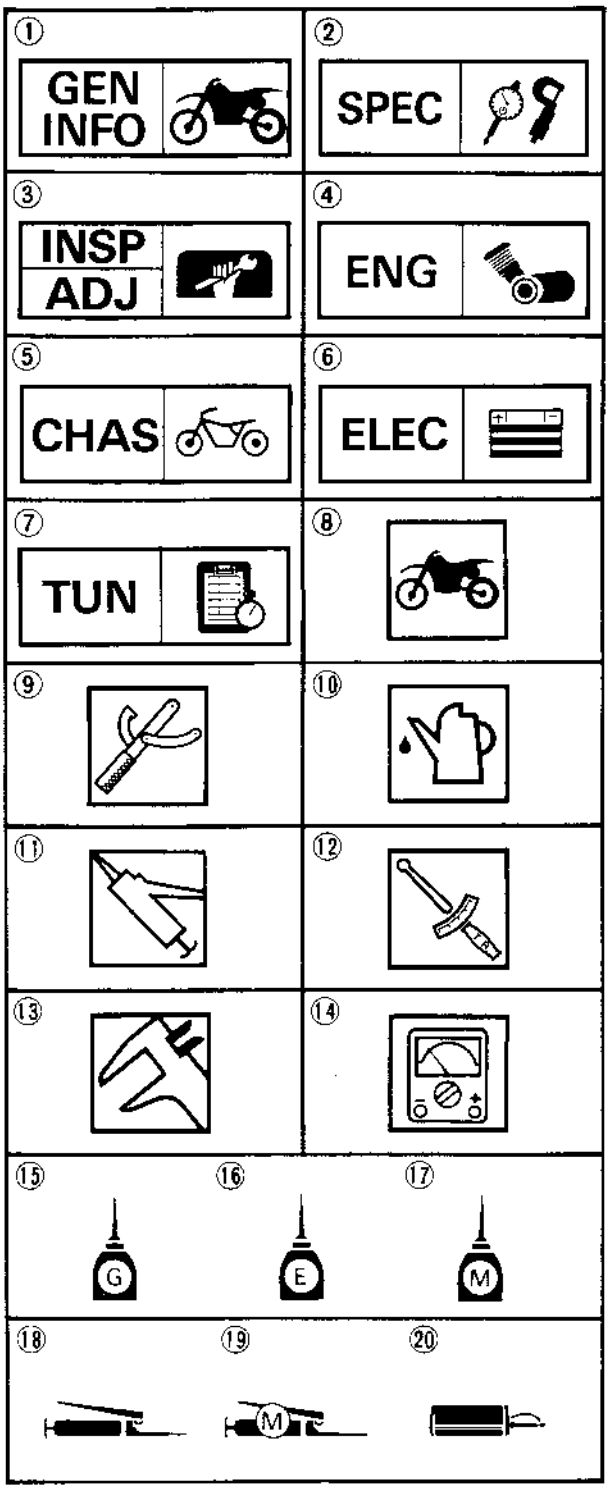

ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑦ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Appendices
③ Regular inspection and adjustment
④ Engine
⑤ Chassis
⑥ Electrical
⑦ Tuning

Illustrated symbols ⑧ to ⑭ are used to identify the specifications appearing in the text.

⑧ No engine dismounting
⑨ Special tool
⑩ Filling fluid
⑪ Lubricant
⑫ Tightening
⑬ Wear limit, clearance
⑭ Resistance (Ω), Voltage (V), Electric current (A)

Illustrated symbols ⑮ to ⑳ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑮ Apply gear oil
⑯ Apply engine mixing oil
⑰ Apply molybdenum disulfide oil
⑱ Apply lightweight lithium-soap base grease
⑲ Apply molybdenum disulfide grease
⑳ Apply locking agent (LOCTITE®)

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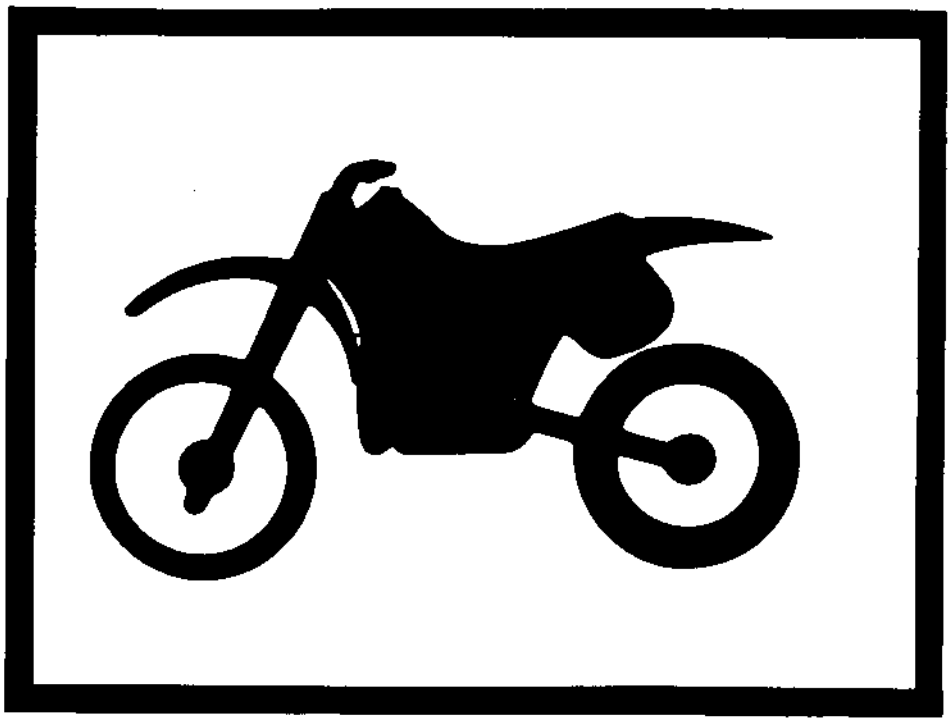
TUNING

CHAPTER 1
GENERAL INFORMATION



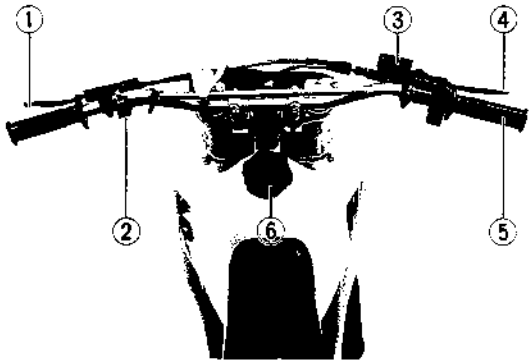
DESCRIPTION

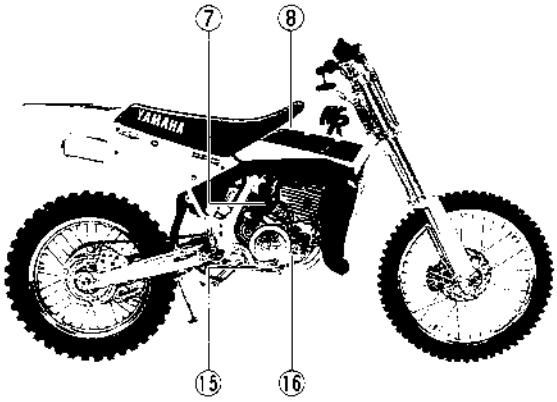
① Clutch lever
② "ENGINE STOP" button
③ Front brake master cylinder
④ Front brake lever
⑤ Throttle grip
⑥ Fuel tank cap
⑦ Kick starter
⑧ Fuel tank
⑨ Fuel cock
⑩ Starter lever
⑪ Drive chain
⑫ Air cleaner
⑬ Shift pedal
⑭ Front fork
⑮ Rear brake pedal
⑯ Check screw (Transmission oil level)

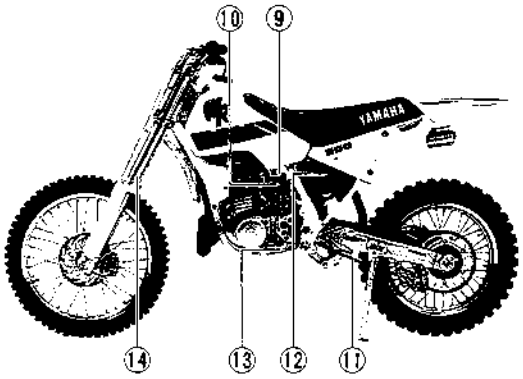
1

NOTE:

- The machine you have purchased may differ slightly from those shown in the photographs.
- Designs and specifications are subject to change without notice.



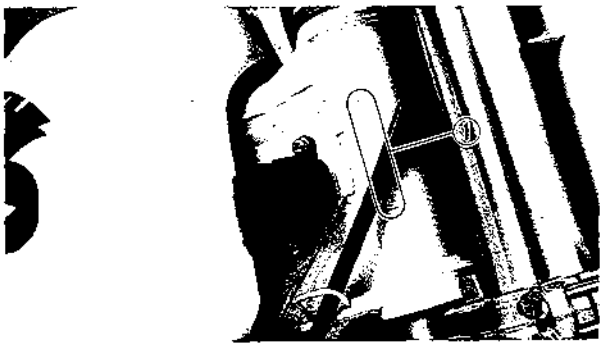




MACHINE IDENTIFICATION

There are two significant reasons for knowing the serial number of your machine:

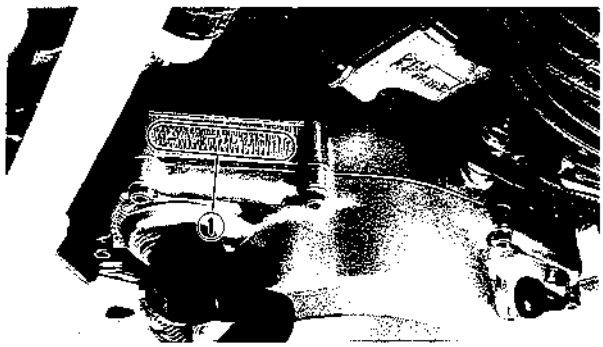
1. When ordering parts, you can give the number to your Yamaha dealer for positive identification of the model you own.
2. If your bike is stolen, the authorities will need the number to search for and identify your machine.



VEHICLE IDENTIFICATION NUMBER

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

Starting Serial Number:
JYA4AAW0*NA000101



ENGINE SERIAL NUMBER

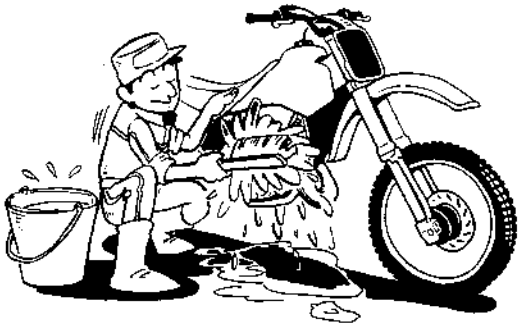
The engine serial number ① is stamped into the elevated part of the right rear section of the engine.

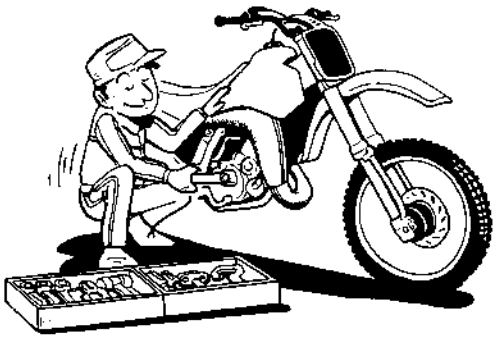
NOTE:

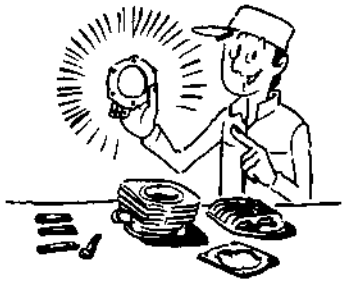
The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.

Starting Serial Number:
4AA-000101

1







IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

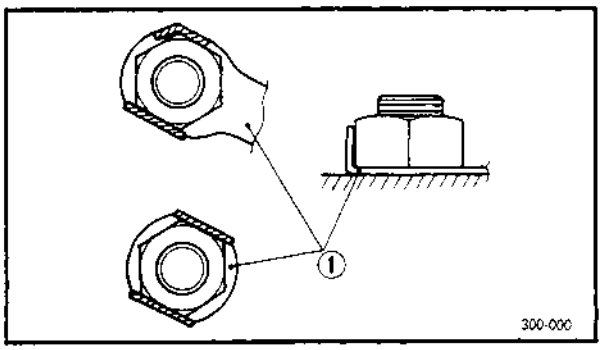
1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "SPECIAL TOOL".
3. When disassembling the machine, keep mated parts together. They include gears, cylinders, pistons, and other mated parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machine 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 recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

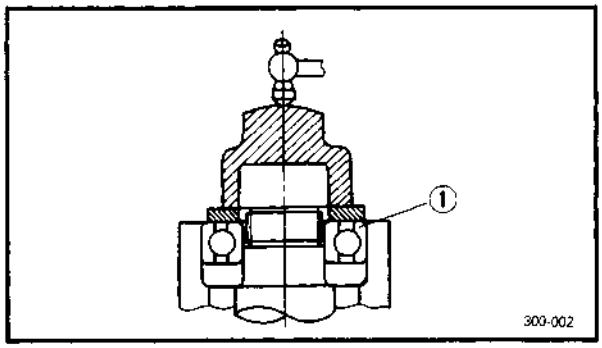
GASKETS, OIL SEALS AND O-RINGS

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



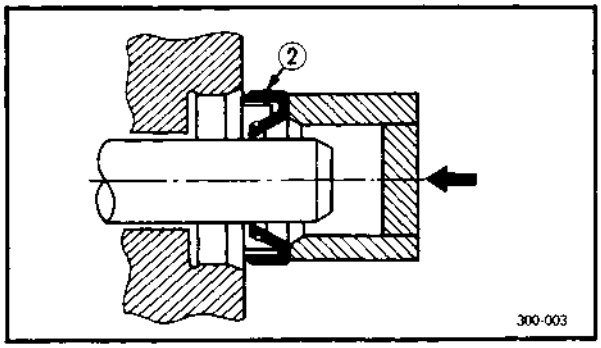
LOCK WASHERS/PLATES AND COTTER PINS

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

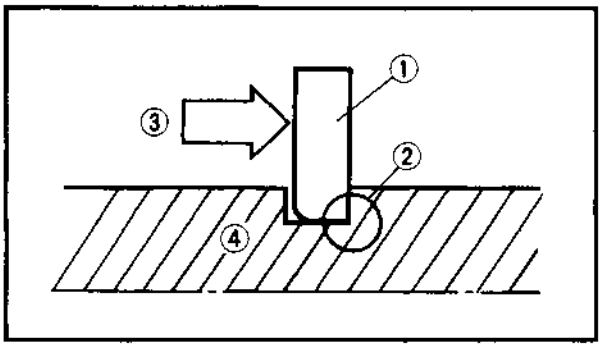
1. Install the bearing(s) ① and oil seal(s) ② with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.



CAUTION:

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

1



CIRCLIPS

1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted 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.

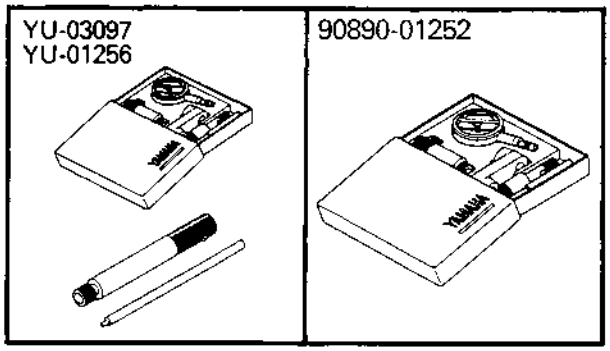
④ Shaft

SPECIAL TOOLS

The following special tools are required to perform maintenance, adjustments, and repairs on your machine. These tools can be obtained through your Yamaha dealer.

NOTE:

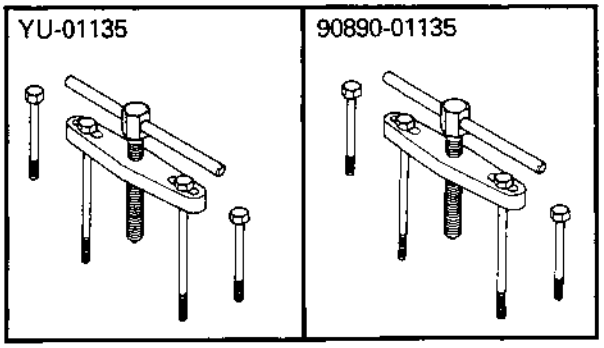
- For U.S.A., use part number starting with "YM-" or "YU-".
- For others, use part number starting with "90890-".



FOR TUNE UP

1. Dial Gauge and Stand
   P/N. YU-03097, YU-01256
   90890-01252

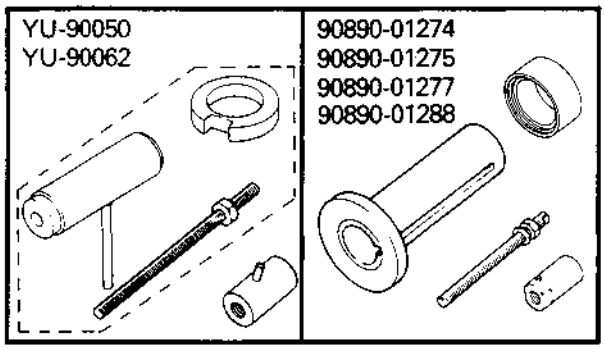
These tools are used to set the ignition timing.



FOR ENGINE SERVICE

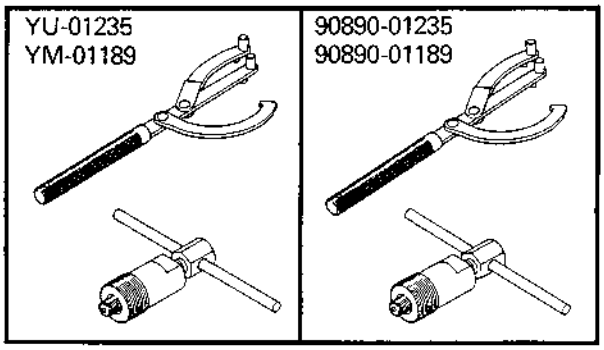
1. Crankcase Separating Tool
   P/N. YU-01135
   90890-01135

This tool is used to split the crankcases as well as remove the crankshaft from either case.



2. Crankshaft Installing Tool
   Pot P/N. YU-90050, 90890-01274
   Bolt P/N. YU-90050, 90890-01275
   Spacer P/N. YU-90050, 90890-01288
   Adapter P/N. YU-90062, 90890-01277

These tools are used to install the crankshaft.

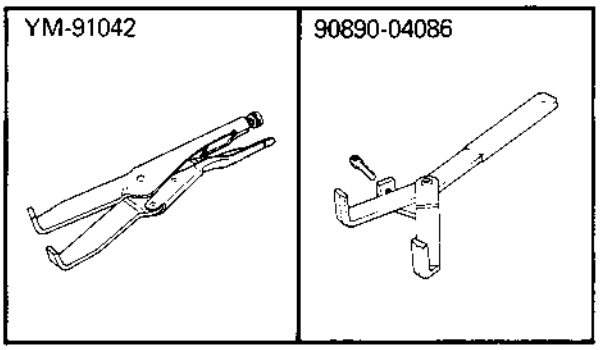


3. Rotor Holder and Rotor Puller
   Holder P/N. YU-01235
   90890-01235

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

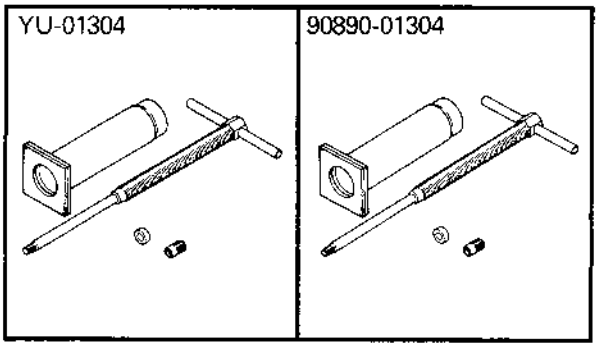
   Puller P/N. YM-01189
   90890-01189

This tool is used to remove the magneto.



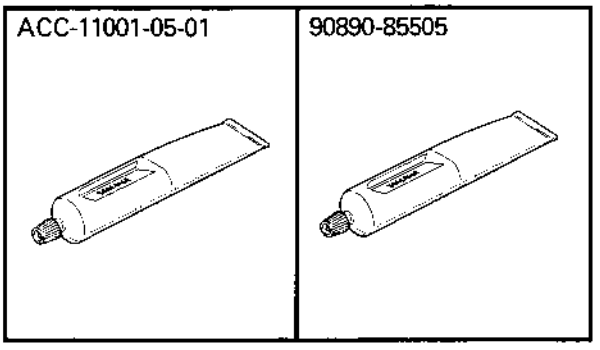
4. Clutch Holder
   P/N. YM-91042
   90890-04086

This tool is used to hold the clutch when removing or installing the clutch boss securing nut.



5. Piston Pin Puller
   P/N. YU-01304
   90890-01304

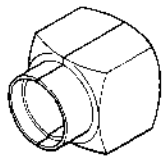
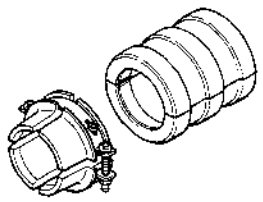
This tool is used to remove the piston pin.



6. Quick Gasket®
   P/N. ACC-11001-05-01
   YAMAHA Bond No. 1215
   P/N. 90890-85505

This sealant (Bond) is used for crankcase mating surfaces, etc.

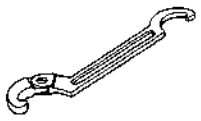
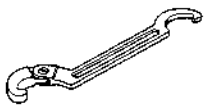
1

YM-1424	90890-01442
	

FOR CHASSIS SERVICE

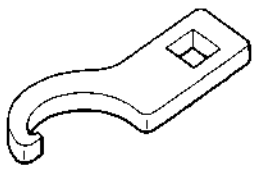
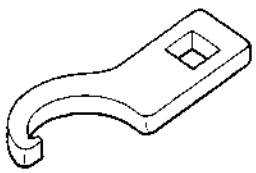
1. Fork Seal Driver
   P/N. YM-1424
   90890-01442

This tool is used when installing the fork oil seal.

YU-01268	90890-01268
	

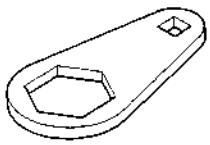
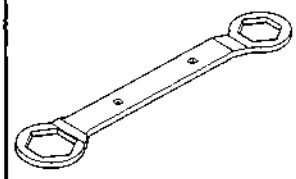
2. Ring Nut Wrench
   P/N. YU-01268
   90890-01268

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

YM-33975	90890-01403
	

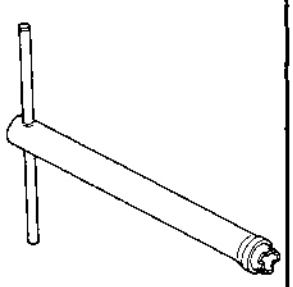
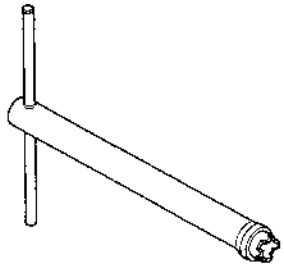
3. Ring Nut Wrench
   P/N. YM-33975
   90890-01403

This tool is used when tightening the steering ring nut to specification.

YM-38519	90890-01348
	

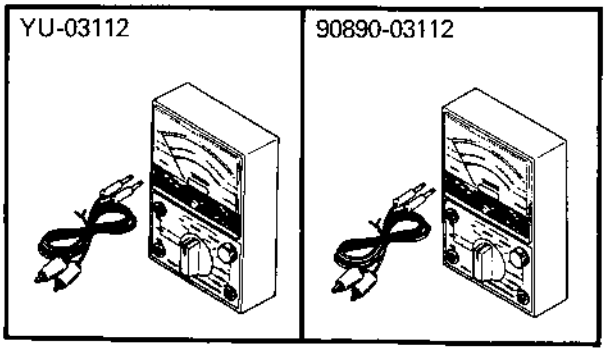
4. Locknut Wrench
   P/N. YM-38519
   90890-01348

Use this wrench to remove and install the stearing stem nut.

YM-1423	90890-01423
	

5. Damper Rod Holder
   P/N. YM-1423
   90890-01423

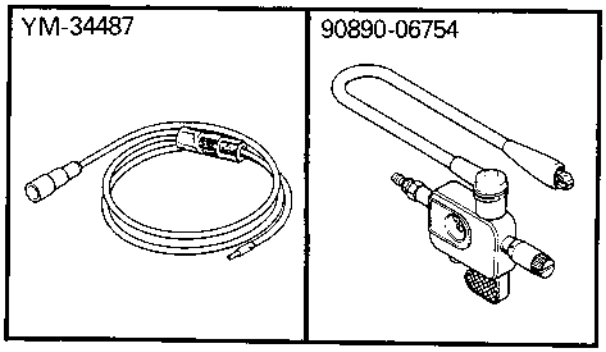
Use this tool to remove and isntall the damper rod.



FOR ELECTRICAL SERVICE

1. Yamaha Pocket Tester
   P/N. YU-03112
   90890-03112

Use this tool to inspect the coil resistance, output voltage and amperage.

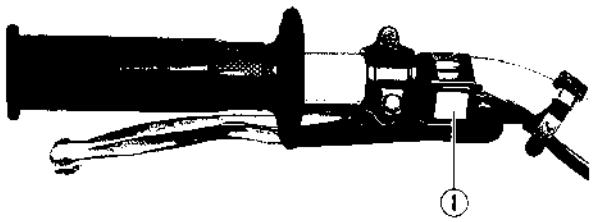


2. Dynamic Spark Tester
   P/N. YM-34487
   Ignition Checker
   P/N. 90890-06754

This instrument is necessary for checking the ignition system components.

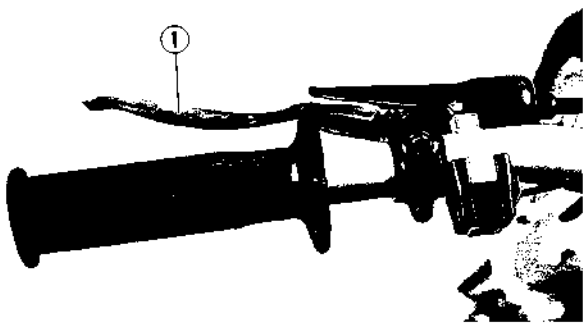
CONTROL FUNCTIONS

"ENGINE STOP" BUTTON



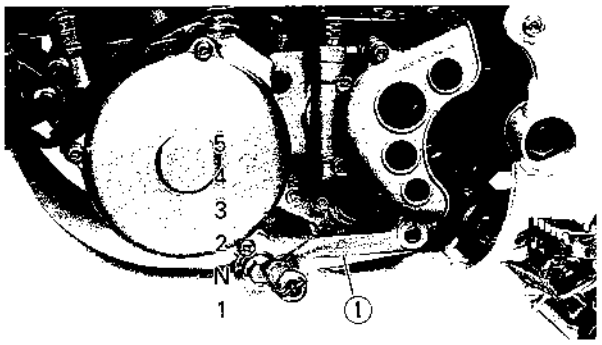
The "ENGINE STOP" button ① is located on the left handlebar. Continue pushing the "ENGINE STOP" button till the engine comes to a stop.

CLUTCH LEVER

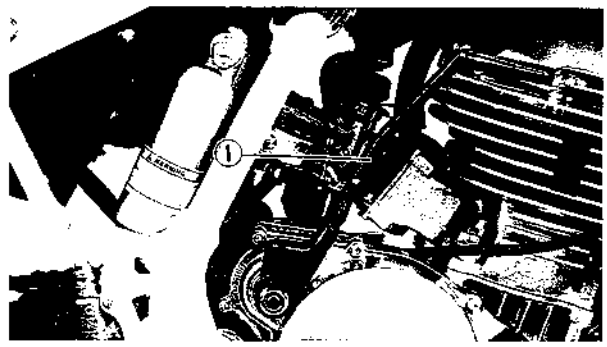


The clutch lever ① is located on the left handlebar; it disengages or engages the clutch. Pull the clutch lever to the handlebar to disengage the clutch, and release the lever to engage the clutch. The lever should be pulled rapidly and released slowly for smooth starts.

SHIFT PEDAL

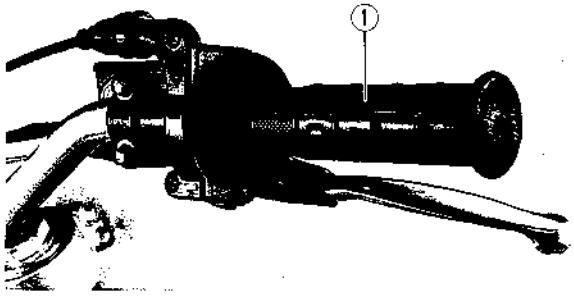


The gear ratios of the constant-mesh 5 speed transmission are ideally spaced. The gears can be shifted by using the shift pedal ① on the left side of the engine.



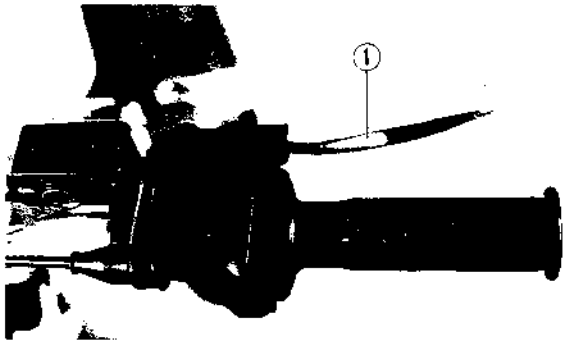
KICK STARTER

Rotate the kick starter ① away from the engine. Push the starter down lightly with your foot until the gears engage, then kick smoothly and forcefully to start the engine. This model has a primary kick starter so the engine can be started in any gear if the clutch is disengaged. In normal practices, however, shift to neutral before starting.



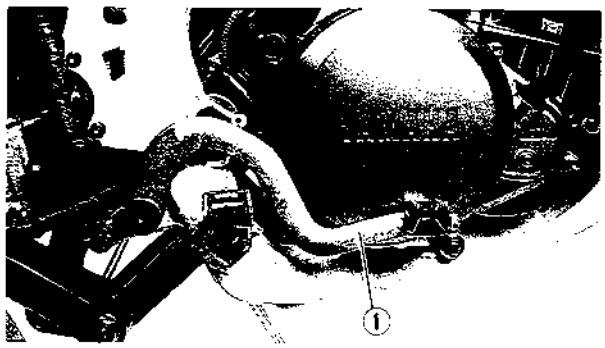
THROTTLE GRIP

Throttle grip ① is located on the right handlebar; it accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.



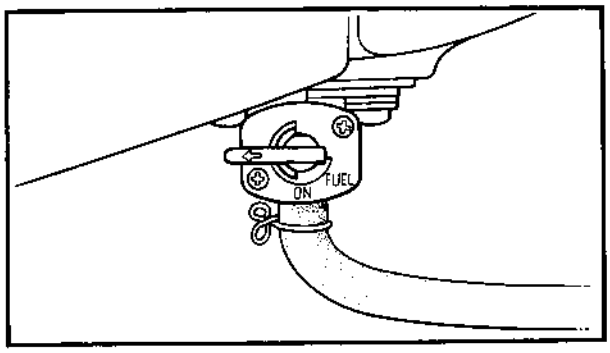
FRONT BRAKE LEVER

The front brake lever ① is located on the right handlebar. Pull it toward the handlebar to activate the front brake.



REAR BRAKE PEDAL

The rear brake pedal ① is located on the right side of the machine. Press down on the brake pedal to activate the rear brake.

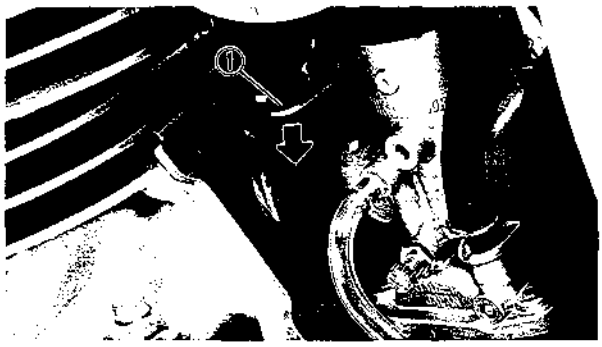


FUEL COCK

The fuel cock supplys fuel from the tank to carburetor while filtering the fuel. The fuel cock has the two positions:

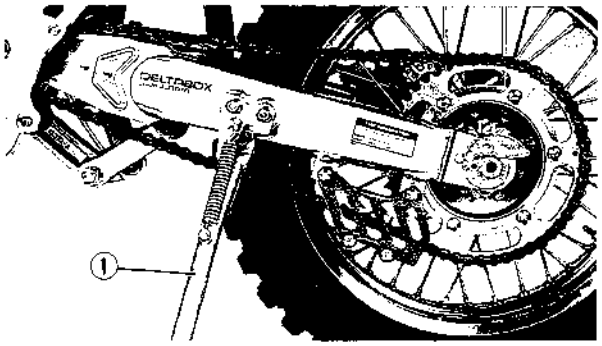
OFF: With the lever in this position, fuel will not flow. Always return the lever to this position when the engine is not running.

ON: With the lever in this position, fuel flows to the carburetor. Normal riding is done with the lever in this position.



STARTER LEVER (CHOKE)

When cold, the engine requires a richer air-fuel mixture for starting. A separate starter circuit, which is controlled by the starter lever ①, supplies this mixture. Push the starter lever ① down to open the circuit for starting. When the engine has warmed up, pull it up to close the circuit.

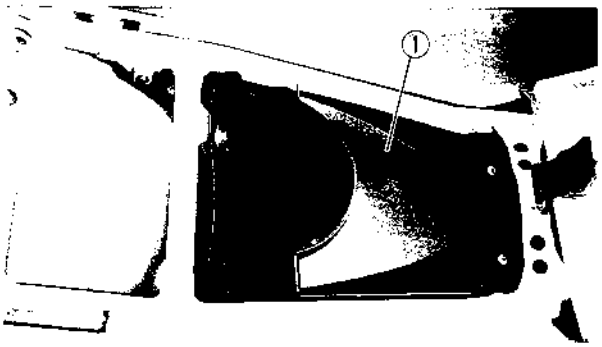


FIXED SIDESTAND

The sidestand ① is located on the left swingarm.

⚠ WARNING

This sidestand is used to support only the machine when parking it.
Never apply additional force to the sidestand.



AIR FILTER CASE COVER

When running on a course with excessive mud splashes, fit this air filter cover ①, as shown. When running in rainy weather, seal appropriately over this cover

1

FUEL AND ENGINE MIXING OIL

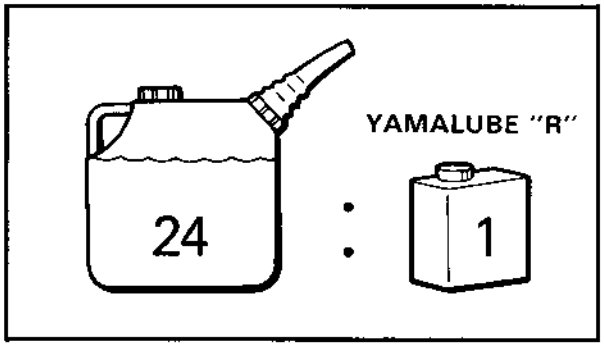
Mix oil with the gas at the ratio specified below. Always use fresh, name-brand gasoline, and mix the oil and gas the day of the race. Do not use premix that is more than a few hours old.

Recommended Fuel:
Except for AUS:
Premium unleaded fuel with a research octane number of 95 or higher.
For AUS:
Unleaded fuel only

NOTE:

Except for AUS:

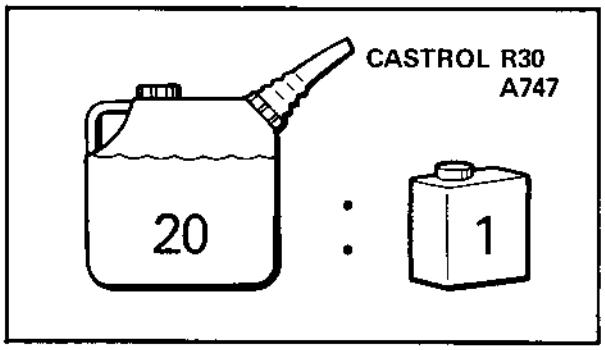
1. If knocking or pinging occurs, use a different brand of gasoline or higher octane grade.
2. If unleaded gasoline is not available, then leaded gasoline can be used.



CAUTION:

Never mix two types of oil in the same batch; clotting of the oil could result. If you wish to change oil types, be sure to drain the fuel tank and the carburetor float bowl of old premix prior to filling with the new type.

Fuel Tank Capacity:
13.0 L (2.86 Imp gal, 3.43 US gal)



Mixing Oil
Recommended Oil:
Yamalube "R"
(Yamalube Racing 2-cycle Oil)
Mixing Ratio: 24 : 1
If for any reason you should use another type, select from the following list.
Mixing ratio: 20 : 1
•Castrol R30
•Castrol A747

PRE-OPERATION CHECK LIST

Before riding for break-in operation, practice or a race, make sure the machine is in good operating condition.
Before using this machine, check the following points.

Item	Routine	Page
Fuel	Check that a fresh mixture of oil and gasoline is filled in the fuel tank. Check the fuel line for leakage.	P1-11
Transmission Oil	Check that the oil level is correct. Check the crankcase for leakage.	P3-6 ~ 7
Gear Shifter and Clutch	Check that gears can be shifted correctly in order and that the clutch operates smoothly.	P1-8, P3-3
Throttle grip/Housing	Check for smooth operation, Lubricate/Adjust if necessary.	P3-3 ~ 4
Brakes	Check the play of front brake and effect of front and rear brake.	P3-9 ~ 12
Chain	Check chain slack and alignment. Check that the chain is lubricated properly.	P3-12 ~ 14
Wheels	Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play.	P3-21 ~ 22
Steering	Check that the handlebar can be turned smoothly and have no excessive play.	P3-22 ~ 23
Front Forks and Rear Shock Absorber	Check that they operate smoothly and there is no oil leakage.	P3-15 ~ 20
Cables (Wires)	Check that the clutch and throttle cables move smoothly. Check that they are not caught when the handlebars are turned or when the front forks travel up and down.	P3-25
Muffler	Check that the muffler is tightly mounted and has no cracks.	—
Sprocket	Check that the rear wheel sprocket tightening bolt is not loose.	P3-12
Bolts and Nuts	Check the chassis and engine for loose bolts and nuts.	—
Lead Connectors	Check that the CDI magneto, CDI unit, and ignition coil are connected tightly.	—
Settings	Is the machine set suitably for the condition of the racing course and weather or by taking into account the results of test-runs before racing? Is inspection and maintenance completely done?	—

STARTING AND BREAK-IN

CAUTION:

Before starting the machine, perform the checks in the pre-operation check list.

1

⚠ WARNING

Never start or run the engine in a closed area. The exhaust fumes are poisonous; they can cause loss of consciousness and death in a very short time. Always operate the machine in a well-ventilated area.

STARTING A COLD ENGINE

1. Shift the transmission into neutral.
2. Turn the fuel cock to "ON" and full open the starter lever (CHOKE).
3. With the throttle completely closed start the engine by kicking the kick starter forthly with firm stroke.
4. Run the engine at idle or slightly higher until it warms up: this usually takes about one or two minutes.
5. The engine is warmed up when it responds normally to the throttle with the starter lever (CHOKE) turned off.

CAUTION:

Do not warm up the engine for extended periods.

STARTING A WARM ENGINE

Do not operate the starter. Open the throttle slightly and start the engine by kicking the kick starter forthly with firm stroke.

CAUTION:

Observe the following break-in procedures during initial operation to ensure optimum performance and avoid engine damage.

BREAK-IN PROCEDURES

1. Before starting the engine, fill the fuel tank with a break-in oil-fuel mixture of 12 : 1 to 14 : 1.
2. Perform the pre-operation checks on the machine.
3. Start and warm up the engine. Check the idle speed, and check the operation of the controls and the "ENGINE STOP" button.
4. Operate the machine in the lower gears at moderate throttle openings for five to eight minutes. Stop and check the spark plug condition; it will show a rich condition during break-in.
5. Allow the engine to cool. Restart the engine and operate the machine as in the step above for five minutes. Then, very briefly shift to the higher gears and check full-throttle response. Stop and check the spark plug.
6. After again allowing the engine to cool, restart and run the machine for five more minutes. Full throttle and the higher gears may be used, but sustained full-throttle operation should be avoided. Check the spark plug condition.
7. Allow the engine to cool, remove the top end, and inspect the piston and cylinder. Remove any high spots on the piston with 600-grit, wet sandpaper. Clean all components and carefully reassemble the top end.
8. Drain the break-in oil-fuel mixture from the fuel tank and refill with the specified mix.
9. Restart the engine and check the operation of the machine throughout its entire operating range. Stop and check the spark plug condition. Restart the machine and operate it for about 10 to 15 more minutes. The machine will now be ready to race.

1

CAUTION:

- After the break-in or before each race, you must check the entire machine for loose fittings and fasteners as per "TORQUE-CHECK POINTS".
  Tighten all such fasteners as required.
- When any of the following parts have been replaced, they must be broken in.
  CYLINDER AND CRANKSHAFT:
  About one hour of break-in operation is necessary.
  PISTON, RING AND GEARS:
  These parts require about 30 minutes of break-in operation at half-throttle or less.
  Observe the condition of the engine carefully during operation.

TORQUE CHECK POINTS

- Frame Construction
  - Frame to Under Tube
  - Frame to Seat Rail
  - Combined Seat and Tank — Fuel Tank to Frame
- Engine Mounting — Frame to Engine
- Steering — Steering Shaft to Handlebar
  - Steering Shaft to Handlebar
  - Steering Shaft to Handle Crown
  - Handle Crown to Handlebar
- Suspension
  - Front
    - Steering Shaft to Front Fork
      - Front Fork to Handle Crown
      - Front fork to Under Bracket
    - Front Fork to Wheel
      - Front Fork to Front Axle
      - Tightening of Front Axle
  - Rear — For Link Type
    - Assembly of Links
    - Link to Frame
    - Link to Shock Absorber
    - Link to Swingarm
  - Rear — Installation of Shock Absorber
    - Shock Absorber to Frame
    - Shock Absorber to Swingarm
    - Shock Absorber to Crankcase (Engine)
  - Rear — Installation of Swingarm — Tightening of Pivot Shaft
- Wheel — Installation of Wheel
  - Front
    - Tightening of Front Axle
    - Tightening of Fork End
  - Rear
    - Tightening of Rear Axle
    - Tightening of Swingarm End
    - Wheel to Sprocket
- Brake
  - Hydraulic Type
    - Front
      - Caliper to Front Fork
      - Brake Disc to Wheel
      - Tightening of Union Bolt
      - Master Cylinder to Handlebar
      - Tension Bar to Front Fork
      - Compression Bar to Front Fork
      - Tightening of Air Bleeder
    - Rear
      - Caliper to Swingarm
      - Brake Disc to Wheel
      - Tightening of Union Bolt
      - Master Cylinder to Frame
      - Tension Bar to Swingarm
      - Compression Bar to Swingarm
      - Tightening of Air Bleeder
  - Mechanical Type
    - Front
      - Brake Cam to Lever
      - Tension Bar to Front Fork
      - Compression Bar to Front Fork
    - Rear
      - Brake Cam to Lever
      - Tension Bar to Swingarm
      - Compression Bar to Swingarm
- Fuel System
  - Fuel Tank to Fuel Cock
  - Fuel Tank to Fuel Sender

NOTE:

- Concerning the tightening torque, refer to the MAINTENANCE SPECIFICATIONS in CHAPTER 2 SPECIFICATIONS.
- The above chart indicates the TORQUE-CHECK POINTS for all models. Refer to only those items relate to your machine.

CLEANING AND STORAGE

CLEANING

Frequent cleaning of your machine will enhance its appearance, maintain good overall performance, and extend the life of many components.

1. Before washing the machine, block off the end of the exhaust pipe to prevent water from entering. A plastic bag secured with a rubber band may be used for this purpose.
2. If the engine is excessively greasy, apply some degreaser to it with a paint brush. Do not apply degreaser to the chain, sprockets, or wheel axles.
3. Rinse the dirt and degreaser off with a garden hose; use only enough pressure to do the job.

CAUTION:

Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brakes and transmission seals. Many expensive repair bills have resulted from improper high pressure detergent applications such as those available in coin-operated car washers.

4. After the majority of the dirt has been hosed off, wash all surfaces with warm water and a mild detergent. Use an old toothbrush to clean hard-to-reach places.
5. Rinse the machine off immediately with clean water, and dry all surfaces with a soft towel or cloth.
6. Immediately after washing, remove excess water from the chain with a paper towel and lubricate the chain to prevent rust.
7. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
8. Automotive wax may be applied to all painted or chromed surfaces. Avoid combination cleaner-waxes, as they may contain abrasives.
9. After completing the above, start the engine and allow it to idle for several minutes.

1

STORAGE

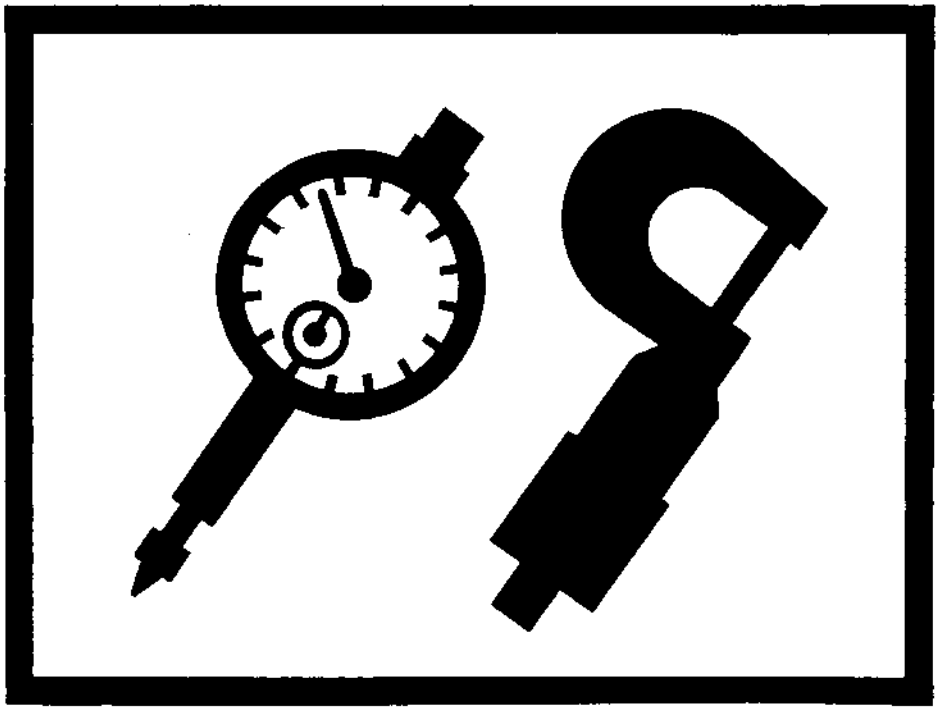
If your machine is to be stored for 60 days or more, some preventive measures must be taken to avoid deterioration. After cleaning the machine thoroughly, prepare it for storage as follows:

1. Drain the fuel tank, fuel lines, and the carburetor float bowl.
2. Remove the spark plug, pour a tablespoon of SAE 10W30 motor oil in the spark plug hole, and reinstall the plug. With the engine stop switch pushed in, kick the engine over several times to coat the cylinder walls with oil.
3. Remove the drive chain, clean it thoroughly with solvent, and lubricate it. Reinstall the chain or store it in a plastic bag tied to the frame.
4. Lubricate all control cables.
5. Block the frame up to raise the wheels off the ground.
6. Tie a plastic bag over the exhaust pipe outlet to prevent moisture from entering.
7. If the machine is to be stored in a humid or salt-air environment, coat all exposed metal surfaces with a film of light oil. Do not apply oil to rubber parts or the seat cover.

NOTE:

Make any necessary repairs before the machine is stored.

CHAPTER 2
SPECIFICATIONS



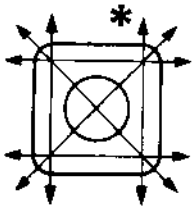
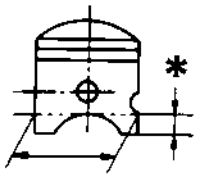
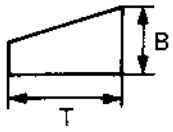
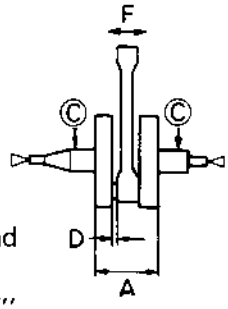
SPECIFICATIONS

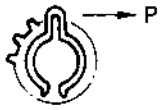
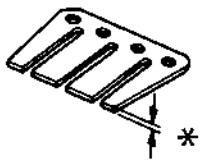
GENERAL SPECIFICATIONS

Model	WR500ZD
Model Code Number	4AA1
Vehicle identification number	JYA4AAW0*NA000101
Engine Starting Number	4AA-000101
Dimensions:	
Overall Length	2,205 mm (86.8 in)
Overall Width	845 mm (33.3 in)
Overall Height	1,270 mm (50.0 in)
Seat Height	985 mm (38.8 in)
Wheelbase	1,505 mm (59.3 in)
Minimum Ground Clearance	370 mm (14.6 in)
Basic Weight:	
With Oil and Full Fuel Tank	121.8 kg (269 lb)
Engine:	
Engine Type	Air cooled 2-stroke, gasoline, torque induction
Cylinder Arrangement	Single cylinder, forward inclined
Displacement	487 cm^3
Bore × Stroke	87 × 82 mm (3.43 × 3.23 in)
Compression Ratio	6.64 : 1
Starting System	Kick starter
Lubrication System	Premix (24 : 1) (Yamalube R) Premix (20 : 1) (Castrol R30) (Castrol A747)
Oil Type or Grade (2-Cycle):	
Transmission Oil	Yamalube 4 (10W30) or SAE 10W30 type SE motor oil
Periodic Oil Change	0.75 L (0.66 Imp qt, 0.79 US qt)
Total Amount	0.80 L (0.70 Imp qt, 0.85 US qt)
Air Filter	Wet type element
Fuel:	
Type	Except for AUS: Premium unleaded fuel with a research octane number of 95 or higher For AUS: Unleaded fuel only
Tank Capacity	13.0 L (2.86 Imp gal, 3.43 US gal)
Carburetor:	
Type/Manufacturer	VM38SS/MIKUNI
Spark plug:	
Type/Manufacturer	B8EG/NGK
Gap	0.5 ~ 0.6 mm (0.020 ~ 0.024 in)

Model	WR500ZD
Clutch Type	Wet, multiple-disc
Transmission:	
Primary Reduction System	Spur gear
Primary Reduction Ratio	63/24 (2.625)
Secondary Reduction System	Chain drive
Secondary Reduction Ratio	50/14 (3.571)
Transmission Type	Constant mesh, 5-speed
Operation	Left foot operation
Gear Ratio: 1st	29/15 (1.933)
2nd	24/16 (1.500)
3rd	22/18 (1.222)
4th	22/22 (1.000)
5th	20/24 (0.833)
Chassis:	
Frame Type	Semi double cradle
Caster Angle	28°15′
Trail	128 mm (5.04 in)
Tire:	
Type	With tube
Size (F)	80/100-21 51M
Size (R)	120/90-18 65M
Brake:	
Front Brake Type	Single disc brake
Operation	Right hand operation
Rear Brake Type	Single disc brake
Operation	Right foot operation
Suspension:	
Front Suspension	Telescopic fork
Rear Suspension	Swingarm (New monocross suspension)
Shock Absorber:	
Front Shock Absorber	Air, coil spring, oil damper
Rear Shock Absorber	Gas, coil spring, oil damper
Wheel Travel:	
Front Wheel Travel	300 mm (11.8 in)
Rear Wheel Travel	310 mm (12.2 in)
Electrical:	
Ignition System	CDI Magneto
Generator System	Flywheel magneto

MAINTENANCE SPECIFICATIONS
ENGINE

Model	WR500ZD
Cylinder Head: Warp Limit 	<0.03 mm (0.0012 in)> *Lines indicate straightedge measurement.
Cylinder: Bore Size Taper Limit Out of Round Limit	 87.00~87.02 mm (3.425~3.426 in) <0.05 mm (0.0020 in)> <0.01 mm (0.0004 in)>
Piston: Piston Size/ Measuring Point*  Piston Clearance <Limit> Oversize: 1st 2nd 3rd 4rd Piston Offset	 87.00 mm (3.425 in)/32 mm (1.26 in) 0.080~0.085 mm (0.0031~0.0033 in) <0.1 mm (0.004 in)> 87.25 mm (3.435 in) 87.50 mm (3.445 in) 87.75 mm (3.455 in) 88.00 mm (3.465 in) 1.5 mm (0.06 in), EX-side
Piston Ring: Sectional Sketch  End Gap (Installed) Side Clearance (Installed)	 Keystone B = 1.5 mm (0.059 in) T = 3.4 mm (0.134 in) 0.35~0.50 mm (0.014~0.020 in) 0.03~0.05 mm (0.0012~0.0020 in)
Crankshaft:  Crank Width "A" Run Out Limit "C" Connecting Rod Big End Side Clearance "D" Small End Free Play "F" <Limit>	 65.95~66.00 mm (2.597~2.598 in) <0.03 mm (0.0012 in)> 0.25~0.75 mm (0.01~0.03 in) 0.4~1.0 mm (0.016~0.039 in) <2.0 mm (0.08 in)>
Clutch: Friction Plate Thickness/Quantity <Wear Limit> Clutch Plate Thickness/Quantity <Warp Limit>	 3.0 mm (0.12 in) × 7 <2.7 mm (0.11 in)> 1.6 mm (0.063 in) × 6 <0.05 mm (0.002 in)>

Model		WR500ZD
Clutch Spring Free Length/Quantity		36.0 mm (1.42 in) × 6
<Limit>		<34.0 mm (1.34 in)>
Clutch Housing Thrust Clearance		0.17 ~ 0.23 mm (0.0067 ~ 0.0091 in)
Clutch Housing Radial Clearance		0.03 ~ 0.55 mm (0.0012 ~ 0.0217 in)
Clutch Release Method		Inner push, cam push
Push Rod Bending Limit		0.2 mm (0.008 in)
Transmission:		
Main Axle Deflection Limit		<0.01 mm (0.0004 in)>
Drive Axle Deflection Limit		<0.01 mm (0.0004 in)>
Shifter:		
Shifting Type		Guide bar
Guide Bar Bending Limit		<0.05 mm (0.0020 in)>
Kick Starter Type		Kick and mesh type
Kick Clip Friction Force 		P = 0.8 ~ 1.2 kg (1.8 ~ 2.6 lb)
Air Filter Oil Grade (Oiled Filter)		Foam-air-filter oil
Carburetor:		
Type/Manufacturer		VM38SS/MIKUNI
I.D. Mark		4AA00
Main Jet	(M.J.)	#440
Main Air Jet	(M.A.J.)	φ2.5
Jet Needle-clip Position	(J.N.)	6F16-3
Needle Jet	(N.J.)	Q-8
Cutaway	(C.A.)	3.5
Pilot Jet	(P.J.)	#40
Pilot Air Screw	(P.A.S.)	1-1/2
Valve Seat Size	(V.S.)	φ3.5
Starter Jet	(G.S.)	#90
Float Arm Height	(F.H.)	19.1 ~ 21.1 mm (0.75 ~ 0.83 in)
Fuel Level	(F.L.)	3 ~ 5 mm (0.12 ~ 0.20 in)
Reed Valve:		
Thickness* 		0.42 mm (0.017 in)
Valve Stopper Height		8.4 ~ 8.8 mm (0.331 ~ 0.346 in)
Valve Bending Limit		0.6 mm (0.024 in)

Parts to be tightened	Thread size	Q'ty	Tightening torque		
			Nm	m•kg	ft•lb
Spark plug	M14×1.25	1	25	2.5	18
Cylinder head (Stud bolt)	M 8×1.25	7	15	1.5	11
(Nut)	M 8×1.25	7	22	2.2	16
Cylinder (Stud bolt)	M12×1.25	4	15	1.5	11
(Nut)	M12×1.25	4	35	3.5	25
Crankcase	M 6×1.0	11	12	1.2	8.7
Bearing cover plate	M 6×1.0	5	10	1.0	7.2
Crankcase cover 1 (Magneto cover)	M 6×1.0	3	10	1.0	7.2
Crankcase cover 2 (Chain cover)	M 6×1.0	1	10	1.0	7.2
Crankcase cover 3	M 6×1.0	8	9	0.9	6.5
Oil drain bolt	M12×1.5	1	20	2.0	14
Kick starter	M12×1.0	1	50	5.0	36
Primary drive gear	M18×1.0	1	115	11.5	85
Clutch	M20×1.0	1	75	7.5	54
Push rod (Locknut)	M 6×1.0	1	10	1.0	7.2
Clutch spring	M 6×1.0	6	10	1.0	7.2
Drive sprocket	M20×1.0	1	75	7.5	54
Stopper lever	M 6×1.0	1	15	1.5	11
Shift pedal	M 6×1.0	1	10	1.0	7.2
Magneto rotor	M12×1.25	1	85	8.5	61
Magneto base	M 6×1.0	2	10	1.0	7.2

CHASSIS

Model	WR500ZD
Steering System:	
Steering Bearing Type	Taper roller bearing
Front Suspension	
Front Fork Travel	300 mm (11.8 in)
Fork Spring Free Length	480 mm (18.9 in)
Spring Rate, STD	K = 3.9 N/mm (0.39 kg/mm, 21.8 lb/in)
Optional Spring	Yes
Oil Capacity	505 cm^3 (17.7 Imp oz, 17.1 US oz)
Oil Level	120 mm (4.72 in) (From top of inner tube fully compressed without spring.)
Oil Grade	Front Fork Oil "01"
Front Fork Top End	Zero mm (Zero in)
Rear Suspension:	
Shock Absorber Travel	129 mm (5.08 in)
Spring Free Length	260 mm (10.24 in)
Fitting Length	240 mm (9.45 in)
Spring Rate, STD <Min. ~ Max.>	K = 48.0 N/mm (4.8 kg/mm, 264 lb/in)
Optional Spring	Yes
Enclosed Gas Pressure <Min. ~ Max.>	1,000 kPa (10 kg/cm^2, 142 psi) <700 ~ 1,300 kPa (7 ~ 13 kg/cm^2, 100 ~ 185 psi)>
Rear Arm:	
Swingarm Free Play Limit	
End	<1 mm (0.04 in)>
Side	<0.3 mm (0.01 in)>

Model	WR500ZD
Wheel:	
Front Wheel Type	Spoke wheel
Rear Wheel Type	Spoke wheel
Front Rim Size/Material	1.60×21/Aluminum
Rear Rim Size/Material	MT2.50×18/Aluminum
Rim Runout Limit	
Vertical	<2.0 mm (0.08 in)>
Lateral	<2.0 mm (0.08 in)>
Drive Chain:	
Type/Manufacturer	520V6/DAIDO
Number of Links	117 links+Joint
Chain Slack	30~60 mm (1.2~2.4 in)
Front Disc Brake:	
Disc Outside Dia.×Thickness	230×3.0 mm (9.06×0.12 in)
<Disk Wear Limit>	<2.5 mm (0.1 in)>
Pad Thickness Inner & Outer	4.4 mm (0.17 in)
<Limit>	<0.8 mm (0.03 in)>
Master Cylinder Inside Dia.	11.0 mm (0.433 in)
Caliper Cylinder Inside Dia.	27.0 mm (1.063 in)
Brake Fluid Type	DOT #4
Rear Disc Brake:	
Disc Outside Dia.×Thickness	220×4.5 mm (8.66×0.18 in)
Pad Thickness Inner & Outer	4.7 mm (0.19 in)
<Limit>	<1.0 mm (0.04 in)>
Master Cylinder Inside Dia.	12.7 mm (0.500 in)
Caliper Cylinder Inside Dia.	30.23 mm (1.190 in)
Brake Fluid Type	DOT #4
Brake Lever & Brake Pedal:	
Brake Lever Free Play	10~20 mm (0.4~0.8 in) (at lever end)
Brake Pedal Position	10 mm (0.4 in) (Vertical height below footrest top)
Clutch Lever Free Play/Position	2~3 mm (0.08~0.12 in)/at lever pivot

	Part to be tightened	Thread size	Q'ty	Tightening torque		
				Nm	m•kg	ft•lb
△	Handle crown and outer tube	M 8×1.25	4	23	2.3	17
△	Handle crown and steering shaft	M36×1.0	1	115	11.5	85
△	Handlebar holder (Upper)	M 8×1.25	4	23	2.3	17
△	Handlebar holder (Lower)	M10×1.25	2	40	4.0	29
△	Steering ring nut (Lower)	M28×1.5	1	Refer to NOTE		
△	Front fork and cap bolt	M46×1.0	2	30	3.0	22
△	Front fork and base valve	M22×1.0	2	55	5.5	40
	Cap bolt and damper rod (Front fork)	M10×1.0	2	15	1.5	11
△	Front brake master cylinder and bracket	M 6×1.0	2	9	0.9	6.5
	Front brake master cylinder cap	M 4×0.7	2	2	0.2	1.4
△	Front brake master cylinder and joint bolt	M10×1.25	1	26	2.6	19
△	Brake hose (Front and rear) and joint bolt	M10×1.25	1	14	1.4	10
△	Front brake hose union bolt (Caliper)	M10×1.25	1	26	2.6	19
△	Front brake caliper and axle bracket	M 8×1.25	2	23	2.3	17
△	Brake caliper (Front and rear) and pad pin	M10×1.25	2	18	1.8	13
△	Brake caliper (Front and rear) and bleed screw	M 8×1.25	1	6	0.6	4.3
△	Front wheel axle	M14×1.5	1	59	5.9	43
△	Front wheel axle holder	M 6×1.0	4	9	0.9	6.5
△	Brake disk (Front and rear) and wheel hub	M 6×1.0	6	12	1.2	8.7
△	Rear brake pedal mounting	M 8×1.25	1	19	1.9	13
△	Rear brake master cylinder and frame	M 6×1.0	2	10	1.0	7.2
	Rear brake reservoir tank and frame	M 6×1.0	1	4	0.4	2.9
△	Rear brake caliper and caliper bracket	M 8×1.25	2	23	2.3	17
△	Rear brake caliper and joint bolt	M10×1.0	1	26	2.6	19
△	Rear brake hose union bolt (Master cylinder)	M10×1.25	1	26	2.6	19
△	Rear wheel axle and nut	M18×1.5	1	115	11.5	85
△	Rear wheel sprocket and wheel hub	M 8×1.25	6	30	3.0	22
	Engine mounting:					
△	Engine bracket (Front) and frame	M 8×1.25	4	32	3.2	23
△	Engine bracket (Front) and engine	M 8×1.25	1	32	3.2	23
△	Engine and frame (Lower)	M10×1.25	1	64	6.4	46
△	Engine bracket (Upper) and frame	M 8×1.25	2	32	3.2	23
△	Engine bracket (Upper) and engine	M10×1.25	1	64	6.4	46
△	Pivot shaft and nut	M16×1.5	1	85	8.5	61
△	Relay arm and frame	M10×1.25	1	59	5.9	43
△	Relay arm and connecting rod	M14×1.5	1	59	5.9	43
△	Connecting rod and swingarm	M14×1.5	1	59	5.9	43
△	Rear shock absorber and frame	M10×1.25	1	56	5.6	40
△	Rear shock absorber and relay arm	M10×1.25	1	32	3.2	23

NOTE:

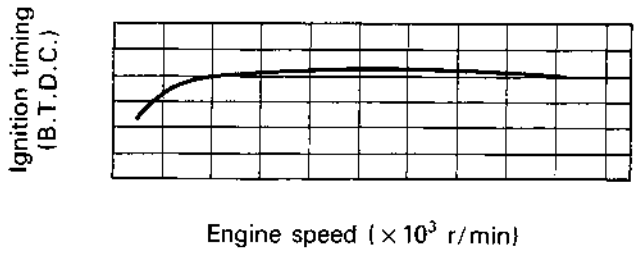
1. First, tighten the ring nut approximately 38 Nm (3.8 m•kg, 27 ft•lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut 4 Nm (0.4 m•kg, 2.9 ft•lb).

	Part to be tightened	Thread size	Q'ty	Tightening torque		
				Nm	m•kg	ft•lb
△	Back stay (left)	M 8×1.25	2	19	1.9	13
△	Back stay (right)	M 8×1.25	1	16	1.6	11
△	Seat rail	M 8×1.25	1	16	1.6	11
△	Drive chain tensioner mounting	M 8×1.25	2	19	1.9	13
	Seal guard and swingarm	M 6×1.0	2	5	0.5	3.6
	Support chain and protector chain	M 6×1.0	2	3	0.3	2.2
	Protector and swingarm	M 6×1.0	2	12	1.2	8.7
△	Fuel tank mounting	M 6×1.0	2	10	1.0	7.2
	Side cover 3 and fuel tank	M 6×1.0	4	3	0.3	2.2
	Front fender and under bracket	M 6×1.0	4	6	0.6	4.3
	Rear fender mounting	M 6×1.0	4	7	0.7	5.1
	Guard flap mounting	M 6×1.0	2	5	0.5	3.6
	Side cover 1, 2 mounting	M 6×1.0	2	3	0.3	2.2
	Seat mounting	M 8×1.25	2	16	1.6	11
	Sidestand and sidestand bracket	M10×1.25	1	40	4.0	29
	Sidestand bracket and swingarm	M10×1.25	2	40	4.0	29

NOTE:

△ - marked portion shall be checked for torque tightening after break-in or before each race.

ELECTRICAL

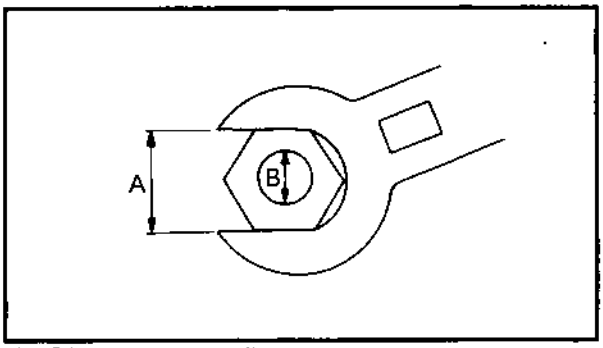
Model	WR500ZD
Ignition System:	
Ignition Timing (B.T.D.C.)	1.9 ~ 2.1 mm (0.075 ~ 0.083 in)/16°/2,000 rpm
Advancer Type	Electrical
	
CDI	
Magneto-Model/Manufacturer	F003T20672/MITSUBISHI
Source Coil Resistance (Color)	279 ~ 341Ω at 20°C (68°F) (Brown-Black)
Pickup Coil Resistance (Color)	11.2 ~ 13.6Ω at 20°C (68°F) (White/Red-Black)
CDI Unit-Model/Manufacturer	F08T01472/MITSUBISHI
Ignition Coil:	
—Model/Manufacturer	F6T537/MITSUBISHI
Minimum Spark Gap	6 mm (0.24 in)
Primary Winding Resistance	0.26 ~ 0.36Ω at 20°C (68°F)
Secondary Winding Resistance	3.5 ~ 4.7kΩ at 20°C (68°F)

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 multi-fastener 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)	TORQUE SPECIFICATION		
		Nm	m•kg	ft•lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11.0
14 mm	10 mm	30	3.0	22.0
17 mm	12 mm	55	5.5	40.0
19 mm	14 mm	85	8.5	61.0
22 mm	16 mm	130	13.0	94.0

2



A: Distance across flats
B: Outside thread diameter

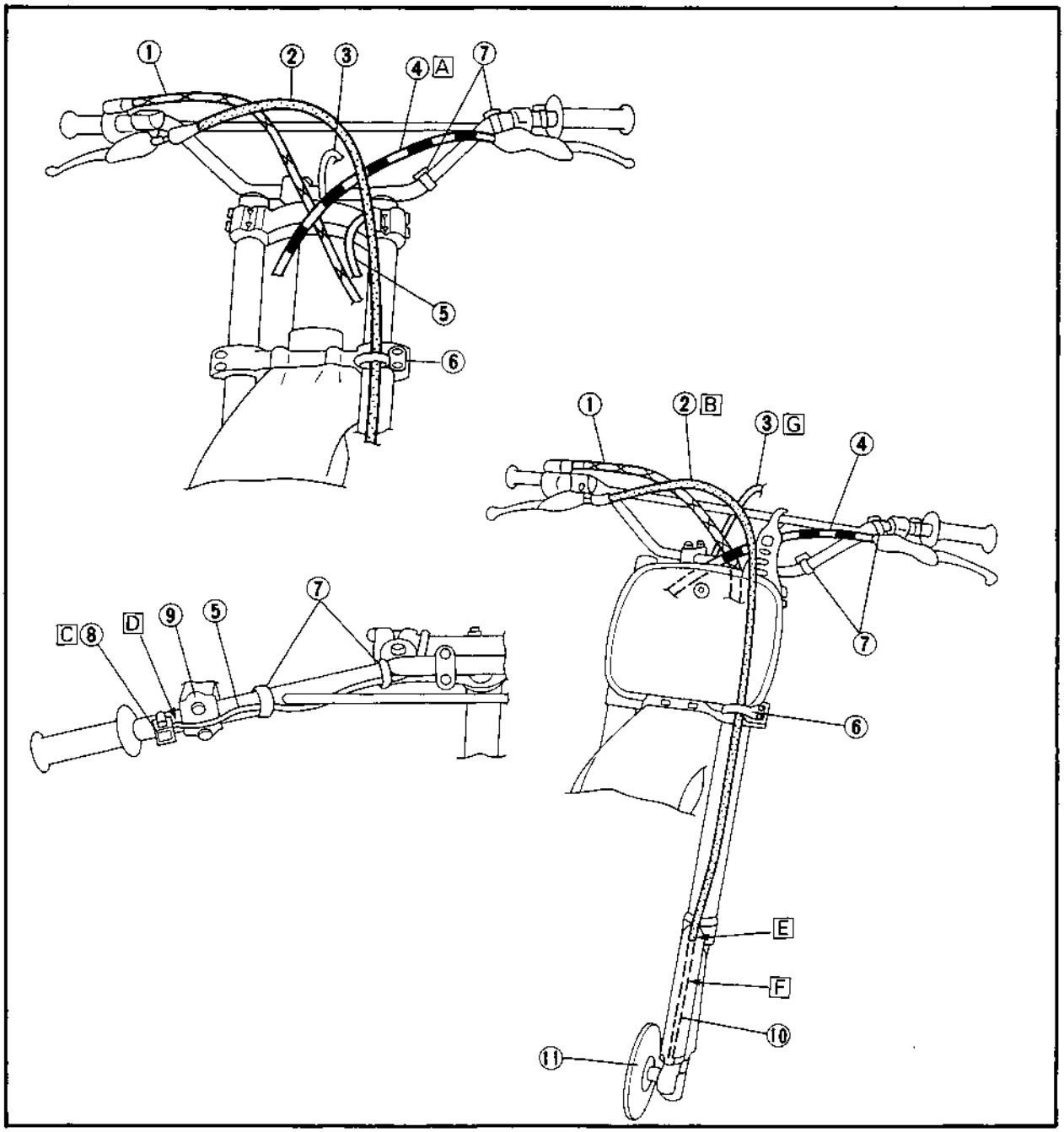
DEFINITION OF UNITS

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

CABLE ROUTING DIAGRAM

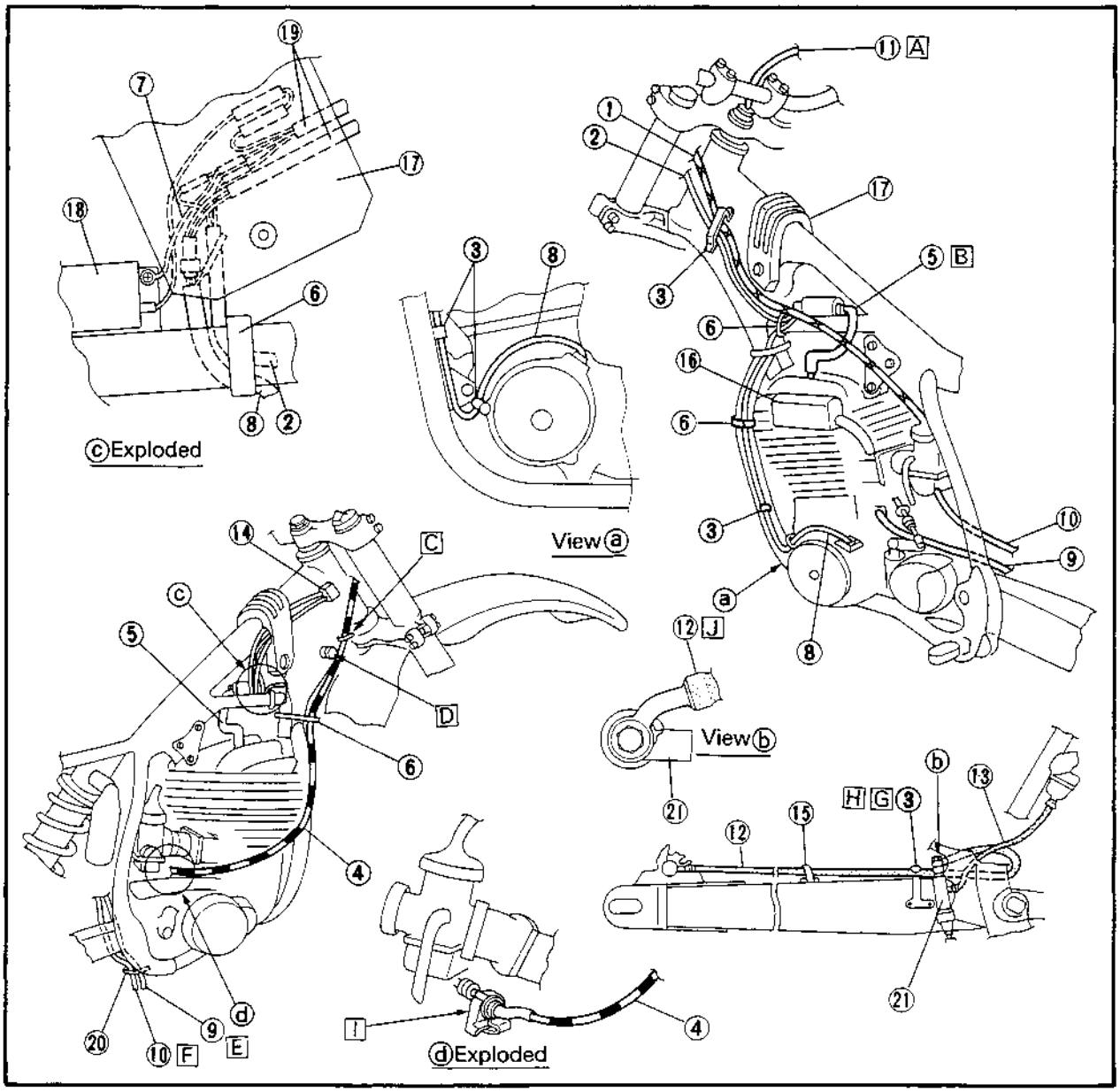
① Throttle cable
② Brake hose
③ Fuel tank breather hose
④ Clutch cable
⑤ "ENGINE STOP" button lead
⑥ Cable guide
⑦ Band
⑧ "ENGINE STOP" button
⑨ Lever holder
⑩ Protector
⑪ Brake disc

[A] Pass the clutch cable between the brake hose and throttle cable.
[B] Brake hose routing:
Master cylinder→Throttle cable (out-side)→
Cable guide (left of under bracket)→
Guide (protector)→Protector (behind)→
Hose cover→Caliper
[C] Keep the clearance between the "Engine stop" button and lever holder.
[D] Do not pinch the "Engine stop" button lead.
[E] Insert the brake hose into rings of protector.
[F] Pass the brake hose behind the protector.
[G] Pass the breather hose in front of the handle-bar and behind the tension pipe.
[F] Pass the brake hose behind the protector.



① Throttle cable
② "ENGINE STOP" button lead
③ Clamp
④ Clutch cable
⑤ High tension cord
⑥ Band
⑦ Earth lead
⑧ CDI magneto lead
⑨ Transmission oil breather hose
⑩ Carburetor breather hose
⑪ Tank cap breather hose
⑫ Rear brake hose
⑬ Reservoir tank hose
⑭ CDI unit
⑮ Brake hose holder
⑯ Y.E.I.S.
⑰ Damper
⑱ Ignition coil
⑲ CDI unit lead
⑳ Cable guide
㉑ Rear master cylinder

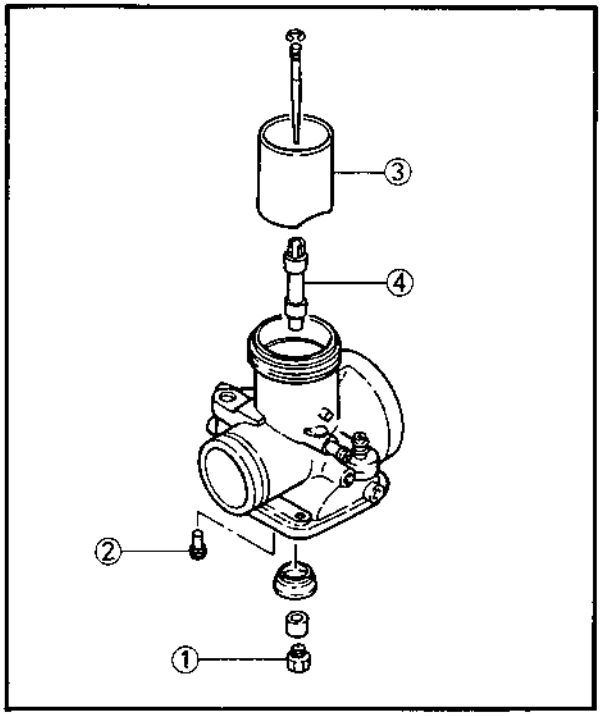
[A] Pass the breather hose in front of the handlebar and behind the tension pipe.
[B] Pass the high tension lead inside of the throttle cable.
[C] Pass the clutch cable through the cable guide.
[D] Pass the clutch cable below the fuel tank holding boss on the frame.
[E] Pass the transmission oil breather hose inside of right rear arm.
[F] Pass the carburetor breather hose inside of right rear arm.
[G] Pass the brake hose inside of the reservoir tank hose.
[H] Brake hose routing: Master cylinder→Inside of rear arm bracket→Clamp→Brake hose holder→Caliper
[I] Pass the clutch cable through the holder on the upper crankcase.
[J] Lightly touch the rear brake hose with the projection on the rear master cylinder.



SETTING PARTS

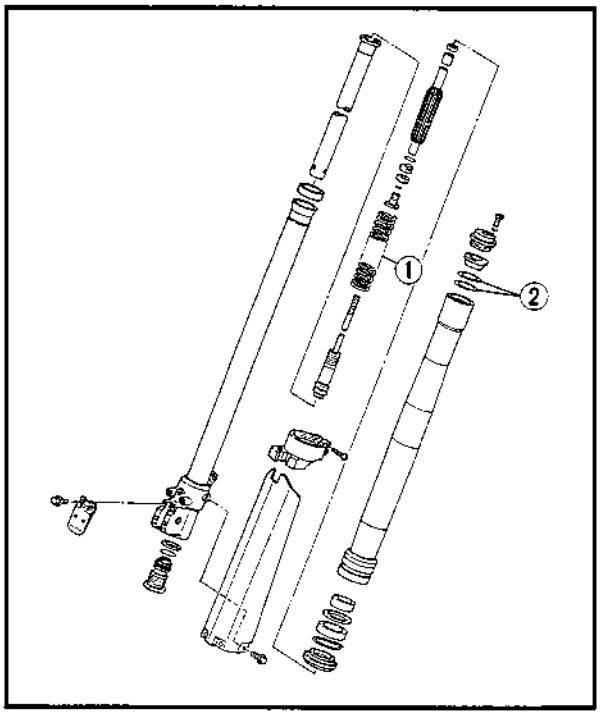
NOTE:

For details of machine setting, refer to "CHAPTER 7 (TUNING)".



CARBURETOR

Part name	Size	Part number
Main Jet ① (STD)	#430 #440 #450	137-14143-86 137-14143-88 137-14143-90
Pilot Jet ② (STD)	#35 #40 #45	193-14142-35 193-14142-40 193-14142-45
Throttle Valve ③ (STD)	2.5 3.0 3.5	2X8-14112-30 2X8-14112-35 2X8-14112-40
Main Nozzle ④ (STD)	Q-6 Q-8 R-0	510-14141-56 510-14141-58 510-14141-R0



FRONT FORK

Front fork spring ①

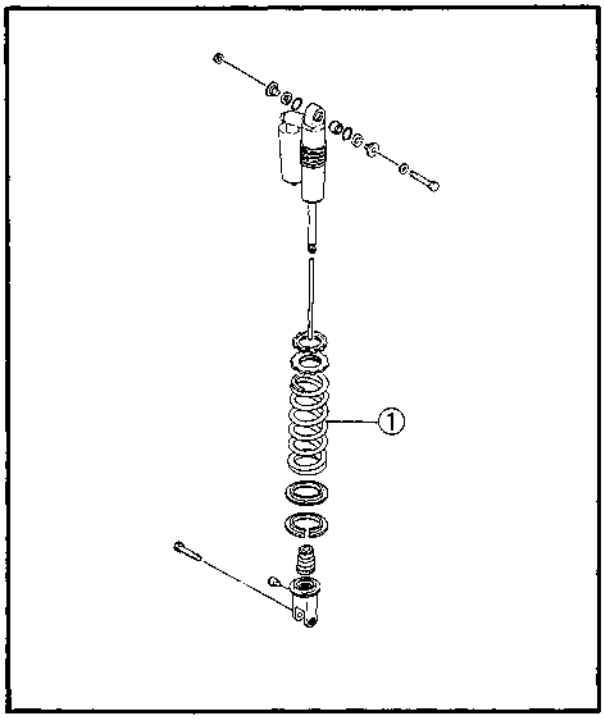
TYPE	SPRING RATE	SPRING PART NUMBER	I.D. MARK
STD	0.390	3XK-23141-L0	–
SOFT	0.380	3XJ-23141-30	1-1 slit
HARD	0.400	3XJ-23141-50	1-3 slit

Spring adjustment washer ②

PART NUMBER	3XJ-23364-L0

Fork oil level

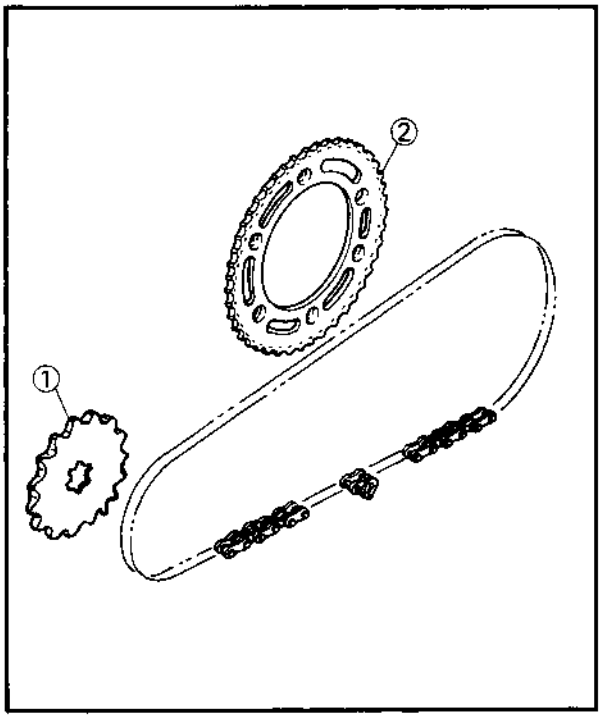
Standard	120 mm (4.72 in)
Extent of Adjustment	75 ~ 130 mm (2.95 ~ 5.12 in)
From top of outer tube with inner tube and damper rod fully compressed without spring.	



REAR SHOCK ABSORBER

Rear shock spring ①

TYPE	SPRING RATE	SPRING NUMBER	I.D. COLOR
STD	4.8	4AA-22212-00	—
SOFT	4.6	3XJ-22212-00	Green
HARD	5.0	3XJ-22212-20	Red



DRIVE AND DRIVEN SPROCKETS

Part name	Size	Part number
Drive sprocket ①	13T	93834-13029
(STD)	14T	93834-14049
	15T	93834-15075
Driven sprocket ②	44T	26A-25444-50
	46T	26A-25446-50
	48T	26A-25448-50
(STD)	50T	26A-25450-50
	52T	26A-25452-50

CHAPTER 3
REGULAR INSPECTION AND ADJUSTMENTS

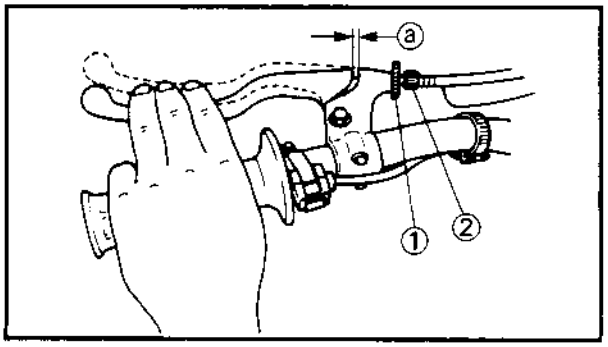
MAINTENANCE INTERVALS

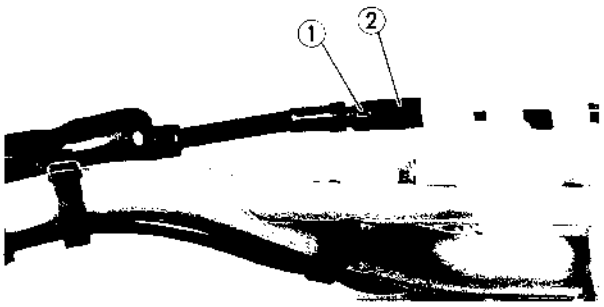
The following schedule is intended as a general guide to maintenance and lubrication. Bear in mind that such factors as weather, terrain, geographical location, and individual usage will alter the required maintenance and lubrication intervals. If you are a doubt as to what intervals to follow in maintaining and lubricating your machine, consult your Yamaha dealer.

Item	After break-in	Every race	Every third	Every fifth	As required	Remarks
PISTON Inspect and clean Replace		●		●	●	Inspect crack Remove carbon
PISTON RING Inspect Replace	●	●	●		●	Check ring end gap
PISTON PIN, SMALL END BEARING Inspect Replace		●			●	
CYLINDER HEAD Inspect and clean Retighten	● ●	● ●				Remove carbon Check gasket
CYLINDER Inspect and clean Replace	●	●			●	Seizure Wear
CLUTCH Inspect and adjust Replace	●	●			●	Inspect friction plate, clutch plate and spring
TRANSMISSION Replace oil Inspect transmission	●			●	●	Yamalube 4 (10W-30) or SAE 10W30 SE motor oil
SHIFT CAM, FORK Inspect					●	Inspect wear
ROTOR NUT Retighten	●			●		
MUFFLER Inspect Clean	●	●		●		
CRANK Inspect and clean				●	●	
CARBURETOR Inspect, adjust and clean	●	●				
SPARK PLUG Inspect and clean Replace	●	●			●	
DRIVE CHAIN Lubricate, slack, alignment Replace	●	●			●	Use chain lube Chain slack: 30~60 mm (1.2~2.4 in)

Item	After break-in	Every race	Every third	Every fifth	As required	Remarks
OUTSIDE NUTS AND BOLTS Retighten	●	●				Refer to the "STARTING AND BREAK-IN" in CHAPTER 1. GENERAL INFORMATION.
AIR FILTER Clean and lubricate Replace	●	●			●	Use foam air-filter oil
FRAME Clean and inspect	●	●				
FUEL TANK, COCK Clean and inspect	●		●			
BRAKES Adjust free play Lubricate pivot point Check fluid level and leakage Retighten brake disc bolts, caliper bolts and union bolts Replace pads	● ● ● ●	● ● ● ●			●	
FRONT FORKS Inspect and adjust Replace oil Replace oil seal	● ●	●		●	●	Suspension oil "01"
FRONT FORK OIL SEAL AND DUST SEAL Clean and lube	●	●				Lithium base grease
REAR SHOCK ABSORBER Inspect and adjust Lube and retighten	● ●	● ●				Lithium base grease
CHAIN GUARD AND ROLLERS Inspect	●	●				
SWINGARM Inspect and retighten	●	●				
RELAY ARM, CONNECTING ROD Inspect and lube	●	●				Lithium base grease
STEERING HEAD Inspect free play and retighten Clean and lube Replace bearing	●	●		●	●	Lithium base grease
TIRE, WHEELS Inspect air pressure, wheel run-out, tire wear and spoke looseness Retighten sprocket bolt Inspect bearings Replace bearings Lubricate	● ●	● ●	● ●		●	Lithium base grease
THROTTLE, CONTROL CABLE Check routing and connection Lubricate	● ●	● ●				Yamaha cable lube or SAE 10W30 motor oil

3





3

CLUTCH ADJUSTMENT

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

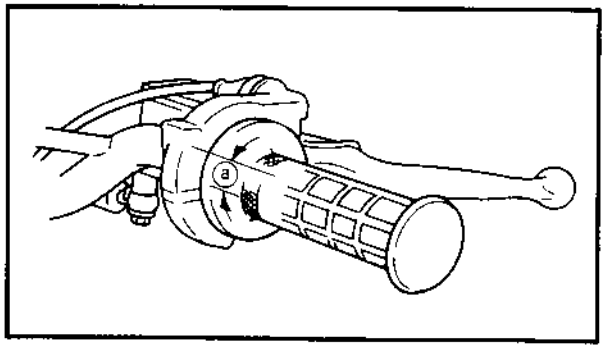
Clutch Lever Free Play ⓐ:
2 ~ 3 mm (0.08 ~ 0.12 in)

2. Adjust:
   - Clutch lever free play

Clutch lever free play adjustment steps:
- Loosen the looknut ①.
- Turn the adjuster ② until free play ⓐ is within the specified limits.
- Tighten the locknut.

NOTE:

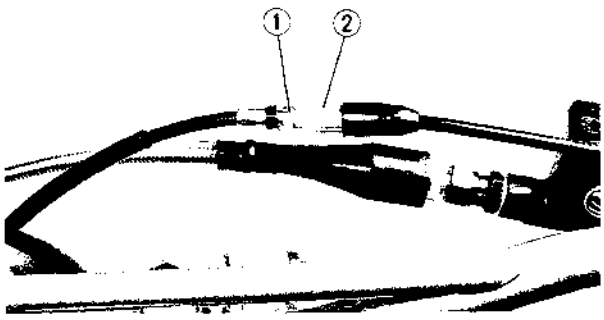
After adjustment, check proper operation of clutch lever.



THROTTLE CABLE ADJUSTMENT

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

Free Play ⓐ:
3 ~ 5 mm (0.12 ~ 0.20 in)



2. Adjust:
   • Throttle cable free play

Throttle cable free play adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② until the specified free play is obtained.
- Tighten the locknut.

NOTE:

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

⚠ WARNING

After adjusting, turn the handlebar to right and left and make sure that the engine idling does not run faster.

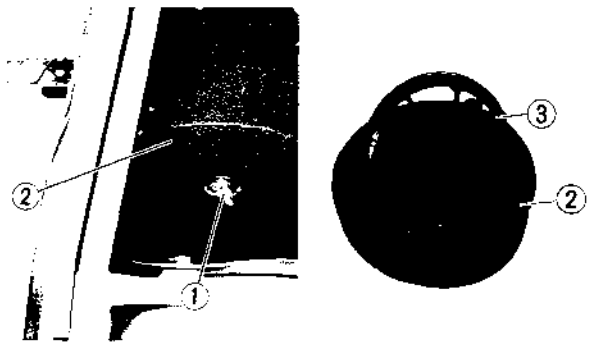
AIR FILTER CLEANING

NOTE:

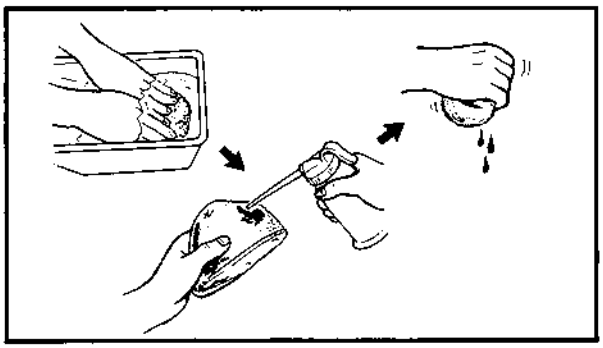
Proper air filter maintenance is the biggest key to preventing premature engine wear and damage.

CAUTION:

Never run the engine without the air filter element in place; this would allow dirt and dust to enter the engine and cause rapid wear and possible engine damage.



1. Remove:
   • Seat
   • Fitting bolt ①
   • Air filter element ②
   • Spring washer
   • Washer
   • Filter guide ③



2. Clean:
   • Air filter element
     Clean them with solvent.

NOTE:

After cleaning, remove the remaining solvent by squeezing the element.

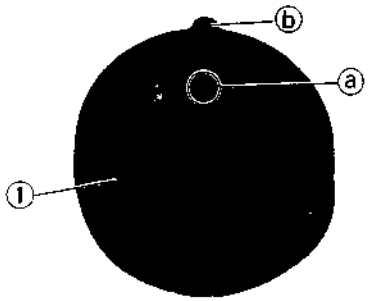
CAUTION:

Do not twist the element when squeezing the element.

3. Inspect:
   • Air filter element
     Damage → Replace.
4. Apply:
   • Foam-air-filter oil
     To the element.

NOTE:

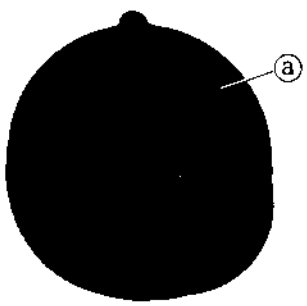
Squeeze out the excess oil. Element should be wet but not dripping.



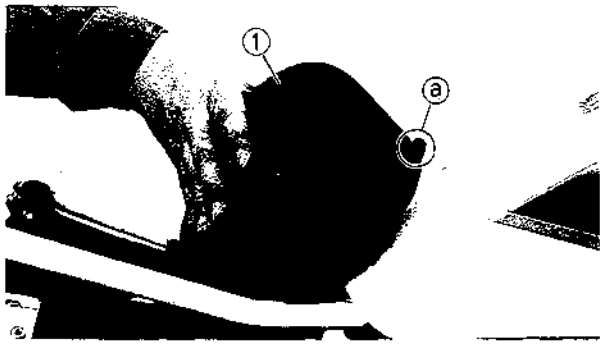
5. Install:
   • Filter guide ①

NOTE:

Align the top mark ⓐ on filter guide with the projection ⓑ on air filter element.



6. Apply:
   • Lithium soap base grease
     On-to the matching surface ⓐ on air filter element.



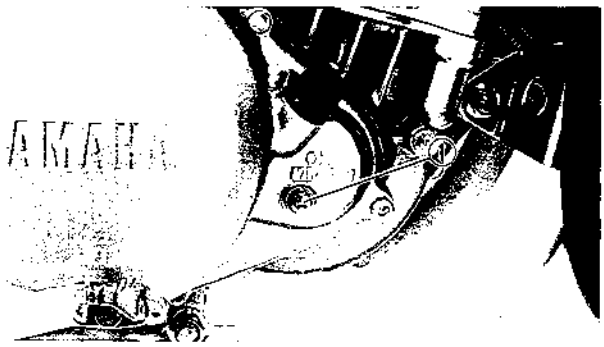
9. Install:
   - Air filter element ①
   - Fitting bolt

NOTE:

Be sure the projection ⓐ is upward.

TRANSMISSION OIL LEVEL CHECK

1. Start the engine, warm it up for several minutes and wait for five minutes.
2. Place the machine on a level place and hold it up on upright position by placing the suitable stand under the engine.



3. Check:
   - Transmission oil level

Transmission oil level checking steps:
- Remove the checking screw ①
- Inspect the oil level.

NOTE:

Be sure the machine is positioned straight up when inspecting the oil level.

⚠ WARNING

Never attempt to remove the checking screw just after high speed operation. The heated oil could spout out, causing danger. Wait until the oil cools down.

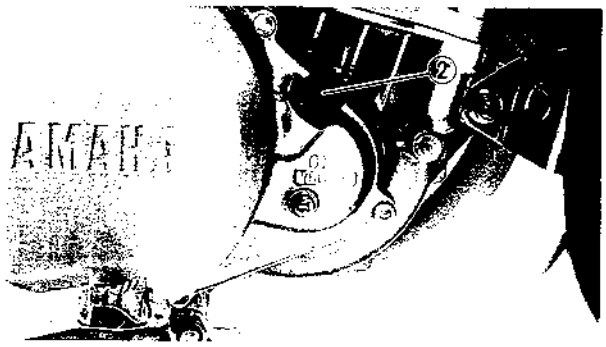
Oil flows out→Oil level is correct.
Oil does not flow out→Oil level is low. Add transmission oil until oil flows out.

- Inspect the gasket (checking screw), replace if damaged.
- Tighten the checking screw.

Checking Screw:
10 Nm (1.0 m•kg, 7.2 ft•lb)

TRANSMISSION OIL REPLACEMENT

1. Start the engine and warm it up for several minutes and wait for five minute.
2. Place the machine on a level place and hold it on upright position by placing the suitable stand under the engine.
3. Place a suitable container under the engine.



4. Remove:
   - Drain bolt ①
   - Oil filler cap ②

   Drain the transmission oil.
5. Install:
   - Drain bolt

Drain Bolt:
20 Nm (2.0 m•kg, 14 ft•lb)

6. Fill:
   - Transmission oil

Recommended Oil:
Yamalube 4 (10W30) or SAE 10W30 Type SE Motor Oil
Oil Capacity
(Periodic Oil Change):
0.75 L (0.66 Imp qt, 0.79 US qt)

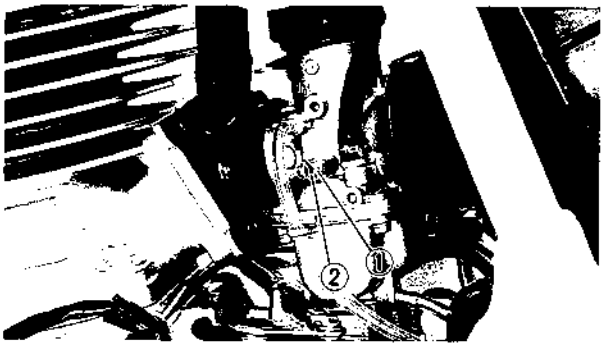
7. Check:
   - Oil leakage
8. Check:
   - Transmission oil level
9. Install:
   - Oil filler cap ②

AIR SCREW ADJUSTMENT

1. Adjust:
   - Air screw

Adjusting steps:
- Screw in the pilot air screw ① until it is lightly seated.
- Back out by the specified number of turns.

Pilot Air Screw:
1-1/2 turns out

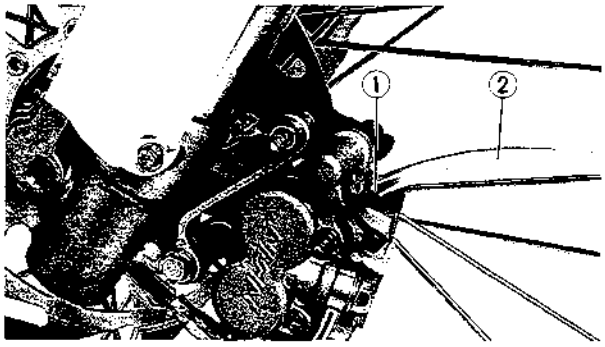


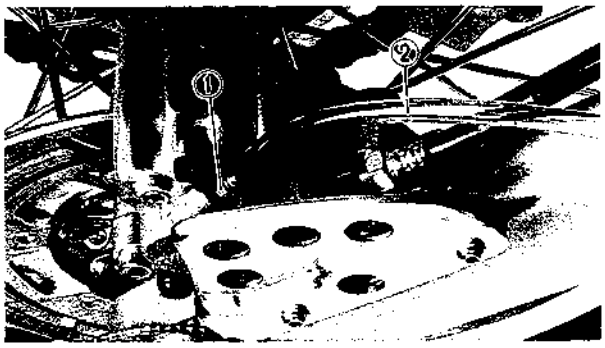
IDLE SPEED ADJUSTMENT

1. Start the engine and thoroughly warm it up.
2. Adjust:
   - Idle speed

Adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② until the engine runs at the lowest possible speed.
- Tighten the locknut.

3





BRAKE SYSTEM 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 ② tightly to the caliper bleed screw ①.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever or pedal several times.
f. Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
h. Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.

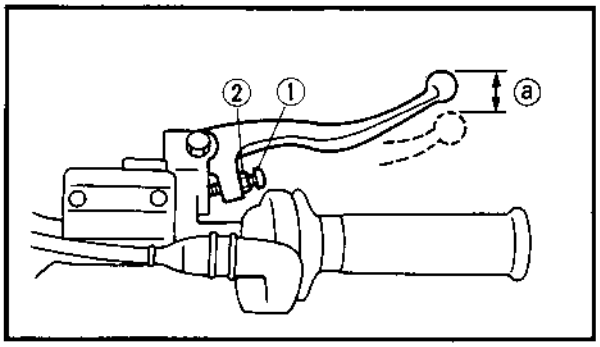
Bleed Screw:
6 Nm (0.6 m•kg, 4.3 ft•lb)

i. Repeat steps (e) to (h) until 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 BRAKE ADJUSTMENT

CAUTION:

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

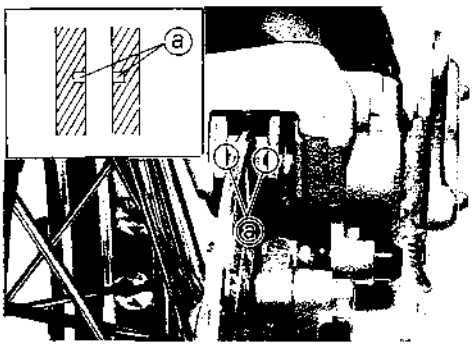
1. Check:
   - Front brake lever free play ⓐ
     Out of specification→Adjust.

Front Brake Lever Free Play ⓐ:
10~20 mm (0.4~0.8 in)

2. Adjust:
   - Front brake lever free play

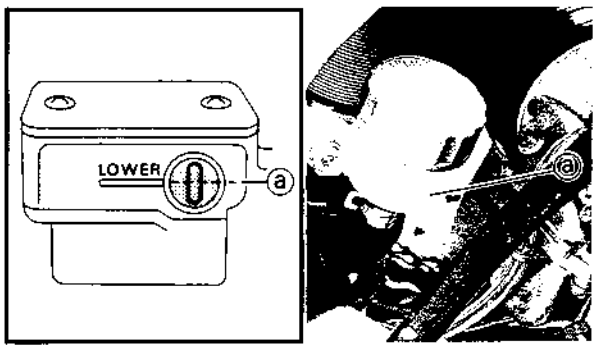
Front brake lever free play adjustment steps:
- Loosen the locknut ②.
- Turn the adjuster ① until the free play ⓐ is within the specified limits.
- Tighten the locknut.

3



BRAKE PAD INSPECTION

1. Inspect:
   - Brake pads
     Over wear limit ⓐ→Replace as a set.



BRAKE FLUID LEVEL INSPECTION

1. Place the master cylinder so that its top is in a horizontal position.
2. Inspect:
   - Brake fluid level
     Fluid at lower level→Fill up.

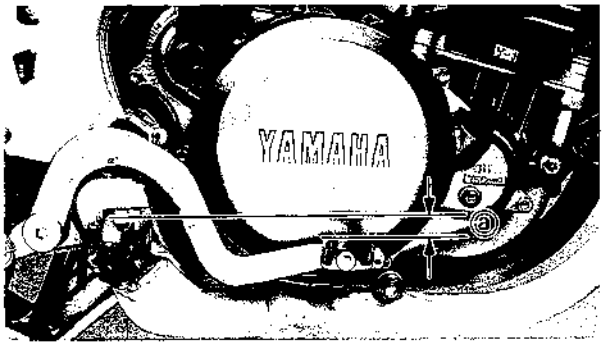
ⓐ Lower level

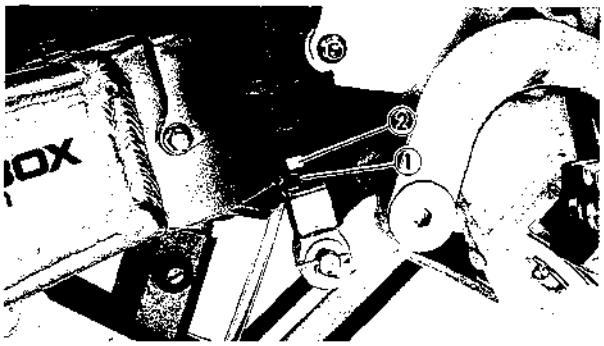
INSP ADJ

Recommended Brake Fluid:
DOT #4

⚠ WARNING

- **Use only designated quality brake fluid to avoid poor brake performance.**
- **Refill with same type and brand of brake fluid; mixing fluids could result in poor brake performance.**
- **Be sure that water or other contaminants do not enter master cylinder when refilling.**
- **Clean up spilled fluid immediately to avoid erosion of painted surfaces or plastic parts.**





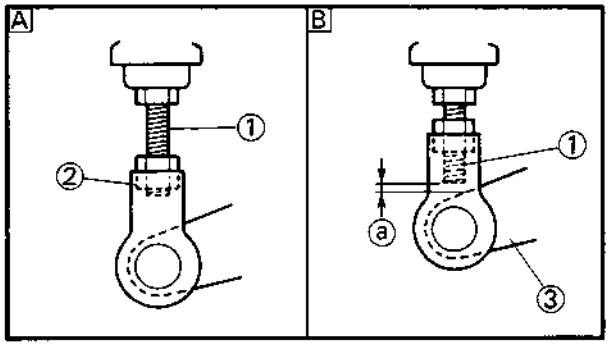
REAR BRAKE ADJUSTMENT

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

Brake Pedal Height ⓐ:
10 mm (0.4 in)

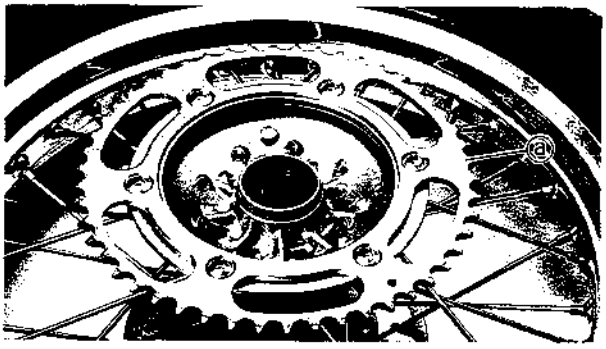
2. Adjust:
   - Brake pedal height

Pedal height adjustment steps:
- Loosen the locknut ①.
- Turn the adjusting nut ② until the pedal height ⓐ is within specified height.
- Tighten the locknut.



⚠ WARNING

- **Adjust the pedal height between the Maximum [A] and the Minimum [B] as shown. (In this adjustment the bolt ① end should protrude out of the lower adjusting nut ② but not be less than 2 mm (0.08 in) away from the brake pedal ③).**
- **After the pedal height adjustment, make sure that the rear brake does not drag.**

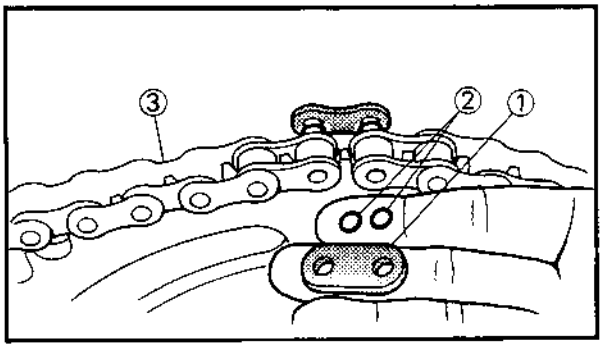


SPROCKETS INSPECTION

1. Inspect:
   - Sprocket teeth ⓐ
     Excessive wear→Replace.

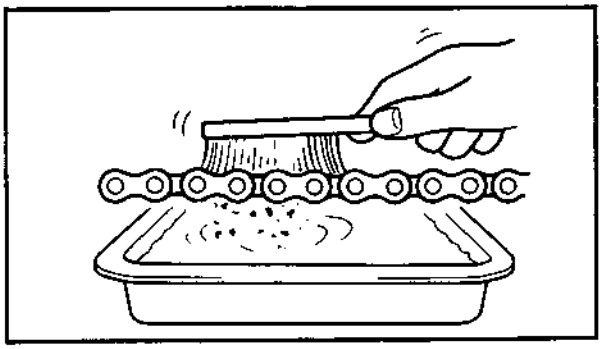
NOTE:

Replace the drive, driven sprockets and drive chain as a set.

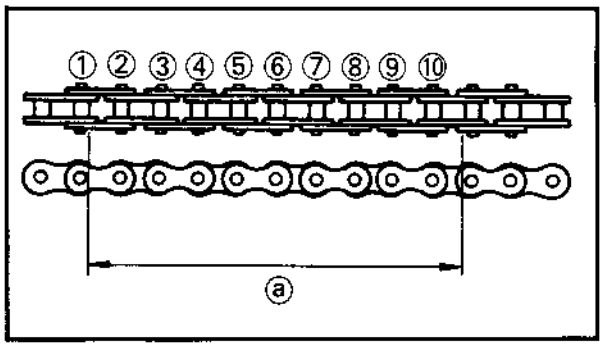


DRIVE CHAIN INSPECTION

1. Remove:
   - Master link clip
   - Joint ①
   - O-ring ②
   - Drive chain ③

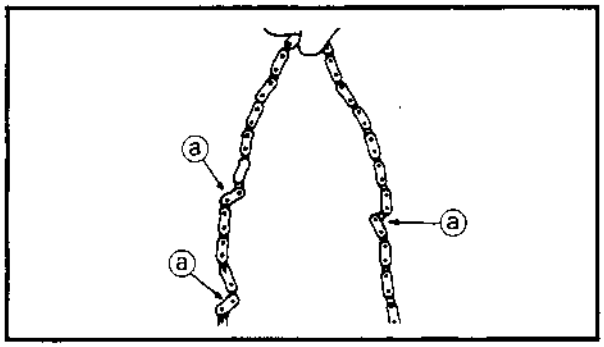


2. Clean:
   - Drive chain
     Place it in solvent, and brush off as much dirt as possible. Then remove the chain from the solvent and dry the chain.

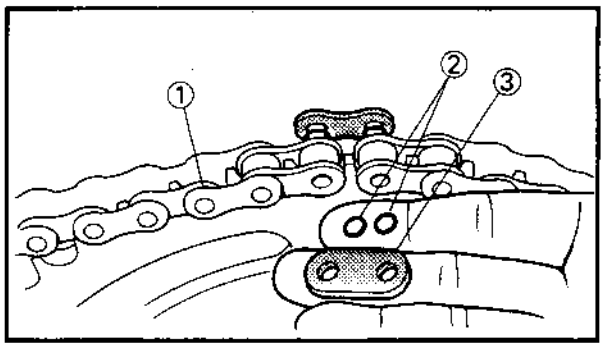


3. Measure:
   • Drive chain length (10 links) ⓐ
   Out of specification → Replace.

Drive Chain Length (10 links):
Limit: 150.1 mm (5.91 in)



4. Check:
   • Drive chain stiffness ⓐ
   Clean and oil the chain and hold as illustrated.
   Stiff → Replace drive chain.

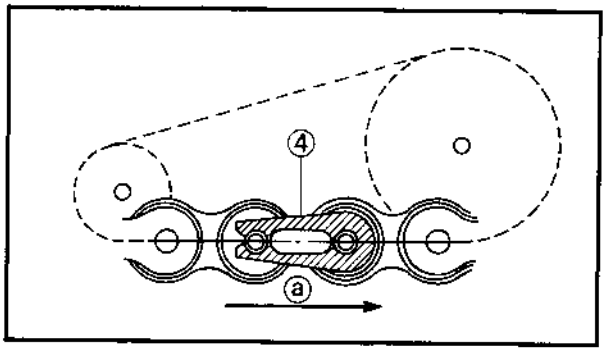


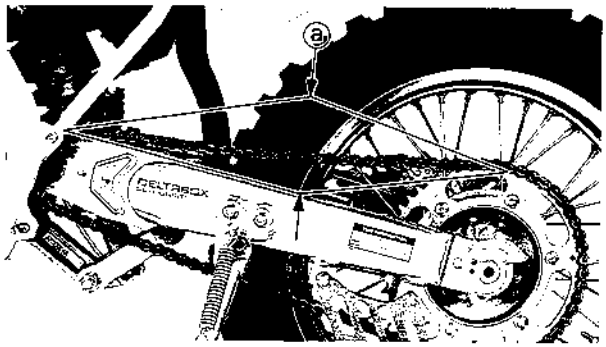
5. Install:
   • Drive chain ①
   • O-ring ②
   • Joint ③
   • Master link clip ④

NOTE:

During reassembly, the master link clip must be installed with the rounded end facing the direction of travel.

ⓐ Turning direction





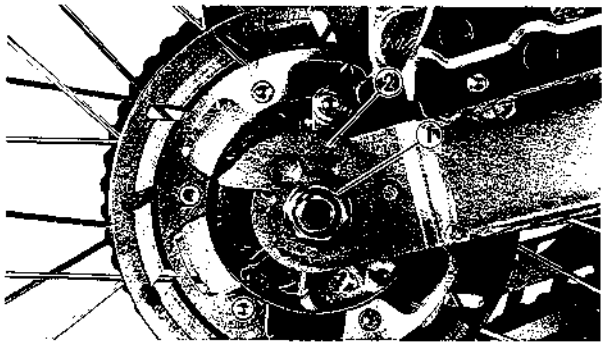
DRIVE CHAIN SLACK ADJUSTMENT

1. Check:
   • Drive chain slack ⓐ
   Out of specification → Adjust.

Drive Chain Slack:
30 ~ 60 mm (1.2 ~ 2.4 in)

NOTE:

- Before checking and/or adjusting, rotate the rear wheel through several revolutions and check the slack several times to find the tightest point. Check and/or adjust chain slack with rear wheel in this "tight chain" position.
- To check the chain slack the machine must stand vertically with its both wheels on the ground and without a rider.



2. Adjust:
   - Drive chain slack

Drive chain slack adjustment steps:

CAUTION:

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

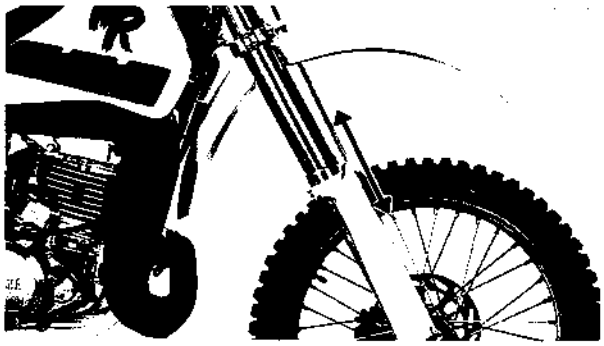
- Loosen the axle nut ①.
- Turn the both chain puller (Left and right) ② clockwise or counterclockwise until the specified slack is obtained.

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 the chain to be tight.

Axle Nut:
115 Nm (11.5 m•kg, 85 ft•lb)



FRONT FORK INSPECTION

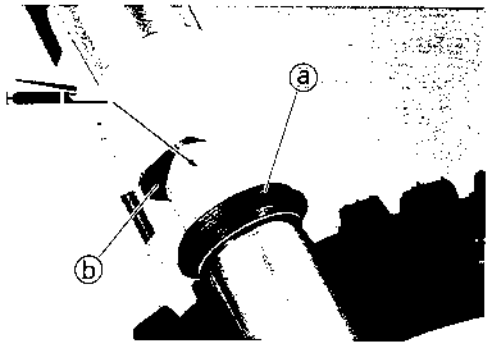
1. Inspect:
   - Front fork smooth action
     Operate the front brake and stroke the front fork.
     Unsmooth action/oil leakage→Repair or replace.

FRONT FORK OIL SEAL AND DUST SEAL CLEANING

1. Remove:
   - Protector
   - Dust seal ①

NOTE:

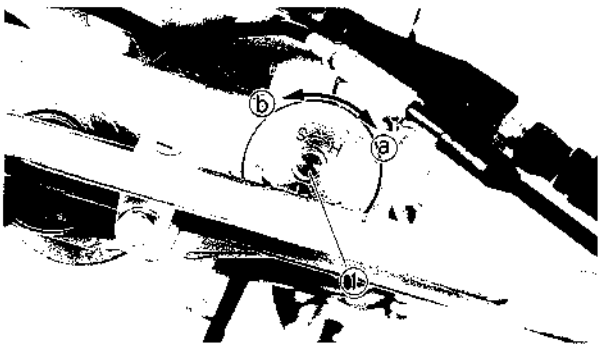
Use a thin screw driver, and be careful not to damage the inner fork tube and dust seal.



2. Clean:
   - Dust seal ⓐ
   - Oil seal ⓑ

NOTE:

Apply the lithium soap base grease on the inner tube.



FRONT FORK REBOUND DAMPING FORCE ADJUSTMENT

1. Adjust:
   - Rebound damping force
     By turning the adjuster ①.

Stiffer ⓐ→	Increase the rebound damping force. (Turn the adjuster ① in.)
Softer ⓑ→	Decrease the rebound damping force. (Turn the adjuster ① out.)

Extent of Adjustment:	
Maximum	Minimum
Fully turned in position	20 clicks out (From maximum position

•STANDARD POSITION:
This is the position which is back by the specific number of clicks from the fully turned-in position.

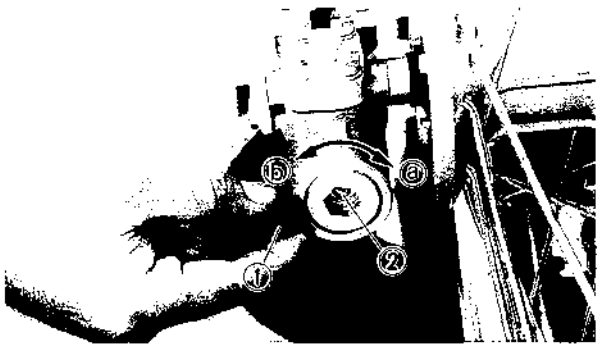
STANDARD POSITION:
6 Clicks Out

CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.

⚠ WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



FRONT FORK COMPRESSION DAMPING FORCE ADJUSTMENT

1. Remove:
   •Rubber cap ①
2. Adjust:
   •Compression damping force
   By turning the adjuster ②.

Stiffer ⓐ → Increase the compression damping force. (Turn the adjuster ② in.)
Softer ⓑ → Decrease the compression damping force. (Turn the adjuster ② out.)

INSP ADJ

Extent of Adjustment:	
Maximum	Minimum
Fully turned in position	20 clicks out (From maximum position)

•STANDARD POSITION:
This is the position which is back by the specific number of clicks from the fully turned-in position.

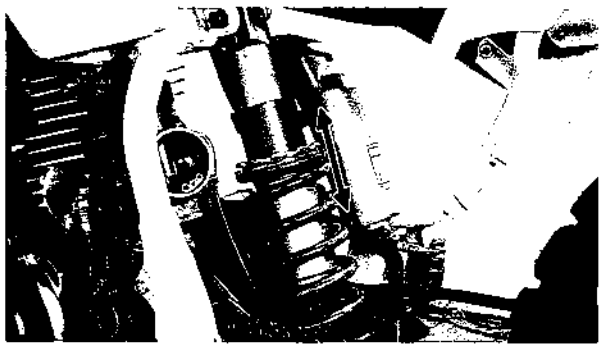
STANDARD POSITION:
8 Clicks Out

CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.

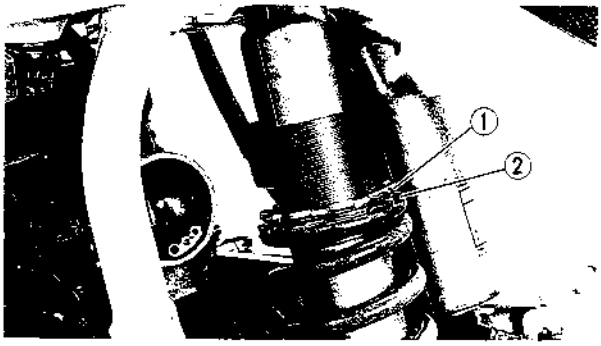
⚠ WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



REAR SHOCK ABSORBER INSPECTION

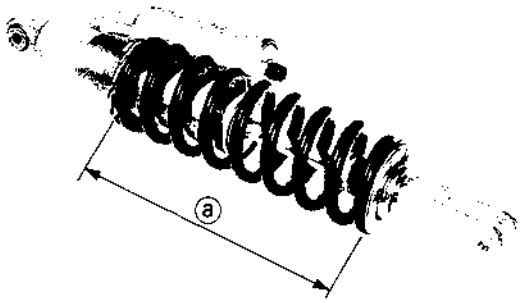
1. Inspect:
   •Swingarm smooth action
   Abnormal noise/Unsmooth action→
   Grease the pivoting points or repair the pivoting points.
   Damage/Oil leakage→Replace.



REAR SHOCK ABSORBER SPRING PRELOAD ADJUSTMENT

1. Remove:
   - Back stay
   - Air cleaner case
2. Elevate the rear wheel by placing the suitable stand under the engine.
3. Loosen:
   - Locknut ①
4. Adjust:
   - Spring preload
     By turning the adjuster ②.

Stiffer→Increase the spring preload.
(Turn the adjuster ② in.)
Softer→Decrease the spring preload.
(Turn the adjuster ② out.)



Spring Length (Installed):	
Standard position ⓐ	Extent of adjustment
240 mm (9.45 in)	237 ~ 260 mm (9.33 ~ 10.23 in)

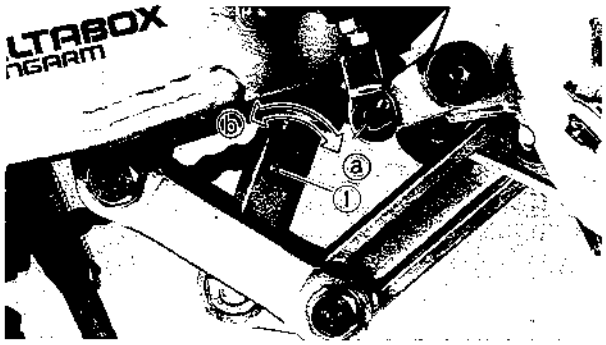
NOTE:

The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjuster.

CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.

5. Tighten
   - Locknut



REAR SHOCK ABSORBER REBOUND DAMPING FORCE ADJUSTMENT

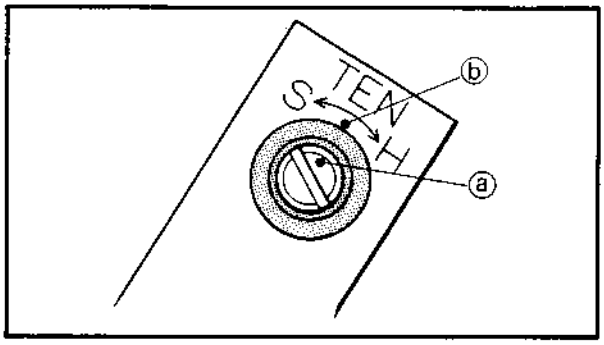
1. Adjust:
   - Rebound damping force
     By turning the adjuster ①.

Stiffer ⓐ → Increase the rebound damping force. (Turn the adjuster ① in.)
Softer ⓑ → Decrease the rebound damping force. (Turn the adjuster ① out.)

Extent of Adjustment:

Maximum	Minimum
Fully turned in position	20 clicks out (From maximum position)

3

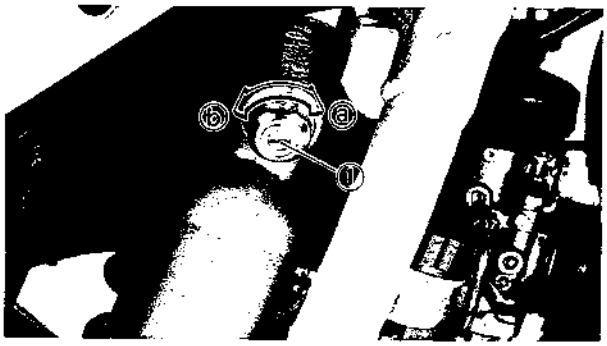


- STANDARD POSITION:
  This is the position which align the punch mark ⓐ on adjuster with punch mark ⓑ on the bracket. (Which is back by the specific number of clicks from the fully turned-in position.)

STANDARD POSITION:
About 8 Clicks Out

CAUTION:

Do not turn out (in) the adjuster from the damping force minimum (maximum) setting.



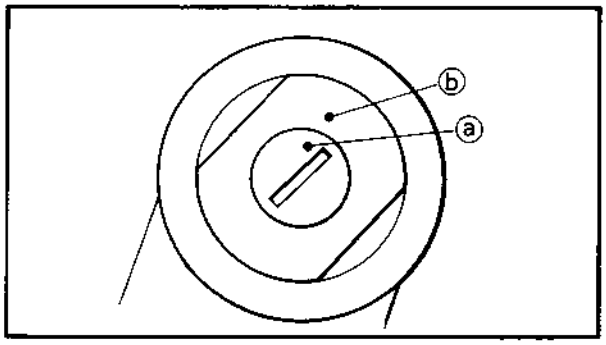
REAR SHOCK ABSORBER COMPRESSION DAMPING FORCE ADJUSTMENT

1. Adjust:
   - Compression damping force
     By turning the adjuster ①.

Stiffer ⓐ → Increase the compression damping force. (Turn the adjuster ① in.)
Softer ⓑ → Decrease the compression damping force. (Turn the adjuster ① out.)

Extent of Adjustment:

Maximum	Minimum
Fully turned in position	20 clicks out (From maximum position

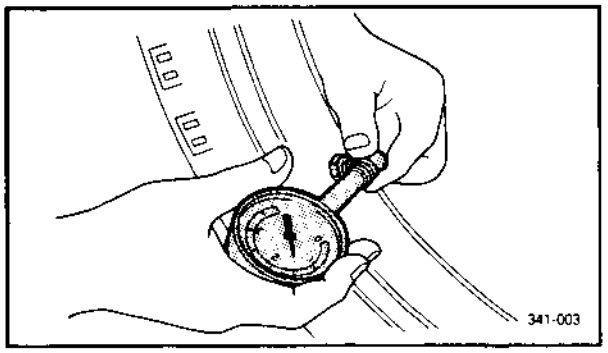


- STANDARD POSITION:
  This is the position which is back by the specific number of clicks from the fully turned-in position. (Which align the punch mark ⓐ on adjuster with punch mark ⓑ on the bracket.)

STANDARD POSITION:
About 11 Clicks Out

CAUTION:

Do not turn out (in) the adjuster from the damping force minimum (maximum) setting.



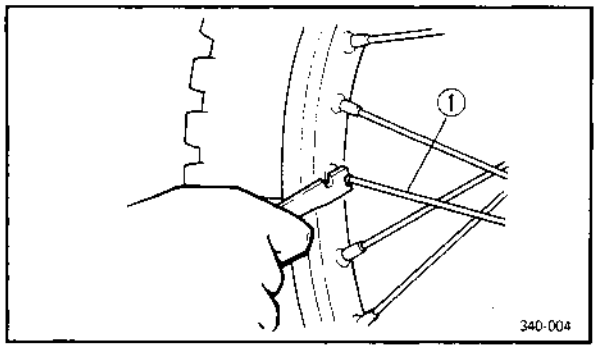
TIRE PRESSURE CHECK

1. Measure:
   - Tire pressure
     Out of specification→Adjust.

Standard Tire Pressure:
100 kPa (1.0 kg/cm², 14 psi)

NOTE:

- Check the tire while it is cold.
- Loose bead stoppers allow the tire to slip off its position on the rim when the tire pressure is low.
- A tilted tire valve stem indicates that the tire slips off its position on the rim.
- If the tire valve stem is found tilted, the tire is considered to be slipping off its position. Correct the tire position.



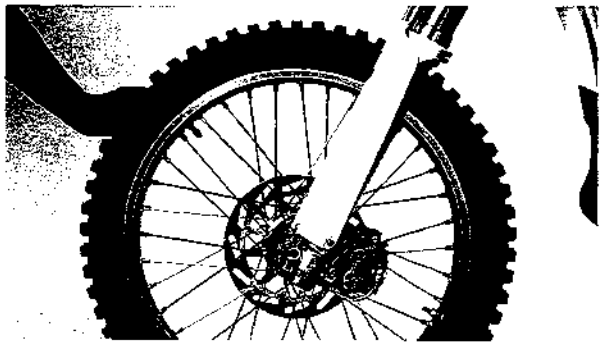
SPOKES INSPECTION AND TIGHTENING

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

NOTE:

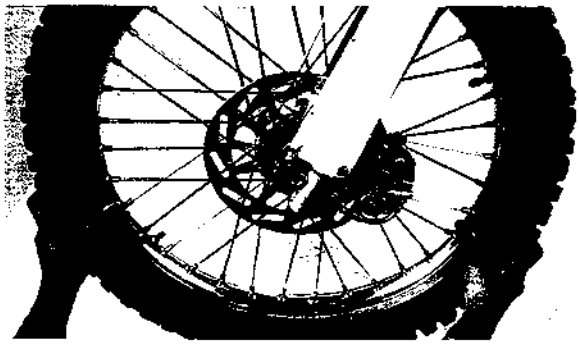
Be sure to retighten these spokes before and after Break-in.
After a practice or a race check spokes for looseness.

Nipple:
6 Nm (0.6 m•kg, 4.3 ft•lb)

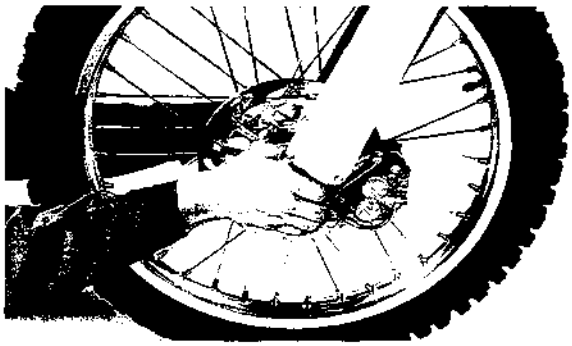


WHEEL INSPECTION

1. Inspect:
   - Wheel runout
     Elevate the wheel and turn it.
     Abnormal runout→Replace.

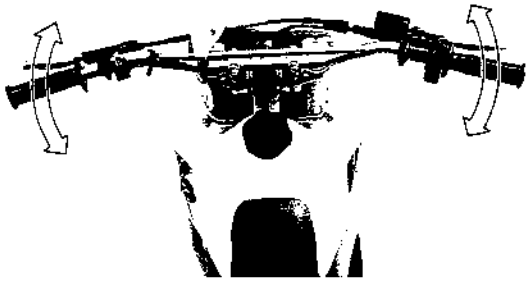


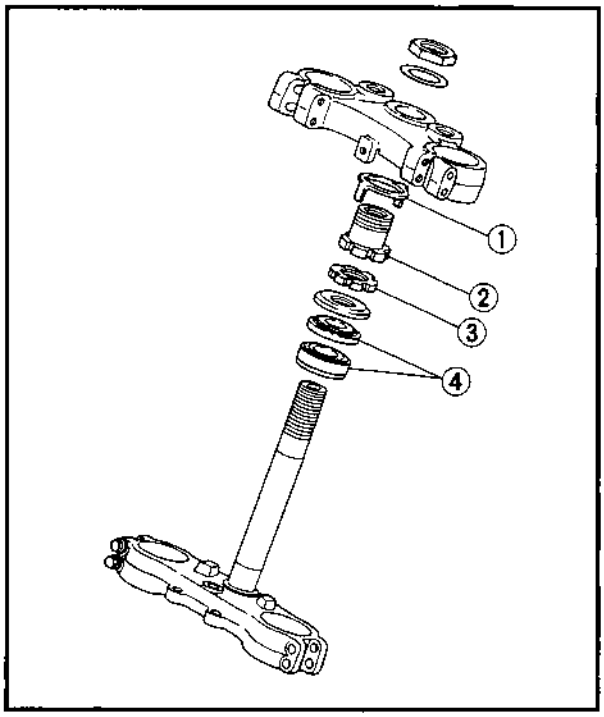
2. Inspect:
   - Bearing free play
     Exist play→Replace.



STEERING HEAD INSPECTION AND ADJUSTMENT

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Check:
   - Steering stem
     Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     Free play→Adjust steering head.
3. Check:
   - Steering smooth action
     Turn the handlebar lock to lock.
     Unsmooth action→Adjust steering ring nut.





4. Adjust:
   - Steering ring nut

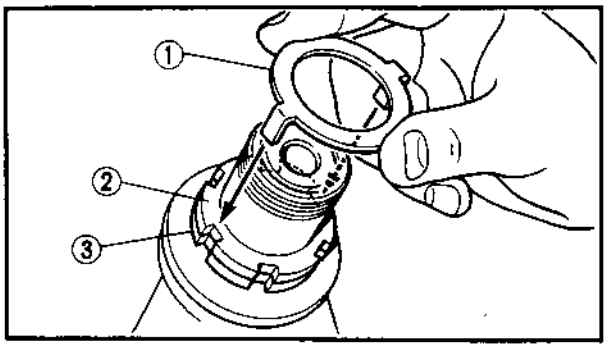
Steering ring nut adjustment steps:
- Remove the handlebar and handle crown.
- Remove the lock washer ①.
- Remove the ring nut (upper) ②, and loosen the ring nut (lower) ③.
- Tighten the ring nut (lower) ③ using Ring Nut Wrench.

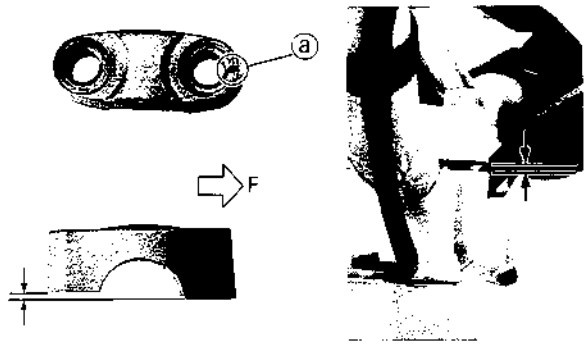
NOTE:
Set the torque wrench to the Ring Nut Wrench so that they form a right angle.

Ring Nut Wrench
YU-01268/90890-01268
YM-33975/90890-01403

④ Steering bearing

3





Ring Nut (Initial Tightening):
38 Nm (3.8 m•kg, 27 ft•lb)

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

⚠ WARNING

Avoid over-tightening.

Ring Nut (Final Tightening):
4 Nm (0.4 m•kg, 2.9 ft•lb)

- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings.
- Install the ring nut (upper).
- Finger tighten the ring nut (upper) ②, then align the slots of both ring nuts. If not aligned, hold the ring nut (lower) ③ and tighten the other until they are aligned.
- Install the lock washer ①.

NOTE:

Make sure the lock washer tab is placed in the slots.

- Install the handle crown and handlebar.

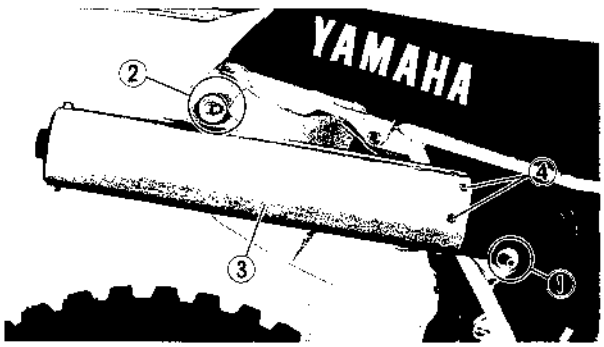
NOTE:

- The upper handlebar holder should be installed with the punched mark ⓐ forward.
- Insert the end of fuel breather hose into the hole of steering shaft.

CAUTION:

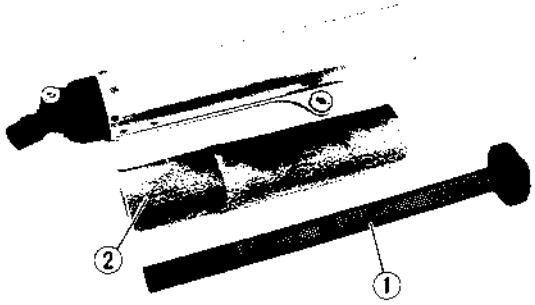
First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.

Steering Stem Nut:
115 Nm (11.5 m•kg, 85 ft•lb)
Handlebar Upper Holder:
23 Nm (2.3 m•kg, 17 ft•lb)
Pinch Bolt (Handle Crown):
23 Nm (2.3 m•kg, 17 ft•lb)



SILENCER FIBER REPLACEMENT

1. Remove:
   - Side cover (right)
   - Bolt ①, ②
   - Silencer ③
   - Bolt (silencer) ④



2. Remove:
   - Silencer pipe ①
   - Fiber ②

LUBRICATION

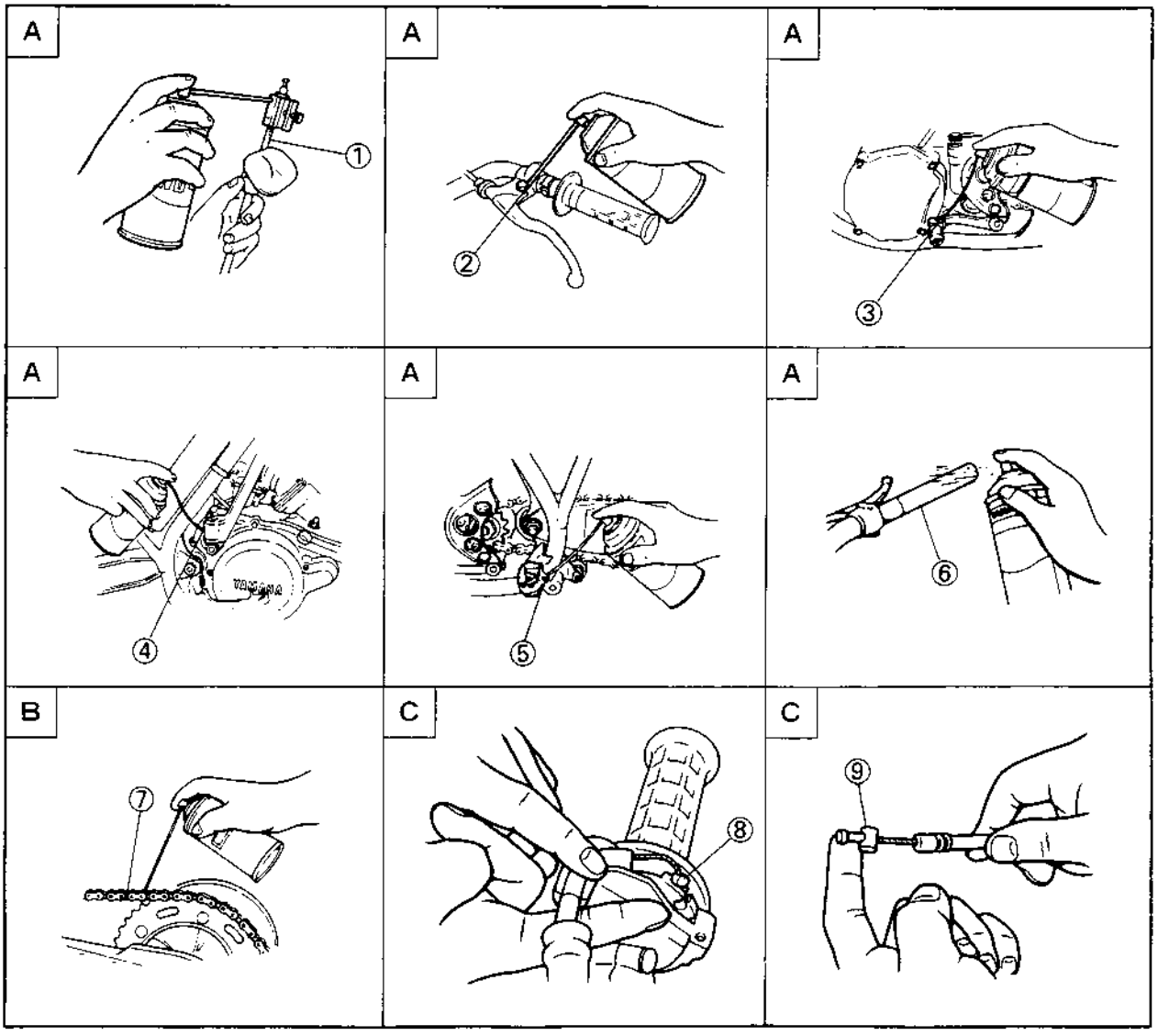
To ensure smooth operation of all components, lubricate your machine during setup, after break-in, and after every race.

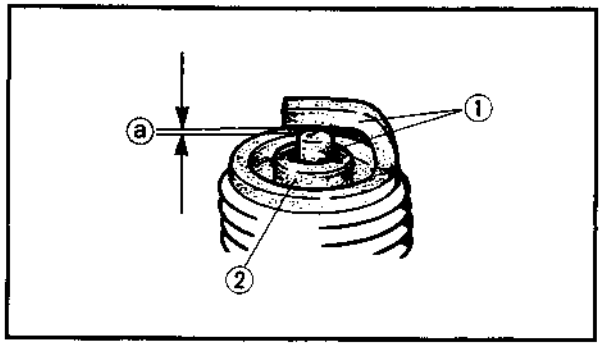
① All control cable
② Brake and clutch lever pivots
③ Shift pedal pivot
④ Kick axle pivot
⑤ Footrest pivot
⑥ Throttle-to-handlebar contact
⑦ Drive chain
⑧ Throttle guide and cable end
⑨ Clutch cable end

[A] Use Yamaha cable lube or equivalent on these areas.
[B] Use Yamaha chain lube or equivalent.
[C] Lubricate the following areas with highquality, lightweight lithium-soap base grease.

CAUTION:

Wipe off any excess grease, and avoid getting grease on the brake discs.





SPARK PLUG INSPECTION

1. Remove:
   - Spark plug
2. Inspect:
   - Electrode ①
     Wear/Damage→Replace.
   - Insulator color ②
     Normal condition is a medium to light tan color.
     Distinctly different color→Check the engine condition.

NOTE:

When the engine runs for many hours at low speeds, the spark plug insulator will become sooty, even if the engine and carburetor are in good operating condition.

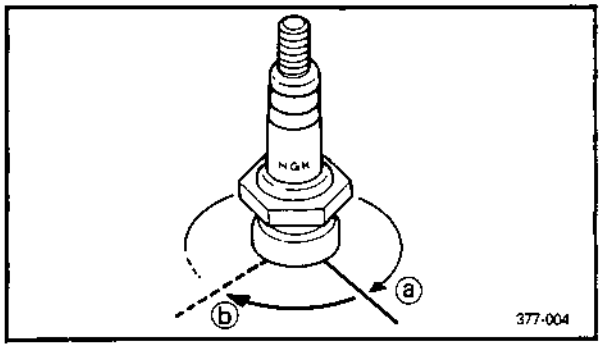
3. Measure:
   - Plug gap ⓐ
     Use a Wire Gauge or Thickness Gauge.
     Out of specification→Regap.

Spark Plug Gap:
0.5 ~ 0.6 mm (0.020 ~ 0.024 in)

Standard Spark Plug:
B8EG (NGK)

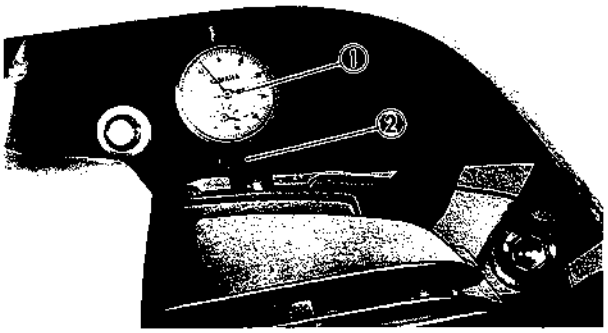
4. Clean the plug with a spark plug cleaner if necessary.
5. Tighten:
   - Spark plug

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



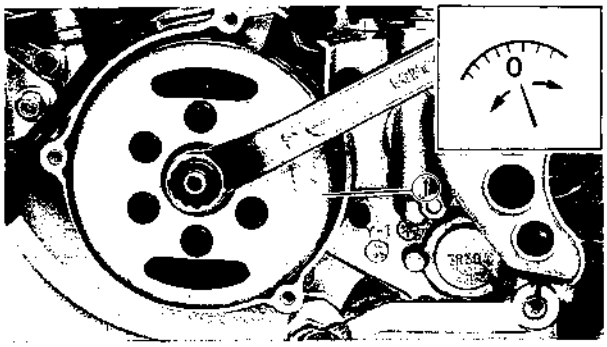
NOTE:

- Before installing a spark plug, clean the gasket surface and plug surface.
- Finger-tighten ⓐ the spark plug before torquing to specification ⓑ.



IGNITION TIMING CHECK

1. Remove:
   - Spark plug
   - Crankcase cover (left)
2. Attach:
   - Dial gauge ①
   - Dial gauge stand ②

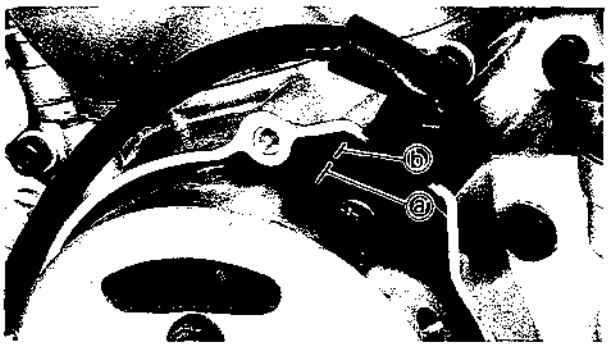


3. Rotate the magneto rotor ① until the piston reaches top dead center (TDC). When this happens, the needle on the dial gauge will stop and reverse directions even though the rotor is being turned in the same direction.
4. Set the dial gauge to zero at TDC.

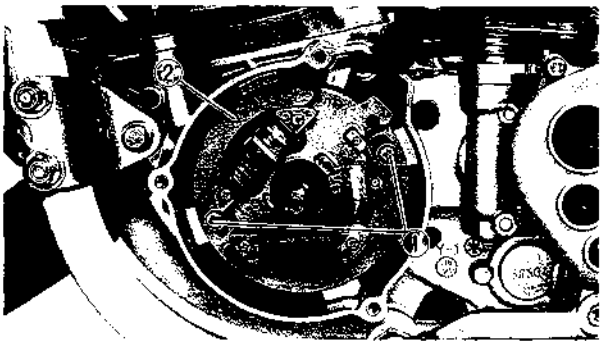
3

5. From TDC, rotate the rotor clockwise until the dial gauge indicates that the piston is at a specified distance from TDC.

Ignition Timing:
1.9 ~ 2.1 mm (0.075 ~ 0.083 in)



6. Check:
   - Ignition timing
     Punch mark ⓐ on rotor should be aligned with punch mark ⓑ on stator.
     No. alignment → Adjust.



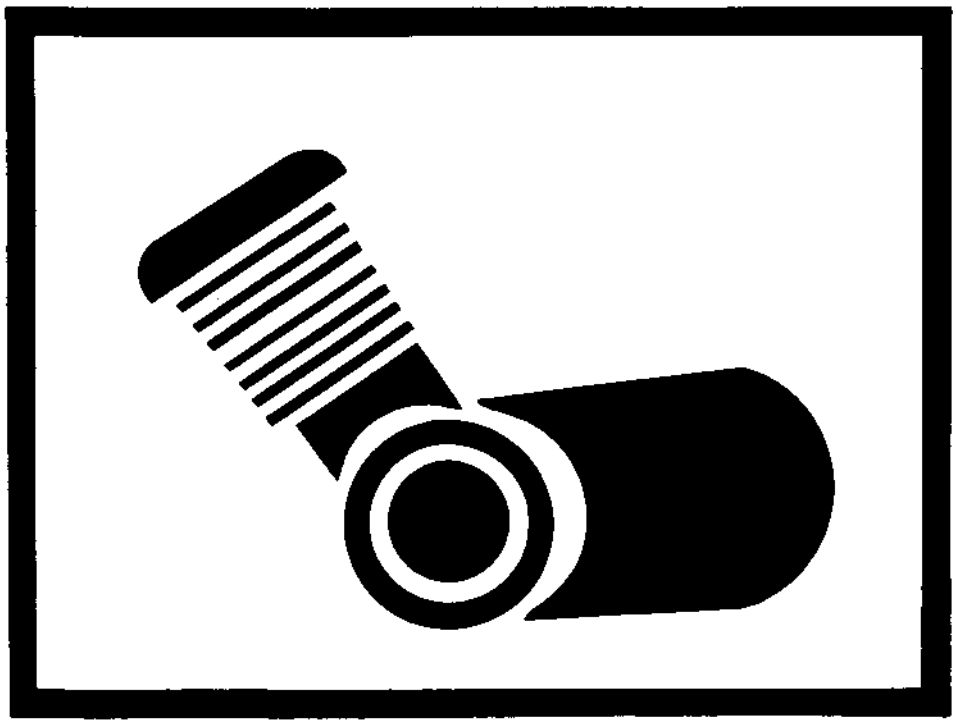
7. Adjust:
   •Ignition timing

Adjustment steps:
- •Remove the rotor.
- •Loosen the screws (stator) ①.
- •Install the rotor.
- •Align the punch marks by turning the stator ②.
- •Remove the rotor.
- •Tighten the screws (stator) ①.
- •Install the rotor.

Screw (Stator):
10 Nm (1.0 m•kg, 7.2 ft•lb)
Rotor (Nut):
85 Nm (8.5 m•kg, 61 ft•lb)

3

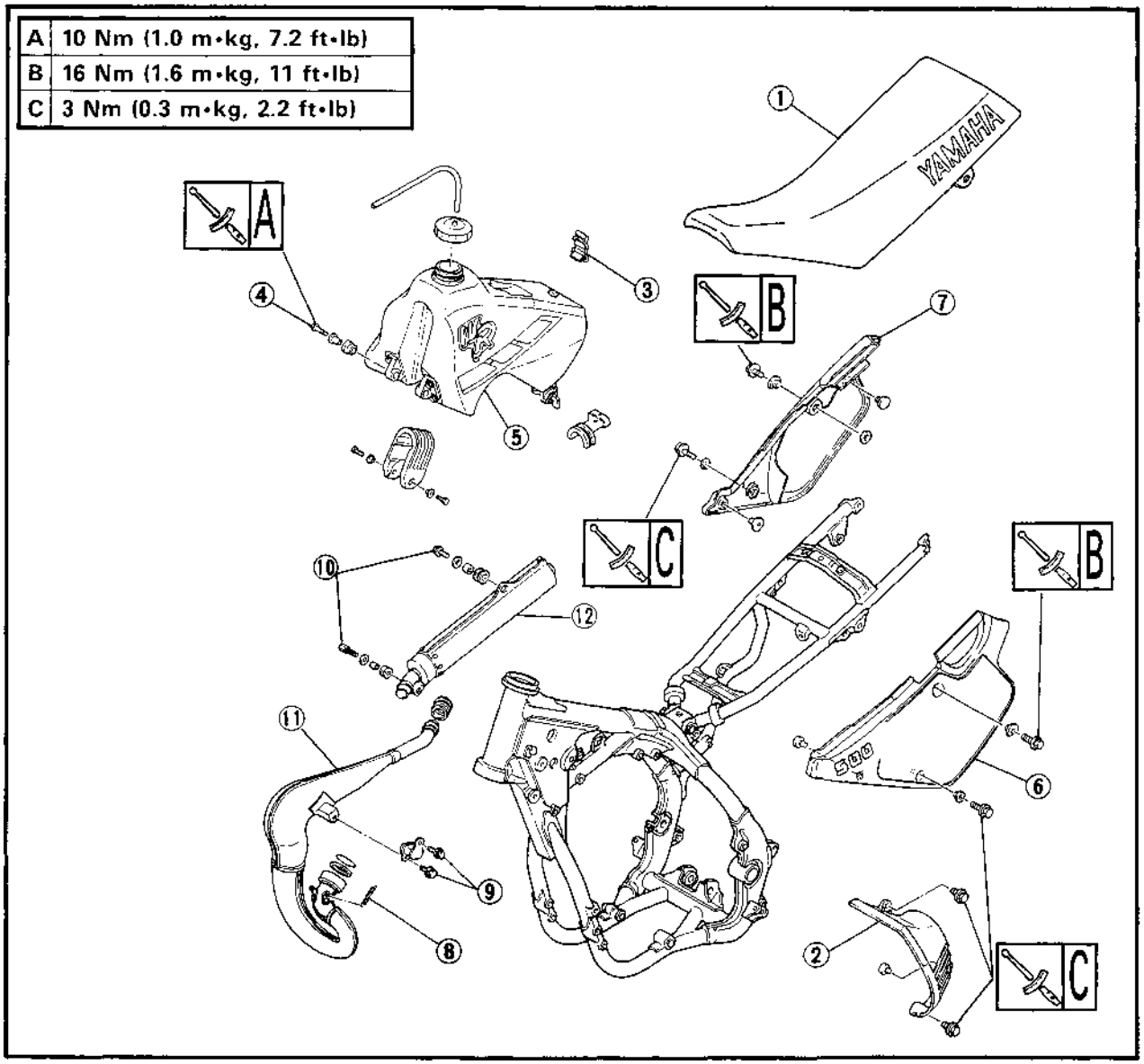
CHAPTER 4
ENGINE



SEAT, FUEL TANK, SIDE COVERS, EXHAUST PIPE AND SILENCER

PREPARATION FOR REMOVAL

*Turn the fuel cock to "OFF".
*Disconnect the fuel hose at carburetor side.



Order	Part name	Q'ty	Remarks
1	Seat	1	
2	Side cover 3 (air scoop)	1	
3	Fitting band	1	Remove on fuel tank side.
4	Bolt (fuel tank)	2	
5	Fuel tank	1	
6	Side cover 1	1	
7	Side cover 2	1	
8	Tension spring	3	
9	Bolt (exhaust pipe)	2	
10	Bolt (silencer)	2	
11	Exhaust pipe	1	
12	Silencer	1	

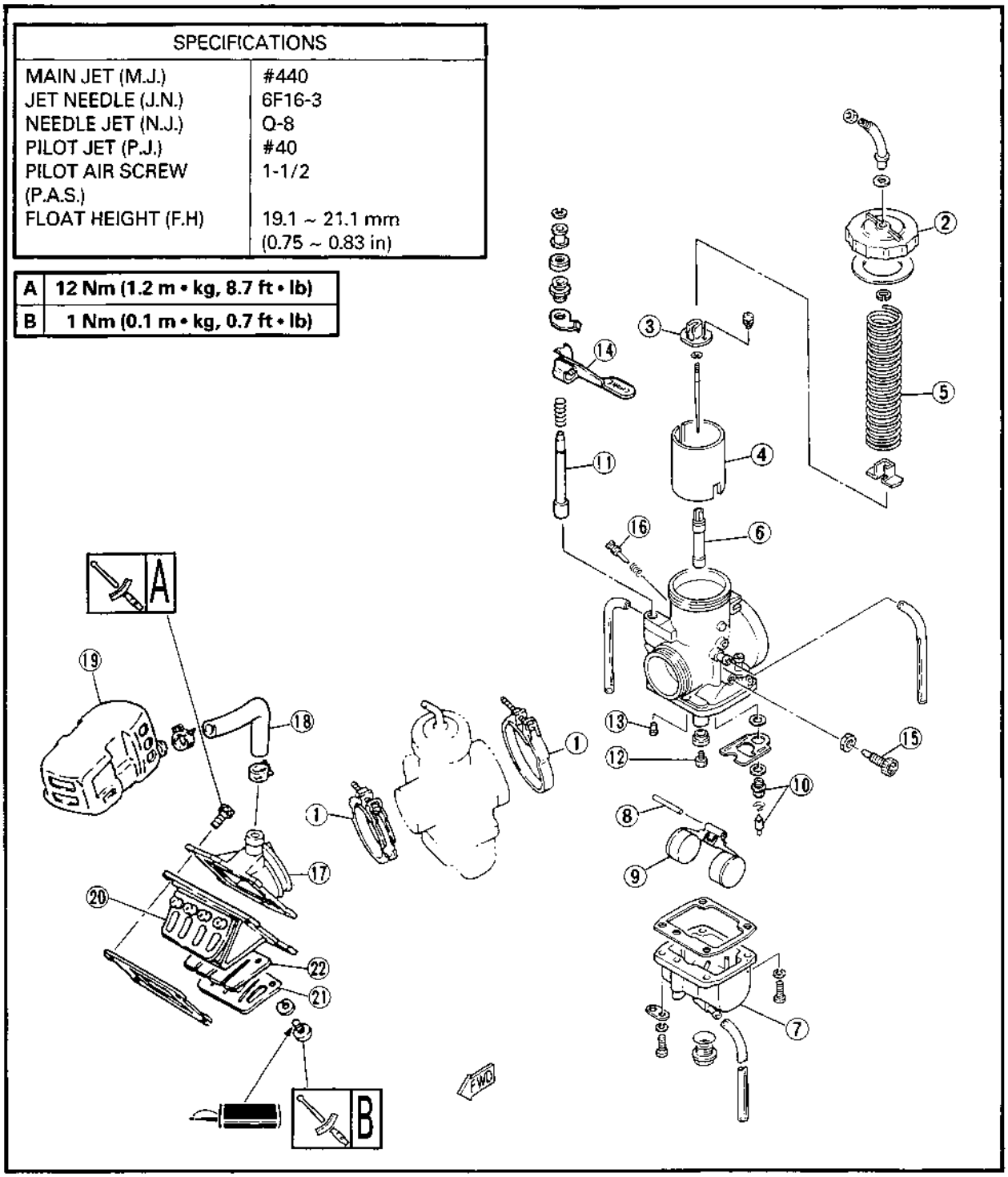
CARBURETOR AND REED VALVE

PREPARATION FOR REMOVAL

*Turn the fuel cock to "OFF".
*Disconnect the fuel hose at carburetor side.
*Remove the fuel tank.

SPECIFICATIONS	
MAIN JET (M.J.)	#440
JET NEEDLE (J.N.)	6F16-3
NEEDLE JET (N.J.)	O-8
PILOT JET (P.J.)	#40
PILOT AIR SCREW (P.A.S.)	1-1/2
FLOAT HEIGHT (F.H)	19.1 ~ 21.1 mm (0.75 ~ 0.83 in)

A	12 Nm (1.2 m • kg, 8.7 ft • lb)
B	1 Nm (0.1 m • kg, 0.7 ft • lb)

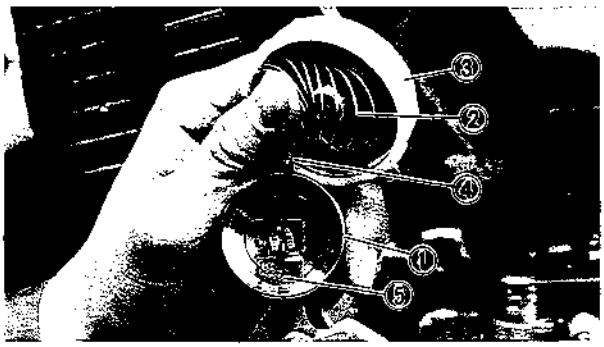


NOTE ON REMOVAL AND REASSEMBLY

- With the engine mounted, the following parts can be removed.
- Before servicing, clean the machine and take care so that foreign material do not enter the engine.
- Remove the gasket adhered on the contacting surface.
- Before inspection, the removed parts should be cleaned and blow out all passages and jets with compressed air.
- After removing the carburetor, cover the carburetor joint not to enter foreign material.

Extent of removal: ① Carburetor removal ② Carburetor disassembly
③ Reed valve removal and disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Clamp (carbretor joint)	2	Loosen the screws (carbretor joint).
	2	Mixing chamber top	1	
	3	Connecter	1	
	4	Throttle valve	1	
	5	Spring (throttle valve)	1	Refer to "REMOVAL POINTS".
②	6	Main nozzle	1	
	7	Float chamber	1	
	8	Pin (float)	1	
	9	Float	1	
	10	Valve seat assembly	1	
	11	Starter plunger	1	
	12	Main jet	1	
	13	Pilot jet	1	
	14	Starter lever	1	
③	15	Throttle stop screw	1	
	16	Air screw	1	
	17	Carburetor joint	1	
	18	Hose	1	
	19	Air chamber	1	
	20	Reed valve assembly	1	
	21	Stopper (reed valve)	2	
	22	Reed valve	2	



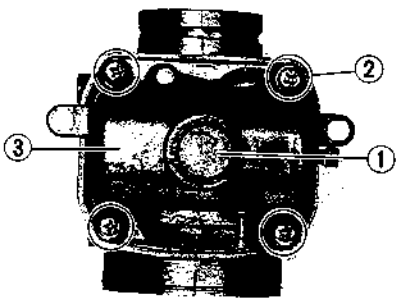
REMOVAL POINTS

THROTTLE VALVE

1. Remove:
   - Throttle valve ①
   - Spring (throttle valve) ②
   - Mixing chamber top ③
   - Throttle cable ④
   - Connector ⑤

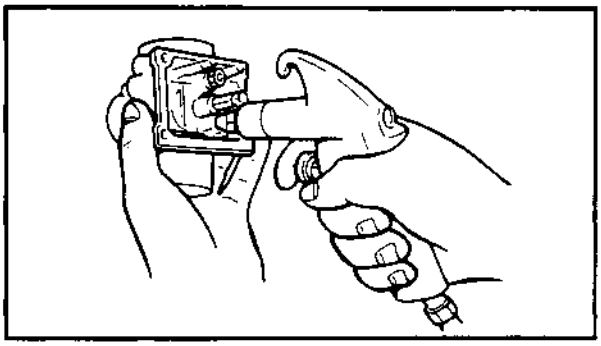
NOTE:

While compressing the spring (throttle valve), disconnect the throttle cable.



FLOAT CHAMBER

1. Remove:
   - Drain plug ①
   - Screw ②
   - Float chamber ③



INSPECTION

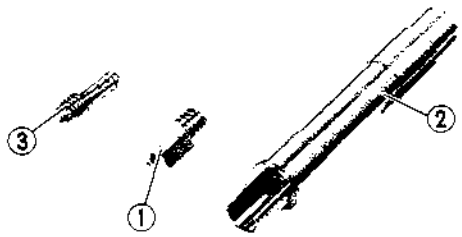
CARBURETOR

1. Inspect:
   - Carburetor body
     Contamination → Clean.

NOTE:

- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.

4

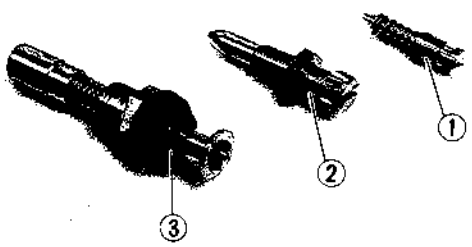


2. Inspect:
   - Main jet ①
   - Main nozzle ②
   - Pilot jet ③

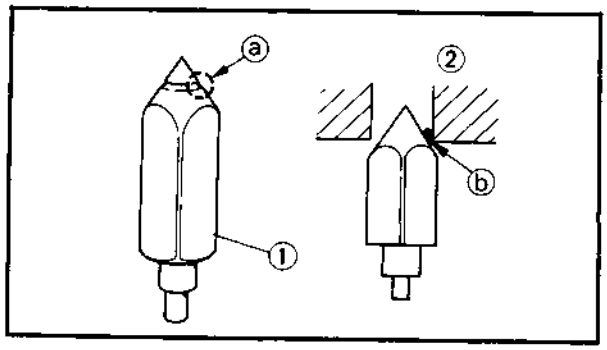
   Contamination → Clean.

NOTE:

- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.



3. Inspect:
   - Pilot air screw ①
   - Throttle stop screw ②
   - Starter plunger ③
     Wear/Contamination → Replace.



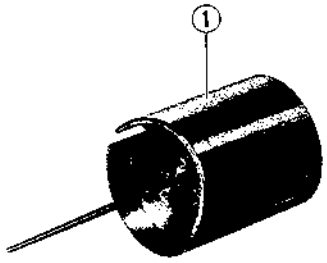
NEEDLE VALVE

1. Inspect:
   - Needle valve ①
   - Valve seat ②

   Grooved wear ⓐ → Replace.
   Dust ⓑ → Clean.

NOTE:

Always replace the needle valve and valve seat as a set.



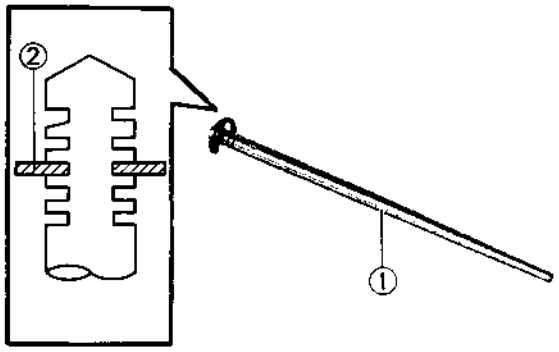
THROTTLE VALVE

1. Inspect:
   - Throttle valve ①

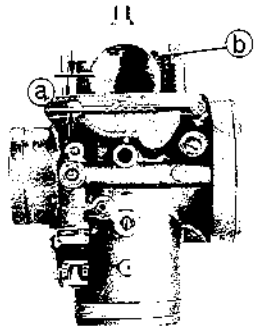
   Wear/Damage → Replace.
2. Check:
   - Free movement

   Stick → Repair or replace.
   Insert the throttle valve ① into the carburetor body, and check for free movement.
3. Inspect:
   - Jet needle ①

   Bends/Wear → Replace.
   - Clip position ②



Standard Clip Position:
No. 3 Groove



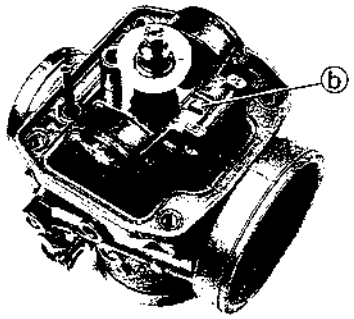
FLOAT ARM HEIGHT

1. Measure:
   - Float arm height ⓐ

   Out of specification → Adjust the tab ⓑ of float arm.

Float Arm Height.
19.1 ~ 21.1 mm (0.75 ~ 0.83 in)

4

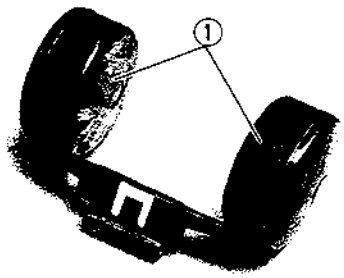


Measurement and adjustment steps:
- Hold the carburetor in an upside down position.
- Measure the distance between the mating surface of the float chamber (gasket removed) and tip of the float arm using a gauge.

NOTE:

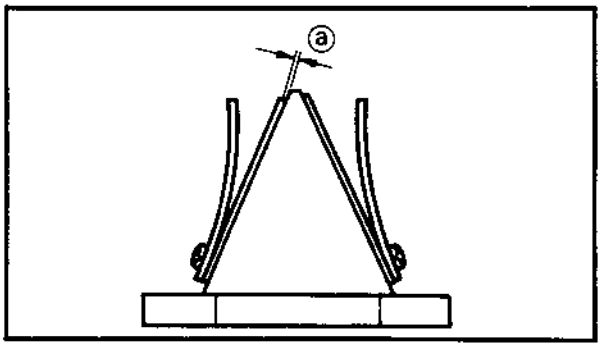
The float arm should be resting on the needle valve, but not compressing the needle valve.

- If the float height is not within specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tab ⓑ on the float.
- Recheck the float height.



FLOAT

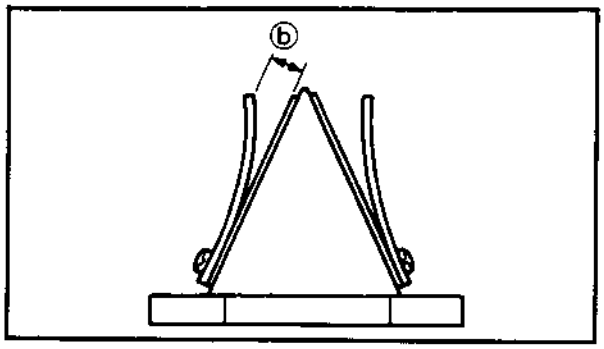
1. Inspect:
   - Float ①
     Damage→Replace.



REED VALVE

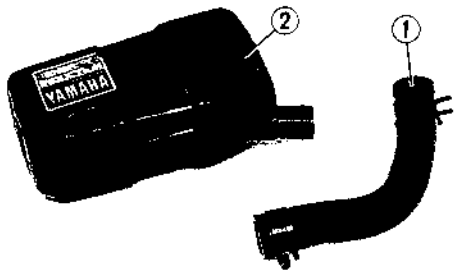
1. Measure:
   - Reed valve bending ⓐ
     Out of specification→Replace.

Reed Valve Bending Limit:
0.6 mm (0.024 in)



- Valve Stopper Height ⓑ
  Out of specification→Adjsut stopper/Replace valve stopper.

Valve Stopper Height:
8.4~8.8 mm (0.331~0.346 in)



Y.E.I.S. AIR CHAMBER

1. Inspect:
   - Hose ①
   - Air chamber ②

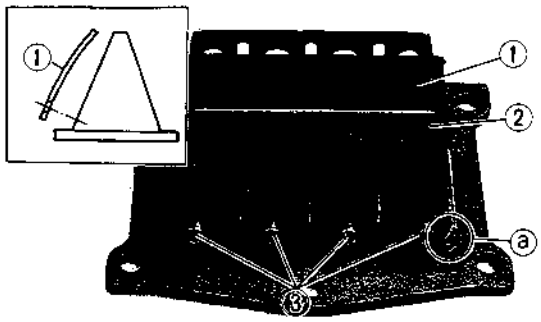
   Crack/Damage→Replace.

NOTE:

The air chamber and hose should be handled with special care.
Any imperfect connection or installation of these parts or damaged parts will have an adverse effect on the performance of the system. Check parts, and be sure to replace any defective one.

CAUTION:

Never attempt to modify the Yamaha Energy Induction System.



ASSEMBLY AND INSTALLATION

REED VALVE

1. Install:
   - Reed valve ①
   - Stopper (reed valve) ②
   - Screw (read velve) ③

NOTE:

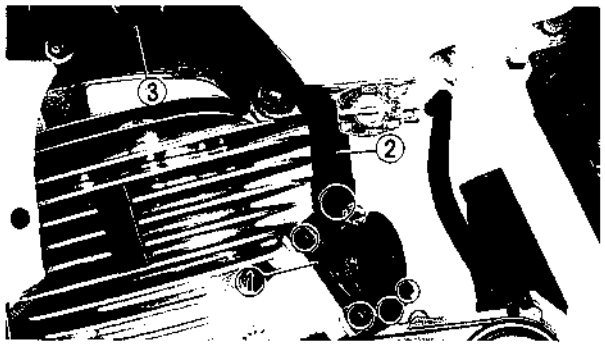
- Install the reed valve with the reed valve bending as shown.
- Note the cut ⓐ in the lower corner of the reed and stopper plate.

Screw (Reed Valve):
1 Nm (0.1 m•kg, 0.7 ft•lb)
LOCTITE®

CAUTION:

Tighten each screw gradually to avoid warping.

4



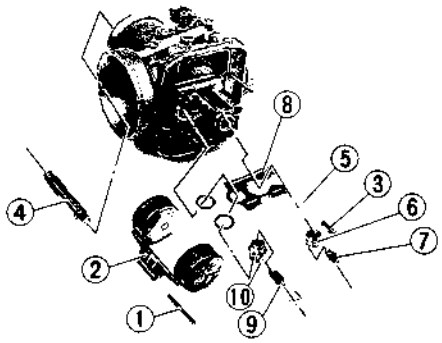
2. Install:
   - Reed valve assembly
   - Gasket (reed valve assembly)
   - Carburetor joint ①
   - Hose ②
   - Y.E.I.S. air chamber ③

NOTE:

Always use a new gasket.

	Bolt (Carburetor Joint): **12 Nm (1.2 m•kg, 8.7 ft•lb)**

CARBURETOR

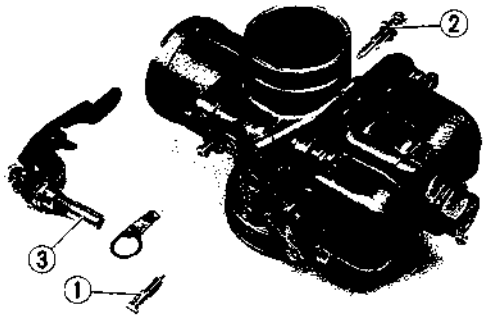


1. Install:
   - Pin (float) ①
   - Float ②
   - Pilot jet ③
   - Main nozzle ④
   - Main jet cover ⑤
   - Ring ⑥
   - Main jet ⑦
   - Plate ⑧
   - Needle valve ⑨
   - Valve seat ⑩

NOTE:

Make sure the float arm for smooth movement.

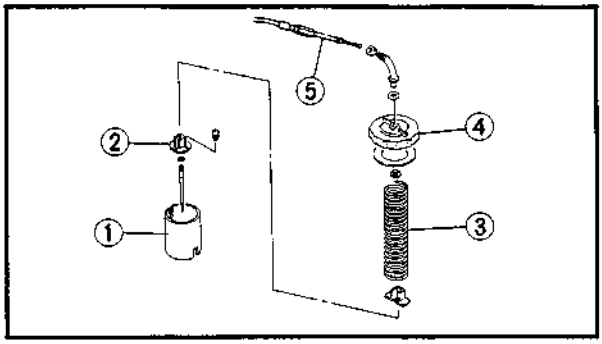
2. Install:
   - Gasket (float chamber)
   - Float chamber



3. Install:
   - Pilot air screw ①
   - Throttle stop screw ②
   - Starter plunger ③

Note the following installation points:
- Screw in the pilot air screw ① until it is lightly seated.
- Back out by the specified number of turns.

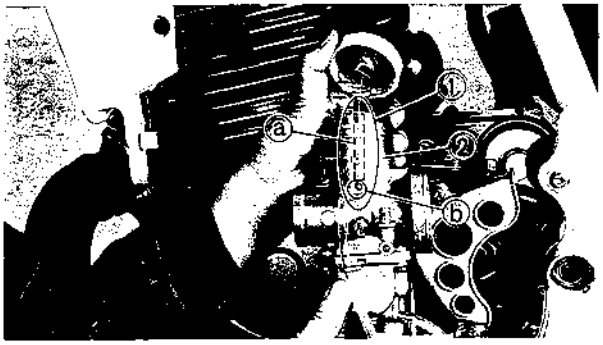
	Pilot Air Screw: **1 and 1/2 turns out**



4. Install:
   - Throttle valve ①
   - Connector ②
   - Spring (throttle valve) ③
   - Mixing chamber top ④
   - Throttle cable ⑤

NOTE:

While compressing the spring, connect the throttle cable.

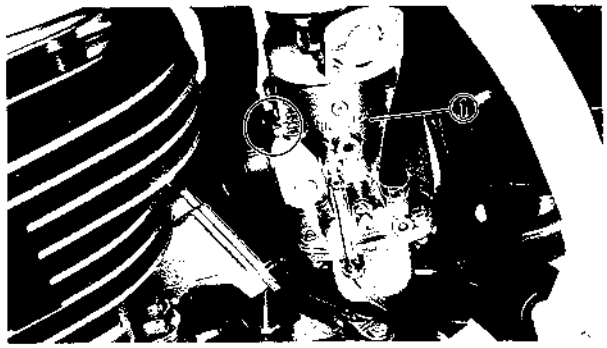


CARBURETOR INSTALLATION

1. Install:
   - Throttle valve ①
     To carburetor body ②.

NOTE:

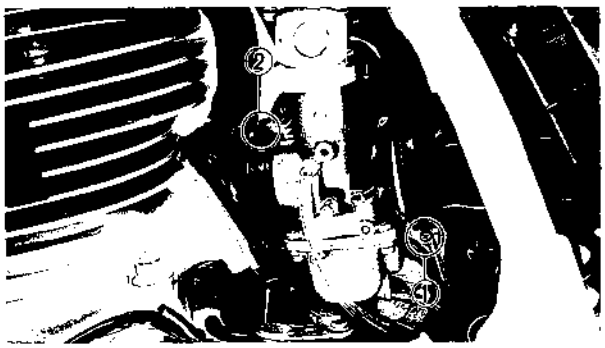
Align the groove ⓐ of the throttle valve with the projection ⓑ of the carburetor body.



2. Install:
   - Carburetor ①

NOTE:

Install the projection between the carburetor joint slots.



3. Tighten:
   - Screw (air cleaner joint) ①
   - Screw (carburetor joint) ②

4. Adjust:
   - Idle speed
     Refer to "CHAPTER 3—IDLE SPEED" section.

CYLINDER HEAD, CYLINDER AND PISTON

PREPARATION FOR REMOVAL

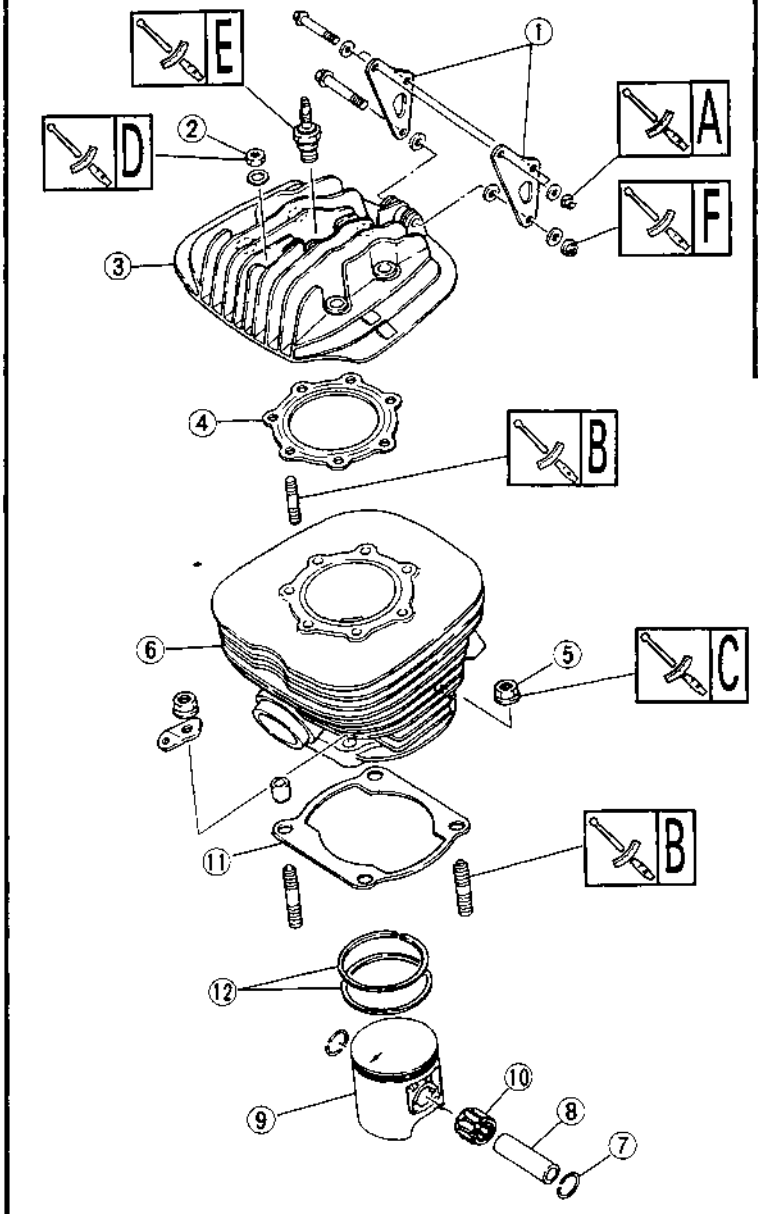
*Turn the fuel cock to "OFF".
*Disconnect the fuel hose at carburetor side.
*Remove the following parts:

- Seat
- Side cover 2 (right)
- Fuel tank
- Exhaust pipe and silencer
- CDI unit
- Plug cap and spark plug
- Side cover 3 (air scoop)
- Rear upper bracket (cylinder head)
- Carburetor

SPARK PLUG: B8EG/NGK
SPARK PLUG GAP: 0.5 ~ 0.6 mm (0.020 ~ 0.024 in)

CYLINDER HEAD WARPAGE LIMIT: 0.03 mm (0.0012 in)
PISTON CLEARANCE: 0.080 ~ 0.085 (0.0031 ~ 0.0033 in)
PISTON RING SIDE CLEARANCE: 0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)
PISTON RING END GAP (INSTALLED): 0.35 ~ 0.50 mm (0.0014 ~ 0.0020 in)

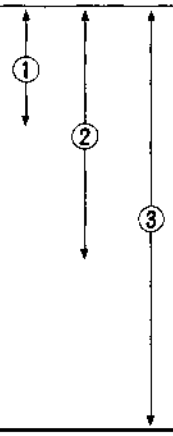
A	32 Nm (3.2 m • kg, 23 ft • lb)
B	15 Nm (1.5 m • kg, 11 ft • lb)
C	35 Nm (3.5 m • kg, 25 ft • lb)
D	22 Nm (2.2 m • kg, 16 ft • lb)
E	25 Nm (2.5 m • kg, 18 ft • lb)
F	64 Nm (6.4 m • kg, 46 ft • lb)

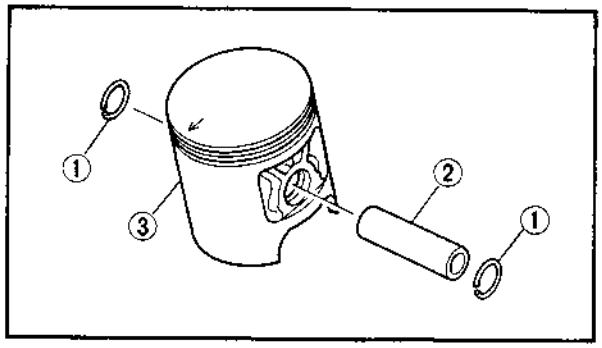


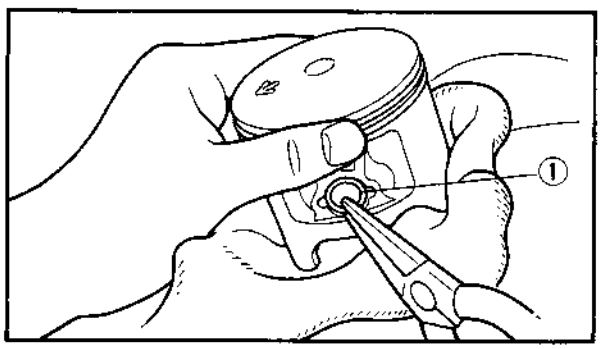
NOTE ON REMOVAL AND REASSEMBLY

- With the engine mounted, the following parts can be removed.
- Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- Take care not to scratch the contacting surface when removing the cylinder and cylinder head.
- Take care not to scratch the cylinder and piston surface.
- For reassembly, the removed parts should be cleaned with solvent, and apply the engine oil onto the sliding surface.
- When removing the cylinder head, the piston should be positioned at TDC (top dead center).

Extent of removal: ① Cylinder head removal ② Cylinder removal ③ Piston and piston ring removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Rear upper bracket	2	
	2	Nut (cylinder head)	6	Loosen each nut 1/4 turn, and remove them after all nuts are loosened.
	3	Cylinder head	1	
	4	Cylinder head gasket	1	
	5	Nut (cylinder)	4	
	6	Cylinder	1	
	7	Clip (piston pin)	1	
	8	Piston pin	1	Refer to "REMOVAL POINTS".
	9	Piston	1	
	10	Small end bearing	1	
	11	Cylinder gasket	1	
	12	Piston ring	1	Refer to "REMOVAL POINTS".





REMOVAL POINTS

PISTON AND PISTON RING

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

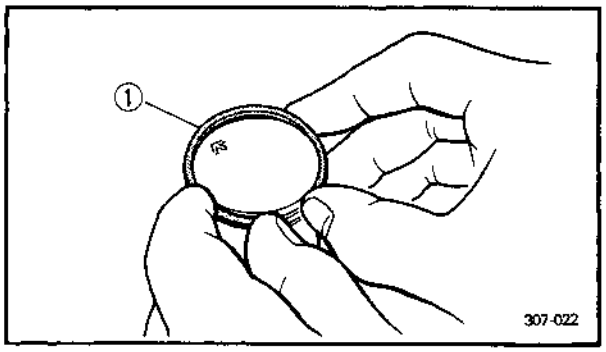
NOTE:

- Before removing piston pin clip, cover crankcase with a clean rag to prevent piston pin clip from falling into crankcase cavity.
- 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 the Piston Pin Puller.

Piston Pin Puller:
YU-01304/90890-01304

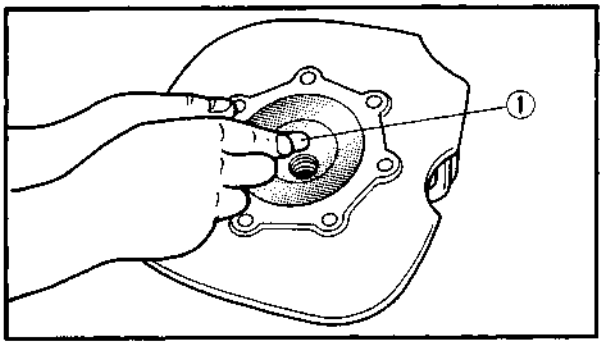
CAUTION:

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



2. Remove:
   • Piston ring ①

NOTE:
Take care not to scratch the piston and damage the piston ring.



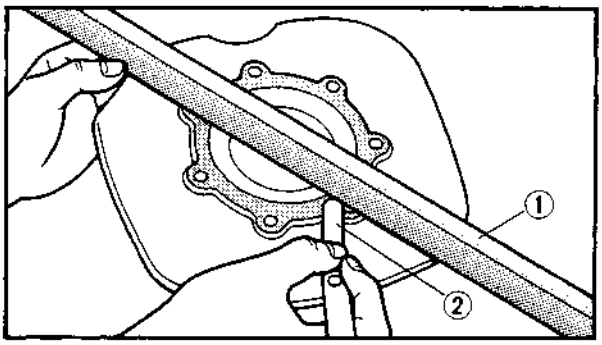
INSPECTION

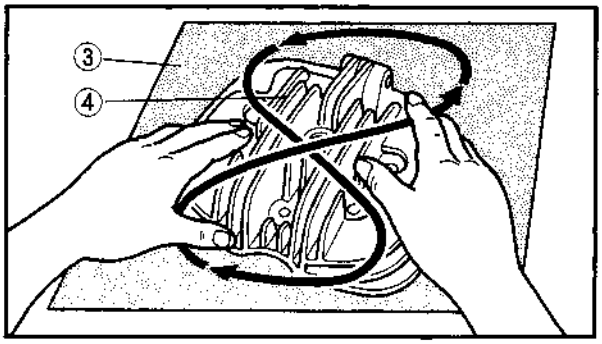
CYLINDER HEAD

1. Remove:
   • Carbon deposits
   Use a rounded scraper ①.

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

2. Inspect:
   • Cylinder head warpage
   Out of specification → Re-surface.



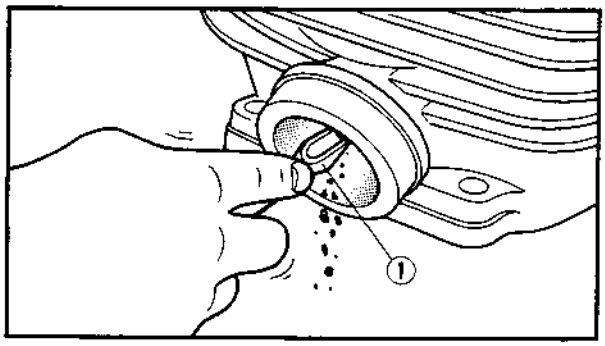


Warpage measurement and re-surfacement steps:
- Attach a straightedge ① and a thickness gauge ② on the cylinder head.
- Measure the warpage.

Warpage Limit:
0.03 mm (0.0012 in)

- If the warpage is out of specification, resurface the cylinder head.
- Place a 400 ~ 600 grit wet sandpaper ③ on the surface plate, and re-surface the head ④ using a figure-eight sanding pattern.

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



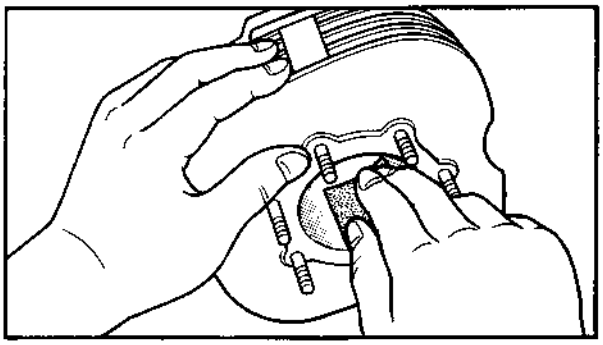
CYLINDER

1. Remove:
   - Carbon deposits

   Use a rounded scraper ①.

NOTE:

Do not use a sharp instrument. Avoid scratching the aluminum.



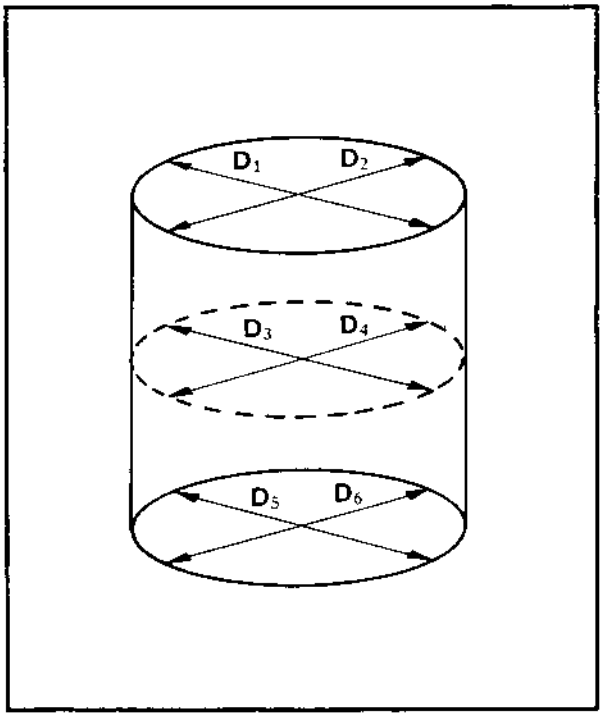
2. Inspect:
   - Cylinder inner surface

   Score marks→Repair or replace.

   Use #600 ~ 800 grit wet sandpaper.

CAUTION:

Do not rebore the cylinder.



3. Measure:
   - Piston-to-cylinder clearance

Piston-to-cylinder clearance measurement steps:

First step:

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

NOTE:

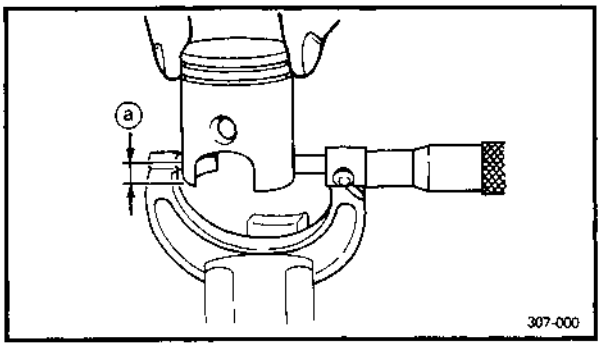
Measure the cylinder bore "C" in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.

	Standard	Wear Limit
Cylinder Bore "C"	87.00 ~ 87.02 mm (3.425 ~ 3.426 in)	87.1 mm (3.429 in)
Taper "T"	—	0.05 mm (0.0020 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) − (Minimum 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.

ⓐ 32 mm (1.26 in) from the piston bottom edge.

	Piston Size P
Standard	87.0 mm (3.425 in)

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

3rd step:

•Calculate the piston-to-cylinder clearance with following formula:

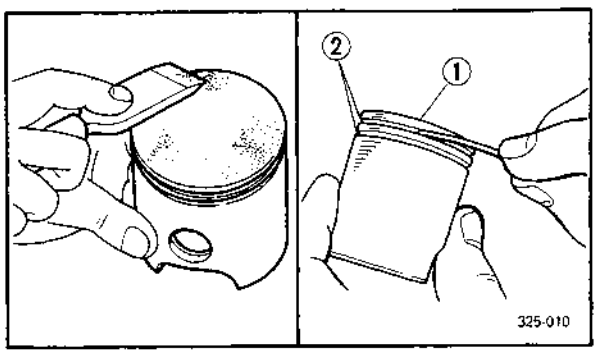
Piston-to-cylinder Clearance =
Cylinder Bore "C" –
Piston Skirt Diameter "P"

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

Piston-to-cylinder Clearance:

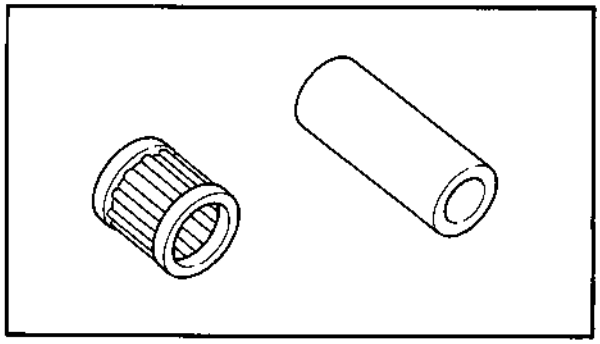
Standard	<Limit>
0.080 ~ 0.085 mm (0.0031 ~ 0.0033 in)	0.1 mm (0.004 in)

4



PISTON

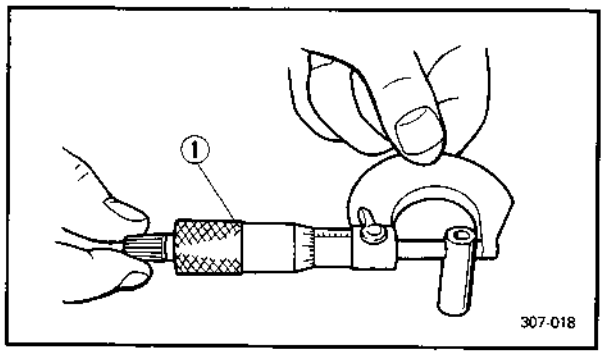
1. Remove:
   •Carbon deposits
   From the piston crown ① and ring groove ②.
2. Inspect:
   •Piston wall
   Score marks → Repair or replace.



PISTON PIN AND SMALL END BEARING

1. Inspect:
   - Piston pin
   - Small end bearing

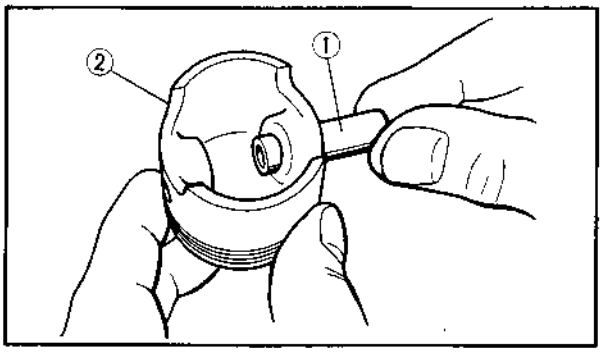
   Signs of heat discoloration → Replace.



2. Measure:
   - Piston pin outside diameter

   Use micrometer ①.
   Out of limit → Replace.

Piston Pin Outside Diameter:	
Standard	<Limit>
17.995 ~ 18.000 mm (0.7085 ~ 0.7087 in)	17.975 mm (0.7077 in)

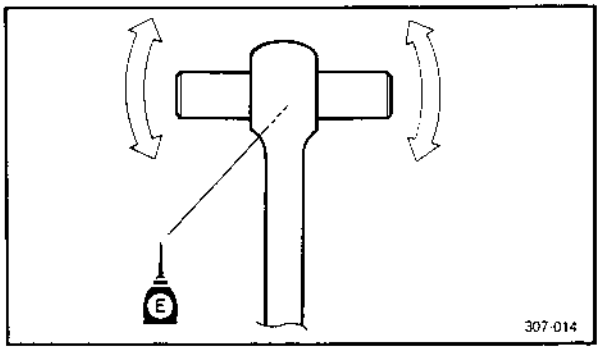


3. Check:
   - Free play (when the piston pin ① is in place in the piston ②)

   There should be no noticeable for the play.
   Free play exists → Replace piston pin and/or piston.

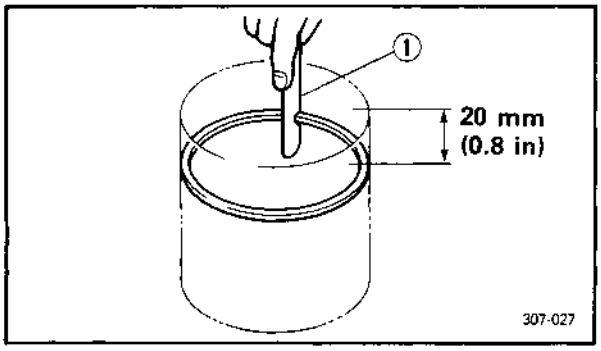
4. Install:
   - Small end bearing
   - Piston pin

   Into the small end of connecting rod.



5. Check:
   - Free play

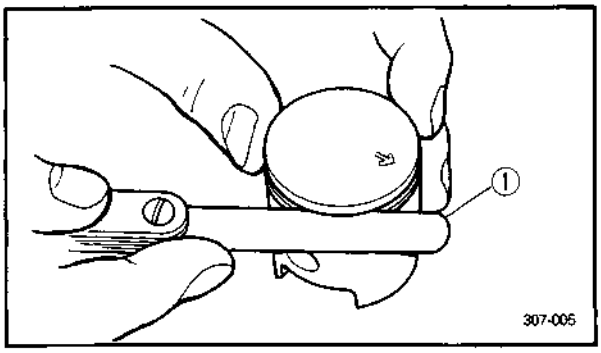
   There should be no noticeable free play.
   Free play exists → Inspect the connecting rod for wear/Replace the pin and/or connecting rod as required.



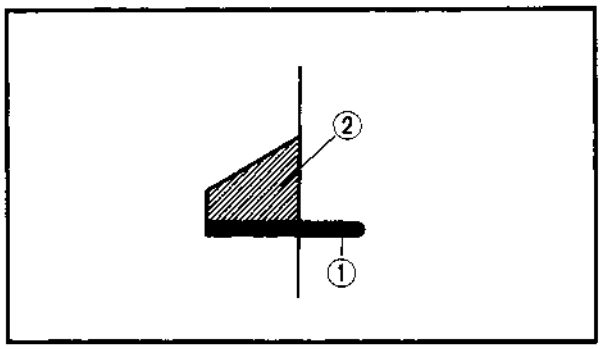
PISTON RING

1. Install:
   - Piston ring
     Into the cylinder.
     Push the ring with the piston crown.
2. Measure:
   - End gap
     Out of specification → Replace rings as a set.
     Using a Thickness Gauge ①.

Ring End Gap (Installed):	
Standard	<Limit>
0.35 ~ 0.50 mm (0.014 ~ 0.020 in)	0.6 mm (0.024 in)



3. Measure:
   - Side clearance
     Use a Thickness Gauge ①.
     Out of limit → Replace piston and/or ring.

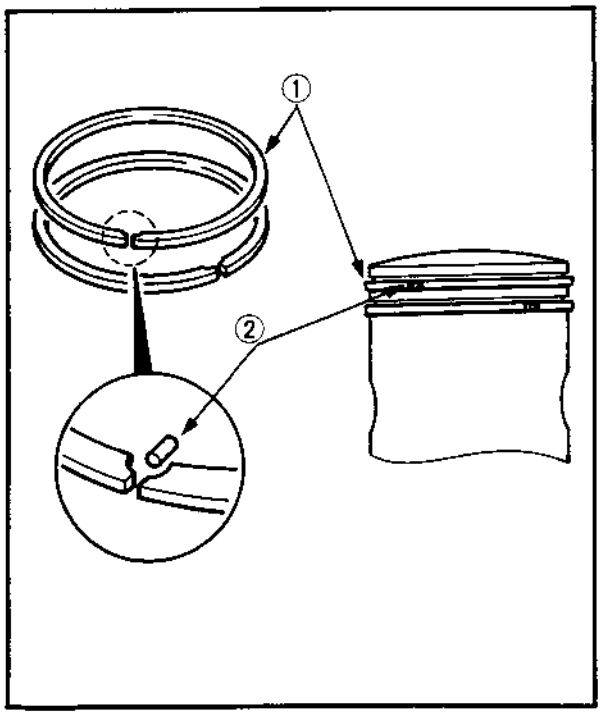


Side Clearance:	
Standard	<Limit>
0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)	0.1 mm (0.004 in)

NOTE:

Check at several points.

② Piston ring



ASSEMBLY AND INSTALLATION

PISTON RING AND PISTON

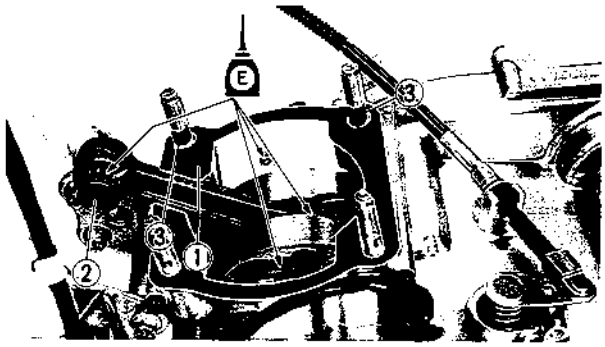
1. Install:
   - Piston rings ①

NOTE:

- Align the piston ring gap with the pin ②.
- After installing the piston ring, check the smooth movement of it.

CAUTION:

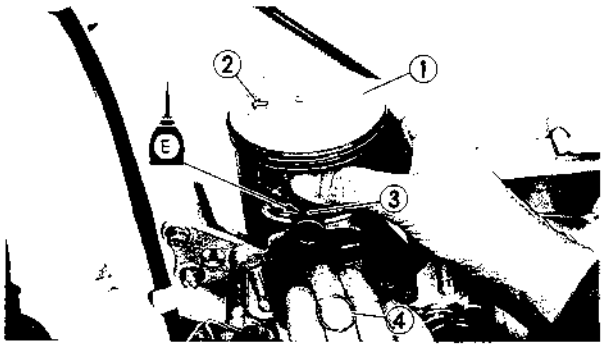
Take care not to scratch the piston and damage the piston ring.



2. Install:
   - Cylinder gasket ①
   - Small end bearing ②
   - Dowel pin ③

NOTE:

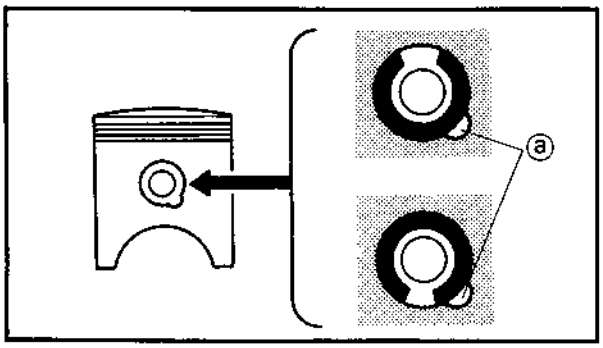
- Apply the engine mixing oil onto the bearing (crankshaft and connecting rod).
- Always use a new gasket.



3. Install:
   - Piston ①
   - Piston pin ③
   - Piston pin clip ④

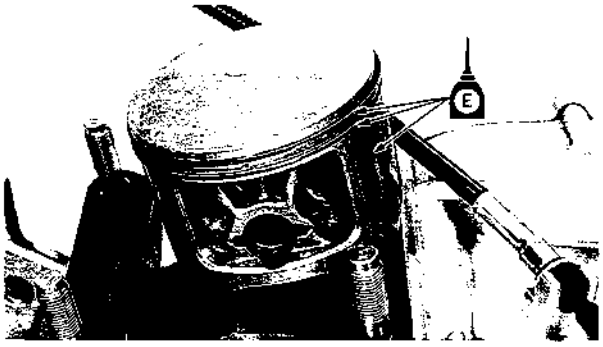
NOTE:

- The arrow ② on piston dome must face forward.
- Apply the engine mixing oil onto the piston pin ③.
- Before installing piston pin clip, cover crankcase with a clean rag to prevent piston pin clip from falling into crankcase cavity.



CAUTION:

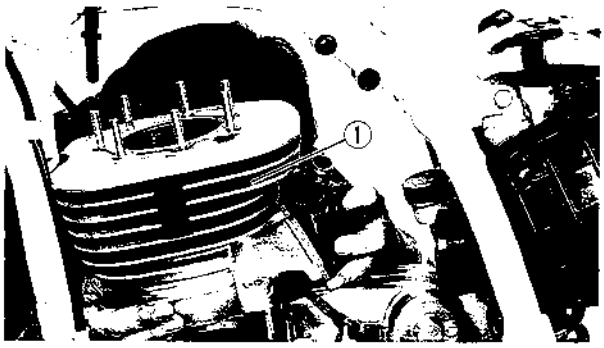
- **Do not allow the clip open ends to meet the piston slot ⓐ.**
- **Always use a new piston pin clip.**



CYLINDER HEAD AND CYLINDER

1. Apply:
   - Engine oil

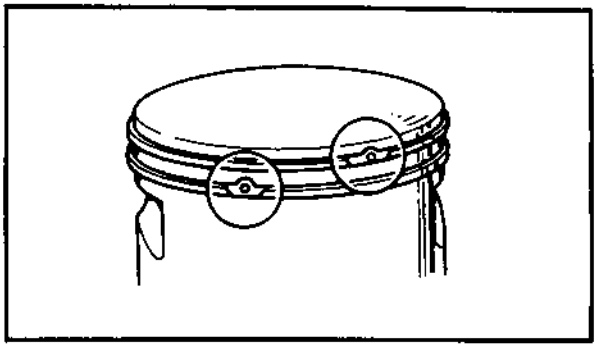
   To piston, piston ring and cylinder surface.



2. Install:
   - Cylinder gasket
   - Cylinder ①

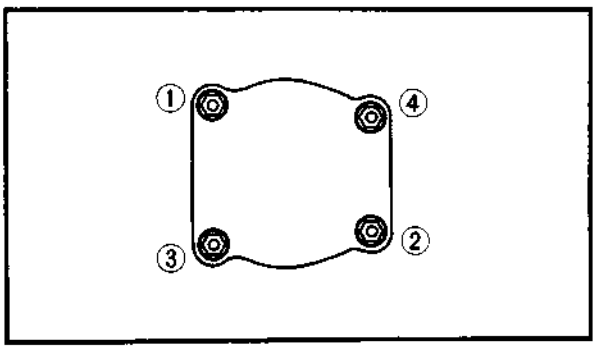
NOTE:

- Always use a new gasket.
- After installing, check the smooth movement of the piston.



CAUTION:

Make sure the rings are properly positioned. Install the cylinder with one hand while compressing the piston ring with the other hand.

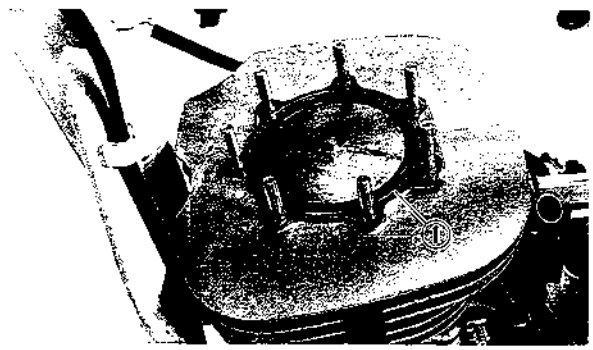


3. Install:
   - Nut (cylinder)

NOTE:

Tighten the nuts in stage, using a crisscross pattern.

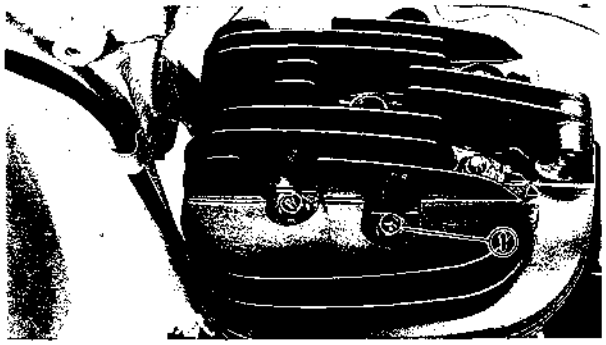
	Nut (Cylinder): **35 Nm (3.5 m•kg, 25 ft•lb)**

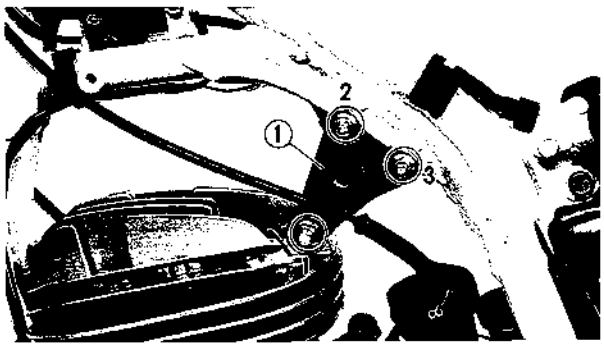


4. Install:
   - Cylinder head gasket ①

NOTE:

Always use a new gasket.





5. Install:
   - Cylinder head
   - Nut (cylinder head) ①

NOTE:

Tighten the nuts (cylinder head) ① in stage, using a crisscross pattern.

	Nut (Cylinder Head): **22 Nm (2.2 m•kg, 16 ft•lb)**

6. Install:
   - Rear upper bracket ①

	Bolt **(Rear Upper Bracket—Frame):** **32 Nm (3.2 m•kg, 23 ft•lb)** **Bolt** **(Rear Upper Bracket—Engine):** **64 Nm (6.4 m•kg, 46 ft•lb)**

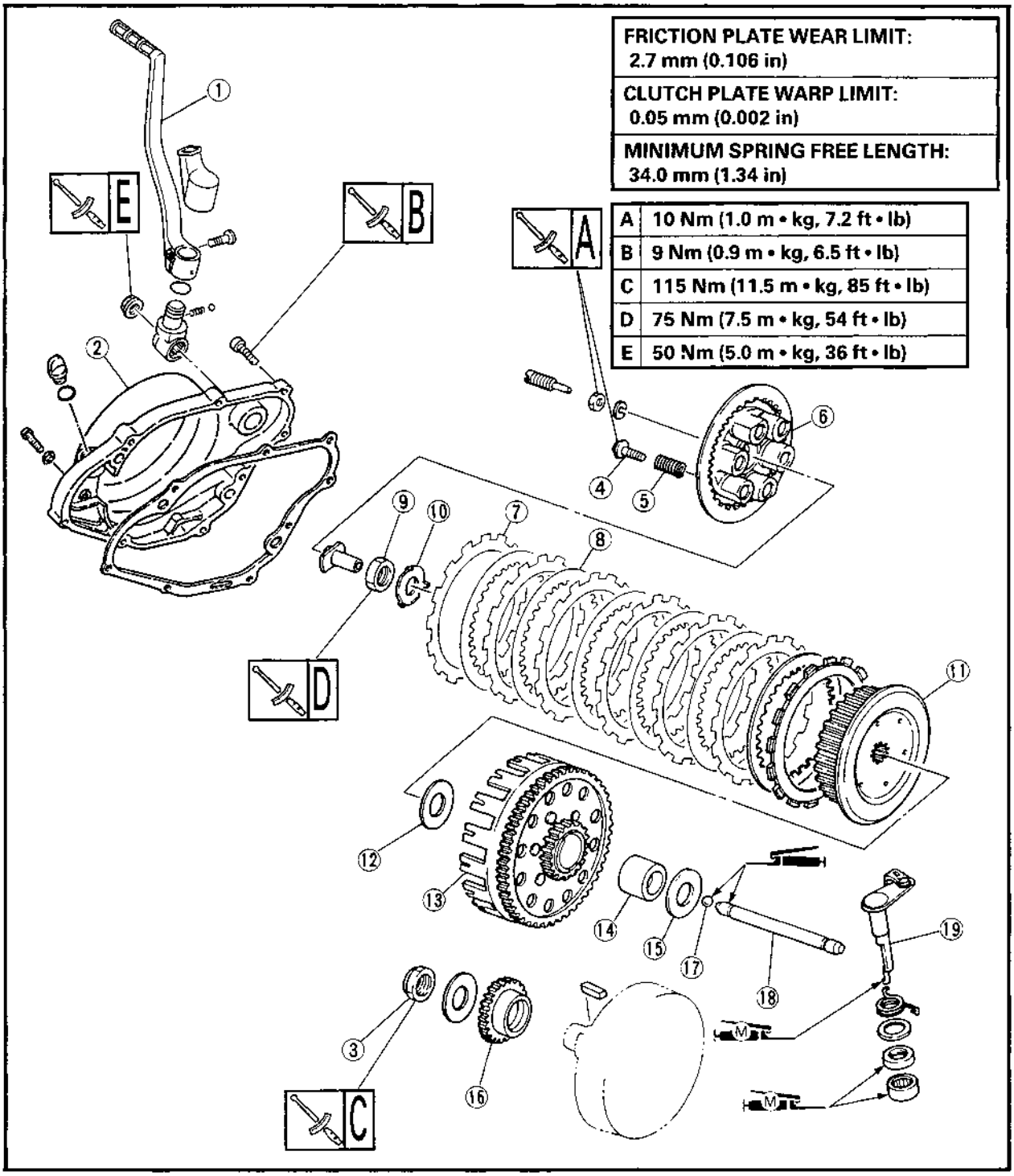
7. Install:
   - Spark plug
   - Spark plug cap

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

PRIMARY DRIVE GEAR, CLUTCH AND PRIMARY DRIVEN GEAR

PREPARATION FOR REMOVAL

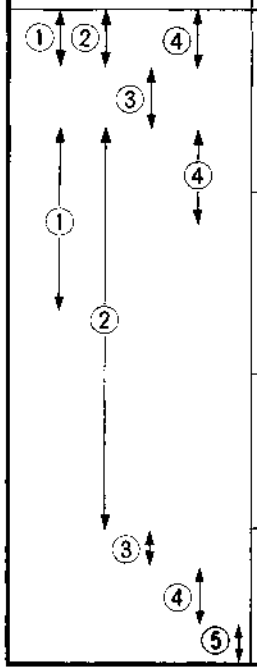
*Drain the transmission oil.

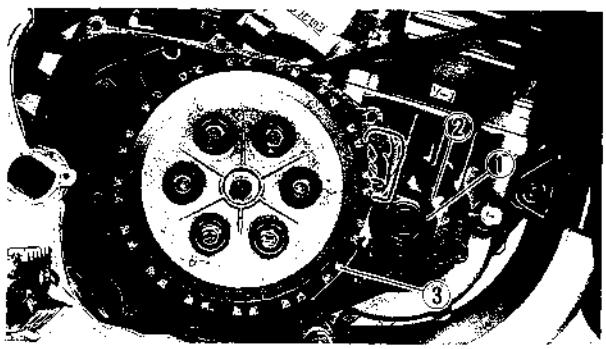


NOTE ON REMOVAL AND REASSEMBLY

- With the engine mounted, the following parts can be removed.
- Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For reassembly, the removed parts should be cleaned with solvent, and apply the transmission oil onto the sliding surface.

Extent of removal: ① Clutch plate and friction plate removal ② Primary driven gear removal ③ Primary drive gear removal ④ Push rod removal ⑤ Push lever removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Kick starter	1	
	2	Clutch cover	1	
	3	Nut (primary drive gear)	1	Loosen the nut (primary drive gear). Refer to "REMOVAL POINTS".
	4	Screw (clutch spring)	6	
	5	Clutch spring	6	
	6	Pressure plate	1	
	7	Friction plate	6	
	8	Clutch plate	5	
	9	Nut (clutch boss)	1	Use special tool. Refer to "REMOVAL POINTS".
	10	Lock washer	1	
	11	Clutch boss	1	
	12	Thrust washer	1	
	13	Primary driven gear	1	
	14	Spacer	1	
	15	Thrust washer	1	
	16	Primary drive gear	1	
	17	Ball	1	
	18	Push rod 2	1	
	19	Push lever complete	1	



REMOVAL POINTS

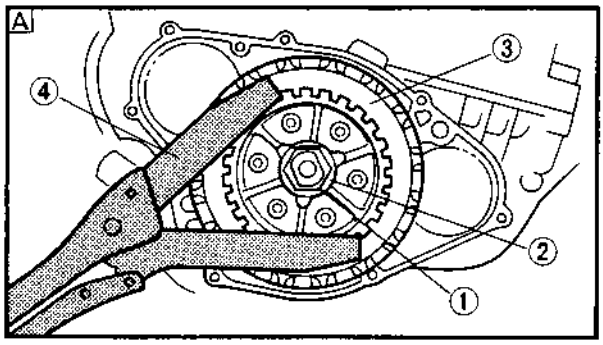
PRIMARY DRIVE GEAR

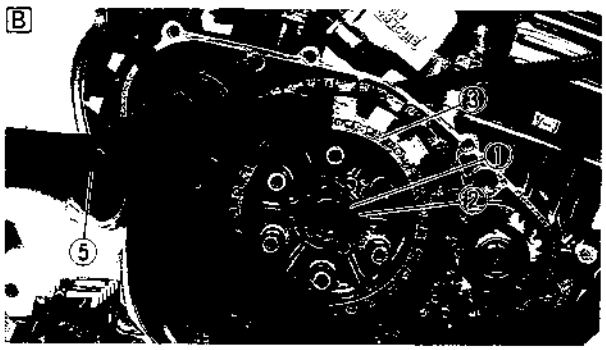
1. Loosen:
   - Nut (primary drive gear) ①

NOTE:

Place a folded rag between the teeth of the primary drive gear ② and driven gear ③.

2. Remove:
   - Primary drive gear ②
   - Primary driven gear ③





CLUTCH BOSS

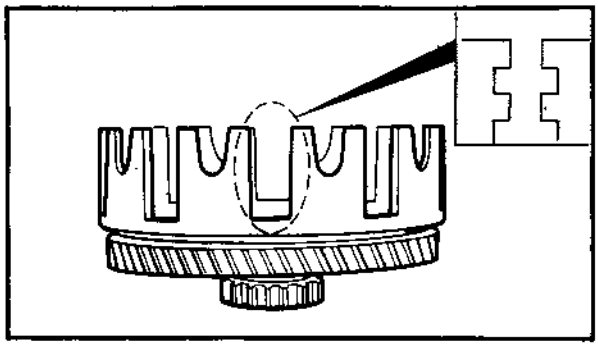
1. Remove:
   - Nut ①
   - Lock washer ②
   - Clutch boss ③

NOTE:

Straighten the lock washer tab and use the Clutch Holder ④, ⑤ to hold the clutch boss.

Clutch Holder:
YM-91042 ..... ④
90890-04086 ..... ⑤

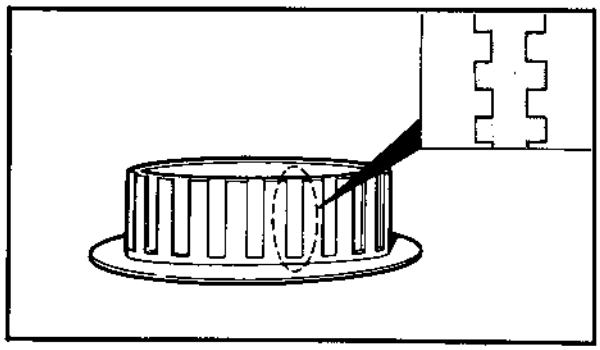
A For USA
B Except for USA



INSPECTION

CLUTCH HOUSING AND BOSS

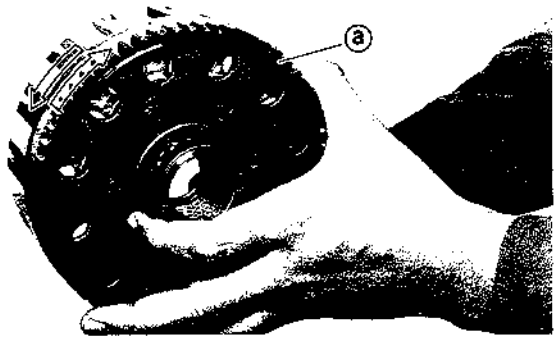
1. Inspect:
   - Dogs on the clutch housing
     Cracks/Wear/Damage→Deburr or replace.
   - Clutch housing bearing
     Chafing/Wear/Damage→Replace.



2. Inspect:
   - Clutch boss
     Scoring/Wear/Damage→Replace.

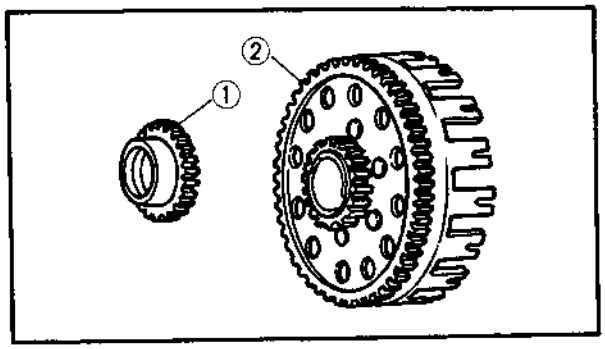
NOTE:

Scoring on the clutch boss splines will cause erratic operation.



PRIMARY DRIVEN GEAR

1. Check:
   - Circumferential play
     Free play exists→Replace.
   - Gear teeth ⓐ
     Wear/Damage→Replace.



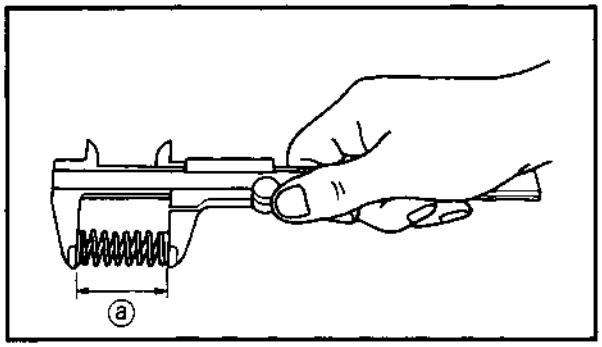
PRIMARY DRIVE GEAR AND DRIVEN GEAR

1. Inspect:
   - Primary drive gear ①
   - Primary driven gear ②

   Wear/Damage→Replace.

NOTE:

Replace the primary drive gear and primary driven gear as a set.



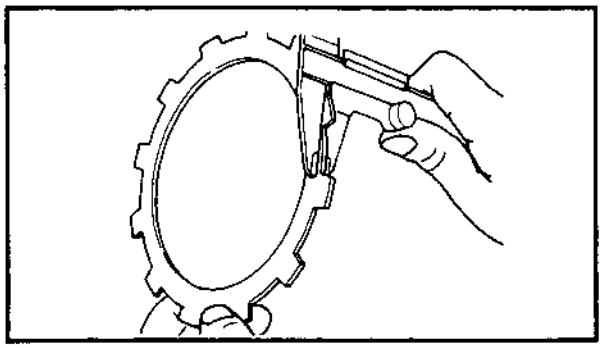
CLUTCH SPRING

1. Measure:
   - Clutch spring free length ⓐ

   Out of specification→Replace spring as a set.

Clutch Spring Minimum Length:	
Standard	<Limit>
36.0 mm (1.42 in)	34.0 mm (1.34 in)

4



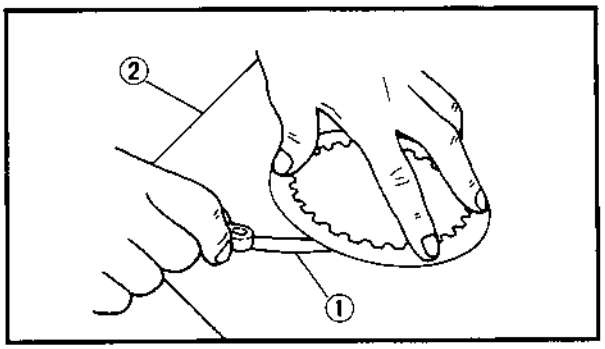
FRICTION PLATE

1. Measure:
   - Friction plate thickness

   Out of specification→Replace friction plate as a set.

   Measure at all four points.

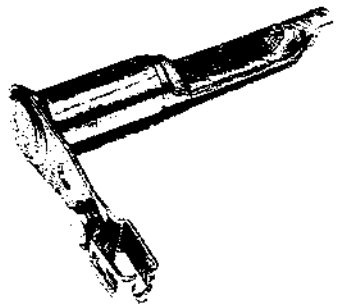
Friction Plate Thickness:	
Standard	<Limit>
3.0 mm (0.12 in)	2.7 mm (0.11 in)



CLUTCH PLATE

1. Measure:
   - Clutch plate warpage
     Out of specification → Replace clutch plate as a set.
     Use a surfacce plate ② and thickness gauge ①.

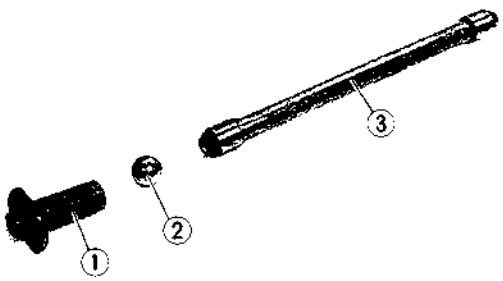
Warp Limit: 0.05 mm (0.002 in)



PUSH LEVER AXLE

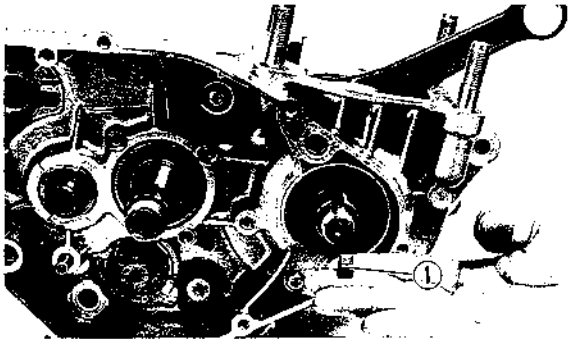
1. Inspect:
   - Push lever axle
     Wear/Damage → Repair using 300 ~ 400 grit sand paper or replace.

2. Inspect:
   - Torsion spring
     Fatique/Wear/Damage → Replace.



PUSH ROD AXLE

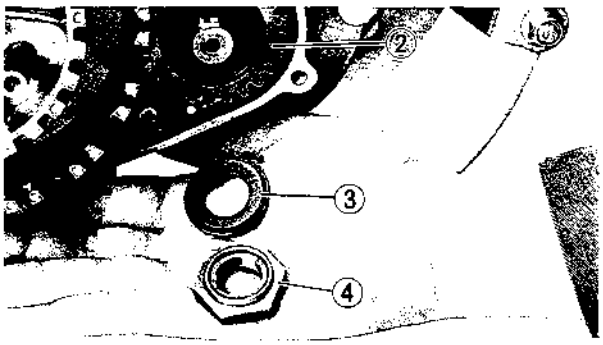
1. Inspect:
   - Push rod 1 ①
   - Ball ②
   - Push rod 2 ③
     Wear/Damage/Bend → Replace.



ASSEMBLY AND INSTALLATION

PRIMARY DRIVE GEAR

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



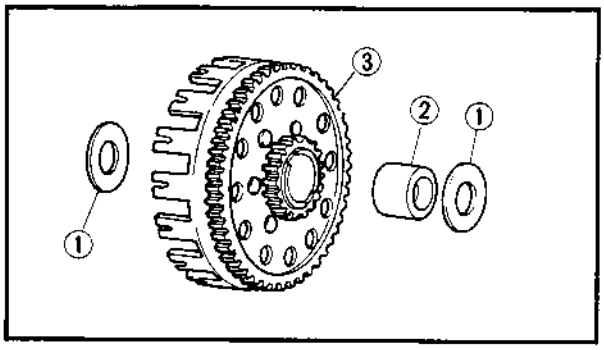
2. Tighten:
   - Nut (primary drive gear) ④

	Nut (Primary Drive Gear): 115 Nm (11.5 m•kg, 85 ft•lb)

NOTE:

Place a folded rag between the teeth of the primary drive gear ② and driven gear.

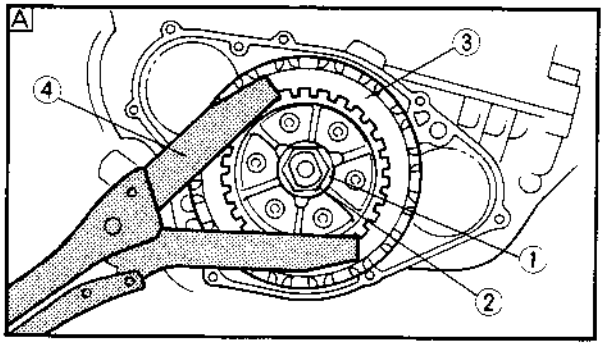
CLUTCH



1. Install:
   - Thrust washer ①
   - Spacer ②
   - Primary driven gear ③

NOTE:

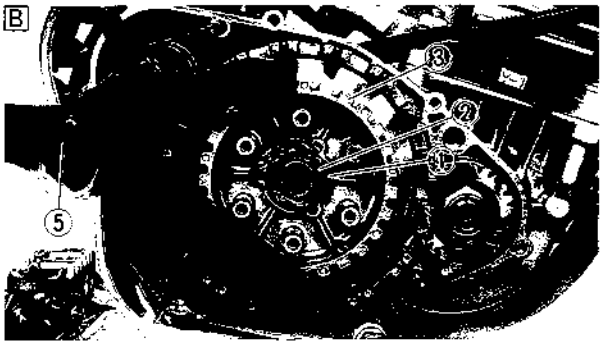
Apply the transmission oil onto the spacer and thrust washer.



2. Install:
   - Lock washer ①
   - Nut (clutch boss) ②
   - Clutch boss ③

NOTE:

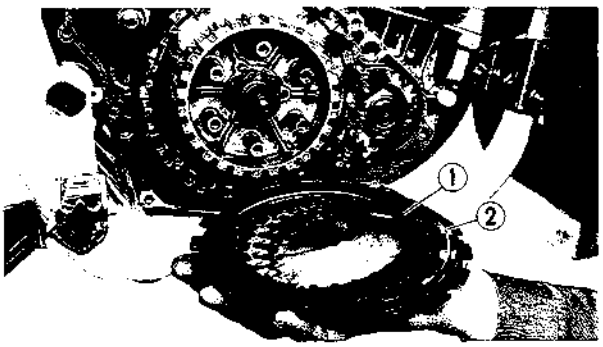
- Always use a new lock washer.
- Hold the clutch boss to tighten the nut (clutch boss) by the clutch holder ④, ⑤.
- Bend the lock washer tab along the nut flats.



	Clutch Holder: **YM-91042** ..... ④ **90890-04086** ..... ⑤

A For USA
B Except for USA

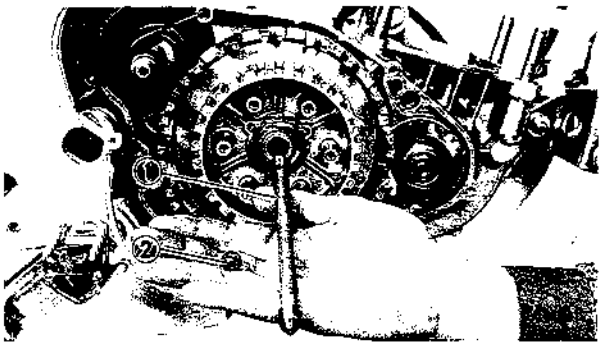
	Nut (Clutch Boss): 75 Nm (7.5 m•kg, 54 ft•lb)



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

NOTE:

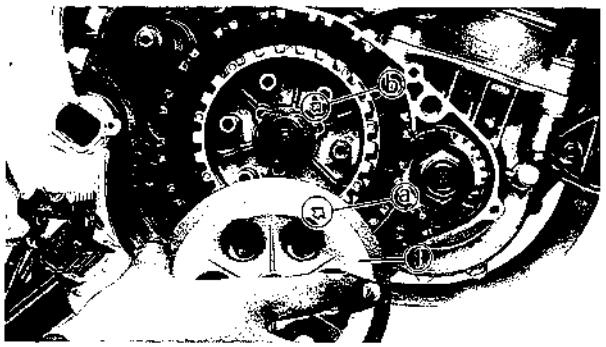
- Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.
- Apply the transmission oil onto the friction plates and clutch plates.



4. Install:
   - Push rod 2 ①
   - Ball ②

NOTE:

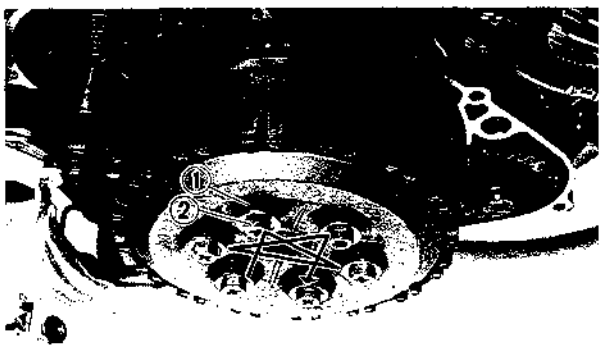
Apply the lithium soap base grease the push rod 2 and ball.



5. Install.
   - Pressure plate ①

NOTE:

Make sure the arrow mark ⓐ on the pressure plate fits on the arrow mark ⓑ on the clutch boss.

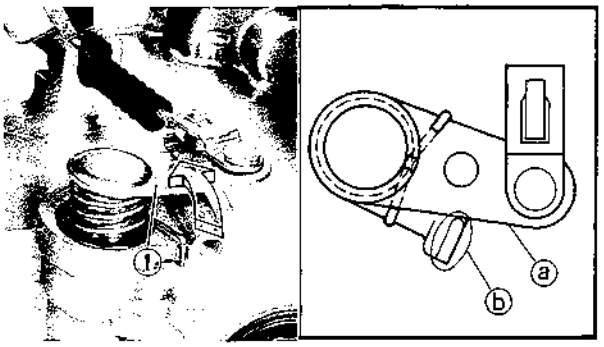


6. Install:
   - Clutch spring ①
   - Screw (clutch spring) ②

NOTE:

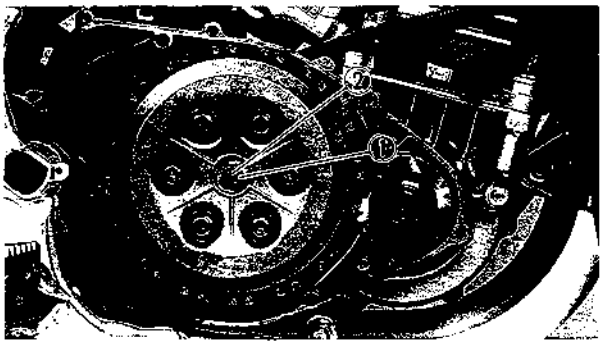
Tighten the screws in stage, using a crisscross pattern.

	Screws (Clutch Spring): 10 Nm (1.0 m•kg, 7.2 ft•lb)



7. Check:
   - Push lever position

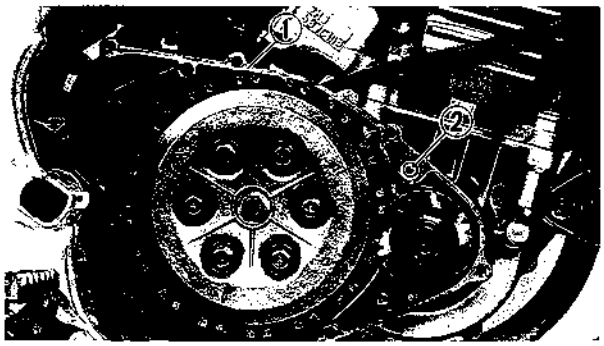
   Push the push lever ① forward until it stops. With the push lever in this position, the edge ⓐ of the push lever should be aligned with the mark ⓑ on the crankcase.
   Not aligned→Adjust.



8. Adjust:
   - Push lever position

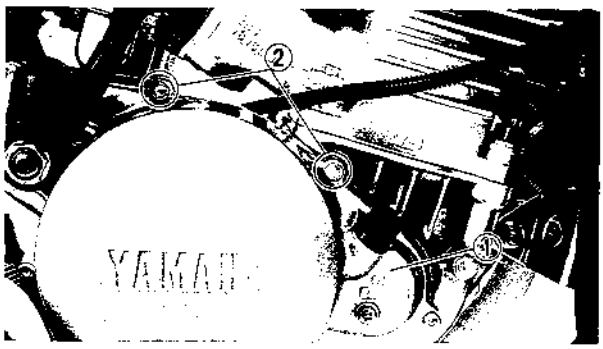
Push lever position adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② to align the forward edge of the push lever with the mark on the crankcase.
- Tighten the locknut ①.

Locknut:
10 Nm (1.0 m•kg, 7.2 ft•lb)



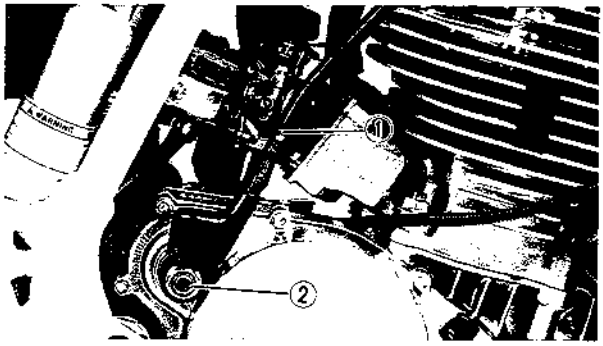
9. Install:
   - Gasket (clutch cover) ①
   - Dowelpin ②

NOTE:
Always use a new gasket.



10. Install:
    - Clutch cover ①
    - Bolt (clutch cover) ②

Bolts (Clutch Cover):
9 Nm (0.9 m•kg, 6.5 ft•lb)



11. Install:
    - Kick starter ①
    - Nut (kick starter) ②

Nut (Kick Starter):
50 Nm (5.0 m•kg, 36 ft•lb)

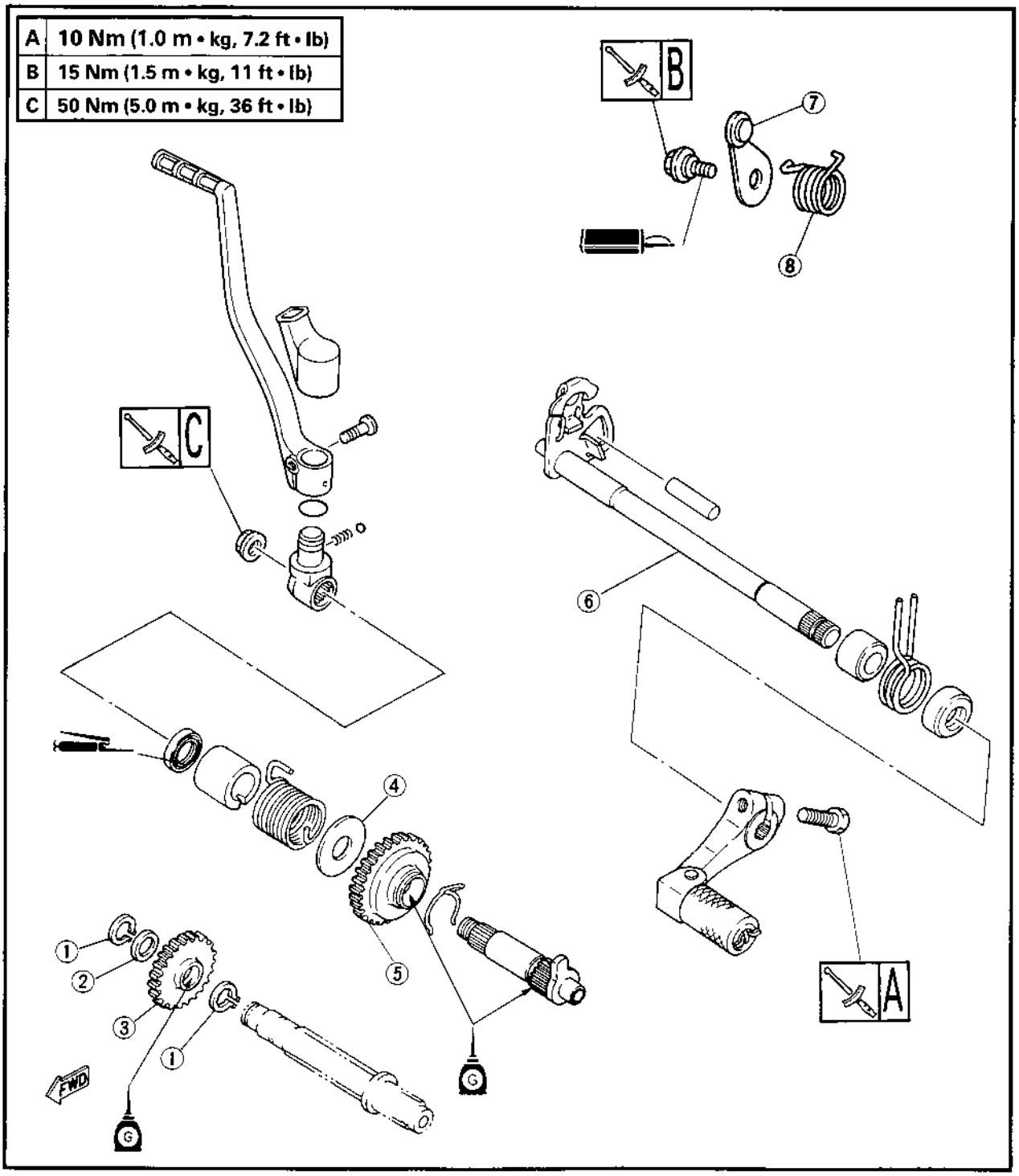
KICK STARTER AND SHIFT SHAFT

PREPARATION FOR REMOVAL

*Drain the transmission oil.

*Remove the following parts.

- Kick starter
- Shift pedal
- Clutch cover
- Primary driven gear



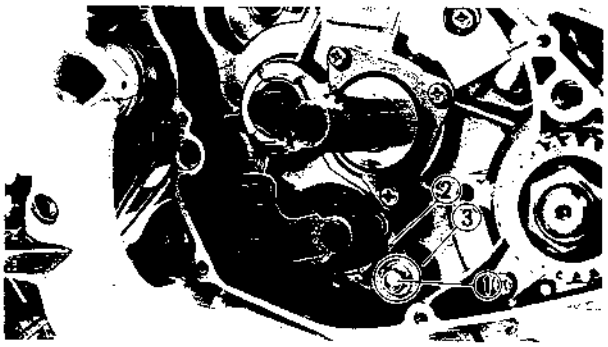
NOTE ON REMOVAL AND REASSEMBLY

- With the engine mounted, the following parts can be removed.
- Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For reassembly, the removed parts should be cleaned with solvent, and apply the transmission oil onto the sliding surface.

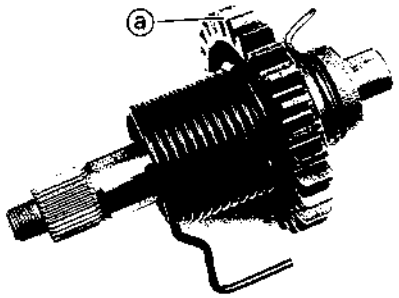
Extent of removal: ① Kick gear and kick idle gear removal
② Shift shaft and stopper lever removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Circlip	1	
	2	Plain washer	2	
	3	Kick idle gear	1	
	4	Plain washer	1	
	5	Kick gear	1	
②	6	Shift shaft	1	
	7	Stoper lever	1	Refer to "REMOVAL POINTS".
	8	Torsion spring	1	

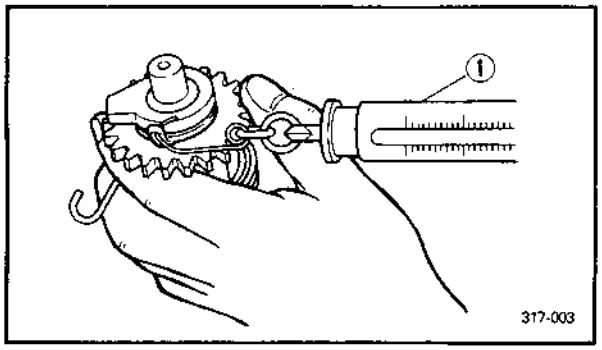
4



REMOVAL POINTS
STOPPER LEVER
1. Remove:
   - Bolt (stopper lever) ①
   - Stopper lever ②
   - Torsion spring ③



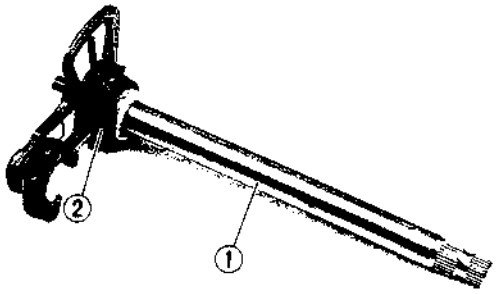
INSPECTION
KICK AXLE
1. Inspect:
   - Kick gear teeth ⓐ
     Wear/Damage→Replace.
2. Check:
   - Kick gear smooth movement
     Unsmooth movement→Replace.



KICK GEAR CLIP

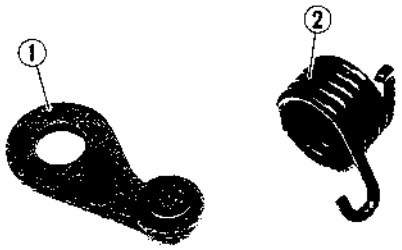
1. Measure:
   - Kick clip friction force
     Out of specification → Replace.
     Use a spring gauge ①.

Kick Clip Friction Force:
0.8 ~ 1.2 kg (1.8 ~ 2.6 lb)



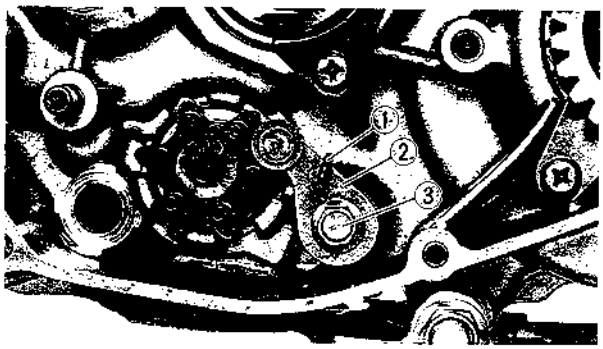
SHIFT SHAFT

1. Inspect:
   - Shift shaft ①
     Bend/Damage → Replace.
   - Spring ②
     Broken → Replace.



STOPPER LEVER

1. Inspect:
   - Stopper lever ①
     Wear/Damage → Replace.
   - Torsion spring ②
     Broken → Replace.



ASSEMBLY AND INSTALLATION

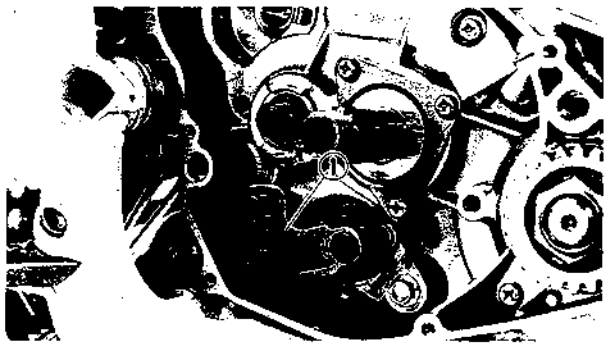
STOPPER LEVER

1. Install:
   - Torsion spring ①
   - Stopper lever ②
   - Bolt (stopper lever) ③

NOTE:

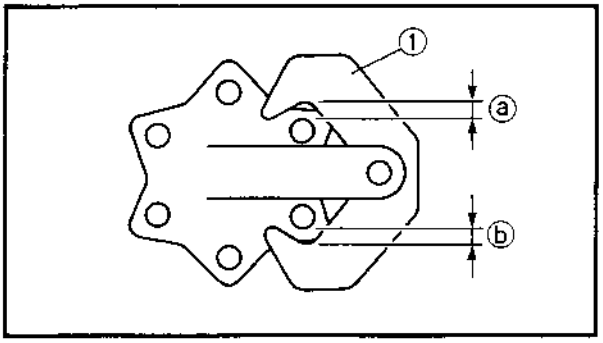
Align the stopper lever roller with the slot on segment.

Bolt (Stopper Lever):
15 Nm (1.5 m•kg, 11 ft•lb)
LOCTITE®

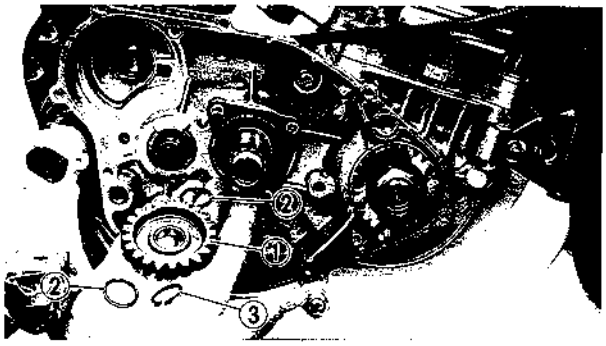


SHIFT SHAFT

1. Install:
   - Shift shaft ①



2. Check:
   - Shift lever ① position
     Gaps ⓐ and ⓑ are not equal→Replace the shift shaft.

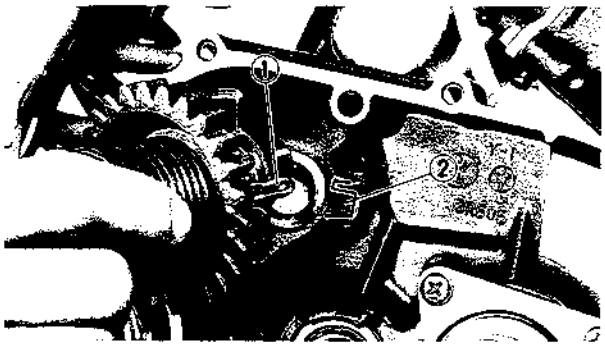


KICK IDLE GEAR

1. Install:
   - Kick idle gear ①
   - Plain washer ②
   - Circlip ③

NOTE:

Always use a new circlip.

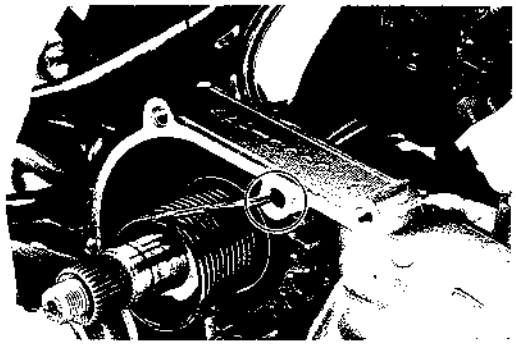


KICK GEAR

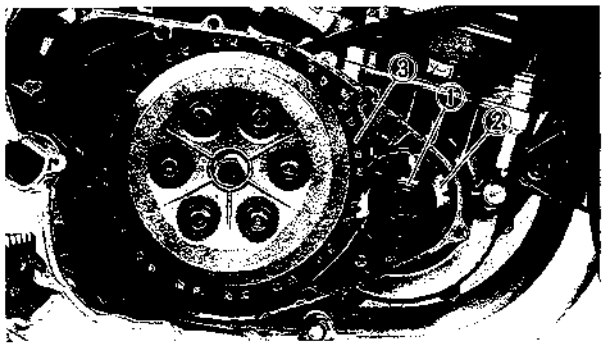
1. Install:
   - Clip (kick axle) ①
     Onto the kick gear.
2. Install:
   - Kick gear assembly
     To the kick axle.

NOTE:

- Slide the axle assembly into the case; make sure the kick clip ① and kick axle stopper ② fit into their home positions.
- Turn the kick starter return spring clockwise and hook into the proper hole in the crankcase.
- After installation, make sure the kick gear engages and disengages properly with the idle gear.



2. Install:
   •Clutch

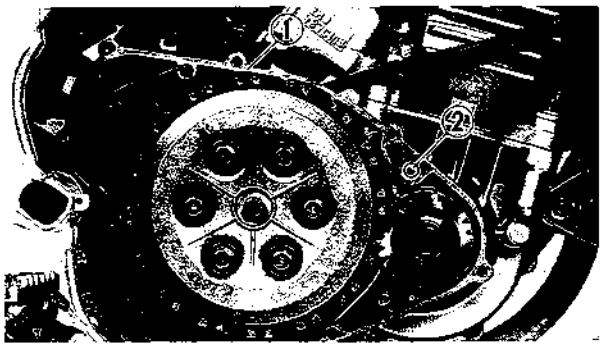


3. Tighten:
   •Nut (primary drive gear) ①

	Nut (Primary Drive Gear): **115 Nm (11.5 m•kg, 85 ft•lb)**

NOTE:

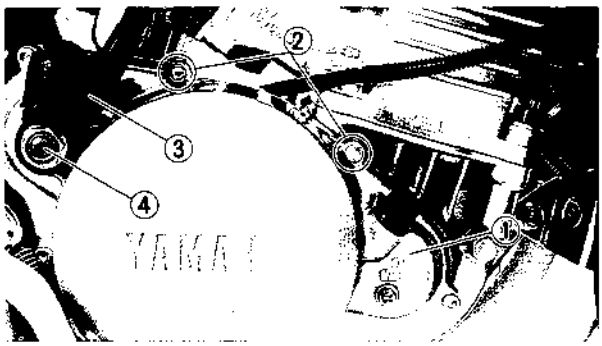
Place a folded rag between the teeth of the primary drive gear ② and driven gear ③.



4. Install:
   •Gasket (clutch cover) ①
   •Dowel pin ②

NOTE:

Always use a new gasket.



5. Install:
   •Clutch cover ①
   •Bolt (clutch cover) ②
   •Kick starter ③
   •Nut (kick starter) ④

	Bolts (Clutch Cover): **9 Nm (0.9 m•kg, 6.5 ft•lb)** **Nut (Kick Starter):** **50 Nm (5.0 m•kg, 36 ft•lb)**

CDI MAGNETO

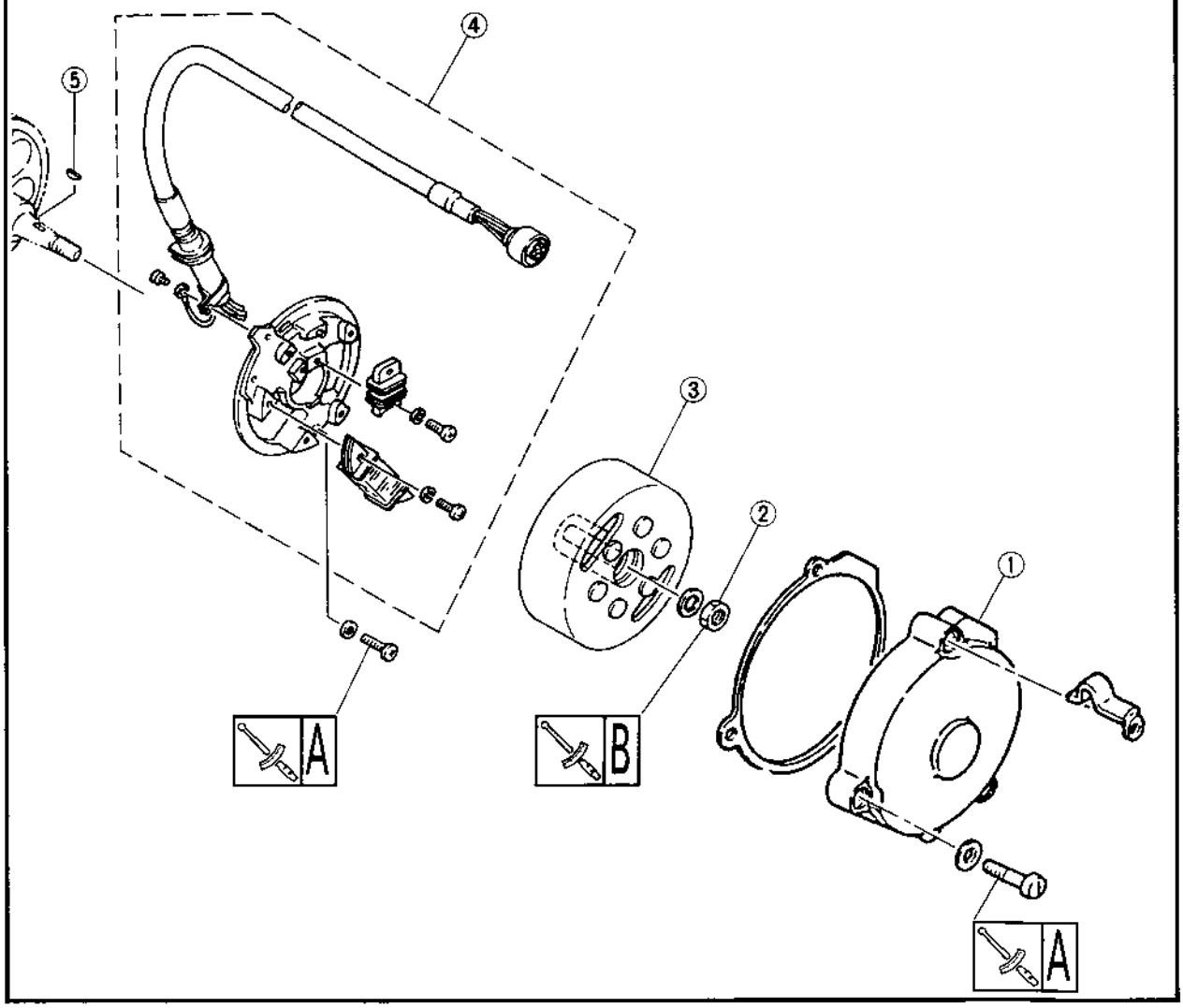
PREPARATION FOR REMOVAL

*Turn the fuel cock to "OFF".
*Disconnect the fuel hose at carburetor side.
*Remove the following parts.
- Seat
- Fuel tank

*Disconnect the CDI magneto lead.

A	10 Nm (1.0 m • kg, 7.2 ft • lb)
B	85 Nm (8.5 m • kg, 61 ft • lb)

IGNITION TIMING:
1.9 ~ 2.1 mm (0.075 ~ 0.084 in)

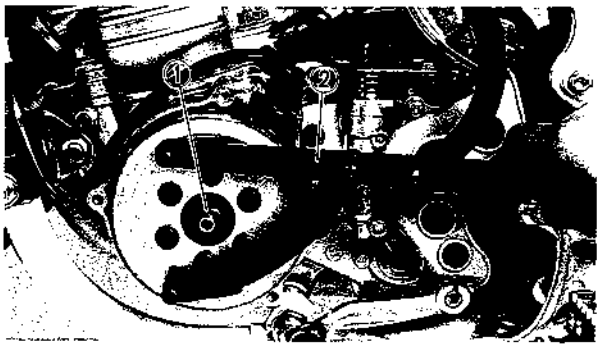


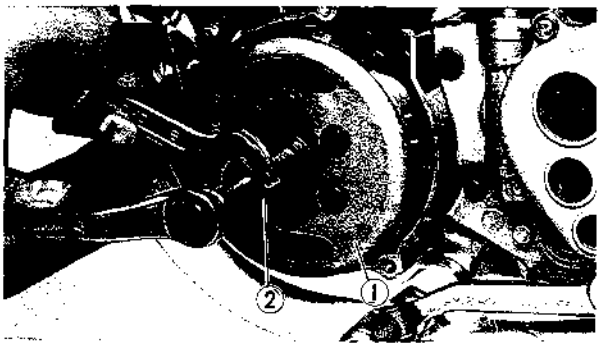
NOTE ON REMOVAL AND REASSEMBLY

•With the engine mounted, the following parts can be removed.
•Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
•Remove the gasket adhered on the contacting surface.

Extent of removal: ① CDI magneto removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Magneto cover	1	
	2	Nut (rotor)	1	Use special tool. Refer to "REMOVAL POINTS".
	3	Rotor	1	
	4	Stator	1	
	5	Woodruff key	1	





REMOVAL POINTS

ROTOR

1. Remove:
   •Nut (rotor) ①
   Use the Rotor Holding Tool ②.

Rotor Holding Tool:
YU-01235/90890-01235

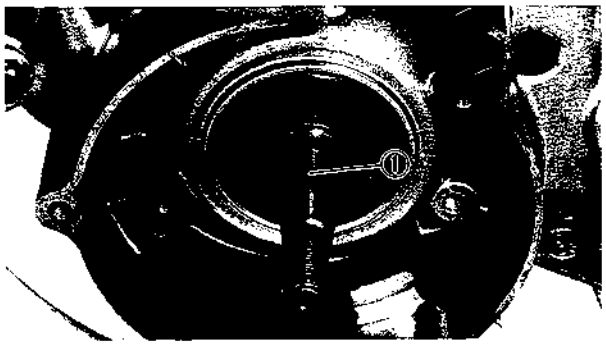
2. Remove:
   •Washer
   •Rotor ①
   Use the Rotor Puller ②.

Rotor Puller:
YM-01189/90890-01189

INSPECTION

CDI MAGNETO

1. Inspect:
   •Rotor inner surface ⓐ
   •Stator outer surface ⓑ
   Damage→Inspect the crankshaft runout and crankshaft bearing.
   If necessary, replace CDI magneto/stator.



2. Inspect:
   - Woodruff key ①
     Damage → Replace.

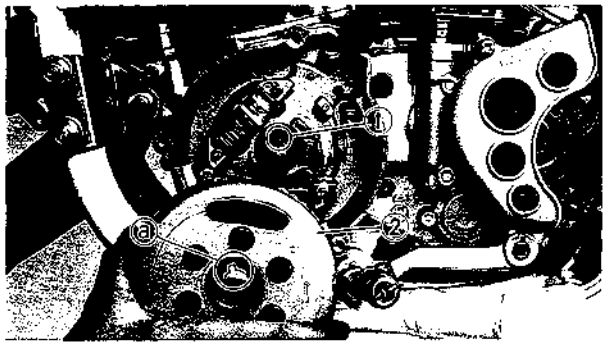
ASSEMBLY AND INSTALLATION

CDI MAGNETO

1. Install:
   - Stator

NOTE:

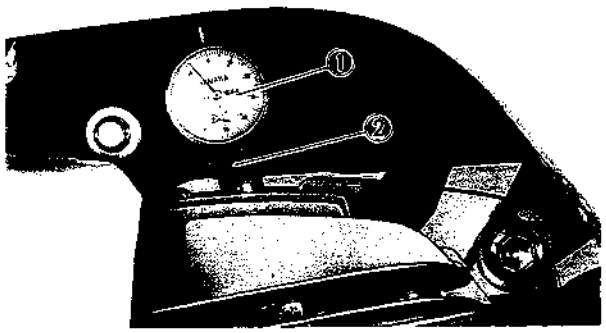
Temporarily tighten the screw (stator) at this point.



2. Install:
   - Woodruff key ①
   - Rotor ②

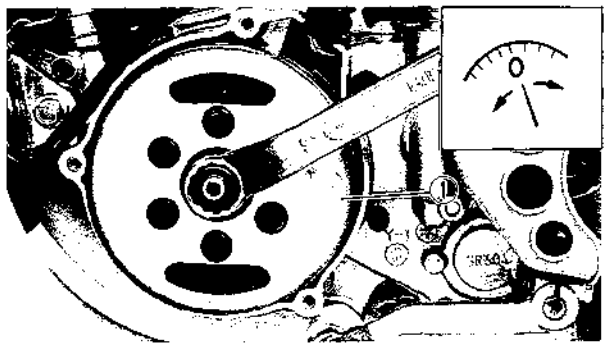
NOTE:

- Clean the tapered portions of the crankshaft and rotor.
- When installing the rotor ② make sure the woodruff key ① is properly seated in the key-way ⓐ of the crankshaft.



3. Remove:
   - Spark plug
4. Attach:
   - Dial gauge ①
   - Dial gauge stand ②

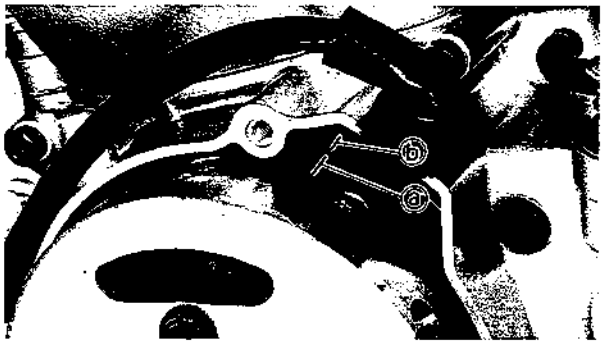
Dial Gauge:
YU-03097/90890-01252
Stand:
YU-01256



5. Rotate the magneto rotor ① until the piston reaches top dead center (TDC). When this happens, the needle on the dial gauge will stop and reverse directions even though the rotor is being turned in the same direction.
6. Set the dial gauge to zero at TDC.

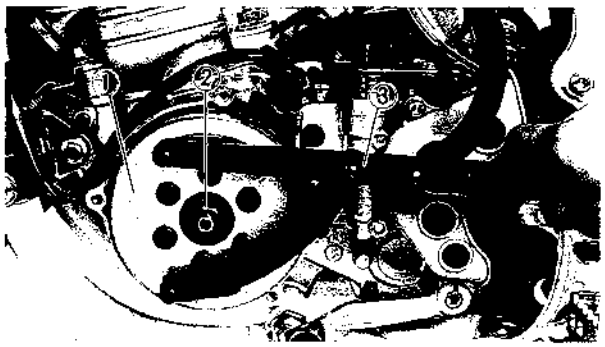
7. From TDC, rotate the rotor clockwise until the dial gauge indicates that the piston is at a specified distance from TDC.

Ignition Timing:
1.9 ~ 2.1 mm (0.075 ~ 0.084 in)



8. Align the punch mark ⓐ on the rotor with punch mark ⓑ on the stator by moving the stator.
9. Remove:
   - Rotor
10. Tighten:
   - Screw (stator)

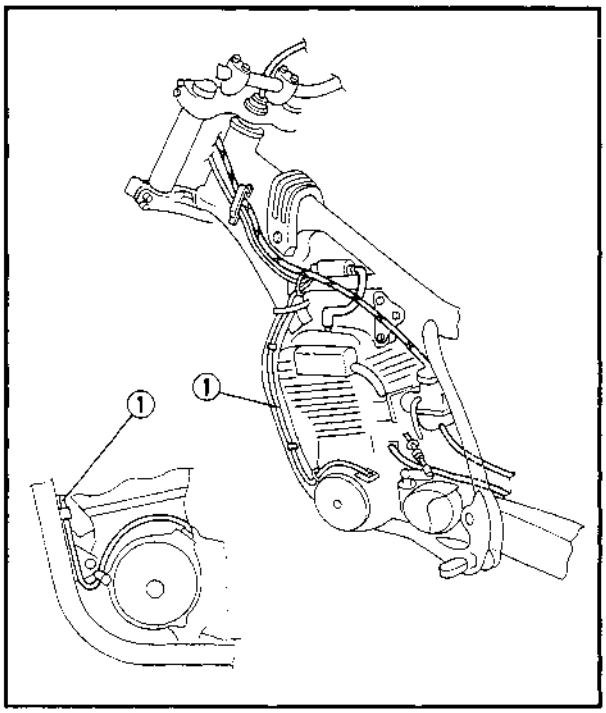
Screw (Stator):
10 Nm (1.0 m•kg, 7.2 ft•lb)



11. Install:
   - Rotor ①
   - Plain washer
   - Nut (rotor) ②
     Use the Rotor Holding Tool ③.

Rotor Holding Tool:
YU-01235/90890-01235

Nut (CDI Magneto):
85 Nm (8.5 m•kg, 61 ft•lb)



12. Connect:
   - CDI magneto lead ①
13. Install:
   - Spark plug
   - Gasket (magneto cover)
   - Magneto cover
   - Screw (magneto cover)

Screws (Magneto Cover):
10 Nm (10 m•kg, 7.2 ft•lb)

4

ENGINE REMOVAL

PREPARATION FOR REMOVAL

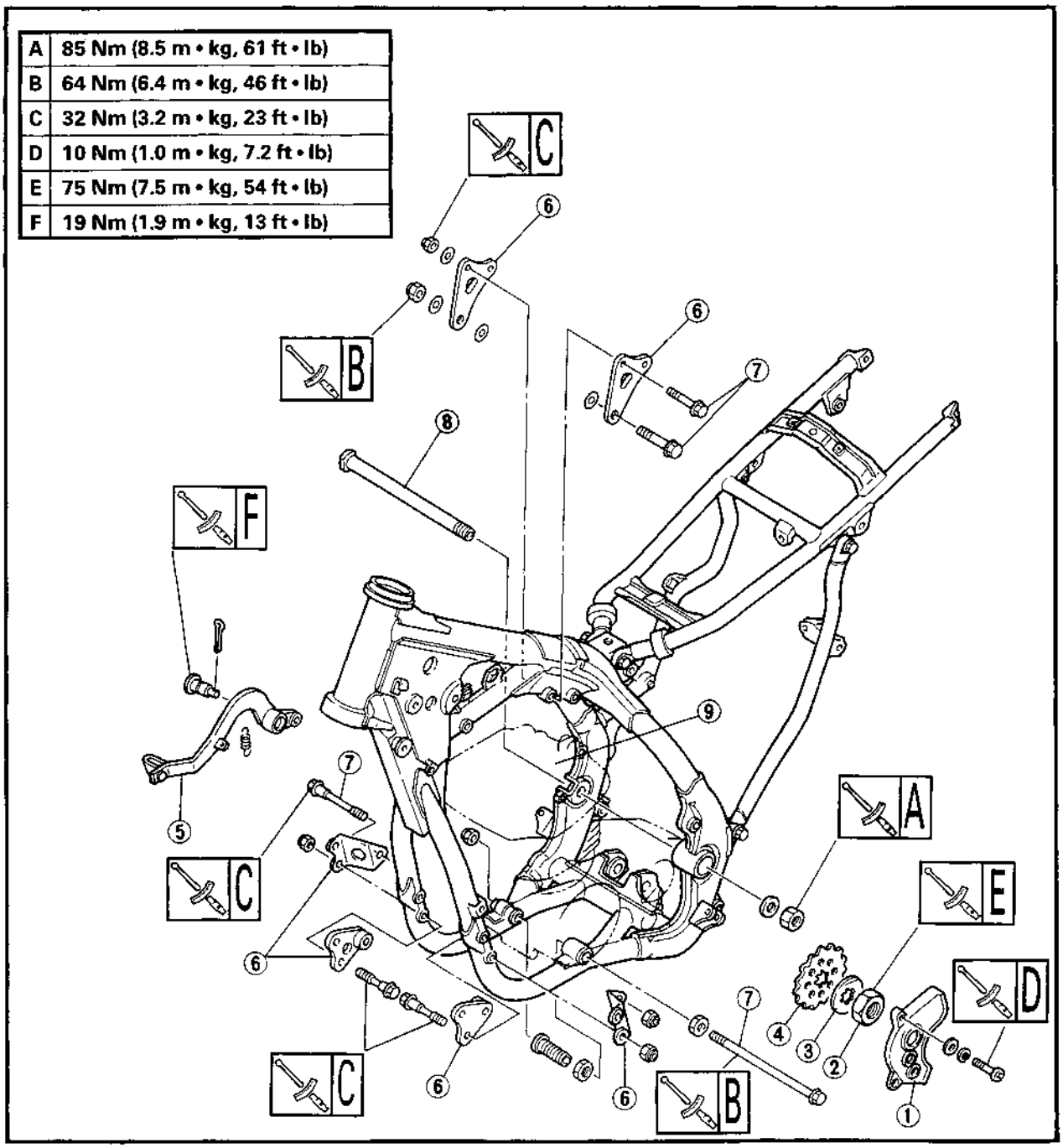
*Hold the machine by placing the suitable stand under the engine.

⚠ WARNING

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

*Drain the transmission oil.
*Turn the fuel cock to "OFF".
*Disconnect the fuel hose at carburetor side.
*Disconnect the clutch cable at engine side.
*Remove the following parts:
- Carburetor
- Seat
- Fuel tank
- Side cover 2 (right)
- Exhaust pipe and silencer
- Plug cap and spark plug
- Side cover 3 (air scoop)
- Shift pedal

A	85 Nm (8.5 m • kg, 61 ft • lb)
B	64 Nm (6.4 m • kg, 46 ft • lb)
C	32 Nm (3.2 m • kg, 23 ft • lb)
D	10 Nm (1.0 m • kg, 7.2 ft • lb)
E	75 Nm (7.5 m • kg, 54 ft • lb)
F	19 Nm (1.9 m • kg, 13 ft • lb)

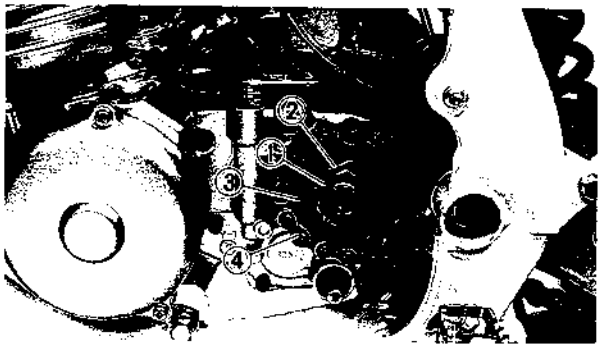


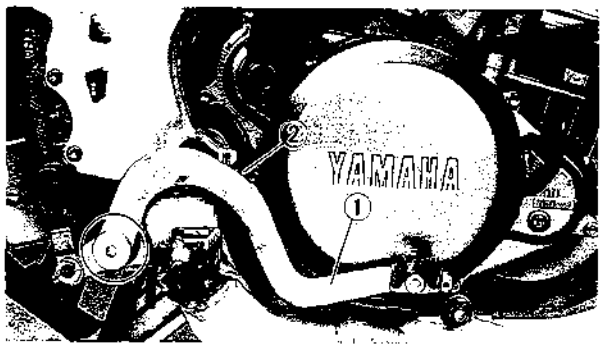
NOTE ON REMOVAL AND REASSEMBLY

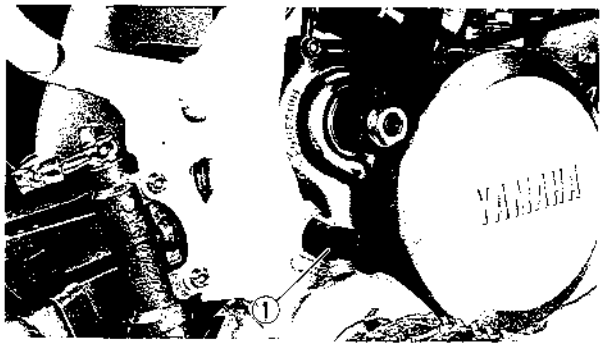
•Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.

Extent of removal: ① Engine removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Chain cover	1	
	2	Nut (drive sprocket)	1	Refer to "REMOVAL POINTS".
	3	Lock washer	1	
	4	Drive sprocket	1	
	5	Brake pedal	1	
	6	Engine bracket	6	
	7	Engine mounting bolt	3	
	8	Pivot shaft	1	Refer to "REMOVAL POINTS".
	9	Engine	1	Refer to "REMOVAL POINTS".







REMOVAL POINTS

DRIVE SPROCKET

1. Remove:
   - •Nut (drive sprocket) ①
   - •Lock washer ②
   - •Drive sprocket ③
   - •Drive chain ④

   Straighten the lock washer.

NOTE:

Remove the drive sprocket ③ together with the drive chain ④.

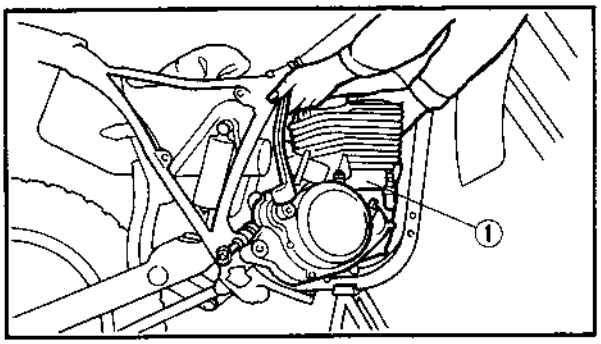
BRAKE PEDAL

1. Remove:
   - •Cotter pin (Brake pedal mounting bolt)
   - •Brake pedal ①
   - •Tension spring ②

PIVOT SHAFT

NOTE:

If the shaft ① is pulled all the way out, the swingarm will come loose. If possible, insert a shaft of similar diameter into the other side of the swingarm to support it.

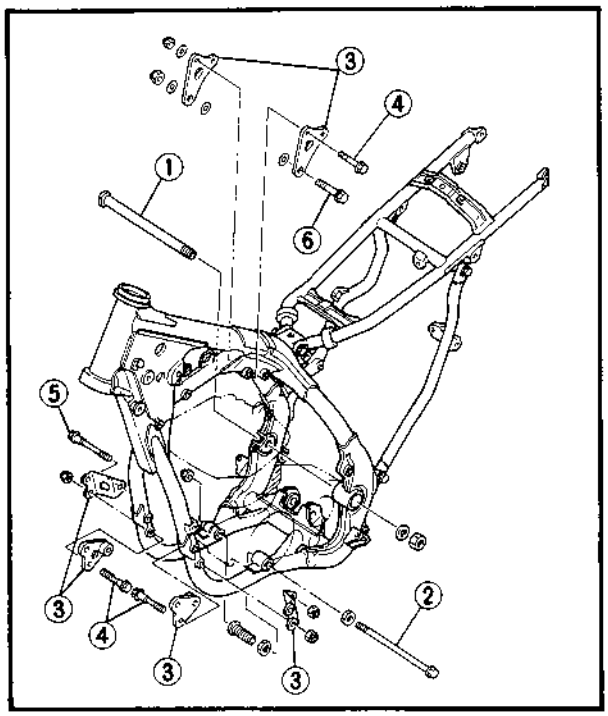


ENGINE REMOVAL

NOTE:

Make sure that the couplers and cables are disconnected.

1. Remove:
   - Engine ①
     Front right side.

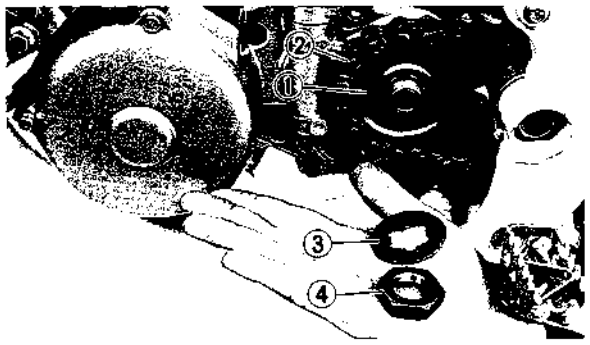


ASSEMBLY AND INSTALLATION

ENGINE INSTALLATION

1. Install:
   - Pivot shaft ①
     Install the engine from right side.
   - Engine mounting bolt (lower) ②
   - Engine bracket ③
   - Engine bracket mounting bolt ④
   - Engine mounting bolt (front) ⑤
   - Engine mounting bolt (Upper) ⑥

Engine Mounting Bolt (Front):
32 Nm (3.2 m•kg, 23 ft•lb)
Engine Mounting Bolt (Lower):
64 Nm (6.4 m•kg, 46 ft•lb)
Engine Mounting Bolt (Upper):
64 Nm (6.4 m•kg, 46 ft•lb)
Engine Bracket Mounting Bolt:
32 Nm (3.2 m•kg, 23 ft•lb)
Pivot Shaft:
85 Nm (8.5 m•kg, 61 ft•lb)



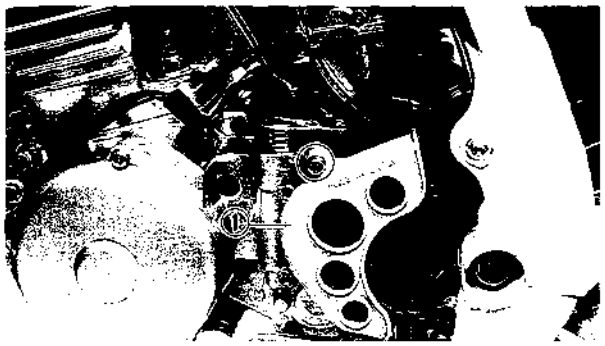
2. Install:
   - Drive sprocket ①
   - Drive chain ②
   - Lock washer ③
   - Nut (drive sprocket) ④

NOTE:

- Install the drive sprocket ① togather with the drive chain ②.
- Always use a new lock washer.

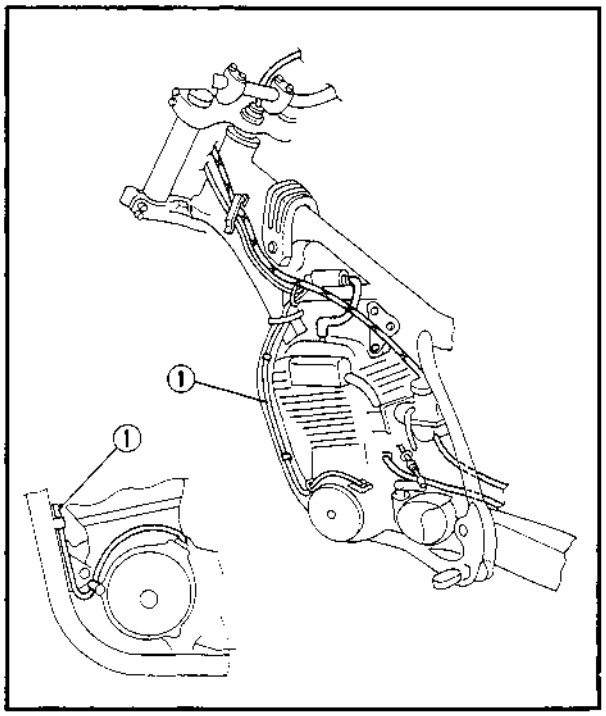
	Nut (Drive Sprocket): **75 Nm (7.5 m•kg, 54 ft•lb)**

3. Bend the lock washer tab to lock the locknut.



4. Install:
   - Chain cover ①
   - Bolt (chain cover)

	Bolts (Chain Cover): **10 Nm (1.0 m•kg, 7.2 ft•lb)**



5. Connect:
   - CDI magneto lead ①

NOTE:

Connect the CDI magneto lead to the CDI unit lead on the left side of the tension pipe.
Then clamp the CDI magneto lead togather with the ignition coil lead, "ENGINE STOP" button lead and wire harness using the band on the main pipe.

6. Connect:
   • Clutch cable ①

7. Install:
   • Spark plug
   • Plug cap

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

4

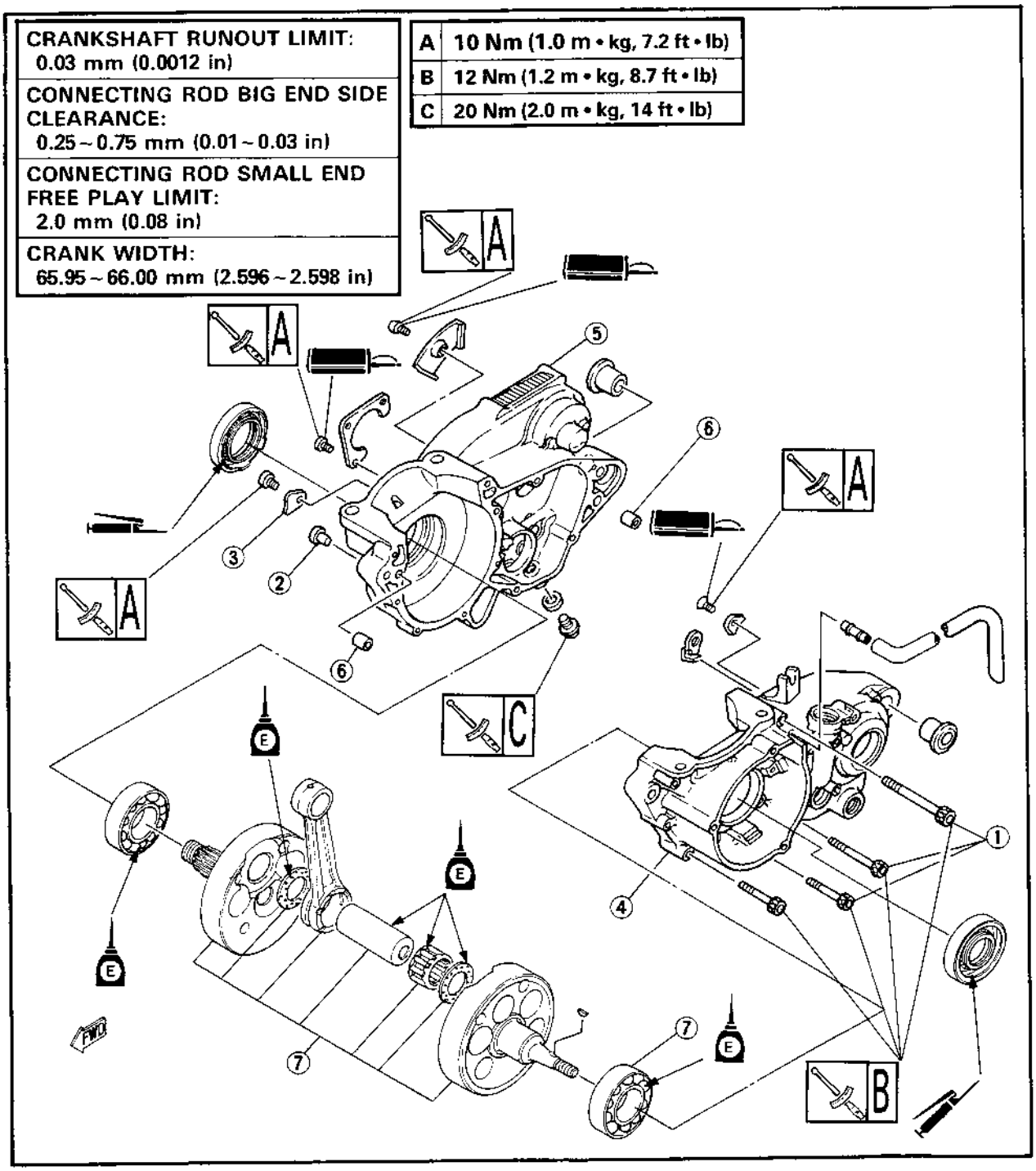
CRANKCASE AND CRANKSHAFT

PREPARATION FOR REMOVAL

* Remove the engine.
* Remove the following parts:
  - Cylinder head
  - Cylinder
  - Piston
  - Magneto cover
  - Clutch cover
  - Primary drive gear
  - Primary driven gear
  - Kick axle
  - Kick idle gear
  - Shift shaft
  - Stopper lever
  - Rotor and stator

CRANKSHAFT RUNOUT LIMIT: 0.03 mm (0.0012 in)
CONNECTING ROD BIG END SIDE CLEARANCE: 0.25 ~ 0.75 mm (0.01 ~ 0.03 in)
CONNECTING ROD SMALL END FREE PLAY LIMIT: 2.0 mm (0.08 in)
CRANK WIDTH: 65.95 ~ 66.00 mm (2.596 ~ 2.598 in)

A	10 Nm (1.0 m • kg, 7.2 ft • lb)
B	12 Nm (1.2 m • kg, 8.7 ft • lb)
C	20 Nm (2.0 m • kg, 14 ft • lb)

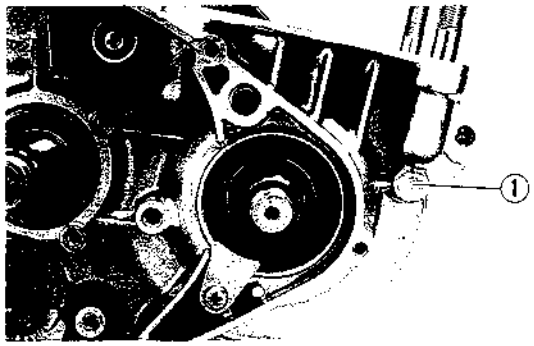


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For reassembly, the removed parts should be cleaned and apply the transmission oil onto the sliding surface.

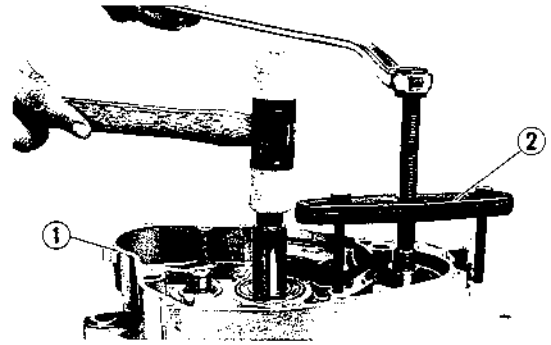
Entent of removal: ① Separating crankcase ② Crankshaft removal

Extent of removal	Order	Part name	Q'ty	Remarks
① ②	1	Bolt	11	
	2	Plug	1	
	3	Holder	1	
	4	Crankcase (left)	1	Use special tool. Refer to "REMOVAL POINTS".
	5	Crankcase (right)	1	
	6	Dowel pin	2	Use special tool. Refer to "REMOVAL POINTS".
	7	Crankshaft	1	



REMOVAL POINTS
CRANKCASE

1. Remove:
   - Plug ①



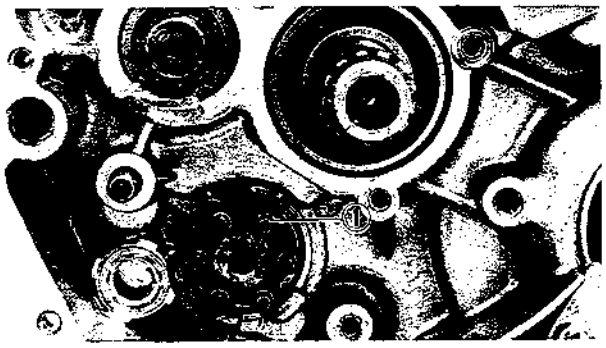
2. Remove:
   - Crankcase (right) ①

   Use the Crankcase Separating Tool ②.

	Crankcase Separating Tool: YU-01135/90890-01135

NOTE:

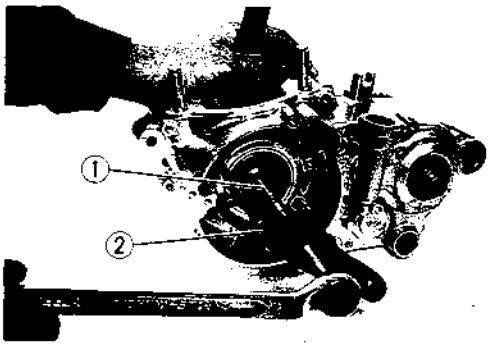
- Fully tighten the tool holding bolts, but make sure the tool body is parallel with the case. if necessary, one screw may be backed out slightly to level tool body.
- As pressure is applied, alternately tap on the front engine mounting boss and transmission shafts.



CAUTION:

- **Turn the segment ① to the position shown in the figure so that it does not contact the crankcase.**
- **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.**

4



CRANKSHAFT

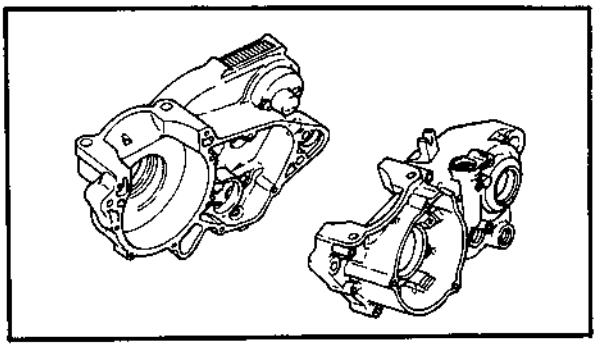
1. Remove:
   - Crankshaft ①

   Use the Crankcase Separating Tool ②.

	Crankcase Separating Tool: YU-01135/90890-01135

CAUTION:

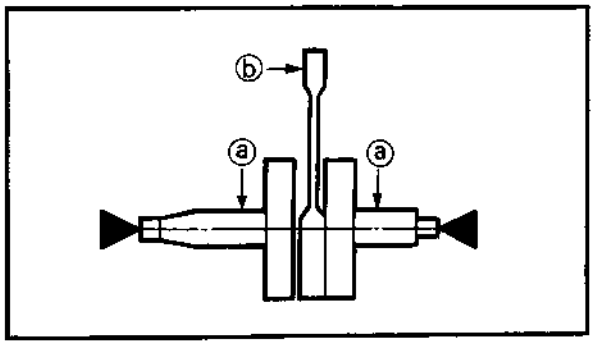
Do not use a hammer to drive out the crankshaft.



INSPECTION

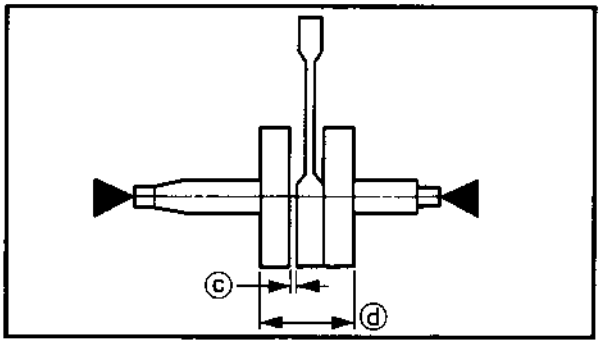
CRANKCASE

1. Inspect:
   - Contacting surface
     Scratches → Replace.
   - Crankcase
     Cracks/Damage → Replace.



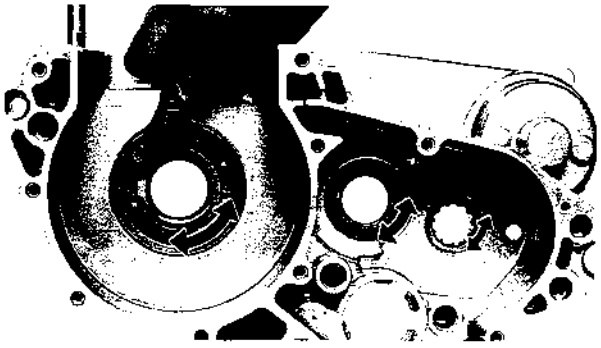
CRANKSHAFT

1. Measure:
   - Runout limit ⓐ
   - Small end free play limit ⓑ
   - Connecting rod big end side clearance ⓒ
   - Crank width ⓓ
     Out of specification → Replace.
     Use a V-Blocks, the Dial Gauge and a thickness gauge.



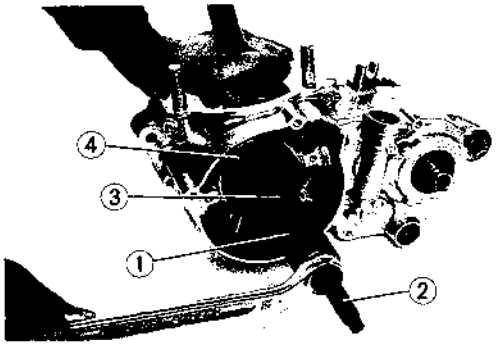
	Dial Gauge: **YU-03097/90890-01252**

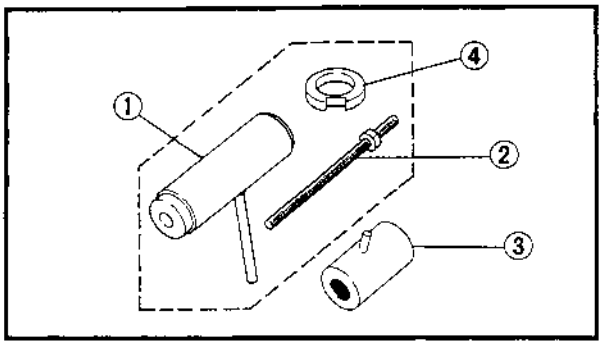
	Standard	<Limit>
Runout Limit:	–	0.03 mm (0.0012 in)
Small End Free Play:	0.4 ~ 1.0 mm (0.016 ~ 0.039 in)	2.0 mm (0.08 in)
Side Clearance:	0.25 ~ 0.75 mm (0.010 ~ 0.030 in)	←
Crank Width:	65.95 ~ 66.00 mm (2.596 ~ 2.598 in)	←



BEARING

1. Inspect:
   - Bearings
     Rotate inner race with a finger.
     Rough spot/Seizure → Replace.





ASSEMBLY AND INSTALLATION

CRANKSHAFT

1. Install:
   - Crankshaft

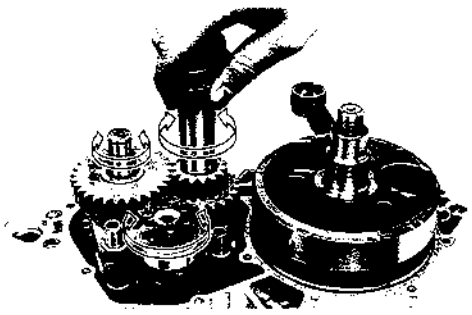
   Use the Crankshaft Installing Tool ①, ②, ③, ④.

Crankshaft Installing Tool:
(Pot): YU-90050/90890-01274
(Bolt): YU-90050/90890-01275
(Spacer): YU-90050/90890-01288
(Adapter): YU-90062/90890-01277

NOTE:

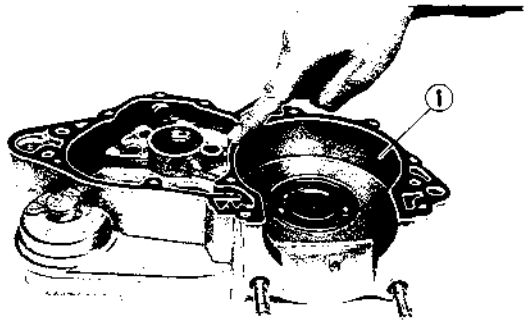
- Hold the connecting rod at top dead center with one hand while turning the nut of the Installing Tool with the other. Operate the Installing Tool until the crankshaft bottoms against the bearing.
- Before installing the crankshaft, clean the contacting surface of crankcase.
- Apply the lithium soap base grease onto the oil seal lip.

4



2. Check:
   - Shifter operation
   - Transmission operation

   Unsmooth operation → Repair.



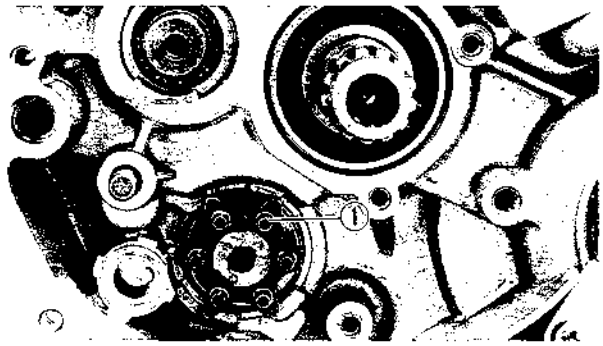
3. Apply:
   - Sealant

   Onto the crankcase (right) ①

	Quick Gasket®: **ACC-11001-05-01** **Yamaha Bond No. 1215:** **90890-85505**

NOTE:

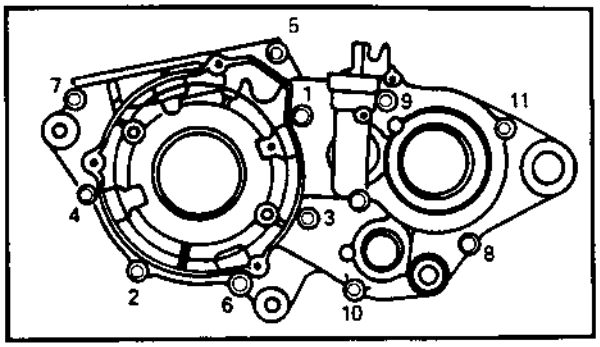
Clean the contacting surface of crankcase left, right before applying the sealant.



4. Install:
   - Dowel pins
   - Crankcase (left)
   - Crankcase (right)

NOTE:

- Turn the shift cam ① to the position shown in the figure so that it does not contact the crankcase when installing the crankcase.
- Fit the crankcase (right) onto the crankcase (left). Tap lightly on the case with soft hammer.

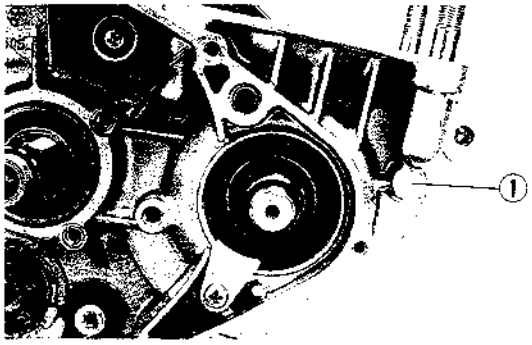


5. Tighten:
   - Bolt (crankcase)

NOTE:

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

	Bolts (Crankcase): **12 Nm (1.2 m•kg, 8.7 ft•lb)**



6. Install:
   - Plug ①

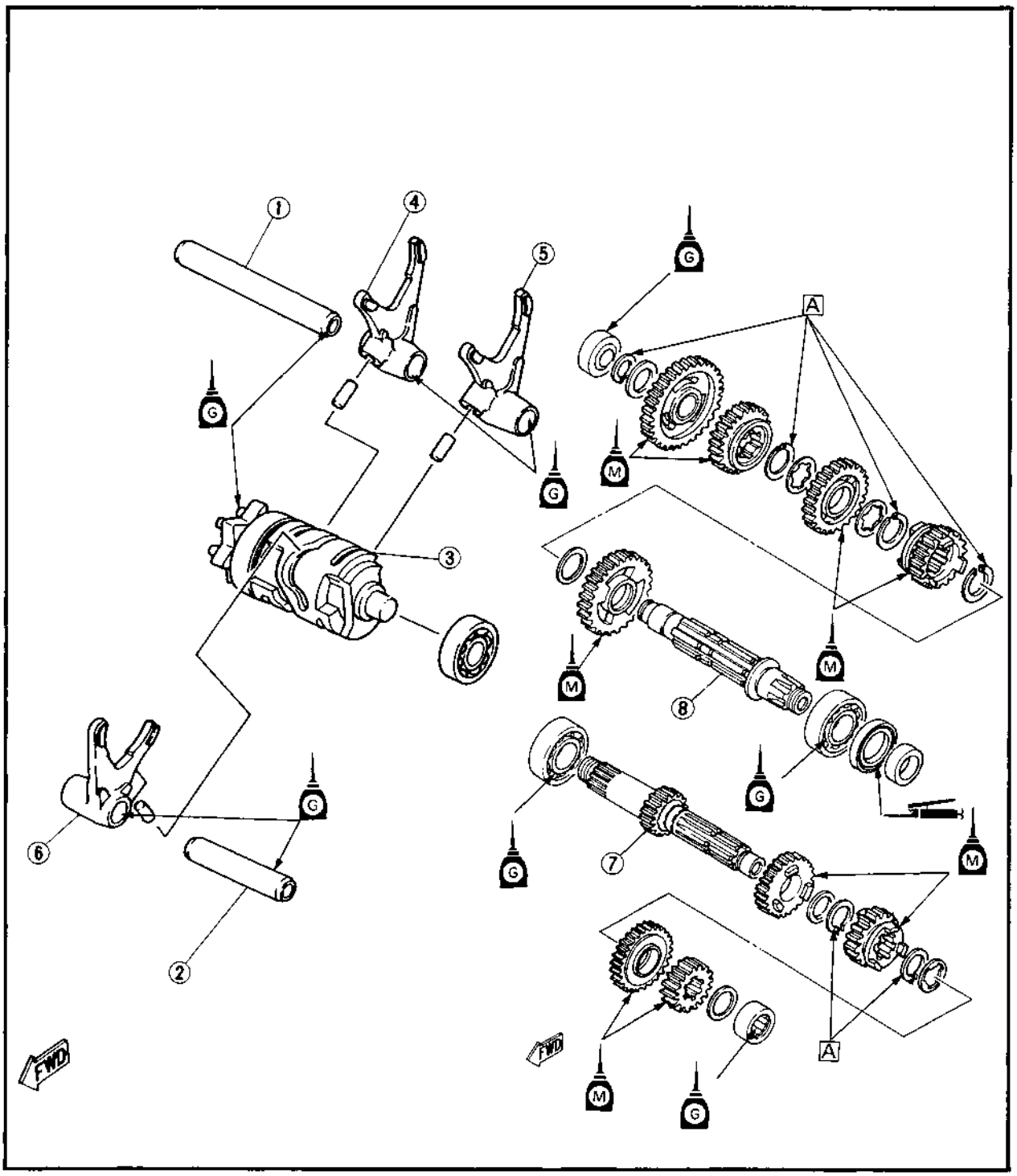
7. Remove:
   • Sealant
   Forced out on-the cylinder mating surface.
8. Apply:
   • Engine oil
   To the crank pin, bearing and oil delivery hole.
9. Check:
   • Crankshaft and transmission operation
   Unsmooth operation → Repair.

TRANSMISSION, SHIFT CAM AND SHIFT FORK

PREPARATION FOR REMOVAL

*Remove the engine.
*Separate the crankcase.

A USE NEW ONE

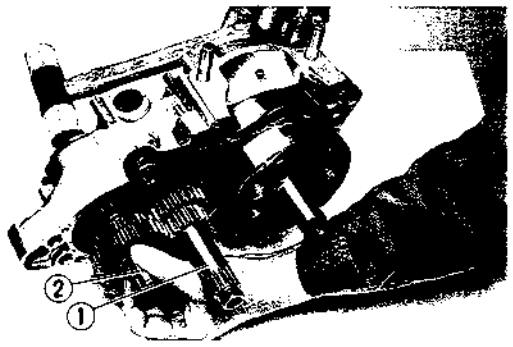


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For reassembly, the removed parts should be cleaned and apply the transmission oil onto the sliding surface.

Extent of removal: ① Shift cam removal
② Main axle and drive axle removal

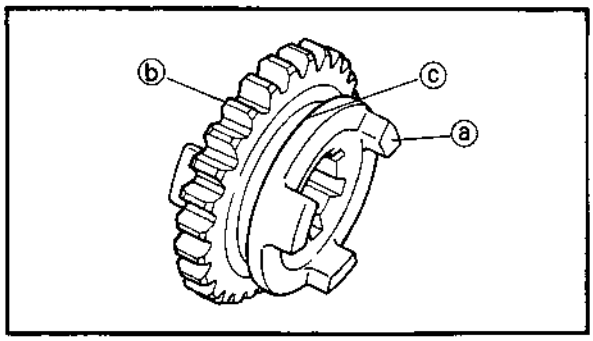
Extent of removal	Order	Part name	Q'ty	Remarks
① ②	1	Guide bar (long)	1	
	2	Guide bar (short)	1	
	3	Shift cam	1	
	4	Shift fork 3	1	
	5	Shift fork 1	1	
	6	Shift fork 2	1	
	7	Main axle	1	Refer to "REMOVAL POINTS".
	8	Drive axle	1	



REMOVAL POINTS
TRANSMISSION
1. Remove:
   - Main axle ①
   - Drive axle ②

   Tap lightly on the transmission drive axle with a soft hammer to remove.

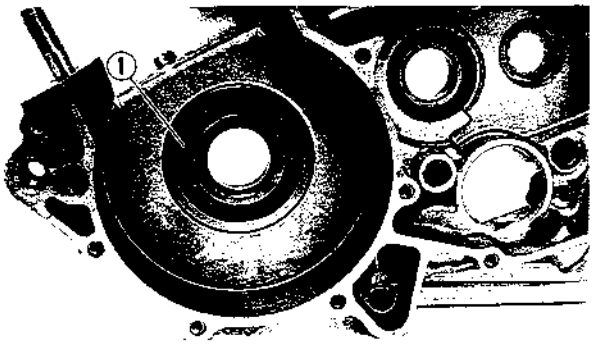
NOTE:
Remove assembly carefully. Note the position of each part. Pay particular attention to the location and direction of shift forks.



INSPECTION
GEARS
1. Inspect:
   - Matching dog ⓐ
   - Gear teeth ⓑ
   - Shift fork groove ⓒ

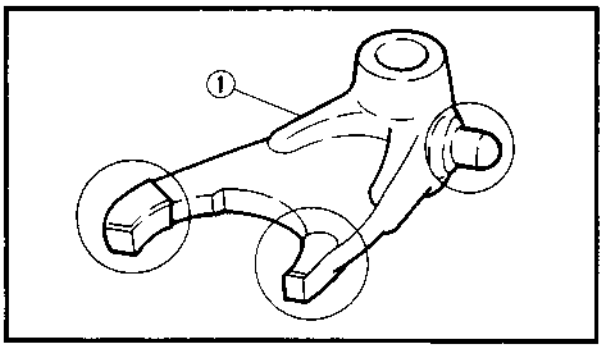
   Wear/Damage → Replace.

2. Check:
   - Gears movement
     Unsmooth movement→Repair or replace.



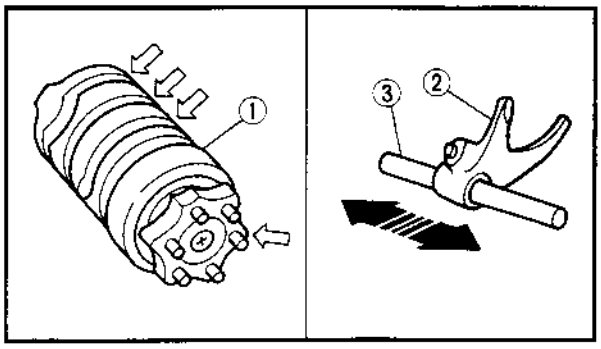
BEARING

1. Inspect:
   - Bearing ①
     Rotate inner race with a finger.
     Rough spot/Seizure→Replace.



SHIFT FORK AND SHIFT CAM

1. Inspect:
   - Shift fork ①
     Wear/Damage/Scratches→Replace.

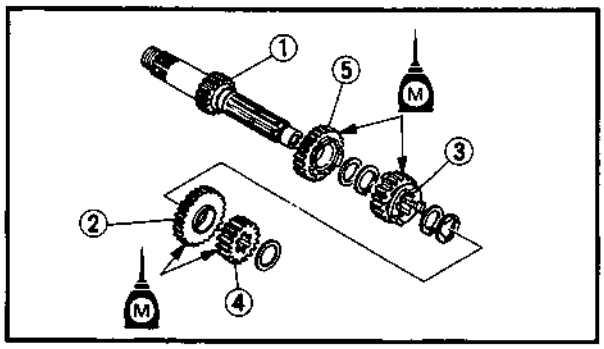


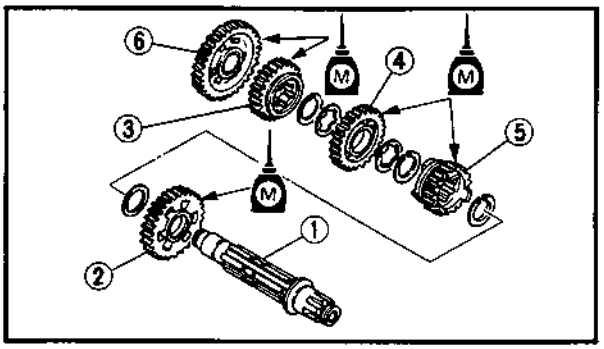
2. Inspect:
   - Shift cam ①
   - Shift fork ②
     Wear/Damage/Scratches→Replace.
   - Guide bar ③
     Bend/Wear/Damage→Replace.

3. Check:
   - Shift fork movement
     On its guide bar.
     Unsmooth operation→Replace.
     Shift fork and/or guide bar.

NOTE:

For a malfunctioning shift fork, replace not only the shift fork itself but the two gears adjacent to the shift fork.





ASSEMBLY AND INSTALLATION

TRANSMISSION

1. Install:
   - Main axle ①
   - 5th pinion gear (24T) ②
   - 3rd pinion gear (18T) ③
   - 2nd pinion gear (16T) ④
   - 4th pinion gear (22T) ⑤

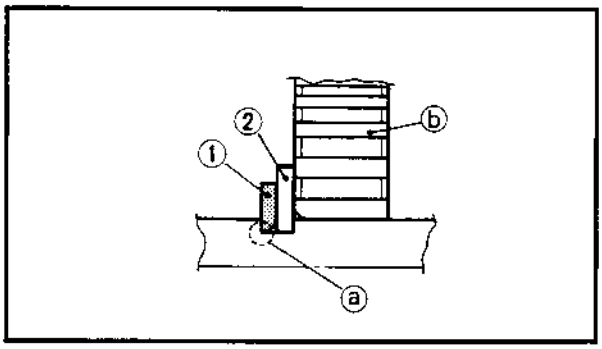
NOTE:

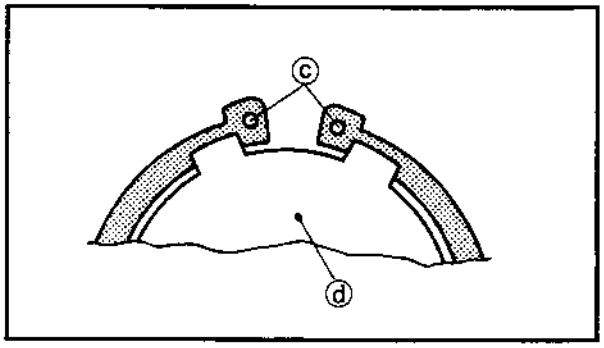
Apply the molybdenum disulfide oil onto the gears inner circumference.

2. Install:
   - Drive axle ①
   - 2nd wheel geare (24T) ②
   - 4th wheel gear (22T) ③
   - 3rd wheel gear (22T) ④
   - 5th wheel gear (20T) ⑤
   - 1st wheel gear (29T) ⑥

NOTE:

Apply the molybdenum disulfide oil onto the gears inner circumference.

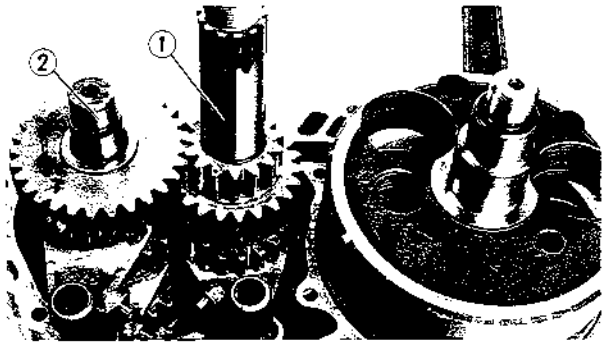




3. Install:
   - Circlip ①
   - Washer ②

NOTE:

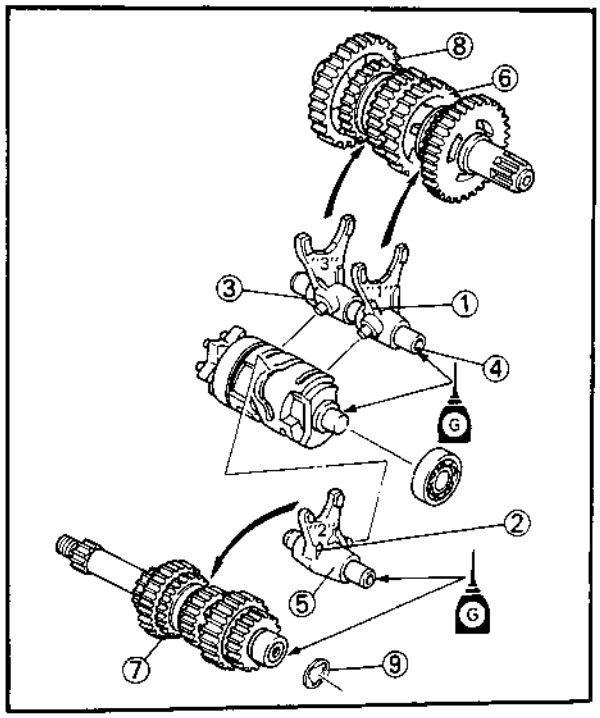
- Be sure the circlip sharp-edged corner ⓐ is positioned opposite side to the washer ② and gear ⓑ.
- Always use a new circlip.
- Be sure the circlip end ⓒ is positioned at axle spline groove ⓓ.



4. Install:
   - Main axle ①
   - Drive axle ②

NOTE:

When installing the drive axle into the crankcase, pay careful attention to the crankcase oil seal lip.

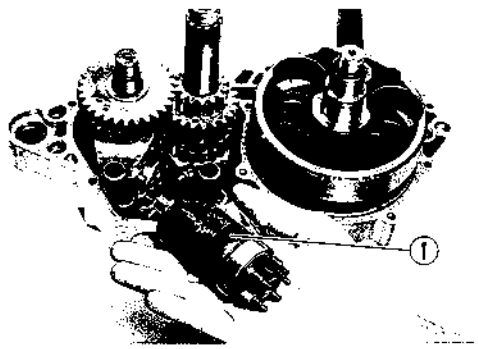


SHIFT CAM AND SHIFT FORK

1. Install:
   - Shift fork #1 ①
   - Shift fork #2 ②
   - Shift fork #3 ③
   - Shift fork guide bar (long) ④
   - Shift fork guide bar (short) ⑤
   - Washer ⑨

NOTE:

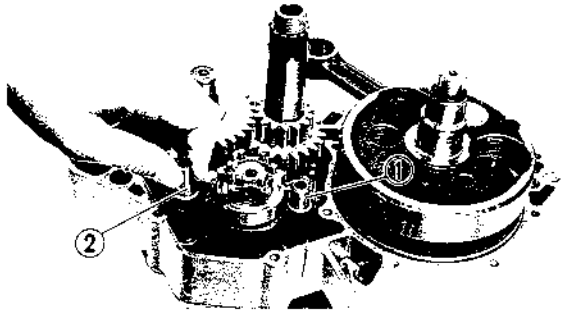
- Mesh the shift fork #2 ② with the 3rd pinion gear ⑦ and #3 ③ with the 4th wheel gear ⑧ on the drive axle.
- Mesh the shift fork #1 ① with the 5th wheel gear ⑥ on the drive axle.
- Install the shift forks with the embossed number should face downward.



2. Install:
   - Shift cam ①

NOTE:

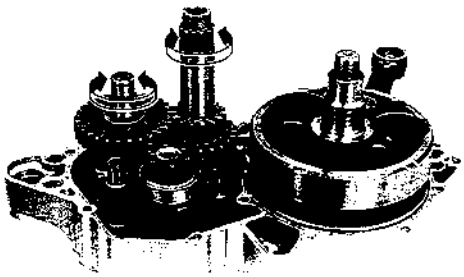
Apply the transmission oil onto the shift cam.



3. Install:
   - Guide bar (longer) ②
   - Guide bar (shorter) ①

NOTE:

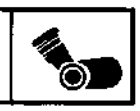
Be sure the long bar ② is inserted into the shift forks #1 and #3 and the short one ① into #2.



4. Check:
   - Shifter operation
   - Transmission operation

   Unsmooth operation → Repair.

5. Install:
   - Crankcase (right)



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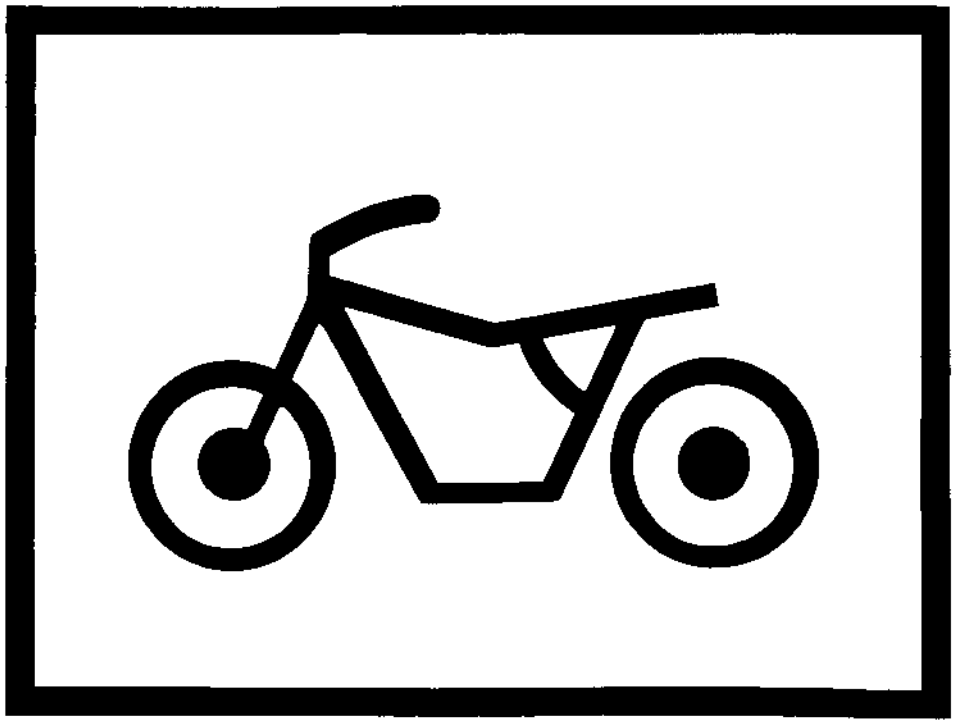
CHAPTER 5
CHASSIS



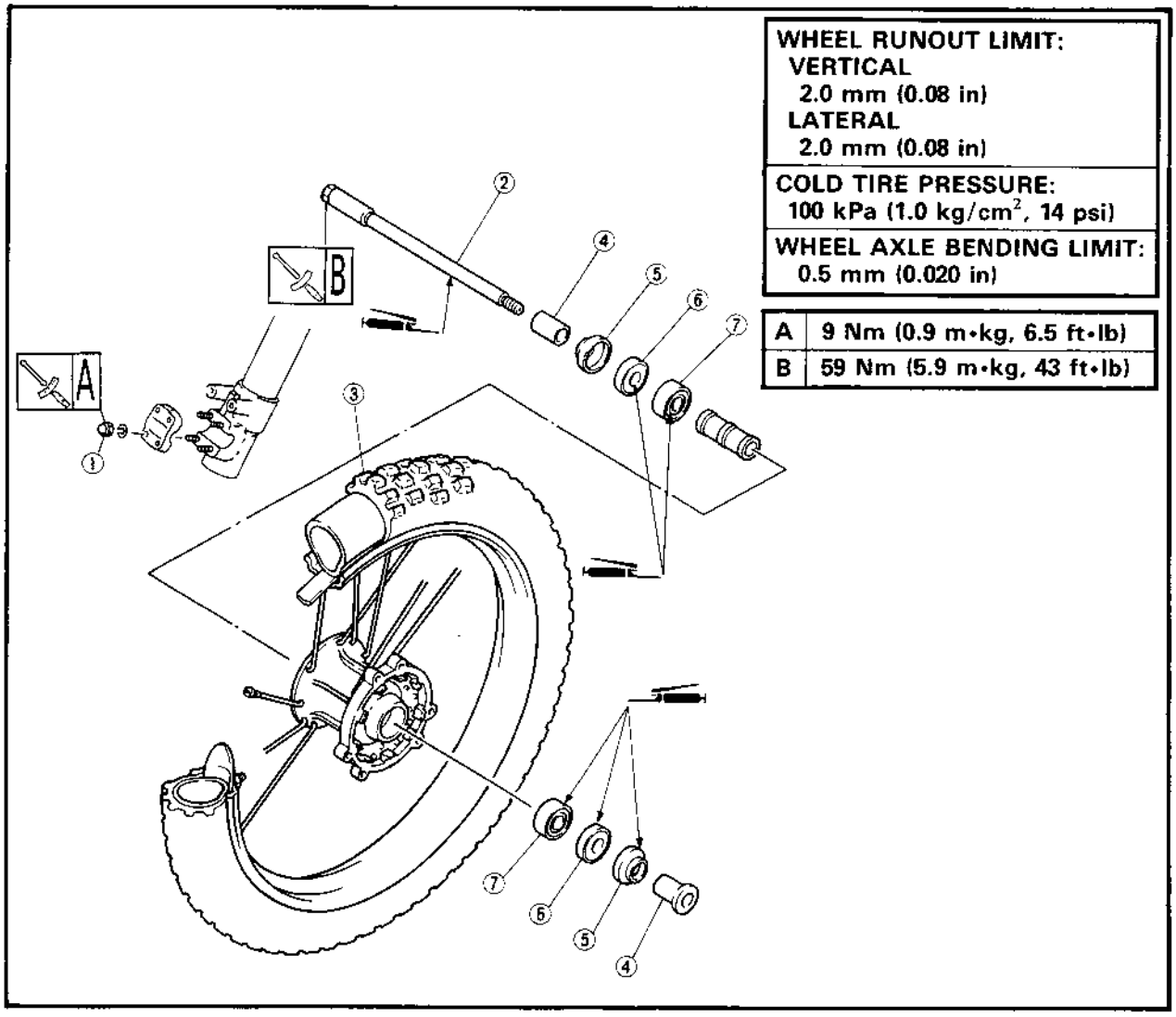
FRONT WHEEL

PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand under the engine.

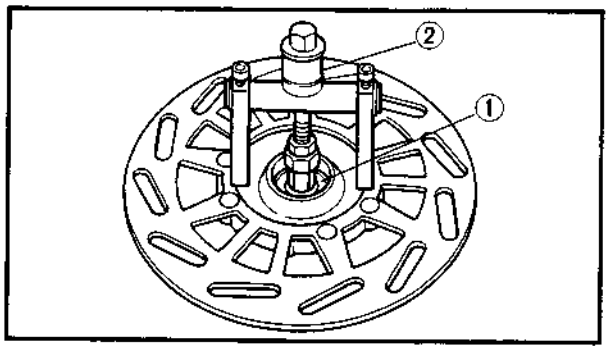
⚠ WARNING

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



Extent of removal: ① Front wheel removal ② Wheel bearing removal

Extent of removal	Order	Part name	Q'ty	Remarks
① ②	1	Nut (axle holder)	4	Only loosening
	2	Front wheel axle	1	
	3	Front wheel	1	
	4	Collar	2	
	5	Dust cover	2	
	6	Oil seal	2	
	7	Bearing	2	Refer to "REMOVAL POINTS".



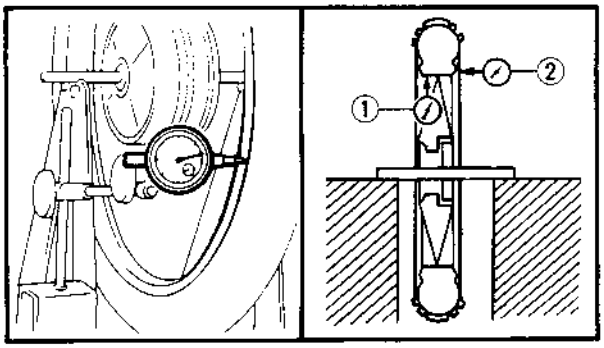
REMOVAL POINTS

WHEEL BEARING (IF NECESSARY)

1. Remove:
   - Bearing ①

NOTE:

Remove the bearing ① using a general bearing puller ②.



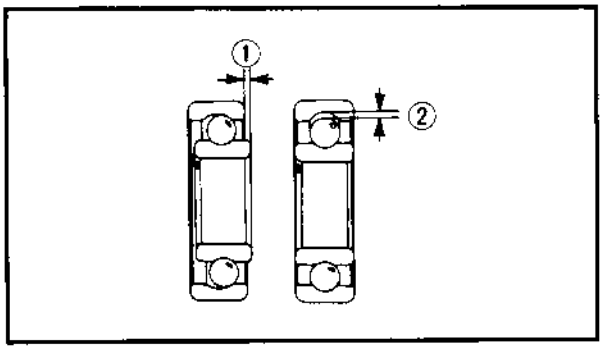
INSPECTION

FRONT WHEEL

1. Measure:
   - Wheel runout

   Out of limit → Replace.

Rim Runout Limits:
Radial ①: 2.0 mm (0.08 in)
Lateral ②: 2.0 mm (0.08 in)

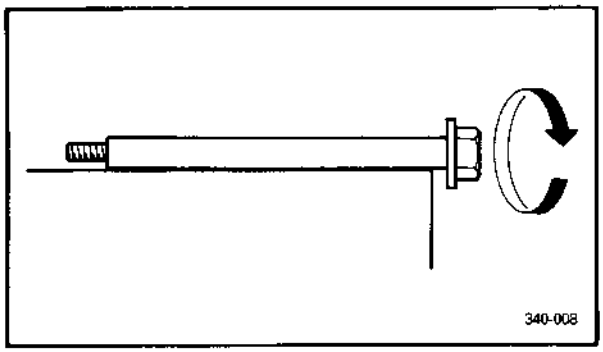


2. Inspect:
   - Bearing

   Rotate inner race with a finger.
   Rough spot/Seizure → Replace.

NOTE:

Replace the bearings, oil seal and wheel collar as a set.



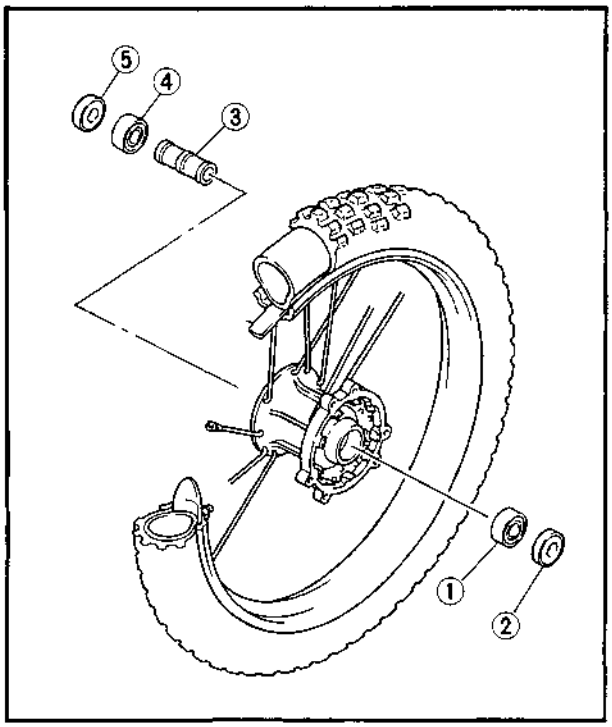
3. Inspect:
   - Front wheel axle

   Roll the axle on a flat surface.
   Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent axle.

5



ASSEMBLY

FRONT WHEEL

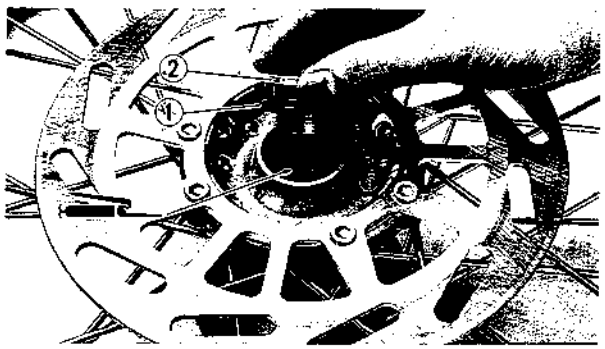
1. Install:
   - Bearing (left) ①
   - Oil seal (left) ②
   - Spacer ③
   - Bearing (right) ④
   - Oil seal (right) ⑤

NOTE:

- Apply the lithium soap base grease on the bearing and oil seal lip when installing.
- Use a socket that matches the outside diameter of the race of the bearing.
- Left side of bearing shall be installed first.
- Always use a new oil seal.
- Install the oil seal with its manufacture's marks or numbers facing outward.

CAUTION:

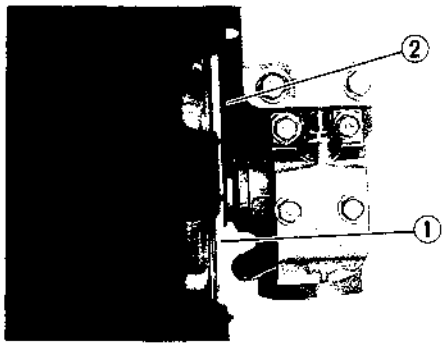
Do not strike the inner race of balls of the bearing. Contact should be made only with the outer race.



2. Install:
   - Dust cover ①
   - Collar ②

NOTE:

Apply the lithium soap base grease on the oil seal lip.



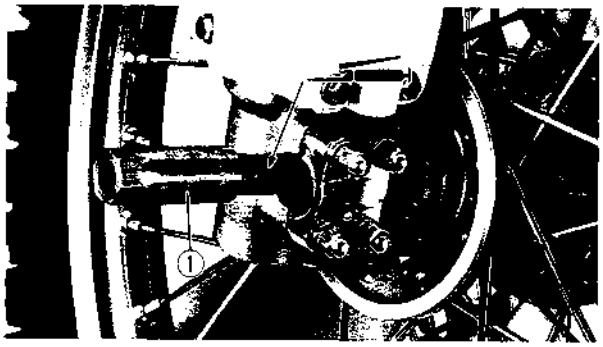
INSTALLATION

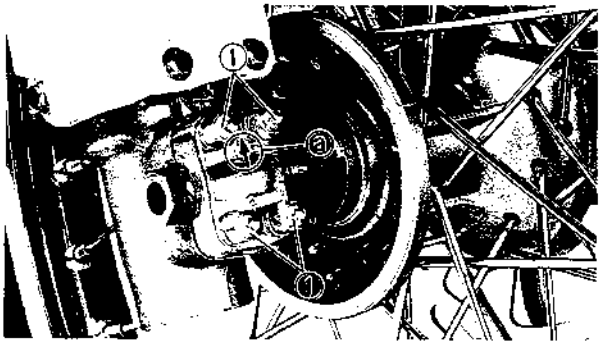
FRONT WHEEL

1. Install:
   - Front wheel

NOTE:

Install the brake disc ① between the brake pads ② correctly.





2. Install:
   • Front wheel axle ①

	Front Wheel Axle: **59 Nm (5.9 m•kg, 43 ft•lb)**

NOTE:

Apply the lithium soap base grease on the wheel axle.

3. Tighten:
   • Nut (axle holder) ①

	Nut (Axle Holder): **9 Nm (0.9 m•kg, 6.5 ft•lb)**

NOTE:

- Face the arrow mark ⓐ upward.
- When tightening the axle holder nuts, first, tighten the nuts on the upper side of axle holder.

5

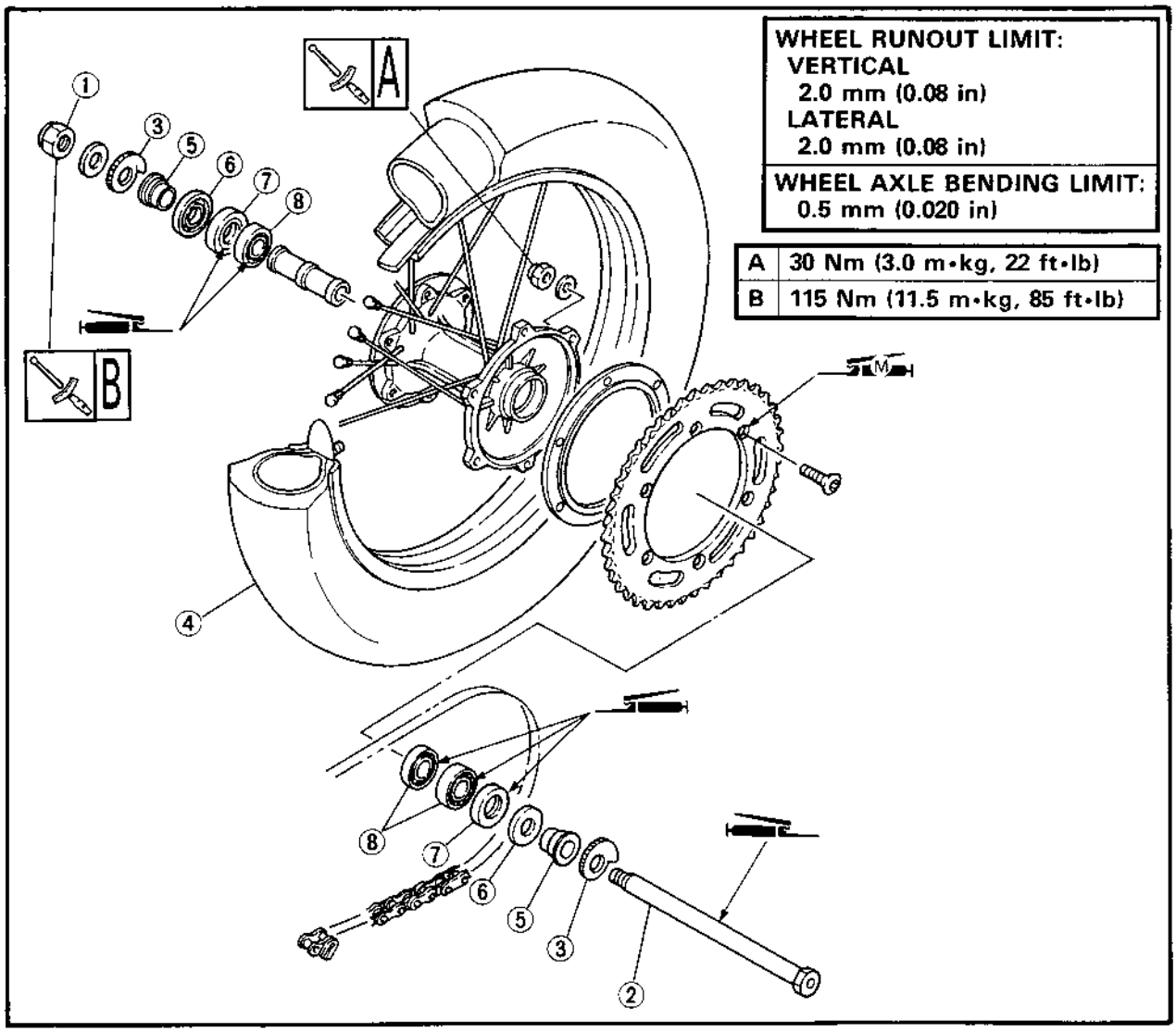
REAR WHEEL

PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand under the engine.

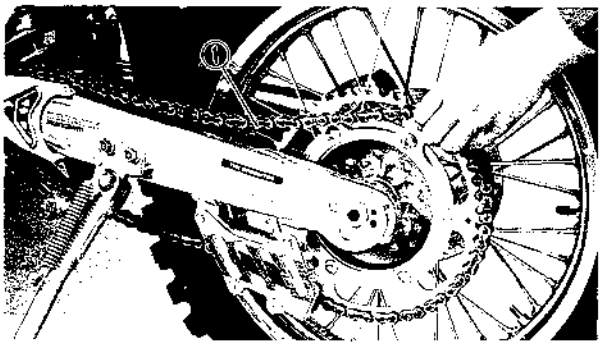
⚠ WARNING

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



Extent of removal: ① Rear wheel removal ② Wheel bearing removal

Extent of removal	Order	Part name	Q'ty	Remarks
① ②	1	Nut (rear wheel axle)	1	
	2	Rear wheel axle	1	
	3	Chain puller	2	
	4	Rear wheel	1	Refer to "REMOVAL POINTS".
	5	Collar	2	
	6	Dust cover	2	
	7	Oil seal	2	
	8	Bearing	3	Refer to "REMOVAL POINTS".

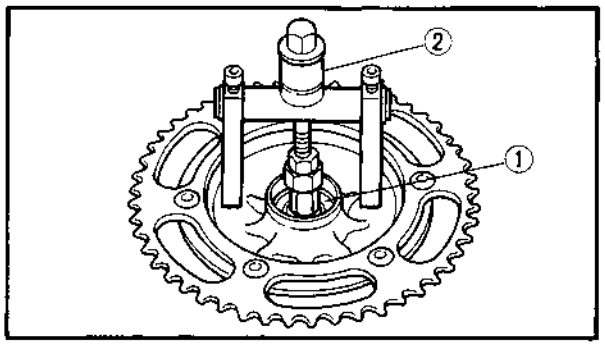


REMOVAL POINTS

REAR WHEEL

1. Remove:
   - Drive chain ①

   Loosen the drive chain adjuster and push the rear wheel forward.

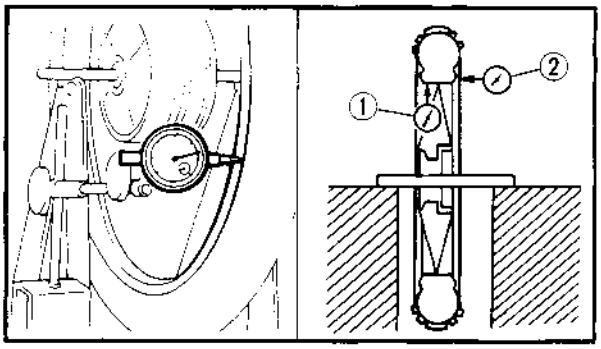


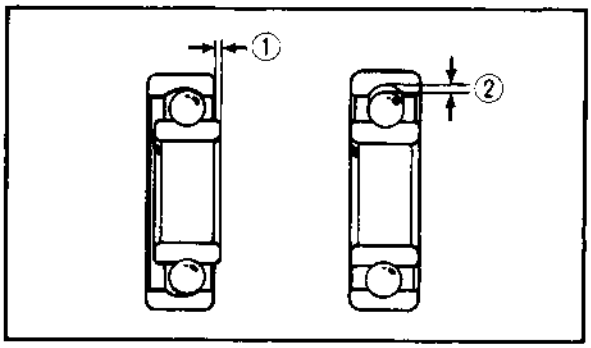
WHEEL BEARING (IF NECESSARY)

1. Remove:
   - Bearing ①

NOTE:

Remove the bearing ① using a general bearing puller ②.





INSPECTION

REAR WHEEL

1. Measure:
   - Wheel runout

   Out of limit→Replace.

Rim Runout Limits:
Radial ①: 2.0 mm (0.08 in)
Lateral ②: 2.0 mm (0.08 in)

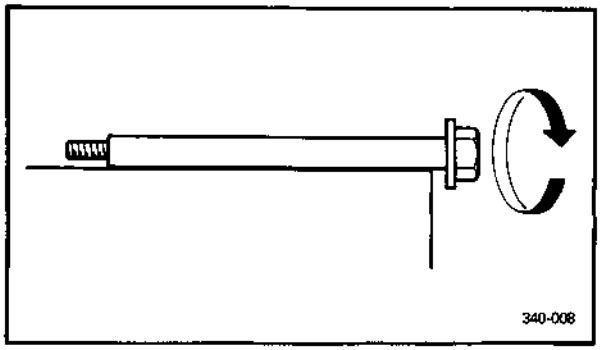
2. Inspect:
   - Bearing

   Rotate inner race with a finger.
   Rough spot/Seizure→Replace.

NOTE:

Replace the bearings, oil seal and wheel collar as a set.

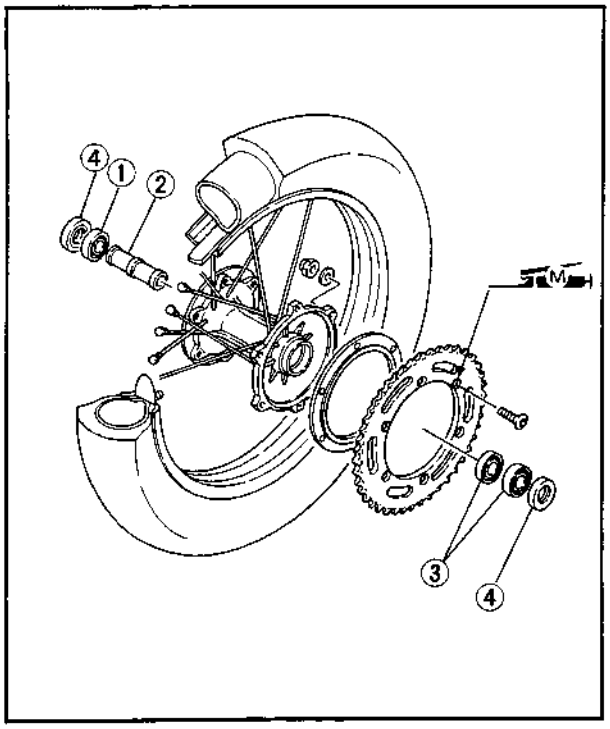
5



3. Inspect:
   - Rear wheel axle
     Roll the axle on a flat surface.
     Bends→Replace.

⚠ WARNING

Do not attempt to straighten a bent axle.



ASSEMBLY AND INSTALLATION

REAR WHEEL

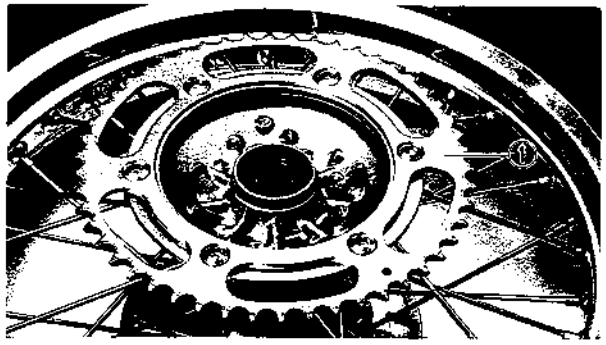
1. Install:
   - Bearing (right) ①
   - Spacer ②
   - Bearing (left) ③
   - Oil seal ④

NOTE:

- Apply the lithium soap base grease on the bearing and oil seal lip when installing.
- Use a socket that matches the outside diameter of the race of the bearing.
- Right side of bearing shall be installed first.
- Always use a new oil seal.
- Install the oil seal with its manufacture's marks or numbers facing outward.

CAUTION:

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

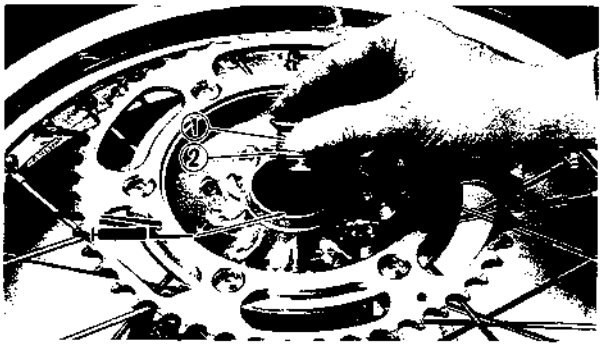


2. Install:
   - Driven sprocket ①

NOTE:

- Apply the molybdenum disulfide grease on the chamfered face of sprocket.
- Tighten the bolts in stage, using a crisscross pattern.

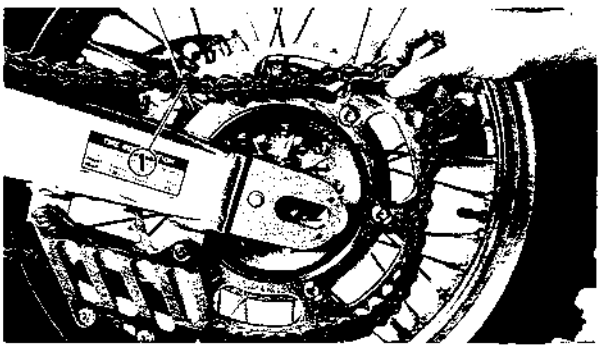
	Bolt (Drive Sprocket): **30 Nm (3.0 m•kg, 22 ft•lb)**



3. Install:
   - Collar ①
   - Dust cover ②

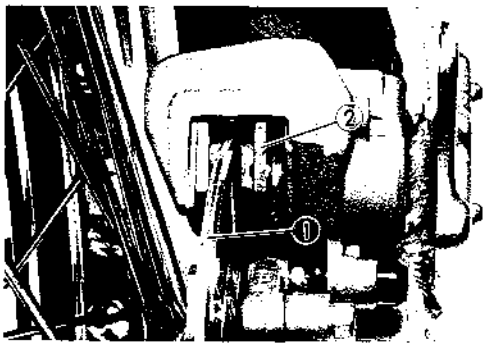
NOTE:

Apply the lithium soap base grease on the oil seal lip.



4. Install:
   - Drive chain ①

   To driven sprocket.

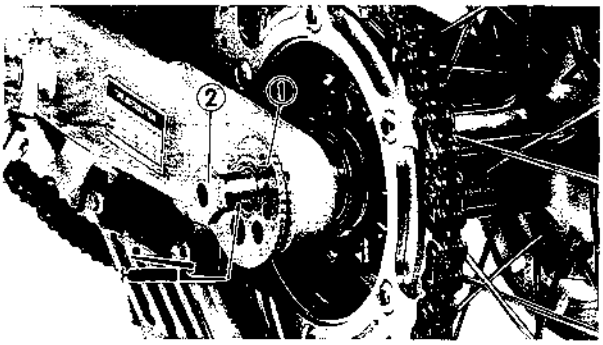


5. Install:
   - Rear wheel

NOTE:

Install the brake disc ① between the brake pads ② correctly.

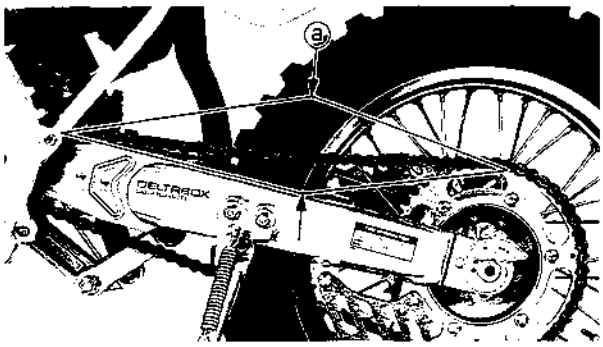
5



6. Install:
   - Chain puller ①
   - Rear wheel axle ②

NOTE:

Install the chain pullers (left and right), and insert the wheel axle from left side.

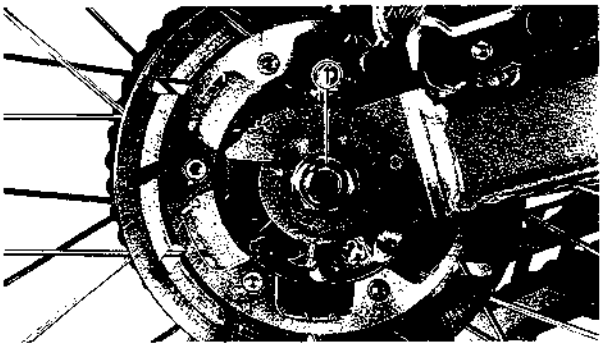


7. Adjust:
   - Drive chain slack ⓐ

Drive Chain Slack:
30 ~ 60 mm (1.2 ~ 2.4 in)

NOTE:

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



8. Install:
   - Nut (rear wheel axle) ①

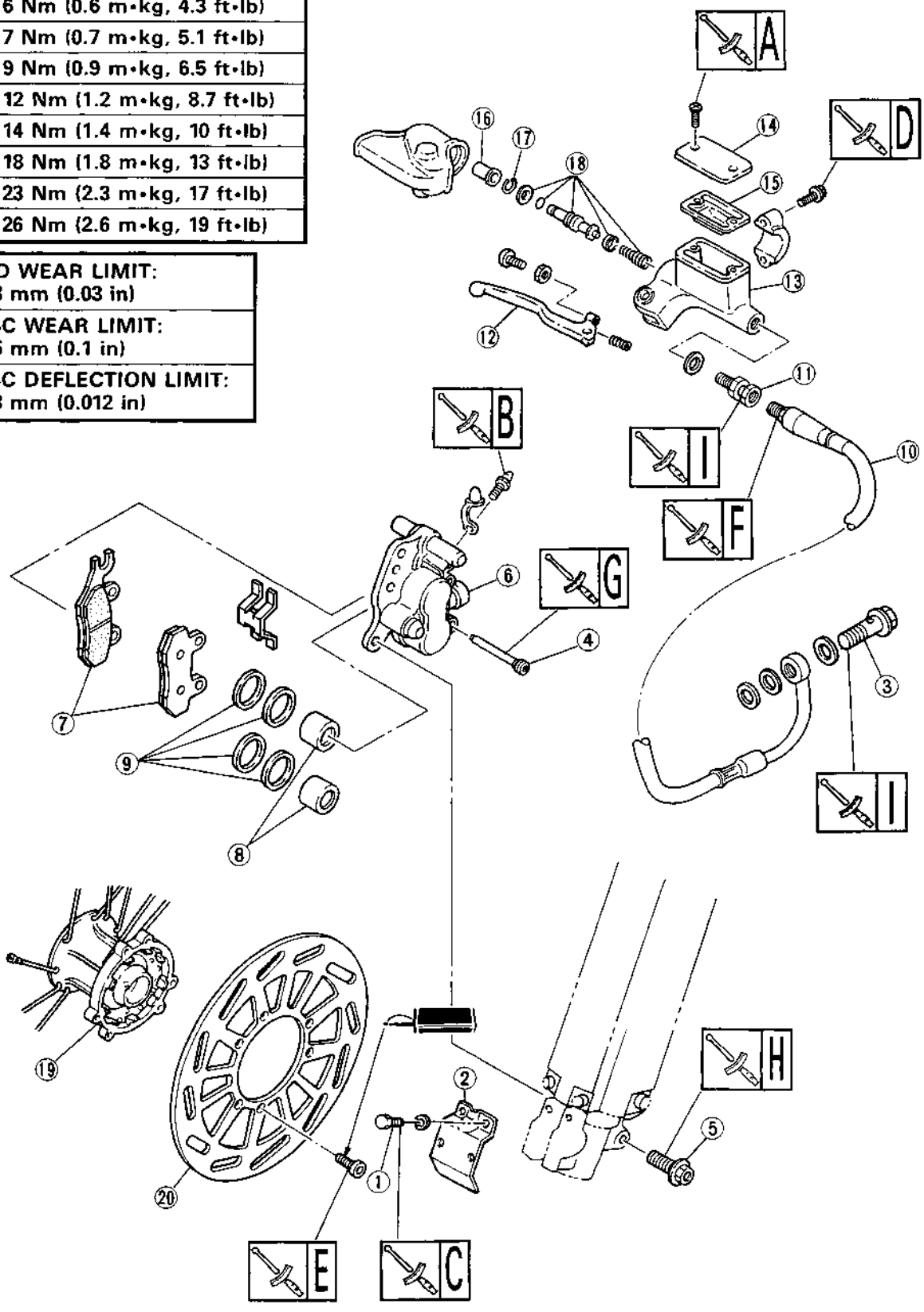
Nut (Rear Wheel Axle):
115 Nm (11.5 m•kg, 85 ft•lb)

5

FRONT BRAKE

A	2 Nm (0.2 m•kg, 1.4 ft•lb)
B	6 Nm (0.6 m•kg, 4.3 ft•lb)
C	7 Nm (0.7 m•kg, 5.1 ft•lb)
D	9 Nm (0.9 m•kg, 6.5 ft•lb)
E	12 Nm (1.2 m•kg, 8.7 ft•lb)
F	14 Nm (1.4 m•kg, 10 ft•lb)
G	18 Nm (1.8 m•kg, 13 ft•lb)
H	23 Nm (2.3 m•kg, 17 ft•lb)
I	26 Nm (2.6 m•kg, 19 ft•lb)

PAD WEAR LIMIT: 0.8 mm (0.03 in)
DISC WEAR LIMIT: 2.5 mm (0.1 in)
DISC DEFLECTION LIMIT: 0.3 mm (0.012 in)

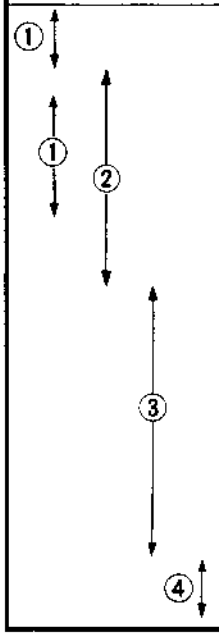


5

CAUTION:

Disc brake components rarely require disassembly. DO NOT:
- **Disassemble components unless absolutely necessary.**
- **Use solvents on internal brake component.**
- **Use contaminated brake fluid for cleaning.**
- **Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.**
- **Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.**
- **Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

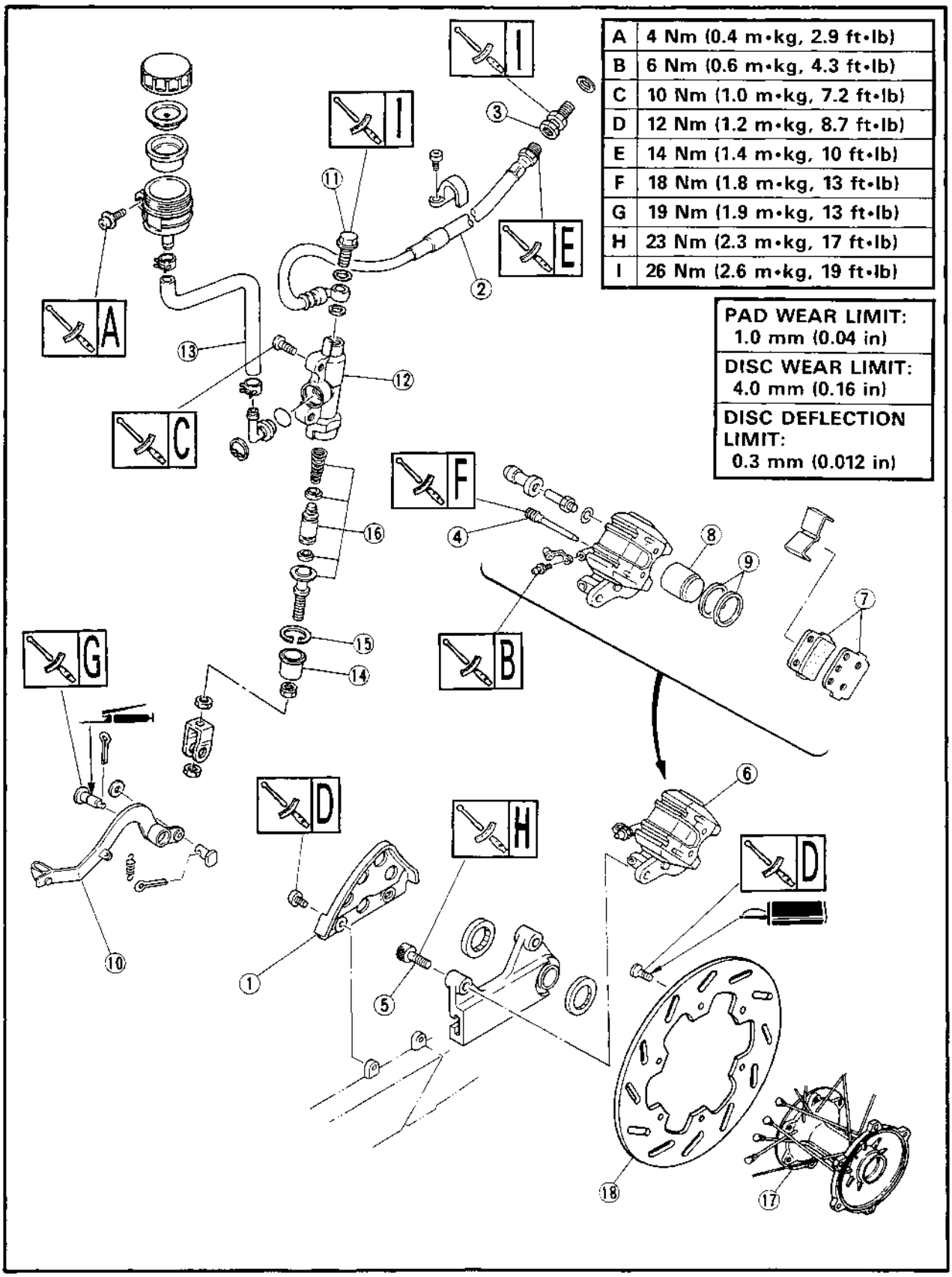
Extent of removal: ① Brake pads removal ② Caliper removal and disassembly ③ Master cylinder removal and disassembly ④ Brake disc removal



Order	Part name	Q'ty	Remarks
1	Bolt (hose cover)	4	
2	Hose cover	1	
3	Union bolt	1	Drain the brake fluid.
4	Pad pin	2	Refer to "REMOVAL POINTS".
5	Bolt (caliper)	2	
6	Caliper	1	
7	Brake pad	2	
8	Caliper piston	2	Refer to "REMOVAL POINTS".
9	Piston seal	4	
10	Brake hose	1	Drain the brake fluid.
11	Joint bolt	1	
12	Brake lever	1	
13	Master cylinder	1	
14	Reservoir tank cap	1	
15	Diaphragm	1	
16	Master cylinder boot	1	
17	Circlip	1	Refer to "REMOVAL POINTS".
18	Master cylinder kit	1	
19	Front wheel	1	Refer to "FRONT WHEEL" section.
20	Brake disc	1	

5

REAR BRAKE

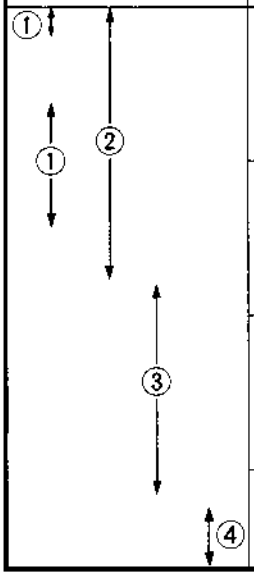

A 4 Nm (0.4 m•kg, 2.9 ft•lb)
B 6 Nm (0.6 m•kg, 4.3 ft•lb)
C 10 Nm (1.0 m•kg, 7.2 ft•lb)
D 12 Nm (1.2 m•kg, 8.7 ft•lb)
E 14 Nm (1.4 m•kg, 10 ft•lb)
F 18 Nm (1.8 m•kg, 13 ft•lb)
G 19 Nm (1.9 m•kg, 13 ft•lb)
H 23 Nm (2.3 m•kg, 17 ft•lb)
I 26 Nm (2.6 m•kg, 19 ft•lb)
PAD WEAR LIMIT: 1.0 mm (0.04 in)
DISC WEAR LIMIT: 4.0 mm (0.16 in)
DISC DEFLECTION LIMIT: 0.3 mm (0.012 in)

5

CAUTION:

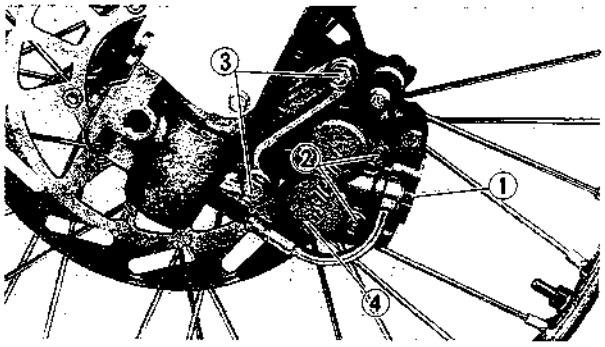
Disc brake components rarely require disassembly. DO NOT:
- **Disassemble components unless absolutely necessary.**
- **Use solvents on internal brake component.**
- **Use contaminated brake fluid for cleaning.**
- **Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.**
- **Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.**
- **Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

Extent of removal: ① Brake pads removal ② Caliper removal and disassembly
③ Master cylinder removal and disassembly ④ Brake disc removal



Order	Part name	Q'ty	Remarks
1	Protector	1	
2	Brake hose	1	Drain the brake fluid.
3	Joint bolt	1	
4	Pad pin	2	Refer to "REMOVAL POINTS".
5	Bolt (caliper)	2	
6	Caliper	1	
7	Brake pad	2	
8	Caliper piston	2	
9	Piston seal	2	Refer to "REMOVAL POINTS".
10	Brake pedal	1	
11	Union bolt	1	Drain the brake fluid.
12	Master cylinder	1	
13	Reservoir hose	1	
14	Master cylinder boot	1	
15	Circlip	1	Refer to "REMOVAL POINTS".
16	Master cylinder kit.	1	
17	Rear wheel	1	Refer to "REAR WHEEL" section.
18	Brake disc	1	

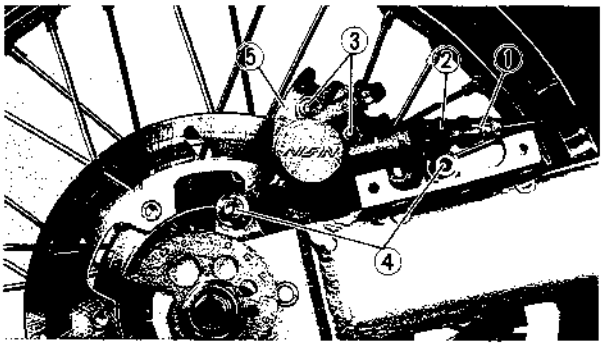
5



REMOVAL POINTS

FRONT CALIPER

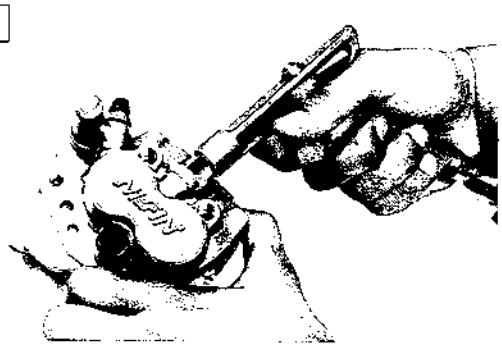
1. Remove:
   - Union bolt ①
   - Pad pin ②
   - Bolt (caliper) ③
   - Caliper ④



REAR CALIPER

1. Remove:
   - Brake hose ①
   - Joint bolt ②
   - Pad pin ③
   - Bolt (caliper) ④
   - Caliper ⑤

FRONT



CALIPER PISTON

1. Remove:
   - Caliper piston

   Use compressed air and proceed carefully.

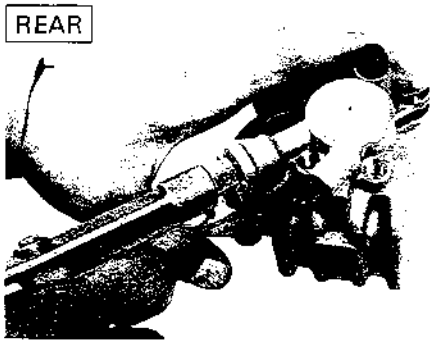
⚠ WARNING

- **Cover piston with rag and use extreme caution when expelling piston from cylinder.**
- **Never attempt to pry out piston.**

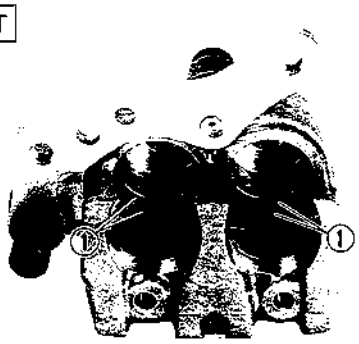
Caliper piston removal steps:

- Insert a piece of rag into the caliper to lock one caliper.
- Carefully force the piston out of the caliper cylinder with compressed air.

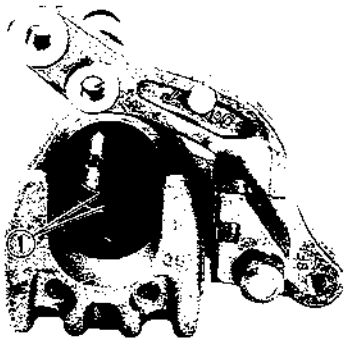
REAR



FRONT



REAR



PISTON SEAL KIT

1. Remove:
   - Piston seal ①

NOTE:

Remove the piston seal by pushing it with a finger.

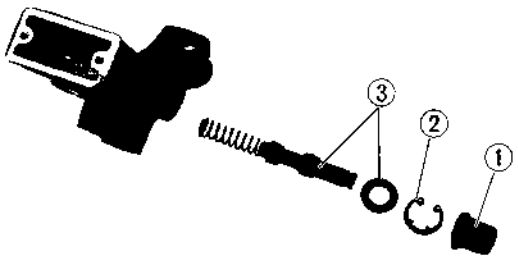
CAUTION:

Never attempt to pry out piston seals.

⚠ WARNING

Replace the piston seals whenever a caliper is disassembled.

FRONT

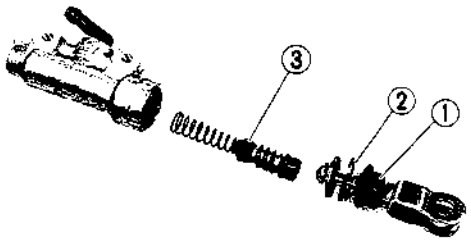


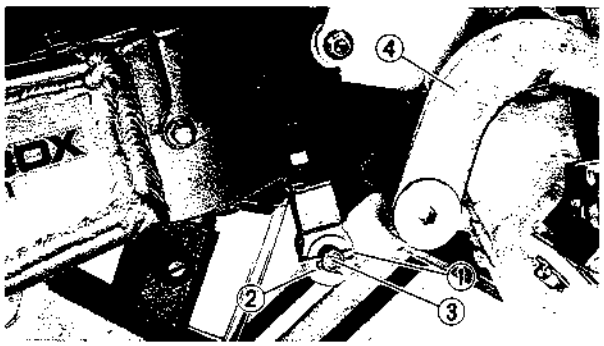
MASTER CYLINDER KIT

1. Remove:
   - Master cylinder boot ①
   - Circlip ②
   - Master cylinder kit ③

   Use a long nose circlip plier.

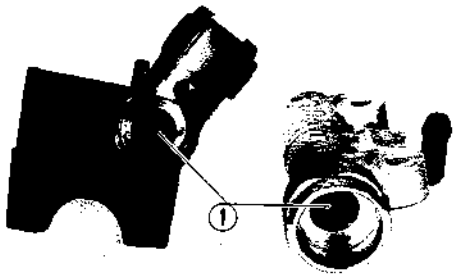
REAR





BRAKE PEDAL

1. Remove:
   - Cotter pin (Brake pedal mounting bolt)
   - Cotter pin ①
   - Plain washer ②
   - Pin ③
   - Brake pedal ④



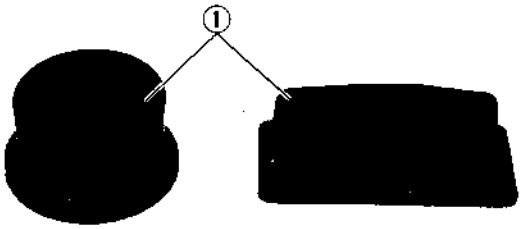
INSPECTION

MASTER CYLINDER

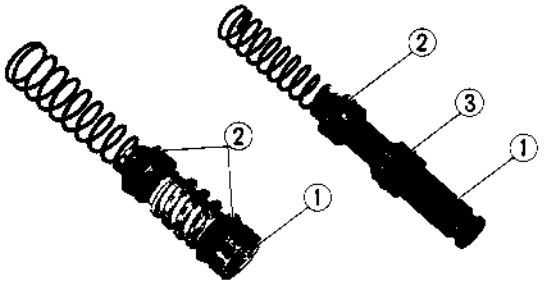
1. Inspect:
   - Master cylinder body ①
     Wear/Scratches → Replace master cylinder assembly.
     Stains → Clean.

NOTE:

Use new brake fluid.



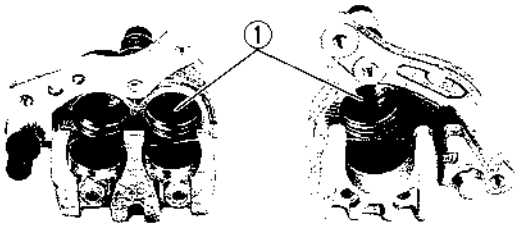
2. Inspect:
   - Diaphragm ①
     Crack/Damage → Replace.



3. Inspect:
   - Master cylinder piston ①
   - Master cylinder cup ②
   - O-ring ③
     Wear/Damage/Score marks → Replace master cylinder kit.

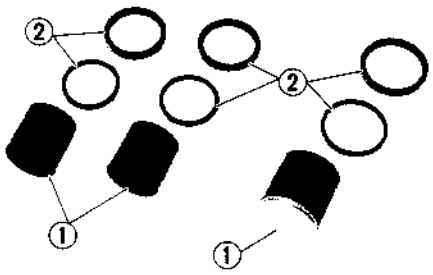
NOTE:

Replace master cylinder piston and cup as a set.



CALIPER

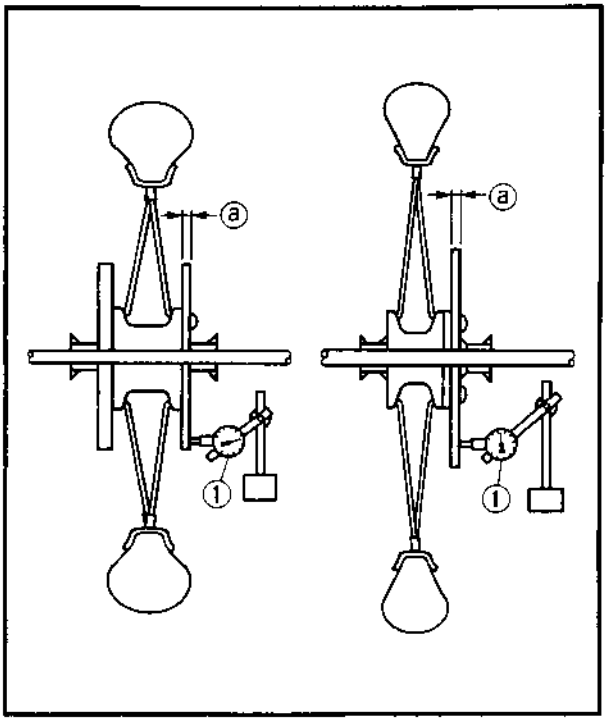
1. Inspect:
   - Caliper cylinder ①
     Wear/Score marks → Replace caliper assembly.



2. Inspect:
   • Caliper piston ①
   Wear/Score marks → Replace caliper assembly.

⚠ WARNING

Replace the piston seals ② whenever a caliper is disassembled.



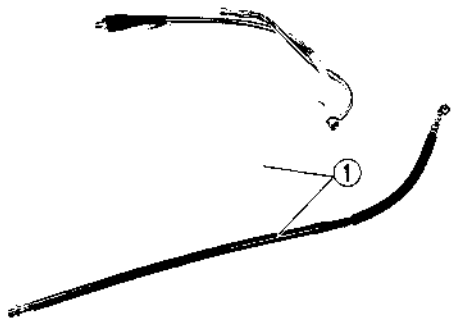
BRAKE DISC

1. Measure:
   • Brake disc deflection
   Use Dial Gauge ①.
   Out of specification → Inspect wheel runout.
   If wheel runout is in good condition, replace.

Maximum Deflection:
0.3 mm (0.01 in)

   • Brake disc thickness ⓐ
   Out of limit → Replace.

Disc Wear Limit
Front:
2.5 mm (0.10 in)
Rear:
4.0 mm (0.16 in)



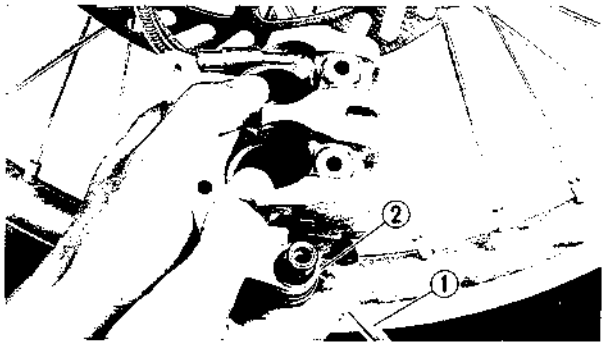
BRAKE HOSE

1. Inspect:
   • Brake hose ①
   Crack/Damage → Replace.

FRONT BRAKE ASSEMBLY AND INSTALLATION

⚠ WARNING

- **All internal parts should be cleaned in new brake fluid only.**
- **Internal parts should be lubricated with brake fluid when installed.**
- **Replace the piston seal and dust seal whenever a caliper is disassembled.**

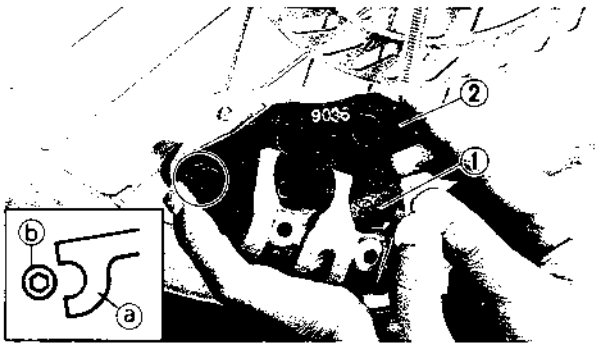


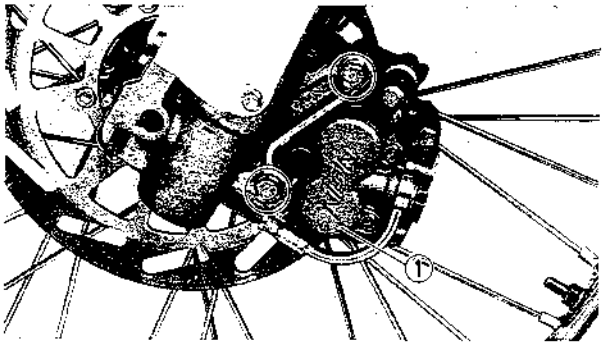
BRAKE PAD

1. Connect the transparent hose ① to the bleed screw ② and place the suitable container under its end.
2. Loosen the bleed screw and push the caliper piston in.

CAUTION:

Do not reuse the drained brake fluid.





3. Install:
   - Brake pad 1 ①
   - Brake pad 2 ②

NOTE:

Fit the brake pad receptacle ⓐ on the brake pad 2 around the projection ⓑ on the caliper.

4. Install:
   - Pad pin

	Pad Pin: 18 Nm (1.8 m•kg, 13 ft•lb)

5. Install:
   - Caliper ①

	Bolt (caliper): 23 Nm (2.3 m•kg, 17 ft•lb)

CALIPER PISTON

1. Clean:
   - Caliper
   - Piston seal
   - Caliper piston

   Clean them with brake fluid.

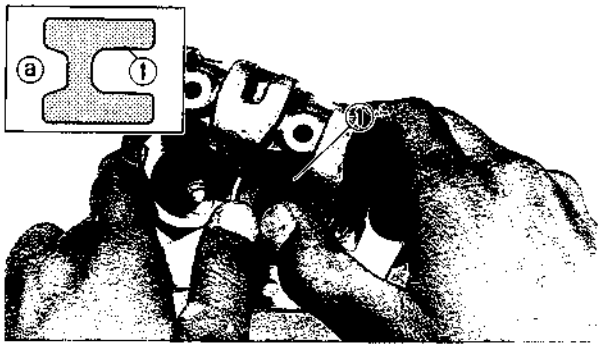
2. Install:
   - Piston seal ①

NOTE:

Fit the piston seal onto the slot on caliper correctly.

⚠ WARNING

Replace the piston seals whenever a caliper is disassembled.



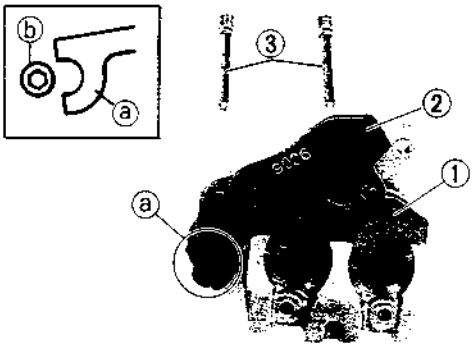
3. Install:
   - Caliper piston ①

NOTE:

Apply the brake fluid on the piston wall.

CAUTION:

- **Be sure that the shallow depressed side ⓐ face the caliper side.**
- **Never force to insert.**



CALIPER

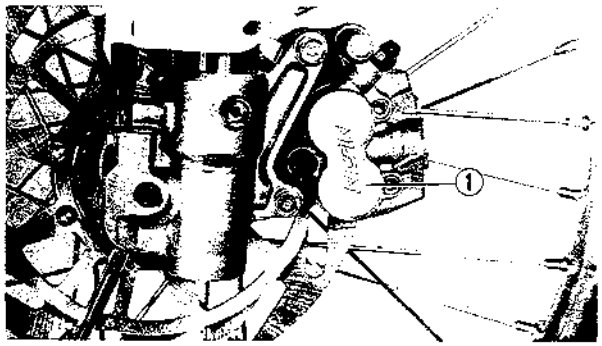
1. Install:
   - Brake pad 1 ①
   - Brake pad 2 ②
   - Pad pin ③

NOTE:

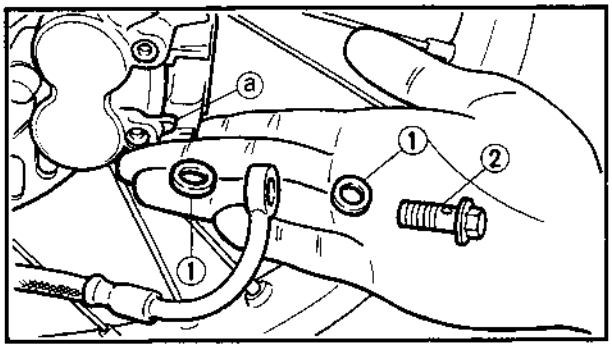
Fit the brake pad receptacle ⓐ on the brake pad 2 around the projection ⓑ on the caliper.

	Pad Pin: **18 Nm (1.8 m•kg, 13 ft•lb)**

2. Install:
   - Caliper ①



	Bolt (caliper): **23 Nm (2.3 m•kg, 17 ft•lb)**



3. Install:
   - Copper washer ①
   - Union bolt ②

	Union Bolt: 26 Nm (2.6 m•kg, 19 ft•lb)

NOTE:

Always use a new copper washer.

CAUTION:

When installing the brake hose to the caliper, lightly touch the brake pipe with the projection ⓐ on the caliper.

4. Air bleed:
   - Brake system

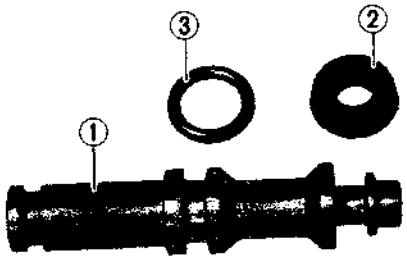
   Refer to CHAPTER 3. — "BRAKE SYSTEM AIR BLEEDING" section.

MASTER CYLINDER KIT

1. Clean:
   - Master cylinder
   - Master cylinder kit

   Clean them with brake fluid.

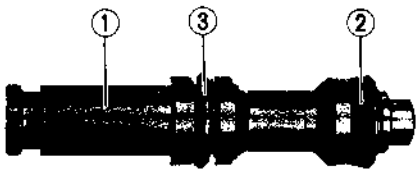
5



2. Install:
   - Master cylinder piston ①
   - Master cylinder cup ②
   - O-ring ③

NOTE:

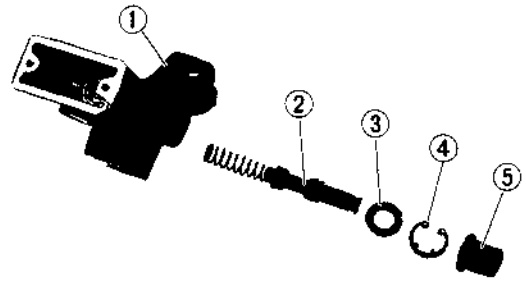
- Apply the brake fluid on the master cylinder cup and O-ring.
- After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.



3. Install:
   - Spring ①
   - Master cylinder piston ②

NOTE:

Install the spring at the smaller dia. side.



4. Install:
   - Master cylinder ①
   - Master cylinder kit ②
   - Plain washer ③
   - Circlip ④
   - Master cylinder boot ⑤

   Use a long nose circlip plier.

NOTE:

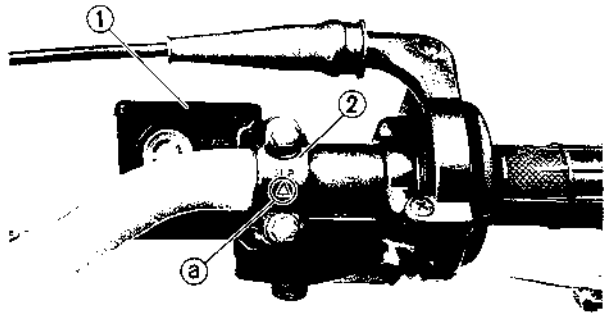
Apply the brake fluid on the master cylinder kit.

MASTER CYLINDER BRACKET

1. Install:
   - Master cylinder ①
   - Master cylinder bracket ②

NOTE:

Install the bracket so that the arrow mark ⓐ face upward.

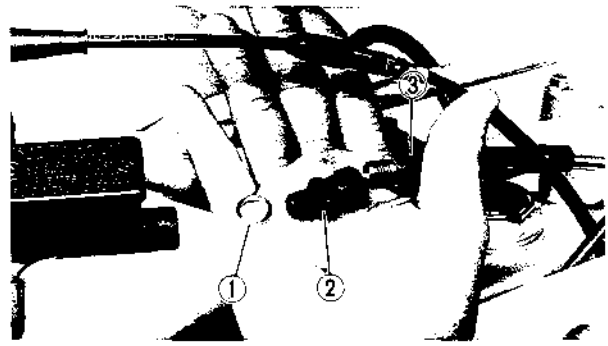


	Bolt (Master Cylinder Bracket): 9 Nm (0.9 m•kg, 6.5 ft•lb)

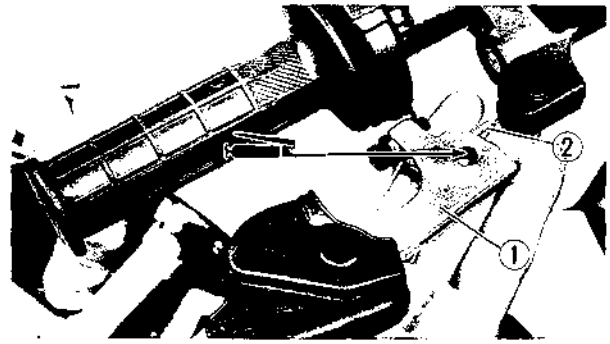
2. Install:
   - Copper washer ①
   - Joint bolt ②
   - Brake hose ③

NOTE:

Always use a new copper washer.



	Joint Bolt: 26 Nm (2.6 m•kg, 19 ft•lb) **Brake Hose: 14 Nm (1.4 m•kg, 10 ft•lb)**

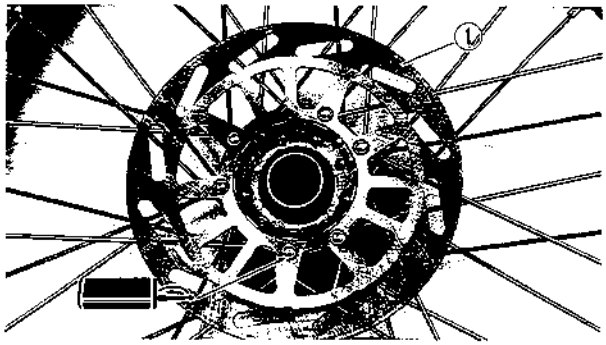


3. Install:
   - Brake lever ①
   - Spring ②

NOTE:

Apply the lithium soap base grease on the sliding surface.

5



BRAKE DISC

1. Install:
   - Brake disc ①

NOTE:

- Tighten the bolts in stage, using a crisscross pattern.
- Apply the LOCTITE® on the bolt's thread.

	Bolt (brake disc): **12 Nm (1.2 m•kg, 8.7 ft•lb)**

BRAKE FLUID

1. Fill:
   - Brake fluid

	Recommended Brake Fluid: **DOT #4**

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 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 vapor lock.**

5

2. Air bleed:
   •Brake system
   Refer to CHAPTER 3. — "BRAKE SYSTEM AIR BLEEDING" section.

REAR BRAKE ASSEMBLY AND INSTALLATION

⚠ WARNING

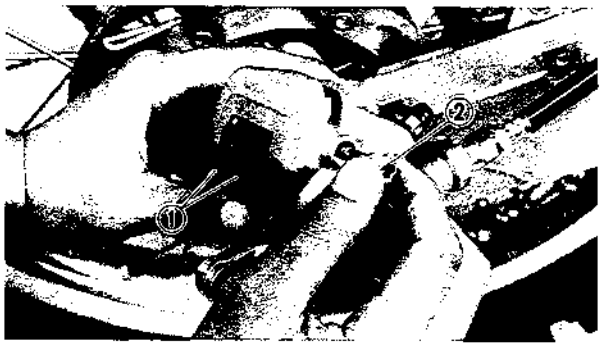
•All internal parts should be cleaned in new brake fluid only.
•Internal parts should be lubricated with brake fluid when installed.
•Replace the piston seal and dust seal whenever a caliper is disassembled.

BRAKE PAD

1. Connect the transparent hose ① to the bleed screw ② and place the suitable container under its end.
2. Loosen the bleed screw and push the caliper piston in.

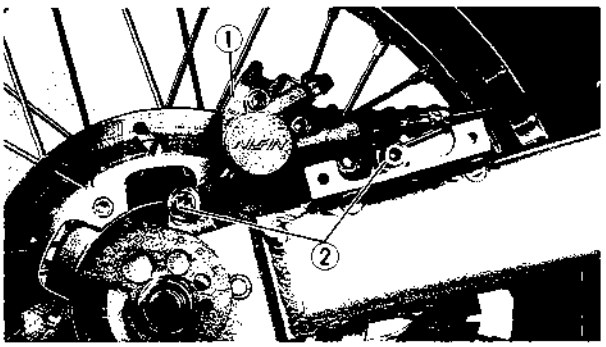
CAUTION:

Do not reuse the drained brake fluid.



3. Install:
   •Brake pad ①
   •Pad pin ②

	Pad Pin: **18 Nm (1.8 m•kg, 13 ft•lb)**



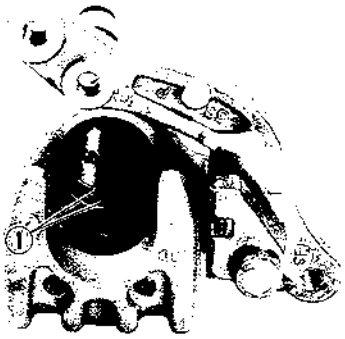
4. Install:
   - Caliper ①
   - Bolt (caliper) ②

	Bolt (Caliper): **23 Nm (2.3 m•kg, 17 ft•lb)**

CALIPER PISTON

1. Clean:
   - Caliper
   - Piston seal
   - Caliper piston

   Clean them with brake fluid.



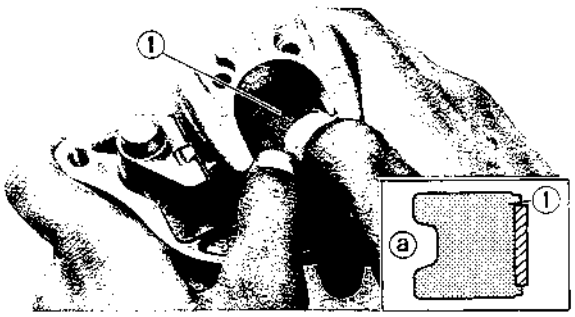
2. Install:
   - Piston seal ①

NOTE:

Fit the piston seal onto the slot on caliper correctly.

⚠ WARNING

Replace the piston seals whenever a caliper is disassembled.



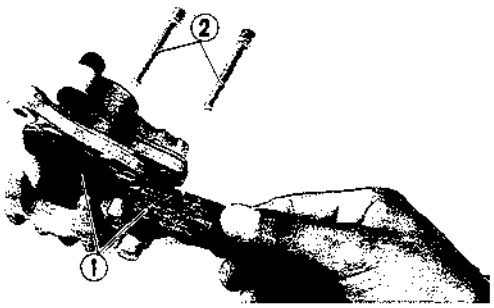
3. Install:
   - Caliper piston ①

NOTE:

Apply the brake fluid on the piston wall.

CAUTION:

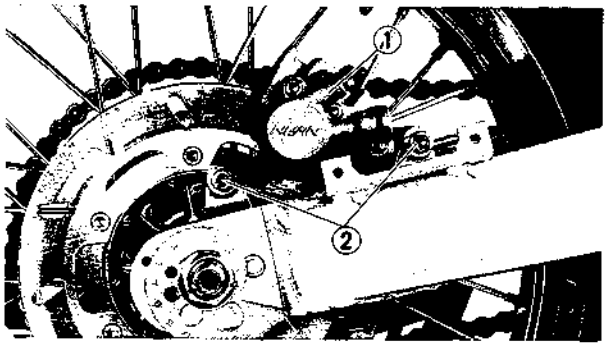
- **Be sure that the depressed side ⓐ face the caliper side.**
- **Never force to insert.**



CALIPER

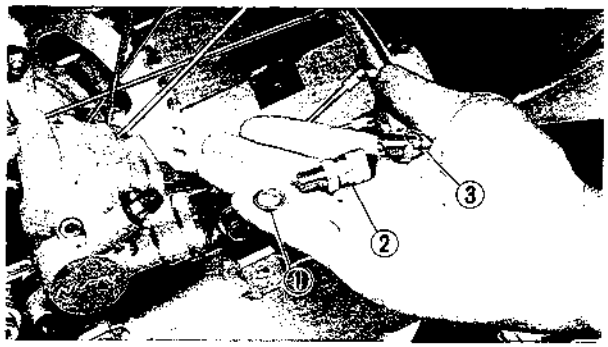
1. Install:
   - Brake pad ①
   - Pad pin ②

	Pad Pin: **18 Nm (1.8 m•kg, 13 ft•lb)**



2. Install:
   - Caliper ①
   - Bolt (caliper) ②

	Bolt (Caliper): **23 Nm (2.3 m•kg, 17 ft•lb)**



3. Install:
   - Copper washer ①
   - Joint bolt ②
   - Brake hose ③

	Joint Bolt: **26 Nm (2.6 m•kg, 19 ft•lb)** **Brake Hose:** **14 Nm (1.4 m•kg, 10 ft•lb)**

NOTE:

Always use a new copper washer.

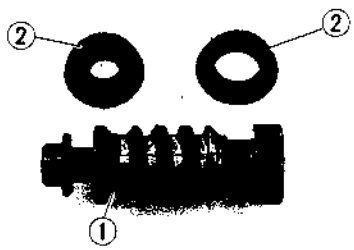
4. Air bleed:
   - Brake system

   Refer to CHAPTER 3. — "BRAKE SYSTEM AIR BLEEDING" section.

MASTER CYLINDER KIT

1. Clean:
   - Master cylinder
   - Master cylinder kit

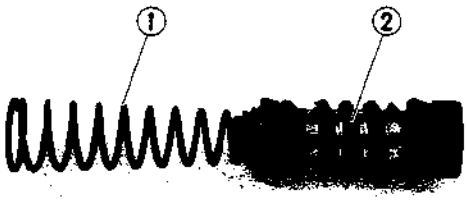
   Clean them with brake fluid.



2. Install:
   - Master cylinder piston ①
   - Master cylinder cup ②

NOTE:

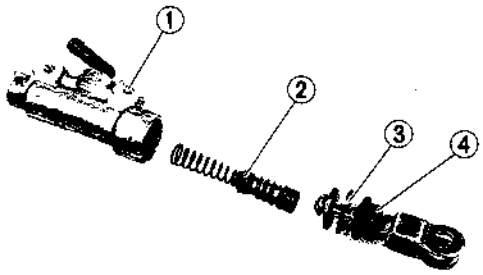
- Apply the brake fluid on the master cylinder cup.
- After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.



3. Install:
   - Spring ①
   - Master cylinder piston ②

NOTE:

Install the spring at the smaller dia. side.

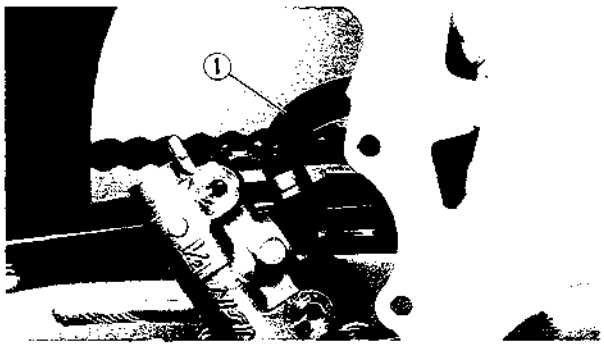


4. Install:
   - Master cylinder ①
   - Master cylinder kit ②
   - Circlip ③
   - Master cylinder boot ④

NOTE:

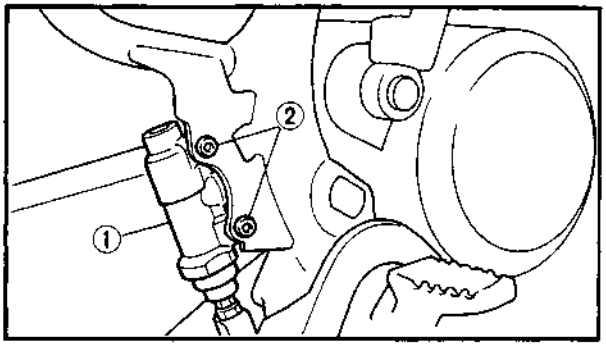
Apply the brake fluid on the master cylinder kit.

5



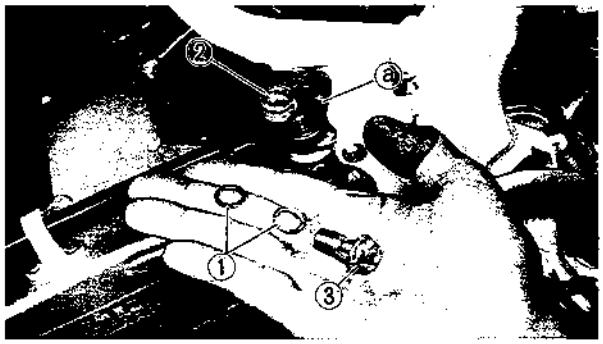
MASTER CYLINDER

1. Install:
   - Reservoir hose ①



2. Install:
   - Master cylinder ①
   - Bolt (master cylinder) ②

	Bolt (Master Cylinder): 10 Nm (1.0 m•kg, 7.2 ft•lb)



3. Install:
   - Copper washer ①
   - Brake hose ②
   - Union bolt ③

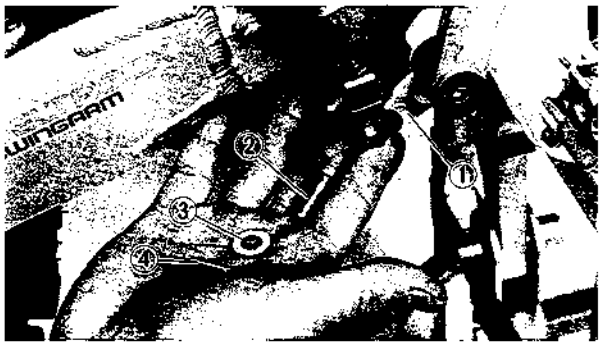
NOTE:

Always use a new copper washer.

CAUTION:

When installing the brake hose to the master cylinder, lightly touch the brake pipe with the projection ⓐ on the master cylinder.

Union Bolt:
26 Nm (2.6 m•kg, 19 ft•lb)



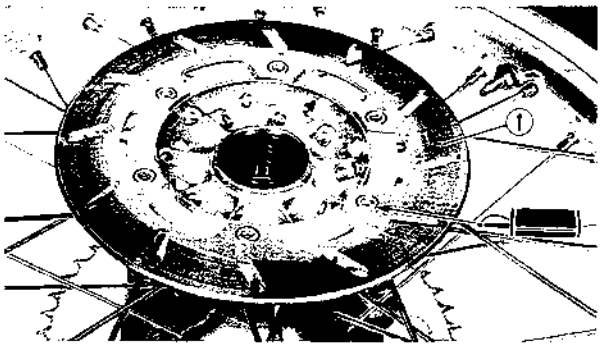
4. Install:
   - Brake pedal ①
   - Cotter pin (Brake pedal mounting bolt)
   - Pin ②
   - Plain washer ③
   - Cotter pin ④

NOTE:

After installing, check the brake pedal height.

⚠ WARNING

Always use new cotter pins.



BRAKE DISC

1. Install:
   - Brake disc ①

NOTE:

- Tighten the bolts in stage, using a crisscross pattern.
- Apply the LOCTITE® on the bolt's thread.

Bolt (Brake Disc):
12 Nm (1.2 m•kg, 8.7 ft•lb)

5

BRAKE FLUID

1. Fill:
   • Brake fluid

Recommended Brake Fluid:
DOT #4

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 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 vapor lock.**

2. Air bleed:
   • Brake system
   Refer to CHAPTER 3. — "BRAKE SYSTEM AIR BLEEDING" section.

5

FRONT FORK

PREPARATION FOR REMOVAL

*Remove the following parts:
- Front wheel
- Caliper
- Handlebar

*Hold the machine by placing the suitable stand under the engine.

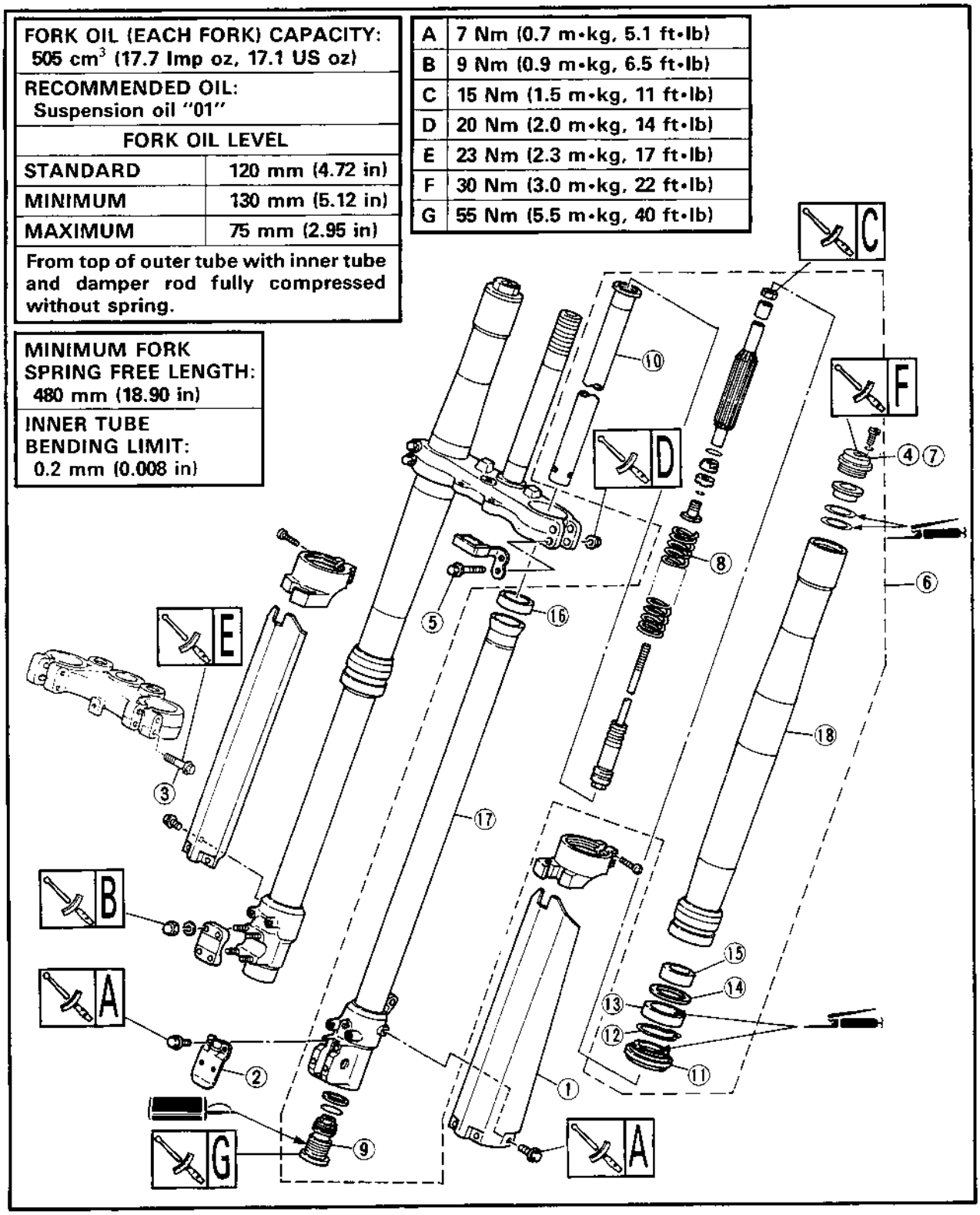
⚠ WARNING

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

FORK OIL (EACH FORK) CAPACITY: 505 cm³ (17.7 Imp oz, 17.1 US oz)	
RECOMMENDED OIL: Suspension oil "01"	
FORK OIL LEVEL	
STANDARD	120 mm (4.72 in)
MINIMUM	130 mm (5.12 in)
MAXIMUM	75 mm (2.95 in)
From top of outer tube with inner tube and damper rod fully compressed without spring.	

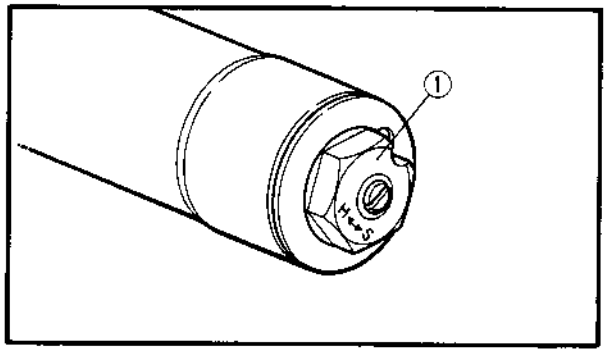
MINIMUM FORK SPRING FREE LENGTH: 480 mm (18.90 in)
INNER TUBE BENDING LIMIT: 0.2 mm (0.008 in)

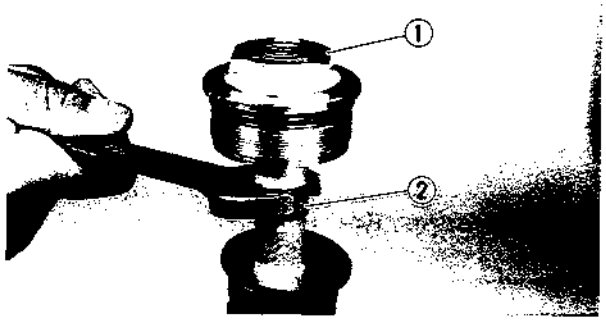
A	7 Nm (0.7 m•kg, 5.1 ft•lb)
B	9 Nm (0.9 m•kg, 6.5 ft•lb)
C	15 Nm (1.5 m•kg, 11 ft•lb)
D	20 Nm (2.0 m•kg, 14 ft•lb)
E	23 Nm (2.3 m•kg, 17 ft•lb)
F	30 Nm (3.0 m•kg, 22 ft•lb)
G	55 Nm (5.5 m•kg, 40 ft•lb)



Extent of removal: ① Front fork removal ② Front fork disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Protector	1	
	2	Hose cover	1	
	3	Pinch bolt (handle crown)	2	Only loosening
	4	Cap bolt	1	Only loosening
①	5	Pinch bolt (under bracket)	2	Only loosening
②	6	Front fork	1	
	7	Cap bolt	1	Refer to "REMOVAL POINTS".
	8	Fork spring	1	Drain the fork oil.
	9	Base valve	1	Use special tool.
				Refer to "REMOVAL POINTS".
	10	Damper rod	1	
	11	Dust seal	1	
	12	Stopper ring	1	Refer to "REMOVAL POINTS".
	13	Oil seal	1	Refer to "REMOVAL POINTS".
	14	Plain washer	1	
	15	Slide metal	1	
	16	Piston metal	1	
	17	Inner tube	1	
	18	Outer tube	1	





REMOVAL POINTS

CAP BOLT

1. Remove:
   - Cap bolt ①

   From the outer tube.

NOTE:

Before removing the front fork from the machine, loosen the cap bolt ①.

2. Remove:
   - Cap bolt ①

   Hold the nut ② (damper rod).

5

HANDLING NOTE

NOTE:

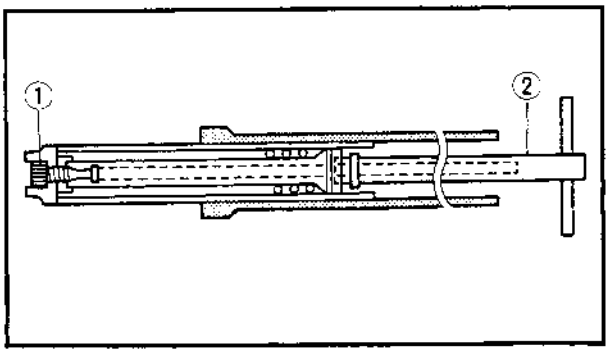
The front fork requires careful attention. So it is recommended that the front fork be maintained at the dealers.

CAUTION:

To prevent an accidental explosion of air, the following instructions should be observed:

- **The front fork with a built-in piston rod has a very sophisticated internal construction and is particularly sensitive to foreign material.**
  Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.
- **Before removing the cap bolts or front forks, be sure to extract the air from the air chamber completely.**

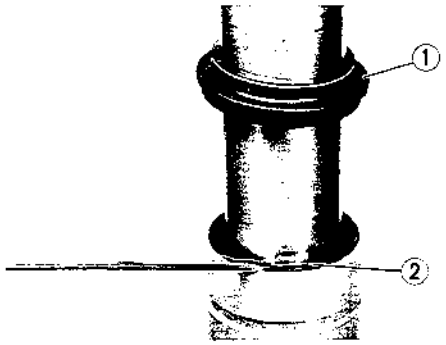
5



BASE VALVE

1. Remove:
   - Base valve ①
     Use a Damper Rod Holder ② to lock the rod assembly.

	Damper Rod Holder: **YM-1423/90890-01423**

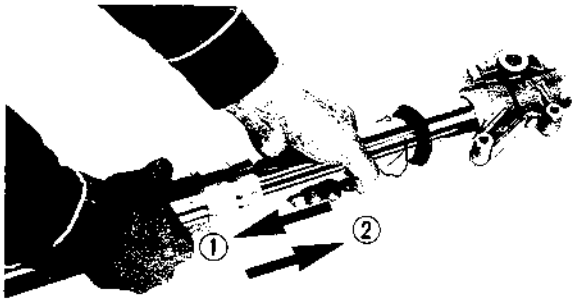


OIL SEAL

1. Remove:
   - Dust seal ①
   - Stopper ring ②
     Using slotted-head screwdriver.

CAUTION:

Take care not to scratch the inner tube.

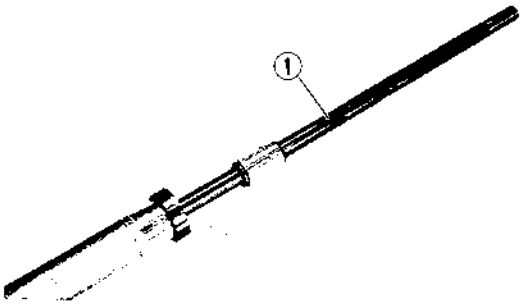


2. Remove:
   •Oil seal

Oil seal removal steps:
- Push in slowly ① the inner tube just before it bottoms out and then pull it back quickly ②.
- Repeat this step until the inner tube can be pulled out from the outer tube.

CAUTION:

Don't bottom out the inner tube in the above step, or the oil lock piece will be damaged.



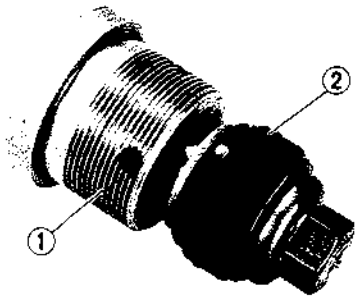
INSPECTION

DAMPER ROD

1. Inspect:
   •Damper rod ①
   Bend/Damage→Replace rod assembly.

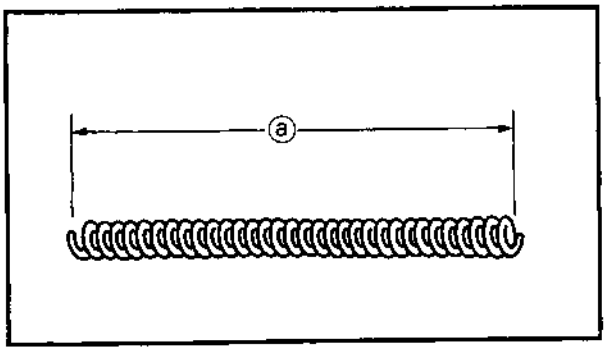
CAUTION:

The front fork with a built-in damper rod has a very sophisticated internal construction and is particularly sensitive to foreign material.
Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.



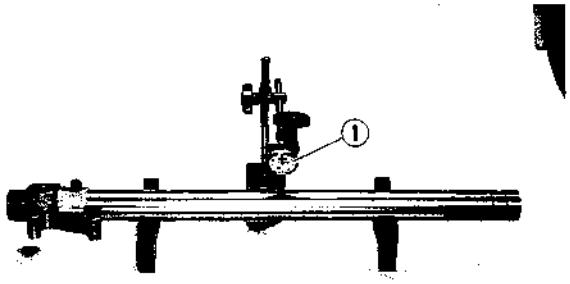
BASE VALVE

1. Inspect:
   •Valve assembly ①
   Wear/Damage→Replace.
   •O-ring ②
   Damage→Replace.



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

Fork Spring Free Length:	
Standard	Limit
480 mm (18.90 in)	475 mm (18.70 in)



INNER TUBE

1. Inspect:
   •Inner tube surface
   Score marks→Repair or replace.
   Use #1,000 grit wet sandpaper.
   Damaged oil lock piece→Replace.
   •Inner tube bends
   Out of specification→Replace.
   Use Dial Gauge ①.

Inner Tube Bending Limit: 0.2 mm (0.008 in)

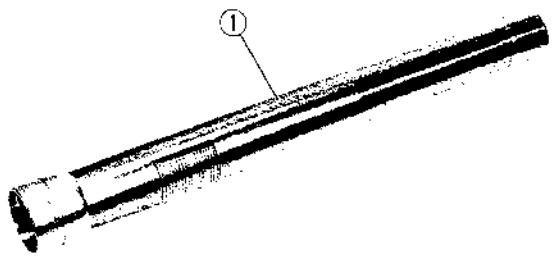
NOTE:

The bending value is shown by one half of the Dial Gauge reading.

⚠ WARNING

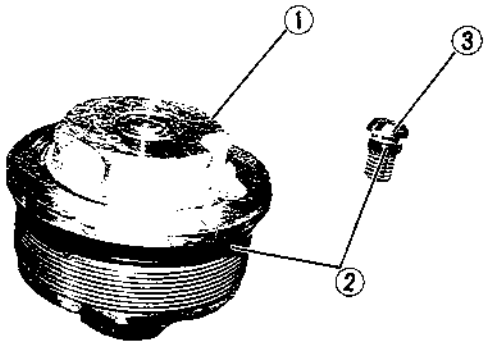
Do not attempt to straighten a bent inner tube as this may dangerously weaken the tube.

5



OUTER TUBE

1. Inspect:
   •Outer tube ①
   Score marks/Wear/Damage→Replace.



CAP BOLT

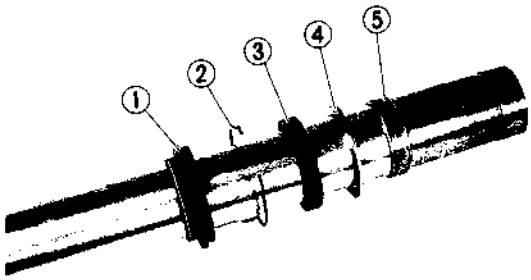
1. Inspect:
   - Cap bolt ①
   - O-ring ②
   - Air bleed screw ③

   Wear/Damage → Replace.

ASSEMBLY AND INSTALLATION

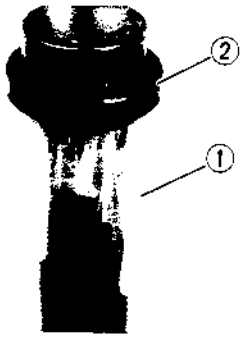
FRONT FORK ASSEMBLY

1. Wash the all parts in a clean solvent.
2. Install:
   - Dust seal ①
   - Stopper ring ②
   - Oil seal ③
   - Plain washer ④
   - Slide metal ⑤



NOTE:

- Apply the fork oil on the inner tube.
- When installing the oil seal ②, use vinyl seat ① with fork oil applied to protect the oil seal lip.
- Install the oil seal with its manufacture's marks or number facing the axle holder side.



CAUTION:

Always use a new oil seal and slide metal.

5

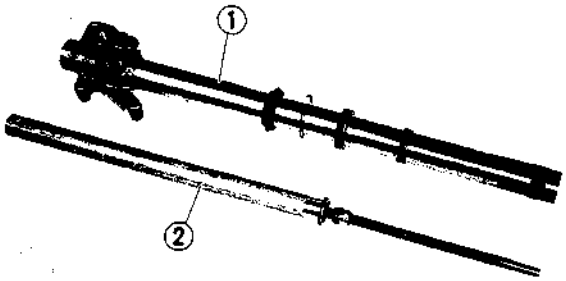
3. Install:
   - Piston metal ①

NOTE:

Install the piston metal onto the slot on inner tube.

CAUTION:

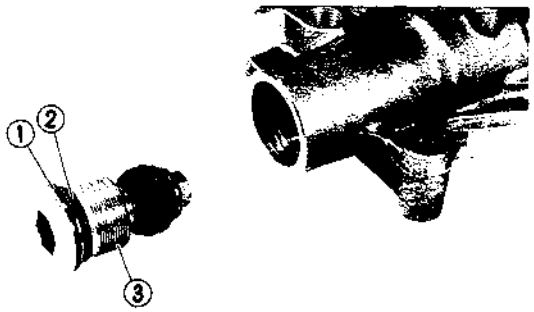
Always use a new piston metal.



4. Install:
   - Inner tube ①
   - Damper rod ②

CAUTION:

To install the damper rod into the inner tube, hold the inner tube aslant. If the inner tube is held vertically, the damper rod may fall into it, damaging the valve inside.

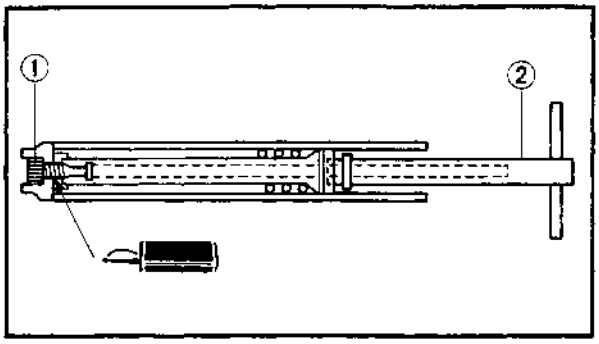


5. Install:
   - Copper washer ①
   - O-ring ②
   - Base valve ③

   To inner tube.

NOTE:

Always use a new copper washer.



6. Tighten:
   - Base valve ①

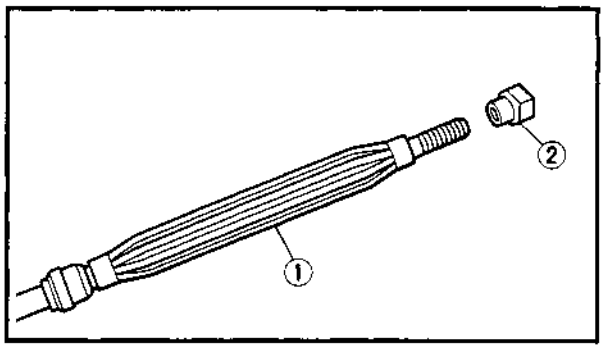
   Use Damper Rod Holder ② to lock the rod assembly.

	Damper Rod Holder: **YM-1423/90890-01423**

	Base Valve: **55 Nm (5.5 m•kg, 40 ft•lb)** **LOCTITE®**

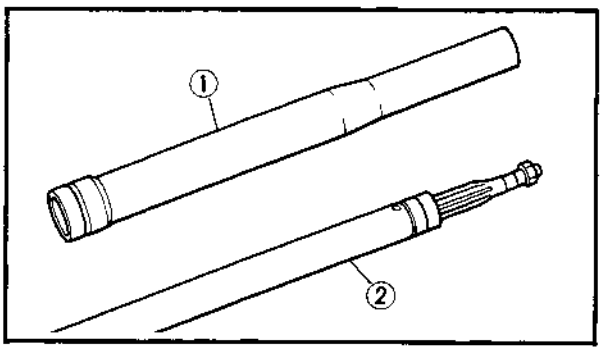
NOTE:

Apply the LOCTITE® onto the base valve thread.

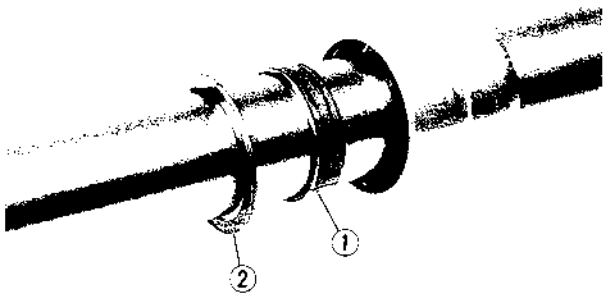


7. Install:
   - Spring guide ①
   - Nut ②

   To damper rod.

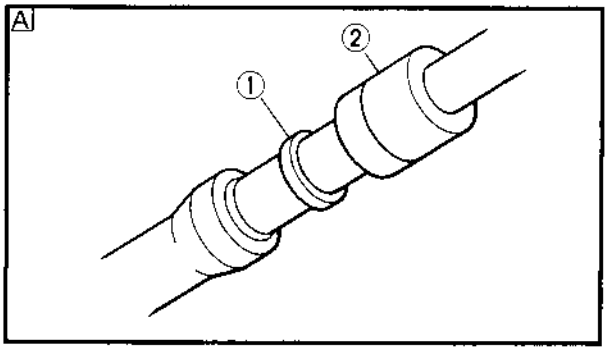


8. Install:
   - Outer tube ①
   - Inner tube ②



9. Install:
   - Slide metal ①
   - Plain washer ②

   To outer tube slot.

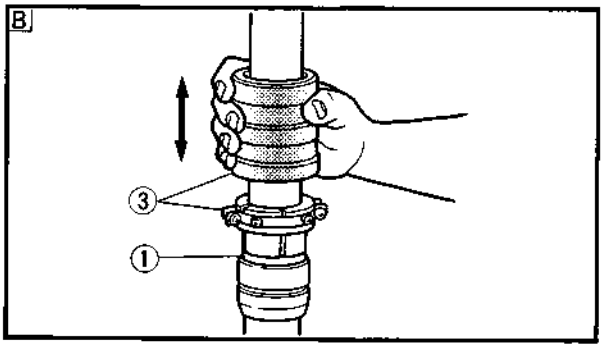


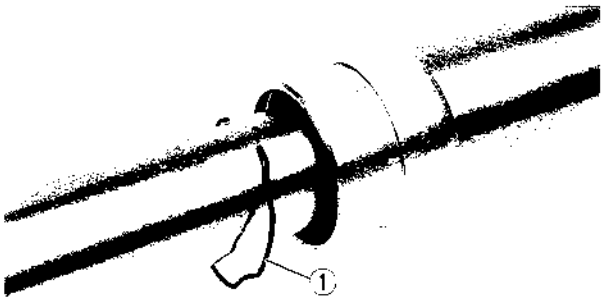
10. Install:
    - Oil seal ①

    Press the oil seal into the outer tube with Fork Seal Driver ②, ③.

Fork Seal Driver:	
YM-1424	②
90890-01442	③

A For USA
B Except for USA

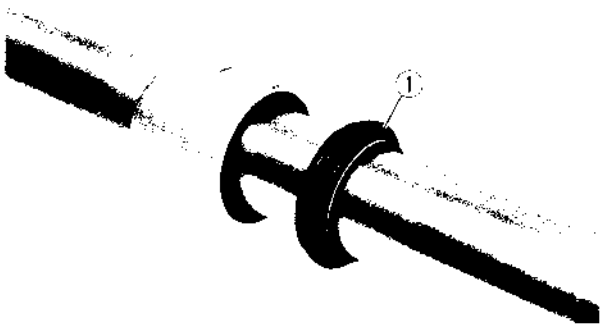




11. Install:
    - Stopper ring ①

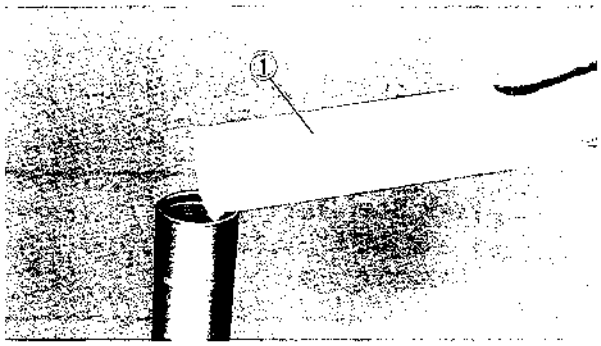
NOTE:

Fit the stopper ring correctly in the groove in the outer tube.



12. Install:
    - Dust seal ①

13. Check:
    - Inner tube smooth movement
      Tighteness/Binding/Rough spots→
      Repeat the steps 2 to 12.



14. Compress the front fork fully.

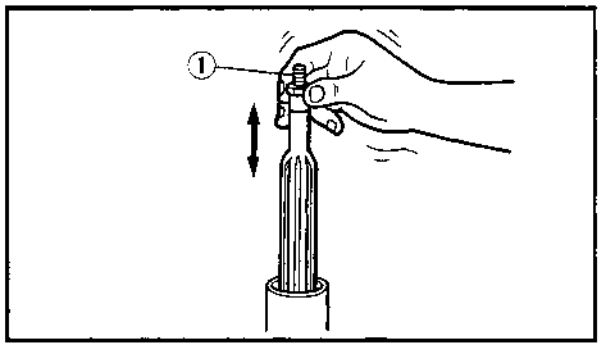
15. Fill:
    - Front fork oil
      Until outer tube top surface with recommended fork oil ①.

Recommended Oil:
Suspension Oil "01"

CAUTION:

- **Be sure to use recommended fork oil. If other oils are used, they may have an excessively adverse effect on the front fork performance.**
- **NEVER allow foreign materials to enter the front fork.**

5

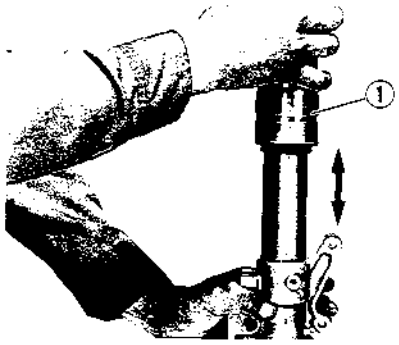


16. After filling, pump the damper rod ① slowly up and down more than 10 times to distribute the fork oil.

NOTE:

Be sure to pump the damper rod slowly because the fork oil will spurt out from its end.

17. Fill:
    - Front fork oil
      Until outer tube top surface with recommended fork oil once more.



18. After filling, pump the outer tube ① slowly up and down (about 200 mm (7.9 in) stroke) to distribute the fork oil once more.

NOTE:

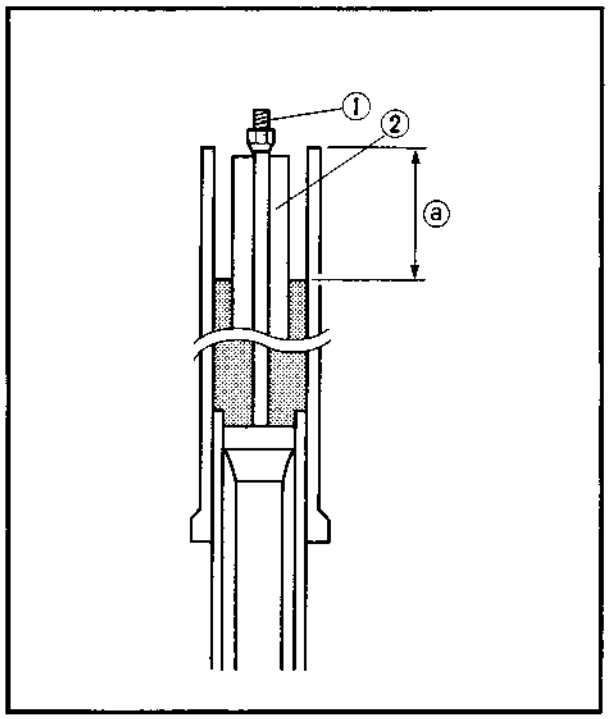
Be careful not to excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps 15 to 18.

19. Wait ten minutes until the air bubbles have been removed from the front fork, and the oil has dispense evenly in system before setting recommended oil level.

NOTE:

Fill with the fork oil up to the top end of the outer tube, or the fork oil will not spread over to every part of the front forks, thus making it impossible to obtain the correct level.
Be sure to fill with the fork oil up to the top of the outer tube and bleed the front forks.

20. Measure:
    - Oil level (left and right) ⓐ
      Out of specification→Adjust.



Fork Oil Level:	
Standard	120 mm (4.72 in)
Minimum	130 mm (5.12 in)
Maximum	75 mm (2.95 in)
From top of outer tube with inner tube and damper rod ① fully compressed without spring.	

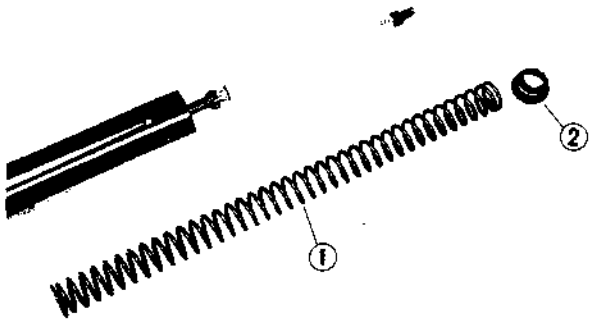
NOTE:

Be sure to install the spring guide ② when checking the oil level.

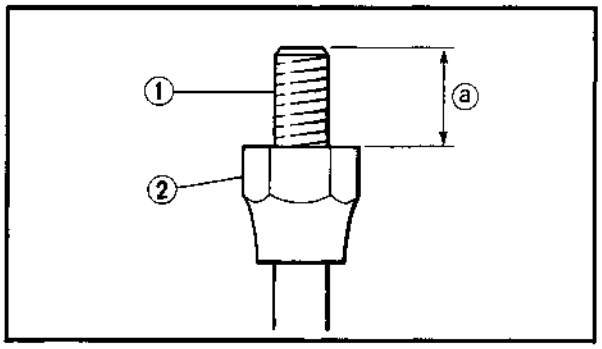
⚠ WARNING

Never fail to make the oil level adjustment between the maximum and minimum level and always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

5



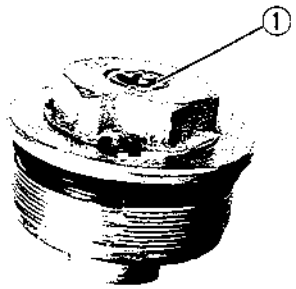
21. Install:
- Fork spring ①
- Spring guide ②



22. Measure:
- Distance ⓐ

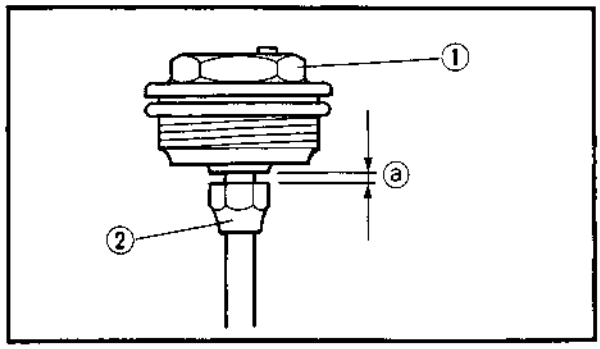
Out of specification → Turn into the locknut.

Distance ⓐ:
18 mm (0.71 in) or more
Between damper rod top ① and locknut top ②.



23. Loosen:
- Rebound damping adjuster ①

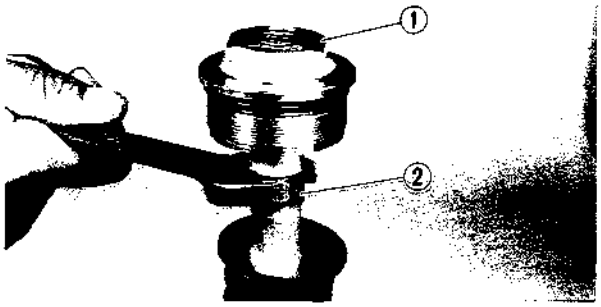
NOTE:
- Loosen the rebound damping adjuster finger tight.
- Record the set position of the adjuster (the amount of turning out the fully turned in position).



24. Install:
- Cap bolt ①

Fully tighten the cap bolt onto the damper rod by hand.

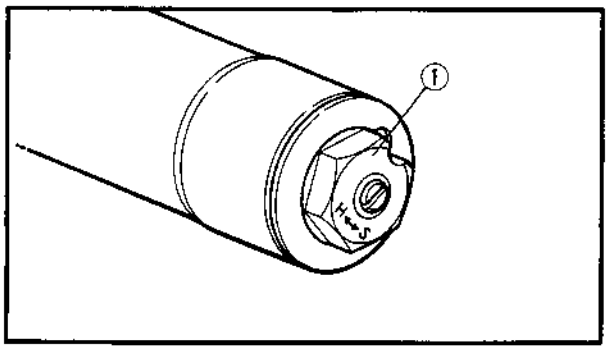
NOTE:
Make sure that there is a clearance ⓐ of Zero ~ 1 mm (Zero ~ 0.04 in) between the cap bolt and locknut ②.



25. Tighten:
- Locknut

NOTE:
Hold the cap bolt ① and tighten the locknut ② with specified torque.

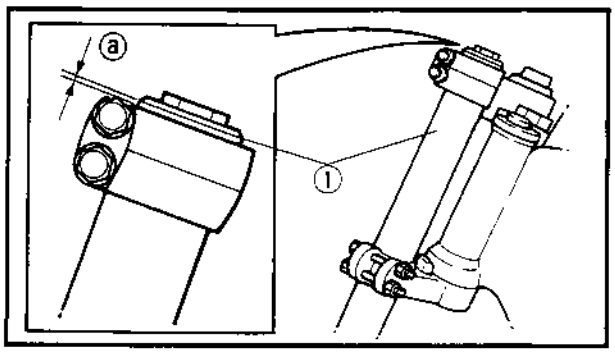
Locknut:
15 Nm (1.5 m•kg, 11 ft•lb)



26. Install:
    - Cap bolt ①

      To outer tube.

      Temporarily tighten the cap bolt.



INSTALLATION

1. Install:
    - Front fork ①

      Temporarily tighten the pinch bolts (lower).
2. Tighten:
    - Cap bolt

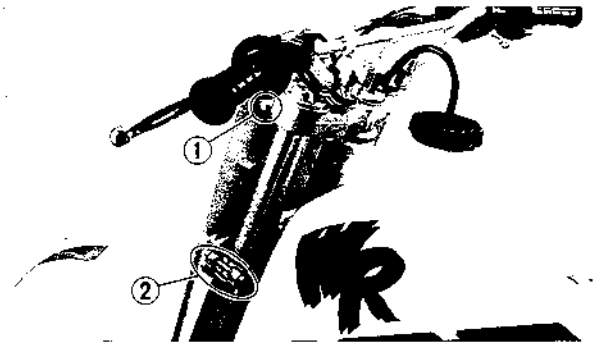
	Cap Bolt: **30 Nm (3.0 m•kg, 22 ft•lb)**

NOTE:

Do not tighten the pinch bolt (upper) yet.

3. Adjust:
    - Front fork top end ⓐ

	Front Fork Top End (Standard) ⓐ: **Zero mm (Zero in)**



4. Tighten:
    - Pinch bolt (handle crown) ①
    - Pinch bolt (under bracket) ②

	Pinch Bolt (Handle Crown): **23 Nm (2.3 m•kg, 17 ft•lb)** **Pinch Bolt (Under Bracket)** **20 Nm (2.0 m•kg, 14 ft•lb)**

CAUTION:

Tighten the under bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.

5. Adjust:
    - Rebound damping adjuster
    - Compression damping adjuster

NOTE:

Turn in the damping adjuster finger-tight and then turn out to the originally set position.

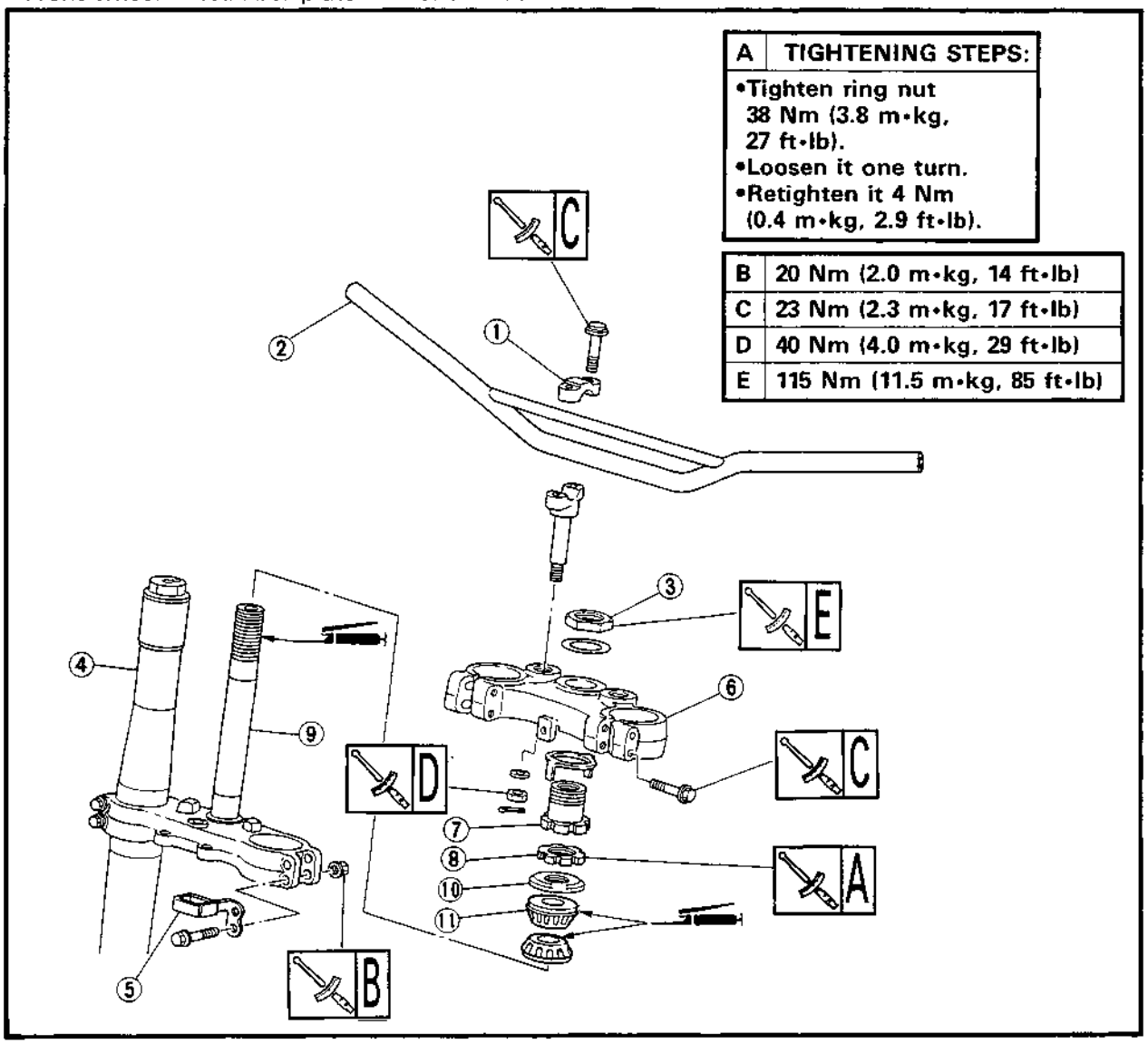
STEERING

PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand under the engine.
* Remove the following parts:
  •Front wheel •Number plate •Front fender

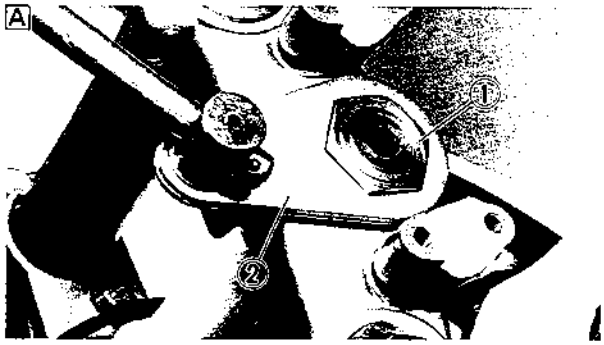
⚠ WARNING

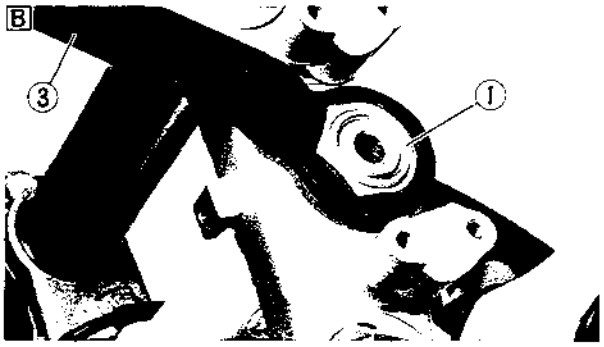
Support the machine securely so there is no danger of it falling over.



Extent of removal: ① Handlebar removal ② Under bracket removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Handlebar holder (upper)	2	
	2	Handlebar	1	
	3	Steering shaft nut	1	Use special tool. Refer to "REMOVAL POINTS".
	4	Front fork	2	Refer to "FRONT FORK" section.
	5	Guide	1	
②	6	Handle crown	1	Refer to "REMOVAL POINTS".
	7	Ring nut (upper)	1	
	8	Ring nut (lower)	1	
	9	Steering Shaft	1	
	10	Ball race cover 2	1	
	11	Bearing	1	





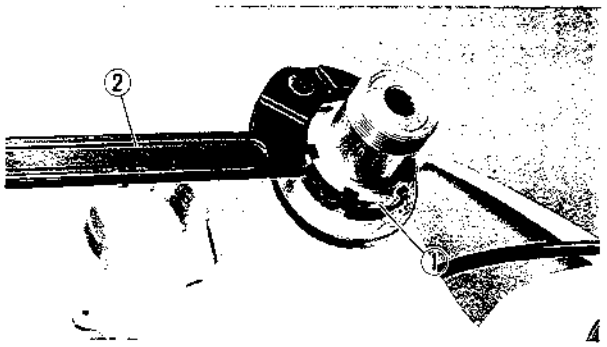
REMOVAL POINTS

STEERING SHAFT NUT

1. Remove:
   •Steering shaft nut ①
   Use the Locknut Wrench ②, ③

	Locknut Wrench: **YM-38519** ..... ② **90890-01348** ..... ③

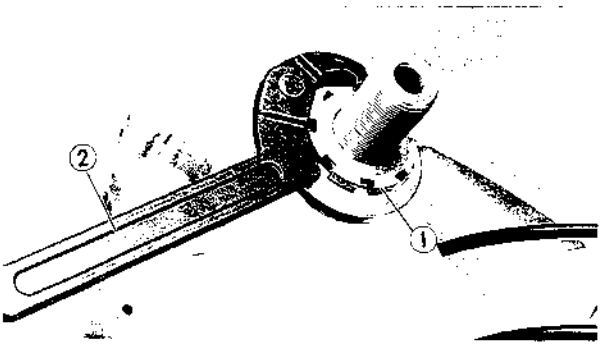
A For USA
B Except for USA



RING NUT

1. Remove:
   •Ring nut (upper) ①
   Use the Ring Nut Wrench ②.

	Ring Nut Wrench: **YU-01268/90890-01268**

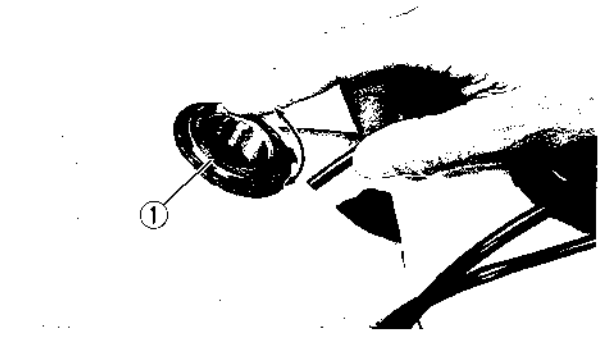


2. Remove:
   •Ring nut (lower) ①
   Use the Ring Nut Wrench ②.

	Ring Nut Wrench: **YU-01268/90890-01268**

⚠ WARNING

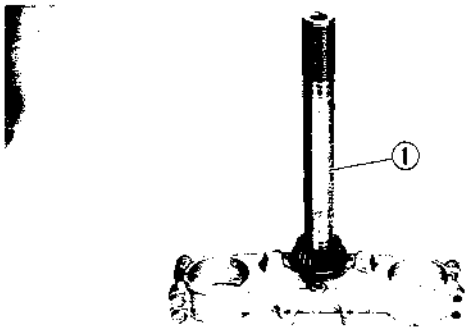
Support the steering shaft so that is may not fall down.



INSPECTION

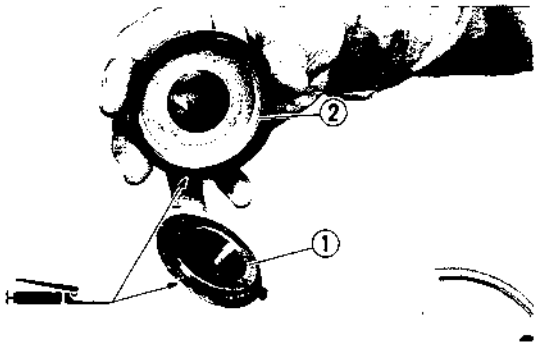
BEARING

1. Wash the bearings in solvent.
2. Inspect:
   •Bearing (upper and lower) ①
   Pitting/Damage→Replace races and bearing.
   Install the bearing in the races. Spin the bearings by hand. If the bearings hang up or are not smooth in their operation in the races, replace bearings and races.



STEERING SHAFT

1. Inspect:
   - Steering shaft ①
     Bend/Damage→Replace.



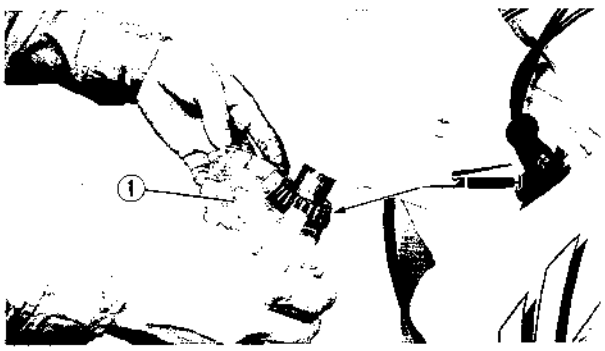
ASSEMBLY AND INSTALLATION

UNDER BRACKET

1. Install:
   - Bearing ①
   - Ball race cover 2 ②

NOTE:

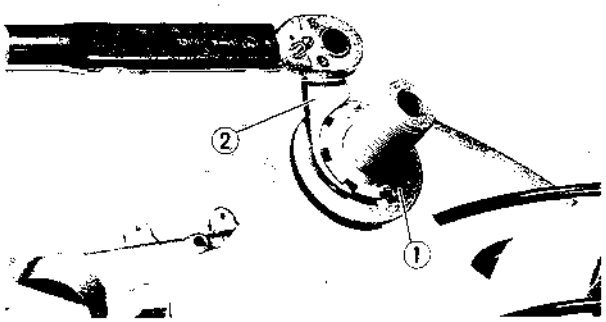
Apply the lithium soap base grease on the bearing and ball race cover lip.



2. Install:
   - Under bracket ①

NOTE:

Apply the lithium soap base grease on the bearing.

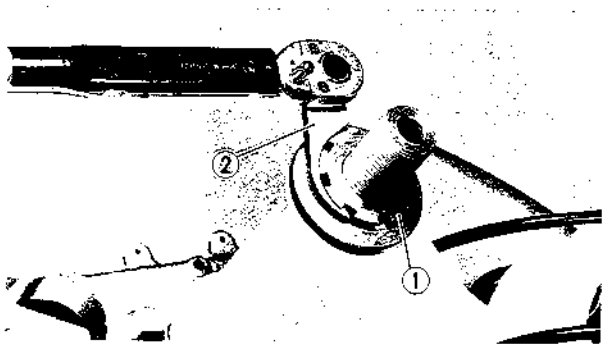


3. Install:
   - Ring nut (lower) ①
     Use the Ring Nut Wrench ②.

	Ring Nut Wrench: **YM-33975/90890-01403**

NOTE:

Apply the lithium soap base grease on the steering shaft thread.



Ring nut tightening steps:

NOTE:

Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.

- Tighten the ring nut using the Ring Nut Wrench ②.

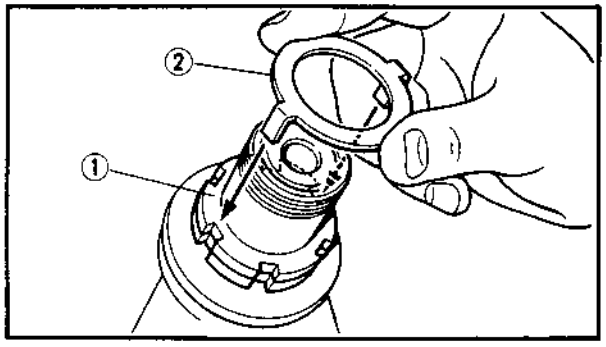
Ring Nut (Lower) (Initial Tightening):
38 Nm (3.8 m•kg, 27 ft•lb)

- Loosen the ring nut ① completely and retighten it to specification.

⚠ WARNING

Do not over-tightening.

Ring Nut (Lower) (Final Tightening):
4 Nm (0.4 m•kg, 2.9 ft•lb)



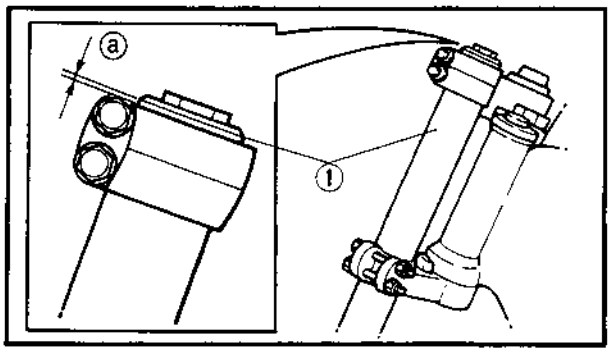
4. Check the steering shaft by turning it lock to lock. If there is any binding, remove the steering shaft assembly and inspect the steering bearings.
5. Install:
   - Ring nut (upper) ①
   - Lock washer ②

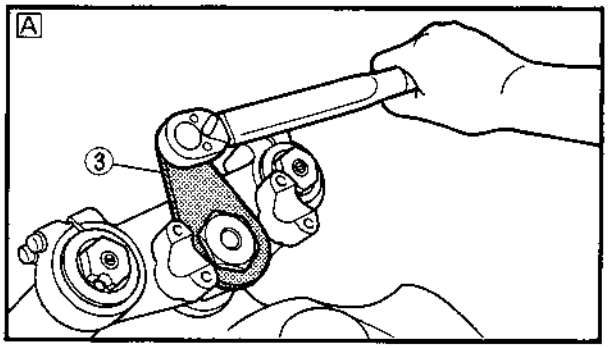
Installation steps:

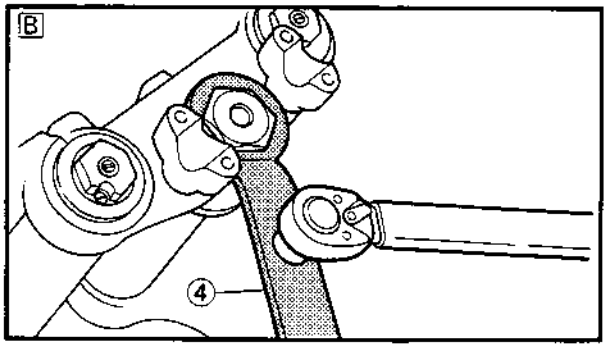
- Install the ring nut (upper) ①.
- Finger tighten the ring nut (upper), then align the slots of both ring nuts. If not aligned, hold the ring nut (lower) and tighten the other until they are aligned.
- Install the lock washer ②.

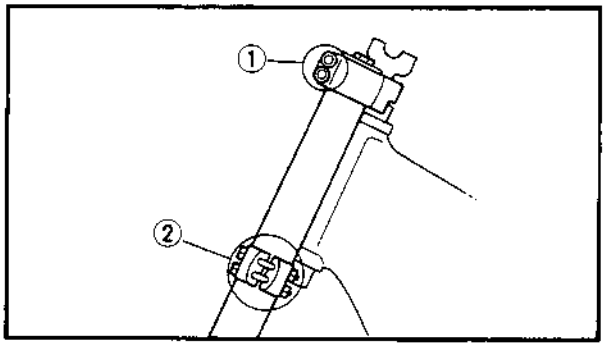
NOTE:

Make sure the lock washer tab is placed in the slots.









6. Install:
   - Handlle crown
   - Front fork (left and right) ①

	Front Fork Top End (Standard) ⓐ: Zero mm (Zero in)

NOTE:

Temporarily install at the lower pinch bolt end to keep at position.

7. Install:
   - Plain washer ①
   - Steering shaft nut ②

   Use the Locknut Wrench ③, ④.

	Locknut Wrench: **YM-38519 ..... ③** **90890-01348 ..... ④**

A For USA
B Except for USA

NOTE:

Set the Torque Wrench to the Locknut Wrench so that they form a right angle.

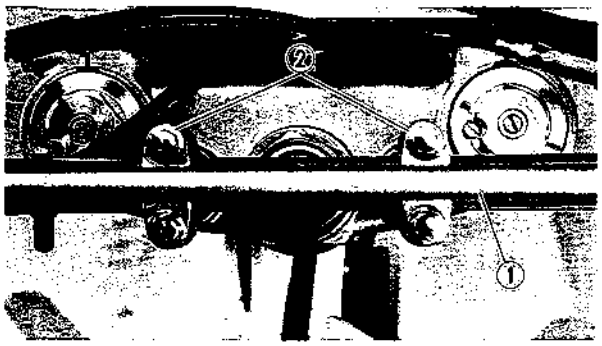
	Steering Shaft Nut: 115 Nm (11.5 m•kg, 85 ft•lb)

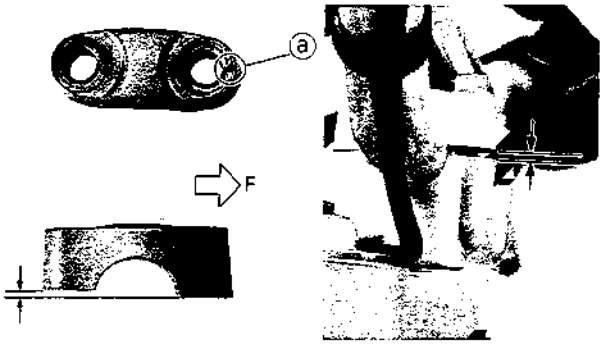
8. After tightening the nut, check the steering for smooth movement. If not, adjust the steering by loosening the ring nut (lower) little by little.
9. Tighten:
   - Pinch bolt (handle crown) ①
   - Pinch bolt (under bracket) ②

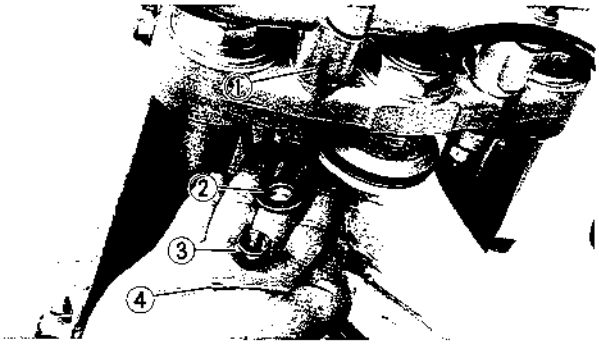
	Pinch Bolt (Handle Crown): 23 Nm (2.3 m•kg, 17 ft•lb) **Pinch Bolt (Under Bracket): 20 Nm (2.0 m•kg, 14 ft•lb)**

CAUTION:

Tighten the under bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.







10. Install:
    - Handlebar ①
    - Handlebar holder ②

	Bolt (Handlebar Holder): 23 Nm (2.3 m•kg, 17 ft•lb)

NOTE:

- The upper handlebar holder should be installed with the punched mark ⓐ forward.
- Insert the end of the fuel breather hose into the hole of the steering shaft.

CAUTION:

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

HANDLEBER LOWER HOLDER

1. Install:
    - Handlebar lower holder ①
    - Plain washer ②
    - Nut ③
    - Cotter pin ④

	Nut (Handlebar Lower Holder): 40 Nm (4.0 m•kg, 29 ft•lb)

⚠ WARNING

Always use a new cotter pin.

5

SWINGARM

PREPARATION FOR REMOVAL

*Hold the machine by placing the suitable stand under the engine.

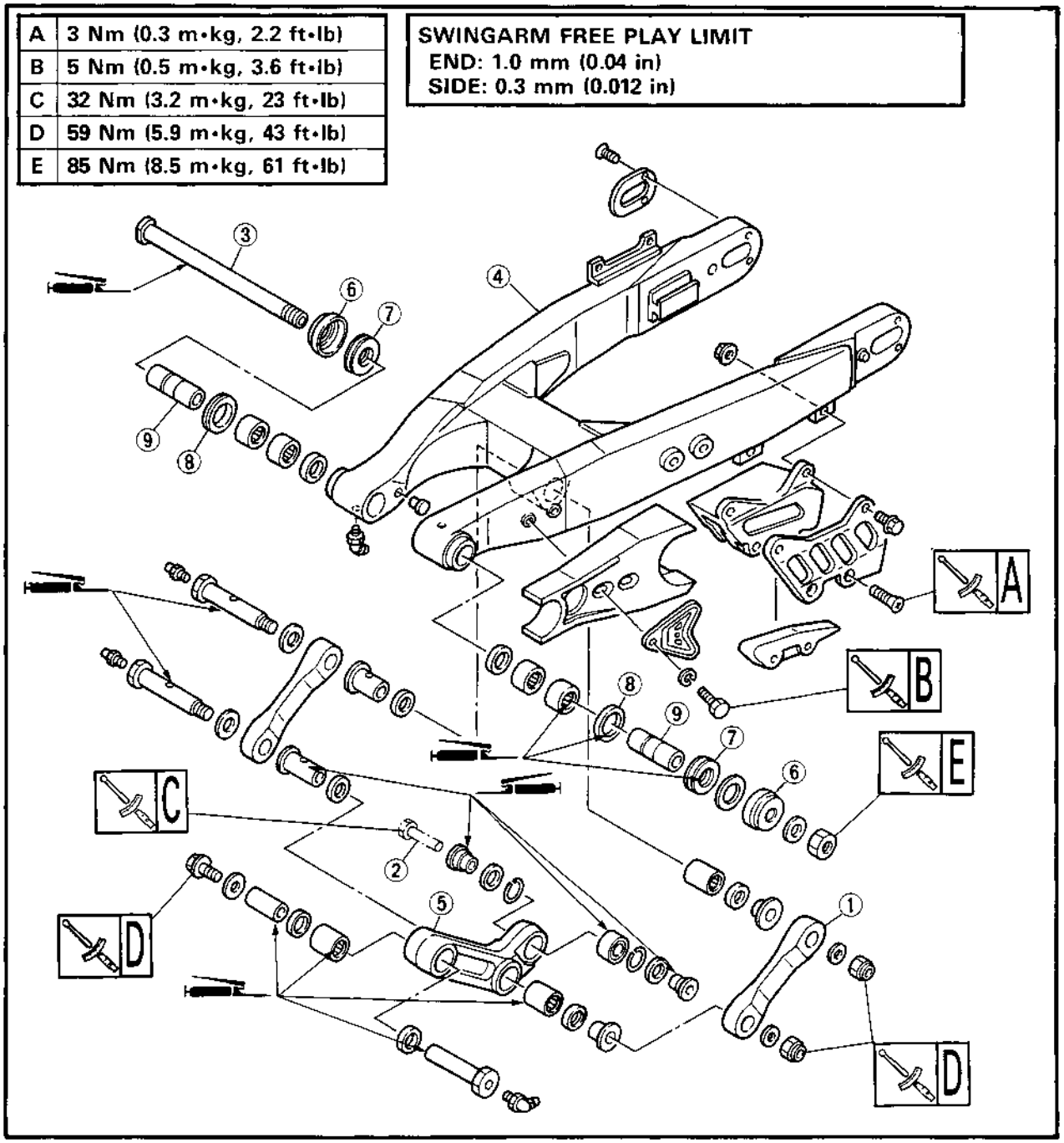
⚠ WARNING

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

*Remove the following parts:
- Rear wheel
- Brake caliper (rear)
- Chain support
- Brake hose holder
- Brake pedal

A	3 Nm (0.3 m•kg, 2.2 ft•lb)
B	5 Nm (0.5 m•kg, 3.6 ft•lb)
C	32 Nm (3.2 m•kg, 23 ft•lb)
D	59 Nm (5.9 m•kg, 43 ft•lb)
E	85 Nm (8.5 m•kg, 61 ft•lb)

SWINGARM FREE PLAY LIMIT
END: 1.0 mm (0.04 in)
SIDE: 0.3 mm (0.012 in)



5

NOTE ON REMOVAL AND REASSEMBLY

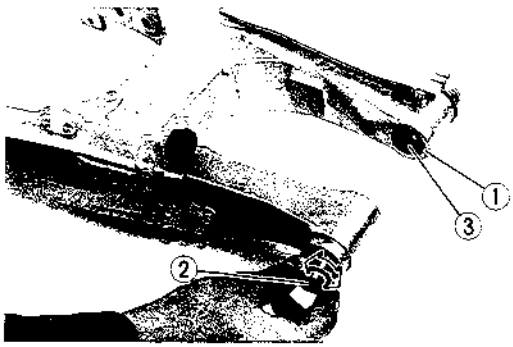
•For reassembly, the removed parts should be cleaned with the solvent, and apply the grease on the moving parts.

Extent of removal: ① Swingarm removal ② Swingarm disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Connecting rod	2	
	2	Bolt (rear shock absorber)	1	
	3	Pivot shaft	1	
	4	Swingarm	1	
	5	Relay arm	1	
②	6	Cover	2	
	7	Bearing	2	
	8	Oil seal	2	
	9	Solid bush	2	

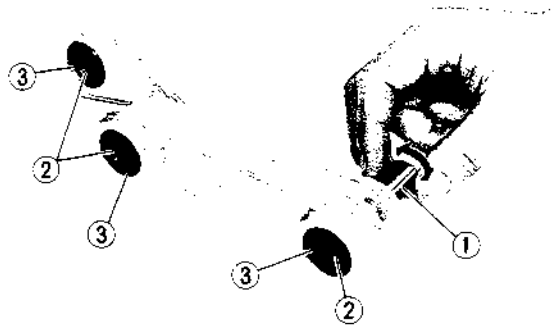
INSPECTION

Wash the bearings, solid bushes and covers in solvent.



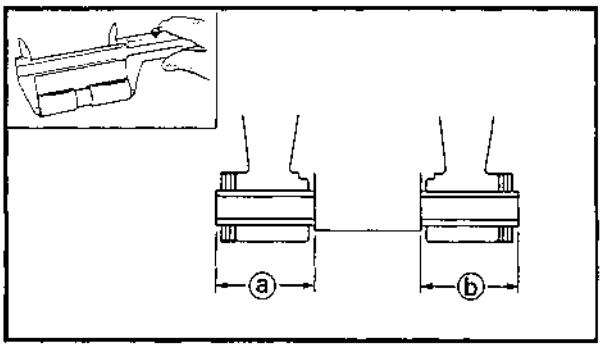
SWINGARM

1. Inspect:
   •Bearing (Swingarm) ①
   •Solid bush (Swingarm) ②
   Free play exists/Unsmooth revolution/Rust→Replace bearing and solid bush as a set.
2. Inspect:
   •Oil seal ③
   Damage→Replace.



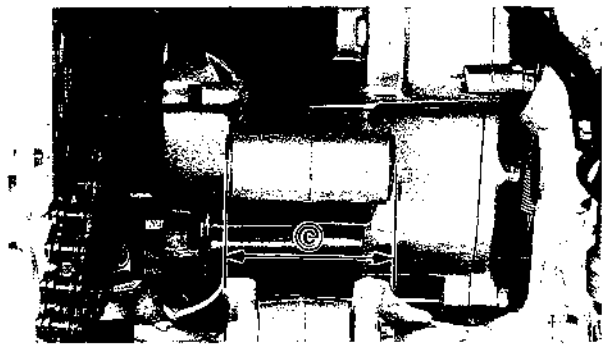
RELAY ARM

1. Inspect:
   •Collar (relay arm) ①
   •Bearing (relay arm) ②
   Free play exists/Unsmooth revolution/Rust→Replace bearing and collar as a set.
2. Inspect:
   •Oil seal (relay arm) ③
   Damage→Replace.

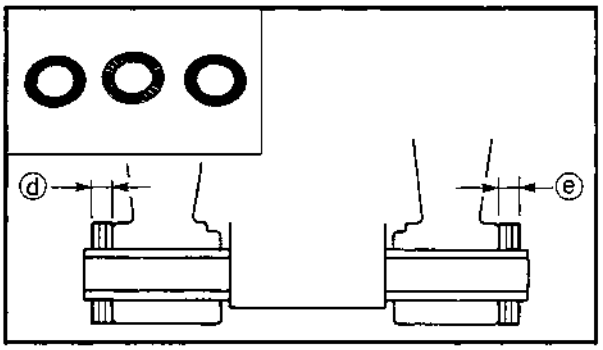


SWINGARM SIDE CLEARANCE

1. Measure:
   - Solid bush (right) length ⓐ
   - Solid bush (left) length ⓑ

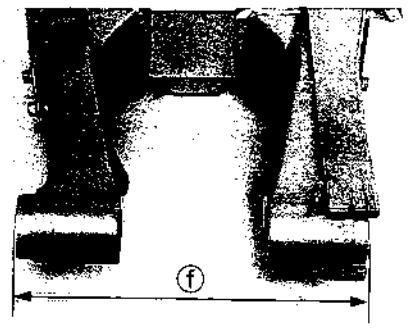


2. Measure:
   - Engine mounting boss width ⓒ

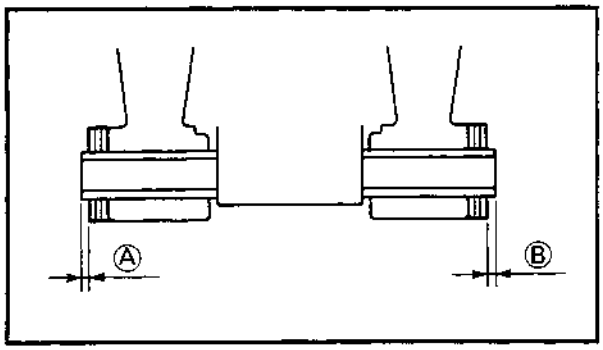


3. Measure:
   - Bearing (right) thickness ⓓ
   - Bearing (left) thickness ⓔ

5



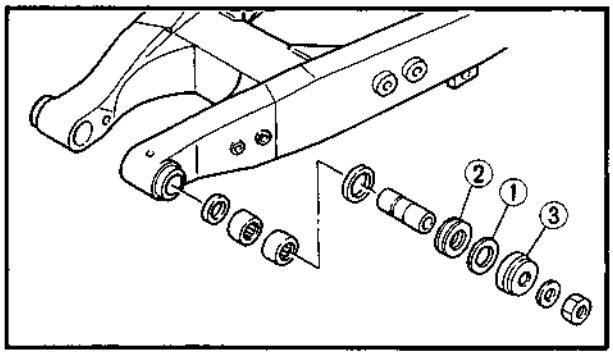
4. Measure:
   - Swingarm head pipe length ⓕ



5. Calculate:
   - Swingarm side clearance "Ⓐ + Ⓑ"
     Out of specification → Adjust side clearance using shim.
     By using formula given below.

"Ⓐ + Ⓑ" = (ⓐ + ⓑ + ⓒ) − (ⓓ + ⓔ + ⓕ)

Side Clearance "A + B":
0.3 mm (0.012 in)

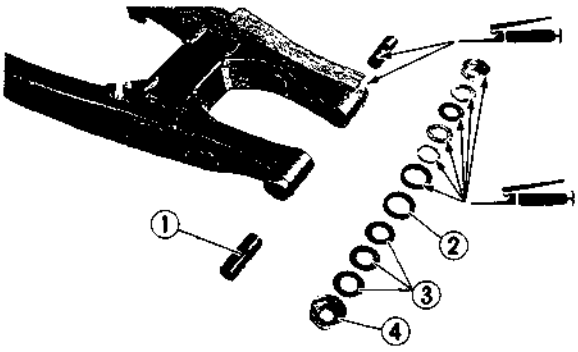


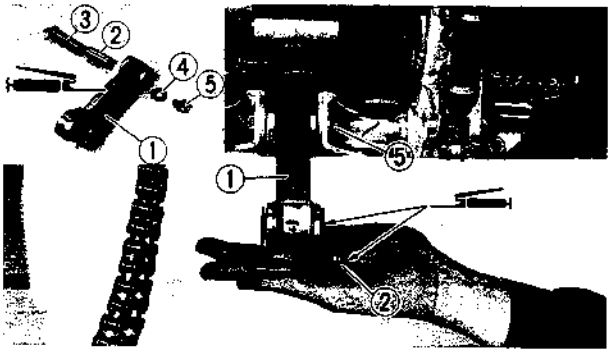
If the end clearance is out of specification, adjust it to specification by installing the adjust shim ① at position, Ⓐ and Ⓑ.

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.

- Adjust shim ①
- Bearing ②
- Cover ③





ASSEMBLY AND INSTALLATION

SWINGARM

1. Install:
   - Solid bush ①
   - Oil seal ②
   - Bearing ③
   - Cover ④

NOTE:

Apply the lithium soap base grease on the solid bush, bearing and oil seal lip.

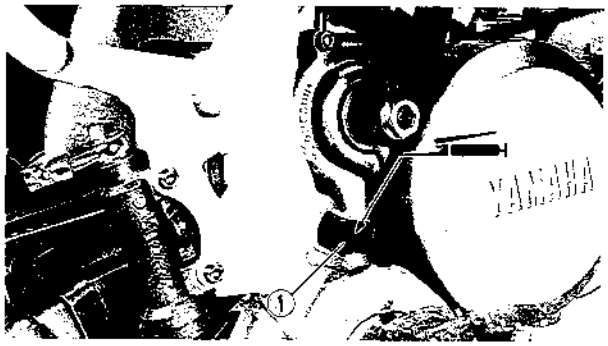
2. Install:
   - Relay arm ①
   - Collar ②
   - Union nut ③
   - Plain washer ④
   - Flange bolt ⑤

NOTE:

Apply the lithium soap base grease on the sliding surface of the union nut, collar and oil seal lip.

	Flange Bolt: **59 Nm (5.9 m•kg, 43 ft•lb)**

5

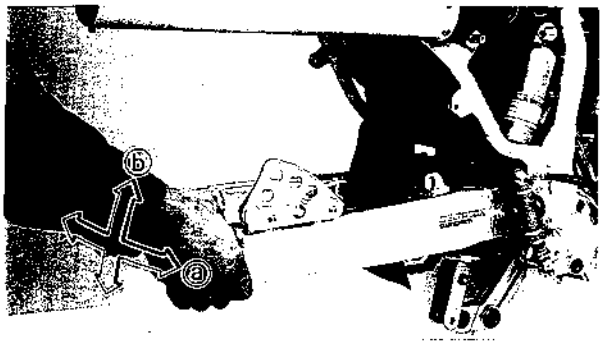


3. Install:
   - Pivot shaft ①
     From right side.

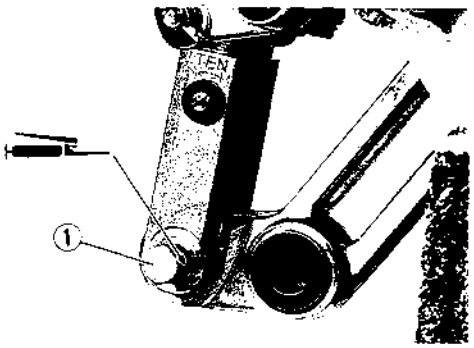
NOTE:

Apply the lithium soap base grease on the pivot shaft.

	Nut (Pivot Shaft): **85 Nm (8.5 m•kg, 61 ft•lb)**



4. Check:
   - Swingarm side play ⓐ
     Free play exists → Check side clearance.
   - Swingarm up and down movement ⓑ
     Unsmooth movement/Binding/Rough spots → Grease or replace bearings, solid bushes and collars.



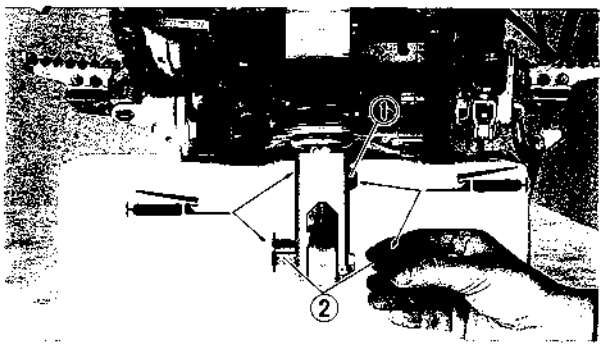
5. Install:
   - Bolt (rear shock absorber—lower) ①

NOTE:

Apply the molybdenum disulfide grease on the bolt.

	Bolt (Rear Shock Absorber—Lower): **32 Nm (3.2 m•kg, 23 ft•lb)**

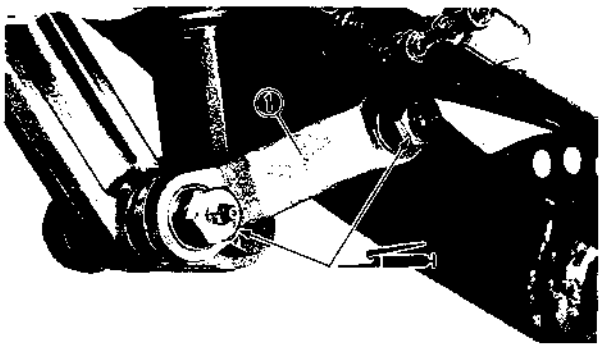
5



6. Install:
   - Bolt (rear shock absorber—lower) ①
   - Collar ②

NOTE:

Apply the lithium soap base grease on the collars and oil seal lip.



7. Install:
   - Connecting rod ①

NOTE:

Apply the lithium soap base grease on the bolt.

	Nut (Connecting Rod): **59 Nm (5.9 m•kg, 43 ft•lb)**

5

REAR SHOCK ABSORBER

PREPARATION FOR REMOVAL

✻Hold the machine by placing the suitable stand under the engine.

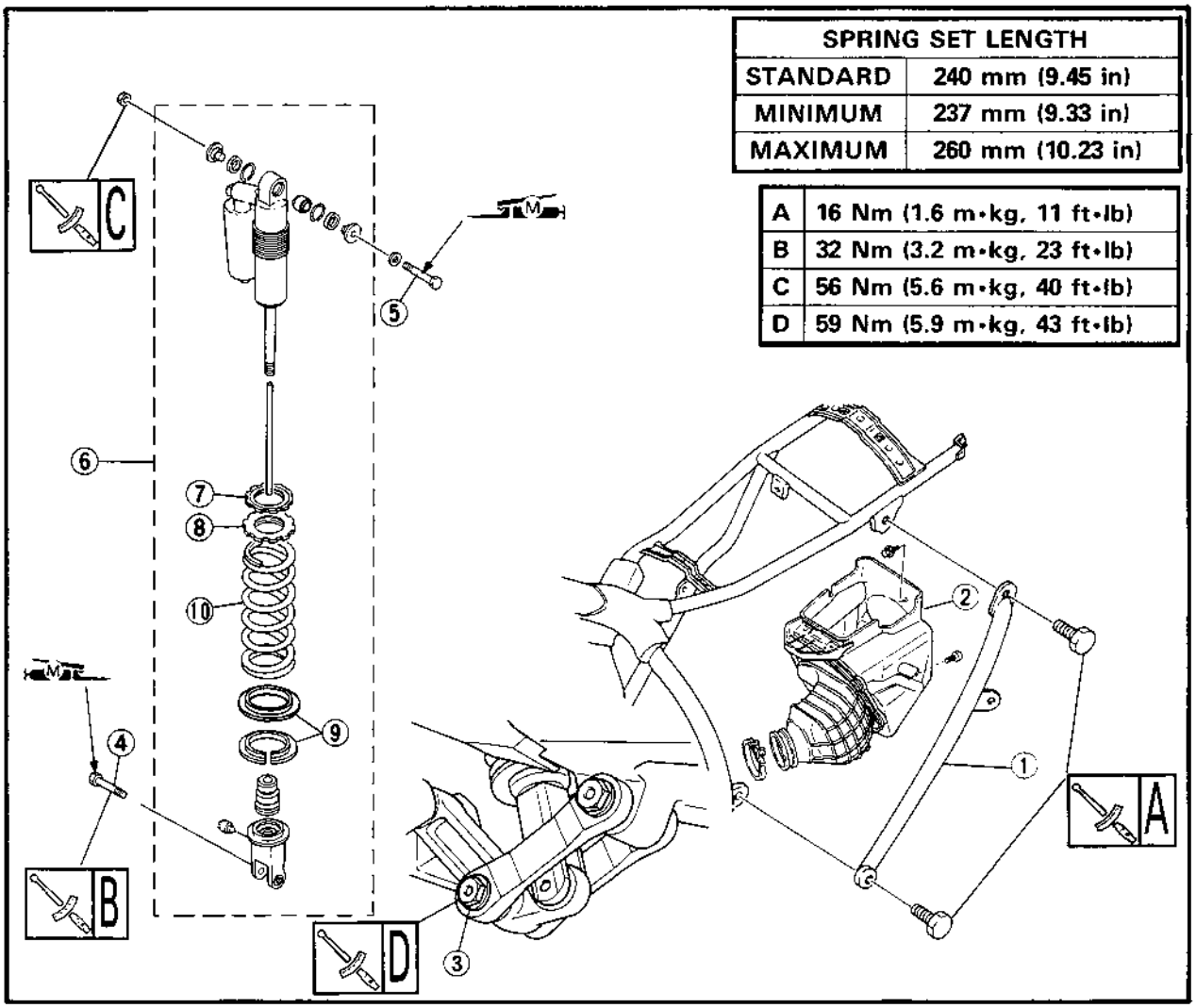
⚠ WARNING

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

✻Remove the following parts:
- Side cover 1 (left)
- Seat

SPRING SET LENGTH	
STANDARD	240 mm (9.45 in)
MINIMUM	237 mm (9.33 in)
MAXIMUM	260 mm (10.23 in)

A	16 Nm (1.6 m•kg, 11 ft•lb)
B	32 Nm (3.2 m•kg, 23 ft•lb)
C	56 Nm (5.6 m•kg, 40 ft•lb)
D	59 Nm (5.9 m•kg, 43 ft•lb)



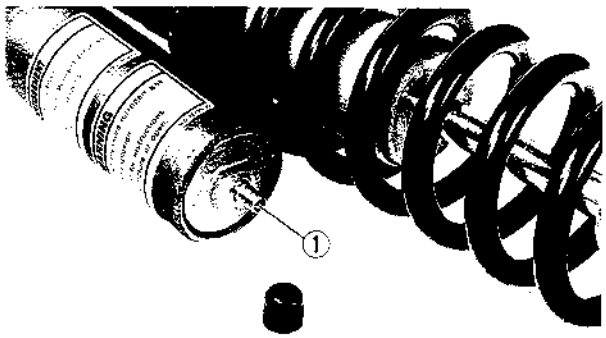
Extent of removal: ① Rear shock absorber removal ② Spring (rear shock absorber) removal

Extent of removal	Order	Part name	Q'ty	Remarks
①, ②	1	Back stay	1	Refer to "REMOVAL POINTS".
	2	Air cleaner case	1	
	3	Bolt (connecting rod)	1	
①	4	Bolt (rear shock absorber —lower)	1	
②	5	Bolt (rear shock absorber —upper)	1	
	6	Rear shock absorber	1	Refer to "REMOVAL POINTS".
	7	Locknut	1	Loosen fully.
	8	Adjuster	1	
	9	Spring guides	2	
	10	Spring (rear shock absorber)	1	Refer to "REMOVAL POINTS".

⚠ WARNING

This shock absorber is provided with a separate type tank filled with high-pressure nitrogen gas. To prevent the danger of explosion, read and understand the following information before handling the shock absorber.
The manufacturer can not be held responsible for property damage or personal injury that may result from improper handling.

1. **Never tamper or attempt to disassemble the cylinder or the tank.**
2. **Never throw the shock absorber into an open flame or other high heat. The shock absorber may explode as a result of nitrogen gas expansion and/or damage to the hose.**
3. **Be careful not to damage any part of the gas tank. A damaged gas tank will impair the damping performance or cause a malfunction.**
4. **Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.**
5. **Never attempt to remove the plug at the bottom of the nitrogen gas tank. It is very dangerous to remove the plug.**
6. **When scrapping the shock absorber, follow the instructions on disposal.**

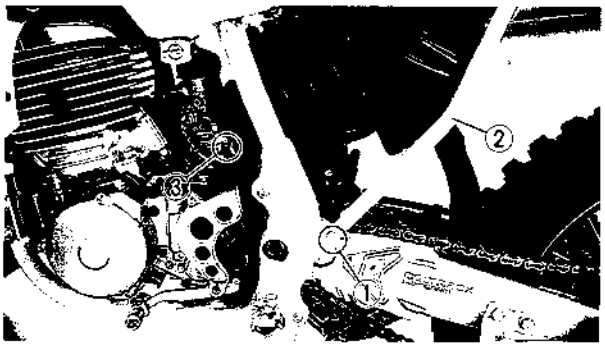


NOTES ON DISPOSAL (YAMAHA DEALERS ONLY)

Before disposing the shock absorber, be sure to extract the nitrogen gas from valve ①. Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

⚠ WARNING

To dispose of a damaged or worn-out shock absorber, take the unit to your Yamaha dealer for this disposal procedure.

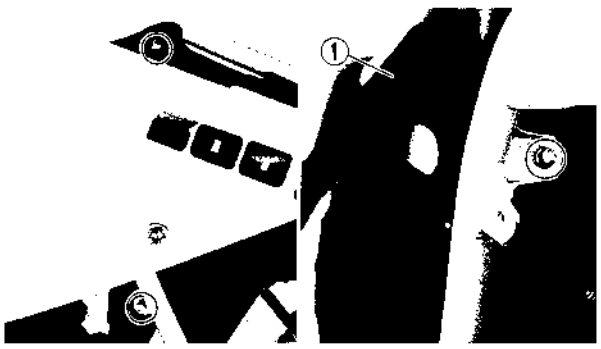


REMOVAL POINTS

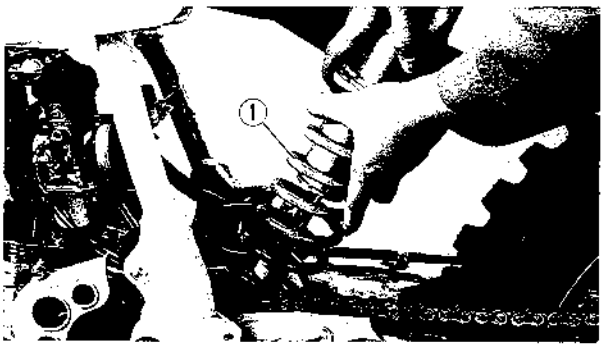
AIR CLEANER CASE

1. Remove:
   - Bolt (back stay) ①
   - Back stay ②
2. Loosen:
   - Screw (air cleaner joint) ③

5

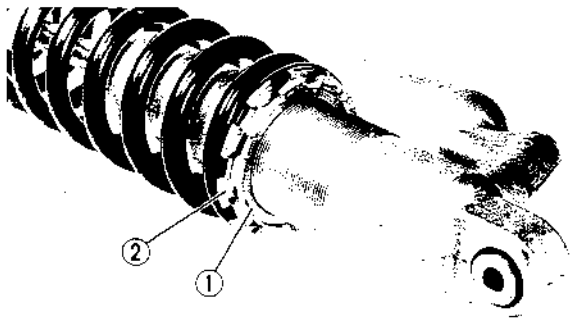


3. Remove:
   - Air cleaner case ①



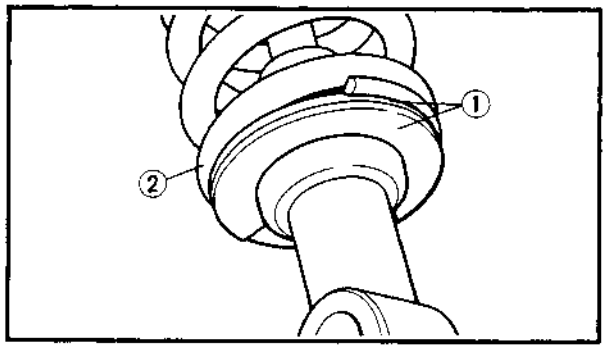
REAR SHOCK ABSORBER

1. Remove:
   - Rear shock absorber ①

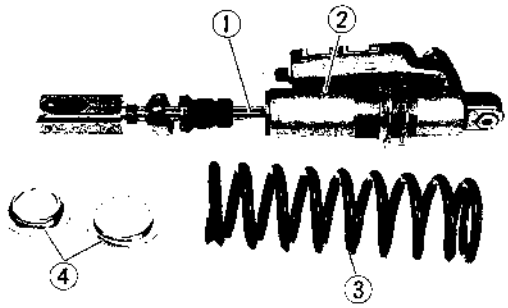


SPRING (REAR SHOCK ABSORBER)

1. Loosen:
   - Locknut ①
   - Adjuster ②



2. Remove:
   - Spring guides ①
   - Spring ②

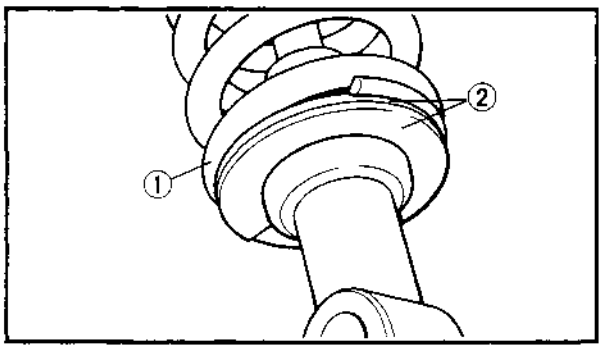


INSPECTION

DAMPER ROD/SHOCK ABSORBER/ SPRING/SPRING GUIDE

1. Inspect:
   - Damper rod ①
     Bends/Damage → Replace absorber assembly.
   - Shock absorber ②
     Oil leaks → Replace absorber assembly.
     Gas leaks → Replace absorber assembly.
   - Spring ③
     Damage → Replace spring.
     Fatigue → Replace spring.
     Move spring up and down.
   - Spring guide ④
     Wear/Damage → Replace spring guide.

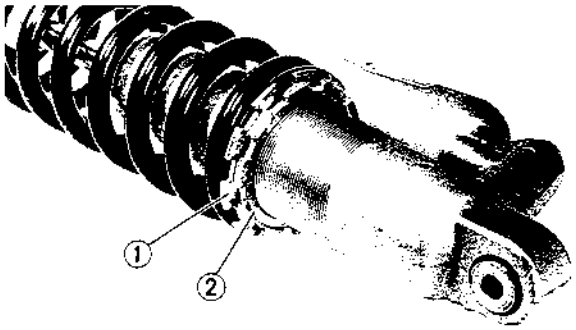
5



ASSEMBLY AND INSTALLATION

SPRING (REAR SHOCK ABSORBER)

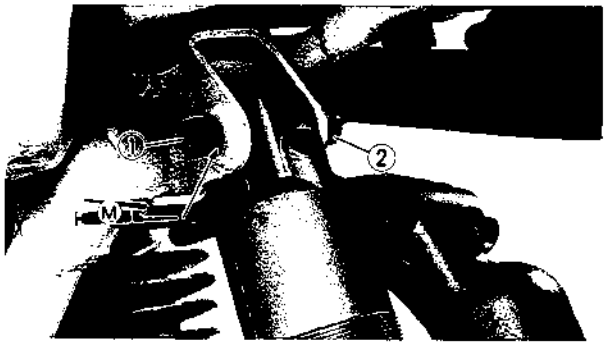
1. Install:
   - Spring ①
   - Spring guides ②



2. Install:
   - Adjuster ①
   - Locknut ②

CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.



REAR SHOCK ABSORBER

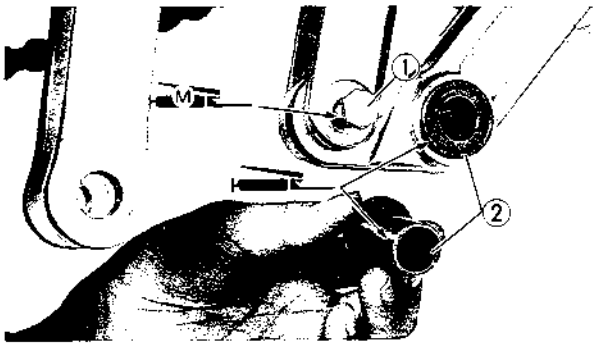
1. Install:
   - Rear shock absorber
2. Install:
   - Bolt (rear shock absorber—upper) ① from left side.
   - Nut ②

NOTE:

Apply the molybdenum disulfide grease on the bolt.

	Bolt (Rear Shock Absorber—Upper): 56 Nm (5.6 m•kg, 40 ft•lb)

5

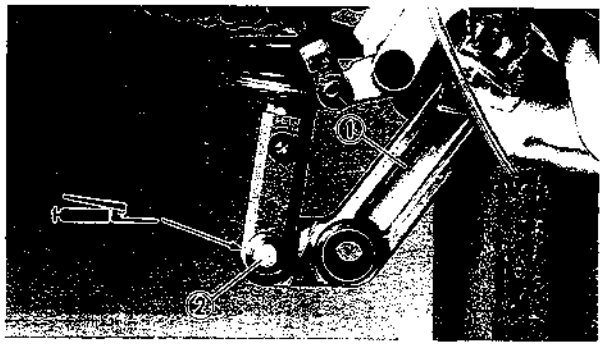


3. Install:
   - Bolt (rear shock absorber—lower) ①
   - Collar ②

NOTE:

- Apply the molybdenum disulfide grease on the bolt.
- Apply the lithium soap base grease on the collars and oil seal lip.

	Bolt (Rear Shock Absorber—Lower): 32 Nm (3.2 m•kg, 23 ft•lb)

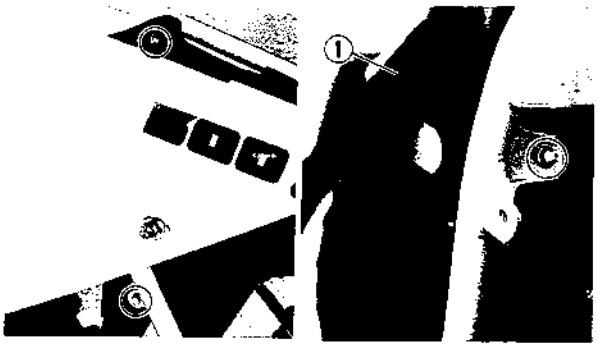


4. Install:
   - Relay arm ①
   - Bolt (relay arm) ②

NOTE:

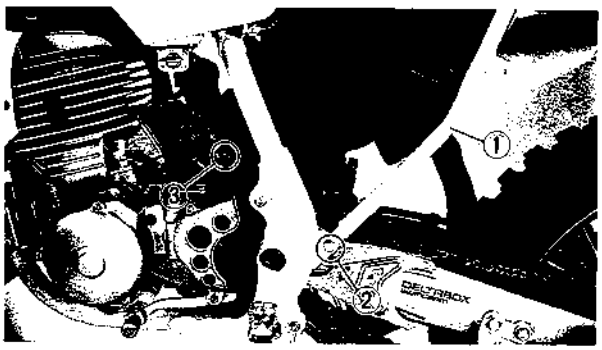
Apply the lithium soap base grease on the bolt.

	Nut (Relay Arm): **59 Nm (5.9 m•kg, 43 ft•lb)**



AIR CLEANER CASE

1. Install:
   - Air cleaner case ①



2. Install:
   - Back stay ①
   - Bolt (back stay) ②

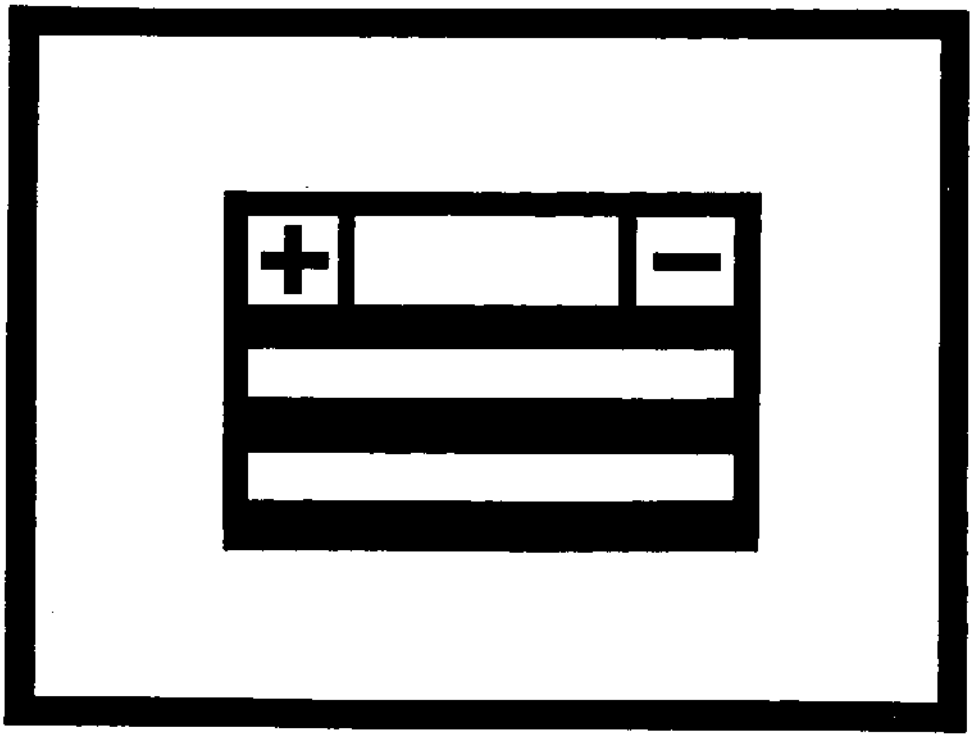
	Bolt (Back Stay): **16 Nm (1.6 m•kg, 11 ft•lb)**

3. Tighten:
   - Screw (air cleaner joint) ③

5

5

CHAPTER 6
ELECTRICAL



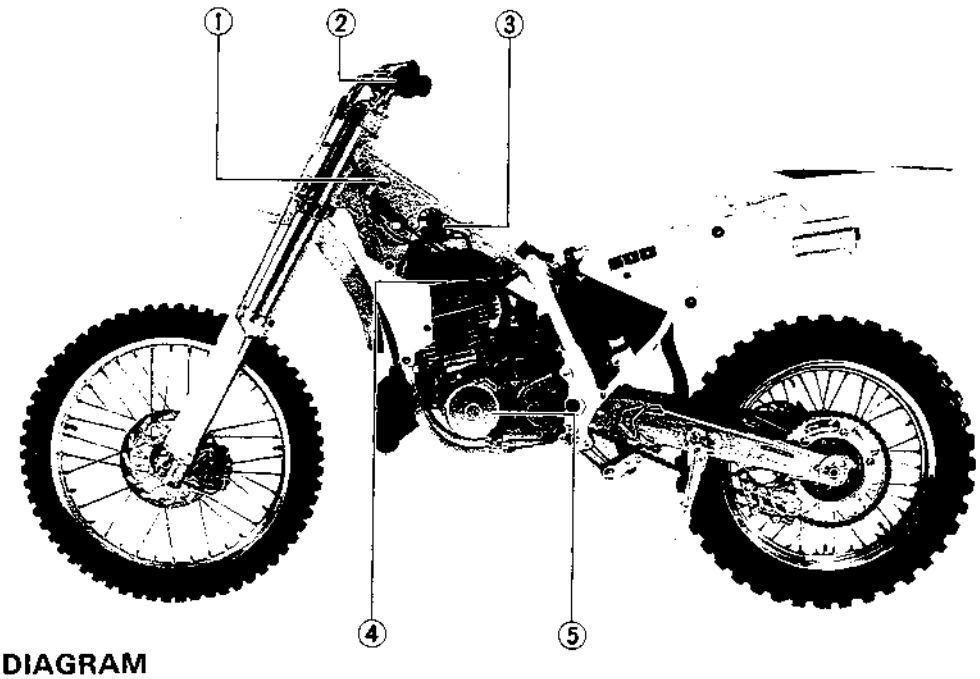
ELECTRICAL COMPONENTS AND WIRING DIAGRAM

① CDI unit
② "ENGINE STOP" button
③ Ignition coil
④ Spark plug
⑤ CDI magneto

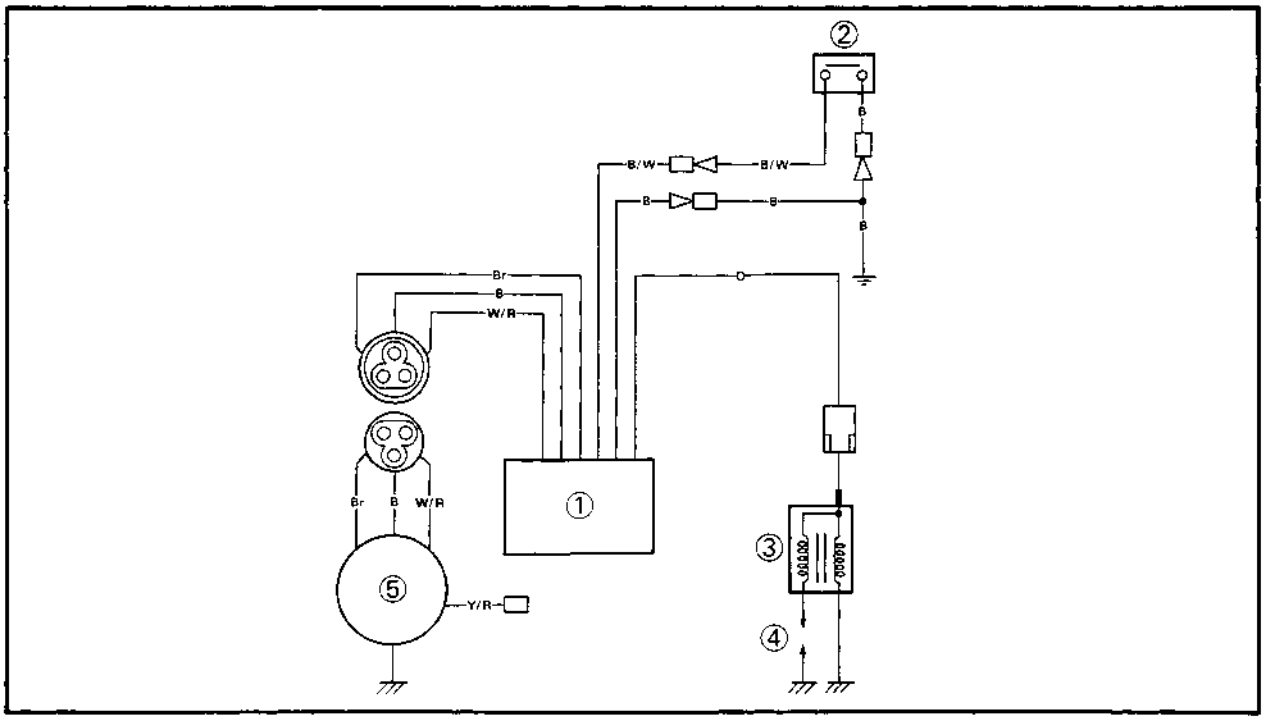
COLOR CODE

Br	Brown
O	Orange
B	Black
B/W	Black/White
W/R	White/Red
G/W	Green/White
B/R	Black/Red
W/G	White/Green

ELECTRICAL COMPONENTS



WIRING DIAGRAM

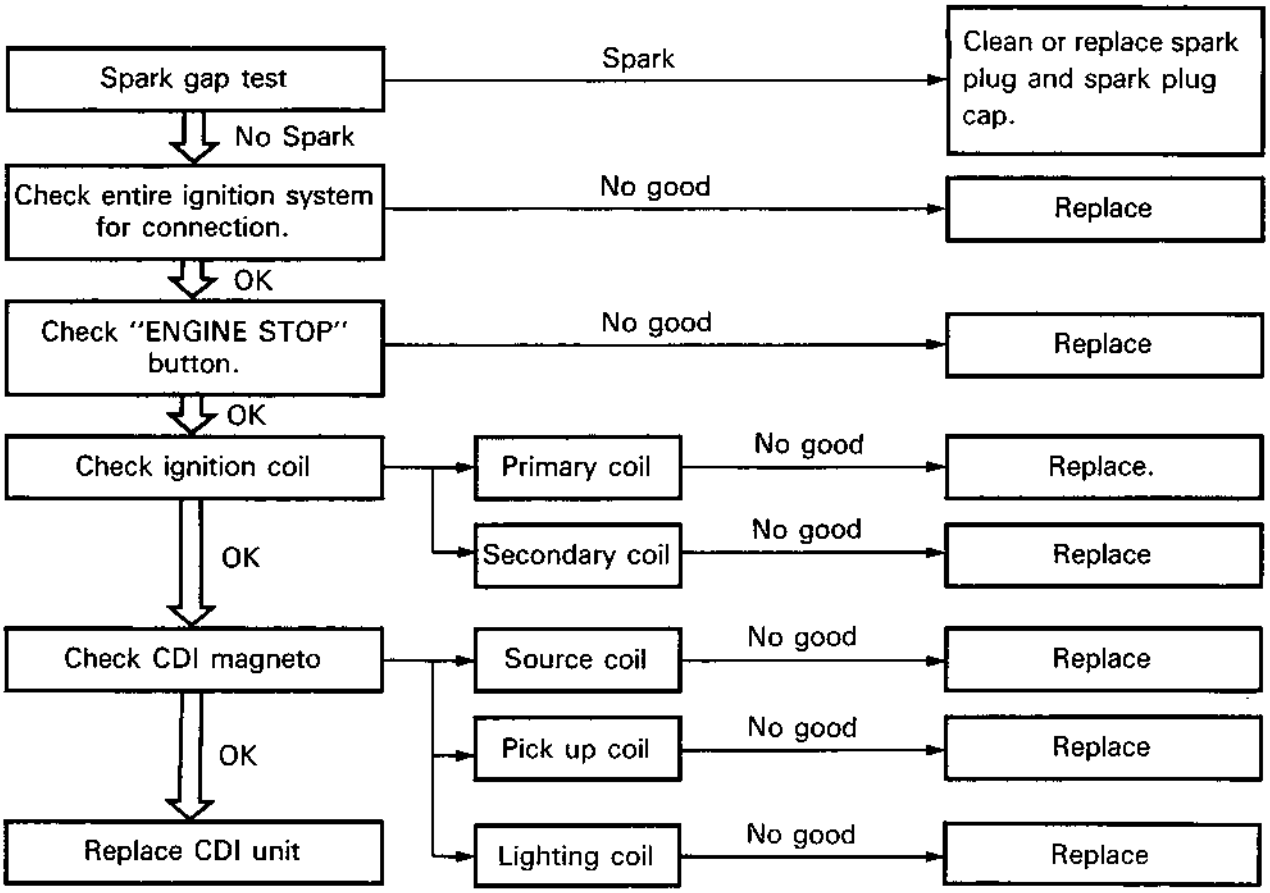


6

IGNITION SYSTEM

INSPECTION STEPS

Use the following steps for checking the possibility of the malfunctioning engine being attributable to ignition system failure and for checking the spark plug which will not spark.



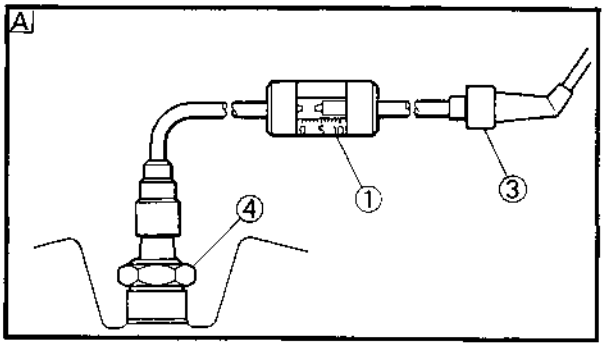
NOTE:

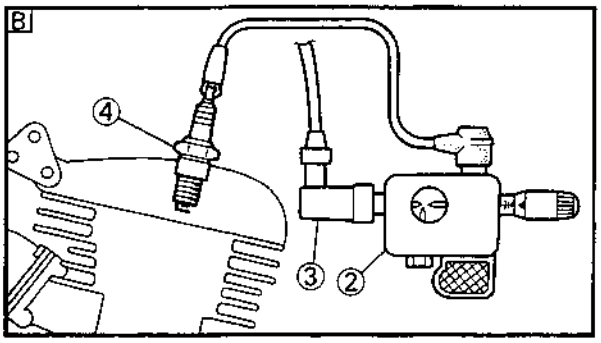
- Remove the following parts before inspection.
  1) Seat
  2) Fuel tank
- Use the following special tools in this inspection.

Dynamic spark tester:
YM-34487
Ignition Checker:
90890-06754

Pocket Tester:
YU-03112
90890-03112

6





SPARK GAP TEST

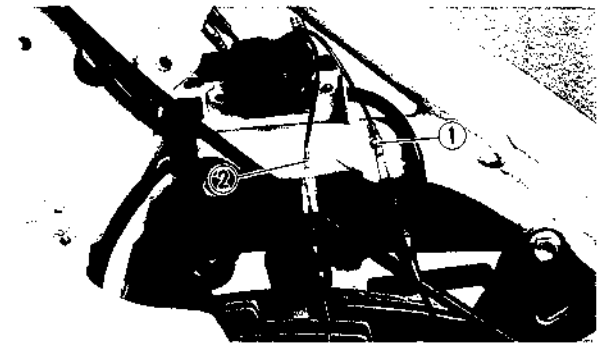
1. Disconnect the spark plug cap from spark plug.
2. Connect the Dynamic spark tester ① (Ignition checker ②) as shown.
   - Spark plug cap ③
   - Spark plug ④
3. Kick the kick starter.
4. Check the ignition spark gap.
5. Start engine, and increase spark gap until misfire occurs.

Minimum Spark Gap:
6.0 mm (0.24 in)

A For USA
B Except for USA

COUPLERS AND LEADS CONNECTION INSPECTION

1. Check:
   - Couplers and leads connection
     Rust/Dust/Looseness/Short-circuit→Repair or replace.



"ENGINE STOP" BUTTON INSPECTION

1. Inspect:
   - "ENGINE STOP" button conduct

Tester (+) lead→Black/White lead ①
Tester (−) lead→Black lead ②

		B/W ①	B ②	Tester Selector Position
	PUSH IN	○—○		Ω×1
	FREE			

No continuity while being pushed→Replace.
Continuity while being freed→Replace.

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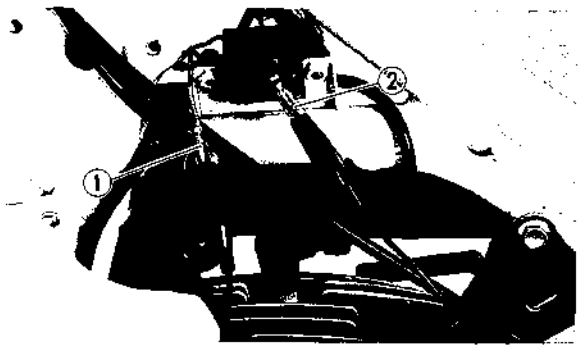
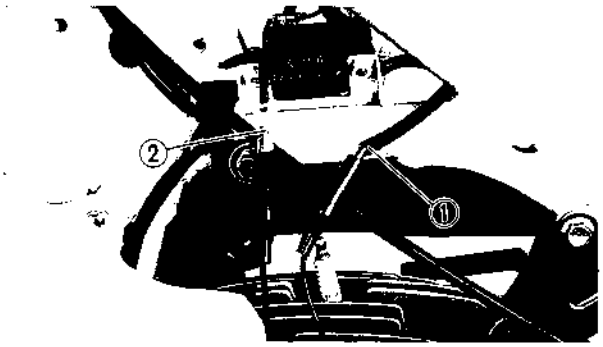


IGNITION COIL INSPECTION

1. Inspect:
   - Primary coil resistance
     Out of Specification → Replace.

Tester (+) lead → Orange lead ①
Tester (−) lead → Black lead ②

	Primary Coil Resistance	Tester Selector Position
	0.26 ~ 0.36Ω at 20°C (68°F)	Ω × 1

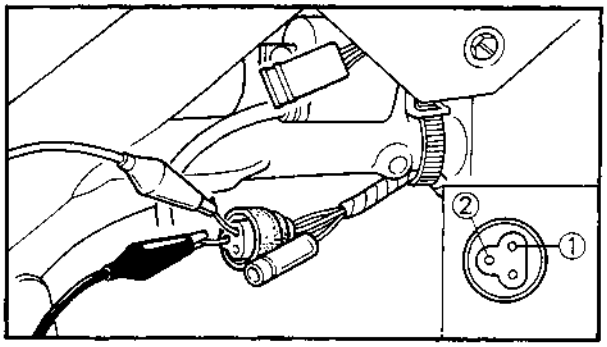


2. Inspect:
   - Secondary coil resistance
     Out of specification → Replace.

Tester (+) lead → Spark plug lead ①
Tester (−) lead → Black lead ②

	Secondary Coil Resistance	Tester Selector Position
	3.5 ~ 4.7kΩ at 20°C (68°F)	Ω × 1K

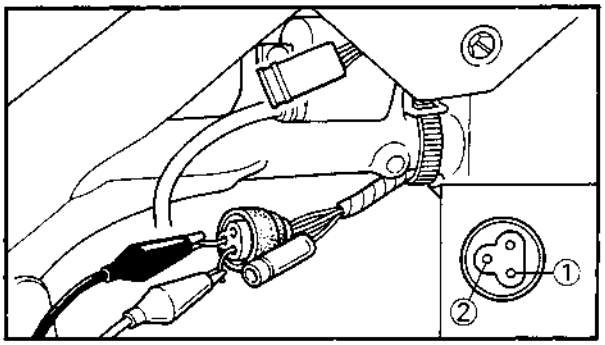
6



CDI MAGNETO INSPECTION

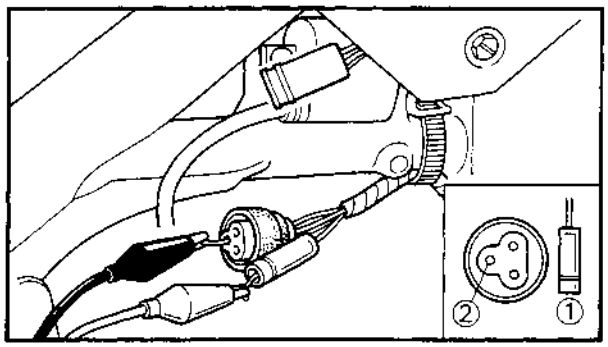
1. Inspect:
   - Source coil resistance
     Out of specification→Replace.

Tester (+) lead→Brown lead ① Tester (−) lead→Black lead ②	
Source Coil Resistance	**Tester Selector Position**
279 ~ 341Ω at 20°C (68°F)	Ω×100



2. Inspect:
   - Pick up coil resistance
     Out of specification→Replace.

Tester (+) lead→White/Red lead ① Tester (−) lead→Black lead ②	
Pick up Coil Resistance	**Tester Selector Position**
11.2 ~ 13.6Ω at 20°C (68°F)	Ω×10



3. Inspect:
   - Lighting coil resistance
     Out of specification→Replace.

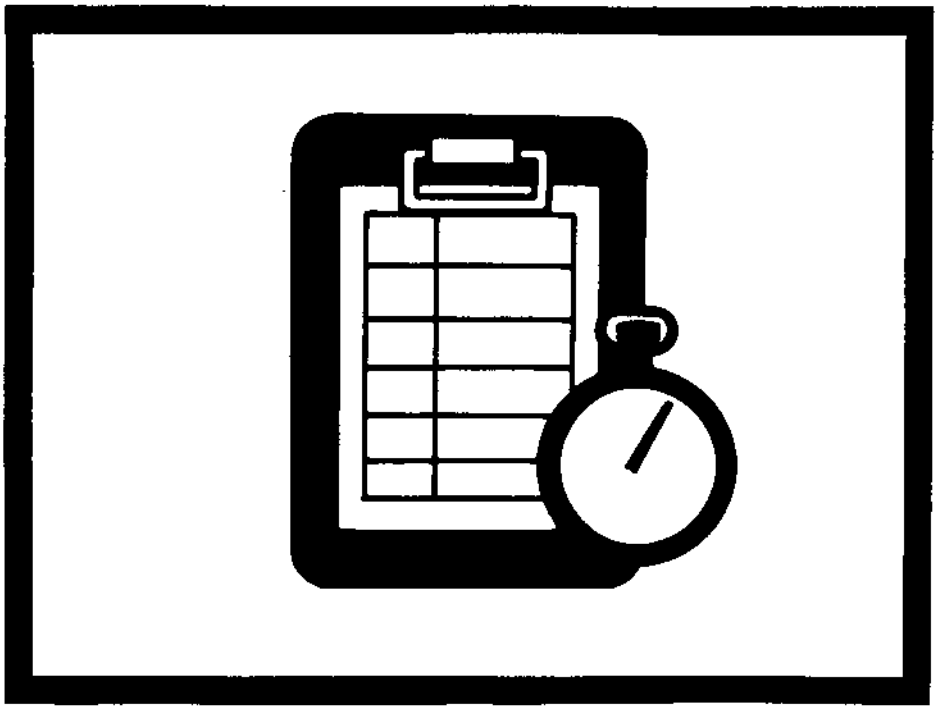
Tester (+) lead→Yellow/Red lead ① Tester (−) lead→Black lead ②	
Lighting Coil Resistance	**Tester Selector Position**
0.43 ~ 0.53Ω at 20°C (68°F)	Ω×1

CDI UNIT INSPECTION

Check all electrical components. If no fault is found, replace the CDI unit. Then check the electrical components again.

6

CHAPTER 7
TUNING



CARBURETOR TUNING

Symptoms of improper settings

If your machine exhibits one or more of the symptoms listed below, it may need carb tuning changes. Before attempting any changes, however, make sure that everything else is in good shape and tuned properly. Check the condition of the spark plug, make sure the ignition timing is correct, service the air filter properly, decarbonize the muffler and spark arrestor, etc. If your machine has run properly at a certain track in the past and then starts running poorly with the same carb settings, the problem is almost certain to be elsewhere; changing the carb settings in such a case would be a waste of time.

If your machine is **too rich**, it will:
• Accelerate poorly; • Misfire; • Smoke excessively; • Foul spark plugs; • Have a "deep" exhaust note.
If your machine is **too lean**, it will:
• Ping or rattle; • Accelerate erratically; • Act like it's running out of fuel; • Run extremely hot.

- If your machine pings or rattles, make sure the gasoline you are using is fresh and of a sufficient octane rating. You might also try different brands of high-octane gas.

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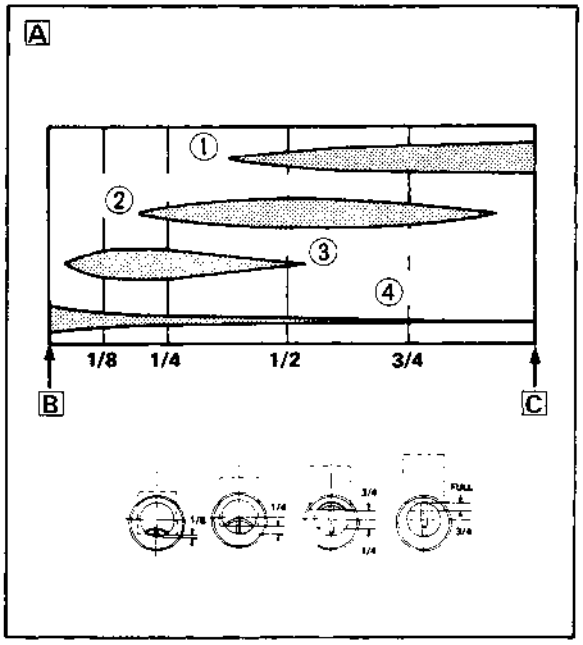
Making setting changes

Carb setting changes are made by changing or adjusting following five carburetor components.

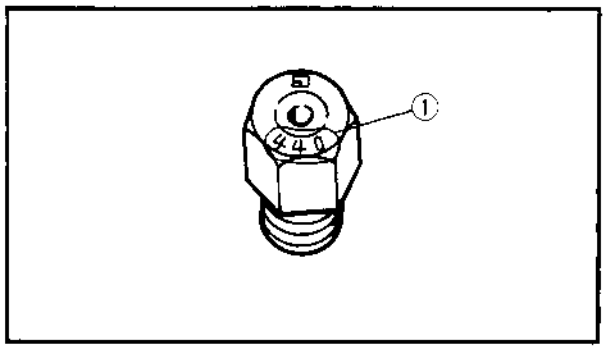
- Pilot air screw
- Main jet
- Pilot jet
- Throttle valve
- Jet needle



Four of the components, the jet needle, needle jet, main jet, and pilot jet, regulate the flow of fuel; the throttle valve and pilot air screw requlate the flow of air. The following chart indicates the working range of each component. Note how the working ranges overlap each other as the throttle valve moves from closed to fully open.

If you note a particular symptom of rich or lean running in a specific range, use the chart to determine which component needs changing. Use the following information to decide what changes to make.

A SLIDE VALVE CARBURETOR WARKING RANGE OF EACH CARBURETOR COMPONENT
B CLOSED
C FULL OPEN
① Main jet
② Jet needle
③ Throttle valve cutaway
④ Pilot air screw & jet



Main jet

The main jet has its greatest effect in the 3/4-to-full-throttle range. The number of the main jet, stamped on the bottom or side of the jet, indicates the relative size of the hole in the jet which meters fuel. The larger the number on the main jet is, the bigger the hole and the more fuel it will pass; hence, larger numbers mean richer jetting. Smaller numbers, of course, mean leaner jetting. Make main-jet changes one step (#10) at a time.

① Jet number

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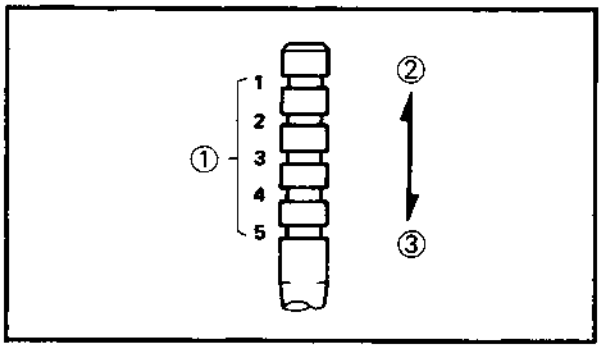
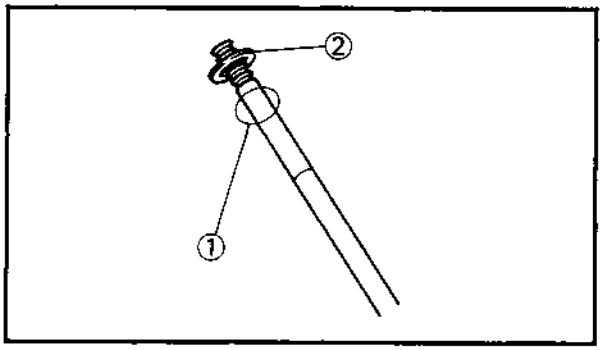


Jet needle

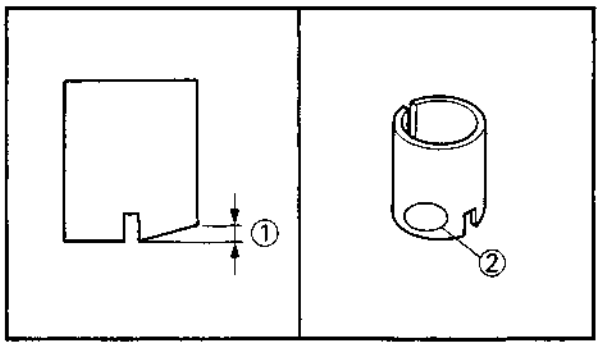
The jet needle has its greatest effect in the 1/4-to-3/4-throttle range. The needle moves in and out of the needle jet; since the needle is tapered, its position in the jet determines the amount of fuel allowed through. There are five grooves in the top of the needle in which a circlip fits. This clip locates the needle in the slide and, therefore, determines its position relative to the needle jet. Moving the clip down has the effect of pulling the needle further out of the jet; the mixture is thereby richened. Moving the clip up leans the mixture. Change the clip position one step at a time.

If changing the clip position doesn't provide the proper setting, the jet needle may be changed.

① Clip position
② Leaner
③ Richer



① Jet needle number
② Circlip



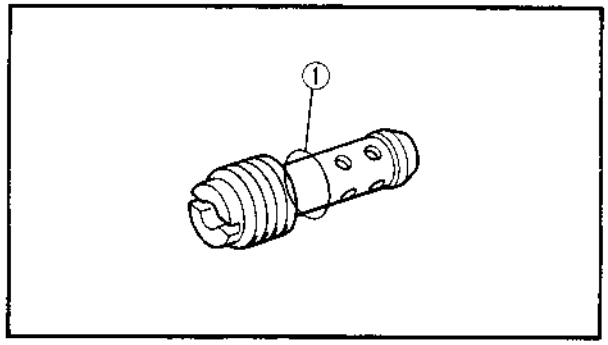
Throttle valve

The throttle valve may be changed to affect the mixture in the 1/8-to-1/2-throttle range. The bottom portion of the throttle valve which faces the rear of the carb is cut at an angle; this is called the cutaway. The height of the cutaway determines the characteristic of the airflow. The height is indicated by the number stamped on the bottom of the throttle valve. A smaller number means a smaller cutaway, and a smaller cutaway provides a richer mixture.

Conversely, a larger cutaway makes the mixture leaner. Make throttle valve changes in increments of 0.5.

① Cutaway
② Cutaway number

7



Pilot jet and pilot air screw

The pilot jet and pilot screw control the mixture in the closed-to-1/8-throttle range. To adjust the mixture in this range, the pilot air screw can be turned to change the airflow through the circuit, or the pilot jet can be changed to provide more or less fuel. Start by turning the pilot air screw. Screwing it in richens the mixture, and turning it out leans the mixture. Pilot air screw specs indicate the turns out from a lightly seated position. Make changes in 1/4-turn increments. If turning the screw between one and two-and-a-half turns doesn't provide the desired results, change the pilot jet. This jet has a number stamped on it which indicates its size; the larger the number is, the richer the jet. Make one-step (#5) changes in the pilot jet, and fine-tune with the pilot screw.

① Pilot jet number

TEST RUNS

Warm up the engine with the carburetor at the standard settings, and run two or three laps of the course while examining the operating condition of the spark plug.

Test-ride the machine by varying the throttle opening.

Condition of spark plug	
Correct	Insulator is dry and light tan color.
Too hot	Insulator is whitish.
Too cold	Insulator is wet and sooty.

7

If spark plug is whitish, the fuel-air mixture is lean.

- Replace the main jet with a one step large type.

If spark plug is wet, the fuel-air mixture is rich.

- Replace the main jet with a one step smaller type.

Set the carburetor so that the engine delivers satisfactory power at any throttle opening.

If the air-fuel mixture is too lean, the engine tends to overheat and seize up, and on the contrary, if too rich, the spark plug easily gets wet, thus causing misfires.

The proper setting of the mixture varies depending on atmospheric conditions (pressure, humidity, and temperature).
Taking these conditions into consideration, adjust the carburetor settings properly.

- Take a note of carburetor settings as well as weather conditions, course conditions, and lap times so they can be utilized as reference data for future races.

SPARK PLUG

Spark plug reading

Proper spark plug reading is essential to achieve optimum performance and engine reliability. In order to achieve a proper plug reading, it will be necessary to perform the following: Install a new standard spark plug, warm up the engine, and run two or three laps of a course at maximum power output (on main jet circuit), then run at wide open throttle for approximately 15 seconds, stop the engine before closing the throttle and simultaneously disengage the clutch while braking to a stop. Also, establish a consistency in the gas and oil premix used, making sure it's within the manufacturer's specifications. The insulator tip color and deposits will vary depending on the different brands of gas and oil you use.

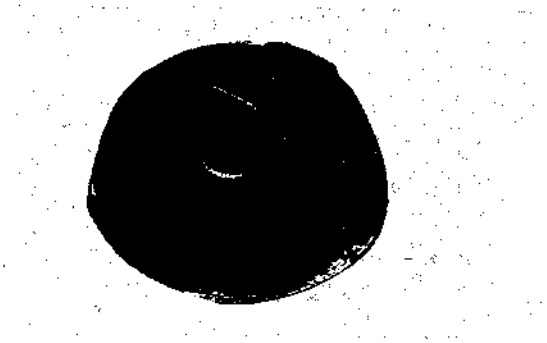
Do not allow the engine to run at idle speeds, or it may erase the true plug reading.

When removing the spark plug, make note of its torque (loose, correct or over tightened). The color and type of deposits on the spark plug insulator tip will give you a good indication of how this particular engine is operating.

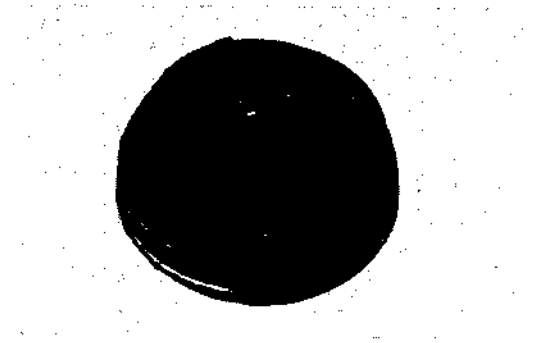
Don't forget that a darker-than-normal color is quite common during the break-in period.

Even at part-throttle operation, the spark plug may get oily indicating that fuel is rich.

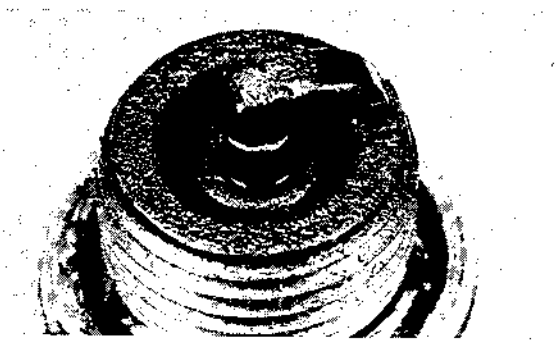
The following are some of the more common spark plug symptomos and how they relate to engine operating to operate.



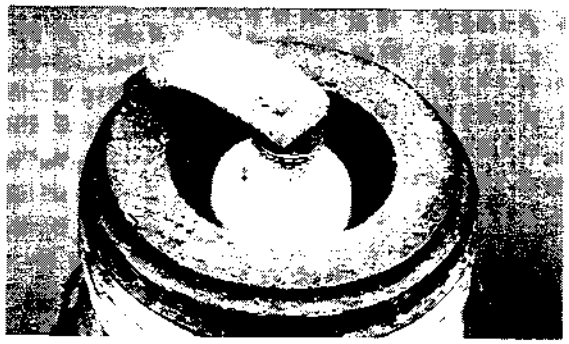
Normal:
Dark-brown-to-light-tan color with slight deposits and slight electrode wear. This indicates the engine has been running the way it has been designed to operate.



Rich:
Dry, sooty black, carbon deposits. Possible cause: Rich air-fuel mixture, dirty air filter, excessive low-speed operation, weak ignition or incorrect heat range.

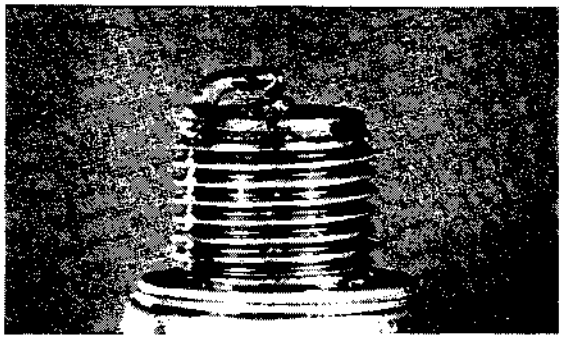


Oil fouled:
Wet, black and oily deposits. Possible cause: Excessive low-speed operation, using an oil that is not recommended and/or an incorrect premix ratio, transmission oil entering the crankcase, rich air-fuel mixture, dirty air filter, low compression, weak ignition, incorrect heat range and/or spark gap or excessive exhaust carbon buildup.



Overheating:

Light gray or white color. Insulator nose blistered, glazed, cracked or shows signs of aluminum speckles, and the electrodes are burned. May be accompanied by an audible "pinging/rattling." Possible cause: Lean air-fuel mixture or air leak, incorrect timing, insufficient cooling, incorrect spark plug heat range or improper spark plug installation (the tightening torque is too loose or the threads are dirty). Tiny aluminum speckles on the insulator nose indicate an extremely high operating temperature due to preignition/detonation and melting of the piston crown. If this condition exists, it is vital the piston be inspected and the cause corrected before any future operation.



Gap bridging:

Carbon deposits lodged between the side and center electrode. Possible cause: An excessive amount of carbon buildup, using an oil that is not recommended and/or an incorrect premix ratio, high-speed operation after excessive low-speed operation or dirt bypassing the air filter.

NOTE:

If a darker-or-lighter-than-normal plug color still exists after tuning, it may be necessary to make an adjustment to the main jet. If the plug shows symptoms of being rich (darker-than-normal), change to the next smaller main jet. If the plug shows symptoms of being lean (lighter-than-normal), change to a larger main jet. Make a test run after each change.

Additional information on spark plug is available from spark plug manufacturers.

Heat range:
Heat range refers to the classification of the spark plug's ability to transfer heat from the firing tip of the insulator to the cylinder head. The motorcycle manufacturer has already determined through extensive testing the correct heat range for your machine. However, if an engine has been modified, it may require a change of heat range (one step) colder or hotter.

CAUTION:

Select a spark plug with a colder or hotter heat range carefully and cautiously. A spark plug with too hot of a heat range may lead to preignition and possible engine damage. A spark plug with too cold a heat range may foul as the result of too much carbon buildup.

GEARING

Selection of the secondary reduction ratio (Sprocket)

$$\text{Standard secondary gear ratio} = \frac{\text{Number of driven sprocket teeth}}{\text{Number of drive sprocket teeth}}$$

Preconditions

- For instance, if 48T sprocket is used for the standard gear ratio:

Course condition	Reduction ratio
• Fast course	Small (46T)
• Many curves • Sandy or soft ground	Large (50T)

- If the straight portion of a course is longer, the secondary reduction ratio should be reduced so that the machine speed can be increased.

- When the course has many corners or uphills or is wet, the secondary reduction ratio should be increased so that gear shifting is possible with smooth acceleration.

Actually, the speed must be changed depending on the ground condition on the day of race and therefore, be sure to run through the racing circuit prior to a race and set the machine suitable for the entire course of the circuit.

Ⓐ

Ⓑ \ Ⓒ	40	42	㊹	45	㊻	㊽	49	50	51	52
11	3.636	3.818	4.000	4.091	4.182	4.364	4.455	4.545	4.636	4.727
12	3.333	3.500	3.666	3.750	3.833	4.000	4.083	4.167	4.250	4.333
⑬	3.077	3.231	3.385	3.462	3.538	3.692	3.769	3.846	3.923	4.000
⑭	2.857	3.000	3.143	3.214	3.286	3.429	3.500	3.571	3.643	3.714
⑮	2.667	2.800	2.933	3.000	3.067	3.200	3.267	3.333	3.400	3.467

Ⓐ Secondary reduction ratio
Ⓑ Drive sprocket
Ⓒ Driven sprocket

- If the straight portion of a course on which the machine can be run at maximum speed is longer, the machine should be so set that the maximum machine speed can be developed toward the end of the straight course, but care should be taken not to over-rev the engine.

- As a matter of fact, it is difficult to set the machine so as to best suit the entire course of the circuit. That is, some portions will have to be set with importance placed on the area where the result of the race is most affected. Also in this case, run through the entire course first and select the reduction ratio while taking a note of lap times so that the overall result is the best.

NOTE:

The technique of riding varies from rider to rider, and machine setting and power will also differ from machine to machine. Therefore, it is not clever to copy your machine setting from other riders at the beginning. Be sure to select the machine setting so that it matches your level of riding technique.

SUSPENSION TUNING

INTRODUCTION

No area of machine maintenance is more critical than proper suspension tuning. An improperly tuned suspension will keep even the best rider from attaining the full benefit of his machine's ability. Hence follow the instructions in this chapter to adjust the suspension to the rider's specifications and course conditions.

WHILE TUNING THE SUSPENSION, YOU MUST BEAR SOME IMPORTANT POINTS IN MIND:

- If the machine is new, break in the suspension with at least four hours of riding before making any setting evaluations or changes.

Break-in:
To afford better riding comfort, the rebound damping is set on a two steps softer side. After the break-in period, return the suspension unit to the standard position.

- The three major factors which must be considered in suspension tuning are RIDER WEIGHT, RIDER ABILITY, and TRACK CONDITIONS. Additional influences include the RIDER'S STYLE and POSITIONING on the machine.

- If you have any problem,make tests by changing your riding posture or position so that the cause of problem can be found out.

- It is a wise practice to adjust settings so as to best suit to straight lines, corners, or gaps, whatsoever you can most skillfully handle the machine in racing courses.

- Make setting changes in small increments; a little bit goes a long way, and it is very easy to overadjust a setting.

- The front and rear suspension should be balanced; when one is changed, the other might need to be changed similarly.

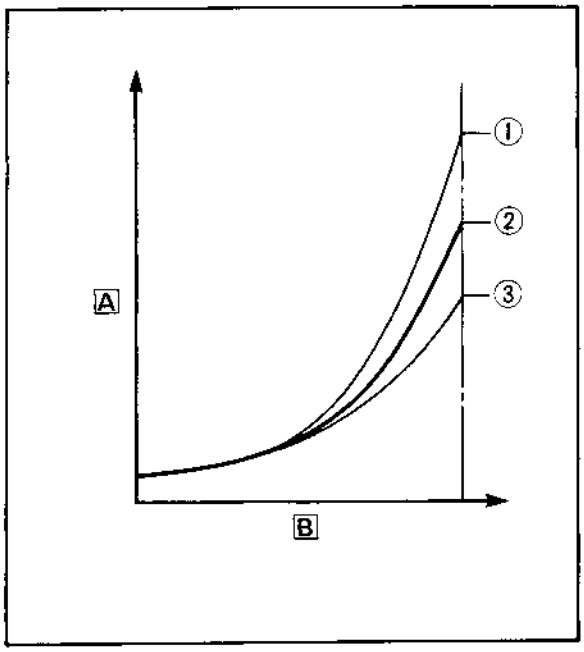
- When evaluating suspension performance the rider must make every effort to ride consistently and recognize the effects of his input; such things as changes in rider position and increasing fatigue may lead to incorrect judgments about necessary setting adjustments.

- If you have lost confidence in your suspension setting, reset it to the standard, and readjust it.

- When the proper settings have been determined for a particular track, they should be written down for reference upon returning to that track.

- Lubricate the shock mounting-eye pivots after break-in and after every race to prevent excess friction from affecting suspension performance.

FRONT FORK



Fork oil level

NOTE:

Compared with conventional type front forks, the up-side down front forks are very sensitive to variations in the oil level. Therefore, adjust the oil level with special care.

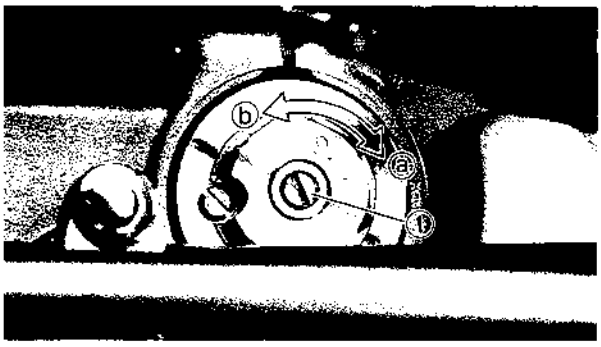
A change in the fork oil level will not affect the damping force at the early stage of fork travel, but it will have a great effect at the later stage.

- When the oil level is raised:
  The air spring in the later half stage of travel is stronger, and thus the front fork is harder.

- When the oil level is lowered:
  The air spring in the later half stage of travel is lessened, and thus the front fork is softer.

The oil level works most effectively at the end of fork travel.

A WEIGHT
B FORK STROKE
1 High oil level
2 Std oil level
3 Low oil level

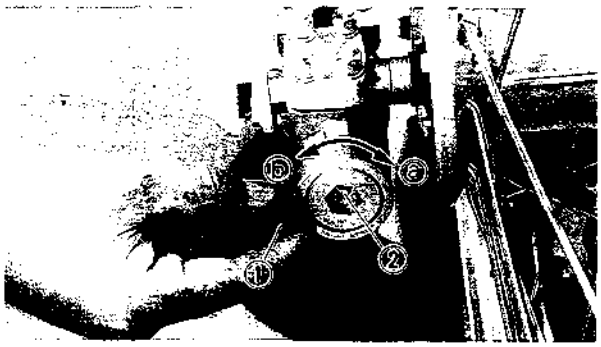


Rebound damping

The rebound damping can be adjusted by turning the adjuster 1 at the top of the fork.
Turning the adjuster clockwise increases the rebound damping.
Turning the adjuster counterclockwise decreases the rebound damping.

a Stiffer
b Softer

7



Compression damping

The compression damping can be adjusted by turning the adjuster ② at the bottom of the fork. Turning the adjuster clockwise increase the compression damping.

① Rubber cap

ⓐ Stiffer
ⓑ Softer

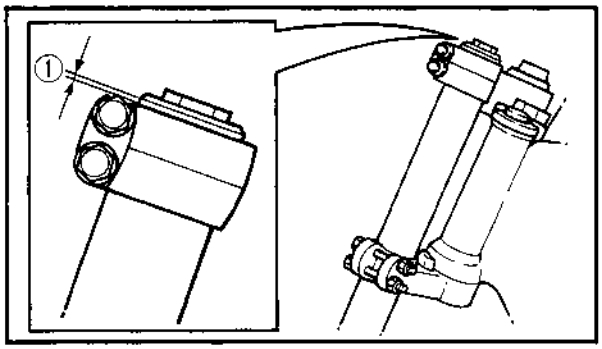
Fork spring

In addition to the standard type, two different type fork springs are sold. A proper spring should be selected according to the conditions of a racing course or the weight of the rider.

NOTE:

Always check the oil levels before changing or re-installing springs.

- Using the hard spring:
  Increases the preload; the fork becomes stiffer and rebounds more quickly.
- Using the soft spring:
  Decreases the preload; the fork becomes softer and rebounds more slowly.



Fork clamp position

Steering qualities are greatly affected by the fork clamp position (the amount of the outer tube projection over the handle crown).
When the projection is smaller, the front end becomes lighter due to change in weight bias. Also, it tends to understeer in turns and "wash out." When the projection is greater, the result is converse.
Be sure the front tire doesn't rub the fender when the fork tubes compress fully. Make this adjustment in 5 mm (0.2 in) increments.

① Front fork top end

CAUTION:

The outer tubes, both right and left, should be projected evenly.

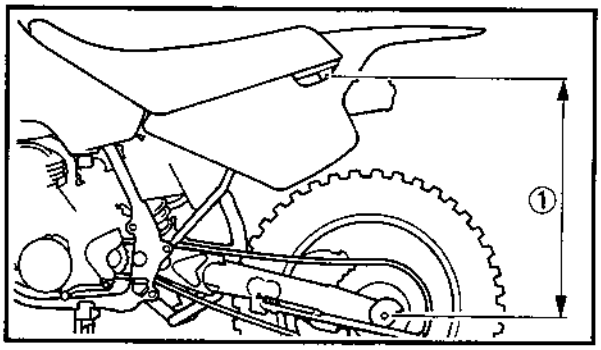
7

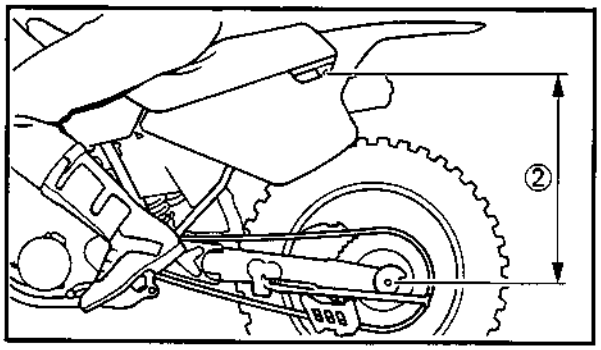
REAR SHOCK

Spring preload

The preload is adjusted by changing the set length of the spring.

- Shortening the set length: increases the preload; the shock becomes stiffer and rebounds more quickly.
- Lengthening the set length: decreases the preload; the shock becomes softer and rebounds more slowly.





NOTE:

The suspension spring preload adjustment varies depending on the rider's level of technique, weight, or preference, but the standard setting is that the suspension sinks one-third of the rear wheel travel with the rider sitting astride the seat.

Adjustment steps

1. Elevate the rear wheel by placing the suitable stand.
2. Measure the distance ① between bolt (rear wheel axle) center and bolt (rear fender mounting) center.
3. Remove the stand and sit on seat.
4. Measure the distance ② between bolt (rear wheel axle) center and bolt (rear fender mounting).
5. Calculate:
   Difference = ① − ②

Standard Difference:
90 ~ 100 mm (3.5 ~ 4.0 in)

6. Turn the spring preload adjuster so that specific difference is obtained.

Spring replacement

In addition to the standard spring, heavy and light springs are available. If the standard spring is improper for your purpose, select a proper one according to the rider's weight or course conditions.

- Using the hard spring:
  The spring rate is higher; the spring is stiffer and rebounds more quickly.
- Using the soft spring:
  The spring rate is lower; the spring is softer and rebounds more slowly.

Rebound damping

The rebound damping is adjustable by turning the adjusting ring next to the shock's lower mounting bracket.

- Turning the adjuster clockwise increases the rebound damping; the shock rebounds slower.
- Turning the adjuster counterclockwise decreases the rebound damping; the shock rebounds faster.

CAUTION:

Adjust the damping in increments of 2 clicks. And test the performance by riding after adjustment.

For reference purposes, always record the settings for a cold shock.

Compression damping

The compression damping can be adjusted by turning the adjuster at the shock reservoir (right side).

- Turning the adjuster clockwise increases the compression damping. That is, the rear shock is hard to sink and therefore, the cushion is felt hard.
- Turning the adjuster counterclockwise decreases the compression damping. That is, the rear shock sinks easily and therefore, the cushion is felt soft.

CAUTION:

Adjust the damping in increments of 2 clicks. And test the performance by riding after adjustment.

TROUBLESHOOTING IMPROPER SETTINGS

Listed below are some symptoms of improper suspension settings and the most likely means of correcting them.
The proper settings can be achieved by applying the information in this chapter in a scientific, methodical manner; this does not mean, however, that you must be a scientist or trained technician to succeed. Simply take time to think about the changes you believe are necessary, check them against the symptoms and cures described here, make the changes in small increments, and take notes on the changes and their effects.

SYMPTOMS OF THE FRONT FORKS

Too hard

1. The front forks are too stiff
   ... the springs are too strong or compression damping is too high.
2. The front forks stiffens up at the end of stroke
   .... the fork oil level is too high.
3. The front forks operate but a hard ride is felt
   .... the spring preload is too high or air is built up in fork.

NOTE:
Release any air pressure that may build up air each fork.

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Too soft
The front forks dive much when the brake or throttle is not applied.
1. Fork oil level is low.
2. Springs are too soft.
3. Spring preload is low.

NOTE:
Keep the oil level and compression damping constant on right and left.

SYMPTOMS OF THE REAR SHOCK

Too hard
1. The suspension is too stiff
   .... compression damping is too high.
   .... spring is too hard.
2. The suspension operates but a hard ride is felt
   .... unbalance between the spring and rebound damping.
3. Spring preload is too hard.

NOTE:
Apply the molybdenum disulfide grease to pivot points of the rear shock.

Too soft
On landing after a big jump, bottoming occurs (Normally OK)
.... spring preload is too soft or compression damping is too soft.
.... spring is too soft.

READJUSTMENT OF THE SUSPENSION

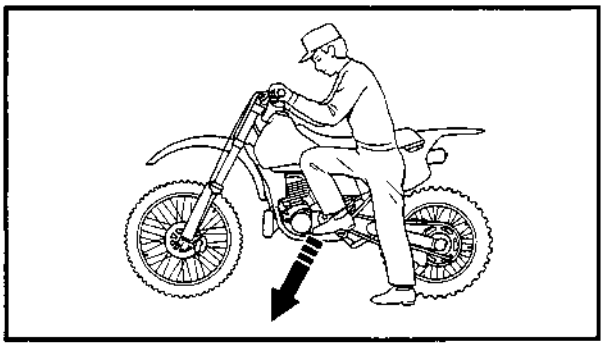
Type of course

Many corners	Lower the front end slightly. (Increase the fork tube height 5 mm (0.2 in))
Fast course with many jumps	Raise the front end slightly. (Decrease the fork tube height 5 mm (0.2 in)) Slower steering gives greater stability at high speed.
Deep sandy whoops	Raise the front end slightly. To gain stability

After making such preliminary adjustments, begin the actual on-track testing and evaluation.

Remember

1. Always make changes in small increments.
2. Make sure the rider is consistent in his evaluation of improper suspension performance.
3. A change in the front suspension might require a change in the rear, and vice versa.



FRONT AND REAR COMPATIBILITY

Use this procedure to determine if the suspension is balanced reasonably well: Hold the bike upright (remove the sidestand). While standing next to the machine, lightly pull on the front brake, place one foot on the footpeg closest to you, and push down hard. If the bike maintains its level attitude as the suspension is compressed, the bike is rather well balanced. Sit astride the bike and take a riding posture. Next check to see that the bike is in a horizontal position. If one end drops noticeably more than the other, however, the front and rear are not compatible and must be readjusted to achieve better balance.

GENERAL SYMPTOMS AND REMEDY

This is one of the most effective adjustment procedures but suspension settings should vary depending on the condition of racing courses or the rider's preference.

NOTE:

If you have lost confidence in your suspension setting, reset it to the standard, and readjust it.

Front end searching during down hill or acceleration at out of corner:

Front fork is soft.

.... Step 1 Decrease the tube height 5 mm (0.2 in).

...Step 2 Increase compression damping 2 clicks.

. . . Step 3 Increase the oil level 10 mm (0.4 in).
. . . Step 4 Use alternate stiffer fork spring.

Front end "knifes" or oversteers in turns:

(Front end tends to turn inward)
Front fork is too soft.

.... Step 1 Increase oil level 10 mm (0.4 in).
. . . Step 2 Increase compression damping 2 clicks.
. . . Step 3 Decrease tube height 5 mm (0.2 in).

NOTE:
Heavier or expert riders may need the heavy spring.

Front end pushes or "washes out" in turns:

(When a front wheel tends to push outward rather than "bite" in a turn)
Front fork is too stiff.

. . . Step 1 Bleed air.
. . . Step 2 Decrease compression damping 2 clicks.
. . . Step 3 Decrease oil level 5 ~ 10 mm (0.2 ~ 0.4 in).
. . . Step 4 Increase tube height 5 mm (0.2 in).

NOTE:
The softer spring may be required for lighter or less experienced riders.

Front fork doesn't respond to small bumps in sweeping turns:

Front fork is too hard.

.... Step 1 Decrease oil level 10 mm (0.4 in).

... Step 2 Increase the rebound damping 2 clicks.

... Step 3 Use soft spring.

Rear end "kicks" when braking over bumps:

The shock probably has too little rebound damping.

...Step 1 Check the operation of the brake actuated suspension.

...Step 2 Increase the rebound damping 2 clicks.

Rear tire won't "hook up" out of corners:

(A lack of traction coming out of turns)

The shock may be too stiff.

.... Step 1 Decrease the rear shock spring preload 2 mm (0.08 in).

....Step 2 Decrease the rebound damping 2 clicks.

.... Step 3 Use soft spring (In case of a lightweight rider).

Bike lands on the front wheel off high speed jumps:

(This may be due to improper riding posture)
Rebound damping is too fast (or spring is too hard).

.... Step 1 Increase rebound damping by 2 clicks each time.

.... Step 2 Decrease the shock spring preload 2 ~ 3 mm (0.08 ~ 0.12 in).

.... Step 3 Decrease the compression damping 2 clicks.

Front and rear of the bike bottom off high-speed jumps:

(If harsh bottoming occurs once or twice per lap of the race)
Front and rear suspension system are too soft

.... Step 1 F/F: Increase oil level 10 mm (0.4 in).
R/S: Increase spring preload in 2 mm (0.08 in) increments.

.... Step 2 F/F: Increase compression damping by 2 clicks or use hard spring.
R/S: Increase compression damping by 2 clicks or use hard spring.

NOTE:
After making adjustments, check front and rear compatibility.

Adjustment depending on bottoming condition: (Rear shock)

- Bottom at low speed
  .... Increase spring preload in 2 mm (0.08 in) increments until maximum preload is achieved.
  If bottoming still occurs use alternate hard spring.
- Bottom after successive 3 or 4 jumps:
  .... Decrease rebound damping 2 clicks.

NOTE:

The rear shock on this machine may mislead some riders.

a. The rear shock bottoms when the spring and damping are overcome by the total weight of the machine and rider (due to full stroke).
b. A bottoming sensation may actually be the inability of rider and machine weight to overcome an overly stiff spring or excessive damping.

Observe the rear end off jumps; if it doesn't approach bottoming, try lowering the spring preload and damping.

SETTING RECORD TABLE

The data shown here is an example of entry. For your actual use, copy the necessary data from the Owner's Manual.

Event name	Supercross			
Date	Aug/19			
Weather	Fine/25°C (77°F)			
Place	Anaheim			

Setting specs.

Ignition timing	1.1 mm (0.043 in)			
Spark plug	B8EG (0.5 mm)			
Carburetor Main jet Jet needle Needle jet Cutaway Pilot jet Air screw	 #440 6F-16-3 Q-8 (#247) 3.5 #40 1 and 1/2			
Gearing	50/14 (3.571)			
Front fork Spring type Tube height Oil quantity level weight Rebound damping Compression damping	 k=0.390 0 mm (0 in) 505 cm^3 (14.7 Imp oz, 14.2 US oz) 120 mm (4.72 in) Fork oil "01" 6 8			
Rear shock Spring type Preload Rebound damping Compression damping	 k=4.8 240 mm (9.45 in) 8 11			
Front tire (pressure) Rear tire (pressure)	BRIDGESTONE 96.6 kPa (1.0 kg/cm^2, 14 psi) BRIDGESTONE 96.6 kPa (1.0 kg/cm^2, 14 psi)			

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