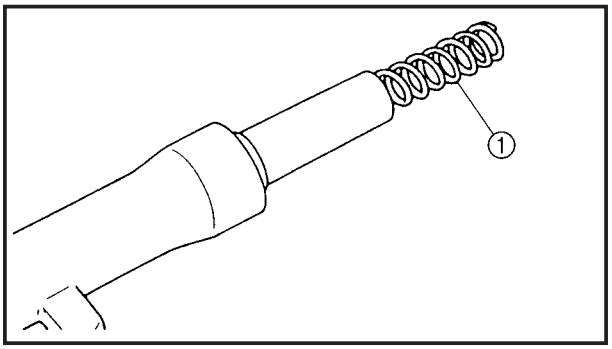
6. Fill:
   - front fork leg
     (with the specified amount of the recommended fork oil)

Quantity (each front fork leg)
0.064 L (2.26 Imp.oz, 2.16 US oz)
Recommended oil
Fork oil 10W or equivalent



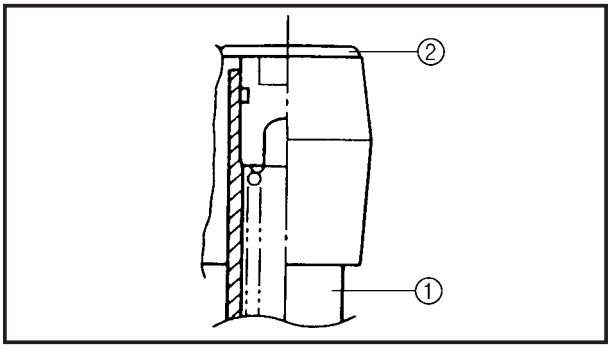
Front fork leg oil level ⓐ (from the top of the inner tube, with the inner tube fully compressed and without the fork spring)
104.5 mm (4.11 in)

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



7. Install:
   - fork spring ①

NOTE:
Install the fork spring with the smaller pitch facing up.



EAS00662

INSTALLING THE FRONT FORK LEGS

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

1. Install:
   - front fork leg ①
   - front fork cap bolt ②
     Temporarily tighten the lower bracket pinch bolt.

NOTE:
Pull up the inner tube until it is stopped, then install the front fork cap bolt ②.

2. Tighten:
   - lower bracket pinch bolt ①

43 Nm (4.3 m·kg, 31 ft·lb)

   - front fork cap bolt ②

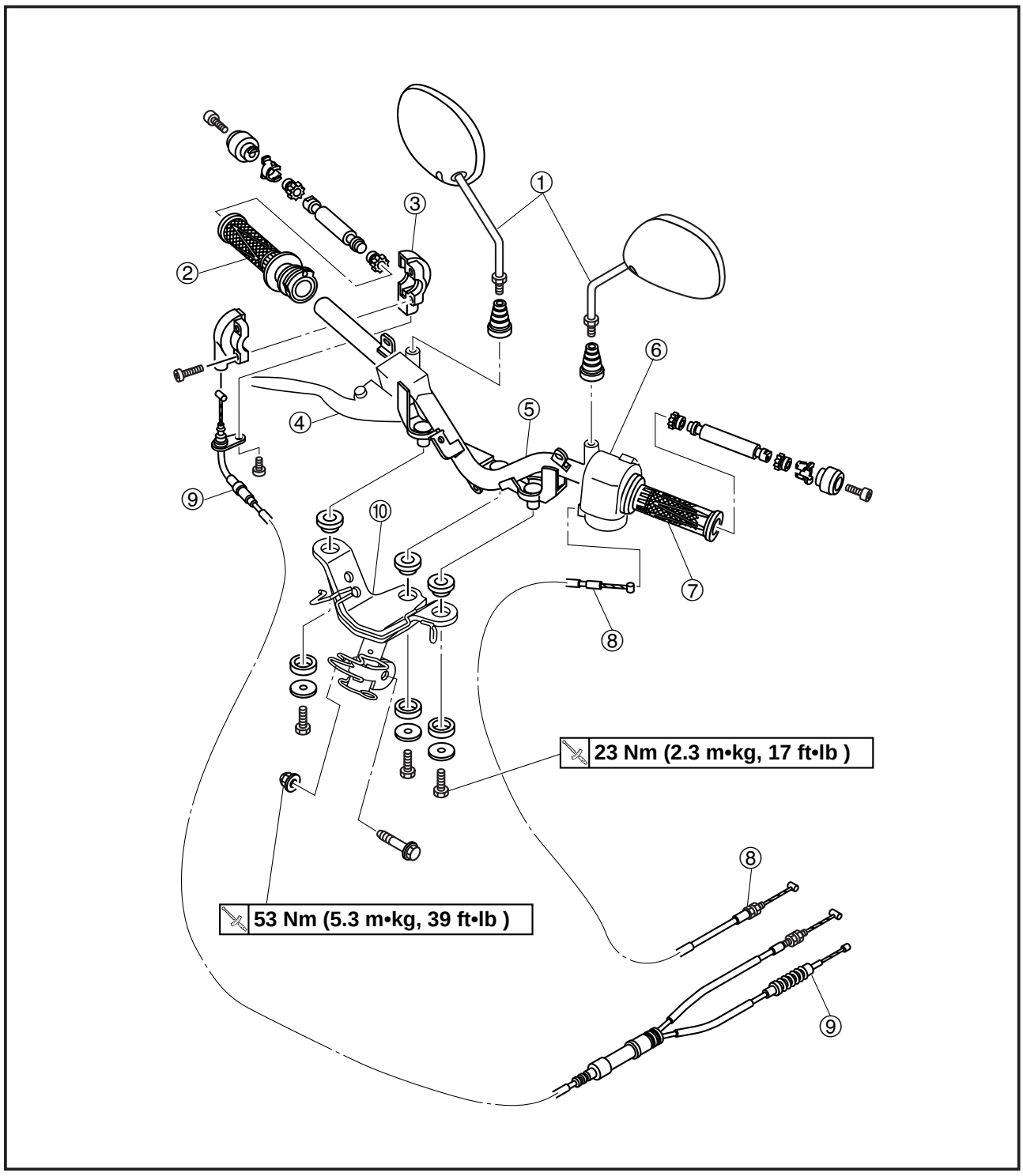
50 Nm (5.0 m·kg, 36 ft·lb)

3. Install:
   - front fender — **10 Nm (1.0 m·kg, 7.2 ft·lb)**
4. Install:
   - front wheel
     Refer to “FRONT WHEEL AND BRAKE DISC”.
   - brake hose clamp
   - brake caliper assembly
     Refer to “FRONT BRAKE”.

EASF0055

HANDLEBAR

① Rear view mirror (left and right)
② Throttle grip
③ Throttle housing
④ Master cylinder
⑤ Handlebar
⑥ Left handlebar switch
⑦ Handlebar grip
⑧ Starter cable
⑨ Throttle cable
⑩ Handlebar bracket



EAS00666

REMOVING THE HANDLEBAR

1.Stand the vehicle on a level surface.

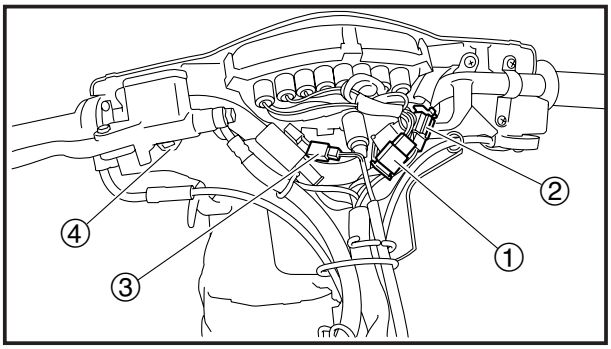
⚠WARNING

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

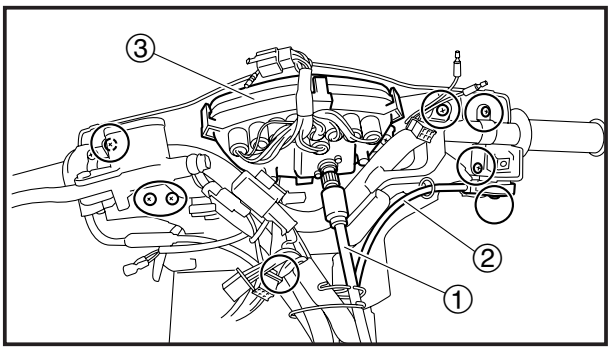
2. Remove:
   - side cowlings (left and right)
   - front cowling
   - center panels

   Refer to “REMOVING THE FRONT COWLINGS” in chapter 3.
   - headlight assembly

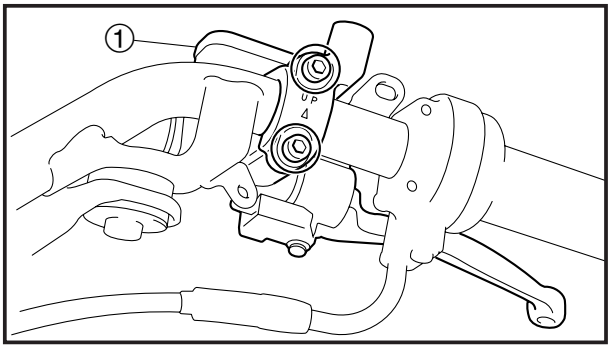
   Refer to “REPLACING THE HEADLIGHT BULBS” in chapter 3.



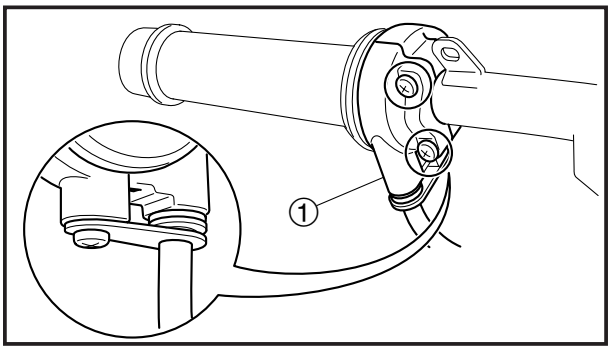
3. Disconnect:
   - meter assembly couplers ①
   - right handlebar switch coupler ②
   - left handlebar switch coupler ③
   - front brake light switch connectors ④



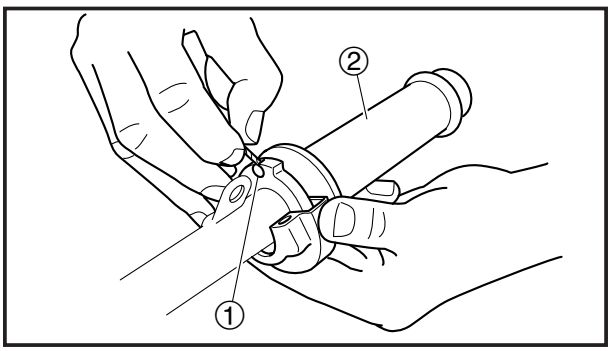
4. Disconnect:
   - speedometer cable ①
   - choke cable ②
5. Remove:
   - speedometer assembly ③



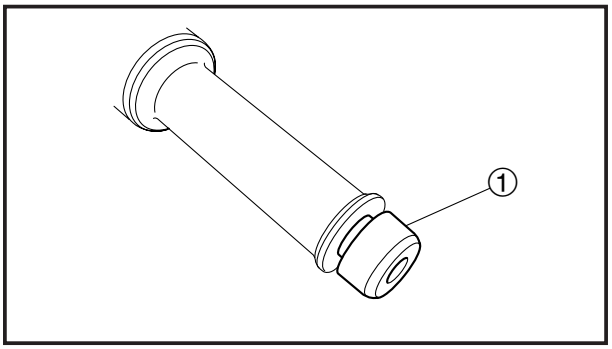
6. Remove:
   - rear view mirrors (left and right)
   - brake master cylinder ①
   - throttle housing



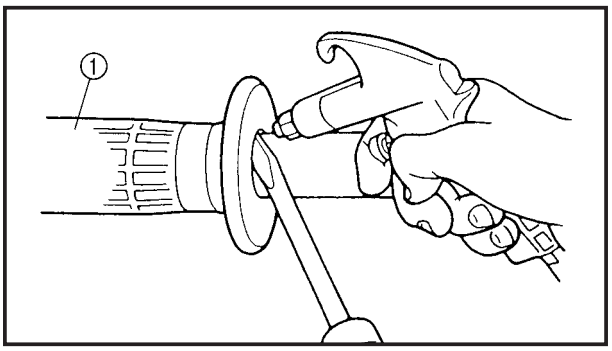
7. Remove:
   - lever holder ①



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



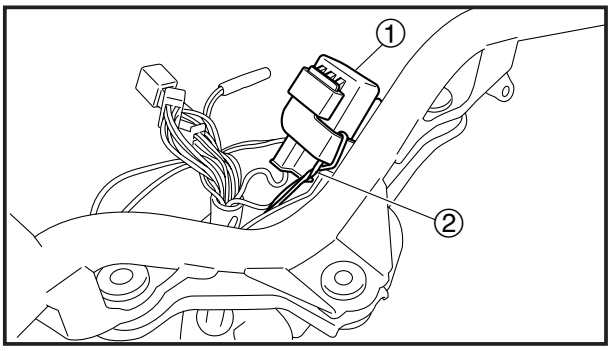
9. Remove:
   - grip end ①



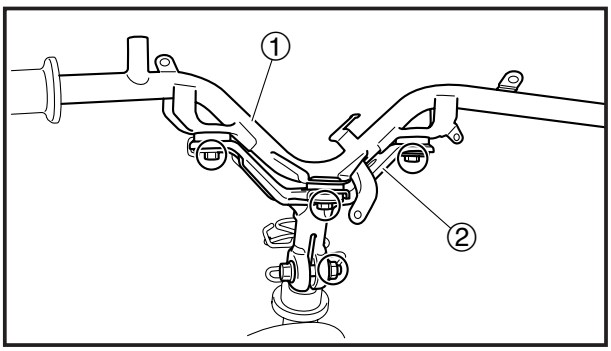
10. Remove:
    - handlebar grip ①

NOTE:

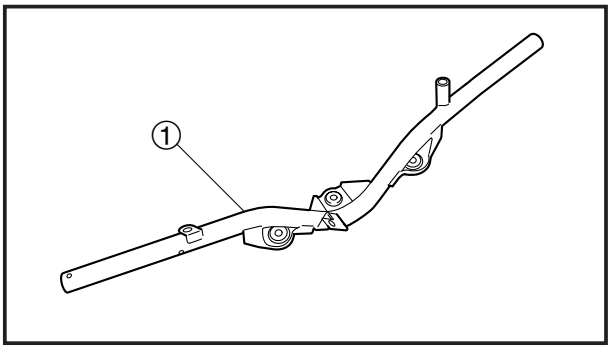
Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



11. Remove:
    - relay
    - wire harness strap ①



12. Remove:
    - handlebar ①
    - washers
    - bushings
    - handlebar bracket ②



EAS00668

CHECKING THE HANDLEBAR

1. Check:
    - handlebar ①

    Bends/cracks/damage → Replace.

⚠WARNING

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

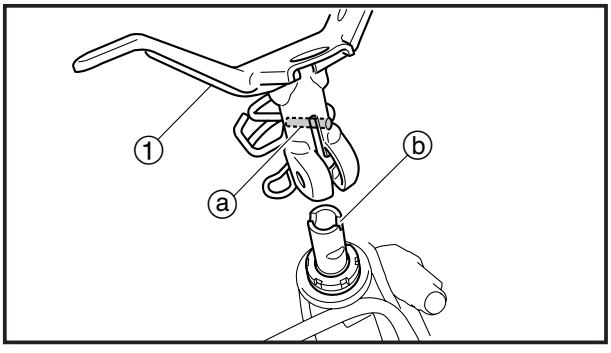
EAS00670

INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

⚠WARNING

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



2. Install:
    - handlebar bracket ①

53 Nm (5.3 m·kg, 38 ft·lb)

NOTE:

Align the projection ⓐ in the handlebar bracket with the slit ⓑ in the steering shaft.

3. Install:
   - bushings
   - washers
   - handlebar **23 Nm (2.3 m·kg, 17 ft·lb)**
   - wire harness strap

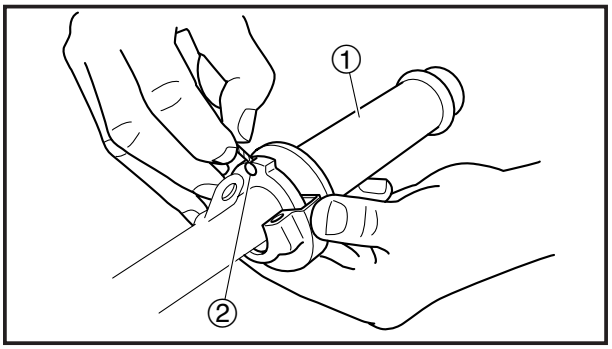
   Refer to “CABLE ROUTING” in chapter 2.
4. Install:
   - handlebar grip

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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.

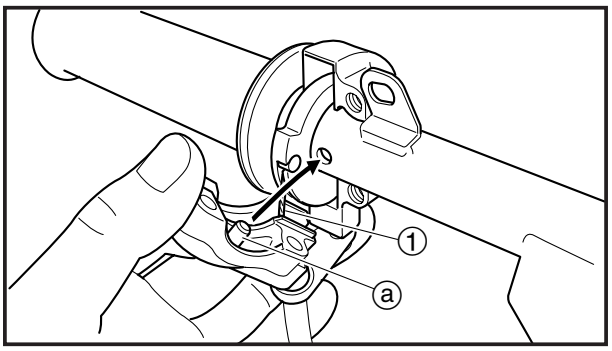


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5. Install:
   - throttle grip ①
   - throttle cable ②
   - throttle housing

NOTE:

Lubricate the inside of the throttle grip with a thin coat of lithium-soap-based grease and install it onto the handlebar.



6. Install:
   - lever holder ①

NOTE:

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

⚠WARNING

Make sure the throttle grip operates smoothly.

7. Install:
   - brake master cylinder

     11 Nm (1.1 m·kg, 8.0 ft·lb)

     Refer to “FRONT BRAKE”.
8. Install:
   - plastic locking ties

     Refer to “CABLE ROUTING” in chapter 2.
9. Adjust:
   - throttle cable free play

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

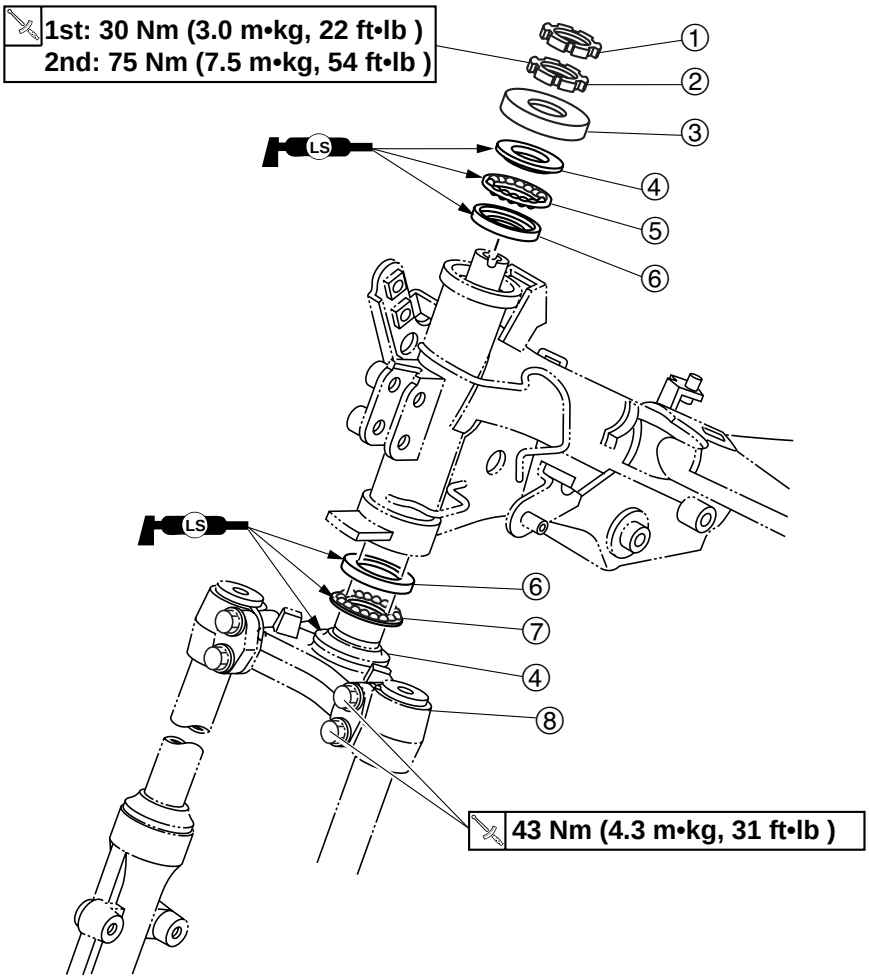


Throttle cable free play (at the flange of the throttle grip)
3–7 mm (0.12–0.28 in)

EASF0057

STEERING HEAD

① Upper ring nut
② Lower ring nut
③ Ball race cover
④ Bearing inner race
⑤ Upper bearing
⑥ Bearing outer race
⑦ Lower bearing
⑧ Lower bracket



EAS00679

REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

⚠WARNING

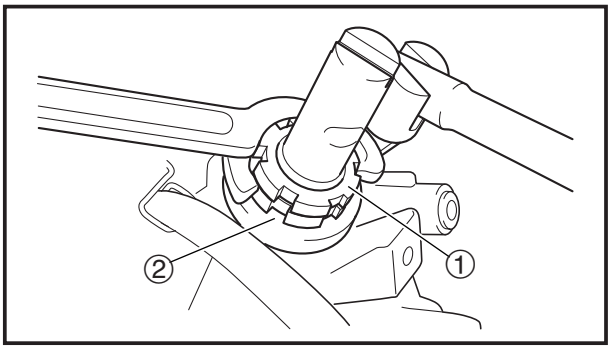
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   - side cowlings (left and right)
   - center panels
   - inner panel

   Refer to "REMOVING THE FRONT COWLINGS" in chapter 3.
   - front fork

   Refer to "FRONT FORK".
   - handlebar

   Refer to "HANDLEBAR".



3. Remove:
   - upper ring nut ①
   - lower ring nut ②

NOTE:

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



Steering nut wrench
90890-01403
Ring nut wrench
90890-01268

⚠WARNING

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

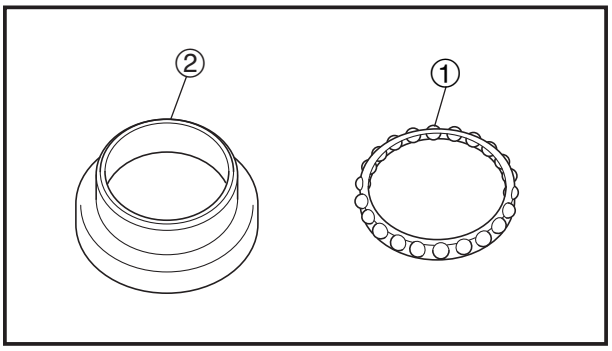
EAS00681

CHECKING THE STEERING HEAD

1. Wash:
   - bearings
   - bearing races

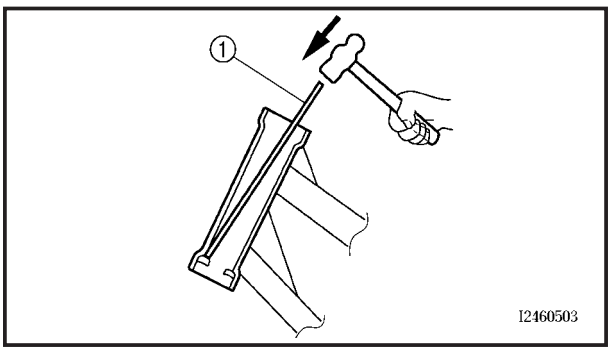


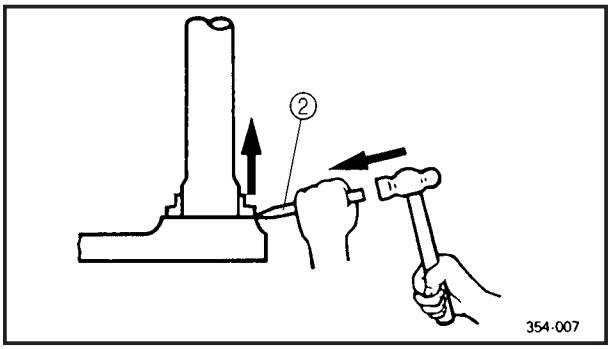
Recommended cleaning solvent
Kerosene



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.

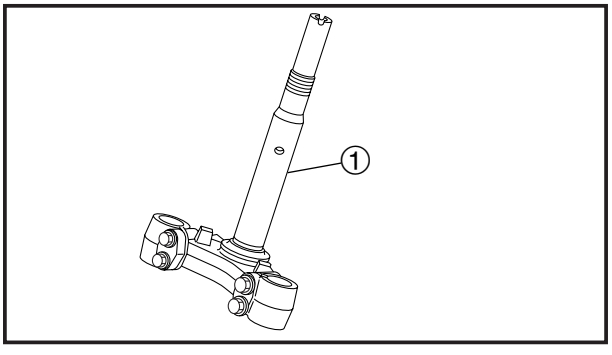
CAUTION:

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:
   - lower bracket ①

   (along with the steering stem)

   Bends/cracks/damage → Replace.

EAS00683

INSTALLING THE STEERING HEAD

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

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

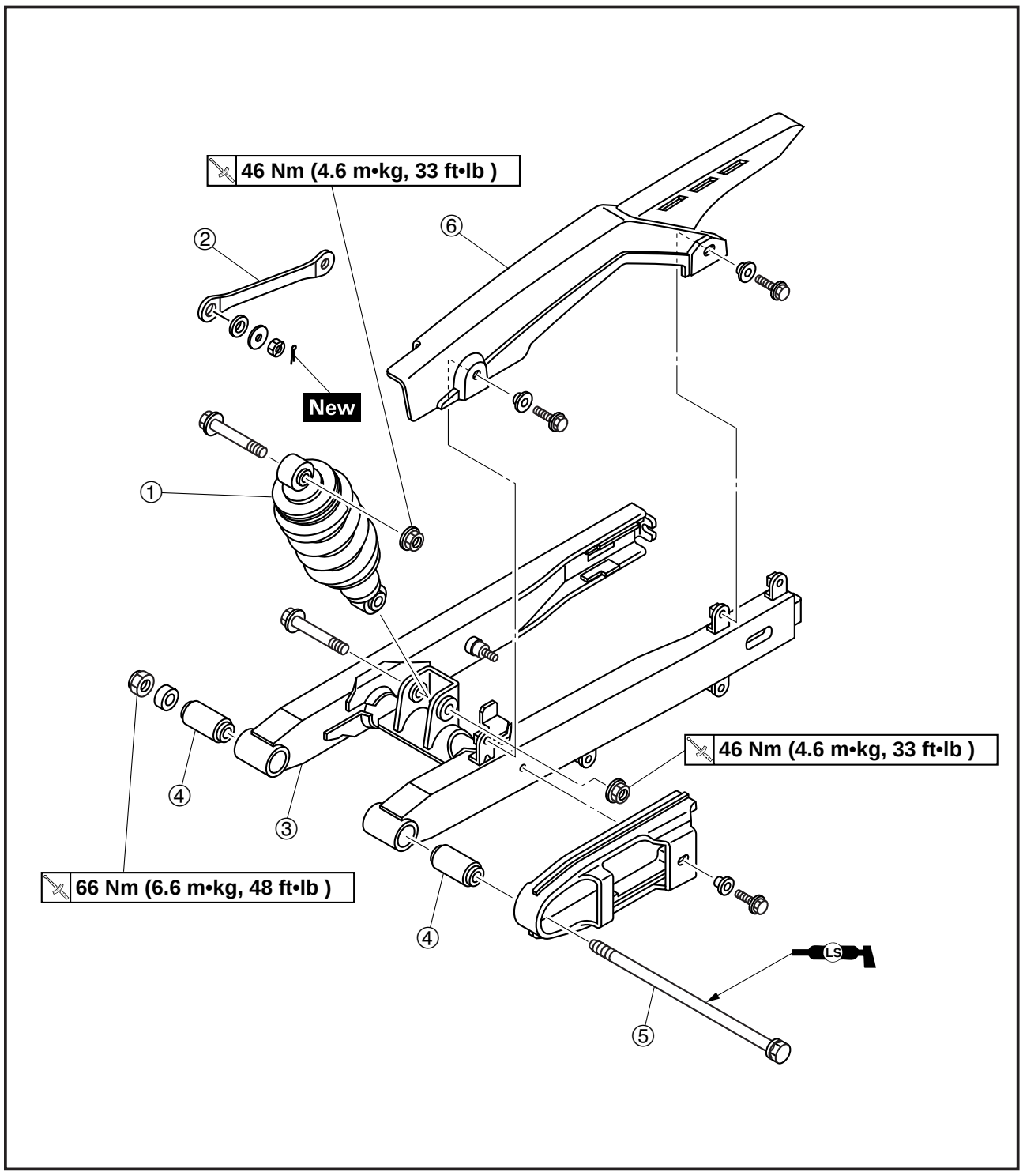
2. Install:
   - lower ring nut
   - upper ring nut

   Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” in chapter 3.
3. Install:
   - front fork legs

   Refer to “FRONT FORK”.

REAR SHOCK ABSORBER ASSEMBLY AND SWINGARM

① Rear shock absorber
② Brake torque rod
③ Swingarm
④ Bushing
⑤ Swingarm pivot shaft
⑥ Drive chain case



EAS00691/EAS00702

REMOVING THE REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

1. Stand the vehicle on a level surface.

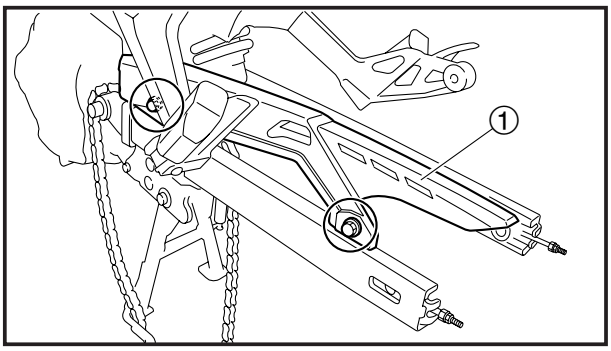
⚠WARNING

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

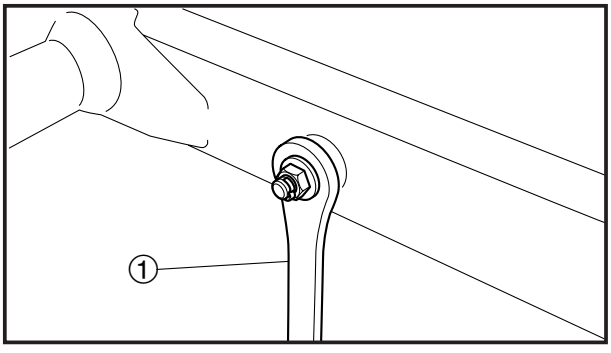
NOTE:

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

2. Remove:
   - center panel
   - rear cowlings (left and right)
     Refer to “REMOVING THE REAR COWLINGS” in chapter 3.
   - muffler
     Refer to “REMOVING THE ENGINE” in chapter 4.
   - rear wheel
     Refer to “REAR WHEEL AND BRAKE”.

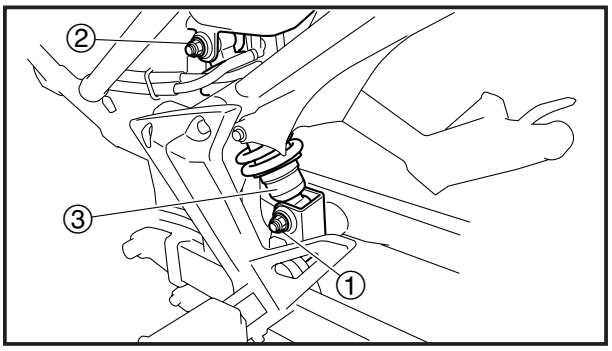


3. Remove:
   - drive chain case bolts
   - drive chain case ①

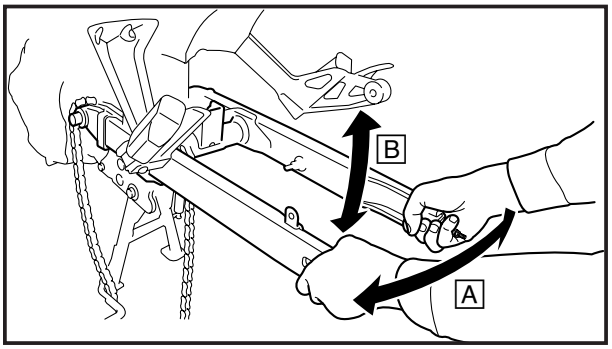


4. Remove:
   - cotter pin
   - washer
   - brake torque rod ①

REAR SHOCK ABSORBER ASSEMBLY AND SWINGARM



5. Remove:
   - rear shock absorber bolt (upper and lower) ①
   - washer
   - rear shock absorber nut (upper and lower) ②
   - washers
   - rear shock absorber assembly ③



6. Measure:
   - swingarm side play
   - swingarm vertical movement

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Measure the tightening torque of the swingarm pivot shaft nut.

	Pivot shaft nut **66 Nm (6.6 m·kg, 43 ft·lb)**

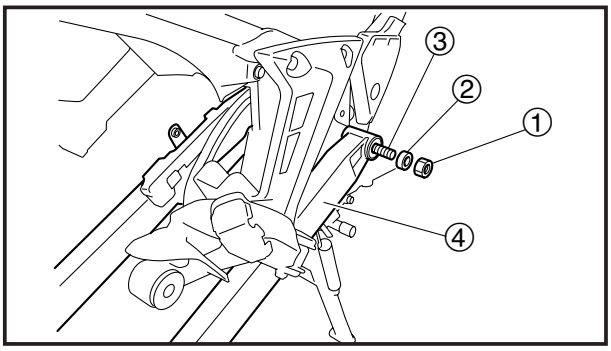
b. Measure the swingarm side play [A] by moving the swingarm from side to side.

c. If the swingarm side play is out of specification, check the spacers and bearings.

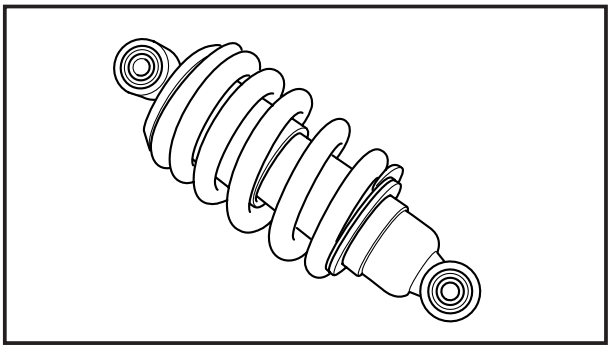
	Swingarm side play (at the end of the swingarm) **1 mm (0.04 in)**

d. Check the swingarm vertical movement [B] by moving the swingarm up and down.
   If swingarm vertical movement is not smooth or if there is binding, check the washer and bushings.

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7. Remove:
   - swingarm pivot shaft nut ①
   - washer ②
   - swingarm pivot shaft ③
   - swingarm ④

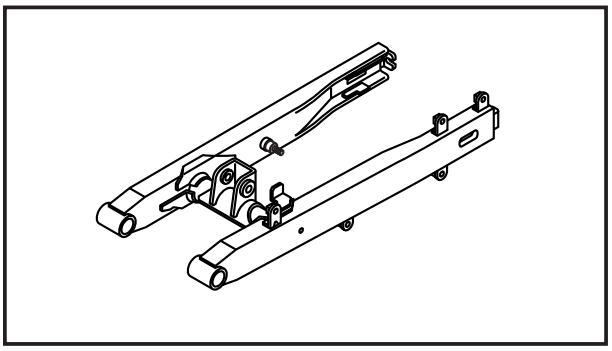


EAS00695

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

The following procedure applies to both rear shock absorber assemblies.

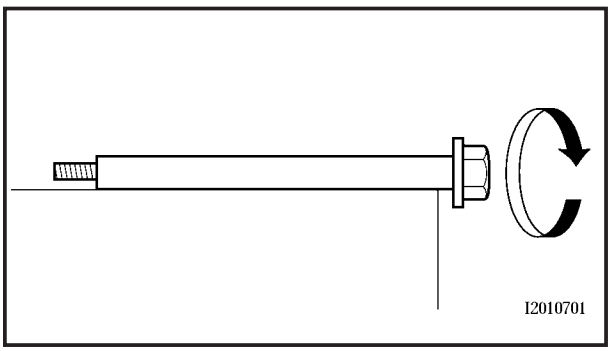
1. Check:
   - rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   - rear shock absorber
     Oil leaks → Replace the rear shock absorber assembly.
   - spring
     Damage/wear → Replace the rear shock absorber assembly.
   - bushings
     Damage/wear → Replace.
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



EAS00707

CHECKING THE SWINGARM

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



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

⚠WARNING

Do not attempt to straighten a bent pivot shaft.

3. Wash:
   - swingarm pivot shaft
   - washer
   - bushings

	Recommended cleaning solvent **Kerosene**

4. Check:
   - washer
     Damage/wear → Replace.
   - bushings
     Damage/wear → Replace.

EAS00711/EAS00699

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

1. Lubricate:
   - swingarm pivot shaft

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

2. Install:
   - swingarm
   - swingarm pivot shaft
   - collar
   - swingarm pivot shaft nut

   66 Nm (6.6 m·kg, 48 ft·lb)
3. Install:
   - rear shock absorber assemblies
   - rear shock absorber nuts
   - rear shock absorber bolts

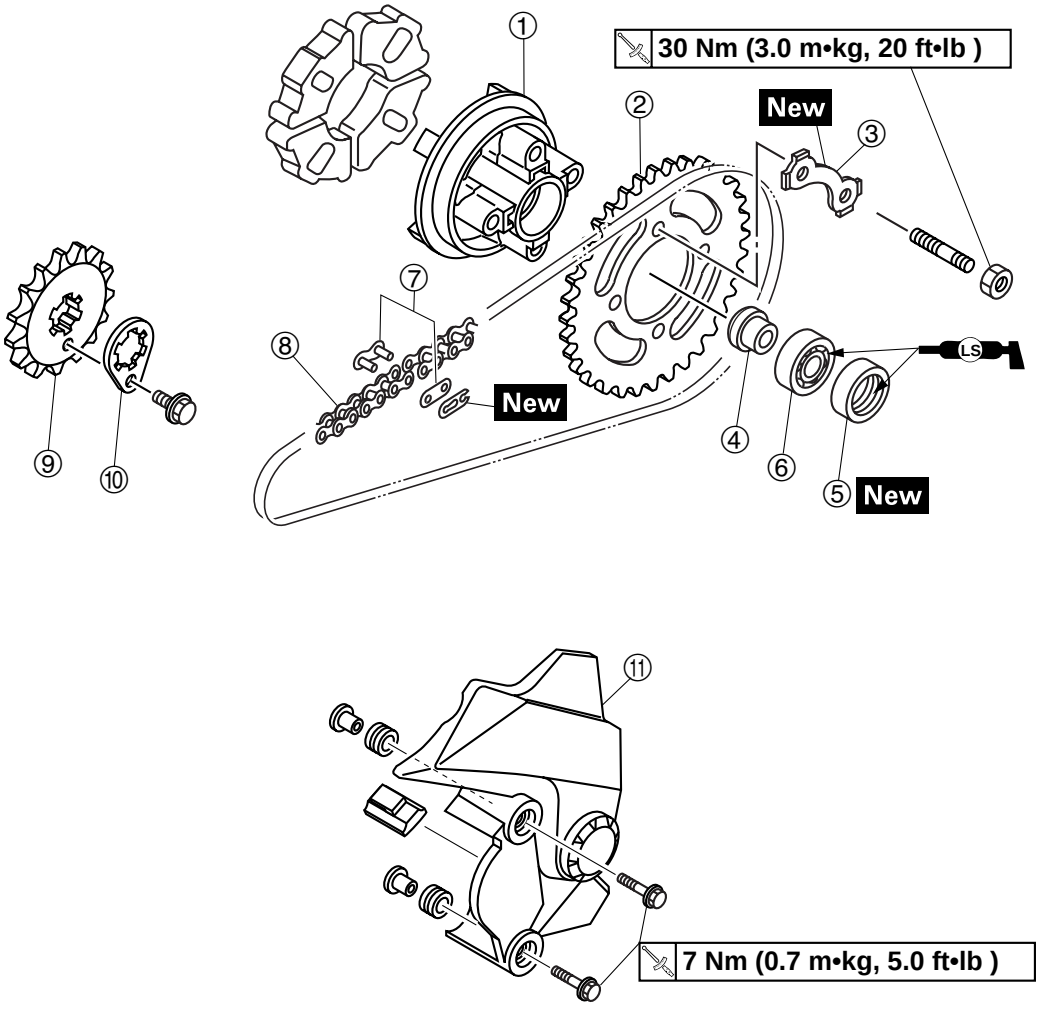
   46 Nm (4.6 m·kg, 33 ft·lb)
4. Install:
   - brake torque rod (to swingarm)

   16 Nm (1.6 m·kg, 12 ft·lb)
5. Install:
   - drive chain case

   10 Nm (1.0 m·kg, 7.2 ft·lb)
6. Install:
   - rear wheel
     Refer to “REAR WHEEL AND BRAKE”.
   - muffler
     Refer to “REMOVING THE ENGINE” in chapter 4.
   - rear cowlings (left and right)
     Refer to “INSTALLING THE REAR COWLINGS” in chapter 3.

DRIVE CHAIN AND SPROCKETS

① Rear wheel drive hub
② Driven sprocket
③ Lock washer
④ Collar
⑤ Oil seal
⑥ Bearing
⑦ Master link
⑧ Drive chain
⑨ Drive sprocket
⑩ Circlip
⑪ Drive sprocket cover



EAS00706

REMOVING THE DRIVE CHAIN AND SPROCKETS

1.Stand the vehicle on a level surface.

⚠WARNING

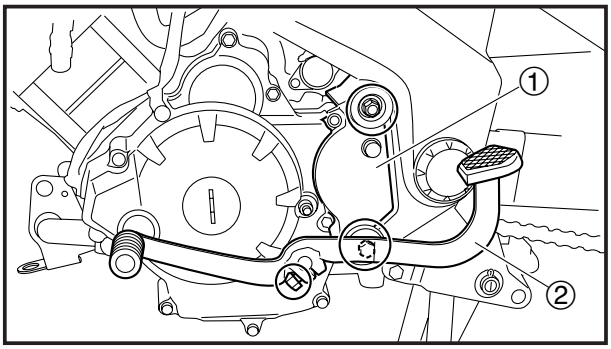
Securely support the vehicle so that there is no danger of it falling over.

NOTE:

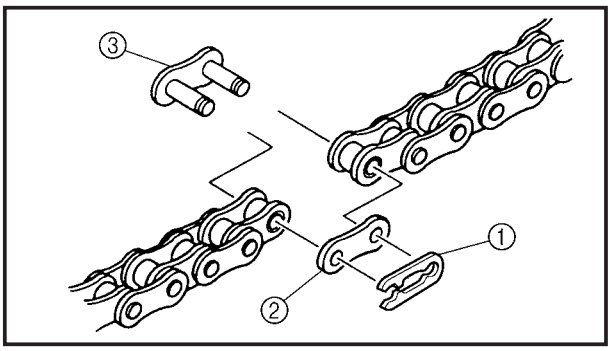
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - rear wheel
   - rear wheel drive hub assembly

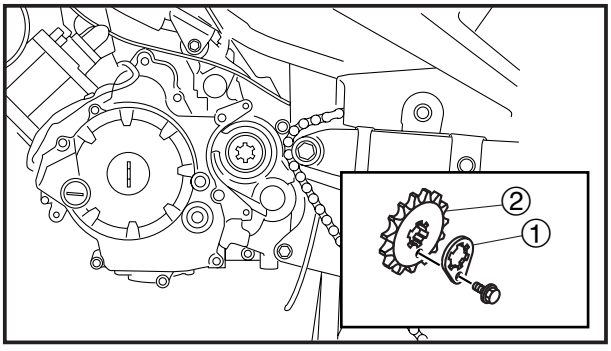
   Refer to “REAR WHEEL AND BRAKE”.



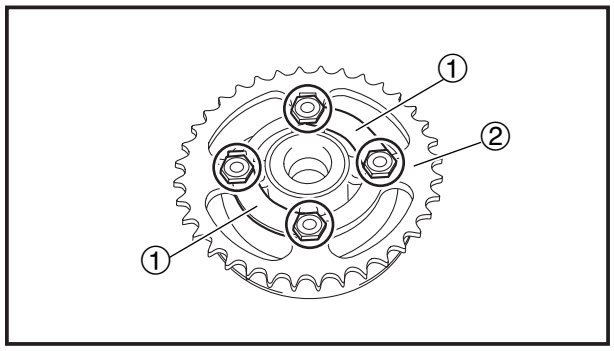
3. Remove:
   - shift pedal bolt
   - shift pedal ①
   - drive sprocket cover bolts
   - drive sprocket cover ②



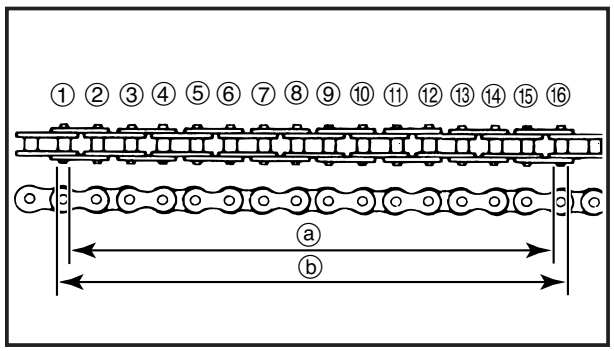
4. Remove:
   - master link clip ①
   - master link plate ②
   - master link body ③
5. Remove:
   - drive chain



6. Remove:
   - sprocket holder bolt
   - drive sprocket holder ①
   - drive sprocket ②



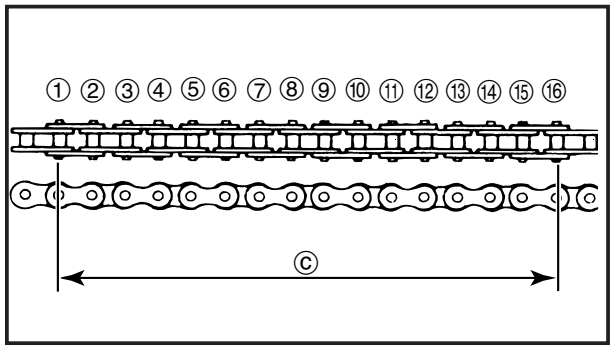
7. Straighten the lock washer tabs.
8. Remove:
   - driven sprocket nuts
   - driven sprocket bolts
   - lock washers ①
   - driven sprocket ②



EAS00710

CHECKING THE DRIVE CHAIN

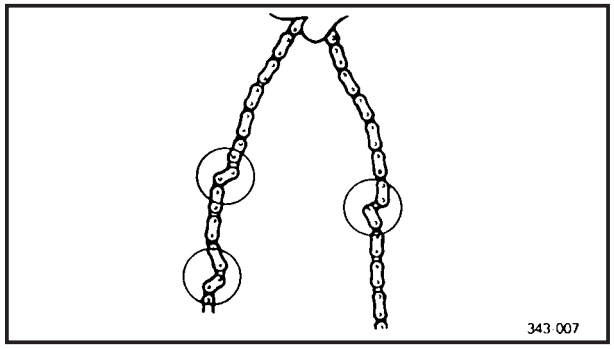
1. Measure:
   - Measure the length of 15 links on the inner side ⓐ and outer side ⓑ of the pin and calculate the length between pin centers.
   - Length ⓒ between pin centers = (inner dimension ⓐ + outer dimension ⓑ)/2
   - 15-Link section c of the drive chain
     Out of specification → Replace the drive chain, drive sprocket and rear wheel sprocket as a set.



15-link drive chain section limit (maximum)
194.3 mm (7.65 in)

NOTE:
- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Perform this measurement at two or three different places.

2. Check:
   - drive chain
     Stiffness → Clean and lubricate or replace.

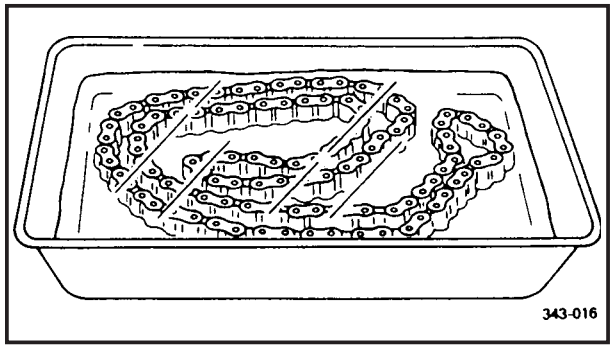


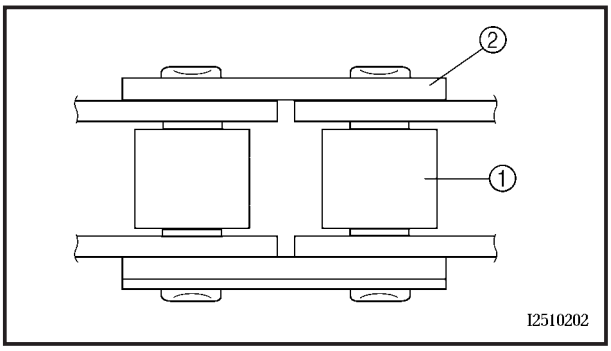
3. Clean:
   - drive chain

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a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene and completely dry it.

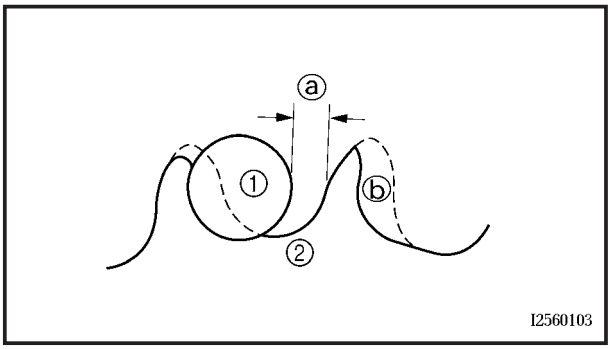
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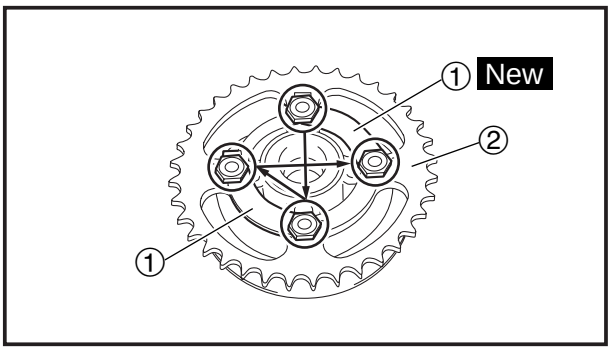
4. Check:
   - drive chain rollers ①
     Damage/wear → Replace the drive chain.
   - drive chain side plates ②
     Cracks/damage/wear → Replace the drive chain.
5. Lubricate:
   - drive chain

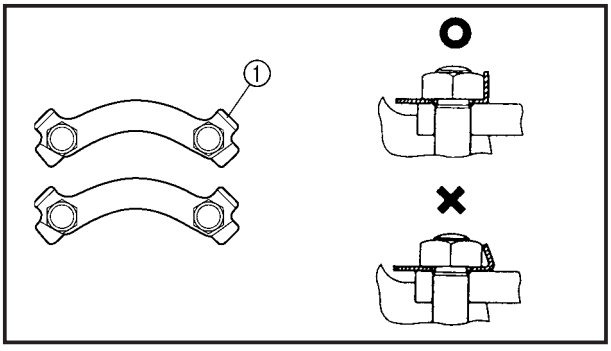
Recommended lubricant
Engine oil or chain lubricant suitable for non-O-ring chains



6. Check:
   - drive sprocket
   - driven sprocket
     Worn more than 1/4 tooth ⓐ → Replace the drive chain and sprockets as a set.
     Bent teeth → Replace the drive chain and sprockets as a set.

ⓑ Correct
① Drive chain roller
② Drive chain sprocket





EAS00714

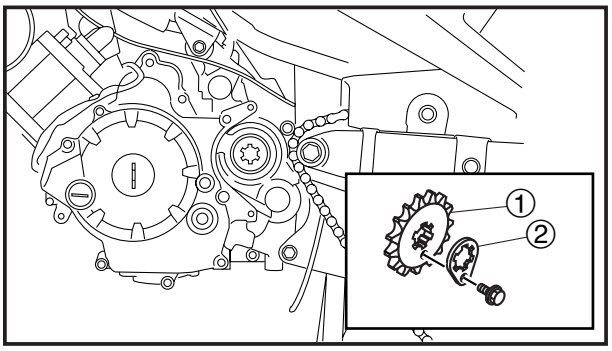
INSTALLING THE DRIVE CHAIN AND SPROCKETS

1. Install:
   - driven sprocket ②
     30 Nm (3.0 m·kg, 22 ft·lb)
   - lock washers ① **New**
   - driven sprocket bolts
   - driven sprocket nuts

NOTE:
Tighten the bolts in a crisscross pattern.

2. Bend:
   - lock washer tab ①

NOTE:
Bend the lock washer tabs along a flat side of each bolt.

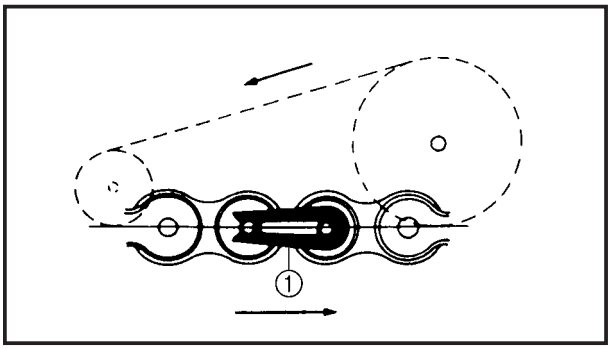


3. Install:
   - drive sprocket ①
   - sprocket holder ②
   - Sprocket holder bolt

4. Lubricate:
   - drive chain
   - master link **New**

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

5. Install:
   - master link body
   - master link plate



6. Install:
   - master link clip ①

CAUTION:

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

7. Adjust:
   - drive chain slack
     Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.

Drive chain slack
25–35 mm (0.98–1.38 in)

CAUTION:

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

ELEC

CHAPTER 8
ELECTRICAL SYSTEM

ELECTRICAL COMPONENTS 8-1

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CHECKING THE SWITCHES 8-5

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CHARGING SYSTEM 8-22
CIRCUIT DIAGRAM 8-22
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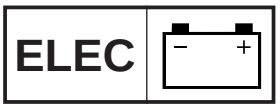
LIGHTING SYSTEM 8-25
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TROUBLESHOOTING 8-26
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SIGNALING SYSTEM 8-30
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TROUBLESHOOTING 8-41

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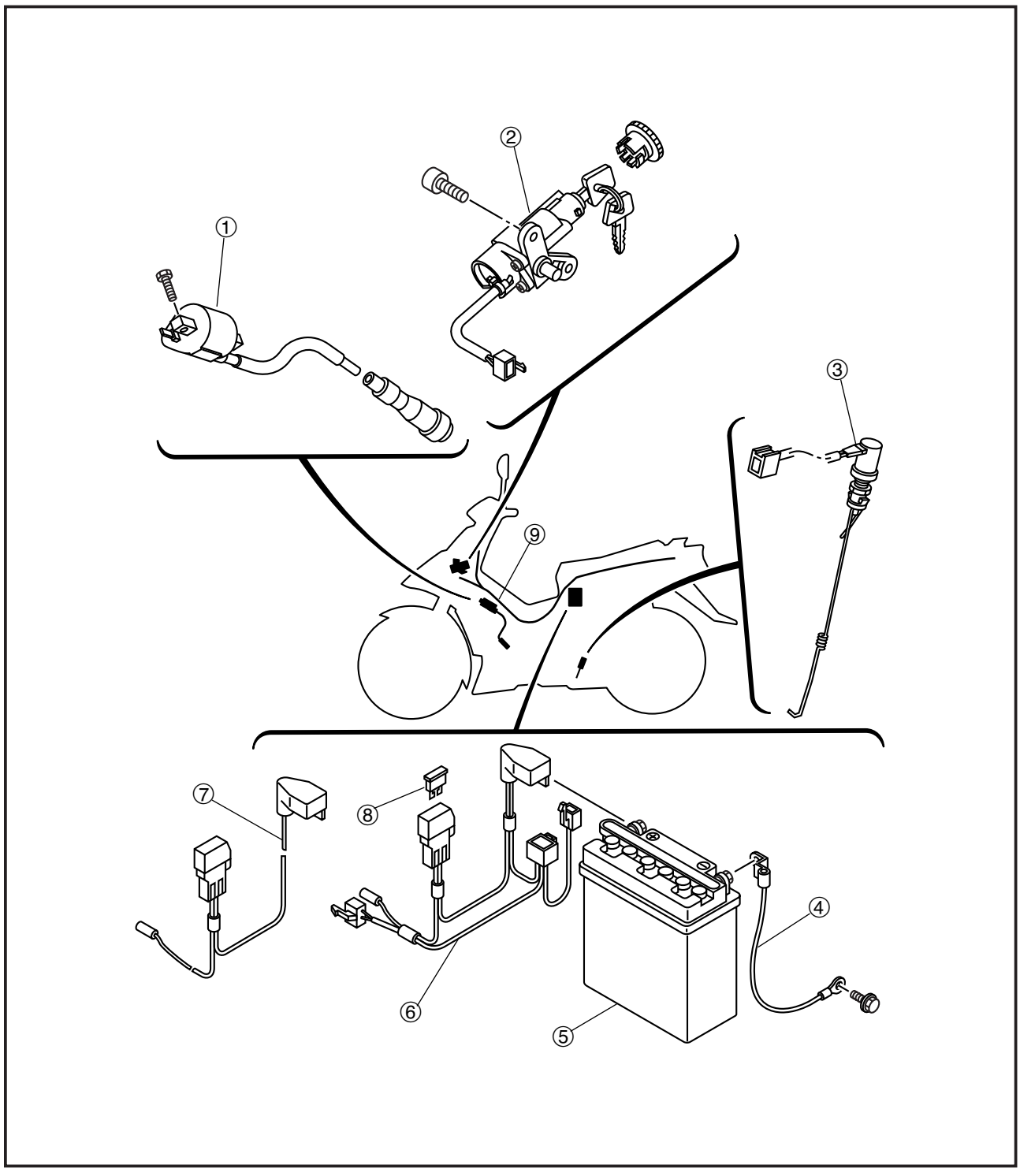

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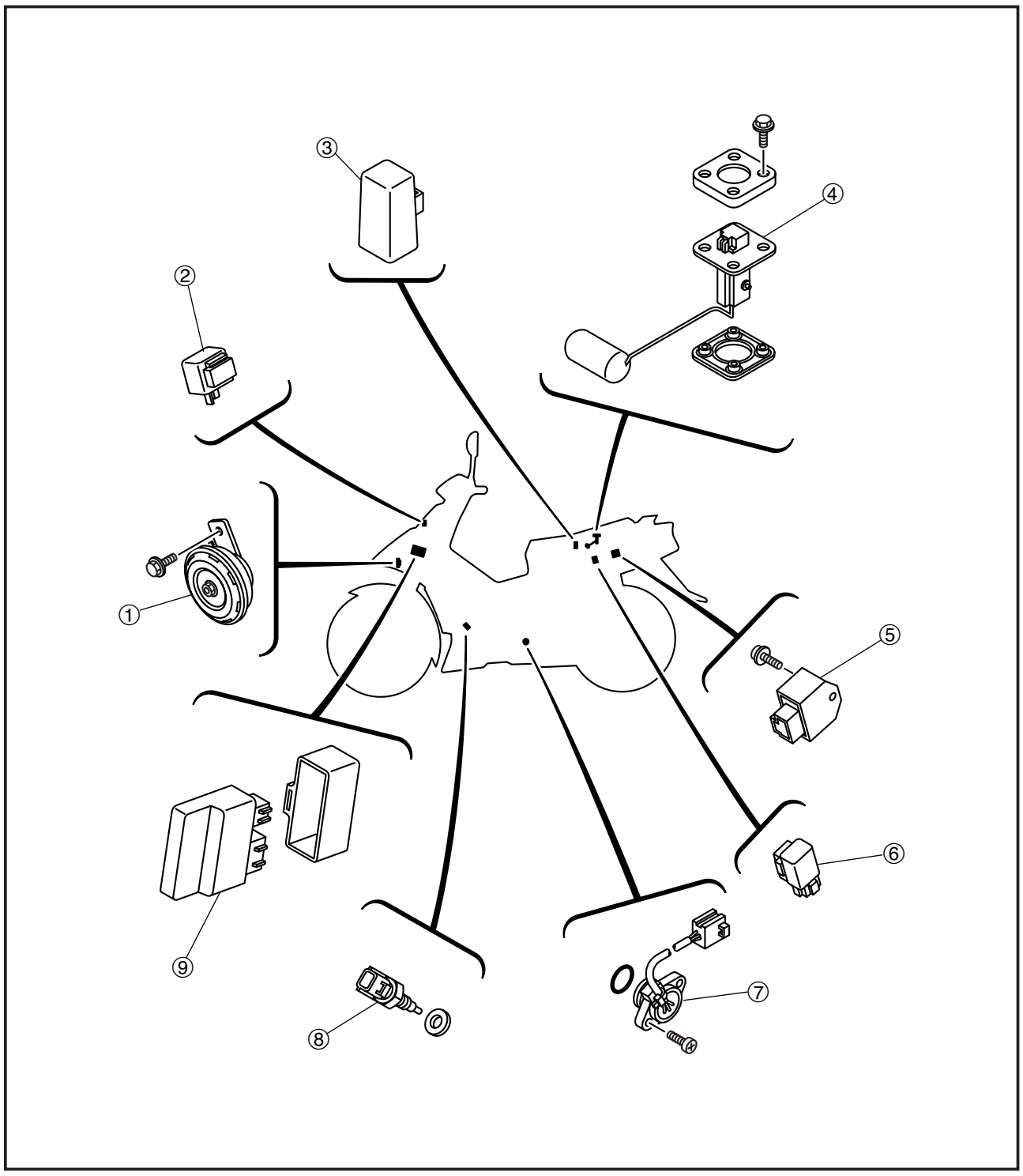
ELECTRICAL SYSTEM

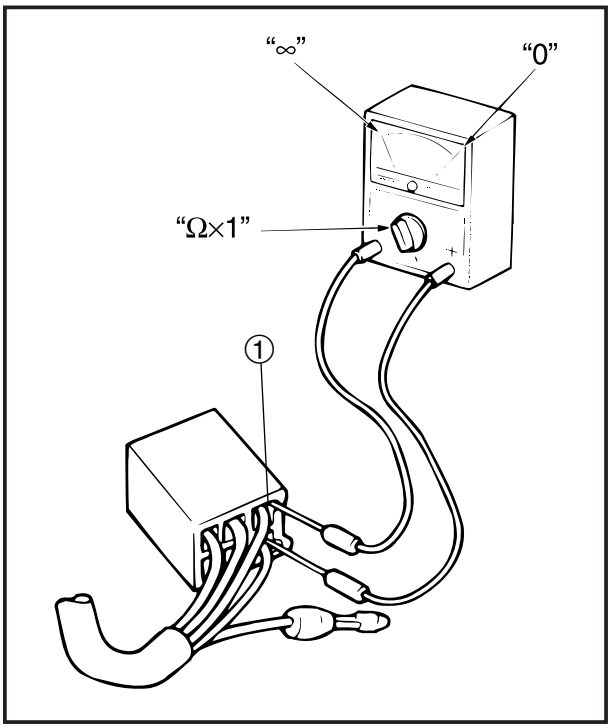
ELECTRICAL COMPONENTS

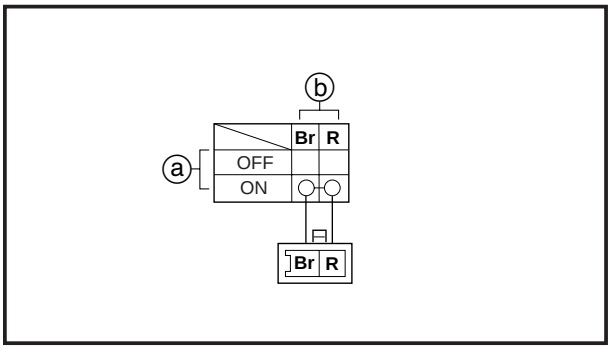
① Ignition coil
② Main switch
③ Rear brake light switch
④ Negative battery lead
⑤ Battery
⑥ Positive battery lead (T135SE)
⑦ Positive battery lead (T135S)
⑧ Fuse
⑨ Wire harness



① Horn
② Turn signal relay
③ Starter relay (T135SE)
④ Fuel gauge
⑤ Rectifier/regulator
⑥ Fan motor relay
⑦ Neutral switch
⑧ Thermo sensor
⑨ C.D.I. unit







EAS00730

CHECKING SWITCH CONTINUITY

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

CAUTION:

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



Pocket tester
90890-03112

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.
The switch positions ⓐ are shown in the far left column and the switch lead colors ⓑ are shown in the top row in the switch illustration.

NOTE:

"○—○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:
There is continuity between red and brown when the switch is set to "ON".

EAS00731

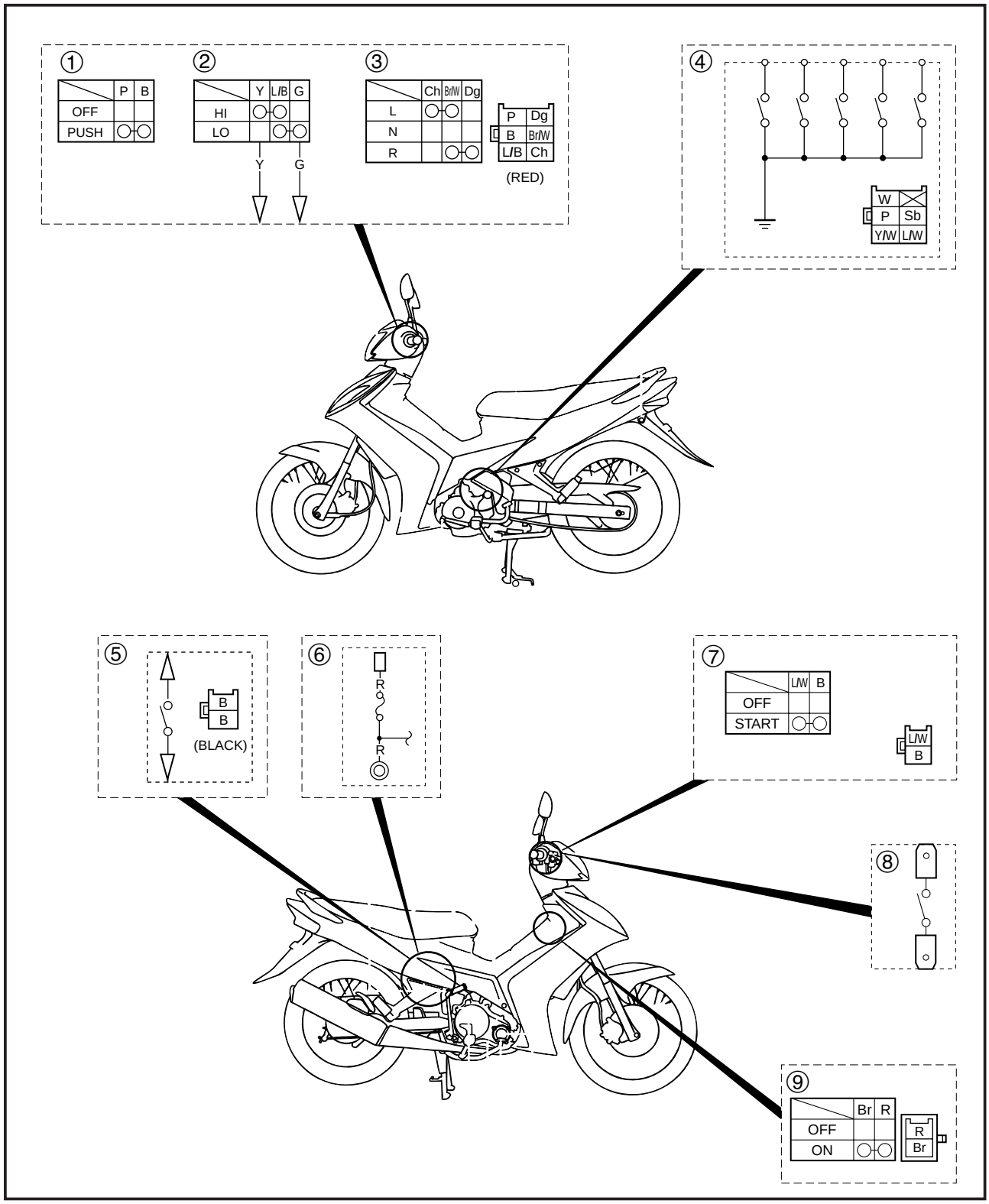
CHECKING THE SWITCHES

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

Damage/wear → Repair or replace.

Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.



① Horn switch
② Dimmer switch
③ Turn signal switch
④ Neutral switch
⑤ Rear brake light switch
⑥ Fuse
⑦ Start switch
⑧ Front brake light switch
⑨ Main switch

EAS00732

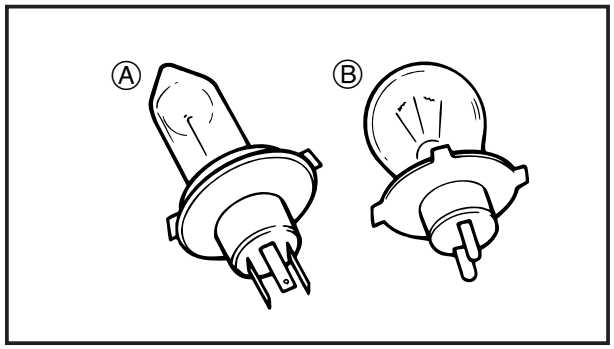
CHECKING THE BULBS AND BULB SOCKETS

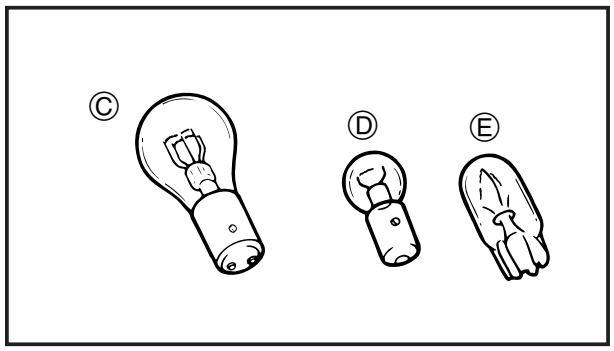
Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.





TYPES OF BULBS

The bulbs used on this vehicle are shown in the illustration on the left.

- Bulbs Ⓐ and Ⓑ are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- 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 sockets 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

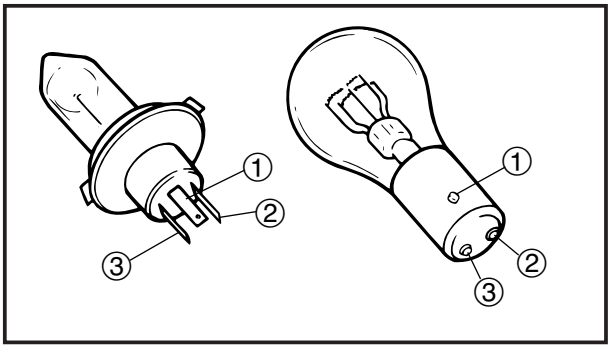
NOTE:

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Connect the positive tester probe to terminal ① and the negative tester probe to terminal ②, and check for continuity.
b. Connect the positive tester probe to terminal ① and the negative tester probe to terminal ③, and check for continuity.
c. If either of the readings indicate no continuity, replace the bulb.

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CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:
   - bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.



Pocket tester
90890-03112

NOTE:

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

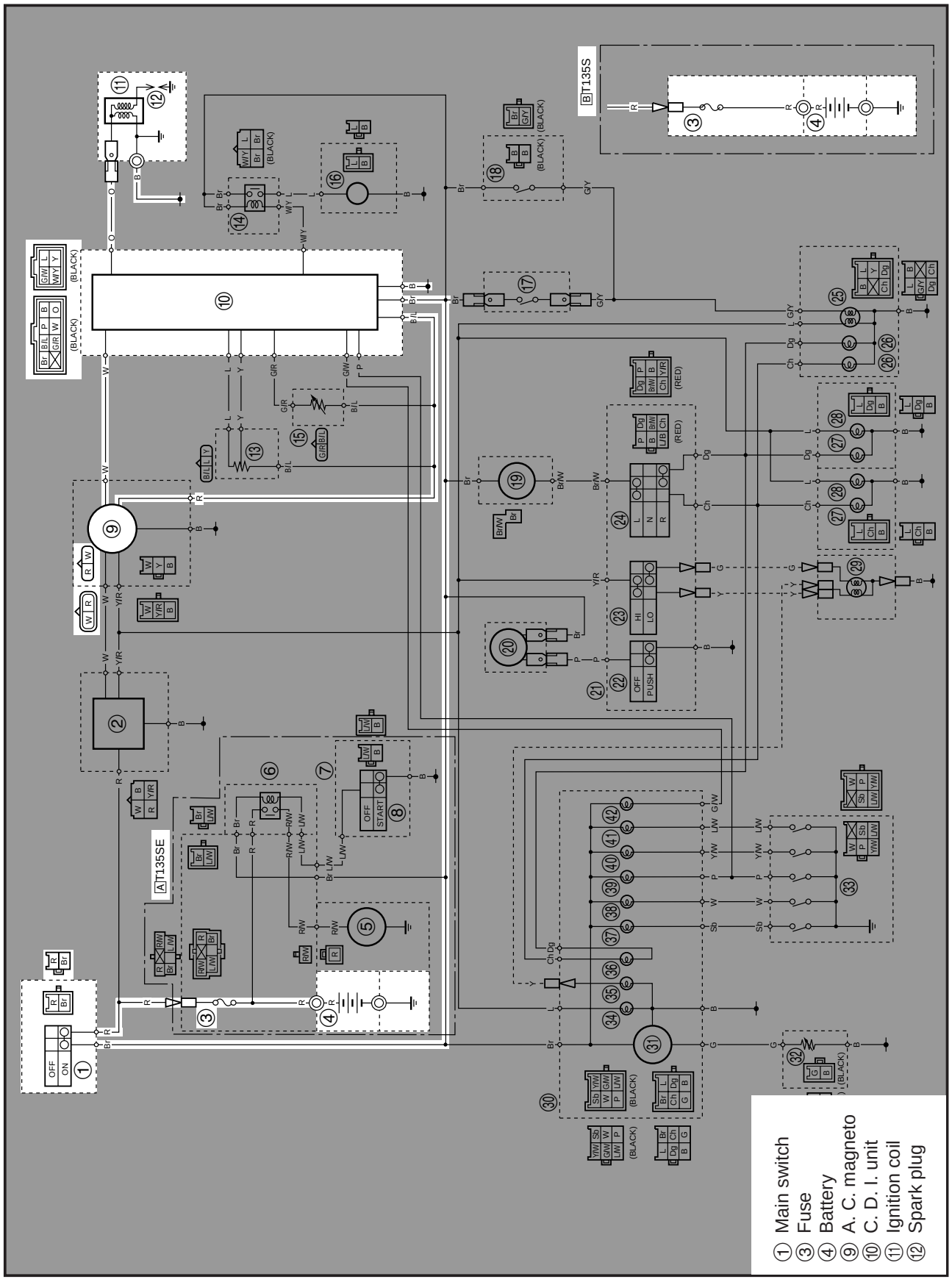
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a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

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EAS00734

IGNITION SYSTEM
CIRCUIT DIAGRAM



EAS00736

TROUBLESHOOTING

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

Check:
1. fuse
2. battery
3. spark plug
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. pickup coil resistance
8. main switch
9. wiring connections (of the entire ignition system)

NOTE:

- Before troubleshooting, remove the following part(s):
  1. side cowlings (left and right)
  2. front cowling
  3. center panels (upper and lower)
  4. rear cowlings (left and right)
  5. inner panel
- Troubleshoot with the following special tool(s).



Ignition checker
90890-06754
Pocket tester
90890-03112

EAS00738

1. Fuse

- Check the fuse for continuity.
  Refer to “CHECKING THE FUSE” in chapter 3.
- Is the fuse OK?

YES

NO → Replace the fuse.

EAS00739

2. Battery

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



Minimum open-circuit voltage
12.8 V or more at 20°C

- Is the battery OK?

YES

NO →
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00740

3. Spark plug

- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
  Refer to “CHECKING THE SPARK PLUG” in chapter 3.



Standard spark plug
CPR8EA-9 (NGK)
Spark plug gap
0.8–0.9 mm (0.031–0.035 in)

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

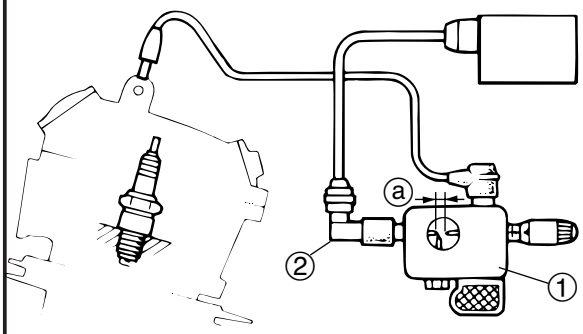
YES

NO → Re-gap or replace the spark plug.

EAS00742

4. Ignition spark gap

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



Minimum ignition spark gap
6 mm (0.24 in)

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

NO

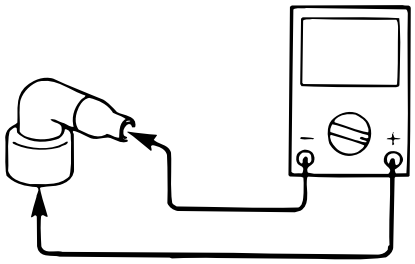
The ignition system is OK.

YES

EAS00744

5. Spark plug cap resistance

- Remove the spark plug cap from the spark plug lead.
- Connect the pocket tester ("Ω × 1k" range) to the spark plug cap as shown.
- Measure the spark plug cap resistance.



Spark plug cap resistance
5 kΩ at 20°C (68°F)

- Is the spark plug cap OK?

YES

NO

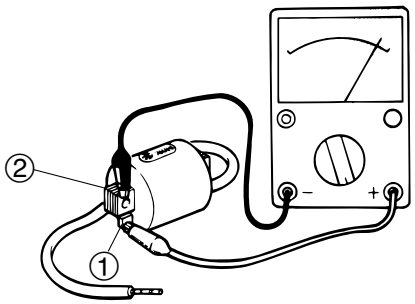
Replace the spark plug cap.

EAS00746

6. Ignition coil resistance

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

Positive tester probe → terminal ①
Negative tester probe → ignition coil base ②

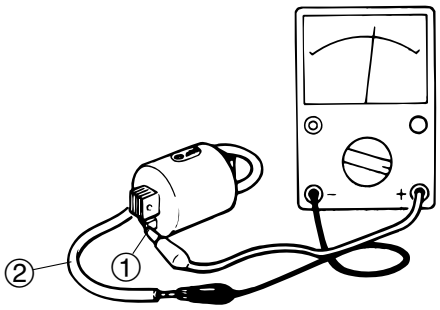


- Measure the primary coil resistance.

Primary coil resistance
0.32–0.48 Ω at 20°C (68°F)

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

Negative tester probe → terminal ①
Positive tester probe → spark plug lead ②



- Measure the secondary coil resistance.

Secondary coil resistance
5.68–8.52 kΩ at 20°C (68°F)

- Is the ignition coil OK?

YES → (end)

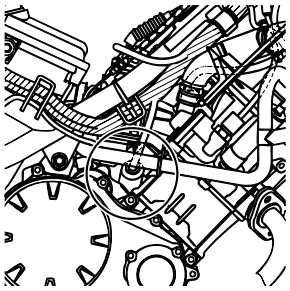
NO → Replace the ignition coil.

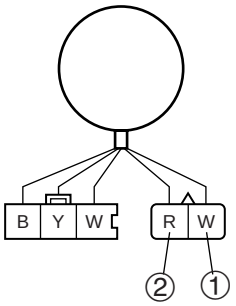
EAS00748

7. Pickup coil resistance

- Disconnect the pickup coil coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the pickup coil terminal as shown.

Positive tester probe → white ①
Negative tester probe → red ②





- Measure the pickup coil resistance.

Pickup coil resistance
248–372 Ω at 20°C (68°F)
(between white and red)

- Is the pickup coil OK?

YES → (end)

NO → Replace the stator coil/pickup coil assembly.

EAS00749

8. Main switch

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

YES → (end)

NO → Replace the main switch.

EAS00754

9. Wiring
• Check the entire ignition system wiring. Refer to “CIRCUIT DIAGRAM”. • Is the ignition system wiring properly connected and without defects?

⇩ YES

Replace the C.D.I. unit.

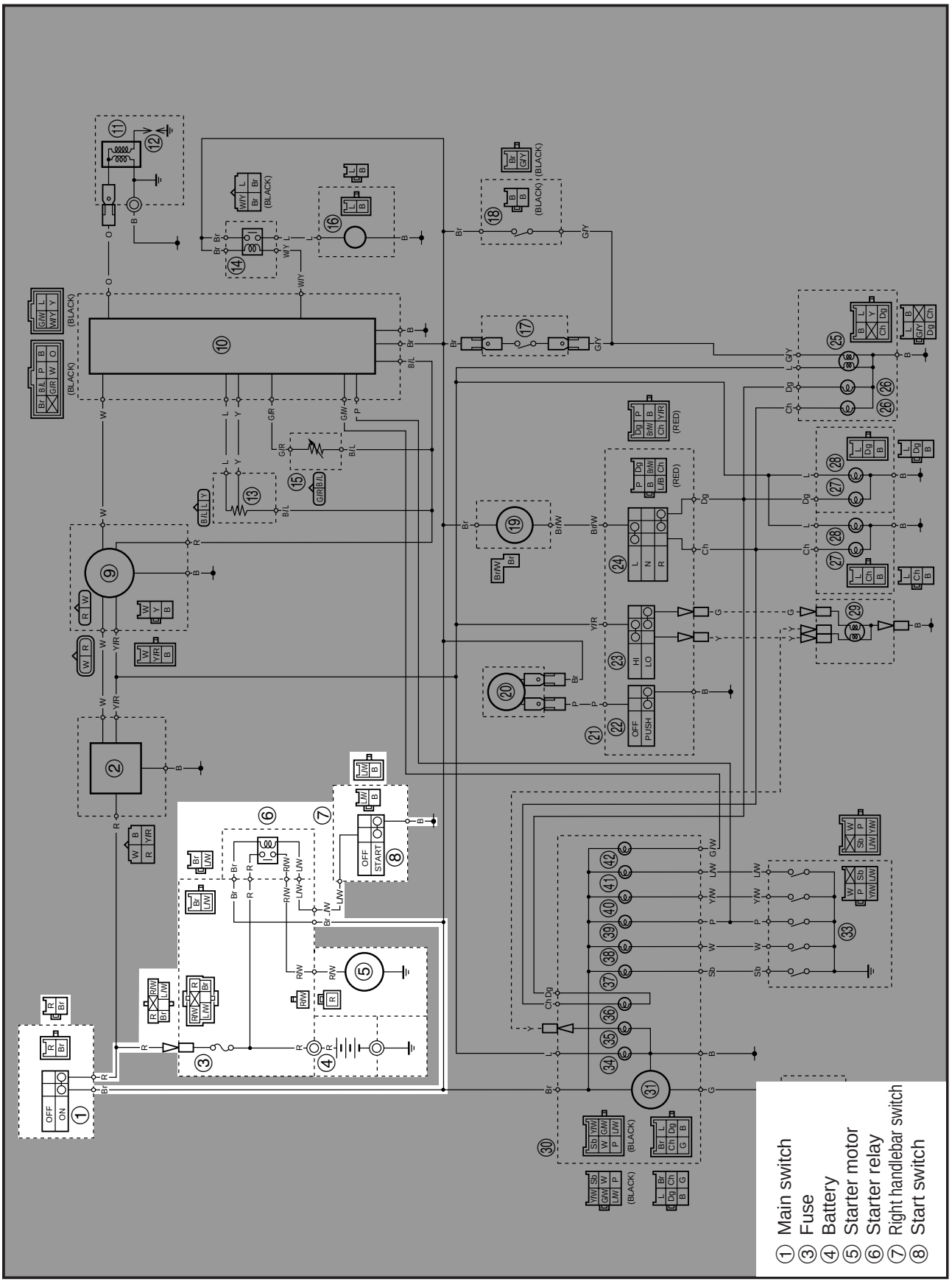
⇩ NO

Properly connect or repair the ignition system wiring.

EAS00755

ELECTRIC STARTING SYSTEM (T135SE)

CIRCUIT DIAGRAM



EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. fuse
2. battery
3. starter motor
4. starter relay
5. main switch
6. start switch
7. wiring connections
   (of the entire starting system)

NOTE:
- Before troubleshooting, remove the following part(s):
  1. side cowlings (left and right)
  2. front cowling
  3. center panels (upper and lower)
  4. rear cowlings (left and right)
  5. inner panel
- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

EAS00738

1. Fuse

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

YES

NO

Replace the fuse.

EAS00739

2. Battery

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

Minimum open-circuit voltage
12.8 V or more at 20 °C

- Is the battery OK?

YES

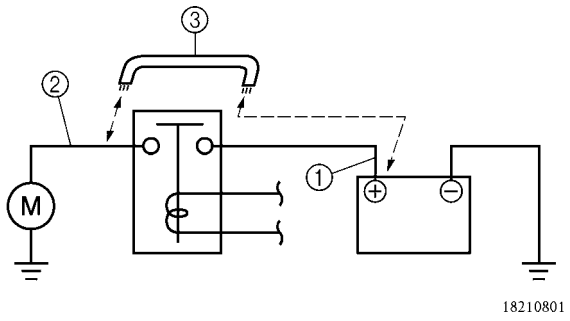
NO

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

EAS00758

3. Starter motor

- Connect the positive battery terminal ① and starter motor lead ② with a jumper lead ③.



WARNING

- **A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, other-wise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.**

- Does the starter motor turn?

YES

NO

Repair or replace the starter motor.

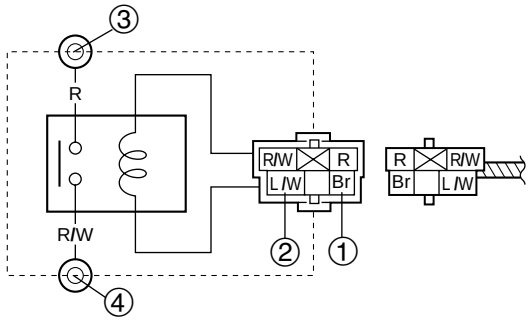
EAS00761

4. Starter relay

- Remove the starter relay from the starter relay coupler on the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (DC 12 V) to the starter relay coupler as shown.

Positive battery terminal → brown ①
Negative battery terminal → blue/white ②

Positive tester probe → red ③
Negative tester probe → red/white ④



- Does the starter relay have continuity between red and red/white?

YES → Replace the starter relay.

NO → Replace the starter relay.

EAS00749

5. Main switch

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

YES → NO → Replace the main switch.

EAS00764

6. 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

7. Wiring

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

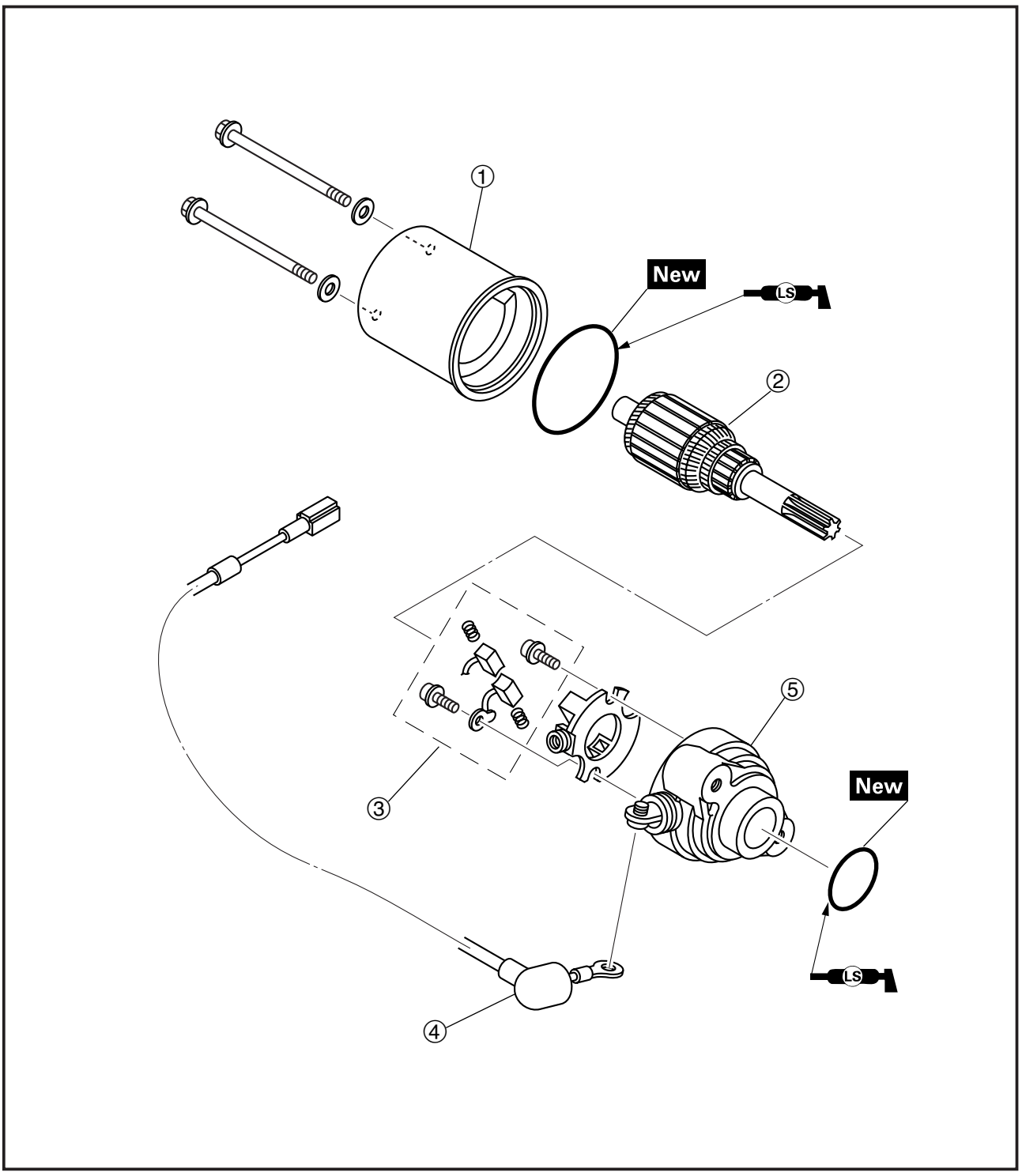
YES → The starting system circuit is OK.

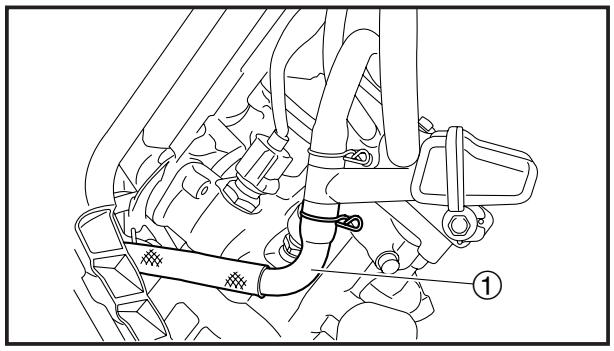
NO → Properly connect or repair the starting system wiring.

EASF0061

STARTER MOTOR (T135SE)

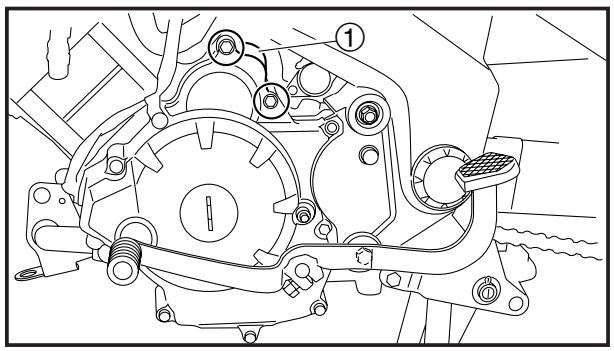
① Starter motor yoke
② Armature
③ Brush set
④ Starter motor lead
⑤ Starter motor front cover



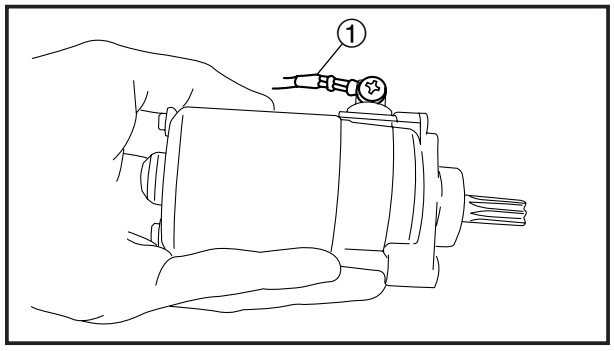


REMOVING THE STARTER MOTOR

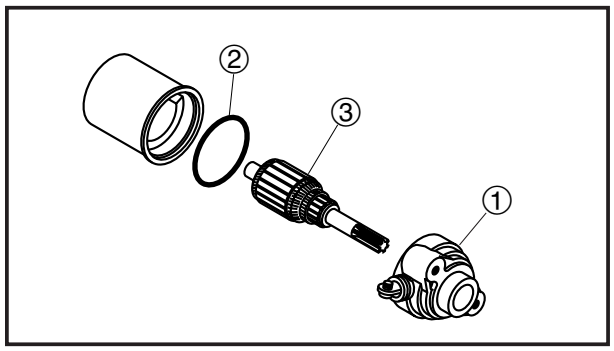
1. Remove:
   - breather pipe ①



2. Remove:
   - starter motor ①

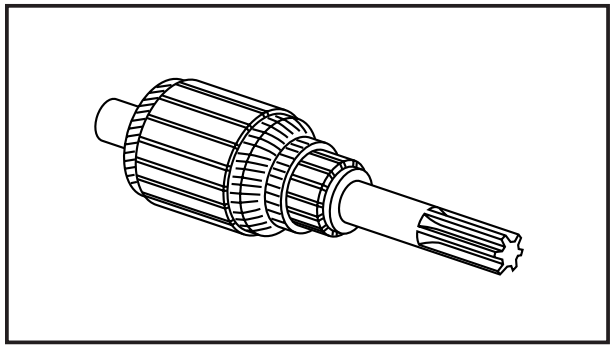


3. Remove:
   - starter motor lead ①



DISASSEMBLING THE STARTER MOTOR

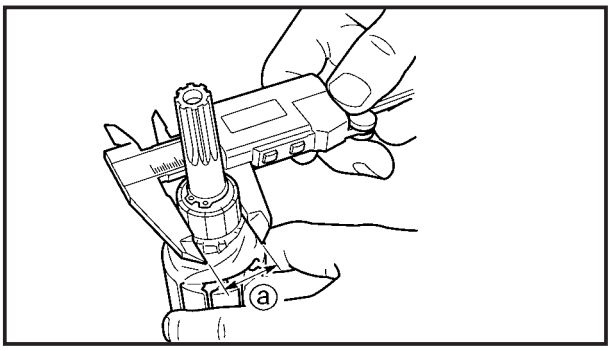
1. Remove:
   - starter motor front cover bolts (with washers)
   - starter motor front cover ①
   - O-ring ②
   - armature ③



EAS00769

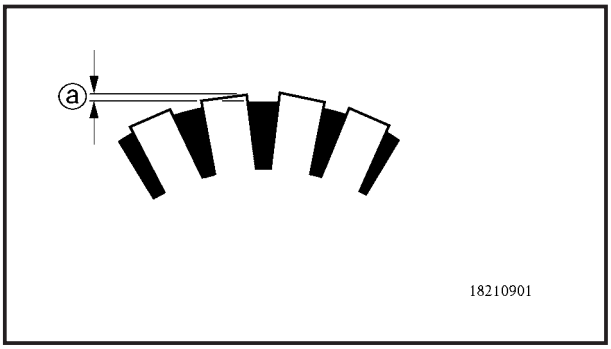
CHECKING THE STARTER MOTOR

1. Check:
   - commutator
     Dirt → Clean with 600-grit sandpaper.



2. Measure:
   • commutator diameter ⓐ
   Out of specification → Replace the starter motor.

	Commutator wear limit **16.6 mm (0.65 in)**



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

	Mica undercut **1.35 mm (0.05 in)**

NOTE:
The mica of the commutator must be undercut to ensure proper operation of the commutator.

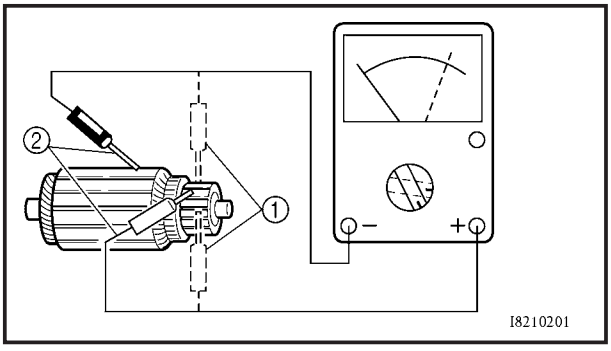
4. Measure:
   • armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

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

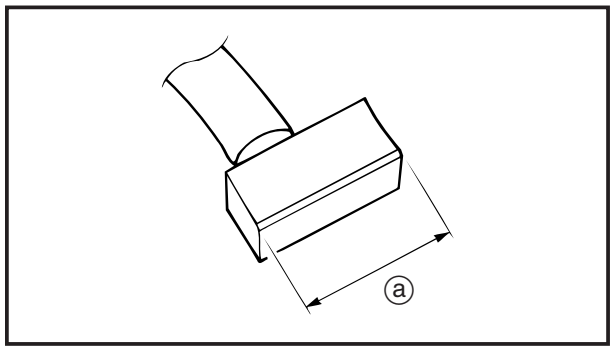
	Pocket tester **90890-03112**

	Armature coil **Commutator resistance ①** **0.0315–0.0385 Ω at 20°C (68°F)** **Insulation resistance ②** **Above 1 MΩ at 20°C (68°F)**



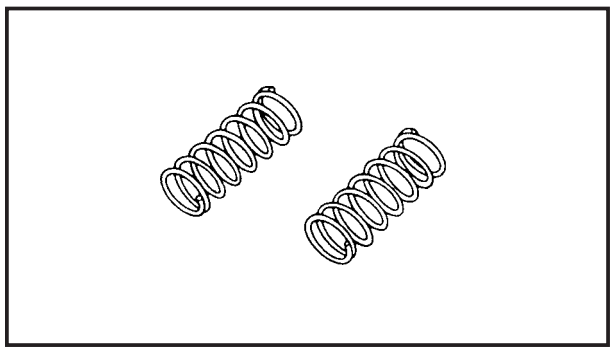
b. If any resistance is out of specification, replace the starter motor.

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

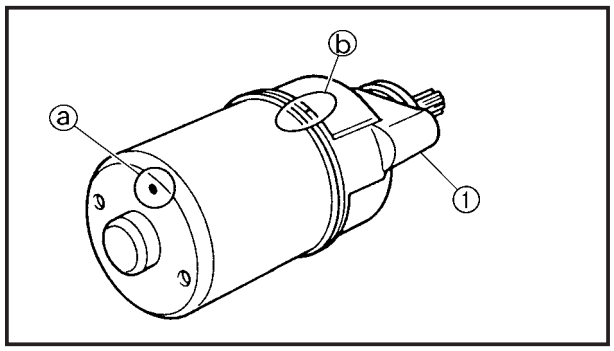
Brush length wear limit
3.5 mm (0.14 in)



6. Measure:
   • brush spring force
   Out of specification → Replace the brush springs as a set.

Brush spring force
3.92–5.88 N (400–600 gf)

7. Check:
   • gear teeth
   Damage/wear → Replace the armature.



EAS00772

ASSEMBLING THE STARTER MOTOR

1. Install:
   • O-ring **New**
   • armature
   (in start motor front cover ①)
   • O-ring **New**
   • starter motor yoke
   • starter motor front cover bolts
   (with washers)
   • O-ring **New**

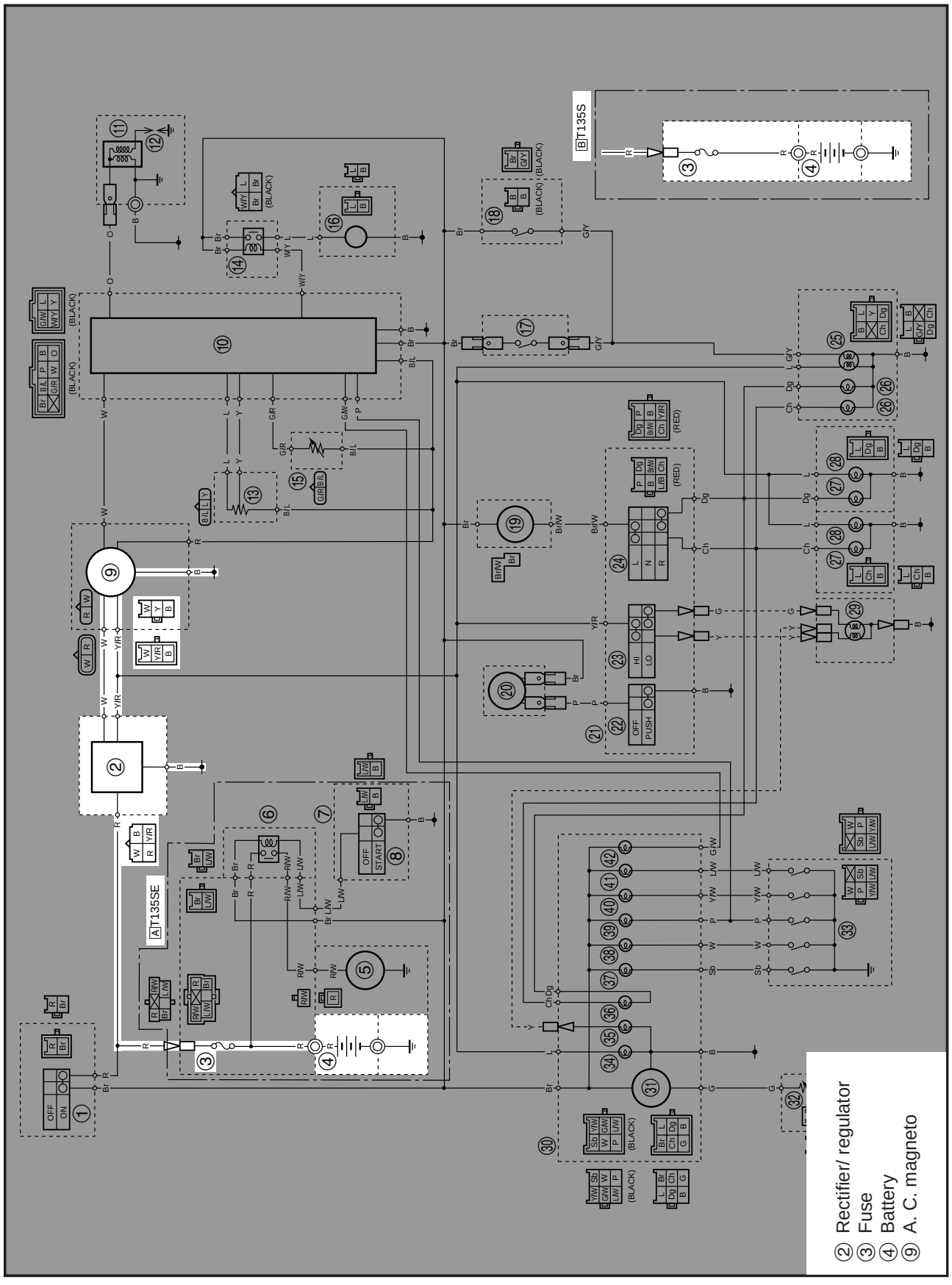
NOTE:
Align the mark ⓐ on the starter motor yoke with the mark ⓑ on the starter motor front cover.

INSTALLING THE STARTER MOTOR

For installation, reverse the removal procedure.

EAS00773

CHARGING SYSTEM
CIRCUIT DIAGRAM



EAS00774

TROUBLESHOOTING

The battery cannot be charged.

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

NOTE:

- Before troubleshooting, remove the following part(s):
  1. side cowlings (left and right)
  2. front cowling
  3. center panels (upper and lower)
  4. rear cowlings (left and right)
  5. inner panel
- Troubleshoot with the following special tool(s).



Engine tachometer
90890-03113
Pocket tester
90890-03112

EAS00738

1. Fuse

- Check the fuse for continuity.
  Refer to “CHECKING THE FUSE” in chapter 3.
- Is the fuse OK?

YES

NO → Replace the fuse.

EAS00739

2. Battery

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



Minimum open-circuit voltage
12.8 V or more at 20 °C

- Is the battery OK?

YES

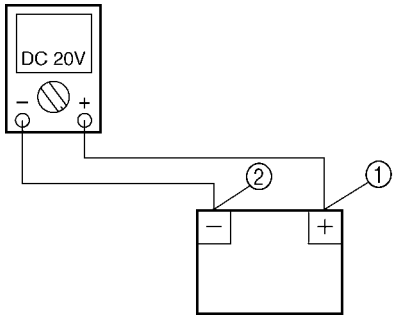
NO →
- Clean the battery terminals.
- Recharge or replace the battery.

EAS00775

3. Charging voltage

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

Positive tester probe →
positive battery terminal ①
Negative tester probe →
negative battery terminal ②



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

Charging voltage
14 V at 5,000 r/min

NOTE:
Make sure the battery is fully charged.

- Is the charging voltage within specification?

NO

YES

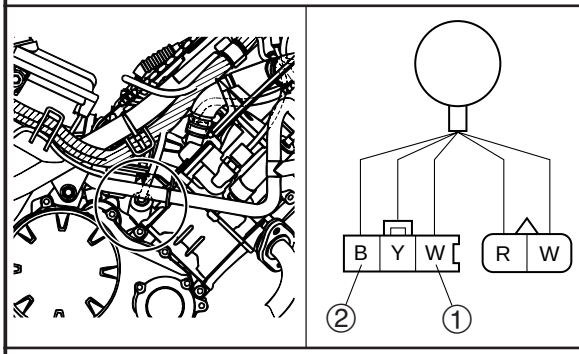
The charging circuit is OK.

EAS00776

4. Charging coil resistance

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

Positive tester probe → white ①
Negative tester probe → black ②



- Measure the charging coil resistances.

Charging coil resistance
0.38–0.58 Ω at 20°C (68°F) (W – B)

- Is the charging coil OK?

YES

NO

Replace the stator coil/pickup coil assembly.

EAS00779

5. Wiring

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

YES

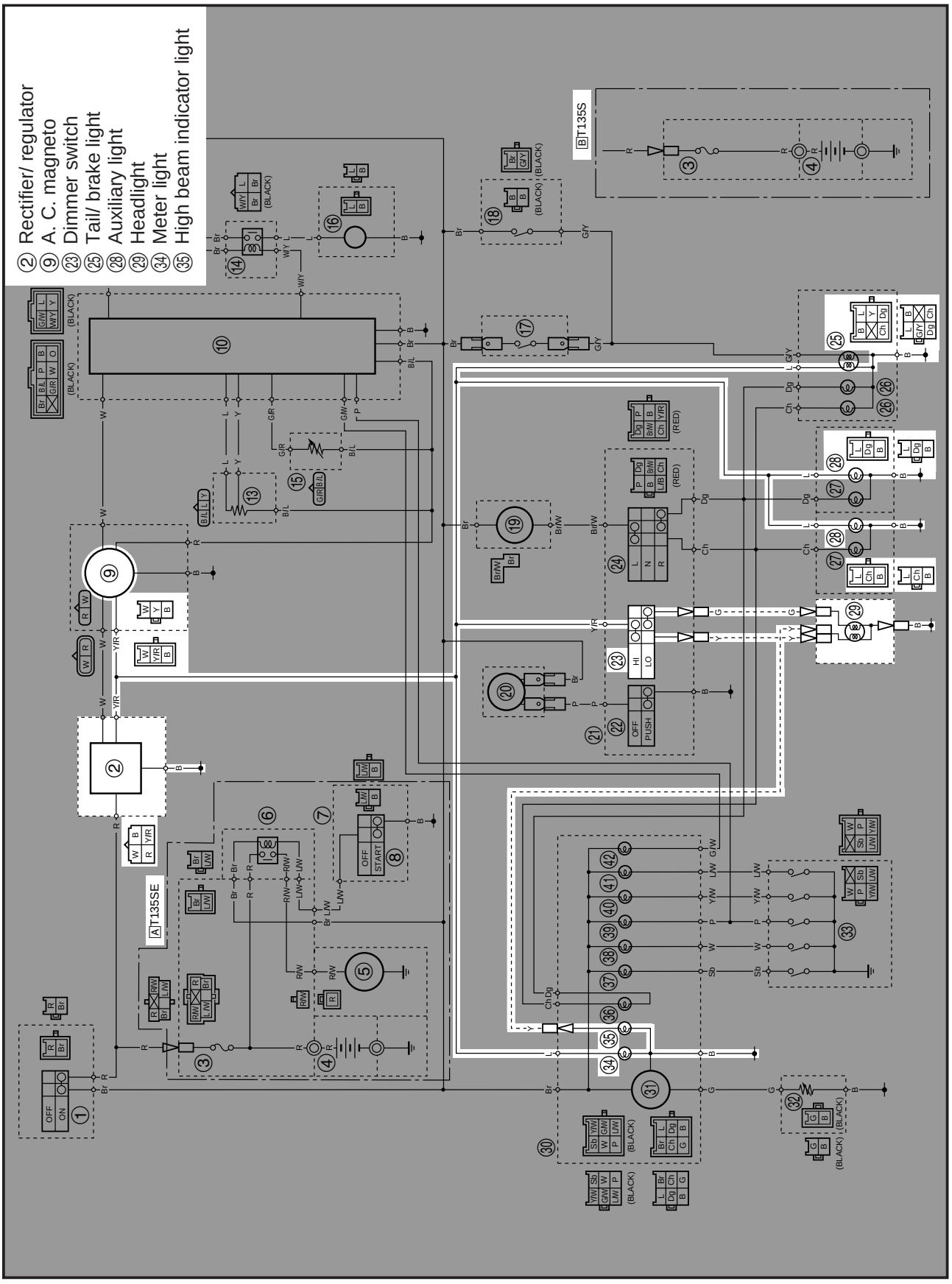
NO

Replace the rectifier/regulator.

Properly connect or repair the charging system wiring.

EAS00780

LIGHTING SYSTEM
CIRCUIT DIAGRAM



EAS00781

TROUBLESHOOTING

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

Check:
1. lighting coil resistance
2. wiring connections
   (of the entire lighting system)

NOTE:

- Before troubleshooting, remove the following part(s):
  1. side cowlings (left and right)
  2. front cowling
  3. center panels (upper and lower)
  4. rear cowling (right)
  5. inner panel
  6. headlight assembly
- Troubleshoot with the following special tool(s).



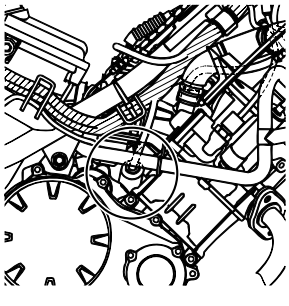
Pocket tester
90890-03112

EAS00776

1. Lighting coil resistance

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

Positive tester probe → yellow ①
Negative tester probe → black ②



- Measure the lighting coil resistances.



Lighting coil resistance
0.29–0.43 Ω at 20°C (68°F) (Y – B)

- Is the lighting coil OK?

YES

NO → Replace the stator coil/pickup coil assembly.

EAS00787

2. Wiring

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

YES → Check the condition of each of the lighting system circuits. Refer to “CHECKING THE LIGHTING SYSTEM”.

NO → Properly connect or repair the lighting system wiring.

EAS00788

CHECKING THE LIGHTING SYSTEM

1. The headlight and the high beam indicator light fail to come on.

EAS00784

1. Dimmer switch
•Check the dimmer switch for continuity. Refer to “CHECKING THE SWITCHES”. •Is the dimmer switch OK?

YES

NO

The dimmer switch is faulty. Replace the left handlebar switch.

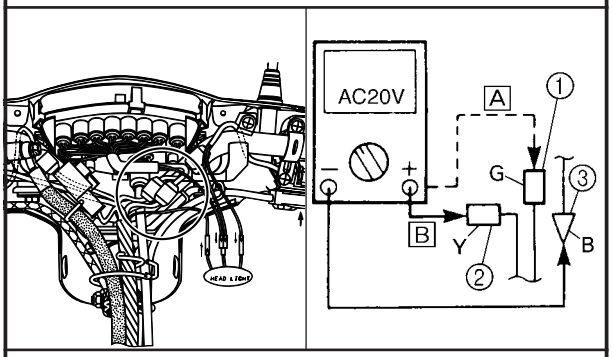
2. Headlight bulb and socket
•Check the headlight bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”. •Are the headlight bulb and socket OK?

YES

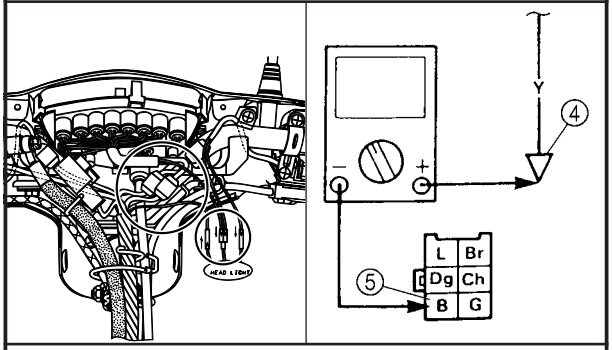
NO

Replace the headlight bulb, socket or both.

3. Voltage
•Connect the pocket tester (AC 20 V) to the headlight and high beam indicator light connectors as shown.
A When the dimmer switch is set to “≡D”. B When the dimmer switch is set to “≡D”.



Headlight
Positive tester probe → green ① or yellow ②
Negative tester probe → black ③



High beam indicator light
Positive tester probe → yellow ④
Negative tester probe → black ⑤

•Set the main switch to “ON”. •Start the engine. •Set the dimmer switch to “≡D” or “≡D”. •Measure the voltage (AC 12 V) of green ① (yellow ②) on the headlight connector (wire harness side) and yellow ④ on the meter assembly connector (wire harness side). •Is the voltage within specification?

YES

NO

This circuit is OK.

Replace the rectifier/regulator.

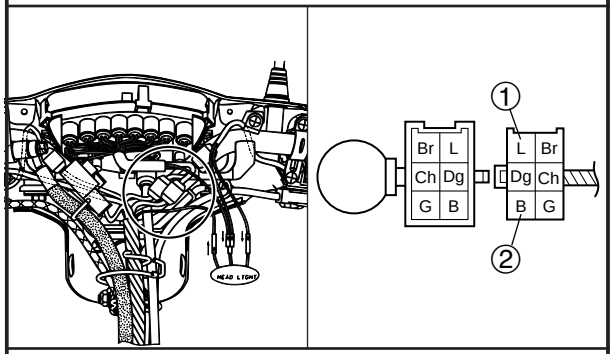
EAS00789

2. The meter light fails to come on.

1. Meter light bulb and socket
•Check the meter light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”. •Are the meter light bulb and socket OK?

YES

NO → Replace the meter light bulb, socket or both.

2. Voltage
•Connect the pocket tester (AC 20 V) to the meter light coupler (wire harness side) as shown.
Positive tester probe → blue ① **Negative tester probe → black ②**

•Set the main switch to “ON”. •Start the engine. •Measure the voltage (AC 12 V) of blue lead terminal ① on the meter light coupler (wire harness side). •Is the voltage within specification?

YES → This circuit is OK.

NO → Replace the rectifier/regulator.

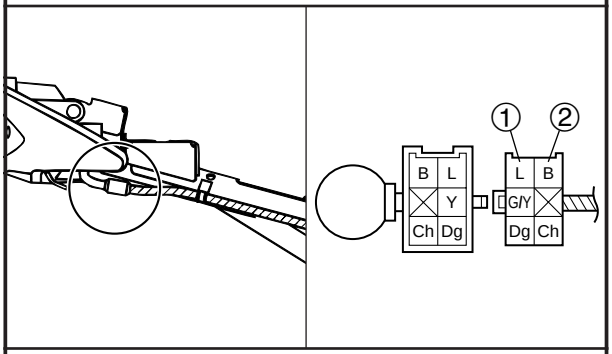
EAS00790

3. The tail/brake light fails to come on.

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

YES

NO → Replace the tail/brake light bulb, socket or both.

2. Voltage
•Connect the pocket tester (AC 20 V) to the tail/brake light coupler (wire harness side) as shown.
Positive tester probe → blue ① **Negative tester probe → black ②**

•Set the main switch to “ON”. •Start the engine. •Measure the voltage (AC 12 V) of blue lead terminal ① on the tail/brake light coupler (wire harness side). •Is the voltage within specification?

YES → This circuit is OK.

NO → Replace the rectifier/regulator.

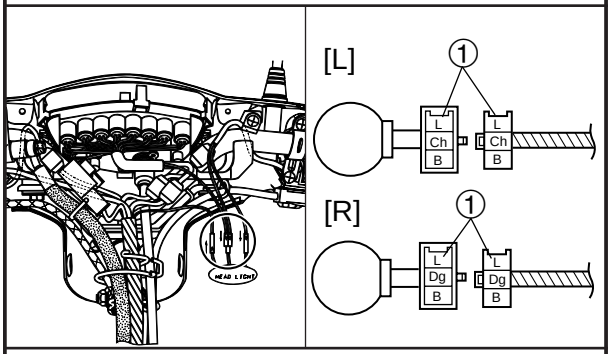
4. The auxiliary light fails to come on.

1. Meter light bulb and socket
•Check the meter light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”. •Are the meter light bulb and socket OK?

YES

NO

Replace the auxiliary light bulb, socket or both.

2. Voltage
•Connect the pocket tester (AC 20 V) to the auxiliary light coupler (wire harness side) as shown.
Positive tester probe → blue ① **Negative tester probe → black ②**

•Set the main switch to “ON”. •Start the engine. •Measure the voltage (AC 12 V) of blue lead terminal ① on the auxiliary light coupler (wire harness side). •Is the voltage within specification?

YES

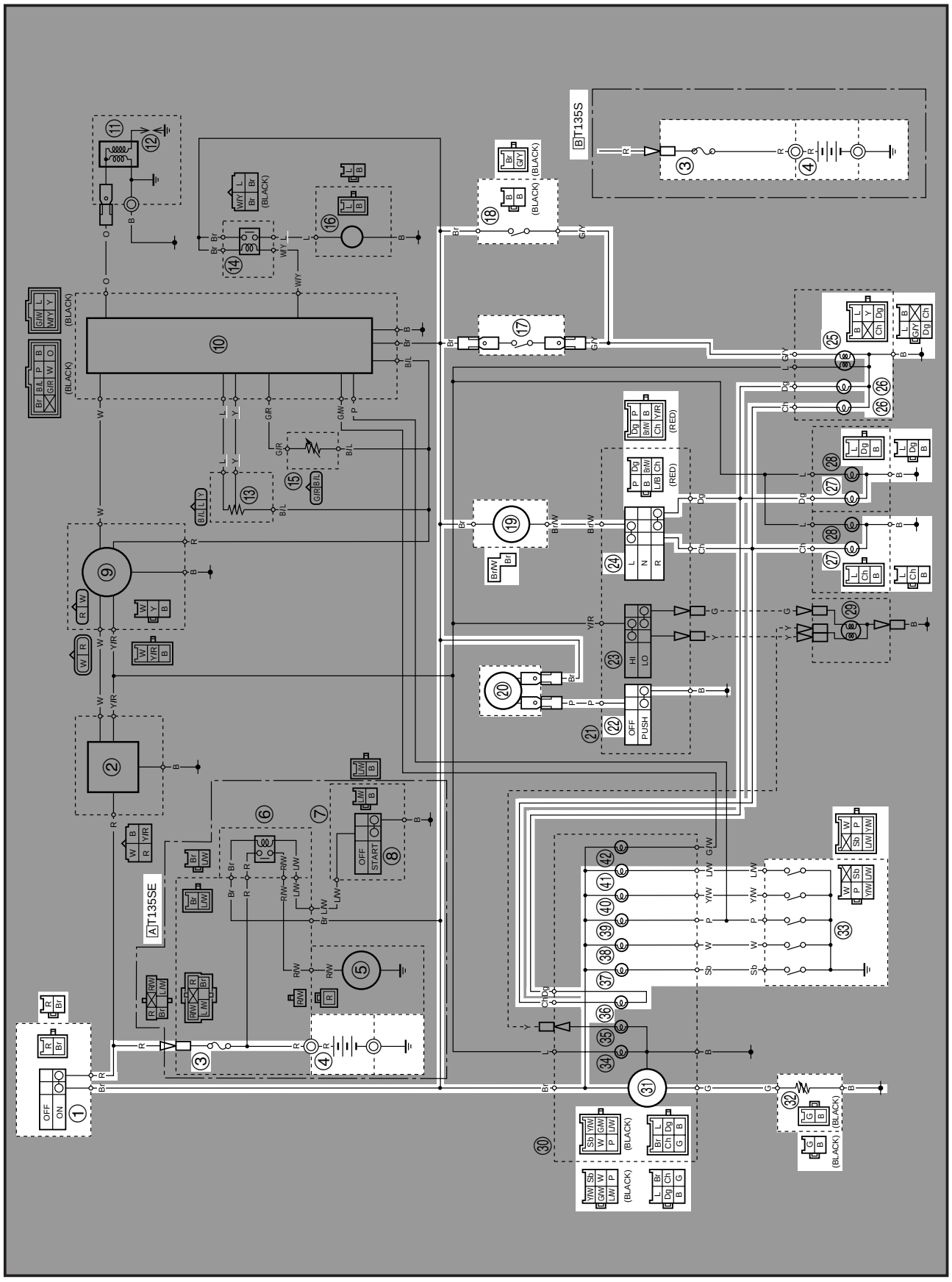
NO

This circuit is OK.

Replace the rectifier/regulator.

EAS00793

SIGNALING SYSTEM
CIRCUIT DIAGRAM



① Main switch
③ Fuse
④ Battery
⑰ Front brake light switch
⑱ Rear brake light switch
⑲ Turn signal relay
⑳ Horn
㉒ Horn switch
㉔ Turn signal switch
㉕ Tail/brake light
㉖ Rear turn signal light
㉗ Front turn signal light
㉛ Fuel gauge
㉜ Fuel sender
㉝ Neutral switch
㊱ Turn signal indicator light
㊲ Neutral indicator light
㊳ 1st gear position indicator light
㊴ 2nd gear position indicator light
㊵ 3rd gear position indicator light
㊶ 4th gear position indicator light

EAS00794

TROUBLESHOOTING

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

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

NOTE:

•Before troubleshooting, remove the following part(s):
1. side cowling (right)
2. front cowling
3. center panel (lower)
4. rear cowling (right)
5. headlight assembly

•Troubleshoot with the following special tool(s).



Pocket tester
90890-03112

EAS00738

1. Fuse

•Check the fuse for continuity.
Refer to “CHECKING THE FUSE” in chapter 3.
•Is the fuse OK?

YES

NO → Replace the fuse.

EAS00739

2. Battery

•Check the condition of the battery.
Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.



Minimum open-circuit voltage
12.8 V or more at 20 °C (68 °F)

•Is the battery OK?

YES

NO →
•Clean the battery terminals.
•Recharge or replace the battery.

EAS00783

3. Main switch

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

YES

NO → Replace the main switch.

EAS00795

4. Wiring

•Check the entire signaling system wiring.
Refer to “CIRCUIT DIAGRAM”.
•Is the signaling system wiring properly connected and without defects?

YES → Check the condition of each of the signaling system circuits.
Refer to “CHECKING THE SIGNALING SYSTEM”.

NO → Properly connect or repair the signaling system wiring.

EAS00796

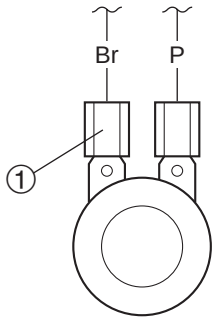
CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

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

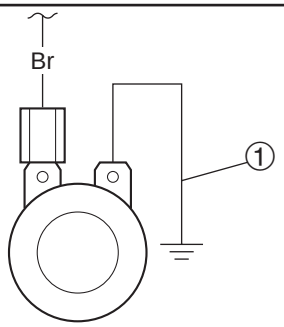
YES

NO → Replace the left handlebar switch.

2. Voltage
•Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.
Positive tester probe → brown ① **Negative tester probe → ground**

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

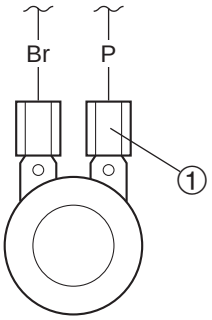
YES

NO → The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

3. Horn
•Disconnect the pink connector at the horn terminal. •Connect a jumper lead ① to the horn terminal and ground the jumper lead. •Set the main switch to “ON”. •Does the horn sound?


NO

YES → The horn is OK.

4. Voltage
•Connect the pocket tester (DC 20 V) to the horn connector at the pink terminal as shown.
Positive tester probe → pink ① **Negative tester probe → ground**

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

YES → Repair or replace 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.
  Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Are the tail/brake light bulb and socket OK?

YES

NO → Replace the tail/brake light bulb, socket or both.

2. Brake light switches

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

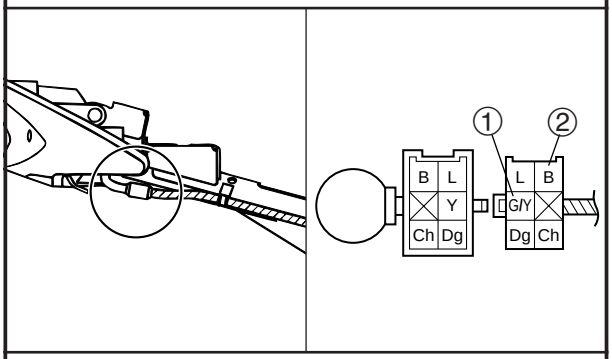
YES

NO → Replace the brake light switch.

3. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Positive tester probe → green/yellow ①
Negative tester probe → black ②



- Set the main switch to “ON”.
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (DC 12 V) of green/yellow lead terminal ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

YES → This circuit is OK.

NO → The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EAS00799

3. The turn signal light, turn signal indicator light or both fail to blink.

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

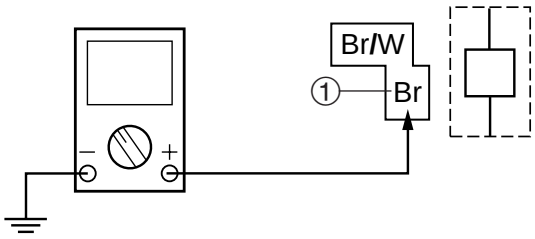
YES

NO → Replace the turn signal light bulb, socket or both.

2. Turn signal switch
•Check the turn signal switch for continuity. Refer to “CHECKING THE SWITCHES”. •Is the turn signal switch OK?

YES

NO → Replace the left handlebar switch.

3. Voltage
•Connect the pocket tester (DC 20 V) to the turn signal relay coupler as shown.
Positive tester probe → brown ① **Negative tester probe → ground**

•Set the main switch to “ON”. •Measure the voltage (DC 12 V) on brown lead terminal ① at the turn signal relay coupler. •Is the voltage within specification?

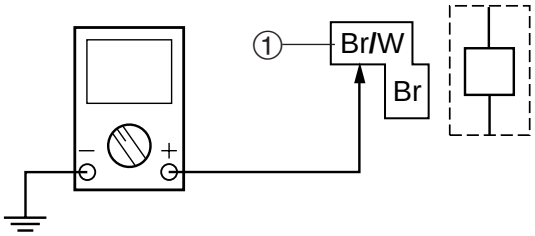
YES

NO → The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.

4. Voltage

•Connect the pocket tester (DC 20 V) to the turn signal relay coupler as shown.

Positive tester probe → brown/white ①
Negative tester probe → ground



•Set the main switch to "ON".
•Measure the voltage (DC 12 V) on brown/white lead terminal ① at the turn signal relay coupler.
•Is the voltage within specification?

YES

NO

The turn signal relay is faulty and must be replaced.

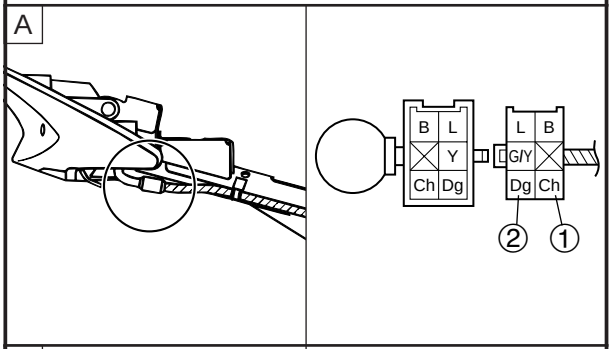
5. Voltage

•Connect the pocket tester (DC 20 V) to the turn signal light coupler (wire harness side) as shown.

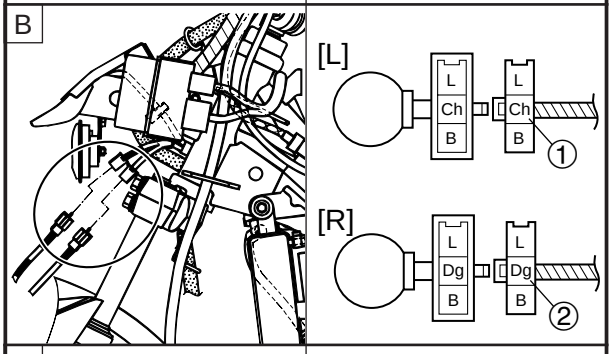
Turn signal light
A Rear
B Front
Left turn signal light
Positive tester probe → chocolate ①
Negative tester probe → ground
Right turn signal light
Positive tester probe → dark green ②
Negative tester probe → ground

C Turn signal indicator light
Positive tester probe → chocolate ③
Negative tester probe → ground
Positive tester probe → dark green ④
Negative tester probe → ground

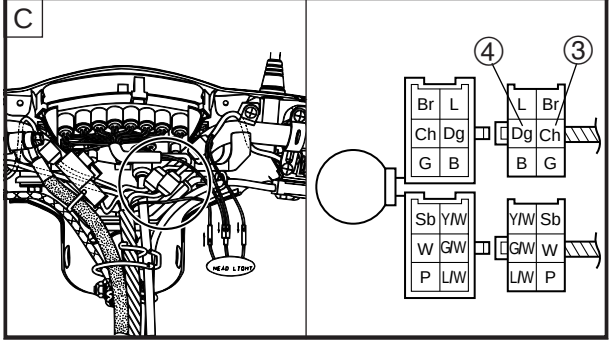
A



B



C



- Set the main switch to “ON”.
- Set the turn signal switch to “⇦” or “⇨”.
- Measure the voltage (DC 12 V) of the chocolate ① or dark green lead terminal ② at the turn signal light coupler (wire harness side) and chocolate ③ or dark green ④ at the turn signal indicator light coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the turn signal switch to the turn signal light coupler is faulty and must be repaired.

EAS00801

4. The gear position indicator lights fail to come on.

1. Gear position indicator light bulb and socket

- Check the gear position indicator light bulb and socket for continuity.
  Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Are the gear position indicator light bulb and socket OK?

YES

NO

Replace the gear position indicator light bulb, socket or both.

2. Neutral switch

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

YES

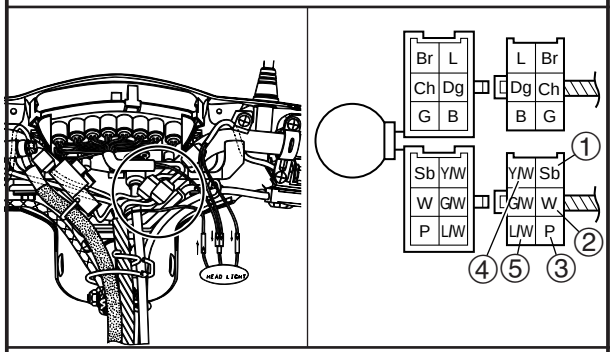
NO

Replace the neutral switch.

3. Voltage

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

Neutral indicator light
Positive tester probe → sky blue ①
Negative tester probe → ground
1st gear position indicator light
Positive tester probe → white ②
Negative tester probe → ground
2nd gear position indicator light
Positive tester probe → pink ③
Negative tester probe → ground
3rd gear position indicator light
Positive tester probe → yellow/white ④
Negative tester probe → ground
4th gear position indicator light
Positive tester probe → blue/white ⑤
Negative tester probe → ground



- Set the main switch to "ON".
- Shift the transmission into each gear.
- Measure the voltage (DC 12 V) of the sky blue ①, white ②, pink ③, yellow/white ④, or blue/white ⑤ lead terminal at the meter assembly coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

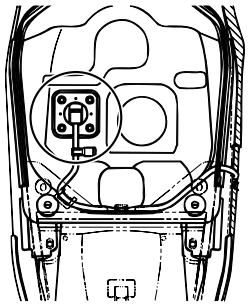
EAS00804

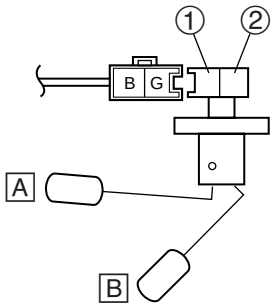
5. The fuel level gauge fails to operate.

1. Fuel sender

- Remove the fuel sender from the fuel tank.
- Connect the pocket tester to the fuel sender coupler (fuel sender side) as shown.

Positive tester probe → green ①
Negative tester probe → black ②





- Measure the fuel sender resistances.

Fuel sender resistance
(up position A)
(Ω × 1)
4–10 Ω at 20°C (68°F)
Fuel sender resistance
(down position B)
(Ω × 10)
90–100 Ω at 20°C (68°F)

- Is the fuel sender OK?

YES

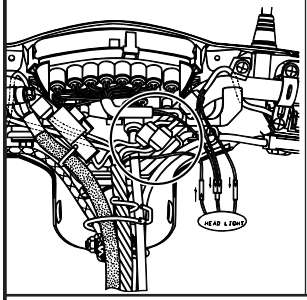
NO

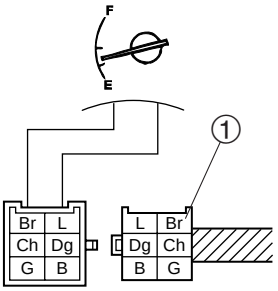
Replace the fuel sender.

2. Voltage

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

Positive tester probe → brown ①
Negative tester probe → ground





- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of brown lead terminal ① on the meter assembly coupler (wire harness side).
- Is the voltage within specification?

YES

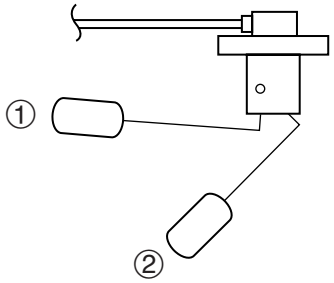
NO

Check the wiring connections of the entire signaling system

3. Fuel level gauge

- Set the main switch to "ON".
- Move the float up ① or down ②.
- Check that the fuel level gauge needle moves to "F" or "E".

NOTE:
Before reading the fuel level gauge, leave the float in one position (either up or down) for at least three minutes.



- Does the fuel level gauge needle move appropriately?

YES

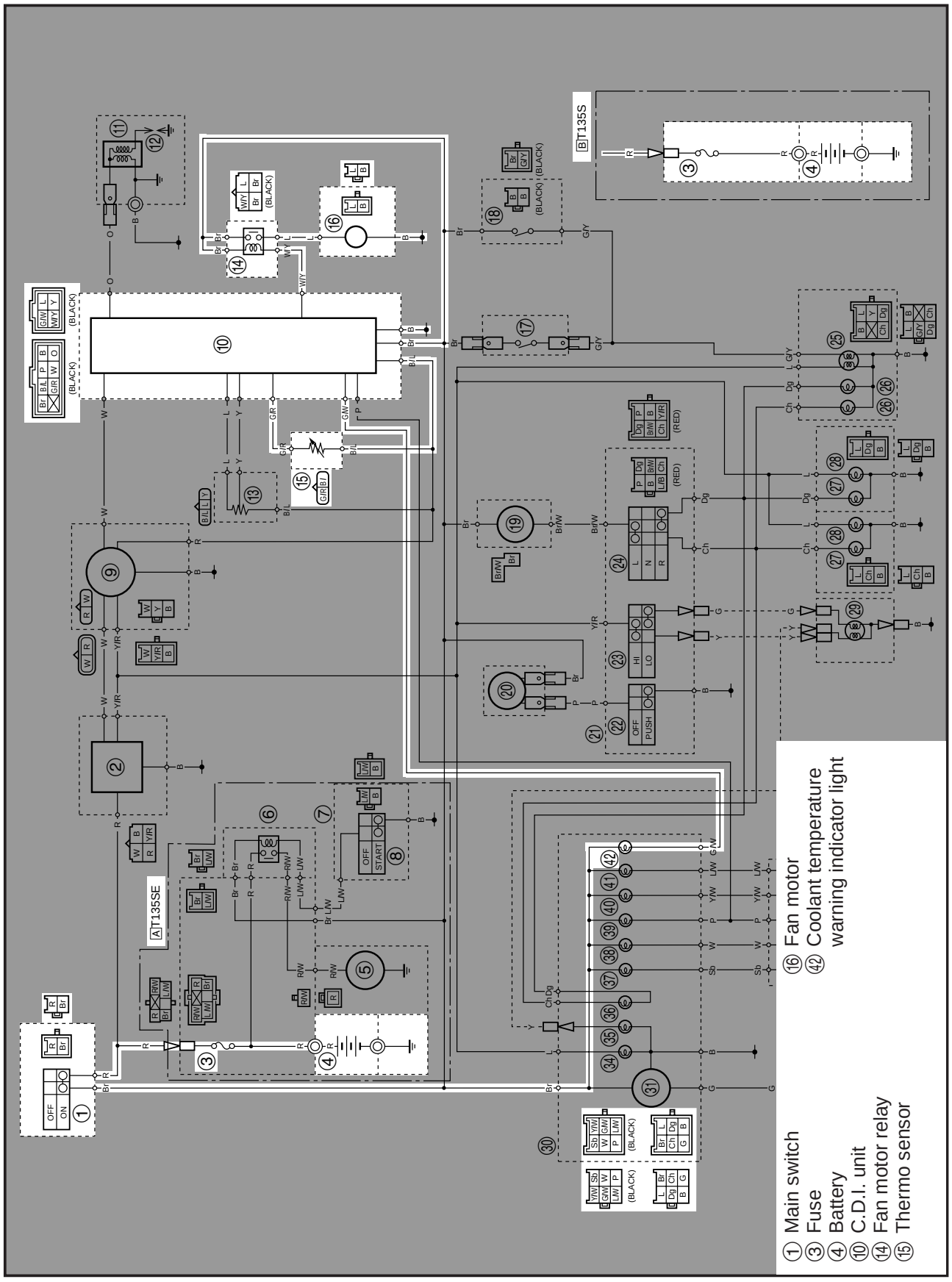
NO

Replace the fuel level gauge.

4. Wiring

Check the entire signaling system's wiring.

COOLING SYSTEM
CIRCUIT DIAGRAM



TROUBLESHOOTING

•The radiator fan motor fails to turn.

Check:
1. fuse
2. battery
3. main switch
4. fan motor
5. fan motor relay
6. thermo sensor
7. wiring harness
   (of the entire cooling system)

NOTE:
- Before troubleshooting, remove the following part(s):
  1. side cowlings (left and right)
  2. center panel (lower)
  3. rear cowling (right)
  4. coolant
- Troubleshoot with the following special service tool(s).



Pocket tester
90890-03112
Digital circuit tester
90890-03174

EAS00738

1. Fuse

- Check the fuse for continuity.
  Refer to “CHECKING THE FUSE” in chapter 3.
- Is the fuse OK?

YES ⇩

NO ⇩

Replace the fuse.

EAS00739

2. Battery

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



Minimum open-circuit voltage
12.8 V or more at 20 °C (68 °F)

- Is the battery OK?

YES ⇩

NO ⇩

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

EAS00783

3. Main switch

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

YES ⇩

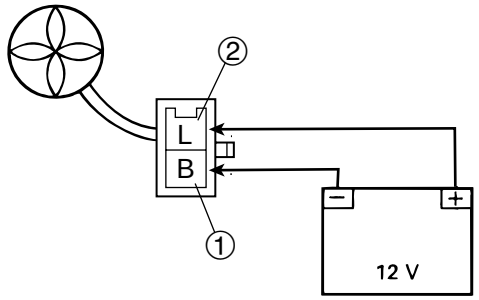
NO ⇩

Replace the main switch.

4. Radiator fan motor

- 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

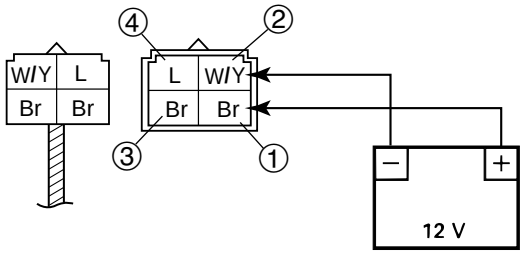
NO

The radiator fan motor is faulty and must be replaced.

5. Radiator fan motor relay

- Disconnect the radiator fan motor relay coupler.
- Connect the pocket tester to the radiator fan motor relay coupler (relay side) as shown.

Battery positive lead → brown ①
Battery negative lead → white/yellow ②
Positive tester probe → brown ③
Negative tester probe → blue ④



- Check the radiator fan motor relay blue and brown for continuity.
- Does the coupler is OK?

YES

NO

Replace the radiator fan motor relay.

6. Thermo sensor

- Remove the thermo sensor from the cylinder.
- Connect the digital circuit tester (Ω × 100) to the thermo switch ① as shown.
- Immerse the thermo sensor in a container filled with coolant ②.

NOTE:

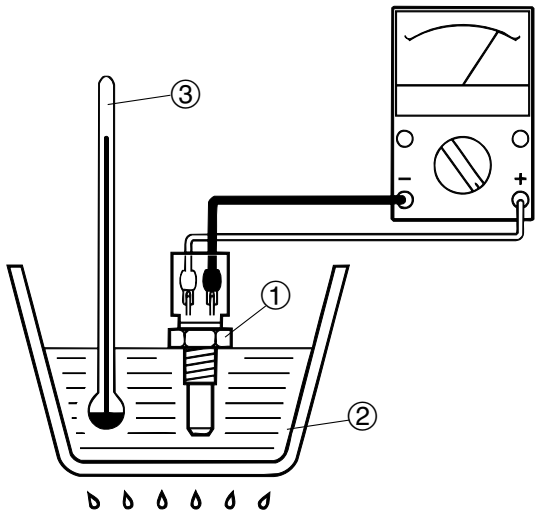
Make sure that the thermo sensor terminals do not get wet.

- 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 sensor for continuity at the temperatures indicated in the table.

Thermo sensor resistance
2.32–2.59 kΩ at 20°C (68°F)
310–326 Ω at 80°C (176°F)
140–144 Ω at 110°C (230°F)

⚠WARNING

- **Handle the thermo sensor with special care.**
- **Never subject the thermo sensor to strong shocks. If the thermo sensor is dropped, replace it.**



- Does the thermo sensor operate properly as described above?

YES

Tighten the thermo sensor to specified torque.

18 Nm (1.8 m•kg, 13 ft•lb)

NO

Replace the thermo sensor.

EAS00795

7. Wiring

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

YES

Check the condition of each of the cooling system circuits.
Refer to “CHECKING THE COOLING SYSTEM”.

NO

Properly connect or repair the cooling system wiring.

SELF-DIAGNOSIS

The T135SE/S features a self-diagnosing system for following circuit (-s).

1. Throttle position sensor (TPS)
2. Thermo sensor

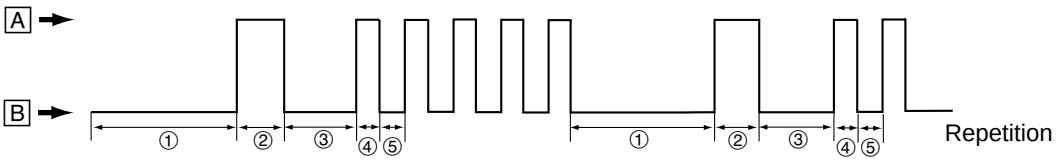
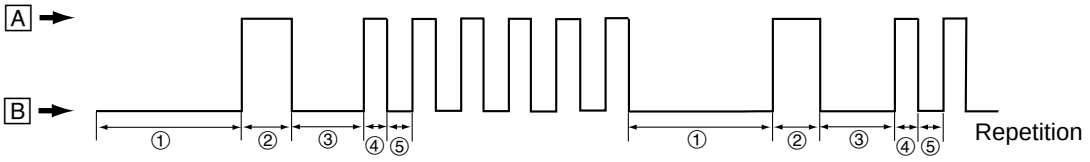
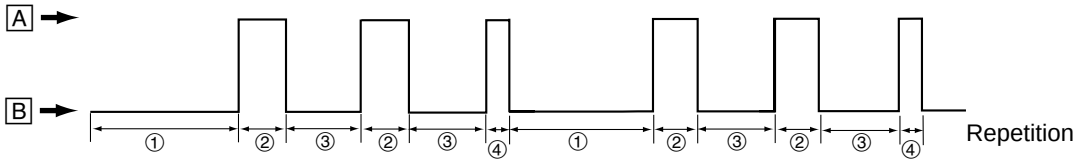
1. ENGINE TROUBLE INDICATOR LIGHT

When the main switch is turned to “ON”, the following items are monitored and the condition codes are displayed on the coolant temperature warning indicator light (irrespective of whether the engine is running or not).

Item	Condition	Response	Display condition code
Throttle position sensor (TPS)	Disconnected Short-circuit	• Enables the vehicle to run so that the ignition timing is fixed when the throttle is fully opened. • Displays the condition code on the coolant temperature warning indicator light.	Blinks in Fault code [1]
	Locked		Blinks in Fault code [2]
Thermo sensor	Disconnected Short-circuit	• Enables the vehicle to run so that the ignition timing is fixed. • Displays the condition code on the coolant temperature warning indicator light.	Blinks in Fault code [3]

Display order on the coolant temperature warning indicator light

When one item being monitored

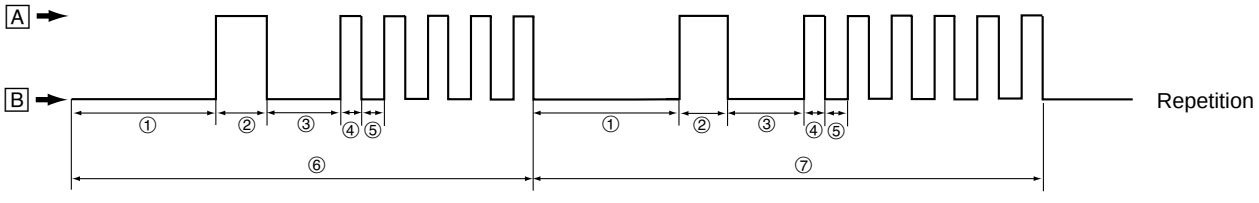
Fault code	Condition
[1]	
[2]	
[3]	

① 3 seconds
② 1 second
③ 1.5 seconds
④ 0.5 seconds
⑤ 0.5 seconds

A Light on
B Light off

When more than one item is being monitored

① Light off (seconds) ..... 3 sconds
② Light on (seconds) ..... 1 scond
③ Light off (seconds) ..... 1.5 sconds
④ Light on (seconds) ..... 0.5 sconds
⑤ Light off (seconds) ..... 0.5 sconds
⑥ 1 cycle ..... Fault code [1]
⑦ 1 cycle ..... Fault code [2]



TROUBLESHOOTING

The coolant temperature warning indicator light starts to display the self-diagnosis sequence.

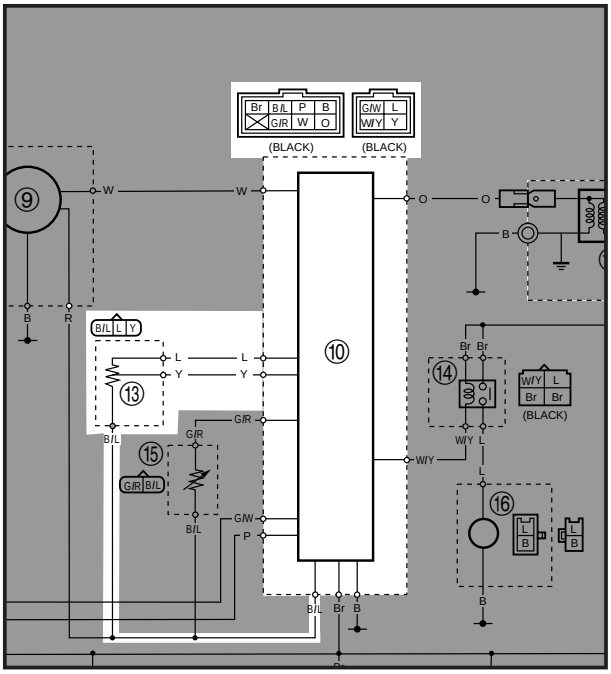
Check:
1. throttle position sensor
2. thermo sensor

NOTE:
- Before troubleshooting, remove the following part(s):
  1. side cowlings (left and right)
  2. front cowling
  3. center panel (lower)
- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112

1. Throttle position sensor

CIRCUIT DIAGRAM



⑩ C.D.I. unit
⑬ 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.

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?

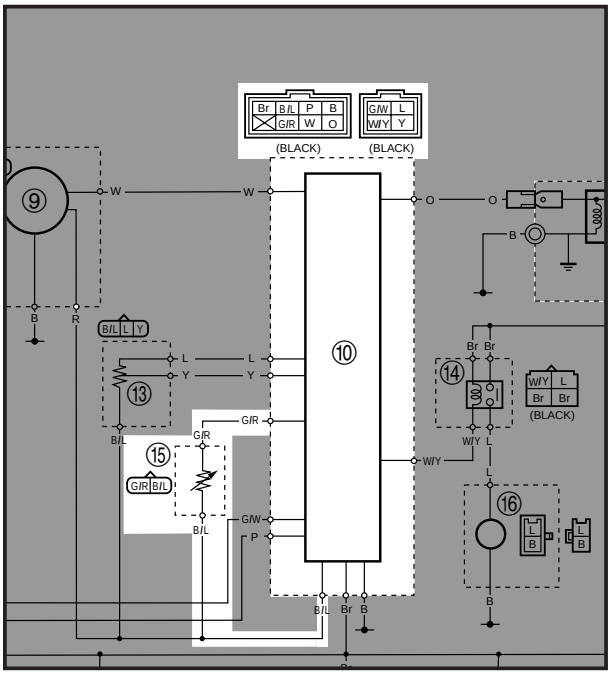
⇩ YES ⇩ NO

Replace the C.D.I unit.

Replace the throttle position sensor.

2. Thermo sensor

CIRCUIT DIAGRAM



⑩ C.D.I. unit
⑮ Thermo sensor

1. Wireharness
•Check the wireharness for continuity. Refer to “CIRCUIT DIAGRAM”. •Is the wireharness OK?

YES

NO

Repair or replace the wireharness.

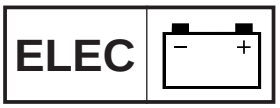
2. Thermo sensor
•Check the thermo sensor. Refer to “COOLING SYSTEM”. •Is the thermo sensor OK?

YES

Replace the C.D.I. unit.

NO

Replace the thermo sensor.


ELEC

TRBL SHTG ?

CHAPTER 9
TROUBLESHOOTING

TROUBLESHOOTING 9-1
ELECTRICAL SYSTEM 9-1
COMPRESSION SYSTEM 9-2
INTAKE AND EXHAUST SYSTEM 9-3

TRBL SHTG ?

EASF0062

TROUBLESHOOTING

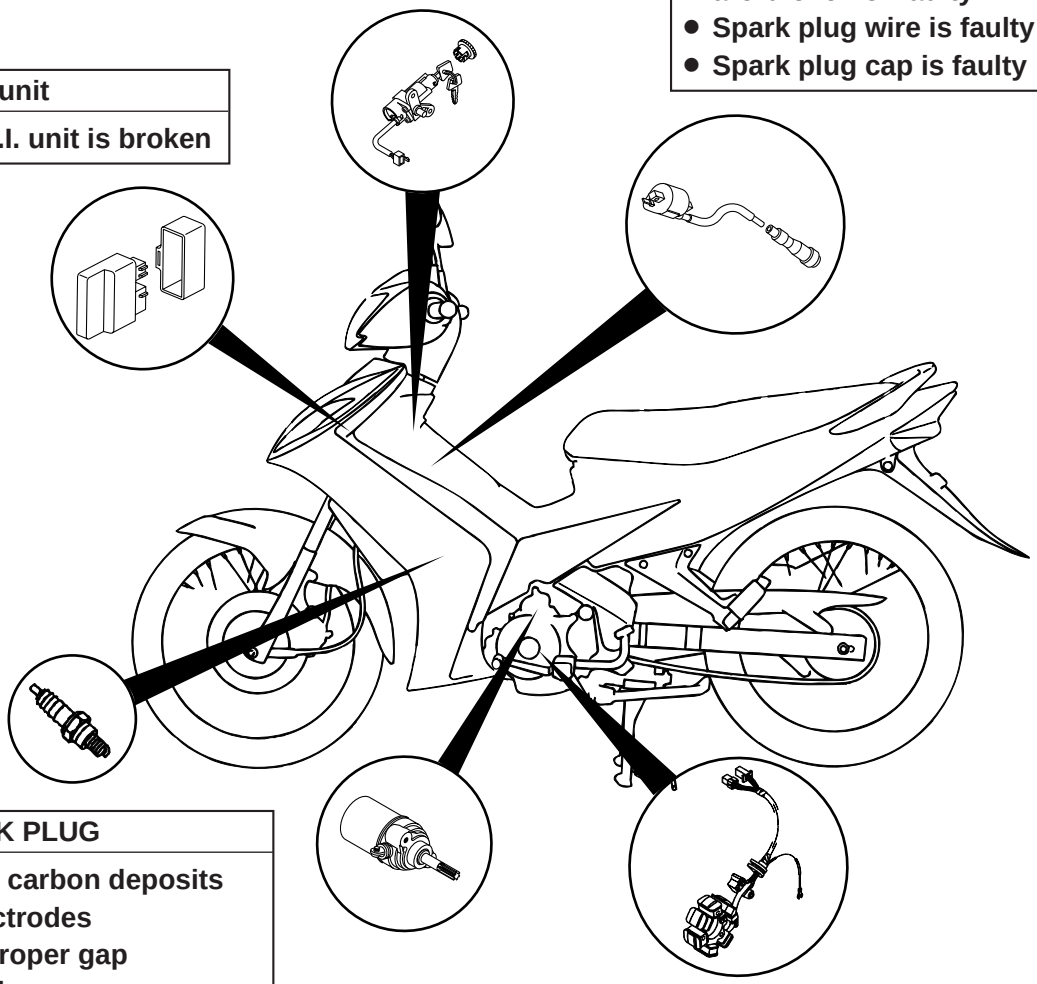
TROUBLESHOOTING
ELECTRICAL SYSTEM

***CHECK ALL WIRES CONNECTIONS**

MAIN SWITCH (see page 8-5)
- Main switch is shorted

IGNITION COIL (see page 8-13)
- Primary or secondary windings are broken or faulty
- Spark plug wire is faulty
- Spark plug cap is faulty

C.D.I. unit
- C.D.I. unit is broken

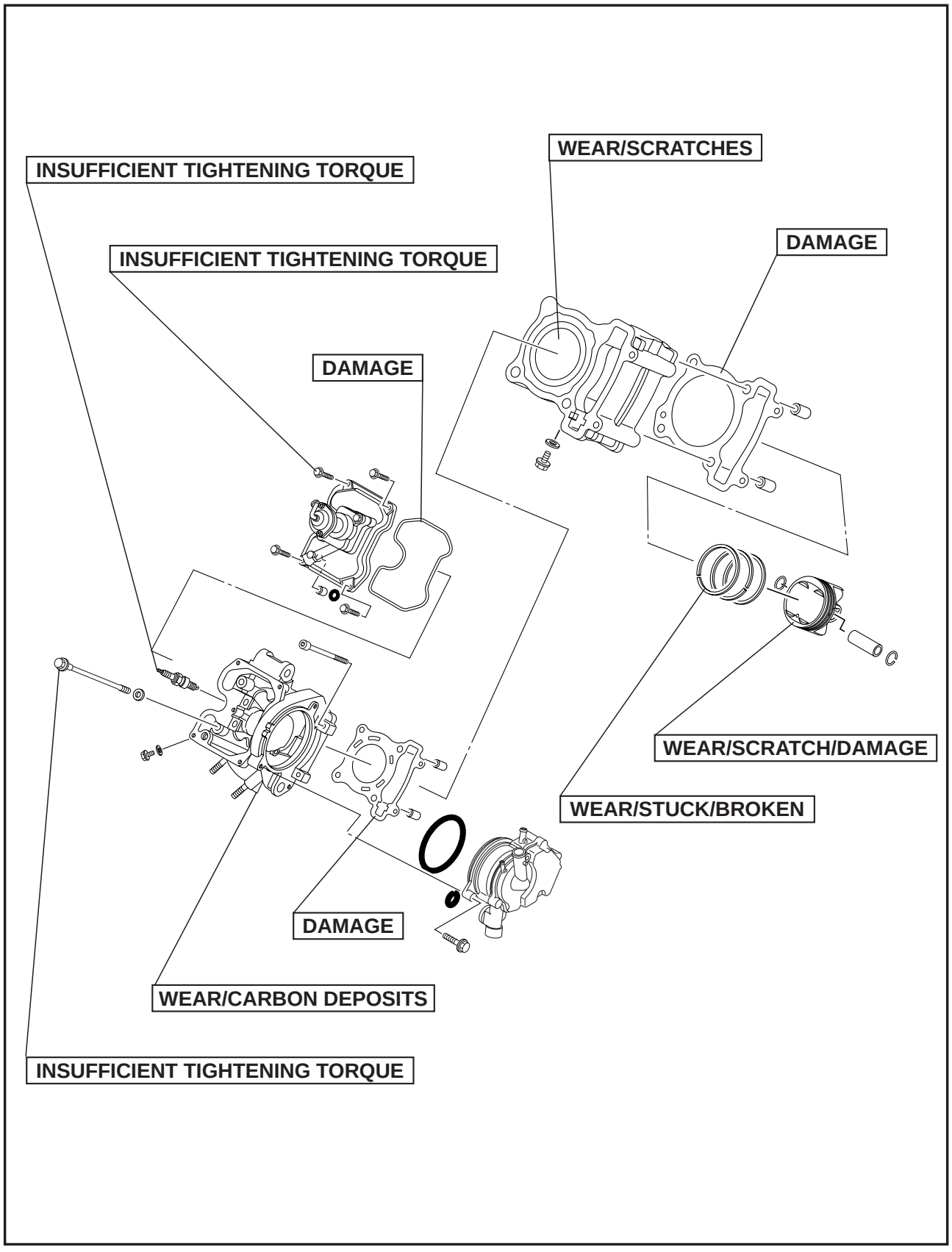


SPARK PLUG
- Wet carbon deposits
- Electrodes
- Improper gap
- Broken

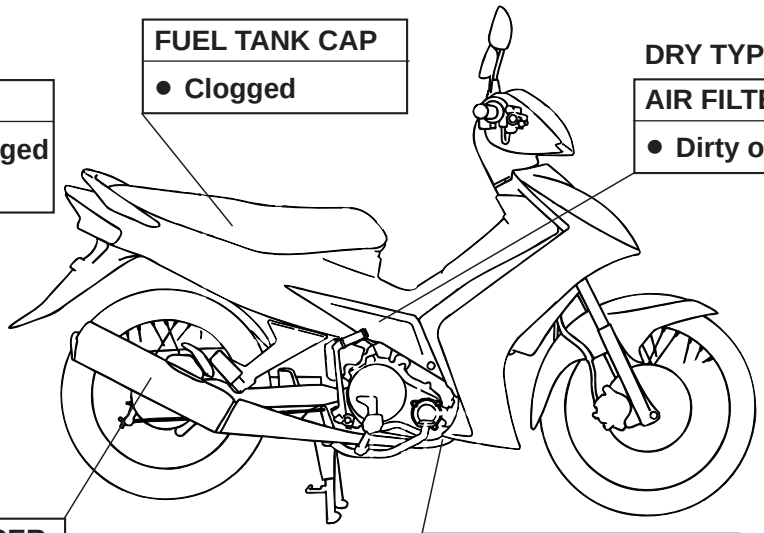
STARTER MOTOR(see page 8-18)
- Starter motor is broken or faulty
- Starter relay is broken
- Starter switch is broken

CHARGING COIL (see page 8-24)/ PICKUP COIL (see page 8-13)
- Windings are broken

COMPRESSION SYSTEM



INTAKE AND EXHAUST SYSTEM



FUEL COCK
- Clogged

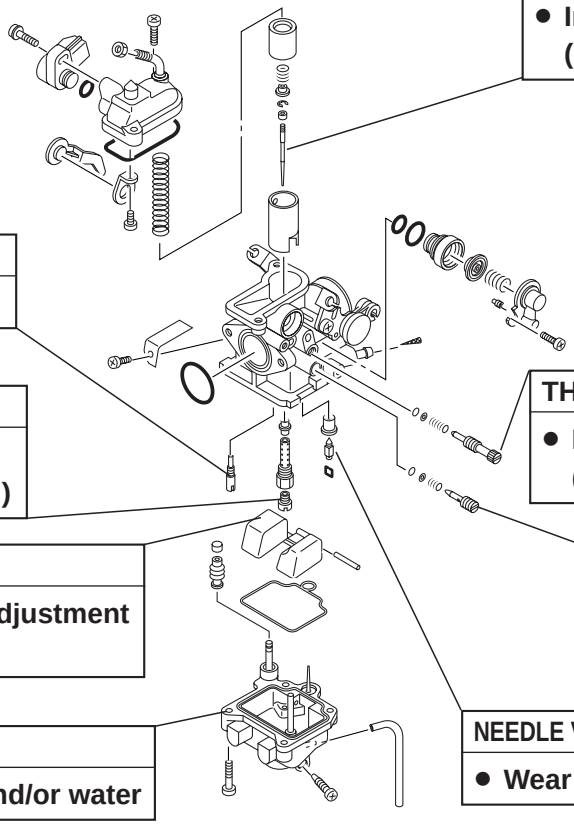
FUEL TANK CAP
- Clogged

DRY TYPE
AIR FILTER ELEMENT
- Dirty or clogged

FUEL HOSE
- Clogged, damaged or kinked

SILENCER
- Clogged

EXHAUST PIPE
- Cracked or broken
- Carbon deposits



NEEDLE SET
- Improperly adjusted (medium speed)

PILOT JET
- Clogged (low speed)

MAIN JET
- Incorrect size
- Clogged (high speed)

THROTTLE STOP SCREW
- Improperly adjusted (idling and starting)

FLOAT
- Incorrect fuel level adjustment
- Puncture

PILOT AIR SCREW
- Improperly adjusted (idling and starting)

FLOAT CHAMBER
- Accumulated dust and/or water

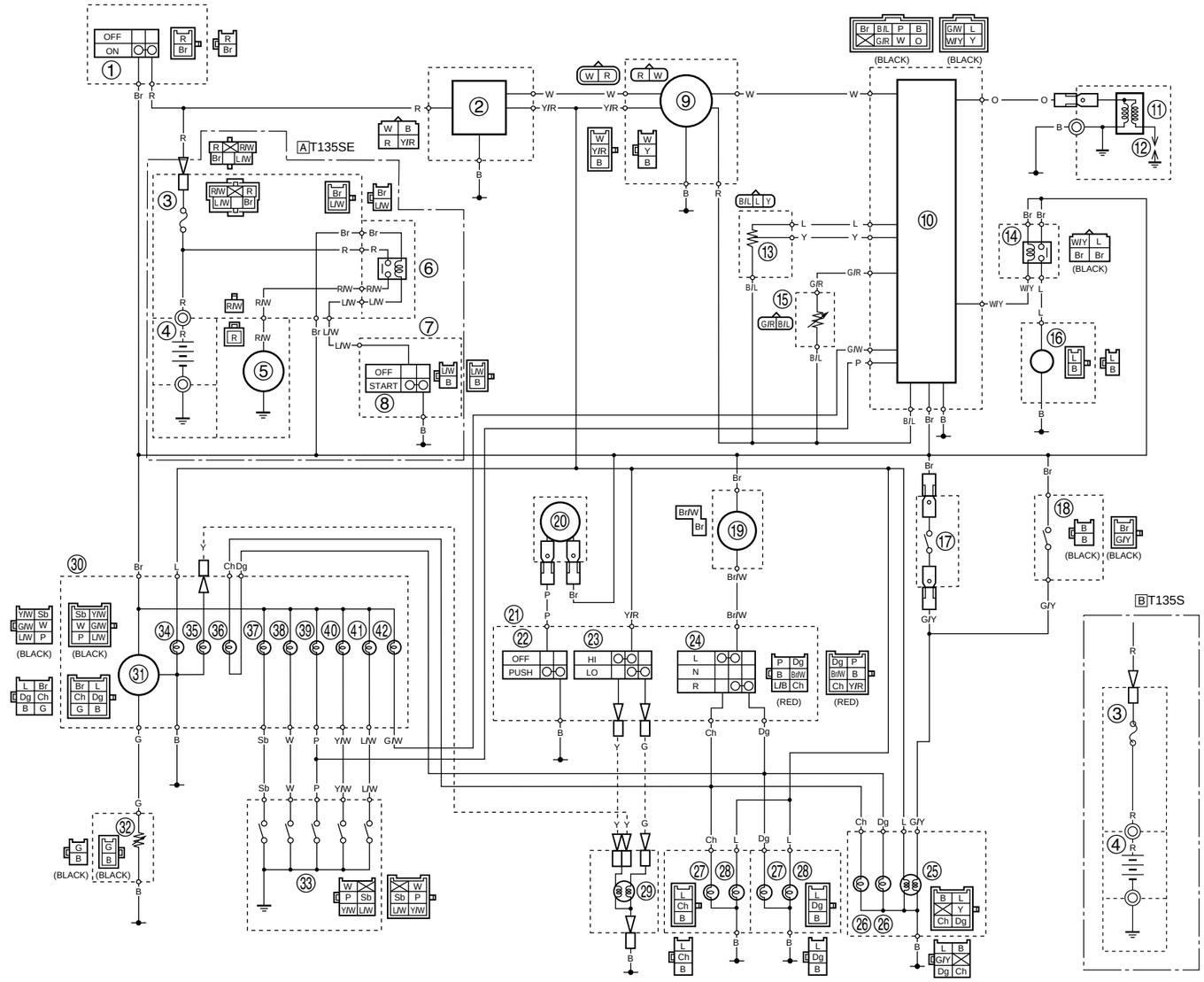
NEEDLE VALVE ASSEMBLY
- Wear

TRBL SHTG ?

YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

YamahaT135.COM

T135SE/ T135S WIRING DIAGRAM



① Main switch
② Rectifier/regurator
③ Fuse
④ Battery
⑤ Starter motor
⑥ Starter relay
⑦ Right handlber switch
⑧ Start switch
⑨ A.C. magneto
⑩ C.D.I. unit
⑪ Ignition coil
⑫ Spark plug
⑬ Throttle position sensor
⑭ Fan motor relay
⑮ Thermo sensor
⑯ Fan motor
⑰ Front brake light switch
⑱ Rear brake light switch
⑲ Turn signal relay
⑳ Horn
㉑ Left handlebar switch
㉒ Horn switch
㉓ Dimmer switch
㉔ Turn signal switch
㉕ Tail/brake light
㉖ Rear turn signal light
㉗ Front turn signal light
㉘ Auxilialy light
㉙ Headlight
㉚ Meter assembly
㉛ Fuel gauge
㉜ Fuel sender
㉝ Neutral switch
㉞ Meter light
㉟ High beam indicator light
㊱ Turn signal indicator light
㊲ Nutral indicator light
㊳ 1st gear position light
㊴ 2nd gear position light
㊵ 3rd gear position light
㊶ 4th gear position light
㊷ Coolant temparature warning indicator light

COLOR CORD

B.....Black	P.....Pink	G/Y.....Green/Yellow
Br .....Brown	R.....Red	L/B.....Blue/Black
Ch .....Chocolate	W .....White	L/W .....Blue/White
Dg .....Dark green	Y.....Yellow	R/W .....Red/White
G .....Green	B/L.....Black/Blue	W/Y .....White/Yellow
L .....Blue	Br/W.....Brown/White	Y/R .....Yellow/Red
O .....Orange	G/R.....Green/Red	Y/W .....Yellow/White
Sb .....Sky blue	G/W.....Green/White	

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