



**YAMAHA**

**YZ490N**

**OWNER'S SERVICE  
MANUAL**

[www.legends-yamaha-enduros.com](http://www.legends-yamaha-enduros.com)

## IMPORTANT NOTICE

THIS MACHINE IS DESIGNED STRICTLY FOR COMPETITION USE ONLY. IT IS ILLEGAL TO OPERATE THIS VEHICLE ON STREET. OFF ROAD USE ON PUBLIC LAND MAY BE ILLEGAL. PLEASE CHECK YOUR LOCAL RIDING AREA REGULATIONS. SUSPENSION ON THIS MACHINE CAN BE ADJUSTED. FOR DETAILS OF TUNING, REFER TO THE RACE PREPARATION AND TUNING MANUAL.

### SAFETY WARNINGS:

1. **GASOLINE IS HIGHLY FLAMMABLE:**
  - \* Always turn off the engine when refueling.
  - \* Take care not to spill on the engine or exhaust pipe/muffler, when refueling.
  - \* If any gasoline spills on the engine or exhaust pipe/muffler, wipe it off immediately.
  - \* Never refuel while smoking or in the vicinity of an open flame.
2. If you should swallow some gasoline or inhale a lot of gasoline vapor, or allow some gasoline to get in your eye(s), see your doctor immediately. If any gasoline spills on your skin or clothing, immediately wash it with soap and water, and change your clothes.
3. Do not touch any moving or heated areas.
  - \* The engine and exhaust pipe/muffler are heated up. Park the machine in a place where pedestrians or children are not likely to touch the machine.
  - \* Do not park the machine on a slope or soft ground; the machine can easily overturn.
4. When transporting the machine in another vehicle, be sure it is kept upright and that the fuel petcock is turned to the "OFF" position. If it should lean over, gasoline may leak out of the carburetor or fuel tank.
5. Never start your engine or let it run for any length of time in a closed area. The exhaust fumes are poisonous and can cause loss of consciousness and death within a short time. Always operate your machine in an area with adequate ventilation.
6. Always wear a helmet, gloves, boots, trousers, and jacket for motocross riding.
7. The sidestand should be removed whether in races or practice.

YZ490N

### OWNER'S SERVICE MANUAL

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## TO THE NEW OWNER

This manual will provide you with a good basic understanding of features, operation, and basic maintenance and inspection items of this vehicle.

**PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY BEFORE OPERATING YOUR NEW MACHINE.** If you have any questions regarding the operation or maintenance of your machine, please consult your Yamaha dealer.

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

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

**CAUTION:** . . . . . A CAUTION indicates special procedures that must be followed to avoid damage to the machine.

**WARNING:** . . . . . A WARNING indicates special procedures that must be followed to avoid injury to a machine operator or person inspecting or repairing the machine.

## NOTICE

Some data in this manual may become outdated due to improvements made to this model in the future. If there is any question you have regarding this manual or your machine, please consult your Yamaha dealer.

### F.I.M. MOTORCYCLE WEIGHTS

#### Weights of motorcycles without fuel

The minimum weights for motocross motorcycles are:

for the class 125 cc . . . . . minimum 88 kg (194 lb)

for the class 250 cc . . . . . minimum 98 kg (216 lb)

for the class 500 cc . . . . . minimum 102 kg (225 lb)

In modifying your bike (e.g., for weight reduction), take note of the above limits of weight.

**OVERSEAS SERVICE  
OVERSEAS OPERATIONS  
YAMAHA MOTOR CO.,LTD.**

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# **1 GENERAL INFORMATION**

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# 1 GENERAL INFORMATION

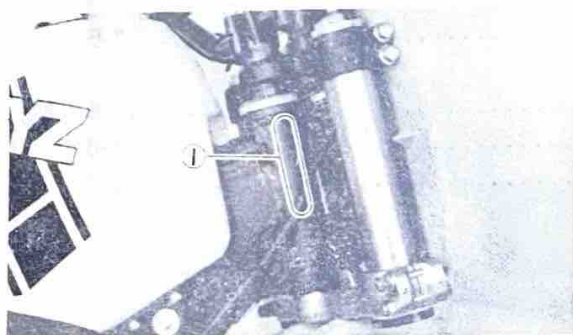
## MACHINE IDENTIFICATION

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

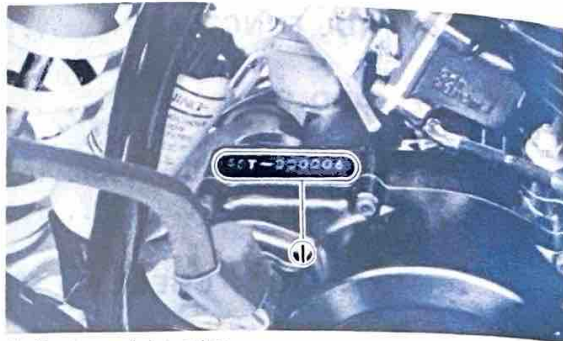
The vehicle identification number is stamped on the right of the steering head pipe.



1. Vehicle identification number

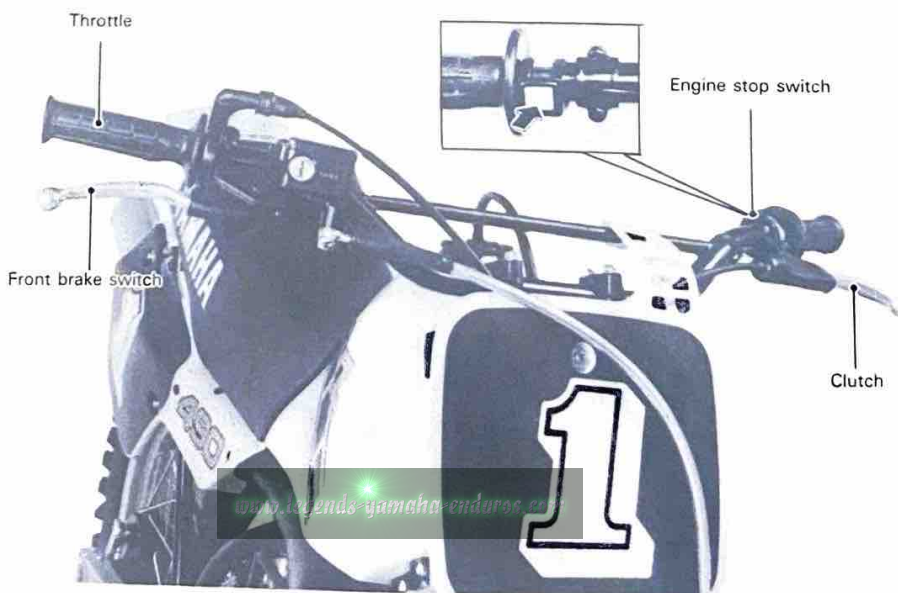
### Engine serial number

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

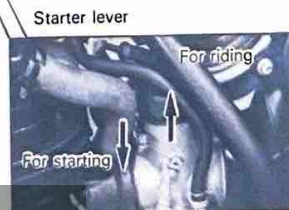
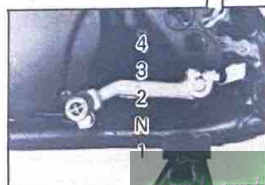
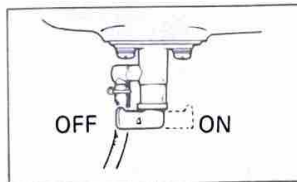
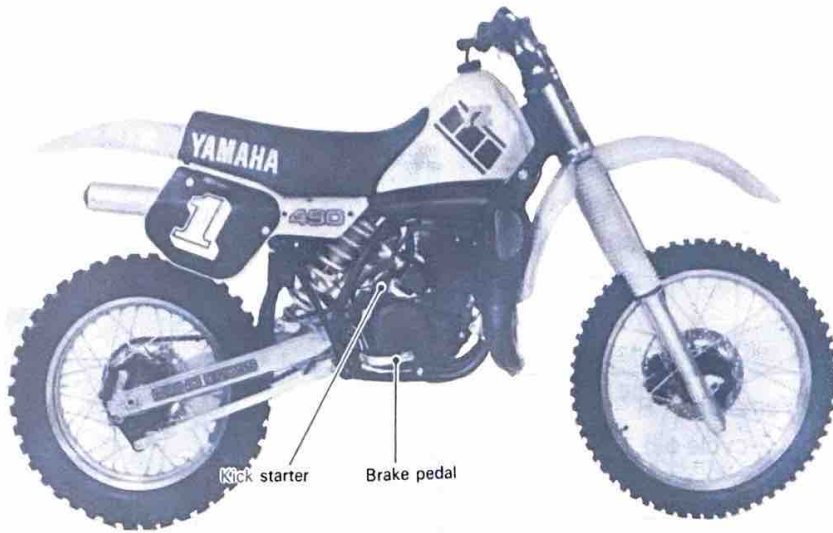


1. Engine serial number

## CONTROL FUNCTIONS







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## FUEL AND OIL

### Fuel

Recommended fuel:  
Premium fuel with an octane rating  
of at least 90

Fuel tank capacity:  
10.5 L (2.31 Imp gal, 2.77 US gal)

### Engine 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.

Recommended oil	Mixing ratio
Castrol R30 A545 A747	20 : 1

### CAUTION:

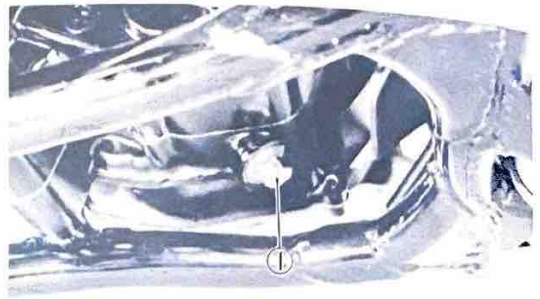
Never mix two types of oil in the same  
batch; clotting of the oil could result.

### Transmission oil

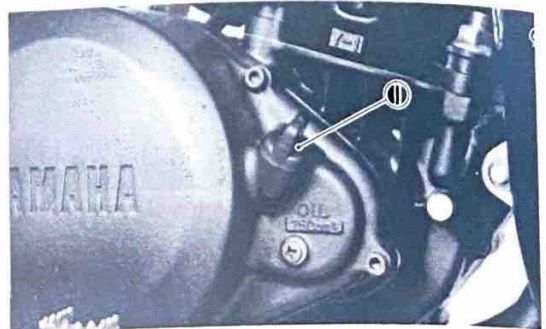
Recommended oil:  
Yamalube 4-cycle oil or SAE  
10W 30 SE motor oil

Periodic oil change:  
750 cm<sup>3</sup> (0.66 Imp qt, 0.79 US qt)

Overhaul:  
800 cm<sup>3</sup> (0.70 Imp qt, 0.85 US qt)



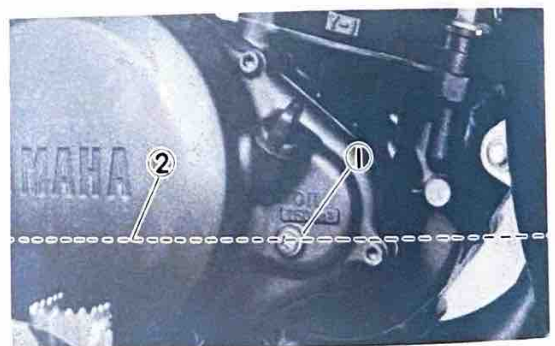
1. Drain plug



1. Filler plug

### CHECKING OIL LEVEL

On the right side of the engine there is a  
checking screw. To check, warm up the  
engine for 1 minute. Stop engine. Leave the  
engine as it is for a few minutes and place the  
machine upright, then remove the oil level  
checking screw. If oil flows out, the oil level  
is correct.



1. Checking screw

2. Oil level

## PREOPERATION CHECKS

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

### INSPECTION AND MAINTENANCE

#### Cooling water

Check that water is filled up to the radiator filler cap.

#### Fuel

Check that a fresh mixture of oil and gasoline is filled in the fuel tank.

#### Gear oil

Check that the gear oil level is correct.

#### Gear shifter and clutch

Check that gears can be shifted correctly in order and that the clutch operates smoothly.

#### Brakes

Check the play of both front and rear brakes and their braking effect.

#### Brake actuated suspension

Check that the brake pedal height and free play are correct.

Then check that it operate correctly.

#### Chain

Check chain slack and alignment. Check that the chain is lubricated properly.

#### Wheels

Is the tire pressure correct?

Check for excessive wear. Check for loose spokes and have no excessive play.

#### Steering

Check that the handlebars can be turned smoothly and have no excessive play.

#### Front forks and rear shock

Check that they operate smoothly and there is no oil leakage.

#### 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.

#### Muffler

Check that the muffler is tightly mounted and has no cracks.

#### Sprocket

Check that the rear wheel sprocket tightening bolt is not loose.

#### Bolts and nuts

Check the chassis and engine for loose bolts and nuts.

#### Fuel and oil

Check the fuel tank, fuel cock, carburetor, engine bottom for leakage.

#### Lead wire 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?

\*The machine should be checked and serviced regularly so that only a simple, minor adjustment of settings is required prior to a race.

# STARTING AND BREAK-IN

## CAUTION:

Before starting the machine, perform the checks in the preoperation check list.

## 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

Shift the transmission into neutral. Turn on the fuel cock and push the starter lever down on the carburetor. With the throttle completely closed, kickstart the engine with a smooth, firm stroke. Using the starter lever as required, run the engine at idle or slightly higher until it warms up; this usually takes about one or two minutes. The engine is warmed up when it responds normally to the throttle with the starter lever raised completely.

## CAUTION:

Do not warm up the engine for extended periods.

### Starting a warm engine

Do not push down the starter lever. Open the throttle slightly and kickstart the engine with a smooth, 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 preoperation 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 switch.
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; instructions for this are on page 3-7. 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. Check the entire machine for loose screws, bolts, and nuts.
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.

**CAUTION:**

1. After the break-in period is completed, check the entire machine for loose fittings and fasteners. Tighten all such fasteners as required.
2. 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, RINGS 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.

---

## 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 can force water into wheel bearings, front fork seals, brake drums, and transmission seals. Avoid using high-pressure hoses such as those found in coin-operated car washes.

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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.

## 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 10W 30 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.

## **2** REGULAR MAINTENANCE AND ADJUSTMENT

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## 2 REGULAR MAINTENANCE AND ADJUSTMENT

### 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 in 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-cycle oil 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	●	●			●	N-86, N-86G, N-2G, N-2C, B8EG, B8EGV Gap: 0.5 ~ 0.6 mm (0.020 ~ 0.024 in)
DRIVE CHAIN Lubricate, slack, alignment Replace	●	●			●	Use chain lube Chain slack: 20 ~ 30 mm (0.8 ~ 1.2 in)



Item	After break-in	Every race	Every third	Every fifth	As required	Remarks
OUTSIDE NUTS AND BOLTS Retighten	●	●				
AIR FILTER Clean and oil Replace	●	●			●	Use Foam air-filter oil or SAE 10W30 motor 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 linings/pads	● ● ● ●	● ● ● ●			●	Pad wear limit: 0.8 mm (0.43 in) Lining wear limit: 2 mm (0.08 in)
FRONT FORKS Inspect and adjust Replace oil Replace oil seal	● ●	●		●	●	Fork oil 15 wt
REAR SHOCK Inspect and adjust lube and retighten	● ●	● ●				Lithium base grease
CHAIN GUARD AND ROLLERS Inspect and replace					●	
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	● ●	● ●		●	●	Medium weight wheel bearing grease
TIRE, WHEELS Inspect air pressure, wheel run-out, tire wear and spoke looseness Retighten sprocket bolt Inspect bearings Replace bearings Lubricate	● ●	● ●	● ●		●	Medium weight wheel bearing grease
THROTTLE, CONTROL CABLE Check routing and connection Lubricate	● ●	● ●				Yamaha cable lube SAE 10W30 motor oil
OUTSIDE NUTS AND BOLTS Retighten	●	●				

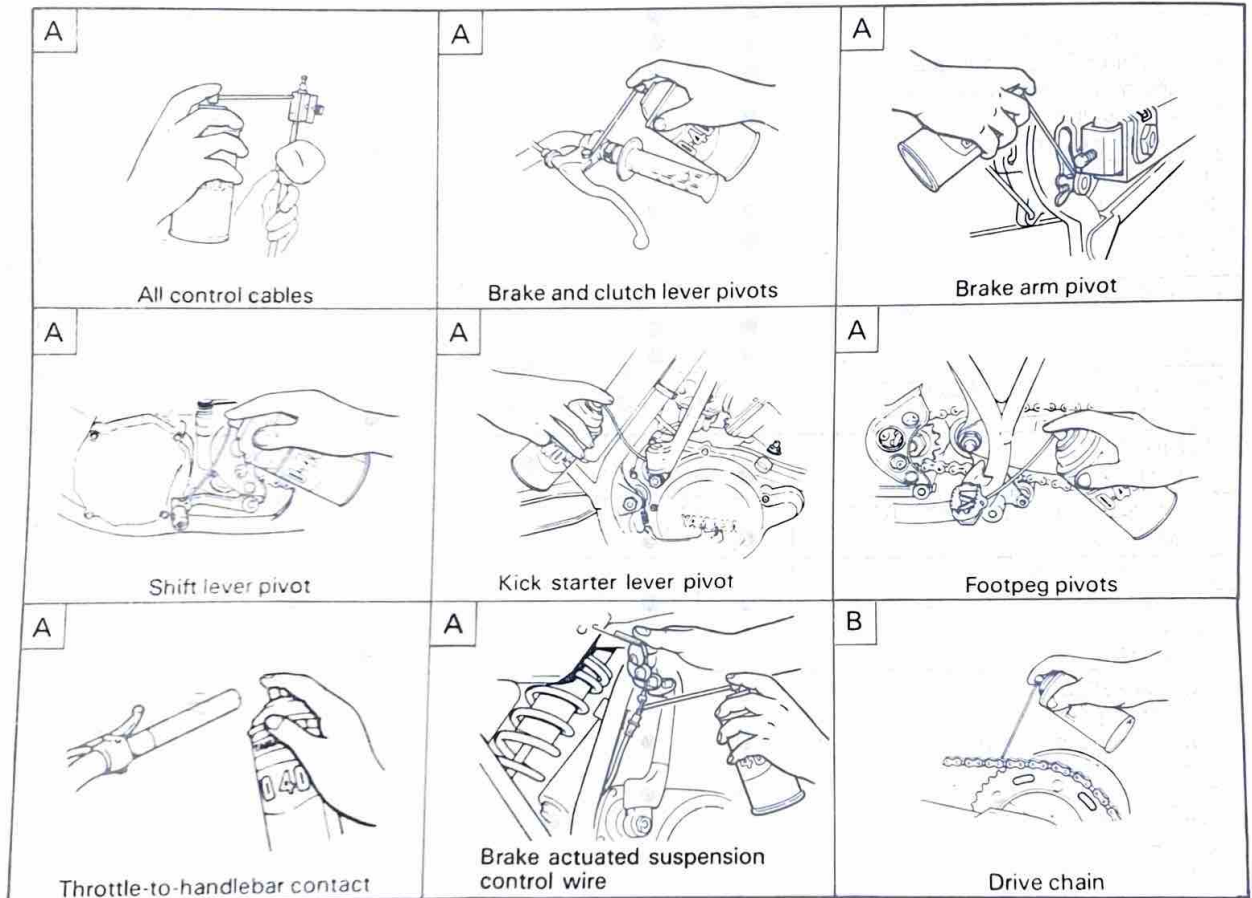
# LUBRICATION

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

Before lubricating, thoroughly clean the machine of sand, dirt and water.

A. Use Yamaha cable lube or WD-40 on these areas.




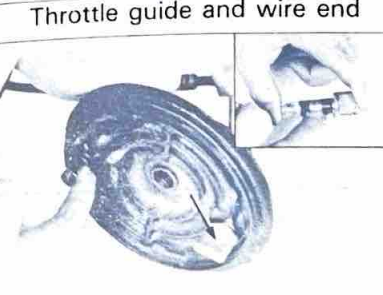
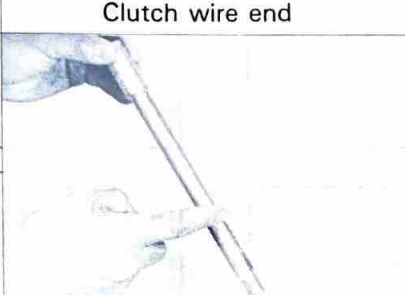

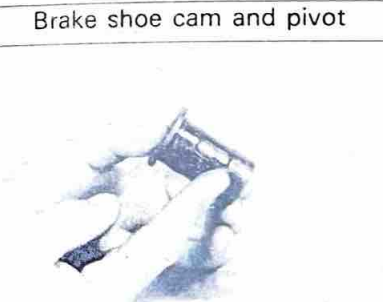
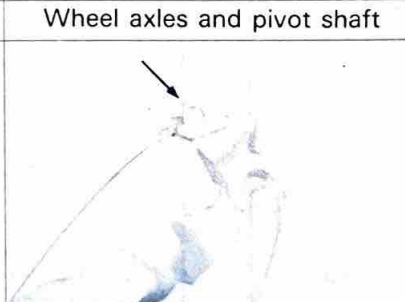
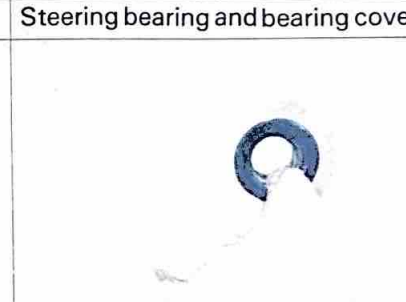
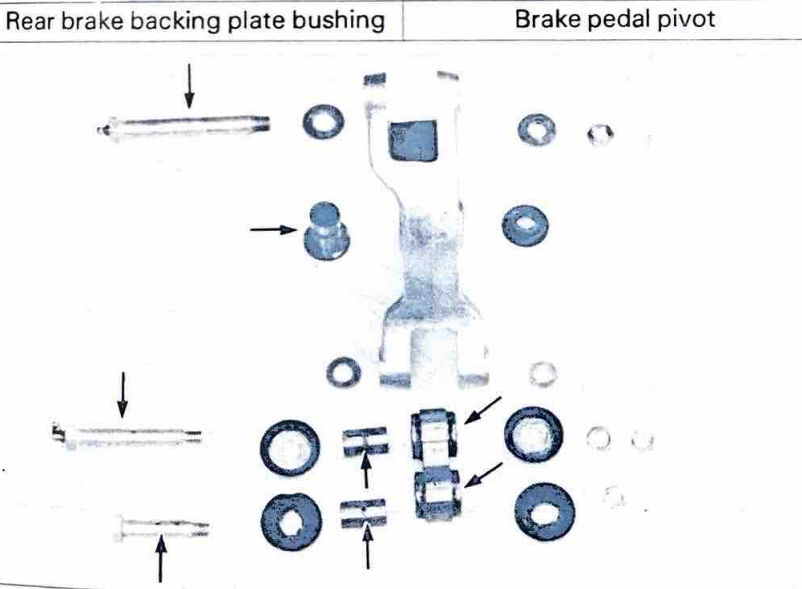
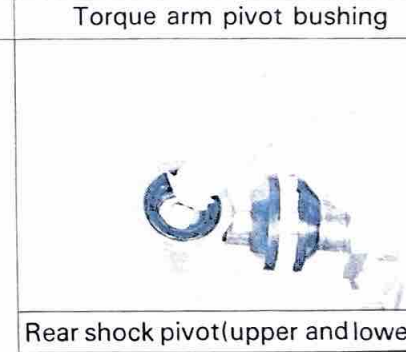
B. Use racing chain lube.



- C. Lubricate the following areas with high-quality, lightweight lithium soap base grease:

**CAUTION:**

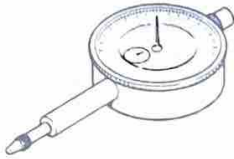
Wipe off any excess grease, and avoid getting grease on the brake disc and brake shoes.

		
		
		
		
<p>Relay arm and connecting rod Connecting rod bearing and oil seal</p>		

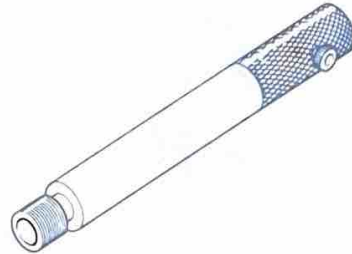
## SPECIAL TOOLS

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

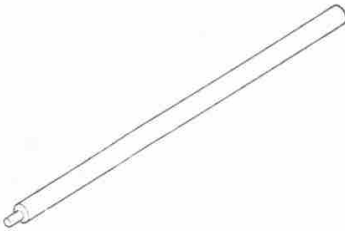
1 Dial gauge (T/No. YU-03097)



2 Dial gauge stand (T/No. YU-01256-1)

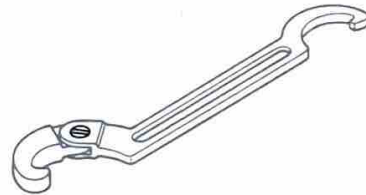


3 Dial gauge extension (T/No. YU-01256-2)



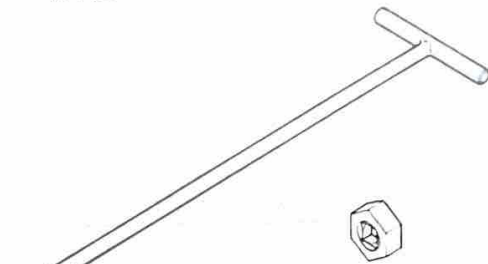
Tools 1, 2, and 3 are used to set the ignition timing.

4 Steering nut wrench (T/No. YU-01268)



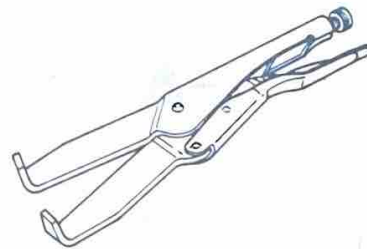
Use this wrench to put the proper tension on the steering head bearings.

5 Fork cylinder holder and adapter (T/No. YM-33962, YM-01326)



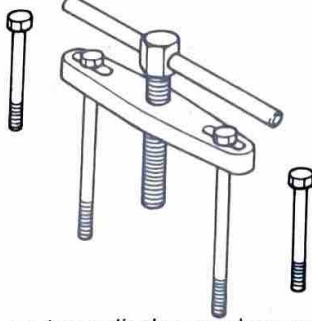
Use these tools to remove and install the fork cylinder.

6 Clutch holding tool (T/No. YM-91042)



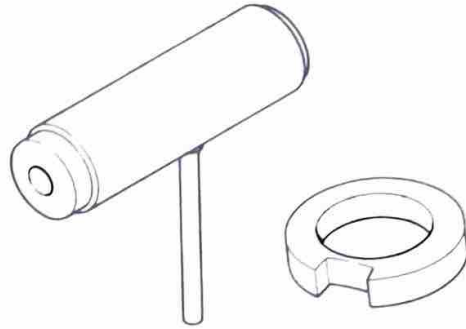
Use this tool to hold the clutch boss while removing or tightening the clutch boss nut.

7 Crankcase separating tool (T/No. YU-01135)

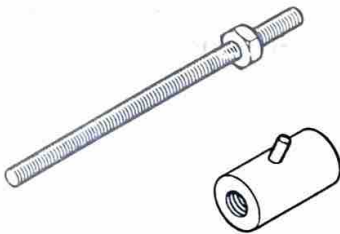


This tool is used to split the crankcases as well as remove the crankshaft from either case.

8 Crankshaft installing tool (T/No. YU-90058) and spacer (T/No. YU-90059)

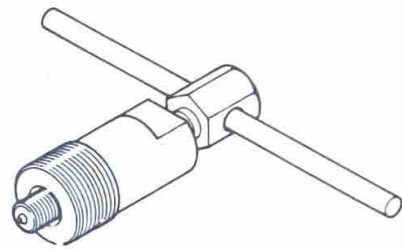


9 Crankshaft installing bolt and adapter (T/No. YU-90060, YU-90063)



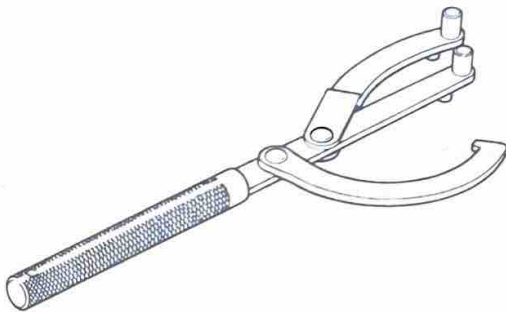
Tools 8 and 9 are used to install the crankshaft.

10 Rotor puller (T/No. YM-01189)



This tool is used to remove the magneto.

11 Universal rotor holder (T/No. YU-01235)



12 Fork seal and bushing service tool (T/No. YM-08020)



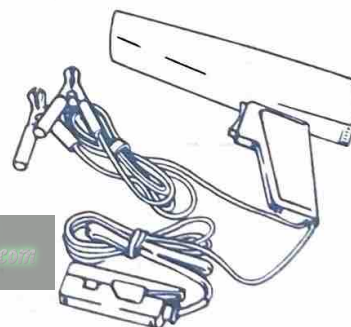
This tool is used to install the fork oil seal.

13 Yamaha pocket tester (T/No. YU-03112)



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

14 Timing light (T/No. YU-08037)

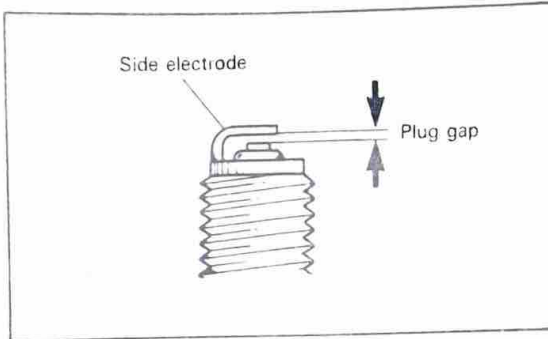


# MINOR MAINTENANCE AND ADJUSTMENTS

## Spark plug

Standard spark plug:  
N-86, N-86G, N-2G, N-2C/  
(CHAMPION)  
B8EG, B8EGV/(NGK)

Spark plug gap:  
0.5 ~ 0.6 mm (0.020 ~ 0.024 in)



1. Whenever a new spark plug is installed, the gap must be checked and adjusted properly. Use a wire feeler gauge to check the gap, and adjust the gap by bending the side electrode gently.
2. Be sure to clean the gasket surface and threads before installing the spark plug. Torque the plug to specification.

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

### NOTE:

If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque is 1/2 to 1/4 turns past finger tight. Have the spark plug torque to the correct value as soon as possible with a torque wrench.

## Ignition timing

### Checking

Ignition timing is checked with a timing light by observing the position of the case mark and rotor mark.

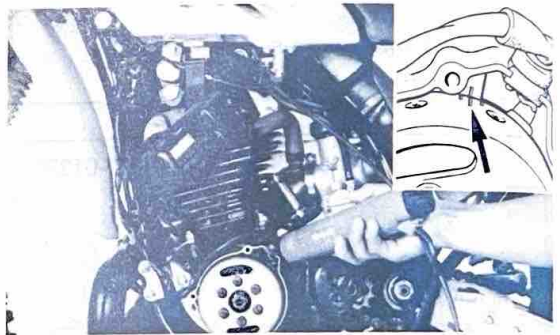
### NOTE:

If no tachometer and firing light are available, make a check using a dial gauge in the manner specified in "ADJUSTMENTS".

1. Remove the crankcase cover (L).
2. Connect the timing light to the spark plug lead wire.
3. Start the engine and keep it running at the specified speed. Use a tachometer for checking.

Specified speed: 2,000 r/min

4. While keeping the engine running at a specified speed, check that the rotor mark is aligned with the case mark. If they are not aligned, adjust the ignition timing.

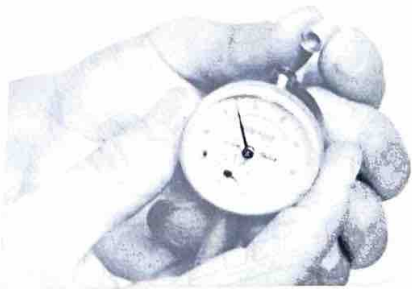


### Adjustment

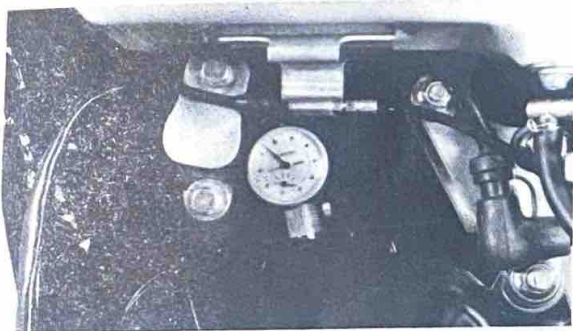
The ignition timing must be set precisely to ensure that the ignition spark occurs at the proper time to provide optimum engine power.

- 1 Remove the spark plug, and the left-hand crankcase cover.

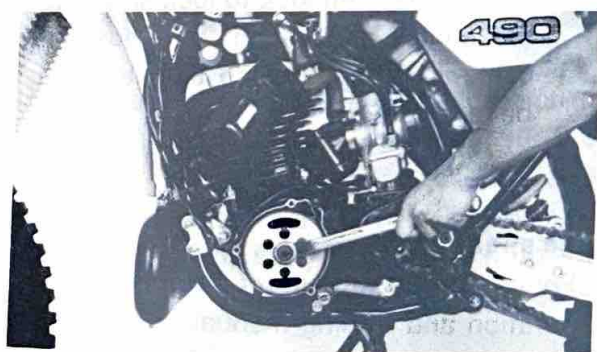
2. Unscrew the dial gauge cap and screw the dial gauge extension onto the dial gauge.



3. Insert the dial gauge with the extension into the dial gauge stand.
4. Screw the dial gauge stand into the spark plug hole.



5. Rotate the magneto rotor 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. Zero the dial gauge at TDC.

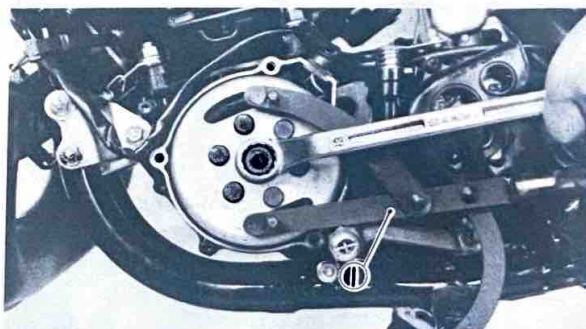


6. From TDC, rotate the rotor clockwise until the dial gauge indicates that the piston is at a specified distance from TDC. At this point, the scribed marks on the rotor and the crankcase should be aligned.

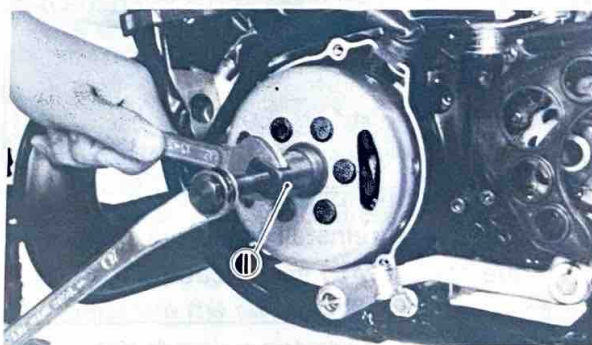
Ignition timing: B.T.D.C.  
 $2.0 \pm 0.1$  mm ( $0.079 \pm 0.004$  in)



7. If the marks are not aligned, punch a new mark on the crankcase in line with the rotor mark.
8. Remove the flywheel magneto using the magneto holder and flywheel puller.

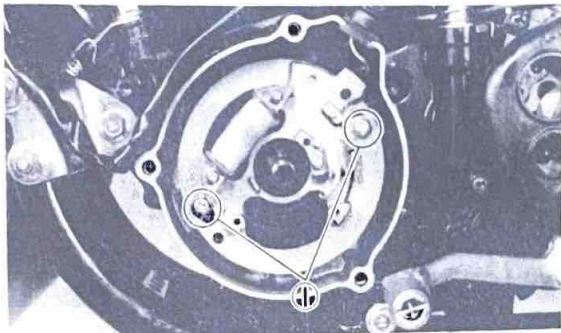


1. Rotor holding tool (YU-01235)



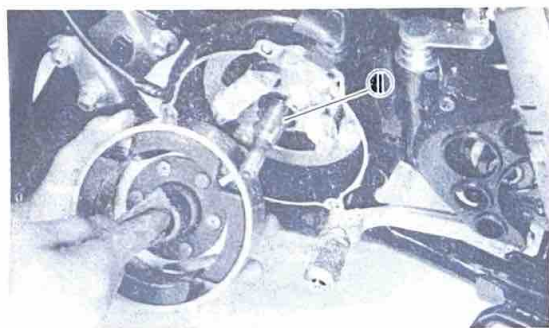
1. Flywheel magneto puller (YM-01189)

- Loosen the base set screws and turn the base right or left until the base mark aligns the new mark. And tighten the base set screws.



1. Set screw

- Thoroughly degrease the crankshaft and flywheel magneto and fit the woodruff key to the keyway correctly.



1. Woodruff key

- Reinstall the flywheel and tighten the nut.

Tightening torque:  
85 Nm (8.5 m·kg, 60 ft·lb)

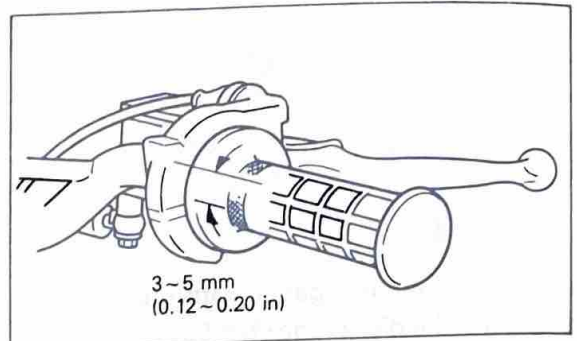
- Remove the dial gauge assembly and stand, and reinstall the spark plug. Torque the plug to specification.

Spark plug torque:  
25 Nm (2.5 m·kg, 18 ft·lb)

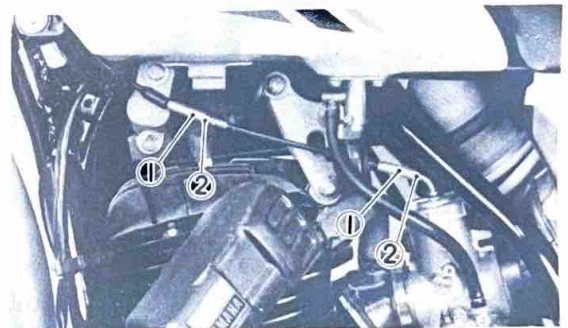
- Reinstall the left-hand crankcase cover and the side cover.

### Throttle cable

- Check the free play in the throttle twist grip; the play should be 3 ~ 5 mm (0.12 ~ 0.20 in) at the edge of the inner flange of the grip.



- To adjust the free play, loosen the lock nut on the cable adjuster and turn the adjuster in or out to achieve the proper free play. Retighten the locknut.



1. Adjuster

2. Locknut

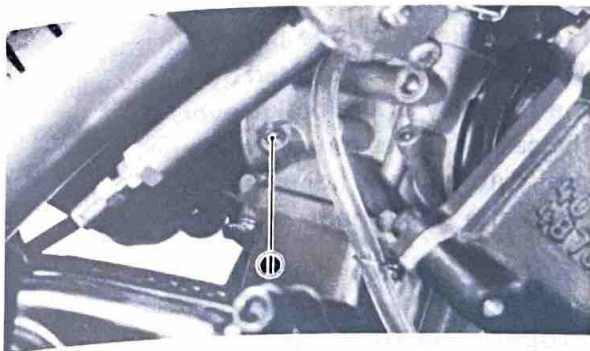
- After adjustment, start the engine and check throttle operation. Turn the handlebars from lock to lock and note if the engine speeds up; if it does, the cable adjustment is too tight and must be readjusted.

### Idle speed

\*For carburetor tuning, refer to the Race preparation and Tuning manual.

- Screw in the pilot air screw until it is lightly seated.
- Back out by the specified number of turns. Start the engine and let it warm up.

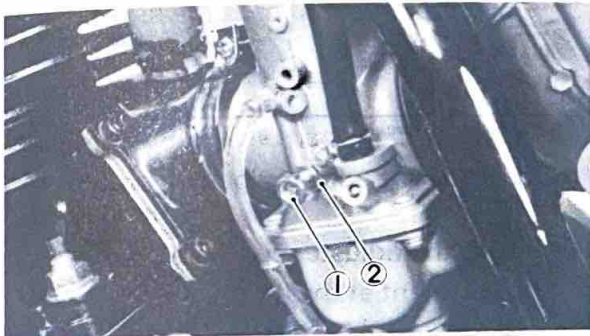




1. Pilot air screw

Pilot air screw:  
1 and 3/4 ± 1/4 turns out

- Loosen the locknut on the throttle stop screw and turn the screw until the idle is at the desired rpm.



1. Throttle stop screw

2. Locknut

- Turn the pilot air screw in or out in 1/8-turn increments to achieve the highest rpm with just the pilot screw.
- Once again, turn the throttle stop screw to attain the desired idle rpm, and tighten the locknut.

The throttle response off idle should be crisp and clean, without any hesitation. If the engine is completely warmed up and hesitates off idle, turn the pilot air screw in or out in 1/8-turn increments until the problem is eliminated.

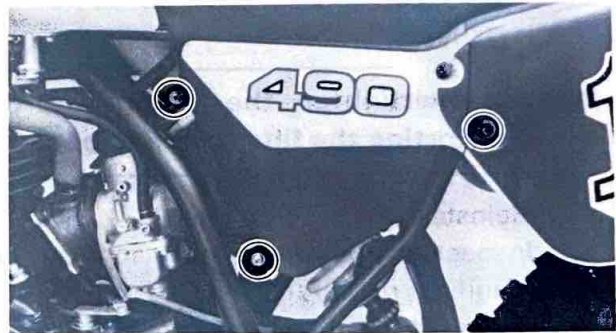
### Air filter

Proper air filter maintenance is the biggest key to preventing premature engine wear and damage. All elements of the air filter system should be maintained after every moto; engine life will be prolonged and power output will remain consistent.

### 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. In addition, carburetor jetting would be significantly affected, with subsequent poor performance and possible overheating.

- Remove the left side cover from the machine.



- Remove the fitting nut and remove the air filter element as shown below.



1. Fitting nut

- Separate the element from the filter cage.
- Wash the element gently but thoroughly in solvent, squeeze the solvent out of the element, and allow the element to dry.
- Pour a small quantity of **foam-air-filter oil** on the element and work it thoroughly into the foam. Squeeze out the excess oil.
- Reinstall the element on the filter cage, and coat the sealing edge of the element assembly with light grease to provide an airtight seal.



7. After checking the air inlet hose for any obstructions, carefully reinstall the element assembly in the air filter box. Reinstall the fitting nut and tighten it.

**CAUTION:**

Do not overtighten the fitting nut to avoid distorting the filter element cage.

8. Reinstall the left side cover.
9. Inspect the air filter joint and intake manifold rubber for tears and cracks. Replace them if any damage is found.

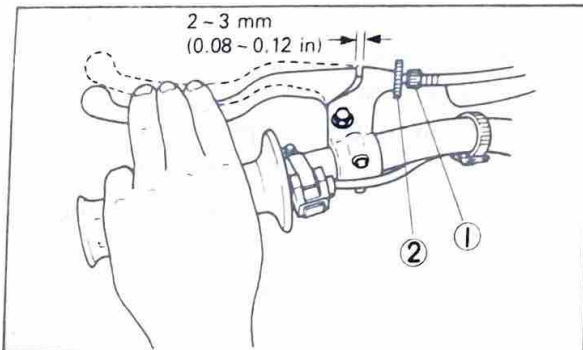
**NOTE:**

Each time filter element is serviced check inside air box for any signs of dirt or dust.

**Clutch lever**

To avoid clutch slipping or dragging, the clutch mechanism and cable must be adjusted correctly.

1. Adjust the cable adjuster at the handle lever to provide 2 ~ 3 mm (0.08 ~ 0.12 in) of free play at the clutch lever pivot; tighten the locknut.



1. Adjuster 2. Locknut

\*For the mechanical adjustment, refer to 3-17 of "Clutch mechanism adjustment".

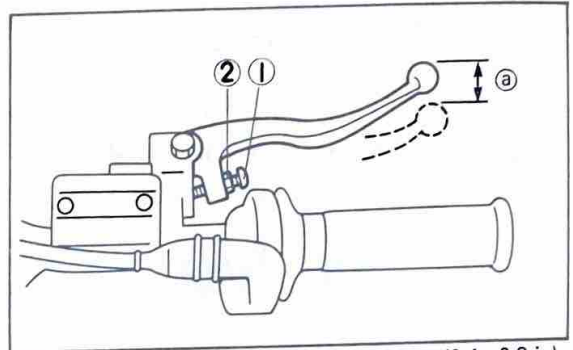
**Front brake**

**Front brake lever free play adjustment**

The brake can be adjusted by simply adjusting the free play of the brake lever. The piston in the caliper moves forward as a brake pad wears out, automatically adjusting the clearance between the brake pads and brake disc.

**CAUTION:**

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



1. Adjuster 2. Locknut a. 10 ~ 20 mm (0.4 ~ 0.8 in)

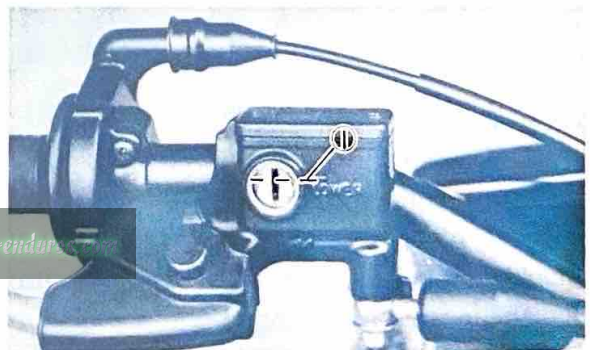
1. Loosen the adjuster locknut on the brake lever.
2. Turn the adjuster so that the brake lever movement at the lever end is 10 ~ 20 mm (0.4 ~ 0.8 in) before the adjuster contacts the master cylinder piston.
3. After adjusting, tighten the locknut.

**Brake fluid level**

Insufficient brake fluid may let air enter the brake system, possibly causing the brakes to become ineffective.

Before riding, check the brake fluid level and replenish when necessary; observe these precautions:

1. Use only the designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.



1. Lower level

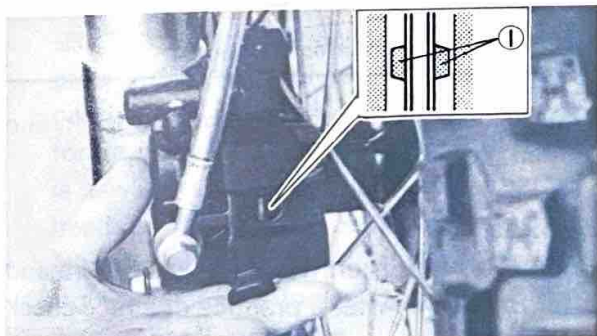
2. Add the brake fluid to the reservoir so that all the air in it is completely expelled.

Brake fluid: DOT #3

3. Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
4. 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. Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.
6. Have a Yamaha dealer check the cause if the brake fluid level goes down.

### Front brake pad

To check, examine the pads in the front brake. If any pad is worn to the wear limit, replace both pads in the caliper.



1. Wear indicator

Wear limit: 0.8 mm (0.03 in)

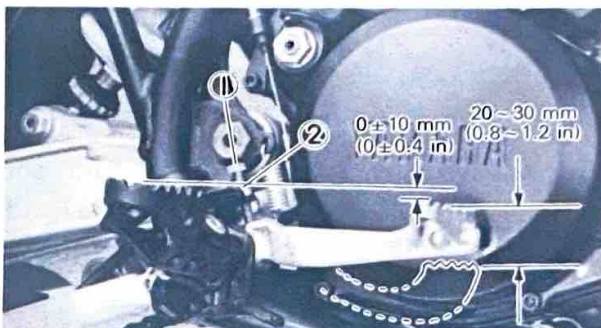
### Rear brake

In adjusting the rear brake, the pedal height should first be set and then the free play should be adjusted.

### CAUTION:

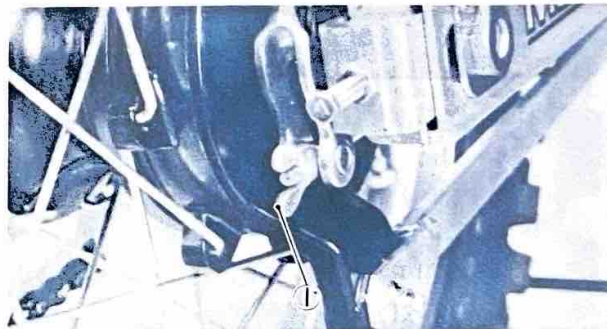
To permit the interlocking mechanism with the rear suspension to operate correctly, set the brake pedal height and free play properly.

1. Loosen the locknut on the brake pedal height adjuster, and turn the adjuster to achieve the desired pedal height according to rider preference. Tighten the locknut.



1. Adjuster 2. Lock nut

2. Turn the adjusting nut on the end of the brake rod in or out to achieve the desired free play within 20 ~ 30 mm (0.8 ~ 1.2 in).



1. Adjusting nut

### Drive chain

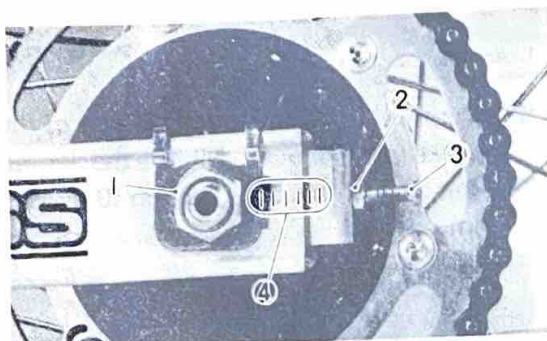
To ensure reliability and prolong chain and sprocket life, the chain must be adjusted and lubricated after every race. In addition, an excessively dirty or muddy chain should be wiped or brushed to remove as much dirt and mud as possible before lubricating.

1. With the machine standing vertically and without rider on it, check the slack at the position shown below; the normal vertical slack is 20 ~ 30 mm (0.8 ~ 1.2 in). If the free play exceeds 30 mm (1.2 in), the chain must be adjusted.



a. 20–30 mm (0.8–1.2 in)

2. Loosen the axle securing nut, and loosen both locknuts on the chain adjuster bolts.



- |                      |                   |
|----------------------|-------------------|
| 1. Axle securing nut | 3. Adjusting bolt |
| 2. Locknut           | 4. Adjust mark    |

3. Turn both adjuster bolts an equal amount to achieve the proper chain free play. Check to see that the adjusting marks on both chain adjusters align with the corresponding marks on the swing arm on each side to ensure proper axle alignment.
4. Tighten the locknuts on the adjusting bolts.
5. Tighten the axle securing nut to specification.

Axle nut: 100 Nm (10.0 m·kg, 70 ft·lb)

6. Check the brake pedal free play.

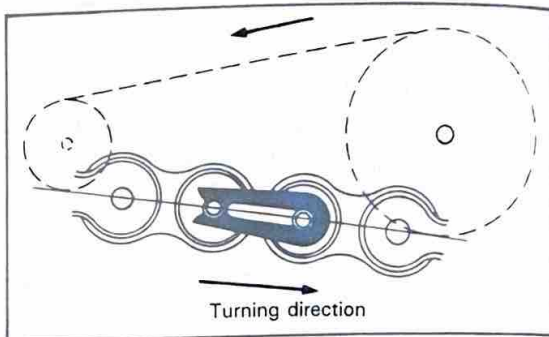
#### CAUTION:

The brake pedal free play and the rear axle alignment must always be checked after the chain is adjusted or the rear wheel is removed.

7. After removing any excessive dirt or mud, spray chain lube between both rows of sideplates and on the chain rollers.
8. To clean the chain thoroughly, remove the chain from the machine, place it in solvent, and brush off as much dirt as possible. Then remove the chain from the solvent, dry the chain, and lubricate it immediately to prevent rust. Reinstall the chain on the machine and adjust it.
9. During reassembly, the master link clip must be installed with the rounded end facing the direction of travel.

#### NOTE:

The chain should be cleaned and lubricated after every use of the machine.



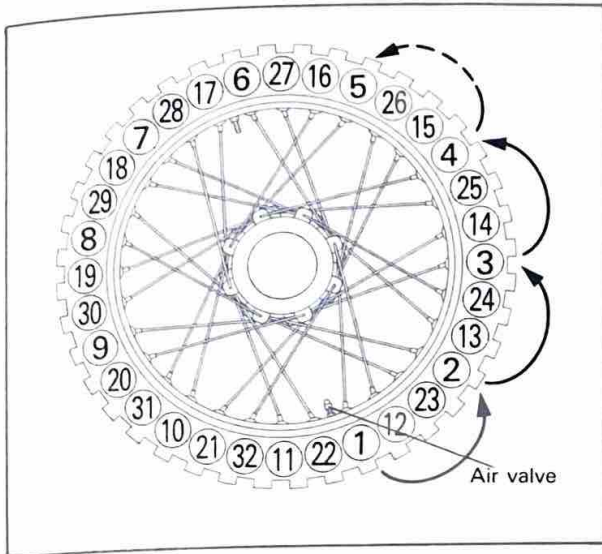
\*For the maintenance of the sprocket and chain, refer to 4-4.

#### Spokes

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

1. Perform the retightening at an interval of three spokes as shown below.

2. The retightening will be completed at No. 32 after three turns of the wheel. If there still spokes that are short of torque, then repeat the same procedure.

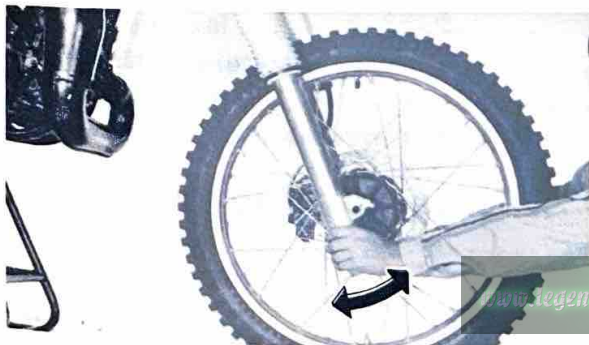


Nipple:

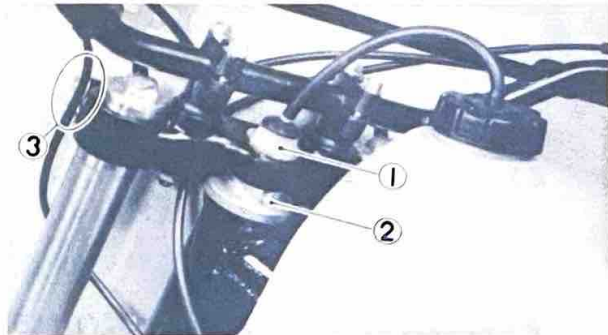
6 Nm (0.6 m · kg, 4.3 ft · lb)

### Steering head

1. Block the front wheel off the ground, grab the bottom of the fork legs, and gently push and pull the legs to check for free play in the steering head. If there is any noticeable play in the steering head, the bearings must be adjusted. In addition, check to see that the forks swing from lock to lock without any binding or catching. If any such binding is noticed, the bearings should be cleaned, inspected, and readjusted after thorough greasing.



2. To adjust the bearings, first loosen the steering fitting nut and inner tube pinch bolts.

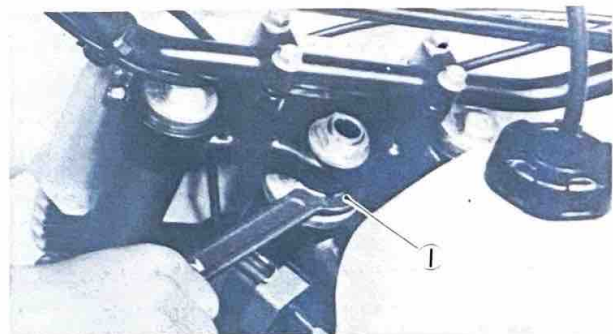


1. Steering fitting nut 2. Ring nut 3. Pinch bolts

3. Tighten the ring nut beneath the handle crown with the steering nut wrench until the free play is eliminated and there is no binding.

Steering ring nut

10 Nm (1.0 m · kg, 7.2 ft · lb)



1. Steering nut wrench (YU-01268)

4. Torque the steering fitting nut and inner tube pinch bolts to specification.

Fitting nut:

85 Nm (8.5 m · kg, 61 ft · lb)

Pinch bolt:

23 Nm (2.3 m · kg, 17 ft · lb)

### CAUTION:

After a short running period, check steering head for proper adjustment.

[www.legends-yamaha-enduros.com](http://www.legends-yamaha-enduros.com)

# **3 ENGINE MAINTENANCE AND REPAIR**

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# 3 ENGINE MAINTENANCE AND REPAIR

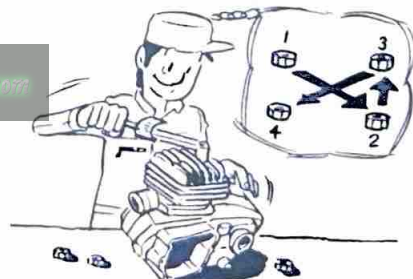
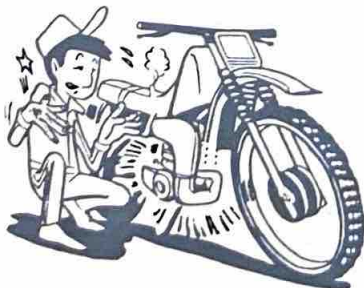
## PREPARATION FOR SERVICE

Prior to beginning any work on the engine, take note of the following bits of advice; they will greatly facilitate your engine maintenance and repair:

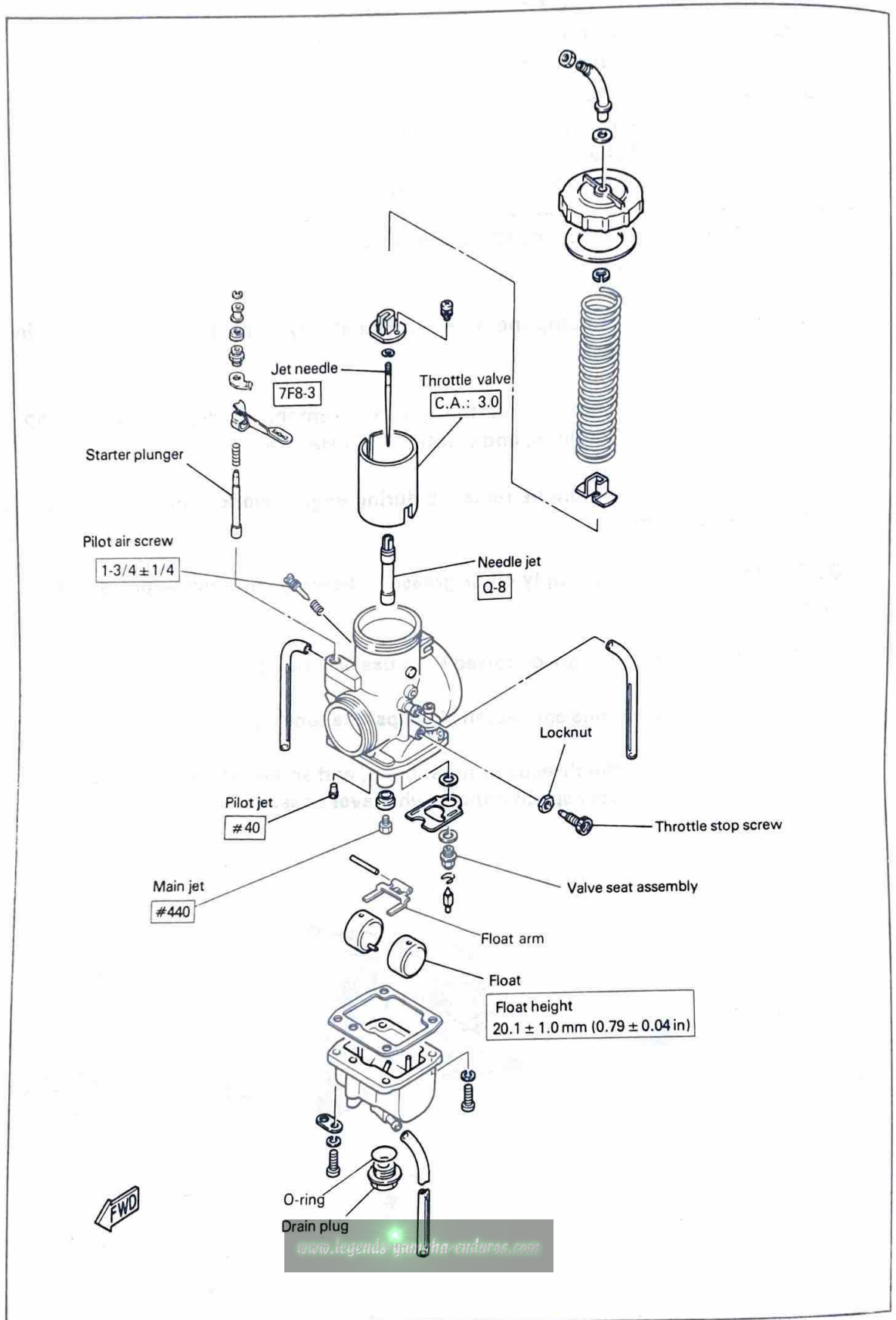
NOTE:

The engine removal is required for the servicing of the transmission, crankshaft, and bearings, oil seals, etc, of the crankcase.  
The procedures in page 3-3 to 3-18 are not accompanied by the engine removal.

- Clean your machine as described in the General Information section entitled, "Cleaning and Storage";
- Group the parts of each component on individual trays, and arrange the parts in the order of their removal;
- When replacing parts, always use the genuine Yamaha article to maintain optimum performance, durability, and safety;
- All gaskets and seals should be replaced during engine work, and all gasket surfaces should be clean;
- During assembly, always apply oil or grease to bearing surfaces to protect them upon initial start-up;
- Replace all circlips which are distorted from use or disassembly;
- Always replace cotter pins and piston pin clips after one use;
- Always clean and oil the threads of nuts, bolts, and screws during assembly, and torque them to the proper specifications whenever possible.



# CARBURETOR



For details of carburetor tuning, refer to the Race Preparation and Tuning Manual.

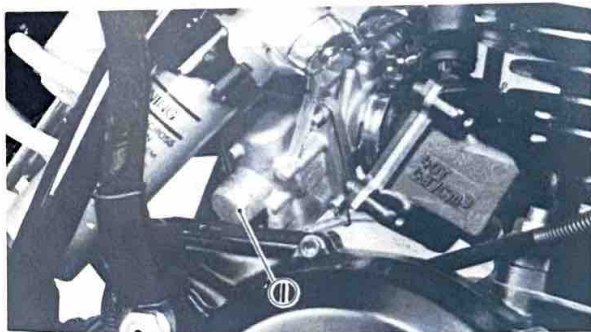
### Turning and repair parts

Part name	Size	Part number
Main jet (STD)	# 420	137-14143-84
	# 430	137-14143-86
	# 440	137-14143-88
	# 450	137-14143-90
	# 460	137-14143-92
Pilot jet (STD)	# 35	193-14142-35
	# 40	193-14142-40
	# 45	193-14142-45
Throttle valve (STD)	2.5	40T-14112-25
	3.0	40T-14112-30
	3.5	40T-14112-35
Needle jet (STD)	Q-6	8A7-14141-56
	Q-8	8A7-14141-58
	R-0	8A7-14141-RO
Valve seat assembly	φ3.5	23X-14107-35

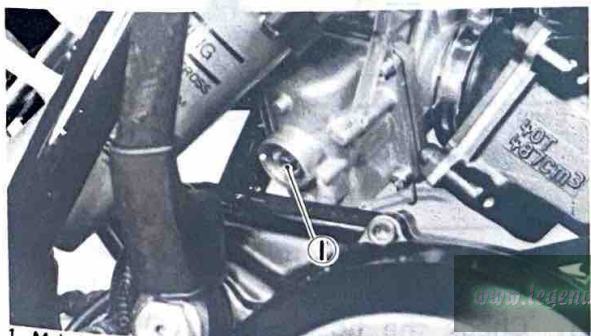
### Main jet replacement

#### NOTE:

It is not necessary to remove the carburetor to replace the main jet: Loosen the hose clamps on the manifold and air cleaner joint, rotate the carb, and remove the drain plug from the float bowl. The main jet can thereby be removed and replaced.



1. Drain plug



1. Main jet

Standard Main Jet Size: # 440

### WARNING:

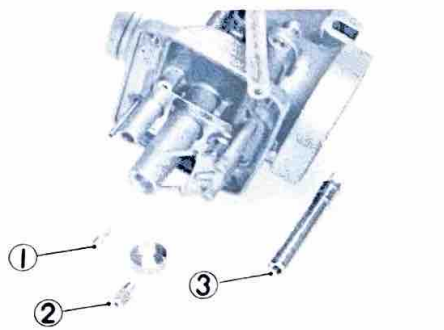
When the drain plug is removed, the fuel in the float bowl will drain. Do not remove the plug when the engine is hot. Place a rag under the carb when removing the plug to catch the fuel. Remove the plug in a well-ventilated area, away from any open flame. Always clean and dry the machine after completing main jet changes.

### IMPORTANT:

The carburetor has been set for operation at or near sea level; in most instances, it will not require changes. Some conditions, however, do demand carb setting changes to maintain performance. If this is the case, make the changes in small increments and check the results with a spark plug check. Improper settings can lead to poor performance or possible engine damage. If you are in doubt as to what setting changes to make, consult your Yamaha dealer.

### Inspection

1. Examine carburetor body and fuel passages. If contaminated, wash carburetor in petroleum-based solvent. Do not use caustic carburetor cleaning solutions. Blow out all passages and jet with compressed air.

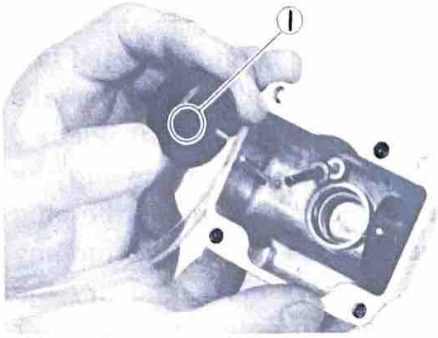


1. Pilot jet

2. Main jet

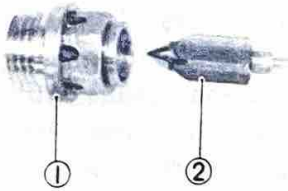
3. Needle jet

2. Examine condition of floats. If floats are damaged, they should be replaced. The floats should be installed with the "LIP" mark facing upward.



1. "UP" mark

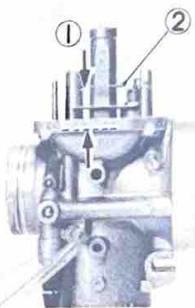
3. Inspect inlet float valve and seat for wear or contamination. Replace these components as a set.



1. Valve seat      2. Float valve

4. Hold the carburetor in an upside down position. Measure the distance from the mating surface of the float chamber (gasket removed) to the tip of the float arm using a gauge.

Float height:  $20.1 \pm 1.0$  mm ( $0.79 \pm 0.04$  in)

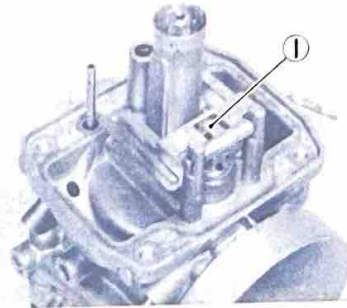


1. Float height      2. Float arm

**CAUTION:**

**Check the float valve and valve seat for wear before adjustment.**

**Make the adjustment by bending the tang on the float arm.**



1. Tang

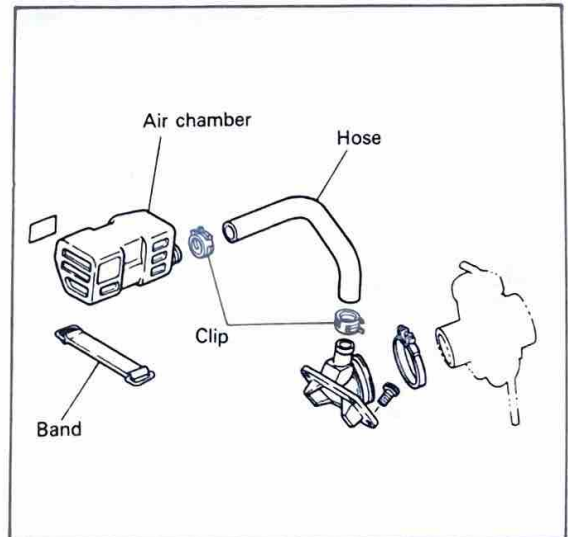
**YAMAHA ENERGY INDUCTION SYSTEM (Y.E.I.S.)**

**CAUTION:**

**Never attempt to modify the Yamaha Energy Induction System.**

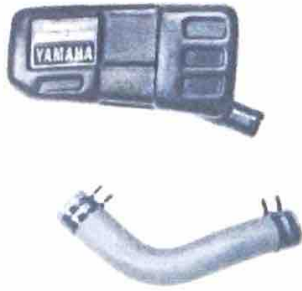
The air chamber and hose should be handled with special care.

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.

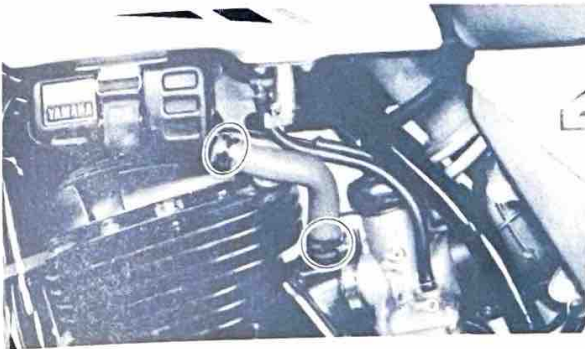


**Inspection**

1. Check the hose and air chamber for cracks or any other damage. If there is any cracks or damage, replace them.



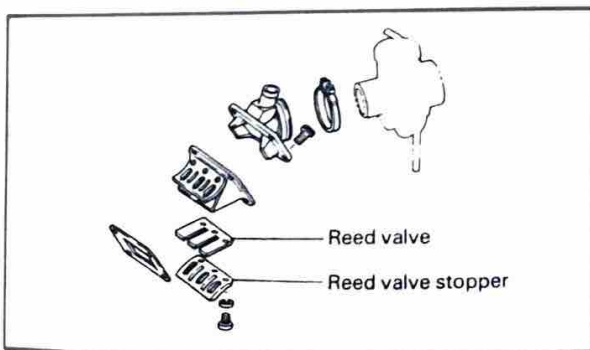
2. Check the tightness of hose clip, and retighten as required.



**NOTE:**

The fuel tank is attached to the Y.E.I.S. air chamber. When removing or mounting the fuel tank, first remove the band holding the air chamber.

**REED VALVE**

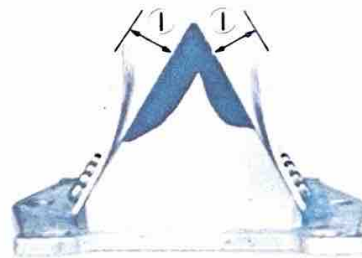


**Inspection**

1. Inspect rubber intake manifold for signs of weathering, checking or other deterioration.

2. Inspect reed petals for signs of fatigue and cracks. Reed petals should fit flush or nearly flush against neoprene seats. If in doubt as to sealing ability, apply suction to carburetor side of assembly. Leakage should be slight to moderate.
3. Check valve stopper height. If beyond tolerance, adjust or replace. If it is 0.3 mm (0.012 in) more or less than specified, replace the valve stopper.

Valve stopper height:  
10.5 ± 0.2 mm (0.413 ± 0.008 in)

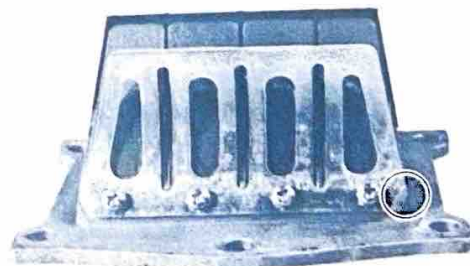


1. Valve stopper height

4. Check reed valve for bending. If beyond tolerance, replace reed valve.

Reed valve bending limit:  
0.6 mm (0.024 in)

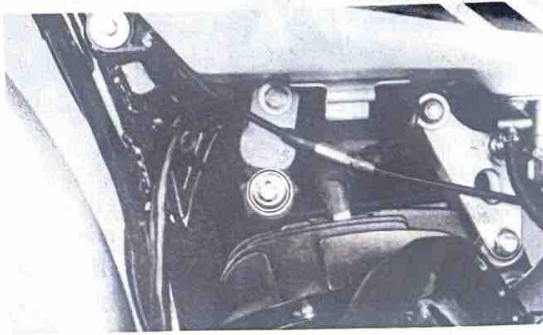
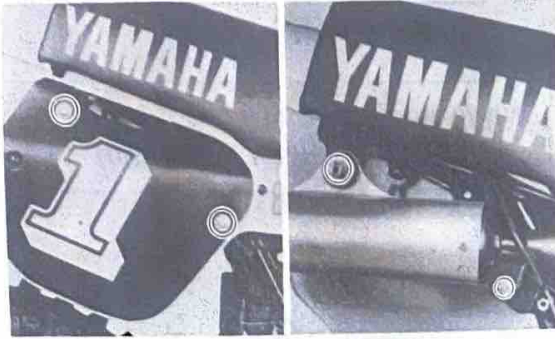
5. During reassembly, note the cut in the lower corner of the reed and stopper plate. Use as aid to direction of reed installation.



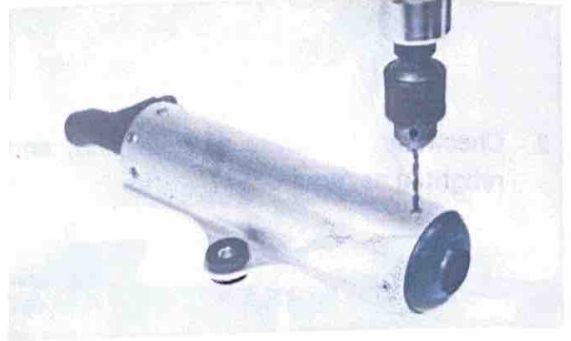
## MUFFLER

### Removal

1. Remove side cover.
2. Remove muffler and silencer mounting bolts and loosen the muffler joint screws.
3. Unhook coil springs at muffler to cylinder joint and remove muffler.



3. When the silencer gets a large carbon build up inside, remove the rivets with a 4 mm drill and replace the fiber in it. After the replacement, make sure that the silencer is secured by new rivets.

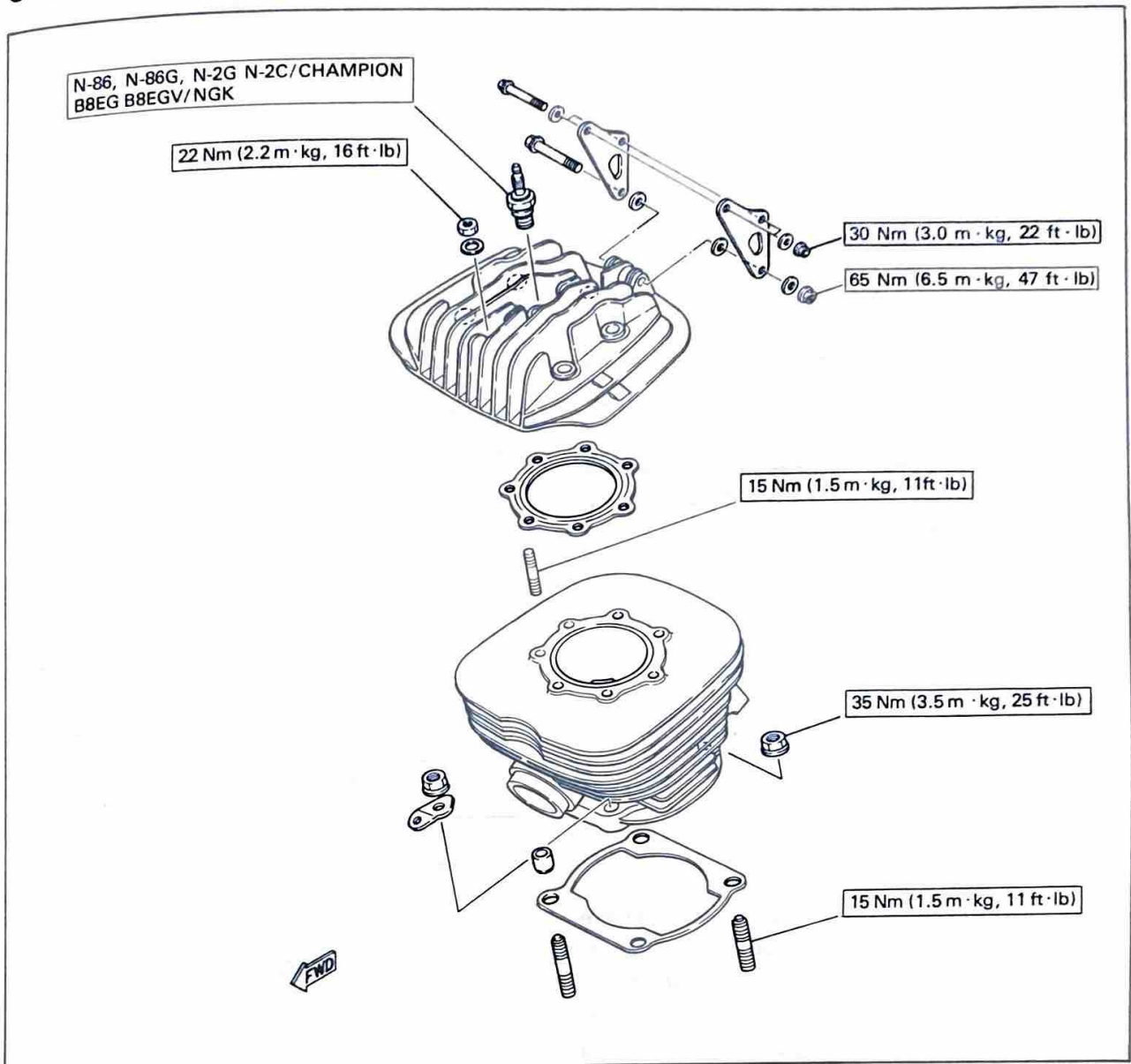


### Maintenance

1. Using a rounded scraper, remove excess carbon deposits from manifold area of exhaust pipe.
2. Check the exhaust pipe and muffler mounting bracket for cracks. If it has excessive cracks repair or replace it.

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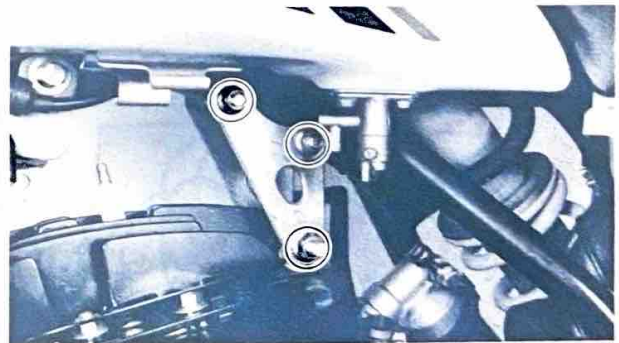
# CYLINDER HEAD



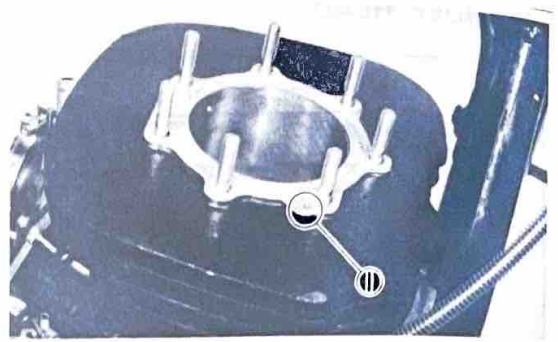
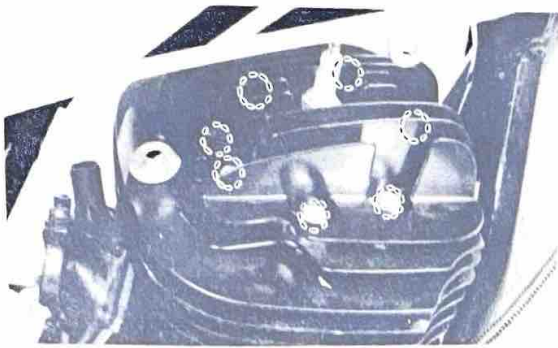
## Removal

1. Remove the muffler.
2. Remove spark plug lead wire. Loosen, but do not remove spark plug.
3. Remove the cylinder head holding brackets. And remove cylinder head nuts.

Remove cylinder head and gasket.



Upper	Bracket to frame	30 Nm (3.0 m · kg, 22 ft · lb)
	Bracket to head	65 Nm (6.5 m · kg, 47 ft · lb)
Cylinder head nut		22 Nm (2.2 m · kg, 16 ft · lb)



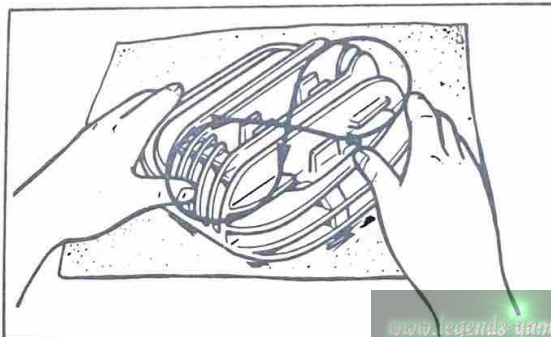
1. "UP" mark

## Maintenance

1. Using a rounded scraper, remove carbon deposits from combustion chamber. Take care to avoid damaging the spark plug threads. Do not use a sharp instrument. Avoid scratching the metal surface.



2. Place the head on a surface plate. There should be no warpage. Correct by resurfacing. Place 400 ~ 600 grit wet emery sandpaper on surface plate and resurface head using a figure-eight sanding pattern. Rotate head several times to avoid removing too much material from one side.



3. The head gasket should be installed with the "UP" mark facing upward.

## CYLINDER

### Removal

1. Remove the Y.E.I.S. air chamber hose.
2. Remove the carburetor.
3. Remove cylinder holding nuts (4).  
With the piston at top dead center, rise the cylinder until the cylinder skirts clear crankcase. Stuff a clean shop rag into crankcase cavity, around rod, to prevent dirt and other foreign particles from entering. Remove cylinder and base gasket.

Cylinder holding nut:  
35 Nm (3.5 m · kg, 25 ft · lb)



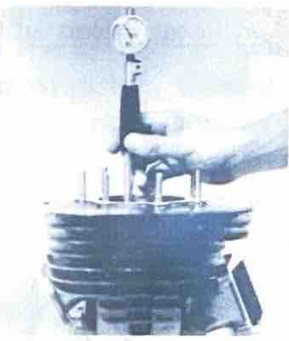
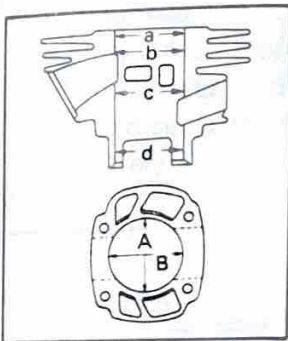
### Maintenance

1. Using a rounded scraper, remove carbon deposits from the exhaust port.





2. Check cylinder bore. Using a cylinder hone, remove any scoring. Hone lightly, using smooth stones. Hone no more than required to avoid excess piston clearance.
3. Using a cylinder gauge set to standard bore size, measure the cylinder. Measure front-to-rear and side-to-side at top, center and bottom just above exhaust port.
4. Compare minimum and maximum measurements. If over tolerance and not correctable by honing, rebore to next oversize.



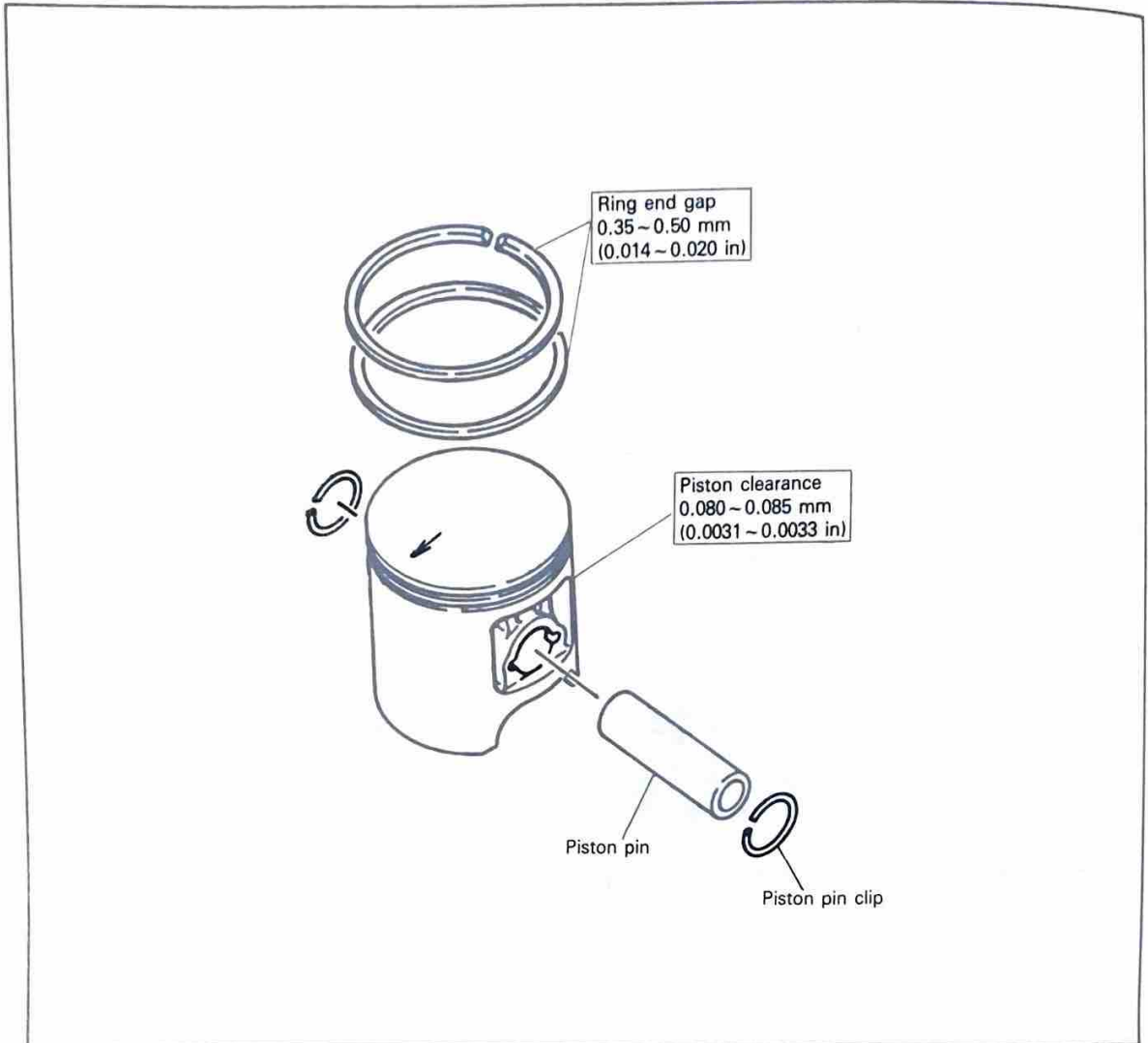
**Max. allowable taper:**

0.05 mm (0.0020 in)

**Max. allowable out-of-round:**

0.01 mm (0.0004 in)

## PISTON ASSEMBLY



### Removal

1. Remove the piston pin clip (1) from the piston. Push the piston pin out from opposite side. Remove the piston.

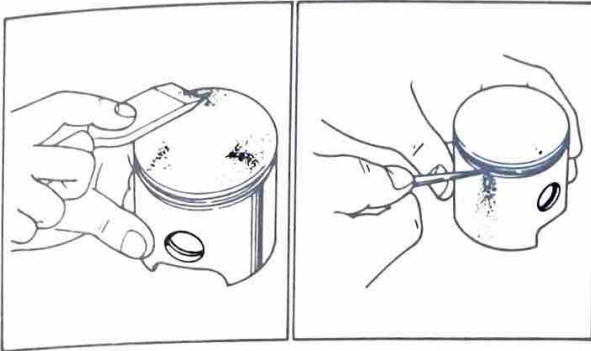


### NOTE:

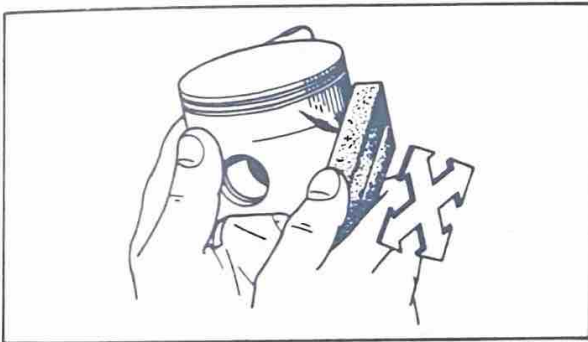
If the pin hangs up, use a piston pin puller. Do not hammer on pin as damage to rod, piston and bearing will result.

## Maintenance

- Using a rounded scraper, remove carbon deposits from piston crown and ring grooves.

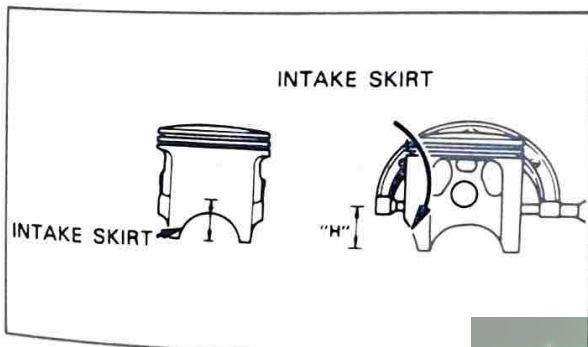


- Using 400 ~ 600 grit wet sandpaper, lightly sand score marks and lacquer deposits from sides of piston. Sand in crisscross pattern. Do not sand excessively.



### Piston outside diameter measurement

- Measure across the skirts at height "H" (just above the intake skirt cutaway) as shown in illustrations.



HEIGHT "H": 32 mm (1.26 in)

- To determine the piston-to-cylinder clearance, subtract the piston diameter from the minimum cylinder diameter. If the nominal piston clearance is not within tolerance, replace the piston or bore the cylinder as required.

$$\text{PISTON CLEARANCE} = \text{Minimum Cylinder Diameter} - \text{Maximum Piston diameter}$$

### Example:

$$87.035 \text{ mm (3.4266 in)} - 86.955 \text{ mm (3.4234 in)} = 0.080 \text{ mm (0.0032 in)}$$

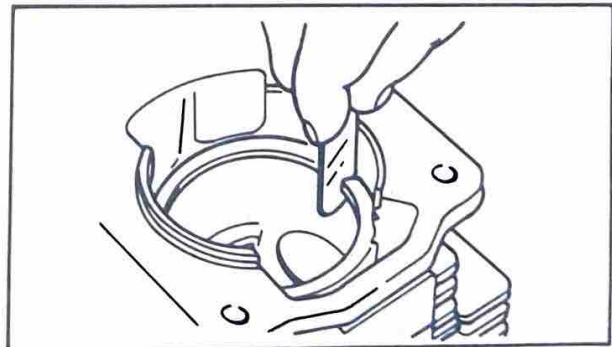
Normal piston clearance:  
0.080 ~ 0.085 mm (0.0031 ~ 0.0033 in)

### Piston rings

- Insert ring into cylinder. Push down approximately 20 mm (0.787 in) using piston crown to maintain right-angle to bore. Measure installed end gap. If beyond tolerance, replace.

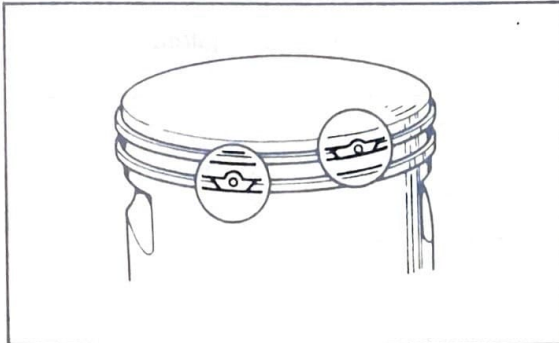
#### Ring end gap installed

0.35 ~ 0.50 mm (0.014 ~ 0.02 in)  
Limit: 1.0 mm (0.04 in)



2. Holding cylinder towards light, check for full seating of ring around bore. If not fully seated, check cylinder. If cylinder is not out-of-round, replace piston ring.

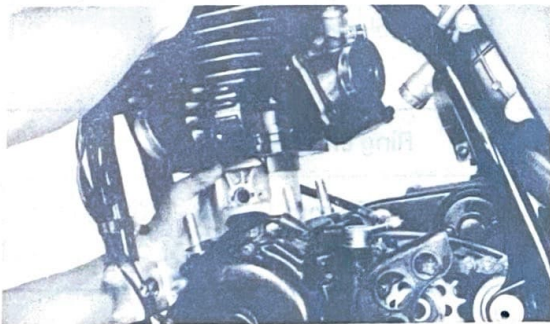
3. During installation, make sure ring ends are properly fitted around ring locating pin in piston groove. Apply liberal coating of two-stroke oil to ring.



4. While squeezing the rings, slip the cylinder down over the piston; the cylinder should slide easily onto the piston. Do not force the cylinder onto the piston, as the rings may be bent or broken easily.

**NOTE:** \_\_\_\_\_

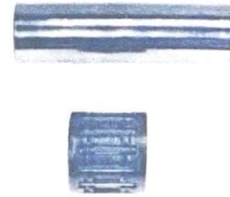
New ring requires break-in. Follow first portion of new machine break-in procedure.



**Piston pin, bearing**

1. Check the pin for signs of wear. If any wear is evident, replace pin and bearing.
2. Check the pin and bearing for signs of heat discoloration. If excessive (heavily blued), replace both.
3. Check the bearing cage for excessive wear. Check the rollers for signs of flat spots. If found, replace pin and bearing.

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**Reassembling**

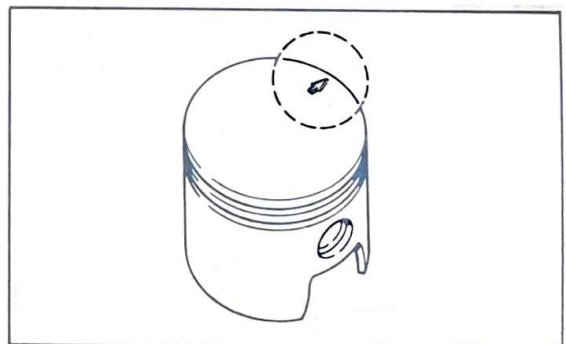
1. During re-assembly, always use a new cylinder base gasket.

Cylinder nut torque:  
35 Nm (3.5 m · kg, 25 ft · lb)  
Cylinder head nut torque:  
22 Nm (2.2 m · kg, 16 ft · lb)

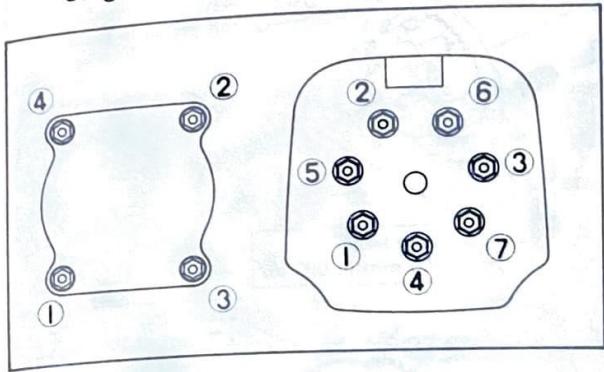
2. Install new piston pin clips and make sure they are fully seated within their grooves.
3. During re-assembly, coat the piston skirt areas, cylinder wall, piston pin and bearing liberally with two-stroke oil.
4. Take care during installation to avoid damaging the piston skirts against the crankcase as the cylinder is installed.

**NOTE:** \_\_\_\_\_

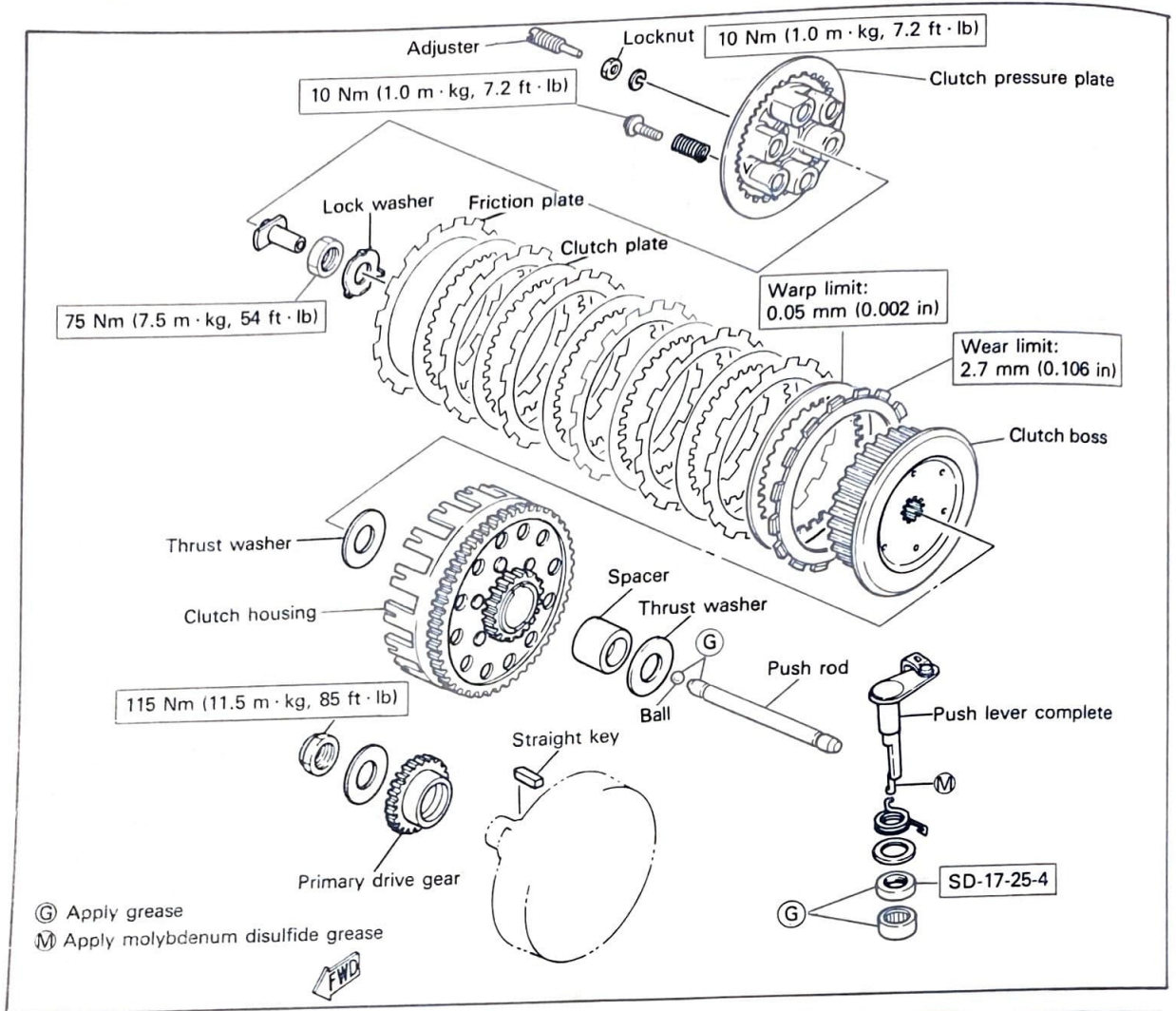
The arrow on piston dome must face forward.



5. Tighten the cylinder and cylinder head in sequence as shown and torque in two stages.

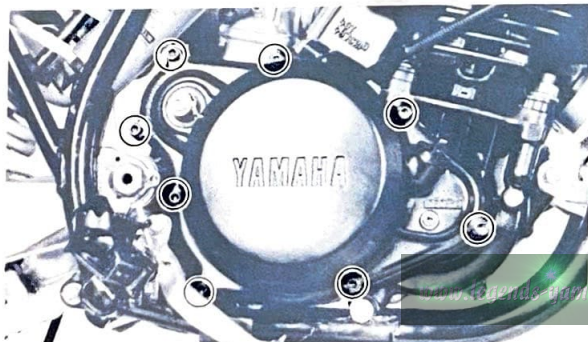
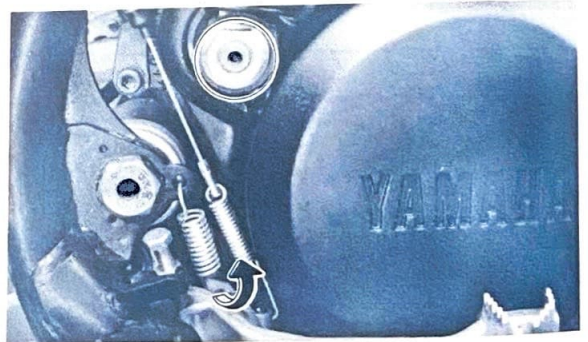


# CLUTCH



## Removal

1. Drain the transmission oil.
2. Remove the rear brake adjuster and return spring and control wire.
3. Remove the kick starter lever.
4. Remove the Allen bolts holding the side cover in place and remove the cover. Note the position of the dowel pins.



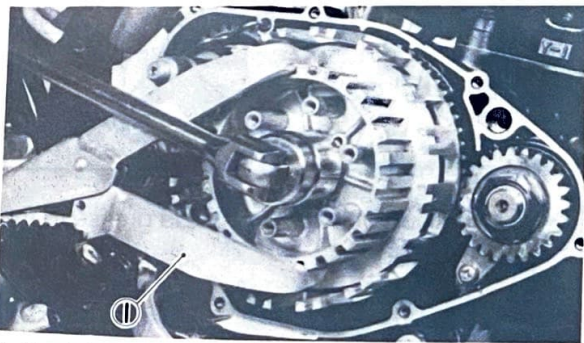
- Remove the phillips screws (6) holding the pressure plate. Remove the clutch springs, pressure plate ball and push rod. Remove the clutch plates and friction plates.



**NOTE:**

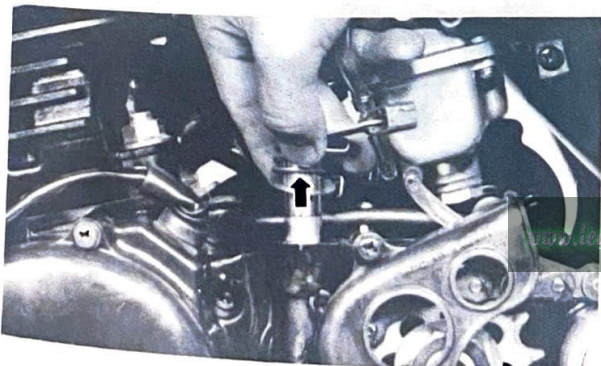
When removing phillips spring screws, loosen each screw in several stages working in a crisscross pattern to avoid any unnecessary warpage. Note the condition of each piece as it is removed and its location within the assembly.

- Bend lock washer tab down. Using the clutch holding tool, remove the clutch securing nut and lock washer. Remove the clutch boss and driven gear (clutch housing).



1. Clutch holding tool (YM-91042)

- Pull out the clutch push lever complete.



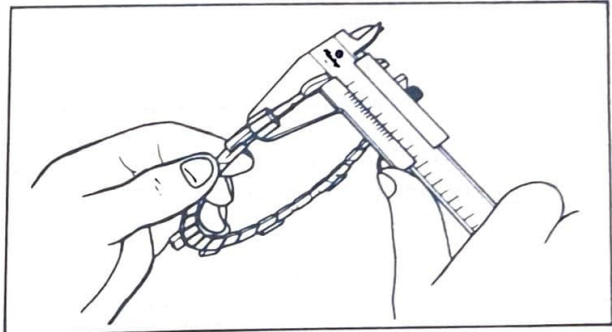
**Maintenance**

- Measure the friction plates at three or four points. If their minimum thickness exceeds tolerance, replace.

Friction plate thickness:

New: 3.0 mm (0.12 in)

Limit: 2.7 mm (0.106 in)

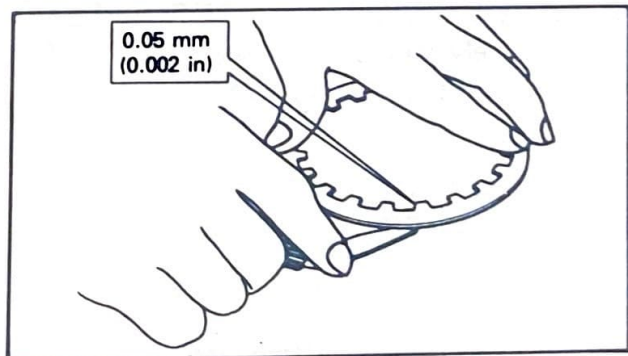


- Check the plates for signs of warpage and heat damage, replace as required.

**NOTE:**

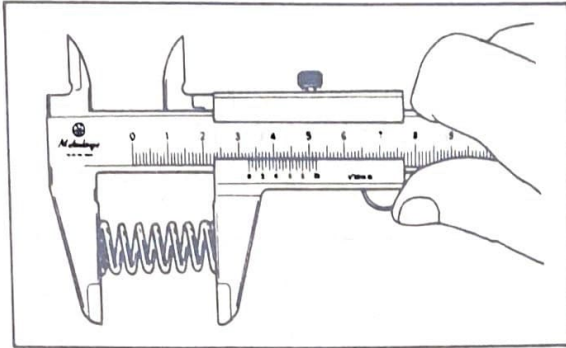
For optimum performance, if any plate requires replacement, it is advisable to replace the entire set.

- Place each clutch plate on a surface plate and check for warpage with a feeler gauge; if warpage exceeds 0.05 mm (0.002 in), replace the clutch plate.



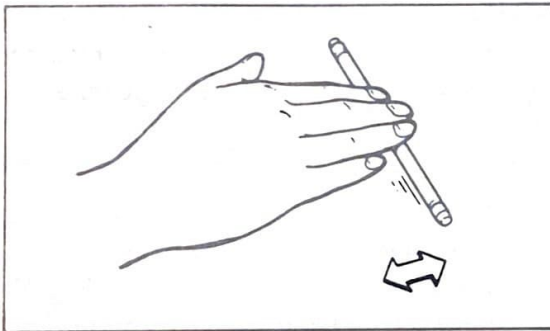
Clutch plate warpage allowance:  
0.05 mm (0.002 in) Maximum

4. Measure each clutch spring; if the free length of a spring is less than 35 mm (1.38 in), replace the spring as a set.



Clutch spring free length:  
 New: 36.0 mm (1.42 in)  
 Limit: 35.0 mm (1.38 in)

5. Roll the push rod across a surface plate. If rod is bent, replace.

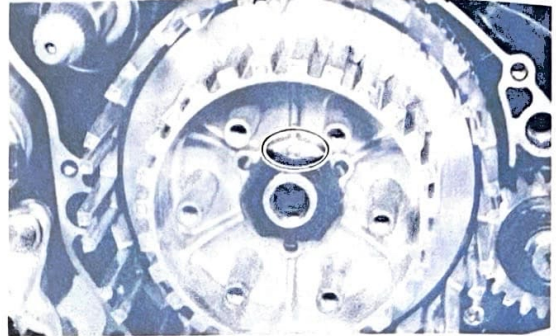


6. Inspect the clutch push lever. If excessively worn, repair using 300 ~ 400 grit sand paper or replace.



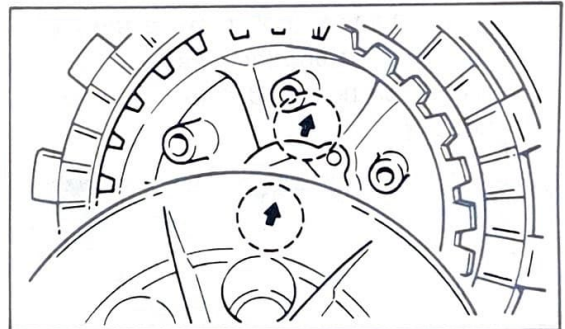
## Installation

1. When installing the clutch locknut, always use a new lock washer. After tightening the locknut to the specification, be sure to lock it with the lock washer.

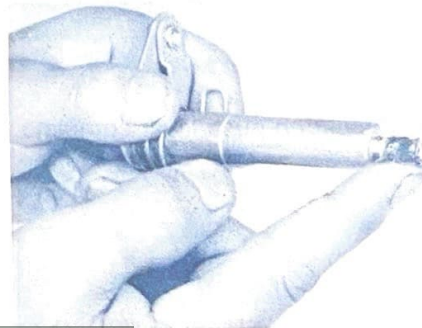


Clutch locknut torque:  
 75 Nm (7.5 m · kg, 54 ft · lb)

2. When installing the clutch pressure plate, align arrow mark on clutch boss and pressure plate mark.



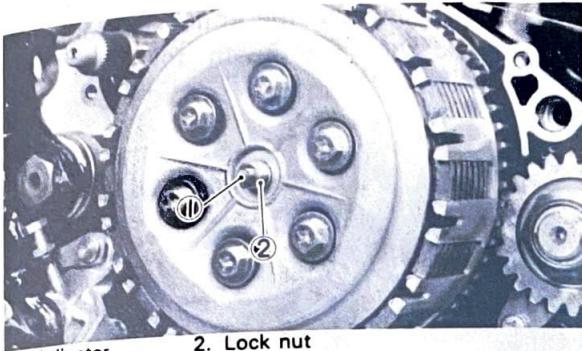
3. Apply molybdenum disulfide grease to the push lever.





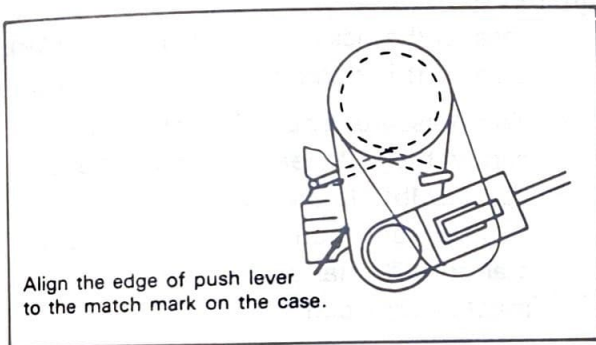
## Mechanism adjustment

1. Loosen the clutch mechanism adjuster locknut, and loosen the adjusting screw.



1. Adjuster  
2. Lock nut

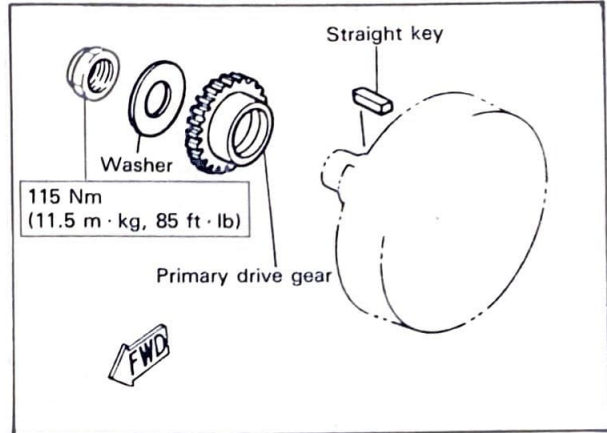
2. At the handle lever, loosen the cable adjuster locknut and adjust the cable length to align the match mark on the left-hand crankcase with the edge of the push lever.



3. Turn the clutch mechanism adjusting screw in until resistance is felt, and tighten the adjuster locknut.
4. Adjust the cable adjuster at the handle lever to provide 2 ~ 3 mm (0.08 ~ 0.12 in) of free play at the clutch lever pivot; tighten the locknut.

## PRIMARY DRIVE GEAR

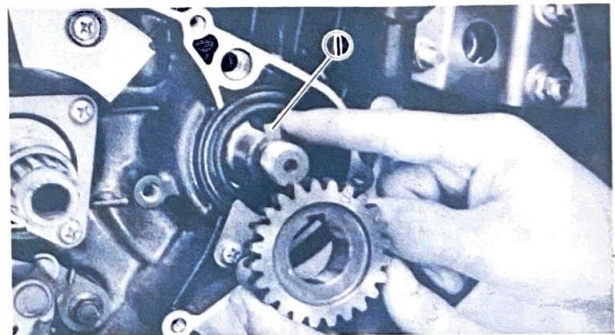
### Removal



1. Place a small piece of rolled rag or a small piece of lead between the gears, and remove the primary drive gear securing nut, lock washer, washer, and key.

### Installation

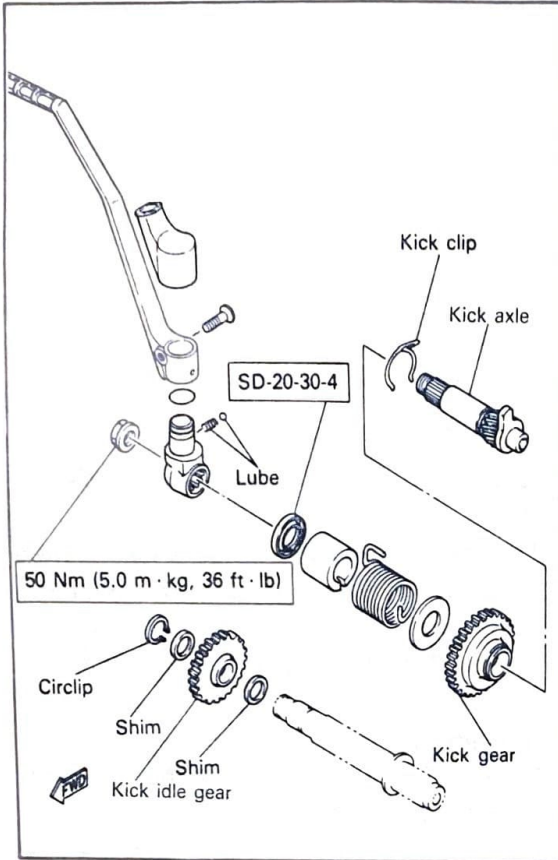
1. First, fit the straight key to the keyway in the crankshaft correctly.



1. Straight key
2. Next, mount the primary drive gear, washer, and nut on the crankshaft, and tighten to specification.

Primary drive gear:  
115 Nm (11.5 m·kg, 85 ft·lb)

## KICK STARTER



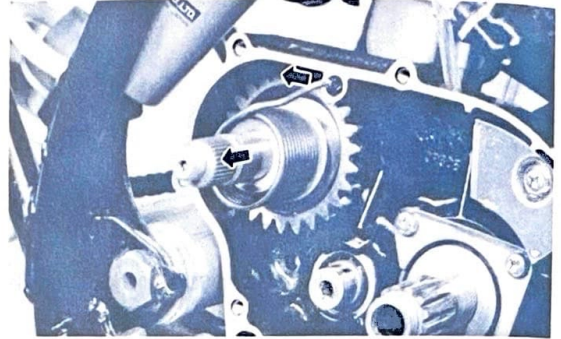
### Removal

1. Remove circlip and kick idle gear.



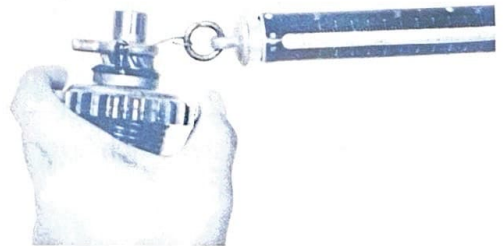
1. Kick idle gear
2. Circlip

2. Unhook the kick return spring from its post in the crankcase. Allow it to relax. Then remove the kick axle assembly by rotating the shaft counterclockwise and then pulling out the entire assembly. Check the gear teeth for wear and breakage.



### Inspection

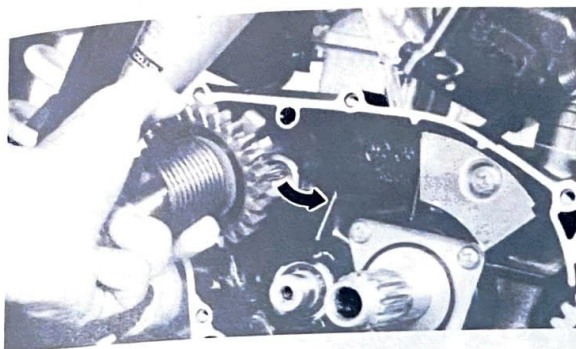
1. Inspect the kick stopper on the end of kick axle; if it is damaged, replace the axle.
2. The pressure required to move the kick clip on the kick gear should be about 1.0 kg (2.2 lb). If the pressure required is more or less than this amount, the kick starter will malfunction; the kick clip must be replaced.



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

## Reassembly

1. Slide the axle assembly into the case; make sure the kick clip and kick axle stopper fit into their home position.

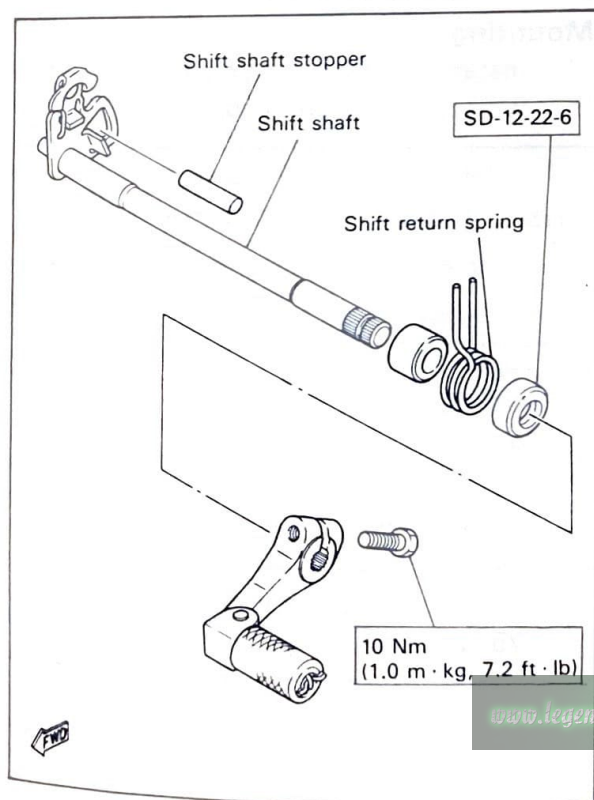


2. Turn the kick starter return spring clockwise and hook into the proper hole in the crankcase.
3. After installing, make sure the kick gear engages and disengages properly with the idle gear.

## SHIFT SHAFT

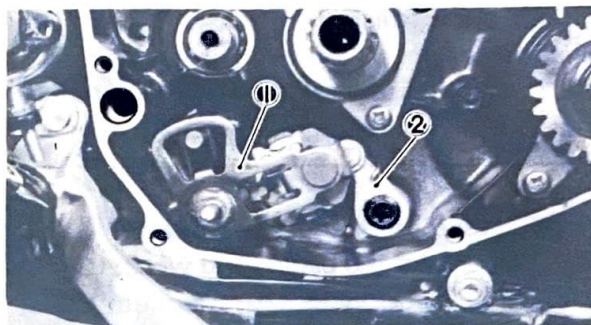
### NOTE:

Shift shaft maintenance should be performed with clutch assembly removed.



## Removal

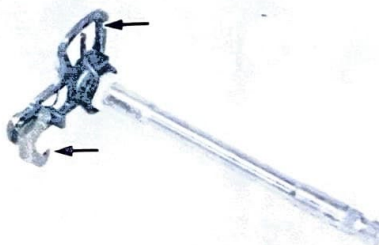
1. Pull out the shift shaft assembly.
2. Remove the flange bolt, stopper lever and spring.



1. Shift shaft assembly 2. Stopper lever

## Inspection

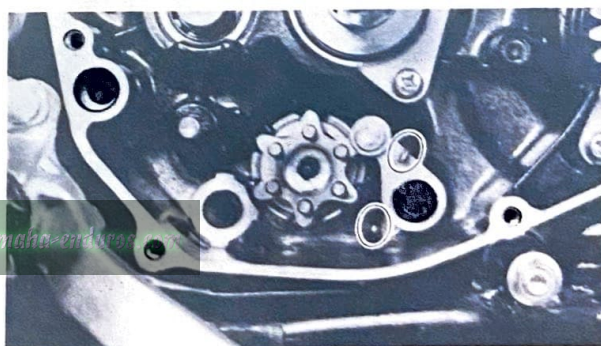
1. Inspect shift return spring. A broken or worn spring will impair the return action of the shifting mechanism.
2. Inspect the shift shaft assembly for bending of shaft, worn or bent spline, and broken or worn shift arm spring. A bent shaft will cause hard shifting.



3. Inspect the segment and stopper for wear or damage, replace as required.

## Installation

1. Engage the stopper lever return spring with its home position.



## ENGINE REMOVAL AND MOUNTING

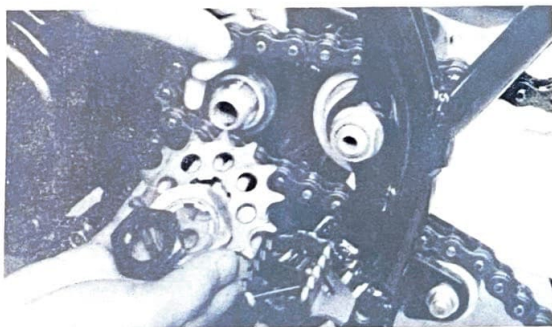
### Removal

#### NOTE:

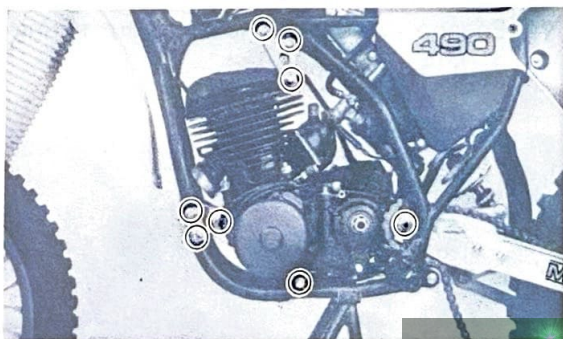
The engine removal is required for the servicing of the transmission, crankshaft, and bearings, oil seals, etc, of the crankcase.

The procedures in page 3-2 to 3-19 are not accompanied by the engine removal.

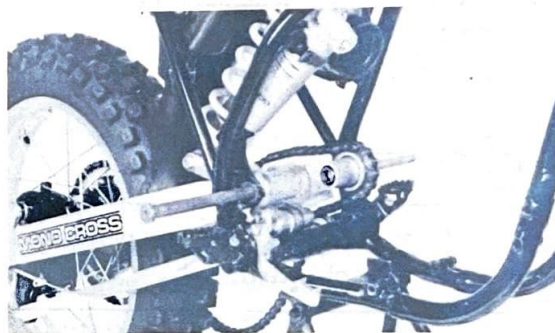
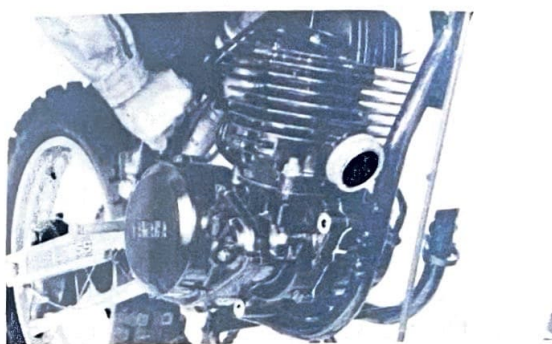
1. Remove the seat and fuel tank.
2. Disconnect the cables and wires. (Clutch cable, Spark plug cap, Magneto leads)
3. Drain off the transmission oil.
4. Remove the muffler, Y.E.I.S. chamber and carburetor.
5. Remove the rear brake adjuster, return spring and control wire.
6. Remove the shift pedal and chain cover.
7. Remove the chain and sprocket from the machine.



8. Remove the cylinder head holding brackets.
9. Remove the two engine mounting bolts and mount brackets.



10. Remove the nut from the swingarm pivot shaft, and pull the shaft out about two-thirds of its length; if the shaft 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.
11. Remove the engine from right side of frame.



### Mounting

1. Install engine mounting bolts and nuts with proper tightening torque.

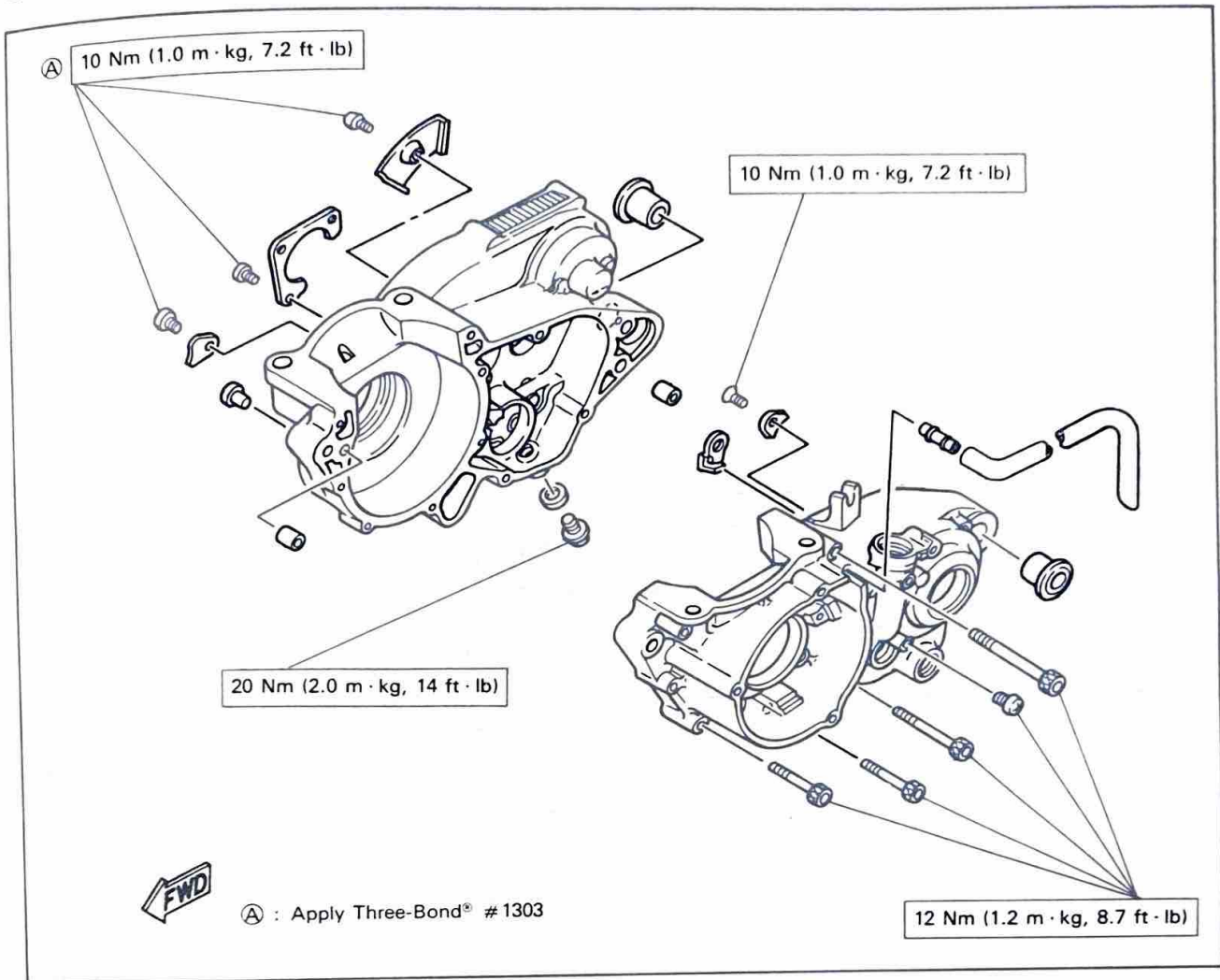
Bolt	Tightening torque
Bracket to frame	30 Nm (3.0 m·kg, 22 ft·lb)
Bracket to engine	65 Nm (6.5 m·kg, 47 ft·lb)
Center, Lower	30 Nm (3.0 m·kg, 22 ft·lb)

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

2. Install drive sprocket and chain.

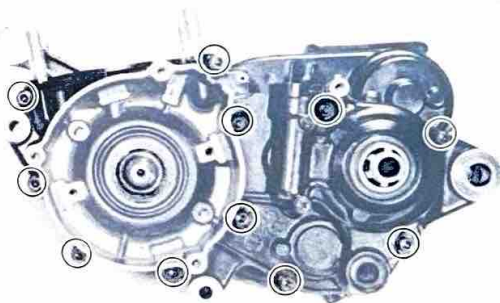
Drive sprocket nut torque:  
75 Nm (7.5 m·kg, 54 ft·lb)

# CRANKCASE

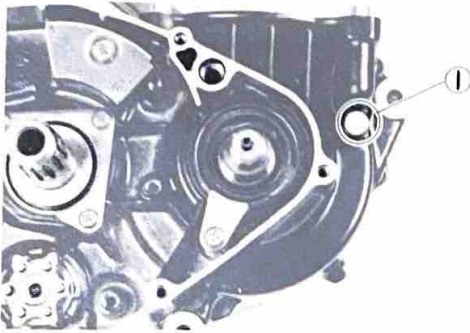


## Disassembly

1. Working in a crisscross pattern, loosen the crankcase bolts 1/4 turn each. Remove them after all are loosened.
2. Before separating the crankcase, turn the segment to the position show in the figure so that it does not contact the crankcase.



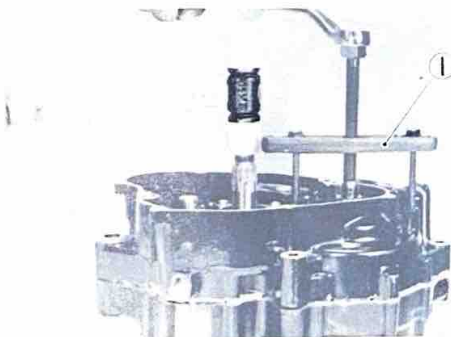
- Remove the blind plug.  
Install crankcase separating tool on the right crankcase.



1. Blind plug

**NOTE:**

Tighten the securing bolts on the crankcase separating tool, but make sure the tool body is parallel with the case. If necessary, one screw may be backed out slightly to level tool body.



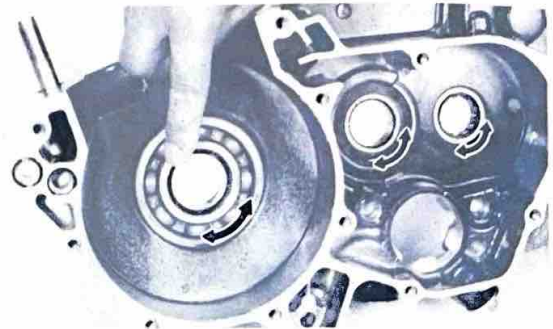
1. Crankcase separating tool

**CAUTION:**

Use a 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 halves are reluctant to separate, check for a remaining case screw or fitting. Do not force.

**Bearings and oil seals**

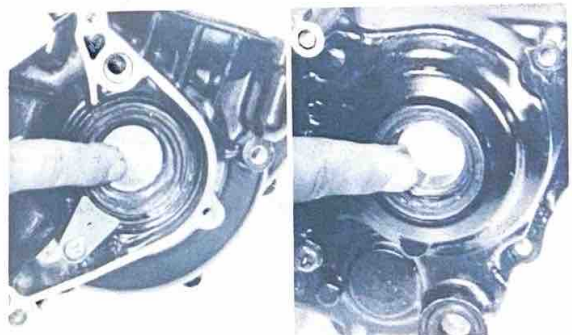
- After cleaning and lubricating the bearings, rotate inner race with a finger. If rough spots are noticed, replace the bearing.



**NOTE:**

Bearing(s) are most easily removed or installed if the cases are first heated to approximately 90° ~ 120°C (194° ~ 248°F). Bring the case up to proper temperature slowly. Use an oven.

- Check oil seal lips for damage or wear. Replace as required.
- Always replace crankshaft oil seals whenever the crankshaft is removed.
- Install bearing(s) and oil seal(s) with their manufacturer marks or numbers facing outward. Before installation, apply grease to oil seal lips and bearings.

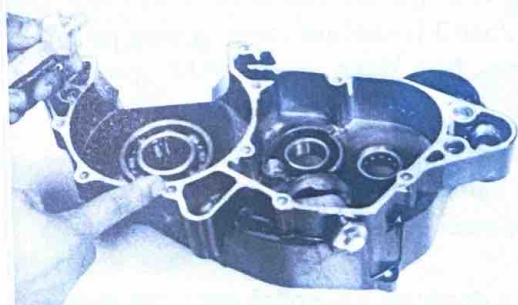


### Assembly

1. Check to see that all parts move freely and that all loose shims are in place. Make sure all shafts are fully seated.



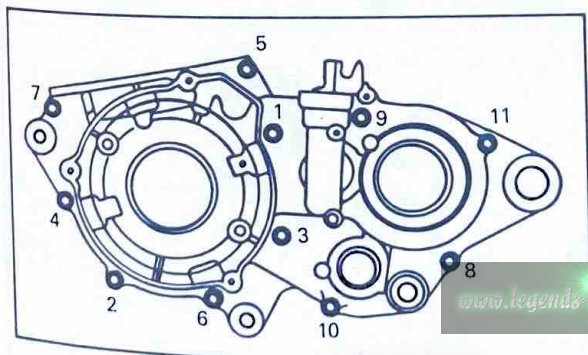
2. Thoroughly clean the case mating surfaces of oil or grease with lacquer thinner. Apply YAMAHA BOND #4 to the mating surfaces of both case halves.



### NOTE:

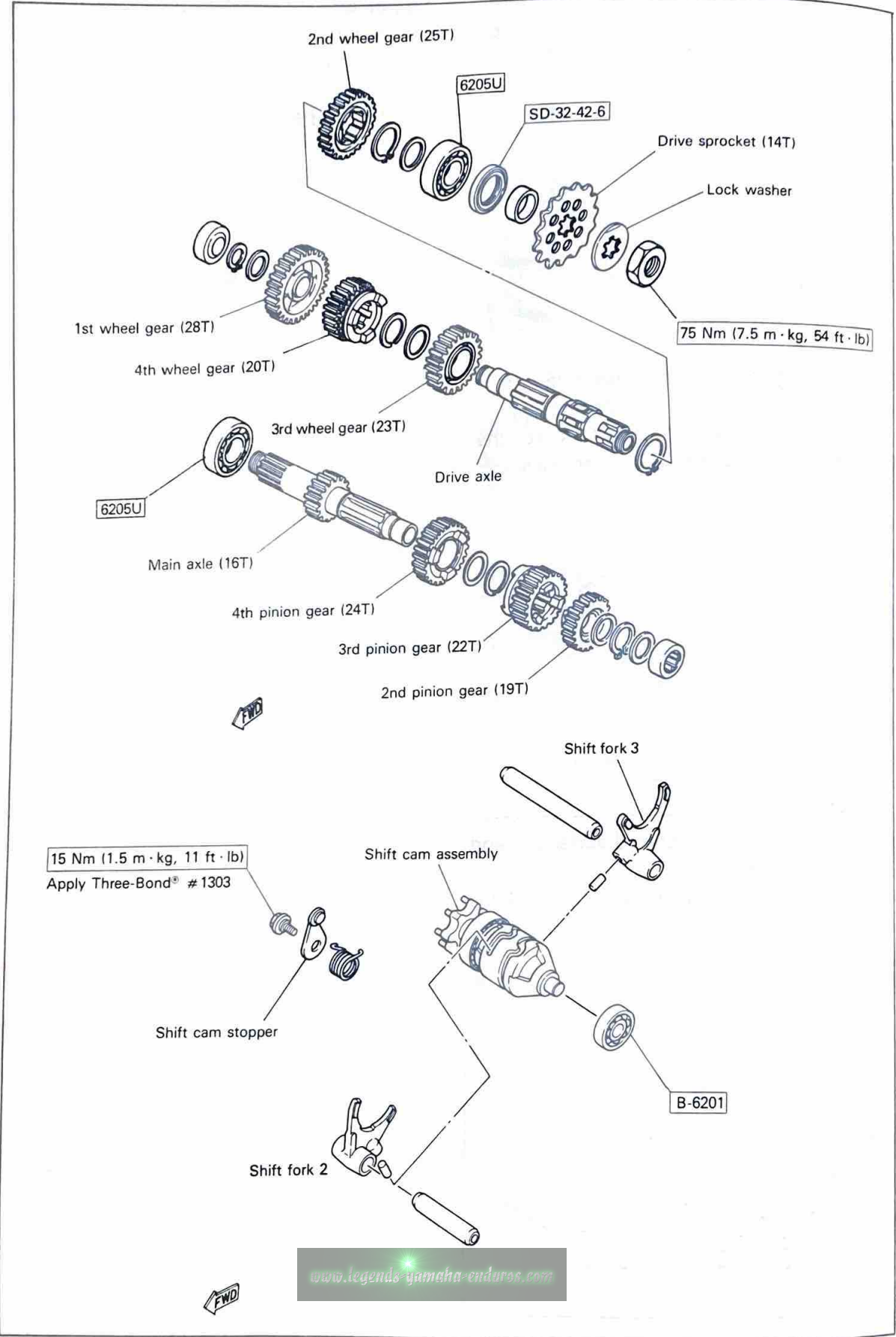
- a. Do not tap on machined surface or end of crankshaft.
- b. Before installing the crankshaft, check the crankshaft oil seals for damage.

3. Tighten the crankcase tightening screws in numerical order as shown.



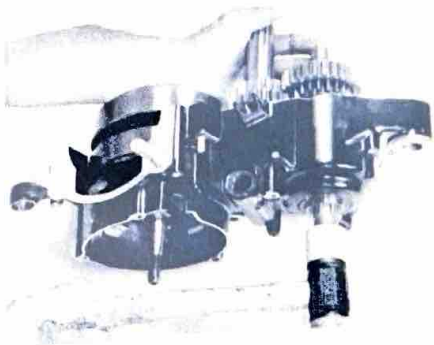
4. After reassembly, apply a liberal coating of two-stroke oil to the crank pin and bearing and into each crankshaft bearing oil delivery hole.
5. Check crankshaft and transmission shafts for proper operation and freedom of movement.

# TRANSMISSION AND SHIFTER





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

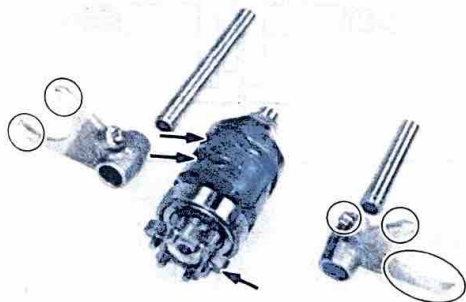


**NOTE:**

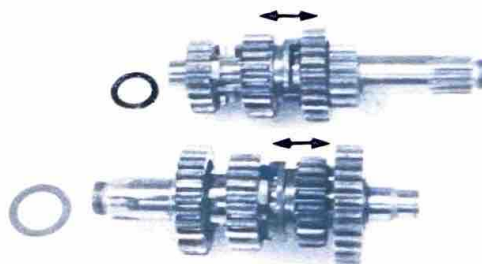
Remove assembly carefully. Note the position of each part. Pay particular attention to the location and direction of shift forks.

**Inspection**

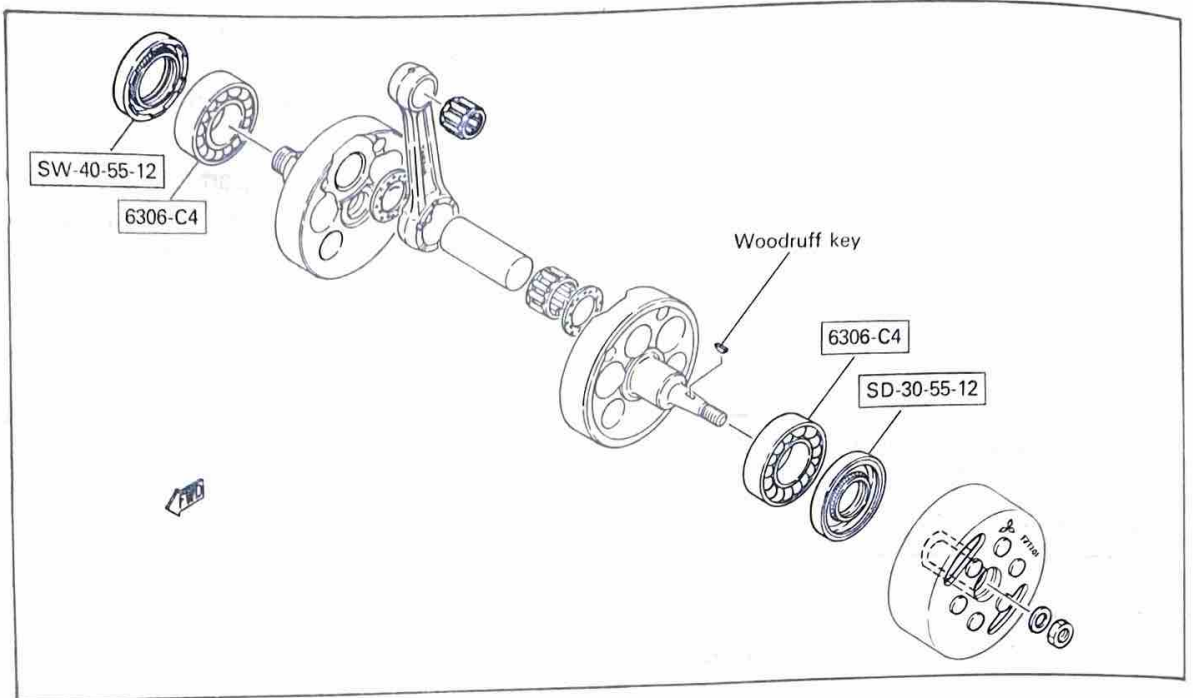
1. Inspect each shift fork for signs of galling on gear contact surfaces. Check for bending. Make sure each fork slides freely on its guide bar.
2. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or any damage, replace cam.
3. Check the cam followers on each shift fork for wear. The follower should fit snugly into its seat in the shift fork, but should not be overly tight. Check the ends that ride in the grooves in the shift cam. If they are worn or damaged, replace.
4. Check shift cam segment and bearing for looseness, damage, or wear.



5. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the gear teeth for signs of pitting, galling; or other extreme wear. Replace as required.
6. Check to see that each gear properly engages its counterpart on the shaft. Check the mating dogs for rounded edges, cracks, or missing portions. Replace as required.

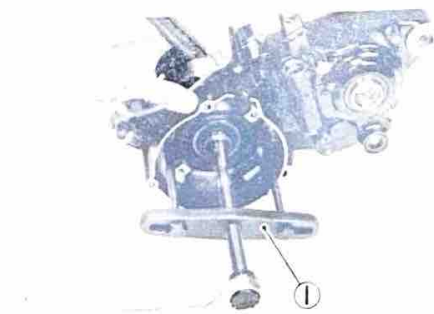


# CRANKSHAFT



## Removal

1. Remove crankshaft assembly with crankcase separating tool.

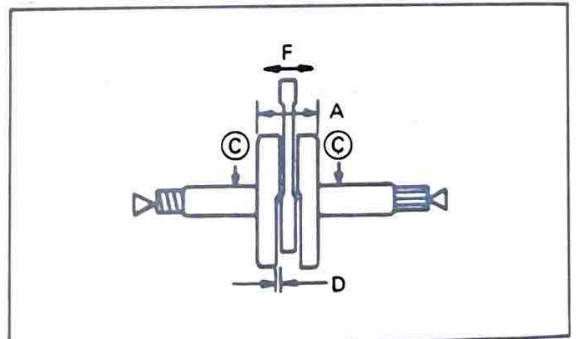


1. Crankcase separating tool (YU-01135)

## Inspection

1. Check crankshaft components.

Small end free play (F)  
 0.4 ~ 1.0 mm (0.016 ~ 0.04 in)  
 Limit «2.0 mm (0.08 in)»



Big end side clearance (D):  
 0.25 ~ 0.75 mm (0.010 ~ 0.030 in)

Run out limit (C):  
0.03 mm (0.0012 in)  
Flywheel width (A):  
 $66 \pm_{0.05}^0$  mm ( $2.59 \pm_{0.02}^0$  in)

2. If any of the above measurements exceed tolerance, crankshaft repair is required. Take the machine to your authorized Yamaha dealer.

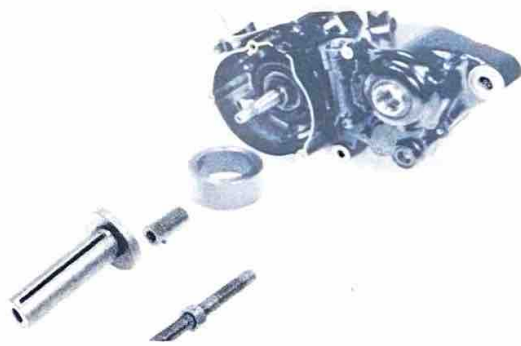
### Installation

1. Set the crankshaft into **left** case half and install crankshaft installing tool.

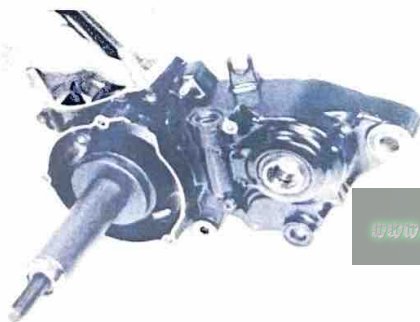
### CAUTION:

To protect the crankshaft against scratches or to facilitate the operation of installation: Pack the oil seal lips with grease. Apply engine oil to each bearing.

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



1. Spacer
2. Crankshaft installing pot
3. Adapter
4. Crankshaft installing bolt



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## **4 CHASSIS MAINTENANCE AND REPAIR**

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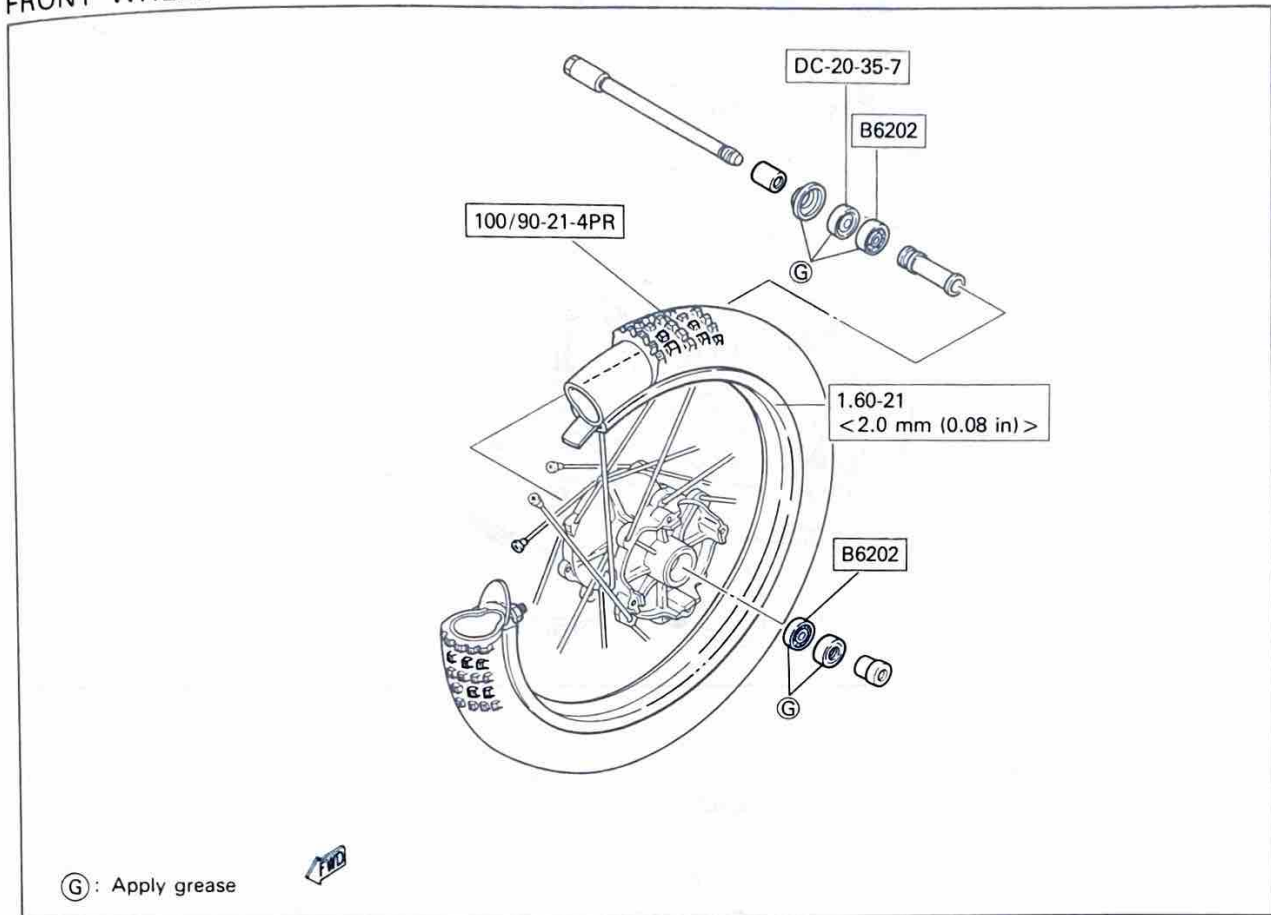
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## 4 CHASSIS MAINTENANCE AND REPAIR

### WHEEL ASSEMBLIES, SPROCKETS AND CHAIN

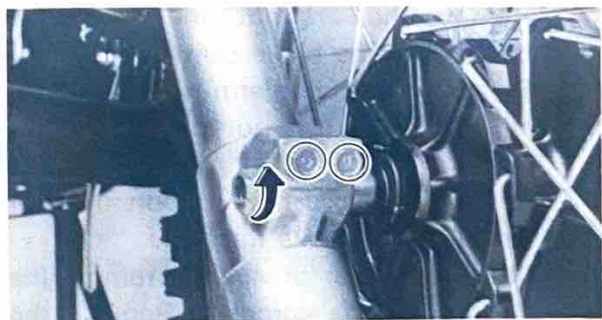
Whenever performing chassis work, always take extra care and double-check each step of each procedure. The wheels, brakes, suspension, steering, and frame must all be in top condition to provide optimum performance, reliability, and safety.

#### FRONT WHEEL



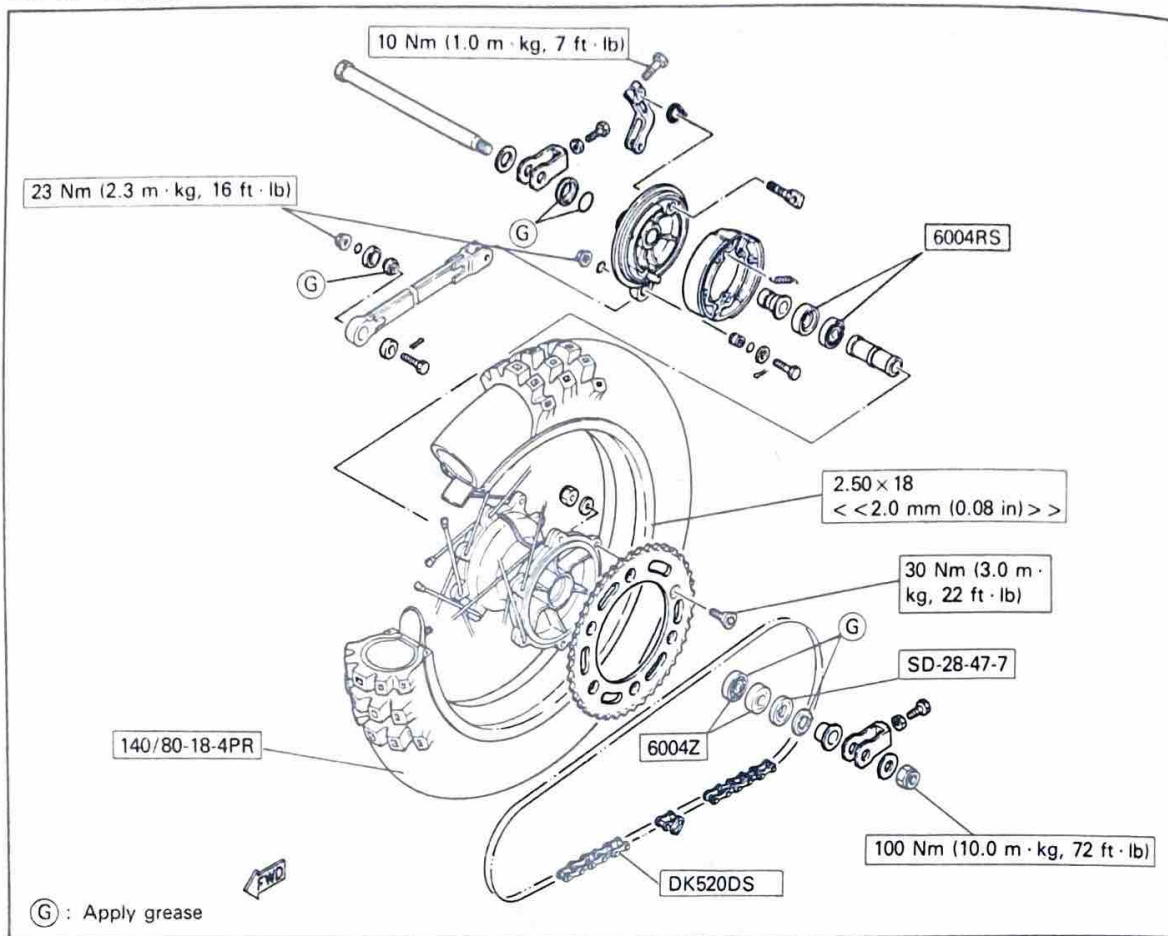
#### Front wheel removal

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Unscrew the axle from the left-hand fork leg, and support the front wheel while removing the axle.
3. Remove the front wheel.



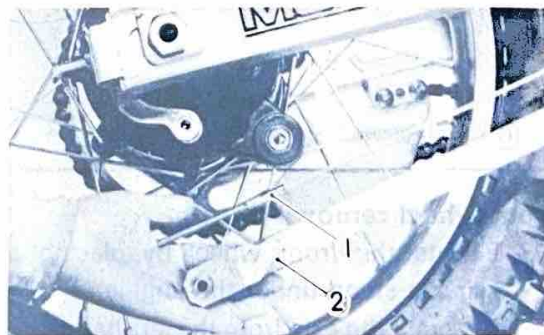
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## REAR WHEEL



### Rear wheel removal

1. To remove the rear wheel, place a suitable stand under the machine to keep the machine stable while the rear wheel is removed.
2. Remove the wing nut, and remove the cable from the brake cam lever.
3. Remove the torque arm from the backing plate; take care not to lose the seals or collar.
4. Remove the axle nut, support the rear wheel, and remove the axle.
5. Move the wheel forward and remove the chain from the sprocket. Remove the wheel from the machine.



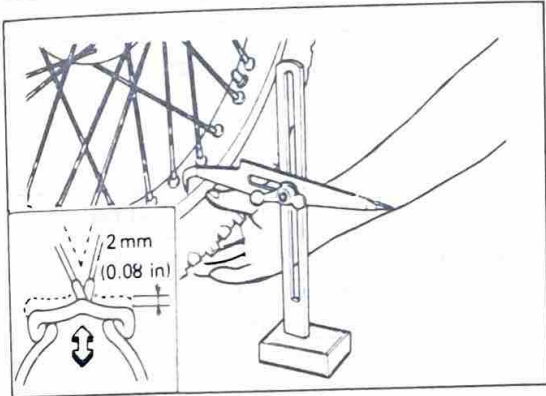
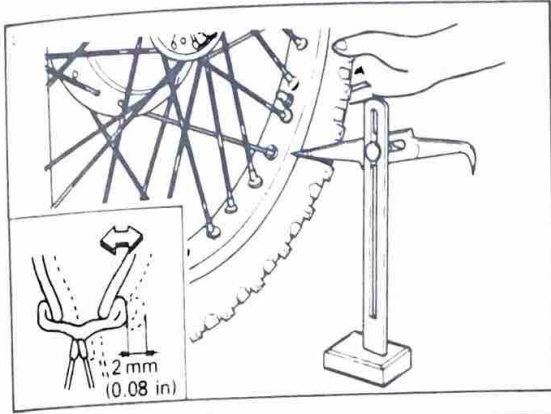
1. Brake cable 2. Torque arm



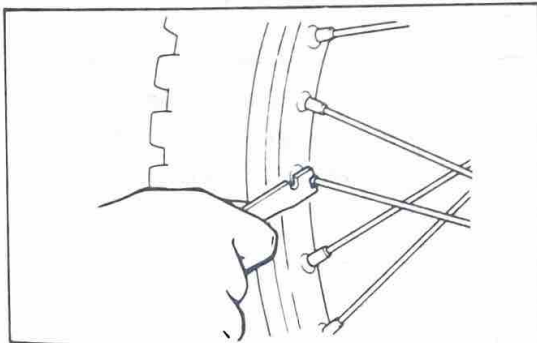


## Rims and spokes

1. Block the wheels off the ground.
2. Spin the wheels and observe the amount of runout.
3. If the runout exceeds 2.0 mm (0.080 in), true the wheels.



4. Tap each spoke with a spoke wrench to determine if any spokes are loose; tighten all loose spokes and replace bent spokes. Tightening procedures are on page 2-13 "Spokes".



\*The nipple wrench must be of the correct size. Use care not to over-tighten.

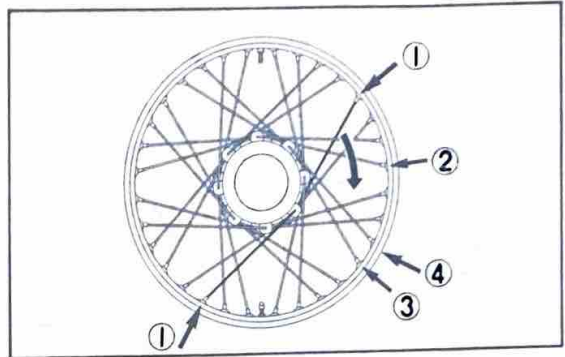
### CAUTION:

If a rim or spokes are severely "dinged" or bent, replace them.

## Spoke replacement

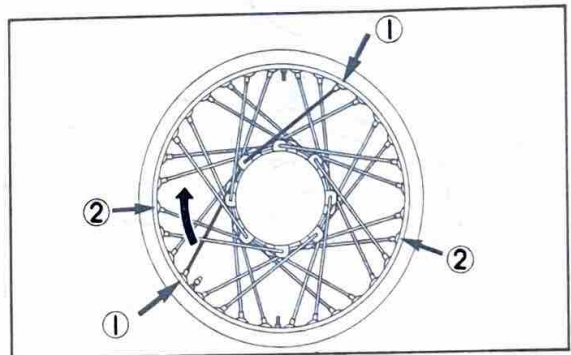
### [Front]

1. When replacing the spoke ①, remove the nipples ①, ②, ③ and ④.
2. Turn the spoke ① up to ③. Then pull the spoke out.
3. Install and fit a new spoke.



### [Rear]

1. When replacing the spoke ①, remove the nipples ① and ②.
2. Turn the spoke ① up to ②. Then pull the spoke out.
3. Install and fit a new spoke.



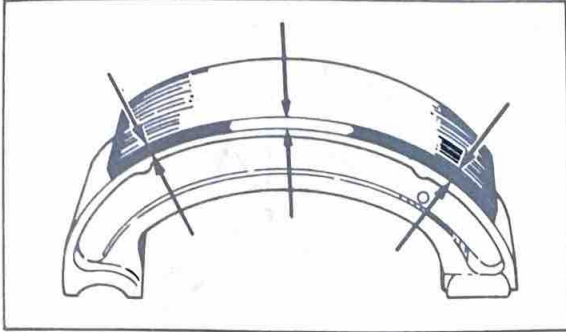
## Bearings

1. To inspect the wheel bearings, try to move the wheel sideways in relation to the fork in the front or the frame in the rear. If any movement is felt, the bearings must be replaced.
2. Block the wheels off the ground and spin each wheel. If the wheels do not spin freely with the brakes disengaged, the bearings must be replaced. If bearings need replacement, take the wheels to your Yamaha dealer for this service.

### Brake shoe inspection

Measure the shoe thickness with slide calipers.

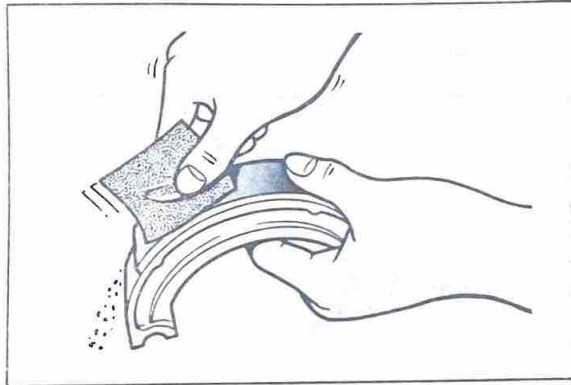
If they measure less than replacement limit, replace them. Smooth out any rough spots on shoe surface with sandpaper.



Brake shoe thickness:

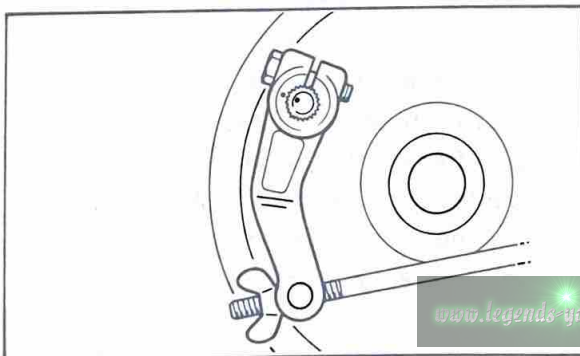
New 4.0 mm (0.16 in)

Limit 2.0 mm (0.08 in)



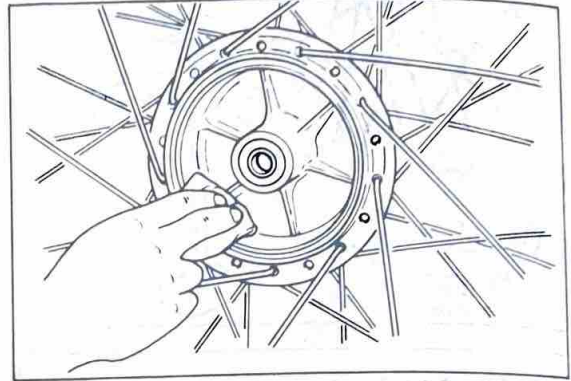
### Brake cam lever

When removing the brake cam lever from the shaft, put match marks on both the cam lever and the shaft. The marks will be of great help when the brake is reassembled.



### Brake drum

1. Inspect the brake drum; if there is any oil or dirt on the inner surface, wipe the drum clean with a rag dampened with lacquer thinner or solvent.
2. If the drum is deeply grooved, the drum must be replaced.

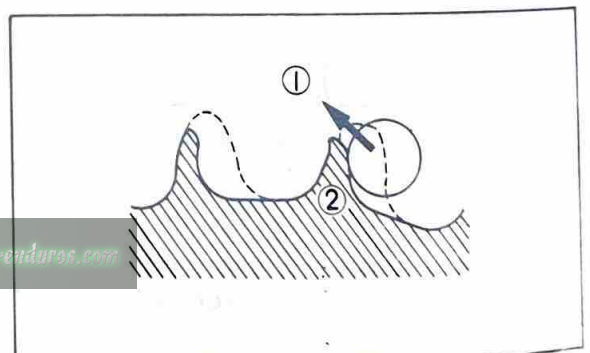


### Sprockets and chain (Adjustment begins on page 2-12)

Tuning and repair parts.

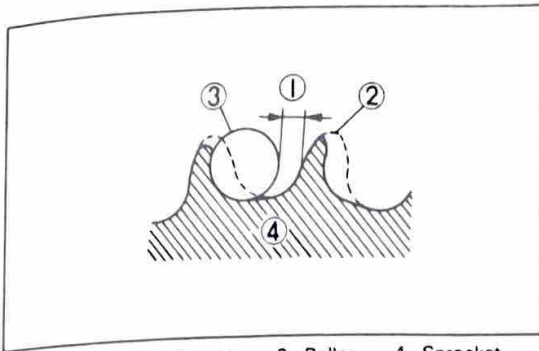
Part name	Size	Part number
Drive sprocket (STD)	13T	23X-17461-30
	14T	23X-17461-40
	15T	23X-17461-50
Lock washer		90215-21239
Driven sprocket (STD)	44T	3R4-25444-01
	45T	3R4-25445-00
	46T	3R4-25446-00
	48T	3R4-25448-00
	50T	3R4-25450-00
	52T	3R4-25452-00
Chain	111L + joint	94585-20111
Chain joint		94685-20001

1. Inspect the teeth on the rear sprocket; if they are worn as shown in the illustrations below, replace the sprockets and chain as a set.



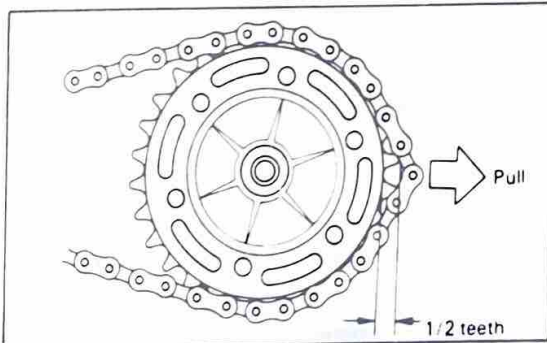
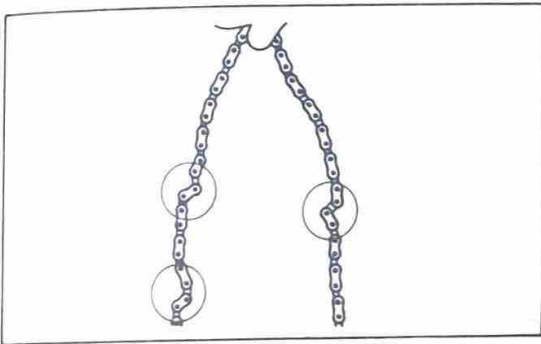
1. Slip off

2. Bent teeth



1. 1/4 tooth 2. Correct 3. Roller 4. Sprocket

2. If the chain stays bent or kinked after cleaning and lubrication, or if the chain can be pulled away from the sprocket more than 1/2 the length of a sprocket tooth, the chain and sprockets should be replaced as a set.



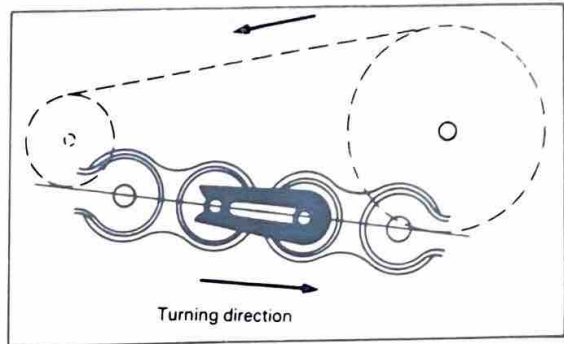
3. When replacing the drive sprockets, always use a new lock washer. After tightening the sprocket nut to the specification, be sure to lock it with the lock washer.

Drive sprocket securing nut torque:  
75 Nm (7.5 m · kg, 54 ft · lb)

4. When installing the driven sprocket, lightly smear grease on the fitting bolts.

Driven sprocket securing nut torque:  
30 Nm (3.0 m · kg, 22 ft · lb)

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



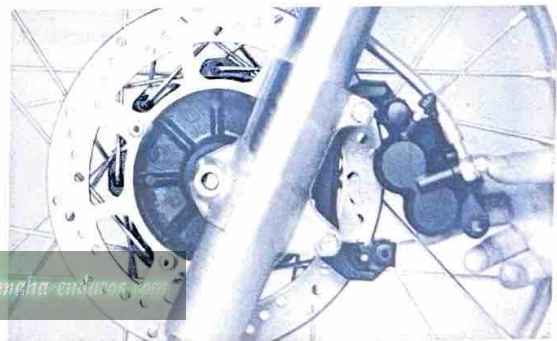
#### NOTE:

The chain should be cleaned and lubricated after every use of the machine.

#### Wheel installation

When installing wheels, reverse the removal procedure taking care of the following points.

1. Lightly smear grease on:
  - \* The shafts
  - \* The bearings and oil seal lips
  - \* The O-ring and dust cover interior for the rear brake shoe plate
  - \* The oil seal and collar outer circumference from the torque arm.
2. Make sure nuts are properly tightened.
3. When installing the front wheel, remove the brake pads as required.



Front wheel axle:

60 Nm (6.0 m · kg, 43 ft · lb)

Axe pinch bolts:

20 Nm (2.0 m · kg, 14 ft · lb)

Rear wheel axle:

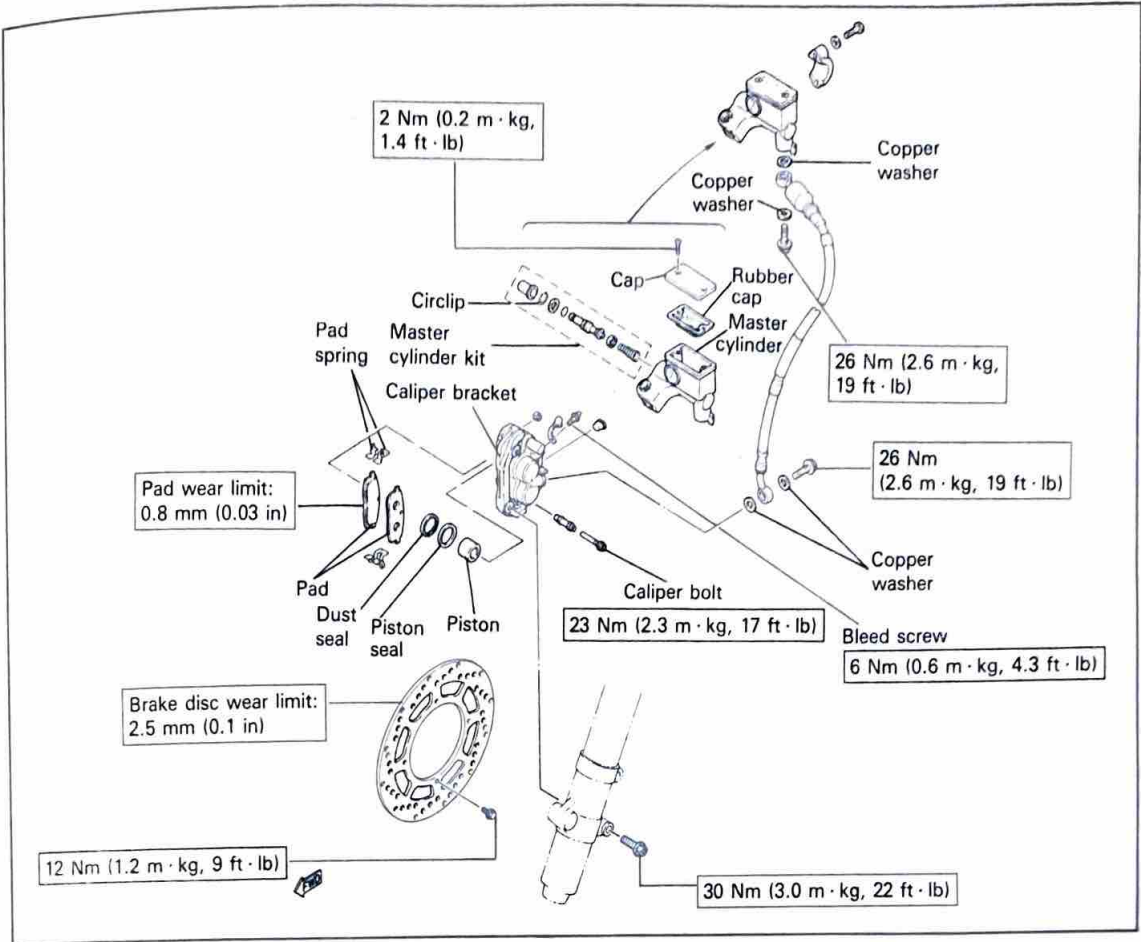
100 Nm (10.0 m · kg, 72 ft · lb)

Torque arm:

23 Nm (2.3 m · kg, 16 ft · lb)

4. Be sure to adjust the slack of the chain.  
(Refer to page 2-12 of "Drive chain".)
5. Adjust the play in the brake lever and pedal.

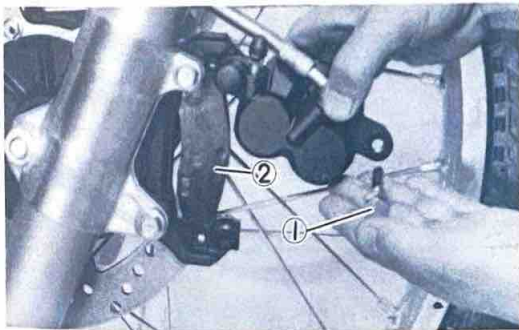
# FRONT DISK BRAKE



## Caliper pad replacement

**NOTE:** \_\_\_\_\_  
 It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

1. Remove the caliper bolt and pads.



1. Caliper bolt 2. Pads

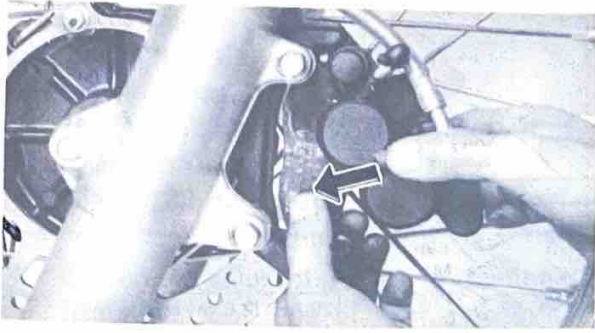
**NOTE:** \_\_\_\_\_  
 Replace the pads as a set if either is found to be worn to wear limit.

Pad wear limit:  
 0.8 mm (0.03 in)



1. Wear indicator

2. Hold the pads in the caliper bracket and turn the caliper body clockwise.

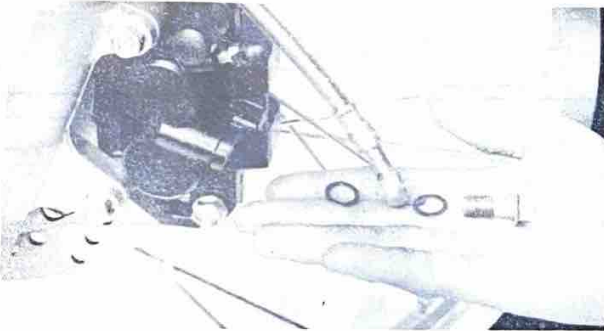


3. Tighten the caliper bolt to specification.

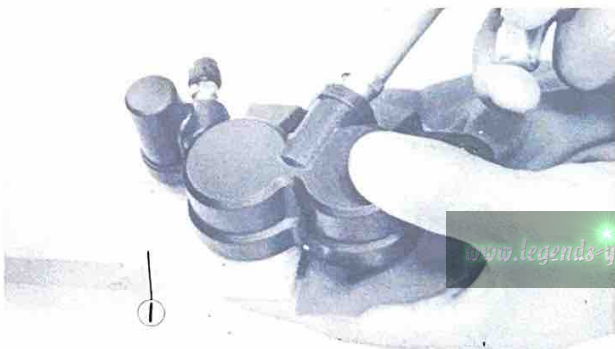
Caliper bolt:  
23 Nm (2.3 m · kg, 17 ft · lb)

### Caliper disassembly

1. Remove the caliper brake hose. Allow the caliper assembly to drain into a container.
2. Place the open hose end into the container and pump the old fluid out of the master cylinder.



3. Remove the caliper bolt and pads as in Caliper Pad Replacement Procedure.
4. Insert a piece of wooden block into the caliper to lock one caliper piston.
5. Carefully force the piston out of the caliper cylinder with compressed air. Never try to pry out the piston.

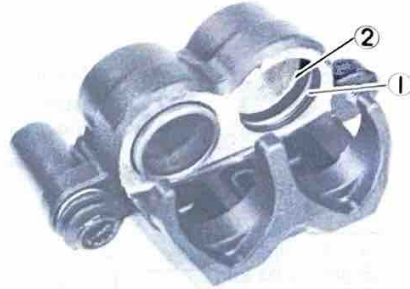


1. Wooden piece

### NOTE:

In the first place, remove one piston and inspect. After inserting the piston, remove remaining one.

6. Remove the dust seal and piston seal.



1. Dust seal 2. Piston seal

### Inspection

1. Replace the caliper piston if it is scratched.



2. Replace any brake pad worn beyond limits. Replace the brake pads as a set.

Pad wear limit: 0.8 mm (0.03 in)



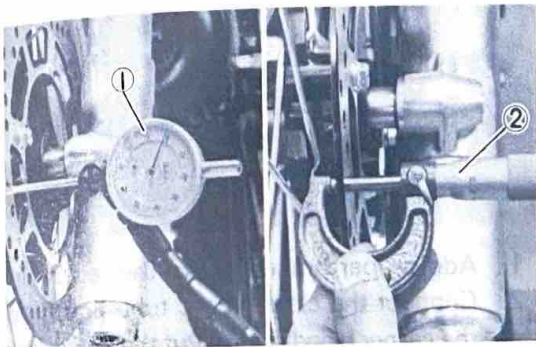
3. Inspect the caliper cylinder body. Replace if scratched: Clean all passages with new brake fluid.

4. Inspect the brake hose.

Replace every four years or if cracked, frayed or damaged.

5. Check for wear and deflection of disc.

Maximum deflection:  
0.15 mm (0.006 in)  
Minimum disc thickness:  
2.5 mm (0.1 in)



1. Deflection 2. Thickness

### Assembly

When reassembling the caliper, reverse the disassembly procedure taking care of the following points.

1. 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 fluid: DOT #3

2. Tighten each bolts to specification.

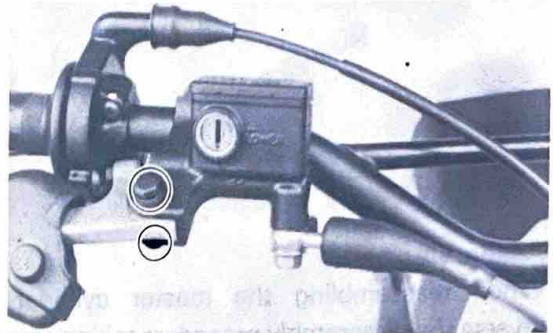
Caliper bolt:  
23 Nm (2.3 m · kg, 17 ft · lb)  
Brake hose:  
26 Nm (2.6 m · kg, 19 ft · lb)  
Brake disc:  
12 Nm (1.2 m · kg, 9 ft · lb)

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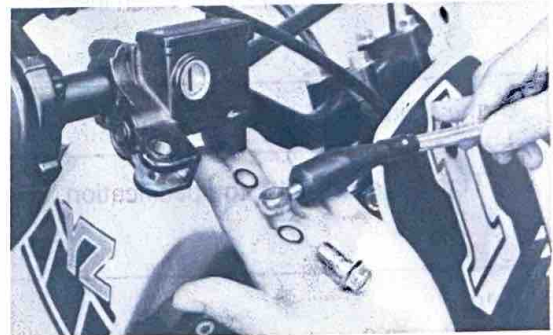
3. Bleed the air completely from the brake system.

### Master cylinder disassembly

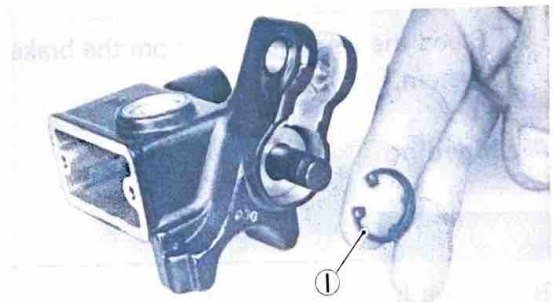
1. Remove the brake lever and spring.



2. Remove the brake hose and then master cylinder. Remove the cap and rubber cap, and drain the brake fluid.



3. Remove the dust boot, circlip and master cylinder kit.

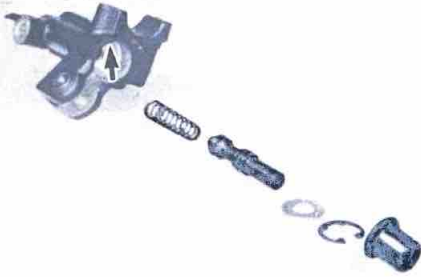


1. Circlip

### Inspection

1. Inspect the master cylinder body. Replace if scratched. Clean all passages with new brake fluid.

2. Inspect the master cylinder kit. If worn or damaged, replace as a assembly.



### Assembly

When reassembling the master cylinder, reverse the disassembly procedure taking care of the following points.

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

Brake fluid: DOT #3

2. Tighten each bolts to specification.

Cap:

2 Nm (0.2 m•kg, 1.4 ft•lb)

Brake hose:

26 Nm (2.6 m•kg, 19 ft•lb)

3. Bleed the air completely from the brake system.

### Air bleeding

#### WARNING:

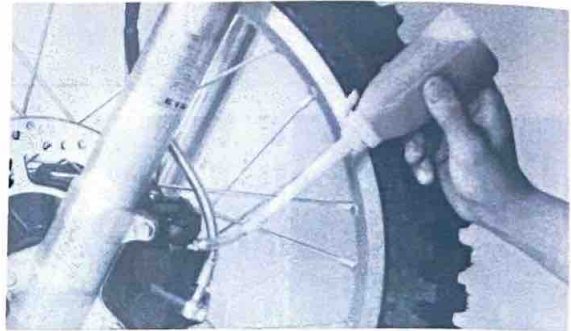
Bleed the brake system if:

- 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.

#### NOTE:

If the caliper and/or the master cylinder are drained of its brake fluid, inject fluid through the air bleed screw into the master cylinder using an oil feeder. Continue injecting oil until the fluid coming out at the master cylinder is free from air. While doing this, take care not to allow the fluid overflow. Then, bleed the air trapped in the caliper top by the following procedure.



1. Add proper brake fluid to the reservoir.
2. Connect the clear plastic tube tightly to the caliper bleed screw. Put the end of the tube into a container.



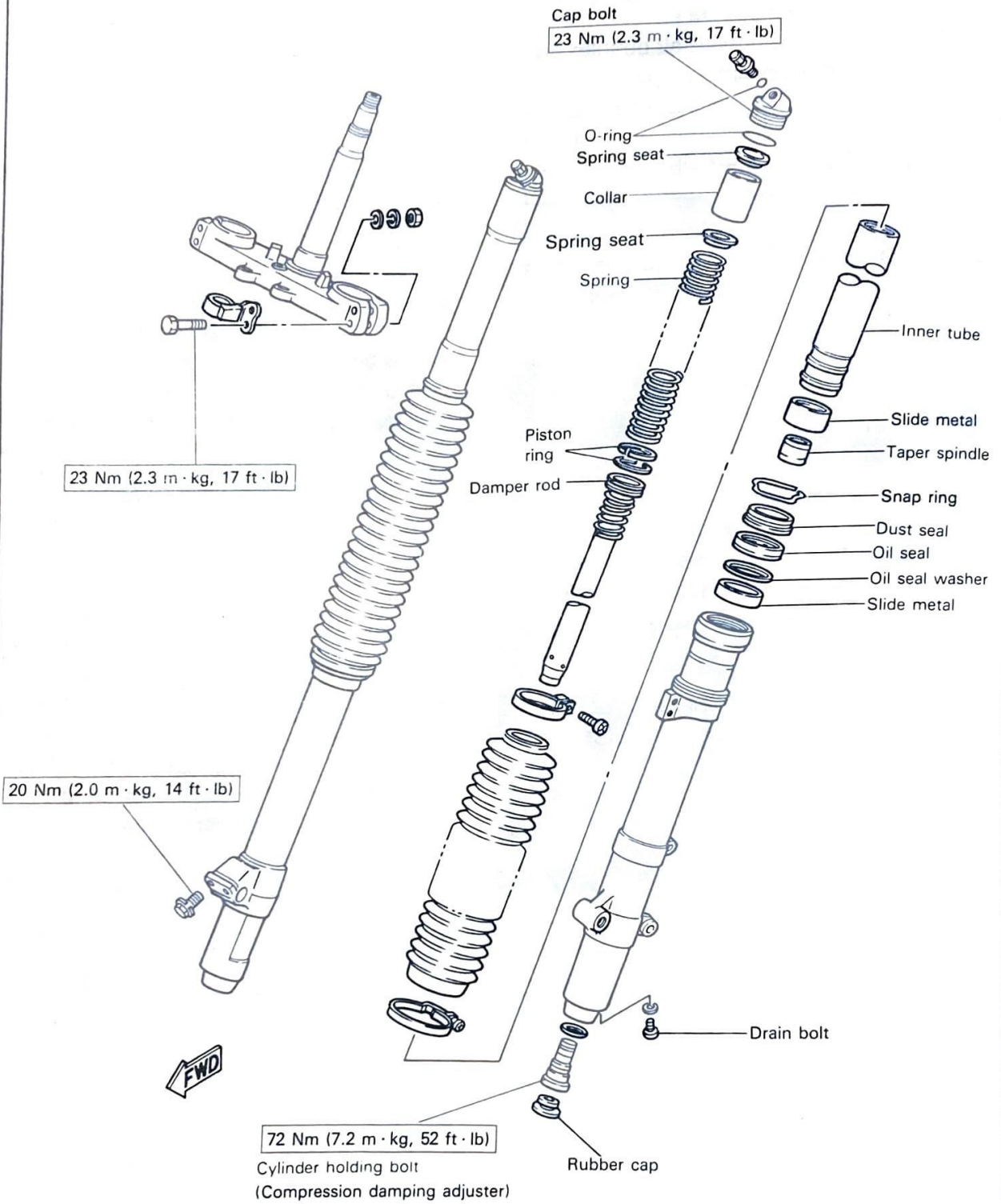


3. Slowly apply the brake lever several times. Pull in lever. Hold the lever in "on" position. Loosen the bleed screw. Allow the lever to travel slowly toward its limit. When the limit is reached, tighten the bleed screw.
4. Continue step (3) until all air bubbles are removed from system.

Bleed screw:  
6 Nm (0.6 m•kg, 4.5 ft•lb)

5. Add the brake fluid to the reservoir so that all the air in it is completely expelled.

# FRONT FORK



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## Front fork setting

For details of front fork setting, refer to the Race Preparation and Tuning Manual. It is advisable to take a note of the standard setting data and specified range of adjustment.

## Fork oil

Recommended oil:

Fork oil 15 wt

Oil quantity:

528 cm<sup>3</sup> (18.6 Imp oz, 17.9 US oz)

Oil level:

STD ..... 180 mm (7.09 in)

MIN..... 190 mm (7.48 in)

MAX. .... 145 mm (5.71 in)

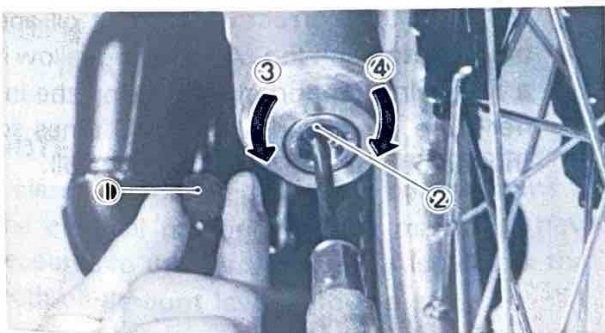
(From top of inner tube fully compressed without spring.)

## Compression damping

STD SETTING: 4 clicks in  
MIN. ~ MAX.: 0 ~ 16 clicks in

### CAUTION:

1. Be sure to fit the rubber cap to prevent malfunction due to dust, lint, etc.
2. Use a torque below 10 Nm (1.0 m · kg, 7.2 ft · lb) for turning the adjuster.



1. Rubber cap
2. Compression damping adjuster
3. Soft
4. Hard

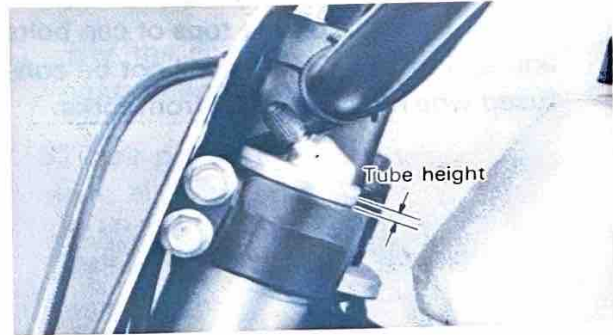
## Fork spring

FREE LENGTH: 542.5 mm (21.36 in)

Type	Spring rate (kg/mm)	Part number	I.D. mark
STD	0.325	39X-23141-20	2 slits
SOFT	0.305	39X-23141-00	Noting
HARD	0.345	57H-23141-20	3 slit

## Fork tube height

STD 6 mm (0.24 in)  
MIN. 0 mm (0 in)  
MAX. 10 mm (0.39 in)



## Air pressure

STD 0 kPa (0kg/cm<sup>2</sup>, 0 psi)  
MAX 245 kPa (2.5 kg/cm<sup>2</sup>, 35 psi)

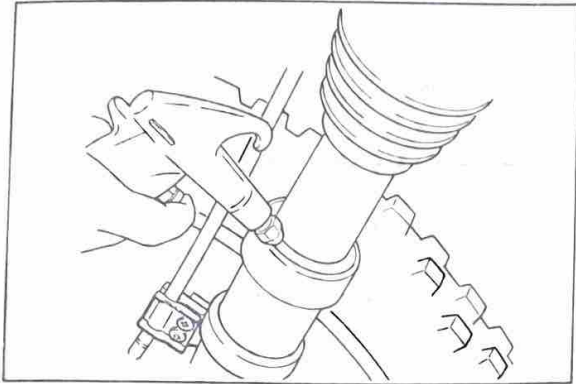
## Handling note

### CAUTION:

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

1. Use only air or nitrogen for filling. Never use any other gas. An explosion may result.
2. Never throw the front fork into fire.
3. Before removing the cap bolts or front forks, be sure to extract the air from the air chamber completely.

- 1 After running over a dusty or sandy course, remove the dust cover and remove the dust around the front forks. This cleaning will protect the fork oil seals against damage.

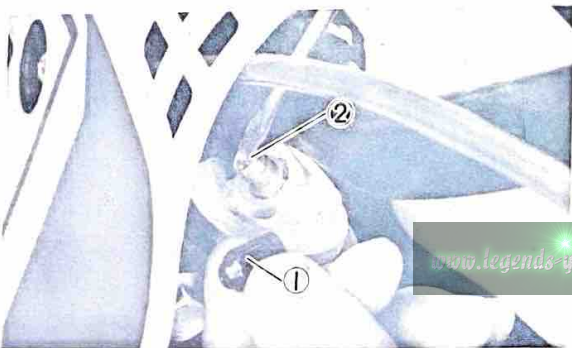


2. Before removing the front forks, put the marks, R and L, on the tops of cap bolts and spring seats so you will not be confused when reinstalling the front forks.



### Fork oil replacement

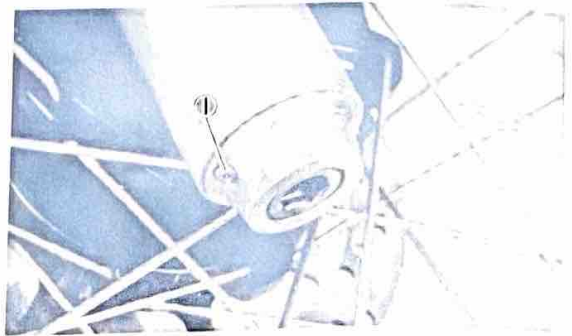
1. Place a suitable stand under the engine to keep the front of machine raised off the floor.
2. Remove the valve cap and depress the air valve to allow the air to escape from the fork legs.



1. Valve cap

2. Valve

3. Place an open container beneath each drain hole and remove the drain screws.

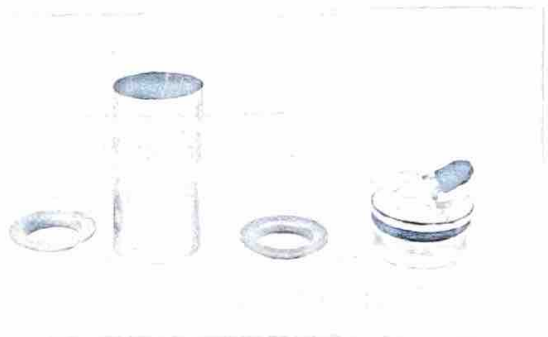


1. Drain screw

4. After most of oil has drained, slowly raise and lower outer tubes to pump out remaining oil.
5. Install drain screws.

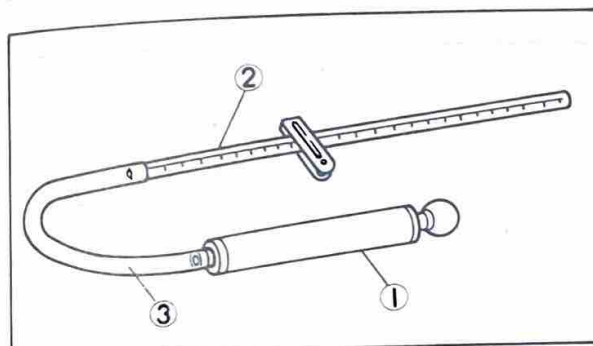
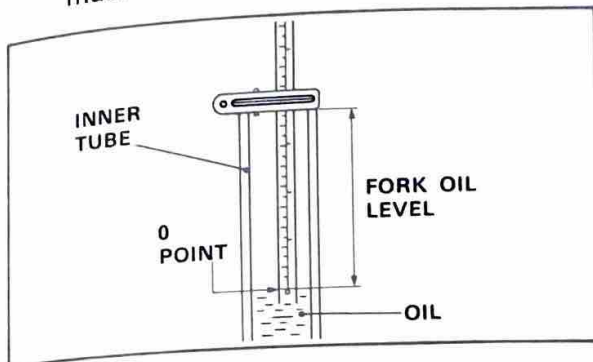
**NOTE:** \_\_\_\_\_  
Check gasket, replace if damaged.

6. Remove the handlebar and the cap bolt assembly, spacer, spring seat and fork spring.



7. Measure the correct amount of oil and pour it into each leg. After filling, allow it a few minutes and slowly pump the inner tube up and down 2 or 3 times so that air can be extracted from the oil.

8. Measure the oil level from top of the fork tube with the oil level tool or the tape measure roll. The oil level tool can be made easily as shown in illust. Fork tube must be fully bottomed.



1. Syringe 2. Glass tube 3. Vinyl hose

**NOTE:**

The oil level tool can be made easily as shown in illust. Fork tube must be fully bottomed.

Recommended oil:

Fork oil 15 wt

Oil quantity (STD):

528 cm<sup>3</sup> (18.6 Imp oz, 17.9 US oz)

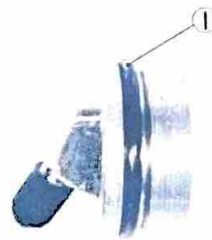
Oil level (STD):

180 mm (7.09 in)

**NOTE:**

Unless the specified amount oil conforms to the oil level marking on the machine, have recourse to the marked level. Also check that both oil amount levels are the same.

9. Inspect the O-ring on the cap bolt; if it is cut or otherwise damaged, replace the O-ring.



1. O-ring

10. Install the spring, spring seat, spacer, spring seat, cap bolt and torque to specification.

Cap bolt:

23 Nm (2.3 m · kg, 17 ft · lb)

11. Set the air pressure to specification or your preference.

STD air pressure:

MAX. air pressure:

0 kPa (0 kg/cm<sup>2</sup>, 0 psi)

245 kPa (2.5 kg/cm<sup>2</sup>, 35 psi)

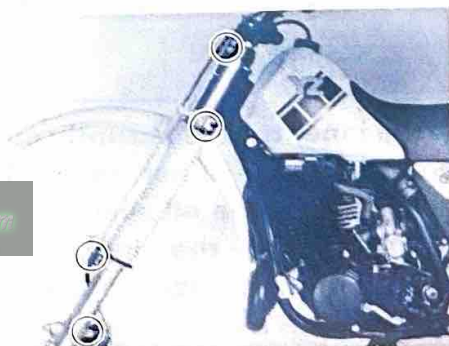
12. Install the handlebar.

Handlebar:

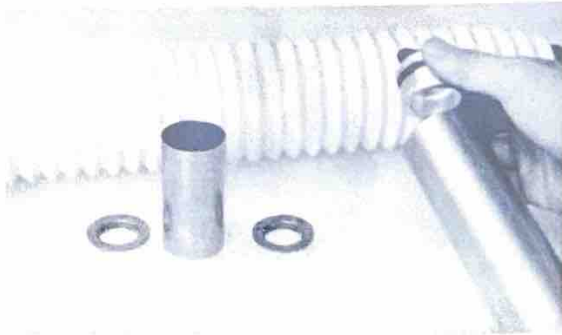
23 Nm (2.3 m · kg, 17 ft · lb)

**Removal and disassembly**

1. Place the machine on a suitable stand to keep it stable while the front wheel and forks are removed.
2. Let the air out of the forks, and loosen the cap bolts slightly.
3. Remove the front wheel and caliper, loosen the fork tube pinch bolts, and remove the forks.



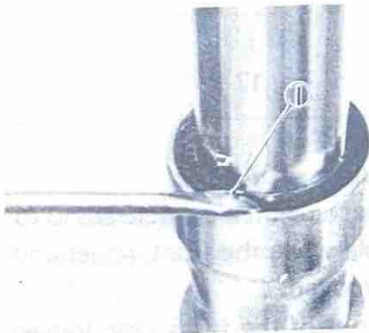
- Remove the rubber boot, spacer, spring seats.



- Fill the fork completely with fork oil and reinstall the cap bolt. Depress the air valve until oil flows out.



- Remove the snap ring from the top of the outer tube.

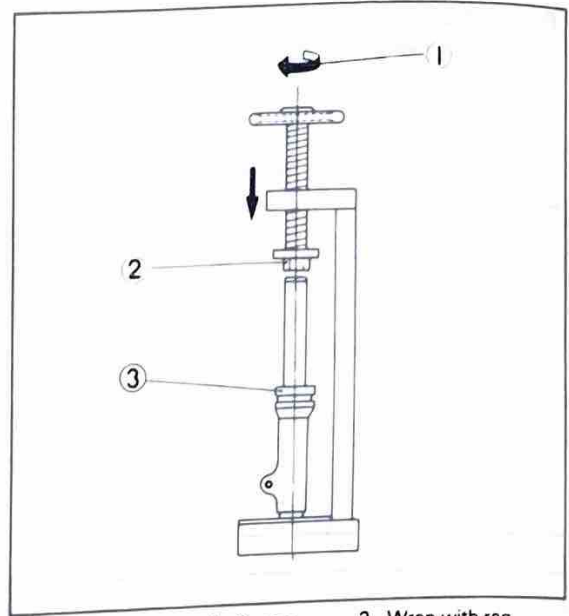


1. Snap ring

- Place a spacer on top of the cap bolt, and place the fork leg in a hand press as illustrated. The spacer will keep the press from contacting the air valve.

**CAUTION:**

If the inner tube is abruptly contracted or air enters the inner tube, the oil may spurt out or the oil seal may spring out. Never touch the inner tube during disassembling operation. Also wrap the oil seal with a rag for safety.



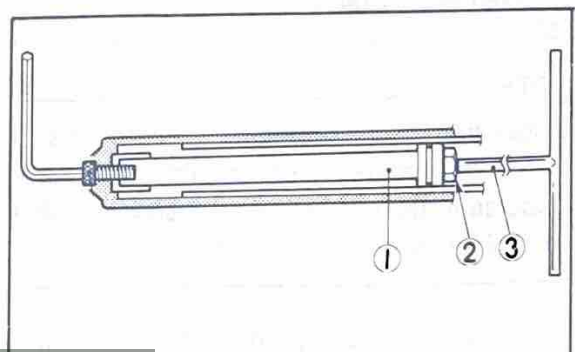
1. Turn slowly 2. Spacer 3. Wrap with rag

- Wrap a rag around the top of the slider, and slowly turn the handle of the press until the oil seal is pushed out of the slider.
- Remove the dust seal, and oil seal. Discard the oil seal, as the seal must always be replaced whenever the fork is disassembled.

**NOTE:**

For oil seal replacement alone, the following steps can be left out.

- Clamp the axle lug in a vise, and push the inner tube all the way into the slider.
- Use the damping-cylinder holding tool to remove the holding bolt from the bottom of the outer tube.



1. Damper rod 2. Holder 3. T-Handle

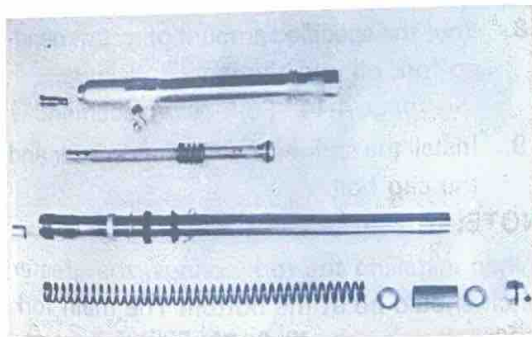
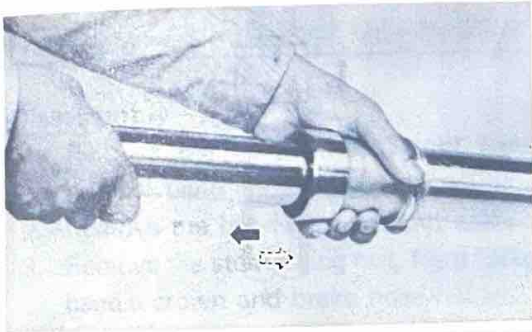
**NOTE:**

The holding bolt is locked with LOCTITE®. To remove it, tap it with a hammer several times so that it can be loosened.

12. Slowly push the inner fork tube into the outer fork tube, and then pull the fork back quickly until it tops out. The slide metal will be dislodged from the outer fork tube after doing this several times.

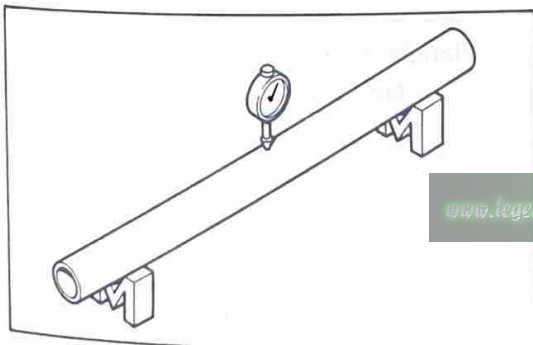
**CAUTION:**

Avoid bottoming the inner fork tube in the outer fork tube. The taper spindle could be damaged.



**Inspection**

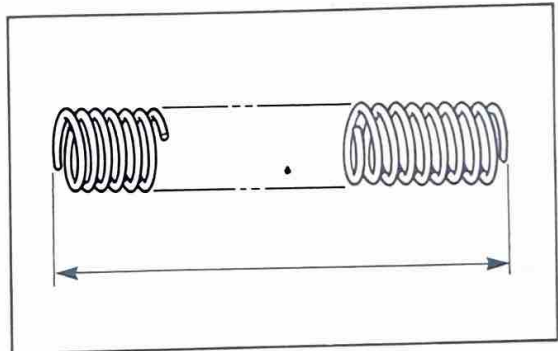
1. Examine fork inner tube for scratches and straightness. If the tube is scratched severely or bent, it should be replaced.



**WARNING:**

Do not attempt to straighten a fork tube, since this may weaken the part dangerously.

2. Inspect the slide metal. If damaged or excessively worn, replace it.
3. Inspect the damper rod and piston ring. If damaged or excessively worn, replace it.
4. Check the outer tube for dents. If any dent causes the inner tube to "hang up" during operation, the outer tube should be replaced.
5. Measure the free length of the springs.



Fork spring free length:  
 STD 542.5 mm (21.4 in)  
 Limit: 538 mm (21.18 in)

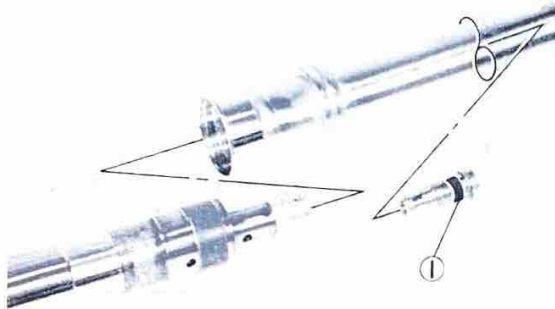
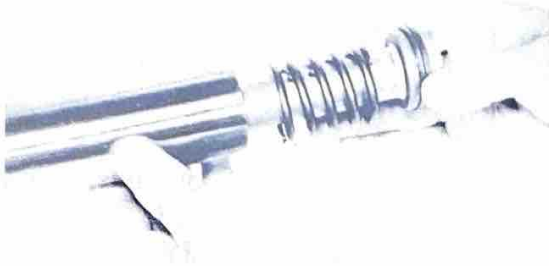
6. Check the O-ring on the cap bolt. If damaged, replace it.

**Reassembly**

1. Make sure all components are clean before assembly. Always install a new fork seal. Do not re-use a seal.
2. Apply LOCTITE® to the threads of the bolt, and reinstall the bolt.

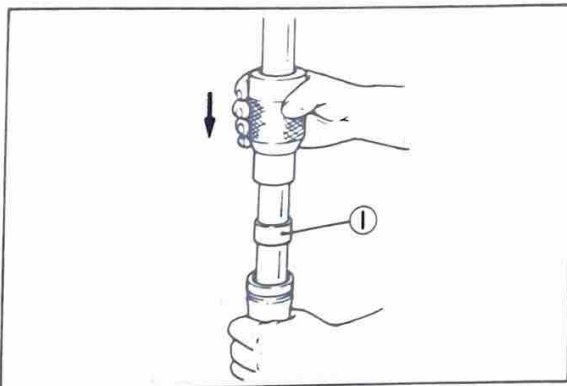
- Using the damping-cylinder holding tool, torque the holding bolt to specification.

Holding bolt torque:  
72 Nm (7.2 m · kg, 52 ft · lb)



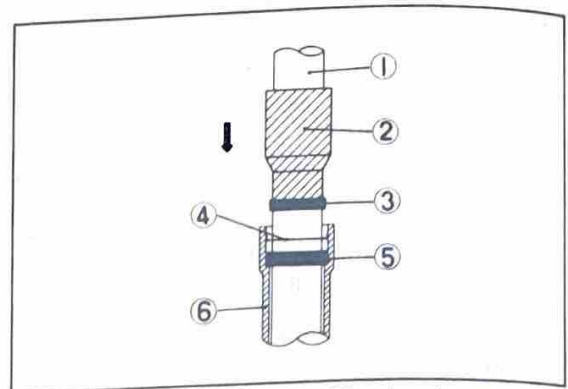
- Apply LOCTITE®

- Install the slide metal using the special 43.2 mm (1.70 in) fork tool (YM-08020).



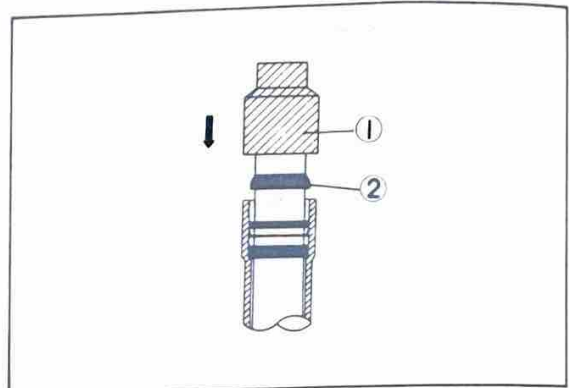
- Slide metal

- Install the seal washer, making sure the beveled edge faces upward.
- Oil and install a new oil seal in the top of the slider with the special tool. (see illustration.)



- Inner tube
- Special tools
- Oil seal
- Oil seal washer
- Slide metal
- Outer tube

- Gently tap the dust seal into place with the special tool and install the snap ring.



- Special tool
- Dust seal

- Pour the specified amount of recommended fork oil into the inner fork tube. (See page 4-14 "Fork oil replacement".)
- Install the spring, spring seats spacer and the cap bolt.

**NOTE:** When installing the fork springs, the greater pitch should be at the bottom. The main fork spring has a small coil diameter at the bottom.

- Install the fork assembly into the triple clamps, and torque the pinch bolts to specification.

Handle crown  
23 Nm (2.3 m · kg, 17 ft · lb)  
Under bracket  
23 Nm (2.3 m · kg, 17 ft · lb)

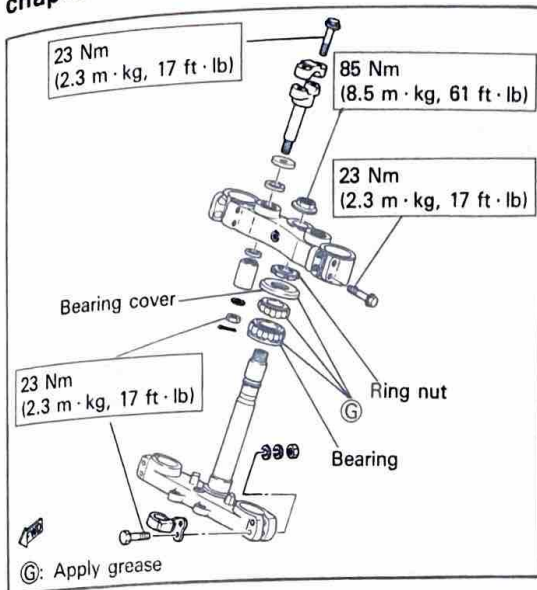
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- Reinstall the front wheel, taking care to compress the forks several times before tightening the axle pinch bolts; this will center the fork legs properly on the axle.



## STEERING HEAD

(Adjustment begins on page 2-14 of chapter 2.)



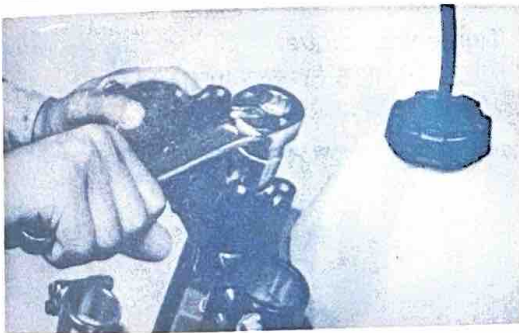
## Inspection

1. Wash the bearings in solvent.
2. Clean and inspect the bearing races. If pitted or damaged, replace the races and bearings.
3. Install the bearings 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.



## Disassembly

1. Remove the front wheel, front forks, number plate and front fender.
2. Remove the handlebar and put aside.
3. Remove the stem fitting nut, front forks, handle crown and brake hose holder.



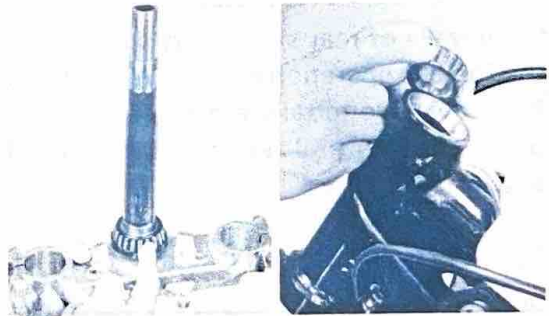
4. Supporting the under bracket, remove the steering ring nut with the steering nut wrench.
5. Remove the under bracket.



## Assembly

For installation, reverse the procedure for removal. Take care following precautions.

1. Coat the bearings and bearing cover with lithium base grease before installing.



2. Tighten the steering fitting nut and front fork pinch bolts with specified torque.

Steering fitting nut

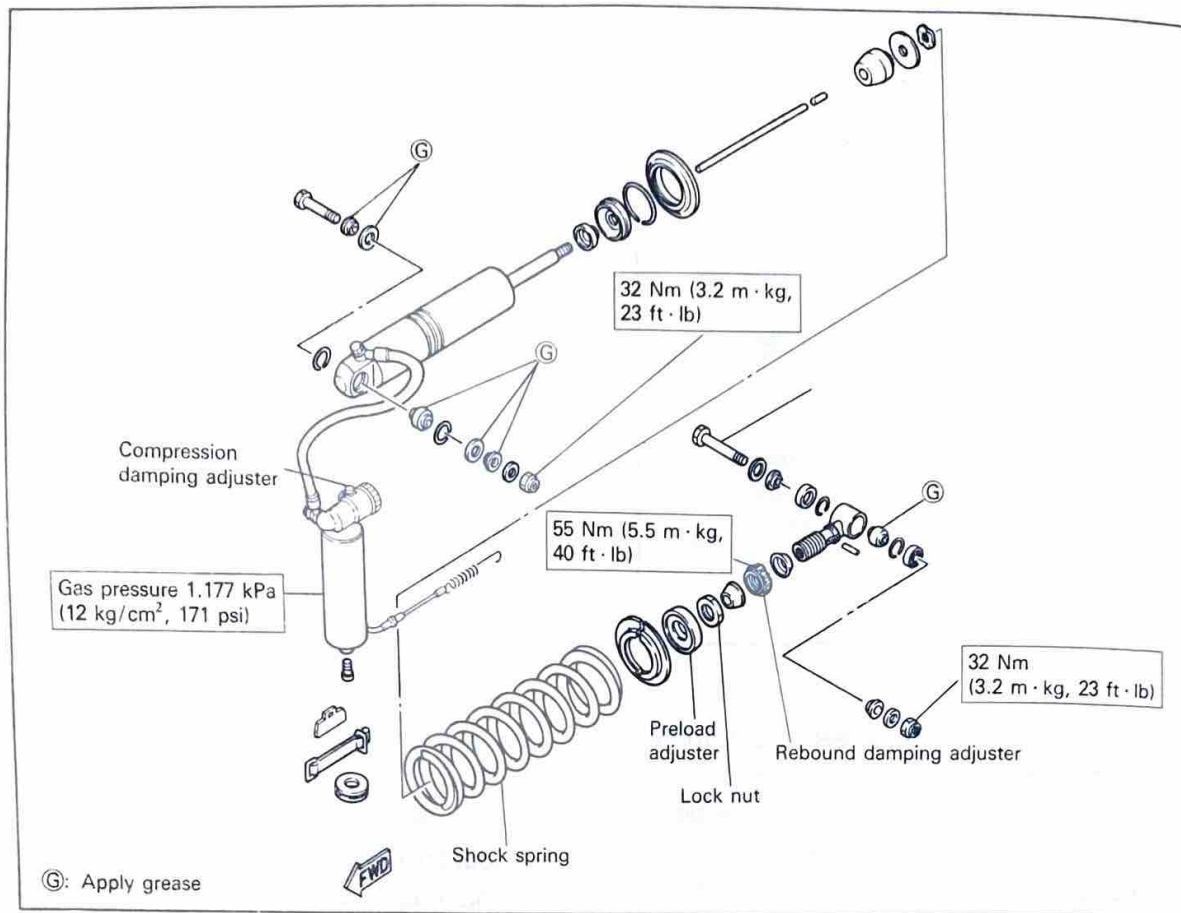
85 Nm (8.5 m · kg, 61 ft · lb)

Pinch bolt

23 Nm (2.3 m · kg, 17 ft · lb)

3. Recheck steering adjustment to make sure there is no binding when the forks are moved from lock to lock. If necessary, repeat the adjustment procedure.

# REAR SHOCK (MONOCROSS SUSPENSION "DE CARBON" SYSTEM)



## Rear shock setting

For details of rear shock setting, refer to the Race Preparation and Tuning Manual. It is advisable to take a note of the standard setting and specified range of adjustment.

Tightening torque:  
55 Nm (5.5 m·kg, 40 ft·lb)

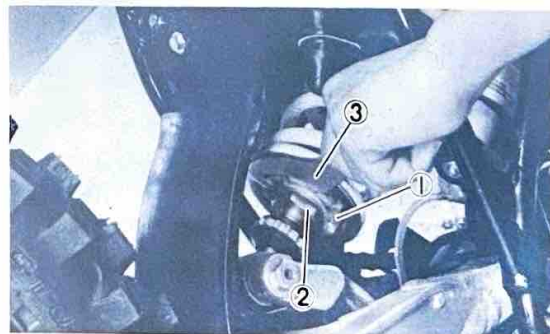
## Spring preload (Installed length)

STD	.....	275 mm (10.83 in)
MIN	.....	253 mm (9.96 in)
MAX	.....	283 mm (11.14 in)

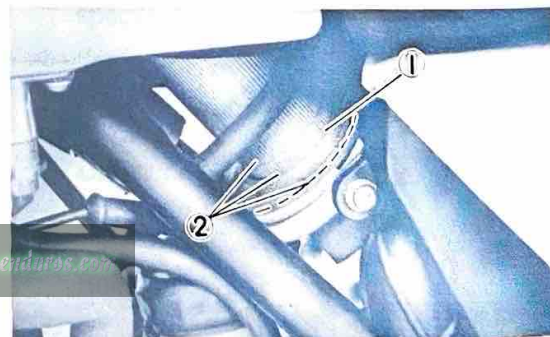
The length of the spring (installed) changes 1 mm (0.04 in) per turn of the adjuster and 7.5 mm (0.295 in) per groove of the upper spring seat.

### CAUTION:

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



1. Adjuster      2. Locknut      3. Special wrench

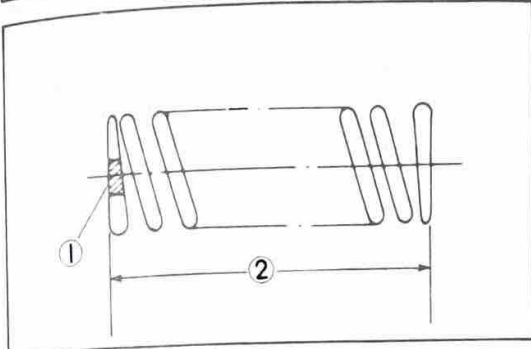


1. Circlip      2. Groove

## Shock spring

FREE LENGTH: 288 mm (11.34 in)

Type	Spring rate (kg/mm)	Part number	I.D. color
STD	4.75	39X-22212-20	Blue-Green
SOFT	4.50	39X-22212-00	—
HARD	5.00	57H-22212-20	Blue-Pink



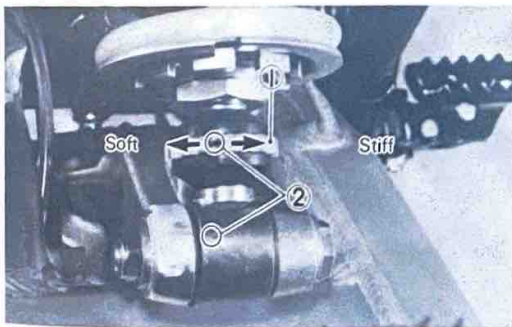
1. I.D. Color 2. Free length

## Rebound damping

STD SETTING: 14 clicks out  
[Min ~ Max] [25 ~ 0]

## CAUTION:

Don't turn out the adjuster more than 25 clicks from the stiffest position.



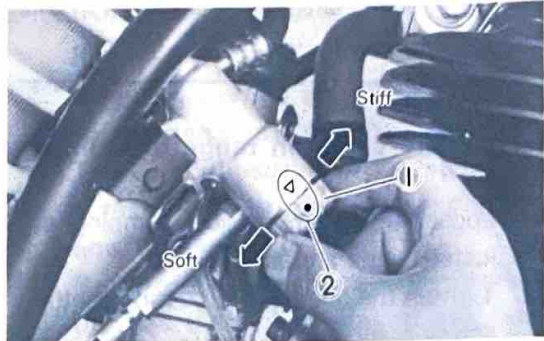
1. Rebound damping adjuster  
2. STD Adjustment marks

## Compression damping

STD SETTING: 20 clicks in  
[Min ~ Max] [0 ~ 28]

## CAUTION:

Don't turn in the adjuster more than 28 clicks from the softest position.



1. Compression damping adjuster  
2. STD Adjustment marks

## WARNING:

The compression damping adjuster is very hot immediately after a run. Never allow your bare hand or part of your body to touch it.

## Nitrogen gas pressure

STD. 1,177 kPa (12 kg/cm<sup>2</sup>, 171 psi)  
MIN. 686 kPa (7 kg/cm<sup>2</sup>, 100 psi)  
MAX. 1,480 kPa (15 kg/cm<sup>2</sup>, 213 psi)

## Brake actuated suspension

This system is so designed that when the rear brake pedal is depressed, the compressor damping force of the rear suspension can be reduced.

Thanks to this system, the hopping of the rear wheel on rough terrain can be controlled to ensure safe braking.

STD setting: 4 turns out  
MIN setting: 0.5 turns out  
(There is no change in damping force.)  
Max setting: 4 turns out  
Damping force can be minimized.

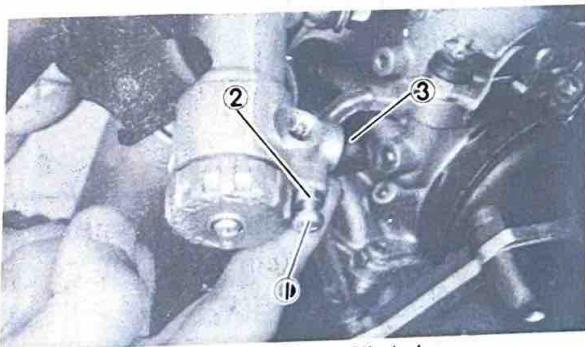
**CAUTION:**

With the adjuster backed out 0 to 0.5 turns, the compression damping force will be excessive, except when brakes are applied. Therefore, avoid setting the adjuster in this range.

**Setting the variation range of damping force**

1. Loosen the compression damping adjuster to the softest position.
2. Tighten the damping force range setting screw completely.
3. Back out the setting screw your desired number of turns and tighten the locknut.

Locknut:  
4 Nm (0.4 m · kg, 2.9 ft · lb)



1. Setting screw 2. Locknut 3. Blind plug

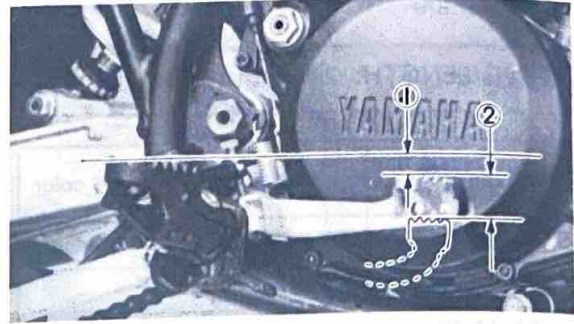
4. Back out the compression damping adjuster to its original set position.

**CAUTION:**

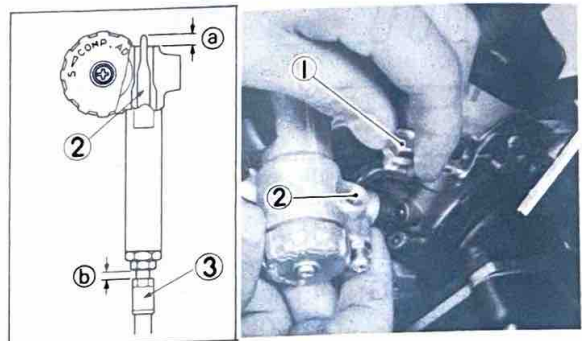
Never remove the blind plug.

**Control wire adjustment**

1. Set the brake pedal height within  $\pm 10$  mm (0.4 in.) from the footrest top and adjust the brake pedal play to 20~30 mm (0.8~1.2 in). The adjustments are required to allow the interlocking mechanism to operate properly.

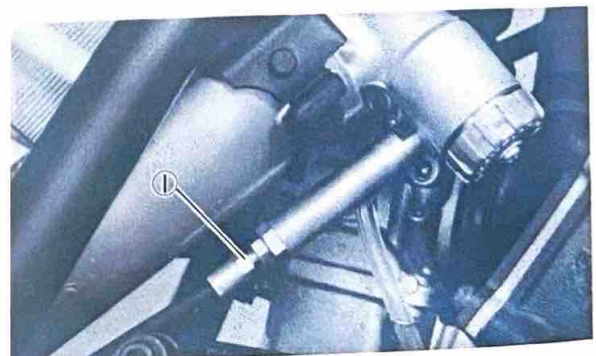


2. Remove the cap on top of the housing and turn the adjuster so that the top end of the rod in the housing projects out 2.5 mm (0.1 in) and that the distance (b) is 5~10 mm (0.2~0.4 in).



1. Cap 2. Rod 3. Adjuster

3. Make sure the rod moves the moment that the brake pedal is depressed.
4. Tighten the locknut and install the cap carefully so that no mud or water enters the housing.



1. Adjuster

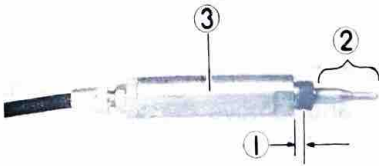
Locknut ①:  
5 Nm (0.5 m · kg, 3.6 ft · lb)  
Cap ②:  
6 Nm (0.6 m · kg, 4.3 ft · lb)

- When replacing the control wire, coat the threaded portion of the housing with Three-Bond #1303 and the rod with molybdenum disulfide grease.

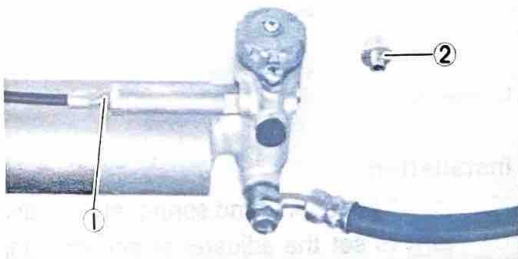
**CAUTION:**

Use care so that the bond will not stick on the rod.

Housing: 120 Nm (1.2 m·kg, 8.7 ft·lb)



- Apply Three-Bond #1303
- Apply Molybdenum disulfide grease
- Housing



1. Locknut

2. Cap

**Handling notes**

**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.

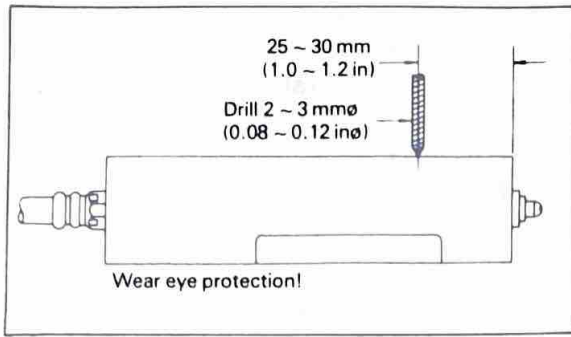
- Never tamper or attempt to disassemble the cylinder or the tank. Never tamper with the nut securing the hose to the cylinder assembly; otherwise, oil will spurt from the cylinder due to the high pressure in the nitrogen gas tank.
- Never throw the shock absorber into an open flame or other high heat. The shock absorber may explode as a result of nitrogen gas expansion and/or damage to the hose.
- Be careful not to damage any part of the gas tank. A damaged gas tank will impair the damping performance or cause a malfunction.
- Use care not to damage any part of the hose. Any break in the hose may result in a spurt of oil under high-pressure.
- Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.
- Never attempt to remove the plug at the bottom of the nitrogen gas tank. It is very dangerous to remove the plug.
- Never attempt to remove the banjo bolts where the hose attaches to the monoshock and sub tank.
- 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. To do so, drill a 2 or 3 mm (0.08 ~ 0.12 in) hole through the tank at a position 25 ~ 30 mm (1.0 ~ 1.2 in) from the bottom end of the tank. At this time, wear eye protection to prevent eye damage from escaping gas and/or metal chips.

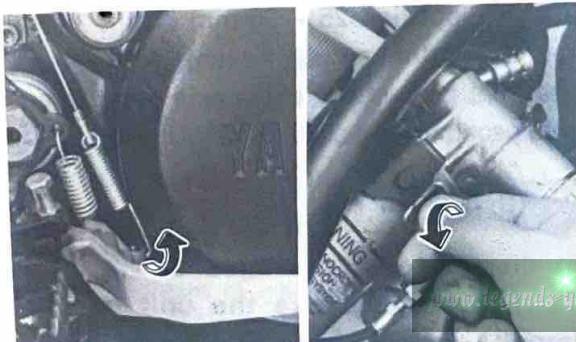
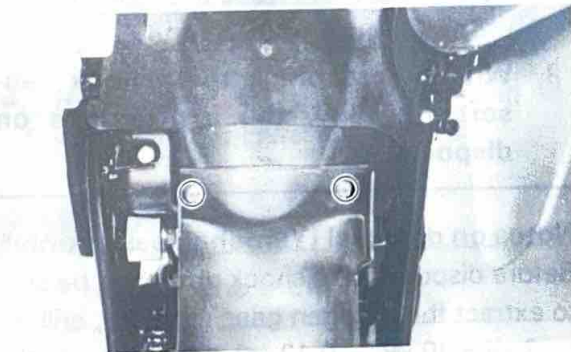
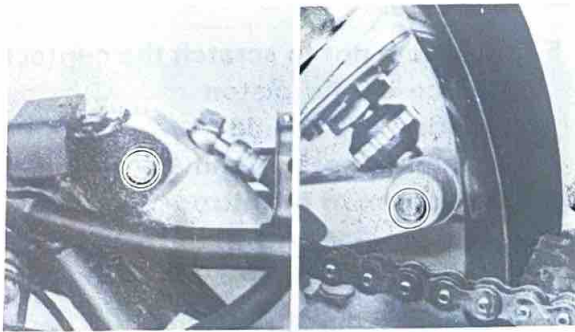
**WARNING:**

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

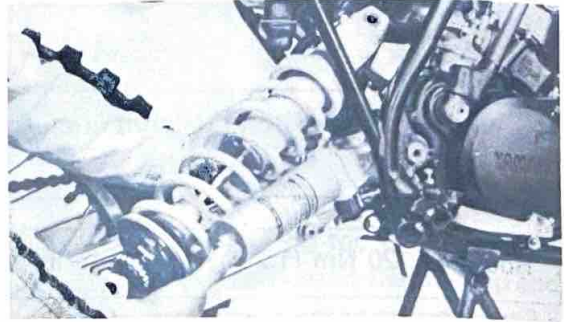


**Removal**

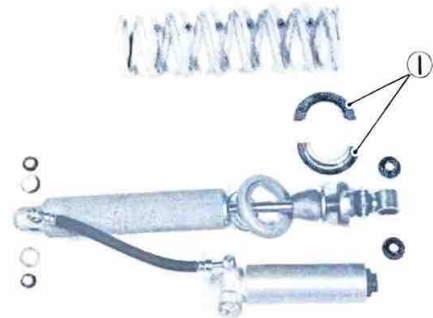
1. To remove the shock absorber, place the machine on a suitable stand to keep the bike stable while the shock absorber is removed.
2. Loosen and remove the bolts as shown below.



3. Carefully remove the shock absorber from the frame; take care to avoid damaging the rubber hose or the shock reservoir.



4. Loosen the locknut and loosen the adjuster. This will make it easy to remove the spring.
5. Push down the spring, remove the spring retainer, and remove the spring.



1. Retainers

**Installation**

1. Install the spring and spring retainer, and turn to set the adjuster as shown in the illustration.

STD	.....	275 mm (10.83 in)
MIN	.....	253 mm (9.96 in)
MAX	.....	283 mm (11.14 in)

The length of the spring (installed) changes 1 mm (0.04 in) per turn of the adjuster.

**CAUTION:**

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

2. Tighten the locknut.

Locknut:  
55 Nm (5.5 m·kg, 40 ft·lb)

3. Apply grease to the pivot shafts.

**CAUTION:**

**Wipe off any excessive grease, and avoid getting grease on the brake shoes.**

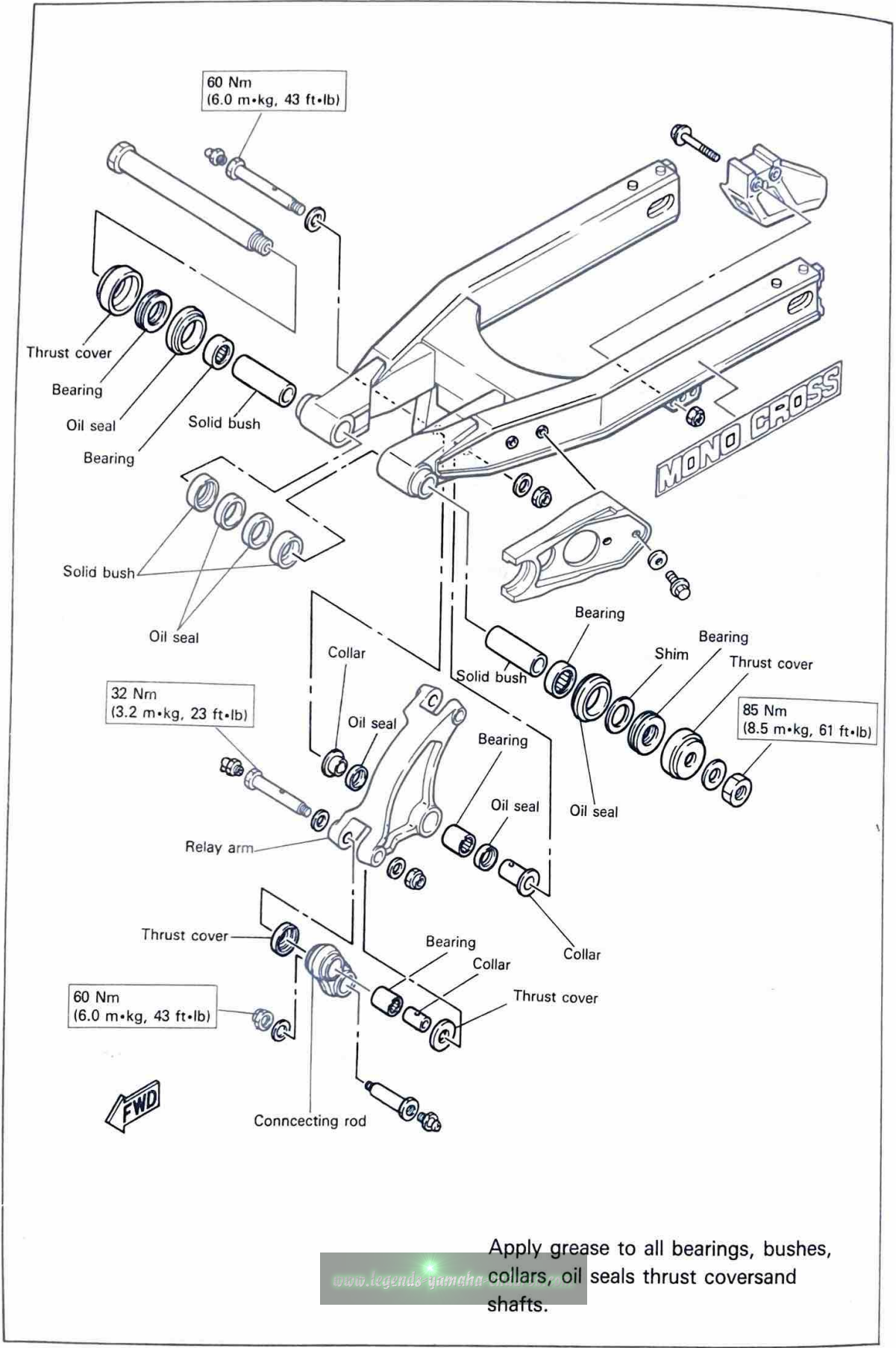
4. Install the shock absorber on the machine.
5. Tighten the nut to specification.

Upper bolt:  
32 Nm (3.2 m·kg, 23 ft·lb)

Lower bolt:  
32 Nm (3.2 m·kg, 23 ft·lb)

6. After installing, make sure all these parts move smoothly.

# SWINGARM



Apply grease to all bearings, bushes, collars, oil seals thrust covers and shafts.

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### Swingarm free play inspection

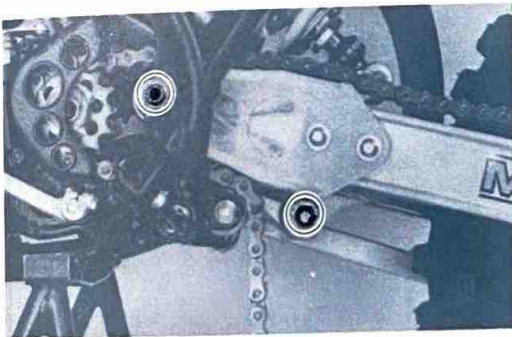
1. To check the swingarm free play, remove the rear wheel and disconnect the shock from the relay arm.
2. Grasp the ends of the swingarm and try to move the arm sideways; if the free play exceeds tolerance, remove the swingarm and take it to your Yamaha dealer for bearing replacement.



Swingarm free play:  
0 ~ 1 mm (0 ~ 0.04 in)

### Removal

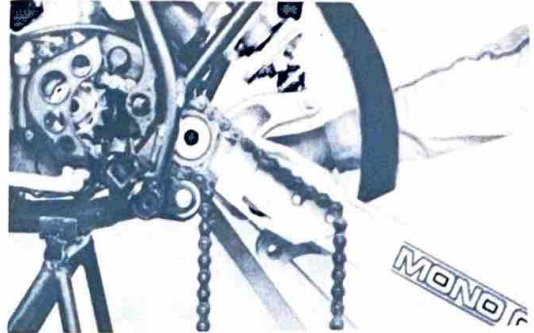
1. Remove the rear wheel assembly.
2. Remove the pivot bolt which connecting the relay arm with the swingarm.



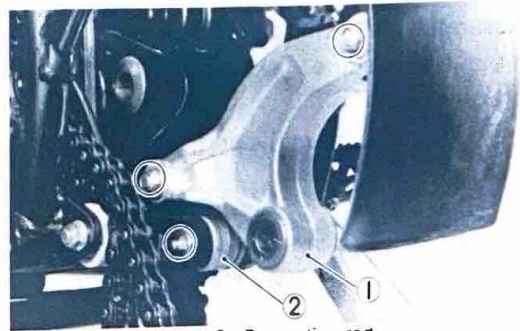
3. Remove the nut on the swingarm pivot shaft and top out the shaft with a long aluminum or brass rod.

### NOTE: \_\_\_\_\_

Carefully remove the arm while noting the location of spacing washers and shims. They must be reinstalled in the same positions.



4. Remove the relay arm and the connecting rod.



1. Relay arm  
2. Connecting rod

### Inspection

1. Closely inspect the swingarm for cracks or other damages. Repair or replace it as required.
2. Inspect the thrust covers, bearings, bushes, oil seals and collars. If damaged or worn, replace.



### Assembly

Assemble the swingarm by reversing the removal procedure. Take care of the following precautions.

1. Apply grease to the portions of the swingarm.

Bush:

Coat all inside surface of bushes with grease.

Oil seal:

Fill the lip portion of oil seals with grease.

Dust cover:

Coat inside and outside surface of dust seals with grease.

Thrust cover:

Fill inside of thrust cover with grease.

Pivot shaft:

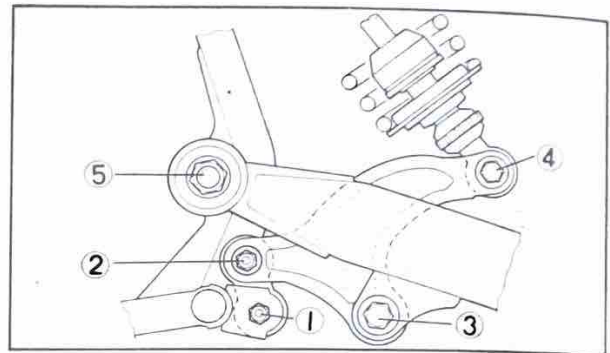
Coat outside surface of shaft with grease.

Grease nipple:

Using a grease gun lubricate the swingarm pivot point.

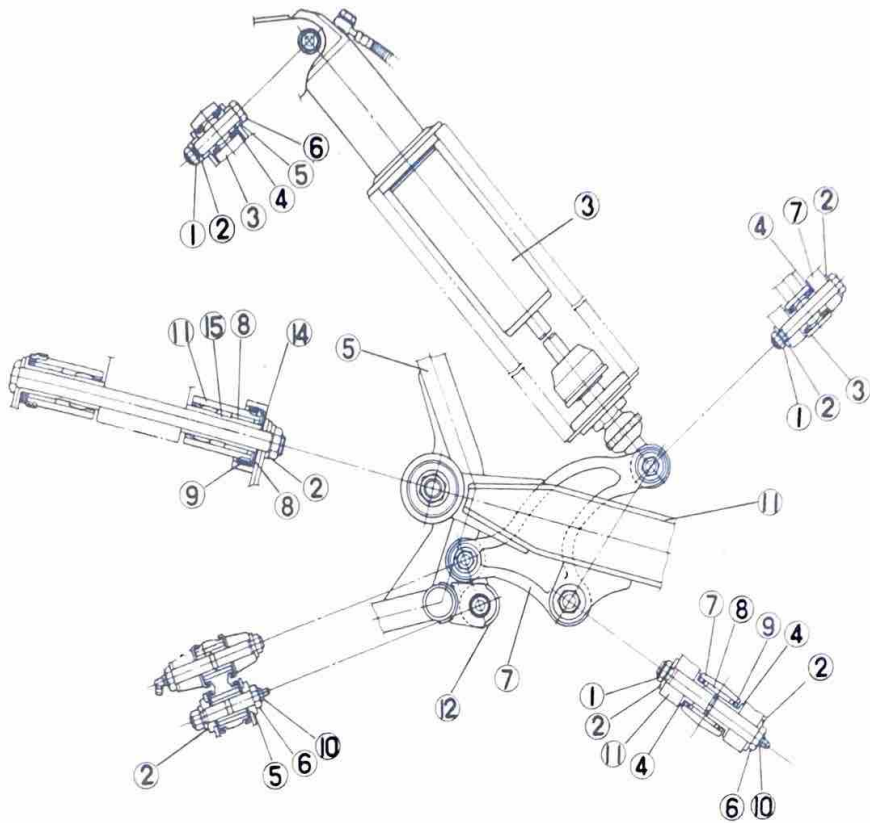
2. Tighten the nuts to specification.

- ① Connecting rod - Frame:  
60 Nm (6.0 m·kg, 43 ft·lb)
- ② Connecting rod - Relay arm:  
32 Nm (3.2 m·kg, 23 ft·lb)
- ③ Relay arm - Swingarm:  
60 Nm (6.0 m·kg, 43 ft·lb)
- ④ Relay arm - Suspension:  
32 Nm (3.2 m·kg, 23 ft·lb)
- ⑤ Pivot shaft:  
85 Nm (8.5 m·kg, 61 ft·lb)



### CAUTION:

**Wipe off any excess grease, and avoid getting grease of the brake shoes.**



- |                        |                       |
|------------------------|-----------------------|
| 1. Self-locking nut    | 9. Oil seal           |
| 2. Washer              | 10. Grease nipple     |
| 3. Rear shock absorber | 11. Rear arm complete |
| 4. Collar              | 12. Connecting rod    |
| 5. Frame               | 13. Thrust cover      |
| 6. Bolt                | 14. Shim              |
| 7. Relay arm           | 15. Solid bush        |
| 8. Bearing             |                       |

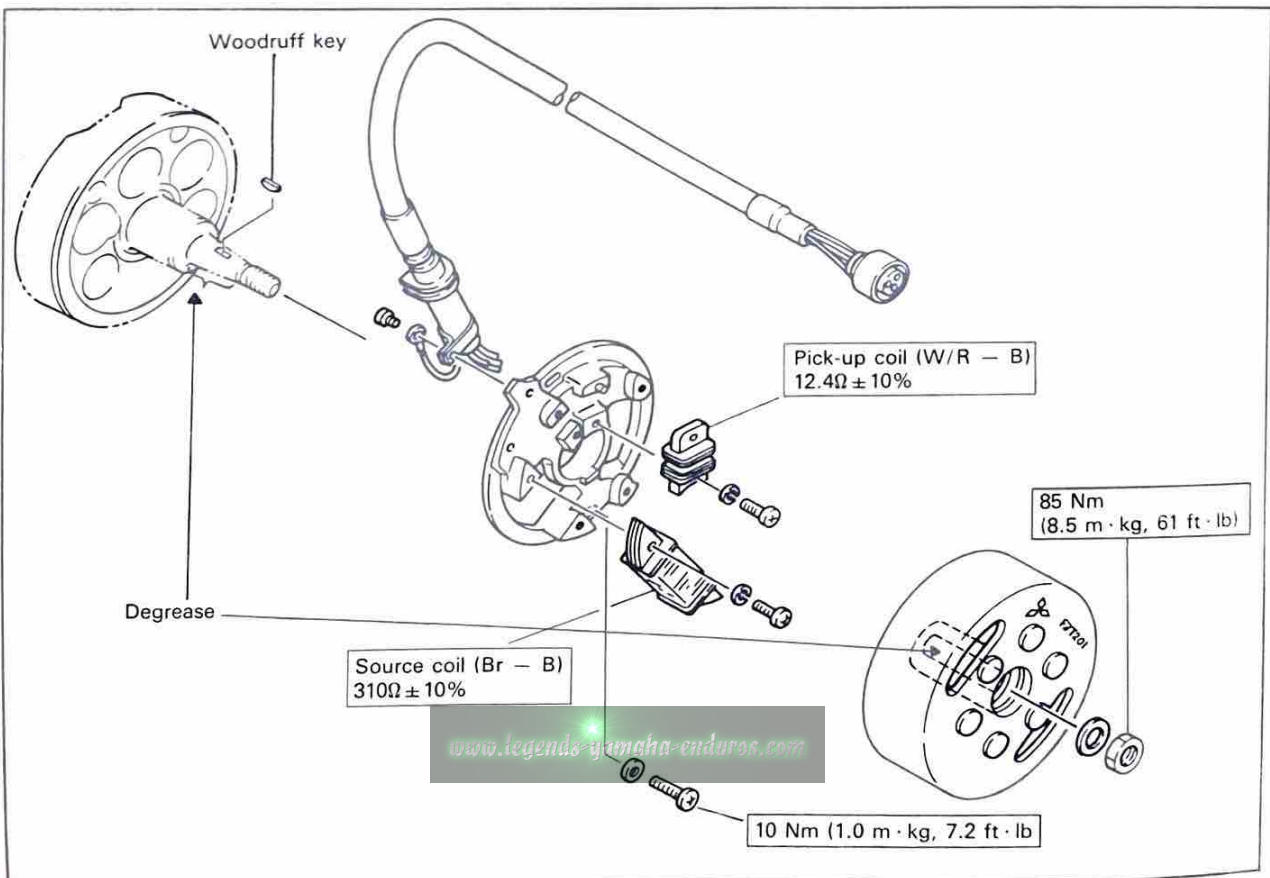
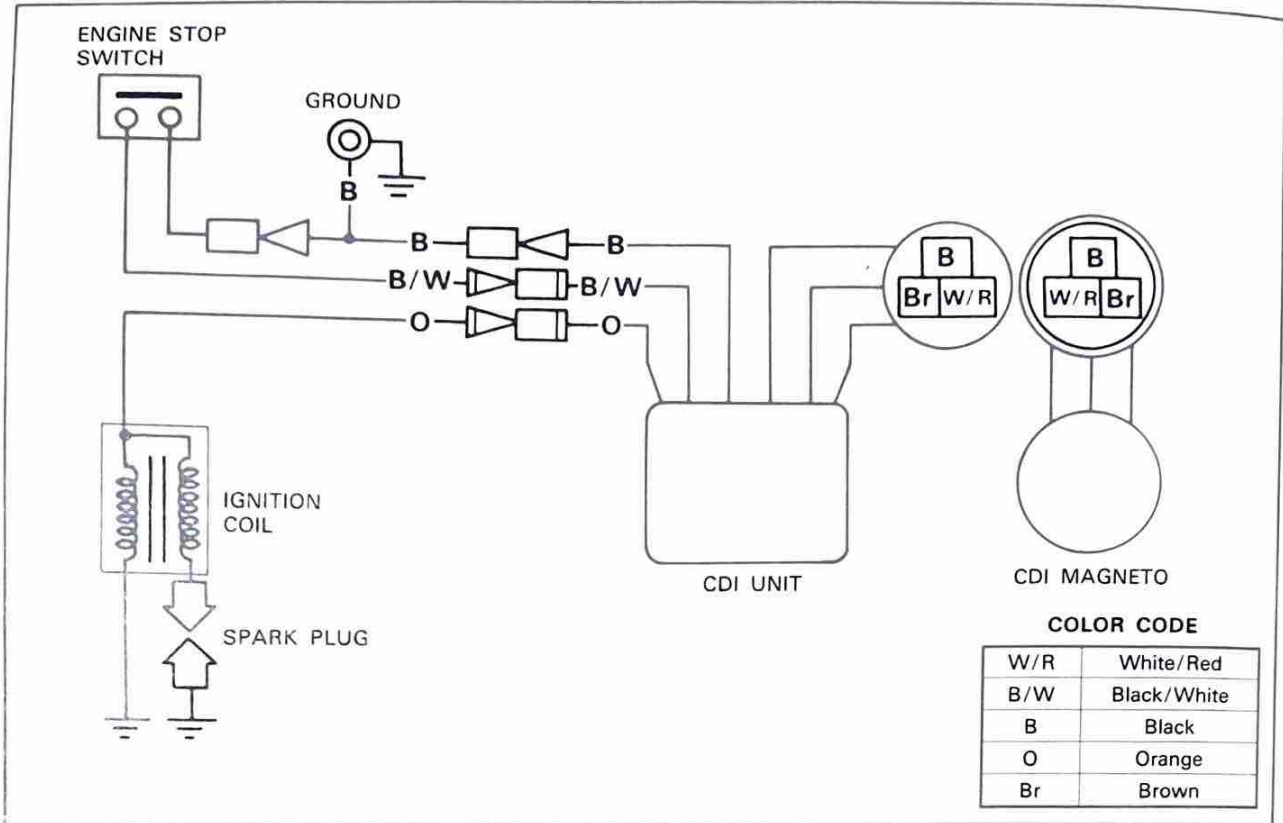


# 5 ELECTRICAL TROUBLESHOOTING

WIRING DIAGRAM .....5-1  
IGNITION SYSTEM .....5-2

# 5 ELECTRICAL TROUBLESHOOTING

## WIRING DIAGRAM

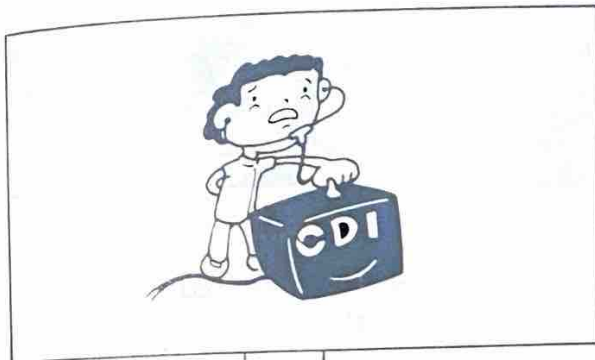


# IGNITION SYSTEM

Make sure the wire harness is in a position it will not make contact with exhaust pipe, which could short out C.D.I. unit.

## Troubleshooting

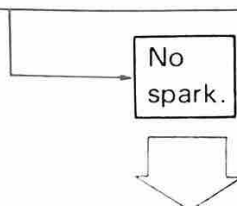
If the ignition spark is of poor quality or if there is no spark at all, use the following procedure, to locate and repair the problem.



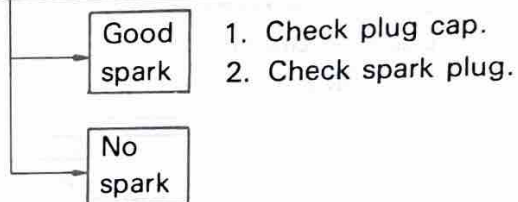
1	Spark plug test
Remove the spark plug and check the spark.	
Ground the spark plug to the cylinder head, and kick the starter.	

### NOTE:

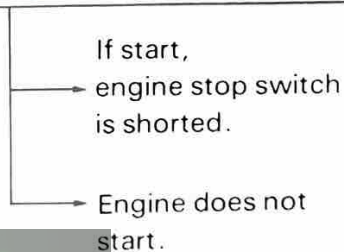
If the spark plug is oily or has carbon deposits, clean it replace.

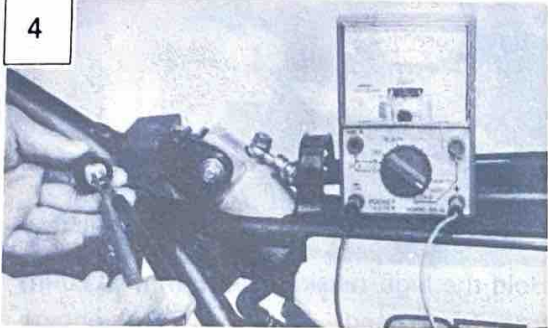


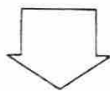
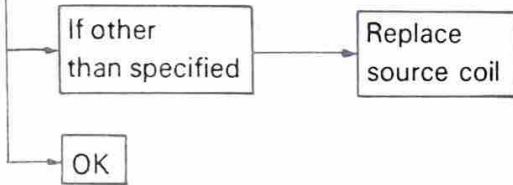
2	Spark gap test
Remove the spark plug cap and check the spark.	
Hold the high tension lead 5 mm (0.20 in) from the head, and kick the engine through.	

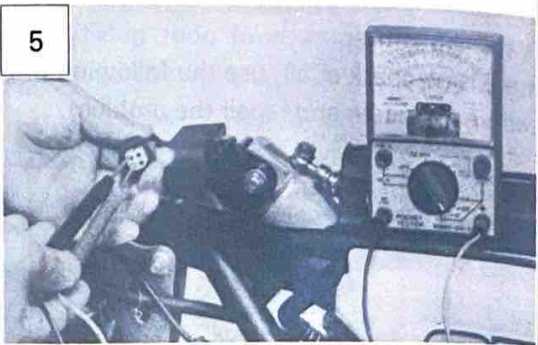


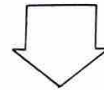
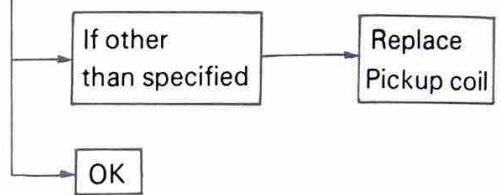
3	Engine stop switch
Disconnect the Black/White lead of engine stop switch at C.D.I. unit.	



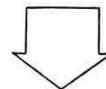
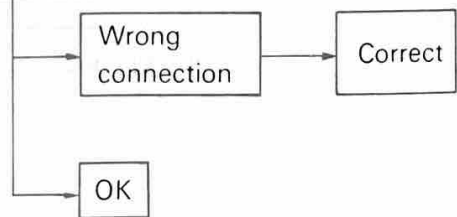
4	C.D.I. Magneto (Source coil) test
Disconnect the magneto leads, and use the pocket tester to check the resistance of the magneto coils.	
4	
<p>Source coil resistance: Black – Brown: <math>310\Omega \pm 10\%</math></p>	



5	C.D.I. Magneto (Pickup coil) test
Disconnect the magneto leads, and use the pocket tester to check the resistance of the pickup coil.	
5	
<p>Pickup coil resistance: Black – White/Red: <math>12.4\Omega \pm 10\%</math></p>	



6	Connectors check-up
<ol style="list-style-type: none"> <li>1. Check the connectors and couplers for looseness of joining ends.</li> <li>2. Keep the connectors and couplers from dirt or rust.</li> </ol>	

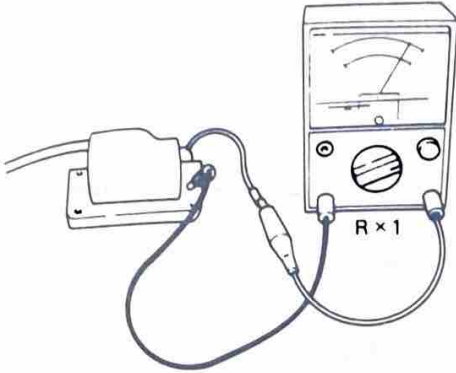




7

### Ignition coil test

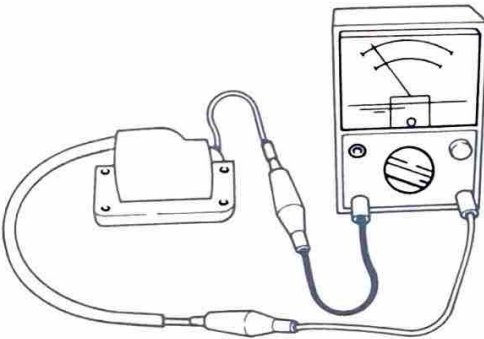
Use the pocket tester to check the resistance of primary and secondary windings of the ignition coil.



Primary coil resistance:  
 $1.0\Omega \pm 15\%$

### CAUTION:

Make sure the wire harness is in a position it will not make contact with exhaust pipe, which could short out C.D.I. unit.



Secondary coil resistance:  
 $5.9\text{ K}\Omega \pm 15\%$

If other than specified

Replace ignition coil

OK

Replace C.D.I. unit

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## **6 APPENDICES**

<b>TROUBLESHOOTING GUIDE</b> .....	<b>6-1</b>
<b>Engine is hard to start or does not start</b> .....	<b>6-1</b>
<b>Overheat</b> .....	<b>6-2</b>
<b>Transmission and shifter</b> .....	<b>6-2</b>
<b>Poor high speed performance</b> .....	<b>6-3</b>
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## 6 APPENDICES

### TROUBLESHOOTING GUIDE

**Engine is hard to start or does not start.**

Ignition System	
Possible Cause	Remedy
<ol style="list-style-type: none"> <li>1. Spark plug is wet.</li> <li>2. Ignition coil is faulty.</li> <li>3. C.D.I. unit is faulty.</li> <li>4. C.D.I. magneto is faulty (Pickup coil, source coil)</li> <li>5. Ignition timing is incorrect.</li> <li>6. Wire is broken, shorted or disconnected.</li> <li>7. Engine stop switch is shorted.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean or replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Adjust</li> <li>• Repair, replace or connect</li> <li>• Repair or replace</li> </ul>
Compression System	
Possible Cause	Remedy
<ol style="list-style-type: none"> <li>1. Piston rings are sticking or worn.</li> <li>2. Cylinder or piston is worn or scratched.</li> <li>3. Compression leaks passing cylinder head gasket. (Head is distorted.)</li> <li>4. Crankshaft side oil seal is faulty.</li> <li>5. Air leaks through crankcase sealing surfaces.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Repair or replace</li> <li>• Replace (or repair)</li> <li>• Replace</li> <li>• Repair</li> </ul>
Air/Fuel System	
Possible Cause	Remedy
<ol style="list-style-type: none"> <li>1. Carburetor pilot jet is clogged.</li> <li>2. Fuel petcock or pipe is clogged.</li> <li>3. Float valve is faulty. (Float height is too high or too low.)</li> <li>4. Reed valve is broken or deformed.</li> <li>5. Fuel tank filler cap or carburetor breather pipe is clogged.</li> <li>6. Air screw is improperly adjusted.</li> <li>7. Fuel is deteriorated.</li> <li>8. Oil-gas mixing ratio is incorrect.</li> <li>9. Air leaks through carburetor joints.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean</li> <li>• Clean</li> <li>• Replace (remove gasoline from crankcase)</li> <li>• Replace</li> <li>• Clean</li> <li>• Adjust</li> <li>• Replace</li> <li>• Replace</li> <li>• Retighten or replace gasket</li> </ul>

## Overheat

Possible Cause	Remedy
<ol style="list-style-type: none"><li>1. Incorrect air-fuel mixture</li><li>2. Air leaks through carburetor joint.</li><li>3. Incorrect ignition timing</li><li>4. Carbon builds up in cylinder head or on piston head.</li><li>5. Improper spark plug heat range (too hot)</li><li>6. Fuel is deteriorated or oil-gas mixing ratio is incorrect.</li></ol>	<ul style="list-style-type: none"><li>• Adjust</li><li>• Repair or replace</li><li>• Adjust</li><li>• Decarbonize</li> <li>• Replace</li> <li>• Replace</li></ul>

## Transmission and shifter

Trouble	Possible Cause	Remedy
Gears slip off	<ol style="list-style-type: none"><li>1. Gear dogs are worn.</li><li>2. Shift forks are bent. (burnt or worn)</li><li>3. Shift cam stopper spring is fatigued.</li></ol>	<ul style="list-style-type: none"><li>• Replace</li><li>• Replace</li> <li>• Replace</li></ul>
Gear shifts skipping over the next.	<ol style="list-style-type: none"><li>1. Shift cam stopper spring is fatigued.</li><li>2. Shift forks are bent. (burnt or worn)</li></ol>	<ul style="list-style-type: none"><li>• Replace</li> <li>• Replace</li></ul>
Gear does not select	<ol style="list-style-type: none"><li>1. Shift cam is worn. (broken)</li><li>2. Change shaft is bent.</li><li>3. Shift arm spring is broken.</li><li>4. Gears are broken.</li></ol>	<ul style="list-style-type: none"><li>• Replace</li><li>• Replace</li><li>• Replace</li><li>• Removal (Replace)</li></ul>
Shift pedal does not return.	<ol style="list-style-type: none"><li>1. Change return spring is broken.</li><li>2. Change shaft is bent.</li></ol>	<ul style="list-style-type: none"><li>• Replace</li><li>• Replace</li></ul>

## Poor high speed performance

Ignition System	
Possible Cause	Remedy
<ol style="list-style-type: none"> <li>1. Spark plug is dirty or plug gap is too narrow.</li> <li>2. C.D.I. unit is faulty.</li> <li>3. C.D.I. magneto is faulty.</li> <li>4. Ignition coil is faulty.</li> <li>5. Ignition timing is incorrect.</li> <li>6. Loose wire connection.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean, repair or replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Adjust</li> <li>• Repair</li> </ul>
Compression System	
Possible Cause	Remedy
<ol style="list-style-type: none"> <li>1. Piston rings are sticking or worn.</li> <li>2. Cylinder or piston is worn or scratched.</li> <li>3. Compression leakage through crankcase sealing surfaces or crankshaft side oil seal.</li> <li>4. Carbon deposits in combustion chamber (Piston, Cylinder head).</li> </ol>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Repair or replace</li> <li>• Repair or replace</li> <li>• Decarbonize</li> </ul>
Air/Fuel System	
Possible Cause	Remedy
<ol style="list-style-type: none"> <li>1. Clogged carburetor jets.</li> <li>2. Improperly adjusted main jet (High speed)</li> <li>3. Improperly adjusted jet needle (Medium speed)</li> <li>4. Incorrect fuel level</li> <li>5. Dirty or clogged air cleaner element</li> <li>6. Clogged fuel tank filler cap or carburetor breather pipe.</li> <li>7. Clogged fuel petcock or kinked fuel pipe.</li> <li>8. Deteriorated fuel.</li> <li>9. Improper oil-gas mixing ratio</li> <li>10. Cracked or broken exhaust pipe (Leakage of exhaust gases).</li> </ol>	<ul style="list-style-type: none"> <li>• Clean</li> <li>• Adjust</li> <li>• Adjust</li> <li>• Adjust</li> <li>• Clean</li> <li>• Clean</li> <li>• Clean or repair</li> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> </ul>

## Clutch

Trouble	Possible Cause	Remedy
Clutch slips	<ol style="list-style-type: none"><li>1. Friction plate is worn.</li><li>2. Clutch plate is worn.</li><li>3. Clutch spring is fatigued.</li><li>4. Pressure plate is deformed.</li><li>5. Clutch paly is too small.</li><li>6. Clutch adjustment is incorrect.</li><li>7. Match marks of clutch boss and pressure plate does not aligned.</li></ol>	<ul style="list-style-type: none"><li>• Replace</li><li>• Replace</li><li>• Replace</li><li>• Replace</li><li>• Adjust</li><li>• Adjust</li><li>• Reassemble</li></ul>
Clutch drags	<ol style="list-style-type: none"><li>1. Clutch plate is worped.</li><li>2. Clutch lock nut is loosen.</li><li>3. Friction plate is broken.</li><li>4. Clutch play is too much.</li><li>5. Oil viscosity is incorrect.</li></ol>	<ul style="list-style-type: none"><li>• Replace</li><li>• Replace</li><li>• Replace</li><li>• Adjust</li><li>• Replace</li></ul>

## Chassis

Steering head is loose		
Possible Cause	Remedy	
<ol style="list-style-type: none"> <li>1. Roller is worn.</li> <li>2. Steering nut is loose.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Retighten</li> </ul>	
Wheels have excessive run-out		
Possible Cause	Remedy	
<ol style="list-style-type: none"> <li>1. Bearing is worn.</li> <li>2. Rim has dent.</li> <li>3. Spokes are loose (or broken).</li> <li>4. Axle nut is loose.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Repair or replace</li> <li>• Retighten or replace</li> <li>• Retighten</li> </ul>	
Brakes		
Trouble	Possible Cause	Remedy
Faulty	<ol style="list-style-type: none"> <li>1. Brake pad or shoes are worn.</li> <li>2. Brake is improperly adjusted.</li> <li>3. Brake drum contains water.</li> <li>4. Brake disc, pad or lining is greasy.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Adjust</li> <li>• Clean</li> <li>• Degrease or replace</li> </ul>
Not return smoothly	<ol style="list-style-type: none"> <li>1. Wire is starved for oil.</li> <li>2. Camshaft is starved for grease.</li> <li>3. Return spring or brake shoe spring is broken.</li> <li>4. Brake pedal axle is starved for grease.</li> </ol>	<ul style="list-style-type: none"> <li>• Grease or replace</li> <li>• Grease</li> <li>• Replace</li> <li>• Grease</li> </ul>
Frame and Swingarm		
Possible Cause	Remedy	
<ol style="list-style-type: none"> <li>1. Frame is cracked.</li> <li>2. Rear arm is bent.</li> <li>3. Rear arm is cracked.</li> <li>4. Bushing is worn.</li> <li>5. Bushing lacks oil.</li> </ol>	<ul style="list-style-type: none"> <li>• Weld, reinforce or replace</li> <li>• Repair or replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Lubricate</li> </ul>	



# SPECIFICATIONS

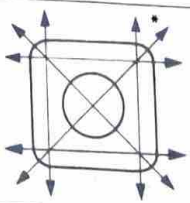
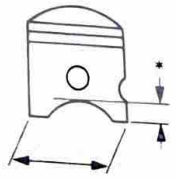
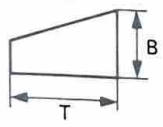
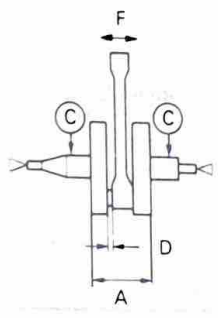
## I. GENERAL SPECIFICATIONS

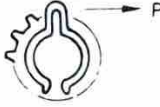
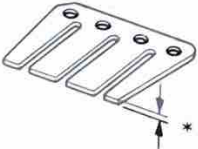
Item	Model	YZ490N
Model Code Number	57H	
Vehicle Identification Number	JYA57H00*FA000101	
Engine Starting Number	57H-000101	
Dimensions:		
Overall Length	2,175 mm (85.6 in)	
Overall Width	850 mm (33.5 in)	
Overall Height	1,215 mm (47.8 in)	
Seat Height	960 mm (37.8 in)	
Wheelbase	1,475 mm (58.1 in)	
Minimum Ground Clearance	335 mm (13.2 in)	
Basic Weight:		
With Oil and Full Fuel Tank	110.5 kg (243.7 lb)	
Engine:		
Engine Type	Air, cooled 2-stroke, gasoline, torque induction	
Cylinder Arrangement	Single cylinder, forward inclined	
Displacement	487 cm <sup>3</sup>	
Bore × Stroke	87 × 82 mm (3.43 × 3.23 in)	
Compression Ratio	6.8 : 1	
Starting System	Kick starter	
Lubrication System	Premix (24 : 1) (Yamalube R) Premix (20 : 1) (Castrol R30) (Castrol A545) (Castrol A747)	
Oil Type or Grade (2-Cycle):		
Transmission Oil	Yamalube 4-cycle oil or SAE 10W30 type SE motor oil or GL gear 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	Premix Premium gasoline	
Tank Capacity	10.5 L (2.31 Imp gal, 2.77 US gal)	
Carburetor:		
Type/Manufacturer	VM40SS/MIKUNI	
Spark plug:		
Type/Manufacturer	N-86, N-86G, N-2G, N-2C/CHAMPION B8EG, B8EGV/NGK	
Gap	0.5 – 0.6 mm (0.019 – 0.024 in)	
Clutch Type	Wet, multiple-disc	

Item	Model	YZ490N
<b>Transmission:</b> Primary Reduction System Primary Reduction Ratio Secondary Reduction System Secondary Reduction Ratio Transmission Type Operation Gear Ratio   1st 2nd 3rd 4th		Helical gear 63/24 (2.625) Chain drive 46/14 (3.286) Constant mesh, 4-speed Left foot operation 28/16 (1.750) 25/19 (1.316) 23/22 (1.045) 20/24 (0.833)
<b>Chassis:</b> Frame Type Caster Angle Trail		Semi double cradle 28°30' 120 mm (4.72 in)
<b>Tire:</b> Type Size (F) Size (R)		With tube 100/90-21-4PR 140/80-18-4PR
<b>Brake:</b> Front Brake Type Operation Rear Brake Type Operation		Disk brake Right hand operation Drum brake Right foot operation
<b>Suspension:</b> Front Suspension Rear Suspension		Telescopic fork (Pneumo-mechanical) Swingarm (New monocross suspension)
<b>Shock Absorber:</b> Front Shock Absorber Rear Shock Absorber		Air, coil spring, oil damper Gas, coil spring, oil damper
<b>Wheel Travel:</b> Front Wheel Travel Rear Wheel Travel		300 mm (11.8 in) 320 mm (12.6 in)
<b>Electrical:</b> Ignition System		C.D.I. Magneto

## II. MAINTENANCE SPECIFICATIONS

### Engine

Item	Model	YZ490N
Cylinder Head: Warp Limit 		$<0.03 \text{ mm (0.0012 in)}>$ *Lines indicate straightedge measurement.
Cylinder: Bore Size Taper Limit Out of Round Limit		87.00 ~ 87.02 mm (3.425 ~ 3.426 in) $<0.05 \text{ mm (0.002 in)}>$ $<0.01 \text{ mm (0.0004 in)}>$
Piston: Piston Size/ Measuring Point* Piston Clearance $<\text{Limit}>$ Oversize    1st 2nd 3rd 4th Piston offset 		87.00 mm (3.42 in)/32 mm (1.26 in) 0.080 ~ 0.085 mm (0.0031 ~ 0.0033 in) $<0.1 \text{ mm (0.004 in)}>$ 87.25 mm (3.435 in) 87.50 mm (3.445 in) 87.75 mm (3.456 in) 88.00 mm (3.465 in) 1.5 mm (0.059 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" $<\text{Limit}>$		65.95 ~ 66.00 mm (2.597 ~ 2.598 in) $<0.03 \text{ mm (0.0012 in)}>$ 0.25 ~ 0.75 mm (0.0098 ~ 0.0295 in) 0.4 ~ 1.0 mm (0.016 ~ 0.04 in) $<2.0 \text{ mm (0.08 in)}>$

Item	Model YZ490N
<b>Clutch:</b> Friction Plate Thickness/ Quantity Wear Limit Clutch Plate Thickness/ Quantity Warp Limit Clutch Spring Free Length/ Quantity Clutch Spring Minimum Length Clutch Housing Thrust Clearance Clutch Housing Radial Clearance Clutch Release Method Push Rod Bending 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)> 36.0 mm (1.42 in) × 6 <35.0 mm (1.38 in)> 0.17 ~ 0.23 mm (0.067 ~ 0.0090 in) 0.03 ~ 0.55 mm (0.0012 ~ 0.0217 in) Inner push, cam push <0.2 mm (0.008 in)>
<b>Transmission:</b> Main Axle Deflection Limit Drive Axle Deflection Limit	<0.01 mm (0.0004 in)> <0.01 mm (0.0004 in)>
<b>Shifter:</b> Shifting Type Guide Bar Bending Limit	Guide bar <0.05 mm (0.0020 in)>
<b>Kick Starter:</b> Type Kick Clip Friction Force [Min ~ Max]	 Kick and mesh type P = 0.8 ~ 1.2 kg (1.76 ~ 2.65 lb)
Air Filter Oil Grade (Oiled Filter)	Foam-air-filter oil
<b>Carburetor:</b> Type/ Manufacturer I.D. Mark Main Jet (M.J.) Main Air Jet (M.A.J.) Jet Needle-clip Position (J.N.) Needle Jet (N.J.) Cutaway (C.A.) Pilot Jet (P.J.) Pilot Air Screw (P.A.S.) Valve Seat Size (V.S.) Starter Jet (G.S.) Float Height (F.H.)	VM40SS/MIKUNI 57H-00 # 440 φ3.0 7F8-3 Q-8 3.0 # 40 1-3/4 φ3.5 # 80 20.1 ± 1.0 mm (0.79 ± 0.04 in)
<b>Reed Valve:</b> Thickness*  Valve Stopper Height Valve Bending Limit	 0.20 mm (0.008 in)  10.5 ± 0.2 mm (0.413 ± 0.008 in) 0.6 mm (0.024 in)

Tightening Torque	Thread Size	Q'ty	Nm	m•kg	ft•lb
Spark plug	M14 × 1.25	1	25	2.5	18
Cylinder head -Stud bolt	M8 × 1.25	7	15	1.5	11
-Nut	M8 × 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	M6 × 1.0	11	12	1.2	8.7
Bearing cover plate	M6 × 1.0	5	10	1.0	7.2
Crankcase cover	M6 × 1.0	12	10	1.0	7.2
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
Primary driven (clutch assembly)	M20 × 1.0	1	75	7.5	54
Push rod (locknut)	M6 × 1.0	1	10	1.0	7.2
Clutch spring	M6 × 1.0	6	10	1.0	7.2
Drive sprocket	M20 × 1.0	1	75	7.5	54
Stopper lever	M6 × 1.0	1	15	1.5	11
Shift pedal	M6 × 1.0	1	10	1.0	7.2
Flywheel magneto	M12 × 1.25	1	85	8.5	61
Magneto base	M6 × 1.0	2	10	1.0	7.2

## II. MAINTENANCE SPECIFICATIONS

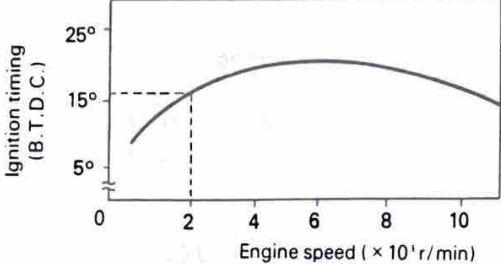
### Chassis

Item	Model	YZ490N
<b>Steering System:</b> Steering Bearing Type		Taper roller bearing
<b>Front Suspension</b> Front Fork Travel Fork Spring Free Length Collor Length Spring Rate, STD/I.D. mark Optional Spring Spring Rate, Soft/I.D. mark Hard/I.D. mark Oil Capacity		300 mm (11.8 in) 542.5 mm (21.4 in) 70 mm (2.76 in) K = 3.2 N/mm (0.325 kg/mm, 18.2 lb/in)/(2 slits) Yes K = 3.0 N/mm (0.305 kg/mm, 17.1 lb/in)/(Nothing) K = 3.4 N/mm (0.345 kg/mm, 19.3 lb/in)/(3 slits) 528 cm <sup>3</sup> (18.6 Imp oz, 17.9 US oz)
Oil level  Oil Grade Enclosed Air Pressure < Min. ~ Max. >		180 mm (7.09 in) (From top of inner tube fully compressed without spring.) Fork oil 15 wt 0 kPa (0 kg/cm <sup>2</sup> , 0 psi) < 0 ~ 245 kPa (0 ~ 2.5 kg/cm <sup>2</sup> , 0 ~ 35.6 psi) >
<b>Rear Suspension:</b> Shock Absorber Travel Spring Free Length Fitting Length Spring Rate, STD/I.D. color Optional Spring Spring Rate, Soft/I.D. color Hard/I.D. color Enclosed Gas Pressure < Min. ~ Max. >		116 mm (4.57 in) 288 mm (11.34 in) 275mm (10.83 in) K = 46.6 N/mm (4.75 kg/mm, 266 lb/in)/(Blue-Green)  K = 44.1 N/mm (4.5 kg/mm, 252 lb/in)/(Nothing) K = 49.0 N/mm (5.0 kg/mm, 278 lb/in)/(Blue-Pink) 1,177 kPa (12 kg/cm <sup>2</sup> , 170.7 psi) < 686 ~ 1,480 kPa (7 ~ 15 kg/cm <sup>2</sup> , 100 ~ 213 psi) >
<b>Rear Arm:</b> Swingarm Free Play Limit End Side		< 1 mm (0.04 in) > < 0.2 mm (0.008 in) >
<b>Wheel:</b> Front Wheel Type Rear Wheel Type Front Rim Size/ Material Rear Rim Size/ Material Rim Runout Limit Vertical Lateral		Spoke wheel Spoke wheel 1.60-21/ Aluminum 2.50-18/ Aluminum  < 2.0 mm (0.08 in) > < 2.0 mm (0.08 in) >
<b>Drive Chain:</b> Type/ Manufacturer Number of Links Chain slack		DK520DS/ DAIDO 111 links + Joint 20 ~ 30 mm (0.8 ~ 1.2 in)

Item	Model	YZ490N
<b>Front Disc Brake:</b> Disc Outside Dia. × Thickness Pad Thickness <Limit> Master Cylinder Inside Dia. Caliper Cylinder Inside Dia. Brake Fluid Type		240 × 3.0 mm (9.45 × 0.12 in) 4.0 mm (0.16 in) <0.8 mm (0.03 in)> 11.0 mm (0.433 in) 27.0 mm (1.061 in) × 2 DOT #3
<b>Drum Brake:</b> Type Drum Inside Dia <Limit> Lining Thickness <Limit> Shoe Spring Free Length		<b>Leading and trailing</b> 150 mm (5.91 in) <151 mm (5.94 in)> 4 mm (0.16 in) <2 mm (0.08 in)> 68.0 mm (2.68 in)
<b>Brake Lever &amp; Brake Pedal:</b> Brake Lever Free Play Brake Pedal Free Play/Position		10 ~ 20 mm (0.4 ~ 0.8 in)/ (at lever end) 20 ~ 30 mm (0.8 ~ 1.2 in) / 0 ± 10 mm (0 ± 0.4 in) (below footrest top)
Clutch Lever Free Play/ Position		2 ~ 3 mm (0.08 ~ 0.12 in)/at lever pivot

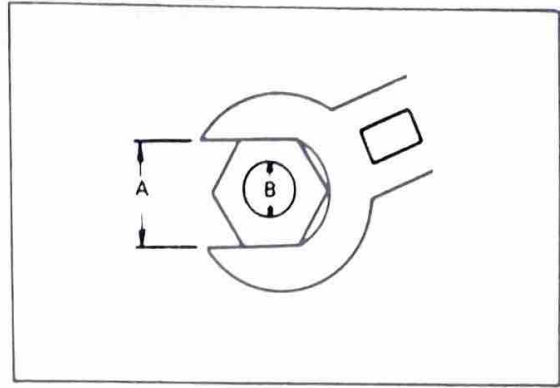
Tightening Torque:	Thread Size	Q'ty	Nm	m · kg	ft · lb
Front wheel axle	M14 × 1.5	1	60	6.0	43
Handle crown -Inner tube	M8 × 1.25	4	23	2.3	17
-Steering shaft	M22 × 1.0	1	85	8.5	61
-Handle holder	M8 × 1.25	4	23	2.3	17
Steering nut	M25 × 1.0	1	10	1.0	7.2
Brake disk	M6 × 1.0	4	12	1.2	9
Caliper bolt	M8 × 1.25	1	23	2.3	17
Caliper bracket	M8 × 1.25	2	30	3.0	22
Air bleed	M7 × 1.0	1	6	0.6	4.3
Brake hose	M10 × 1.25	2	26	2.6	19
Engine mount -Front, Frame	M8 × 1.25	2	30	3.0	22
-Front, Engine	M8 × 1.25	1	30	3.0	22
-Lower	M8 × 1.25	1	30	3.0	22
-Rear, Upper	M8 × 1.25	2	30	3.0	22
-Rear, Engine	M10 × 1.25	1	65	6.5	47
Rear wheel axle	M18 × 1.5	1	100	10.0	72
Sprocket wheel -Hub	M8 × 1.25	6	30	3.0	22
Rear shock -Frame	M10 × 1.25	1	32	3.2	23
Pivot axle	M16 × 1.5	1	85	8.5	61
Torque arm	M8 × 1.25	2	23	2.3	17
Brake cam lever	M6 × 1.0	1	10	1.0	7.2
Relay arm -Swingarm	M12 × 1.25	1	60	6.0	43
-Rear shock	M10 × 1.25	1	32	3.2	23
-Connecting rod	M10 × 1.25	1	32	3.2	23
Frame -Connecting rod	M10 × 1.25	1	60	6.0	43

## Electrical

Item	Model
Ignition System: Ignition Timing (B.T.D.C.)  Advancer Type	YZ490N  16°/2000 rpm 2.0±0.1 mm (0.079±0.004 in) Electrical  
C.D.I. Magneto-Model/ Manufacture Pickup Coil Resistance (Color)  Source Coil Resistance (Color)  C.D.I. Unit-Model/ Manufacturer	F03T20671/MITSUBISHI 12.4Ω±10% at 20°C (68°F) (Black — White/Red) 310Ω±10% at 20°C (68°F) (Brown — Black) F8T01472/MITSUBISHI
Ignition Coil: — Model/ Manufacturer Minimum Spark Gap  Primary Winding Resistance Secondary Winding Resistance	F6T411/MITSUBISHI 10 kV or more at 500 r/min 15 kV or less at 8,000 r/min 6 mm (0.24 in) at 1,500 1.0Ω±15% at 20°C (68°F) 5.9kΩ±15% at 20°C (68°F)



A (Nut)	B (Bolt)	TORQUE SPECIFICATION		
		Nm	m·kg	ft·lb
10 mm	6 mm	5	0.6	4.5
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



A: Distance across flats  
B: Outside thread diameter

## CONVERSION TABLES

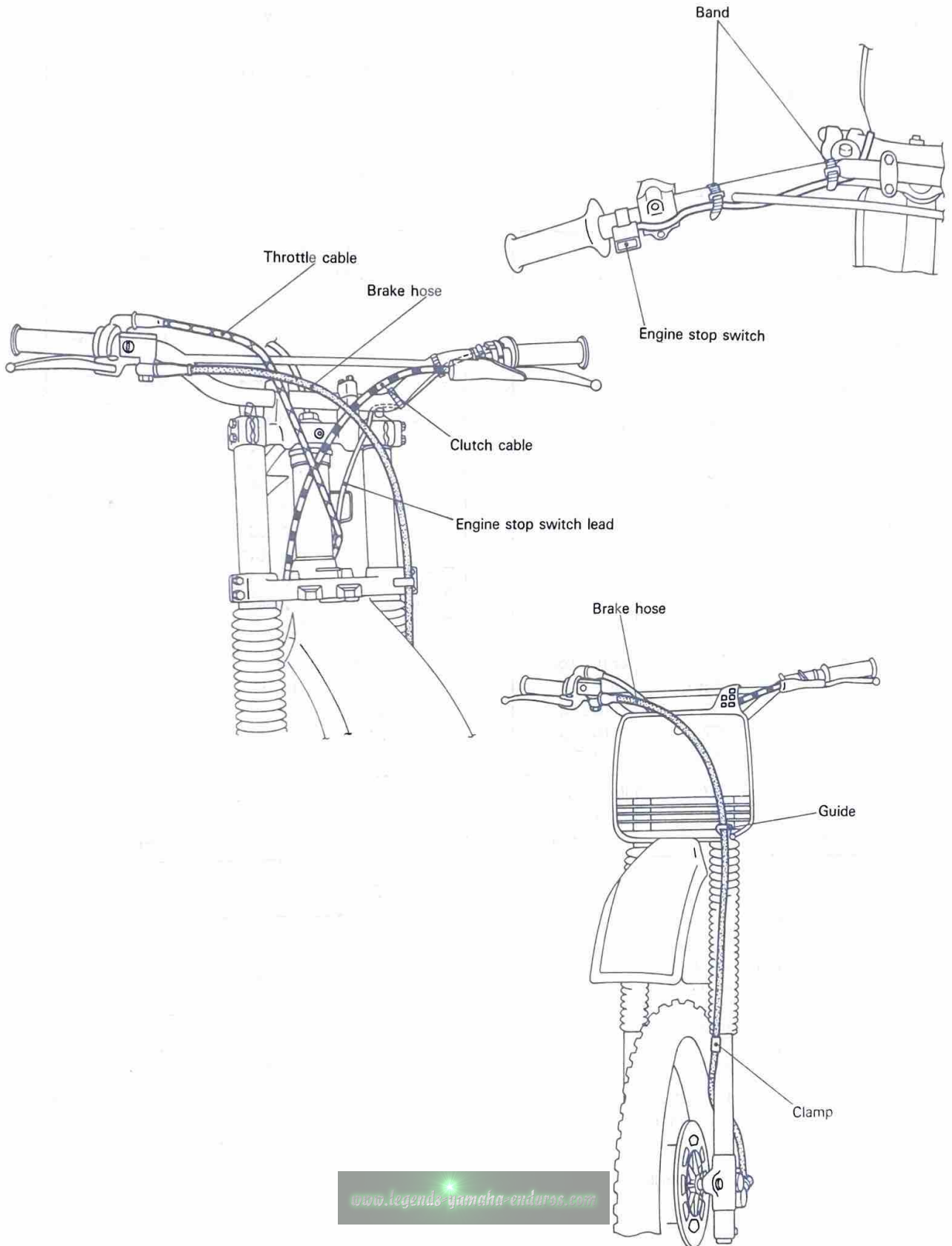
METRIC TO INCH SYSTEM			
	KNOWN	MULTIPLIER	RESULT
TORQUE	m·kg	7.233	ft·lb
	m·kg	86.80	in·lb
	cm·kg	0.0723	ft·lb
	cm·kg	0.8680	in·lb
WT.	kg	2.205	lb
	g	0.03527	oz
FLOW/DISTANCE	km/ℓ	2.352	mpg
	km/hr	0.6214	mph
	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
VOL./CAPACITY	cc (cm <sup>3</sup> )	0.03382	oz (US liq)
	cc (cm <sup>3</sup> )	0.06102	cu.in
	ℓ (liter)	2.1134	pt (US liq)
	ℓ (liter)	1.057	qt (US liq)
	ℓ (liter)	0.2642	gal (US liq)
MISC.	kg/mm	56.007	lb/in
	kg/cm <sup>2</sup>	14.2234	psi (lb/in <sup>2</sup> )
	Centigrade(°C)	9/5(°C) + 32	Fahrenheit(°F)

INCH TO METRIC SYSTEM			
	KNOWN	MULTIPLIER	RESULT
TORQUE	ft·lb	0.13826	m·kg
	in·lb	0.01152	m·kg
	ft·lb	13.831	cm·kg
	in·lb	1.1521	cm·kg
WT.	lb	0.4535	kg
	oz	28.352	g
FLOW/DISTANCE	mpg	0.4252	km/ℓ
	mph	1.609	km/hr
	mi	1.609	km
	ft	0.3048	m
	yd	0.9141	m
	in	2.54	cm
	in	25.4	mm
VOL./CAPACITY	oz (US liq)	29.57	cc (cm <sup>3</sup> )
	cu.in	16.387	cc (cm <sup>3</sup> )
	pt (US liq)	0.4732	ℓ (liter)
	qt (US liq)	0.9461	ℓ (liter)
	gal (US liq)	3.785	ℓ (liter)
MISC.	lb/in	0.017855	kg/mm
	psi (lb/in <sup>2</sup> )	0.07031	kg/cm <sup>2</sup>
	Fahrenheit(°C)	5/9(°F - 32)	Centigrade(°F)

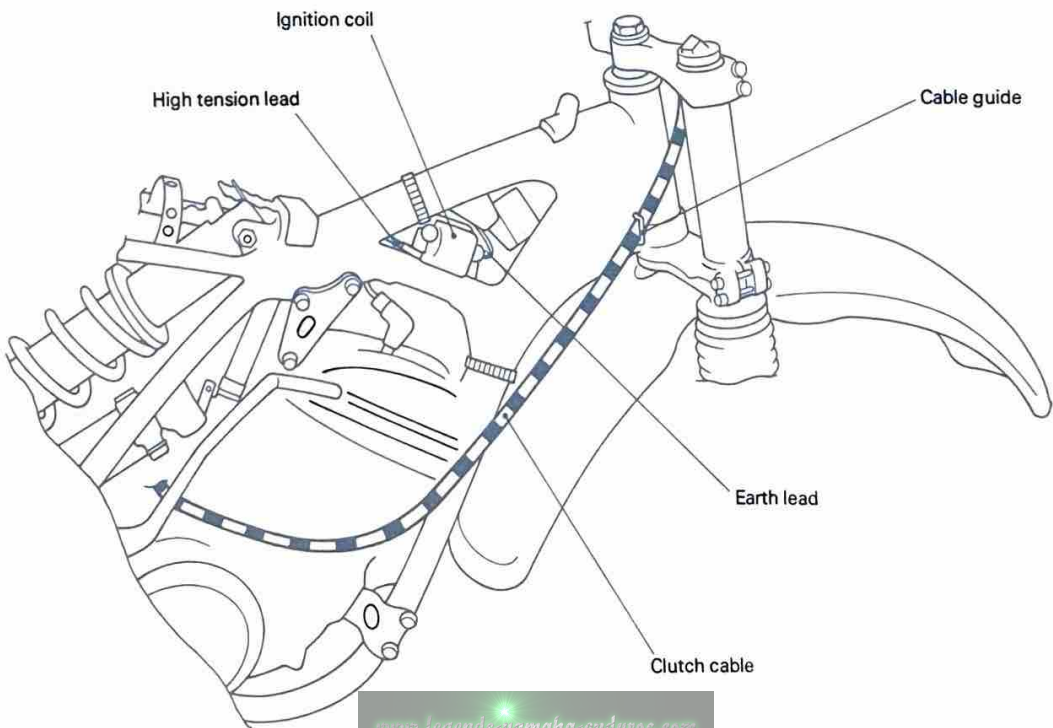
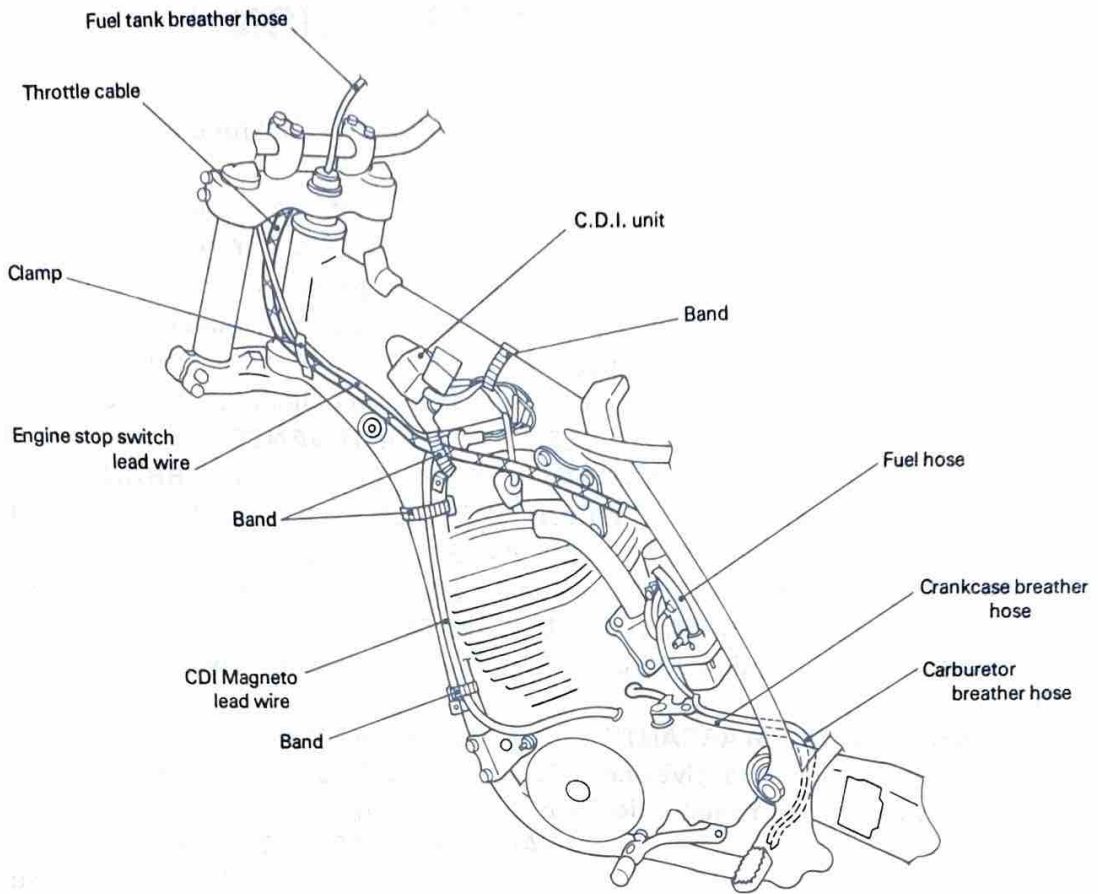
## DEFINITION OF UNITS

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

# CABLE ROUTING DIAGRAM



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# WARRANTY INFORMATION

Please refer to your copy of the YAMAHA LIMITED WARRANTY for details of the warranty offered on your new Yamaha.

The YAMAHA LIMITED WARRANTY contains the warranty policy, an explanation of the warranty, and other important information. Becoming familiar with these policies will help you make the best use of Yamaha's warranty programs.

There are certain requirements which you must meet in order to qualify for warranty coverage. **FIRST**, your new Yamaha must be operated and maintained properly, as explained in this manual. If you have any questions about procedure in this manual, please consult a dealer. **ABUSE AND NEGLECTED MAINTENANCE MAY LEAD TO MECHANICAL FAILURES WHICH CANNOT BE COVERED UNDER WARRANTY.**

**SECOND**, IF ANY PROBLEMS OCCUR WHICH YOU FEEL SHOULD BE COVERED UNDER WARRANTY, NOTIFY YOUR DEALER IMMEDIATELY. Don't delay, as small problems left unrepaired can become large problems which may not be covered under warranty. We recommend that the YAMAHA LIMITED WARRANTY be used as a folder in which you may keep your registration and other important documents related to your new Yamaha.

\* The YAMAHA LIMITED WARRANTY is to be supplied by a Yamaha dealer at the time of purchase. If you did not receive one, or have lost yours, you may obtain extracopies upon request from your Yamaha dealer or by writing to:

YAMAHA MOTOR CORPORATION U.S.A

6555 Katella Avenue

P.O. Box 6555

Cypress, California 90630

Attn: Warranty Department



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