YAMAHA

TY250D

OWNER'S SERVICE MANUAL

LIT-11626-00-63

NOTICE

Yamaha Motor Company is confident you will enjoy your new Yamaha to the utmost. We have made every effort to provide you with a safe, well-engineered and carefully constructed product.

This Owner's Service Manual will acquaint you with several features and maintenance procedures concerning your Yamaha. However, if you are unfamiliar with the product, or the features or procedures outlined within this manual, we strongly urge you to consult your Authorized Yamaha Dealer for additional information.

TY250D OWNER'S SERVICE MANUAL

1st Edition - August 1976

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LIT-11626-00-63

FOREWORD

Yamaha's TY250D Trials is a completely new model designed solely for the rigors of Trials competition. Each unit is assembled and checked according to the same rigorous principles as our championship road racing and motocross models.

This Owner's Service Manual is included with your TY250D to provide basic information for operation and maintenance. Additional information regarding major repairs, such as crankcase disassembly, can be found within the DT250B/400B Service Manual and various other information and training manuals available from your Authorized Yamaha Dealer.

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

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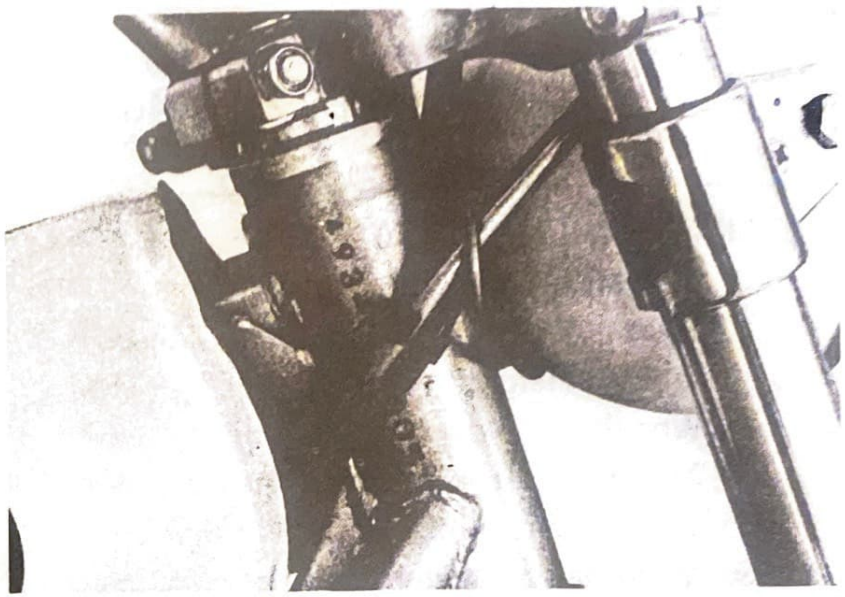
CHAPTER 1. GENERAL INFORMATION

1-1. MACHINE IDENTIFICATION

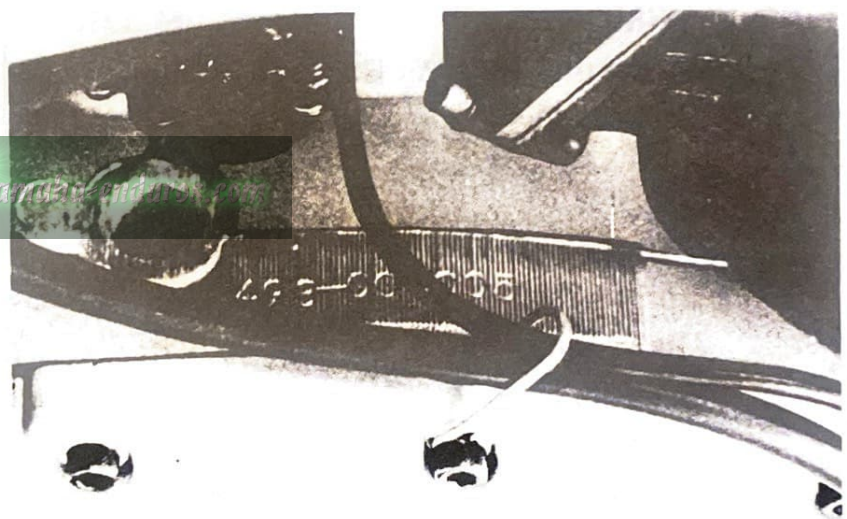
The frame serial number is located on the right-hand side of the headstock assembly. The first three digits identify the model. This number is followed by a dash. The remaining digits identify the production number of the unit.

The engine serial number is located on a raised boss at the upper rear, right-hand side of the engine. Engine identification follows the same code as frame identification.

Normally, both serial numbers are identical; however, on occasion they may be two or three numbers off.



Frame serial number



Engine serial number

NOTE:

Always check your registration papers against the actual machine serial numbers. If any discrepancy is found, have it corrected immediately.

1-2. GENERAL SPECIFICATIONS

These specifications are for general use. For a more complete list refer to Maintenance Specifications and/or the DT250B/400B Service Manual.

DIMENSIONS/WEIGHTS		
Overall Length	1,985 mm	(78.1 in)
Overall Width	835 mm	(32.9 in)
Overall Height	1,110 mm	(43.7 in)
Wheelbase	1,295 mm	(51.0 in)
Minimum Ground Clearance	280 mm	(11.0 in)
Seat Height (Unloaded)	760 mm	(29.9 in)
Machine Net Weight	93 kg	(205 lbs)
PERFORMANCE		
Minimum Turning Radius	1,600 mm	(63.0 in)
Braking Distance	15 m @50 km/h	(49.2 ft @31 mph)
ENGINE		
Type	2-stroke, Gasoline, "Torque Induction"	
Bore x Stroke	70 x 64 mm	(2.756 x 2.520 in)
Displacement	246 cc	(15.01 cu.in)
Starting System	Primary Kick	
Lubricating System	Separate Lubrication (Yamaha Autolube)	

CARBURETION		
Manufacturer/Type		MIKUNI/VM26SS
Idle r.p.m.		1,050 – 1,150 r.p.m.
Main Jet		#150
Needle Jet		N-8
Jet Needle #/Clip Position		4L6–3
Air Jet		2.5
Air Screw (Turns Out)		Trial riding: 2.0 Enduro riding: 1.0
Cut Away		3.0
Air Cleaner Type		Wet, Oiled Foam Rubber
CLUTCH		
Type		Wet, Multiple-disk
Primary Drive System		Helical Gear
Primary Drive Ratio		68/20 (3.400)
TRANSMISSION		
Type		Constant Mesh, 5-speed Forward
Reduction Ratio	1st.	38/14 (2.714)
	2nd.	35/17 (2.058)
	3rd.	32/21 (1.523)
	4th.	27/26 (1.038)
	5th.	21/32 (0.656)

ELECTRICAL	
Ignition Type/Timing	Magneto 3.1 ± 0.15 mm B.T.D.C.
Spark Plug/Mfr./Type/Gap	NGK B-7ES 0.5 – 0.6 mm
Headlight Rating	6V 35W/35W
Taillight/Stop Light Rating	6V 5.3W/17W
CHASSIS	
Frame Type	Tubular steel
Front Suspension/Type	Telescopic Forks
Rear Suspension/Type	Swinging Arm
Caster/Trail	26°30'/88 mm (3.46 in)
Front Tire/Size/Tread Type	2.75-21-4PR Trials Universal
Nominal Pressure	0.9 kg/cm^2 (13 Psi)
Rear Tire/Size/Tread Type	4.00-18-4PR Trials Universal
Nominal Pressure	1.1 kg/cm^2 (16 Psi)
Front Brake Type/Actuating Method	Internal Expansion, Right Hand Operation
Rear Brake Type/Actuating Method	Internal Expansion, Right Foot Operation

VOLUMES/TYPE FLUID		
Gasoline Tank/Type	5.0 lit. (1.3 gal)	Low-Lead Gasoline
Oil Tank/Type	0.35 lit. (0.37qt.)	YAMALUBE 2 cycle oil or SAE 10W/30 type "SE" motor oil
Transmission/Type	1,000 cc (1qt.)	YAMALUBE 4 cycle oil or SAE 10W/30 type "SE" motor oil
Front Fork (Each)/Type	162 cc	YAMAHA FORK OIL 20wt.

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 to the owner. Information regarding changes is forwarded to all Authorized Yamaha Dealers as soon as available. If a discrepancy is noted, please consult your dealer.

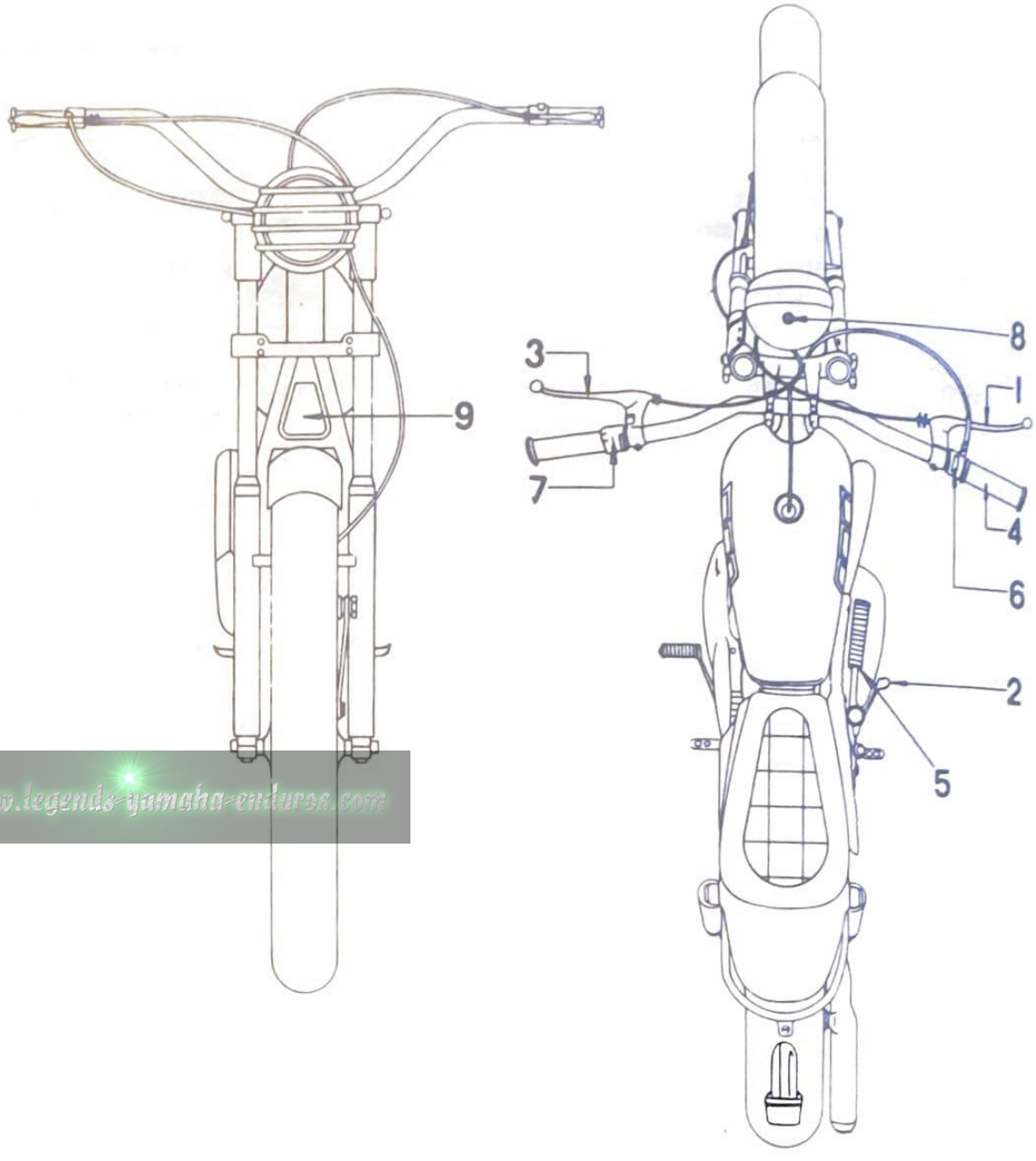
1-3. MAINTENANCE SPECIFICATIONS

ITEM	NOMINAL (NEW)	MINIMUM (ALLOWABLE)	MAXIMUM (ALLOWABLE)
AUTOLUBE			
Minimum Pump Stroke (At Idle)	0.20–0.25mm (0.008–0.010in.)	–	–
Maximum Pump Stroke (At Full Throttle)	1.85–2.05mm (0.073–0.081in.)	–	–
MAGNETO/IGNITION			
Ignition Source Coil Resistance	1.8Ω±10%	–	–
Secondary Ignition Coil Resistance (Primary)	1.7Ω±10%	–	–
Secondary Ignition Coil Res. (Secondary)	6.0KΩ±20%	–	–
Lighting Source Coil Res. (Yellow/Red lead wire)	0.4Ω±10%	–	–
Lighting Source Coil Res. (Yellow lead wire)	1.2Ω±10%	–	–
Ignition Timing	3.1±0.15mm (0.12±0.006in.) B.T.D.C.	–	–
Ignition Point Gap	0.3–0.4mm (0.012–0.016in.)	–	–
Condenser Capacity	0.3μ F	–	–
ENGINE – TOP END			
Cylinder Taper	0.008mm (0.0003in.)	–	0.05mm(0.002in.)
Cylinder Out of Round	–	–	0.01mm(0.0004in.)
Piston Clearance	0.040–0.045mm (0.0016–0.0018in.)	–	–
Top Ring Eng Gap (Free)	approximately 7.0mm (0.28in.)	–	–
Top Ring End Gap (Installed)	–	0.3mm(0.012in.)	0.5mm(0.020in.)
2nd Ring End Gap (Free)	approximately 6.5mm (0.26in.)	–	–
2nd Ring End Gap (Installed)	–	0.2mm(0.008in.)	0.4mm(0.016in.)
Ring/Ring Groove Clearance (2nd Ring Only)	–	0.03mm(0.0001in.)	0.08mm(0.003in.)
Connecting Rod Axial Play	0.8–1.0mm (0.03 0.04in.)	–	2.0mm(0.08in.)
Connecting Rod/Crank Side Clearance	–	0.25mm(0.010in.)	0.75mm(0.030in.)

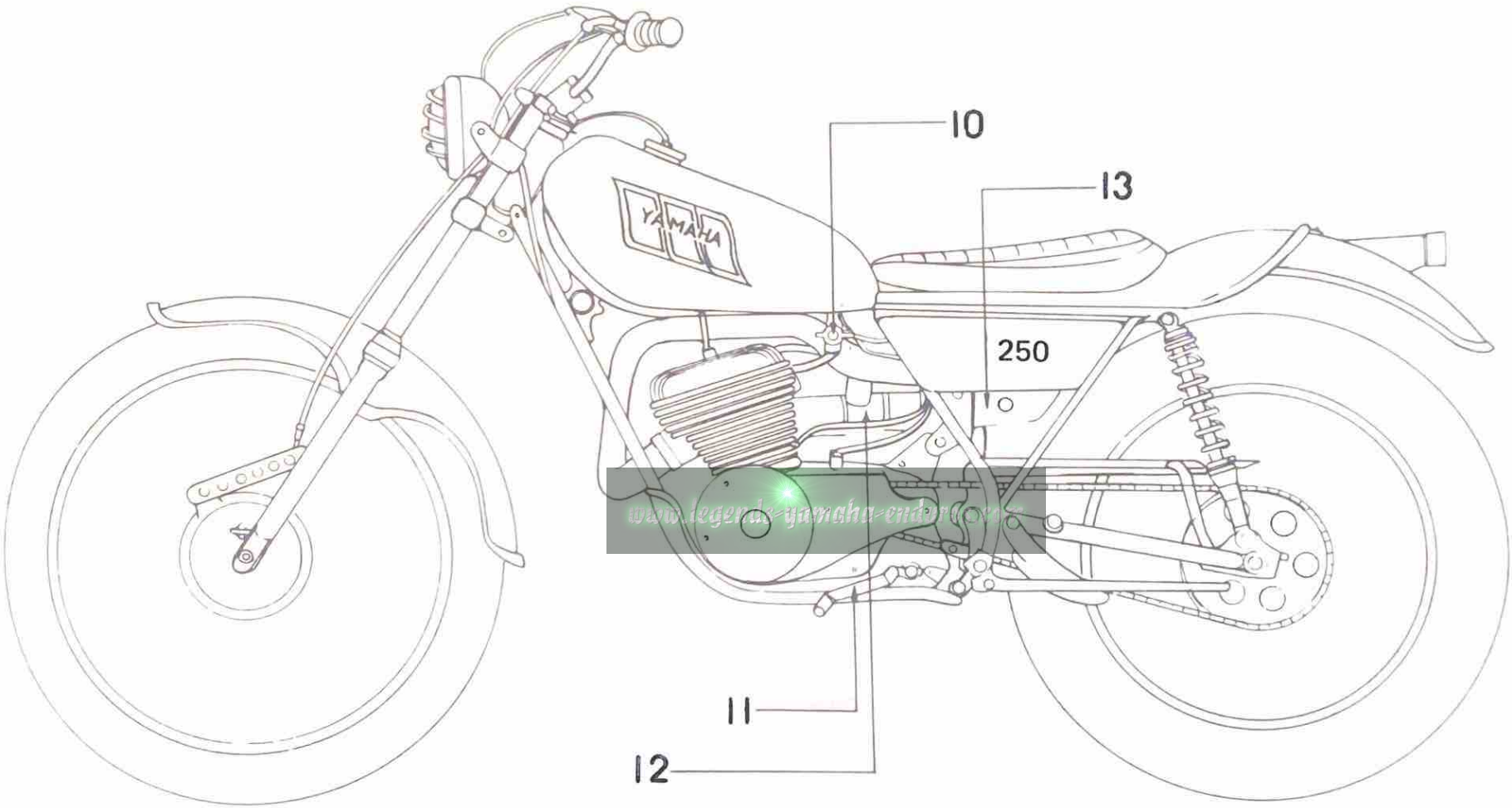
ITEM	NOMINAL (NEW)	MINIMUM (ALLOWABLE)	MAXIMUM (ALLOWABLE)
ENGINE – CLUTCH			
Friction Plate Thickness	3.0mm(0.12in.)	2.7mm(0.11in)	–
Clutch Plate Warp Allowance	–	–	0.05mm(0.002in.)
Spring Free Length	36.4mm(1.43in.)	35.4mm(1.39in.)	–
Spring Set Length Difference	–	–	1mm(0.04in.)
CHASSIS			
Front Brake Shoe Diameter	110mm(4.33in.)	105mm(4.13in.)	–
Rear Brake Shoe Diameter	130mm(5.12in.)	125mm(4.92in.)	–
Wheel Run-out Limits Vertical	–	–	2mm(0.08in.)
Wheel Run-out Limits Lateral	–	–	2mm(0.08in.)
Front Fork Spring Free Length	400mm(15.75in.)	–	–
Rear Shock Spring Free Length	224.5mm(8.84in.)	–	–
TORQUE VALUES			
See, also, Torque Chart, Page45	–	–	–
Transmission Drain Plug	2.0–2.5 m-kg (14–18 lb-ft)	–	–
Front Fork Cap Bolt(Top of inner tube)	5.0 m-kg(36 lb-ft)	–	–
Front Axle Securing Nut	4.0–4.5 m-kg (29–33 lb-ft)	–	–
Rear Axle Securing Nut	4.5–5.0 m-kg (33–36 lb-ft)	–	–
Cylinder Head Bolt	2.0 m-kg(14 lb-ft)	–	–
Cylinder Cap Bolt	2.0 m kg(14 lb-ft)	–	–
Flywheel Securing Nut	4.0–4.5 m-kg (29–33 lb-ft)	–	–
Clutch Securing Nut	6.0–7.0 m-kg (42–51 lb-ft)	–	–
Drive Sprocket Securing Nut	6.0–7.0 m-kg (42–51 lb-ft)	–	–
Drive Sprocket Securing Bolts	2.0 m-kg(14 lb-ft)	–	–

1-4. NOMENCLATURE

1. Front Brake Lever
2. Rear Brake Pedal
3. Clutch Lever
4. Throttle
5. Kick Crank
6. Engine Stop Switch
7. Headlight On/Off Switch
   Headlight Hi/Lo Switch
8. High Beam Indicator
9. Tool Box



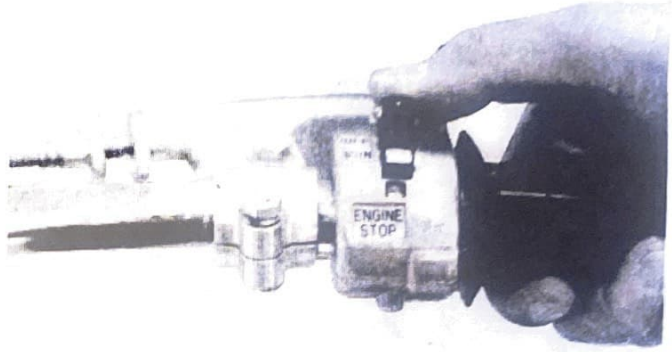
10. Fuel Petcock
11. Change pedal
12. Starter Jet Lever
13. Engine Oil Tank (Autolube tank)



2-1. CONTROL FUNCTIONS

A. Engine Stop Switch

Make sure that the engine stop switch is on "RUN". The engine stop switch has been equipped to ensure safety in an emergency such as when the motorcycle is upset of trouble takes place in the throttle system. The engine will not start when the stop switch is turned to "OFF".

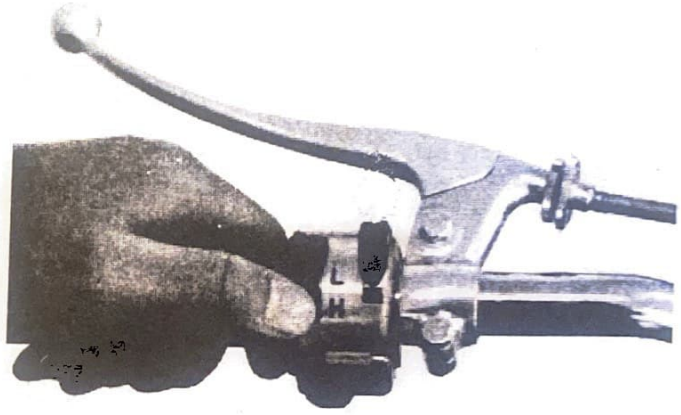


B. Headlight On/Off Switch

The headlight on/off switch is located on the left handle switch assembly. Push the switch forward for on. Pull back for off.

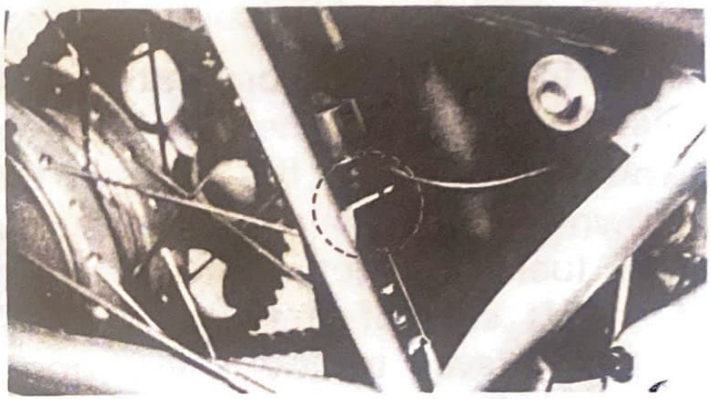
C. Headlight Hi/Lo Switch

The headlight hi/lo switch is located on the left handle switch assembly. Push the switch forward for low beam. Pull back for high.



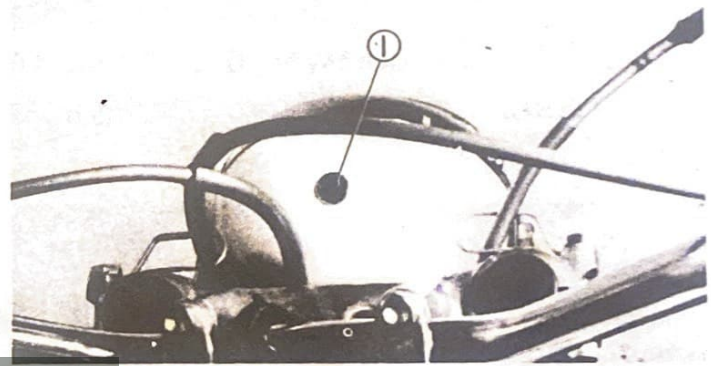
D. Stop Light Switch

The stop light switch is located on the right-hand side of the machine next to the rear fender, to the rear of the engine.
The switch is connected to the brake pedal and is actuated when the pedal is depressed.



E. High Beam Indicator

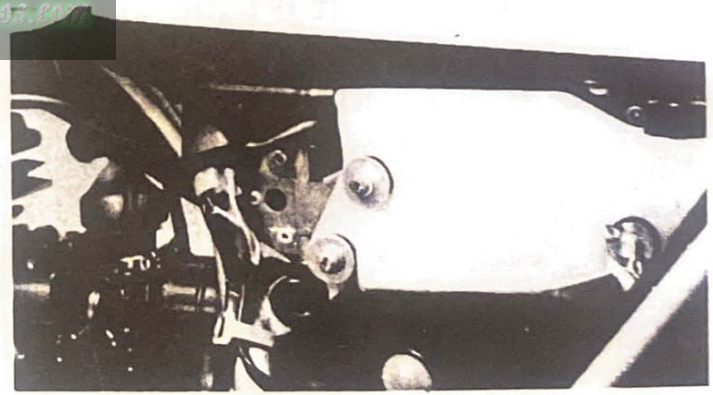
Located on top of the headlight shell. The high beam indicator is lit when the headlight high beam circuit is in operation.



1. High beam Indicator

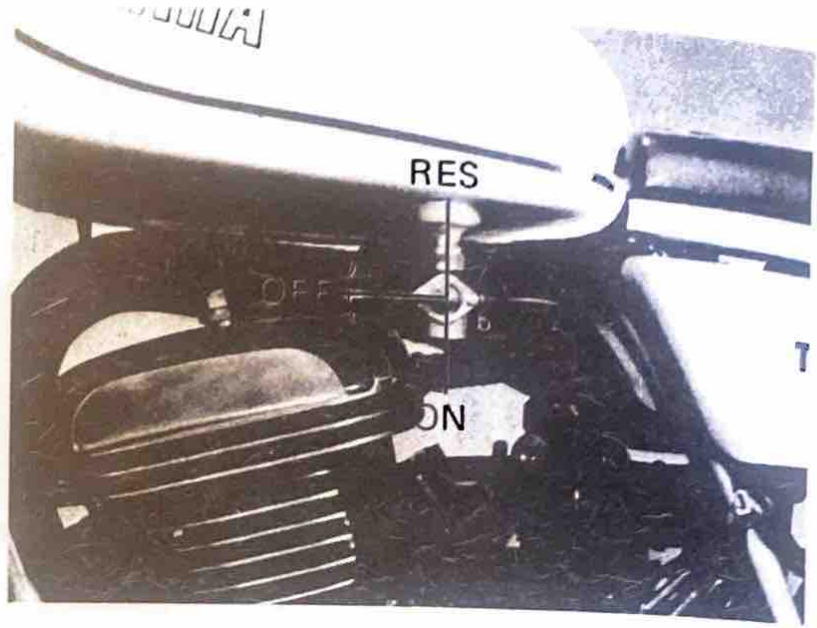
F. Engine Oil Tank (Autolube tank)

The engine oil tank is located below the left side of the seat. A window situated at the lower portion of the tank provides an indication when oil level decreases within the tank. (See Autolube Section for filling instructions.)



G. Fuel Tank and Petcock

The fuel tank incorporates a threaded plastic filler cap. The cap has a vent tube which is routed to the front of the handle crown and down along a frame down-tube. The fuel tank petcock is situated to the rear left side of the fuel tank. Turn the petcock lever to the "ON" position and fuel will flow to the carburetor. Turn lever to the "OFF" position to shut off fuel supply to the carburetor. If you run out of fuel while riding , move the lever to "RES" position.



H. Front Brake Lever

Located on the right handlebar. The front brake lever actuates the single leading-shoe front brake when it is squeezed.

I. Rear Brake Pedal

Located directly in front of the rider's right footrest. The rear brake pedal actuates the single leading-shoe rear brake when it is depressed.

J. Clutch Lever

Located on the left handlebar. The clutch lever will disengage the clutch when squeezed.

K. Throttle

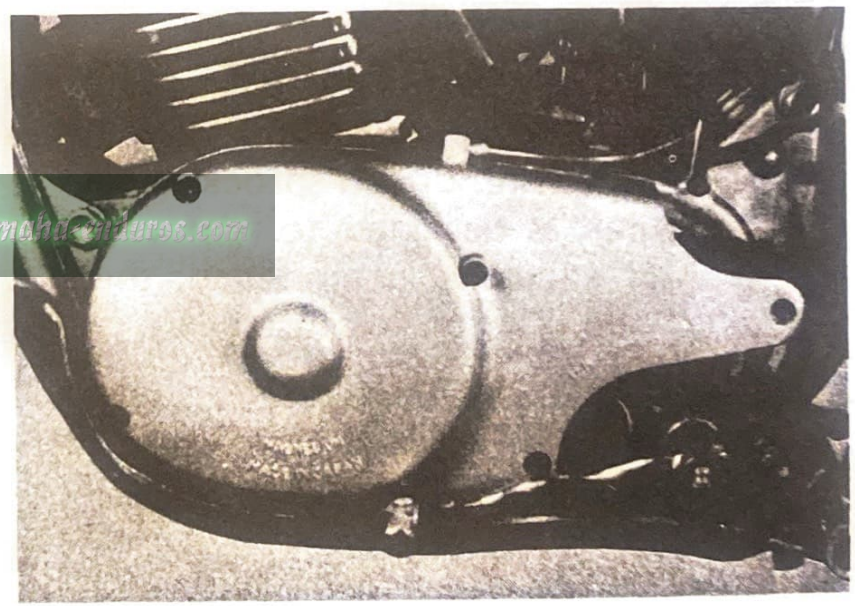
The throttle is the positive-return type, and is located on the right handlebar.

L. Kick Crank

The kick starter crank is located on the right rear side of the engine. Rotate the crank lever out, press your foot upon it firmly, push down until the gears engage the primary drive train and kick briskly to start the engine.

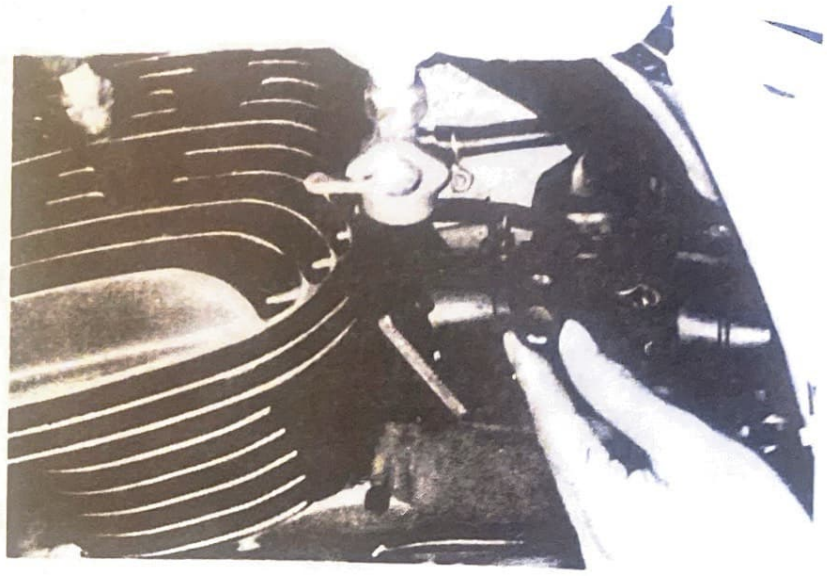
M. Change pedal

The transmission change pedal is located on the left-hand side of the machine directly in front of the rider's footrest. The shift mechanism is of the racheting type and controls gear selection for the 5-speed transmission.



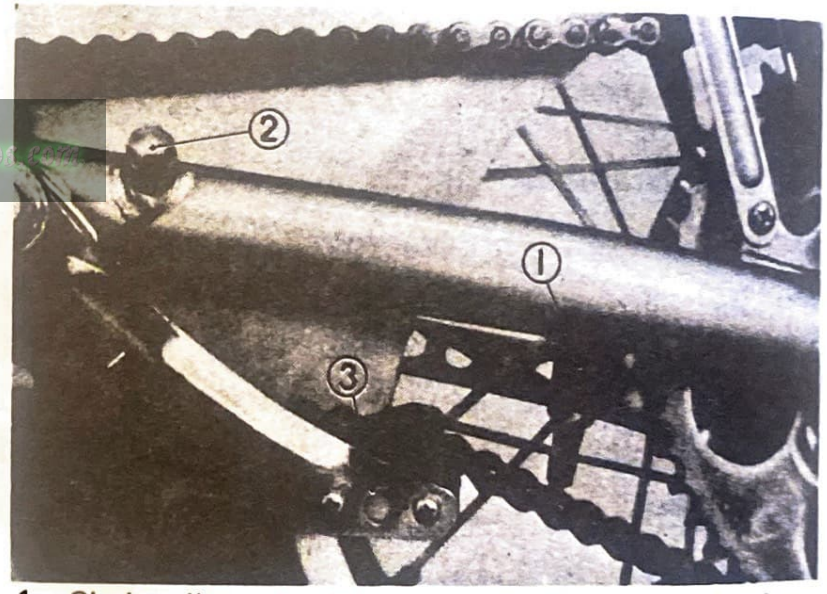
N. Carburetor Starter Jet (Choke)

The carburetor starter jet (choke) is located on the left side of the carburetor assembly. The jet is designed to supply an extra rich fuel/air mixture for cold engine starts. It is actuated by a knob. Pull the knob to turn the jet on. Always disengage the knob after the engine is running smoothly. Never ride the machine with the jet (choke) on.



O. Drive Chain Tensioner

The drive chain tensioner is located on the underside of the drive chain midway between the drive and driven sprockets. The tensioner is designed to remove small amounts of excessive chain slack, thereby reducing the "lurch" caused by rapid throttle changes.



1. Chain oiler 2. Filler cap 3. Drive chain tensioner

P. Chain Oiler

Located on the left arm of the swing arm. The chain oiler allows oil to flow onto the chain. The filler cap is directly in front of the oiler.
The drive chain must be oiled while the machine is at a standstill. If you loosen the adjusting screw of the oiler (counter-clockwise), oil comes out of it. In this way, oil the drive chain while turning the rear wheel. Do not forget to tighten the adjusting screw (clockwise) after finishing oiling.

NOTE:

Never oil the drive chain from the oiler while riding a machine. Drops of oil will be splashed on to the rear wheel, making it very slippery and thus incurring danger to the rider.

2-2. GASOLINE AND OIL

A. Gasoline

Use gasoline with an octane rating of 86+. Some regular gasolines and most mid-range gasolines have such ratings. High-test or Ethyl grade gasolines usually have octane ratings in excess of 94. In addition, they often have considerable tetra-ethyl lead added, which can cause spark plug problems.
Always use fresh, name-brand gasoline. Low-lead or unleaded gasolines are suitable provided they meet the minimum (86+) octane requirements.

CAUTION:

With the autolube feature it is unnecessary and even harmful to the engine to mix oil with the gasoline. Never mix oil with the gasoline. Always use straight gasoline.

B. Engine Oil

We recommend that your first choice be YAMALUBE 2-CYCLE which can be purchased from any Authorized Yamaha Dealer. If for any reason you should use another type, the oil should meet or exceed BIA certification "TC-W". Check container top or label for service specification.

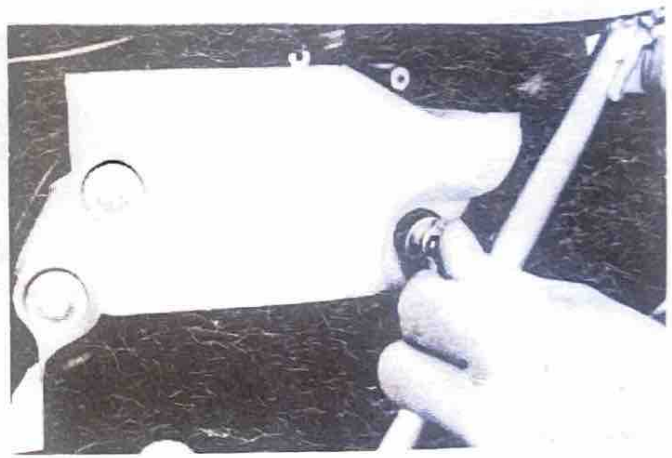
CAUTION:

Under extremely cold conditions 0°C (32°F) or below some oils become very thick and will not flow as readily to the autolube pump. This may cause oil pump starvation. Yamalube will flow normally to the pump at ambient temperatures down to 20°C (0°F).

C. Engine Oil

Always check Engine oil tank oil level before operating machine. If oil level shows at sight glass window:

1. Remove side cover.
2. Unscrew wing nut holding tank to frame.



3. Rotate hinged tank away from frame and remove cap.
4. Top off tank. Re-install side cover.

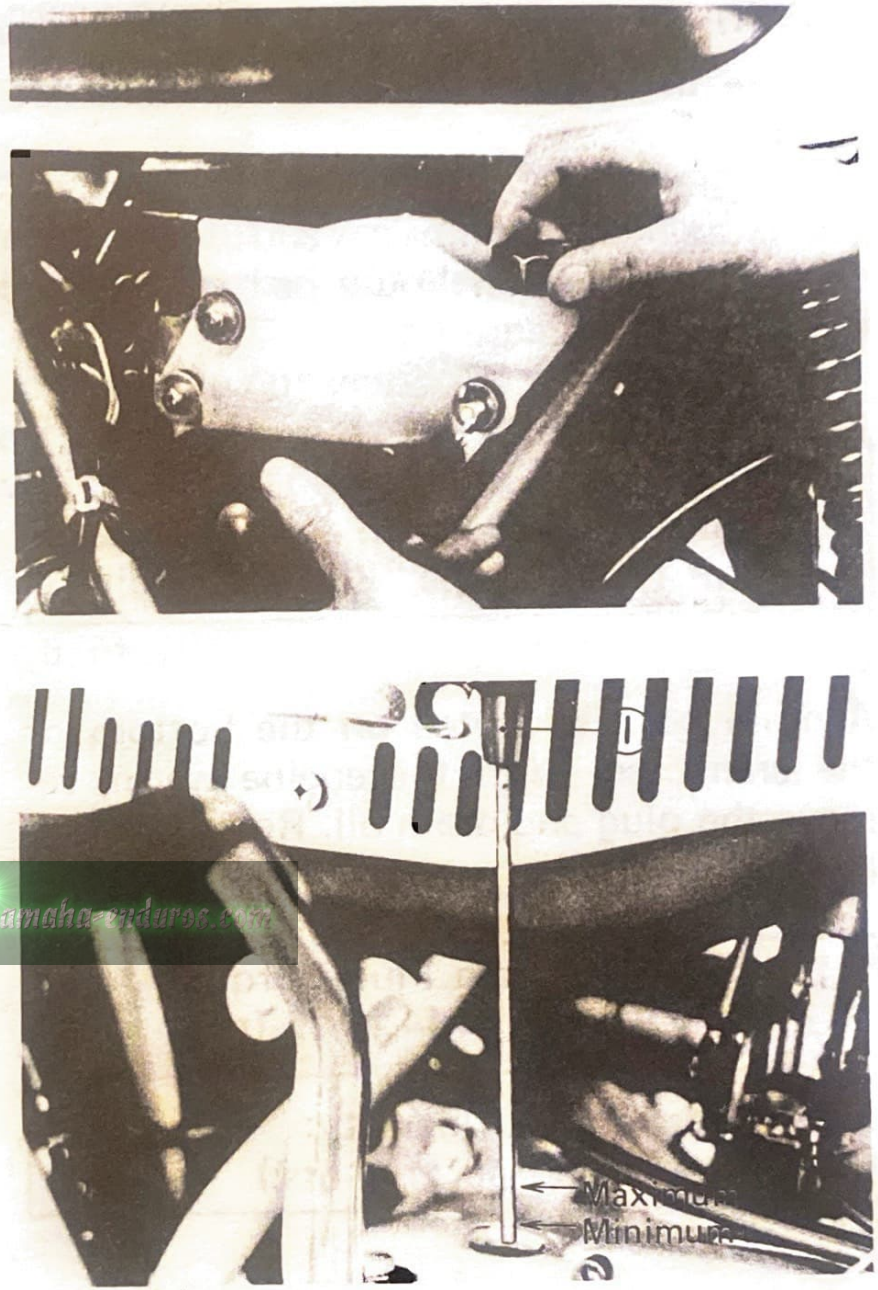
D. Chain Oiler

The filler cap is located on the lef-hand side of the swing arm. Remove the cap and top off with recommended oil. Reinstall cap.

Recommended Oil: SAE 10W/30 type "SE" motor oil
Chain Oiler Quantity: 165 cc

E. Transmission Oil

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. Unscrew the dipstick and clean. Set it on the case threads in a level position. Remove and check level.



1. Dipstick

NOTE:

Be sure the machine is level and on both wheels.

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 type "SE" motor oil

A drain bolt 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.

Transmission Drain Plug Torque:
2.0–2.5 m-kg (14–18 lb-ft)
Transmission oil Quantity:
1,000 cc (1.1 qts.)

Transmission oil should be replaced several times during the break-in period. If the unit is used for competition, oil replacement should also be often. See Maintenance Chapter.

CAUTION:

Under no circumstances should any additives be included with the transmission oil. This oil also lubricates and colls the clutch. Many additives will cause severe clutch slippage.

CHAPTER 3. OPERATION

CAUTION

1. Before riding this motorcycle, become thoroughly familiar with all operating controls and their function. Consult your Yamaha dealer regarding any control or function you do not thoroughly understand.
2. This model is designed for competition use only. It is not equipped with Government approved lighting, mirrors, horn or directional signals. In most instances, it is illegal to ride this model (either day or night) on any public street or highway.

3-1. PRE-OPERATION CHECK CHART

ITEM	ROUTINE	PAGE
BRAKES	Check operation/adjustment	24, 25
CLUTCH	Check operation/lever adjustment	26, 27
ENGINE OIL TANK	Check oil level/top-off as required	16, 17
TRANSMISSION	Check oil level/top-off as required	17, 18
DRIVE CHAIN	Check alignment/adjustment/lubrication	14,15,17, 28,100-106
THROTTLE	Check for proper throttle and autolube cable operation	107, 108
WHEELS & TIRES	Check pressure/runout/spoke tightness/axle nuts	109-120
FITTINGS/FASTENERS	Check all—tighten as necessary	—
LIGHTS/SIGNALS	Check headlight/tail—stop lights	130-132

NOTE:

Pre-operation checks should be made each time the machine is used. Such an inspection can be thoroughly accomplished in a very short time; and the added safety it assures is more than worth the time involved.

3-2. STARTING AND OPERATION

CAUTION:

Prior to operating the machine, perform steps listed in preoperation check list.

Turn fuel petcock lever to "ON" (vertical) position.
Check engine stop switch. Stop switch must be in "RUN" position to complete ignition circuit.

A. Starting Cold

Pull the starter knob out. Keep the throttle completely closed. Engage the kick starter and start the engine.

B. Starting with Engine Warm

Do not engage starter knob. Open throttle slightly (1/4 turn). Engage the kick starter and start the engine.

C. Warm-up

Run the engine at idle or between idle and 1/8th throttle using the starter knob as required until the engine is worm.
This procedure normally takes 2 to 3 minutes. To check, see if the engine responds normally to throttle with starter knob off.

CAUTION:

See "Break-in Section" prior to operating engine for first time.

NOTE:

The kick mechanism is of the primary type. Therefore, the engine may be started in any gear provided clutch is disengaged. The engine may be started in neutral with clutch engaged or disengaged.

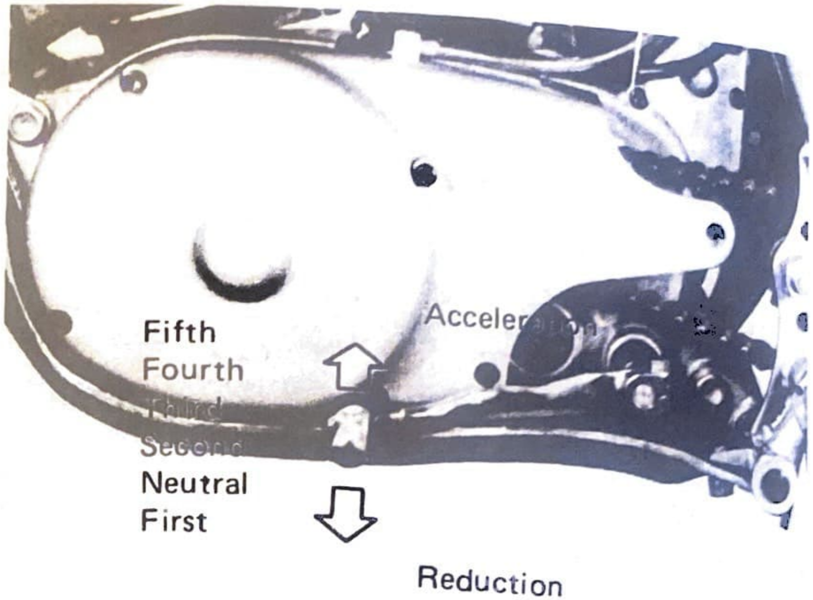
D. Shifting

A 5-speed transmission is employed. Low gear is at the bottom of the shift pattern; high gear at the top of the shift pattern; neutral is located half-way between first and second positions.

The shift mechanism is of the ratcheting type common to most motorcycles. Allow the lever to return to its "at rest" position prior to selecting another gear. Neutral is selected by pulling up or depressing on the change pedal halfway between first and second gears.

With the engine running in the neutral position, disengage the clutch (pull in clutch lever), press down on the shift lever until low gear is engaged, remove foot from change pedal, increase engine speed slightly, slowly release clutch lever while advancing throttle. Repeat procedure for remaining gears.

Except during competition, shift the transmission when engine speed is approximately 3,000 to 4,000 rpm. This can be interpreted as approximately one-half throttle. (See "Break-In").



3-3. BREAK-IN PROCEDURE

You must not put an excessive load on the engine during the first ten to twenty hours of operation.

0 – 100 kms (0 – 50 miles)
Avoid operation above one half throttle.

100 – 200 kms (50 – 100 miles)
Avoid full throttle operation. Allow the motorcycle to rev. freely through the gears but do not use full throttle at any time.

200 – 400 kms (100 – 250 miles)
Avoid prolonged full throttle operation. Avoid cruising speeds in excess of one half throttle. Vary speeds occasionally.

400 kms (250 miles)
Avoid full throttle operation. Avoid cruising speeds in excess of 100 km/h (60 mph)

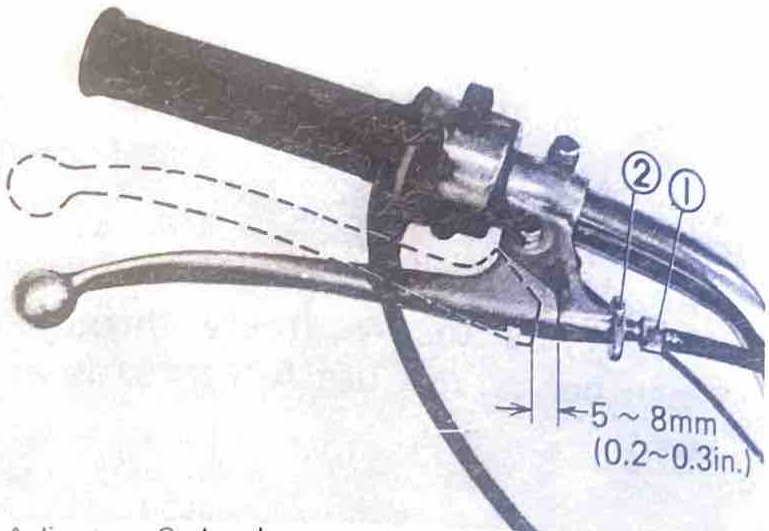
4-1. BRAKES ADJUSTMENT

A. Front Brake

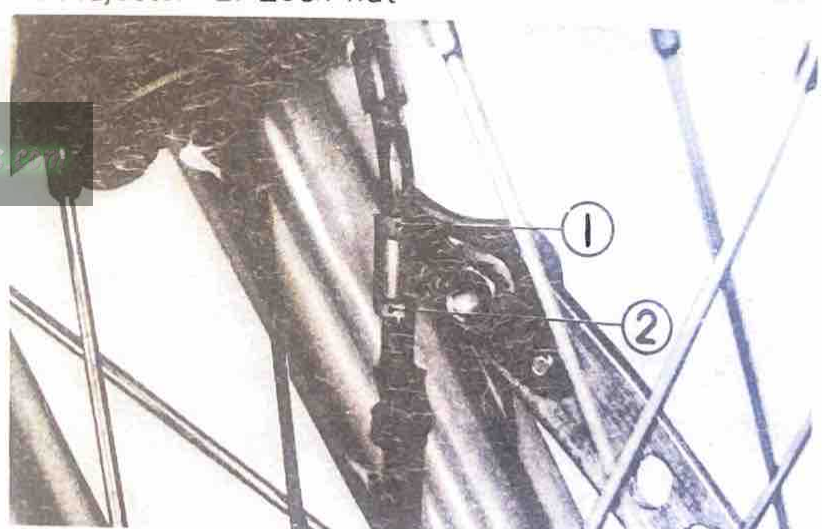
Front brake should be adjusted to suit rider preference with a minimum cable slack of 5 – 8 mm (0.2 – 0.3 in) play at the brake lever pivot point.

Adjustment is accomplished at one of two places; either the handle lever holder or the front brake hub.

1. Loosen the lock nut.
2. Turn the cable length adjuster in or out until adjustment is suitable.
3. Tighten the lock nut.



1. Adjuster 2. Lock nut



1. Adjuster 2. Lock nut

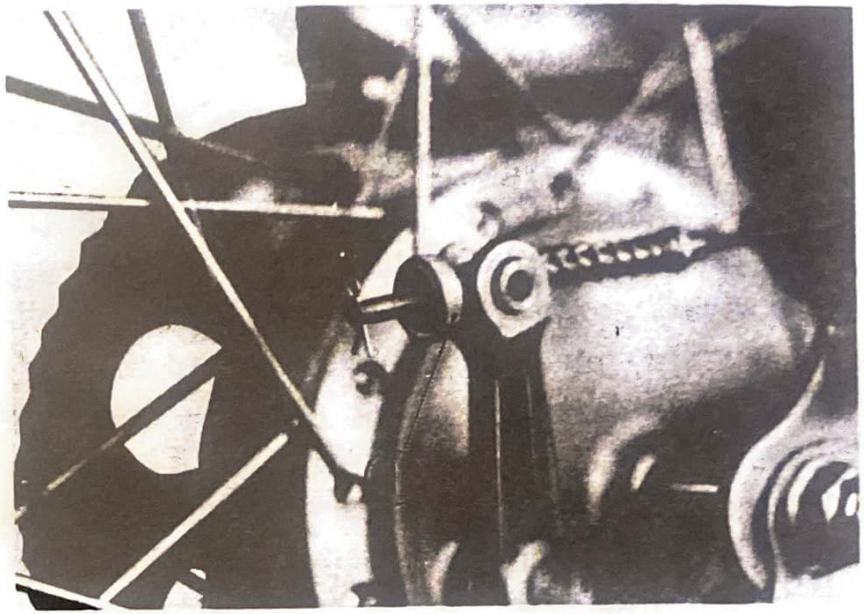
B. Rear Brake

Adjust rear brake pedal play to suit, providing a minimum of 25mm (1.0 in) freeplay. Adjustment is accomplished as follows:

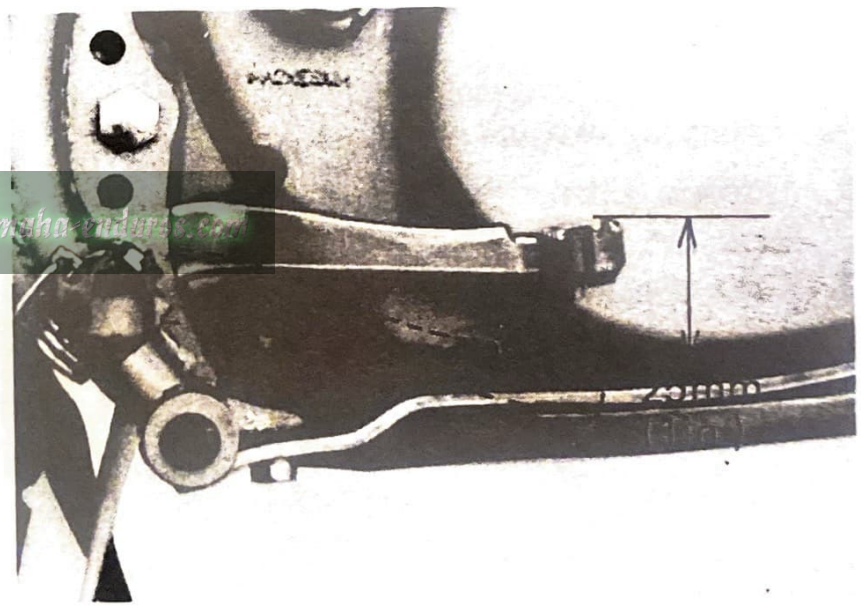
1. Turn the adjuster on the rear brake rod in or out until brake pedal freeplay is suitable (25 mm (1.0 in) minimum freeplay).

NOTE:

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



1. Adjuster

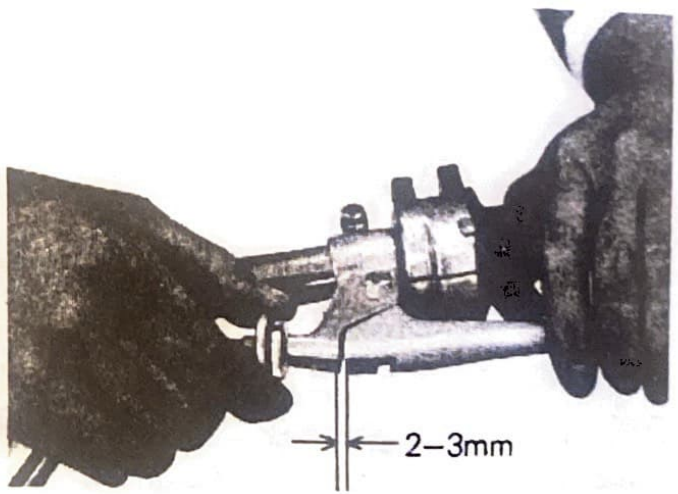


4-2. CLUTCH ADJUSTMENT

This model has clutch cable length adjusters and a clutch mechanism adjuster. The cable length adjuster is used to take up slack from cable stretch and to provide sufficient freeplay for proper clutch operation under various operating conditions. The clutch mechanism adjuster is used to provide the correct amount of clutch "throw" for proper disengagement. Normally, once the mechanism is properly adjusted, the only adjustment required is maintenance of freeplay at the clutch handle lever.

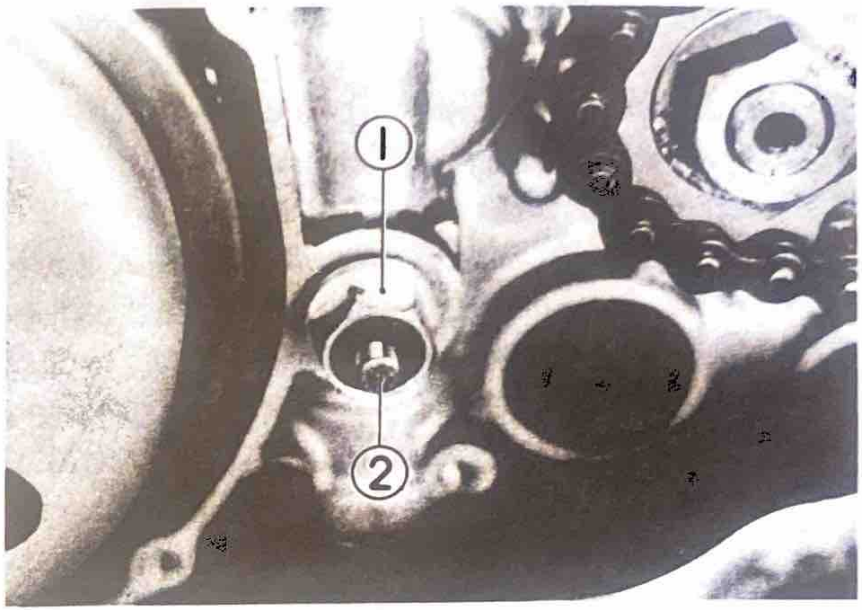
A. Freeplay Adjustment

1. Loosen either the handle lever adjuster locknut.
2. Turn the length adjuster in or out until proper lever freeplay is achieved.



B. Mechanism Adjustment

1. Remove rear, left-hand crankcase cover. Note position of clutch axle lever under engine.
2. Loosen lock nut and fully tighten adjustor.
3. Turn cable length adjuster in or until lever is positioned slightly behind main axle center line.
4. Back adjustor out until axle lever shaft contacts clutch push rod inside engine. Turn adjust screw in approximately 1/8 turn and tighten lock nut. Readjust handle lever freeplay as required.
5. Re-install side cover.



1. Lock nut
2. Adjustor

4-3. DRIVE CHAIN ADJUSTMENT

To adjust drive chain, proceed as follows:

1. Remove rear axle cotter pin.
2. Loosen rear axle securing nut.
3. With rider in position on machine, both wheels on ground, set axle adjusters until there is 40 – 50 mm (1.6 – 2.0 in) slack in the drive chain at the bottom of the chain at a point midway between the drive and driven axles.
4. Turn cam adjusters both left and right until axle is situated in same cam slot position.
5. Tighten the rear axle securing nut.

Axle Nut Torque:
7.0 – 10.0 m-kg (610 – 870 in-lb)

6. Install a new cotter pin, bend the ends.
7. Check stop light operation and brake pedal freeplay.

CAUTION:

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

1. **Rear axle alignment**
2. **Brake pedal freeplay**
3. **Stop light operation**

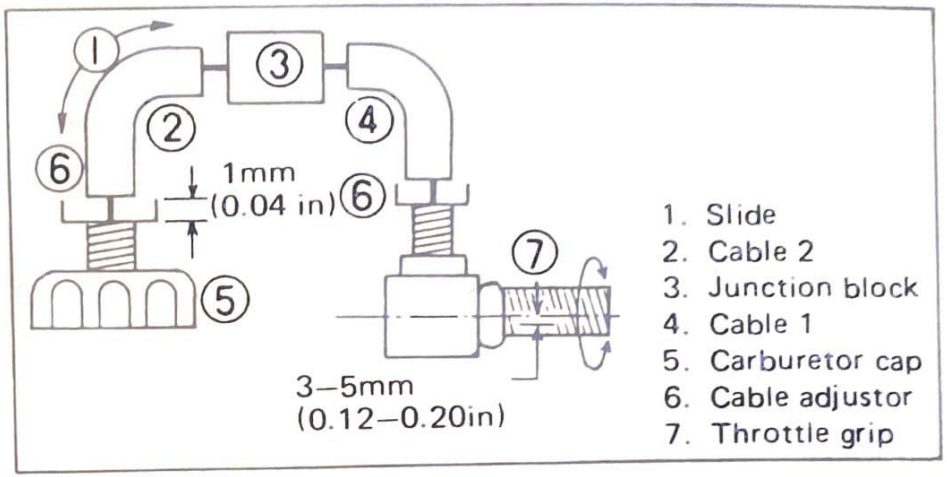
4-4. CARBURETOR

Under normal operating conditions, there are only three adjustments to be made to the carburetor.

A. Throttle Cable Adjustment

1. Lift the rubber mixing chamber cap cover.
2. Grasp outer cable housing. Lift up. Slack should equal 1 mm (0.04in). If slack is incorrect, loosen adjusting bolt locknut and turn adjusting bolt in or out as required to achieve correct slack. Tighten adjusting bolt locknut. Re-install cap cover.

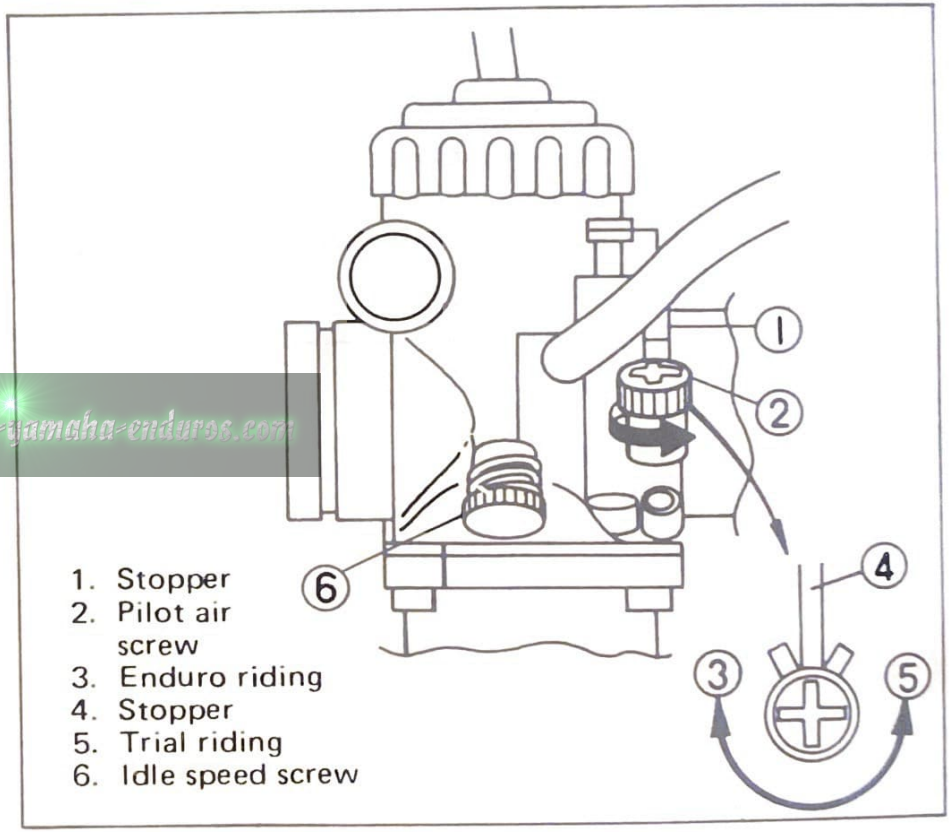
3. Check play in turning direction of throttle grip. The play should be 3 – 5 mm (0.12 – 0.20 in) at grip flange. Loosen the lock nut and turn the wire adjuster to make the necessary adjustment. After adjusting, be sure to tighten the locknut properly.



B. Idle Speed and Pilot Air Adjustments

1. Make certain that throttle cable freeplay is proper.
2. Pilot air screw
   Turn air adjusting screw until it lightly seats, then back it out turns specified. This adjustment can be made with engine stopped.

Air screw (turns out)	
Enduro riding	1.0
Trial riding	2.0



3. Start the engine and let it warm up.
4. Idle speed screw
   Turn idle speed screw in or out to achieve smooth engine operation at idle speed specified.

Idle speed: 1,050 – 1,150 rpm

NOTE:

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

4-5. AUTOLUBE ADJUSTMENT

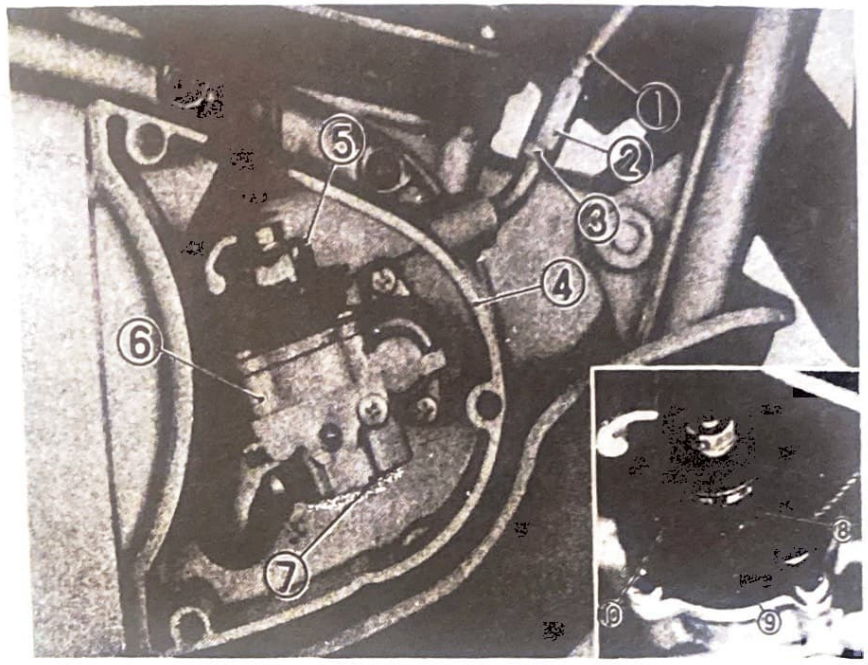
A. Cable Adjustment

1. Remove Autolube pump cover, which is located on forward portion of the right-hand crankcase cover.
2. Rotate throttle until all slack is removed from all cable. Hold this position.
3. Check to see that Autolube pump plunger pin is aligned with the mark on the Autolube pump pulley.

4. If the mark and pin are not in alignment, loosen cable length adjuster lock nut on upper edge of crankcase cover and adjust cable length until alignment is achieved. Tighten adjuster locknut.

NOTE:

Before adjusting Autolube cable always set throttle cable freeplay first.



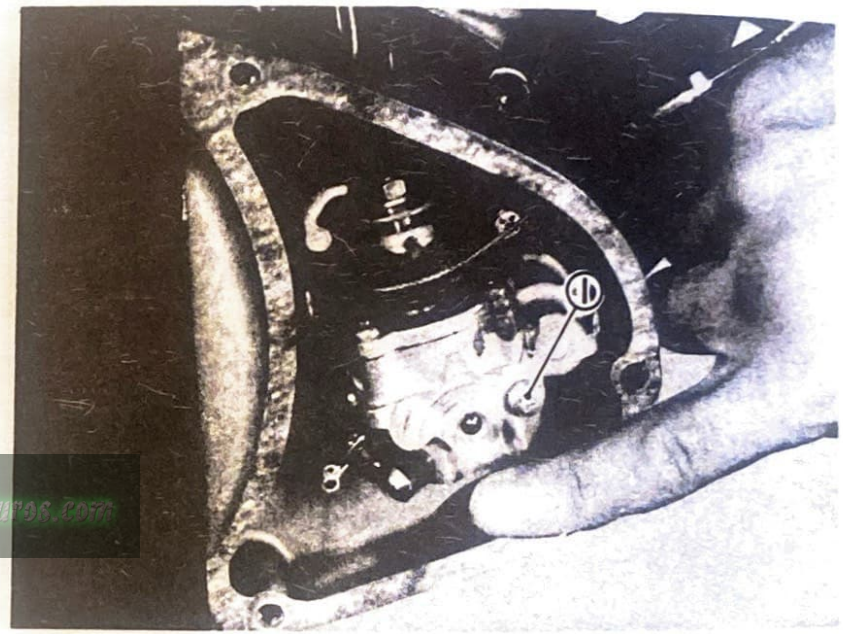
1. Pump cable
2. Cable adjusting bolt
3. Lock nut
4. Crankcase
5. Adjusting plate
6. Oil pump
7. Blind plug
8. Plunger pin
9. Mark (□)
10. Pump cable pulley

B. Air bleeding

The Autolube pump and delivery lines must be bled, whenever the Autolube tank has run dry.

1. Bleeding the pump case and/or oil pipe
   a. Remove the pump cover and remove the bleed screw.
   b. Keep the oil running out until air bubbles disappear.
   c. 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.

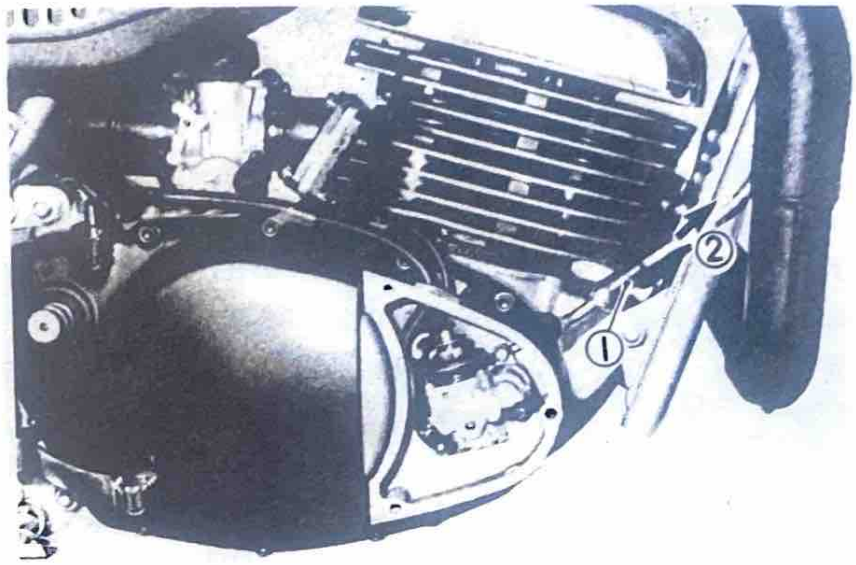


1. Bleed screw

2. Bleeding the pump distributor and/or delivery pipe
   a. Start the engine.
   b. 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.

   c. Keep the engine running at about 2,000 rpm for two minutes or so, and both distributor and delivery pipe can be completely bled.



1. Pump wire 2. Pull

4-6. SPARK PLUG

The spark plug indicates how the engine is operating. If the engine is operating correctly, and the machine is being ridden correctly, then the tip of the white insulator around the positive electrode of the spark plug will be 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:
0.5 ~ 0.6 mm (0.020 – 0.024 in)

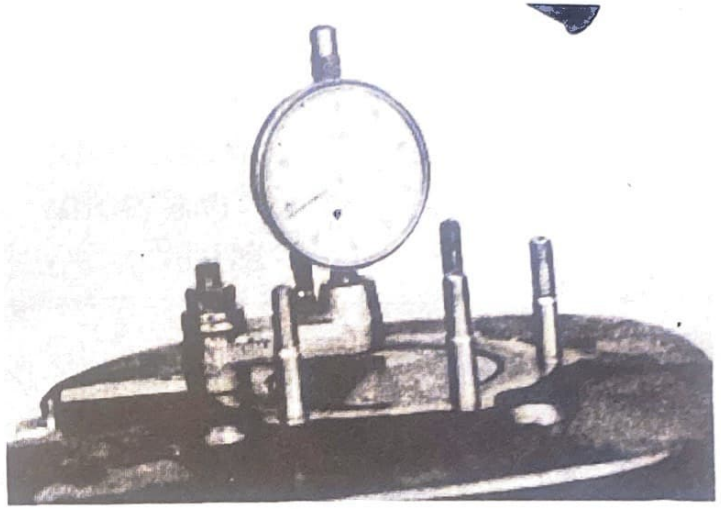
Engine heat and combustion chamber deposits will cause any spark plug to slowly break down and erode. If the electrodes finally become too worn, or if for any reason you believe the spark plug is not functioning correctly, replace it.
When installing the plug, always clean the gasket surface, use a new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

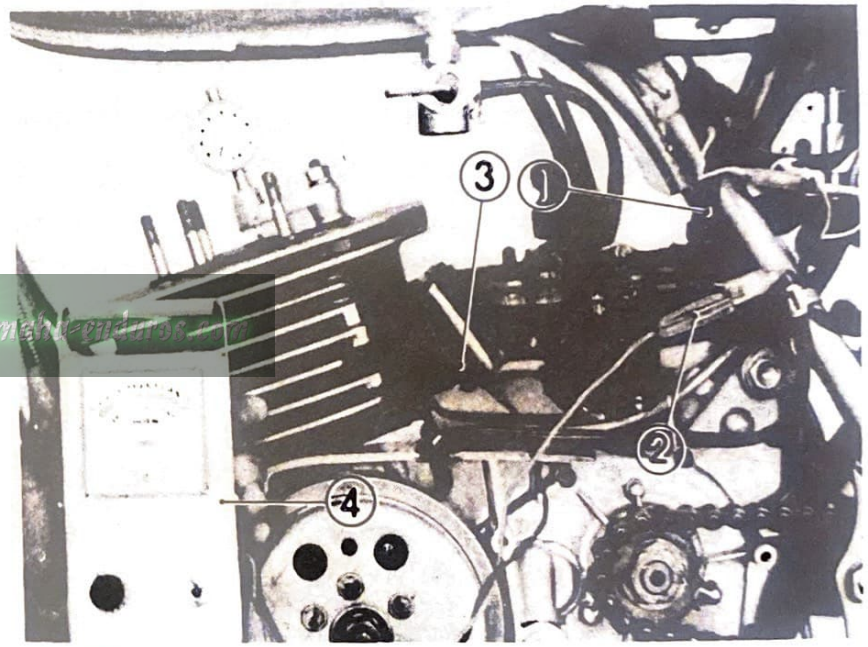
Standard Spark Plug	Tightening torque
N.G.K. B-7ES	1.5 – 2.5 m-kg (130 – 230 in-lb.)

4-7. IGNITION TIMING

Ignition timing must be set with a dial gauge (to determine piston position) and a point checker (to determine exactly when contact breaker points begin to open). Proceed as follows:

1. Remove cylinder head, and head gasket.
2. Insert dial gauge stand and dial gauge.
3. Remove engine crankcase left cover to gain access to contact breaker assembly (ignition points).
4. Switch on point checker and adjust. Connect red lead of Point Checker to black wire in wire harness coming from magneto. Push engine stop switch to "OFF".
5. Connect black lead of point checker to unpainted surface of cylinder fin or crankcase bolt or screw.



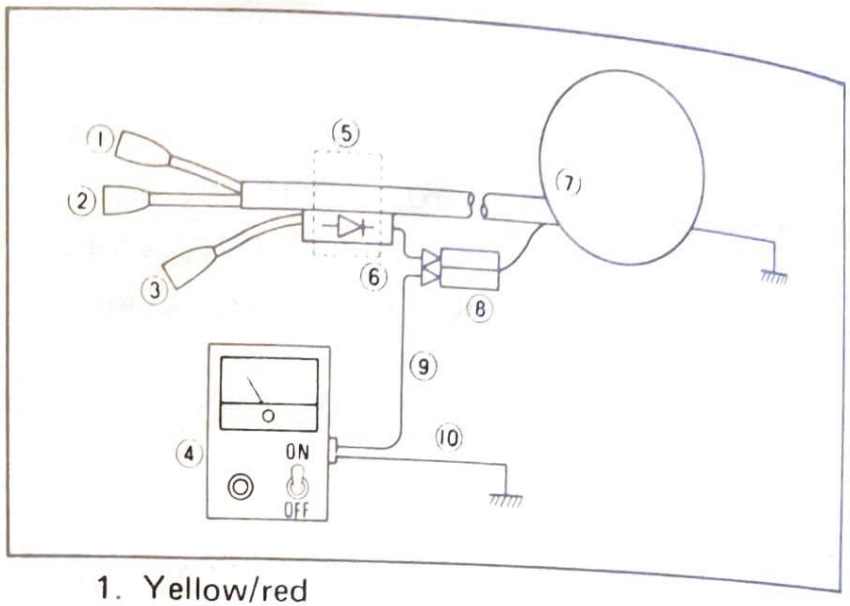


1. Diode
2. Red lead wire
3. Black lead wire
4. Point checker

NOTE:

In order to prevent the engine from turning in the reverse direction, a diode is used. Therefore, the point checker must be connected as illustrated below.

6. Rotate magneto flywheel until piston is at top-dead-center (TDC). Tighten set screw on dial gauge stand to secure dial gauge assembly. Set the zero on dial indicator needle. Rotate flywheel back and forth to be sure that indicator needle does not go past zero.



1. Yellow/red
2. Yellow
3. Black
4. Point checker
5. Tape
6. Diode
7. Flywheel magneto
8. Two-pole connector
9. Red
10. Black

7. Starting at TDC, rotate flywheel clockwise until dial indicator reads approximately 4 needle revolutions before top-dead-center (BTDC).
8. Slowly turn flywheel counterclockwise until gauge indicates correct timing figure. At this time, the ohmmeter needle should swing from "CLOSED" to "OPEN" position, indicating the contact breaker (ignition points) have just begun to open.

Ignition Timing:
3.1 ± 0.15 mm B.T.D.C.
(0.12 ± 0.006 in)

9. Repeat step 7 and 8 to verify point opening position. If points do not open within specified tolerance, they must be adjusted.
10. Adjust ignition points by barely loosening Phillips-head screw and carefully rotating contact breaker assembly with a slotted screwdriver until point checker indicates points "OPEN". Re-tighten Phillips-head screw. Repeat steps 6 through 8.
11. When correct ignition timing has been accomplished, check maximum point gap by turning flywheel until maximum point opening occurs. Measure point gap with thickness gauge.

Point Gap	0.35 mm. (0.014 in.)
Normal	0.30 mm. (0.012 in.)
Minimum:	0.40 mm. (0.016 in.)

NOTE:

If the maximum point gap is over tolerance the point rubbing block is probably worn and the contact breaker assembly should be replaced. Do not attempt to bend the fixed point bracket to decrease maximum point gap. This will only result in point misalignment, difficulty in setting timing and premature point failure. See "IGNITION" for point replacement procedure.

12. Remove dial gauge assembly and dial gauge stand. Replace cylinder head.

NOTE:

The projection of the cylinder head gasket must be forward.

Cylinder Head Nut Torque:
2.1 – 2.5 m-kg (180 – 220 in-lb.)

13. Disconnect point checker. Replace engine crankcase cover.

NOTE:

If a shortened dial gauge stand is available it may be used rather than removing cylinder head. Consult your dealer.

CHAPTER 5. MAINTENANCE AND MINOR REPAIRS

The following sections provide information for the disassembly, troubleshooting and maintenance of various components of the motorcycle. If you do not have the necessary tools and an understanding of the mechanical principles involved, please refrain from attempting repairs. The use of improper tolls and/or procedures can cause major damage to the unit with resultant additional repair costs. To properly understand the procedures outlined we suggest you consult your Yamaha Dealer prior to attempting any repair procedures.

5-1 INTERVALS CHARTS

PERIODIC MAINTENANCE INTERVALS

Unit: km (miles)

Item	Remarks	Initial		Thereafter every	
		400 (250)	800 (500)	800 (500)	1,600 (1,000)
Brake System (Complete)	Chk/Adj. as required-Repair as required	0		0	
Clutch	Check/Adjust as required	0		0	
Spark Plug	Inspect/Clean or replace as required	0	0	0	
Wheels and Tires	Pressure/Spoke Tension/Runout	0	0	0	
Fittings and Fasteners	Tighten before each trip	0	0	0	
Grip wire	Cable Oper/Adj. (incl. Autolube) (See Lube note #4)	0	0		0
Drive Chain	Tension/Alignment	0	0	0	
Transmission Oil Level Check	Includes Trans./Autolube Tank (See Note #1)	0	0	0	
Air Filter	Foam Type (See Service Notes #2 & #4)	0	0	0	
Fuel Petcock	Clean/Flush Tank as required	0	0		0
Ignition Timing	Adjust/Clean/Replace points as required		0		0
Carburetor Adjustment	Check Operation/Fittings		0		0
Carburetor Overhaul	Clean/Repair as required/Refit/Adjust		0		0
Cylinder Compression	Preventive Maintenance Check		0		0
Decarbonize Engine	Includes Exhaust System		0		0

SERVICE NOTE:

1. Check Engine oil tank level before each ride. Top off when oil level shows at the sight glass or before any prolonged use. See "Lubrication Intervals" for type of oil to use.

2. Foam elements air filters must be damp with oil at all times to function properly. Remove, clean, and oil filter at least once per month or every 400 ~ 800 km (250 ~ 500 miles); whichever occurs first. (If extremely hard usage, such as dirt riding, clean and lube daily.) See "Lubrication Intervals" for additional details.

3. Pre-operational checks should be made each time the machine is used. Such an inspection can be thoroughly accomplished in a very short time, and the added safety it assures the rider is more than worth the minimal time involved.

4 For additional information regarding drive chain, transmission oil level, wet-type air filter, see "Lubrication Intervals".

LUBRICATION INTERVALS

Unit: km (miles)

Item	Remarks	Type	Period				
			Initial			Thereafter every	
			400 (250)	800 (500)	1,600 (1,000)	400 (500)	1,600 (1,000)
Autolube	See Service Notes	#1	See Service Notes				
Trans. Oil	Warm Engine Before Draining	#2	0	CHK	0	CHK	0
Drive Chain	Lube/Adjust as required	#3	See Service Notes				
Drive Chain	Remove/Clean/Lube/Adjust	#3		0		0	
Air Filter	Foam Type	#8	See Service Notes				
Throttle Grip & Housing	Light Application	#4		0			0
Rear Arm Pivot Shaft	Apply Until Grease Shows	#5			0		0
Brake Pedal Shaft	Light Application	#4			0		0
Change Pedal Shaft	Light Application	#4			0		0
Front Forks	Drain Completely-Ck Specs	#3		CHK	0		0
Steering Ball Races	Inspect Thoroughly/Med. Pack	#6			0		0
Point Cam Lubr. Wick	Very Light Application	#7			0		0
Wheel Bearings	Do not Over-Pack	#6			0		0

Recommended lubricant type

1. Check tank level before each ride. Top off when oil level is at sight glass or before any prolonged use. Use the following lubricant (in order of preference): Yamalube 2-cycle, or two-stroke oil labeled "BIA certified for service TC-W".
2. At ambient temperatures of 45-90° F, use Yamalube 4-cycle oil or 10W/30 "SE" motor oil. Do not use "additives" in oil.
3. Use 10W/30 "SE" motor oil. (If desired, specialty type lubricants of quality manufacture may be used.) "Drive Chain" — Lube every 400km (250 miles). If severe usage, every 200km (100 miles) or after every event.
4. Light duty: smooth, lightweight, "White" grease. Heavy duty: standard lube grease (Do not use lube grease on throttle/housing.)
5. Use standard lube grease — smooth, not coarse.
6. Medium-weight wheel bearing grease of quality manufacturer — preferrably waterproof.
7. Lightweight machine oil.
8. Air filters—foam element air filters must be damp with oil at all times to function properly. Clean and lube monthly or per mileage. If hard usage, clean and lube daily. Do not over-oil. Use SAE 10W/30 "SE" motor oil.

A. Maintenance and Lubrication Intervals

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

B. Competition

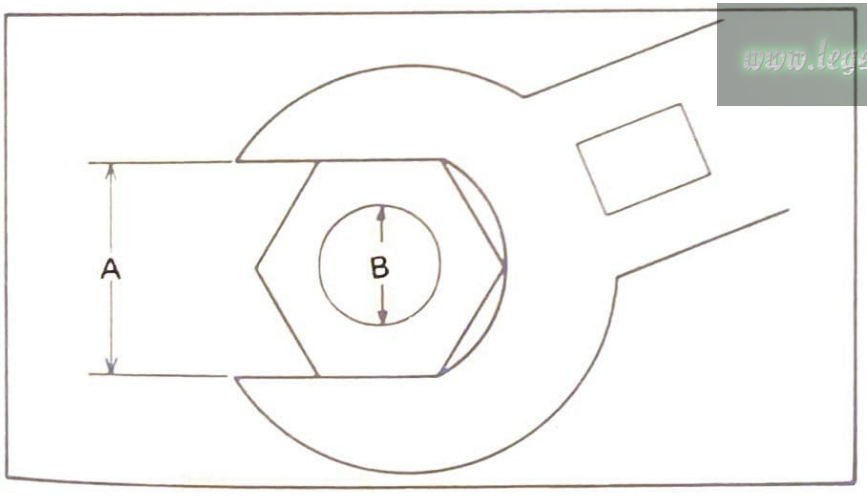
The serious competitor will no doubt already have a maintenance and lubrication schedule of his own. However, until one can be established according to individual usage, we suggest the following:

1. Cut the chart mileage recommendations by one-half. If no speedometer; estimate 10—15 mph average speed.
2. Immediately preceding each competition, pay particular attention to the following:
   a. A thorough pre-operation check.
   b. Clean and lubricate air filter.
   c. Lubricate all controls, cables and rear arm pivot.
3. Every other competition, perform the steps outlined in No. 2, and:
   a. Check front fork operation and steering adjustment.
   b. Remove chain: clean, oil and re-install.
   c. Remove wheel assemblies and service brakes and bearings.
   d. Check rear shock absorbers and swing arm operation.
   e. Check Autolube pumps stroke and cable.

C. Torque Specifications

The list below covers those study/bolt sizes with standard I.S.O. pitch threads. Torque specifications for components with thread pitches other than standard are given within the applicable chapter.

Torque specifications call for dry, clean threads. Components such as the cylinder or cylinder head should be at room temperature prior to torquing. A cylinder head or any other item with several fasteners should be torqued down in a cross-hatch pattern in successive stages until torque specification is reached. The method is similar to installing an automobile wheel and will avoid warping the component.



A (Nut)	B (Bolt)	Torque Specification		
		m-kg	ft-lb	in-lb
10mm	6mm	1.0	7.0	85
12(13)mm	8mm	2.0	15	175
(14mm)	(8mm)	2.0	15	175
14(17)mm	10mm	3.5–4.0	25–29	300–350
17(19)mm	12mm	4.0–4.5	29–33	350–400
19(22)mm	14mm	4.5–5.0	33–36	400–400
22mm	16mm	5.5–6.5	41–49	480–570
(26)mm	(17)mm	6.0–7.0	40–50	500–600
24(27)mm	18mm	6.0–7.0	40–50	500–600
27(30)mm	20mm	6.0–8.0	50–60	600–700

D. Tools

The Owner's Tool Kit supplied with the machine provides the minimum tools required for emergency repairs and minor maintenance. The maintenance procedures outlined within this manual require additional special tools and instruments.

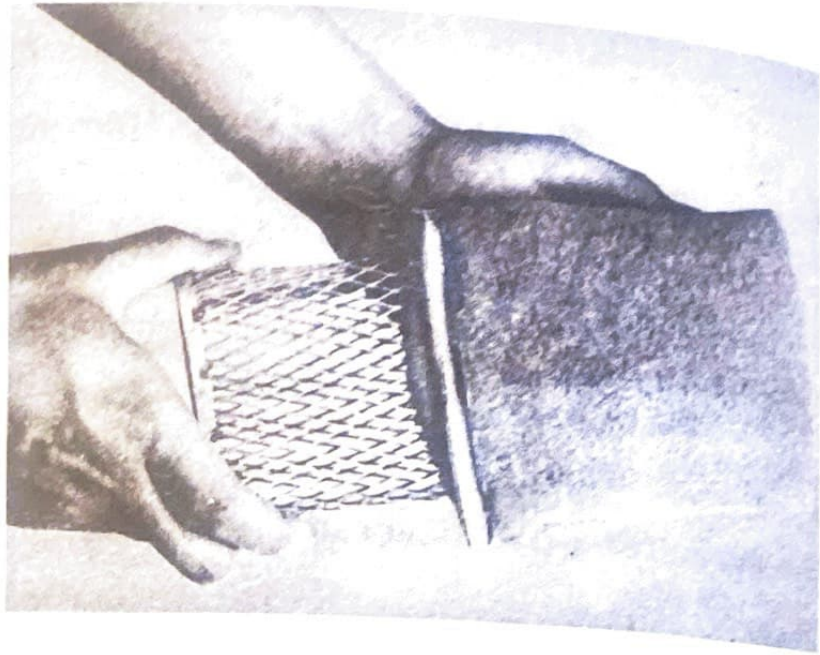
5-2. AIR FILTER

1. Remove the seat securing bolt. Remove the seat.

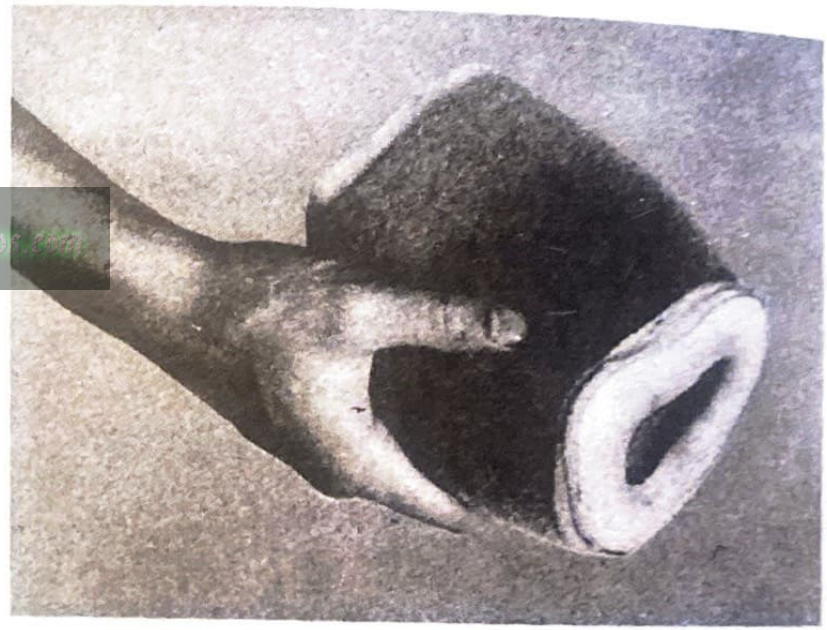
2. Remove the Pan-head screws (3) holding the air filter case cover in place. Remove the cover.

3. Remove the air filter element assembly.

4. Slip the element off the wire mesh guide.



5. Wash the element gently, but thoroughly, in solvent.
6. Squeeze excess solvent out of element and dry.



7. Pour a small quantity of motor oil onto filter element and work thoroughly into the porous foam material.

NOTE:

In order to function properly, the element must be damp with oil at all times, but not "dripping" with oil.

8. Re-insert the wire mesh filter element guide into the element.
9. Coat the upper and lower edges of the filter element with lube grease. This will provide an air-tight seal between the filter case cover and filter seat.
10. Re-install the element assembly, case cover and seat.

NOTE:

Each time filter element maintenance is performed, check the air inlet to the filter case for obstructions. Check the air cleaner joint rubber to the carburetor and manifold fittings for an air-tight seal. Tighten all fittings thoroughly to avoid the possiblity of unfiltered air entering the engine.

CAUTION:

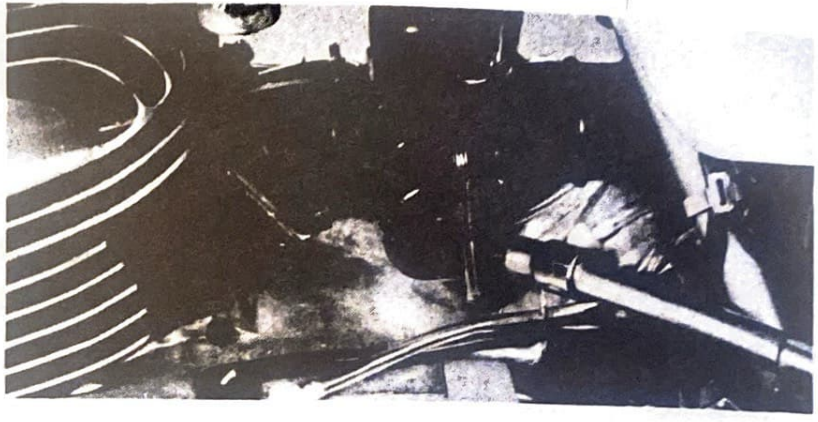
Never operate the engine with the air filter element removed. This will allow unfiltered air to enter, causing rapid wear and possible engine damage. Additionally, operation without the filter element will affect carburetor jetting with subsequent poor performance and possible engine over-heating.

5-3. CARBURETOR

A. Removal Inspection and Installation

1. Turn fuel petcock lever to the "OFF" position.
2. Remove the gasoline tank fuel line from fitting at carburetor.

3. Loosen the manifold and inlet joint bands (hose clamps) on front and rear of carburetor.



NOTE:

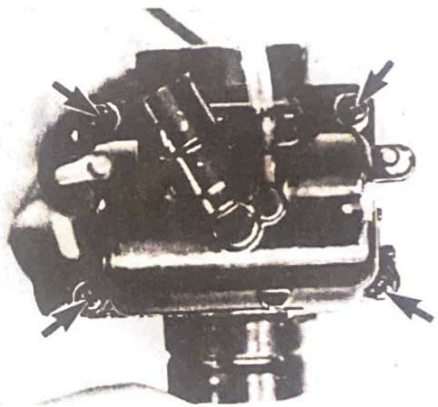
Main jet can be easily removed without dismounting carburetor.

Main Jet:	#150

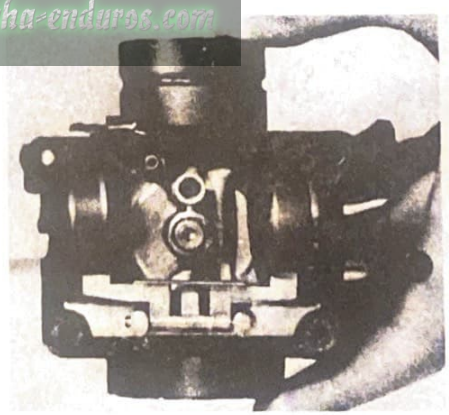
4. Push the air cleaner joint (hose) off the carburetor inlet.
5. Rotating the carburetor body, work it off the cylinder manifold joint.

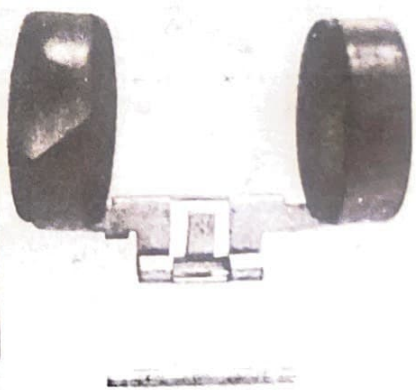
6. Noting the presence, location and routing of all vent and overflow tubes, pull the carburetor toward you.
7. With the carburetor clear of the engine, push the mixing chamber cover off.
8. Unscrew the mixing chamber top. Remove the throttle valve (slide) and needle assembly.

9. Remove the pan-head screws (4) holding float chamber body.

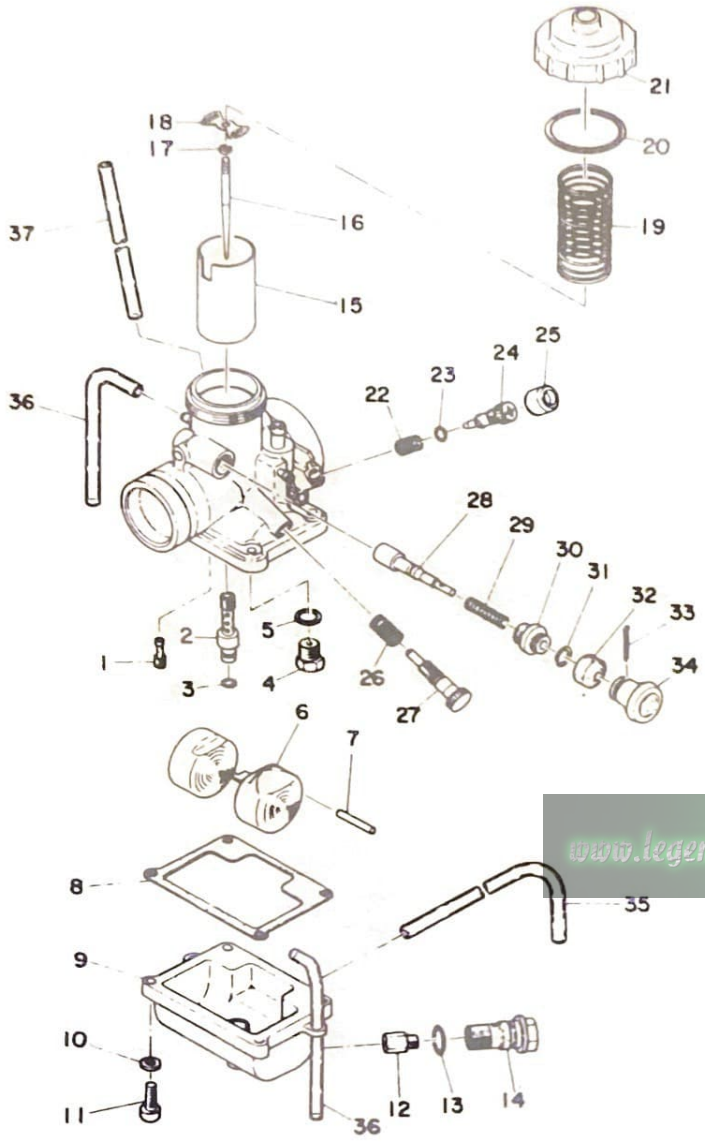


10. Remove dual float. If a pin is loose or missing, or if the float is damaged in any fashion, replace the float.
11. On the carburetor body, remove the pin securing the float arm. Remove dual float ass'y.



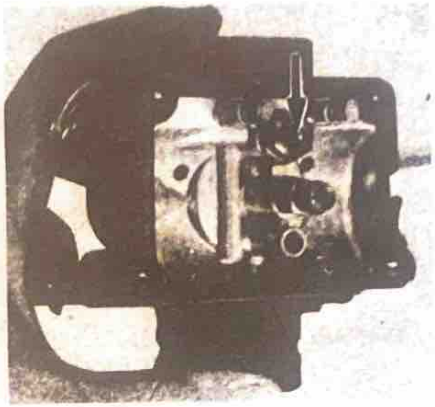


CARBURETOR

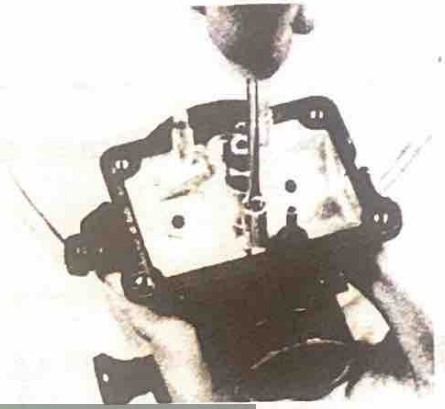


1. Pilot jet
2. Main nozzle
3. O-ring
4. Valve seat assembly
5. Valve seat washer
6. Float
7. Float pin
8. Float chamber gasket
9. Float chamber body
10. Spring washer
11. Panhead screw
12. Main jet
13. O-ring
14. Banjo bolt
15. Throttle valve
16. Needle
17. Clip
18. Stopper cable
19. Throttle valve spring
20. O-ring
21. Mixing chamber top
22. Air adjusting spring
23. O-ring
24. Air adjusting screw
25. Cap
26. Throttle stop spring
27. Throttle screw
28. Starter plunger
29. Plunger spring
30. Plunger cap
31. Plunger clip
32. Plunger cap cover
33. Cotter pin
34. Holder
35. Over flow pipe
36. Air vent pipe
37. Pipe

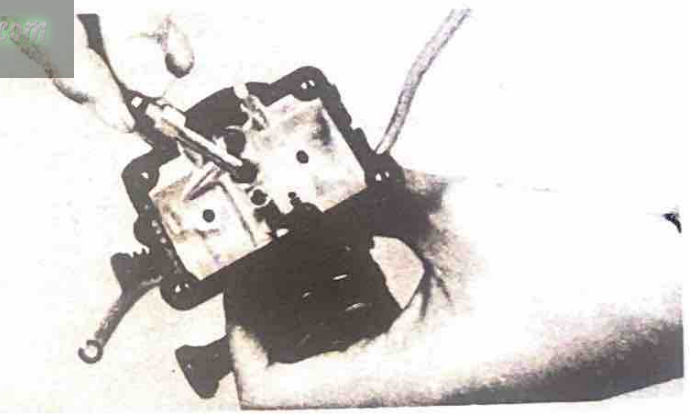
12. Remove the inlet needle directly beneath the float arm tang. Inspect the needle and seat for signs of excessive wear or attached foreign particles. Replace as required. Always replace inlet needle and inlet valve seat as an assembly.



13. Remove, in order, the following components.
    a. Pilot jet



    b. Main Nozzle (push from bottom through venturi)
    c. Throttle Screw (Idle Speed Screw)
    d. Air Adjusting Screw (Idle Mixture Screw)



14. Pull the starter jet knob to open the circuit.
15. Wash the carburetor in petroleum-base solvent. Wash all associated parts.

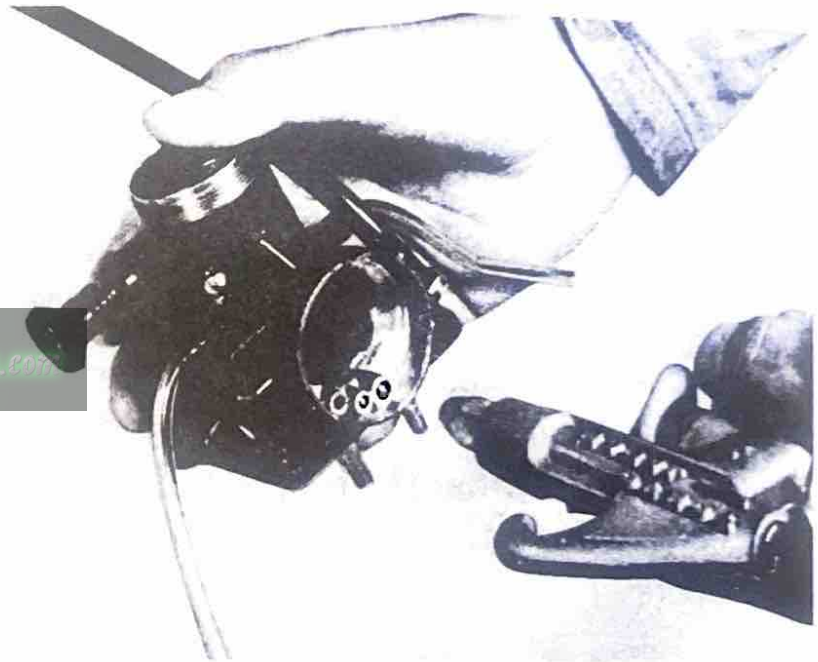
NOTE:

It is rarely necessary to "boil" the carburetor in a warm or hot carburetor bath. If this is necessary, remove the starter plunger assembly.

16. Using high pressure air, blow out all passages and jets.

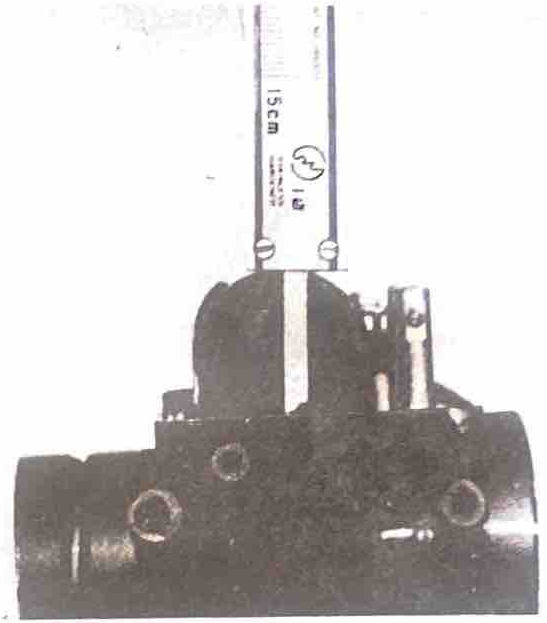
NOTE:

Never direct high pressure air into carburetor with float chamber body installed.
Damage to float assembly may occur.



17. Re-install all components.
Using a vernier caliper, measure the float height from the top of the float to the float chamber gasket seat. (gasket removed).

Float Height:	24.0±2.5mm (0.995±0.10 in.)



NOTE:

The float arm should be just resting on, but not depressing, the spring loaded inlet needle.
To correct float height, remove the arm and bend the tang a slight amount as required. Correct as required.

18. Install the float chamber body.
19. Moving to machine, push needle out of seat in throttle valve (slide). Inspect for signs of bending, scratches or wear. Replace as required.

20. Check needle clip position. Clip position is counted starting with the first clip groove at the top of the needle.

Jet Needle Type:	4L6
Clip Position:	3

21. 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 as necessary.
22. Install throttle valve and needle assembly in carburetor mixing chamber. Tighten mixing chamber top as tight as possible by hand. Do not use pliers or vice-grips as they may deform the mixing chamber shape, causing the throttle valve to stick during operation.
23. Install the mixing chamber top cover and all overflow and vent tubes. Reinstall carburetor. Check position and routing of all tubes. Check tightness of all fittings. Make sure carburetor is mounted in a level position.
24. After installation, re-adjust throttle cable and Autolube pump cable per directions in "Mechanical Adjustments."

B. Troubleshooting

A Trials machine requires immediate, predictable throttle response over a wide operating range. Cylinder porting, combustion chamber compression, ignition timing, muffler design, carburetor size and component selection are all balanced to achieve this goal. However, variations in temperature, humidity and altitude, etc., will affect carburetion and, consequently, engine performance.

The following list gives each of the major components of the TY250D carburetor that can be readily changed in order to modify carburetor performance, if required. If you are unfamiliar wit carburetor theory, we suggest you refrain from making changes. Quite often, a performance problem is caused by another related component, such as the exhaust system, ignition timing or combustion chamber compression.

NOTE:

See "Mechanical Adjustments" for additional carburetor adjustments.

1. Idle Air Mixture Screw:
   Controls the ratio of air to fuel in the idle circuit. Turning the screw in decreases the air supply giving a richer mixture. Normally, for Trials competition, the idle mixture screw is backed out to a lean position. OPERATING RANGE MOST AFFECTED BY THIS ADJUSTMENT: ZERO TO 1/8 THROTTLE.
2. Pilot Jet:
   Controls the ratio of fuel to air in the idle circuit. Changing the jet to one with a higher number supplies more fuel to the circuit giving a richer mixture.
   OPERATING RANGE MOST AFFECTED BY THIS JET: ZERO TO 1/8 THROTTLE.

3. Throttle Valve (Slide):
The throttle valve (slide) has a portion of the base cut away to control air flowing over the main nozzle. A wider angle (more "cutaway") will create a leaner mixture. Throttle valves are numbered according to the angle of the cutaway. The higher the number, the more cutaway, the leaner the mixture.
OPERATING RANGE MOST AFFECTED BY THE THROTTLE VALVE: 1/8 to 1/4 (+) THROTTLE.
4. Jet Needle:
The jet needle is fitted within the throttle valve. The tapered end of the needle fits into the main nozzle outlet. Raising the needle allows more fuel to flow out of the nozzle outlet giving a richer mixture. There are five circlip grooves at the top of the needle.
Moving the needle clip from the first, or top groove, through the fifth, or bottom groove, will give a correspondingly richer mixture.
OPERATING RANGE MOST AFFECTED BY THE JET NEEDLE: 1/4 TO 3/4 (+) THROTTLE.
5. Main Jet:
The main jet controls overall fuel flow through the main nozzle. Changing the jet to one with a higher number supplies more fuel to the main nozzle giving a richer mixture.
OPERATING RANGE MOST AFFECTED BY THE MAIN JET: 3/4 TO FULL THROTTLE.

NOTE:

Excessive changes in main jet size can affect overall performance.

CAUTION:

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

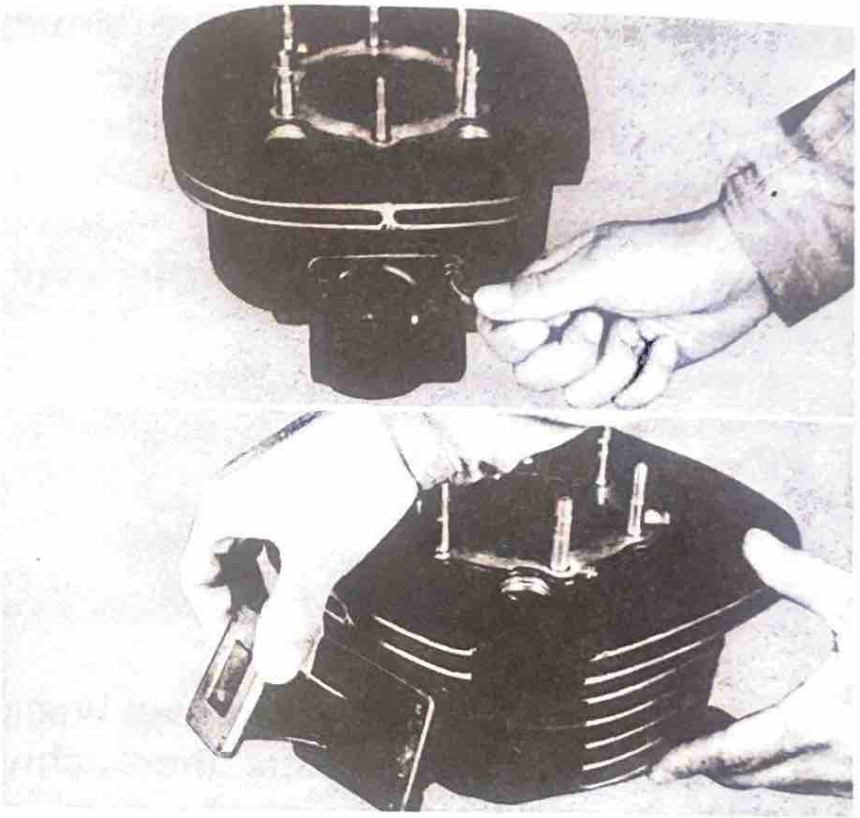
5-4. REED VALVE

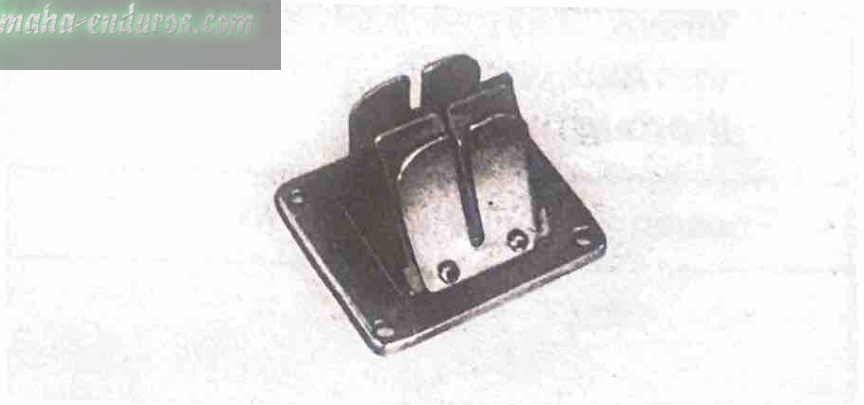
With carburetor removed, proceed as follows:

1. Remove the bolts (4) holding the intake manifold and reed valve assembly to cylinder. Remove assembly.

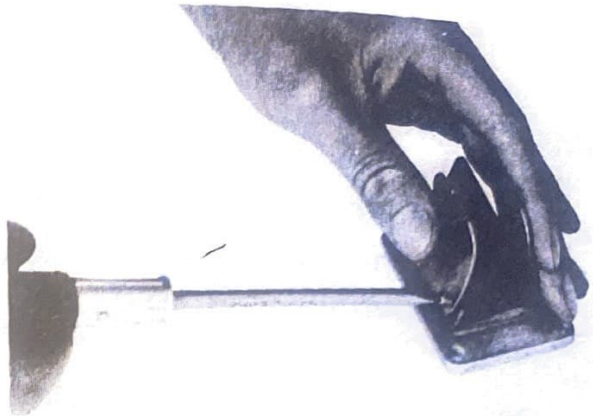
2. Inspect rubber intake manifold for signs of weathering, cracking or other deterioration.

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.



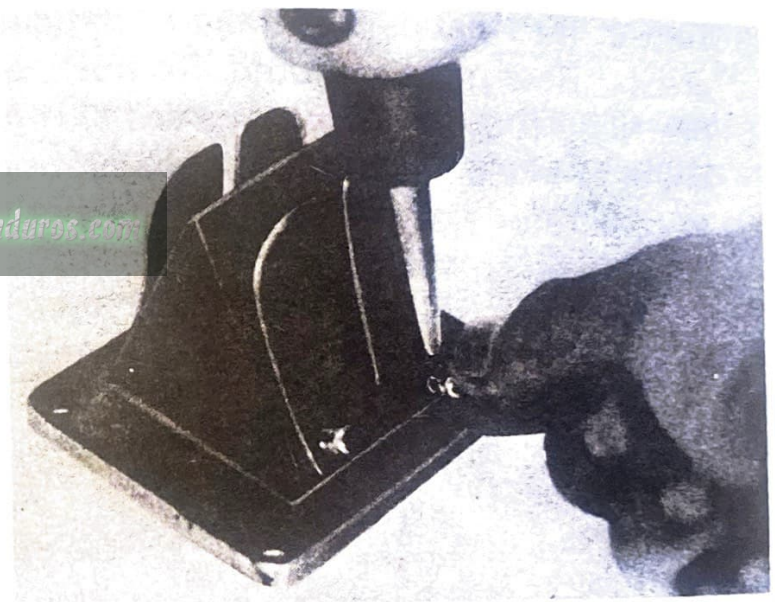


4. If disassembly of the reed valve assembly is required, proceed as follows:
   a. Remove pan-head screw (2) securing stopper plate and reed to reed block. Handle reed carefully. Avoid scratches and do not bend. Note from which side of the reed block the reed and stopper plate were removed. Re-install on same side.



   b. During reassembly, clean reed block, reed, and stopper plate thoroughly. Apply a holding agent, such as "Lock-Tite," to threads of Phillips screws. Tighten each screw gradually to avoid warping. Tighten the screws thoroughly.

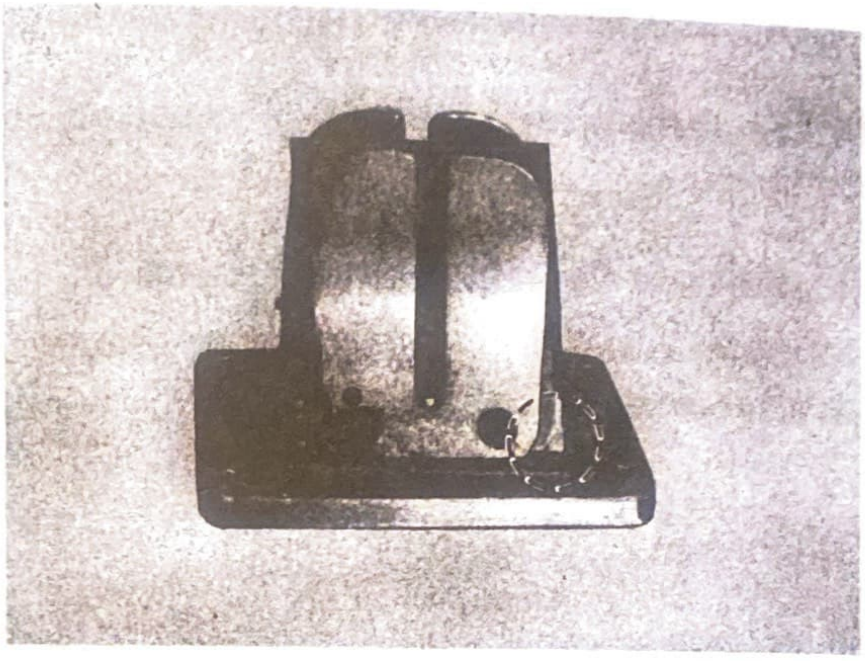
Torque: 8.0 cm-kg (6.9 in-lb)



NOTE:

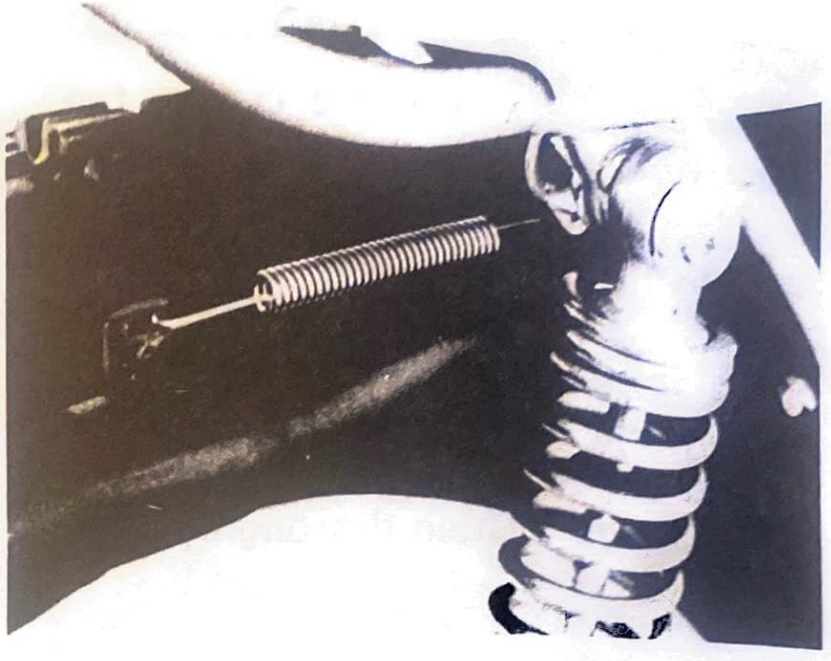
During assembly, note the cut in the lower corner of the reed and stopper plate. Use as aid to direction of reed installation.

5. During reassembly of the reed valve assembly and manifold, install new gaskets and torque securing bolts gradually and in pattern. Tighten thoroughly.



5-5. Top End and Muffler

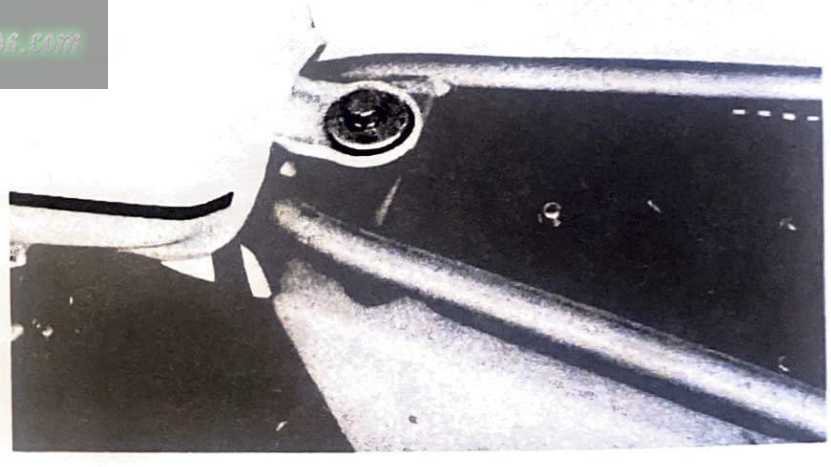
With the carburetor removed, proceed as follows:



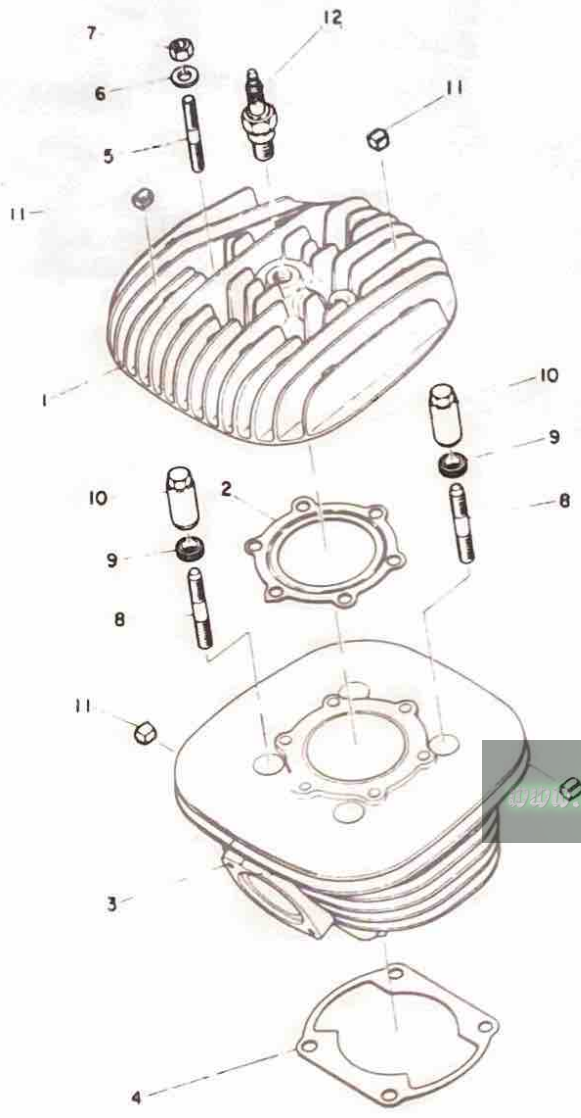
A. Muffler and Cylinder Head Removal

1. Remove coil springs at muffler/spark arrester joint.

2. Remove seat assembly.
3. Remove securing bolt at rear of fuel tank.

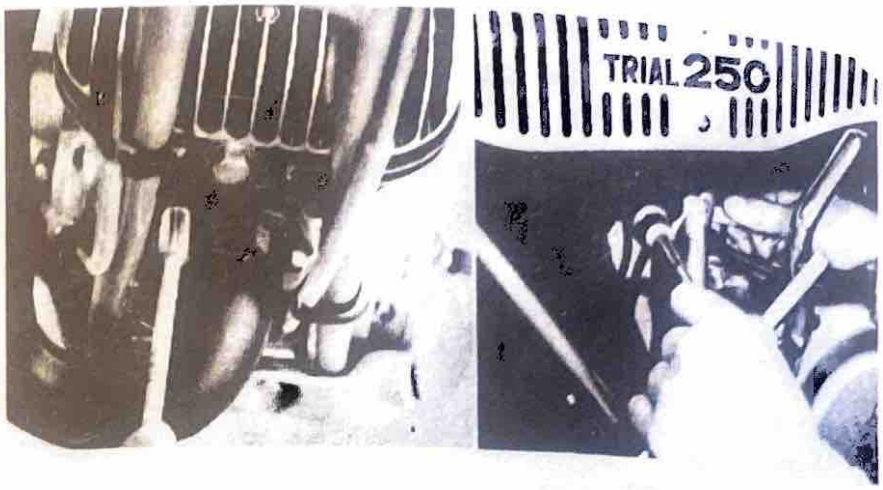


CYLINDER HEAD · CYLINDER



1. Cylinder Head
2. Clyinder Head Gasket
3. Cylinder
4. Cylinder Gasket
5. Stud Bolt
6. Washer
7. Nut
8. Cylinder Holding Bolt
9. Holding Washer
10. Holding Nut
11. Absorber
12. Spark Plug

4. Lift rear of fuel tank up and pull back to clear frame mounts.
5. Remove bolts (2) holding muffler to cylinder. Remove muffler.



6. Remove spark plug lead wire. Loosen, but do not remove spark plug.

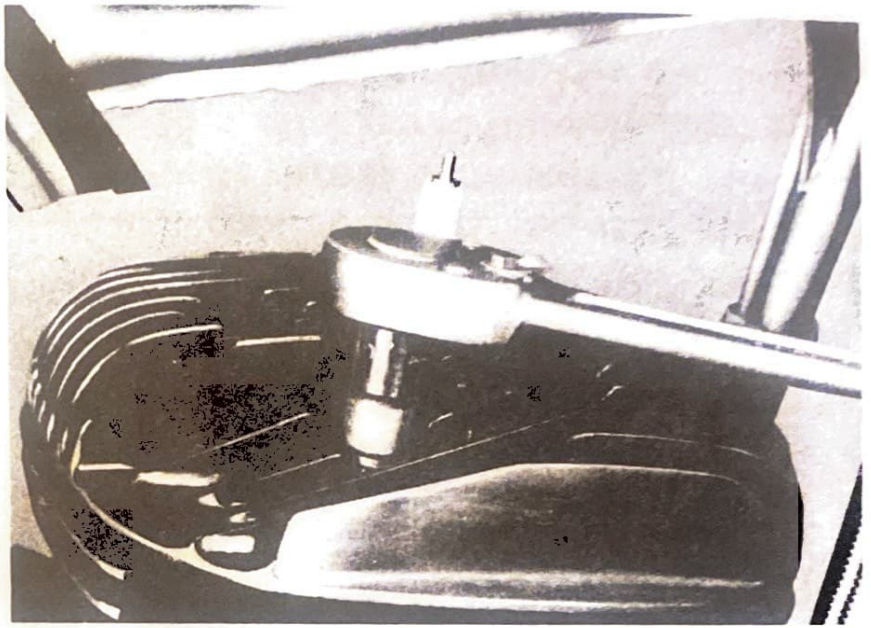
Remove nuts (6) securing cylinder head to cylinder. Remove cylinder head and gasket.

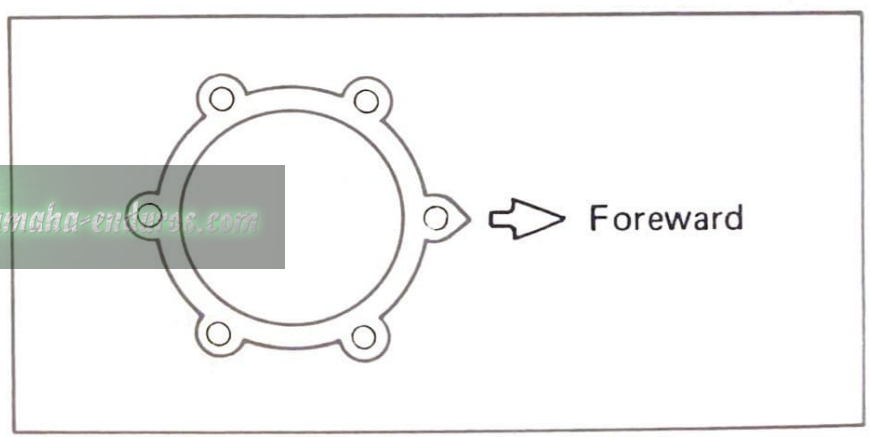
NOTE:

Break each nut loose (1/4 turn) prior to removing any one nut.

NOTE:

The head gasket should be installed as illustration.



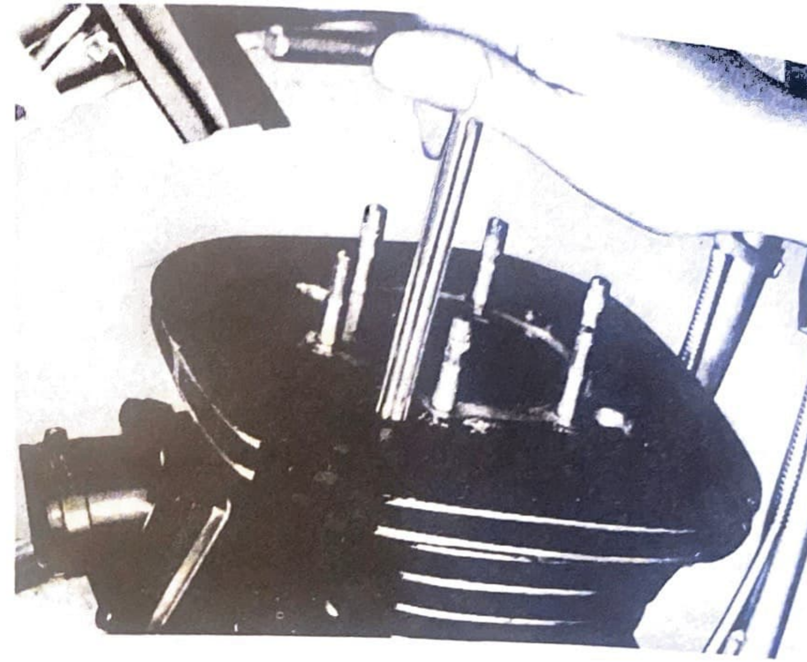


B. Cylinder Removal

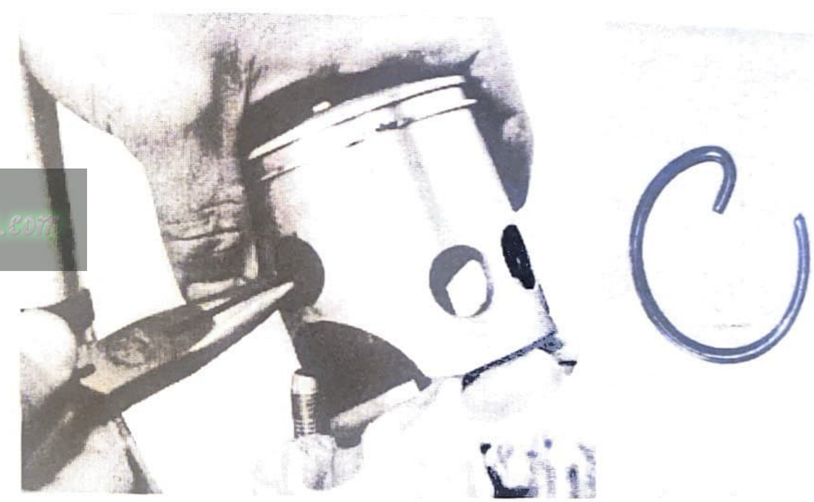
1. Remove cap bolts (4) securing cylinder to crankcase.

   NOTE:

   Break each bolt loose (1/4 turn). Prior to removing any one bolt.



2. With piston at Top Dead Center, raise cylinder until cylinder skirts clear crankcase. Stuff a clean shop rag into crankcase cavity, around rod, to prevent dirt and other foreign particles from entering. Remove cylinder.
3. Remove piston pin clip (1) from piston. Push piston pin out from opposite side. Remove piston.

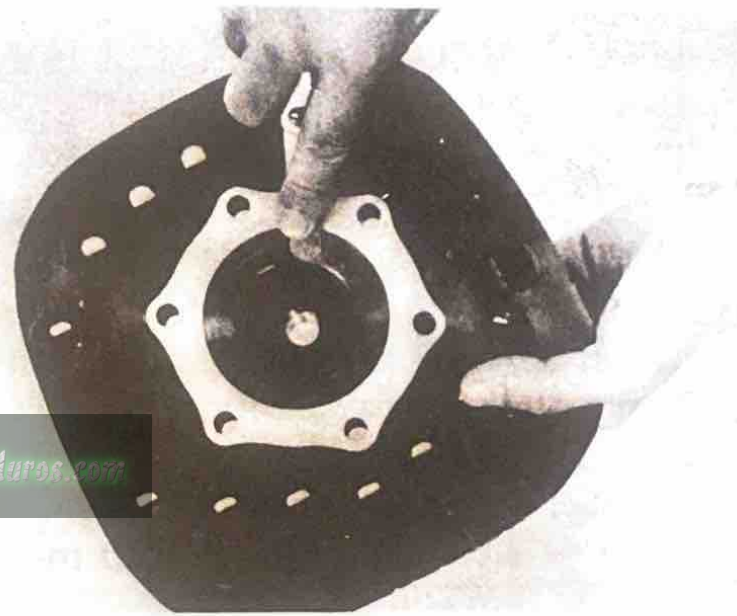


C. Maintenance—Muffler/Spark Arrester

1. Using a rounded scraper, remove excess, carbon deposits from manifold area of muffler. Check muffler gasket condition. The gasket seat is located around the cylinder exhaust port.
2. Carbon deposits within the muffler may be removed by lightly tapping the outer shell with a hammer and then blowing out with compressed air. Heavy wire, such as a coat hanger, may be inserted to break loose deposits. Use care.
3. Remove spark arrester. Remove Phillips screw holding baffle in place. Clean carbon out of baffle and arrester assembly with scraper. Re-install.

D. Maintenance—Cylinder Head

1. Remove spark plug.
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. Place head on a surface plate. There should be no warpage. Correct by re-surfacing. (Place 400-600 grit wet sand-paper on surface plate and resurface head using a figure-eight sanding pattern. Rotate head several times to avoid removing too much material from one side.)
4. Clean spark plug gasket mating surface thoroughly.
5. Wash head in solvent and wipe dry.
6. Install new cylinder head gasket during reassembly.

NOTE:

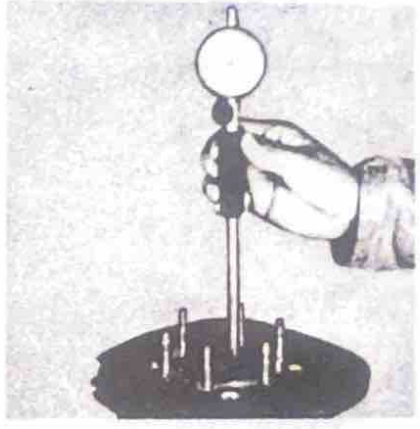
The projection of the cylinder head gasket must be forward.

Cylinder Head Nut Torque:
2.1 – 2.5 m-kg (180 – 220 in-lbs)

E. Maintenance—Cylinder

1. Remove reed valve assembly.
2. Using a rounded scraper, remove carbon deposits from exhaust port.

3. Remove cylinder base gasket and clean gasket surface on cylinder and crankcase thoroughly.
4. Check cylinder bore. Using a cylinder hone, remove any scoring. Hone lightly, using smooth stones. Hone no more than required to avoid excess piston clearance.
5. Using a cylinder gauge set to standard bore size, measure the cylinder. Measure at six points; at top, center, and from bottom of skirts, in line with the piston pin and at right angle to pin. Compare minimum and maximum measurements. If over tolerance, and not correctable by honing, re-bore to next over-size.



Standard bore: 70.00mm (2.756 in.)
Max. Allowable Taper: 0.05mm. (0.002 in.)
Max. Allowable Out-of-Round: 0.01mm (0.0004 in.)

6. Wash cylinder thoroughly with soap and water. Dry. Coat walls with light oil film immediately.
7. During re-assembly, always use a new cylinder base gasket.

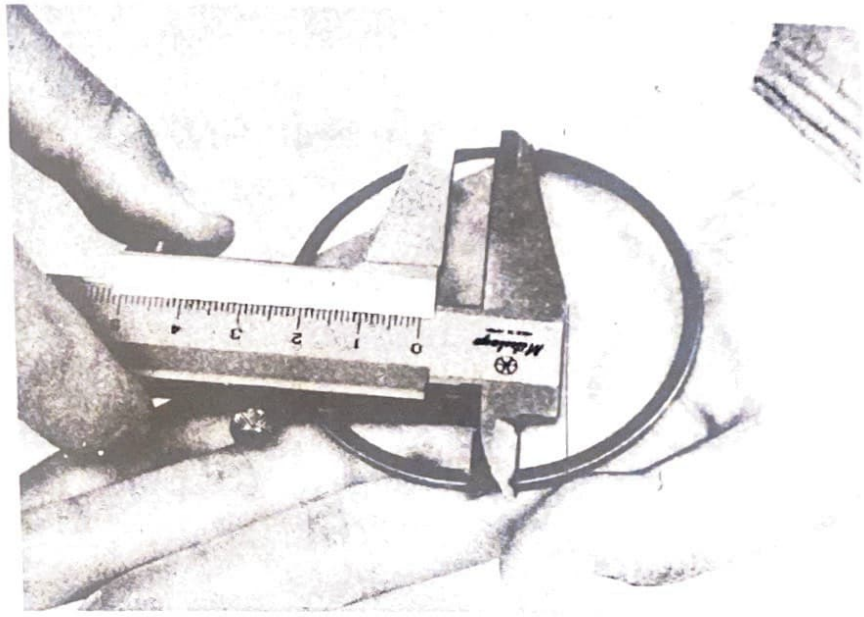
Cylinder Holding Bolt Torque: 4.2~4.5 m-kg (30~33 ft-lb.)

F. Maintenance—Piston Rings

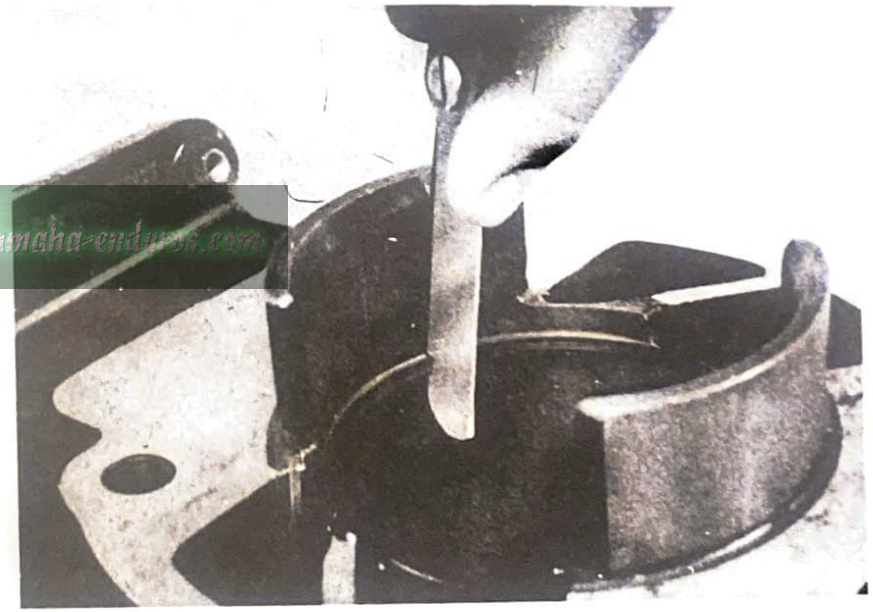
1. Remove rings from piston. Remove ring expander from lower ring groove.
2. Check rings for scoring. If any severe scratches are noticed, replace set.

3. Measure ring end gap in free position. If beyond tolerance, replace set.

Top Ring End Gap, Free	approx. 7.0mm (0.28 in.)
2nd Ring End Gap, Free	approx. 6.5mm (0.27 in.)



4. Insert each ring into cylinder. Push down approximately 20 mm (3/4 in) using piston crown to maintain right-angle to bore. Measure installed end gap. If beyond tolerance, replace set.



	Minimum	Maximum
Top Ring End Gap, Installed	0.3mm (0.012 in.)	0.5mm (0.020 in.)
2nd Ring End Gap, Installed	0.2mm (0.008 in.)	0.4mm (0.016 in.)

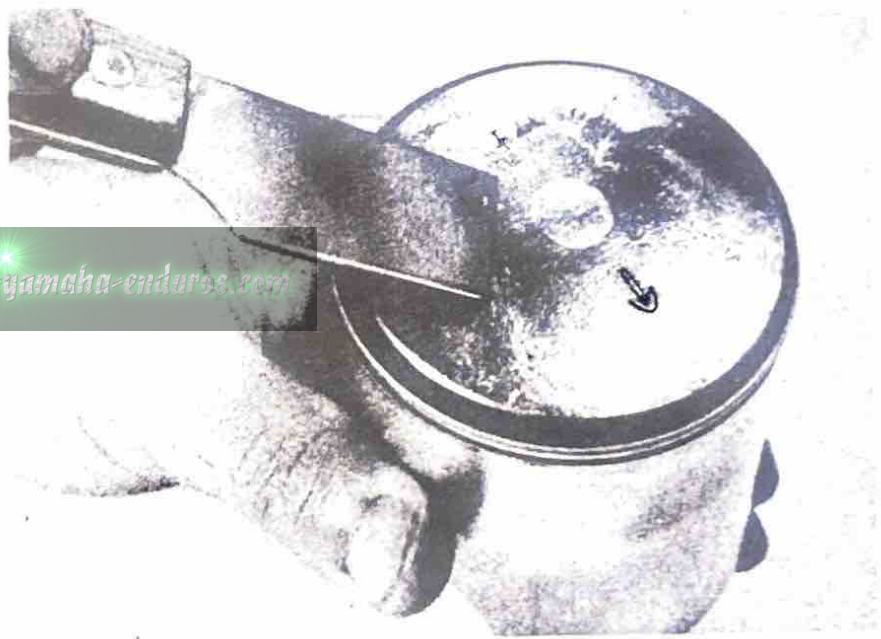
5. Holding cylinder towards light, check for full seating of ring around bore. If not fully seated, check cylinder. If cylinder is not out-of-round, replace ring.
6. Check ring expander. If worn excessively, or broken, replace set.
7. With rings installed in grooves, insert feeler gauge between ring edge and groove. If beyond tolerance, replace ring and/or piston as required.

	Min.	Max.
Top Ring Groove Clearance	—	—
2nd Ring Groove Clearance	0.03mm (0.0012 in.)	0.08mm (0.0031 in.)

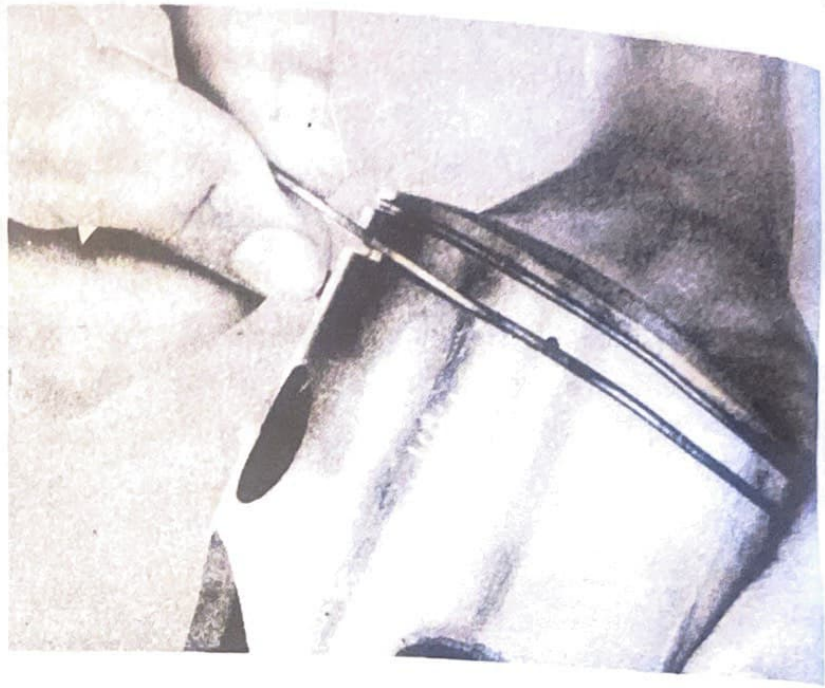
8. During installation, make sure ring ends are properly positioned on either side of locating pin in ring groove. Make sure ring expander is positioned in like manner. Apply liberal coating of two-stroke oil to rings.
9. New rings require break-in. Follow first portion of new machine break-in procedure.

G. Maintenance—Piston

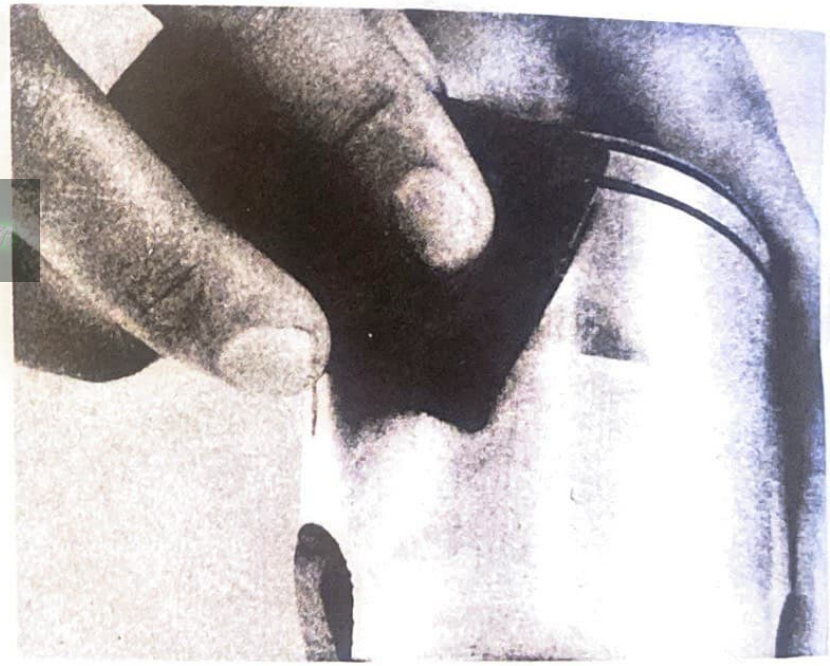
1. Remove carbon deposits from piston crown.



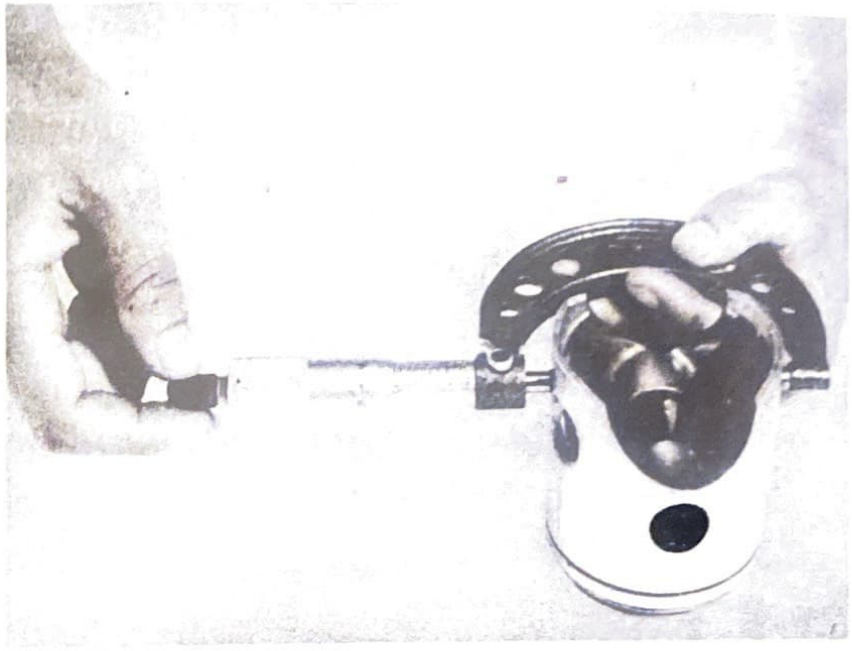
2. Break a used piston ring in two. File end square. De-burr edges to avoid scratching ring groove and clean carbon deposits from ring grooves.



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

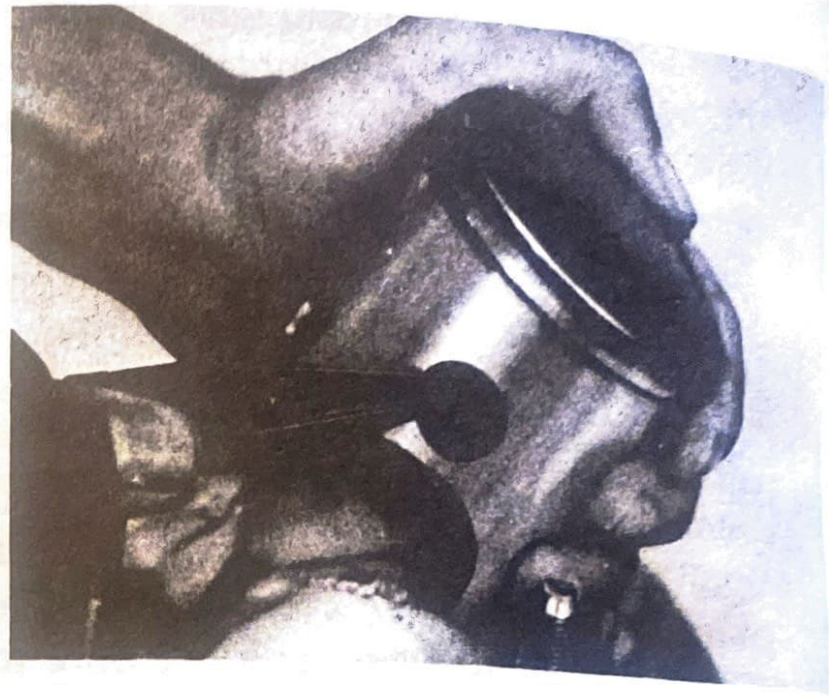


4. Wash piston in solvent and wipe dry.
5. Using an outside micrometer, measure piston diameter. The piston is cam-ground and tapered. The only measuring point is at right-angles to the wrist pin holes about 10 mm (1/2 in) from bottom of piston. Compare piston diameter to cylinder bore measurements.
   Piston minimum diameter subtracted from maximum cylinder diameter gives piston clearance. If beyond tolerance, hone cylinder to tolerance or re-bore to next over-size and fit new piston.

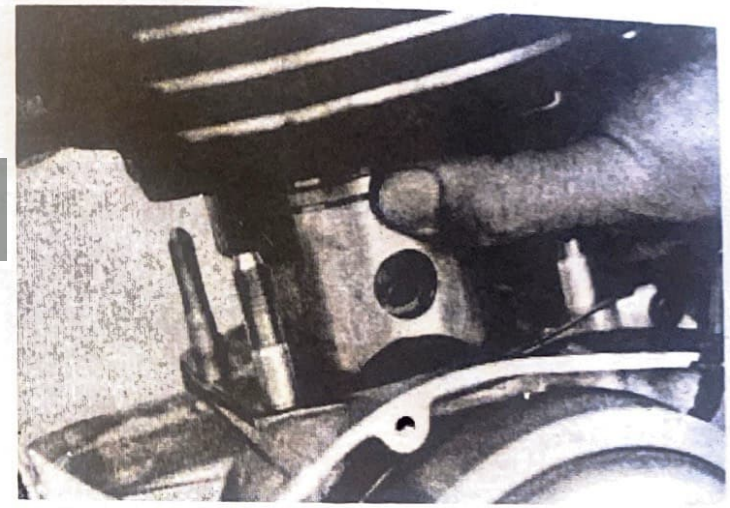


	Miminum	Maximum
Piston Clearance	0.040mm (0.0016 in.)	0.45mm (0.0018 in.)
Maximum Wear Limit	0.1mm (0.004 in.)	

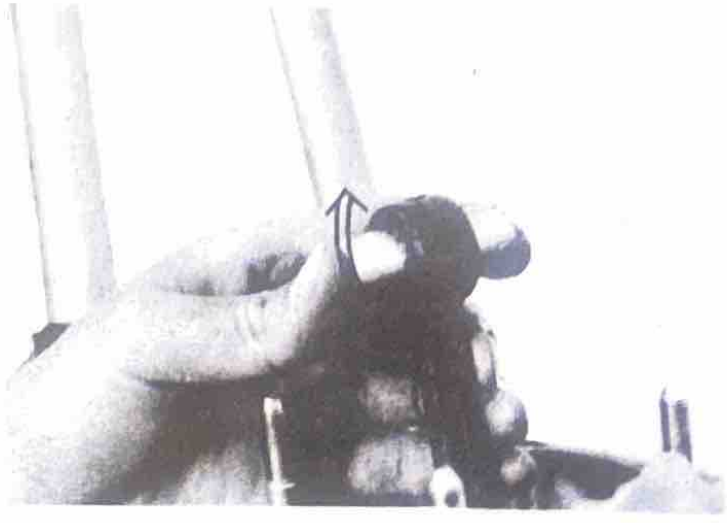
6. During re-assembly, coat the piston skirt areas liberally with two-stroke oil.
7. Install new piston pin circlips and make sure they are fully seated within their grooves.
8. Take care during installation to avoid damaging the piston skirts against the crankcase as the cylinder is installed. Note the two induction holes in the piston skirt. These must be to the rear during installation.



9. Make sure the rings are properly positioned as the cylinder is installed.

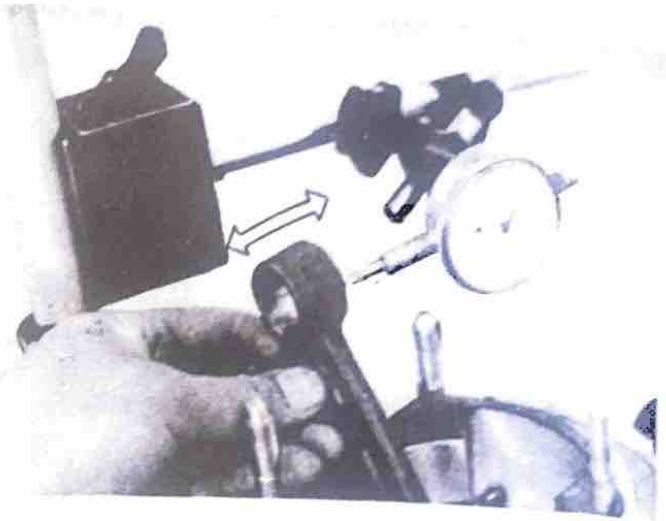


H. Maintenance—Piston Pin, Bearing and Connecting Rod



1. Check the pin for signs of wear. If any wear is evident, replace pin and bearing.
2. Check the pin and bearing for signs of heat discoloration. If excessive (heavily blued), replace both.
3. Check the bearing cage for excessive wear. Check the rollers for signs of flat spots. If found, replace pin and bearing.
4. Apply a light film of oil to pin and bearing surfaces. Install in connecting rod small end. Check for play. There should be no noticeable vertical play. If play exists, check connecting rod small end diameter and wear. Replace pin and bearing or all as required.

5. Mount a dial gauge at right angles to the connecting rod small end and measure axial play. (Push the bottom of the rod to one side then rock the top from side to side.)

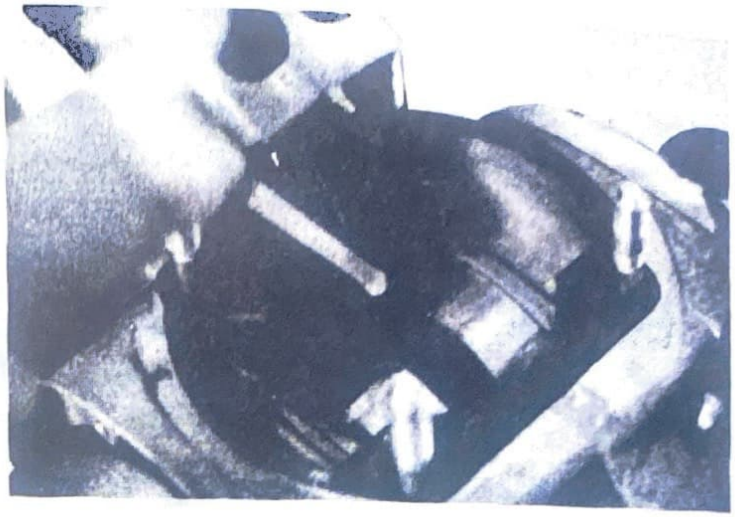


	Nominal	Wear Limit
Connecting rod axial play	0.8~1.0mm (0.032~0.040 in.)	2.0mm (0.08 in.)

6. Remove the dial gauge and slide the connecting rod to one side. Insert a feeler gauge between the side of the connecting rod big end and the crank wheel. Measure clearance.

	Minimum	Maximum
Connecting rod/ crank side clearance	0.25m (0.001 in.)	0.75mm (0.030 in.)

7. If any of the these measurements exceed tolerance, crankshaft repair is required. Take the machine to your Authorized Dealer.
8. During reassembly, apply a liberal coating of two-stroke oil to the piston pin and bearing. Apply several drops of oil to the connecting rod big end. Apply several drops of oil into each crankshaft bearing oil delivery hole.



I. Troubleshooting—Top End and Muffler

If performance is not up to par, the following procedure will indicate if top end repair is required.

1. Adjust ignition timing.
2. Make a spark plug reading. Adjust spark plug and/or carburetion as required.
3. Warm up engine. Insert compression gauge into spark plug hole. With ignition off and throttle on, kick engine over briskly several times. If compression measurement exceeds tolerance disassembly cylinder head and decarbonize.

4. Decarbonize muffler/spark arrester assembly. Decarbonize cylinder head and piston crown. Take care that carbon does not drop into crankcase cavity or foul ring grooves. Reassemble.
5. Reassemble and re-check compression pressure. If no improvement, disassemble top end completely.

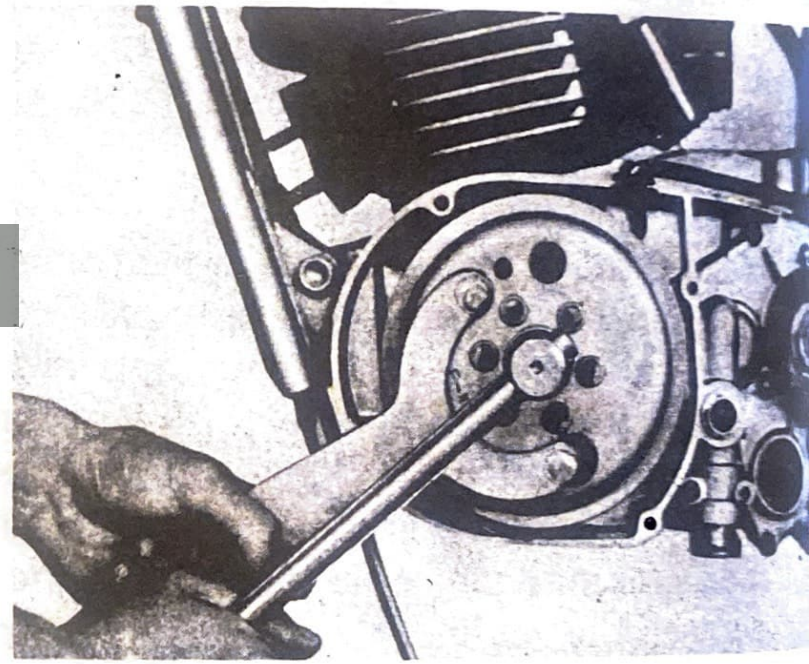
5-6. IGNITION

NOTES:

For timing procedure, see "Mechanical Adjustments, Ignition Timing." For theory of operation and troubleshooting.

A. Removal

1. Remove left crankcase cover.
2. Remove the Flywheel Magneto securing nut, lock washer and bevelled washer. Note installation order and direction.

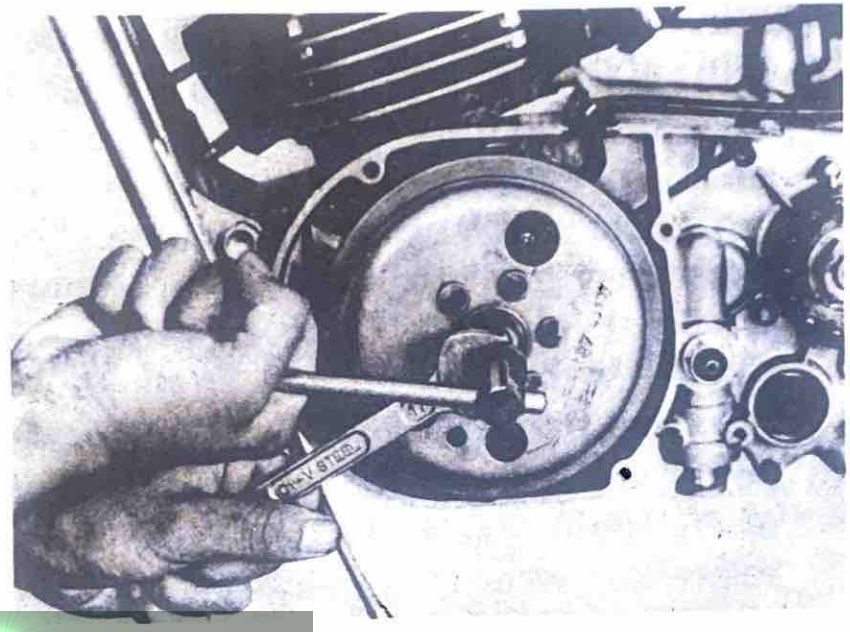


3. Install Flywheel Puller.

NOTE:

The puller body has a left-hand thread.

4. Tighten the puller body thoroughly into the flywheel. While holding the body, tighten the push bolt. This will pull the flywheel off the tapered end of the crankshaft.



NOTE:

If the flywheel is frozen on the taper, keep pressure on the push bolt while tapping on the end of the bolt with a light steel hammer.

5. With the flywheel removed, the magneto backing plate is exposed, allowing for replacement of any assembly therein.
6. The ignition source coil is located on the right-hand side of the backing plate. The lighting source coil is on the left.

B. Maintenance

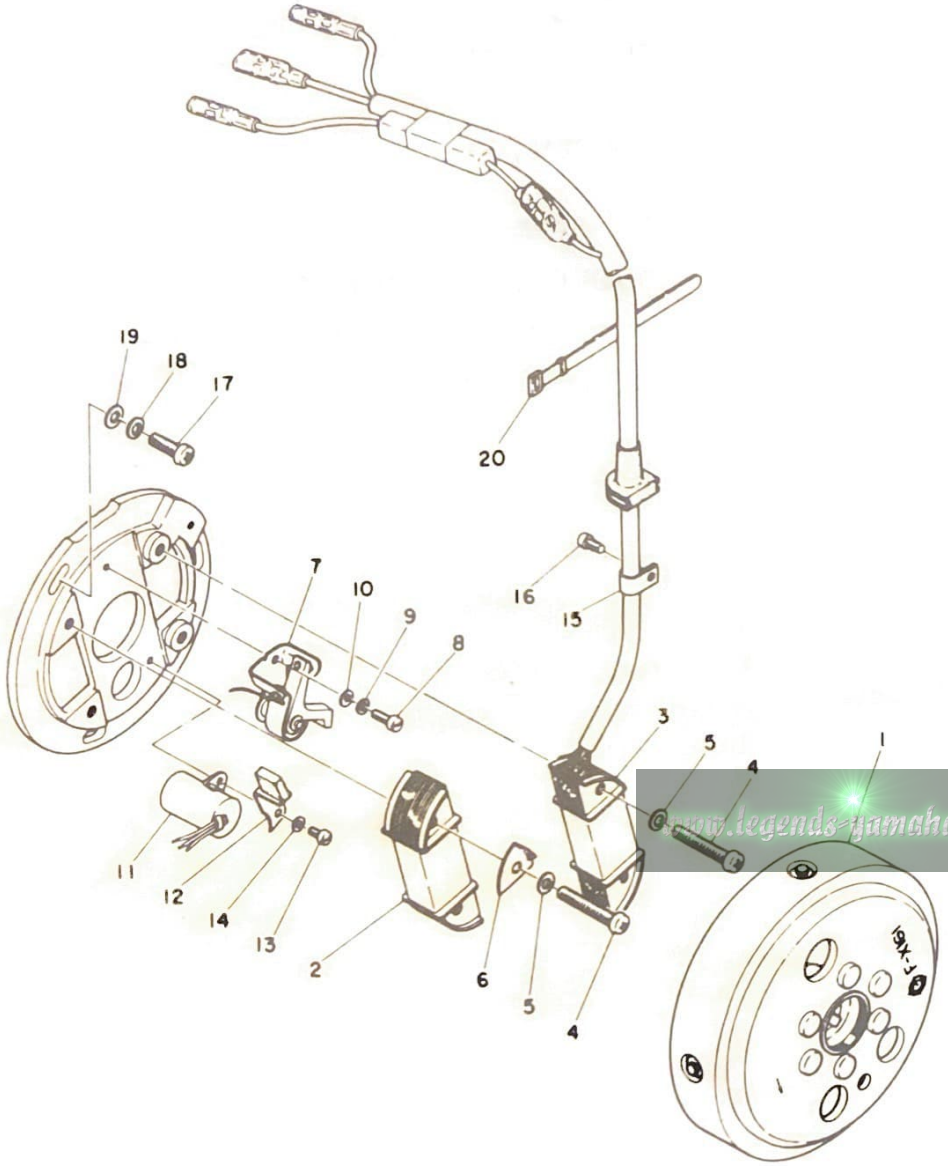
1. Apply a few drops of lightweight machine oil or distributor lubricant to the point cam lubricator.
2. The ignition points can be lightly filed with an ignition point file or sanded with 400-600 grit sandpaper. Place a piece of clean paper between the points, let them close, and repeatedly remove the paper until no residue shows. The paper may be dipped in lacquer thinner or point cleaning fluid to provide a solvent to remove oil and sanding residue from point surfaces.
3. Point replacement should only occur when point gap exceeds maximum tolerance; when the points are severely pitted; or if the points become shorted or show faulty operation.

Point Gap:
Nominal 0.35mm (0.014 in.)
Minimum 0.30mm (0.012 in.)
Maximum 0.40mm (0.016 in.)

NOTE:

There is no separate point gap adjustment. Point gap is directly related to ignition timing and cam follower wear. New points, when installed, should be lightly burnished and thoroughly cleaned per paragraph number two.

FLYWHEEL MAGNETO



1. Rotor Ass'y
2. Source Coil
3. Lighting Coil
4. Panhead Screw
5. Spring Washer
6. Timing Plate
7. Contact Breaker Ass'y
8. Panhead Screw
9. Spring Washer
10. Plain Washer
11. Condenser
12. Lubricator
13. Panhead Screw
14. Spring Washer
15. Lead Clamp
16. Panhead Screw
17. Panhead Screw
18. Spring Washer
19. Plain Washer
20. Switch Cord Band

4. When replacing ignition condenser, source coil, or lighting source coil, soldering is required. Use a low wattage gun. Do not allow wiring to overheat as lacquer insulation on coil windings may be destroyed. The use of a heat sink is recommended.
5. When installing flywheel magneto, make sure woodruff key is properly seated in keyway in 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 bevelled washer, lockwasher and lock nut. Tighten carefully to recommended torque value.

Flywheel Securing Bolt Torque:
6.0 – 8.0 m-kg (520 – 690 in-lb)

NOTE:

Whenever the flywheel magneto is removed, ignition timing must be re-set.

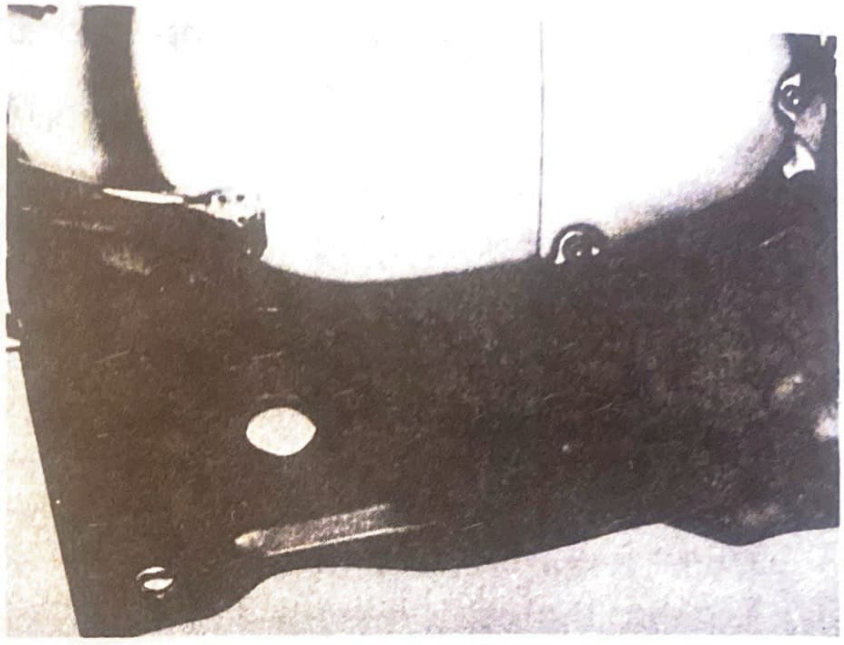
5-7. CLUTCH, SHIFTER AND KICK STARTER

NOTE:

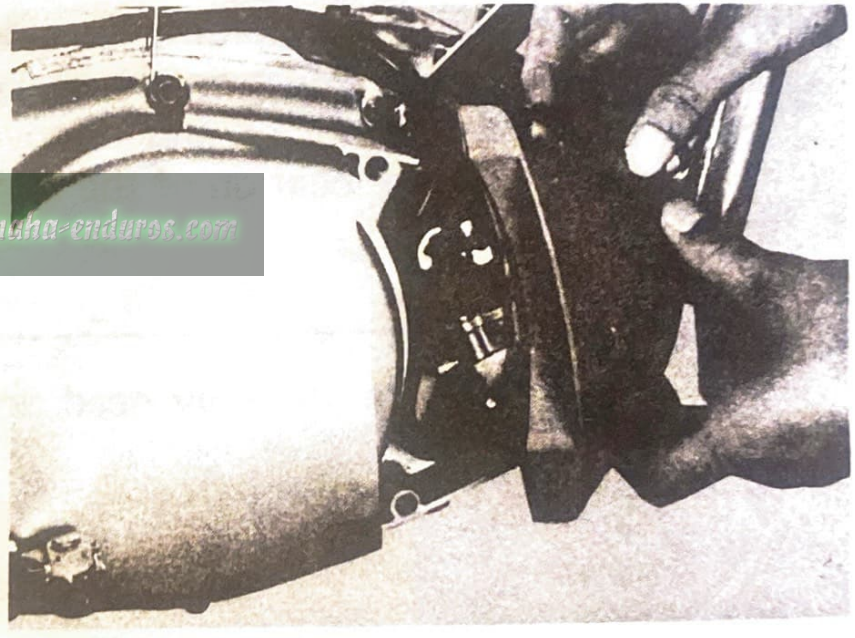
Clutch adjustment is covered in Chapter 4, "Mechanical Adjustments."

A. Removal

1. Remove the engine protector.



2. Remove the kick crank.
3. To allow clearance for side cover removal, remove the rear brake cable adjust nut and clevis pin.
4. Remove the Autolube pump cover.

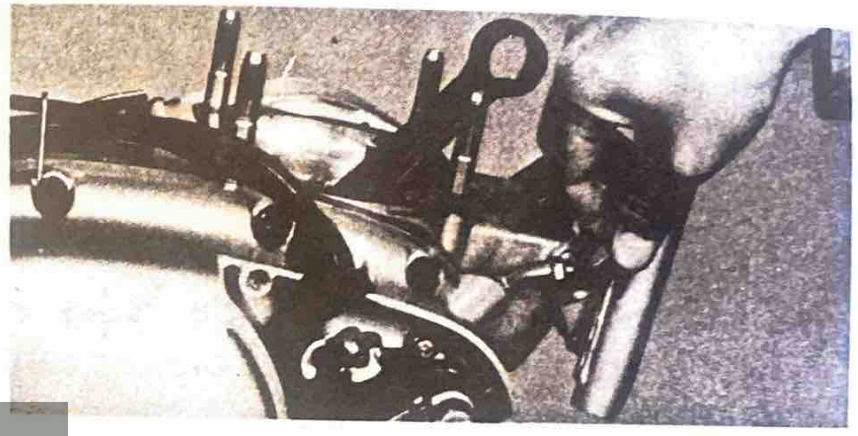


5. Remove oil pipe at oil pump and oil delivery pipe at carburetor.

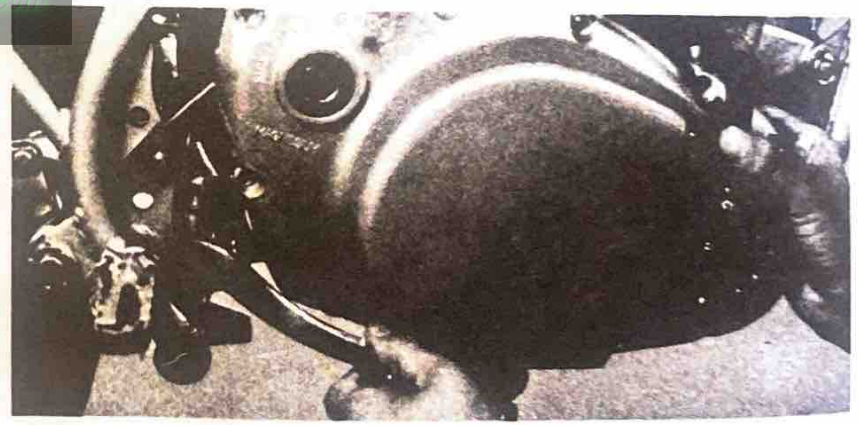
NOTE:

Pull oil pipe through oil pipe holder and plug the end so oil will not run out of oil tank.

6. Rotate the pump pulley to increase cable slack and remove the cable end from its seat in the pulley.
7. Loosen the cable length adjustor lock-nut. Remove the adjustor and cable.



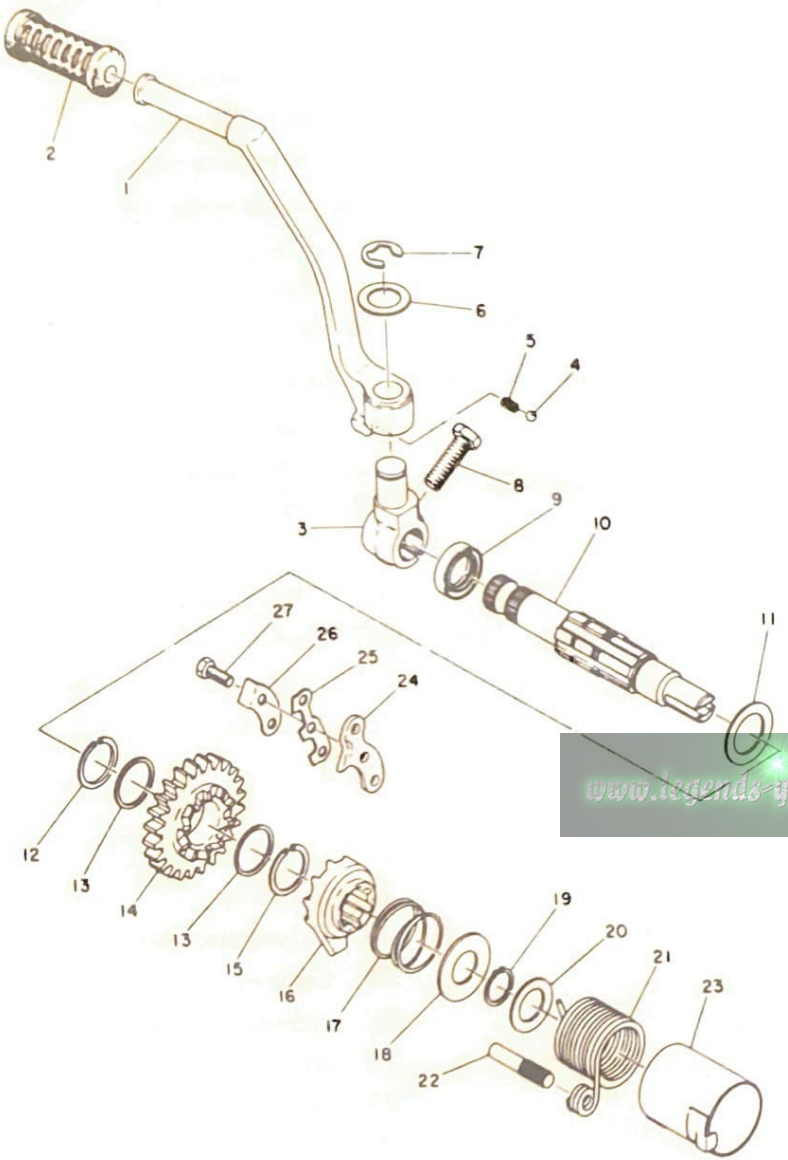
8. Remove the Allen bolts holding the side cover in place. Push down on the brake pedal to provide clearance and remove the cover. Note the location of the kick axle shim.



NOTE:

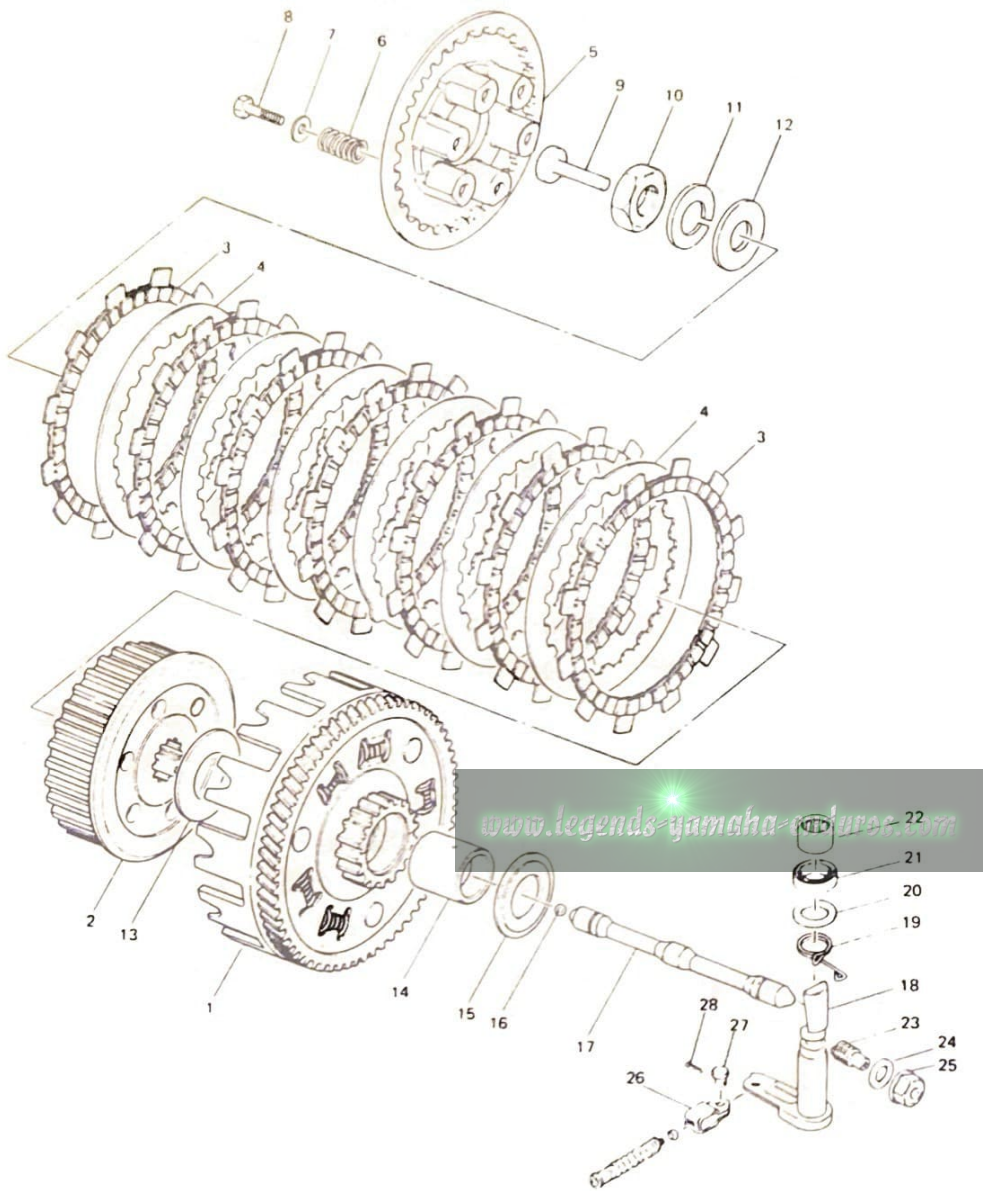
The Autolube pump assembly need not be removed for this procedure.

KICK STARTER



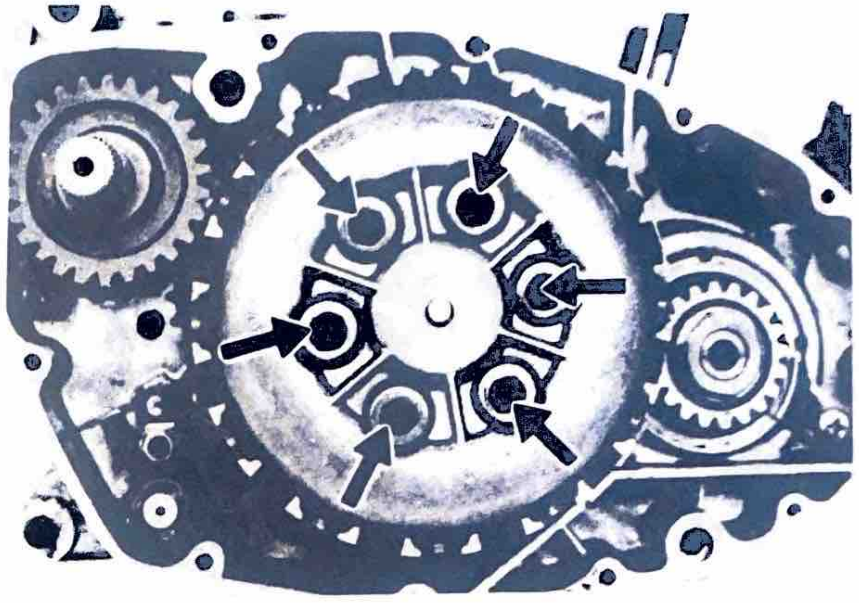
1. Kick Crank
2. Kick Lever Cover
3. Kick Crank Boss
4. Ball
5. Boss Stopper Spring
6. Washer
7. Circlip
8. Bolt
9. Oil Seal
10. Kick Axle
11. Plain Washer
12. Circlip
13. Gear Hold Washer 5
14. Kick Gear
15. Circlip
16. Ratchet Wheel
17. Ratchet Wheel Spring
18. Spring Cover
19. Circlip
20. Gear Hold Washer
21. Kick Spring
22. Kick Spring Stopper
23. Spring Guide
24. Ratchet Wheel Guide
25. Lock Washer
26. Stopper
27. Bolt

CLUTCH



1. Primary driven gear complete
2. Clutch boss
3. Friction plate
4. Clutch plate
5. Pressure plate
6. Clutch spring
7. Plate washer
8. Crossrecess hexagonscrew
9. Push rod
10. Lock nut
11. Spring washer
12. Plain washer
13. Thrust plate 2
14. Spacer
15. Thrust plate 1
16. Ball
17. Push rod
18. Push lever axle
19. Return spring
20. Plate washer
21. Oil seal
22. Bearing
23. Adjusting screw
24. Gasket
25. Adjusting nut
26. Joint
27. Pin
28. Cotter pin

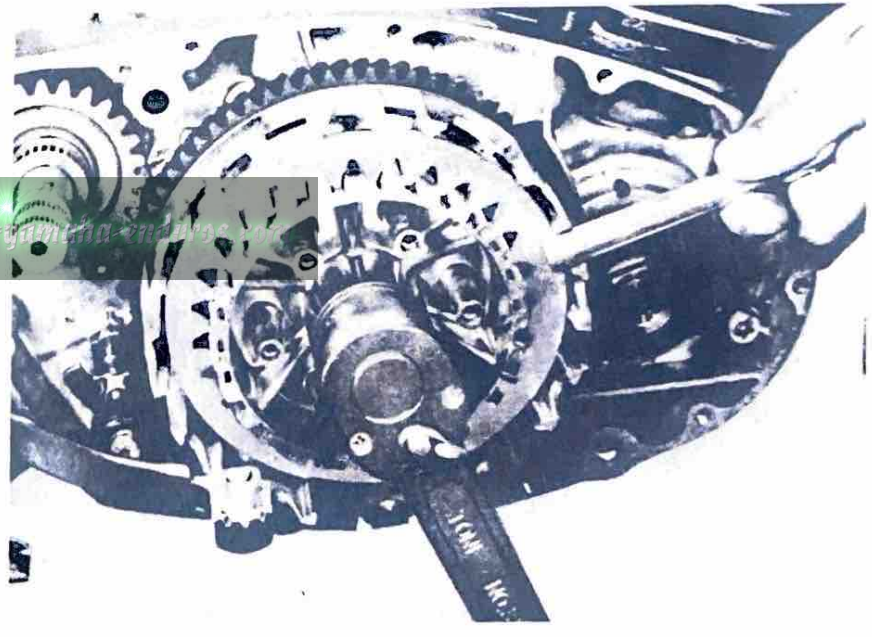
9. Remove the Phillips screws (6) holding the pressure plate. Remove the clutch springs, pressure plate and push rod. Remove the clutch plates, friction plates.



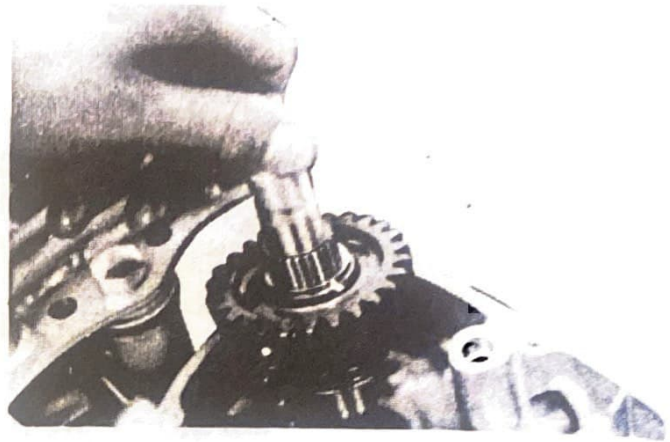
NOTE:

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

10. Using the clutch holding tool, remove the clutch securing nut, spring washer and plain washer. Remove the clutch boss and driven gear ass'y. (clutch housing).

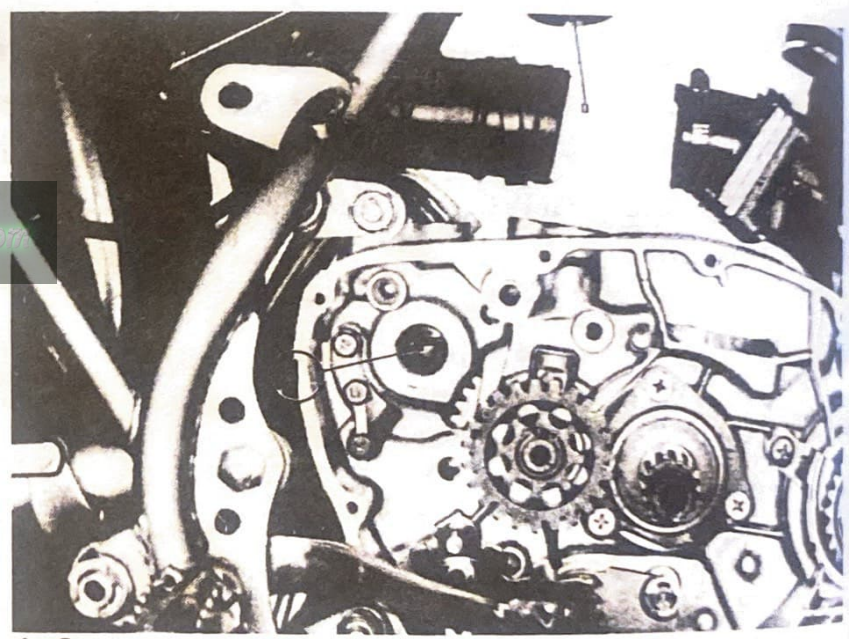


11. If the clutch housing spacer remains on the transmission main axle, remove it. Remove the thrust plate and thrust plate spacers.
12. The kick crank assembly, complete, may be removed by install kick crank or kick axle and rotating the kick axle counterclockwise approximately 45° and pulling out. This procedure allows the ratchet wheel arm to clear the ratchet wheel stopper.



NOTE:

The kick crank return spring is located within the crankcase assembly. Note how the leading edge of the torsion spring fits into a groove machined into the end of the kick axle. Note the amount of pre-load on the spring during disassembly. The same pre-load must be exerted during reassembly for proper detenting of the ratchet wheel.

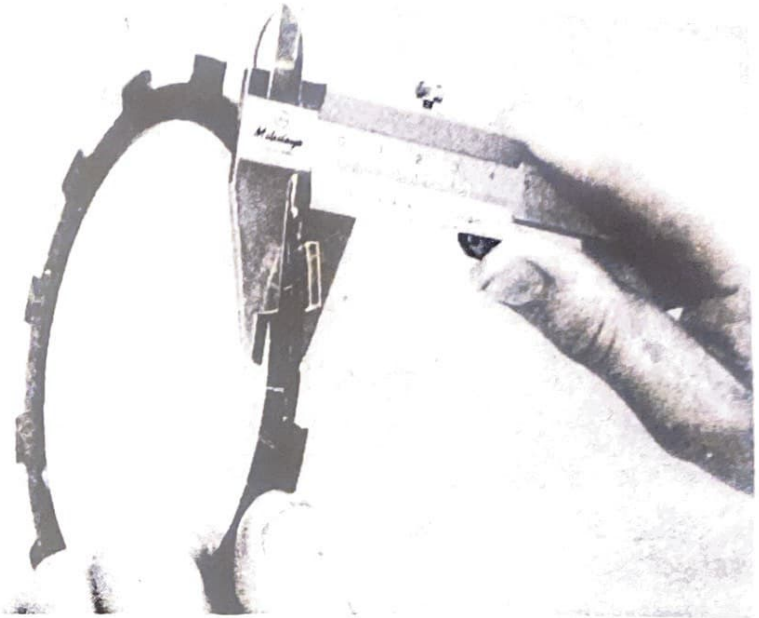


1. Spring

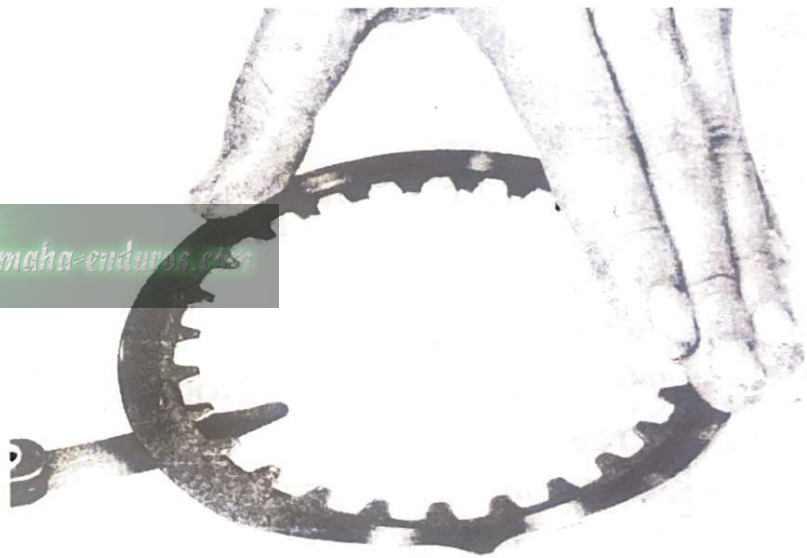
B. Troubleshooting–Clutch Assembly

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

	New	Wear Limit
Friction Plate Thickness	3.0mm (0.12 in.)	2.7mm (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.

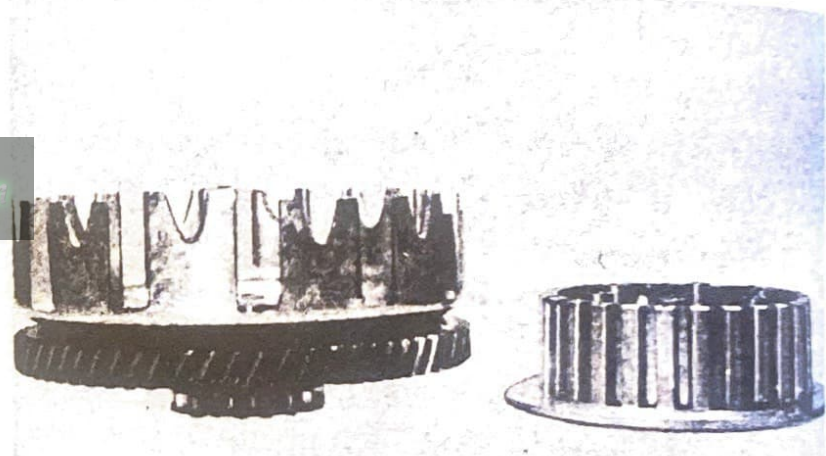


Clutch Plate Warp Allowance: 0.05mm (0.002 in.) Maximum

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 and spacer for signs of galling, heat damage, etc. If severe, replace as required.
6. Apply a thin film of oil to transmission main axle and inside surface of bushing spacer. Slip spacer over main axle. 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 moderate, deburr. If severe, replace.



8. Check splines on clutch boss for signs of galling. If moderate, deburr. If severe, replace.

NOTE:

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

9. Fit the clutch thrust plate with a light film of oil. Check for smooth rotation. Check for signs of excessive wear. Replace as necessary.
10. If clutch operation has been abnormal, and the above procedures show no major failures, install the clutch housing on the transmission main axle with thrust plate 1 bushing spacer, thrust plate 2 and clutch boss in their proper positions for reassembly. Do not install clutch or friction plates. Install spring washers and clutch securing nut. Torque to standard assembly value.

Clutch Securing Nut Torque:
7.0~8.0 m-kg (610~670 in-lb.)

11. With transmission in neutral and primary drive gear stationary, clutch boss should turn without excessive drag within the clutch housing. If housing does not turn easily, indicating insufficient housing end play, check thrust plates for incorrect thickness. Correct by installing thinner thrust plates.

12. Measure each clutch spring. If beyond tolerance replace.

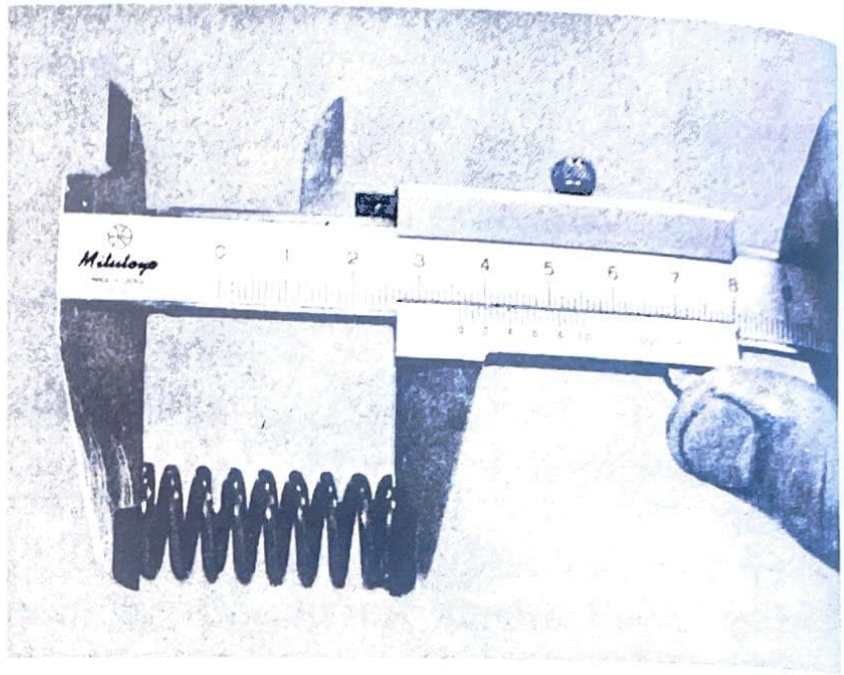
Clutch Spring Free Length	36.4 (1.433 in.)	35.4mm (1.394 in.)

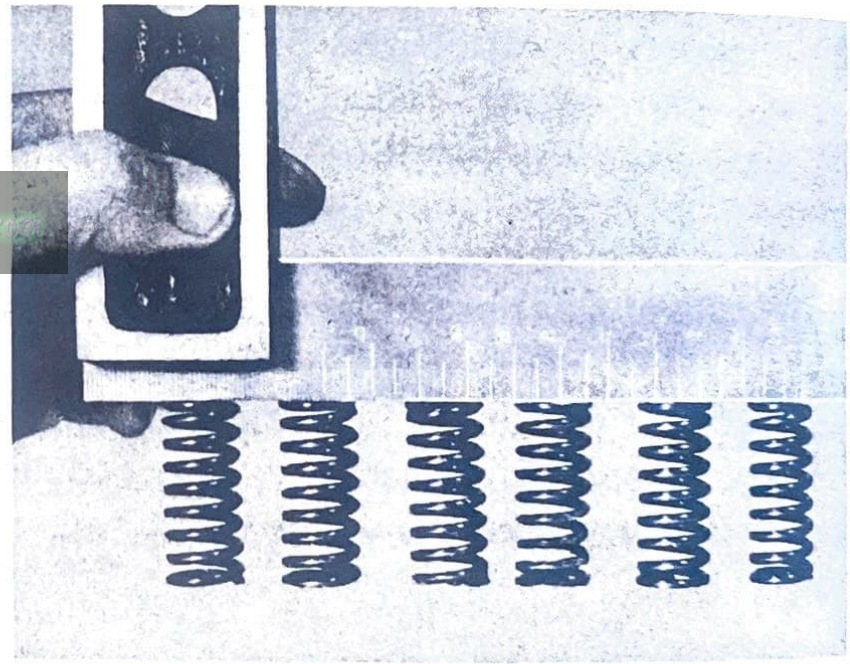
NOTE:

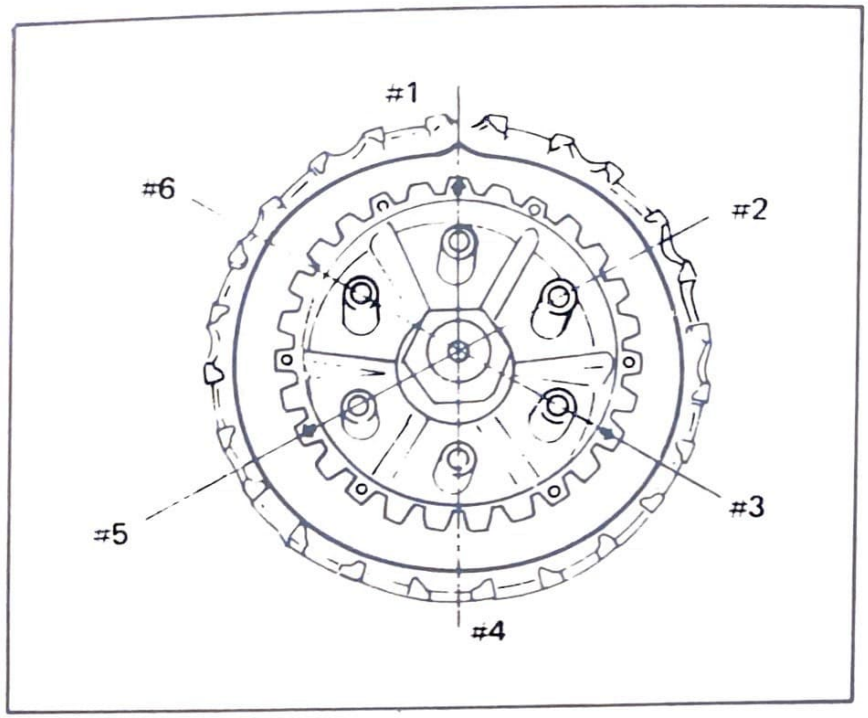
For optimum clutch operation it is advisable to replace the clutch springs as a set if one or more are faulty.

13. Place the clutch spring set on a level surface as shown. Rotate each spring until all are at approximately the same vertical angle and maximum apparent height. Place straight edge across set. If any spring exceeds tolerance, replace that spring.

Clutch spring set maximum length difference: 1.0 mm (0.04 in.)





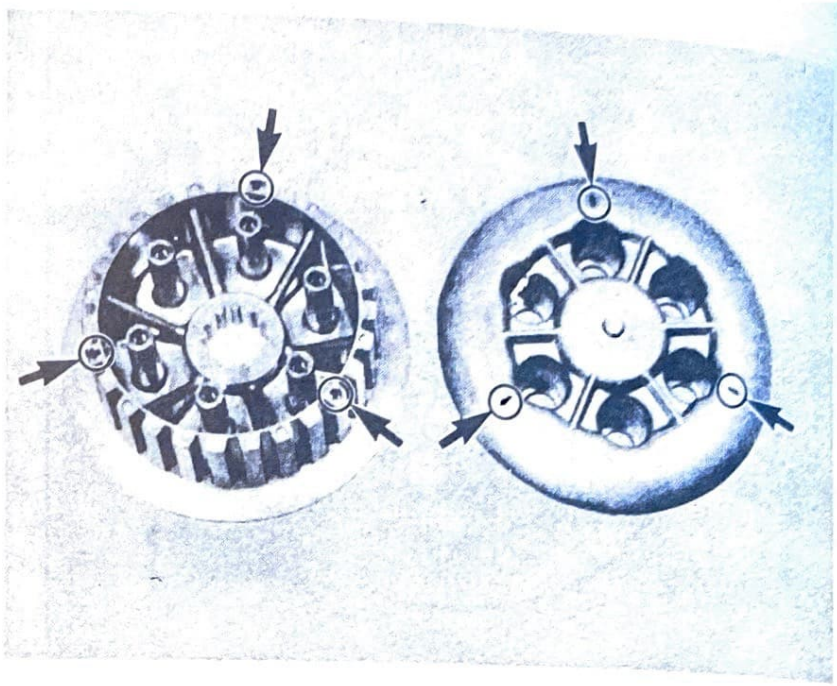


14. In order to reduce noise caused by the clutch plates and clutch boss, each clutch plate is cut away at part of the edge #1. This permits the clutch plate to move outward due to certifugal force. Align one of the plate cutaways so that it so that it is centered as shown in #2 with the arrow on the hub. Install a friction plate. Next install a clutch plate with cutaway off-set approximately 60° from previous plate. Continue this procedure in a clockwise direction until all clutch plates are installed.

NOTE:

Install all parts with a heavy coat of 10W/30 "SE" motor oil on their mating surfaces.

15. Install clutch pressure plate.



NOTE:

Align arrow mark on clutch boss and pressure plate mark.

16. While properly engaging crankshaft and oil pump worm shaft, install crankcase cover (right).

NOTE:

When installing the crankcase cover, be sure to replace the crankcase cover gasket. Also make sure that two dowel pins are fitted in the crankcase.

5-8. SHIFT MECHANISM

NOTE:

Shifter maintenance and adjustment should be performed with clutch assembly removed.

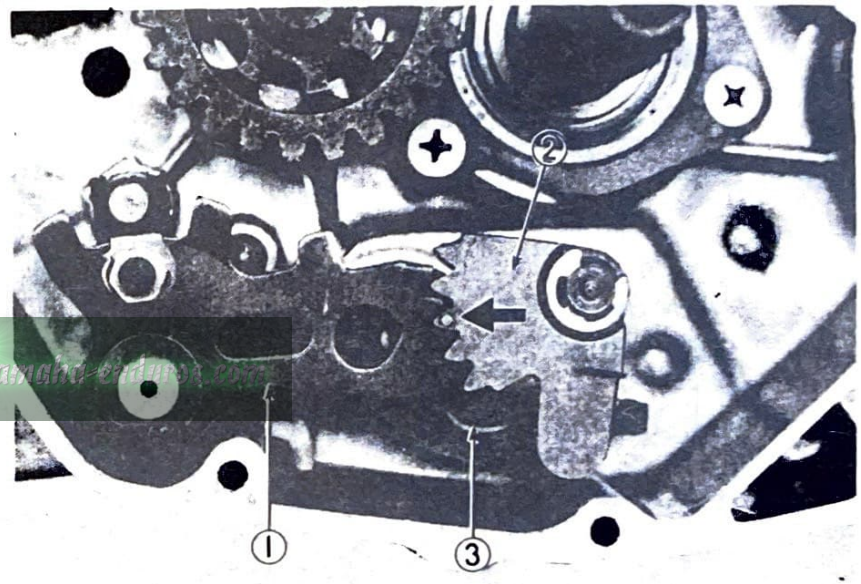
A. Maintenance

1. Remove circlip from left side of change shaft and pull shaft and change lever 1 out from the right hand side.

   NOTE:

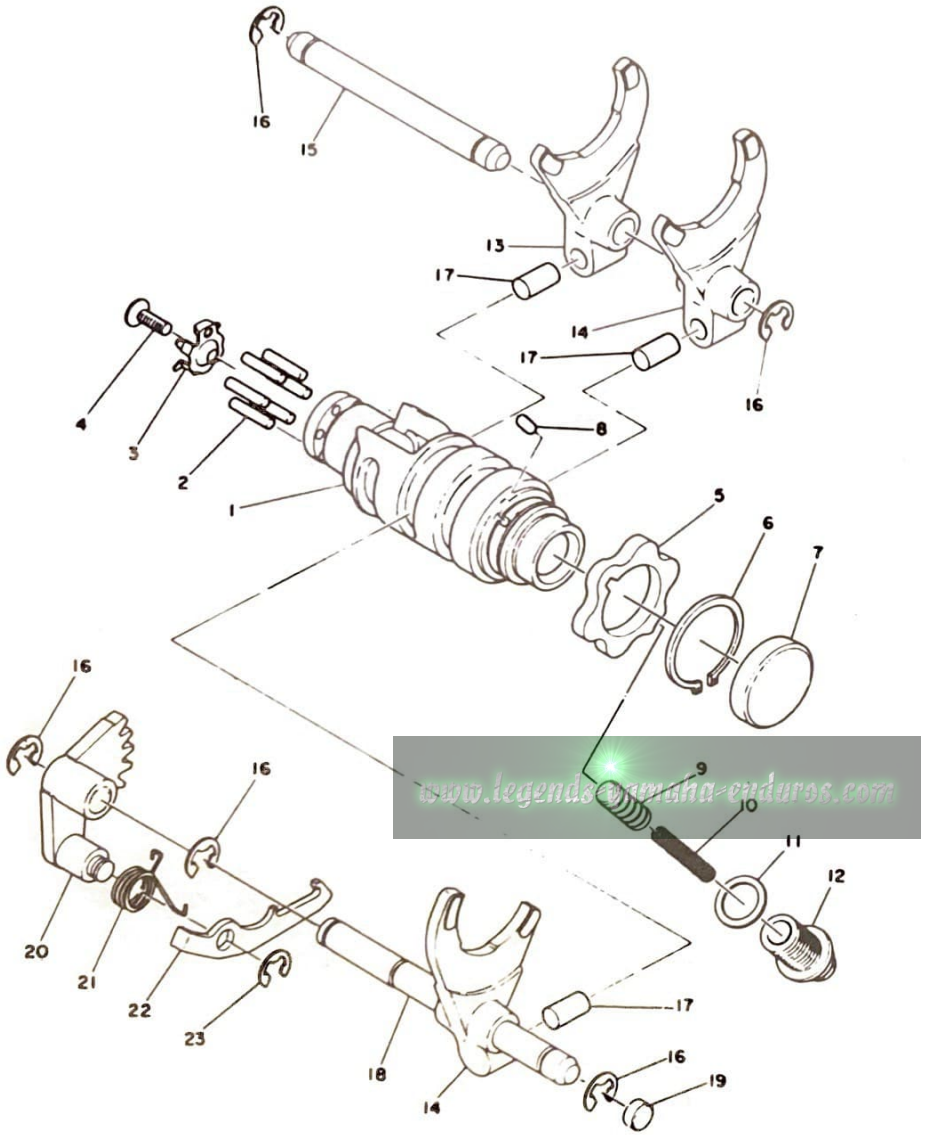
   Remove change lever 2 and change lever 3 as an assembly.

2. With the change pedal in place on the shaft, push down—then up. There should be no freeplay. If evident, the shaft return spring is fatigued, replace.
3. Check the return springs for change levers 1, 2 and 3. If it will not hold change lever 3 firmly against the shift cam dowel pins, replace.
4. During reassembly, note the index marks on change levers 2 and 1. Align.



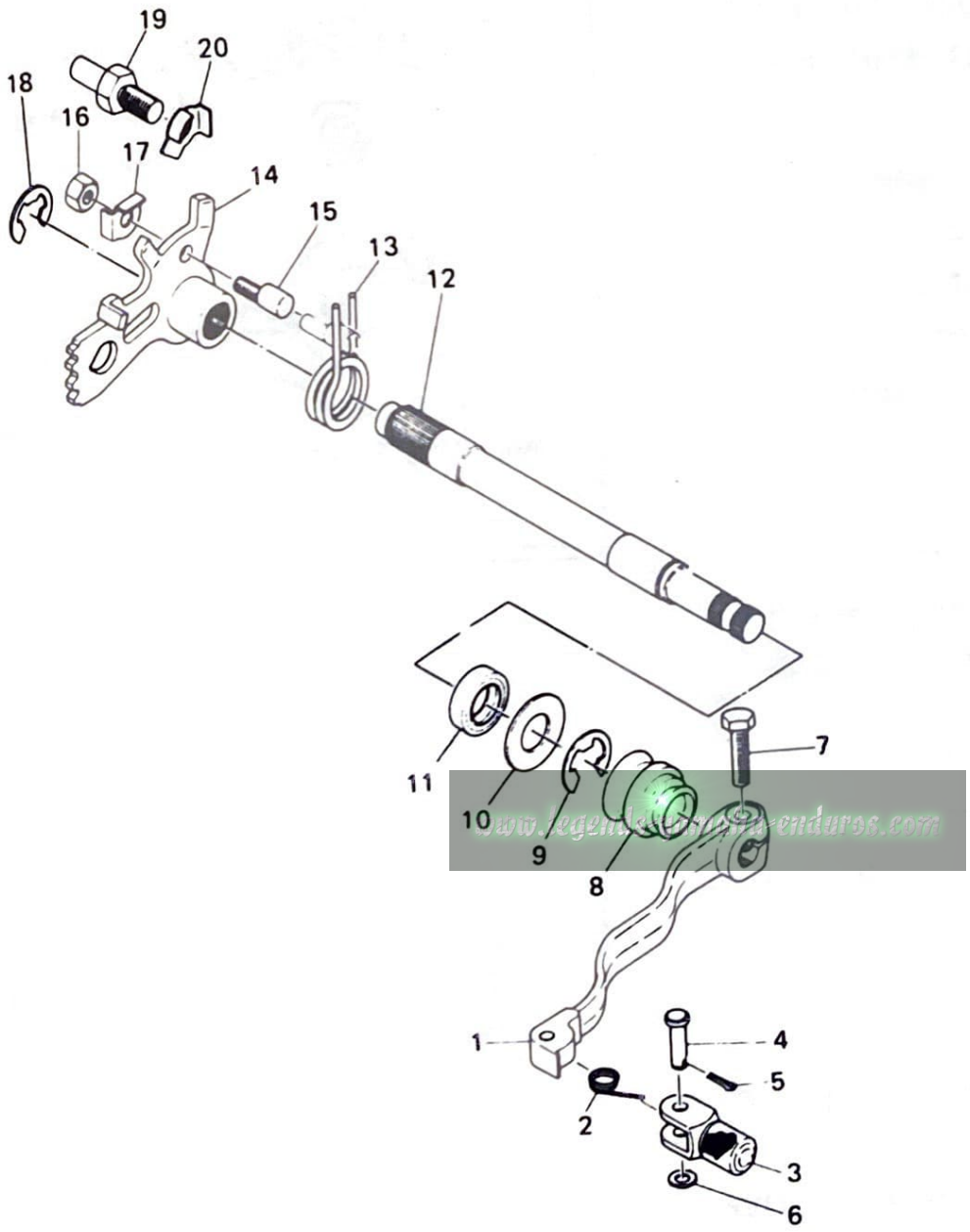
1. Change lever 1
2. Change lever 2
3. Change lever 3

SHIFTER 1



1. Shift Cam
2. Dowel Pin
3. Side Plate
4. Flathead Screw
5. Stopper Plate
6. Circlip
7. Blind Plug
8. Dowel Pin
9. Cam Stopper
10. Cam Stopper Spring
11. Drain Plug Gasket
12. Spring Screw
13. Shift Fork 1
14. Shift Fork
15. Shift Fork Guide Bar
16. Circlip
17. Cam Follower Pin
18. Shift Fork Guide Bar
19. Blind Plug
20. Change Lever 2
21. Spring
22. Change Lever 3
23. Circlip

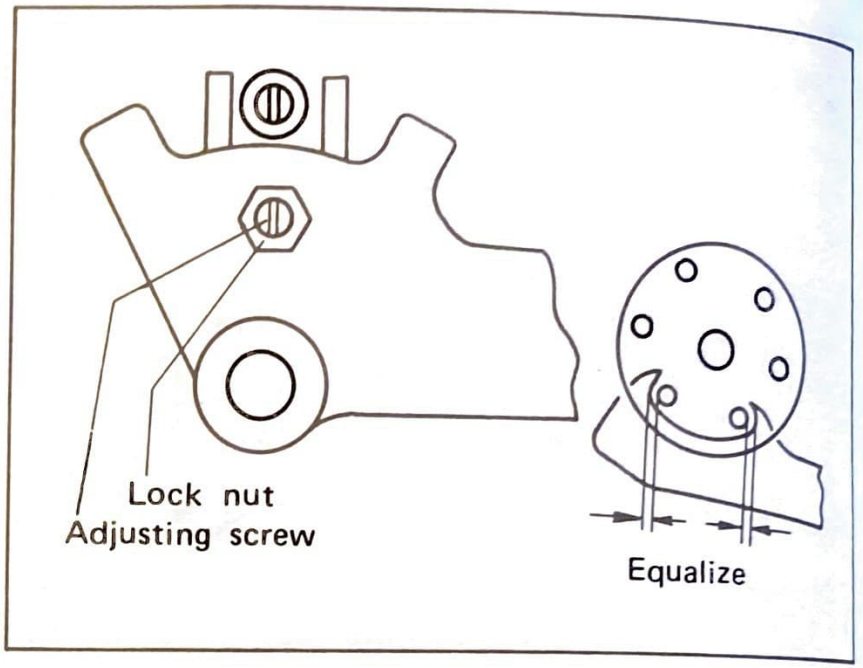
SHIFTER 2



1. Change lever
2. Return spring
3. Change pedal
4. Pin
5. Cotter pin
6. Plain washer
7. Bolt
8. Sealing Boot
9. Circlip
10. Change Axle Washer
11. Oil Seal
12. Change Shaft
13. Shaft Return Spring
14. Change Lever 1
15. Adjusting Screw
16. Nut
17. Lock Washer
18. Circlip
19. Screw Stopper
20. Lock Washer

B. Adjustment

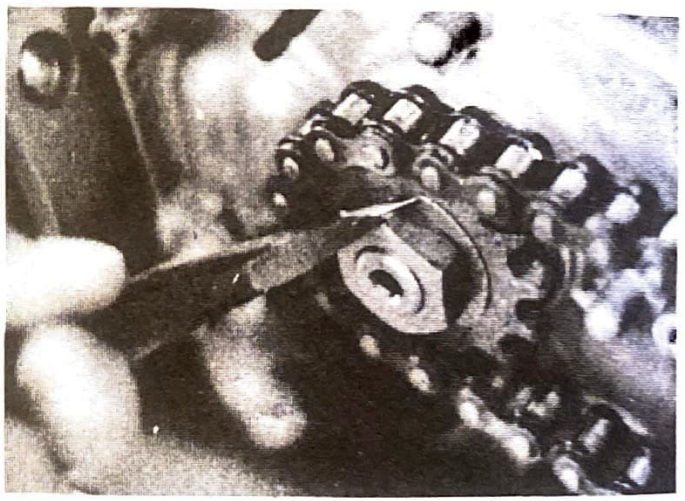
In 2nd gear, check for proper centering. Change adjustment on screw as required.



5-9. SPROCKETS AND CHAIN

NOTE:

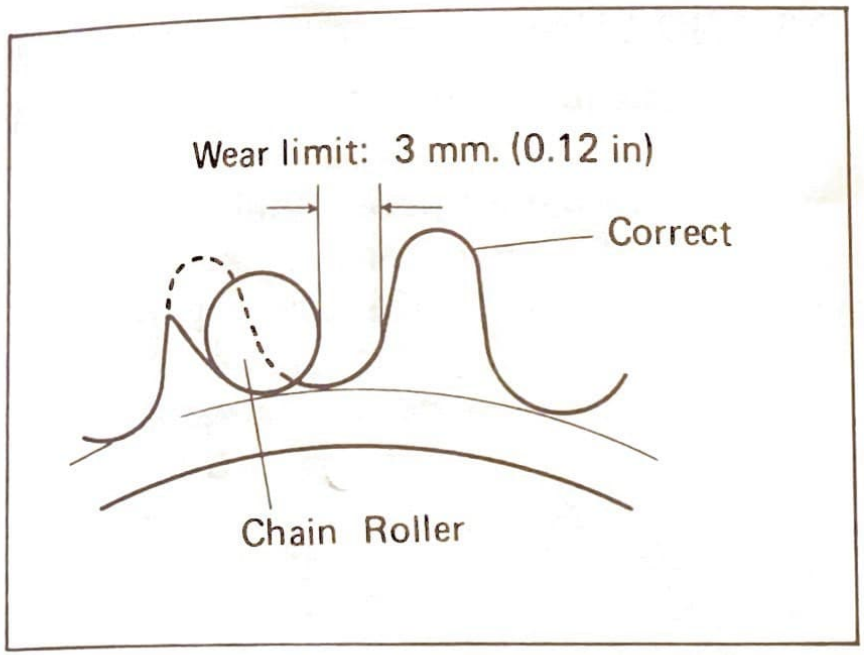
Please refer to Maintenance Intervals and Lubrication Intervals charts for additional information.

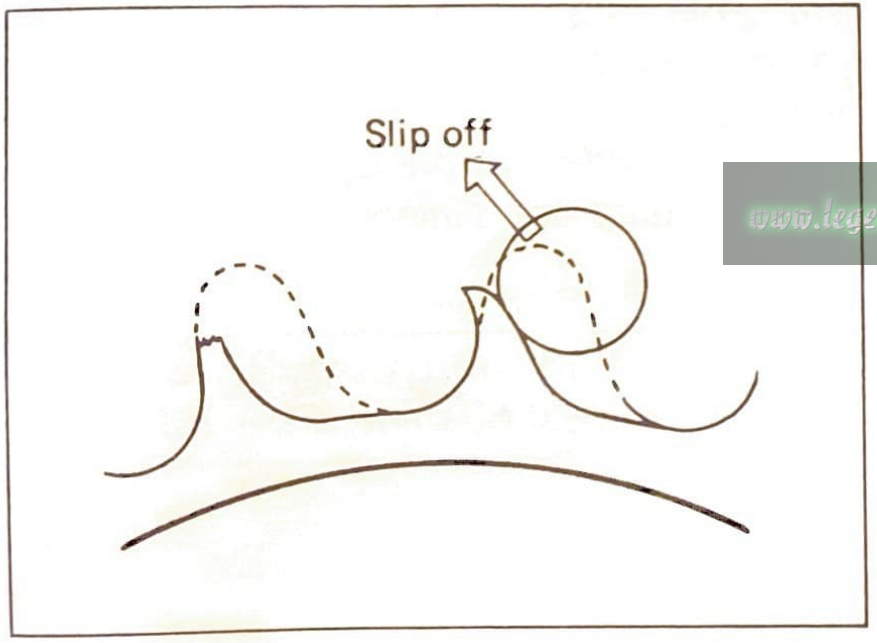


A. Drive Sprocket

With the left crankcase cover removed, proceed as follows:

1. Using a blunt chisel, flatten the drive sprocket lock washer tab.



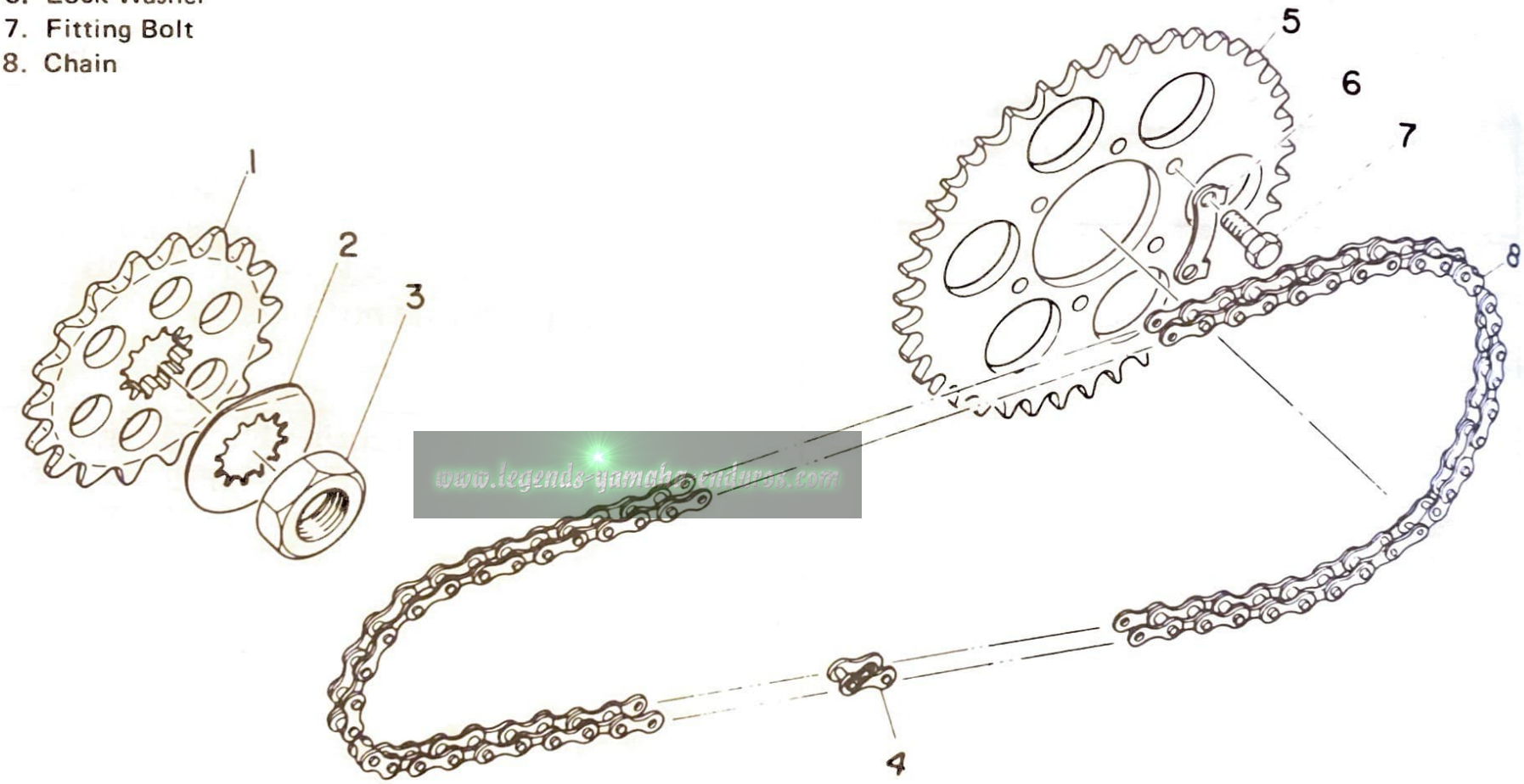


2. With the drive chain in place, transmission in gear, firmly apply the rear brake. Remove the sprocket securing nut. Remove the sprocket.
3. Check sprocket wear. Replace if wear decreases tooth width as shown.
4. Replace if tooth wear shows a pattern such as that in the illustration, or as caution and common sense dictate.
5. During reassembly, make sure the lock washer splines are properly seated on the drive shaft splines. Tighten securing nut thoroughly to specified torque value. Bend lock washer tab fully against securing nut flats.

Drive Sprocket Securing Nut Torque:
6.0 – 8.0 m-kg (520 – 690 in-lb)

DRIVE SPROCKETS AND CHAIN

1. Drive Sprocket
2. Lock Washer
3. Lock Nut
4. Chain Joint
5. Sprocket Wheel Gear
6. Lock Washer
7. Fitting Bolt
8. Chain

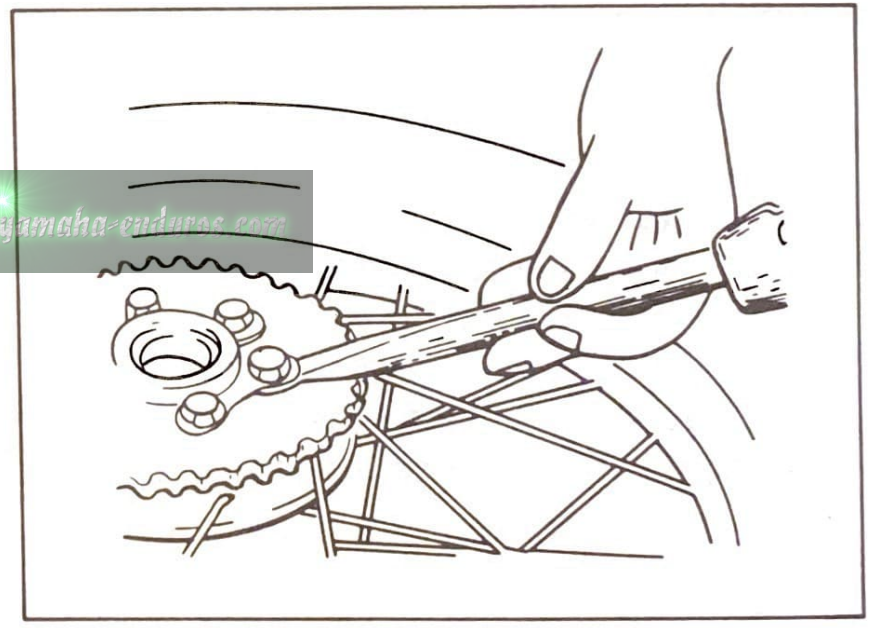


B. Driven Sprocket

With the rear wheel removed, proceed as follows:

1. Using a blunt chisel, flatten the securing bolt lock washer tabs. Remove the securing bolts (6). Remove the lock washers and sprocket.
2. Check sprocket wear per procedures for the drive sprocket.
3. Check the sprocket to see that it runs true. Do not heat and hammer to straighten. Use a press. If severely bent, replace.
4. During reassembly, make sure the sprocket and sprocket seat are clean. Tighten the securing bolts in a cross-hatch pattern. Bend the tabs of the lock washers fully against the securing bolt flats.

Driven Sprocket Securing Bolt Torque:
1.8 – 2.9 m-kg (155 – 250 in-lb)

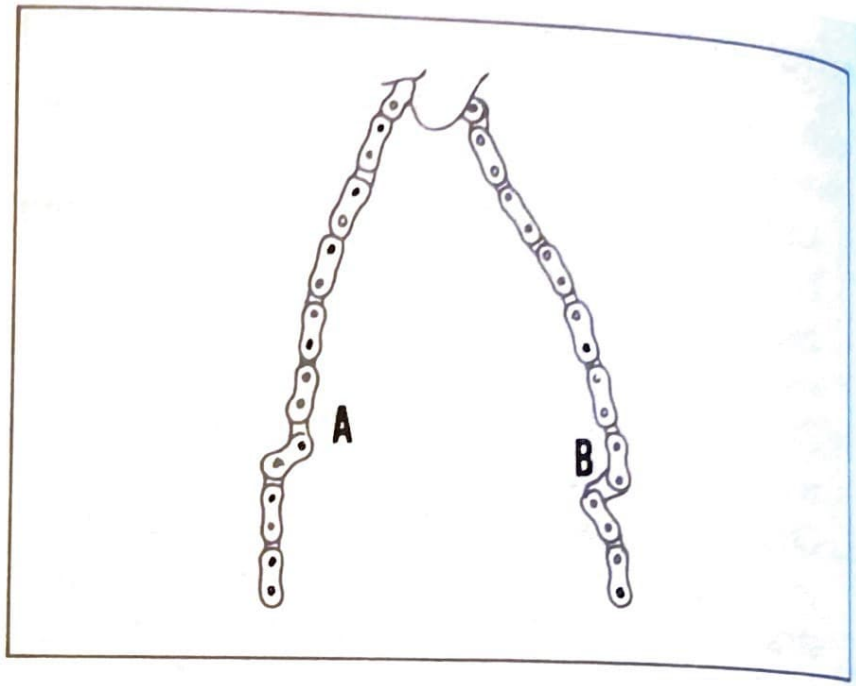


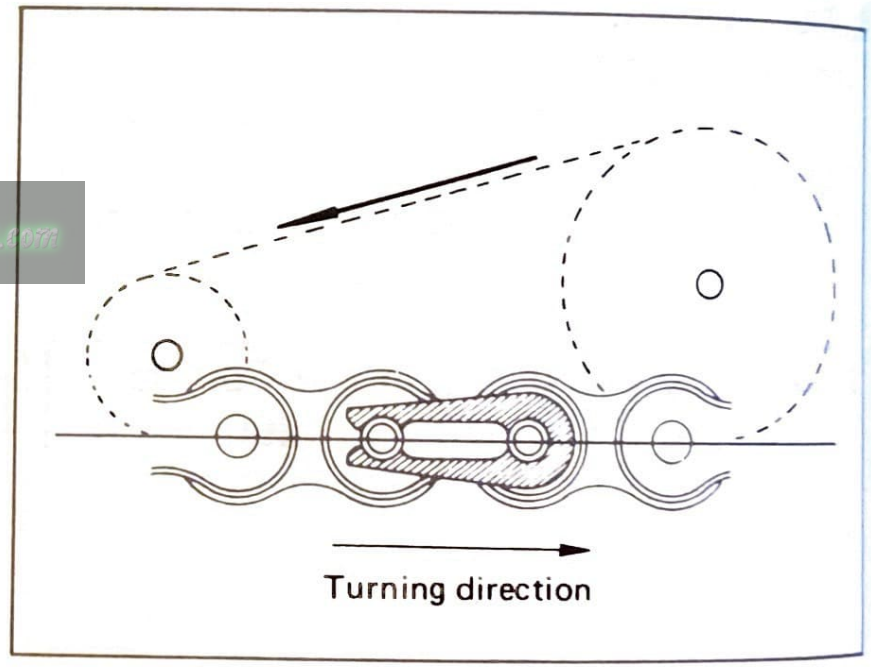
C. Chain

NOTE:

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

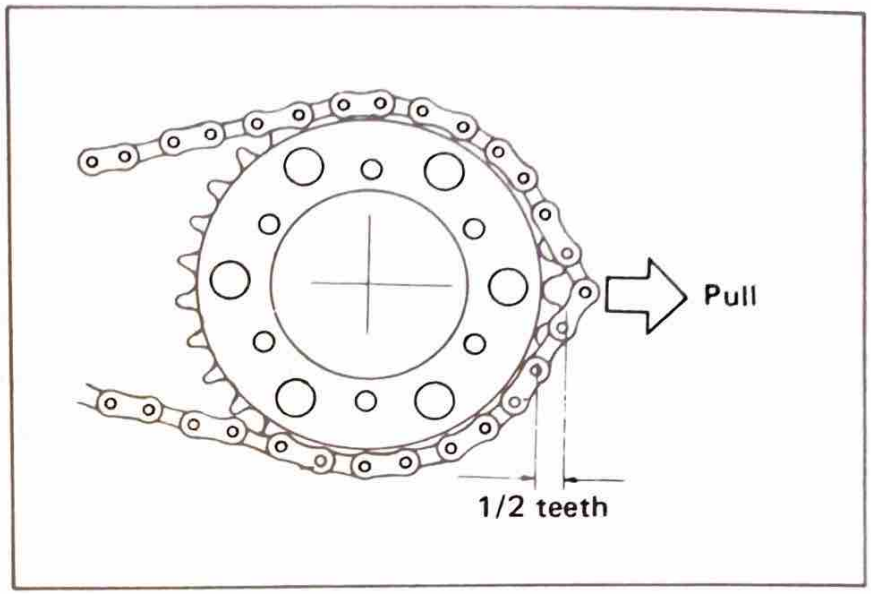
1. Using blunt-nosed pliers, remove the master link clip and side plate. Remove the chain.
2. Check the chain for stiffness. Hold as illustrated. If stiff, soak in solvent solution, clean with medium bristle brush, dry with high pressure air. Oil chain thoroughly and attempt to work out kinks. If still stiff, replace.
3. Check the side plates for visible wear. Check to see if excessive play exists in pins and rollers. Check for damaged rollers. Replace chain as required.
4. During reassembly, the master link clip must be installed with the rounded end facing the direction of travel.





D. Troubleshooting

With the chain installed on the machine, excessive wear may be roughly determined by attempting to pull 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.
If any portion of the chain shows signs of damage, or if either sprocket shows signs of excessive wear, remove and inspect.



E. Maintenance

The chain should be lubricated per the recommendations given in the Maintenance and Lubrication Intervals charts. (More often, if possible.) Preferably after every use. See "Chassis and Suspension, Swing Arm", for additional information regarding chain guide and oiler.

1. Wipe off dirt with shop rag. If accumulation is severe, use soft bristle brush, then rag.

2. 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:

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 20wt. or 30wt. may be used, but several specialty types by accessory manufacturers offer more penetration, corrosion resistance and shear strength for roller protection.
In certain areas, semi-drying lubricants are preferable. These will resist picking up sand particles, dust, etc. Consult your Authorized Yamaha Dealer.

3. Periodically, remove the chain. Wipe and/or brush excess dirt off. Blow off with high pressure air.
4. Soak chain in solvent, brushing off remaining dirt. Dry with high pressure air. Lubricate thoroughly to make sure lubricant penetrates. Wipe off excess. Re-install.

NOTE:

The swing arm chain oiler is designed to provide periodic chain lubrication during operation only.
It will not provide complete lubrication to the areas between the inner and outer side plates.

See page 15 for chain oiler instructions.

5-10. CABLES

NOTE:

See Maintenance and Lubrication Intervals Charts for additional information.

Cable maintenance is primarily concerned with preventing deterioration through rust and weathering, as well as providing proper lubrication to allow the cable to move freely within its housing.

Cable removal is straight-forward 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.

Cable routing is of paramount importance, however. For details of cable routing, see the cable routing diagrams at the end of this manual.

A. Maintenance

1. Remove the cable.
2. Check for free movement of the cable within its housing. If movement is obstructed, check for fraying of the cable strands. If fraying 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 end. Allow excess to drain and re-install.

NOTE:

Choice of lubricant depends upon conditions and preference. However, a semi-drying, graphite-base lubricant will probably perform most adequately under most conditions.

4. Under certain conditions, a water displacing lubricant is more suitable. Check with the Authorized Yamaha Dealer in your area.

5-11. THROTTLE CABLE CYLINDER

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

1. Remove throttle cable number one from handlebar housing.
2. Remove throttle cable number two from carburetor mixing chamber top.
3. Remove Autolube pump cable from pump pulley. Remove cable adjuster.
4. Remove seat and fuel tank.
5. Remove cable/cylinder assembly completely.
6. Remove cylinder cap, throttle cable two and Autolube pump cable.
7. Wash assembly thoroughly in solvent.
8. Lubricate all associated 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, this should be avoided.

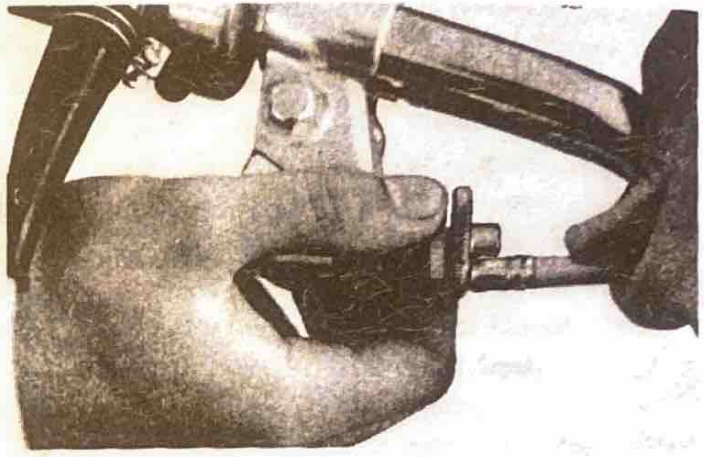
10. Reassemble all cables. Make sure cylinder is sealed from ravages of weather and riding conditions. Reinstall. See cable routing diagrams for correct installation position. See Mechanical Adjustments Chapter for correct cable adjustment.

CHAPTER 6 CHASSIS AND SUSPENSION

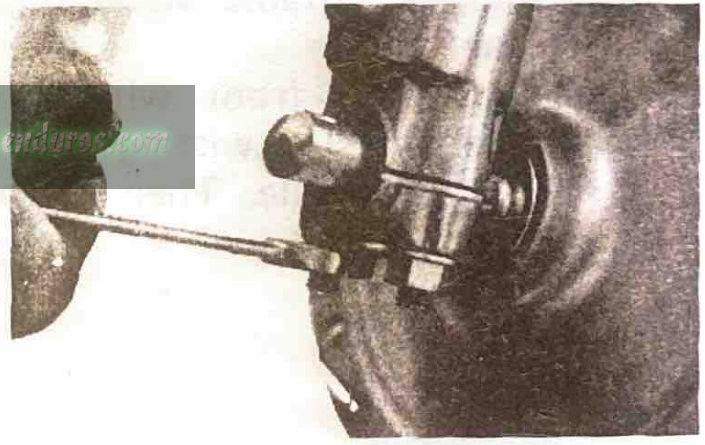
6-1. WHEELS AND TIRES

A. Front Wheel

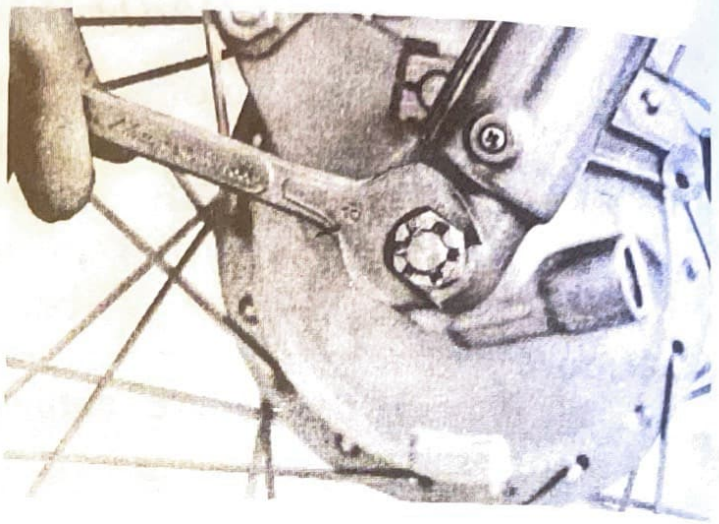
1. Removal
   a. Disconnect the brake cable at the front brake lever.



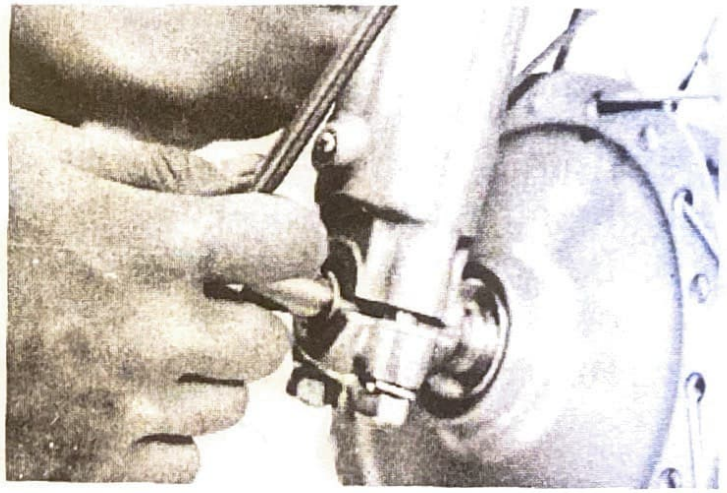
   b. Disconnect the brake cable at the front brake lever.
   c. Remove the tension bar.
   d. Remove cotter pin from front wheel nut.
   e. Remove the front wheel nut.



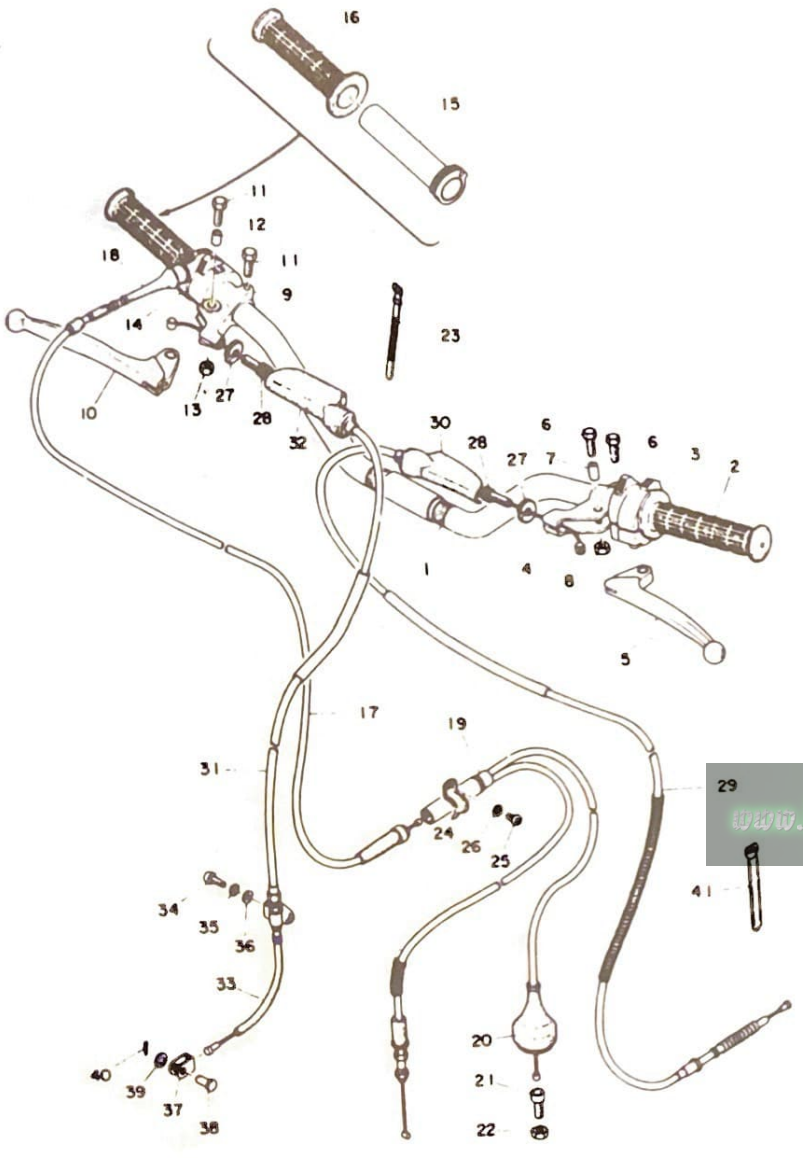
f. Loosen the two axle holder nuts.



g. Raise the front of the machine by placing a suitable stand under the engine.
Remove the front wheel axle by simulatneously twisting and pulling out on the axle. Then remove the wheel assembly.

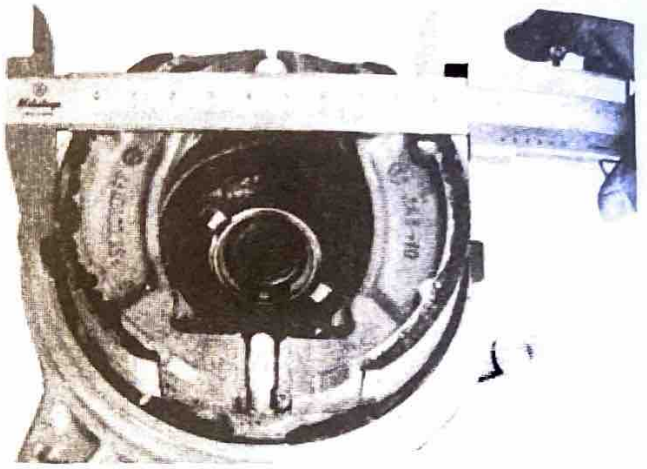


HANDLE WIRE



1. Handle bar
2. Left Grip
3. Handle Swtich
4. Left Lever Holder Ass'y
5. Left Lever
6. Bolt
7. Lever Collar
8. Nut
9. Right Lever Holder Ass'y
10. Right Lever
11. Bolt
12. Lever Collar
13. Nut
14. Right Handle Switch
15. Guide Tube
16. Right Grip
17. Throttle Wire
18. Throttle Boot
19. Throttle Wire
20. Rubber Cap
21. Wire Joint
22. Lock Nut
23. Wire Guide Holder
24. Holder
25. Panhead Screw
26. Spring Washer
27. Wire Adjusting
28. Wire Adjusting Bolt
29. Clutch Wire
30. Lever Cover
31. Front Brake Wire
32. Lever Cover
33. Wire Boot
34. Panhead Screw
35. Spring Washer
36. Plain Washer
37. Wire Joint
38. Link Joint Pin
39. Pedal Link Washer
40. Cotter Pin
41. Switch Cord Band

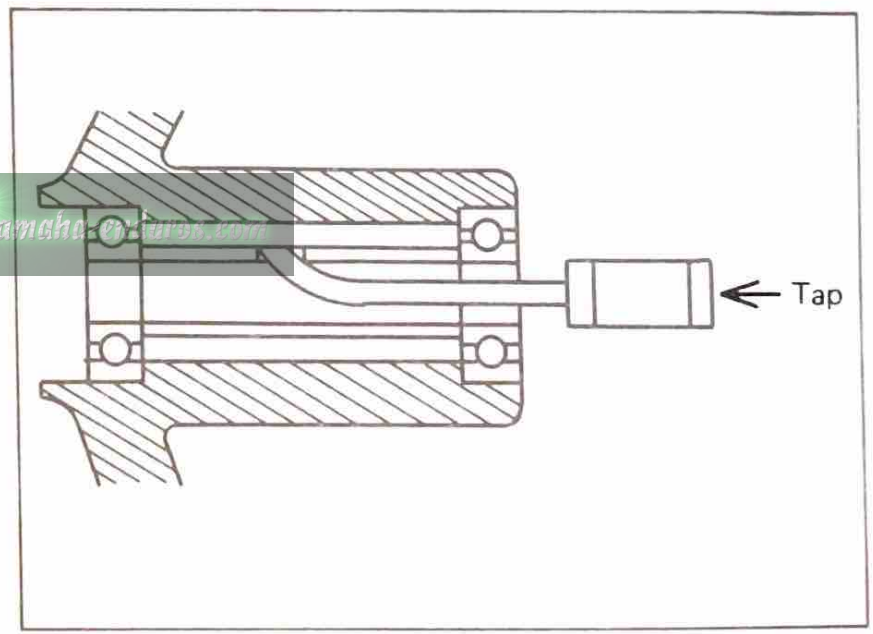
2. Front axle
   Remove any corrosion from axle with emery cloth. Then place it on a surface plate and check for bending. If bent, replace.
3. Checking Brake Shoe Wear
   a. Measure the outside diameter at the brake shoe with slide calipers. If it measures less than specified, replace.



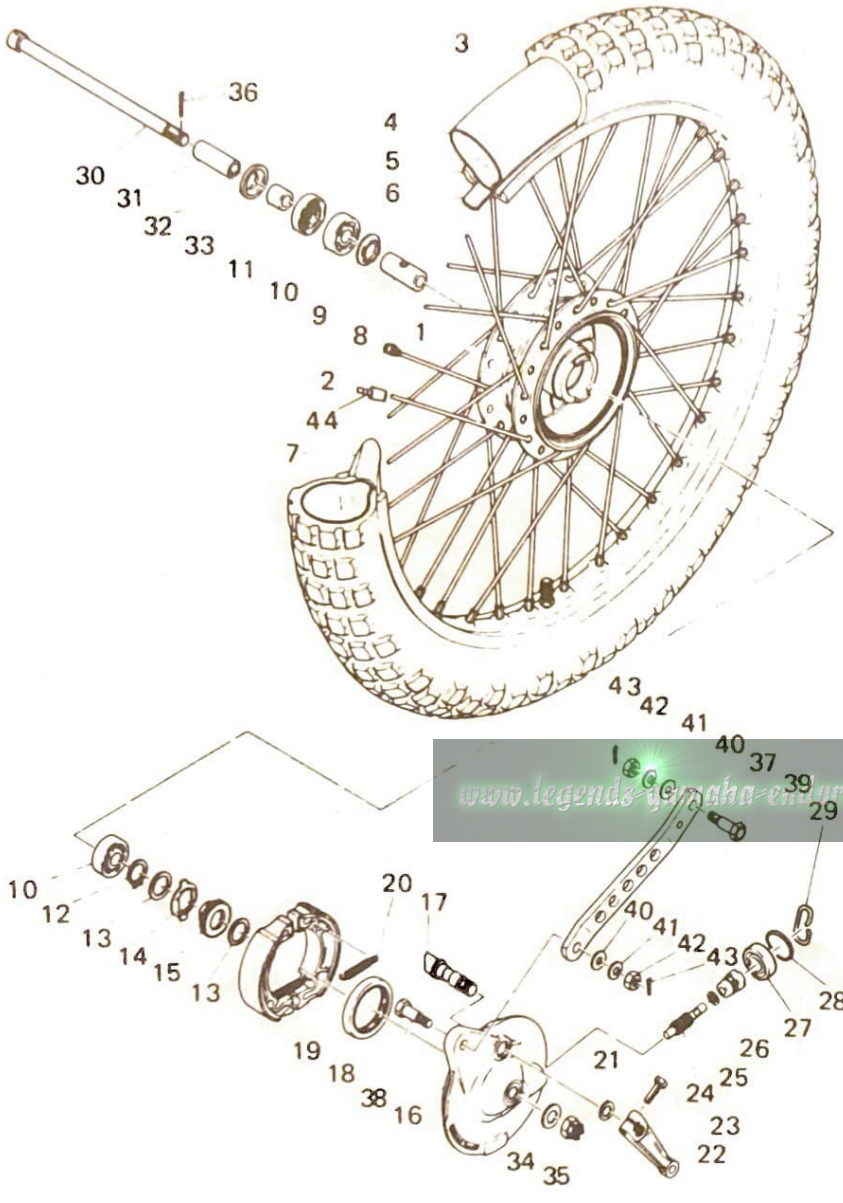
Front Brake Shoe Diameter: 110.0 mm (4.30 in) Replacement Limit: 105.0 mm (4.10 in.)

   b. Remove any glazed areas from brake shoes using coarse sand paper.

4. Brake Drum
   Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noises. Remove oil by wiping with a rag soaked in lacquer thinner or solvent. Remove scratches by lightly and evenly rubbing with emery cloth.
5. Replacing Wheel Bearings
   If the bearings allow excessive play in the wheel or if it does not turn smoothly, replace the bearing as follows:
   a. First clean the outside of the wheel hub.
   b. Manufacture a removal tool. Insert the bent end into the hole located in the center of the bearing spacer. Drive the spacer out from the hub by tapping with a hammer.
   c. Push out the bearing on the opposite side.
   d. To install the wheel bearing, reverse the above sequence. Be sure to grease the bearing before installation and use the bearing fitting tool.



FRONT WHEEL



1. Front Hub
2. Spoke Set
3. Front Tire
4. Front Tube
5. Front Rim
6. Rim Band
7. Bead Spacer
8. Bearing Spacer
9. Spacer Flange
10. Bearing
11. Oil Seal
12. Circlip
13. Thrust Washer
14. Meter Clutch
15. Drive Gear
16. Brake Plate Shoe
17. Camshaft
18. Oil Seal
19. Brake Shoe Comp
20. Return Spring
21. Camshaft Seal
22. Camshaft Lever
23. Bolt
24. Meter Gear
25. Thrust Washer
26. Bushing
27. Oil Seal
28. Blind Plug
29. Wheel Axle
30. Collar
31. Hub Dust Cover
32. Wheel Axle Collar
33. Plain Washer
34. Axle Nut
35. Cotter Pin
36. Tension Bar
37. Tension Bar Bolt
38. Tension Bar Bolt
39. Plain Washer
40. Spring Washer
41. Nut
42. Cotter Pin

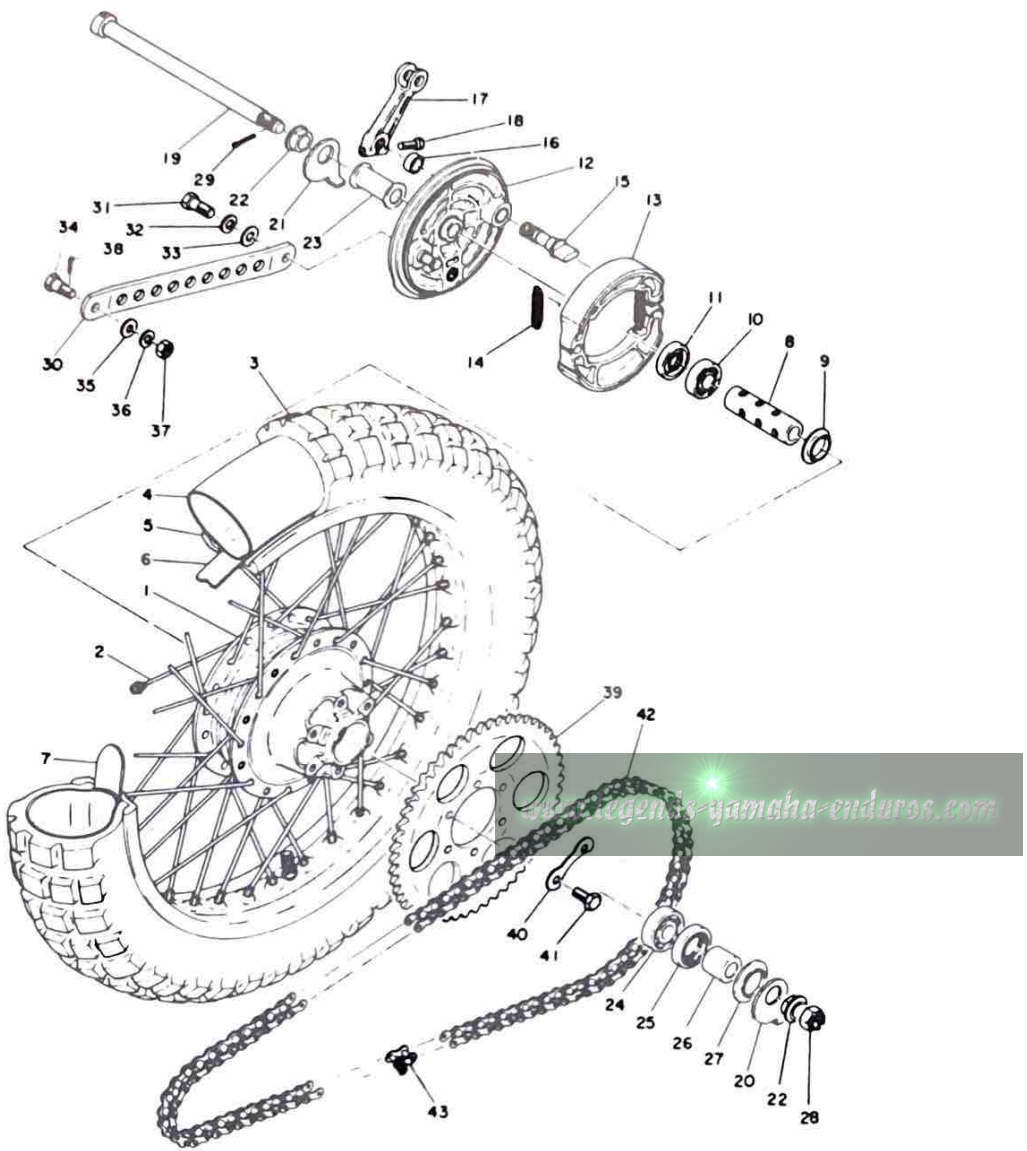
e. Check the lips of the seals for damage or warpage. Replace if necessary.

B. Rear Wheel

The rear wheel is 18-in size, and the rear tire is Trials Universal. A single leading-shoe type brake is used. A labyrinth seal between the wheel hub and the brake plate is provided to prevent water and dust leakage.

1. Removal
   a. Remove the tension bar and brake rod from rear shoe plate.
   b. Remove cotter pin from rear wheel axle nut.

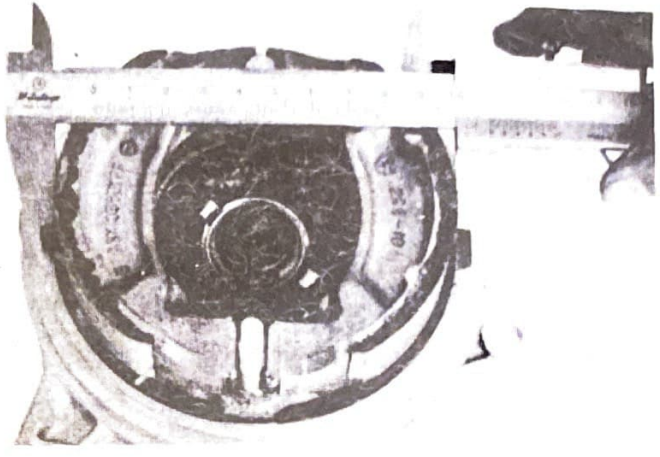
REAR WHEEL



1. Rear Hub
2. Spoke Set
3. Rear Tire
4. Rear Tube
5. Rear Rim
6. Rim Band
7. Bead Spacer
8. Bearing Spacer
9. Spacer Flange
10. Bearing
11. Oil Seal
12. Brake Shoe Plate
13. Brake Shoe Comp
14. Return Spring
15. Camshaft
16. Camshaft Seal
17. Camshaft Lever
18. Bolt
19. Wheel Axle Collar
20. Chain Left Puller
21. Chain Right Puller
22. Wheel Axle Collar
23. Axle Collar
24. Bearing
25. Oil Seal
26. Axle Collar
27. Dust Cover
28. Axle Nut
29. Cotter Pin
30. Tension Bar
31. Tension Bar Bolt
32. Spring Washer
33. Plain Washer
34. Tension Bar Bolt
35. Plain Washer
36. Spring Washer
37. Nut
38. Cotter Pin
39. Sprocket Wheel Gear
40. Lock Washer
41. Bolt
42. Chain
43. Chain Joint

c. Remove the rear wheel axle nut.
d. Pull out the rear wheel axle by simultaneously twisting and pulling out.
e. Remove the rear wheel assembly.

2. Checking Brake Shoe Wear
   a. Measure the outside diameter at the brake shoe with slide calipers. If it measures less than specified, replace.



Rear Brake Shoe Diameter:	130.0 mm (5.10 in.)
Replacement Limit:	125.0 mm (4.90 in.)

   b. Smooth out a rough shoe surface with sandpaper or a file.

3. Brake Drum
   Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noises. Remove oil by wiping with a rag soaked in lacquer thinner or solvent. Remove scratches by lightly and evenly rubbing with emery cloth.

4. Replacing Wheel Bearings
See front wheel section.

C. Checking Rims and Spokes (Front & Rear Wheels)

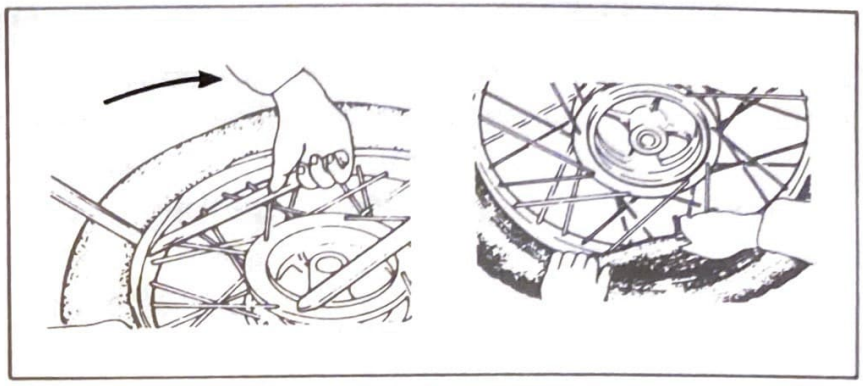
1. Checking for loose spokes
Loose spokes can be checked by bracing the machine off the ground so that the wheel can spin free. Slowly revolve the wheel and at the same time let the metal shaft of a fairly heavy screwdriver bounce off each spoke. If all the spokes are tightened approximately the same then the sound given off by the screwdriver hitting the spokes should sound the same. If any spoke makes a dull flat sound, check it for looseness.
2. Checking rim "run-out"
While you have the wheel elevated, you should check that it does not have too much run-out. "Run-out" is the amount the wheel deviates from a straight line as it spins. Spin the wheel, and solidly anchor some sort of a pointer about 3 mm (1/8 in) away from the side of the rim. As the wheel spins, the distance between the pointer and the rim should not change more than 2 mm (1/16 in) total. Any greater fluctuation means that you should have your dealer remove this rim warpage by properly adjusting the spokes.

Run-Out Limits:	2mm (0.07 in.) (1/16") Lateral
Run-Out Limits:	2mm (0.07 in.) (1/16") Vertical

D. Tire Repairs

1. Remove valve cap, valve core, and valve stem lock nut.
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 removal irons (with rounded edges) and begin to work the tire bead over the edge of the rim, starting 180° opposite the tube stem. Take care to avoid pinching the tube as you do this.



4. After you have worked one side of the tire completely off the rim, then you can slip the tube out. Be very careful not to camage the stem while pushing it back out to the rim hole.

NOTE:

If you are changing the tire itself, then finish the removal by working the tire off the same rim edge just previously mentioned.

E. Installing Tire

Re-installing the tire assembly can be accomplished by reversion the disassembly procedure. The only difference in procedure would be right after the tube has been installed. 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. Also, right after the tire has been completely slipped onto the rim, check to make sure that the stem is squarely in the center of the hole in the rim.

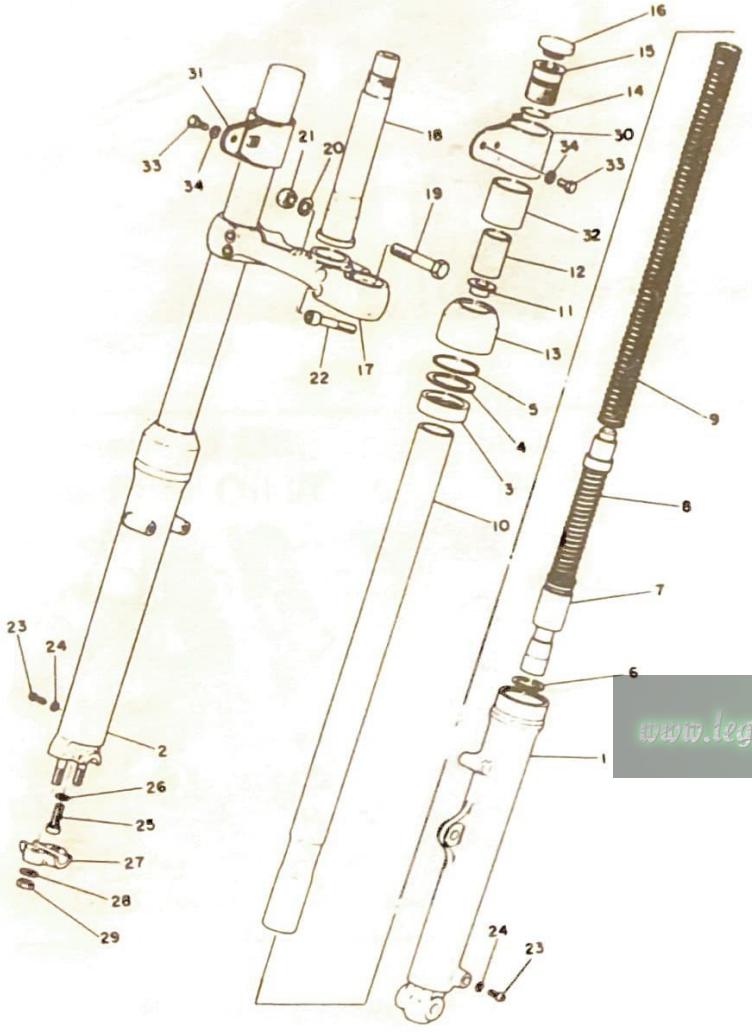
Tire Pressure		
Frong	0.9 kg/cm^2 (13 Psi)	Normal riding
Rear	1.1 kg/cm^2 (16 Psi)	

6-2. FRONT FORKS AND STEERING HEAD

A. General

The front forks on your machine utilizes chrome plated tubular steel fork legs (inner tubes) and tubular aluminum sliders (outer tubes). The bearing surface is the entire inside surface of the aluminum outer tube. The steering head pivot is supported by two sets of unchanged ball and race bearing assemblies.

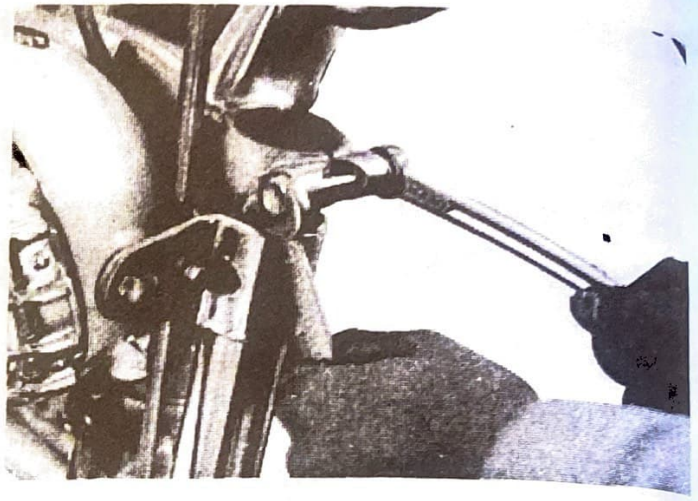
FRONT FORK



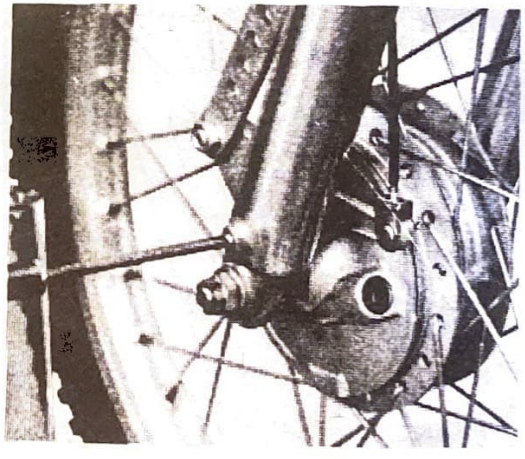
1. Outer Left Tube
2. Outer Right Tube
3. Oil Seal
4. Oil Seal Washer
5. Oil Seal Clip
6. Clip
7. Piston
8. Cylinder Comp
9. Fork Spring
10. Inner Tube
11. Spring Upper Seat
12. Spacer
13. Dust Seal
14. O-ring
15. Cap Bolt
16. Cap
17. Upper Bracket
18. Steering Shaft
19. Bolt
20. Spring Washer
21. Nut
22. Under Bracket Bolt
23. Drain Plug
24. Drain Plug Gasket
25. Bolt
26. Packing
27. Holder
28. Spring Washer
29. Nut
30. Upper Left Cover
31. Upper Right Cover
32. Packing
33. Bolt
34. Spring Washer

B. 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 tube.



2. Remove cap bolts on inner fork tubes.
3. Remove drain screw from each outer tube with open container under each drain hole.

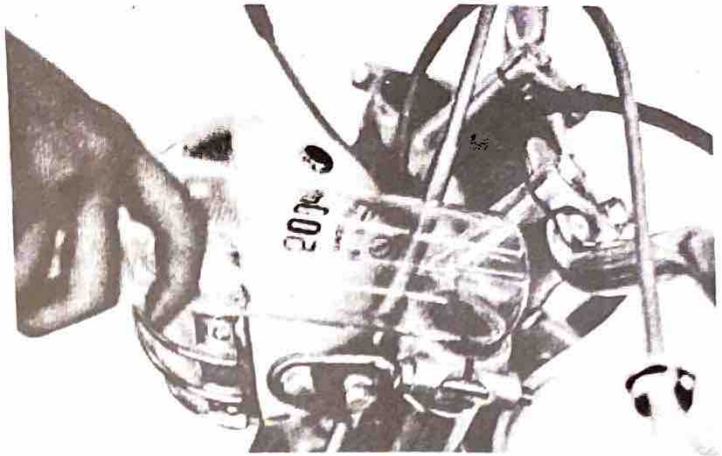


4. After most of oil has drained, slowly raise and lower outer tubes to pump out remaining oil.
5. Replace drain screws.

NOTE:

Check gaskets, replace if damaged.

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



Recommended Oil: Yamaha Fork Oil 20wt. (other brand of fork oil may be used) Quantity: 162cc (5.5 oz.) per leg

NOTE:

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

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.
9. Replace fork cap bolts and torque to specification.

Fork Cap Torque:	3.0~4.0 m-kg (260~350 in-lb)

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

Fork Tube Pinch Bolt Torque: 0.8~1.3 m-kg (70~110 in-lb.)

C. Front Fork Disassembly

1. With the front wheel removed and the various pinch bolts loosened, the fork legs can be removed from the upper and lower brackets.

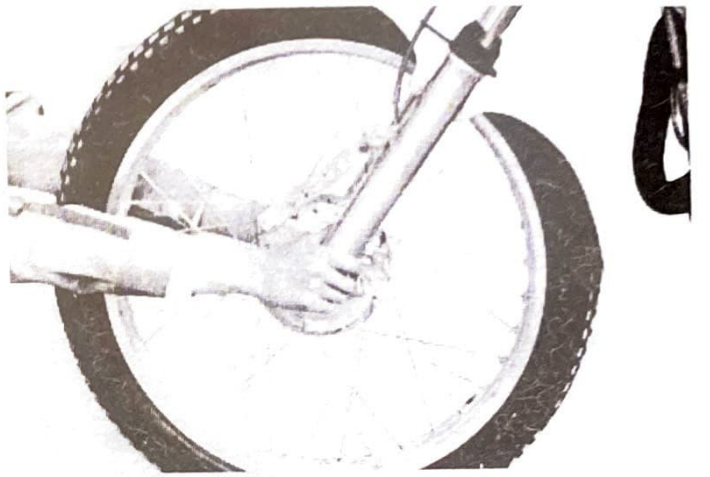
2. Disassembly procedure for individual fork tube assembly is found in DT250B/400B Service Manual.

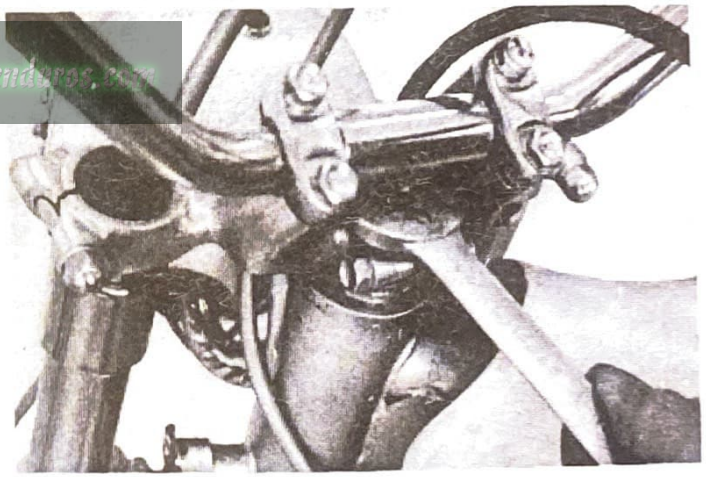
NOTE:

Proper fork seal installation is important. Also, carefully tap seal in with large socket to avoid damage to aluminum fork tube.

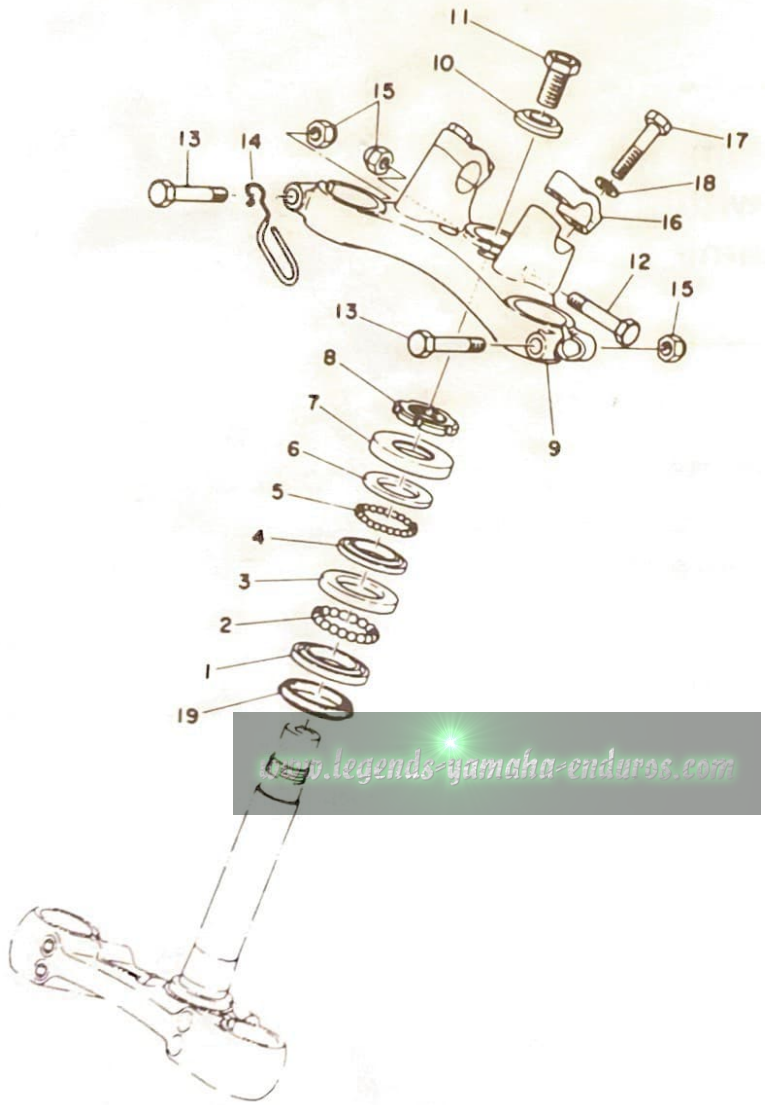
D. Steering Head Adjustment

1. With front wheel elevated, grab bottoms of fork legs and gently push and pull to check steering head free play. There should be no noticeable free paly.
2. If steering head needs adjustment, loosen steering fitting bolt.





STEERING HEAD



1. Ball Race
2. Ball
3. Ball Race
4. Ball Race
5. Ball
6. Ball Race
7. Ball Race Cover
8. Fitting Nut
9. Handle Crown
10. Crown Washer
11. Steering Fitting Bolt
12. Handle Crown Bolt
13. Handle Crown Bolt
14. Wire Holder
15. Nut U
16. Handle Upper Holder
17. Fitting Bolt
18. Spring Washer
19. Dust Seal

3. Loosen crown pinch bolt.
4. Use steering nut wrench to tighten ring nut. Tighten until free play is eliminated.

CAUTION:

Forks must swing from lock to lock without binding or catching.

5. Tighten steering fitting bolt and torque to specification.

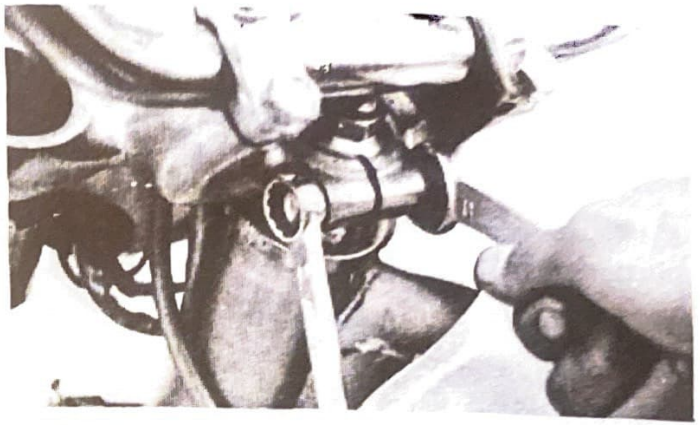
Stem Bolt Torque:	4.2~6.5 m-kg (360~560 in-lbs.)

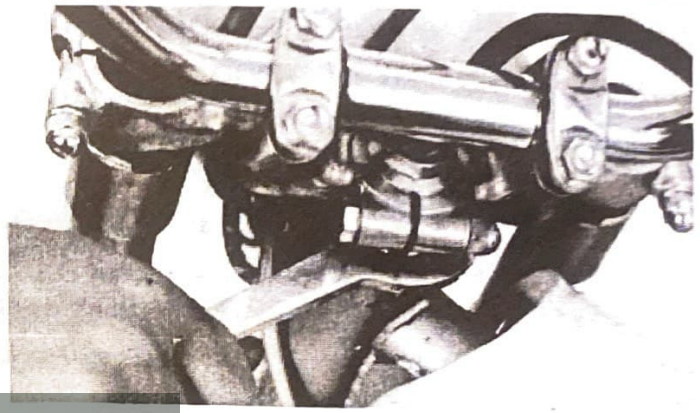
6. Tighten pinch bolts at fork crown and torque to specification.

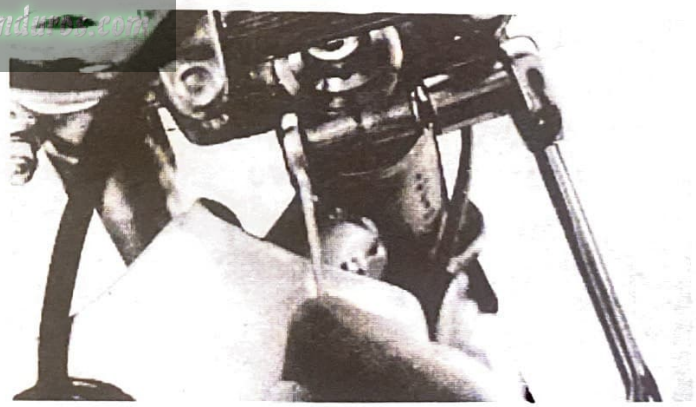
Crown Pinch Bolt Torque: 0.8~1.3 m-kg (70~110 in-lb.)

NOTE:

For steering head disassembly—refer to DT250B/400B Service Manual for correct procedure.



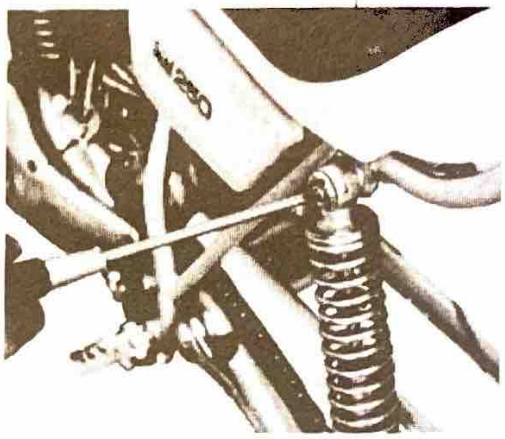


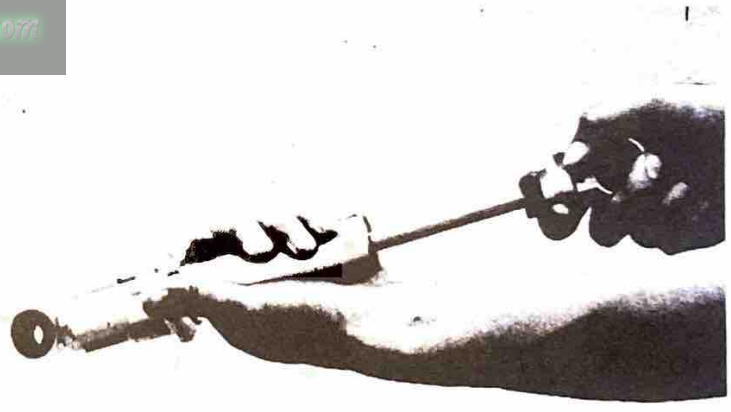


E. Rear Shock Absorbers and Swing Arm

(A) Rear Shock Absorbers Removal and Inspection

1. After rear wheel has been removed, remove two Phillips head screws, lock washers from each shock absorbers.
2. Remove shock absorbers.
3. Place shock absorbers bottom eyelet in vise. Grasp and compress spring. Remove upper spring seat and spring.
4. Check the rod. If it is bent or damaged, replace the shock absorber.
5. Check for oil leakage. If oil leakage is evident, replace the shock absorber.
6. Operate shock absorber shaft to check damping. As you push down, only slight damping should be felt. Return stroke will have considerable damping. If there is no damping, replace shock absorbers.

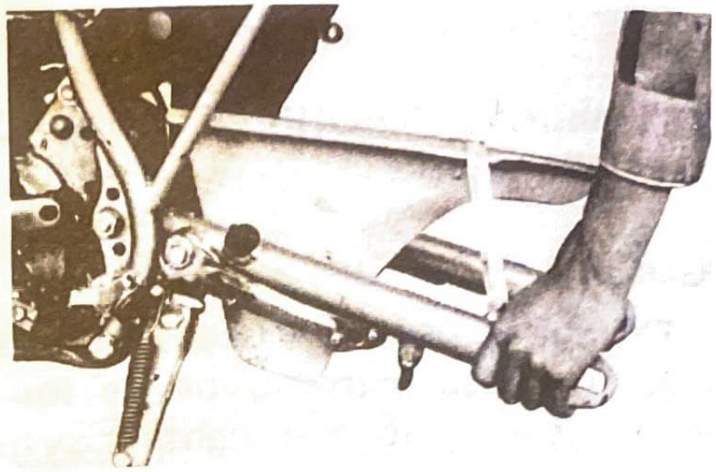




(B) Swing Arm Inspection

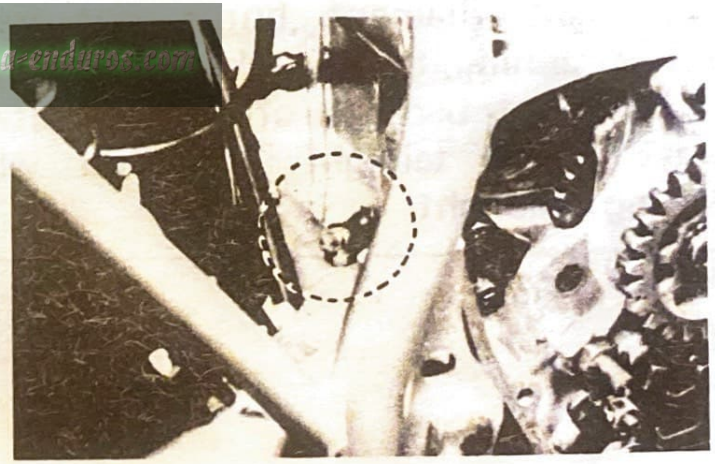
1. With rear wheel and shock absorbers removed, grasp the ends of the arm and move from right to left to check for free play.

Swing Arm Free Play: 1.0mm (0.04 in.)



2. If free play is excessive, remove swing arm and replace swing arm bushings.
3. Swing arm pivot lubrication—as required, 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.
4. Wipe off excess.

Recommended Lubricant: Lithium base grease



CHAPTER 7. ELECTRICAL SYSTEM

7-1. GENERAL INFORMATION AND SCHEMATICS

A. General

The TY250D uses a flywheel magneto to generate electrical current/voltage for the ignition system and the lighting system. There are two coils attached to the magneto backing plate. The right-hand coil supplies primary voltage to the ignition coil. The left-hand coil provides alternating current (A.C.) for operation of the lights.

NOTE:

If headlight filament burns out while engine is running, the taillight filament may also burn out because of excess voltage. Always check taillight operation when replacing headlight.

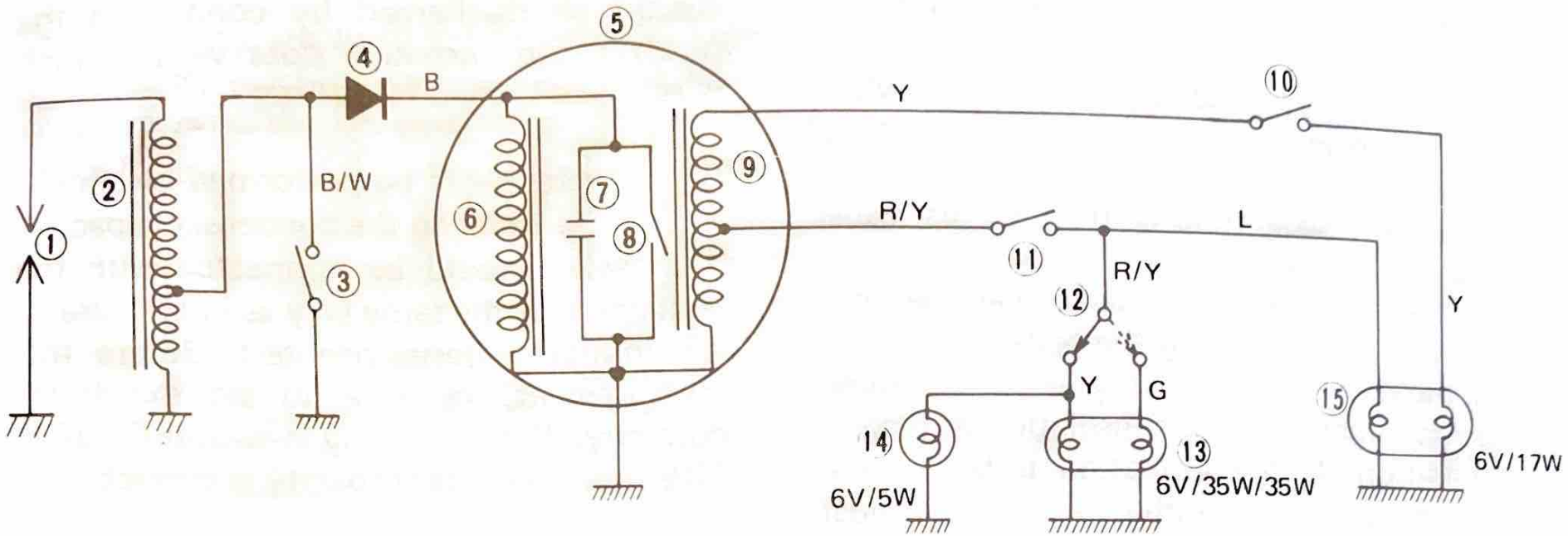
B. Table of Component Parts

PART NAME	MANUFACTURER	MODEL/TYPE
Flywheel Magneto	HITACHI	F145–53
Ignition Coil	HITACHI	CM61–20N
Contact Breaker Assy	HITACHI	
Condenser	HITACHI	
Spark Plug	N.G.K.	B–7ES
Headlight	KOITO	6V 35/35W
High Beam Indicator	KOITO	6V 5W
Taillight	STANLEY	6V 17/5.3W
Brakelight Switch	ASAHI DENSO	YST35S–001

C. Ignition Timing

Refer to "Mechanical Adjustments, Ignition Timing" for step-by-step procedure.

D. Connection Diagrams



1. Spark plug (NGK B-7ES)
2. Ignition coil (CM61-20N)
3. Engine stop switch
4. Diode (To prevent engine from running back wards)
5. Flywheel magneto (F145-53)
6. Ignition power source coil
7. Condenser
8. Contact breaker
9. Lighting coil
10. Stoplight switch
11. Lighting switch
12. Dimmer switch
13. Head light
14. High beam indicator
15. Tail/stop light

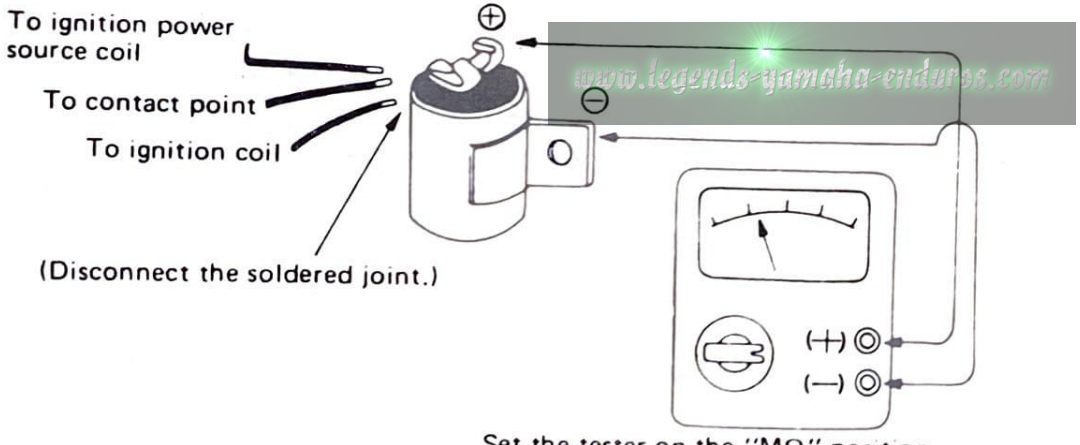
Color code

B:	Black	G:	Green
Y:	Yellow	B/W:	Black/white
L:	Blue	R/Y:	Red/yellow

E. Condenser

The condenser instantly stores a static electric charge as the contact breaker points separate, and the energy stored in the condenser discharges instantly when the points are closed. If it were not for the condenser, an electric arc would jump across the separating contact points, causing them to burn.

Insulation resistance tests should be conducted by connecting the tester as shown. If the pointer swings fully and the reading is more than 3MΩ, the insulation is in good condition. If the insulation is faulty, the poiner will stay pointing at the uppermost reading, indicating very little resistance.



Set the tester on the "MΩ" position

NOTE:

After this measurement, the condenser should be discharged by connecting the positive and megative sides with a thick wire.

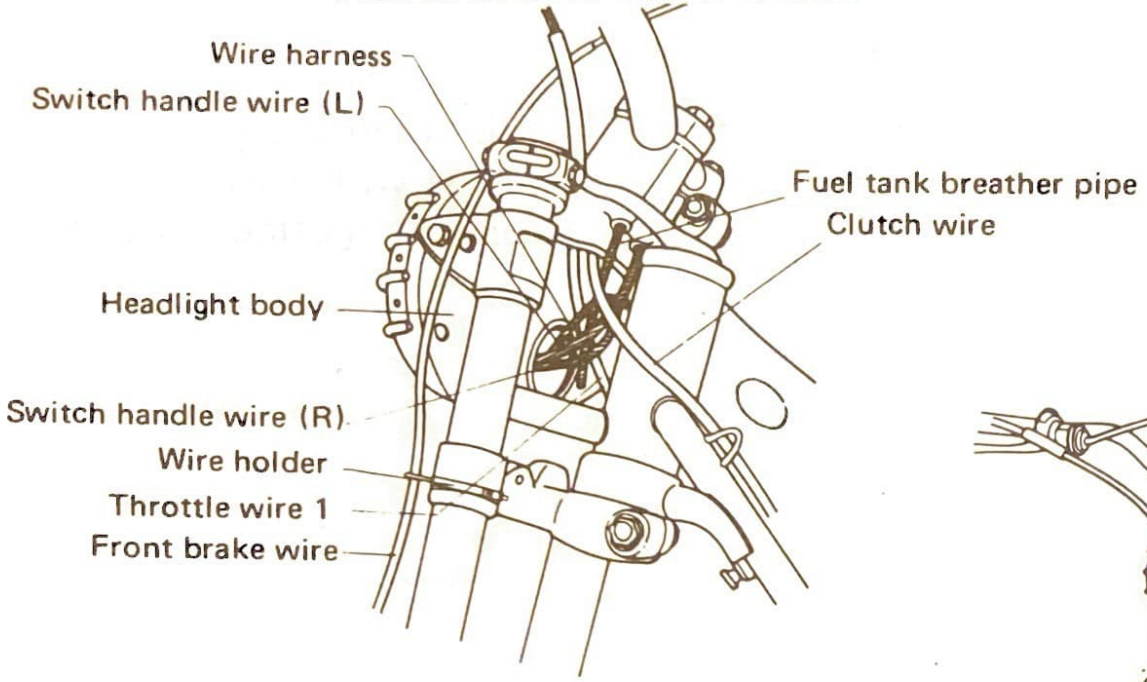
Capacity tests can be performed by simply setting the tester to the condenser capacity. The tester should be connected with the condenser in the same way as in the case of the insulation resistance test. Before this measurement, be sure to set the tester correctly. If the reading is within 0.3μF ± 10%, the condenser capacity is correct.

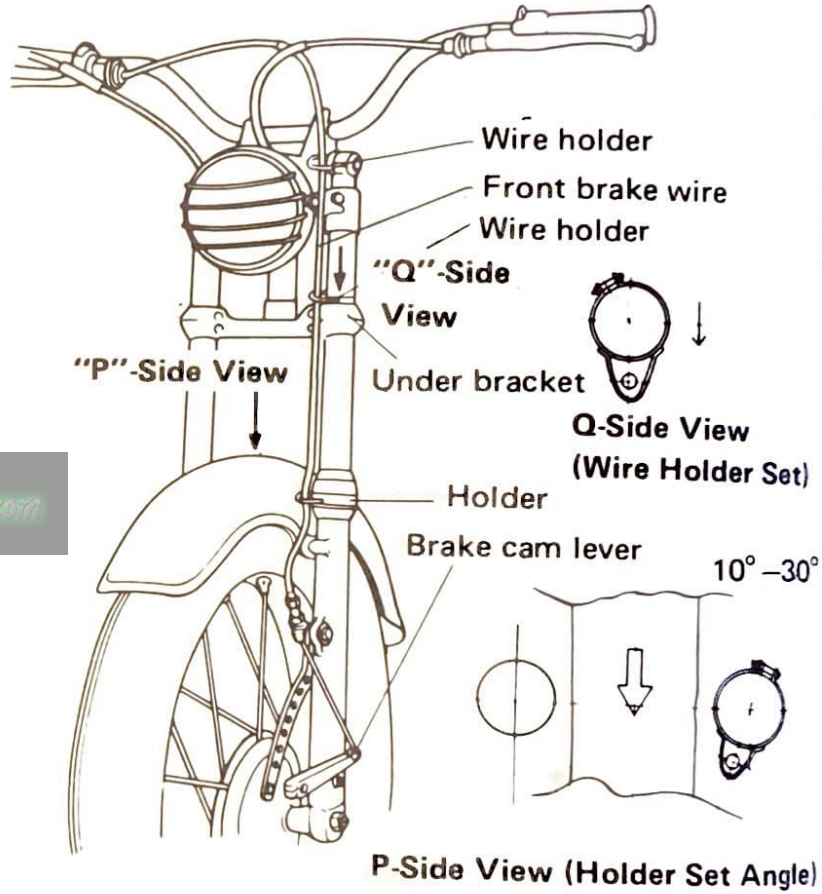
CHAPTER 8. MISCELLANEOUS

The following are included to provide additional information for metric to inch system conversions, machine storage, etc. We feel you should be familiar with each assembly's structure even though you, the owner, are advised to refrain from attempting disassembly yourself.

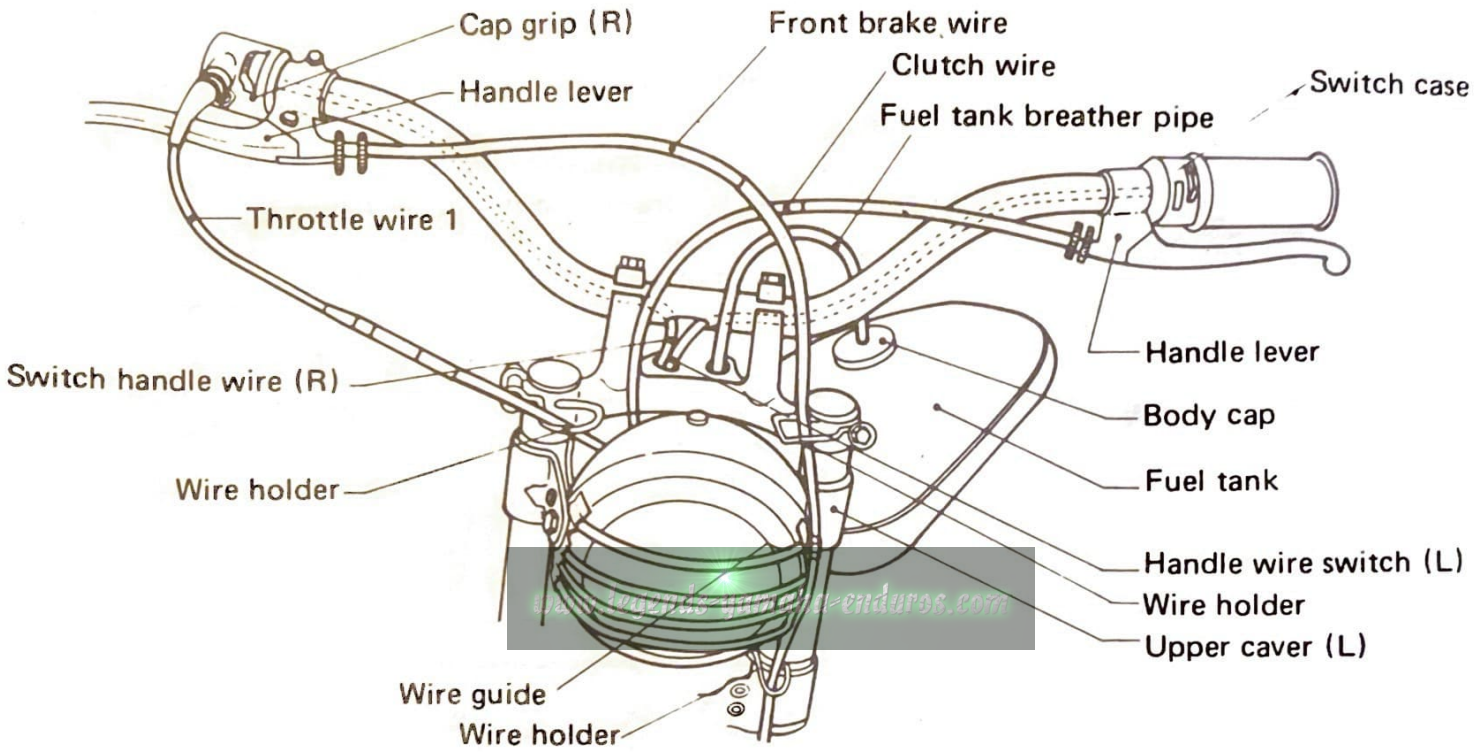
8-1 CABLE ROUTING DIAGRAMS

HEADLIGHT-SIDE VIEW

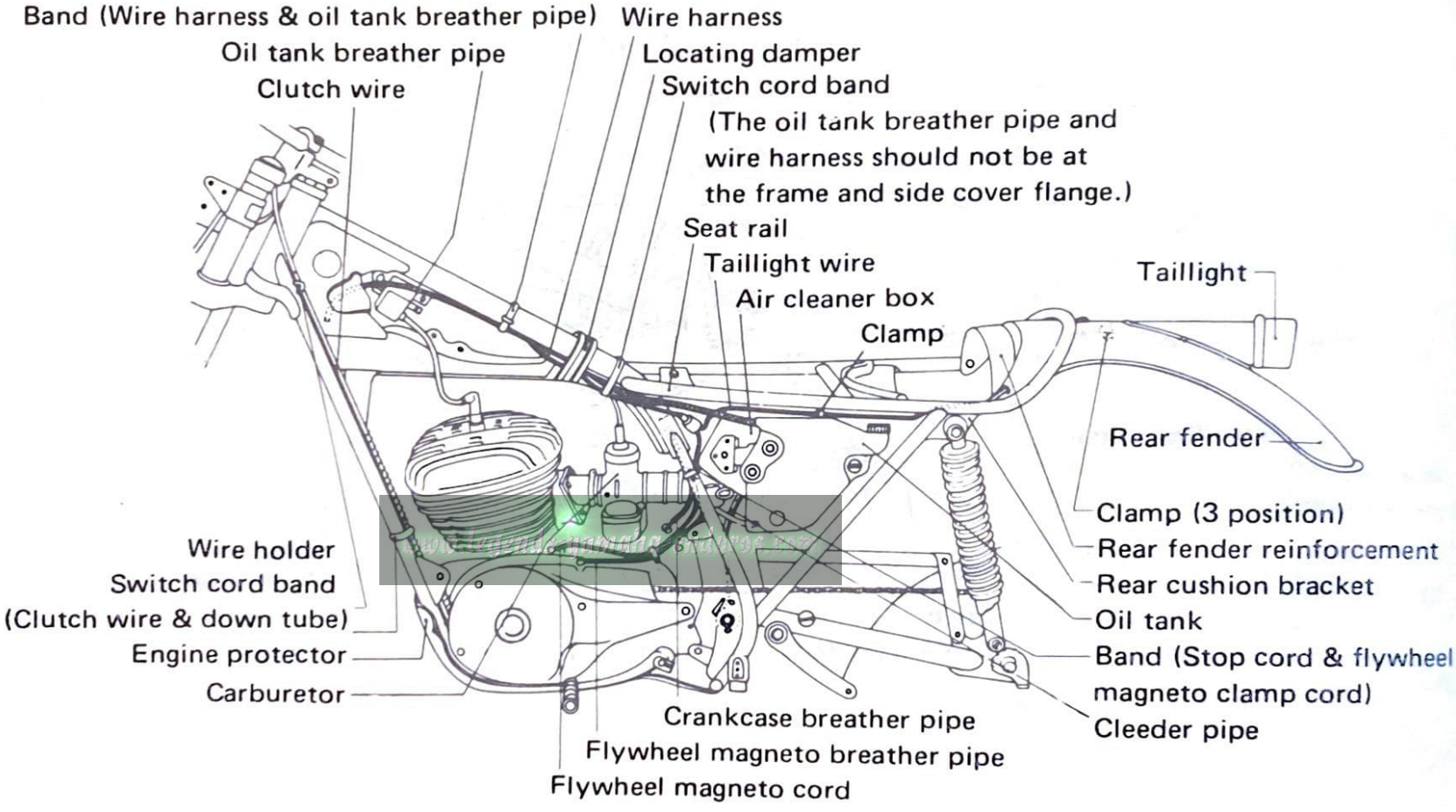




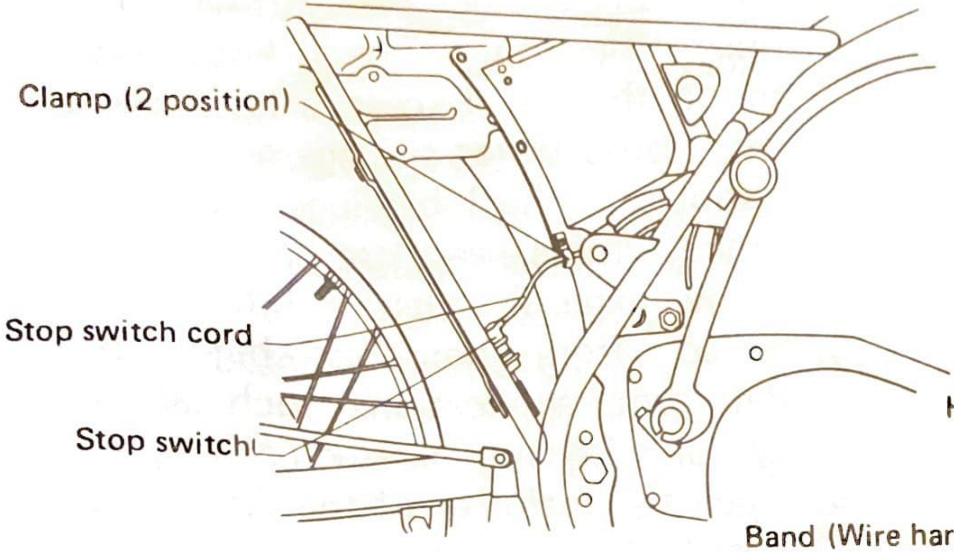
HANDLE CROWN-SIDE VIEW



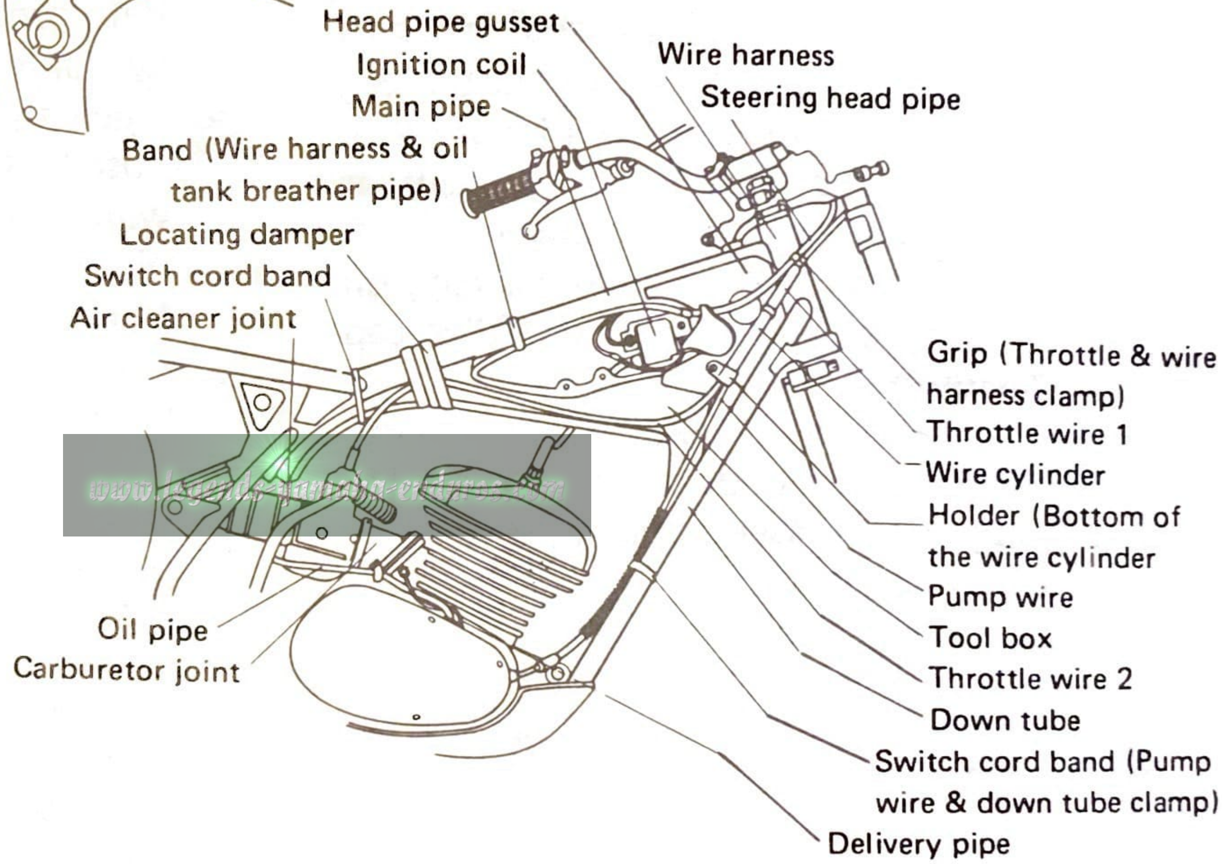
LEFT-SIDE VIEW



STOP SWITCH-SIDE VIEW



RIGHT-SIDE VIEW



8-2. CLEANING AND STORAGE

A. Cleaning

Frequent thorough cleaning of your motorcycle will not only enhance it's appearance but will improve general performance and extend the useful life of many components.

1. Before cleaning the machine:
   a. Block off end of exhaust pipe to prevent water entry; a plastic bag and strong rubber band may be used.
   b. Remove air cleaner or protect it from water with plastic covering.
   c. Make sure spark plug(s), gas cap, oil tank cap, transmission oil filler cap are properly installed.
2. If engine case is excessively greasy, apply degreaser with a paint brush. Do not apply degreaser to chain, sprockets, or wheel axles.
3. Rinse dirt and degreaser off with garden hose, using only enough hose pressure to do the job. Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brake drums, and transmission seals. Many expensive repair bills have resulted from improper high-pressure detergent applications such as those available in coin-operated car washes.
4. Once the majority of the dirt has been hosed off, wash all surfaces with warm water and mild, detergent-type soap. An old tooth brush or bottle brush is handy to reach those hard-to-get-to places.
5. Rinse machine off immediately with clean water and dry all surfaces with a chamois, clean towel, or soft absorbent cloth.
6. Immediately after washing, remove excess moisture from chain and lubricate to prevent rust.
7. Chrome-plated parts such as handlebars, rims, spokes, forks, etc., may be further cleaned with automotive chrome cleaner.

8. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
9. Automotive-type wax may be applied to all painted and chrome-plated surfaces. Avoid combination cleaner-waxes. Many contain abrasives which may mar paint or protective finish on fuel and oil tanks.
10. After finishing, start the engine immediately and allow to idle for several minutes.

B. Storage

Long term storage (30 days or more) of your motorcycle will require some preventive procedures to insure against deterioration. After cleaning machine thoroughly, prepare for storage as follows:

1. Drain fuel tank, fuel lines, and carburetor float bowl(s).
2. Remove empty fuel tank, pour a cup of 10W to 30W oil in tank, shake tank to coat inner surfaces thoroughly and drain off excess oil. Re-install tank.
3. Remove spark plug(s), pour about one tablespoon of 10W to 30W oil in spark plug hole(s) and re-install spark plug. Kick engine over several times (with ignition off) to coat cylinder walls with oil.
4. Remove drive chain. Clean thoroughly with solvent and lubricate with graphite-base chain lubricant. Re-install chain or store in a plastic bag (tie to frame for sake-keeping).
5. Lubricate all control cables.
6. Remove battery and charge. Store in a dry place and re-charge once a month. Do not store battery in an excessively warm or cold place (less than 32°F or more than 90°).
7. Block up frame to raise both wheels off ground. (Main stands can be used on machines so equipped).
8. Tie a plastic bag over exhaust pipe outlet(s) to prevent moisture entering.
9. If storing in humid or salt-air atmosphere, coat all exposed metal surfaces with a light film of oil. Do not apply oil to rubber parts or seat cover.

8-3. WARRANTY INFORMATION (for U.S.A.)

Please refer to your copy of the Yamaha Owner's Warranty Guide* for details of the warranty offered on your new Yamaha.

The Warranty Guide contains the warranty policy, an explanation of the warranty, and other important information. Becoming familiar with these policies will be to your advantage in making the best use of Yamaha's warranty programs.

There are certain requirements which you must meet in order to quality for warranty coverage.

FIRST, your new Yamaha must be operated and maintained properly, as explained in this manual. If you have any questions about any procedure in this manual, please consult your dealer. ABUSE AND NEGLECTED MAINTENANCE MAY LEAD TO MACHANICAL FAILURES WHICH CANNOT BE COVERED UNDER WARRANTY.

SECOND, IF ANY PROBLEMS OCCUR WHICH YOU FEEL SHOULD BE COVERED UNDER WARRANTY, NOTIFY YOUR DEALER IMMEDIATELY. Don't delay, as small problems left unrequired can become large problems which may not be covered under warranty.

We recommend that the Warranty Guide be used as a folder in which you may keep your registration and other important documents related to your new Yamaha.

* The Yamaha Owner's Warranty Guide is to be supplied by your Yamaha dealer at the time of purchase. If you did not receive one or have lost yours, you may obtain extra copies upon request from your Yamaha dealer or by writing to:

YAMAHA INTERNATIONAL CORPORATION
P.O.Box 6600
Buena Park, California 90620
Attn: Warranty Department