GENUINE

RT180 (A-G)

LIT-11616-07-30

RT180 (A-B)
SERVICE MANUAL

1st Edition, January 1990

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NOTICE

This manual was written by Yamaha Motor Company primarily for use by Yamaha dealars and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that people using this book to perform maintenance and repairs on Yamaha motorcycles have a basic understanding of the mechanical concepts and procedures inherent in motocycle repair technology. Without such knowledge, attempted repairs or service to this model render it unfit to use and/or unsafe.

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

SERVICE DIVISION
YAMAHA MOTOR DA AMAZÔNIA., LTDA.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation:

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

⚠ WARNING Failure to follow WARNING instructions could result in servere injury or death to the motorcycle operator, a bystander, or a person inspecting 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.

MANUAL FORMAT

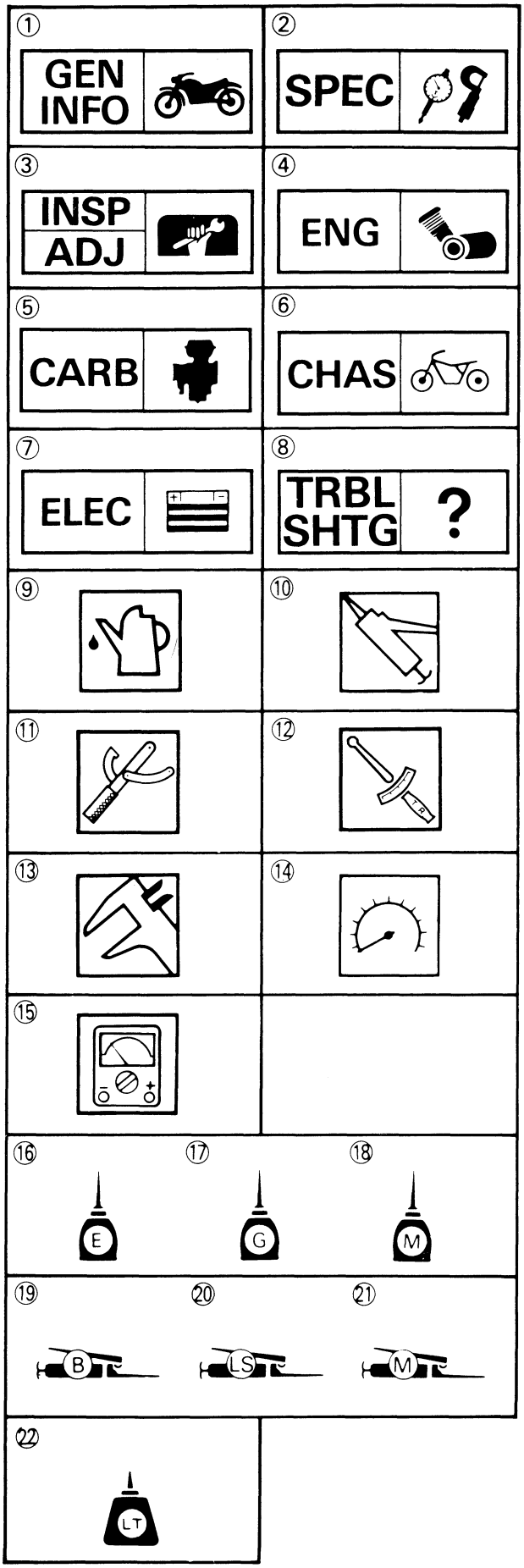
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, hand reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

In this format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
  Pitting/Damage → Replace.

EXPLODED DIAGRAM

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



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑧ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Specifications
③ Periodic inspection and adjustment
④ Engine
⑤ Carburetion
⑥ Chassis
⑦ Electrical
⑧ Troubleshooting

Illustrated symbols ⑨ to ⑮ are used to identify the specifications appearing in the text.

⑨ Filling fluid
⑩ Lubricant
⑪ Special tool
⑫ Tightening
⑬ Wear limit, clearance
⑭ Engine speed
⑮ Ω, V, A

Illustrated symbols ⑯ to ㉒ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑯ Apply engine oil
⑰ Apply gear oil
⑱ Apply molybdenum disulfide oil
⑲ Apply wheel bearing grease
⑳ Apply lightweight lithium-soap base grease
㉑ Apply molybdenum disulfide grease
㉒ Apply locking agent (LOCTITE®)

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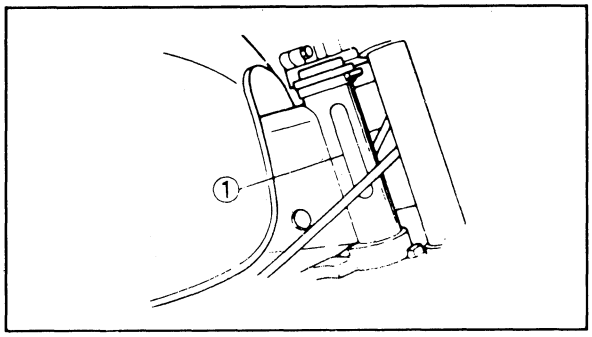
CARBURETION

CHAPTER 6.
CHASSIS

CHAPTER 7.
ELECTRICAL

CHAPTER 8.
TROUBLESHOOTING

GENERAL INFORMATION



MACHINE IDENTIFICATION

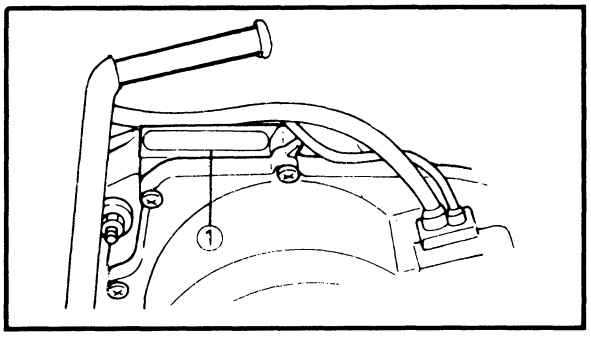
VEHICLE IDENTIFICATION NUMBER

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

NOTE:

The vehicle identification number is used to identify your machine and may be used to register your machine with the licensing authority in your state.

Starting Serial Number:
9C63VCA0*L0000101



ENGINE SERIAL NUMBER

The engine serial number 1 is stamped into the elevated part of the right rear section of the engine.

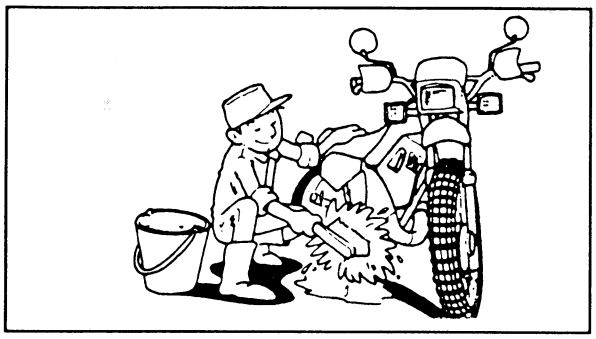
NOTE:

The first three digits of this number are for model identification; the remaining digits are the unit production number.

Starting Serial Number:
3VC - 000101

NOTE:

Designs and specifications are subject to change without notice.

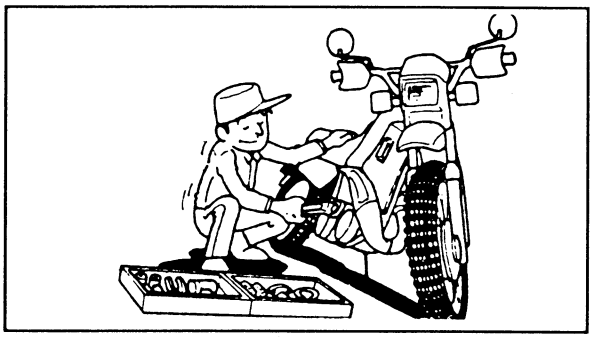


IMPORTANT INFORMATION

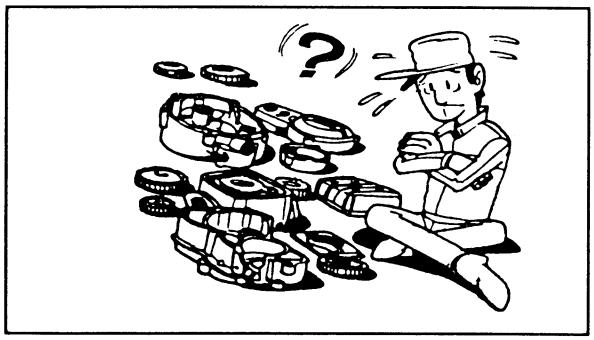
PREPARATION FOR REMOVAL

1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.

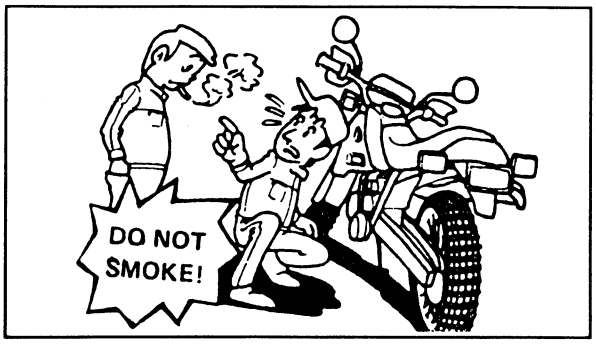
2. Use proper tools and cleaning equipment. Refer to "SPECIAL TOOL".



3. When disassembling the machine, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have beeen "mated" through normal wear. Mated parts must be reused as an assembly or replaced.



4. During the machine's disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.



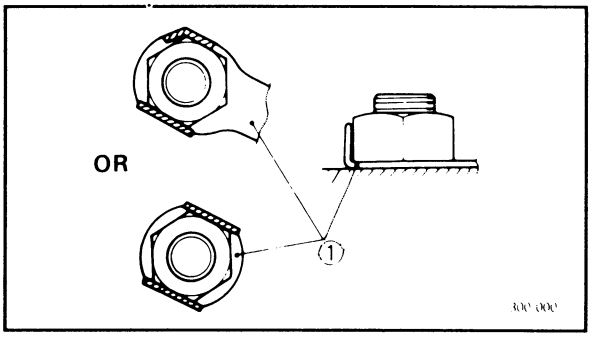
5. Keep away from fire.

ALL REPLACEMENT PARTS

1. We recommended to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

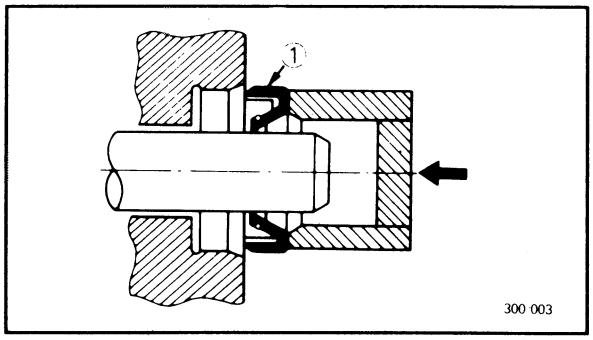
GASKETS, OIL SEALS, AND O-RINGS

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



LOCK WASHERS/PLATES AND COTTER PINS

1. All lock washers/plates ① and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



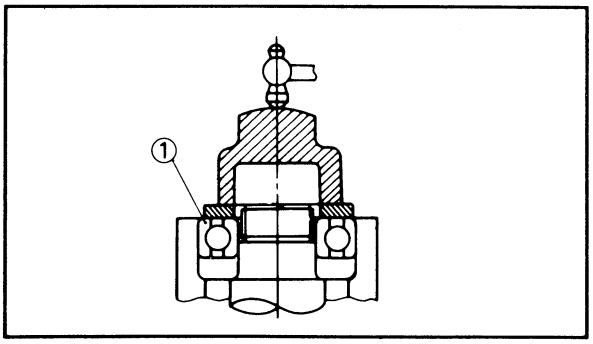
BEARINGS AND OIL SEALS

1. Install the bearing(s) and oil seal(s) with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally whe installing.

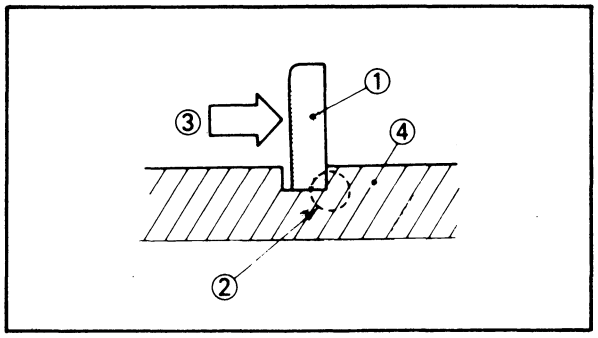
① Oil seal

CAUTION:

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



① Bearing



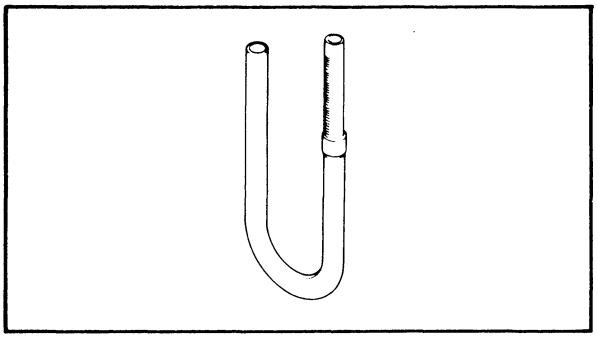
CIRCLIPS

1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace deformed circlips. When installing a circlip ①, make sure that the sharp edged corner ② is positioned opposite to the thrust ③ it receives. See the sectional view.

④ Shaft

SPECIAL TOOLS

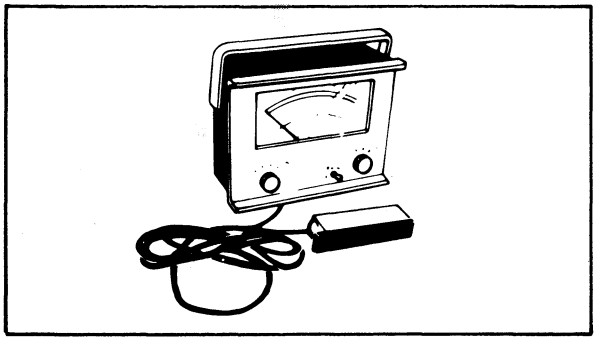
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



FOR TUNE UP

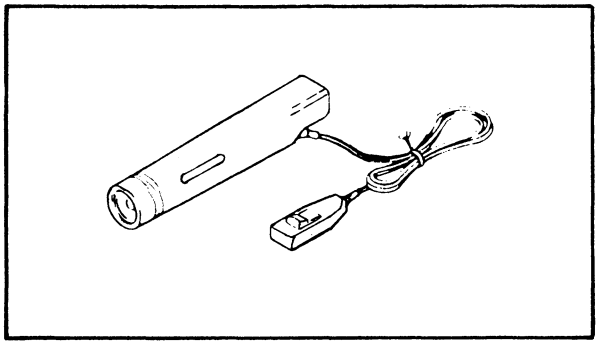
1. Fuel Level Gauge
   P/N. YM-01312-A

This gauge is used to measure the fuel level in the float chamber.



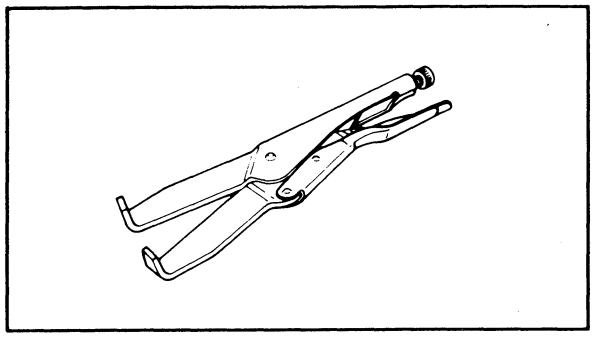
2. Engine Tachometer
   P/N. YU-08036

This tool is needed for determining engine rpm.



3. Inductive Timing Light
   P/N. YM-33277

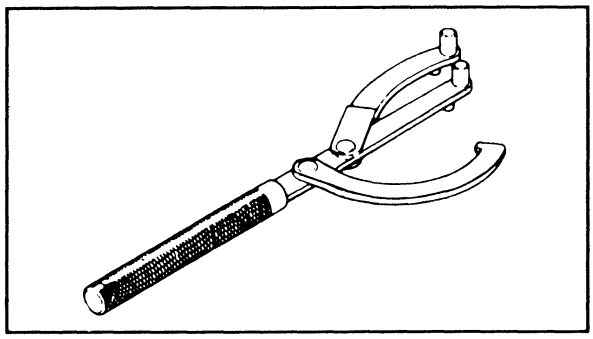
This tool is necessary for adjusting ignition timing



FOR ENGINE SERVICE

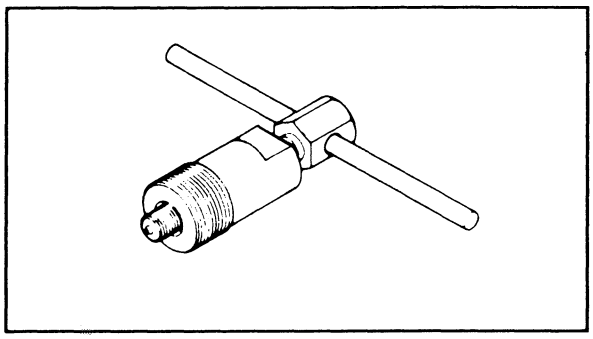
1. Universal Clutch Holder
   P/N. YM-91042

This tool is used to hold the clutch when loosening or tightening the clutch boss locknut.



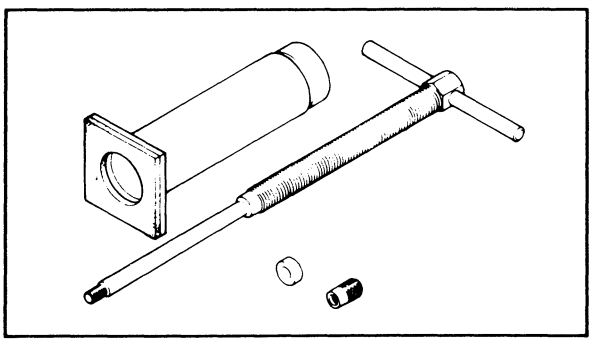
2. Universal Rotor Holder
   P/N. YU-01235

This tool is used when loosening or tightening the flywheel magneto securing bolt.



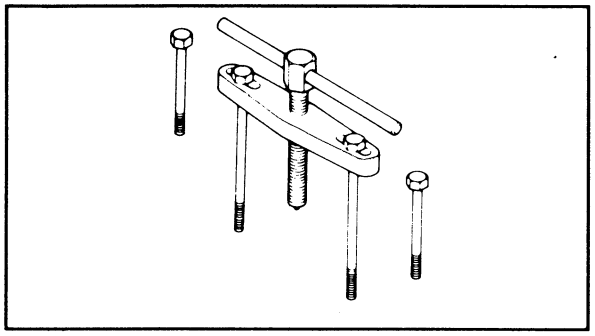
3. Flywheel Puller
   P/N. YM-01189

This tool is used for removing the flywheel.



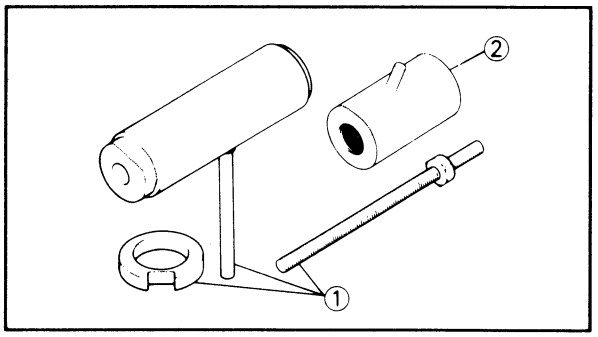
4. Piston Pin Puller
   P/N. YU-01304

This tool is used to remove the piston pin.



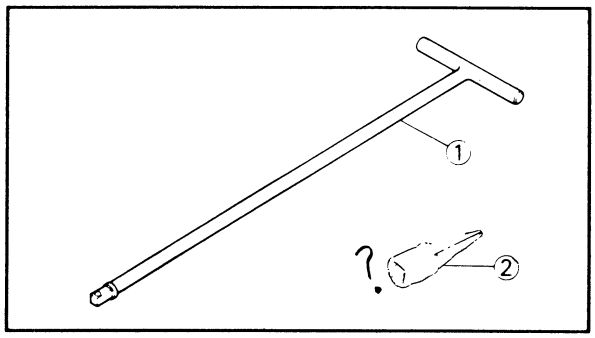
5. Crankcase Separating Tool
   P/N. YU-01135

This tool is used to remove the crankshaft or separate the crankcase.



6. Crankshaft Installing Tool
   P/N. YU-90050 ①
   P/N. YU-90063 ②

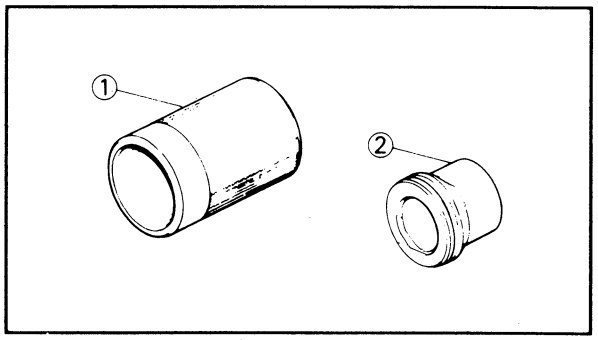
These tools are used to install the crankshaft.



FOR CHASSIS SERVICE

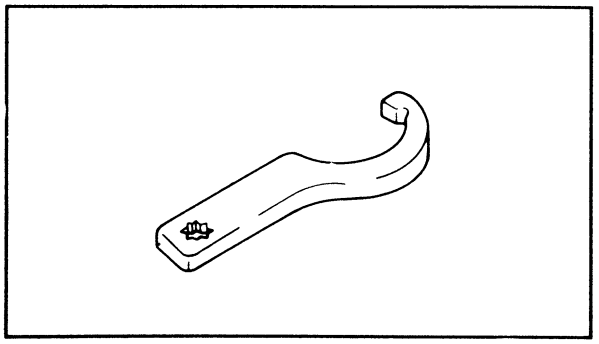
1. T-Handle - ①
   P/N. YM-01326
   Front Fork Cylinder Holder - ②
   P/N. YM-01300-1

This tool is used to loosen and tighten the front fork cylinder holding bolt.



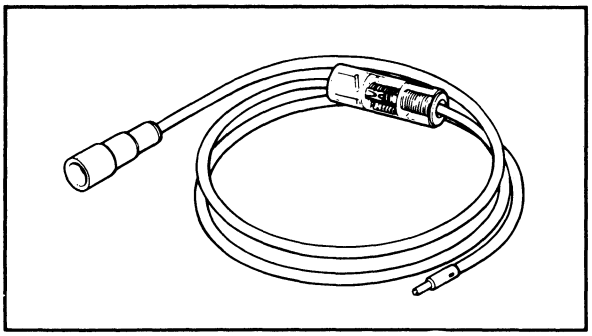
2. Front Fork Seal Driver (Weight) - ①
   P/N. YM-33963
   Adapter - ②
   P/N. YM-01369

These tools are used when installing the fork seal.



3. Ring Nut Wrench
   P/N. YU-33975

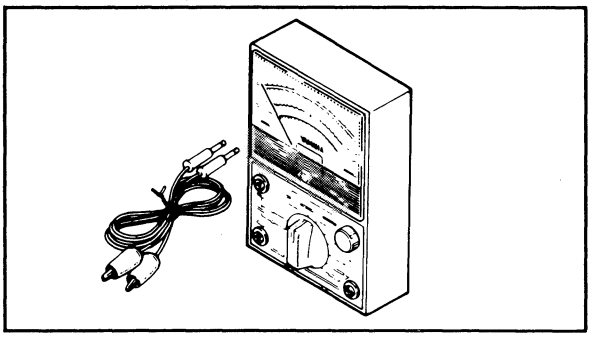
This tool is used to loosen and tighten the steering ring nut.



FOR ELECTRICAL COMPONENTS

1. Dynamic Coil Tester
   P/N. YU-34487

This tester is necessary for checking the ignition system components.



2. Pocket Tester
   P/N. YU-03112

This tester is invaluable for checking the electrical system.

SPECIFICATIONS

GENERAL SPECIFICATIONS

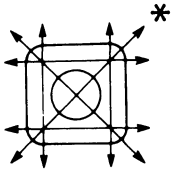
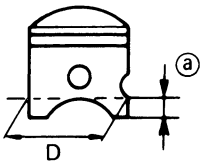
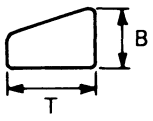
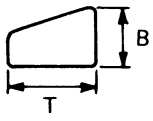
Model	RT180A
Model Code Number	3VC1
Vehicle Indentification Number	9263VCA07K0000101
Engine Serial Number	3VC-000101
Dimensions:	
Overall Length	2,050 mm (80.71 in)
Overall Width	860 mm (33.86 in)
Overall Height	1,175 mm (46.26 in)
Seat Height	860 mm (33.86 in)
Wheel Base	1,345 mm (52.93 in)
Minimum Ground Clearance	290 mm (11.42 in)
Basic Weight:	
With Oil and Full Fuel Tank	112kg (247 lb)
Minimum Turning Radius:	2,200 mm (86.6 in)
Engine:	
Engine Type	Air-cooled, 2-Stroke, gasoline
Induction System	Reed valve
Cylinder Arrangement	Forward Inclined Single Cylinder
Displacement	176 cm^3
Bore x Stroke	64.5 x 54.0 mm (2.54 x 2.12 in)
Compression Ratio	6.5 : 1
Starting System	Kick starter
Lubrication System	Separate lubrication (Yamaha Autolube)
Engine Oil:	
Type	Yamalube "2" or air cooled 2-stroke engine oil
Capacity (Oil tank)	0.75 L (0.66 Imp qt. 0.79 US qt)
Transmission Oil:	
Type	Yamalube "4",SAE 10W30 type SE motor oil or "GE" gear oil
Capacity:	
Periodic Oil Change	0.55 L (0.48 Imp qt, 0.58 Us qt)
Total Amount	0.6 L 0.53 Imp qt, 0.63 Us qt)
Air Filter:	
Type	Wet element

Model	RT180A	
Fuel:		
Type	Regular gasoline	
Fuel Tank Capacity:		
Full Amount	13 L (2.86 Imp gal, 3.43 US gal)	
Reserve Amount	1.1 L (0.24 Imp gal, 0.29 US gal)	
Carburetor:		
Type/Quantify	VM24SS/1pc	
Manufacturer	MIKUNI	
Spark plug:		
Type/Quantity	B8ES/1 pc	
Manufacturer	NGK	
Plug Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in)	
Clutch:		
Type	Wet, multiple disc	
Transmission:		
Type	Constant mesh 6-speed	
Primary Reduction System	Helical gear	
Primary Reduction Ratio	71/22 (3.227)	
Secondary Reduction System	Chain drive	
Secondary Reduction Ratio	51/14 (3.643)	
Operation	Manual	
Gear Ratio		
1st	35/11 (3.182)	
2nd	29/15 (1.933)	
3rd	26/19 (1.368)	
4th	24/22 (1.091)	
5th	22/23 (0.957)	
6th	21/25 (0.840)	
Chassis:		
Frame Type	Semi Double Cradle	
Caster Angle	28.5°	
Trail	119 mm (4.79 in)	
Tire:		
Type	With tube	
Size:		
Front	80/100-21	
Rear	100/100-18	
Cold Tire Pressure:	Front	Rear
	100 kPa (1.0 kgf/cm², 15 psi)	100 kPa (1.0 kgf/cm², 15 psi)

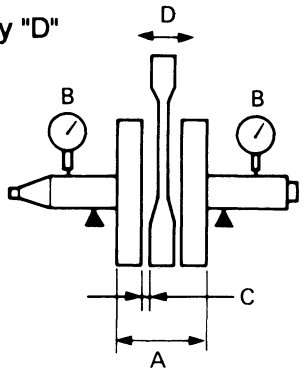
Model	RT180A
Brake:	
Front Brake Type	Single disc brake
Front Brake Operation	Right hand operation
Rear Brake Type	Drum brake
Rear Brake Operation	Right foot operation
Suspension:	
Front Suspension Type	Telescopic fork
Rear Suspension Type	Swingarm (Monocross)
Shock Absorber:	
Front Shock Absorber	Coil spring/Oil damper
Rear Shock Absorber	Coil and gas spring/Oil damper
Wheel Travel:	
Front Wheel Travel	200 mm (7.9 in)
Rear Wheel Travel	150 mm (5.9 in)
Electrical:	
Ignition System	CDI
Generator System	Flywheel magneto

MAINTENANCE SPECIFICATIONS

ENGINE

Model		RT180A
Cylinder Head: Warpage Limit		0.03 mm (0.0012 in) *Lines indicate straightedge measurement
Cylinder: Bore Size Taper Limit Out of Round Limit		64.50 ~ 64.52 mm (2.539 ~ 2.540 in) 0.05 mm (0.002 in) 0.01 mm (0.0004 in)
Piston: Piston Size "D" Measuring Point "a"		64.46 ~ 64.50 mm (2.538 ~ 2.539 in) 10 mm (0,4 in)
Piston Off-Set Piston-to-Cylinder Clearance <Limit> Over Size: 1st 2nd		0.5 mm (0.02 in) 0.035 ~ 0.040 mm (0.0014 ~ 0.0016 in) 0.1 mm (0.004 in) 64.75 mm (2.549 in) 65 mm (2.559 in)
Piston Ring: Sectional Sketch	Top Ring 	Keystone type B = 1.5 mm (0.059 in) T = 2.6 mm (0.102 in)
	2nd Ring 	Keystone type B = 1.5 mm (0.059 in) T = 2.6 mm (0.102 in)
End Gap (Installed)	Top Ring	0.3 ~ 0.5 mm (0.012 ~ 0.02 in)
	2nd Ring	0.3 ~ 0.5 mm (0.012 ~ 0.02 in)
Side Clearance	Top Ring	0.03 ~ 0.05 mm (0.001 ~ 0.002 in)
	Top Ring	0.03 ~ 0.05 mm (0.001 ~ 0.002 in)

Model	RT180A
Crankshaft:	
Crank Width "A"	55.85 ~ 55.95 mmm (2.19 ~ 2.20 in)
Runout Limit "B"	0.03 mm (0.0012 in)
Big End Side Clearance "C"	0.15 ~ 0.70 mm (0.006 ~ 0.028 in)
<Limit>	<1.0 mm (0.040 in)>
Small End Free Play "D"	1.0 ~ 1.5 mm (0.039 ~ 0.059 in)
Clutch	
Friction Plate:	
Thickness	2.92 ~3.08 mm (0.115 ~ 0.121 in)
Quantity	6 pcs
Wear Limit	2.7 mm (0.106 in)
Clutch Plate:	
Thckness	1.1 ~ 1.3 mm (0.043 ~ 0.051 in)
Quantity	5 pcs
Warpage Limit	0.05 mm (0.002 in)
Clutch Spring:	
Free Length	33 mm (12.99 in)
Quantity	5 pcs
Minimum Free Length	32 mm (1.260 in)
Clutch Release Method	Inner Push, Cam Push
Push Rod Bending Limit	<0.5 mm (0.02 in)>
Transmission:	
Main Axle Runout Limit	0.08 mm (0.003 in)
Drive Axle Runout Limit	0.08 mm (0.003 in)
Shifter:	
Type	Guide bar
Guide Bar Bending Limit	0.03 mm (0.0012 in)
Kick Starter:	
Type	Kick and mesh type
Air Filter:	
Oil Grade	Foam Air-Filter Oil



Model		RT180A
Carburetor:		
I.D. Mark		3VC00
Main Jet	(M.J.)	# 130
Air Jet	(A.J.)	ø0.5
Jet Needle-Position	(J.N.)	5JP27-2
Needle Jet	(N.J.)	P-2
Cutaway	(C.A)	3.0
Pilot Outlet	(P.O.)	ø0.6
Pilot Jet	(P.J.)	#27.5
Air Screw	(A.S.)	1-1/2 turns out
Bypass 1	(B.P. 1)	ø1.4
Valve Seat Size	(V.S.)	ø2.5
Starter Jet	(G.S.)	#20
Fuel Level	(F.L.)	25 ~ 27 mm (0.984 ~ 1.063 in)
Float Height	(F.H.)	20 ~ 22 mm (0.787 ~ 0.866 in)
Idling Speed		1,450 ~ 1,550 r/min
Reed Valve:		
Valve Thickness		0.18 ~ 0.22 mm (0.007 ~ 0.009 in)
Valve Stopper Height		8.7 ~ 9.3 mm (0.342 ~ 0.366 in)
Valve Bending Limit		0.9 mm (0.035 in)
Lubrication System:		
Autolube Pump:		
Color Code		Blue
Minimum Stroke		0.20 ~ 0.25 mm (0.008 ~ 0.010 in)
Maximum Stroke		1.85 ~ 2.05 mm (0.073 ~ 0.08 in)
Minimum Output		0.48 ~ 0.59 cm^3 per 200 strokes
Maximum Output		4.40 ~ 4.87 cm^3 per 200 strokes
Pulley Adjusting Mark		at idle with cable slack eliminated

NOTE;

Float level and fuel level are measured from the gasket mating surface of the carburetor body.

Tightening Torque:

Parts to be tightened	Qty.	Thread size	Tightening torque Nm	Tightening torque m·kg	Tightening torque ft·lb	Remarks
Spark Plug	1	M14 x 1.25	25	2.5	18	
Cylinder Head						
Stud Bolt	4	M8 x 1.25	12	1.2	8.6	
Nut	4	M8 x 1.25	25	2.5	18	
Cylinder						
Stud Bolt	4	M10 x 1.25	15	1.5	11	
Nut	4	M10 x 1.25	35	3.5	25	
Oil Pump						
Screw	2	M5 x 0.8	8	0.8	5.8	LT
Carburetor Joint						
Bolt	4	M6 x 1.0	8	0.8	5.8	
Exhaust Pipe						
Nut	2	M6 x 1.0	11	1.1	7.9	
Stud Bolt	2	M6 x 1.0	5	0.5	3.6	
Transmission Oil Drain Bolt	1	M12 x 1.5	20	2.0	14	
Crankcase Cover						
Screw	15	M6 x 1.0	10	1.0	7.2	
Oil Pump Cover						
Screw	3	M6 x 1.0	8	0.8	5.8	
Crankcase						
Screw	12	M6 x 1.0	8	0.8	5.6	
Kick Crank Bass						
Bolt	1	M8 x 1.25	23	2.3	17	
Primary Drive Gear						
Nut	1	M12 x 1.0	60	6.0	43	
Clutch Boss						
Nut	1	M14 x 1.0	50	5.0	36	
Clutch Spring						
Bolt	5	M5 x 0.8	6	0.6	4.3	
Plate Cover						
Screw	2	M6 x 1.0	10	1.0	7.2	LT
Drive Sprocket						
Nut	1	M6 x 1.0	60	6.0	43	
Stopper Lever						
Bolt	1	M6 x 1.0	10	1.0	7.2	LT
Change Pedal						
Bolt	1	M6 x 1.0	11	1.1	7.9	
CDI Magneto Rotor						
Nut	1	M12 x 1.25	70	7.0	50	
Stator						
Screw	2	M6 x 1.0	8	0.8	5.8	

CHASSIS

Model	RT180A
Steering System:	
Bearing Type Upper	Ball bearing
Lower	Ball bearing
Bearing Size (Quantity):	
Upper	3/16 in (22 pcs.)
Lower	1/4 in (19 pcs.)
Front Suspension:	
Front Fork Travel	200 mm (7.87 in)
Fork Spring Free Length	535 mm (21.06 in)
<Limit>	524 mm (20.6 in)
Spring Rate (K_1)	5.2 N/mm (0.52 kg/mm, 29.1 lb/in)
(K_2)	7.8 N/mm (0.78 kg/mm, 43.6 lb/in)
Sroke (K_1)	0 ~ 105 mm (0 ~ 4.1 in)
(K_2)	105 ~ 200 mm (4.1 ~ 7.9 in)
Optional Spring	NO
Oil Capacity	280 cm^3
Oil Grade	Fork oil 10W or equivalent
Rear Suspension:	
Shock Absorber Travel	82 mm (3.23 in)
Spring Free Length	258 mm (10.16 in)
Fitting Length	245 mm (9.65 in)
Spring Rate (K_1)	40 N/mm (4.0 kg/mm, 224 lb/in)
Stroke (K_1)	0 ~ 67 mm (0 ~ 2.64 in)
Spring Rate (K_2)	66 N/mm (6.6 kg/mm, 369 lb/in)
Stroke (K_2)	67 ~ 82 mm (2.64 ~ 3.23 in)
Optional Spring	NO
Enclosed Gas Pressure	150 kPa (15 kg/cm^2, 213 psi)
Swingarm:	
Free Play Limit	1.0 mm (0.04 in)
	Move swingarm end side to side
Front Wheel:	
Type	Spoke Wheel
Rim Size	1.85 x 21
Rim Material	Steel
Rim Runout Limit:	
Vertical	2.0 mm (0.08 in)
Lateral	2.0 mm (0.08 in)

Model	RT180A
Rear Wheel:	
Type	Spoke Wheel
Rim Size	2.15 x 18
Rim Material	Steel
Rim Runout Limit:	
Vertical	2.0 mm (0.08 in)
Lateral	2.0 mm (0.08 in)
Drive Chain:	
Type/Manufacturer	428H/DAIDO
Number of Links	122
Chain Free Play	40 mm (1.57 in)
Front Disc Brake:	
Type	Single
Disc Outside Diameter	245 mm (9.65 in)
Disc Thickness	4.0 mm (0.16 in)
Pad Thickness	6.8 mm (0.27 in)
<Wear Limit>	0.8 mm (0.03 in)
Master Cylinder Inside Diameter	12.7 mm (0.5 in)
Caliper Cylinder Inside Diameter	38.1 mm (1.50 in)
Brake Fluid Type	DOT N° 4 If DOT N° 4 is not available, DOT N° 3 can be used.
Rear Drum Brake:	
Type	Leading, Trailing
Brake Drum Inside Diameter	130 mm (5.12 in)
<Limit>	131 mm (5.16 in)
Shoe Spring Free Length	36.5 mm (1.44 in)
Lining Thickness	4 mm (0.16 in)
<Limit>	2 mm (0.08 in)
Brake Lever and Brake Pedal:	
Brake Lever Free Play	10 ~ 20 mm (0.4 ~ 0.8 in) At end of brake lever
Brake Pedal Position	20 mm (0.8 in) Below top of footrest
Brake Pedal Free Play	20 ~ 30 mm (0.8 ~ 1.2 in)
Clutch Lever and Throttle Grip:	
Clutch Leve Free Play/position	2 ~ 3 mm (0.08 ~ 0.12 in)
Throttle Cable Free Play	3 ~ 5 mm (0.12 ~ 0.20 in) at grip flange

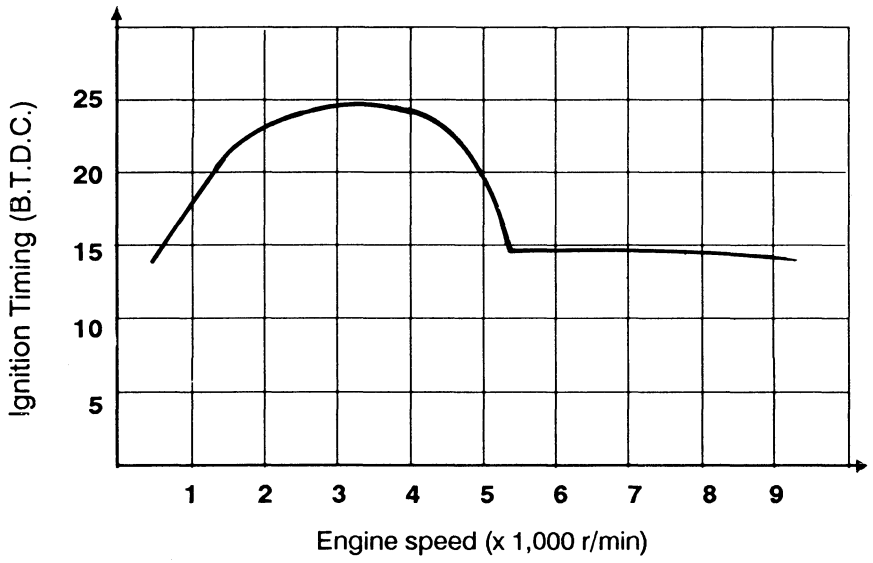
Tightening Torque:

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m· kg	ft· lb	
Front Fork, Steering:					
Handle Crown and Inner Tube	M8 x 1.25	23	2.3	17	
Handle Crown and Steering Shaft	M14 x 1.25	54	5.4	39	
Handlebar Holder	M8 x 1.25	15	1.5	11	
Steering Shaft and Ring Nut	M25 x 1.0	6	0.6	4.3	Refer to "NOTE"
Under Bracket Pinch Bolt	M8 x 1.25	23	2.3	17	
Engine Mounting:					
Front	M8 x 1.25	25	2.5	18	
Rear upper	M8 x 1.25	25	2.5	18	
Rear lower	M10 x 1.25	39	3.9	28	
Swingarm, Rear Shock Absorber:					
Pivot Shaft and Frame	M12 x 1.25	43	4.3	31	
Rear Shock Absorber and Frame	M10 x 1.25	25	2.5	18	
Wheels:					
Front Wheel Axle and Nut	M14 x 1.5	85	8.5	61	
Rear Wheel Axle and Nut	M14 x 1.5	85	8.5	61	
Front Brake Caliper	M10 x 1.25	35	3.5	25	
Union Bolt (Brake Hose)	M10 x 1.25	27	2.7	20	
Wheel Sprocket and Hub	M10 x 1.25	39	3.9	28	
Rear Wheel Hub Stud Bolt	M10 x 1.25	39	3.9	28	

NOTE:

1. First, tighten the ring nut approximately 38 Nm (3.8 m·kg, 27 ft·lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut to specification.

Model	RT180A
Voltage:	
Ignition Timing (B.T.D.C.)	18° at 1,500 r/min
Advancer Type	Electrical type
C.D.I.:	
Magneto Model/Manufacturer	42L - VO/YAMAHA
C.D.I. Unit Model/Manufacturer	23K - MO/YAMAHA
Pickup Coil Resistance (Color)	90 ~ 110 Ω at 20 °C (68 °F) (White/Red - Black)
Source Coil Resistance (Color)	270 ~ 330Ω at 20 °C (68 °F) (Black/Red - Black)
Ignition Coil:	
Model/Manufacturer	3T2 - MO/YAMAHA
Minimum Spark Gap	6 mm (0.24 in)
Primary Coil Resistance	1.4 ~ 1.8 Ω at 20 °C (68 °F)
Secondary Coil Resistance	5.1 ~ 7.7 kΩ at 20 °C (68 °F)
Spark Plug Cap:	
Type	Rubber Type
Plug Cap Resistance	5 kΩ

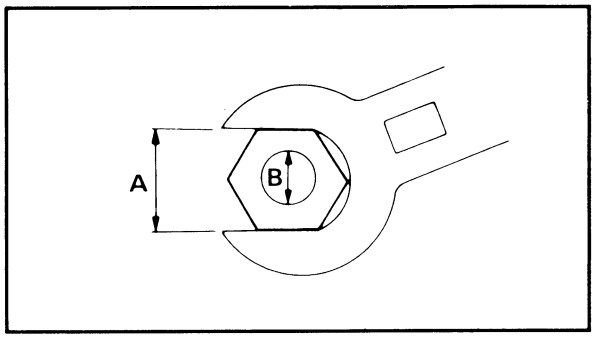


Charging System:	Flywheel magneto
Flywheel Magneto : Model/Manufacturer Charging Coil Resistance (Color) Lighting Coil Resistance (Color)	 42L-VO/YAMAHA 0.28 ~ 0.34 Ω at 20 °C (68 °F) (White - Black) 0.42 ~ 0.52Ω at 20 °C (68 °F) (Yellow - Black)
Oil Level Switch:	23 K-OO/YAMAHA
Indicator L ight: Oil Level	 12 V 3.4 W x 1 pc

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multifastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

A (Nut)	B (Bolt)	General torque specifications		
		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



A: Distance across flats
B: Outside thread diameter

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm cm	millimeter centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	kilogram	10^{3} gram	Weight
N	Newton	1 kg × m/sec^2	Force
Nm m•kg	Newton meter Meter kilogram	N × m m × kg	Torque Torque
Pa N/mm	Pascal Newton per millimeter	N/m^2 N/mm	Pressure Spring rate
L cm^3	Liter Cubic centimeter	—	**Volume or Capacity**
r/min	**Revolution per minute**	—	**Engine Speed**

LUBRICATION POINTS AND LUBRICANT TYPE

ENGINE

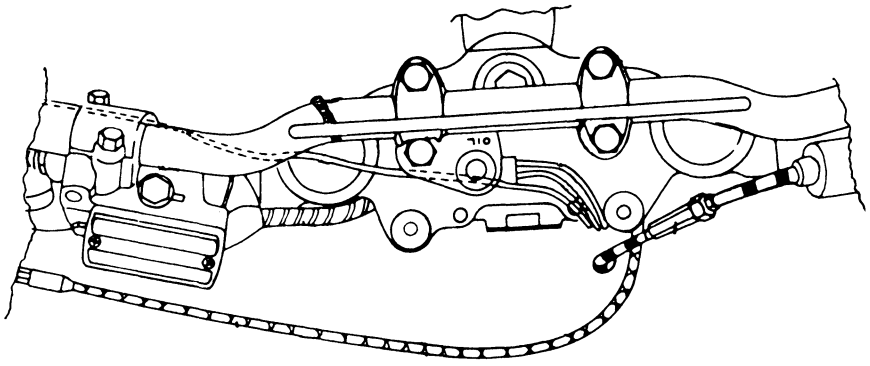
Lubrication Points (Part name)	Lubricant Type
Oil seal lips (All)	SL
O-rings (All)	SL
Bearing retainer	
Crankshaft bearings (Left and center)	E
Needle bearings (Connecting rod)	E
Main axle bearings	G
Drive axle bearings	G
Push lever bearing	G
Crank pins	E
Piston rings, piston pins and pistons	E
Shaft (Autolube pump)	E
Kick idle gear	G
Kick axle	G
Primary driven gear (Clutch housing)	G
Push rod	G
Push lever axle	G
Sliding gear (Transmission)	M
Free movement gear (Transmission)	M
Guide bar (Shift forks)	G
Crankcase mating surfaces	Quick gasket ®

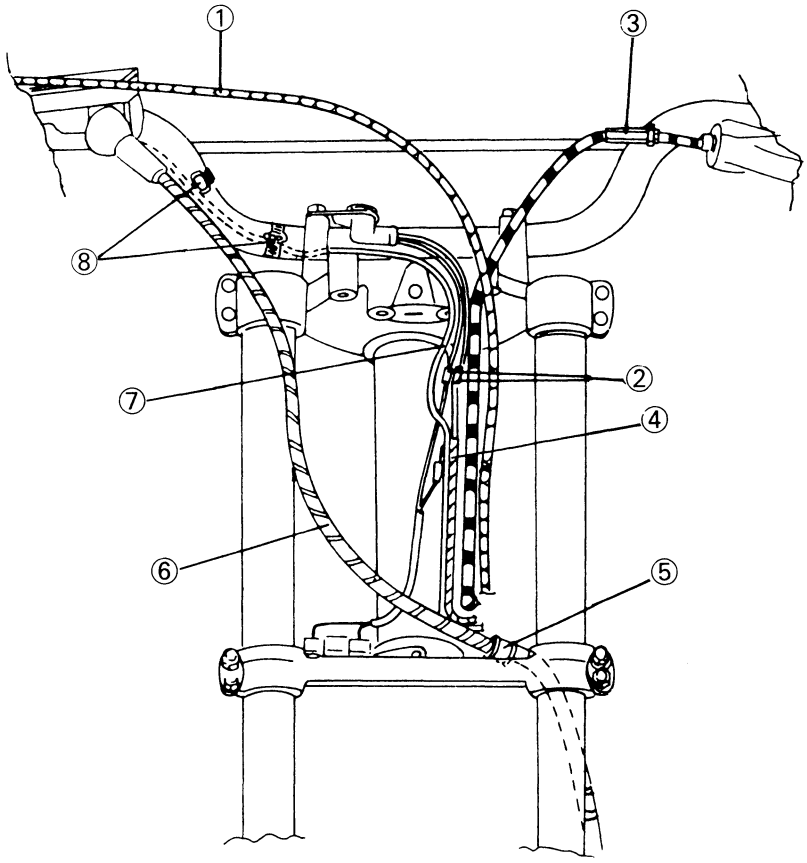
CHASSIS

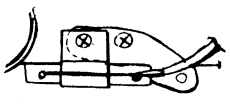
Lubrication Points (Part name)	Lubricant Type
Ball bearing (Steering shaft)	
Bearing (Steering shaft)	
Pivot shaft (Swingarm)	
Oil seal lip (Swingarm, Steering shaft)	
Bearing (Swingarm)	
Collar (Swingarm)	
Throttle grip inner surface	
Lever pivots and cable end	
Oil seal lip (Wheels)	
Rear brake pedal boss	
Sidestand pivot	

CABLE ROUTING

① Throttle cable
② "OIL" warning indicator light
③ Clutch cable
④ Wireharness
⑤ Clamp
⑥ Brake hose
⑦ ENGINE STOP switch lead
⑧ Switch lead band



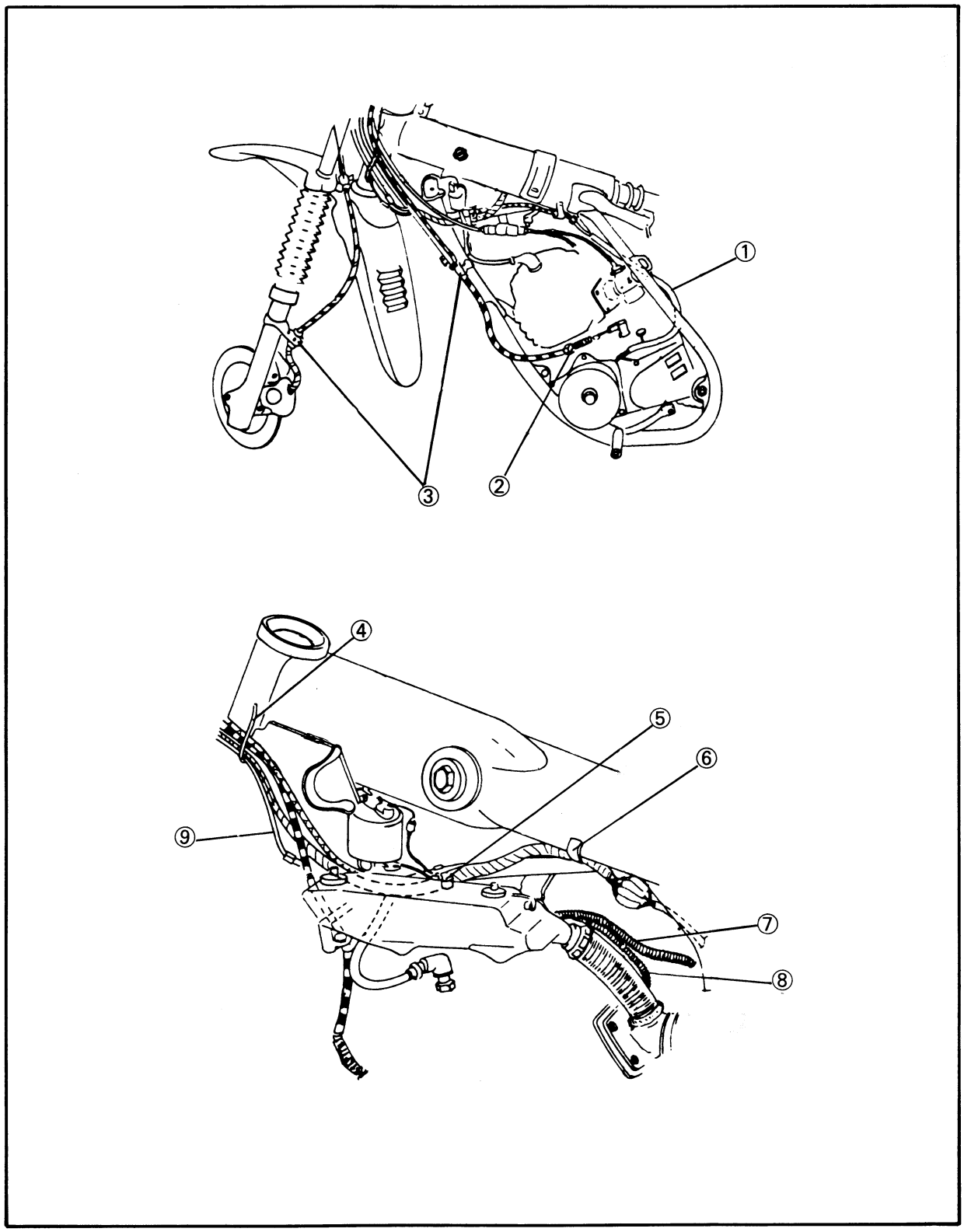




View A

CABLE ROUTING

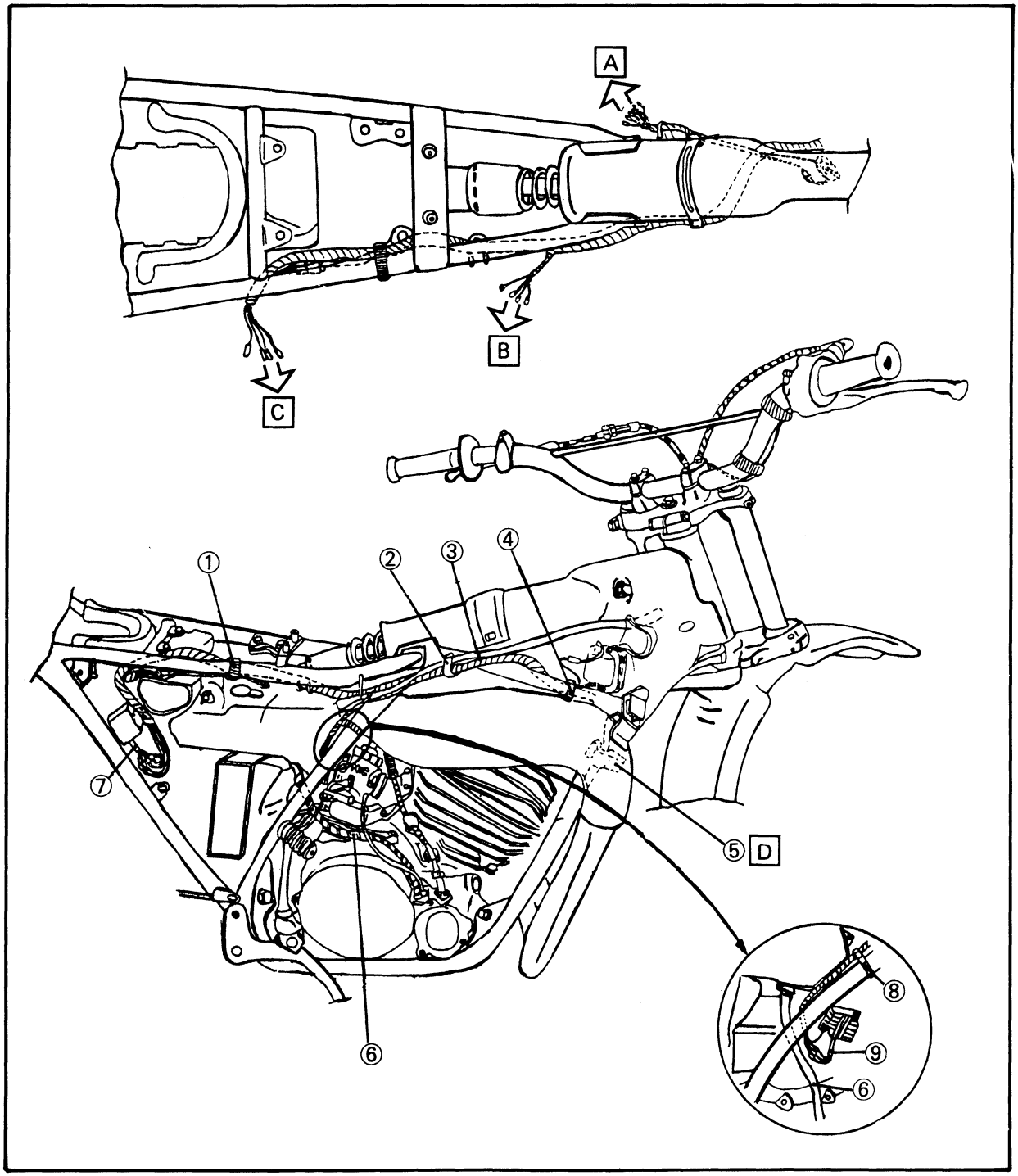
① Flywheel magneto lead
② Clutch cable holder
③ Clamp
④ Cable guide
⑤ Band
⑥ Clamp
⑦ Throttle cable
⑧ Oil pump cable
⑨ ENGINE STOP switch lead



CABLE ROUTING

① Band
② Clamp
③ Oil tank breather hose
④ Band
⑤ Clamp
⑥ Oil hose
⑦ C.D.I. unit lead
⑧ Band
⑨ Rectifier/Regulator lead

[A] To flywheel magneto lead
[B] To rectifier/regulator
[C] To C.D.I. unit
[D] Pass the clutch cable



PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION

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

PERIODIC MAINTENANCE/LUBRICATION

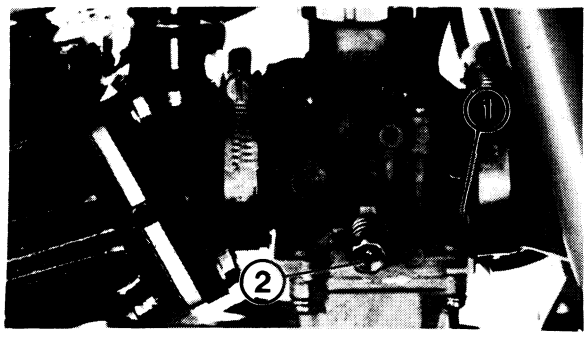
ITEM	REMARKS	BREAK-IN 1 month	EVERY 6 months	EVERY 12 months
Spark plug	Check condition. Clean or replace if necessary.	○	○	○
Air filter	Clean. Replace if necessary.	Every 20 ~ 40 hrs (More often in wet or dust areas)		
Carburetor*	Check idle speed/starter operation. Adjust if necessary.	○	○	○
Fuel line	Check fuel hose for cracks or damage. Replace if necessary.		○	○
Transmission oil*	Check oil level/oil leakage. Correct if necessary. Replace every 24 months. (Warm up engine before draining.)	REPLACE	○	○
Autolube pump*	Check operation. Correct if necessary. Air bleeding.	○	○	○
Front brake*	Check operation/fluid leakage/See NOTE. Correct if necessary.		○	○
Rear brake*	Check operation. Adjust if necessary.		○	○
Clutch*	Check operation. Adjust if necessary.		○	○
Rear arm pivot*	Check rear arm assembly for looseness. Correct if necessary. Moderately repack every 24 months**.	○		○
Wheels	Check balance/damage/runout/spoke tighteness. Repair if necessary.		○	○
Wheel bearings*	Check bearings assembly for looseness/damage. Replace if damaged.		○	○
Steering bearing*	Check bearings assembly for looseness. Correct if necessary. Moderately repack every 24 months**.	○		○
Front forks*	Check operation/oil leakage. Repair if necessary.		○	○
Rear shock absorber*	Check operation/oil leakage. Repair if necessary.		○	○
Drive chain	Check chain slack/alignment. Adjust if necessary. Clean and lube.	Every ride (More often in wet or dusty areas)		
Fittings/Fasteners*	Check all chassis fittings and fasterners. Correct if necessary.	○	○	○
Sidestand*	Check operation. Repair if necessary.	○	○	○

*: It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.
**: Medium weight wheel bearing grease.

NOTE:

Brake fluid replacement:

1. When disassembling the master cylinder or caliper cylinder, replace the brake fluid. Normally check the brake fluid level and add the fluid as required.
2. On the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
3. Replace the brake hoses every four years, or if cracked or damaged.



ENGINE

IDLE SPEED ADJUSTMENT

1. Adjust:
   • Engine idle speed

Adjustment steps:
• Turn in the pilot air screw ① until it is lightly seated.
• Turn out the pilot air screw for the specified number of turns.

Pilot Air Screw Turns Out:
1-1/2 counterclockwise turns from seat

• Start the engine and let it warm up. Turn the throttle stop screw ② until the idle speed is in the specified range. Use the inductive Tachometer.

Turn in	**Idle speed becomes higher.**
Turn out	**Idle speed becomes lower.**

Inductive tachometer:
P/N. YU-08036

Engine idle speed:
1,450 ~ 1,550 r/min

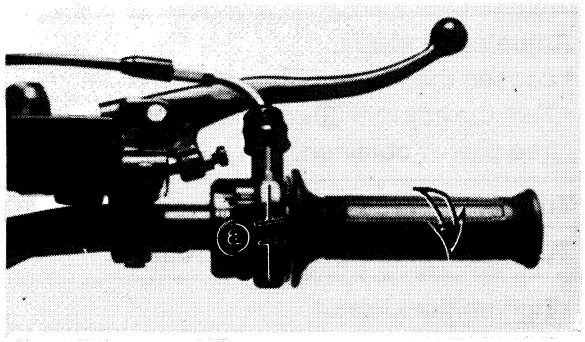
• Turn the pilot air screw ① in or out 1/8 turn increments to achieve the highest speed with just the pilot air screw.
• Once again, turn the throttle stop screw ② to attain the specified idle speed.

2. Check:
   • Throttle cable free play
   Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.

THROTTLE CABLE FREE PLAY ADJUSTMENT

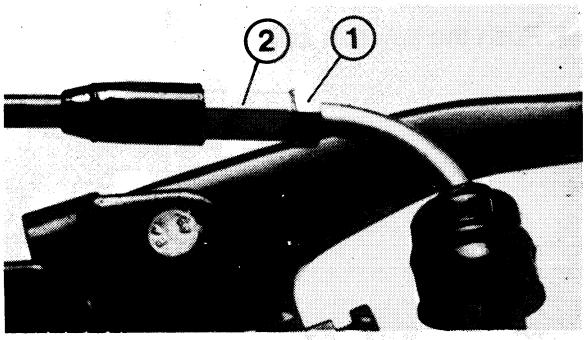
NOTE:

Before adjusting the throttle cable free play, the engine idle speed should be adjusted.



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

	Throttle cable free play: **3 ~ 5 mm (0.12 ~ 0.20 in)**



2. Adjust:
   - Throttle cable free play

Adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the correct free play is obtained.

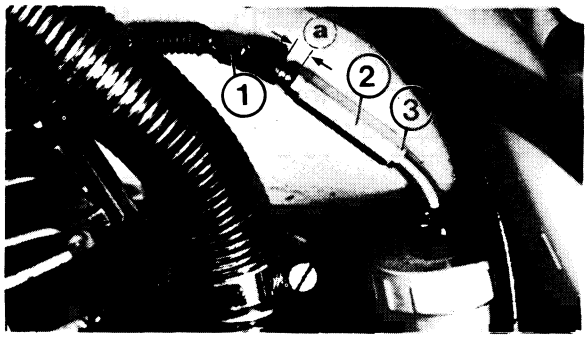
Turn in	**Free play is increased.**
Turn out	**Free play is decreased.**

- Tighten the locknut.

CARBURETOR CABLE FREE PLAY ADJUSTMENT

NOTE:

Before adjusting carburetor cable, throttle cable free play should be adjusted.



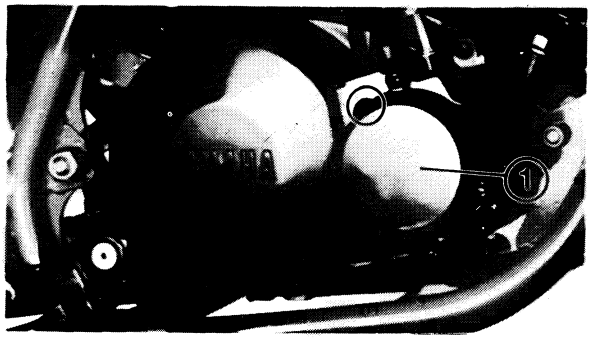
1. Pull up the adjuster cover ①.
2. Check:
   • Carburetor cable free play ⓐ
   Out of specification → Adjust.

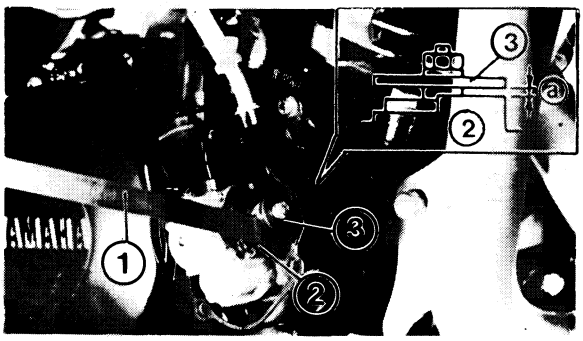
	Carburetor cable free play: 1.0 mm (0.04 in)

3. Adjust:
   • Carburetor cable free play.

Adjustment steps:	
• Loosen the locknut ②.	
• Turn the adjuster ③ in or out until the correct free play is obtained.	
Turn in	**Free play is increased.**
Turn out	**Free play is decreased.**
• Tighten the locknut.	

4. Push the adjuster cover down.





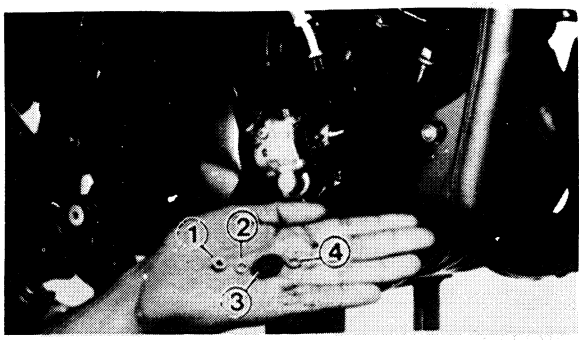
AUTOLUBE PUMP STROKE ADJUSTMENT

1. Remove:
   • Autolube pump cover ①
2. While running the engine at idle, observe the pump adjusting plate carefully. Stop the engine when the adjusting plate moves out to its limit.
3. Measure:
   • Gap ⓐ
   Out of specification → Adjust.
   Measure the gap with the thickness gauge ① between the raised boss ② on the pump adjusting pulley and the adjusting plate ③.

	Minimum pump stroke: 0.20 ~ 0.25 mm (0.008 ~ 0.010 in)

NOTE:

When inserting the thickness gauge between the adjusting plate and the adjusting pulley, be careful so that neither the plate nor the pulley is moved. In other words, do not force the thickness gauge into the gap.



4. Adjust:
   Autolube pump minimum stroke

Adjustment steps:
- Remove the locknut①, spring washer② and adjusting plate ③.
- Adjust the pump stroke by adding or removing a shim ④

Add shim	**Pump stroke is increased.**
Remove shim	**Pump stroke is decreased.**

- Install the adjusting plate, spring washer and locknut.

Locknut:
6 Nm (0.6 m·kg, 4,3 ft·lb)

- Recheck the minimum pump stroke. If out of specification, perform the above steps again.

5. Install:
   • Autolube pump cover

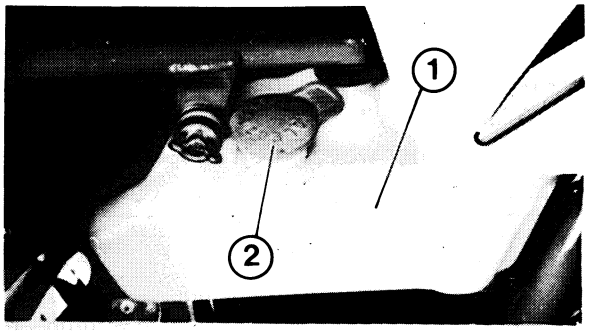
Bolts (Autolube pump cover):
8 Nm (0.8 m·kg, 5.6 ft·lb)

6. Check:
   • Autolube pump cable free play

AUTOLUBE PUMP AIR BLEEDING

NOTE:

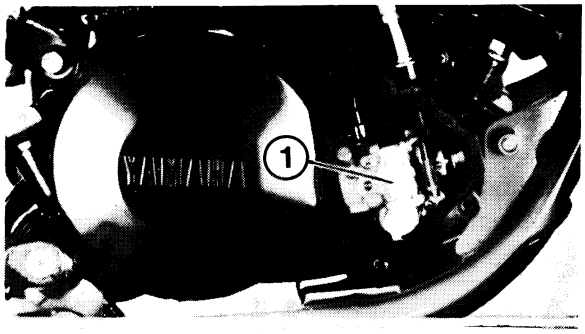
The Autolube pump and delivery lines must be bled on the following occasions:
- Setting up a new machine out of the crate.
- Whenever the oil tank has run dry.
- Whenever any portion of the engine oil system is disconnected.



1. Remove:
   • Autolube pump cover
2. Fill:
   • Oil tank ①

Yamalube 2-cycle oil or air-cooled 2-stroke engine oil

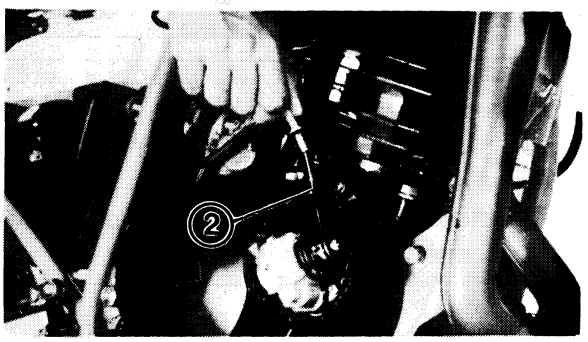
② Oil tank filter cap



3. Air bleed:
   • Pump case and/or oil pipe

Air bleeding steps:
- Remove the bleed screw ①.
- Keep the oil running out until air bubbles disappear.
- When air bubbles are expelled completely, tighten the bleed screw.

NOTE:
- Check the bleed screw gasket, and if damaged, replace with a new one.
- Place a rag or oil pan under the Autolube pump to catch oil.



4. Air bleed:
   • Pump distributor and/or delivery pipe.

Air bleeding steps:
- Remove the clip ①.
- Start the engine.
- Pull the pump cable ② all the way out to set the pump stroke to a maximum.

NOTE:

It is difficult to bleed the distributor completely with the pump stroke at a minimum, and therefore the pump stroke should be set to a maximum.

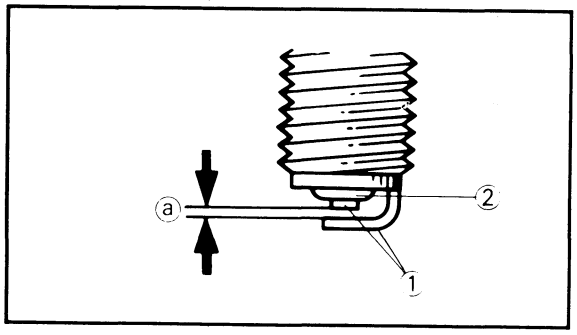
- Keep the engine running at about 2,000 r/min for two minutes or so, and both distributor and delivery pipe can be completely bled.
- Install the clip.

5. Install:
   • Autolube pump cover

	Screw (Autolube pump cover): 8 Nm (0.8 m·kg, 5.6 ft·lb)

SPARK PLUG INSPECTION

1. Remove:
   • Spark plug
2. Inspect:
   • Spark plug type
   Incorrect → Replace.



Standard spark plug: B8ES(NGK)

3. Inspect:
   • Electrode ①
   Wear/Damage → Replace.
   • Insulator ②
   Abnormal color → Replace.
   Normal color is a medium-to-light tan color.
4. Clean:
   • Spark plug
   Use a spark plug cleaner or wire brush.
5. Measure:
   • Plug gap ⓐ
   Use a Wire Gauge or Feeler Gauge.
   Out of specification → Regap.

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

6. Tighten:
   • Spark plug

	Spark plug: 20 Nm (2.0 m·kg, 14 ft·lb)

NOTE:
- Before installing a spark plug, clean the gasket and plug surfaces.
- Finger-tighten the spark plug before torquing to specification.

IGNITION TIMING CHECK

Non-adjustable

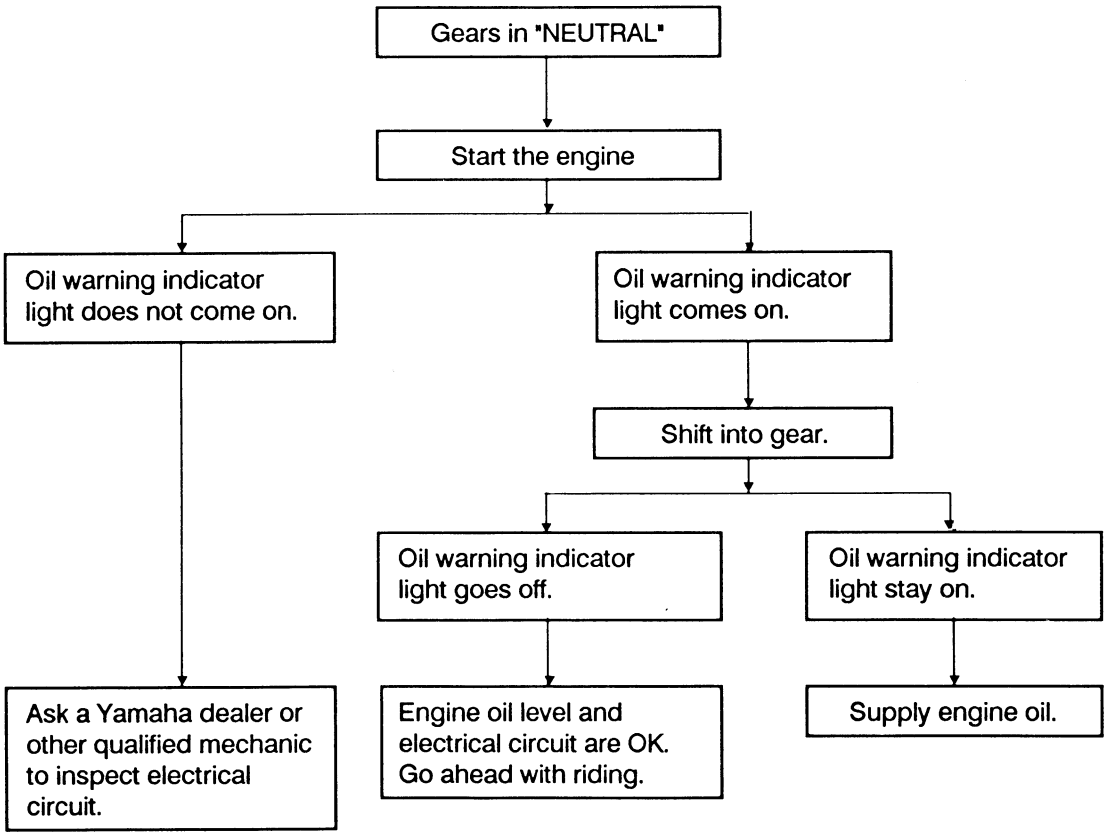
ENGINE OIL LEVEL INSPECTION

1. Check:
   - Oil level

   Oil level low → Add sufficient oil.

Recommended oil:
Yamalube 2-cycle engine oil or air-cooled 2-stroke engine oil with "BIA certified for service TCW".
Oil tank capacity:
0.75 L (0.66 Imp qt, 0.79 US qt)

OIL WARNING LIGHT CHECKING METHOD



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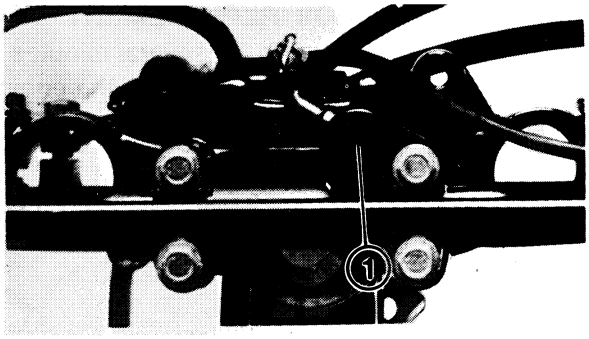
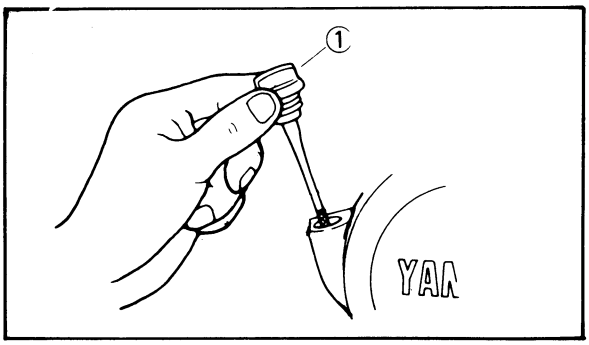


CAUTION:

Always use the same type of engine oil; mixing oils may result in a harmful chemical reaction and lead to poor performance.

① "OIL" warning indicator light



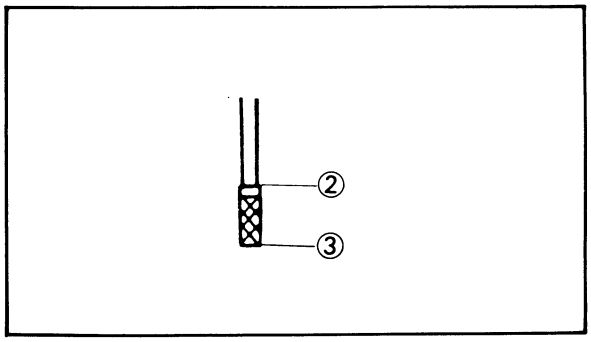
TRANSMISSION OIL LEVEL INSPECTION

1. Inspect:
   - Transmission oil level
     Oil level low → Add sufficient oil

Transmission oil level inspection steps:
- Place the machine on a level place.
- Warm up the engine for several minutes, and stop it.
- Rest the oil dipstick ① on the threads of the hole.

NOTE:
- Wait a few minutes until level settles before inspecting.
- Position machine straight up when inspecting oil level, a slight tilt to the side can produce false readings.

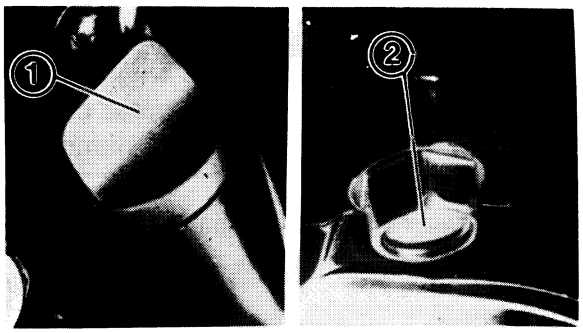
Inspect:
- Oil level
  Oil level should be between maximum ② and minimum ③ marks.
- Oil level low → Add oil to proper level.

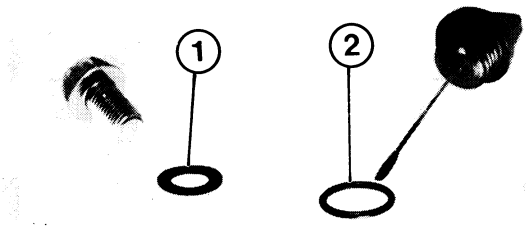


Recommended oil:
Yamalube "4", SAE 10W30 Type SE Motor Oil or "GL" Gear Oil

NOTE:
Recommended engine oil classification: API Service "SE", "SF" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

CAUTION:
- **Do not add any chemical additives. Transmission oil also lubricates the clutch and additives could cause clutch slippage.**
- **Be sure no foreign material enters the crankcase.**





TRANSMISSION OIL REPLACEMENT

1. Warm up the engine for several minutes.
2. Place an open container under the engine.
3. Remove:
   - Oil filler cap ①
   - Drain plug ②

   Drain transmission oil.

4. Inspect:
   - Gasket (Drain plug) ①
   - O-ring (Oil cap) ②

   Damage → Replace.

5. Install:
   - Drain plug

	Drain plug: **20 Nm (2.0 m·kg, 14 ft·lb)**

6. Fill:
   - Crankcase

	Recommended oil: **Yamalube "4", SAE 10W30 Type SE Motor Oil or "GL" Gear Oil.** **Periodic oil change:** **0.55 L (0.48 Imp qt, 0.58 US qt)**

NOTE:

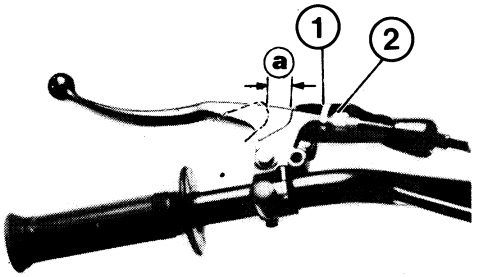
Recommended engine oil classification: API Service "SE", "SF" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

CAUTION:

- **Do not add any chemical additives. Transmission oil also lubricates the clutch and additives could cause clutch slippage.**
- **Be sure no foreign material enters the crankcase.**

7. Install:
   • Oil fillter cap
8. Inspect:
   • Oil leaks
   • Oil level

NOTE:
Wipe off any oil spilled on the crankcase.



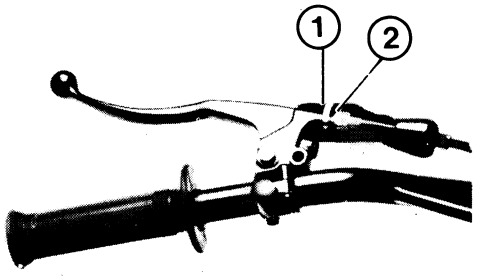
CLUTCH ADJUSTMENT
Free Play Adjustment

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

	Free Play: **2~3 mm (0.08~0.12in)**

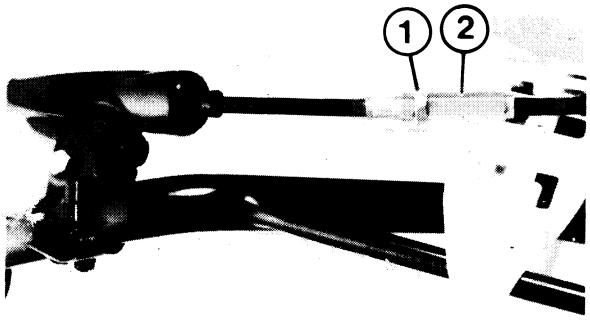
2. Adjust:
   • Clutch cable free play

Adjustment steps:	
• Loosen the locknut ①.	
• Turn the adjuster ② in or out until the correct free play is obtained.	
Turn in	**Free play is increased.**
Turn out	**Free play is decreased.**
• Tighten the locknut.	



Mechanism Adjustment

1. Loosen:
   - Locknuts ①
2. Turn in the adjusters ②

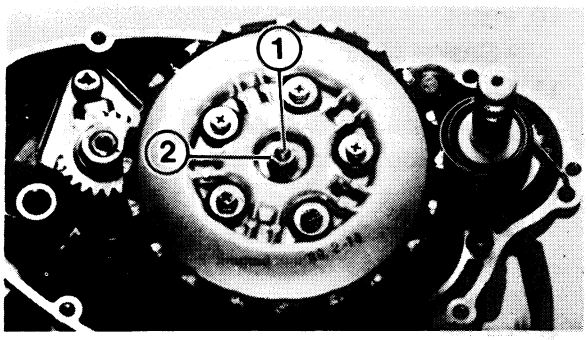


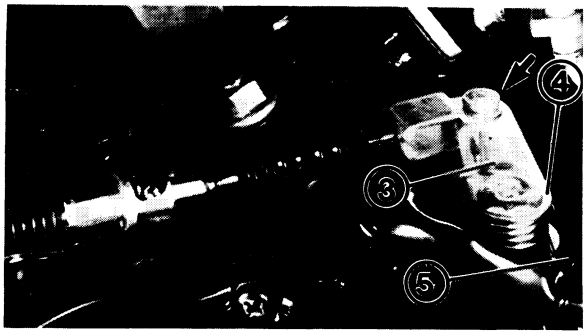
3. Disconnect:
   - Autolube pump cable ①
   - Autolube pump hoses ②

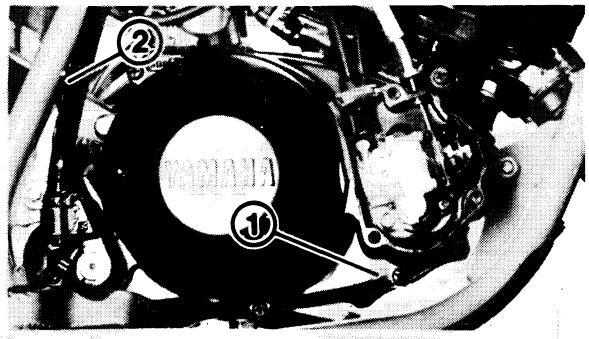
   Refer to the "AUTOLUBE PUMP CABLE AND HOSE" section in CHAPTER 4.
4. Drain
   - Transmission oil

   Refer to the "TRANSMISSION OIL REPLACEMENT" section.

5. Loosen:
   - Rear brake adjuster
6. Remove:
   - Kick crank ③
   - Crankcase cover (right) ④







7. Adjust:
   • Adjuster (Push rod # 1) ①

Adjustment steps:
- Loosen the locknut ②.
- Move the push lever ③ forward until it stops.
- With the push lever in this position, turn the adjuster ① to align the mark ④ on the end of the push lever with the projection ⑤ on the crankcase.
- Tighten the locknut ②.

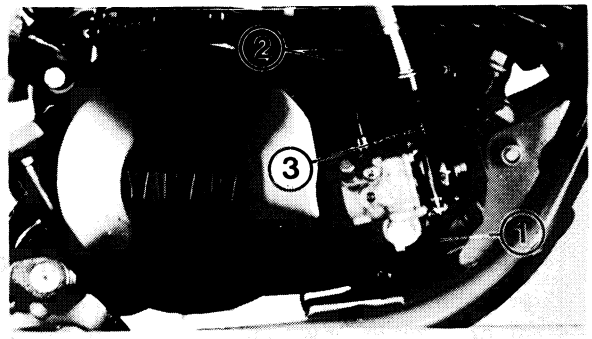
Locknut:
8 Nm (0.8m·kg, 5.8 ft·lb)

8. Install:
   • Crankcase cover (right) ①
   • Kick crank ②

Screw (Crankcase cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Drain Plug (Oil):
20 Nm (2.0 m·kg, 14 ft·lb)
Bolt (Kick crank):
23 Nm (2.3 m·kg, 17 ft·lb)

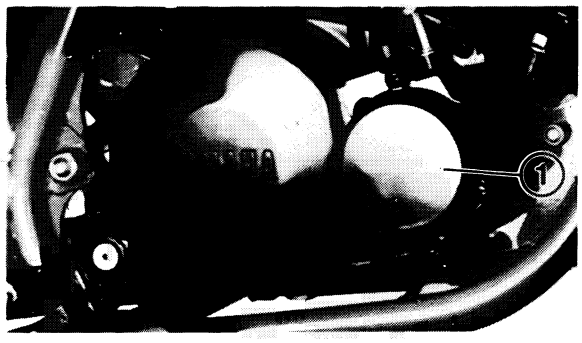
NOTE:
- When installing the crankcase cover, engage the autolube pump drive gear with its driven gear and slowly turn the autolube pump shaft, if you need.
- Tighten the screws (Crackcase cover) in a crisscross pattern.
- Install the kick crank so that it does not contact the case.

9. Adjust:
   • Rear brake free play
   Refer to the "REAR BRAKE ADJUSTMENT" section.



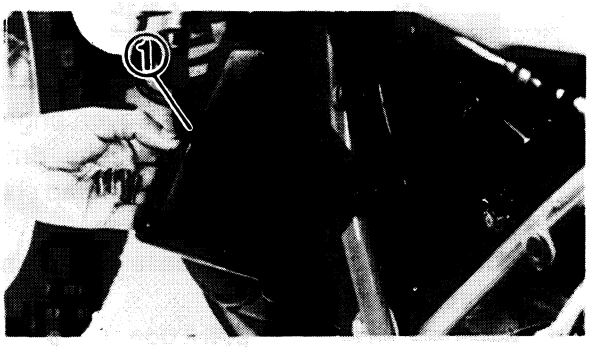
10. Install:
    • Gasket (Autolube pump cover) ①
11. Connect:
    • Autolube pump hoses ②
    • Autolube pump cable ③
12. Adjust:
    • Clutch cable free play
      Refer to the "FREE PLAY ADJUSTMENT" section.
13. Fill:
    • Crankcase
      Refer to the "TRANSMISSION OIL REPLACEMENT section.

Recommended oil:
Yamalube "4", SAE 10W30 Type SE Motor Oil or "GL" Gear Oil.
Periodic oil change:
0.55 L (0.48 Imp qt, 0.58 US qt)



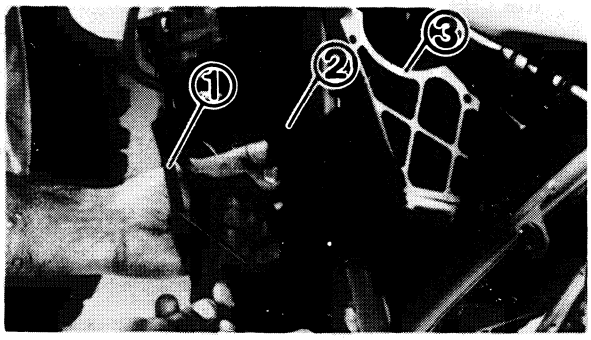
14. Air bleeding:
    • Autolube pump
      Refer to the "AUTOLUBE PUMP AIR BLEEDING" section.
15. Install:
    • Autolube pump cover ①

Screw (Autolube pump cover):
8 Nm (0.8 m· kg, 5.6 ft·lb)



AIR FILTER CLEANING

1. Remove:
    • Side cover (Left)
    • Filter case cover ①



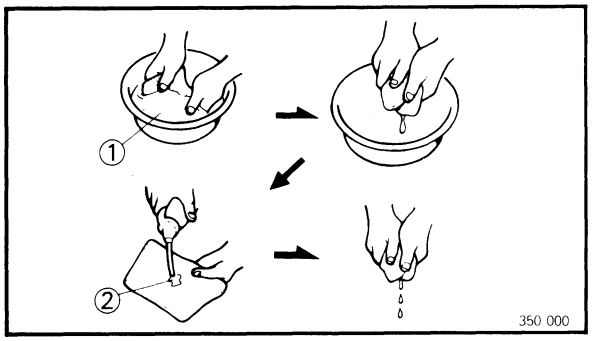
2. Remove:
    • Screw (air filter assembly)
    • Element guide 1 ①
    • Air filter element ②
    • Element guide 2 ③

CAUTION:

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

3. Inspect:
   - Air filter element ②
   - Element guide ①
   - Element guide ③

   Damage → Replace.



4. Clean:
   - Air filter element

Cleaning steps:
- Wash the element with solvent ①.
- Remove the remaining solvent by squeezing the element.
- Apply the foam-air-filter oil ② to the entire surface of the element.
- Wrap the element with a clean rag, and squeeze out the excess oil.

NOTE:

The element should be wet but not dripping.

CAUTION:

Do not twist the filter element when squeezing it.

⚠ WARNING

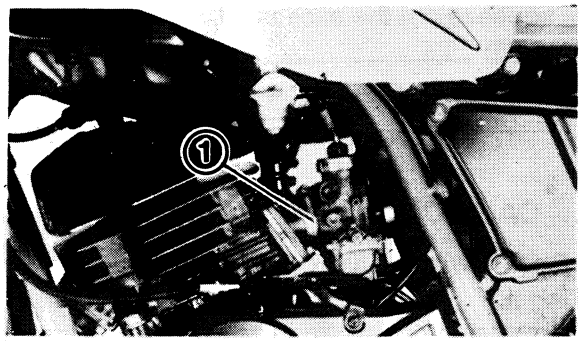
Never use low flash point solvents such as gasoline to clean the air filter element. Such solvent may lead to a fire or explosion.

5. Clean the inside of the air filter case and the case cover, using a cloth dampened with solvent.
6. Greese the entire sealing edge of the element with soap-base lithium grease.
7. Install:
   - Element guide ②
   - Air filter element
   - Element guide ①
   - Screws

CAUTION:

Make sure the element edge fits into the corresponding element groove.

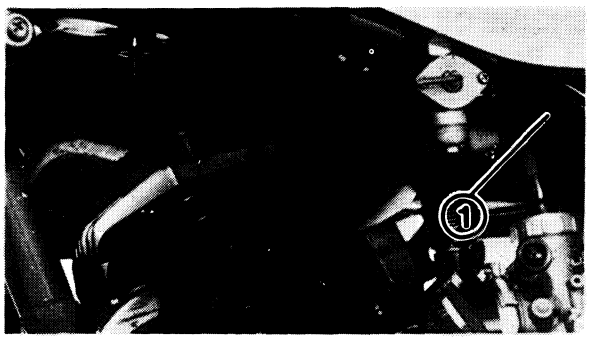
8. Install:
   - Filter case cover
   - Side cover (Left) ①



CARBURETOR JOINT INSPECTION

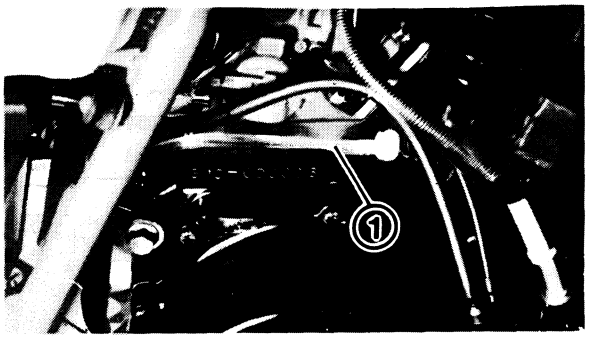
1. Inspect:
   - Carburetor joint ①
     Cracks/Damage → Replace.
     Refer to the "REED VALVE" section in CHAPTER 6 for replacement.
2. Check the tightening torque of the carburetor joint securing bolts.

	Bolt (Carburetor joint): 8 Nm (0.8 m·kg, 5.8 ft·lb)



FUEL LINE INSPECTION

1. Inspect:
   - Fuel hose ①
     Cracks/Damage → Replace.
     Loose connection → Connect properly.

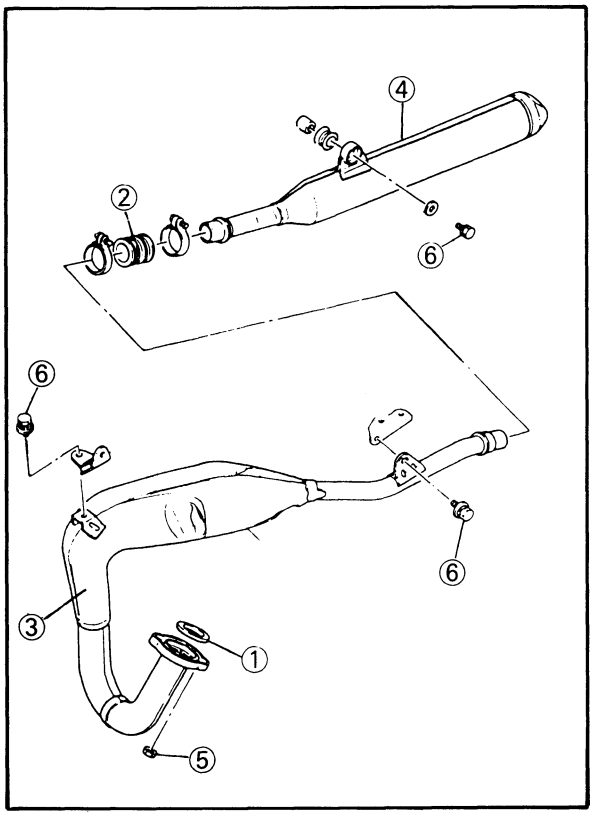


CRANKCASE VENTILATION HOSE INSPECTION

1. Inspect:
   - Crankcase ventilation hose ①
     Cracks/Damage → Replace.

CAUTION:

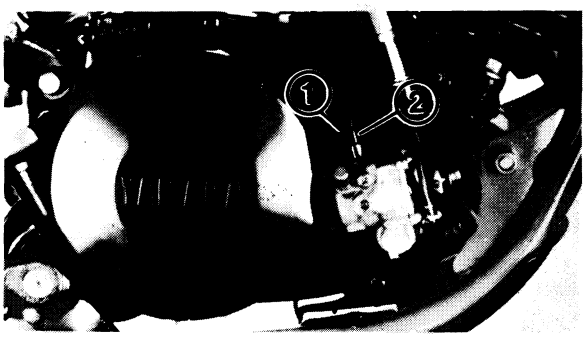
Make sure the crankcase ventilation hose is routed correctly.



EXHAUST SYSTEM INSPECTION

1. Inspect:
   - Gasket (Exhaust pipe) ①
   - Joint (Silencer) ②
     Damage → Replace.
     Exhaust gas leakage → Repair.
   - Exhaust pipe ③
   - Silencer ④
     Cracked/Dent/Damage → Repair or replace.
2. Tighten:
   - Exhaust pipe
   - Muffler

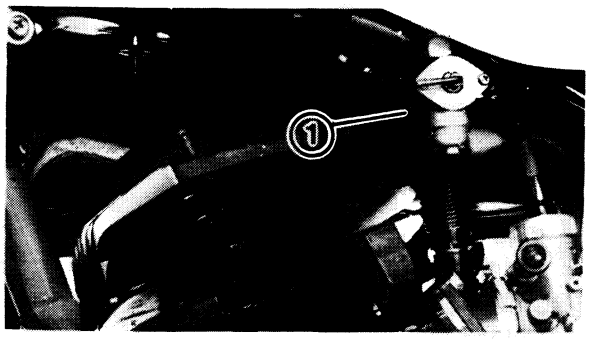
	Nut ⑤ (Exhaust pipe): 11 Nm (1.1 m· kg, 7.9 ft· lb)



ENGINE OIL LINE INSPECTION

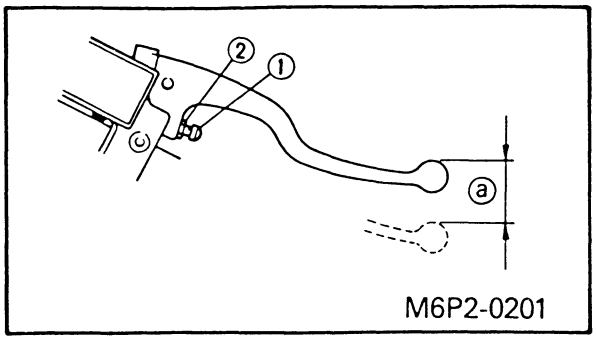
1. Remove:
   • Autolube pump cover
2. Inspect:
   • Oil hose ①
   • Oil delivery hose ②
   Cracks/Damage → Replace.
   Loose connection → Correct properly.
3. Install:
   • Autolube pump cover

	Screw (Autolube pump cover): 8 Nm (0.8 m·kg, 5.6 ft·lb)



Y.E.I.S HOSE INSPECTION

1. Inspect:
   • Y.E.I.S. hose ①
   Cracks/Damage → Replace.



CHASSIS

FRONT BRAKE ADJUSTMENT

1. Check:
   • Brake lever free play ⓐ
   Out of specification → Adjust.

Free play:
5 ~ 8 mm (0.20 ~ 0.31 in)

2. Adjust:
   • Brake lever free play

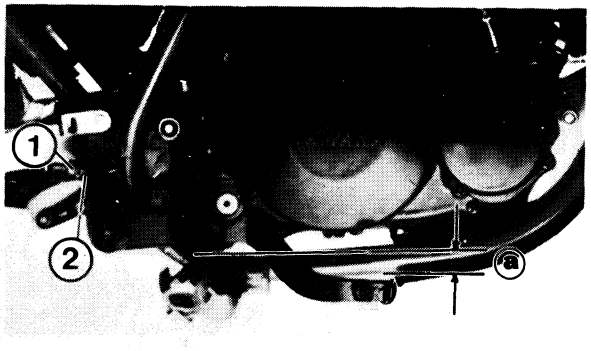
Adjustment steps:
- Loosen the locknut ②.
- Turn the adjuster ① in or out until the specified free play is obtained.

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

- Tighten the locknut.

CAUTION:

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



REAR BRAKE ADJUSTMENT

Rear Brake Pedal Height Adjustment

1. Check:
   • Brake pedal height ⓐ
   Out of specification → Adjust.

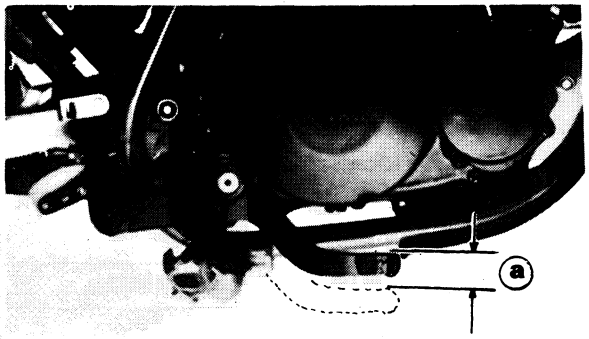
Brake pedal height:
20 mm (0.8 in)
Below top of footrest.

2. Adjust:
   • Brake pedal height

Adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified pedal height is obtained.

Turn in	**Pedal height is increased.**
Turn out	**Pedal height is decreased.**

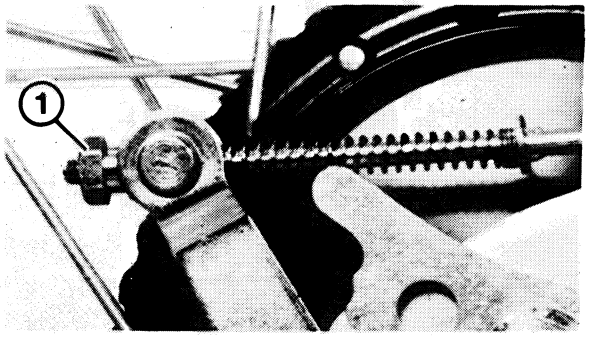
• Tighten the locknut.



Rear Brake Free Play Adjustment

1. Check:
   • Brake pedal free play ⓐ
   Out of specification → Adjust.

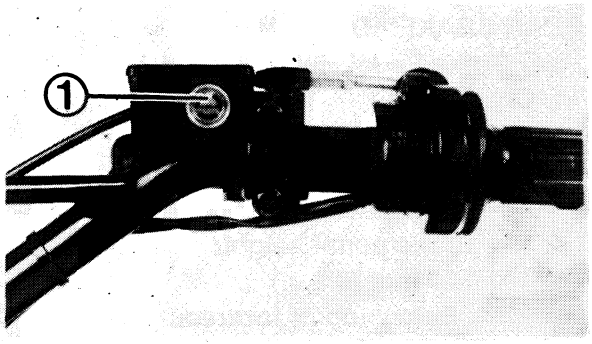
Brake pedal free play:
20 ~ 30 mm (0.8 ~ 1.2 in)



2. Adjust:
   • Rear brake pedal free play

Adjustment steps:
• Turn the adjuster ① in or out until the specified free play is obtained.

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



BRAKE FLUID INSPECTION

1. Place the machine on a level surface.
2. Inspect:
   • Brake fluid level
   Fluid level is below "LOWER" level line ①
   → Replenish.

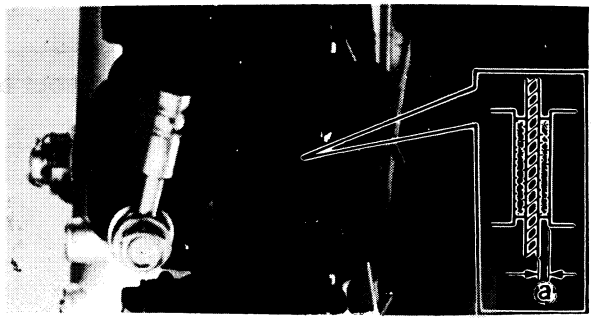
Recommended brake fluid:
DOT #4
If DOT #4 is not available, #3 can be used.

NOTE:

- Position the machine straight up when inspecting the brake fluid level.
- When inspecting the front brake fluid level, make sure the master cylinder top is horizontal by turning the handlebars.

⚠ WARNING

- **Use only the designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.**
- **Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in a vapor lock.**

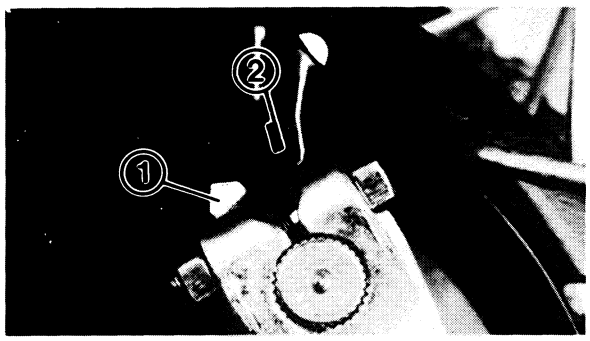


FRONT BRAKE PAD INSPECTION

1. Remove:
   - Rubber plug
2. Inspect:
   - Wear limit ⓐ
     Out of specification→ Replace pads.

Wear limit:
0.8 mm (0.03 in)

Refer to "BRAKE PAD REPLACEMENT" section in CHAPTER 6.



REAR BRAKE SHOE INSPECTION

1. Activate the brake pedal.
2. Inspect:
   - Wear indicator ①
     Indicator at wear limit line ② → Replace brake shoes.
     Refer to "REAR WHEEL" section in CHAPTER 6.

BRAKE HOSE INSPECTION

1. Inspect:
   - Brake hose ①
     Cracks/Wear/Damage → Replace.

DRIVE CHAIN SLACK ADJUSTMENT

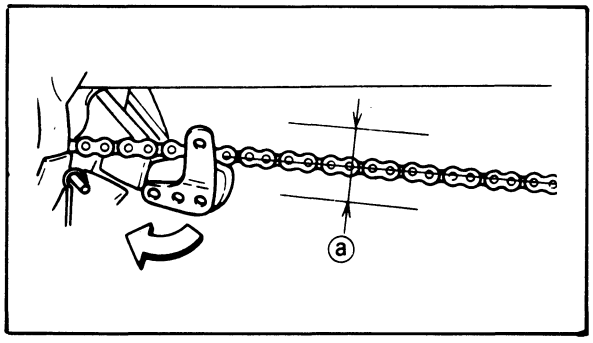
NOTE:

Before checking and/or adjusting, rotate the rear wheel several revolutions and check slack at several points to find the tightest point. Check and adjust the chain slack with the rear wheel in this "tightest" position.

1. Place the machine on a level surface, and hold it in an upright position.

NOTE:

Both wheels should be on the ground without a rider on the machine.

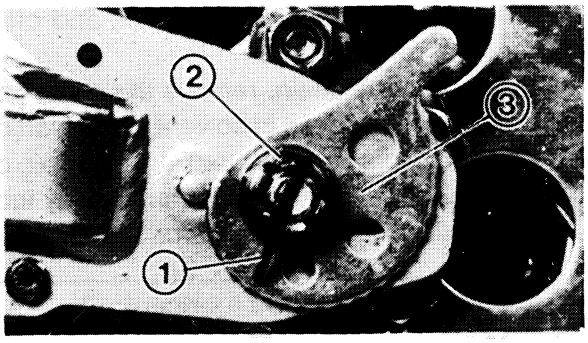


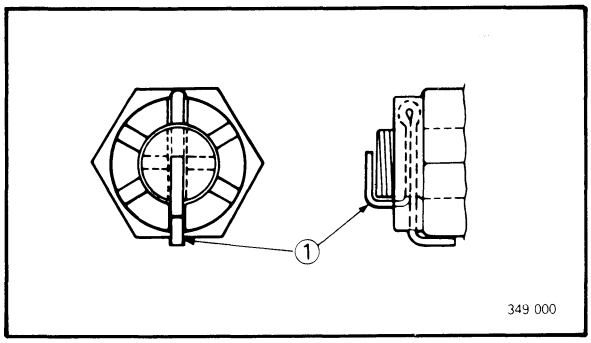
2. Check:
   - Drive chain slack ⓐ
     Out of specification → Adjust.

Drive chain slack:
40 mm (1.6 in)

NOTE:

Slack check should be made with the tensioner in the relaxed position (not touching the chain).





3. Adjust:
   • Drive chain slack

Adjustment steps:

CAUTION:

Too little chain slack will overload the engine and over vital parts; keep the slack within the specified limits.

- Remove the cotter pin ①.
- Loosen the axle nut ②.
- Turn both chain pullers (left and right) ③ clockwise or counterclockwise until the specified slack is obtained.

NOTE:

Turn each chain puller exactly the same amount to maintain correct axle alignment. (There are marks on each side of swingarm and on each chain puller; use them to check for proper alignment).

- Tighten the axle nut to specification, while pushing up or down on the chain, making it tight.

Axle nut:
85 Nm (8.5 m·kg, 61 ft·lb)

- Install the cotter pin.

CAUTION:

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

⚠ WARNING

Always use a new cotter pin.

DRIVE CHAIN LUBRICATION

The chain consists of many parts which work with each other. If the chain is not maintained properly, it will wear out rapidly. This service is especially important when riding in dust conditions.

1. Use Yamaha chain and cable Lube or other brand of spray type chain lubricant. First, remove all dirt and mud from the chain with a brush or cloth, then spray the lubricant between both rows of side plates and on all center rollers.
2. To clean the chain, remove the chain from the machine, dip it in solvent, and clean out as much dirt as possible. Take the chain out of the solvent and dry it. Immediately lubricate the chain to prevent rust.

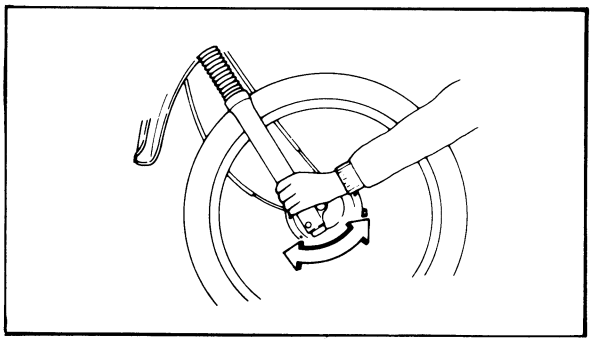
Recommended lubricant:
Yamaha Chain and Cable Lube or SAE 10W30 Motor Oil

STEERING HEAD ADJUSTMENT

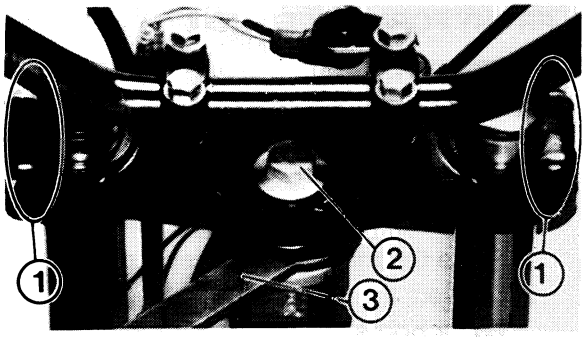
⚠ WARNING

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

1. Elevate the front wheel by placing a suitable stand under the engine.



2. Check:
   - Steering assembly bearing
     Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     Looseness → Adjust steering head.



3. Adjust:
   • Steering head

Adjustment steps:
- Remove the side covers, seat, and fuel tank.
- Loosen the pinch bolts (Handle crown) ① and flange bolt (Steering stem) ②.
- Tighten the ring nut using the Ring Nut Wrench ③.

Ring nut wrench:
P/N. YU-33975

NOTE:
Set the torque wrench to the ring nut wrench so that they form a right angle.

Ring nut (initial tightening):
38 Nm (3.8 m·kg, 27 ft·lb)

- Loosen the ring nut one turn.
- Retighten the ring nut using the Ring Nut Wrench.

⚠ WARNING
Avoid over-tightening.

Ring nut (final tightening):
6 Nm (0.6 m·kg, 4.3 ft·lb)

NOTE:
Recheck the steering head by turning the steering from lock to lock, after adjusting steering head.
If steering is binding, loosen the ring nut slightly.
If steering is loose, repeat the adjustment steps.
- Tighten the flange bolt (Steering stem) ② and pinch bolts (Handle crown) ①.

Flange bolt (Steering stem):
54 Nm (5.4 m·kg, 39 ft·lb)
Pinch bolt (Handle crown):
23 Nm (2.3 m·kg, 17 ft·lb)

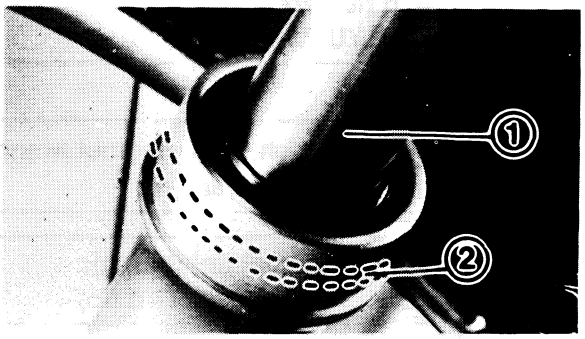
- Install the fuel tank, seat and side covers.

FRONT FORK INSPECTION

⚠ WARNING

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

1. Place the machine on a level place.
2. Loosen the clamps and pull up the Fork cover boots.



3. Check:
   - Inner tube ①
     Scratch/Damage → Replace.
   - Oil seal ②
     Excessive oil leakage → Replace.
   - Boot
     Torn → Replace.
4. Hold the machine in the upright position and apply the front brake.

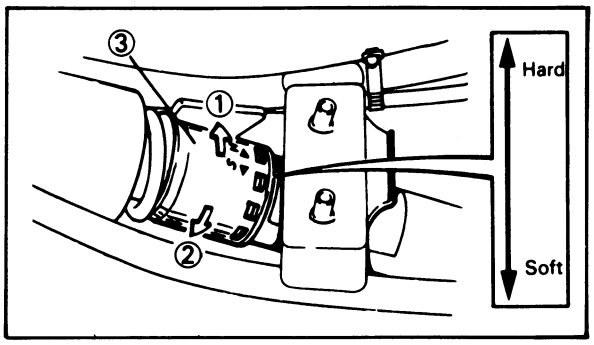
5. Check:
   - Operation
     Pump the front fork up and down several times.
     Unsmooth operation → Repair.
     Refer to "FRONT FORK" section in CHAPTER 5.

REAR SHOCK ABSORBER ADJUSTMENT

⚠ WARNING

This shock absorber contains highly pressurized nitrogen gas. Read and understand the following information before handling shock absorber. The manufacture cannot be held responsible for property damage or personal injury that may result from improper handling.

- **Do not tamper with or attempt to open the cylinder assembly.**
- **Do not subject shock absorber to an open flame or other high heat source. This may cause the unit to explode due to excessive gas pressure.**
- **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.**



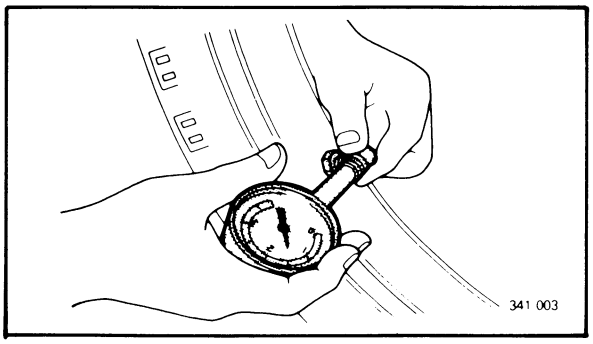
1. Adjust:
   • Spring preload

Adjustment steps: • Elevate the rear wheels by placing the suitable stand. • Remove both side covers,seat and fuel tank.	
Turn adjuster to "Hard" ①	**Increase the spring preload.**
Turn adjuster to "Soft" ②	**Decrease the spring preload.**

	Soft		STD	Hard	
Adjusting position	1	2	3	4	5

• Install the fuel tank, seat and both side covers.

③ Spring preload adjuster



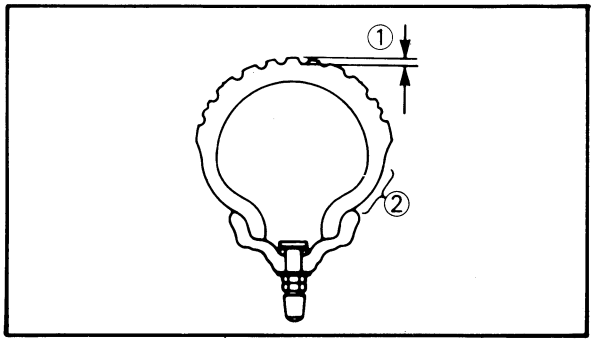
TIRE INSPECTION

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

⚠ WARNING

Tire inflation pressure should be checked and adjusted when the temperature of the tire equals the ambient air temperature.

Cold tire pressure	Front	Rear
Off road riding	100 kPa (1.0 kgf/cm², 15 psi)	100 kPa (1.0 kgf/cm², 15 psi)



2. Inspect:
   • Tire surfaces
   Wear/Damage → Replace.

Minimum tire tread depth:
(Front and Rear)
4.5 mm (11.4 in)

① Tread depth
② Side wall

⚠ WARNING

• It is dangerous to ride with a worn-out tire. When the tire tread reaches minimum tire tread depth, replace the tire immedialely.
• Patching a punctured tube is not recommended.
If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

WHEEL INSPECTION

1. Inspect:
   • Wheels
   Damage/Bends → Replace.

NOTE:

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

⚠ WARNING

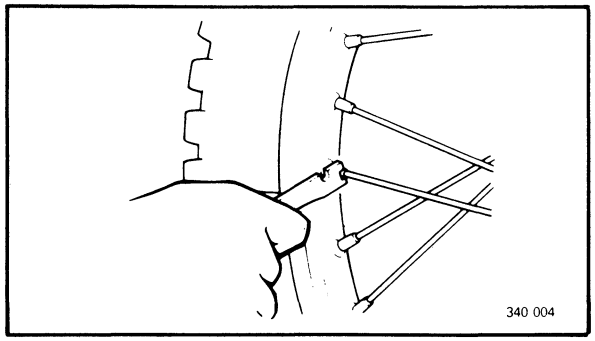
Never attempt even small repairs to the wheel.

2. Tighten:
   • Valve stem locknut

	1.5 Nm (0.15 m·kg, 1.1 ft·lb)

⚠ WARNING

Ride conservatively after installing a tire to allow it to seat itself properly on the rim.



SPOKE INSPECTION AND TIGHTENING

1. Inspect:
   • Spokes
   Bend/Damage → Replace.
   Loose spoke → Retighten evenly.
2. Tighten:
   • Spokes

NOTE:

Be sure to retighten these spokes before and after Break-in.

	Nipple: **6 Nm (0.6 m·kg, 4.3 ft·lb)**

CABLE INSPECTION AND LUBRICATION

⚠ WARNING

Damaged cable sheath may cause corrosion and interfere with the cable movement. Replace damaged cables as soon as possible.

Cable

1. Inspect:
   - Cable sheath
   - Cable end

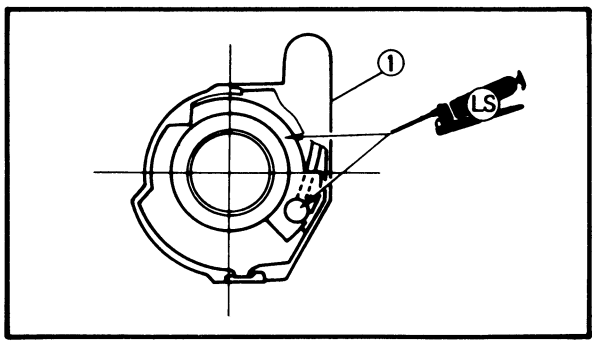
   Damage → Replace.
2. Check:
   - Cable operation

   Unsmooth operation → Lubricate.

	Recommended lubricant: **Yamaha Chain and Cable Lube or SAE 10W30 Motor Oil**

NOTE:

Hold cable end upward and apply several drops of lubricant into cable.



3. Apply the grease to the throttle cable end and cable guide groove on inside of throttle-housing ①.

	Lithium soap base grease

Brake and clutch levers

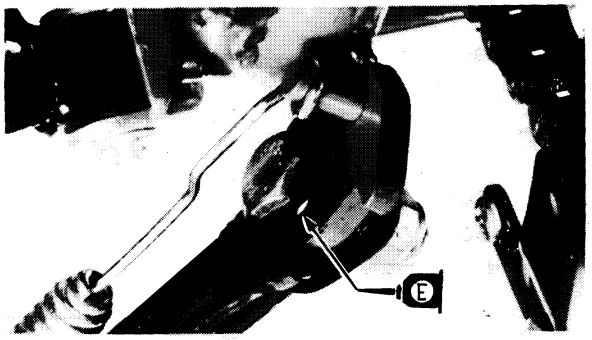
1. Lubricate the pivoting parts of each lever.

Recommended lubricant:
Yamaha Chain and Cable Lube
or SAE-10W30 Motor Oil

Brake pedal

1. Lubricate the pivoting parts.

Recommended Lubricant:
Yamaha Chain and Cable Lube
or SAE-10W30 Motor Oil



Sidestand

1. Lubricate the pivoting parts.

Recommended lubricant:
Yamaha Chain and Cable Lube
or SAE-10W30 Motor Oil

ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

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

- Cylinder head
- Cylinder
- Piston and piston ring
- Clutch
- Primary drive gear
- Kick axle
- Shift shaft
- Magneto rotor
- Stator
- Autolube pump

SIDE COVERS

1. Remove
   - Side cover (Right)
   - Side cover (Left)
   - Seat

FUEL TANK

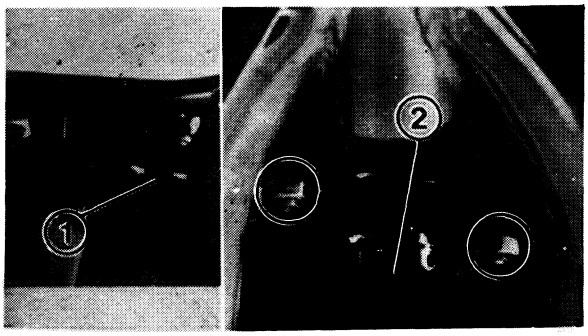
1. Turn the fuel cock to "OFF" position and disconnect the fuel hose ①.

2. Remove:
   - Fuel tank

TRANSMISSION OIL

1. Drain:
   - Transmission oil

   Refer to the "TRANSMISSION OIL REPLACEMENT" section in the CHAPTER 3.



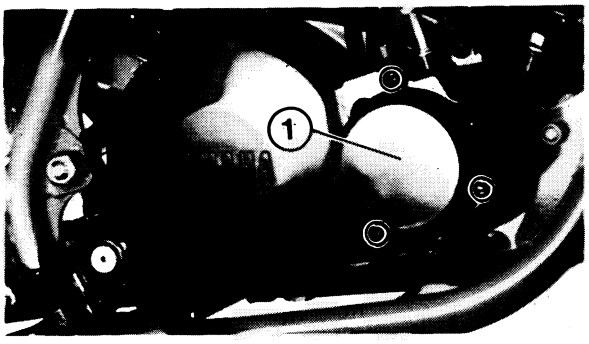
EXHAUST PIPE

1. Loosen:
   - Screw (Muffler joint) ①
2. Remove:
   - Gasket (Exhaust pipe)
   - Bracket screw
   - Exhaust pipe ②

CARBURETOR

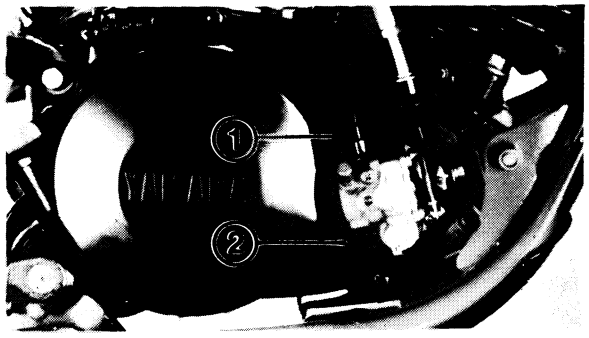
1. Remove:
   - Fuel tank
   - Carburetor

   Refer to the "CARBURETOR - REMOVAL" section in the CHAPTER 6.



AUTOLUBE PUMP CABLE AND HOSE

1. Remove:
   - Autolube pump cover ①



2. Disconnect:
   - Oil hose ①
   - Gasket (Autolube pump cover) ②

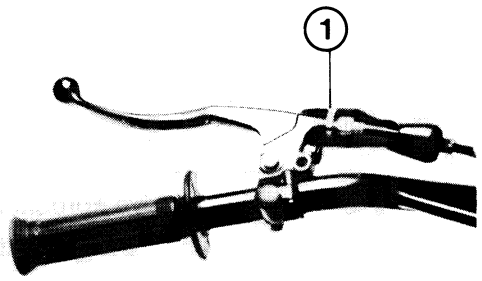
NOTE:

Plug the oil hose so that oil will not run out of the oil tank.

3. Remove:
   - Stopper clip (pump cable) ①
   - Clip (pump cable outer) ②
4. Disconnect:
   - Autolube pump cable ③

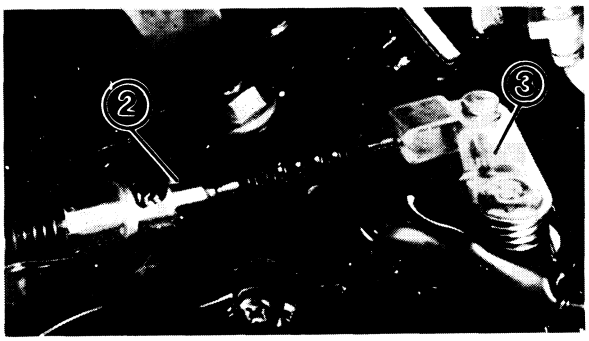
NOTE:

Turn the pump pulley counterclockwise by finger to make pump cable loose enough for its end to be removed from the pulley.



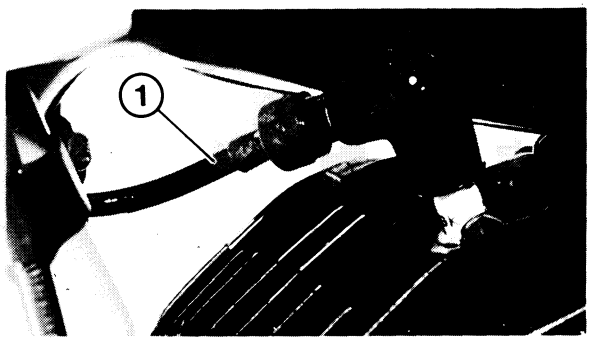
CLUTCH CABLE

1. Loosen:
   - Adjuster (Clutch cable) ①



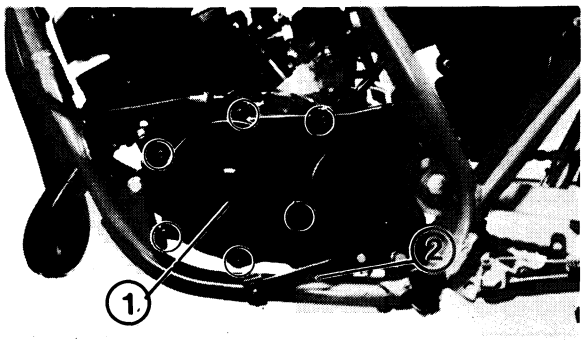
2. Disconnect:
   - Clutch cable ②
     (from clutch push lever ③)

LEADS AND HOSE



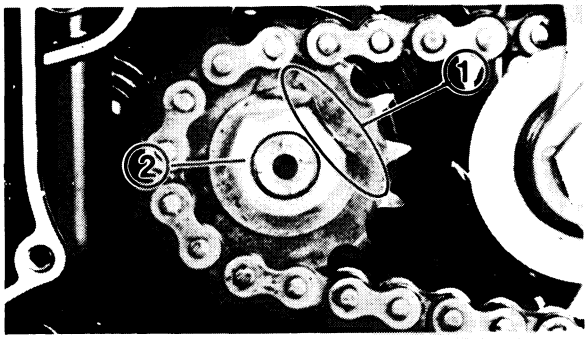
1. Disconnect:
   - Spark plug lead ①

2. Disconnect:
   - CDI magneto leads ①
3. Remove:
   - YEIS chamber hose ②



DRIVE CHAIN

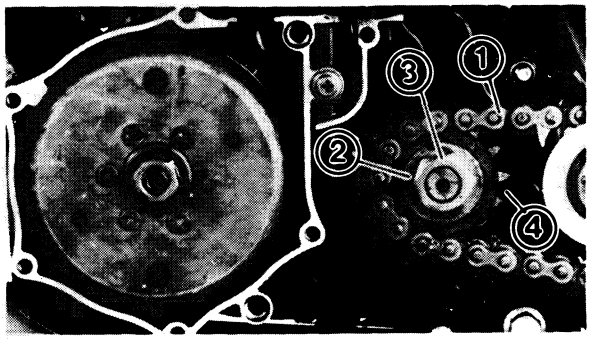
1. Remove:
   - Change pedal ①
   - Crankcase cover (Left) ②
   - Gasket (Crankcase cover)



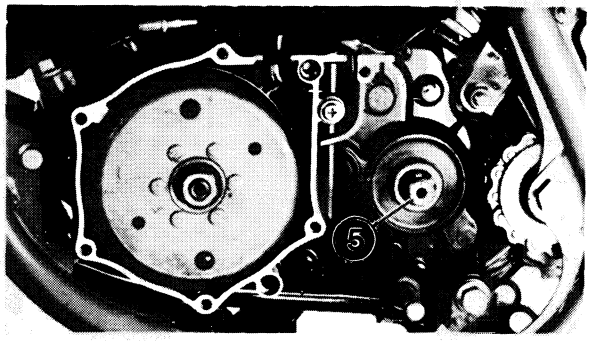
2. Straighten:
   - Lock washer tab ①
3. Loosen:
   - Nut (Drive sprocket) ②

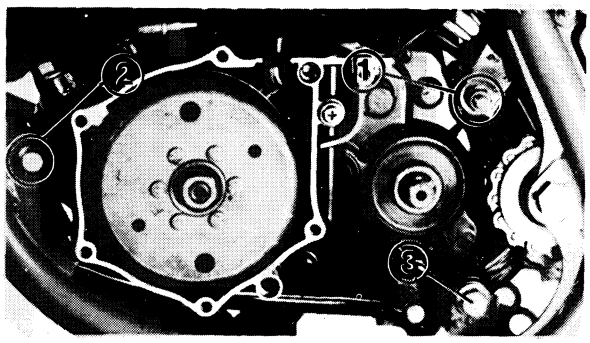
NOTE:

When loosening the nut (drive sprocket), apply the rear brake pedal and put the transmission in 6th gear.



4. Remove:
   - Drive chain ①
   - Nut (Drive sprocket) ②
   - Lock washer ③
   - Drive sprocket ④
   - Spacer collar ⑤





ENGINE REMOVAL

1. Remove:
   - Bolt (Engine mount - rear upper) ①
   - Bolt (Engine mount - front) ②
2. Remove:
   - Bolt (Engine mount - Rear lower) ③

3. Remove:
   • Engine assembly (from left side)

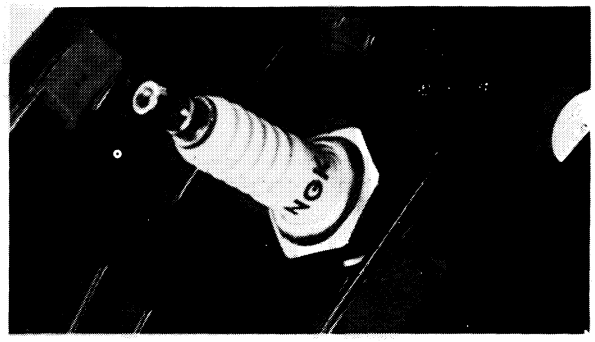
ENGINE DISASSEMBLY

CYLINDER HEAD, CYLINDER AND PISTON

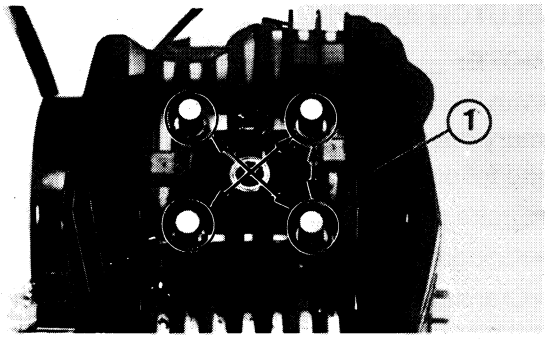
NOTE:

With the engine mounted, the cylinder head, cylinder and piston can be maintained by removing the following parts.

- Side covers (Right and left)
- Seat
- Fuel tank
- Exhaust pipe
- YEIS hose
- Carburetor



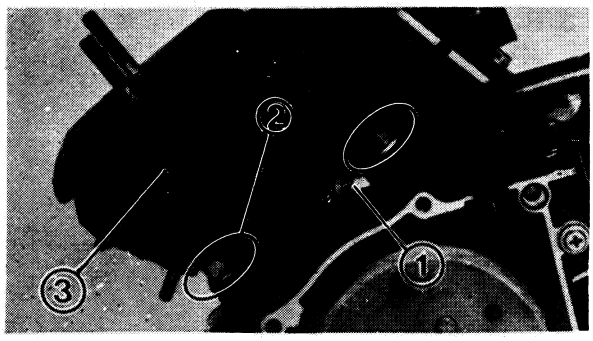
1. Remove:
   • Spark plug ①



2. Remove:
   • Cylinder head ①
   • Gasket (Cylinder head)

NOTE:

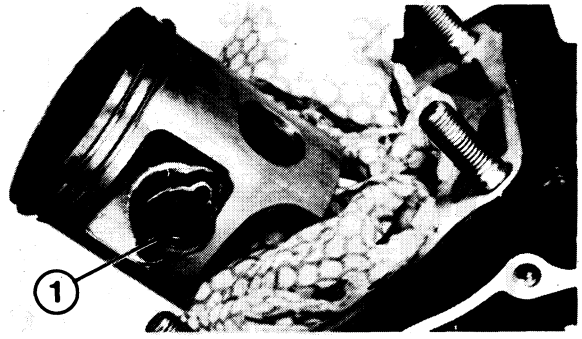
- Loosen the nuts starting with upper left, lower right, then upper right and lower left.
- Loosen each nut 1/4 turn, and remove them after all nuts are loosened.



3. Remove:
   - Clutch cable guide ①
   - Cylinder base nuts ②
   - Cylinder ③
   - Gasket (cylinder)
   - Dowel pins

NOTE:

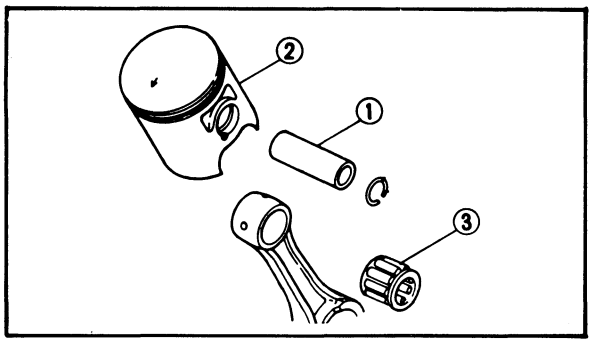
Loosen each nut 1/4 turn, and remove them after all nuts are loosened.



4. Remove:
   - Piston pin clip ①

NOTE:

Before removing piston pin circlip, cover crankcase with a clean rag to prevent circlip from falling into crankcase cavity.



5. Remove:
   - Piston pin ①
   - Piston ②
   - Small end bearing ③

NOTE:

Before removing the piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use Piston Pin Puller.

	Piston pin puller: **P/N. YU-01304**

CAUTION:

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

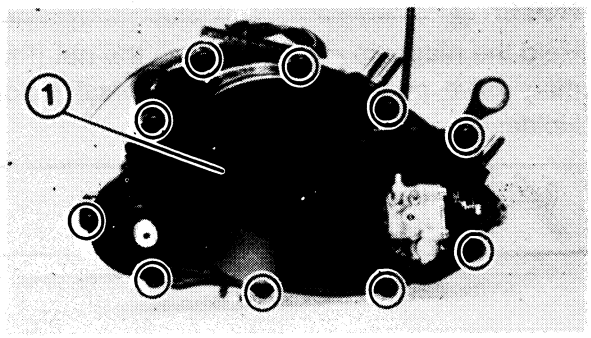
CLUTCH AND PRIMARY DRIVE GEAR

NOTE:

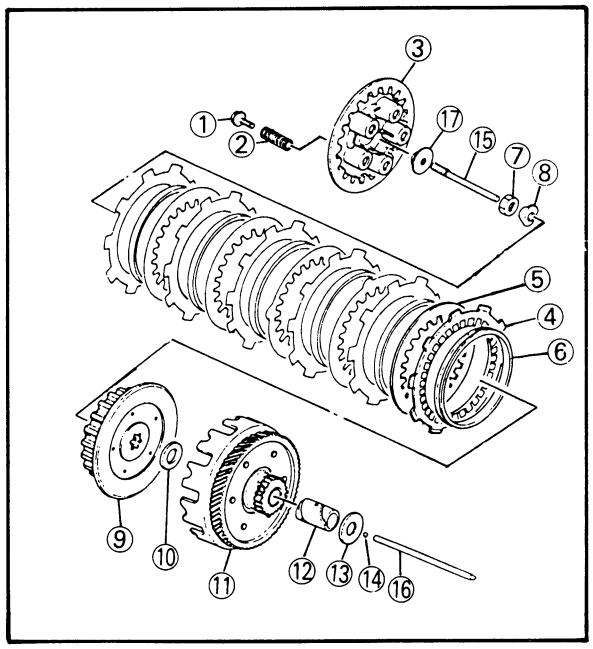
With the engine mounted, the clutch, and primary drive gear can be maintained by removing the following parts.

- Brake pedal
- Kick crank
- Crankcase cover (right)

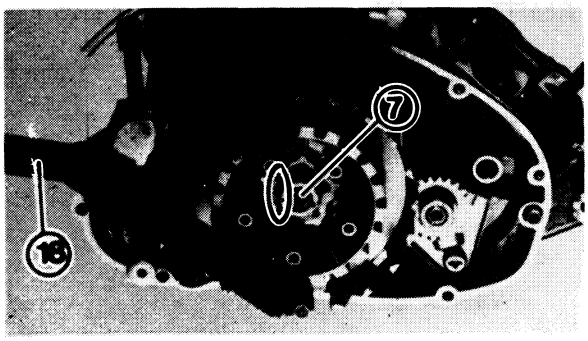
1. Remove:
   - Kick crank ①



2. Remove:
   - Crankcase cover (Right)
   - Dowel pins
   - Gasket (Crankcase cover)



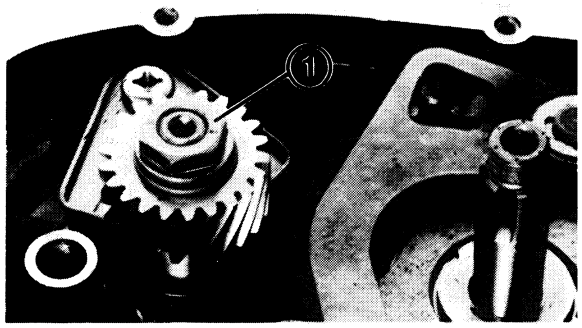
3. Remove:
   - Bolts ①
   - Clutch springs ②
   - Pressure plate ③
   - Friction plates ④
   - Clutch plates ⑤
   - Clutch dumper ⑥
   - Nut (Clutch boss) ⑦
   - Lock washer ⑧
   - Clutch boss ⑨
   - Washer ⑩
   - Clutch housing ⑪
   - Collar ⑫
   - Thrust plate ⑬
   - Ball ⑭
   - Push rod #1 ⑮
   - Push rod #2 ⑯
   - Push plate ⑰



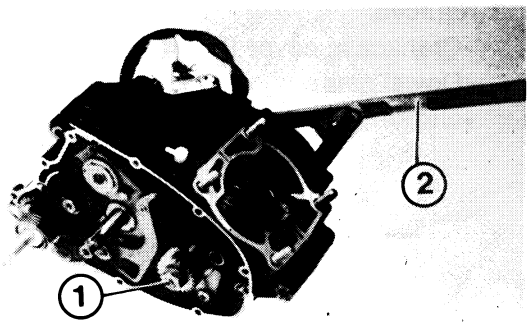
NOTE:

- Before loosening the nut (Clutch boss) ⑦ straighten the lock washer tab.
- Hold the clutch boss to loosen the nut (Clutch boss) by the Universal Clutch Holder ⑱.

	Universal clutch holder: YM-91042



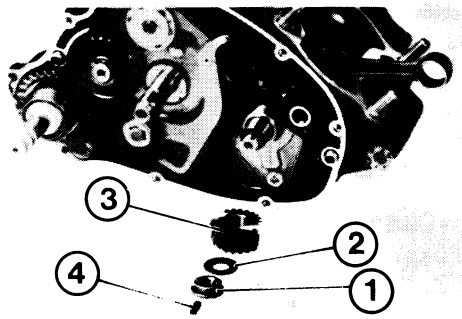
4. Loosen:
   • Nut (Primary drive gear) ①



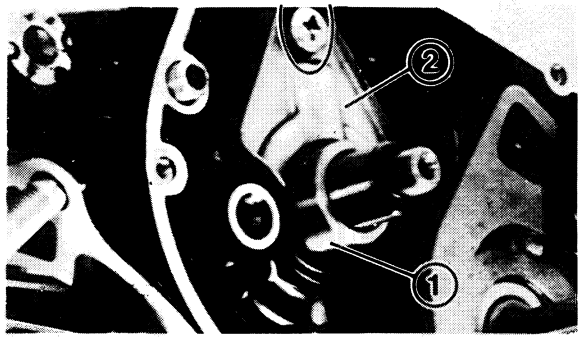
NOTE:

Hold the magneto rotor to loosen the nut (Primary drive gear) ① by the Universal Rotor Holder ②.

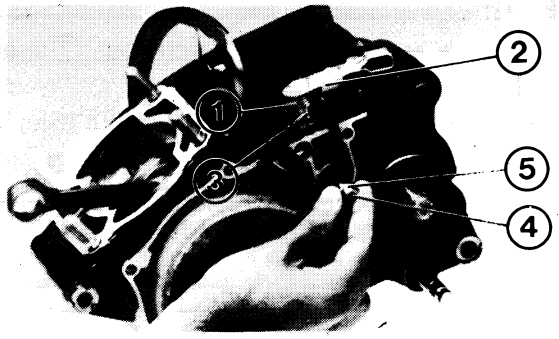
	Universal rotor holder: YU-01235



5. Remove:
   • Nut (Primary drive gear) ①
   • Plain washer ②
   • Primary drive gear ③
   • Straight key ④



6. Remove:
   • Spacer collar ①
   • Oil seal retainer ②



CLUTCH PUSH LEVER

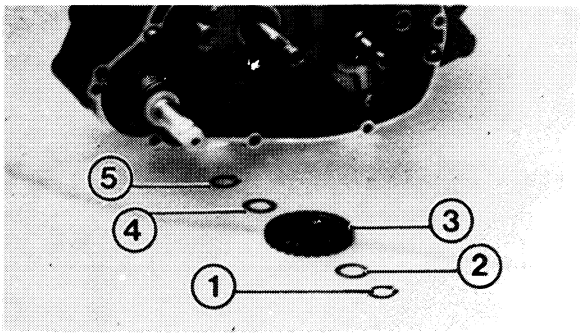
1. Unhook:
   • Return spring (Push lever) ①
2. Remove:
   • Push level (Clutch) ②
   • Return spring ①
   • Washer ③
   • Holding screw (Push lever) ④
   • Washer ⑤

KICK AXLE AND KICK IDLE GEAR

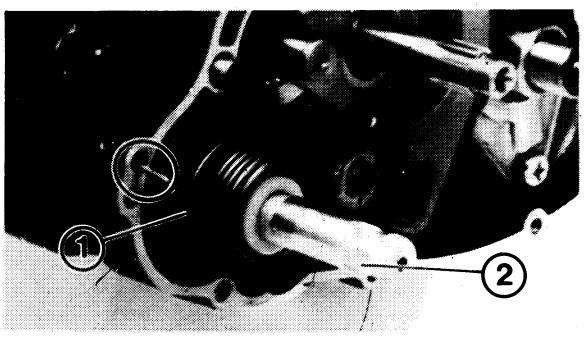
NOTE:

With the engine mouted, the kick axle and kick idle gear can be maintained by removing the following parts.

- Brake pedal
- Autolube pump cable and hoses
- Kick crank
- Crankcase cover (Right)
- Clutch



1. Remove:
   - Circlip ①
   - Washer ②
   - Kick idle gear ③
   - Washer ④
   - Circlip ⑤



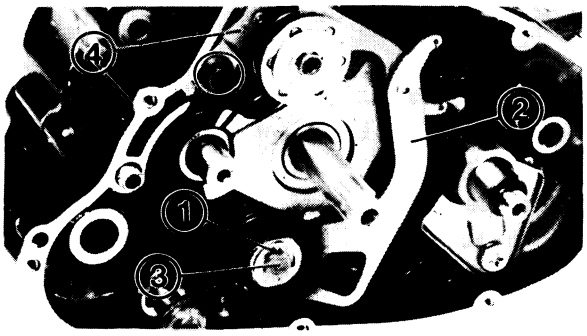
2. Unhook:
   - Return spring (kick axle) ①
3. Remove:
   - Kick axle ② (pull straight out)

SHIFT SHAFT AND STOPPER LEVER

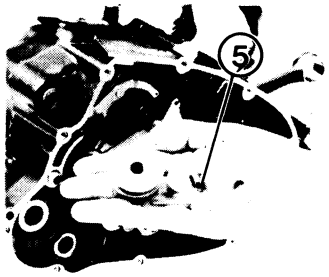
NOTE:

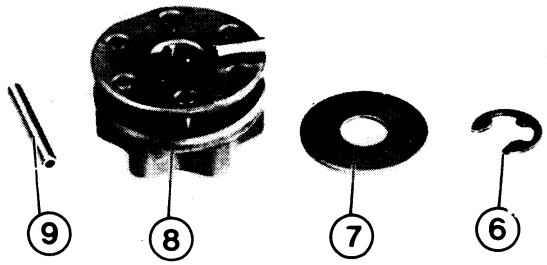
With the engine mounted, the shift shaft can be maintained by removing the following parts.

- Brake pedal
- Autolube pump cable and hoses
- Kick crank
- Crankcase cover (right)
- Clutch



1. Remove:
   - Circlip ①
   - Shift lever ②
   - Shift shaft ③
   - Stopper lever ④
   - Spring ⑤
   - Circlip ⑥
   - Side plate ⑦
   - Segment ⑧
   - Pin ⑨

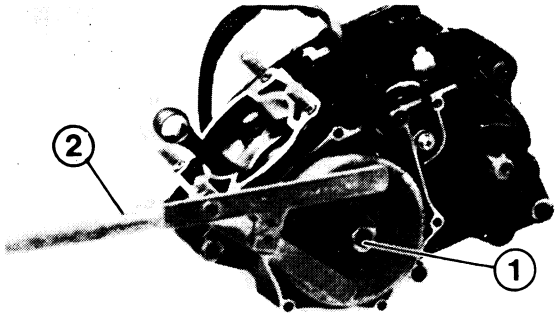




ROTOR

NOTE:

With the engine mounted, the rotor can be maintained by removing the following parts.
- Crankcase cover (Left)

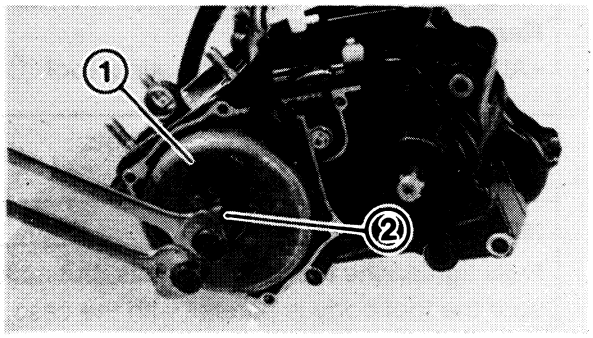


1. Remove:
   - Nut (rotor) ①
   - Plain washer

NOTE:

Hold the rotor to loosen the nut (Rotor) by the Universal Rotor Holder ②.

	Universal rotor holder: P/N. YU-01235

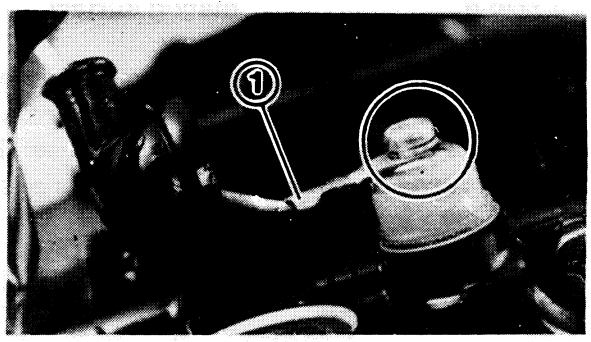


2. Remove:
   - Rotor ①
   - Woodruff key

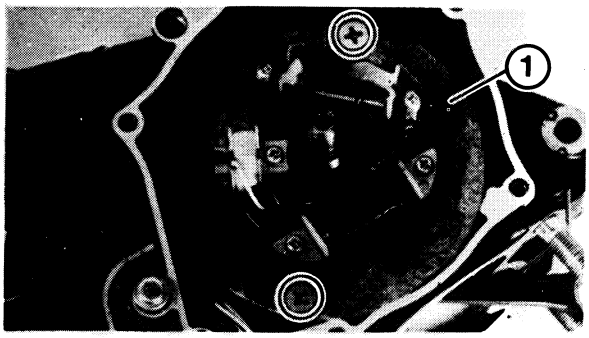
NOTE:

When removing the rotor, use the Rotor Puller ②.

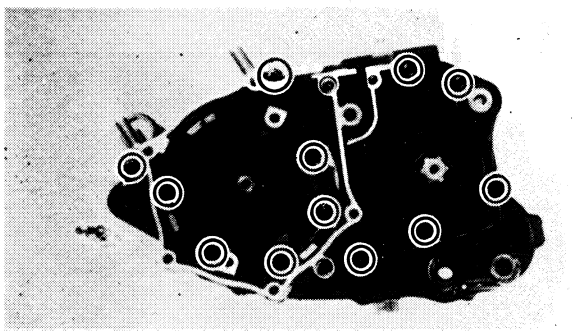
	Rotor puller: P/N YM-01189



3. Disconnect:
   - Neutral switch lead ①



4. Remove:
   - Stator ①

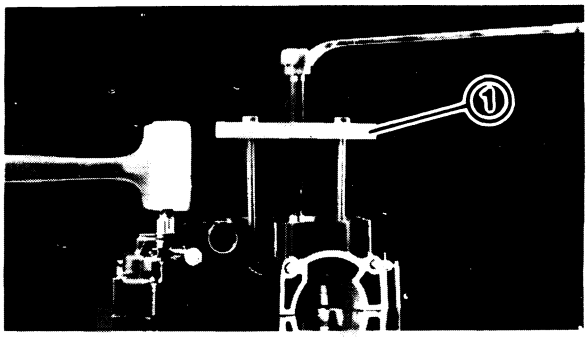


CRANKCASE (LEFT)

1. Remove:
   - Crankcase (Left)

NOTE:

- Loosen each screw 1/4 turn, and remove them after all are loosened.



Removal steps:
- Attach the Crankcase Separating Tool ① .

Crankcase separating tool:
P/N. YU-01135

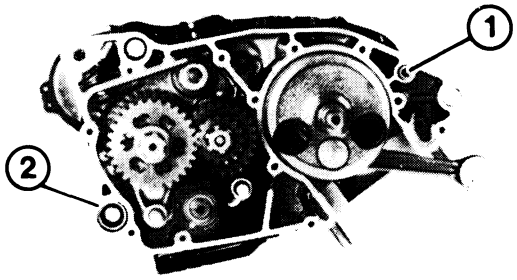
NOTE:

Fully tighten the tool holding bolts, but make sure the tool body is parallel with the case. If necessary, one screw may be backed out slightly to level tool body.

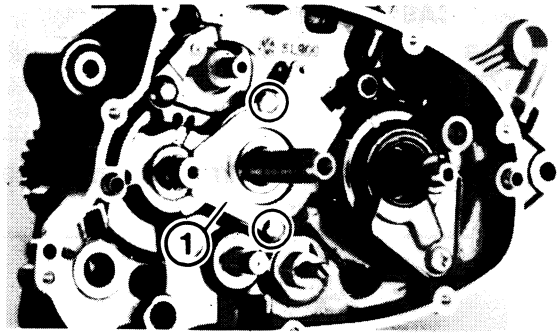
- As pressure is applied, alternately tap on the front engine mounting boss, and transmission shafts.
- Then, remove the crankcase (right).

CAUTION:

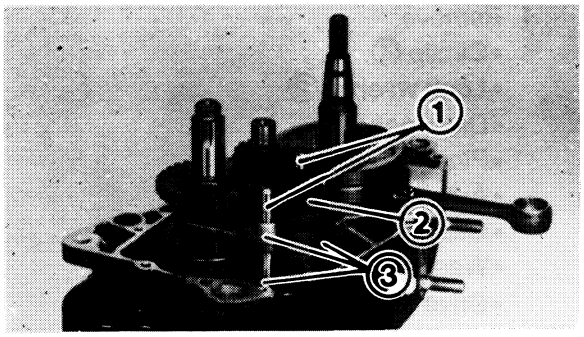
- **Use soft hammer to tap on the case half. Tap only on reinforced portions of case.**
- **Do not tap on gasket mating surface.**
- **Work slowly and carefully.**
- **Make sure the case halves separate evenly.**
- **If one end "hangs up", take pressure off the push screw, realign, and start over. If the cases do not separate, check for a remaining case screw or fitting.**
- **Do not force.**



2. Remove:
   - Dowel pins ①
   - Damper collar ②



3. Remove:
   - Bearing retainer ①

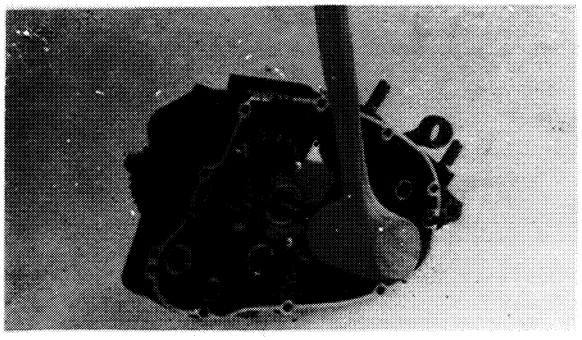


SHIFTER AND TRANSMISSION

1. Remove:
   - Guide bars ①
   - Shift cam ②
   - Shift forks ③

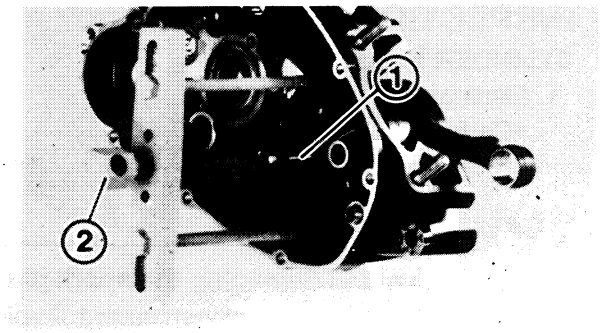
NOTE:

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



2. Remove:
   - Transmission assembly

   If necessary, tap lightly on the transmission drive axle with a soft hammer.



CRANKSHAFT

1. Remove:
   - Crankshaft ①

NOTE:

If necessary, remove the crankshaft with the Crankcase Separating Tool ②.

	Crankcase separating tool: P/N. YU-01135

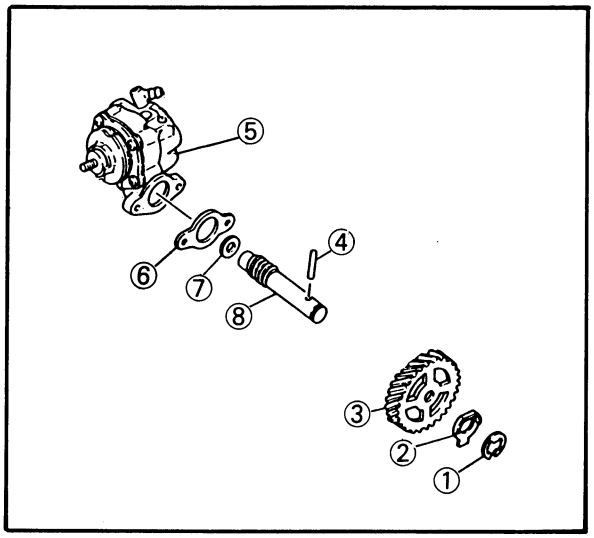
- Fully tighten the tool holding bolts, but make sure the tool body is parallel with the case. If necessary, one screw may be backed out slightly to level tool body.

AUTOLUBE PUMP ASSEMBLY

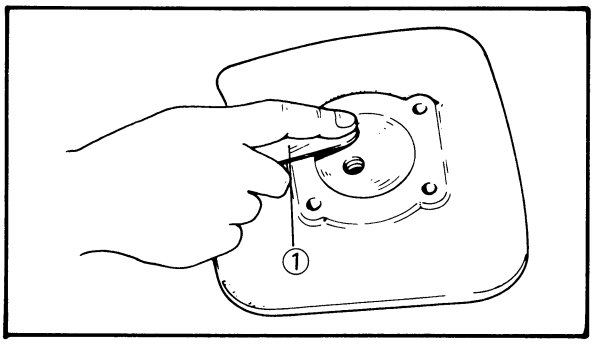
NOTE:

With the engine mounted, the autolube pump assembly can be maintained by removing the following parts.

- Pump case cover
- Autolube pump cable and hoses
- Brake pedal
- Kick crank
- Crankcase cover (Right)



1. Remove:
   - Circlip ①
   - Lock washer ②
   - Drive gear ③
   - Pin ④
   - Autolube pump ⑤
   - Gasket ⑥
   - Washer ⑦
   - Drive shaft (Autolube pump) ⑧



INSPECTION AND REPAIR

CYLINDER HEAD

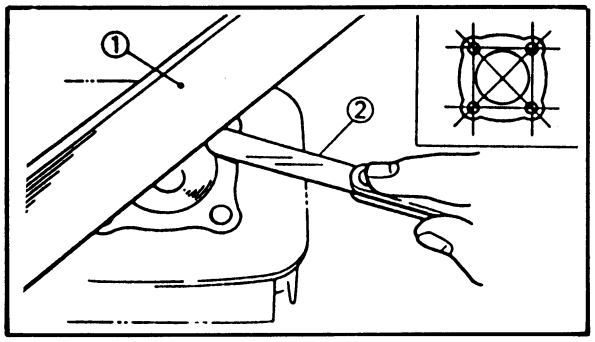
1. Eliminate:
   - Carbon deposits
     Use a rounded scraper ①

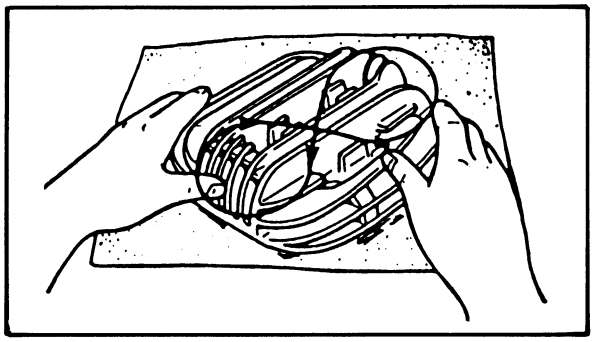
CAUTION:

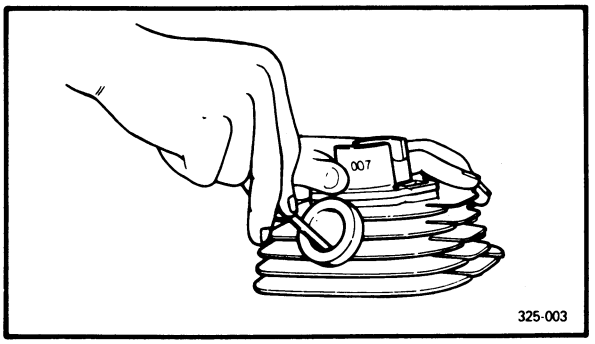
Take care to avoid damaging the spark plug threads. Do not use a sharp instrument. Avoid scratching the aluminum.

2. Measure:
   - Cylinder head warpage
     Out of specification → Resurface.

Warpage limit:
0.03 mm (0.0012 in)







Warpage measurement and resurfacement steps:

- Attach a straight edge 1 on the cylinder head and measure the warpage using a thickness gauge 2 .
- If the warpage is out of specification, resurface the cylinder head.
- Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.

NOTE:

Rotate the head several times to avoid removing too much material from one side.

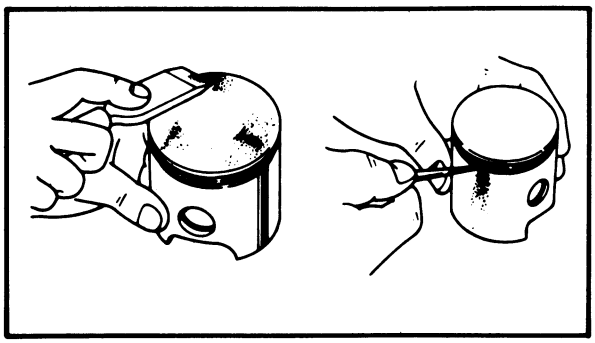
CYLINDER AND PISTON

1. Eliminate:
   - Carbon deposits
     Use a rounded scraper

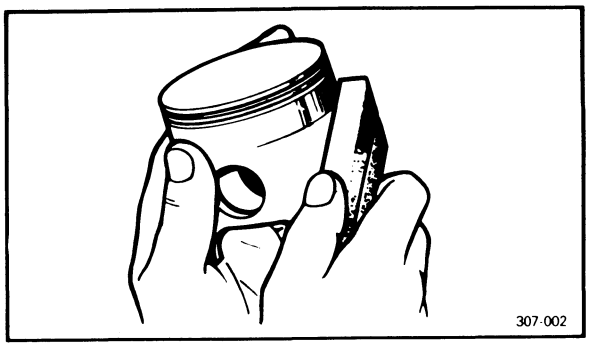
CAUTION:

Do not use a sharp instrument and avoid damaging or scratching.

2. Inspect:
   - Cylinder wall
     Wear/Scratches → Rebore or replace.



3. Eliminate:
   - Carbon deposits
     (from piston crown and ring grooves)
4. Inspect:
   - Piston crown
     Burrs/Nicks/Damage → Replace.

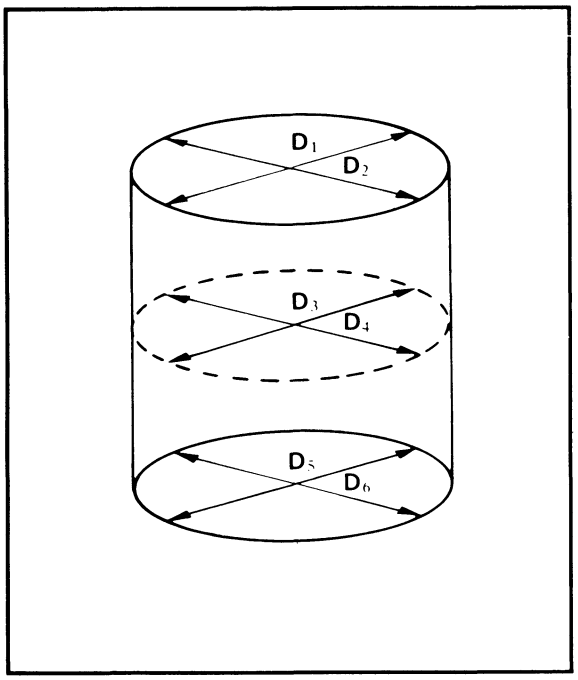


5. Eliminate:
   - Score marks and carbon deposits (from piston wall)
     Use 600 ~ 800 grit wet sandpaper

NOTE:

Sand in a crisscross pattern. Do not sand excessively.

6. Inspect:
   - Piston wall
     Wear/Scratches/Damage→Replace.



7. Measure:
   - Piston-to-cylinder clearance

Measurement steps:

First step:

- Measure the cylinder bore "C" with a Cylinder Bore Gauge.

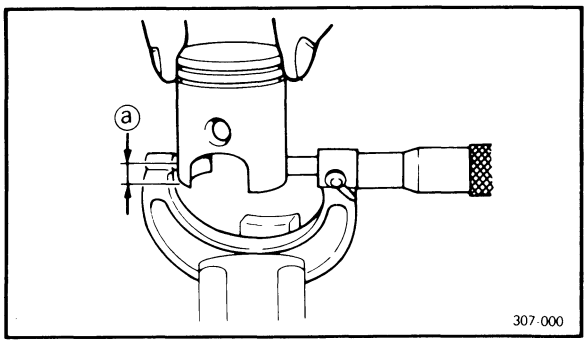
NOTE:

Measure the cylinder bore "C" in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.

	Standard	Wear limit
Cylinder bore "C"	64.50 ~ 64.53 mm (2.539 ~ 2.540 in)	64.6 mm (2.543 in)
Taper "T"	—	0.05 mm (0.0019 in)
Out of round "R"	—	0.01 mm (0.0004 in)

C = Maximum D
T = (Maximum D_1 or D_2) − (Maximum D_5 or D_6)
R = (Maximum D_1, D_3 or D_5) − (Maximum D_2, D_4 or D_6)

- If out of specification, rebore or replace cylinder, and replace piston and piston rings as a set



2nd step:
- Measure the piston skirt diameter "P" with a micrometer.

ⓐ 10.0 mm (0.40 in) from the piston bottom edge

Piston size P	
Standard	**64.46 ~ 64.50 mm (2.538 ~ 2.539 in)**
Oversize 1	**64.75 mm (2.55 in)**
Oversize 2	**65.00 mm (2.56 in)**

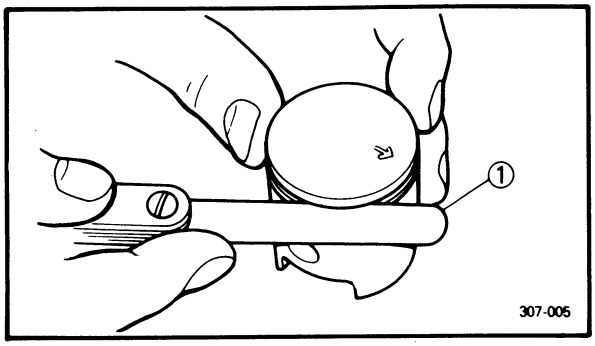
- If out of specification, replace piston and piston rings as a set.

3rd step:
- Calculate the piston-to-cylinder clearance with following formula:

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

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

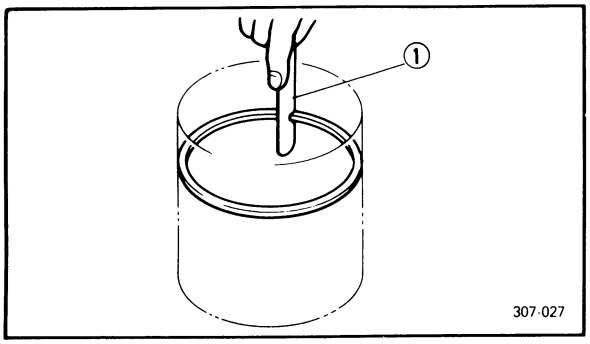
Piston-to-cylinder clearance:
0.035 ~ 0.040 mm
(0.0014 ~ 0.0016 in)
Limit: 0.1 mm (0.004 in)



PISTON RINGS

1. Measure:
   - Side clearance
     Out of specification → Replace piston and/or rings.
     Use a Feeler gauge ①.

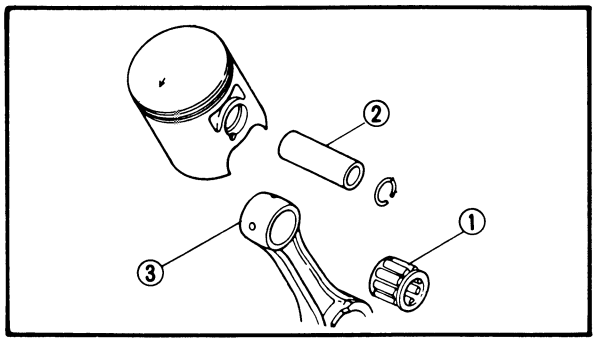
Side clearance	Top	0.030 ~ 0.050 mm (0.0012~0.0020 in)
	2nd	0.030 ~ 0.050 mm (0.0012~0.0020 in)



2. Install:
   - Piston ring
     (into cylinder)
     Push the ring with the piston crown.
3. Measure:
   - End gap
     Out of specification → Replace rings as a set.
     Use a Feeler Gauge ①.

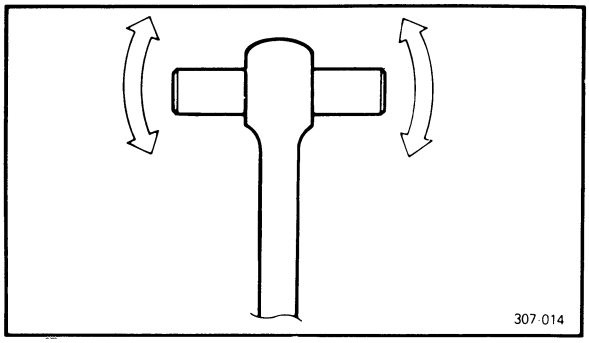
End gap	Top	0.30 ~ 0.50 mm (0.012 ~ 0.020 in)
	2nd	0.30 ~ 0.50 mm (0.012 ~ 0.020 in)

Oversize piston ring	
Oversize 1	25
Oversize 2	50

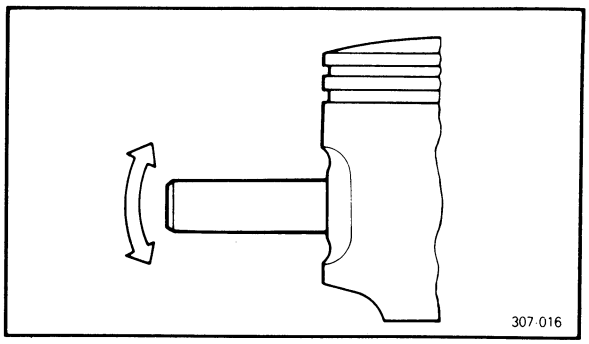


PISTON PIN BEARING

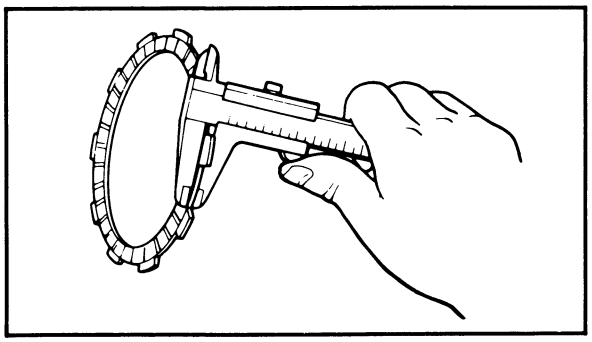
1. Lubricate:
   - Small end bearing ①
   - Piston pin ②
     (lightly)
2. install:
   - Small end bearing ①
   - Piston pin ②
     (into small end ③ of connecting rod)



3. Check:
   • Free play
   There should be no noticeable for the play.
   Free play exists → Inspect the connecting rod, pin, and bearing for wear/Replace the pin and/or connecting rod as required.
4. Install:
   • Piston pin
   (into piston pin hole)



5. Check:
   • Free play (when the piston pin is in place in the piston)
   There should be no noticeable for the play.
   Free play exists → Replace piston pin and/or piston.
6. Inspect:
   • Piston pin and bearing
   Signs of heat discoloration → Replace.

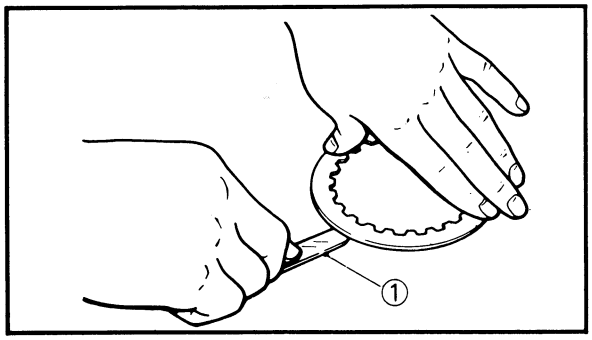


CLUTCH

1. Inspect:
   • Friction plate
   Damage/Wear → Replace friction plates as a set.
2. Measure:
   • Friction plate thickness
   Out of specification → Replace friction plate as a set.

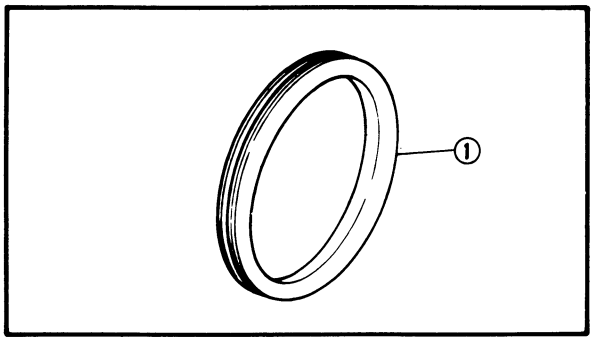
Wear limit: 2.7 mm (0.106 in)

3. Inspect:
   • Clutch plate
   Damage → Replace clutch plates as a set.

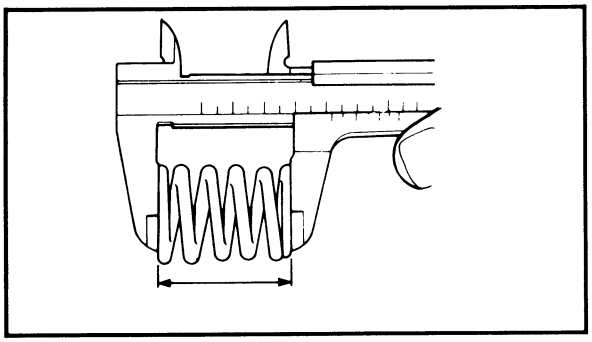


4. Measure:
   • Clutch plate warpage
   Out of specification → Replace clutch plate as a set.
   Use a surface plate and Feeler Gauge ①

Warp limit: 0.05 mm (0.002 in)

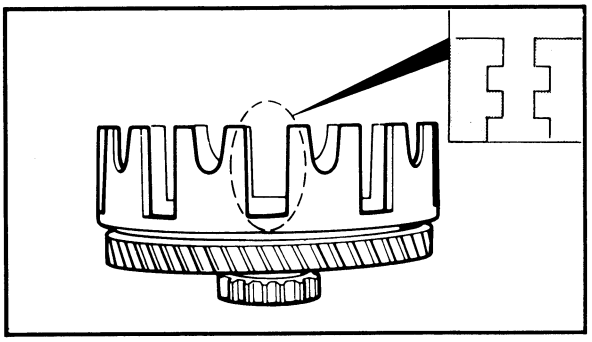


5. Inspect:
   • Clutch damper ①
   Wear/Damage → Replace.



6. Measure:
   • Clutch spring free length
   Out of specification → Replace spring as a set.

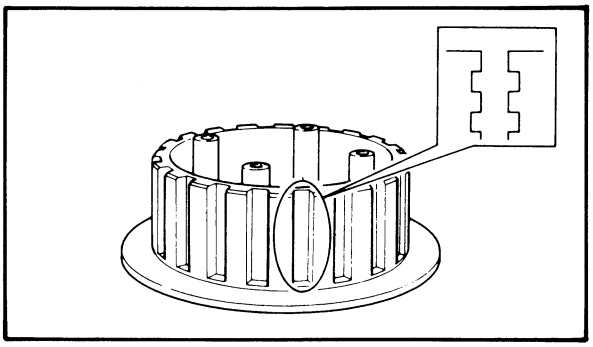
Clutch spring minimum length:
32.0 mm (1.260 in)



7. Inspect:
   • Dogs on the clutch housing
   Cracks/Wear/Damage → Deburr or replace.
   • Clutch housing bearing
   Scoring/Wear/Damage → Replace clutch housing.

NOTE:

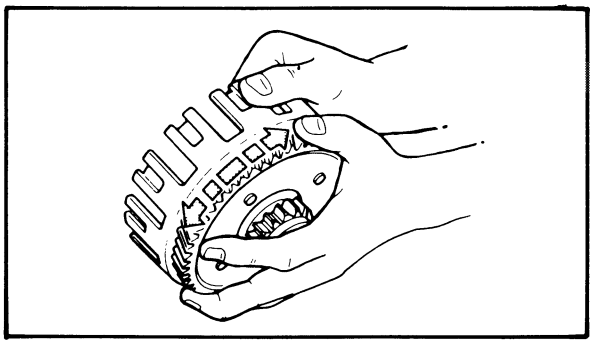
Scoring on the clutch housing dogs will cause eratic operation.



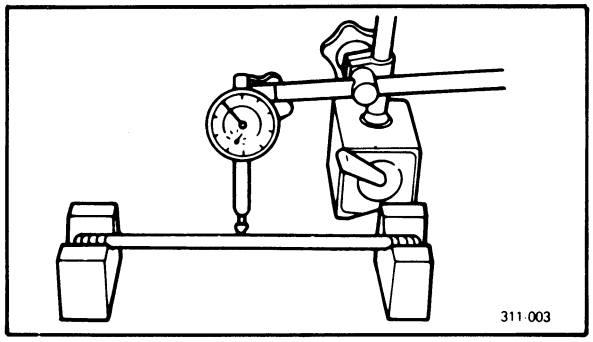
8. Inspect:
   • Clutch boss splines
   Scoring/Wear/Damage → Replace clutch housing.

NOTE:

Scoring on the clutch boss splines will cause erratic operation.

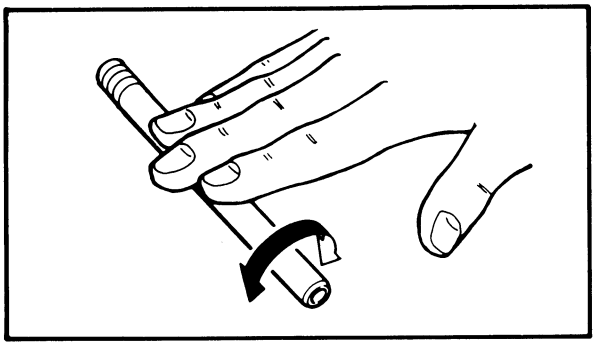


9. Check:
   • Circumferential play
   Free play exists → Replace clutch housing assembly.

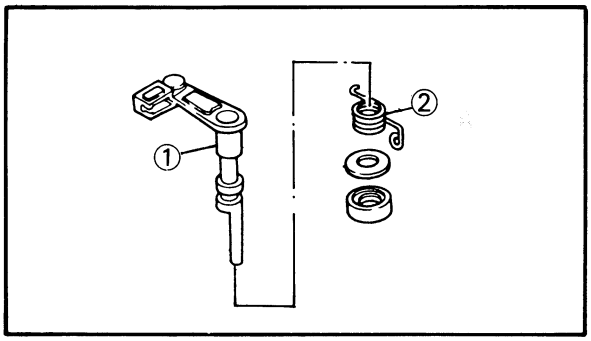


10. Measure:
    • Push rod # 2 runout
    Out of specification → Replace.
    Use a V-Block and Dial Gauge.

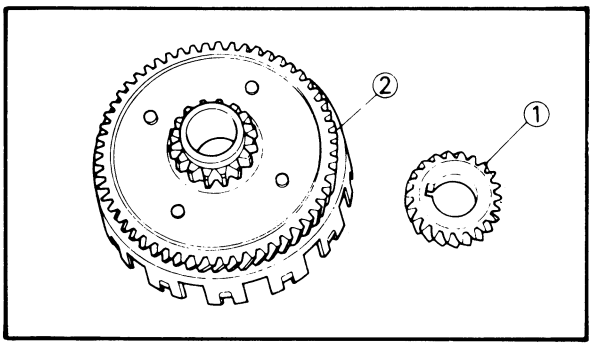
Runout limit:
0.15 mm (0.006 in)



11. Inspect:
    • Push rod # 1 runout
    Roll the guide bar on a flat surface.
    Bends → Replace.

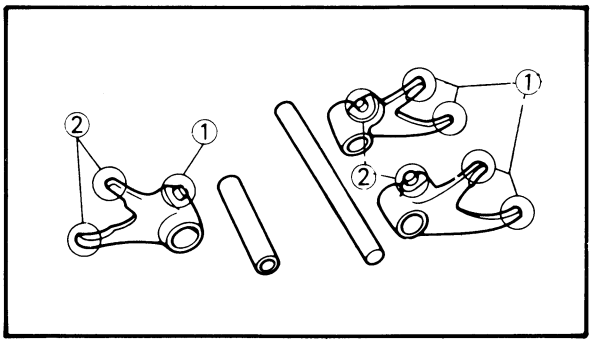


12. Inspect:
    • Push lever ①
    • Return spring ②
    Wear/Damage → Replace.



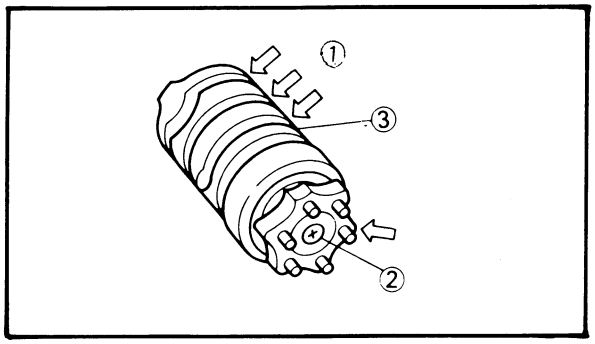
PRIMARY DRIVE

1. Inspect:
    • Primary drive gear teeth ①
    • Primary driven gear teeth ②
    Wear/Damage → Replace both gears.
    Excessive noises during operation → Replace both gears.

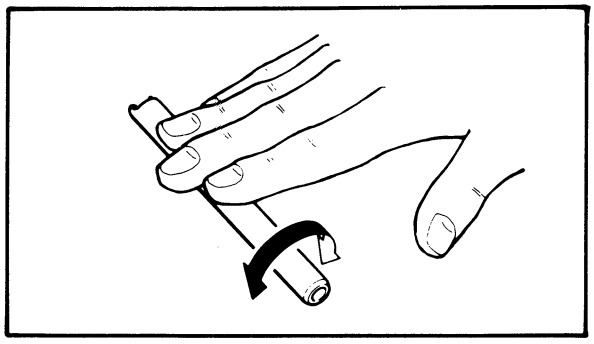


TRANSMISSION AND SHIFTER

1. Inspect:
    • Shift fork cam follower ①
    • Shift fork pawl ②
    Scoring/Bends/Wear → Replace.



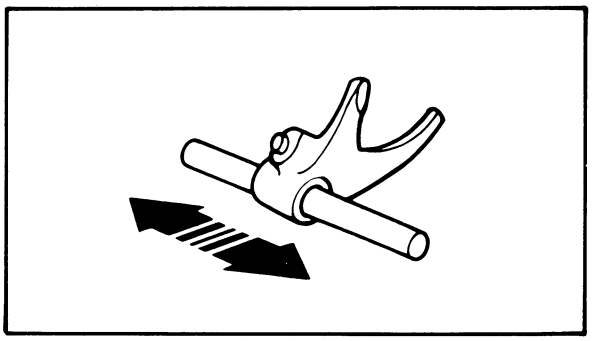
2. Inspect:
   - Shift cam groove ①
   - Shift cam segment ②
     Wear/Damage → Replace shift cam assembly.
   - Shift cam bearing
     Bearing turns roughly → Replace shift cam assembly.



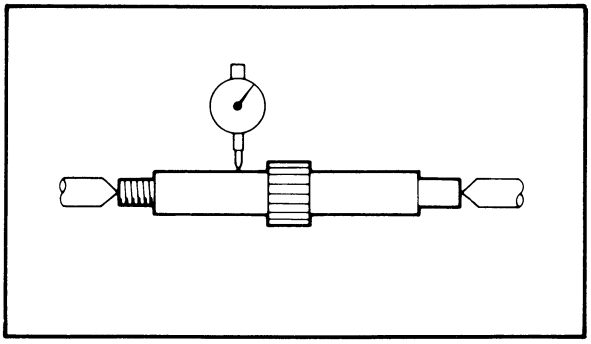
3. Inspect:
   - Guide bar
     Roll the guide bar on a surface.
     Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent guide bar.

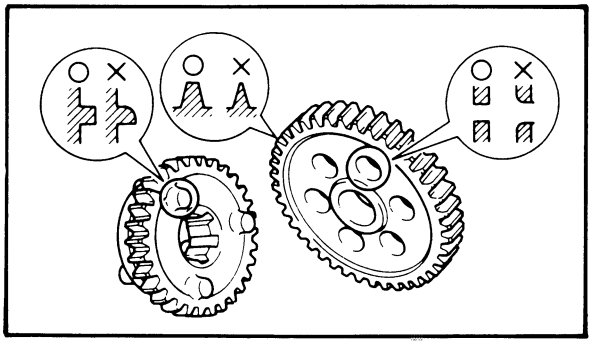


4. Check:
   - Shift fork movement
     Unsmooth operation → Replace shift fork and/or guide bar.

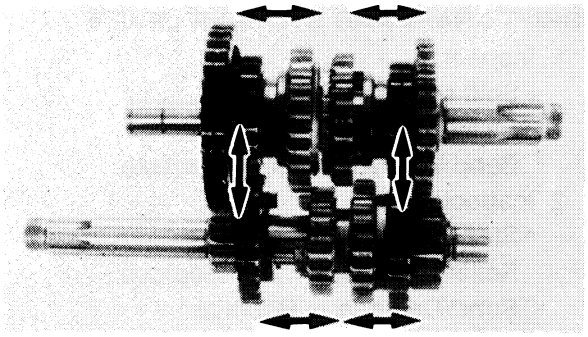


5. Measure:
   - Axle runout (Main and Drive)
     Use centering device and dial gauge.
     Out of specification → Replace bent axle.

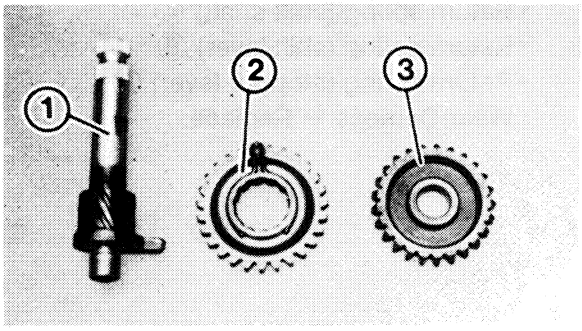
	Runout limit: **0.08 mm (0.003 in)**



6. Inspect:
   - Gear teeth
     Blue discoloration/Pitting/Wear → Replace.
   - Mated dogs
     Rounded edges/Cracks/Missing portions → Replace

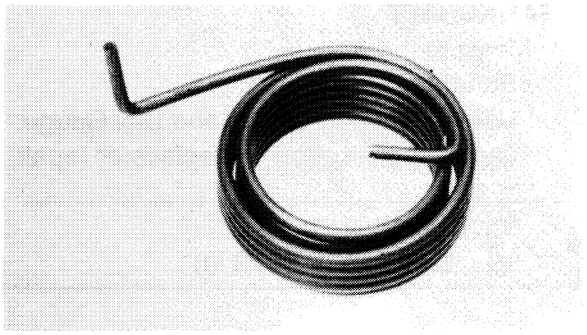


7. Check:
   - Proper gear engagement (each gear) (to its counter part)
     Incorrect → Reassemble.
   - Gear movement
     Roughness → Replace.
8. Inspect:
   - Circlips
     Damage/Looseness/Bends → Replace.

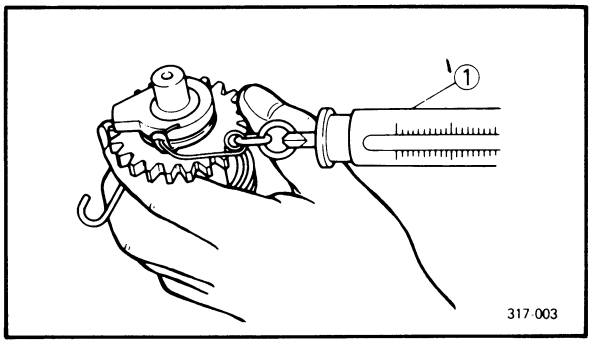


KICK STARTER

1. Inspect:
   - Kick axle ①
   - Kick gear teeth ②
   - Kick idle gear teeth ③
     Damage/Wear → Replace both gears.



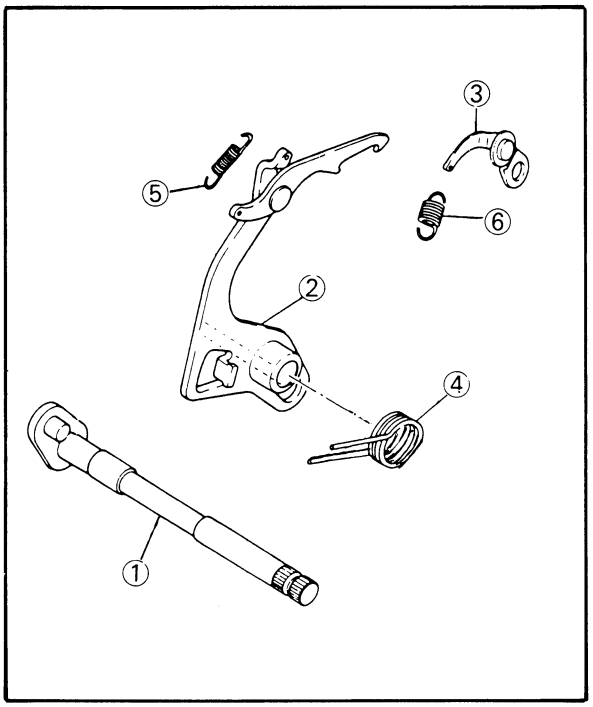
2. Inspect:
   - Return spring (Kick axle)
     Wear/Damage → Replace.



3. Measure:
   - Kick clip tension
     Out of specification → Replace.
     Use a Spring Gauge ①.

Kick clip tension:
0.8 ~ 1.2 kg (1.76 ~ 2.65 lb)

CAUTION:
Do not try to bend the clip.



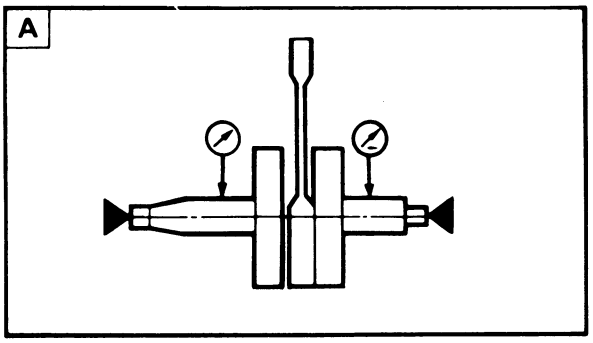
SHIFT SHAFT AND STOPPER LEVER

1. Inspect:
   - Shift shaft ①
   - Shift lever ②

   Bend/Wear/Damage → Replace.
2. Inspect:
   - Stopper lever ③

   Roller turns roughly → Replace.
   Bend/Damage → Replace.
3. Inspect:
   - Return spring (shift shaft) ④
   - Return spring (shift lever) ⑤
   - Return spring (stopper lever) ⑥

   Wear/Damage → Replace.

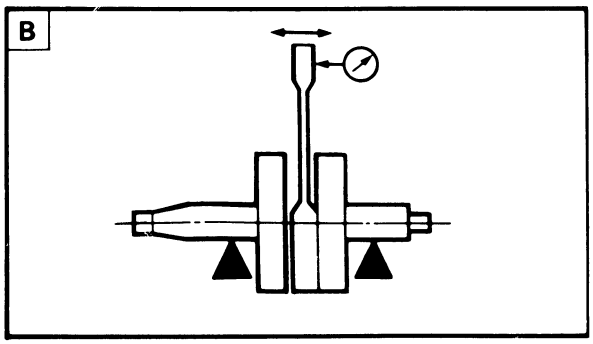


CRANKSHAFT

1. Measure:
   - Runout [A]

   Use a centering device and Dial Gauge.
   Out.of specification → Replace or repair.

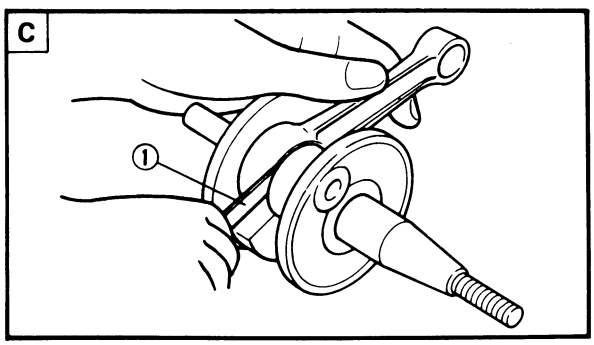
Runout limit:
0.03 mm (0.0012 in)



2. Measure:
   - Small end free play [B]

   Use a Dial Gauge.
   Out of specification→Replace the defective parts.

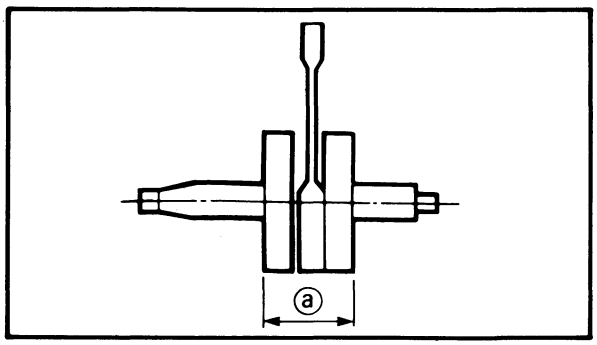
Small end free play:
1.0 ~ 1.5 mm (0.039 ~ 0.059 in)



3. Measure:
   - Big end side clearance [C]

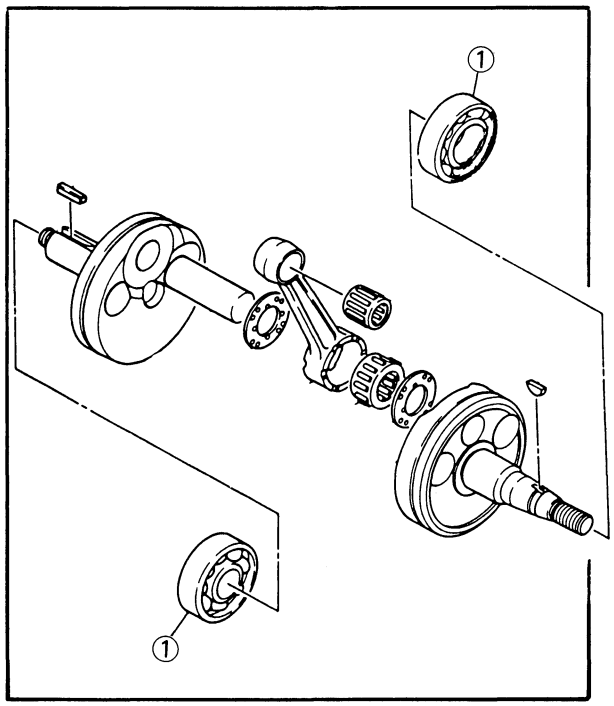
   Use a Feeler Gauge ①.
   Out of specification→Replace the defective parts.

Big end side clearance:
0.15 ~ 0.70 mm (0.006 ~ 0.028 in)
<Limit>:
<1.0 mm (0.040 in)>



4. Measure:
   • Crank width ⓐ
   Out of specification → Replace or repair.

Crank width:
55.85 ~ 55.95 mm
(2.199 ~ 2.203 in)



5. Inspect:
   • Crankshaft bearings ①
   Pitting/Damage → Replace.

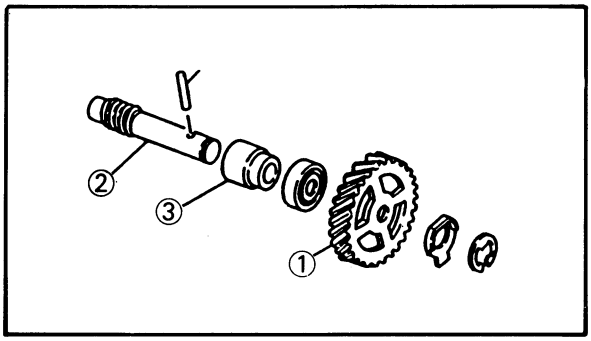
NOTE:
Lubricate the bearings immediately after examining them to prevent rust.

AUTOLUBE PUMP

Wear or an internal malfunction may cause pump output to vary from the factory setting. This situation is, however, extremely rare. If improper output is suspected, inspect the following:

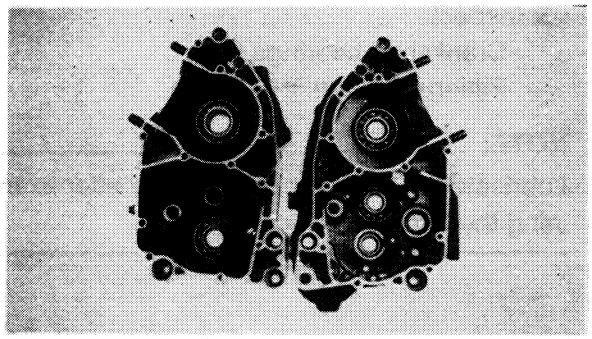
1. Inspect:
   • Delivery line
   Obstructions → Blow out.
   • Pump body seal/Crankcase cover seal
   Wear/Damage → Replace.
2. Inspect:
   • Allowing air
   Air exists → Air bleed.
   Refer to the "AUTOLUBE PUMP AIR BLEEDING" section in the CHAPTER 3.
3. Check:
   • Pump output
   Out of specification → Adjust.

Minimum output/200 Stroke:
0.48 ~ 0.59 cm³ (0.017 ~ 0.021 Imp oz, 0.016 ~ 0.020 US oz)
Maximum output/200 Stroke:
4.40 ~ 4.87 cm³ (0.155 ~ 0.171 Imp oz, 0.149 ~ 0.165 US oz)



4. Inspect:
   - Drive gear (autolube pump) ①
   - Drive shaft (autolube pump) ②
   - Pivot collar (drive shaft) ③

   Wear/Damage → Replace.

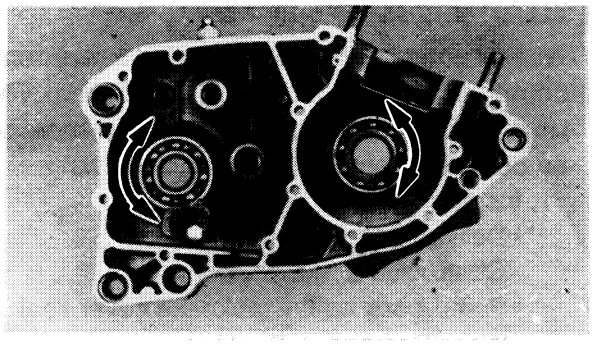


CRANKCASE

1. Thoroughly wash the case halves in mild solvent.
2. Clean all the gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Inspect:
   - Crankcase

     Cracks/Damage → Replace.
   - Oil delivery passages

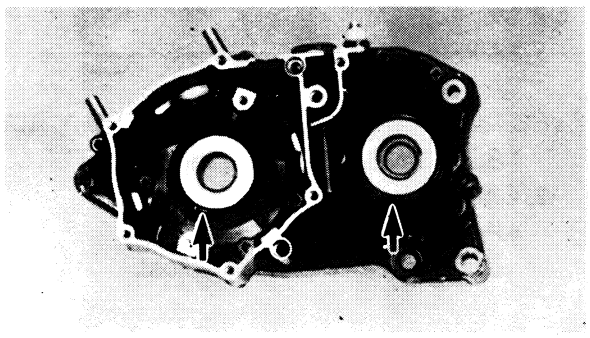
     Clog → Blow out with compressed air.



BEARINGS AND OIL SEALS

1. Inspect:
   - Bearings

     Pitting/Damage → Replace.

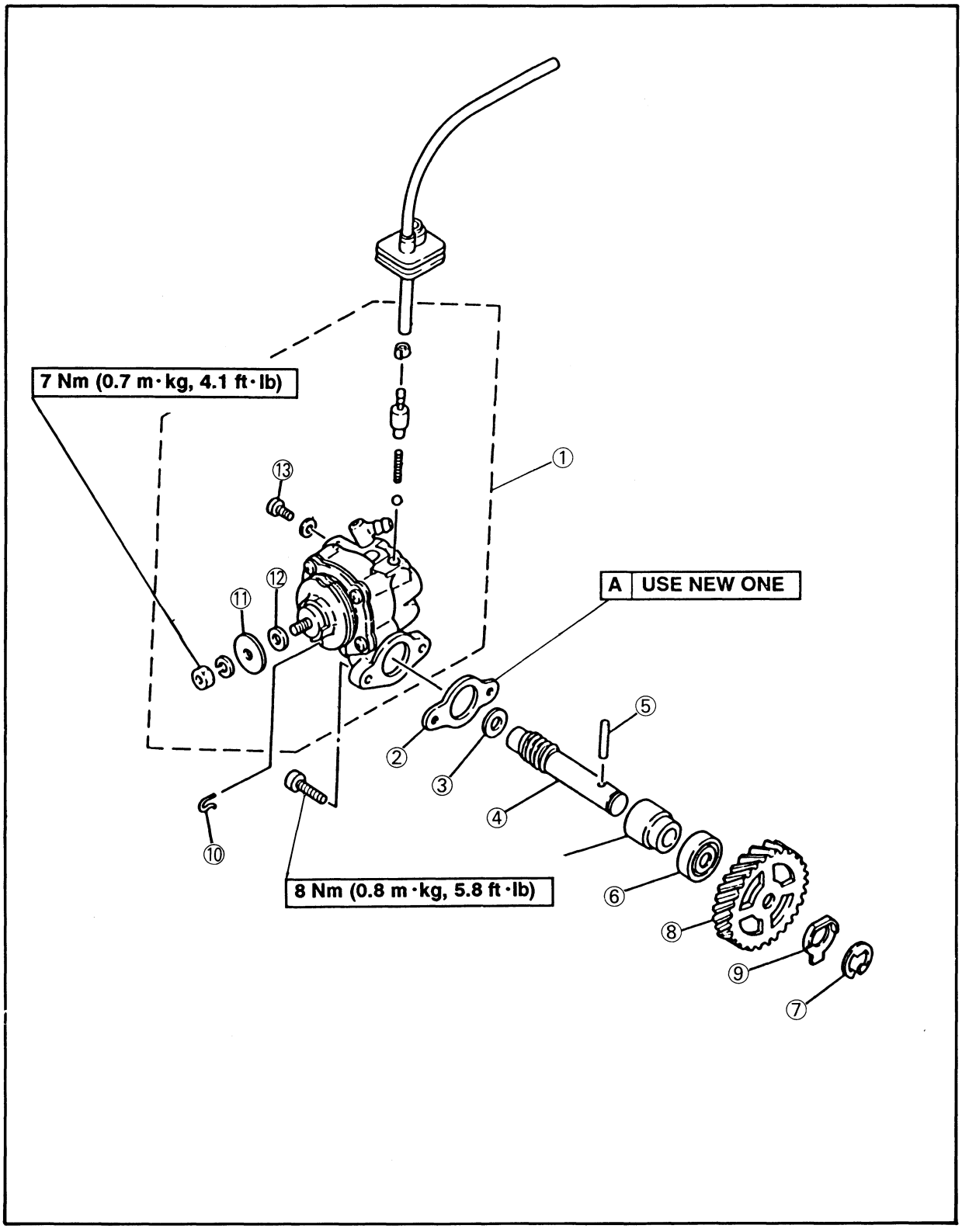


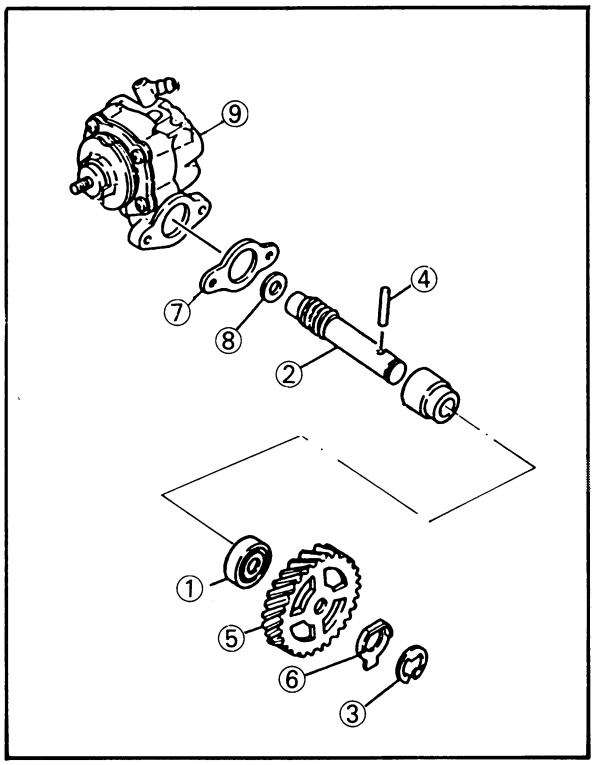
2. Inspect:
   - Oil seals

     Damage/Wear → Replace

AUTOLUBE PUMP

① Autolube pump
② Gasket
③ Washer
④ Drive shaft
⑤ Pin
⑥ Oil seal
⑦ Circlip
⑧ Autolube pump gear
⑨ Lock washer
⑩ Clip
⑪ Adjusting plate
⑫ Shim
⑬ Bleed screw





ENGINE ASSEMBLY AND ADJUSTMENT

AUTOLUBE PUMP

1. Lubricate:
   - Oil seal lips ①

	Lightweight lithium-soap base grease

2. Install:
   - Drive shaft (Autolube pump) ②
   - Circlip ③
   - Pin ④
   - Drive gear (autolube pump) ⑤
   - Lock washer ⑥
   - Gasket ⑦
   - Washer ⑧
   - Autolube pump ⑨

	Screw (Autolube pump): 5 Nm (0.5 m·kg, 3.6 ft·lb)

CAUTION:

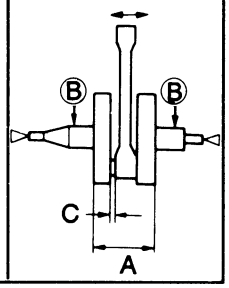
- **Always use a new circlip.**
- **Always use a new gasket.**

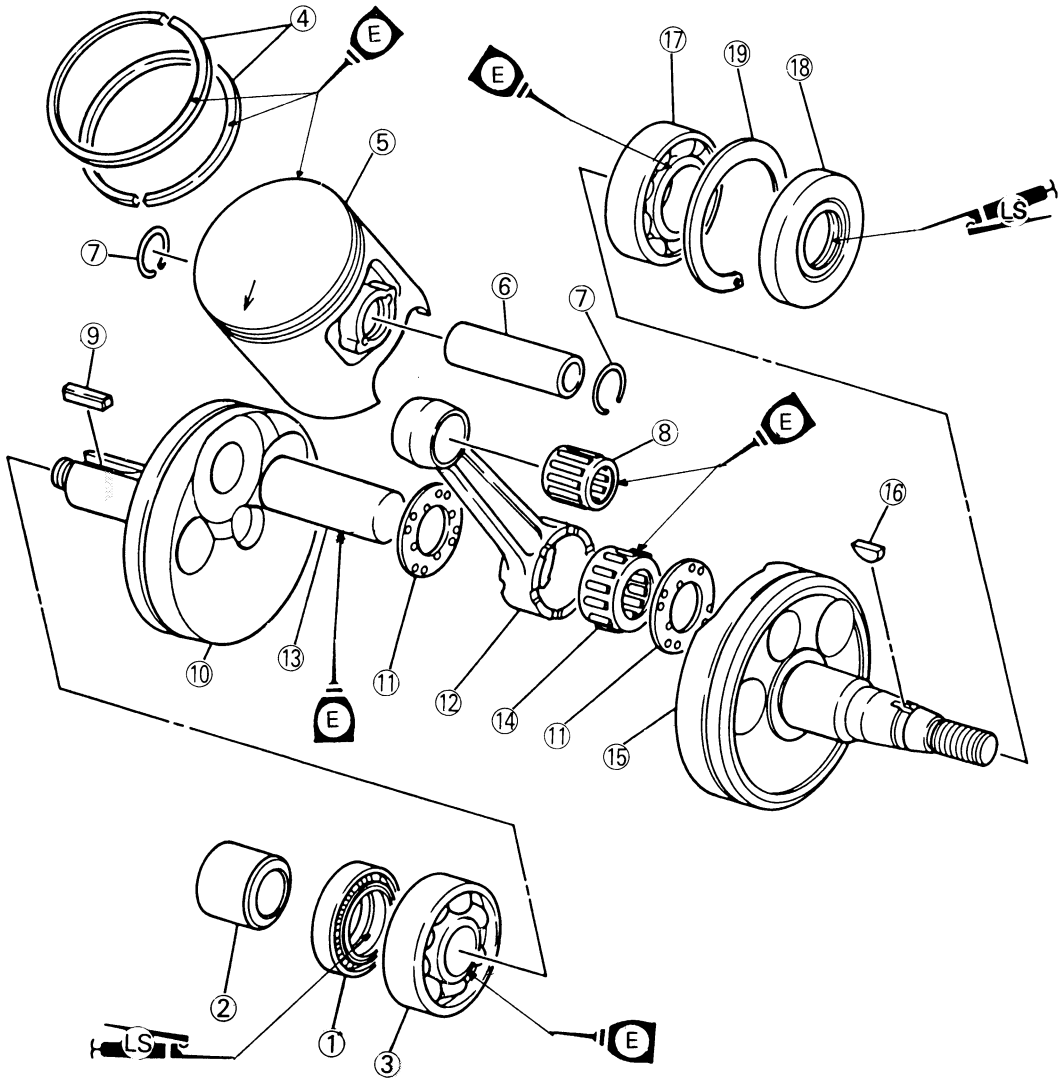
CRANKSHAFT/PISTON/BALANCER

① Oil seal
② Collar
③ Bearing
④ Piston ring set
⑤ Piston
⑥ piston pin
⑦ piston pin clip
⑧ Small end bearing
⑨ Straight key
⑩ Crank (right)
⑪ Thrust bearing
⑫ Connecting rod
⑬ Crank pin
⑭ Big end bearing
⑮ Crank (left)
⑯ Woodruff key
⑰ Bearing
⑱ Oil seal
⑲ Circlip

A	**PISTON TO CYLINDER CLEARANCE:** **0.035 ~ 0.040 mm (0.0014 ~ 0.0016 in)**
B	**END GAP (INSTALLED):** **Top ring** **0.30 ~ 0.50 mm (0.012 ~ 0.020 in)** **2nd ring** **0.30 ~ 0.50 mm (0.012 ~ 0.020 in)**

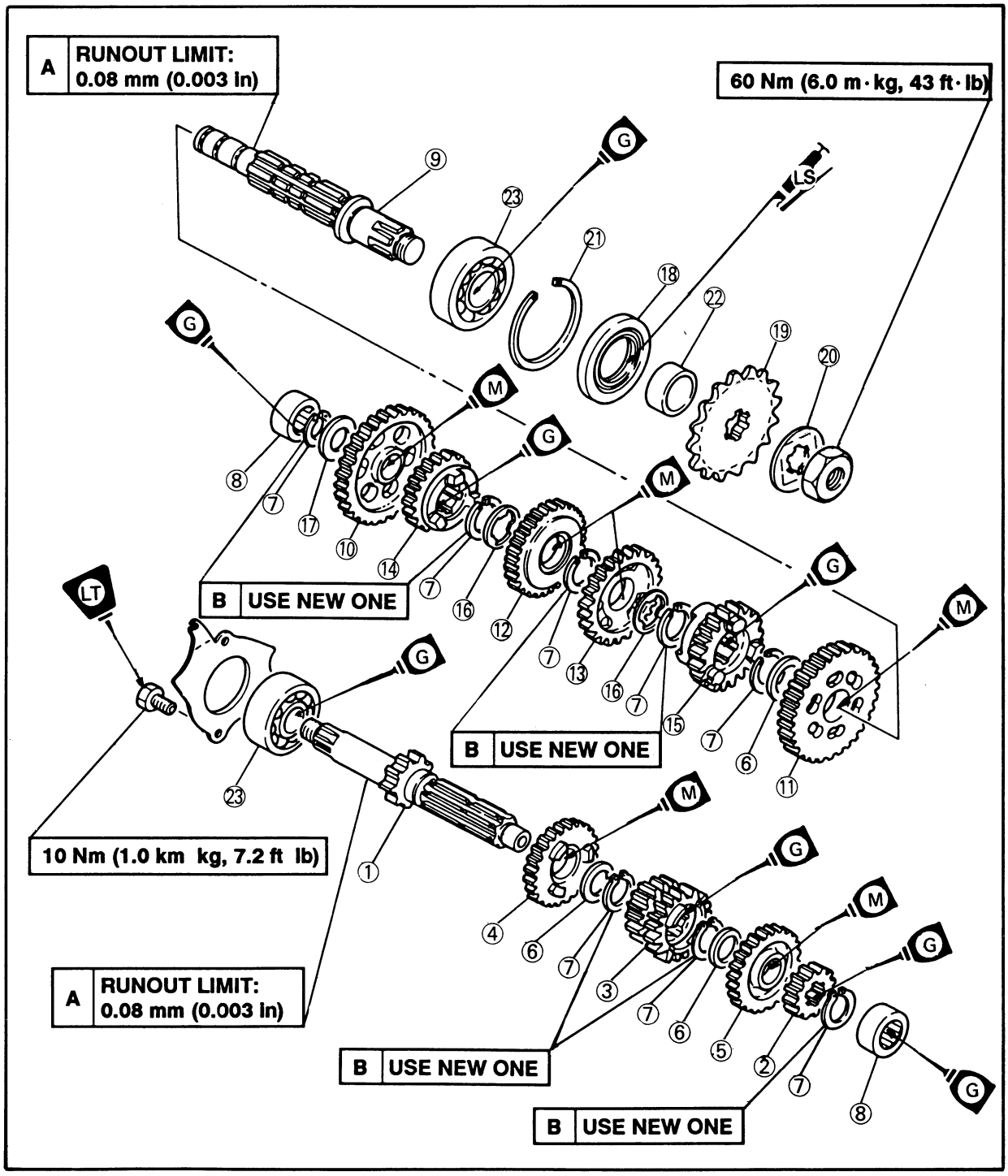
C	**CRANKSHAFT:**
	A: 55.85 ~ 55.95 mm (2.199 ~ 2.203 in) **B: 0.03 mm (0.0012 in)** **C: 0.15 ~ 0.70 mm (0.006 ~ 0.028 in)** **<Limit> 1.0 mm (0.04 in)** **D: 1.0 ~ 1.5 mm (0.039 ~ 0.059 in)**





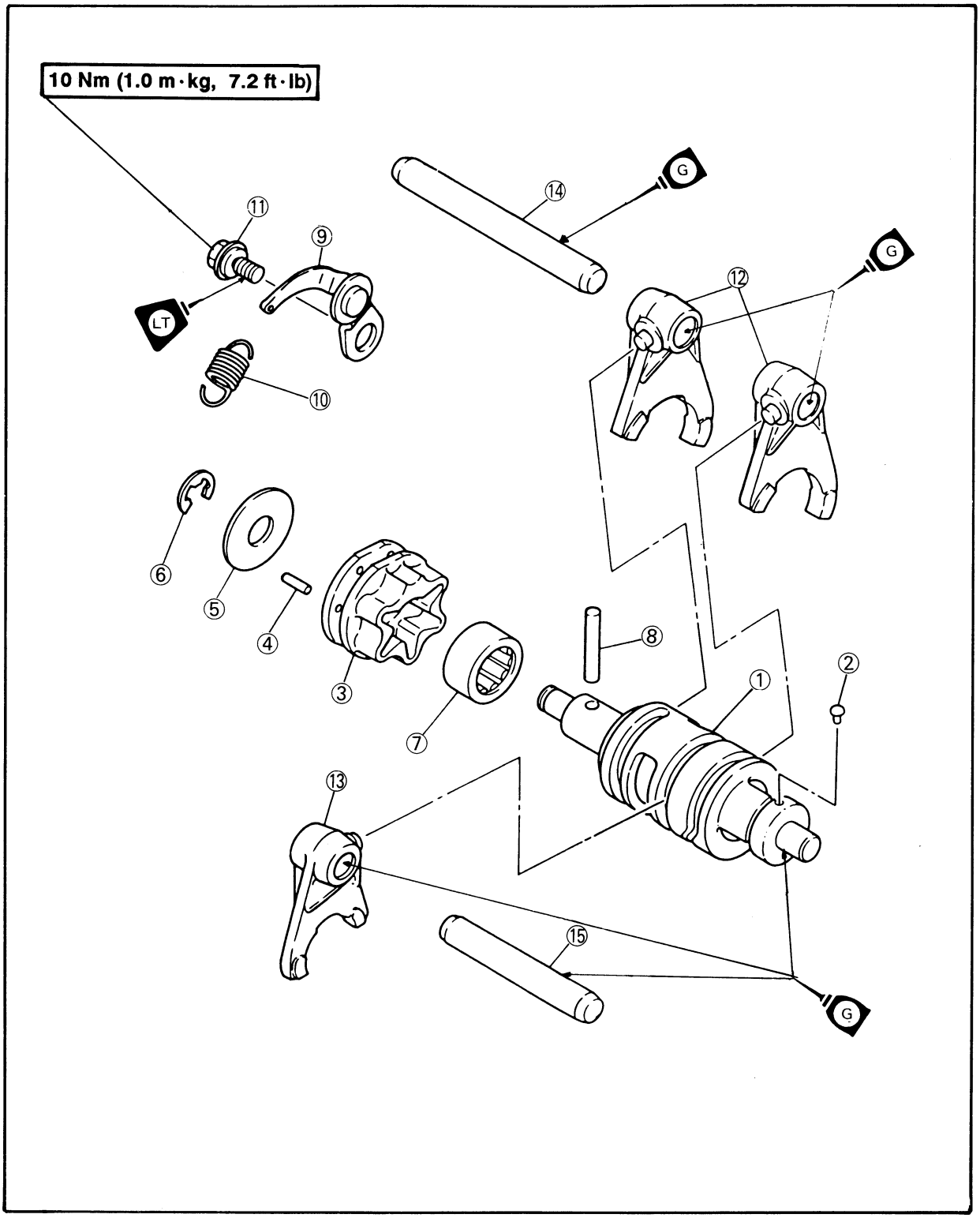
TRANSMISSION

① Main axle
② 2nd pinion gear
③ 3rd/4th pinion gear
④ 5th pinion gear
⑤ 6th pinion gear
⑥ Plain washer
⑦ Circlip
⑧ Cylindrical bearing
⑨ Drive axle
⑩ 1st wheel gear
⑪ 2nd wheel gear
⑫ 3rd wheel gear
⑬ 4th wheel gear
⑭ 5th wheel gear
⑮ 6th wheel gear
⑯ Special washer
⑰ Shim
⑱ Oil seal
⑲ Drive sprocket
⑳ Lock washer
㉑ Circlip
㉒ Collar
㉓ Bearing



SHIFTER

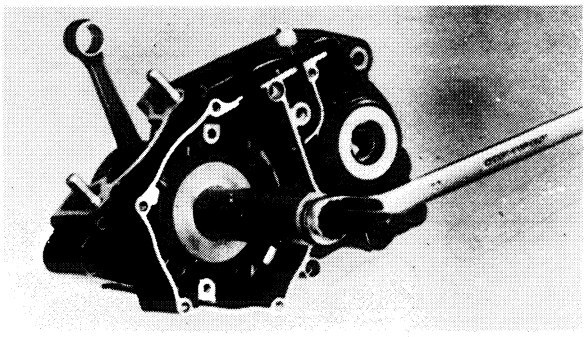
① Shift cam
② Neutral point
③ Segment
④ Dowel pin
⑤ Side plate
⑥ Circlip
⑦ Cylindrical bearing
⑧ Dowel pin
⑨ Stopper lever
⑩ Return spring
⑪ Securing bolt
⑫ Shift fork #1
⑬ Shift fork #2
⑭ Guide bar #2
⑮ Guide bar #1



CRANKSHAFT

CAUTION:

To protect the crankshaft against scratches or to facilitate the operation of the installation, apply the grease to the oil seal lips, and apply the engine oil to each bearing.



1. Install:
   - Crankshaft (into left case half)

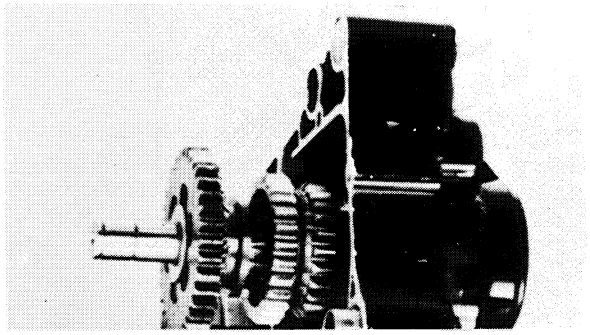
NOTE:

- Attach the Crankshaft Installing Tool to install the crankshaft.

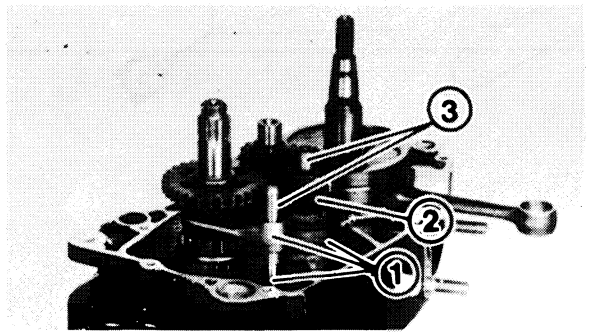
Crankshaft installing tool:
P/N. YU-90050
P/N. YU-90063

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

TRANSMISSION AND SHIFTER



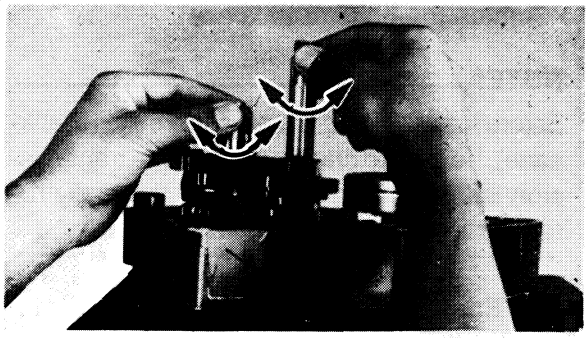
1. Install:
   - Transmission assembly (into left case half)



2. Install:
   - Shift forks ①
   - Shift cam ②
   - Guide bars ③

NOTE:

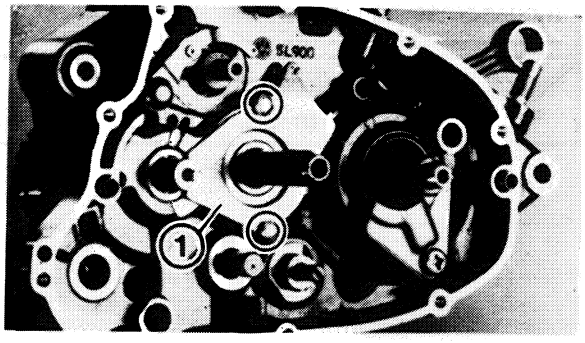
Each shift fork is identified by a number cast on its side. All the numbers should face the left side.



3. Lubricate:
   • Transmission component parts

	Yamalube "4", SAE10W30 type SE motor oil or "GL" Gear Oil

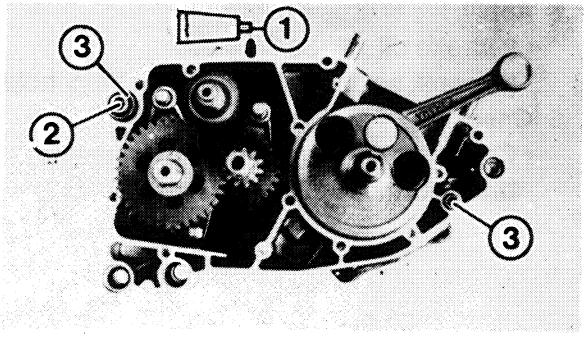
4. Check:
   • Shifter operation
   Unsmooth operation → Repair.



CRANKCASE (RIGHT)

1. Install:
   • Bearing retainer ①

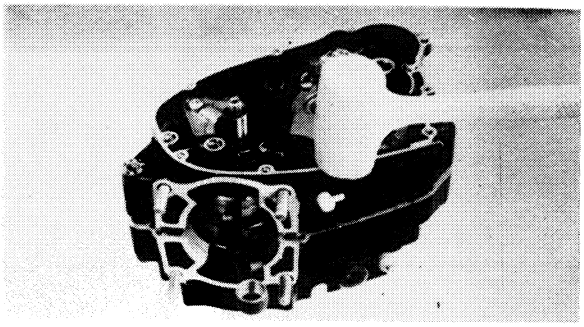
	Screw (bearing retainer): 10 Nm (1.0 m·kg, 7.2 ft·lb) USE LOCTITE ®



2. Apply:
   • Yamaha Bond No. 4 ①
   (to mating surface of both crankcase halves)

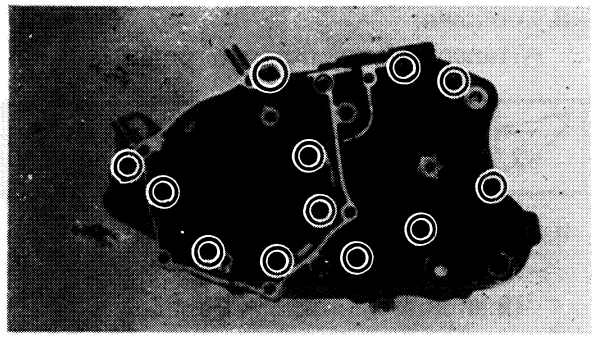
	Yamaha Bond No. 4 ACC-11001-30-00

3. Install:
   • Damper collar ②
   • Dowel pins ③



4. Install:
   • Crankcase (Right)

Installation step:
- Apply the lithium soap base grease to the oil seal lips.
- Fit the right crankcase onto the left case.
- Tap lighty on the case with a soft hammer.



• Tighten the bolts (crankcase).

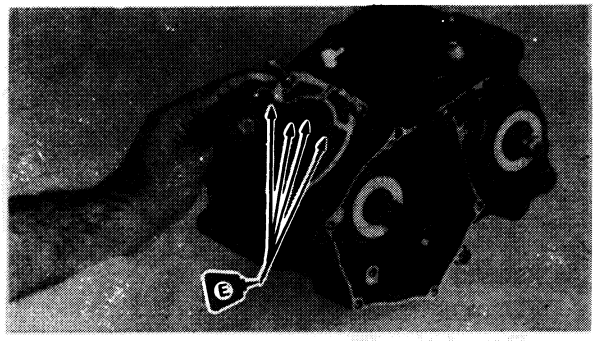
NOTE:

Before installing and torquing the bolts (Crankcase), be sure to check whether the transmission is functioning properly by manually rotating the shift cam either way.

NOTE:

Tighten the bolts (crankcase) in stage, using a crisscross pattern.

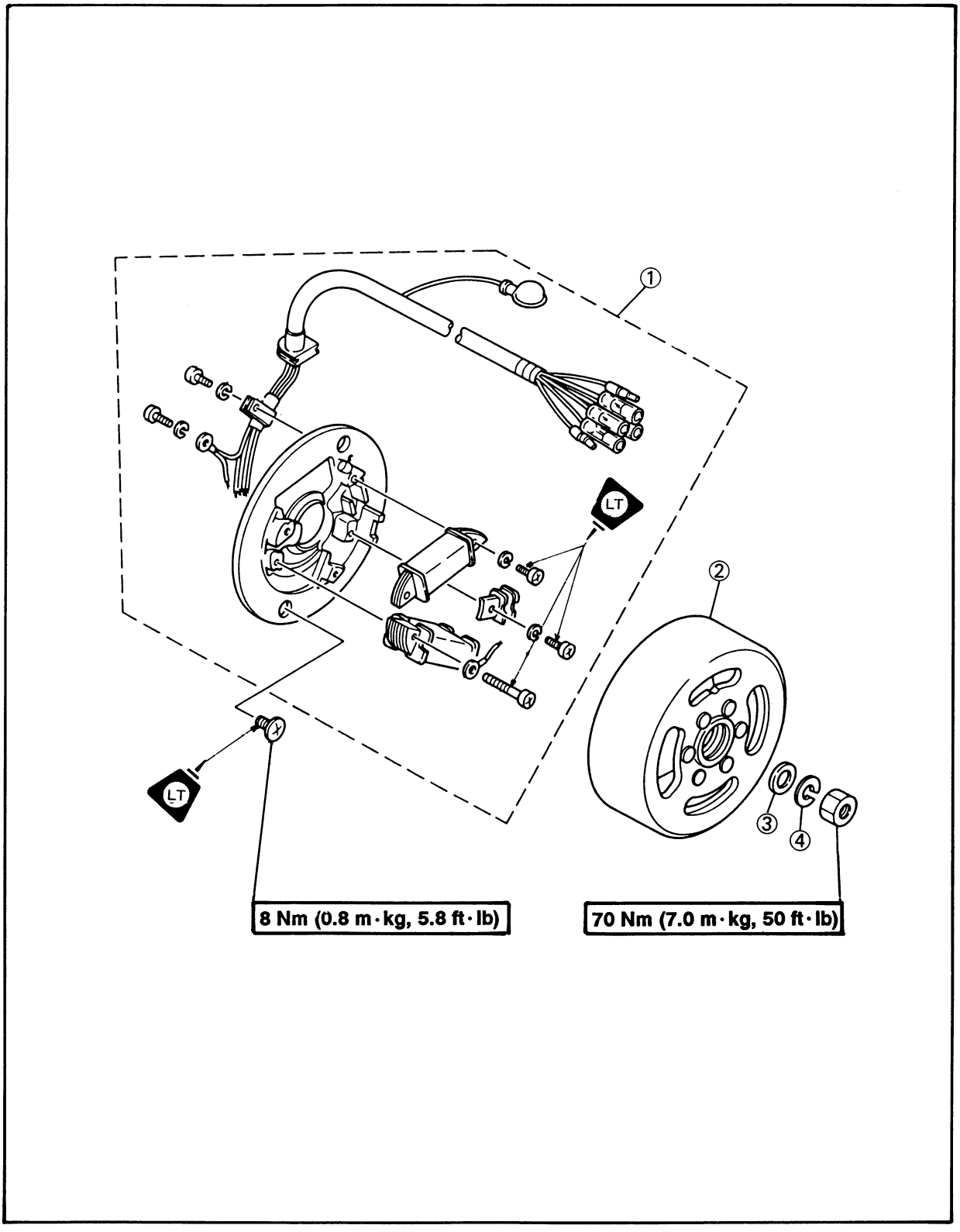
Bolts (crankcase):
8 Nm (0.8 m·kg, 5.8 ft·lb)

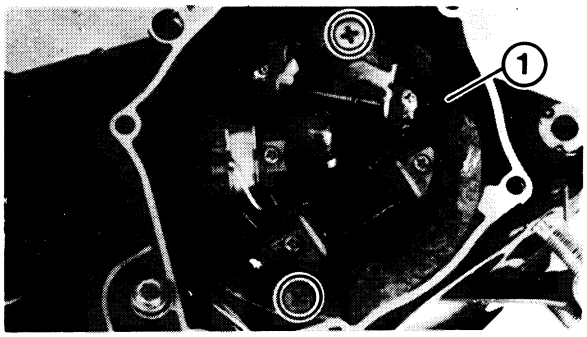


5. Apply:
   • 2-stroke oil
   (to crank pin, bearing and oil delivery hole)
6. Check:
   • Crankshaft and transmission operation
   Unsmooth operation → Repair.

MAGNETO ROTOR

① Stator assembly
② Rotor
③ Plate washer
④ Spring washer

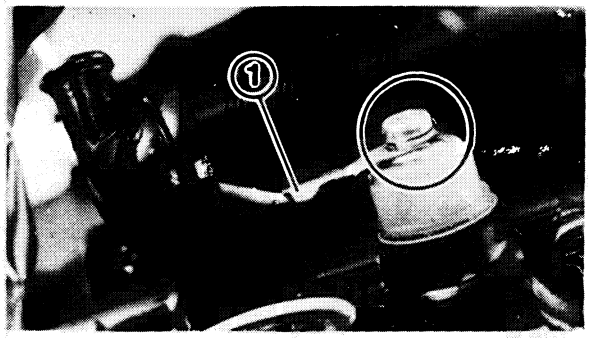




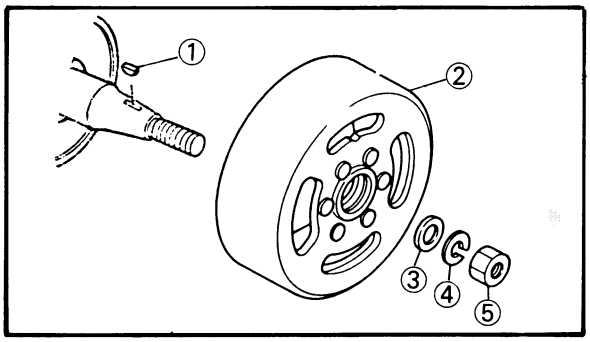
MAGNETO ROTOR

1. Install:
   - Stator ①

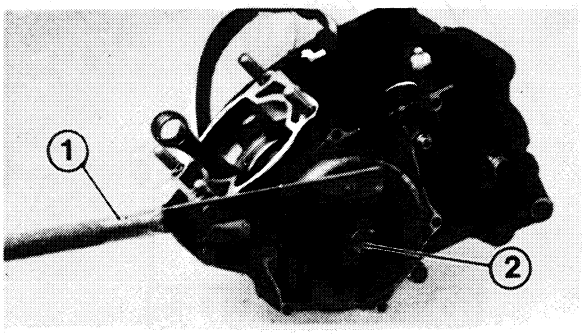
	Screw (stator): **8 Nm (0.8 m·kg, 5.8 ft·lb)** **Use LOCTITE ®**



2. Connect:
   - Neutral switch lead ①



3. Install:
   - Woodruff key ①
   - Rotor ②
   - Plain washer ③
   - Spring washer ④
   - Nut (rotor) ⑤



NOTE:

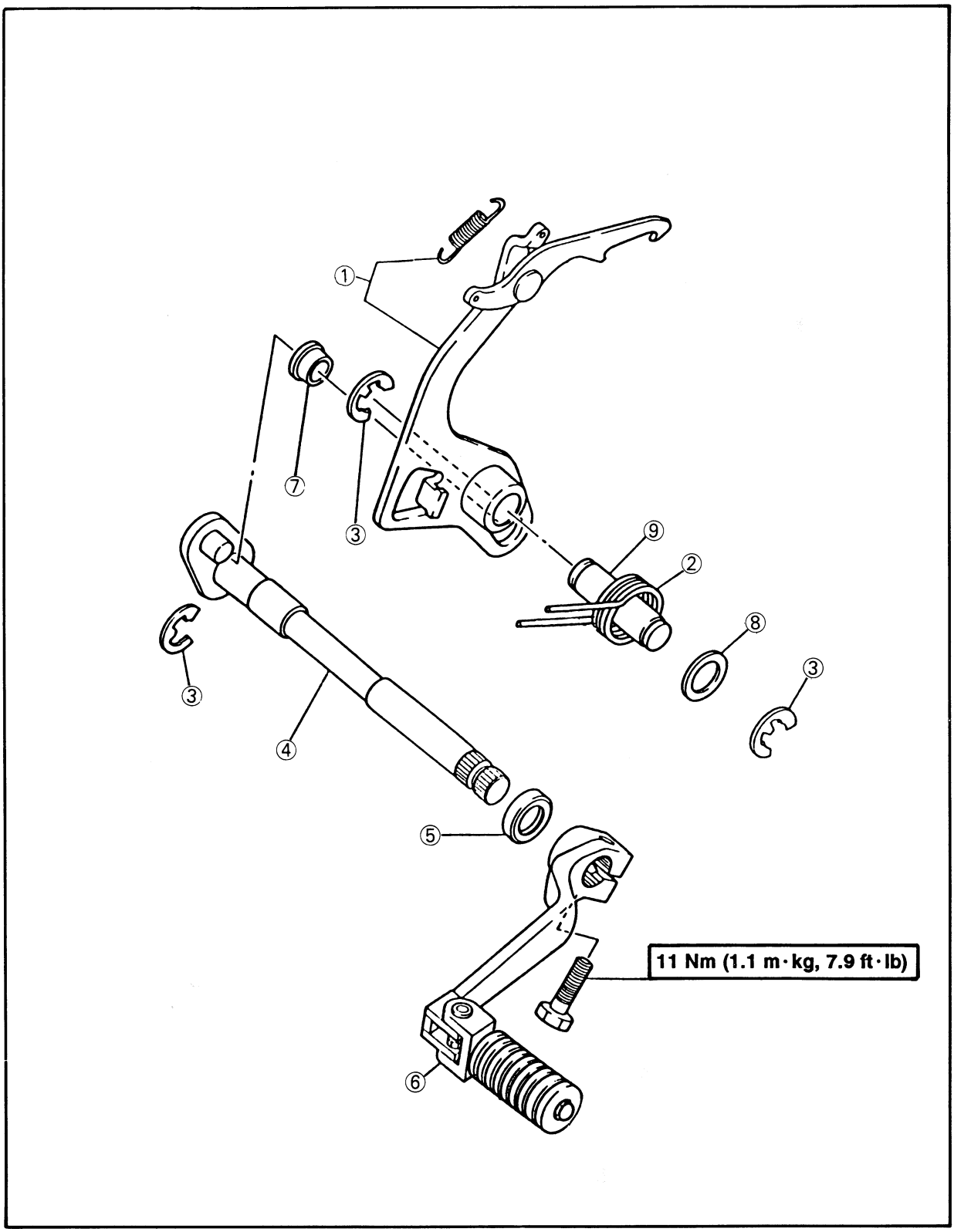
- Clean the tapered portions of the crankshaft and rotor.
- When installing the rotor, make sure the key is properly seated in the key way of the crankshaft.
- Hold the rotor by the Rotor Holder ① to tighten the nut ②.

	Universal rotor holder: **P/N. YU-01235**

	Nut (rotor) **70 Nm (7.0 m·kg, 50 ft·lb)**

SHIFT SHAFT

① Shift lever
② Spring
③ Circlip
④ Shift shaft
⑤ Oil seal
⑥ Change pedal
⑦ Shift lever roller
⑧ Plate washer
⑨ Shaft

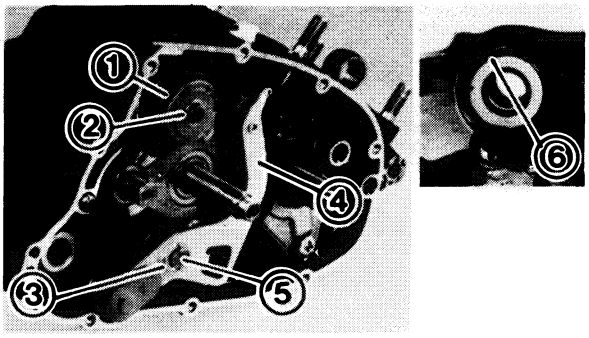


SEGMENT, STOPPER LEVER AND SHIFT SHAFT

1. Install:
   - Segment

NOTE:

Align the index mask on the segment ① with the index mark on the shift cam ②.



2. Install:
   - Return spring ①
   - Stopper lever ②

	Bolt (stopper lever): 10 Nm (1.0 m·kg, 7.2 ft·lb)

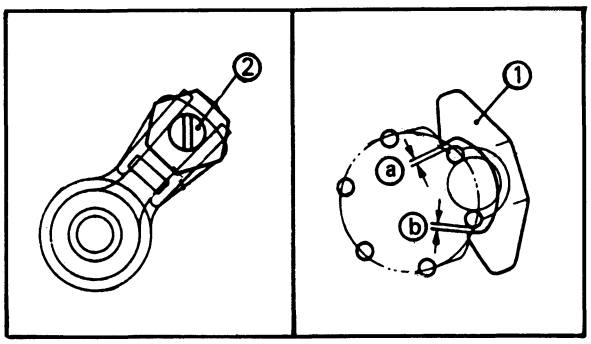
NOTE:

Mesh the stopper lever with the shift cam.

3. Install:
   - Shift shaft ③
   - Shift lever ④
   - Circlip ⑤

NOTE:

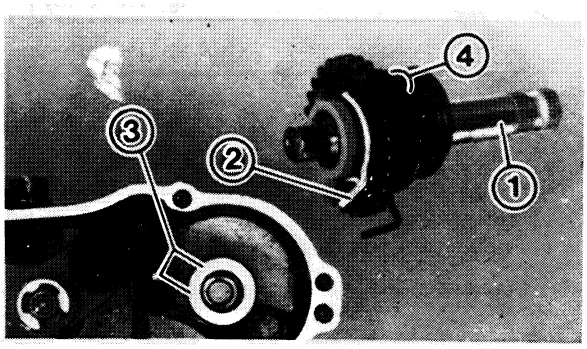
Apply the grease to the oil seal lip ⑥.



4. Check:
   - Shift pawl ① position
     Check the clearance ⓐ and ⓑ, if they are not equal → Adjust with adjusting screw ② so that clearances are equal.

2 Shift cam

KICK AXLE AND KICK IDLE GEAR



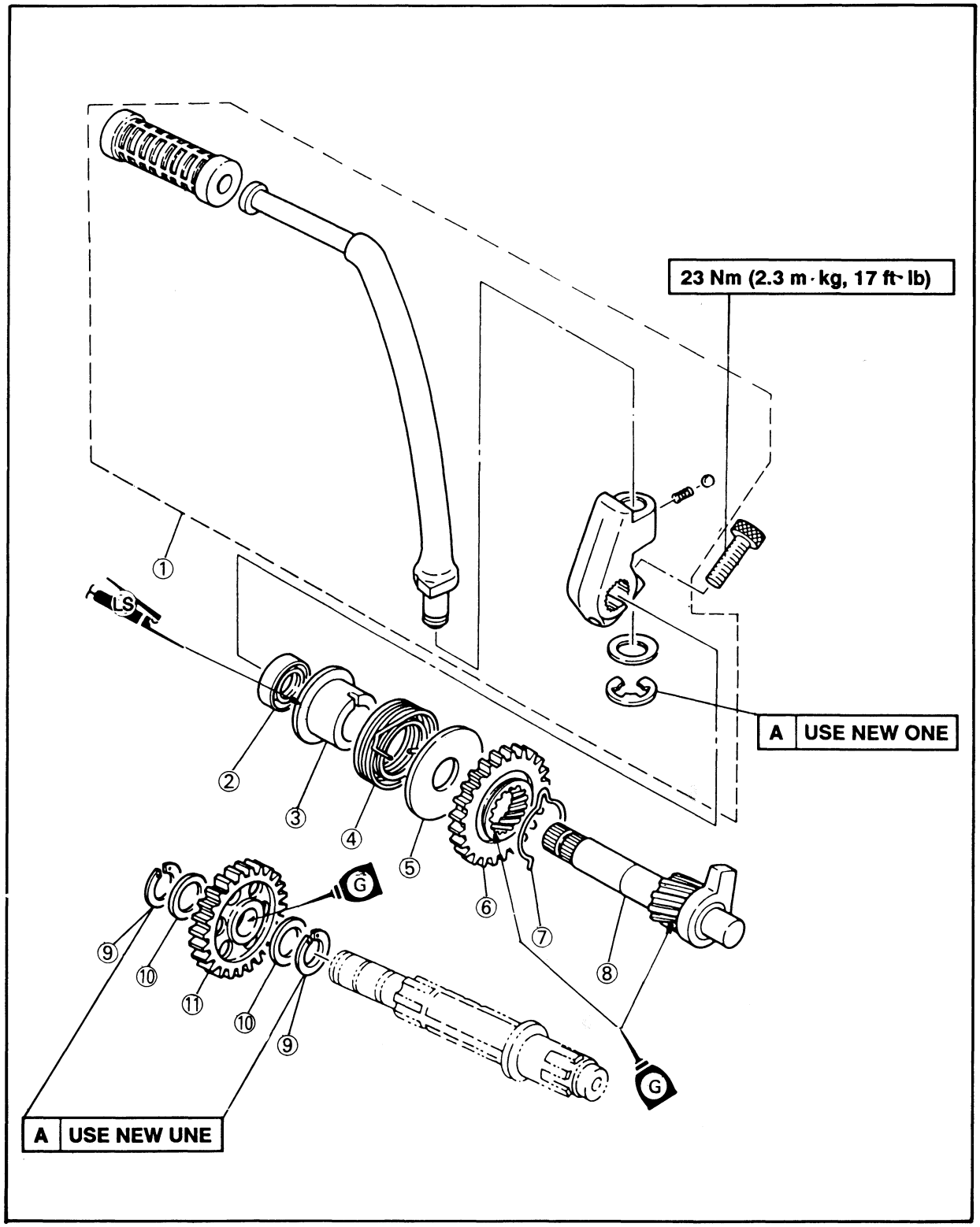
1. Install:
   - Kick axle assembly ①

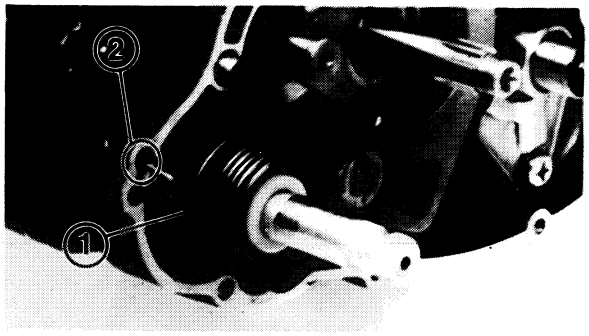
NOTE:

- Make sure tha the kick stopper ② is stopped at the projection ③ of the crankcase.
- Make sure the kick clip ④ is engaged with the crankcase hole ⑤.

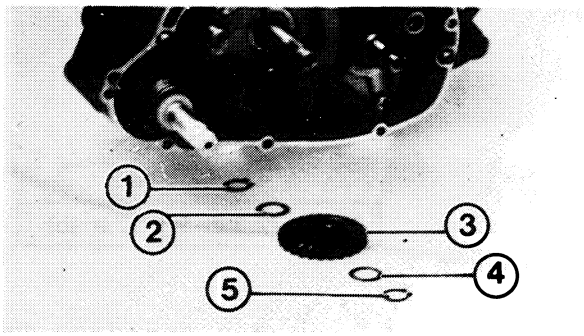
KICK AXLE

① Kick crank
② Oil seal
③ Spring guide
④ Kick spring
⑤ Washer
⑥ Kick gear
⑦ Clip
⑧ Kick axle
⑨ Circlip
⑩ Washer
⑪ Kick idle gear



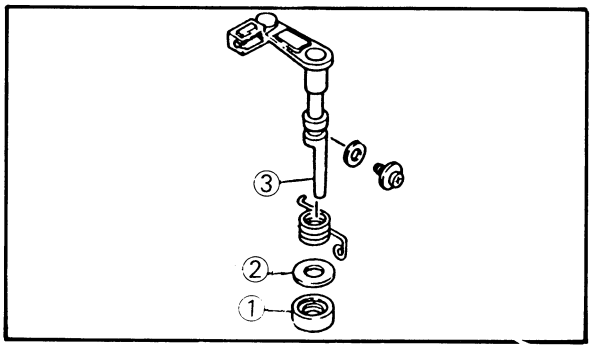


2. Set the kick spring ① to the spring hook ②.



3. Install:
   - Circlip ①
   - Washer ②
   - Kick idle gear ③
   - Washer ④
   - Circlip ⑤

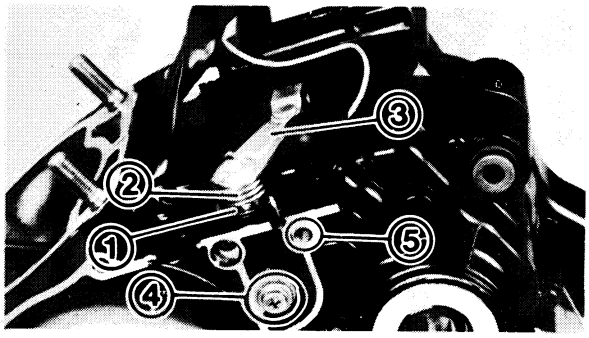
4. Check:
   - Kick axle operation
     Use the kick crank.
     Unsmooth operation→ Repair.



CLUTCH PUSH LEVER

1. Lubricate:
   - Oil seal (Lip) ①
   - Washer ②
   - Push lever axle ③

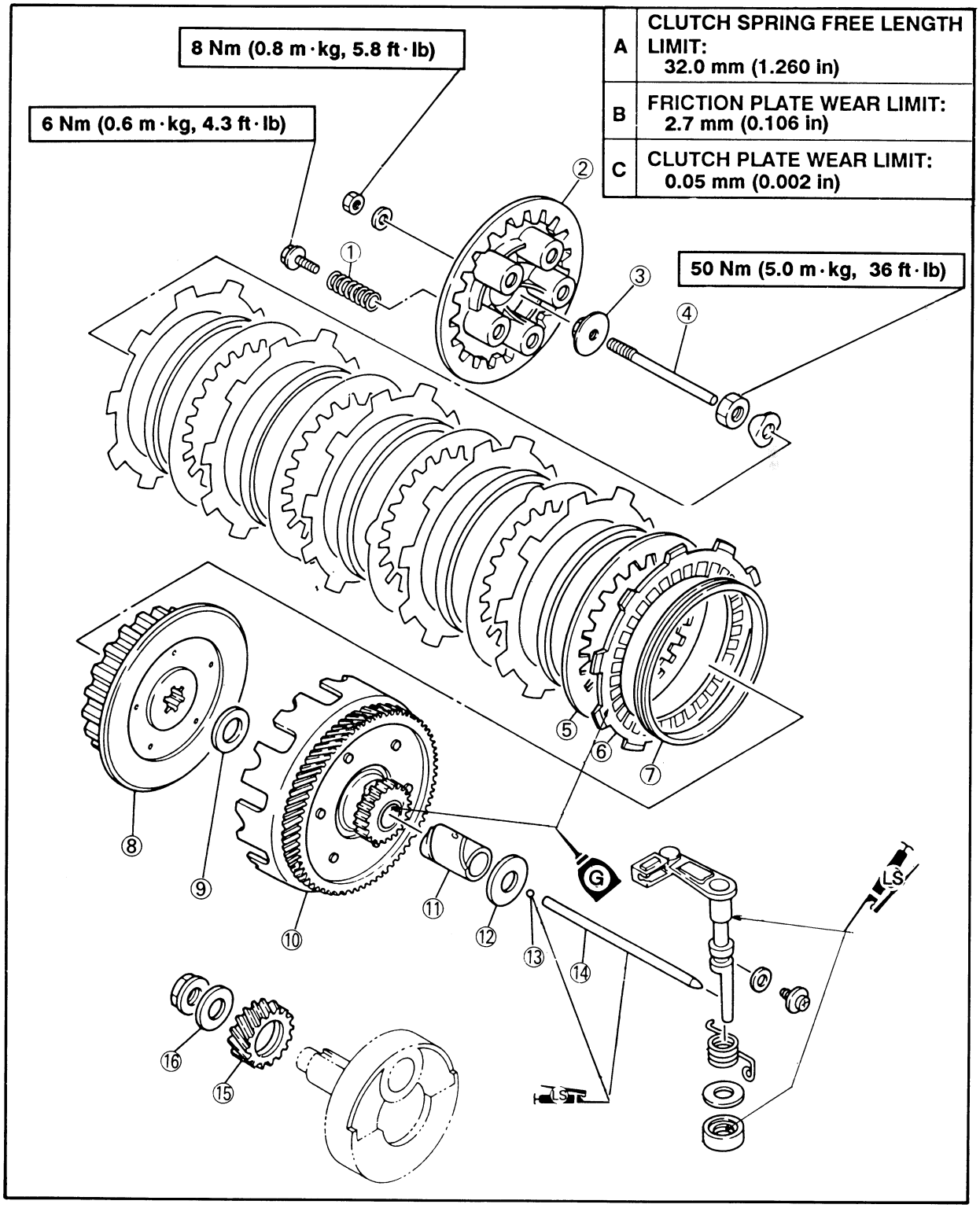
	Lithium soap base grease

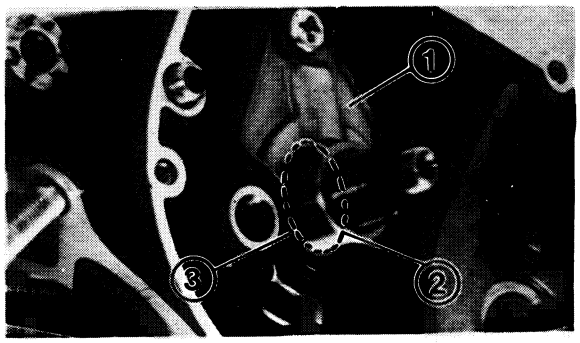


2. Install:
   - Washer ①
   - Return spring ②
   - Push lever ③
3. Set the return spring ② to the spring hook ⑤.
   - Screw ④

CLUTCH AND PRIMARY DRIVE GEAR

① Clutch spring
② Pressure plate
③ Push plate
④ Push rod #1
⑤ Clutch plate
⑥ Friction plate
⑦ Clutch damper
⑧ Clutch boss
⑨ Plain washer
⑩ Clutch housing
⑪ Collar
⑫ Washer plain
⑬ Ball
⑭ Push rod #2
⑮ Push lever axle
⑯ Return spring
⑰ Oil seal
⑱ Primary drive gear





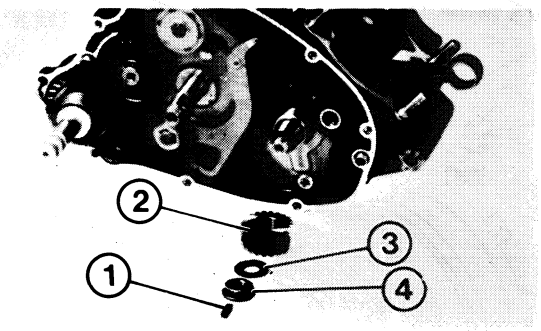
PRIMARY DRIVE GEAR AND CLUTCH

1. Install:
   - Oil seal retainer ①
   - Spacer collar ②

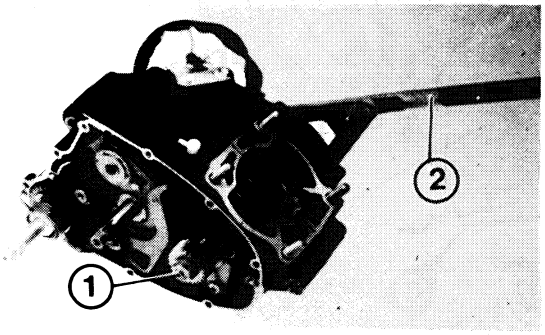
	Oil seal retainer: **10 Nm (1.0 m·kg 7.2 ft·lb)**

NOTE:

Before installing the spacer collar②, grease the oil seal lip ③.



2. Install:
   - Straight key ①
   - Primary drive gear ②
   - Conical spring washer ③
   - Nut (primary drive gear) ④



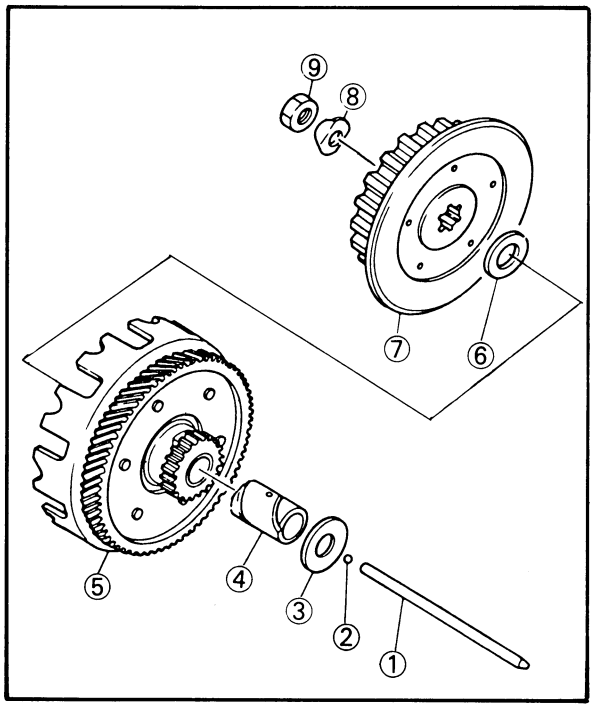
3. Tighten:
   - Nut (Primary drive gear) ①

	Nut (Primary drive gear): **60 Nm (6.0 m·kg, 43.4 ft·lb)**

NOTE:

Hold the rotor to tighten the nut (primary drive gear) ①by the Universal Rotor Holder ②.

	Universal rotor holder: **P/N. YU-01235**



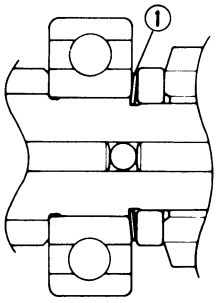
5. Lubricate:
   - Push rod # 2 ①
   - Ball ②

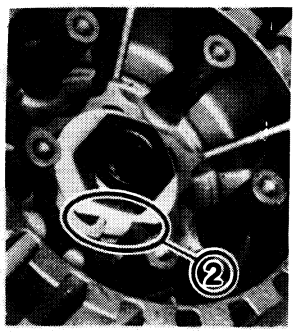
	Lithium soap base grease

6. Install:
   - Push rod # 2 ①
   - Ball ②
   - Thrust plate ③
   - Collar ④
   - Clutch housing ⑤
   - Thrust washer ⑥
   - Clutch boss ⑦
   - Lock washer ⑧
   - Nut (Clutch boss) ⑨

⚠ WARNING

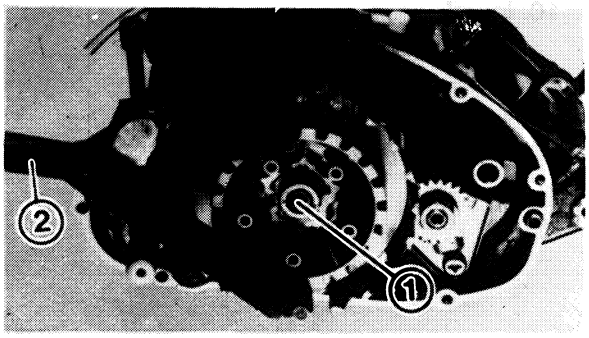
Always use a new lock washer.





NOTE:

Install the lock washer ① in proper position



7. Tighten:
   - Nut (Clutch boss) ①

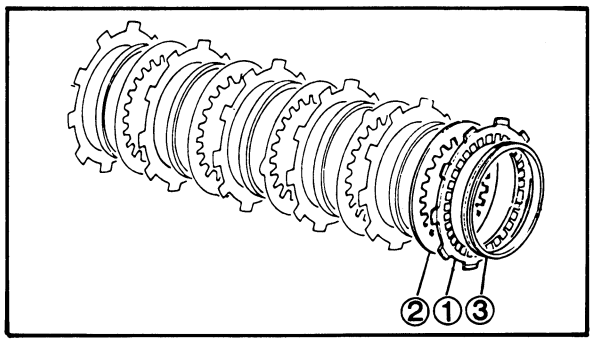
	Nut (Clutch boss): **50 Nm (5.0 m·kg, 36 ft·lb)**

NOTE:

Hold the clutch boss to tighten the nut ① (clutch boss) by the Universal Clutch Holder ②.

	Universal clutch holder: **P/N. YM-91042**

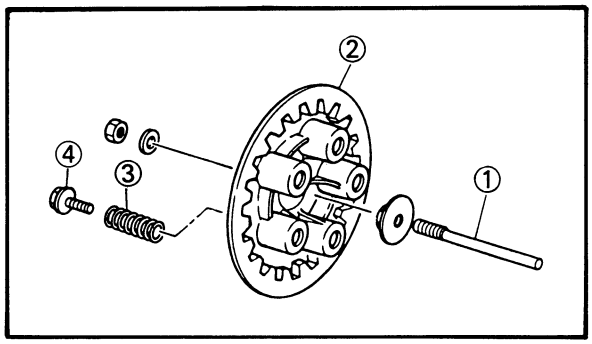
8. Bend the lock washer tab along the nut flats.



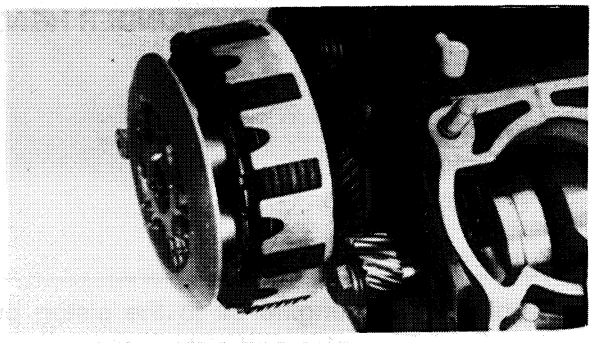
9. Install:
   - Friction plates ①
   - Clutch plates ②
   - Clutch damper ③

Installation steps:
- Install the friction plate onto the clutch boss.
- Install the clutch plate so as to locate the projection ④ at # 1.
- Install the friction plate with the larger inside diameter onto the clutch boss.
- Install the clutch damper onto the clutch plate.
- Next install the remaining clutch plates and friction plates alternately on the clutch boss.
- Be sure to install a clutch plate with projection offset approximately 60 from previous plate projection.
- Continue this procedure in a clockwise direction until all clutch plates are installed.

NOTE:
Before installing a friction and clutch plates apply sufficient coating of transmission oil to each plate.



10. Install:
    - Push rod # 1 ①
    - Pressure plate ②
    - Clutch springs ③
    - Bolts (Pressure plate) ④

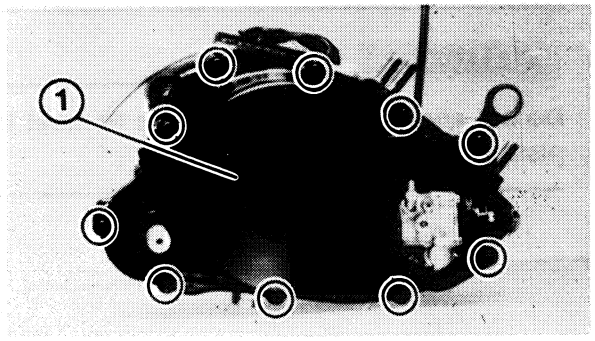


11. Tighten:
    • Bolts (Pressure plate)

	Bolt (Pressure plate): **6 Nm (0.6 m· kg, 4.3 ft ·lb)**

NOTE:
Tighten the bolts (Pressure plate) in stage, using a crisscross pattern.

12. Adjust:
    • Clutch mechanism free play
    Refer to the "CLUTCH MECHANISM ADUSTMENT" section in the CHAPTER 3 .

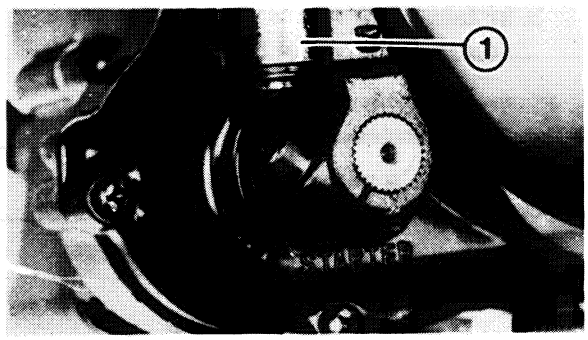


13. Install:
    • Gasket (Crankcase cover)
    • Dowel pins
    • Crankcase cover (Right) ①
    • Drain plug (Transmission oil) ②

NOTE:
Tighten the screws (Crankcase cover) in stage, using a crisscross pattern.

⚠ WARNING
Always use a new gasket.

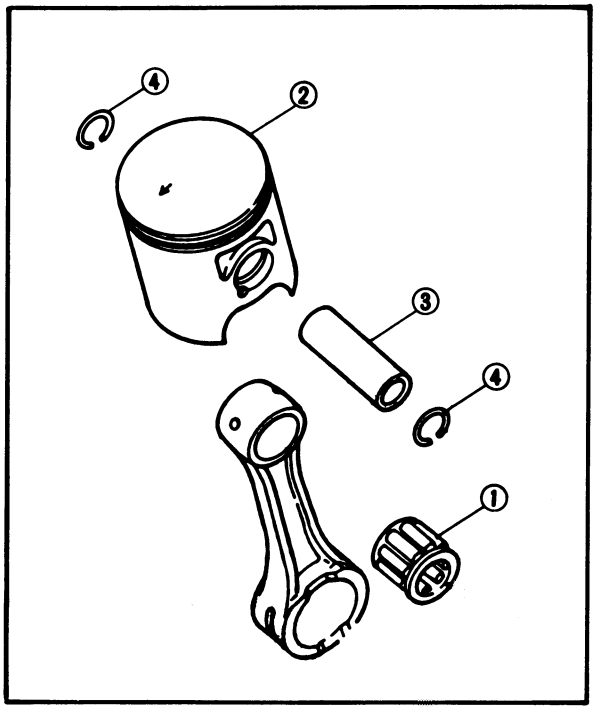
	Screw (Crankcase cover): **10 Nm (1.0 m· kg, 7.2 ft ·lb)** **Drain plug (Transmission oil):** **20 Nm (2.0 m· kg, 14 ft ·lb)**



14. Install:
    • Kick crank ①

CAUTION:
Be sure to install the kick crank in such a way that it does not make contact with the crank case cover.

	Bolt (Kick crank): **23 Nm (2.3 m·kg, 17 ft·lb)**



PISTON, CYLINDER AND CYLINDER HEAD

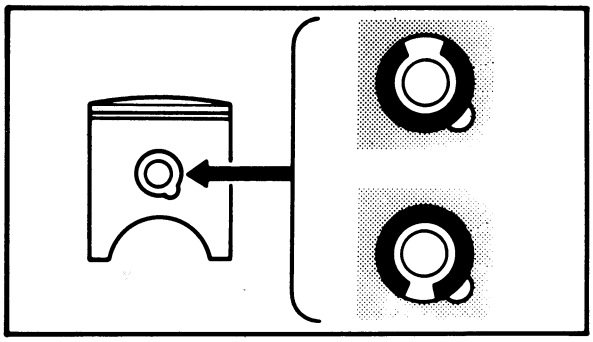
1. Install:
   - Bearing ①
   - Piston ②
   - Piston pin ③
   - Piston pin clips ④

NOTE:

- Apply 2-stroke engine oil to the piston pin, bearing, piston pins and piston skirt areas.
- The arrow on the piston must point to the front of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean towel or rag so you will not accidentally drop the pin clip and material into the crankcase.

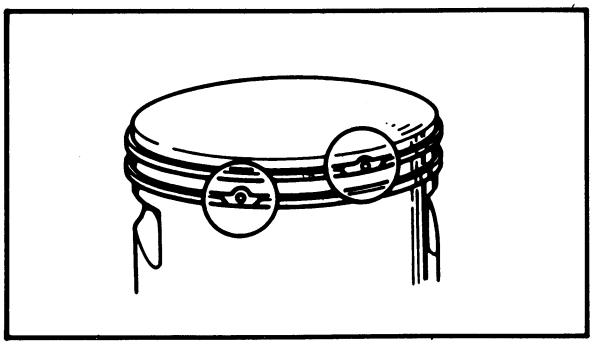
⚠ WARNING

Always use a new piston pin clip.



CAUTION:

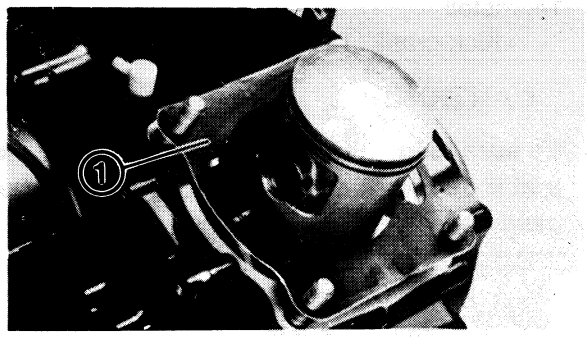
Do not allow the clip open ends to meet the piston pin slot.



2. Check:
   - Piston ring position

CAUTION:

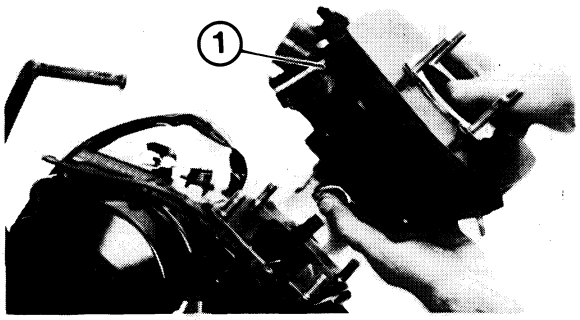
- **Make sure ring ends are properly fitted around ring locating pins in piston grooves.**
- **Be sure to check the manufacture's marks or numbers stamped on the rings are on the top side of the rings.**



3. Install:
   - Gasket (Cylinder) ①

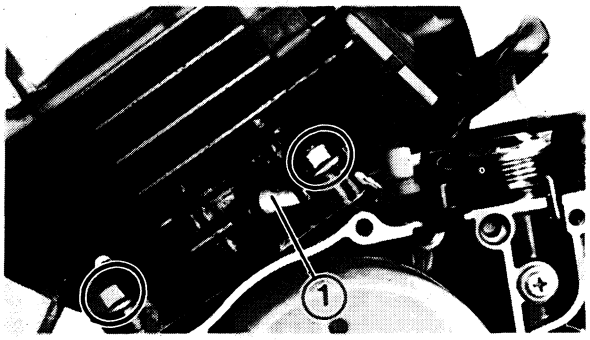
⚠ WARNING

Always use a new gasket.



4. Install:
   - Cylinder ①
   - Clutch cable guide

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



5. Tighten:
   - Nuts (Cylinder)

	Nut (Cylinder): **35 Nm (3.5 m·kg, 25 ft·lb)**

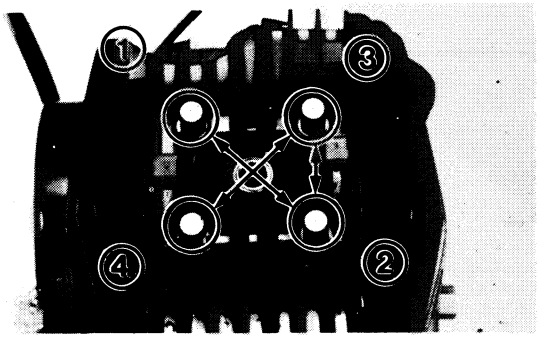
NOTE:
Tighten the nuts in stage, using a crisscross pattern.

① Clutch cable guide

6. Install:
   - Gasket (Cylinder head)
   - Cylinder head

⚠ WARNING

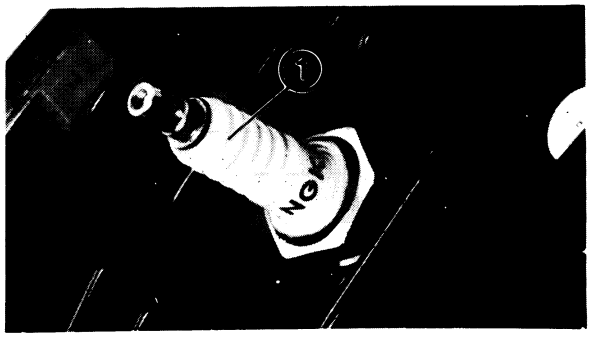
Always use a new gasket.



7. Tighten:
   - Nuts (Cylinder head)

	Nut (Cylinder head): **25 Nm (2.5 m·kg, 18 ft·lb)**

NOTE:
Tighten the nuts in stage, using a crisscross pattern.

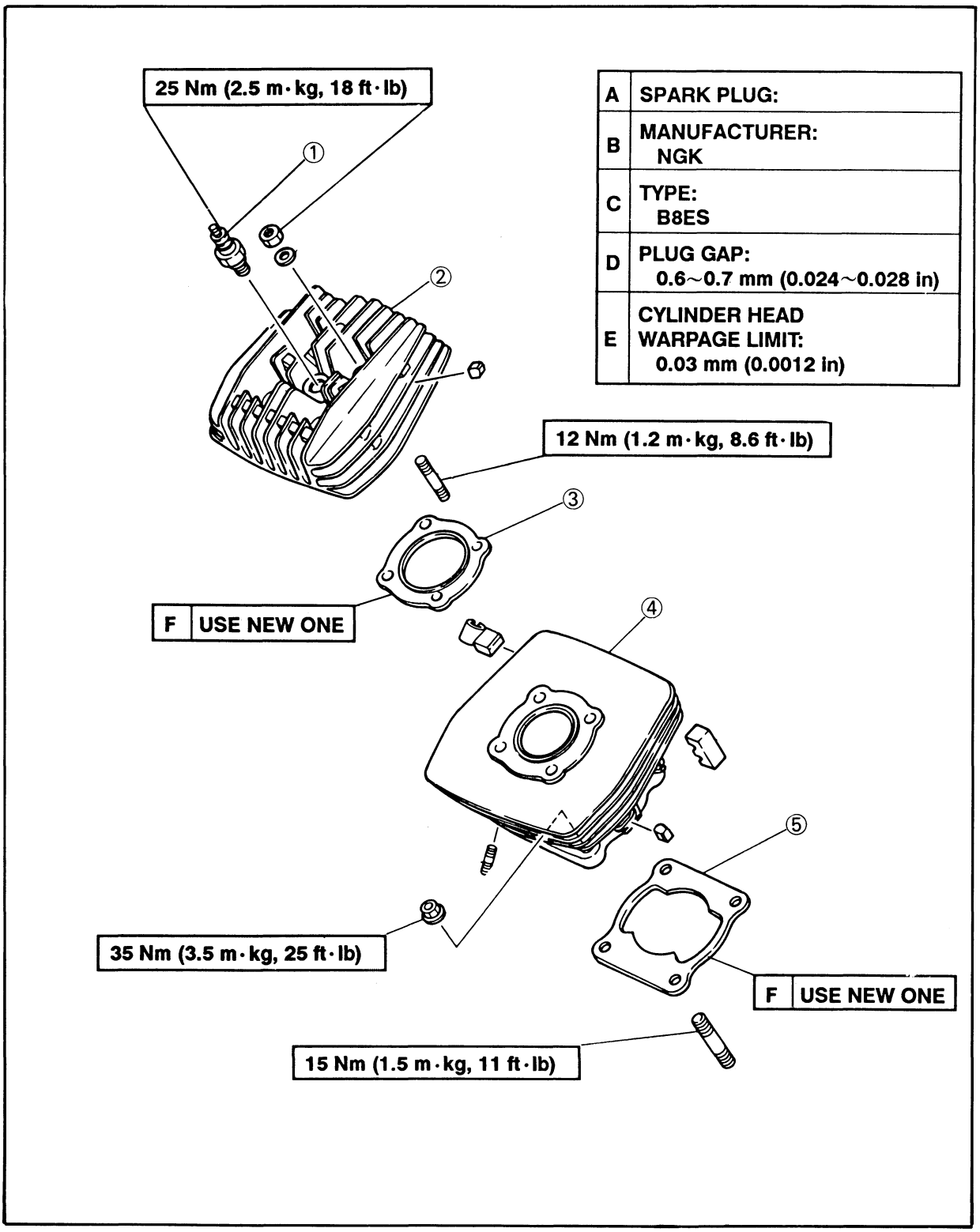


8. Install:
   • Spark plug (1)

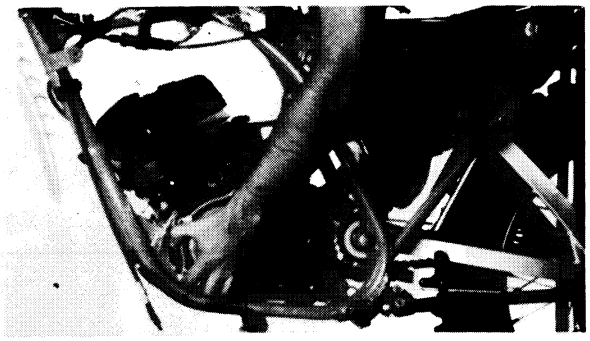
	Spark Plug: **25 Nm (2.5 m·kg, 18 ft·lb)**

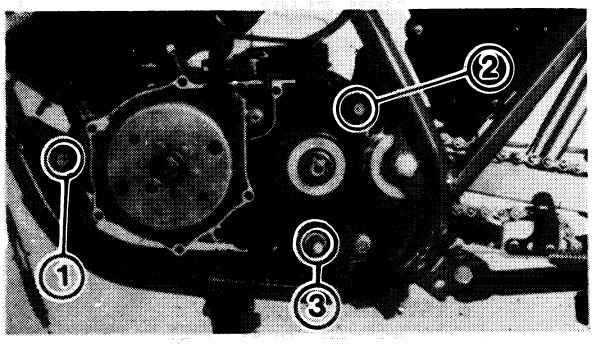
CYLINDER HEAD AND CYLINDER

① Spark plug
② Cylinder head
③ Cylinder head gasket
④ Cylinder
⑤ Cylinder gasket



A	SPARK PLUG:
B	MANUFACTURER: NGK
C	TYPE: B8ES
D	PLUG GAP: 0.6~0.7 mm (0.024~0.028 in)
E	CYLINDER HEAD WARPAGE LIMIT: 0.03 mm (0.0012 in)





REMOUNTING ENGINE

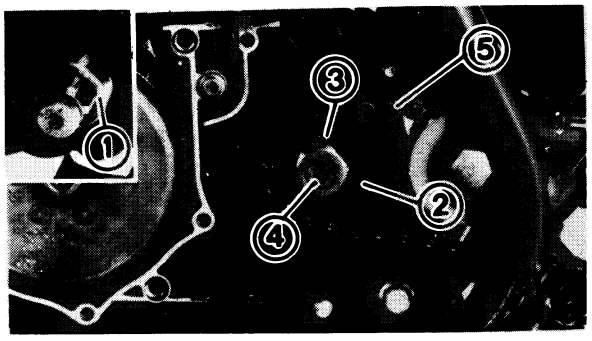
Reverse the "ENGINE REMOVAL" procedure.
Note the following points.

1. Install:
   - Engine assembly (to left side)
   - Mounting bolts

Mounting bolts:
Bolt ① (Front):
25 Nm (2.5 m·kg, 18 ft·lb).
Bolt ② (Rear upper):
25 Nm (2.5 m·kg, 18 ft·lb).
Bolt ③ (Rear lower):
39 Nm (3.9 m·kg, 28 ft·lb)

NOTE:

Temporary tighten the bolts before tightening them to specification.

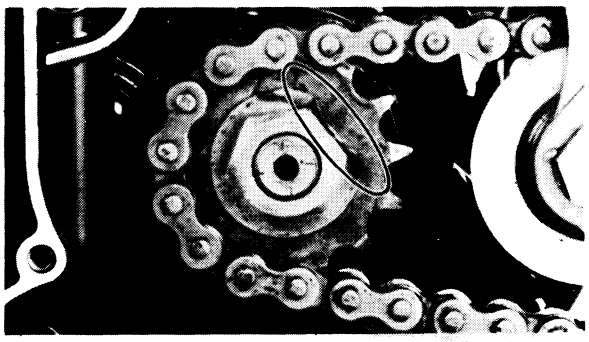


2. Install:
   - Spacer collar ①
   - Drive sprocket ②
   - Lock washer ③.
   - Nut (drive sprocket) ④
   - Drive chain ⑤

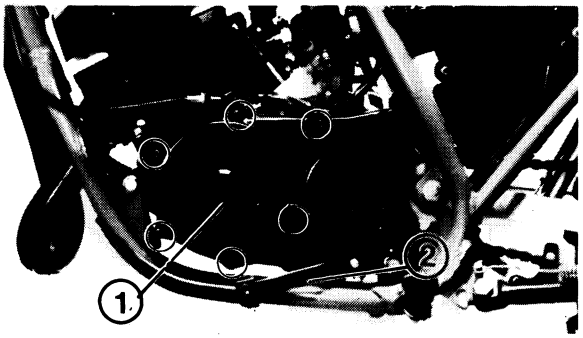
NOTE:

Before installing the spacer collar ①, grease the oil seal lip.

Nut (drive sprocket):
60 Nm (6.0 m·kg, 43 ft·lb)



3. Bend the lock washer tab along the nut flats.



4. Install:
   - Gasket (Crankcase cover)
   - Crankcase cover (Left) ①
   - Change pedal ②

NOTE:

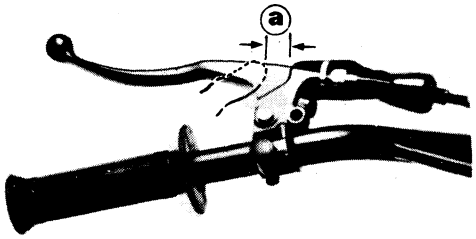
Tighten the screws (Crankcase cover) in stage, using a crisscross pattern.

	Screw (Crankcase cover): **10 Nm (1.0 m·kg, 7.2 ft·lb)** **Bolt (Change pedal):** **11 Nm (1.1 m·kg, 7.9 ft·lb)**

5. Adjust:
   - Drive chain slack

   Refer to the " DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

	Drive chain slack: **40 mm (1.57 in)**

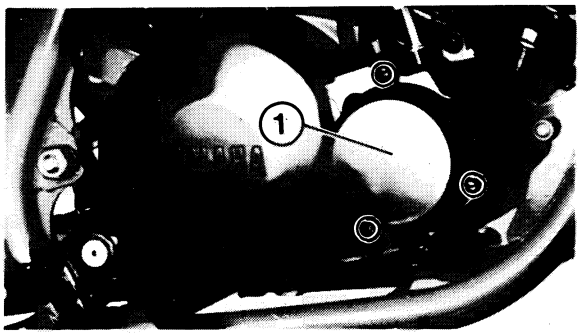


6. Adjust:
   - Clutch cable free play ⓐ

   Refer to the "CLUTCH ADJUSTMENT" section in the CHAPTER 3.

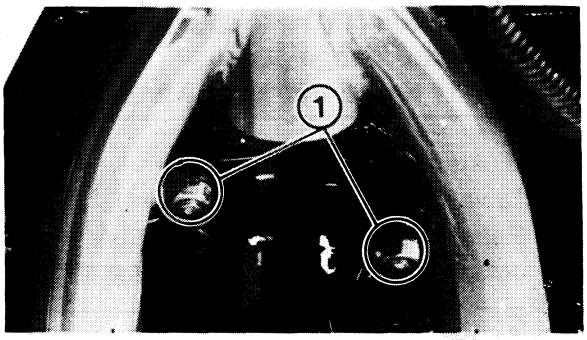
	Free play: **2 ~ 3 mm (0.08 ~ 0.12 in)**

7. Air bleeding:
   • Autolube pump
   Refer to the "AUTOLUBE PUMP AIR BLEEDING" section in the CHAPTER 3.



8. Install:
   • Autolube pump cover ①

	Bolt (autolube pump cover): 8 Nm (0.8 m· kg, 5.6 ft· lb)



9. Install:
   • Gasket (exhaust pipe)
   • Exhaust pipe

	Nut ① (Exhaust pipe): 11 Nm (1.1 m· kg, 7.9 ft· lb)

⚠ WARNING

Always use a new gasket.

10. Fill:
    • Crankcase
    Refer to the "TRANSMISSION OIL REPLACEMENT" section in the CHAPTER 3.

	Total amount: 0.6 L (0.53 Imp qt, 0.63 US qt)

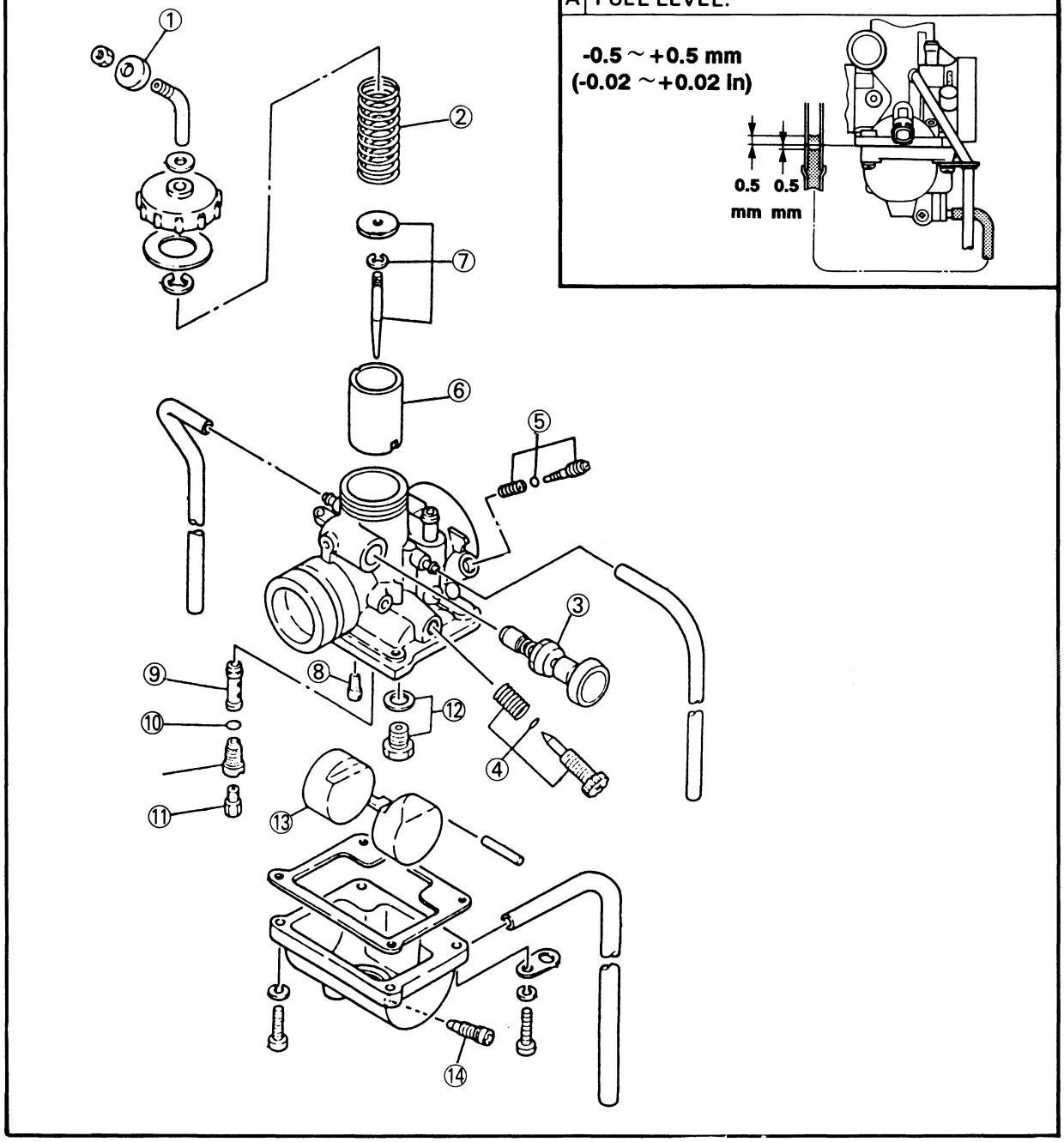
CARBURETION

CARBURETOR

① Cap
② Throttle valve spring
③ Starter plunger
④ Throttle stop screw
⑤ Pilot air screw
⑥ Throttle valve
⑦ Needle set
⑧ Pilot jet
⑨ Needle jet
⑩ O-Ring
⑪ Main jet
⑫ Needle valve set
⑬ Float
⑭ Drain bolt

SPECIFICATIONS

MAIN JET (M.J.)	#130
MAIN AIR JET (M.A.J.)	φ0.5
JET NEEDLE (J.N.)	5JP27-2
NEEDLE JET (N.J.)	Px2
PILOT JET (P.J.)	#27.5
PILOT AIR SCREW (P.A.S.)	1-1/2
FLOAT HEIGHT (F.H.)	20 ~ 22 mm
ENGINE IDLING SPEED	1,450 ~ 1,550 r/min



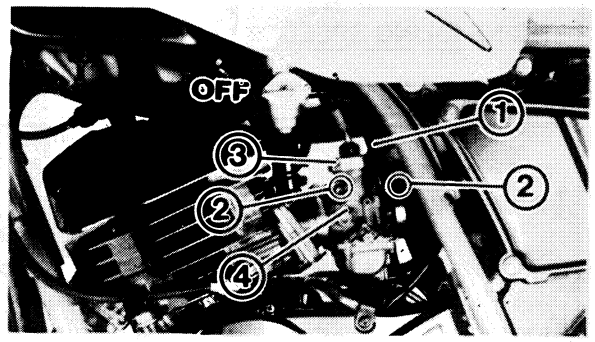
5

REMOVAL

NOTE:

The following parts can be cleaned and inspected without disassembly.

- Throttle valve
- Starter plunger
- Throttle stop screw

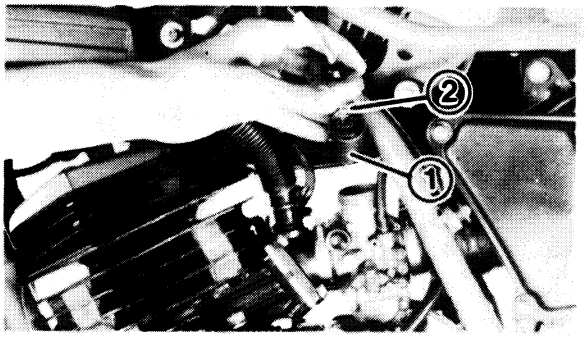


1. Turn the fuel cock to "OFF" position.
2. Disconnect:
   - Fuel hose ①

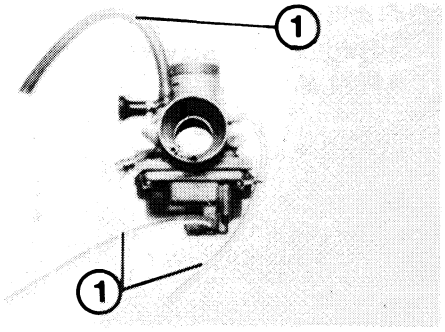
⚠ WARNING

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

3. Disconnect:
   - Oil delivery hose
4. Loosen:
   - Screws (Carburetor damp)②
5. Remove:
   - Carburetor top ③
   - Carburetor ④

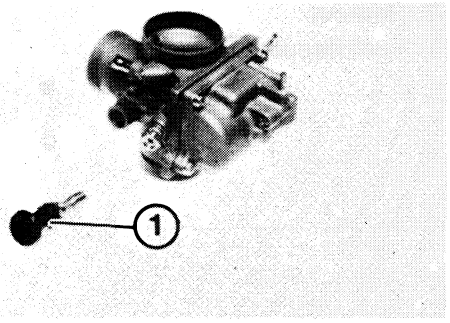


6. Remove:
   - Throttle valve ①
   - Return spring ②

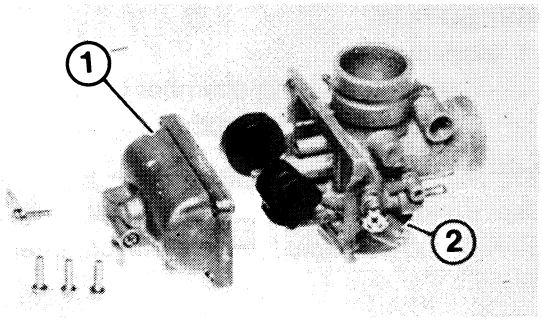


DISASSEMBLY

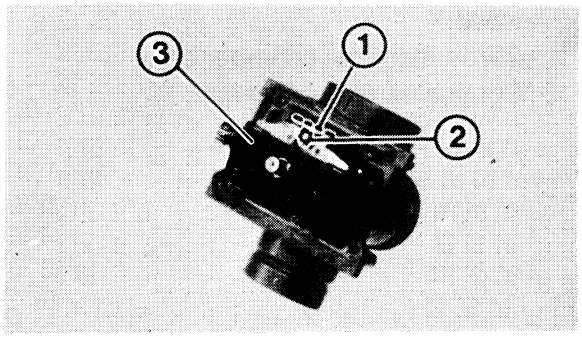
1. Remove:
   - Hoses ①



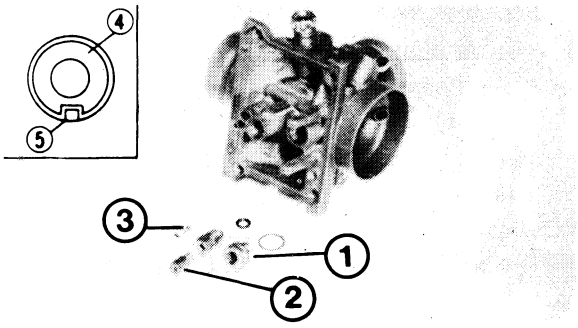
2. Remove:
   - Starter plunger assembly ①



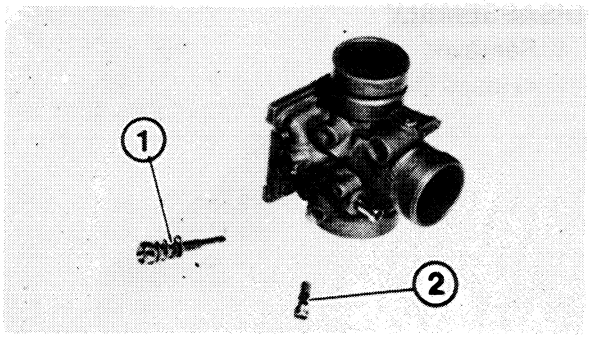
3. Remove:
   - Float chamber ①
   - Gasket (Float chamber) ②



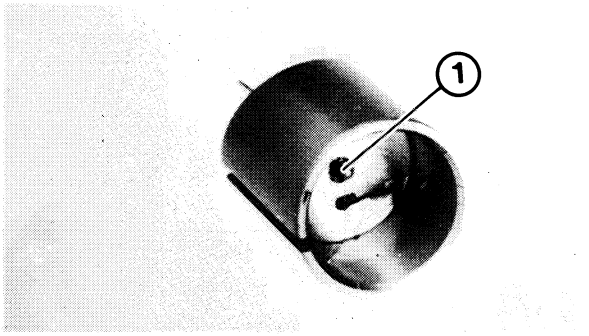
4. Remove:
   - Float pin ①
   - Float ②
   - Needle valve ③



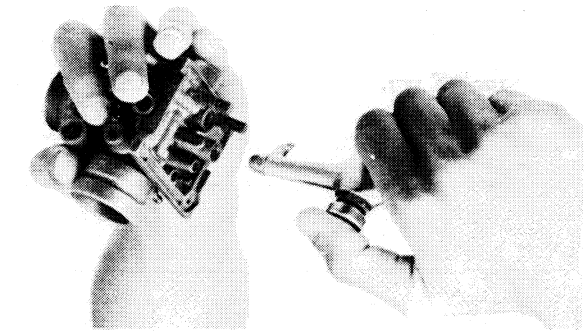
5. Remove:
   - Valve seat ①
   - Main jet ②
   - Pilot jet ③
   - Needle jet ④



6. Remove:
   - Throttle stop screw ①
   - Pilot air screw ②



7. Remove:
   - Jet needle ①

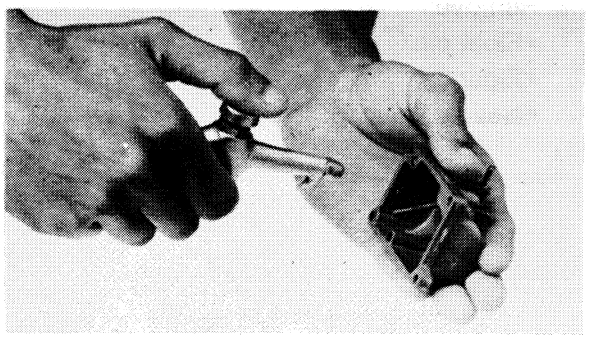


INSPECTION

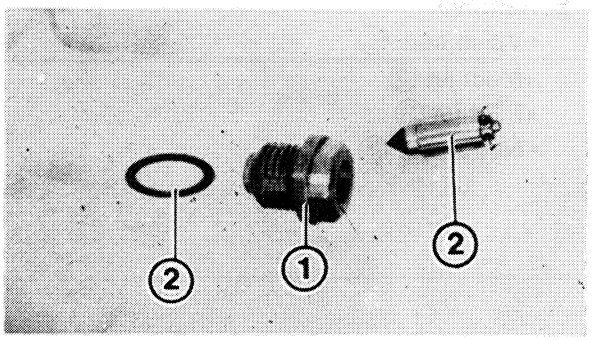
1. Inspect:
   - Carburetor mixing chamber body
     Contamination → Clean.

NOTE:

Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.



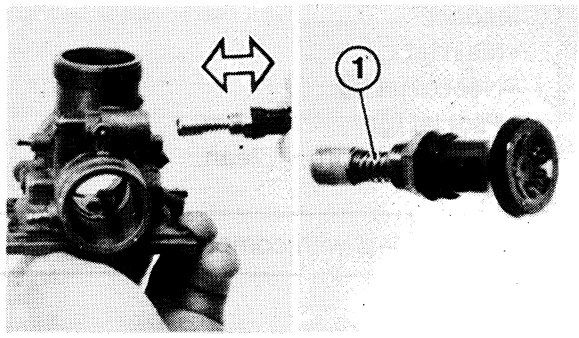
2. Inspect:
   - Carburetor float chamber body
     Contamination → Clean.



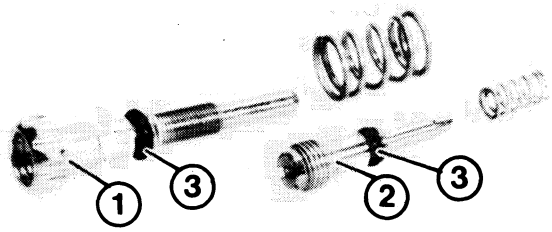
3. Inspect:
   - Valve seat ①
   - Needle valve ②
   - Gasket ③
     Wear/Damage/Contamination → Replace as a set.

NOTE:

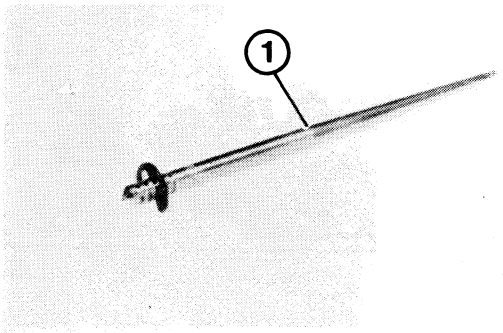
Always replace the needle valve and seat as a set.



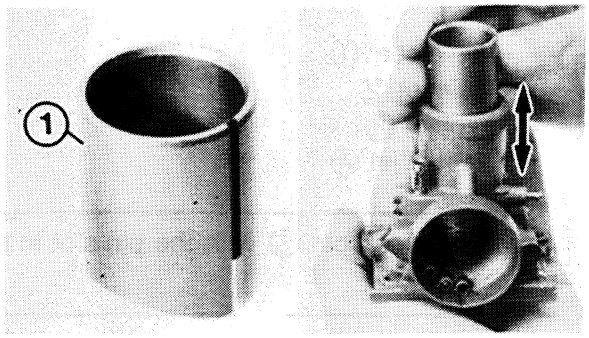
4. Inspect:
   • Starter plunger ①
   Wear/Contamination → Replace
5. Check:
   • Free movement
   Stick → Replace.
   Insert the throttle valve into the carburetor body, and check for free movement.



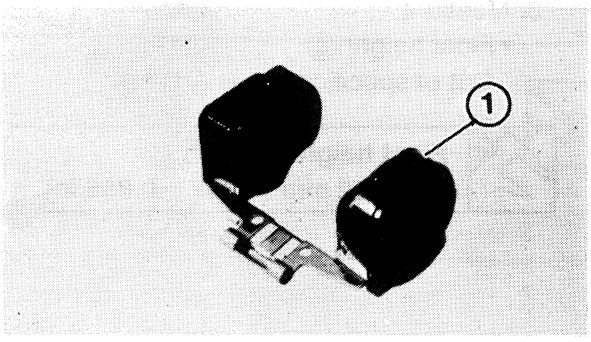
6. Inspect:
   • Throttle stop screw ①
   • Pilot air screw ②
   • O-ring ③
   Wear/Damage → Replace.



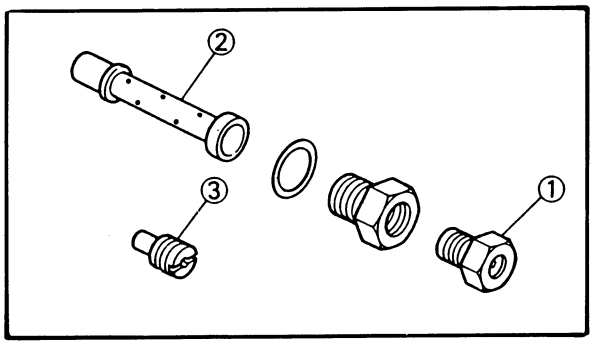
7. Inspect:
   • Jet needle ①
   Bends/Wear → Replace.



8. Inspect:
   • Throttle valve ①
   Wear/Damage → Replace.
9. Check:
   • Free movement
   Stick → Replace.
   Insert the throttle valve into the carburetor body, and check for free movement.



10. Inspect:
    • Float ①
    Damage → Replace.



11. Inspect:
    - Main jet ①
    - Needle jet ②
    - Pilot jet ③

    Contamination → Clean.

NOTE:

Blow out the jets with compressed air.

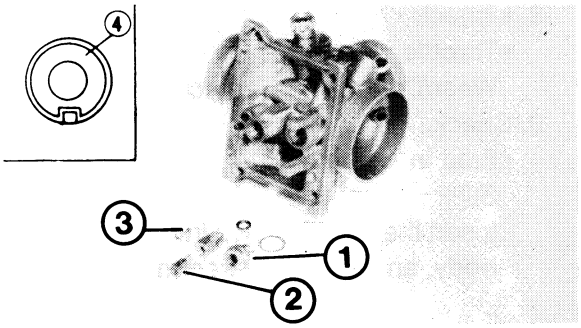
ASSEMBLY

Reverse the "DISASSEMBLY" procedures. Note the following points.

CAUTION:

Before reassembling, wash the all parts with a clean gasoline.

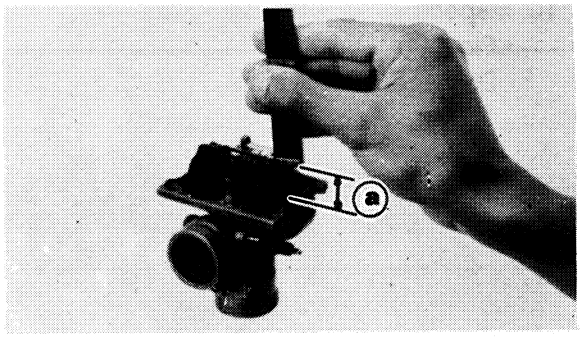
1. Connect:
    - Throttle cable



2. Install:
    - Valve seat ①
    - Main jet ②
    - Pilot jet ③
    - Needle jet ④

NOTE:

Align the knock pin ⑤ with the pin slot in the needle jet.



3. Measure:
    - Float height ⓐ

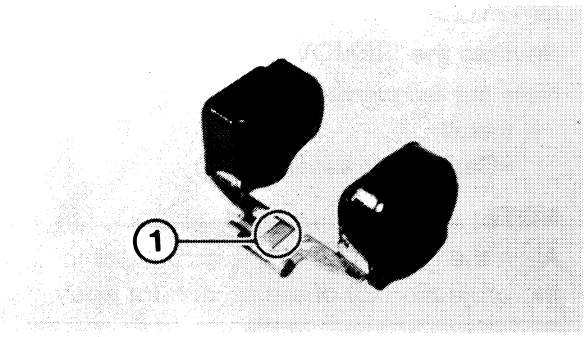
    Out of specification → Adjust.

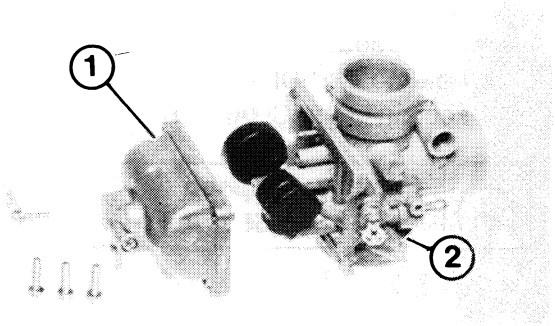
	Float height (F.H.) : **20 ~ 22 mm (0.787 ~ 0.866 in)**

Measurement and adjustment steps:
- Hold the carburetor in an upside down position.
- Measure the distance from the mating surface of the float chamber (gasket removed) to the top of the float.

NOTE:
The float arm should be resting on the needle valve, but not compressing the needle valve.

- If the float height is not within specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- Adjust the float height by bending the float tang ① on the float.
- Recheck the float height.





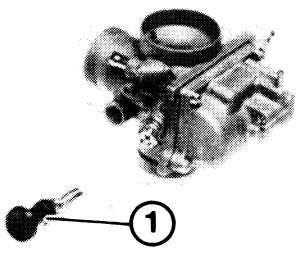
4. Install:
   - Float chamber ①
   - Gasket (Float chamber) ③

⚠ WARNING

Always use a new gasket.

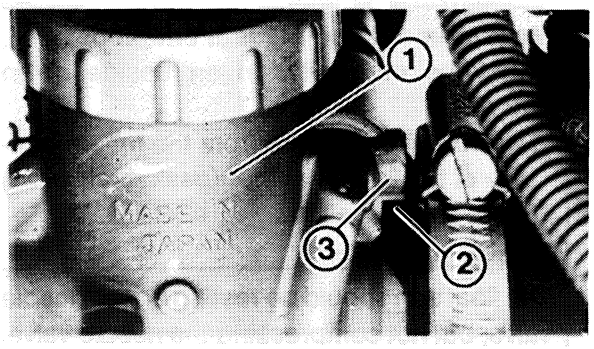
5. Tighten:
   - Screw (Float chamber)

	Screw (Float chamber): 2 Nm (0.2 m· kg, 1.4 ft·lb)



6. Install:
   - Starter plunger ①

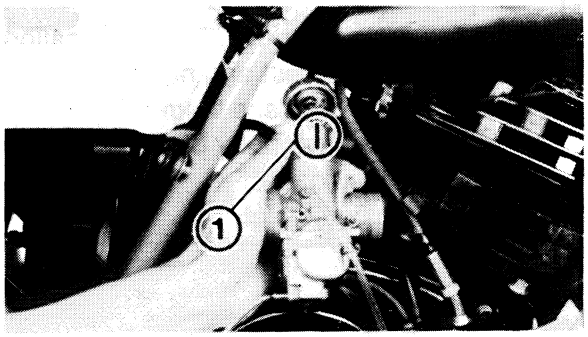
	Nut (Starter plunger): 3.5 Nm (0.35 m· kg, 2.5 ft·lb)



7. Install:
   • Throttle valve

NOTE:

Align the groove ① of the throttle valve with the projection of the carburetor body.



INSTALLATION

Reverse the "REMOVAL" procedures.

Note the following points.

1. Install:
   • Carburetor assembly ①

NOTE:

Align the groove ② of the carburetor joint with the projection ③ of the carburetor body.

2. Adjust:
   • Idle speed
   Refer to the "IDLE SPEED ADJUSTMENT" section in the CHAPTER 3.

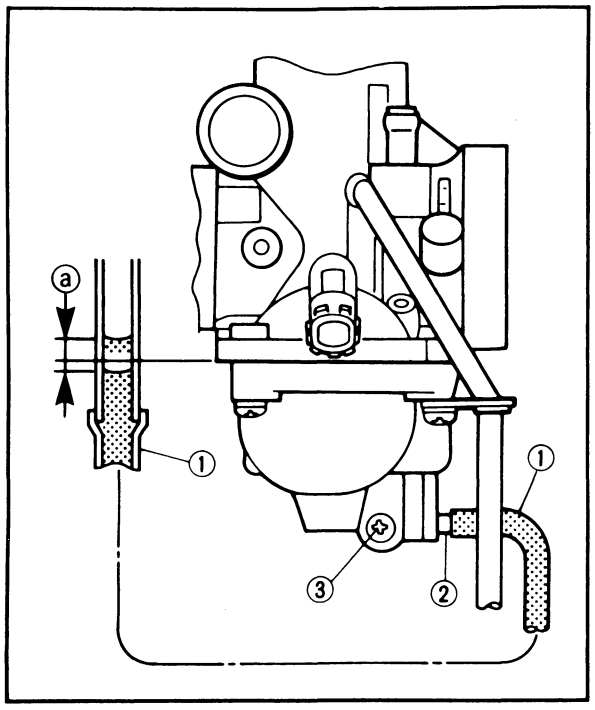
	Engine idle speed **1,450 ~ 1,550 r/min**

3. Adjust:
   • Throttle cable free play
   Refer to the "THROTTLE CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.

	Throttle cable free play: **3 ~ 5 mm (0.12 ~ 0.20 in)**

4. Adjust:
   • Carburetor cable free play
   Refer to the "CARBURETOR CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.

	Carburetor cable free play: **1.0 mm (0.04 in)**



ADJUSTMENT

Fuel Level Adjustment

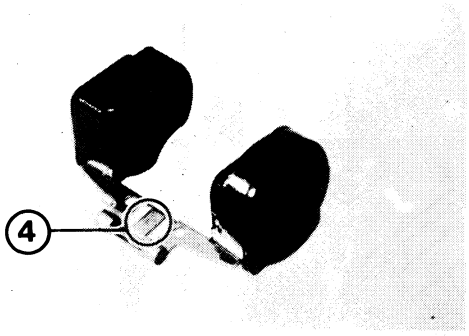
1. Measure:
   - Fuel level ⓐ
     Out of specification → Adjust.

Fuel level ⓐ:
-0.5 ~ + 0.5 mm
(- 0.02 ~ + 0.02 in)
In the middle of the float chamber below the carburetor body edge

Fuel level measurement and adjustment steps:
- Place the machine on a level surface.
- Use a garage jack under the engine to ensure that the carburetor is positioned vertically.
- Connect the Fuel Level Gauge ① to the drain pipe ②.

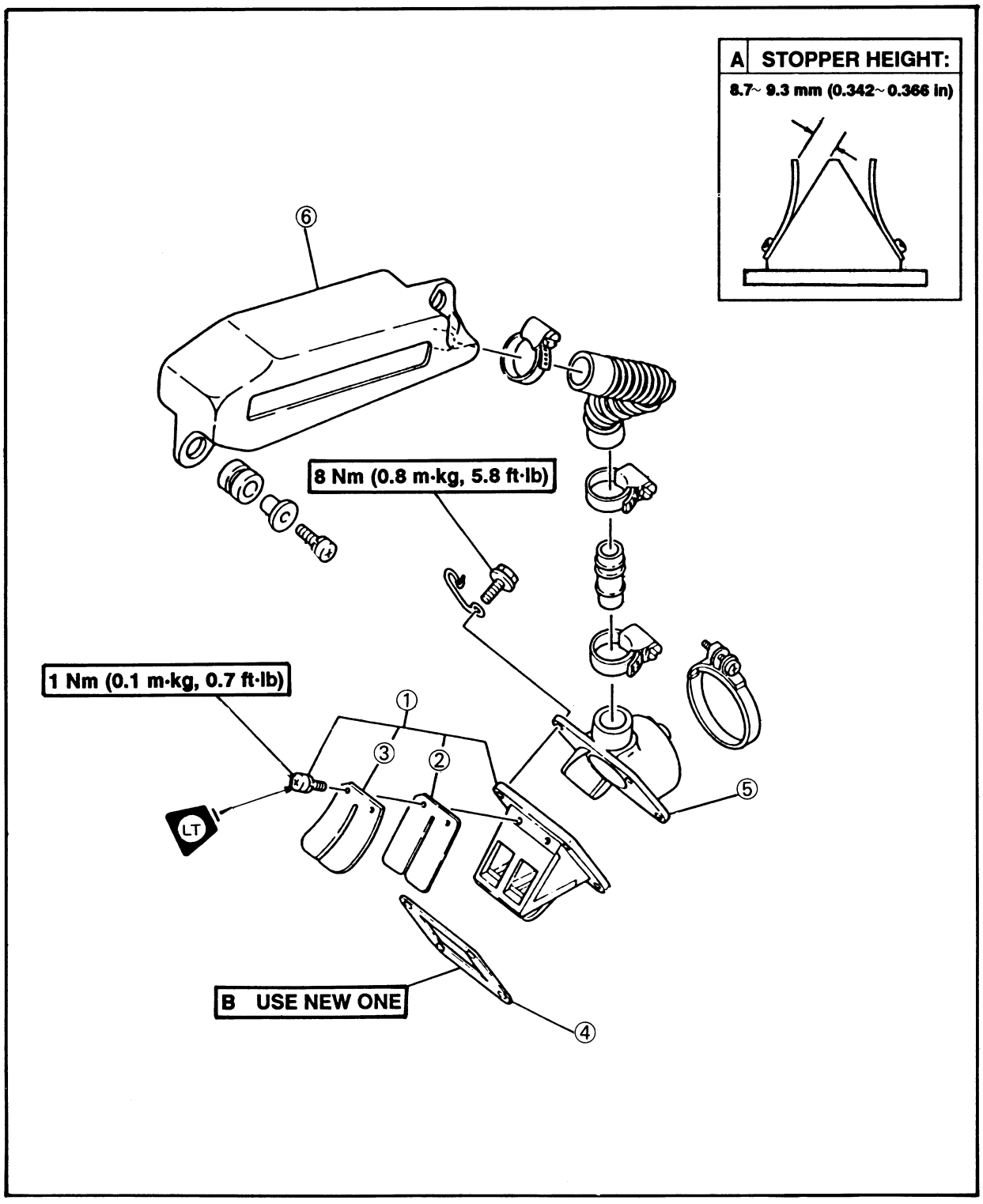
Fuel level gauge:
P/N. YM-01312-A

- Loosen the drain screw ③ and warm up the engine for several minutes.
- Measure the fuel level ⓐ with the gauge.
- If the fuel level is incorrect, adjust the fuel level.
- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- Adjust float level by bending the float tang ④ slightly.
- Install the carburetor.
- Recheck the fuel level.



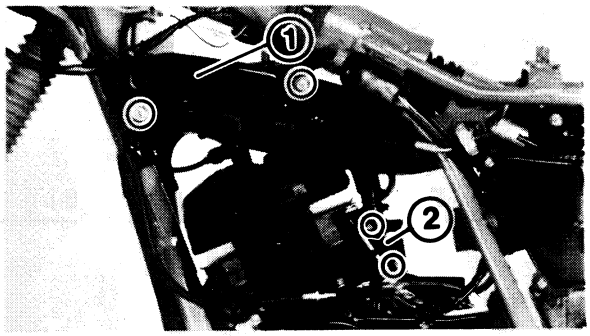
REED VALVE

① Reed valve assembly
② Reed valve
③ Stopper plate
④ Gasket
⑤ Carburetor joint
⑥ Y.E.I.S. chamber

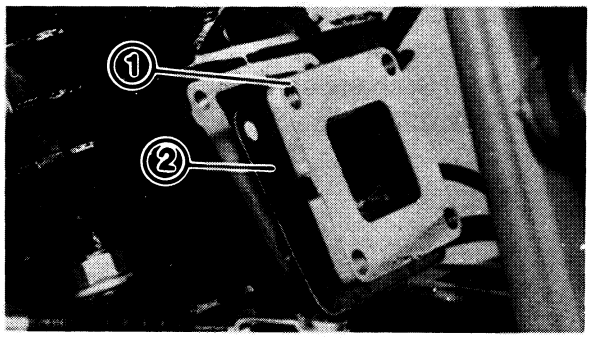


REMOVAL

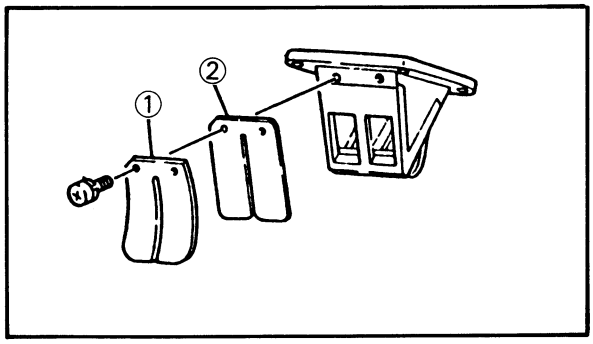
1. Remove:
   - Carburetor
     Refer to the "CARBURETOR-REMOVAL" section.



2. Remove:
   - YEIS chamber ①
   - Carburetor joint ②

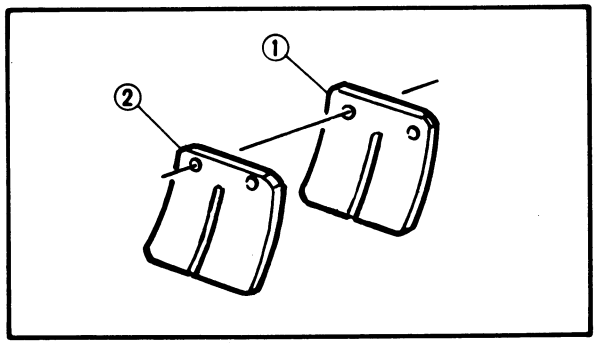


3. Remove:
   - Reed valve assembly ①
   - Gasket ②



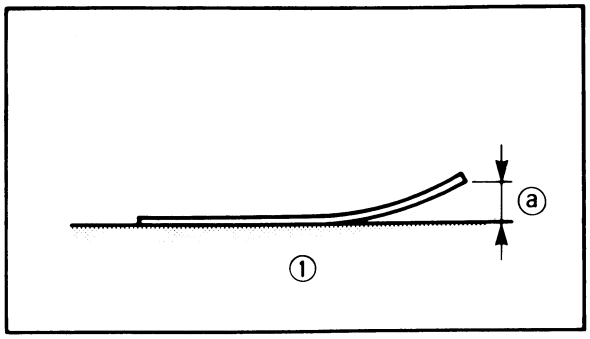
DISASSEMBLY

1. Remove:
   - Reed valve stopper ①
   - Reed valve ②



INSPECTION

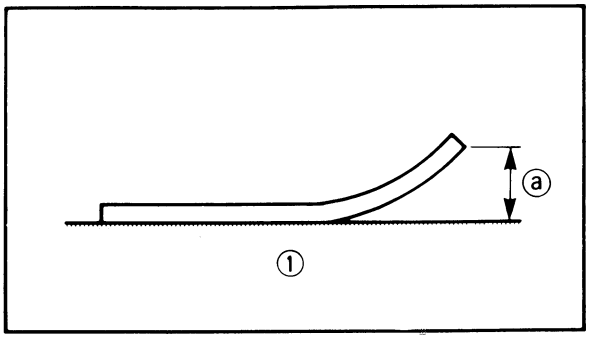
1. Inspect:
   - Reed valve ①
   - Reed valve stopper ②
     Cracks/Damage → Replace.



2. Measure:
   • Reed valve bending limit ⓐ
   Out of specification → Replace.

Read valve bending limit:
0.4 mm (0.035 in)

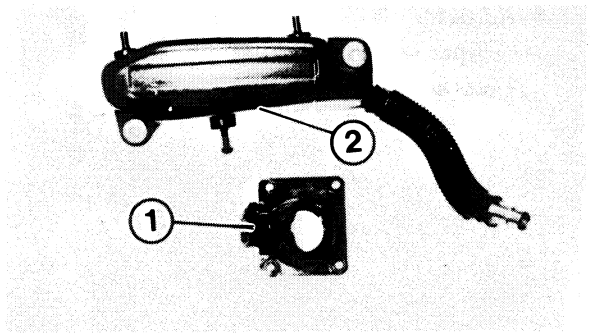
① Surface plate



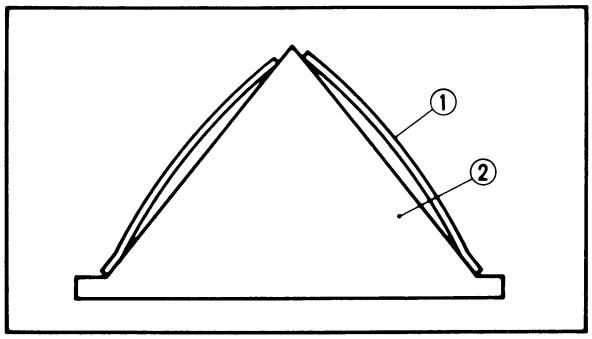
3. Measure:
   • Reed valve stopper height ⓐ
   Out of specification → Replace.

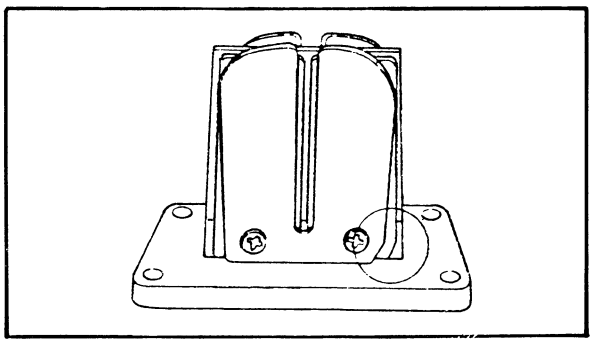
Reed valve stopper height:
8.7 ~ 9.3 mm (0.342 ~ 0.366 in)

① Surface plate



4. Inspect:
   • Carburetor Joint ①
   • Y.E.I.S. chamber ②
   Cracks/Damage → Replace.





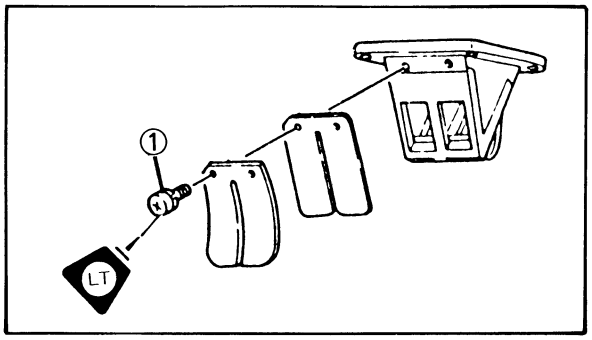
ASSEMBLY

Reverse the "DISASSEMBLY" procedure.
Note the following points.

1. Install:
   • Reed valves
   • Reed valve stoppers

NOTE:

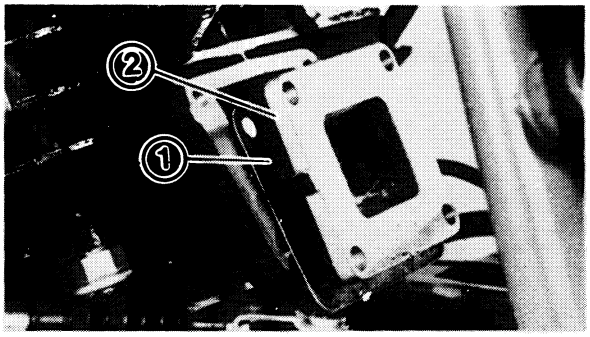
- Place the reed valve ① with its concave facing the reed valve seat ②.
- Fit the reed valve stopper cut with the corresponding cut on the reed valve.



2. Tighten:
   • Screws (Reed valve) ①

Screws (reed valve):
1 Nm (0.1 m·kg, 0.7 ft·lb)
Use LOCTITE ®

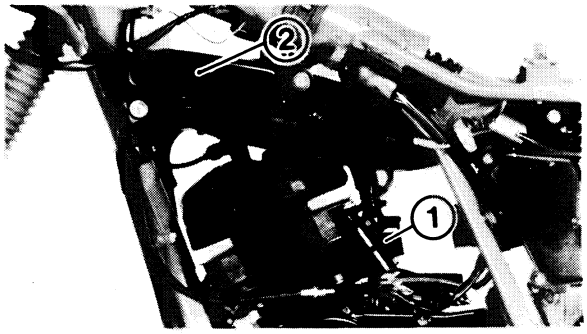
NOTE:
Tighten each screw gradually to avoid warping



INSTALLATION
Reverse the "REMOVAL" procedure.
Note the following points.
1. Install:
   • Gasket (New) ①
   • Reed valve assembly ②

⚠ WARNING

A damaged gasket may cause the engine revs to accelerate. Always use a new gasket.



2. Install:
   • Carburetor joint ①

Bolt (carburetor joint):
8 Nm (0.8 m·kg, 5.8 ft·lb)

Y.E.I.S. chamber ②

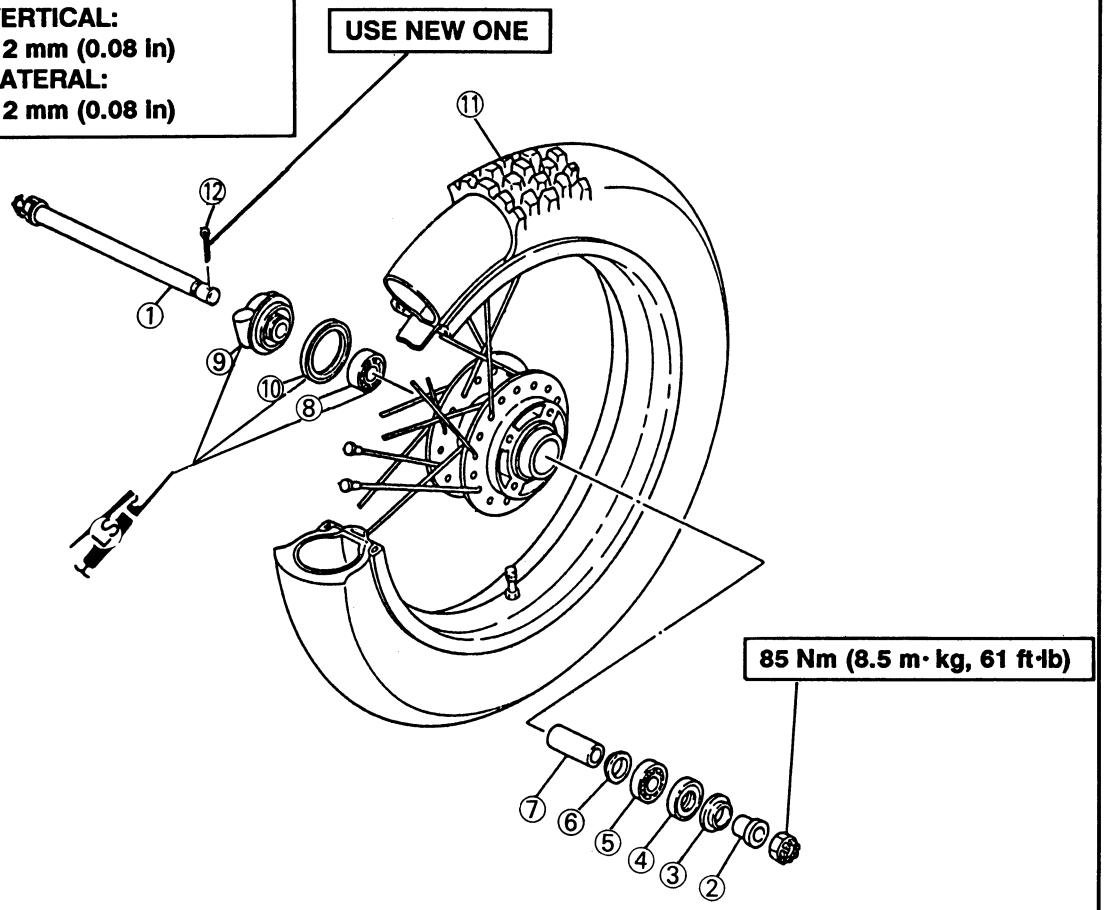
CHASSIS

FRONT WHEEL

① Wheel axle
② Collar
③ Dust cover
④ Oil seal
⑤ Bearing
⑥ Spacer (flange)
⑦ Spacer (bearing)
⑧ Bearing
⑨ Gear unit (speedometer)
⑩ Oil seal
⑪ Front wheel
⑫ Cotter pin

Basic weight: With oil and full fuel tank	**112 kg (247 lb)**	
Cold tire pressure	**Front**	**Rear**
Off-road riding	**100 kPa (1.0 kg/cm², 15 psi)**	**100 kPa (1.0 kg/cm², 15 psi)**

A	**TIRE SIZE:** **80/100-21-4PA** **TUBE SIZE:** **80/100-21-TR4**
B	**RIM SIZE:** **1.85-21**
C	**RIM RUNOUT LIMIT:** **VERTICAL:** **2 mm (0.08 in)** **LATERAL:** **2 mm (0.08 in)**



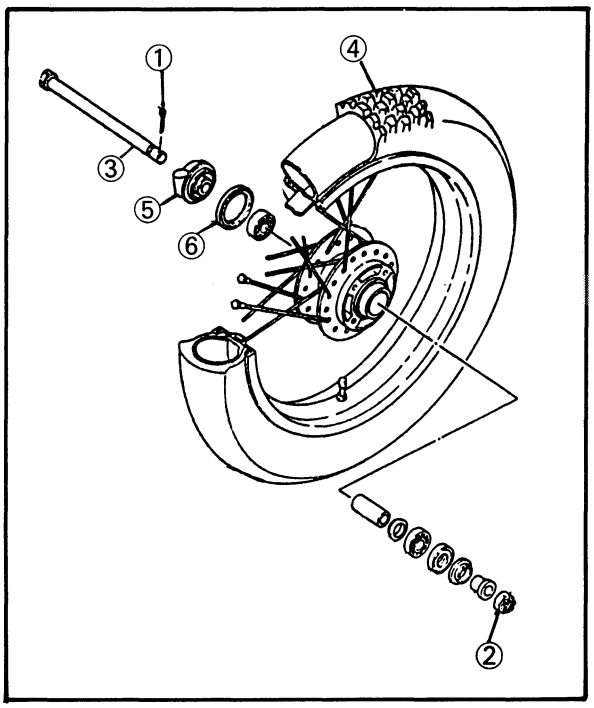
6

REMOVAL

⚠ WARNING

Support the machine securely so there is no danger of it falling over.

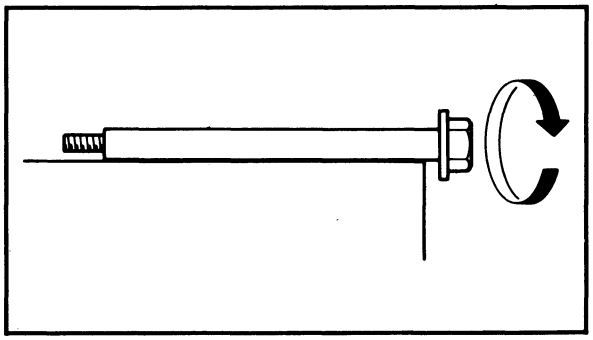
1. Elevate the front wheel by placing a suitable stand under the engine.



2. Remove:
   - Colter pin ①
   - Nut (axle) ②
   - Front wheel axle ③
   - Front wheel ④
   - Gear unit (speedometer) ⑤
   - Spacer collar ⑥

NOTE:

Do not depress the brake lever when the wheel is off the machine otherwise the brake pads will be forced shut.



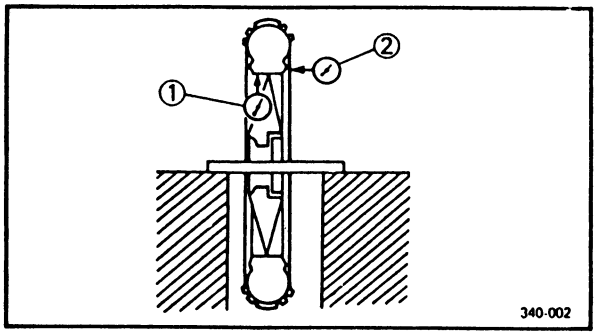
INSPECTION

1. Eliminate any corrosion from parts.
2. Inspect:
   - Front wheel axle
     Roll the axle on a flat surface.
     Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent axle.

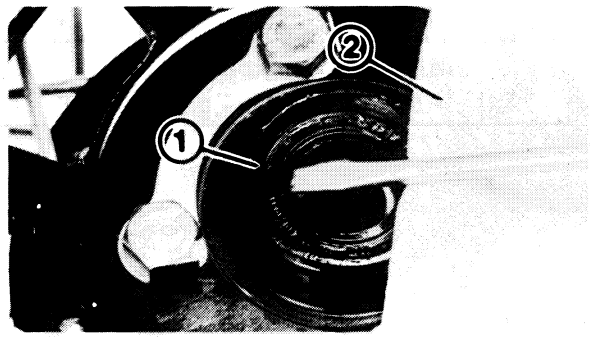
3. Inspect:
   - Wheel
     Cracks/Bends/Warpage → Replace.

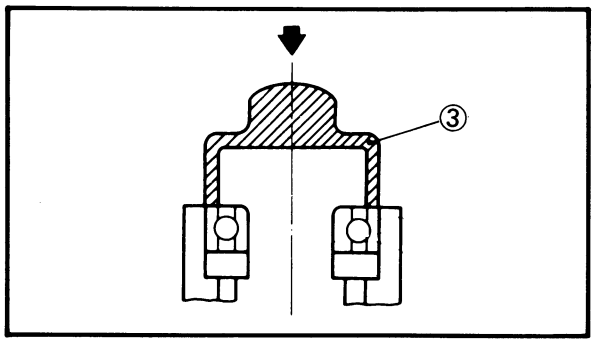


4. Measure:
   • Wheel runout
   Out of specification→Check the wheel and bearing play.

Rim runout limits.
Vertical ①: 2.0 mm (0.08 in)
Lateral ②: 2.0 mm (0.08 in)

5. Check:
   • Wheel bearings
   Bearings allow play in the wheel hub or wheel turns roughly → Replace.
   • Oil seals
   Wear/Damage → Replace.





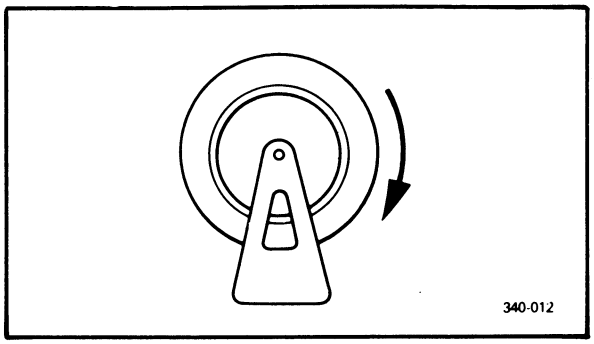
Wheel bearing and oil seal replacement steps:
- Clean the outside of the wheel hub.
- Remove the oil seal ① using a flat-head screw driver.

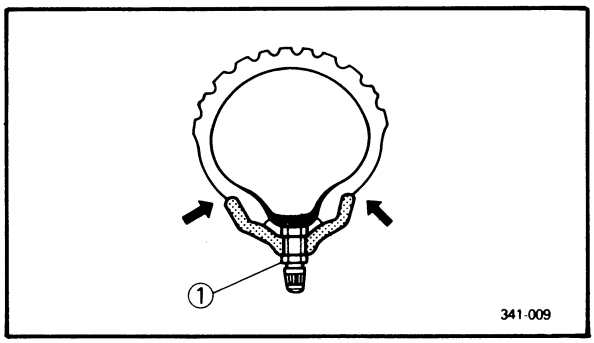
NOTE:
Place a rag ② against the outer edge to protect this edge.

- Remove the bearing using a general bearing puller.
- Install the new bearing and oil seal by reversing the previous steps.

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

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





6. Check:
   • Wheel balance
   Wheel is not statically balanced if it comes to rest at the same point after several light rotations.
   Out of balance → Install appropriate balance weight at lightest point (on top).

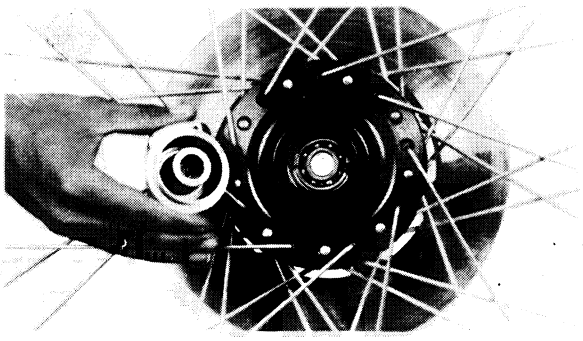
NOTE:
Balance wheel with brake disc installed.

⚠ WARNING

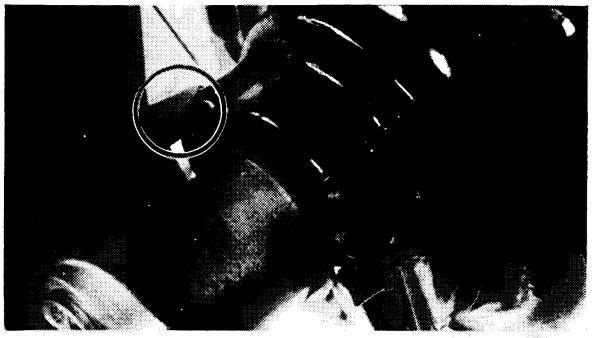
• After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in machine damage and possible operator injury.
• After a tire repair or replacement, be sure to torque tighten the valve stem locknut ① to specification.

	Valve stem locknut: 1.5 Nm (0.15 m·kg, 1.1 ft·lb)

INSTALLATION
Reverse the removal procedure.
Note the following points.
1. Lubricate:
   • Front wheel axle
   • Bearing
   • Oil seal (lip and inside)
2. Inspect:
   • Cover gear unit
   Wear/Leakage/Damage → Replace.



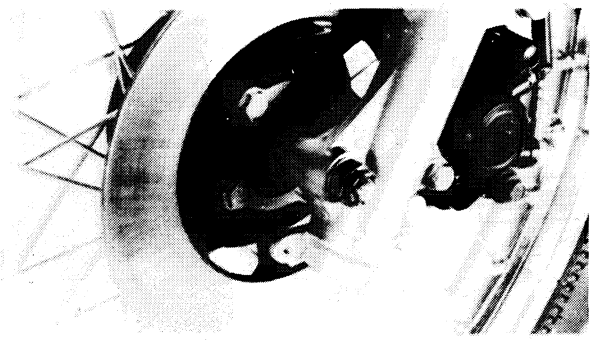
3. Install:
   • Gear unit assembly



4. Install:
   • Front wheel assembly
   • Front wheel axle

NOTE:

Be sure the boss on the outer fork tube is pressed against the projection on the gear unit housing.

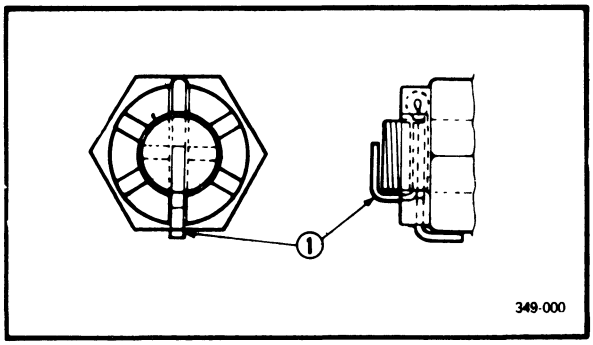


5. Tighten:
   • Nut (Front wheel axle)

	Nut (Front wheel axle): **85 Nm (8.5 m·kg, 61 ft·lb)**

NOTE:

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.



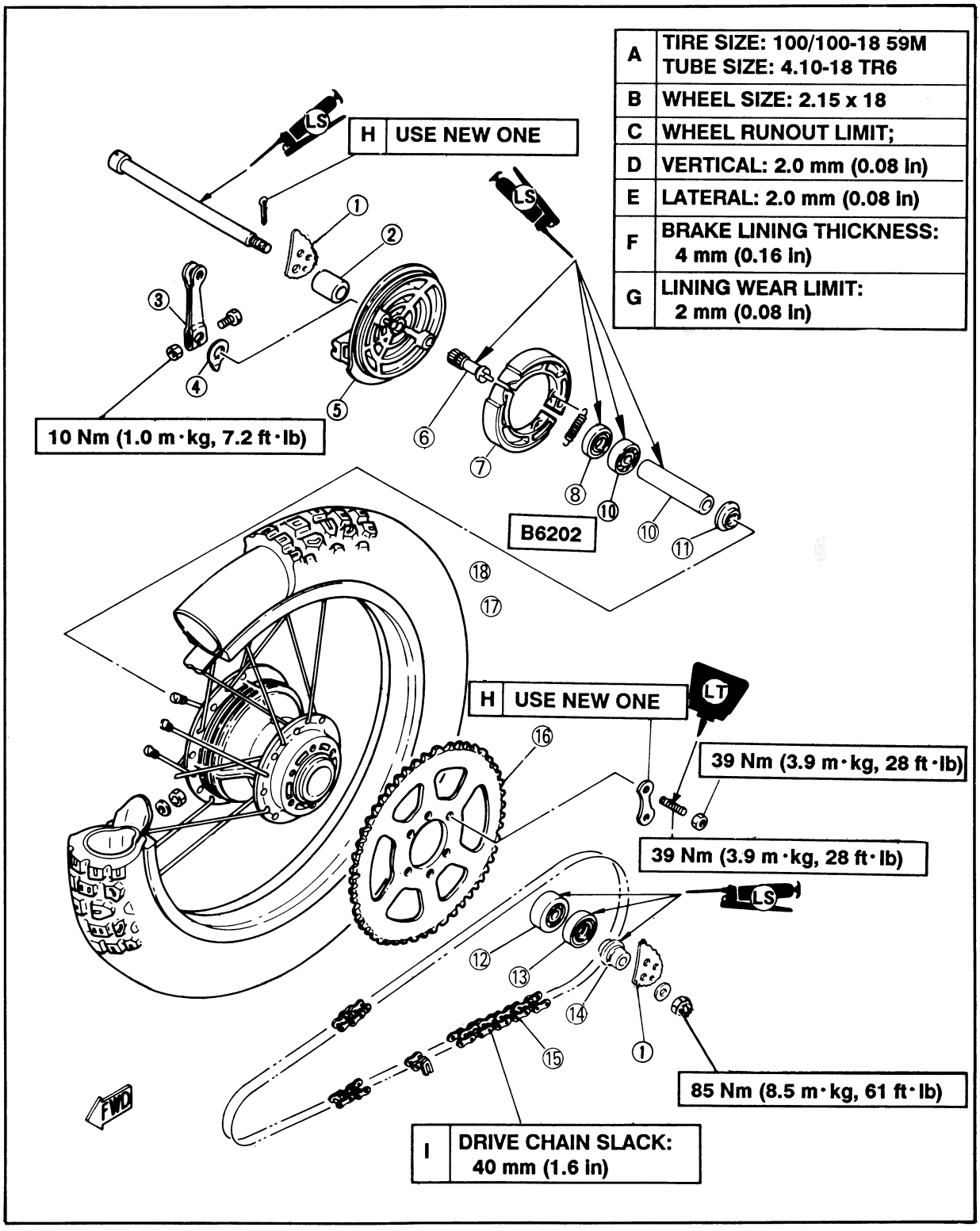
6. Install:
   • Cotter pin (new) ①

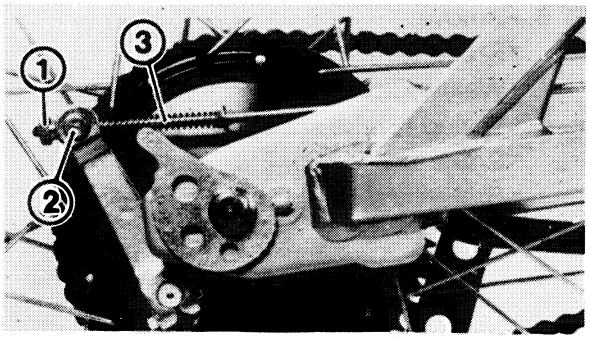
⚠ WARNING

Always use a new cotter pin.

REAR WHEEL

① Drive chain puller
② Collar
③ Brake cam lever
④ Plate indicator
⑤ Brake shoe plate
⑥ Cam shaft
⑦ Brake shoe
⑧ Oil seal
⑨ Bearing
⑩ Collar
⑪ Spacer
⑫ Bearing
⑬ Oil seal
⑭ Collar
⑮ Drive chain
⑯ Driven sprocket
⑰ Hub
⑱ Rear wheel



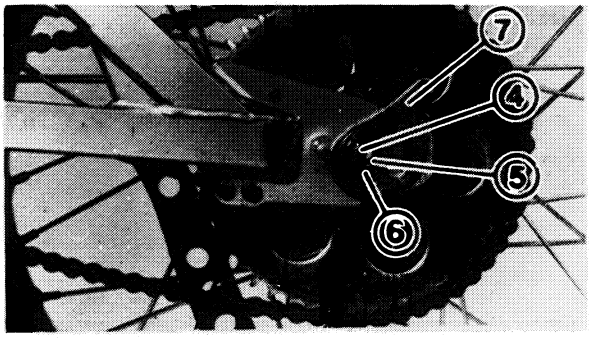


REMOVAL

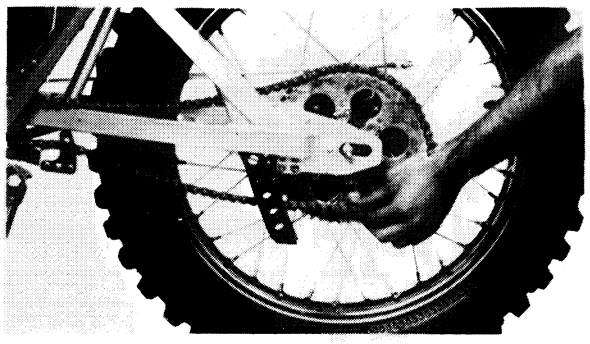
1. Elevate the rear wheel by placing a suitable stand under the engine.

⚠ WARNING

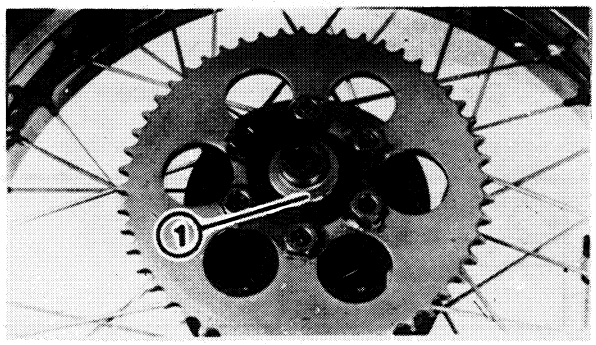
Support the machine securely so there is no danger of it falling over.



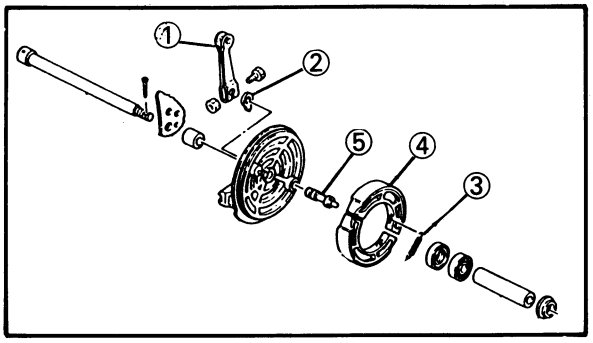
2. Remove:
   - Adjuster (rear brake) ①
   - Pin ②
   - Spring ③
   - Cotter pin ④
   - Nut (Rear Wheel axle) ⑤
   - Washer ⑥
   - Chain puller (Left) ⑦



3. Push the rear wheel forward and remove the drive chain from the driven sprocket.



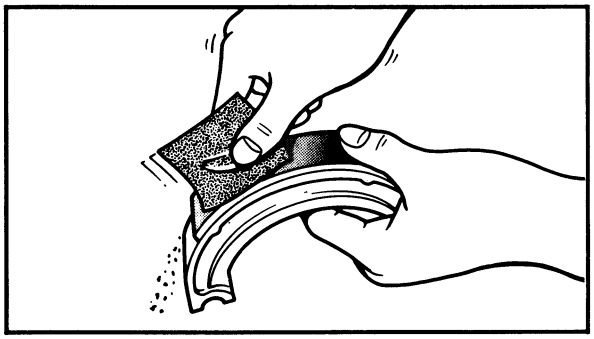
4. Remove:
   - Rear wheel axle
   - Chain puller
   - Rear wheel
   - Spacer collar ①



6. Remove:
   - Brake cam lever ①
   - Wear indicator ②
   - Spring (Brake shoe) ③
   - Brake shoes ④
   - Brake cam shaft ⑤

INSPECTION:

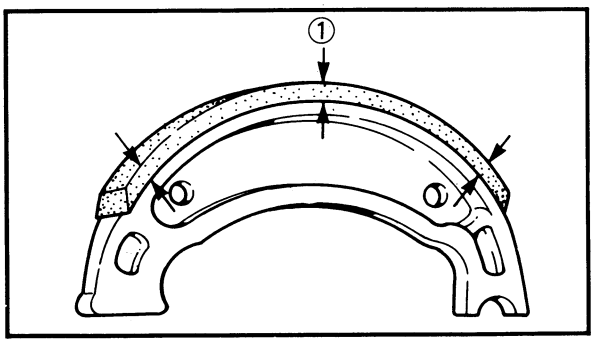
1. Eliminate any corrosion from parts.
2. Inspect:
   Refer to "FRONT WHEEL - INSPECTION" section.



3. Inspect:
   - Brake lining surface
     Glazed areas → Remove.
     Use coarse sand paper.

NOTE:

After using the sand paper, clean of the polished particles with cloth.

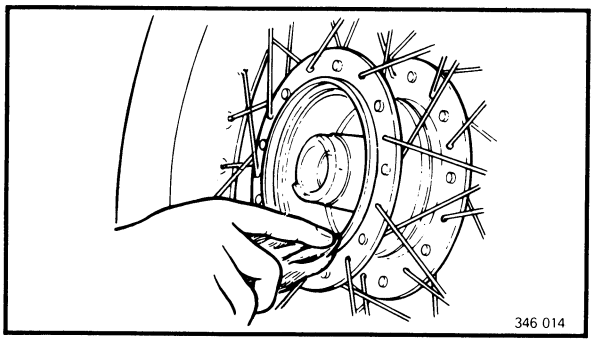


4. Measure:
   - Brake lining thickness ①
     Out of specification → Replace.

Brake lining thickness:
4 mm (0.16 in)
Wear limit:
2 mm (0.08 in)

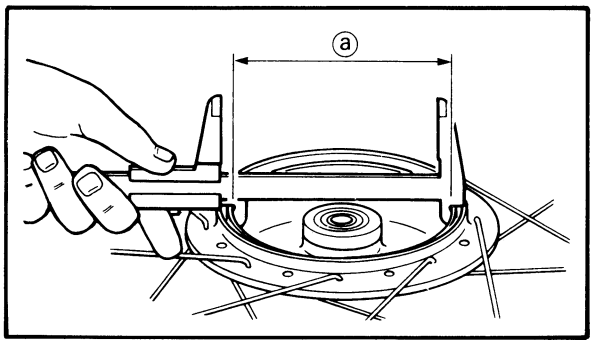
NOTE:

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



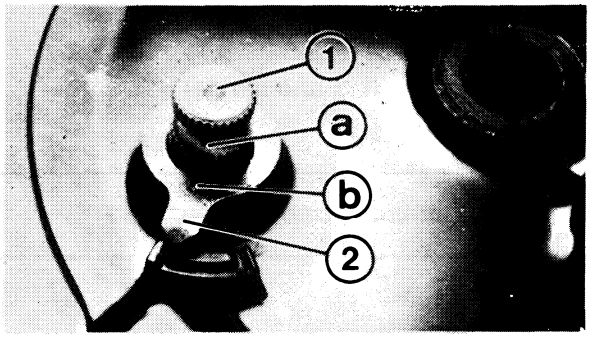
5. Inspect:
   • Brake drum inner surface
     Oil/Scratches → Remove.

Oil	**Use a rag soaked in lacquer thinner or solvent.**
Scratches	**Use emery cloth (lightly and evenly polishing).**



6. Measure:
   • Brake drum inside diameter ⓐ
     Out of specification → Replace.

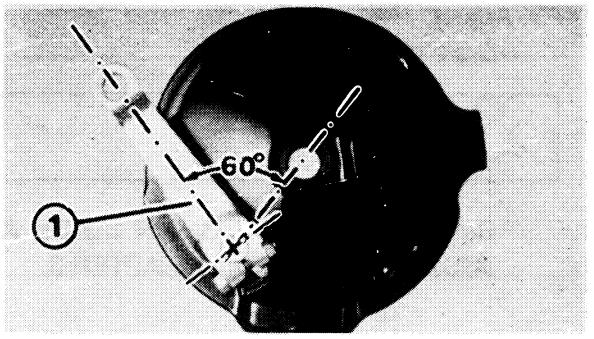
Brake drum wear limit:
131 mm (5.16 in)



INSTALATION:
Reverse the removal procedure.
Note the following points:
1. Install:
   • Brake cam shaft ①
   • Wear indicator ②

NOTE:
• Apply the lithium soap base grease onto the brake cam shaft.
• Align the slot ⓐ in the brake cam shaft with the projection ⓑ on the wear indicator.

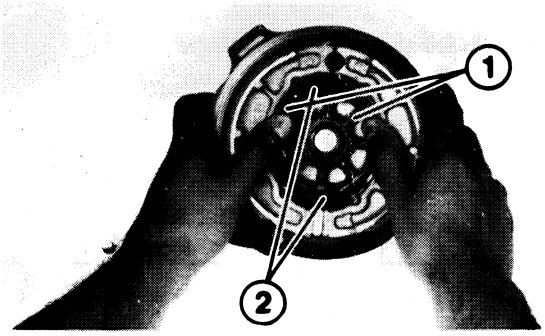
CAUTION:
Wipe off the excess grease.



2. Install:
   • Brake cam lever ①

NOTE:
Install the brake cam lever as shown.

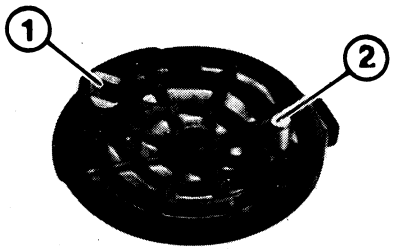
Bolt (Brake cam lever):
10 Nm (1.0 m·kg, 7.2 ft·lb)



3. Apply:
   • Lithium soap base grease
   Onto the brake cam lever① and pivot shaft ②.

CAUTION:

Wipe off the excess grease.



4. Install:
   • Brake shoes ①
   • Springs (Brake shoes) ②

⚠ WARNING

When installing the spring and brake shoe, take care not to damage the spring and not to apply grease to the brake shoes.

5. Lubricate:
   • Rear wheel axle
   • Oil seals (Lip and inside)

	Lithium soap base grease

6. Install:
   • Rear wheel assembly

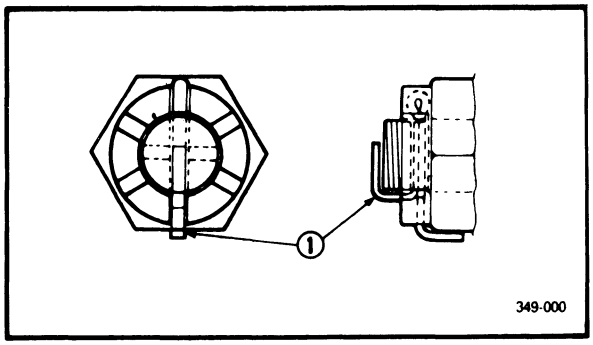
7. Adjust:
   • Drive chain slack

	Drive chain slack: **40 mm (1.61 in)**

Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in CHAPTER 3.

8. Tighten:
   • Nut (Rear wheel axle)

	Nut (Rear wheel axle): 85 Nm (8.5 m·kg, 61 ft·lb)



9. Install:
   • Cotter pin ①

CAUTION:

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

⚠ WARNING

Always use a new cotter pin.

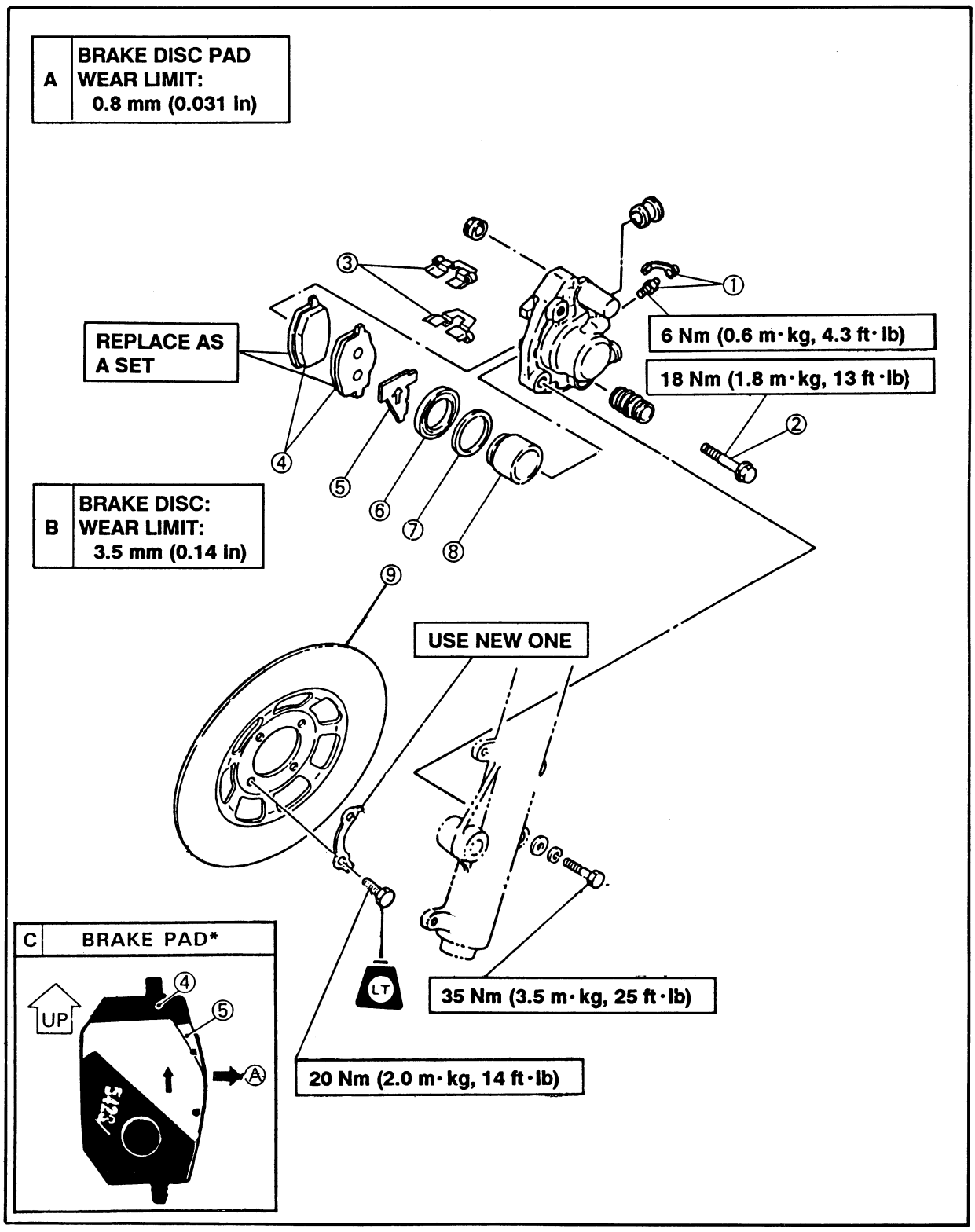
10. Adjust:
    • Rear brake pedal free play
      Refer to "CHAPTER 3 - REAR BRAKE ADJUSTMENT" section.

	Rear brake pedal free play: 20 ~ 30 mm (0.8 ~ 1.2 in)

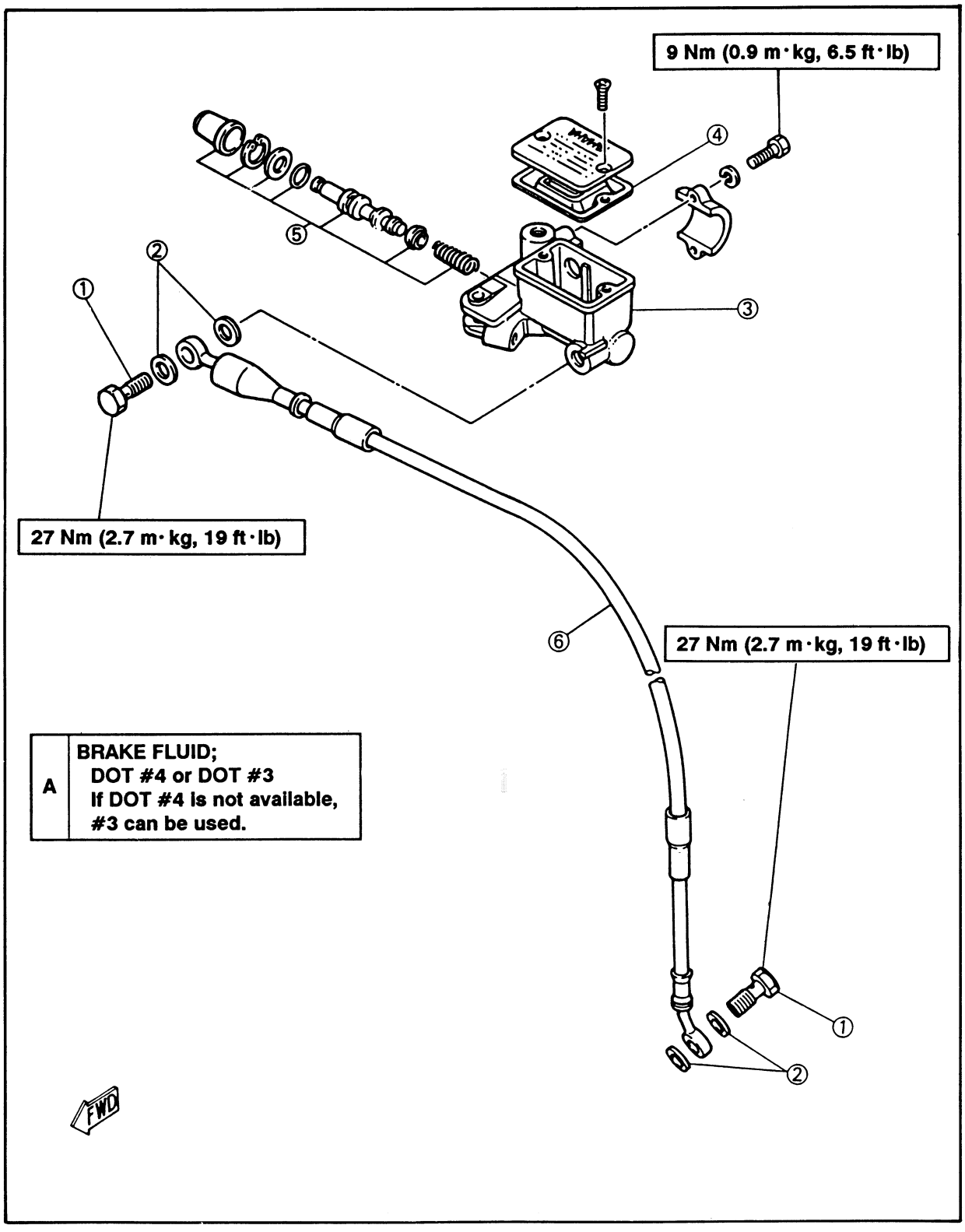
FRONT BRAKE

① Air bleed screw
② Retaining bolt
③ Pad spring
④ Brake pads
⑤ Shim
⑥ Dust seal
⑦ Piston seal
⑧ Piston
⑨ Brake disc

* Be sure to position the pad so that its round side 4 is backward A.
Be sure to position the shim 5 so that its arrow mark is upward.



① Union bolt
② Copper washer
③ Master cylinder
④ Diaphragm
⑤ Master cylinder kit
⑥ Brake hose



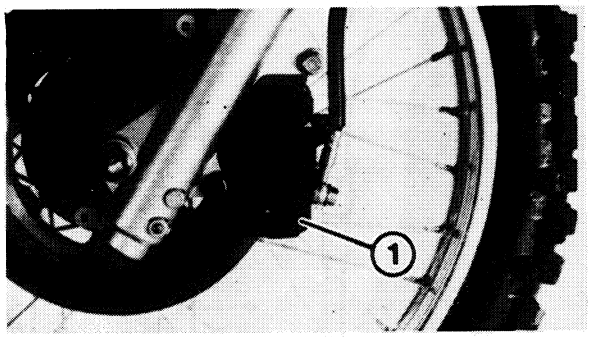
CAUTION:

Disc brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic connection in the system is opened, the entire system should be disassembled, drained, cleaned and then properly filled and bled upon reassembly. Do not use solvents on brake internal components. Solvents will cause seals to swell and distort. Us only clean brake fluid for cleaning. Use care with brake fluid. Brake fluid is injurious to eyes and will damage painted surfaces and plastic parts.

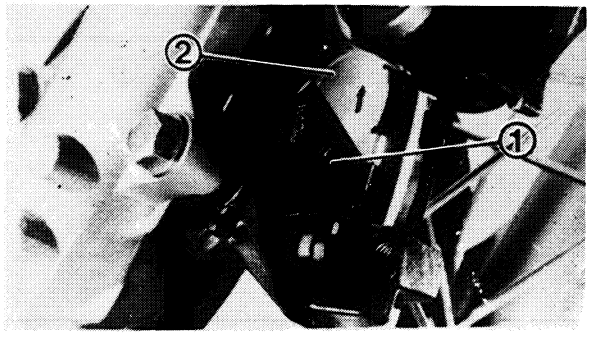
BRAKE PAD REPLACEMENT

NOTE:

It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.



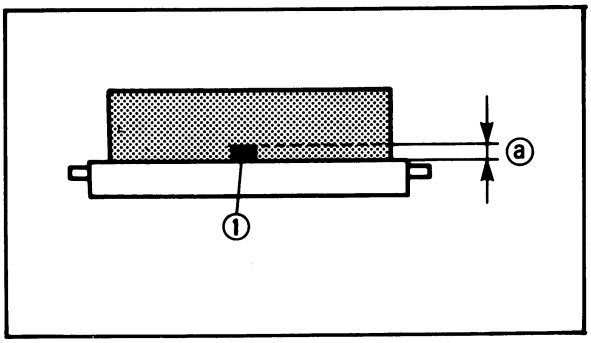
1. Remove:
   - Retaining bolt (Caliper body) ①
2. Turn the caliper body counterclockwise.



3. Remove:
   - Brake pads ①
   - Pad springs ②

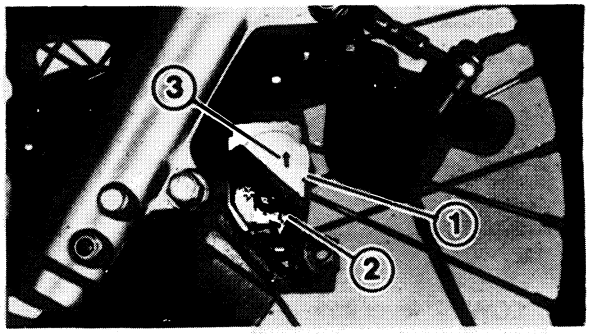
NOTE:

- Replace the pad springs as a set if pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit ⓐ.



Wear limit:
0.8 mm (0.031 in)

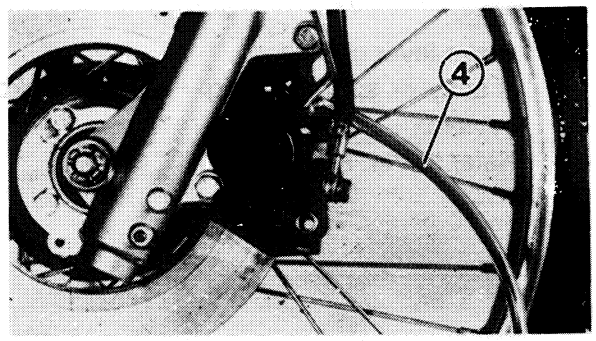
① Wear indicator



4. Install:
   - Pad springs ①
   - Brake pads ②

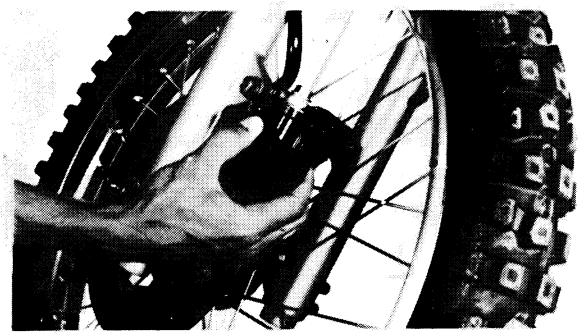
Installation steps:
- Be careful to install the pad springs ① in proper position as shown.
- Install the brake pads ②.

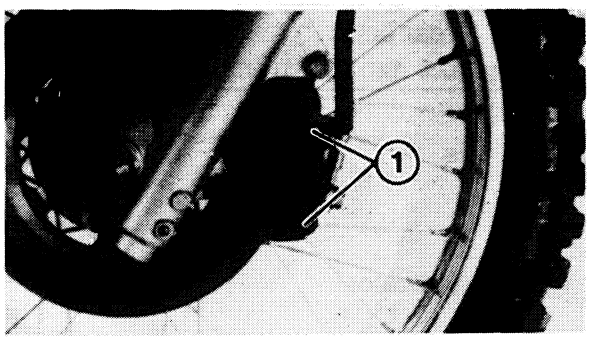
NOTE:
Be sure to position the pad with the arrow ③ to up side.



- Connect a suitable hose ④ tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the piston into the caliper by your finger.
- Tighten the caliper bleed screw.

Caliper bleed screw:
6 Nm (0.6 m·kg, 4.3 ft·lb)



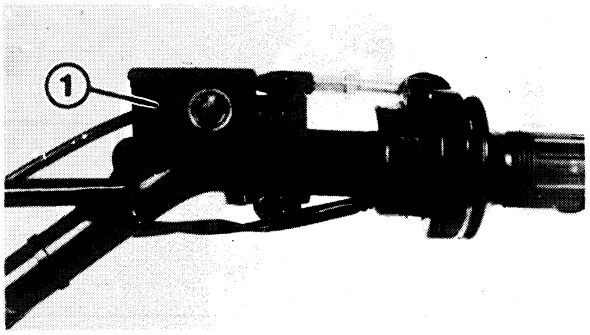


5. Lubricate:
   • Retaining bolt (caliper body) ①

	Lithium soap base grease

6. Tighten:
   • Retaining bolt (caliper body) ①

	Retaining bolt (Caliper body): 18 Nm (1.8 m· kg, 13 ft·lb)



7. Inspect:
   • Brake fluid level
   Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

① "LOWER" lever line

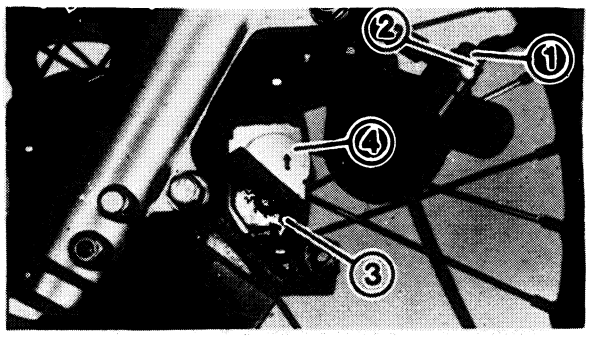
8. Check:
   • Brake lever operation
   A softy or spongy filling → Bleed brake system.
   Refer to the "AIR BLEEDING" section.

CALIPER DISASSEMBLY

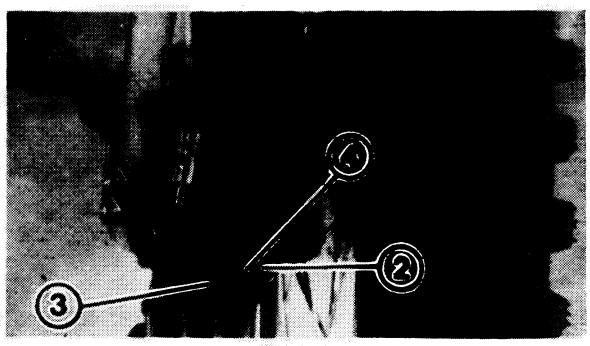
1. Remove:
   • Union bolt ①
   • Cooper washers ②

NOTE:

Place the open hose end into a container and pump the oil fluid out carefully.



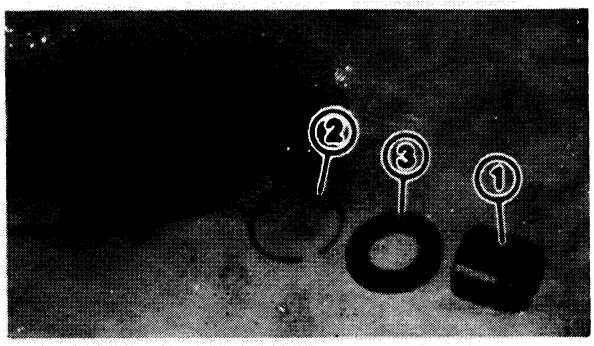
2. Remove:
   • Retaining bolt (Caliper body)
   • Brake pads ①
   • Pad springs ②
   Refer to the "BRAKE PAD REPLACEMENT" section.



3. Remove:
   - Caliper body ①
   - Caliper bracket ②

NOTE:

Before removing the caliper body from the bracket, disconnect the dust boot ③ from the guide shaft ④ on the bracket.



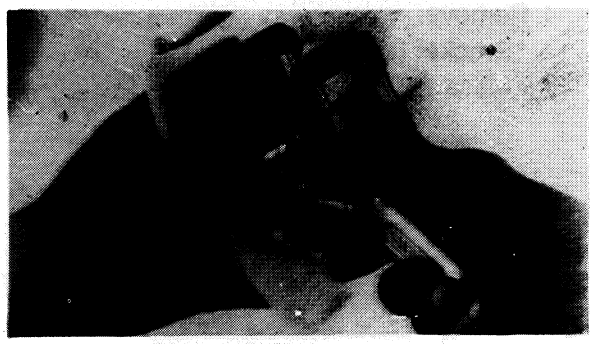
4. Remove:
   - Caliper piston ①
   - Clip ②
   - Dust seal ③

Removal steps:

- Blow moderately compressed air into the hose joint opening to force out the caliper piston from the caliper body.

⚠ WARNING

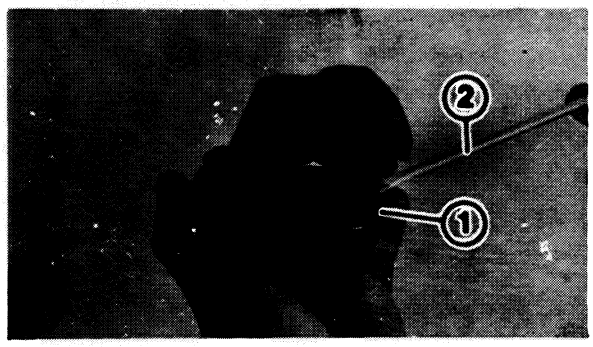
- **Never try to pry the caliper piston.**
- **Cover the piston with a rag 5. Use care so that piston does not cause injury as it is expelled from the cylinder.**



- Remove the clip ①, using a thin screw driver ②.

CAUTION:

- **When removing the clip take care not to damage the dust seal and caliper body.**



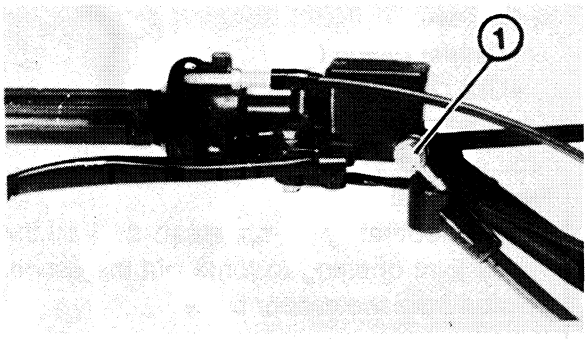
- Remove the dust seal and piston seal.

MASTER CYLINDER DISASSEMBLY

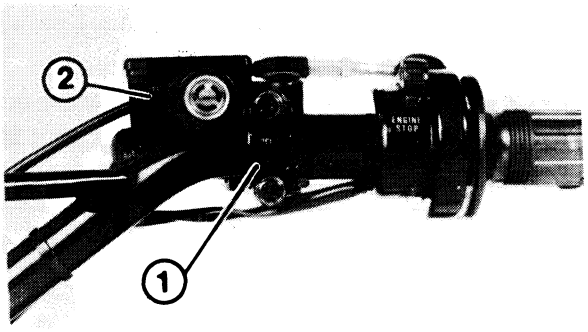
NOTE:

Drain the brake system of the brake fluid before removing the master cylinder.

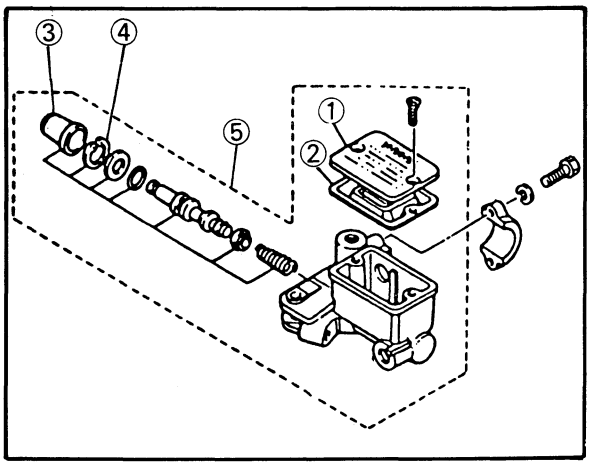
1. Remove:
   - Brake lever
   - Return spring (Brake lever)
2. Pull back the brake hose cover from the master cylinder.
3. Remove:
   - Union bolt ①
   - Copper wachers



4. Remove:
   - Bracket (Master cylinder) ①
   - Master cylinder ②



5. Remove:
   - Cap (Master cylinder) ①
   - Diaphragm ②
   - Dust boot
   - Circlip ④
   - Master cylinder kit ⑤

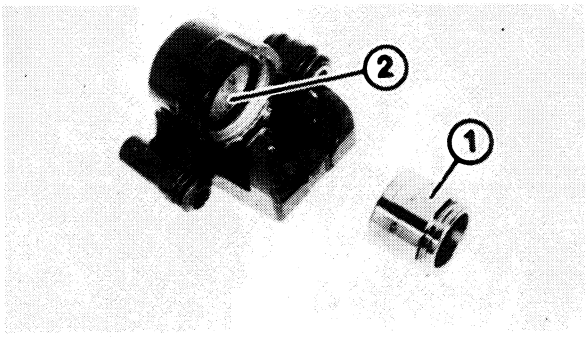


INSPECTION AND REPAIR

Recommended brake component replacement schedule:	
Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Replace only when brakes or disassembled

⚠ WARNING

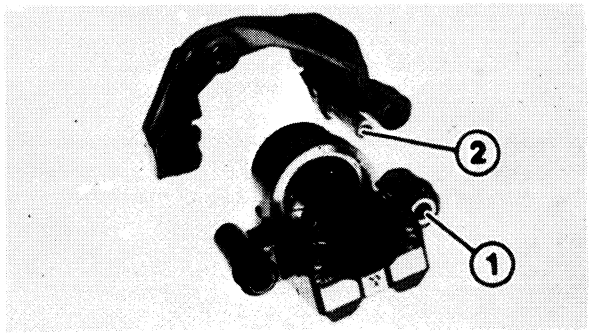
All internal parts should be cleaned in new brake fluid only. Do not use solvents.



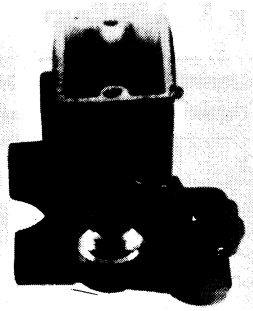
1. Inspect:
   - Caliper piston ①
     Scratches/Rust/Wear → Replace.
   - Caliper cylinder ②
     Wear/Scratches → Replace.

⚠ WARNING

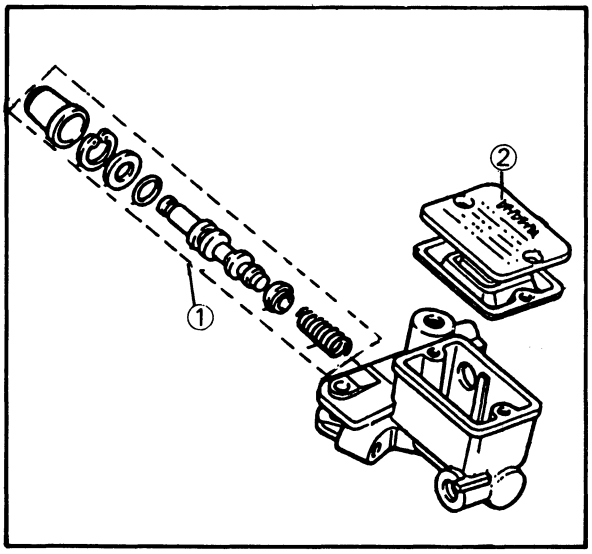
Replace the piston seal and dust seal whenever a caliper is disassembled.



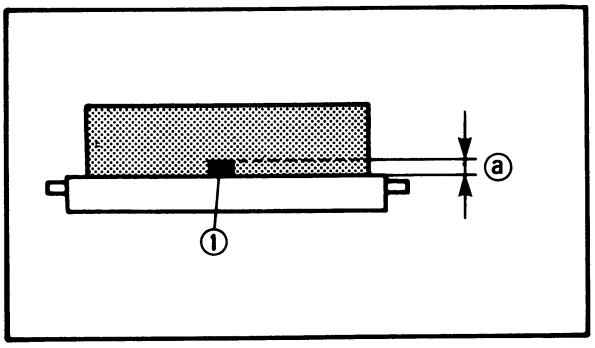
2. Inspect:
   - Caliper body
   - Caliper bracket
     Cracks/Damage → Replace.
   - Oil delivery passage (Caliper body)
     Blow out with compressed air.
   - Slide collar (Caliper body) ①
   - Guide shaft (Caliper bracket) ②
     Rust/Wear/Damage → Replace.
   - Slider boot (Caliper body)
   - Dust boot (Guide pin - Bracket)
     Wear/Damage → Replace.



3 Inspect:
- Master cylinder
  Wear/Scratches → Replace the caliper assembly.
- Master cylinder body
  Cracks/Damage → Replace.
- Oil delivery passage (Caliper body)
  Blow out with compressed air.



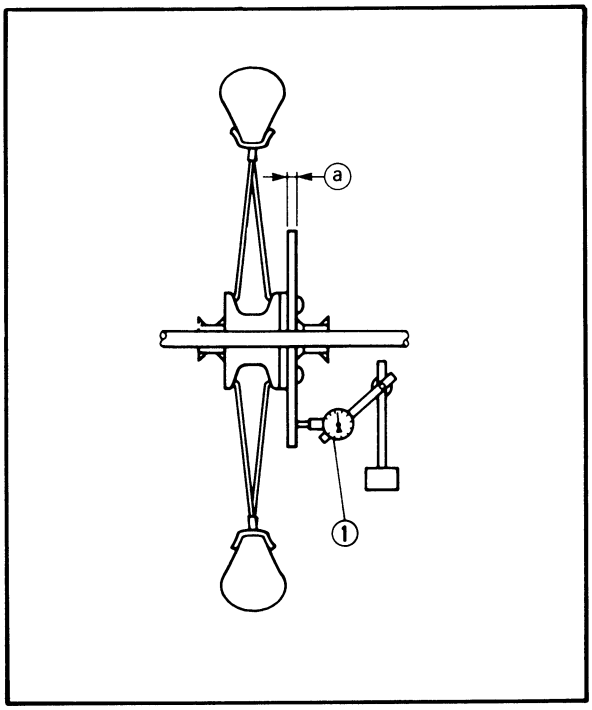
4. Inspect:
- Master cylinder kit ①
  Scratches/Wear/Damage → Replace.
- Diaphragm ②
  Wear/Damage → Replace.
- Brake hose
  Cracks/Wear/Damage → Replace.



5. Measure:
   • Brake pads (thickness) ⓐ
   Out of specification → Replace.

Wear limit ⓐ:
0.8 mm (0.031 in)

NOTE:
- Replace the pad spring as a set if pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.



6. Inspect:
   • Brake disc
   Wear/Damage → Replace.
7. Measure:
   • Brake disc deflection
   Use Dial Gauge ①
   Out of specification → Inspect wheel runout.
   If wheel runout is not in good condition, replace.

Maximum deflection:
0.15 mm (0.006 in)

   • Brake disc thickness ⓐ
   Out of specification → Replace.

Minimum thickness:
3.5 mm (0.14 in)

NOTE:
Tighten the bolts (Brake disc) in stage, using a crisscross pattern.

Bolt (Brake disc):
20 Nm (2.0 m·kg, 14 ft·lb)
Use LOCTITE®

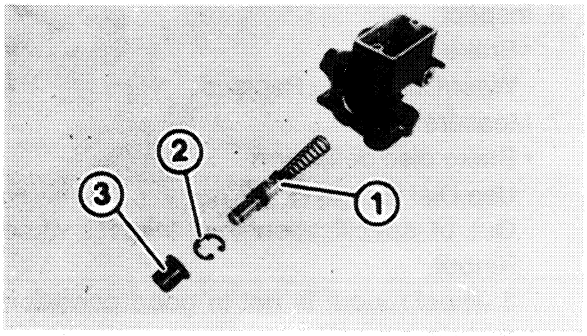
ASSEMBLY

⚠ WARNING

•All internal parts should be cleaned in new brake fluid only.
•Internal parts should be lubricated with brake fluid when installed.

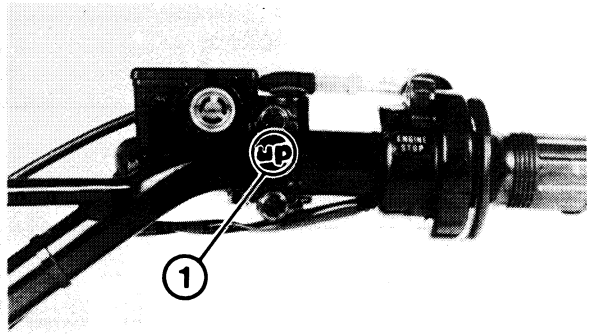
Recommended brake fluid:
DOT #3 or DOT #4

• Replace the piston seal and dust seal whenever a caliper is disassembled.



Front Brake

1. Install:
   - Master cylinder kit ①
   - Circlip ②
   - Dust boot ③

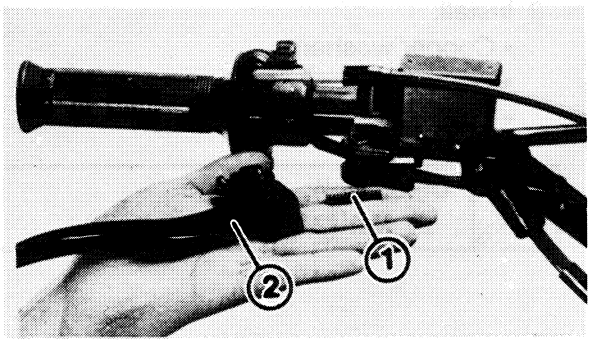


2. Install:
   - Master cylinder

NOTE:

- Install the master cylinder bracket with the "UP" mark ① facing upward.
- Tighten first the upper bolt, then the lower bolt.

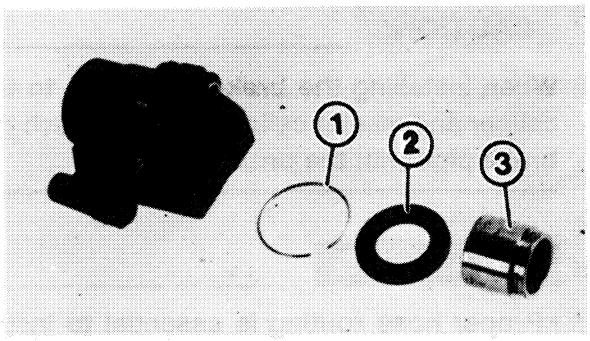
Bolts (Master cylinder bracket):
9 Nm (0.9 m·kg,6.5 ft·lb)



3. Install:
   - Return spring (brake lever) ①
   - Brake lever ②

NOTE:

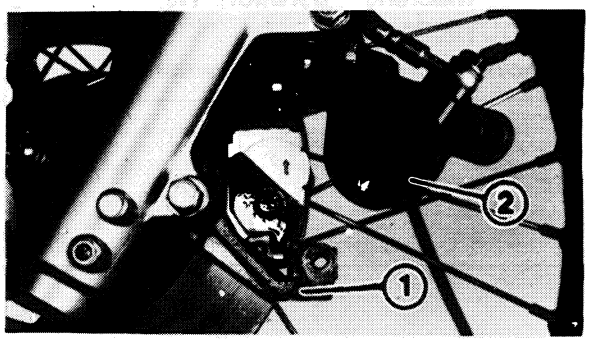
Apply lithium soap base grease to the brake lever pivot.



4. Install:
   - Piston seal ①
   - Dust seal ②
   - Caliper piston ③

⚠ WARNING

Always use new piston seal and dust seal.



5. Install:
   - Caliper bracket ①

	Caliper bracket: 35 Nm (3.5 m·kg, 25 ft·lb)

6. Install:
   - Pad springs
   - Brake pads

   Refer to the "BRAKE PAD REPLACEMENT" section.
7. Install:
   - Caliper body ②

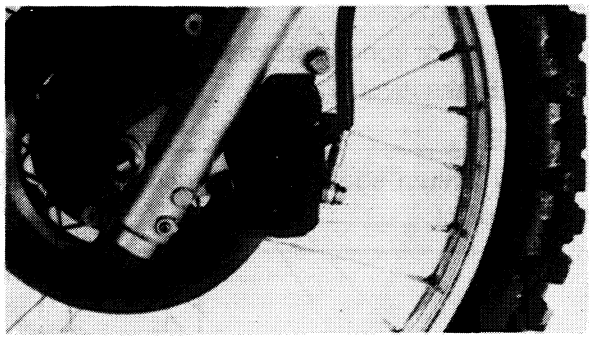
NOTE:

Apply the lithium-soap base grease onto the caliper guide shaft and retaining bolt.

CAUTION:

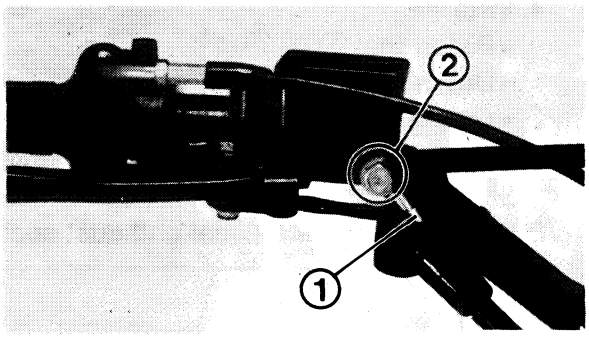
- **Take care not to allow grease to touch the brake pads.**
- **Wipe off any excess grease.**

	Retaining bolt (Caliper body): 18 Nm (1.8 m·kg, 13 ft·lb)



8. Install:
   - Copper washers
   - Brake hose
   - Union bolt

	Union bolt: **27 Nm (2.7 m·kg, 19 ft·lb)**

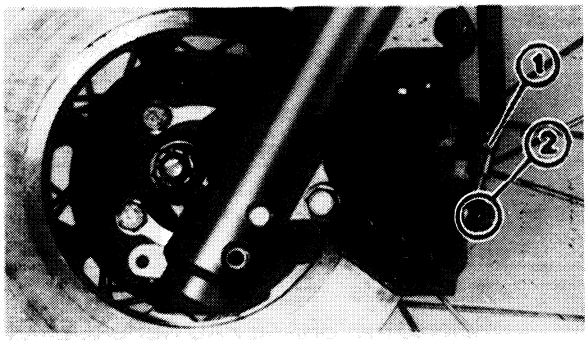


CAUTION:

When installing the brake hoses ① to the caliper and master cylinder, lightly touch the brake pipe with the projection ②.

⚠ WARNING

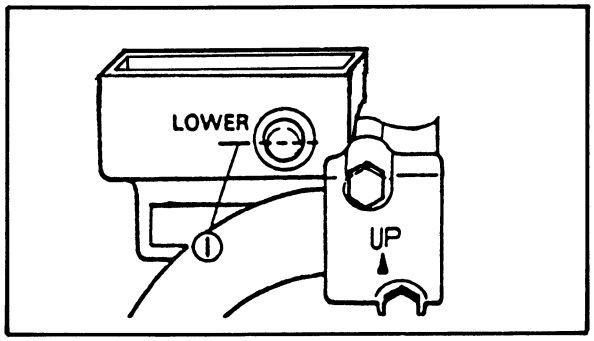
- **Proper hose routing is essential to insure safe machine operation. Refer to "CABLE ROUTING".**
- **Always use new copper washers.**



9. Cover the brake hose connecting point on the master cylinder with the brake hose cover.

10. Fill:
    - Master cylinder tank
      To "LOWER" level line ①

	Recommended brake fluid: **DOT #4 or DOT #3** **If DOT #4 is not available, #3 can be used.**



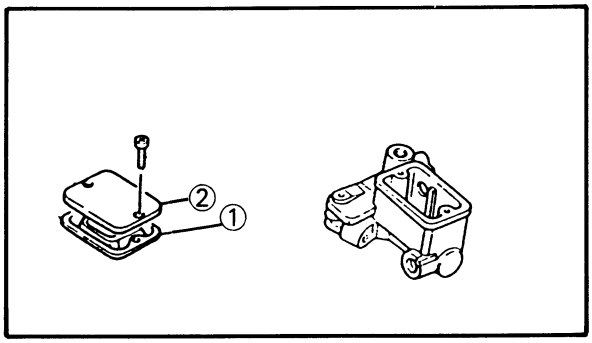
CAUTION:

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

⚠ WARNING

- **Use only the designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performace.**
- **Refill with the same type of brake fluid: mixing fluids may result in a chemical reaction and lead to poor performance.**
- **Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.**

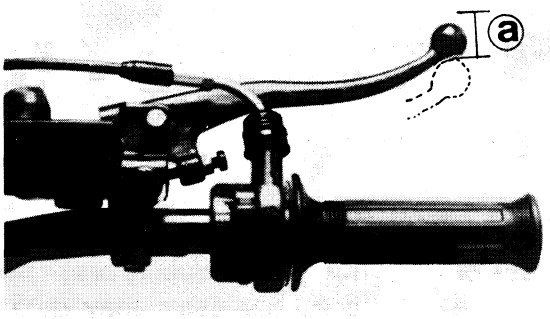
11. Bleed the air completely from the brake system.
    Refer to the "AIR BLEEDING" section.



12. Install:
    - Diaphragm ①
    - Cap (Master cylinder) ②

	Screw (Master cylinder): 2 Nm (0.2 m·kg, 1.4 ft·lb)

13. Inspect:
    - Brake fluid level
      Refer to the "BRAKE FLUID INSPECTION" section in CHAPTER 3.



14. Adjust:
    • Front brake lever free play ⓐ

Free play ⓐ :
10 ~ 20 mm (0.4 ~ 0.8 in)

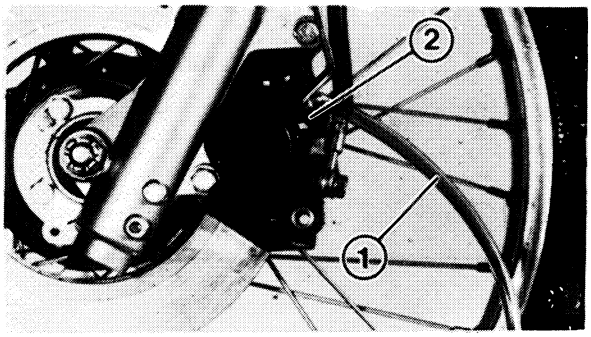
Refer to the "FRONT BRAKE ADJUSTMENT" section in CHAPTER 3.

AIR BLEEDING

⚠ WARNING

Bleed the brake system if:
- **The system has been disassembled.**
- **A brake hose has been loosened or removed.**
- **The brake fluid is very low.**
- **The brake operation is faulty.**

A dangerous loss of braking performance may occur if the brake system is not properly bled.



1. Bleed:
   • Brake fluid

Air bleeding steps:
a. Add proper brake fluid to the reservoir.
b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
c. Connect the clear plastic tube ① tightly to the caliper bleed screw.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever several times.
f. Pull the lever in. Hold the lever in position.
g. Loosen the bleed screw ② and allow the lever to travel towards its limit.
h. Tighten the bleed screw when the lever limit has been reached, then release the lever.

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

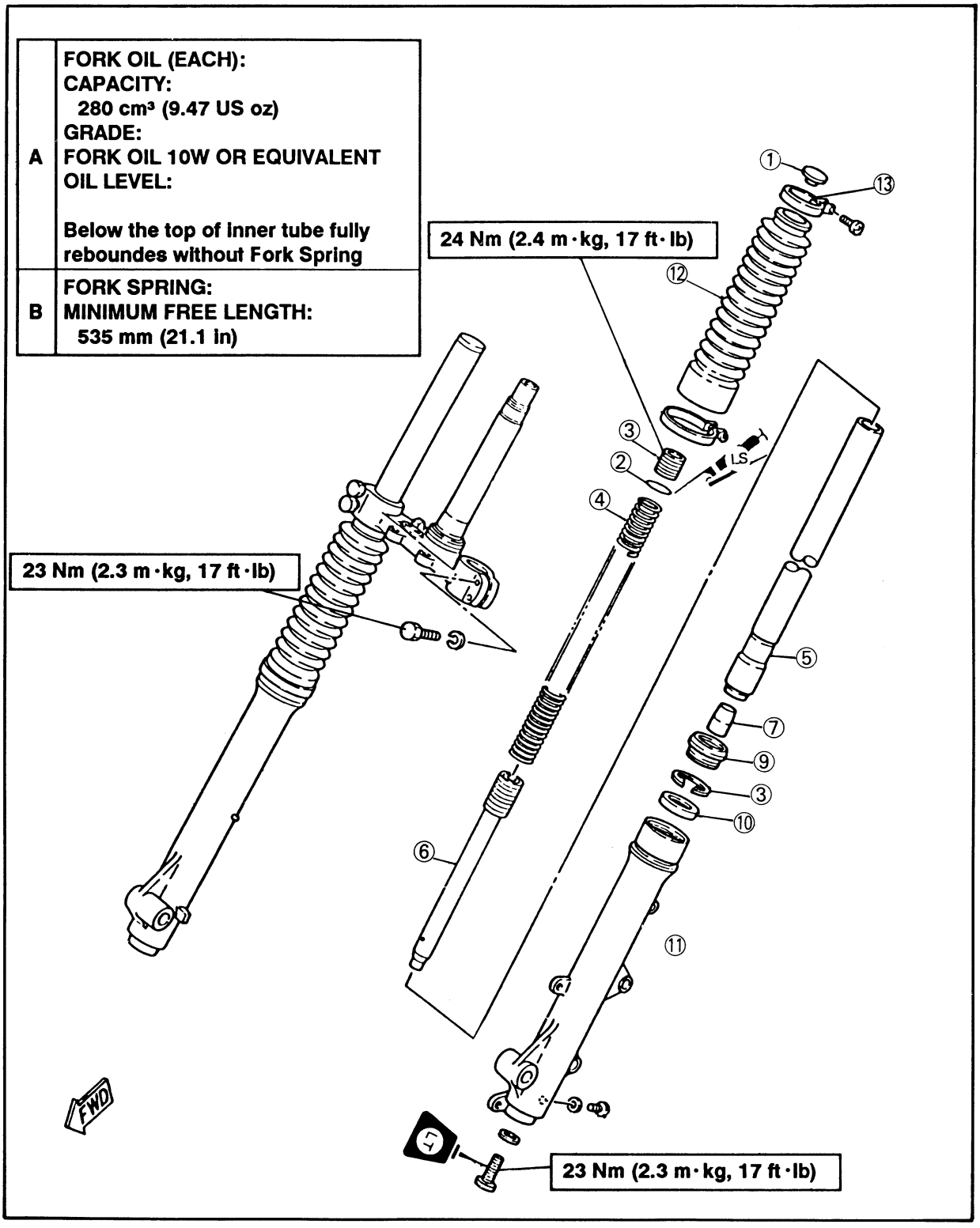
i. Repeat steps (e) to (h) until all of the air bubbles have been removed from the system.

NOTE:
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappered.

j. Add brake fluid to the level line on the reservoir.

FRONT FORK

① Cap
② O-Ring
③ Cap bolt
④ Fork spring
⑤ Inner fork tube
⑥ Damper rod
⑦ Oil lock pieces
⑧ Circlip
⑨ Dust seal
⑩ Oil seal
⑪ Outer fork tube
⑫ Fork boot
⑬ Band



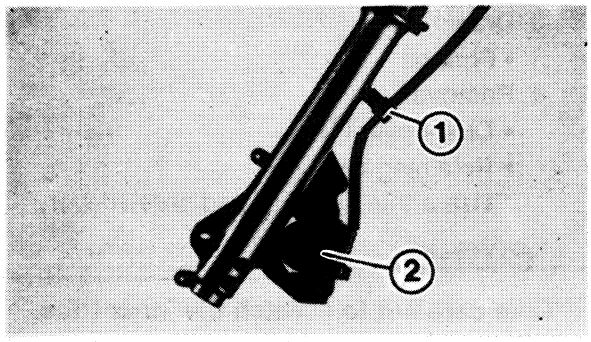
REMOVAL

⚠ WARNING

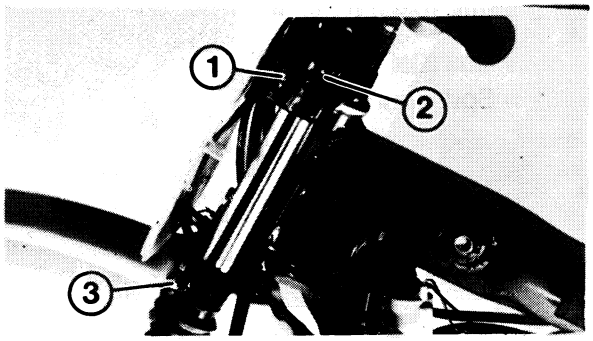
Support the machine securely so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.

2. Remove:
   - Front wheel
     Refer to the "FRONT WHEEL - REMOVAL" section.



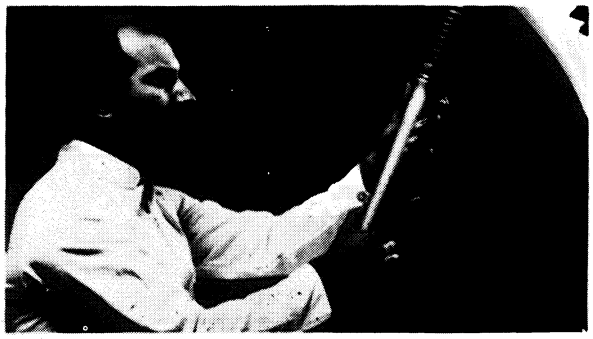
3. Remove:
   - Holder (Brake hose) ①
   - Brake caliper assembly ②



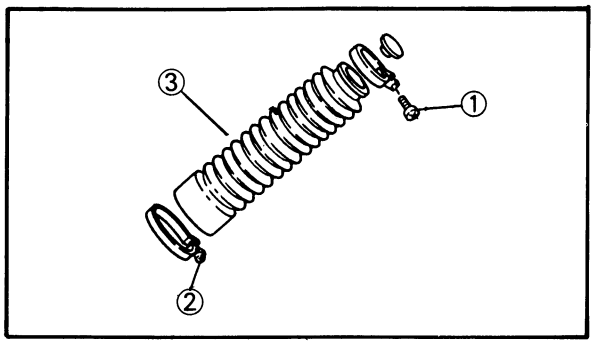
4. Loosen:
   - Pinch bolts (Handle crown) ①
   - Cap bolt ②
   - Pinch bolts (Under bracket) ③

⚠ WARNING

Support the fork before loosening the pinch bolts.

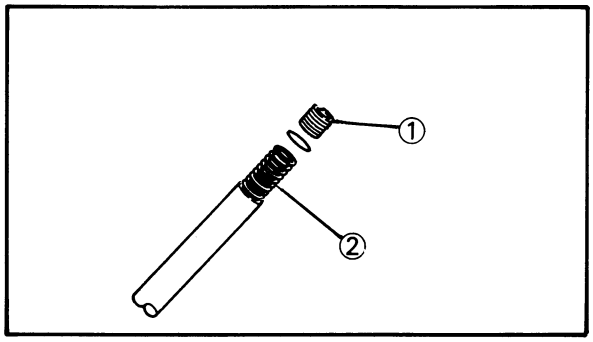


5. Remove:
   - Front fork

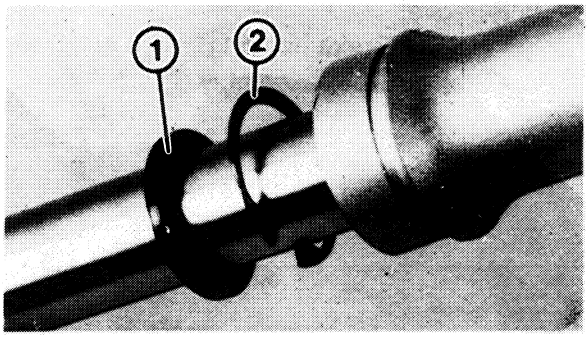


DISASSEMBLY

1. Remove:
   - Clamps (Upper ① and lower ②)
   - Fork boot ③



2. Remove:
   - Cap bolt ①
   - Fork spring ②

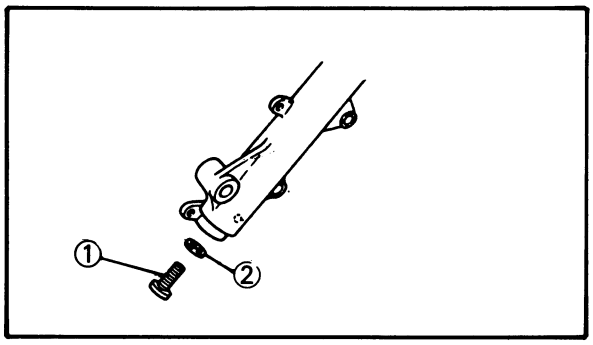


3. Drain:
   - Fork oil
4. Remove:
   - Dust cover ①
   - Retaining clip ②

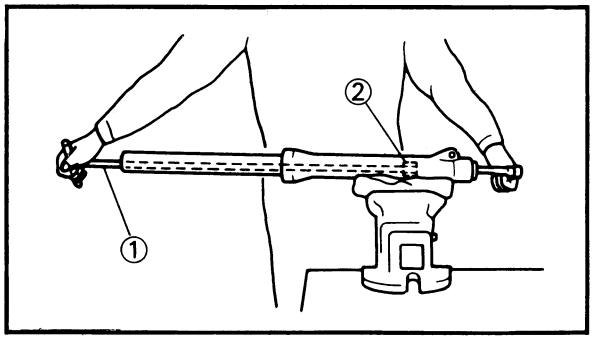
   Use a thin slotted-head screwdriver.

CAUTION:

Take care not to scratch the inner tube.



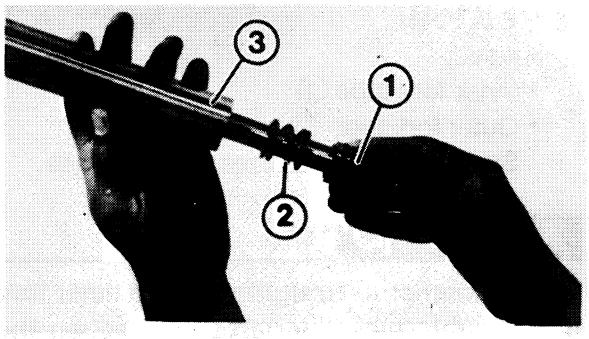
5. Remove:
   - Bolt (Damper rod) ①
   - Spring washer ②



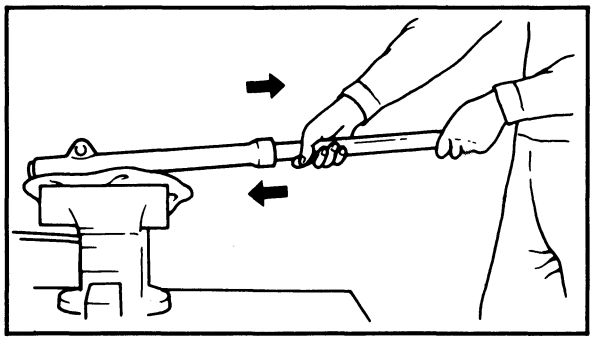
NOTE:

Hold the damper rod to loosen the bolt (Damper rod) by the T-Handle ① and Holder ②.

T-Handle:
YM-01326
Holder:
P/N. YM-01300-1



6. Remove:
   - Damper rod ①
   - Rebound spring ②
     (From inner fork tube ③)

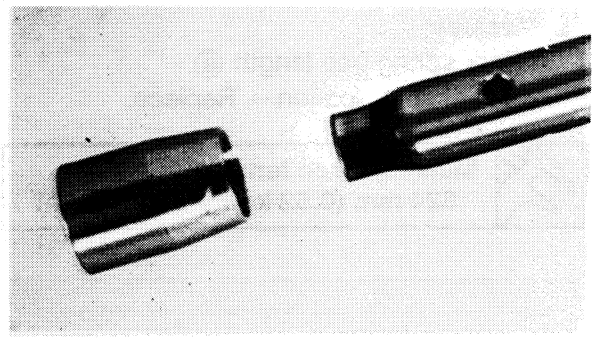


7. Remove:
   - Inner fork tube

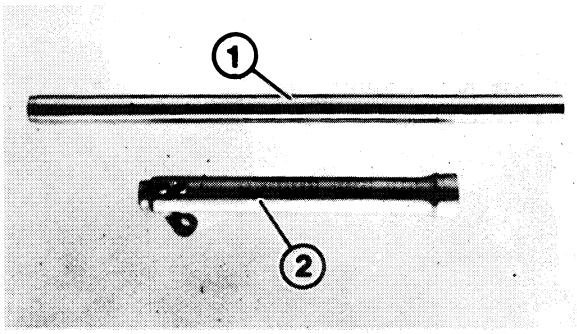
Removal steps:
- Hold the fork leg horizontally.
- Pull out the inner fork tube from the outer tube forcelly, but carefully.

CAUTION:

Avoid bottoming the inner tube in the outer tube during the above procedure, as the oil lock piece will be damaged.



8. Remove:
   - Oil seal
   - Oil lock piece



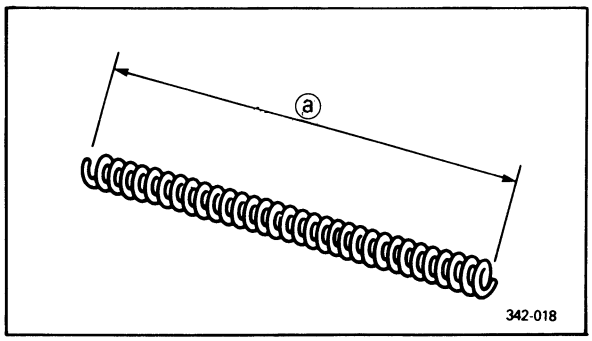
INSPECTION

1. Inspect:
   - Inner fork tube ①
   - Outer fork tube ②

   Scratches/Bends/Damage → Replace.

⚠ WARNING

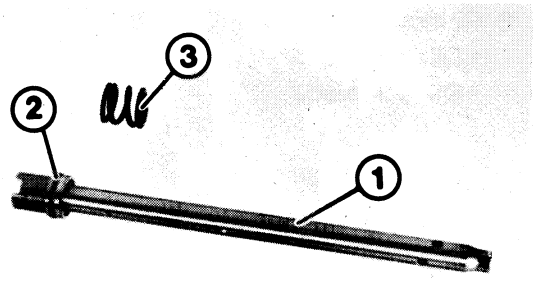
Do not attempt to straighten a bent inner fork tube as this may dangerously weaken the tube.



2. Measure:
   - Fork spring free length ⓐ

   Out of specification → Replace.

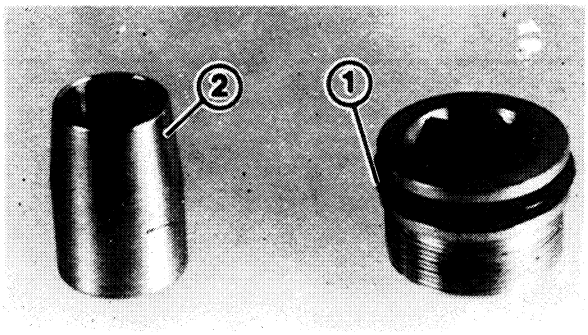
Minimum free length ⓐ:
524 mm (0.52 kg/mm, 29.1 lb/in)



3. Inspect:
   - Damper rod ①

   Wear/Damage → Replace.
   Contamination → Blow out all oil passages with compressed air.
   - Piston ring ②
   - Rebound spring ③

   Wear/Damage → Replace.



4. Inspect:
   - O-Ring (Cap bolt) ①
   - Oil lock piece ②

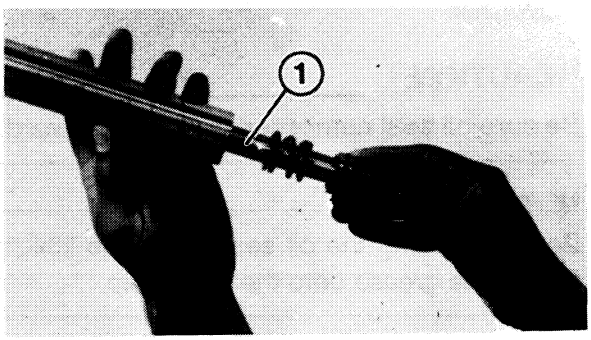
   Damage → Replace.

ASSEMBLY

Reverse the "DISASSEMBLY" procedure.
Note the following points.

NOTE:

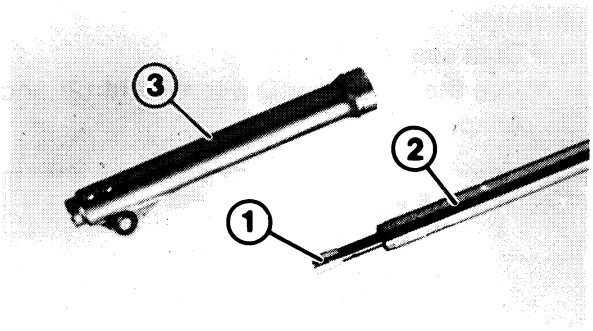
- In front fork reassembly, be sure to use following new parts.
  * Guide
  * Slide bush
  * Oil seal
  * Dust seal
- Make sure all components are clean before reassembly.



1. Install:
   - Damper rod ①

CAUTION:

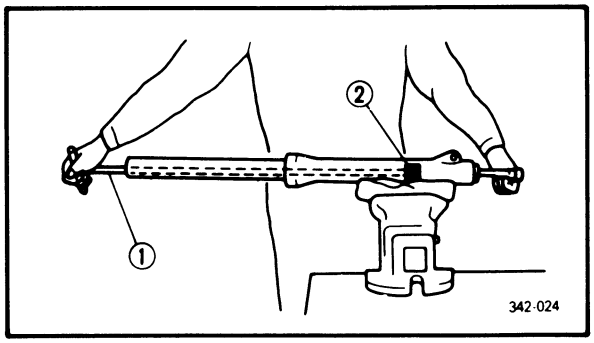
Allow the damper rod to slide slowly down the inner fork tube until it protrudes from the bottom, being careful not to damage the inner fork tube.



2. Install:
   - Oil lock piece ①
     (To damper rod)
3. Lubricate:
   - Inner fork tube (Outer surface) ②

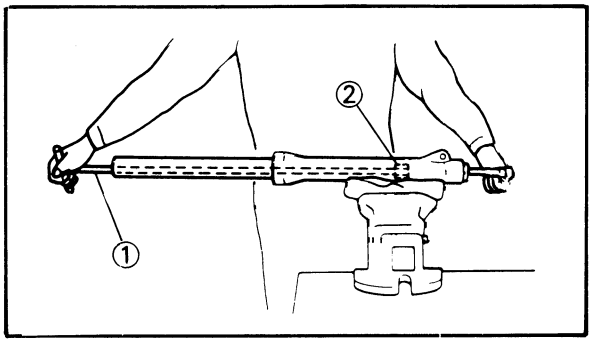
FORK OIL 10W or EQUIVALENT

③ Outer fork tube



4. Tighten:
   - Bolt (Damper rod)

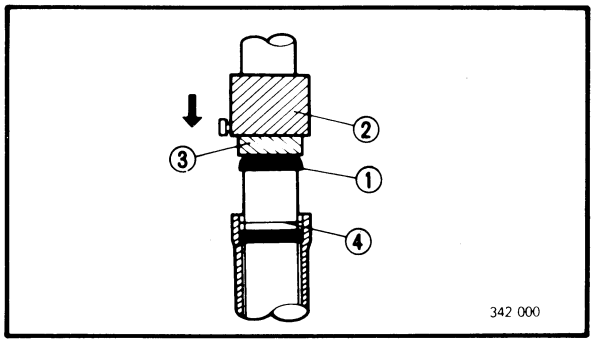
Bolt (Damper rod):
23 Nm (2.3 m·kg, 17 ft·lb)
Use LOCTITE®



NOTE:

Hold the damper rod to tighten the bolt (Damper rod) by the T-Handle ① and Holder ②.

T-Handle:
YM-01326
Holder:
P/N. YM-01300-1



5. Install:
   • Oil seal ①
   Use the Fork Seal Driver Weight ② and Adapter ③.

Fork seal driver weight:
YM-33963
Adapter:
YM-01369

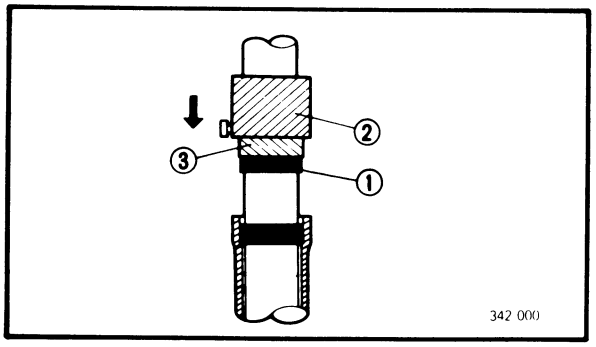
④ Washer

CAUTION:

Be sure oil seal numbered side face upward.

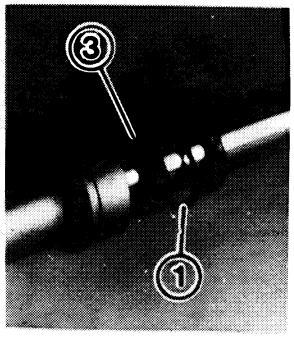
NOTE:

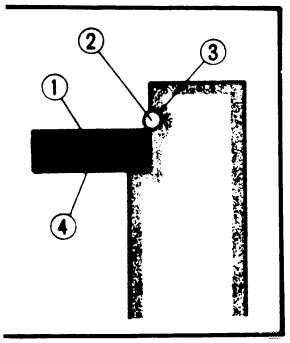
Before installing the oil seal, apply the lithium soap base grease onto the oil seal lip.



6. Install:
   • Dust seal ①
   Use the Fork Seal Driver Weight ② and Adapter ③.

Fork seal driver weight:
YM-33963
Adapter:
YM-01369





7. Install:
   • Retaining clip ①

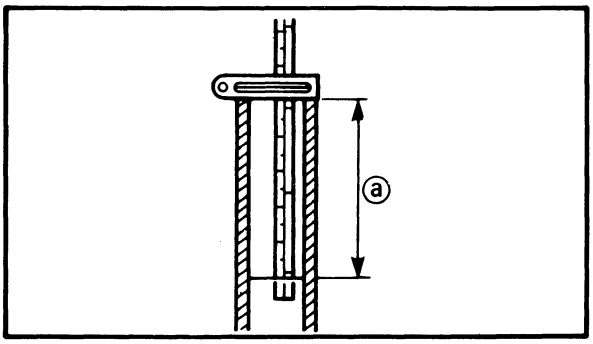
NOTE:

Fit the retaining clip① correctly in the groove ② in the outer tube.

③ Dust seal

8. Fill:
   • Front fork

Oil capacity:
280 cm³
Recommended oil:
Fork oil 10WT or equivalent
After filling, slowly pump the fork up and down to distribute oil



9. Measure:
   • Oil level ⓐ
   Out of specification → Add or reduce oil.

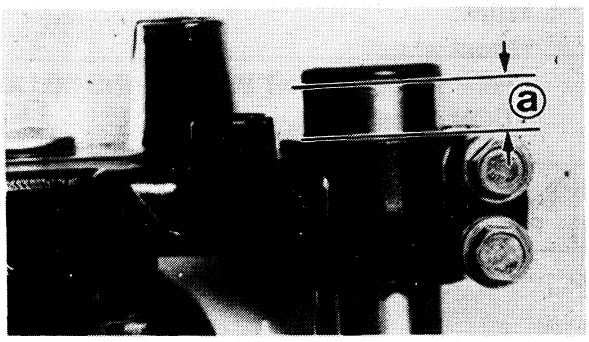
Fork oil level: 370 mm
Below the top of inner tube fully rebounded without fork spring.

NOTE:
Place the fork in upright position.

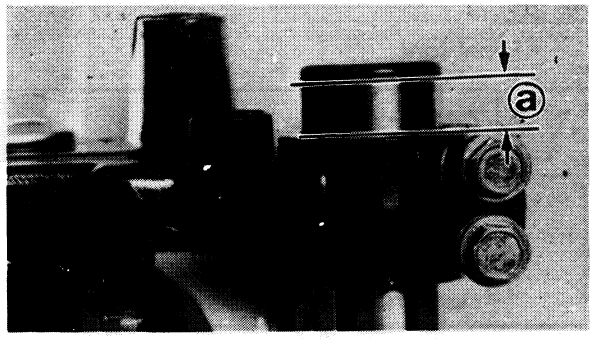
10. Install:
    • Fork spring
    • Cap bolt

NOTE:
Apply lithium soap base grease to the O-ring (Cap bolt).

11. Before installing the front fork, temporary tighten the cap bolt.



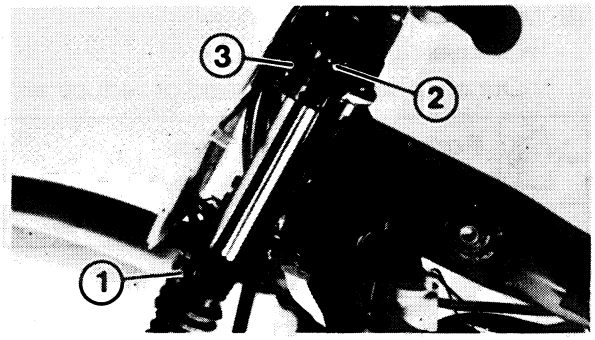
INSTALLATION
Reverse the "REMOVAL" procedure.
Note the following points.
1. Install:
   • Front fork
   Temporary tighten the pinch bolts.



NOTE:

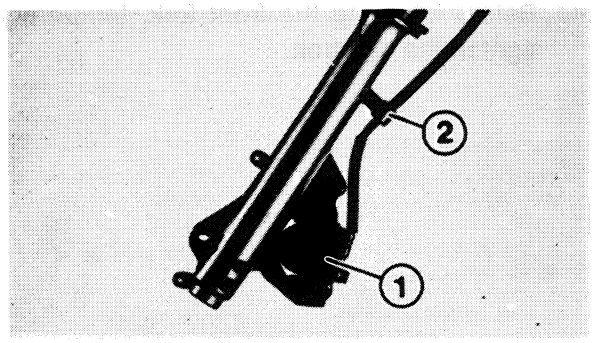
Position the inner fork tube end in such a way that it is projected with ⓐ from the top of the handle crown.

Projected length:
10 mm (0.4 in)



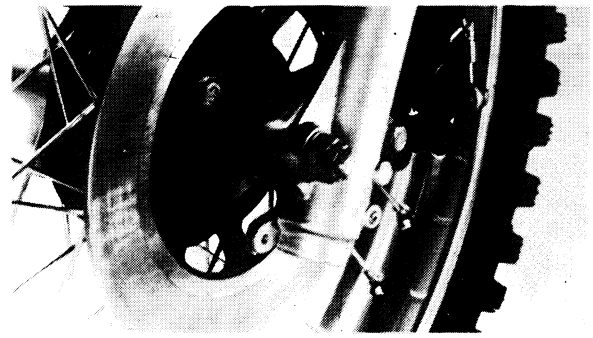
2. Tighten:
   - Pinch bolts ① (Under bracket)
   - Cap bolt ②
   - Pinch bolts ③ (Handle crown)

Pinch bolt (Under bracket):
23 Nm (2.3 m·kg, 17 ft·lb)
Cap bolt:
24 Nm (2.4 m·kg, 17 ft·lb)
Pinch bolt (Handle crown):
23 Nm (2.3 m·kg, 17 ft·lb)



3. Install:
   - Brake caliper assembly ①
   - Holder (Brake hose) ②

Bolt (Caliper bracket):
35 Nm (3.5 m·kg, 25 ft·lb)
Bolt (Brake hose holder):
10 Nm (1.0 m·kg, 7.2 ft·lb)



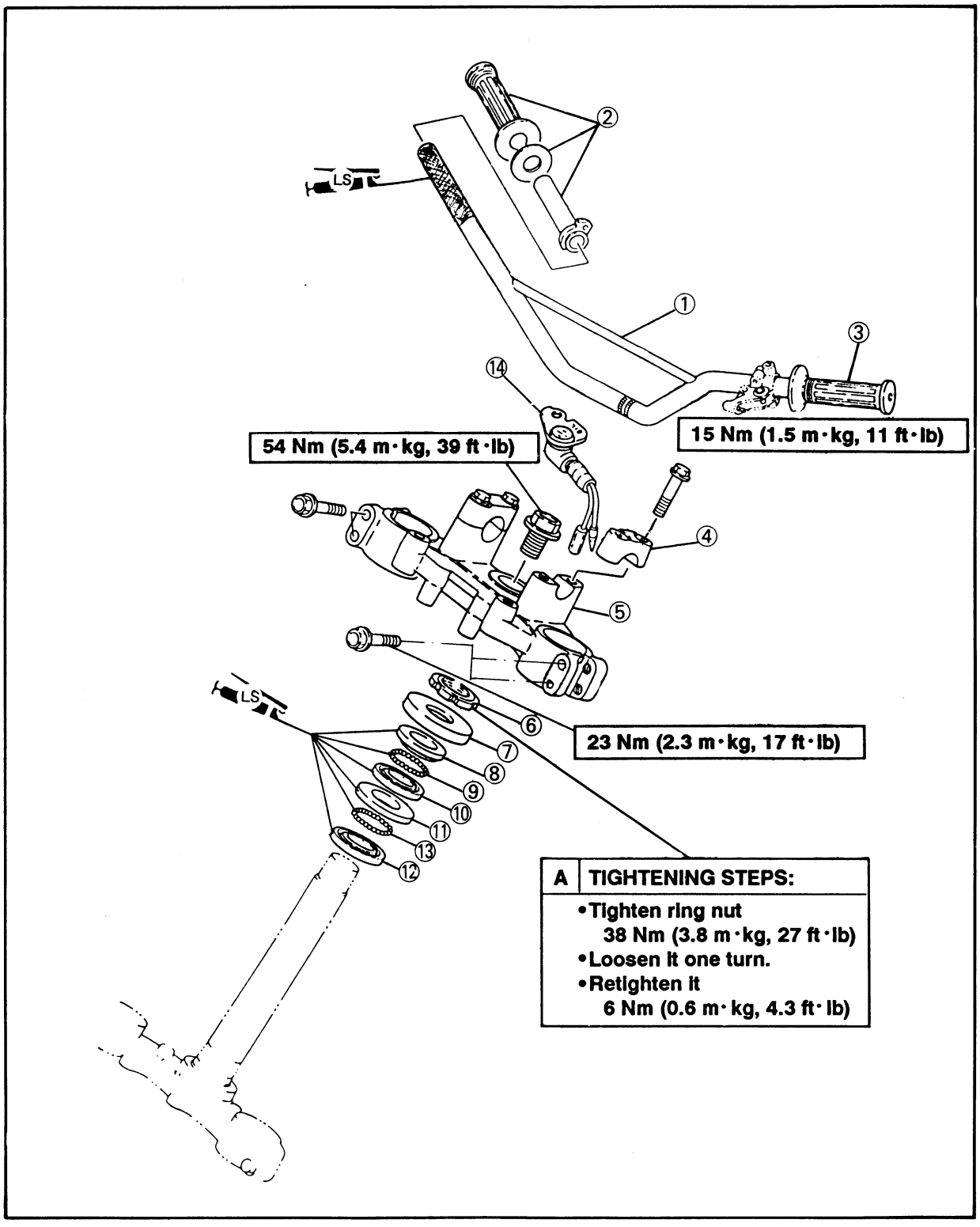
4. Install:
   - Front wheel

   Refer to the "FRONT WHEEL - INSTALLATION" section.

Wheel axle nut (Front):
85 Nm (8.5 m·kg, 61 ft·lb)

STEERING HEAD AND HANDLEBARS

① Handlebar
② Handlebar grip (Right)
③ Handlebar grip (Left)
④ Handlebar holder (Upper)
⑤ Handle crown
⑥ Ring nut
⑦ Cover
⑧ Bearing race 1 (Upper)
⑨ Ball
⑩ Bearing race 1 (Lower)
⑪ Bearing race 2 (Upper)
⑫ Bearing race 2 (Lower)
⑬ Ball 2
⑭ Oil light indicator



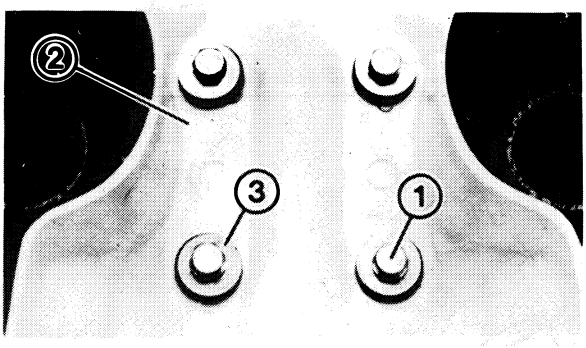
REMOVAL

⚠ WARNING

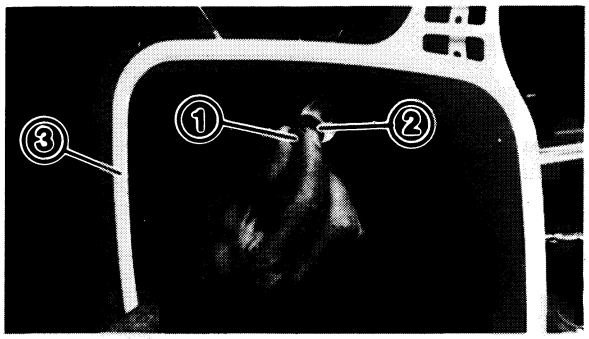
Securely support the machine so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.

2. Remove
   - Front wheel
     Refer to the "FRONT WHEEL - REMOVAL" section.
   - Front fork
     Refer to the "FRONT FORK - REMOVAL" section.

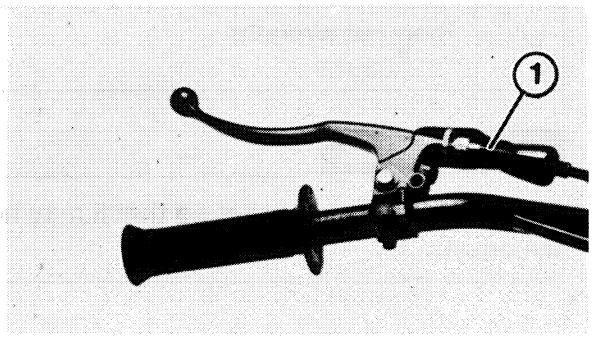


3. Remove:
   - Bolts ① (Front fender)
   - Front fender ②
   - Washers ③



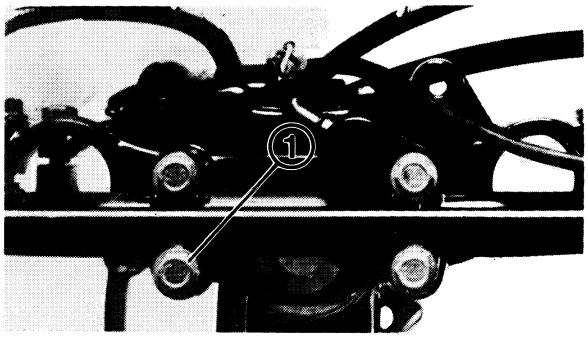
4. Remove:
   - Bolts ①(Number plate)
   - Washer ②
   - Number plate ③

5. Remove:
   - Bands ①
   - Master cylinder assembly ②



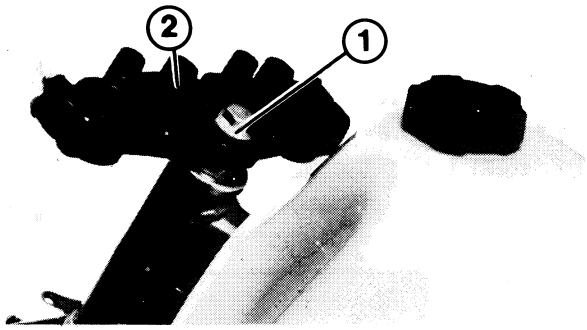
6. Disconnect:
   • Clutch cable ①
   (From clutch cable pivot)

7. Loosen:
   • Screws (Throttle cable housing) ①

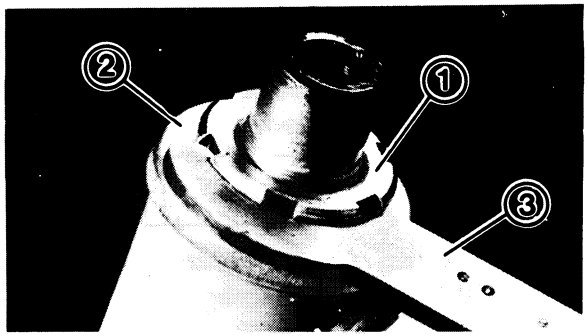


8. Remove:
   • Handlebar holders ①
   • Handlebar

NOTE:
For complete removal of the handlebar, be sure to clear the throttle cable housing.

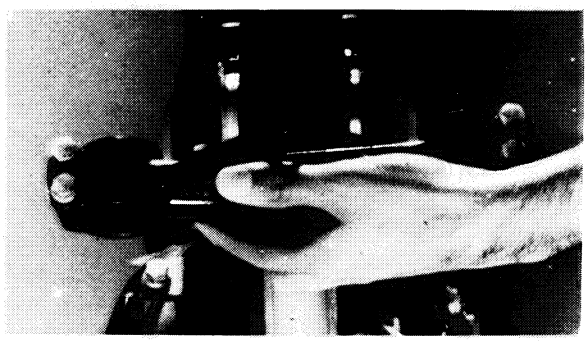


9. Remove:
   • Flange bolt (steering stem) ①
   • Handlebar crown ②



10. Remove:
    • Ring nut ①
    • Under bracket ②

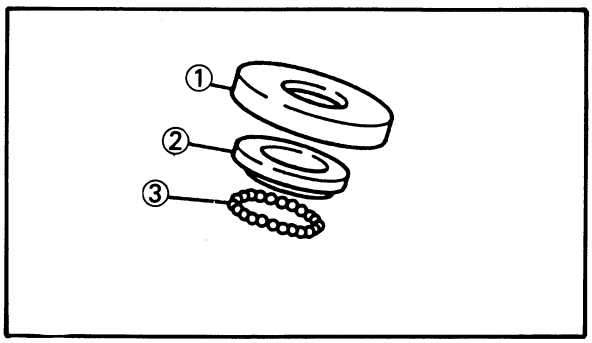
NOTE:
When removing the ring nut, use the Ring Nut Wrench ③.



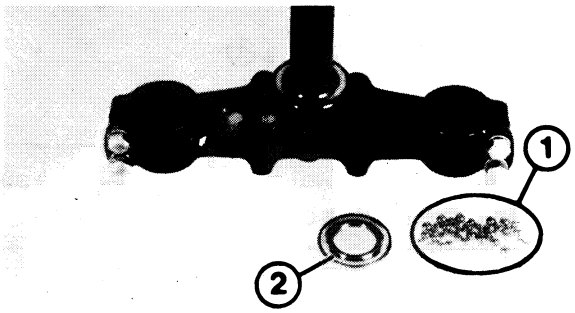
Ring nut wrench:
YU-33975

⚠ WARNING

Support the lower bracket so that it may not fall down.

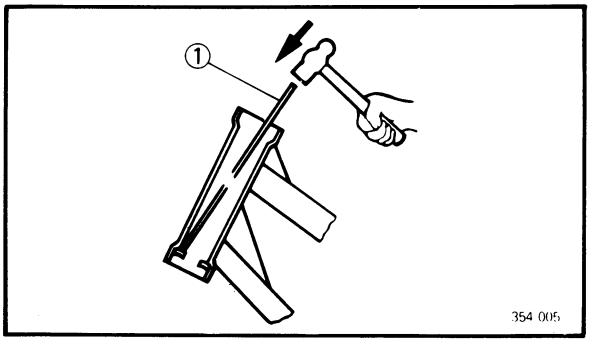


11. Remove:
    - Bearing cover ①
    - Bearing race ① and ②(Upper and lower) ②
    - Ball ③

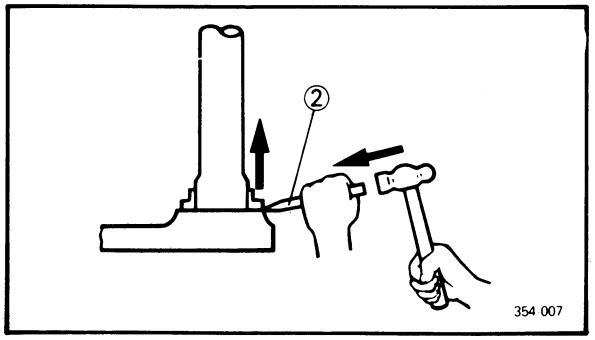


INSPECTION

1. Wash the bearing in a solvent.
2. Inspect:
    - Bearing races ①
      Pitting/Damage → Replace.
    - Dust seal ②
      Wear/Damage → Replace.



Bearing race replacement steps:
- Remove the bearing races on the head pipe using long rod① and the hammer as shown.
- Remove the bearing race on the steering stem using the floor chisel ② and the hammer as shown.
- Install the new dust seal and races.

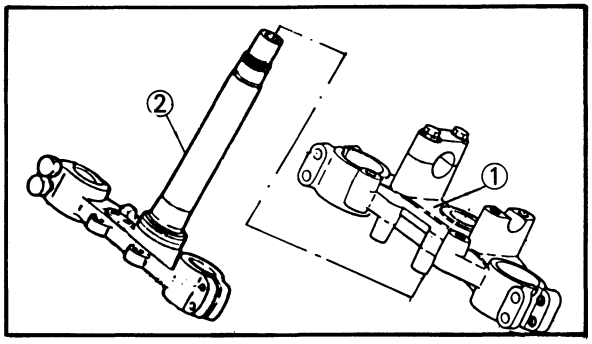


NOTE:

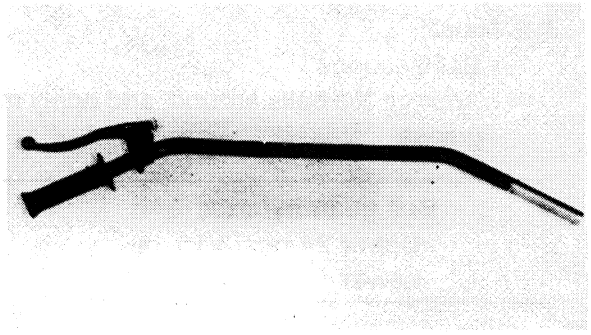
- Always replace bearings and races as a set.
- Replace the dust seal whenever the steering head is disassembled.

CAUTION:

If the bearing race is not fitted squarely, the head pipe could be damaged.



3. Inspect:
   - Handlebar crown ①
   - Under bracket ②
   (With steering stem)
   Cracks/Bends/Damage → Replace.



4. Inspect:
   - Handlebar
   Bends/Cracks/Damage → Replace.

⚠ WARNING

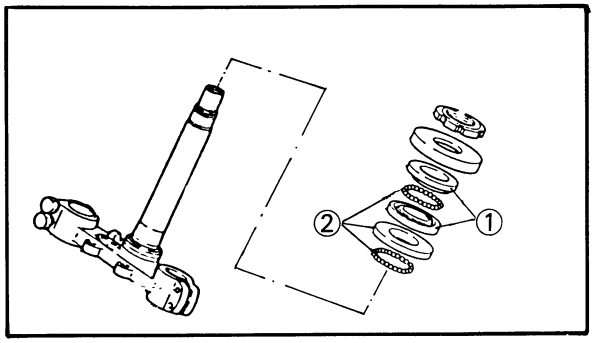
Do not attempt to straighten a bent handlebar as this may weaken the handlebar.

Handlebar replacement steps:
- Remove the handlebar grip, and lever holder.
- Install the lever holder to a new handlebar.
- Apply a light coat of an adhesive for rubber on the left handlebar end.
- Install the handlebar grip.

NOTE:
Wipe off excess adhesive with a clean rag.

⚠ WARNING

Leave the handlebar intact until the adhesive becomes dry enough to make the grip and handlebar stick securely.

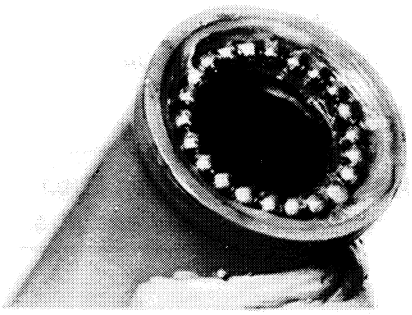


INSTALLATION

Revers the "REMOVAL" procedures.
Note the following points.

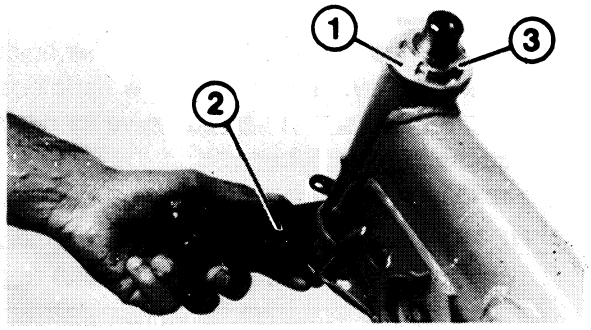
1. Lubricate:
   - Bearing races ①
   - Bearings

	Lithium-soap Base Grease



2. Install:
   - Ball bearings
     Arrange the balls around, and apply more grease

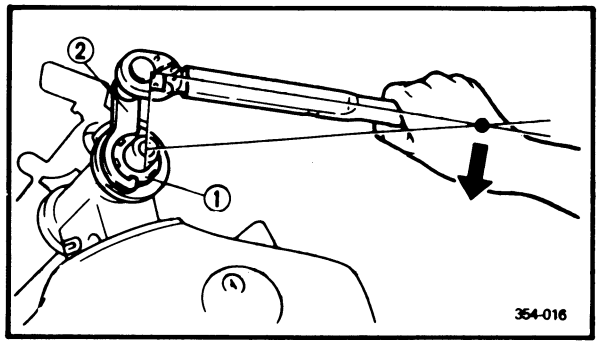
Ball quantity/size: **Upper 22 pcs/3/16 in** **Lower 19 pcs/1/4 in**



3. Install:
   - Ball race (Top-Upper)
   - Bearing cover ①
   - Under bracket ②
   - Ring nut ③

⚠ WARNING

Hold the bracket until it is secured.



4. Tighten:
   - Ring nut ①

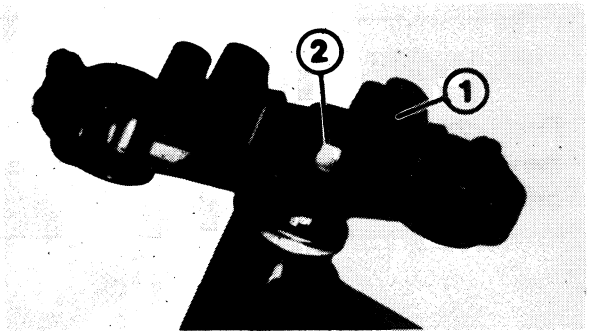
Tightening steps: • Tighten the ring nut using the Ring Nut Wrench ②.
Ring nut wrench: **YU - 33975**
NOTE: Set the torque wrench to the ring nut wrench so that they form a right angle.
Ring nut (Initial Tightening): **38 Nm (3.8 m·kg, 27 ft·lb)**
• Loosen the ring nut one turn.

•Retighten the ring nut using the Ring Nut Wrench.

⚠ WARNING

Avoid over-tigtening.

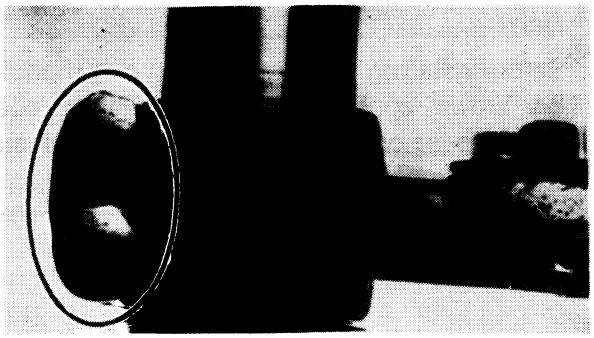
	Ring nut (Final Tightening): 6 Nm (0.6 m·kg, 4.3 ft·lb)



5. Install:
   • Handlebar crown ①
   • Flange bolt (Steering stem) ②

NOTE:

Temporarily tighten the flange bolt and pinch bolt.

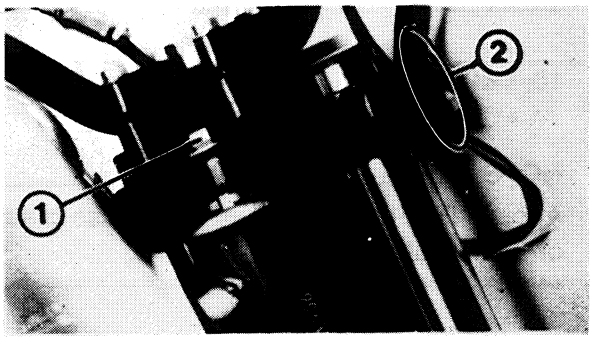


6. Install:
   • Front fork
   Refer to the "FRONT FORK - INSTALLATION" section.

	Pinch Bolt (Under bracket): 23 Nm (2.3 m·kg, 17 ft·lb)

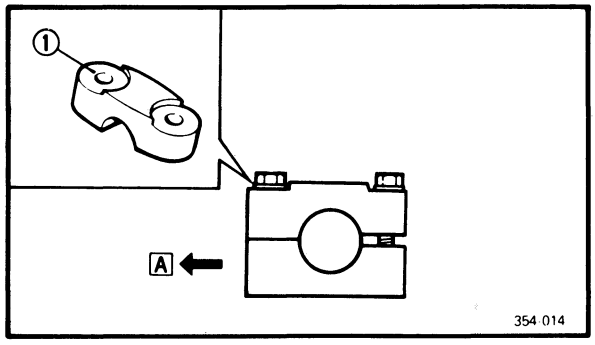
NOTE:

- In this stage, temporarily tighten the pinch bolts (Handlebar crown).
- Apply lithium soap base grease to the O-ring (Cap Bolt).



7. Tighten:
   • Flange bolt (Steering strem) ①
   • Pinch bolts (Handlebar crown) ②

	Flange Bolt (Steering stem): 54 Nm (5.4 m·kg, 39 ft·lb)
	Pinch Bolt (Handlebar Crown): 23 Nm (2.3 m·kg, 17 ft·lb)



8. Intall:
   - Handlebar
   - Handlebar holders

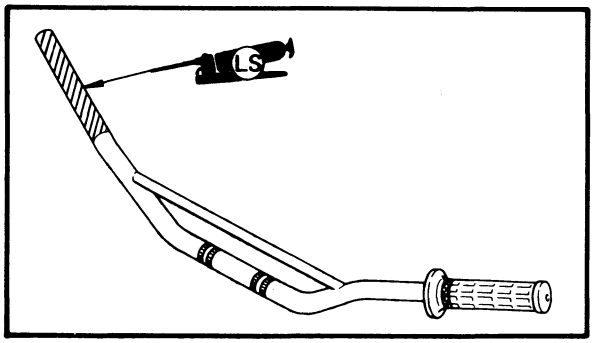
	Bolt (Handlebar holder): 15 Nm (1.5 m·kg, 11 ft·lb)

NOTE:

The upper handlebar holder should be installed with the punch mark ① forward A.

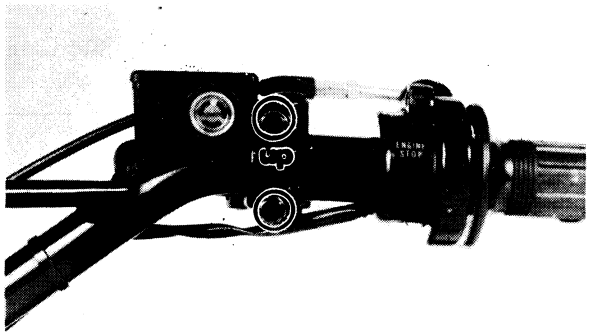
CAUTION:

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



NOTE:

Before installing the handlebar onto the handlebar crown, apply a light coat of lithium soap base grease onto the handlebar end and install the throttle housing to the handlebar.



9. Install:
   - Brake master cylinder

NOTE:

- Install the master cylinder bracket with the "UP" mark facing upward.
- Tighten first the upper bolt, then the lower bolt.

	Bolts (Master cylinder bracket): 9 Nm (0.9 m·kg, 6.5 ft·lb)

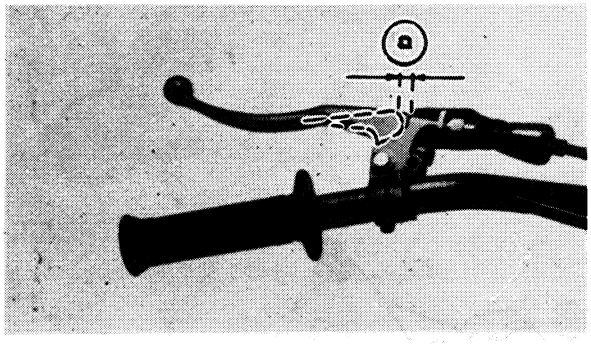
10. Install:
    - Clutch cable

NOTE:

Apply a light coat of lithium soap base grease onto the clutch cable end.

11. Install:
    • Front wheel
    Refer to the "FRONT WHEEL - INSTALLATION" section.

	Front wheel axle: **85 Nm (8.5 m· kg, 61 ft· lb)**



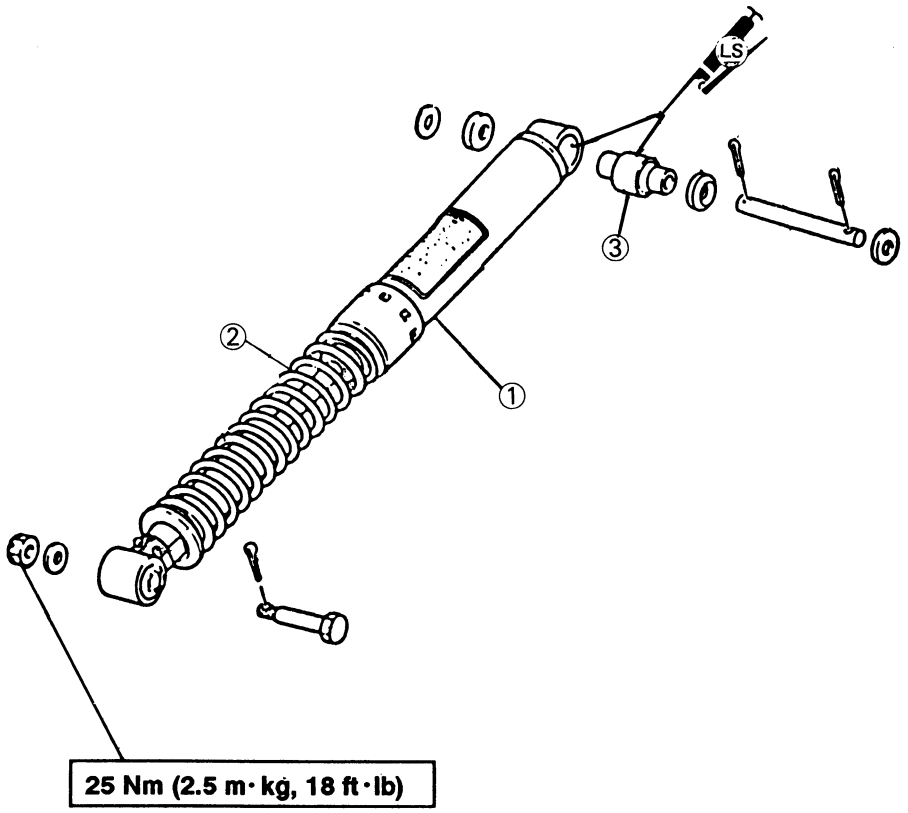
12. Adjust:
    • Clutch cable free play ⓐ
    Refer to the "CLUTCH ADJUSTMENT" section in CHAPTER 3.

	Free play: **2 ~ 3 mm (0.08 ~ 0.12 in)**

REAR SHOCK ABSORBER AND SWINGARM

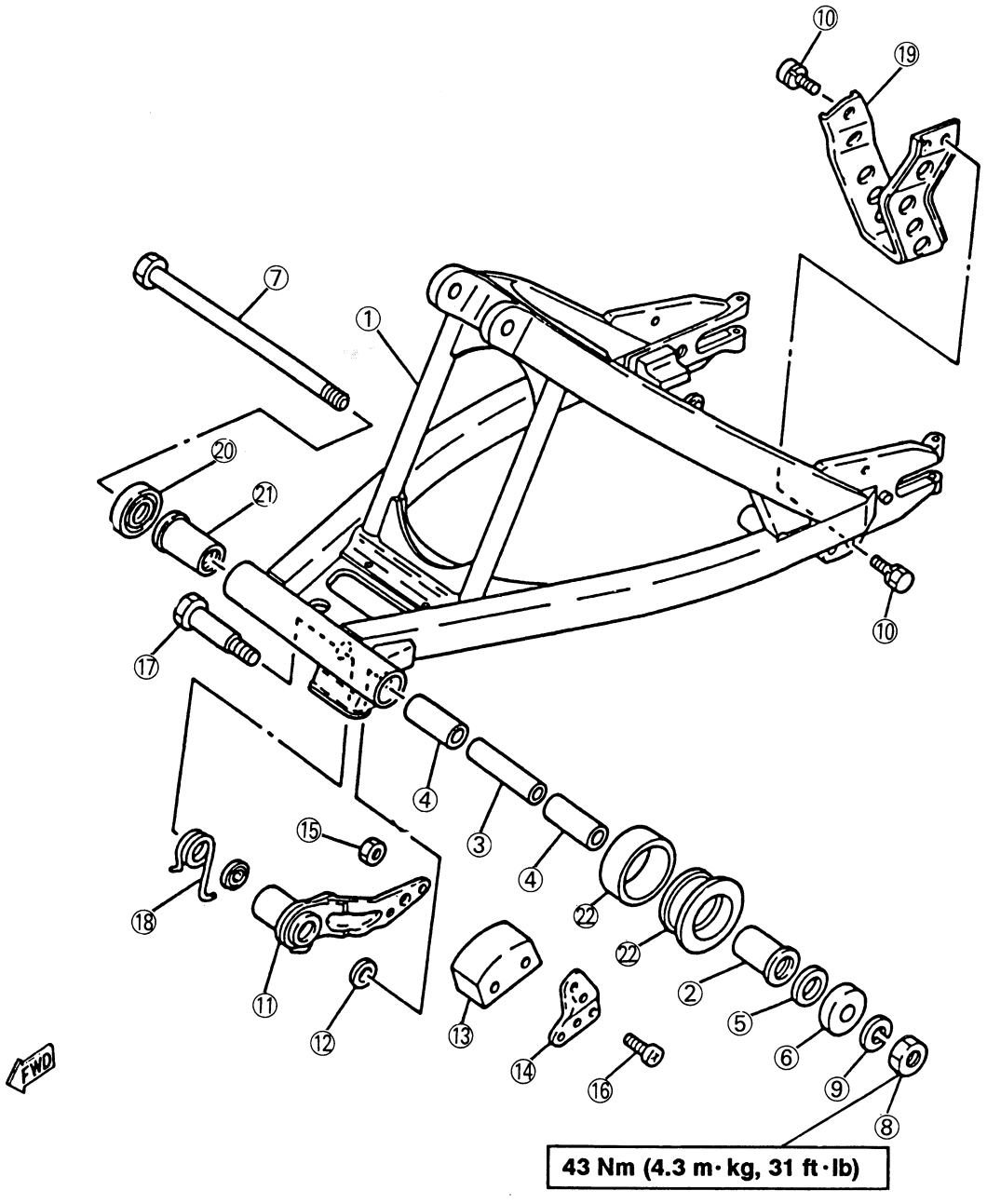
① Rear shock absorber assembly
② Spring
③ Bush

A	SPRING PRELOAD (INSTALLED): STANDARD LENGTH: 245 mm (9.64 in) MINIMUM LENGTH: 241 mm (9.49 in) MAXIMUM LENGTH: 249 mm (9.80 in)



REAR SHOCK ABSORBER AND SWINGARM

① Swingarm
② Bush 1
③ Bush 2
④ Swingarm bush
⑤ Shim
⑥ Thrust cover
⑦ Pivot shaft
⑧ Self lock nut
⑨ Spring washer
⑩ Bolt with washer
⑪ Tensioner arm
⑫ Oil seal
⑬ Tensioner
⑭ Chain guide
⑮ Nut
⑯ Pan head screw
⑰ Bolt
⑱ Torsion spring
⑲ Chain guard
⑳ Thrust cover
㉑ Bush
㉒ Seal

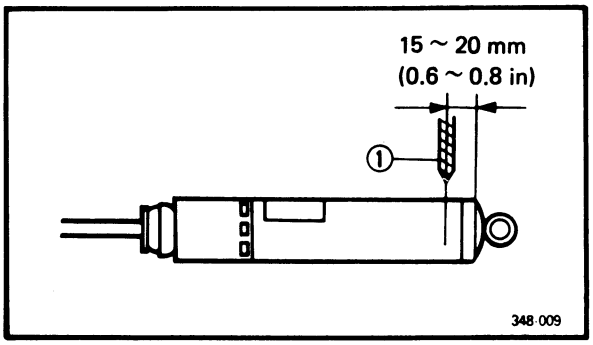


HANDLING NOTES

⚠ WARNING

This shock absorber contains highly pressurized nitrogen gas. Read and understand the following information before handling the shock absorber. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

- **Do not tamper with or attempt to open the cylinder assembly.**
- **Do not subject shock absorber to an open flame or other high heat source. This may cause the unit to explode due to excessive gas pressure.**
- **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.**
- **Take care not to scratch the contact surface of the piston rod with the cylinder or oil could leak out.**
- **When scrapping the shock absorber, refer to the "NOTES ON DISPOSAL" section.**



NOTES ON DISPOSAL

Shock absorber disposal steps:
Gas pressure must be released before disposing of shock absorber. To do so, drill ① a 2 ~ 3 mm (0.08 ~ 0.12 in) hole through the cylinder wall at a point 15 ~ 20 mm (0.6 ~ 0.8 in) from the end of the gas chamber.

⚠ WARNING

Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

REMOVAL

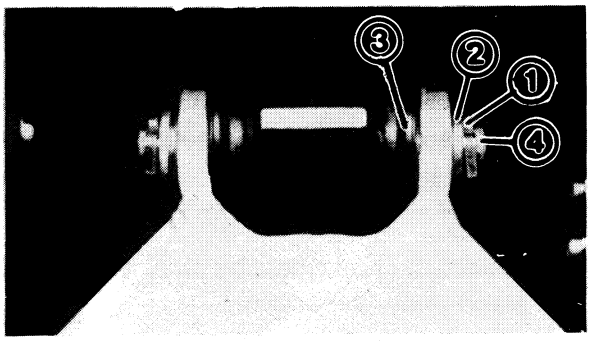
⚠ WARNING

Securely support the machine so there is not danger of it falling over.

Rear shock absorber

1. Remove:
   - Side covers (left and right)
   - Seat
   - Fuel tank

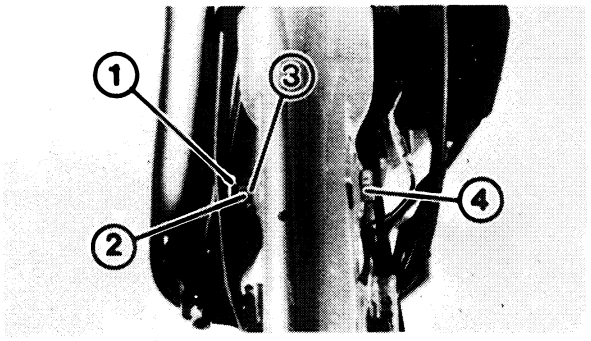
2. Elevate the rear wheel by placing a suitable stand under the engine.



3. Remove:
   - Cotter pin ①
   - Washer ②
   - Thrust cover ③
   - Clevis pin ④

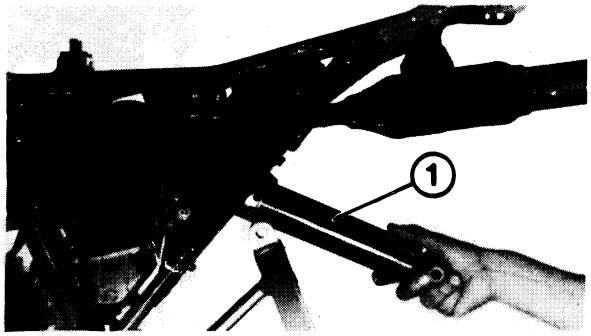
⚠ WARNING

When removing the clevis pin ④, hold the swingarm so that it does not drop downwards when the clevis pin removed.



4. Remove:
   - Cotter pin ①
   - Nut ②
   - Washer ③
   - Bolt (Shock absorber - Upper) ④

5. Remove:
   • Rear wheel
   Refer to the "REAR WHEEL - REMOVAL" section.



6. Remove:
   • Rear shock absorber ①

Swingarm

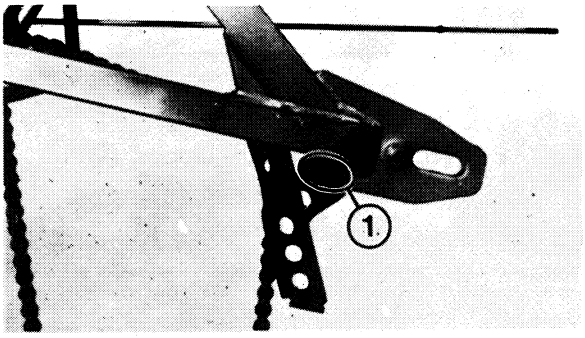
⚠ WARNING

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

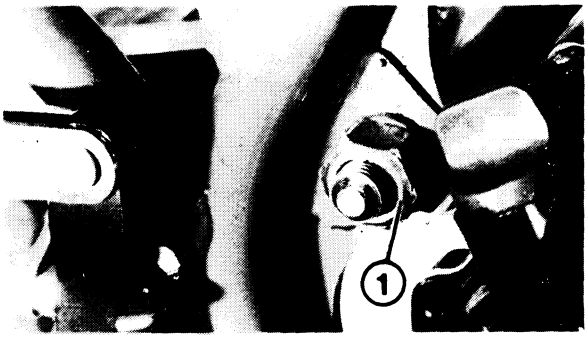
1. Elevate the rear wheel by placing a suitable stand under the engine.

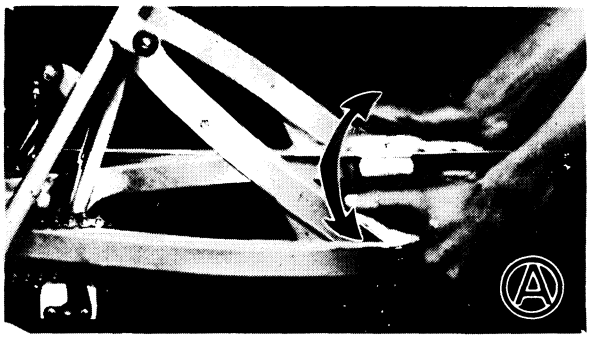
2. Remove:
   • Rear shock absorber
   Refer to the "REAR SHOCK ABSORBER" section.

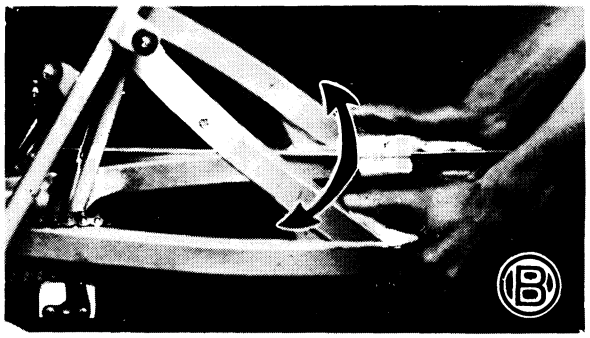
3. Remove:
   • Rear wheel
   Refer to the "REAR WHEEL - REMOVAL" section.



4. Remove:
   • Bolts (Chain guard) ①







5. Check:
   - Swingarm free play

Inspection steps:
- Check the tightening torque of the pivot shaft (swingarm) securing nut ①.

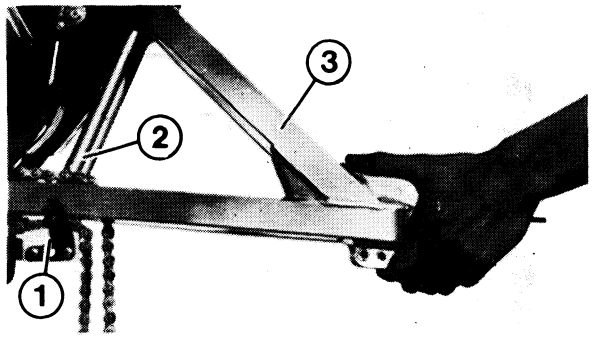
Nut (swingarm-pivot shaft):
43 Nm (4.3 m·kg, 31 ft·lb)

- Check the swingarm side play [A] by moving it from side to side.
- If side play is noticeable, check the collar and bushings or adjust the shim.

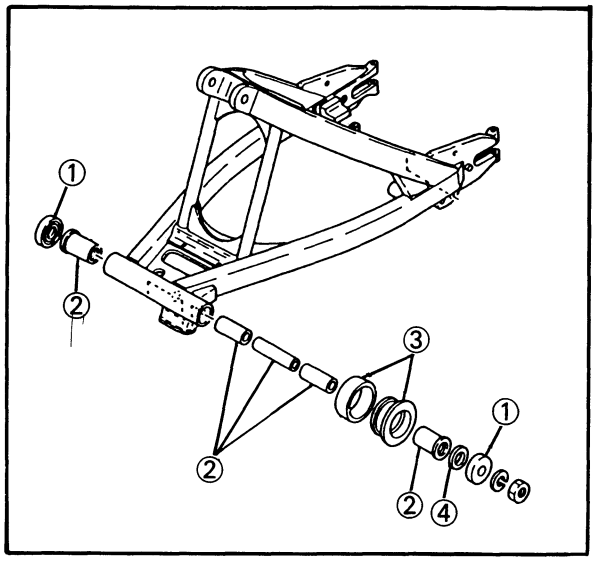
Side play (At end of swingarm):
1.0 mm (0.04 in)

- Check the swingarm vertical movement [B] by moving it up and down.
- If vertical movement is tight, bound or rough, check the collar and bushings or adjust the shim.

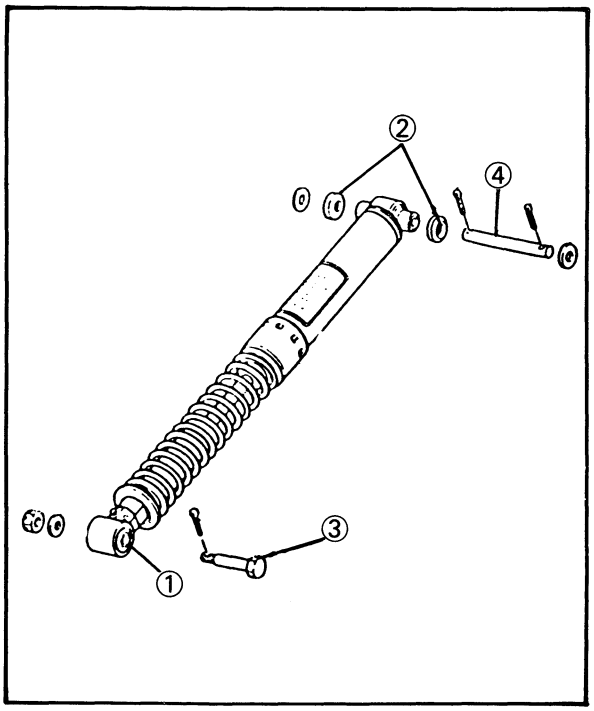
6. Disconnect:
   - Joint (Drive chain) ①



7. Remove:
   - Chain tensioner ①
   - Pivot shaft ②
   - Swingarm ③



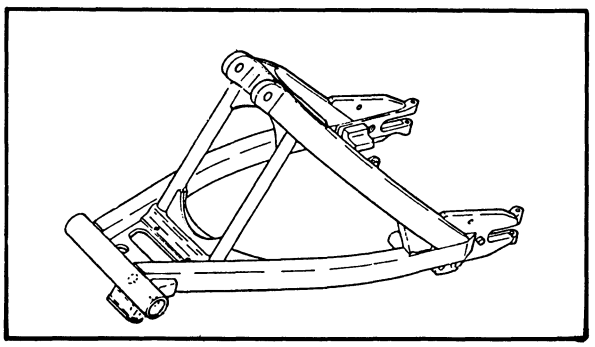
8. Remove:
   - Thrust covers ①
   - Bushings (Swingarm) ②
   - Seal ③
   - Shim ④



INSPECTION

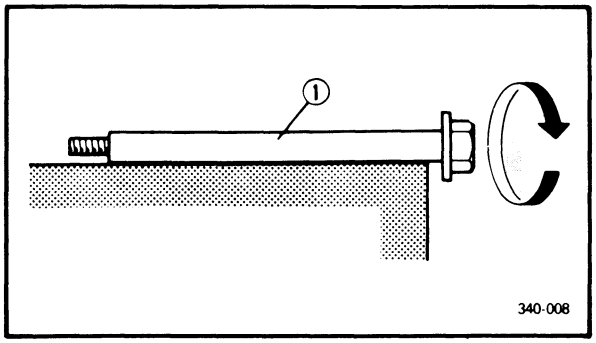
Shock Absorber

1. Inspect:
   - Shock absorber rod
     Bends/Damage → Replace the shock absorber assembly.
   - Shock absorber
     Oil leaks/Gas leaks → Replace the shock absorber assembly.
   - Spring
     Wear/Damage → Replace the shock absorber assembly.
   - Bushings ①.
     Wear/Damage → Replace.
   - Thrust covers ②
   - Bolt ③
     Wear/Bends/Damage → Replace.
   - Clevis pin ④
     Wear/Damage → Replace.



Swingarm

1. Inspect:
   - Swingarm
     Crack/Bend/Damage → Replace.

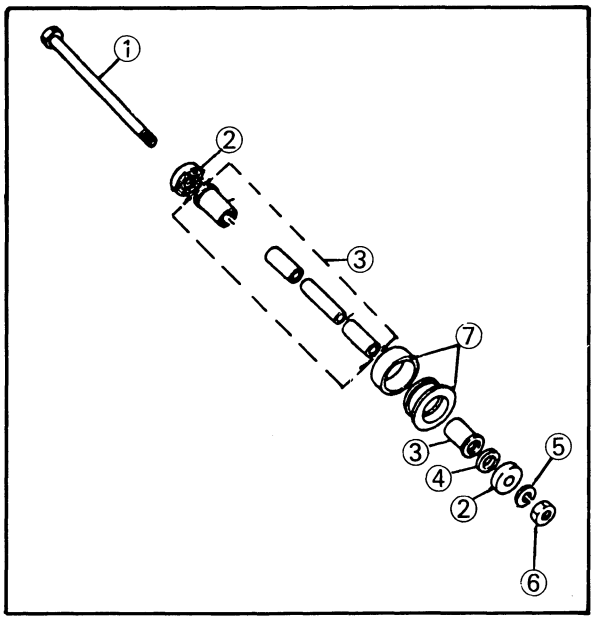


2. Inspect:
   • Pivot shaft ①
   Roll the axle on a flat surface.
   Bends → Replace.

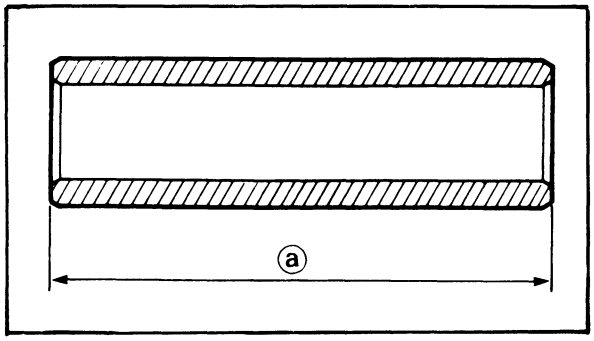
⚠ WARNING

Do not attempt to straighten a bent axle.

3. Wash the swingarm pivoting parts in a solvent.



4. Inspect:
   • Pivot shaft ①
   • Thrust cover ②
   • Bushings (Swingarm) ③
   Pitting/Damage → Replace.
   • Washer plate ④
   • Spring washer ⑤
   • Nut ⑥
   Scratches/Damage → Replace.
   • Seal ⑦
   Wear/Damage → Replace.



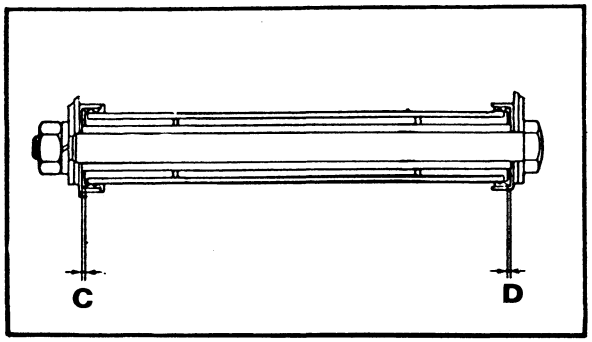
SIDE CLEARANCE ADJUSTMENT

1. Measure:
   • Collar length ⓐ
   Out of specification → Replace.

	Inner Collar length: **165.2 ~ 165.4 mm (6.504 ~ 6.512 in)**

2. Measure:
   • Pivot width (Swingarm) ⓑ

3. Calculate:
   • Swingarm side clearance
   Out of specification→Adjust side clearance using shim.
   By using formula given below.

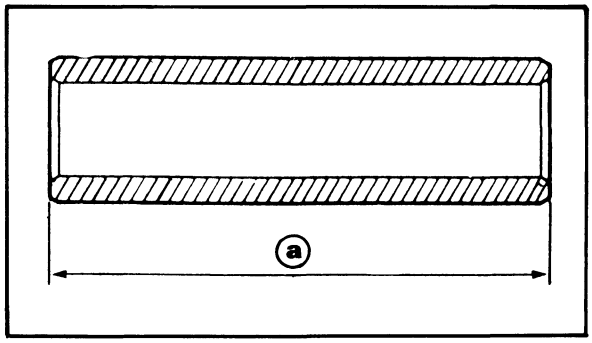


Side clearance:
= ⓐ - ⓑ

Side clearance:
Less than 0.3 mm (0.012 in)

If the side clearance is out of specification, adjust it to specification by installing the adjust shim at positions, C and D.

NOTE:
- The adjust shim is available only in the 0.3 mm (0.012 in) - thick type.
- When only one shim is required, install it on the left side, and when two shims are necessary, install them on both right and left sides.



Example:
If the inner collar length
ⓐ = 165.4 mm (6.512 in)
and the pivot width
ⓑ = 164.9 mm (6.492 in)
Side clearance
= 165.4 - 164.9 = 0.5 mm
Then, install the one shim on the left side.

NOTE:
After installing the shim, the side clearance should be 0.2 mm (0.008 in).

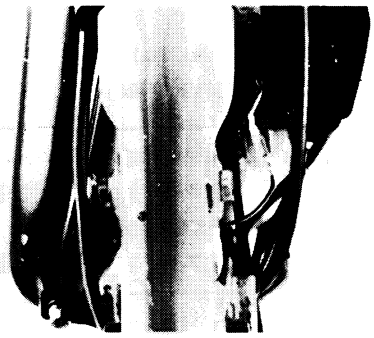
Shim thickness:
0.3 mm (0.0012 in)

INSTALLATION

Rear shock Absorber

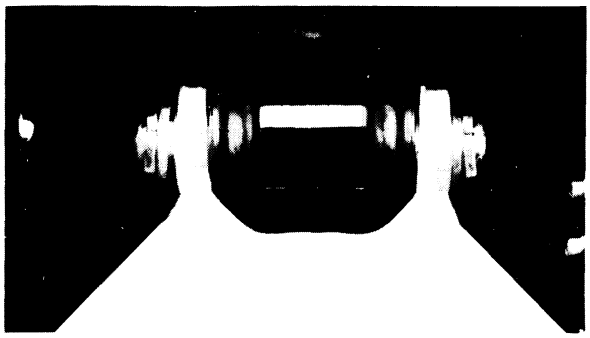
Reverse the "REMOVAL" procedure.
Note the following points.

1. Apply:
   - Lithium soap base grease
     To clevis pin and mounting bolt



2. Tighten:
   - Nut (Shock absorber)

	Nut (Shock absorber): 25 Nm (2.5 m·kg, 18 ft·lb)



3. Install:
   - Clevis pin
   - Shock absorber
   - Cotter pin

⚠ WARNING

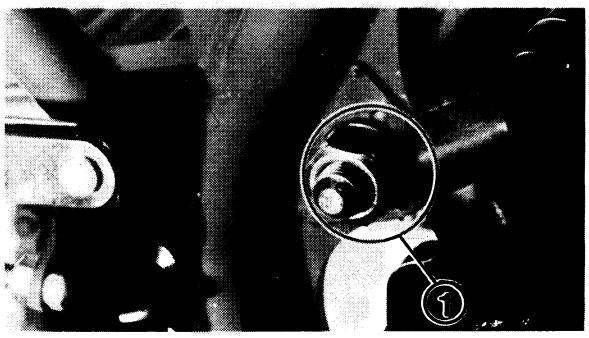
Always use a new cotter pin.

4. Adjust:
   - Rear shock absorber
     Refer to the 'REAR SHOCK ABSORBER ADJUSTMENT" section in CHAPTER 3.

Swingarm

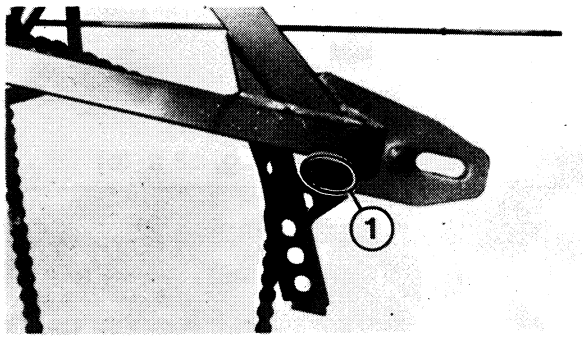
Reverse the "REMOVAL" procedure.
Note the following points.

1. Apply:
   - Lithium soap base grease
     To bushings pivotting, shaft, collar and inside of thrust cover.



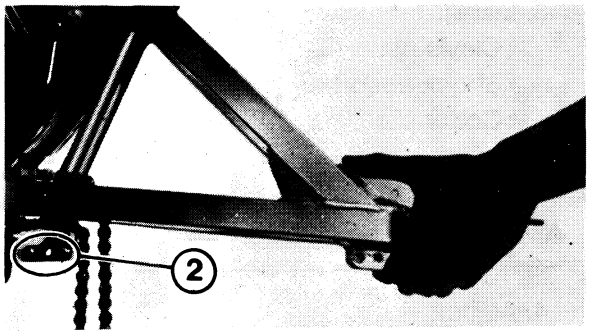
2. Tighten:
   • Nut (Pivot shaft) ①

	Nut ① (Pivot shaft): **43 Nm (4.3 m· kg, 31 ft·lb)**



3. Tighten:
   • Bolts (Chain guard) ①
   • Nut (Chain tensioner) ②

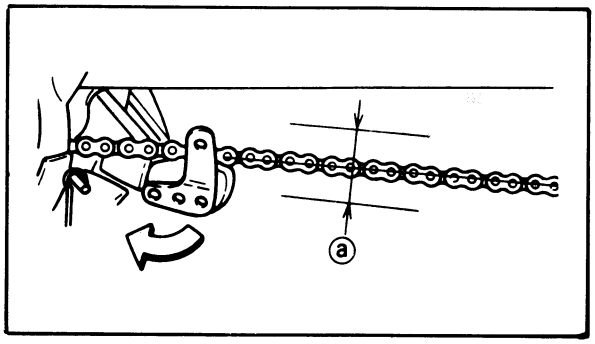
	Bolt (Chain guard): **4 Nm (0.4 m· kg, 2.9 ft·lb)** **Nut (chain tensiner):** **7 Nm (0.7 m· kg, 5.1 ft·lb)**



4. Install:
   • Rear wheel
   Refer to "REAR WHEEL - INSTALLATION" section.

	Nut (Rear wheel axle): **85 Nm (8.5 m·kg, 61 ft·lb)**

5. Install:
   • Rear shock absorber
   Refer to the "REAR SHOCK ABSORBER" section.



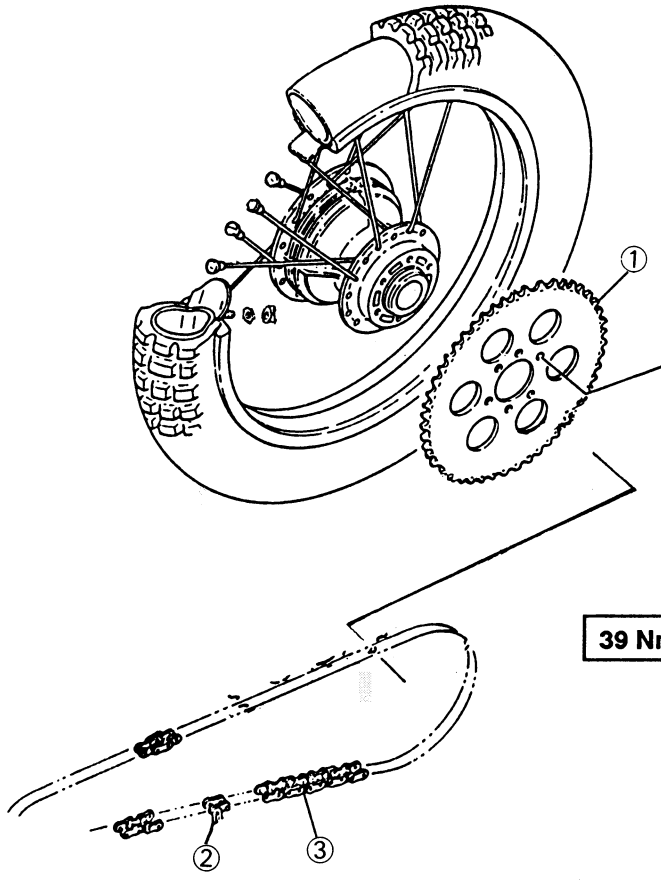
6. Adjust:
   • Drive chain slack ⓐ
   Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in CHAPTER 3.

	Drive chain slack: **40 mm (1.81 in)**

DRIVE CHAIN AND SPROCKETS

① Drive sprocket
② Chain joint
③ Drive chain
④ Stud bolt
⑤ Nut
⑥ Plate washer

A	DRIVE CHAIN: TYPE: 428 H N° OF LINKS: 122 DRIVE CHAIN SLACK: 40 mm (1.57 in)



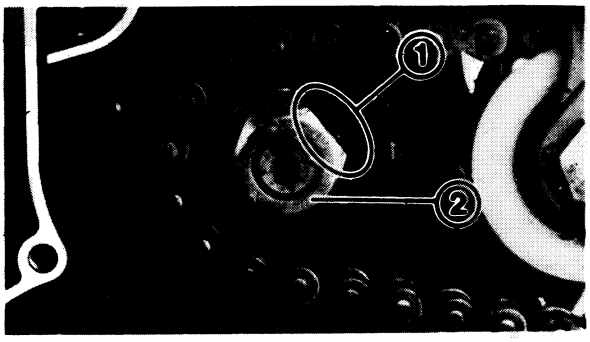
39 Nm (3.9 m· kg, 28 ft · lb)

NOTE:

Before removing the drive chain and sprocket, drive chain stretch should be checked.

REMOVAL

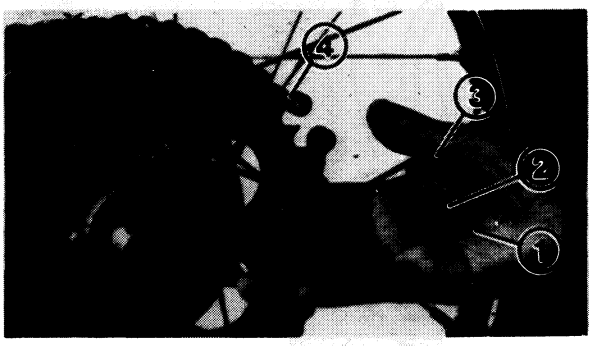
1. Remove:
   - Crankcase cover (Left) ①



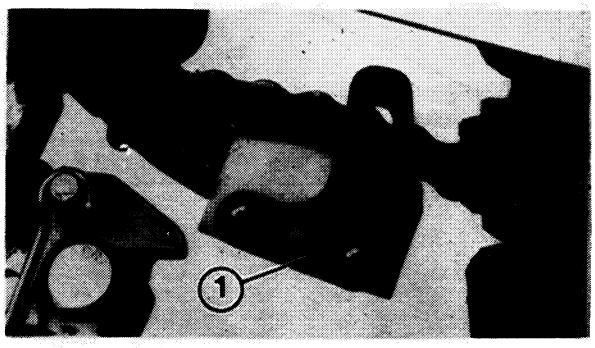
2. Straighten:
   - Lock washer tab ①
3. Loosen:
   - Nut (Drive sprocket) ②

NOTE:

When loosening the drive sprocket nut, apply the rear brake pedal and shift transmission to the 6th position.

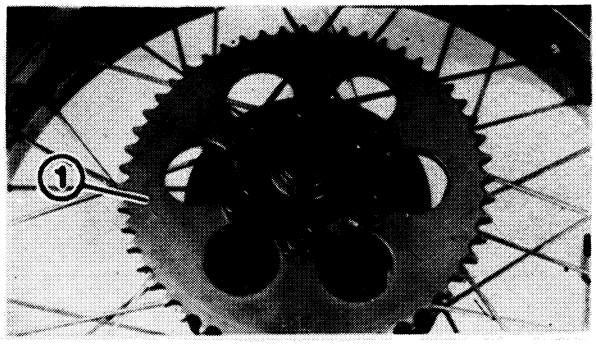


4. Remove:
   - Clip (Master link) ①
   - Plate (Master link) ②
   - Master link ③
   - Drive chain ④

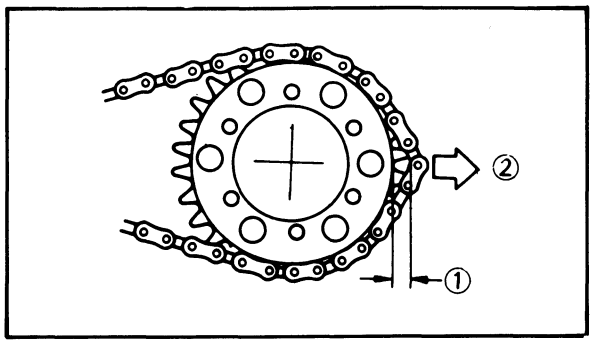


5. Remove:
   - Chain tensioner ①
   - Drive sprocket
6. Remove:
   - Rear wheel

   Refer to the "REAR WHEEL - REMOVAL" section.

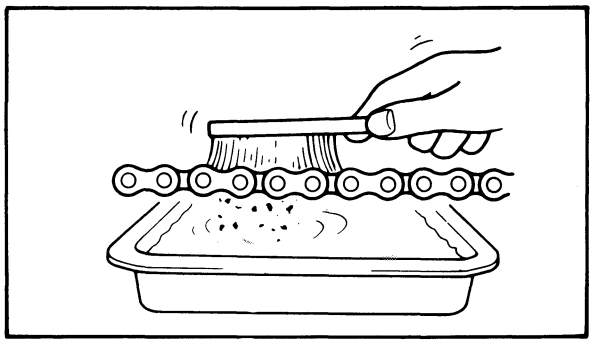


7. Remove:
   - Driven sprocket ①

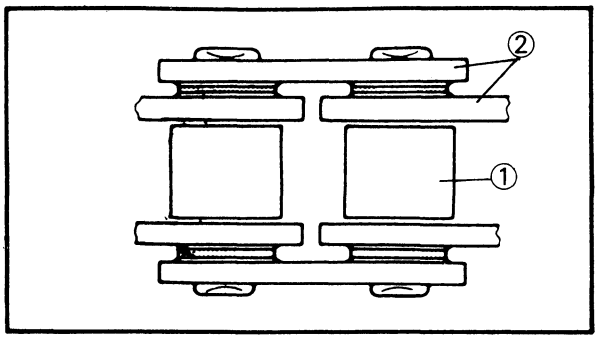


INSPECTION AND CLEANING

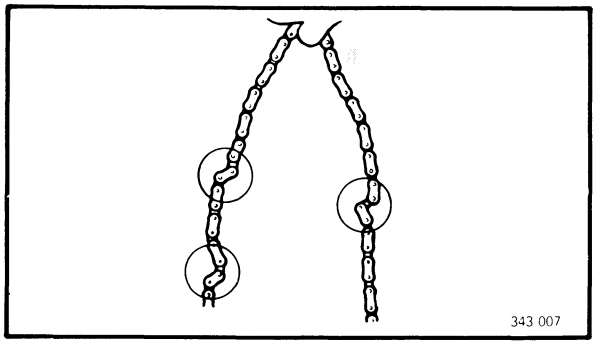
1. Check:
   - Drive chain stretch
     Pull ② the chain away from the driven sprocket.
     Distance chain/sprocket higher than 1/2 tooth ①→ Replace drive chain.



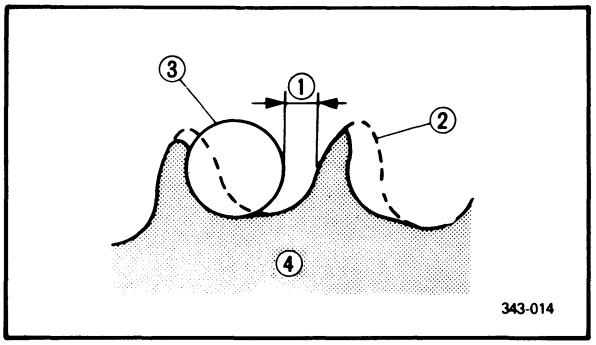
2. Clean:
   - Drive chain
     Place it in solvent, and brush off as much dirt as possible. Then remove the chain from the solvent and dry the chain.



3. Inspect:
   - Rollers ①
   - Side plates ②
     Damage/Wear → Replace drive chain.

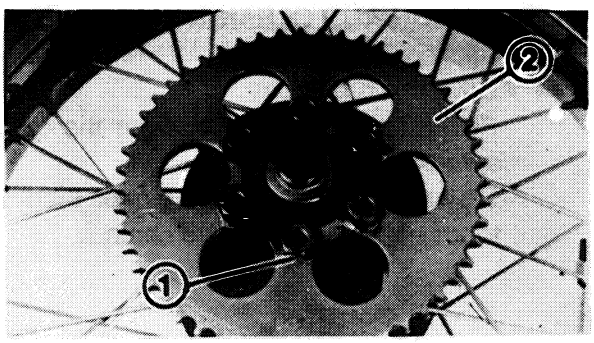


4. Check:
   - Drive chain stiffness
     Stiff → Replace drive chain.



5. Inspect:
   - Drive sprocket
     More than 1/2 tooth ① wear→ Replace sprocket.
     Bent teeth→ Replace sprocket

② Correct
③ Roller
④ Sprocket



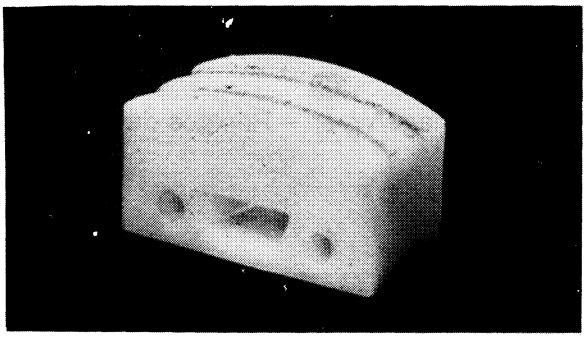
Drive sprocket replacement steps:
- Straighten the lock washer ① tabs and remove the driven sprocket ②.
- Install a new driven sprocket and lock washers.

⚠ WARNING

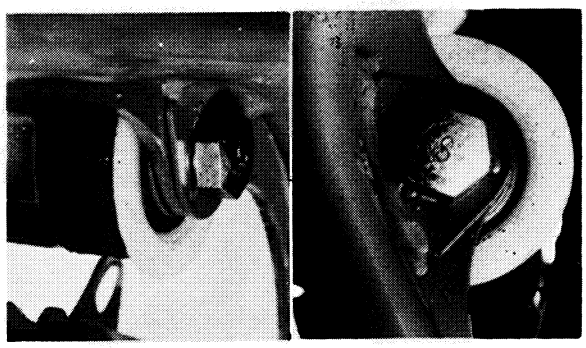
Always use new lock washers.

Nut (Driven sprocket):
39 Nm (3.9 m·kg, 28 ft·lb)

- Bend the lock washer tabs along the nut flats.



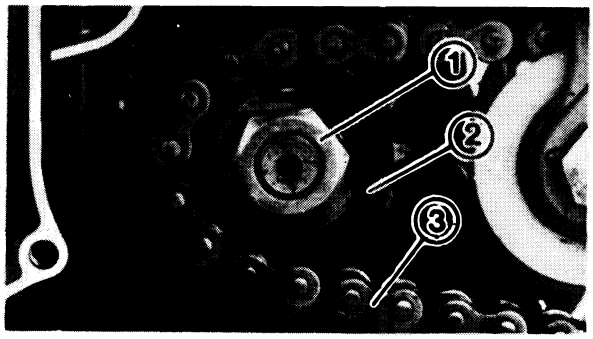
6. Inspect:
   - Chain tensioner
     Wear/Damage → Replace.



INSTALLATION
Reverse the "REMOVAL" procedure.
Note the following points.

1. Install:
   - Rear wheel
     Refer to the "REAR WHEEL - INSTALLATION" section.

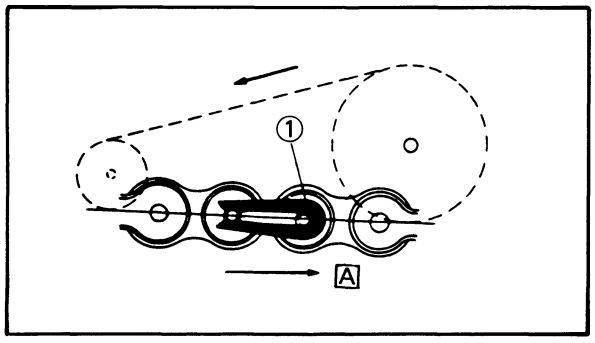
Nut (Rear Wheel axle):
85 Nm (8.5 m·kg, 61 ft·lb)
Bolt (Swingarm end):
8 Nm (0.3 m·kg, 2.2 ft·lb)



2. Install:
   - Lock washer ①
   - Drive sprocket ②
   - Drive chain ③

3. Tighten:
   - Nut (Drive sprocket) ④

	Nut (Drive sprocket): 60 Nm (6.0 m·kg, 43 ft·lb)

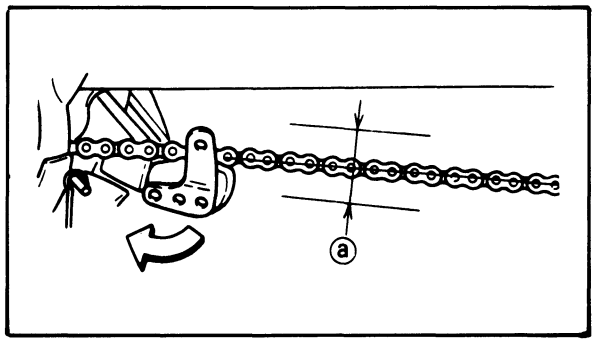


4. Bend the lock washer tab along the nut flats.

⚠ WARNING

Always use a new lock washer (drive sprocket). Make sure that the clip ① is installed in the correct direction. Otherwise, the drive chain will be separated.

A Turning direction



5. Adjust:
   - Drive chain slack ⓐ
     Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in CHAPTER 3.

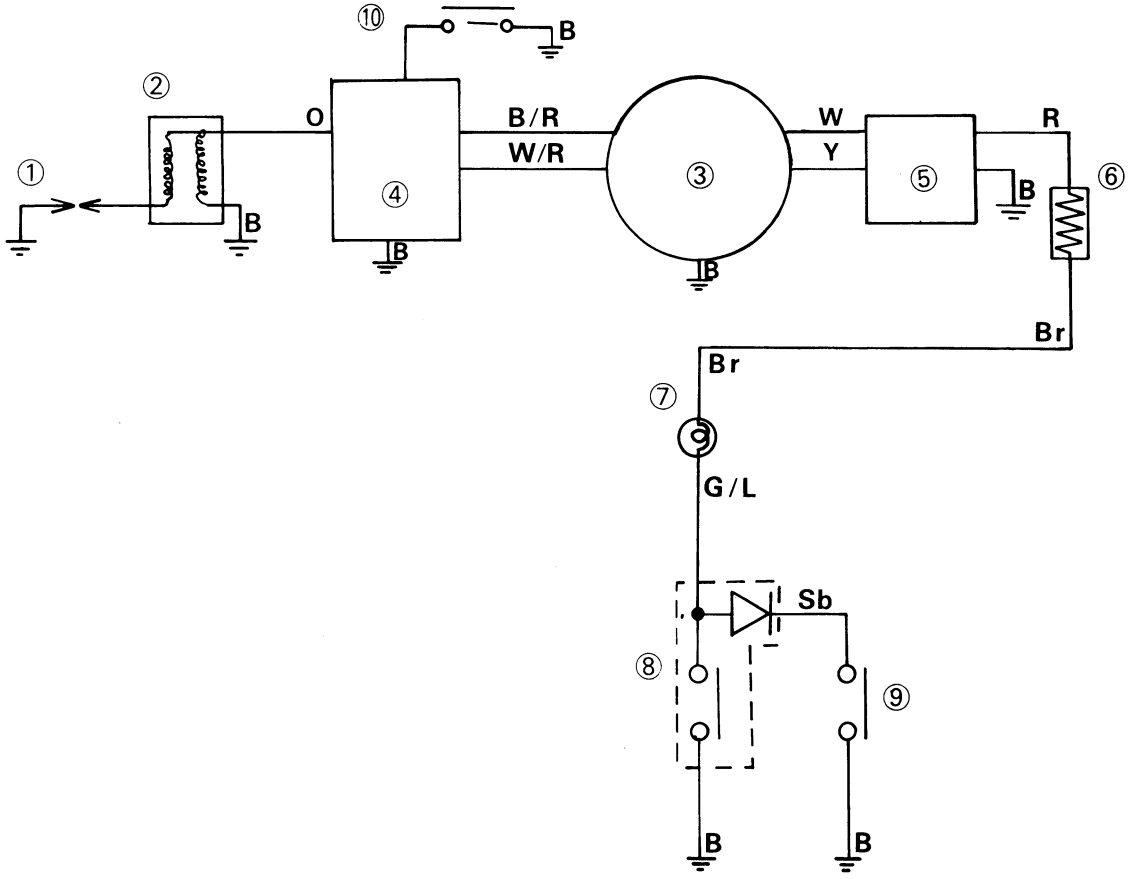
	Drive chain slack: 40 mm (1.57 in)

ELECTRICAL

RT180A CIRCUIT DIAGRAM

COMPONENTS

① Spark plug
② Ignition coil
③ C.D.I. Magneto
④ C.D.I. Unit
⑤ Rectifier/regulator
⑥ Resistor
⑦ Oil level indicator light
⑧ Oil level gauge
⑨ Neutral switch
⑩ "ENGINE STOP" switch



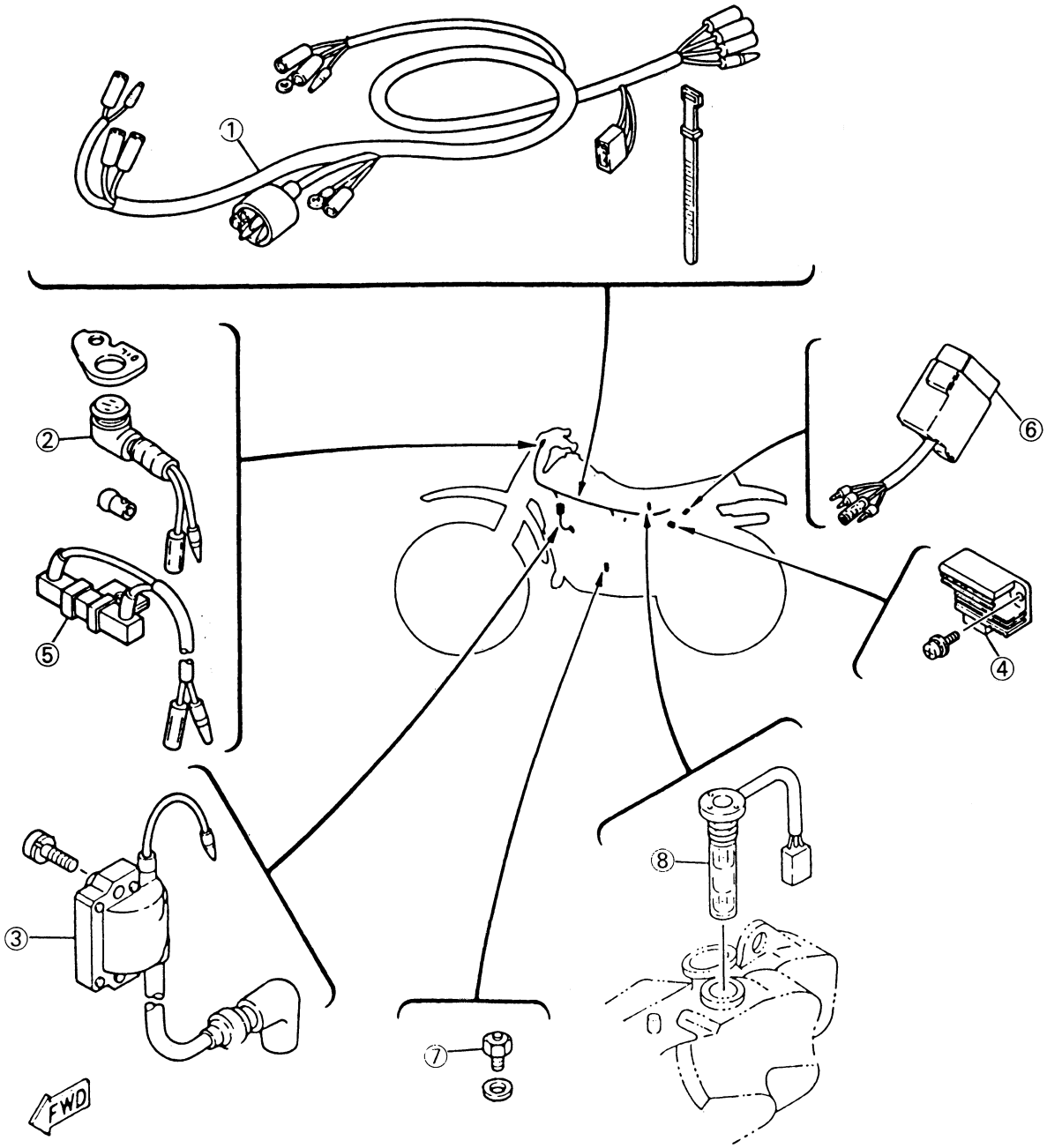
COLOR CODE

B	Black	Ch	Chocolate	W/R	White/Red
R	Red	Dg	Dark green	W/L	White/Blue
O	Orange	Sb	Sky blue	Y/R	Yellow/Red
L	Blue	Br	Brown	G/R	Green/Red
P	Pink	L/Y	Blue/Yellow	G/Y	Green/Yellow
Y	Yellow	B/Y	Black/Yellow	G/W	Green/White
G	Green	B/W	Black/White	Br/W	Brown/White
W	White	B/R	Black/Red	L/R	Blue/Red

ELECTRICAL COMPONENTS (1)

① Wireharness
② "OIL" level indicator light
③ Ignition coil
④ Rectifier/Regulator
⑤ Resistor
⑥ C.D.I. Unit
⑦ "NEUTRAL" switch
⑧ "OIL" level gauge

IGNITION COIL:
PRIMARY COIL RESISTANCE
1.44 ~ 1.76Ω at 20 °C (68 °F)
SECONDARY COIL RESISTANCE
5.12 ~ 7.68 kΩ at 20 °C(68 °F)

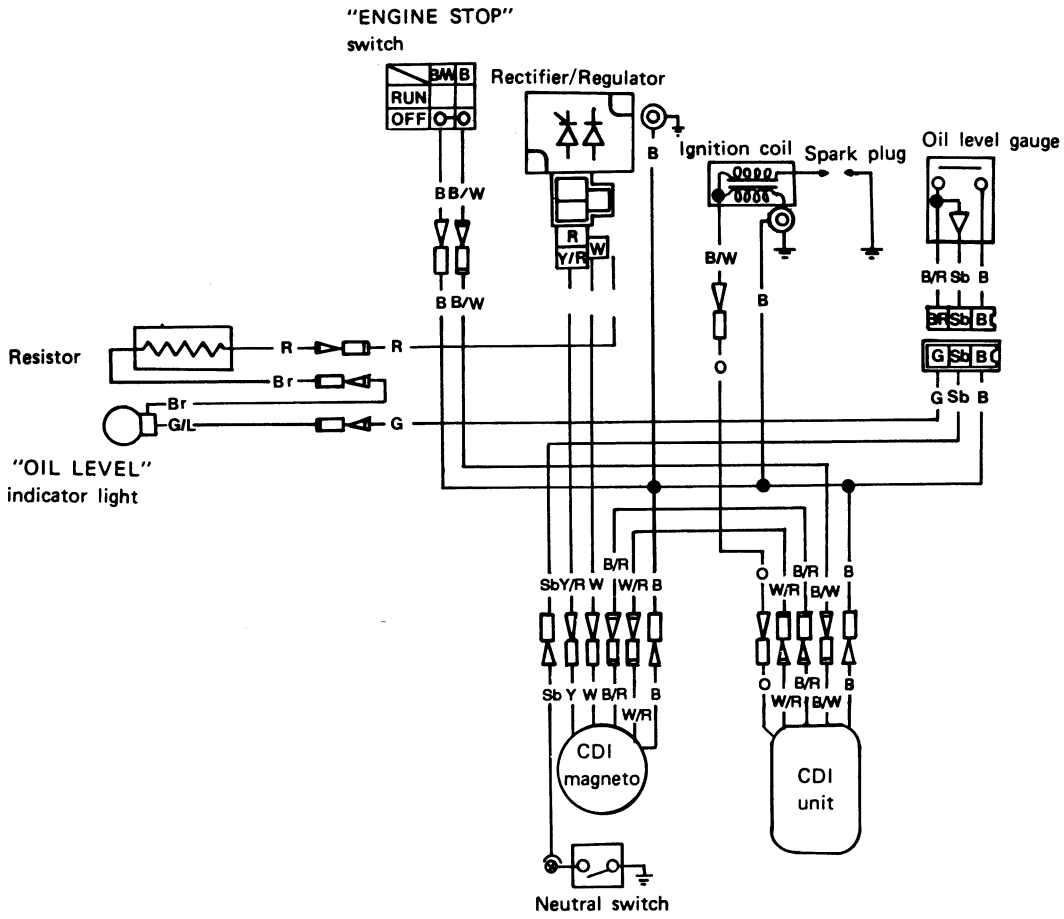


SIGNAL SYSTEM

CIRCUIT SYSTEM

NOTE:

For the color codes, see page 7-1.



TROUBLESHOOTING

"OIL" INDICATOR LIGHT DOES NOT COME ON.

Procedure:

Check:

1. Bulb
2. Bulb socket
3. Resistor
4. Oil Level gauge (Diode)
5. Oil level gauge
6. Neutral switch
7. Lighting coil
8. Wiring connection (entire lighting system)

NOTE:

Remove the following parts before troubleshooting.

1) Side covers (Left and right)
2) Seat
3) Fuel tank
4) Oil tank cover

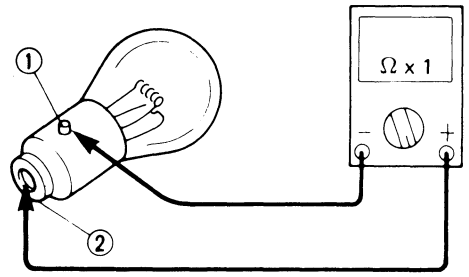
Use the following special tool in this troubleshooting.

Pocket tester:
90890-03112

1.Bulb

- Remove the bulb.
  Connect the Pocket Tester (Ω x 1) to the bulb.

Tester (+) Lead → Terminal ①
Tester (-) Lead → Terminal ②



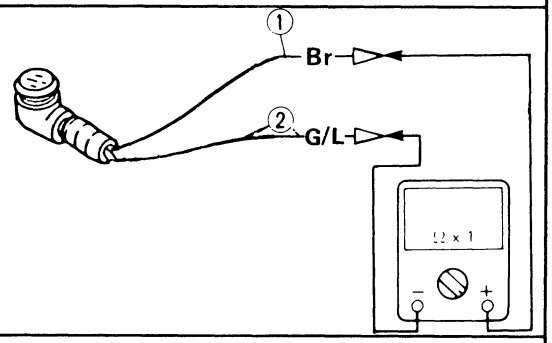
- Check the bulb for continuity.

NOCONTINUITY → Replace bulb.

2. Bulb socket

- Disconnect the indicator lights lead ① from the wire harness.
- Connect the Pocket Tester (Ωx 1) to the lead

Tester (+) Lead → Brown ① Terminal
Tester (-) Lead → Green/Blue ② Terminal



- Check the bulb socket for continuity.

NOCONTINUITY → Replace bulb socket.

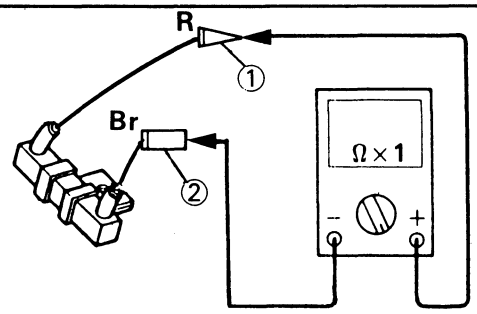
*

*

3.Resistor

- Disconnect the resistor lead.
- Connect the pocket tester (Ω x 10) to the resistor lead.

Tester (+) lead → Red lead ①
Tester (-) lead → Brown lead ②



- Measure the resistor resistance.

Resistor resistance:
17Ω at 20 °C

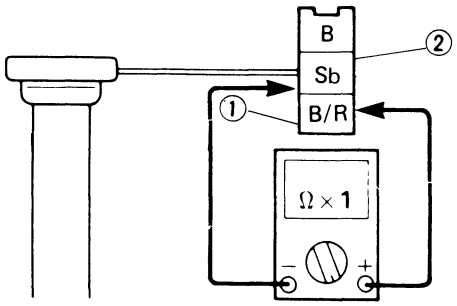
OUT OF SPECIFICATION → Replace resistor

MEETS SPECIFICATION

4. Oil level gauge

- Remove the oil level gauge from the oil tank.
- Disconnect the oil level gauge coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the oil level gauge.

Tester (+) Lead → Black/Red ① Terminal
Tester (-) Lead → Sky blue ② Terminal



- Check the oil level gauge for continuity.

NOCONTINUITY → Replace oil level gauge

CONTINUITY

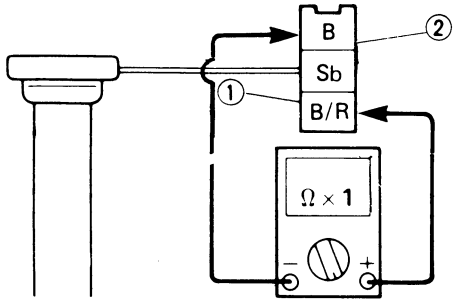
*

*

5.Oil level gauge

- Connect the Pocket Tester (Ω x 1) to the oil level switch.

Tester (+) Lead → Black/Red ① Terminal
Tester (-) Lead → Black ② Terminal



- Hold the oil level gauge in an upright and upside down position.
- Check the oil level gauge for continuity.

Switch position	Good condition	Bad condition		
Upright position	○	X	X	○
Up side down position	X	○	X	○

○ : Continuity X : Nocontinuity

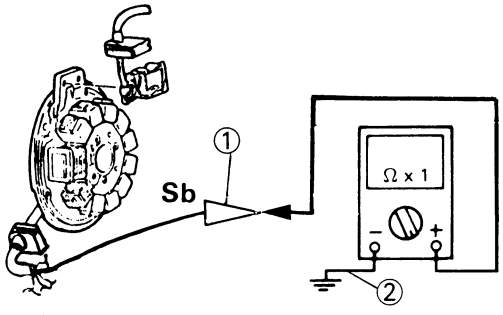
BAD CONDITION → Replace oil level gauge.

GOOD CONDITION

6.Neutral switch

- Disconnect the C.D.I. magneto lead from the wireharness.
- Connect the Pocke Tester (Ω x 1) to the neutral switch.

Tester (+) Lead → Sky blue ① Terminal
Tester (-) Lead → Frame Ground ②



• Shift the transmission in neutral gear.
• Check the neutral switch for continuity.

Transmission position	Good condition	Bad condition		
Neutral	○	×	×	○
Gear	×	○	×	○

○ : Continuity × : Nocontinuity

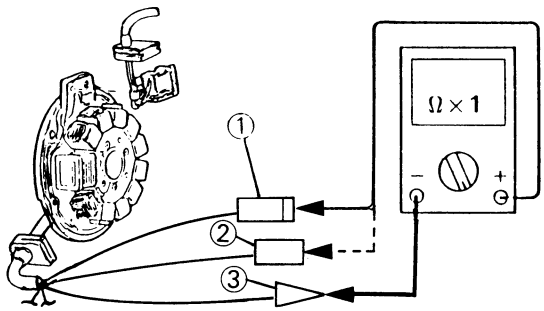
BAD CONDITION → Replace neutral switch.

GOOD CONDITION ↓

7. Lighting coil resistance

• Disconnect the C.D.I. magneto leads (Yellow and White) from the wireharness.
• Connect the Pocket Tester (Ω x 1) to the lighting coil coupler.

Tester (+) Lead → Yellow ① and white ② Terminals
Tester (-) Lead → Black ③ Terminal



• Measure the lighting coil resistances

Lighting coil resistances
Yellow - Black:
0.42 ~ 0.52 Ω at 20 °C (68 °F)
White - Black:
0.28 ~ 0.34 Ω at 20 °C (68 °F)

OUT OF SPECIFICATION → Replace stator assembly.

BOTH MEETS SPECIFICATION ↓

8.Wiring connection

• Check the entire lighting system for secure connections.
Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

CORRECT ↓

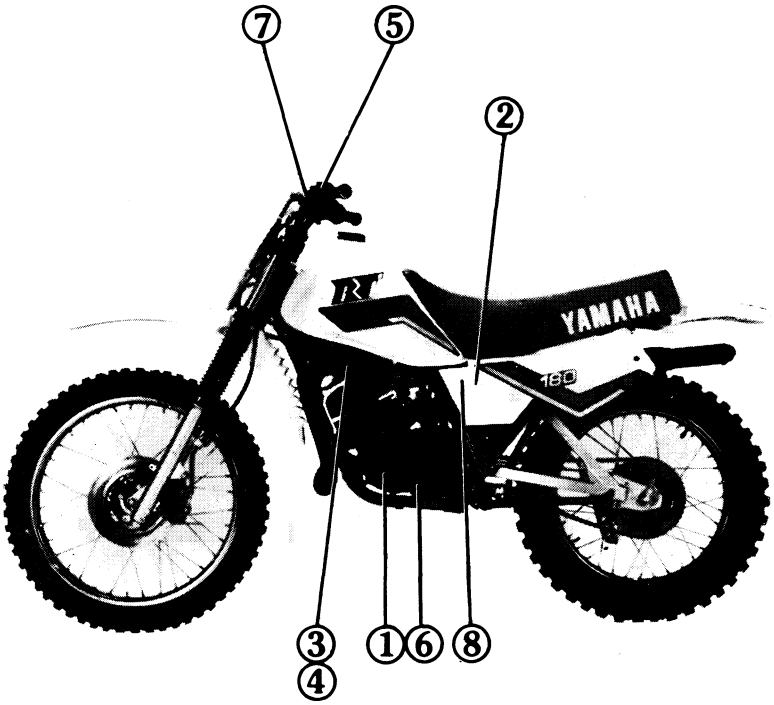
Rectifier/Regulator is faulty, replace it.

Previous circuit-diagram shows ignition circuit in circuit diagram.

NOTE:

For the color codes, see page 7-1.

① CDI magneto
② CDI unit
③ Ignition coil
④ Spark plug
⑤ "ENGINE STOP" switch
⑥ Neutral switch
⑦ "OIL" indicator light
⑧ "Oil" level gauge



TROUBLESHOOTING

IF IGNITION SYSTEM SHOULD BECOME INOPERATIVE (NO SPARK OR INTERMITTENT SPARK)

Procedure

Check;

1. Spark plug
2. Ignition spark gap
3. Spark plug cap resistance
4. Ignition coil resistance
5. "ENGINE STOP" switch
6. Source coil resistance
7. Pickup coil resistance
8. Wiring connection (Entire ignition system)

NOTE:

Remove the following parts before troubleshooting.

1) Side cover (Left)
2) Side cover (Right)
3) Seat
4) Fuel tank

Use the following special tools in this troubleshooting.

Pocket tester:
P/N. YU - 03112

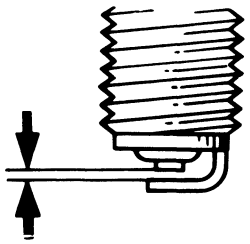
Dynamic spark tester:
P/N. YU - 34487

1. Spark plug

- Check the spark plug condition
- Check the spark plug gap.
  Refer to the "SPARK PLUG INSPECTION" section in the CHAPTER 3.

Standard spark plug:
B8ES (N.G.K.)

Spark plug gap:
0.6 ~ 0.7 mm (0.24 ~ 0.28 in)



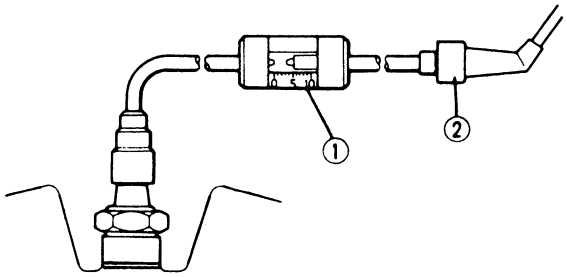
INCORRECT → Repair or replace spark plug.

CORRECT

*

2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the Dynamic Spark Tester① to the spark plug and spark plug cap ②, and set the specified spark gap.



- Start the engine.
- Check the ignition spark condition.

Minimum spark gap:
6 mm (0.24 in)

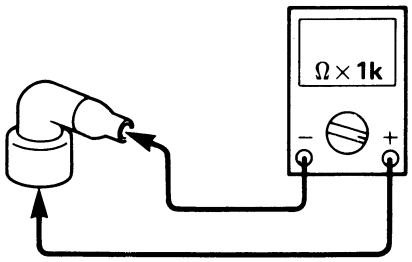
SPARK

Ignition circuit is good.

OUT OF SPECIFICATION

3. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the Pocket Tester (Ω x 1k) to the spark plug cap.



- Check the spark plug cap for specified resistance.

Spark plug cap resistance:
4 ~ 6 kΩ at 20 °C (69 °F)

OUT OF SPECIFICATION

Replace spark plug cap.

MEETS SPECIFICATION

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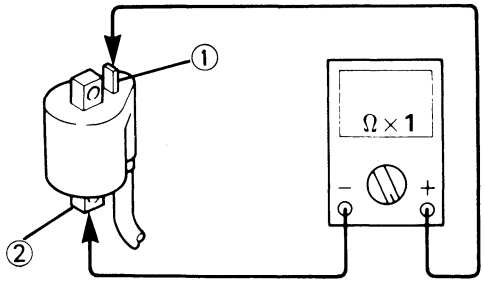
4. Ignition coil resistance

- Disconnect the ignition coil lead (Black/White) from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the ignition coil.

Tester (+) Lead → (B/W) ① Terminal
Tester (-) Lead → Ignition Coil Base ②

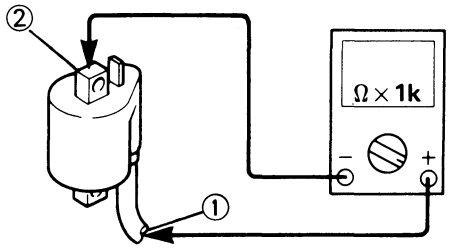


- Measure the primary coil resistance.

Primary coil resistance:
0.7 ~ 1.1 Ω at 20 °C (68 °F)

- Connect the Pocket Tester (Ωx 1) to the ignition coil.

Tester (+) Lead → Spark Plug Lead ①
Tester (-) Lead → Ignition Coil Base ②



- Measure the Secondary coil resistance.

Secondary coil resistance:
5.7 ~ 8.5 kΩ at 20 °C (68 °F)

OUT OF SPECIFICATION

Replace ignition coil.

MEETS SPECIFICATION

*

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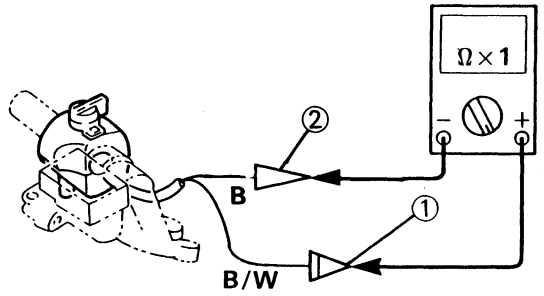
5. "ENGINE STOP" switch

- Disconnect the "ENGINE STOP" switch leads (Black/White and Black) from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the "ENGINE STOP" switch.

Tester (+) Lead → Black/White ① Lead
Tester (-) Lead → Black ② Lead



- Turn the "ENGINE STOP" switch to "OFF" and "RUN".
- Check the "ENGINE STOP" switch for continuity.

Switch position	Good condition	Bad condition		
RUN	X	O	X	O
OFF	O	X	X	O

O: Continuity X: Nocontinuity

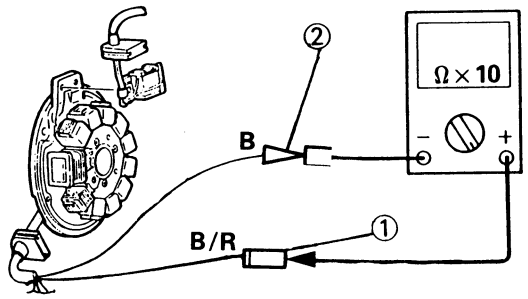
BAD CONDITION → Replace handlebar switch.

*

6. Source coil resistance

- Disconnect the C.D.I. magneto leads (Black/Red and Black) from the wireharness.
- Connect the Pocket Tester (Ωx 100) to the source coil.

Tester (+) Lead → Black/Red ①Terminal
Tester (-) Lead → Black ② Terminal



- Measure the source coil resistance.

Source coil resistance:
270 ~ 330Ω at 20 °C (68 °F)

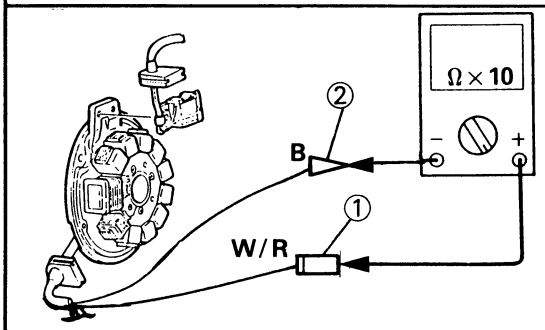
OUT OF SPECIFICATION → Replace source coil.

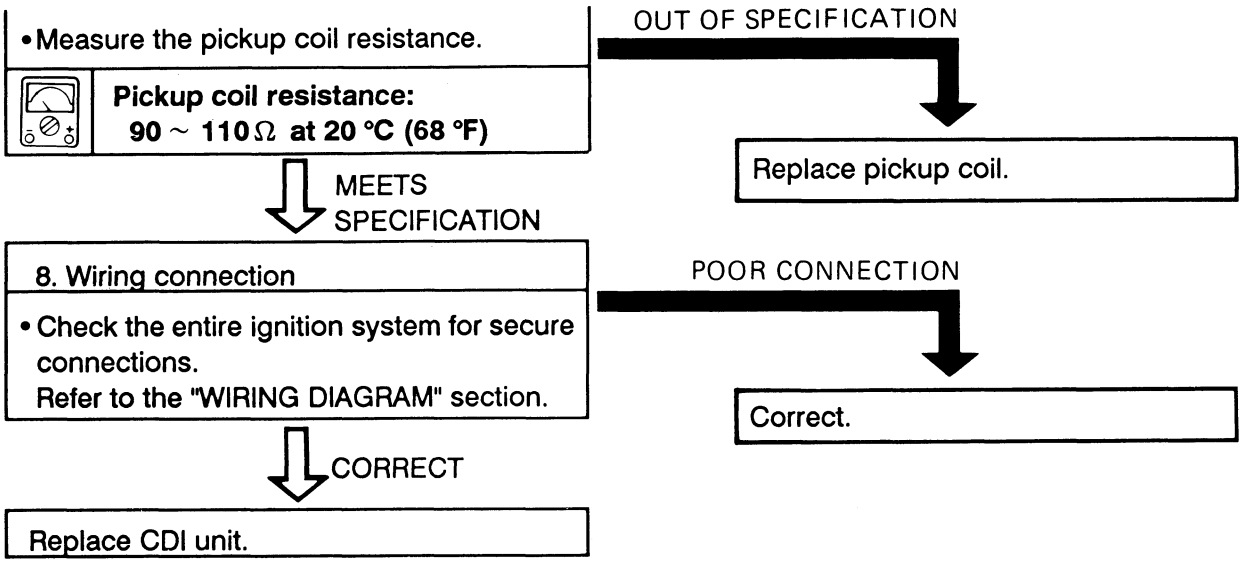
MEETS SPECIFICATION

7. Pickup coil resistance

- Disconnect the C.D.I. magneto leads (White/Red and Black) from the wireharness.
- Connect the Pocket Tester (Ωx 100) to the pickup coil.

Tester (+) Lead →White/Red ① Terminal
Tester (-) Lead →Black ② Terminal




• Measure the pickup coil resistance.
Pickup coil resistance:
90 ~ 110 Ω at 20 °C (68 °F)
OUT OF SPECIFICATION
Replace pickup coil.
MEETS SPECIFICATION
8. Wiring connection
• Check the entire ignition system for secure connections.
Refer to the "WIRING DIAGRAM" section.
POOR CONNECTION
Correct.
CORRECT
Replace CDI unit.

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 inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM	PROBABLE CAUSE
Fuel tank	• Empty • Clogged fuel filter • Clogged fuel breather hose • Contaminated fuel or fuel containing water or foreign material
Fuel cock	• Clogged fuel hose
Carburetor	• Contaminated fuel or fuel containing water or foreign material • Clogged pilot jet • Clogged pilot air passage • Sucked-in air • Deformed float • Groove-worn needle valve • Improperly sealed valve seat • Improperly adjusted fuel level • Improperly set pilot jet • Clogged starter jet • Starter plunger malfunction • Improperly adjusted starter cable
Air cleaner	• Clogged air filter

STARTING FAILURE/HARD STARTING

ELECTRICAL SYSTEM — **PROBABLE CAUSE**

- 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
- CDI unit system
  - Faulty CDI unit
  - Faulty source coil
  - Faulty pick-up coil
  - Broken woodruff key
- Switches and wiring
  - Faulty "ENGINE STOP" switch
  - Broken or shorted wiring
  - Faulty ignition control unit

COMPRESSION SYSTEM — **PROBABLE CAUSE**

- Cylinder and cylinder head
  - Loose spark plug
  - Loose cylinder head or cylinder
  - Broken cylinder head gasket
  - Broken cylinder gasket
  - Worn, damaged or seized cylinder
- 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
  - Improperly sealed crankcase (Damaged oil seal)
  - Seized crankshaft
- Reed valve
  - Deformed reed valve stopper
  - Improperly seated reed valve
  - Loose intake manifold
  - Broken gasket
  - Broken reed valve

POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE — **PROBABLE CAUSE**

- Carburetor
  - Improperly returned starter plunger
  - Clogged or loose pilot jet
  - Clogged pilot air passage
  - Improperly adjusted idle speed (Throttle stop screw)
  - Improper throttle cable play
  - Faulty pick up coil

POOR MEDIUM AND HIGH SPEED PERFORMANCE

FUEL SYSTEM

	PROBABLE CAUSE
Fuel tank	• Clogged fuel filter • Contaminated fuel or fuel containing water or foreign material • Clogged fuel breather hose
Fuel cock	• Clogged fuel hose
Carburetor	• Contaminated fuel or fuel containing water or foreign material • Sucked-in float • Deformed float • Groove-worn needle valve • Improperly sealed valve seat • Improperly set clip position of jet needle • Improperly adjusted fuel level • Clogged or loose main jet • Clogged or loose needle jet
Air cleaner	• Clogged air filter

ELECTRICAL SYSTEM

	PROBABLE CAUSE
Spark plug	• Improper plug gap • Worn electrodes • Wire between terminals broken • Improper heat range • Faulty spark plug cap
CDI unit system	• Faulty C.D.I. Unit • Faulty source coil • Faulty pick-up coil

POOR MEDIUM AND HIGH SPEED PERFORMANCE

TRBL SHTG ?

COMPRESSION SYSTEM — **PROBABLE CAUSE**

- Cylinder and cylinder head
  - Loose spark plug
  - Broken cylinder head gasket
  - Broken cylinder gasket
  - Loose cylinder head or cylinder
  - Worn, damaged or seized cylinder
- Piston and piston ring
  - Improperly installed piston ring
  - Worn, fatigued or broken piston ring
  - Seized piston ring
  - Seized or damaged piston
- Crankcase and crankshaft
  - Improperly seated crankcase
  - Improperly sealed crankcase (Damaged oil seal)
  - Seized crankshaft
- Reed valve
  - Deformed reed valve stopper
  - Improperly adjusted reed valve stopper height
  - Improperly seated reed valve
  - Loose intake manifold
  - Broken gasket
  - Broken reed valve

FAULTY GEAR SHIFTING

HARD SHIFTING

	PROBABLE CAUSE
Clutch	• Improperly adjusted clutch cable • Improperly adjusted push lever position • Improper engagement of push lever and push rod • Warped clutch plate • Swollen friction plate • Broken clutch plate
Transmission oil	• High oil level • Improper quality (High viscosity) • Contamination

CHANGE PEDAL DOES NOT MOVE

	PROBLABE CAUSE
Shift shaft	• Bent shift shaft
Shift cam and shift fork	• Groove jammed with impurities • Seized shift fork • Bent shift fork guide bar
Transmission	• Seized transmission gear • Jammed impurities • Incorrectly assembled transmission

JUMP-OUT GEAR

	PROBABLE CAUSE
Shift shaft	• Improperly adjusted shift lever position • Imporperly returned stopper lever
Shift fork	• Worn shift fork
Shaft cam	• Improper thrust play • Worn shift cam groove
Transmission	• Worn gear dog

CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING

	PROBABLE CAUSE
Clutch	• Improperly adjusted clutch cable • Loose clutch spring • Fatigued clutch spring • Worn friction plate • Worn clutch plate
Transmission oil	• Low oil level • Improper quality (Low viscosity) • Contamination

CLUCH DRAGGING

	PROBABLE CAUSE
Clutch	• Improperly adjusted clutch cable • Improperly adjusted push lever position • Improper engagement of push lever and push rod • Warped clutch plate • Swollen friction plate • Broken clutch boss
Transmission oil	• High oil level • Improper quality (High viscosity) • Contamination

IMPROPER KICKING

SLIPPING

	PROBABLE CAUSE
Kick axle assembly	• Low tension of kick clip • Worn kick axle • Worn or damaged kick idle gear • Worn or damaged kick gear • Damaged kick clip • Kick clip coming off • Damaged kick clip stopper
Transmission oil	• Improper quality (Low viscosity) • Contamination

HARD KICKING

	PROBABLE CAUSE
Kick axle assembly	• High tension of kick clip • Seized kick gear • Seized kick idle gear
Transmission oil	• Improper quality (High viscosity) • Contamination
Cylinder, piston and piston ring	• Damaged or seized cylinder • Damaged or seized piston • Damaged or seized piston ring
Crankcase and crankshaft	• Improperly seated crankcase • Improperly seated crankshaft • Damaged or seized crankshaft • Damaged or seized crankshaft bearing

KICK CRANK NOT RETURNING

	PROBABLE CAUSE
Kick axle assembly	• Damaged kick return spring • Kick return spring coming off • Kick clip coming off • Damaged kick return spring stopper

INSTABLE HANDLING

INSTABLE HANDLING — **PROBABLE CAUSE**

- Handlebars
  - Improperly installed or bent
- Steering
  - Improperly installed handle crown
  - Bent steering shaft
  - Improperly installed steering shaft (Improperly tightened ring nut)
  - Damaged ball bearing, roller bearing or bearing race
- Front forks
  - Uneven oil levels on both sides
  - Uneven spring tension (Uneven damping adjuster position)
  - Broken spring
  - Twisted front forks
- Tires
  - Uneven tire pressures on both sides
  - Incorrect tire pressure
  - Unevenly worn tires
- Wheels
  - Incorrecty wheel balance
  - Deformed cast wheel
  - Loose bearing
  - Bent or loose wheel axle
  - Excessive wheel run-out
- Frame
  - Twisted
  - Damaged head pipe
  - Improperly installed bearing race
- Swingarm
  - Worn bearing or brush
  - Bent or damaged
- Rear shock absorber
  - Fatigued spring
  - Improperly adjusted spring preload
  - Oil leakage
- Drive chain
  - Improperly adjusted chain slack

OVERHEATING OR OVER-COOLING

OVERHEATING

	PROBABLE CAUSE
Ignition system	• Improper spark plug gap • Improper spark plug heat range • Faulty C.D.I. Unit
Fuel system	• Improper carburetor main jet (Improper setting) • Improperly adjusted fuel height • Clogged air cleaner element • Lean mixture (Falty Autolube pump settings)
Compression system	• Heavy carbon build-up
Transmission oil	• Incorrect oil level • Improper oil viscosity • Inferior oil quality
Brake	• Dragging brake

FAULTY BRAKE

POOR BRAKING EFFECT

└ Disc brake

PROBABLE CAUSE

- Worn brake pad
- Worn brake disc
- Air in brake fluid
- Leaking brake fluid
- Faulty cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose
- Oily or greasy brake disc
- Oily or greasy brake pad
- Improper brake fluid level

FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION

OIL LEAKAGE

PROBABLE CAUSE

- Bent, damaged or rusty inner tube
- Damaged or cracked outer tube
- Damaged oil seal lip
- Improperly installed oil seal
- Improper oil level (too much)
- Loose damper rod holding bolt
- Broken cap bolt O-ring
- Loose drain bolt
- Damaged drain bolt gasket

MALFUNCTION

PROBABLE CAUSE

- Bent, deformed or damaged inner tube
- Bent or deformed outer tube
- Damaged fork spring
- Worn or damaged slide metal
- Bent or damaged damper rod
- Improper oil viscosity
- Improper oil level