FOREWORD

This Service Manual has been written to acquaint the mechanic with the disassembly, reassembly, maintenance, and troubleshooting procedures required to provide optimum performance and longevity of the unit.
The information enclosed should be closely studied to avoid unnecessary repairs and to provide the owner with a sound, safe, dependable machine.
Other information is produced by the U.S. distributor, YAMAHA INTERNATIONAL CORPORATION, and is necessary to provide total technical coverage regarding the product.

NOTE:

The Research and Engineering Departments of Yamaha are continually striving to further perfect all models. Improvements and modifications are therefore inevitable.
In light of this fact, all specifications within this manual are subject to change without notice. Information regarding changes is forwarded to all Authorized Yamaha Dealers as soon as available.

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SERVICE MANUAL
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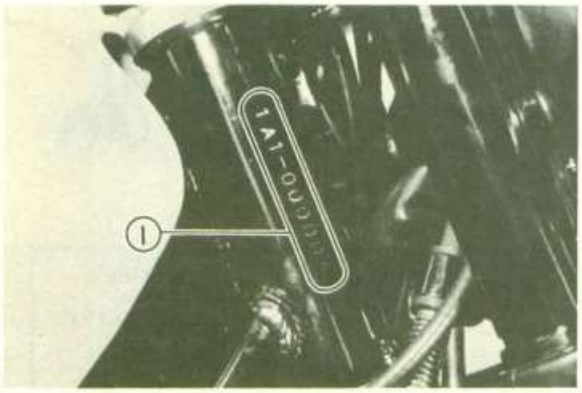
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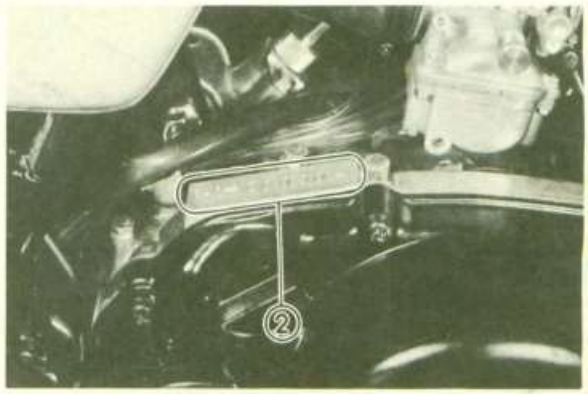
CHAPTER 1. GENERAL INFORMATION

1-1. MACHINE IDENTIFICATION

The frame serial number is located on the right-hand side of the headstock assembly. The first three digits identify the model. This is followed by a dash. The remaining digits identify the production number of the unit. The engine serial number is located on a raised boss on the upper rear, right-hand side of the engine. Engine identification follows the same code as frame identification.

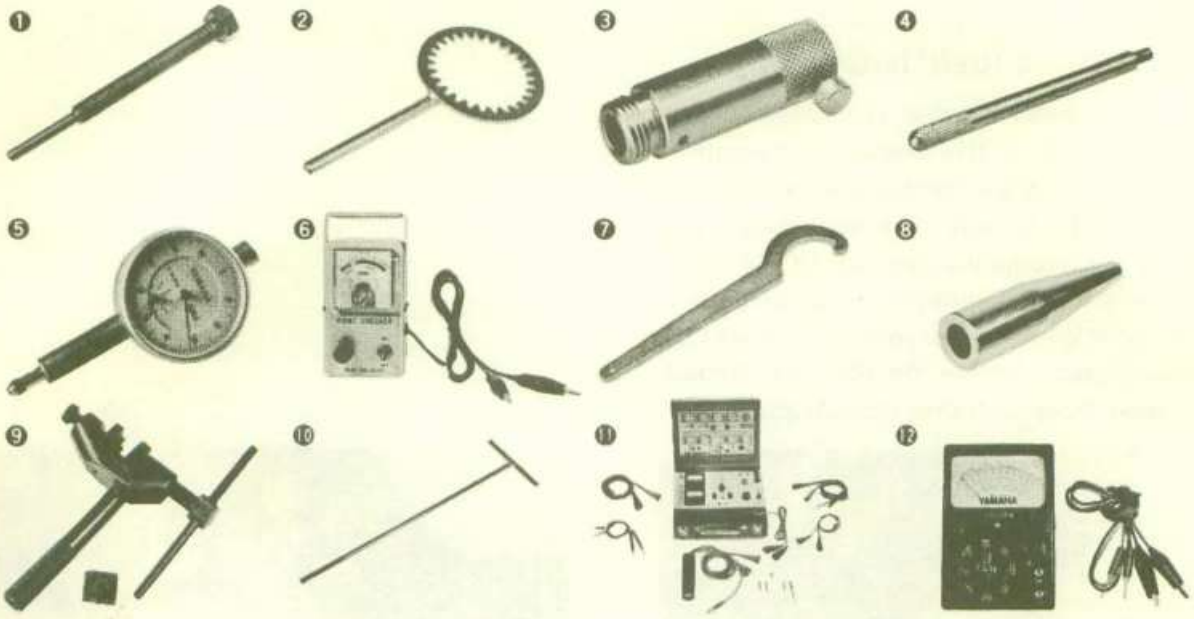


1. Frame serial number



2. Engine serial number

1-2. SPECIAL TOOLS



No.	Description	Tool No.
1	Armature puller bolt	90890-01111
2	Clutch holding tool	90890-01024
3	Dial gauge stand #2	90890-01195
4	Dial gauge needle L = 56 mm (2.24 in)	90890-03042
5	Dial gauge	90890-03002
6	Point checker	90890-03064
7	Steering nut wrench	90890-01051

No.	Description	Tool No.
8	Cylinder cup installer	90890-01171 (Front disc)
		90890-01219 (Rear disc)
9	Drive chain cutter	90890-01081
10	Fork spring guide wrench	90890-01212
11	Electro tester	90890-03021
12	Pocket tester	90890-03096

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PERIODIC INSPECTION AND ADJUSTMENT

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CHAPTER 2.
PERIODIC INSPECTION AND ADJUSTMENT

2-1. INTRODUCTION

This chapter includes all information necessary to perform recommended inspection and adjustments. These preventive maintenance procedures, if followed, will insure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies not only to vehicles already in service, but also to new vehicles that are being prepared for sale. Any service technician performing preparation work should be familiar with this entire chapter.

2-2. MAINTENANCE INTERVALS CHARTS

The following charts should be considered strictly as a guide to general maintenance and lubrication intervals. You must take into consideration that weather, terrain, geographical location, and a variety of individual uses all tend to alter this time schedule. For example, if the motorcycle is continually operated in an area of high humidity, then all parts must be lubricated much more frequently than shown on the chart to avoid damage caused by water to metal parts.

A. Maintenance intervals

Item	Remarks	Period						
		Initial (miles)				Thereafter every (miles)		
		250	500	1,000	2,000	1,000	2,000	8,000
Brake system (Complete)	Check/Adjust as required — Repair as required		○	○		○		
Clutch	Check/Adjust as required		○	○		○		
Battery	Top-off/Check specific gravity as required — Monthly or →	○		○		○		
Spark plug	Inspect/Clean or Replace as required	○	○	○		○		
Wheels and tires	Tire Pressure/Wear/Balance	○	○	○		○		
Fittings and fasteners	Tighten before each ride and/or →	○	○	○		○		
Autolube	Cable operation/Adjustment	○	○	○			○	
Drive chain	Tension/Alignment	○	○	○		○	○	
Oil level check	Includes Transmission, Autolube (See Service Note No. 1) and Brake Fluid (See Service Note No. 10)	○	○	○		○		
Air filter	Paper type (See Service Notes No. 2)	○	○	○		○		
Fuel petcock	Clean/Flush tank as required	○		○			○	
Ignition timing	Adjust/Clean or Replace parts as required		○	○			○	
Carburetor Adjustment	Check Operation/Adjustment/ Fittings		○	○			○	
Decarbonize Engine	Includes exhaust system (See Engine Overhaul — Chapter 3)			○			○	

Service Notes:

No. 1 Check Autolube tank level before each ride.

No. 2 Clean the filter element with compressed air. The element is made of filter paper and should be kept free of water and oil. Remove and clean filter at least once per month or every 250 ~ 500 miles (400 ~ 800 km).

No. 3 For additional information regarding drive chain maintenance, engine oil level etc., see "Lubrication intervals".

B. Lubrication intervals

Item	Remarks	Lubricant (See list)	Period							
			Initial (miles)				Thereafter (miles)			
			250	500	1,000	2,000	1,000	2,000	4,000	8,000
Autolube	See "Service Notes"	No. 1								
Transmission oil	Warm engine before draining	No. 2	CHK	○	○		CHK	○		
Drive chain	Lube/Adjust as required	No. 4	See service notes							
	Remove/Clean — Lube/Adjust	No. 4			○		○			
Control and meter cables	All — apply thoroughly	No. 4			○	○		○		
Throttle grip and housing	Light application	No. 5				○		○		
Speedometer gear housing	Light application	No. 5				○			○	
Rear arm pivot shaft	Apply until grease shows	No. 6			○		○			
Brake pedal shaft	Light application	No. 5			○			○		
Stand shaft pivot	Light application	No. 5			○			○		
Front forks	Drain completely/ Check Specs.	No. 3		CHK		○	CHK	○		
Steering ball races	See "Chassis Overhaul" Chapt. 5	No. 7				○		CHK	○	
Point cam lubricating wick	Very light application	No. 8							CHK	
Wheel bearings	See "Chassis Overhaul" Chapt. 5	No. 7				○	CHK	○		

Recommended lubricant type

No. 1 Check Autolube tank level before each ride. Top off before any prolonged use. Use the following lubricants (in order of preference):

a. Yamalube 2-cycle
b. 2-cycle oil with "BIA certified for service TC-W"
c. 2-cycle oil for air-cooled engines
d. 10W/30 Automotive oil with the "SE" rating

CAUTION:

Use this last oil only in an emergency situation when 2-cycle oils are not available.

NOTE:

Oil types should not be mixed. This is particularly true of synthetic-base and petroleum-base oils. Mixing of these types will cause a chemical reaction and often curdle the oils, seriously altering their lubricating qualities.

No. 2 At ambient temperatures of 0 ~ 30°C (32 ~ 86°F), use "Yamalube 4-cycle". Do not use "additives" in oil.

No. 3 Use Yamaha fork oil.

No. 4 Use 10W/30 "SE" motor oil. (If desired, specialty lubricants of quality manufacture may be used.)

Drive chains — Lube every 150 ~ 200 miles (250 ~ 350 km). In severe conditions every 50 ~ 100 miles (80 ~ 150 km).

No. 5 Use cable/chain lubricant (specialty types available — use name-brand of quality manufacture).

No. 6 Use a soft chassis lube grease.

No. 7 Medium-weight wheel bearing grease of quality manufacture (preferably waterproof).

No. 8 Lightweight machine oil.

2-3. ENGINE

A. Carburetor

1. Make certain that throttle cable free play and carburetors synchronization is correct.
2. Pilot air screw
   Turn air adjusting screw until it lightly seats, then back its out to specification. This adjustment can be made with engine stopped.

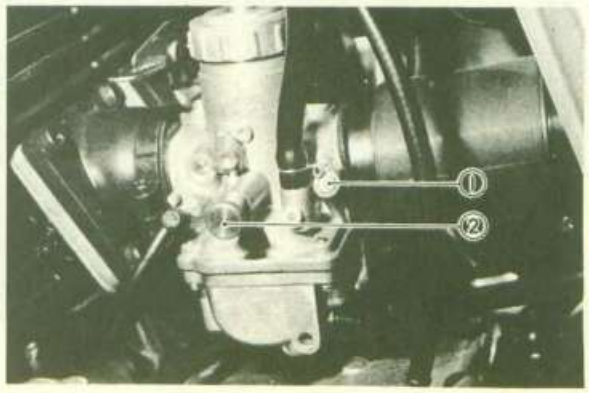
Air screw (Turns out):
1-1/2 left and right

NOTE:

Right-hand carburetor pilot air screw located on inboard side of right carburetor.

3. Start the engine and let it warm up.
4. Throttle stop screw
   Turn throttle stop screw in or out to achieve smooth engine operation at specified idle speed.
   Left-hand and right-hand throttle stop screws must be set so that both cylinders are working together.

Idling speed:
1,100 ~ 1,200 rpm



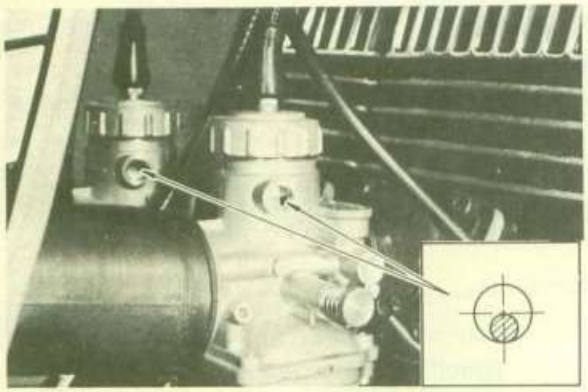
1. Pilot air screw 2. Throttle stop screw

NOTE:
The pilot air and throttle stop screws are separate adjustments but they must be adjusted at the same time to achieve optimum operating condition at engine idle speeds.

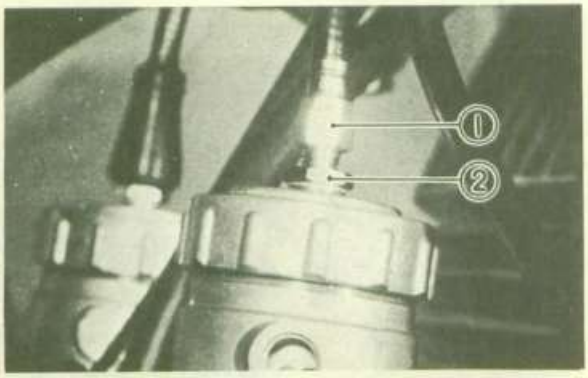
5. Synchronizing carburetors
Both cylinders will not operate evenly unless the carburetion system for each side is identical. If one carburetor slide is higher than the other slide, overall poor engine performance will result.

a. Remove the bolts from the throttle opening adjusting ports of both right and left carburetors, and fully turn the throttle grip out.

b. Adjust the marks on the throttle slides in both carburetors to the positions as illustrated.



1) Loosen the locknuts.
2) By turning the adjusters in or out, adjust the throttle slides to the same position.
3) Tighten the locknuts.



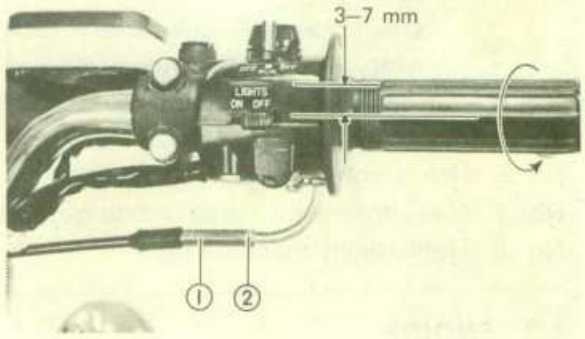
1. Adjuster 2. Locknut

c. Turn the throttle grip in once, and fully open it again. With the throttle grip in this position, check the position of both throttle slides.

d. Install the bolts and tighten.

NOTE:
During this operation, take care so that no dust enters the carburetor.

6. Throttle cable
After engine idle speed and carburetors synchronization are set, check play in turning direction of throttle grip. The play should be 3 ~ 7 mm (0.12 ~ 0.28 in) at grip flange. Loosen the locknut and turn the wire adjuster to make the necessary adjustment. After adjusting, be sure to tighten the locknut properly.



1. Adjuster 2. Locknut

B. Air cleaner

1. Remove the air cleaner element assembly.

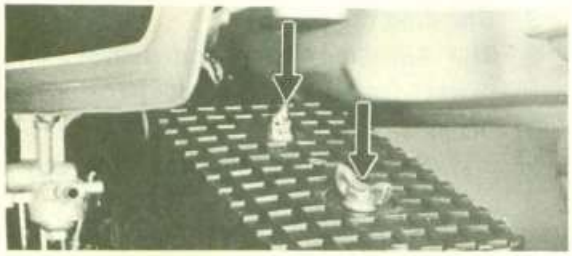
a. Turn the fuel cock lever to "OFF" position, and remove the fuel pipes.

b. Lift the seat and remove the bolts (2) holding the fuel tank. Lift the tank.



NOTE:
In this step take care that the fuel level pipe (front end of fuel tank) is not disconnected.

c. Remove the air filter case cap by removing the wing nuts (2). Pull out the element.



2. The air cleaner should be cleaned by blowing with compressed air, and/or by lightly tapping the filtering paper so that the dust may be removed.

NOTE:

The element is made of paper and should be kept away from water and oil.

CAUTION:

Never operate the engine with the air cleaner element removed. This will allow unfiltered air to enter, causing rapid wear and possible engine damage. Additionally, operation without the cleaner element will affect carburetor tuning with subsequent poor performance and possible engine overheating.

C. Autolube pump

1. Cable adjustment

NOTE:

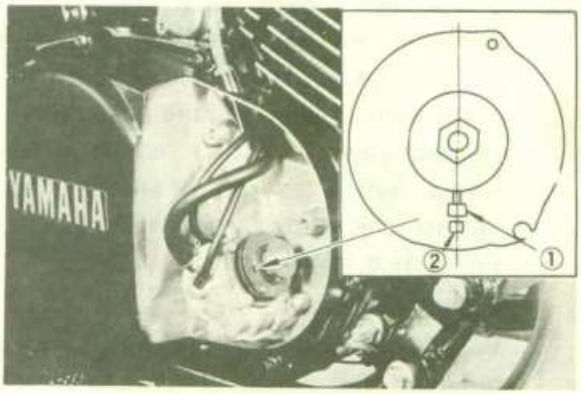
Prior to this adjustment, make sure that the throttle valve can be opened to the full-open position.

a. Remove Autolube pump cover, which is located on forward portion of the righthand crankcase cover.



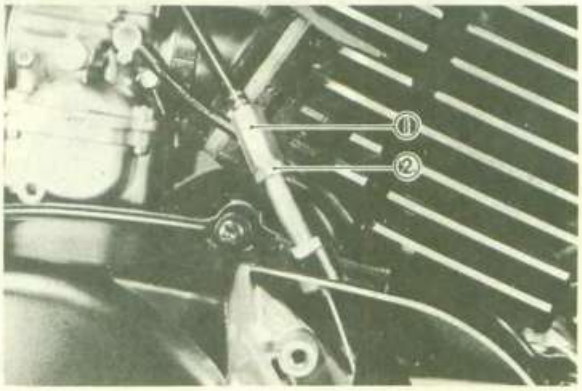
b. Fully open the throttle grip. Hold this position.

c. Check to see that Autolube pump plunger pin is aligned with the mark on the Autolube pump pulley.



1. Plunger pin 2. Mark

d. If the mark and pin are not in alignment, loosen cable length adjustor *lock nut* on top of crankcase cover and adjust cable length until alignment is achieved.



1. Adjuster 2. Locknut

e. Apply grease on pump pulley.

f. Tighten adjustor locknut.

NOTE:

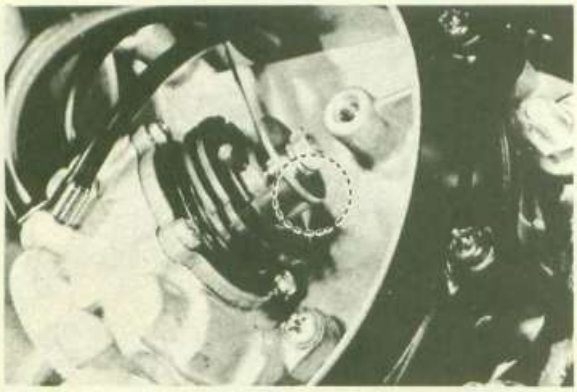
Before adjusting Autolube cable always set carburetors synchronization and throttle cable free play first. (Refer to page 10.)

2. Pump stroke adjustment

Normally the checking and adjustment of the pump stroke are not required, but if any sign of trouble resulting from an incorrect minimum pump stroke is noticed (e.g., excessive engine oil consumption or engine seizure), proceed as follows:

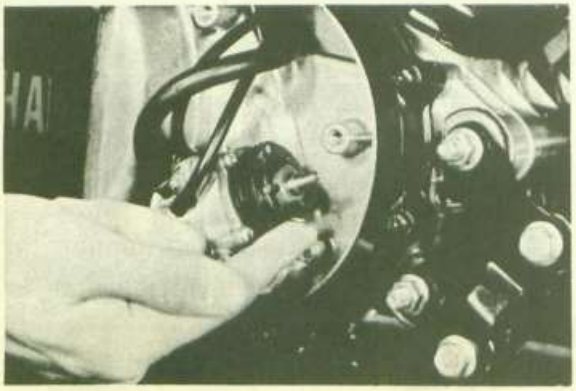
a. Remove the pump cover and start the engine.
b. While running the engine idle, observe the pump adjust plate carefully, and stop the engine the moment that the adjust plate moves out to the limit.
c. Measure the gap with the thickness gauge between the raised boss on the pump adjust pulley and the adjust plate.
d. Repeat steps 2. and 3. above a few times. When the gap measured is the largest, the pump stroke is considered to be at a minimum.

NOTE:
When inserting the thickness gauge between the adjusting plate and the adjusting pulley, be careful so that either the plate or the pulley is not moved. In other words, do not force the thickness gauge into the tap.



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

e. If clearance is not correct, remove the adjust plate locknut and the adjust plate.
f. Remove or add an adjustment shim as required.

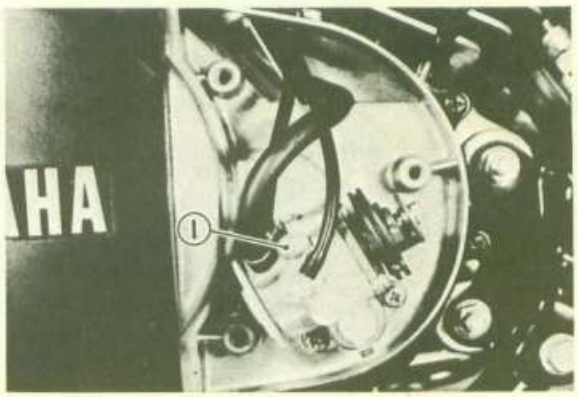


g. Re-install adjustment plate and locknut. Re-measure gap. Repeat procedure as required.

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

a. Bleeding the pump case and/or oil pipe
   1) Remove the pump cover and remove the bleed screw.
   2) Keep the oil running out until air bubbles disappear.
   3) When air bubbles are expelled completely, tighten the bleed screw and install the pump cover.

NOTE:
Check the bleed screw gasket, and if damaged, replace with a new one.



1. Bleed screw

b. Bleeding the pump distributor and/or delivery pipe.
   1) Start the engine.
   2) Pull the pump wire all the way out to set the pump stroke to a maximum.

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

3) Keep the engine running at about 2,000 rpm for five minutes or so, and both distributor and deliverly pipe can be completely bled.

D. Engine and transmission oil

1. Engine

a. Autolube oil

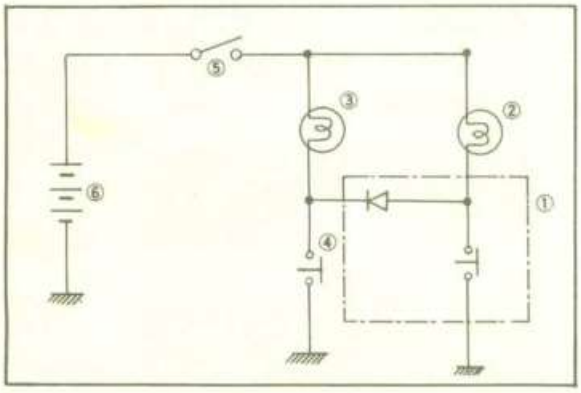
We recommend that your first choice be Yamalube 2-cycle. If for any reason you should use another type, the oil should have the BIA certification "for service 'TC-W'". Check container top or label for service specification. If the above oils not available, use a 30W or 40W 2-stroke oil for air-cooled engines.

b. Autolube tank

Always check Autolube tank oil level before operating machine. If oil caution light comes on, remove filler cap and top off tank.

NOTE:

The oil caution light has been designed to come on when the transmission is in the neutral position. This will allow you to frequently check the condition of the bulb. If the caution light does not come on while the machine is in neutral, check the condition of the bulb.



1. Oil level switch assembly
2. Oil caution light
3. Neutral light
4. Neutral switch
5. Main switch
6. Battery

2. Transmission

a. The dip stick is located above and slightly in front of the kick crank.

To check level, start the engine and let it run for several minutes to warm and distribute oil with the engine stopped, unscrew the dipstick and clean. Set it on the case threads in a level position. Remove and check level.



1. Dip stick

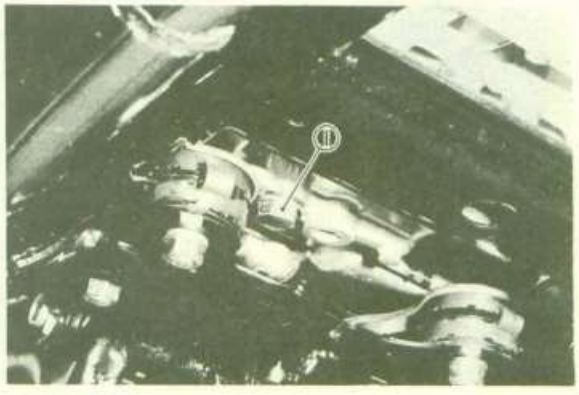
NOTE:

Be sure the machine is level and on both wheels.

b. The stick has Minimum and Maximum marks. The oil level should be between the two. Top off as required.

Recommended oil:
Yamalube 4-cycle oil or SAE 10W/30 automotive oil with "SE" rating

c. A drain plug is located on the bottom of the crankcase. With the engine warm, remove the plug and drain oil. Re-install plug and add fresh oil.



1. Drain plug

Transmission drain plug torque:
1.5 ~ 2.1 m-kg (10.8 ~ 15.2 ft-lb)
Transmission oil quantity:
Total: 1,700 cc (1.8 US.qt)
Exchange: 1,500 cc (1.6 US.qt)

NOTE:

Transmission oil should be replaced several times during the break-in period.

CAUTION:

Under no circumstances should any additives be included with the transmission oil. This oil also lubricates and cools the clutch. Additives may cause clutch slippage.

E. Clutch

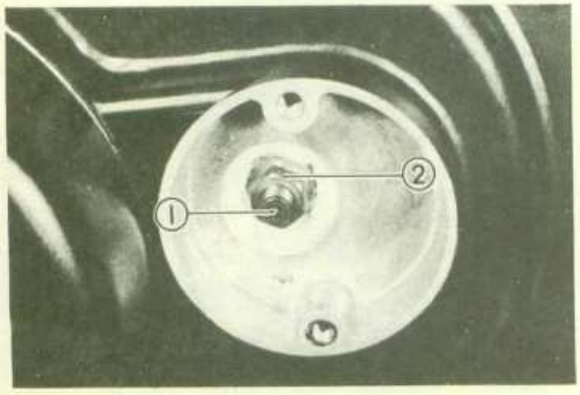
Proper *clutch adjustment* requires two separate procedures.

1. Loosen cable adjustor locknut.
2. Turn clutch cable adjustor (at lever) all the way into the lever holder.

NOTE:

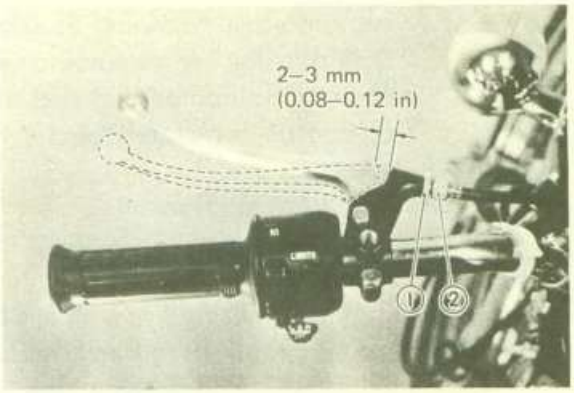
The above procedure provides for maximum cable free play to allow for proper clutch actuating mechanism adjustment.

3. Remove the clutch adjusting cover.
4. Loosen the adjusting screw locknut, and slowly tighten the adjusting screw until resistance is felt.
   This means that the play of the push rod is removed; back off adjusting screw 1/4 turn.



1. Adjusting screw 2. Locknut

5. Tighten locknut and replace the cover.
6. At clutch lever assembly, turn cable length adjustor in or out until proper lever free play is obtained.



1. Locknut 2. Adjuster

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

7. Tighten clutch lever adjustor locknut.

F. Cylinder head

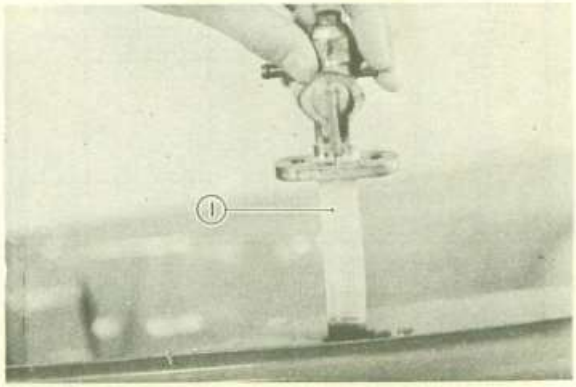
Check torque of cylinder head holding nuts. If loose, tighten in a crisscross pattern until proper torque is achieved.

Cylinder head nut torque:
1.9 ~ 2.1 m-kg
(13.7 ~ 15.2 ft-lb)

2-4. CHASSIS

A. Fuel petcock

1. Clean fuel filter
   a. Drain the fuel into the fuel tank.
   b. Remove the Phillips head screw on fuel petcock and remove the fuel petcock assembly.



1. Filter screen

   c. Clean the filter.

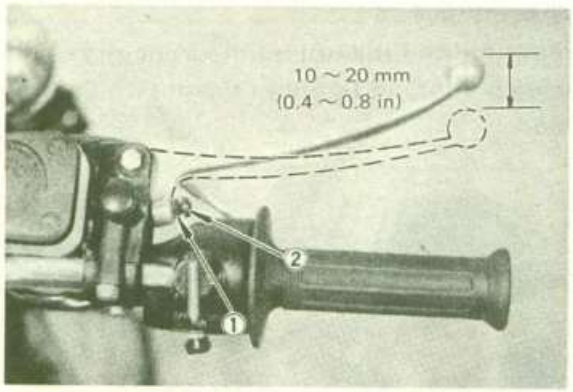
NOTE:

If filter is damaged, replace its assembly.

B. Brakes and wheels

1. Brake adjustment
   The brake can be adjusted by simply adjusting the distance that the brake lever and pedal can travel. (The piston in the caliper moves forward as the brake pad wears out, automatically adjusting the clearance between the brake pad and the brake disc.)

a. Front disc
   1) Loosen the adjusting screw locknut.
   2) By turning the adjusting screw in or out, adjust the play of the brake lever and then tighten the locknut.



1. Locknut 2. Adjusting screw

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

NOTE:
Check freedom of adjusting screw and switch case.

b. Rear disc
   1) Loosen the adjuster locknut at the push rod.
   2) By turning the adjuster in or out, adjust the play of the brake pedal and then tighten the locknut.

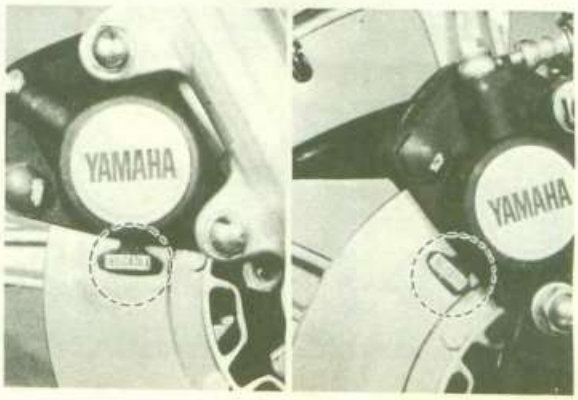


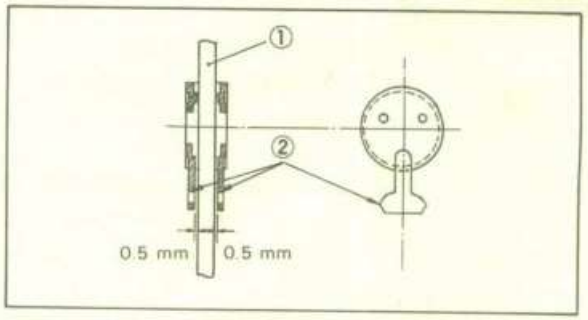
1. Adjuster 2. Locknut

Free play:
5 ~ 10 mm
(0.2 ~ 0.4 in)

NOTE:
Check brake rod whether it is free play.

2. Brake pad check
   The pads are provided with a wear indicator for checking the condition of the brake without the need for disassembly.

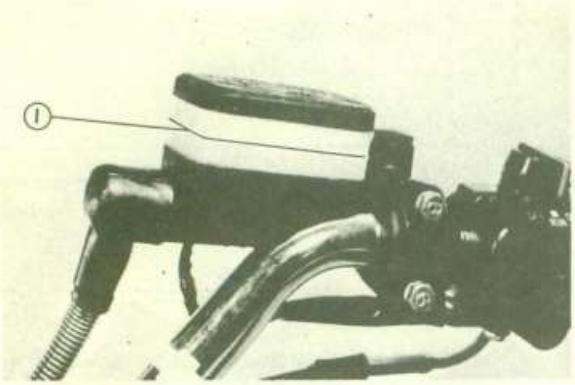




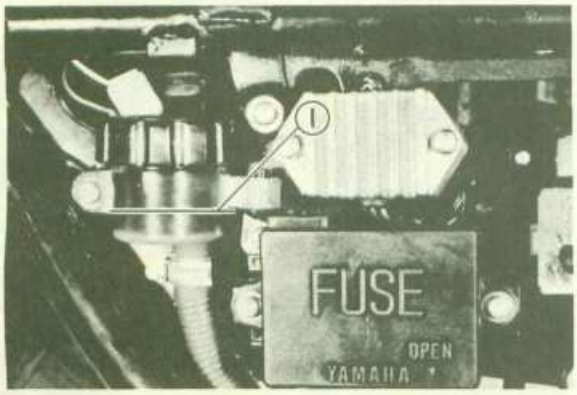
1. Brake disc 2. Indicator

3. Check the brake fluid level
   Insufficient brake·fluid may allow air to enter the brake system, possibly causing the brake to become ineffective. Check the brake fluid level and replenish when necessary and observe these precautions.

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



1. Lower level



1. Lower level

Recommended brake fluids: DOT #3 with 240°C (464°F) boiling point

b. Refill with the same type and brand of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.

c. Be careful that water or other contamination does not enter the master cylider when refilling. Water will significantly lower the boiling point and may result in vapor lock.

4. Checking the aluminum wheels.

a. Check for cracks, bends or warpage of the wheels. If a wheel is deformed or cracked, it must be replaced.

NOTE:

These aluminum wheels are not designed for use with tubeless tires.

b. Raise the wheel off the ground. Spin.

Rim runout limits: *Vertical* — 2 mm (0.08 in) Lateral — 1 mm (0.04 in)

5. Front axle

a. Check axle nuts.

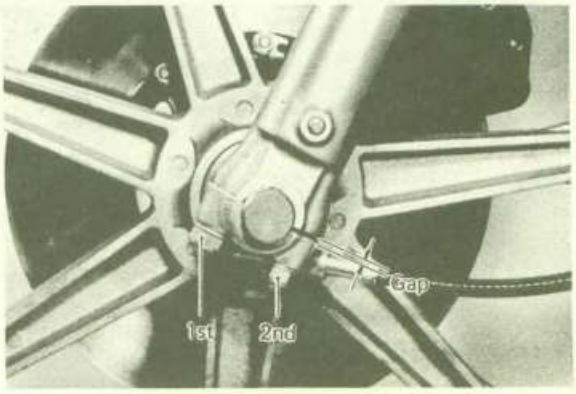
Front axle nut torque: 8.3 ~ 13 m-kg (60 ~ 94 ft-lb)
Rear axle nut torque: 12 ~ 18 m-kg (87 ~ 130 ft-lb)

b. Check axle holder nuts (right side).

Front axle holder nut torque: 1.1 ~ 1.8 m-kg (8.0 ~ 13.0 ft-lb)

CAUTION:

First tighten the nut on the front end of the axle holder, and tighten the nut on the rear end.



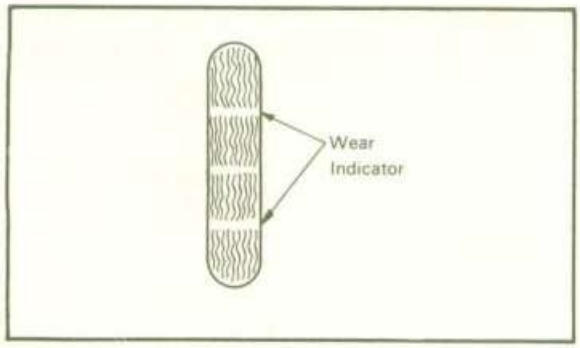
6. Tires

a. Tire pressure

	Front tire	Rear tire
Normal riding	1.8 kg/cm² (26 lb/in²)	2.0 kg/cm² (28 lb/in²)
Continuous high speed riding or with passenger	2.0 kg/cm² (28 lb/in²)	2.3 kg/cm² (32 lb/in²)

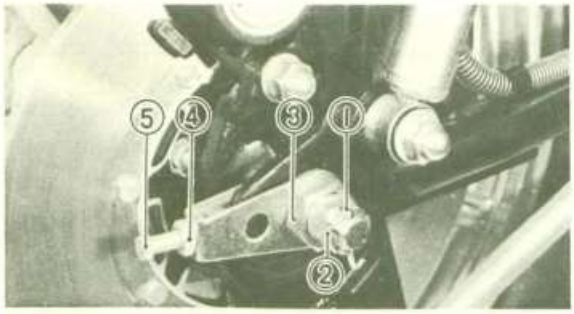
b. Check the tire wear

If a tire tread shows cross wise lines, it means that the tire is worn to its limit. Replace the tire.



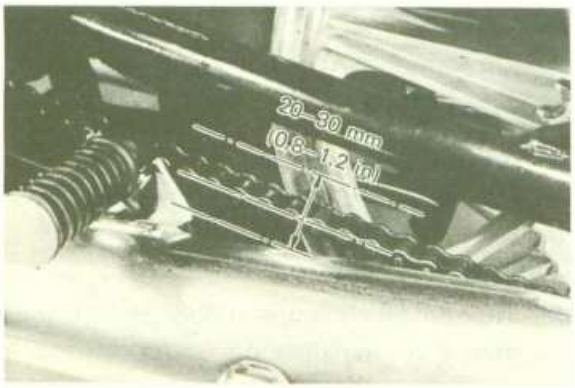
C. Drive chain

1. Drive chain adjustment
   To adjust drive chain, proceed as follows:
   a. Remove rear axle cotter pin.
   b. Loosen rear axle securing nut and caliper bracket shaft nut.
   c. Remove tension bar bolt cotter pin and loosen tension bar lock nut.



1. Cotter pin
2. Axle nut
3. Caliper bracket shaft nut
4. Locknut
5. Adjusting bolt

   d. With rider in position on machine both wheels on ground, set axle adjustors until there is specified freeplay in the drive chain at the bottom of the chain a point midway between the drive and driven sprockets.



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

   e. Turn chain puller bolts until both ends of the axle are positioned evenly. This can be checked by utilizing the marks on the very end of the swing arm, just above the rear axle.
   Tighten caliper bracket shaft nut, rear axle securing nut and tension bar locknut.

Caliper bracket shaft nut torque:
5 ~ 8 m-kg (36 ~ 58 ft-lb)
Rear axle securing nut torque:
12 ~ 18 m-kg (87 ~ 130 ft-lb)
Tension bar locknut torque:
1.4 ~ 2.2 m-kg (10 ~ 16 ft-lb)

   f. Install new cotter pins at rear axle and tension bar bolt, and bend the end over.

NOTE:
Tighten bolt locknuts thoroughly.

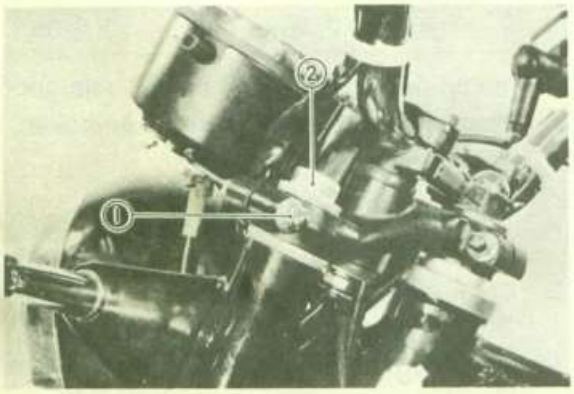
2. Drive chain maintenance
   The chain should be lubricated according the recommendations given in the Maintenance and Lubrication Interval Charts. Lubrication should be performed more often if possible and preferably after every use.
   a. Wipe off dirt with shop rag. If accumlation is severe, use wire brush, then rag.
   b. Apply lubricant between roller and side plates on both inside and outside of chain.
   Don't skip a portion as this will cause uneven wear.
   Apply thoroughly. Wipe off excess.

NOTE:
Choice of lubricant is determined by use and terrain. SAE 20W or 30W motor oil may be used, but several specialty lubricants offered by accessory manufacturers offer more penetration and corrosion resistance for roller protection. In certain areas, semi-drying lubricants are preferable. These will resist picking up sand particles, dust, etc.

c. Periodically, remove the chain. Wipe and/or brush excess dirt off. Blow off with high pressure air.
d. Soak chain in solvent, brushing off remaining dirt. Dry with high pressure air. Lubricate thoroughly while off machine. Work each roller thoroughly to make sure lubricant penetrates. Wipe off excess. Re-install.

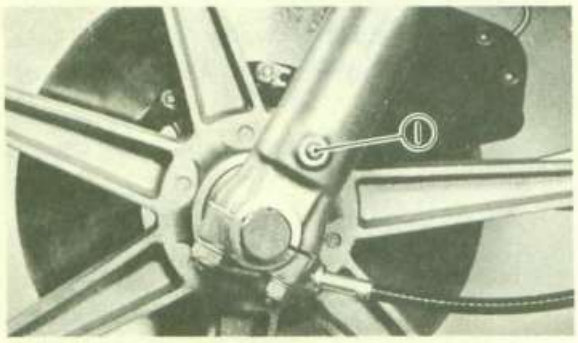
D. Front fork oil change

1. With the front wheel removed or raised off the floor with a suitable frame stand, loosen pinch bolt at the top of each inner fork tubes.
2. Remove cap bolts from inner fork tubes.



1. Pinch bolt 2. Cap bolt

3. Remove drain screw from each outer tube with open container under each drain hole.



1. Drain screw

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

NOTE:
Check gasket. Replace if damaged.

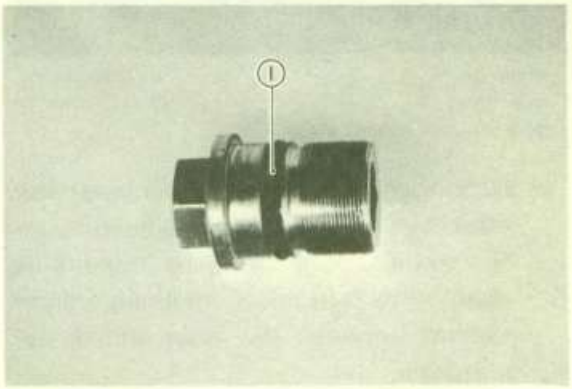
6. Pour specified amount of oil into the inner tube through the upper end opening.

Front fork oil:
Yamaha fork oil 10W, 20W, 30W

NOTE:
Specialty fork oils of quality manufacture may be used. Select the weight oil that suits local conditions and your preference (lighter for less damping; heavier for more damping).

Front fork oil capacity:
144 ±4 cc (4.87 oz) each side
Front fork oil level: (below the top of the fork) 389 ±10 mm each side (15.3 ±0.4 in)

7. After filling, slowly pump the outer tubes up and down to distribute the oil.
8. Inspect O-ring on fork cap bolts and replace if damaged.



1. O-ring

9. Replace fork cap bolts and torque to specification.

Fork cap torque:
1.5 ~ 3.0 m-kg (11 ~ 22 ft-lb)

10. Tighten pinch bolts at fork crown and torque to specification.

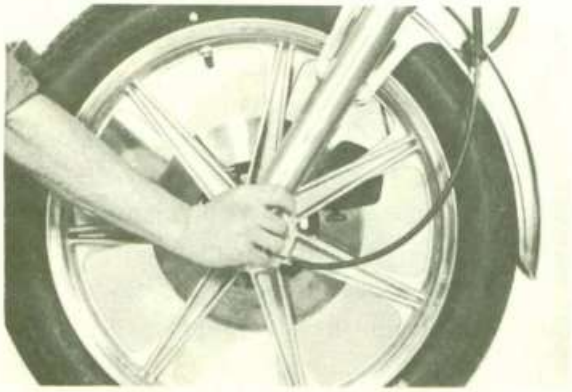
Fork tube pinch bolt torque:
1.4 ~ 2.2 m-kg (10 ~ 16 ft-lb)

E. Suspension, steering and swing arm

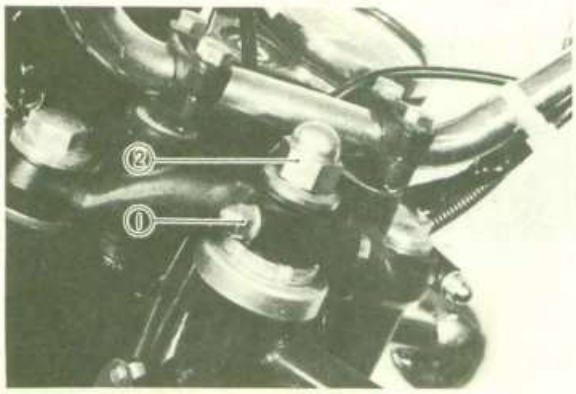
1. Steering head adjustment
   The steering assembly should be checked periodically for looseness.
   Do this as follows:

a. Block machine up so that front wheel is off the ground.

b. Grasp bottom of forks and gently rock fork assembly backward and forward, checking for looseness in the steering assembly bearings.



c. If steering head needs adjustment, loosen crown pinch-bolt and steering fitting nut.



1. Pinch bolt 2. Fitting nut

d. Using steering nut wrench, adjust steering head fitting nut until steering head is tight without binding when forks are turned.



1. Steering nut wrench

NOTE:

Excessive tightening of this nut will cause rapid wear of ball bearings and races. Re-check for looseness and freedom of movement.

e. Tighten steering fitting bolt and crown pinch bolt in that order.

NOTE:

After completing steering adjustment, make certain forks pivot from stop to stop without binding. If binding is noticed, repeat adjustment.

2. Suspension

a. Check all suspension components for proper operation.

b. Check all suspension components for proper tightness.

c. Check rear shocks (right and left) for identical adjustment.

3. Swing arm

a. Check for freedom of up and down movement.

b. Check side to side freeplay.

Swing arm free play:
1 mm (0.04 in) at end of swing arm

c. Check all securing bolts for proper tightness.

d. Grease swing arm periodically.

2-5. ELECTRICAL

A. Contact breaker points

1. Apply a few drops of light-weight machine oil or distributor lubricant to the point cam lubricator.
2. The ignition points can be lightly sanded with oil stone to remove corrosion. Place a piece of clean paper between the points, let them close, and remove the paper. Repeat until no residue shows. The paper may be dipped in lacquer thinner or point cleaning fluid to remove oil and sanding residue from point surfaces.



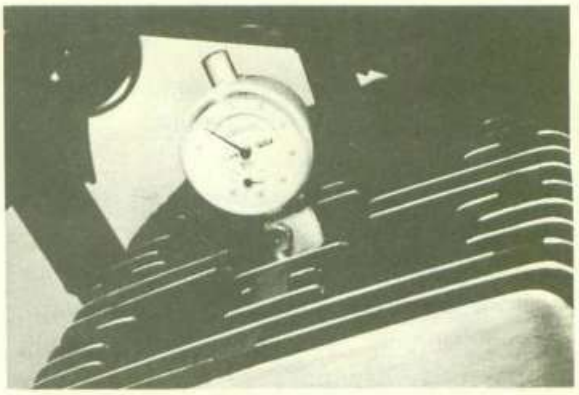
3. Point replacement should only be necessary when point gap exceeds maximum tolerance; when the points are severely pitted or if the points become shorted or show faulty operation.

NOTE:
New points, when installed, must be cleaned and adjusted.

B. Ignition timing

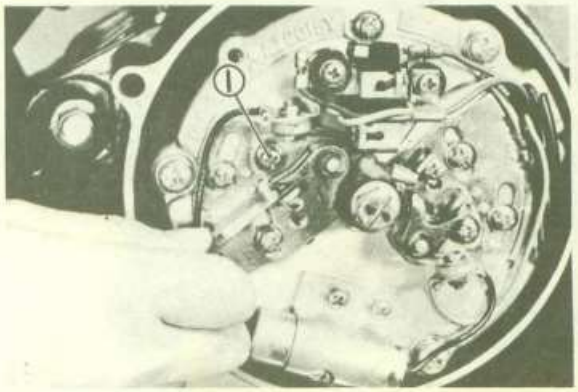
Ignition timing must be set with dial gauge and point checker.
Proceed as follows:

1. Put machine in neutral.
2. Remove spark plug and screw dial gauge stand in to spark plug hole.



3. Insert dial gauge into stand.
4. Remove generator cover.
5. Adjust ignition points
   a. Rotate crankshaft counterclockwise and insert a thickness gauge of 0.35 mm (0.014 in) with the point gap at maximum. The gap is satisfactory if the thickness gauge can be inserted.
   b. If the gap is not proper, adjust by moving the contact point assembly. Repeat this procedure for each set of points.

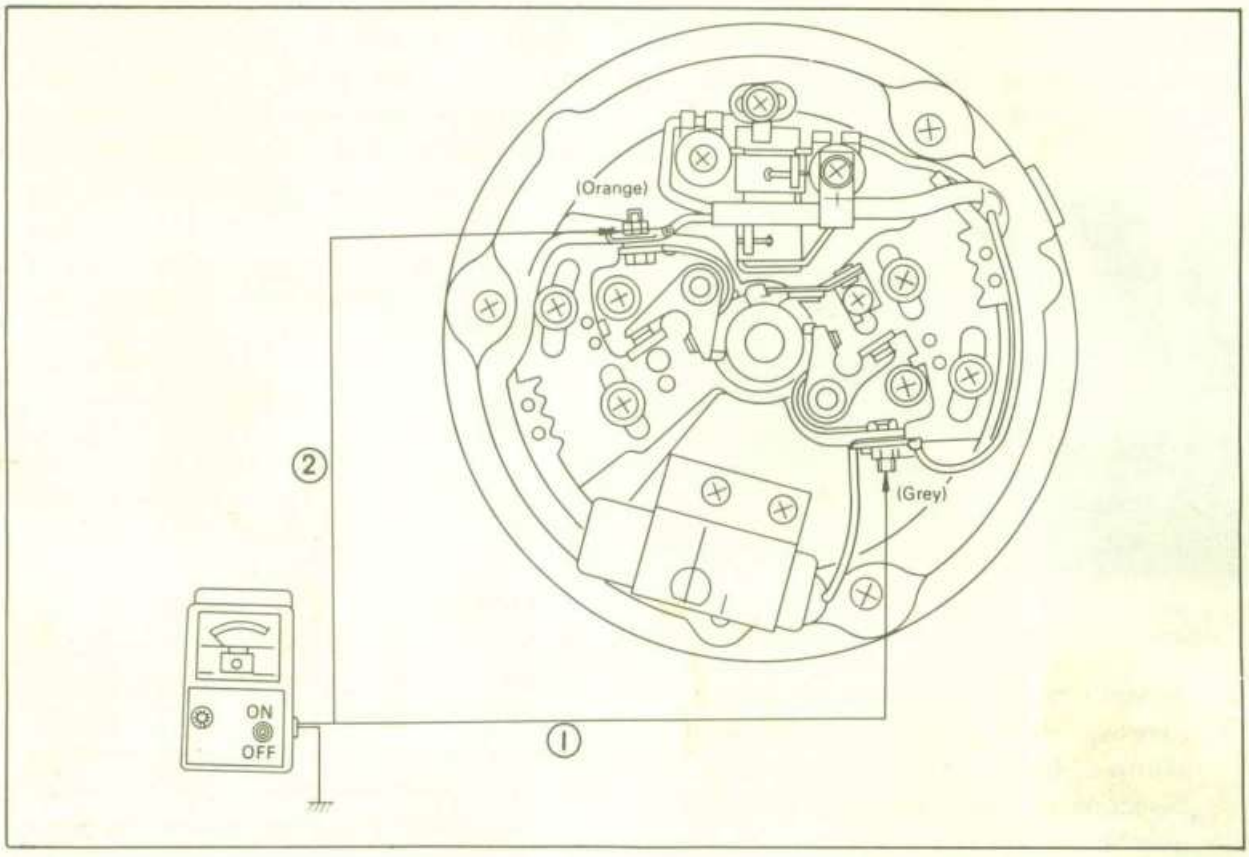
Point gap:
0.30 ~ 0.40 mm (0.012 ~ 0.016 in)



1. Adjusting screw

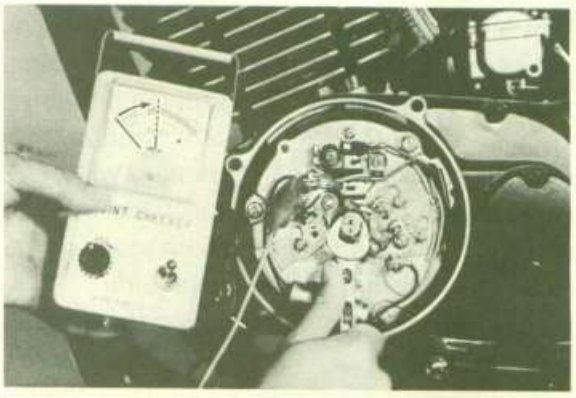
6. Switch on point checker and adjust.

7. Connect point checker terminals to point assembly.
   Positive (Red) lead to orange terminal for left-hand cylinder or grey terminal for right-hand cylinder.
   Negative (Black) lead to a good ground.



1. Right-hand cylinder ignition timing connection
2. Left-hand cylinder ignition timing connection

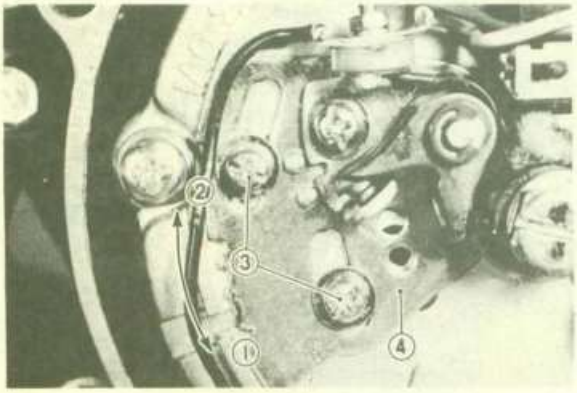
8. Rotate crankshaft until piston is at top-dead-center (T.D.C.). Set the zero on dial gauge face to line up exactly with dial gauge needle. Tighten set screw on dial gauge stand to secure dial gauge assembly. Rotate crankshaft back and forth to be sure that indicator needle does not go past zero.
9. Starting at T.D.C., rotate crankshaft clockwise until dial gauge reads approximately 4 needle revolutions before-top-dead-center (B.T.D.C.).
10. Slowly turn crankshaft until dial gauge reads ignition advance setting listed in specifications. At this time the point checker needle should swing from "CLOSED" to "OPEN" position, indicating the contact breaker (ignition points) have just begun to open.



Ignition timing specifications (B.T.D.C.):
2.3 ±0.15 mm (0.09 ±0.006 in)

11. Repeat steps 9. and 10. to verify point opening position. If points do not open within specified tolerance, they must be adjusted.

12. Adjust ignition points by slightly loosening Phillips head screws and carefully rotating contact breaker plate assembly with a slotted screwdriver. Make small adjustment and retighten Phillips head screw before rechecking timing. Recheck timing by repeating steps 9. and 10.



1. Retard
2. Advance
3. Screw
4. Breaker plate

13. Repeat procedure for opposite cylinder.
14. Remove dial gauge assembly and stand. Re-install spark plugs. Disconnect point checker. Replace generator cover.

C. Spark plug

The spark plug indicates how the engine is operating. If the engine is operating correctly, and the machine is being ridden properly, the tip of the white insulator around the positive electrode of the spark plug will be a medium tan color. If the insulator is very dark brown or black color, then a plug with a hotter heat range might be required. This situation is quite common during the engine break-in period.

If the insulator tip shows a very light tan or white color or is actually pure white and glazed or if electrodes show signs of melting, then a spark plug with a colder heat range is required. Remember, the insulator area surrounding the positive electrode of the spark plug must be a medium tan color. If it is not, check carburetion, timing and ignition adjustments.

The spark plug must be removed and checked. Check electrode wear, insulator color, and electrode gap.

Spark plug gap:
0.6 ~ 0.7 mm (0.02 ~ 0.03 in)

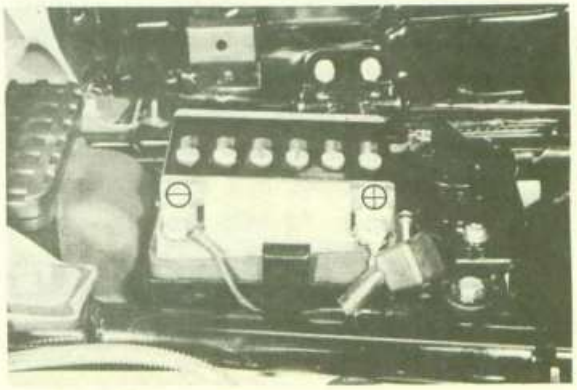
Engine heat and combustion chamber deposits will cause any spark plug to slowly break down and erode. If the electrodes finally become too worn, or if for any reason you believe the spark plug is not functioning correctly, replace it. When installing the plug, always clean the gasket surface, use a new gasket, wipe off any grime that might be present on the surface of the spark plug, and torque the spark plug properly.

Standard spark plug	Tightening torque
NGK B-8ES	1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)

D. Battery

A poorly maintained battery will deteriorate quickly. The battery fluid should be checked at least once a month.

1. The level should be between the upper and lower level marks. Use only distilled water for refilling. Normal tap water contains minerals which are harmful to a battery; therefore, refill only with distilled water.
2. Always make sure the connections are correct when installing the battery. The red lead is for the + terminal and the black lead is for the − terminal. Make sure the breather pipe is properly connected and is not damaged or obstructed.



NOTE:

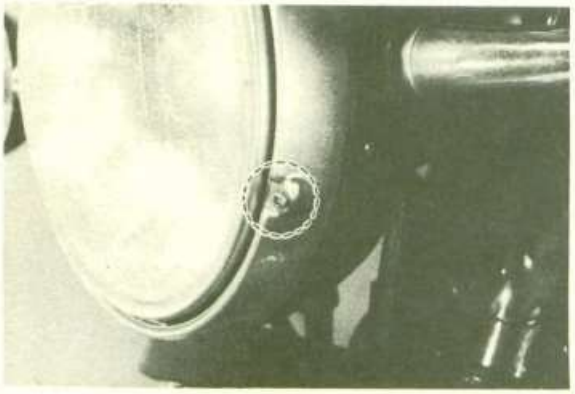
When filled with dilute sulfuric acid (electrolyte), this battery can be put into use immediately. That is, it is a dry-charged battery. It is advisable, however, that the battery be charged as much as possible before using to insure maximum performance. This initial charge will prolong the life of the battery.

Charging current:	0.55 A
Charging hours:	10 hrs.

E. Headlight

1. Headlight beam adjustment
   When necessary, adjust the headlight beam as follows.

a. Adjust horizontally by tightening or loosening the adjust screw.



To adjust to the right:
tighten the screw
To adjust to the left:
loosen the screw

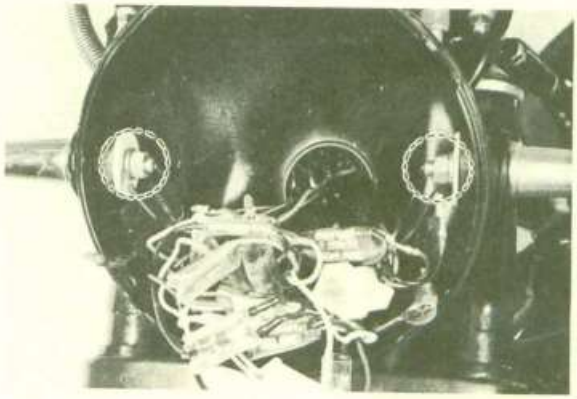
b. Adjust vertically as follows:

1) Remove the anchor screw holding the headlight rim and remove the rim by prying lightly with a screwdriver at the gap provided at the bottom of the headlight.

NOTE:

Take care not to damage the headlight.

2) Slightly loosen the two headlight mounting nuts and refit the rim to the headlight body.



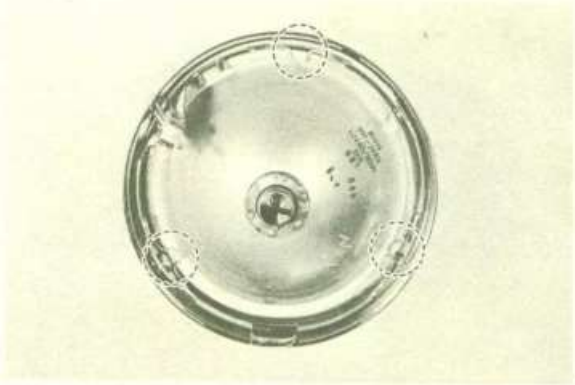
NOTE:

Do not tighten the anchor screw yet.

3) Next, adjust *vertically by moving* the headlight body. When adjustment is complete, hold the body in place, remove the rim and tighten the two mounting nuts. Then refit the rim to the headlight body.

2 Replacing the headlight bulb

a. Unhook spring and pull the defective unit out of the shell.



b. Slip a new unit into position and install springs.

c. Adjust headlight beam.

NOTE:

Take care not to damage the headlight. It is very fragile.

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3

CHAPTER 3.
ENGINE OVERHAUL

3-1. REMOVAL

A. Preparation for removal

1. All dirt, mud, dust and foreign material should be throughly removed from the exterior of the engine before removal and disassembly. This will prevent any harmful foreign material from entering the engine.
2. Before engine removal and disassembly, be sure that you have the proper tools and cleaning equipment so that you can perform a clean and efficient job.
3. During disassembly of the engine, clean and place all parts in trays in order of disassembly. This will speed assembly time and help insure correct re-installation of all engine parts.
4. Start the engine and warm it for a few minutes. Stop engine, remove drain plug and drain transmission oil.

B. Fuel tank assembly

1. Turn fuel petcock to the "OFF" position and disconnect fuel pipes.
2. Remove bolt holding rear of fuel tank.



3. Disconnect and plug cross over pipe.
4. Lift up rear of tank and slide back. Remove tank (lift rear of tank and slide back).

NOTE:

Be careful not to lose rubber dampers at front of tank.

C. Exhaust

1. Remove nuts holding exhaust pipe to cylinder.



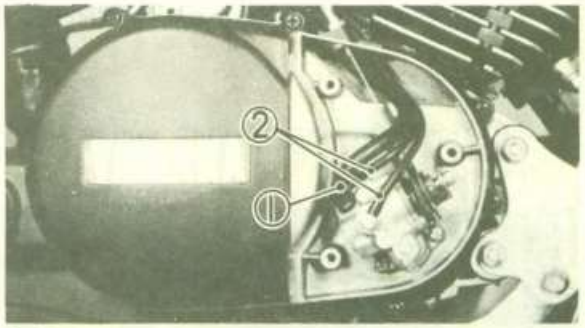
2. Remove exhaust pipe assembly.

D. Gear change pedal

Completely remove bolt securing gear change pedal. Remove pedal.

E. Wiring and cables

1. Remove spark plug cap.
2. Remove oil pump cover.
3. Remove oil pipe at oil tank. Remove delivery pipes at carburetors.



1. Oil pipe 2. Oil delivery pipe

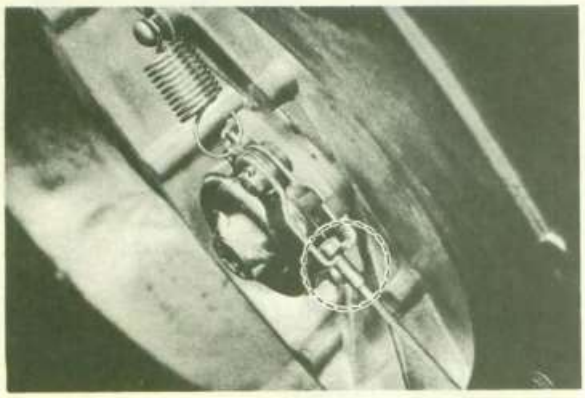
NOTE:

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

4. Rotate pump pulley to full throttle position and remove return spring end and wire end from pulley seat.
5. Loosen wire adjustor lock nut and remove adjustor and wire.
6. Remove tachometer cable.
7. Remove left crankcase cover.



8. Remove clutch wire from handle lever first, then from clutch push lever.

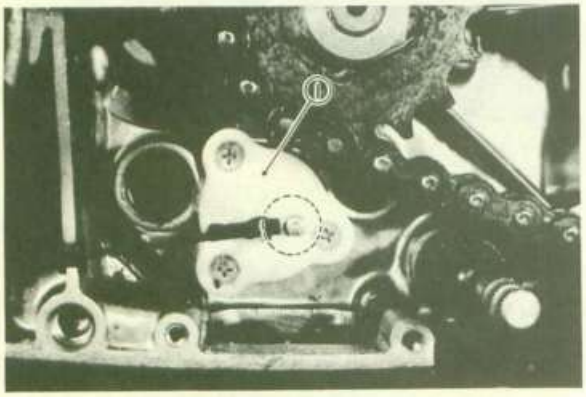


F. Carburetor

1. Remove air vent pipes at cleaner box.
2. Loosen carburetor hose clamps.
3. Remove carburetor top and throttle valve assembly.
4. Push air cleaner joint off the carburetor inlet and carefully remove carburetor.

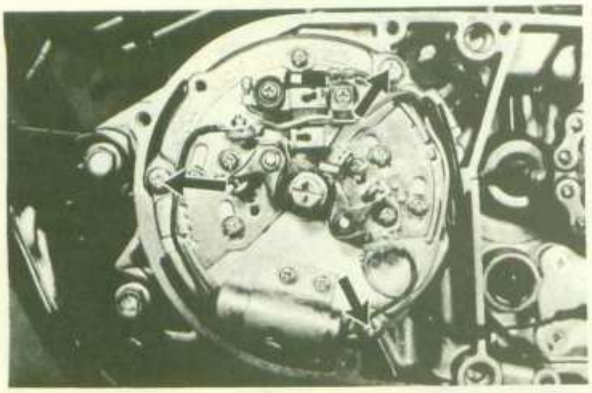
G. Generator

1. Remove generator wiring and neutral switch wire.



1. Neutral switch

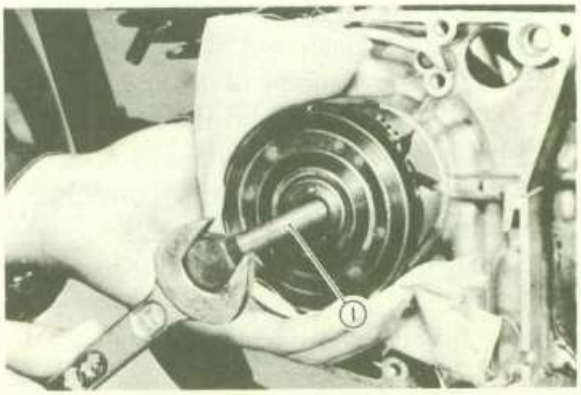
2. Remove yoke mounting bolts and remove yoke assembly.



3. Remove rotor bolt and cam.



4. Remove rotor using armature puller bolt.

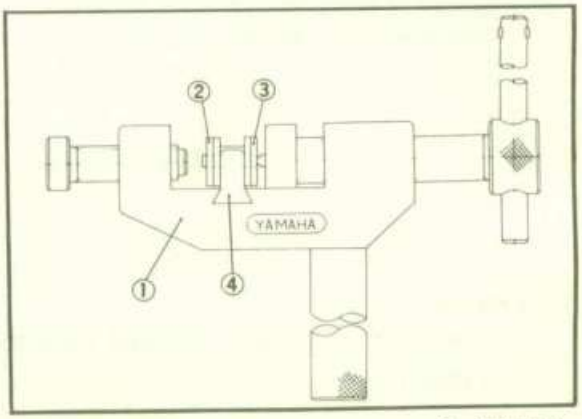


1. Armature puller bolt

5. Remove woodruff key.

H. Drive chain

1. Loosen drive sprocket before disconnecting chain.
   a. Bend down lock tab.
   b. Put transmission in gear.
   c. Apply rear brake.
   d. Loosen sprocket securing nut.
2. Remove master link using drive chain cutter. Remove drive chain.



1. Chain cutter
2. Chain joint
3. Side plate
4. Attachment

I. Removal

1. Remove engine mounting bolts and mounting plates.

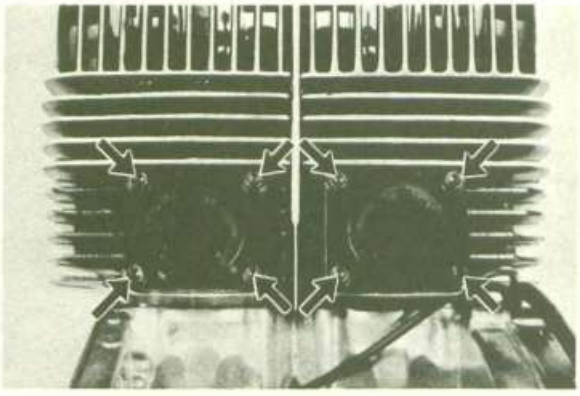


2. Remove engine from right side of frame.

3-2. DISASSEMBLY

A. Reed valve assembly

Remove reed valve assembly holding bolts, carburetor joint and reed valve assembly.



B. Cylinder head

Remove cylinder head holding nuts and cylinder head.

NOTE:

Loosen spark plug before loosening cylinder head.

C. Cylinder

Remove cylinders.

D. Piston pin and piston

1. Remove piston pin clip from piston.



NOTE:

Before removing the piston pin clip, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.

2. Push piston pin from opposite side, then pull out.
   Protect pin with rag as shown.



NOTE:

Before removing piston pin, deburr clip groove and pin hole area.

E. Kick crank

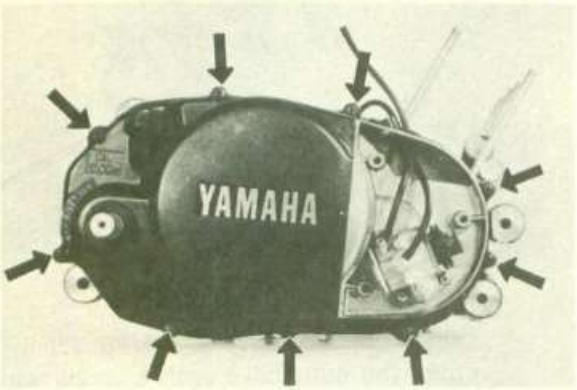
Remove kick crank securing bolt and kick crank.

NOTE:

The bolt must be completely removed from the kick crank.

F. Crankcase cover, right

Remove righthand crankcase cover holding screws and the cover.

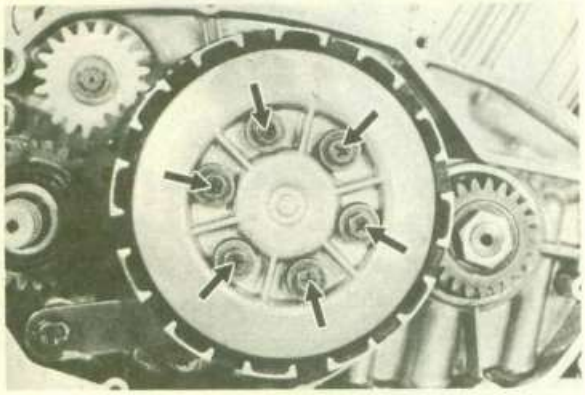


NOTE:

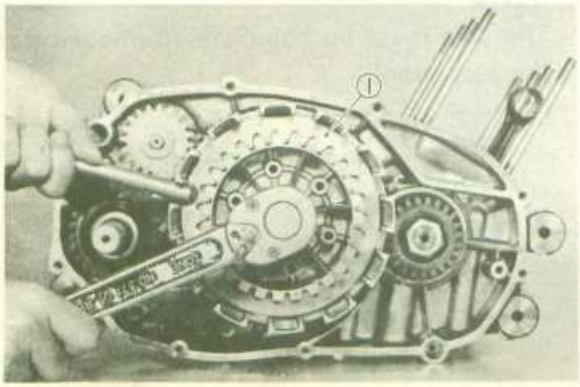
Crankcase cover can be removed without removing Autolube pump. (See Autolube pump section.)

G. Clutch assembly and primary drive gear

1. Remove clutch spring holding screws, pressure plate, clutch plates, friction plates, cushion rings, push rod and ball.

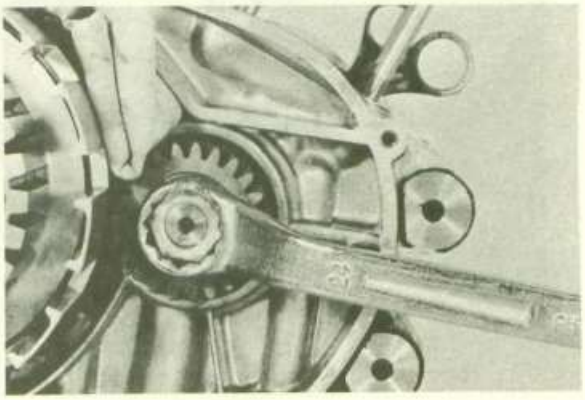


2. Install clutch holding tool on clutch boss. Remove locknut and bellevile spring washer.

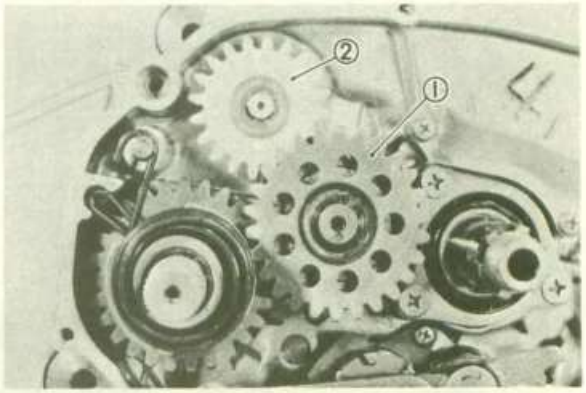


1. Clutch holding tool

3. Loosen primary drive gear by first placing a folded rag between the teeth of the primary gears to lock them. Loosen drive gear nut. Remove nut and washer.



4. Remove driven gear assembly and primary drive gear assembly. Kick idel gear assembly and tachometer drive gear assembly.



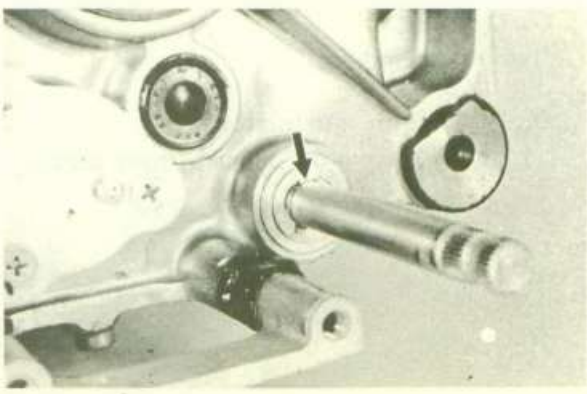
1. Kick idle gear
2. Tachometer drive gear

H. Kick axle assembly

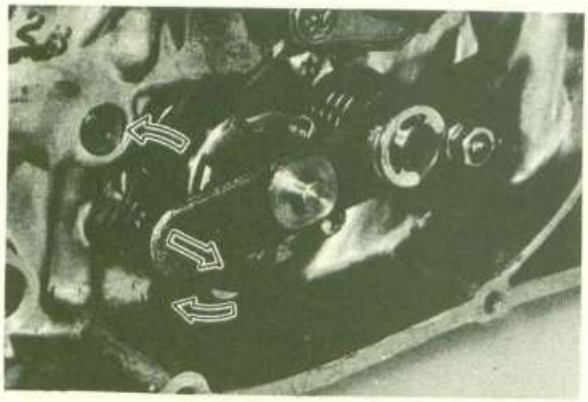
Remove kick axle assembly.

I. Change shaft assembly

1. Remove sealing boot, change shaft circlip and washer from left side of change shaft and pull shaft assembly out from right-hand side.



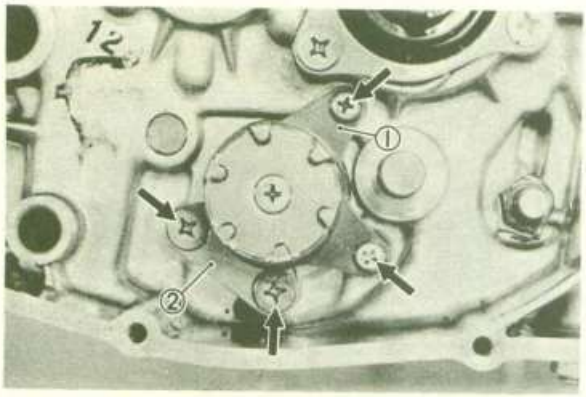
2. Remove circlip and pull change lever assembly.



NOTE:
Remove change lever 3, bracket, spring and shift return spring as an assembly.

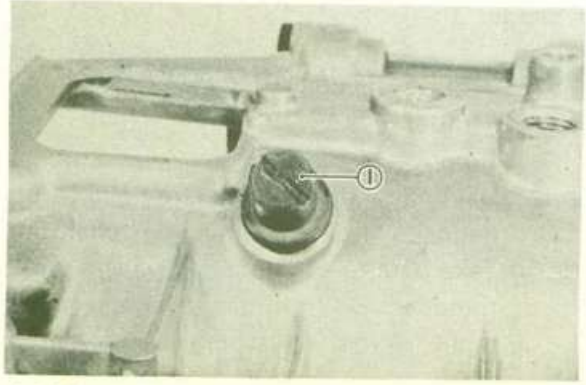
J. Clutch push rod
Remove clutch push rod from left side crankcase.

K. Change lever guide and stopper plate
Remove change lever guide and cam stopper plate.



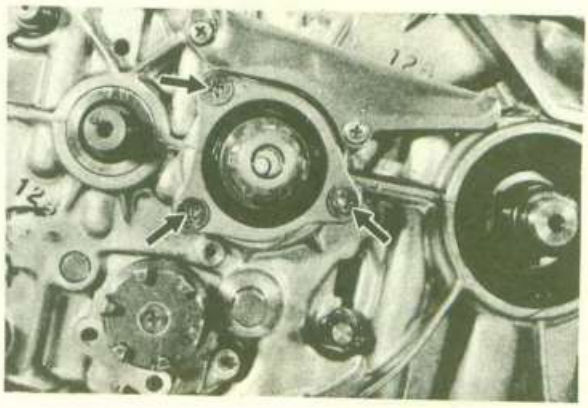
1. Change lever guide
2. Cam stopper plate

L. Shift cam stopper
Remove bolt, spring and stopper.

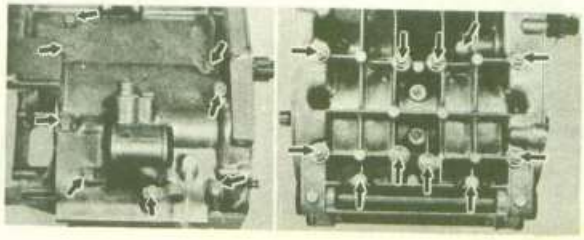


1. Shift cam stopper

M. Bearing stopper plate
Remove bearing stopper plate.

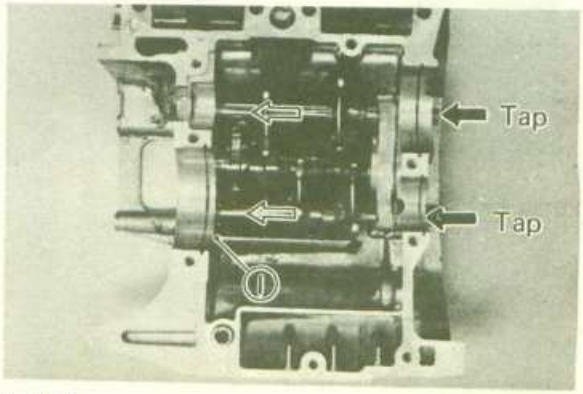


N. Crankcase
1. Remove crankcase holding bolts. Each bolt position is numbered. Start with the highest number for disassembly. Loosen each bolt 1/4 turn and proceed to the next.



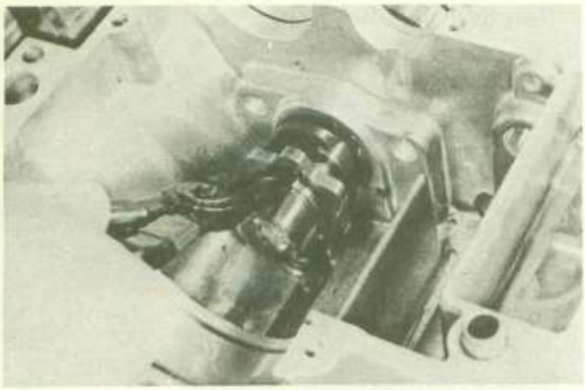
2. Split crankcase by lightly striking the front and rear parts of the upper crankcase.

O. Transmission
1. Remove transmission by tapping it with a soft-faced hammer or the hands.
2. Remove circlip, guide bars, brind plugs and shift forks.



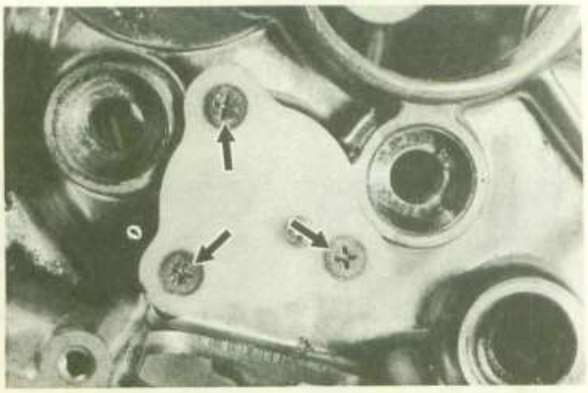
1. Circlip

3. Remove stopper plate and shift cam.

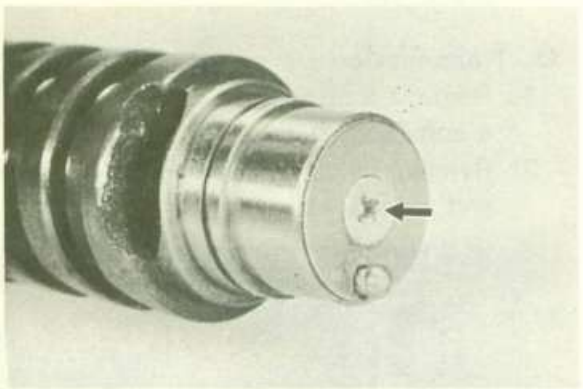


P. Neutral switch

1. Remove shiftcam side plate holding and remove neutral switch, and O-ring.

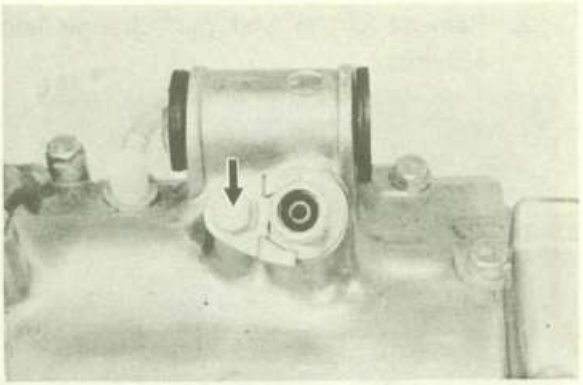


2. Remove shiftcam side plate holding screw, and remove side plate, neutral point and spring.

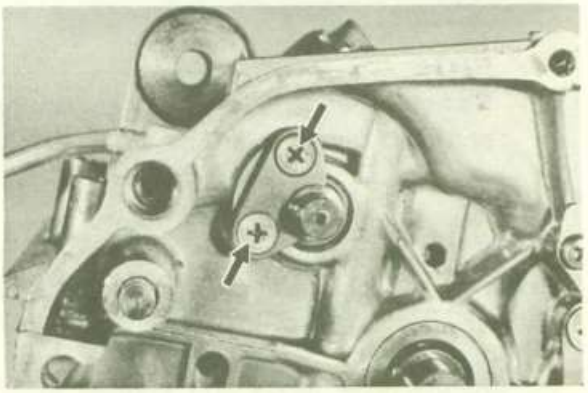


Q. Tachometer gear

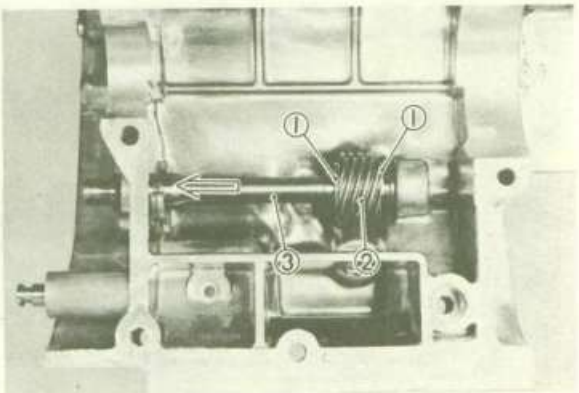
1. Remove driven gear assembly.



2. Remove drive gear axle stopper plate.



3. Remove tachometer drive gear and drive gear axle.



1. Remove circlips 2. Drive gear 3. Drive gear axle

R. Crankshaft

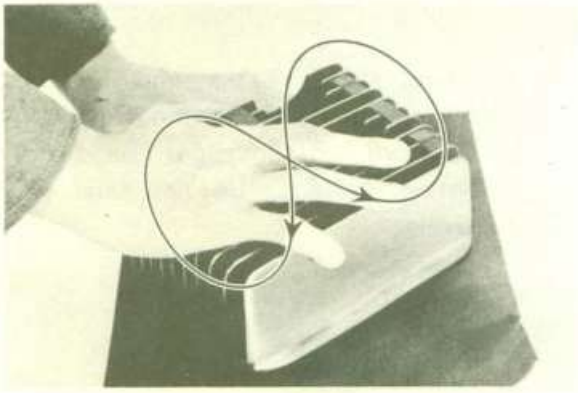
Remove crankshaft by striking the shaft with hands.

3-3. INSPECTION AND REPAIR

A. Cylinder head

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

3. Place on a surface plate. There should be no warpage. Correct by re-surfacing as follows:
   Place 400 ~ 600 grit wet sandpaper on surface plate and re-surface head using a figure-eight sanding pattern Rotate head several times to avoid removing too much material from one side.



B. Cylinder

1. Remove any deposits from cylinder exhaust port and decompression passages.



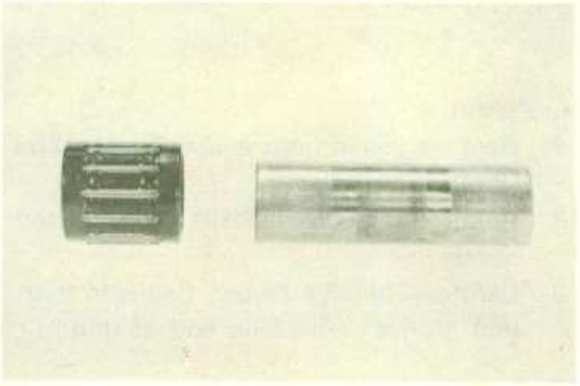
2. Hone cylinder bore using a hone with fine stones. Hone no more than required to remove all wear marks.
3. Using a cylinder gauge set to standard bore size, measure the cylinder. Measure front-to-rear and side-to-side at top, center and bottom just above exhaust port. Take minimum and maximum measurements. If over tolerance and not correctable by honing, rebore to next over-size.



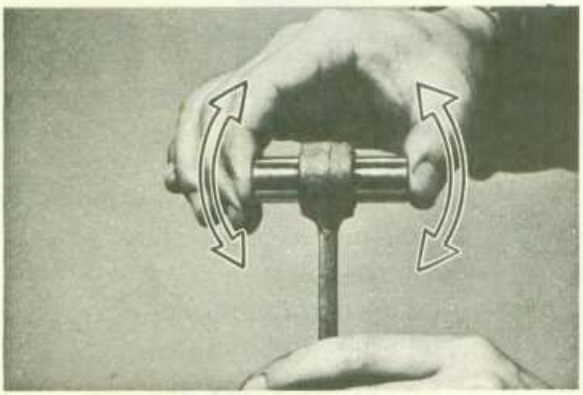
Maximum allowable taper: 0.05 mm (0.002 in)
Maximum allowable out-of-round: 0.01 mm (0.0004 in)
Piston over size: 64.25 mm (2.530 in) 64.50 mm (2.539 in) 64.75 mm (2.549 in) 65.00 mm (2.559 in)

C. Piston pin and bearing

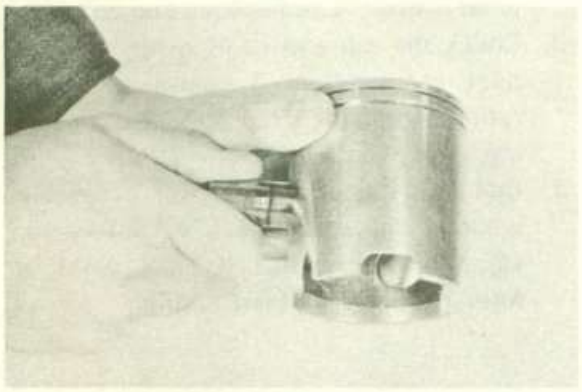
1. Check the pin for signs of wear. If any wear is evident, replace pin and bearing.
2. Check the pin and bearing for signs of heat discoloration. If excessive (indentation on pin, etc.), replace pin and bearing.
3. Check the bearing cage for excessive wear or damage. Check the rollers for signs of flat spots. If such wear is found, replace pin and bearing.



4. Apply light film of oil to pin and bearing surfaces. Install in connecting rod small end to inspect for wear. Check for play. There should be no noticeable vertical play. If play exists, check connecting rod small end for wear. Replace pin, connecting rod and/or bearing, as required.



5. The piston pin should have no noticeable free play in the piston. If the piston pin is loose, replace the pin and/or piston.

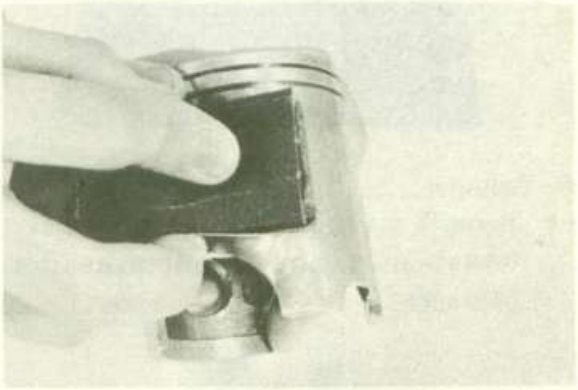


D. Piston

1. Remove piston rings and expander (2nd ring).
2. Remove carbon deposits from piston crown.
3. Carefully remove carbon deposits from ring grooves with filed end of ring.

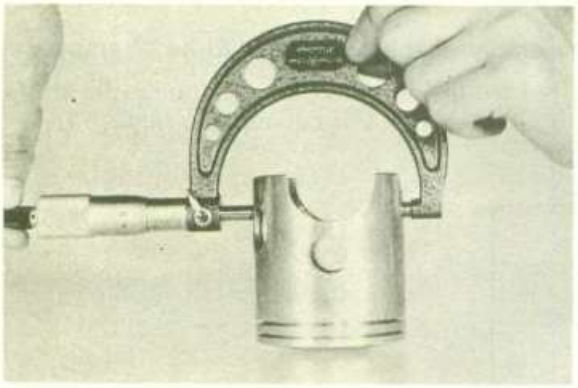


4. Remove score marks and lacquer deposits from sides of piston using 600 ~ 800 grit wet sandpaper. Sand in a crisscross pattern. Do not sand excessively.



5. Wash piston in solvent and wipe dry.
6. Using an outside micrometer, measure piston diameter. The piston is cam-ground and tapered. The only true measuring point is at right angles to the piston pin holes, about 10 mm (0.4 in) from bottom of piston. Compare piston diameter to cylinder bore measurements.

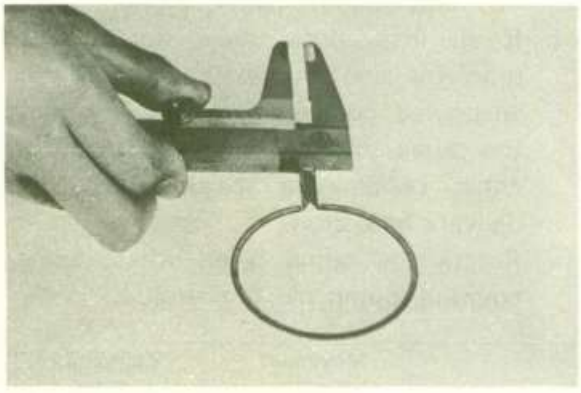
   Piston maximum diameter subtracted from minimum cylinder diameter gives piston clearance. If beyond tolerance, hone cylinder to tolerance or bore to next oversize and fit oversize piston.



Piston clearance:	
Maximum:	0.040 mm (0.0016 in)
Minimum:	0.035 mm (0.0014 in)

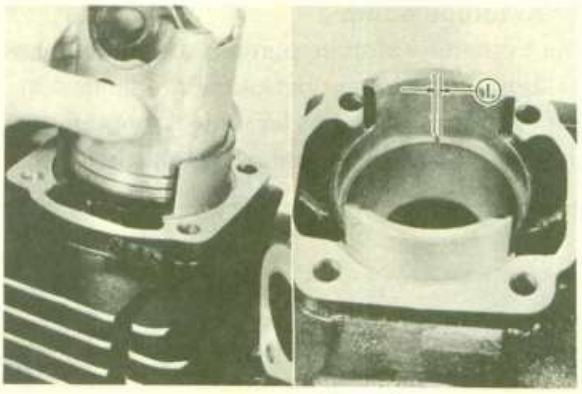
E. Piston rings

1. Check rings for scoring. If any severe scratches are noticed, replace ring set.
2. Measure ring end gap in free position. If beyond tolerance, replace ring set.



Ring end gap, free:	
Top:	6.5 mm (0.26 in)
Second:	6.5 mm (0.26 in)

3. Insert each ring into cylinder. Push down approximately 20 mm (0.8 in) using piston crown to position ring at right angle to bore. Measure installed end gap. If beyond tolerance, replace ring set.



1. Ring end gap

Ring end gap, installed:		
	Minimum	Maximum
Top	0.3 mm (0.012 in)	0.5 mm (0.020 in)
Second	0.3 mm (0.012 in)	0.5 mm (0.020 in)

4. With ring installed in groove, insert feeler gauge between ring side and groove. If beyond tolerance, replace ring and/or piston as required.

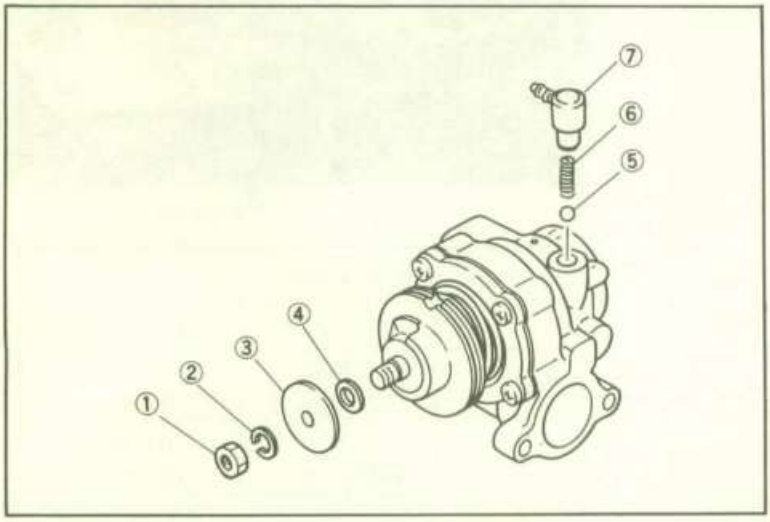
2nd ring groove clearance:	
Minimum	Maximum
0.03 mm (0.0012 in)	0.05 mm (0.0020 in)



5. Check ring expander, if worn excessively or broken, replace ring set.

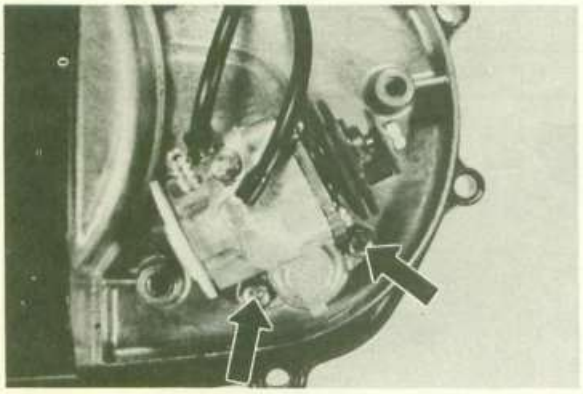
F. Autolube pump

The Yamaha Autolube pump is a sealed unit. Its output has been checked and adjusted at the factory. Except for the components shown in the illustration, no further disassembly of the pump should be attempted. The adjustments and servicing of the Autolube pump are covered on page 11.



1. Nut
2. Spring washer
3. Adjusting plate
4. Plunger shim
5. Ball
6. Compression spring
7. Nozzle

1. Removal
   a. Remove (two) Phillips screws securing pump to crankcase cover. Remove pump.



2. Troubleshooting and repair
   a. Wear or an internal malfunction may cause pump output to vary from the factory setting. This situation is, however, extremely rare. If improper output is suspected, check the following:
      1) Obstructions in delivery line to pump or from pump to carburetors.
      2) Worn or damaged pump body seal or crankcase cover seal.
      3) Missing or improperly installed check ball or spring.
      4) Improperly installed or routed oil delivery line(s).
      5) Loose fitting(s) allowing air to enter pump and/or engine.
   b. If all inspections show no obvious problems and improper output is still suspected, connect a delivery line from the pump to a container graduated in cubic centimeters (cc's). Keep the delivery line short.
      Rotate the pump bleed wheel while counting pump plunger strokes.

	Maximum throttle	Minimum throttle
Pump output at 200 strokes	5.1 ~ 5.7 cc	0.5 ~ 0.6 cc

3. Reassembly
   Always install a new pump case gasket.

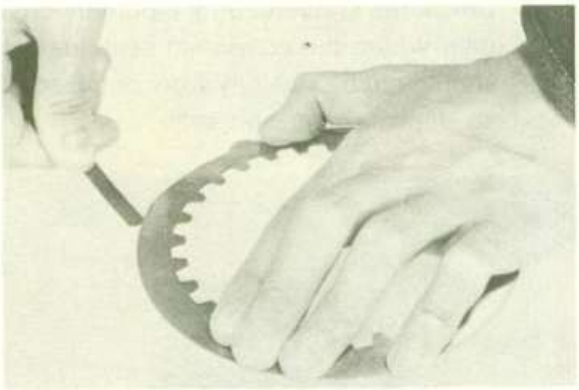
G. Clutch

1. Measure the friction plates at three or four points. If their minimum thickness is less than the indicated limit replace.

	New	Wear limit
Friction plate thickness	3.0 mm (0.12 in)	2.7 mm (0.11 in)



2. Check the friction plates for signs of warpage and heat damage. Replace as required.
3. Check each clutch plate for signs of heat damage and warpage. Place on surface plate (plate glass is acceptable) and use feeler gauge as illustrated. If warpage exceeds tolerance, replace.

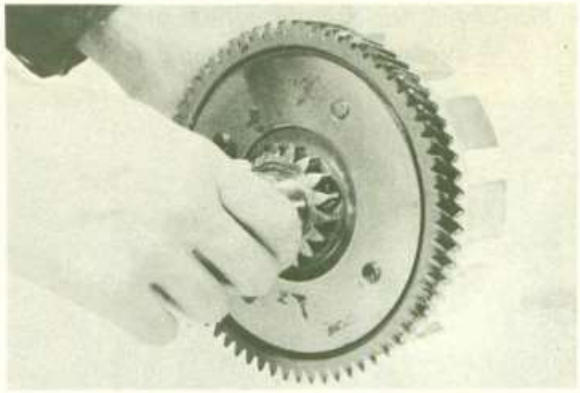


Clutch plate warpage allowance: 0.05 mm (0.002 in)

NOTE:

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

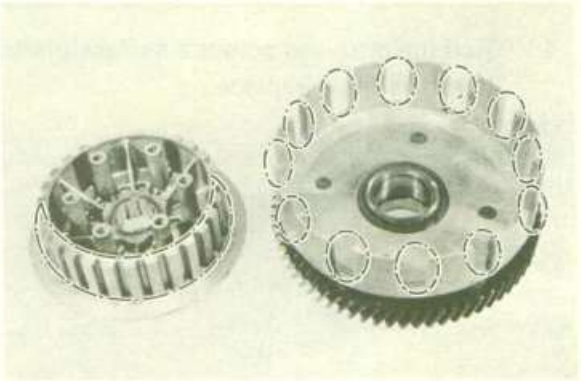
4. Thoroughly clean the primary driven gear assembly and spacer. Apply a light film of oil on the bushing surface and spacer. Fit the spacer into the bushing. It should be a smooth, thumb-press fit. The spacer should rotate smoothly within the bushing.



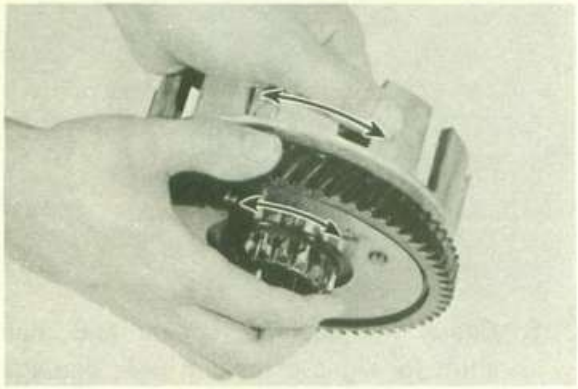
5. Check the bushing, spacer and main shaft for signs of galling heat damage, etc. If damage is severe, replace as required.
6. Apply a thin film of oil to transmission main shaft and inside surface of bushing spacer. Slip spacer over main shaft. Spacer should fit with approximately same "feel" as in clutch housing. Replace as required.
7. Check dogs on driven gear (clutch housing).
   Look for cracks and signs of galling on edges. If damage is moderate, deburr. If severe, replace.
8. Check splines on clutch boss for signs of galling. If damage moderate, deburr. If severe, replace.

NOTE:

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

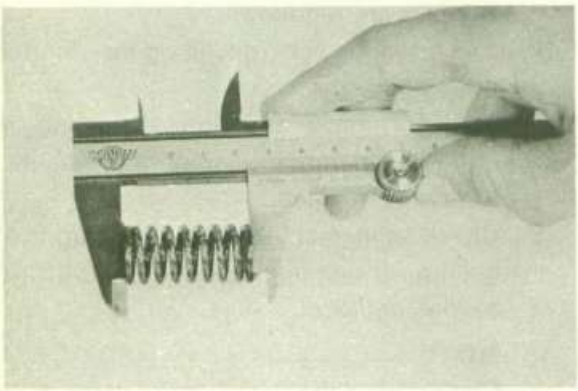


9. Check for circumferential play by hand. If excess play exists, replace it.



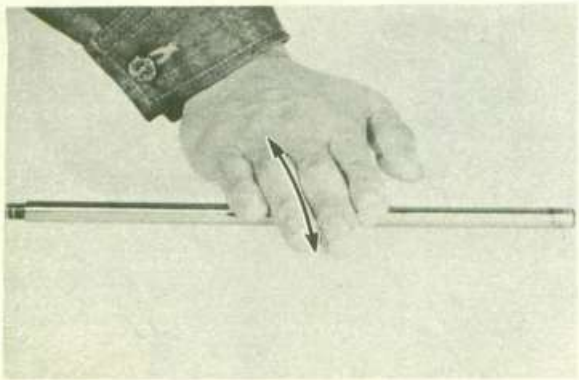
10. Measure each clutch spring. If beyond tolerance, replace.

	New	Minimum
Clutch spring free length	36.4 mm (1.433 in)	35.4 mm (1.394 in)



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

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

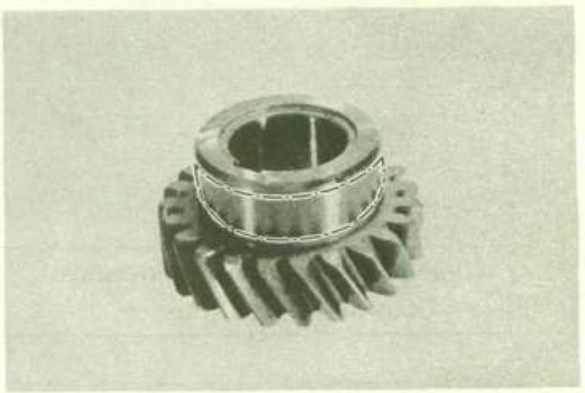


H. Primary drive

1. Check the drive gear and driven gear for obvious signs of wear or damage from material within the primary case.
2. If a gear must be replaced due to damage, it is always advisable to pay strict attention to the lash numbers (mark) during replacement. Marks are scribed on the side of each gear. Match these marks.

Primary drive gear		Primary driven gear		Lash tolerance
Lash number	Indicated mark	Lash number	Indicated mark	
69 68	D	62 63	D	
67	C	64	C	131 ±1
66 65	B	65 66	B	

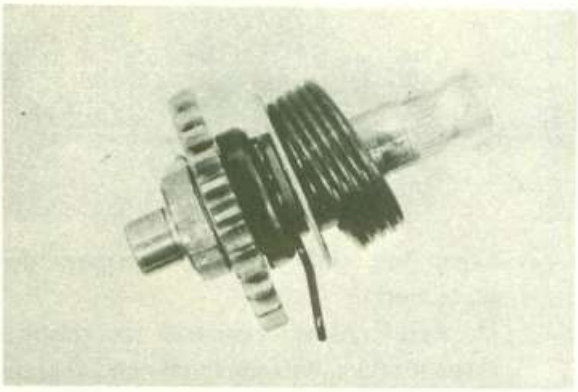
3. Check the shoulder on the primary drive gear where the crankshaft seal rides. It should not be severely worn or galled. If so, replace gear and seal.



I. Kick starter

1. Check the ratchet teeth on the kick gear and ratchet wheel. The mating edges should fit flush against each other. If there is severe rounding off, replace as a set.

2. Check to see that the kick gear spins freely on the kick axle. If not, replace either or both as required. Replace if any signs of galling are found.



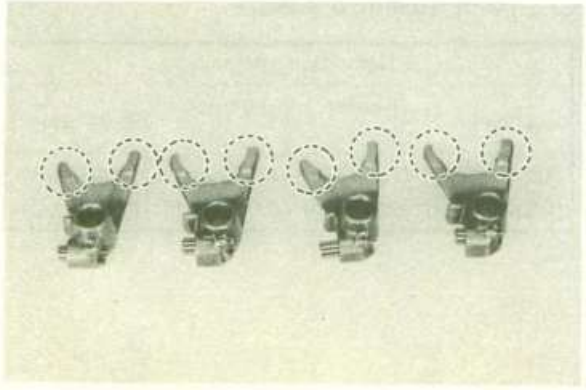
3. The kick gear clip is built into the ratchet wheel. The force of the clip is measured by a spring balance.

Standard tension:
0.8 ~ 1.3 kg (1.8 ~ 2.9 lb)

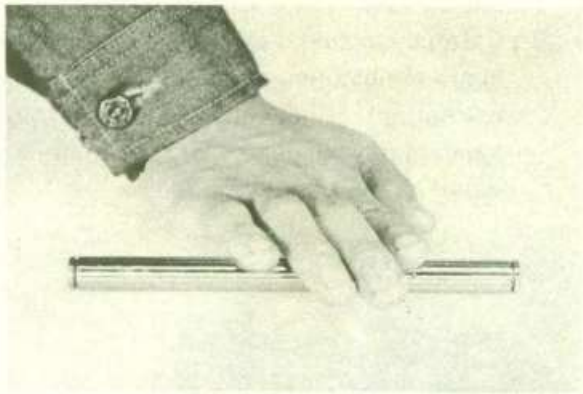


J. Transmission

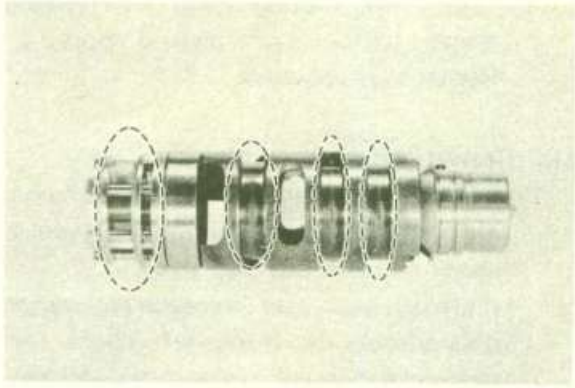
1. Inspect each shift fork for signs of galling on gear contact surfaces. Check for bending. Make sure each fork slides freely on its guide bar.



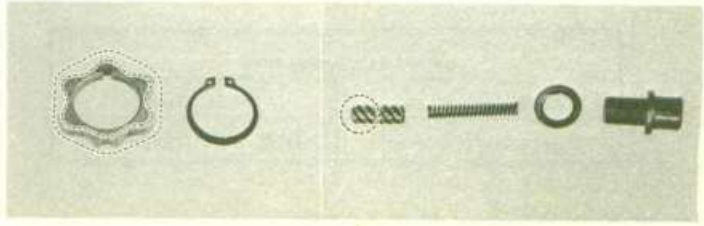
2. Roll the guide bars across a surface plate. If any bar is bent, replace.



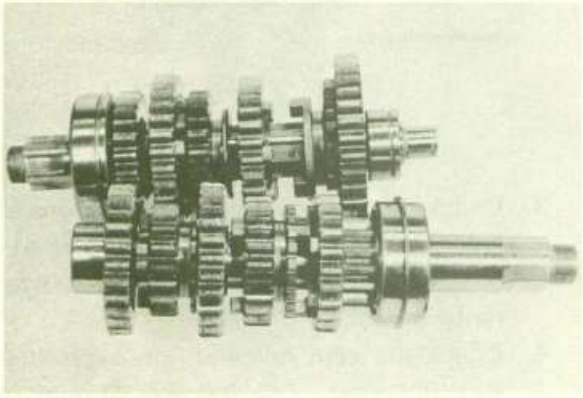
3. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or any damage, replace cam.
4. Check the cam followers on each shift fork for wear. The follower should fit snugly into its seat in the shift fork, but should not be overly tight. Check the ends that ride in the grooves in the shift cam. If they are worn or damaged, replace followers.
5. Check shift cam dowel pins and side plate for looseness, damage, or wear. Repair as required.



6. Check the shift cam stopper plate and circlip and stopper for wear. Replace as required.



7. Check the transmission shafts using a centering device and dial gauge. If any shaft is bent, replace.
8. 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.

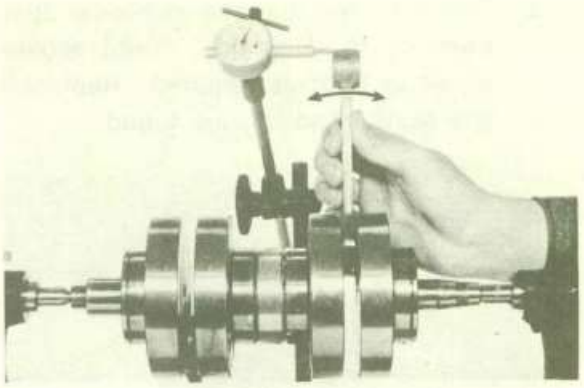


9. Check to see that each gear moves freely on its shaft.
10. Check to see that all washers and clips are properly installed and undamaged. Replace bent or loose clips and bent washers.
11. Check to see that each gear properly engages its counterpart on the shaft. Check the mating dogs for rounded edges,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

K. Crankshaft

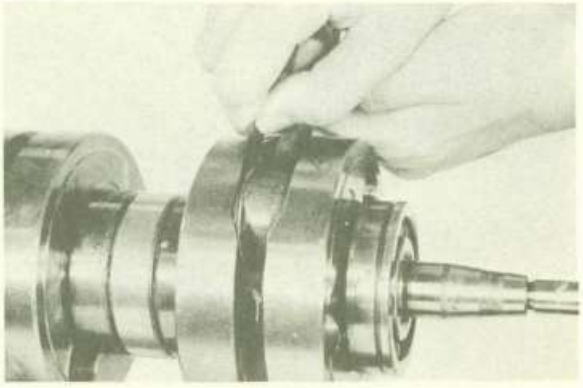
1. Check connecting rod axial play at small end (to determine the amount of wear of crank pin and bearing at big end).
   If small end play exceeds tolerance, disassemble the crankshaft, check connecting rod, crank pin and big end bearing.
   Replace defective parts. Play after reassembly should be within specification.

Rod axial clearance	
Minimum	Maximum
0.36 mm (0.014 in)	0.98 mm (0.039 in)



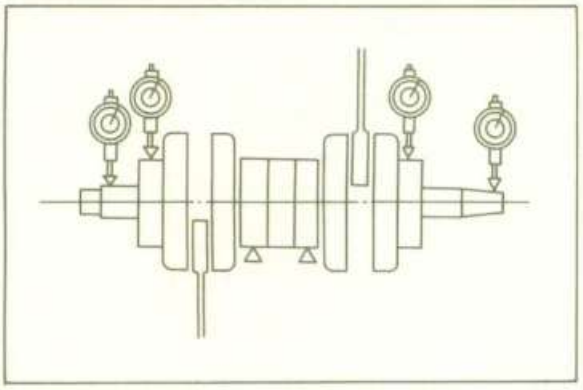
2. Check the connecting rod side clearance at big end.
   If axial play exceeds tolerance, disassemble the crankshaft and replace any worn parts. Big end axial play should be within specification.

Rod side clearance	
Minimum	Maximum
0.25 mm (0.010 in)	0.75 mm (0.030 in)



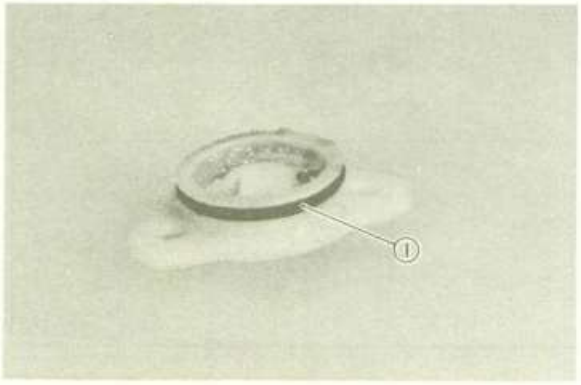
3. Check crankshaft assembly runout (misalignment of crankshaft parts).
   Dial gauge readings should be within specification.
   Correct any misalignment by tapping the flywheel with a brass hammer and/or by using a wedge.

Deflection tolerance			
Left side	Center (left)	Center (right)	Right side
0.05 mm (0.0020 in)	0.05 mm (0.0020 in)	0.05 mm (0.0020 in)	0.05 mm (0.0020 in)



L Neutral switch

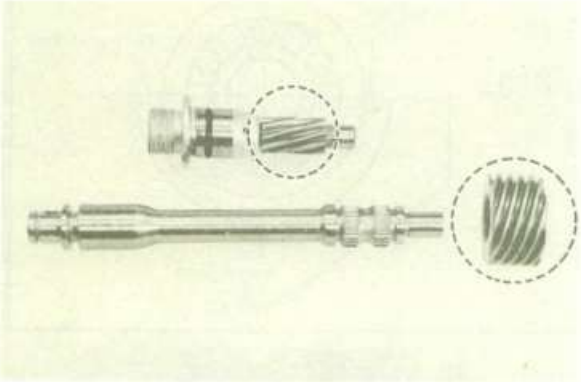
1. Check O-ring, replace if damaged.
2. Check neutral point for wear. Replace as required.



1. O-ring

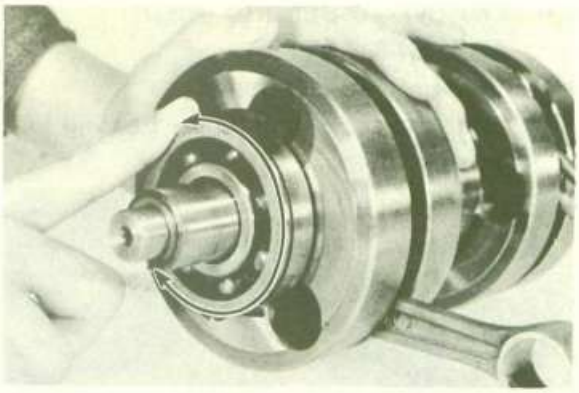
M. Tachometer gear

Check driven gear and drive gear for any signs of galling. Replace as required.



N. Bearings and oil seals

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



2. Check oil seal lips for damage and wear. Replace as required.



3. Installation
   Install bearing(s) and oil seal(s) with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the exposed view side.) When installing bearing(s) or oil seal(s), apply a light coating of lightweight lithium base grease to balls and seal lip(s).

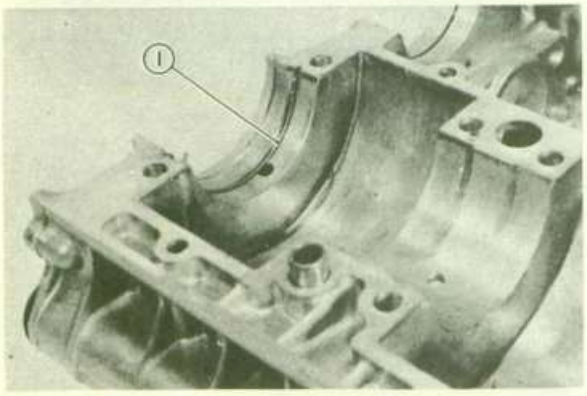
O. Crankcase

1. Thoroughly wash the case halves in mild solvent.
2. Clean all gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Visually inspect case halves for any cracks, road damage, etc.
4. Check all fittings not previously removed for signs of loosening or damage.
5. Check oil delivery passages in transfer ports for signs of blockage.

3-4. ENGINE ASSEMBLY AND ADJUSTMENT

A. Crankshaft installation

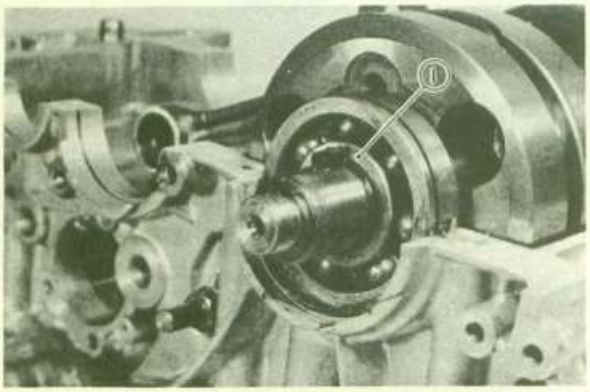
1. Install the circlip half on the bearing (on the clutch side).



1. Circlip

2. Install crankshaft seal.

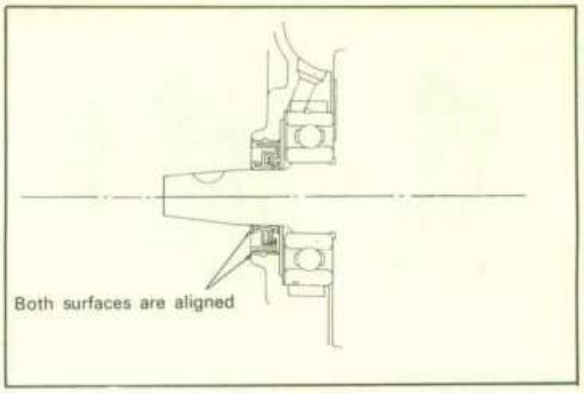
NOTE:
Check seal, replace if damaged.



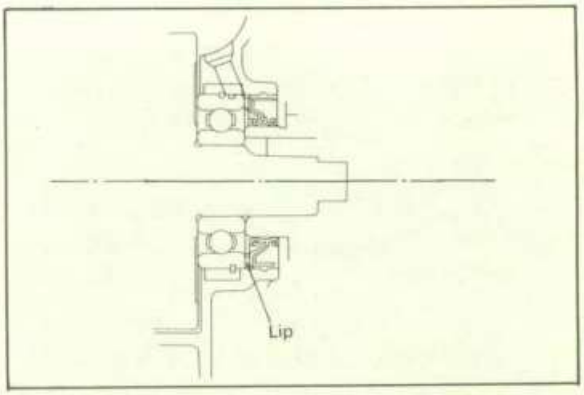
1. Crankshaft seal

3. Install the crankshaft oil seal
   a. Oil seal (L) — generator side.
   Install the oil seal in the crankcase boss so that the seal will be even with the boss end surface.

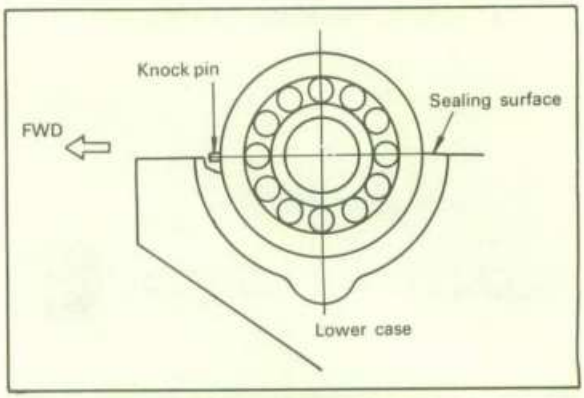
NOTE:
In this case, the oil seal will not touch the bearing.

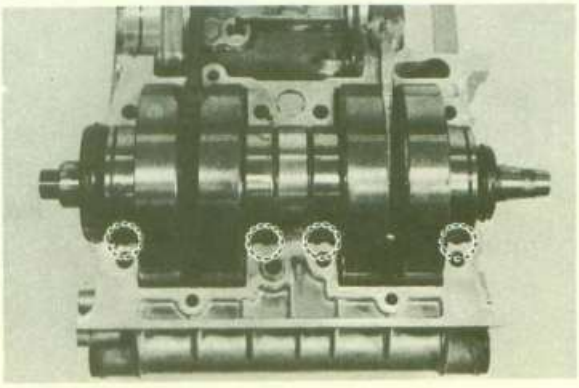


   b. Oil seal (R) — clutch side
   The lip on the side of oil seal should connect the outer race of the bearing.



4. Install the crankshaft assembly, align the bearing knock pin with the pin slot in the crankcase lower half.





B. Tachometer gear

1. Install tachometer drive gear, drive gear axle and stopper plate.

Stopper plate securing screw torque:
0.3 ~ 0.4 m-kg
(2.2 ~ 2.9 ft-lb)

NOTE:
Apply LOCK-TITE to threads of the screw.

2. Install driven gear assembly.

C. Neutral switch

1. Install neutral point, spring and side plate.

NOTE:
Apply LOCK-TITE to threads of the screw.

2. Apply a grease to neutral switch cup and install O-ring and neutral switch.

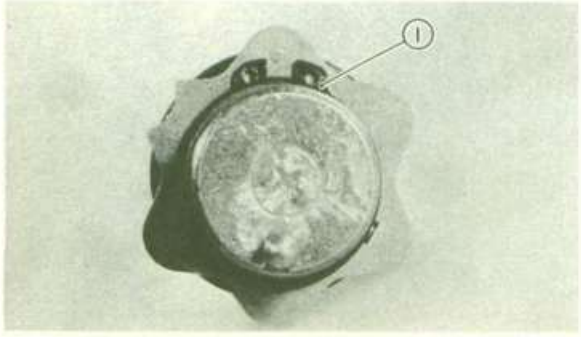
D. Transmission and shifter installation

1. Install shift cam and stopper plate.

NOTE:
1) Position of stopper plate.



2) Position of stopper plate circlip.

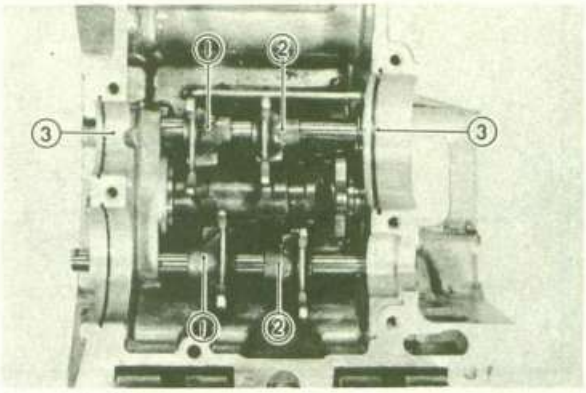


1. Circlip

2. Install shift forks, guide bars.

NOTE:
Check blind plug, replace if damaged.

3. Install circlips half on drive axle.



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

4. Install oil seal on axle beforehand.

NOTE:
Exercise care not to damage oil seal lip when installing transmission into case.

5. Fit transmission into lower case and install drive sprocket.

NOTE:
1) Be sure axle circlips are fitted to bearings and circlips have been positioned in circlip grooves.
2) Transmission installation is easier if shift cam is rotated to neutral position.

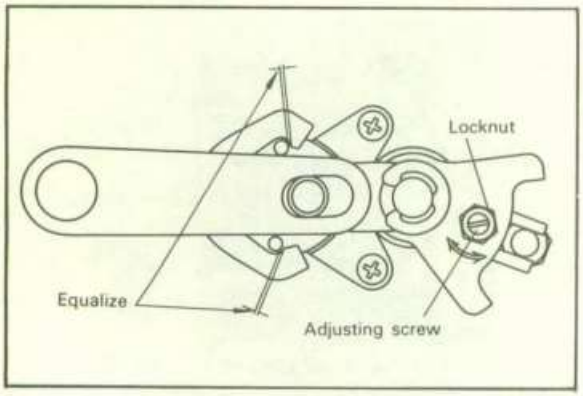
6. Install cam stopper plate, change lever guide and shift cam stopper assembly.

NOTE:
Apply LOCK-TITE to threads of change lever guide and cam stopper plate securing screws.

Cam stopper plate securing screw torque:
0.9 ~ 1.3 m-kg
(6.5 ~ 9.4 ft-lb)

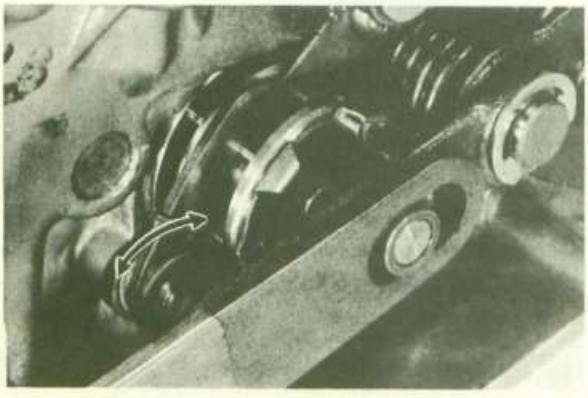
Change lever guide securing screw torque:
0.3 ~ 0.4 m-kg
(2.2 ~ 2.9 ft-lb)

7. Install change lever assembly and change shaft assembly.
8. In each gear, check for proper centering. Change adjustment on screw as required.



NOTE:
If change lever is adjusted, apply LOCK-TITE to threads of adjusting screw.

9. With change pedal in place on the change shaft, push down, then up. There should be no freeplay. If free play is evident, shift return spring is fatigued, replace.
10. Check return spring for change levers (3). If it will not hold change lever (3) firmly against shift cam dowel pins, replace spring.

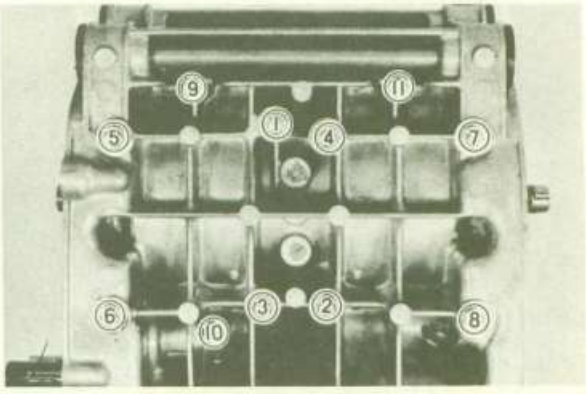


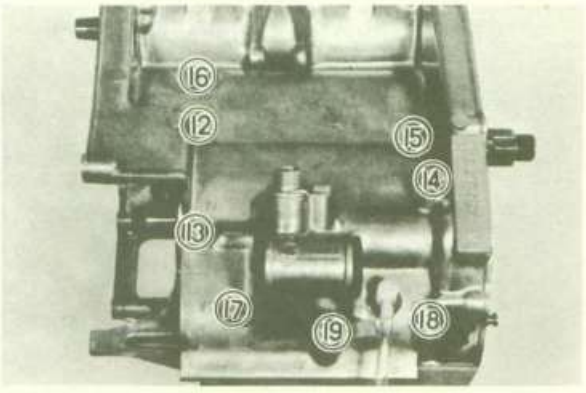
11. Check to see that all parts move freely prior to installing upper case half. Check for correct transmission operation and make certain that all loose shims are in place. At the same time check for complete engagement of all engaging dogs into appropriate gear slots.

E. Crankcase

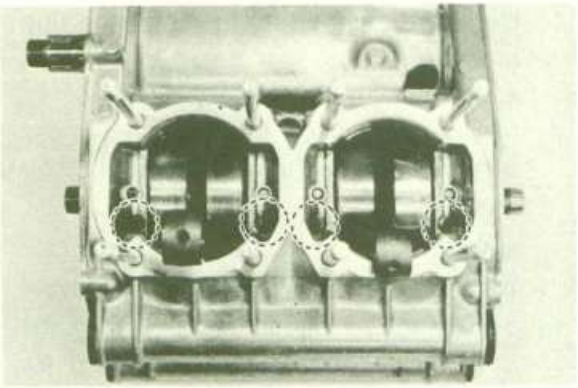
1. Apply YAMAHA BOND #4 to the mating surfaces of both case halves. Apply thoroughly over all mating surfaces.
2. Set the crankcase half onto lower case half. Install the crankcase holding bolts and nuts. Each bolt and nut position is numbered. Tighten all crankcase holding bolts and nuts gradually until proper torque is reached.

	Bolt size	Crankcase number	Tightening torque
(1)	6 mm bolt	(12) ~ (19)	0.5 m-kg (3.6 ft-lb)
(2)	8 mm nut	(1) ~ (8)	1.0 m-kg (7.2 ft-lb)
(3)	6 mm bolt	(9) ~ (11)	0.5 m-kg (3.6 ft-lb)
(4)	8 mm nut	(1) ~ (8)	2.5 m-kg (18.1 ft-lb)
(5)	6 mm bolt	(9) ~ (11)	1.0 m-kg (7.2 ft-lb)
(6)	6 mm bolt	(12) ~ (19)	1.0 m-kg (7.2 ft-lb)





3. After reassembly, apply a liberal coating of two-stroke oil to the crank pin and bearing and into each crankshaft bearing oil delivery hole.



4. Install bearing stopper plate.

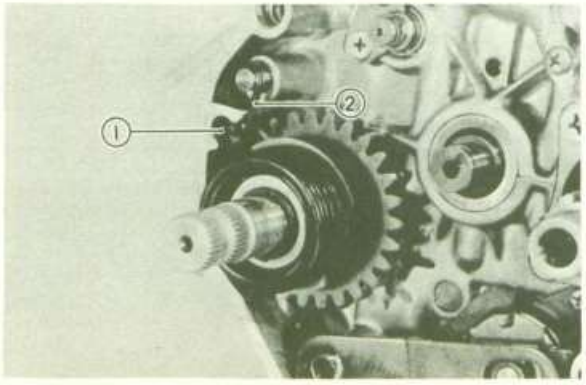
Bearing stopper plate securing screw torque: 0.7 ~ 1.0 m-kg (5.1 ~ 7.2 ft-lb)

5. Check crankshaft and transmission shafts for proper operation and freedom of movement.

F. Kick starter assembly

1. Set kick gear clip in groove of crankcase.
2. Rotate kick spring clockwise and hook it on kick spring stopper.

NOTE:
Make sure that kick stopper is stopped at projection of crankcase.



1. Kick gear clip 2. Kick spring

3. Check whether kick starter acts correctly and whether it returns to its home position.

G. Kick idle, tachometer drive and primary drive gears

Install kick idle gear, tachometer drive gear and primary drive gear.

NOTE:
Tighten primary drive gear securing nut after clutch assembly is installed.

H. Clutch

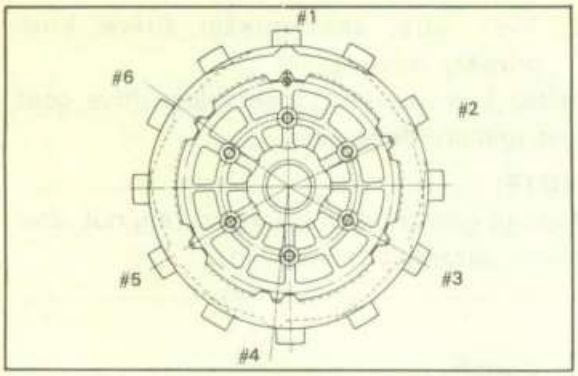
1. Install thrust plates, spacer, primary driven gear and clutch boss.
2. Install clutch holding tool on clutch boss and tighten locknut.

Clutch locknut torque: 5.0 ~ 8.0 m-kg (36 ~ 58 ft-lb)

3. Install clutch plates, friction plates and cushion rings.

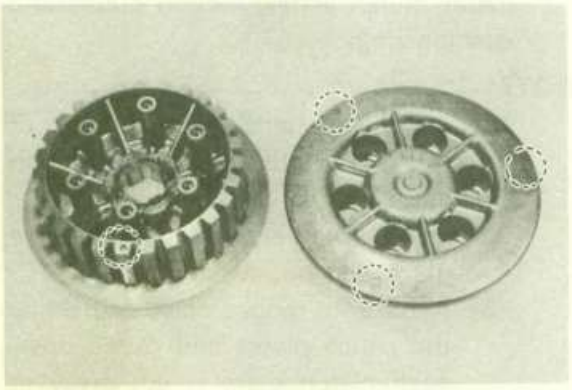
NOTE:

1) Install all parts with a coat of 10W/30 motor oil on their mating surfaces.
2) Check whether cushion rings are in place and not twisted.
3) In order to reduce noise caused by the clutch plates and clutch boss, each clutch plate is cut away at part of the edge (#1). This permits the clutch plate to move outward due to centrifugal force.
   Align one of the plate cutaways so that it is positioned as shown at #2.
   Install a friction plate. Next install a clutch plate with cutaway offset approximately 60° from previous plate cutaway.
   Continue this procedure in a clockwise direction until all clutch plates are installed.



4. Install steel ball and push rod into main axle.
5. Install clutch pressure plate.

NOTE:
Align arrow mark on clutch boss and one of pressure plate marks.



Clutch spring holding screw torque:
0.7 ~ 1.0 m-kg
(5.1 ~ 7.2 ft-lb)

CAUTION:
Tighten primary drive gear nut at this time.

Primary drive gear nut torque:
5.0 ~ 8.0 m-kg
(36 ~ 58 ft-lb)

I. Right-hand crankcase cover

While properly engaging crankshaft and oil pump gear, install new case cover gasket and right-hand crankcase cover. Tighten holding screws gradually until proper torque is reached.

Crankcase cover holding screw torque:
0.7 ~ 1.0 m-kg (5.1 ~ 7.2 ft-lb)

J. Piston

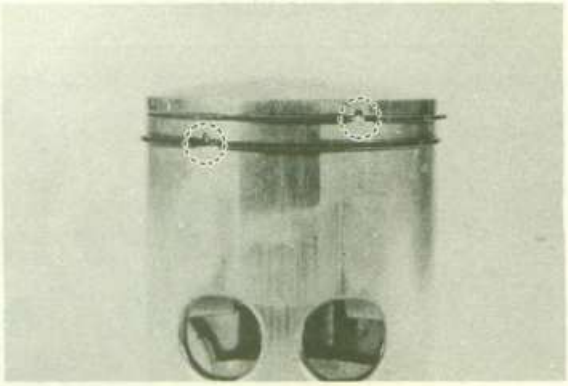
1. During reassembly, coat the piston ring grooves, piston skirt areas, piston pin, and bearing with two-stroke oil.
2. Install new piston pin clips and make sure they are fully seated in their grooves.

NOTE:
Take care during installation to avoid damaging the piston skirts against the crankcase as the cylinder is installed. Be sure the arrow stamped on the piston crown points forward. Also make sure that the left piston (already marked during removal) is fitted to the lefthand connecting rod. This guarantees that all previous clearances remain unchanged unless new parts are installed or cylinder work is done.

K. Cylinder

1. Install a new cylinder base gasket.
2. Install cylinder with one hand while compressing piston rings with other hand.

NOTE:
Make sure the rings are properly positioned.



L. Cylinder head

Install cylinder head gasket and cylinder head. Tighten nuts in two steps, using a crisscross pattern.

Head nut torque:
1.9 ~ 2.1 m-kg (13.7 ~ 15.2 ft-lb)

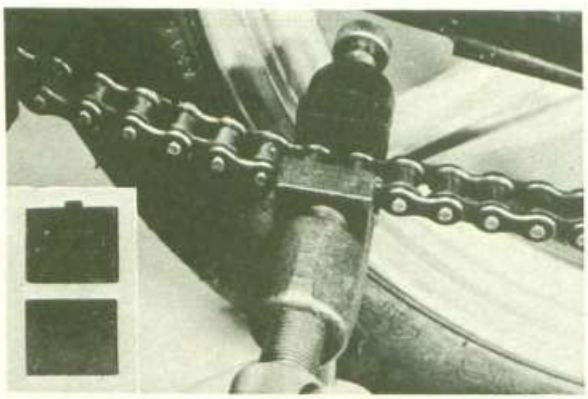
3-5. MOUNTING

Refer to sections 3-2. and mount the engine in the frame as follows:

1. Place the engine in the frame.
2. Install engine mounting bolts with proper tightening torque. (Refer to 3-1-I.)

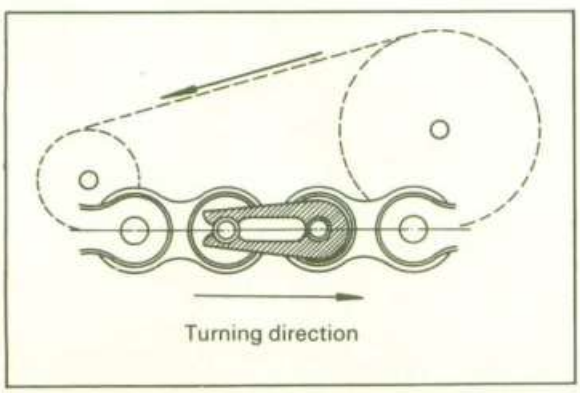
Tightening torque:	
8 mm bolt	1.4 ~ 2.2 m-kg (10.1 ~ 15.9 in-lb)
10 mm bolt	2.7 ~ 3.4 m-kg (19.5 ~ 24.6 in-lb)

3. Install drive chain using drive chain cutter (installing adapter used).



NOTE:

Install chain joint in proper direction.



4. Tighten drive sprocket to proper torque. (Refer to 3-1-H.)

Drive sprocket nut torque:
5 ~ 8 m-kg (36 ~ 58 ft-lb)

5. Install generator assembly and connect wires.

NOTE:

When installing rotor, make sure woodruff key is properly seated in keyway of crankshaft. Apply a light coating of lithium soap base grease to tapered portion of crankshaft end. Carefully install flywheel taking care to align for woodruff key. Install belleville washer, lockwasher and locknut. Tighten carefully to recommended torque value.

Rotor bolt torque:
1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)
Yoke mounting bolt torque:
0.7 ~ 1.0 m-kg (5.1 ~ 7.2 ft-lb)

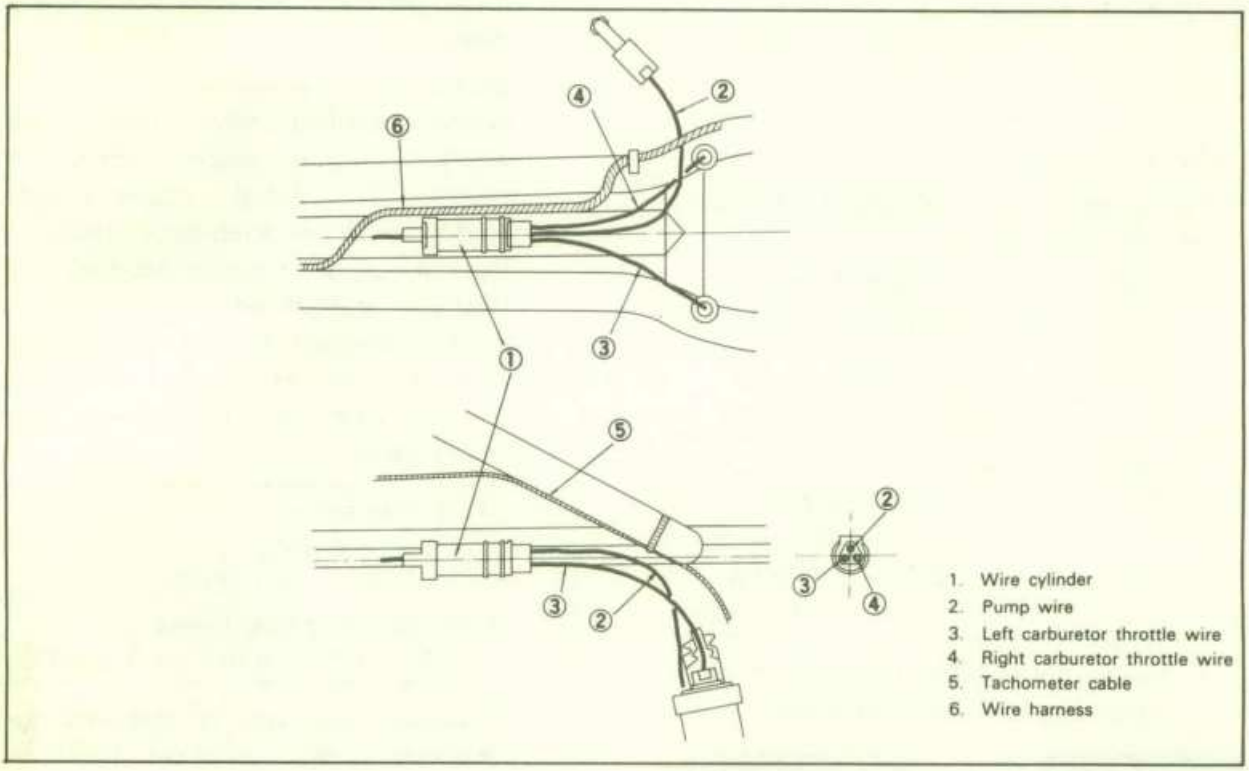
Whenever generator is removed, ignition timing must be re-set. (Refer to 3-1-G.)

6. Adjust ignition timing. (Refer to 2-5-C.)
7. Install clutch wire and left crankcase cover and adjust.
8. Install gear change pedal.
9. Install tachometer cable.
10. Install carburetor assembly and adjust. (Refer to 3-1-F.)
11. Install exhaust pipe.

12. Install oil pump wire and adjust. (Refer to 3-1-F.)

NOTE:
Check wire cylinder position.

13. Install fuel tank.



CHAPTER 4. CARBURETION

4-1. Carburetor 51

A. Inspection and repairing 51

4-2. Reed valve assembly 52

A. Removal and troubleshooting 52

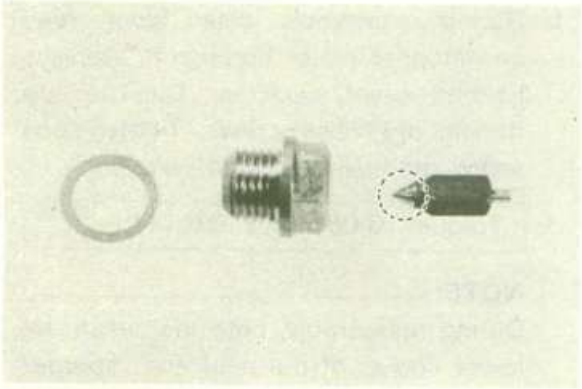
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CHAPTER 4. CARBURETION

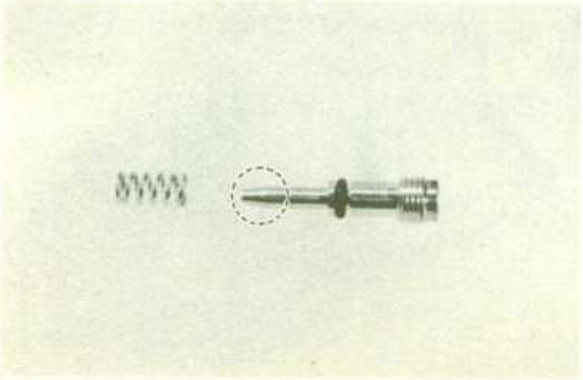
4-1. CARBURETOR

A. Inspection and repairing

1. Remove following parts
   a) Pilot air screw
   b) Idle speed screw
   c) Float chamber
   d) Float
   e) Needle valve
   f) Valve seat
   g) Main jet
   h) Main nozzle
   i) Pilot jet
2. Wash carburetor in petroleum base solvent. Wash all associated parts.
3. Using high pressure air, blow out all passages and jet's.
4. Inspect needle and seat for signs of excessive wear or foreign particles. Repalce as required. Always replace inlet needle and valve seat as an assembly.



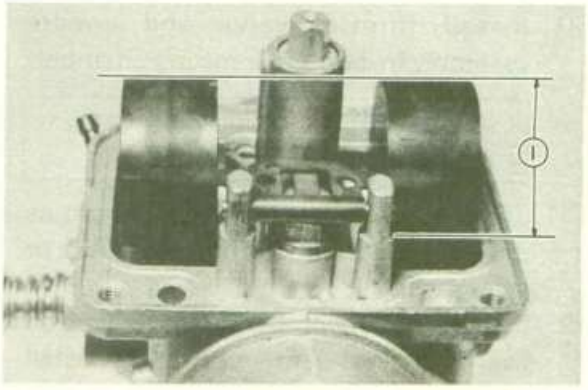
5. Inspect pilot air screw for signs of excessive wear or foreign particles. Replace as requred.



6. Float level
   a. Re-install components, with exception of float chamber.

Tightening torque:
Pilot jet: 0.08 m-kg (0.6 ft-lb)
Main jet: 0.2 m-kg (1.4 ft-lb)
Valve seat: 0.4 m-kg (2.9 ft-lb)

   b. Using a vernier caliper, measure the distance from float chamber gasket seat (gasket removed) to top of float.



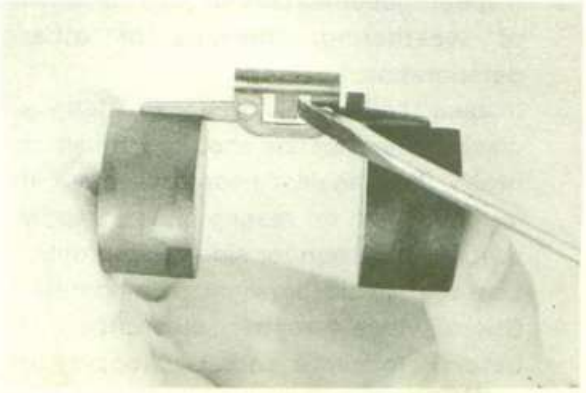
1. Float level

Float level:
23 ±2.5 mm
(0.91 ±0.10 in)

NOTE:

The float should be just resting on, but not depressing, the spring loaded inlet needle.

   c. To correct float level, remove float assembly and bend tang a slight amount as required. Both right and left sides of float should measure identically.



7. Install float chamber.

Tightening torque: 0.2 m-kg (1.4 ft-lb)

8. Remove needle out of seat in throttle valve (slide). Inspect for signs of bending scratches or wear. Replace as required.
9. Check throttle valve (slide) for signs of wear. Insert into carburetor body and check for free movement. If slide or body is out of round causing slide to stick, replace.
10. Install throttle valve and needle assembly in carburetor mixing chamber.

Jet needle holding plate torque: 0.1 m-kg (0.7 ft-lb)

11. Tighten mixing chamber top as tight as possible by hand. Do not use pliers or vice-grips.
12. Install mixing chamber top cover, and all overflow and vent tubes. Re-install carburetor. Check position and routing of all tubes. Check tightness of all fittings. Make sure carburetor is mounted in a level postion. (Refer to CABLE ROUTING DIAGRAM).
13. After installation, readjust throttle cable and Autolube pump cable, see direction in Chapter 2, Section 2-3-A. and 2-3-C.

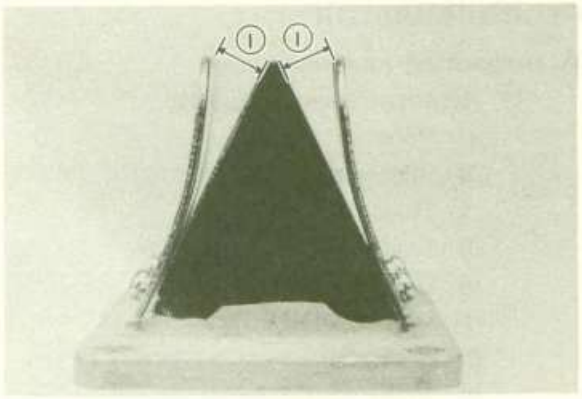
4-2. REED VALVE ASSEMBLY

A. Removal and troubleshooting

With carburetor removed, proceed as follows:

1. Remove the bolts holding the carburetor joint and reed valve assembly to cylinder. Remove assembly.
2. Inspect rubber carubretor joint for signs of weathering, checking or other deterioration.
3. Inspect reed petals for signs of fatigue cracks. Reed petals should fit flush or nearly flush against neoprene seats. If in doubt as to sealing ability, apply suction to carburetor side of assembly. Leakage should be slight to moderate.
4. Check valve stopper clearance. If beyond tolerance, adjust stopper or replace as required.

Valve stopper clearance: 9 ±0.3 mm (0.35 ±0.012 in)



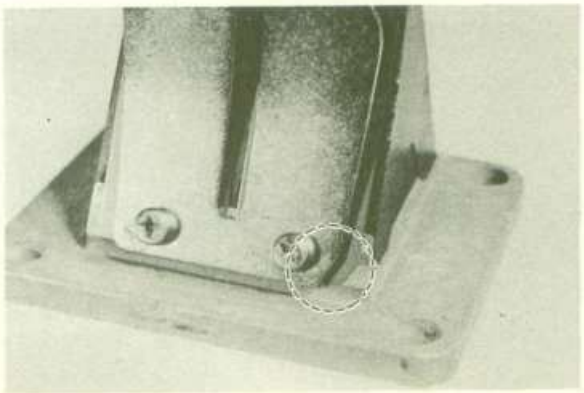
1. Valve stopper clearance

5. If disassembly of the reed valve assembly is required, proceed as follows:
   a. Remove Phillips screws securing stopper plate and reed to reed block. Handle reed carefully. Avoid scratches and do not bend. Note form which side of the reed block the reed and stopper plate were removed. Re-install on same side.
   b. During reassembly, clean block, reed and stopper plate thoroughly. Apply a holding agent, such as "Loc-Tite", to threads of Phillips screws. Tighten each screw gradually to avoid warping.

Torque: 0.08 m-kg (0.6 in-lb)

NOTE:

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



6. During reassembly of the reed valve assembly and manifold, install new gaskets and torque the securing bolts gradually and in pattern to the proper torque.

Reed valve securing bolt torque:
0.7 ~ 1.0 m-kg
(5.1 ~ 7.2 ft-lb)

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5

CHAPTER 5. CHASSIS

5-1. FRONT WHEEL

A. Removal

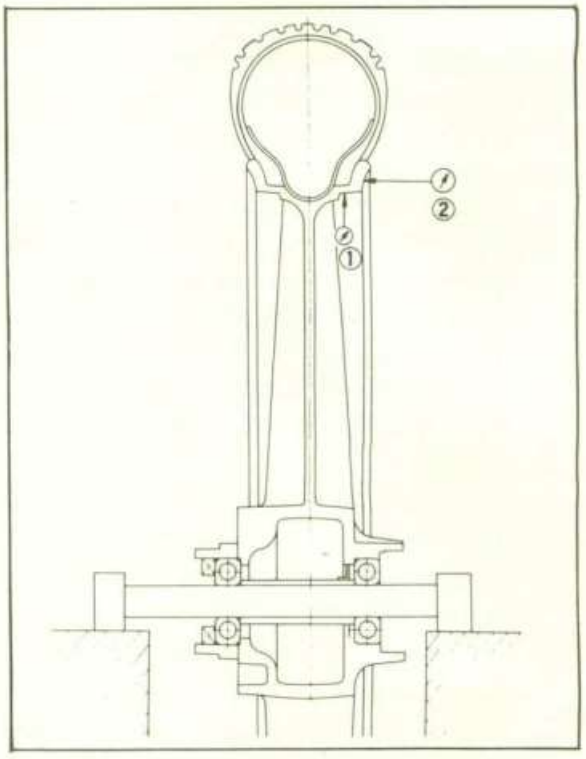
1. Remove cotter pin from front axle nut.
2. Remove the front axle nut.
3. Loosen the two axle holder nuts at the bottom of the fork leg.
4. Raise the front wheel of the machine by placing a suitable stand under the engine.
5. Remove the front wheel axle by simultaneously twisting and pulling out on the axle. Then remove the wheel assembly. In this case, the speedometer gear unit housing must be removed.

B. Front axle

Remove any corrosion from axle with emery cloth. Place the axle on a surface plate and check for bends. If bent, replace.

C. Front wheel inspection

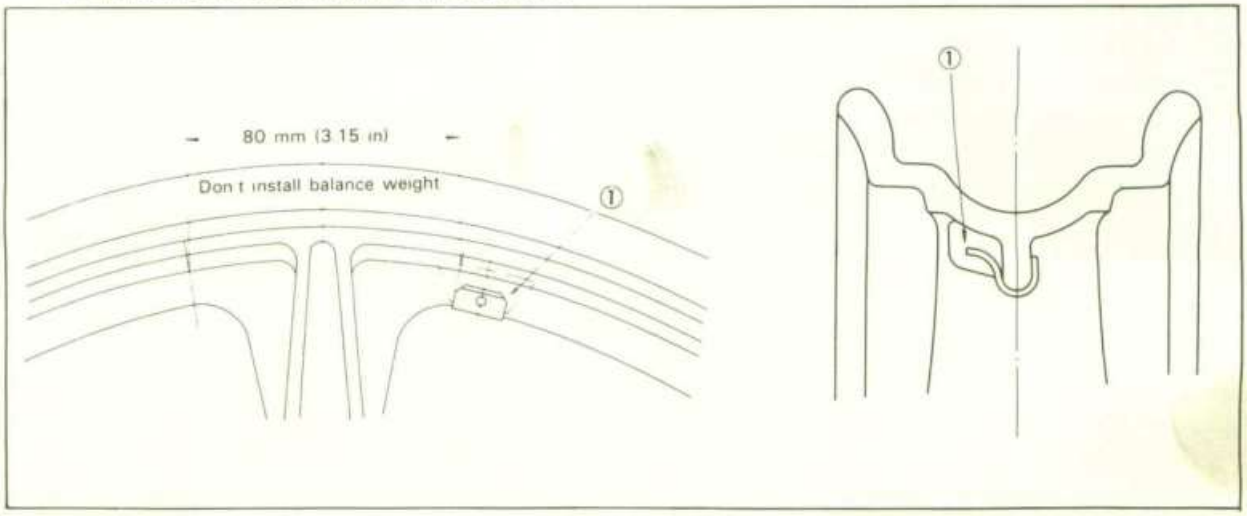
1. Check for cracks, bends or warpage of wheels. If a wheel is deformed or cracked, it must be replaced.
2. Check wheel run-out
   If deflection exceeds tolerance, check wheel bearing or replace wheel as requried.



1. Vertical 2. Lateral

Rim run-out limits:
Vertical — 2 mm (0.08 in)
Lateral — 1 mm (0.04 in)

3. Check wheel balance.
   Rotate wheel lightly several times and observe resting position.
   If wheel is not statically balanced, wheel will come to rest at the same position. Install balance weight at lighter position (at top) as illustrated.



1. Balance weight

NOTE:

The wheel should be balanced with brake disc installed.

D. Replacing wheel bearings

If the bearings allow play in the wheel hub or if wheel does not turn smoothly, replace the bearings as follows:

1. First clean the outside of the wheel hub.
2. Drive the bearing out by pushing the spacer aside (the spacer "floats" between the bearings) and tapping around the perimeter of the bearing inner race with a soft metal drift pin and hammer. Both bearings can be removed in this manner.
3. To install the wheel bearing, reverse the above sequence. Be sure to grease the bearing before installation. Use a socket that matches the outside race of the bearing as a tool to drive in the bearing.

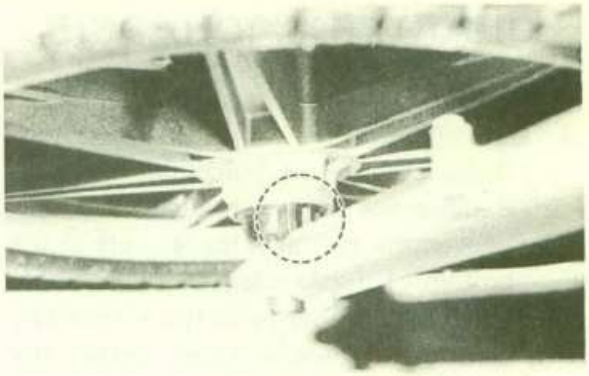
CAUTION:

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

E. Installing front wheel

When installing front wheel, reverse the removal procedure taking care of the following points:

1. Lightly grease lips of front wheel oil seals and gear teeth of speedometer drive and driven gears. Use light-weight lithium soap base grease.
2. Make sure there is an enough gap between disc pads.
3. Check for proper engagement of the boss on the outer fork tube with the locating slot on speedometer gear unit housing.

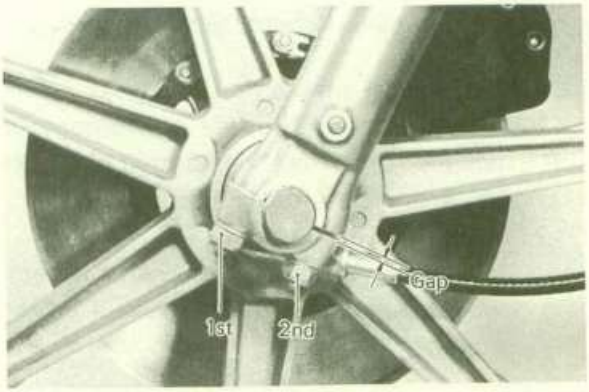


4. Always secure the front wheel axle as follows:

a. Torque the front axle nut.

Axle nut torque:
8.3 ~ 13 m-kg (60 ~ 94 ft-lb)

b. Torque axle holder nuts. First tighten nut on front end of axle holder, and tighen nut on rear end.



Holder nut torque:
1.1 ~ 1.8 m-kg
(8.0 ~ 13.0 ft-lb)

c. Install a new cotter pin.

5-2. REAR WHEEL

A. Removal

1. Place machine on center stand.
2. Disconnect the drive chain. (Refer to 3-1-H.)
3. Remove cotter pin from rear axle.
4. Remove the rear axle nut.
5. Remove the rear axle by simultaneously twisting and pulling out.
6. Remove the rear wheel assembly.

B. Rear axle

See front wheel section, paragraph "Front axle".

C. Replacing wheel bearings

See front wheel section, paragraph "Replacing wheel bearings".

D. Rear wheel inspection

See front wheel section, paragraph "Front wheel inspection".

E. Installing rear wheel

When installing rear wheel, reverse removal procedure taking care of following points:

1. Lightly grease lip of rear wheel oil seals.
2. Make sure there is an enough gap between disc puds.
3. Install wheel assembly and axle.
4. Connect drive chain. (Refer to 3-5.)
5. Adjust drive chain. (Refer to 2-4-C.)

5-3. DISC BRAKES (Front and rear)

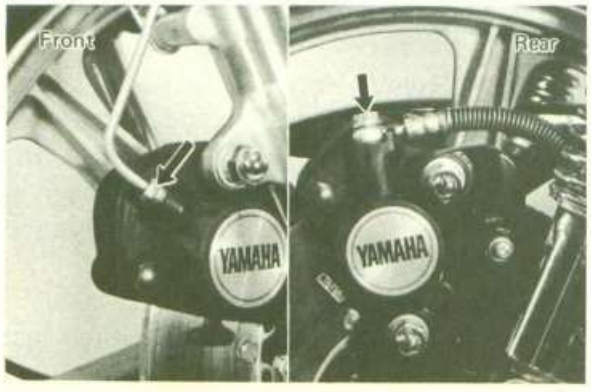
A. Front and rear disc brake disassembly

Avoid disassembling the disc brake whenever possible. Trouble that has nothing to do with the brake cam and should be fixed without disassembling the brake.

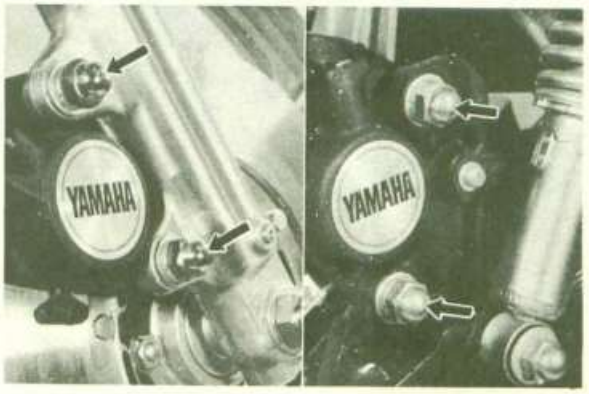
CAUTION:

Brake fluid will damage painted and other surfaces. Use caution whenever working with brake fluid.

1. Caliper assembly.
   a. Removing caliper assembly
      1) Remove brake pipe and hose from caliper.



2) Wrap up brake pipe with clean vinyl sheet or clean cloth.
3) Keep front brake lever pulled in. This prevents fluid from dripping.
4) Remove caliper securing bolts and nuts, and remove caliper.



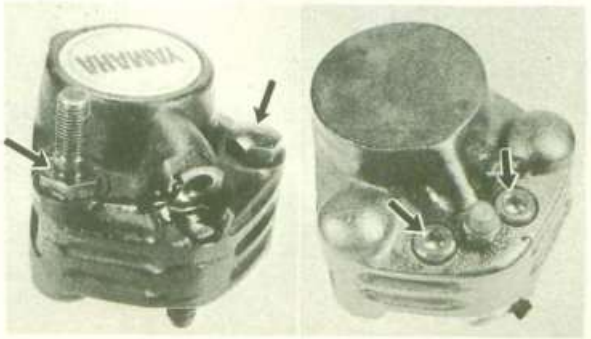
b. Removing the pads

Remove the pads from the caliper. If difficult to remove, push the piston to the bottom of the cylinder using the piston pushing tool, and remove.

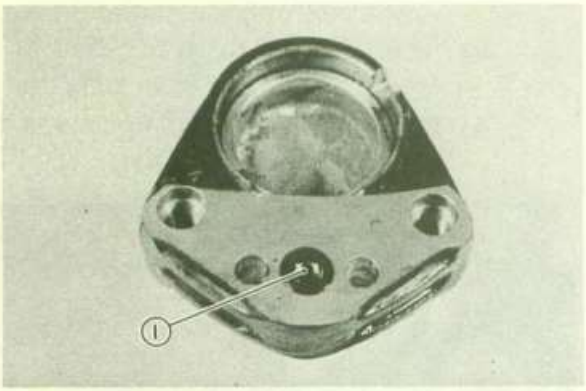


c. Removing the piston seal

1) Remove the two bridge bolts and two hexagon bolts.



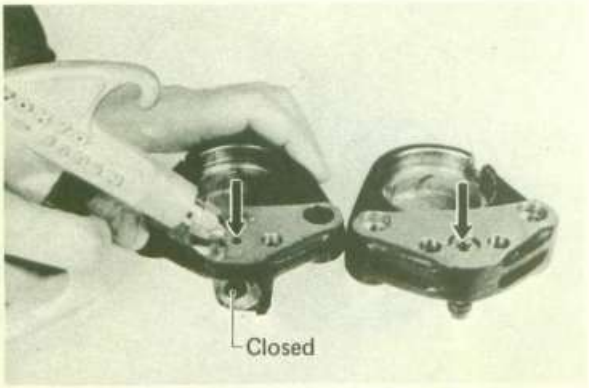
2) Remove the caliper seal.



1. Caliper seal

NOTE:
The bridge bolts and hexagon bolts should be replaced every two years.

3) Feed compressed air into the brake fluid inlet to force out the piston. Never attempt to pry it out with a screwdriver.



CAUTION:
When doing above procedure care should be taken so that piston does not hit your face or body.

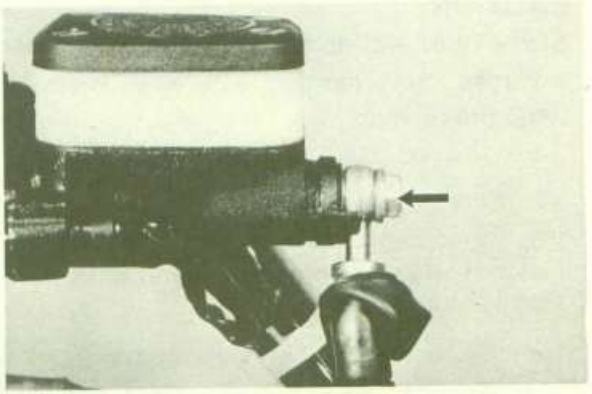
4) Remove the piston seal and dust seal from the caliper body.



1. Dust seal 2. Piston seal

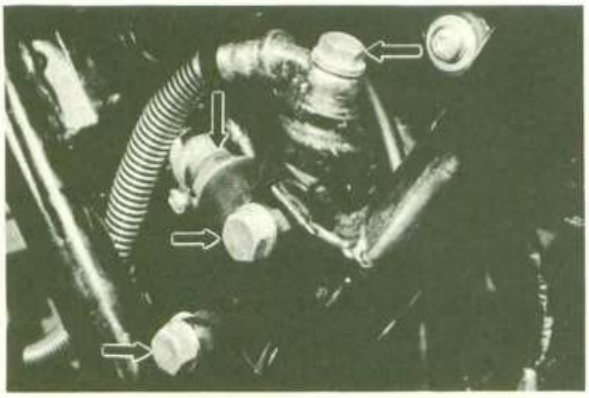
CAUTION:
Keep the removed parts free from gasoline, kerosene and engine oil. Otherwise, all seals will swell up and deteriorate. The piston seals and dust seals should be replaced every two years.

2. Master cylinder
   a. Master cylinder disassembly
      1) Disconnect front stop switch lead wire.
      2) Remove the brake lever. (Be careful not to lose the brake lever return spring.)
      3) Remove the brake hose.

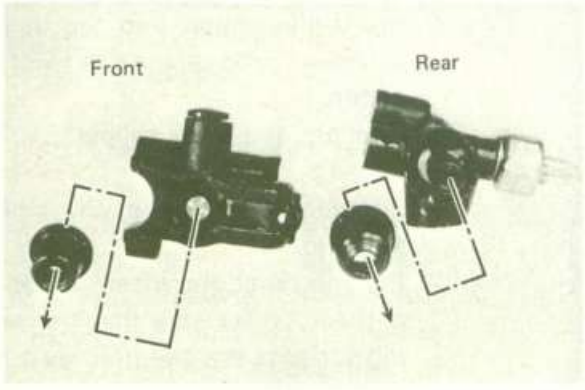


      4) Remove the two bolts securing the master cylinder, and remove the master cylinder from the handlebar. Remove the reservoir cap, and remove the diaphragm. Drain the brake fluid.
   b. Removing rear brake master cylinder
      1) Disconnect rear stop switch lead wire.

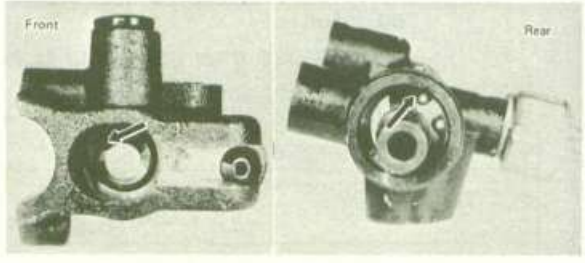
2) Remove brake hose.
3) Remove two bolts securing master cylinder. Remove reservoir hose. Drain off brake fluid.



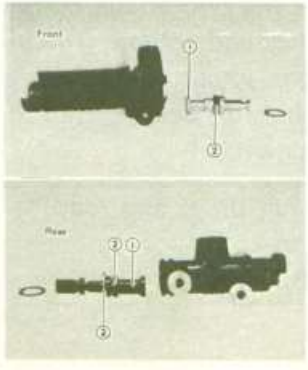
c. Mastercylinder (front and rear brakes) disassembly
1) Remove master cylinder boot.



2) Remove snap ring using circlip pliers.

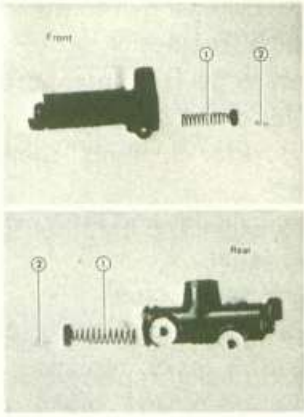


3) Remove piston. (Note that spring remains in master cylinder.)



1. Piston
2. Cylinder cup
3. Piston holder

4) Remove return spring and stopper valve.



1. Return spring
2. Valve

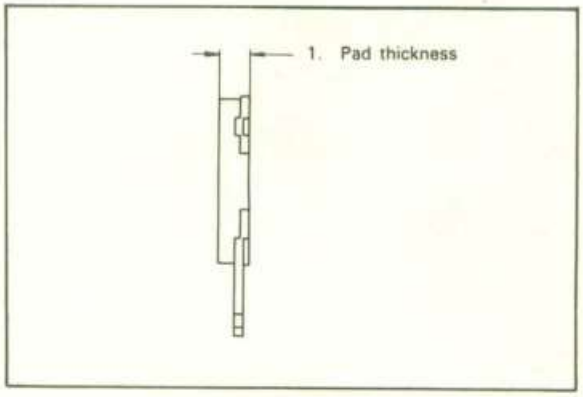
5) Remove stopper plate.
6) Remove cylinder cup.

B. Disc brake inspection

1. Caliper

a. Piston
If the piston has scratches on its outer surface, it should be replaced.

b. Pads
If any pad is worn beyond limits, it should be replaced.

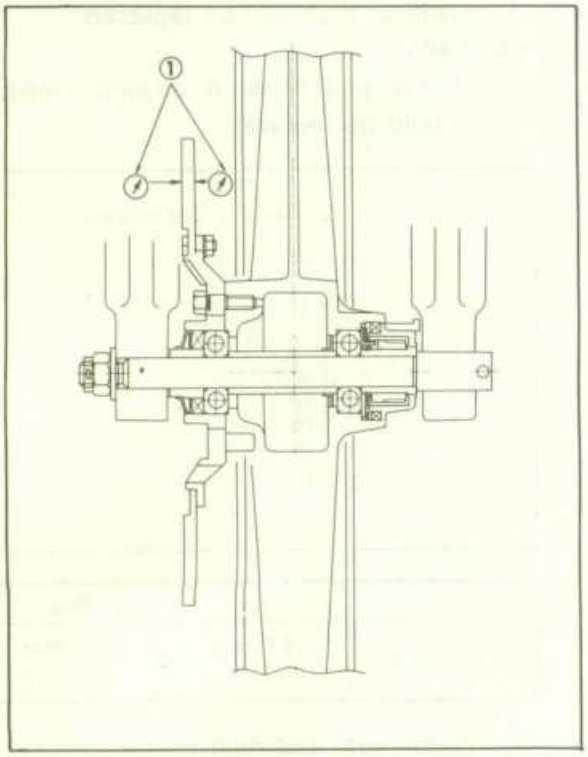


	Front	Rear
Wear limit	4.5 mm (0.18 in)	4.5 mm (0.18 in)

c. Piston seal and dust seal
If piston seal or dust seal is scratched or damaged, it should be replaced. Whether or not it is scratched or damaged, it should be replaced every two years.

d. Bridge bolts
Bridge bolts should be replaced every time the caliper is removed, whether damaged or not.

2. Master cylinder
   a. Master cylinder body
      1) If the master cylinder has scratches or worn spots, replace it.
      2) If the outlet edge is scratched or damaged, replace it.
      3) Check the port for clogging. Clean as required.
      4) Check the cylinder and breather for excessive wear.
3. Brake hose and brake pipe
   a. Check the brake hose and brake pipe, and if damaged or leaky, replace.
   b. Replace brake hose and brake pipe every four years.
4. Disc
   a. The deflection of the disc assembly should be less than 0.15 mm (0.006 in). If deflection exceeds 0.15 mm, check the deflection of the disc and the wheel bearing.



1. Dial gauge

   b. If the disc is worn excessively or damaged, replace it.

	Front	Rear
Standard	7.0 mm (0.28 in)	7.0 mm (0.28 in)
Wear limits	6.5 mm (0.26 in)	6.5 mm (0.26 in)

C. Disc brake assembly

1. Cleaning
   All disassembled parts should be washed in the following manner before they are assembled.
   a. Be sure to use new brake fluid for washing. (Do not use mineral oil; it will cause rubber parts to swell up. Also avoid using alcohol.)
   b. If any other mineral oil other than brake fluid is used on rubber parts, they should be replaced. Metallic parts should also be washed in brake fluid.
2. Caliper
   a. Installing the piston
      1) it the piston seal and dust seal in the groove in the caliper cylinder.
      2) Coat the caliper cylinder and piston with new brake fluid.
      3) Insert the piston into the caliper cylinder. Take care not to twist the piston.
   b. Outer caliper and inner caliper installation
      1) Fit the caliper seal in the caliper seal groove.
      2) Put the outer and inner caliper together. (Make sure that the sealing surfaces are free from dust and scratches.)
      3) Tighten the two hexagon head bolts. (The bridge bolts are installed later.)
      Always use new bolts and tighten to specification.

Tightening torque:
Front caliper — 1.8 ~ 2.6 m-kg (13.1 ~ 18.8 ft-lb)
Rear caliper — 1.8 ~ 2.6 m-kg (13.1 ~ 18.8 ft-lb)

      4) Replace the two bridge bolts with new ones, and tighten. The bridge bolts are important safety parts and should be tightened to specification.

Tightening torque (front and rear):
7.5 ~ 9.5 m-kg (54.2 ~ 68.7 ft-lb)

c. Pad installation
   1) The pads may be installed when the caliper or bridge bolts are tightened.
   2) When the pads alone are to be replaced, it is necessary to push the piston so that the pads can be placed in position. When the piston is pushed back, the brake fluid level in the master cylinder reservoir increases. It may be necessary to loosen the bleed screw to let out some of the brake fluid.

d. Caliper installation
   1) The caliper can be installed by reversing the removal procedure. Install caliper (front and rear).

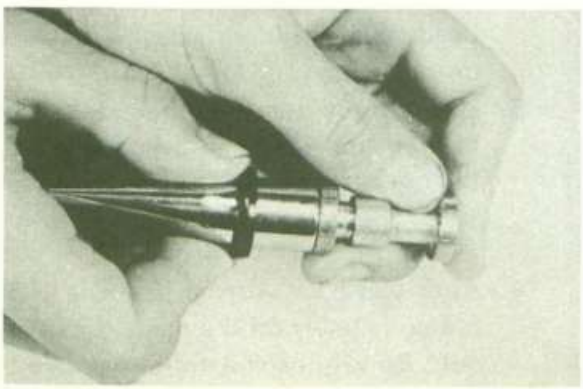
Tightening torque:
4.5 ~ 5.0 m-kg
(32.5 ~ 36.2 ft-lb)

   2) Install the brake pipe (front) and brake hose (rear).

Tightening torque:
Front caliper — 1.4 ~ 2.3 m-kg (10.1 ~ 16.6 ft-lb)
Rear caliper — 3.0 ~ 4.8 m-kg (21.7 ~ 34.7 ft-lb)

3. Master cylinder

a. Cylinder cup installation
   1) After soaking the cup in new brake fluid, assemble the cup and piston. Take care not to scratch the cup or piston. (Use cylinder cup installer.)



   2) Install the stopper plate.
   3) Insert the spring and valve into the master cylinder body.

b. Piston installation
   1) Check the outer surface of the piston for scratches. Carefully insert the piston into the cylinder. Take care not to scratch the inner wall of the cylinder. If scratched, fluid leakage may result.
   2) Install the snap ring.
   3) Firmly fit the boot in the grooves of the master cylinder and piston.

c. Installing the master cylinder on the handlebar
   1) Install the master cylinder on the handlebar.
   2) Connect brake hose to master cylinder with union bolt.

Tightening torque:
(front and rear master cylinder)
2.3 ~ 2.8 m-kg
(16.6 ~ 20.3 ft-lb)

NOTE:
If gasket is damaged, replace it.

   3) Connect reservoir hose to rear master cylinder.
   4) Fill the reservoir with brake fluid (DOT #3) and air. (Refer to "Air bleeding".)

d. Front brake hose and brake pipe
Both brake hose and brake pipe should be tightened.

Tightening torque:
1.4 ~ 2.3 m-kg
(10.1 ~ 16.6 ft-lb)

e. Disc
   1) The disc bolts should be tightened to specification.

Tightening torque:
1.7 ~ 2.2 cm-kg
(12.3 ~ 16.0 in-lb)

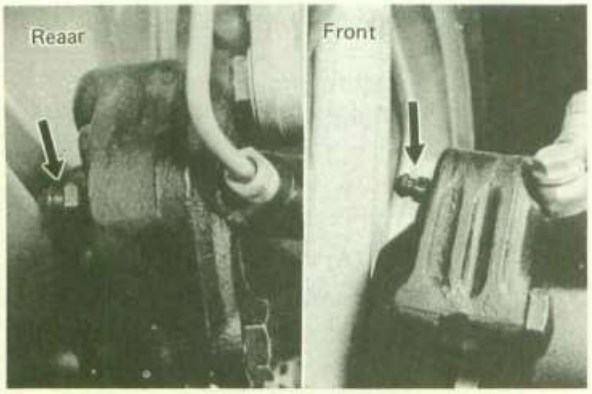
   2) The deflection of the disc assembly should be within limits.

Deflection limit:
0.15 mm (0.006 in)

f. Air bleeding

If any of the parts relating to the brake fluid have been removed, air must be bled after reassembly.

1) Add brake fluid (DOT #3) to the reservoir.
2) Install the diaphragm. Be careful not to loose brake fluid because of overflow.
3) Connect a vinyl tube tightly to the caliper bleed screw.
4) Put the end of the vinyl tube into a container.
5) Apply the brake lever and pedal several times. With the brake lever drawn in, loosen the bleed screw.



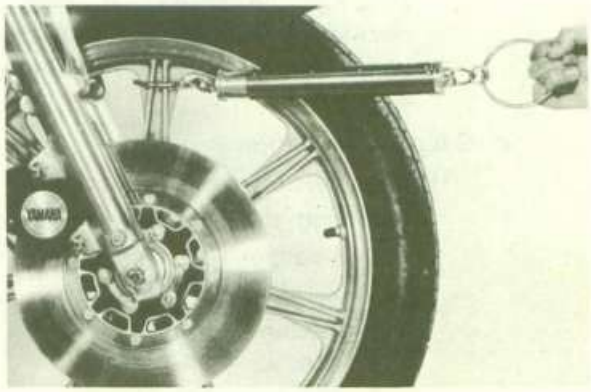
NOTE:

The brake lever should be squeezed gently; otherwise, air will form very small bubbles, and air bleeding will become difficult.

6) When the brake lever and pedal comes in contact with the handlebar grip and foot rest arm, tighten the bleed screw.
7) Continue operations from 5) and 6) until air bubbles disappear completely.

Bleed screw tightening torque:
0.6 ~ 0.9 m-kg
(4.3 ~ 6.5 in-lb)

8) Add brake fluid to the level line on the reservoir.
9) The reservoir is air-tight. When the brake pads are worn, the fluid level will lower, but it is automatically adjusted by the shift of the diaphragm. Therefore, when the brake fluid is added, the diaphragm must be set in its original position.
10) The disc trailing torque should be within the specified amount after it is assembled.



Torque:
1.0 kg or less (2.2 lb)

If torque exceeds this limit, check the disc run-out.

NOTE:

A slight drag on the disc is normal and will not develop into a worse condition.

5-4. TIRES AND TUBES

A. Removal

1. Remove valve cap, valve core, and valve stem locknut.
2. When all air is out of tube, separate tire bead from rim (both sides) by stepping on tire with your foot.
3. Use two tire irons (with rounded edges) to work the tire bead over the edge of the rim, starting 180° opposite the tube stem. Be careful not to pinch the tube as you do this.
4. After you have worked one side of the tire completely off the rim, slip the tube out. Be very careful not to damage the stem while pushing it back out of the rim hole.

NOTE:

If you are changing the tire itself, then finish the removal by working the second bead off the rim.

B. Installation

Reinstall the tire and tube by reversing the disassembly procedure. After the tube has been installed, but before the tire has been completely slipped onto the rim, inflate the tube. This removes any creases that might exist. Release the air and continue with reassembly. After the tire has been completely slipped onto the rim, make sure the stem comes out of the hole in the rim at a right angle to the rim. Finally, inflate the tire.

	Front tire	Rear tire
Normal riding	1.8 kg/cm² (26 lb/in²)	2.0 kg/cm² (28 lb/in²)
Continued high speed riding or with passenger	2.0 kg/cm² (28 lb/in²)	2.3 kg/cm² (32 lb/in²)

NOTE:

Make sure the wheel is balance every time the tire replaced. (Refer to 5-1-C.)

5-5. DRIVE CHAIN AND SPROCKETS

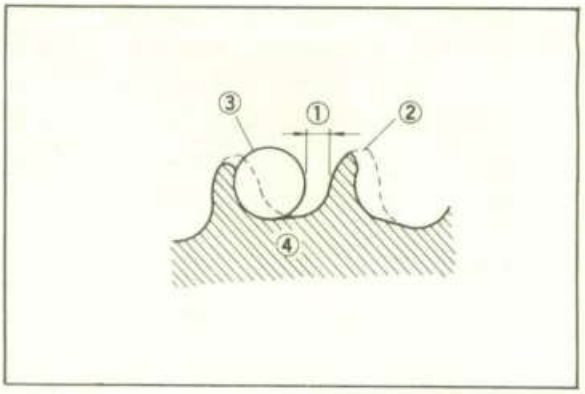
NOTE:

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

A. Drive sprocket

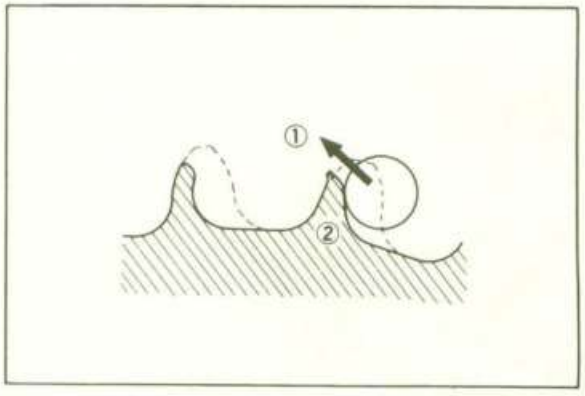
With the left crankcase cover removed, proceed as follows:

1. Using a blunt chisel, flatten the drive sprocket lock washer tab.
2. With the drive chain in place and transmission in gear, firmly apply the rear brake. Remove the sprocket securing nut. Remove the sprocket.
3. Check sprocket wear. Replace if tooth width has decreased as shown



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

4. Replace if tooth wear shows a pattern resembling that in the illustration.



1. Slip off
2. Bend teeth

5. During reassembly, make sure the lock washer splines are properly engaged on the drive shaft splines. Tighten securing nut to specified torque. Bend lock washer tab against securing nut flats.

Drive sprocket securing nut torque:
5.0 ~ 8.0 m-kg (36 ~ 58 in-lb)

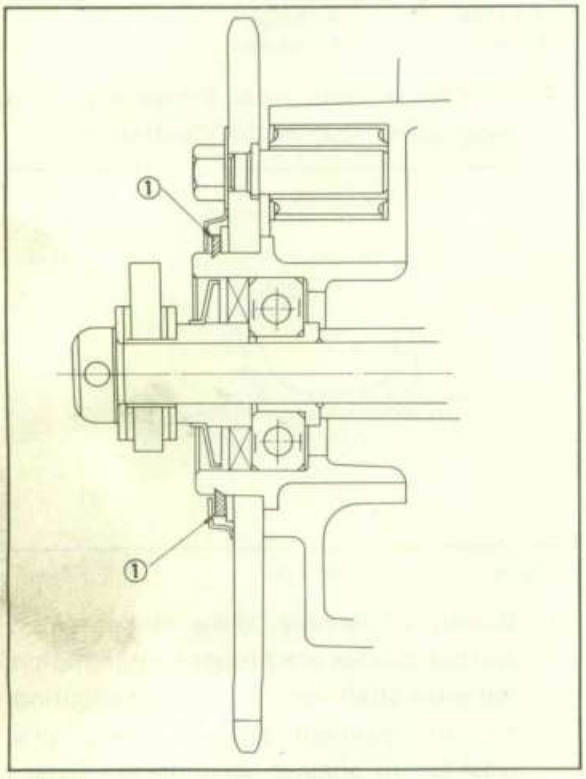
B. Driven sprocket

With the rear wheel assembly removed, proceed as follows:

1. Using a blunt chisel, flatten the securing bolt lock tabs.
   Remove the securing bolts. Remove the lock washers sprocket circlip, plate washer and sprocket.
2. Check sprocket wear per procedures for the drive sprocket.
3. Check the sprocket to see that it runs true. If bent, replace.

4. During reassembly as illustrated, make sure that sprocket and sprocket seat are clean. Tighten the securing bolts in a crisscross pattern. Apply a grease and bend the tabs of the lock washers fully against the securing bolt flats.

NOTE:
Make sure the circlip is proper position.

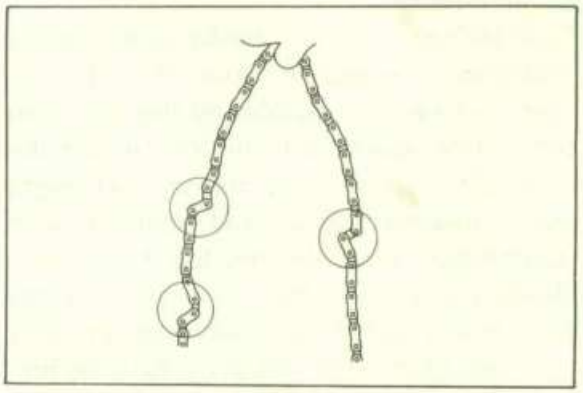


1. Circlip

Driven sprocket securing bolt torque:
4.2 ~ 6.8 m-kg
(43 ~ 54 ft-lb)

C. Chain inspection

1. With the chain installed on the machine, excessive wear may be checked for by taking up chain freeplay and pulling the chain away from the rear sprocket. If the chain will lift away more than one-half the length of the sprocket teeth, remove and inspect the chain. If any portion of the chain shows signs of damage, or if either sprocket shows signs of excessive wear, remove and replace.
2. Check the chain for stiffness. Hold as illustrated. If stiff, soak in solvent solution, clean with wire brush and dry with high pressure air. Oil chain thoroughly and attempt to work out kinks. If still stiff, replace.



3. Check the side plate for damage. Check to see if excessive play exists in pins and rollers. Check for damaged rollers. Replace as required.

D. Chain maintenance

The chain should be lubricated according to the recommendations given in the Maintenance and Lubrication intervals charts.
More often if possible. Preferable after every use. See "Chassis and suspension, swing arm", for additional information regarding chain guide.

1. Wipe off dirt with shop rag. If accumulation is severe, use wire brush, then wipe with rag.
2. Apply lubricant between rollers and side plates on both inside and outside of chain. Don't skip a portion as this will cause uneven wear. Apply thoroughly and wipe off excess.

NOTE:
Chain and lubricant should be at room temperature to assure penetration of lubricant into rollers.
Choice of lubricant is determined by use and terrain. SAE 20W or 30W oil may be used, but several specialty types by accessory manufacturers offer more penetration and corrosion resistance for roller protection. In certain areas, semi-drying lubricants are preferable. These

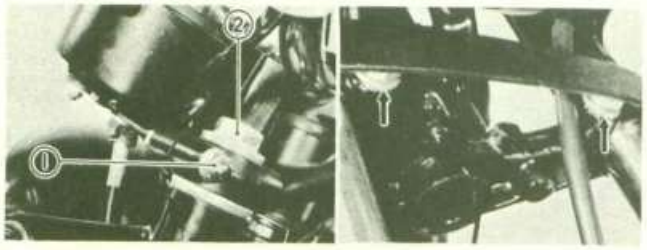
will resist picking up sand particles dust and dirt.

3. Periodically, remove the chain and blow off with high pressure air.
4. Brush off dirt and soak chain in solvent. Dry with high pressure air. Lubricate thoroughly while off machine. Work each roller thoroughly to make sure lubricate penetrates. Wipe off excess. Re-install.

5-6. FRONT FORKS

A. Disassembly

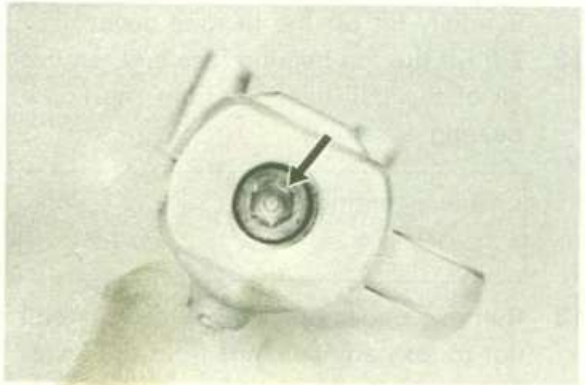
1. With the front wheel and front fender removed, the fork legs can be removed from the upper and lower brackets by loosening upper and lower pinch bolts.



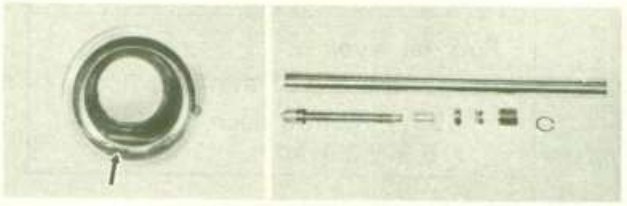
1. Pinch bolt 2. Cap bolt

NOTE:
When remove right fork leg, brake hose and pipe must be removed at front fork and top of caliper.

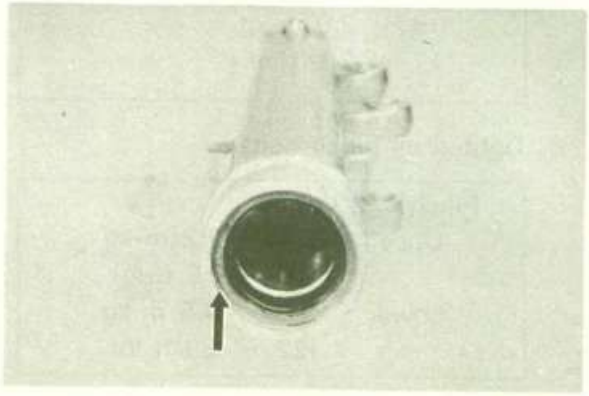
2. Remove the caps and drain the oil from both fork tubes.
3. Remove the internal hexagonal bolt from bottom of outer tubes using fork spring guide wrench.



4. Remove inner tube and damper assembly from outer tube.
5. Remove clip from bottom of inner tube and pull out fork piston assembly. Inspect and replace if damaged.



6. To replace fork seal, remove wire clip, and cover washer from outer tubes.



7. Carefully pry out old seal without damaging fork tube.
8. Insert new seal "open" side down.

B. Assembly

1. When assembling the front fork, reverse the order of disassembly.

NOTE:
Fork springs must be installed with greater pitch upward.

2. Installing the front forks
   a. Insert the front fork tubes to the correct position and partially tighten the under-bracket mounting bolt.
   b. Pour specified amount of oil into the inner tube through the upper end opening. Use Yamaha fork oil 10W, 20W, 30W.

NOTE:
Specialty type fork oils of quality manufacture may be used.

Fork oil capacity:
144 ±4 cc (4.87 oz) each side
Fork oil level: (below the top of the fork) 389 ±10 mm each side (15.3 ±0.4 in)

c. Install the inner tube caps.

Inner tube cap torque:
1.5 ~ 3.0 m-kg (11 ~ 22 ft-lb)

d. Tighten all pinch bolts.

Pinch bolt torque:
Upper — 1.4 ~ 2.2 m-kg (10 ~ 16 ft-lb)
Lower — 3.0 ~ 4.5 m-kg (22 ~ 33 ft-lb)

3. Install brake hose and pipe and bleed air. (Refer to 5-3-C-3-f.)

5-7. STEERING HEAD

A. Adjustment

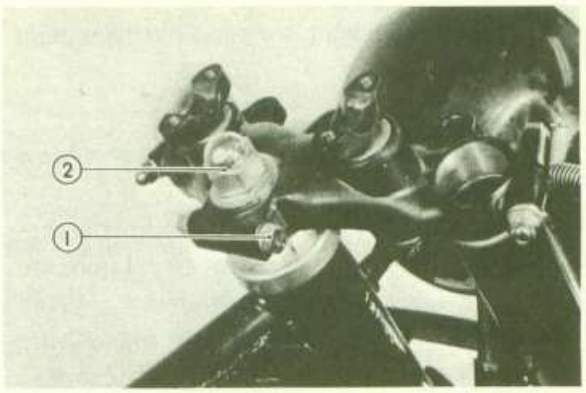
Refer to Chapter 2, Section 2-4, paragraph E for steering head adjustment procedure.

B. Disassembly

1. After removing front forks, remove headlight from headlight body.
2. Disconnect electrical wires between headlight body and main wiring harness of frame.

NOTE:
Removal of fuel tank will aid in disconnecting wiring.

3. Disconnect any electrical wires between handlebar switches and main wiring harness in headlight body.
4. Disconnect clutch and throttle cables at handlebars.
5. Disconnect tachometer and speedometer cables at instruments.
6. Remove handlebars and put aside.
7. Loosen stem pinch bolt.
8. Remove stem fitting nut and crown washer.

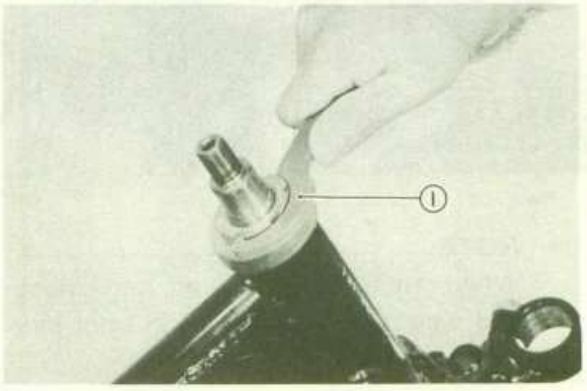


1. Pinch bolt 2. Fitting nut

9. Remove handle crown (upper bracket) and instruments, as an assembly.

NOTE:
Hold headlight body to keep it from falling.

10. Remove steering ring nut with steering nut wrench.



1. Steering nut wrench

CAUTION:
Support "under bracket" so that the loose bearings will not fall out.

11. Still supporting the under bracket, carefully lift off the bearing cover.
12. Lift off the top bearing race and remove all of the ball bearings from the upper bearing assembly.

Ball quantity/size:
19/1/4 in

13. Remove under bracket, be very careful not to lose any bearings from the lower assembly.

Ball quantity/size: 19/1/4 in

14. Remove races from head pipe using drift pinch and hammer. Work the race out gradually by tapping lightly around its complete backside diameter.
15. Remove the bearing race from the lower bracket by tapping around its backside diameter with a drift punch and hammer.
16. Remove dust seal.

C. Inspection

1. Examine all the balls for pits or partial flatness. If any one is found defective, the entire set (including both races) should be replaced. If either race is pitted, shows rust spots, or is damaged in any way, replace both races and all balls.
2. Examine dust seal under lowest race and replace if damaged.

D. Installation

1. If pressed-in races have been removed, tap in new races.
2. Grease the lower ball race of the bottom assembly and arrange the balls around it. Then apply more grease.
3. Grease the lower ball race of the upper assembly and arrange the balls around it. Then apply more grease and set the top race into place.

NOTE:

Use medium-weight wheel bearing grease of quality manufacturer, preferably waterproof.

4. Carefully slip the under bracket stem up into the steering head. Hold the top bearing assembly in place so the stem does not knock any balls out of position.
5. Set the upper bearing cover on and install the ring nut. Tighten the ring nut so all free play is taken up, but so the bracket can still pivot freely from lock to lock. Recheck for free play after the entire fork unit has been installed. (Refer to Chapter 2-4-E, for Steering head adjustment.)
6. Install the fork tubes into the under bracket to ease headlight body installation.
7. Install the headlight body and stays onto the fork tubes with rubber and steel spacing washers properly in place.
8. Install the upper fork bracket. Tighten steering fitting nut, then tighten stem pinch bolt. Torque to specifications.

Steering fitting nut: 4.2 ~ 5.2 m-kg (30.4 ~ 37.6 ft-lb)
Stem pinch bolt: 1.4 ~ 2.2 m-kg (10.1 ~ 15.9 ft-lb)

9. Tighten upper fork tube pinch bolts and torque to specification.

Upper fork tube pinch bolt torque: 1.4 ~ 2.2 m-kg (10.1 ~ 15.9 ft-lb)

NOTE:

Make certain that tops of fork tubes are adjusted to the same level. If necessary, loosen under bracket pinch bolts and adjust.

10. Install handlebars and torque to specification.

CAUTION:

Tighten bolts in stages to maintain an equal gap on each side of the handlebar holder.

Handlebar mounting bolt torque: 1.4 ~ 2.2 m-kg (10.1 ~ 15.9 ft-lb)

11. Reconnect all electrical wiring and check operation.
12. Install headlight and check operation.
13. Install front wheel.
14. Reconnect speedometer and tachometer cables.
15. Reconnect clutch and throttle cables and check operation and adjustment.

5-8. SWING ARM

A. Swing arm inspection

1. With rear wheel and shock absorbers removed, grasp the ends of the arm and move from right to left to check for free play.

Swing arm free play:
1 mm (0.04 in)

2. If free play is excessive, remove swing arm and replace swing arm bushings.

B. Swing arm lubrication

1. Apply grease to grease fitting on top of pivot with low pressure hand operated gun. Apply until fresh grease appears at both ends of pivot shaft.

Recommended lubricant:
Smooth chassis lube grease

2. Wipe off excess grease.

C. Swing arm removal

1. Remove nut on swing arm pivot bolt and tap out bolt with a long aluminum or brass rod.

NOTE:

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

Pivot bolt torque:
5.0 ~ 8.0 m-kg
(36 ~ 58 ft-lb)

2. Tap *out old bushing* from each side of pivot using the long rod.
3. Install new bushings using a press.

NOTE:

Do not tap on bushing. Press in new bushings.

5-9. REAR SHOCK ABSORBER

A. Removal

1. Remove the rear shock absorber from the machine.
2. Push down the spring, remove the spring retainer, and remove the spring.

B. Inspection

1. Check the rod, and if it is bent or damaged, replace the shock absorber.
2. Check for oil leakage. If oil leakage is evident, replace the shock absorber.
3. At proper position, operate shock absorber rod to check damping.
   Slight resistance should be felt on the compression (down) stroke and considerable resistance should be felt on the return (up) stroke.
4. Install the spring, and install the shock absorber on the machine.

Rear shock absorber
Tightening torque:
2.3 ~ 3.7 m-kg
(19.6 ~ 26.8 ft-lb)

5-10. CABLES AND FITTINGS

A. Cable maintenance

NOTE:

See Maintenance and Lubrication intervals charts for additional information. Cable maintenance is primarily concerned with preventing deterioration through rust and weathering and providing for proper lubrication to allow the cable to move freely within its housing. Cable removal is straightforward and uncomplicated. Removal will not be discussed within this section. For details, see the individual maintenance section for which the cable is an integral part.

WARNING:

Cable routing is very important, for details of cable routing, see the cable routing diagrams at the end of the manual. Improperly routed, assembled or adjusted cables may render the vehicle unsafe for operation.

1. Remove the cable.
2. Check for free movement of cable within its housing. If movement is obstructed, check for fraying or kinking of cable strands. If damage is evident, replace the cable assembly.

3. To lubricate cable, hold in vertical position. Apply lubricant to uppermost end of cable. Leave in vertical position until lubricant appears at bottom. Allow excess to drain and re-install.

NOTE:
Choice of lubricant depends upon conditions and preference. However, a semi-drying chain and cable lubricant will probably perform adequately under most conditions.

B. Throttle maintenance

1. Remove Phillips head screws from throttle housing assembly and separate two halves of housing.
2. Disconnect cable end from throttle grip assembly and remove grip assembly.
3. Wash all parts in mild solvent and check contact surfaces for burrs or other damage. (Also clean and inspect right-hand end of handlebar.)
4. Lubricate contact surfaces with light coat of lithium soap base grease and reassemble.

NOTE:
Tighten housing screws evenly to maintain an even gap between the two halves.

5. Check for smooth throttle operation and quick spring return when released and make certain that housing does not rotate on handlebar.

C. Cable junction maintenance

The throttle cable cylinder (junction point for Autolube control cable) must be periodically maintained.

1. Remove throttle cable (1) from handlebar housing.
2. Remove throttle cable (2) from carburetor mixing chamber top.
3. Remove Autolube pump cable from pump pulley. Remove cable adjustor.
4. Remove seat and fuel tank.
5. Remove the cable/cylinder assembly.
6. Remove cylinder cap, throttle cable (2) and Autolube pump cable.
7. Wash assembly thoroughly in solvent.
8. Lubricate all cables.
9. Apply a thin coating of lubricant to cylinder walls.

NOTE:
A small amount of lithium soap base grease may be used in lieu of cable lubricant. However, if machine is to be used in extreme cold, use cable lubricant.

10. Reassemble all cables. Seal cylinder to keep from damage due to adverse weather and riding conditions. Reinstall cables using routing diagrams in back of book. See Mechanical adjustments chapter for correct cable adjustment.

CHAPTER 6. ELECTRICAL

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CHAPTER 6. ELECTRICAL

6-1. IGNITION SYSTEM

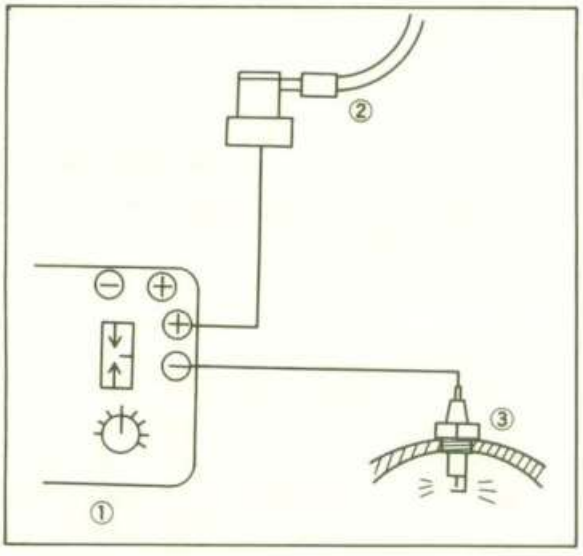
A. Ignition timing

Refer to Chapter 2-5, B. for ignition timing procedure.

B. Spark gap test

The entire ignition system can be checked for misfire and weak spark using the Electro Tester. If the ignition system will fire across a sufficient gap, the engine ignition system can be considered good. If not, proceed with individual component tests until the problem is found.

1. Warm up engine thoroughly so that all electrical components are at operating temperature.
2. Stop engine and connect tester as shown.



1. Electro-Tester
2. Plug wire from coil
3. Spark plug

3. Start engine and increase spark gap until misfire occurs. (Test at various rpm's between idle and red line.)

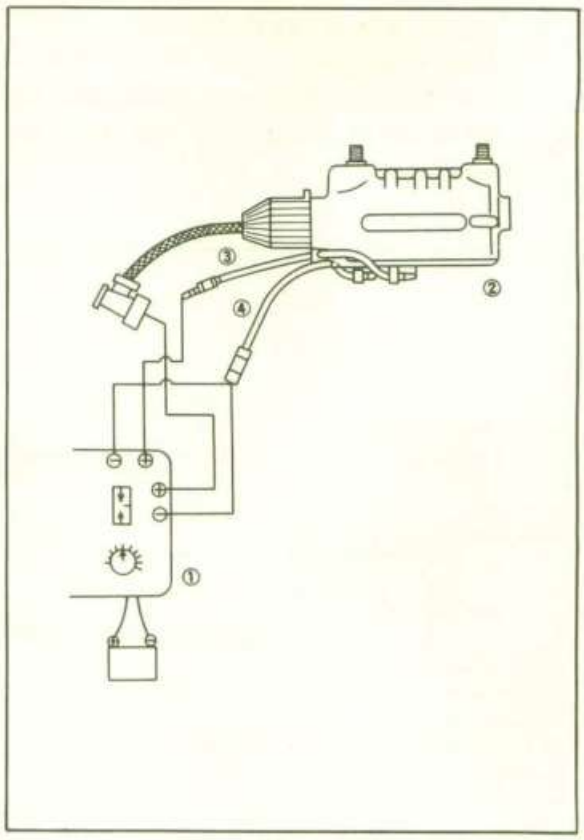
Minimum spark gap: 6 mm (0.24 in)

C. Ignition coil

1. Coil spark gap test.

a. Remove fuel tank and disconnect ignition coil from wire harness and spark plug.

b. Connect Electro Tester as shown.



1. Electro-Tester
2. Ignition coil
3. Red/White
4. Orange

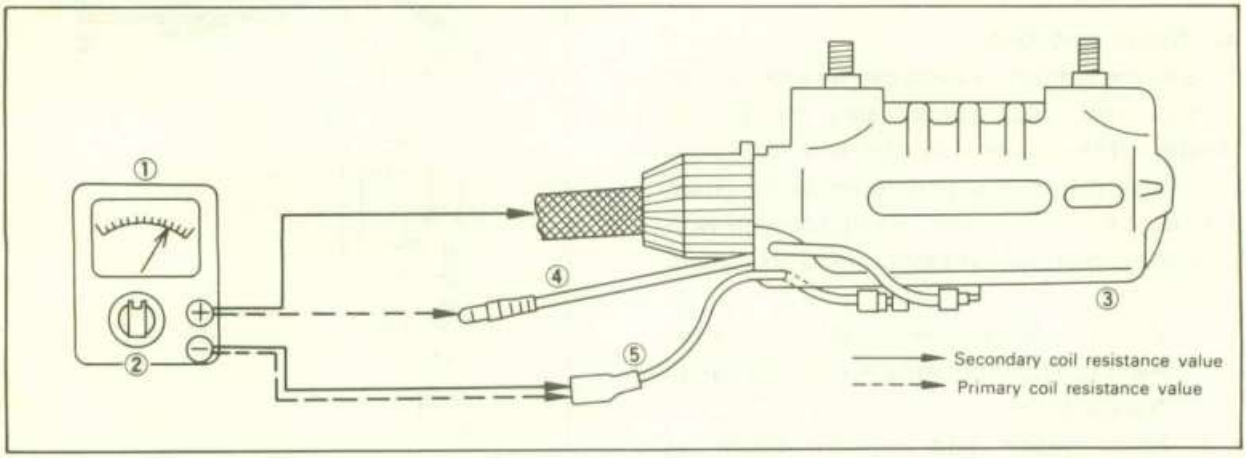
c. Connect fully charged battery to tester.

d. Turn on spark gap switch and increase gap until misfire occurs.

Minimum spark gap: 6 mm (0.24 in)

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

Standard values:
Primary coil resistance:
1.4Ω ±10% at 20°C (68°F)
Secondary coil resistance:
6.6kΩ ±20% at 20°C (68°F)



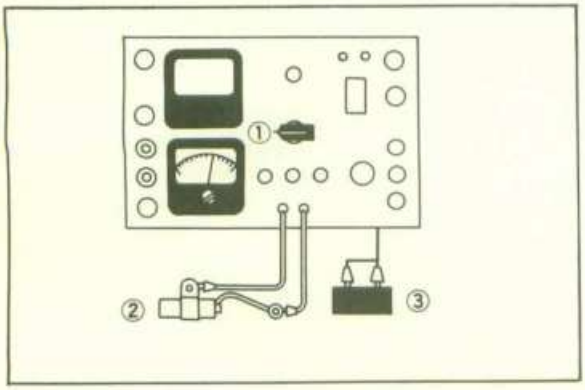
1. Pocket-Tester
2. Set the tester on the "Resistance" position
3. Ignition coil
4. Red/White
5. Orange

D. Condenser test

If the contact points show excessive wear, or the spark is weak (but the ignition coil is in good condition), check the condencer.
Capacity test (use electro tester).

a. Calibrate capacity scale.
b. Connect tester.
c. Meter needle will deflect and return to center as condenser is charged.
   After needle stops, note reading on "μF" scale.

Condenser capacity: 0.22μF



1. Capacity
2. Condenser
3. Battery

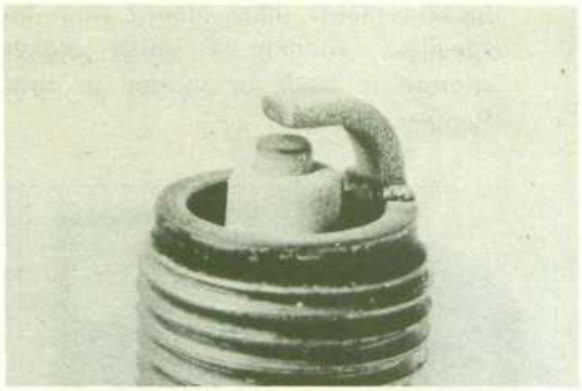
CAUTION:

After this measurement, the condencer should be discharged by connecting the positive and negative sides with a thick wire to prevent shock.

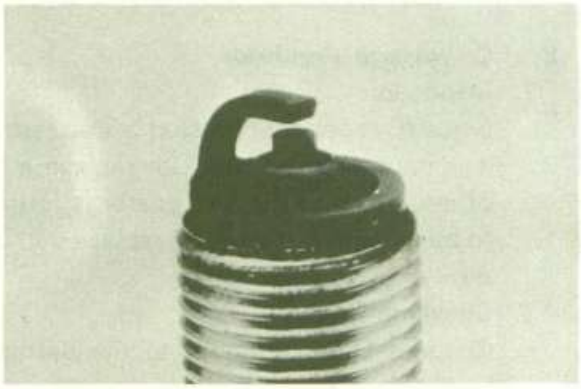
E. Spark plug

The life of a spark plug and its discoloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with suitable ones determined by the color and condition of the bad plugs. One machine may be ridden only in urban areas at low speeds; another may be ridden for hours at high speed. Confirm what the present plugs indicate by asking the rider how long and how fast he rides. Recommend a hot, standard, or cold plug type accordingly. It is actually economical to install new plugs often since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

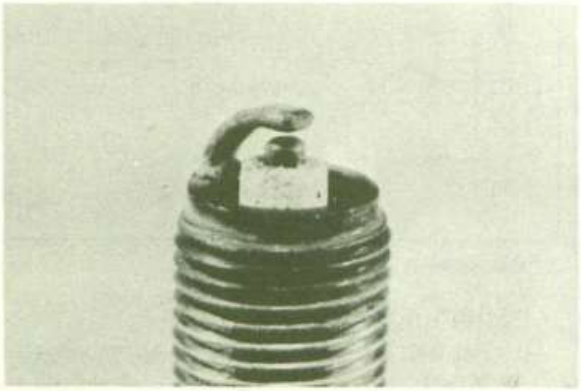
1. How to "read" a spark plug (condition)
   a. Best condition: When the porcelain around the center electrode is a light tan color.



b. If the electrodes and porcelain are black and somewhat oily, replace the plug with a hotter type for low speed riding.



c. If the porcelain is burned white and/or the electrodes are partially burned away, replace the plug with a colder type for high speed riding.



2. Inspection
Instruct the rider to:

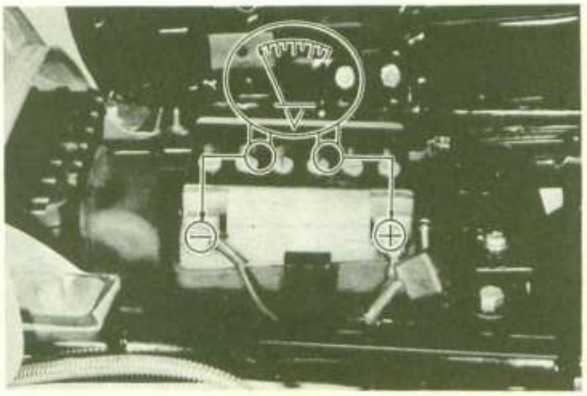
a. Inspect and clean the spark plug at least once per month or every 1,600 km (1,000 mi.).
b. Clean the electrodes of carbon and adjust the electrode gap.
c. Be sure to use the proper reach plug as a replacement to avoid overheating, fouling or piston damage.

Spark plug type: B-8ES NGK
Spark plug gap: 0.6 ~ 0.7 mm (0.02 ~ 0.03 in)

6-2. CHARGING SYSTEM

A. A.C. generator

1. Checking method.
a. Connect D.C. voltmeter to the battery terminales.



b. Start engine.
c. Accelerate engine to approximately 2,000 rpm or more and check generated voltage.

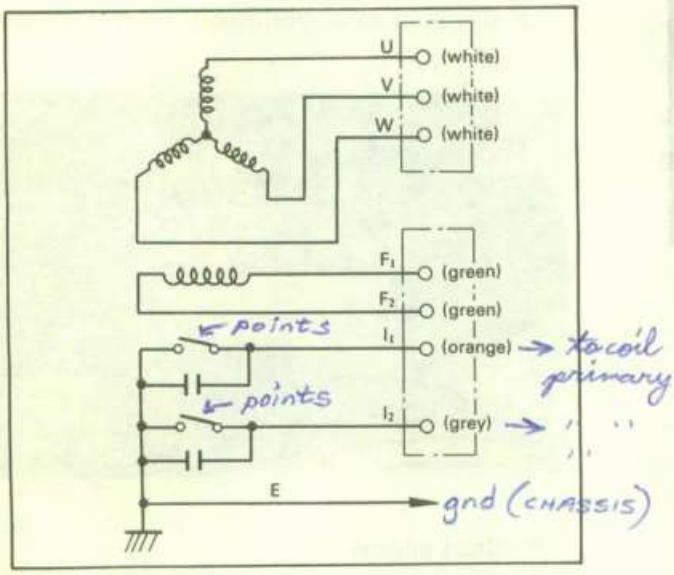
Generated voltage: 14.5 ±0.3V

d. If the indicated voltage cannot be reached then perform the tests in step 2.

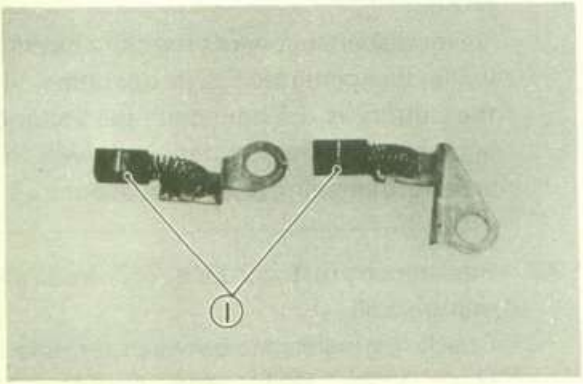
NOTE:
Never disconnect wires from the battery while the generator is in operation. If the battery is disconnected, the voltage across the generator terminals will increase, damaging the semiconductors.

2. Resistance test of field coil and armature coil.
Check the resistance between terminals U-V, V-W, W-U, and $F_1 - F_2$. If resistance is out of specification, coil is broken. Check the coil connections. If the coil connections are good, then the coil is broken inside and it should be replaced.

Field coil resistance: $F_1 - F_2$ 5.5Ω ±15% at 20°C (68°F)
Armature coil resistance: (U-V, V-W, W-U) Each 0.46Ω ±10% at 20°C (68°F)

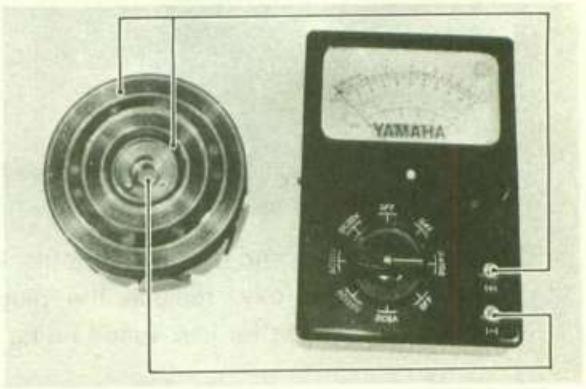


2. Checking brushes.
   a. If carbon brushes do not function correctly, electricity cannot pass to rotor field windings. This reduces alternator output.
   b. Visually inspect carbon brush holder and brushes for obvious breakage or wear. If either brush is worn past minimum length mark, replace both brushes.



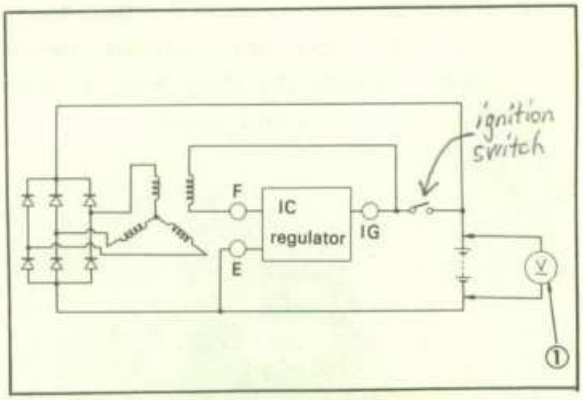
1. Minimum length mark

3. Checking rotor.
   a. Clean both slip rings.
   b. Measure insulation between each slip ring and rotor core. This must show infinite resistance. If resistance measurements differ greatly from this specified, winding is either broken, shorted to itself, or shorted to core. Replace it.



B. I.C. voltage regulator

1. Inspection.
   Since IC regulator is sealed with a resin, it is impossible to check or replace any of inner parts. If the regulator is found to be defective, it must be replace with a new one.
2. Checking method.
   a. Connect D.C. voltmeter to the battery terminales.



1. D.C. voltmeter

   b. Start engine.
   c. Accelerate engine to approximately 2,000 rpm or more and check regulated voltage.

Regulated voltage: 14.5 ±0.3V

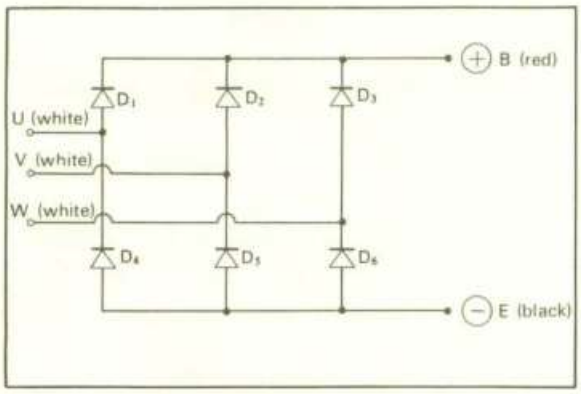
   d. If voltage is off, check battery, generator and rectifier. If generator and rectifier are good, then IC regulator is broken and it should be replaced.

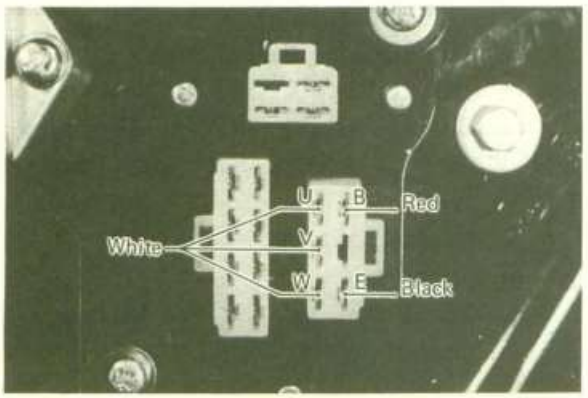
NOTE:

1) Never disconnect wires from the battery while the generator is in operation. If the battery is disconnected, the voltage across the generator terminals will increase, damaging the semiconductors.
2) When checking the regulator being installed on a machine, the battery should not be removed, and it should be fully charged.
3) Never use a high voltage insulation ohmmeter such as a megaohmmeter for such a test. If high voltage is applied to the regulator terminals, the regulator will be damaged.

C. Checking silicon rectifier

1. Check silicon rectifier as specified using Yamaha Pocket Tester.





Checking element	Pocket test connecting point (+) (red)	Pocket test connecting point (−) (black)	Good	Replace (element shorted)	Replace (element opend)
D_1	B	U	○	○	×
	U	B	×	○	×
D_2	B	V	○	○	×
	V	B	×	○	×
D_3	B	W	○	○	×
	W	B	×	○	×
D_4	U	E	○	○	×
	E	U	×	○	×
D_5	V	E	○	○	×
	E	V	×	○	×
D_6	W	E	○	○	×
	E	W	×	○	×

○ ..... Continuty
× ..... Discontinuty (∞)

Even if one of elements is broken, replace assembly.

CAUTION:

The silicon rectifier can be damaged if subject to overcharging. Special care should be taken to avoid a short circuit and/or incorrect connection of the positive and negative leads at the battery. Never connect the rectifier directly to the battery to make a continuity check.

6-3. BATTERY

A. Checking

1. If battery sulfation (white accumulations) occurs on plates due to lack of battery electrolyte, the battery should be replaced.
2. If the bottoms of the cells are filled with corrosive material falling off the plates, the battery should be replaced.
3. If the battery shows the followiing defects, it should be replaced:

a. The voltage will not rise to a specific value even after many hours of charging.
b. No gassing occurs in any cell.
c. The battery requires a charging voltage of more than regulating voltage in order to supply a current of 0.55A for 10 hours.

B. Service life

The service life of a battery is usually 2 to 3 years, but lack of care as described below will shorten the life of the battery.

1. Negligence in keeping battery topped off with distilled water.
2. Battery being left discharged.
3. Over-charging with heavy charge.
4. Freezing.
5. Filling with water of sulfuric acid containing impurities.
6. Improper charging voltage/current on new battery.

Battery	12V, 5.5AH
Electrolyte	Specific gravity: 1.28 Quantity: 480 cc
Initial charging current	0.55A/25 hours (new battery)
Recharging current	0.55/10 hours (or until specific gravity reaches 1.28)
Refill fluid	Distilled water (to maximum level line)
Refill period	Check once per month (or more often, as required)

C. Storage

If the motorcycle is not to be used for a long time, remove the battery and have it stored. The following instructions should be observed by shops equipped with charger.

1. Recharge the battery.
2. Store the battery in a cool, and dry place.
3. Recharge the battery before re-installation.

6-4. LIGHTING AND SIGNAL SYSTEMS

A. Lighting tests and checks

The battery provides power for operation of the horn, taillight, stoplight neutral light and flasher light. If none of the above operates, always check battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery water, or a defective charging system. See section, 6-2, charging system, for checks of battery and charging system.

1. Horn does not work.
   a. Check for 12V on brown wire to horn.
   b. Check for good grounding of horn (pink wire) when horn button is pressed.
2. Brake light does not work.
   a. Check bulb.
   b. Check for 12V on yellow wire to brake light.
   c. Check for 12V on brown wire to each brake light switch (front brake and rear brake switches).
3. Taillight does not work.
   a. Check bulb.
   b. Check for 12V on blue wire.
   c. Check for ground on black wire to tail/brake light assembly.
4. Flasher light(s) do not work.
   a. Check bulb.
   b. Right circuit:
      1) Check for 12V on dark green wire to light.
      2) Check for ground on black wire to light assembly.
   c. Left circuit:
      1) Check for 12V on dark brown wire to light.
      2) Check for ground on black wire to light assembly.
   d. Right and left circuits do not work:
      1) Check for 12V on brown/white wire to flasher switch on left handlebar.
      2) Check for 12V on brown wire to flasher relay.
      3) Replace flasher relay.
      4) Replace flasher switch.
   e. Check flasher self canceling system. (Refer to flasher self canceling system.)
5. Neutral light does not work.
   a. Check bulb.
   b. Check for 12V on sky blue wire to neutral switch.
   c. Replace neutral switch.
6. Oil caution light does not work.
   a. Place shift lever in neutral gear to check bulb.
   b. Replace bulb.
   c. Check for 12V on black/red wire to oil level switch.
   d. Replace oil level switch.

B. Flasher self canceling system

1. Description

This system automatically turns the flahser light off after you have changed course or turned corner so you can safely forget about turning off the signal. It is electronically operated depending on the time lapsed or the distance travelled after the handle switch has been applied.

In other words, the signal is automatically turned off when the vehicle has travelled over a certain distance at low speeds or while the signal light at an intersection is "red", or after a short lapse of time from when you changed course at high speeds.

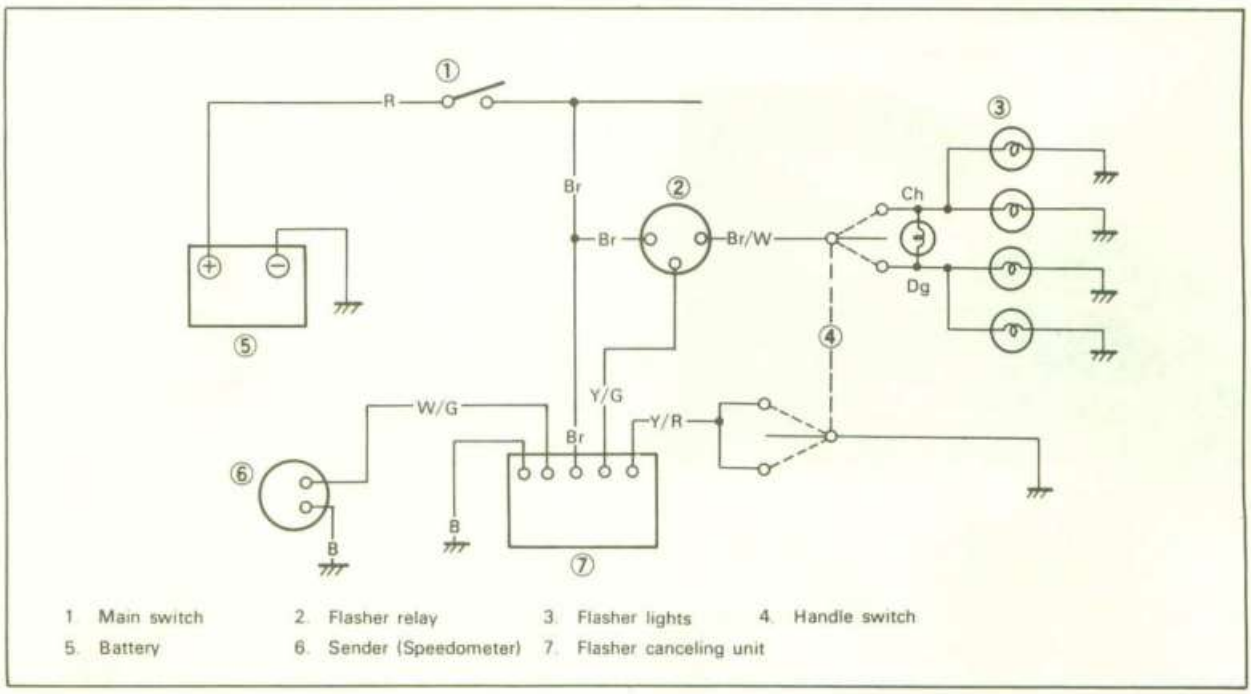
2. Operation

The handle switch lever has the following three positions; L (left), OFF and R (right). The switch lever is pushed back to its home position by spring force when it is released from your finger, but the signal continues to light up over a certain time or distance as noted already.

If the switch lever is depressed into OFF, the signal will turn off quickly, independent of the flasher canceling unit. At normal operation, therefore, the switch lever should be pushed into OFF as soon as you have turned a corner or changed course.

The flasher canceling unit is reset each time the switch lever is turned to R or L and begins to count time or distance. If the turn signal is required to continue turning on more than 100 meters or 10 seconds, the switch lever must be kept in the position to which it is turned or repeatedly turned to the same position.

In other words, both time and distance are calculated from the moment that the handle switch lever is applied, and therefore, the handle switch can be turned on and off as often as possible.



1. Main switch
2. Flasher relay
3. Flasher lights
4. Handle switch
5. Battery
6. Sender (Speedometer)
7. Flasher canceling unit

3. Inspection

If the flasher auto canceling system should become inoperative, proceed as follows:

1) Pull off the 6-p connector from the flasher canceling unit, and operate the handle switch.
   If the signal operates normally in L, R and OFF:

a) Flasher unit
b) Bult
c) Lighting circuit
d) Handle switch light circuit

} are in good condition

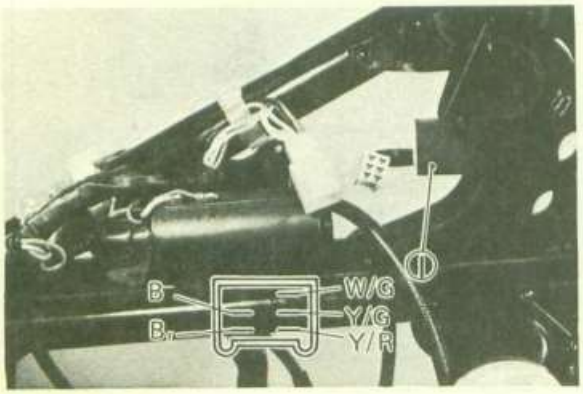
Therefore, any one of the following is considered to be defective:

a) Flasher canceling unit
b) Handle switch reset circuit
c) Speedometer sensor circuit

2) Pull off the 6-p connector from the flasher canceling unit, and connect a tester ($\Omega \times 100$ range) across the white/green and the black lead wires on the wire harness side. Turn the speedometer shaft, and if the tester needle swings back and forth four times between 0 and $\infty\Omega$, the speedometer sensor circuit is in good condition. If not, check the sender and wireharness, and replace any of these as necessary.
3) Pull off the 6-p connector from the flasher canceling unit, and check if there is continuity between the yellow/red lead wire on the wireharness side and the chassis.

Flasher switch OFF	$\infty\Omega$
Flasher switch L or R	0Ω

If the tester needle does not swing as indicated above, check the handle switch circuit and wire harness.



1. Flasher cancelling unit

B: Black
Br: Brown
W/G: White/Green
Y/G: Yellow/Green
Y/R: Yellow/Red

4) If no defect is found with the above three check-ups and the flasher canceling systems is still inoperative, replace the flasher canceling unit.
5) If the signal flashers only when the handle switch lever is turned to L or R and it turns off immediately when the handle switch lever is turned to OFF, replace the flasher canceling unit.

4. Notes on handling

1) The flasher canceling system does not always operate at a proper time, because it is so designed that only when the requirements of both time and distance are met, it functions. It is advisable to make it a habit to turn the handle switch to OFF with your finger each time it is used.
2) Current continues to flow through the flasher relay after the signal is turned off automatically, therefore, it should preferably be turned off manually each time.
3) If the handle switch is turned on with wrong wiring, the system may become inoperative. Check for correct wiring after it is re-connected.
4) The signal can be used with the flasher canceling unit being disconnected. It can be operated manually. Should the system fail to operate, pull off the connector and the turn signal can be operated manually.

CHAPTER 7. APPENDICES

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7-2. Specification 87
Circuit diagram
Cable routing diagram

CHAPTER 7. APPENDICES

7-1. Troubleshooting guide

The following guide is not complete in itself. If a problem is found within an individual component mentioned in the chart, refer to the section or chapter involved for inspection procedures.

1. Will not start or difficult to start

a. Ignition system

Possible cause	Remedy
No spark	1. Check ignition main switch. 2. Check engine stop switch. 3. Check points assembly. 4. Check condenser. 5. Check wiring, magneto coil. 6. Check ignition coil. 7. Check high tension lead. 8. Check spark plug. 9. Check ignition timing.
Weak or intermittent spark	1. Use Electro Tester, spark gap test. 2. Check spark plug. 3. Check high tension lead. 4. Check ignition assembly.

b. Air/Fuel systems

Possible cause	Remedy
No fuel	1. Check fuel tank. 2. Check petcock. 3. Remove fuel pipe, check fuel flow.
Intermittent or poor fuel flow	1. Clean fuel tank, check cap vent. 2. Clean petcock. 3. Remove carburetor, service.
Bad fuel	1. Flush fuel system, complete. 2. Add fresh fuel, proper grade.
Blocked air intake or malfunction	1. Clean and lube filter. 2. Check reed valve assembly.

c. Engine/Exhaust systems

Possible cause	Remedy
Incorrect compression pressure	1. If compression is too high, check for excessive carbon buildup. 2. No compression or low compression, check: a. Cylinder head gasket. b. Cylinder base gasket. c. Piston, rings, cylinder.
Poor bottom end compression	Check crankcase seals, left and right.
Blocked exhaust system	1. Check muffler/spark arrester. 2. Check exhaust port carbon formation. 3. Check exhaust pipe for internal damage.

2. Poor idle and/or low speed performance

a. Ignition system

Possible cause	Remedy
Spark plug fouled or incorrect gap	Clean and gap, or replace if necessary.
Contact points bad	Clean and gap, or replace if necessary.
Incorrect ignition timing	Reset timing.
Weak spark	Check ignition coil and condenser.

b. Air/Fuel systems

Possible cause	Remedy
Tank cap vent plugged	Clean or repair as necessary.
Fuel petcock plugged	Clean or repair as necessary.
Carburetor slow speed system inoperative	Clean or repair as necessary.
Pilot screw out of adjustment or plugged	Adjust or clean as necessary.
Carburetor float level incorrect	Measure and adjust as required.
Starter lever on	Push lever off.
Air leak	Repair.
Carburetor not level	Level.

c. Engine/Exhaust system. See "No start" section

3. Poor mid-range and high speed performance

a. Ignition systems

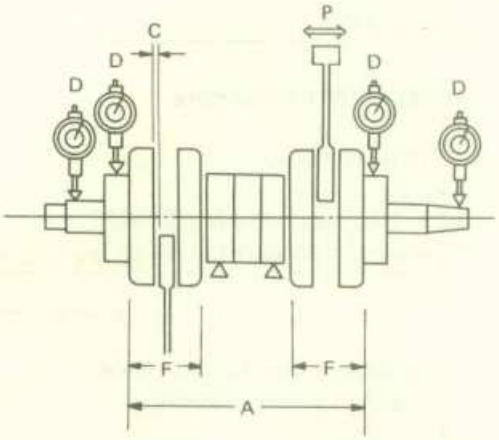
Possible cause	Remedy
Spark plug gap incorrect	Clean and gap or change spark plug if necessary.
Ignition timing incorrect	Reset.
Points set too close	Regap/Reset timing.

b. Air/Fuel systems

Possible cause	Remedy
Dirty air filter element	Clean.
Carburetor float level incorrect	Measure and adjust if required.
Incorrect main jet size	Remove jet and check size.
Incorrect jet needle clip position	Check position of clip in needle.
Cracked or leaking reeds	Remove and repair as necessary.
Carburetor not level	Level.

7-2. SPECIFICATION

A. GENERAL	
1. MODEL	
1) Model (I.B.M. No.)	RD400C (1A1) (RD400D (1A1))
2) Frame I.D. and Starting Number	1A1-000101 (1A1-100101)
3) Engine I.D. and Starting Number	1A1-000101 (1A1-100101)
2. DIMENSION	
1) Overall Length	2,015 mm (79.3 in)
2) Overall Width (standard)	830 mm (32.7 in)
3) Overall Height (standard)	1,090 mm (42.9 in)
4) Seat Height	810 mm (31.9 in)
5) Wheelbase	1,315 mm (51.8 in)
6) Minimum Ground Clearance	155 mm (6.1 in)
3. WEIGHT	
1) Net Weight	155 kg (342 lb)
4. PERFORMANCE	
* 1) Maximum Speed	160 km/h (99 mph) or more
2) Climbing Ability	28°
3) Minimum Turning Radius	2,310 mm (90.9 in)
* 4) 0 ~ 400 m Acceleration Time	14.0 sec.
5) Braking Distance	14 m @50 km/h (45.9 ft @31 mph)
6) Fuel Consumption	32 km/liter @60 km/h (74 mi/gal @37 mph)
B. ENGINE	
1. DESCRIPTION	
1) Engine Type	Air cooled, 2-stroke, forward incline, twin, torque induction system
2) Engine Model	1A1
3) Displacement	398 cc (24.29 cu.in)
4) Bore × Stroke	64 mm × 62 mm (2.520 in × 2.441 in)
5) Compression Ratio	6.2 : 1
6) Starting System	Primary kick starter
7) Ignition System	Battery ignition
8) Lubrication System	Separate lubricant (Yamaha Autolube)
2. CYLINDER HEAD	
1) Combustion Chamber Volume	26.3 ±0.4 cc (B-8ES)
2) Combustion Chamber Type	Dome + Squish
3) Head Gasket Thickness	0.5 mm (0.02 in)
4) Tightening Torque:	
Cylinder Head Holding nut (M8 P1.25)	1.9 ~ 2.1 m-kg (13.7 ~ 15.2 ft-lb)
Spark Plug (M14 P1.25)	1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)
3. CYLINDER	
1) Material	Aluminum alloy with cast iron sleeve
2) Bore Size	$64\ ^{+0.02}_{0}$ mm ($2.52\ ^{+0.0008}_{0}$ in)
3) Taper Limit	0.05 mm (0.002 in)
4) Outof Round Limit	0.01 mm (0.0004 in)
4. PISTON	
1) Piston Skirt Clearance	0.035 ~ 0.040 mm (0.0014 ~ 0.0016 in)
2) Piston Over Size	64.25 mm, 64.50 mm, 64.75 mm, 65.00mm (2.530 in) (2.539 in) (2.549 in) (2.559 in)
3) Piston Pin Outside Diameter × Length	$16\ ^{0}_{-0.005}$ mm × 54 mm ($0.63\ ^{0}_{-0.0002}$ in × 2.13 in)
5. PISTON RING	
1) Piston Ring Design (Top)	Keystone ring (1.2 mm)
Piston Ring Design (2nd)	Plain ring (1.5 mm)

2) Ring End Gap (Installed) (Top)	0.3 ~ 0.5 mm (0.012 ~ 0.020 in)
Ring End Gap (Installed) (2nd)	0.3 ~ 0.5 mm (0.012 ~ 0.020 in)
3) Ring Groove Side Clearance (Top)	——
Ring Groove Side Clearance (2nd)	0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)
6. SMALL END BEARING	
1) Type	Needle bearing
7. BIG END BEARING	
1) Type	Needle bearing
8. CRANKSHAFT	
1) Crankshaft Assembly Width (A)	$154\ ^{+0.05}_{-0.10}$ mm ($6.06\ ^{+0.002}_{-0.004}$ in)
Crankshaft Assembly Width (F)	$52\ ^{0}_{-0.05}$ mm ($2.05\ ^{0}_{-0.002}$
2) Crankshaft Deflection (D)	0.05 mm (0.0020 in)
3) Connecting Rod Large End Side Clearance (C)	0.25 ~ 0.75 mm (0.010 ~ 0.030 in)
4) Connecting Rod Small End Deflection (P)	0.36 ~ 0.98 mm (0.014 ~ 0.039 in)
	
5) Crank Pin Outside Diameter × Length	22 × 51 mm (0.87 × 2.01 in)
6) Crank Pin Type	Solid type
7) Crank Bearing Type (Left) × Q'ty	6305C3 special × 1 pc.
Crank Bearing Type (Center) × Q'ty	6206C3 special × 2 pcs.
Crank Bearing Type (Right) × Q'ty	6305C3 special × 1 pc.
8) Crank Oil Seal Type (Left) × Q'ty	SW-20-40-10 special × 1 pc.
Crank Oil Seal Type (Center) × Q'ty	Labyrinth seal × 1 pc.
Crank Oil Seal Type (Right) × Q'ty	SW-40-62-10 special × 1 pc.
9. CLUTCH	
1) Clutch Type	Wet, multiple disc type
2) Clutch Operating Mechanism	Inner pushtype, screw push system
3) Primary Reduction Ratio and Method	66/23 (2.869), Helical gear
4) Primary Reduction Gear Back Lash Tolerance	131 ±1 (B—B, C—C, D—D)
Primary Drive Gear Back Lash Number	D (69, 68), C (67), B (66, 65)
Primary Driven Gear Back Lash Number	D (62, 63), C (64), B (65, 66)
5) Friction Plate—Thickness/Quantity	3 mm (0.12 in) × 7 pcs.
—Wear Limit	2.7 mm (0.11 in)
6) Clutch Plate—Thickness/Quantity	1.2 mm (0.05 in) × 6 pcs.
—Warp Limit	0.05 mm (0.002 in)
7) Clutch Spring—Free Length/Quantity	36.4 mm (1.433 in) × 6 pcs.
—Minimum Length	35.4 mm (1.394 in)
8) Clutch Housing Axial Play (Wear Limit)	0.07 ~ 0.14 mm (0.003 ~ 0.006 in)
9) Push Rod Bending Limit	0.2 mm (0.008 in)
10) Oil Seal Type—Push Rod	SD0-8.8-22-6
11) Tightening Torque:	
Primary Drive Gear Securing Nut (M16 P1.0)	5.0 ~ 8.0 m-kg (36 ~ 58 ft-lb)
Clutch Boss Securing Nut (M18 P1.0)	5.0 ~ 8.0 m-kg (36 ~ 58 ft-lb)
Clutch Spring Screw (M6 P1.0)	0.7 ~ 1.0 m-kg (5.1 ~ 7.2 ft-lb)

10. TRANSMISSION	
1) Type	Constant mesh, 6-speed forward
2) Gear Ratio 1st (Teeth) (Ratio)	36/14 2.571
2nd	32/18 1.777
3rd	29/22 1.318
4th	26/24 1.083
5th	25/26 0.961
6th	24/27 0.888
3) Transmission Gear Oil Quantity and Type	1,450 ~ 1,550 cc (Oil change), YAMALUBE-4 cycle 1,700 cc (Total)
4) Bearing Type — Main Axle (Left)	Needle bearing (ϕ20 — ϕ30 — 15)
— Main Axle (Right)	5205
— Drive Axle (Left)	6305N special
— Drive Axle (Right)	Needle bearing (ϕ20 — ϕ33 — 15)
5) Oil Seal Type — Drive Axle (Left)	SD-35-62-6
6) Secondary Reduction Ratio and Method	38/17 2.235, chain
7) Tightening Torque:	
Drive Sprocket Securing Nut (M18 P1.0)	5 ~ 8 m-kg (36 ~ 58 ft-lb)
11. SHIFTING MECHANISM	
1) Type	Cam drum, return type
2) Oil Seal Type — Change Lever	S-12-22-5
3) Tightening Toruqe — Change Pedal (M6 P1.0)	0.9 ~ 1.3 m-kg (6.5 ~ 9.4 ft-lb)
12. KICK STARTER	
1) Type	Rachet type
2) Oil Seal Type	SO-20-30-45
3) Kick Clip Friction Tension	0.8 ~ 1.3 kg (1.8 ~ 2.9 lb)
4) Tightening Torque — Kick Crank (M8 P1.25)	2.0 ~ 2.5 m-kg (14.5 ~ 18.1 ft-lb)
13. CRANKCASE	
1) Tightening Torque (M8 P1.25)	2.4 ~ 2.6 m-kg (17.4 ~ 18.8 ft-lb)
(M6 P1.0)	0.9 ~ 1.1 m-kg (6.5 ~ 7.2 ft-lb)
14. INTAKE	
1) Air Cleaner — Type/Quantity	Dry, paper filter/1 pc.
2) Induction System	Torque Induction System
3) Reed Valve	
Type	"V" type
Bending Limit	0.3 mm (0.012 in) or less
Valve Lift	9 ±0.3 mm (0.35 ±0.012 in)
Tightening Torque	0.08 m-kg (0.6 ft-lb)
15. CARBURETOR	
1) Type and Manufacturer/Quantity	VM28SC MIKUNI/2 pcs.
2) I.D. Mark	1A100
3) Main Jet (M.J.)	#115
4) Air Jet (A.J.)	0.5
5) Jet Needle-clip Position (J.N.)	5L1-3
6) Needle Jet (N.J.)	P-2
7) Cutaway (C.A.)	2.5
8) Pilot Jet (P.J.)	#25
9) Air Screw (turns out) (A.S.)	1-1/2
10) Starter Jet (G.S.)	#70
10) Fuel Level (F.L.)	30 ±1 mm (1.18 ±0.04 in)
12) Float Height (F.H.)	23 ±2.5 mm (0.91 ±0.10 in)
13) Idling Engine Speed	1,100 ~ 1,200 rpm
16. LUBRICATION	
1) Autolube Pump — Color Code	Sky blue
2) Autolube Pump — Minimum Stroke	0.20 ~ 0.25 mm (0.008 ~ 0.010 in)
3) Autolube Pump — Maximum Stroke	2.05 ~ 2.27 mm (0.081 ~ 0.090 in)

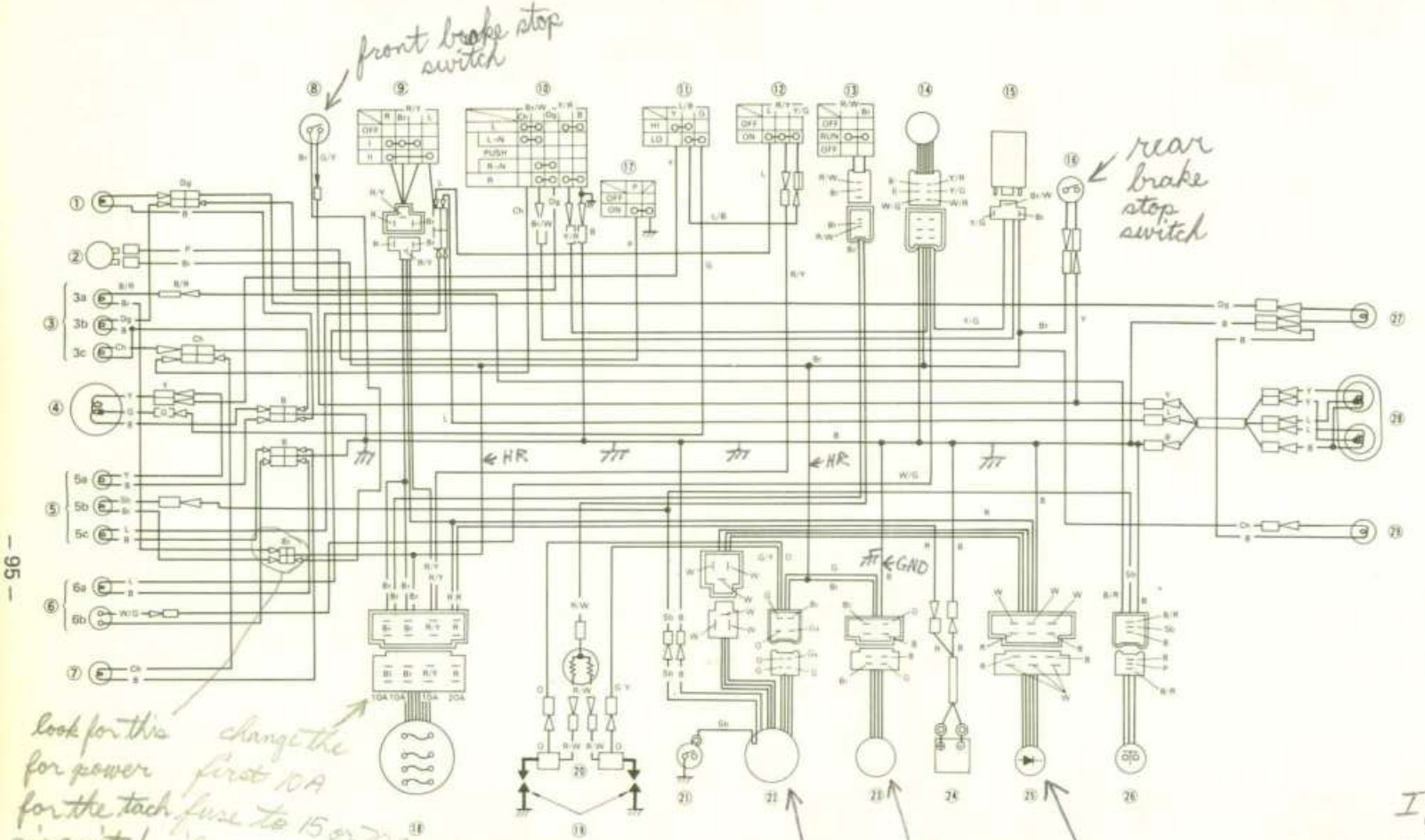
4) Autolube Pump – Reduction Ratio	21/23 × 55/1 = 50.2
5) Autolube Pump – Minimum Output/ 200 Strokes	0.5 ~ 0.6 cc
6) Autolube Pump – Maximum Output/ 200 Strokes	5.1 ~ 5.7 cc
7) Throttle Position (Adjusting Mark)	At full open (□)
8) Oil Tank Capacity	1.8 liter (1.9 US.qt)
9) *Oil* Grade	YAMALUBE 2 cycle
C. CHASSIS	
1. FRAME	
1) Frame Design	Double cradle type, high tensil tube frame
2) Tightening Torque:	
Engine Mounting Bolt (M8 P1.25)	1.4 ~ 2.2 m-kg (10.1 ~ 15.9 ft-lb)
Engine Mounting Bolt (M10 P1.25)	2.7 ~ 3.4 m-kg (19.5 ~ 24.6 ft-lb)
2. STEERING SYSTEM	
1) Caster	62.5°
2) Trail	109 mm (4.33 in)
3) Number and Size of Balls in Steering Head:	
Upper Race	19 pcs., 1/4 in
Lower Race	19 pcs., 1/4 in
4) Tightening Torque:	
Steering Shaft Fitting Nut (M16 P1.5)	6.0 ~ 9.5 m-kg (43.4 ~ 68.7 ft-lb)
Stem Pinch Bolt (M8 P1.25)	1.4 ~ 2.2 m-kg (10.1 ~ 15.9 ft-lb)
Handlebar Mounting Bolt (M8 P1.25)	1.4 ~ 2.2 m-kg (10.1 ~ 15.9 ft-lb)
3. FRONT SUSPENSION	
1) Type	Telescopic fork
2) Damper Type	Oil damper, coil spring
3) Front Fork Cushion Travel	120 mm (4.72 in)
4) Front Fork Spring:	
Free Length	422.5 mm (16.6 in)
Wire Diameter × Winding Diameter	3.8 mm (0.15 in) × 24.5 mm (0.96 in)
Spring Constant	K_1 = 0.38 kg/mm (0 ~ 125 mm)
	K_2 = 0.7625 kg/mm (125 ~ 165 mm)
5) Inner Tube Outside Diameter	34 mm (1.34 in)
6) Oil Seal Type	SD34-46-10.5
7) Front Fork Oil Quantity and Type	144 ±4 cc (4.87 oz) YAMAHA FORK OIL
8) Tightening Torque:	
Front Fork Cap Bolt	3.0 ~ 4.0 m-kg (22 ~ 29 ft-lb)
Under Bracket and Inner Tube	3.0 ~ 4.5 m-kg (22 ~ 33 ft-lb)
Handle Crown and Inner Tube	1.4 ~ 2.2 m-kg (10 ~ 16 ft-lb)
4. REAR SUSPENSION	
1) Type	Swing arm
2) Damper Type	Oil damper, coil spring
3) Rear Shock Absorber Travel	80 mm (3.15 in)
Set Length	322 mm (12.7 in)
4) Rear Shock Absorber Spring:	
Set Length	198 mm (7.83 in)
Free Length	219 mm (8.66 in)
Wire Diameter × Winding Diameter	6.5 mm (0.26 in) × 53.5 mm (2.11 in)
Spring constant	K_1 = 1.5 kg/mm (0 ~ 60 mm)
	K_2 = 2.175 kg/mm (60 ~ 80 mm)
5) Swing Arm Free Play (Limit)	1 mm (0.04 in)
6) Pivot Shaft – Outside Diameter	16 mm (0.63 in)
7) Tightening Torque:	
Rear Shock Absorber (Upper)	2.3 ~ 3.7 m-kg (16.6 ~ 26.8 ft-lb)
Rear Shock Absorber (Under)	2.3 ~ 3.7 m-kg (16.6 ~ 26.8 ft-lb)
Pivot Shaft	5.0 ~ 8.0 m-kg (36 ~ 58 ft-lb)

5. FUEL TANK	
1) Capacity	13 liter (3.4 US.gal)
2) Fuel Grade	Regular gasoline (90 octane)
6. WHEEL	
1) Type (Front and Rear)	Aluminum cast wheel
2) Tire Size (Front)	3.25S18 – 4PR
(Rear)	3.50S18 – 4PR
3) Tire Pressure (Front) (Normal riding)	1.8 kg/cm² (26 lb/in²)
(Rear)	2.0 kg/cm² (28 lb/in²)
4) Rim Run Out Limit (Front/Rear):	
Vertical	2 mm (0.08 in)
Lateral	1 mm (0.04 in)
5) Bearing Type:	
Front Wheel (Left)	6303ZZ/3A
Front Wheel (Right)	6303Z
Rear Wheel (Left)	6304ZZ/3A
Rear Wheel (Right)	6303Z
6) Oil Seal Type:	
Front Wheel (Left)	SDD-45-56-6
Front Wheel (Right)	SD-28-47-7
Rear Wheel (Left)	SD-28-52-6
Rear Wheel (Right)	SD-28-47-7
7) Secondary Drive Chain Type:	
Type	DK530DS
Number of Links	95L+Joint
Chain Pitch	15.875 mm (5/8 in)
Chain Free Play	20 ~ 30 mm (0.8 ~ 1.2 in)
8) Tightening Toruqe:	
Front Wheel Axle	8.3 ~ 13 m-kg (60 ~ 94 ft-lb)
Front Axle Holder	1.1 ~ 1.8 m-kg (8.0 ~ 13.0 ft-lb)
Rear Wheel Axle	12 ~ 18 m-kg (87 ~ 130 ft-lb)
7. BRAKE	
1) Disc Brake (Front and Rear)	
Type	Hydraulic disc type
Disc Size (Outside Dia. × Thickness)	267 mm (11.7 in) × 7 mm (0.28 in)
Disc Wear Limit	6.5 mm (0.26 in)
Disc Pad Size	9.0 mm (0.35 in)
Pad Wear Limit	4.5 mm (0.18 in)
Master Cylinder Inside Dia. (Front/Rear)	15.87 mm (0.625 in)/14.0 mm (0.55 in)
Caliper Cylinder Inside Dia. (Front/Rear)	48 mm (2.13 in)
Brake Fluid Type	DOT #3
Tightening Torque:	
Outer caliper and inner caliper	
Hexagon bolt (Front/Rear)	1.8 ~ 2.6 m-kg (13.1 ~ 18.8 ft-lb)
Bridge bolt (Front/Rear)	7.5 ~ 9.5 m-kg (54.2 ~ 68.7 ft-lb)
Caliper securing bolt and nut (Front/Rear)	4.0 ~ 5.0 m-kg (28.9 ~ 36.2 ft-lb)
Caliper and brake pipe (Front)	1.4 ~ 2.3 m-kg (10.1 ~ 16.6 ft-lb)
Caliper and brake hose (Rear)	3.0 ~ 4.8 m-kg (21.7 ~ 34.7 ft-lb)
Master cylinder and brake hose (Front/Rear)	2.3 ~ 2.8 m-kg (16.6 ~ 20.3 ft-lb)
Brake hose and pipe (Front)	1.4 ~ 2.3 m-kg (10.1 ~ 16.6 ft-lb)
Disc mounting bolt (Front/Rear)	1.7 ~ 2.2 m-kg (12.3 ~ 16.0 ft-lb)
D. ELECTRICAL	
1. IGNITION SYSTEM	
1) Battery (AC Generator)	
Model/Manufacturer	AZ2015Y/MITSUBISHI
Voltage	12V

Rotor Coil Thread Size	M10 P1.25
Tightening Torque (Rotor)	1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)
Tightening Torque (Stater)	0.7 ~ 1.0 m-kg (5.1 ~ 7.2 ft-lb)
2) Ignition Timing, mm (B.T.D.C.)	2.3 ±0.15 mm (0.09 ±0.006 in)
3) Ignition Coil	
Model/Manufacturer	CM11-53/HITACHI
Spark Gap	6 mm or more/500 rpm
Primary Winding Resistance	1.4Ω ±10% at 20°C
Secondary Winding Resistance	6.6kΩ ±20% at 20°C
4) Spark Plug	
Type/Quantity	NGK B-8ES 2 pcs.
Spark Plug Gap	0.6 ~ 0.7 mm (0.02 ~ 0.03 in)
5) Resistor	
Resistance	1.6Ω
6) Contact Breaker	
Manufacture/Quantity	MITSUBISHI/2 pcs.
Point Gap	0.30 ~ 0.40 mm (0.012 ~ 0.016 in)
Point Spring Pressure	700 ±50 g
7) Condenser	
Capacity	0.22μF
Insulation Resistance	5MΩ (500V megger used)
Q'ty	2 pcs.
2. CHARGING SYSTEM	
1) AC Generator	
Charing Output	14V, 0A/950 rpm or less 14V 15A or more/2,000 rpm 14V 20A or more/5,000 rpm
Rotor Coil Resistance	5.5Ω ±15%/20°C
(Filed coil)	
Stator coil Resistance	0.46Ω ±10%/20°C
(Amature coil)	
Brush Size/Q'ty	11 mm (0.43 in)/2 pcs.
Brush Wear Limit	6 mm (0.24 in)
Brush Spring Pressure	540 g ±15%
2) Rectifier	
Type	6-element type (Full wave)
Model/Manufacturer	DS10TEY-L/MITSUBISHI or DE3804/STANLEY
Capacity	12A
Withstand Voltage	400V
3) Regulator	
Type	I.C. regulator
Model/Manufacture	RFT12M_2/MITSUBISHI
Regulating Voltage	14.5 ±0.3V
4) Battery	
Model/Manufacture/Q'ty	AYT2-12/F.B or YUASA/1 pc.
Capacity	12V, 5.5A
Charging Rate	0.55A 10 hours
Specific Gravity	1.28/20°C
3. LIGHTING SYSTEM	
1) Head Light Type	Sealed beam
2) Bulb Wattage/Q'ty:	
Head Light Wattage	12V, 40W/30W × 1 pc.
Tail/Stoplight Wattage	12V, 8W/27W × 2 pcs.
Flasher Light Wattage	12V, 27W × 4 pcs.
Flasher Pilot Light Wattage	12V, 3.4W × 2 pcs.
Meter Light Wattage	12V, 3.4W × 4 pcs.
High Beam Indicator Light Wattage	12V, 3.4W × 1 pc.

Neutral Light Wattage	12V, 3.4W × 1 pc.
Oil Level Indicator Light Wattage	12V, 3.4W × 1 pc.
3) Horn	
Model/Manufacturer	CF3-12/NIKKO
Maximum Amperage	2.5A
4) Flasher Relay	
Type	Condenser type
Model/Manufacturer	061300-4810/NIPPON DENSO
Flasher frequency	85 cycl/min.
Capacity	27W × 2 +3.4W
5) Flasher Canceling Unit	
Model	EVH-AC518
Voltage	DC 9V ~ 16V
6) Fuse	
Rating/Q'ty	MAIN (Red) 20A HEAD. L (Red/Yellow) 10A SIGNAL (Brown) 10A IGNITION (Red/White) 10A
4. MISCELLANEOUS	
1) Oil Level Switch	
Manufacturer	STANLEY
Stroke	82 mm

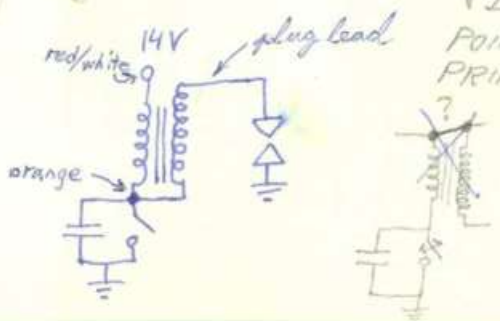
RD400C(D) CIRCUIT DIAGRAM



1. Front flasher light (R)
2. Horn
3. Pilot lamp
3a. Oil
3b. Flasher (R)
3c. Flasher (L)
4. Headlight
5. Tachometer
5a. Highbeam
5b. Neutral
5c. Lighting (× 2)
6. Speedometer
6a. Lighting (× 2)
6b. Sender
7. Front falsher light (L)
8. Front stop switch
9. Main switch
10. Flasher switch
11. Dimmer switch
12. Light switch
13. Engine stop switch
14. Canceling unit
15. Flasher relay
16. Rear stop switch
17. Horn button
18. Fuse box
19. Spark plug
20. Ignition coil
21. Neutral switch
22. AC generator
23. Regulator
24. Battery
25. Rectifier
26. Oil level switch
27. Rear flasher light (R)
28. Tail/Stoplight
29. Rear flasher light (L)

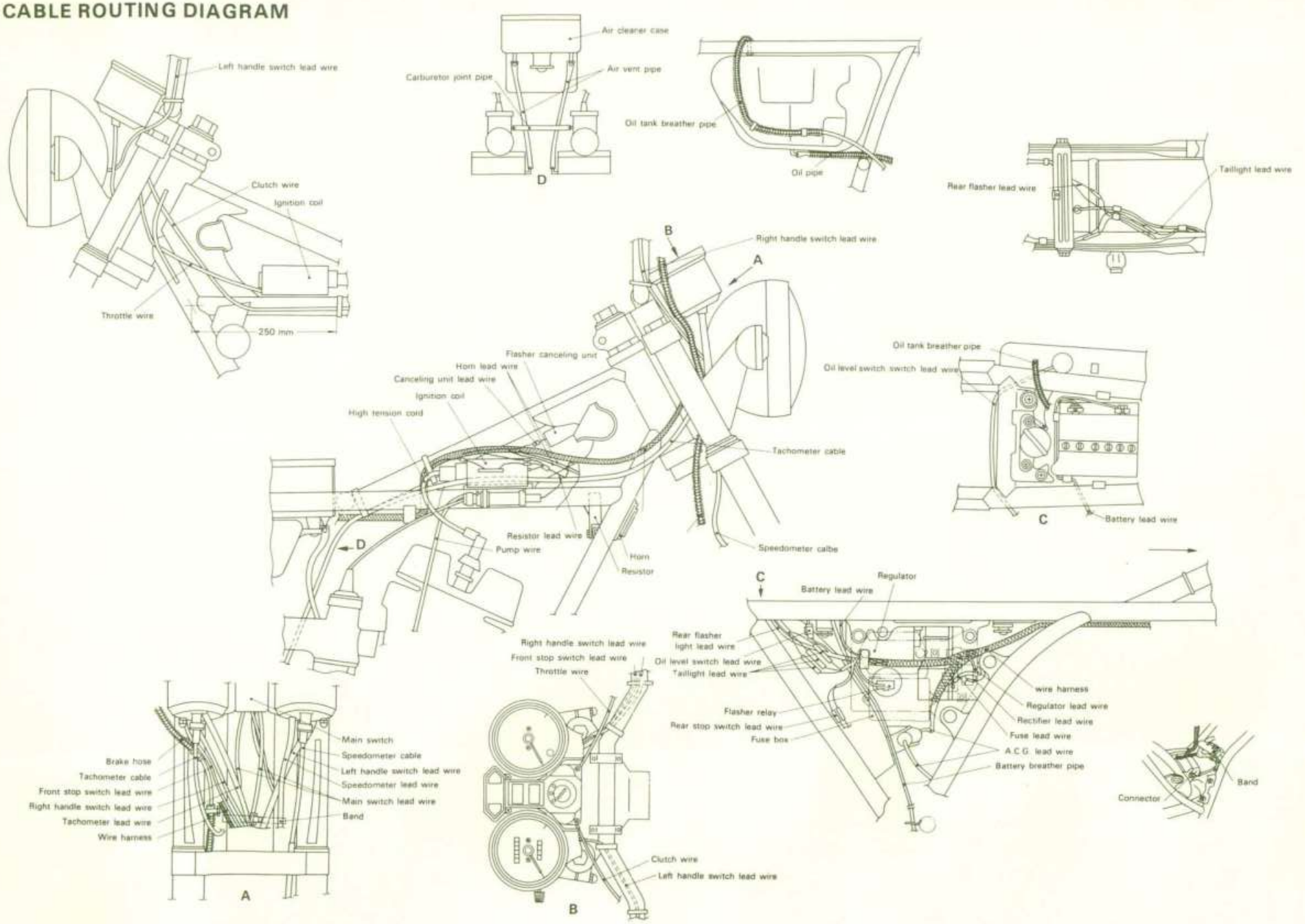
Color cord

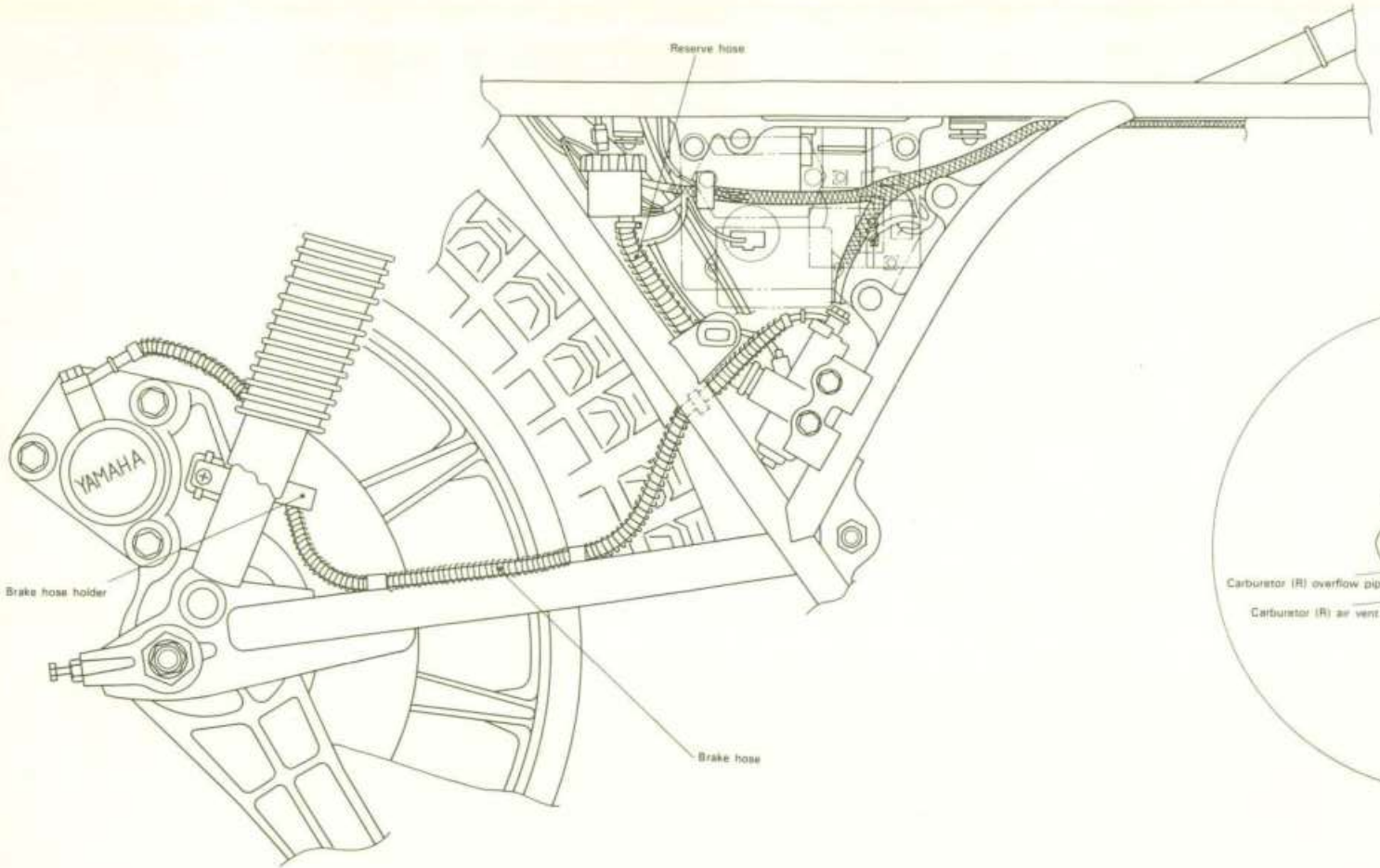
R	Red
Br	Brown
L	Blue
Dg	Dark green
B	Black
P	Pink
Y	Yellow
G	Green
Ch	Dark brown (Chocolate)
Sb	Sky blue
O	Orange
Gy	Grey
W	White
R/Y	Red/Yellow
G/Y	Green/Yellow
B/R	Black/Red
W/G	White/Green
R/W	Red/White
Br/W	Brown/White
Y/G	Yellow/Green
W/R	White/Red
Y/G	Yellow/Red
L/B	Blue/Black

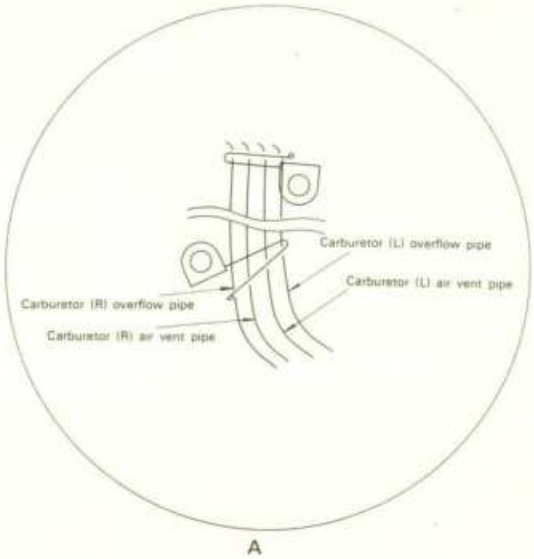


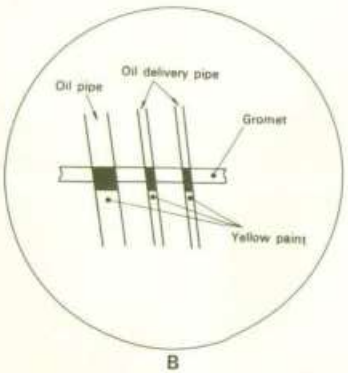
IGNITION POINTS → orange and grey wires from the alternator to the points are the current paths from the primary coil windings to gnd. → the points cut this path, stopping the current

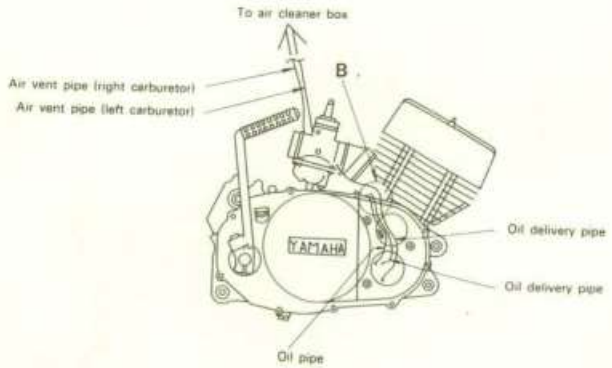
CABLE ROUTING DIAGRAM

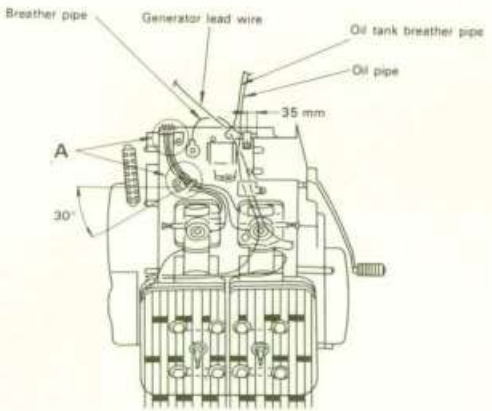



Reserve hose
YAMAHA
Brake hose holder
Brake hose


Carburetor (L) overflow pipe
Carburetor (L) air vent pipe
Carburetor (R) overflow pipe
Carburetor (R) air vent pipe
A


Oil pipe
Oil delivery pipe
Grommet
Yellow paint
B


To air cleaner box
Air vent pipe (right carburetor)
Air vent pipe (left carburetor)
B
YAMAHA
Oil delivery pipe
Oil delivery pipe
Oil pipe


Breather pipe
Generator lead wire
Oil tank breather pipe
Oil pipe
35 mm
A
30°

RD400F
Supplement

FOREWORD

This Supplementary Manual for the RD400F has been published to supplement the Service Manual for the RD400C(D) and provides updated information for the RD400C(D) model as well as new data concerning the RD400F. For complete information on service procedures it is necessary to use this Supplementary Service Manual together with the Service Manual for the RD400C(D) (LIT-11616-00-22).

NOTE:

This Supplementary Service Manual contains special information regarding periodic maintenance to the emissions control system for the RD400F. Please read this material carefully.

SERVICE DEPT.
INTERNATIONAL DIVISION
YAMAHA MOTOR CO., LTD.

NOTICE

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

This model has been designed and maufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the machine will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer before continuing. Before attempting any service, check with your Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his machine and to conform with federal environmental quality objectives.

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

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

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.



Page numbers shown in brackets correspond to page numbers of the RD400C(D) (LIT-11616-00-02).

(PAGE 3)

1-1. MACHINE IDENTIFICATION

Starting Serial Number

RD400F; 2V0-000101

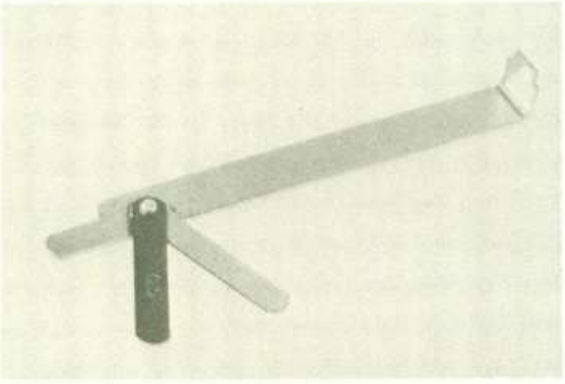
(PAGE 4)

1-2. SPECIAL TOOLS

13. Vacuum gauge
    This gauge is needed for carburetor synchronization.
    P/N. 90890-03094



14. Special thickness gauge
    This tool is used to check and adjust the exhaust valve opener.
    P/N. 90890-01293



(PAGE 4)

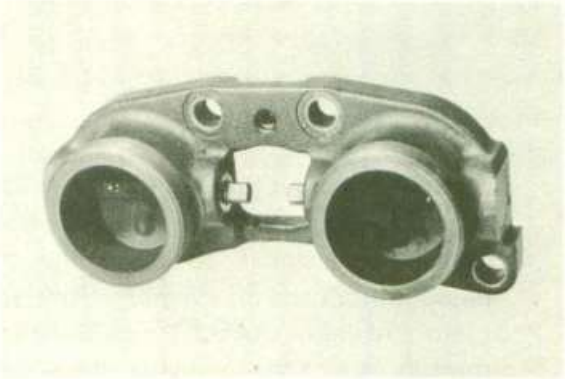
1-3. EXHAUST VALVE SYSTEM

On this model an Exhaust Valve System is installed to improve the driveability and to reduce the engine emission level.

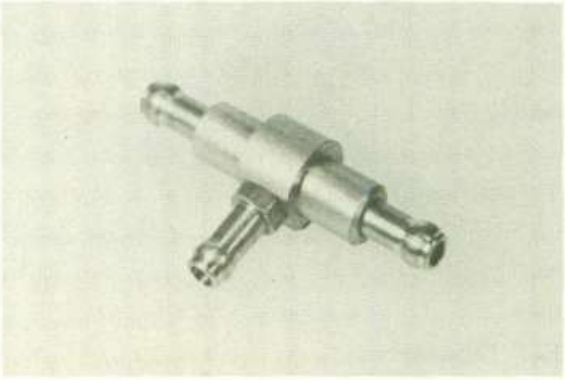
A. Construction

This system consists of an Exhaust valve, Check valve, Actuator, and Valve opener.

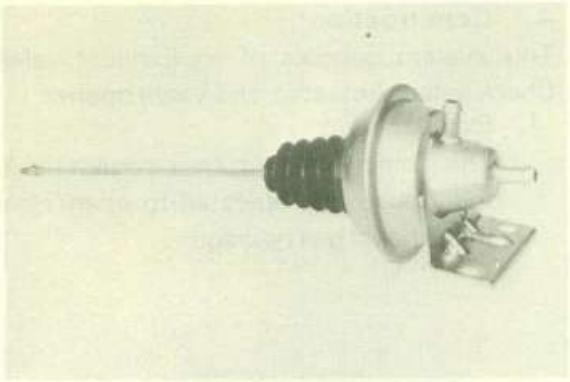
1. Exhaust valve:
   This component, which is connected to the actuator, is operated to open/close the exhaust gas passage.



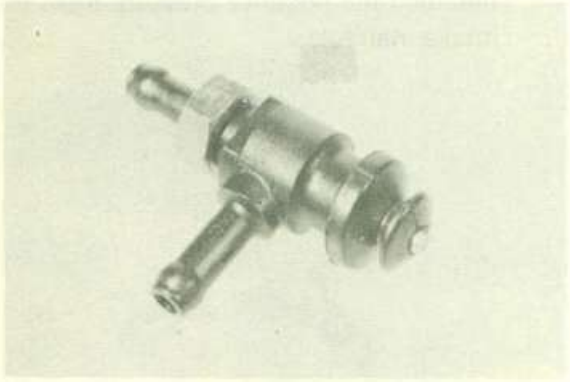
2. Check valve:
   The function of this component is to maintain the negative pressure from the intake manifolds.



3. Actuator:
   The negative pressure from the intake manifolds works the diaphragm in the actuator. In this way the diaphragm overcomes the return spring force, causing the exhaust valve connected to the diaphragm to close.



4. Valve opener:
   At less than 3.3 ± 0.2 mm (0.13 ± 0.008 in) throttle valve slide opening, the valve opener is designed to close the air passage from the air cleaner to the actuator. At more than 3.3 mm (0.13 in) throttle valve slide opening, the valve opener is designed to open said passage, allowing the air flow from the air cleaner to the actuator.



B. Operation

1. When engine is stopped:
   The exhaust valve is opened by means of a return spring in the actuator.
2. When engine is running:

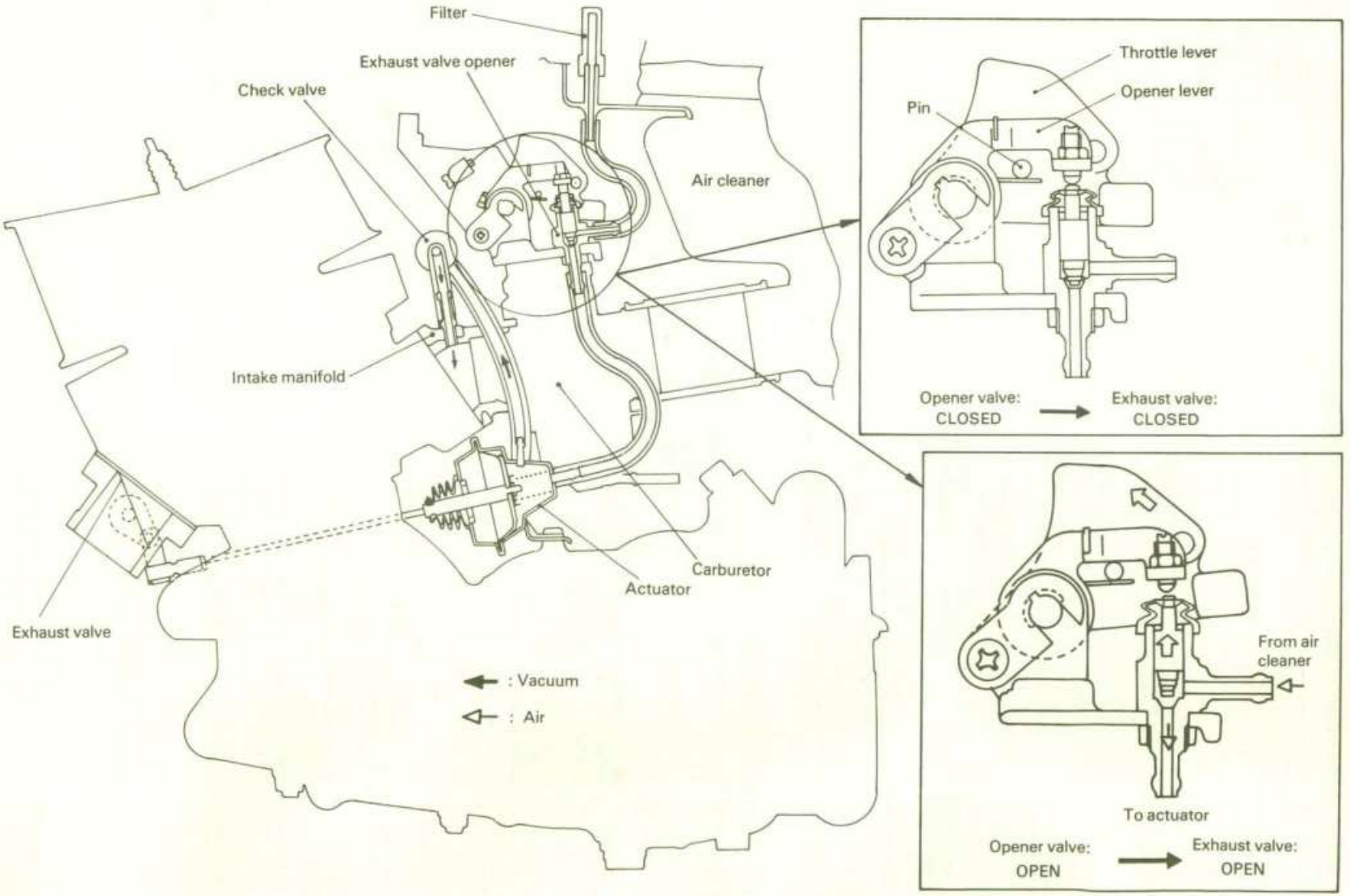
a. The exhaust valve is closed at less than 3.3 ± 0.2 mm (0.13 ± 0.008 in) of throttle valve slide opening. The intake manifold vacuum through the check valve moves the actuator, causing the exhaust valve to close.

b. When the throttle valve slide is opened more than 3.3 ± 0.2 mm (0.13 ± 0.008 in), the opener allows air to enter the actuator diaphragm chamber.
   As the pressure of the diaphragm chamber approaches atomspheric pressure, the internal spring pushes the actuator rod to its static position which opens the exhaust valve.

Valve opener	Actuator	Exhaust valve
Open	OFF*	Open
Closed	ON*	Closed

* OFF: Actuator is working to open the exhaust valve.
ON: Actuator is working to close the exhaust valve.

EMISSION CONTROL SYSTEM



(PAGE 7 ~ 8)
MAINTENANCE AND LUBRICATION CHART
A. Periodic Maintenance emission control system

No.	ITEM	REMARKS	INITIAL BREAK-IN		THEREAFTER EVERY
			1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months
1.	Ignition Timing	Check and clean contact breaker point. Check ignition timing. Replace point if necessary. Check point cam wick. Apply oil if necessary.	○	○	○
2.	Spark Plug	Check spark plug condition and plug gap. Replace plug every 4,000 km (2,500 mi).	○	Replace	Replace
3.	Carburetor synchronization	Adjust synchronization of carburetors and adjust exhaust valve opener at the same time.	○	○	○
4.	Idle Speed	Check and adjust engine idle speed. Adjust cable free play if necessary.	○	○	○
5.	Exhaust Valve System	Check exhaust valve for proper function. Check control hoses for cracks or damage. Replace if necessary.	○	○	○
6.	Exhaust System	Check for leakage. Retighten if necessary. Replace gasket(s) if necessary.	○	○	○
7.	Fuel Hose	Check fuel hose for cracks or damage. Replace if necessary.	○	○	○
8.	Fuel Petcock	Check fuel petcock for proper function.	○	○	○

B. General maintenance/lubrication

No.	ITEM	REMARKS	TYPE	INITIAL BREAK-IN		THEREAFTER EVERY		
				1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months	16,000 km (10,000 mi) or 24 months
1.	Transmission Oil	Warm-up engine before draining.	Yamalube 4-cycle oil or SAE 10W/30 "SE" motor oil or "GL" gear oil	○	○	○		
2.	Air Filter	Dry type filter. Clean with compressed air	–	○	○	○		
3.	Brake System	Adjust free play. Replace pads if necessary.	–	○	○	○		
4.	Clutch	Adjust free play.	–	○	○	○		
5.	Drive Chain	Apply chain lube thoroughly.	Yamaha chain and cable lube or SAE 10W/30 motor oil	CHECK CHAIN TENSION AND LUBE EVERY 500 km (300 mi)				
6.	Control/ Meter Cables	Apply cable lube thoroughly.	Yamaha chain and cable lube or 10W/30 motor oil	○	○	○		
7.	Throttle cable	Adjust/ Lubricate if necessary	Lithium base grease		○	○		
8.	Rear Arm Pivot shaft	Apply lightly.	Lithium base grease		○		○	

NO.	ITEM	REMARKS	TYPE	INITIAL BREAK-IN		THEREAFTER EVERY		
				1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months	16,000 km (10,000 mi) or 24 months
9.	Stand Shaft Pivots/ Brake Pedal Shaft/ Change Pedal Shaft/ Kick Crank Boss	Apply lightly.	Yamaha chain and cable lube or SAE 10W/30 motor oil		○	○		
10.	Front Fork Oil	Drain completely. Refill to specification.	Yamaha Fork Oil 10Wt or equivalent					○
11.	Steering Ball Bearing and Races	Check bearing assembly for looseness. Moderately repack every 16,000 km (10,000 mi).	Medium weight wheel bearing grease		○	○		Repack
12.	Wheel Bearings	Check bearings for smooth rotation.	—		○	○		
13.	Battery	Check specific gravity. Check breather pipe for proper operation.	—		○	○		
14.	Autolube Pump	Check and adjust pump and minimum pump stroke.	—	○	○	○		

C. Anticipated maintenance

The maintenance items in this table are set apart from the regular periodic maintenance items because of their anticipated need for irregular service intervals. The service interval is dependent upon variable factors such as the severity of use, operating conditions, etc. Therefore, perform this maintenance when the described symptoms warrant it.

No.	ITEM	REMARKS
1	Spark Plug	If any spark plug failure is noticed, replace it. Symptoms indicating spark plug failure are anticipated to occur around 4,000 km (2,500 mi).
2	Decarbonization	If heavy power loss is evident, decarbonize the cylinder head, piston head and exhaust system. Carbon built-up is anticipated to occur around 5,000 ~ 10,000 km (3,000 ~ 6,000 mi).
3	Piston	If the piston rattles, the vehicle becomes hard to start, appears to be lacking power, or becomes inoperative, repair as follows: replace the piston and piston rings, clean, hone, or replace the cylinder. These symptoms are anticipated to occur mainly below 4,000 km (2,500 mi).

1. Spark plug
   a. Symptoms—If the spark plug becomes wet with fuel or oil, or receives an accumulation of carbon, the spark plug will become electrically shorted and ineffective. As a result, engine misfiring may occur, possibly the engine may suddenly stop and restarting will be impossible. These symptoms are anticipated to occur at about 4,000 km.
   b. Maintenance criterion—If above mentioned symptoms are noticed, remove the spark plug and inspect the electrode for carbon bridging and/or oily electrode condition.
   c. Maintenance—After inspection, replace plug if necessary.
2. Decarbonization
   a. Symptoms—If a vehicle is driven habitually at low speed, the engine runs cold and thus carbon tends to build up on the cylinder exhaust port, cylinder head, piston head, exhaust passage, in the exhaust pipe, and in the silencer. With sufficient carbon deposits the exhaust passages become clogged and restricts the passage of exhaust gas.
   Eventually the engine will demonstrate poor performance, poor acceleration (20 to 30% down from original), afterburning, or after running.
   Sufficient carbon accumulation to justify decarbonization is anticipated to occur between 5,000 to 10,000 km of operation.
   b. Maintenance criterion—If any of the symptoms above are noticed, inspect as follows to determine the necessity for anticipated maintenance.
      1) Check fuel flow.
      2) Check ignition timing.
      3) Check spark plug for color and carbon build-up. (In the case of heavy carbon build-up, spark plug shows black color and/or the carbon build-up evident.)
   c. Maintenance—After this inspection, if decarbonization is deemed necessary, decarbonize the piston crown, exhaust port, cylinder head and exhaust passage of exhaust system by disassembling these components and carefully scraping the accumulated carbon with a round scraper.
3. Piston
   a. Symptoms—If the engine develops a rattling piston noise, is difficult to start, provides markedly reduced performance (20% or more), and/or causes a sudden engine stoppage, the piston may be worn excessively. This may be the result of a number of conditions of improper carburetion, inadequate or improper lubrication and/or improper ignition timing. Such conditions can result in overheating and piston wear. These symptoms are anticipated to occur below 4,000 km.
   b. Maintenance criterion—If any of the above mentioned symptoms are noticed, inspect as follows to determine the necessity for anticipated maintenance.
      1) Check fuel flow.
      2) Check ignition timing.
      3) Check for kick cranking resistance. (If piston worn, the resistance of the kick crank is unusually heavy or unusually light.)
      4) Check spark plug for unusual color or deposit. (If piston is worn, the spark plug may show a bright metalic color or deposit on the spark plug insulator.)
   c. Maintenance—If an inspection reveals damage to the cylinder, bore or replace cylinder, and replace piston and piston rings. Make sure proper piston clearance is maintained.

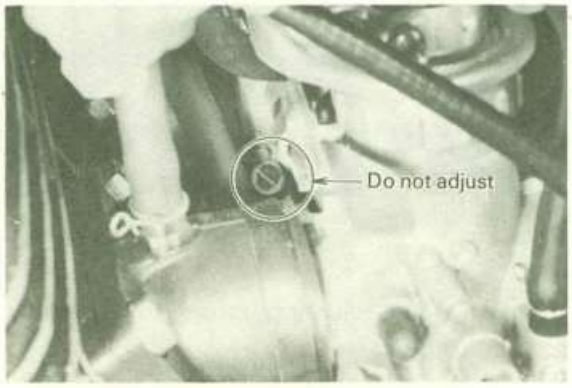
(PAGE 9 ~ 13)

2-3. ENGINE

A. Carburetor

1. Idle mixture

The idle mixture is set at the factory by the use of special equipment. No attempt should be made by the dealer to change this adjustment.



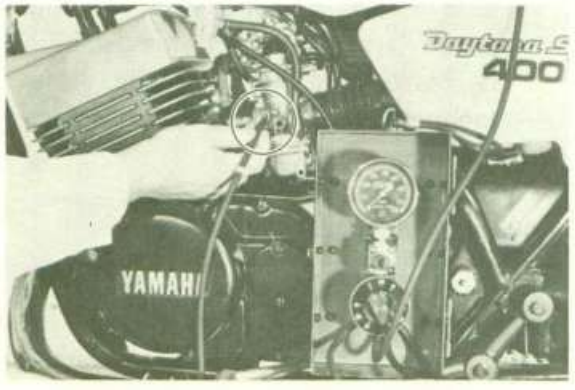
2. Synchronization

NOTE:

Carburetors must be checked for simultaneous opening and closing at specified intervals. Adjust synchronization if necessary. Ignition timing must be set properly before checking and/or adjusting carburetor synchronization.

a. Synchronization check

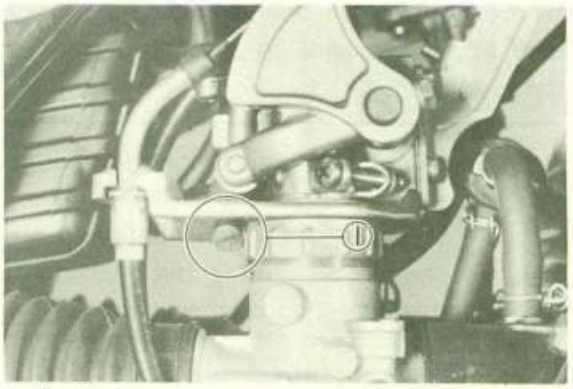
1) Remove the rubber caps from the right and left carburetor vacuum take off nozzles, and connect the vacuum gauge hoses to each nozzle.



2) Start the engine and allow it to warm up for a few minutes.
The warm up is complete when the engine responds normally to throttle opening.

3) With the engine warm and idling, adjust the vacuum gauge dampers until the gauge needles flutter slightly. Quickly open and close the throttle to check that the gauge needles respond quickly. If response is slow, readjust the gauge dampers. (This procedure is not necessary when using mercury manumeters.)

4) Set the engine speed at approximately 2,500 r/min with the throttle stop screw.



1. Throttle stop screw

5) The carburetors are synchronized if the difference in gauge readings is within the specified limits: if not, adjust the synchronization.

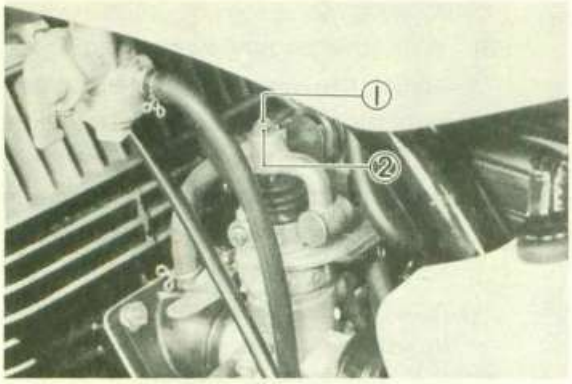
Difference in gauge reading:
Less than 30 mmHg

b. Synchronizing the carburetors

NOTE:

The fuel tank must be either elevated at the rear or removed to gain access to the carburetor synchronizing screw.

1) Loosen the synchronizing screw lock nut and turn the synchronizing screw in or out until both carburetors are synchronized.



1. Synchronizing screw 2. Lock nut

2) After adjusting, tighten the lock nut.

NOTE:

The exhaust valve opener must be checked and adjusted whenever the carburetors are synchronized.

c. Checking and adjusting the exhaust valve

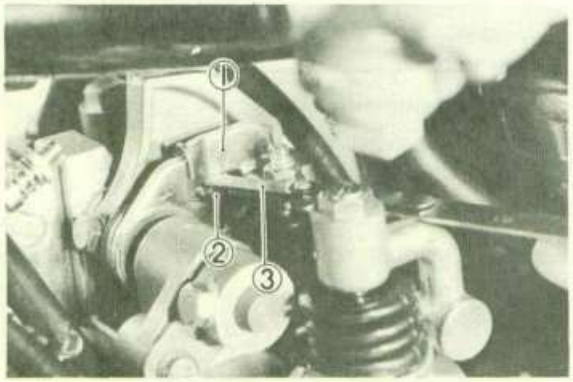
1) Measure the gap between the opener lever and lift pin by using the thickness gauge (special tool).

Proper gap: $0.8^{+0.2}_{-0.3}$ mm ($0.031^{+0.008}_{-0.012}$ in)

If the gap exceeds the specified limit, adjust the gap.

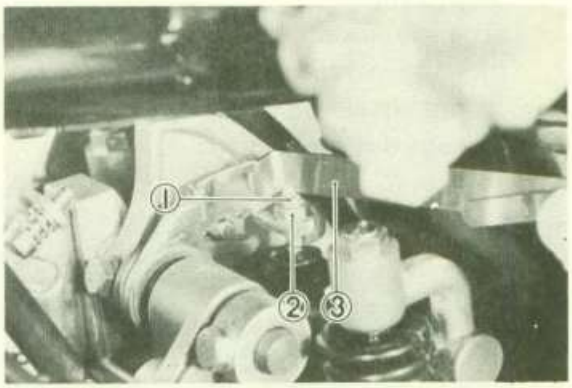
NOTE:

Before measuring gap, set the engine speed at specified idling speed. (Refer to A-3. "Idle Speed".



1. Opener lever 3. Special thickness gauge (Special tool)
2. Lift pin

2) Adjusting the gap as follows:
Loosen the adjusting screw lock nut on the opener lever and turn the adjusting screw in or out (use a special thickness gauge as a screw driver) until the proper gap is obtained.



1. Adjusting screw 3. Special thickness gauge
2. Lock nut

3) After adjusting tighten the lock nut.

3. Idle speed
Check and adjust idle speed as follows:

NOTE:

Carburetors must be synchronized before setting final idle speed. The idle speed adjustment is made by turning the throttle stop screw only.

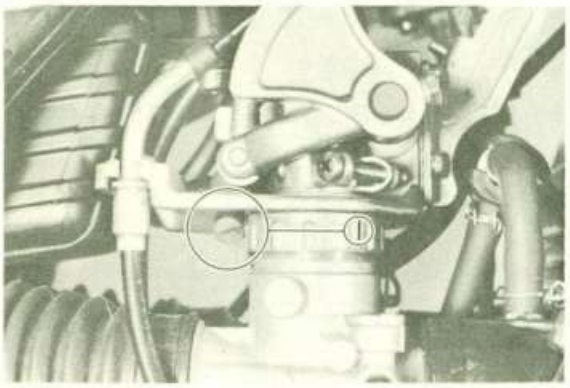
a. The engine must be warmed up before setting idle speed.

NOTE:

A warmed engine is defined as one which has been operated for about 5 minutes at 2,500 ~ 3,000 r/min with no load.

b. Set the engine idle speed to the specified r/min by turning the throttle stop screw in to increase the engine speed and back off the screw to decrease the engine speed. Use a tachometer for checking and adjusting the engine speed.

Idle speed: 1,300 ~ 1,400 r/min



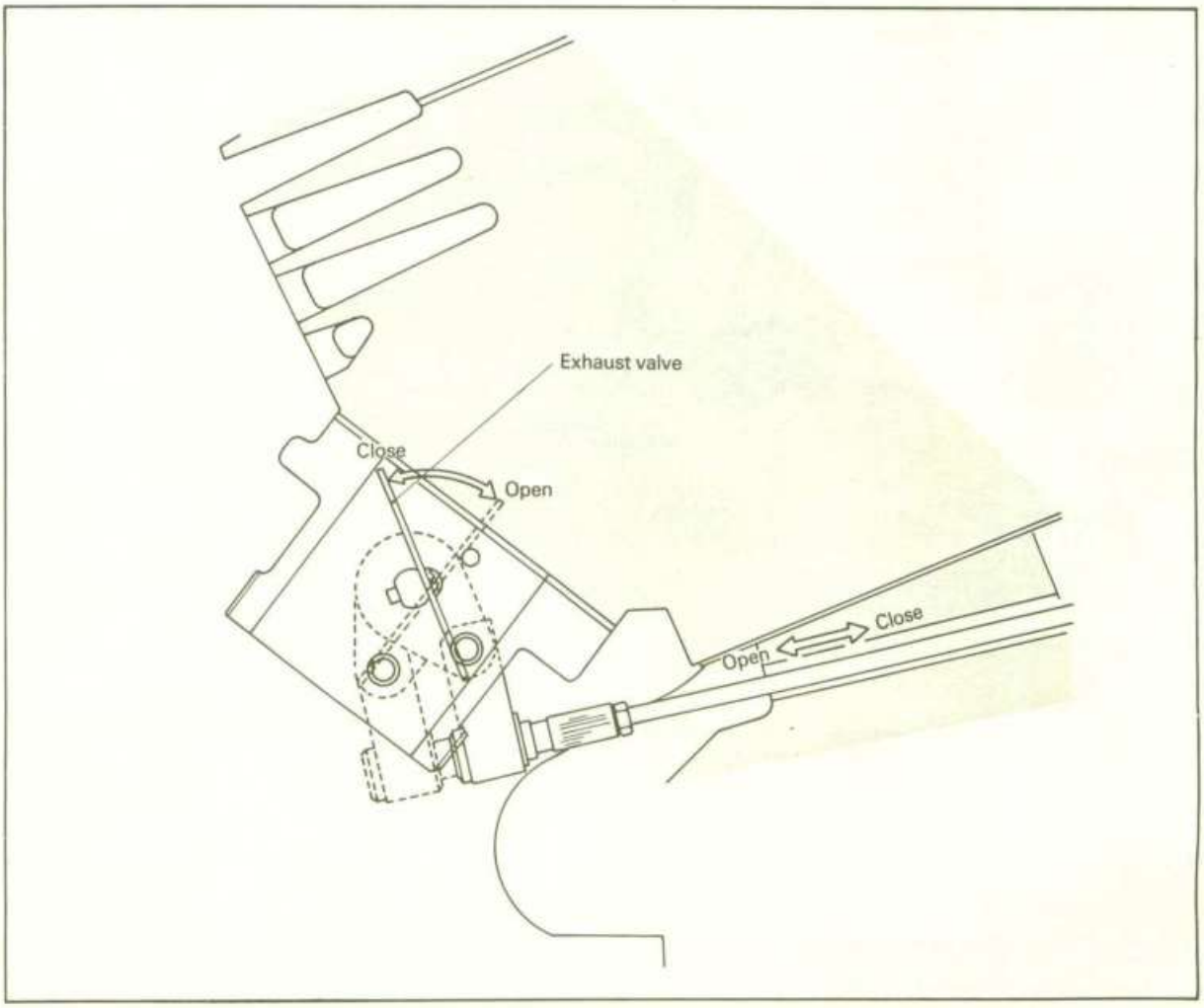
1. Throttle stop screw

4. Exhaust valve system
   Check the exhaust valve operation as follows:
   a. Checking with the engine stopped
      1) Check to see whether the exhaust valve is in the open position.
      (This valve is open if the control link is extended.)
      If the valve is not in the open position, check the following:

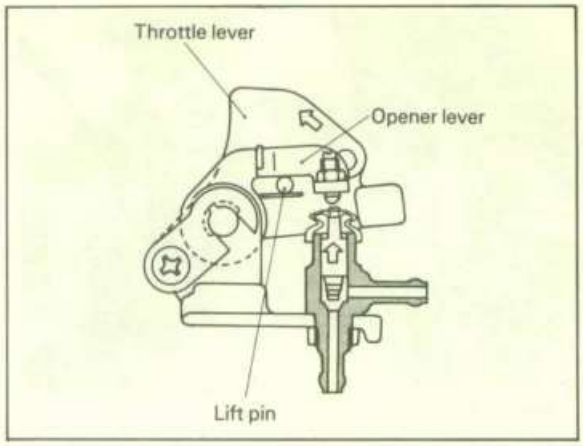
Open the throttle to actuate the valve opener mechanism.

(If this procedure does not open the valve:)

First, open the valve manually, pulling the exhaust control rod out. Then, close the valve manually, pushing the rod in. When the rod is released, the valve should open freely. If the mechanism operates stiffly, and the valve cannot be moved by the force of the actuator spring alone, replace the exhaust valve assembly.

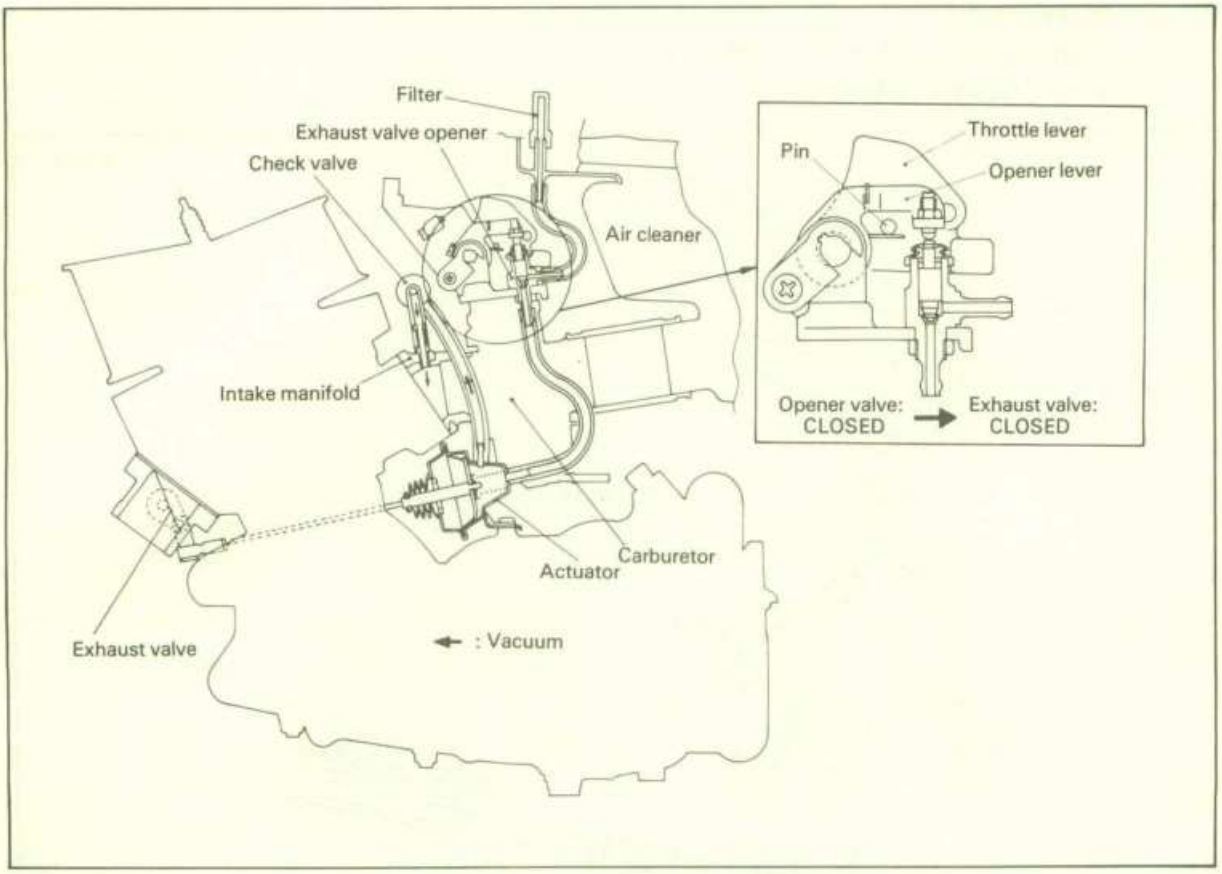


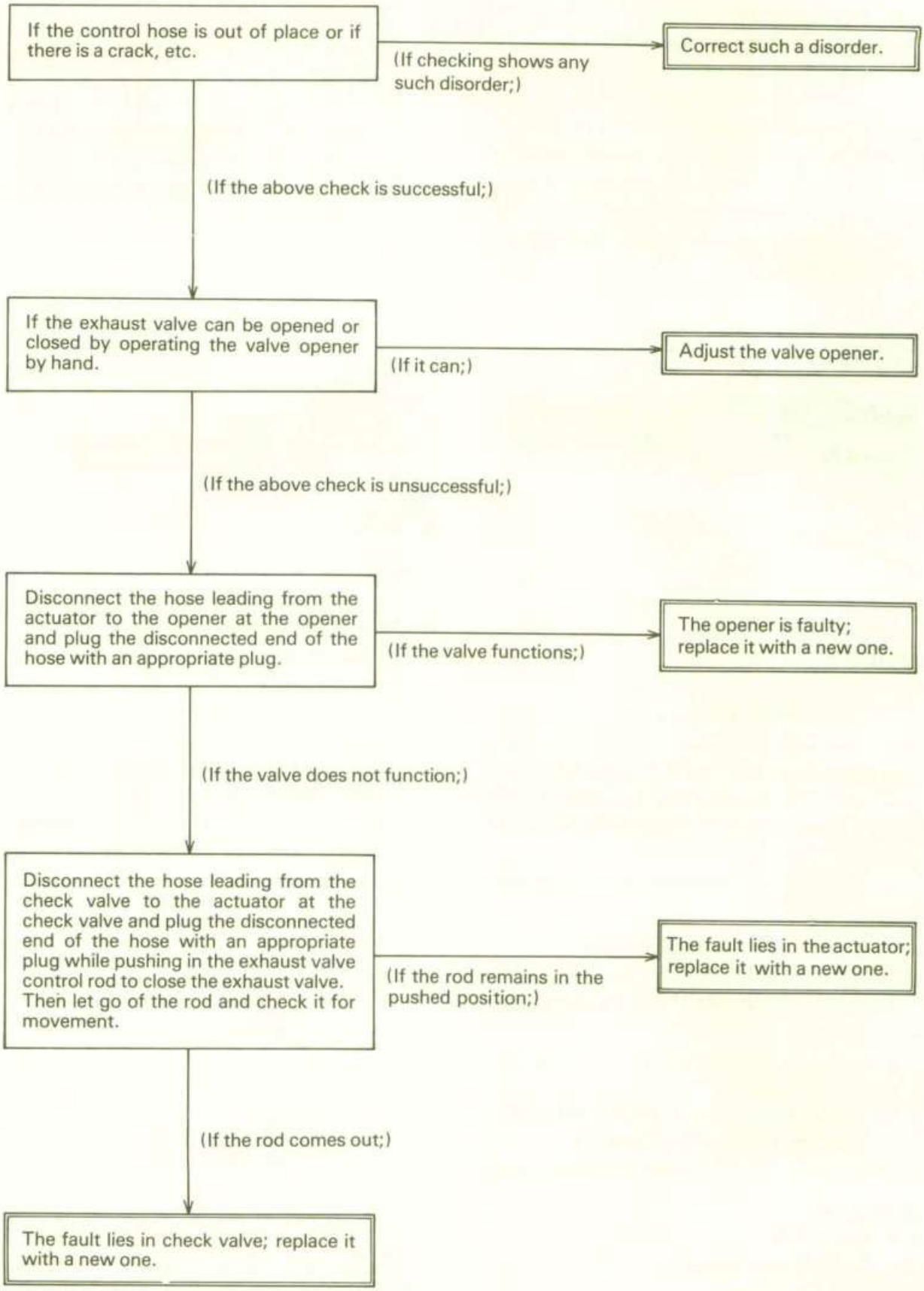
2) Check the operation of opener lever. While turning the throttle grip slowly, check to see if the opener lever is lifted by the lift pin. The opener lever may begin to operate before the lift pin contacts it. If this condition exists, dirt or debris may be blocking the free movement of the lever. Clean and lubricate as necessary to maintain free lever movement. Use engine oil or equivalent for lubrication.



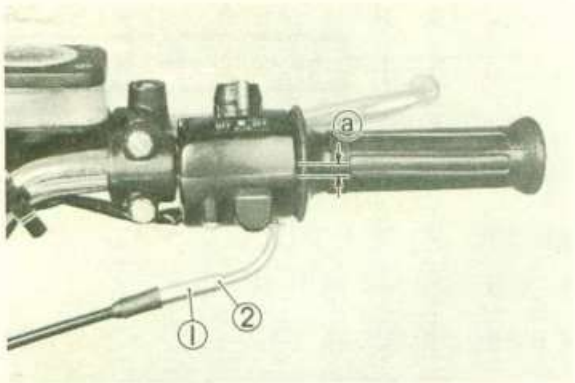
b. Checking at idling

The valve should be completely closed at idle. Check to see whether the exhaust valve is closed or not. (This can be ascertained by noting whether the control link is withdrawn into the actuator.) If it is not closed, check the following:




If the control hose is out of place or if there is a crack, etc.
(If checking shows any such disorder;)
Correct such a disorder.
(If the above check is successful;)
If the exhaust valve can be opened or closed by operating the valve opener by hand.
(If it can;)
Adjust the valve opener.
(If the above check is unsuccessful;)
Disconnect the hose leading from the actuator to the opener at the opener and plug the disconnected end of the hose with an appropriate plug.
(If the valve functions;)
The opener is faulty; replace it with a new one.
(If the valve does not function;)
Disconnect the hose leading from the check valve to the actuator at the check valve and plug the disconnected end of the hose with an appropriate plug while pushing in the exhaust valve control rod to close the exhaust valve. Then let go of the rod and check it for movement.
(If the rod remains in the pushed position;)
The fault lies in the actuator; replace it with a new one.
(If the rod comes out;)
The fault lies in check valve; replace it with a new one.

5. Throttle cable
After setting the engine idle speed and synchronizing the carburetors, check play in turning direction of throttle grip. The play should be 3 ~ 7 mm (0.12 ~ 0.28 in) at grip flange. Loosen the lock nut and turn the wire adjuster to make the necessary adjustment. After adjusting, be sure to tighten the lock nut properly.



1. Adjuster a. 3 ~ 7 mm (0.12 ~ 0.128 in)
2. Lock nut

(PAGE 11)

B. Air cleaner

2. NOTE should read as follow:

NOTE:

The element of this model is a dry foam rubber type. The element can be cleaned with water, however, dry it completely before installing.

(PAGE 13)

D. Engine and transmission oil

2. Transmission
b. The oil recommendation should read as follows:

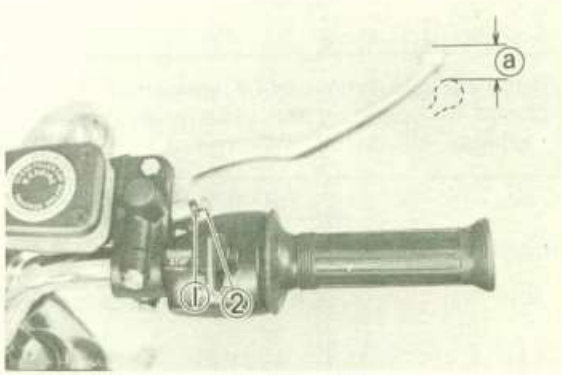
Recommended oil:
Yamalube 4-cycle oil or SAE 10W/30 "SE" motor oil or "GL" gear oil

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2-4. CHASSIS

A. Brakes and wheels

1. Brake adjustment
a. Front brake
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 lock nut 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.



1. Lock nut a. 5 ~ 8 mm (0.2 ~ 0.3 in)
2. Adjuster

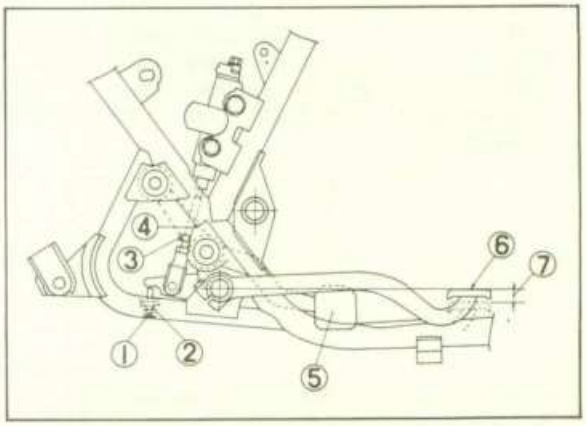
3) After adjusting, tighten the lock nut.

NOTE:

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

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b. Rear brake
The rear brake pedal should be so adjusted that it has a free play of 8 ~ 10 mm (0.3 ~ 0.4 in) from when the brake pedal is trod to when the brake begins to be effected.

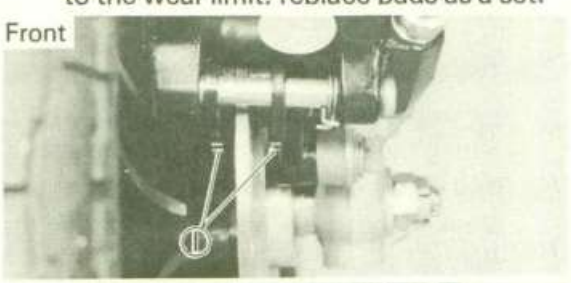


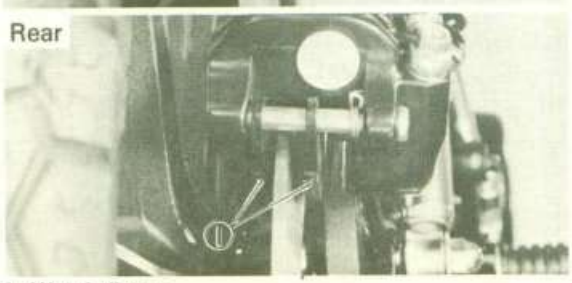
1. Adjuster (for pedal height)
2. Lock nut
3. Lock nut
4. Brake rod
5. Footrest
6. Pedal height 0 mm (0 in)
7. Free play 8 ~ 10 mm (0.3 ~ 0.4 in)

1) Loosen the adjuster lock nut (for pedal height).
2) By turning the adjuster clock wise or counterclockwise, adjust the brake pedal position so that its top end is flush with the footrest top end.
3) Secure the adjuster lock nut.
4) Loosen the brake rod adjuster lock nut and turn the brake rod downward until there is noticeable free play between rod and master cylinder.
5) Turn in the brake rod until it lightly touches the master cylinder, then turn it out by approximately 1-1/2 turns (for proper free play).
6) Tighten the brake rod adjuster lock nut.

CAUTION:
See that the punched mark on the brake rod is not above the top surface of the adjuster lock nut when securing the brake rod adjuster lock nut.

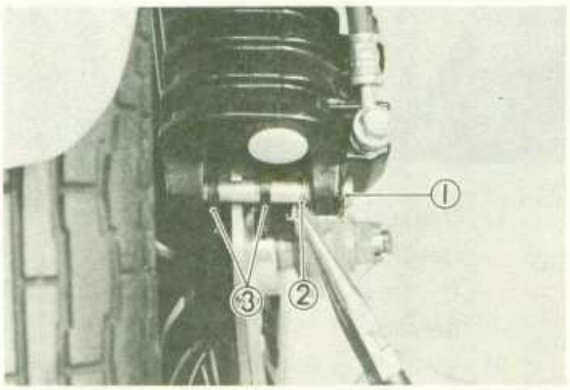
2. Brake pad check (Front and rear)
For easy checking of wear on the disc brake pads, a wear indicator is attached to each brake pad. This indicator permits a visual check without disassembling the pads.
To check, look at the pad wear indicator in back of the caliper. If any pad is worn to the wear limit, replace pads as a set.





1. Wear indicator

3. Caliper pad replacement
It is not necessary to disassemble the brake calipers and brake hoses to replace the pads.
a. Pull out the pad retaining pin while pinching the coil spring clip ends with pliers.



1. Pad retaining pin 3. Pad
2. Coil spring

b. Install the new brake pads. Replace the following parts if pad replacement is required:
*Pads *Coil spring *Pin

NOTE:
Replace the pads as a set if either is worn to the wear limit.

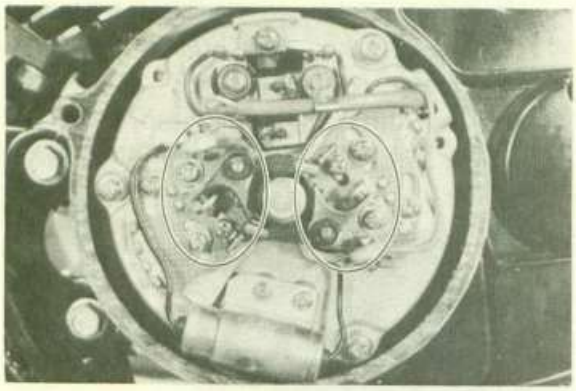
(PAGE 18)
D. Front fork oil change
6. Specifications should read as follows:

Front fork oil:
Yamaha Fork Oil 10Wt or equivalent
Oil capacity:
163.5 ± 4 cc (5.53 ± 0.14 oz) each leg
Oil level (below the top of the inner tube and without spring):
420 mm (16.54 in) each leg

(PAGE 20 ~ 22)
2-5. ELECTRICAL
A. Ignition Timing
1. Ignition timing is checked with a timing light by observing the position of the stationary pointer stamped on the timing plate and the mark on the rotor.

NOTE:
Check and clean the contact braker before adjusting the ignition timing.

a. Checking the contact breaker



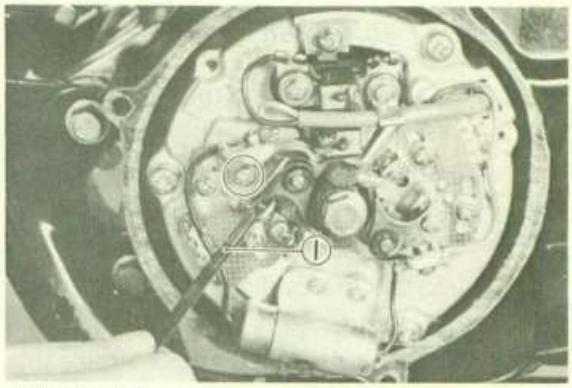
1) Visually check the arm's bakelite heel for chipping or damage.
If faulty, replace the contact breaker.
2) Visually check the contact breaker point surfaces for protuberance, burning, oil or dust. If necessary, clean surfaces (refer to A-1-b).
3) Check the breaker arm and arm shaft for rust or wear. If necessary, replace the contact breaker.

b. Cleaning the contact breaker
1) Using a point file or sandpaper, smooth out the surfaces.
2) Place a white business card or paper of hard texture between the points, and by pulling it repeatedly, throughly remove the metal, dust and/or oil. (For easy operation, the card may be damped with a lacquer thinner or detergent.)
If the repeated application of steps in 1) and 2) above are not effective, repalce the contact breaker.

c. Replacing the contact breaker
If any defect is found in a-1) or a-3) above, or if the steps in b. above are not effective, the contact breaker should be replaced.

d. Adjust point gap (at widest opening) by moving the contact breaker assembly. Use feeler gauge for this adjustment.

Point gap: 0.3 ~ 0.4 mm (0.012 ~ 0.016 in)



1. Feeler gauge

e. Add a few drops of lightweight machine oil onto the felt rubbing pad after each point adjustment to lubricate the point cam surface. Do not over oil.

2. Checking and adjusting the ignition timing

a. Remove the generator cover.

b. Connect the timing light to the left (right) spark plug lead wire.

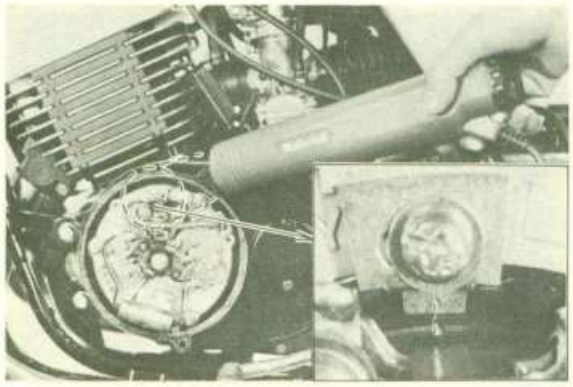


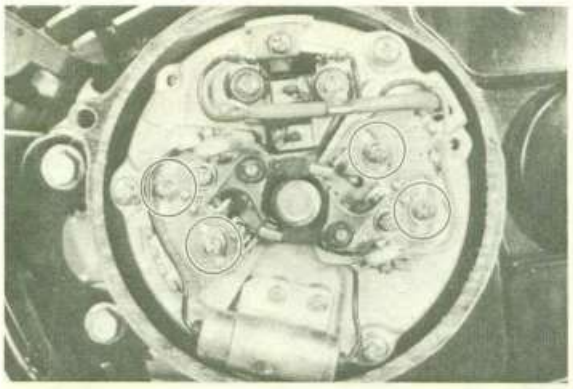
1. Timing light

c. Start the engine and keep its speed as specified. Use a tachometer for checking.

d. The timing mark on the rotor should line up with the stationary pointer on the timing plate at a specified engine speed. If it does not align, loosen the two breaker shift plate screws and move the shift plate until the marks align.

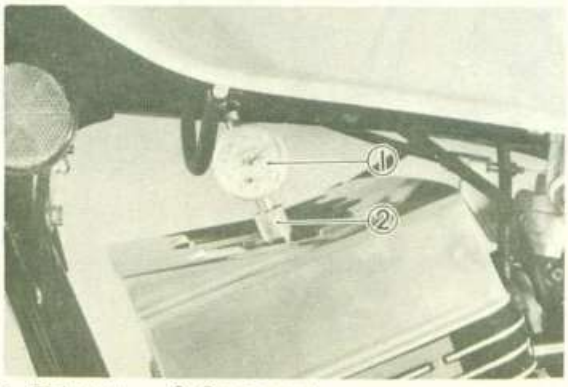
Idle speed: 1,300 ~ 1,400 r/min Ignition timing: 20°B.T.D.C. @ idle





e. Retighten the screws. Check the timing again.
f. Repeat the procedure (step b ~ e) for the right cylinder.

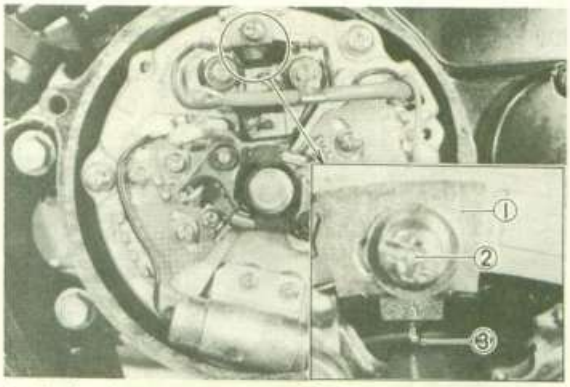
3. Setting the timing plate
Be sure to set the timing plate as follows when the engine is overhauled or when replacing the generator cover.
a. Shift the transmission into neutral.
b. Remove the left spark plug and screw the dial gauge stand and the dial gauge into the spark plug hole.



1. Dial gauge 2. Gauge stand

c. Rotate the crankshaft until the left side piston is at the top-dead-center (T.D.C).
Set the dial gauge needle to "O" and tighten the set screw on the gauge stand.
d. Starting at T.D.C., rotate the crankshaft clockwise until the dial gauge reads approximately 4 needle revolutions.
e. Slowly rotate the crankshaft counterclockwise until the dial gauge reads ignition advance setting listed in the specification.
f. Loosen the timing plate setting screw and align the stationary pointer stamped on the timing plate and the mark on the rotor. Tighten the setting screw and adjust the ignition timing (refer to "A. Ignition Timing").

Ignition timing (B.T.D.C.): 2.4 ± 0.15 mm (0.0945 ± 0.0059 in)



1. Timing plate 3. Rotor
2. Timing plate setting screw

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C. Spark plug

1. After a run of initial 1,000 km (600 mi), check the discoloration of the spark plug and clean it. After that, measure the plug gap and adjust it if it does not conform to the specification.
2. Whenever the spark plug is replaced or cleaned, measure the plug gap, and if incorrect, readjust the plug gap.

Spark plug gap : 0.6 ~ 0.8 mm (0.024 ~ 0.031 in)

3. Replace the spark plug when the machine has travelled the specified distance. When replacing spark plugs,

always use the proper type.

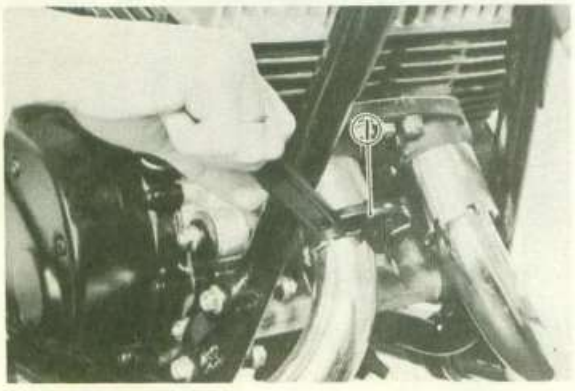
Replacement limit:
Initial 5,000 km (3,000 mi) thereafter every 4,000 km (2,500 mi)
Standard spark plug: B8ES (NGK)

4. When installing the plug, always clean the gasket surface, wipe off any grime that might be present on the surface of the spark plug, and torque the spark plug properly.

Spark plug tightening torque:
2.0 m-kg (14.5 ft-lb)

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CAHPTER 3.
ENGINE OVERHAUL
3-1. REMOVEL
C. Exhaust

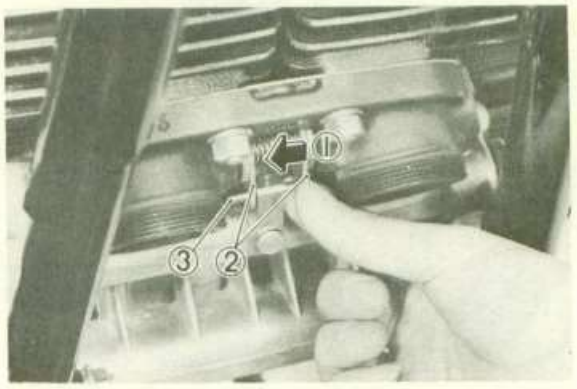
1. Remove the ring nuts holding the exhaust pipes to the exhaust valve body.



1. Ring nut wrench

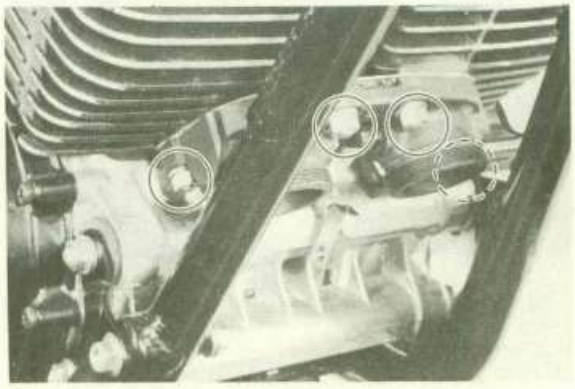
2. Remove the exhaust pipes.
3. Remove the exhaust valve cover plate and disconnect the linkage at the valve levers by pushing the lever against the compression spring.

CAUTION:
The joint nut is locked by holding agent. Do not remove the joint nut yet, this may damage the actuator diaphram.



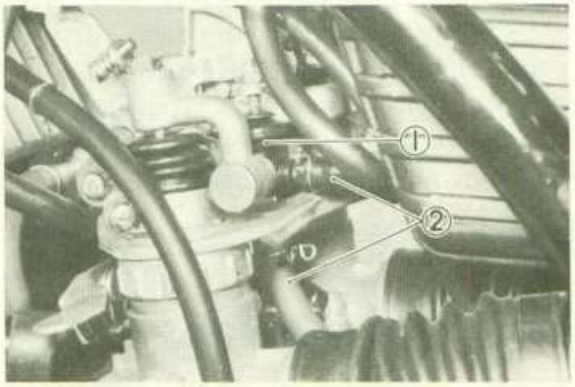
1. Push
2. Valve lever
3. Connecting pin

4. Remove the nuts holding the exhaust valve assembly to the cylinders.



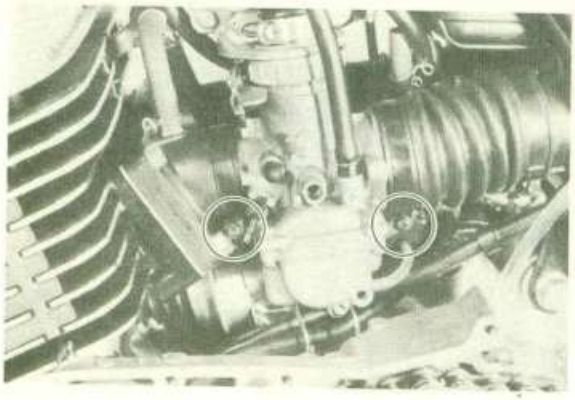
(PAGE 28)
F. Carburetor

1. Remove the control hoses at the exhaust valve opener.

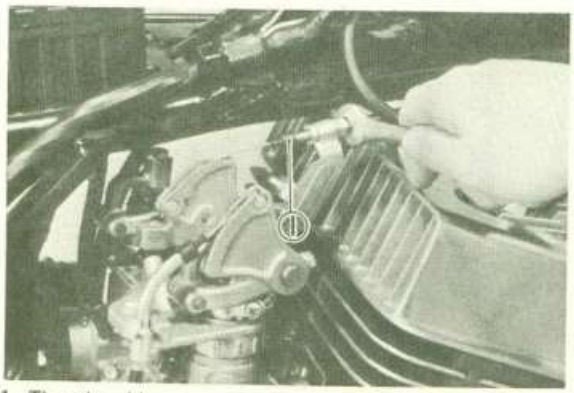


1. Valve opener
2. Control hose

2. Loosen the caburetor hose clamps.



3. Push the air cleaner joints off the carburetor inlet and carefully remove the carburetor assembly. Disconnect the throttle cable from the throttle lever.



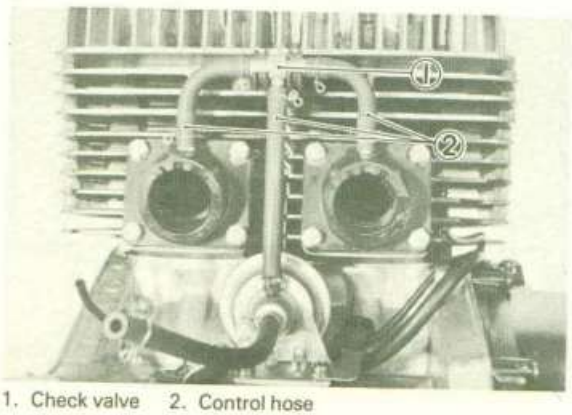
1. Throttle cable

(PAGE 29)

3-2. DISASSEMBLY

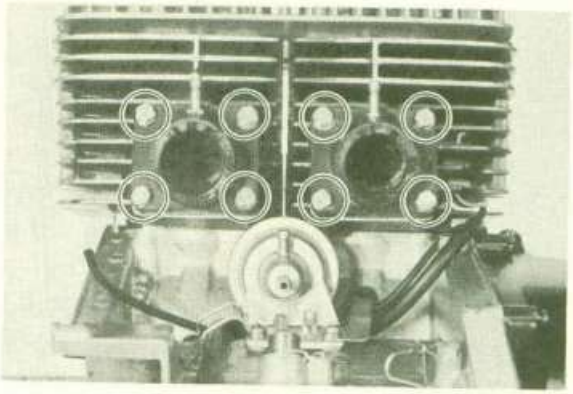
A. Check valve and reed valve

1. Remove the control hoses and the check valve from the carburetor joints. Remove the check valve holding bracket.



1. Check valve 2. Control hose

2. Remove the carburetor joints and reed valve assemblies.



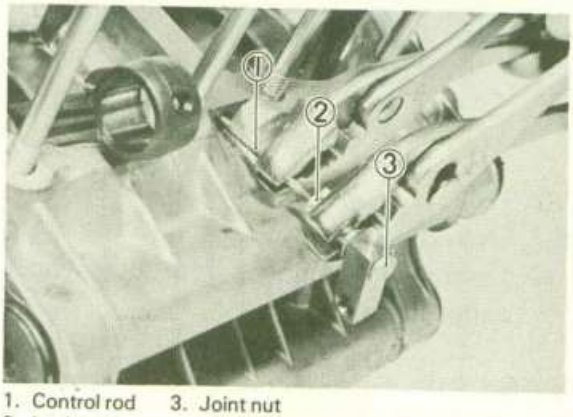
Add the following item next of **"D. Piston pin and piston."**

Actuator

1. Remove the joint nut, holding the rod with pliers.

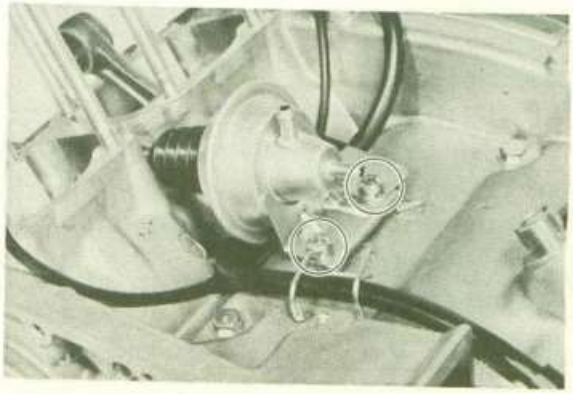
CAUTION:

When removing the joint nut, the rod must be held tightly to prevent it from turning together with said nut since it is locked by a holding agent. The lock nut must never be loosened as it effects the exhaust valve opening.



1. Control rod 3. Joint nut
2. Lock nut

2. Remove the actuator assembly and the hose clamp.



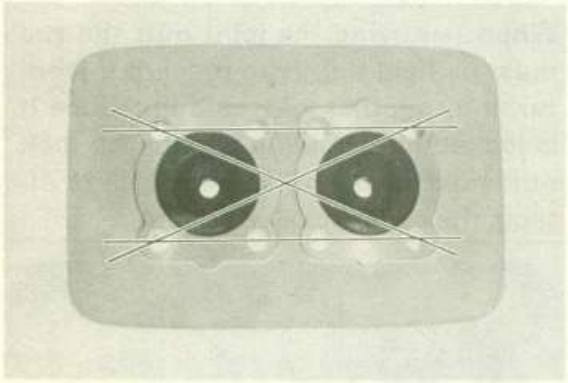
(PAGE 32 ~ 33)

3-3. INSPECTION AND REPAIR

A. Cylinder head

1. Remove the spark plugs.
2. 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 aluminum.
3. Check the cylinder head for warpage by using a precision straight edge. If the warpage exceeds the specified limit, correct by machining or replace it.

Head surface warpage: Less than 0.15 mm (0.0059 in)



(PAGE 33)

B. Cylinder

1. Remove any deposits from the cylinder exhaust port.

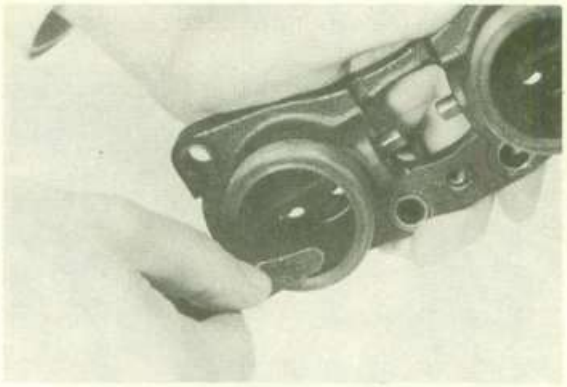
(PAGE 41)

P. Emission control system

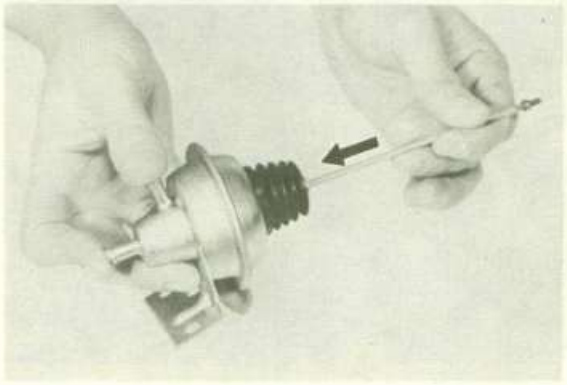
1. Exhaust valve
   Remove any deposits from the exhaust valve and check the valve for damage. Replace the exhaust valve assembly if damaged.

CAUTION:

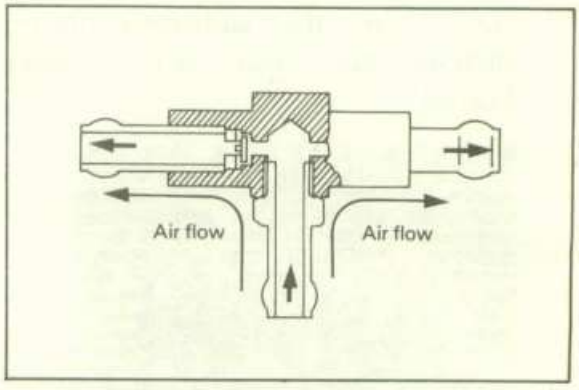
The exhaust valve holding screw ends are covered with locking compound. Do not remove this locking compound from these screw ends.
Do not apply any lubricant to the valve shaft.



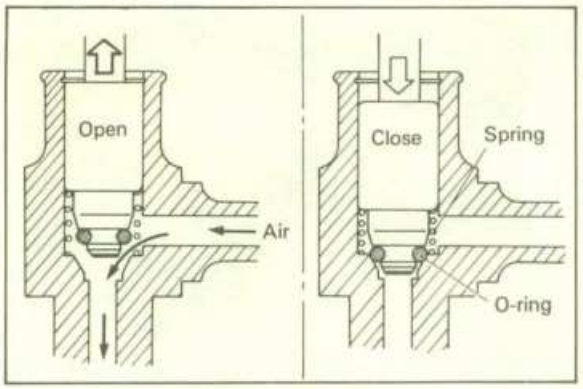
2. Actuator
   Plug the actuator nozzles with your fingers or an appropriate plug while pushing in the control rod, then let go of the rod and check it for movement. If the rod comes out, replace the actuator.



3. Check valve
   Check the check valve for oneway function. Replace if damaged.



4. Valve opener
   Check the valve opener (attached on the throttle control body) for proper function. Replace if damaged.



5. Control hoses
   Check the hoses for cracks or damage. Replace if damaged.

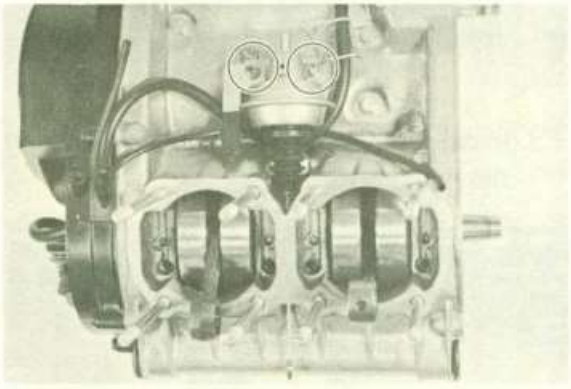
(PAGE 46)

3-4. ENGINE ASSEMBLY AND ADJUSTMENT

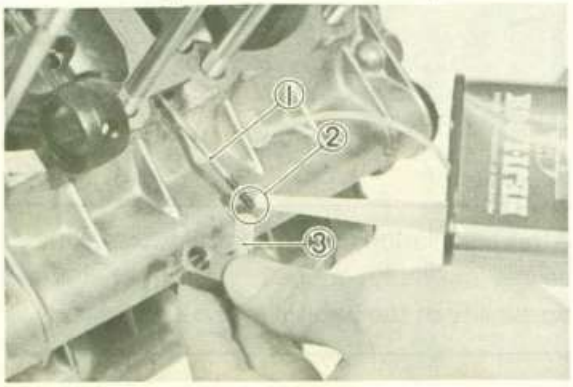
Add the following item next of **"I. Right-hand crankcase cover".**

Actuator

1. Pass the control rod through the holes of the upper crankcase, and then install the actuator and the hose clamp onto the crankcase.



2. Apply a holding agent, such as "LOCK-TITE" to the control rod thread and install the joint nut on it securely.



1. Control rod
2. Apply holding agent
3. Joint nut

(PAGE 47)

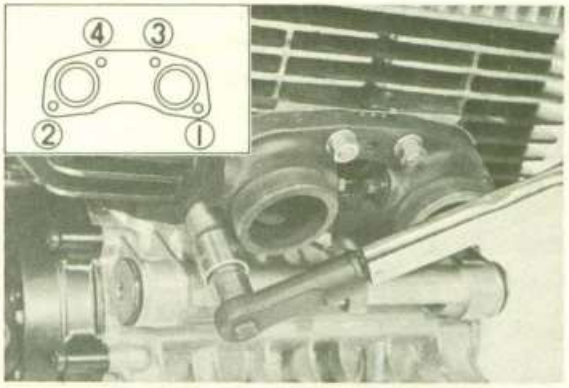
L. Exhaust valve and cylinder head

1. Install a head gasket and the cylinder head onto the cylinders. Place the washers and nuts in place and tighten nuts temporarily (finger tight).
2. Install an exhaust valve gasket and exhaust valve assembly.



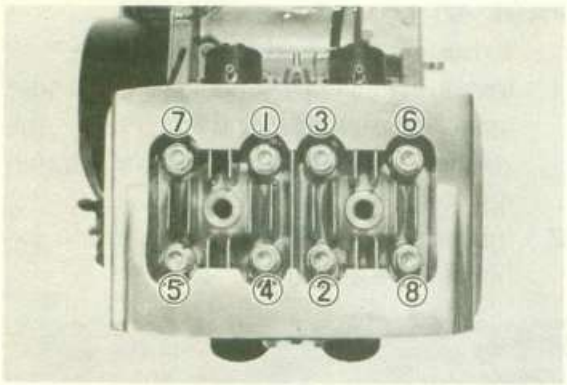
3. By following the illustration, tighten the nuts with the proper tightening sequence. Torque all nuts in two stages and final torque to the specification.

Exhaust valve nut torque:	
1st	0.8 m-kg (5.8 ft-lb)
Final	1.6 m-kg (11.6 ft-lb)

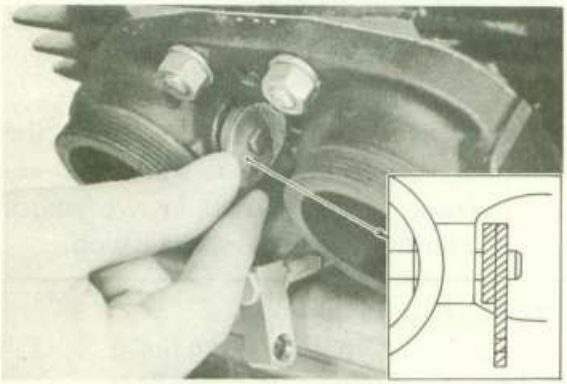


4. Follow the illustration for the proper cylinder head tightening sequence. Torque all nuts in two stages and final torque to the specification.

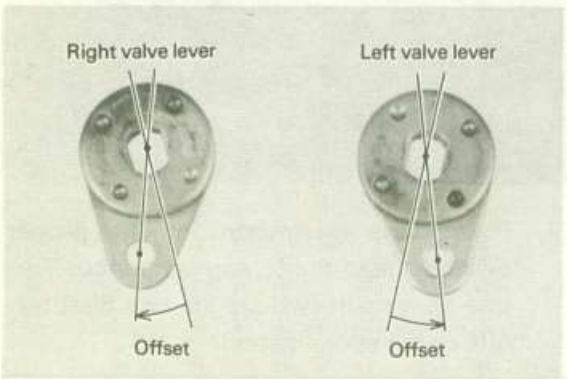
Cylinder head nut torque:	
1st	1.0 m-kg (7.2 ft-lb)
Final	2.0 m-kg (14.5 ft-lb)



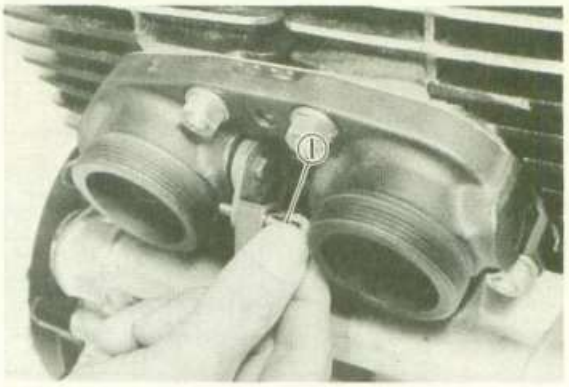
5. Connect the control rod to the exhaust valve.
   a. Install the right valve lever to the right exhaust valve shaft.



CAUTION:
Note that the exhaust valve leves are not interchangeable between the right and the left, eventhough they are similiar in shape to each other.

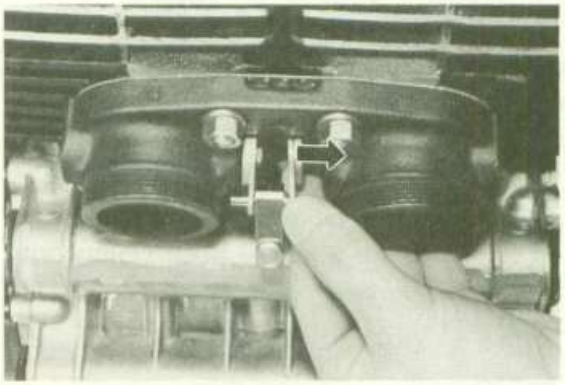


   b. Install the control rod joint to the valve lever with the connecting pin.

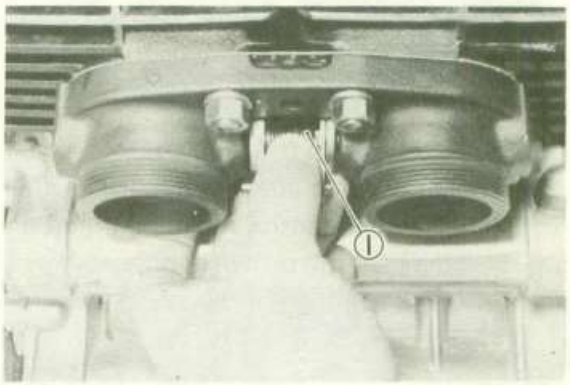


1. Connecting pin

   c. First install the left valve lever to the connecting pin and then to the left valve shaft.

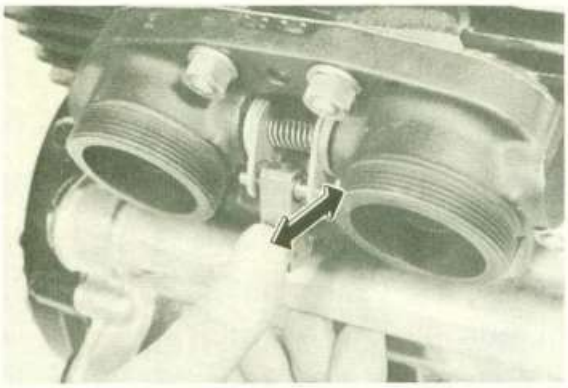


   d. Install the lever holding spring between the right and left levers.



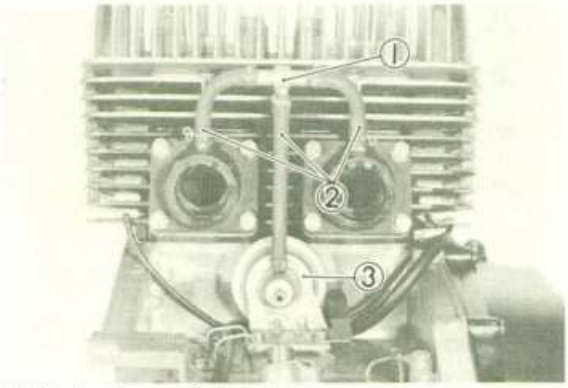
1. Lever holding spring

NOTE:
After installation, make sure that the exhaust valves are fully opened. If not, check the possibility of the wrong lever being fitted.



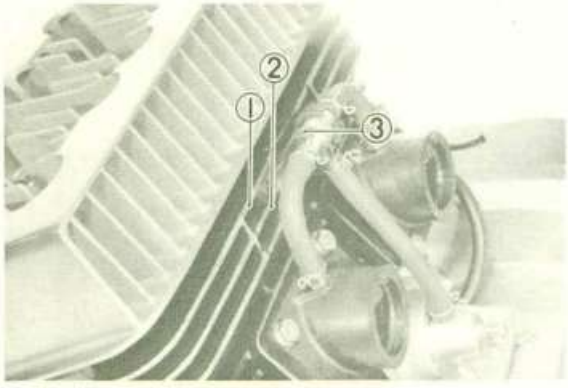
M. Actuator control hoses and check valve

1. Connect the hoses to the actuator and the check valve as shown.



1. Check valve
2. Control hose
3. Actuator

2. Install the check valve holding bracket to the cylinder and hold the check valve.



1. Top fin
2. Second fin
3. Valve holding bracket

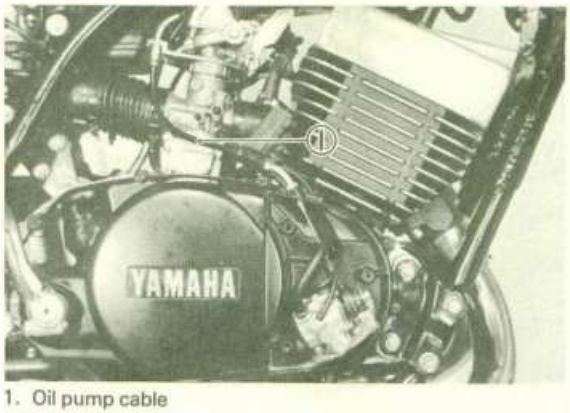
NOTE:

Securely insert the check valve holding bracket between the top and the second fin on the right (or left) cylinder.

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3-5. MOUNTING

12. Install the oil pump cable and adjust. (Refer to 2-3-C)

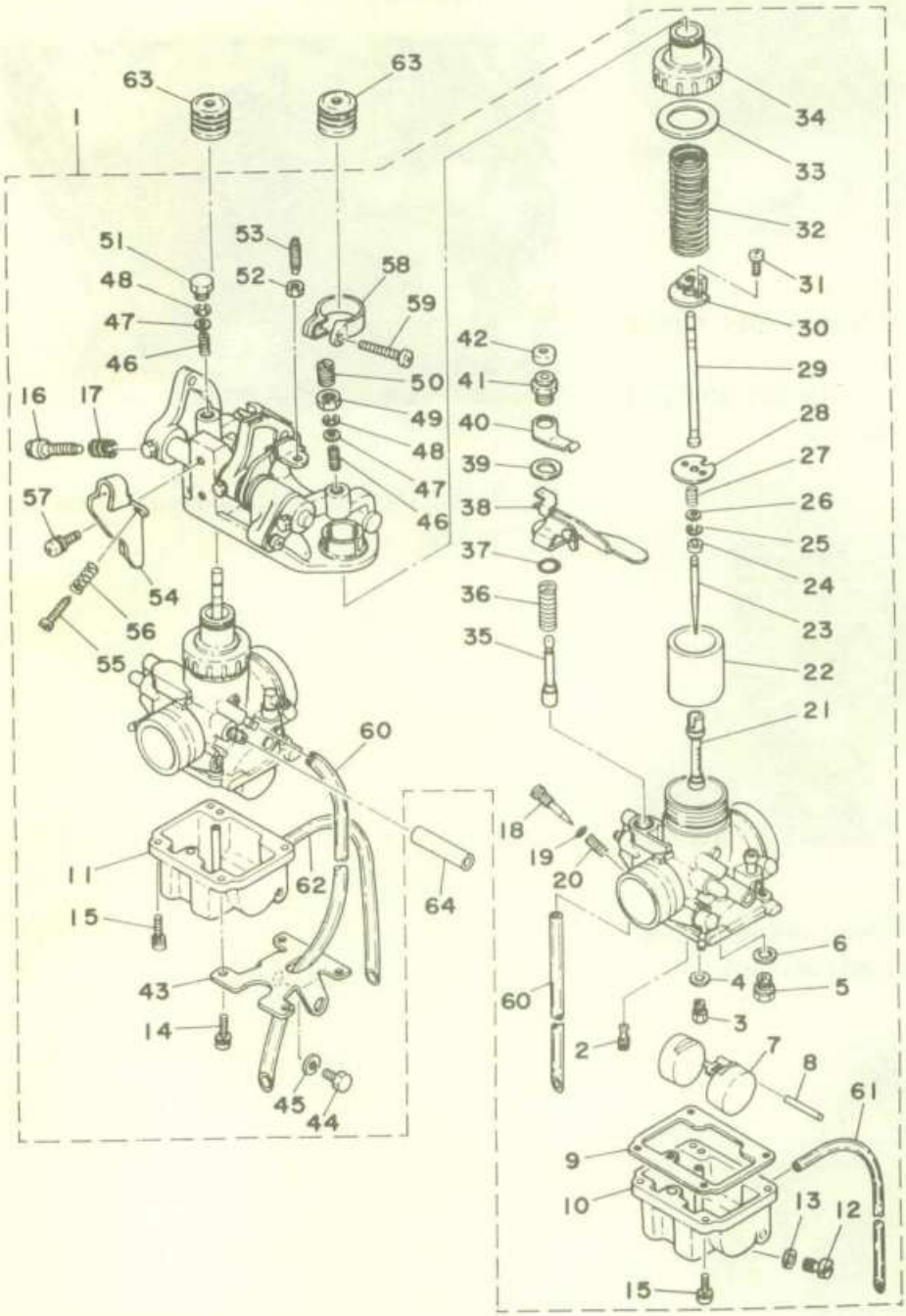


1. Oil pump cable

13. Install the fuel tank and connect the fuel hoses.

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4-1. CARBURETOR



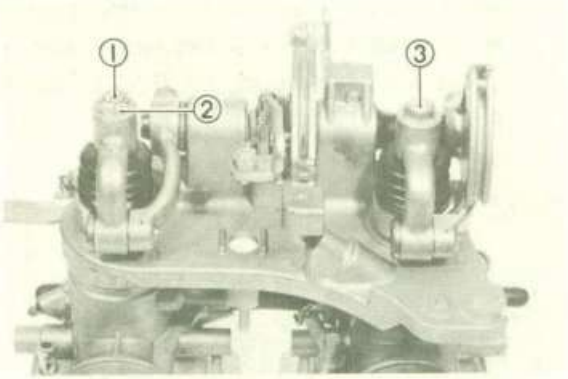
1. Carburetor assembly
2. Pilot jet
3. Main jet
4. Main jet washer
5. Valve seat assembly
6. Valve seat washer
7. Float
8. Float pin
9. Float chamber gasket
10. Float chamber body (left)
11. Float chamber body (right)
12. Drain plug
13. Packing
14. Screw
15. Screw
16. Throttle stop screw
17. Spring
18. Pilot screw
19. "O"-ring
20. Spring
21. Main nozzle
22. Throttle valve slide
23. Jet needle
24. Ring
25. Clip
26. Washer
27. Spring
28. Jet needle set plate
29. Throttle rod
30. Plate
31. Screw
32. Throttle valve spring
33. Packing
34. Mixing chamber top
35. Plunger
36. Plunger spring
37. "O"-ring
38. Starter lever
39. Washer
40. Plate
41. Plunger cap
42. Cover
43. Plate
44. Bolt
45. Spring washer
46. Spring
47. Washer
48. Clip
49. Nut
50. Screw
51. Screw
52. Nut
53. Screw
54. Bracket
55. Full throttle stop screw
56. Spring
57. Screw
58. Clip
59. Screw
60. Air vent pipe
61. Over flow pipe (left)
62. Over flow pipe (right)
63. Cap
64. Starter connecting pipe

A. Disassembly

CAUTION:

Do not disassemble the carburetors, especially the throttle control body except when it is necessary. If it was disassembled, make elaborate synchronization and adjustments to the opener and idle speed.

1. Throttle control body removal
   a. Loosen the synchronizing screw lock nut (left carburetor) and remove the synchronizing screw (left carburetor)/throttle rod holding bolt (right carburetor).

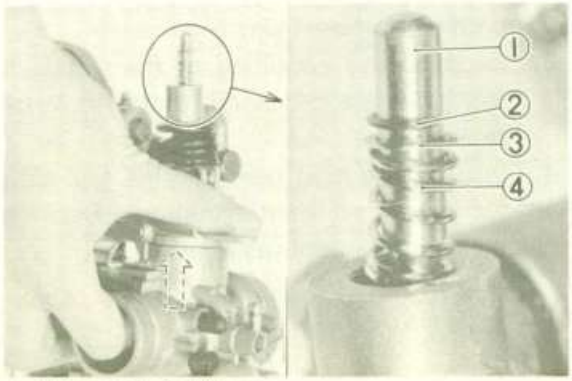


1. Synchronizing screw
2. Lock nut
3. Throttle rod holding bolt

   b. Lift the throttle valve slide by your finger and remove the clip, washer, and spring from the throttle rod. Remove the boots from the throttle rods.

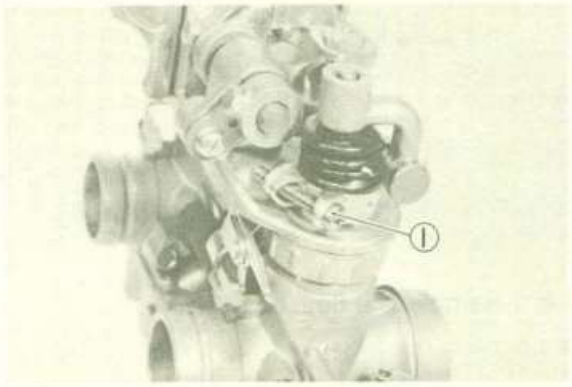
NOTE:

Be careful not to lose the clips, washers, springs etc.



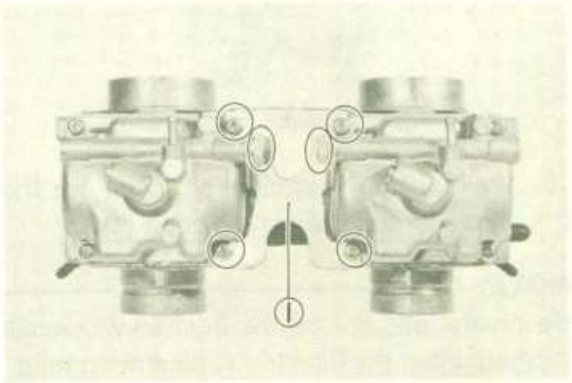
1. Throttle rod
2. Clip
3. Washer
4. Spring

   c. Loosen the clamp screws holding the throttle control body to the carburetors and remove the throttle control body.



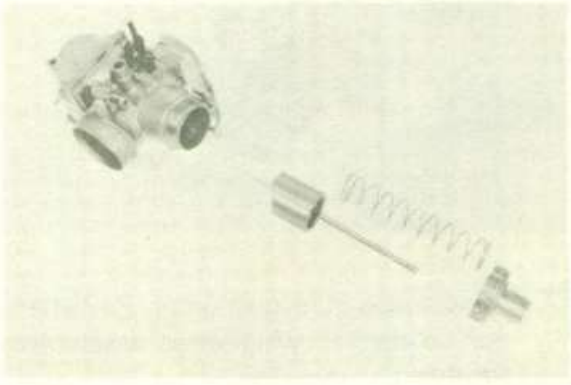
1. Clamp screw

2. Remove the carburetor joint plate holding screws and bolts. Separate the right and left carburetors.

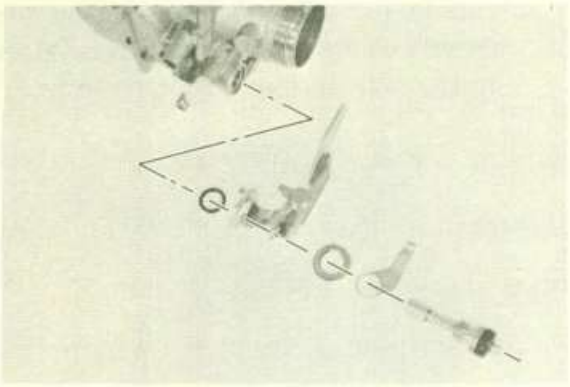


1. Joint plate

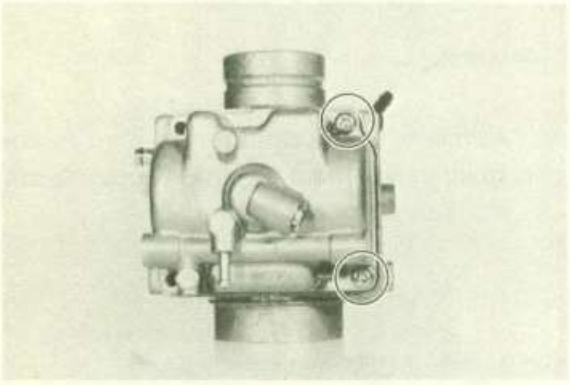
3. Remove the mixing chamber top and the throttle valve slide.



4. Straighten the lock washer tab and remove the starter assembly from the left carburetor.

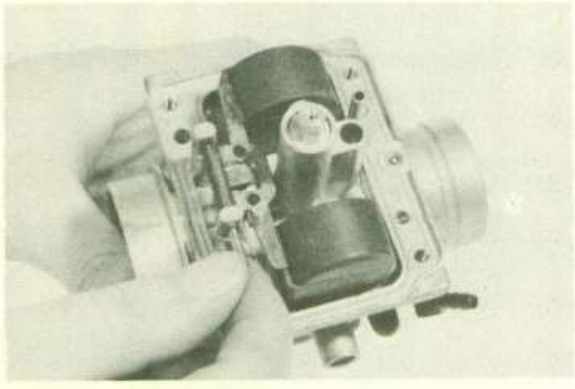


5. Remove the float bowl cover.



6. Pull out the float pivot pin. Remove the float assembly and the needle jet.

NOTE:
Be careful not to lose the float valve needle located under the float level adjustment tang.



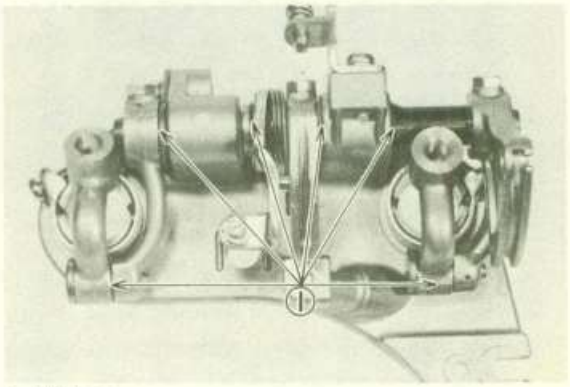
7. Reassemble in reverse order. Pay attention to the following when assembling the throttle valve slide.
   a. The jet needle spacer is fitted with a position determining pin. Securely insert this pin (longer end) into the positioning hole in the throttle valve.



1. Positioning hole 2. Position determining pin

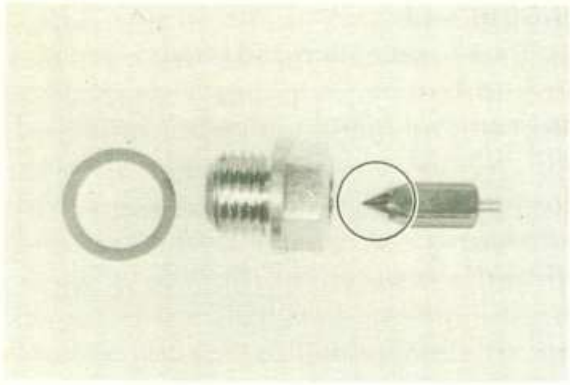
B. Inspection

1. Inspect the throttle control linkage for wear or damage. Lubricate the throttle lever shaft and the pivots with Yamaha Chain and Cable Lube or 10W/30 motor oil. Replace, if damaged.

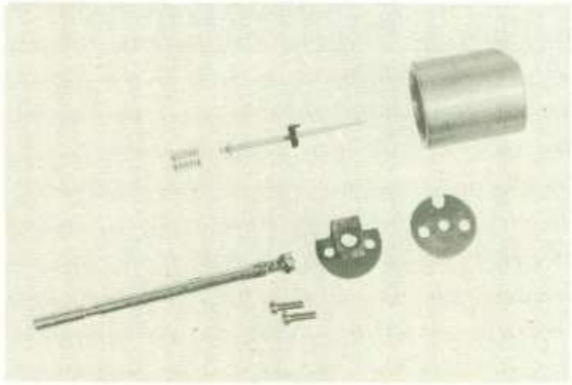


1. Lubricate

2. Examine the carburetor body and fuel passages. If contaminated, wash the carburetor in a petroleum-based solvent. Do not use caustic carburetor cleaning solutions. Blow out all passages and jets with compressed air.
3. Examine the condition of the floats. If the floats are damaged, they should be replaced.
4. Inspect the inlet needle valve and seat for wear or contamination. Replace these components as a set.

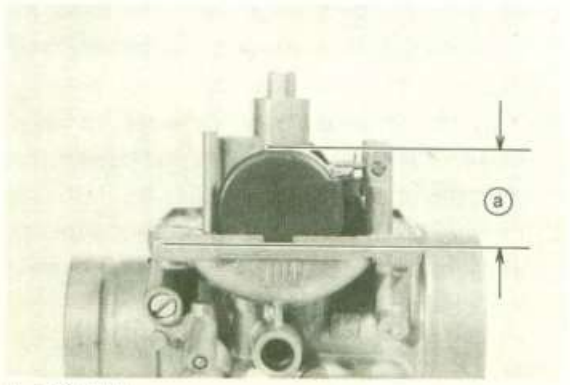


5. Inspect the throttle valve slide.
   Replace the throttle valve if scratched or damaged.

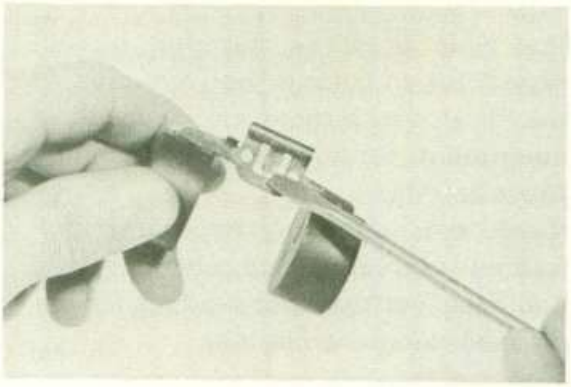


C. Adjustments

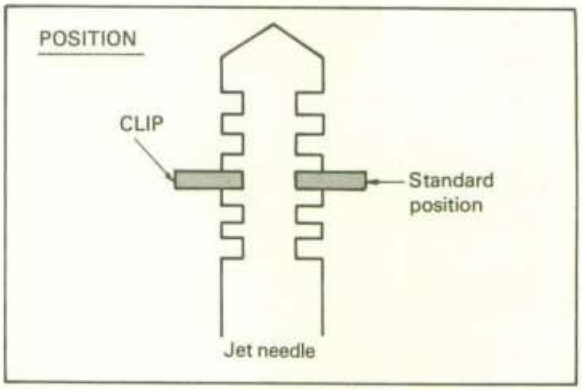
1. Float level adjustment
   Measure the distance from the bottom of the float to the float bowl gasket seating surface without the gasket. Bend the tang on the float arm if any float level adjustment is necessary. Both floats must be at the same height. Adjust the float level to the specification.



a. Float level
   21 ± 1 mm (0.83 ± 0.04 in)



2. Jet needle clip position
   The mid-range air/fuel supply is effected by the position of the needle in the needle jet. Check to see that the needle clip position is correct. If not, change the clip position to the specified position.



d. Specifications

Main jet	#140
Jet needle/Clip position	5FN29/3
Needle jet	0-0
Starter jet	#40
Float height (above gasket surface)	21 ± 1 mm (0.83 ± 0.04 in)
Pilot jet	#30
Pilot air screw	Preset
Fuel valve seat	ø2.5
Engine idle speed	1,300 ~1,400 r/min

CAUTION:

The pilot air screw settings are adjusted for maximum performance at the factory with the use of specialized equipment. Do not attempt to change these settings.

If all other engine systems are functioning correctly, any changes will decrease performance and cause increased exhaust emissions.

(PAGE 59 ~ 60)

5-3. DISC BRAKES (Front and rear)

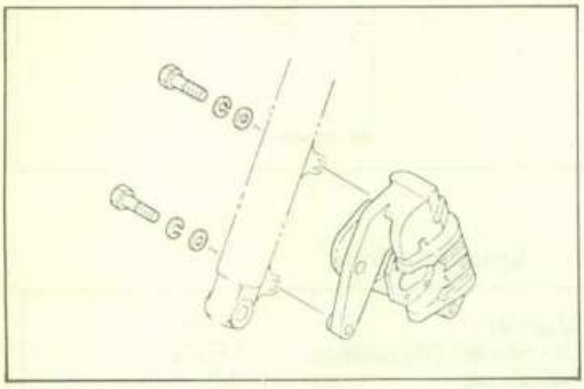
A-1. Caliper disassembly

a. Remove the caliper brake hose. Allow the caliper assembly to drain into a container.

b. Place the open hose end into the container and pump the old fluid out of the master cylinder.

c. Remove the coil spring, pin, and pads.

d. Remove the brake caliper holding bolt and remove the caliper assembly from the front fork.



e. Remove the retaining ring and the dust seal.

f. Carefuly force the piston out of the caliper cylinder with compressed air. Never try to pry out the piston.

WARNING:

Cover the piston with a rag. Use care so that piston does not cause injury as it is expelled from the cylinder.

g. Remove the piston seal.

(PAGE 61 ~ 62)

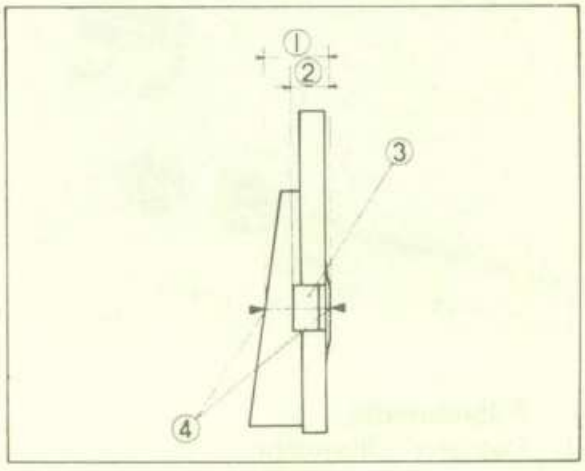
B. Brake inspection and repair

Recommended Brake Component Replacement Schedule:	
Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Replace only when brakes are disassembled

1. Caliper

a. Replace the caliper piston if it is scratched.

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



1. Pad thickness
2. Wear limit
3. Wear indicator
4. Measuring points

Wear limit (Front and rear):
6.5 mm (0.26 in)

See Caliper Pad Replacement procedure for parts to be replaced when pads are replaced.

c. Replace the piston and the dust seals if damaged. Replace the seals every two years.

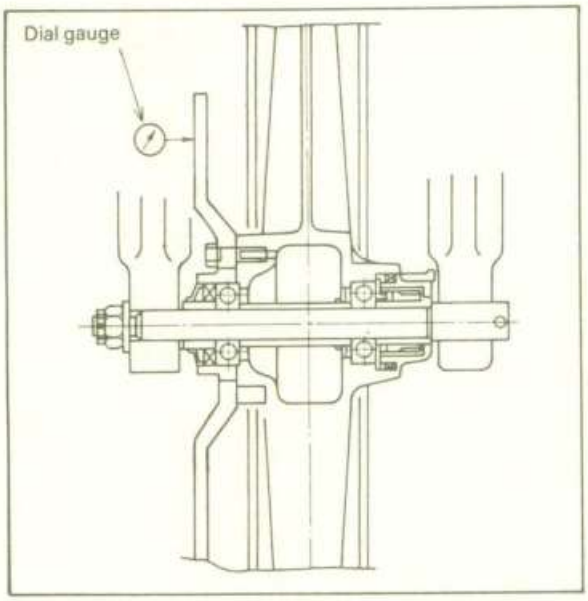
d. Inspect the caliper cylinder body. Replace if scratched. Clean all passages with new brake fluid.

e. Inspect the brake hoses. Replace hoses at recommended intervals or if cracked, frayed or damaged.

f. Check for wear and deflection of the disc (front and rear).

Maximum deflection: 0.15 mm (0.006 in) Minimum disc thickness: 4.5 mm (0.18 in)

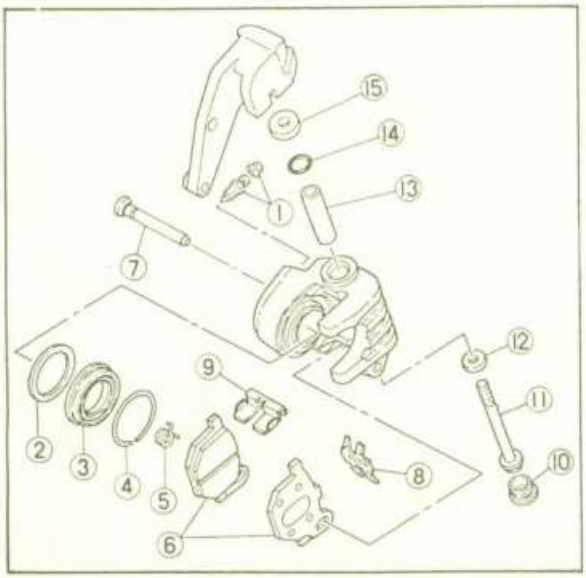
If the disc is worn beyond minimum thickness or deflection exceeds specified limit, replace the disc.



(PAGE 62)

C. Disc brake assembly

2. Caliper
   a. Replace the following parts whenever a caliper is disassembled.



1. Bleed screw (with cap)
2. Piston seal
3. Dust seal
4. Retaining ring
5. Coil spring
6. Pads
7. Pin
8. Spring pad
9. Retainer
10. Swing bolt cap
11. Swing bolt
12. Washer
13. Sleeve
14. O-ring
15. Washer

   b. Install the piston seal and piston. Place the caliper cylinder into the caliper frame.
   c. Install the retaining ring, coil spring, pads, pin, pad spring, and retainer.
   d. Install the pivot bolt, washers, sleeve, O-ring, and bolt cap. When installing the pivot bolt, apply it with a holding agent, such as "LOCK-TITE".

Pivot bolt torque: 2.5 m-kg (18.0 ft-lb)

   e. Attach the brake hoses.

Brake hose torque: 2.5 m-kg (18.0 ft-lb)

(PAGE 64)

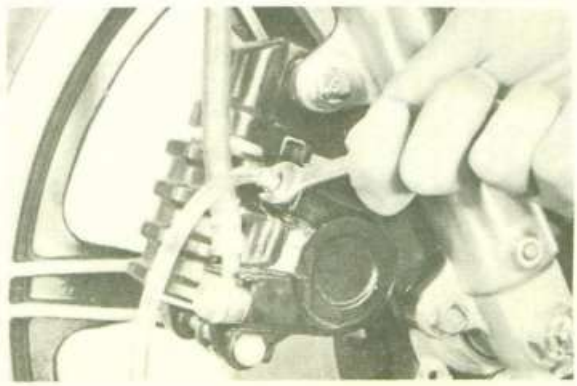
C. Disc brake assembly

3-f. Air bleeding

CAUTION:

If the brake system is disassembled or if any brake hose has been loosened or removed, the brake system must be bled to remove air from the brake fluid. If the brake fluid level is very low or brake operation is incorrect, bleed the brake system.

1) Add proper brake fluid to the reservoir. Install the diaphragm, being careful not to spill or overflow the reservoir.
2) Connect the clear plastic tube tightly to the caliper bleed screw. Put the end of the tube into a container.



3) Slowly apply the brake lever or pedal several times. Pull in lever (push down pedal). Hold the lever or pedal in "ON" position. Loosen the bleed screw. Allow the pedal or lever to travel slowly toward its limit. Tighten the bleed screw just before the limit.

NOTE:

If bleeding is difficult, it may be necessary to let the brake system stabilize for a few hours. Repeat bleeding procedure.

Bleed screw tightening torque:
0.6 m-kg (4.5 ft-lb)

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5-6. FRONT FORKS

B. Assembly

2-b. Pour specified amount of oil into the inner tube through the upper end opening.

Recommended oil:
Yamaha Fork Oil 10wt or equivalent
Quantity per leg:
163.5 ± 4 cc (5.53 ± 0.14 oz)
Oil level (below the top of the inner tube and without spring):
420 ± 10 mm (16.54 ± 0.39 in)

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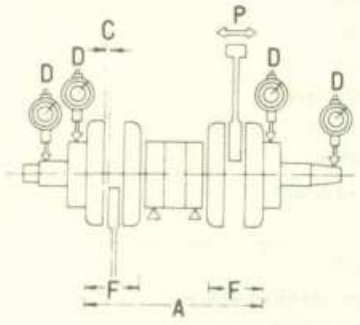
7-2. SPECIFICATION

A. General

Items	RD400F
Model:	
Model (I.B.M. No.)	RD400F (2V0)
Frame I.D. and starting number	2V0-000101
Engine I.D. and starting number	2V0-000101
Dimension:	
Overall length	2,005 mm (78.9 in)
Overall width	830 mm (32.7 in)
Overall height	1,090 mm (42.9 in)
Seat height	795 mm (31.3 in)
Wheel base	1,320 mm (52.0 in)
Minimum ground clearance	155 mm (6.1 in)
Weight:	
Net weight	155 kg (342 lb)
Performance:	
Climbing ability	28°
Minimum turning radius	2,310 mm (90.9 in)
Braking distance	14 m at 50 km/h (45.9 ft at 31 mph)

B. Engine

Items	RD400F
Description:	
Engine type	Air cooled, 2-stroke forward incline, twin, torque induction system
Engine model	2V0
Displacement	398 cc
Bore × stroke	64 × 62 mm (2,520 × 2,441 in)
Compression ratio	10.2 : 1 (6.7 : 1 Corrected)
Starting system	Primary kick starter
Ignition system	Battery ignition
Lubrication system	Separate lubricator (Yamaha Autolube)
Cylinder head:	
Combustion chamber volume	21.7 ± 0.5 cc (with B8ES)
Combustion chamber type	Dome + Squish
Head gasket thickness	1.5 mm (0.06 in)
Tightening torque:	
Cylinder head holding nut (M8 P1.25)	2.0 m-kg (14.5 ft-lb)
Spark plug (M14 P1.25)	2.0 m-kg (14.5 ft-lb)
Cylinder:	
Material	Aluminum alloy with cast iron sleeve
Bore size	$64^{+0.02}_{0}$ mm ($2.13^{+0.0008}_{0}$ in)
Taper limit	0.05 mm (0.002 in)
Out of round limit	0.01 mm (0.0004 in)

Items		RD400F
Piston:		
Piston skirt clearance		0.030 ~ 0.035 mm (0.0012 ~ 0.0014 in)
Piston over size:	1st	64.25 mm (2.530 in)
	2nd	64.50 mm (2.539 in)
	3rd	64.75 mm (2.549 in)
	4th	65.00 mm (2.559 in)
Piston pin outside diameter × length		16 × 54 mm (0.63 × 2.13 in)
Piston ring:		
Piston ring:	Top	Keystone ring/1.2 mm (0.047 in)
	2nd	Keystone ring/1.2 mm (0.047 in)
Ring end gap, installed:	Top	0.3 ~ 0.5 mm (0.012 ~ 0.020 in)
	2nd	0.3 ~ 0.5 mm (0.012 ~ 0.020 in)
Ring groove side clearance:	Top	—
	2nd	—
Small end bearing:		
Type		Needle bearing
Big end bearing:		
Type		Needle bearing
Crankshaft:		
Crankshaft assembly width (A)		$154^{+0.05}_{-0.10}$ mm ($6.06^{+0.002}_{-0.004}$ in)
Crankshaft assembly width (F)		$52^{0}_{-0.05}$ mm ($2.05^{0}_{-0.02}$ in)
Crankshaft deflection (D)		0.03 mm (0.0012 in)
Connecting rod large end side clearance (C)		0.25 ~ 0.75 mm (0.010 ~ 0.030 in)
Connecting rod small end deflection (P)		0.36 ~ 0.98 mm (0.014 ~ 0.039 in)
		
Crank pin outside diameter × length		22 × 51 mm (0.87 × 2.01 in)
Crank pin type		Solid type
Crank bearing type:	left/Q'ty	B6305C3/1pc.
	center/Q'ty	B6206C3/2 pcs.
	right/Q'ty	B6305C3/1pc.
Crank oil seal type:	left/Q'ty	SW-20-40-10/1pc.
	center/Q'ty	Labyrinth seal/1pc.
	right/Q'ty	SW-40-62-10/1pc.
Clutch:		
Clutch type		Wet, multiple disc type
Clutch generating mechanism		Inner push type, screw push system

Items	RD400F
Primary reduction ratio and method	66/23 (2.870)/Helical gear
Primary reduction gear back lash	150 ~ 152 71 → 79 ~ 81, 72 → 78 ~ 80 73 → 77 ~ 79, 74 → 76 ~ 78 75 → 75 ~ 77
Primary drive gear back lash number	75 ~ 81
Primary driven gear back lash number	71 ~ 75
Friction plate: Thickness/Q'ty	3 mm (0.12 in)/7 pcs
Wear limit	2.7 mm (0.11 in)
Clutch plate: Thickness/Q'ty	1.2 mm (0.05 in)/6 pcs.
Warp limit	0.3 mm (0.012 in)
Clutch spring: Free length/Q'ty	36.4 mm (1.43 in)/6 pcs.
Minimum length	35.4 mm (1.39 in)
Clutch housing axial play	0.07 ~ 0.14 mm (0.003 ~ 0.006 in)
Push rod bending limit	0.2 mm (0.008 in)
Oil seal type: Push lever axle	SDO-8.8-22-6
Tightening torque:	
Primary drive gear securing nut (M161.0)	6.5 m-kg (47.0 ft-lb)
Clutch boss securing nut (M18 P1.0)	6.5 m-kg (47.0 ft-lb)
Clutch spring screw (M6 P1.0)	0.9 m-kg (6.5 ft-lb)
Transmission:	
Type	Constant mesh, 6-speed forward
Gear ratio: 1st, teeth (ratio)	36/14 (2.571)
2nd	32/18 (1.778)
3rd	29/22 (1.318)
4th	26/24 (1.083)
5th	25/26 (0.962)
6th	24/27 (0.889)
Transmission gear oil: Type	SAE 10W/30 type "SE" motor oil or "GL" gear oil
Capacity	Oil change: 1.5 lit (1.6 US qt) Total: 1.7 lit (1.8 US qt)
Bearing type: Main axle: Left	Needle bearing (ø20-ø30-15)
Right	5205
Drive axle: Left	6305N
Right	Needle bearing (ø20-ø33-15)
Oil seal type: Drive axle	SD-35-62-6
Secondary reduction ratio and method	37/17 (2.176)/chain
Tightening torque:	
Drive sprocket securing nut (M18 P1.0)	6.5 m-kg (47.0 ft-lb)
Shifting mechanism:	
Type	Cam drum, return type
Oil seal type: Change lever	S-12-22-5
Tightening torque:	
Change pedal securing bolt (M6 P1.0)	1.1 m-kg (8.0 ft-lb)
Kick starter:	
Type	Ratchet type
Oil seal type	SO-20-35-4.5
Kick clip friction torque	0.8 ~ 1.3 kg (1.8 ~ 2.9 lb)
Tightening torque:	
Kick crank securing bolt (M8 P1.25)	2.3 m-kg (16.5 ft-lb)
Crankcase:	
Tightening torque: (M8 P1.25)	2.5 m-kg (18.0 ft-lb)
(M6 P1.0)	1.0 m-kg (7.2 ft-lb)

Items	RD400F
Intake:	
Air cleaner: Type/Q'ty	Dry foam rubber/1 pc.
Induction system	Torque induction system
Reed valve:	
Type	"V" type
Bending limit	$0.9^{+0.2}_{-0.3}$ mm ($0.035^{+0.008}_{-0.012}$ in) or less
Valve lift	9.2 ± 0.4 mm (0.362 ± 0.016 in)
Tightening torque (M3 P0.5)	0.09 m-kg (0.65 ft-lb)
Carburetor:	
Type and manufacturer/Q'ty	VM28SS/MIKUNI/2 pcs.
I.D. mark	2V000
Main jet (M.J.)	#140
Air jet (A.J.)	0.6
Jet needle: Clip position (J.N.)	5FN29-3
Needle jet (N.J.)	0-0
Cutaway (C.A.)	4.0
Pilot jet (P.J.)	#30
Pilot air screw (Turns out) (A.S.)	Preset
Starter jet (G.S.)	#40
Float height (F.H.)	21 ± 1 mm (0.83 ± 0.04 in)
Idling engine speed	1,300 ~ 1,400 r/min
Lubrication:	
Autolube pump:	
Color code	Sky blue
Minimum stroke	0.20 ~ 0.25 mm (0.008 ~ 0.010 in)
Maximum stroke	2.05 ~ 2.27 mm (0.081 ~ 0.089 in)
Reduction ratio	21/23 × 55/1 = 50.217
Minimum output/200 cycles	0.50 cc (0.017 oz)
Maximum output/200 cycles	5.53 cc (0.19 oz)
Throttle position (Adjusting mark)	At full opened (▬)
Oil tank capacity	1.6 lit (1.7 US qt)
Oil grade	2-stroke engine oil

C. Chassis

Items	RD400F
Frame:	
Frame design	Double cradle type, high tensile tube frame
Tightening torque:	
Engine mounting bolt (M8 P1.25)	1.8 m-kg (13.0 ft-lb)
Engine mounting bolt (M10 P1.25)	3.0 m-kg (21.5 ft-lb)
Steering system:	
Caster	27.5°
Trail	109 mm (4.29 in)
Number and size of balls in steering head:	
Upper race	19 pcs., 1/4 in
Lower race	19 pcs., 1/4 in
Tightening torque:	
Steering shaft fitting nut (M16 P1.5)	8.0 m-kg (58.0 ft-lb)
Stem pinch bolt (M8 P1.25)	1.8 m-kg (13.0 ft-lb)
Handlebar mounting bolt (M8 P1.25)	1.8 m-kg (13.0 ft-lb)

Items	RD400F
Front suspension:	
Type	Telescopic fork
Damper type	Oil damper, coil spring
Front fork travel	140 mm (5.51 in)
Front fork spring:	
Free length	444.5 mm (17.50 in)
Wire diameter × winding diameter	4.0 × 22.5 mm (0.16 × 0.89 in)
Spring constant:	
0 ~ 100 mm (0 ~ 3.94 in)	K_1 = 0.38 kg/mm (21.3 lb/in)
100 ~ 140 mm (3.94 ~ 5.51 in)	K_2 = 0.762 kg/mm (42.7 lb/in)
Inner tube outside diameter	35 mm (1.38 in)
Oil seal type	SD35-48-10.5
Front for oil: Capacity	163.5 ± 4
Type	Yamaha Fork Oil 10wt or equivalent
Fork oil level (below top of the fork)	420 ± 10 mm (16.54 ± 0.39 in)
Tightening torque:	
Front fork cap bolt (M16 P1.5)	2.5 m-kg (18.0 ft-lb)
Under bracket and inner tube (M12 P1.25)	4.0 m-kg (29.0 ft-lb)
Handle crown and inner tube (M8 P1.25)	1.8 m-kg (13.0 ft-lb)
Rear suspension:	
Type	Swing arm
Damper type	Oil damper, coil spring
Rear shock absorber: Travel	80 mm (3.15 in)
Set length	322 mm (12.68 in)
Rear shock absorber spring:	
Set length	198 mm (7.80 in)
Free length	219 mm (8.62 in)
Wire diameter × winding diameter	65 × 53.5 mm (0.26 × 2.11 in)
Spring constant:	
0 ~ 46 mm (0 ~ 1.81 in)	K_1 = 1.5 kg/mm (84.0 lb/in)
46 ~ 80 mm (1.81 ~ 3.15 in)	K_2 = 2.175 kg/mm (121.8 lb/in)
Swing arm free play (limit)	1 mm (0.04 in)
Pivot shaft: Outside diameter	16 mm (0.63 in)
Tightening torque:	
Rear shock absorber, upper (M10 P1.25)	3.0 m-kg (21.5 ft-lb)
Rear shock absorber, under (M10 P1.25)	3.0 m-kg (21.5 ft-lb)
Pivot shaft (M14 P1.5)	6.5 m-kg (47.0 ft-lb)
Fuel tank:	
Capacity	16.5 lit (4.4 US gal)
Fuel grade	Regular gasoline
Wheel:	
Type: Front	Aluminum cast wheel
Rear	Aluminum cast wheel
Tire size: Front	3.25S18-4PR
Rear	3.50S18-4PR
Tire pressure (Normal riding): Front	1.8 kg/cm² (26 psi)
Rear	2.0 kg/cm² (28 psi)
Rim size: Front	1.85-18
Rear	2.15-18
Rim runout limit (front/rear): Vertical	2 mm (0.08 in)
Lateral	2 mm (0.08 in)
Bearing type:	
Front wheel: Left	6302 ZZ
Right	6302 ZZ

Items	RD400F
Rear wheel: Left	6304 Z
Right	6303 ZZ
Oil seal type:	
Front wheel, Left	SDD45-56-6
Right	SD22-42-7
Rear wheel, Left	SD27-52-5
Right	SD28-47-7
Secondary drive chain:	
Type	DID50DS
Number of links	95L + Joint
Chain pitch	15.875 mm (0.625 in)
Chain free play	30 mm (1.2 in)
Tightening torque:	
Front wheel axle (M14 P1.5)	11.0 m-kg (79.5 ft-lb)
Front axle holder (M8 P1.25)	1.0 m-kg (7.2 ft-lb)
Rear wheel axle (M14 P1.5)	11.0 m-kg (79.5 ft-lb)
Brake:	
Disc brake (front/rear):	
Type	Hydraulic disc type
Disc size (outside dia. × thickness)	267 × 5 mm (10.5 × 0.20 in)
Disc wear limit	4.5 mm (0.18 in)
Disc pad size	11.0 mm (0.43 in)
Pad wear limit	6.5 mm (0.26 in)
Master cylinder inside dia.	15.87 mm (0.62 in)
Caliper cylinder inside dia.	42.85 mm (1.69 in)
Brake fluid type	DOT #3
Tightening torque	
Brake disc and hub (front/rear) (M8 P1.25)	2.0 m-kg (14.5 ft-lb)
Caliper bracket and front fork (M10 P1.25)	3.5-kg (25.5 ft-lg)
Caliper and caliper bracket (front/rear) (M8 P1.25)	2.5 m-kg (18.0 ft-lb)
Caliper and brake hose (front/rear) (M10 P1.25)	2.5 m-kg (18.0 ft-lb)
Master cylinder and brake hose (front and rear) (M10 P1.25)	2.5 m-kg (18.0 ft-lb)
Caliper and bleed screw (front/rear) (M8 P1.25)	0.6 m-kg (4.3 ft-lb)

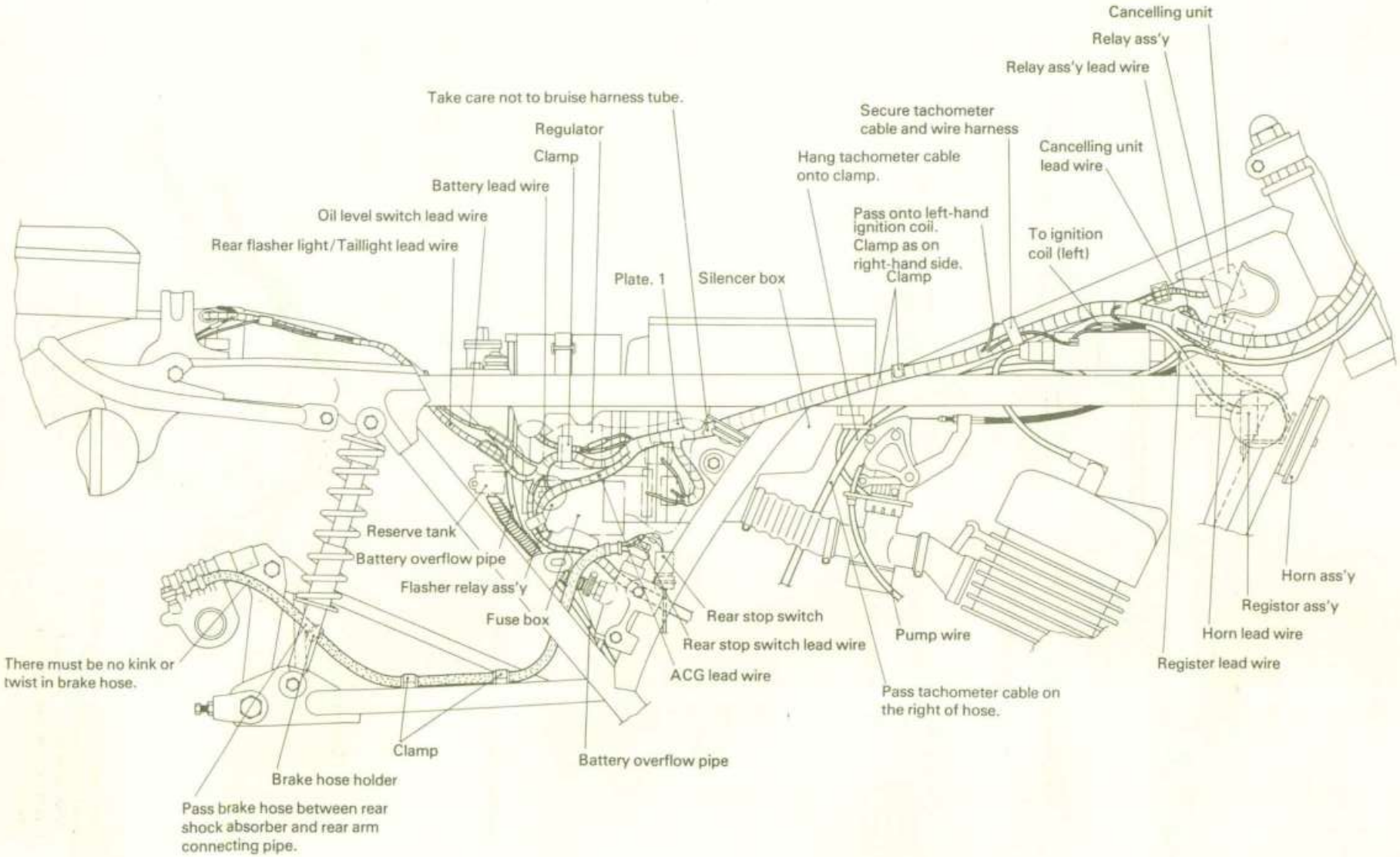
D. Electrical

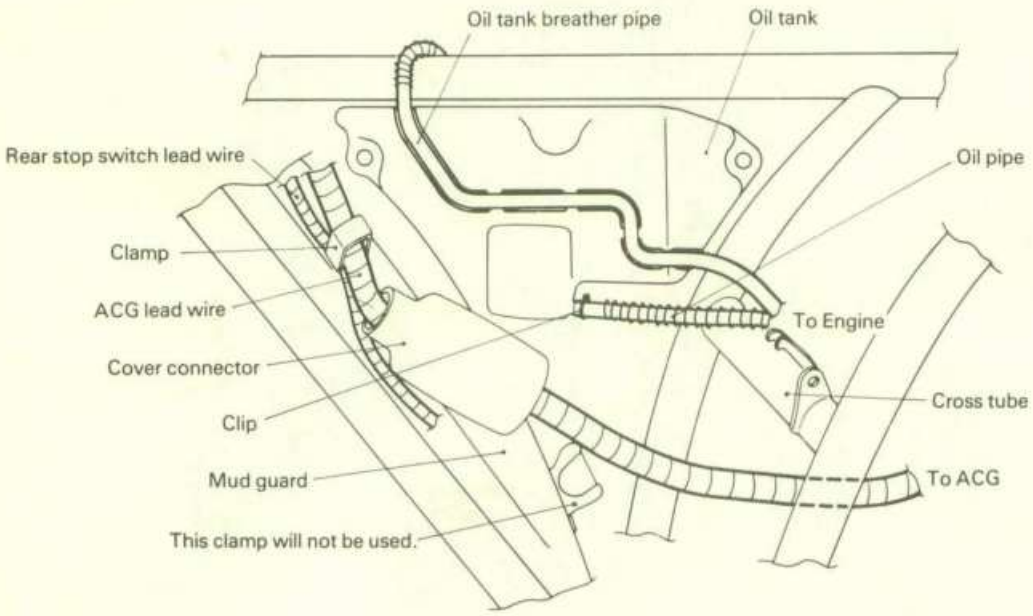
Items	RD400F
Voltage	12V
Ignition system:	Battery ignition
Model/Manufacturer	AZ2015Y16/MITSUBISHI
Voltage	12V
Rotor Coil Thread Size	M10 P1.25
Tightening Torque (Rotor)	2 m-kg (14.5 ft-lb)
Tightening Torque (Stater)	0.9 m-kg (6.5 ft-lb)
Ignition Timing	20° B.T.D.C. @idle (2.4 ± 0.15 mm, 0.0945 ± 0.0059 in B.T.D.C.)
Ignition Coil:	
Model/Manufacturer	CM11-53/HITACHI
Spark Gap	6 mm or more/500 r/min

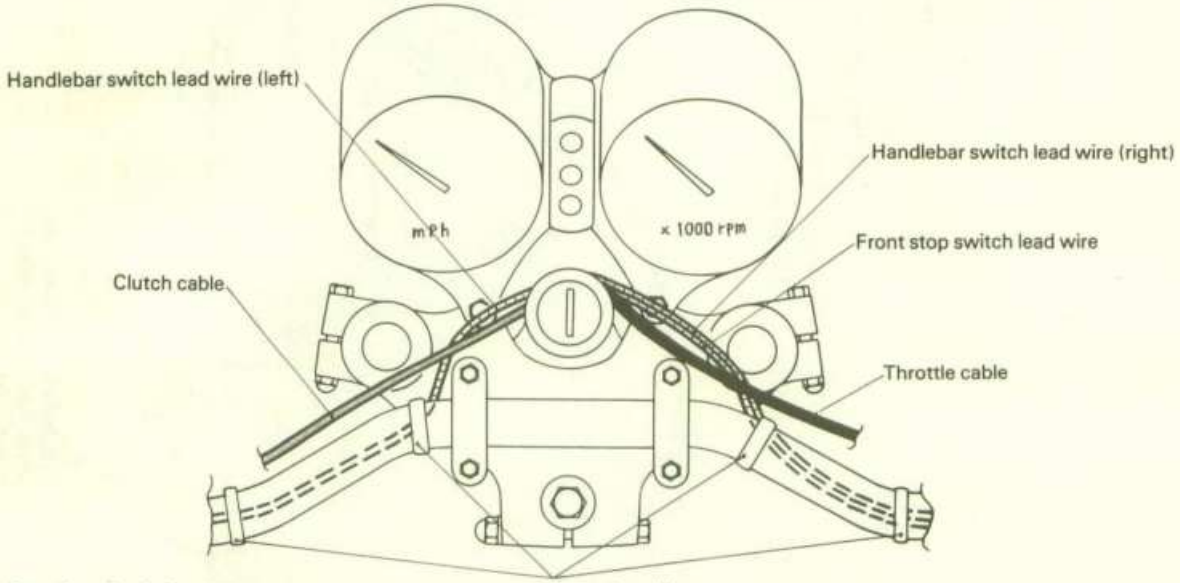
Items	RD400F
Primary Winding Resistance	1.4Ω ± 10%/20°C
Secondary Winding Resistance	~~6.6Ω~~ 6.6kΩ ± 20%/20°C
Spark Plug:	
Type/Quantity	NGK B 8ES 2 pcs.
Spark Plug Gap	0.6 ~ 0.8 mm (0.024 ~ 0.031 in)
Resistor:	
Resistance	1.9Ω ± 10%/20°C
Contact Breaker:	
Manufacture/Quantity	MITSUBISHI/2 pcs.
Point Gap	0.30 ~ 0.40 mm (0.012 ~ 0.016 in)
Point Spring Pressure	700 ± 50 g
Condenser:	
Capacity	0.22μF
Insulation Resistance	5MΩ (500V megger used)
Q'ty	2 pcs.
Charging system	
AC Generator:	
Charing Output	14V 20A or more/5,000 r/min
Rotor Coil Resistance (Filed coil)	5.5Ω ± 15%/20°C
Stator coil Resistance (Armature coil)	0.23Ω ± 10%/20°C
Brush Size/Q'ty	11 mm (0.43 in)/2 pcs.
Brush Wear Limit	6 mm (0.24 in)
Brush Spring Pressure	540 g ± 15%
Rectifier:	
Type	Full wave
Model	SH235-12B
Capacity	15A
Withstand Voltage	200V
Regulator:	
Type	I.C. regulator
Regulating Voltage	14.5 ± 0.5V
Battery:	
Model/Manufacture	12N5.5A-3B/FURUKAWA or YUASA
Capacity	12V, 5.5A
Charging Rate	0.55A 10 hours
Specific Gravity	1.28/20°C
Lighting system:	
Head Light	12V, 50W/35W
Tail/brake Light	12V, 3CP/32CP (8W/27W) × 2
Flasher Light	12V, 32CP (27W) × 4
Pilot Lights: Flasher	12V, 3.4W
High beam	12V, 3.4W
Neutral	12V, 3.4W
Oil warning	12V, 3.4W
Meter Light	12V, 3.4W × 4

Items	RD400F
Horn:	
Model/ Manufacturer	CF3-12/ NIKKO
Maximum Amperage	2.5A
Flasher Relay:	
Type	Condenser type
Model/ Manufacturer	FN25C/ NIPPON DENSO
Flasher frequency	85 cycl/ min.
Capacity	27W × 2 + 3.4W
Flasher Canceling Unit:	
Model	EVH-AC518
Voltage	DC 9V ~ 16V
Fuse:	
Rating/ Q'ty	MAIN (Red) 20A HEAD. L (Red/ Yellow) 10A SIGNAL (Brown) 10A IGNITION (Red/ White) 10A
Miscellaneous	
Oil Level Switch:	
Manufacturer	STANLEY
Stroke	82 mm (3.23 in)

CABLE ROUTING

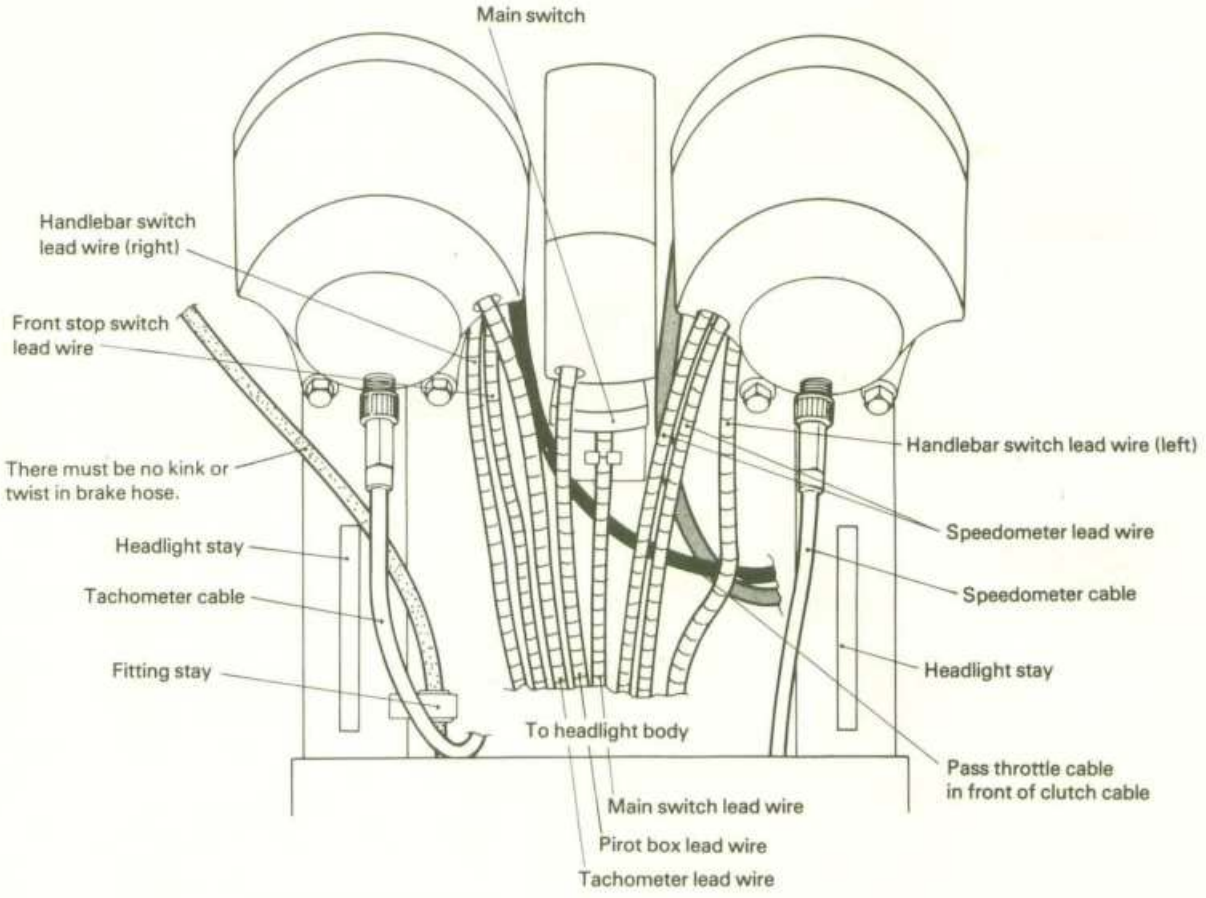


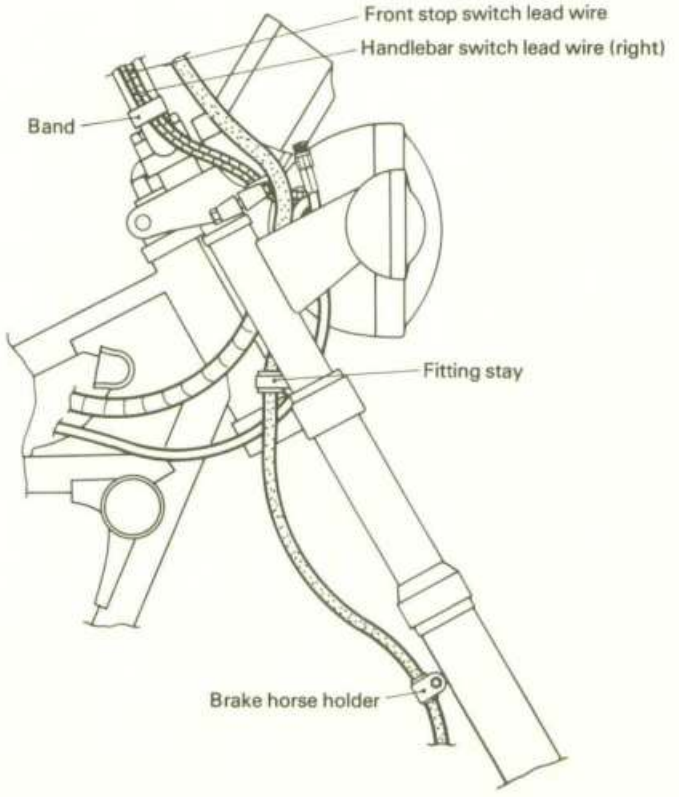


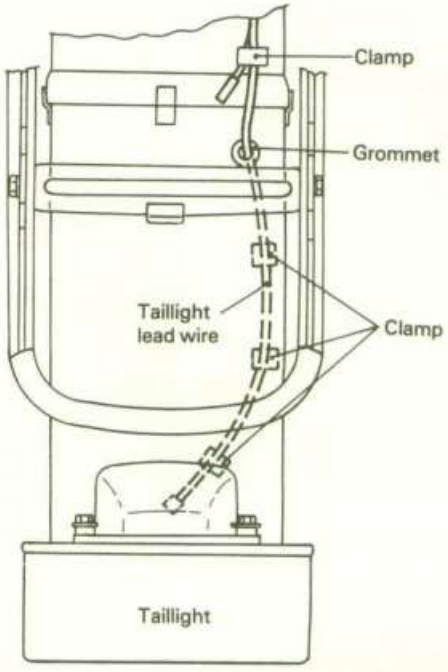


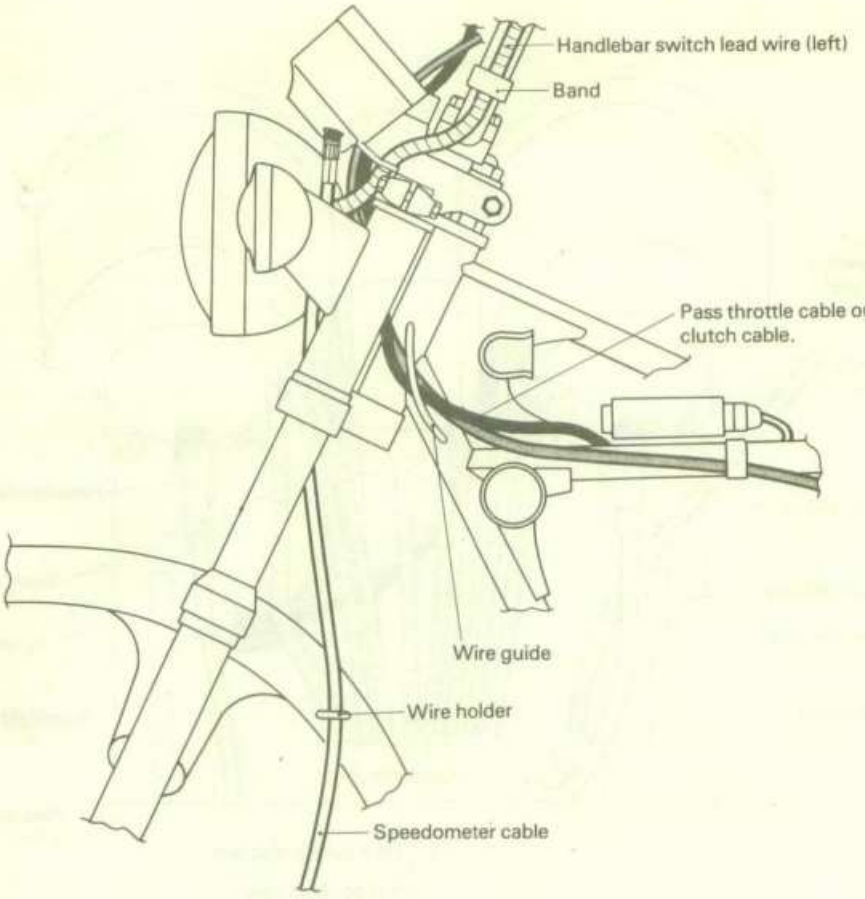
Pass these lead wires between handle crown and meter bracket. These wires must not be slack. Any slack must be stored under meters.

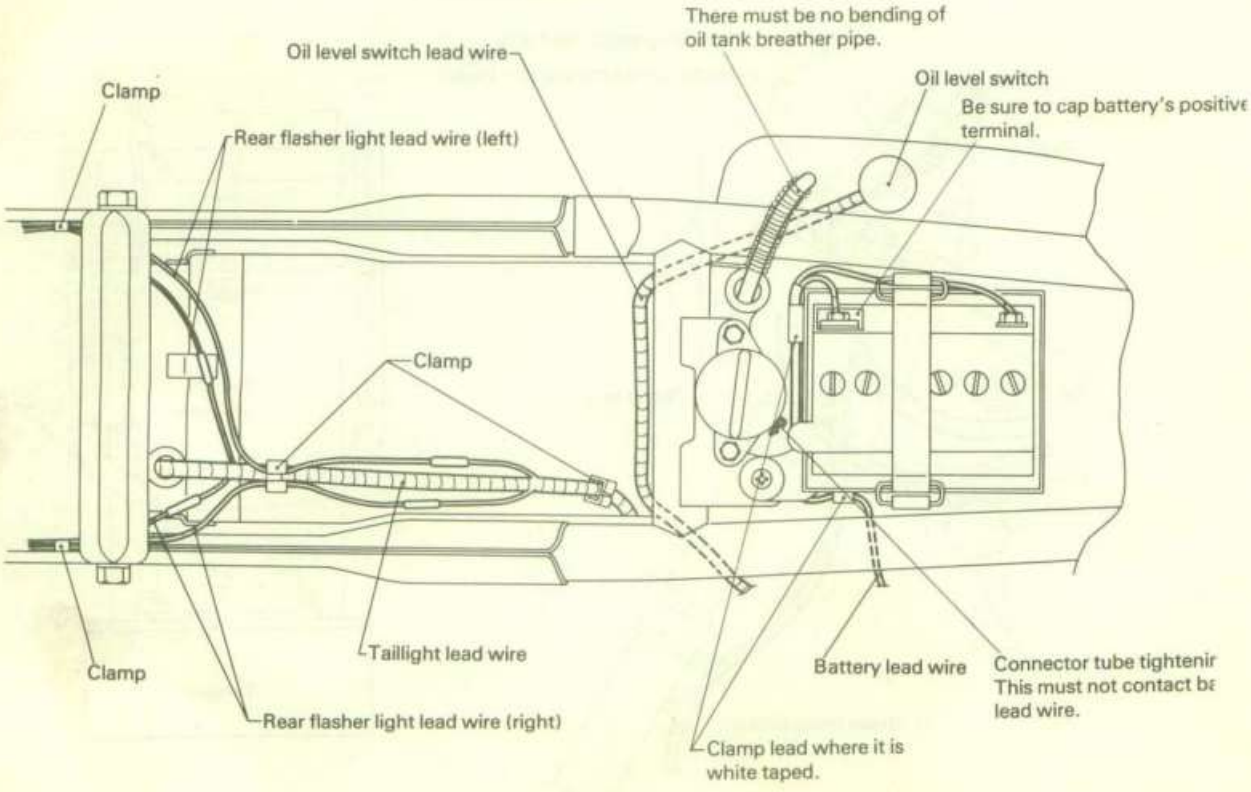
Secure handlebar switch lead wires to handlebar at four places using band


Main switch
Handlebar switch lead wire (right)
Front stop switch lead wire
There must be no kink or twist in brake hose.
Headlight stay
Tachometer cable
Fitting stay
Handlebar switch lead wire (left)
Speedometer lead wire
Speedometer cable
Headlight stay
To headlight body
Pass throttle cable in front of clutch cable
Main switch lead wire
Pirot box lead wire
Tachometer lead wire


Front stop switch lead wire
Handlebar switch lead wire (right)
Band
Fitting stay
Brake horse holder

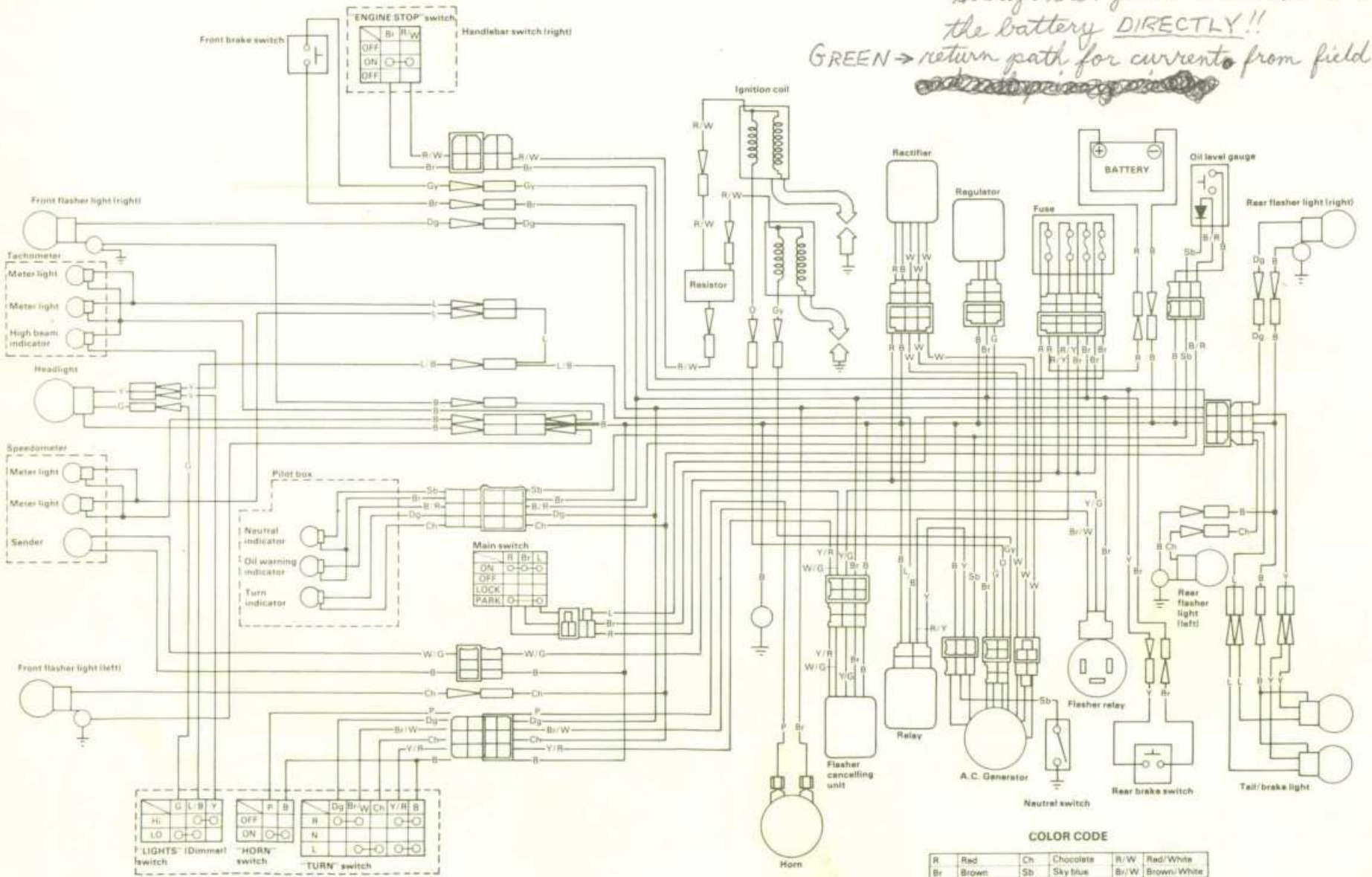

Clamp
Grommet
Taillight lead wire
Clamp
Taillight


Handlebar switch lead wire (left)
Band
Pass throttle cable outside of clutch cable.
Wire guide
Wire holder
Speedometer cable


There must be no bending of oil tank breather pipe.
Oil level switch lead wire
Oil level switch
Be sure to cap battery's positive terminal.
Clamp
Rear flasher light lead wire (left)
Clamp
Clamp
Taillight lead wire
Battery lead wire
Connector tube tightenir
This must not contact be
lead wire.
Rear flasher light lead wire (right)
Clamp lead where it is white taped.

REGULATOR WIRES
Black → ⏚ : chassis or gnd
Brown → +14V for field windings ← connected through the ignition switch to ⊕ side of the battery DIRECTLY!!
GREEN → return path for current from field windings

WIRING DIAGRAM



COLOR CODE

R	Red	Ch	Chocolate	R/W	Red/White
Br	Brown	Sb	Sky blue	Br/W	Brown/White
L	Blue	O	Orange	Y/G	Yellow/Green
Dg	Dark green	Gy	Grey	W/R	White/Red
B	Black	W	White	Y/R	Yellow/Red
P	Pink	R/Y	Red/Yellow	L/B	Blue/Black
Y	Yellow	B/R	Black/Red		
G	Green	W/G	White/Green		