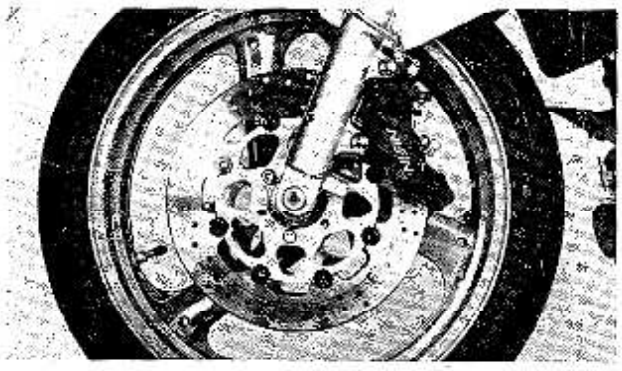
YAMAHA

TZ250W '89

OWNER'S SERVICE MANUAL

LIT-11626-06-85

3LC-28199-10



INFORMATION BEFORE PRE-OPERATION

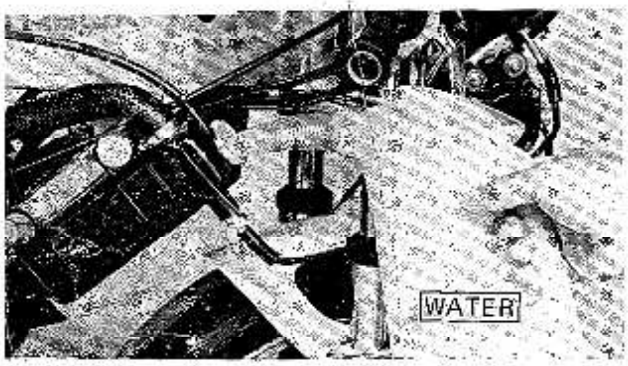
1. The front brake disc is coated with a rust-inhibiter.
   Before riding the machine, throroughly remove it using a lacquer thinner.

⚠WARNING:

- **LACQUER THINNER IS HIGHLY FLAMMABLE.**
  Always turn off the engine while using lacquer thinner. Take care not to spill any lacqur thinner on the engine or exhaust system.
  Never use it in the vicinity of an open flame, or while smoking.
- **LACQUER THINNER CAN CAUSE INJURY.**
  Always use lacquer thinner in a well ventilated area. If you should swallow some lacquer thinner, inhale excess lacquer thinner vapors, or allow any lacquer thinner to get into your eyes, contact a doctor immediately.

NOTE:

- When the machine is not in use for a long time, apply a rust-inhibiter to the brake disc.
- After riding in the rainy weather, wipe the moisture completely off the disc.
- If rust appears on the brake disc, carefully remove it using # 400 sand paper.



2. For storage, a coolant is used.
   Before riding the machine, replace it with cooling water.

TZ250W
OWNER'S SERVICE MANUAL
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Printed in Japan
P/N LIT-11626-06-85

INTRODUCTION

Congratulations on your purchase of a Yamaha TZ250W. This model is the culmination of Yamaha's vast experience in the production of pacesetting racing machines. It represents the highest grade of craftsmanship and reliability that have made Yamaha a leader.

This manual explains operation, inspection, and basic maintenance of your machine. If you have any questions about this manual or your machine, please contact your Yamaha dealer.

NOTE:

As improvements are made on this model, some data in this manual may become outdated. If you have any questions, please consult your Yamaha dealer.

⚠ WARNING:

PLEASE READ THIS MANUAL CAREFULLY AND CAREFULLY YOU OPERATE THIS MACHINE. DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE ATTAINED SATISFACTORY KNOWLEDGE OF ITS CONTROLS AND FEATURES.

TECHNICAL PUBLICATIONS
SERVICE DIVISION
MOTORCYCLE GROUP
YAMAHA MOTOR CO., LTD.

THIS MANUAL

YAMAHA

IMPORTANT NOTICE

THIS MACHINE IS DESIGNED STRICTLY FOR COMPETITION USE, ONLY ON A CLOSED COURSE. It illegal for this machine to be operated on any public street, road, or highway. Please check local regulations before riding.

SAFETY WARNINGS

1. THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY.
   Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.
2. THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OPERATOR ONLY.
   Do not carry passengers on this machine.
3. ALWAYS WEAR PROTECTIVE APPAREL.
   When operating this machine, always wear an approved helmet. Also wear heavy boots, gloves, and protective clothing. Always wear proper fitting clothing that will not be caught in any of the moving parts or controls of the machine.
4. ALWAYS MAINTAIN YOUR MACHINE IN PROPER WORKING ORDER.
   For safety and reliability, the machine must be properly maintained. Your machine should receive service from a qualified mechanic whenever indicated in this manual and/or if the mechanical condition of the machine makes it necessary.
   Always perform the pre-operation checks indicated in this manual. Correcting a mechanical problem before you ride may prevent an accident.
5. GASOLINE IS HIGHLY FLAMMABLE.
   Always turn off the engine while refueling. Take care to not spill any gasoline on the engine or exhaust system. Never refuel in the vicinity of an open flame, or while smoking.
6. GASOLINE CAN CAUSE INJURY.
   If you should swallow some gasoline, inhale excess gasoline vapors, or allow any gasoline to get into your eyes, contact a doctor immediately. If any gasoline spills onto your skin or clothing, immediately wash skin areas with soap and water, and change your clothes.
7. ONLY OPERATE THE MACHINE IN AN AREA WITH ADEQUATE VENTILATION.
   Never start the engine or let it run for any length of time in an enclosed area. Exhaust fumes are poisonous. These fumes contain carbon monoxide, which by itself is odorless and colorless. Carbon monoxide is a dangerous gas which can cause unconciousness or can be lethal.
8. PARK THE MACHINE CAREFULLY; TURN OFF THE ENGINE.
   Always turn off the engine if you are going to leave the machine. Do not park the machine on a slope or soft ground as it may fall over.
9. PROPERLY SECURE THE MACHINE BEFORE TRANSPORTING IT.
   When transporting the machine in another vehicle, always be sure it is properly secured and in an upright position. If the machine should fall over, gasoline may leak from the carburetor or fuel tank.
10. 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.
11. Slick tires are standard for this machine. If it is rain, replace with rain tires. Slick tires unsafe on a wet ground surface because the tires are easy to slip.

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 machine. Please read this manual carefully and completely before operating your new machine.

If you have any questions regarding the operation of maintenance of your machine, please consult your Yamaha dealer.

NOTE:

This manual should be considered a parmanent part of this machine and should remain with it even if the machine is subsequently sold.

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.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

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

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.

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1 GENERAL INFORMATION

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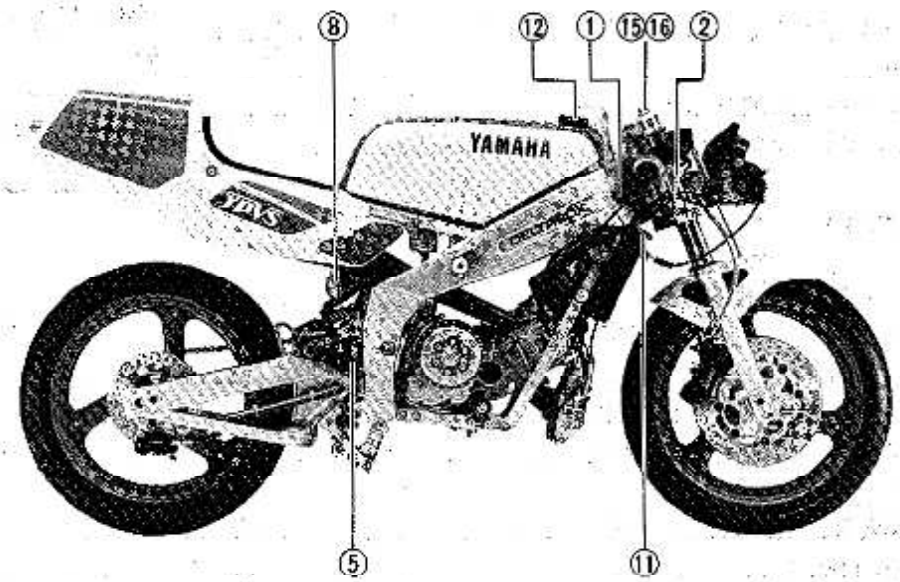
GENERAL INFORMATION

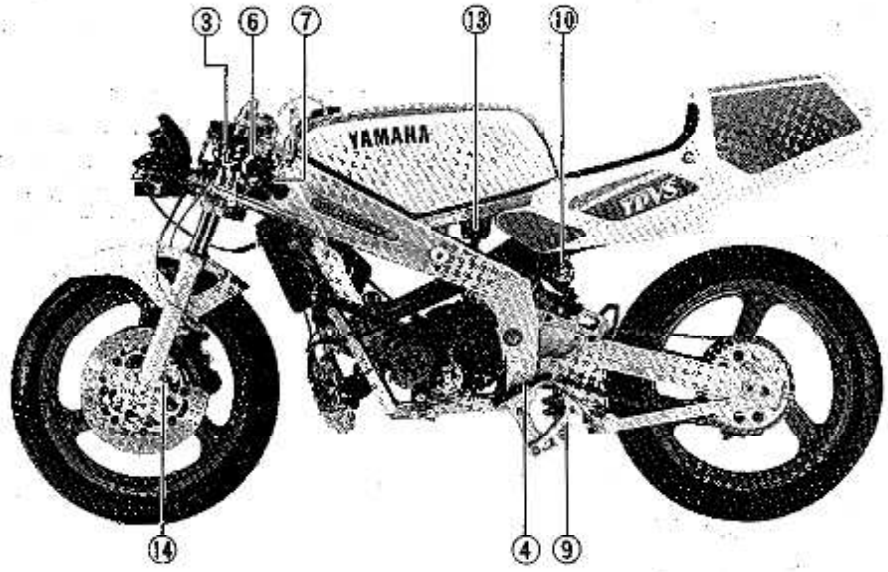
1

DESCRIPTION

① Throttle grip
② Front brake lever
③ Clutch lever
④ Change pedal
⑤ Rear brake pedal
⑥ "ENGINE STOP" button
⑦ Starter lever
⑧ Spring pre-load adjuster (rear shock absorber)
⑨ Rebound damping adjuster (rear shock absorber)
⑩ Compression damping adjuster (rear shock absorber)
⑪ Radiator cap
⑫ Fuel tank cap
⑬ Fuel cock
⑭ Compression damping adjuster (front fork)
⑮ Rebound damping adjuster (front fork)
⑯ Spring pre-load adjuster (front fork)

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

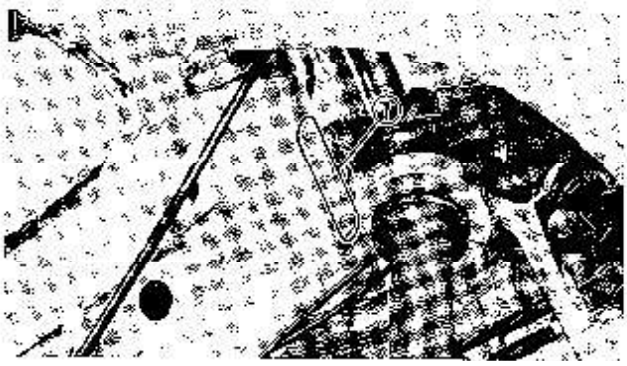




MACHINE IDENTIFICATION

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

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



VEHICULE IDENTIFICATION NUMBER (FOR USA AND CANADA)

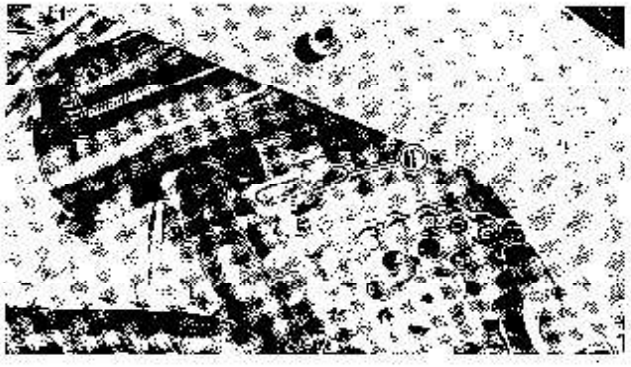
The vehicle identification number ① is stamped on the right of the steering head pipe.

Starting Serial Number:
JYA3LC00 * JA000101

FRAME SERIAL NUMBER (EXCEPT FOR USA AND CANADA)

The frame serial number ① is stamped on the right of the steering head pipe.

Starting Serial Number:
3LC-000101



ENGINE SERIAL NUMBER

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

NOTE:

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

Starting Serial Number:
3LC-000101

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

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

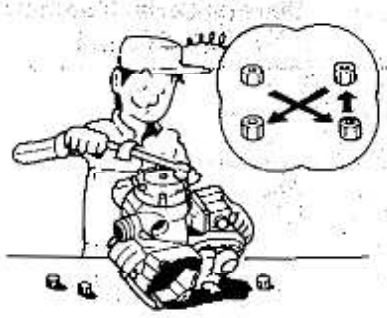
2. Use proper tools and cleaning equipment. Refer to "SPECIAL TOOL".



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



4. During the machines disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are cprrectly reinstalled.
5. Keep away from fire.

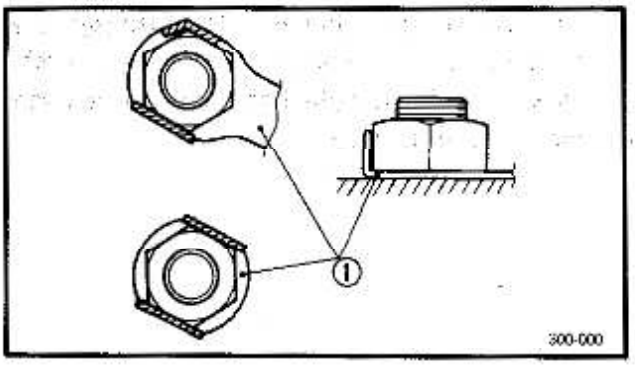


ALL REPLACEMENT PARTS

1. We recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

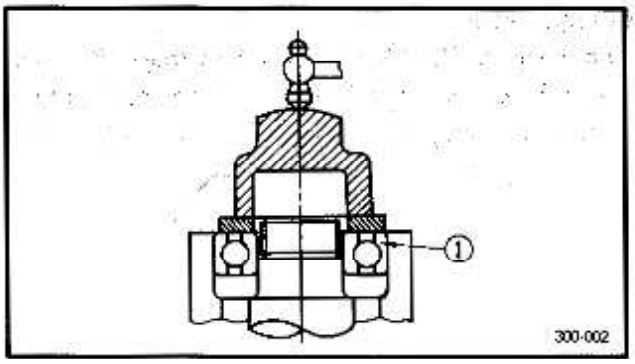
GASKETS, OIL SEALS, AND O-RINGS

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



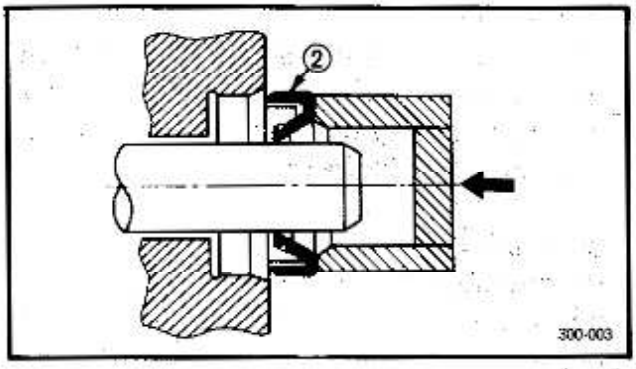
LOCK WASHERS/PLATES AND COTTER PINS

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



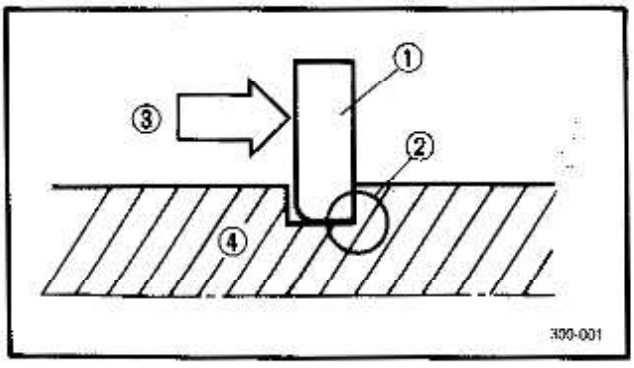
BEARINGS AND OIL SEALS

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



⚠ CAUTION:

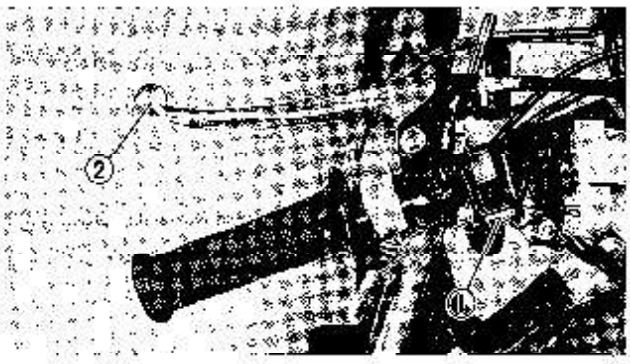
Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.



CIRCLIPS

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

④ Shaft



CONTROL FUNCTIONS

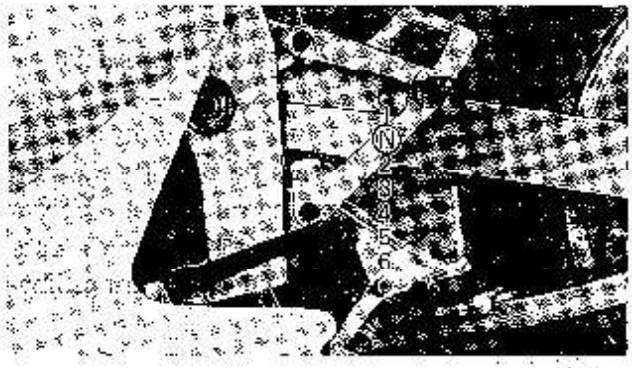
"ENGINE STOP" Button

The "ENGINE STOP" button ① is located on the left handlebar.

Continue pushing the "ENGINE STOP" button till the engine comes to a stop.

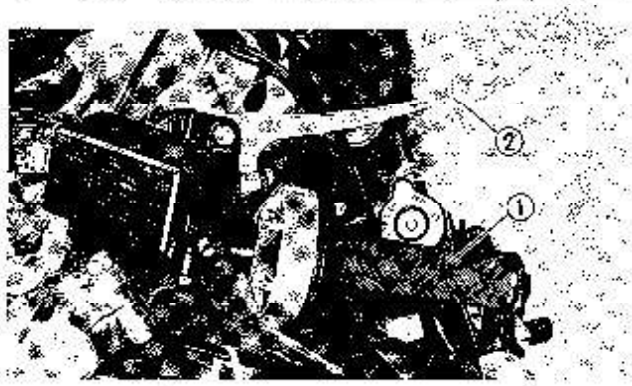
Clutch Lever

The clutch lever ② is located on the left handlebar; it disengages or engages the clutch. Pull the clutch lever to the handlebar to disengage the clutch, and release the lever to engage the clutch. The lever should be pulled rapidly and released slowly for smooth starts.



Change Pedal

The gear ratios of the constant-mesh 6-speed transmission are ideally spaced. The gears can be shifted by using the change pedal on the left side of the engine.

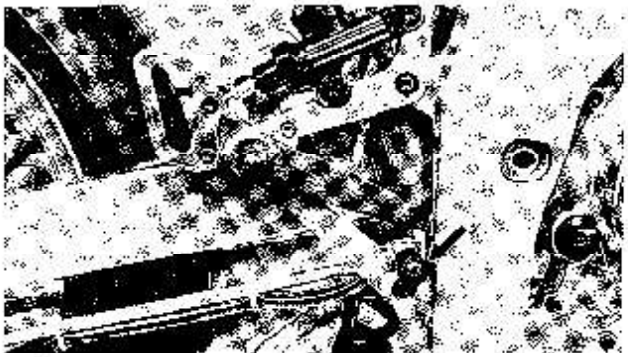


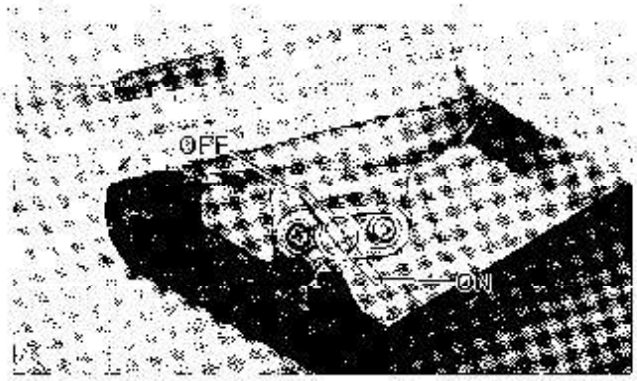
Throttle Grip

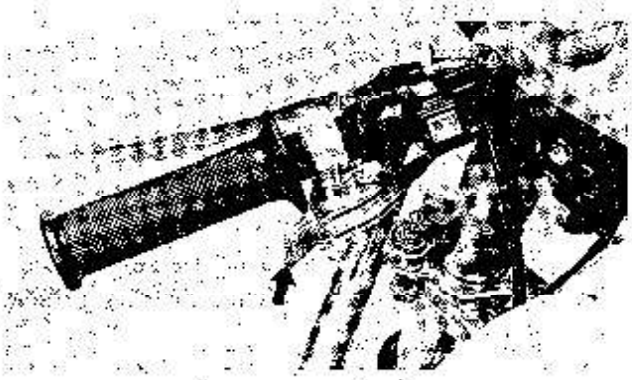
The throttle grip ① is located on the right handlebar; it accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.

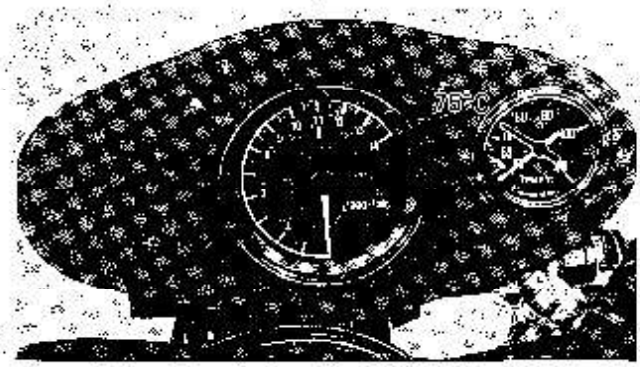
Front Brake Lever

The front brake lever ② is located on the right handlebar. Pull it toward the handlebar to activate the front brake.









Rear Brake Pedal

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

⚠ CAUTION:

Do not apply rear brake when the machine is moving backward to avoid damage to the tension bar.

Fuel Cock

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

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

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

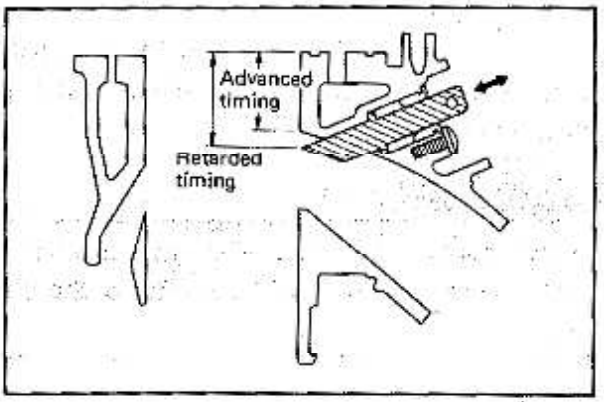
Starter lever (CHOKE)

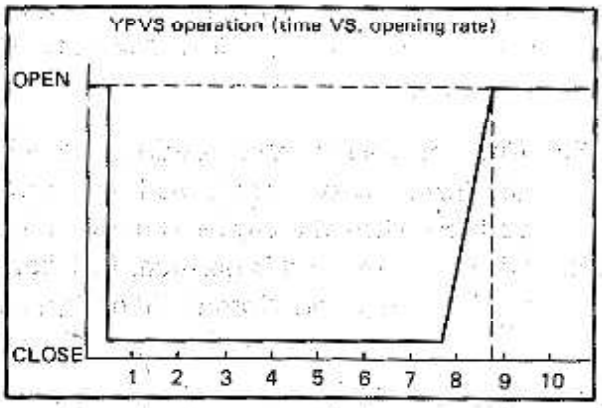
When cold, the engine requires a richer air-fuel mixture for starting. A separate starter circuit, which is controlled by the starter, supplies this mixture. Pull the starter lever out to open the circuit for starting. When the engine has warmped up push it in to close the circuit.

WATER TEMPERATURE GAUGE

This gauge indicates the cooling water temperature.

Water temperature maybe 75°C (167°F) when engine is operated in good conditions.





Y.P.V.S. (Yamaha Power Valve System)

Feature

Exhaust timing greatly effects the performance of 2 stroke engines. To produce high torque at high speeds, advanced timing is needed; at low speeds, retarded timing is needed. To control exhaust timing, and insure high torque at all speeds, Yamaha has developed an exclusive "Power Valve" system (Y.P.V.S.). With Y.P.V.S., the rider can now count on a smooth delivery of power at any speed.

In the upper part of the exhaust port, there is a valve which is connected to a servomotor. When engine speed increases, the valve is opened, and vice versa. Thus, the valve maintains the correct exhaust timing automatically.

Battery charging

Use a 12V car battery to charge the Ni-Cd battery set. For this charging, connect the battery set, car battery and adapter in the order as shown below. The charging time is about 3 hours.

NOTE:

1. Ni-Cd battery set should be fully charged at each practice or race.
2. Remember to disconnect the battery on an inactive engine to prevent battery discharging.
3. Use the accompanying battery charger only.
4. Be sure to use a battery with an enough charged capacity of more than 12V-20AH.
5. Replace an Ni-Cd battery after 100 charging operations.

⚠ CAUTION:

1. **Use a 12 volt car battery only to charge the Ni-Cd battery set. Other power sources such as a car battery charger may cause damage to the battery.**
2. **Be sure to connect the red and the black lead clips correctly to the + and the − terminal of the car battery in that order.**
3. **Ni-Cd battery set and Battery charger should be free from water exposure.**
4. **Never throw the Ni-Cd battery into a fire or other high head sources. The battery may explode as a result of expansion.**

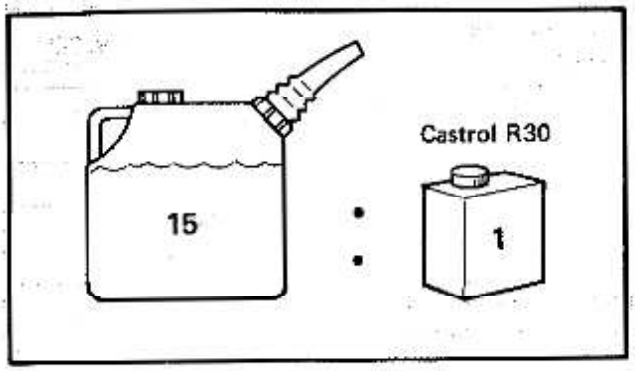
FUEL, OIL AND COOLING WATER

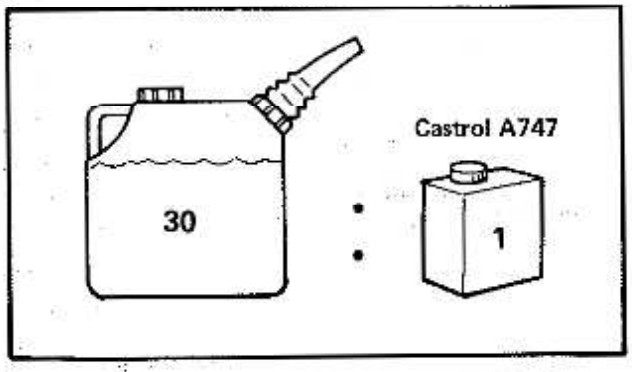
FUEL

Use premium fuel with an octane rating of at least 90. Mix oil with the gas at the ratio specified below. Always use fresh, name-brand gasoline, and mix the oil and gas the day of the race.

⚠ CAUTION:

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





Recommended Fuel:
Except for Australia
Premium fuel with an octane rating of at least 90.
For Australia
Unleaded fuel only

Fuel tank capacity:
23.5 L (5.17 Imp gal, 6.21 US gal)

Engine mixing oil	
Recommended oil:	Mixing ratio (Break-in)
Castrol R30 A747	15 : 1 (12 : 1) 30 : 1 (20 : 1)

TRANSMISSION OIL

The transmission oil should be replaced at the specified intervals.
Refer to "CHAPTER 2. – MAINTENANCE INTERVALS" and "TRANSMISSION OIL REPLACEMENT" section for more detail.

Recommended oil:
- **Castrol R30**
- **SAE 20W40 SE motor oil**

Oil capacity:
Periodic oil change:
0.45 L (0.40 Imp qt, 0.48 US qt)
Total amount:
0.5 L (0.44 Imp qt, 0.53 US qt)

COOLING WATER

⚠ CAUTION:

Hard water or salt water is harmful to the engine parts. You may use distilled water, if you can't get soft water.

PRE-OPERATION CHECK LIST

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

Before using this machine, check the following points.

NOTE:

1. The front brake disc is coated with a rust inhibiter. Before pre-operation thoroughly remove it using a laquer thinner.
2. For strage, a coolant is used. Before riding the machine remove it with cooling water. Refer to "INFORMATION BEFORE PRE-OPERATION".

Item	Routine	Page
Cooling water	Check that coding water filled up to the radiator filler cap. Check the cooling system for leakage.	1-9, 2-7
Fuel	Check that a fresh mixture of oil and gasoline is filled in the fuel tank. Check the fuel line for leakage.	1-8
Transmission Oil	Check that the oil level is correct. Check the crankcase for leakage.	1-8
Gear Shifter and Clutch	Check that gears can be shifted correctly in order and that the clutch operates smoothly.	2-8
Throttle Grip/Housing	Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and the housing, if necessary.	2-7
Brakes	Check the play of both front and rear brakes and their braking effect. Check brake disc surface.	2-8, 9, 10
Chain	Check chain slack and alignment. Check that the chain is lubricated properly.	2-10, 11
Wheels	Check for excessive wear, fire pressure, loose spokes and ensure there is no free play.	5-1
Steering	Check that the handlebars can be turned smoothly and have no excessive play.	2-11
Front Forks and Rear Shock Absorbers	Check that they operate smoothly and there is no oil leakage.	3-2 ~ 8
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.	5-2
Bolts and Nuts	Check the chassis and engine for loose bolts and nuts.	7-16, 17
Lead Connectors	Check that the CDI magneto, CDI unit, and ignition coil are connected tightly.	—
Settings	Taking into account the result of pre race test-runs, — is the machine set suitably for the weather conditions and race course? Is inspection and maintenance completed?	7-19
Y.P.V.S.	Check battery/charging.	1-7, 4-10

STARTING AND BREAK-IN

⚠ CAUTION:

Prior to operating the machine, perform steps listed in PRE-OPERATION CHECK LIST.

⚠ WARNING:

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.

STARTING A COLD ENGINE

NOTE:

Before starting the engine, make sure that the VPVS control unit lead is connected to the battery.

1. Turn the fuel cock to "ON" and pull the starter lever (CHOKE).
2. Shift the transmission into "1st" gear.
3. Apply the clutch lever and push the machine.
4. After gaining some momentum, release the clutch lever.
5. As soon as the engine starts, quickly apply the clutch lever again and open the throttle grip ② slightly at the same time so as to sustain idling of the engine. Then, shift the gears to neutral.
6. After applying full-throttle a few times, turn the choke lever to the original position. Take some time to allow the engine to warm up.

WARMING UP

Run the engine at varying speeds below 5,000 r/min for 3 ~ 4 minutes. Fully warm up until the thermometer reads 75°C (167°F) or so.

⚠ CAUTION:

Do not operate engine for extended warm-up periods.

STARTING A WARM ENGINE

Do not push the starter lever. Open throttle slightly.

⚠ CAUTION:

Observe break-in procedures for initial operation.

BREAK-IN PROCEDURES

1. Prior to starting, fill tank with a break-in gasoline/oil mixture (See page 1-4) and install the hotter type spark plugs.
2. After fueling and pre-operational checks have been made, refer to "Starting a cold engine" and start engine.
3. Allow engine to warm up. Check operating controls and "Engine stop" button operation.

NOTE:

During break-in, mask part of the radiator core so that the water temperature is 60 ~ 75°C (140 ~ 167°F).

4. Operate machine at 9,000 r/min maximum and run about 20 km (13 miles). Check spark plug condition. Spark plug will show rich condition during break-in.
5. Allow engine to cool. Operate machine at 8,000 ~ 10,000 r/min and run about 30 km (20 miles). Very briefly, shift to higher gears (4th or 5th) and check full throttle response. Check spark plug condition.
6. Allow engine to cool. Operate machine at 11,000 r/min maximum and run about 5 km (3 miles). Full throttle and higher gears may be used, but avoid sustained full throttle operation. Check spark plug condition.
7. Allow engine to cool. Remove top end and inspect. Remove "high" spots on piston with No. 600 grit, wet sandpaper. Clean, and carefully reassemble.
8. Remove break-in fuel/oil mixture from tank. Refill with specified fuel/oil mixture. Check entire unit for loose or misadjusted fittings/controls/fasteners.

9. Re-start engine and check through entire operating range thoroughly. Stop. Check spark plug condition. Re-start. After running of 50 km (30 miles), machine is ready to race.

⚠ CAUTION:

After the break-in period, check every fitting and fastener for looseness.
If any loose is found, retighten it securely.

CLEANING AND STORAGE

CLEANING

Frequent thorough cleaning of your machine will not only enhance its appearance but will improve general performance and extend the useful life of many components.

1. Before cleaning the machine:
   Block off end of exhaust pipe to prevent water entry; a plastic bag and strong rubber band may be used.
   Take care not to pour water to Y.P.V.S. parts, the battery set, and the control unit.
2. If engine case is excessively greasy, apply degreaser with a paint brush. Do not apply degreaser to chain, sprockets, or wheel axles.
3. Rinse dirt and degreaser off with garden hose, using only enough hose pressure to do the job.

⚠ CAUTION:

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

4. Once the majority of the dirt has been hosed off, wash all surfaces with warm water and mild, detergent-type soap. 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 chamois, clean towel, or soft absorbent cloth.
6. Immediately after washing, remove excess moisture from chain and lubricate to prevent rust.
7. Automotive-type wax may be applied to all painted and chrome-plated surfaces. Avoid combination cleaner-waxes. Many contain abrasives which may mar paint or protective finish.
8. After completing the above, start the engine immediately and allow to idle for several minutes.

STORAGE

Long term storage (60 days or more) of your machine will require some preventive procedures to insure against deterioration. After cleaning machine thoroughly, prepare for storage as follows:

1. Drain the fuel tank, fuel lines, and carburetor float bowl(s).
2. Remove the spark plugs, pour about one tablespoon of SAE 10W/30 oil in spark plug hole and re-install spark plugs. Run engine over several times (with ignition off) to coat cylinder walls with oil.
3. Remove drive chain. Clean thoroughly with solvent and lubricate. Reinstall chain or store in a plastic bag (tie to frame for safe-keeping).
4. Lubricate all control cables.
5. Block up frame to raise both wheels off ground.
6. Tie a plastic bag over exhaust pipe outlet to prevent moisture from entering.
7. If the machine is to be stored in humid or salt air atmosphere, coat all exposed metal surfaces with a light film of oil. Do not apply oil to rubber parts or seat cover.
8. Drain the cooling water completely.
9. Disconnect the Ni-Cd battery set.

NOTE:

Make any necessary repairs before storing the machine.

2 PERIODIC MAINTENANCE AND ADJUSTMENT

MAINTENANCE INTERVALS CHART 2-1

LUBRICATION 2-3

SPECIAL TOOLS 2-4

MINOR MAINTENANCE AND ADJUSTMENTS 2-5
- Spark plug 2-5
- Ignition timing adjustment 2-5
- Rotor removal 2-6
- Cooling water 2-7
- Carburetor 2-7
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- Clutch lever adjustment 2-8
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- Drive chain lubrication 2-11
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PERIODIC MAINTENANCE AND ADJUSTMENT

MAINTENANCE INTERVALS CHART

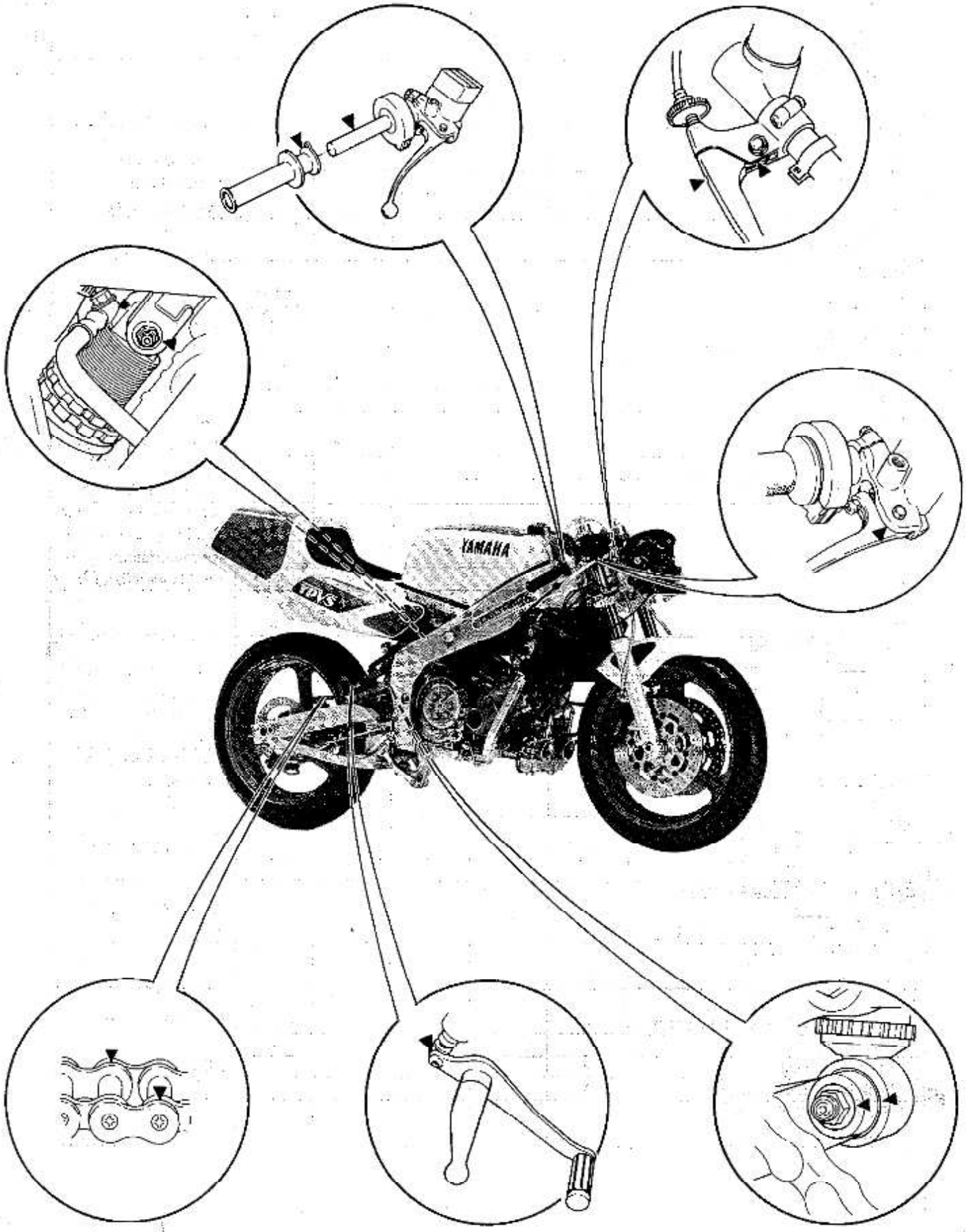
The maintenance and lubrication schedule chart should be considered strictly as a guide to general maintenance and lubrication intervals. You must take into consideration that weather, terrain, geographical locations, and a variety of individual uses all tend to demand that each owner alter this time schedule to match his environment. For example, if the machine is continually operated in an area of high humidity then all parts must be lubircated much more frequently than shown on the chart to avoid rust and damage. If you are in doubt as to how closely you can follow these time recommendations, check with the Yamaha dealer in your area.

2

Item	Every race	Every second race	Every third race	Every fifth race	As required	Recommend lubricant
PISTON						*: Check clearance to piston pin.
Clean/Inspect for cracks and seizure	●*					
Replace			●			
PISTON RING						
Replace	●					
CYLINDER HEAD						
Inspect warp	●					
Clean/Retighten					●	
CYLINDER						
Clean/Inspect for seizure	●					
Replace					●	
Retighten					●	
CLUTCH						
Adjust play	●					
Inspect plates, seals, push rod O-ring	●					
Replace					●	
TRANSMISSION						Castrol R-30 Yamalube 4-cycle oil SAE 20W40 SE motor oil
Change oil			●			
Inspect gears and shift fork				(●)	●	
Replace bearing					●	
CRANKSHAFT						
Inspect			●			
Replace				●		
PISTON PIN, CON-ROD SMALL END, BEARING						*: Replace small end bearing for every four races.
Inspect wear, discolored, pitting	●					
Replace				*●	●	
C.D.I. ROTOR NUT						
Retighten				●		
Y.P.V.S.						*: See page 1-3 and 4-10
Check/Adjust linkage	●					
Battery charging	●*					
IGNITION						
Check timing	●					
EXHAUST SYSTEM						
Inspect crack, exhaust pipe spring/Retighten silencer	●					
Cleaning			●			
OIL PUMP WIRE MESH						
Cleaning			●			

Item	Every race	Every second race	Every third race	Every fifth race	As required	Recommend lubricant
CARBURETOR						
Inspect/Adjust	●					
Clean/Retighten	●					
SPARK PLUG						
Inspect electrode	●					
Replace					●	
DRIVE CHAIN						
Clean and lube	●					Yamaha chain and cable lube or Spray type lube
Check slack and alignment	●					
Replace			●			
FRAME						
Clean/Inspect for cracks	●					
FRONT FORK						
Change oil			●		After 10 races	Yamaha fork oil 15 wt or equivalent
Replace seal					●	
REAR SHOCK ABSORBER						
Inspect/Adjust	●					Grease
Lube	●					
STEERING HEAD						
Inspect clack, free play	●					Medium-weight wheel bearing grease of quality manufacture (preferable waterproof)
Clean/Lube				●		
Replace bearings					●	
SWING ARM						Medium-weight wheel bearing grease of quality manufacture (preferable waterproof)
Inspect play, check	●					
Lube			●			
CHAIN GUARD						
Replace					●	
WHEELS AND TIRES						
Check pressure/runout/wear	●					Medium-weight wheel bearing grease of quality manufacture (preferable waterproof)
Inspect bearings	●					
Lube			●			
Replace bearings					●	
THROTTLE						Yamaha chain and cable lube or spray type lube
Lube	●					
CONTROL CABLES						
Routing (Connection)	●					SAE 10W/30 motor oil
Inspect/Lube	●					
CLUTCH AND BRAKE LEVER PIVOT						SAE 10W/30 motor oil
Lube/Retighten	●					
BOLTS AND NUTS						
Retighten	●					
BRAKE						
Clean/Inspect/Check fluid leakage	●					Lithium base grease
Replace pad					●	
Check fluid level	●					DOT # 4
Check brake disc surface	●					
FUEL TANK PETCOCK						
Clean	●					

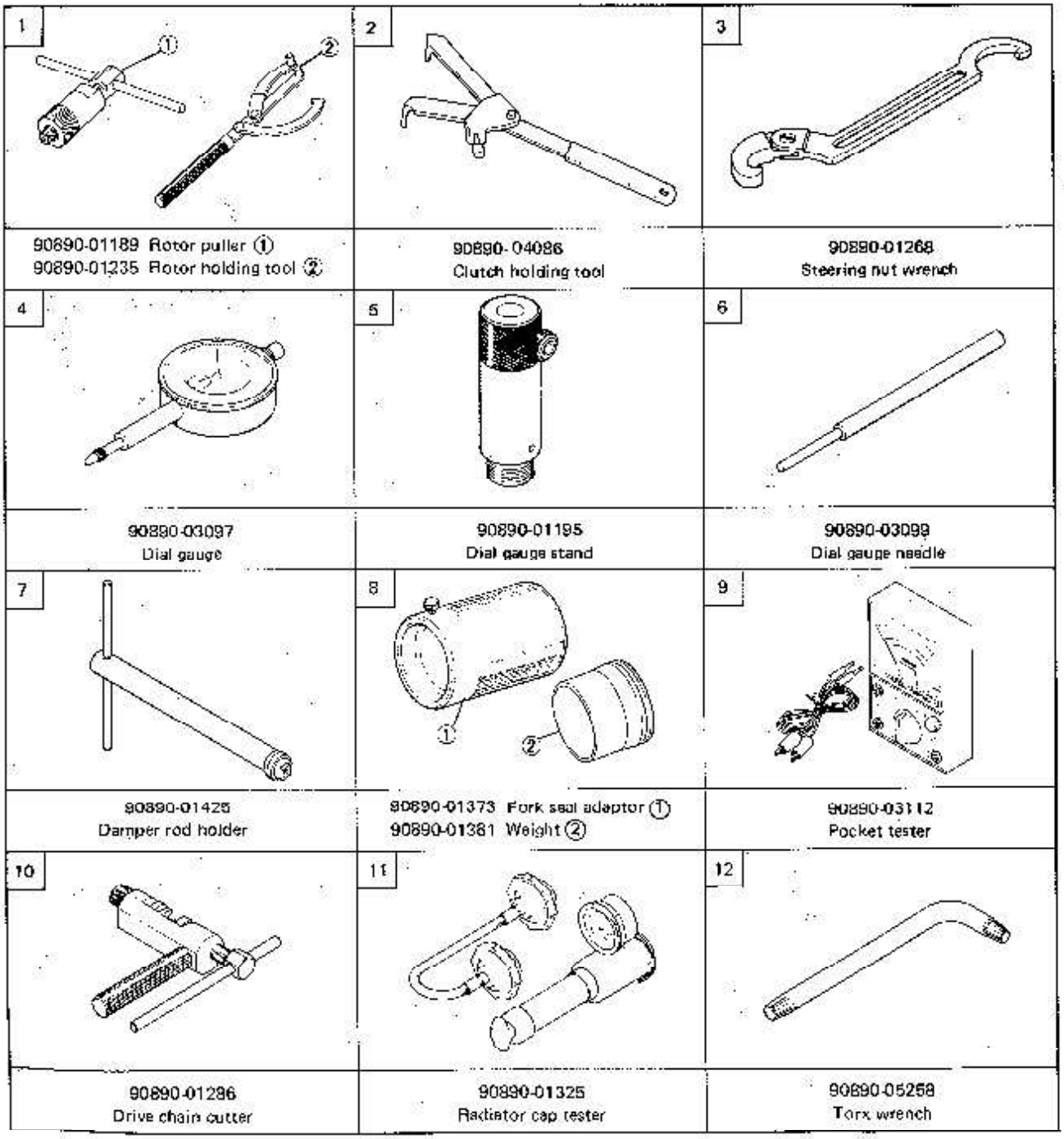
LUBRICATION



Apply grease to the following points.

1	Steering head bearing (Upper and lower)	9	Rear wheel axle surface
2	Brake pedal pivot	10	Swingarm pivot bush & pivot axle
3	Rear shock unit pivot (Upper and lower)	11	Rear shock unit pivot bush (Upper and lower)
4	Swingarm pivot bearing		
5	Throttle grip guide tube inner surface	12	Clutch lever wire end
6	Front wheel bearing	13	Throttle grip guide tube wire end hole
7	Front wheel axle surface	14	Rear brake tension bar ball joint
8	Rear wheel bearing	15	Rear brake caliper bracket boss

SPECIAL TOOLS

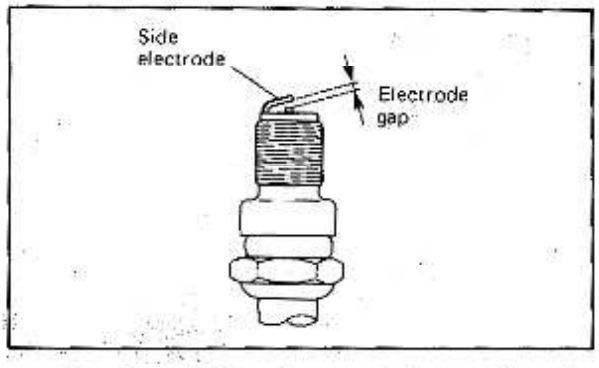


MINOR MAINTENANCE AND ADJUSTMENTS

Spark plug

Standard spark plug: R5184-105/NGK

1. Measure the electrode gap with a wire thickness gauge.



Adjustment can be made by bending the side electrode.

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

When installing the plug, always clean the gasket surface and use a new gasket. Wipe off any grime from the threads and torque the spark plug properly.

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

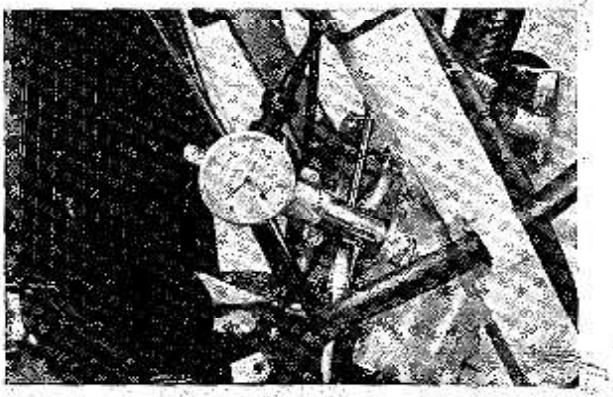
2. The insulator must be a medium-to-light tan color. If not, check carburetion, ignition timing and gas-oil mixing ratio.
If the porcelain is a very dark brown or black color, then a plug with a hotter heat range may be required.
This situation is quite common during the engine break-in period. However, use the standard plug. If the insulator tip shows a very light tan or white color or is actually pure white or if the electrodes show signs of melting, then a spark plug with a colder heat range is required.

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 torqued to the correct value as soon as possible with a torque wrench.

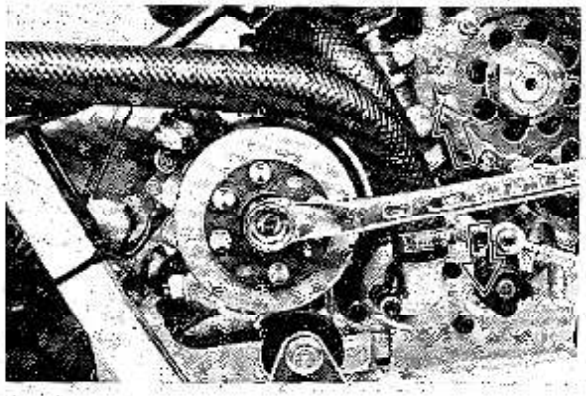
Ignition timing adjustment

Ignition timing must be set with a dial gauge (to determine piston position)
Proceed as follows:

1. Remove left cylinder spark plug, and screw Dial Gauge Stand into spark plug hole.
2. Insert Dial Guage Assembly with a 56 mm (2.2 in) extension (needle) into stand.



3. Rotate rotor until piston is at top-dead center (T.D.C.). Tighten set screw on dial gauge stand to secure dial gauge assembly. Set the zero on dial gauge face to line up exactly with dial gauge needle. Rotate rotor back and forth to be sure that gauge needle does not go past zero.

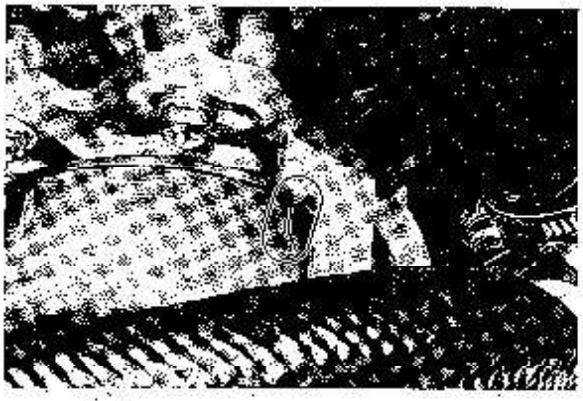


4. Starting at T.D.C., rotate rotor counterclockwise until dial indicator reads approximately 2.5 mm (0.1 in) before top dead center (B.T.D.C.).

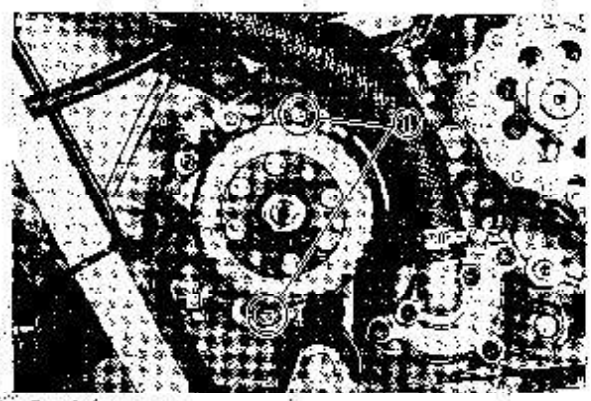
NOTE:
Unlike the normal engine, this one turns in the reverse direction; that is , it turns clockwise when viewed at the left side.

5. Then turn the rotor clockwise until indicator needle reads specified below.

Ignition timing: 2.0 mm (0.08 in) B.T.D.C.



6. Check to see that the rotor timing mark aligns with the stater timing mark.
7. If marks are not in align, loosen the two stater retaining screws and rotate the stater. Tighten screws and recheck the ignition timing.



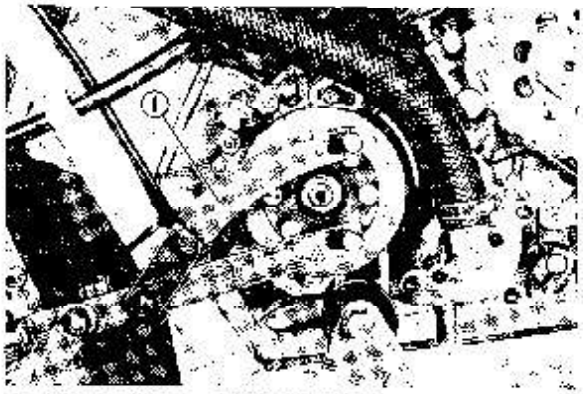
1. Retaining screw

8. Remove dial gauge assembly and stand. Install spark plug.

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

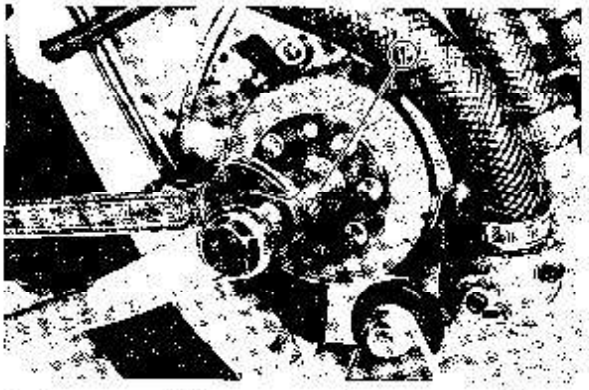
Rotor removal
When removing the rotor, use the rotor puller.

1. Remove the rotor holding nut.



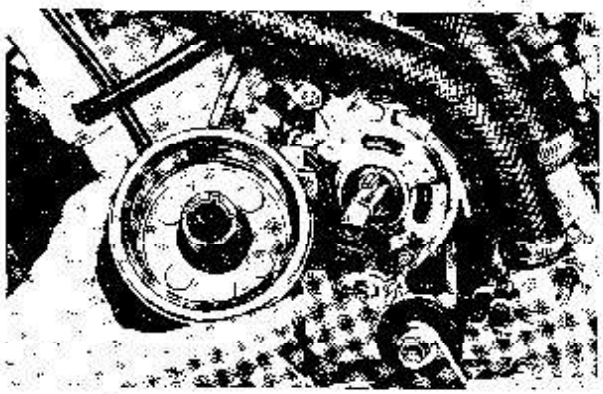
1. Rotor holding tool (90890-01235)

2. Remove the rotor using rotor puller.



1. Rotor puller (90890-01189)

3. When installing the rotor, fit the woodruff key to the key way correctly.

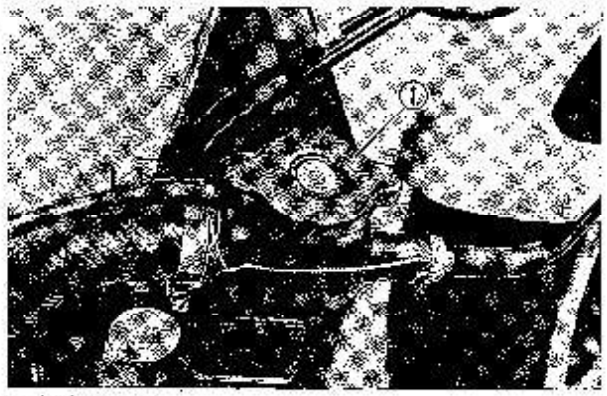


C.D.I. rotor:
53 Nm (5.3 m·kg, 38 ft·lb)

Cooling water

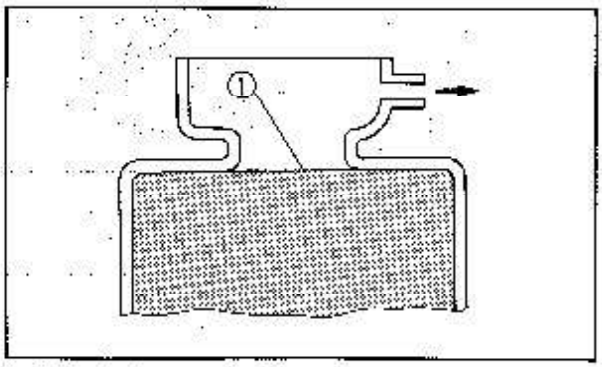
⚠ WARNING:

Do not remove the radiator cap ① , drain bolt and hoses when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury.
When the engine has cooled, place a thick towel over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.



1. Radiator cap

1. Inspection
a. Start the engine and warm it up for a one minute.
b. Place the machine on a level place, and hold it in an uplight position.
c. Remove the radiator cap.
d. Check the cooling water level.
If level is low, add cooling water. Refer to "CHAPTER 1 - FUEL, OIL AND COOLING WATER" section.

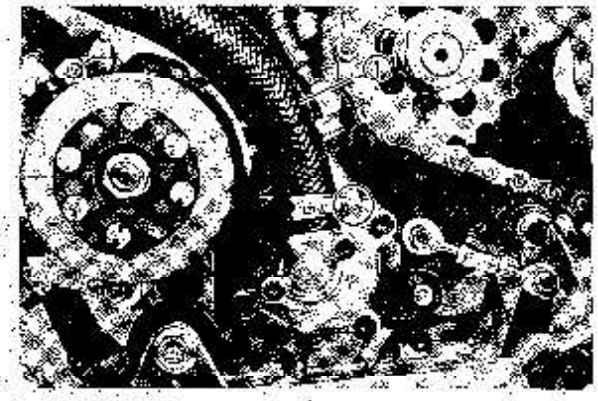


1. Coolant level

2. Replacement
a. Place the container under the radiator hose.
b. Disconnect the radiator hose ① .

⚠ WARNING:

Do not remove the radiator hose ① when the engine and radiator are hot.



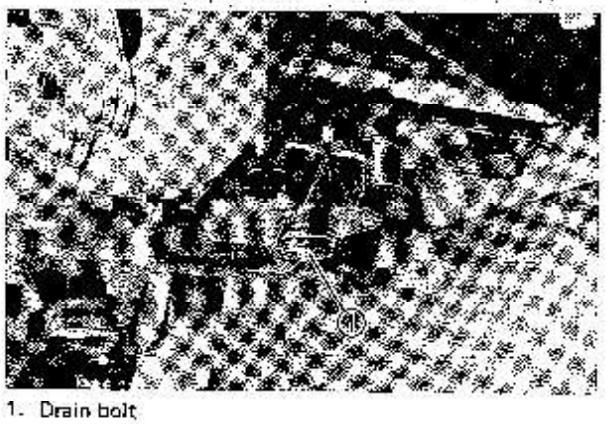
1. Radiator hose

b. Drain the cooling water by removing the radiator cap.
c. Connect the radiator hose and fill the radiator with cooling water.
Refer to "CHAPTER 1 — FUEL, OIL AND COOLANT" section.

NOTE:
At manufacture, a coolant is used for storage. Before pre-operation, replace it with cooling water.

Transmission oil replacement

1. Place the container under the engine.
2. Place the machine on the level place and hold it on upright position.
3. Warm up the engine for one minute.
4. Drain the transmission oil by removing the drain bolt ① .



1. Drain bolt

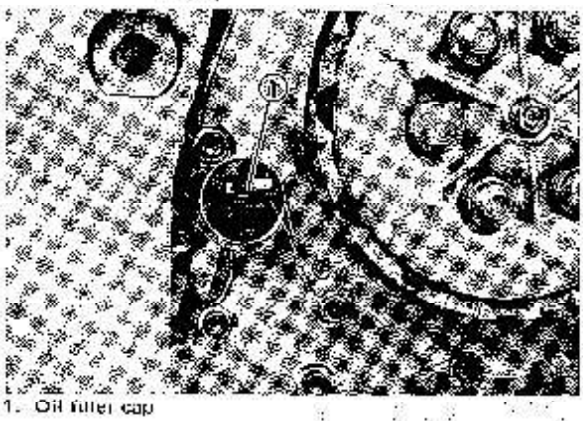
5. Install the drain bolt.

Drain bolt:
33 Nm (3.3 m·kg, 24 ft·lb)

6. Remove the filler cap ① and fill the crankcase with the recommended oil.

Recommended oil:
- Castrol R30
- SAE 20W40 SE motor oil

Oil capacity:
Total amount:
0.45 L (0.40 Imp qt, 0.48 US qt)
Periodic oil change:
0.5 L (0.44 Imp qt, 0.53 US qt)

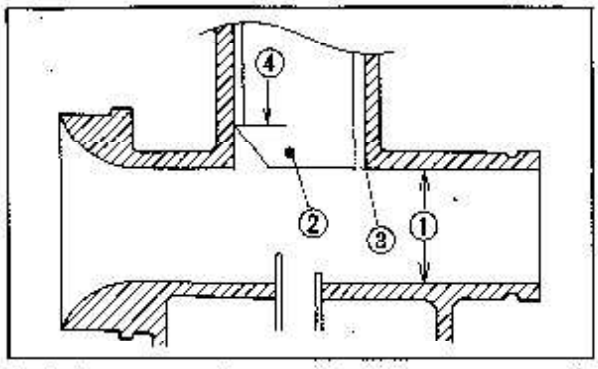


1. Oil filler cap

7. Warm up the engine for a one minute, and wait for a several minute.
8. Remove the checking bolt.
If oil flows out, oil level is correct. If oil does not flow out, add recommended oil until oil flows out.

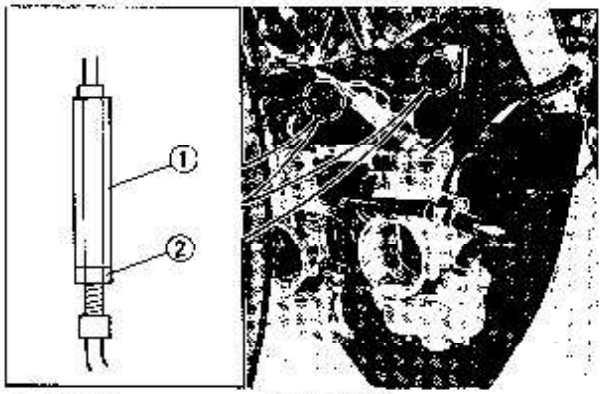
Carburetor

1. Throttle valve opening adjustment
a. Make sure that both carburetors fully open and close.
b. Check the positions of both the throttle valves just before they disappear at the top of the carburetor venturi bore.



1. Carburetor venturi bore
2. Throttle valve
3. Open the throttle valve and synchronize the throttle cables just before the valves disappear.
4. Cut-away

c. If they are not on a level with each other, the throttle cable should be adjusted by turning the adjusting screw on the carburetor cap or by turning the adjusting screw on the throttle grip side.
d. The adjustment can be made by the locknut and adjuster. Tightening the adjuster raises the throttle valve, and vice versa.

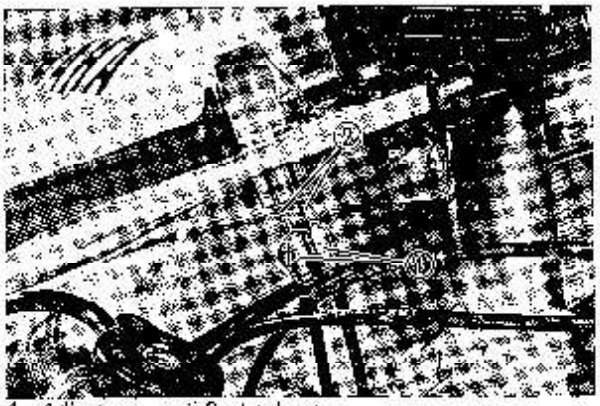


1. Adjuster 2. Locknut

2. Throttle cable free play adjustment.
a. After the throttle valve opening adjustment, check play in turning direction of throttle grip. The play should be 3 ~ 5 mm (0.12 ~ 0.2 in) at grip flange, loosen the locknut and turn the wire adjuster to make the necessary adjustment.

NOTE:
When adjust the cable free play, turn the wire adjusters for equal number of turning.

b. Tighten the locknuts.



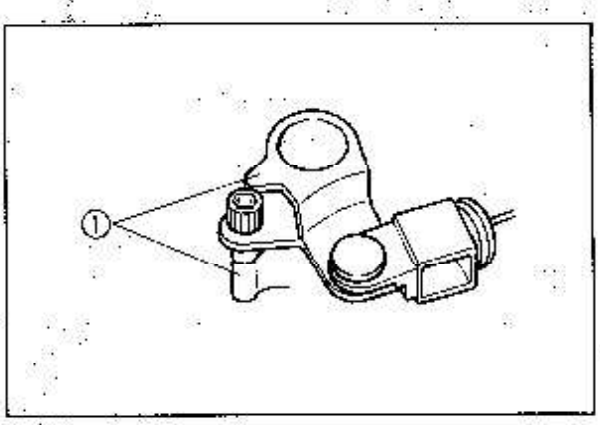
1. Adjuster 2. Locknut

3. Pilot air screw adjustment
   Turn pilot air screw in until lightly seated. Back out specified turns.

Pilot air screw turns out: 1-1/2

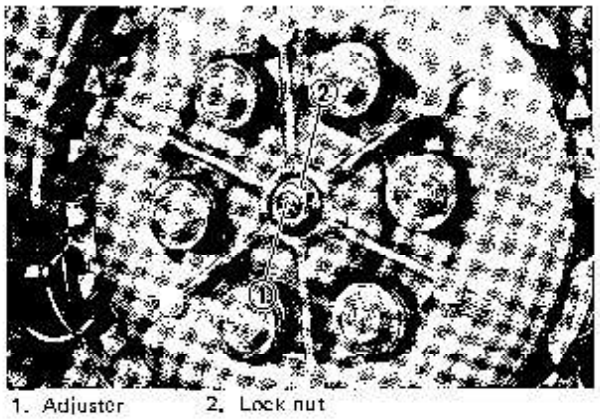
Clutch mechanism adjustment

1. Push the lever in the direction of the arrow as shown. When resistance is felt check that the alignment marks ① align with each other.



1. Adjuster

2. Unless the marks align, loosen the locknut and turn the adjuster in or out.



1. Adjuster 2. Lock nut

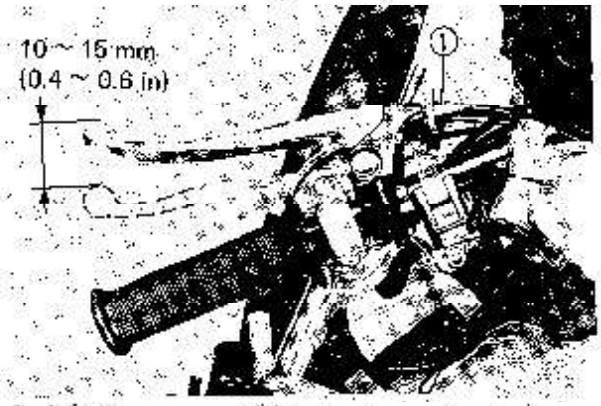
3. Tighten the locknut.

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

Clutch lever adjustment

The clutch should be adjusted to suit rider preferance within a 10 ~ 15 mm (0.4 ~ 0.6 in) free play at the clutch lever end.

1. Turn the lever adjuster either in or out until proper lever free play is achieved.



1. Adjuster

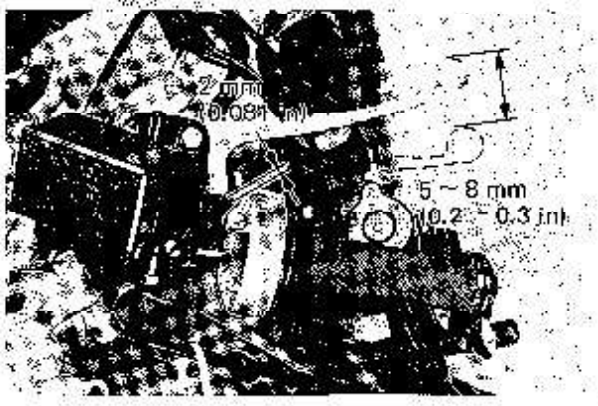
Front brake adjustment

The front brake lever should be so adjusted that it has a free play of 5 ~ 8 mm (0.2 ~ 0.3 in) at the lever end.

1. Loosen the locknut on the brake lever.
2. Turn the adjuster so that the brake lever movement at the lever end is 5 ~ 8 mm (0.2 ~ 0.3 in) before the adjuster contacts the master cylinder piston.
3. After adjusting, tighten the locknut.

⚠ WARNING:

The distance between lever adjuster and throttle grip housing should be 2 mm (0.08 in) or more.



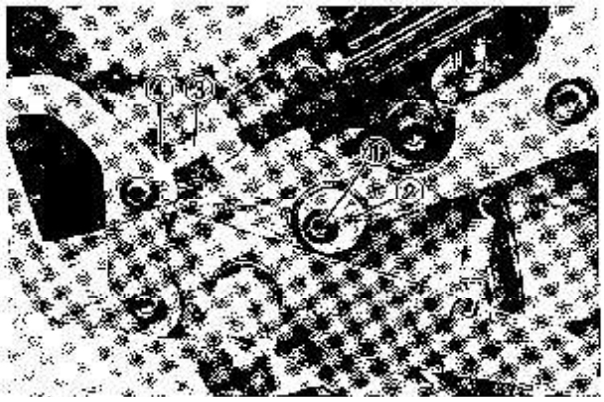
NOTE:
Check for correct play and make sure it is working properly.

Rear brake adjustment

⚠ CAUTION:
For the brake pedal position adjustment, be sure to proceed as follows:

The rear brake pedal should be so adjusted that it has a free play of 13 ~ 15 mm (0.51 ~ 0.59 in) from when the brake pedal is trod to when the brake begins to be effected.

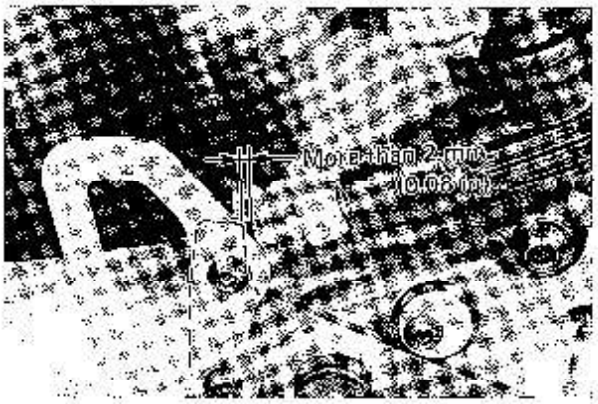
1. Loosen the adjuster lockbolt ① (for pedal height).
2. By turning the adjuster ② clockwise or counterclockwise, adjust the brake pedal position so that its top end is approx. 61 mm (2.40 in) below the footrest top end.



3. Secure the adjusting lockbolt ①.
4. Loosen the brake rod adjuster locknut.

⚠ CAUTION:
After adjusting the pedal height, adjust the pedal free play.

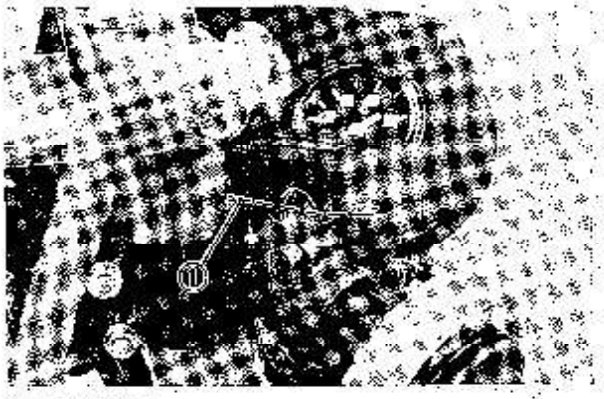
5. Loosen the locknut ③ (For free play adjuster).
6. Turn the adjusting bolt ④ until correct free play (13 ~ 15 mm (0.51 ~ 0.59 in)) is obtained.
7. Tighten the locknut ④.



⚠ CAUTION:
The clearance between brake pedal and adjusting bolt should be more than 2 mm (0.08 in).

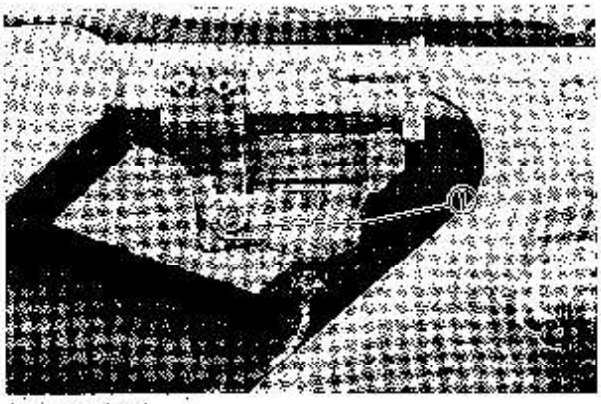
Brake fluid level inspection
Insufficient brake fluid may allow air to enter the brake system, possibly causing the brakes to become ineffective.
Before riding, check the brake fluid level and replenish when necessary, and observe these precautions:

1. Use only the designated quality brake fluid; otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
2. Refill with the same type of brake fluid, mixing fluids may result in a harmful chemical reaction and lead to poor performance.



1. Lower level

Recommended brake fluid: DOT #4



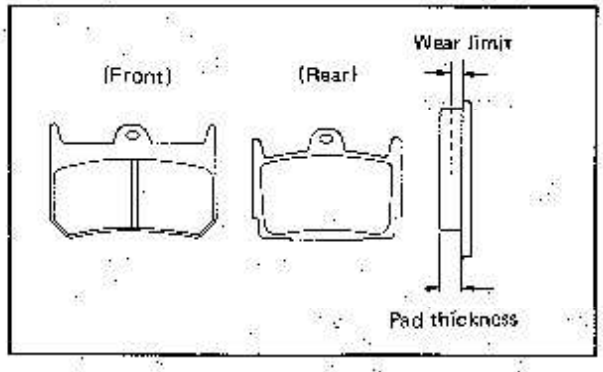
1. Lower level

3. Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point and may result in vapor lock.
4. Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

Front and rear brake pads check

Measure the thickness at the brake pad with slide calipers. If it measures less than specified, replace the pads.

Brake pad thickness	(Front) (Rear)	5.3 mm (0.20 in) 4.0 mm (0.16 in)
Wear limit	(Front) (Rear)	1.0 mm (0.04 in) 1.0 mm (0.04 in)



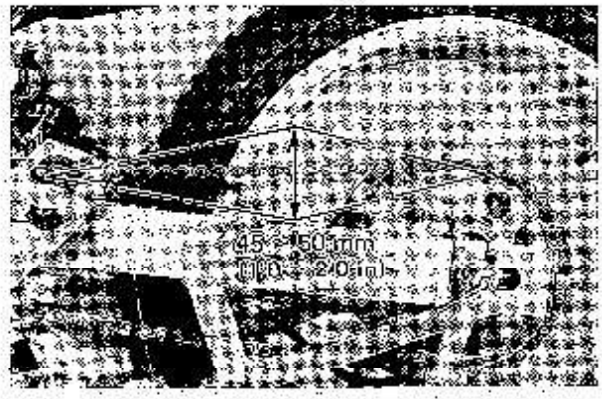
Drive chain slack check

To check the chain slack, the machine must stand vertically with its both wheels on the ground and without operator on it.

Check the slack at the position shown in the illustration. Then measure the slack in drive chain at the bottom of chain at a point midway between the drive and driven axles.

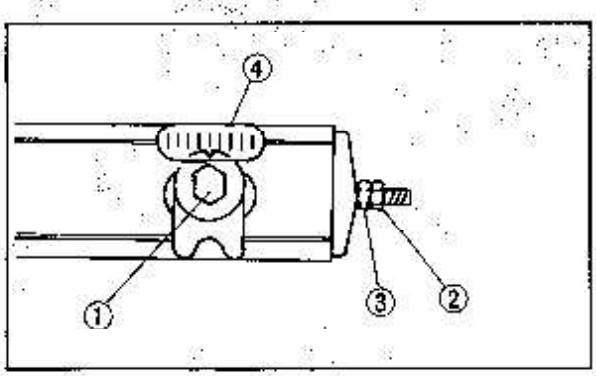
Chain slack: 45 ~ 50 mm (1.8 ~ 2.0 in)

If the slack exceeds 50 mm (2.0 in) adjust the chain slack.



Drive chain adjustment

1. Loosen axle securing nut and adjuster locknuts.
2. Turn adjusting bolts left and right until the adjust marks on the adjusters are aligned with the adjust marks. Tighten locknuts on adjusting bolts.



1. Axle shaft
2. Locknut
3. Adjusting bolt
4. Adjust mark

NOTE:

Be sure that both right and left adjusting bolts are in the corresponding positions.

3. Tighten the rear axle securing nut.

Axle nut:
115 Nm (11.5 m-kg, 85 ft-lb)

⚠ CAUTION:

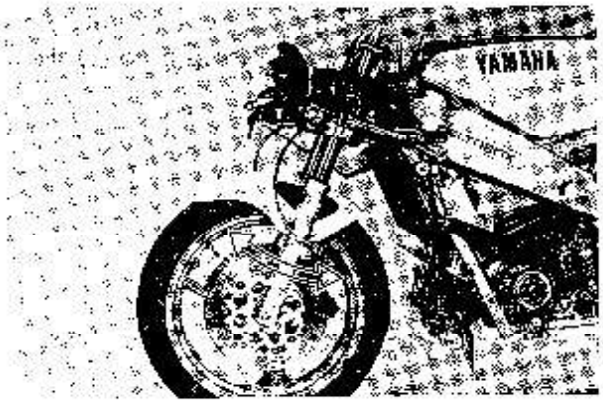
Whenever the chain is adjusted and/or the rear wheel is removed, always check rear axle alignments during reassembly.

Drive chain lubrication

1. First, remove dirt and mud from the chain with a brush or cloth and then spray the lubricant between both rows of side plates and on all center rollers.
2. To clean the entire chain, first remove the chain from the machine, dip it in solvent and clean out as much dirt as possible. Then take the chain out of the solvent and dry it. Immediately, lubricant the chain to prevent the formation of rust.

Steering head adjustment

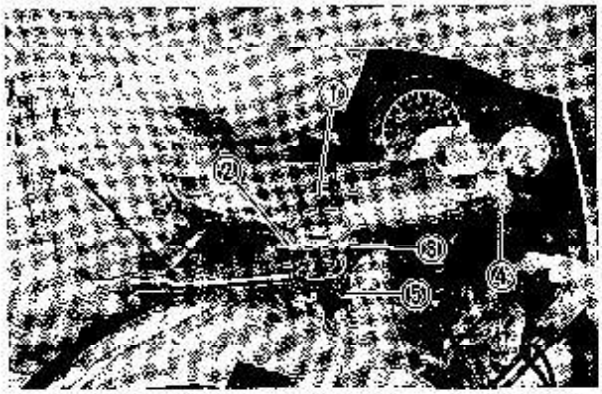
1. With front wheel elevated, grab bottoms of fork legs and gently push and pull to check steering head free play. There should be no noticeable free play.



NOTE:

Forks must swing from lock to lock without binding or catching. If it is felt, check the bearing or loosening.

2. To adjust, loosen steering fitting bolt and pinch bolt.
3. Loosen the front fork pinch bolts and slide the handle crown up.
4. Tighten the ring nut with the steering nut wrench until the free play is eliminated and there is no binding.



1. Steering fitting bolt 2. Ring nut 3. Pinch bolt
4. Front fork pinch bolts 5. Steering nut wrench

5. Tighten fitting bolt and torque to specification.

Fitting bolt:
54 Nm (5.4 m·kg, 39 ft·lb)

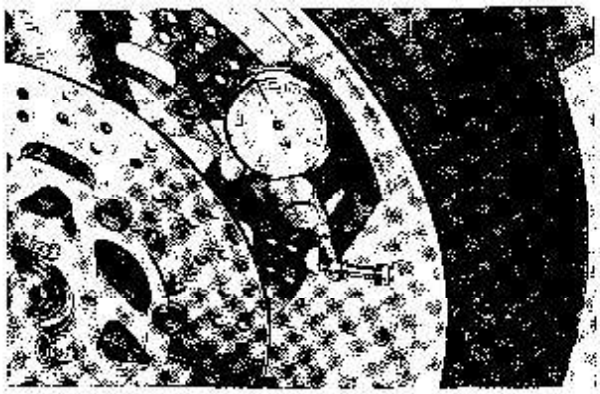
6. Tighten fork pinch bolts and torque to specification.

Fork pinch bolt:
18 Nm (1.8 m·kg, 13 ft·lb)

Tire air pressure

Improper tire pressure affects the smoothness of the tire, traction, handling and the lift of the tires. Always maintain the correct tire pressure.

Tire air pressure (STD):
Front: 210 kPa (2.1 kg/cm², 29.9 psi)
Rear: 220 kPa (2.2 kg/cm², 31.3 psi)



3 SUSPENSION MAINTENANCE

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SUSPENSION MAINTENANCE

SUSPENSION TUNING

⚠ WARNING:

READ AND UNDERSTAND ALL INSTRUCTIONS DEALING WITH SUSPENSION COMPONENTS. FAILURE TO FOLLOW INSTRUCTIONS AND GUIDELINES MAY RESULT IN DAMAGE TO MACHINE AND/OR INJURY TO A MECHANIC OR USER.

To solve any of the following problems perform step 1, then test ride. If further improvement is needed, perform step 2 and follow it with a test ride. Proceed to step 3 if necessary.

FRONT FORKS

Before tuning the front forks, check the fork oil level.

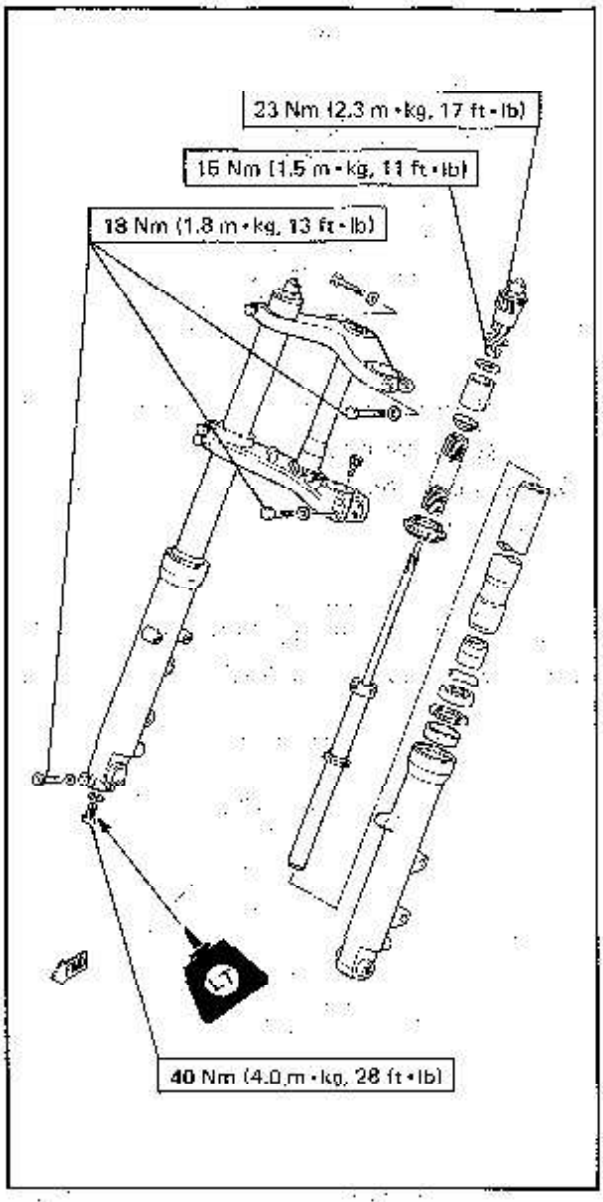
Problem	Step 1	Step 2
Bottoming	Increase spring pre-load	Increase oil level
Too soft	Increase spring pre-load	Increase oil level
Too hard	Decrease spring pre-load	Decrease oil level
GUIDELINES AND LIMITS		
(1) Oil:	STANDARD: 5 wt fork oil	ALTERNATE: 2.5 wt, 7.5 wt

REAR SHOCK ABSORBER

Prior to suspension setting, a seat height must be adjusted; that is, it must be determined whether the machine is given a front or rear tilt. For this determination, vary the entire suspension length to find the best position that gives the machine maximum handlability for a praticular rider by making several runs on a course.

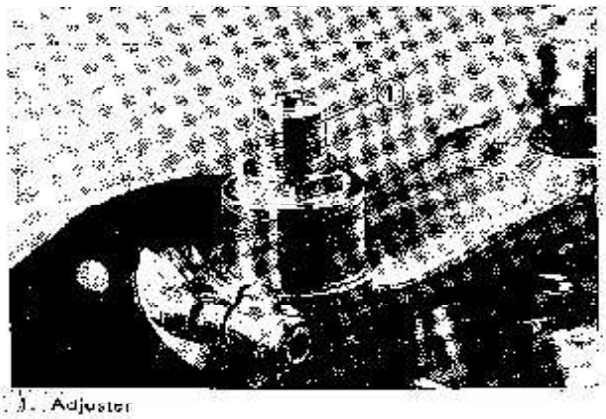
Problem	Step 1	Step 2
Bottoming	Shorten the spring set length	Increase compression damping force
Too soft	Decrease spring set length and increase rebound damping force	Increase compression damping force
Too hard	Increase spring set length and decrease rebound damping force	Decrease compression damping force
GUIDE LINES AND LIMITS		
1. SET LENGTH	MINIMUM: 191 mm (7.52 in) MAXIMUM: 220 mm (8.66 in) STD: 203.5 mm (8.01 in)	
2. REBOUND DAMPING FORCE ADJUSTMENT If the machine "floats up" too early (or too much) on applying the brake or turning corners, adjust the suspension by making its rebound damping force stronger.		

FRONT FORK

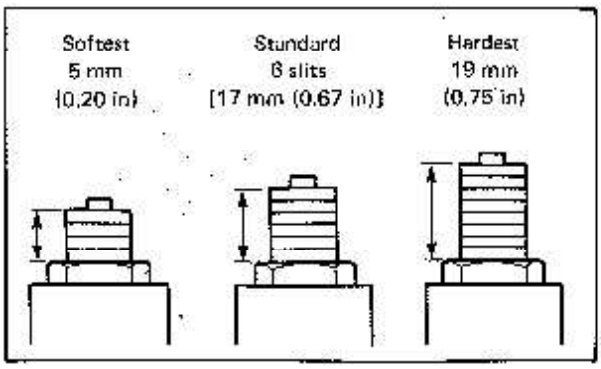


Fork spring pre-load adjustment

The fork spring pre-load is adjustable to suit the rider's preference or road conditions. Using a spanner, turn the adjuster in the fork cap bolt. To make it stiff, turn clockwise. To make it soft, turn counterclockwise.



1. Adjuster



⚠WARNING:

- **Both left and right tensioner should be the same position.**
- **Never attempt to turn the adjuster beyond the softest or hardest setting.**

Damping force adjustment

This front fork is capable of independent damping force adjustment for rebound and compression.

This adjustment can be done without removing the front fork.

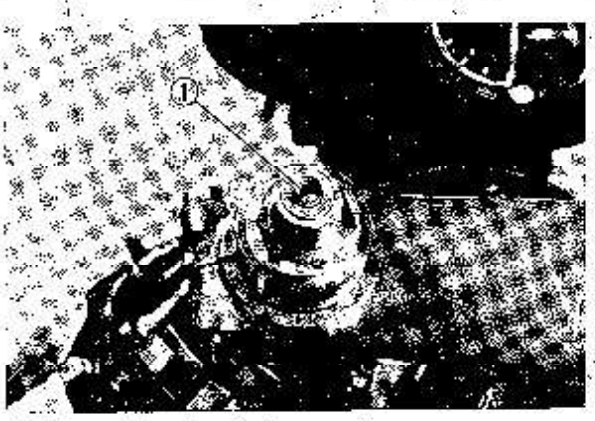
* To make it stiffer, tighten the adjuster. (As illustrated, turn it clockwise.)

* To make it softer, loosen the adjuster. (Turn it counterclockwise.)

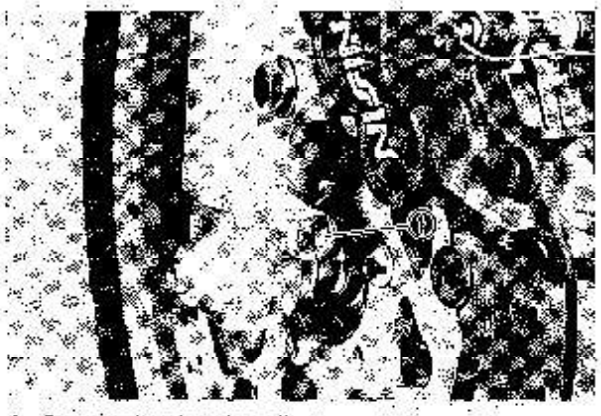
Adjustment should be made notch by notch and test it by riding after each adjustment.

Damping adjuster setting

Rebound damping:
STD: 6 turns out
MAX ~ MIN: 0 ~ 12 turns out
Compression damping:
STD: 6 turns out
MAX ~ MIN: 0 ~ 12 turns out



1. Rebound damping adjuster



1. Compression damping adjuster

⚠ CAUTION:

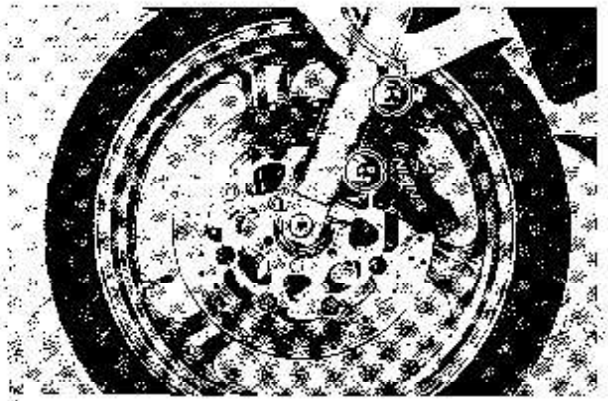
Turn the adjuster until it clicks.
Stop turning the adjuster when it suddenly becomes heavy or light. Do not give any farther turns.

⚠ WARNING:

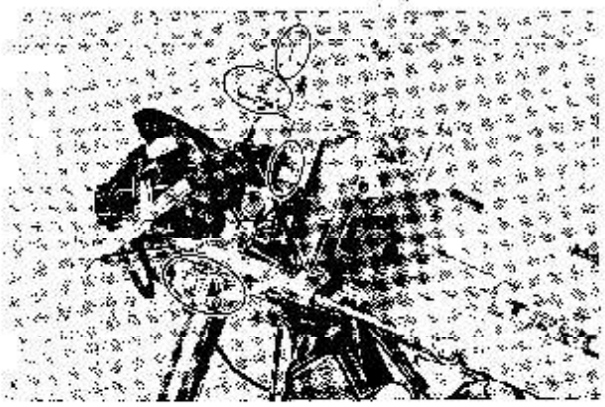
- **Both left and right tensioner should be the same position.**
- **Never attempt to turn the adjuster beyond the softest or hardest setting.**

Removal and disassembly

Remove the caliper body, front wheel and front fender before starting this procedure.



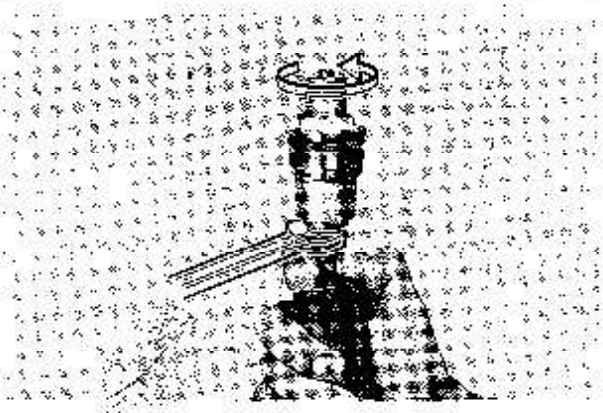
1. Loosen the pinch bolts (upper), cap bolt, handlebar mounting bolts and pinch bolt (lower).



2. Pull out the inner fork tube from the bracket complete.
3. Remove the cap bolt while holding the lock nut.

⚠ CAUTION:

Before removing the cap bolt, make sure that the rebound damping adjuster is fully turned in position.

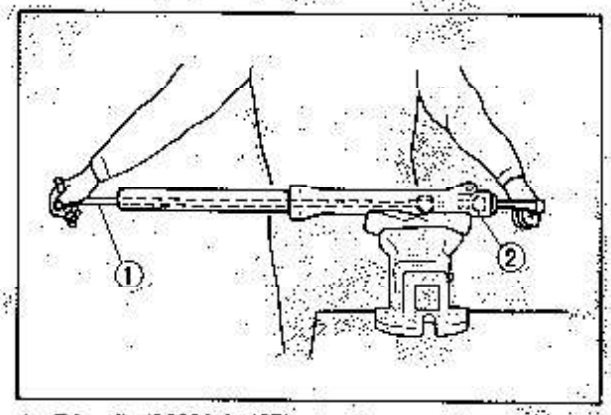


4. Drain the oil from fork tube to oil pan.

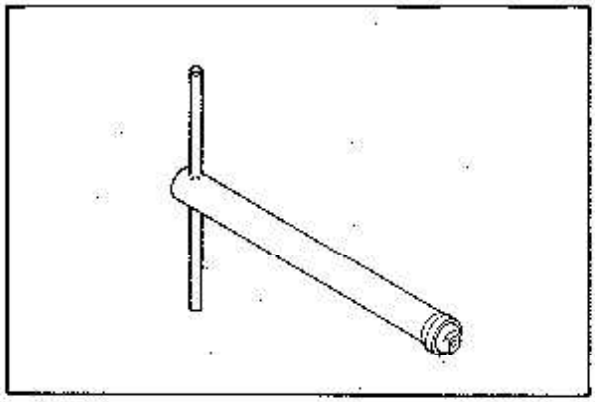
NOTE:

The oil can be completely drained off by sliding the inner tube in and out.

5. Remove the damper rod holding bolt.
   Using a damper rod holder and T-handle (90890-01425).

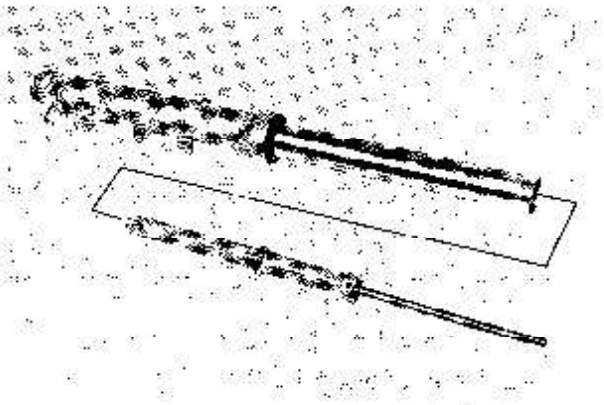


1. T-handle (90890-01425) 2. Damper rod holder

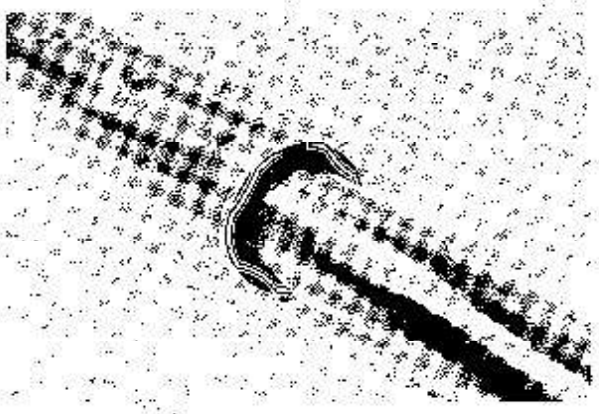


1. T-handle (90890-01425)

6. Remove the damper rod assembly.



7. Remove the oil seal clip.



CAUTION:

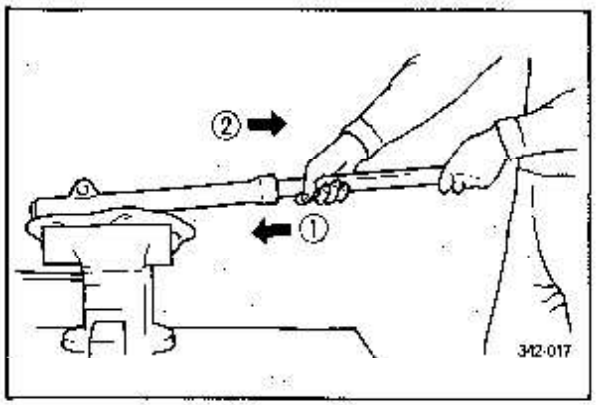
Take care not to scratch the inner tube.

8. Remove the inner tube.

Removal steps.

a. Push in slowly ① the inner tube just before it bottoms out and then pull it back quickly ②.

b. Repeat this steps until the inner tube can be pulled out from the outer tube (usual 2 or 3 times).



Inspection

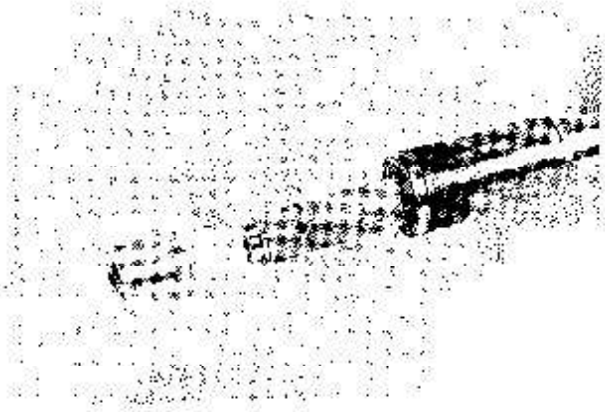
1. The inner tube must be checked for surface wear, bend, rust and wound the tube gets scratched from dirt working past the seal and continually rubbing against the tube. In addition, the tube can become deeply grooved if it is bent.
2. Deep grooves, or nicks, can quickly wear out, the seal lips and permit oil to blow past the seal. Replace the tube if these deep grooves are evident.



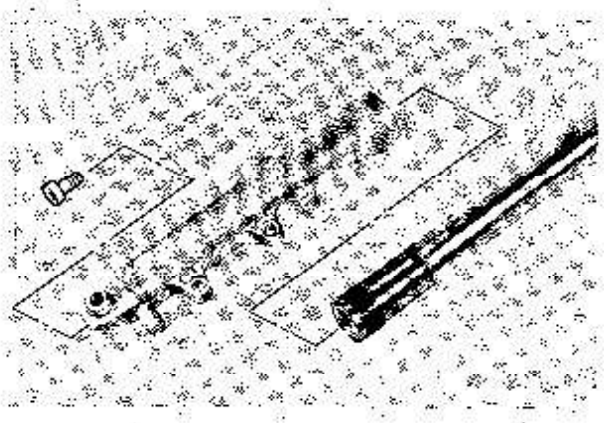
3. Also check for a bent tube. If the tube is found to be bent for any reason, the safest procedures is to replace it.

Installation

1. Install the damper rod and oil lock piece to inner tube.

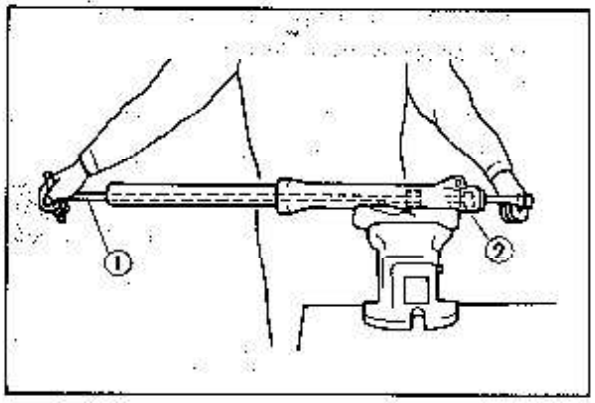


2. Install the inner tube and valve assembly to outer tube.



NOTE:
Apply the LOCKTITE® onto the valve assembly thread.

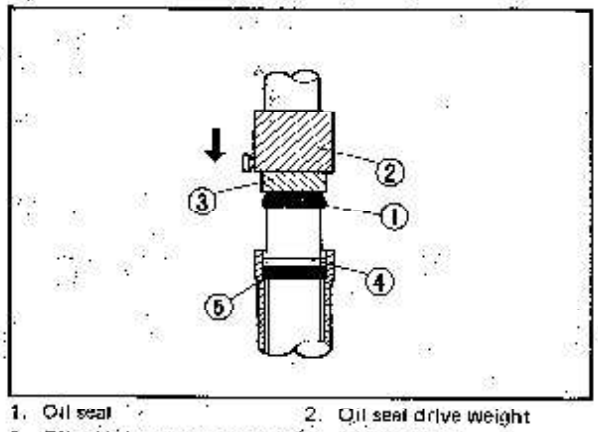
3. Tighten the valve assembly while holding the damper rod with damper rod holder (90890-01425).



1. T-handle (90890-01425) 2. Damper rod holder

Valve assembly:
40 Nm (4.0 m · kg, 28 ft · lb)

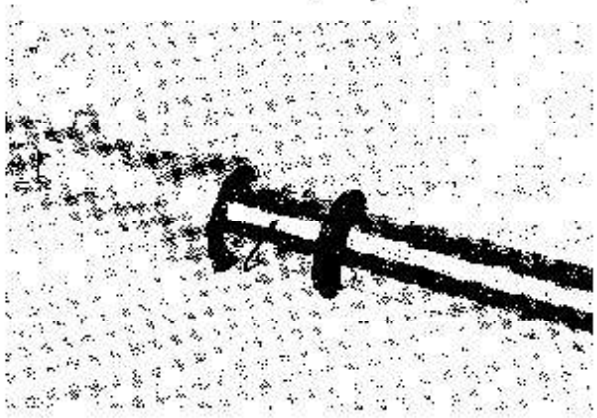
4. Install the slide metal, plain washer and oil seal. Use fork seal driver weight (90890-01367) and attachment (90890-01381).



1. Oil seal 2. Oil seal drive weight
3. Oil seal driver attachment 4. Plain washer
5. Slide metal

5. Install the dust seal and clip.

NOTE:
Fit the retaining clip correctly in the groove in the outer tube.

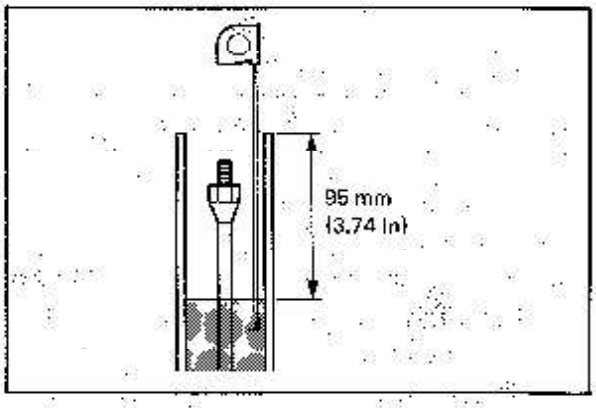


6. Measure correct amount of oil and pour into each leg.

Recommended oil:
Yamaha fork oil 5 wt or equivalent fork oil
Oil quantity:
379 cm³ (14.5 Imp oz, 12.8 US oz)

NOTE:
Select the weight oil that suits local conditions and your preference (lighter for less damping, heavier for more damping).

7. Measure the oil level from top of the fork tube with a tape measure. The inner tube and piston rod must be fully bottomed.

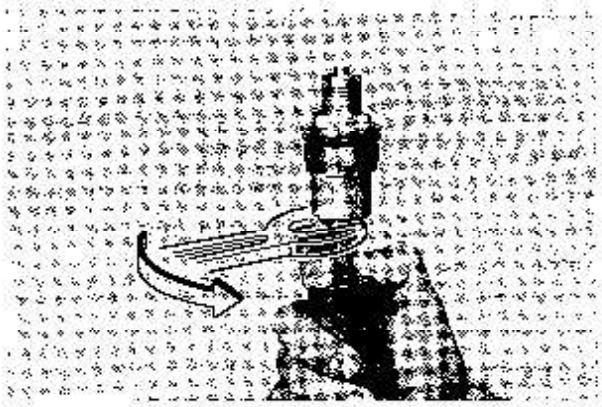


Oil level: 95 mm (3.74 in)

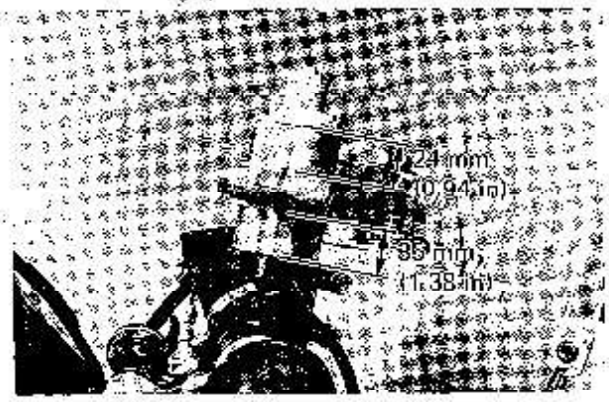
8. After filling, slowly pump the piston rod and inner tube up and down to distribute the oil.

9. Inspect the O-ring on cap bolt and replace if damaged.
10. Install the cap bolt by following steps.
   a. Turn in the locknut to fully turned in position.
   b. Install the cap bolt onto piston rod and turn in the cap bolt to fully turned in position.
   c. Tighten the lock nut.

Locknut: 15 Nm (1.5 m · kg, 11 ft · lb)



11. Insert the inner tube in the bracket complete. And tighten the cap bolt, upper and lower pinch bolts.



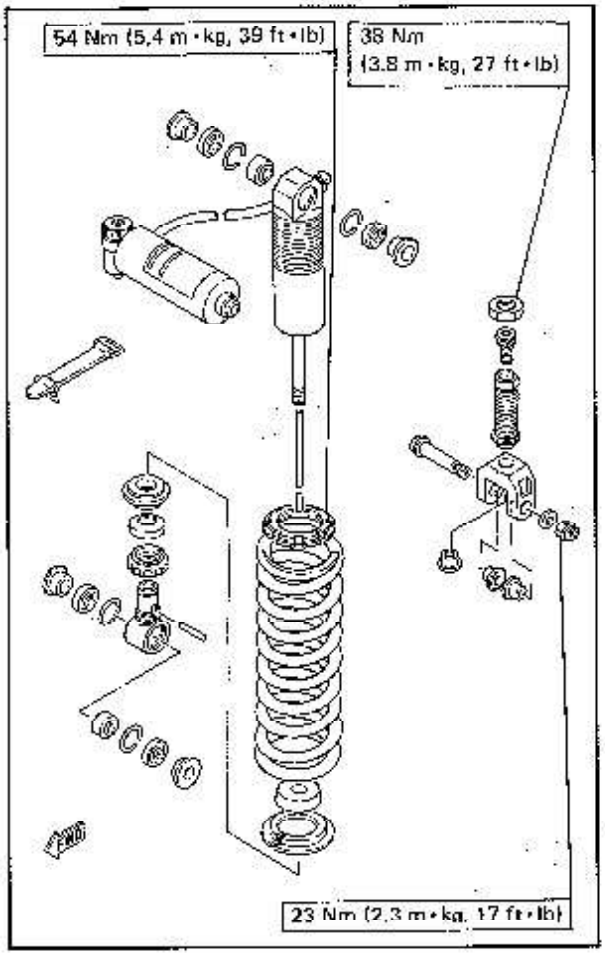
Fork tube height (Without cap bolt): 24 mm (0.94 in) Handlebar position: 35 mm (1.38 in)

Pinch bolt: 18 Nm (1.8 m · kg, 13 ft · lb) Cap bolt: 23 Nm (2.3 m · kg, 17 ft · lb)

12. Tighten the handle holder to specification.

Tightening torque: 7 Nm (0.7 m · kg, 5.1 ft · lb)

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

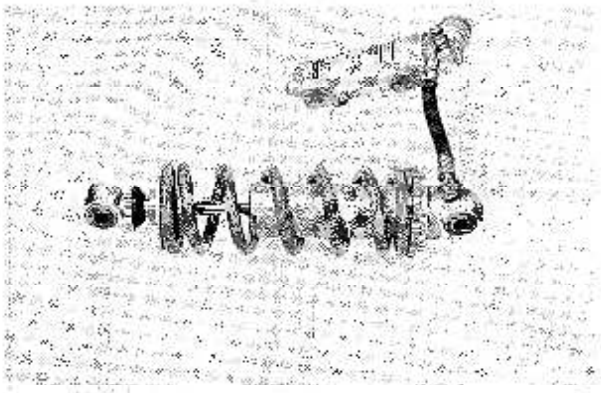


⚠ WARNING:

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

1. **Do not tamper or attempt to open the cylinder assembly.**
2. **Do not subject shock absorber to an open frame or other high heat.**
   This may cause that unit to explode due to excessive gas pressure.
3. **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.**
4. **Handle it with great care, for a score or scratch in the piston rod sliding portion will cause oil leakage.**
5. **Never remove the plug on the cylinder bottom. Injury may result.**

This machine's suspension is adjustable to best suit the rider's preference or road conditions. (For adjustment, refer to "Suspension Tuning".



Damping adjustment

This shock absorber is capable of independent damping force adjustment for rebound and compression.

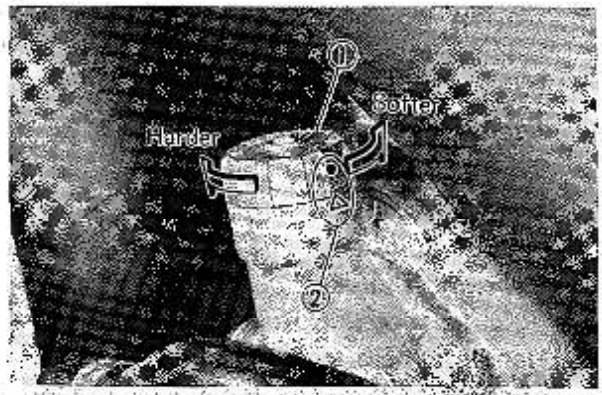
This adjustment can be done without removing the rear shock absorber.

* To make it stiffer, tighten the adjuster. (As illustrated, turn it clockwise.)
* To make it softer, loosen the adjuster. (Turn it counterclockwise.)

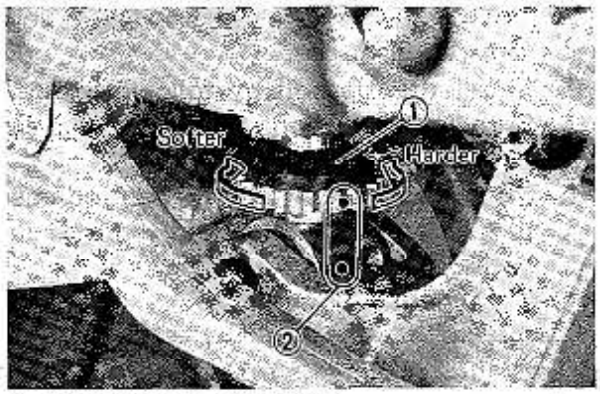
Adjustment should be made notch by notch and test it by riding after each adjustment.

Damping adjuster setting

Rebound damping:	
STD:	10 ± 1 turns out
MAX ~ MIN:	0 ~ 20 turns out
Compression damping:	
STD:	8 ± 1 turns out
MAX ~ MIN:	0 ~ 20 turns out



1. Rebound damping adjuster 2. STD adjustment marks

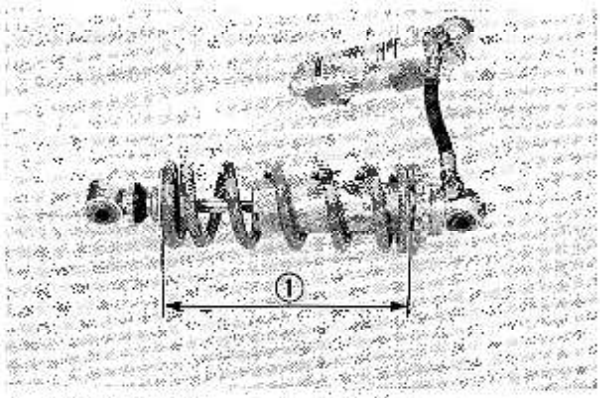


1. Compression damping adjuster
2. STD adjustment marks

⚠ CAUTION:

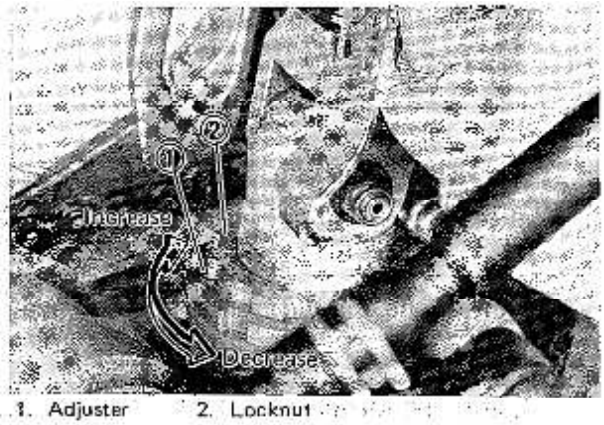
Turn the adjuster until it clicks.
Stop turning the adjuster when it suddenly becomes heavy or light. Do not give any father turns.

Spring pre-load adjustment



1. Installed length

1. Loosen the adjuster locknut.
2. To increase the spring pre-load, tighten the adjuster. To decrease. loosen the adjuster.



1. Adjuster 2. Locknut

NOTE:

Adjustment should be made by tightening or loosening the adjuster 1.5 mm (0.06 in) each time.

Standard length:
203.5 mm (8.01 in)
Minimum length (Hardest):
191 mm (7.52 in)
Maximum length (Softest):
220 mm (8.66 in)

⚠ CAUTION:

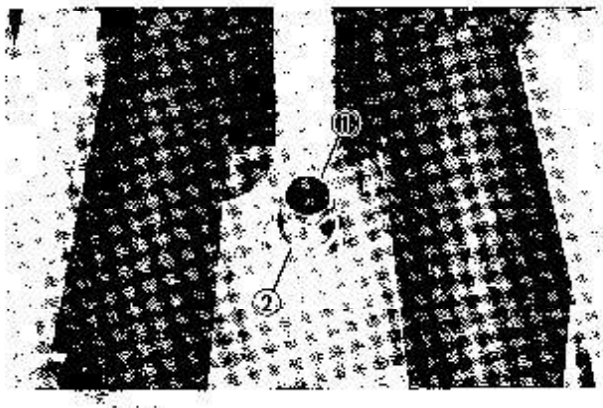
Be sure that adjustment is within the above range.

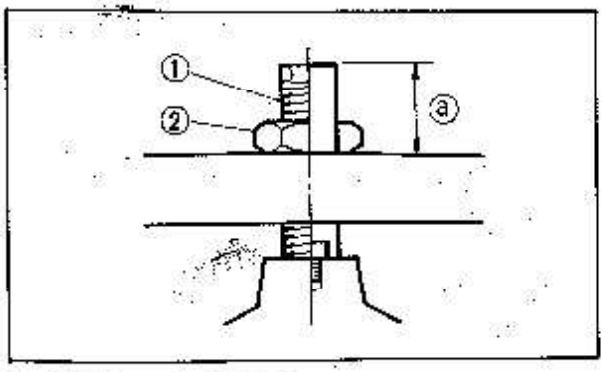
3. After adjustment, tighten the locknut.

Adjuster locknut:
54 Nm (5.4 m·kg, 39 ft·lb)

Seat height

The seat height can be made higher or lower by turning the adjuster.





1. Adjuster 2. Locknut

Adjusting Length ⓐ :
Standard: 33 mm (1.30 in)
Minimum: 21 mm (0.83 in)
Maximum: 41 mm (1.61 in)

After adjustment, be sure to tighten the locknuts.

Bracket locknut:
38 Nm (3.8 m·kg, 27 ft·lb)

⚠ WARNING:

Be sure that adjustment is within the above range.

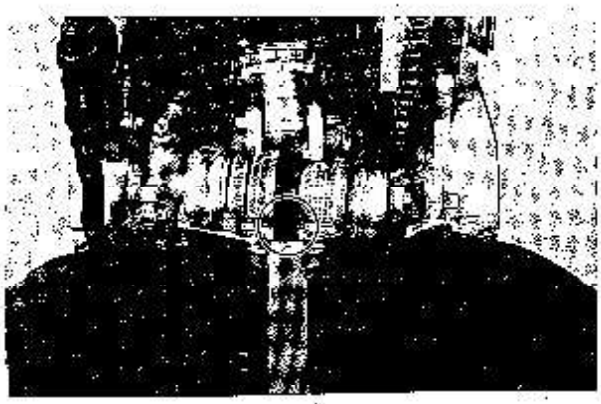
Gas pressure

The nitrogen gas pressure is adjustable. For this adjustment, bring the unit to your Authorized Yamaha dealer.

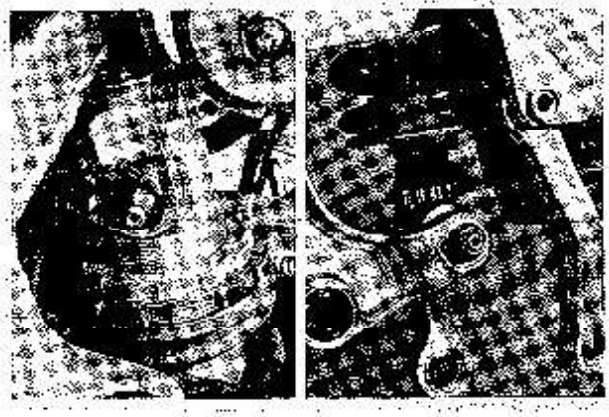
Nitrogen gas pressure:
STD: 1,200 kPa (12 kg/cm², 170 psi)

Absorber removal

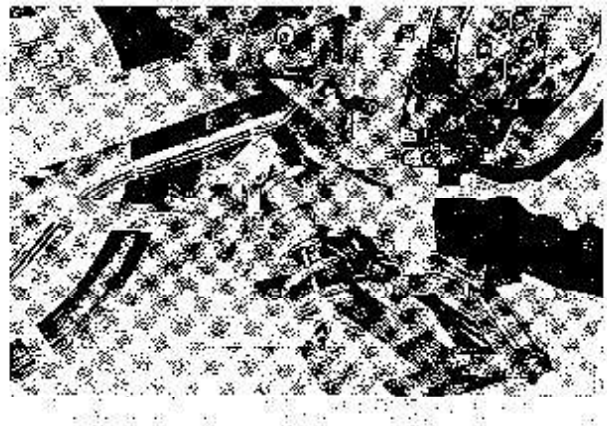
1. Use a suitable stand to raise the rear wheel off the ground.
2. Remove the fuel tank (place the fuel petcock lever to "OFF" and disconnect fuel hose) and exhaust pipes.
3. Remove the rubber bands which holding reservoir tank.



4. Remove the nuts from the bolt securing the upper and lower parts of the shock absorber, and remove the bolt.



5. Remove the shock absorber from the frame.



Assembly

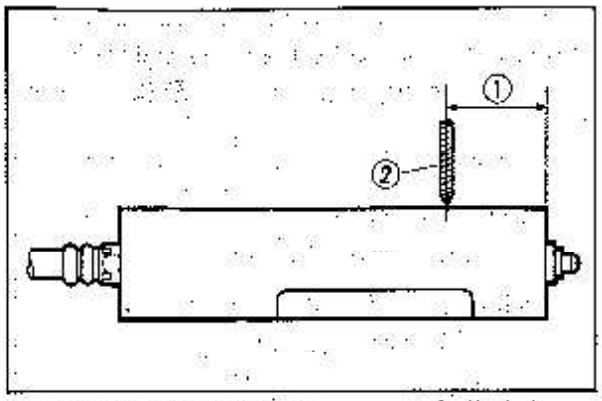
For assembly, reverse the procedure for disassembly while tanking the following precautions:

1. Grease upper and lower bolts.
2. Tighten the nut to specification.

Shock absorber:
23 Nm (2.3 m·kg, 17 ft·lb)

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 30 ~ 35 mm (1.2 ~ 1.4 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.



1. 30 ~ 35 mm (1.2 ~ 1.4 in)
2. 2 ~ 3 mm (0.08 ~ 0.12 in) drill

⚠ WARNING:

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

4 ENGINE MAINTENANCE AND REPAIR

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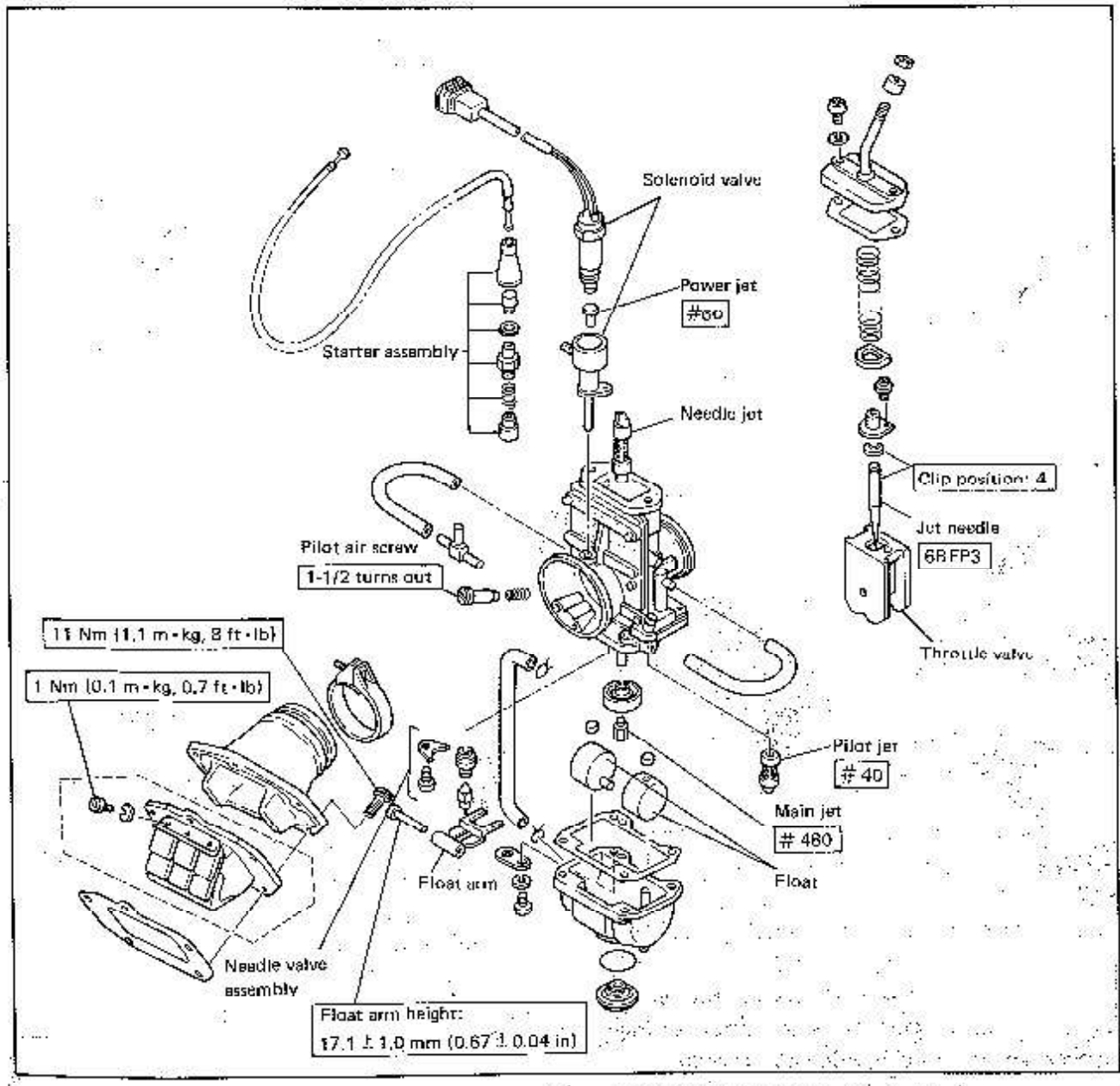
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ENGINE MAINTENANCE AND REPAIR

PREPARATION FOR SERVICE

* Place the removed parts, always on a tray in the order of removal.
* When replacing parts, always use genuine Yamaha parts to maintain better performance, durability and safety.
* All gaskets and seals should be replaced when an engine is overhauled. All gasket surfaces must be cleaned.
* Properly oil all mating engine and transmission parts during assembly.
* All circlips should be replaced before re-assembly.
* Always replace cotter pins and piston pin clips after one use.
* When installing parts, apply grease or oil to them, as required, and following the torque chart. (Refer to Maintenance & Lubrication Schedule Chart.)
* For assembly, reverse the procedure for removal.

CARBURETOR AND REED VALVE



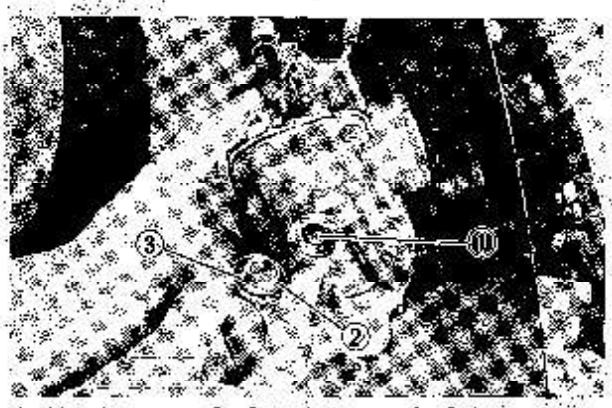
Main jet replacement

1. Turn fuel petcock lever to the "OFF" position.
2. Disconnect the fuel hose.
3. Loosen the manifold joint band (hose clamp).
4. Remove bolt. Main jet is located directly behind bolt.
5. Remove the main jet. Change as required. Reinstall cover bolt and reassemble, reversing steps 1 through 3.

Standard main jet: #480

⚠ WARNING:

Removing the main jet cover bolt will allow the fuel in the float bowl to drain. Do not remove near open flame. Place a container under carburetor to catch overflow. Remove bolt in well-ventilated area. Always clean and dry machine after reassembly.



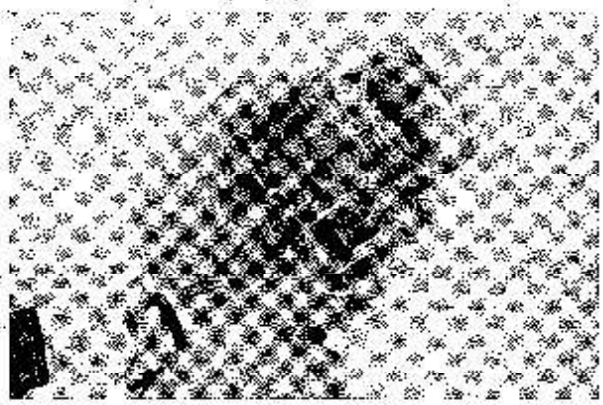
1. Main jet 2. Cover bolt 3. O-ring

IMPORTANT:

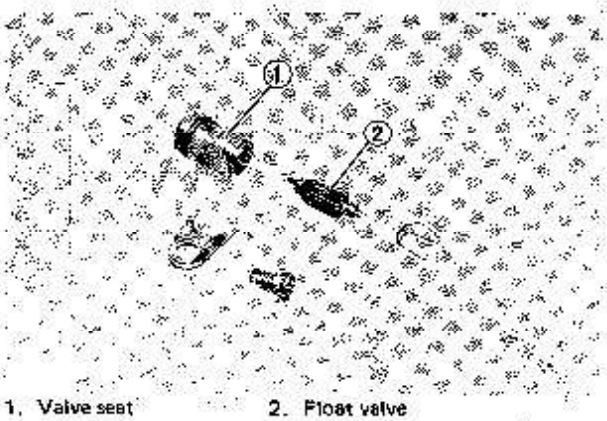
The carburetor has been set for normal sea level conditions. The standard setting is the result of extensive testing and does not usually require changing. However, under conditions of atmospheric pressure, humidity or temperature the standard Main jet should be replaced with another Main jet. If the carburetor requires any other setting changes to suit local conditions of altitude, weather, etc., the changes must be made with great care. Improper carburetor setting changes will cause poor engine performance and possible engine damage. Please consult your YAMAHA dealer about any carburetor setting changes before actually going about them.

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 jets with compressed air.



2. Examine condition of floats. If floats are damaged, they should be replaced.
3. Inspect float valve and seat for wear or contamination. Replace these components as a set.



1. Valve seat 2. Float valve

Float height and jet needle adjustment

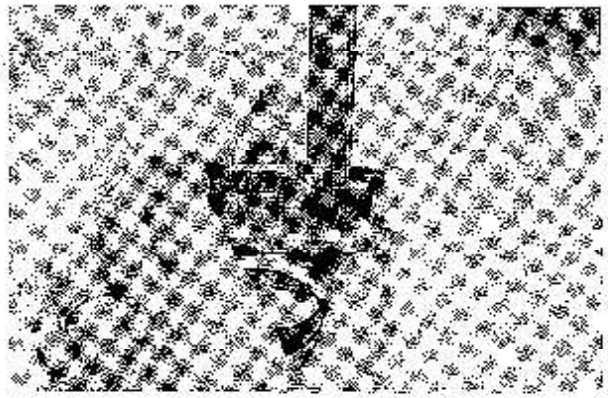
1. Float height

a. Checking

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 arm height: 16.1 ~ 18.1 mm (0.63 ~ 0.71 in) Level with carburetor base

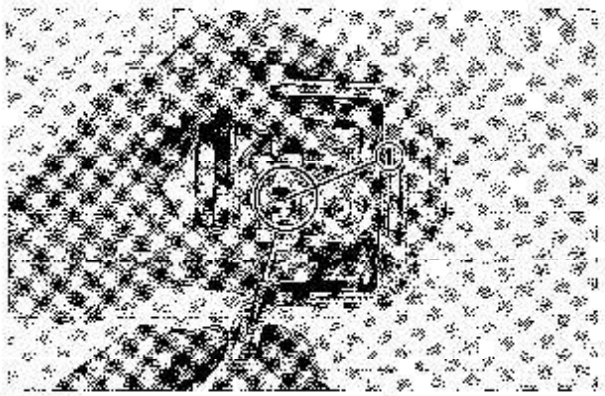


b. Adjustment

⚠ CAUTION:

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

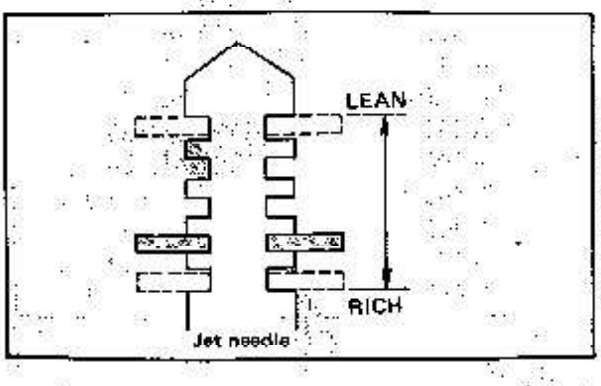
Make the adjustment by bending the tang on the float arm.



1. Tang

2. Jet needle adjustment

The mid-range air/fuel supply is affected by the position of the needle in the needle jet. If it is necessary to alter the mid-range air/fuel mixture characteristics of the machine, the jet needle position may be changed. Move the jet needle up for a leaner condition or toward the bottom position for a richer condition.



Tuning guidance

The following list gives each of the major components of the carburetor that can be readily changed in order to modify performance if required. If you are unfamiliar with carburetor theory, we suggest you refrain from making changes. Quite often, a performance problem is caused by another related component, such as the exhaust system, ignition timing or combustion chamber compression.

NOTE:

Excessive changes in main jet or power jet size can affect performance at all throttle position.

⚠ CAUTION:

The fuel/air mixture ratio is a governing factor upon engine operating temperature. Any carburetor changes, whatsoever, must be followed by a thorough spark plug test.

NOTE:

1. Don't tamper with the throttle valve and jet needle, otherwise the whole setting balance may be impaired.
2. Running carb settings should be determined by the main and power jets alone.

Jet needle:

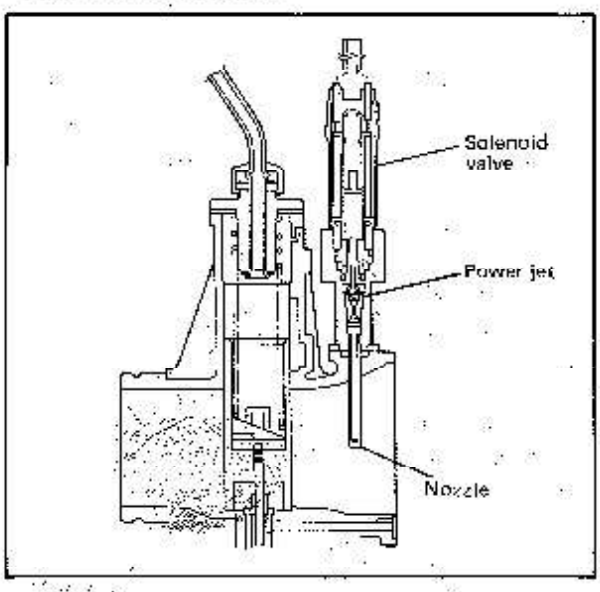
Moving the needle clip from the first, or top groove, through the fifth, or bottom groove, will give a correspondingly richer mixture.

Main jet:

Changing the jet to one with a higher number supplies more fuel to the main nozzle giving a richer mixture.

Power jet with fuel-cut solenoid valve:

- Power jet is a device which has succeed in solving the tendency toward a rich air-fuel mixture in the mid speed range, though on the conventional carburetor it has been difficult to correct this tendency.
- Solenoid valve avoids a power drop at high speeds (over maximum power) by shutting off a fuel flow at approximately 11,750 rpm or more.



- Operation

○When battery is connected, solenoid valve is closed for a second and opened.

○0 ~ (11,650 ~ 11,750 rpm):

*Solenoid valve is opened and mixture is injected at power jet.

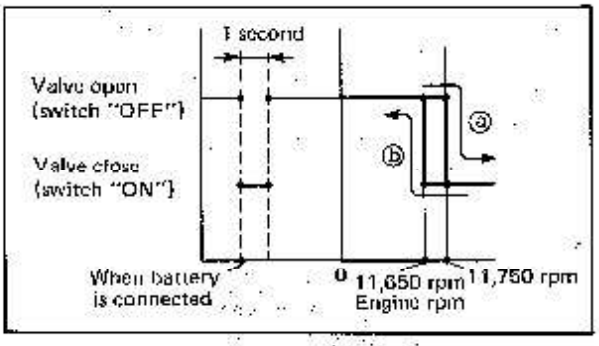
○(11,650 ~ 11,750) or more:

*Solenoid valve is closed by receiving pulse from CDI unit.

***NOTE:**

ⓐ : When engine rpm is increased, valve is closed at 11,750 rpm.

ⓑ : When engine rpm is decreased, valve is opened at 11,650 rpm.



Standard setting: #55

Operating range of each components

Setting part name	Throttle opening						
	0	1/8	1/4	1/2	3/4	7/8	1/1
Jet needle							
Main jet							
Power jet							

Partial range

Partial settings follow the determination of the full throttle settings and these can be performed by usual procedure.

Turning parts

(Main jet)

Size	Part number
# 300	137-14143-60
# 310	137-14143-62
# 320	137-14143-64
# 330	137-14143-66
# 340	137-14143-68
# 350	137-14143-70
# 360	137-14143-72
# 370	137-14143-74
# 380	137-14143-76
# 390	137-14143-78
# 400	137-14143-80
# 410	137-14143-82
# 420	137-14143-84
# 430	137-14143-86
# 440	137-14143-88
# 450	137-14143-90
# 460	137-14143-92
# 470	137-14143-94
# 480	137-14143-96

(Power jet)

Size	Part number
# 50	3G2-14231-10
# 60 (STD)	3G2-14231-12
# 70	3G2-14231-14

(Needle jet)

Size	Part number
R-4	1LX-14141-R4
R-6	1LX-14141-R6
R-8 (STD)	1LX-14141-R8

(Pilot jet)

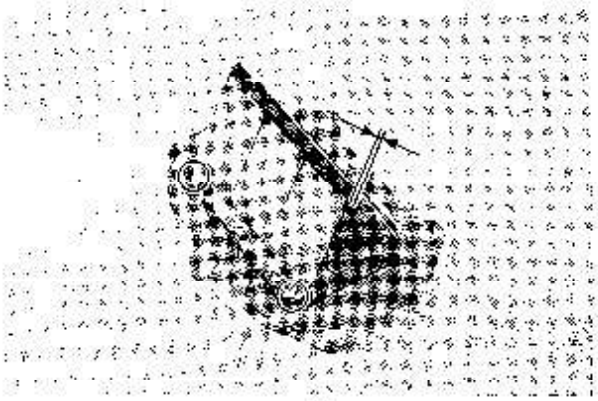
Size	Part number
# 35	193-14142-35
# 40 (STD)	193-14142-40
# 45	193-14142-45

Reed valve inspection

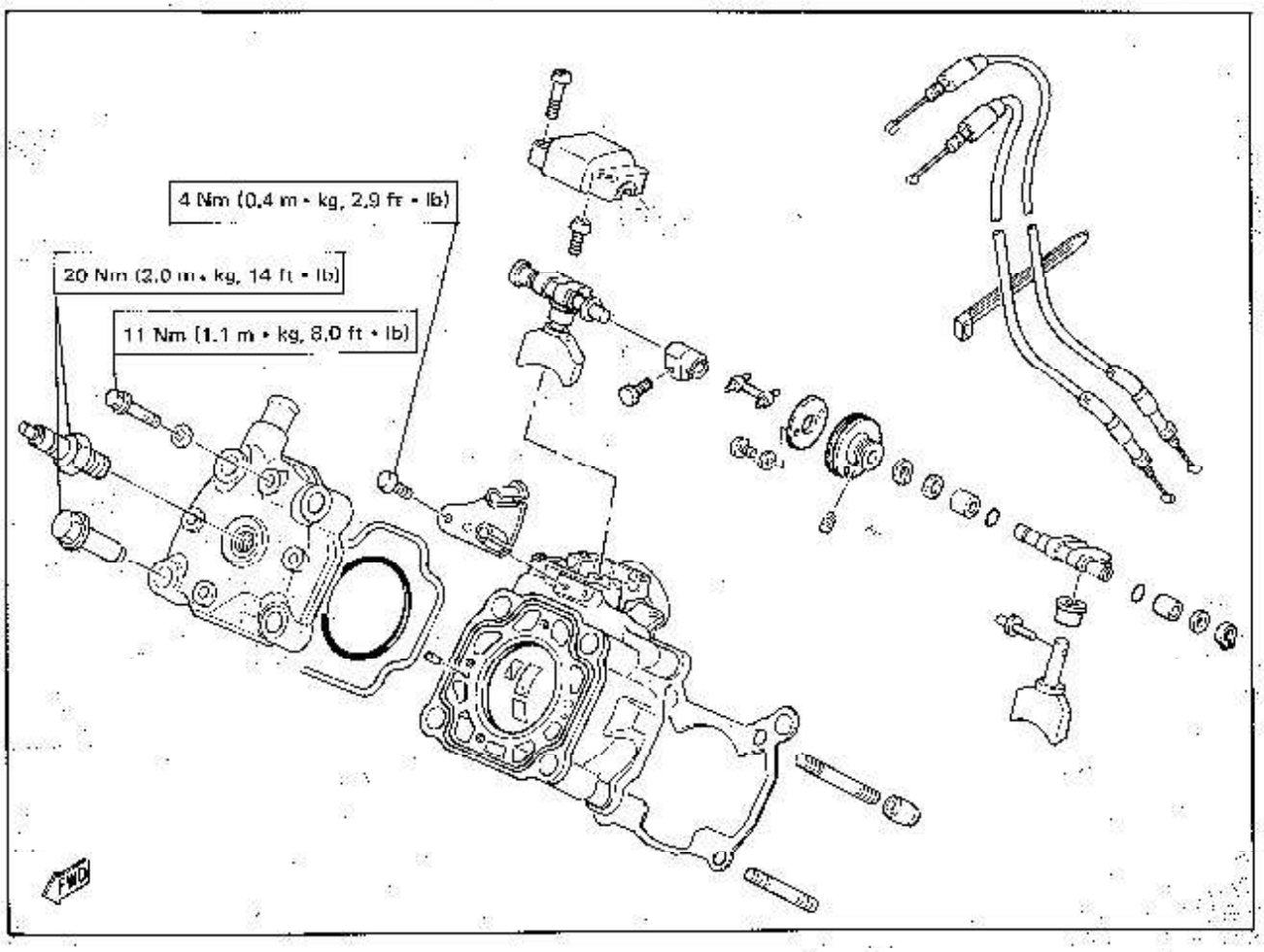
1. Inspect reed valve for signs of fatigue and cracks.
2. Check reed valve for bending. If beyond tolerance, replace reed valve.

Reed valve bending limit:
1.4 mm (0.055 in)

3. During installation, note the cut in the lower corner of the reed and stopper plate.

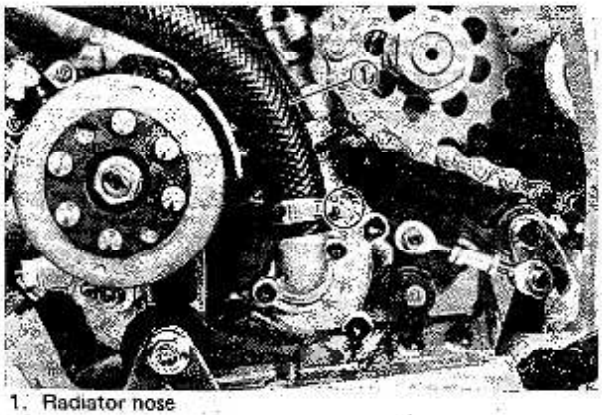


CYLINDER HEAD, CYLINDER, Y.P.V.S. AND PISTON



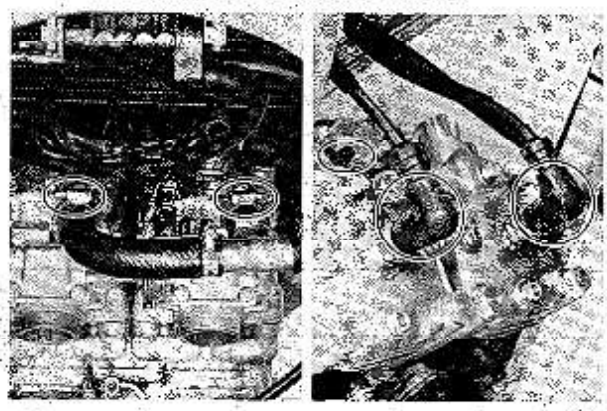
Removal

1. Remove the fuel tank, seat, radiator, and exhaust pipes.
2. Remove the water hoses and drain the cooling water.

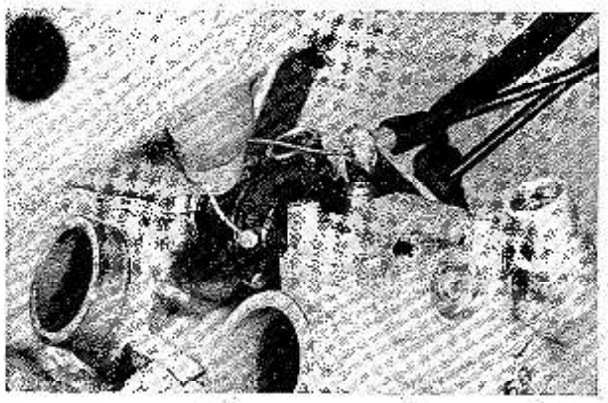


1. Radiator nose

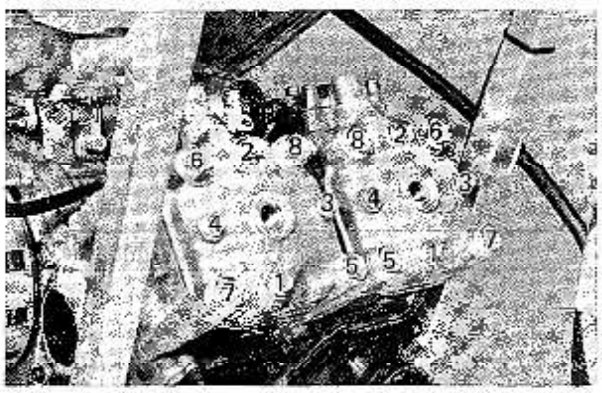
3. Remove the cylinder head joint hose and disconnect the radiator hoses.



4. Remove the Y.P.V.S. control cable holder, then disconnect the control cables from pully.



5. Loosen the cylinder head bolts and nuts in numerical order as shown.



6. Remove the cylinder head and cylinder.

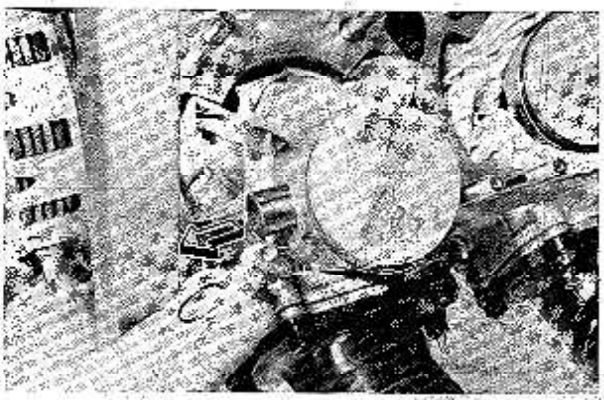
⚠ CAUTION:

Set the piston at the T.D.C. before removing the cylinder head. When removing the cylinder head, some remaining cooling water in the cylinder head may be spilt on the piston. Be sure to wipe away the cooling water from the piston.

7. Remove the piston pin clip from the piston. Push the piston pin out from opposite side. Remove the piston and bearing.

NOTE:

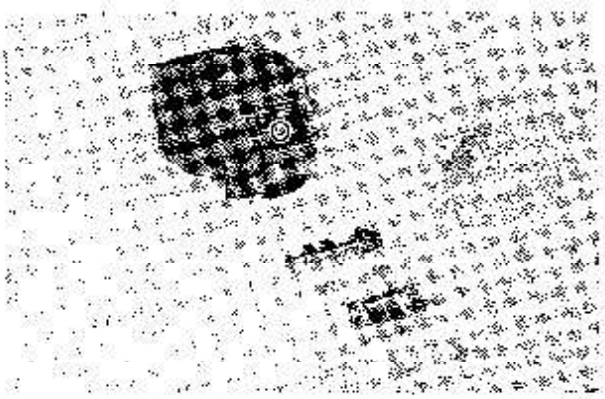
Stuff a clean shop rag into crankcase cavity, around rod, to prevent dirt and water from entiring.



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.

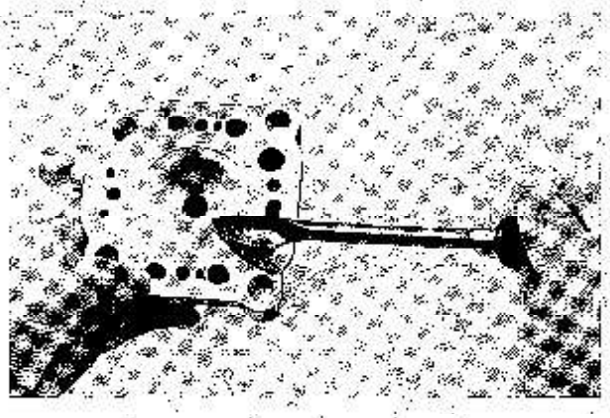
8. Remove the valve cover, valve shaft and valve.



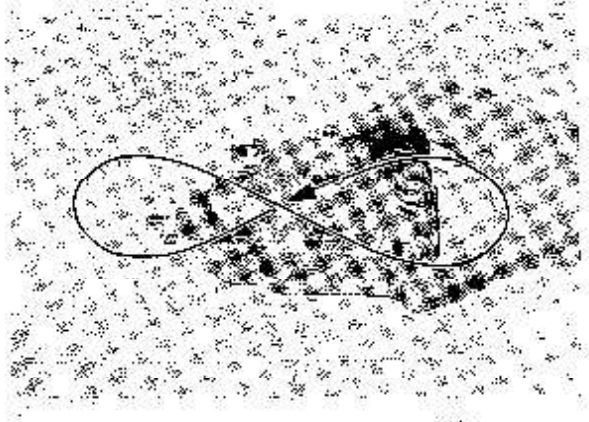
Inspection

Cylinder head

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.

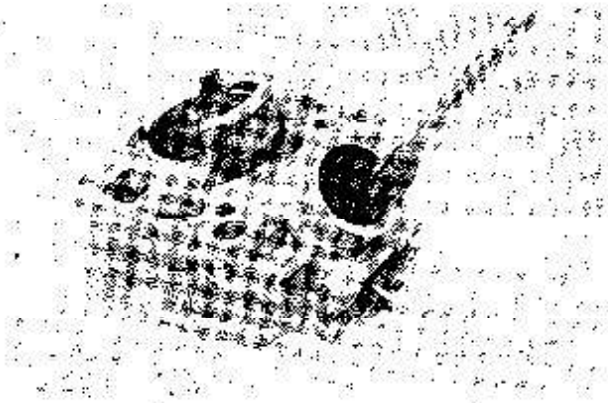


2. Measure the cylinder head warpage using straight edge and thickness gauge. There should be no warpage. Correct by resurfacing. Place 400 ~ 600 grit wet emery sandpaper on surface plate and resurface head using a figure-eight sanding pattern. Rotate head several times to avoid removing too much material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

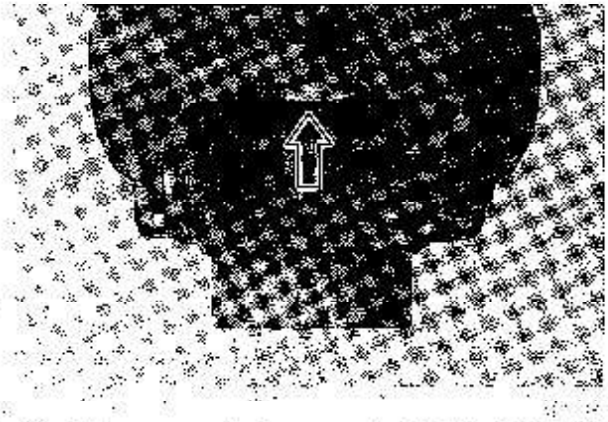


Cylinder

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

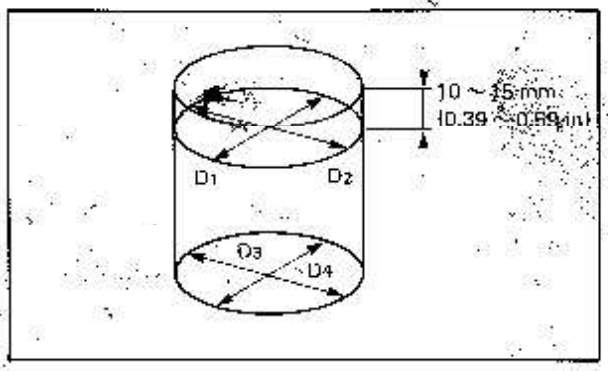


2. Remove and deposits from power valve hole.



3. Using a cylinder gauge set to standard bore size, measure the cylinder bore. Measure front-to-rear and side-to-side at top and bottom.

NOTE:
Since the cylinder wall is electroplated, do not hone or grind it with sand paper, etc.



Cylinder bore (Standard):
56.00 ~ 56.02 mm (2.204 ~ 2.206 in)
< Limit > : 56.10 mm (2.209 in)

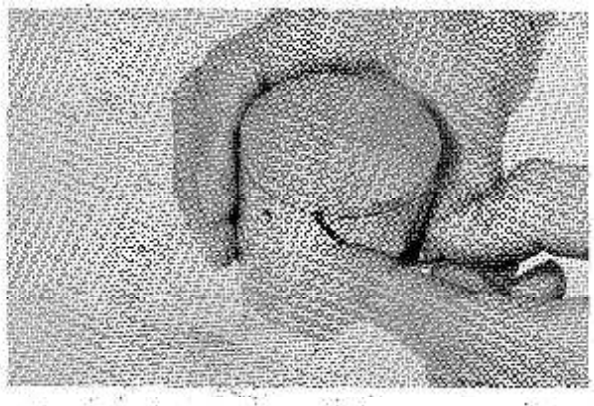
Compare minimum and maximum measurements.

Taper "T" limit: 0.05 mm (0.0019 in) Out of Round "R" limit: 0.01 mm (0.0004 in)

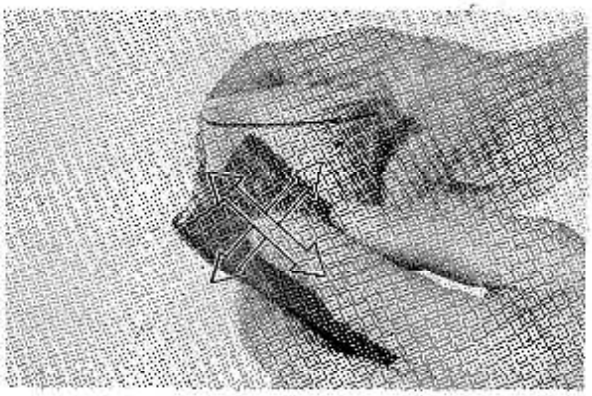
T = (Maximum D_1 or D_2) – (Maximum D_3 or D_4)
R = (Maximum D_1 or D_3) – (Maximum D_2 or D_4)

Piston

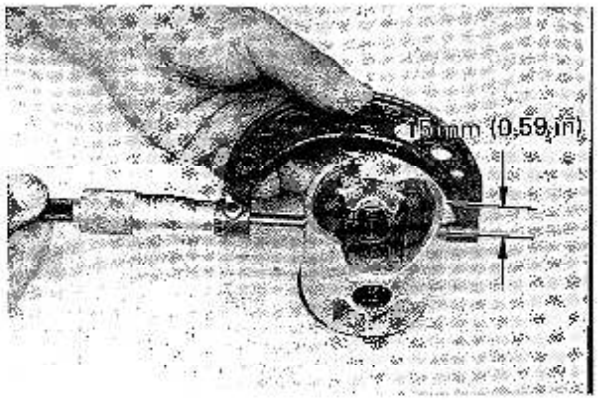
1. Using a rounded scraper, remove carbon deposite from piston crown and ring groove.



2. 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.



3. Measure the out side diameter of the piston and determine the piston clearance as follows.



Piston clearance: A
A = Minimum Cylinder Diameter
– Maximum Piston Diameter
Example:
56.030 mm – 55.985 mm = 0.045 mm

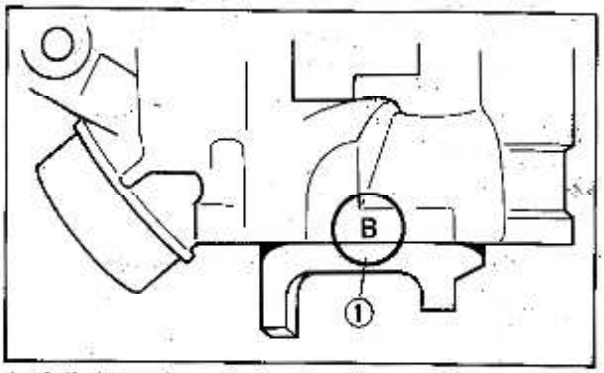
Nominal piston clearance: 0.045 ~ 0.055 mm (0.0018 ~ 0.0022 in)

If beyond tolerance replace piston and/or cylinder as required.

Combination of piston and cylinder

1. Cylinder
The cylinders contained in the crate and available for sale have four marks in the decimal place indicated in the skirt.

Cylinder mark	Cylinder size
A	56.000 ~ 56.005 mm (2.2048 ~ 2.2050 in)
B	56.005 ~ 56.010 mm (2.2050 ~ 2.2052 in)
X C	56.010 ~ 56.016 mm (2.2052 ~ 2.2054 in)
D	56.016 ~ 56.020 mm (2.2054 ~ 2.2056 in)

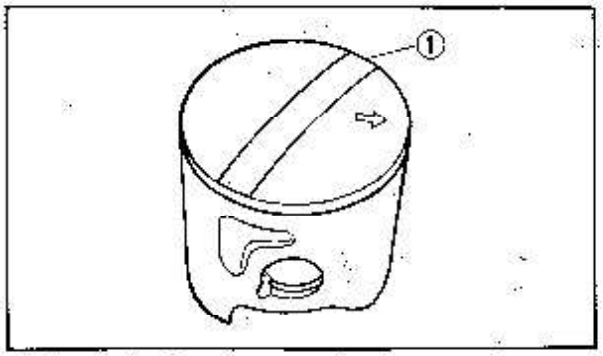


1. Cylinder mark

2. Piston

The pistons contained in the crate and available for sale have the following indication ① on the piston dome.

Indication	Piston size
Red	55.950 ~ 55.955 mm (2.2028 ~ 2.2030 in)
Orange	55.955 ~ 55.961 mm (2.2030 ~ 2.2032 in)
Green	55.961 ~ 55.965 mm (2.2032 ~ 2.2034 in)
Purple	55.965 ~ 55.970 mm (2.2034 ~ 2.2036 in)



1. Piston indication

3. Combination

Combine the piston and cylinder by the following chart.

Cylinder mark	Piston indication
A	Red
B	Orange
C	Green
D	Purple

Piston ring

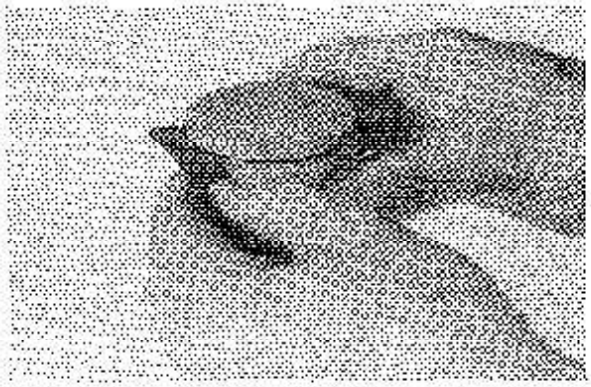
1. Insert ring into cylinder. Push down approximately 10 mm (0.39 in) using piston crown to maintain right-angle to bore. Measure installed end gap. If beyond tolerance, replace.

Ring end gap:
0.15 ~ 0.35 mm (0.006 ~ 0.07 in)
< Limit > : 0.6 mm (0.024 in)



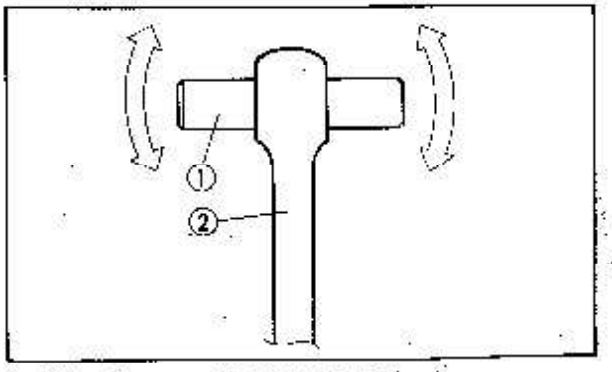
2. Holding cylinder towards light, check for full seating of ring around bore. If not fully seated, check cylinder. If cylinder is not out-of-round, replace piston ring.
3. Fit the piston ring in the groove, and measure ring side clearance. If more than 0.08 mm (0.003 in), replace both piston and piston ring as an assembly.

Ring side clearance:
0.03 ~ 0.07 mm (0.0012 ~ 0.0026 in)
< Limit > : 0.1 mm (0.039 in)



Piston pin and bearing

1. Apply a light film of oil to pin and bearing surfaces. Install in connecting rod small end. Check for play. There should be no noticeable vertical play. If play exists, check connecting rod small end inner surfaces for pitching. Replace pin and bearing or all as required.

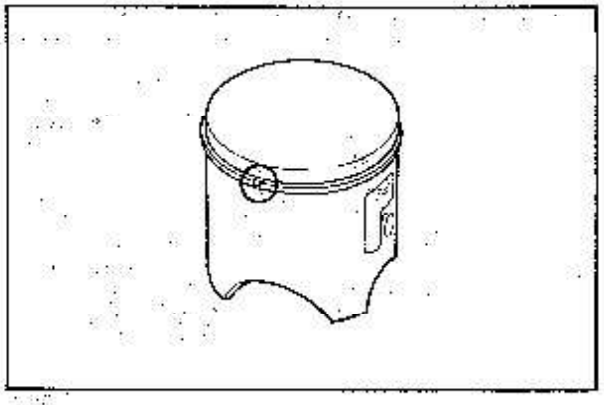


1. Piston pin 2. Connecting rod

NOTE:
Replace small end bearings for every 4 races.

Notes on reassembly

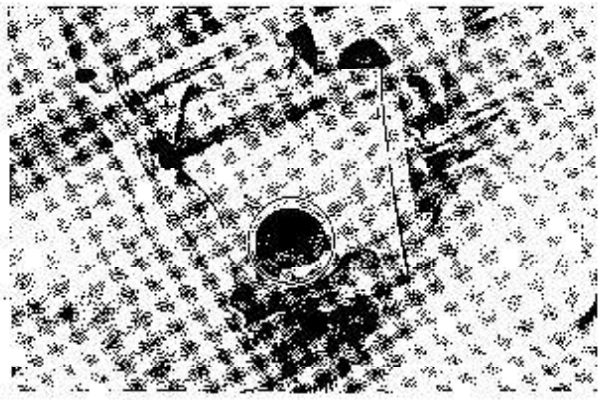
1. Apply a liberal coating of two-stroke oil to the piston pin and bearing. Apply several drops of oil to the connecting rod big end. Apply several drops of oil into each crankshaft bearing oil delivery hole.
2. During installation, make sure ring end are properly fitted around ring locating pin in piston groove. Apply liberal coating of two-stroke oil to ring, piston and small end bearing.



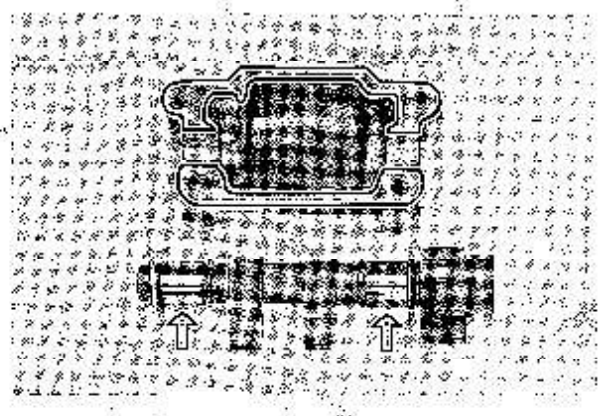
NOTE:

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

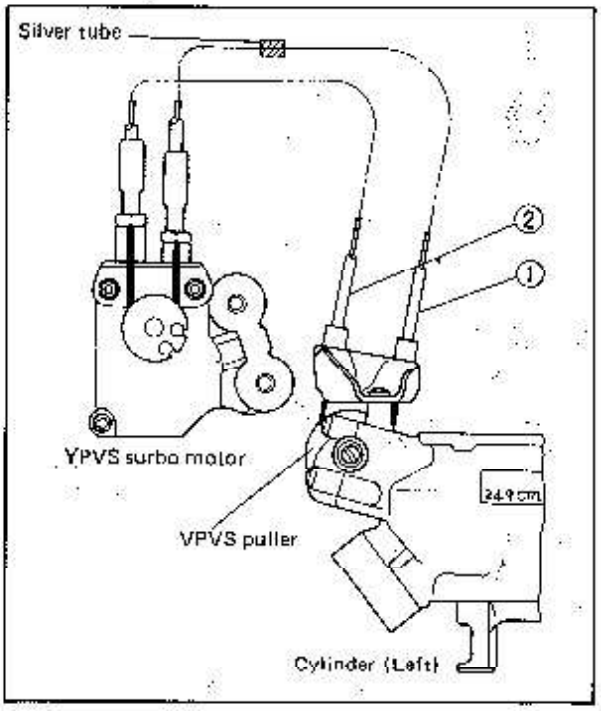
3. As shown, position the piston pin clip so that its ends face upward or downward. In this position, the clip will not slip off easily.



4. Apply Yamaha bond No. 4 to the valve cover and apply grease to the shaft journals.



Y.P.V.S. adjustment

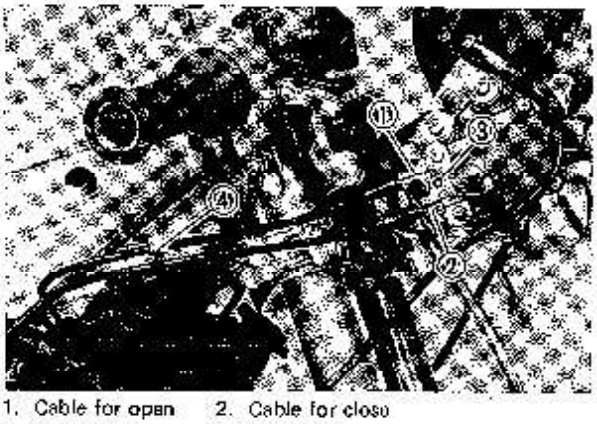


1 YPVS control cable (Open)
2 YPVS control cable (Close)

NOTE:

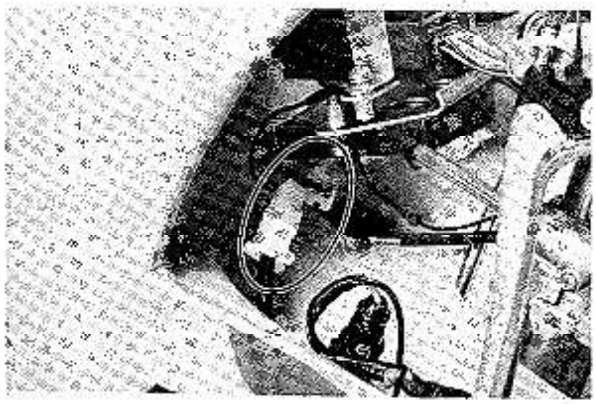
The cable with silver tube is "OPEN" side.

1. Fit the drive cables correctly.



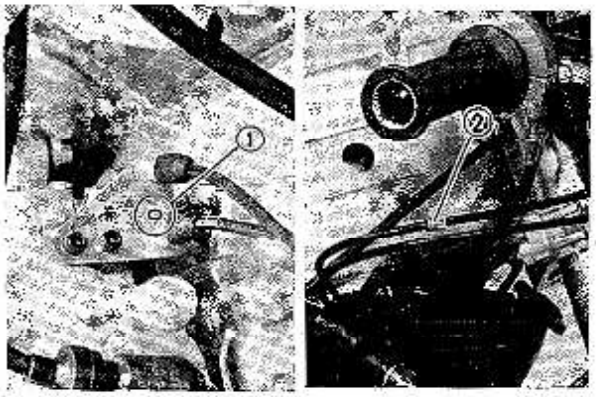
1. Cable for open
2. Cable for close
3. "O" marks
4. Silver tape

2. Connect the battery with the control unit to bring the valve to the fully open position.

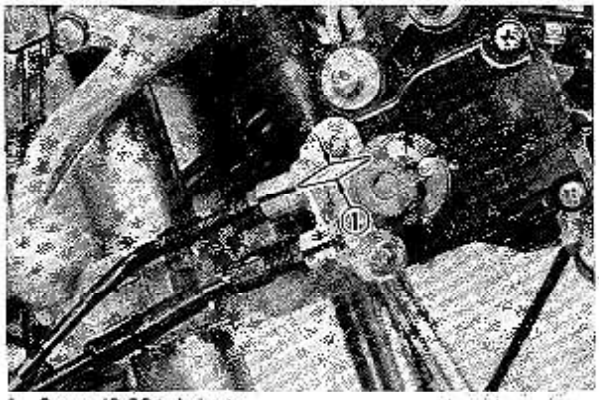


NOTE:
Connected with the battery, the valve becomes close for a approx. 2 minutes and then hold at the fully open position.

3. Fully turn in the adjuster for the cable at the open side (cable 1) by fingers. Then back it up 1/6 turn and tighten the locknut.

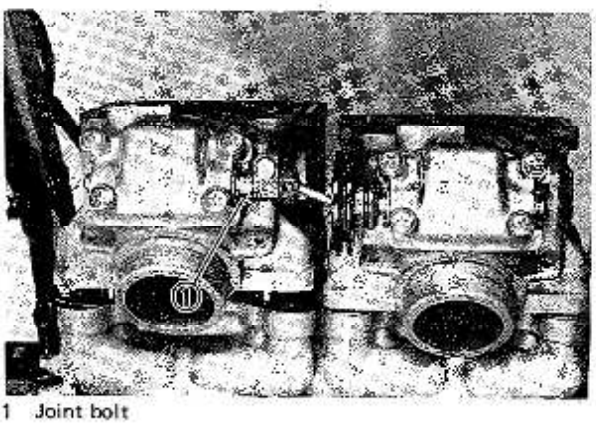


1. "O" marks 2. Silver tape



1. 2 mm (0.08 in) slack

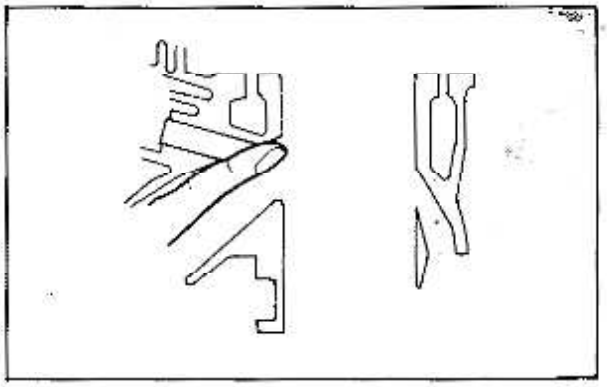
4. Disconnect the battery once and reconnect it. Then again disconnect it when the valve is at the fully open position.
5. Follow the above step 3 for the adjustment of the cable play at the closed side (cable 2).
6. If the valve of the right cylinder is not fully opened or closed when the battery is connected, loosen the joint bolt and adjust the valve position.



1 Joint bolt

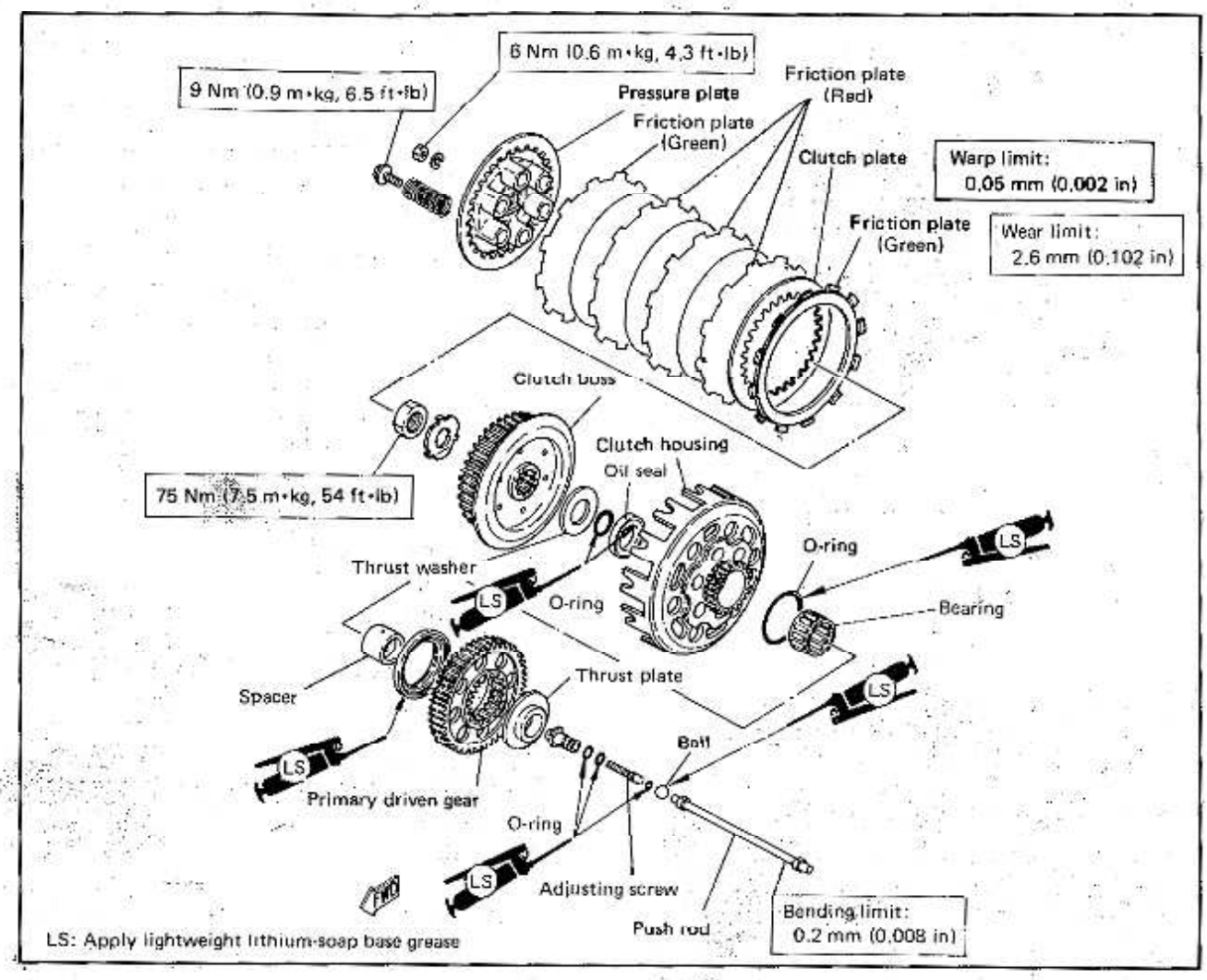
7. Again connect the battery to check the valve for operation.

NOTE:
Insert the finger into the exhaust port and feel to see whether the valve and the top of port are flat.



Joint bolt:
4 Nm (0.4 m·kg, 2.9 ft·lb)
Valve cover:
4 Nm (0.4 m·kg, 2.9 ft·lb)

CLUTCH



Removal

⚠ CAUTION:

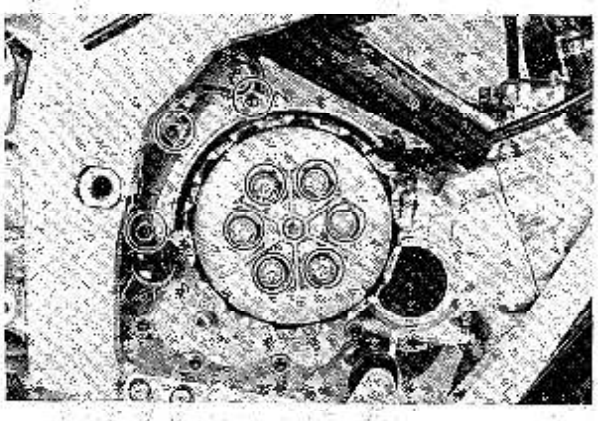
Take care so that no oil is attached to the friction plates.

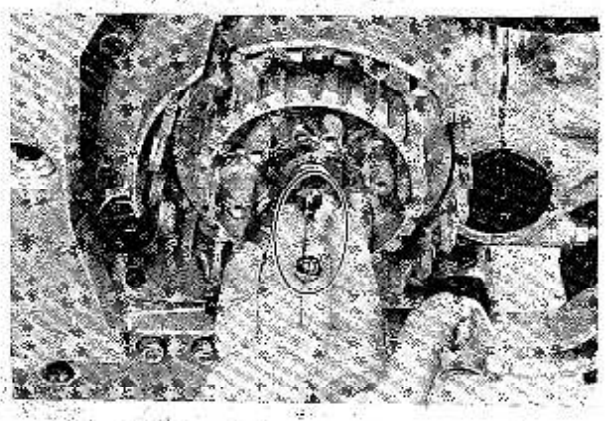
1. Remove the clutch cover and the screws (6) holding the pressure plate. Remove the clutch springs, the clutch plates and friction plates.

NOTE:

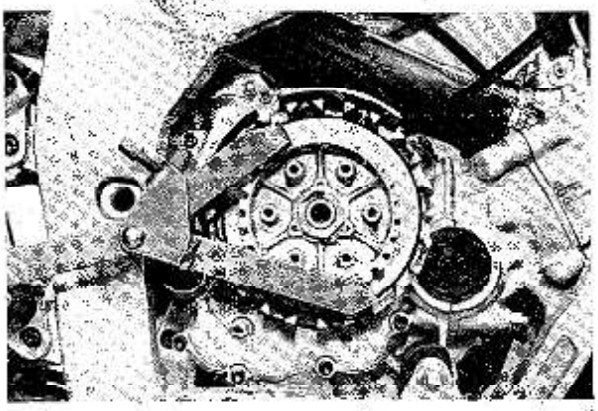
When removing screws, loosen each screw in several stages to avoid warpage. Note the condition of each piece as it is removed and its location with the assembly.

2. Remove ball and push rod.

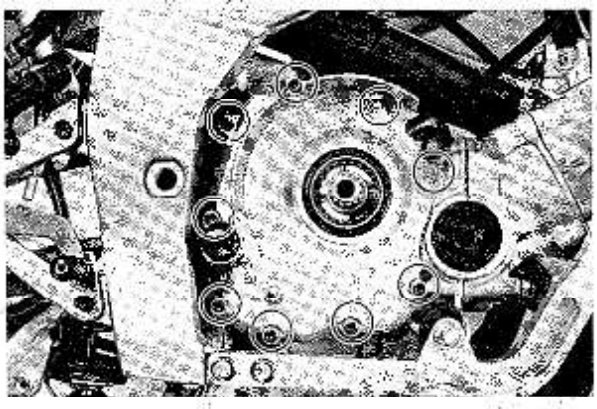




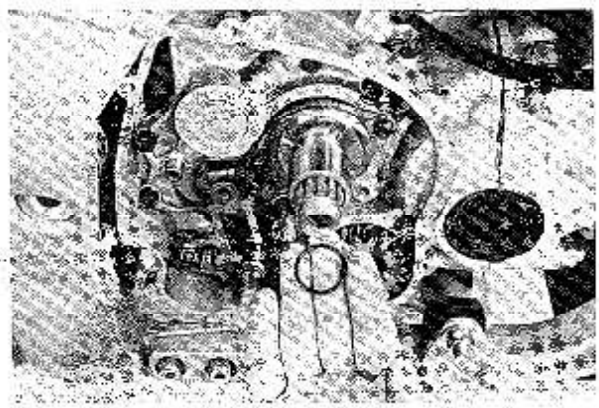
3. Using the clutch holding tool, remove the clutch securing nut and lock washer. Remove the clutch boss, thrust washer, bearing and clutch housing.



4. Remove the drain bolt and drain the transmission oil.
5. Remove the case cover and primary driven gear.



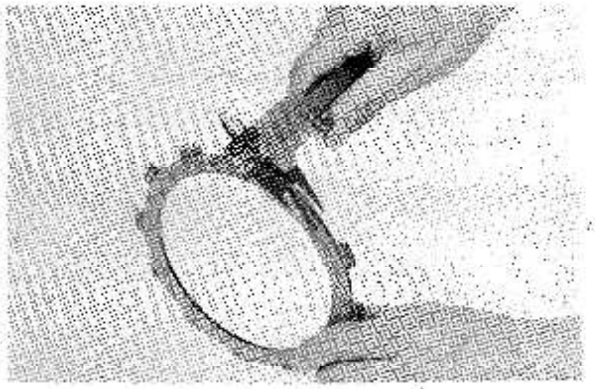
NOTE:
When remove the spacer, first remove the O-ring and then check it.



Inspection

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

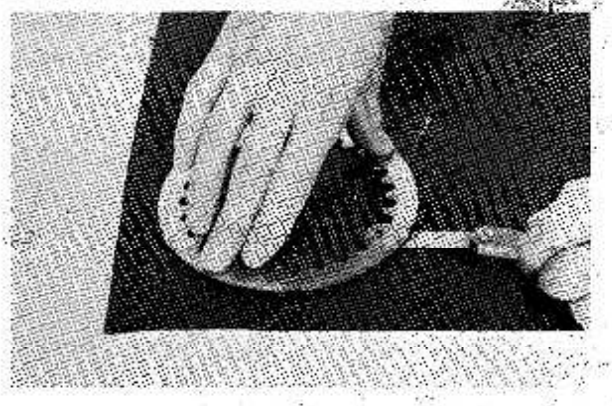
Friction plate thickness:
2.9 ~ 3.1 mm (0.114 ~ 0.122 in)
Wear limit:
2.7 mm (0.106 in)



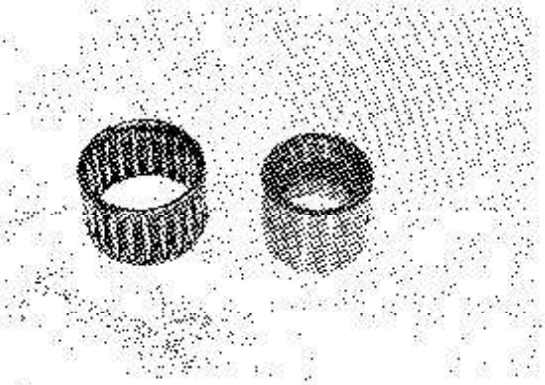
NOTE:
For optimum performance, if any plate requires replacement, it is advisable to replace the entire set.

2. Check each clutch plate for signs of heat damage and warpage. Place on surface plate (plate glass is acceptable) and use feeler gauge.

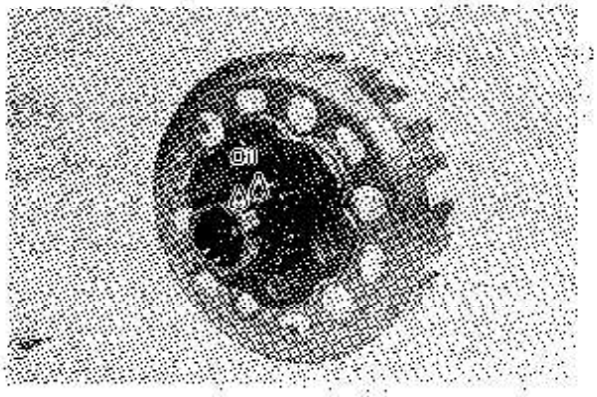
Clutch plate warp limit:
0.05 mm (0.002 in)



3. Check the spacer and bearings for signs of heat discoloration. If excessive (heavily blued), replace both.

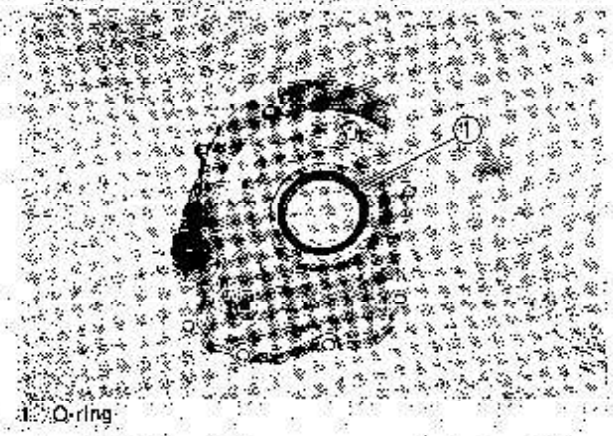


4. Apply a light film of oil to spacer and bearing surfaces. Install in clutch housing. Check for play. There should be no noticeable vertical play. If play exists, check clutch housing inside diameter and wear. Replace spacer and bearings or all as required.

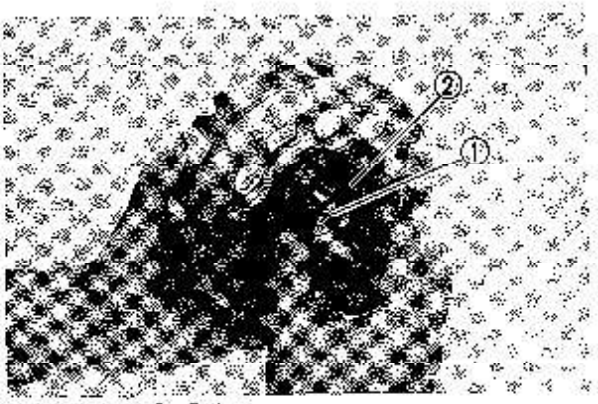


NOTE:
Check oil leakage from push rod. (Inside of the pressure plate). If necessary, replace O-ring.

5. Check crankcase cover oil seal, clutch housing oil seal and O-ring for damage, wear and oil leakage. If found, replace it.



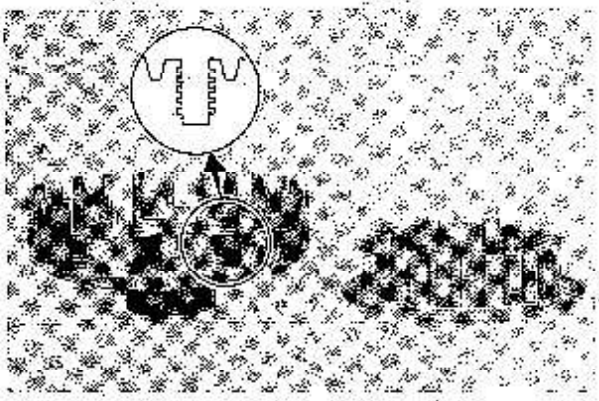
1. O-ring



1. Oil seal 2. O-ring

6. Apply thin coat of oil on transmission main shaft and spacer inside. Slip spacer over main shaft. It should be a smooth, thumb-press fit. The spacer should rotate smoothly. Replace as required.
7. Check splines on clutch boss for signs of galling. If moderate, deburr. If severe, replace.

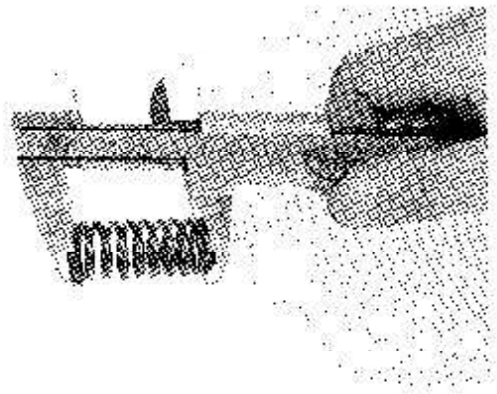
NOTE:
Galling on either the friction plate dogs of the buffer boss or clutch plate splines of the clutch boss will cause erratic clutch operation.



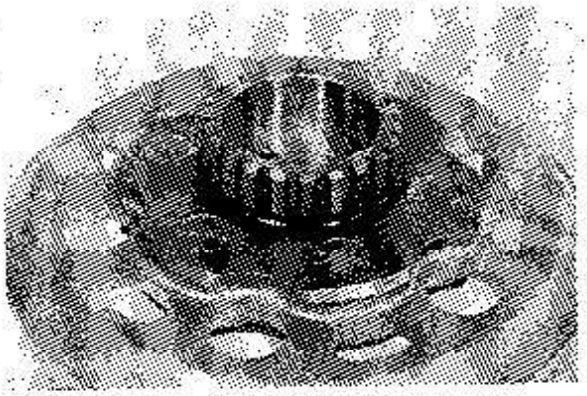
8. Check the thrust plate for signs of wear. Replace as necessary.
9. Measure each clutch spring. If beyond tolerance, replace as a set.

Clutch spring free length: 36.4 mm (1.433 in) Limit: 35.4 mm (1.39 in)

NOTE:
For optimum clutch operation it is advisable to replace the clutch springs as a set if one or more are faulty.

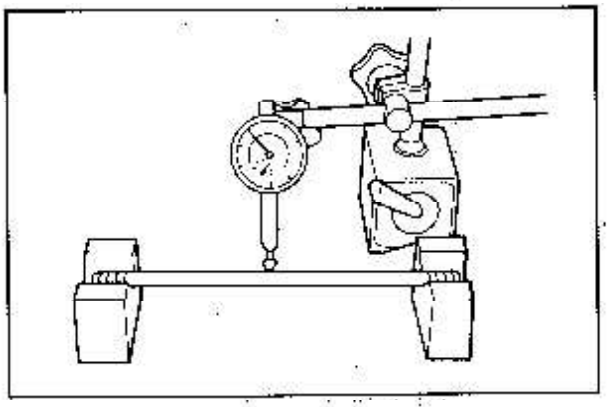


10. Check dogs on driven gear (clutch housing). Look for cracks and signs of galling on edges. If moderate, deburr. If severe, replace.



11. Measure the push rod bending. If rod is bent, replace.

Push rod bending limit:
0.2 mm (0.008 in)



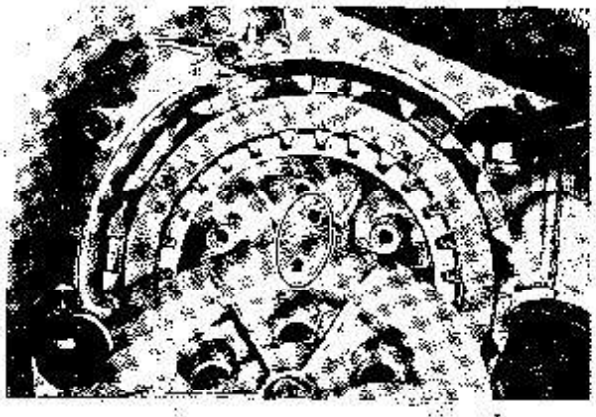
Notes on installation

1. Apply a light coat of 10/30 motor oil to the spacers and bearing surfaces.

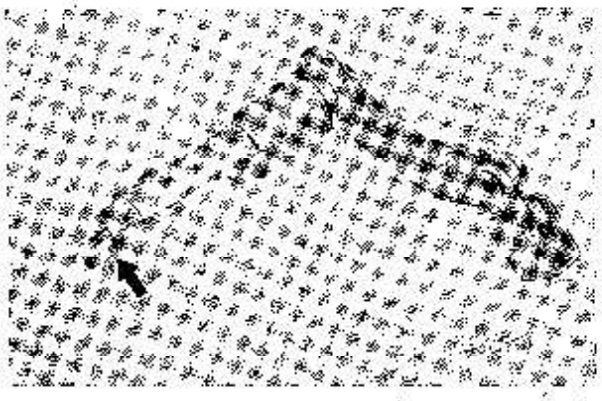
Clutch locknut:
75 Nm (7.5 m·kg, 54 ft·lb)

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

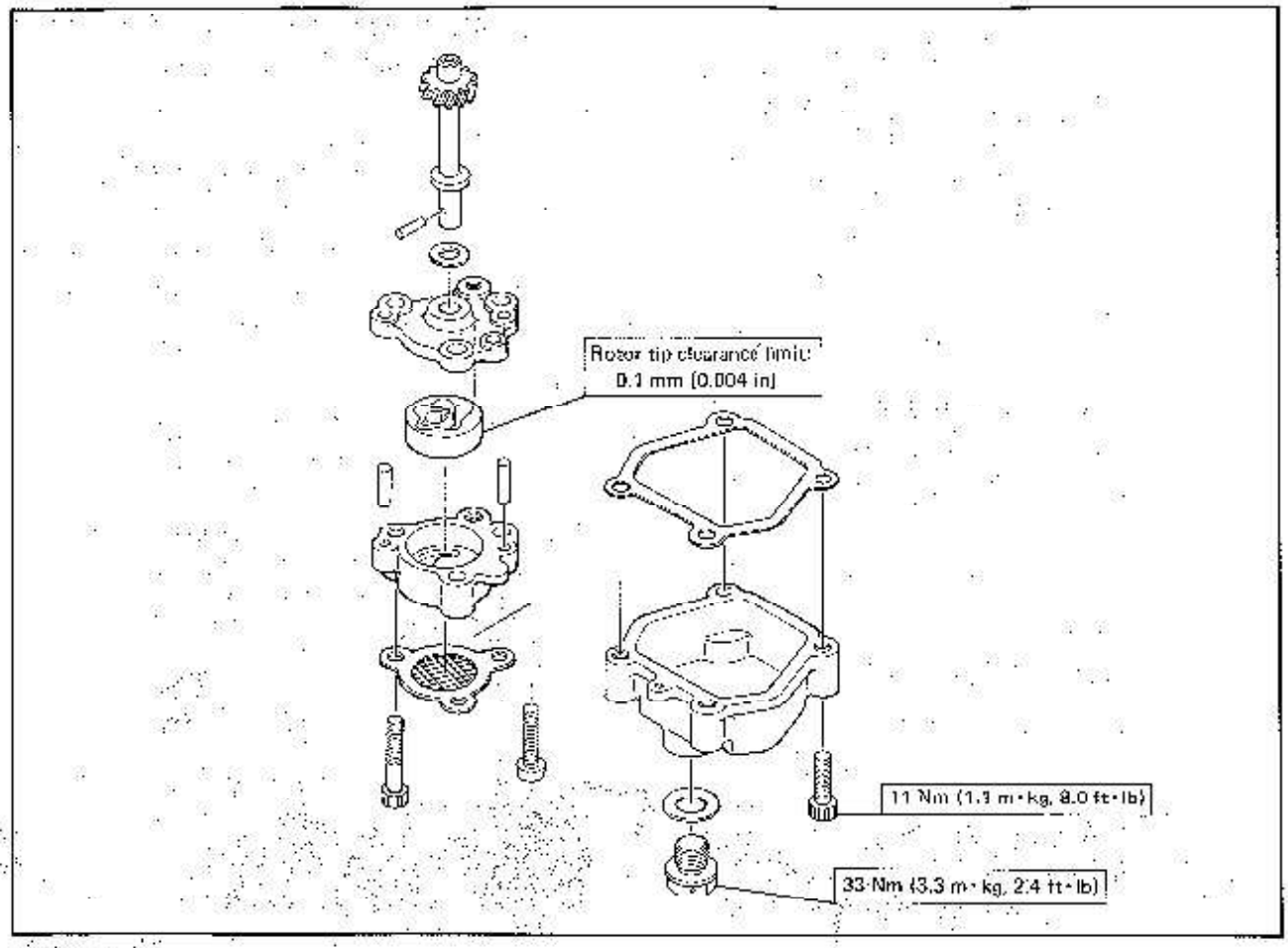
NOTE:
Place the two green friction plate with one innermost and the other outermost.



3. If it is difficult to fit the case cover (1) because the drive gear butts against the driven gear, turn the former using the connecting rod so that the cover can be installed.
4. Apply molybdenum disulfide grease to the tip of the push lever.



OIL PUMP

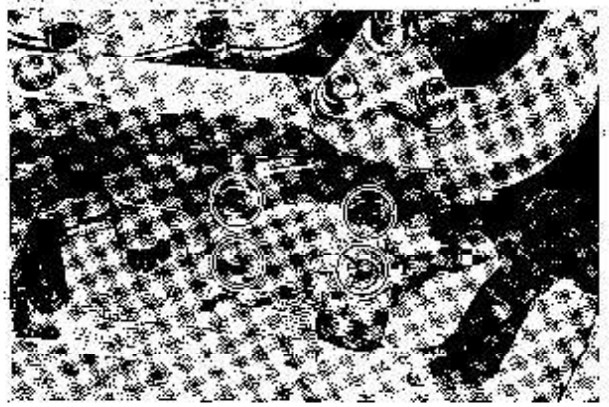


Clean the strainer as specified period. If a lot of metallic dust is noticed, disassemble the engine and check

Cleaning period:
1. After break-in
2. Every 1,000 km (600 mi)

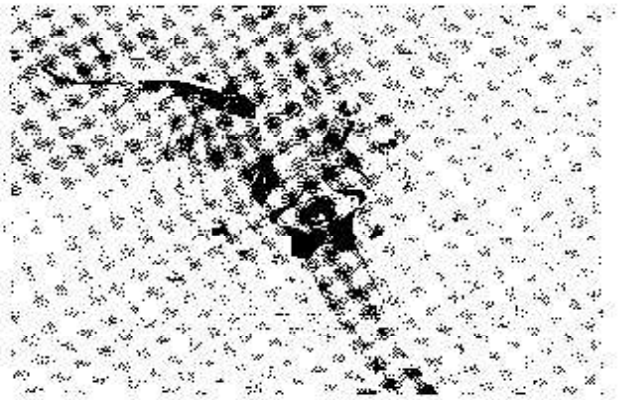
Removal

1. Remove the strainer cover and oil pump assembly.



Inspection

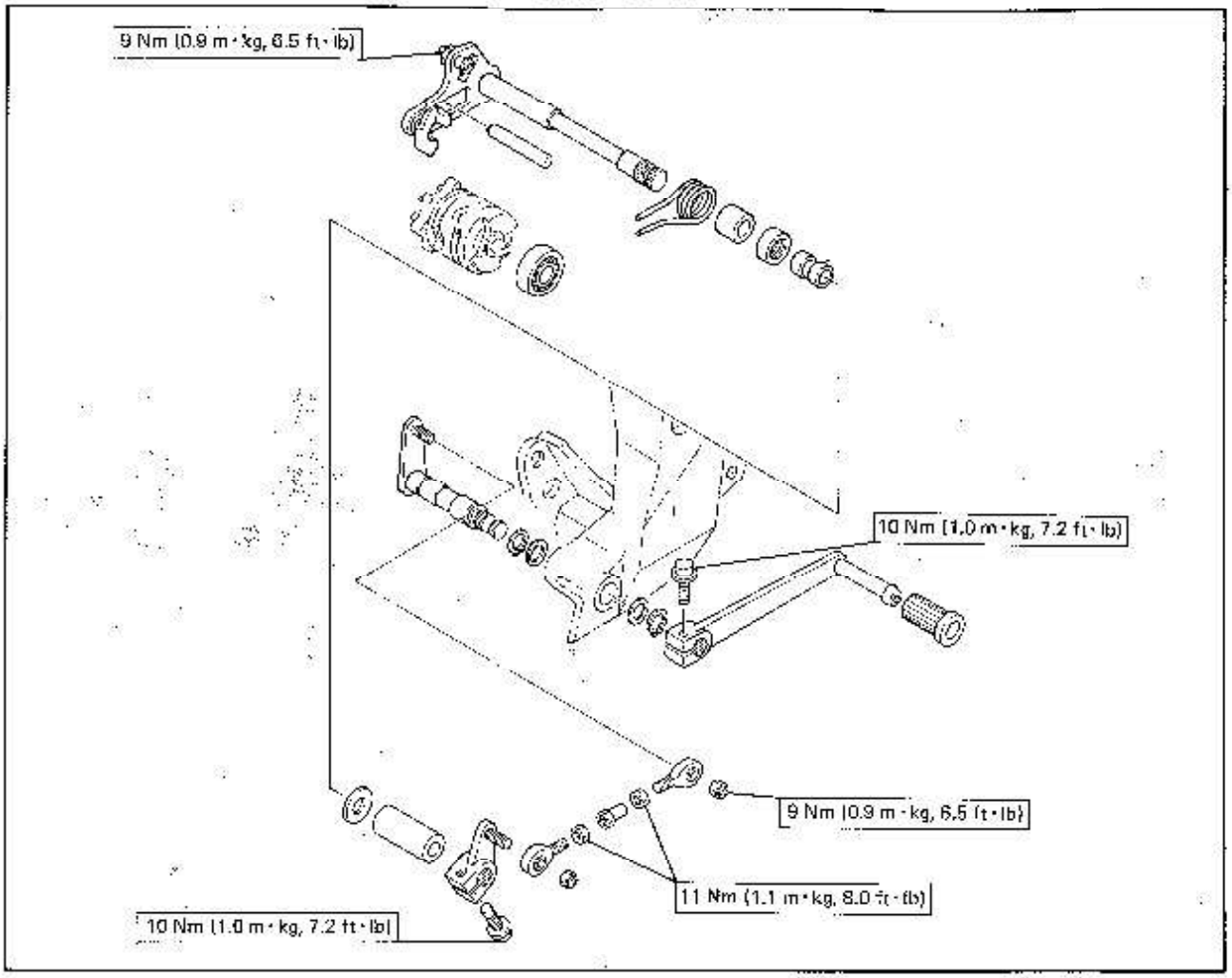
1. Measure clearance between inner rotor-outer rotor and housing-outer rotor. Clearance exceed specification, replace.



Housing-outer rotor clearance:
0.1 mm (0.0039 in)
Inner-outer rotor clearance:
0.1 mm (0.0039 in)

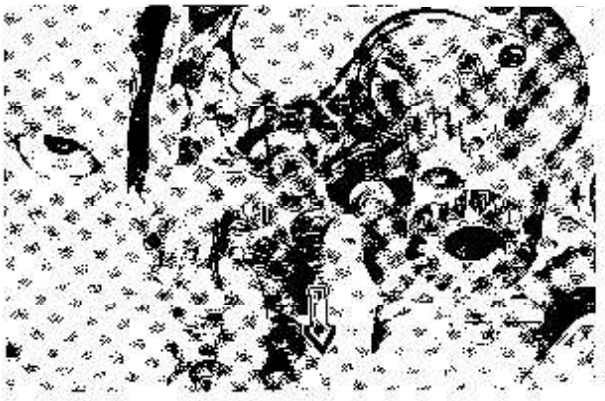
2. Check the condition of pump driven gear teeth. If any chipped or abnormally worn gear teeth are found, check for the cause and take the necessary step then replace old parts.

SHIFTER

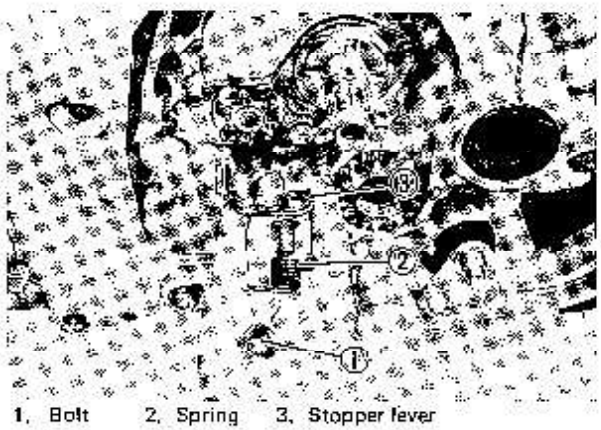


Removal

1. Remove the clutch assembly.
2. Pull out the shift shaft assembly.



3. Shift into "Neutral" gear and unhook the stopper spring.
4. Remove the bolt and stopper lever.
5. Remove the pan head screw and remove the shift cam stopper plates.



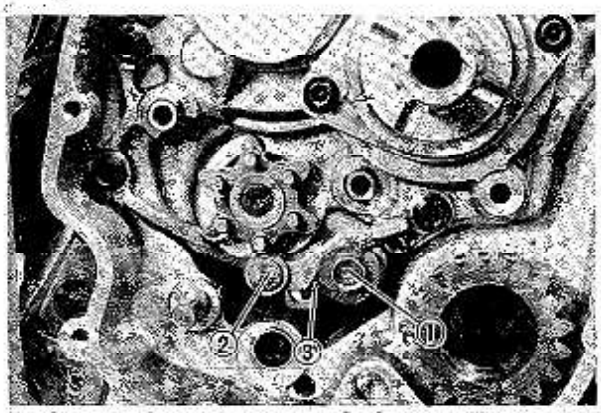
1. Bolt 2. Spring 3. Stopper lever

Inspection

1. Inspect shift return spring. A broken or worn spring will impair the return action of the shifting mechanism.
2. Inspect 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.

Notes on installation

1. Apply a screw locking agent, such as "Loctite", to threads of pan head screw.
2. Engage the shift return spring with its home position.



1. Bolt 2. Stopper lever 3. Spring

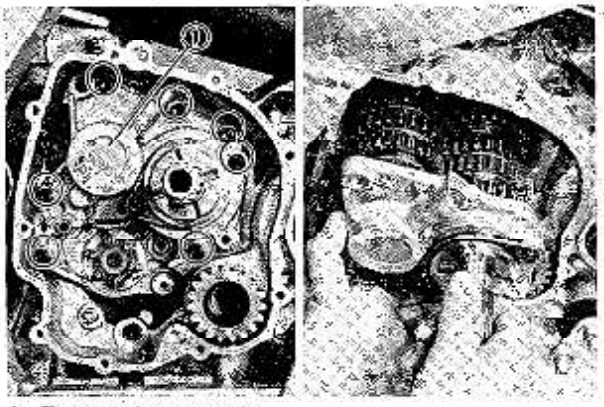
TRANSMISSION AHD SHIFTER

Removal

NOTE:

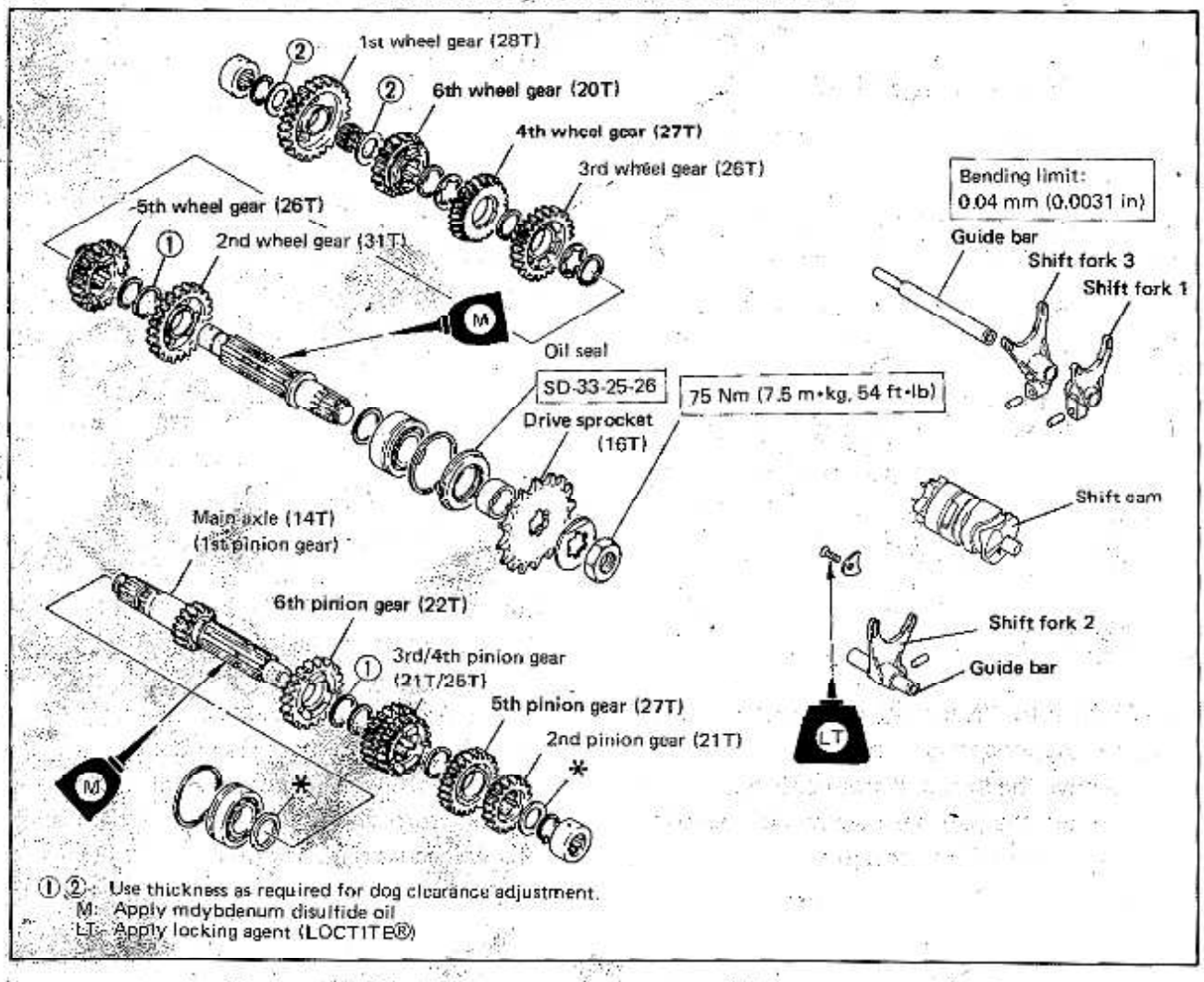
With the engine mounted, the transmission and shifter can be maintained.

1. Remove the clutch, primary driven gear, shift fork and stopped lever. Refer to "CLUTCH" section.
2. Remove the transmission assembly.



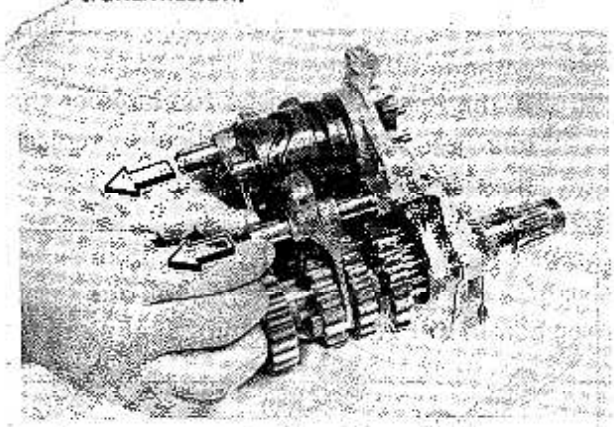
1. Transmission assembly

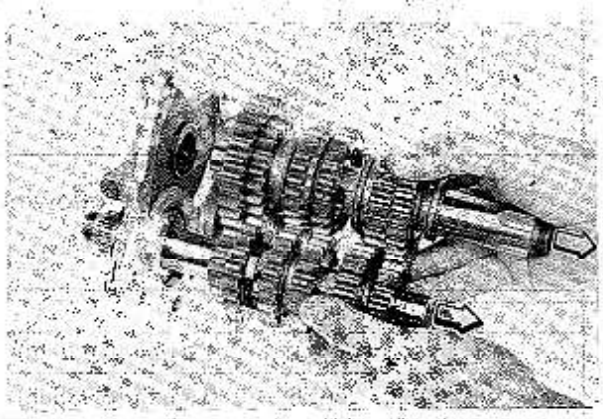
TRANSMISSION AND SHIFTER



①②: Use thickness as required for dog clearance adjustment.
M: Apply mdybdenum disulfide oil
LT: Apply locking agent (LOCTITE®)

3. Remove the shift forks, guide bars and transmission.

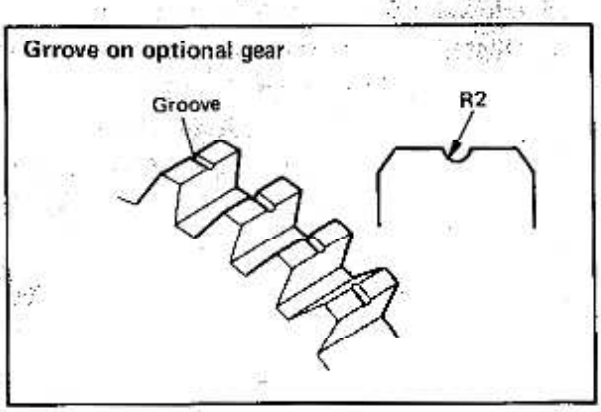




Optional gears

The following gear sets are contained in the packing to allow the rider to change the gear ratios according to the circuit condition or rider's preference.

	Optional gear	Standard gear
1st	34/18 (1.889)	28/14 (2.000)
2nd	27/19 (1.421)	31/21 (1.476)
3rd	25/21 (1.190)	26/21 (1.238)
4th	–	27/25 (1.080)
5th	–	26/27 (0.963)
6th	–	20/22 (0.909)

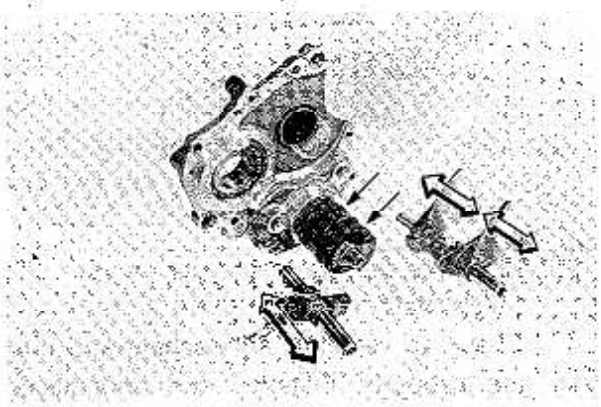


NOTE:

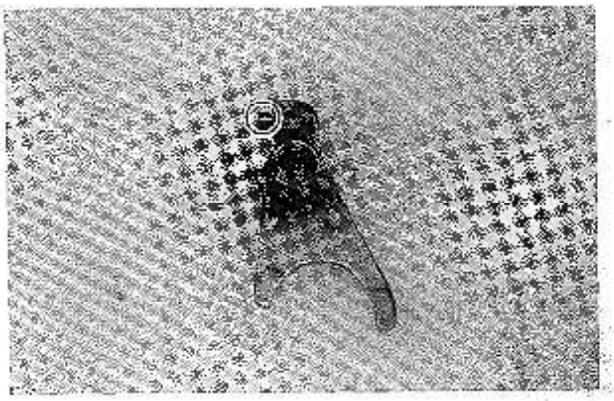
Remove assembly carefully. Note the position of each part. Pay particular attention to the location and direction of shift forks.

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. Roll the guide bars across a surface plate. If any bar is bent, replace.
3. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or any damage, replace the shift cam.



4. 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.

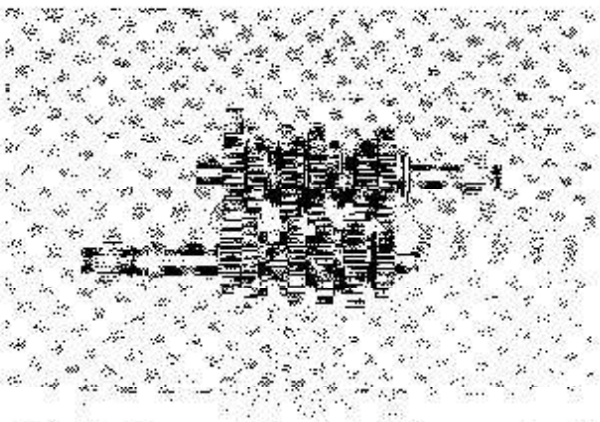


5. Check the segment, circlip, stopper for wear.

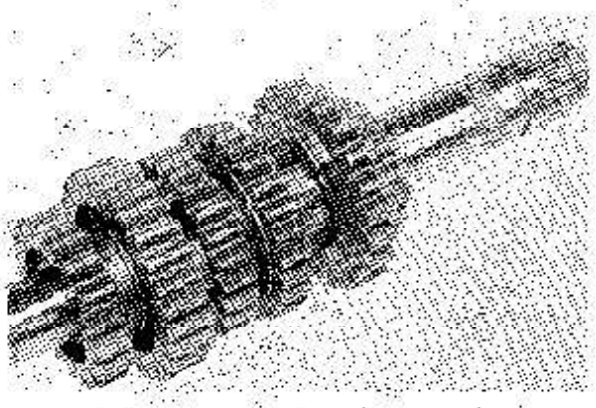
6. Check the transmission shafts using a centering device and dial gauge. If any shaft is bent, replace.

Bending limit:
0.01 mm (0.0004 in)

7. 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.

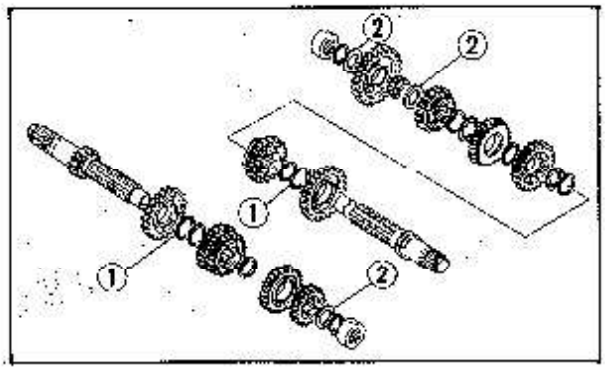


8. Check to see that each gear moves freely on its shaft.
9. Check to see that all washers and clips are properly installed and undamaged. Replace bent or loose clips and bent washers.
10. Check to see that each gear properly engages its counterpart on the shaft. Check the mating dogs for rounded edges, cracks, or missing portions. Replace as required.



Transmission thrust clearance

1. After assembling the transmission, check whether the idle gear turns smoothly without a thrust.
   If the thrust clearance is too large or the idle gear moves with difficulty, replace the shim ① and/or ② .



Choose the shim(s) by the following chart.

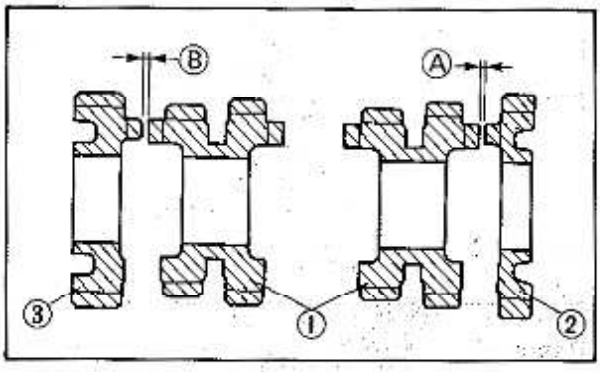
	Part number	
Shim ①	90201-253K0	1.0 mm (0.039 in)
	90207-256E6	0.9 mm (0.035 in)
	90201-256E4	1.5 mm (0.051 in)
	90201-253K1	1.2 mm (0.047 in)
Shim ②	90201-20276	1.0 mm (0.039 in)
	90201-206E5	0.9 mm (0.035 in)

Dog clearance

- It is necessary to adjust the dog clearance when the transmission gear, axle, washer, circlip, bearing or crankcase is replaced.
- If there is any shifting trouble, it is necessary to check the shift fork, shift cam, shift lever and gears. But if there are in good condition, the dog clearance should be inspected.

1. Install the main axle, drive axle, shift cam and shift fork.
2. Position the transmission in neutral.
3. Pull the main axle toward the clutch side.

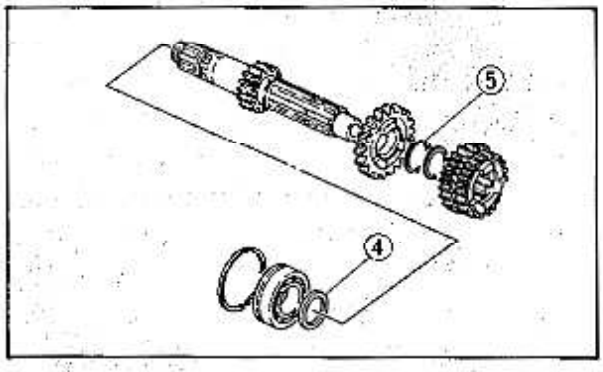
4. Bring the 3rd/4th pinion gear ① into light contact with the 5th pinion gear ③ to the extent that they are not engaged, and measure the clearance Ⓑ between 3rd/4th pinion gear and 5th pinion gear.
5. Bring the 3rd/4th pinion gear ① into light contact with the 6th pinion gear ② to the extent that they are not engaged and measure the clearance Ⓐ between 3rd/4th pinion gear and 5th pinion gear.



6. Clearance Ⓐ and Ⓑ should be more equally 0.5 mm (0.020 in) or more.

Clerance Ⓐ, Ⓑ	More than 0.5 mm (0.020 in)
	A = B

If not, adjust the clerance Ⓐ and Ⓑ by replacing the shim ④ and/or ⑤.

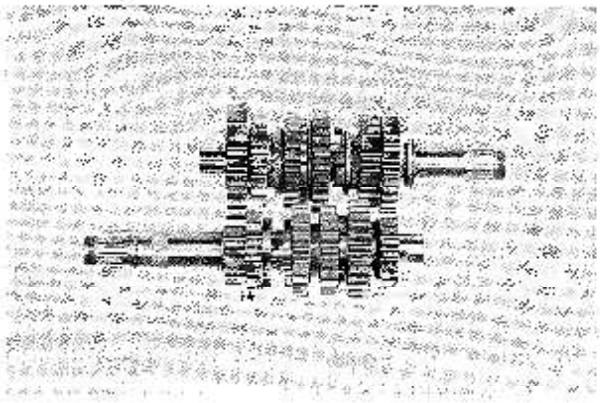


Installation

1. Assemble the main axle and drive axle.

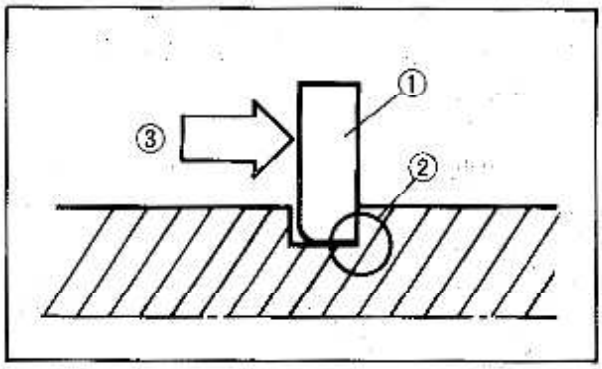
NOTE:

Apply the molybdenum disulfide oil to sliding surface.



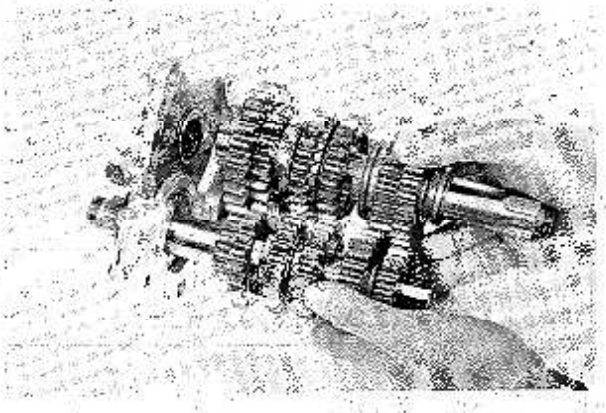
⚠ CAUTION:

- **When installing a circlip, make sure that the sharp-edged corner is positioned opposite to the thrust it receives.**
- **Always use a new circlip.**

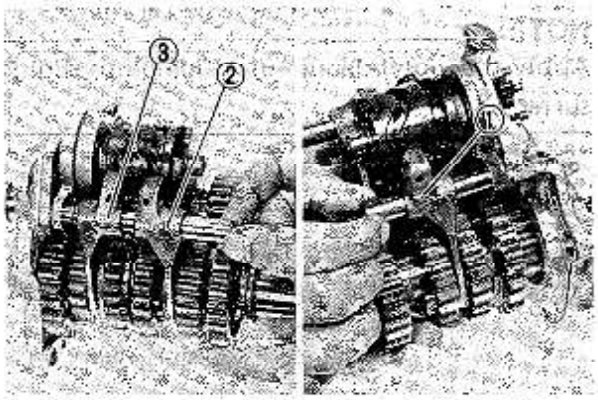


1. Circlip 2. Sharped edged corner 3. Gear

2. Install the main axle and the drive axle.

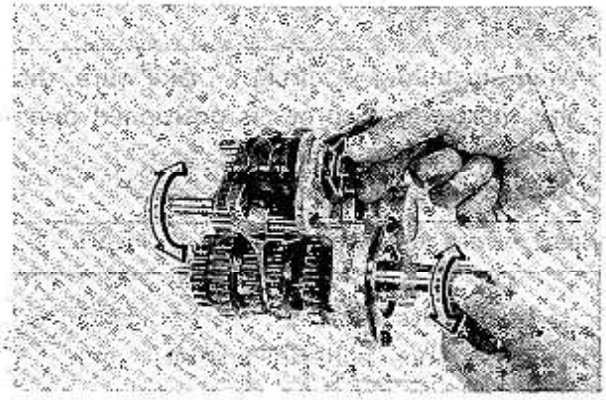


3. Install the shift fork 1, 2, 3, and guide bars.

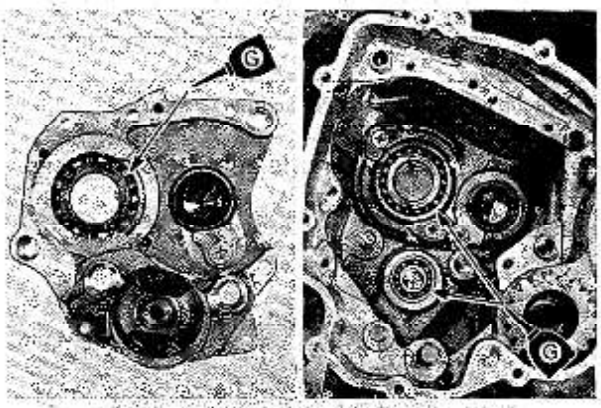


1. Shift fork 1 2. Shift fork 2 3. Shift fork 3

4. After installing, check the transmission operation.

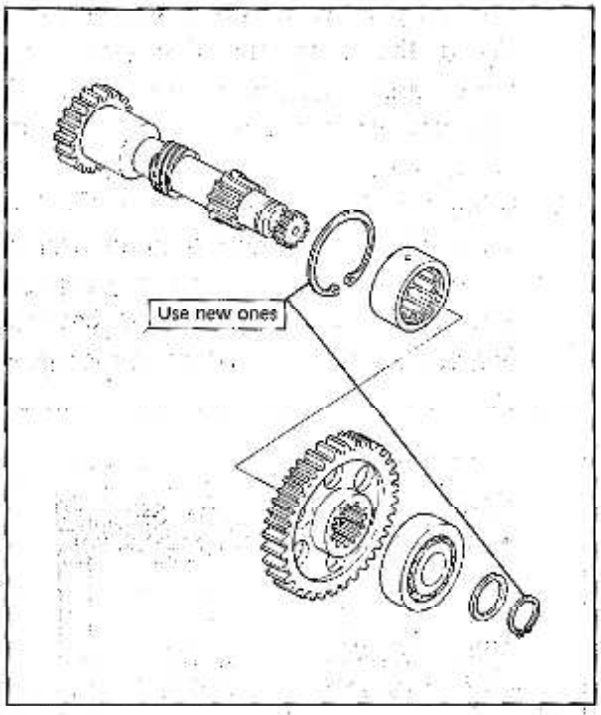


5. Apply the transmission oil onto the bearings and install the transmission assembly.



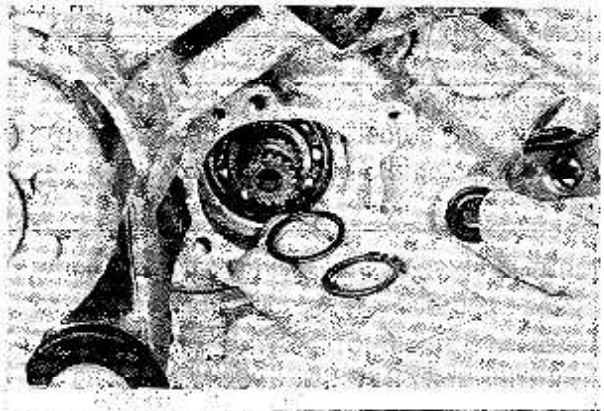
Transmission securing bolt:
13 Nm (1.3 m·kg, 9.4 ft·lb)

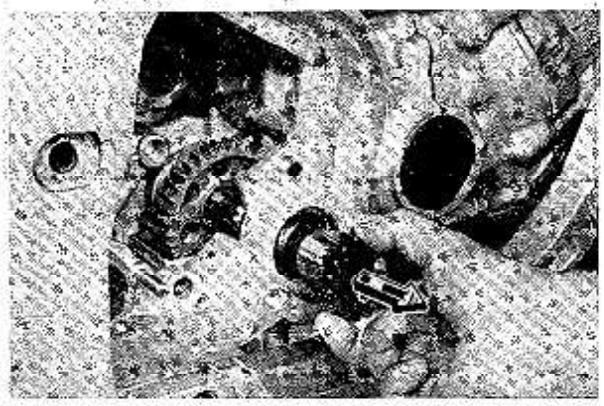
COUNTER SHAFT



Removal

1. Remove the transmission. Refer to "TRANSMISSION AND SHIFTER" section.
2. Remove the water pump and circlip.



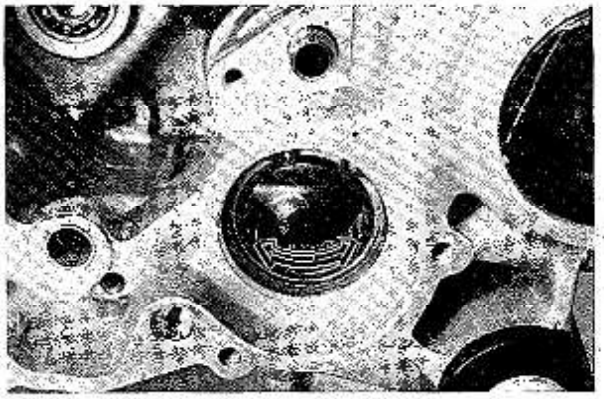


3. Remove the counter shaft and driven gear.

Inspection

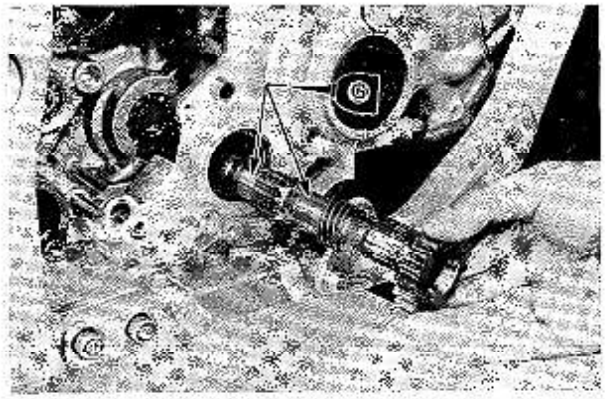
1. Check the dogs on counter shaft and driven gear.

2. Inspect the bearing.

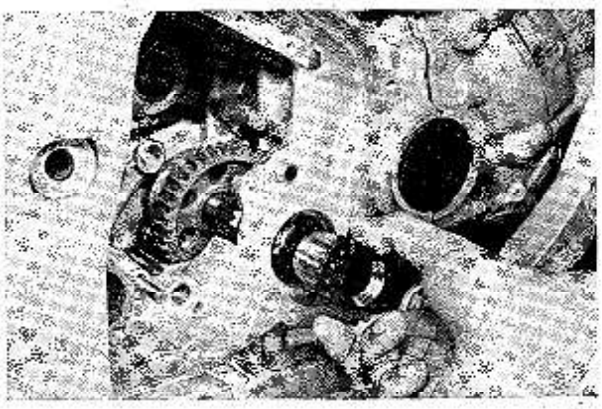


Installation

1. Apply the counter shaft with the transmission oil.

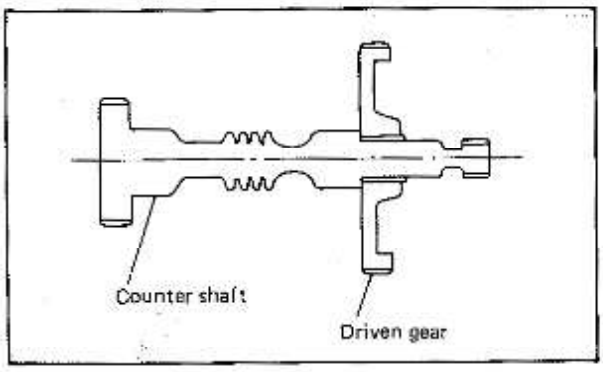


2. Install the counter shaft and driven gear.



NOTE:

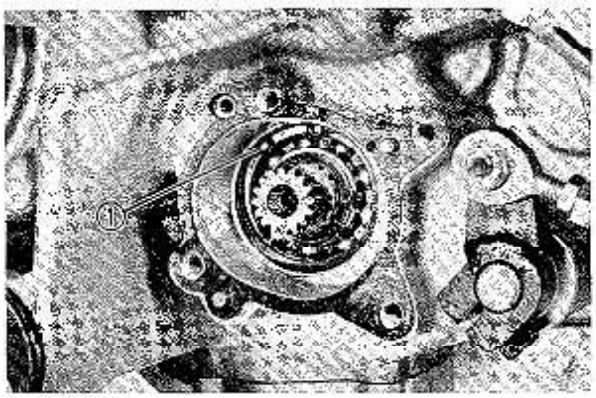
Install the driven gear as shown direction.



3. Install the washer and circlip.

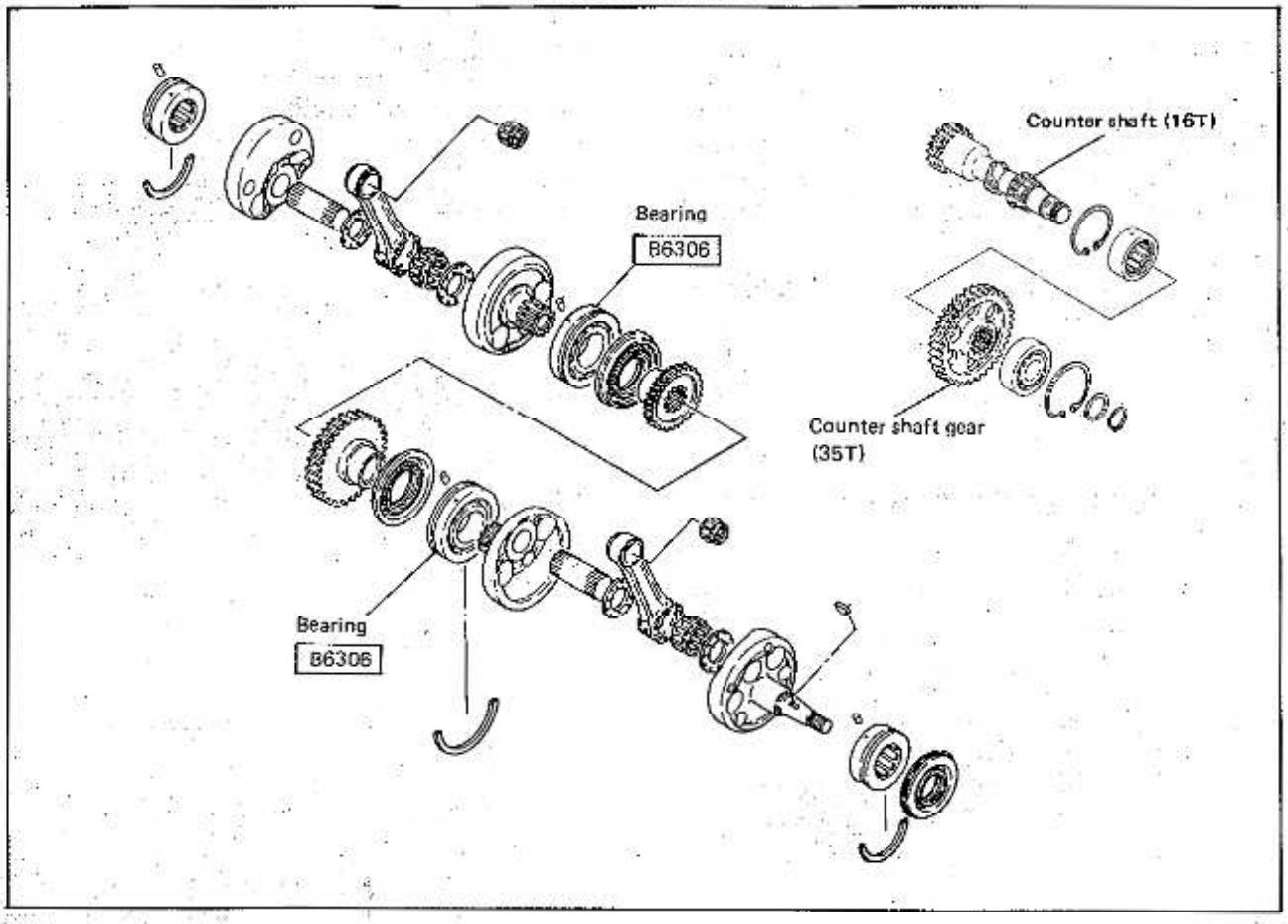
⚠ CAUTION:

Always use a new circlip.



1. Circlip

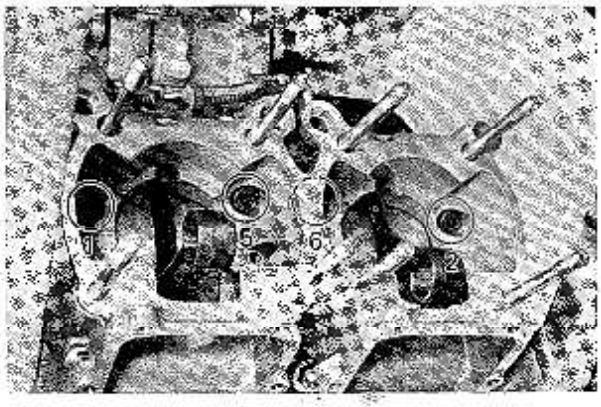
CRANKSHAFT

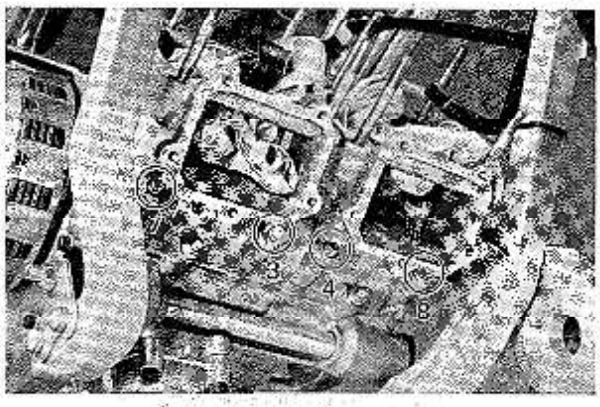


Removal

NOTE:
With the engine mounted, the transmission and shifter can be maintained.

1. Remove the cylinder and piston. Refer to "CYLINDER HEAD, CYLINDER, Y.P.V.S. AND PISTON" section.
2. Remove the nuts and bolts.

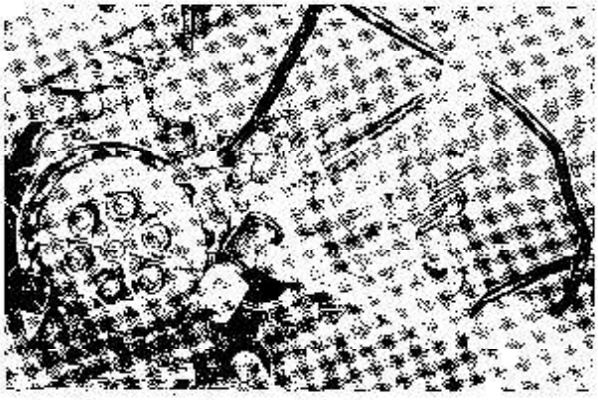




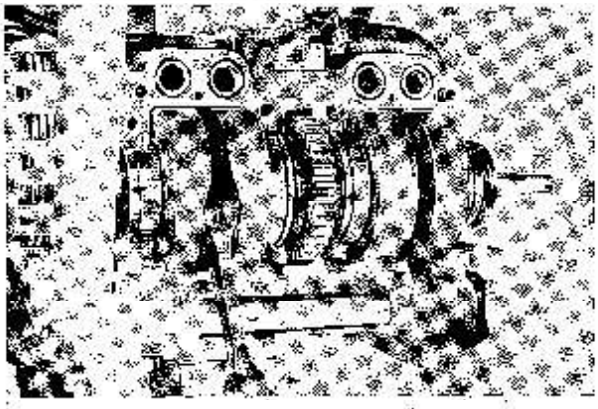
NOTE:
- Loosen the bolts and nuts in numerical order as shown. (Loosen them by rotating them 1/4 turn at a time.)

3. Remove the crankcase.

NOTE:
As pressure is applied, alternately tap on the section where density has increased.



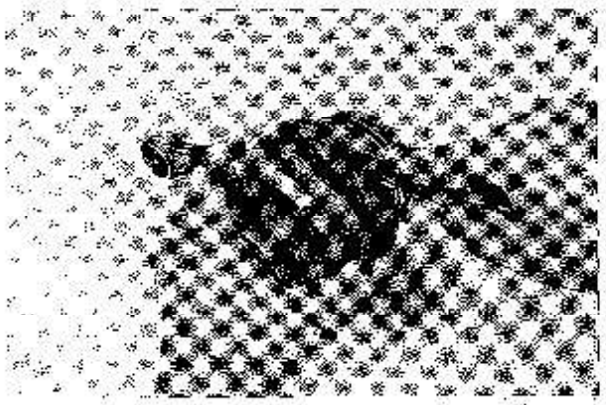
4. Remove the crankshaft.



Inspection

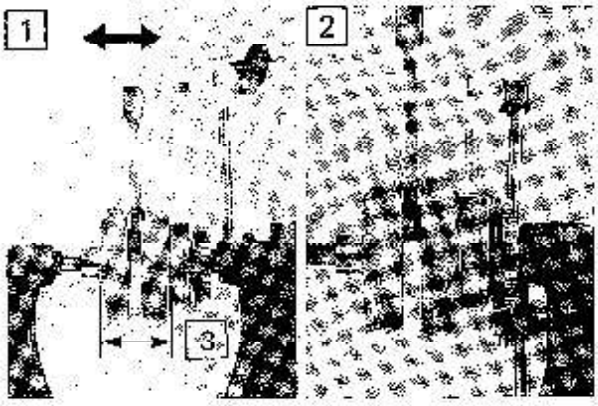
NOTE:
The crankshaft requires the highest degree of accuracy in engineering and servicing.
The crankshaft is susceptible to wear and therefore the crank bearing must be inspected with special care.

1. Slide the connecting rod to one side. Insert a thickness gauge between the side of the connecting rod big end and the crank wheel. Measure clearance.



Connecting rod/crank side clearance (C):
0.25 ~ 0.75 mm (0.010 ~ 0.030 in)

2. Check crankshaft deflection, small end free play and flywheel width as below.

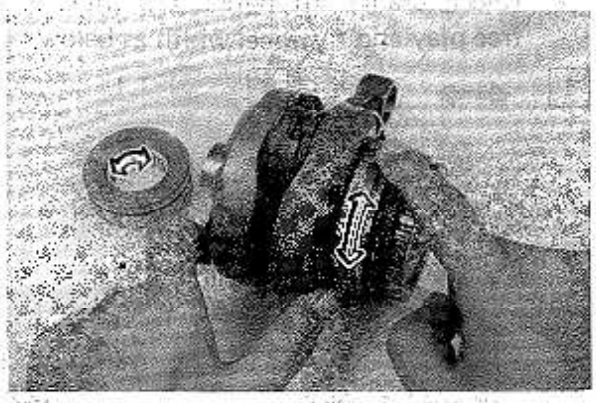


1. Small end free play 2. Crankshaft deflection
3. Flywheel width

Small end free play:
< Limit > : 1.0 mm (0.039 in)
Crankshaft deflection:
< Limit > : 0.03 mm (0.001 in)
Flywheel width:
55.90 ~ 55.95 mm (2.201 ~ 2.203 in)

If any of the above measurements exceed tolerance, crankshaft repair is required. Take the machine to your Authorized Yamaha Dealer.

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



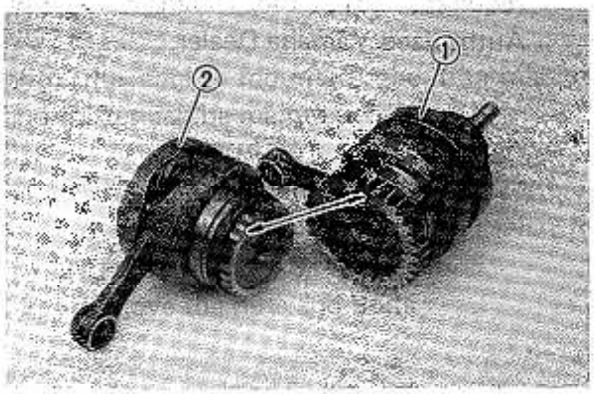
NOTE:

Bearing(s) are not 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.

4. Check oil seal lips for damage or wear. Replace as required.

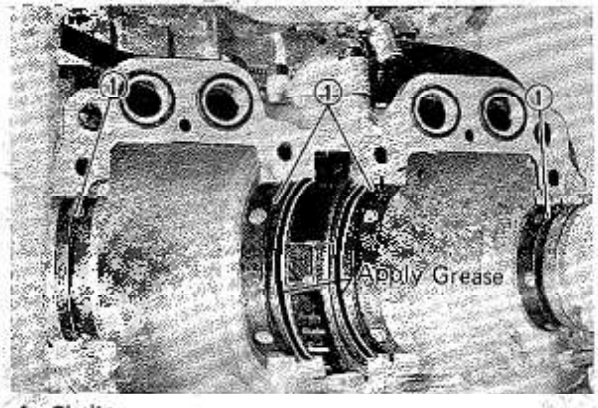
Installation

1. As shown below, align the punch marks and assemble the crankshaft, right and left halves.



1. Crankshaft (L) 2. Crankshaft (R) 3. Punch mark

2. Install the circlip.

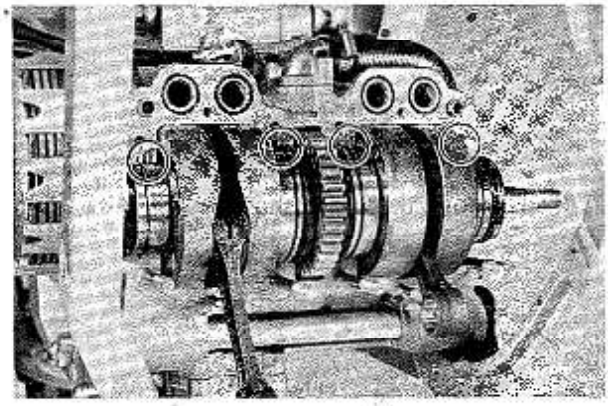


1. Circlip

3. Apply the grease oil seal slot. (Take care not to plug the oil hole.)
4. Install the crankshaft.

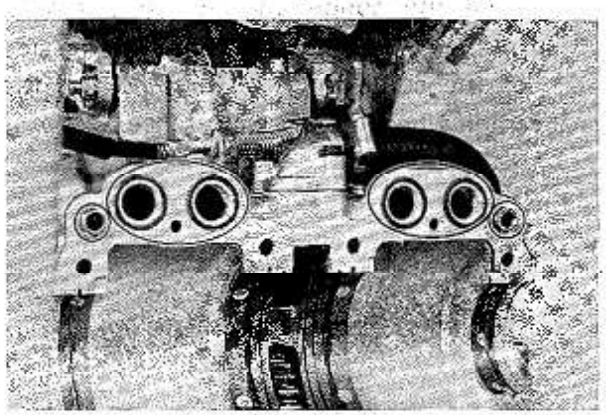
NOTE:

1. Before assembling the crankshaft, install the split-type circlips in the crankcase (lower).
   (4 crankshaft bearings)
2. The knock pins should be positioned in the crankcase dents.



3. The projections of the oil seals and grooves in the bearing should correctly fit the slits in the crankcase and the split-type circlips.
   If not, the primary compression pressure may leak out or oil may be sucked in the crankcase.
4. Push the crankshaft to crankcase.

5. Thoroughly clean the crankcase mating surfaces with a lacquer thinner, coat the surfaces with Yamaha bond No. 4, and put the crankcase halves together.
   Install the dawel pin and O-ring.

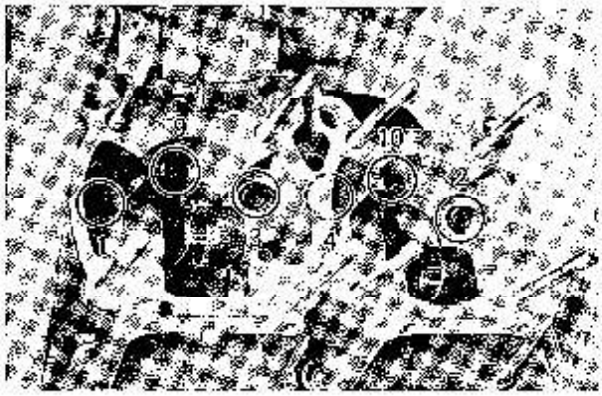


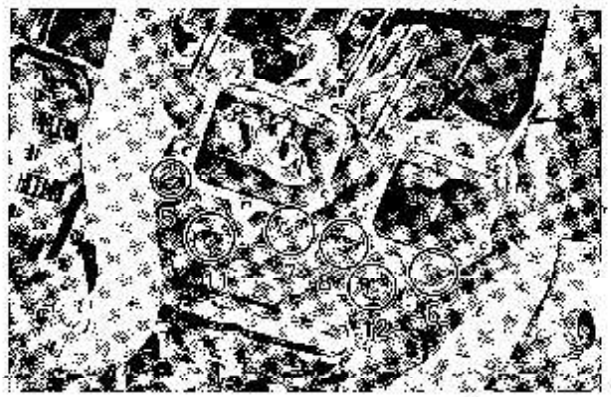
⚠ CAUTION:

Be sure that the oil passage is not clogged with an over-flowing bond.

6. Install the crankcase and tighten the bolts and nuts in numerical order as shown.

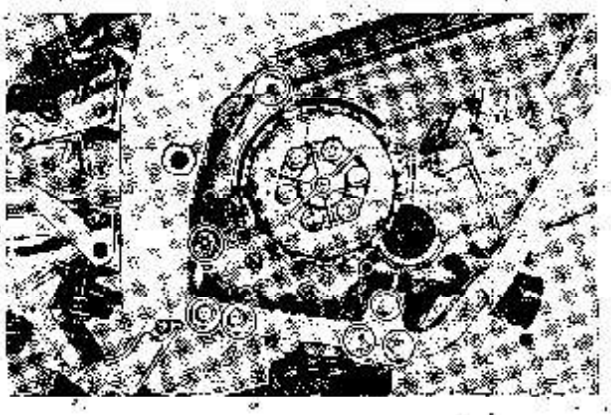
Tightening torque:
1 ~ 8: 20 Nm (2.0 m·kg, 14 ft·lb)
9 ~ 12: 11 Nm (1.1 m·kg, 8.0 ft·lb)



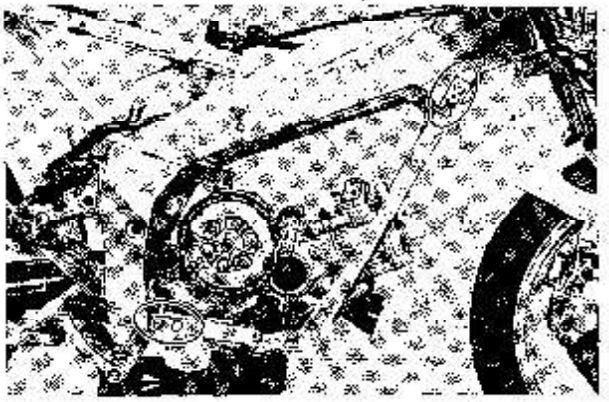


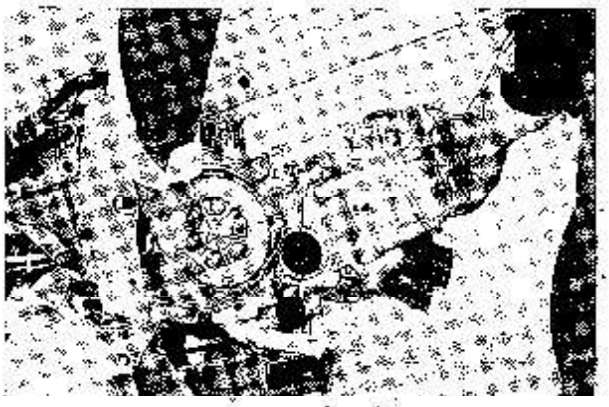
ENGINE REMOVAL

1. Drain the transmission oil and cooling water.
2. Remove the following parts.
   - Radiator
   - Exhaust pipe
   - Carburetor
   - Drive sprocket
   - Shift arm
3. Disconnect the following cables or leads.
   - YPVS control cable
   - Clutch cable
   - CDI magneto lead
   - Spark plug lead.
4. Place the suitable stand under the engine and remove the engine mounting bolt and brackets.



5. Remove down tube and engine.





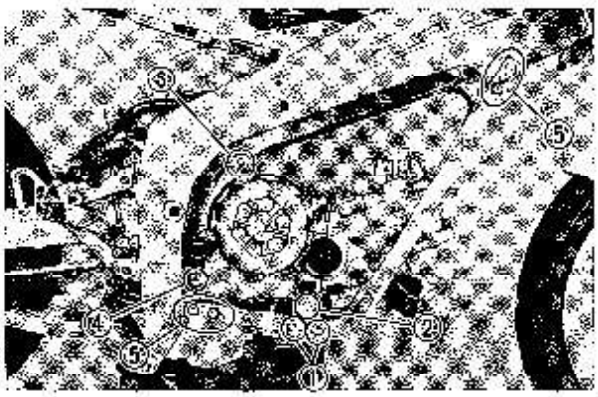
REMOUNTING ENGINE

Reverse removal steps. Pay close attention to installation of following steps.

⚠ WARNING:

Proper cable and lead routing is essential to insure safe machine operation.

1. Tighten the engine mounting bolts.



Bolt		Tightening torque
Front	Bracket to frame ①	30 Nm (3.0 m·kg, 22 ft·lb)
	Bracket to engine ②	60 Nm (6.0 m·kg, 43 ft·lb)
Rear	Upper ③	30 Nm (3.0 m·kg, 22 ft·lb)
	Lower ④	30 Nm (3.0 m·kg, 22 ft·lb)
Right down tube ⑤		30 Nm (3.0 m·kg, 22 ft·lb)

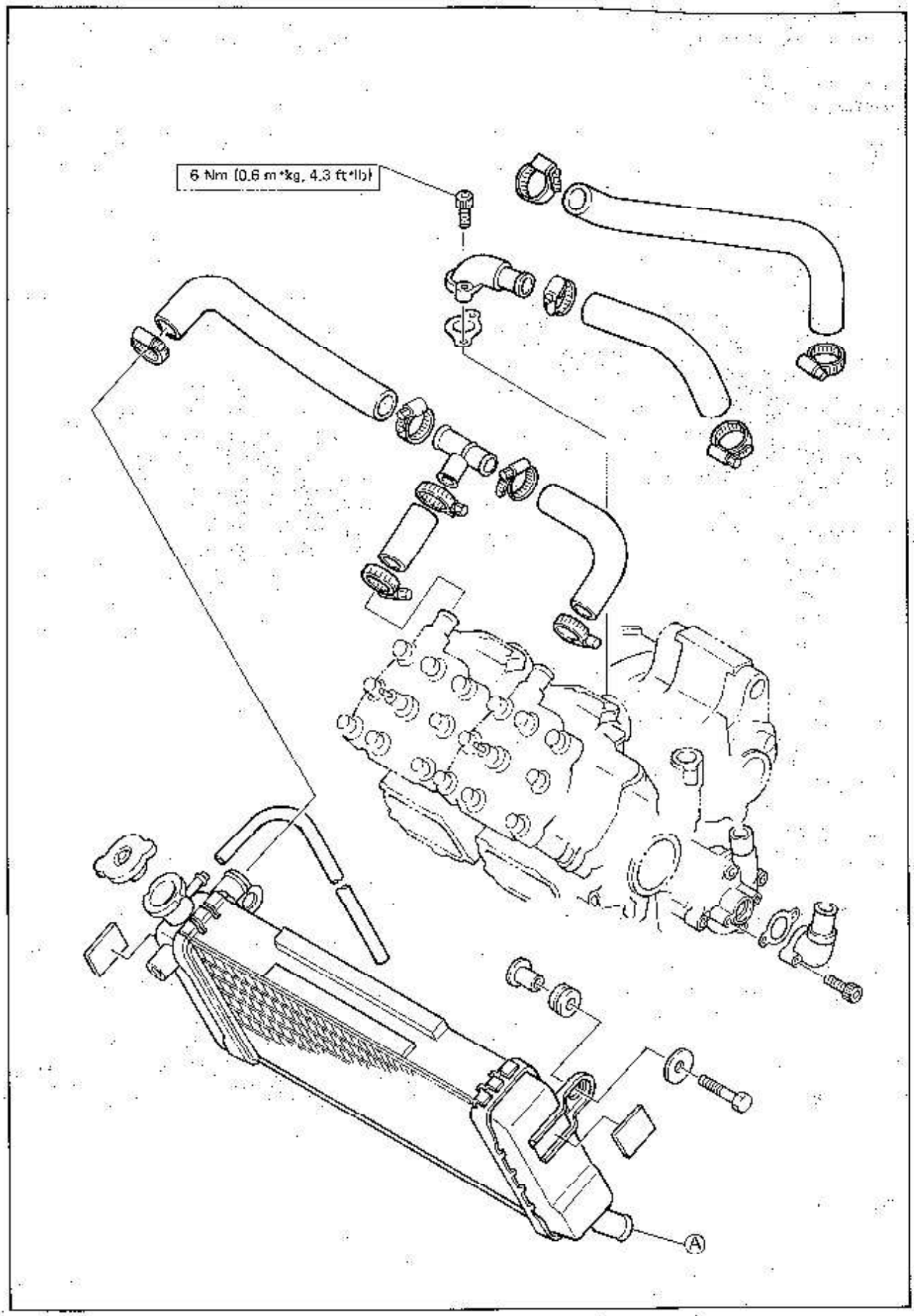
2. Install the drive sprocket.

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

3. Install the rotor.

C.D.I. rotor:
53 Nm (5.3 m·kg, 38 ft·lb)

COOLING SYSTEM



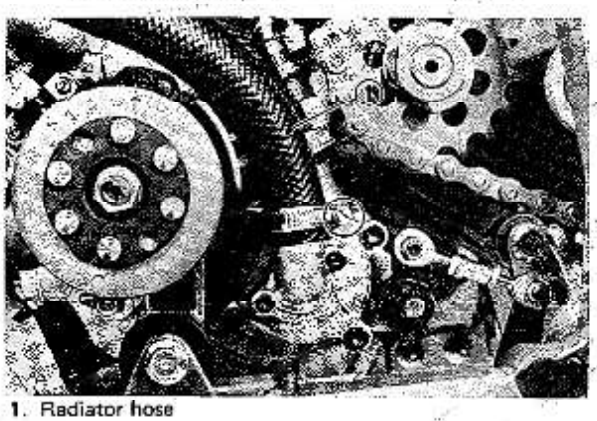
NOTE:

Water in specific areas contains salt. Take care so that the cooling system does not get rasply.

Radiator

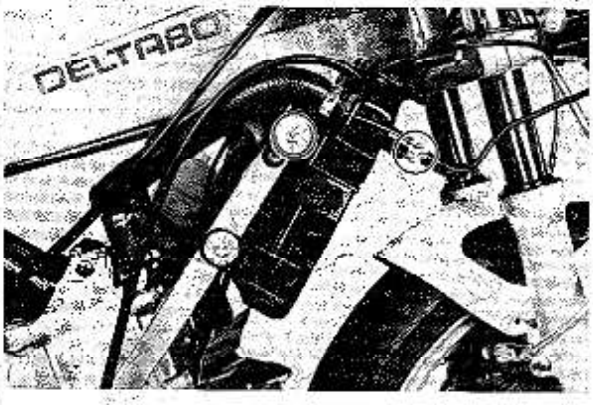
Removal

1. Remove the radiator hose and drain the cooling water.



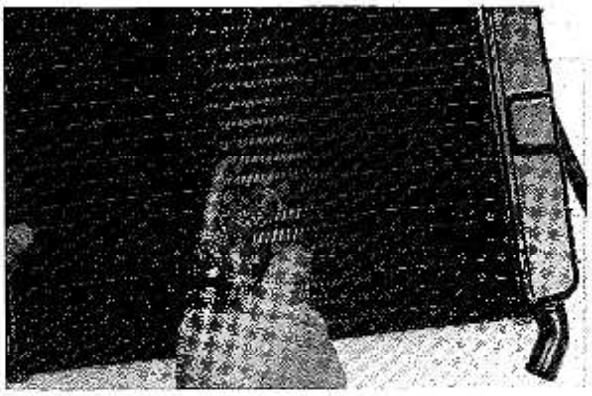
1. Radiator hose

2. Disconnect radiator hose clamps and water temp sensor.
3. Remove the fixing bolts that secure the radiator to the frame. Remove the radiator.

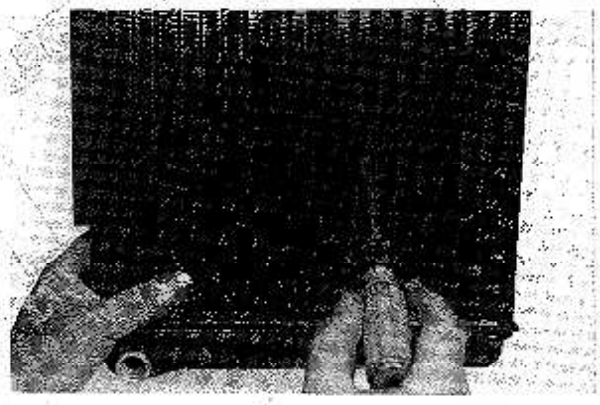


Cleaning

In very dusty conditions, and where insects are numerous, the radiator tube system should be kept clean by blowing through with compressed air from the engine side.



2. Check the radiator core for clogged or flattened fins. If more than 20% fo the radiator core area is flattened, repair or replace.

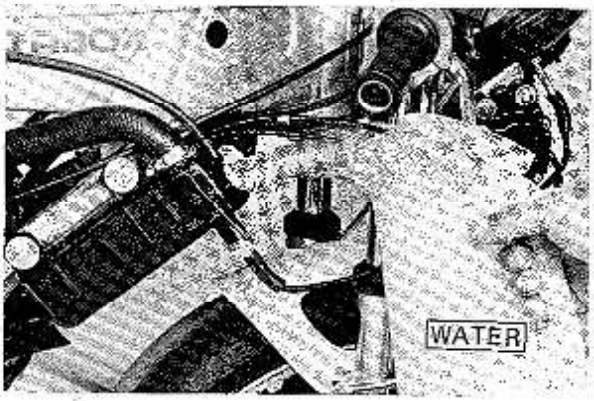


Replacement

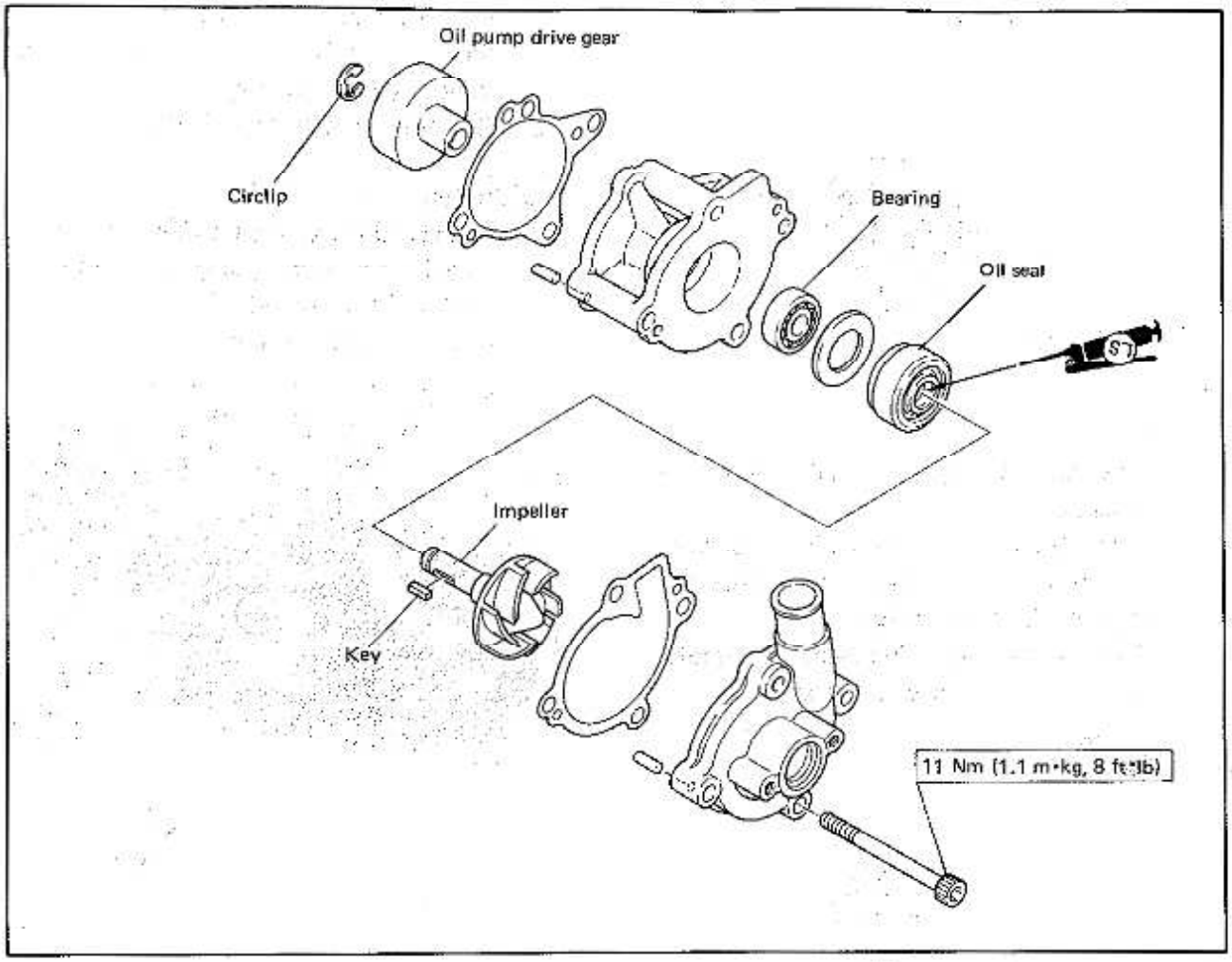
Replacement is made in reverse order.

NOTE:

See page 2-7 to supply cooling water.

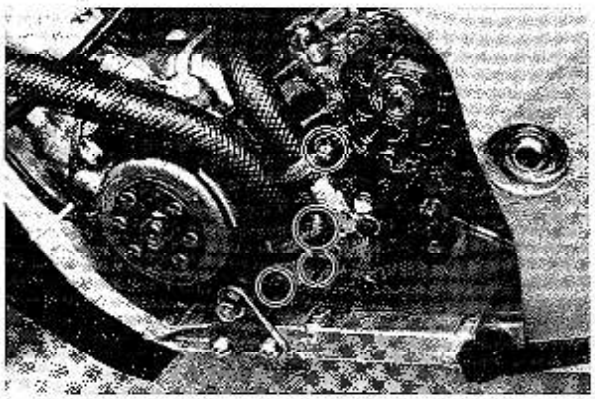


Water pump

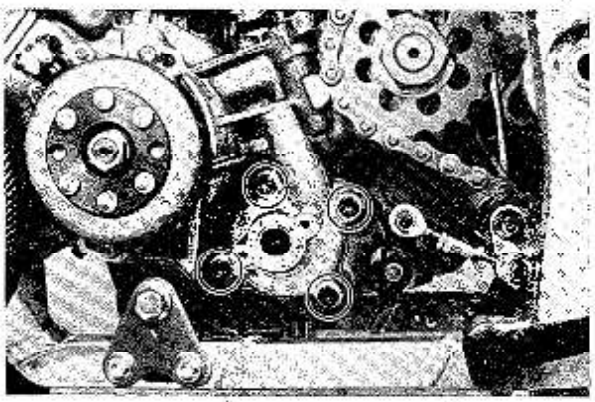


Removal

1. Drain gear oil.
2. Loosen the pipe clips, disconnect the water hoses and drain the cooling water.

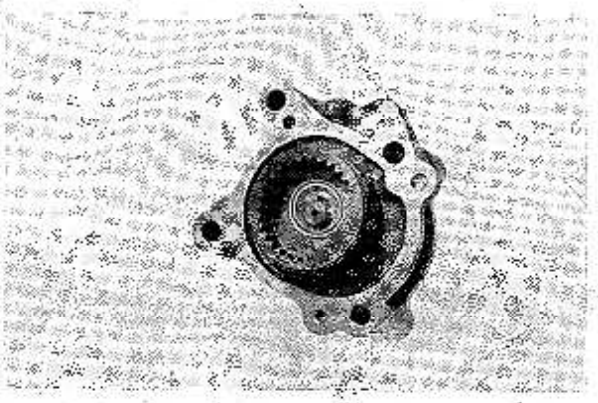


3. Remove the screws (4) securing the water pump and take out the water pump. If necessary, loosen the water pump by striking with a soft hammer.

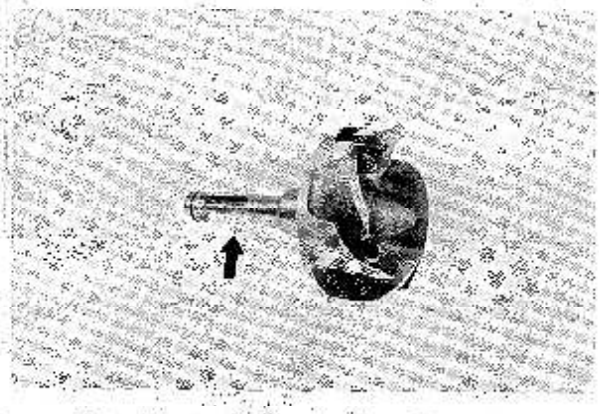


Disassembly

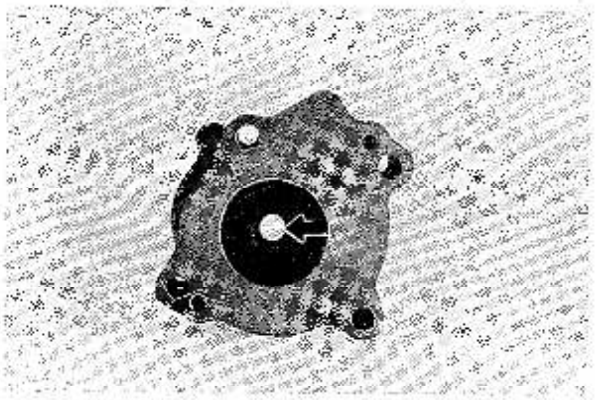
1. Remove the circlip, take out the pump driven gear and key.



2. Remove the impeller shaft from the housing.
3. Check the impeller shaft oil seal surface for scratches. If scratches, replace the impeller shaft assembly.
4. Check the pump drive gear, tachometer drive gear for wear or damage.



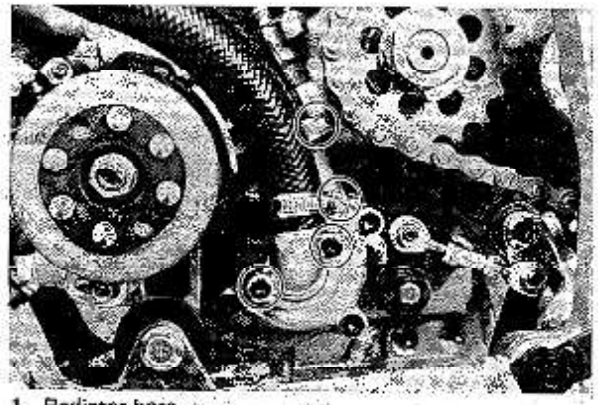
5. Check the bearing and oil seal in the housing for wear.



6. Check the oil seal lip for scratches. If scratched, replace.
7. Before installing, fill the oil seal lip with the water-resisting grease. Use care not to damage the oil seal.
8. Replace the gasket and O-ring.

Installation

1. Replace the water pump housing gasket.
2. Install the water pump assembly and tighten the screws (4).
3. Install the water hoses.



1. Radiator hose

5 CHASSIS MAINTENANCE AND REPAIR

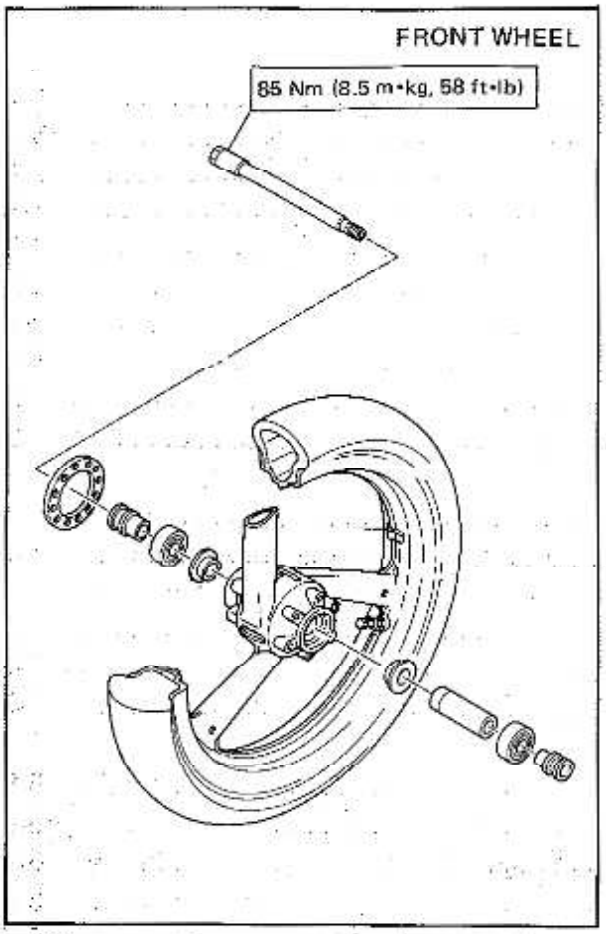
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Wheel bearings inspection 5-2
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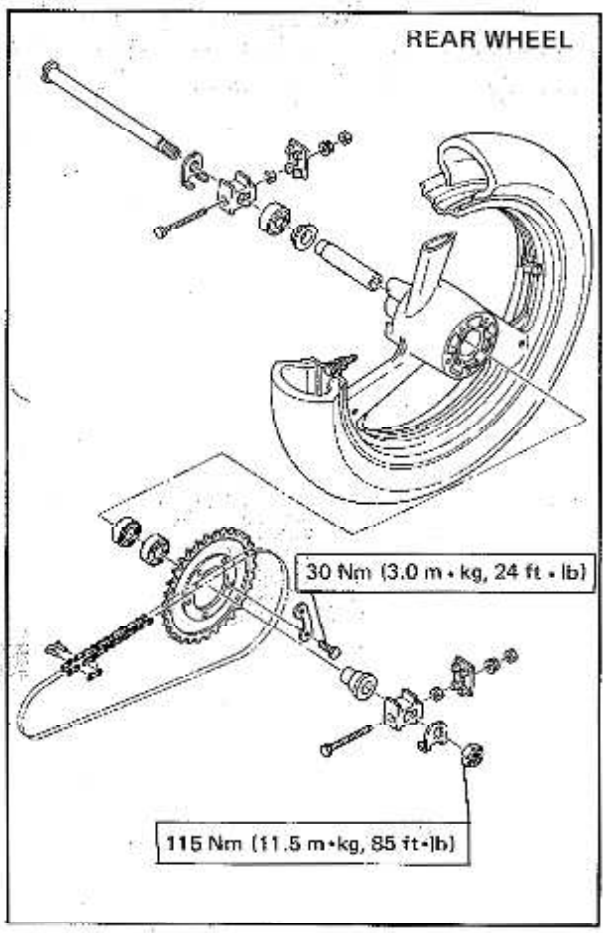
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WHEELS SPROCKETS AND CHAIN

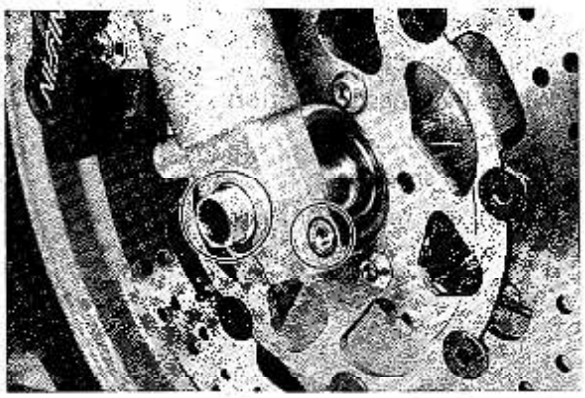




5

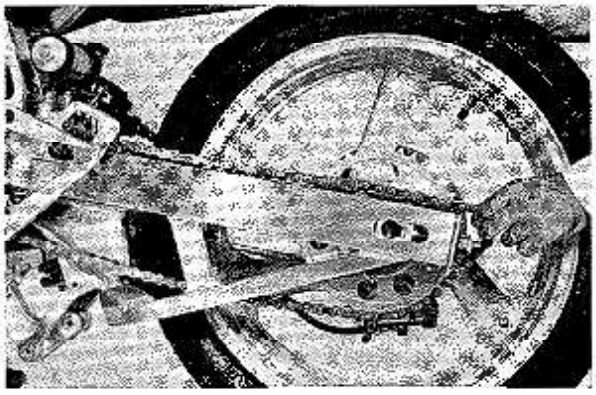
Front wheel removal

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove the caliper body assy.
3. Loosen front axle pinch bolts.
4. Remove the front wheel axle.
5. Remove the front wheel assembly.



Rear wheel removal

1. Remove the rear wheel shaft nut.
2. Raise the rear of the machine and set it on box. Then pull out the rear wheel shaft by simultaneously twisting and pulling out.
3. Remove the rear wheel assembly.



Wheel installation

1. Make sure nuts are properly tightened.

Front wheel axle:
85 Nm (8.5 m·kg, 58 ft·lb)
Axle pinch bolt:
18 Nm (1.8 m·kg, 13 ft·lb)
Rear wheel axle:
115 Nm (11.5 m·kg, 85 ft·lb)

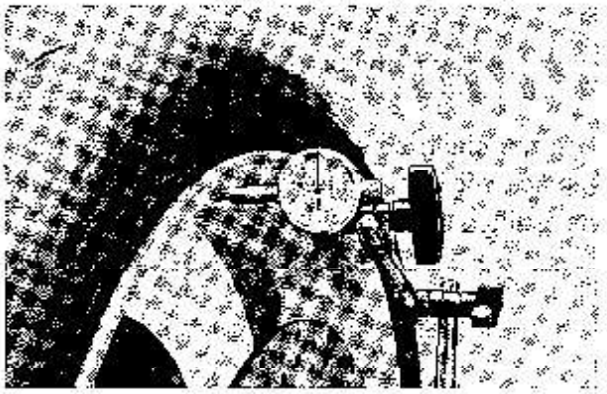
2. Be sure to adjust the slack of the chain. (Refer to "Drive chain adjustment".)
3. Adjust the plays in the brake lever and pedal.

⚠ CAUTION:

Oil or scratched on the surface or the brake disc will impair braking performance or result in abnormal noises. Remove oil by wiping with a rag soaked in lacquer thinner or solvent.

Wheel inspection

1. Use a suitable stand to rise wheels off the ground. Rotate a wheel by hand and check for rim run-out. If spokes are loose or bent, tighten or replace them. The spokes should be checked before each use.



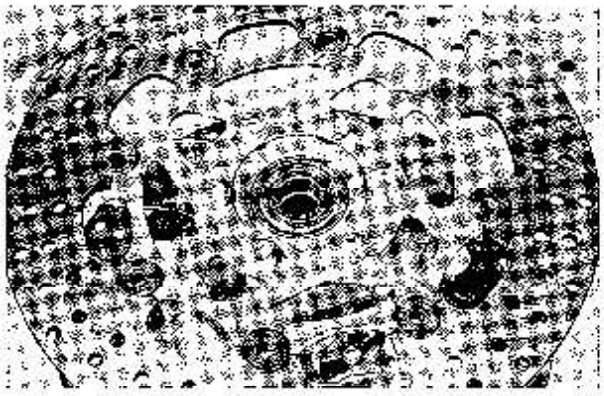
Rim runout limit:
Radial: 1.0 mm (0.04 in)
Lateral: 0.5 mm (0.02 in)

Check wheel balance. Rotate the wheel lightly several times and observe resting position. If the wheel is not statically balanced, it will come to reset at the same position each time. Install an appropriate balance weight at lightest position (at top).



Wheel bearings inspection

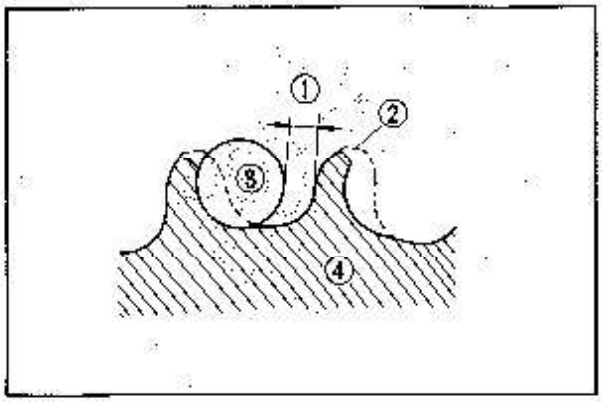
Hold the top of the rear wheel with one hand and the bottom with the other hand, and check the play of the wheel by shaking it sideways. If the bearings allow excessive play in the wheel or if it does not turn smoothly have your dealer replace the wheel bearings.



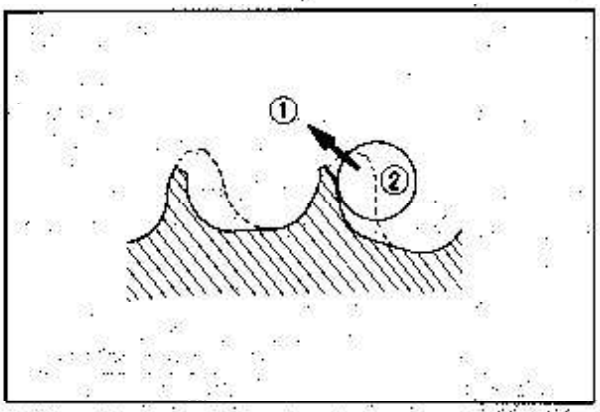
Sprockets

NOTE:
Please refer to Maintenance Intervals and Lubrication Intervals charts for additional information.

1. Check sprocket wear. Replace if wear decrease tooth height to a point approaching the roller center line.
2. Replace if tooth wear shows a pattern such as that in the illustration.



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



1. Slip off ····· 2. Bend teeth

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

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

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

Optional sprockets

(Drive sprocket)

Size	Part number
14T	93834-14170
15T	93834-15077
16T (STD)	93834-16099

(Driven sprocket)

Size	Part number
36T (STD)	240-25436-00
37T	240-25437-00
38T	240-25438-00
39T	240-25439-00
40T	240-25440-00
41T	240-25441-00

Secondary reduction ratio table

Driven / Drive	35	36	37	38	39
15	2.333	2.400	2.467	2.533	2.600
16	2.188	[illegible]	2.313	2.375	2.438
17	2.059	2.118	2.176	2.235	2.294
18	1.944	2.000	2.056	2.111	2.167

Chain

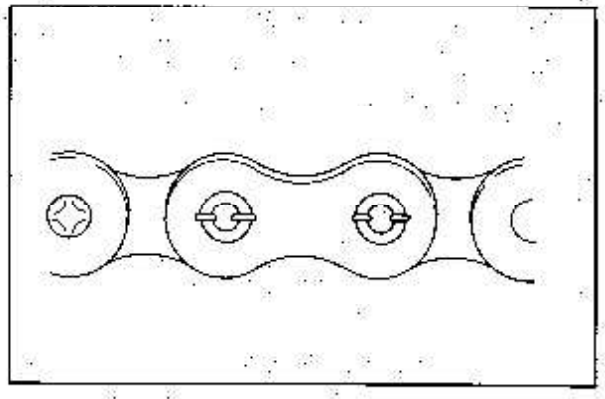
NOTE:

Please refer to Maintenance and Lubrication Intervals charts for additional information.

The chain should be lubricated before every race and replace every three races.

Recommended lubricant:
Yamaha chain and Cable Lube or other name brand spray type lube.

Use the chain cutter and chain caulking tool, replace the chain. The chain joint pin should be caulked as below.

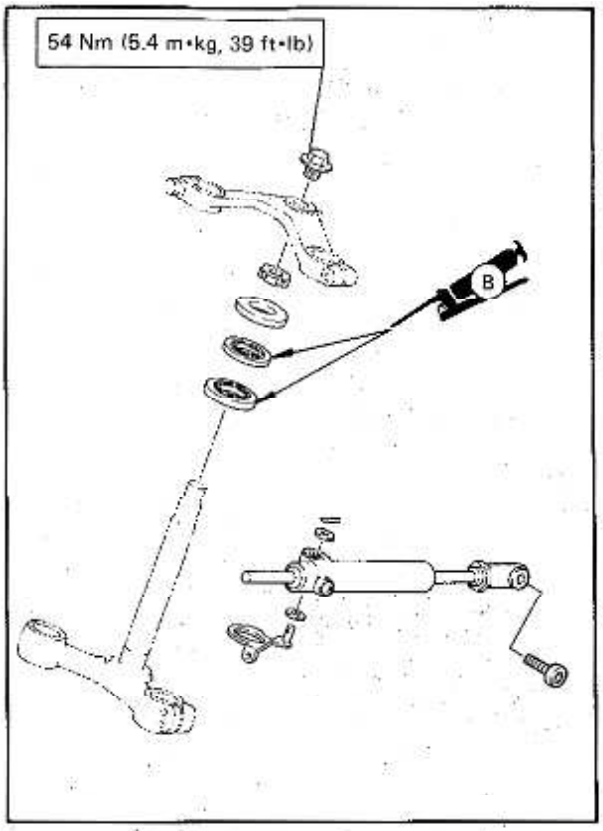


Chain type/No. of link:
RK520TR-Z/103L + Joint

CAUTION:

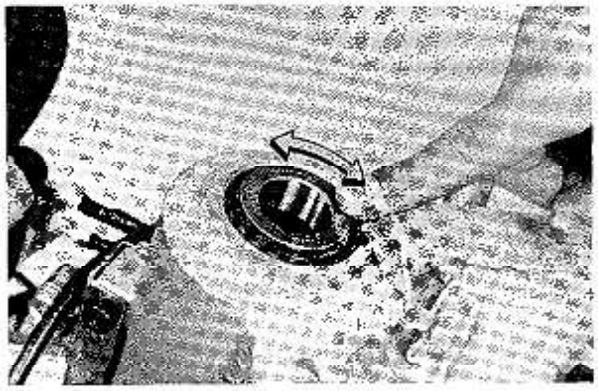
The chain should be cleaned and lubricated after every use of the machine.

STEERING HEAD

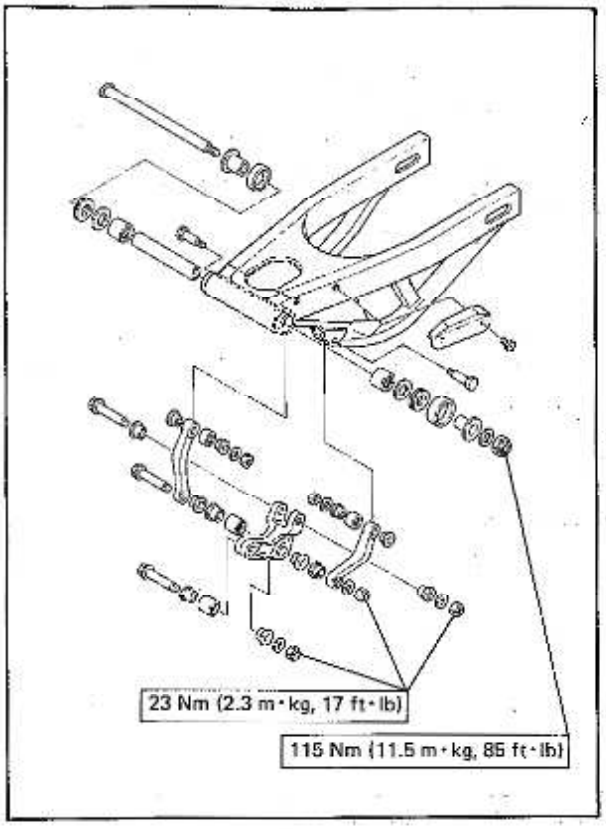


Inspection

1. Wash the bearings in solvent.
2. 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.

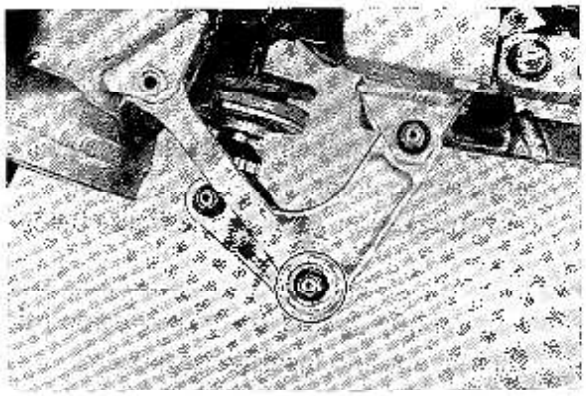


SWINGARM

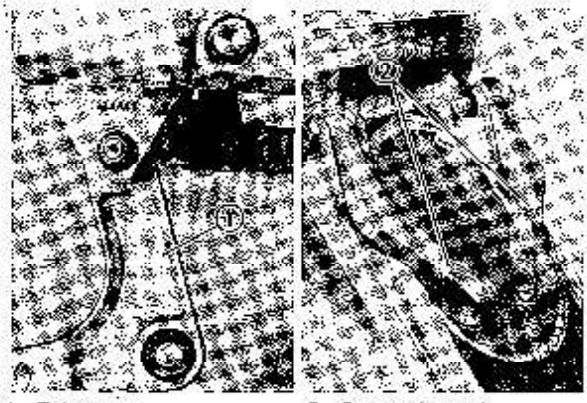


Removal

1. Disconnect the drive chain and remove the rear wheel.
2. Remove relay arm-connecting rod securing bolt and suspension mounting bolt (lower).
3. Remove the pivot shaft and the swingarm.



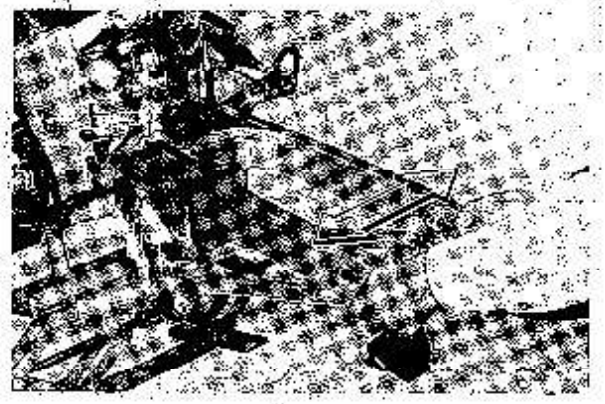
4. Remove the relay arm and the connecting rod.



1. Relay arm 2. Connecting rod

Inspection

1. Grasp the ends of the arm and move from right to left to check for free play.



Swing arm free play:
0 ~ 1 mm (0 ~ 0.04 in)

2. If free play is excessive, remove swing arm and replace swing arm bushings and bearings.
3. Check the swing arm for cracks. If there is any crack, repair or replace the swing arm, as required.
4. For installation, refer to the figure below.

NOTE:

When assembling, grease the following points.

1. Oil seal lips and inside of seal guard.
2. Inside of spacer.
3. Contact surfaces of bearing and bush.

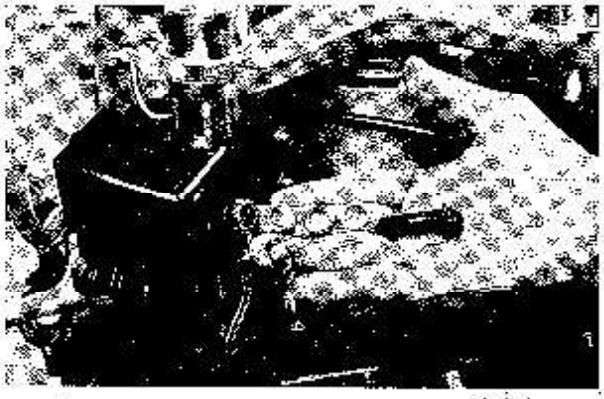
BRAKE SYSTEM

⚠ WARNING

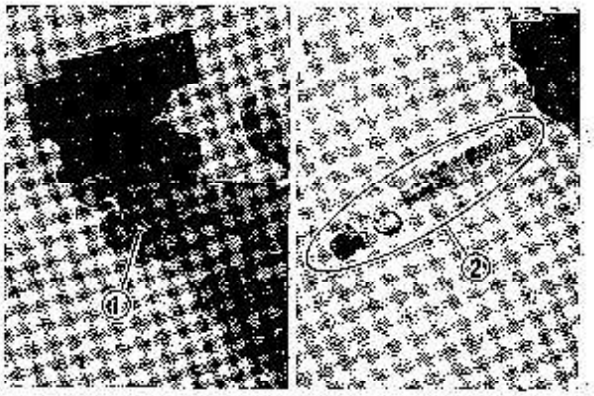
The brake components of this machine are suit for closed circuit use only. Never use on any public road.

Master cylinder disassembly [Front and Rear]

1. Remove the brake lever, spring boot. (front brake)
2. Remove the brake hose and then master cylinder. Remove the cap and rubber cap, and drain the brake fluid.



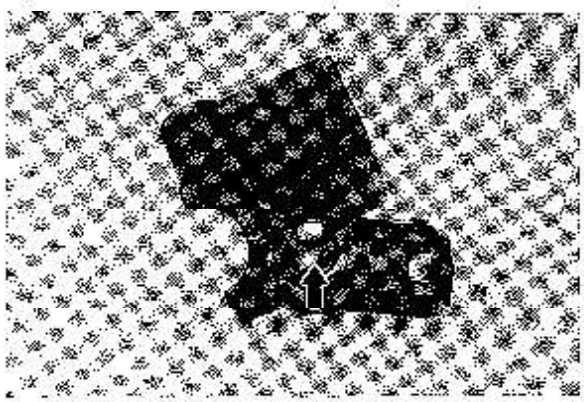
3. Remove the rubber boot circlip and master cylinder kit.



1. Circlip 2. Master cylinder kit

Master cylinder inspection

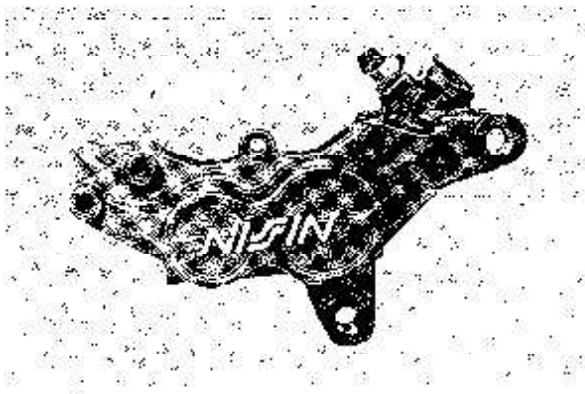
1. Inspect the master cylinder body. Replace if scratched. Clean all passages with new brake fluid.
2. Inspect the master cylinder kit. If worn or damaged, replace as a assembly.



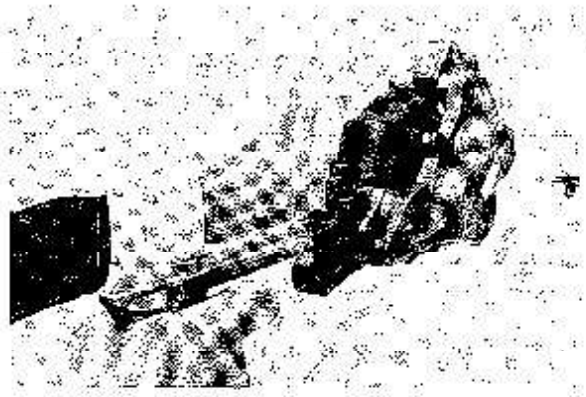
Caliper disassembly

[Front]

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 and pads.
4. Disassemble the caliper body.



5. Plug the fluid passages and lock one piston.
6. Carefully force the piston out of the caliper cylinder with compressed air. Never try to pry out the piston.



NOTE:

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

[Rear]

1. Remove the caliper from the machine.
2. Lock right-side piston and insert folded rag to avoid damaging the piston.

⚠ CAUTION:

Never disassemble the caliper body.

3. Remove the piston with compressed air.

6 ELECTRICAL

IGNITION SYSTEM 6-1
- Troubleshooting chart 6-1
- Connectors check 6-1
- Spark gap test 6-1
- Ignition coil test 6-1
- Engine stop switch 6-2
- CDI unit and magneto 6-2

Y.P.V.S. AND CDI 6-2
- Troubleshooting chart 6-2
- Checking servo-motor 6-3

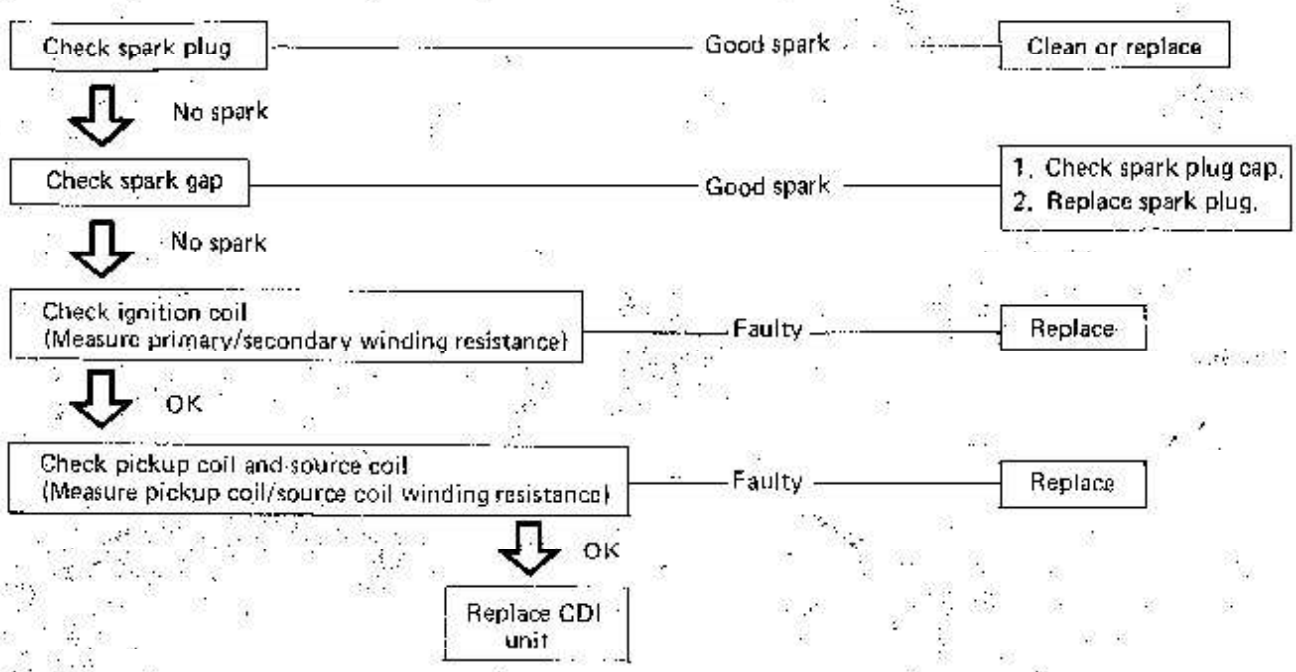
WARNING DIAGRAM 6-4

ELECTRICAL

IGNITION SYSTEM

Troubleshooting chart

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.

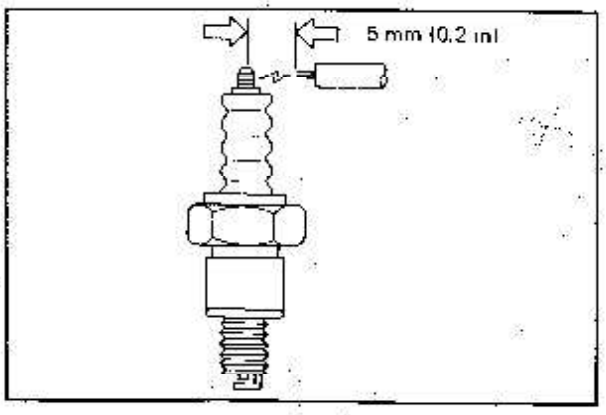


Connectors check

1. Check the connectors and couplers for looseness of joining ends.
2. Keep the connectors and couplers from dirt or rust.
3. For secure and firm joining, take care to hold the connectors and couplers, not the wire portions, in attaching or separating them.

Spark gap test

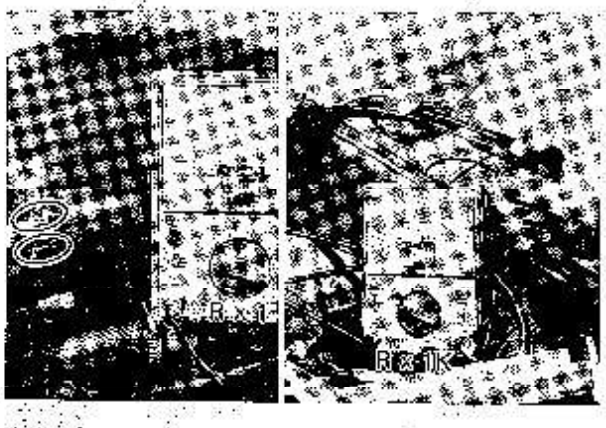
Remove the high tension wire from the spark plug cap, and hold it 5 mm off the plug. Set the gear third or fourth, turn the rear wheel and check for spark.



Ignition coil test

Use a pocket tester or equivalent ohmmeter to determine resistance and continuity of primary and secondary coil windings.

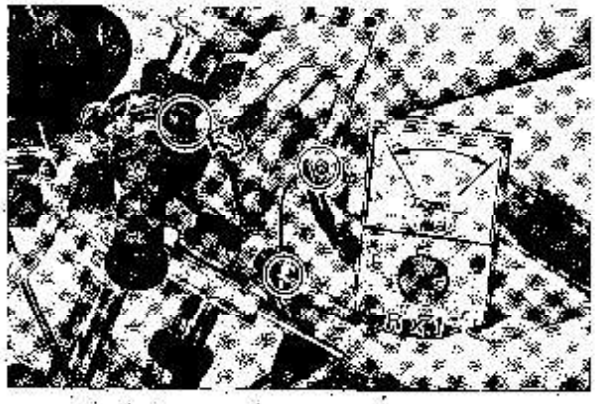
Primary coil resistance Use (Ω x 1) scale	Secondary coil resistance Use (Ω x 1k) scale
0.33Ω ± 15%	5.9kΩ ± 20%



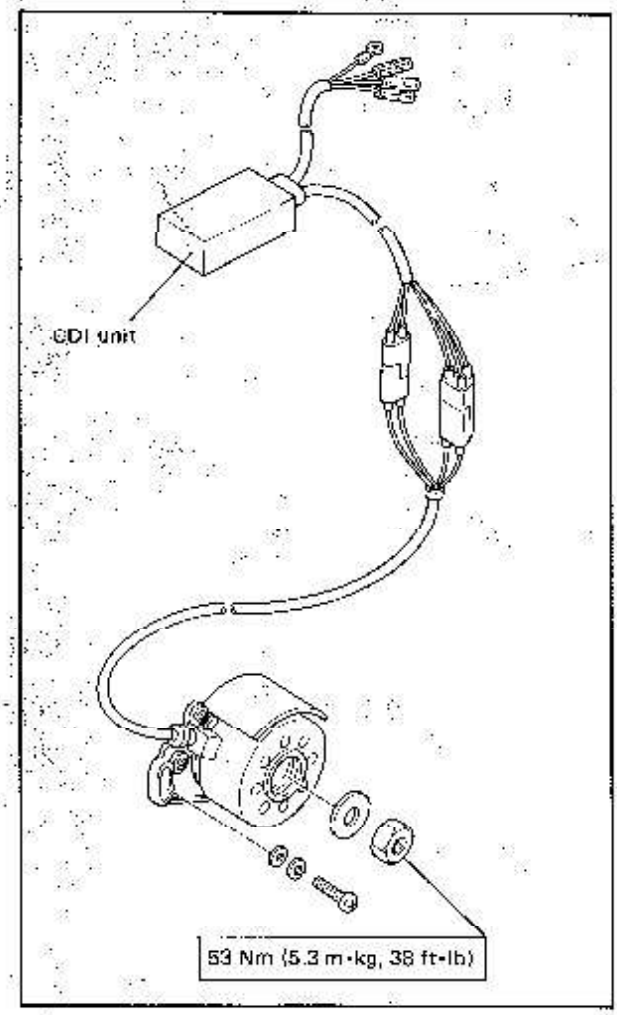
Engine stop switch

Switch may be checked for continuity with a pocket tester on the "R x 1" position.

	Wire color	
	Black/White	Black
Push	○——	——○
Free	—	—

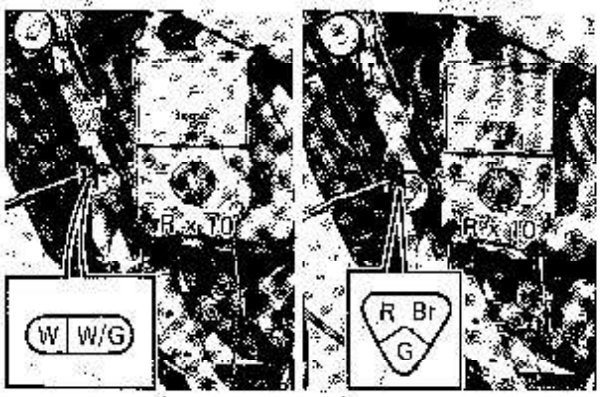


CDI unit and magneto



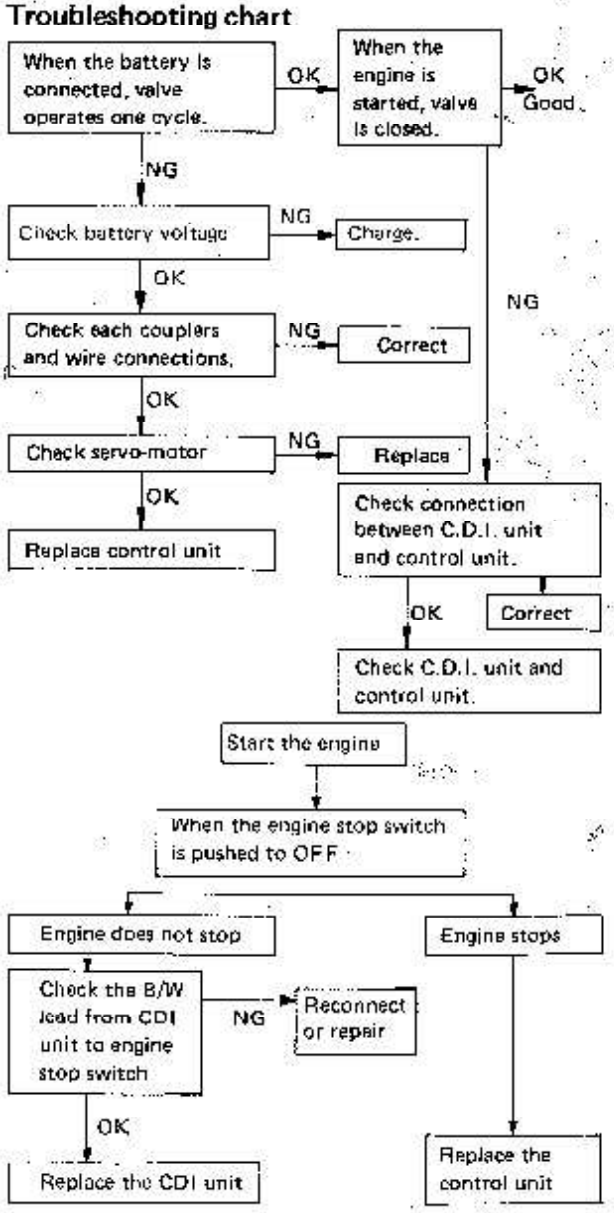
Disconnect the magneto leads, and use the pocket tester to check the resistance of the pickup coil [A] and/or source coil [B].

Pickup coil resistance: Use (Ω x 10) scale	Source coil resistance: Use (Ω x 10) scale
235Ω ± 15% (Blue — White/Green)	50Ω ± 15% (Red — Green)



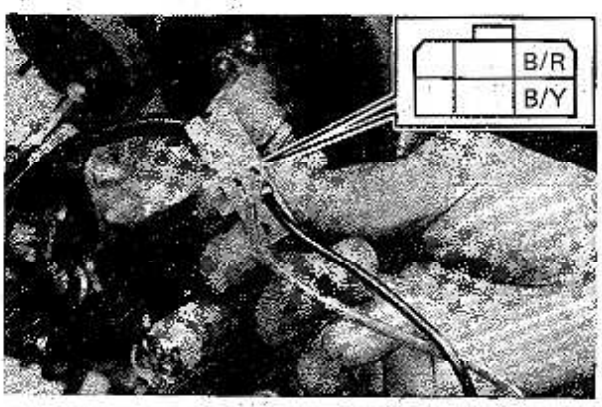
Y.P.V.S. AND CDI

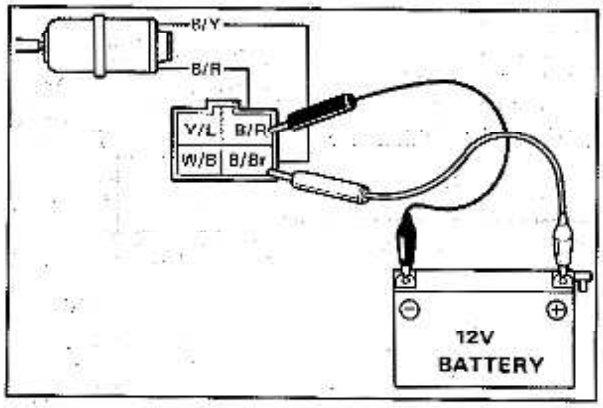
Troubleshooting chart



Checking servo-motor

1. Disconnect the coupler to the servo-motor and connect the 12V battery as shown. The servo-motor is good condition if the motor operates. If does not operate, replace the servo-motor.

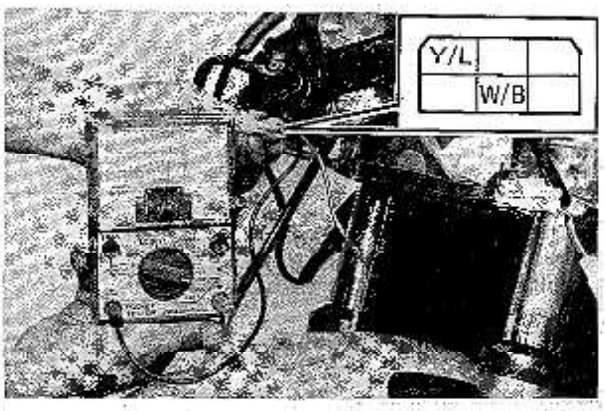


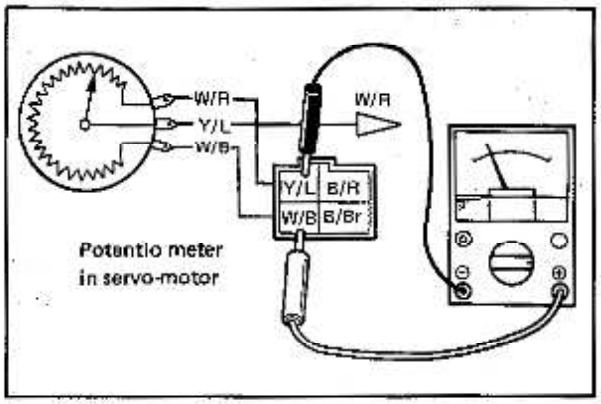


⚠ CAUTION:

Bad connection of the battery leads may cause damage to the servo-motor.

2. Check the resistance between terminals. If the resistance is out of specification, replace the servomotor.





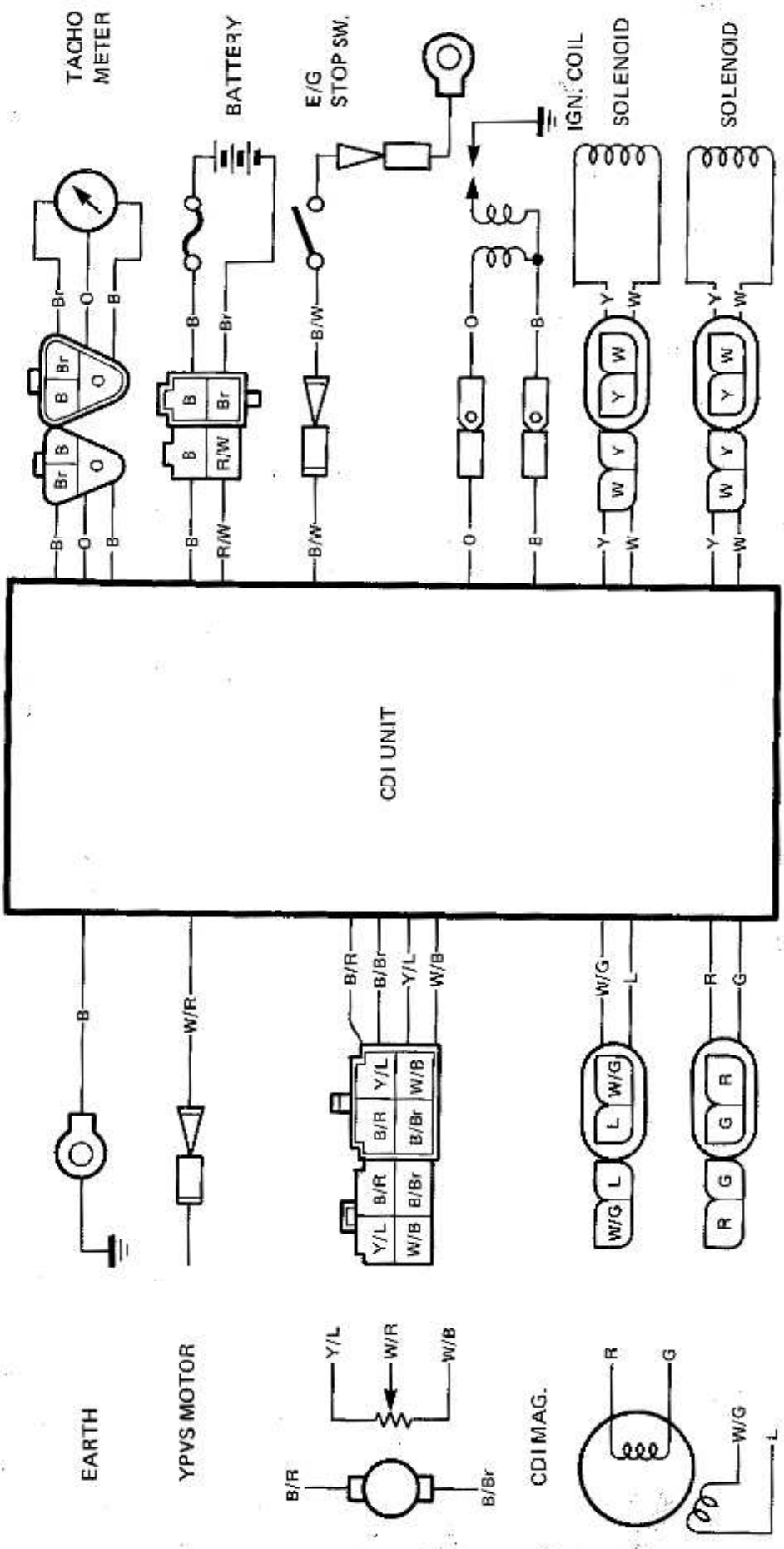
Potentiometer resistance:
(Y/L – W/B):
7.5 kΩ ± 30% at 20°C (68°F)
(Y/L – W/R) + (W/R – W/B):
7.5 kΩ ± 30% at 20°C (68°F)

Fuel cust solenoid valve

1. Check the resistance between terminals. If the resistance is out of specification replace solenoid valve.

Solenoid valve resistance:
(Y – W):
57.8Ω ± 10% at 20°C (68°F)

WIRING DIAGRAM



7 APPENDICES

CABLE ROUTING DIAGRAM 7-1

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- Engine is hard to start or does not start 7-3
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- Overheating 7-5
- Transmission and shifter 7-5
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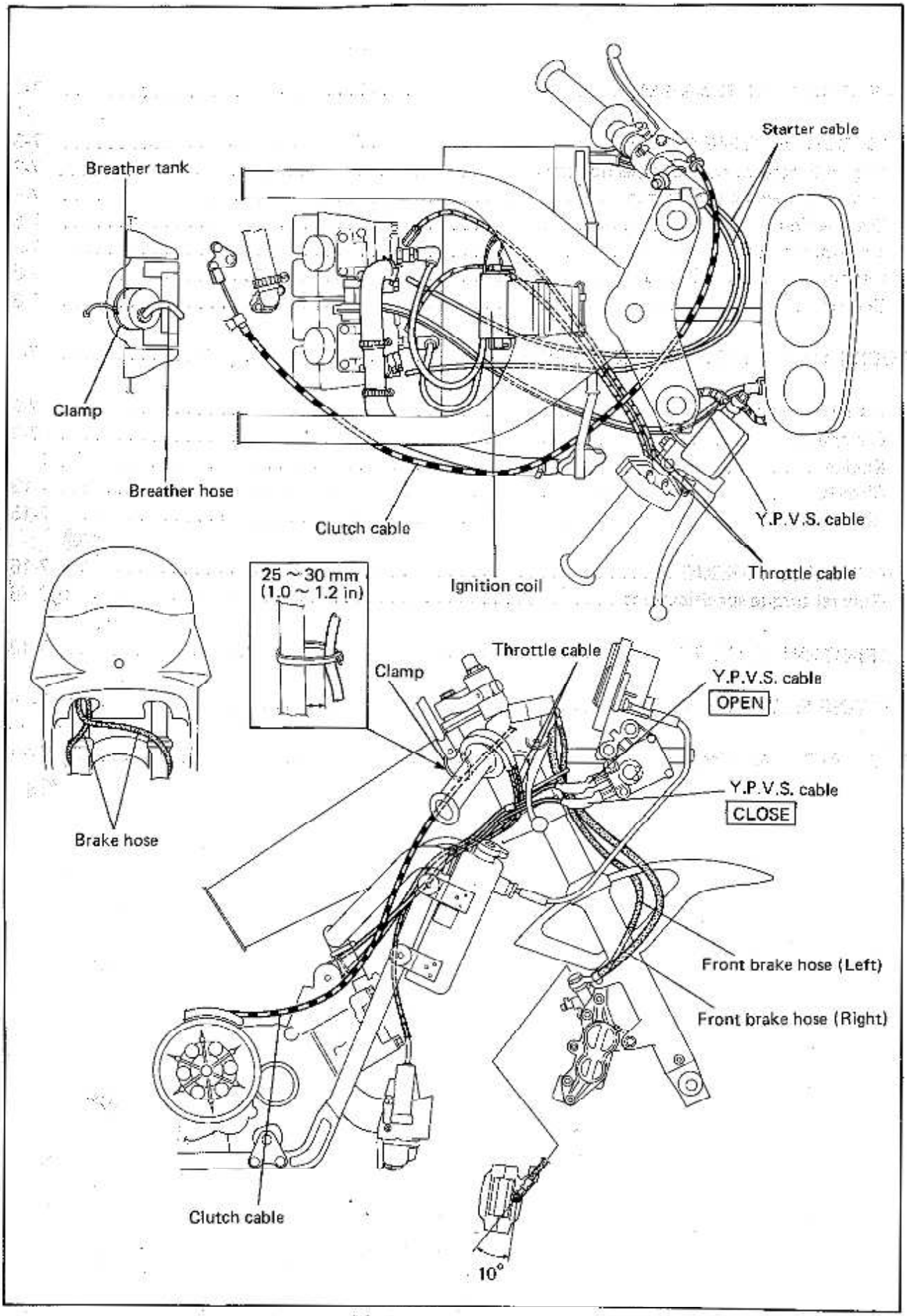
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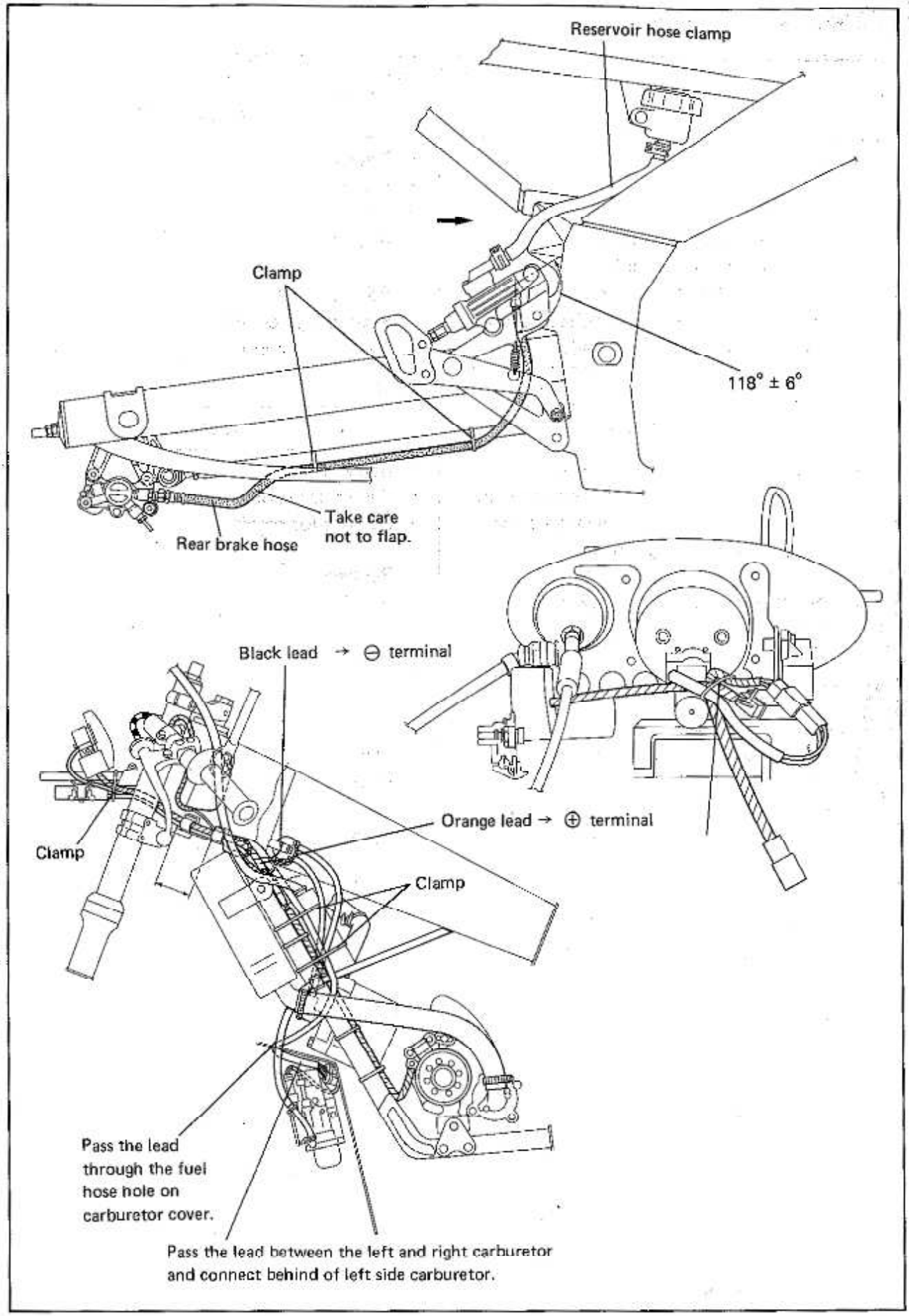
WARRANTY INFORMATION 7-21

7

CABLE ROUTING DIAGRAM



7


Reservoir hose clamp
Clamp
118° ± 6°
Take care not to flap.
Rear brake hose
Black lead → ⊖ terminal
Orange lead → ⊕ terminal
Clamp
Clamp
Pass the lead through the fuel hose hole on carburetor cover.
Pass the lead between the left and right carburetor and connect behind of left side carburetor.

TROUBLESHOOTING GUIDE

Engine is hard to start or does not start.

Ignition System	
Possible Cause	Remedy
1. Spark plug is wet.	• Clean or replace
2. Ignition coil is faulty.	• Replace
3. C.D.I. unit and C.D.I. magneto are faulty. (Pick up coil, source coil)	• Replace • Replace as a set.
4. Ignition timing is incorrect.	• Adjust
5. Wire is broken, shorted or disconnected.	• Repair, replace or connect
6. Engine stop switch is shorted.	• Repair or replace
Compression System	
Possible Cause	Remedy
1. Piston ring is sticking or worn.	• Replace
2. Cylinder or piston is worn or scratched.	• Repair or replace
3. Compression leaks passing cylinder head gasket. (Head is distorted.)	• Replace (or repair)
4. Crankshaft side oil seal is faulty.	• Replace
5. Air leakes through crankcase sealing surfaces.	• Repair
Air/Fuel System	
Possible Cause	Remedy
1. Fuel petcock or pipe is clogged.	• Clean
2. Float valve is faulty. (Float height is too high or too low.)	• Replace (remove gasoline from crankcase)
3. Fuel tank roll over valve or carburetor breather hole is clogged.	• Clean
4. Fuel is deteriorated.	• Replace
5. Oil-gas mixing ratio is incorrect.	• Replace
6. Air leaks through carburetor joints.	• Retighten or replace gasket.

Poor high speed performance

Ignition System	
Possible Cause	Remedy
1. Spark plug is dirty or plug gap is too narrow.	• Clean, repair or replace
2. C.D.I. unit and C.D.I. magneto are faulty.	• Replace • Replace as a set.
3. Ignition coil is faulty.	• Replace
4. Ignition timing is incorrect.	• Adjust
5. Loose wire connection.	• Repair
6. Y.P.V.S. is faulty.	• Repair, adjust or replace
Compression System	
Possible Cause	Remedy
1. Piston ring is sticking or worn..	• Replace
2. Cylinder or piston is worn or scratched.	• Repair or replace
3. Compression leakage through crankcase sealing surfaces or crankshaft side oil seal.	• Repair or replace
4. Carbon deposits in combustion chamber (Piston, Cylinder head).	• Decarbonize
Air/Fuel System	
Possible Cause	Remedy
1. Clogged carburetor jets.	• Clean
2. Improperly adjusted main jet or power jet (High speed).	• Adjust
3. Improperly adjusted jet needle (Medium speed).	• Adjust
4. Incorrect fuel level	• Adjust
5. Clogged fuel tank roll over valve or carburetor breather hole.	• Clean
6. Clogged fuel petcock or kinked fuel pipe.	• Clean or repair
7. Deteriorated fuel	• Replace
8. Improper oil-gas mixing ratio	• Replace
9. Cracked or broken exhaust pipe (Leakage of exhaust gases).	• Replace
10. Clogged or broken solenoid valve.	• Replace

Overheating

Possible Cause	Remedy
1. Incorrect air-fuel mixture	• Adjust
2. Air leaks through carburetor joint.	• Repair or replace
3. Incorrect ignition timing	• Adjust
4. Carbon builds up in cylinder head or on piston head.	• Decarbonize
5. Improper spark plug heat range (too hot).	• Replace
6. Fuel is deteriorated or oil-gas mixing ratio is incorrect.	• Replace
7. Cooling water is less than specified.	• Add water
8. Water pump is malfuncion.	• Repair

Transmission and shifter

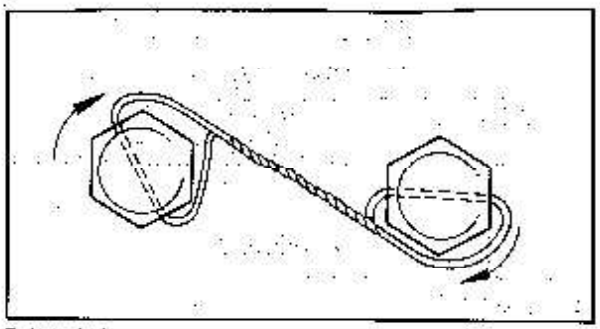
Trouble	Possible Cause	Remedy
Gear slip off	1. Gear dogs are worn.	• Replace
	2. Shift forks are bent (burnt or worn).	• Replace
	3. Shift cam stopper spring is fatigued.	• Replace
Gear shifts skipping over the next.	1. Shift cam stopper spring is fatigued.	• Replace
	2. Shift forks are bent (burnt or worn).	• Replace
Gear does not select.	1. Shift cam is worn. (broken)	• Replace
	2. Shift shaft is bent.	• Replace
	3. Shift arm spring is broken.	• Replace
	4. Gears are broken.	• Replace
Shift pedal does not return.	1. Shift return spring is broken.	• Replace
	2. Shift shaft is bent.	• Replace

Clutch

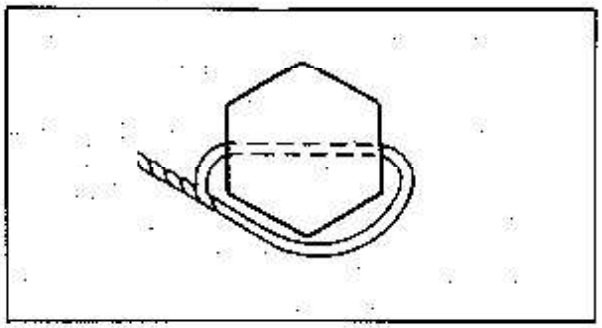
Trouble	Possible Cause	Remedy
Clutch slips	1. Friction plate is worn.	• Replace
	2. Clutch plate is worn.	• Replace
	3. Clutch spring is fatigued.	• Replace
	4. Pressure plate is deformed.	• Replace
	5. Clutch play is too small.	• Adjust
	6. Clutch adjustment is incorrect.	• Adjust
	7. Match marks of clutch boss and pressure plate does not aligned.	• Reassemble
Clutch drags	1. Clutch plate is worped.	• Replace
	2. Clutch locknut is loosen.	• Replace
	3. Friction plate is broken.	• Replace
	4. Clutch play is too much.	• Adjust

Steering head is loose.	
Possible Cause	Remedy
1. Steering ring nut or shaft bolt is loose.	• Retighten
Wheels have excessive run-out.	
Possible Cause	Remedy
1. Bearing is worn. 2. Rim has dent. 3. Spokes are loose (or broken). 4. Axle nut is loose. 5. Spacer has transformed	• Replace • Repair or replace. • Retighten or replace. • Retighten • Replace

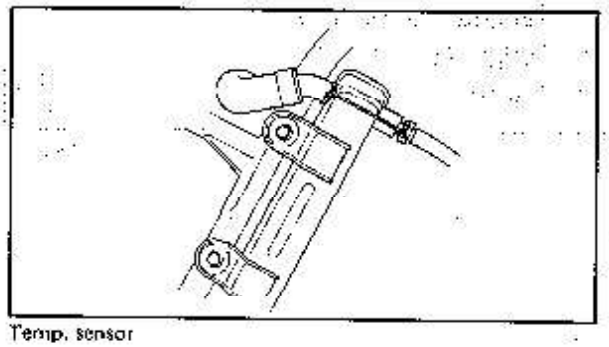
LOCKING WIRE INSTALLATION GUIDE



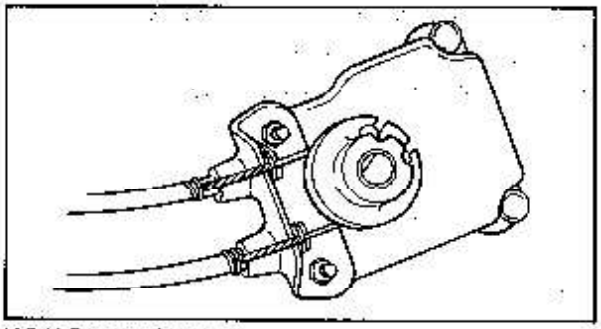
Bolt to bolt



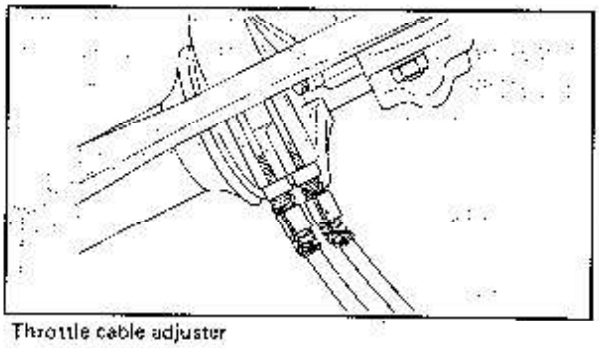
Bolt



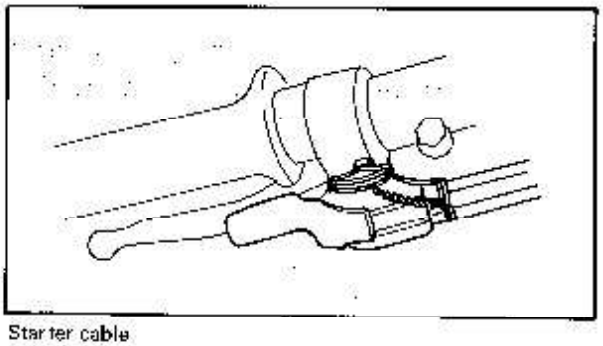
Temp. sensor



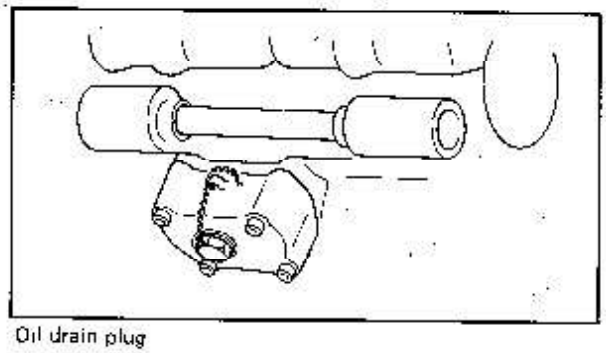
Y.P.V.S. control cable



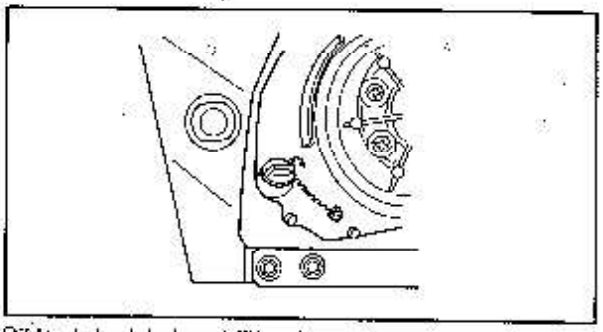
Throttle cable adjuster



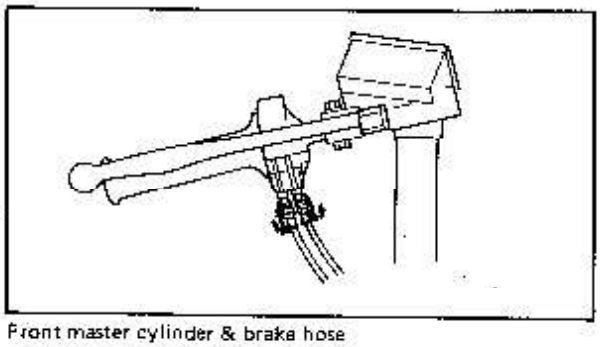
Starter cable



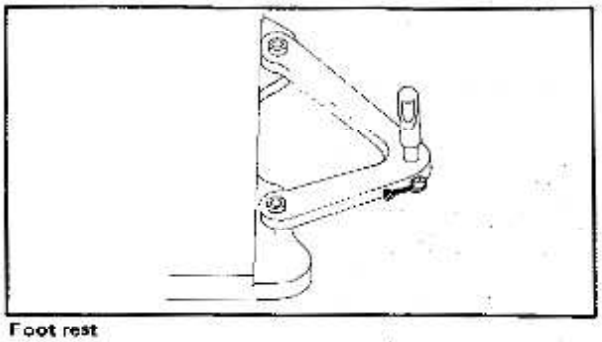
Oil drain plug



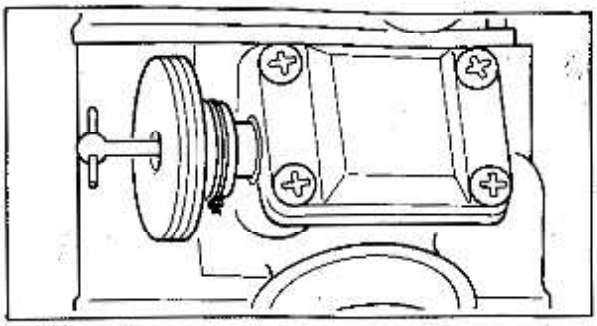
Oil level check bolt and filler plug



Front master cylinder & brake hose



Foot rest



Y.P.V.S. pulley

SPECIFICATIONS

General

Item \ Model	TZ250W
Model code number	3LC1
Frame starting number *Vehicle identification number	3LC-000101 * JYA3LC00 * HA000101
Engine starting number	3LC-000101
Dimensions:	
Overall length	1,935 mm (76.2 in)
Overall width	615 mm (24.2 in)
Overall height	1,120 mm (44.1 in)
Seat height	720 mm (28.3 in)
Wheelbase	1,335 mm (52.6 in)
Minimum ground clearance	115 mm (4.53 in)
Dry weight:	99 kg (218 lb)
Engine:	
Engine type	Liquid cooled 2-stroke gasoline
Cylinder arrangement	Parallel twin
Displacement	249 cc
Bore x Stroke	56 x 50.7 mm (2.20 x 1.99 in)
Compression ratio	8.1 : 1
Starting system	Push to start
Lubrication system:	Mixed gasoline
Mixing ratio	15 : 1 (Castrol R30), 30 : 1 (Castrol A747)
Oil type or grade (2-cycle):	
Transmission oil	Castrol R30 or SAE 20W40 SE motor oil
Periodic oil change	0.45 L (0.40 Imp qt, 0.48 US qt)
Total amount	0.5 L (0.44 Imp qt, 0.53 US qt)
Radiator capacity (Including all routes)	1.5 L (1.2 Imp qt, 1.4 US qt)
Air filter	None
Fuel:	
Type	Premium Gasoline/Premixed
Tank capacity	23.5 L (5.17 Imp gal, 6.21 US gal)
Carburetor:	
Type/Manufacturer	TM38 x 2/MIKUNI
Spark Plug:	
Type/Manufacturer	R5184-105/NGK
Gap	0.5 ~ 0.6 mm (0.020 ~ 0.024 in)
Clutch type:	Dry multiple-disk
Transmission:	
Primary reduction system	Spur gear
Primary reduction ratio	35/34 x 49/19 (2.655)
Secondary reduction system	Chain
Secondary reduction ratio	36/16 (2.250)
Transmission type	Constant mesh, 6-speed
Operation	Left foot operation

* For Canada and USA

Item	Model	TZ250W
Gear ratio [Option]	1st	28/14 (2.000)
	2nd	31/21 (1.476)
	3rd	26/21 (1.238)
	4th	27/25 (1.080)
	5th	26/27 (0.963)
	6th	20/22 (0.909)
Chassis:		
Frame type		Double cradle
Caster angle		23.5°
Trail		83 mm (3.27 in)
Tire:		
Manufacturer/Type	(F)	DUNLOP/KR133
	(R)	DUNLOP/KR133
Size/Air pressur	(F)	3.25/4.75-17/206 kPa (2.1 kg/cm², 29.9 psi)
	(R)	3.25/5.75-17/216 kPa (2.2 kg/cm², 31.3 psi)
Brake:		
Front brake type		Double disc brake
Operation		Right hand operation
Rear brake type		Disc brake
Operation		Right foot operation
Suspension:		
Front suspension		Telescopic fork
Rear suspension		Monocross
Shock absorber:		
Front shock absorber		Coil, spring/Oil damper
Rear shock absorber		Coil, gas spring/Oil damper
Wheel travel:		
Front wheel travel		120 mm (4.72 in)
Rear wheel travel		130 mm (5.12 in)
Electrical:		
Ignition system		CDI

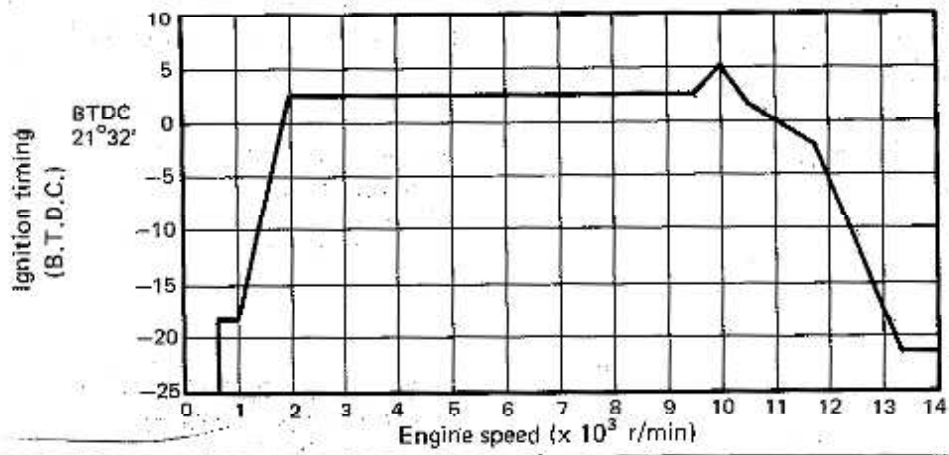
Chassis

Item \ Model	TZ250W
Steering system:	
Steering bearing type	Taper roller bearing
Front suspension:	
Front fork travel	120 mm (4.72 in)
Fork spring free length	293 mm (11.54 in)
Collor length	40 mm (1.57 in)
Spring rate	K = 4.8 N/mm (0.48 kg/mm, 26.9 lb/in)
Oil capacity	379 cm^3 (14.5 Imp oz, 12.8 US oz)
Oil level	95 mm (3.74 in)
Oil grade	Fork oil 5WT or equivalent fork oil
Rear suspension:	
Rear wheel travel	130 mm (5.12 in)
Shock absorber travel	65 mm (2.56 in)
Spring free length	220 mm (8.66 in)
Fitting length	203.5 mm (8.01 in)
< Min. ~ Max. >	191 ~ 220 mm (7.52 ~ 7.95 in)
Spring rate	K = 56.9 N/mm (5.8 kg/mm, 325 lb/in)
Enclosed gas pressure	1,200 kPa (12 kg/cm^2, 170 psi)
Rear arm:	
Swingarm free play limit	
End	< 1.0 mm (0.04 in) >
Side	< 0.4 mm (0.016 in) >
Wheel:	
Front wheel type/Material	Cast wheel/Aluminum
Rear wheel type/Material	Cast wheel/Aluminum
Front rim size	3.50 x 17
Rear rim size	4.50 x 17
Rim runout limit	
Radial	< 1.0 mm (0.040 in) >
Lateral	< 0.5 mm (0.020 in) >
Drain chain:	
Type/Manufacturer	RK520TRZ2/TAKASAGO
Number of links	104L
Chain slack	45 ~ 50 mm (1.77 ~ 1.97 in)

Item \ Model	TZ250W
Front disc brake:	
Disc outside dia. x Thickness	202 x 4 mm (11.10 x 0.16 in)
Pad thickness	5.3 mm (0.21 in)
< Limit >	< 1.0 mm (0.04 in) >
Master cylinder inside dia.	12.7 mm (0.5 in)
Caliper cylinder inside dia.	34 mm (1.34 in), 27 mm (1.06 in)
Brake fluid type	DOT #4
Rear disc brake:	
Disc outside dia thickness	210 x 4 mm (8.27 x 0.16 in)
Pad thickness	4.0 mm (0.16 in)
< Limit >	< 1.0 mm (0.04 in) >
Master cylinder inside dia	12.7 mm (0.50 in)
Caliper cylinder inside dia	25.4 mm (1.00 in)
Brake fluid type	DOT # 4
Brake lever & Brake pedal:	
Brake lever free play/Position	5 ~ 8 mm (0.2 ~ 0.3 in)/at lever end
Brake pedal free play	13 ~ 15 mm (0.51 ~ 0.59 in)
Clutch lever free play/Position:	10 ~ 15 mm (0.4 ~ 0.6 in)/at lever end

Electrical

Item \ Model	TZ250W
Ignition system:	
Ignition timing (B.T.D.C.)	2.0 ± 0.1 mm (0.08 ± 0.004 in)
Advancer type	Electrical



CDI	
Magneto-model/Manufacturer	TVCA31/NIPPONDENSO
Pickup coil resistance (Color)	235Ω ± 20% at 20°C (68°F) (Blue – White/Green)
Source coil resistance (Color)	50Ω ± 20% at 20°C (68°F) (Red – Green)
CDI Unit-Model/Manufacturer	CU1650/KOKUSAN
Ignition coil:	
Model/Manufacturer	TJ0240/NIPPONDENSO
Minimum spark gap	5 mm (0.2 in) or more
Primary winding resistance	0.33Ω + 15% at 20°C (68°F)
Secondary winding resistance	5.9kΩ ± 15% at 20°C (68°F)
Battery: [Y.P.V.S.]	
Type/Manufacturer	Ni-Cd Battery/MATSUSHITA
Capacity/Quantity	1.2V, 0.6A/10 (Series)

TIGHTENING TORQUE

	Item	Q'ty	Thread size	Tightening torque		
				Nm	m·kg	ft·lb
	ENGINE:					
	Cylinder head/Cylinder	8	M8 x 1.25	20	2.0	14
		8	M6 x 1.0	10	1.0	7.2
	Spark plug	2	M14 x 1.25	20	2.0	14
	Cooling water checking bolt	2	M6 x 1.0	9	0.9	6.5
	Y.P.V.S.:					
	Cover	8	M5 x 0.8	4	0.4	2.9
	Holder 1	2	M5 x 0.8	4	0.4	2.9
	Joint bolt	1	M5 x 0.8	4	0.4	2.9
*	Pulley 1	1	M5 x 0.8	4	0.4	2.9
	Holder 2	2	M3 x 0.5	1	0.1	0.7
	Cable setter	2	M5 x 0.8	6	0.6	4.3
	Clutch cover	4	M5 x 0.8	6	0.6	4.3
	Clutch boss	1	M20 x 1.0	75	7.5	54
	Clutch spring	6	M6 x 1.0	9	0.9	6.5
	Clutch adjusting screw locknut	1	M6 x 1.0	6	0.6	4.3
	Water pump	4	M6 x 1.0	11	1.1	8.0
	Oil pump	4	M6 x 1.0	10	1.0	7.2
*	Oil drain plug	1	M12 x 1.5	33	3.3	24
	Strainer cover	6	M6 x 1.0	11	1.1	8.0
	Crankcase	8	M8 x 1.25	20	2.0	14
		12	M6 x 1.0	11	1.1	8.0
	Crankcase cover 3	10	M6 x 1.0	6	0.8	5.8
	Intake Manifold	10	M6 x 1.0	11	1.1	8.0
	Reed valve	12	M3 x 0.5	1	0.1	0.7
	Drive sprocket	1	M20 x 1.0	75	7.5	54
	Shift pedal	1	M6 x 1.0	11	1.1	8.0
	Rotor	1	M12 x 1.0	53	5.3	38
	Stator	2	M6 x 1.0	7	0.7	5.1
	Silencer	4	M6 x 1.0	11	1.1	8.0
	Radiator	4	M6 x 1.0	6	0.6	4.3
*	Oil checking screw	1	M6 x 1.0	9	0.9	6.5
	CHASSIS:					
	Engine mounting bolt	2	M8 x 1.25	30	3.0	22
	Engine mount bracket:					
	Upper	4	M8 x 1.25	23	2.3	17
	Lower	1	M8 x 1.25	60	6.0	43
	Down tube	4	M8 x 1.25	30	3.0	22
	Handle crown:					
	Steering shaft	1	M14 x 1.25	54	5.4	39
	Inner tube	2	M8 x 1.25	18	1.8	13
	Front fork:					
	Cap bolt	2	M35	20	2.0	14
	Handlebar	4	M6 x 1.0	7	0.7	5.1
	Under bracket	4	M8 x 1.25	18	1.8	13
	Damper rod holding bolt	2	M12 x 1.25	40	4.0	28
	Steering damper bracket	2	M8 x 1.25	18	1.8	13
	Front wheel axle	1	M14 x 1.5	85	8.5	58
	Front wheel axle pinch	1	M8 x 1.25	18	1.8	13
	Rear arm:					
	Swing arm and connecting rod	2	M8 x 1.25	23	2.3	17
	Connecting rod and relay arm	1	M8 x 1.25	23	2.3	17
	Relay arm and frame	1	M8 x 1.25	23	2.3	17

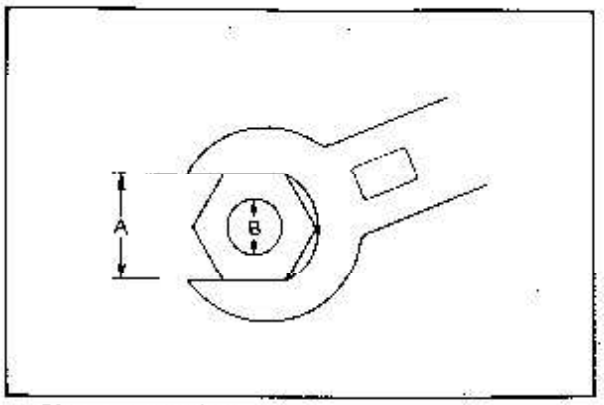
* : Use a locking wire

Item	Q'ty	Thread size	Tightening torque		
			Nm	m·kg	ft·lb
Pivot shaft	1	M18 x 1.0	115	11.5	85
Rear wheel axle	1	M18 x 1.5	115	11.5	85
Driven sprocket	5	M8 x 1.25	30	3.0	22
Rear shoack absorber	2	M8 x 1.25	23	2.3	17
Shock absorber bracket locknut	2	M22 x 1.0	38	3.8	27
Footrest bracket and frame	4	M8 x 1.25	23	2.3	17
* Footrest	2	M6 x 1.0	9	0.9	6.5
Disc brake: (Front)					
Brake disc	6	M8 x 1.25	20	2.0	14
* Caliper and front fork	2	M10 x 1.25	45	4.5	32
Caliper	4	M8 x 1.25	25	2.5	18
* Brake hose	1	M10 x 1.25	25	2.5	18
Air bleed screw	1	M8 x 1.25	6	0.6	4.3
Disc brake: (Rear)					
Brake disc	3	M8 x 1.25	20	2.0	14
* Caliper bracket and caliper	2	M10 x 1.25	45	4.5	32
* Pad retaining bolt	2	M6 x 1.0	10	1.0	7.2
* Brake hose	1	M10 x 1.25	25	2.5	18
Air bleed screw	1	M7 x 1.0	6	0.6	4.3
Tension bar	2	M10 x 1.25	30	3.0	22
Master cylinder:					
Master cylinder and handlebar	2	M6 x 1.0	7	0.7	6
Master cylinder and bracket (R)	2	M8 x 1.25	23	2.3	17
* Master cylinder and brake hose	2	M10 x 1.25	25	2.5	18
Cap	2	M5 x 0.8	2	0.2	1.4
Reservoir tank and frame	1	M6 x 1.0	7	0.7	5.1
Radiator	4	M6 x 1.0	7	0.7	5.1
Thermosensor	1	M16 x 1.5	16	1.6	11
Steering ring nut	1	M25 x 1.0	3	0.3	2
Chain protector	2	M6 x 1.0	7	0.7	6
Muffler and frame	2	M8 x 1.25	18	1.8	13
Rear fender	3	M6 x 1.0	10	1.0	7.2
Cowling:					
Stay bracket and frame	2	M6 x 1.0	15	1.5	11
Stay and frame	2	M6 x 1.0	7	0.7	6
Drive chain	2	M8 x 1.25	26	2.6	19
Seat and frame (front)	2	M6 x 1.0	10	1.0	7.2
Seat and frame (rear)	2	M8 x 1.25	26	2.6	19

* : Use a locking wire

General torque specifications

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



A: Distance across flats
B: Outside thread diameter

A (Nut)	B (Bolt)	Torque specifications Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11.0
14 mm	10 mm	30	3.0	22.0
17 mm	12 mm	55	5.5	40.0
19 mm	14 mm	85	8.5	61.0
22 mm	16 mm	130	13.0	94.0

DEFINITION OF UNITS

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

SETTING RECORD TABLE

The data shown here is an example of entry. For your actual use, copy the necessary data.

Event name				
Date				
Weather	Fine/25°C (77°F)			
Place				

Setting specs.

Ignition timing	1.3 mm			
Spark plug	N-82			
Carburetor				
Main jet	#480			
Power jet	# 60			
Jet needle	6BFP3-4			
Needle jet	R-8			
Cutaway	2.5			
Pilot jet	#40			
Air screw	1 and 1/2			
Float height	17.1 mm (0.67 in)			
Gearing				
1st	28/14 (2.000)			
2nd	31/21 (1.476)			
3rd	26/21 (1.238)			
Secondary				
Front fork				
Spring type	K = 0.48 kg/mm			
Spring pre-load	0 mm			
Tube height	21 mm			
Oil quantity	379 cm^3			
Level	95 mm (3.74 in)			
Weight	5WT			
Rear shock				
Spring type	K = 5.8 kg/mm			
Spring fitting length	191.5 mm (7.54 in)			
Seat height	720 mm (28.3 in)			
Front tire (pressure)	Dunlop KR149, 210 kPa (2.1 kg/cm^2, 29.9 psi)			
Rear tire (pressure)	Dunlop KR133, 220 kPa (2.2 kg/cm^2, 31.3 psi)			

NOTE:

1. Make setting changes in small increments.
2. When the proper settings have been determined for a particular track, they should be written down for reference upon returning to that track.
3. Always make adjustment in cold state.

YAMAHA MOTOR CO.,LTD.
IWATA, JAPAN

PRINTED IN JAPAN
88' • 10 - 0.3 x 1 C6
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