YAMAHA

YFM50S

SERVICE MANUAL

LIT-11616-17-13 5YF-28197-10

EBS00001

YFM50S
SERVICE MANUAL

Printed in U.S.A.
LIT-11616-17-13

EBS00002

NOTICE

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

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

NOTE:

Designs and specifications are subject to change without notice.

EBS00003

IMPORTANT INFORMATION

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

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

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

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

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

EBS00004

HOW TO USE THIS MANUAL

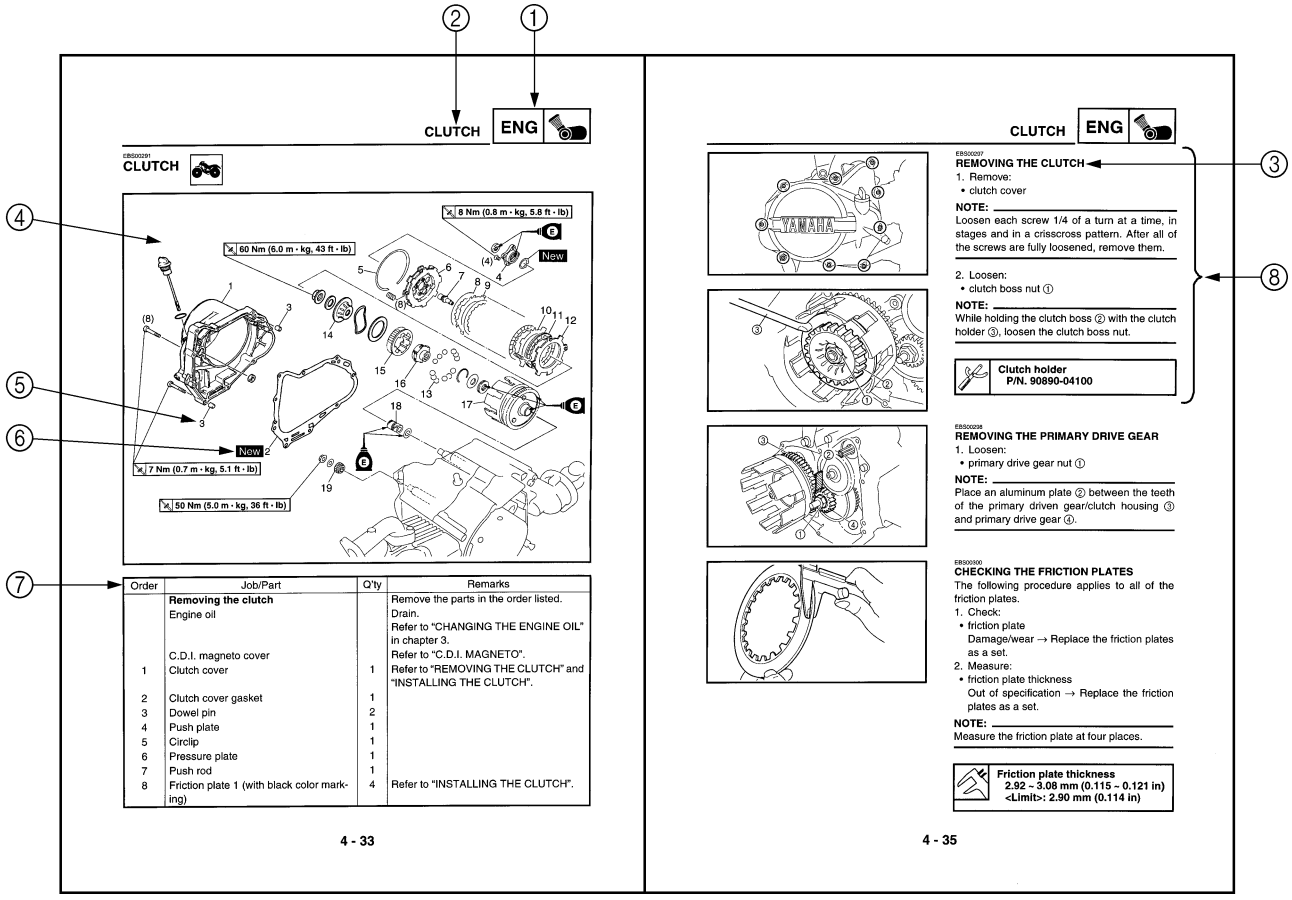
MANUAL ORGANIZATION

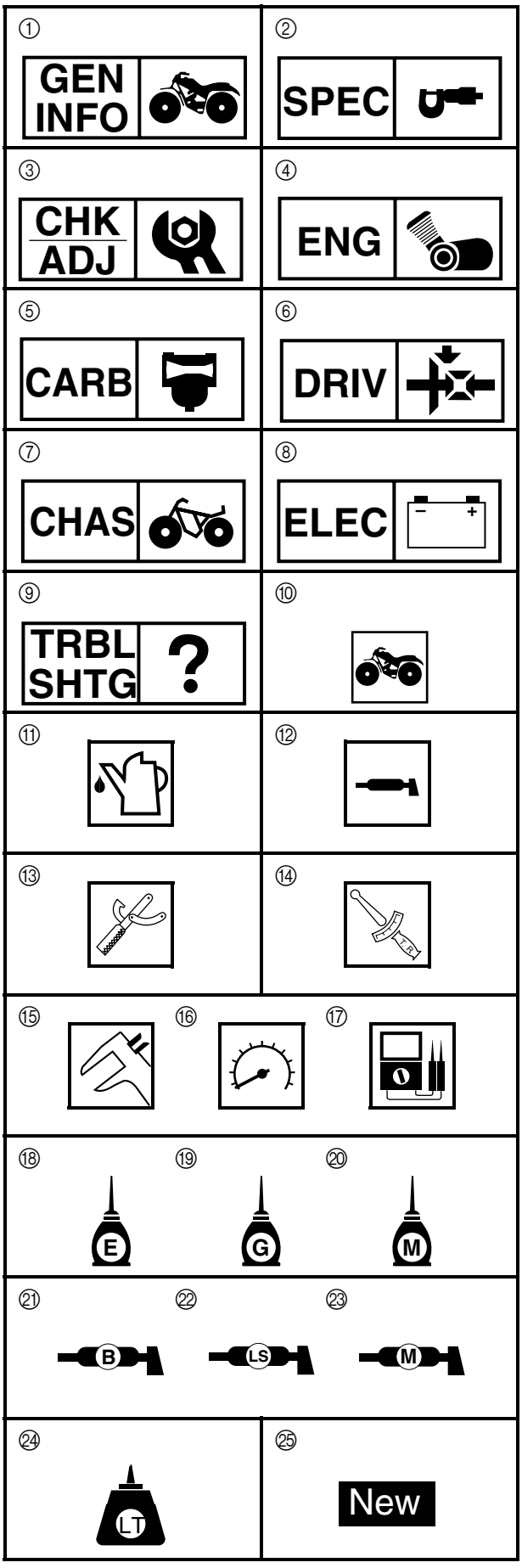
This manual consists of chapters for the main categories of subjects. (See “symbols”)
1st title ①: This is the title of the chapter with its symbol in the upper right corner of each page.
2nd title ②: This title indicates the section of the chapter and only appears on the first page of each section. It is located in the upper left corner of the page.
3rd title ③: This title indicates a sub-section that is followed by step-by-step procedures accompanied by corresponding illustrations.

EXPLODED DIAGRAMS

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

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





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SYMBOLS

The following symbols are not relevant to every machine.

Symbols ① to ⑨ indicate the subject of each chapter.

① General information
② Specifications
③ Periodic checks and adjustments
④ Engine
⑤ Carburetor
⑥ Drive train
⑦ Chassis
⑧ Electrical
⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

⑩ Serviceable with engine mounted
⑪ Filling fluid
⑫ Lubricant
⑬ Special tool
⑭ Torque
⑮ Wear limit, clearance
⑯ Engine speed
⑰ Electrical data (Ω, V, A)

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

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

Symbols ㉔ to ㉕ in the exploded diagrams indicate where to apply a locking agent ㉔ and when to install a new part ㉕.

㉔ Apply the locking agent (LOCTITE®)
㉕ Replace

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CHAPTER 7
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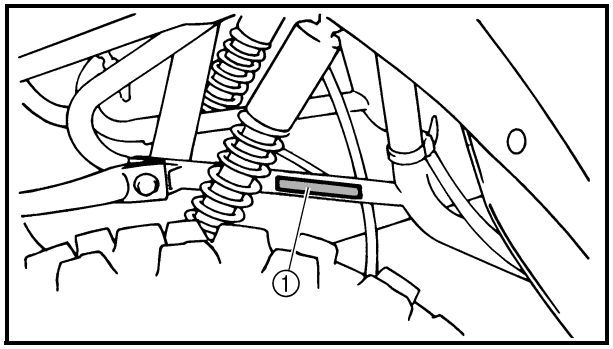
CHAPTER 8
ELECTRICAL

CHAPTER 9
TROUBLESHOOTING



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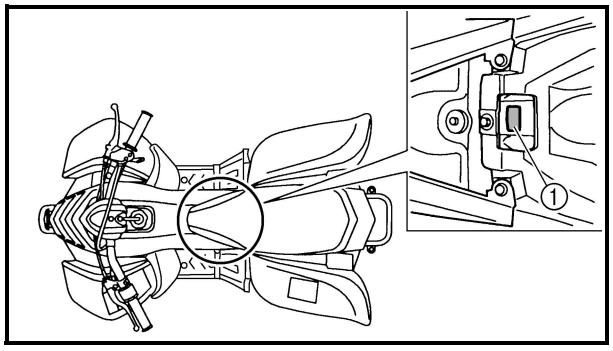
GENERAL INFORMATION

MACHINE IDENTIFICATION

EBS00010

VEHICLE IDENTIFICATION NUMBER

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



EBS00011

MODEL LABEL

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

EBS00013

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 “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.

EBS00014

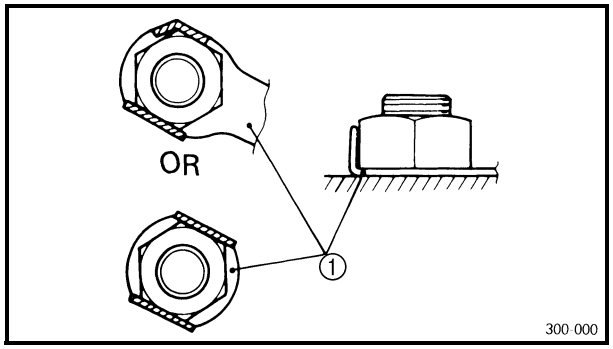
REPLACEMENT PARTS

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

EBS00015

GASKETS, OIL SEALS AND O-RINGS

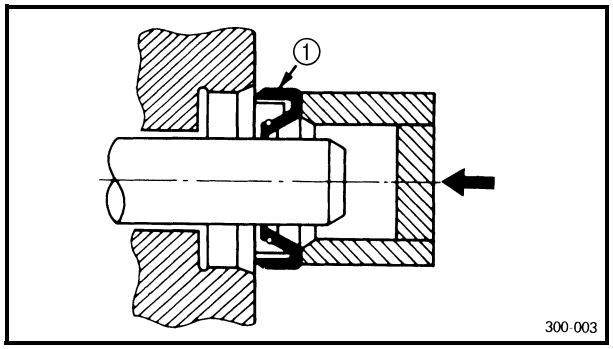
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly properly oil all mating parts and bearings, and lubricate the oil seal lips with grease.



EBS00016

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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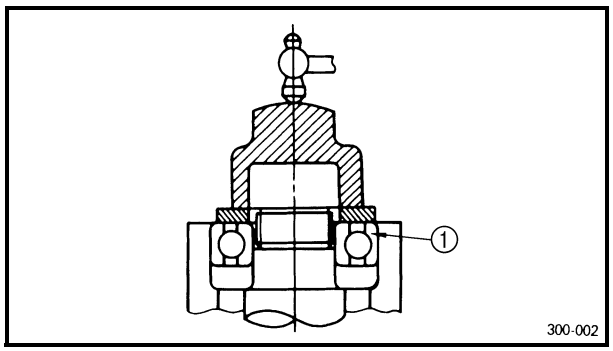
BEARINGS AND OIL SEALS

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.

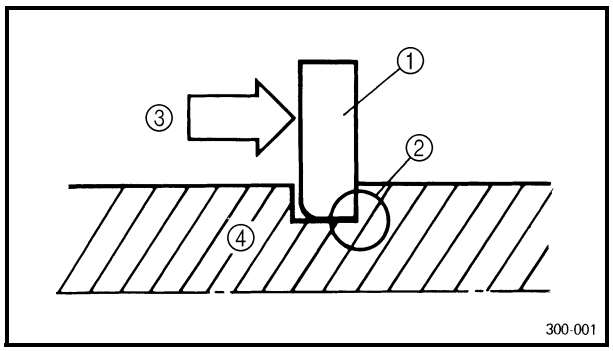
① Oil seal

CAUTION:

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



① Bearing

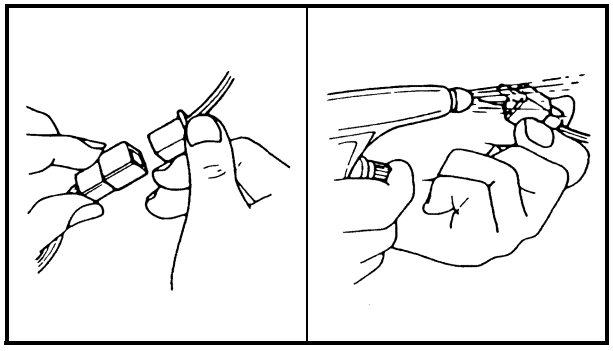


EBS00018

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

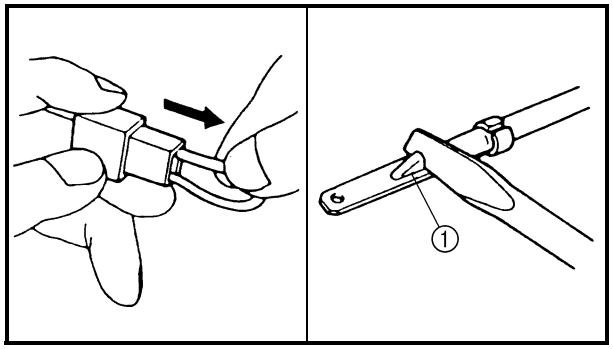


EBS00019
CHECKING THE CONNECTIONS

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

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

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



3. Check:
   - all connections

   Loose connection → Connect properly.

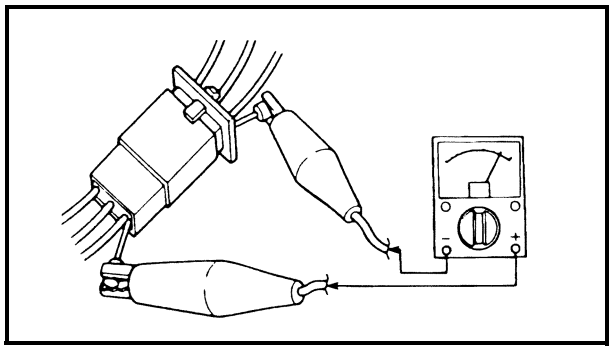
NOTE:

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

4. Connect:
   - lead
   - coupler
   - connector

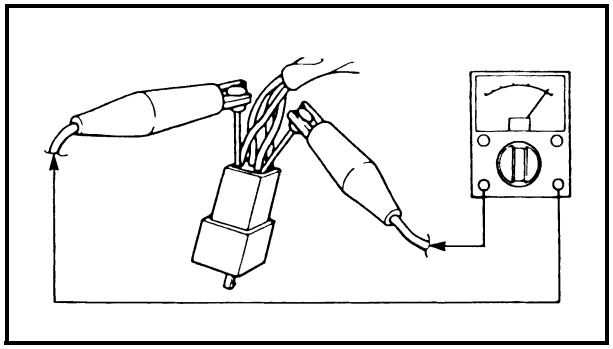
NOTE:

Make sure all connections are tight.



5. Check:
   - continuity (with the pocket tester)

Pocket tester
P/N. YU-03112-C, 90890-03112



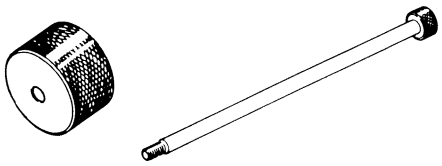
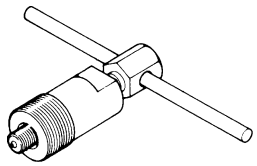
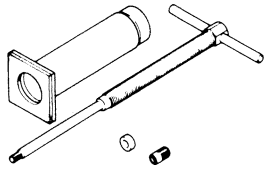
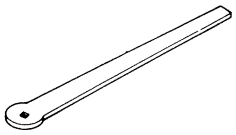
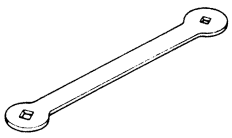
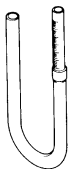
NOTE:

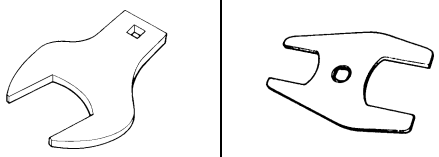
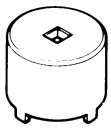
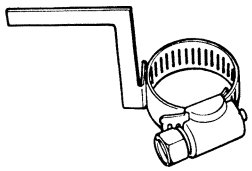
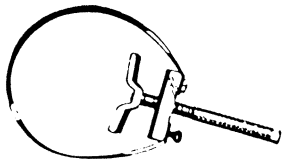
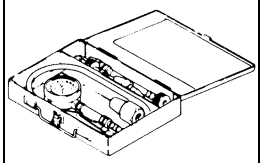
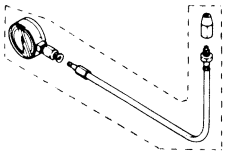
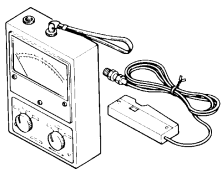
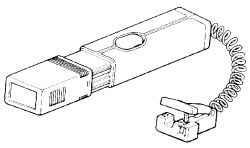
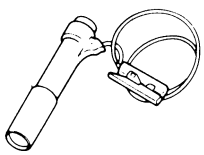
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

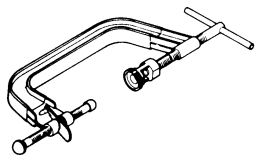
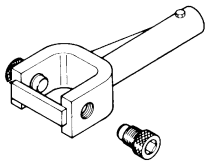
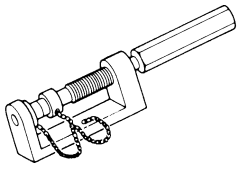
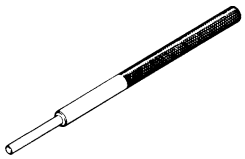
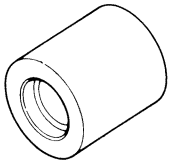
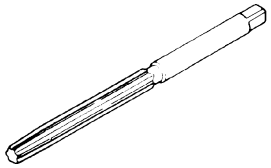
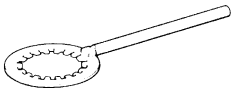
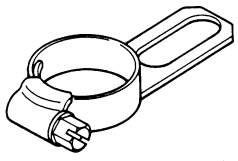
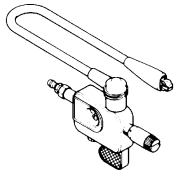
EBS00021

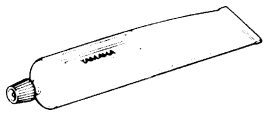
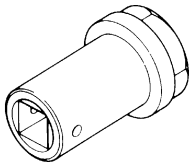
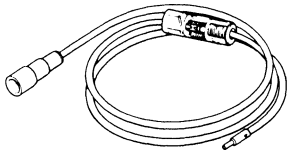
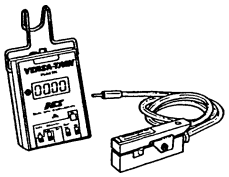
SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools; this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools may differ by shape and part number from country to country. In such a case, two types are provided.
When placing an order, refer to the list provided below to avoid any mistakes.
For US and CDN
P/N. YM-, YU-, YS-, YK-, ACC-
Except for US and CDN
P/N. 90890-

Tool No.	Tool name/Function	Illustration
Bolt 90890-01085 Weight 90890-01084 Set YU-01083-A	Slide hammer bolt (M8)/weight/set These tools are used to remove the rocker arm shaft.	
90890-01189 YM-01189	Flywheel puller This tool is needed to remove the rotor.	
90890-01304 YU-01304	Piston pin puller set This tool is used to remove the piston pin.	
90890-01311 YM-08035	Tappet adjusting tool (3 mm) This tool is necessary for adjusting the valve clearance.	 
90890-01312 YM-01312-A	Fuel level gauge This gauge is used to measure the fuel level in the float chamber.	
90890-01388	Damper rod holder (27 mm) This tool is needed to loosen and tighten the middle driven pinion gear bearing retainer.	

Tool No.	Tool name/Function	Illustration
90890-01422 YM-37132	Axle nut wrench (36 mm) This tool is needed to loosen or tighten the rear axle nut.	
90890-01430 YM-38404	Ring nut wrench This tool is needed to loosen and tighten the final gear case bearing retainer.	
90890-01467 YM-01467	Gear lash measurement tool This tool is used to measure the middle gear backlash.	
90890-01701 YS-01880-A	Sheave holder This tool is needed to hold the rotor when removing or installing the rotor nut.	
Gauge 90890-03081 YU-33223 Adapter 90890-04082	Compression gauge Adapter These tools are needed to measure engine compression.	 
90890-03112 YU-03112-C	Pocket tester This instrument is needed for checking the electrical system.	
90890-03113	Engine tachometer This tool is needed for observing engine rpm.	
90890-03141 YM-33277-A	Timing light This tool is necessary for checking ignition timing.	 

Tool No.	Tool name/Function	Illustration
Compressor 90890-04019 YM-04019 Attachment 90890-04108 YM-04108	Valve spring compressor Valve spring compressor attachment This tool is needed to remove and install the valve assemblies.	
Holder 90890-04062 YM-04062 Attachment 90890-04096	Universal joint holder Universal joint holder attachment This tool is needed when removing or installing the universal joint yoke nut.	 
90890-04097 YM-04097	Valve guide remover (5 mm) This tool is needed to remove and install the valve guide.	
90890-04098 YM-04098	Valve guide installer (5 mm) This tool is needed to install the valve guide.	
90890-04099	Valve guide reamer (5 mm) This tool is needed to rebore the new valve guide.	
90890-04100	Clutch holder This tool is needed to hold the clutch boss when removing or installing the clutch boss nut.	
90890-04129 YM-04129	Pinion gear fix clamp This tool is used to hold the drive axle/middle drive pinion gear assembly.	
90890-06754	Ignition checker This instrument is necessary for checking the ignition system components.	

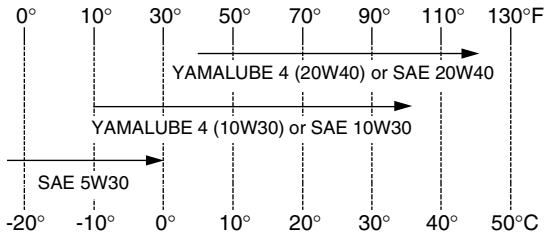
Tool No.	Tool name/Function	Illustration
Bond 90890-85505 Sealant ACC-11001-05-01	Yamaha bond No. 1215 Sealant (Quick Gasket®) This sealant (bond) is used on crankcase mating surfaces, etc.	
YM-01363	27-mm hexagon wrench This tool is needed to loosen and tighten the middle driven pinion gear bearing retainer.	
YM-34487	Dynamic spark tester This instrument is necessary for checking the ignition system components.	
YU-8036-B	Inductive self-powered tachometer This tool is needed for observing engine rpm.	

EBS01001

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard
Model code	5YF1
Dimensions	
Overall length	1,537 mm (60.5 in)
Overall width	825 mm (32.5 in)
Overall height	915 mm (36.0 in)
Seat height	618 mm (24.3 in)
Wheelbase	1,030 mm (40.6 in)
Minimum ground clearance	70 mm (2.76 in)
Minimum turning radius	2,300 mm (90.6 in)
Basic weight	
With oil and full fuel tank	115 kg (253 lb)
Engine	
Engine type	Air-cooled 4-stroke, SOHC
Cylinder arrangement	Forward-inclined single cylinder
Displacement	49 cm^3
Bore × stroke	39.0 × 41.4 mm (1.54 × 1.63 in)
Compression ratio	10.0 : 1
Standard compression pressure (at sea level)	1,200 kPa (12.0 kg/cm^2, 170.6 psi) at 1,000 r/min
Starting system	Electric starter
Lubrication system	Wet sump
Oil type or grade	
Engine oil	API service SE, SF, SG type or higher
Final gear oil	SAE 80API “GL-4” Hypoid gear oil
Oil capacity	
Engine oil	
Periodic oil change	0.80 L (0.70 Imp qt, 0.85 US qt)
Total amount	0.95 L (0.84 Imp qt, 1.00 US qt)
Final gear case oil	
Total amount	0.12 L (0.11 Imp qt, 0.13 US qt)
Air filter	Wet type element

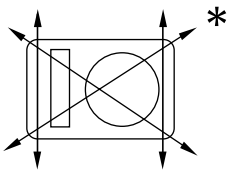
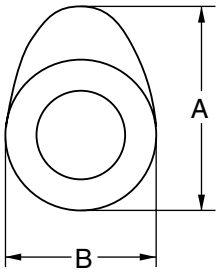
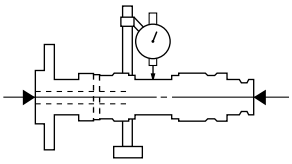


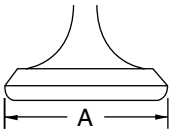
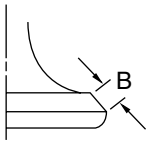
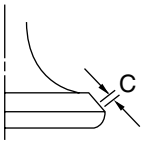
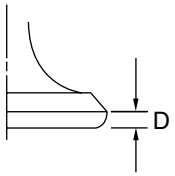
Item		Standard
Fuel		
Type		Unleaded gasoline only
Fuel tank capacity		6.8 L (1.50 Imp gal, 1.80 US gal)
Fuel reserve amount		0.9 L (0.20 Imp gal, 0.24 US gal)
Carburetor		
Type/quantity		VM16SH/1
Manufacturer		MIKUNI
Spark plug		
Type/manufacturer		CR7HS/NGK
Spark plug gap		0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch type		Wet, multiple-disc automatic
Transmission		
Primary reduction system		Spur gear
Primary reduction ratio		65/20 (3.250)
Secondary reduction system		Shaft drive
Secondary reduction ratio		19/18 × 34/10 (3.588)
Operation		Left hand operation
Gear ratio		
1st gear		38/14 (2.714)
Chassis		
Frame type		Steel tube frame
Caster angle		1.0°
Camber angle		2.0°
Kingpin angle		10°
Trail		3.4 mm (0.13 in)
Tread (STD)	front	630 mm (24.80 in)
	rear	665 mm (26.18 in)
Toe-in		0 ~ 10 mm (0 ~ 0.39 in)
Tire		
Type		Tubeless
Size	front	AT16 × 7-7
	rear	AT16 × 8-7
Manufacturer	front	DUNLOP
	rear	DUNLOP
Type	front	KT145
	rear	KT145
Tire pressure (cold tire)		
Maximum load*		40 kg (88 lb)
Off-road riding	front	17 ~ 23 kPa (0.17 ~ 0.23 kgf/cm^2, 2.5 ~ 3.3 psi)
	rear	17 ~ 23 kPa (0.17 ~ 0.23 kgf/cm^2, 2.5 ~ 3.3 psi)
*Load in total weight of rider accessories		

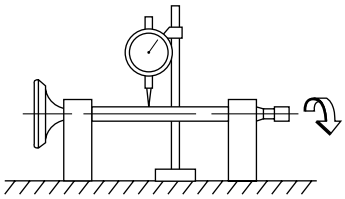
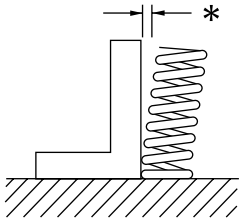
Item		Standard
Brake		
Front brake	type	Drum brake
	operation	Right hand operation
Rear brake	type	Drum brake
	operation	Left hand operation
Suspension		
Front suspension		Leading arm
Rear suspension		Swingarm
Shock absorber		
Front shock absorber		Coil spring/oil damper
Rear shock absorber		Coil spring/oil damper
Wheel travel		
Front wheel travel		57 mm (2.24 in)
Rear wheel travel		56 mm (2.20 in)
Electrical		
Ignition system		C.D.I.
Generator system		A.C. magneto
Battery type		12N7D-3B
Battery capacity		12 V 7 AH
Bulb wattage × quantity		
Neutral indicator light		12 V 1.7 W × 1

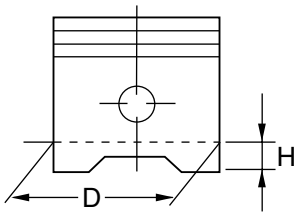
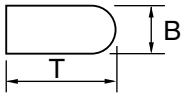
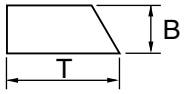
EBS01002

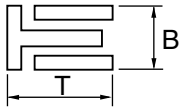
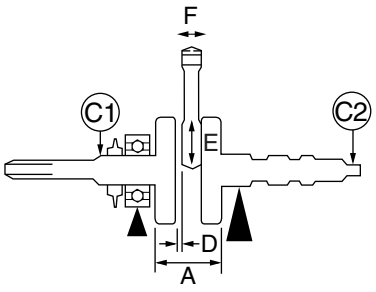
ENGINE SPECIFICATIONS

Item	Standard	Limit
Cylinder head		
Warp limit ∗ 	----	0.05 mm (0.002 in)
Cylinder		
Bore size	39.000 ~ 39.005 mm (1.5354 ~ 1.5356 in)	39.105 mm (1.5396 in)
Taper limit	----	0.05 mm (0.002 in)
Maximum out-of-round	----	0.01 mm (0.0004 in)
Camshaft		
Drive method	Chain drive (Left)	----
Cam dimensions 		
Intake “A”	25.300 ~ 25.310 mm (0.9961 ~ 0.9965 in)	25.200 mm (0.9921 in)
“B”	20.994 ~ 21.094 mm (0.8265 ~ 0.8305 in)	20.894 mm (0.8226 in)
Exhaust “A”	25.301 ~ 25.311 mm (0.9961 ~ 0.9965 in)	25.201 mm (0.9922 in)
“B”	21.021 ~ 21.121 mm (0.8276 ~ 0.8315 in)	20.921 mm (0.8237 in)
Camshaft runout limit 	----	0.03 mm (0.0012 in)
Timing chain		
Timing chain type/No. of links	Bush chain/82	----
Timing chain adjustment method	Manual	----

Item		Standard	Limit
Rocker arm/rocker arm shaft			
Rocker arm inside diameter		10.000 ~ 10.015 mm (0.3937 ~ 0.3943 in)	----
Rocker arm shaft outside diameter		9.981 ~ 9.991 mm (0.3930 ~ 0.3933 in)	----
Rocker-arm-to-rocker-arm-shaft clearance		0.009 ~ 0.034 mm (0.0004 ~ 0.0013 in)	0.08 mm (0.0031 in)
Valve, valve seat, valve guide			
Valve clearance (cold)	IN	0.05 ~ 0.10 mm (0.002 ~ 0.004 in)	----
	EX	0.075 ~ 0.125 mm (0.003 ~ 0.005 in)	----
Valve dimensions			
 Head Diameter	 Face Width	 Seat Width	 Margin Thickness
"A" head diameter	IN	19.9 ~ 20.1 mm (0.7835 ~ 0.7913 in)	----
	EX	16.7 ~ 16.9 mm (0.6575 ~ 0.6654 in)	----
"B" face width	IN	1.10 ~ 2.30 mm (0.0433 ~ 0.0906 in)	----
	EX	1.30 ~ 2.40 mm (0.0512 ~ 0.0945 in)	----
"C" seat width	IN	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.0630 in)
	EX	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.0630 in)
"D" margin thickness	IN	0.5 ~ 0.9 mm (0.0197 ~ 0.0354 in)	1.6 mm (0.0630 in)
	EX	0.6 ~ 1.0 mm (0.0236 ~ 0.0394 in)	1.6 mm (0.0630 in)
Stem outside diameter	IN	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in)	4.950 mm (0.1949 in)
	EX	4.960 ~ 4.975 mm (0.1953 ~ 0.1959 in)	4.953 mm (0.1950 in)
Guide inside diameter	IN	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)	5.030 mm (0.1980 in)
	EX	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)	5.030 mm (0.1980 in)

Item		Standard	Limit
Stem-to-guide clearance	IN	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
	EX	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.10 mm (0.0039 in)
Stem runout limit		----	0.02 mm (0.0008 in)
			
Valve seat width	IN	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.0630 in)
	EX	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.0630 in)
Valve spring			
Free length	IN	32.00 mm (1.26 in)	30.40 mm (1.20 in)
	EX	32.00 mm (1.26 in)	30.40 mm (1.20 in)
Compressed pressure (installed)	IN	136 ~ 158 N at 24.6 mm (13.87 ~ 16.11 kg, 30.57 ~ 35.52 lb at 0.97 in)	----
	EX	136 ~ 158 N at 24.6 mm (13.87 ~ 16.11 kg, 30.57 ~ 35.52 lb at 0.97 in)	----
Tilt limit *	IN		2.5°/1.4 mm (2.5°/0.06 in)
	EX		2.5°/1.4 mm (2.5°/0.06 in)
			
Direction of winding (top view)	IN	Clockwise	----
	EX	Clockwise	----

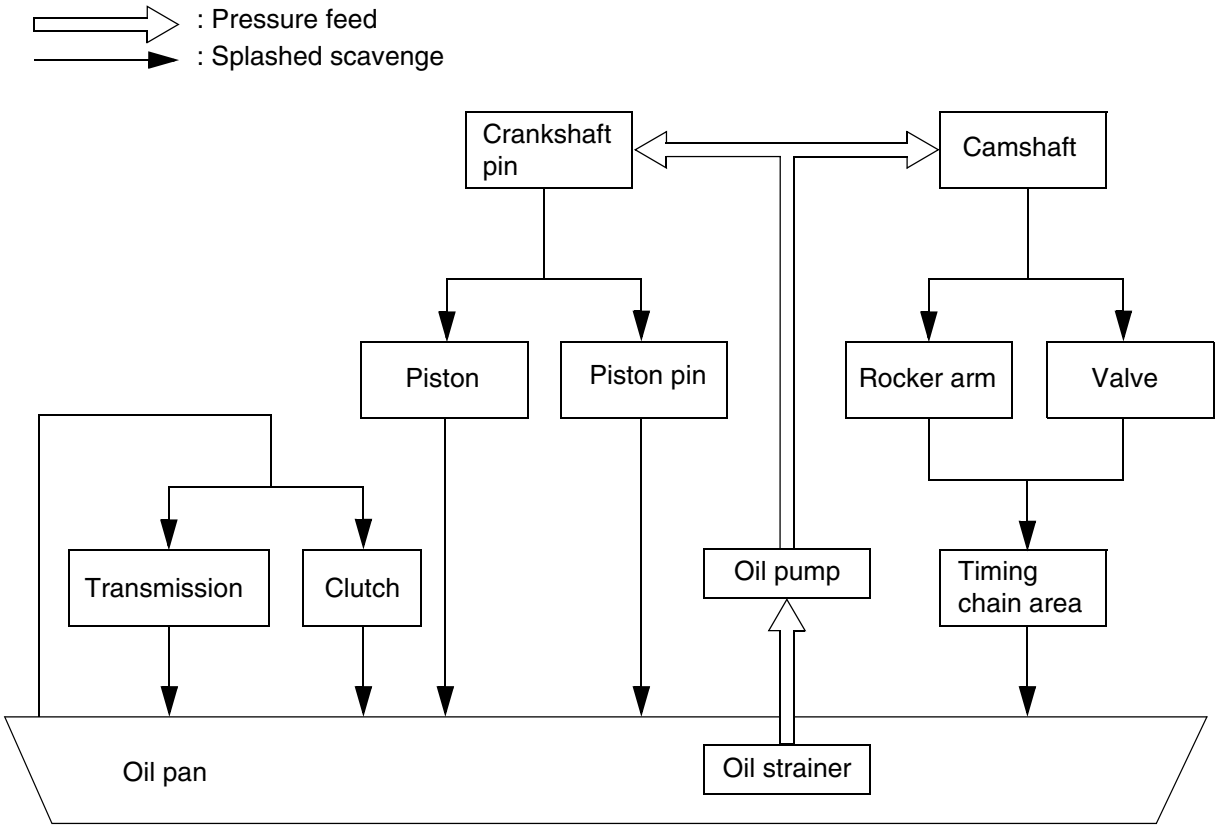
Item		Standard	Limit
Piston			
Piston to cylinder clearance		0.025 ~ 0.045 mm (0.0010 ~ 0.0018 in)	0.15 mm (0.0059 in)
Piston size "D"		38.960 ~ 38.975 mm (1.5339 ~ 1.5344 in)	----
			
Measuring point "H"		5.0 mm (0.20 in)	----
Oversize	2nd	39.5 mm (1.56 in)	----
	4th	40.0 mm (1.57 in)	----
Piston off-set		0.5 mm (0.02 in)	----
Piston off-set direction		Intake side	----
Piston pin bore inside diameter		13.002 ~ 13.013 mm (0.5119 ~ 0.5123 in)	13.043 mm (0.5135 in)
Piston pin outside diameter		12.996 ~ 13.000 mm (0.5117 ~ 0.5118 in)	12.976 mm (0.5109 in)
Piston rings			
Top ring			
			
Type		Barrel	----
Dimensions (B × T)		1.0 × 1.7 mm (0.0394 × 0.0669 in)	----
End gap (installed)		0.08 ~ 0.20 mm (0.0031 ~ 0.0079 in)	0.45 mm (0.0177 in)
Side clearance (installed)		0.030 ~ 0.065 mm (0.0012 ~ 0.0026 in)	0.12 mm (0.0047 in)
2nd ring			
			
Type		Taper	----
Dimensions (B × T)		1.0 × 1.7 mm (0.0394 × 0.0669 in)	----
End gap (installed)		0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in)	0.55 mm (0.0217 in)
Side clearance		0.020 ~ 0.055 mm (0.0008 ~ 0.0022 in)	0.12 mm (0.0047 in)

Item	Standard	Limit
Oil ring		
		
Dimensions (B × T)	2.0 × 2.0 mm (0.0787 × 0.0787 in)	----
End gap (installed)	0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in)	----
Crankshaft		
		
Crank width “A”	40.20 ~ 40.25 mm (1.5827 ~ 1.5846 in)	----
Runout limit C1	----	0.05 mm (0.0020 in)
C2	----	0.04 mm (0.0016 in)
Big end side clearance “D”	0.10 ~ 0.40 mm (0.0039 ~ 0.0157 in)	0.50 mm (0.0197 in)
Big end radial clearance “E”	0.004 ~ 0.019 mm (0.0002 ~ 0.0007 in)	----
Small end free play “F”	0.80 ~ 1.00 mm (0.0315 ~ 0.0394 in)	1.50 mm (0.0591 in)
Clutch		
Friction plate 1 (with black color marking)		
Thickness	2.92 ~ 3.08 mm (0.115 ~ 0.121 in)	2.90 mm (0.114 in)
Quantity	4	----
Friction plate 2		
Thickness	2.92 ~ 3.08 mm (0.115 ~ 0.121 in)	2.90 mm (0.114 in)
Quantity	1	----

Item		Standard	Limit
Clutch plate 1			
Thickness		1.4 mm (0.055 in)	----
Quantity		1	----
Maximum warpage		----	0.06 mm (0.002 in)
Clutch plate 2			
Thickness		1.2 ~ 1.6 mm (0.047 ~ 0.063 in)	----
Quantity		3	----
Maximum warpage		----	0.06 mm (0.002 in)
Clutch spring			
Free length		31.9 mm (1.26 in)	30.3 mm (1.19 in)
Quantity		8	----
Automatic centrifugal clutch			
Clutch-in revolution		2,300 ~ 2,500 r/min	----
Clutch-stall revolution		3,000 ~ 3,200 r/min	----
Transmission			
Main axle deflection limit		----	0.08 mm (0.0031 in)
Drive axle deflection limit		----	0.08 mm (0.0031 in)
Shifter			
Shifter type		Shift drum and guide bar	----
Carburetors			
I. D. mark		5YF1 00	----
Main jet	(M.J)	#72.5	----
Air jet	(A.J)	1.2	----
Jet needle	(J.N)	3PZ13-2	----
Needle jet	(N.J)	D-8M	----
Cutaway	(C.A)	3	----
Pilot outlet	(P.O)	0.7	----
Pilot jet	(P.J)	#15	----
Valve seat size	(V.S)	1.2	----
Fuel level	(F.L)	4.0 ~ 5.0 mm (0.16 ~ 0.20 in) Below the float chamber mating surface	----
Engine idle speed		1,750 ~ 1,850 r/min	----
Intake vacuum		30 kPa (225 mmHg, 8.9 inHg)	----

Item	Standard	Limit
Oil pump		
Oil pump type	Trochoid	----
Inner-rotor-to-outer-rotor-tip clearance	0.05 ~ 0.07 mm (0.002 ~ 0.003 in)	0.15 mm (0.006 in)
Outer-rotor-to-oil-pump-housing clearance	0.013 ~ 0.036 mm (0.0005 ~ 0.0014 in)	0.106 mm (0.0042 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance	0.06 ~ 0.10 mm (0.0024 ~ 0.0039 in)	0.17 mm (0.0067 in)
Shaft drive		
Middle gear backlash	0.17 ~ 0.31 mm (0.007 ~ 0.012 in)	----
Final gear backlash	0.17 ~ 0.31 mm (0.007 ~ 0.012 in)	----

Lubrication chart



EBS01003

CHASSIS SPECIFICATIONS

Item		Standard	Limit
Front suspension			
Shock absorber travel		60 mm (2.36 in)	----
Optional spring		No	----
Rear suspension			
Shock absorber travel		58 mm (2.28 in)	----
Optional spring		No	----
Front wheel			
Type		Panel wheel	----
Rim size		7 × 5.5 AT	----
Rim material		Steel	----
Rim runout limit	radial	----	2.0 mm (0.08 in)
	lateral	----	2.0 mm (0.08 in)
Rear wheel			
Type		Panel wheel	----
Rim size		7 × 6.5 AT	----
Rim material		Steel	----
Rim runout limit	radial	----	2.0 mm (0.08 in)
	lateral	----	2.0 mm (0.08 in)
Front drum brake			
Type		Leading, trailing	----
Brake drum inside diameter		110.0 mm (4.33 in)	110.5 mm (4.35 mm)
Lining thickness		4.0 mm (0.16 in)	2.0 mm (0.08 in)
Shoe spring free length		54.0 mm (2.13 in)	----
Rear drum brake			
Type		Leading, trailing	----
Brake drum inside diameter		130.0 mm (5.12 in)	130.5 mm (5.14 in)
Lining thickness		4.0 mm (0.16 in)	2.0 mm (0.08 in)
Shoe spring free length		36.5 mm (1.44 in)	----
Brake lever and brake pedal			
Brake lever free play (pivot)	front	10 ~ 12 mm (0.39 ~ 0.47 in)	----
	rear	7 ~ 10 mm (0.28 ~ 0.39 in)	----
Throttle lever free play		1.5 ~ 5.0 mm (0.06 ~ 0.20 in)	----

EBS01004
ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
Voltage	12 V	----
Ignition system		
Ignition timing (B.T.D.C.)	10°/1,700 r/min	----
Advanced timing (B.T.D.C.)	30°/5,000 r/min	----
Advancer type	Electrical (analogue)	----
C.D.I.		
Magneto model/manufacturer	F2FM/YAMAHA	----
Pickup coil resistance/color	264 ~ 396 Ω at 20 °C (68 °F)/ White/Red—White/Blue	----
Source coil resistance/color	304 ~ 456 Ω at 20 °C (68 °F)/ Black/Red—Green/White	----
C.D.I. unit model/manufacturer	5YF/YAMAHA	----
Ignition coil		
Model/manufacturer	2JN/YAMAHA	----
Minimum spark gap	6 mm (0.24 in)	----
Primary winding resistance	0.18 ~ 0.28 Ω at 20 °C (68 °F)	----
Secondary winding resistance	6.32 ~ 9.48 kΩ at 20 °C (68 °F)	----
Spark plug cap		
Type	Resin	----
Resistance	10 kΩ	----
Charging system		
Type	A.C. magneto	----
Model/manufacturer	F2FM/YAMAHA	----
Nominal output	14 V 45 W at 5,000 r/min	----
Charging coil resistance/color	0.72 ~ 1.08 Ω at 20 °C (68 °F)/ White—Black	----
Lighting coil resistance	0.32 ~ 0.48 Ω at 20 °C (68 °F)/ Yellow/Red—Black	----
Rectifier/regulator		
Regulator type	Semi conductor-short circuit	----
No-load regulated voltage (DC)	14.0 ~ 15.0 V	----
No-load regulated voltage (AC)	13.0 ~ 14.0 V	----
Model/manufacturer	SH704-12/SHINDENGEN	----
Capacity (DC)	5 A	----
Capacity (AC)	8 A	----
Withstand voltage	200 V	----

Item	Standard	Limit
Electric starter system		
Type	Constant mesh	----
Starter motor		
Model/manufacturer	ADB4A5/DENSO	----
Output	0.2 kW	----
Armature coil resistance	0.029 ~ 0.035 Ω at 20 °C (68 °F)	----
Brush overall length	6.0 mm (0.24 in)	3.5 mm (0.14 in)
Spring force	3.24 ~ 4.22 N (330 ~ 430 gf, 11.66 ~ 15.19 oz)	----
Commutator diameter	16.5 mm (0.65 in)	15.5 mm (0.61 in)
Mica undercut	1 mm (0.04 in)	----
Starter relay		
Model/manufacturer	MS5E-661/JIDECO	----
Amperage rating	100 A	----
Coil winding resistance	4.18 ~ 4.62 Ω at 20 °C (68 °F)	----
Starting circuit cut-off relay		
Model/manufacturer	ACA12115-3/MATSUSHITA	----
Coil resistance	72 ~ 88 Ω at 20 °C (68 °F)	----
Diode	Yes	----
Circuit breakers		
Type	Fuse	----
Amperage for individual circuit		
Main fuse	5 A × 1	----
Reserve	5 A × 1	----

EBS01005

TIGHTENING TORQUES

ENGINE TIGHTENING TORQUES

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Cylinder head (exhaust pipe)	Stud bolt	M6	2	7	0.7	5.1	
Intake and exhaust tappet cover	—	M45	2	18	1.8	13	
Camshaft sprocket cover	Screw	M6	2	7	0.7	5.1	
Cylinder head	Nut	M6	4	12	1.2	8.7	
	Bolt	M6	2	10	1.0	7.2	
Spark plug	—	M10	1	13	1.3	9.4	
C.D.I. magneto rotor	Nut	M10	1	40	4.0	29	
Valve adjuster	Nut	M5	2	7	0.7	5.1	
Camshaft sprocket	Bolt	M8	1	20	2.0	14	
Timing chain tensioner	—	M18	1	18	1.8	13	
Timing chain tension adjuster locknut	Nut	M6	1	7	0.7	5.1	
Oil pump	Screw	M6	2	7	0.7	5.1	
Engine oil drain bolt	Bolt	M12	1	20	2.0	14	
Intake manifold	Screw	M6	2	7	0.7	5.1	
Carburetor	Screw	M6	2	7	0.7	5.1	
Exhaust pipe	Nut	M6	2	10	1.0	7.2	
Muffler	Bolt	M8	2	25	2.5	18	
Spark arrester	Screw	M6	2	8	0.8	5.8	
Muffler purging bolt	Bolt	M6	1	10	1.0	7.2	
Crankcase	Screw	M6	9	7	0.7	5.1	
Crankcase (cylinder head)	Stud bolt	M6	4	10	1.0	7.2	
Main axle bearing retainer	Screw	M6	2	8	0.8	5.8	
Drive axle/middle drive pinion gear assembly plate	Bolt	M6	3	10	1.0	7.2	
Clutch cover	Screw	M6	3	7	0.7	5.1	
C.D.I. magneto cover	Screw	M6	9	7	0.7	5.1	
Starter clutch	Screw	M6	3	10	1.0	7.2	Stake 
Primary drive gear	Nut	M12	1	50	5.0	36	
Clutch boss	Nut	M14	1	60	6.0	43	
Push plate	Screw	M6	4	8	0.8	5.8	
Middle driven shaft bearing retainer	—	M42	1	60	6.0	43	Stake 
Universal joint yoke	Nut	M12	1	90	9.0	65	Stake
Middle driven shaft bearing housing	Bolt	M6	3	10	1.0	7.2	
Shift drum retainer	Screw	M6	2	8	0.8	5.8	
Shift shaft spring stopper	Bolt	M8	1	25	2.5	18	
Shift drum stopper lever	Bolt	M6	1	10	1.0	7.2	
Shift lever	Bolt	M6	1	10	1.0	7.2	
Stator assembly	Screw	M6	2	7	0.7	5.1	
Starter motor	Bolt	M6	2	10	1.0	7.2	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Neutral switch	—	M10	1	20	2.0	14	
Spark arrester tailpipe	Screw	M6	2	8	0.8	5.8	
Purging bolt	Bolt	M6	1	10	1.0	7.2	

EBS01006

CHASSIS TIGHTENING TORQUES

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Engine and frame	M8	33	3.3	24	
Rear swingarm and frame	M12	85	8.5	61	
Rear swingarm and swingarm guard	M8	23	2.3	17	
Rear shock absorber and frame	M10	45	4.5	32	
Rear shock absorber and rear axle housing	M10	45	4.5	32	
Front swingarm and frame	M12	60	6.0	43	
Front shock absorber and frame	M10	45	4.5	32	
Front shock absorber and front swingarm	M12	45	4.5	32	
Steering knuckle and front swingarm	M10	30	3.0	22	
Steering knuckle and tie-rod ball joint	M10	40	4.0	29	
Steering stem and tie-rod ball joint	M10	40	4.0	29	
Tie-rod locknut	M10	15	1.5	11	
Steering stem and frame	M10	35	3.5	25	
Steering stem bushing and frame	M8	23	2.3	17	
Handlebar holder and steering stem	M8	20	2.0	14	
Throttle lever and housing	M8	8	0.8	5.8	
Front wheel and brake drum	M8	28	2.8	20	
Front axle and brake drum	M14	70	7.0	50	
Front brake camshaft and camshaft lever	M6	9	0.9	6.5	
Rear brake camshaft and camshaft lever	M6	9	0.9	6.5	
Rear axle and nut	M28				See NOTE.
Rear wheel and wheel hub	M8	28	2.8	20	
Rear axle and wheel hub	M12	70	7.0	50	
Rear brake drum boss and brake drum	M8	21	2.1	15	
Rear axle housing and rear swingarm	M10	40	4.0	29	
Footrest board bracket and frame	M12	85	8.5	61	
Front bumper and frame	M8	23	2.3	17	
Front bumper and dummy headlight	M6	7	0.7	5.1	
Front bumper and front fender	M6	7	0.7	5.1	
Front fender and frame	M6	7	0.7	5.1	
Front fender stay and frame	M6	7	0.7	5.1	
Footrest board and bracket	M6	7	0.7	5.1	
Rear fender and frame	M6	7	0.7	5.1	
Rear swingarm and final gear case	M8	20	2.0	14	
Final gear case and rear axle housing	M6	20	2.0	14	

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Final gear oil drain plug	M14	23	2.3	17	
Final gear case bearing retainer	M55	80	8.0	58	
Final drive pinion gear and bearing	M20	12	1.2	8.7	
Rear axle housing bearing retainer	M58	110	11.0	80	

NOTE:

1. Before tightening the nuts, apply locking agent (LOCTITE®) to rear axle threads.
2. Tighten the inside nut to 110 Nm (11.0 m · kg, 80 ft · lb).
3. Tighten the outside nut to 130 Nm (13.0 m · kg, 94 ft · lb) while holding the inside nut.
4. Loosen the inside nut to 160 Nm (16.0 m · kg, 115 ft · lb) while holding the outside nut.

EBS00022

HOW TO USE THE 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

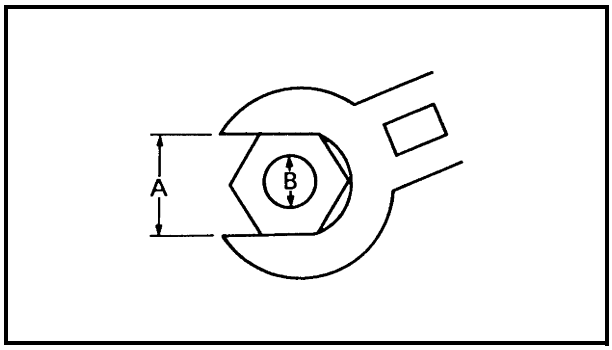
CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
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/h	0.6214	mph
Distance	km m m cm mm	0.6214 3.281 1.094 0.3937 0.03937	mi ft yd in in
Volume/ Capacity	cc (cm^3) cc (cm^3) lt (liter) lt (liter)	0.03527 0.06102 0.8799 0.2199	oz (Imp liq.) cu · in qt (Imp liq.) gal (Imp liq.)
Misc.	kg/mm kg/cm^2 Centigrade (°C)	55.997 14.2234 9/5+32	lb/in psi (lb/in^2) Fahrenheit (°F)

EBS00023

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: Distance between flats
B: Outside thread diameter

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

EBS00024

LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

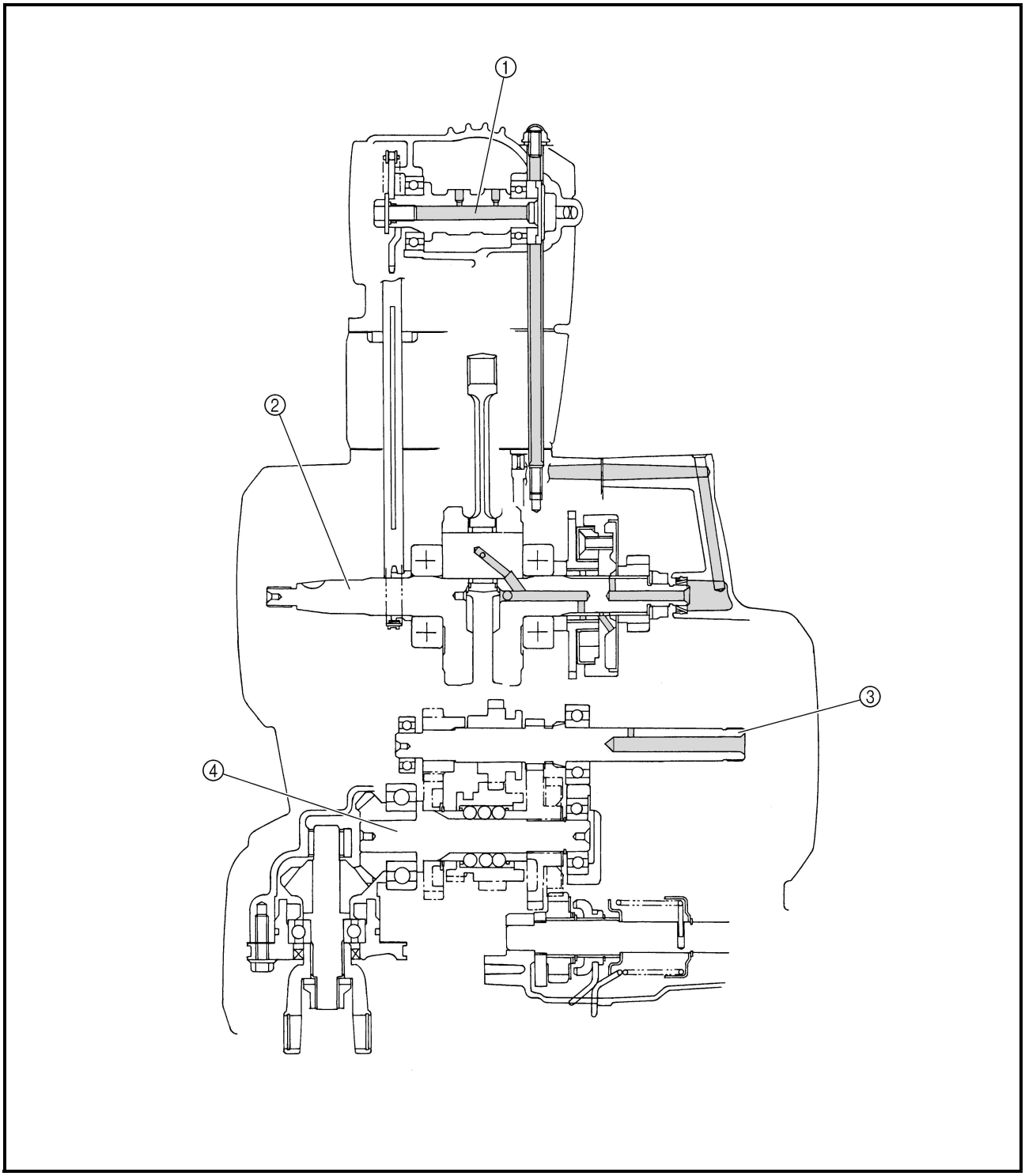
Lubrication points	Lubricant
Oil seal lips	LS
Bearings	E
O-rings	LS
Tappet cover thread	E
Crankshaft pin	E
Connecting rod (bearing)	E
Crankshaft, oil seal	E
Piston, piston ring	E
Piston pin	E
Valve stem	M
Valve stem end	E
Rocker arm	M
Rocker arm shaft	E
Camshaft lobe	M
Camshaft sprocket	E
Timing chain tensioner	E
Intake side timing chain guide	E
Oil pump assembly	E
Starter idle gear shaft	M
Starter wheel gear	E
Primary driven gear, spacer	E
Clutch push rod, oil seal	E
Drive axle, 1st wheel gear	M
Drive axle dog splines	M
Drive axle dog shift fork groove	E
Middle drive/driven pinion gear	E
Shift drum	E
Shift fork guide bar, O-ring	E
Shift shaft	E
Shift shaft washer	LS
Middle driven pinion gear, universal joint yoke, drive shaft, coupling gear, final drive pinion gear splines	LS
Final drive pinion gear, ring gear	E
Crankcase mating surface	Sealant (Quick Gasket®) Yamaha Bond No.1215

Lubrication points	Lubricant
Final gear case and rear axle housing mating surface	Sealant (Quick Gasket®) Yamaha Bond No.1215

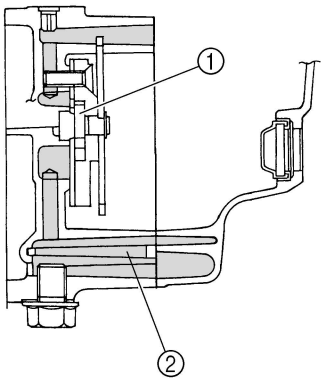
EBS00026

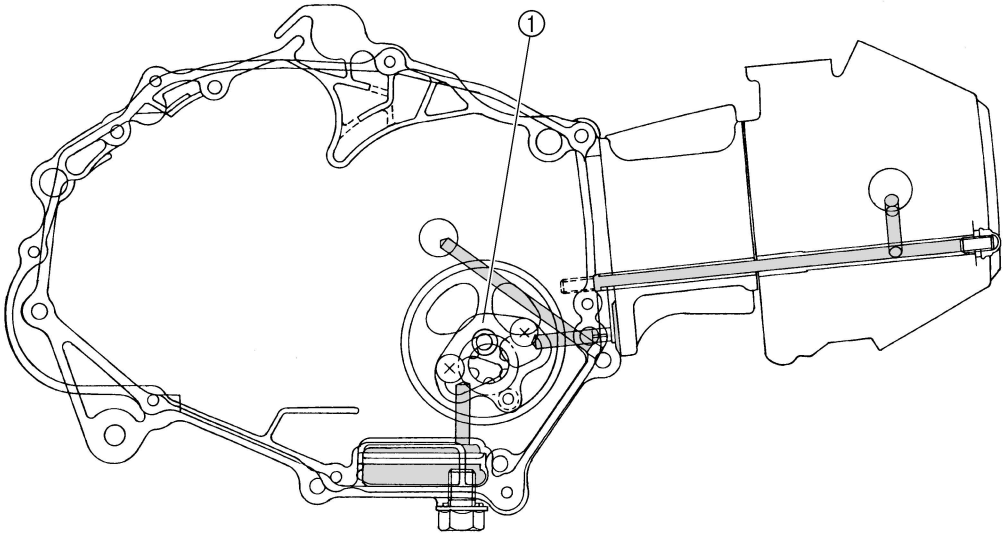
OIL FLOW DIAGRAMS

① Camshaft
② Crankshaft
③ Main axle
④ Drive axle



① Oil pump
② Oil strainer

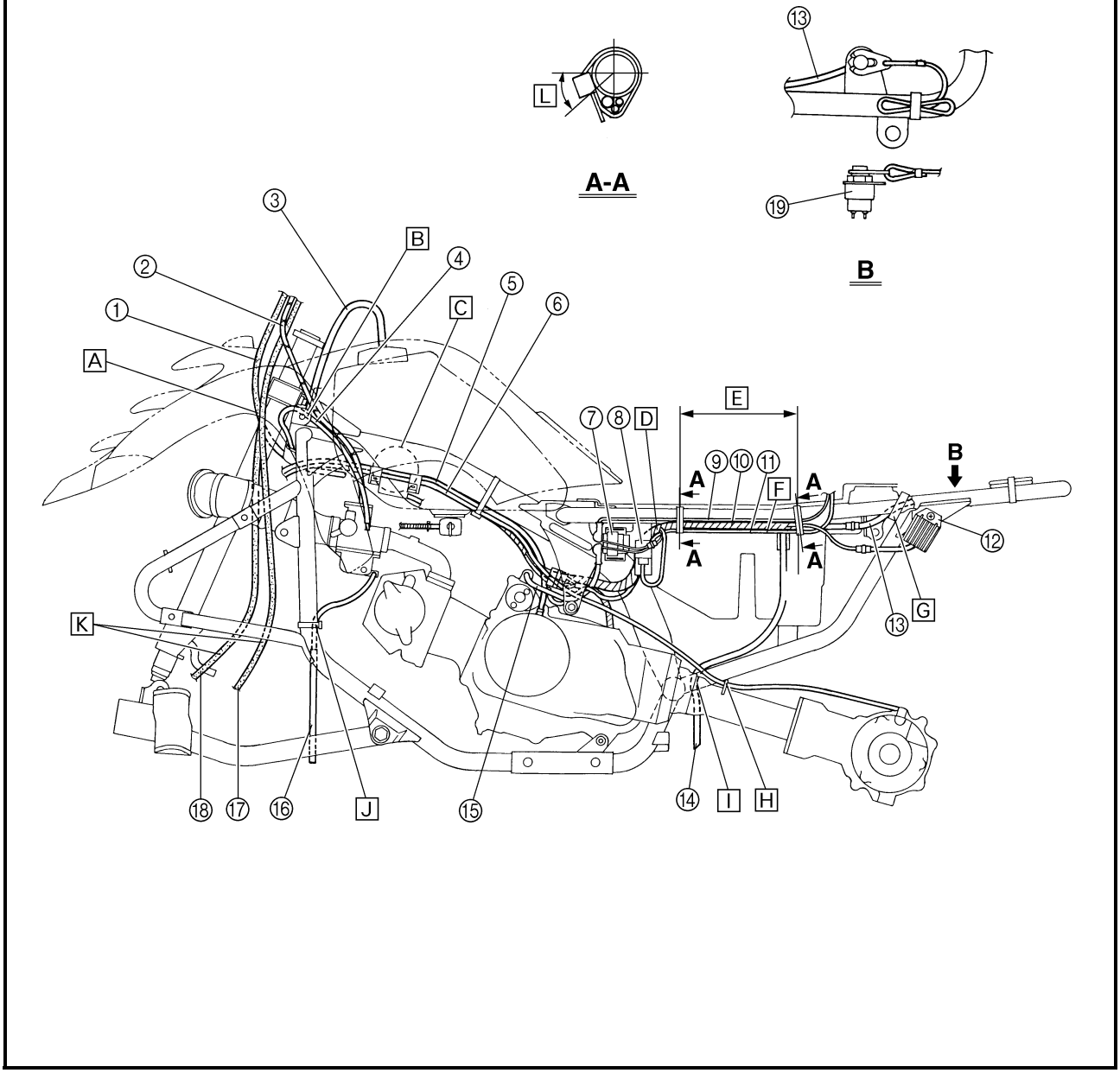




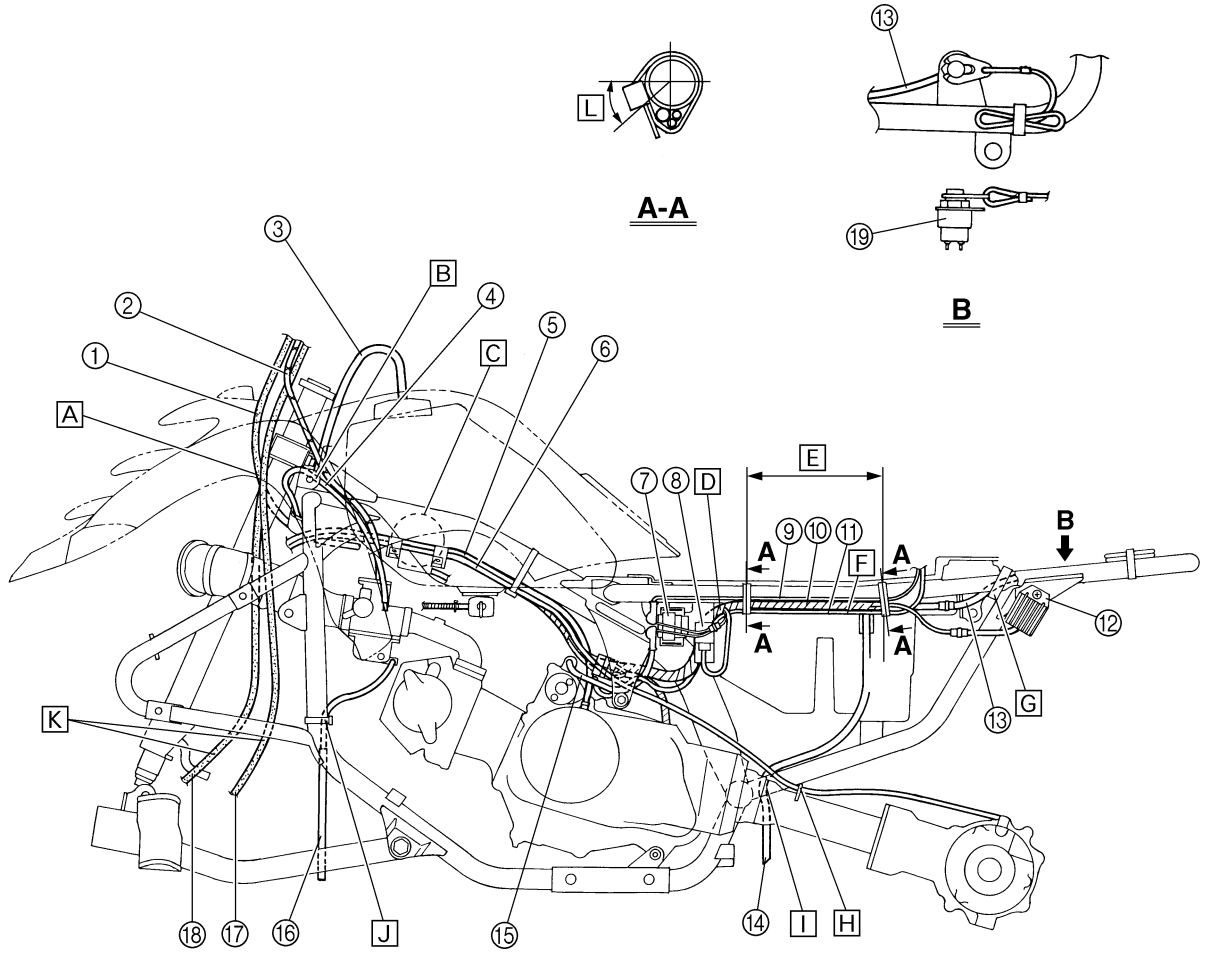
EBS00028

CABLE ROUTING

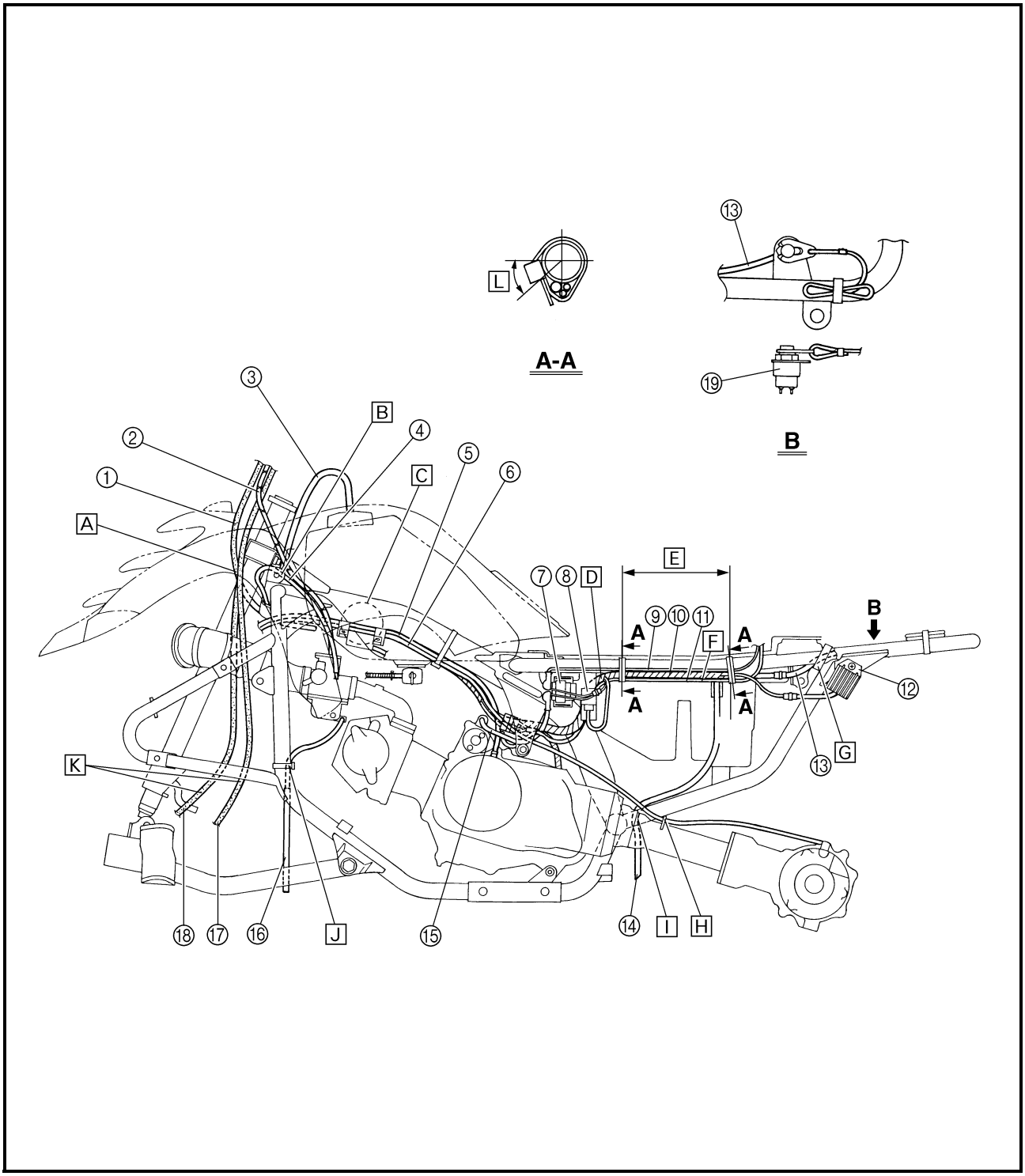
① Rear brake cable
② Throttle cable
③ Fuel tank breather hose
④ Carburetor air vent hose
⑤ Final gear case breather hose
⑥ Crankcase breather hose
⑦ Starter relay
⑧ Starting circuit cut-off relay
⑨ Positive battery lead
⑩ Wire harness
⑪ Negative battery lead
⑫ Rectifier/regulator
⑬ Engine stop switch lead (frame end)
⑭ Battery breather hose
⑮ Starter motor lead
⑯ Fuel overflow hose
⑰ Right front brake cable
⑱ Left front brake cable
⑲ Engine stop switch (frame)



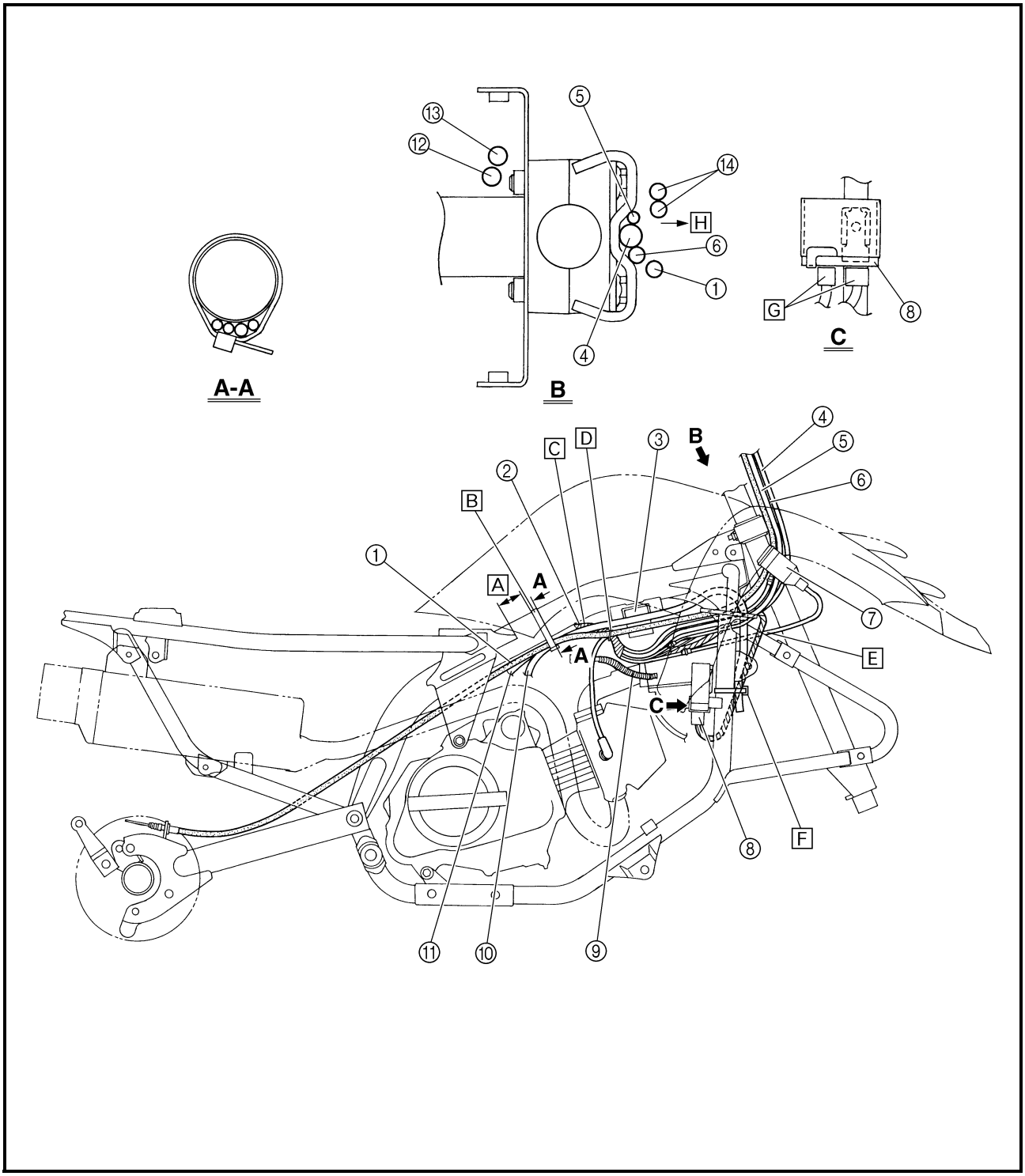
[A] Route the rear brake cable to the right of the steering stem.
[B] Pass the carburetor air vent hose through the hole on the left side of the steering stem bracket and then insert the hose between the bracket and frame. Make sure that there is no slack or bends in the hose. Do not route the hose over the throttle cable.
[C] Route the final gear case breather hose and crankcase breather hose to the right of the ignition coil.
[D] Align the white tape of the wire harness with the bracket.
[E] 200 mm (7.87 in)
[F] To starter motor
[G] Fasten the engine stop switch lead (frame end) to the frame with a plastic band.
[H] Pass the final gear case breather hose through the hose guide.
[I] Pass the battery breather hose through the hole.



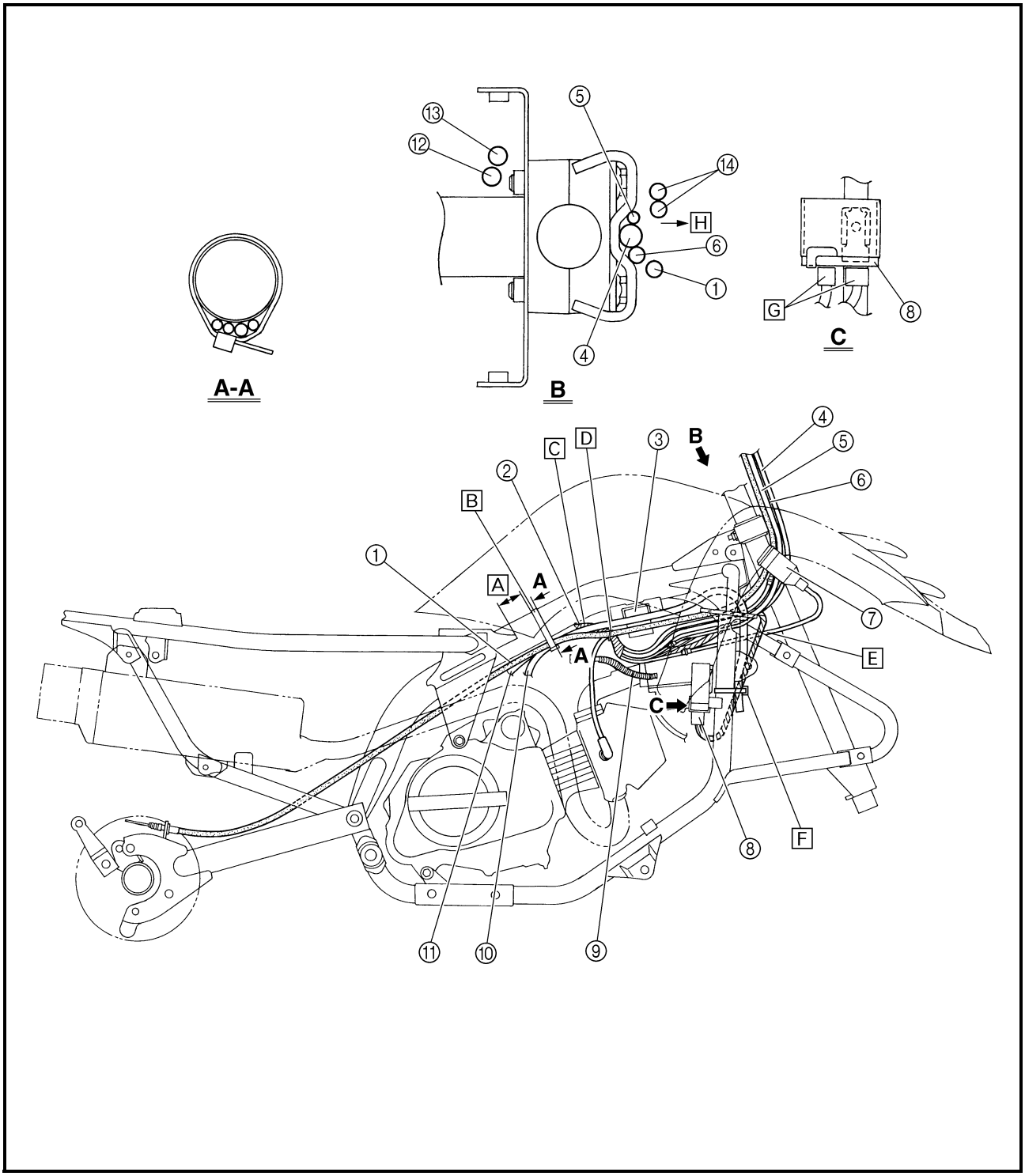
[J] Fasten the carburetor air vent hose with a plastic band. Be sure to not pinch the hose. Install the plastic band with the buckle facing backward and the end inward.
[K] Route the cables under the frame.
[L] 45°



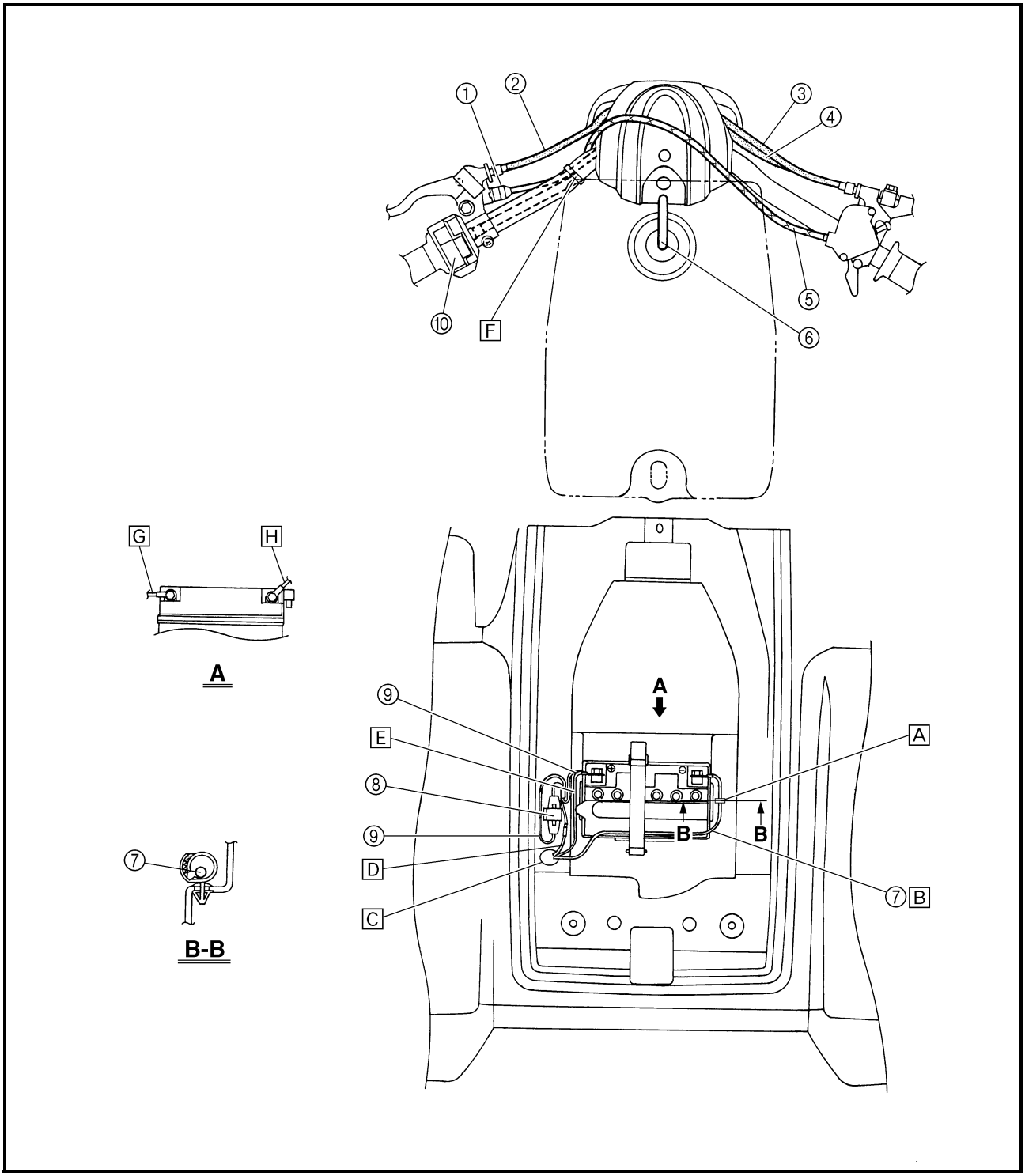
① Rear brake cable
② Wire harness
③ Ignition coil
④ Handlebar switch lead
⑤ Rear brake switch lead
⑥ Neutral indicator light lead
⑦ Main switch
⑧ C.D.I. unit
⑨ Fuel hose
⑩ Crankcase breather hose
⑪ Final gear case breather hose
⑫ Fuel tank breather hose
⑬ Throttle cable
⑭ Front brake cables



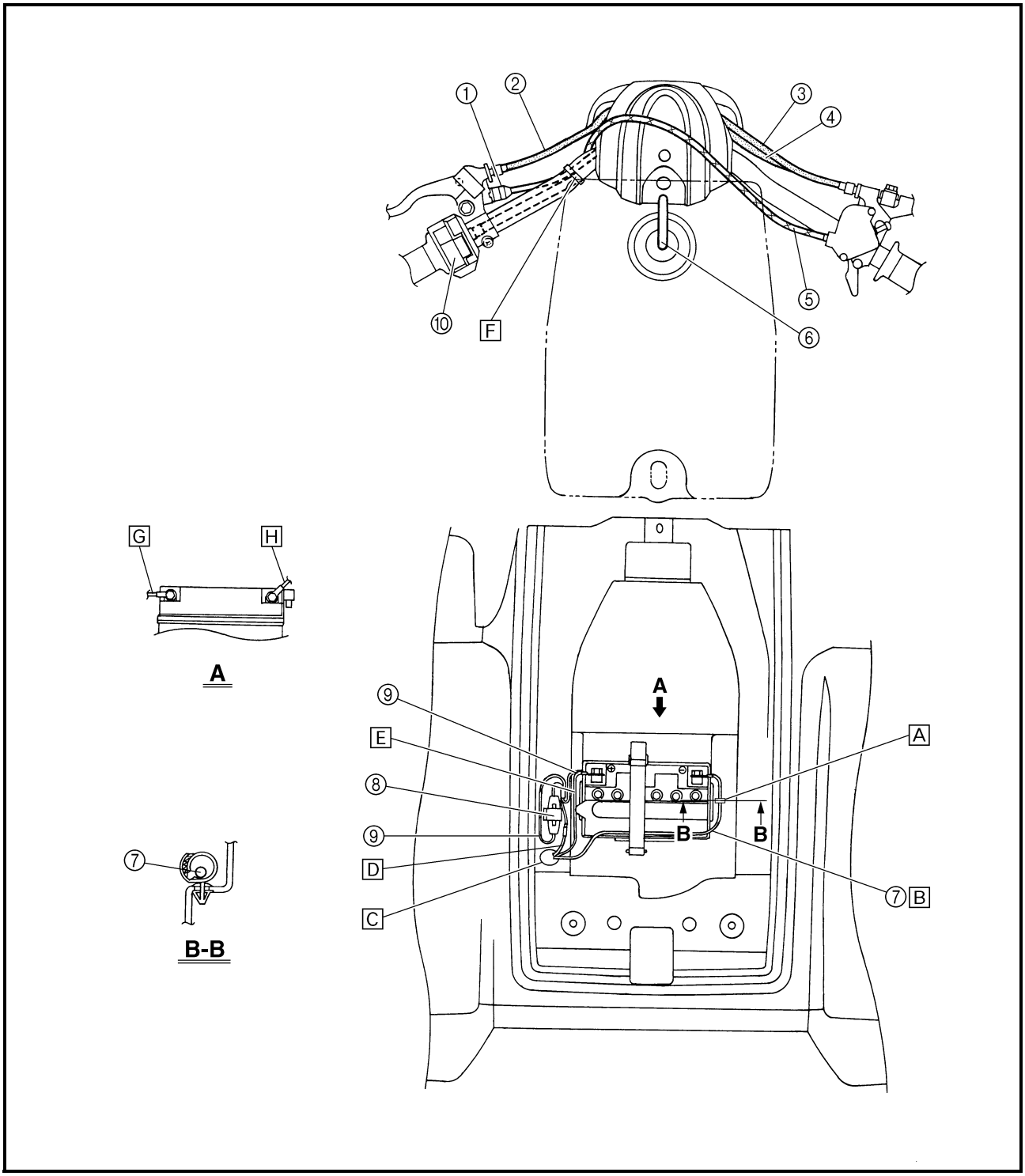
[A] 80 mm (3.15 in)
[B] Fasten the rear brake cable, wire harness, crankcase breather hose, and final gear case breather hose with a plastic band. Be sure to not pinch the hoses.
[C] Route the final gear case breather hose and crankcase breather hose over the wire harness. Fasten the hoses with a plastic band. Be sure to not pinch the hoses. Pass the ends of the hoses between the frame and bracket.
[D] Fasten the rear brake cable and wire harness near the ignition coil with a plastic locking tie.
[E] Do not fasten the main switch lead.
[F] Fasten the crankcase breather hose and final gear case breather hose with a plastic band.
[G] Face the coupler release tabs backward.
[H] Forward



① Rear brake switch
② Rear brake cable
③ Left front brake cable
④ Right front brake cable
⑤ Throttle cable
⑥ Fuel tank breather hose
⑦ Negative battery lead
⑧ Main fuse
⑨ Positive battery lead
⑩ Handlebar switch

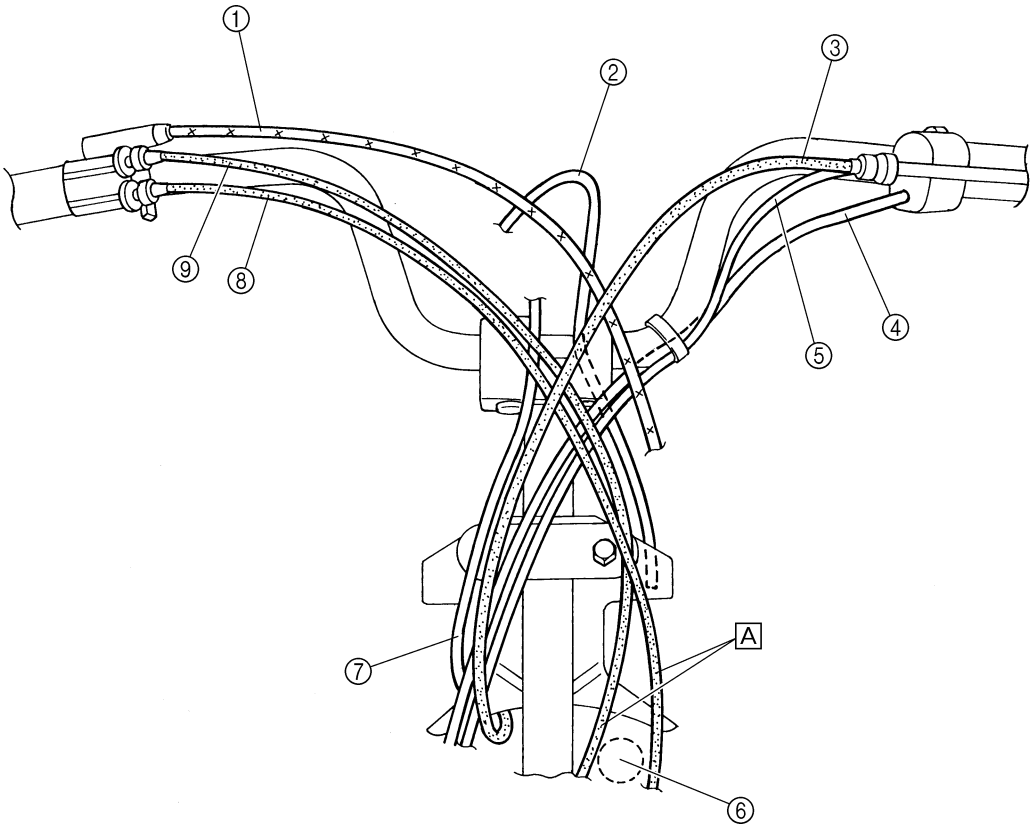


[A] Fasten the negative battery lead with the plastic holder.
[B] To starter motor
[C] Pass the leads through the hole.
[D] To wire harness
[E] To starter relay
[F] Fasten the handlebar switch lead and rear brake switch lead with a plastic band.
[G] Connect the negative battery lead to the battery so that the lead is routed to the side of the battery.
[H] Connect the positive battery lead to the battery so that the lead contacts the battery case.



① Throttle cable
② Fuel tank breather hose
③ Rear brake cable
④ Handlebar switch lead
⑤ Rear brake switch lead
⑥ Air filter joint
⑦ Neutral indicator light lead
⑧ Right front brake cable
⑨ Left front brake cable

Ⓐ Route the front brake cables to the left of the steering stem. Route the left front brake cable to the right of the air filter joint. Route the right front brake cable to the left of the air filter joint.



EBS00029

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as to new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EBS00030

PERIODIC MAINTENANCE/LUBRICATION

ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
Valves*	• Check valve clearance. • Adjust if necessary.	○		○	○	○
Cam chain*	• Check chain tension. • Adjust if necessary.	○		○	○	○
Spark plug	• Check condition. • Adjust gap and clean. • Replace if necessary.	○	○	○	○	○
Air filter element	• Clean. • Replace if necessary.	Every 20 ~ 40 hours (more often in wet or dusty areas)				
Carburetor*	• Check idle speed/choke lever operation. • Adjust if necessary.		○	○	○	○
Crankcase breather system*	• Check breather hose for cracks or damage. • Replace if necessary.			○	○	○
Exhaust system*	• Check for leakage. • Tighten if necessary. • Replace gasket if necessary.			○	○	○
Spark arrester	• Clean.			○	○	○
Fuel line*	• Check fuel hose for cracks or damage. • Replace if necessary.			○	○	○
Engine oil	• Replace (warm engine before draining).	○		○	○	○
Final gear oil	• Check oil level/oil leakage. • Replace every 12 months.	○				○
Brakes*	• Check operation. • Adjust if necessary.	○	○	○	○	○
Wheels*	• Check balance/damage/runout. • Replace if necessary.	○		○	○	○
Wheel bearings*	• Check bearing assemblies for looseness/damage. • Replace if damaged.	○		○	○	○
Steering system*	• Check operation. • Repair if damaged. • Check toe-in. • Adjust if necessary.	○	○	○	○	○
Knuckle shafts/ steering shaft*	• Lubricate every 6 months with Lithium-soap-based grease.			○	○	○
Fittings and fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.	○	○	○	○	○
Battery*	• Check specific gravity. • Check breather hose for correct routing. • Correct if necessary.	○	○	○	○	○

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

EBS00032

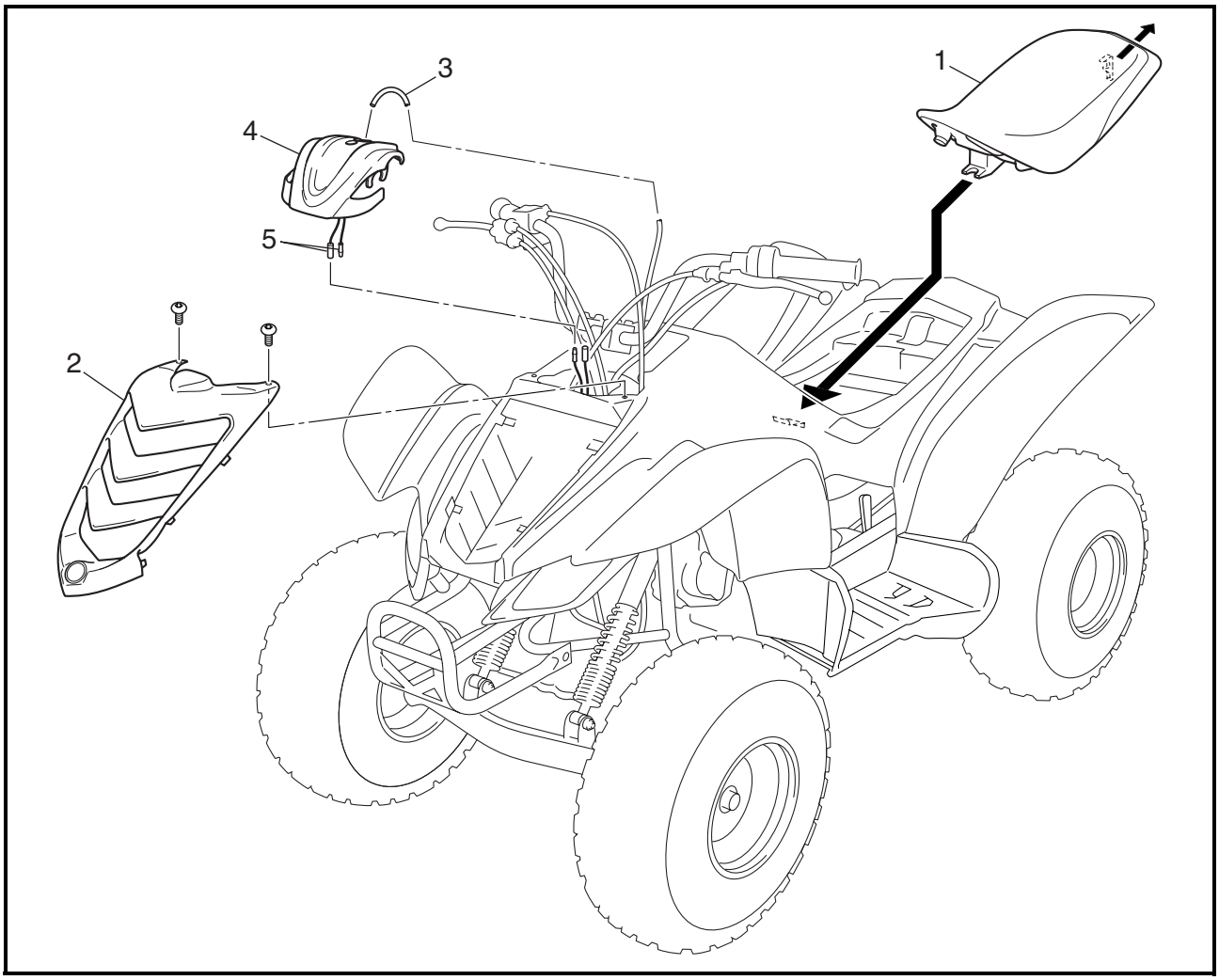
⚠ WARNING

Indicates a potential hazard that could result in serious injury or death.

EBS00033

SEAT, FENDERS AND FUEL TANK

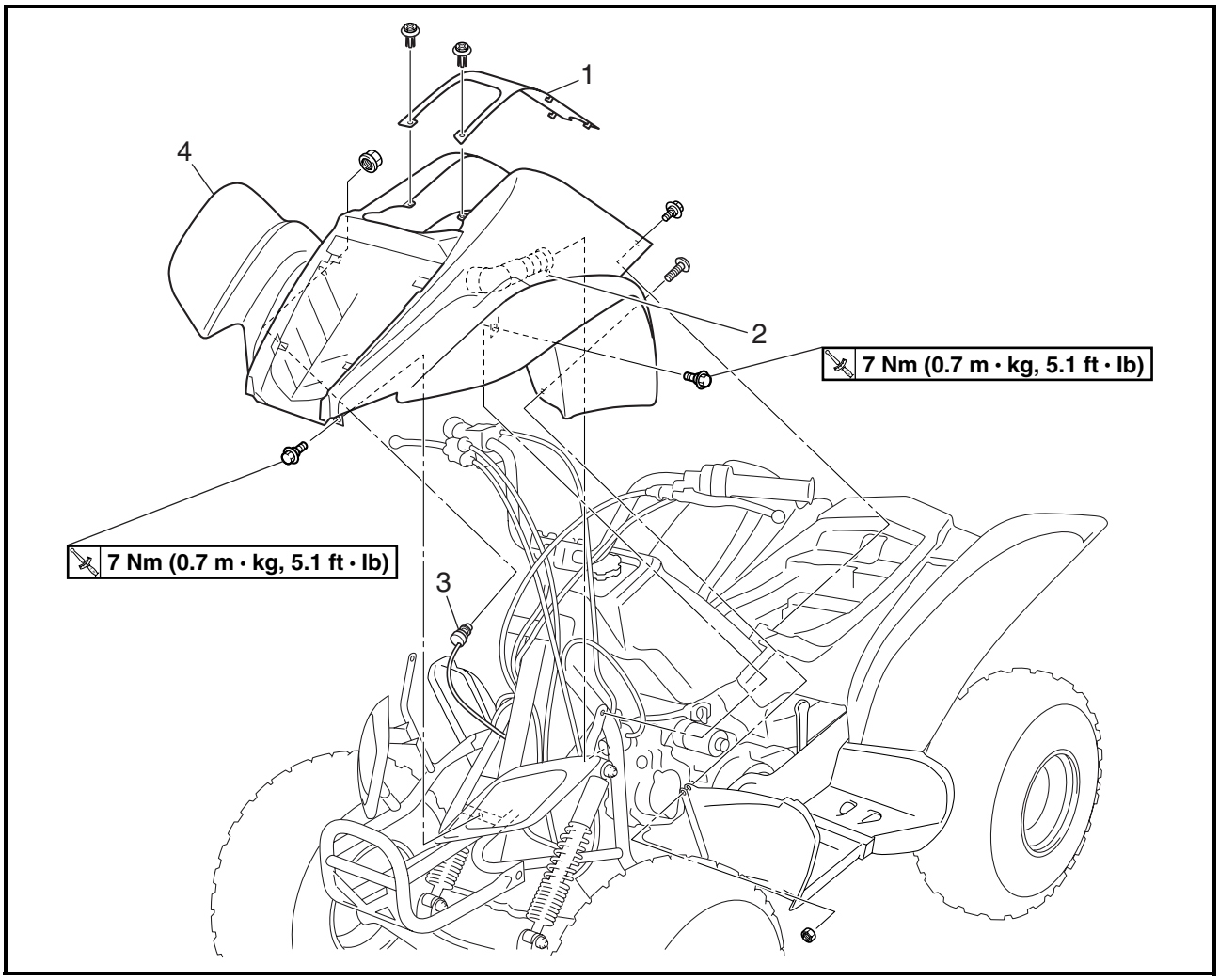
SEAT AND FRONT PANEL



Order	Job/Part	Q'ty	Remarks
	Removing the seat and front panel		Remove the parts in the order listed.
1	Seat	1	**NOTE:** Pull back the seat lock lever, than pull up on the rear of the seat.
2	Front panel	1	
3	Fuel tank breather hose	1	
4	Handlebar cover	1	**NOTE:** When installing the handlebar cover, pass the fuel tank breather hose through the hole in the handlebar cover.
5	Neutral indicator light connectors	2	Disconnect. For installation, reverse the removal procedure.

EBS00037

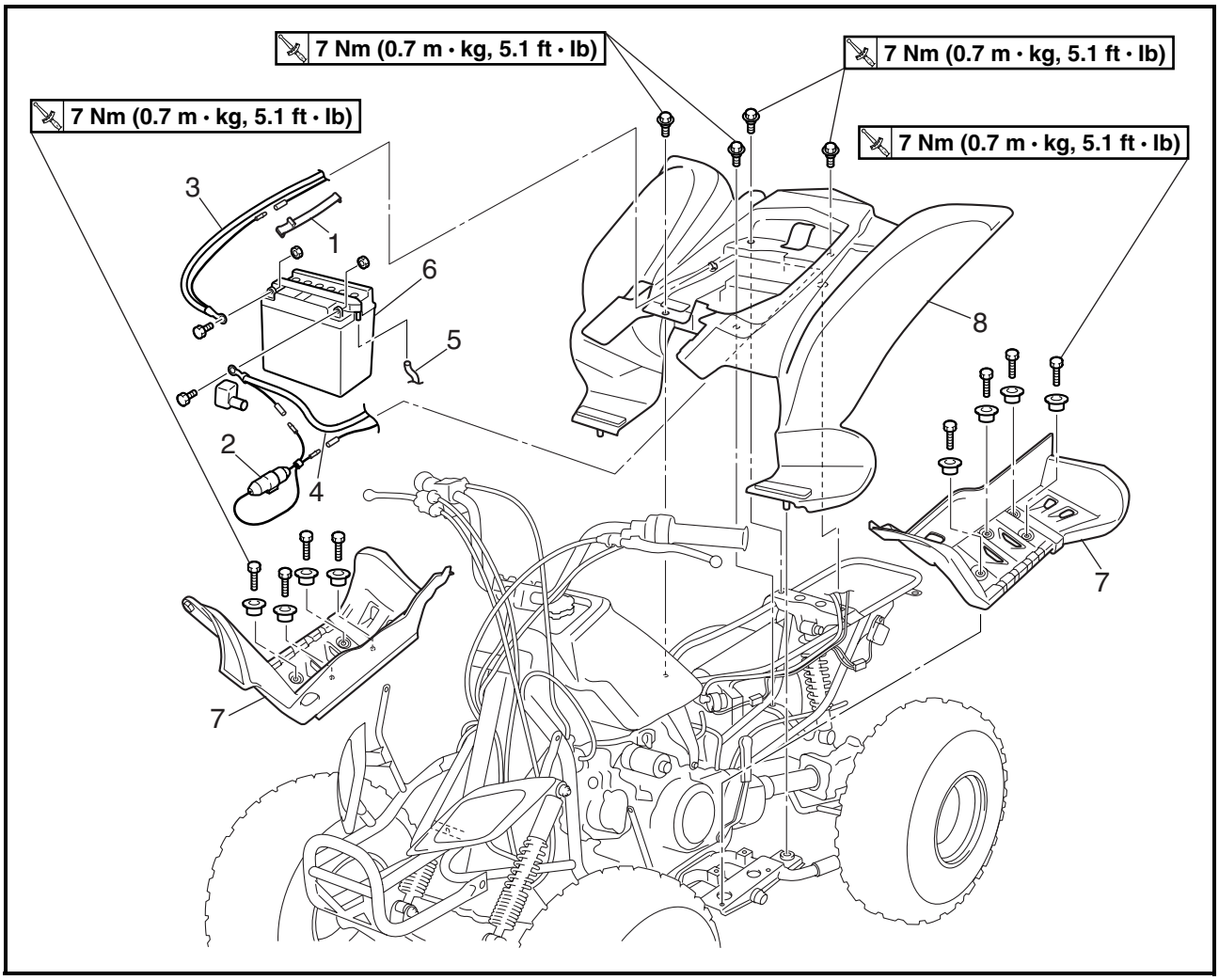
FRONT FENDER



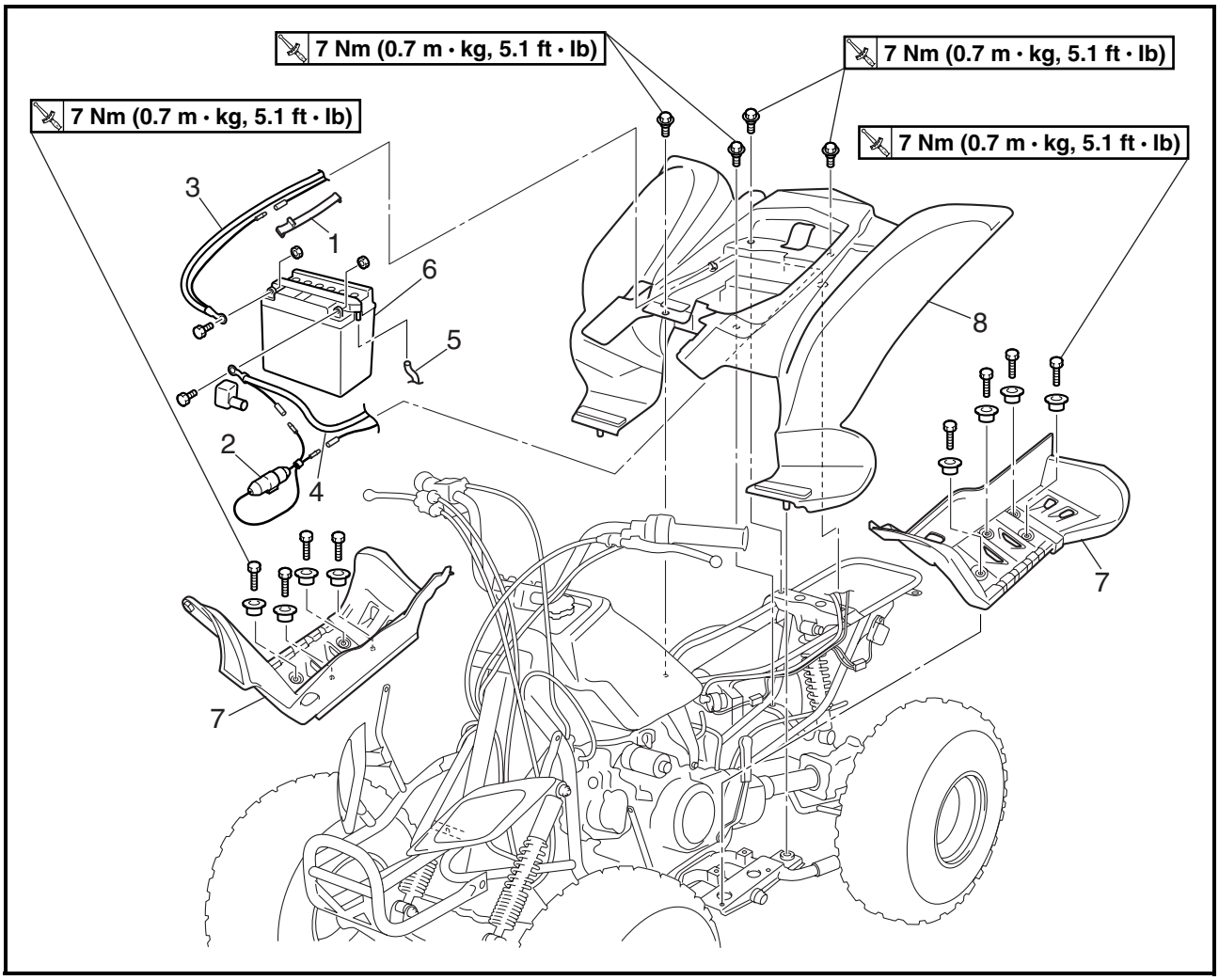
Order	Job/Part	Q'ty	Remarks
	Removing the front fender		Remove the parts in the order listed.
	Seat and front panel		Refer to "SEAT AND FRONT PANEL".
1	Fuel tank top panel	1	
2	Air cleaner joint clamp screw	1	Loosen.
3	Main switch	1	
4	Front fender	1	
			For installation, reverse the removal procedure.

EBS00039

REAR FENDER AND FOOTREST BOARDS



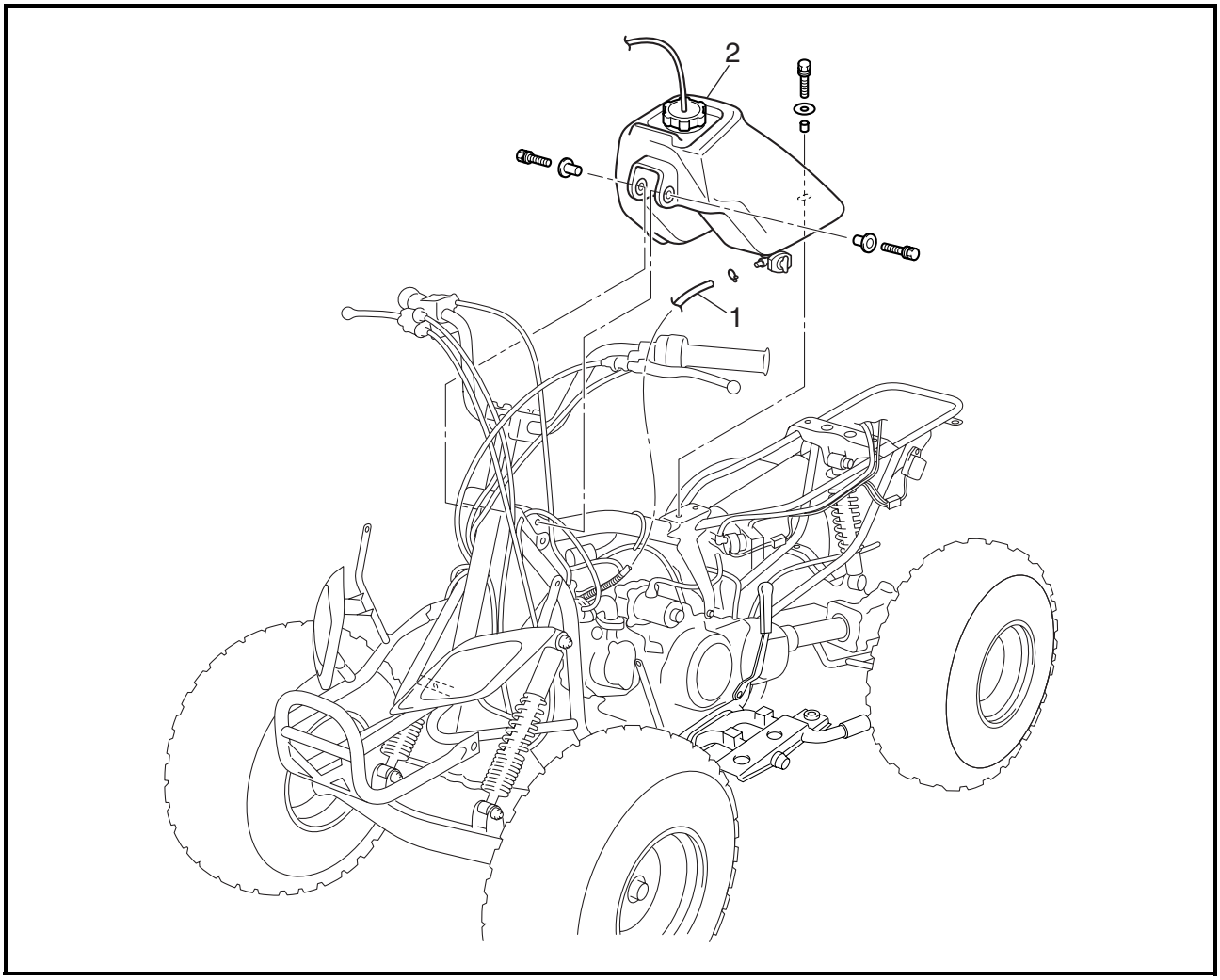
Order	Job/Part	Q'ty	Remarks
	Removing the rear fender and footrest boards		Remove the parts in the order listed.
	Seat		Refer to "SEAT AND FRONT PANEL".
	Front fender		Refer to "FRONT FENDER".
1	Battery band	1	
2	Main fuse	1	
3	Negative battery lead	1	Disconnect. **CAUTION:** **First disconnect the negative lead, then disconnect the positive lead.**
4	Positive battery lead	1	Disconnect.
5	Battery breather hose	1	Disconnect.



Order	Job/Part	Q'ty	Remarks
6	Battery	1	
7	Footrest board	2	
8	Rear fender	1	
			For installation, reverse the removal procedure.

EBS00042

FUEL TANK



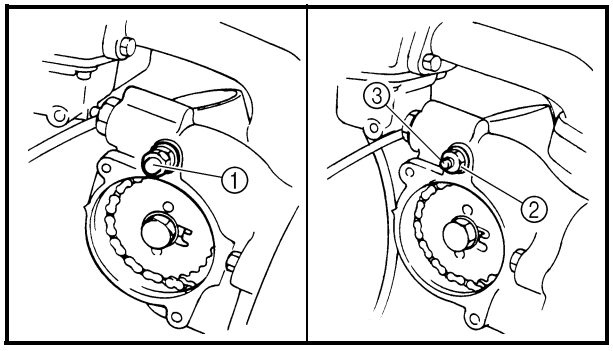
Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed.
	Seat and front panel		Refer to "SEAT AND FRONT PANEL".
	Front fender		Refer to "FRONT FENDER".
1	Fuel hose	1	Disconnect.
			NOTE: Before disconnecting the fuel hose, turn the fuel cock to "OFF".
2	Fuel tank	1	For installation, reverse the removal procedure.

EBS00046

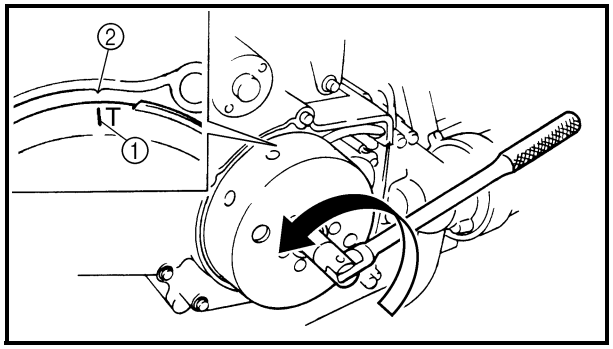
ENGINE

ADJUSTING THE TIMING CHAIN TENSIONER

1. Remove:
   - C.D.I. magneto cover
   - camshaft sprocket cover
     Refer to “CYLINDER HEAD” in chapter 4.



2. Remove:
   - cap nut ①
3. Loosen:
   - locknut ②
   - adjuster ③



4. Adjust:
   - timing chain tensioner

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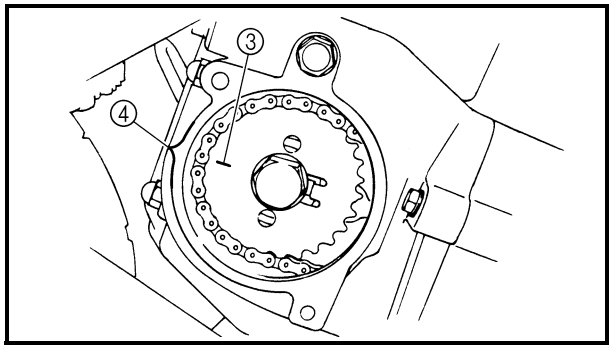
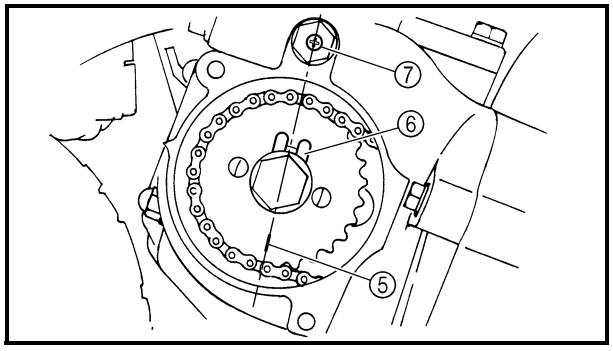
a. Turn the crankshaft counterclockwise with a wrench.
b. Align the “T” mark ① on the rotor with the stationary pointer ② on the crankcase. When the “T” mark is aligned with the stationary pointer, the piston is at the Top Dead Center (TDC).

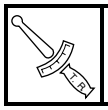


NOTE:

Be sure to align the alignment mark ③ on the camshaft sprocket with the alignment mark ④ on the cylinder head.

c. Turn the crankshaft counterclockwise to align the camshaft sprocket alignment mark ⑤ and alignment tab ⑥ with the adjuster ⑦ as shown in the illustration.
d. Tighten the adjuster.
e. Install the locknut and cap nut and tighten to specification.



	**Locknut** **7 Nm (0.7 m · kg, 5.1 ft · lb)**

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5. Install:
   - camshaft sprocket cover
   - C.D.I. magneto cover
     Refer to “CYLINDER HEAD” in chapter 4.

ADJUSTING THE VALVE CLEARANCE

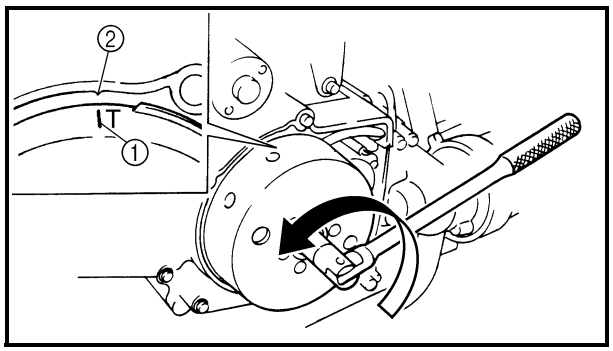
NOTE:

- The valve clearance must be adjusted when the engine is cool to the touch.
- Adjust the valve clearance when the piston is at the Top Dead Center (TDC) on the compression stroke.

1. Remove:
   - C.D.I. magneto cover
   - intake tappet cover
   - exhaust tappet cover
   - camshaft sprocket cover
     Refer to “CYLINDER HEAD” in chapter 4.

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

Valve clearance (cold)
Intake valve
0.05 ~ 0.10 mm
(0.002 ~ 0.004 in)
Exhaust valve
0.075 ~ 0.125 mm
(0.003 ~ 0.005 in)



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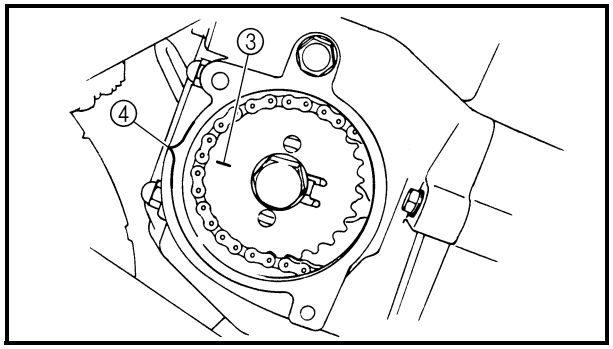
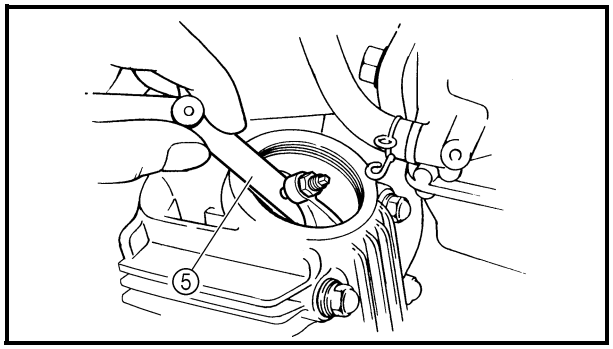
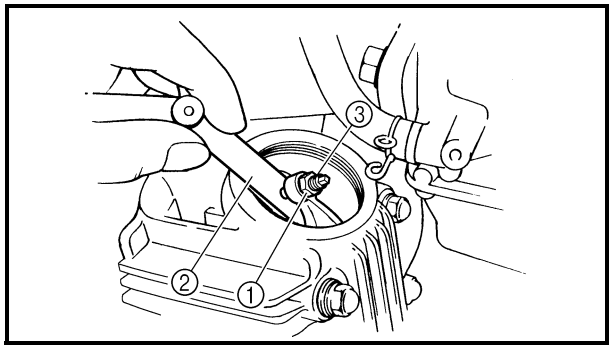
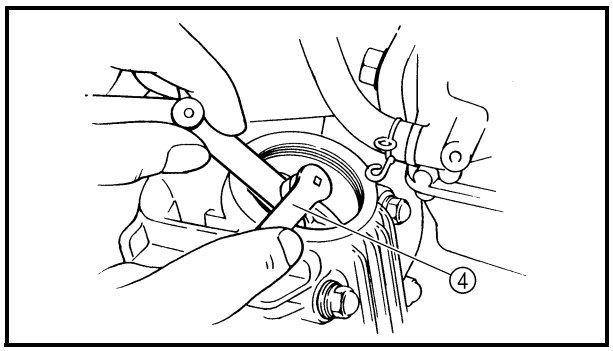
a. Turn the crankshaft counterclockwise with a wrench.
b. Align the “T” mark ① on the rotor with the stationary pointer ② on the crankcase. When the “T” mark is aligned with the stationary pointer, the piston is at the Top Dead Center (TDC).









NOTE:

- When the piston is at the Top Dead Center (TDC) on the compression stroke, there should be clearance between the valve stem tips and their respective adjusting screws.
- Be sure to align the alignment mark ③ on the camshaft sprocket with the alignment mark ④ on the cylinder head.
- If there is no clearance, rotate the crankshaft counterclockwise one turn.

c. Measure the valve clearance using a thickness gauge ⑤.

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3. Adjust:
   - valve clearance

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a. Loosen the locknut ①.
b. Insert a thickness gauge ② between the adjuster end and the valve end.
c. Turn the adjuster ③ clockwise or counterclockwise with the tappet adjusting tool ④ until the proper clearance is obtained.

	**Tappet adjusting tool (3 mm)** **P/N. YM-08035, 90890-01311**

d. Hold the adjuster to prevent it from moving and then tighten the locknut.

	**Locknut** **7 Nm (0.7 m · kg, 5.1 ft · lb)**

e. Measure the valve clearance.
f. If the clearance is incorrect, repeat the above steps until the proper clearance is obtained.

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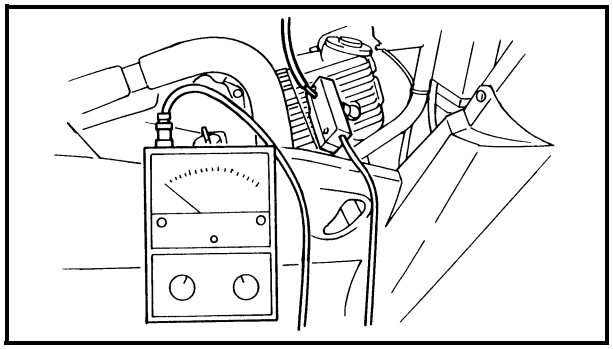
4. Install:
   - camshaft sprocket cover
   - exhaust tappet cover
   - intake tappet cover
   - C.D.I. magneto cover

   Refer to "CYLINDER HEAD" in chapter 4.



EBS00051

ADJUSTING THE ENGINE IDLING SPEED

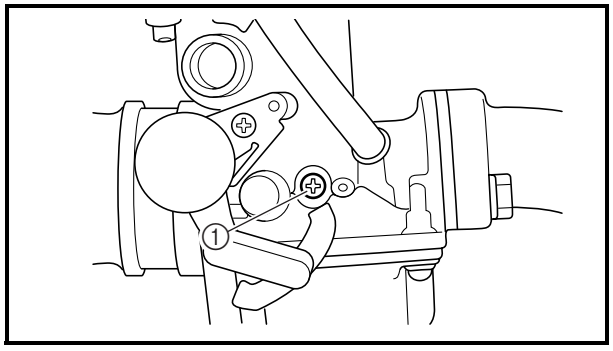
1. Start the engine and let it warm up for several minutes.
2. Attach:
   - engine tachometer ①
     (to the spark plug lead)

	Inductive self-powered tachometer **P/N. YU-8036-B** **Engine tachometer** **P/N. 90890-03113**

3. Measure:
   - engine idling speed

   Out of specification → Adjust.

	Engine idling speed **1,750 ~ 1,850 r/min**



4. Adjust:
   - engine idling speed

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a. Turn the throttle stop screw ① in or out until the specified idling speed is obtained.

Turning in	**Idling speed becomes higher.**
Turning out	**Idling speed becomes lower.**

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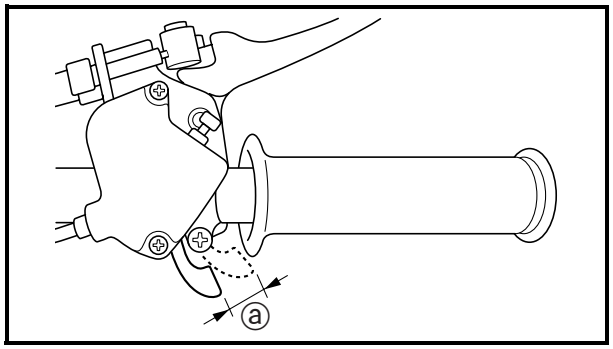
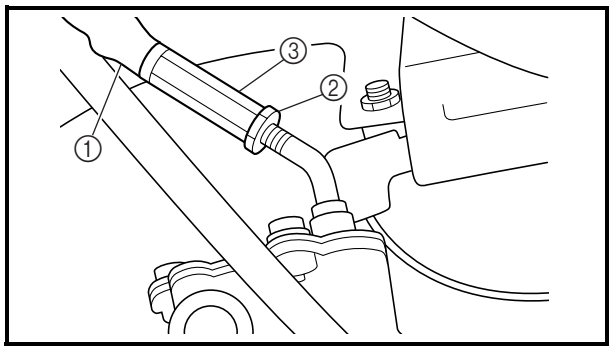
5. Detach:
   - engine tachometer

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

	Throttle lever free play **1.5 ~ 5.0 mm (0.06 ~ 0.20 in)**





EBS00052

ADJUSTING THE THROTTLE LEVER FREE PLAY

NOTE:

Engine idling speed should be adjusted properly before adjusting the throttle lever free play.

1. Measure:
   • throttle lever free play ⓐ
   Out of specification → Adjust.

	Throttle lever free play **1.5 ~ 5.0 mm (0.06 ~ 0.20 in)**

2. Adjust:
   • throttle lever free play

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a. Pull back the adjuster cover ①.
b. Loosen the locknut ② on the carburetor side.
c. Turn the adjuster ③ in or out until the correct free play is obtained.

Turning in	**Free play is increased.**
Turning out	**Free play is decreased.**

d. Tighten the locknut ②.
e. Push in the adjuster cover ①.

⚠ WARNING

After adjusting the free play, turn the handlebar to the right and left to make sure that the engine idling speed does not increase.

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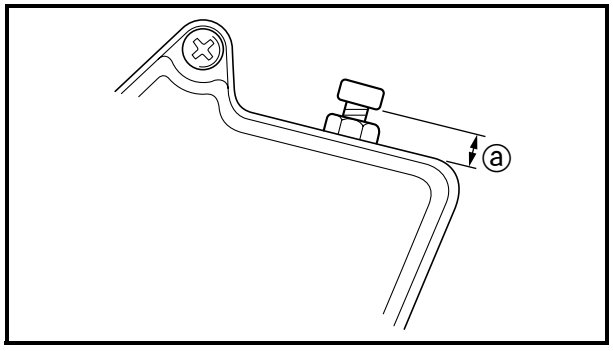

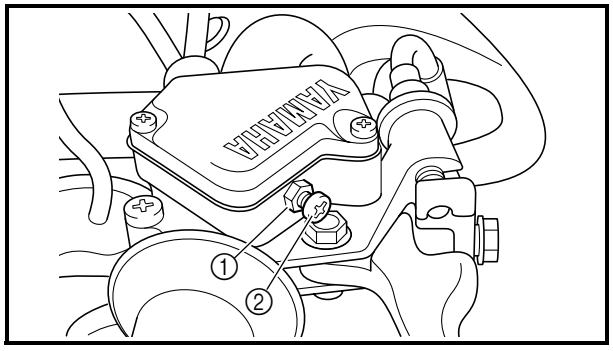

EBS00053

ADJUSTING THE SPEED LIMITER

The speed limiter keeps the carburetor throttle from becoming fully-opened even when the throttle lever is applied to the maximum position. Screwing in the adjuster stops the engine speed from increasing.

1. Measure:
   - speed limiter length ⓐ
     Out of specification → Adjust.

	Speed limiter length **5.0 mm (0.20 in)**

2. Adjust:
   - speed limiter length

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a. Loosen the locknut ①.
b. Turn the adjuster ② in or out until the specified speed limiter length is obtained.

Turning in	**Speed limiter length is decreased.**
Turning out	**Speed limiter length is increased.**

c. Tighten the locknut.

⚠ WARNING

- **Particularly for a beginner rider, the speed limiter should be screwed in completely. Screw it out little by little as their riding technique improves. Never remove the speed limiter for a beginning rider.**
- **For proper throttle lever operation do not turn out the adjuster more than 12.0 mm (0.47 in). Also, always adjust the throttle lever free play to 1.5 ~ 5.0 mm (0.06 ~ 0.20 in).**

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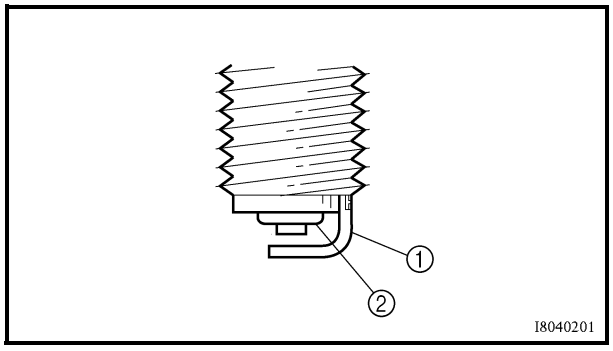
EBS00057

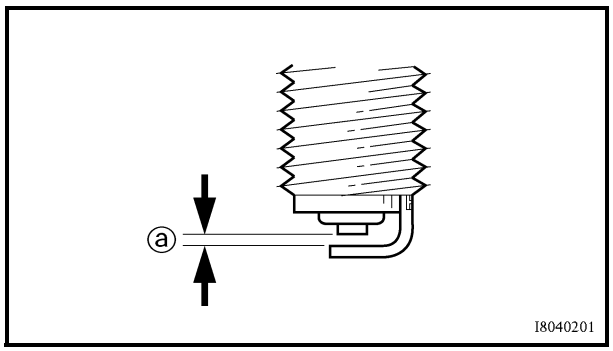
CHECKING THE SPARK PLUG

1. Remove:
   - spark plug
2. Check:
   - spark plug type
     Incorrect → Change.

Standard spark plug
CR7HS/NGK



3. Check:
   - electrode ①
     Wear/damage → Replace.
   - insulator ②
     Abnormal color → Replace.
     Normal color is a medium-to-light tan color.
4. Clean:
   - spark plug
     (with a spark plug cleaner or wire brush)



5. Measure:
   - spark plug gap ⓐ
     Use a wire gauge or thickness gauge.
     Out of specification → Regap.

Spark plug gap
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

6. Tighten:
   - spark plug

13 Nm (1.3 m · kg, 9.4 ft · lb)

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

EBS00058

CHECKING THE IGNITION TIMING

NOTE:

Engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

1. Remove:
   - C.D.I. magneto cover
     Refer to "C.D.I. MAGNETO" in chapter 4.
2. Attach:
   - engine tachometer
   - timing light
     (to spark plug lead)

Inductive self-powered tachometer
P/N. YU-8036-B
Engine tachometer
P/N. 90890-03113
Timing light
P/N. YM-33277-A, 90890-03141

3. Check:
   - ignition timing

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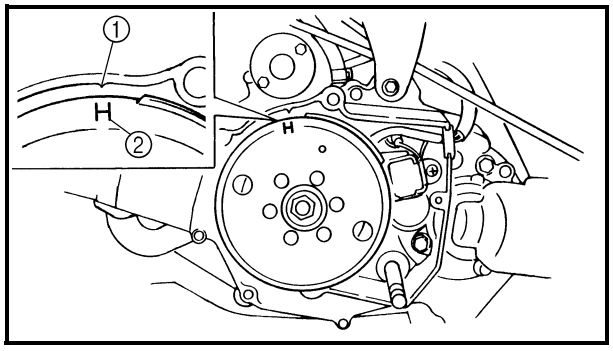
a. Warm up the engine and keep it at the specified speed.

Engine speed
1,750 ~ 1,850 r/min



b. Visually check the stationary pointer ① to verify it is within the required firing range ② indicated on the rotor.
   Incorrect firing range → Check the pickup coil.

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4. Detach:
   - timing light
   - engine tachometer
5. Install:
   - C.D.I. magneto cover
     Refer to "C.D.I. MAGNETO" in chapter 4.

EBS00061

MEASURING THE COMPRESSION PRESSURE

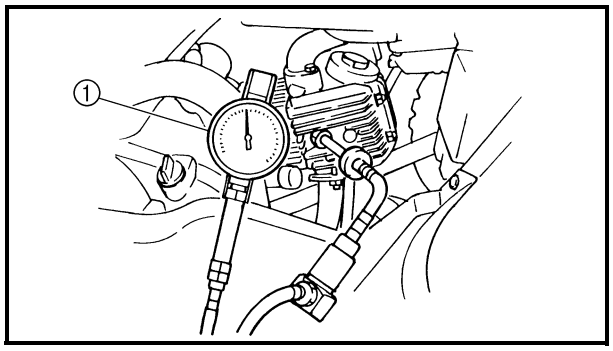
NOTE:

Insufficient compression pressure will result in a loss of performance.

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

CAUTION:

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



5. Attach:
   - adapter
   - compression gauge ①

Compression gauge
P/N. YU-33223, 90890-03081
Adapter
P/N. 90890-04082

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

Compression pressure (at sea level)
Minimum
1,040 kPa
(10.4 kg/cm², 147.9 psi)
Standard
1,200 kPa
(12.0 kg/cm², 170.6 psi)
Maximum
1,340 kPa
(13.4 kg/cm², 190.5 psi)

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

⚠ WARNING

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

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

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

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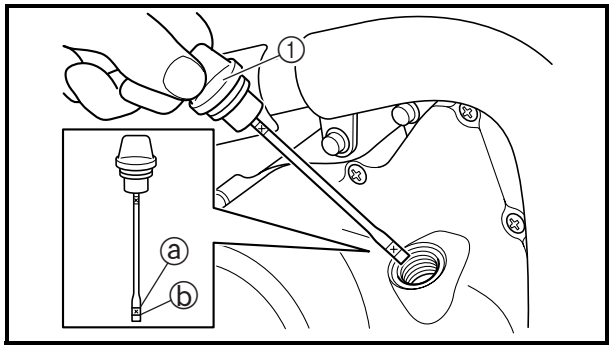
7. Install:
   • spark plug — **13 Nm (1.3 m · kg, 9.4 ft · lb)**
8. Connect:
   • spark plug cap



EBS00064

CHECKING THE ENGINE OIL LEVEL

1. Place the machine on a level surface.
2. Check:
   - engine oil level
     Oil level should be between the maximum ⓐ mark and minimum ⓑ mark.
     Oil level low → Add oil to the proper level.

NOTE:

Do not screw the dipstick ① in when checking the oil level.

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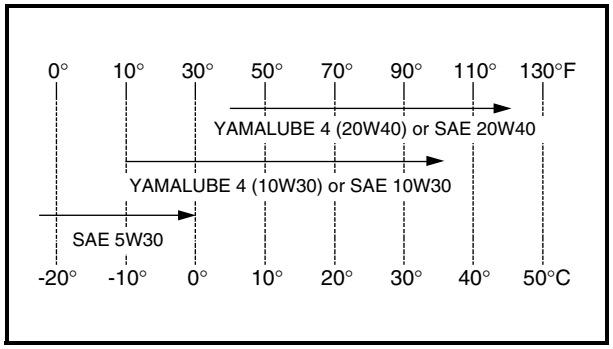
a. Warm up the engine for several minutes, and stop it, then wait at least several minutes for the oil to drain back into the crankcase.

⚠ WARNING

Never remove the dipstick just after high speed operation because the heated oil could spurt out. Wait until the oil cools down before removing the dipstick.

b. Screw the dipstick ① completely out, and wipe the dipstick clean, then just rest the dipstick in the hole.
c. Pull up the dipstick, and check the oil level whether or not it is between maximum ⓐ and minimum level ⓑ.
d. If the level is lower, add the oil up to the proper level.



Recommended oil
Follow the chart on the left.

NOTE:

Recommended oil classification:
API Service “SE”, “SF”, “SG” type or equivalent (e.g. “SF—SE—CC”, “SF—SE—SD” etc.)

CAUTION:

- **Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.**
- **Do not allow foreign material to enter the crankcase.**

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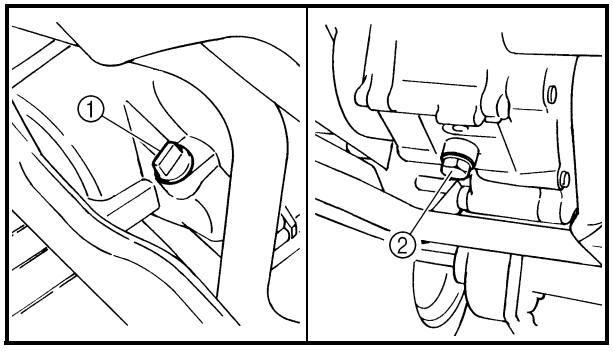
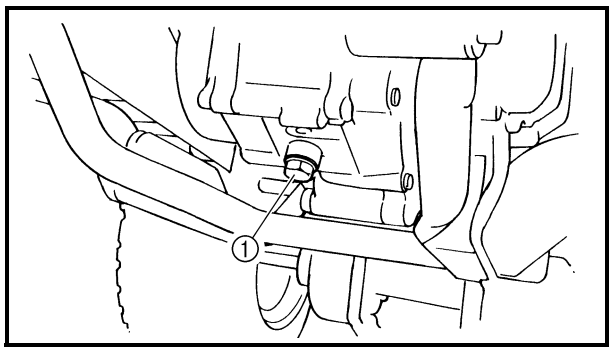


EBS00068

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:
   - dipstick ①
   - engine oil drain bolt ②
     (along with the gasket)
4. Drain:
   - engine oil
     (completely from the crankcase)
5. Check:
   - engine oil drain bolt gasket
     Damage → Replace.



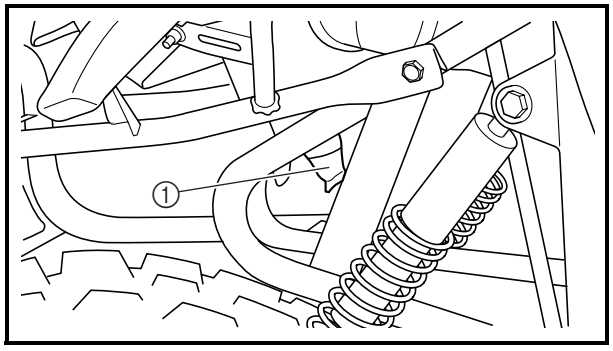
6. Install:
   - engine oil drain bolt ①
     (along with the gasket)

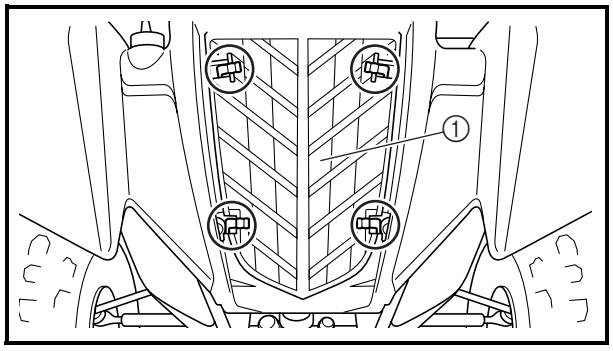
20 Nm (2.0 m · kg, 1.4 ft · lb)

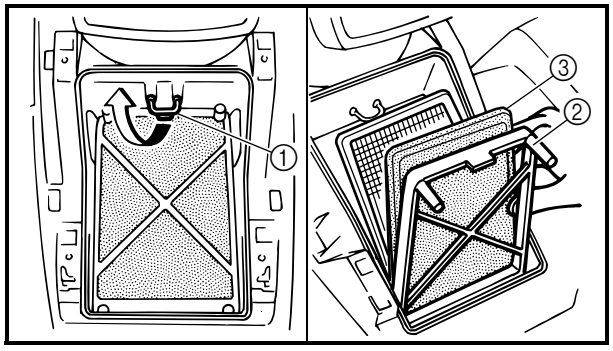
7. Fill:
   - crankcase
     (with the specified amount of the recommended engine oil)

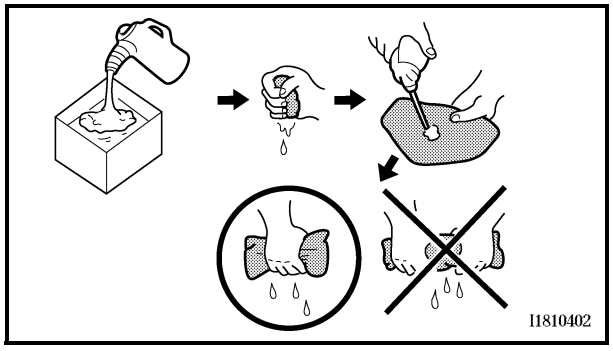
Quantity
Total amount
0.95 L (0.84 Imp qt, 1.00 US qt)
Periodic oil change
0.80 L (0.70 Imp qt, 0.85 US qt)

8. Install:
   - dipstick
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”.









EBS00071

CLEANING THE AIR FILTER ELEMENT

NOTE:

There is a check hose ① at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter element and air filter case.

1. Remove:
   - front panel
     Refer to "SEAT, FENDERS AND FUEL TANK".
2. Remove:
   - air filter cover ①
3. Disconnect:
   - rubber band ①
4. Remove:
   - air filter element guide ②
   - air filter element ③

CAUTION:

The engine should never be run without the air filter; excessive piston and/or cylinder wear may result.

5. Check:
   - air filter element
     Damaged → Replace.
6. Clean:
   - air filter element

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a. Wash the element gently, but thoroughly in solvent.

⚠ WARNING

Use a cleaning solvent which is designed to clean parts only. Never use gasoline or low flash point solvents as they may cause a fire or explosion.

b. Squeeze the excess solvent out of the element and let it dry.

CAUTION:

Do not twist or wring out the element. This could damage the foam material.

c. Apply engine oil to the element.
d. Squeeze out the excess oil.

NOTE:

The element should be wet but not dripping.

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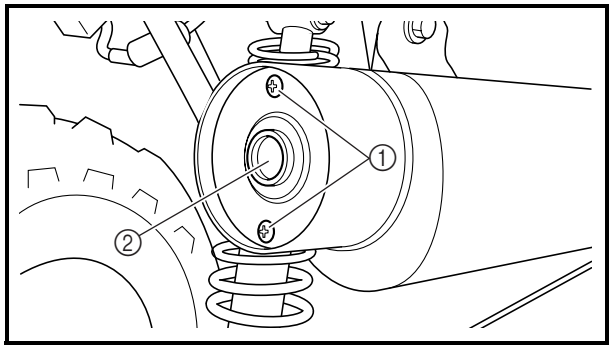
7. Install:
   - air filter element
   - air filter element guide
8. Connect:
   - rubber band
9. Install:
   - air filter cover

NOTE:

Make sure its sealing surface matches the sealing surface of the case so there is no air leak.

10. Install:
    - front panel

    Refer to “SEAT, FENDERS AND FUEL TANK”.



CLEANING THE SPARK ARRESTER

1. Clean:
   - spark arrester

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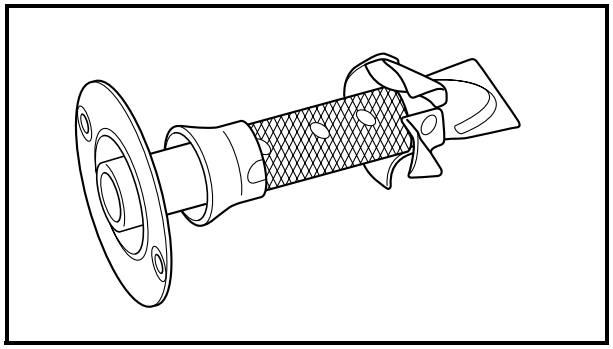
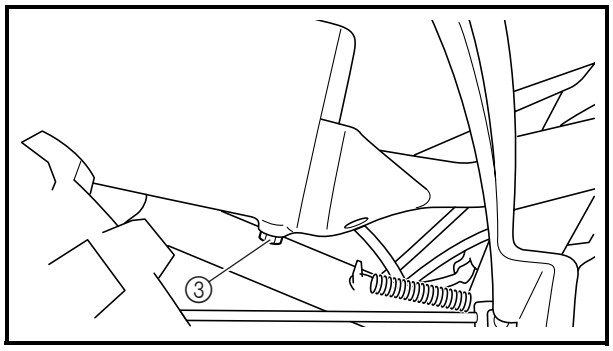
⚠ WARNING

- **Select a well-ventilated area free of combustible materials.**
- **Always let the exhaust system cool before performing this operation.**
- **Do not start the engine when removing the tailpipe from muffler.**

a. Remove the screws ①.
b. Remove the tailpipe ② by pulling it out of the muffler.





c. Tap the tailpipe lightly with a soft-face hammer or suitable tool, then use a wire brush to remove any carbon deposits from the spark arrester portion of the tailpipe and the inner contact surfaces of the muffler.
d. Insert the tailpipe into the muffler and align the screw holes.
e. Insert the screw and tighten it.

	**Screw** **8 Nm (0.8 m · kg, 5.8 ft · lb)**

f. Remove the purging bolt ③.
g. Start the engine and rev it up approximately twenty times while momentarily creating exhaust system back pressure by blocking the end of the muffler with a shop towel.
h. Stop the engine and allow the exhaust pipe to cool.
i Install the purging bolt ③ and tighten it.

	**Bolt** **10 Nm (1.0 m · kg, 7.2 ft · lb)**

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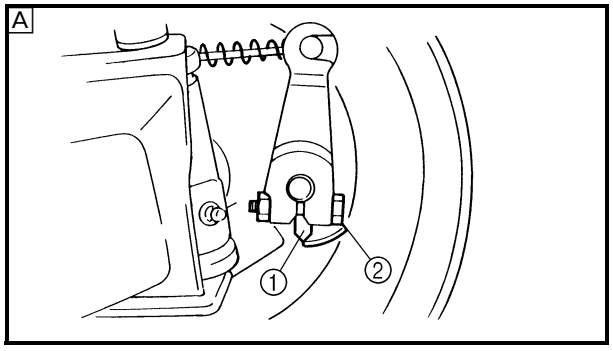

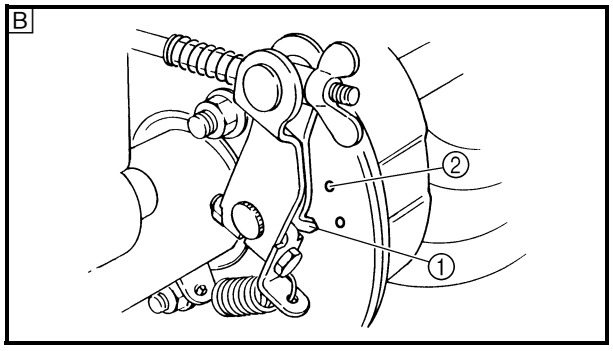

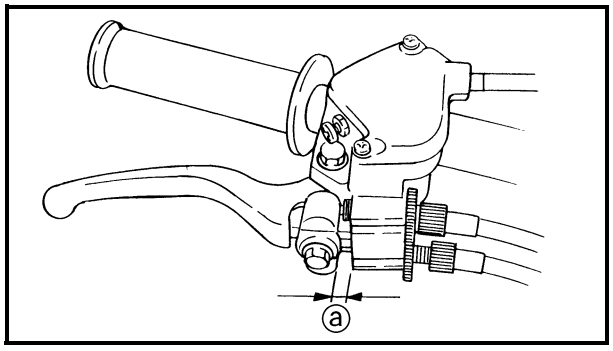

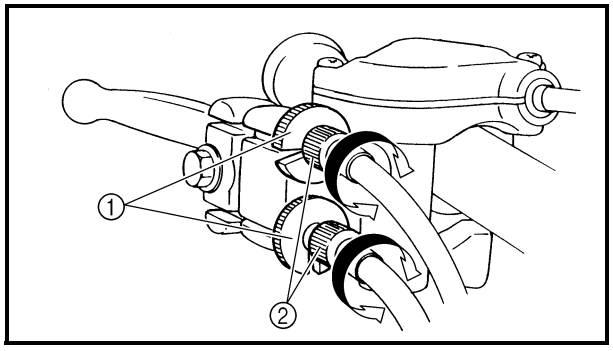

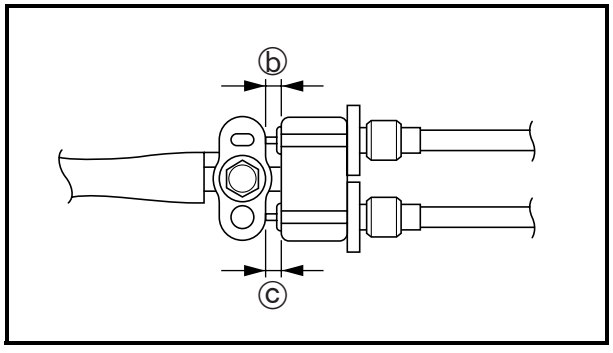

CHASSIS

EBS00079

CHECKING THE FRONT AND REAR BRAKE SHOES

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

Ⓐ Front brake
Ⓑ Rear brake

EBS00082

ADJUSTING THE FRONT BRAKE

NOTE:

Before adjusting the front brake, the front brake linings should be checked.

CAUTION:

Proper lever free play is essential to avoid excessive brake drag.

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

Front brake lever free play
10 ~ 12 mm (0.39 ~ 0.47 in)

2. Adjust:
   - front brake lever free play

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a. Loosen the locknuts ①.
b. Turn the adjusters ② in or out until the specified front brake lever free play is obtained.

NOTE:

Make sure that the difference between clearances ⓑ and ⓒ is less than 2 mm when the front brake lever is squeezed.

c. Tighten the locknuts.

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EBS00084

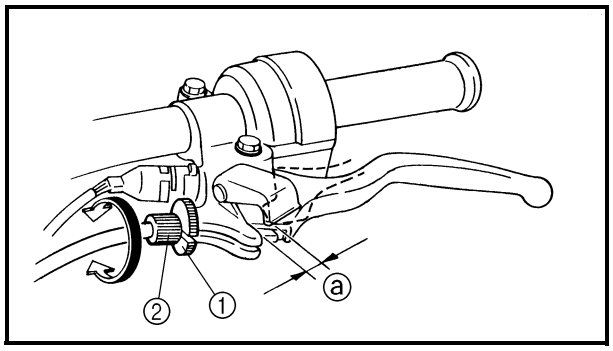
ADJUSTING THE REAR BRAKE

NOTE:

Before adjusting the rear brake, the rear brake linings should be checked.

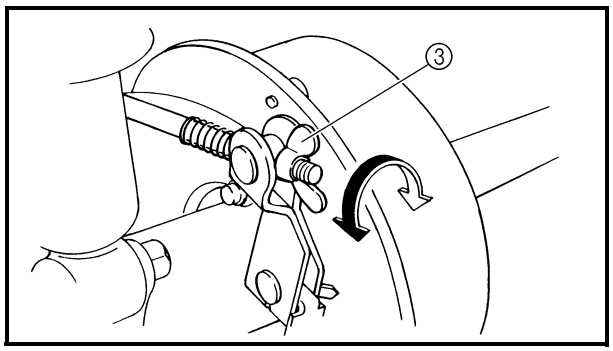
CAUTION:

Proper lever free play is essential to avoid excessive brake drag.



1. Place the machine on a level surface.
2. Measure:
   - rear brake lever free play ⓐ
     Out of specification → Adjust.

Rear brake lever free play
7 ~ 10 mm (0.28 ~ 0.39 in)



3. Adjust:
   - brake lever free play

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First step:

a. Loosen the locknut ① and fully turn in the adjuster ② (lever side).
b. Turn the adjuster ③ in or out until the specified rear brake lever free play is obtained (drum side).
c. Tighten the locknut.

NOTE:

If the free play cannot be adjusted here, adjust if at the lever side of the cable.

Second step:

a. Loosen the locknut ①.
b. Turn the adjuster ② in or out until the specified rear brake lever free play is obtained (lever side).
c. Tighten the locknut.

WARNING

After this adjustment is performed. block the rear of the machine off the ground, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed, perform the above steps again.

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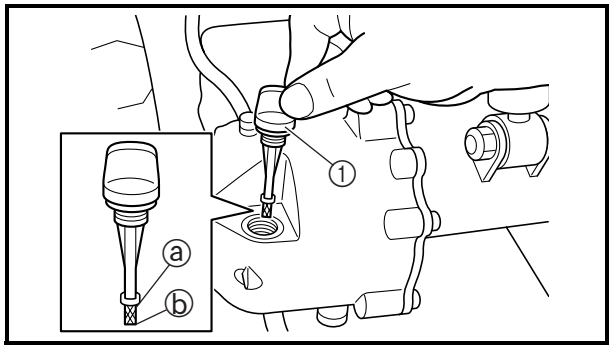


EBS00101

CHECKING THE FINAL GEAR OIL LEVEL

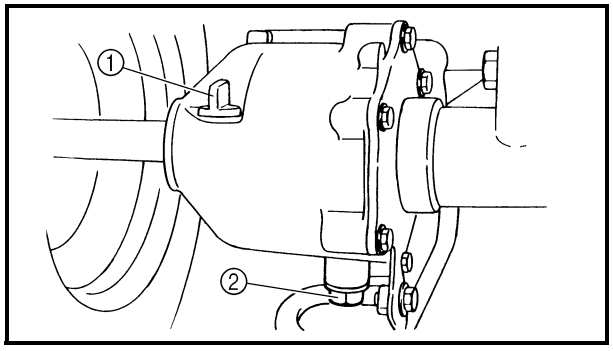
1. Place the machine on a level surface.
2. Remove:
   - dipstick ①
3. Check:
   - final gear oil level
     Oil level should be between the maximum ⓐ and minimum ⓑ marks.
     Oil level low → Add oil to the proper level.

Recommended oil
SAE80 API "GL-4" Hypoid gear oil

CAUTION:

Take care not allow foreign material to enter the final gear case.

4. Install:
   - dipstick



EBS00102

CHANGING THE FINAL GEAR OIL

1. Place the machine on a level surface.
2. Place a receptacle under the final gear case.
3. Remove:
   - dipstick ①
   - final gear oil drain plug ②
4. Drain:
   - final gear oil
5. Install:
   - final gear oil drain plug

23 Nm (2.3 m · kg, 17 ft · lb)

NOTE:

Check the gasket (drain plug). If it is damaged, replace it with a new one.

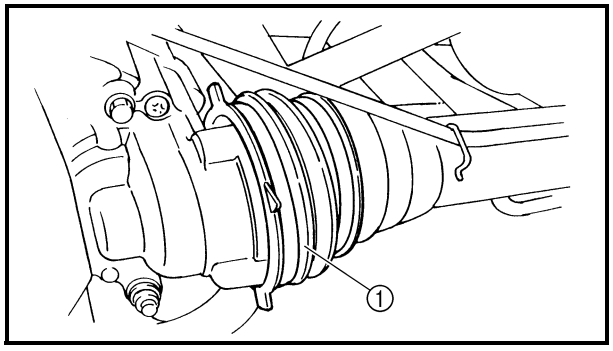
6. Fill:
   • final gear case

Total amount
0.12 L (0.11 Imp qt, 0.13 US qt)
Recommended oil
SAE80 API "GL-4" Hypoid gear oil

CAUTION:

Take care not to allow foreign material to enter the final gear case.

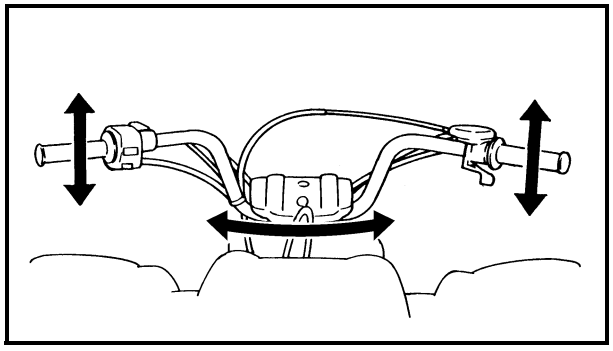
7. Check:
   • final gear oil level
   Refer to "CHECKING THE FINAL GEAR OIL LEVEL".
8. Install:
   • dipstick

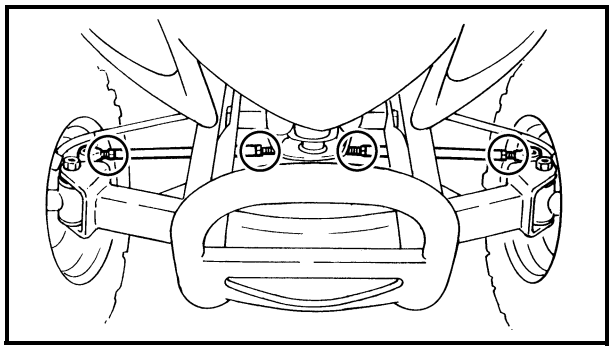


EBS00105

CHECKING THE SWINGARM DUST BOOT

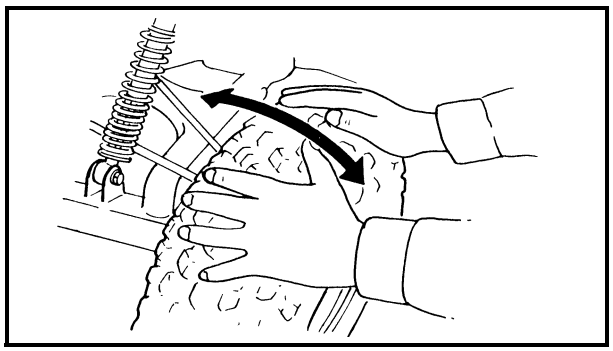
1. Remove:
   • C.D.I. magneto cover
   Refer to "C.D.I. MAGNETO" in chapter 4.
2. Check:
   • dust boot ①
   Damage → Replace.
   Refer to "REAR SHOCK ABSORBER AND REAR SWINGARM" in chapter 7.
3. Install:
   • C.D.I. magneto cover
   Refer to "C.D.I. MAGNETO" in chapter 4.

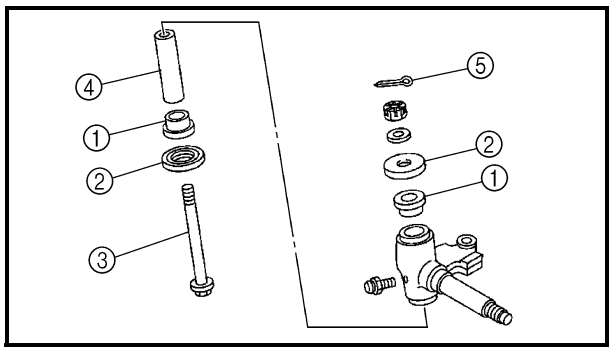




EBS00107
CHECKING THE STEERING SYSTEM

1. Place the machine on a level surface.
2. Check:
   - steering shaft bushings and bearings
     Move the handlebar up and down, and/or back and forth.
     Excessive play → Replace the steering shaft bushings and or bearings.
     Refer to “STEERING SYSTEM” in chapter 7.
3. Check:
   - tie-rod ends
     Turn the handlebar to the left and/or right until it stops completely, then slightly move the handlebar from left to right.
     Tie-rod end has any vertical play →
     Replace the tie-rod end(s).
     Refer to “STEERING SYSTEM” in chapter 7.
4. Raise the front end of the machine so that there is no weight on the front wheels.

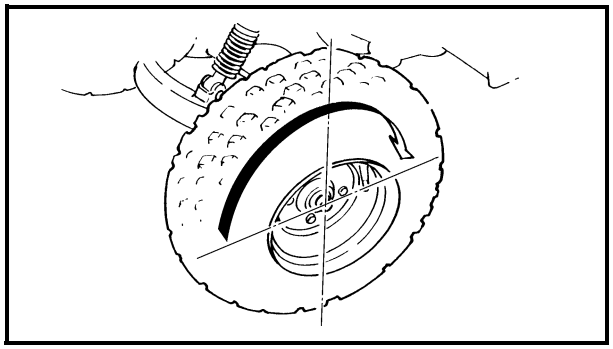


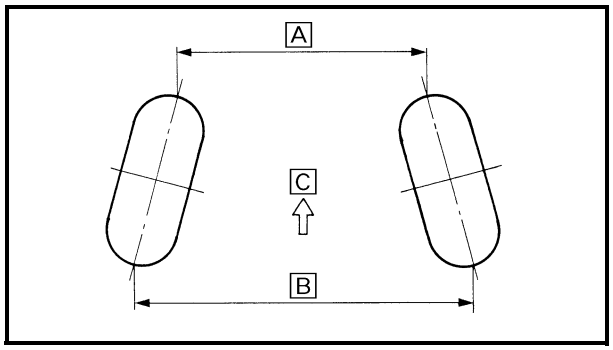


5. Check:
   - knuckles and/or wheel bearings
     Move the wheels laterally back and forth.
     Excessive free play → Replace the following parts.

1) Wheel bearings
2) Bushings ①
3) Thrust covers ②
4) Knuckle shafts ③
5) Spacers ④
6) Cotter pins ⑤

Refer to “FRONT AND REAR WHEELS” and “STEERING SYSTEM” in chapter 7.





EBS00108

ADJUSTING THE TOE-IN

1. Place the machine on a level surface.
2. Measure:
   - toe-in

     Out of specification → Adjust.

	Toe-in **0 ~ 10 mm (0 ~ 0.39 in)**

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NOTE:

Before measuring the toe-in, make sure that the tire pressure is correct.

a. Mark both front tire tread centers.
b. Raise the front end of the machine so that there is no weight on the front tires.
c. Face the handlebar straight ahead.
d. Measure the width A between the marks.
e. Rotate the front tires 180° until the marks are exactly opposite one another.
f. Measure the width B between the marks.
g. Calculate the toe-in using the formula given below.

Toe-in = B – A

h. If the toe-in is incorrect, adjust it.

C Forward

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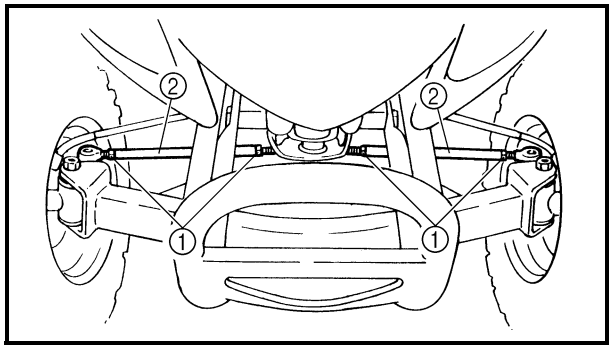
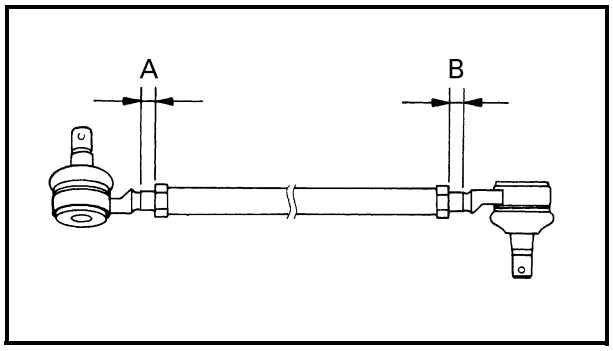
3. Adjust:
   - toe-in

⚠ WARNING

- **Be sure that both tie-rods are turned the same amount. If not, the machine will drift right or left even though the handlebar is positioned straight. This may lead to mishandling and an accident.**
- **After setting the toe-in to specification, run the machine slowly for some distance with both hands lightly holding the handlebar and check that the handlebar responds correctly. If not, turn either the right or left tie-rod within the toe-in specification.**





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a. Mark both tie-rods ends.
   This reference point will be needed during adjustment.
b. Loosen the locknuts (tie-rod end) ① of both tie-rods.
c. The same number of turns should be given to both the right and left tie-rods ② until the specified toe-in is obtained. This is to keep the length of the rods the same.
d. Tighten the rod end locknuts of both tie-rods.

	Locknut (rod end) **15 Nm (1.5 m · kg, 11 ft · lb)**

NOTE:
Adjust the rod ends so that A and B are equal.

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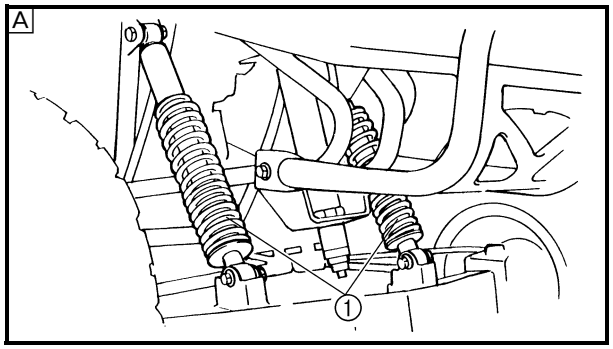
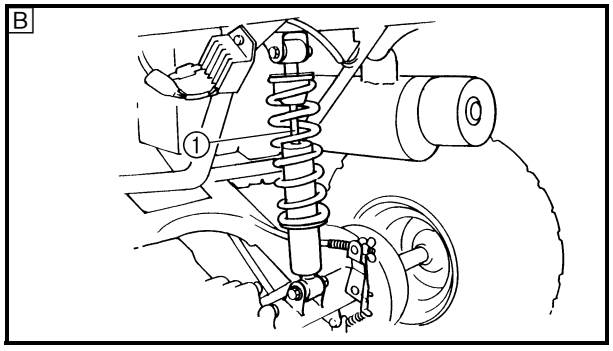
EBS00109

CHECKING THE FRONT AND REAR SHOCK ABSORBERS

1. Place the machine on a level surface.
2. Check:
   - damper rod ①
     Scratch/damage → Replace as a set.
   - oil leakage
     Excessive oil leakage → Replace as a set.
     Refer to "FRONT SHOCK ABSORBER ASSEMBLIES AND FRONT SWINGARM" and "REAR SHOCK ABSORBER AND REAR SWINGARM" in chapter 7.
3. Check:
   - operation
     Pump the shock absorbers up and down for several times.
     Unsmooth operation → Replace as a set.
     Refer to "FRONT SHOCK ABSORBER ASSEMBLIES AND FRONT SWINGARM" and "REAR SHOCK ABSORBER AND REAR SWINGARM" in chapter 7.





A Front shock absorber
B Rear shock absorber

EBS00114

CHECKING THE TIRES

⚠ WARNING

This model is equipped with low pressure tires. It is important that they be inflated correctly and maintained at the proper pressures.

• TIRE CHARACTERISTICS

1) Tire characteristics influence the handling of ATVs. The tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. If other tire combinations are used, they can adversely affect your machine's handling characteristics and are therefore not recommended.

	Manufacturer	Size	Type
Front	DUNLOP	AT16 × 7-7	KT145
Rear	DUNLOP	AT16 × 8-7	KT145

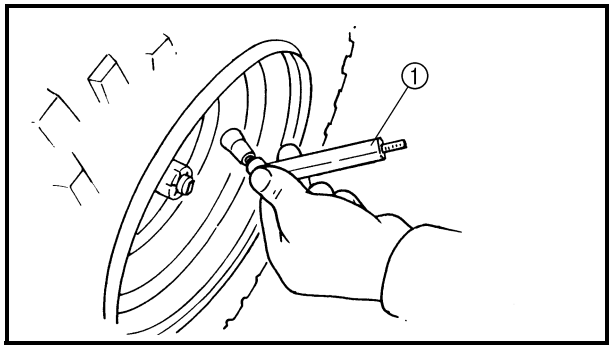
• TIRE PRESSURE

1) Recommended tire pressure
Front 20 kPa (0.20 kgf/cm², 2.9 psi)
Rear 20 kPa (0.20 kgf/cm², 2.9 psi)

2) Tire pressure below the minimum specification could cause the tire to dislodge from the rim under severe riding conditions.
The following are minimums:
Front 17 kPa (0.17 kgf/cm², 2.5 psi)
Rear 17 kPa (0.17 kgf/cm², 2.5 psi)

3) Use no more than
Front 250 kPa (2.5 kgf/cm², 36 psi)
Rear 250 kPa (2.5 kgf/cm², 36 psi)
when seating the tire beads. Higher pressures may cause the tire to burst.
Inflate the tires slowly and carefully.
Fast inflation could cause the tire to burst.

• MAXIMUM LOADING LIMIT
Vehicle load limits: 40 kg (88 lb)
***Total weight of the cargo, trailer hitch vertical load, rider, and accessories.**



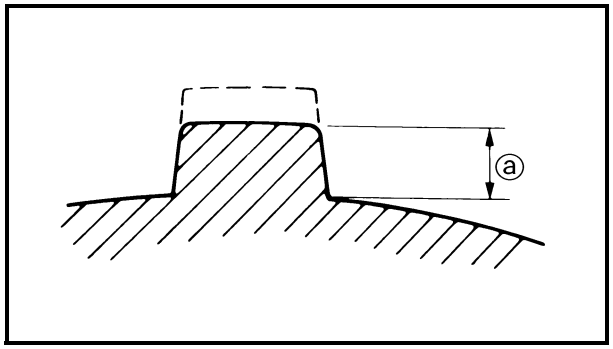
1. Measure:
   • tire pressure
   Out of specification → Adjust.

NOTE:
- The low-pressure tire gauge ① is included as standard equipment.
- If dust or the like is stuck to this gauge, it will not provide the correct readings. Therefore, take two measurements of the tire's pressure and use the second reading.

Cold tire pressure	Front	Rear
Standard	20 kPa (0.20 kgf/cm², 2.9 psi)	20 kPa (0.20 kgf/cm², 2.9 psi)
Minimum	17 kPa (0.17 kgf/cm², 2.5 psi)	17 kPa (0.17 kgf/cm², 2.5 psi)
Maximum	23 kPa (0.23 kgf/cm², 3.3 psi)	23 kPa (0.23 kgf/cm², 3.3 psi)

⚠ WARNING

Uneven or improper tire pressure may adversely affect the handling of this machine and may cause loss of control.
- **Maintain proper tire pressures.**
- **Set tire pressures when the tires are cold.**
- **Tire pressures must be equal in both front tires and equal in both rear tires.**

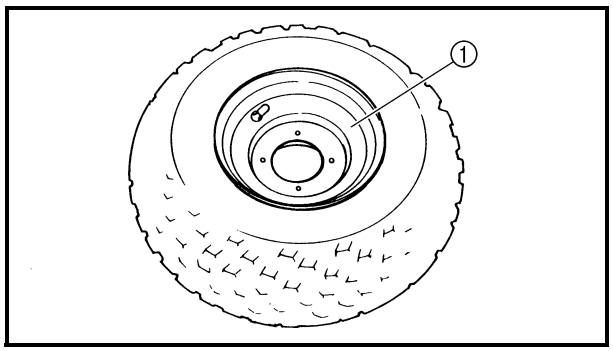


2. Check:
   • tire surfaces
   Wear/damage → Replace.

Tire wear limit ⓐ
Front and rear: 3 mm (0.12 in)

⚠ WARNING

It is dangerous to ride with a worn-out tire. When tire wear is out of specification, replace the tire immediately.



EBS00116

CHECKING THE WHEELS

1. Check:
   • wheel ①
   Damage/bends → Replace.

NOTE:
Always balance the wheel when a tire or wheel has been changed or replaced.

⚠ WARNING

- **Never attempt even small repairs to the wheel.**
- **Ride conservatively after installing a tire to allow it to seat itself properly on the rim.**

EBS00117

CHECKING AND LUBRICATING THE CABLES

⚠ WARNING

A damaged cable sheath may cause corrosion and interfere with the cable movement. An unsafe condition may result so replace a damaged cable as soon as possible.

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

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

NOTE:

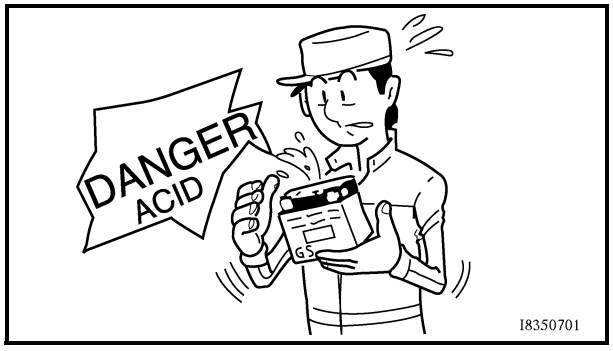
Hold the cable end up and apply several drops of lubricant to the cable.

EBS00118

LUBRICATING THE LEVERS, STEERING SHAFT AND STEERING KNUCKLES

Lubricate the pivoting point and metal-to-metal moving parts of the levers, steering shaft and steering knuckles.

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



EBS00119

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

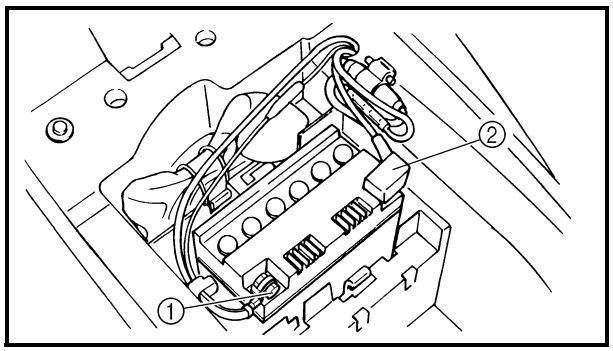
- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

INTERNAL

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

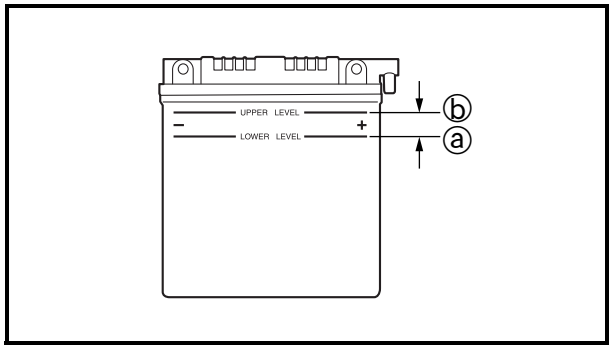
1. Remove:
   - seat
   - battery band

   Refer to “SEAT, FENDERS AND FUEL TANK”.
2. Disconnect:
   - battery leads (from the battery terminals)
   - battery breather hose



CAUTION:

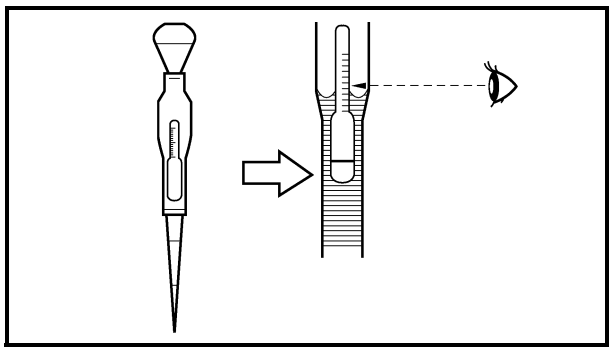
First, disconnect the negative battery lead ①, and then the positive lead ②.



3. Remove:
   • battery
4. 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.

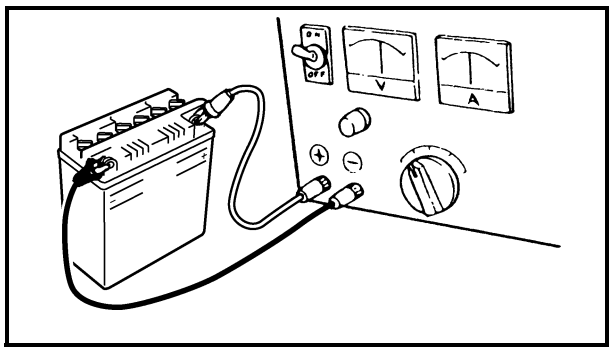
CAUTION:

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



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

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



6. Charge:
   • battery

Battery charging amperage and time
7 amps/10 hrs

⚠ WARNING

Do not quick charge a battery.

CAUTION:

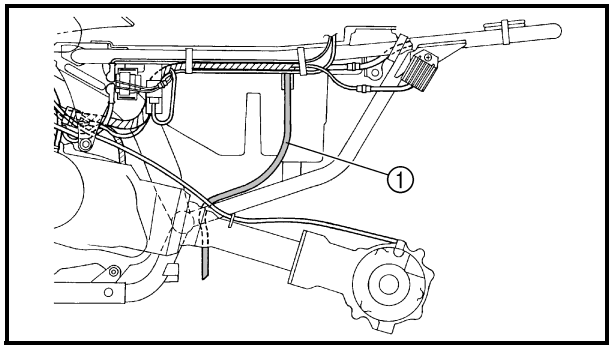
- **Loosen the battery sealing caps.**
- **Make sure the battery breather hose and battery vent are free of obstructions.**
- **To ensure maximum performance, always charge a new battery before using it.**

- **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 machine. (If charging has to be done with the battery mounted on the machine, 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 one battery cell's charge is lower than the rest,
- warpage or buckling of the battery plates or insulators is evident.



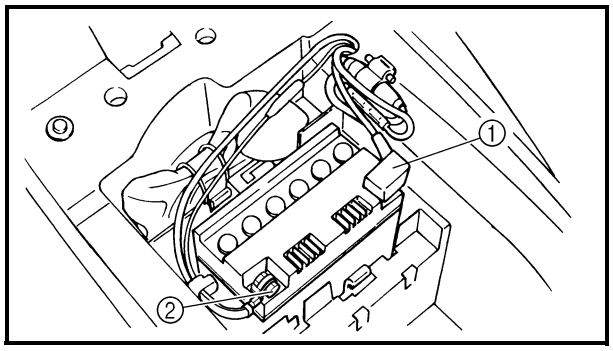
7. Check:
   - battery breather hose and battery vent
     Obstruction → Clean.
     Damage → Replace.
8. Install:
   - battery
9. Connect:
   - battery breather hose ①

CAUTION:

When 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 machine and its finish may be damaged.

NOTE:

Refer to "CABLE ROUTING" in chapter 2.



10. Check:
    - battery terminals
      Dirt → Clean with a wire brush.
      Loose connection → Connect properly.
11. Connect:
    - battery leads
      (to the battery terminals)

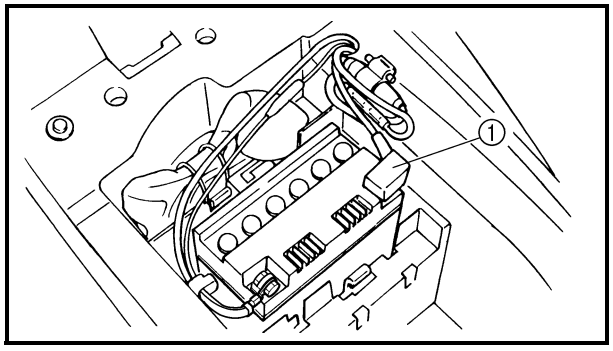
CAUTION:

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

12. Lubricate:
    - battery terminals

	Recommended lubricant **Dielectric grease**

13. Install:
    - battery band
    - seat
      Refer to "SEAT, FENDERS AND FUEL TANK".

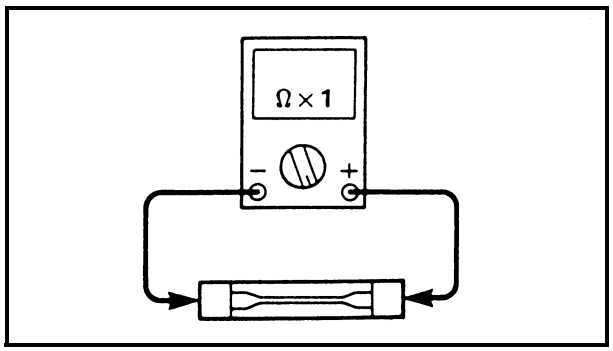


EBS00121
CHECKING THE FUSE

CAUTION:

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

1. Remove:
   - seat
     Refer to "SEAT, FENDERS AND FUEL TANK".
   - fuse holder ①



2. Check:
   - fuse

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

NOTE:

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

	Pocket tester **P/N. YU-03112-C, 90890-03112**

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

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3. Replace:
   - blown fuse

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Set the main switch to "OFF".
b. Install a new fuse of the correct amperage.
c. Set on the switches to verify if the electrical circuit is operational.

d. If the fuse immediately blows again, check the electrical circuit.

Items	Amperage rating	Q'ty
Main	5 A	1
Reserve	5 A	1

⚠ WARNING

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

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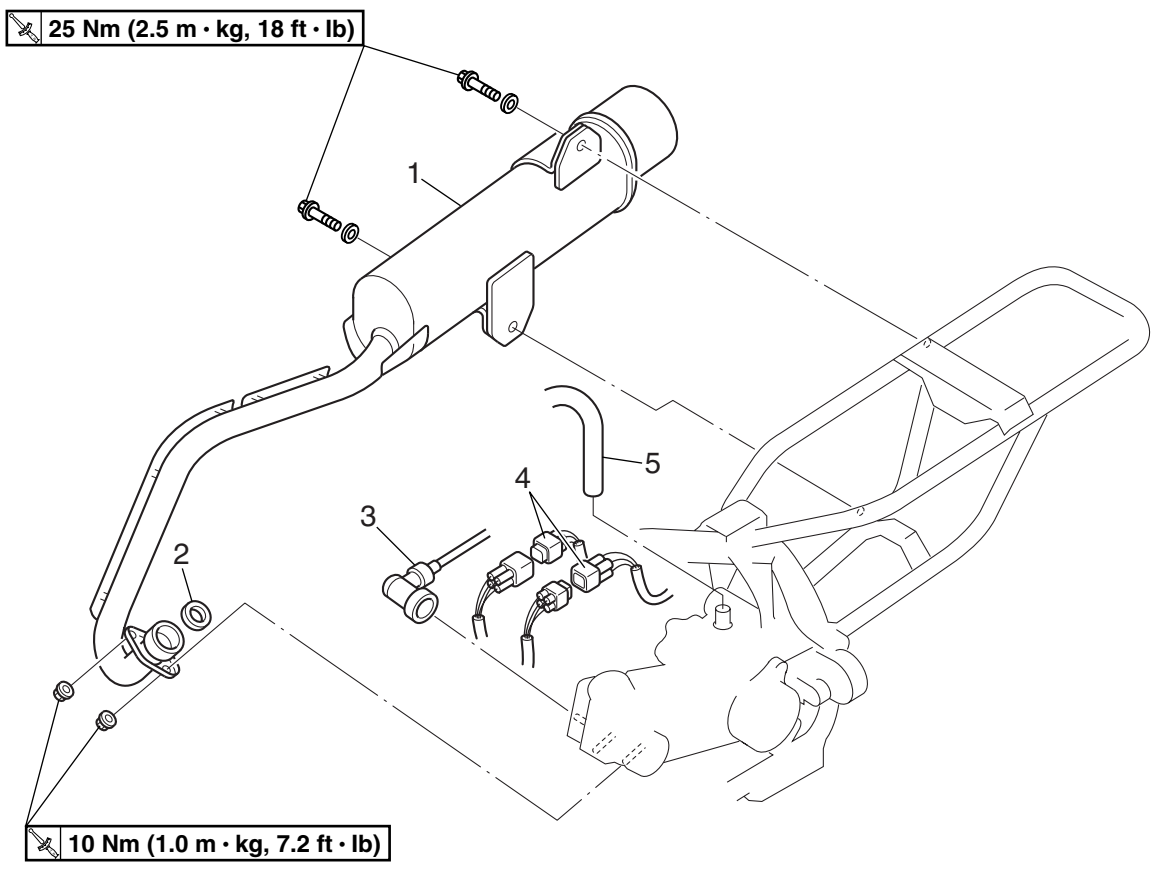
4. Install:
   - seat
     Refer to "SEAT, FENDERS AND FUEL TANK".

EBS00198

ENGINE

ENGINE

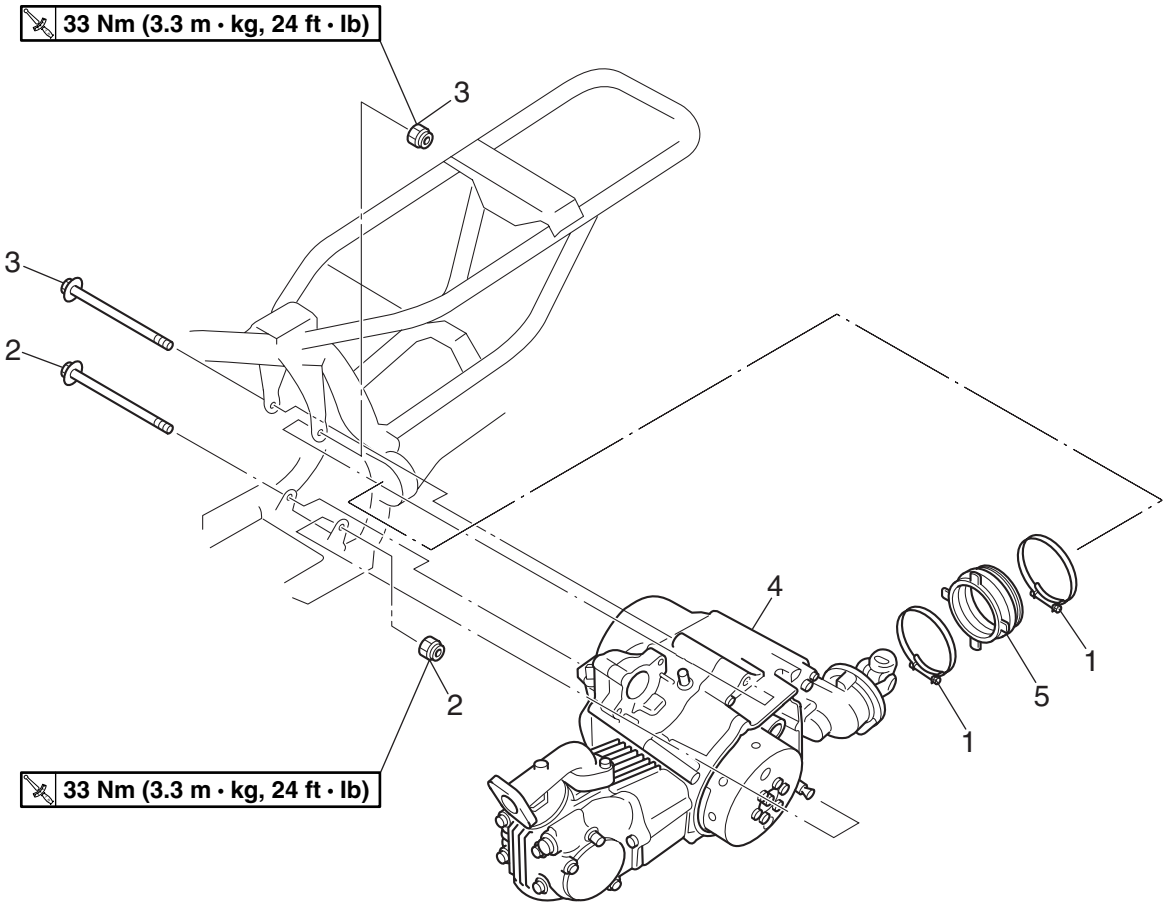
EXHAUST PIPE/MUFFLER, BREATHER HOSE AND LEADS



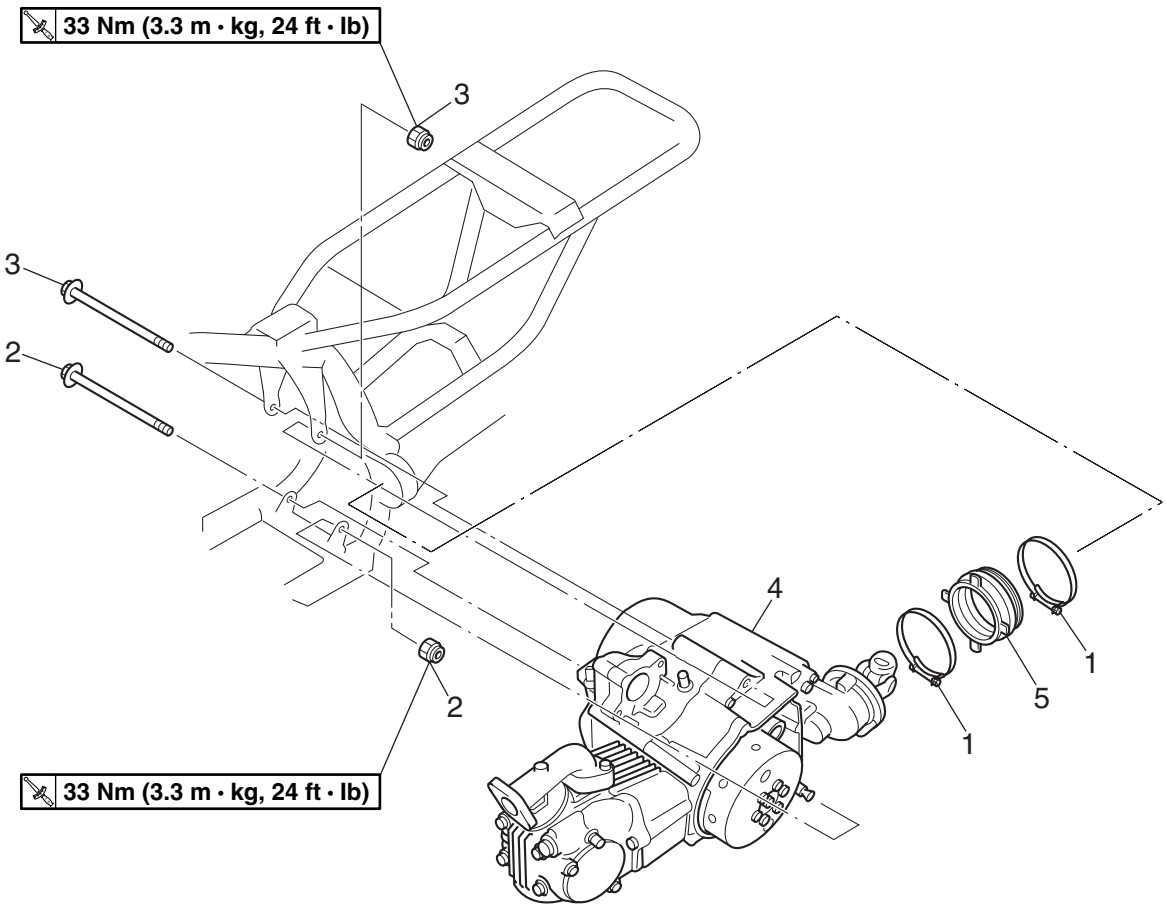
Order	Job/Part	Q'ty	Remarks
	Removing the exhaust pipe/muffler, breather hose and leads		Remove the parts in the order listed.
	Rear fender		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
1	Exhaust pipe/muffler	1	
2	Exhaust pipe gasket	1	
3	Spark plug lead	1	
4	C.D.I. magneto coupler	2	
5	Crankcase breather hose	1	
			For installation, reverse the removal procedure.

EBS00205

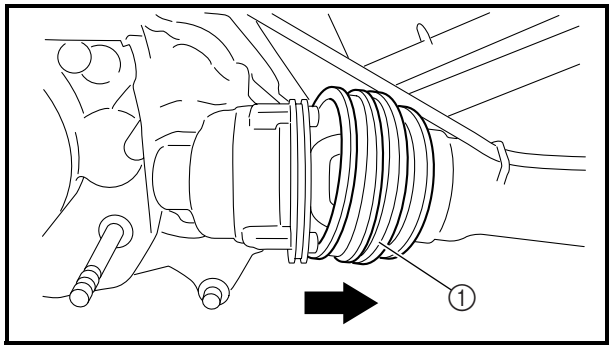
ENGINE MOUNTING BOLTS



Order	Job/Part	Q'ty	Remarks
	Removing the engine mounting bolts		Remove the parts in the order listed.
	Carburetor		Refer to "CARBURETOR" in chapter 5.
	Starter motor		Refer to "ELECTRIC STARTING SYSTEM" in chapter 8.
	C.D.I. magneto cover		Refer to "C.D.I. MAGNETO".
1	Metal clamp	2	
2	Lower engine mounting nut/bolt	1/1	**CAUTION:** **Install all of the bolts/nuts and then tighten them to full torque specifications.** Refer to "INSTALLING THE ENGINE".



Order	Job/Part	Q'ty	Remarks
3	Upper engine mounting nut/bolt	1/1	Refer to "INSTALLING THE ENGINE".
4	Engine assembly	1	
5	Dust boot	1	Refer to "REMOVING THE ENGINE" and "INSTALLING THE ENGINE". For installation, reverse the removal procedure.

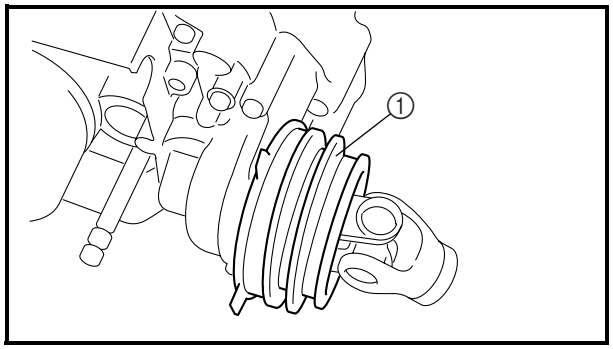


REMOVING THE ENGINE

1. Remove:
   - metal clamps

NOTE:

After removing the metal clamps, slide the dust boot ① towards the swingarm.



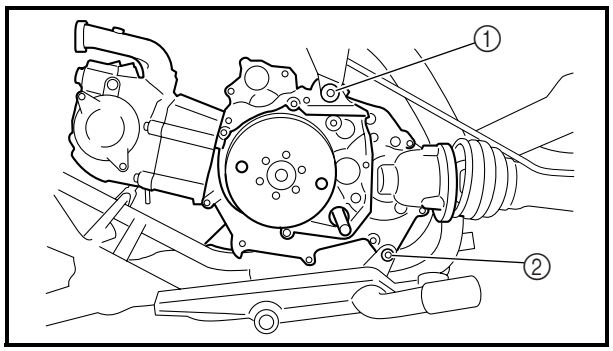
EBS00207

INSTALLING THE ENGINE

1. Install:
   - dust boot ①

NOTE:

Before mounting the engine assembly, install the dust boot onto the middle driven gear bearing housing.



2. Install:
   - upper engine mounting bolt/nut ①
   - lower engine mounting bolt/nut ②

NOTE:

Do not fully tighten the bolts and nuts.

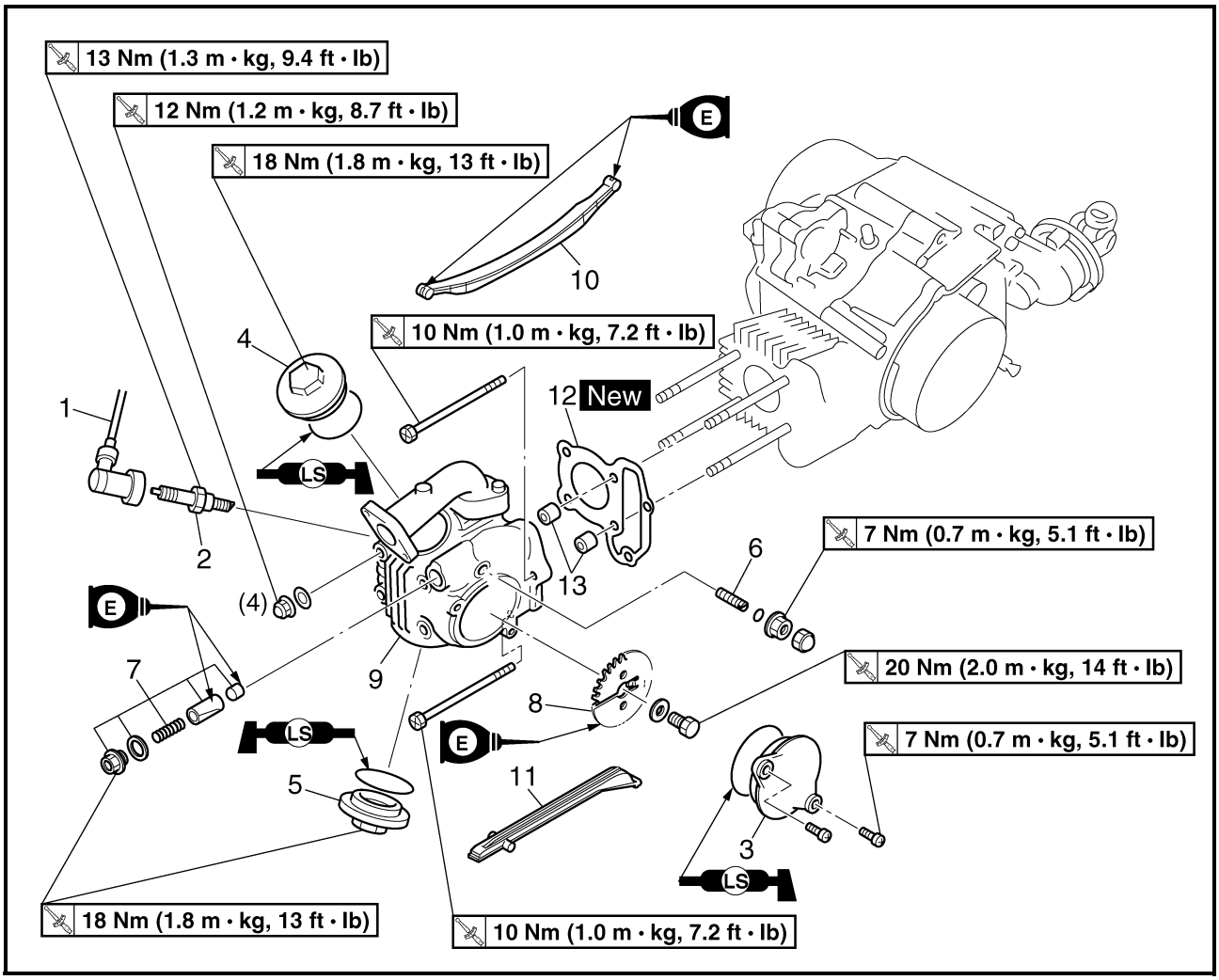
3. Tighten:
   - upper engine mounting nut ①

33 Nm (3.3 m · kg, 24 ft · lb)

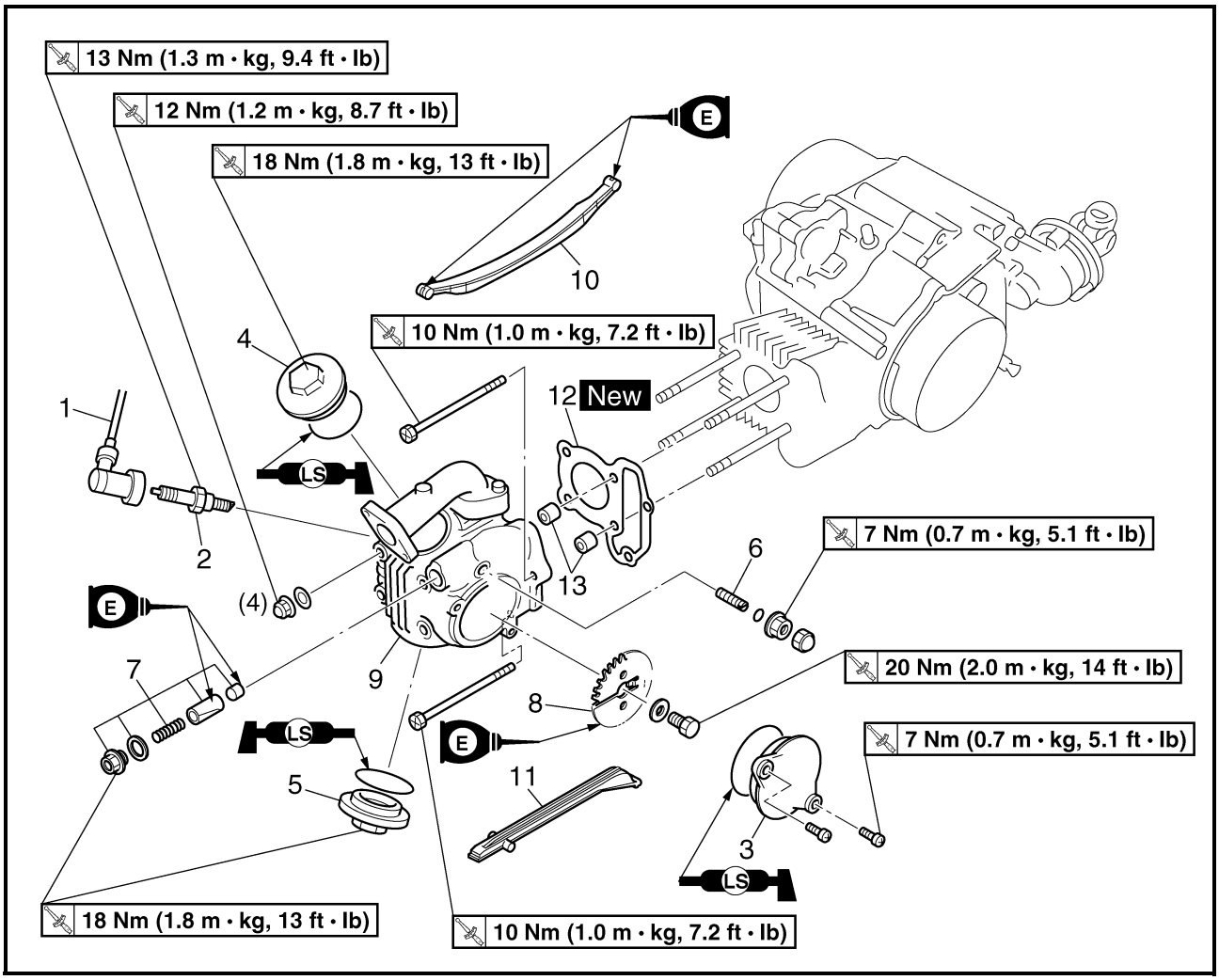
   - lower engine mounting nut ②

33 Nm (3.3 m · kg, 24 ft · lb)

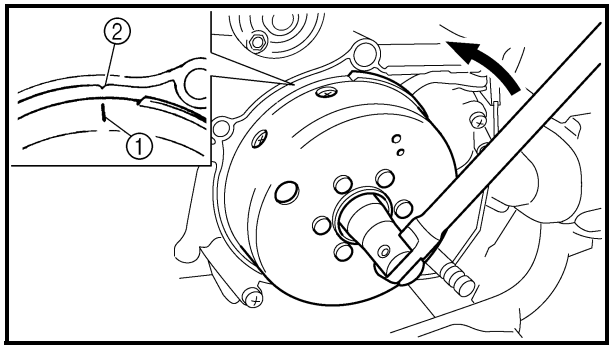
EBS00218
CYLINDER HEAD

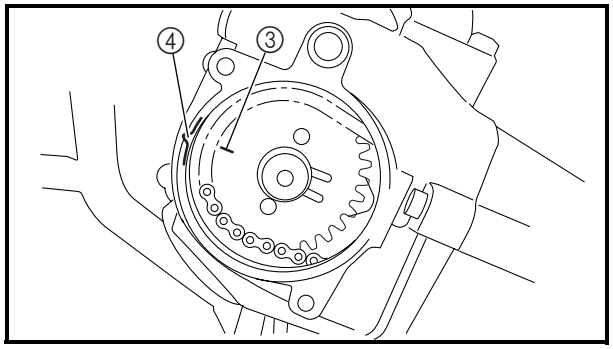


Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		Remove the parts in the order listed.
	Carburetor assembly		Refer to "CARBURETOR" in chapter 5.
	Exhaust pipe/muffler		Refer to "ENGINE".
	C.D.I. magneto cover		Refer to "C.D.I. MAGNETO".
1	Spark plug lead	1	
2	Spark plug	1	
3	Camshaft sprocket cover	1	
4	Intake tappet cover	1	
5	Exhaust tappet cover	1	
6	Timing chain tension adjuster	1	Refer to "REMOVING THE CYLINDER HEAD" and "INSTALLING THE CYLINDER HEAD".
7	Timing chain tensioner assembly	1	
8	Camshaft sprocket	1	
9	Cylinder head	1	
10	Intake side timing chain guide	1	



Order	Job/Part	Q'ty	Remarks
11	Exhaust side timing chain guide	1	
12	Cylinder head gasket	1	
13	Dowel pin	2	
			For installation, reverse the removal procedure.





EBS00220

REMOVING THE CYLINDER HEAD

1. Align:
   - "T" mark on the rotor
     (with the stationary pointer on the crankcase)

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a. Turn the crankshaft counterclockwise with a wrench.
b. Align the "T" mark ① on the rotor with the stationary pointer ② on the crankcase.
   When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

NOTE:

TDC on compression stroke check:
- Both rocker arms must have a valve clearance when the camshaft sprocket alignment mark ③ is aligned with the cylinder head alignment mark ④.
- If not, give the crankshaft one counterclockwise turn to meet the above condition.

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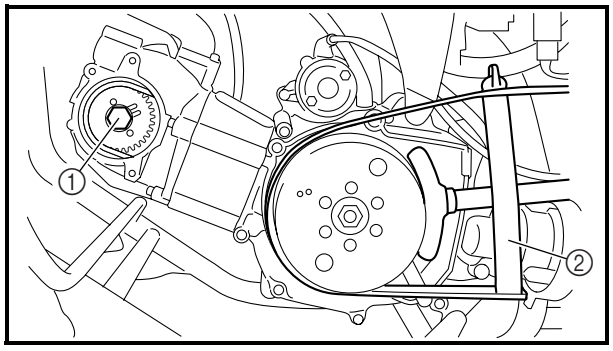


2. Loosen:
   - camshaft sprocket bolt ①
     Use the sheave holder ② to hold the rotor.

NOTE:

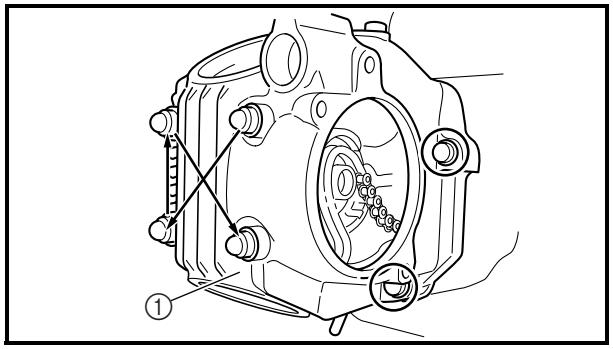
Do not allow the sheave holder to touch the projection on the rotor.

	Sheave holder **P/N. YS-01880-A, 90890-01701**

3. Remove:
   - timing chain tension adjuster
   - timing chain tensioner assembly
   - camshaft sprocket

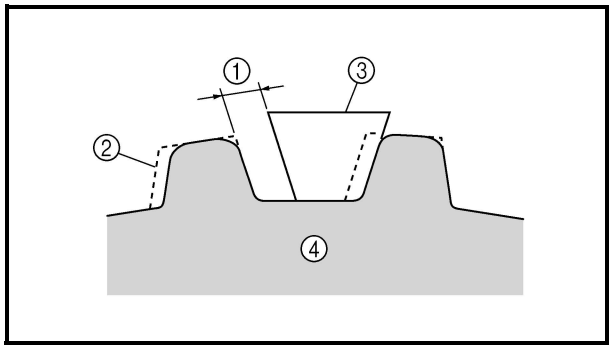
NOTE:

- Fasten a safety wire to the timing chain to prevent it from falling into the crankcase.
- When removing the camshaft sprocket, it is not necessary to separate the timing chain.



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

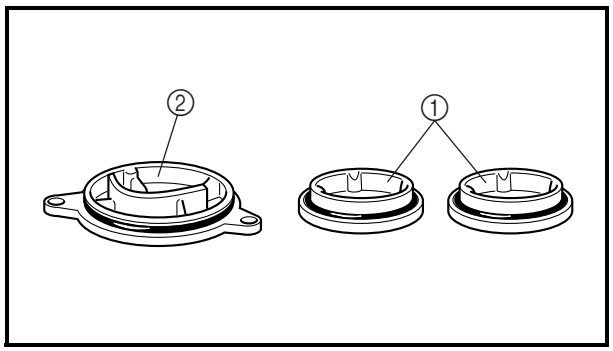
NOTE:
Working in a crisscross pattern, loosen each nut 1/4 of a turn.



EBS00224
CHECKING THE CAMSHAFT SPROCKET

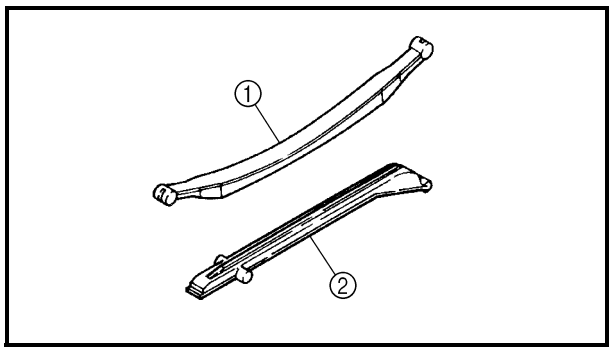
1. Check:
   - camshaft sprocket
     Wear/damage → Replace the camshaft sprocket and timing chain as a set.

① 1/4 of a tooth
② Correct
③ Roller
④ Sprocket



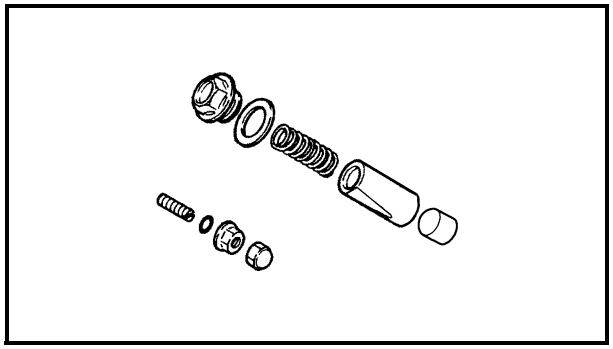
CHECKING THE TAPPET COVERS AND CAMSHAFT SPROCKET COVER

1. Check:
   - tappet covers ①
   - camshaft sprocket cover ②
   - O-rings
     Cracks/damage → Replace.



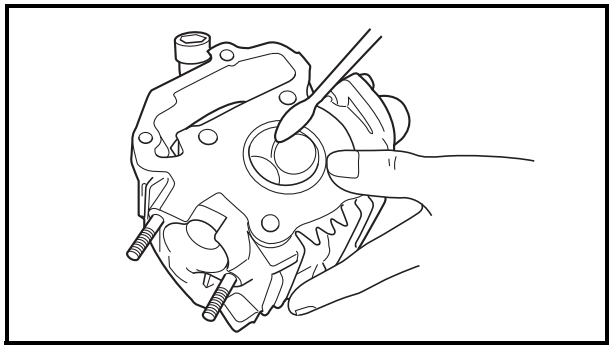
EBS00226
CHECKING THE TIMING CHAIN GUIDES

1. Check:
   - intake side timing chain guide ①
   - exhaust side timing chain guide ②
     Wear/damage → Replace.



EBS00228
CHECKING THE TIMING CHAIN TENSIONER ASSEMBLY

1. Check:
   - chain tensioner assembly
     Wear/damage → Replace.

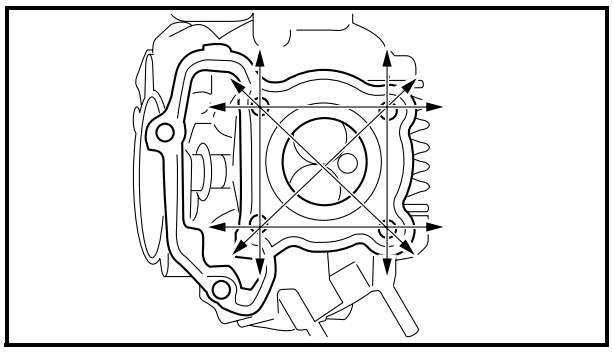


EBS00230
CHECKING THE CYLINDER HEAD

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.
   - cylinder head water jacket
     Mineral deposits/rust → Eliminate.



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

	Maximum cylinder head warpage 0.05 mm (0.002 in)

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a. Place a straightedge and a thickness gauge 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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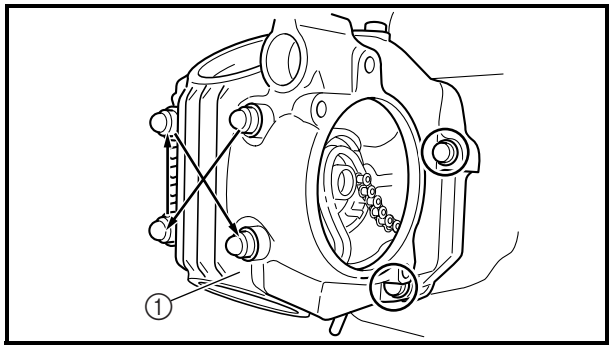

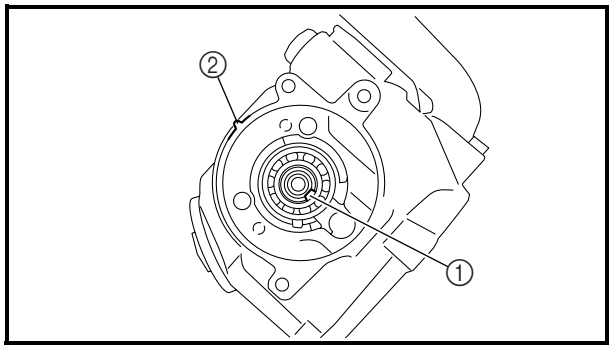

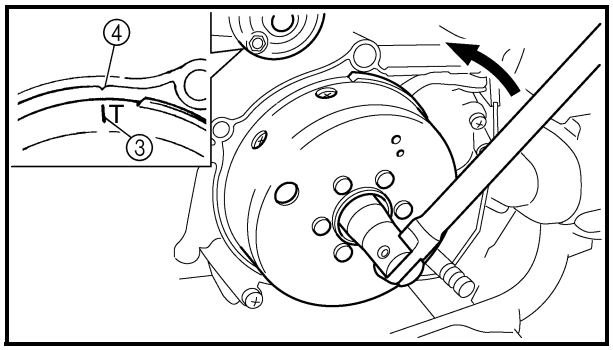

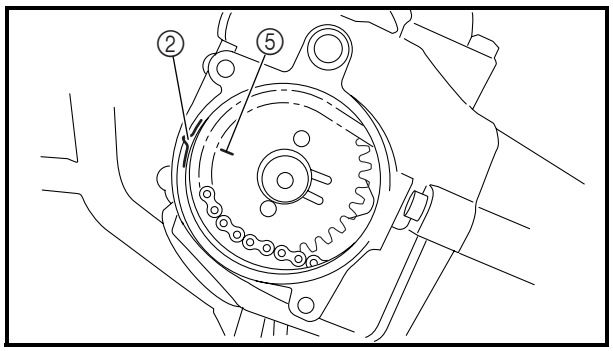

EBS00233

INSTALLING THE CYLINDER HEAD

1. Install:
   - cylinder head ①
   - nuts
   - bolts

NOTE:

Tighten the nuts in two stages and a crisscross pattern.

2. Install:
   - camshaft sprocket

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a. Rotate the camshaft to align the camshaft groove ① opposite to the cylinder head alignment mark ② as shown.
b. Turn the crankshaft counterclockwise with a wrench.
c. Align the "T" mark ③ on the rotor with the stationary pointer ④ on the crankcase. When the "T" mark is aligned with the stationary pointer, the piston is at the Top Dead Center (TDC).

CAUTION:

Do not turn the crankshaft during the camshaft sprocket installation.

d. Place the timing chain onto the camshaft sprocket.
e. Install the camshaft sprocket onto the camshaft and finger tighten the sprocket bolt.

NOTE:

Be sure to align the alignment mark ⑤ on the camshaft sprocket with the alignment mark ② on the cylinder head.

f. Force the camshaft clockwise and counterclockwise to remove timing chain slack.
g. Insert a screwdriver into the timing chain tensioner hole and push the timing chain guide inward.
h. While pushing the timing chain guide, be sure that the camshaft sprocket alignment mark ⑤ is aligned with the cylinder head alignment mark ②.

i. If the marks are aligned, temporarily tighten the camshaft sprocket bolt. If the marks are not aligned, change the meshing position of the camshaft sprocket and timing chain.

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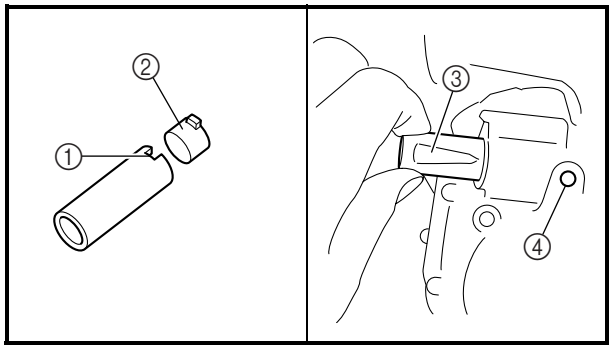


3. Install:
   - timing chain tensioner assembly

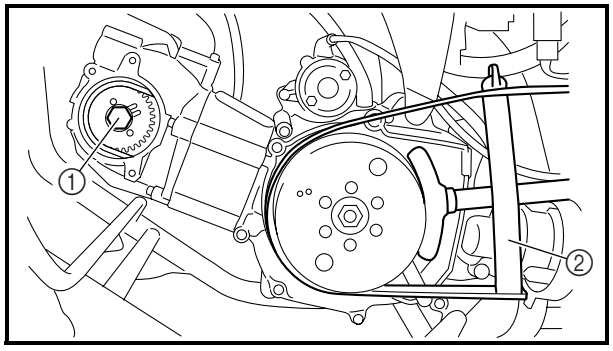
     18 Nm (1.8 m · kg, 13 ft · lb)
   - timing chain tension adjuster

NOTE:
- Align the timing chain tensioner rod groove ① with the timing chain tensioner straight plug projection ②.
- The flat surface ③ of the timing chain tensioner rod should face towards the adjuster threaded hole ④.

⚠ WARNING

Always use a new gasket.

4. Adjust:
   - timing chain tensioner
     Refer to “ADJUSTING THE TIMING CHAIN TENSIONER” in chapter 3.



5. Tighten:
   - camshaft sprocket bolt ①

     20 Nm (2.0 m · kg, 14 ft · lb)

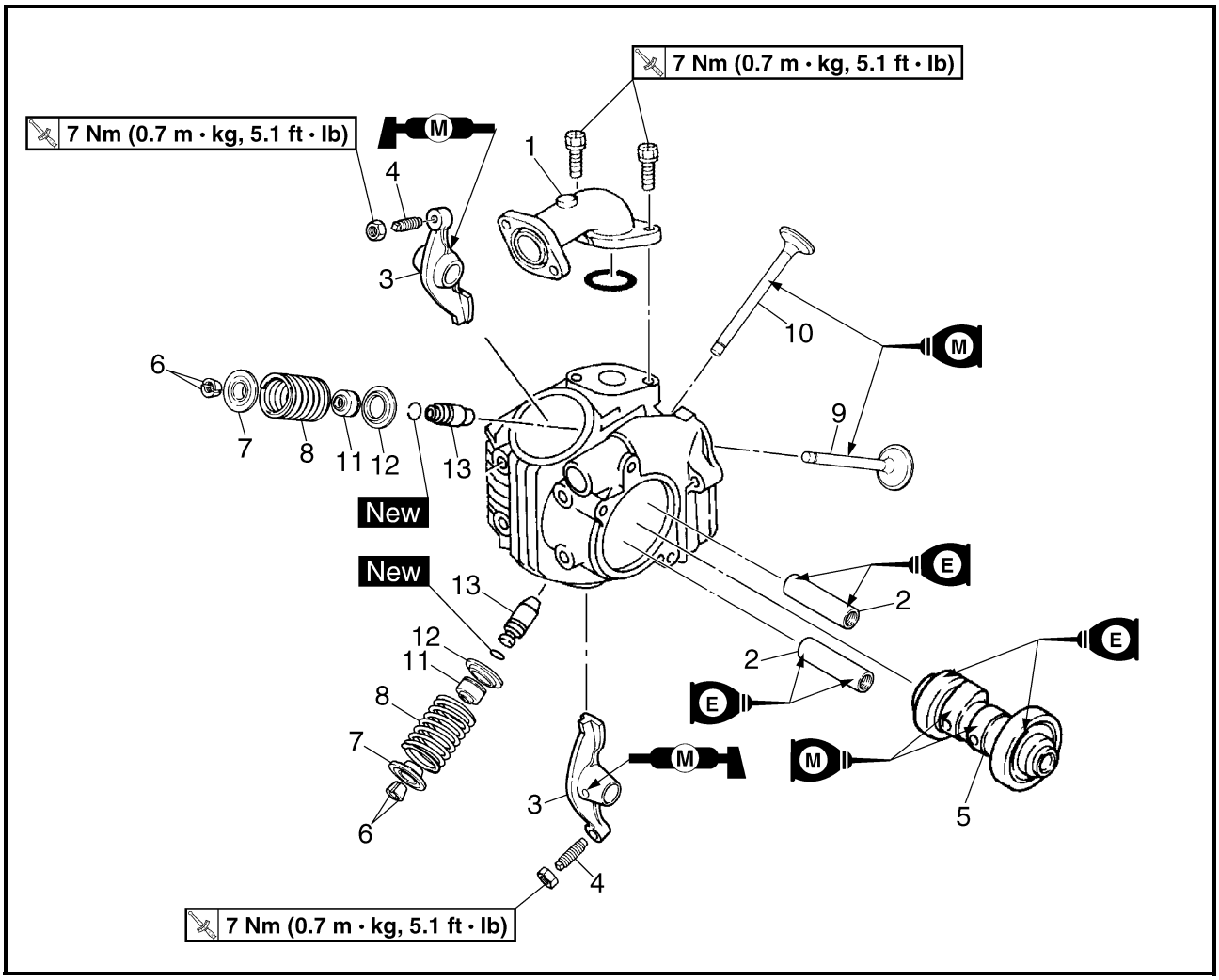
NOTE:
- Use the sheave holder ② to hold the rotor.
- Do not allow the sheave holder to touch the projection on the rotor.

Sheave holder
P/N. YS-01880-A, 90890-01701

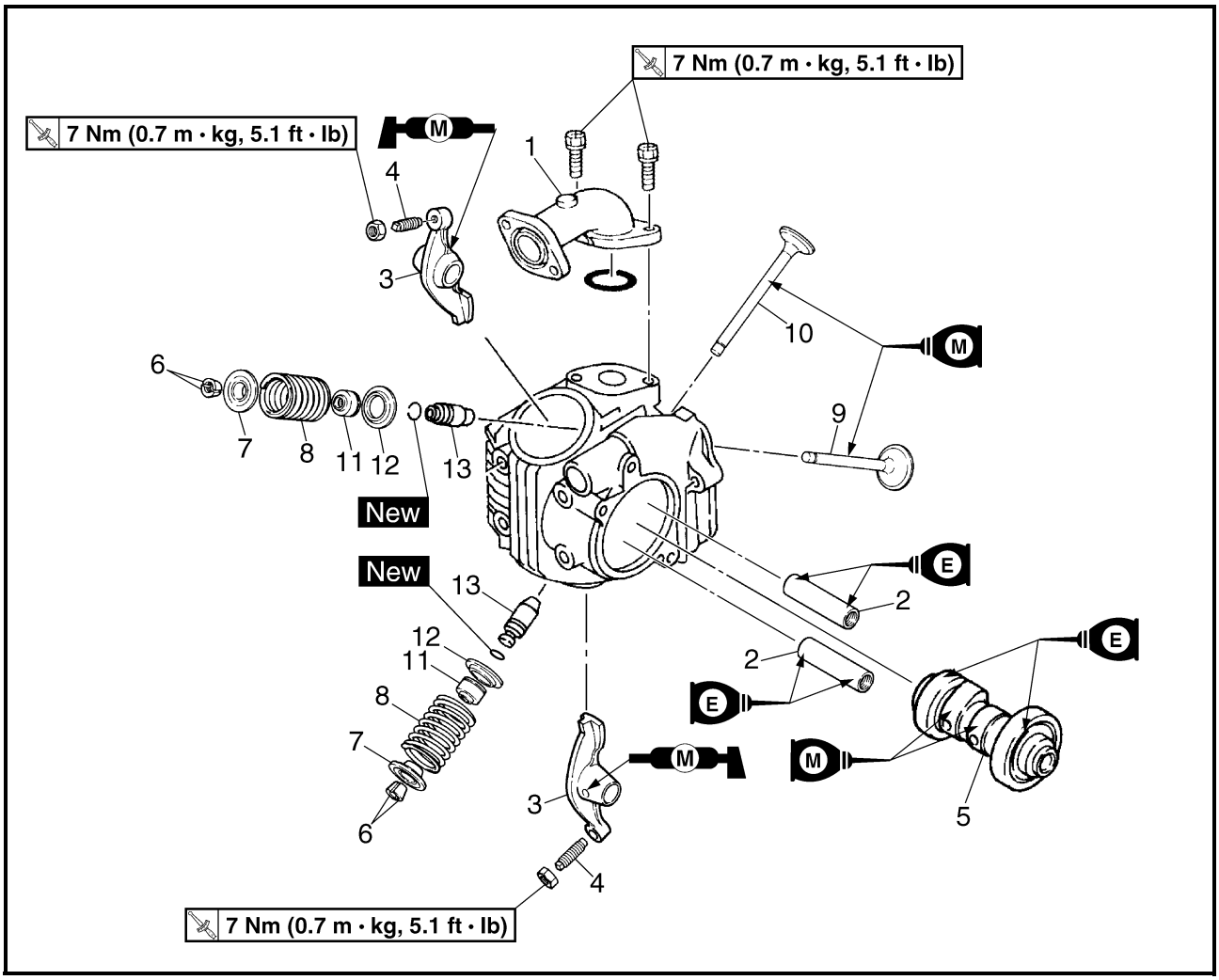
6. Check:
   - camshaft sprocket alignment mark
   - rotor “T” mark
     Out of alignment → Adjust.

EBS00235

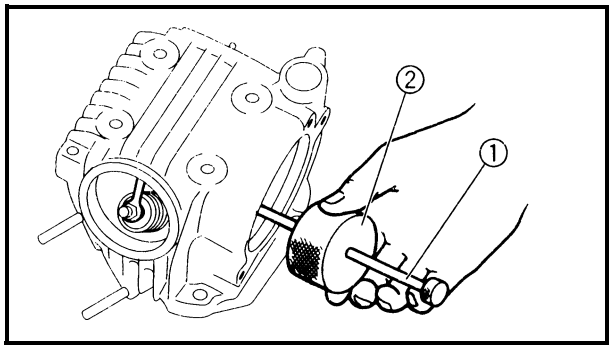
CAMSHAFT, ROCKER ARMS AND VALVES

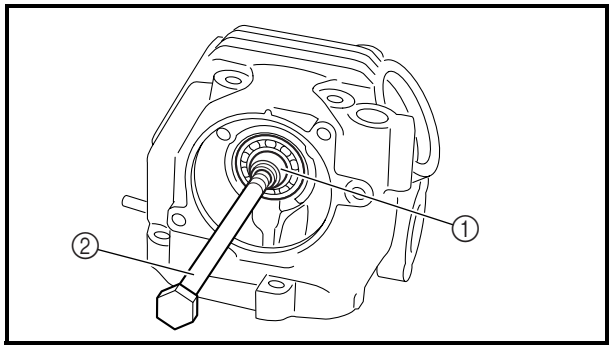


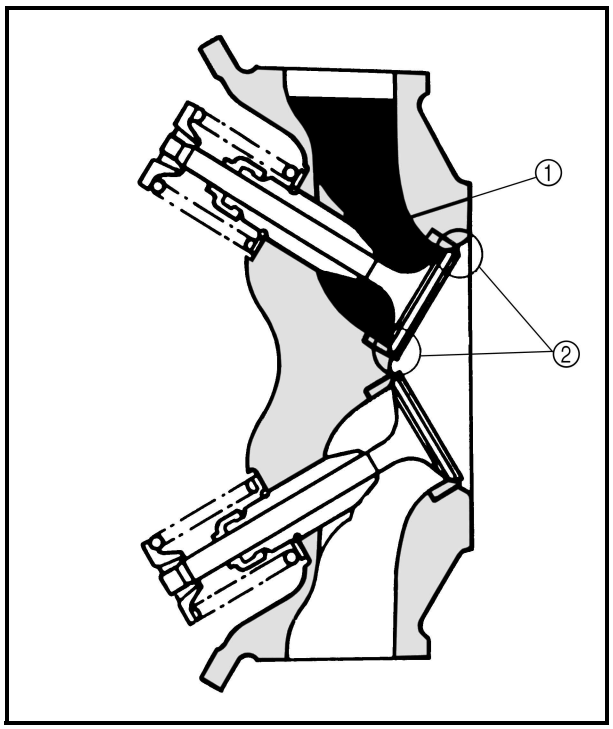
Order	Job/Part	Q'ty	Remarks
	Removing the camshaft, rocker arms and valves		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Intake manifold	1	
2	Rocker arm shaft	2	Refer to "REMOVING THE ROCKER ARMS AND CAMSHAFT" and "INSTALLING THE CAMSHAFT AND ROCKER ARMS".
3	Rocker arm	2	
4	Adjuster	2	
5	Camshaft	1	
6	Valve cotter	4	Refer to "REMOVING THE VALVES AND VALVE SPRINGS" and "INSTALLING THE VALVES AND VALVE SPRINGS".
7	Valve spring retainer	2	
8	Valve spring	2	
9	Intake valve	1	
10	Exhaust valve	1	
11	Valve stem seal	2	
12	Valve spring seat	2	



Order	Job/Part	Q'ty	Remarks
13	Valve guide	2	For installation, reverse the removal procedure.







EBS00237

REMOVING THE ROCKER ARMS AND CAMSHAFT

1. Loosen:
   - locknuts
   - adjusters
2. Remove:
   - intake rocker arm shaft
   - exhaust rocker arm shaft
   - intake rocker arm
   - exhaust rocker arm

NOTE:

Remove the rocker arm shafts with the slide hammer bolt ① and weight ②.

Slide hammer set
P/N. YU-01083-A
Slide hammer bolt (M8)
P/N. 90890-01085
Weight
P/N. 90890-01084

3. Remove:
   - camshaft ①

NOTE:

Screw a M8 bolt ② into the threaded end of the camshaft and then pull out the camshaft.

EBS00238

REMOVING THE VALVES AND VALVE SPRINGS

1. Check:
   - valve sealing

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

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a. Pour a clean solvent ① into the intake and exhaust ports.
b. Check that the valve seals properly.

   There should be no leakage at the valve seat ②.

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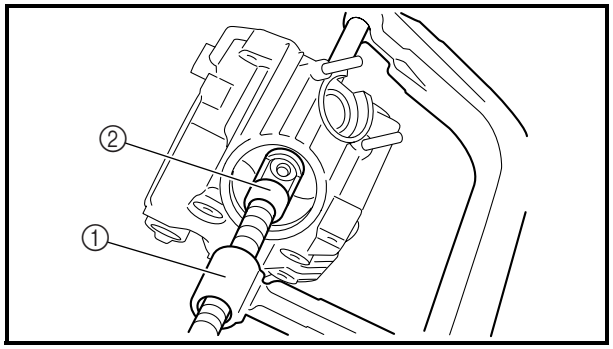
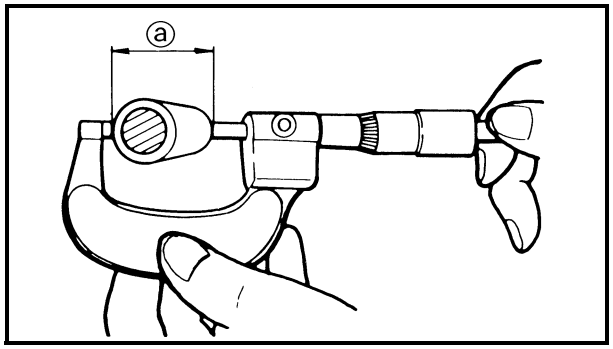
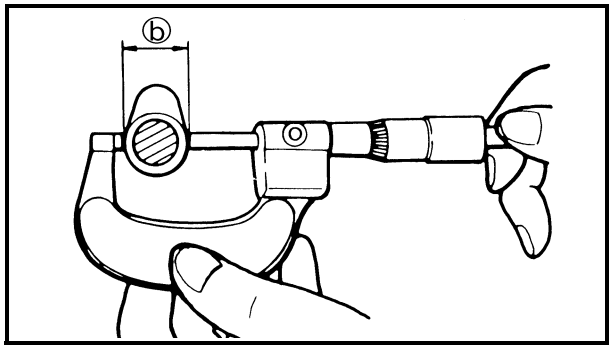


2. Remove:
   • valve cotters

NOTE:
Attach a valve spring compressor ① and attachment ② between the valve spring retainer and the cylinder head to remove the valve cotters.

Valve spring compressor
P/N. YM-04019, 90890-04019
Valve spring compressor attachment
P/N. YM-04108, 90890-04108





EBS00223
CHECKING THE CAMSHAFT

1. Check:
   • cam lobes
   Pitting/scratches/blue discoloration → Replace.
2. Measure:
   • cam lobe dimensions ⓐ and ⓑ
   Out of specification → Replace.

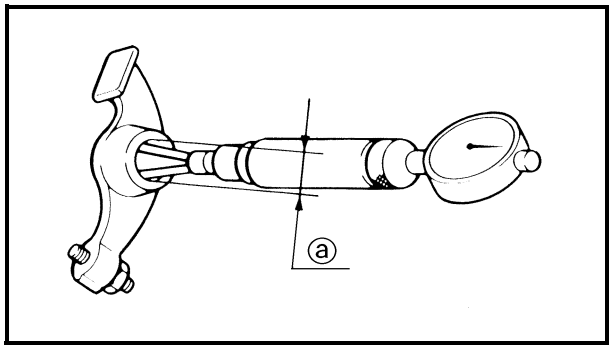
Camshaft lobe limit
Intake
ⓐ 25.200 mm (0.9921 in)
ⓑ 20.894 mm (0.8226 in)
Exhaust
ⓐ 25.201 mm (0.9922 in)
ⓑ 20.921 mm (0.8237 in)

EBS00239
CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

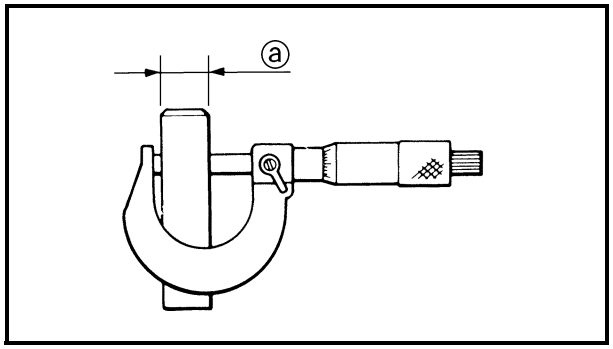
The following procedure applies to all of the rocker arms and rocker arm shafts.

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

2. Check:
   • rocker arm shaft
   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Check:
   • camshaft lobe
   Excessive wear → Replace the camshaft.
4. Measure:
   • rocker arm inside diameter ⓐ
   Out of specification → Replace.



Rocker arm inside diameter
10.000 ~ 10.015 mm
(0.3937 ~ 0.3943 in)



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

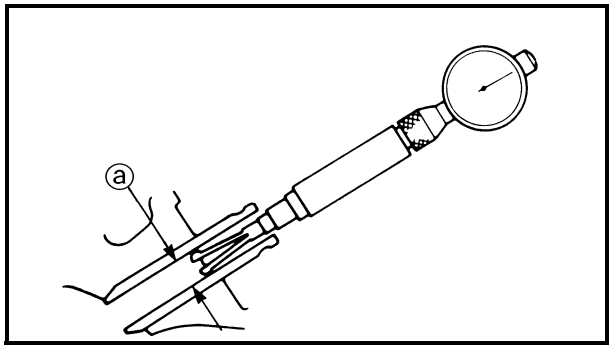
Rocker arm shaft outside diameter
9.981 ~ 9.991 mm
(0.3930 ~ 0.3933 in)

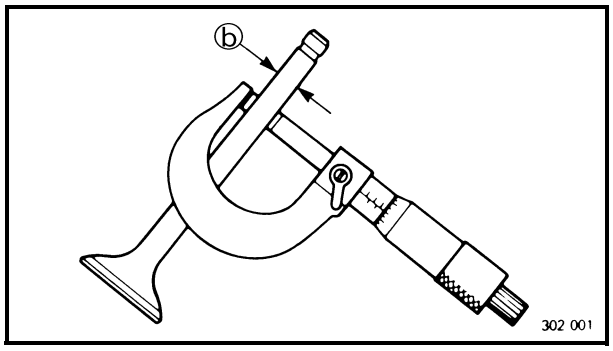
6. Calculate:
   • rocker-arm-to-rocker-arm-shaft clearance

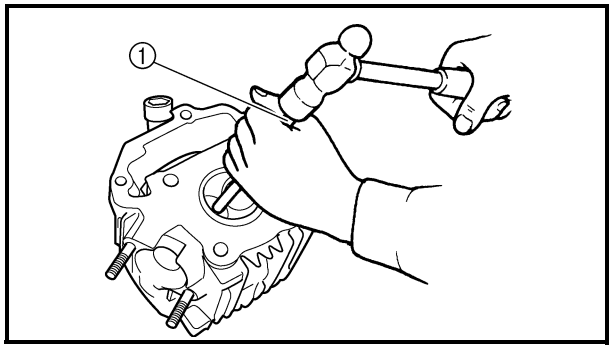
NOTE:
Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

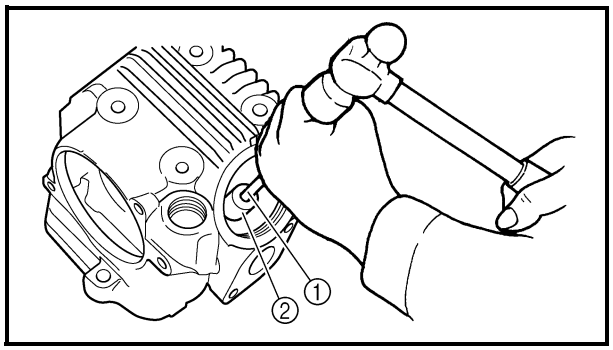
Above 0.08 mm (0.0031 in) → Replace the defective part(s).

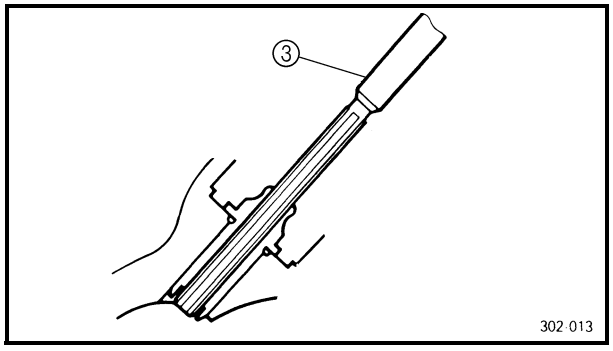
Rocker-arm-to-rocker-arm-shaft clearance
0.009 ~ 0.034 mm
(0.0004 ~ 0.0013 in)
<Limit>: 0.08 mm (0.0031 in)











EBS00240

CHECKING THE VALVES AND VALVE SPRINGS

1. Measure:
   - stem-to-guide clearance

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

Out of specification → Replace the valve guide.

Stem-to-guide clearance
Intake
0.010 ~ 0.037 mm
(0.0004 ~ 0.0015 in)
<Limit>: 0.08 mm (0.0031 in)
Exhaust
0.025 ~ 0.052 mm
(0.0010 ~ 0.0020 in)
<Limit>: 0.10 mm (0.0039 in)

2. Replace:
   - valve guide

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NOTE:

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

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

Valve guide remover (5 mm)
P/N. YM-04097, 90890-04097
Valve guide installer (5 mm)
P/N. YM-04098, 90890-04098
Valve guide reamer (5 mm)
P/N. 90890-04099

NOTE:

After replacing the valve guide reface the valve seat.

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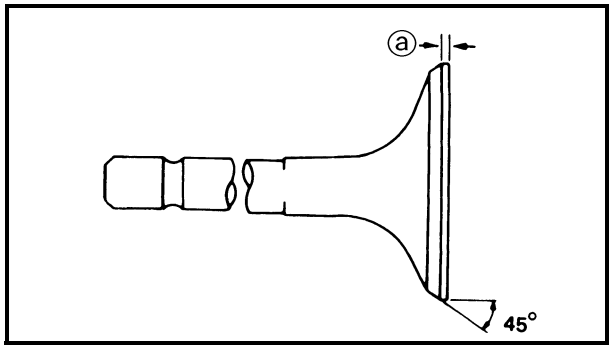
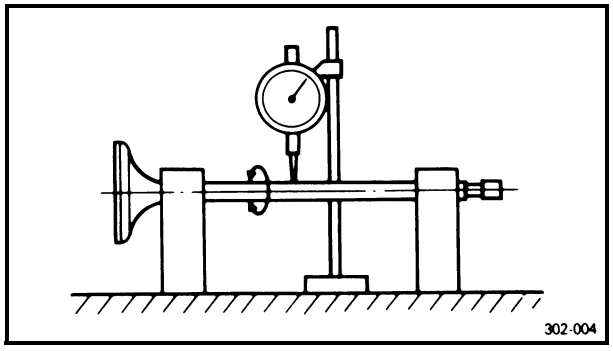




3. Check:
   - valve face
     Pitting/wear → Grind the face.
   - valve stem end
     Mushroom shape or diameter larger than the body of the stem → Replace.
4. Measure:
   - margin thickness ⓐ
     Out of specification → Replace.

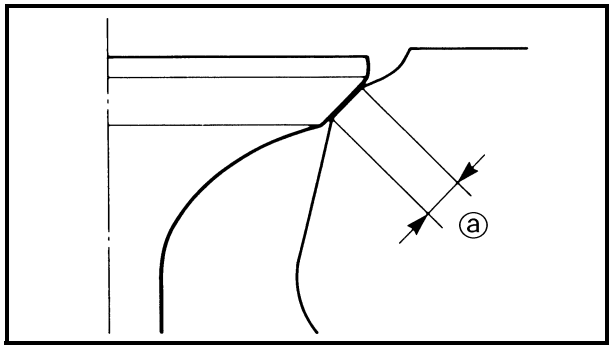
Margin thickness
Intake
0.5 ~ 0.9 mm
(0.0197 ~ 0.0354 in)
<Limit>: 1.6 mm (0.0630 in)
Exhaust
0.6 ~ 1.0 mm
(0.0236 ~ 0.0394 in)
<Limit>: 1.6 mm (0.0630 in)

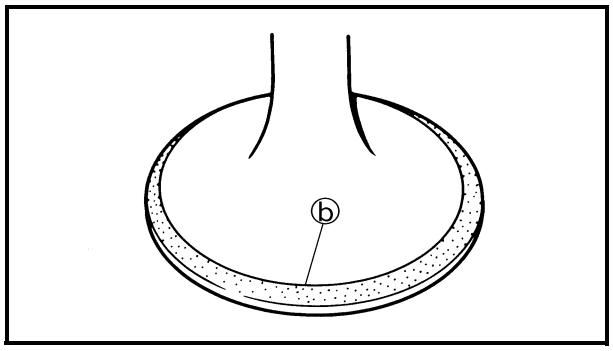
5. Measure:
   - runout (valve stem)
     Out of specification → Replace.

Runout limit
0.02 mm (0.0008 in)

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

6. Eliminate:
   - carbon deposits
     (from the valve face and valve seat)
7. Check:
   - valve seats
     Pitting/wear → Reface the valve seat.





8. Measure:
   - valve seat width ⓐ
     Out of specification → Reface the valve seat.

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

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a. Apply Mechanic's blueing dye (Dykem) ⓑ to the valve face.
b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
d. Measure the valve seat width. Where the valve seat and valve face made contact, blueing will have been removed.
e. If the valve seat is too wide, too narrow, or the seat is not centered, the valve seat must be refaced.

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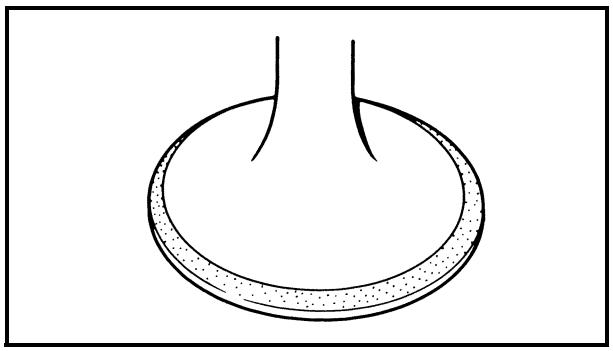

9. Lap:
   - valve face
   - valve seat

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

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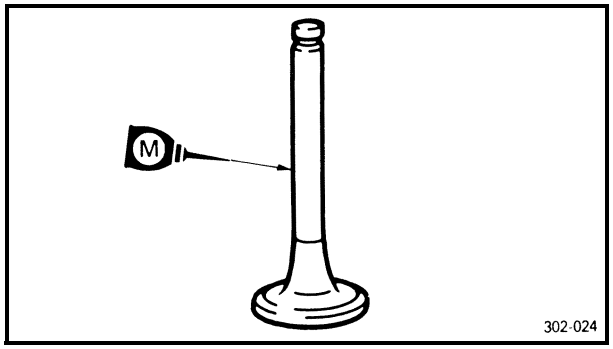
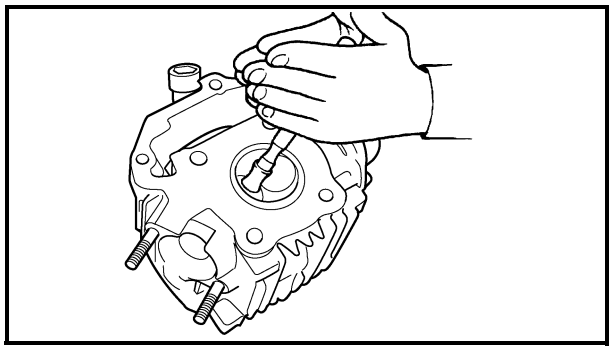
a. Apply a coarse lapping compound to the valve face.

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





b. Apply molybdenum disulfide oil to 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 compound.

NOTE:
For 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.

NOTE:
After every lapping operation be sure to clean off all of the compound from the valve face and valve seat.

f. Apply Mechanic's blueing dye (Dykem) to the valve face.
g. Install the valve into the cylinder head.
h. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
i. Measure the valve seat width again. If the valve seat width is out of specification, reface and relap the valve seat.

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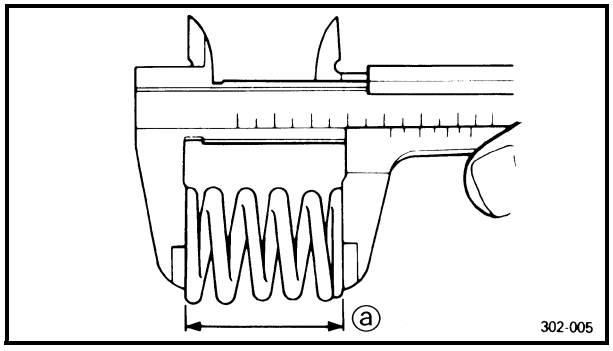
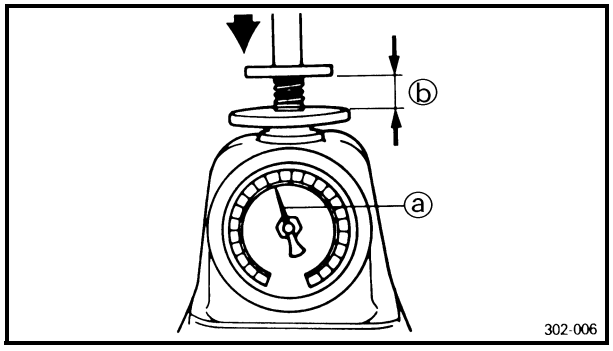


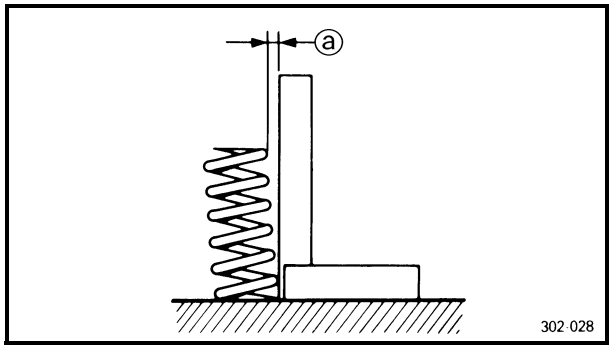
10.Measure:
• valve spring free length ⓐ
Out of specification → Replace.

Valve spring free length
32 mm (1.26 in)
<Limit>: 30.4 mm (1.20 in)



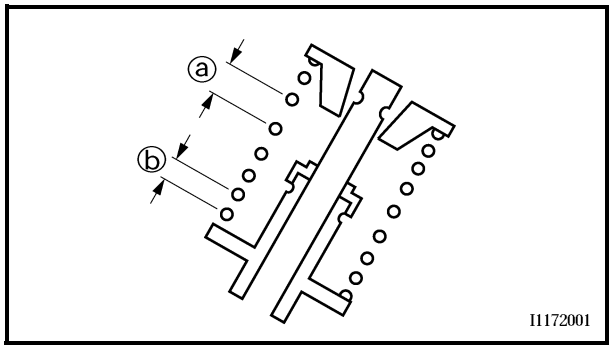
11.Measure:
• compressed spring force ⓐ
Out of specification → Replace.
ⓑ Installed length

Compressed spring force
136 ~ 158 N at 24.6 mm
(13.87 ~ 16.11 kg,
30.57 ~ 35.52 lb at 0.97 in)



12.Measure:
- spring tilt ⓐ
  Out of specification → Replace.

Spring tilt limit
Inner
2.5°/1.4 mm (2.5°/0.06 in)

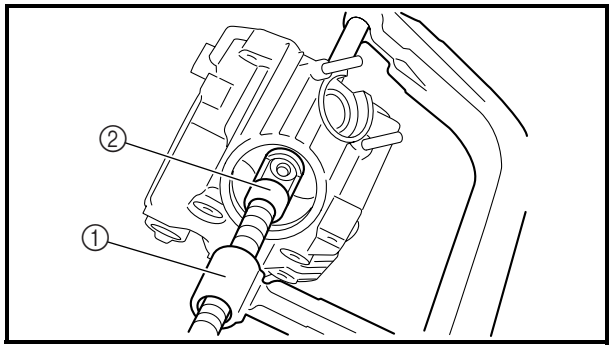


EBS00241
INSTALLING THE VALVES AND VALVE SPRINGS

1. Apply:
   - molybdenum disulfide oil
     (onto the valve stem and valve stem seal)
2. Install:
   - valve spring seats
   - valve stem seals New
   - valves
   - valve springs
   - valve spring retainers

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

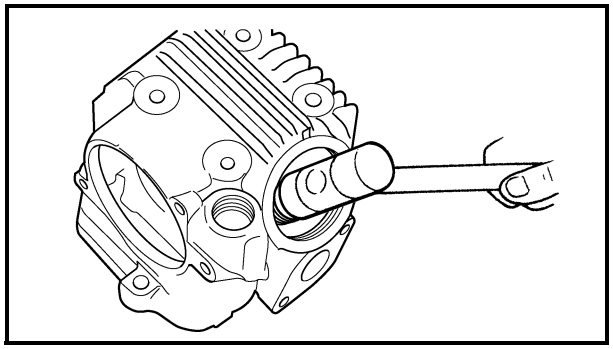
ⓑ Smaller pitch



3. Install:
   - valve cotters

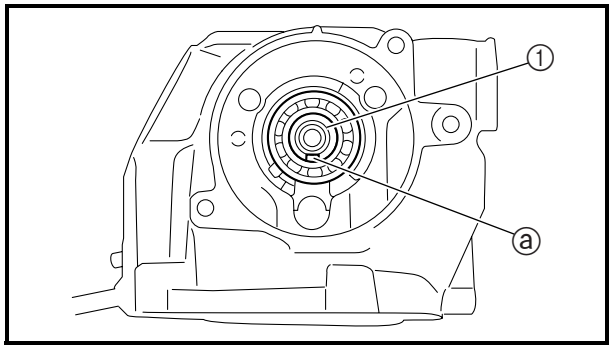
NOTE:
Install the valve cotters while compressing the valve spring with the valve spring compressor ① and attachment ②.

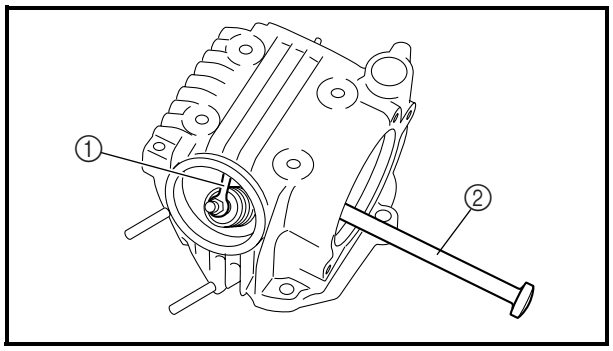
Valve spring compressor
P/N. YM-04019, 90890-04019
Valve spring compressor attachment
P/N. YM-04108, 90890-04108



4. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a piece of wood.

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





EBS00243

INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Install:
   - camshaft ①

NOTE:

Install the camshaft groove ⓐ facing down.

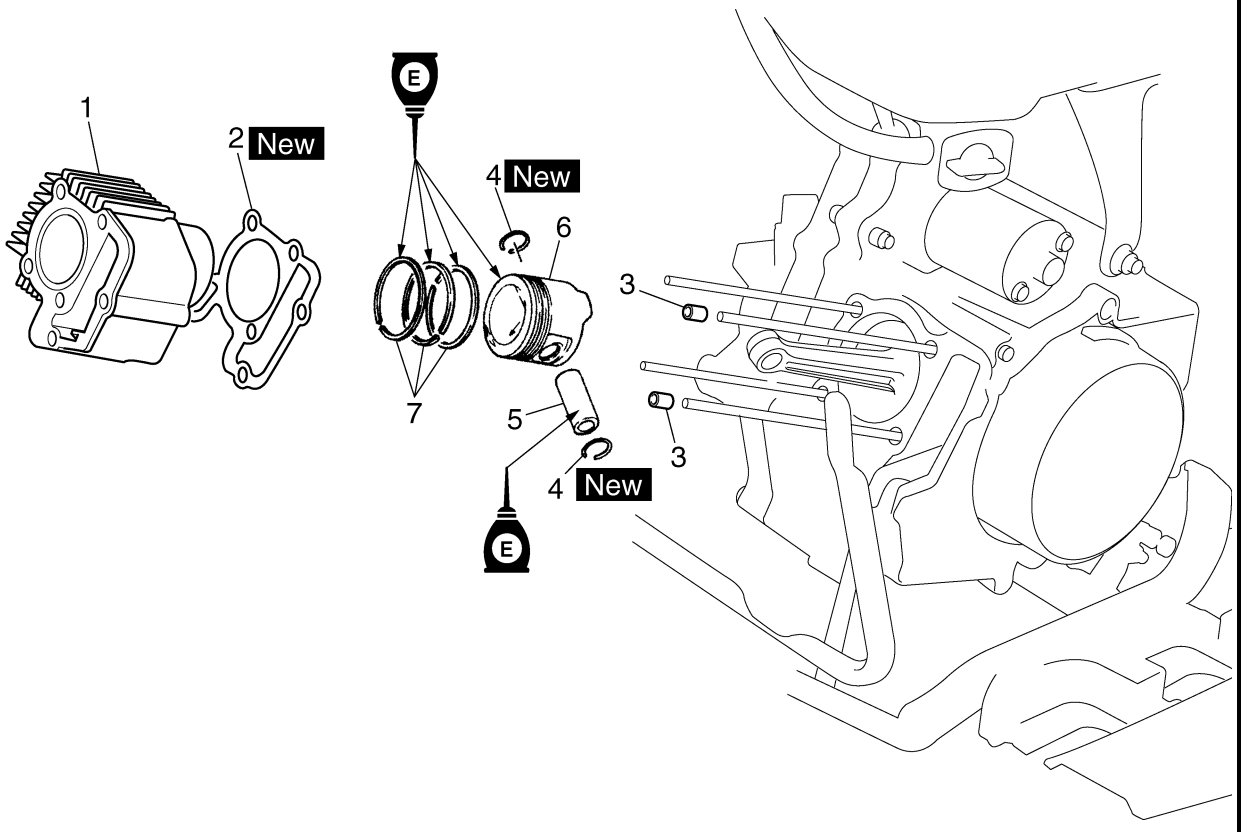
2. Apply:
   - engine oil
     (onto the rocker arm shafts)
3. Install:
   - rocker arms ①
   - rocker arm shafts

NOTE:

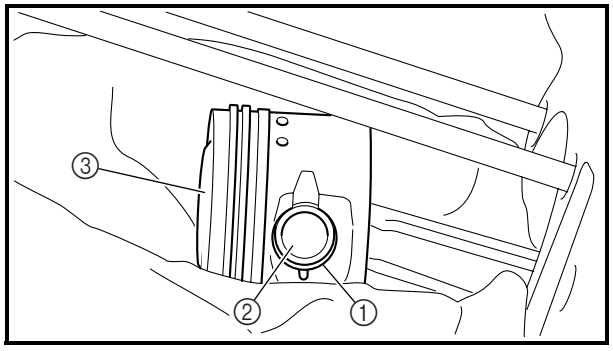
Use a slide hammer bolt ② to install the rocker arm shaft.

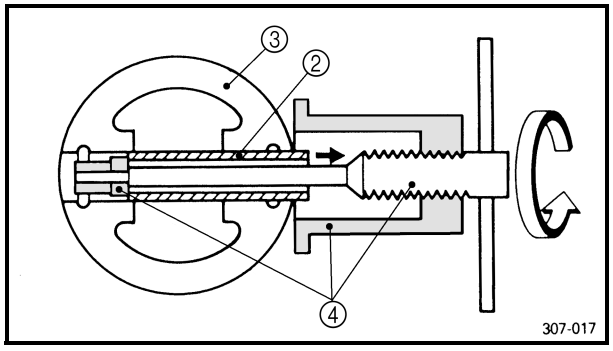
EBS00245

CYLINDER AND PISTON



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





EBS00247
REMOVING THE PISTON

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

NOTE:

Before removing each piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller ④.

Piston pin puller set
P/N. YU-01304, 90890-01304

CAUTION:

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

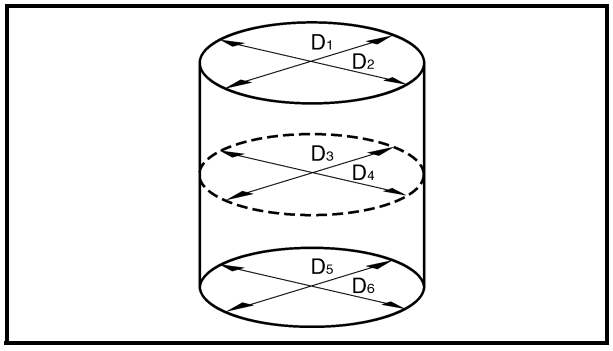
2. Remove:
   - piston rings

NOTE:

Spread the end gaps apart while at the same time lifting the piston ring over the top of the piston crown.

EBS00249
CHECKING THE CYLINDER AND PISTON

1. Check:
   - piston wall
   - cylinder wall
     Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - piston-to-cylinder clearance



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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"	**39.000 ~ 39.005 mm (1.5354 ~ 1.5356 in)**
Taper limit "T"	**0.05 mm (0.002 in)**
Out-of-round "R"	**0.01 mm (0.0004 in)**

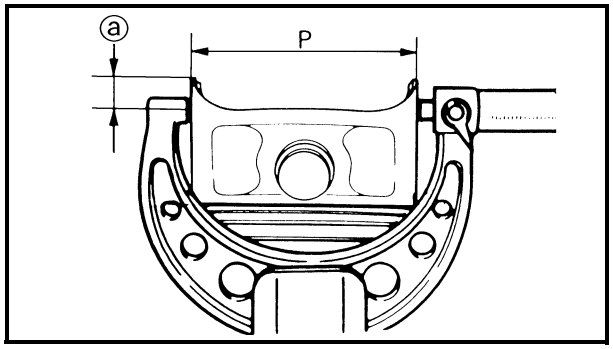
"C" = maximum of D_1 ~ D_2

"T" = maximum of D_1 or D_2 – maximum of D_5 or D_6

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

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

ⓐ 5 mm (0.20 in) from the bottom edge of the piston



	Piston size "P"
Standard	**38.960 ~ 38.975 mm (1.5339 ~ 1.5344 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
0.025 ~ 0.045 mm
(0.0010 ~ 0.0018 in)
<Limit>: 0.15 mm (0.0059 in)

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

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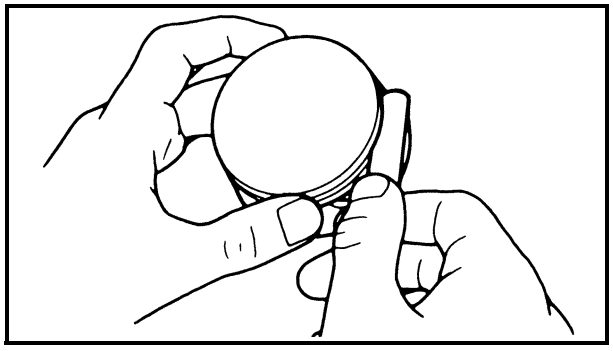
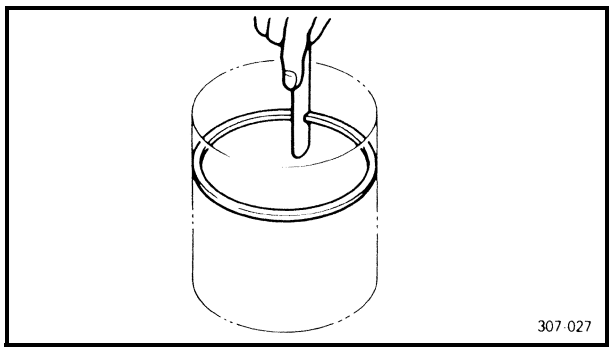


EBS00250
CHECKING THE PISTON RINGS

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>: 0.12 mm (0.0047 in)
2nd ring
0.020 ~ 0.055 mm
(0.0008 ~ 0.0022 in)
<Limit>: 0.12 mm (0.0047 in)



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

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

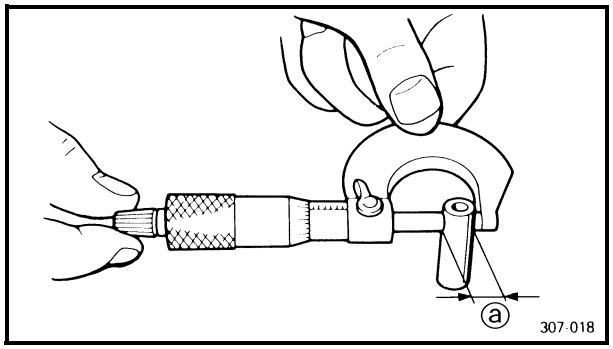
3. Measure:
   - piston ring end gap
     Out of specification → Replace the piston ring.

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

Piston ring end gap
Top ring
0.08 ~ 0.20 mm
(0.0031 ~ 0.0079 in)
<Limit>: 0.45 mm (0.0177 in)
2nd ring
0.05 ~ 0.20 mm
(0.0020 ~ 0.0079 in)
<Limit>: 0.55 mm (0.0217 in)
Oil ring
0.20 ~ 0.70 mm
(0.0079 ~ 0.0276 in)

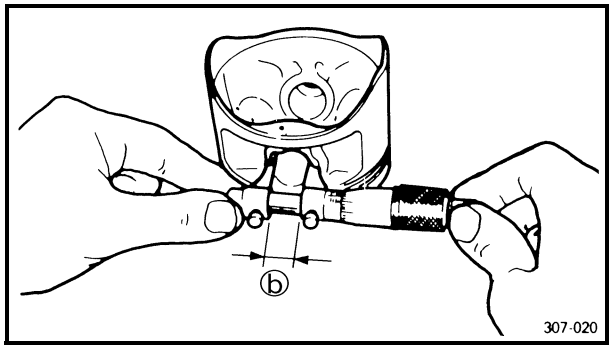
EBS00251
CHECKING THE PISTON PIN

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
12.996 ~ 13.000 mm
(0.5117 ~ 0.5118 in)
<Limit>: 12.976 mm (0.5109 in)



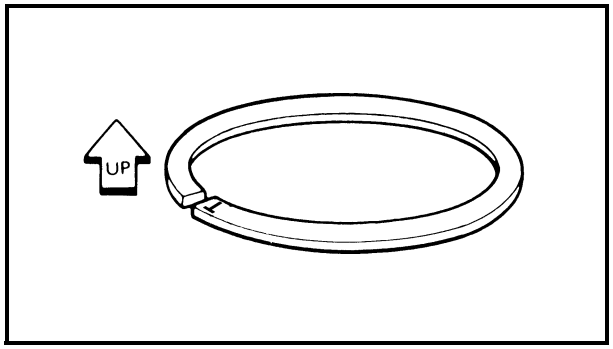
3. Measure:
   - piston pin bore diameter ⓑ
     Out of specification → Replace the piston.

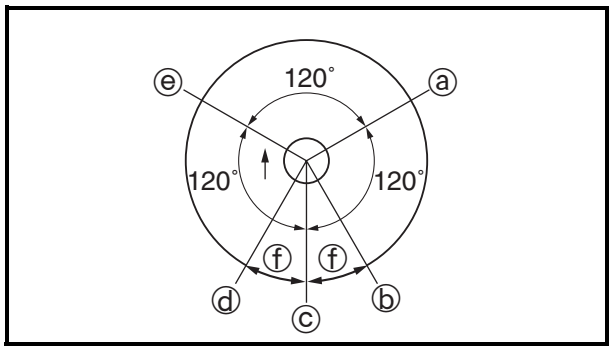
Piston pin bore diameter
13.002 ~ 13.013 mm
(0.5119 ~ 0.5123 in)
<Limit>: 13.043 mm (0.5135 in)

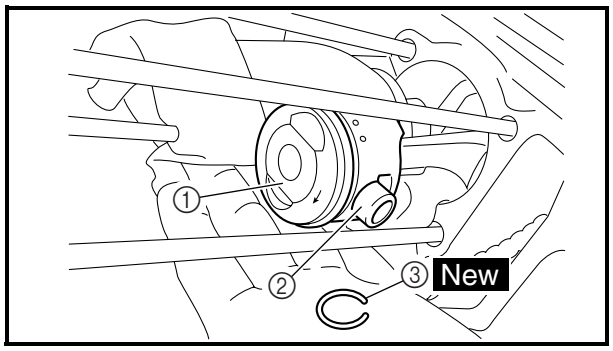
4. Calculate:
   - piston-pin-to-piston-pin-bore clearance
     Out of specification → Replace the piston pin and piston as a set.

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

Piston-pin-to-piston clearance
0.002 ~ 0.017 mm
(0.00008 ~ 0.00067 in)
<Limit>: 0.067 mm (0.00264 in)







EBS00252

INSTALLING THE PISTON

1. Install:
   - piston rings
     (onto the piston)

NOTE:

- Be sure to install the piston rings so that the manufacturer's marks or numbers are located on the upper side of the rings.
- Lubricate the piston and piston rings liberally with engine oil.

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

   Offset the piston ring end gaps as shown.

ⓐ Top ring end
ⓑ Upper oil ring rail end
ⓒ Expander end
ⓓ Lower oil ring rail end
ⓔ 2nd ring end
ⓕ 20 mm (0.79 in)

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

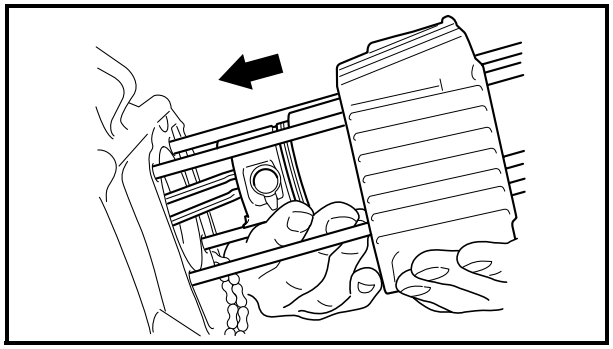
NOTE:

- Apply engine oil onto the piston pin, piston rings and piston.
- Be sure that the arrow mark ⓐ on the piston points to the exhaust side of the engine.
- Before installing the piston pin clips, cover the crankcase with a clean rag to prevent the piston pin clips from falling into the crankcase.

4. Lubricate:
   - piston
   - piston rings
   - cylinder

NOTE:

Apply a liberal coating of engine oil.



EBS00253

INSTALLING THE CYLINDER

1. Install:
   - cylinder

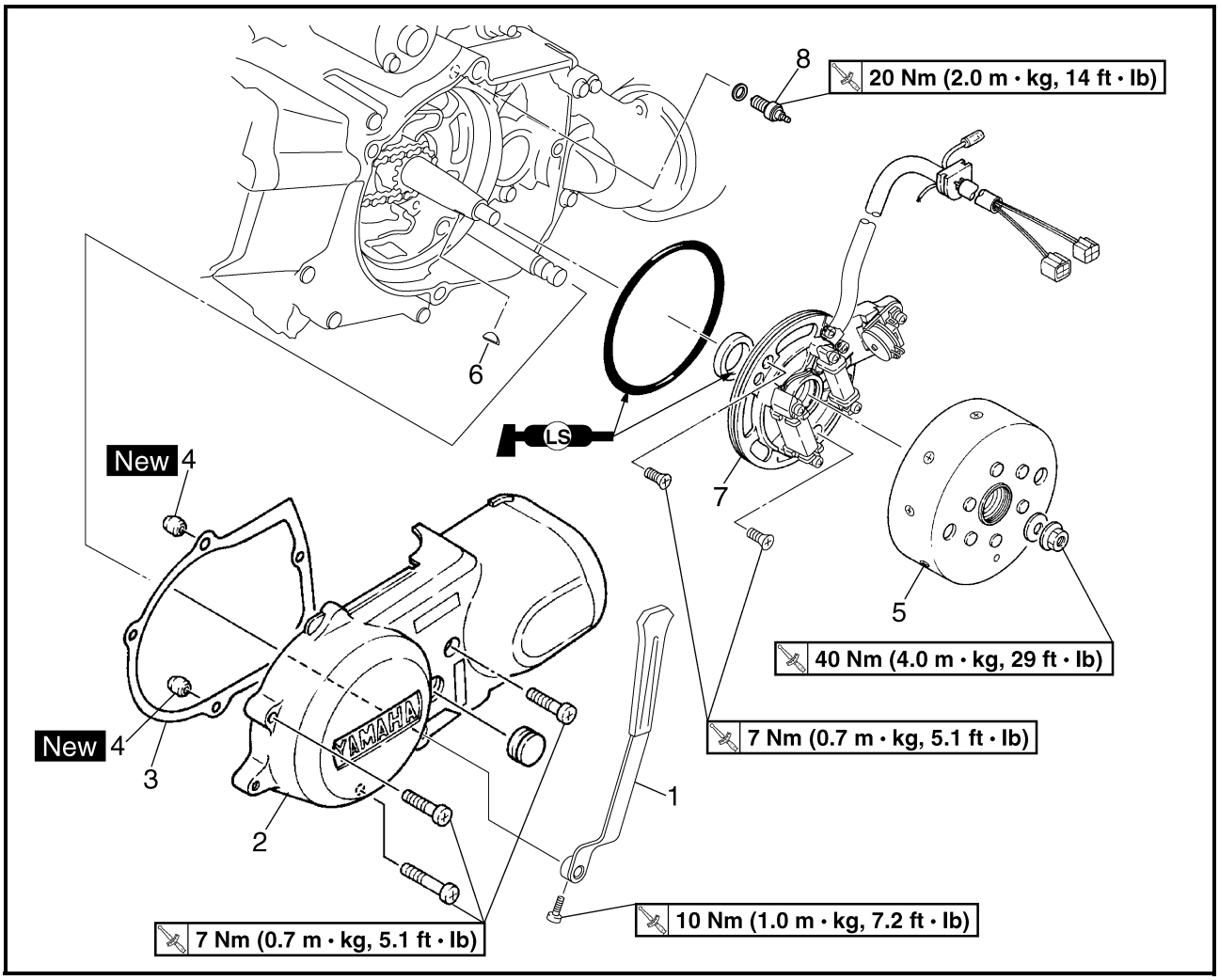
NOTE:

Install the cylinder with one hand while compressing the piston rings with the other hand.

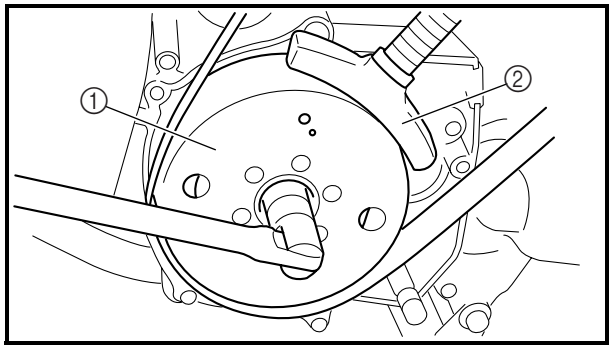
CAUTION:

- **Be careful not to damage the timing chain damper during installation.**
- **Pass the timing chain through the timing chain cavity.**

EBS00256
C.D.I. MAGNETO



Order	Job/Part	Q'ty	Remarks
	Removing the C.D.I. magneto		Remove the parts in the order listed.
	Rear fender		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
1	Shift lever	1	Refer to "INSTALLING THE SHIFT LEVER".
2	C.D.I. magneto cover	1	
3	C.D.I. magneto cover gasket	1	
4	Dowel pin	2	
5	C.D.I. magneto rotor	1	Refer to "REMOVING THE C.D.I. MAGNETO ROTOR" and "INSTALLING THE C.D.I. MAGNETO ROTOR".
6	Woodruff key	1	
7	Pickup coil/stator assembly	1	
8	Neutral switch	1	
			For installation, reverse the removal procedure.



EBS00259

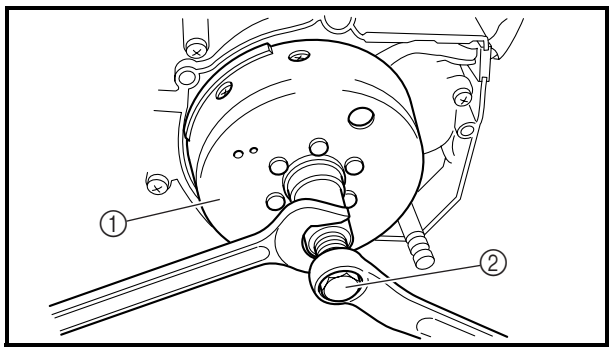
REMOVING THE C.D.I. MAGNETO ROTOR

1. Remove:
   - C.D.I. magneto rotor nut
   - washer

NOTE:

- While holding the C.D.I. magneto rotor ① with the sheave holder ②, loosen the rotor nut.
- Do not allow the sheave holder to touch the projection on the rotor.

	Sheave holder **P/N. YS-01880-A, 90890-01701**

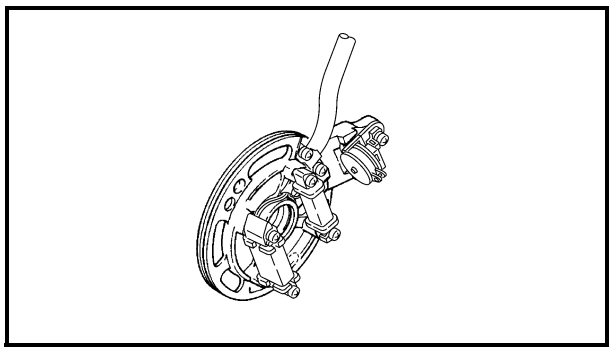


2. Remove:
   - C.D.I. magneto rotor ①
   - woodruff key

NOTE:

Use the flywheel puller ②.

	Flywheel puller **P/N. YM-01189, 90890-01189**



EBS00262

CHECKING THE PICKUP COIL/STATOR ASSEMBLY

1. Check:
   - pickup coil/stator assembly
     Damage → Replace.

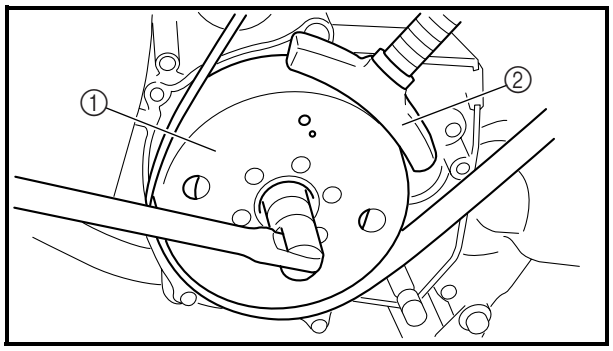
EBS00268

INSTALLING THE C.D.I. MAGNETO ROTOR

1. Install:
   - woodruff key
   - C.D.I. magneto rotor

NOTE:

- Before installing the rotor, clean the outside of the crankshaft and the inside of the rotor.
- After installing the rotor, check that the rotor rotates smoothly. If not, reinstall the key and rotor.



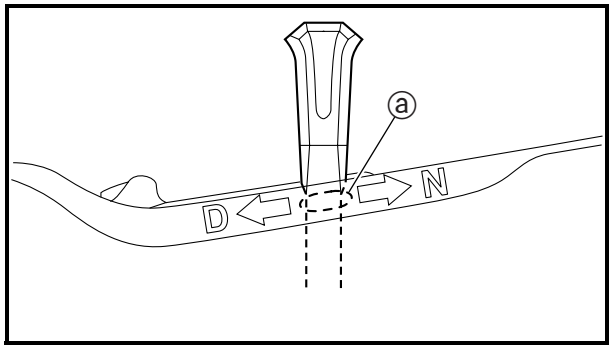
2. Tighten:
   - C.D.I. magneto rotor nut

40 Nm (4.0 m · kg, 29 ft · lb)

NOTE:

- While holding the C.D.I. magneto rotor ① with the sheave holder ②, tighten the C.D.I. magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the rotor.

Sheave holder
P/N. YS-01880-A, 90890-01701



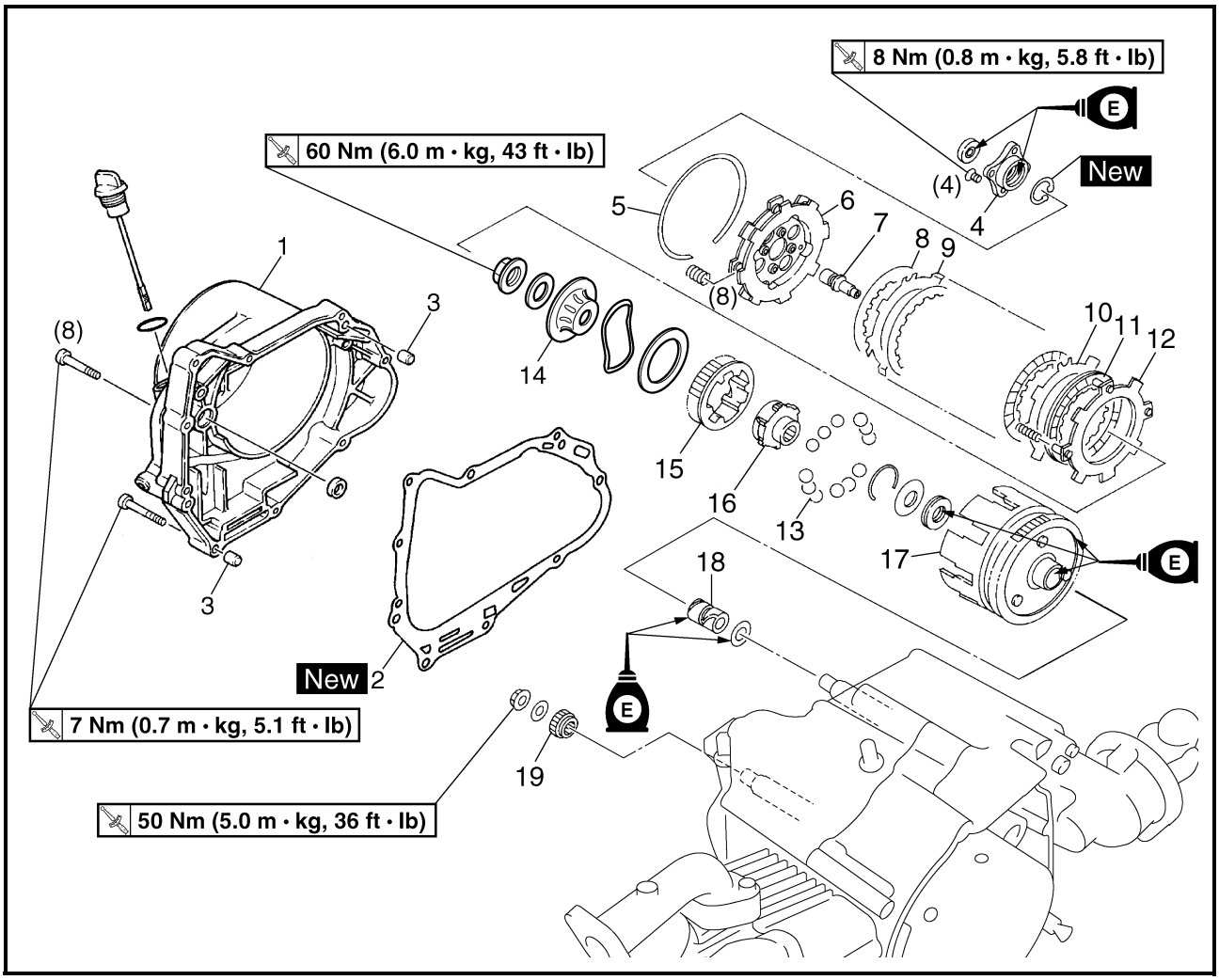
INSTALLING THE SHIFT LEVER

1. Install:
   - shift lever

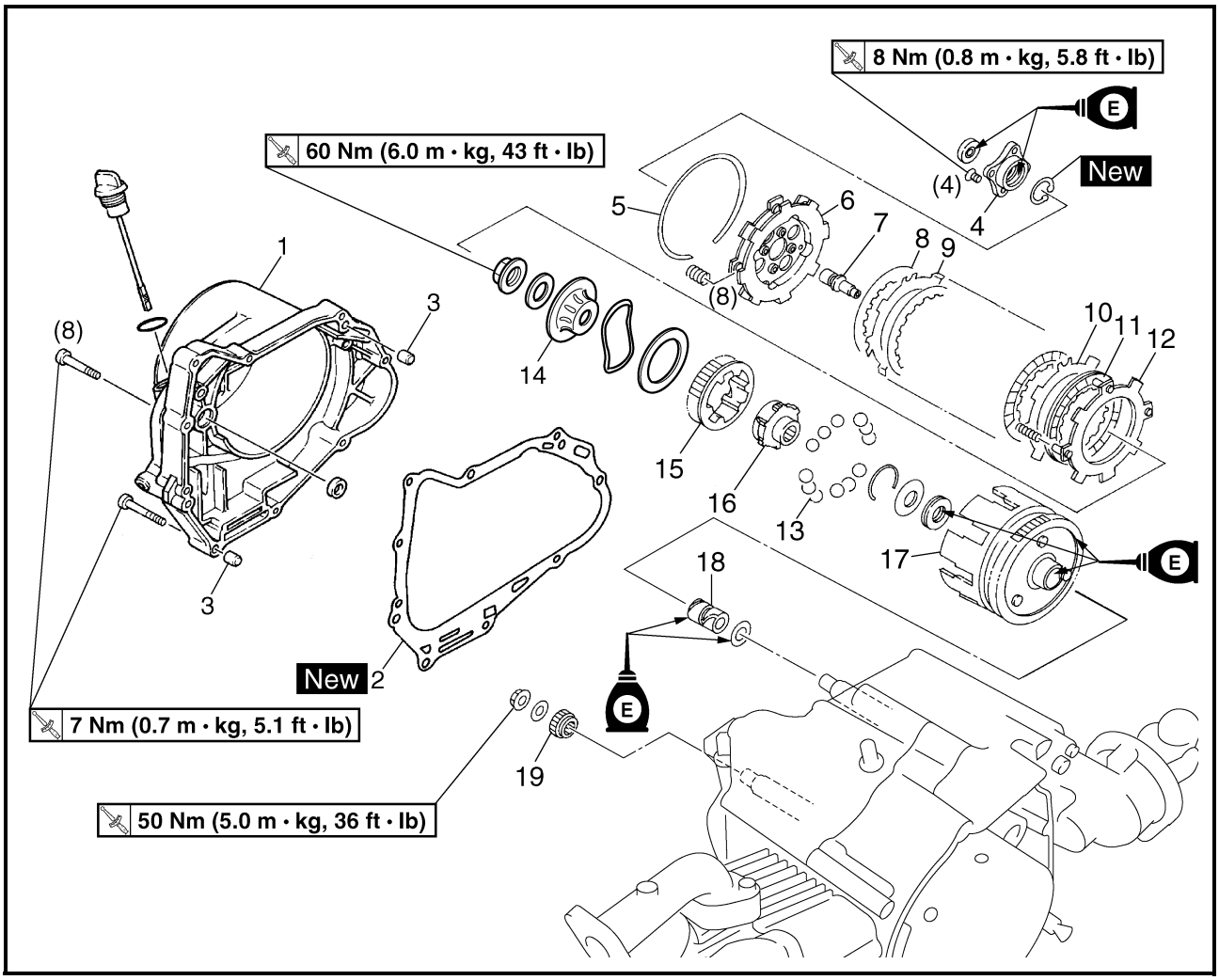
NOTE:

Temporarily install the left footrest board, and then install the shift lever and align it with the mark ⓐ on the left footrest board.

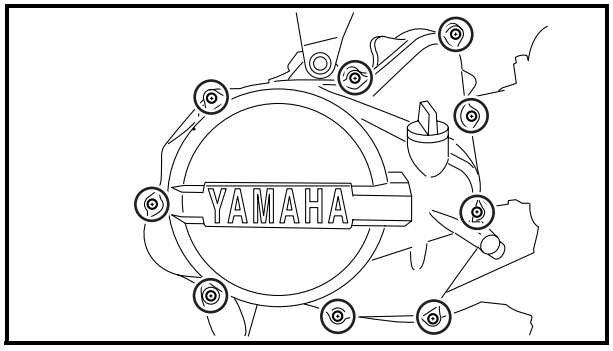
EBS00291
CLUTCH



Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	C.D.I. magneto cover		Refer to "C.D.I. MAGNETO".
1	Clutch cover	1	Refer to "REMOVING THE CLUTCH" and "INSTALLING THE CLUTCH".
2	Clutch cover gasket	1	
3	Dowel pin	2	
4	Push plate	1	
5	Circlip	1	
6	Pressure plate	1	
7	Push rod	1	
8	Friction plate 1 (with black color marking)	4	Refer to "INSTALLING THE CLUTCH".



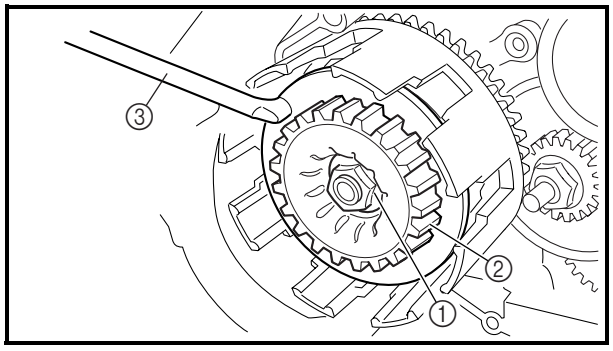
Order	Job/Part	Q'ty	Remarks
9	Clutch plate 1	1	
10	Clutch plate 2	3	
11	Friction plate 2	1	
12	Thrust weight plate	1	
13	Clutch ball	12	Refer to "INSTALLING THE CLUTCH".
14	Thrust plate	1	
15	Clutch boss	1	
16	Clutch boss one-way cam	1	
17	Primary driven gear/clutch housing	1	
18	Spacer	1	
19	Primary drive gear	1	Refer to "REMOVING THE PRIMARY DRIVE GEAR" and "INSTALLING THE PRIMARY DRIVE GEAR". For installation, reverse the removal procedure.



EBS00297
REMOVING THE CLUTCH

1. Remove:
   - clutch cover

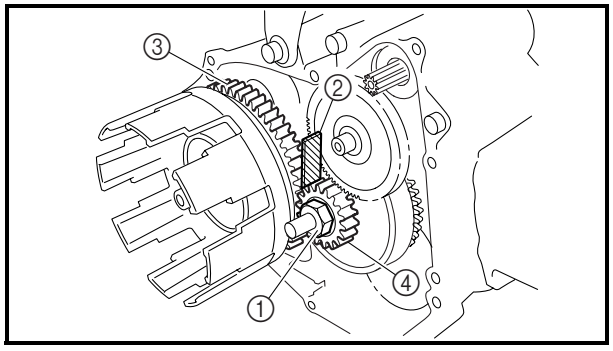
NOTE:
Loosen each screw 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the screws are fully loosened, remove them.



2. Loosen:
   - clutch boss nut ①

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

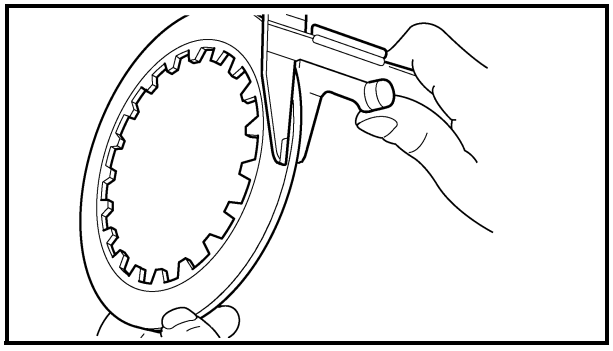
Clutch holder
P/N. 90890-04100



EBS00298
REMOVING THE PRIMARY DRIVE GEAR

1. Loosen:
   - primary drive gear nut ①

NOTE:
Place an aluminum plate ② between the teeth of the primary driven gear/clutch housing ③ and primary drive gear ④.



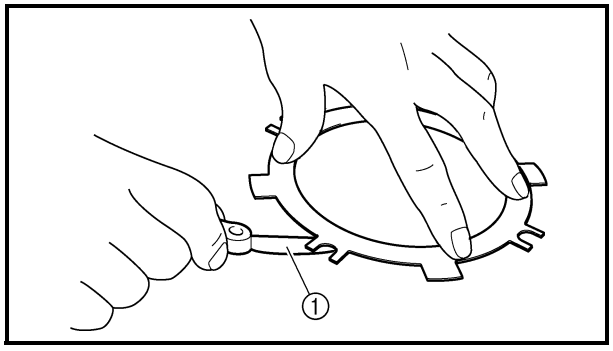
EBS00300
CHECKING THE FRICTION PLATES

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
2.92 ~ 3.08 mm (0.115 ~ 0.121 in)
<Limit>: 2.90 mm (0.114 in)

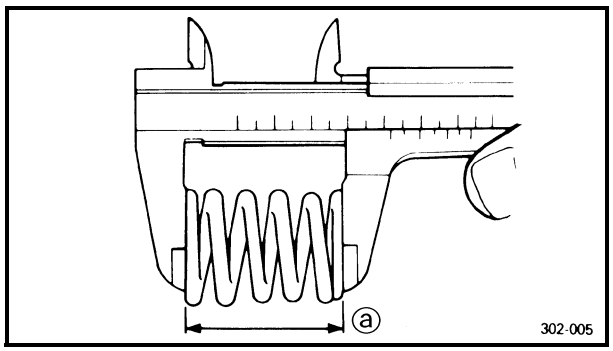


EBS00301
CHECKING THE CLUTCH PLATES

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
0.06 mm (0.002 in)

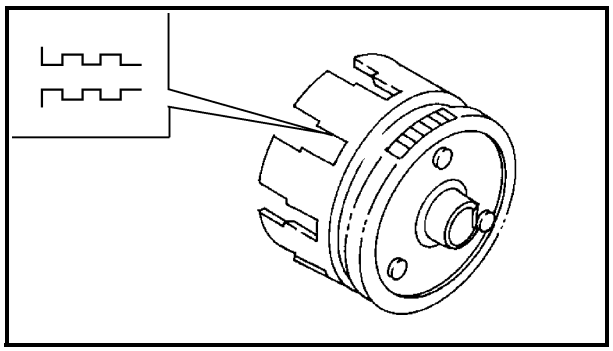


EBS00302
CHECKING THE CLUTCH SPRINGS

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.

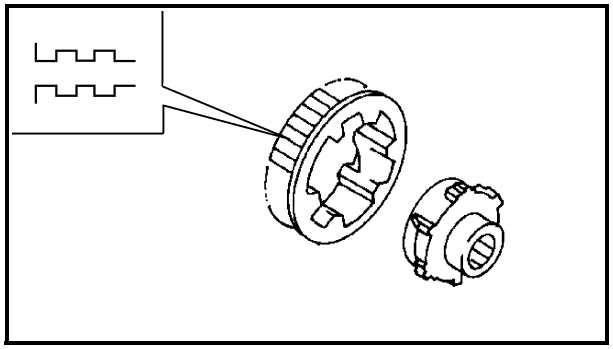
Clutch spring free length
31.9 mm (1.26 in)
<Limit>: 30.3 mm (1.19 in)



EBS00303
CHECKING THE CLUTCH HOUSING

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

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



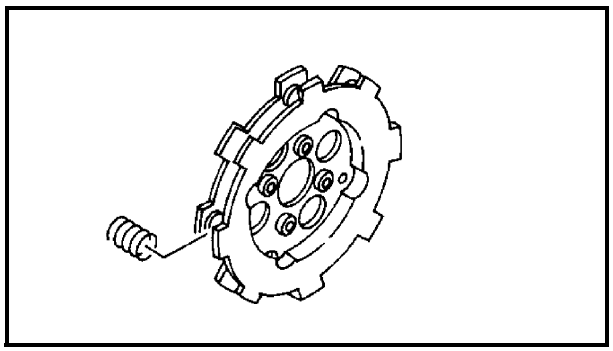
EBS00304
CHECKING THE CLUTCH BOSS

1. Check:
   - clutch boss splines
   - clutch boss cam groove
   - clutch boss one-way cam

   Damage/pitting/wear → Replace the clutch boss and clutch boss one-way cam as a set.

NOTE:

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



EBS00305
CHECKING THE PRESSURE PLATE

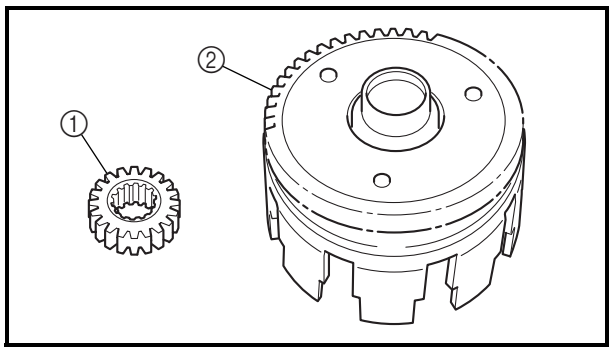
1. Check:
   - pressure plate

   Cracks/damage → Replace.

CHECKING THE CLUTCH BALLS

1. Check:
   - clutch ball

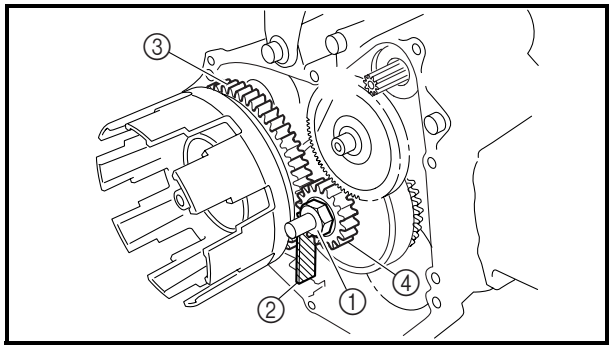
   Pitting/damage/wear → Replace the clutch balls as a set.



EBS00307
CHECKING THE PRIMARY DRIVE GEARS

1. Check:
   - primary drive gear ①
   - primary driven gear ②

   Damage/wear → Replace the primary drive gear and clutch housing as a set.
   Excessive noise during operation → Replace the primary drive gear and clutch housing as a set.



EBS00310
INSTALLING THE PRIMARY DRIVE GEAR

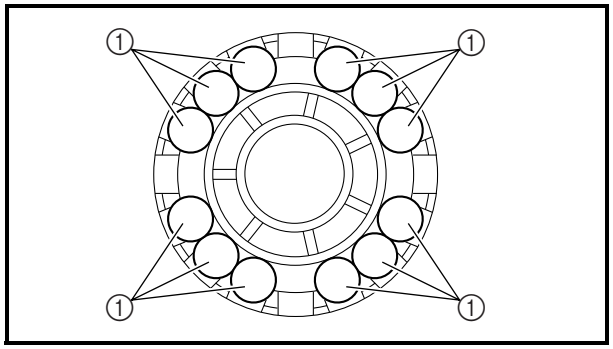
1. Tighten:
   - primary drive gear nut ①

50 Nm (5.0 m · kg, 36 ft · lb)

NOTE:

Place an aluminum plate ② between the teeth of the primary driven gear/clutch housing ③ and primary drive gear ④.

Sheave holder
P/N. YS-01880-A, 90890-01701

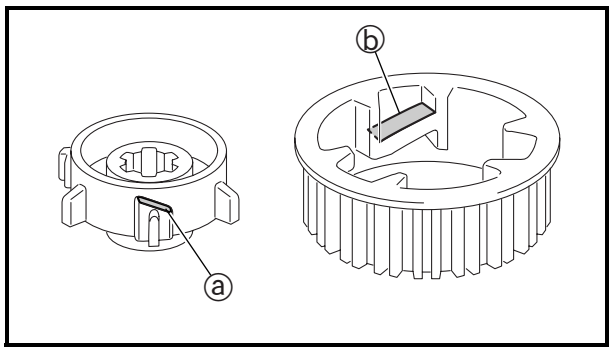


INSTALLING THE CLUTCH

1. Install:
   - clutch balls

NOTE:

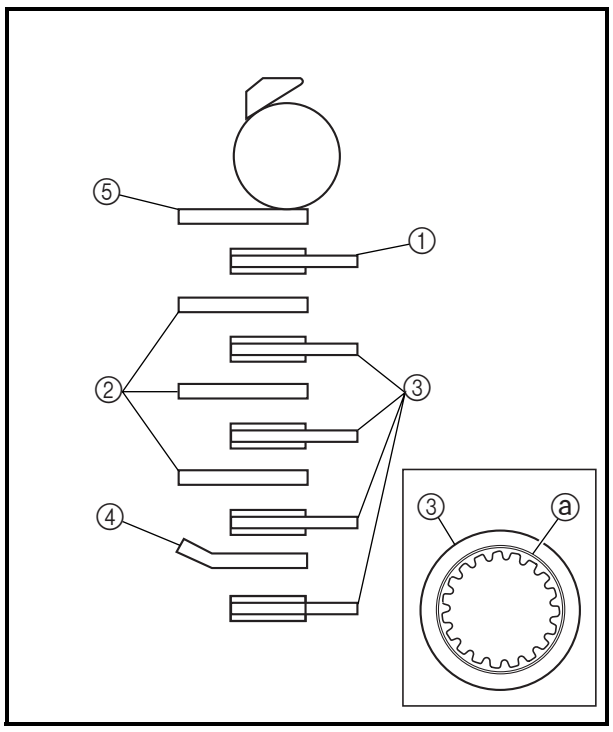
Install the clutch balls ① on the primary driven gear/clutch housing as shown.

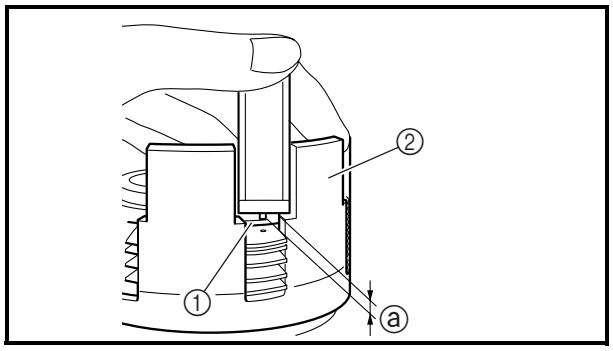


2. Install:
   - thrust weight plate
   - clutch boss one-way cam
   - clutch boss

NOTE:

Align section ⓐ of the clutch boss one-way cam with section ⓑ of the clutch boss and then install the primary driven gear/clutch housing.





3. Install:
   - friction plate 2 ①
   - clutch plates 2 ②
   - friction plates 1 (with black color marking) ③
   - clutch plate 1 ④

⑤ thrust weight plate
ⓐ silver section

NOTE:

Install the clutch plates and friction plates alternately on the clutch boss, starting and ending with a friction plate.

CAUTION:

- **The friction plate 2 ① must be placed between the thrust weight plate and the third clutch plate 2.**
- **The clutch plate 1 ④ must be placed between the first and second friction plate 1.**

4. Adjust:
   - friction plate height

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a. Push the friction plate 1 ① down by hand.
b. Measure the friction plate height ⓐ (distance between the primary driven gear/clutch housing ② and friction plate 1①).

	Friction plate height **1.30 ~ 1.65 mm (0.051 ~ 0.065 in)**

c. If the height is out of specification, adjust the friction plate height.
d. Remove the clutch plate 1, friction plates 1, clutch plates 2, and friction plate 2.
e. Select the suitable clutch plates 2 (3 plates) using the following chart.

	Clutch plates 2 (3 plates)
Thickness (mm)	**1.2 1.4 1.6**

f. Install all parts. Refer to step 2.
g. Remeasure the friction plate height.
h. Remove all parts.

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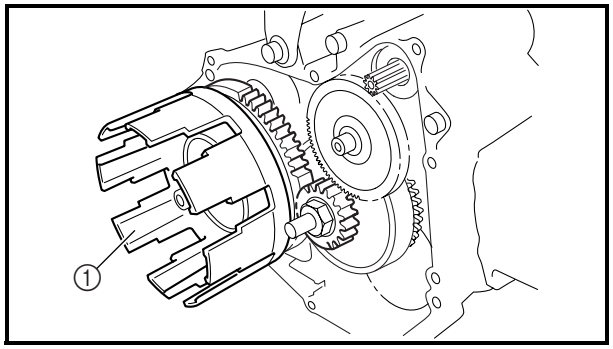
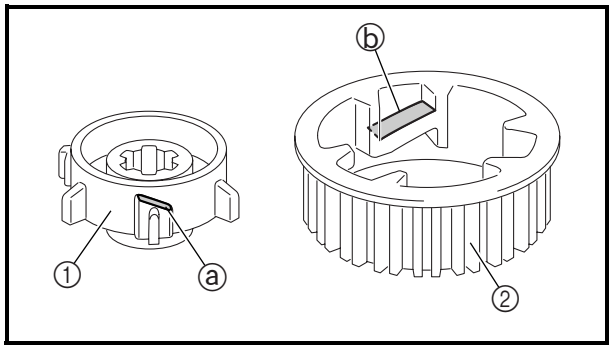


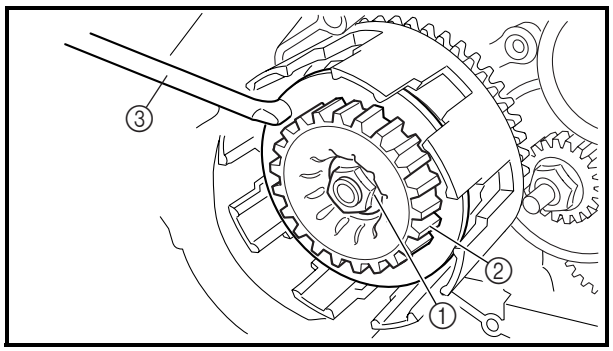
5. Install:
   - clutch housing ①

NOTE:
Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.



6. Install:
   - clutch boss one-way cam ①
   - clutch boss ②

NOTE:
Align section ⓐ of the clutch boss one-way cam with section ⓑ of the clutch boss and then install the primary driven gear/clutch housing.

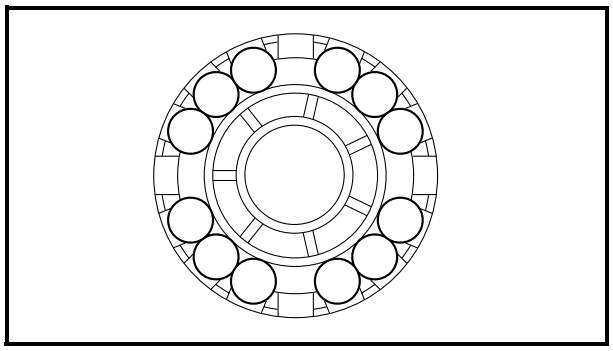


7. Tighten:
   - clutch boss nut ①

60 Nm (6.0 m · kg, 43 ft · lb)

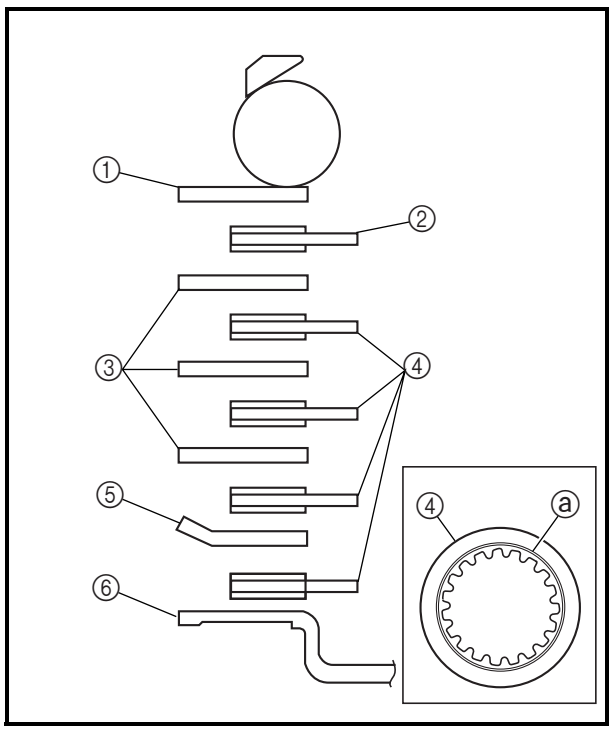
NOTE:
While holding the clutch boss ② with the clutch holder ③, tighten the clutch boss nut.

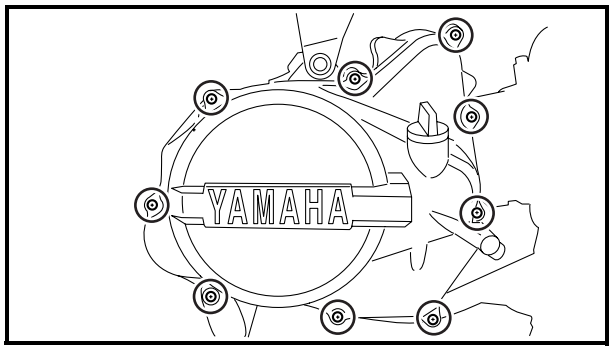
Clutch holder
P/N. 90890-04100



8. Install:
   - clutch balls

NOTE:
Install the clutch balls on the primary driven gear/clutch housing as shown.





9. Install:
   - thrust weight plate ①
   - friction plate 2 ②
   - clutch plates 2 ③
   - friction plates 1 ④
   - clutch plate 1 ⑤
   - pressure plate ⑥

ⓐ silver section

NOTE:

Install the clutch plates and friction plates alternately on the clutch boss, starting and ending with a friction plate.

CAUTION:

- **The friction plate 2 ② must be placed between the thrust weight plate and the third clutch plate 2.**
- **The clutch plate 1 ⑤ must be placed between the first and second friction plate 1.**

10. Install:
    - clutch cover

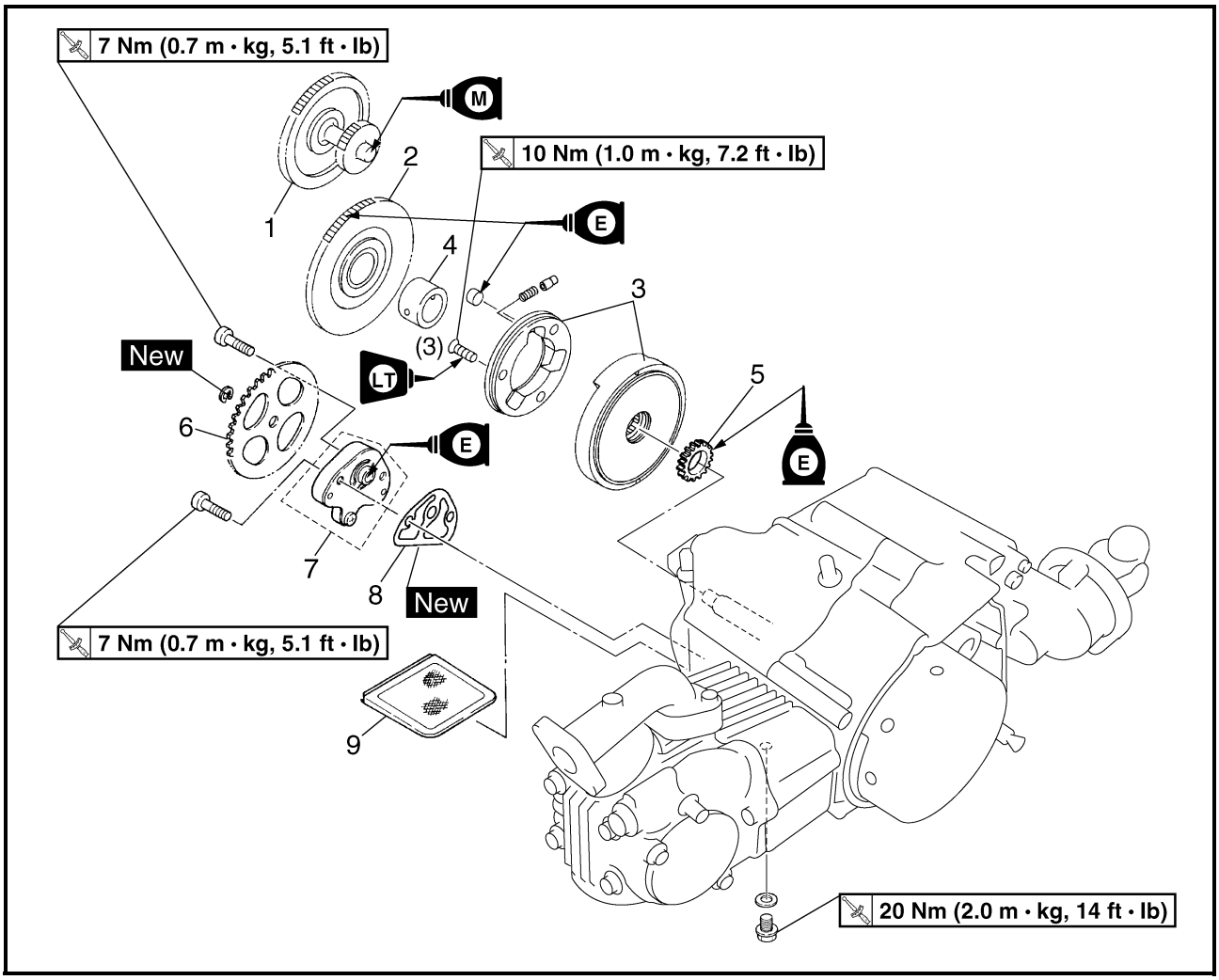
7 Nm (0.7 m · kg, 5.1 ft · lb)

NOTE:

Tighten the screws in stage, using a crisscross pattern.

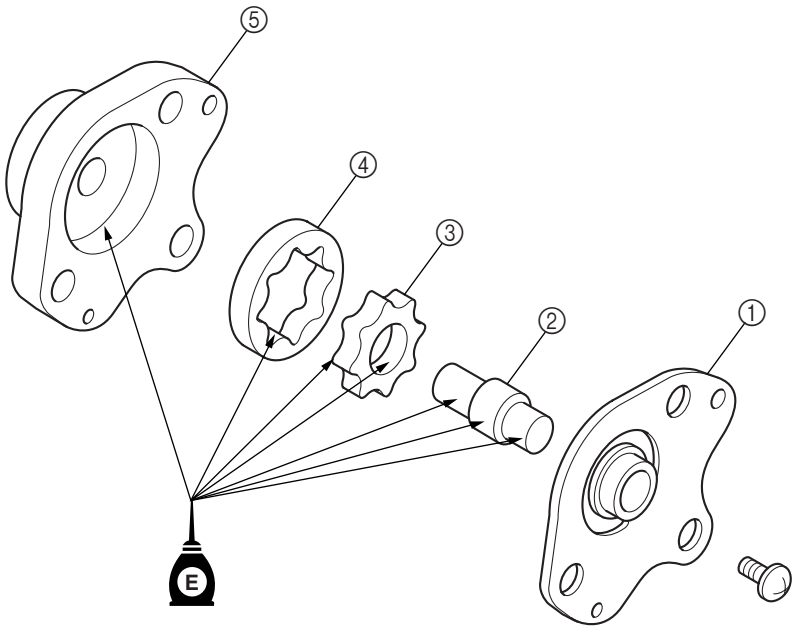
EBS00315

STARTER CLUTCH AND OIL PUMP

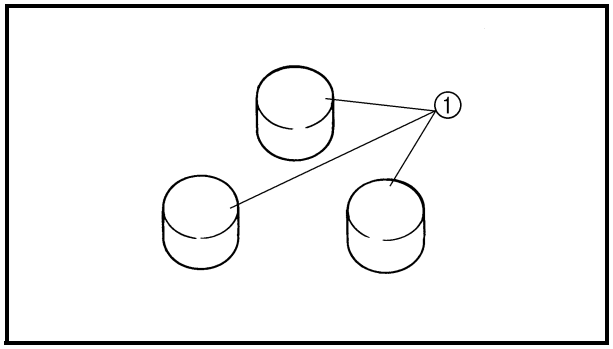


Order	Job/Part	Q'ty	Remarks
	Removing the starter clutch and oil pump		Remove the parts in the order listed.
	Clutch assembly		Refer to "CLUTCH".
1	Starter idle gear assembly	1	
2	Starter wheel gear	1	
3	Starter clutch assembly	1	
4	Spacer	1	
5	Oil pump drive gear	1	
6	Oil pump driven gear	1	
7	Oil pump assembly	1	
8	Oil pump gasket	1	
9	Oil strainer	1	
			For installation, reverse the removal procedure.

EBS00316

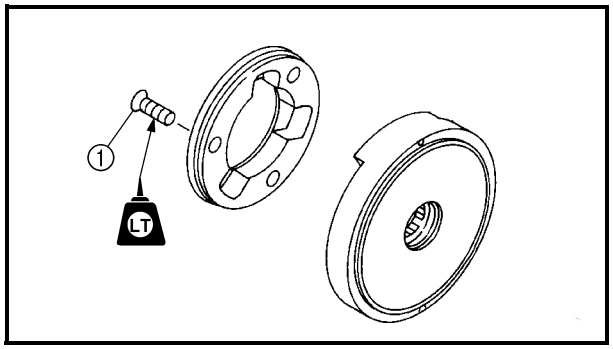


Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Remove the parts in the order listed.
①	Oil pump housing cover	1	
②	Oil pump shaft	1	
③	Inner rotor	1	
④	Outer rotor	1	
⑤	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.



EBS00263
CHECKING THE STARTER CLUTCH

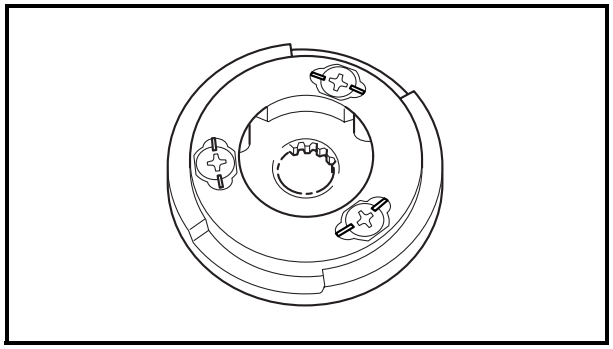
1. Check:
   - starter clutch rollers ①
     Cracks/damage → Replace.

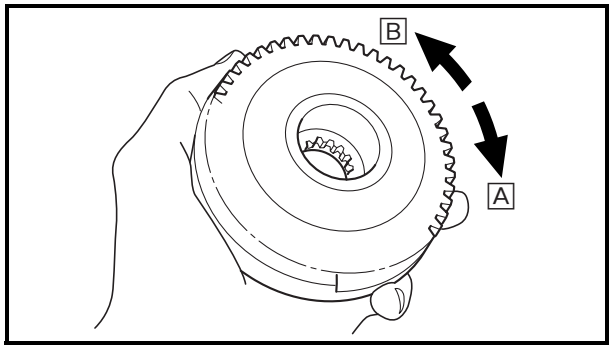


2. Check:
   - starter clutch screws ①
     Loose → Replace with a new one, and clinch the end of the screw.

	Starter clutch screw **10 Nm (1.0 m · kg, 7.2 ft · lb)** **LOCTITE®**

NOTE:
Lock the threads on the starter clutch screws by staking them with a center punch.





3. Check:
   - starter clutch operation

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a. Install the starter wheel gear to the starter clutch, and hold the starter clutch.
b. When turning the starter wheel gear clockwise [A], the starter clutch and the wheel gear should be engaged.
   If not, the starter clutch is faulty. Replace it.
c. When turning the starter wheel gear counterclockwise [B], the starter wheel gear should turn freely.
   If not, the starter clutch is faulty. Replace it.

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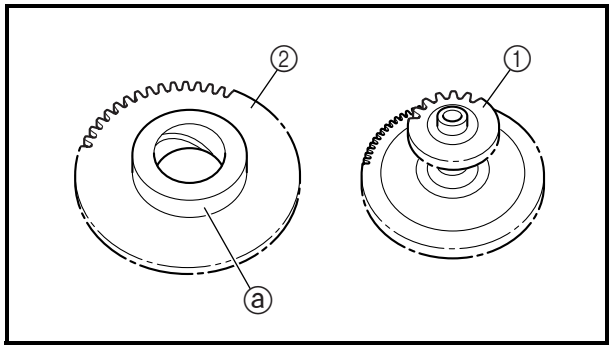
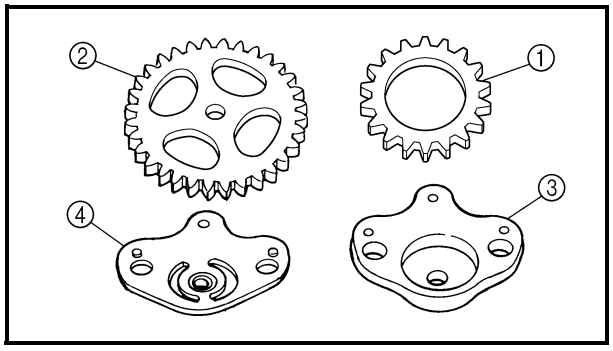
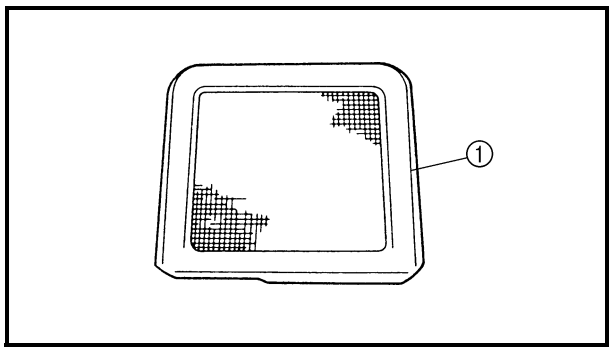


4. Check:
   - starter idle gear teeth ①
   - starter wheel gear teeth ②
     Burrs/clips/roughness/wear → Replace.
5. Check:
   - starter wheel gear contacting surface ⓐ
     Damage/pitting/wear → Replace.

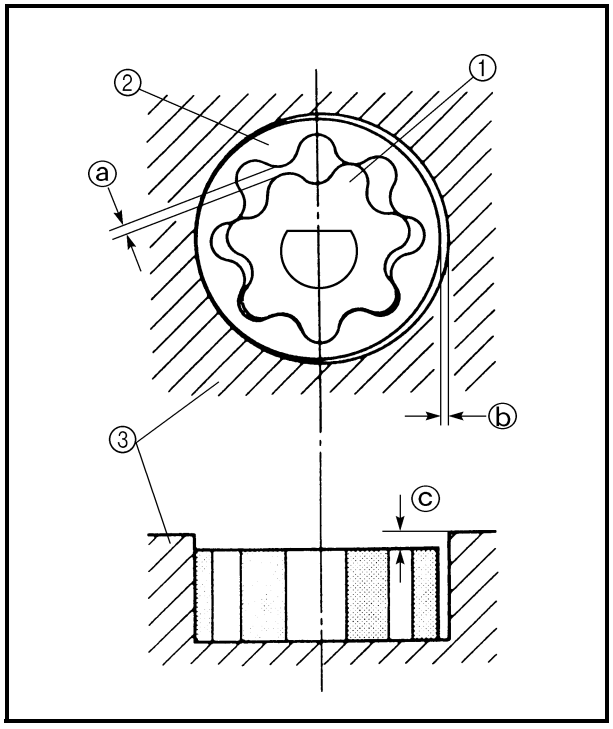


EBS00330
CHECKING THE OIL PUMP

1. Check:
   - oil pump drive gear ①
   - oil pump driven gear ②
   - oil pump housing ③
   - oil pump housing cover ④
     Cracks/wear/damage → Replace.



2. Clean:
   - oil strainer ①
     Damage → Replace.

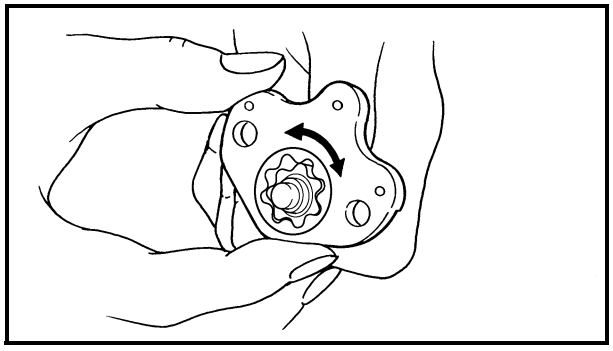


3. Measure:
   - inner-rotor-to-outer-rotor-tip clearance ⓐ
   - outer-rotor-to-oil-pump-housing clearance ⓑ
   - oil-pump-housing-to-inner-rotor-and-outer-rotor clearance ⓒ

   Out of specification → Replace the oil pump.

① Inner rotor
② Outer rotor
③ Oil pump housing

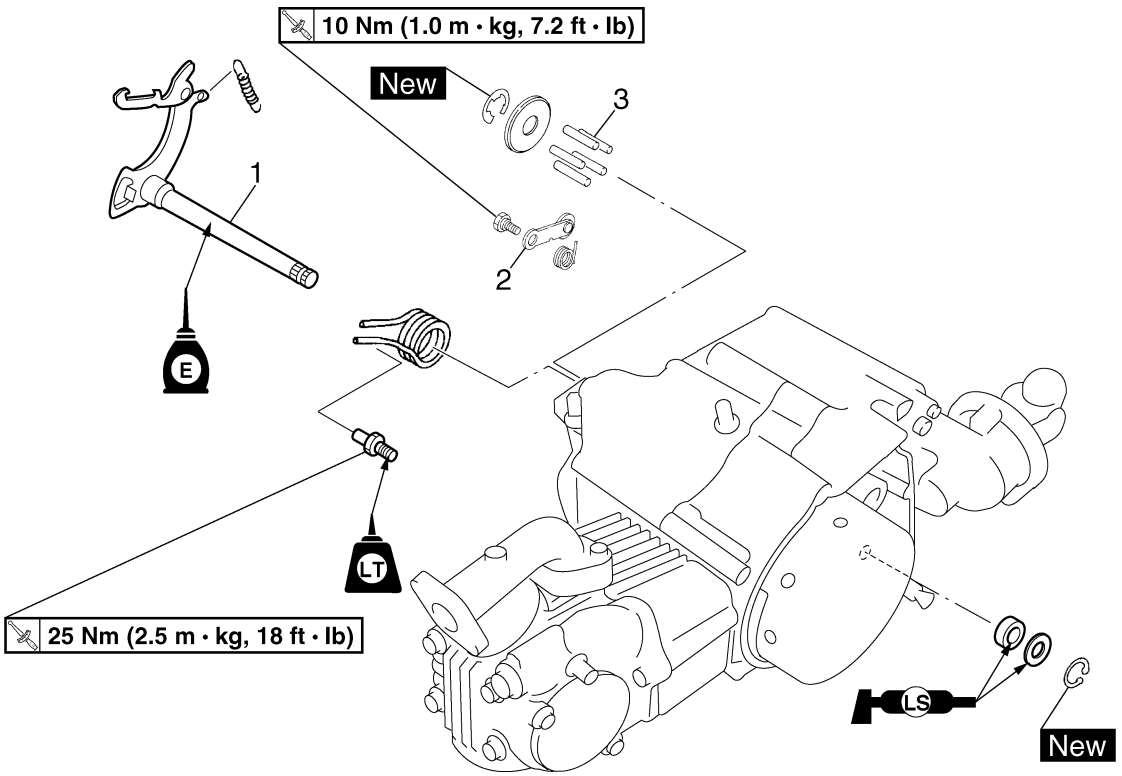
Inner-rotor-to-outer-rotor-tip clearance
0.05 ~ 0.07 mm
(0.002 ~ 0.003 in)
<Limit>: 0.15 mm (0.006 in)
Outer-rotor-to-oil-pump-housing clearance
0.013 ~ 0.036 mm
(0.0005 ~ 0.0014 in)
<Limit>: 0.106 mm (0.0042 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance
0.06 ~ 0.10 mm
(0.0024 ~ 0.0039 in)
<Limit>: 0.17 mm (0.0067 in)



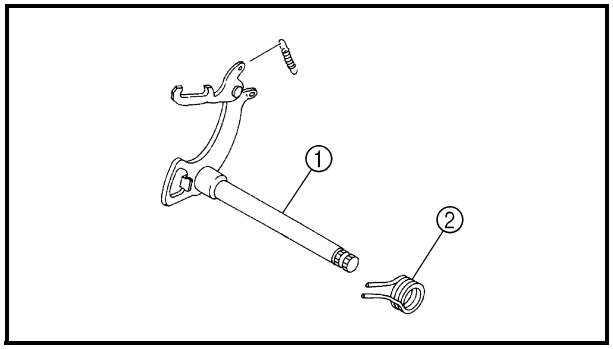
4. Check:
   - oil pump operation

   Rough movement → Repeat steps #1 and #3 or replace the defective parts.

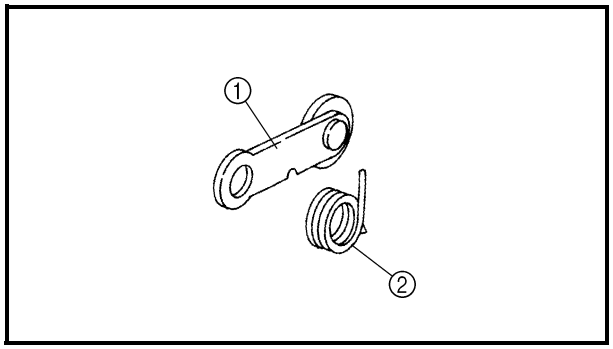
SHIFT SHAFT



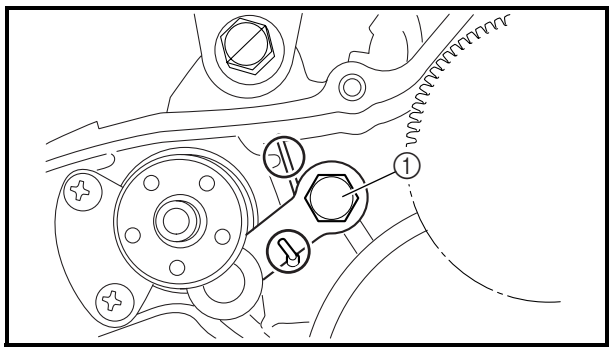
Order	Job/Part	Q'ty	Remarks
	Removing the shift shaft		Remove the parts in the order listed.
	Clutch assembly		Refer to "CLUTCH".
1	Shift shaft	1	
2	Stopper lever	1	
3	Dowel pin	5	
			For installation, reverse the removal procedure.



EBS01018
CHECKING THE SHIFT SHAFT
1. Check:
   - shift shaft ①
     Bends/damage/wear → Replace.
   - shift shaft spring ②
     Damage/wear → Replace.

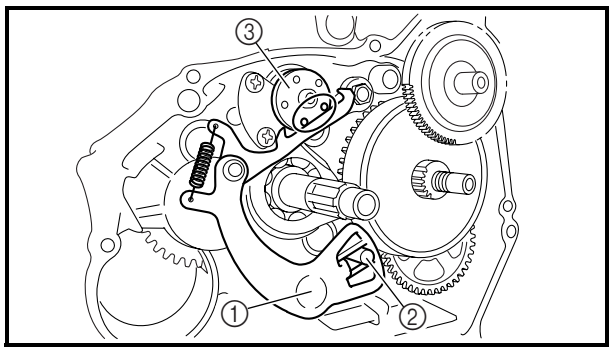


EBS01019
CHECKING THE STOPPER LEVER
1. Check:
   - stopper lever ①
   - stopper lever spring ②
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.



INSTALLING THE STOPPER LEVER
1. Install:
   - stopper lever ①

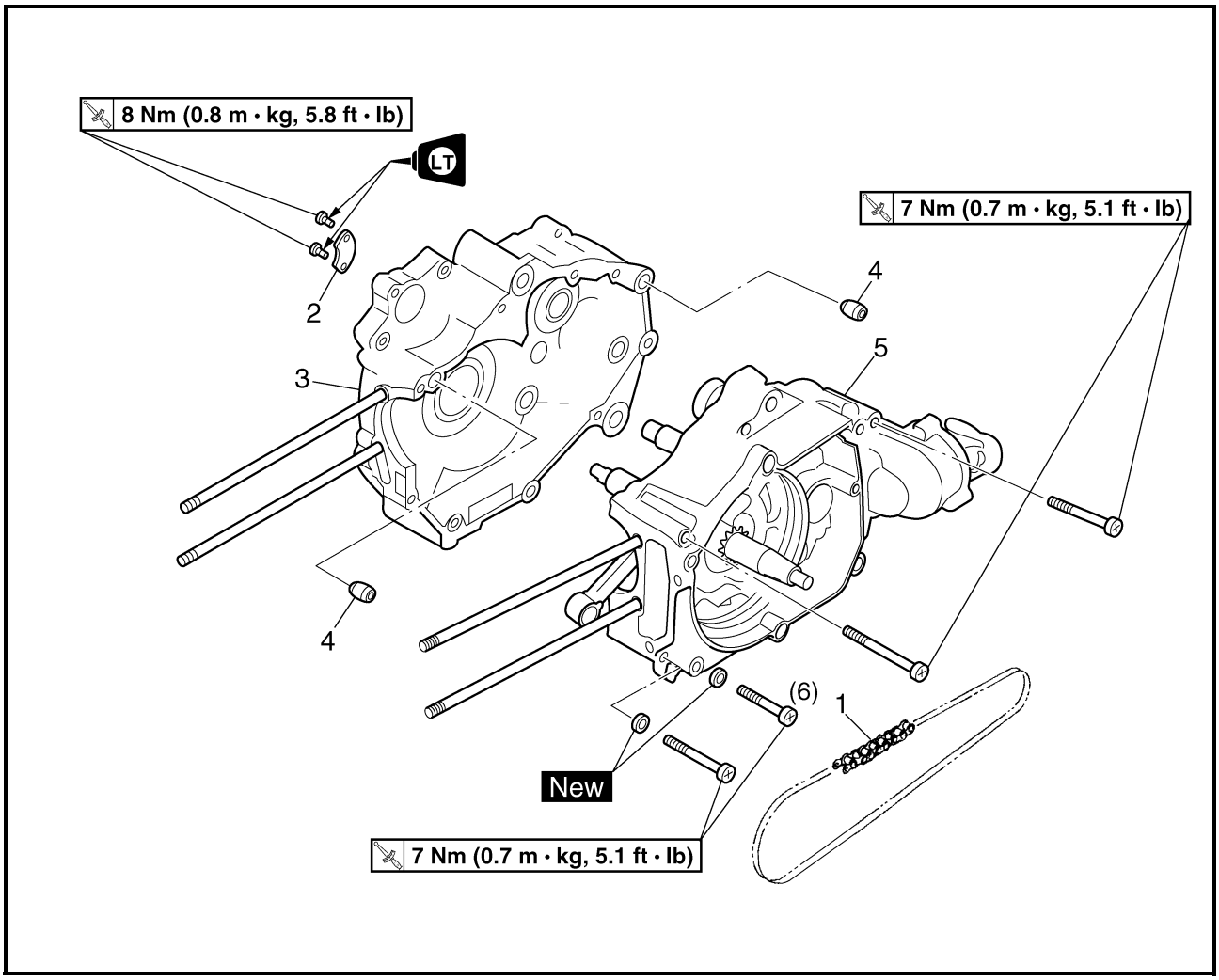
NOTE:
Hook the hooked end of the stopper lever spring onto the stopper lever and catch the straight end of the stopper lever spring onto the crankcase.



INSTALLING THE SHIFT SHAFT
1. Install:
   - shift shaft ①

NOTE:
- Install the end of the shift shaft spring onto the shift shaft spring stopper ②.
- Make sure that the arm section of the shift shaft contacts the dowel pins on the shift drum ③.

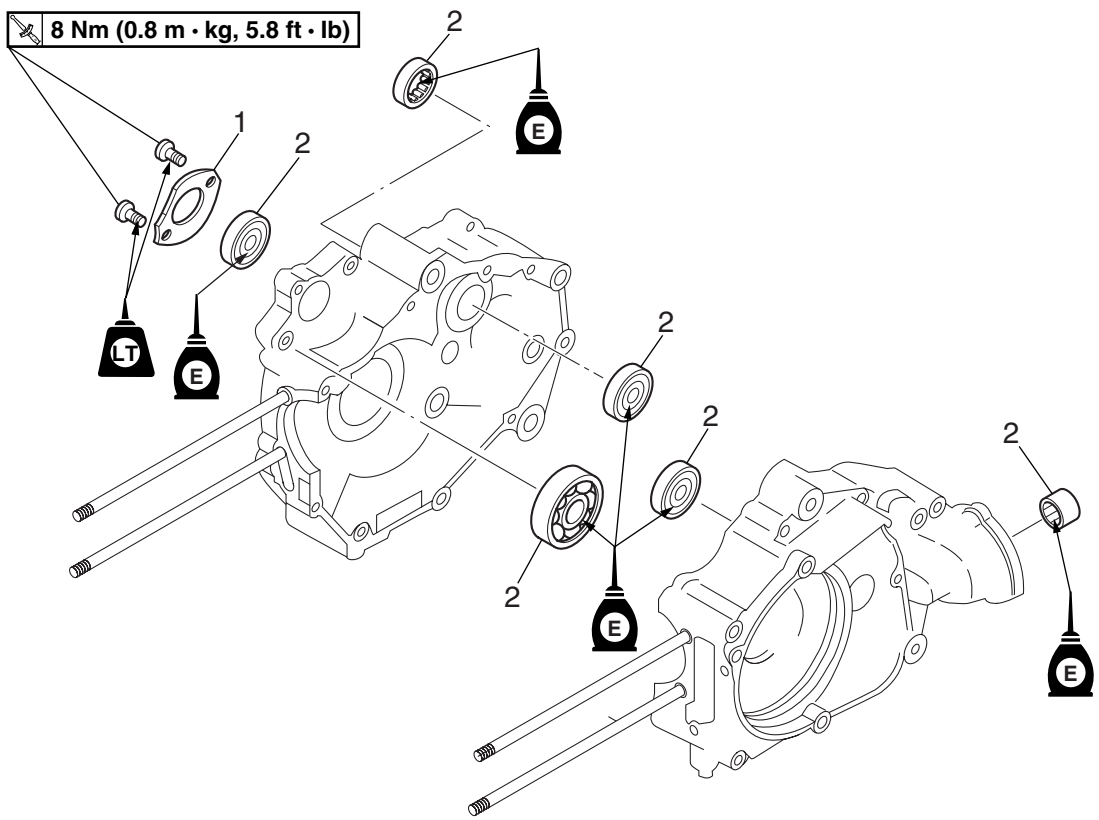
EBS00319
CRANKCASE



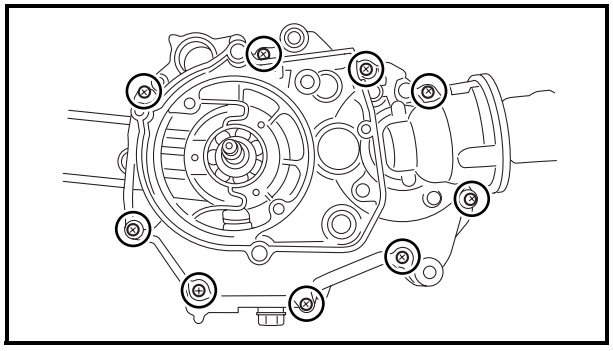
Order	Job/Part	Q'ty	Remarks
	Removing the timing chain and separating the crankcase		Remove the parts in the order listed.
	Engine		Refer to "ENGINE".
	Cylinder head		Refer to "CYLINDER HEAD".
	Cylinder and piston		Refer to "CYLINDER AND PISTON".
	C.D.I. magneto		Refer to "C.D.I. MAGNETO".
	Clutch		Refer to "CLUTCH".
	Starter clutch and oil pump		Refer to "STARTER CLUTCH AND OIL PUMP".
	Shift shaft		Refer to "SHIFT SHAFT".
1	Timing chain	1	
2	Shift drum retainer	1	
3	Right crankcase	1	Refer to "SEPARATING THE CRANKCASE" and "ASSEMBLING THE CRANKCASE".
4	Dowel pin	2	
5	Left crankcase	1	
			For installation, reverse the removal procedure.

EBS00321

CRANKCASE BEARINGS



Order	Job/Part	Q'ty	Remarks
	Removing the crankcase bearings		Remove the parts in the order listed.
	Crankshaft		Refer to "CRANKSHAFT".
	Transmission		Refer to "TRANSMISSION".
	Middle driven pinion gear		Refer to "MIDDLE GEAR".
1	Bearing retainer	1	
2	Bearing	6	Refer to "INSTALLING THE BEARINGS".
			For installation, reverse the removal procedure.



EBS00333

SEPARATING THE CRANKCASE

1. Separate:
   - right crankcase
   - left crankcase

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a. Remove the crankcase screws.

NOTE:

- Loosen each screw 1/4 of a turn at a time and after all the screws are loosened, remove them.
- Loosen the screws in stages, using a criss-cross pattern.

b. Remove the right crankcase.

NOTE:

Insert a screwdriver or pry bar into the pry points in the crankcase and then carefully pry apart the crankcase halves.

CAUTION:

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

c. Remove the dowel pins.

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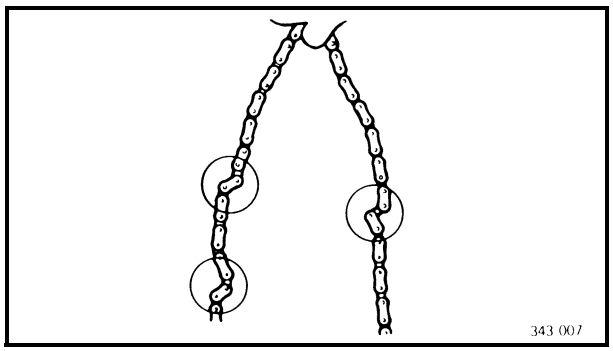
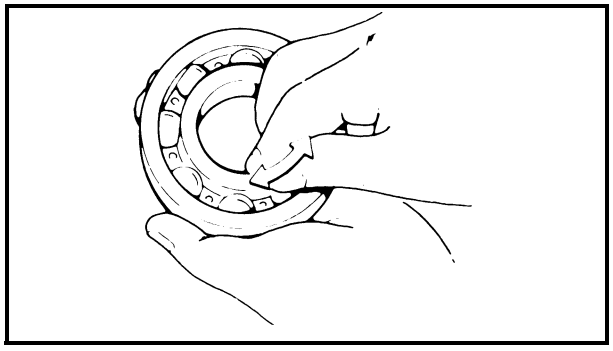


EBS00335

CHECKING THE TIMING CHAIN

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

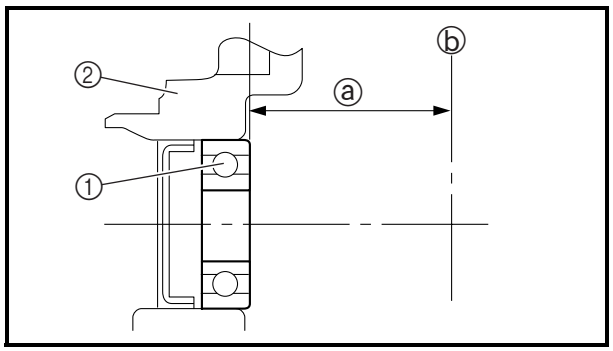


EBS00339
CHECKING THE BEARINGS AND OIL SEALS

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

EBS00338
CHECKING THE CRANKCASE

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

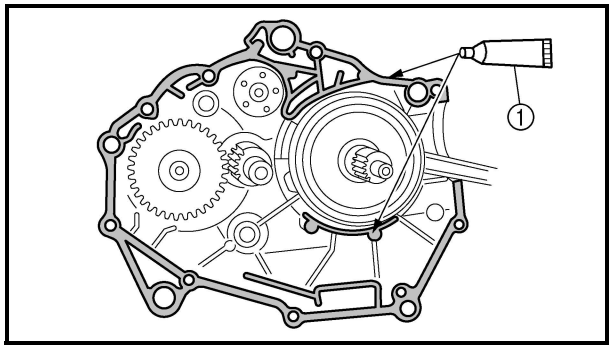


INSTALLING THE BEARINGS

1. Install:
   - left main axle bearing ①

NOTE:
Press the left main axle bearing into the left crankcase ②, as shown in the illustration.

ⓐ 34.0 ~ 34.5 mm (1.34 ~ 1.36 in)
ⓑ Crankcase mating surface



EBS00341
ASSEMBLING THE CRANKCASE

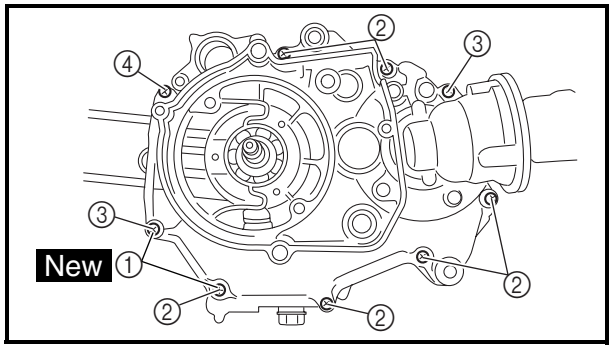
1. Apply:
   - sealant (Quick Gasket®) or Yamaha bond No. 1215 ①
     (to the mating surfaces of both case halves)

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

2. Install:
   - dowel pin
3. Fit the right crankcase onto the left case. Tap lightly on the case with a soft hammer.

CAUTION:

Before installing and torquing the crankcase holding screws, be sure to check whether the transmission is functioning properly by manually rotating the shift drum in both directions.



4. Install:
   - gaskets ① New
   - crankcase screws
5. Tighten:
   - crankcase screws

7 Nm (0.7 m · kg, 5.1 ft · lb)

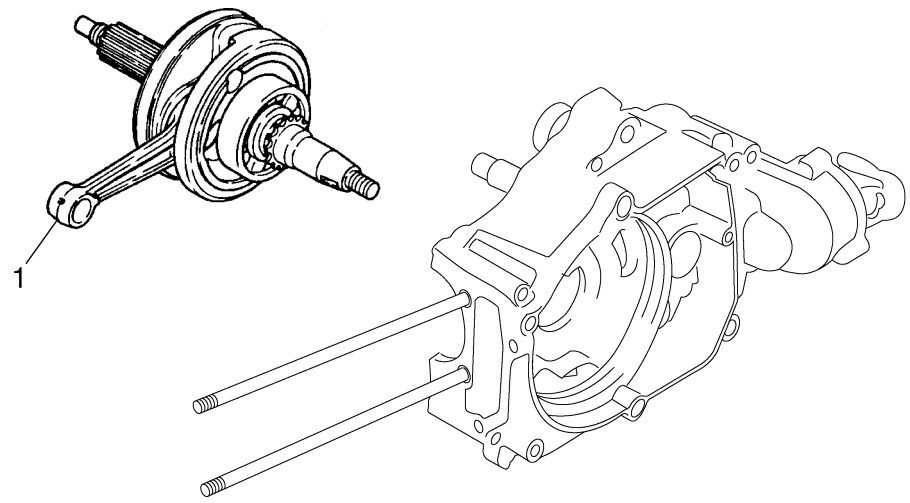
② Screw: ℓ = 45 mm
③ Screw: ℓ = 60 mm
④ Screw: ℓ = 75 mm

NOTE:

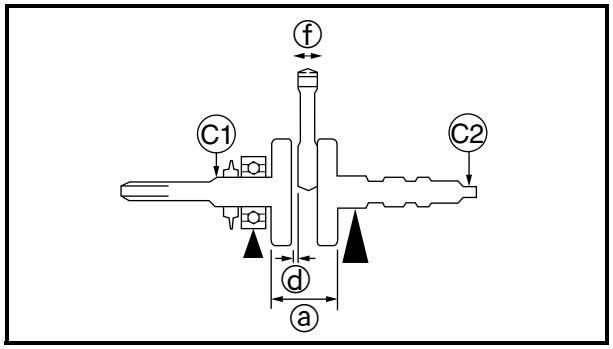
Tighten the screws in stages, using a criss-cross pattern.

6. Apply:
   - 4-stroke engine oil
     (to the crankshaft pin, bearing and oil delivery hole)
7. Check:
   - crankshaft and transmission operation
     Unsmooth operation → Repair.

EBS00326
CRANKSHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Crankshaft	1	Refer to "INSTALLING THE CRANKSHAFT". For installation, reverse the removal procedure.



EBS00361
CHECKING THE CRANKSHAFT

1. Measure:
   • crank width ⓐ
   Out of specification → Replace the crankshaft.

Crank width
40.20 ~ 40.25 mm
(1.5827 ~ 1.5846 in)

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

Big end side clearance
0.10 ~ 0.40 mm
(0.0039 ~ 0.0157 in)
<Limit>: 0.50 mm (0.0197 in)

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

Runout limit
C1: 0.05 mm (0.0020 in)
C2: 0.04 mm (0.0016 in)

4. Measure:
   • small end free play ⓕ
   Out of specification → Replace the big end bearing, crankshaft pin, connecting rod and/or side washer as a set.

Small end free play
Standard
0.80 ~ 1.00 mm
(0.0315 ~ 0.0394 in)
<Limit>: 1.50 mm (0.0591 in)

EBS00362
INSTALLING THE CRANKSHAFT

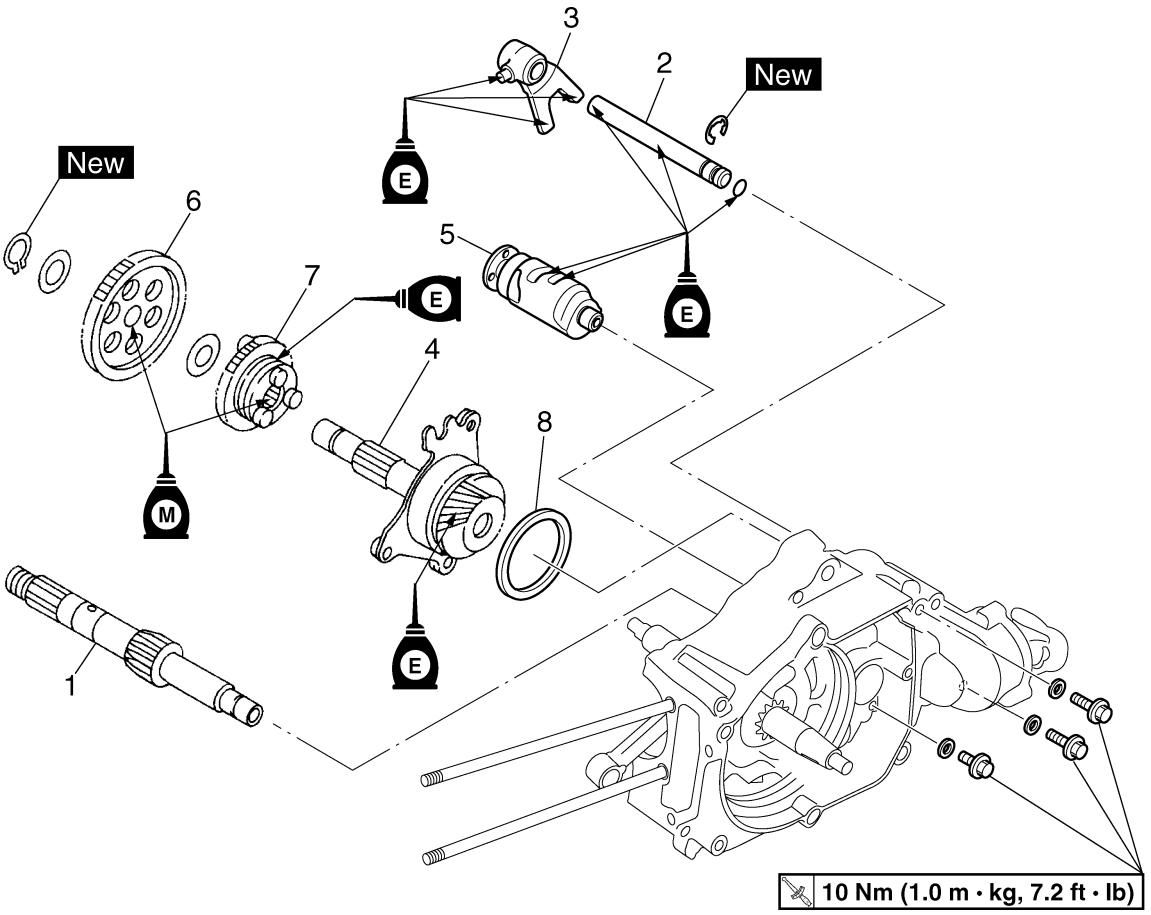
1. Install:
   • crankshaft

CAUTION:

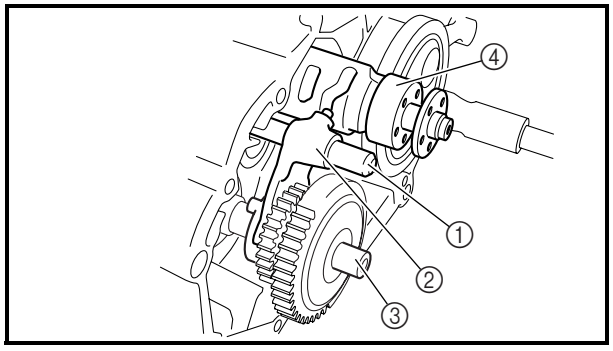
Apply engine oil to each bearing to protect the crankshaft against scratches and to make installation easier.

EBS00345

TRANSMISSION



Order	Job/Part	Q'ty	Remarks
	Removing the transmission		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Main axle/1st pinion gear	1	
2	Shift fork guide bar	1	Refer to "REMOVING THE TRANSMISSION" and "INSTALLING THE TRANSMISSION".
3	Shift fork	1	
4	Drive axle/middle drive pinion gear assembly	1	
5	Shift drum	1	
6	1st wheel gear	1	
7	Drive axle dog gear	1	
8	Middle drive gear shim	1	
			For installation, reverse the removal procedure.

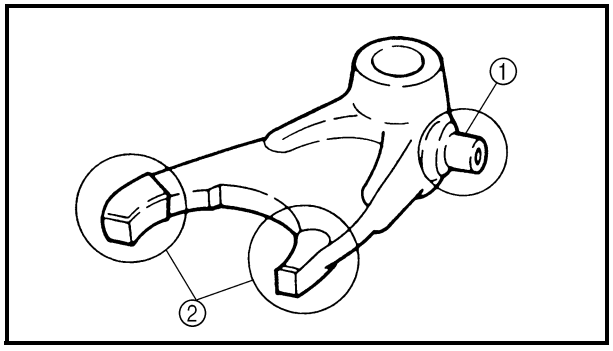


REMOVING THE TRANSMISSION

1. Remove:
   - shift fork guide bar ①
   - shift fork ②
   - drive axle/middle drive pinion gear assembly ③
   - shift drum ④

NOTE:

Remove the shift fork guide bar, shift fork, drive axle/middle drive gear assembly, and shift drum from the crankcase together.

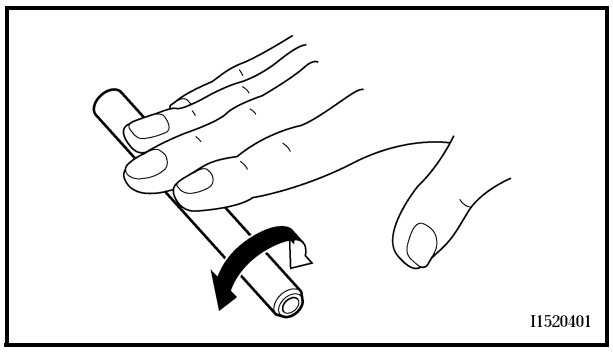


EBS00350

CHECKING THE SHIFT FORK

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

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

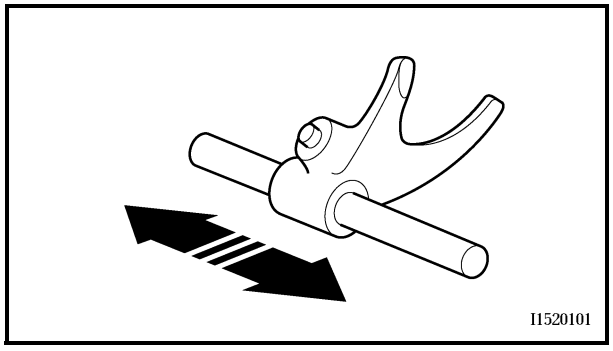


2. Check:
   - shift fork guide bar

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

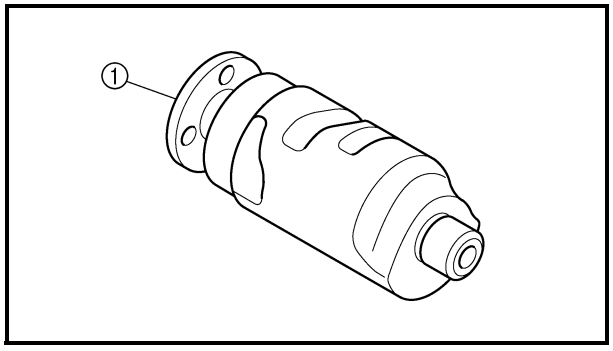
⚠ WARNING

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



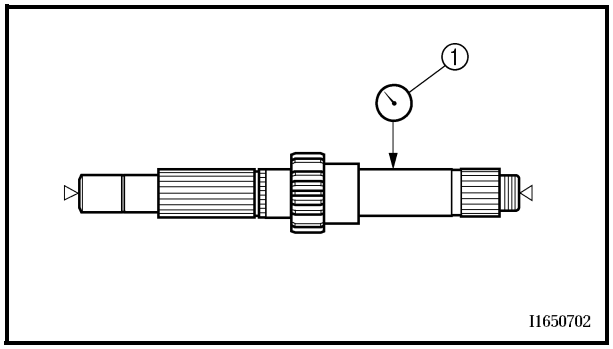
3. Check:
   - shift fork movement

   (along the shift fork guide bar)
   Rough movement → Replace the shift fork and shift fork guide bar as a set.



EBS01103
CHECKING THE SHIFT DRUM

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

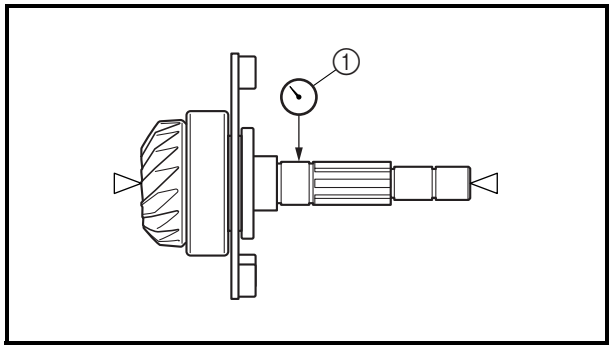


EBS00354
CHECKING THE TRANSMISSION

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

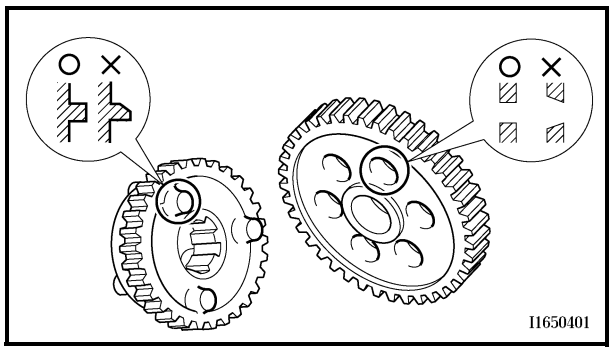
Main axle runout limit
0.08 mm (0.0031 in)

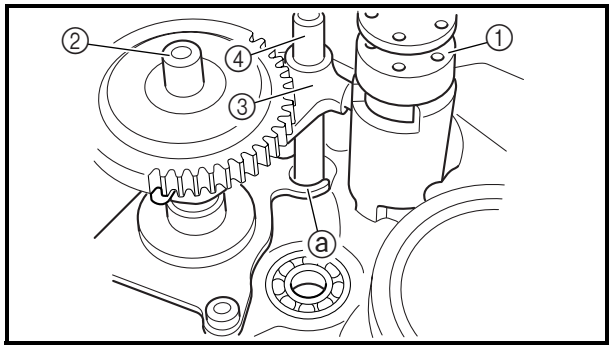
2. Measure:
   - drive axle runout
     (with a centering device and dial gauge ①)
     Out of specification → Replace the drive axle.



Drive axle runout limit
0.08 mm (0.0031 in)

3. Check:
   - transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear(s).
   - transmission gear dogs
     Cracks/damage/rounded edges → Replace the defective gear(s).
4. Check:
   - transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - transmission gear movement
     Rough movement → Replace the defective part(s).
6. Check:
   - circlips
     Bends/damage/looseness → Replace.

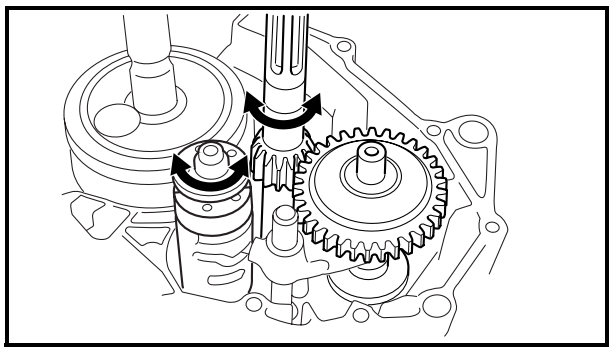




EBS00357
INSTALLING THE TRANSMISSION

1. Install:
   - shift drum ①
   - drive axle/middle drive pinion gear assembly ②
   - shift fork ③
   - shift fork guide bar ④

NOTE:
- The embossed marks on the shift fork should face towards the left of the engine.
- Be sure to install the forked section ⓐ of the drive axle/middle drive gear assembly around the shift fork guide bar when installing the transmission.

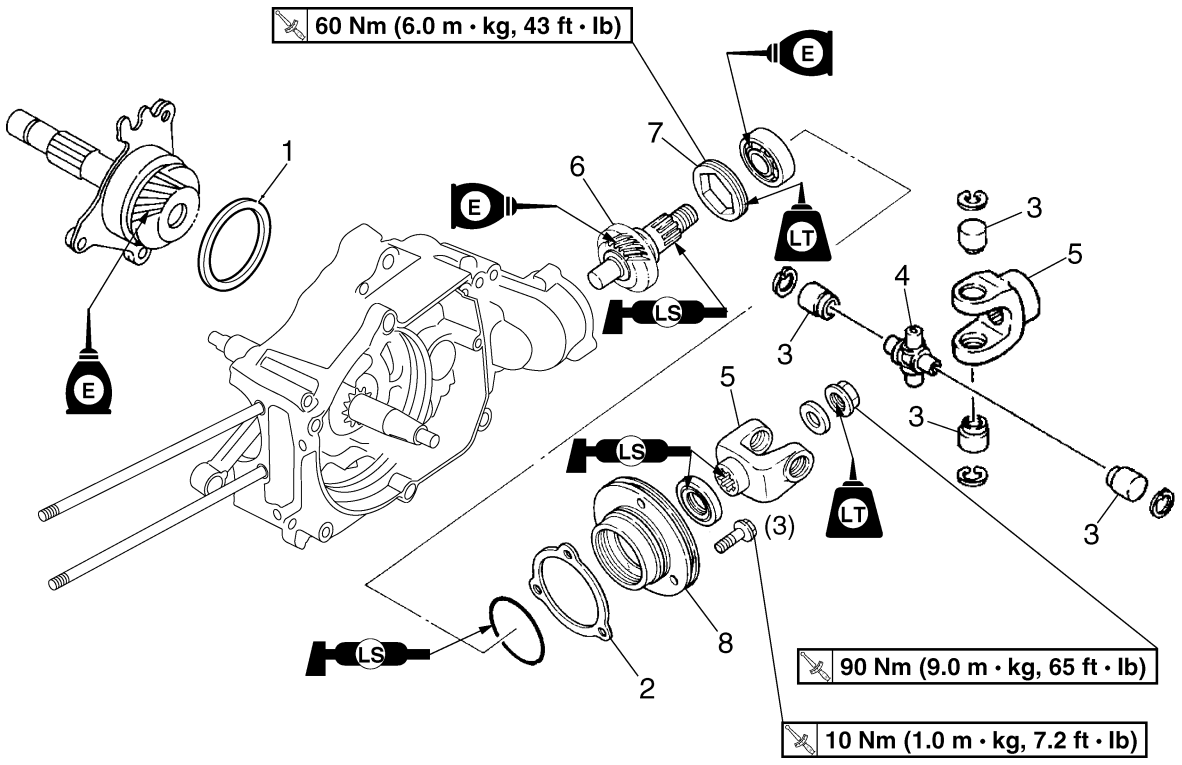


2. Check:
   - transmission
     Rough movement → Repair.

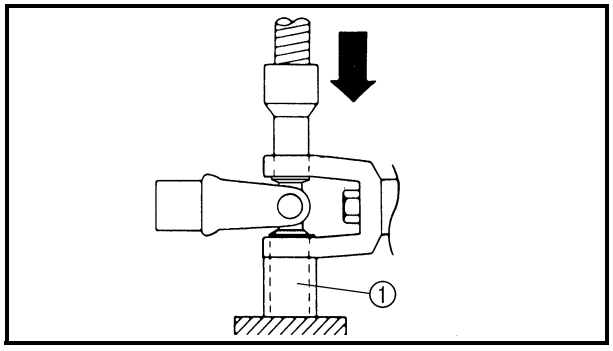
NOTE:
- Oil each gear and bearing thoroughly.
- Before assembling the crankcase, be sure that the transmission is in neutral and that the gears turn freely.

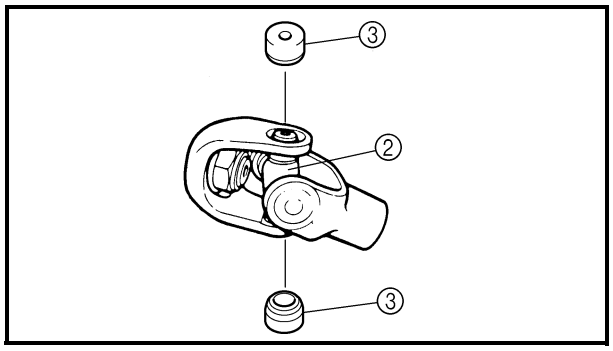
EBS00363

MIDDLE GEAR



Order	Job/Part	Q'ty	Remarks
	Removing the middle gear		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
	Drive axle/middle drive pinion gear assembly		Refer to "TRANSMISSION".
1	Middle drive gear shim	1	
2	Middle driven gear shim		Refer to "SELECTING MIDDLE DRIVEN GEAR SHIMS".
3	Bearing	4	
4	Universal joint	1	
5	Universal joint yoke	2	Refer to "REMOVING THE MIDDLE DRIVEN SHAFT" and "INSTALLING THE MIDDLE DRIVEN SHAFT".
6	Middle driven shaft (with driven pinion gear)	1	
7	Bearing retainer	1	
8	Bearing housing	1	
			For installation, reverse the removal procedure.





EBS00366

REMOVING THE MIDDLE DRIVEN SHAFT

1. Remove:
   - universal joint

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a. Remove the circlips.
b. Place the universal joint in a press.
c. With a suitable diameter pipe ① beneath the yoke ②, press the bearings ③ into the pipe as shown.

NOTE:

It may be necessary to lightly tap the yoke with a punch.

d. Repeat the steps for the opposite bearing.
e. Remove the yoke.

NOTE:

It may be necessary to lightly tap the yoke with a punch.

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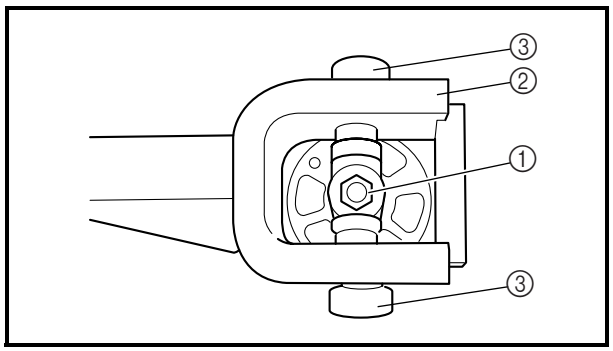
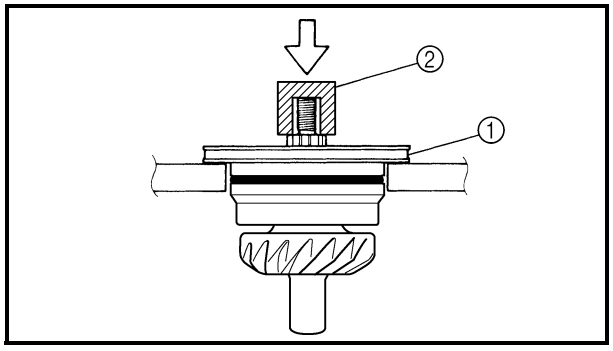


2. Remove:
   - nut ①
   - washer
   - universal joint yoke (front side)

NOTE:

Use the universal joint holder ② and attachment ③ to hold the universal joint yoke.

Universal joint holder
P/N. YM-04062, 90890-04062
Universal joint holder attachment
P/N. 90890-04096



3. Remove:
   • bearing housing assembly ①

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a. Clean the outside of the middle driven shaft.
b. Place the middle driven shaft onto a hydraulic press.

CAUTION:

- **Never directly press the shaft end with a hydraulic press, this will result in damage to the shaft thread.**
- **Install the suitable socket ② on the shaft end to protect the thread from damage.**

c. Press the shaft end and remove the bearing housing.

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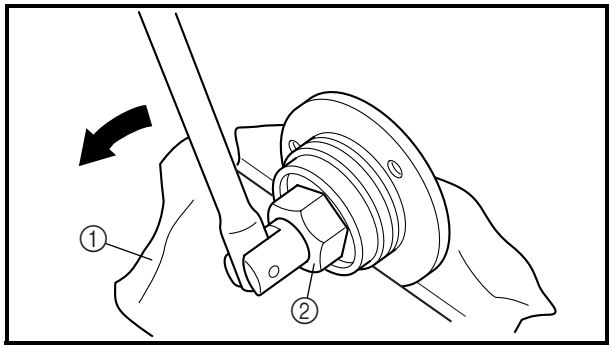

4. Remove:
   • bearing retainer
   • bearing

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a. Place a folded rag ①.
b. Secure the bearing housing edge in the vise.
c. Attach the damper rod holder ②.

27-mm hexagon wrench
P/N. YM-01363
Damper rod holder (27 mm)
P/N. 90890-01388

d. Remove the bearing retainer and bearing.

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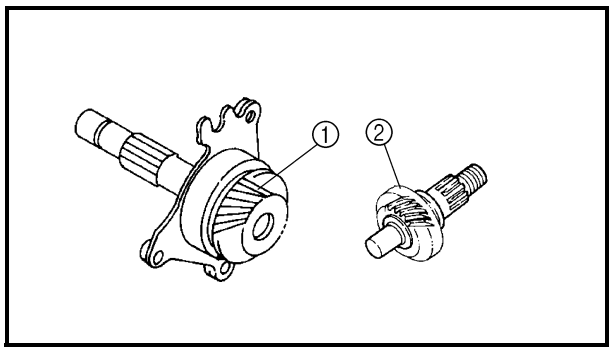
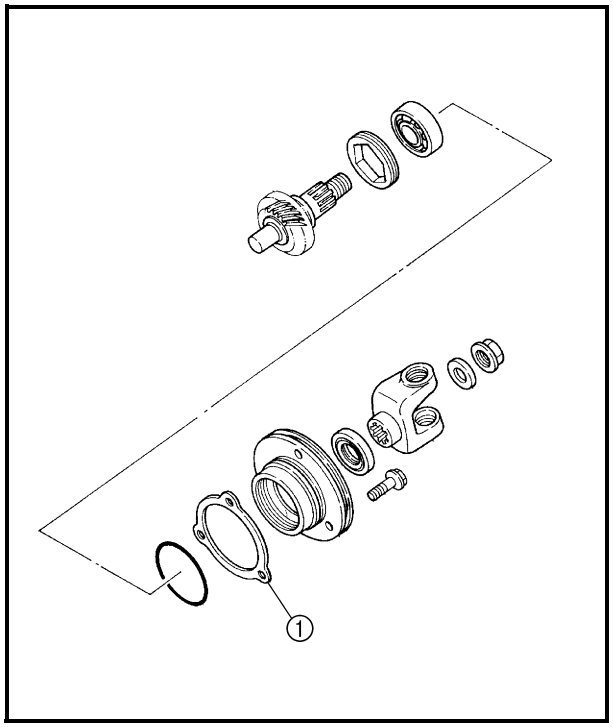


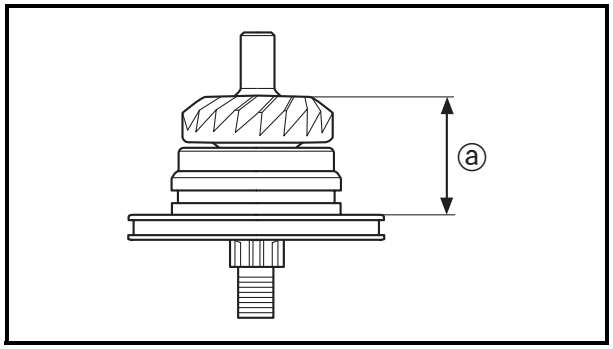
EBS01021

CHECKING THE PINION GEARS

1. Check:
   • drive pinion gear teeth ①
   • driven pinion gear teeth ②
   Pitting/galling/wear → Replace.

2. Check:
   • O-ring
     Damage → Replace.
   • bearings
     Pitting/damage → Replace.
3. Check:
   • universal joint movement
     Roughness → Replace universal joint.





EBS00370
SELECTING MIDDLE DRIVEN GEAR SHIMS

When the drive and driven gear, bearing housing assembly and/or crankcase replaced, be sure to adjust the gear shim ①.

1. Select:
   • middle driven gear shim ①

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a. Measure the distance ⓐ between the middle driven shaft bearing housing and the middle driven pinion gear.
b. Determine the difference using the following chart.

ⓐ (mm)	Difference (mm)
37.83 ≤ ⓐ ≤ 37.90	0.4
37.90 < ⓐ ≤ 38.00	0.5
38.00 < ⓐ ≤ 38.10	0.6
38.10 < ⓐ ≤ 38.20	0.7
38.20 < ⓐ ≤ 38.30	0.8
38.30 < ⓐ ≤ 38.40	0.9
38.40 ≤ ⓐ ≤ 38.45	1.0

c. Select the suitable shim(s) according to the following chart.

Difference	Suitable shim(s)	
	Thickness (mm)	Q'ty (pcs.)
0.4	0.4	1
0.5	0.5	1
0.6	0.3	2
0.7	0.3 + 0.4	1 + 1
0.8	0.4	2
0.9	0.4 + 0.5	1 + 1
1.0	0.5	2

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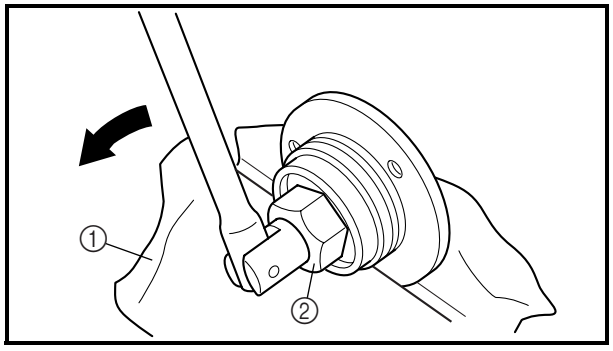

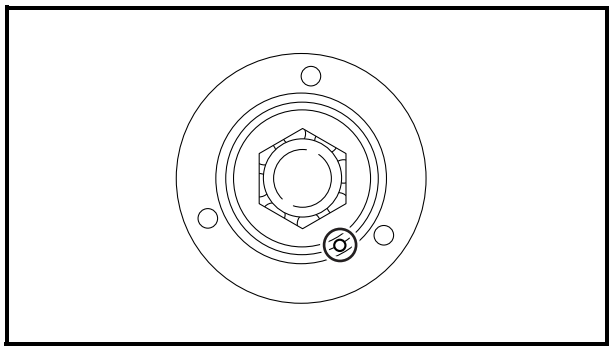

EBS00373
INSTALLING THE MIDDLE DRIVEN SHAFT

1. Install:
   - bearing retainer New

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a. Secure the bearing housing edge in the vise with a clean rag ①.

NOTE:
Apply locking agent (LOCTITE®) to the threads of bearing retainer.

b. Attach the damper rod holder ②.

27-mm hexagon wrench
P/N. YM-01363
Damper rod holder (27 mm)
P/N. 90890-01388

c. Tighten the bearing retainer.

Bearing retainer
60 Nm (6.0 m · kg, 43 ft · lb)
LOCTITE®

NOTE:
Lock the threads with a drift punch.

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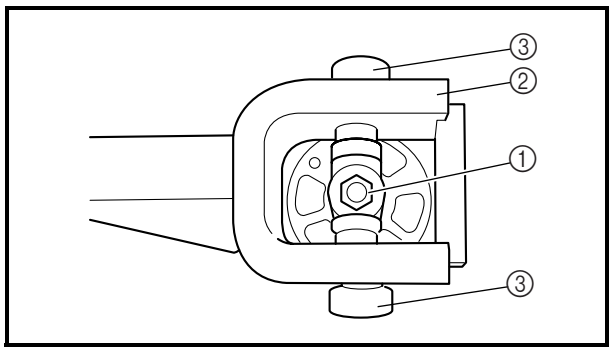
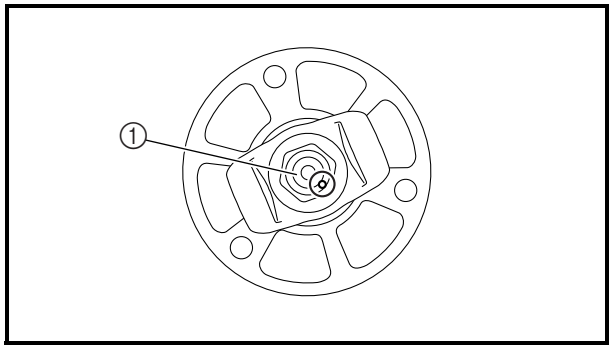
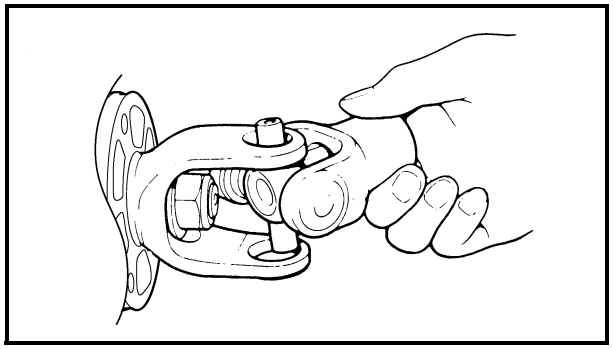


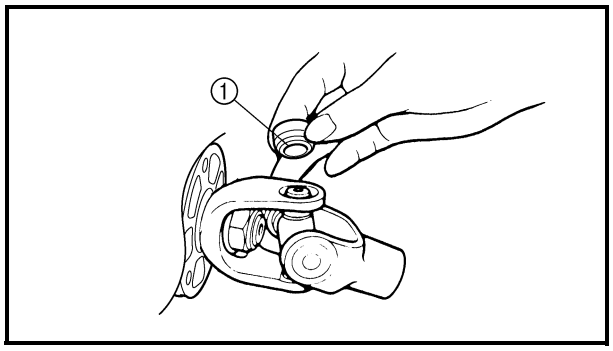


2. Install:
   - universal joint yoke (front side)
   - washer
   - nut ① **90 Nm (9.0 m · kg, 65 ft · lb)**

NOTE:
- Use the universal joint holder ② and attachment ③ to hold the yoke.
- Apply locking agent (LOCTITE®) to the nut threads.
- Lock the threads with a drift punch.

Universal joint holder
P/N. YM-04062, 90890-04062
Universal joint holder attachment
P/N. 90890-04096





3. Install:
   • universal joint

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a. Install the yoke into the universal joint.
b. Apply wheel bearing grease to the bearings.
c. Install the bearing ① onto the yoke.

CAUTION:

Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.

d. Press each bearing into the universal joint using a suitable socket.

NOTE:

The bearing must be inserted far enough into the universal joint so that the circlip can be installed.

e. Install the circlips into the groove of each yoke.

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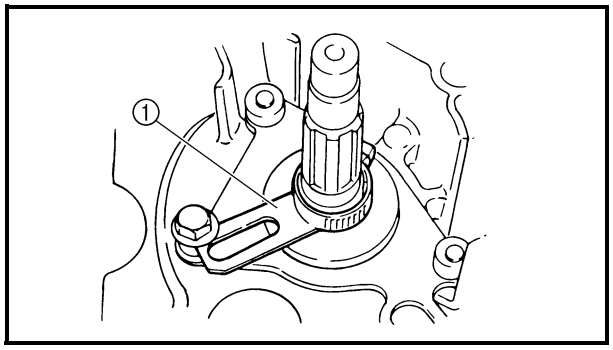

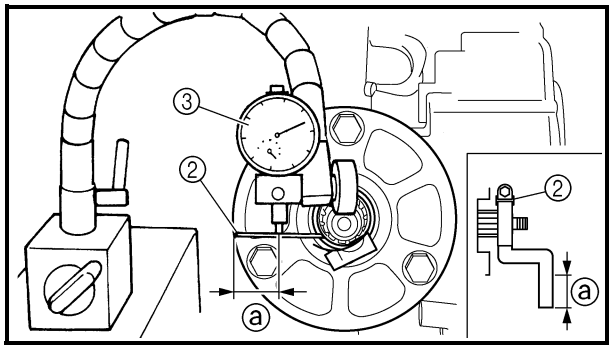

EBS00376

MEASURING THE MIDDLE GEAR BACKLASH

1. Measure:
   - middle gear lash

Middle gear lash
0.17 ~ 0.31 mm (0.007 ~ 0.012 in)

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a. Temporarily install the drive axle/middle drive pinion gear assembly and middle driven pinion gear.
b. Attach the pinion gear fix clamp ① to the drive axle/middle drive pinion gear assembly.

Pinion gear fix clamp
P/N. YM-04129, 90890-04129

NOTE:
Tighten the bolt on one corner of the pinion gear fix clamp as shown to secure the pinion gear fix clamp.

c. Attach the gear lash measurement tool ② and dial gauge ③.

Gear lash measurement tool
P/N. YM-01467, 90890-01467

ⓐ 25.2 mm (0.99 in)

d. Measure the gear lash while rotating the middle driven shaft back and forth.

NOTE:
Measure the gear lash at 4 positions. Rotate the middle driven gear 90° each time.

e. If the gear lash is incorrect, adjust the gear lash by middle driven gear shim(s).

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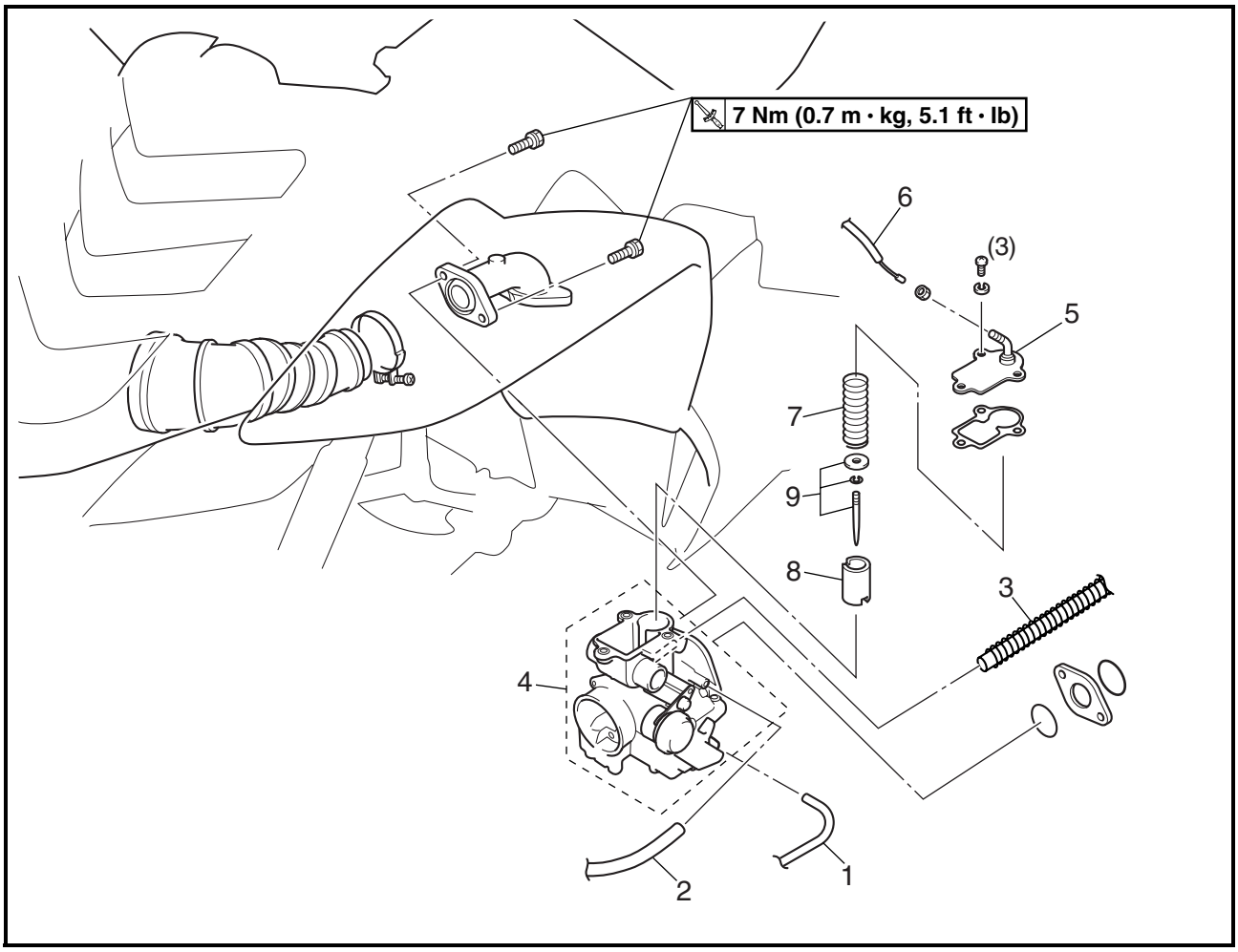
EBS00141

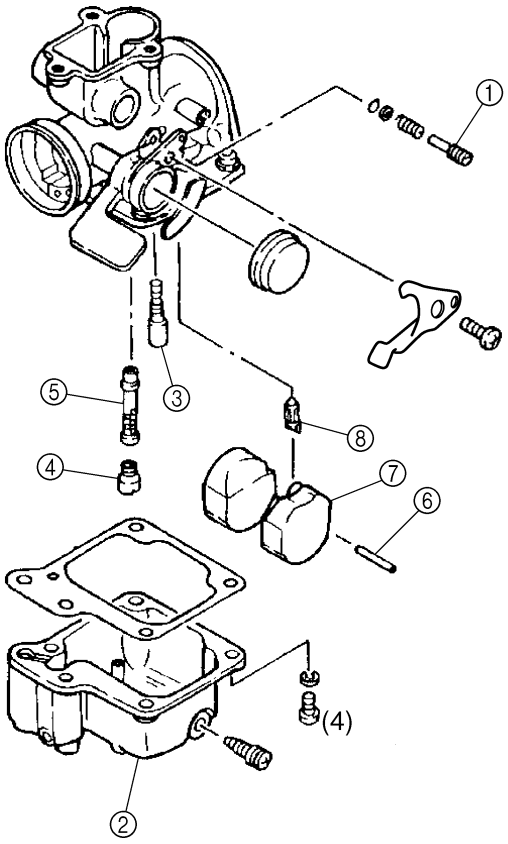
CARBURETOR

CARBURETOR

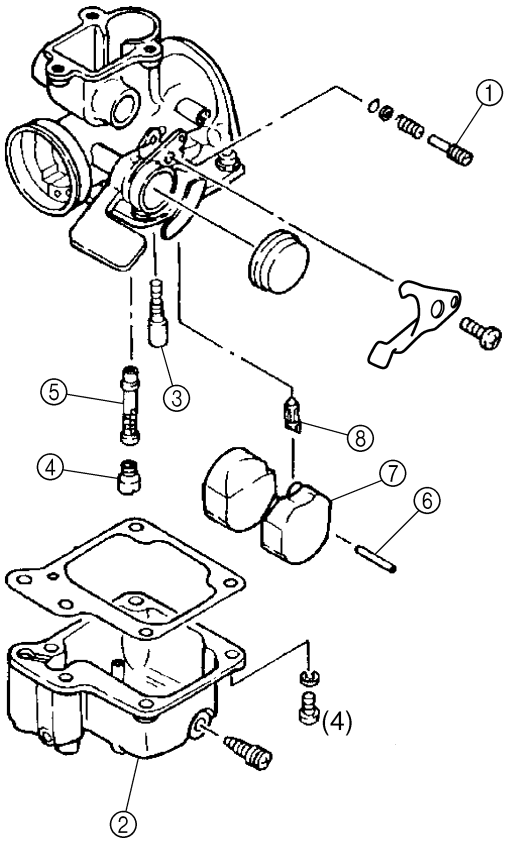


Order	Job/Part	Q'ty	Remarks
	Removing the carburetor		Remove the parts in the order listed.
1	Fuel overflow hose	1	
2	Carburetor air vent hose	1	
3	Fuel hose	1	
4	Carburetor assembly	1	
5	Carburetor top cover	1	
6	Throttle cable	1	
7	Spring	1	Refer to "INSTALLING THE CARBURETOR".
8	Piston valve	1	
9	Jet needle set	1	
			For installation, reverse the removal procedure.

EBS00144



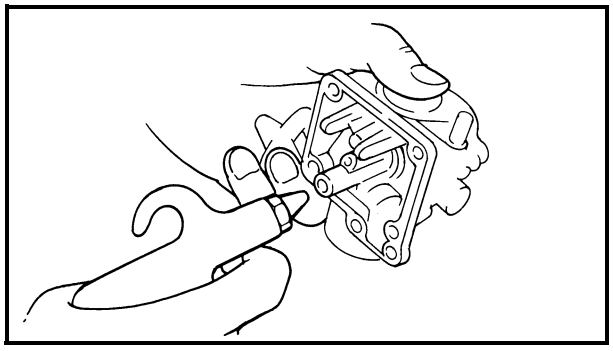
Order	Job/Part	Q'ty	Remarks
	Disassembling the carburetor		Remove the parts in the order listed. **NOTE:** Before disassembling the carburetor, make sure to note the number of times the pilot screw is turned out from the seated position to its set position.
①	Throttle stop screw	1	
②	Float chamber	1	
③	Pilot jet	1	
④	Main jet	1	
⑤	Needle jet	1	
⑥	Float pin	1	



Order	Job/Part	Q'ty	Remarks
⑦	Float	1	Refer to "ASSEMBLING THE CARBURETOR".
⑧	Needle valve	1	For assembly, reverse the disassembly procedure.

EBS00146
DISASSEMBLING THE CARBURETOR

NOTE:
Before disassembling the carburetor, make sure to note the number of times the pilot screw is turned out from the seated position to its set position.



EBS00148
CHECKING THE CARBURETOR

1. Check:
   - carburetor body
   - float chamber
     Cracks/damage → Replace.
   - fuel passage
     Contamination → Clean as indicated.
   - fuel chamber body
     Contamination → 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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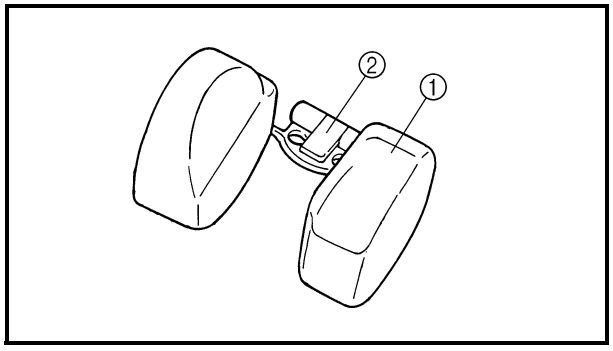
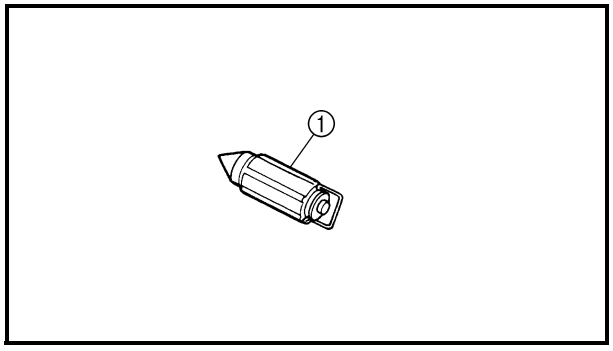
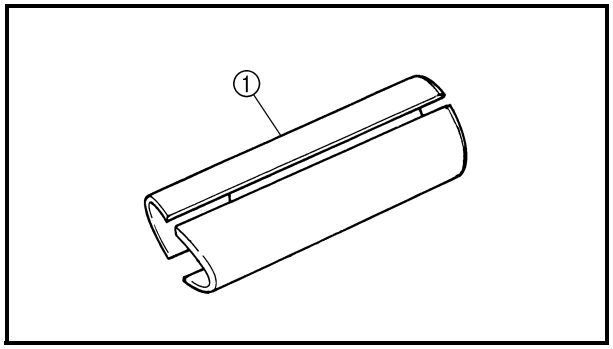


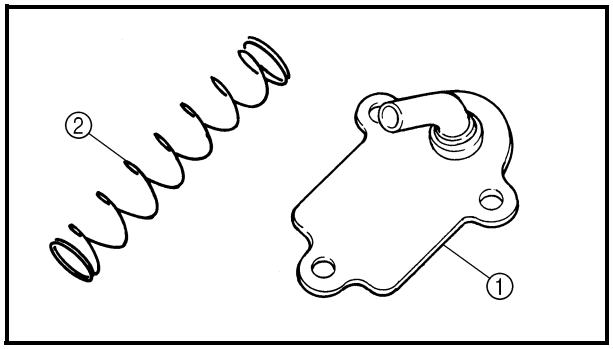
2. Check:
   - float ①
   - float tang ②
     Damage → Replace.



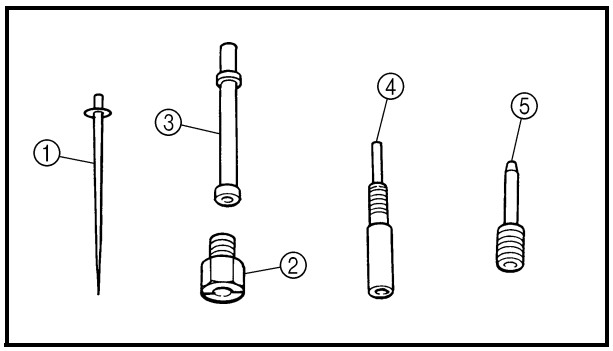
3. Check:
   - needle valve ①
     Contamination/wear/damage → Replace.



4. Check:
   - piston valve ①
     Scratches/wear/damage → Replace.



5. Check:
   - carburetor top cover ①
   - spring ②
     Cracks/damage → Replace.

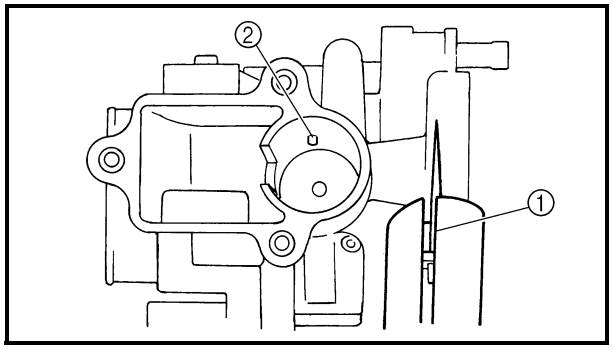


6. Check:
   - jet needle ①
   - main jet ②
   - needle jet ③
   - pilot jet ④
   - throttle stop screw ⑤
     Bends/wear/damage → Replace.
     Blockage → Blow out the jets with compressed air.
7. Check:
   - piston valve movement
     Sticks → Replace the piston valve.
     Insert the piston valve into the carburetor body, and check for free movement.
8. Check:
   - choke valve movement
     Sticks → Replace.

EBS00150
ASSEMBLING THE CARBURETOR

NOTE:
Before assembling the carburetor, make sure to turn out the pilot air screw the same number of times, as noted before disassembly, from the seated position to the set position.

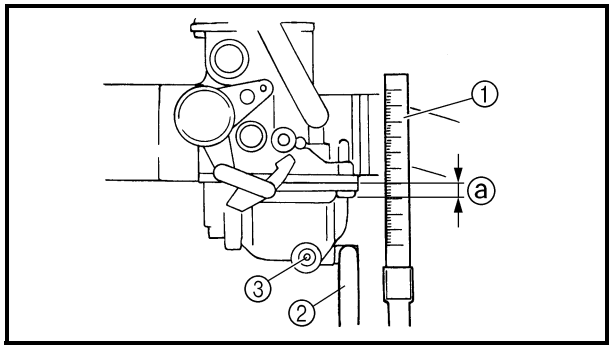
CAUTION:
- **Before reassembling, wash all of the parts in a clean petroleum based solvent.**
- **Always use a new gasket.**



INSTALLING THE CARBURETOR

1. Install:
   - jet needle set
   - piston valve
   - spring
   - throttle cable

NOTE:
Align the slit ① of the throttle valve with the tab ② of the carburetor body.



EBS00154

MEASURING AND ADJUSTING THE FUEL LEVEL

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

Fuel level
(below the float chamber mating surface)
4.0 ~ 5.0 mm (0.16 ~ 0.20 in)

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a. Stand the machine on a level surface.
b. Install the fuel level gauge ① onto the fuel drain pipe ②.

Fuel level gauge
P/N. YM-01312-A, 90890-01312

c. Loosen the fuel drain screw ③.
d. Hold the fuel level gauge vertically next to the line on the float chamber.
e. Measure the fuel level.

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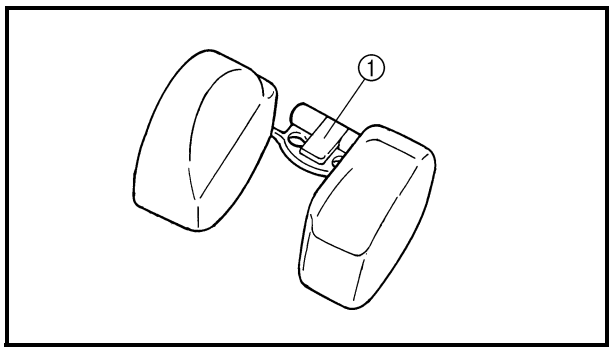

2. Adjust:
   - fuel level

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

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EBS00155

DRIVE TRAIN

TROUBLESHOOTING

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1. A pronounced hesitation or “jerky” movement during acceleration deceleration or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2. A “rolling rumble” noticeable at low speed; a high-pitched whine; a “clunk” from a shaft drive component or area. 3. A locked-up condition of the shaft drive train mechanism, no power transmitted from the engine to the rear wheels.	A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign objects lodged between the moving parts.

NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and check them.

EBS00156
CHECKING NOISES

1. Investigate any unusual noises.

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

CAUTION:

Too little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

c. A slight “thunk” evident at low speed operation. This noise must be distinguished from normal machine operation.
   Diagnosis: Possible broken gear teeth.

⚠ WARNING

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

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2. Check:
   • drained oil
   Drained oil shows large amounts of metal particles → Check the bearing for seizure.

NOTE:

A small amount of metal particles in the oil is normal.

6

3. Check:
   • oil leakage

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a. Clean the entire machine thoroughly, then dry it.
b. Apply a leak-localizing compound or dry powder spray to the shaft drive.
c. Road test the machine for the distance necessary to locate the leak.
   Leakage → Check the component housing, gasket, and/or seal for damage.
   Damage → Replace the component.

NOTE:

- An apparent oil leak on a new or nearly new machine may be the result of a rust preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

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EBS00157

TROUBLESHOOTING CHART

When basic condition “a” and “b” exist, check the following points:

Check the wheel and hub nuts for tightness. → NO → Torque to specification. (Refer to “FRONT AND REAR WHEELS” in chapter 7.)

↓ YES

Check the rear brake adjustment. → NO → Adjust per instructions. (Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.)

↓ YES

Check the rear axle. Feel for bearing damage. → NO → Rear axle bearings and rear drive shaft bearings are probably not damaged. Repeat the test or remove the individual components.

↓ YES

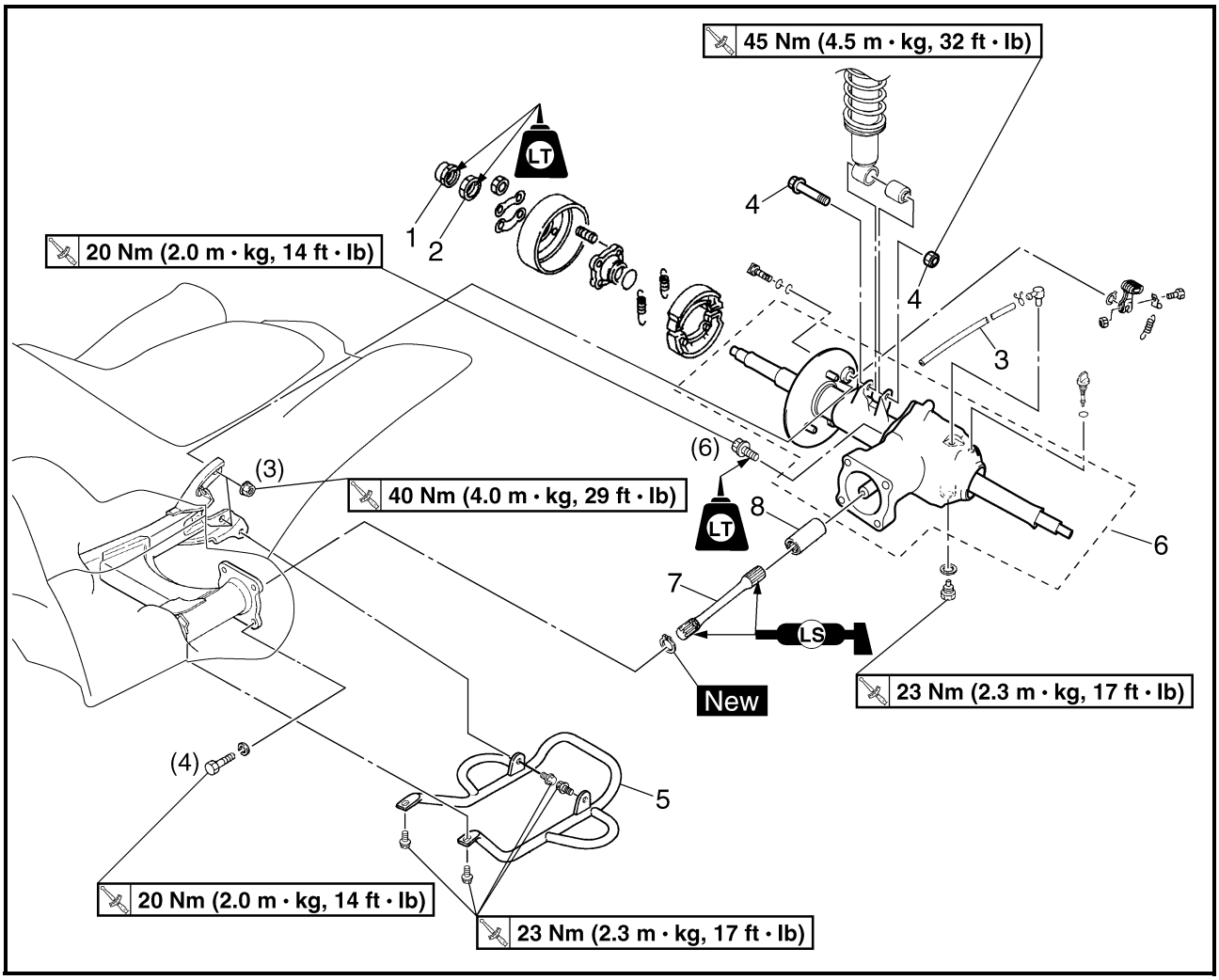
Remove the rear axle. Check for axle bearing damage. → YES → Replace the rear axle bearing. (Refer to “REAR AXLE/FINAL DRIVE ASSEMBLY AND DRIVE SHAFT”.)

↓ NO

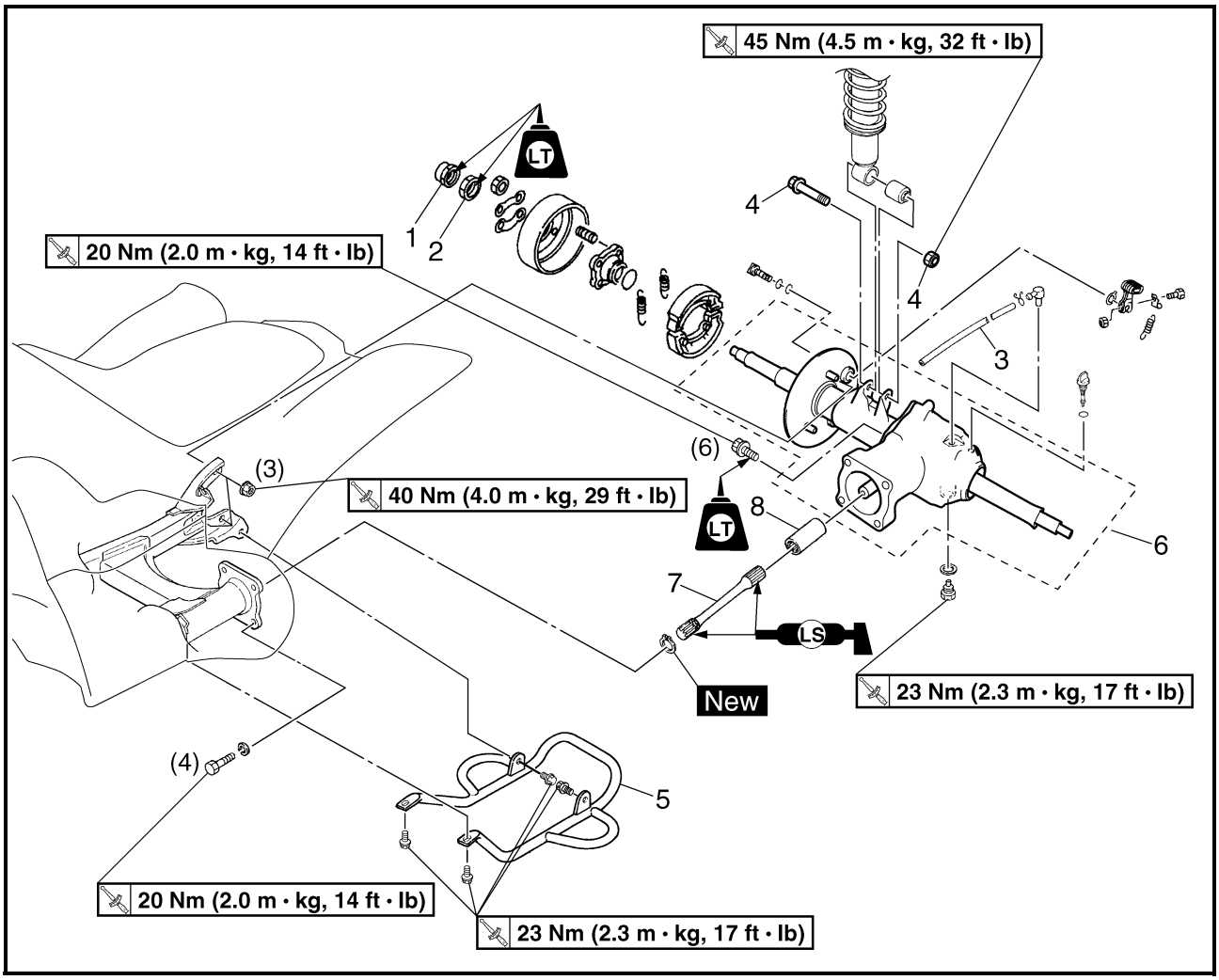
Remove the drive shaft components.

EBS00178

REAR AXLE/FINAL DRIVE ASSEMBLY AND DRIVE SHAFT



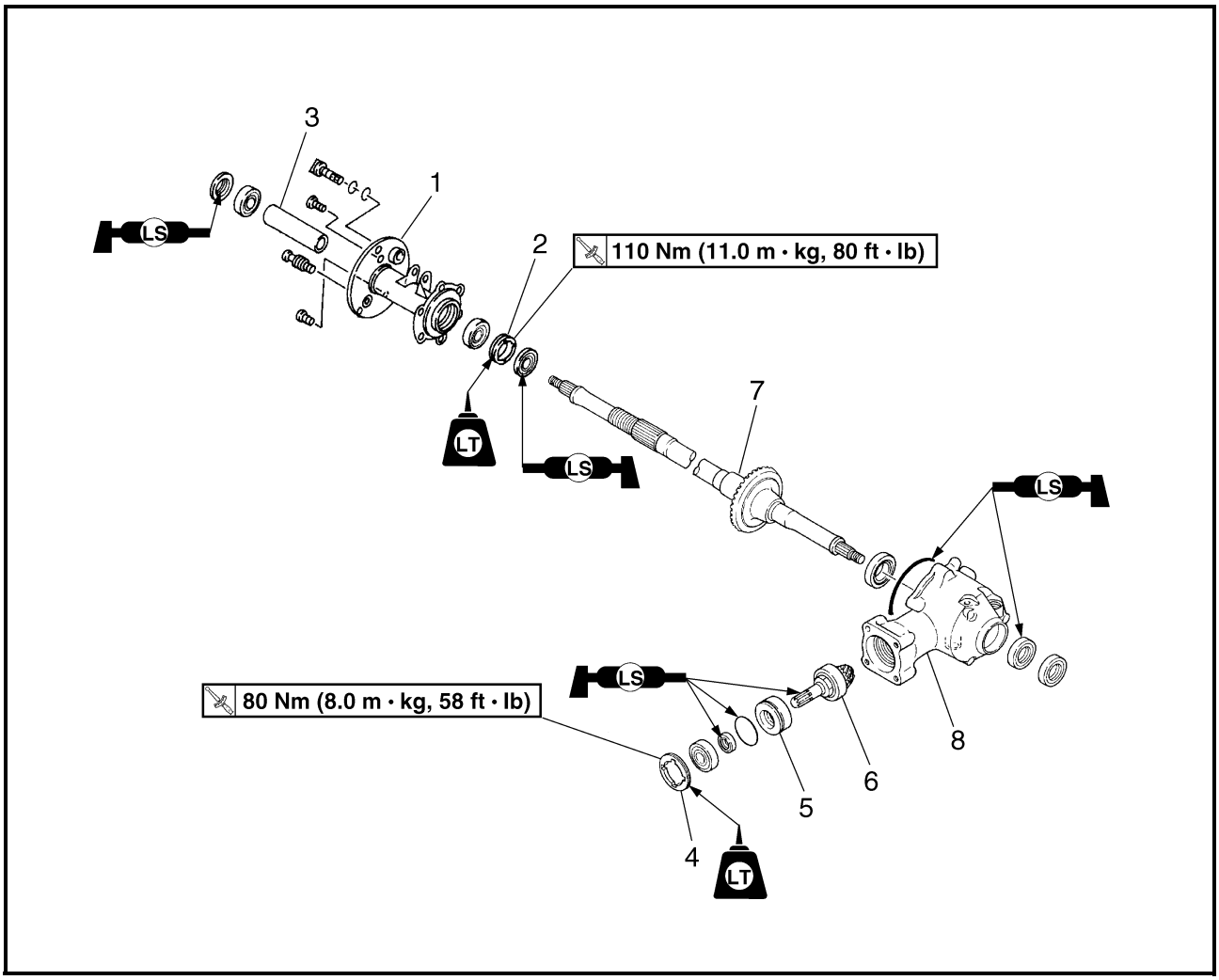
Order	Job/Part	Q'ty	Remarks
	Removing the rear axle/final drive assembly and drive shaft		Remove the parts in the order listed.
	Rear wheels		Refer to "FRONT AND REAR WHEELS" in chapter 7.
	Brake drum cover		Refer to "FRONT AND REAR BRAKES" in chapter 7.
	Final gear oil		Drain. Refer to "CHANGING THE FINAL GEAR OIL" in chapter 3.
1	Nut	1	Refer to "REMOVING THE NUTS" and "INSTALLING THE NUTS".
2	Nut	1	
3	Final gear case breather hose	1	
4	Bolt/nut	1/1	
5	Swingarm guard	1	



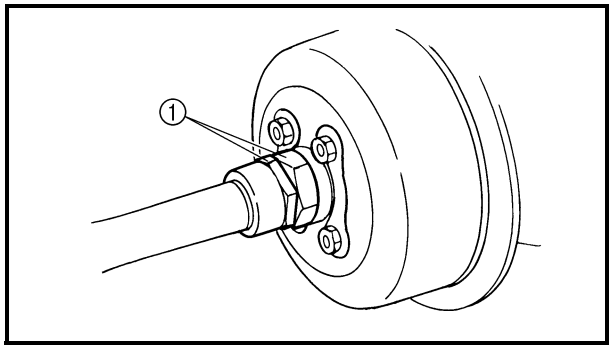
Order	Job/Part	Q'ty	Remarks
6	Rear axle/final drive assembly	1	Refer to "REMOVING THE REAR AXLE/ FINAL DRIVE ASSEMBLY" and "INSTALLING THE REAR AXLE/FINAL DRIVE ASSEMBLY". For installation, reverse the removal procedure.
7	Drive shaft	1	
8	Coupling gear	1	

EBS00179

REAR AXLE/FINAL DRIVE ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear axle/final drive assembly		Remove the parts in the order listed.
1	Rear axle housing	1	
2	Rear axle housing bearing retainer	1	Refer to "DISASSEMBLING THE REAR AXLE HOUSING" and "ASSEMBLING THE REAR AXLE HOUSING".
3	Spacer	1	
4	Final gear case bearing retainer	1	Refer to "DISASSEMBLING THE FINAL GEAR CASE" and "ASSEMBLING THE FINAL GEAR CASE".
5	Spacer	1	
6	Final drive pinion gear	1	
7	Rear axle (with final drive ring gear)	1	
8	Final gear case	1	
			For assembly, reverse the disassembly procedure.



REMOVING THE NUTS

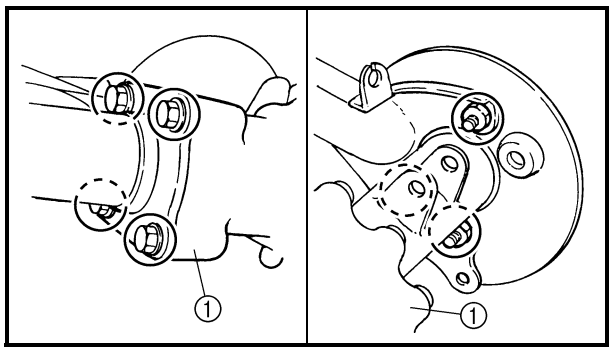
1. Place the machine on a level surface.
2. Loosen:
   - nuts ①

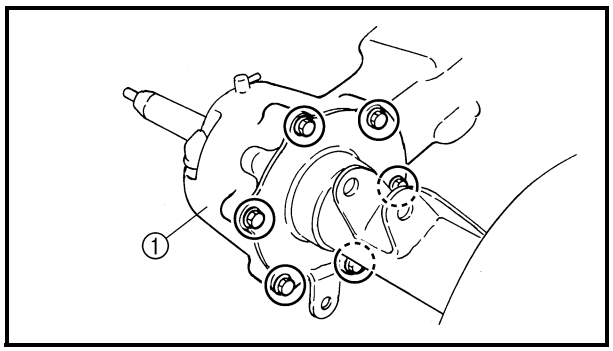
NOTE:

- Apply the rear brake lever so that the rear axle does not turn, when loosening the nuts.
- Use an axle nut wrench (36 mm).

	**Axle nut wrench (36 mm)** **P/N. YM-37132, 90890-01422**

3. Elevate the rear wheels by placing the suitable stand under the frame.
4. Remove:
   - rear wheels
   - wheel hubs
   - nuts
5. Remove:
   - rear brake assembly
     Refer to “FRONT AND REAR BRAKES” in chapter 7.



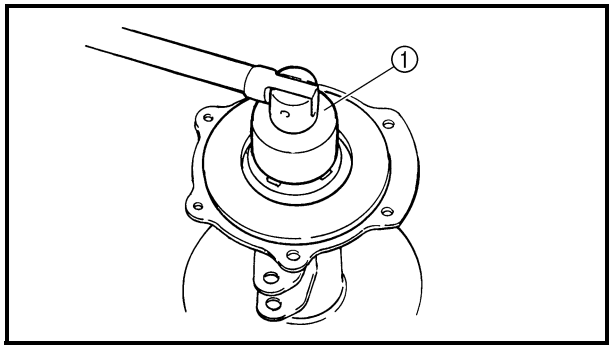


REMOVING THE REAR AXLE/FINAL DRIVE ASSEMBLY

1. Remove:
   - rear axle/final drive assembly ①

NOTE:

Remove the rear axle/final drive assembly as an assembly after removing each bolt and nut.



EBS00181
DISASSEMBLING THE REAR AXLE HOUSING

1. Remove:
   • rear axle housing bearing retainer

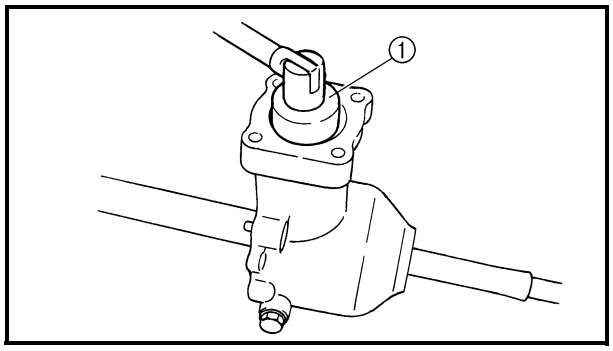
NOTE:
Use a ring nut wrench ①.

	Ring nut wrench **P/N. YM-38404, 90890-01430**

EBS00181
DISASSEMBLING THE FINAL GEAR CASE

1. Remove:
   • rear axle
   (with final drive ring gear)

CAUTION:
Never directly tap the axle end with a hammer, since this will result in damage to the axle thread and spline.

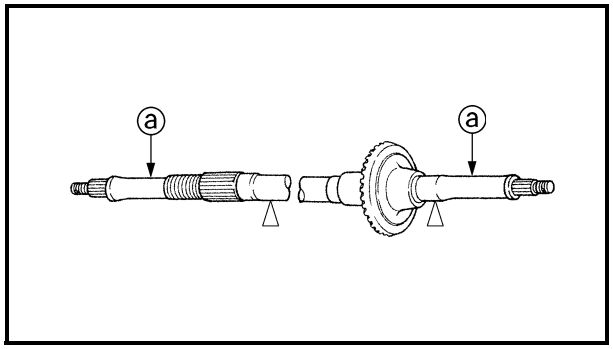


2. Remove:
   • final gear case bearing retainer

NOTE:
Use a ring nut wrench ①.

	Ring nut wrench **P/N. YM-38404, 90890-01430**

3. Remove:
   • final drive pinion gear assembly
   With a soft hammer, lightly tap on the final drive pinion gear end.



EBS00190

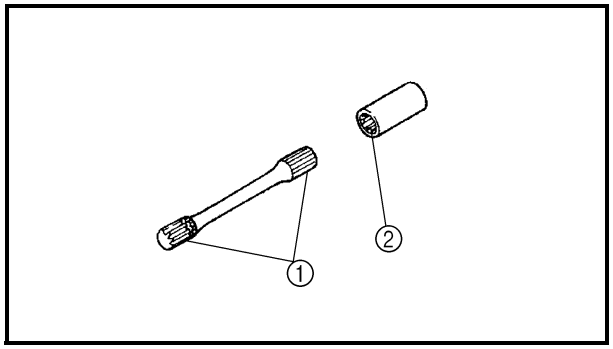
CHECKING THE REAR AXLE

1. Check:
   - rear axle runout ⓐ
     Out of specification → Replace.

⚠ WARNING

Do not attempt to straighten a bent axle.

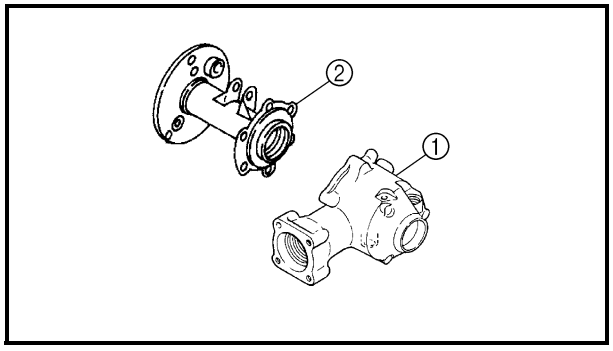
Rear axle runout limit
1.5 mm (0.06 in)



EBS00191

CHECKING THE DRIVE SHAFT

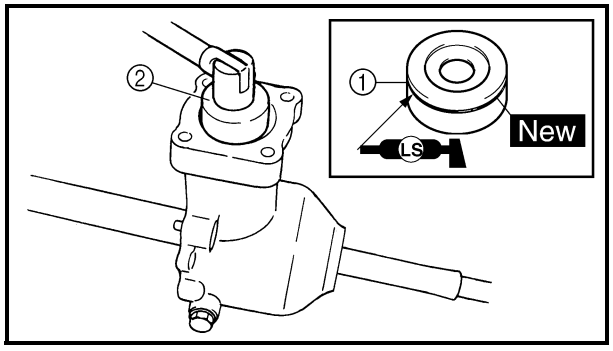
1. Check:
   - drive shaft splines ①
   - coupling gear splines ②
     Wear/damage → Replace.

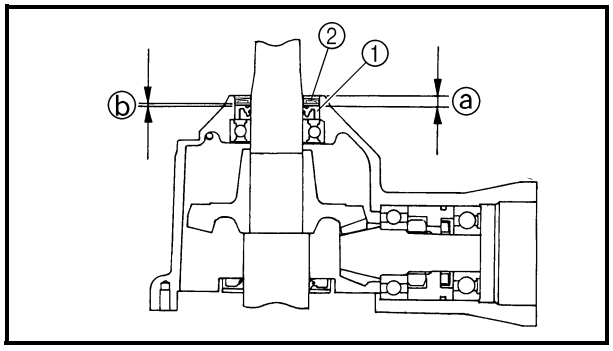


EBS00192

CHECKING THE REAR AXLE HOUSING AND FINAL DRIVE ASSEMBLY

1. Check:
   - final gear case ①
   - rear axle housing ②
     Cracks/damage → Replace.
2. Check:
   - gear teeth
     Pitting/galling/wear → Replace the drive pinion gear and ring gear as a set.
   - oil seals
   - O-rings
     Damage → Replace.
3. Check:
   - bearings
     Damage → Replace.





EBS00195

ASSEMBLING THE FINAL GEAR CASE

1. Install:
   - final drive pinion gear assembly
   - spacer ①
   - bearing
   - final gear case bearing retainer

   80 Nm (8.0 m · kg, 58 ft · lb)

   Use a ring nut wrench ②.

CAUTION:

Always use a new bearing.

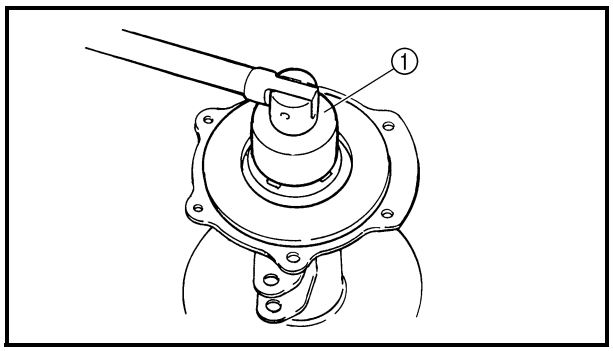
Ring nut wrench
P/N. YM-38404, 90890-01430

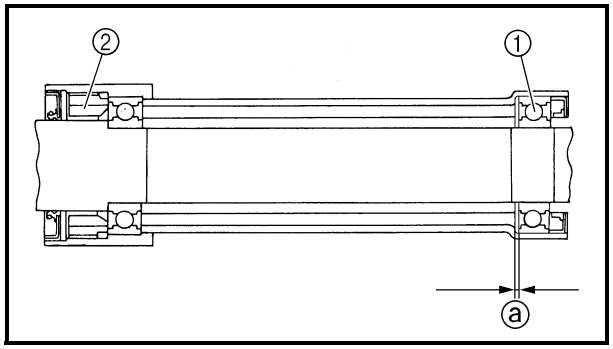
2. Install:
   - oil seal ①
   - dust seal ②

NOTE:

Install the oil seal and dust seal as shown.

ⓐ 6 ~ 6.5 mm (0.24 ~ 0.26 in)
ⓑ 1 ~ 2 mm (0.04 ~ 0.08 in)





EBS00195

ASSEMBLING THE REAR AXLE HOUSING

1. Install:
   - rear axle housing bearing retainer

   110 Nm (11.0 m · kg, 80 ft · lb)

   Use a bearing retainer wrench ①.

CAUTION:

Always use a new bearing.

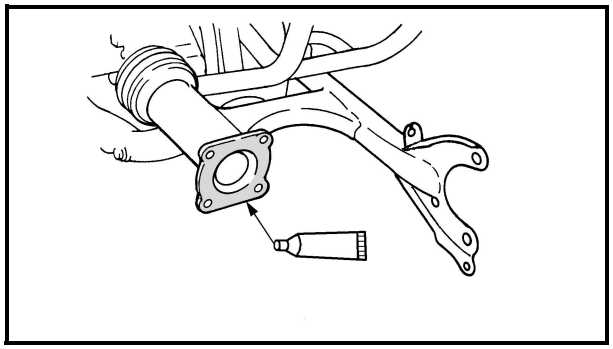
Ring nut wrench
P/N. YM-38404, 90890-01430

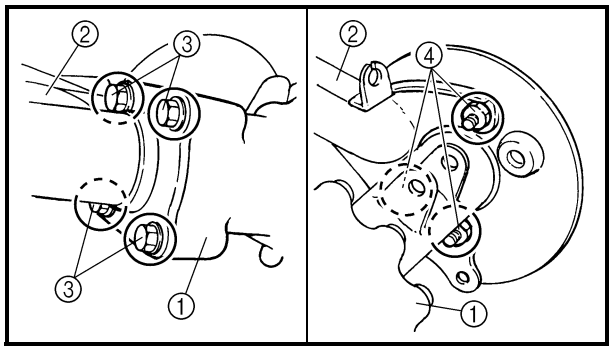
2. Install:
   - bearing ①

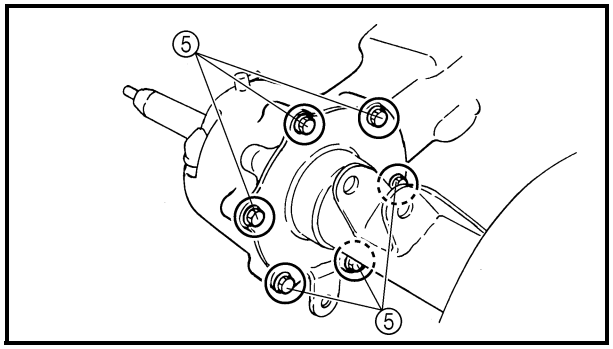
NOTE:

Install the bearing as shown.

ⓐ 0.5 mm (0.02 in)
② rear axle housing bearing retainer







EBS00196

INSTALLING THE REAR AXLE/FINAL DRIVE ASSEMBLY

1. Lubricate:
   - drive shaft
   - coupling gear
   - O-ring
   - oil seal
   - bearing

	Lithium-soap-based grease

2. Install:
   - drive shaft
   - coupling gear
     (to the universal joint)
3. Install:
   - rear axle/final drive assembly

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a. Apply sealant (Quick Gasket®) or Yamaha bond No. 1215 to the mating surfaces of the swingarm and the final gear case.

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

b. Temporarily install the rear axle/final drive assembly ① on the swingarm ②. The bolts and nuts should be temporarily tightened.
c. Check that the rear axle rotates smoothly.
d. Tighten the bolts and nuts.

① Rear axle/final drive assembly
② Swingarm
③ Bolt (× 4)
④ Nut (× 3)
⑤ Bolt (× 6)

	Bolt ③ **20 Nm (2.0 m · kg, 14 ft · lb)** **Nut ④** **40 Nm (4.0 m · kg, 29 ft · lb)** **Bolt ⑤** **20 Nm (2.0 m · kg, 14 ft · lb)** **LOCTITE®**

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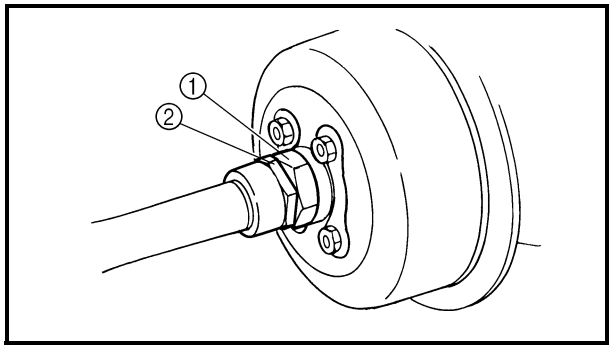

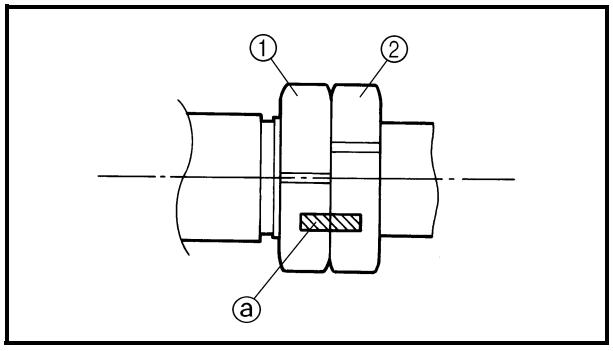

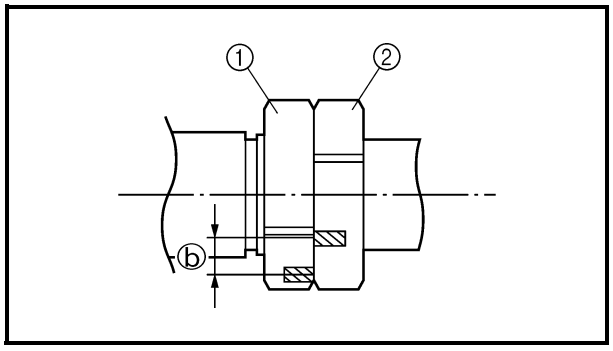

EBS00397

INSTALLING THE NUTS

1. Tighten:
   - nuts ①, ②

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a. Check if the rear brake assembly is installed on the rear axle housing. If the rear brake assembly is not installed, refer to "FRONT AND REAR BRAKES" in chapter 7 for installation instructions.

NOTE:

Before tightening the nuts, apply the LOCTITE® to the thread portion of the rear axle.

b. Finger tighten the inside nut ① while checking the ring gear engagement.
c. Tighten the inside nut with rear axle nut wrench to specification while holding the rear axle.

	**Axle nut wrench (36 mm)** **P/N. YM-37132, 90890-01422**

	**Inside nut (first tightening)** **110 Nm (11.0 m · kg, 80 ft · lb)**

d. Hold the inside nut ① and tighten the outside nut ② with the rear axle nut wrench to specification.

	**Outside nut** **130 Nm (13.0 m · kg, 94 ft · lb)**

e. Draw a line ⓐ on the inside and outside nut.
f. Hold the outside nut ② and tighten back the inside nut ① with the rear axle nut wrench to specification.

	**Inside nut (final tightening)** **160 Nm (16.0 m · kg, 115 ft · lb)**

g. Measure the distance ⓑ between the lines. If distance ⓑ is less then 3 mm (0.12 in), retighten back the inside nut.

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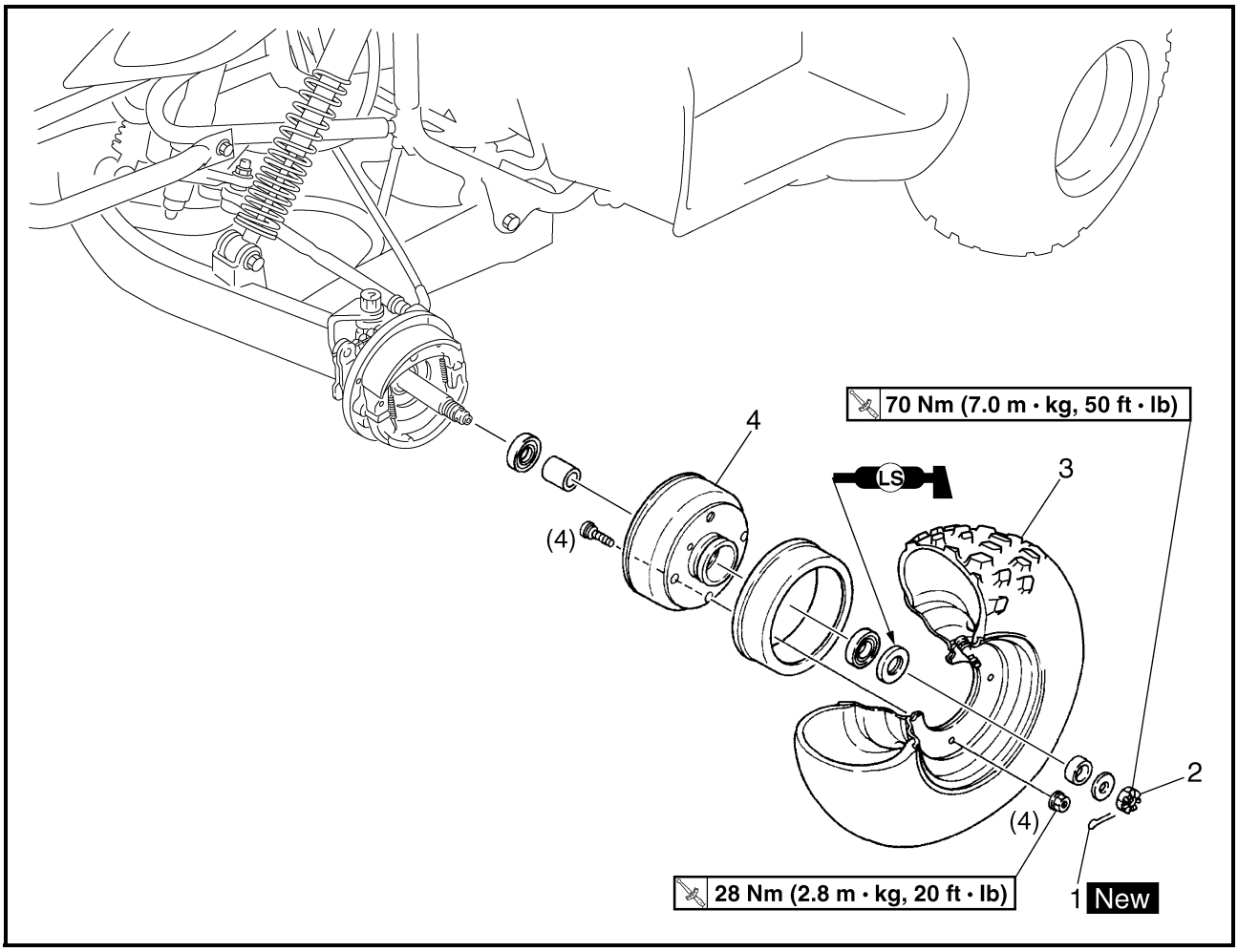
EBS00378

CHASSIS

FRONT AND REAR WHEELS

FRONT WHEELS

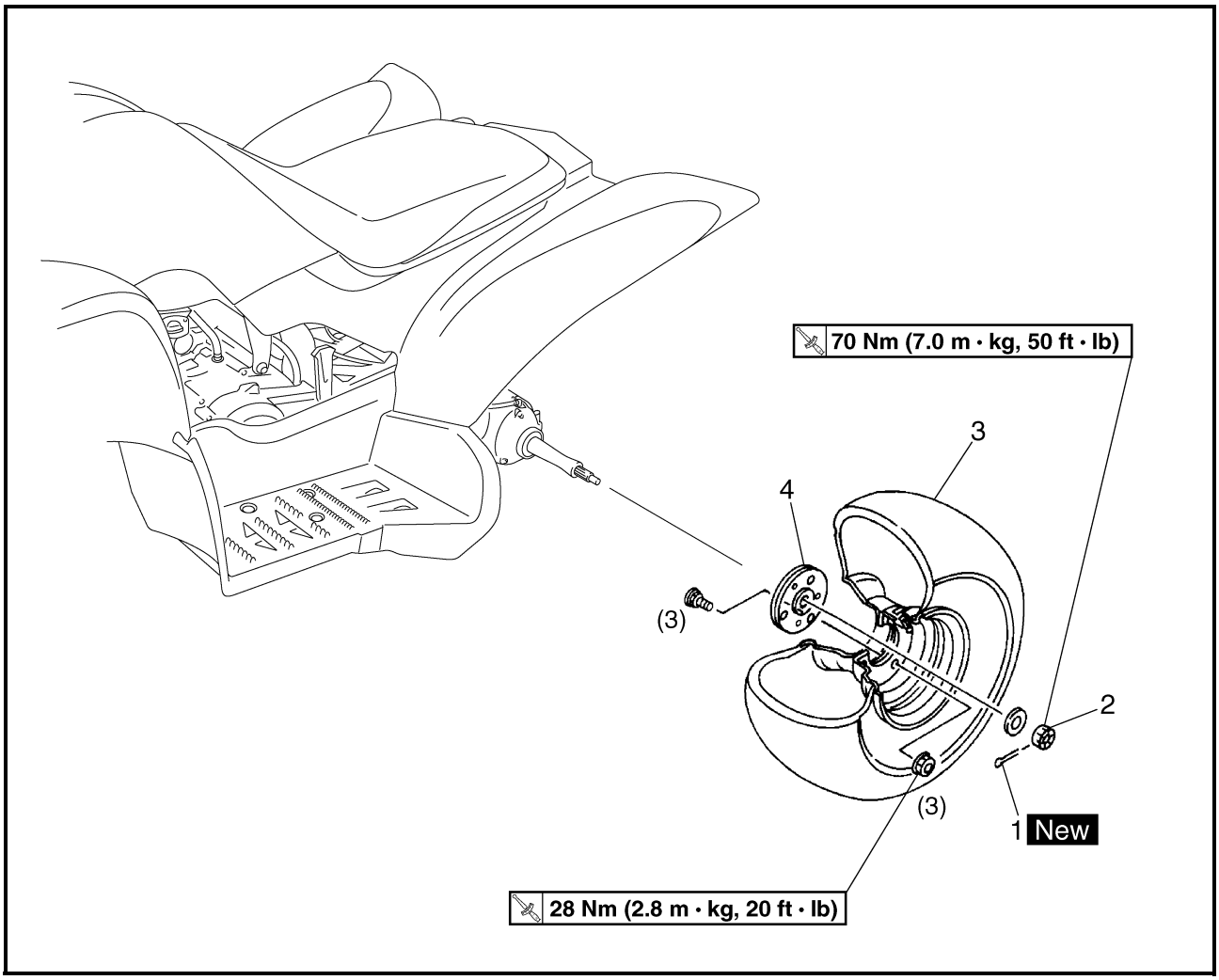


Order	Job/Part	Q'ty	Remarks
	Removing the front wheels		Remove the parts in the order listed. Place the machine on a level surface. **⚠ WARNING** **Securely support the machine so there is no danger of it falling over.** The following procedure applies to both of the front wheels.
1	Cotter pin	1	Refer to "INSTALLING THE WHEEL HUBS".
2	Axle nut	1	
3	Front wheel	1	Refer to "INSTALLING THE WHEELS".
4	Front brake drum	1	For installation, reverse the removal procedure.

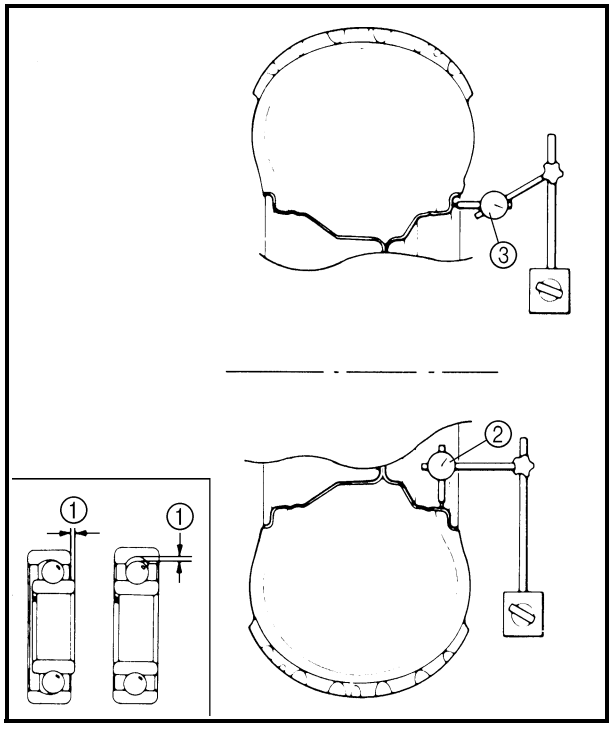
7

EBS00379

REAR WHEELS



Order	Job/Part	Q'ty	Remarks
	Removing the rear wheels		Remove the parts in the order listed. Place the machine on a level surface. **⚠ WARNING** **Securely support the machine so there is no danger of it falling over.** The following procedure applies to both of the rear wheels.
1	Cotter pin	1	Refer to "INSTALLING THE WHEEL HUBS".
2	Axle nut	1	
3	Rear wheel	1	Refer to "INSTALLING THE WHEELS".
4	Rear wheel hub	1	For installation, reverse the removal procedure.



EBS00383
CHECKING THE WHEELS

The following procedure applies to both of the front and rear wheels.

1. Check:
   - wheel
2. Measure:
   - wheel runout

   Over the specified limit → Replace the wheel or check the wheel bearing play ①.

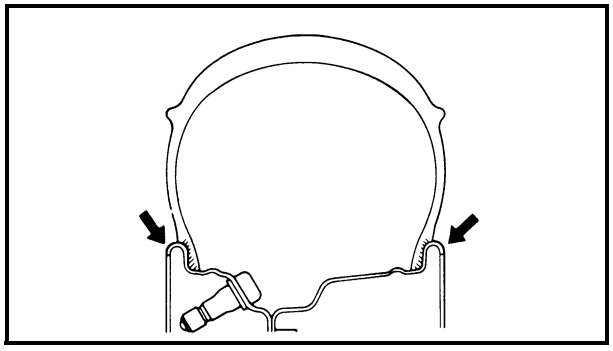
Wheel runout limit
Radial ②: 2.0 mm (0.08 in)
Lateral ③: 2.0 mm (0.08 in)

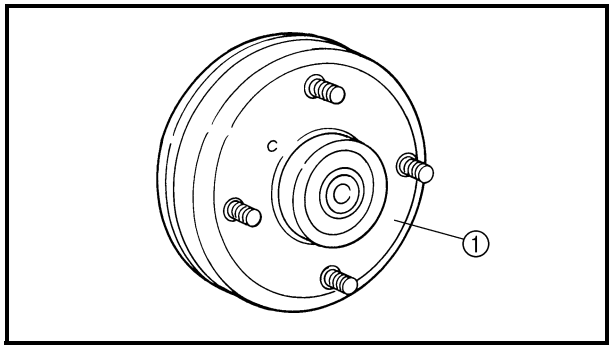
3. Check:
   - wheel balance

   Out of balance → Adjust.

⚠ WARNING

After replacing the tire, ride conservatively to allow the tire to be properly seated in the rim. Failure to do so may cause an accident resulting in machine damage and possible operator injury.





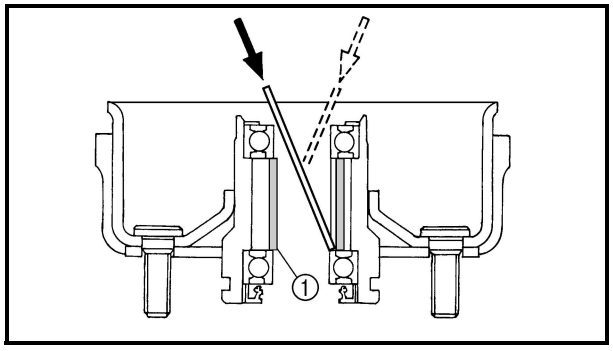
EBS00385
CHECKING THE FRONT WHEEL HUBS

The following procedure applies to both of the front wheel hubs.

1. Check:
   - front wheel hub ①

   Cracks/damage → Replace.
2. Check:
   - wheel bearings

   Wheel hub play/wheel turns roughly → Replace.



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a. Clean wheel hub exterior.
b. Drive bearing out by pushing spacer aside and tapping around perimeter of bearing inner race. Use soft metal drift punch and hammer. The spacer ① “floats” between bearings. Remove both bearings as described.

⚠ WARNING

Eye protection is recommended when using striking tools.

c. To install the wheel bearings, reverse the above sequence. Use a socket that matches outside diameter of bearing outer race to drive in bearing.

CAUTION:

Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

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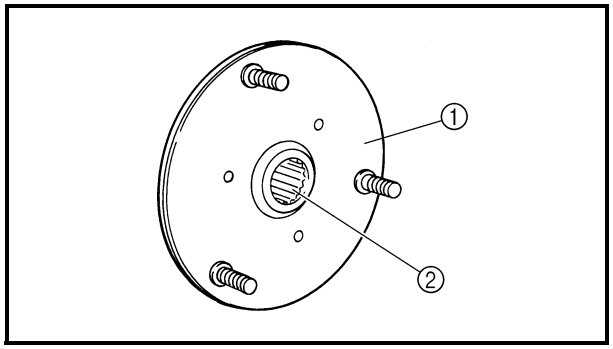
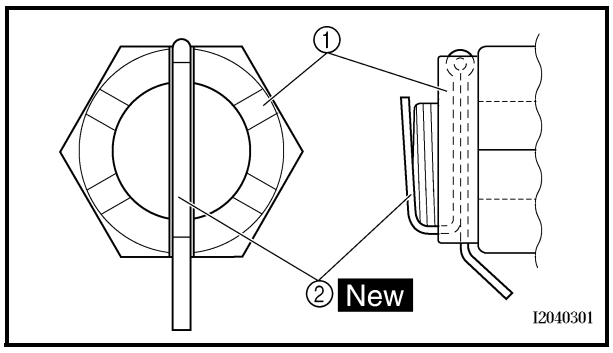


EBS00384

CHECKING THE REAR WHEEL HUBS

The following procedure applies to both of the rear wheel hubs.

1. Check:
   - rear wheel hub ①
     Cracks/damage → Replace.
   - wheel hub splines ②
     Wear/damage → Replace.



EBS00390

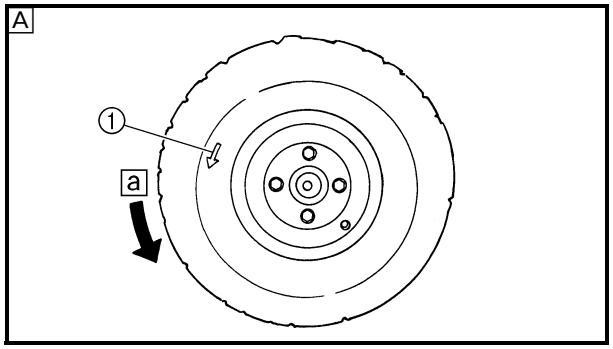
INSTALLING THE WHEEL HUBS

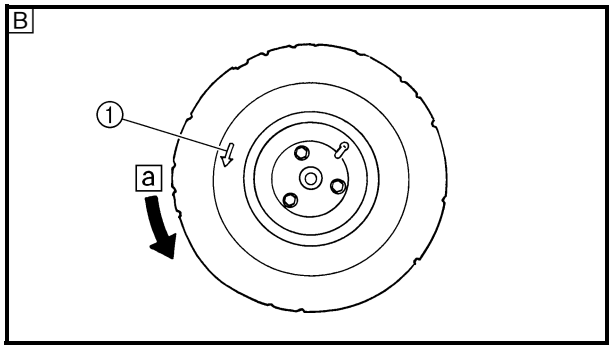
The following procedure applies to both of the front and rear wheel hubs.

1. Install:
   - axle nut ① **70 Nm (7.0 m · kg, 50 ft · lb)**
   - cotter pin ② New

NOTE:

Do not loosen the axle nut after torquing it. If the axle nut groove is not aligned with the cotter pin hole, align the groove with the hole by tightening the axle nut.





EBS00391

INSTALLING THE WHEELS

The following procedure applies to both of the front and rear wheels.

1. Install:
   - wheel

NOTE:

The arrow mark ① on the tire must point in the direction of rotation [a] of the wheel.

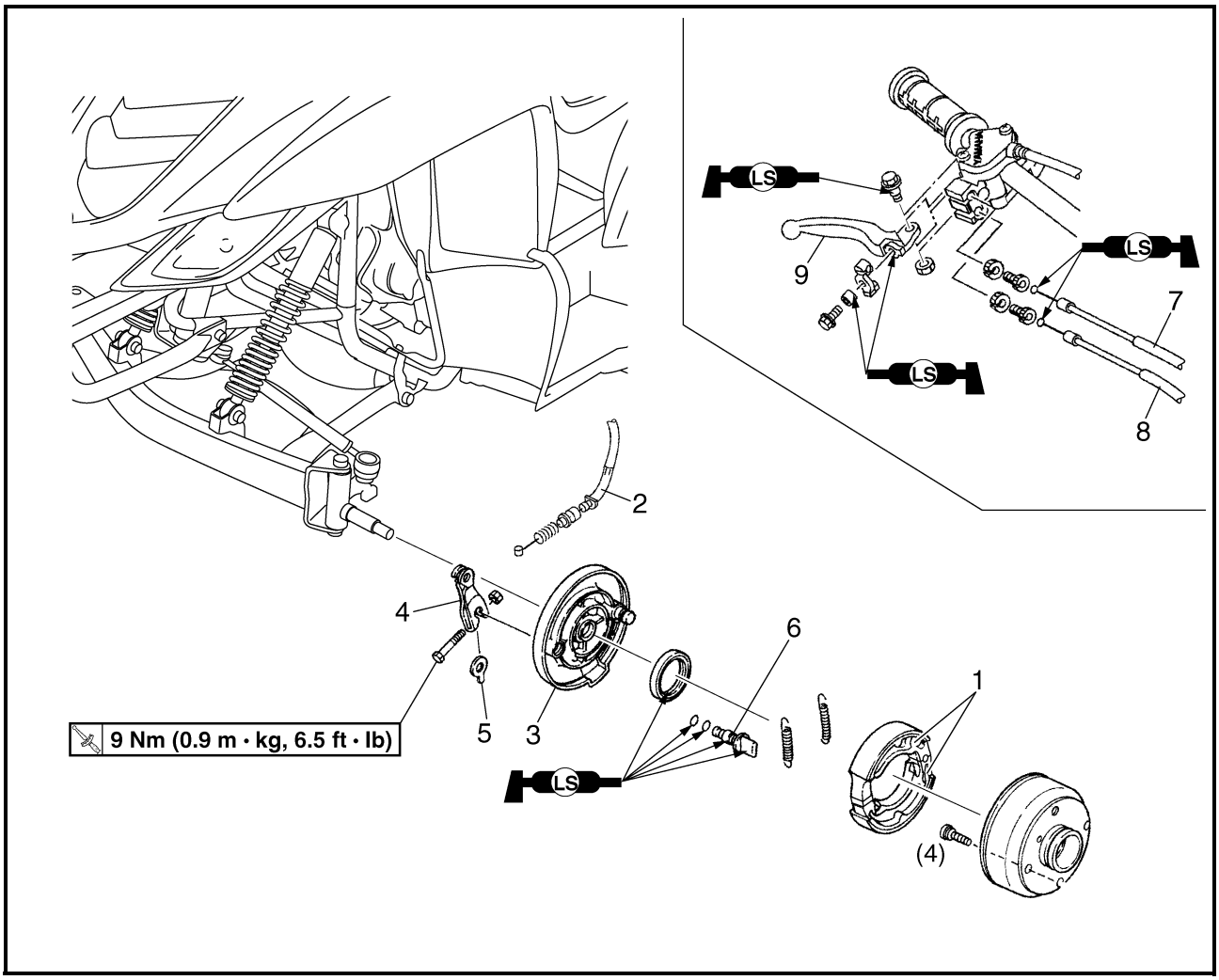
[A] Front wheel
[B] Rear wheel

2. Tighten:
   - nuts — **28 Nm (2.8 m · kg, 20 ft · lb)**

EBS00437

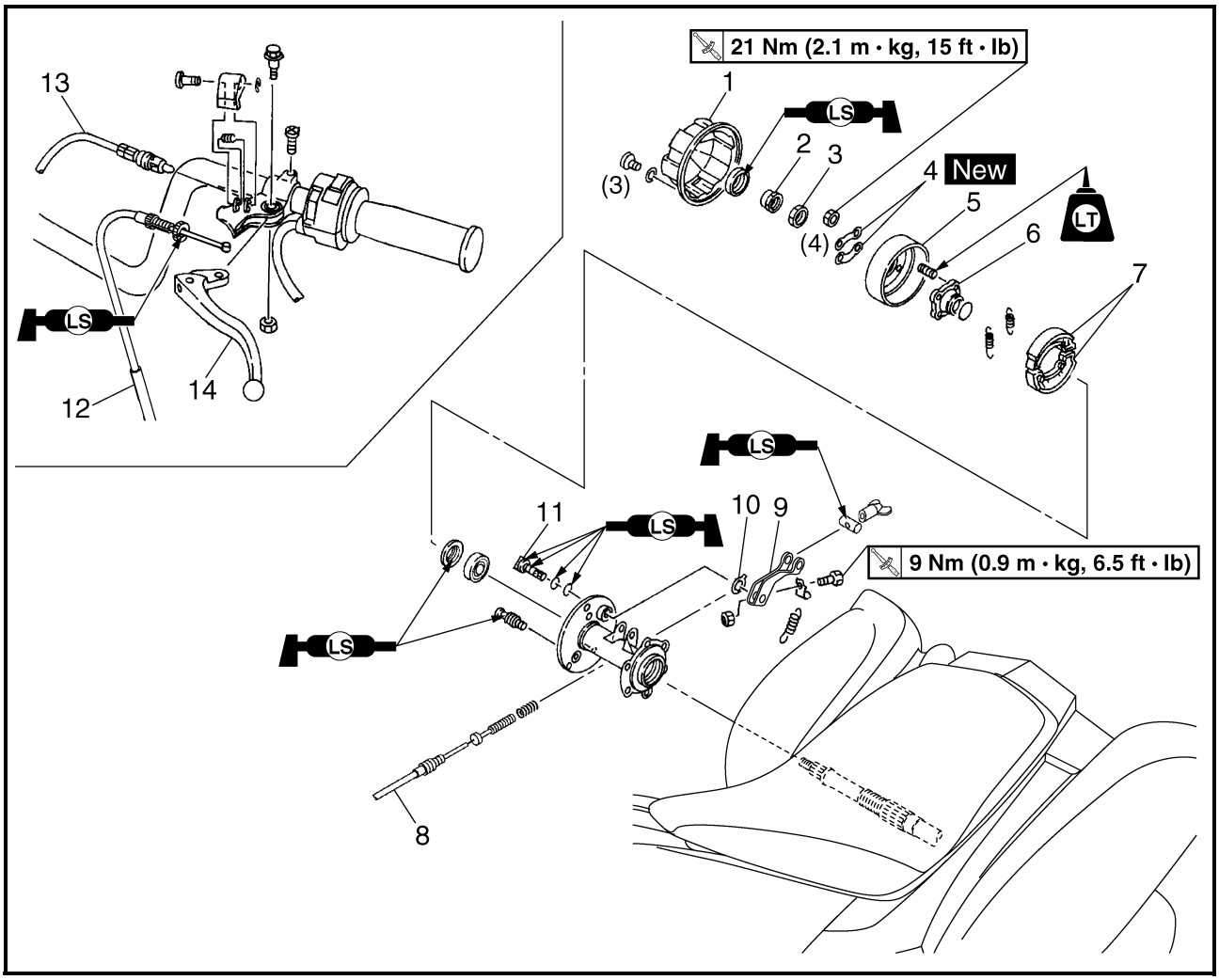
FRONT AND REAR BRAKES

FRONT BRAKE

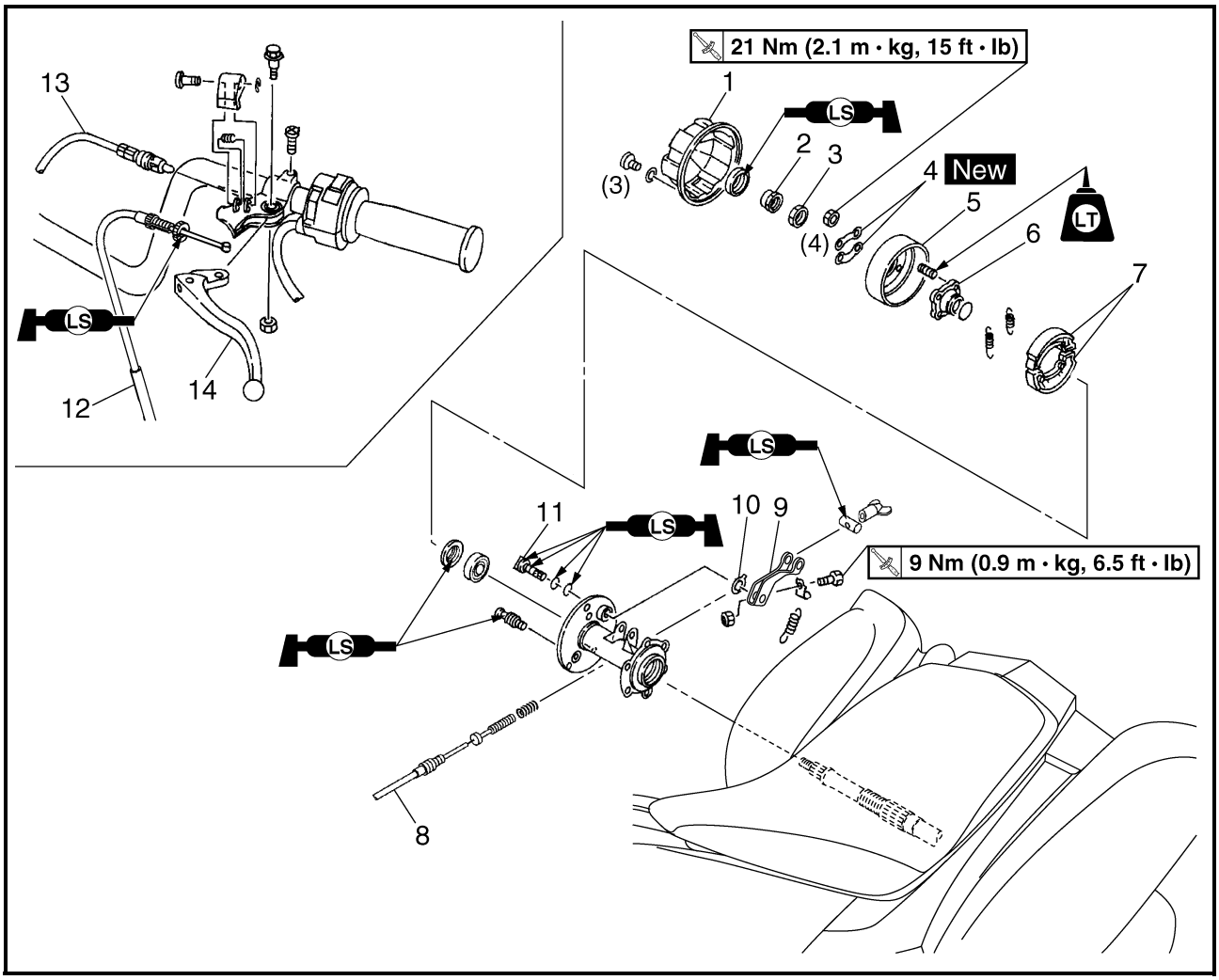


Order	Job/Part	Q'ty	Remarks
	Removing the front brakes		Remove the parts in the order listed.
	Front wheels		Refer to "FRONT AND REAR WHEELS". The following procedure applies to both of the front brakes.
1	Brake shoe	2	Refer to "INSTALLING THE FRONT BRAKES".
2	Front brake cable (drum side)	1	
3	Brake shoe plate	1	
4	Brake camshaft lever	1	Refer to "REMOVING THE BRAKES" and "INSTALLING THE FRONT BRAKES".
5	Brake shoe wear indicator	1	
6	Brake camshaft	1	
7	Left front brake cable (lever side)	1	
8	Right front brake cable (lever side)	1	
9	Front brake lever	1	
			For installation, reverse the removal procedure.

REAR BRAKE



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake		Remove the parts in the order listed. Refer to "FRONT AND REAR WHEELS".
1	Brake drum cover	1	
2	Nut	1	Refer to "REAR AXLE/FINAL DRIVE ASSEMBLY AND DRIVE SHAFT" in chapter 6.
3	Nut	1	
4	Lock washer	2	Refer to "INSTALLING THE REAR BRAKE".
5	Brake drum	1	
6	Brake drum boss	1	
7	Brake shoe	2	
8	Rear brake cable (drum side)	1	
9	Brake camshaft lever	1	Refer to "REMOVING THE BRAKES" and "INSTALLING THE REAR BRAKE".
10	Brake shoe wear indicator	1	
11	Brake camshaft	1	



Order	Job/Part	Q'ty	Remarks
12	Rear brake cable (lever side)	1	
13	Rear brake switch	1	
14	Rear brake lever	1	
			For installation, reverse the removal procedure.

REMOVING THE BRAKES

The following procedure applies to each brake.

1. Remove:
   - brake camshaft lever
   - brake shoe wear indicator
   - brake camshaft

NOTE:

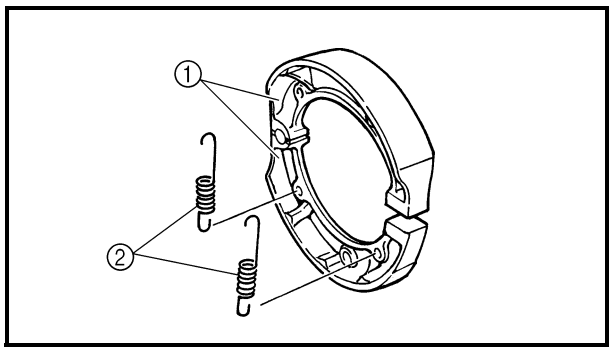
When removing the brake camshaft lever, mark the position on the brake camshaft lever where it is aligned with the punch mark in the brake camshaft.

EBS00439

CHECKING THE BRAKE SHOE PLATES

The following procedure applies to each brake.

1. Check:
   - brake shoe plate
   - pivot pin
   - brake camshaft
     Bends/cracks/damage → Replace.
   - dust seal
     Wear/damage → Replace.



EBS00440

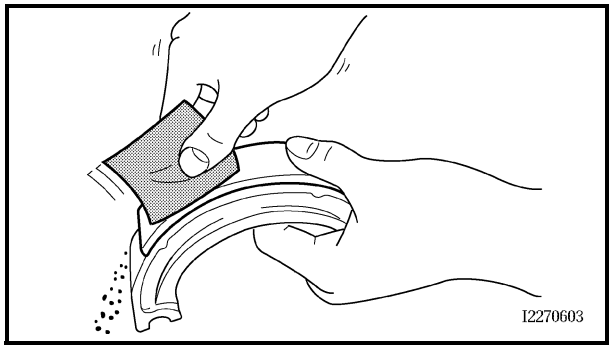
CHECKING THE BRAKE SHOES

The following procedure applies to each brake.

1. Check:
   - brake shoes ①
   - brake shoe springs ②
     Cracks/damage → Replace as a set.

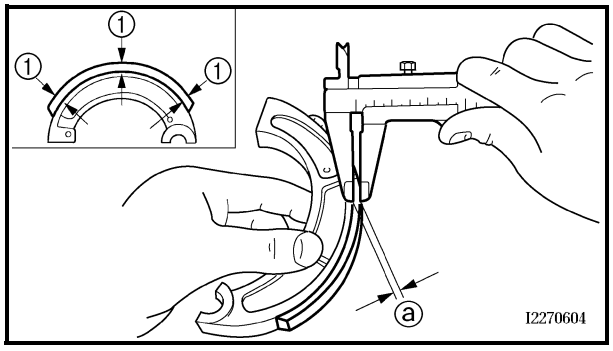
NOTE:

When replacing the brake shoes, replace the brake shoe springs at the same time.



2. Check:
   • brake shoe lining surface
   Glazed areas → Remove.
   Use coarse sandpaper.

NOTE:
After using sandpaper, wipe off the polished particles with a cloth.

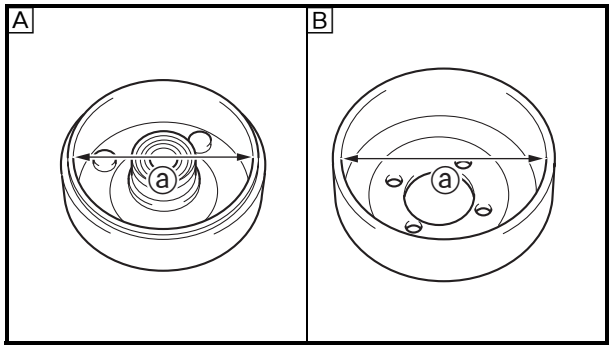


3. Measure:
   • brake shoe lining thickness ⓐ
   Out of specification → Replace.

① Measuring points

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

Brake lining thickness
4.0 mm (0.16 in)
<Limit>: 2.0 mm (0.08 in)



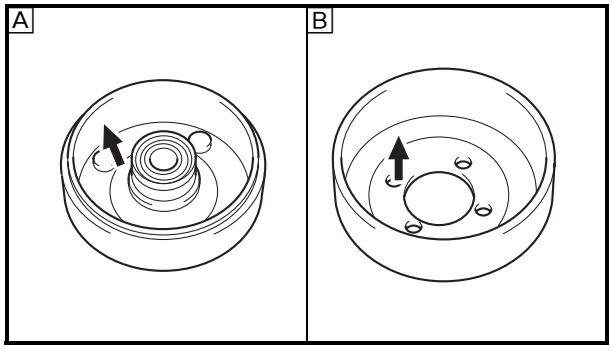
EBS00441
CHECKING THE BRAKE DRUMS

The following procedure applies to each brake.

1. Measure:
   • brake drum inside diameter ⓐ
   Out of specification → Replace.

Rear brake drum inside diameter
Front: 110.0 mm (4.33 in)
<Limit>: 110.5 mm (4.35 in)
Rear: 130.0 mm (5.12 in)
<Limit>: 130.5 mm (5.14 in)

A Front brake drum
B Rear brake drum



2. Check:
   • brake drum inner surface
     Oil/scratches → Remove.

Oil	**Use a rag soaked in lacquer thinner or solvent.**
Scratches	**Use an emery cloth (light and even polishing).**

A Front brake drum
B Rear brake drum

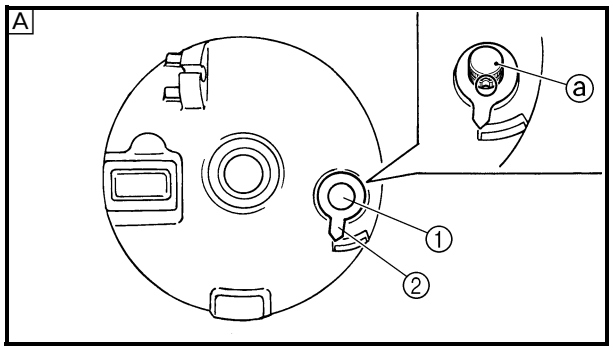
EBS00442
INSTALLING THE FRONT BRAKES

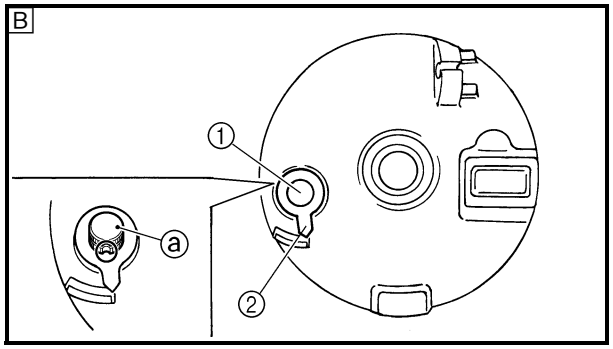
The following procedure applies to both of the front brakes.
Reverse the “Removal” procedure.
Note the following points.
1. Lubricate:
   • brake camshaft
   • pivot pin

	Lithium-soap-based grease

CAUTION:

During installation, lightly grease the brake camshaft and the pivot pin. Wipe off the excess grease.





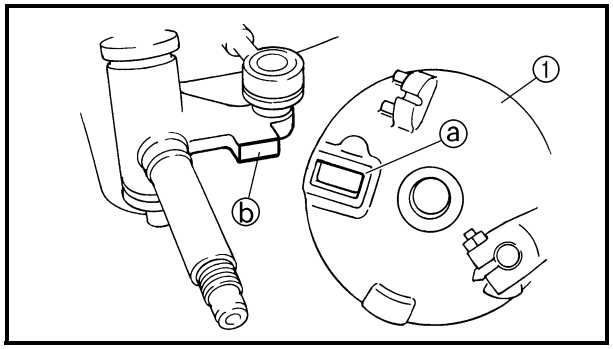
2. Install:
   • brake camshaft ①
   • brake shoe wear indicator ②
   • brake camshaft lever

	9 Nm (0.9 m · kg, 6.5 ft · lb)

NOTE:

- Install the brake camshaft so its punch mark ⓐ is positioned as shown.
- Align the projection on the brake shoe wear indicator with the notch in the brake camshaft.
- Align the punch mark in the brake camshaft with the mark on the brake camshaft lever.

A Left side
B Right side



3. Install:
   • brake shoe plate ①

NOTE:
When installing the brake shoe plate, align the groove ⓐ of the brake shoe plate with the projection ⓑ of the steering knuckle.

4. Install:
   • front brake cable (drum side)
   • brake shoes

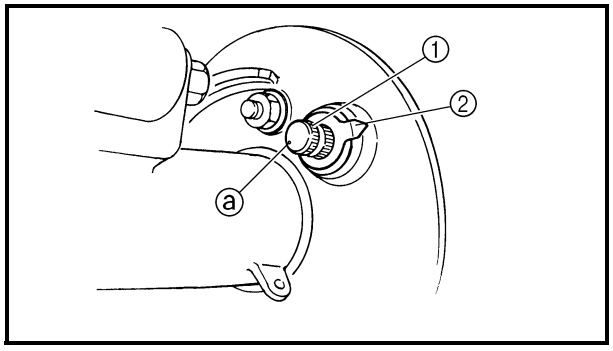
NOTE:
Check that the brake shoes are properly positioned.

5. Check:
   • brake camshaft operation
   Unsmooth operation → Repair.
6. Adjust:
   • front brake
   Refer to "ADJUSTING THE FRONT BRAKE" in chapter 3.

EBS00442
INSTALLING THE REAR BRAKE
Reverse the "Removal" procedure.
Note the following points.
1. Lubricate:
   • brake camshaft
   • pivot pin

	Lithium-soap-based grease

CAUTION:
During installation, lightly grease the brake camshaft and the pivot pin. Wipe off the excess grease.



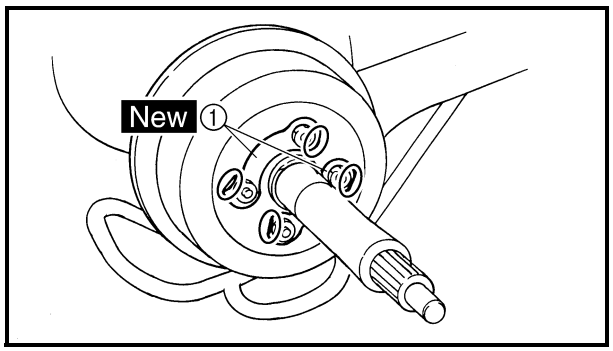
2. Install:
   - brake camshaft ①
   - brake shoe wear indicator plate ②
   - brake camshaft lever

   9 Nm (0.9 m · kg, 6.5 ft · lb)

NOTE:
- Install the brake camshaft so its punch mark ⓐ is positioned as shown.
- Align the projection on the brake shoe wear indicator with the notch in the brake camshaft.
- Align the punch mark in the brake camshaft with the mark on the brake camshaft lever.

3. Install:
   - rear brake cable (drum side)
   - brake shoes

NOTE:
Check that the brake shoes are properly positioned.



4. Install:
   - brake drum boss
   - brake drum
   - lock washers ① New

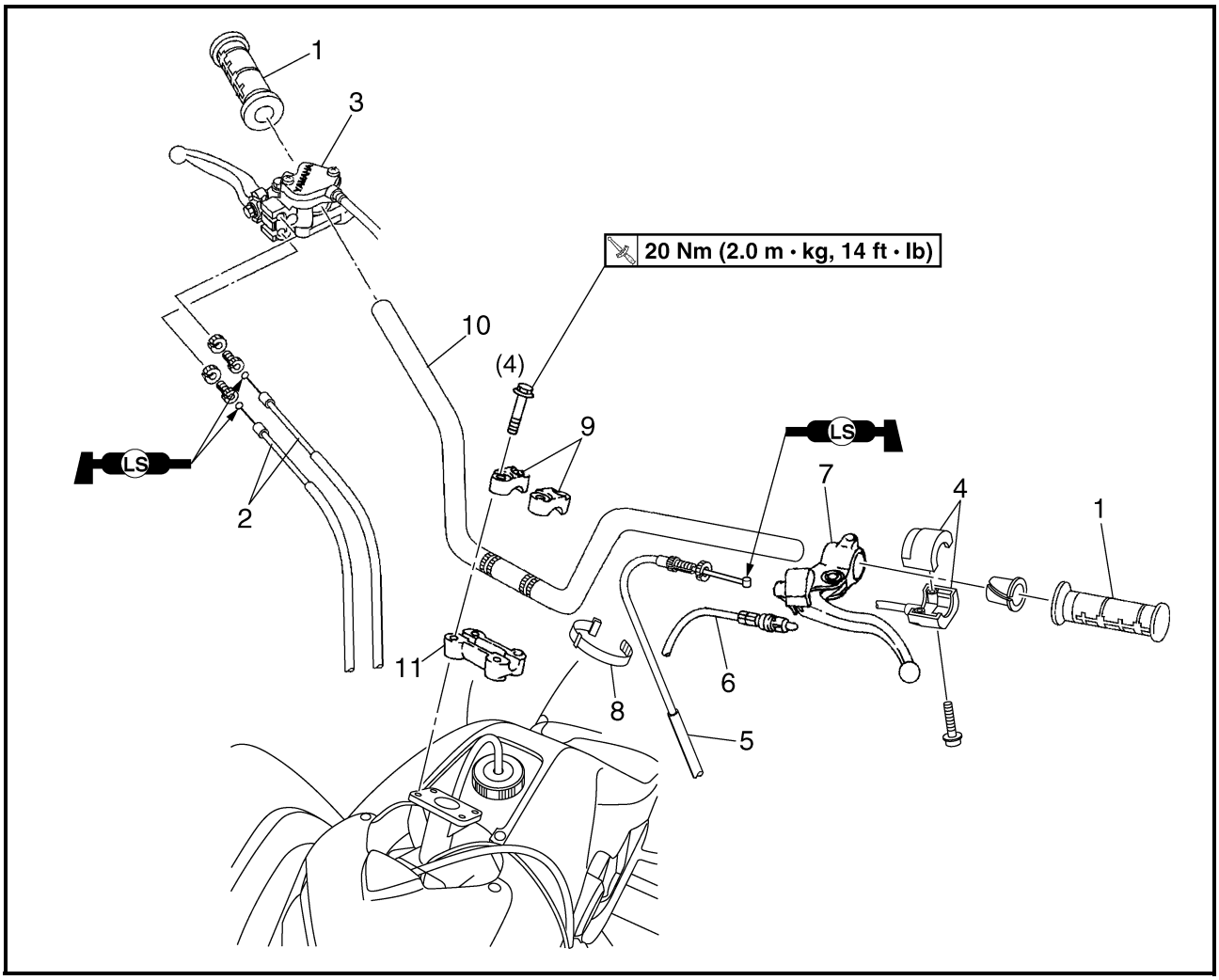
NOTE:
Bend the tabs of each lock washer along a flat side of each nut.

5. Check:
   - brake camshaft operation
     Unsmooth operation → Repair.
6. Adjust:
   - rear brake
     Refer to “ADJUSTING THE REAR BRAKE”. in chapter 3.

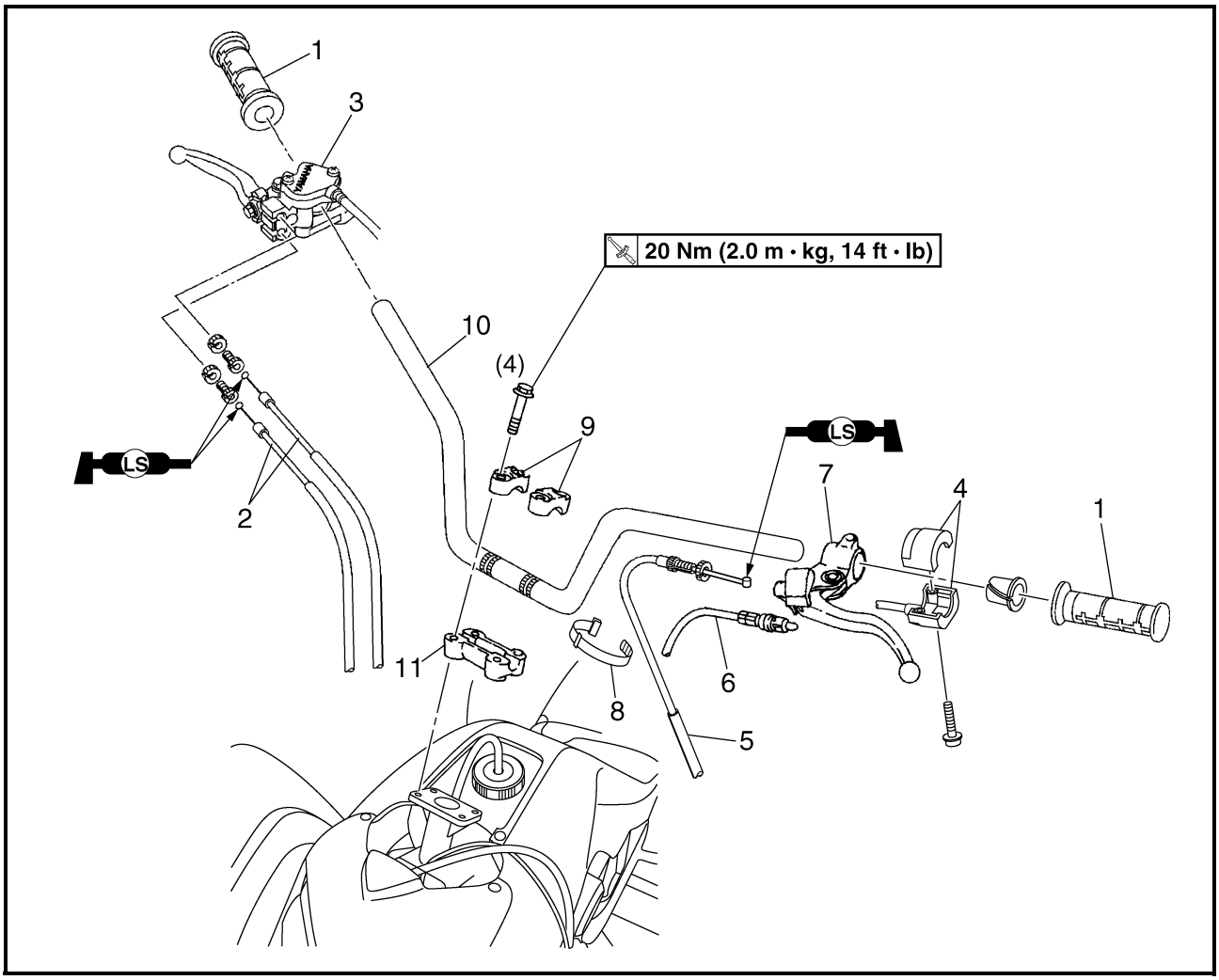
EBS00444

STEERING SYSTEM

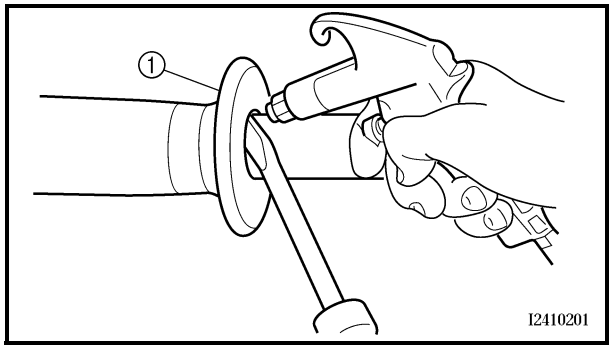
HANDLEBAR



Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed.
	Handlebar cover		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
1	Handlebar grip	2	Refer to "REMOVING THE HANDLEBAR GRIPS" and "INSTALLING THE HANDLEBAR GRIPS".
2	Front brake cable	2	
3	Front brake lever assembly	1	Refer to "INSTALLING THE FRONT BRAKE LEVER ASSEMBLY".
4	Handlebar switch	1	
5	Rear brake cable	1	Refer to "INSTALLING THE REAR BRAKE LEVER".
6	Rear brake switch	1	
7	Rear brake lever	1	
8	Plastic band	1	



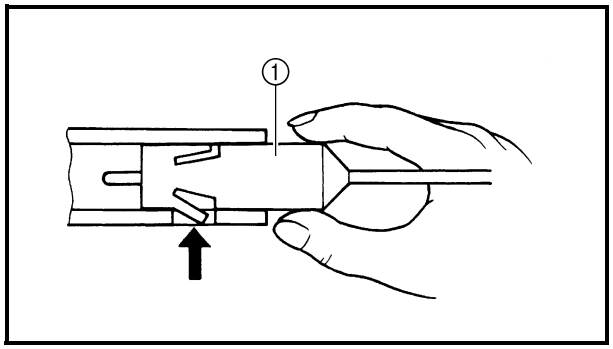
Order	Job/Part	Q'ty	Remarks
9	Upper handlebar holder	2	Refer to "INSTALLING THE HANDLEBAR".
10	Handlebar	1	
11	Lower handlebar holder	1	
			For installation, reverse the removal procedure.



EBS00447
REMOVING THE HANDLEBAR GRIPS

1. Remove:
   - handlebar grips ①

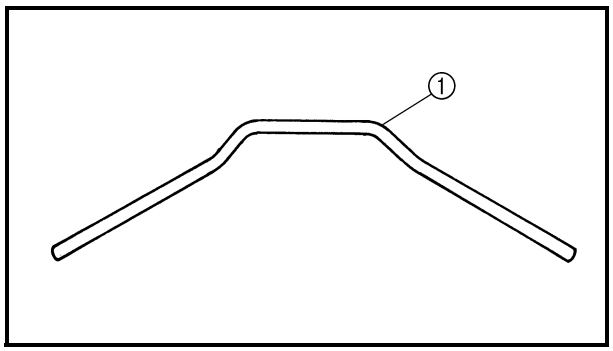
NOTE:
Blow compressed air between the handlebar and handlebar grip, and gradually push the grip off the handlebar.



EBS00445
REMOVING THE REAR BRAKE SWITCH

1. Remove:
   - rear brake switch ①

NOTE:
Push the fastener when removing the rear brake switch out of the rear brake lever holder.

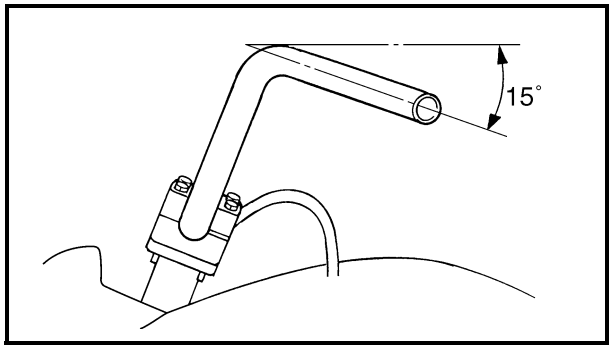


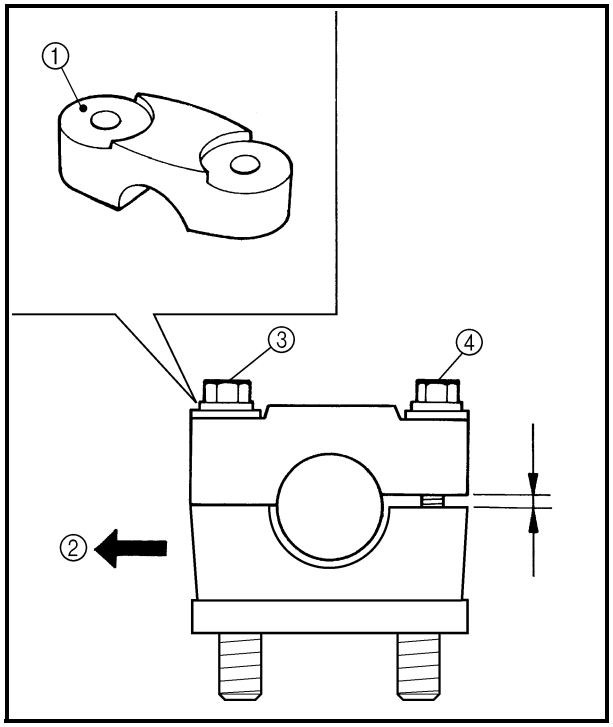
EBS00448
CHECKING THE HANDLEBAR

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

⚠ WARNING

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





EBS00449
INSTALLING THE HANDLEBAR

1. Install:
   - lower handlebar holder
   - handlebar
   - upper handlebar holders

20 Nm (2.0 m · kg, 14 ft · lb)

NOTE:

- Install the handlebar within 15° from the horizontal line shown in the illustration.
- The upper handlebar holders should be installed with the punched mark ① forward ②.

CAUTION:

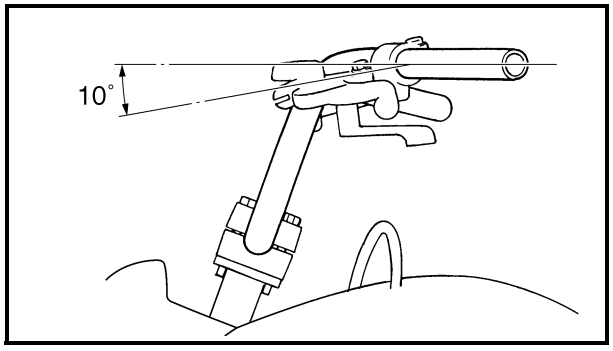
First tighten the bolt ③ on the front side of the handlebar holder, and then tighten the bolt ④ on the rear side.

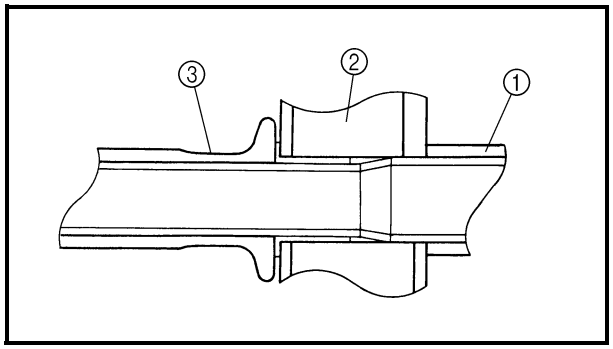
EBS00450
INSTALLING THE HANDLEBAR GRIPS

1. Install:
   - handlebar grips

NOTE:

- Before installing the handlebar grips, temporarily install the rear brake lever and front brake lever assembly on the handlebar.
- Before applying the adhesive, wipe off grease or oil on the handlebar surface with a lacquer thinner.





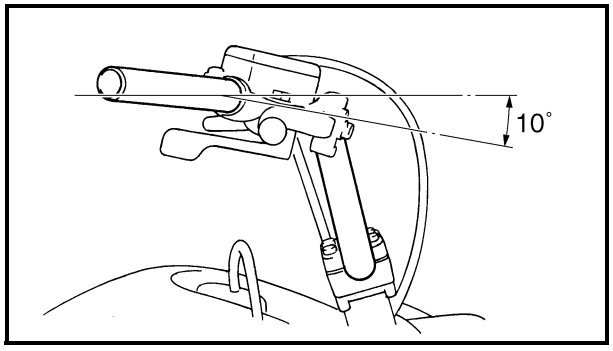
EBS00451
INSTALLING THE REAR BRAKE LEVER

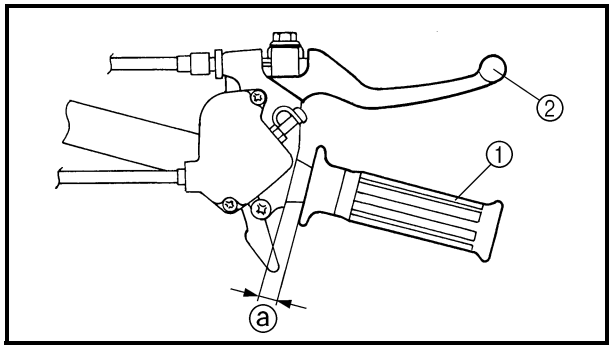
1. Install:
   - rear brake lever ①
   - handlebar switch ②

NOTE:

- Install the rear brake lever within 10° from the horizontal line shown in the illustration.
- After installing the rear brake lever, make sure the rear brake lever ①, handlebar switch ②, and handlebar grip ③ are in the positions shown in the illustration.

2. Adjust:
   - rear brake
     Refer to "ADJUSTING THE REAR BRAKE" in chapter 3.





EBS00452
INSTALLING THE FRONT BRAKE LEVER ASSEMBLY

1. Install:
   - front brake lever assembly ①

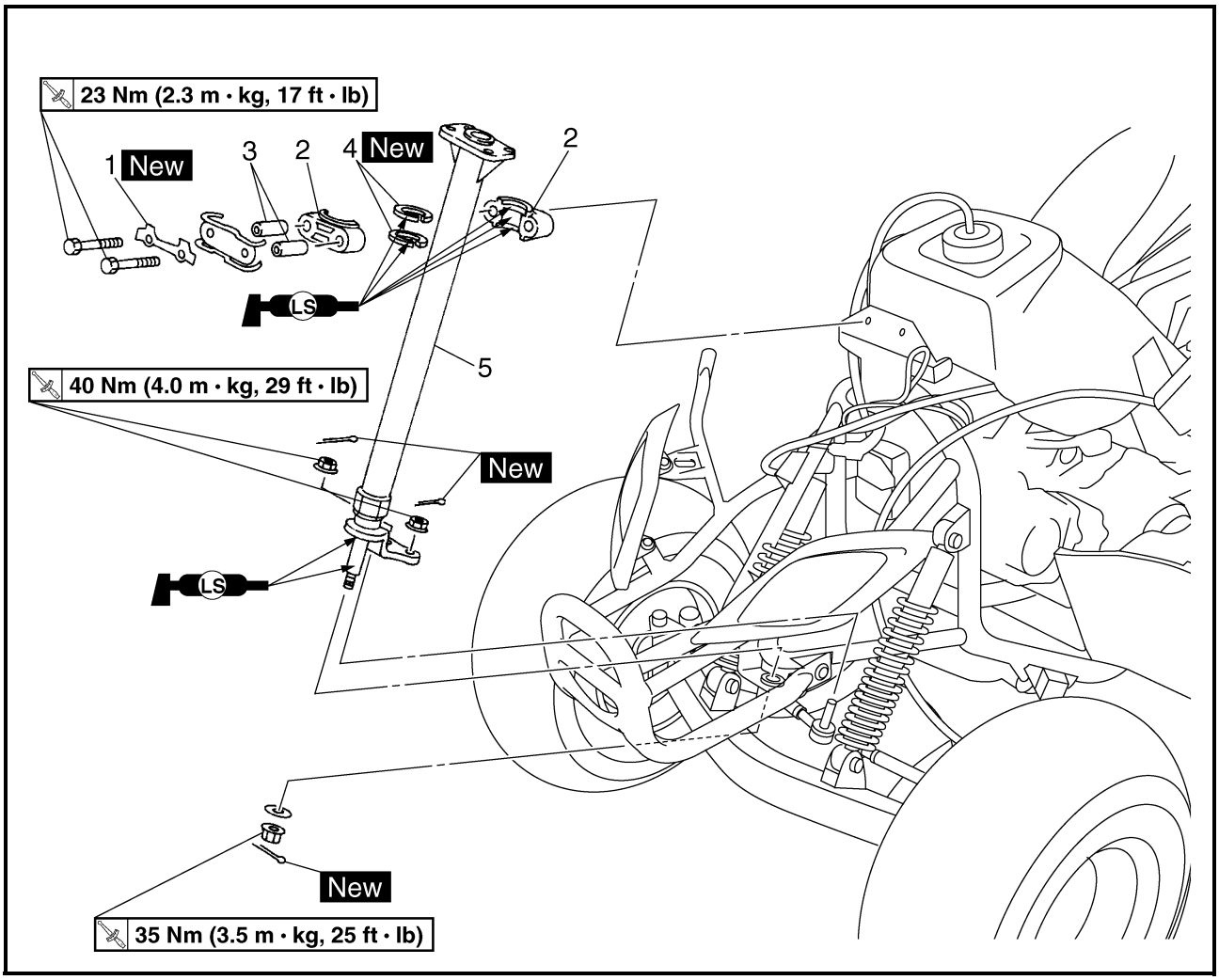
NOTE:

- Install the front brake lever assembly within 10° from the horizontal line shown in the illustration.
- After installing the front brake lever assembly, make sure that the clearance ⓐ between the front brake lever assembly ① and handlebar grip ② is 9 mm (0.35 in).

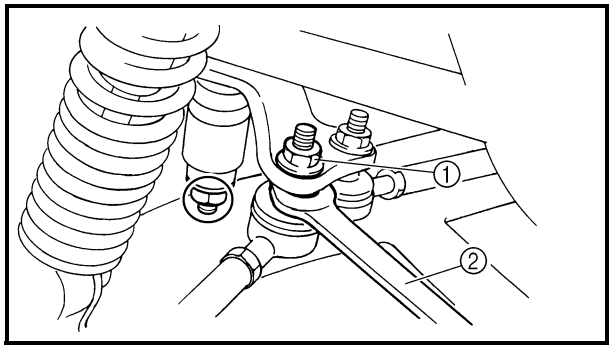
2. Adjust:
   - front brake
     Refer to "ADJUSTING THE FRONT BRAKE" in chapter 3.

EBS00454

STEERING STEM

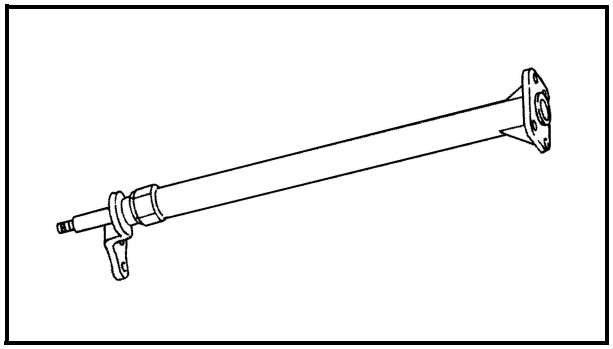


Order	Job/Part	Q'ty	Remarks
	Removing the steering stem		Remove the parts in the order listed.
	Front fender		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Handlebar		Refer to "HANDLEBAR".
1	Lock washer	1	Refer to "INSTALLING THE LOCK WASHER".
2	Steering stem bushing	2	
3	Spacer	2	
4	Oil seal	2	
5	Steering stem	1	Refer to "REMOVING THE STEERING STEM" and "INSTALLING THE STEERING STEM". For installation, reverse the removal procedure.



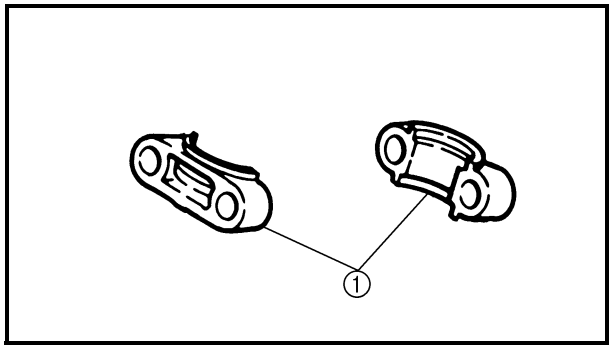
EBS00455
REMOVING THE STEERING STEM
1. Remove:
   • steering stem

NOTE:
When loosening each tie-rod end nut ①, hold the tie-rod ball joint with a 14-mm wrench ②.

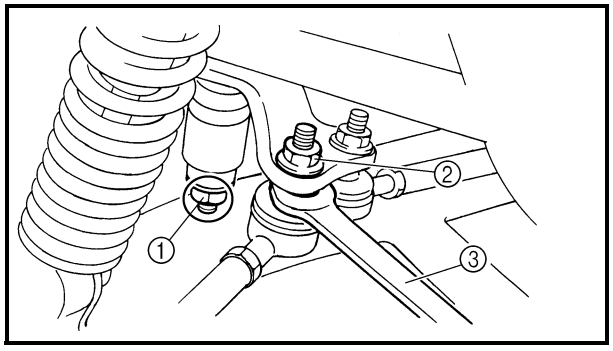


EBS00456
CHECKING THE STEERING STEM
1. Check:
   • steering stem
     Bends → Replace.

⚠ WARNING
Do not attempt to straighten a bent stem; this may dangerously weaken the stem.

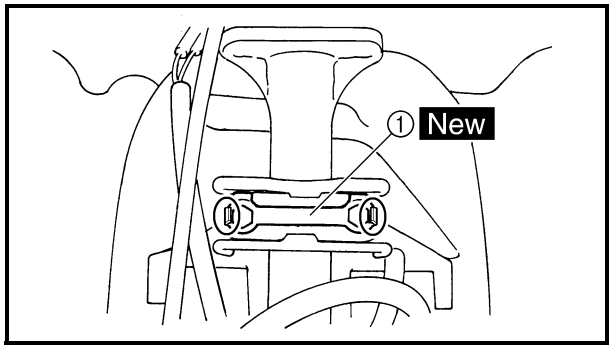


2. Check:
   • steering stem bushings ①
     Wear/damage → Replace.



INSTALLING THE STEERING STEM
1. Tighten:
   • steering stem nut ①
     35 Nm (3.5 m · kg, 25 ft · lb)
   • tie-rod end nut ②
     40 Nm (4.0 m · kg, 29 ft · lb)

NOTE:
When tightening each tie-rod end nut ②, hold the tie-rod ball joint with a 14-mm wrench ③.

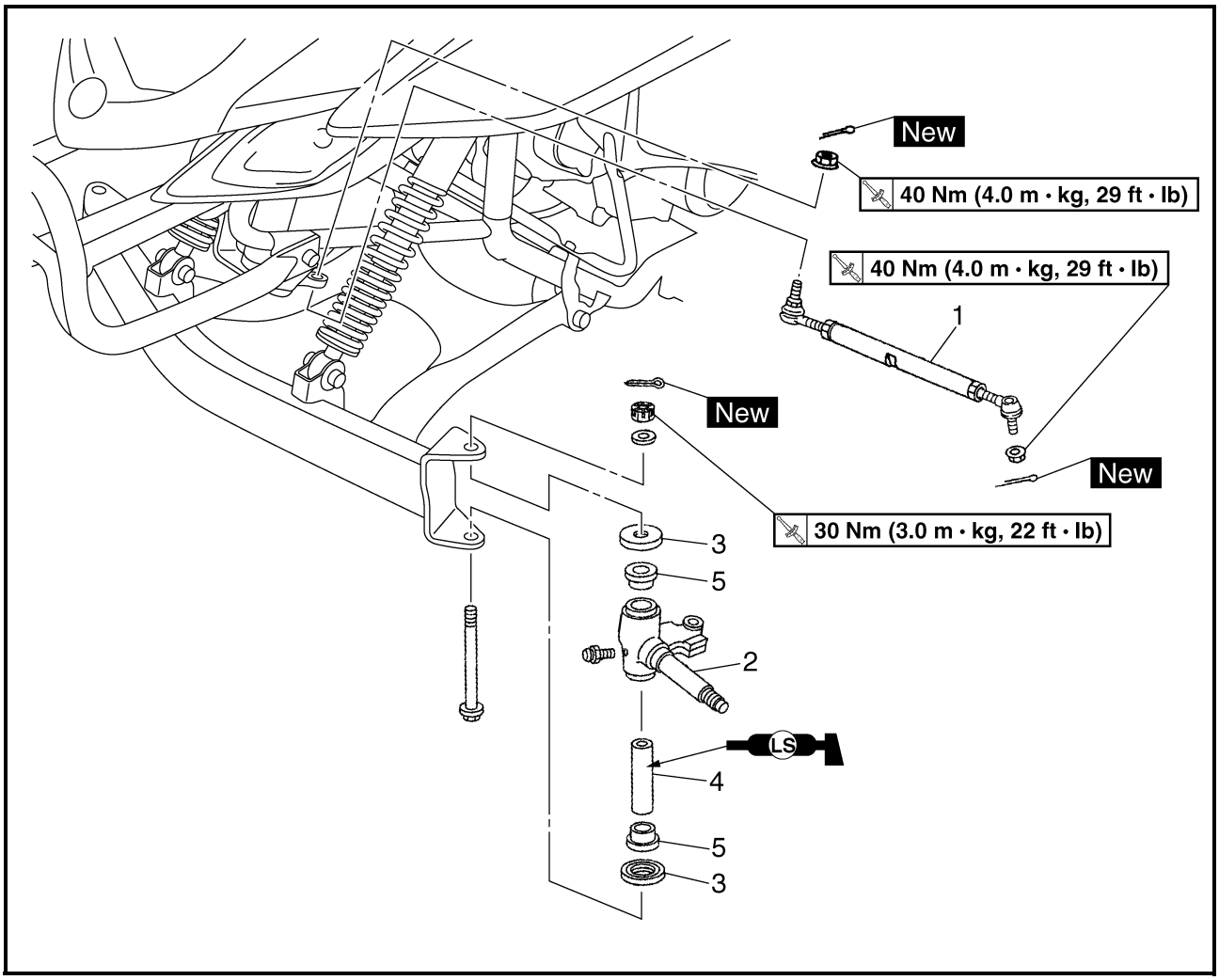


EBS00459
INSTALLING THE LOCK WASHER
1. Install:
   • lock washer ① New

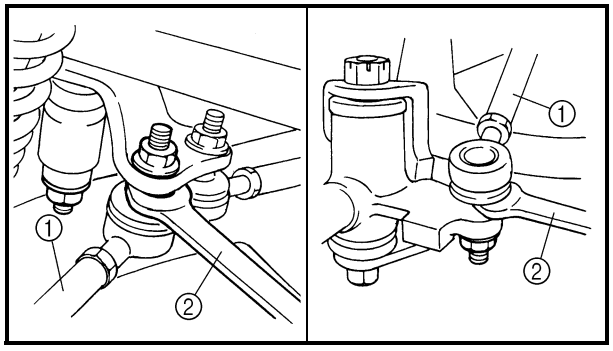
NOTE:
Bend a lock washer tab along a flat side of each bolt.

EBS00460

TIE-RODS AND STEERING KNUCKLES



Order	Job/Part	Q'ty	Remarks
	Removing the tie-rods and steering knuckles		Remove the parts in the order listed.
	Front brakes		Refer to "FRONT AND REAR BRAKES". The following procedure applies to both of the tie-rods and steering knuckles.
1	Tie-rod	1	Refer to "REMOVING THE TIE-RODS" and "INSTALLING THE TIE-RODS".
2	Steering knuckle	1	
3	Thrust cover	2	
4	Spacer	1	
5	Bushing	2	
			For installation, reverse the removal procedure.



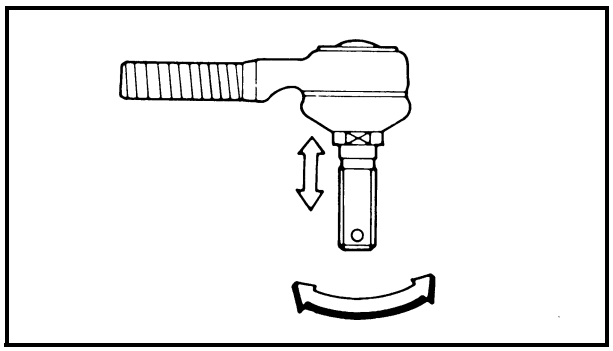
EBS00461
REMOVING THE TIE-RODS

The following procedure applies to both of the tie-rods.

1. Remove:
   - tie-rod ①

NOTE:

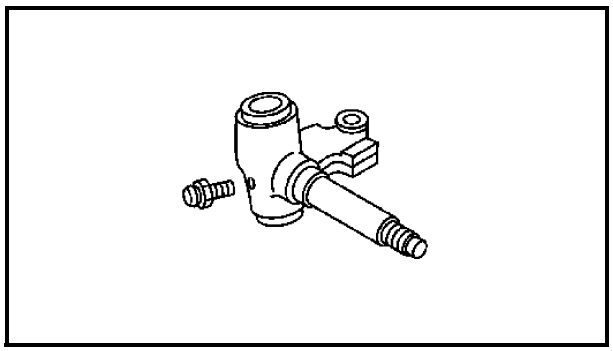
When removing the tie-rod, hold each tie-rod ball joint with a 14-mm wrench ② and then loosen the tie-rod end nut.



EBS00462
CHECKING THE TIE-RODS

The following procedure applies to both of the tie-rods.

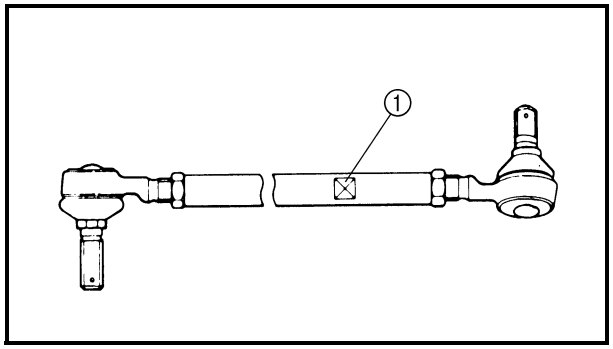
1. Check:
   - tie-rod free play and movement
     Free play → Replace the tie-rod end.
     Turns roughly → Replace the tie-rod end.
2. Check:
   - tie-rod
     Bends/damage → Replace.

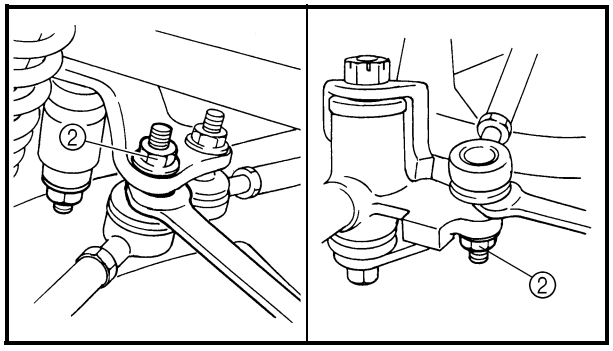


EBS00464
CHECKING THE STEERING KNUCKLES

The following procedure applies to both of the steering knuckles.

1. Check:
   - steering knuckle
     Damage/pitting → Replace.





EBS00465

INSTALLING THE TIE-RODS

The following procedure applies to both of the tie-rods.

1. Install:
   - tie-rod — **15 Nm (1.5 m · kg, 11 ft · lb)**

NOTE:

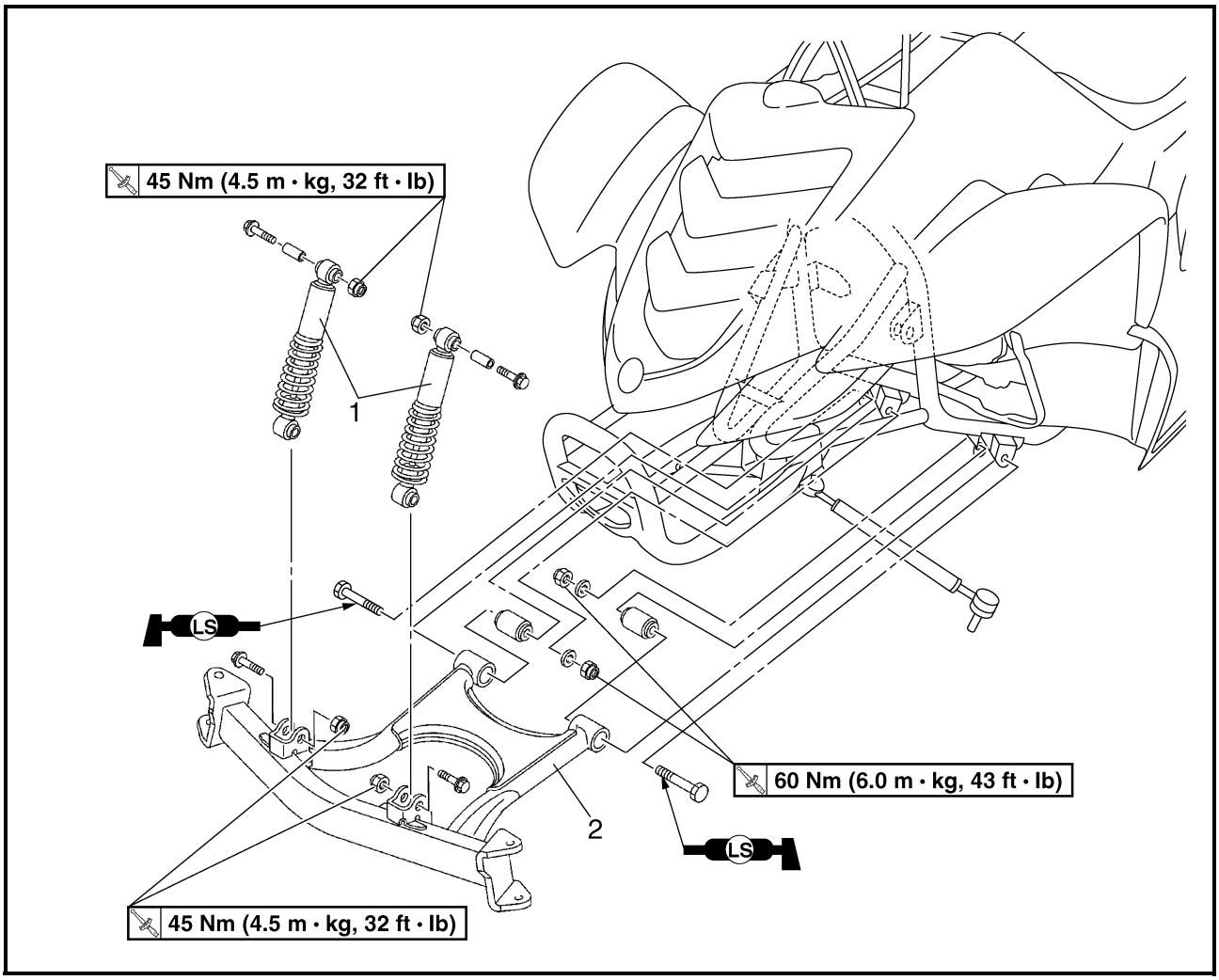
- The tie-rod side which must be installed on the inside has grooves ①.
- When installing the tie-rod, hold each tie-rod ball joint with a 14-mm wrench ② and then tighten the tie-rod end nut.

2. Adjust:
   - toe-in

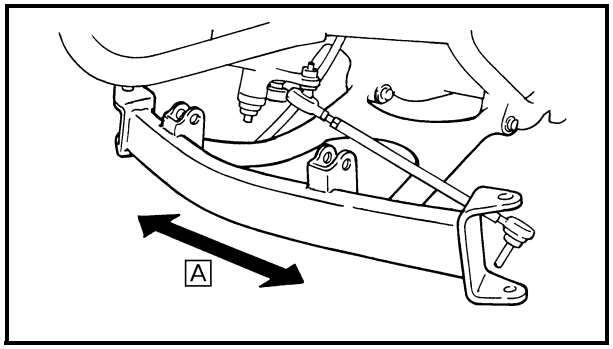
   Refer to “ADJUSTING THE TOE-IN” in chapter 3.

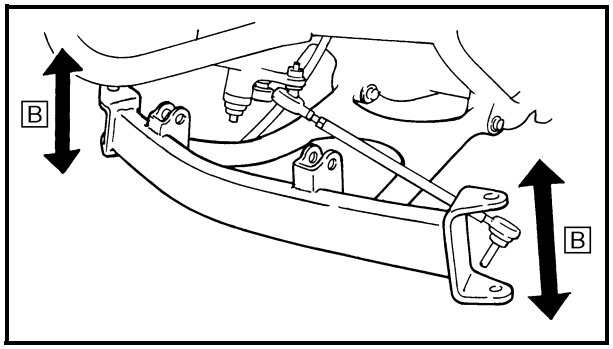
EBS00468

FRONT SHOCK ABSORBER ASSEMBLIES AND FRONT SWINGARM



Order	Job/Part	Q'ty	Remarks
	Removing the front shock absorber assemblies and front swingarm		Remove the parts in the order listed.
	Steering knuckles		Refer to "STEERING SYSTEM".
1	Front shock absorber	2	
2	Front swingarm	1	Refer to "REMOVING THE FRONT SWINGARM".
			For installation, reverse the removal procedure.





EBS00469
REMOVING THE FRONT SWINGARM

1. Check:
   - front swingarm free play

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a. Check the front swingarm side play A by moving it from side to side.
   If side play is noticeable, check the bushings.
b. Check the front swingarm vertical movement B by moving it up and down.
   If the vertical movement is tight or rough, or if there is binding, check the bushings.

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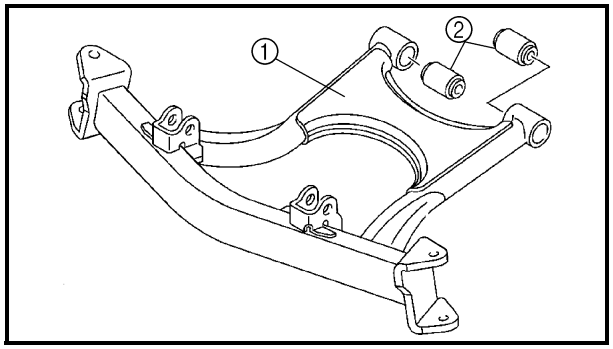
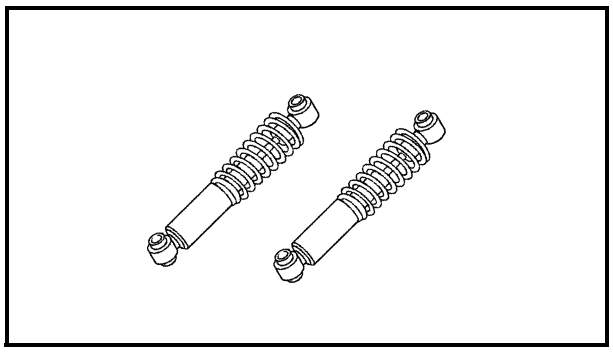
2. Remove:
   - front swingarm



EBS00470
CHECKING THE FRONT SWINGARM

1. Check:
   - front swingarm ①
     Bends/damage → Replace.
2. Check:
   - bushings ②
     Wear/damage → Replace.

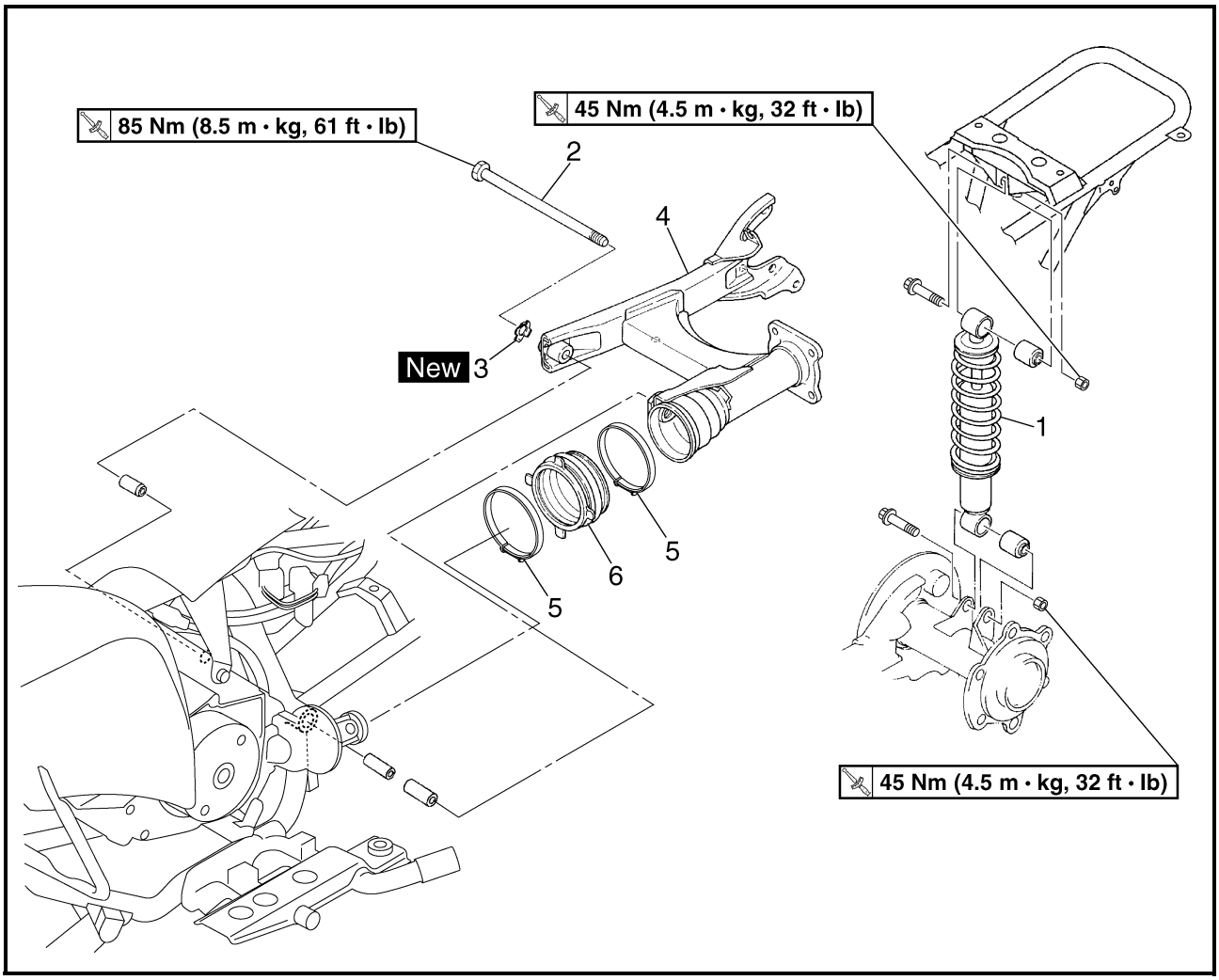


EBS00471
CHECKING THE FRONT SHOCK ABSORBER ASSEMBLIES

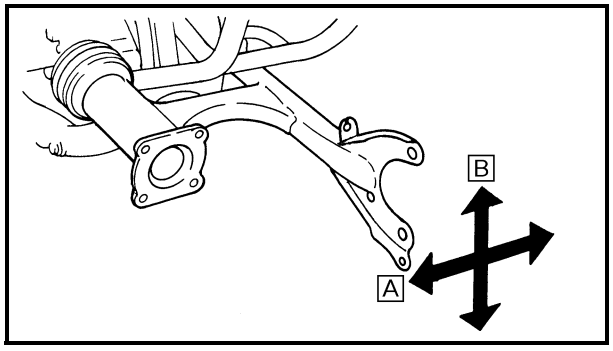
1. Check:
   - shock absorber rod
     Bends/damage → Replace the shock absorber assembly.
   - shock absorber assembly
     Oil leaks → Replace the shock absorber assembly.
   - spring
     Fatigue → Replace the shock absorber assembly.
     Move the spring up and down.

EBS00476

REAR SHOCK ABSORBER AND REAR SWINGARM



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber and swingarm		Remove the parts in the order listed.
	C.D.I. magneto cover		Refer to "C.D.I. MAGNETO" in chapter 4.
	Rear axle/final drive assembly		Refer to "REAR AXLE/FINAL DRIVE ASSEMBLY AND DRIVE SHAFT" in chapter 6.
1	Rear shock absorber	1	
2	Pivot shaft	1	
3	Lock washer	1	Refer to "INSTALLING THE LOCK WASHER".
4	Rear swingarm	1	Refer to "REMOVING THE REAR SWINGARM".
5	Metal clamp	2	
6	Dust boot	1	
			For installation, reverse the removal procedure.



EBS00477

REMOVING THE REAR SWINGARM

1. Check:
   - swingarm free play

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a. Check the tightening torque of the pivot shaft.

	Pivot shaft **85 Nm (8.5 m · kg, 61 ft · lb)**

b. Check the rear swingarm side play [A] by moving it from side to side.
   If side play is noticeable, check the spacer, bushings and pivot shaft.
c. Check the rear swingarm vertical movement [B] by moving it up and down.
   If vertical movement is tight or rough, or if there is binding, check the bushings, spacer and pivot shaft.

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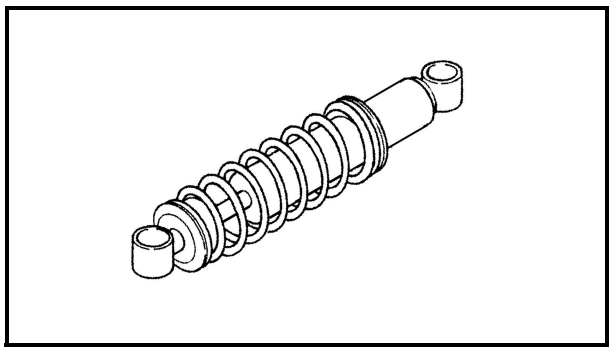
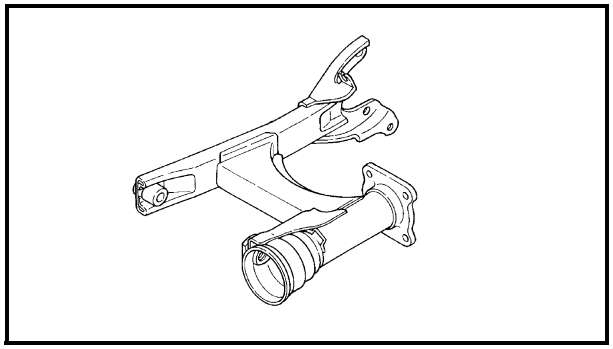
2. Remove:
   - pivot shaft
   - rear swingarm



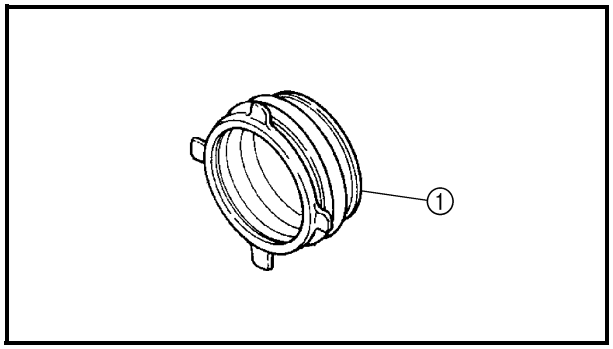
EBS00478

CHECKING THE REAR SHOCK ABSORBER

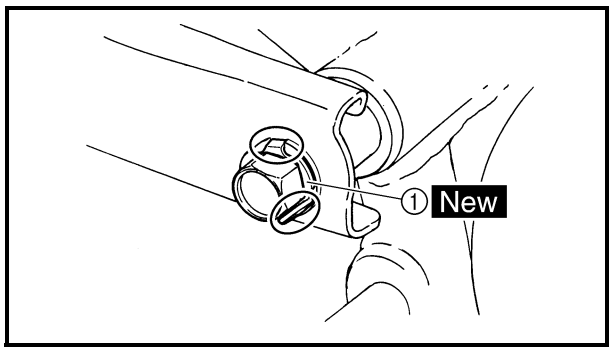
1. Check:
   - shock absorber
     Oil leaks → Replace the shock absorber assembly.
   - shock absorber rod
     Bends/damage → Replace the shock absorber assembly.
   - spring
     Fatigue → Replace the shock absorber assembly.
     Move the spring up and down.



EBS00479
CHECKING THE REAR SWINGARM
1. Check:
   - rear swingarm
     Bends/cracks/damage → Replace.
2. Check:
   - bushings
     Wear/damage → Replace.



EBS00481
CHECKING THE DUST BOOT
1. Check:
   - dust boot ①
     Damage → Replace.



INSTALLING THE LOCK WASHER
1. Install:
   - lock washer ① New

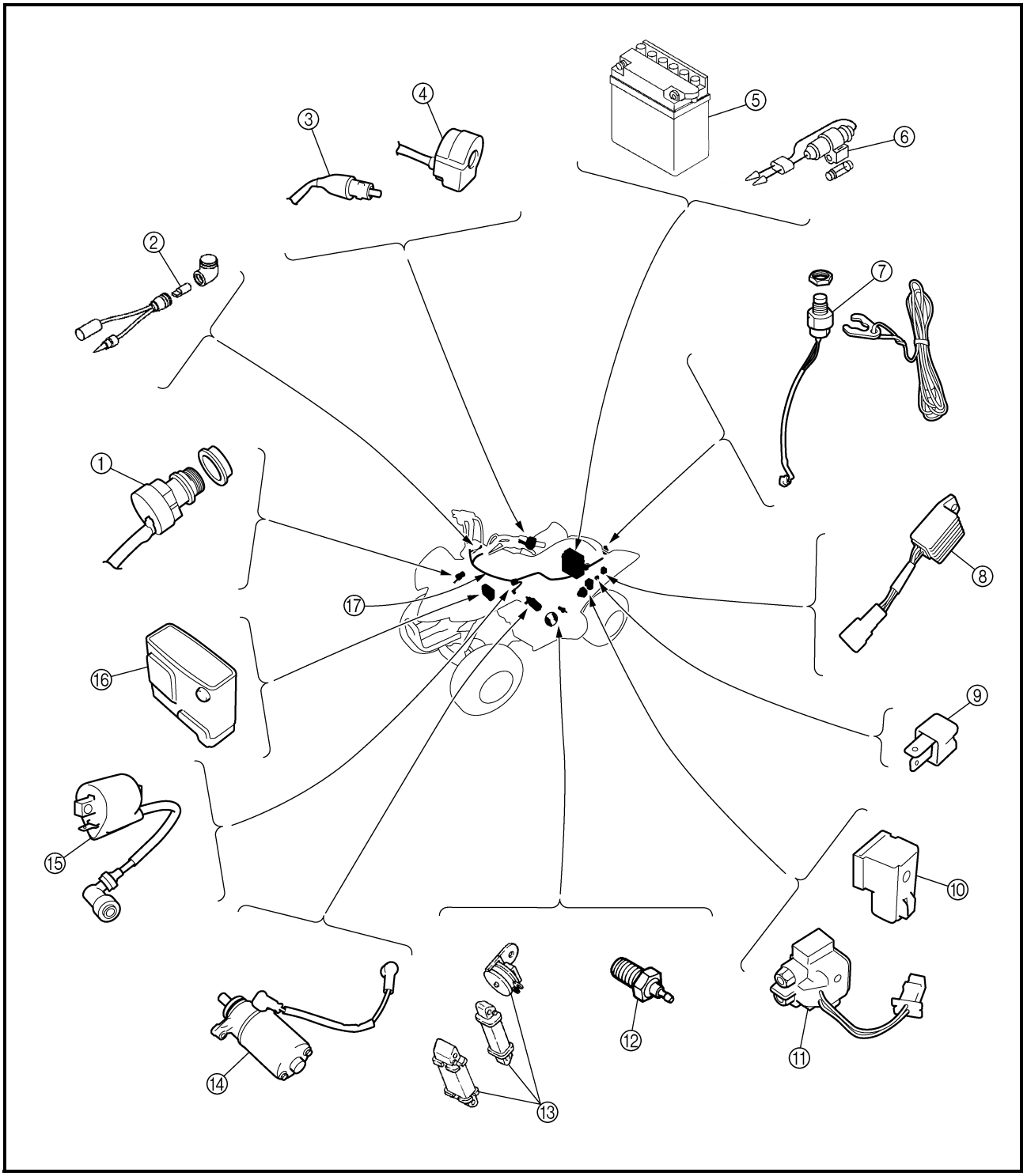
NOTE:
Insert the small tab of the lock washer in the groove on the swingarm, and then bend the other lock washer tab along a flat side of the pivot shaft head.

EBS00500

ELECTRICAL

ELECTRICAL COMPONENTS

① Main switch
② Neutral indicator light
③ Rear brake switch
④ Handlebar switch
⑤ Battery
⑥ Main fuse
⑦ Engine stop switch (frame)
⑧ Rectifier/regulator
⑨ Diode
⑩ Starting circuit cut-off relay
⑪ Starter relay
⑫ Neutral switch
⑬ Pickup coil/stator assembly
⑭ Starter motor
⑮ Ignition coil
⑯ C.D.I. unit
⑰ Wire harness



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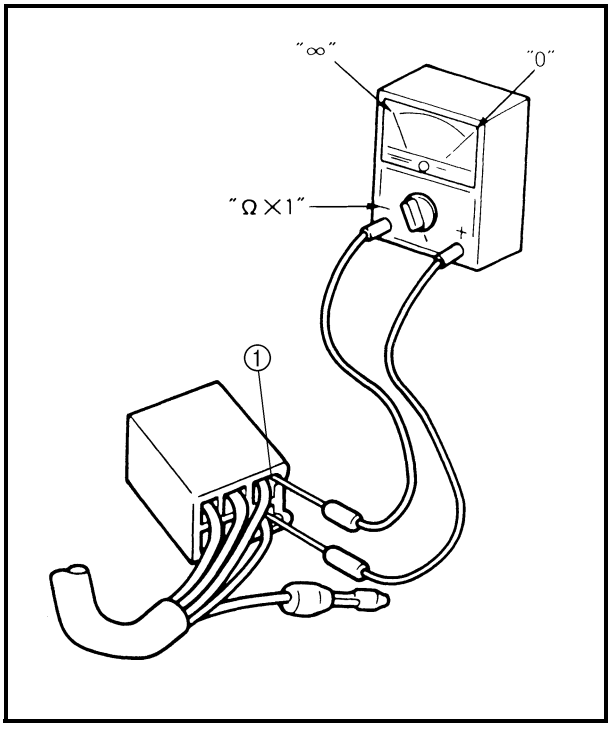
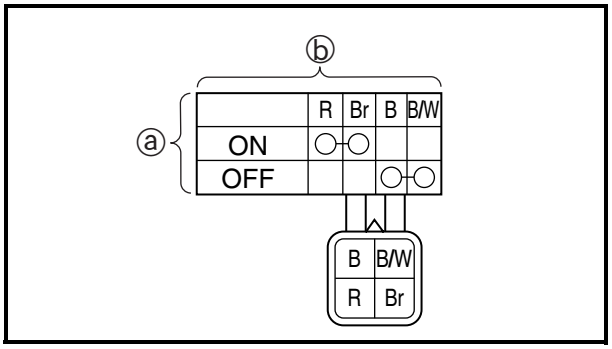




EBS01028

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
P/N. YU-03112-C, 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).

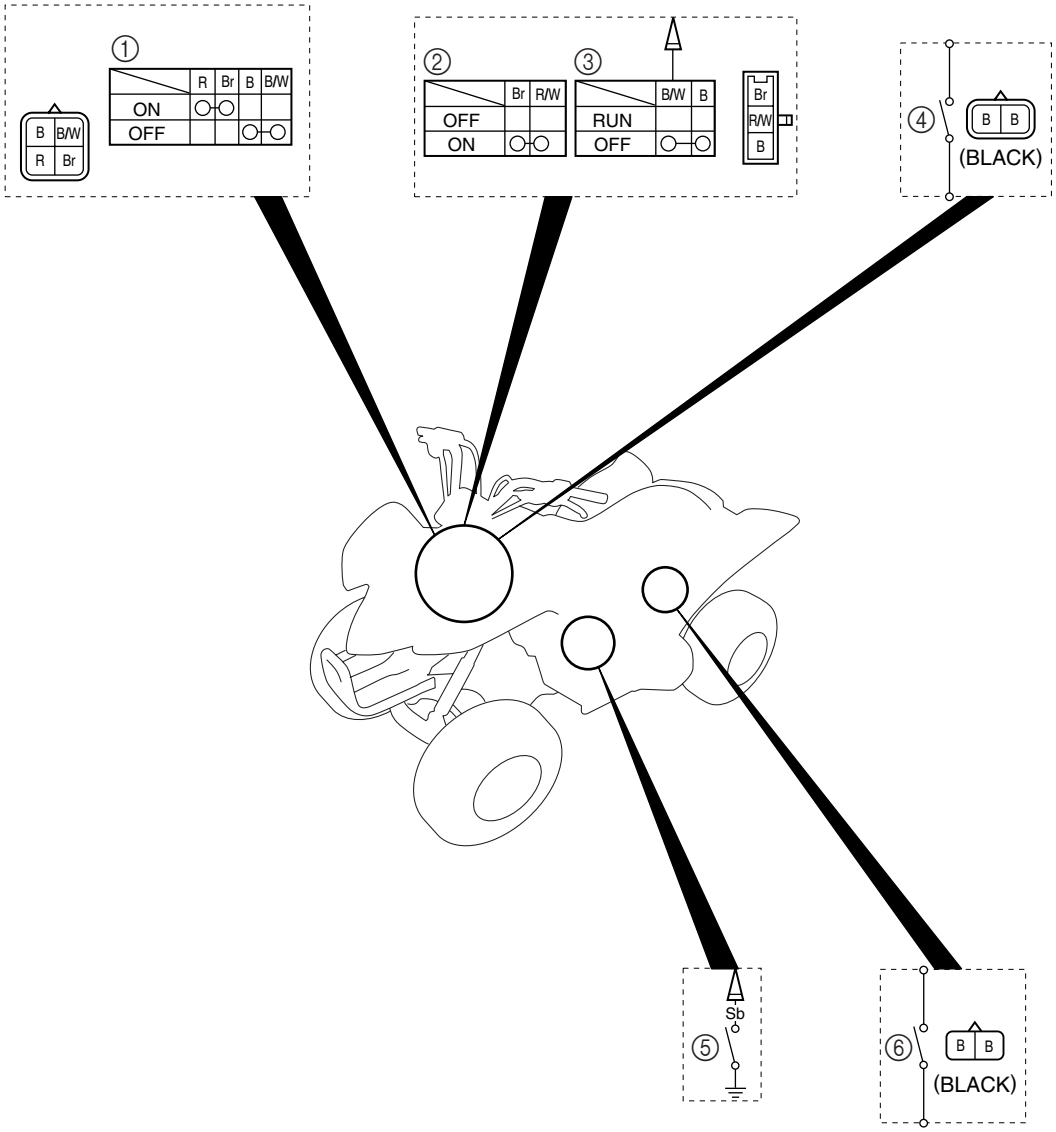
The example illustration on the left shows that:
There is continuity between black and black/white when the switch is set to "OFF".
There is continuity between red and brown when the switch is set to "ON".

EBS01029

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.

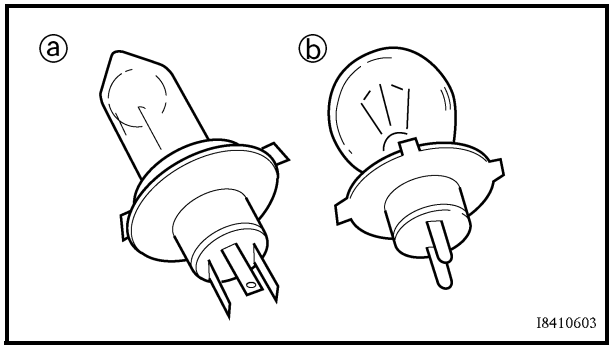


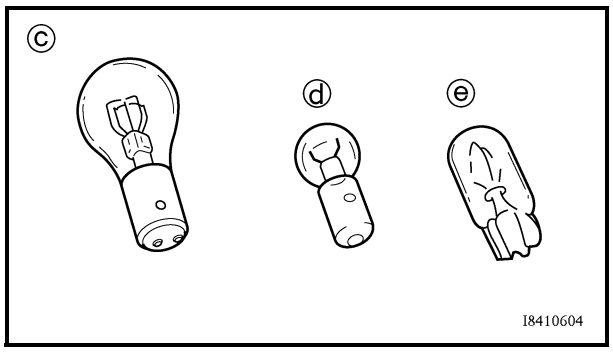
① Main switch
② Start switch
③ Engine stop switch (handlebar)
④ Rear brake switch
⑤ Neutral switch
⑥ Engine stop switch (frame)

EBS01030
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 machine are shown in the illustration on the left.

- Bulbs ⓐ and ⓑ are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs ⓒ is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs ⓓ and ⓔ are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

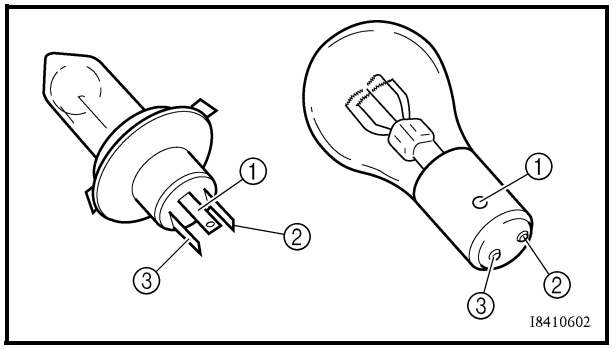
1. Remove:
   - bulb

⚠ WARNING

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

CAUTION:

- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**



2. Check:
   - bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

	**Pocket tester** **P/N. YU-03112-C, 90890-03112**

NOTE:

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.

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a. Connect the positive tester probe to terminal ① and the negative tester probe to terminal ②, and check the continuity.
b. Connect the positive tester probe to terminal ① and the negative tester probe to terminal ③, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

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CHECKING THE CONDITION OF THE BULB SOCKETS

The following procedure applies to all of the bulb sockets.

1. Check:
   - bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.

Pocket tester
P/N. YU-03112-C, 90890-03112

NOTE:

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

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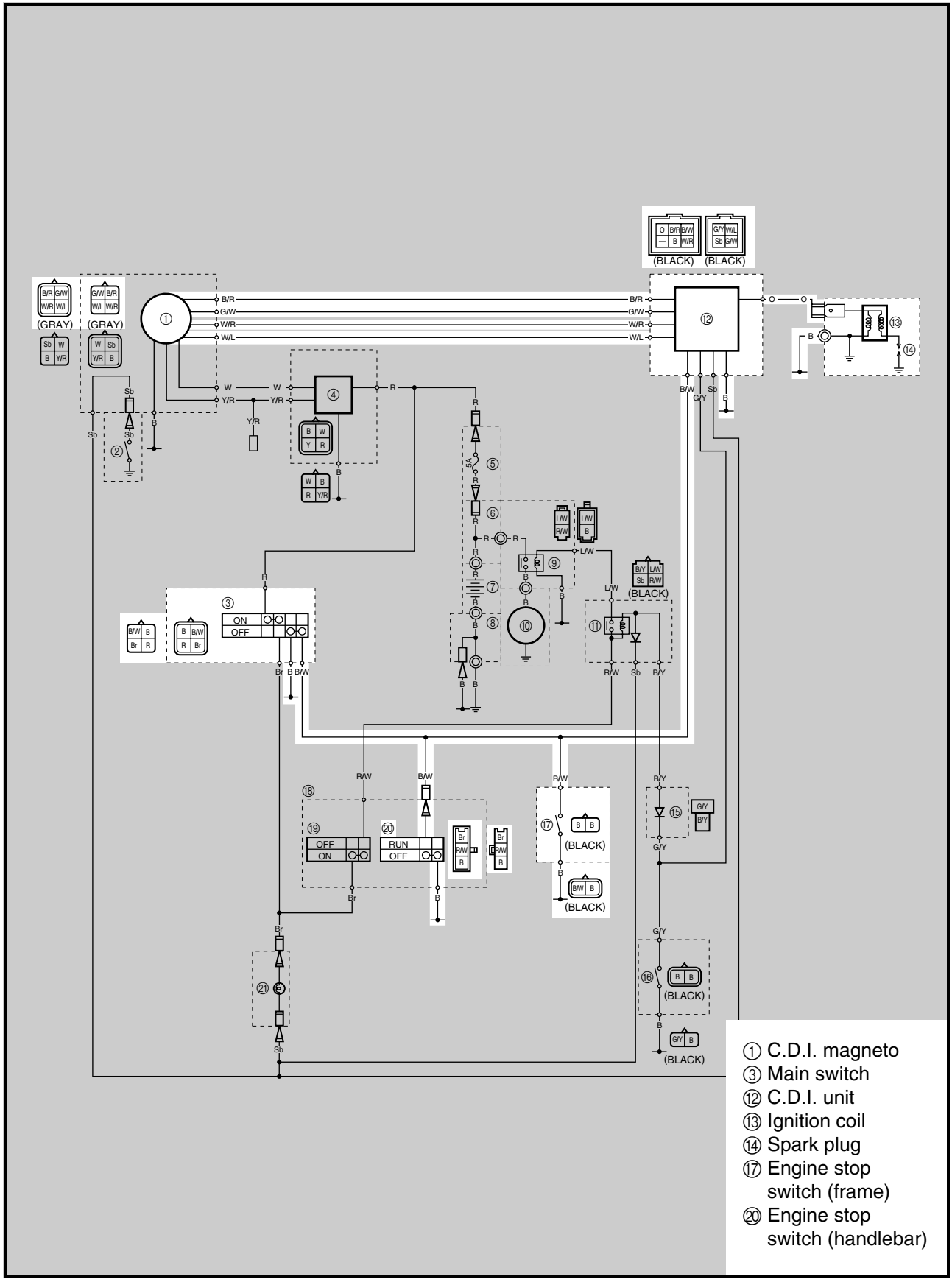
EBS00503

IGNITION SYSTEM

CIRCUIT DIAGRAM



EBS01045
TROUBLESHOOTING

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

Check:
1. spark plug
2. ignition spark gap
3. spark plug cap resistance
4. ignition coil resistance
5. main switch
6. engine stop switches
7. pickup coil resistance
8. source coil resistance
9. wiring connections (of the entire ignition system)

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

1. seat
2. front fender
3. fuel tank

- Troubleshoot with the following special tool(s).

Dynamic spark tester
P/N. YM-34487
Ignition checker
P/N. 90890-06754
Pocket tester
P/N. YU-03112-C, 90890-03112

EBS01032

1. Spark plug

- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.
  Refer to “CHECKING THE SPARK PLUG” in chapter 3.

Standard spark plug
CR7HS (NGK)
Spark plug gap
0.6 ~ 0.7 mm (0.024 ~ 0.028 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.

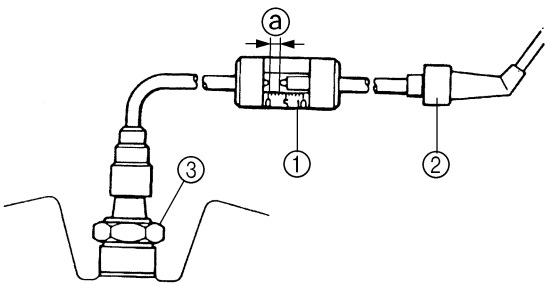
EBS01034

2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition dynamic spark tester ① as shown.

② Spark plug cap
③ Spark plug

- Set the main switch to "ON".
- Measure the ignition spark gap ⓐ.
- Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.



Minimum ignition spark gap
6 mm (0.24 in)

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

NO

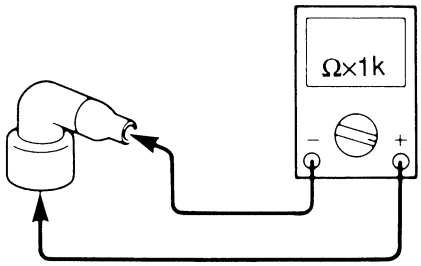
YES

The ignition system is OK.

EBS01036

3. 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
10 kΩ at 20 °C (68 °F)

- Is the spark plug cap OK?

YES

NO

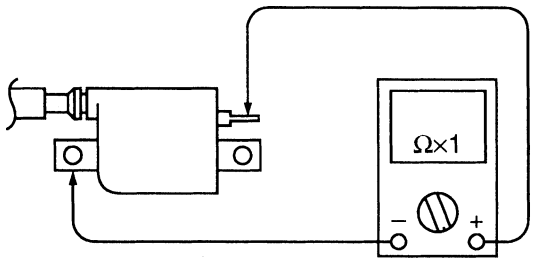
Replace the spark plug cap.

EBS01038

4. Ignition coil resistance

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

Positive tester probe → orange terminal
Negative tester probe → ignition coil base

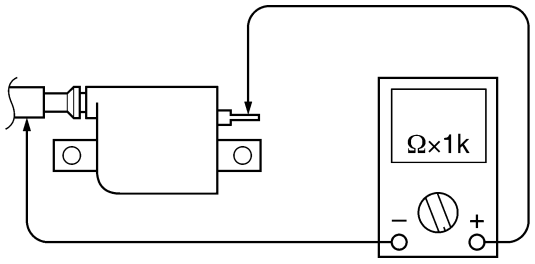


- Measure the primary coil resistance.

Primary coil resistance
0.18 ~ 0.28 Ω at 20 °C (68 °F)

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

Positive tester probe → orange terminal
Negative tester probe → spark plug lead



- Measure the secondary coil resistance.

Secondary coil resistance
6.32 ~ 9.48 kΩ at 20 °C (68 °F)

- Is the ignition coil OK?

YES

NO → Replace the ignition coil.

EBS01041

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.

EBS01042

6. Engine stop switches

- Check the engine stop switches for continuity.
  Refer to "CHECKING THE SWITCHES".
- Are the engine stop switches OK?

YES

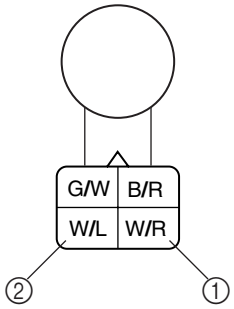
NO → Replace the handlebar switch or engine stop switch (frame).

EBS01040

7. Pickup coil resistance

- Disconnect the C.D.I. magneto coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the pickup coil terminal as shown.

Positive tester probe →
white/red terminal ①
Negative tester probe →
white/blue terminal ②



- Measure the pickup coil resistance.

Pickup coil resistance
264 ~ 396 Ω at 20 °C (68 °F)
(between white/red and white/blue)

- Is the pickup coil OK?

YES

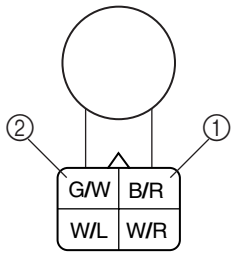
NO → Replace the pickup coil/stator assembly.

EBS01099

8. Source coil resistance

- Disconnect the C.D.I. magneto coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the source coil terminal.

Positive tester probe →
black/red terminal ①
Negative tester probe →
green/white terminal ②



- Measure the source coil resistance.

Source coil resistance
304 ~ 456 Ω at 20 °C (68 °F)
(black/red and green/white)

YES

NO → Replace the pickup coil/stator assembly.

EBS01047

9. Wiring

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

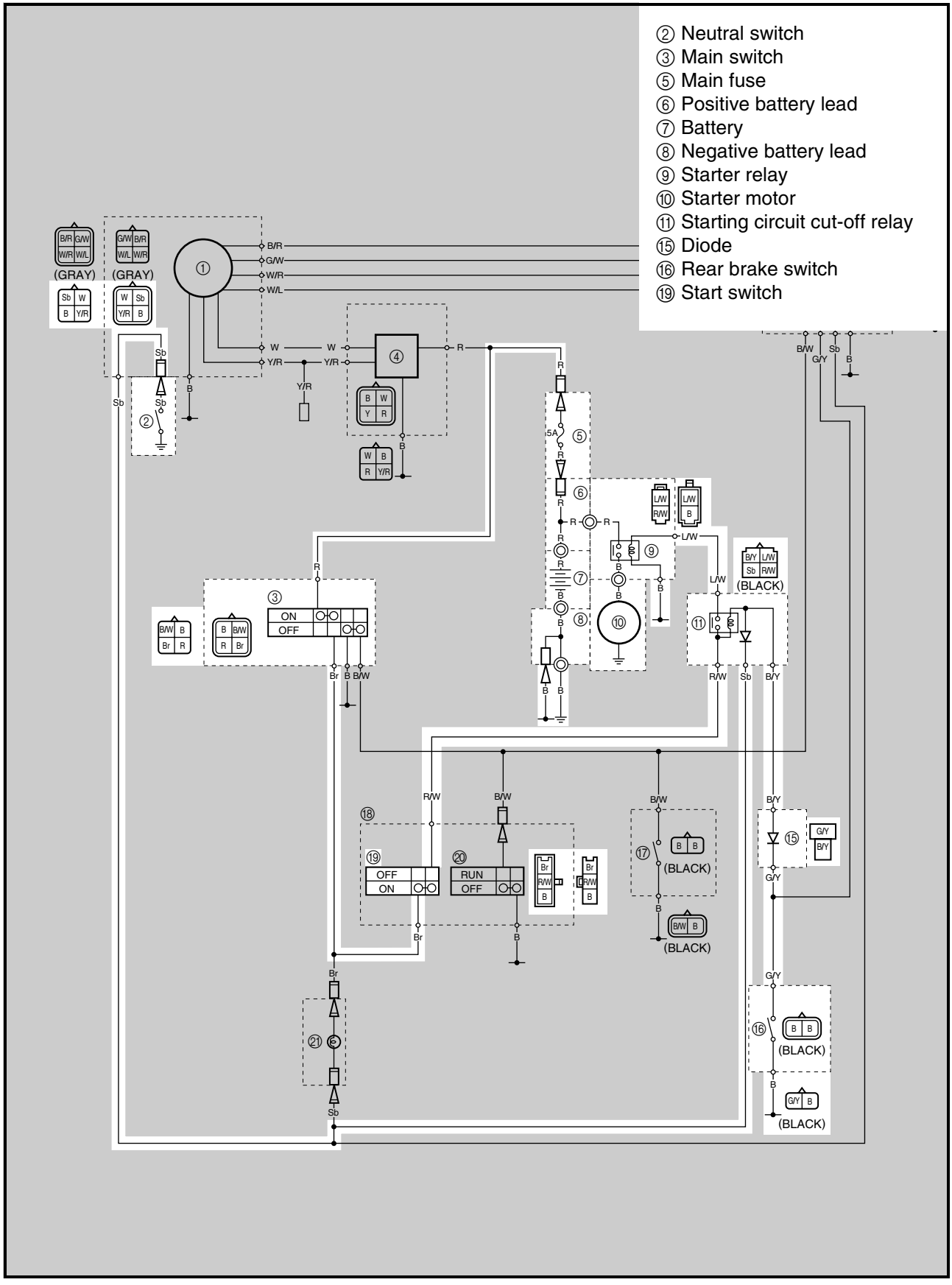
YES → Replace the C.D.I. unit.

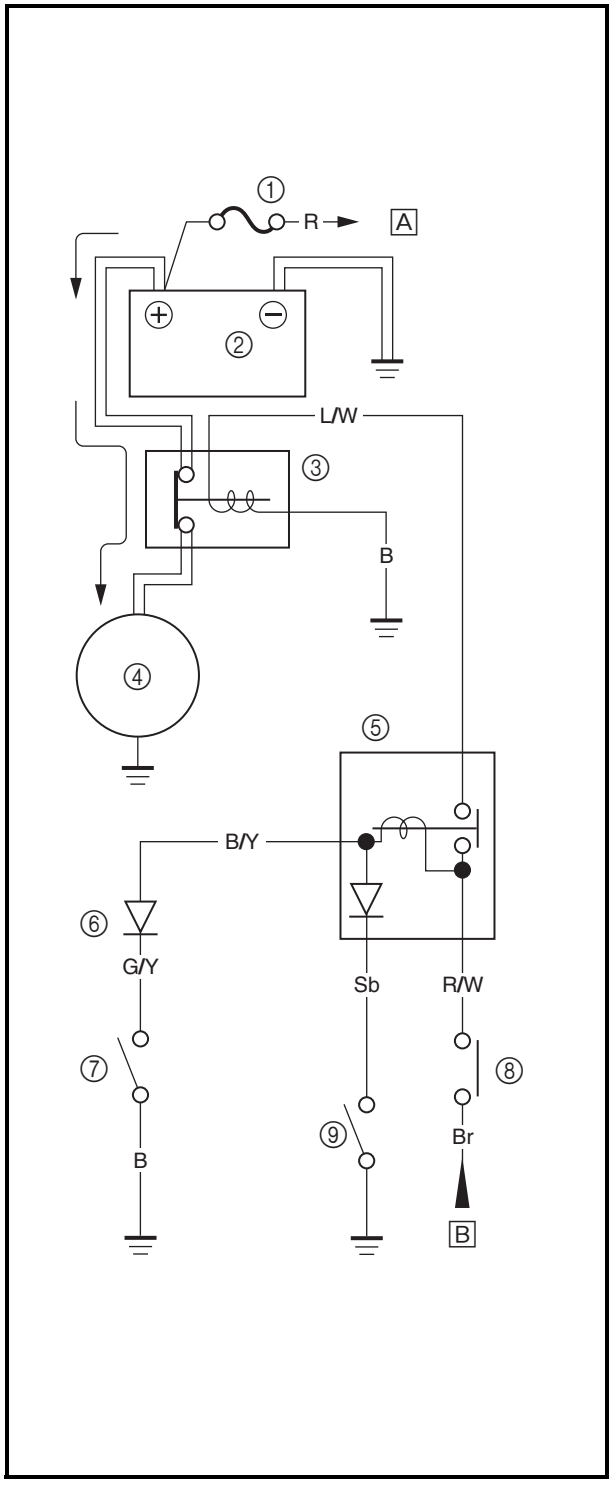
NO → Properly connect or repair the ignition system's wiring.

EBS00506

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM





EBS00507

STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, starting circuit cut-off relay, rear brake switch and neutral switch. If the main switch is on and the engine stop switch is in the RUN position, the starter motor can be operated only if:

- The transmission is in neutral (the neutral switch is closed).

or

- You pull in the rear brake lever (the rear brake switch is ON).

① Main fuse
② Battery
③ Starter relay
④ Starter motor
⑤ Starting circuit cut-off relay
⑥ Diode
⑦ Rear brake switch
⑧ Start switch
⑨ Neutral switch

A TO MAIN SWITCH
B FROM MAIN SWITCH

EBS01050
TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. main fuse
2. battery
3. starter motor
4. starting circuit cut-off relay
5. starter relay
6. main switch
7. neutral switch
8. rear brake switch
9. start switch
10. diode
11. wiring connections
    (of the entire starting system)

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

1. seat
2. front fender
3. rear fender
4. C.D.I. magneto cover

- Troubleshoot with the following special tool(s).

Pocket tester
P/N. YU-03112-C, 90890-03112

EBS01043

1. Main fuse

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

YES

NO → Replace the fuse.

EBS01044

2. Battery

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

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

- Is the battery OK?

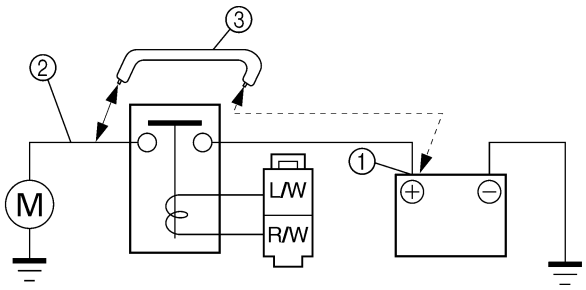
YES

NO →
- Refill battery fluid.
- Clean the battery terminals.
- Recharge or replace the battery.

EBS01051

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, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.**

- Does the starter motor turn?

YES

NO → Repair or replace the starter motor.

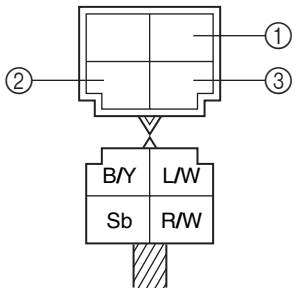
EBS01053

4. Starting circuit cut-off relay

First step:
- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Positive battery terminal → red/white ①
Negative battery terminal → black/yellow ②

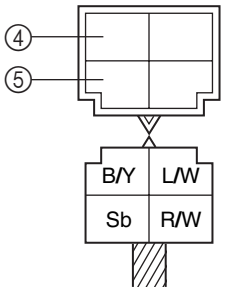
Positive tester probe → red/white ①
Negative tester probe → blue/white ③



- Does the starting circuit cut-off relay have continuity between red/white and blue/white?

Second step:
- Connect the pocket tester (Ω × 1) to the starting circuit cut-off relay coupler as shown.
- Measure the starting circuit cut-off relay for continuity as follows.

Positive tester probe → sky blue ④ **Negative tester probe → black/yellow ⑤**	**Continuity**
Positive tester probe → black/yellow ⑤ **Negative tester probe → sky blue ④**	**No continuity**



NOTE:
When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

- Are the testing readings correct?

YES ⇩

NO ⇩

Replace the starting circuit cut-off relay.

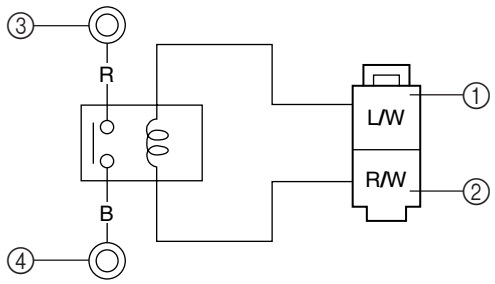
EBS01054

5. Starter relay

- Disconnect the starter relay coupler from the coupler.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starter relay coupler as shown.

Positive battery terminal → blue/white ①
Negative battery terminal → red/white ②

Positive tester probe → red ③
Negative tester probe → black ④



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

YES → NO

Replace the starter relay.

EBS01041

6. Main switch

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

YES → NO

Replace the main switch.

EBS01046

7. Neutral switch

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

YES → NO

Replace the neutral switch.

8. Rear brake switch

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

YES → NO

Replace the rear brake switch.

EBS01057

9. Start switch

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

YES → NO

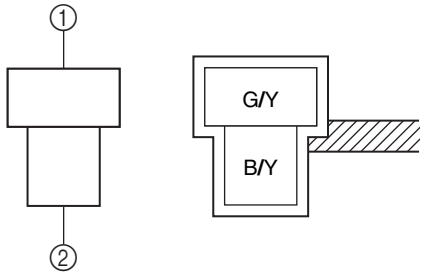
Replace the handlebar switch.

EBS01060

10.Diode

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

Positive tester probe → green/yellow ① **Negative tester probe → black/yellow ②**	**Continuity**
Positive tester probe → black/yellow ② **Negative tester probe → green/yellow ①**	**No continuity**



NOTE:
When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

- Are the testing readings correct?

YES → NO

Replace the diode.

EBS01059

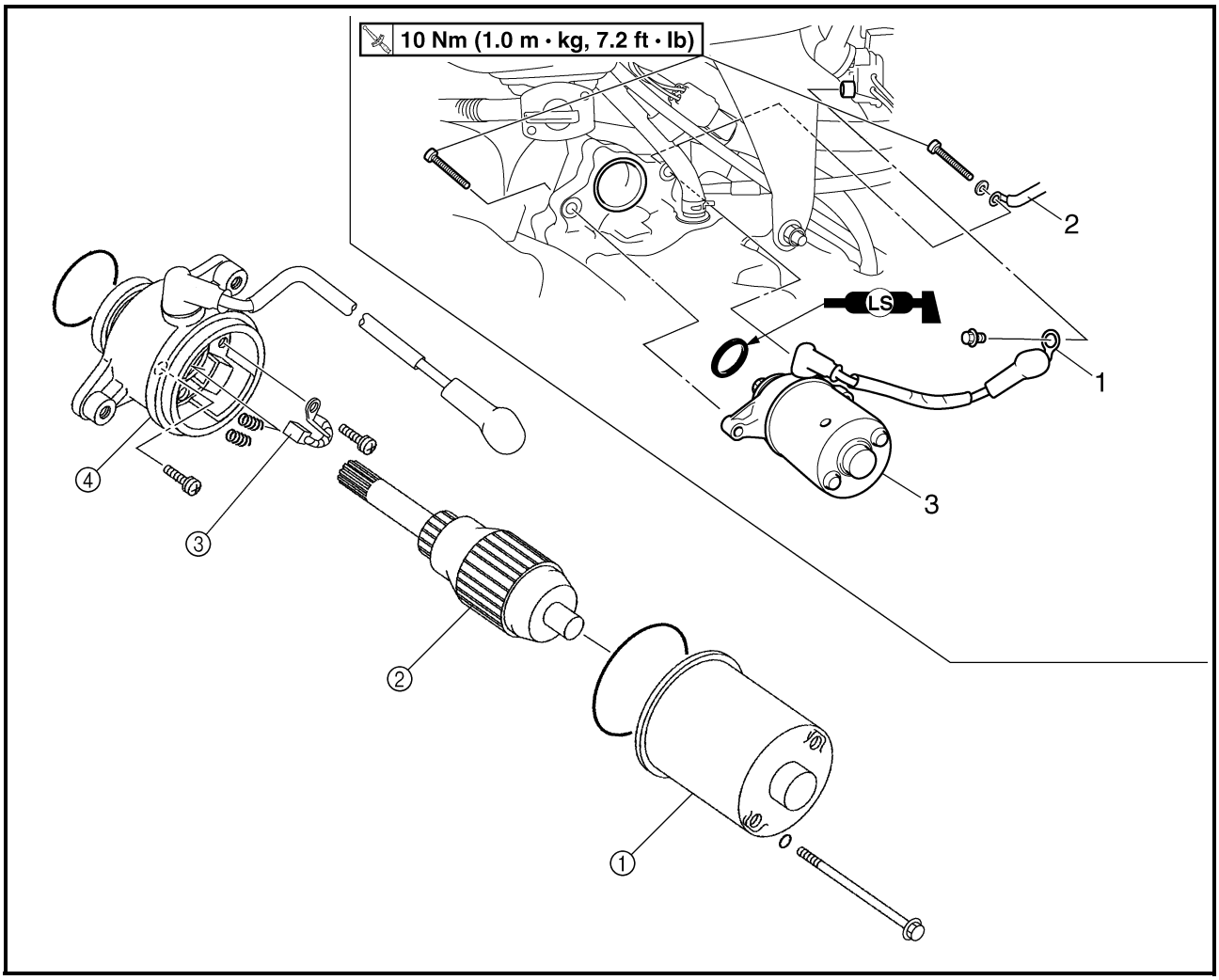
11.Wiring

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

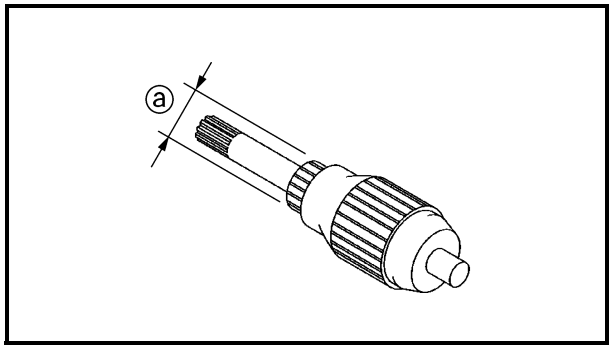
YES → The starting system circuit is OK.

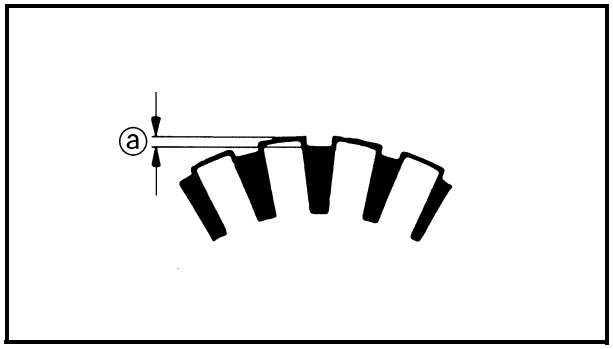
NO → Properly connect or repair the starting system's wiring.

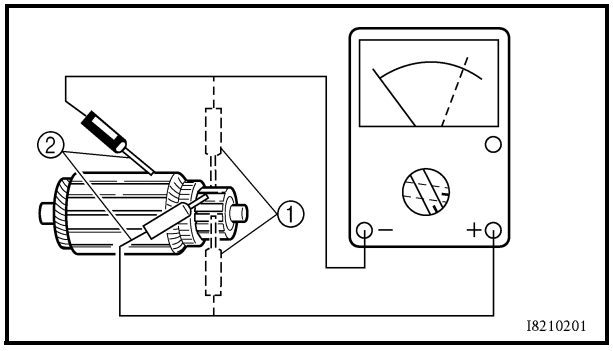
EBS01061
STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter motor		Remove the parts in the order listed.
1	Starter motor lead	1	
2	Ground lead	1	
3	Starter motor	1	
			For installation, reverse the removal procedure.
	Disassembling the starter motor		Remove the parts in the order listed.
①	Yoke	1	
②	Armature coil	1	Refer to "ASSEMBLING THE STARTER MOTOR".
③	Brush	1	
④	Bracket	1	
			For assembly, reverse the disassembly procedure.







EBS01064
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
15.5 mm (0.61 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 mm (0.04 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
P/N. YU-03112-C, 90890-03112

Armature coil
Commutator resistance ①
0.029 ~ 0.035 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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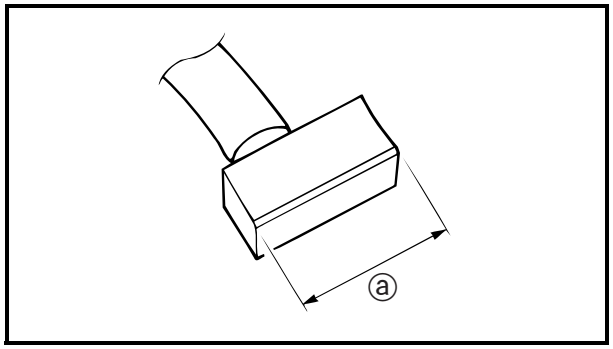


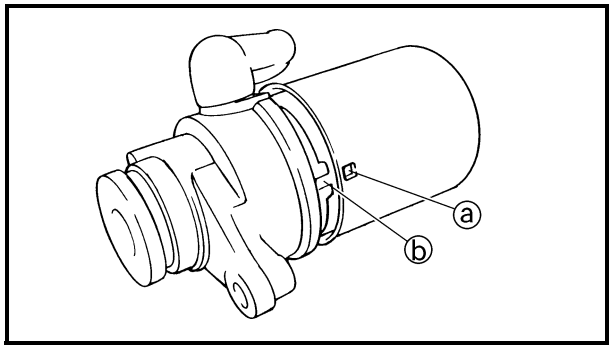
5. Measure:
   • brush length ⓐ
   Out of specification → Replace the brushes as a set.

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
3.24 ~ 4.22 N
(320 ~ 430 gf, 11.66 ~ 15.19 oz)

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



EBS00515
ASSEMBLING THE STARTER MOTOR

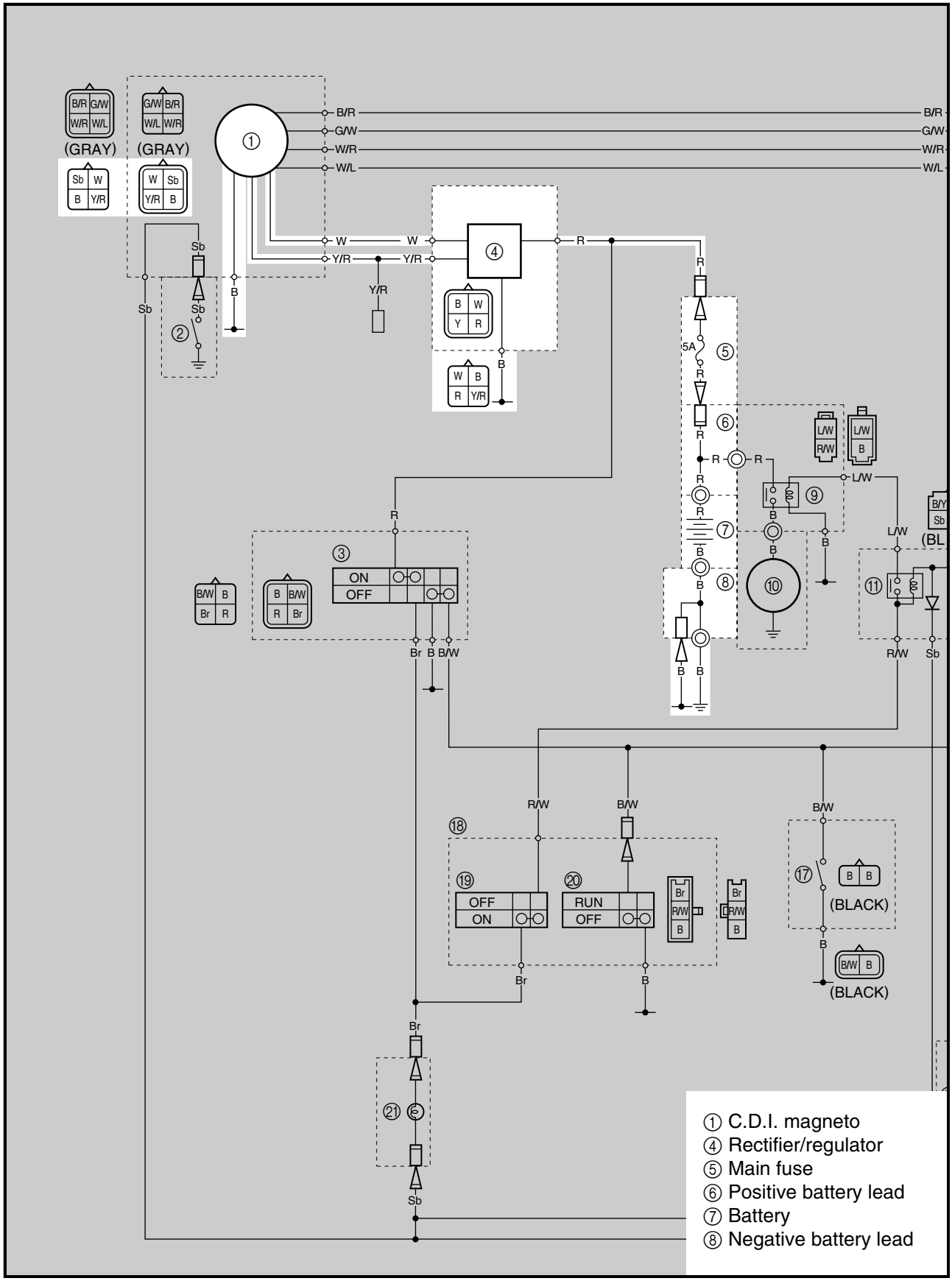
1. Install:
   • bracket
   • brush
   • armature coil
   • yoke

NOTE:
Align the projection ⓐ on the yoke with the slot ⓑ on the bracket.

EBS00516

CHARGING SYSTEM

CIRCUIT DIAGRAM



EBS01065
TROUBLESHOOTING

The battery is not being charged.

Check:
1. main 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. seat
2. rear fender

- Troubleshoot with the following special tool(s).

Inductive self-powered tachometer
P/N. YU-8036-B
Engine tachometer
P/N. 90890-03113
Pocket tester
P/N. YU-03112-C, 90890-03112

EBS01043

1. Main fuse

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

YES ⇩

NO ⇩

Replace the fuse.

EBS01044

2. Battery

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

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

- Is the battery OK?

YES ⇩

NO ⇩

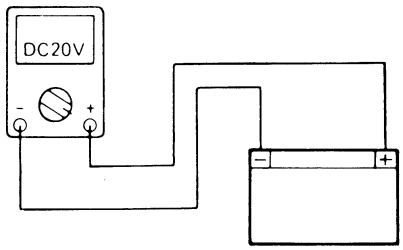
- Refill battery fluid.
- Clean the battery terminals.
- Recharge or replace the battery.

EBS01066

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
Negative tester probe →
negative battery terminal



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

Charging voltage
14 V at 5,000 r/min

NOTE:
Make sure the battery is fully charged.

- Is the charging voltage within specification?

NO

YES

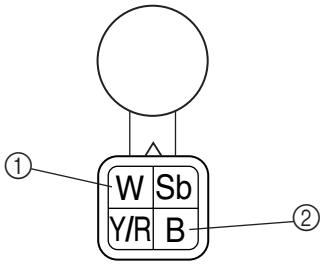
The charging circuit is OK.

EBS01100

4. Charging coil resistance

- Disconnect the C.D.I. magneto coupler from the wire harness.
- Connect the pocket tester (Ω × 1) to the charging coils.

Positive tester probe → white terminal ①
Negative tester probe → black terminal ②



- Measure the charging coil resistance.

Charging coil resistance
0.72 ~ 1.08 Ω at 20 °C (68 °F)
(between white and black)

YES

Replace the rectifier/regulator.

NO

Replace the pickup coil/stator assembly.

EBS01059

5. Wiring

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

YES

The charging system circuit is OK.

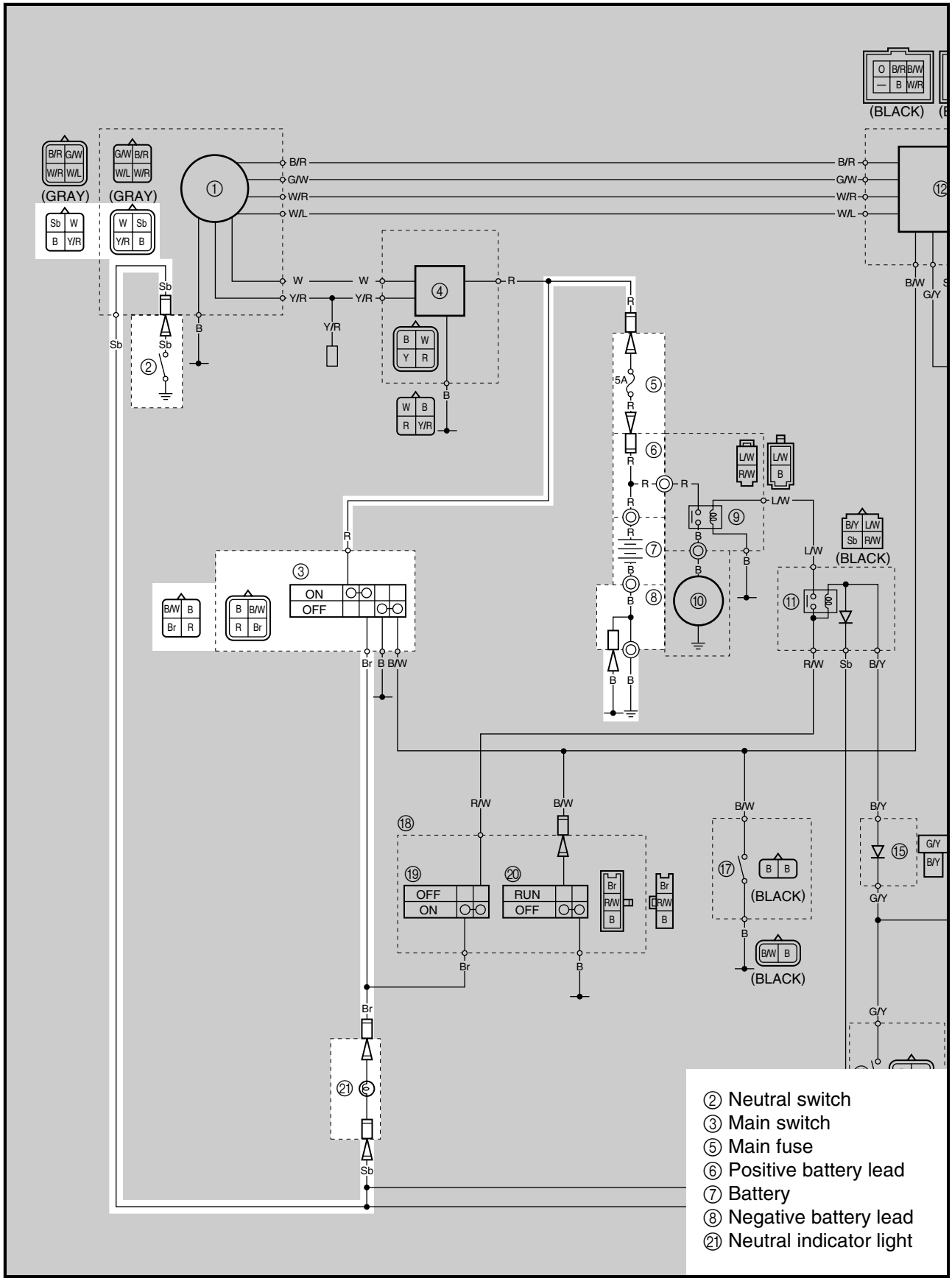
NO

Properly connect or repair the charging system's wiring.

EBS00521

SIGNAL SYSTEM

CIRCUIT DIAGRAM



EBS01073
TROUBLESHOOTING

If the neutral indicator light fails to come on.

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

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

1. seat
2. front fender
3. C.D.I. magneto cover

- Troubleshoot with the following special tool(s).

Pocket tester
P/N. YU-03112-C, 90890-03112

EBS01043

1. Main fuse
- Check the main fuse for continuity. Refer to "CHECKING THE FUSE" in chapter 3.
- Is the main fuse OK?

YES → NO → Replace the fuse.

EBS01044

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

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

- Is the battery OK?

YES → NO →
- Refill battery fluid.
- Clean the battery terminals.
- Recharge or replace the battery.

EBS01041

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.

EBS01074

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

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

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

EBS01075
CHECKING THE SIGNALING SYSTEM

EBS01077
1. The neutral indicator light fails to come on.

1. Neutral indicator light bulb and socket
• Check the neutral indicator light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”. • Are the neutral indicator light bulb and socket OK?

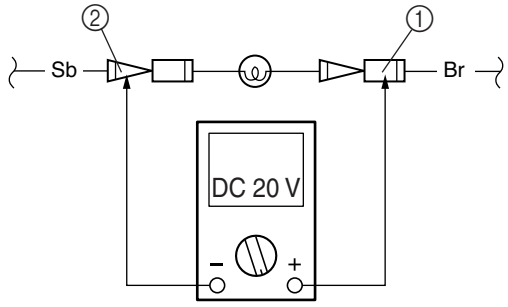
YES ⇩ NO ⇩

Replace the neutral indicator light bulb, socket or both.

2. Neutral switch
• Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”. • Is the neutral switch OK?

YES ⇩ NO ⇩

Replace the neutral switch.

3. Voltage
• Connect the pocket tester (DC 20 V) to the neutral indicator light connectors (wire harness side) as shown.
Positive tester probe → brown ① **Negative tester probe → sky blue ②**

• Set the main switch to “ON”. • Measure the voltage (DC 12 V). • Is the voltage within specification?

YES ⇩ NO ⇩

This circuit is OK.

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

EBS00537

TROUBLESHOOTING

NOTE:
The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for check, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM

Fuel tank
- Empty
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel breather hose
- Deteriorated or contaminated fuel

Fuel cock
- Clogged fuel hose

Carburetor
- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Deformed float
- Worn needle valve
- Improperly sealed valve seat
- Improperly adjusted fuel level
- Improperly set pilot jet

Air filter
- Clogged air filter element

ELECTRICAL SYSTEM

Spark plug
- Improper plug gap
- Worn electrodes
- Wire between terminals broken
- Improper heat range
- Faulty spark plug cap

Ignition coil
- Broken or shorted primary/secondary
- Faulty spark plug lead
- Broken body

C.D.I. system
- Faulty C.D.I. unit
- Faulty pickup coil
- Faulty source coil
- Broken woodruff key

Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch

Starter motor
- Faulty starter motor
- Faulty starter relay
- Faulty starter circuit cut-off relay

Battery
- Faulty battery

COMPRESSION SYSTEM

Cylinder and cylinder head
- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Broken cylinder gasket
- Worn, damaged or seized cylinder

Valve, camshaft and crankshaft
- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improper valve timing
- Broken valve spring
- Seized camshaft
- Seized crankshaft

Piston and piston rings
- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

Crankcase and crankshaft
- Improperly seated crankcase
- Seized crankshaft

Valve train
- Improperly adjusted valve clearance
- Improperly adjusted valve timing

EBS00538

POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE

Carburetor
- Loose pilot jet
- Clogged pilot jet
- Clogged pilot air jet
- Improperly adjusted idle speed (throttle stop screw)
- Improper throttle cable play
- Flooded carburetor

Electrical system
- Faulty battery
- Faulty spark plug
- Faulty C.D.I. unit
- Faulty pickup coil
- Faulty source coil
- Faulty ignition coil

Valve train
- Improperly adjusted valve clearance

Air filter
- Clogged air filter element

EBS00539

POOR MEDIUM AND HIGH-SPEED PERFORMANCE

POOR MEDIUM AND HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURE/HARD STARTING” and “POOR IDLE SPEED PERFORMANCE—Valve train”.

Carburetor
- Improper jet needle clip position
- Improperly adjusted fuel level
- Clogged or loose main jet
- Deteriorated or contaminated fuel

Air filter
- Clogged air filter element

EBS00540

FAULTY DRIVE TRAIN

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1. A pronounced hesitation or “jerky” movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2. A “rolling rumble” noticeable at low speed; a high-pitched whine; a “clunk” from a shaft drive component or area. 3. A locked-up condition of the shaft drive mechanism, no power transmitted from the engine to the rear wheels.	A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign objects lodged between the moving parts.

NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and check them.

EBS00541

FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to “CLUTCH SLIPPING/DRAGGING—CLUTCH DRAGGING”.

SHIFT LEVER DOES NOT MOVE

Shift shaft
- Bent shift shaft

Shift cam, shift forks
- Groove jammed with impurities
- Seized shift fork
- Bent shift fork guide bar

Transmission
- Seized transmission gear
- Jammed impurities
- Incorrectly assembled transmission

JUMPS OUT GEAR

Shift shaft
- Improperly adjusted shift shaft position
- Improperly returned stopper lever

Shift forks
- Worn shift fork

Shift drum
- Improper thrust play
- Worn shift drum groove

Transmission
- Worn gear dog

EBS00545

CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING

Clutch
- Loose clutch spring
- Fatigued clutch spring
- Worn friction plate
- Worn clutch plate
- Incorrectly assembled clutch

Engine oil
- Low oil level
- Improper quality (low viscosity)
- Deterioration

CLUTCH DRAGGING

Clutch
- Warped pressure plate
- Unevenly tensioned clutch springs
- Loose clutch boss nut
- Bent clutch plate
- Swollen friction plate
- Broken clutch boss

Engine oil
- High oil level
- Improper quality (high viscosity)
- Deterioration

EBS00546

OVERHEATING

OVERHEATING

Ignition system
- Improper spark plug gap
- Improper spark plug heat range
- Faulty C.D.I. unit

Fuel system
- Improper carburetor main jet (improper setting)
- Improper fuel level
- Clogged air filter element

Compression system
- Heavy carbon build-up

Engine oil
- Improper oil level
- Improper oil viscosity
- Inferior oil quality

Brake
- Brake drag

EBS00549

FAULTY BRAKE

POOR BRAKING EFFECT

Front and rear drum brake

- Worn brake shoe lining
- Worn brake drum
- Oily or greasy brake shoe lining
- Oily or greasy brake drum
- Improperly adjusted brake lever free play
- Improper brake cam lever position
- Improper brake shoe position
- Fatigued/damaged return spring
- Broken brake cable

EBS00551

SHOCK ABSORBER MALFUNCTION

MALFUNCTION

- Bent or damaged damper rod
- Damaged oil seal lip
- Fatigued shock absorber spring

EBS00552

UNSTABLE HANDLING

UNSTABLE HANDLING

Handlebar

- Improperly installed or bent

Steering

- Incorrect toe-in
- Bent steering stem
- Improperly installed steering stem
- Damaged bearing or bearing race
- Bent tie rods
- Deformed steering knuckles

Tires

- Uneven tire pressures on both sides
- Incorrect tire pressure
- Uneven tire wear

Wheels

- Deformed wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent
- Damaged frame

Swingarm

- Worn bearing or bushing
- Bent or damaged

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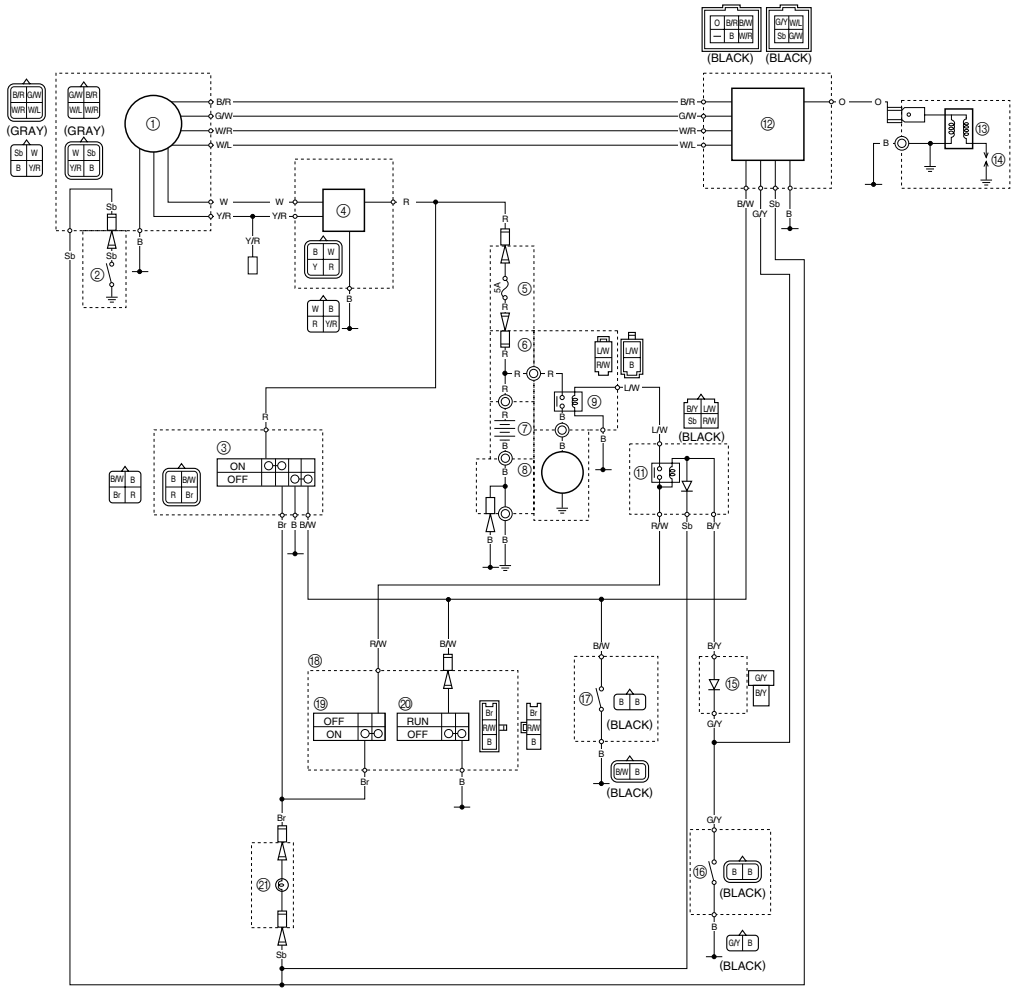
YFM50S WIRING DIAGRAM



① C.D.I. magneto
② Neutral switch
③ Main switch
④ Rectifier/regulator
⑤ Main fuse
⑥ Positive battery lead
⑦ Battery
⑧ Negative battery lead
⑨ Starter relay
⑩ Starter motor
⑪ Starting circuit cut-off relay
⑫ C.D.I. unit
⑬ Ignition coil
⑭ Spark plug
⑮ Diode
⑯ Rear brake switch
⑰ Engine stop switch (frame)
⑱ Handlebar switch
⑲ Start switch
⑳ Engine stop switch (handlebar)
㉑ Neutral indicator light

COLOR CODE

B ..... Black
Br ..... Brown
O ..... Orange
R ..... Red
Sb ..... Sky blue
W ..... White
Y ..... Yellow
B/R ..... Black/Red
B/W ..... Black/White
B/Y ..... Black/Yellow
G/W ..... Green/White
G/Y ..... Green/Yellow
L/W ..... Blue/White
R/W ..... Red/White
W/L ..... White/Blue
W/R ..... White/Red
Y/R ..... Yellow/Red