CHAPTER 2.
PERIODIC INSPECTION AND ADJUSTMENT

2

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.PERIODIC MAINTENANCE

Periodic inspection, adjustment and lubrication will keep your motorcycle in the safest and most efficient condition. Safety is an obligation of the motorcycle owner.

Unit: km (mi)

Item	Remarks	initial				Thereafter every		
		400 (250)	800 (500)	1,600 (1,000)	3,200 (2.000)	1,600 (1,000)	3,200 (2.000)	6,400 (4,000)
Cylinder	Check compression				○			○
Valves	Check/Adjust valve clearance			○	○			○
Cam chain	Check/Adjust chain tension		○					○
Spark pluqs	inspect/Clean or replace as required	○			○		○	
Air filter	Dry type — Clean/Replace as required			○		○		
Carburetor	Check operation/Adjust as required		○		○		○	
Brake system (complete)	Check/Adjust as required — Repair as required		0	0		○		
Clutch	/Adjust free play		io		○		○	
Wheel and tires	Check pressure/Wear/Balance	0	○	○		○		
Fuel petcocks	Clean/Flush tank as required	0		○			○	
Battery	Top-up/Check specific gravity and breather pipe	0	○	0	○	○		
Ignition timing	Adjust/Clean or replace parts as required		○	○	○		○	
Lights/Signals	Check operation/Replace as required	0	0	0	○	○		
Fittings/Fasteners	Tighten before each trip and/or	○	○	○	○	○		
Generator brushes	Check brush wear/Replace if necessary							○

B. LUBRICATION INTERVALS

Unit: Km (mi)

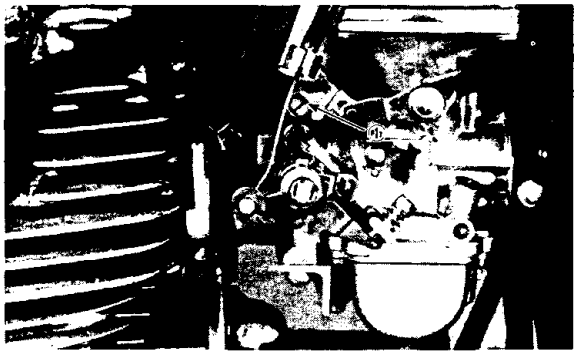
Item	Remarks	Type	Initial				Thereafter every		
			400 (250)	800 (500)	1,600 (1,000)	3,200 (2,000)	1,600 (1,000)	3,200 (2,000)	6,400 (4,000)
Engine/Transmission oil	Replace/Warm engine before draining	YAMALUBE 4-cycle oil or SAE 20W/40 "SE" motor oil	○			○		○	
Drive chain	Lube/Adjust as required	Yamaha chain and cable lube or SAE 10W/30 motor Oil	every 400 (250)						
	Remove/Clean/Lube				○		○		
Brake pedal shaft/Change pedal shaft	Light application	Yamaha chain and cable lube or SAE 10W/30 motor oil			○		○		
Control/Meter cables	Apply thoroughly	Yamaha chain and cable lube or SAE 10W/30 motor oil			○	○		○	
Throttle grip/Housing	Apply lightly	Lithium base grease				○		○	
Hydraulic brake fluid reserve	Use new fluid only	DOT No. 3 Brake fluid	check	check	check	check	check		
Oil filter element	Clean/Replace as required	–	○			○		○	
Front forks	Drain completely – Check specifications	Yamaha Fork Oil 10 wt.				○			○
Steering bearings	Inspect thoroughly Yearly or ...	Medium-weight wheel bearing grease							12,800 (8,000)
Speedometer gear housing	Inspect thoroughly/Pack moderately	Lithium base grease							12,800 (8,000)
Rear arm pivot shafts	Apply grease fully	Medium-weight wheel bearing grease				○			○
Wheel bearings	Do not over/Yearly or . . .	Medium-weight wheel bearing grease							12,800 (8,000)
Point cam lubrication wicks	Apply very lightly	Light-weight machine oil		0	0	0		0	

2-3. ENGINE

A. Carburetor

1. Idle mixture

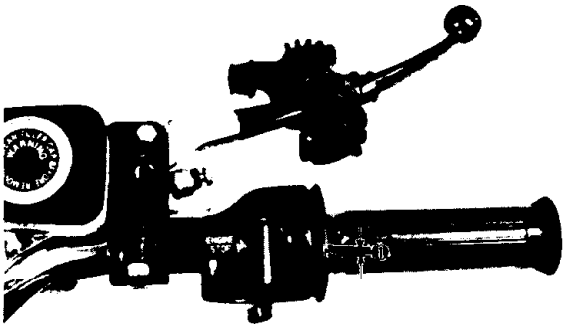
The idle mixture is set at the factory by the use of special equipment. No attempt should be made to change this adjustment by the dealer.



1. Do not adjust

2. Throttle

Turn the throttle grip to see if it operates properly and if the play is normal. Make certain the throttle snaps closed when released.



1.5 ~ 8 mm (0.2 ~ 0.3 in)

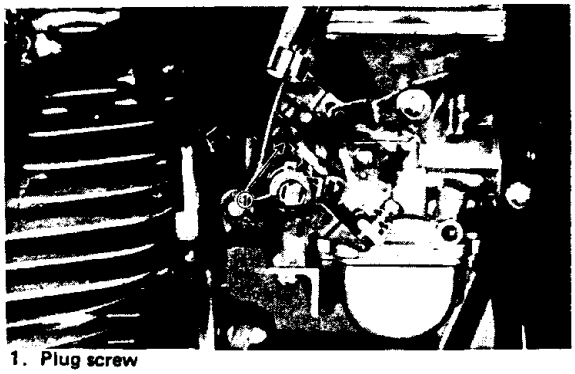
3. Synchronization

NOTE:

Ignition timing and valve clearances must be set properly before synchronizing carburetors.

Procedure:

a. Turn fuel petcocks to "PRIME", and remove the plug screws for the adapter attachment holes in the carburetor body.



1. Plug screw

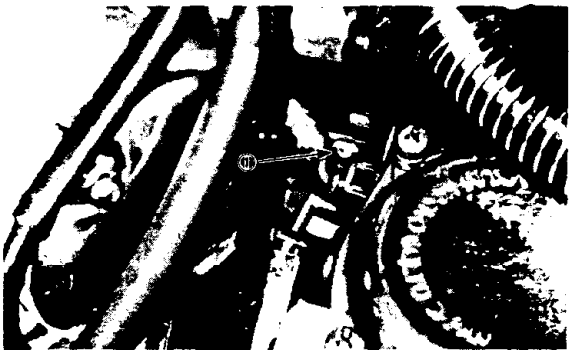
b. Install the attachment and set the vacuum gauge.

c. Start motorcycle and allow it to warm up for 2 ~ 3 minutes. The warm-up is complete when engine responds normally to throttle opening.

d. Adjust damping valve on each vacuum gauge until the needle flutters only slightly. The gauge needles must respond quickly to rapid opening of the throttle.

e. Both gauge will indicate the same reading if the carburetors are synchronized.

f. Turn the synchronizing screw until the gauge readings are the same.



1. Synchronizing screw

g. After adjustment, firmly tighten the plug screws.

NOTE:

Check gasket. Replace if damaged.

4. Idle speed adjustment.

NOTE:

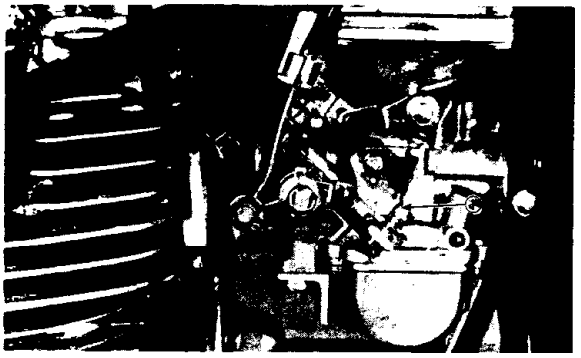
Carburetors must be synchronized before setting final idle speed.

a. Start the engine and warm it up for a few minutes.

b. Set the engine idle speed to specified rpm 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.

Standard idle rpm:
1,200 rpm

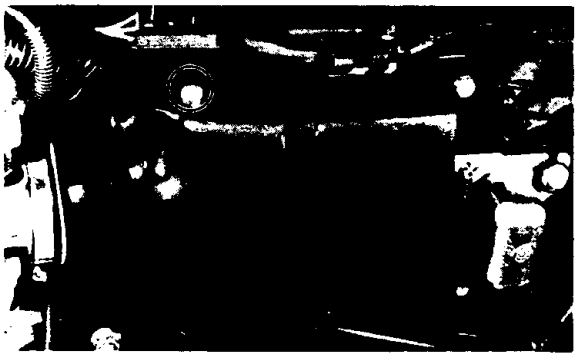


1 .Throttle stop screw

B. Air filters

This model uses a cartridge type air filter element which consists of foam rubber.

1. Removal
   a. Remove the air filter cover by removing the bolts.
   b. Pull out the springs and elements.



2. Cleaning method
   a. Tap the element lightly to remove most of the dust and dirt; then blow out the remaining dirt with compressed air through the inner surface of the element. If element is damaged, replace.

   b. Reassemble by reversing the removal procedure. Check whether the element is seated completely against the case.
   c. The air filter element should be cleaned once a month or every 1,600 km(l,000 mi.). It should be cleaned more often if the machine is operated in extremely dusty areas.

CAUTION:

The engine should never be run without the air cleaner element installed. Excessive oil contamination and engine wear may result.

C. Engine/transmission oil and filter

1. Oil level measurement
   a. To check the level, warm the engine up for several minutes. Stop the engine. With the engine stopped, screw the dip stick completely out and then rest the stick in the hole.

1. Oil level dip stick

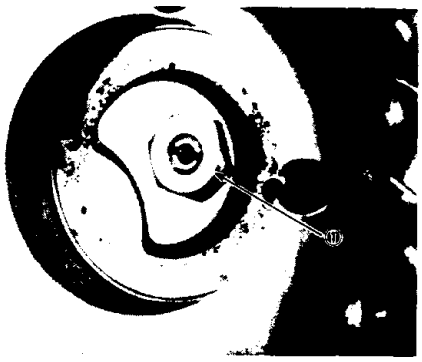
NOTE:

When checking engine oil level with the dip stick, position the machine straight up and on main stand.

   b. The dip stick has a minimum and a maximum mark. The oil level should be between the two. If the level is low, add sufficient oil to raise it to the proper level.
2. Oil replacement and filter cleaning
   a. Start the engine. Allow it to warm up for 2-3 minutes. Stop the engine.
   b. Place an oil pan under the engine.
   c. Remove the drain plugs and drain the oil.

1. drain plugs

d. Remove the filter cover and oil filter securing bolt.



1. Filter securing bolt.

e. Slip the filter element out and clean.

f. Install the filter and filter cover.

Filter torque: 1.0 m-ko (7 ft-lb)

g. Reinstall the drain plugs. (Make sure it is tight.)

Drain plug torque: 4.4 m-kg (32 ft-lb)

h. Add oil through the dip stick hole.

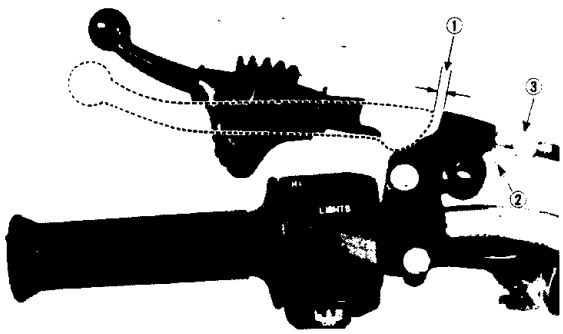
Oil quantity: 2.0 lit (2.1 qt): periodic oil change 2.5 lit (2.6 qt): engine overhauling Recommended oil: Yamalube 4-cycle oil or SAE 20W/40 type "SE" motor oil

D. Clutch adjustment

This model has a clutch cable length adjuster and a clutch mechanism adjuster. Normally, once the mechanism is properly adjusted, the only adjustment required is maintenance of free play at the clutch handle lever.

1. Free play adjustment

Loosen the handle lever adjuster lock nut. Next, turn the length adjuster either in or out until proper lever free play is achieved.



1. 2 ~ 3 mm (0.08 ~ 0.12 in)
2. Lock nut
3. Adjuster

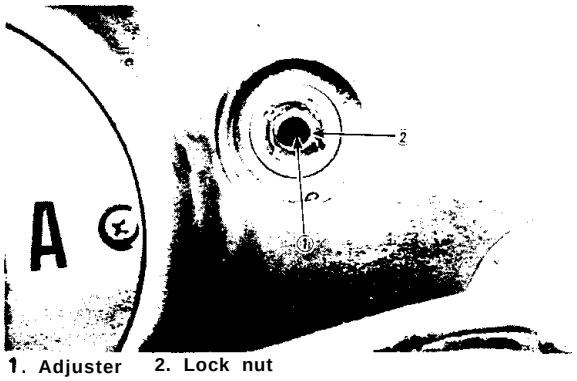
2. Mechanism adjustment

a. Screw in the cable adjuster (on the lever holder) until tight.

b. Screw in the adjuster (push screw) until it lightly seats against a clutch push rod.

c. Back the adjuster out 1/4 turn and tihgten the lock nut.

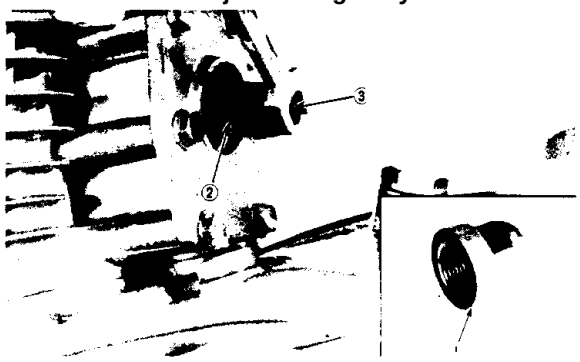
d. Adjust the free play of clutch lever by turning the cable adjuster.



1. Adjuster 2. Lock nut

E. Cam chain adjustment

The cam chain becomes stretched with use, resulting in improper valve timing and engine noise. To prevent this the cam chain tensioner must be adjusted regularly.



1. Cap nut 2. Adjuster bolt 3. Push rod

1. Remove the cap nut.
2. Turn the adjuster bolt in until the push rod (inside the adjuster bolt) is flush with the end of the adjuster bolt.

NOTE:

The push rod will not come out beyond a certain limit even if the adjuster bolt continues to be screwed in.

3. Reinstall the cap nut.

F. Valve clearance adjustment

NOTE:

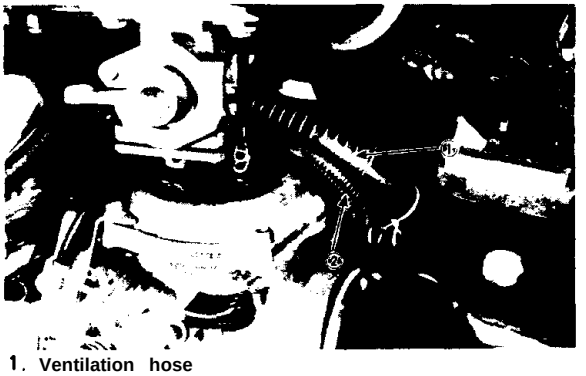
Valve clearance must be measured with the engine at room temperature.

1. Remove all four tappet covers and the generator cover.
2. Turn the crankshaft to align the rotor mark with the "T" mark on the stator.
3. This places the pistons at the top dead center and the valve clearance should be checked and adjusted at the top dead center on the compression stroke by observing when the valve adjusters have clearance.
4. Use a feeler gauge to determine the clearance.

Exhaust valve clearance (cold):
0.15 mm (0.0059 in)
Intake valve clearance (cold):
0.10 mm (0.0039 in)

5. Loosen the valve adjuster lock nut. Turn the adjuster in or out to obtain the correct clearance. Hold the adjuster to prevent it from moving and throughly tighten the lock nut.
6. Recheck the clearance after tightening.

G. Crankcase ventilation system
1. Check ventilation hose for cracks or damage.
2. Replace it if necessary.

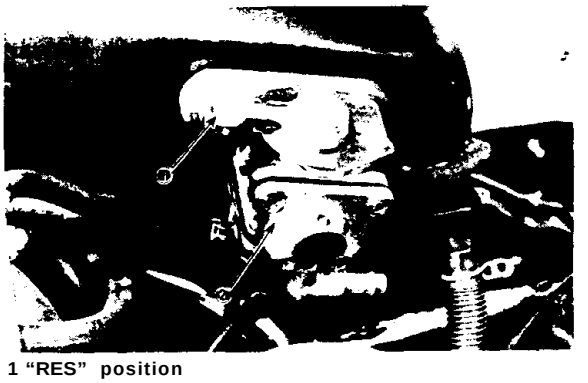


1. Ventilation hose
2. Fuel pipe

H. Exhaust system
1. Check for leakage from exhaust joints and retighten joint bolts and nuts.
2. Replace gaskets if necessary.

2-4. CHASSIS

A. Fuel petcock cleaning
1. Turn the petcock lever to the "ON" or "RES" position. Remove the fuel pipe.
2. Remove the drain cover and clean it with solvent.



1 "RES" position
2. Drain cover

B. Fuel petcock disassembly

If the fuel petcock is leaking or excessively contaminated, it should be removed from the fuel tank and inspected.

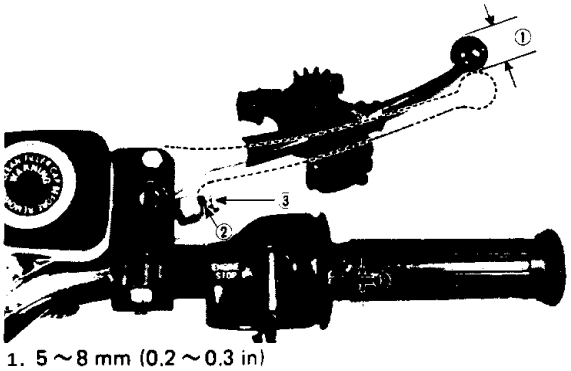
1. Remove fuel tank and position it so that fuel will not spill when the petcock is removed.
2. Remove petcock and inspect filter screen. Clean or replace filter if seriously contaminated.
3. Remove screws on front and rear of petcock and remove plate, gaskets, lever and diaphragm.
4. Inspect all components and replace any that are damaged. If the diaphragm is in any way damaged, or the petcock body gasket surfaces scratched or corroded, the petcock assembly must be replaced. If there is abrasive damage to any component, the fuel tank must be drained and flushed.
5. Reassemble petcock and install on fuel tank.

C. Fuel hose
1. Check fuel hose for cracks or damage.
2. Replace it if necessary.

D. Front brake

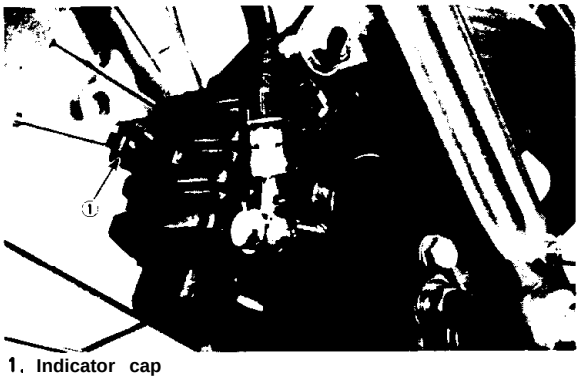
The brake can be adjusted by simplay adjusting the distance that the brake lever can travel. (The piston in the caliper moves forward as the brake pad wears out, automatically adjusting the clearance between the brake pad and the brake disc.)

1. Adjustment
   a. Turn adjuster so that a brake lever end is 5 — 8 mm (0.2 — 0.3 in) before adjuster contacts master cylinder piston.



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

2. Brake pad check



1. Indicator cap

To check, open the wear indicator cap and if any pad is worn to the red line, replace pads.

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.

Recommended brake fluid:
DOT No. 3 Brake fluid

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.

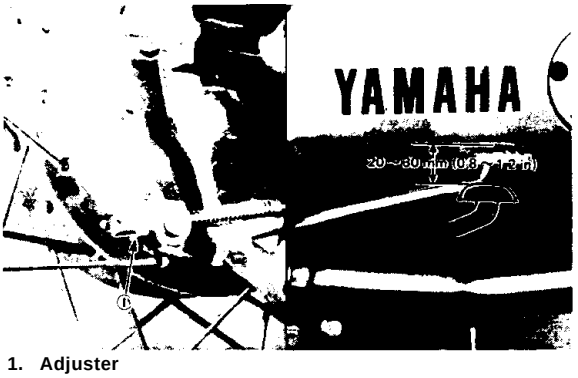
c. Be careful that water or other contamination does not enter the master cylinder when refilling. Water will significantly lower the boiling point and may result in vapor lock.

E. **Rear** brake

1. Adjust rear brake pedal play to suit, providing a minimum of 20 — 30 mm (0.8 — 1.2 in) freeplay. Turn the adjuster on the rear brake rod in or out until brake pedal free play is suitable.

NOTE:

Rear brake pedal adjustment must be checked anytime chain is adjusted or rear wheel is removed and then reinstalled.



1. Adjuster

F. Wheels and tires

1. Wheels

a. Check each spoke for tightness.

NOTE:

If loose spokes are found, tighten and repeat rim runout check.

2. Tires

a. Important notice

Proper loading of XS650E is important for the handling, braking, and other performance and safety characteristics. NEVER OVERLOAD THE **MOTORCYCLE.**

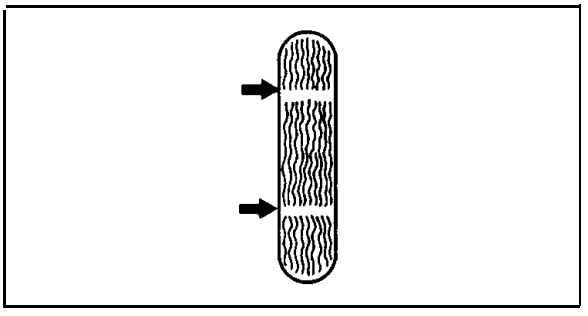
WARNING: Never overload the motorcycle beyond specified tire limits. Operation of an overloaded tire could cause tire damage, an accident and injury.

	FRONT	REAR
XS650E BASIC WEIGHT with oil and full fuel tank	104 kg(229 lb)	119 kg(262 lb)
Standard tire	Bridgestone or Yokohama 3.50H19–4PR	Bridgestone or Yokohama 4.00H18–4PR
Tire load limit	234 kg (515 lb)	280 kg (615 lb)
Cold tire pressure		
Normal riding	1.6 kg/cm² (22 psi)	2.0 kg/cm² (28 psi)
With passenger or high speed riding	2.0 kg/cm² (28 psi)	2.3 kg/cm² (32 psi)
With passenger and extra load riding	2.8 kg/cm² (40 psi)	2.8 kg/cm² (40 psi)
Minimum tire tread depth	0.8 mm (0.03 in)	0.8 mm (0.03 in)

Make sure the total weight of the motorcycle with accessories, rider(s) etc., does not exceed the tire limits.

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.

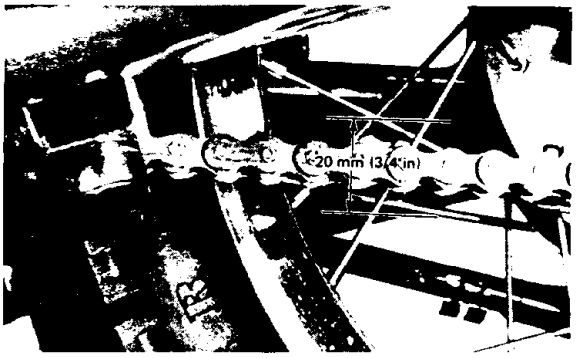


c. Check the wheel damage and check the tightness of spokes.

G. Drive chain

1. Tension check

a. Inspect the drive chain with mainstand erected. Check the tension at the position shown in the illustration. The normal vertical deflection is approximately 20 mm (3/4 in).



20 mm (3/4 in)

2. Tension adjustment

a. Loosen the rear brake adjuster.

b. Remove the cotter pin of the rear wheel axle nut.

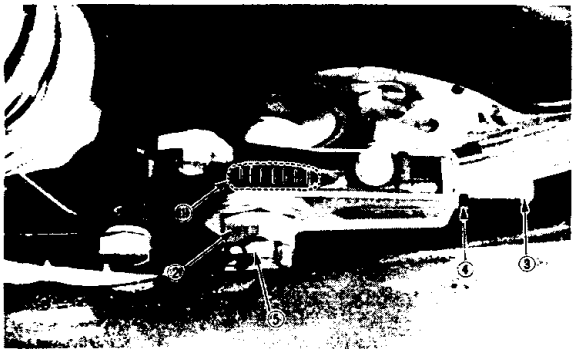
c. Loosen the rear wheel axle nut.

d. Loosen the adjuster lock nuts on each side.

e. To tighten chain turn chain puller adjuster clockwise.

Turn each bolt exactly the same amount to maintain correct axle alignment.

There are marks on each side of rear arm and on each chain puller; use them to check for proper alignment.



1. Alignment marks
2. Rear axle nut
3. Adjuster
4. Lock nut
5. Cotter pin

f. After adjusting be sure to tighten the lock nuts and the rear wheel axle nut.

g. Install a new cotter pin and bend the end over.

h. In the final step, adjust the play in the brake pedal and stoplight switch free play.

3. Lubrication

a. First, remove dirt and mud from the chain with a brush or cloth and then spray the lubricant between both rows of side plates and on all center rollers.

b. To clean the entire chain, first remove the chain from the motorcycle, dip it in solvent and clean with stiff brush. Then take the chain out of the solvent and dry it. Immediately, lubricate the chain to prevent the formation of rust.

Recommended lubricant:
YAMAHA CHAIN AND CABLE LUBE, or SAE 10W/30 type "SE" motor oil

H. Front fork oil change

1. Raise the front wheel off the floor with a suitable frame stand.
2. Loosen the fork pinch bolts.
3. Remove the rubber cap from the top of each fork.

1. Pinch bolt 2. Cap

4. Loosen the cap bolt (adjuster unit).
5. Remove drain screw from each outer tube with open container under each drain hole.

1. Drain screw

CAUTION:

Do not allow oil to contact disc brake components.

6. After most oil has drained, slowly raise and lower outer tubes to pump out re maining oil.
7. Install drain screw.

NOTE:

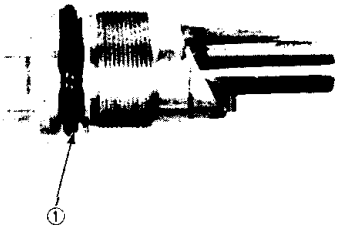
Check gasket. Replace if damaged.

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

Front fork oil:
Yamaha fork oil 10 Wt

Front fork oil capacity:
164 ~ 172 cc (5.54 ~ 5.82 oz) each side

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



1. O-ring

11. Install fork cap bolts.
12. Tighten pinch bolts.

Tightening torque:	m-kg	ft-lb
Fork cap bolt	5.0	36
Pinch bolt	1.0	7

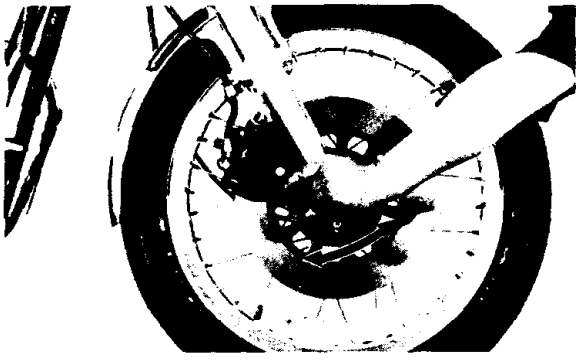
I. Steering head

1. adjustment

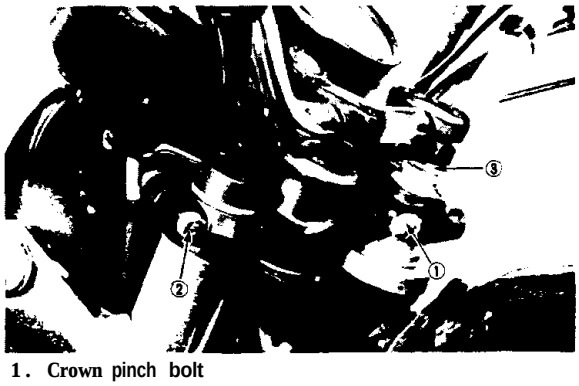
The steering assembly should be checked periodically for looseness.

Do this as follows:

a. Raise front end of machine so that there is no weight on the front wheel.
b. Grasp bottom of forks and gently rock fork assembly backward and forward, checking for looseness in the steering assembly bearings.



c. If there is looseness in the steering head, loosen the crown pinch bolt, fork pinch bolts, and steering fitting bolt.



1. Crown pinch bolt
2. Fork pinch bolt
3. Steering fitting bolt

d. Use steering nut wrench to loosen top steering fitting nut. The top nut serves as a lock nut.

e. Tighten the lower steering fitting nut until the steering head is tight, but does not bind when forks are turned.

f. Retighten the top steering fitting bolt, crown pinch bolts and fork pinch bolts, in that order.

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

2. Lubrication

Refer to PAGE 47.

J. Lubrication of cables, pivots, etc.

1. Throttle cable and grip

The throttle twist grip assembly should be greased at the time that the cable is lubricated since the grip must be removed to get at the end of the throttle cable. Two screws clamp the throttle housing to the handlebar. Once these two are removed, the end of the cable can be held high to pour in several drops of lubricant. With throttle grip disassembled, coat the inside surface of the throttle grip guide tube with a suitable all-purpose grease to cut down friction.

2. Meter cables

Pull the inner cable out and apply cable lube throughly.

Recommended lube:
Yamaha chain and cable lube or SAE 10W/30 motor oil.

3. Rear arm pivot shaft

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

Recommended lube:
Medium-weight wheel bearing grease

4. Brake and change pedal shafts, and center and side stand pivots Lubricate the shafts and pivots with Yamaha chain and cable lube or SAE 10W/30 motor oil.

5. Wheel bearings

Refer to PAGE 39.

2-5. ELECTRICAL

A. Contact breaker point adjustment

1. Remove breaker point cover.
2. Check contact breaker point gap (at largest gap) with clean feeler gauge.

Contact breaker gap:
0.3 ~ 0.4 mm (0.012 ~ 0.016 in)

If necessary, adjust by loosening securing screws and moving the adjustable contact point.

3. Tighten adjusting screws and recheck breaker point gap.

B. Contact breaker point maintenance

1. The contact breaker should be checked for the following:
   a. Wear of the bakelite cam heel
   b. Damage of contact point surfaces

c. Rust or wear on the breaker arm or arm shaft.

d. Faulty insulation of the contact braker assembly.

e Oil or dirt on the assembly.

2. To clean the points, run a point file between the points until the grey deposits and pits have been removed. Spray the points with ignition point cleaner or lacquer thinner, then snap the points shut on a white business card (or paper of hard texture) and repeatedly pull the card through until no more carbon or metal particles come off on the card. (The card may be dipped in lacquer thinner or other cleaner to facilitate this procedure.)

3. Point replacement should be necessary when the points become severely pitted, if the heel is broken or worn unevenly, or if the points become shorted or show faulty operation.

NOTE:
New points must be cleaned and adjusted.

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

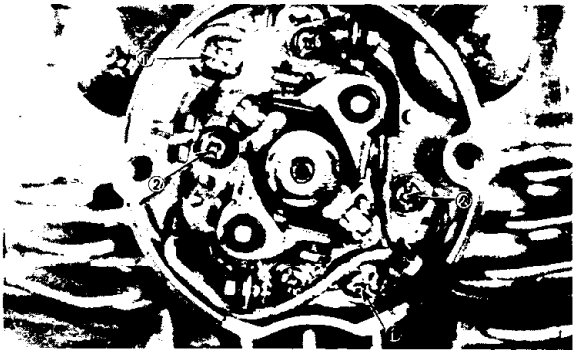
C. Ignition timing

NOTE:
Point gap must be set before setting timing.

1. Ignition timing is checked with a timing light by observing the position of the stationary marks stamped on the stator and the pointer on the generator.

1. Top dead center
2. 15° BTDC/1,200 rpm
3. Advanced mark

2. Ignition timing of right-hand cylinder must be set first. Connect timing light to right-hand spark plug lead wire.
3. Start engine.
4. The mark stamped on the rotor_ should line up with the stationary "F" timing mark. If it does not align, loosen two breaker backing plate screws and move the complete backing plate until the mark on the rotor and the "F" mark align.
5. Retighten screws. Check timing again for the right-hand cylinder.
6. Rev the engine to above 3,500 rpm. Check whether the mark on the rotor is in the vicinity of the stationary "full advance" mark.
7. Repeat procedure (steps 2-6) for another cylinder.



1. Right cylinder timing adjustment
2. Left cylinder timing adjustment

D. Carbon brushes

Visually inspect the carbon brush holder brushes for obvious breakage or wear. Standard brush length is 14.5 mm(0.571 in). Wear limit is 7.0 mm (0.276 in) and marked there.

E. 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 magnet relay lead is for the (+) terminal

and thechassis lead is for the (-) terminal. Make sure the breather pipe is properly connected, properly routed, and is not damaged or obstructed.

NOTE:

The battery must be charged before using to insure maximum performance. Failure to properly charge the battery before first use, or a low electrolyte level, will cause premature failure of the battery.

Charging current:	1.4 Amp
Charging hours:	10 hrs

F. 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

1. 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.
2. 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.
3. The spark plug must be removed and checked. Check electrode wear, insulator color, and electrode gap.

Spark plug gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 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:
Champion N-7Y or NGK BP 7ES
Tightening torque:
2.0 m-kg (14 ft-lb)

G. Headlight

1. Headlight beam adjustment.

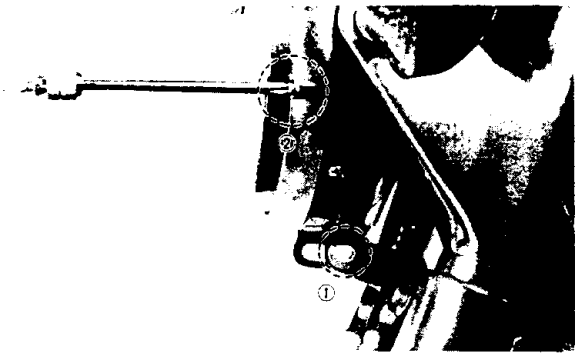
When necessary, adjust the headlight beam as follows:

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) Loosen adjusting screw and adjust vertically by moving the headlight body.
2) Retighten the screw.



1. Vertical adjustment
2. Horizontal adjustment

2. Replacing the headlight bulb.

a. Loosen bolts and replace bulb.
b. After installing, adjust headlight beam.

NOTE:

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