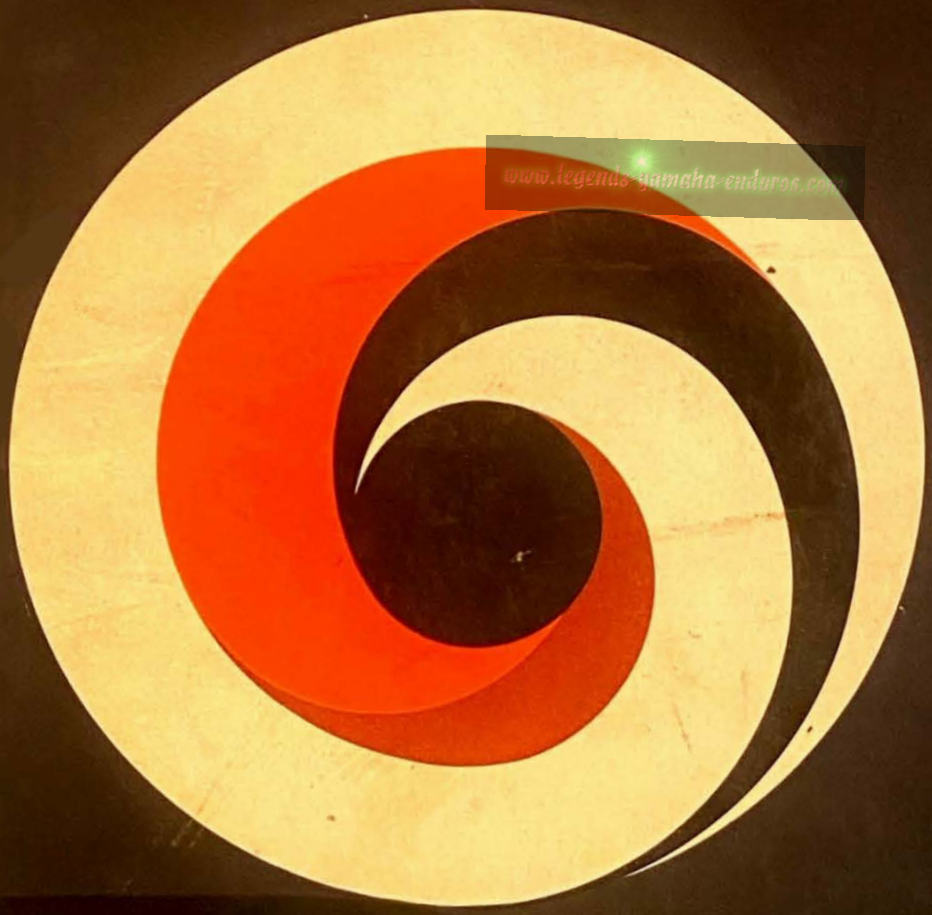
YAMAHA 360 RT 1

SERVICE MANUAL



FOREWORD

This Service Manual for the Yamaha RT1 360cc Enduro is directed to acquaint both the owner and mechanic with the operation, service, and maintenance of his machine.

The RT1 is Yamaha's first fully street legal motorcycle designed to enable the owner to ride it on the street, use it for trail riding, or convert it with factory available parts into a competition ready scrambler or motocrosser.

This manual and the technical and service imformation enclosed should be closely followed to insure continuous good performance, long life, and to enable you to properly maintain the machine.

YAMAHA MOTOR CO., LTD.

SERVICE DIVISION

Contents

Chapter I General

I-1 Features of Yamaha Enduro 360 RTI

1. Single Cylinder 5-Port Engine

The Yamaha RT1 has a 360 cc single cylinder engine.

This iron sleeved aluminum cylinder is of 5-port design and its improved scavenging efficiency results in optimum engine performance in all gears and from 2,500 to 6,000 R. P. M.

2. Convenient and Reliable Yamaha Autolube

Yamaha Autolube—automatic oil injection lubrication system—is well known for its performance and reliability. Like every other Yamaha model, the Yamaha Enduro 360 RT1 also employs the world-renowned Autolube.

3) 5-Speed Transmission

The Yamaha Enduro 360 RT1 assures steady engine performance, from low speed off-road riding to high speed road work, because of the 5-speed transmission.

4. Convenient Primary Kickstarter

The primary kickstarter enables the engine to be started either in gear or in neutral.

5. Easy Riding Position and Superb Maneuverability

The light-weight, sturdy frame combined with the component parts are ideal for off-the-road riding. Agile, and with a riding comfortable position, the Yamaha Enduro 360 RT1 exhibits superb maneuverability and handling over rough terrain.

6) Competition Designed Front Forks and Rear Shocks

The Yamaha Enduro 360 RT1 has telescopic front forks with internal coil springs such as used for competition racers.

The front forks provide excellent handling qualities over the roughest terrain with longer stroke and superb dampening capacity. The rear shocks have 3-way adjustable springs with a longer stroke.

This insures stability under even the roughest condition.

7. Separate Tachometer and Speedometer with a Reset Odometer for Mileage Calibration.

A separate tachometer is provided to enable the rider to make best use of the engine power.

The speedometer combined with a trip meter allows the rider to the reset the mileage for enduros.

8. Trials Univesal Tires for Off-the-road and On the Road Riding.

Trials universal tires for off-the-road and on the road riding are equipped as standard. They are ideal for off-the-road riding as well as on the road riding.

9. Alternate* GYT Parts for Competition Riding.

The GYT kit parts for competition engine tuning are available. You can convert your RT1 into a motorcrosser by simply installing GYT parts and removing all unnecessary parts.

* Genuine Yamaha Tuning

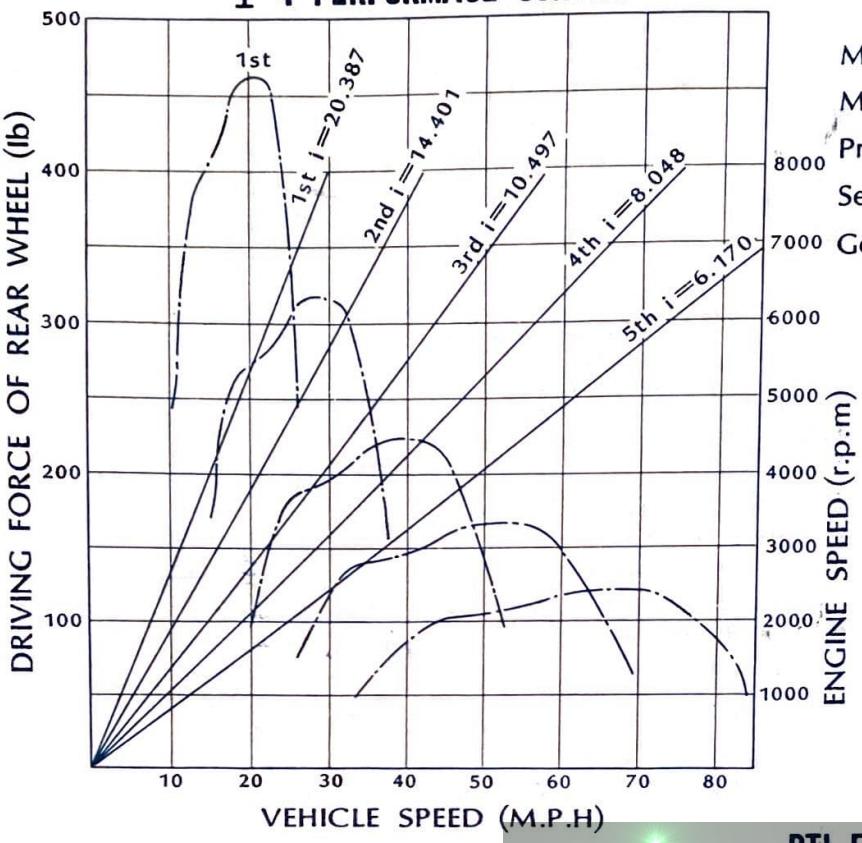
I -3 Specifications & Performance Model RT1

• with RT1M

Model:	YAMAHA 360 RTI
Dimensions:	
Overall length	82.7 in. 2,100 mm.
Overall width	35.0 in. 890 mm.
Overall height	45.7 in. 1,160 mm.
Wheelbase	54.7 in. 1,390 mm.
Min. ground clearance	10.0 in. 255 mm.
Weight:	
Gross	282 lbs. 128 kg.
Net	258 lbs. 117 kg.
Performance:	
Max. speed	78 mph (125 km/h) or more (std.)
Fuel consumption (on paved level roads)	82.5 mpg (at 37 mph)
Climbing ability	35°
Min. turning radius	78.7 in. 2,000 mm.
Braking distance	49 ft. at 31 mph 15 m at 50 km/h
Engine:	
Model	RT1
Type	2 stroke, gasoline
Lubricating system	Separate lubrication (Yamaha Autolube)
Cylinder	Single, forward inclined, 5 port
Displacement	21.42 cu. in. (351 c.c.)
Bore ×Stroke	3,150 ×2,756 in. (80 ×70 mm.)
Compression ratio	6.3:1 (7.2:1)
Max power	30BHP/6,000 r.p.m (36 PS/6,500 r.p.m.)
Max torque	26.0 ft-lbs. /5,500 r.p.m. 3.6 kg-m/5,500 r.p.m. •(28.7 ft-lbs. /6,500 r.p.m. 3.97 kg-m/6,500 r.p.m.)
Starting system	Primary-coupled kick starter system
Ignition system	Flywheel magneto ignition system with secondary ignition coil
Carburetor:	
Type	VM32SH •VM34SH
Air cleaner:	Dry, Paper filter type
Transmission:	
Clutch	Wet, multiple-disk
Primary reduction system	Helical gear
Primary reduction ratio	3,095 (65/21)

Gear Box:	
Type	Constant mesh, 5-speed forward
Reduction ratio lst	2,533 (Total r. ratio 20,387) •2,250
2nd	1,789 ('' 14,401) •1,650
3rd	1,304 ('' 10,497) •1,260
4th	1,000 ('' 8,048) •1,000
5th	0,767 ('' 6,170) •0,793
Secondary reduction system	Chain
Secondary reduction ratio	2,600 (39/15)
Chassis:	
Frame	Tubular-Double loop
Suspension system, front	Telescopic fork
Suspension system, rear	Swinging arm
Cushion system, front	Coil spring, oil damper
Cushion system, rear	Coil spring, oil damper
Steering system:	
Steering angle	49° both right and left
Caster	60°30'
Trail	5.12 in. 130 mm.
Braking system:	
Type of brake	Internal expansion
Operation system, front	Right hand operation
Operation system, rear	Right foot operation
Tire size:	
Front	3.25-19-4PR
Rear	4.00-18-4PR
Dynamo:	
Model	FZC-IAIL
Manufacturer	Mitsubishi Elec.
Battery:	
Model	MV1-6D
Manufacturer	Nippon Battery.
Capacity	6V 2AH
Lighting:	
Headlight	6V 35W/35W
Taillight	6V 5.3W
Stoplight	6V 17W
Meter light	6V 3W×2
Tanks:	
Gasoline tank capacity	2.5gals. (9.5liters)
Oil tank capacity	1.7qts. (1.6liters)

I-4 PERFORMACE CURVES

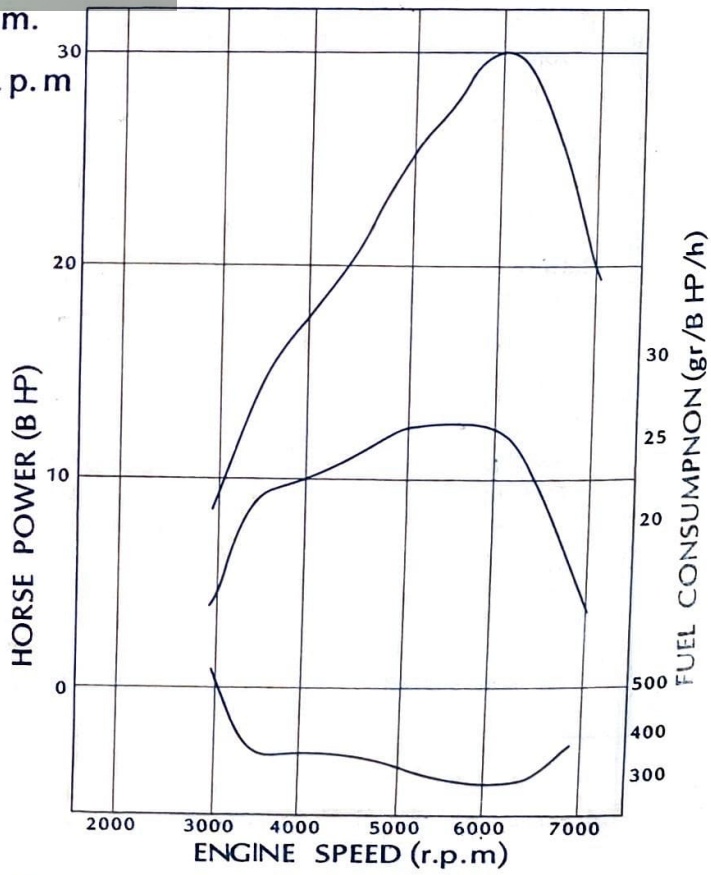


Maximum Power 36 BHP/6,000 r.p.m
Maximum Torque 26.0 ft-lb/5,500 r.p.m
Primary reduction ratio 65/21 (3.095)
Secondary reduction ratio 39/15 (2,600)
Gear ratio 1st 38/15
2nd 34/19
3rd 30/23
4th 26/26
5 th 23/30

Tire size Rear 400-18-4PR

RTI ENGINE PERFORMANCE CURVES

Maximum Power 30 B HP /6,000 r.p.m.
Maximum Torque 26.0 ft-lb/5,500 r.p.m



I -5 Tools and Instruments for Shop Service

The following tools and instruments are required to service the RT1.

1. General Tools

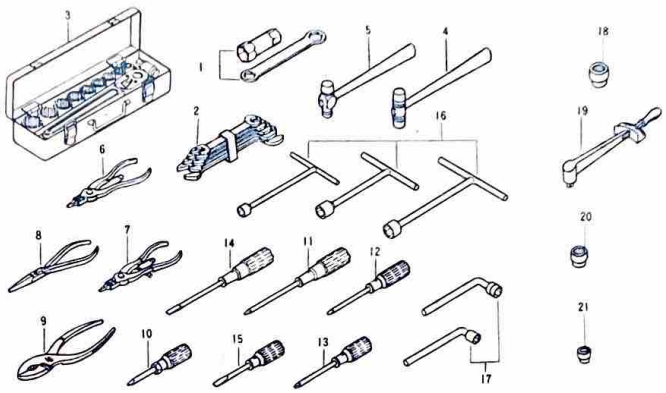


Fig. 1-5-1

1) Plug wrench 23×29mm.
2) A set of wrenches
3) A set of socket wrenches
4) Plastic tip hammer
5) Steel hammer
6) Circlip pliers (ST type)
7) Circlip Pliers (TR type)
8) Needle nose pliers
9) Pliers
10) Phillips-head screwdriver
11) Phillips-head screwdriver (L)
12) Phillips-head screwdriver (M)
13) Phillips-head screwdriver (S)
14) Slot-head screwdriver (M)
15) Slot-head screwdriver (S)
16) T-handle socket wrench

2. Special Tools and instruments

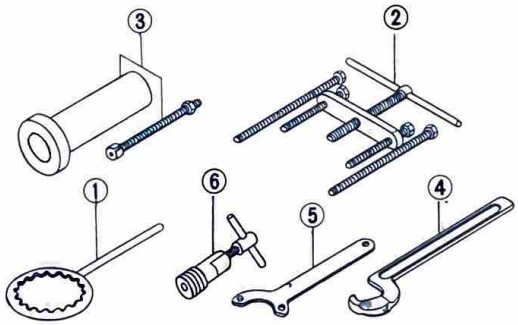


Fig. 1-5-2

1) Clutch holding tool (for YR1 and YM2)
2) Crankcase disassembling tool
3) Crankshaft assembling tool (for YF1 and YG1)
4) Flywheel magneto holding tool
5) Flywheel magneto puller
6) Dial indicator adaptor
7) Crankshaft puller pot adaptor

In addition, an electro-tester. tachometer (engine r.p.m. meter) hydrometer, etc. are needed.

3. Other Naterials

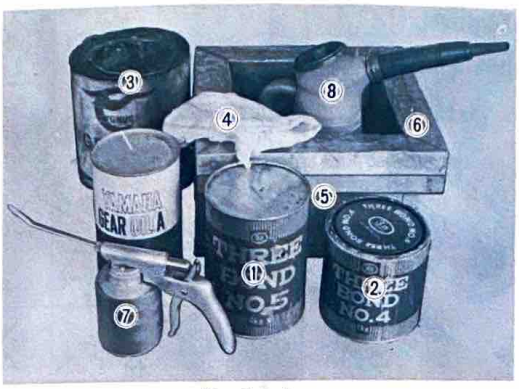


Fig. 1-5-3

1) Yamaha Bond(No. 5)
2) Autolube oil
3) Grease
4) Wiping material
5) Overhauling stand
6) Parts tray
7) Oiler
8) Oil jug

The use of a wooden box as shown in the above photo ⑤ will facilitate engine service and overhaul. Consumable parts (such as gaskets) and replacement parts must also be on hand.

Chapter Ⅱ. YAMAHA Autolube
(Automatic Separate Lubricating System)

Ⅱ-1 What is YAMAHA Autolube ?

Conventional 2-stroke engines are lubricated by oil premixed in gasoline, but YAMAHA's Autolube furnishes an automatic, separate lubrication system. That is, the oil in a separate oil tank is automatically regulated by the oil pump and fed to the engine according to engine speed and load.

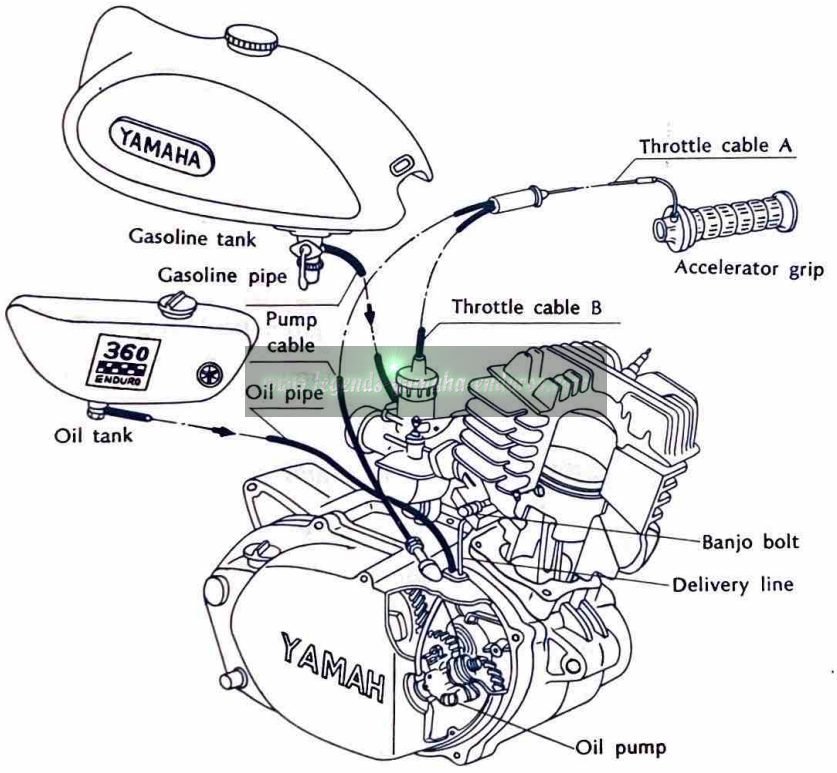


Fig. Ⅱ-1-1

Ⅱ-2 Features of YAMAHA Autolube

The oil pump is driven by the engine through a reduction gear, and is connected to the carburetor throttle cable controlled by the accelerator grip.

The oil pump automatically regulates the volume of lubricating according to engine speed and throttle valve opening, thus pumping the optimum amount of oil for engine lubrication under any operating condition.

This "automatic separate lubrication" does not merely eliminate disadvantages in

the conventional pre-mix system, but it further improves the performance and efficiency of 2-stroke designs by eliminating certain oil-starvation conditions which formerly existed.

A) The Autolube feeds an optimum amount of lubricating oil to the engine under any operating condition, thus featuring:
   - Less oil consumption.
   - Less carbon accumulation.
   - Less exhaust smoke.
   - Improved lubricating efficiency.

B) The Autolube simplifies fuel supply, thus featuring:
   - Using straight gasoline directly in the gas tank.
   - Less fuel contamination.

C) The Autolube improves the reliability of lubrication, thus eliminating:
   - Special care concerning oil/fuel mixing ratio.

II-3 Handling the Oil Pump

The oil pump is a precision-machined assembly. Make no attempt to disassemble it. When you remove the oil pump from the engine, protect it from dust, dirt, etc., and after reinstalling it, bleed and adjust the pump correctly. Proper handling will keep the pump free from trouble.

The oil pump is similar in both mechanism and construction to other Autolube systems. The only difference is the employment of a 5.5$^{\phi}$ plunger because of larger consumption of oil by a 360 cc single cylinder engine.

II-3-A. Checking Minimum Pump Stroke

1) Checking

a. Fully close the accelerator grip.

b. Turn the oil pump starter plate in the direction of the arrow marked on the plate. Then measure the gap between the adjustment pully and the adjustment plate. Keep the gap as wide as possible by observing it with the eye.

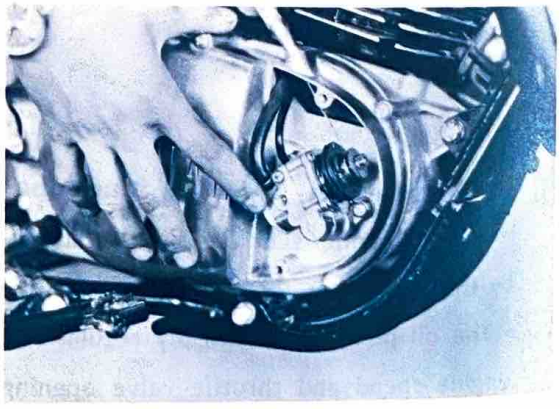


Fig II-3-1

c. Insert a feeler gauge (0.15 mm.) into the gap.

When the gap allows it to enter .....Stroke is correct.

When the gap does not allow .....Stroke is insufficient.

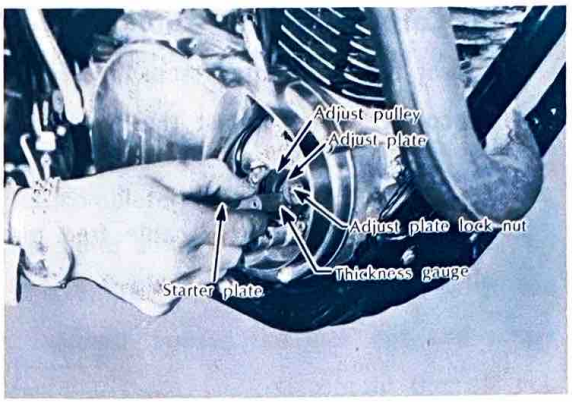


Fig. Ⅱ-3-2

2) Adjustment

a. Remove the adjustment plate lock nut, and then remove the adjustment plate.

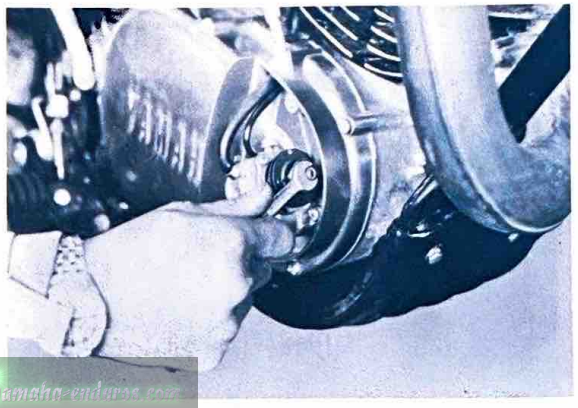


Fig. Ⅱ-3-3

b. Install a 0.1 mm. adjustment shim where the adjustment plate was.

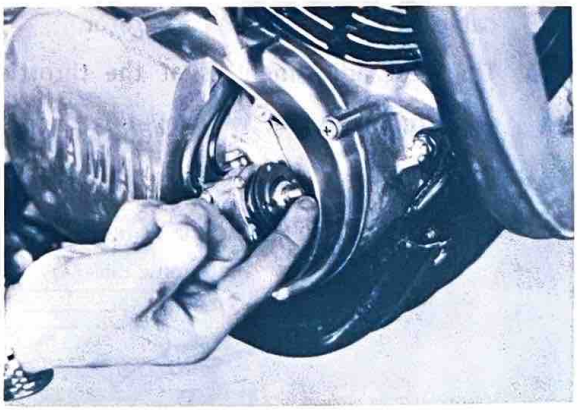


Fig. Ⅱ-3-4

c. Reinstall the adjustment plate lock nut, and measure minimum stroke. When the gap allows a 0.20 mm. feeler gauge to enter but does not allow a 0.25 mm, the stroke is correctly adjusted.

Minimum stroke adjustment limit.....0.15 mm. or less

stroke adjustment tolerance.....0.20 to 0.25 mm.

Ⅱ-3-B Carburetor and Autolube Cable Adjustments

Perform the preceeding steps in section Ⅱ-3-A to check minimun stroke, and adjust it if incorrect. Then adjust the Autolube and carburetor cables.

1) Throttle Cable Adjustment

a. To adjust the throttle cable free play with the engine at idle, begin by removing all slack from throttle cable B in Fig. 11-3-5.

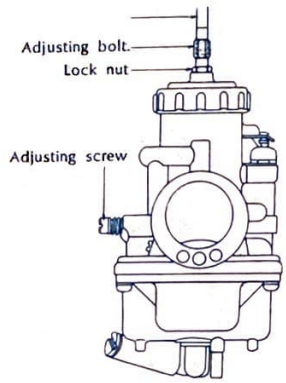


Fig II-3-5

To remove all the free play from the throttle cable, loosen or tighten the throttle cable adjustment screw (see below) until all slack has been taken up. Next, screw the cable adjustor until there is 1 mm free play (1/32") in the cable at the top the carburetor.

b. The next adjustment is at the throttle grip. Loosen the lock nut and screw the adjustor in or out, whichever is necessary to get 0.5—1.0 mm of free play at the cable end. (see Fig. 11-3-6.)

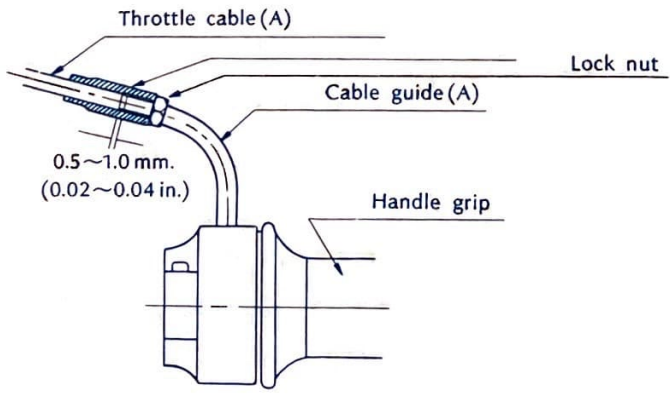


Fig. Ⅱ-3-6

Pull the outer part of the throttle grip to check the play of throttle cable A. If the play is excessive or insufficent, adjust the free play with the adjustment screw.

2) Autolube Cable Adjustment

a. Adjust the pump cable so that the marking (arrow) on the Autolube pump adjustment pully is aligned with the guide pin (see Figs. 11-3-7 &-8).

Begin by fully closing the accelerator grip, then slowly turning it back again so that the slack in the throttle cable is completely taken up. Next , adjust the pump cable so that the marking on the pump adjustment pulley will be aligned with the guide pin, as shown in Fig. 11-3-7. The point of adjustment is at the end of the cable just before it enters the case. Loosen the lock nut and screw the adjustor in or out . whichever direction is necessary to obtain the correct adjustment.

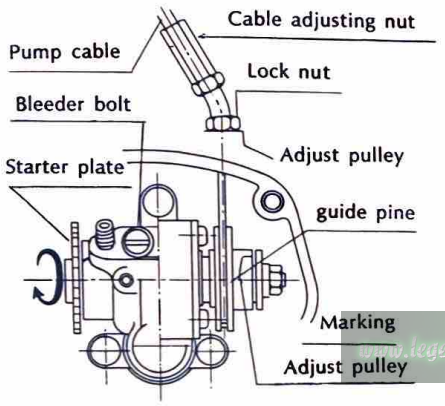


Fig. 11-3-7

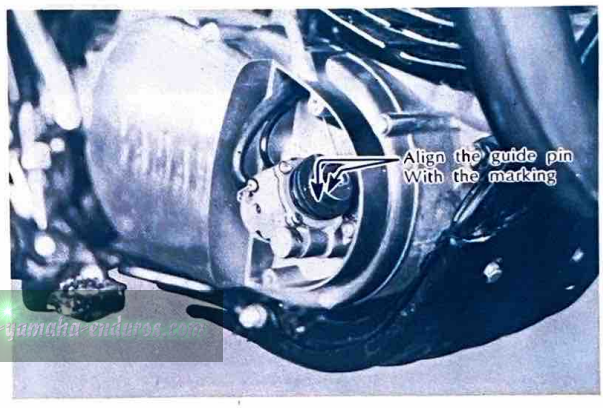


Fig. 11-3-8

II-3-C Bleeding

When the pump has been removed or the Autolube oil has run out, air will enter the pump. The air will cause an irregular flow of oil after the pump is mounted again or the oil is refilled. In order to prevent such an irregular flow of oil, bleed the pump in the following manner.

1) Remove the bleeder bolt.

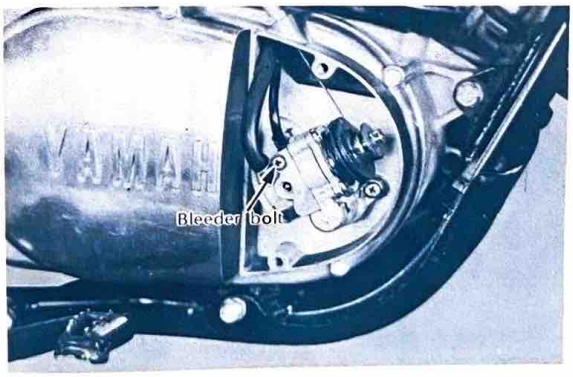


Fig. 11-3-9

2) Next, rotate the starter plate in the direction of the arrow marked on the plate. Continue turning the plate until no air remains, and tighten the bleeder bolt. To facilitate this bleeding, fully open the accelerator grip and rotate the starter plate. As the plunger stroke becomes greater, the air can be quickly bled.

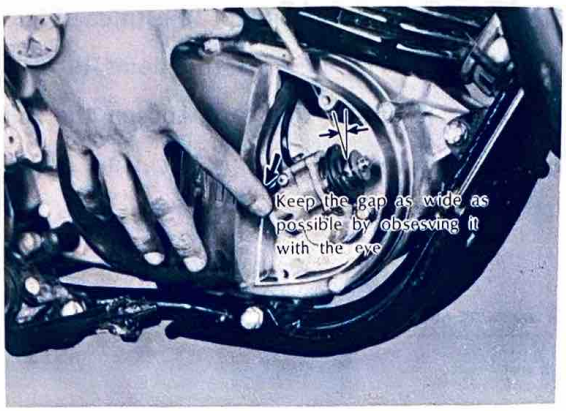


Fig II-3-10

Chapter Ⅲ 5-Port Cylinder Induction System

Ⅲ-1 Construction and Design of the 5-port Induction System

The 2 additional transfer passages are placed to the immediate rear of the standard transfer ports. These two additional ports run from the bottom of the cylinder up to the same height as the standard transfer ports. These additional ports are designed to direct the fresh charge at the area containing the remaining exhaust gases. As the fresh fuel charge enters combustion area the remaining exhaust gas is forced out the exhaust port leaving the combustion area with an uncontaminated full fresh fuel charge.

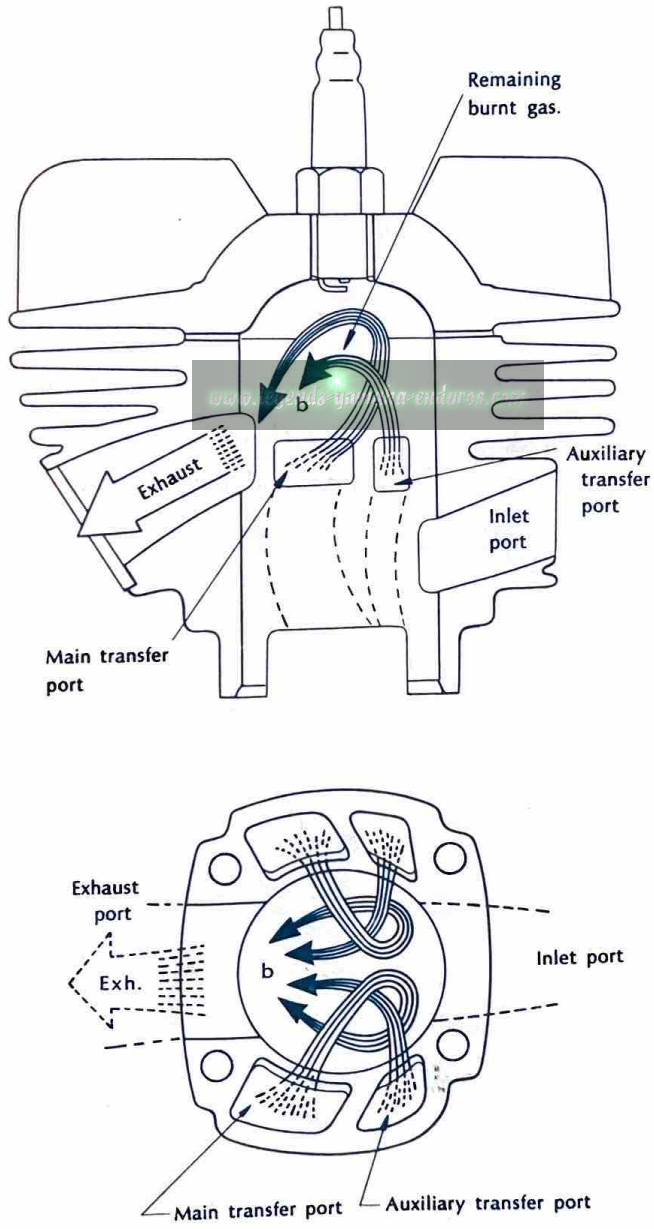


Fig. IV-2-1

Chapter Ⅳ Engine

The RT1 360 cc Enduro engine has been designed with emphasis on both low speed trail riding and high speed road riding. The incorporation of the evenly spaced five-speed transmission and five-port induction system insure complete riding versatility for the owner. The width, height, and weight of the engine has been kept at a bare minimum to insure ease of handling in the roughest terrain.

Disassembly and assembly of the engine and its components should be done in the following manner and order. This will insure correct maintenance and service work for the owner and mechanic.

Preparation for disassembly of the engine:

1) All dirt, mud, dust, and foreign material should be thoroughly removed from the exterior of the engine assembly before removal and disassembly. This will prevent any harmful foreign material from entering the interior of the engine assembly.
2) Before engine removal and disassembly, be sure you have proper tools and cleaning equipment so you can perform a clean and efficient job.
3) During disassembly of the engine, clean and place all parts in trays and in order of disassembly. This will ease and speed assembly time and insure correct installation of all engine parts.

Ⅳ-1 Engine Removal

1) Start the engine and warm it up for a few minutes, then turn off the engine and drain the transmission oil. (Fig. IV-1-1)

Volume of oil: (1.0 qt.) 1,000 c.c.
(SAE 10W/30 Motor Oil)

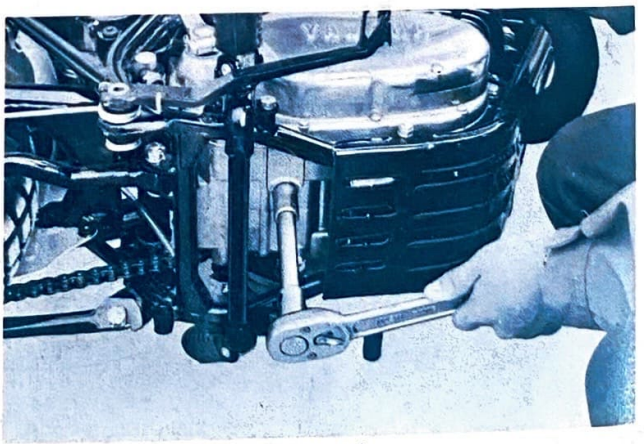


Fig. IV-1-1

2) Remove the muffler.

1) Remove the two springs and two bolts. (Figs. IV-1-2)

Fig. IV-1-2

2) Remove the muffler holding bolts. (Figs. IV-1-3 and 4)

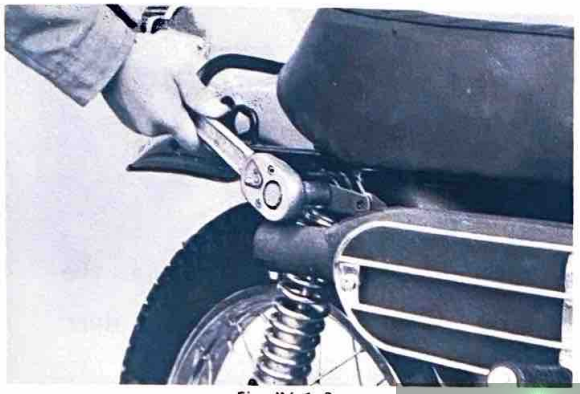


Fig. IV-1-3

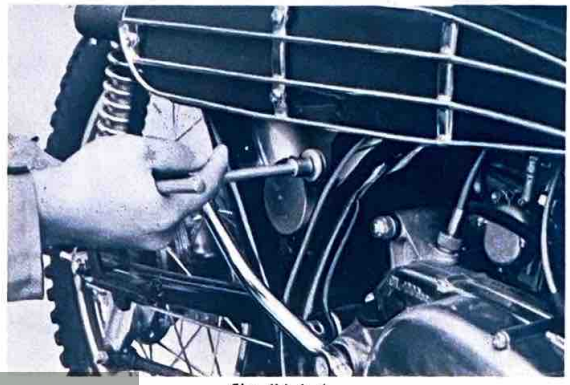


Fig. IV-1-4

3. Remove the change pedal.

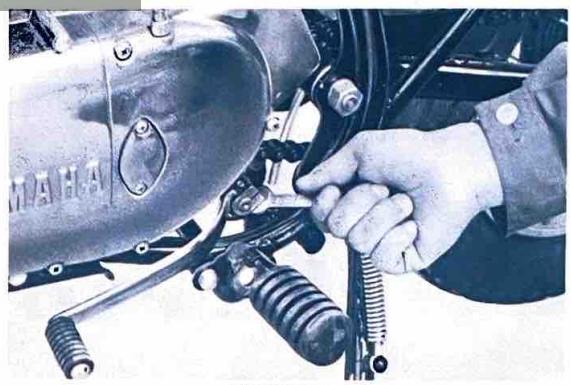


Fig. IV-1-5

4. Remove the chain cover, and then disconect the clutch cable.

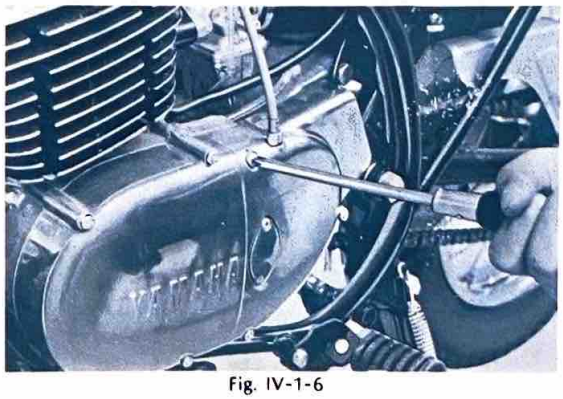


Fig. IV-1-6

5. Disconnect the master link and remove the chain.

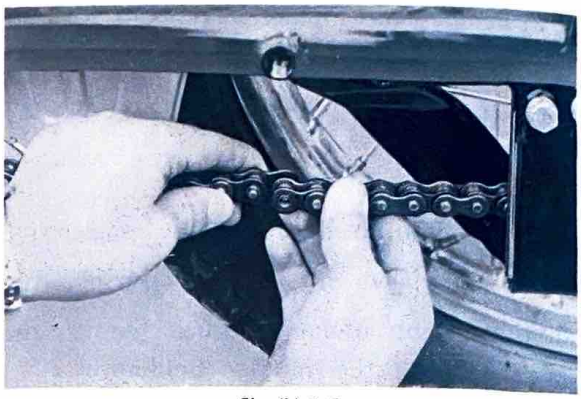
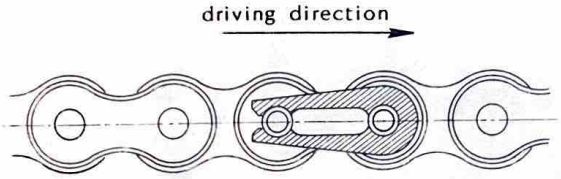


Fig. IV-1-7

When replacing the chain, be sure the master link is facing in the correct direction.



After replacing, adjust the chain free play to 25 mm (1 in.) up and down at the center of the lower section with the rear wheel on the ground, with the rider in position.

6. Remove the pump cover and pump cable.

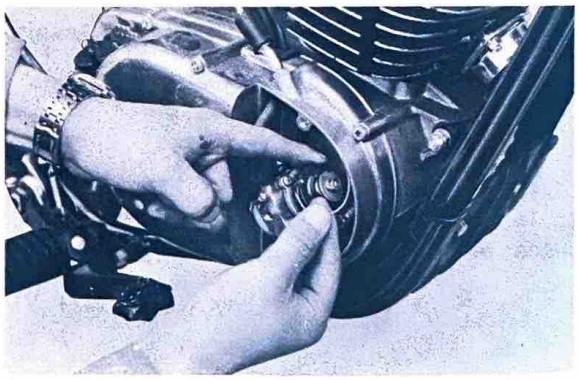


Fig. IV-1-8

7. Remove the tachometer cable.

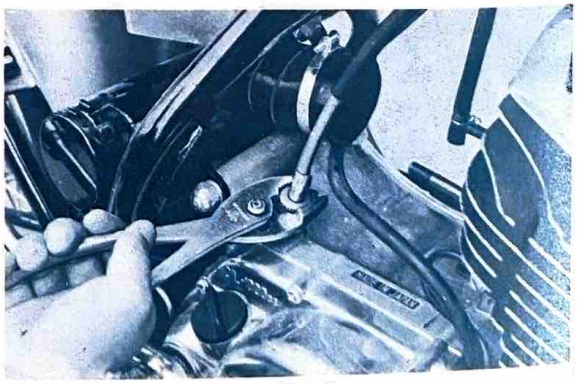


Fig. IV-1-9

8. Remove the carburetor.

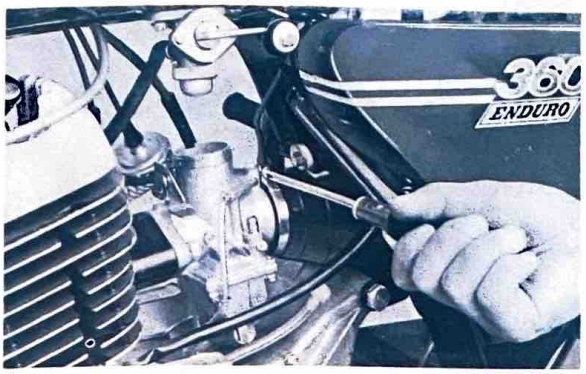


Fig. IV-1-10

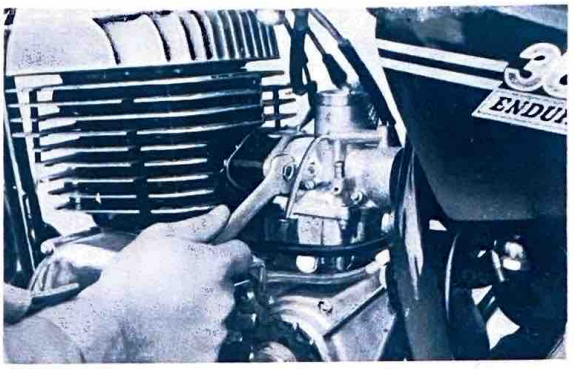


Fig. IV-1-11

9. Disconnect the oil line at the bottom of the oil tank.

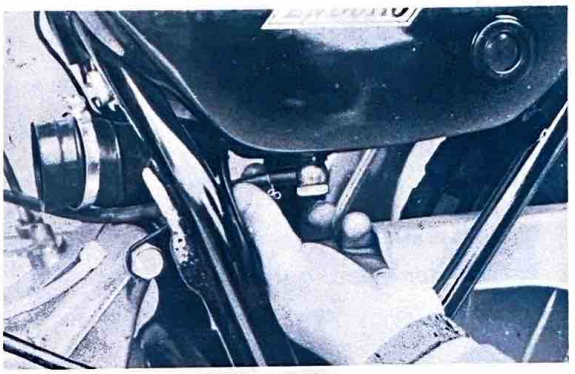


Fig. IV-1-12

10. Disconnect the fuel line at the bottom of the fuel tank.

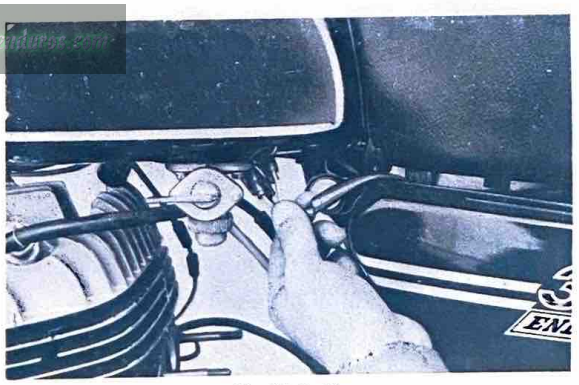


Fig. IV-1-13

11. Remove the four engine mounting bolts.

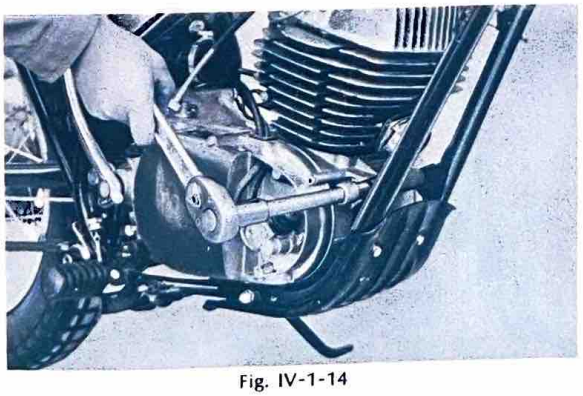


Fig. IV-1-14

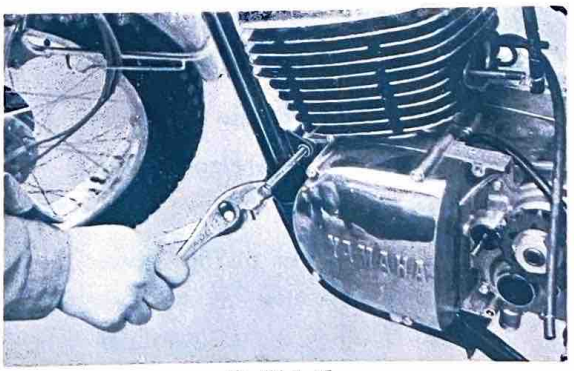


Fig. IV-1-15

12. Remove the engine from th frame.

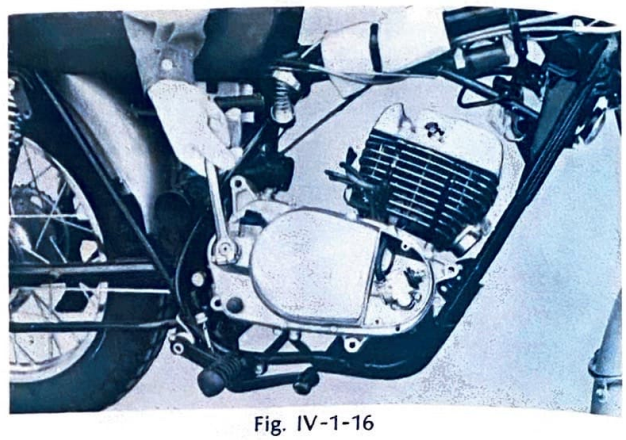


Fig. IV-1-16

Ⅳ-2 Cylinder Head

The cylinder head is bolted on the cylinder with special nuts.

A. Removing

Remove the nuts from the top of the cylinder head, and then the head and gasket. Reverse the sequence for reinstallation. Replace the gasket, if damaged.

Cylinder head tightening torque 3.5～40 kg-m. (25.3～28.9 ft-lbs.) for 10 mm bolts
2.0 kg-m for 8 mm bolts

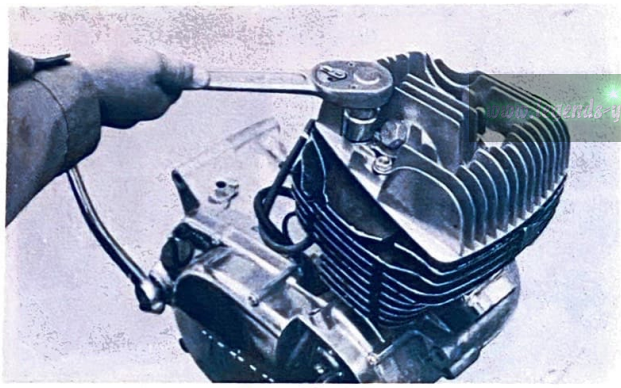


Fig. Ⅳ-2-1

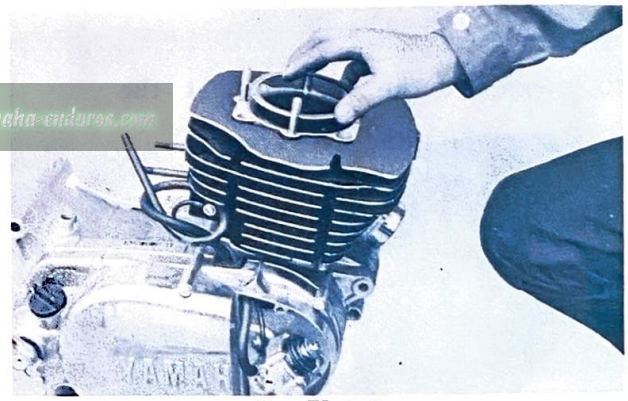


Fig. Ⅳ-2-2

B. Removing Carbon Deposits

Carbon deposits on the combustion chamber dome and piston crown will result in an increase in the compression ratio ,as well as preignition and engine overheating.

Scrape the dome and piston crown clean.

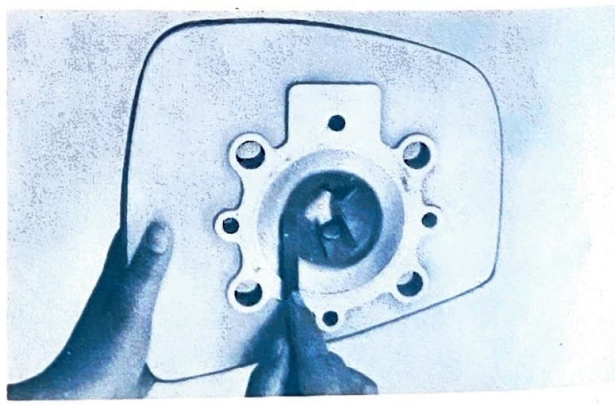


Fig. IV-2-3

A. Removing the Cylinder

1) Remove the oil delivery line banjo bolt from cylinder.

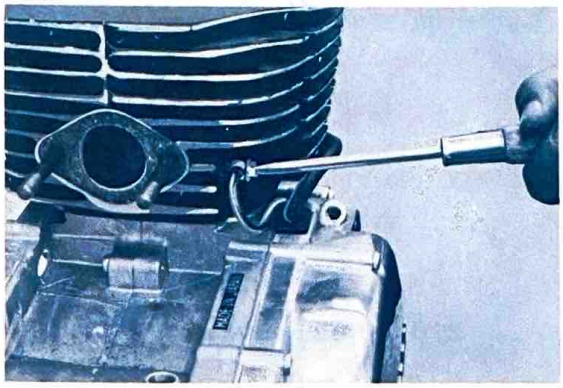


Fig. IV-3-1

2) Remove the cylinder by striking it lightly with a plastic or rubber hammer.

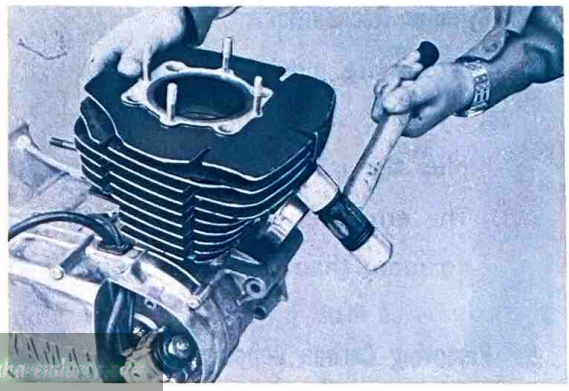


Fig. IV-3-2

3) Always replace the cylinder base gasket when reassembling cylinder.

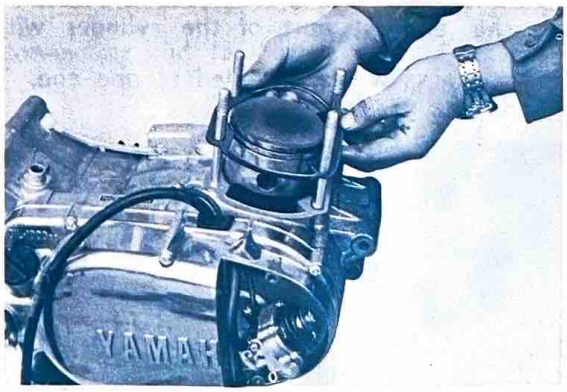
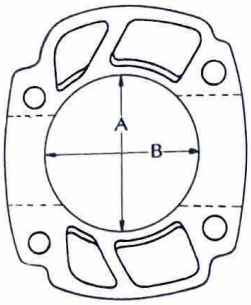


Fig. IV-3-3

B. Checking the Cylinder for Wear

1) Measure the amount of cylinder wall wear with a cylinder bore measuring micrometer or cylinder gauge. (Measure it at four depths by positioning the instrument at right angles to the crankshaft.) If the difference between the maximum and minimum diameter exceeds 0.05 mm.(0.0019"), rebore and hone the cylinder.



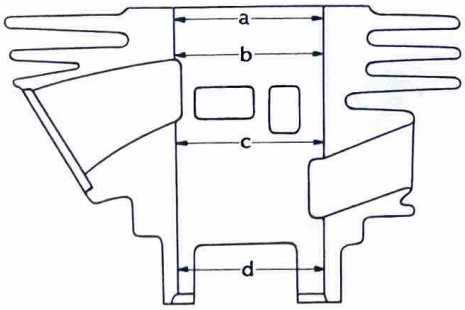


Fig. Ⅳ-3-4

2) The minimum clearance between the piston and the cylinder is 0.045～0.050mm. (0.0018 to 0.0020)

C. Cylinder Reconditioning

1) Pistons are available in 0.25 and 0.50 mm.(0.010" and 0.020") oversizes.
2) Cylinder should be rebored and honed to the diameter of the oversize piston plus the minimum allowable clearance. (IV-3-B-2)
3) The error between the maximum and minimum diameters after honing should be no more than 0.04 mm. (0.0015")

D. Removing Carbon Deposits

Scrape off the carbon accumulation in the exhaust port of the cylinder with a hacksaw blade dulled at one end.

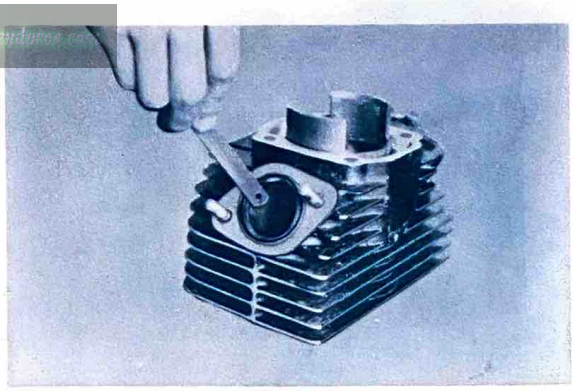


Fig. IV-3-5

E. Installing the Cylinder

Put your fingers at each end of the piston ring, expand the ring, and slip it onto the piston. Align both ends of the ring with the knock pin in each ring groove. Then insert the piston into the cylinder. Take care not to damage the bottom of the cylinder with the rings.

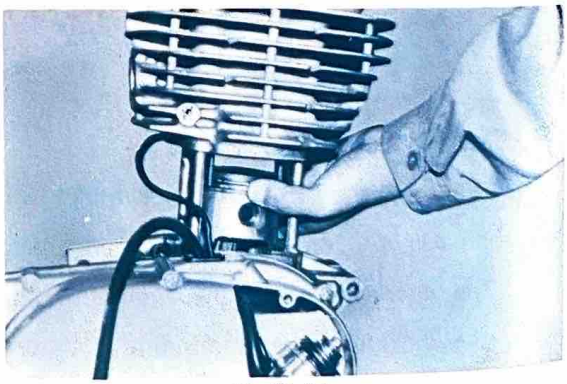


Fig. IV-3-6

Ⅳ-4 Piston Pin

A. Pulling out the Piston Pin

Remove the clips at both ends of the piston pin with needle nose pliers, and press out the piston pin with a finger or a slot-head screwdriver.

Note: Before removing the piston pin clips, cover the crankcase with a clean rag, so you will not accidentally drop the clip or other foreign particles into the crankcase.

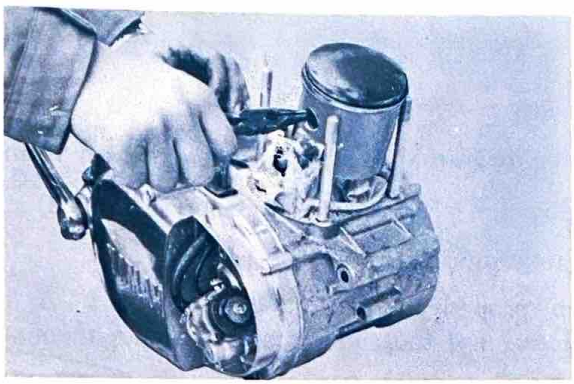


Fig. IV-4-1

B. Piston-to-Piston pin Fit

The piston pin should fit snugly in its bore so that it drags a little as you turn it. If the piston is loose, replace the pin and/or the piston.

If the pin has step-wear in its center, replace the needle bearing as well as the piston pin. Check the small end of the connecting rod for wear by inserting the piston pin and bearing.

Fig. IV-4-2

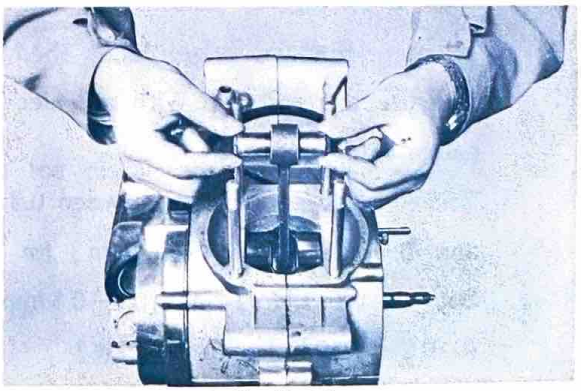


Fig. IV-4-3

Ⅳ-5 Piston Ring

A. Removing the Piston Rings

Put your thumbs at each end of the piston ring and pull the piston ring ends apart. Remove the ring by moving the ring off the piston on the other side of the ring ends.

Fig. IV-5-1

B. Installing the Piston Ring

First fit the No. 2 ring over the piston, and then the No. 1 ring, and align their end gaps with the locating pin in each ring groove. (Fig. IV-5-2)

The printing on all rings must face up to position the gap properly at the pin.

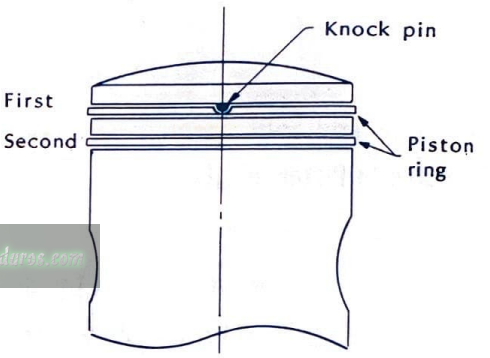


Fig. IV-5-2

C. Checking the Piston Rings

1) Measuring piston ring wear

Put the ring into the cylinder so that the ring is parallel to the cylinder bottom edge, and then measure the end gap with a feeler gauge, (Fig. IV-5-3)

The end gap should be between 0.3 and 0.5 mm. (0.012—0.020 in.) for both No.1 and No.2 rings.[0.4—0.5 mm. (0.016—0.019 in.) with GYT kit.]

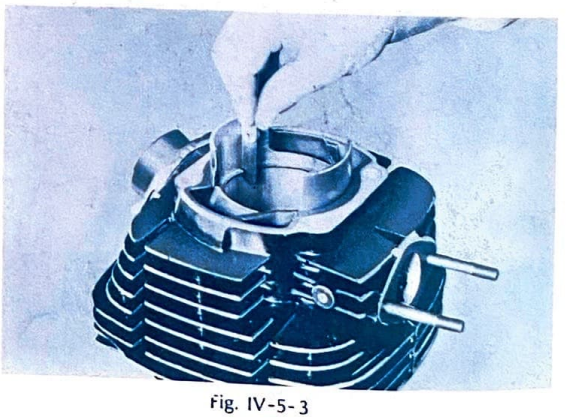


Fig. IV-5-3

2) Removing carbon

Carbon on the piston rings and in the ring grooves will made the rings stick in the piston, thus causing gas blow-by.

Remove the rings from the piston, and clean the carbon from the rings and rings grooves.

Ⅳ-6 Piston

The piston is made of a high-silicon aluminum alloy.

A. Checking and Correcting the Piston to Cylinder Wall Clearance

1) Measuring piston clearance

Piston clearance is the difference between the minimum cylinder bore diameter and the maximum outside diameter of the piston.

As described in IV-3 Cylinder, piston clearance should be 0.045-0.050 mm. (0.0018-0.0020 in.)

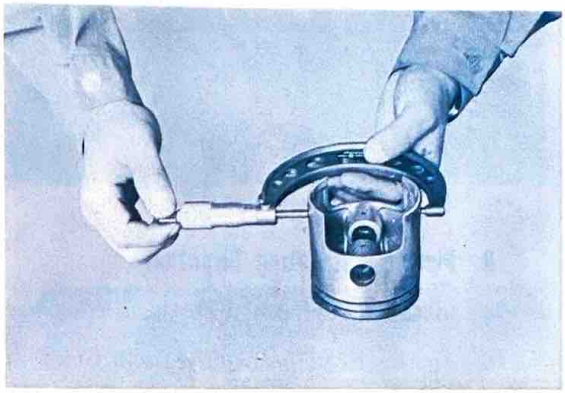


Fig. IV-6-1

To determine the maximum piston diameter, measure the piston with a micrometer at right angles to the skirt 10 mm.(3/8 in.) from its bottom edge. (Fig. IV-6-1)

2) Checking and correcting scratches on the piston.

A piston showing signs of seizure will result in noise and loss of engine power. It will also cause damage to the cylinder wall.

If a piston that has seized is used again without correction, another seizure will develop at the same area. Lightly sand the seizure "high spot" on the piston with #400 sandpaper until smooth. (Fig. IV-6-2)

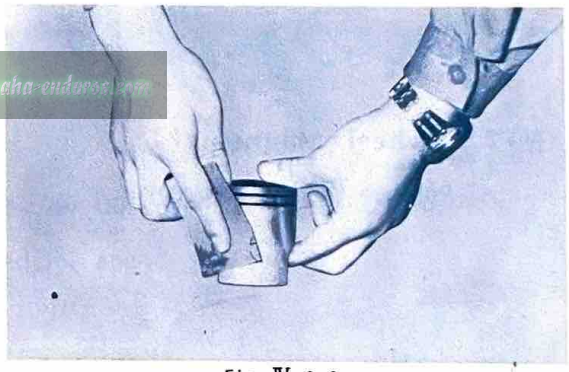


Fig. Ⅳ-6-2

3) Removing Carbon

Remove carbon accumulations on the piston head, with a screwdriver or a saw-blade. (Fig. IV-6-3)

Carbon and gum accumulations in the piston groove will result in piston ring seizure. Remove all carbon from the ring groove. (Fig. IV-6-4)

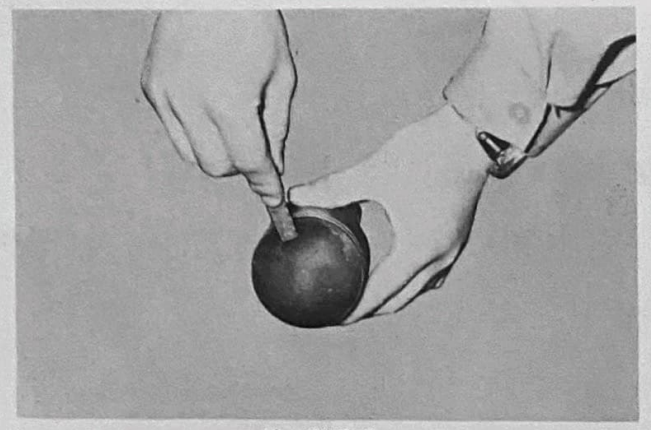


Fig. IV-6-3

Fig. IV-6-4

B. Piston Installation Direction

Install the piston with the arrow mark on the head pointing forward (toward the exhaust port of the cylinder.)

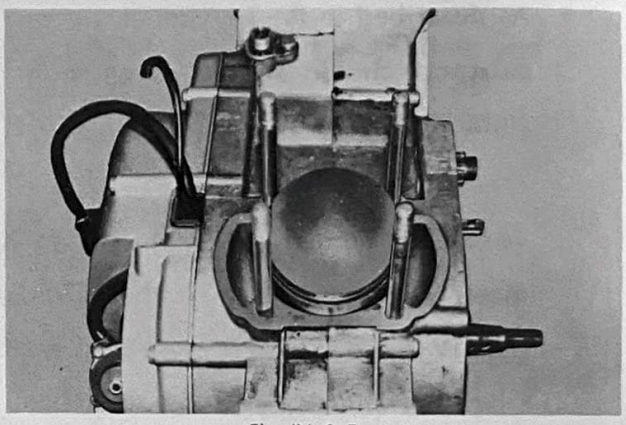


Fig. IV-6-5

Ⅳ-7 Flywheel Magneto

A. Remove the dynamo cover.

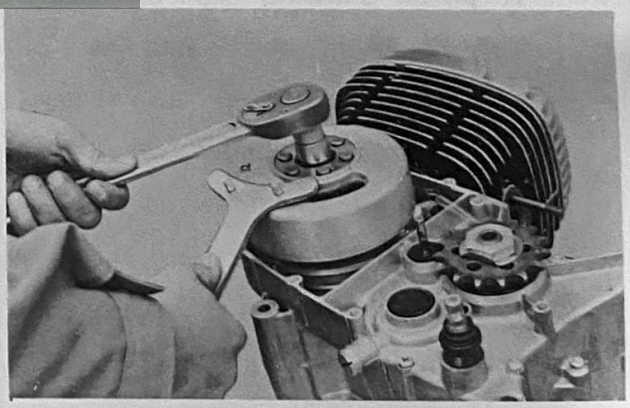


Fig. IV-7-1

B. Remove the nut using a flywheel magneto holding tool.

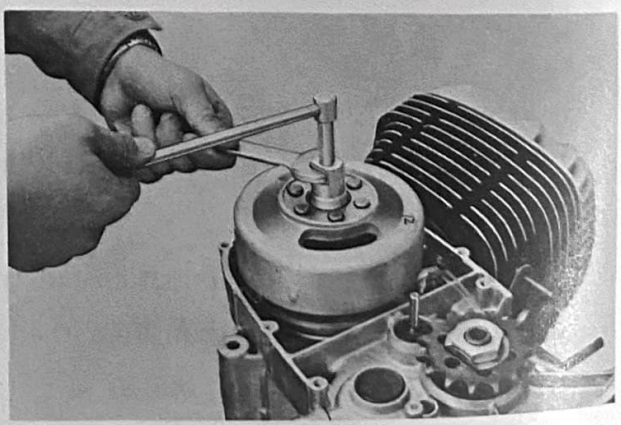


Fig. IV-7-2

C. Install the flywheel magneto puller. (It has a left-hand thread.) After the puller is secure, tighten the push screw and the flywheel will break loose.

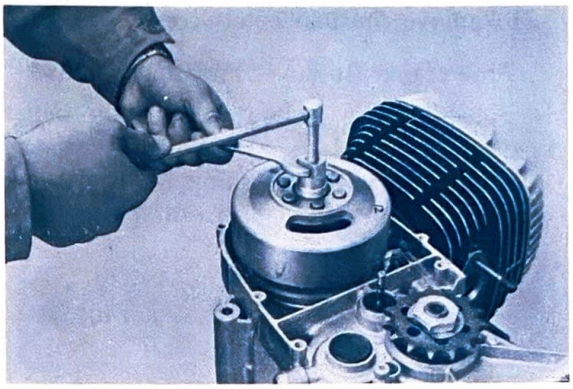


Fig. IV-7-3

D. Remove the three screws holding the flywheel magneto base to the crankcase, and remove the flywheel magneto base.

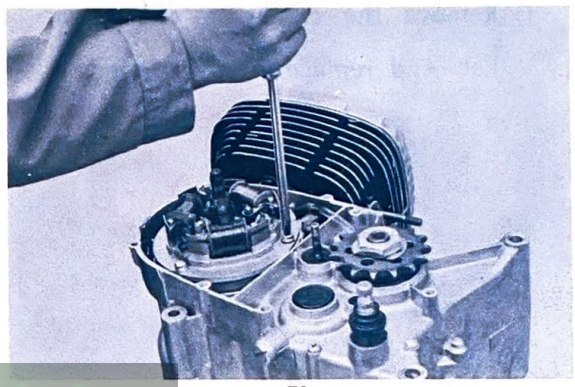


Fig. Ⅳ-7-4

E. Remove the woodruff key.
It is advisable to place the woodruff key on the flywheel magnets (using its magnetic force) while the key is removed for engine service.

Ⅳ-8 Crankcase Cover (R.H.)

A. Removal

1) Remove the kick crank mounting bolt and the crank.

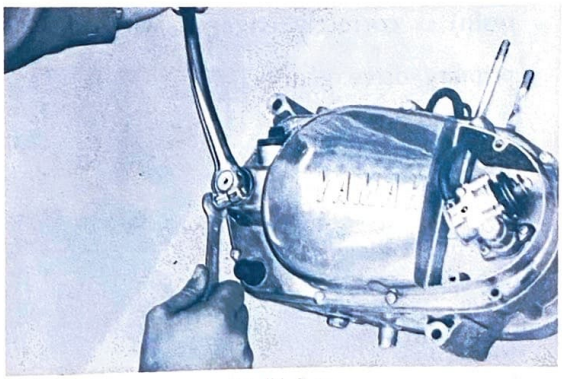


Fig. IV-8-1

2) Remove the pan head screws holding the crankcase cover, and then remove the case cover. The cover can be removed without taking off the oil pump.)

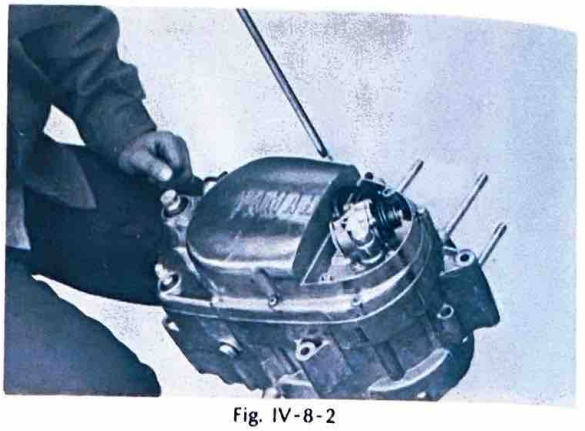


Fig. IV-8-2

3) Remove the crankcase cover gasket. And replace it, if damaged.

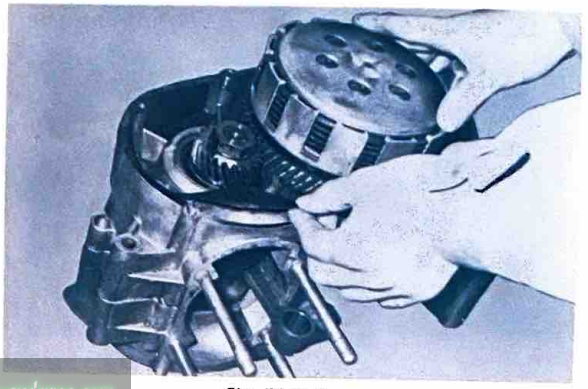


Fig. IV-8-3

B. Installation

Spread YAMAHA Bond No. 5 over the mating surface of the right-hand crankcase. Place the crankcase cover gasket on the crankcase, apply Yamaha Bond No. 5 and install the right-hand crankcase cover. Be sure to apply YAMAHA Bond No. 5 to the mating surface; otherwise, the crankcase will leak.

Note: When installing the crankcase cover (R), make sure that the pump drive gear (made from synthetic resin) is correctly engaged with the primary drive gear

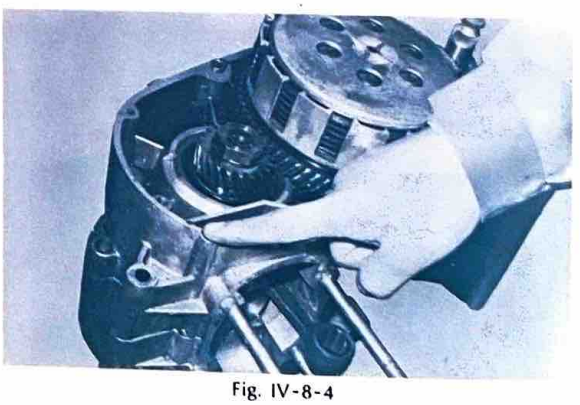


Fig. IV-8-4

Ⅳ-9 Clutch

The clutch is a wet, multi-disc type, consisting of six molded cork friction plates

and seven clutch plates in the clutch housing mounted on the transmission main axle. To disengage the clutch, an inner push rod system is employed. The primary driven gear coupled with the clutch housing is meshed with a kick pinion gear allowing starting by kicking the starter with the clutch disengaged or engaged.

A shock absorber consisting of coil springs is between the primary driven gear and the clutch housing.

The primary drive gear has 21 teeth, and the primary driven gear 65 teeth. (Primary reduction ratio.....65/21 =3.095)

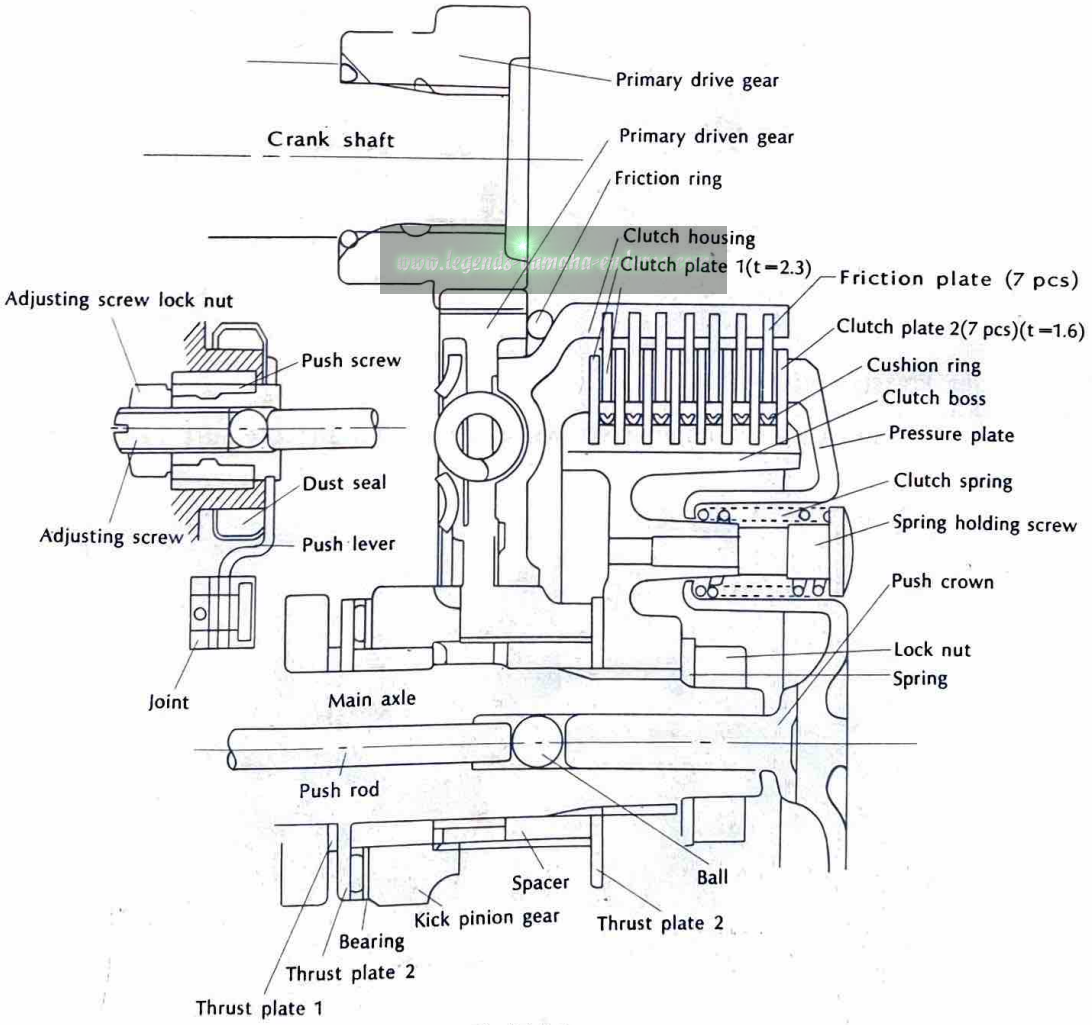


Fig. IV-9-1

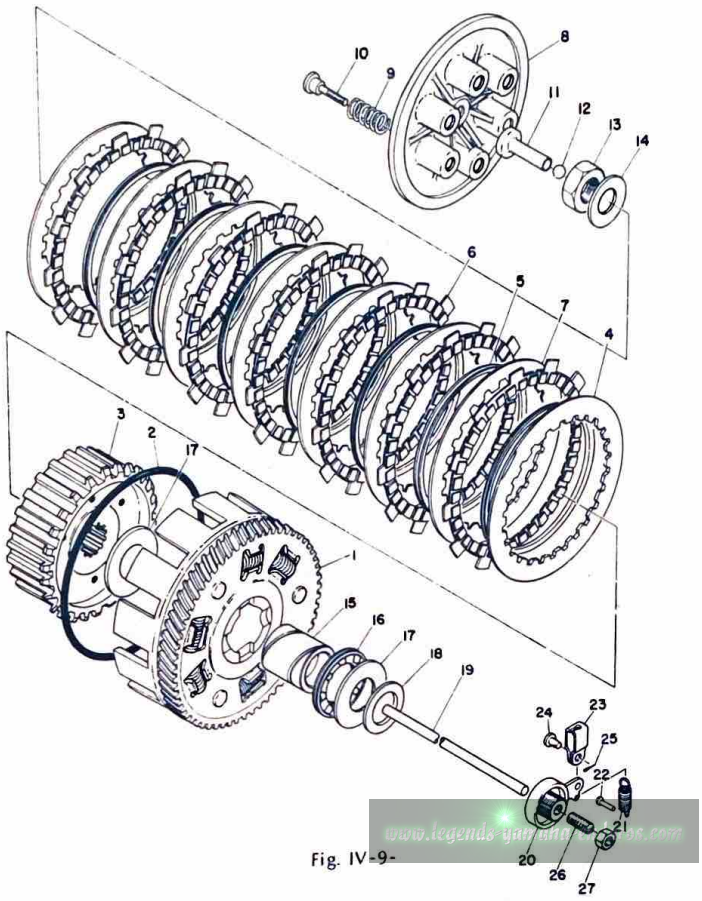


Fig. IV-9-

1. PRIMARY DRIVEN GEAR COMP.
2. O-RING
3. BOSS, Clutch
4. PLATE, Clutch (1)
5. RING, Cushion
6. PLATE, friction
7. PLATE, clutch (2)
8. PLATE, pressure
9. SPRING, clutch
10. SCREW, spring
11. ROD, push
12. BALL
13. NUT, lock
14. SPRING, bellevile
15. SPACER
16. BEARING
17. PLATE, thrust (2)
18. PLATE, thrust (1)
19. ROD, push
20. PUSH LEVER ASS'Y
21. SPRING, return
22. HOOK, spring
23. JOINT
24. PIN
25. PIN, cotter
26. SCREW, adjusting
27. NUT, adjusting

Clutch assy exploded view

A. Removing the Pressure Plate

Remove the six clutch spring holding screws, and take out the pressure plate and push crown.

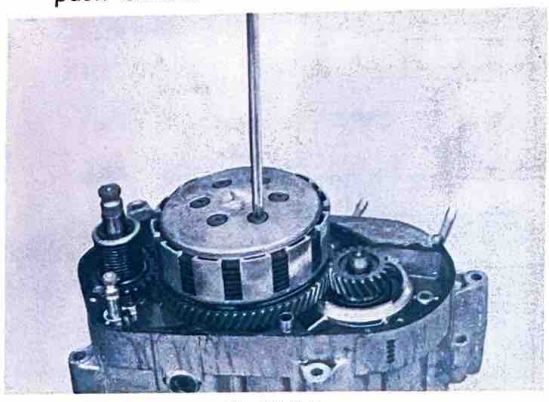


Fig. IV-9-3

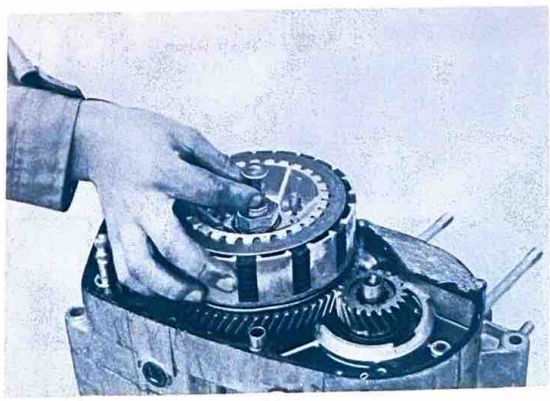


Fig. IV-9-4

B. Removing the Clutch Boss

Install the clutch holding tool (same as R3, DS6,) on the clutch boss.

Loosen the lock nut, and then remove the clutch boss.

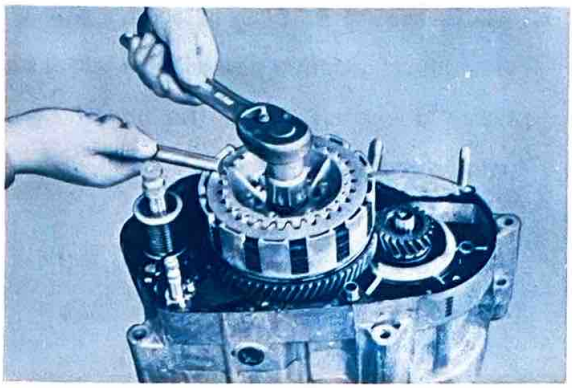
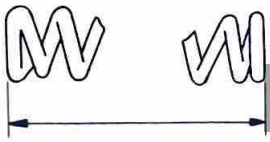


Fig. Ⅳ-9-5

C. Checking the Clutch Spring

If the free length of the spring is 1 mm. (0.04 in.) or more shorter than the standard free length , replace it.



Free length 36.4 mm. (1.433 in .)

Fig. IV-9-6

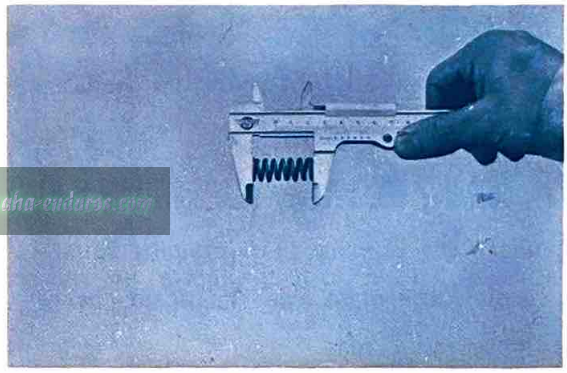


Fig. IV-9-7

D. Checking the Friction Plates

Inspect the friction plates for wear. Replace them if wear equats 0.3 mm. (0.012 in.) or more.

Standard thickness 3.0 mm. (0.118 in.)

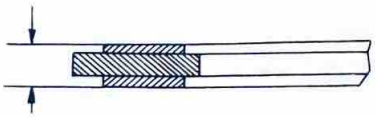


Fig. IV-9-8

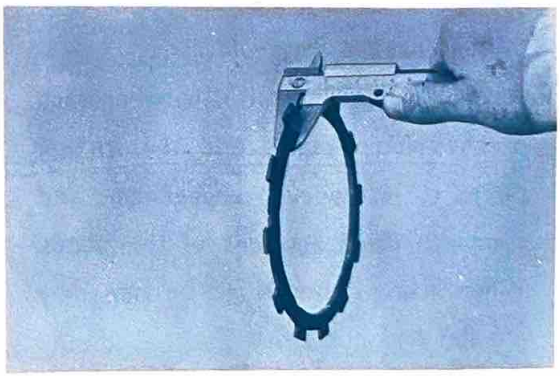


Fig. IV-9-9

E. Clutch Housing Assembly (integrated with the primary driven gear)

A rubber friction ring is placed on the outside of the clutch between the primay driven gear and the clutch housing in order to reduce gear noise at low engine speeds.

1) Inspection

Insert the primary gear retaining collar (spacer) in the primary driven gear boss and check it for radial play.

If any scratches are found, replace it so it will not impair clutch action.

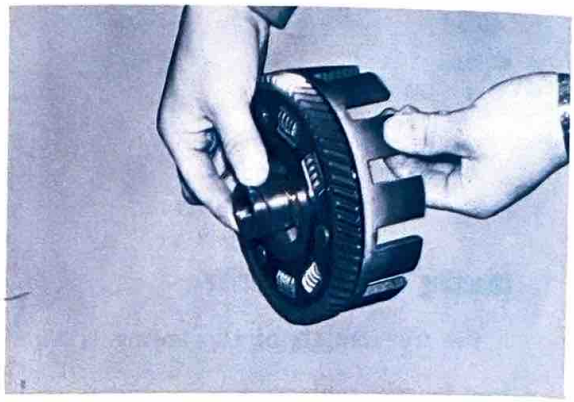


Fig. IV-9-10

If the play is excessive (allowable clearance is between 0.009～0.048 mm.), replace the gear retaining collar because it will cause excessive noise.

F. Checking the Primary Gear Retaining Collar (Spacer)

Place the primary gear retaining collar around the main axle and again check it for radial play.

If play exists (allowable clearance is between 0.020～0.062 mm.) replace the gear retaining collar.

Replace any collar with step-wear on its outer surface.

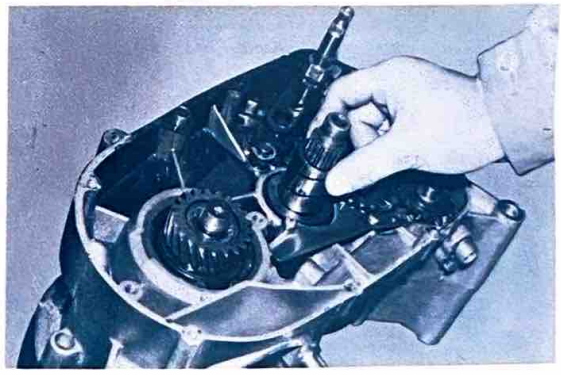


Fig. IV-9-11

G. Fitting Cushion Rings

A cushion ring is installed between each of the clutch plates and the friction plates to insure even engagement and complete disengagement of the plates. When fitting cusion rings, be sure they are flat and not twisted.

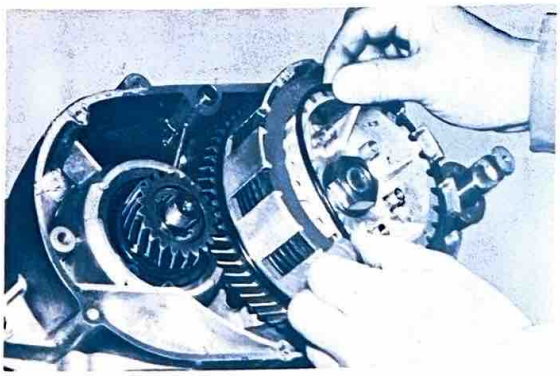


Fig. IV-9-12

H. Checking the Push Rod

Remove the push rod and roll it over a surface plate. If the rod is bent, straighten or replace it.

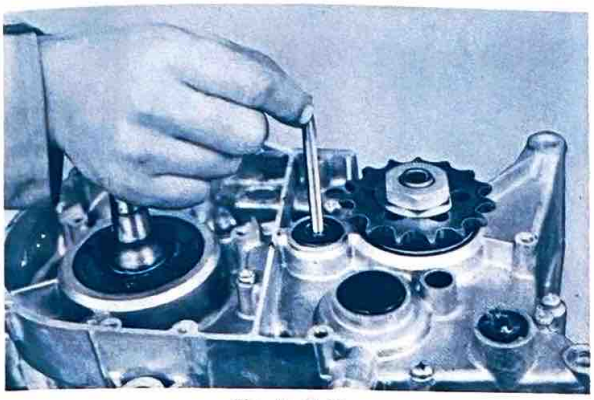


Fig. IV-9-13

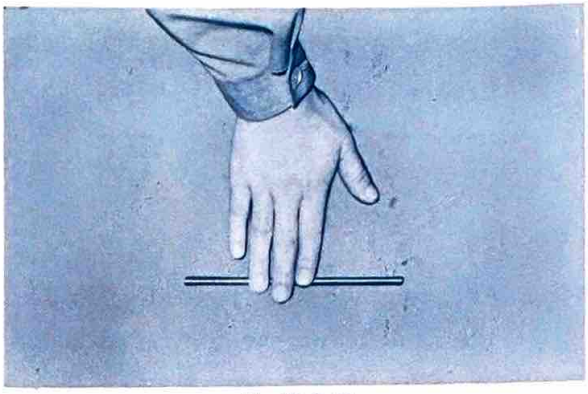


Fig. IV-9-14

1. Caution on Re-assembling the Clutch

On both ends of the primary gear spacer are thrust washers and thrust bearings. If these washers and bearings are incorrectly installed, or omitted, the clutch boss will rub against the primary driven gear, impairing clutch action.

The thrust bearing assembly fits on the primary retaining collar, but it may slip out of place when installing clutch boss.

Therefore, apply grease to both surfaces of the bearing to make it stick to the gear retaining collar.

Before fitting the clutch boss, install the clutch plates, friction plates., etc., and then install the clutch boss.

Correct

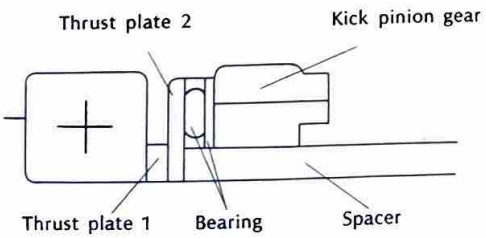


Fig. IV-9-15

Incorrect

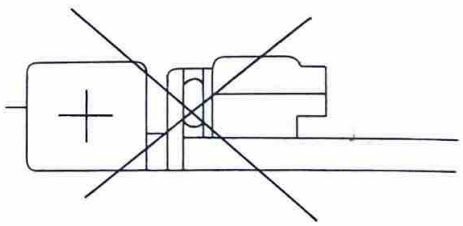


Fig. IV-9-16

J. Adjusting the Clutch

1) Adjusting the Push Screw

Remove the clutch adjustment cover and loosen the push screw lock nut. Rotate the push screw in to a lightly seated position, and back it off ¼ turn to get the proper spacing. Then fully tighten the lock nut.

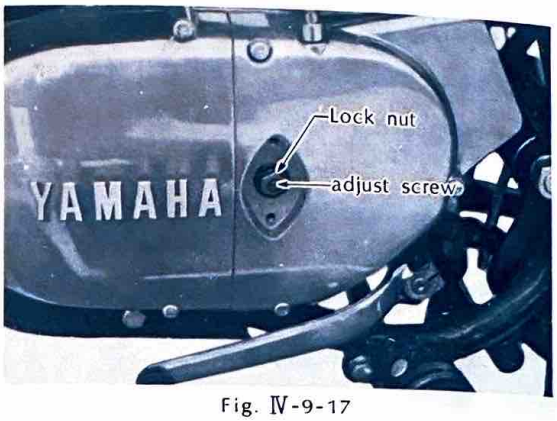


Fig. Ⅳ-9-17

2) Adjusting the Clutch Cable Tension
The clutch cable becomes slackened after being used for a long time. Occasionally the cable must be adjusted so that the play of the clutch handle is from 2 to 3 mm.(1/16-1/8 in.)

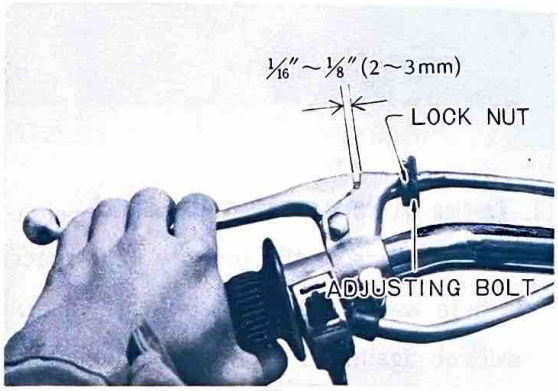


Fig. Ⅳ-9-18

Ⅳ-10 Primary Drive Gear

A. Removal

Feed a rolled-up rag between the teeth of the primary drive gear and the primary driven gear to lock them, and loosen the primary drive gear lock nut.

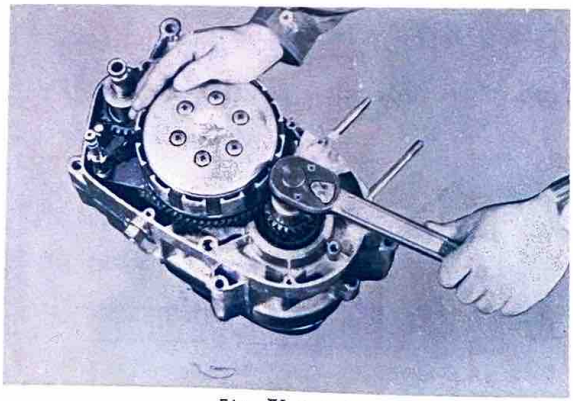


Fig. Ⅳ-10-1

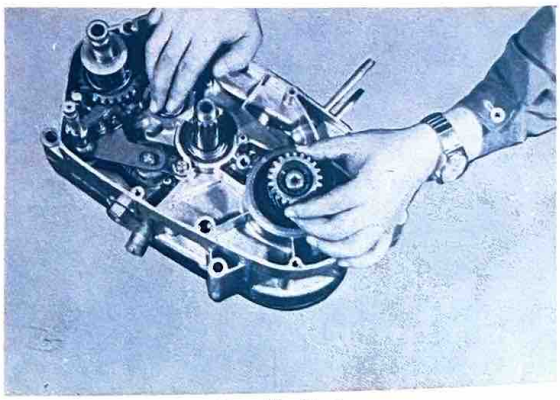


Fig. Ⅳ-10-2

Ⅳ-11 Kick Starter Mechanism

The kickstarter employs the primary kick system. To start the engine, you just

kick the starter with the clutch disengaged or engaged. The ability to start the engine with the clutch disengaged can be a great advantage when racing. The kick gear is driven the same as the YR1. When the kick shaft rotates, the ratchet wheel is disengaged from the ratchet wheel guide and meshes with the kick gear. The rotation of the kick gear is transmitted through the idler gear to the kick pinion that is engaged with the primary driven gear.

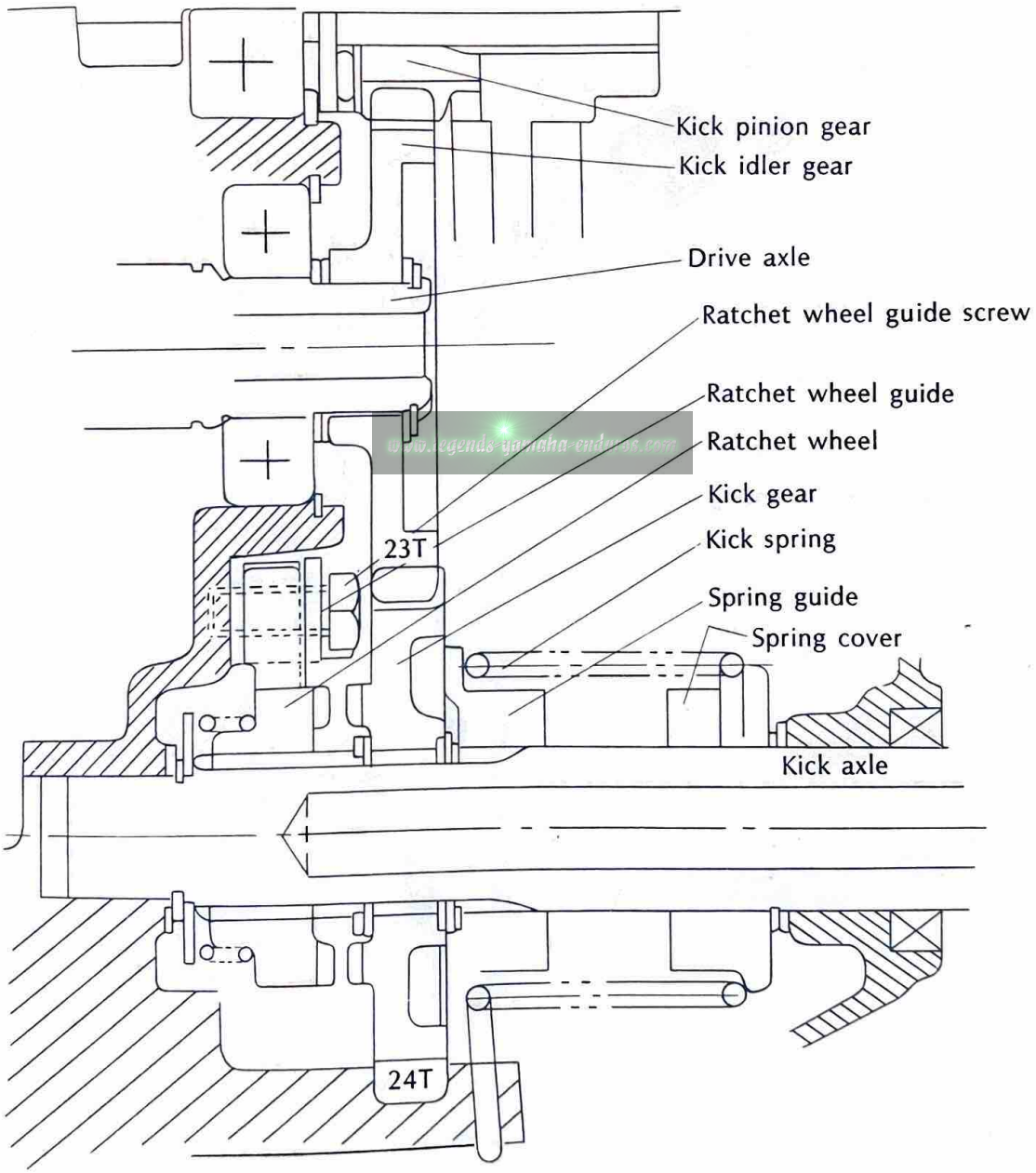
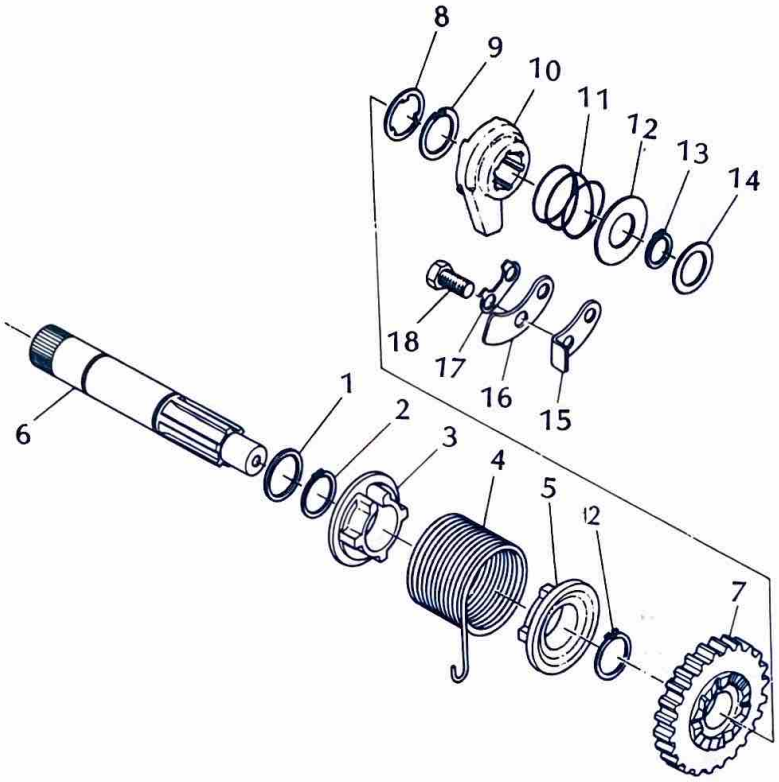


Fig. IV-11-1



1. SHIM (2)
2. CIRCLIP
3. COVER, Spring
4. SPRING, Kick
5. GUIDE, Spring
6. AXLE, Kick
7. GEAR, Kick
8. WASHER
9. CLIP
10. WHEEL, ratchet
11. SPRING, ratchet wheel
12. COVER, Spring
13. CIRCLIP
14. SHIM (1)
15. STOPPER
16. GUIDE, ratchet wheel
17. WASHER, lock
18. SCREW, ratchet wheel guide

Fig. IV-11-2

A. Removal

1) Remove the kick spring

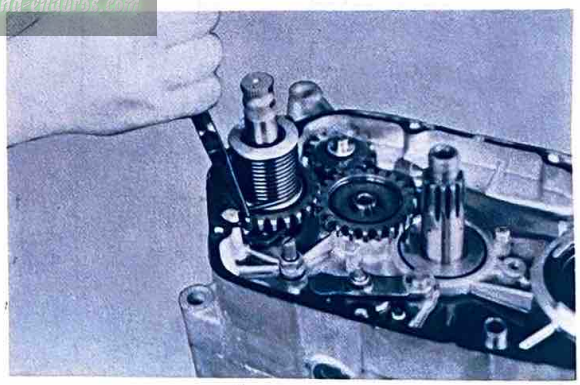


Fig. IV-11-3

2) Then remove the kick starter assembly.

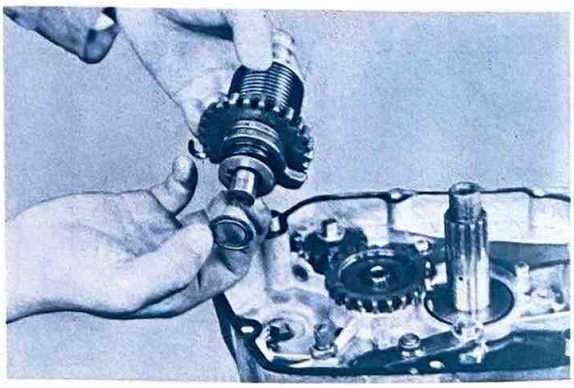


Fig. IV-11-4

B. Reverse the sequence for reinstallation.

Notes on Assembling

1) Align the marking on the kick starter axle with that of the ratchet wheel.
2) When installing the kick starter ass'y in the crankcase, slide the ratchet wheel pawl over the ratchet wheel guide toward the stopper attached to the case. Make sure that the pawl is in close contact with the stopper. Then pull the spr ing forward and hook it on the stopper.

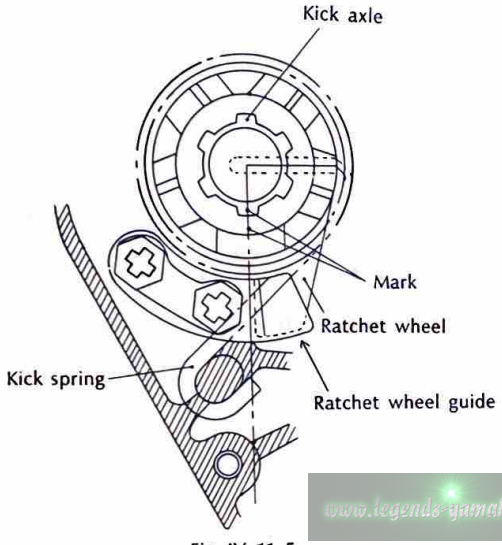


Fig. IV-11-5

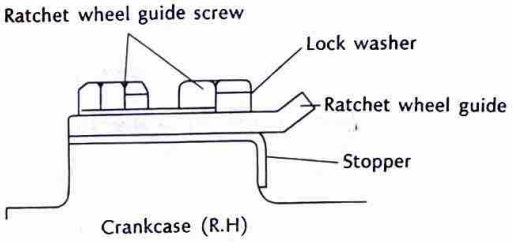


Fig. IV-11-6

C. Removing the Kick Idler Gear

Remove the circlip with clip pliers, and then the kick idler gear can be easily removed.

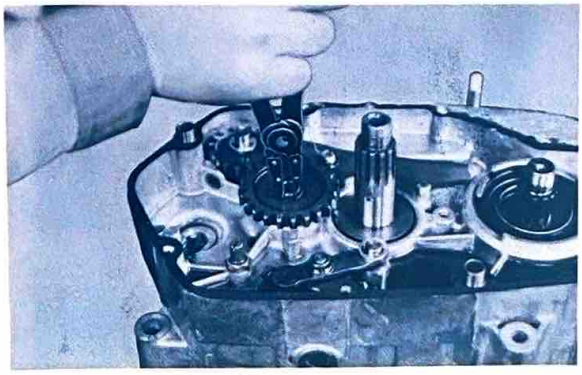


Fig. IV-11-7

D. Removing the Tachometer Drive Gear

The tachometer drive gear is engaged with the kick idler gear to convey the revolutions per minute of the crankshaft to the tachometer through the tachometer cable.

Remove the clip with pliers and the tachometer drive gear can be removed.

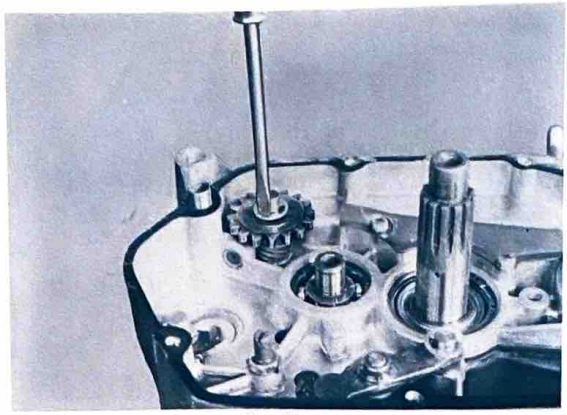


Fig. IV-11-8

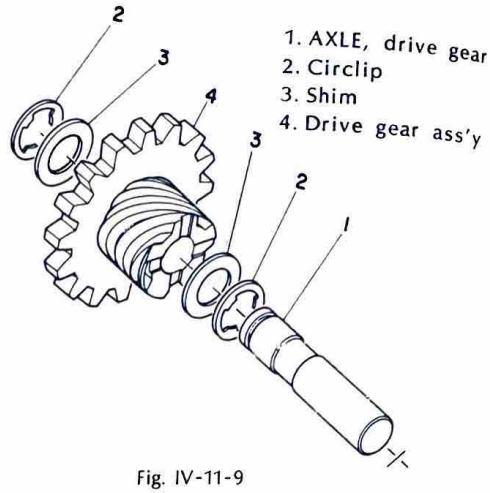


Fig. IV-11-9

Ⅳ-12 Shift Mechanism

The RT1 has been designed to allow the owner to convert it to an optimum output competition machine by installing Yamaha's GYT parts. Therefore, the machine in standard form has been constructed to assure smooth and accurate gear shifting by using an already proven shifting mechanism.

The shift cam drum has one shift fork and two other shift forks are installed on a guide bar located parallel to the cam drum. These three shift forks slide back and forth in the slotted guides that are grooved in the shift drum. A safety device has been provided to prevent the shifter from by-passing the next gear when a quick or hard shift is made. This provides dependability and assurance for correct shifting for the desired gear even under the roughest conditions such as comperition racing.

A see-saw type shifting arrangement is used that enables the rider to shift quickly and easily down for the lower gears and up for the higher gears. Neutral position is located between first and second gears.

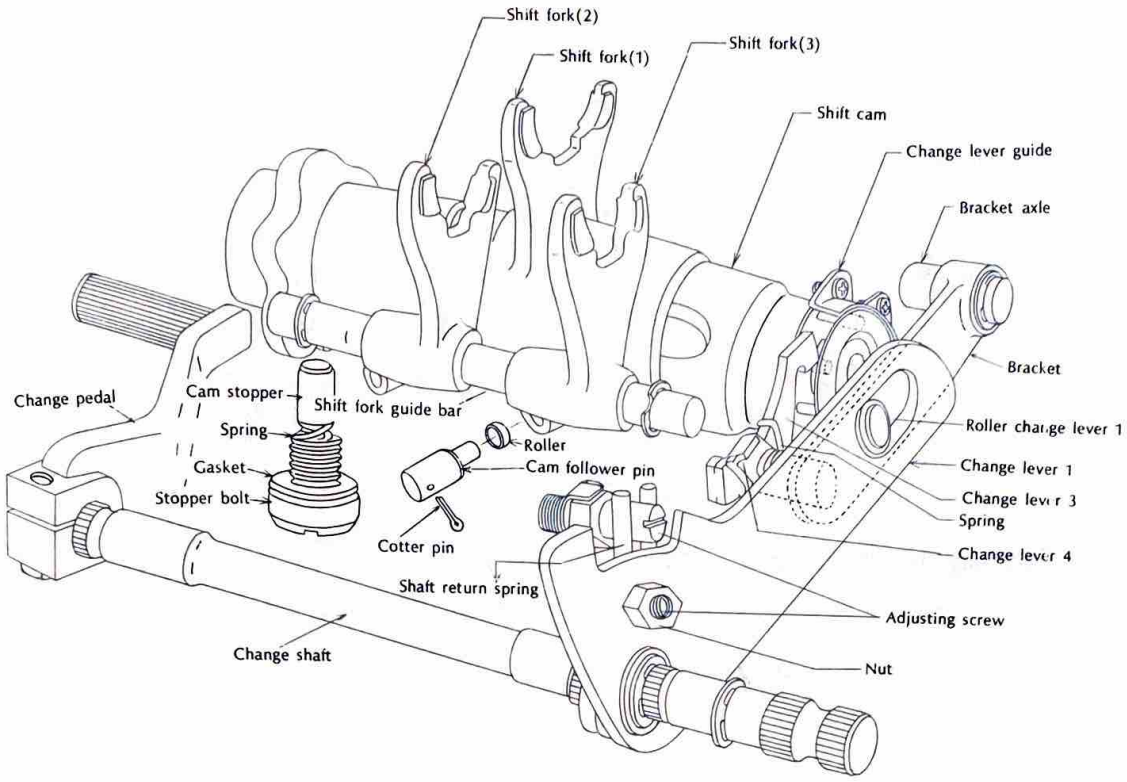


Fig. IV-12-1

A. Removing the Change Axle Assembly

1) Remove the change axle sealing boot.

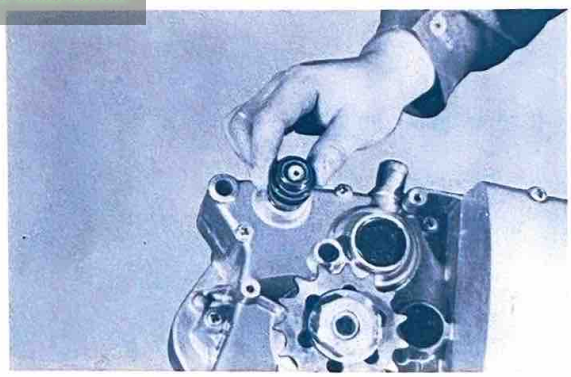


Fig. IV-12-2

2) Pull out the change shaft assembly.

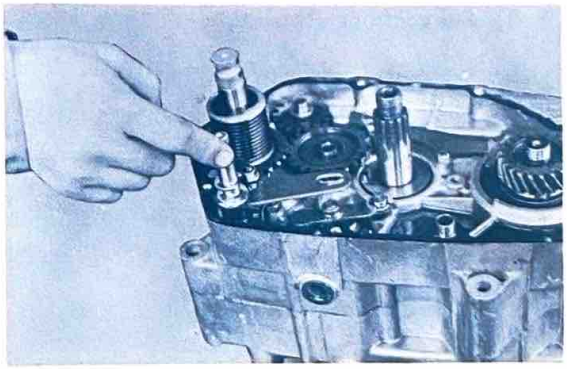


Fig. IV-12-3

B. Checking the Gear Shift Parts

1) Check the gear shift return spring. A broken or fatigued gear shift return spring will impair the return action of the shifting mechanism.

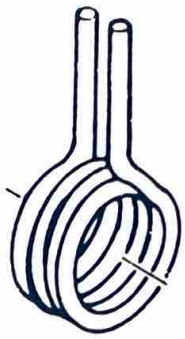


Fig. IV-12-4

C. Removing the Change Lever 3 and 4

Remove the "E" clip with slot-head screwdriver, and the change lever can be removed.

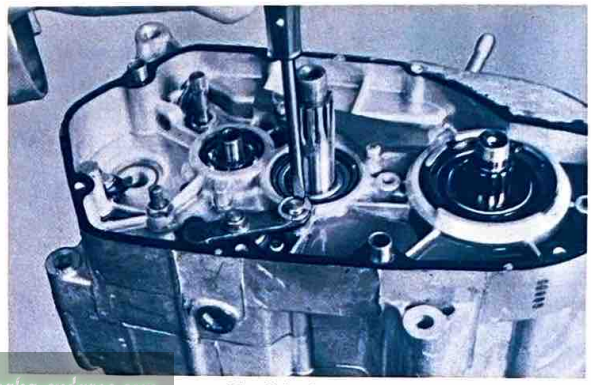


Fig. IV-12-5

D. Checking the Change Lever Spring

Check for a fatigued or broken change lever spring. A faulty change lever spring may result in an improper shifting sequence.

E. Gear Change Adjustment

1) Fully move the gear change lever up and down and turn the adjusting bolt (eccentric bolt) on the case so that the clearance (a) will become equal to the clearance (a'). (a) is the clearance between the bent part of change lever 3 and the stopper (shaded area in the drawing) and (a') is the clearance between the bent part of the stopper. The stopper is a device for preventing the shifter from overrunning the correct position. After the adjustment, lock the adjusting screw with the lock nut.
2) Next turn the adjusting screw (eccentric screw) on change lever 4 so that the clearance (b) will become even with the clearance (b') on each gear position.

(b) is the clearance between the pin and change lever 4. After the adjustment, lock the adjusting screw with the lock nut.

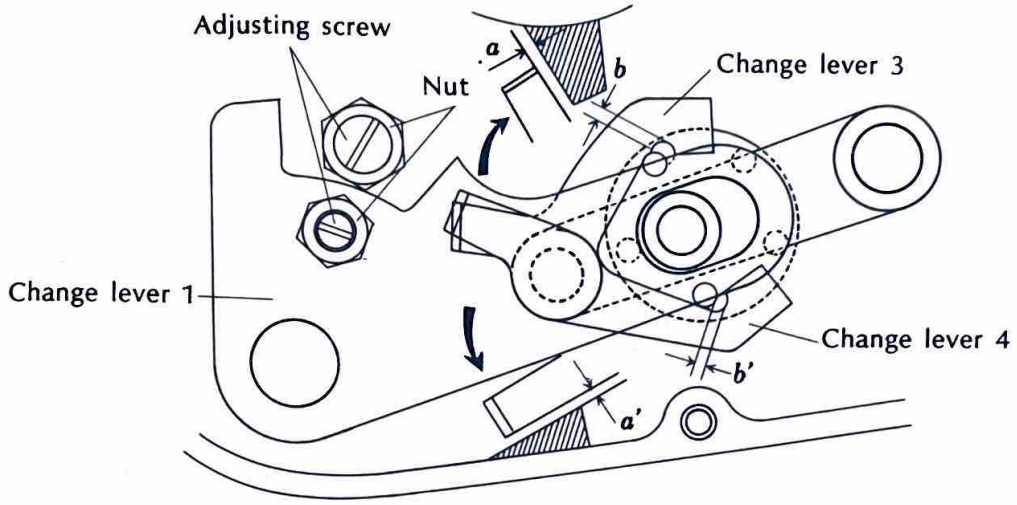


Fig. IV-12-6

Ⅳ-13 Drive Sprocket

A. Removal

1) Straighten the bent edge of the lock washer with a blunt-ended metal punch.

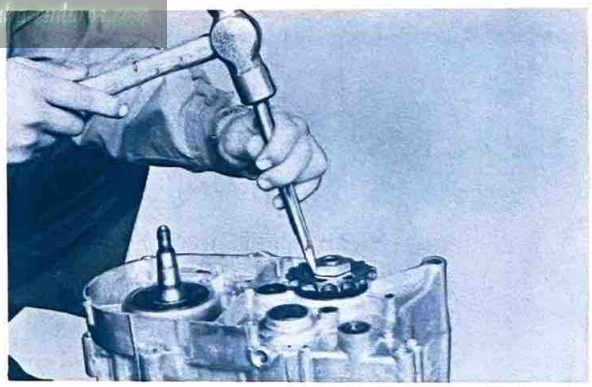


Fig. IV-13-1

2) Keep the drive sprocket from turning with the flywheel magneto holding tool, and remove the sprocket nut.
If the flywheel magneto puller is not available, shift the transmission to low gear, and fit a monkey wrench on the sprocket nut. Then tap the handle of the wrench with a hammer and the shock will loosen the nut.

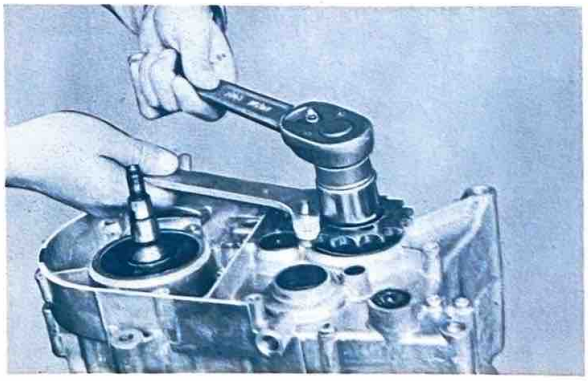


Fig. IV-13-2

B. Inspection

A worn drive sprocket will result in excessive chain noise, and shorten the life of the chain Check the sprocket for worn teeth, and replace if it is worn.

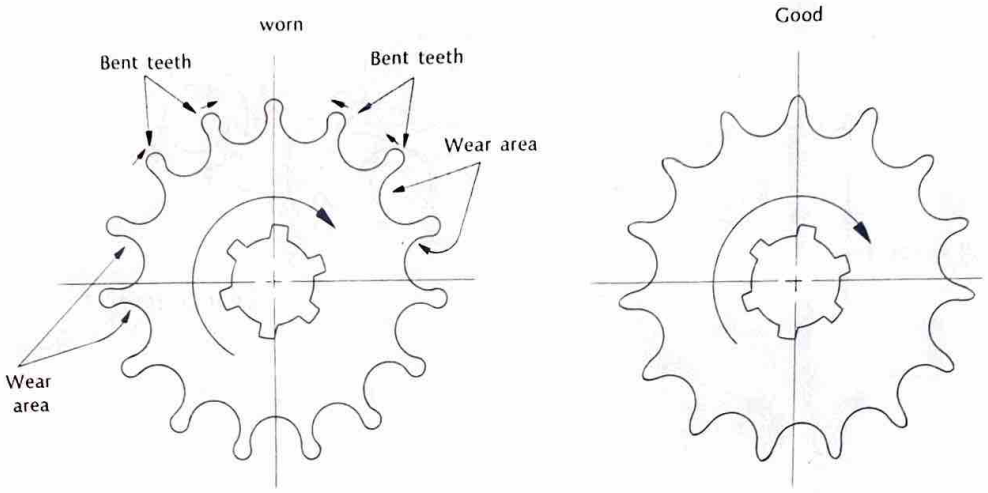


Fig. IV-13-4

Ⅳ-14 Crankcase

A. Separating

1) Remove neutral stopper.

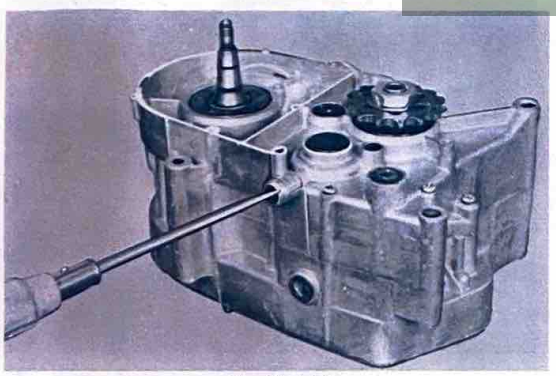


Fig. IV-14-1

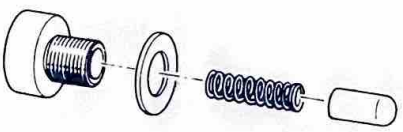


Fig. IV-14-2

2) Remove the change lever guide.

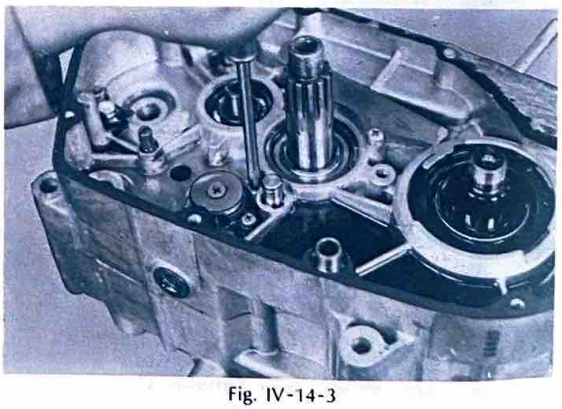


Fig. IV-14-3

3) Remove the pan head screws from the left crankcase.

Fig. Ⅳ-14-4

4) Install the crankcase separating tool on the right crankcase. Divide the crankcase while tapping the main axle and the crankcase alternately with plastic tip hammer.

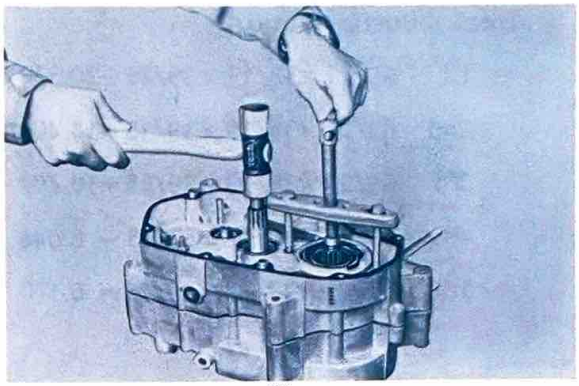


Fig. Ⅳ-14-5

Note: Fully tighten the bolts of the crankcase dividing tool, and keep the tool in a horizontal position.

The crankcase is designed to split into two halves, right and left.

Only one drain plug is provided for both the transmission and clutch housings. Both housings can be drained at the same by removing the drain plug.

B. Reassembling

When reassembling the crankcase, be sure to apply YAMAHA BOND No. 5 to the mating surfaces of both halves.

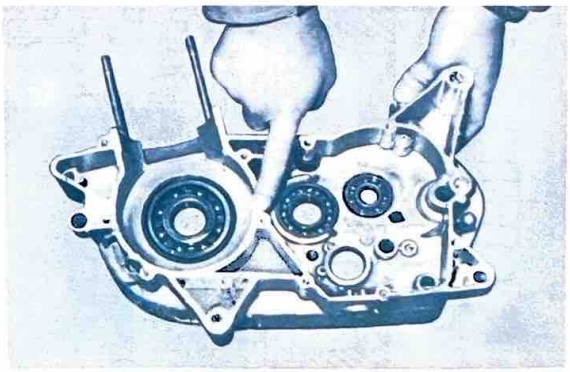


Fig. Ⅳ-14-6

Ⅳ-15 Transmission Assembly

The constant mesh wide ratio 5-speed transmission makes it possible to fully utilize the performance of the engine throughout the entire speed range from low to high. The top pinion is similar in type to the third gear wheel, and the third gear pinion is similar to the top gear wheel.

For layout of the transmission and related parts, refer to Fig. IV-15-1 and 2. The primary reduction ratio is 65/21 =3.095. Therefore the total reduction radios will be; Primary reduction ratio ×Transmission gear reduction ×Secondary reduction ratio = Total reduction ratio.

1st 65/21 ×38/15 ×39/15 =20.378

2nd 65/21 ×34/19 ×39/15 =14.401

3rd 65/21 ×30/23 ×39/15 =10.497

4th 65/21 ×26/26 ×39/15 = 8.048

5th 65/21 ×23/30 ×39/15 = 6.170

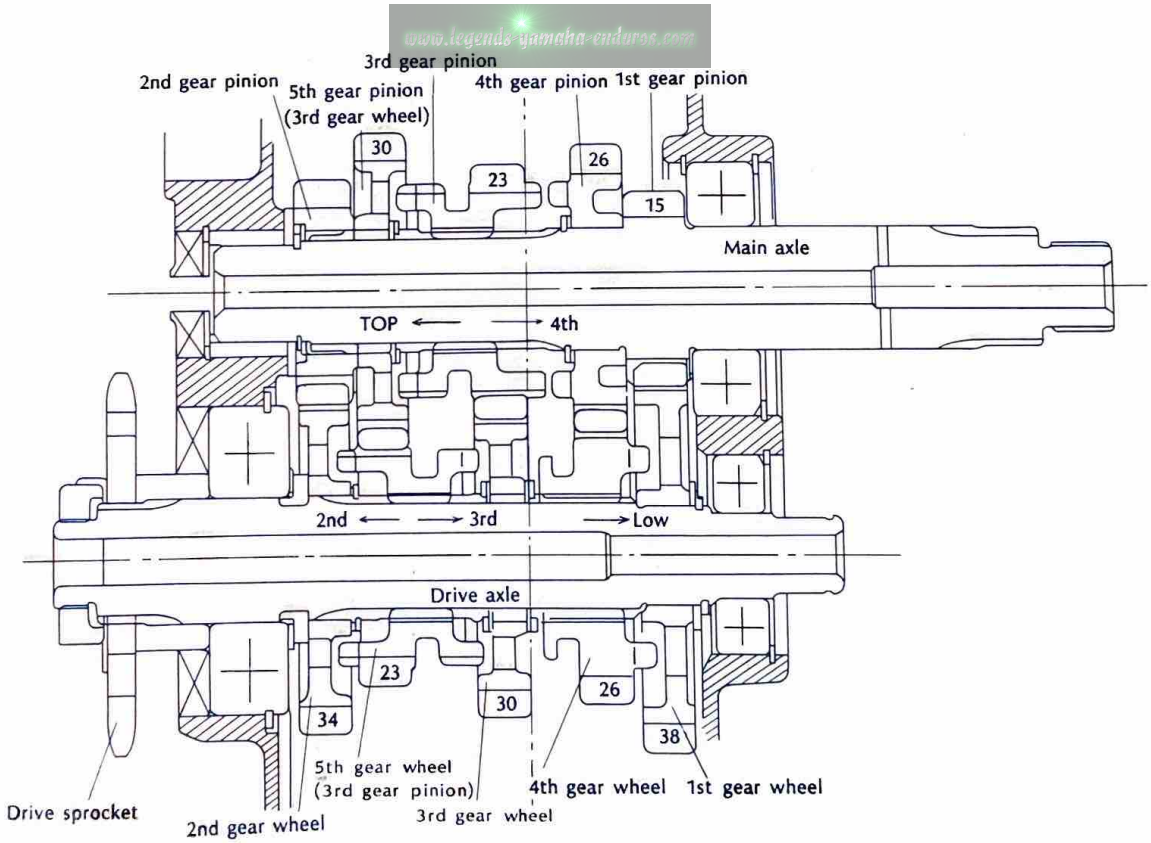
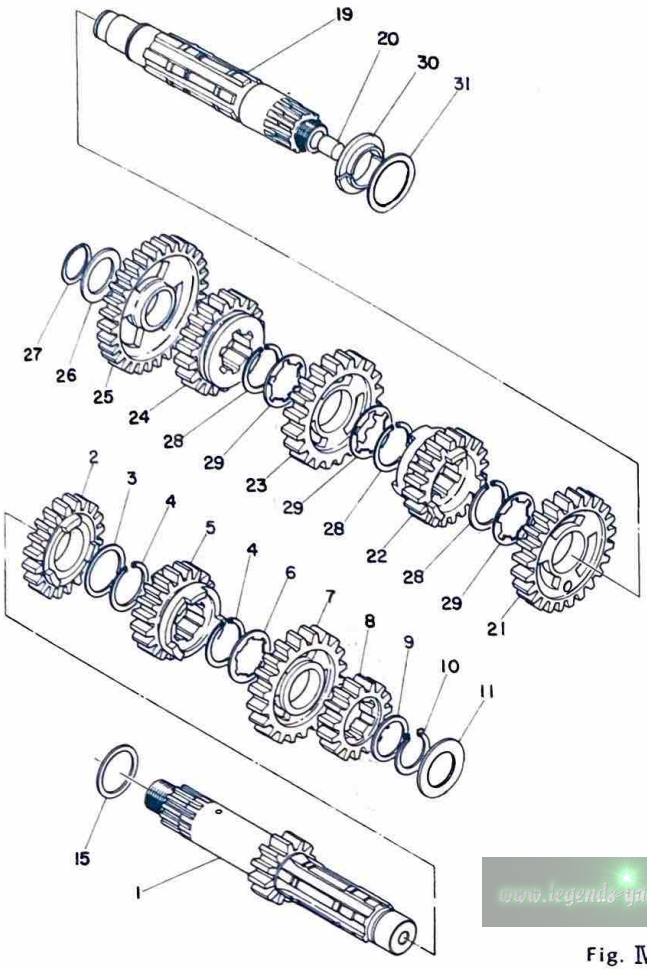


Fig. IV-15-1



1. AXLE, main
2. GEAR, 4th pinion
3. WASHER, gear hold
4. CIRCLIP
5. GEAR, 3rd pinion
6. WACHER, gear hold
7. GEAR, 3rd wheel
8. GEAR, 2nd pinion
9. WASHER, gear hold
10. CIRCLIP
11. SHIM
12. BEARING
13. CIRCLIP
14. OIL SEAL
15. SHIM, main axle
16. BEARING
17. CIRCLIP
18. GEAR, Kick pinion
19. AXLE, drive
20. PLUG, blind
21. GEAR, 2nd wheel
22. GEAR, 3rd pinion
23. GEAR, 3rd wheel
24. GEAR, 4th wheel
25. GEAR, 1st wheel
26. WASHER, gear hold
27. CIRCLIP
28. CIRCLIP
29. WASHER, gear hold
30. SPACER, drive axle
31. SHIM, drive axle

Fig. Ⅳ-15-2

A. Removal

Remove the transmission and shifter as a unit. (Fig. IV-15-3)

B. Reinstallation

Reinstall the transmission and shifter as a unit in the left crankcase half after they are sub-assembled. They can not be installed separately. The transmission unit must be in neutral during installation.

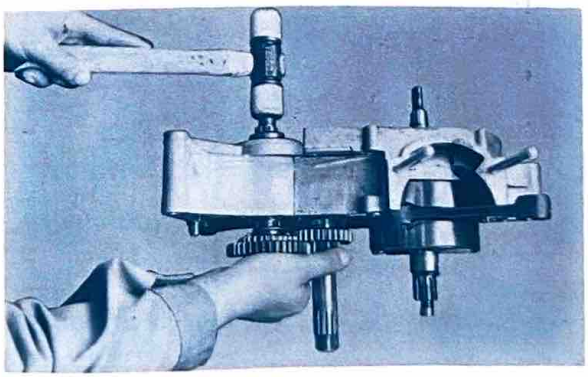


Fig. Ⅳ-15-3

Ⅵ-16 Crankshaft

The crankshaft requires the highest degree of accuracy in engineering and serving of all the engine parts.

The crankshaft is also more susceptible to wear, and therefore, it must be handled with special care.

To increase the inertia force of the crank, the diameter of the crankshaft is increased to 30 mm. (1.18 in.) the thickness of the flywheel to 26 mm. (1.02 in.) and its diameter to 110 mm. (4.33 in.)

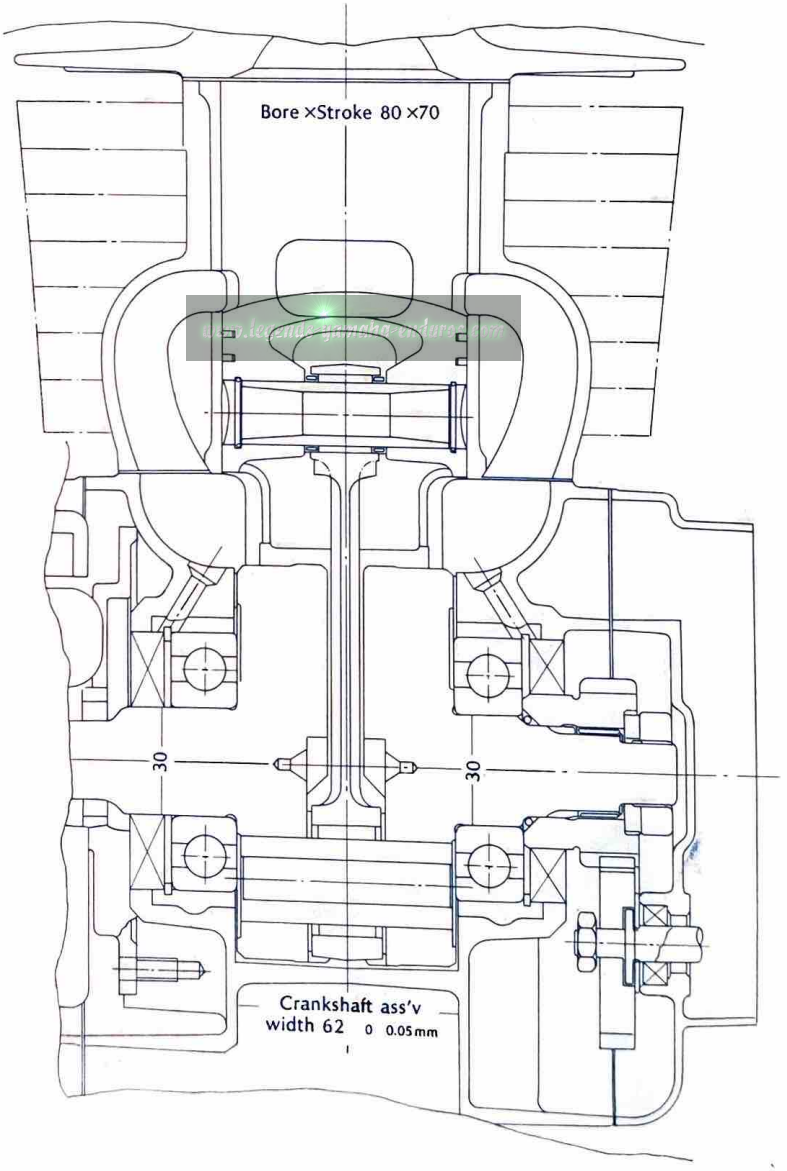
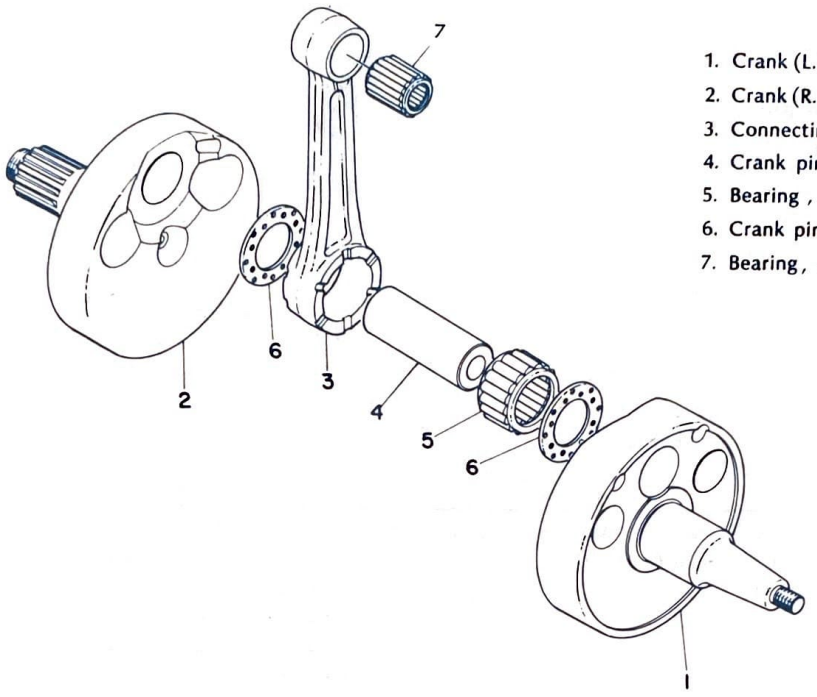


Fig. IV-16-1



1. Crank (L. H.)
2. Crank (R. H.)
3. Connecting rod
4. Crank pin
5. Bearing , con-rod big end
6. Crank pin washer
7. Bearing, con-rod small end

Fig. IV-16-2 Crankshaft component parts

A. Removing the Crankshaft Assembly

Remove the crankshaft assembly with the crankcase separating tool.

Note: Fully tighten the bolts of the crankcase dividing tool, and keep the tool in parallel with the crankcase surface.

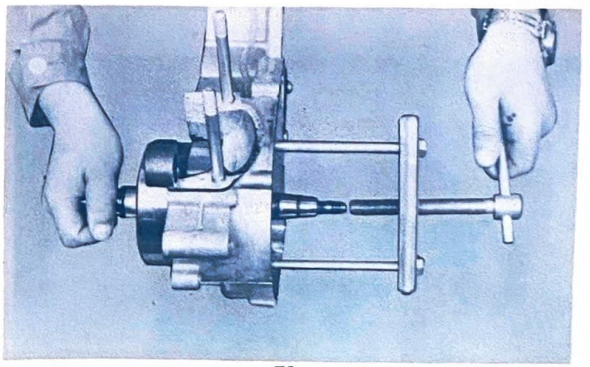


Fig. IV-16-3

B. Installing the Crankshaft Assembry

Install the crankshaft assembly by using the crankshaft setting tool and the crank fitting the spacer.

Hold the connecting rod at top dead center with one hand while turning the handle of the setting tool with the other.

Note: 1) The crankshaft setting tool is same as those used for YG1, and YF1.

2) The crank fitting spacer is required because the crankshaft is larger in diameter.

The oil seal is larger in outside diameter than the crank shaft setting tool body.

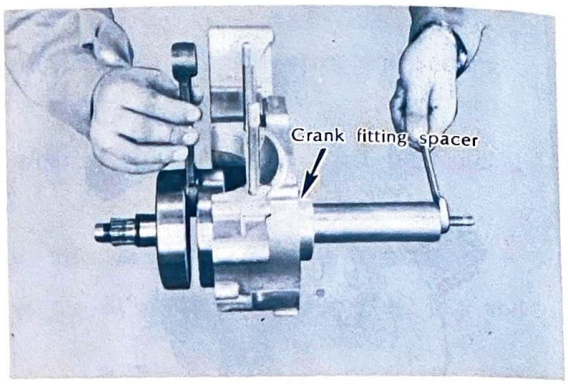


Fig. IV-16-4

C. Inspection and Servicing

1) Checking the crankshaft components

Check connecting rod axial play at small end (to determine the amount of wear of crank pin and bearing at large end) (Fig. IV-16-5)	Small end play should not exceed 2 mm. (0.078 in.)	If small end play exceeds 2 mm, disassemble the crankshaft, check connecting rod crank pin and large end bearing. Replace defective parts. Small end play after reassembly should be within 0.8-1.0 mm. (0.031~0.04 in.)
Check the connecting rod for axial play at large end. (Fig. IV-16-6)	Move the connecting rod to one side and insert a feeler gauge. Large end axial play should be within 0.4-0.5 mm. (0.019 in.)	If excessive axial play is present, (0.6 mm or more) disassemble the crankshaft and replace any worn parts.
Check accuracy of the crankshaft ass'y runout. (Misalignment of parts of the crankshaft) (Fig. IV-16-7)	Dial gauge readings should be within 0.03 mm. (0.0012 in.)	Correct any misalignment by tapping the flywheel with a brass hammer and by using a wedge.

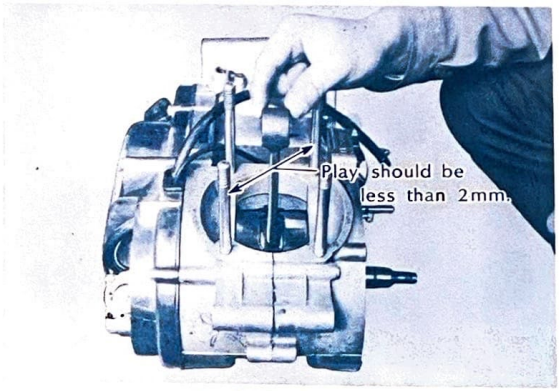


Fig. IV-16-5

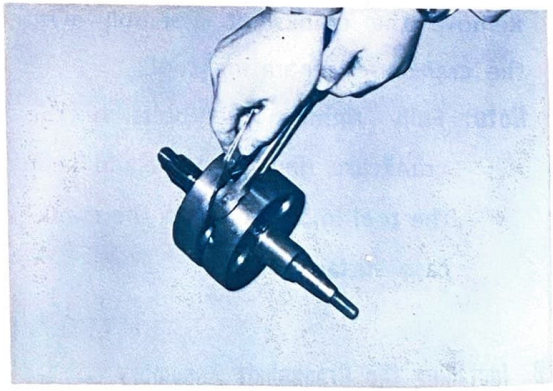


Fig. IV-16-6

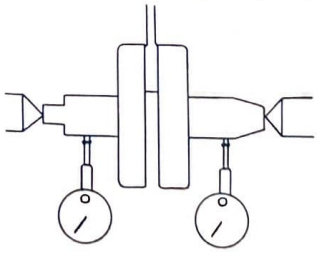


Fig. IV-16-7

Ⅳ-17 Bearings and Oil Seals

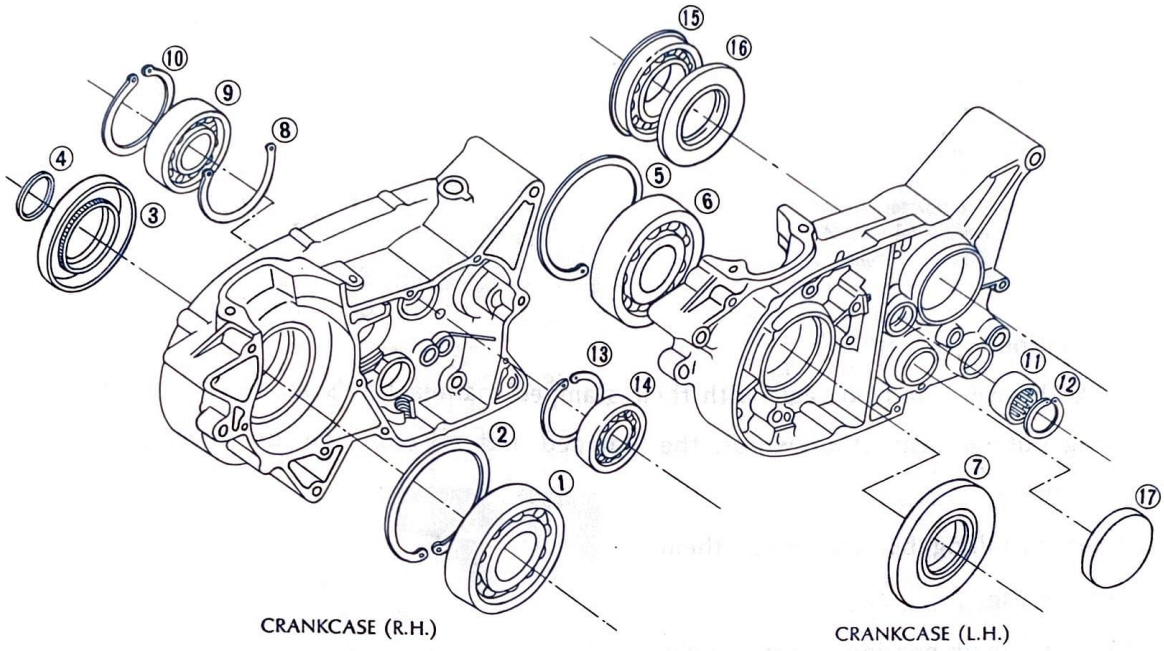


Fig. IV-17-1

1. Bearing 6306
2. Circlip R-72
3. Oil seal SW42-72-10
4. O-ring 3.2-24.5
5. Circlip R-72
6. Bearing 6306
7. Oil seal SW30-72-10
8. Circlip 25.1-31-0.3
9. Bearing 6205
10. Circlip
11. Bearing 20-26-16
12. Circlip 25.1-31-0.1
13. Circlip
14. Bearing 6203
15. Bearing 6305NR
16. Oil seal SD-35-62-6

1. Removal and Installation

1) Removal

a. Pry the oil seals out of place with a slot head screwdriver.
Always replace the oil seals when overhauling the engine.

Note: Place a piece of wood under the screw driver to prevent damage to the case.

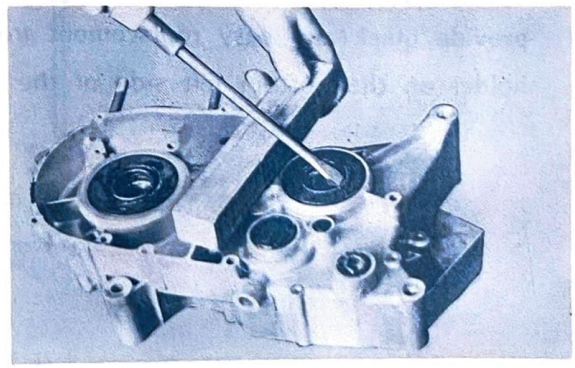


Fig. IV-17-2

b. Remove the bearing with a bearing puller.

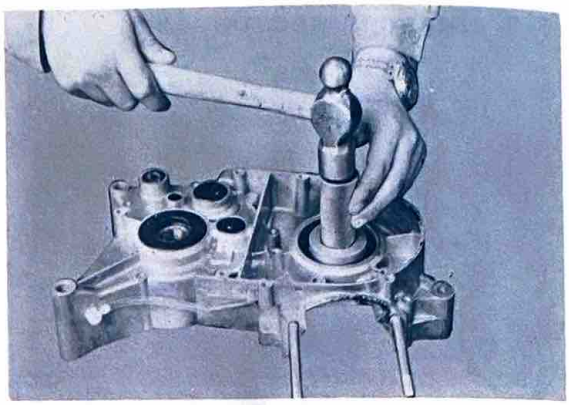


Fig. IV-17-3

2) Installation

Install bearings and oil seals with their stamped manufacture's marks or numerals facing outward. (In other words, the stamped letters must be on the exposed view side.)

When installing bearings pack them with grease.

The crankshaft bearing circlip should be installed so that the circlip end gap is aligned with the arrow marked on each of the crankcase halves.

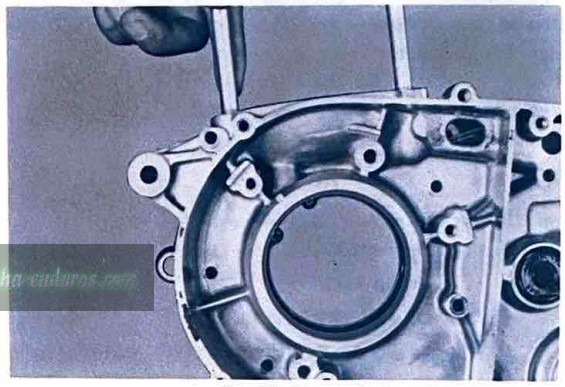
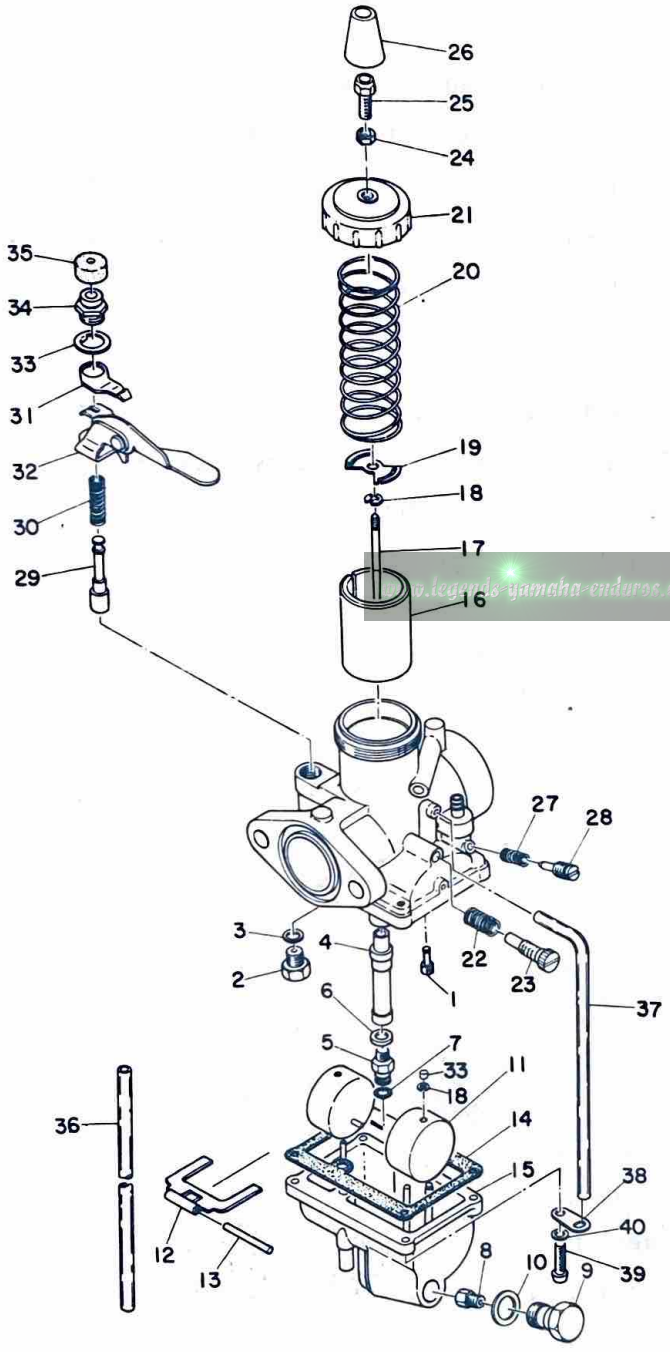


Fig. IV-17-4

Ⅳ-18 Carburetor

The standard RT1 is equipped with a VM 26 SH (26 mm.) carburetor that is equipped with a built-in starter jet.

The carburetor is bolted to a 30 mm. thick bakelite insulator that is between the carburetor and cylinder. This insulator provides more than adequate heat insulation. The carburetor floats have been specially designed to keep the float level from fluctuating due to vibration or shock. The main jet is installed in such a manner to provide quick and easy replacement from the outside by merely removing the jet holder on the bottom left side of the carburetor float bowl.



1. Pilot jet
2. Valve seat ass'y
3. Valve seat washer
4. Main nozzle
5. Needle jet setter
6. Needle jet washer
7. O-ring
8. Main jet
9. Banjo bolt
10. Gasket
11. Float
12. Float arm
13. Float pin
14. Float chamber gasket
15. Float chamber body
16. Throttle valve
17. Needle
18. Clip
19. Spring seat
20. Throttle valve spring
21. Mixing chamber top
22. Throttle stop spring
23. Throttle screw
24. Wire adjusting nut
25. Wire adjusting screw
26. Cap
27. Air adjusting spring
28. Air adjusting screw
29. Starter plunger
30. Plunger spring
31. Starter lever plate
32. Starter lever
33. Cap
34. Plunger cap
35. Plunger cap cover
36. Overflow pipe
37. Air vent pipe
38. Plate
39. Pan head screw
40. Spring washer

Fig. IV-18-1

A . Checking the Carburetor

1) Float

Remove the float and shake it to check if gasoline is inside. If fuel leaks into the float while the engine is running, the float chamber fuel level will rise and make the fuel mixture too rich. Replace the float if it is deformed or leaking.

2) Float valve

Replace the float valve if its seating end is worn with a step or if it is scrached. Check the float valve spring for fatigue. Depress the float valve with your finger, and make sure that it properly seats against the valve seat when released. If the float valve spring is weakened, fuel will overflow, flooding the float chamber while the gas is on.

3) Overflowing

If fuel overflows, check the carburetor as described in 1) and 2) above. If neither 1) nor 2) cures the overflowing, it may be caused by dirt or dust in the fuel preventing the float valve from seating properly. If any dirt or dust is found, clean the carburetor, petcock and gas tank.

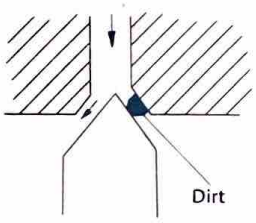


Fig. IV-18-2

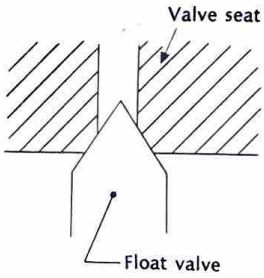


Fig. IV-18-3

4) Cleaning the carburetor

Disassemble the carburetor, and wash all its parts in a suitable solvent. Then blow all the parts off with compressed air. All jets and another delicate parts should be cleaned by blowing compressed air through them.

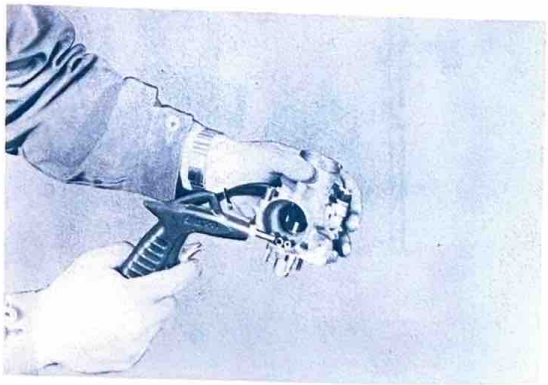


Fig. IV-18-4

B. Float Level Adjustment

The carburetor float level is checked by the Yamaha factory during assembly and testing. But rough riding, worn needle valve, or bent float arm can cause the float level to fluctuate. If the float level raises, this will cause a rich fuel/air mixture that can cause poor performance and spark plug fouling. If the float level decreases, this can cause a lean fuel/air mixture that can result in engine damage.

If the machine is subjected to continuous rough riding or many miles of travel, the float level should be checked and set regularly and in the following manner.

Carburetor float setting:
(with needle spring unloaded)

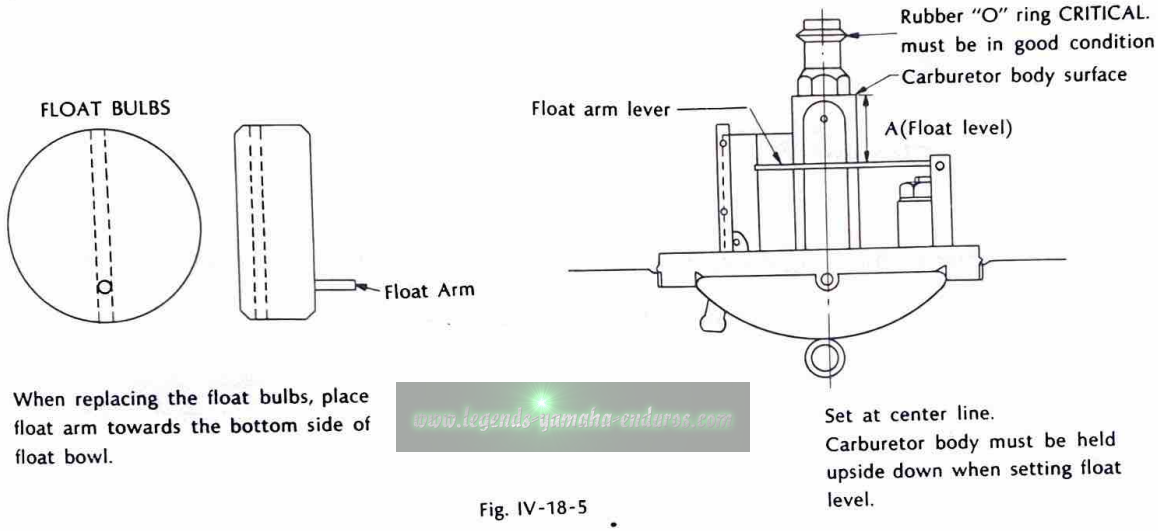


Fig. IV-18-5

1) Remove the float chamber body, and turn over the mixing body. body. Let the float arm rest on the needle valve with the spring fully expanded.
2) Then measure the distance "A" from the float arm lever to the float chamber joint surface.
   Standard measurement of A: 0.49 in.(14.1 mm)
3) When the A distance measured is less than recommended bend the tang up. If it is greater, bend the tang down. (with carburetor body upside down.)

C. Idle Mixtur-Idle speed Adjustment

Turn the idle mixture screw in until lightly seated, then back it out 1½ turns no more or no less. There is no need to experiment. This is a factory setting that can be set with the engine stopped.

No further adjustment is required. Engine idle speed is set by warming up the engine completely and then screwing the idle speed screw in or out, whichever direction is necessary for the engine to idle between 1,400 and 1,500 rpm.

D. Carburetor Setting Table

Name of Parts	Abbreviation	Specifications
Main jet	M. J.	220
Needle jet	N. J.	0-4
Jet needle	J. N.	6DP1-4 stages
Pilot jet	P. J.	30
Starter jet	G. S.	60
Throttle valve cut away	C. A.	1.5
Air screw setting	A. S.	1¼
Idling speed	—	1,450±50 r. p. m.
Float level	F. L.	0.49 in. (13.5 mm.)

Ⅳ—19 Air Cleaner

A. Removal

To remove the air filter, open the seat cover and remove four air cleaner mounting screws. Then the element can be removed.

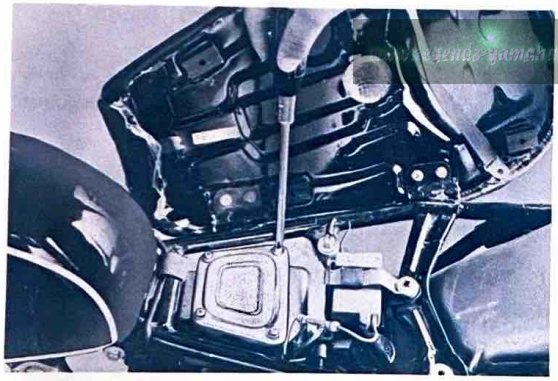


Fig. IV-19-1

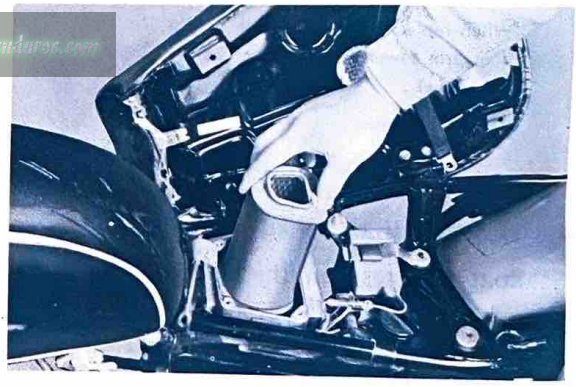


Fig. IV-19-2

B. Cleaning

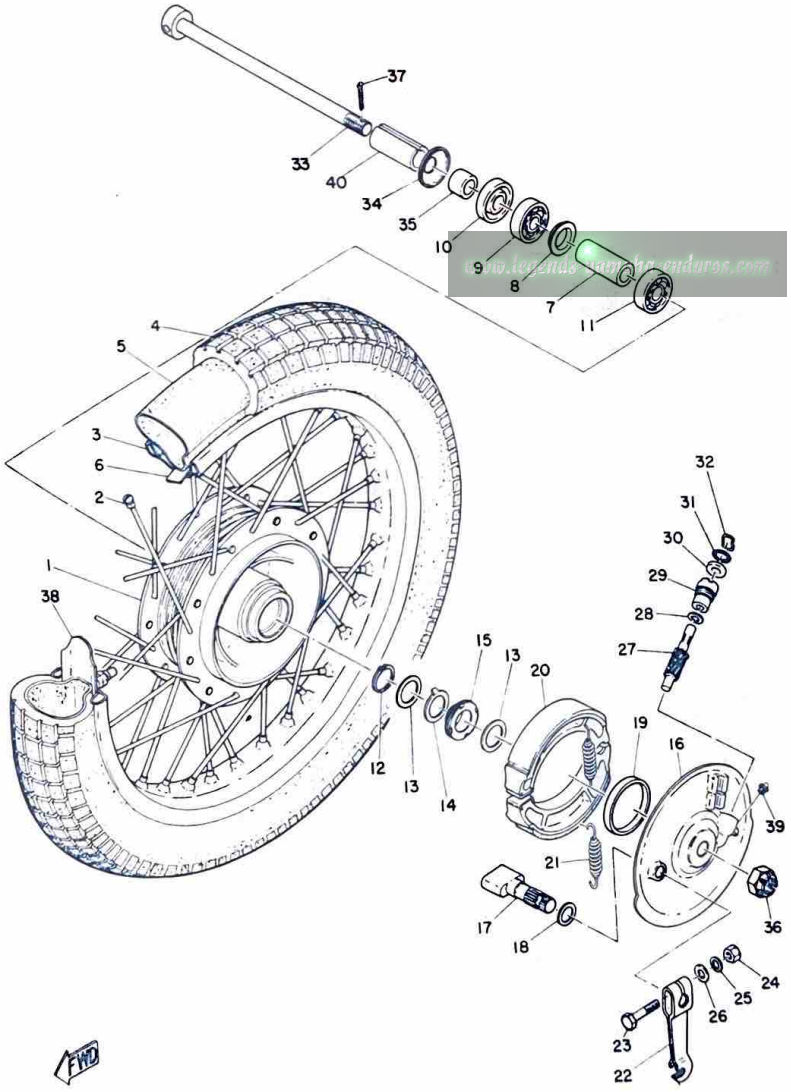
Wash the foam filter thoroughly in solvent until all dirt has been removed. Squeeze all the solvent out. Pour oil onto the filter (any grade of 20 or 30 wt), work it completely in, and then squeeze out the surplus oil. The filter should be completely impregnated with oil, but not "dripping" with it.

Chapter V Chassis

The Yamaha RT1 has been designed for versatility and a combination of uses. It is equipped with all necessary street legal equipment to insure pleasurable road or street riding. This machine can be quickly converted to a competion machine and therefore has been engineered to have a minimum weight factor. Yet with the reduction in weight; rigidity, strength, and safety have been incorporated in the design of the frame to provide an unexcelled competition machine.

V-1 Front Wheel

The 19" front wheel is equipped standard with a 3.25-19" Trials Universal tire,



1. Hub
2. Spoke set
3. Rim
4. Front tire
5. Front tube
6. Rim band
7. Bearing spacer
8. Spacer flange
9. Bearing
10. Oil seal
11. Bearing
12. Circlip
13. Thrust washer (2)
14. Meter clutch
15. Drive gear.
16. Brake shoe plate
17. Shaft cam
18. Cam shaft shim
19. Oil seal
20. Brake shoe complete
21. Brake shoe return spring
22. Cam shaft lever
23. Bolt
24. Nut
25. Spring washer
26. Plain washer
27. Meter gear
28. Thrust washer 1
29. Bushing
30. Oil seal
31. O ring
32. Stop ring
33. Wheel shaft
34. Hub dust cover
35. Wheel shaft collar
36. Shaft nut
37. Cotter pin
38. Bead spacer
39. Grease nipple
40. collar

Fig. V-1-1 **Construction**

This tire gives the rider assurance of maximum performance and safety for both road riding and trail riding. To insure against tire slippage on the rim, a tire bead lock had been installed in the wheel. The front wheel brake size is 150mm. × 30mm. (5.9 × 1.18 in.)A labyrinth seal is installed between the wheel hub and brake plate to provide a seal against and water.

A: Removal

1) Disconnect the brake cable at the front brake lever.

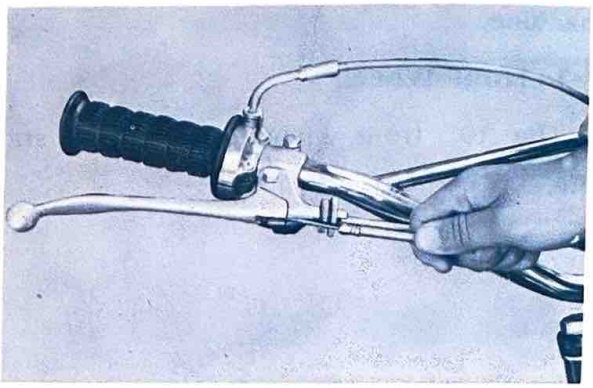


Fig. V-1-2

2) Disconnect both the brake cable and speedometer cable from the front wheel hub plate.

Fig. V-1-3

3) Remove the cotter pin and then remove the front wheel nut.

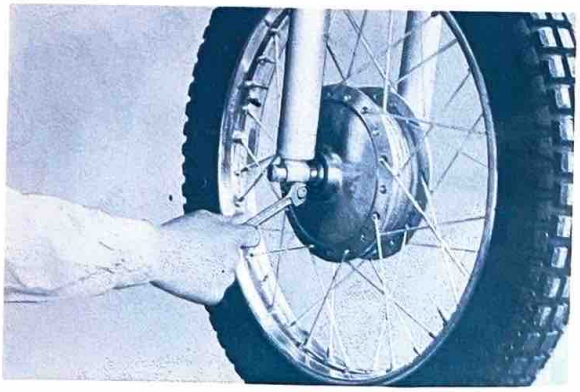


Fig. V-1-4

4) Loosen the front wheel axle lock bolt.

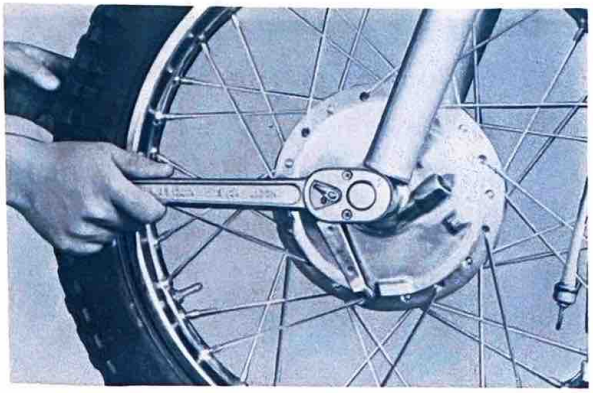


Fig. V-1-5

5) Pull out the front wheel axle by simultaneously twisting and pulling on the axle.

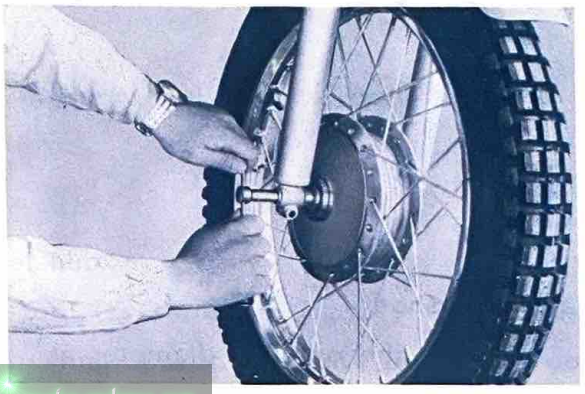


Fig. V-1-6

6) Raise the front of the machine and set it on a box. Then remove the wheel assembly.

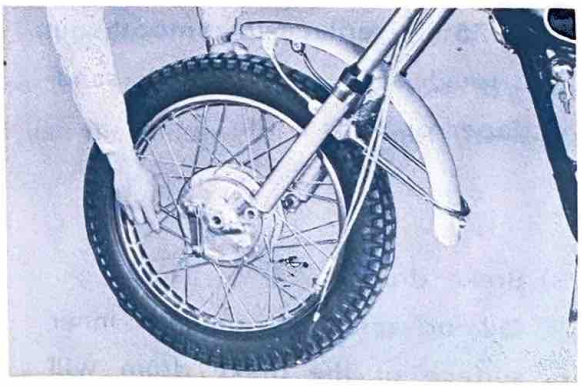


Fig. V-1-7

B: Checking

1) Run out of the rim

As show in Fig. V-1-8, measure the runout of the rim with a dial gauge. Runout limits:2mm. (0.07 in.) or less.

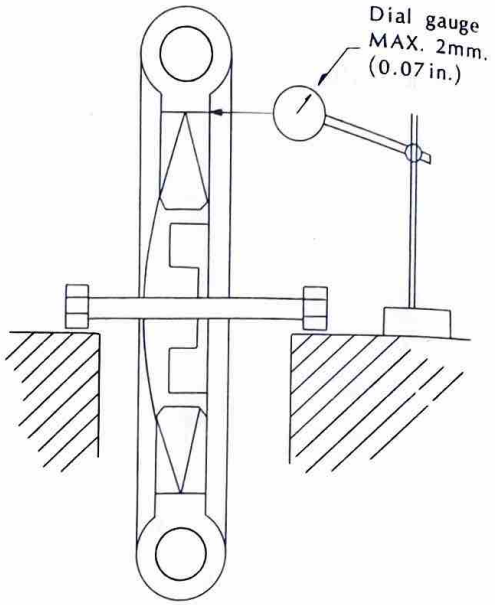


Fig. V-1-8

2) Brake shoe

Measure the outside diameter at the brake shoe with slide calipers. If it measures less than 146mm. (5.75in.), replace it. Smooth out a rough shoe surface with sand-paper or with a file.

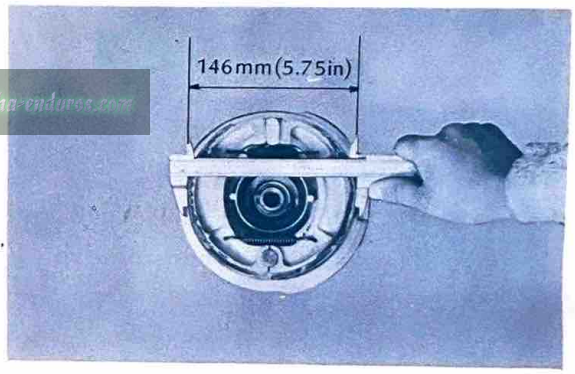


Fig. V-1-9

3) Brake drum

Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noises. Clean or smooth out the surface with a rag soaked in laquer thinner or with sandpaper.

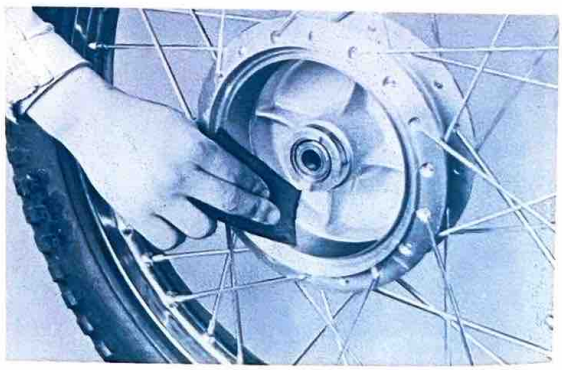


Fig. V-1-10

4) Check the spokes. If they are loose or bent, replace or tighten them. If the machine is ridden in rough country often or raced the spokes should be checked regularly.

5) Repairing the brake shoe

If the brake shoe has uneven contact with the brake drum or scratches, smooth out the surface with sandpaper or hand file.

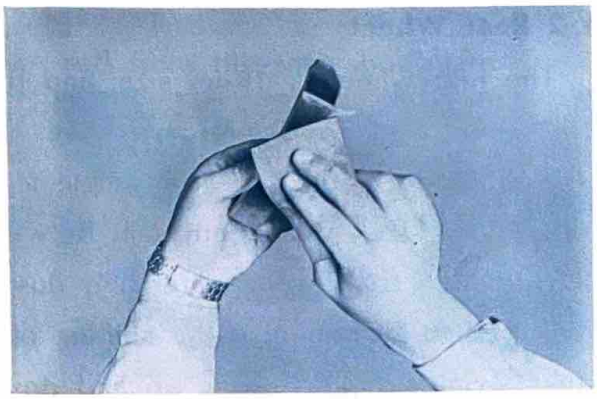


Fig. IV-1-11

6) If the tire is excessively worn replace the tire.

7) Check the tires for damage regularly.

8) If the bearings allow excessive play in the wheel or if it does not turn smoothly, replace the bearing.

Replacing the Wheel Bearing

a. First clean the outside of the wheel hub.

b. Insert the bent end of the special tool (as shown in Fig. V-1-13) into the hole located in the center of the bearing spacer, and drive the spacer out from the hub by tapping the other end of the special tool with a hammer. (Both bearing spacer and spacer flange can easily be removed.)

c. Then push out the bearing on the other side.

d. To install the wheel bearing, reverse the above sequence. Be sure to grease the bearing before installation and use the bearing fitt- ing tool (furnished by Yamaha.)

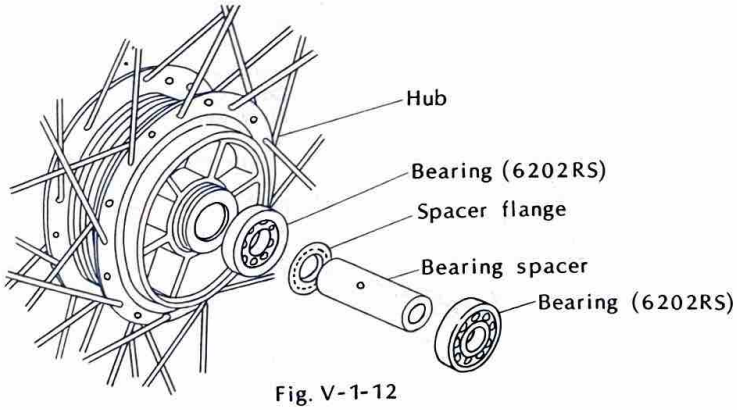
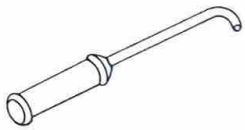


Fig. V-1-12



Insert the bent end of the special tool into the hole located in the center of the bearing space.

Fig. V-1-13

9) Replace a bent or damaged front wheel axle.

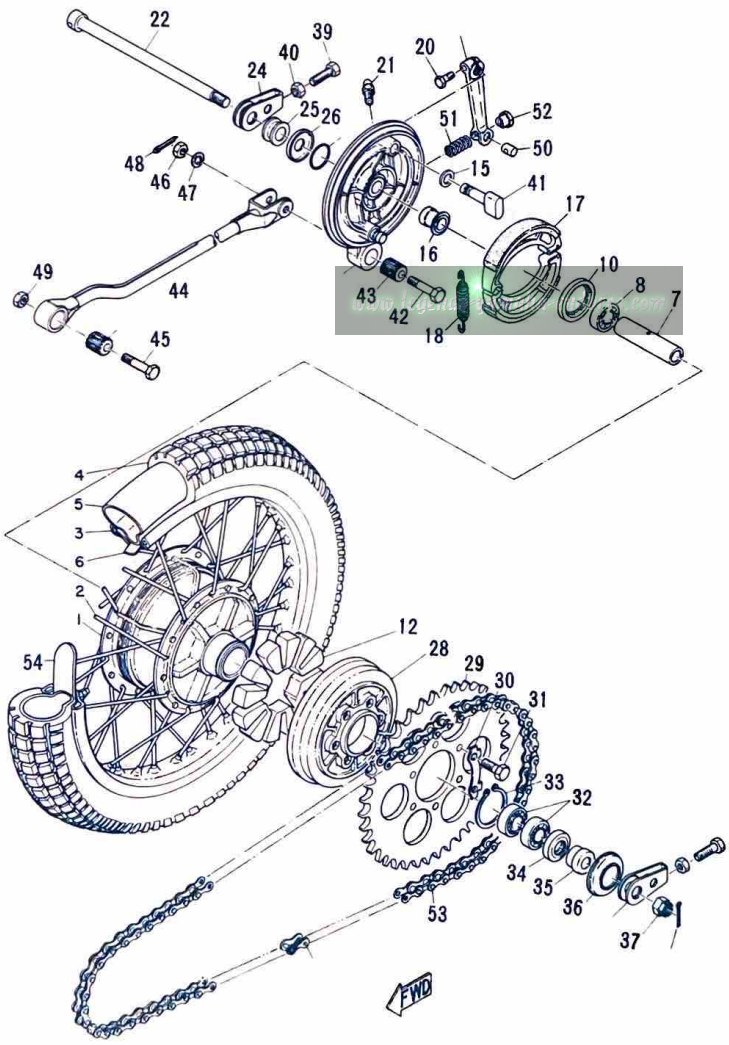
10. If the tooth surface of the helical speedometer drive gear is excessively worn replace it.

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

V-2 Rear Wheel

The rear wheel is 18-in. size, and the rear tire is the 4.00-18 Trials Universal. It is also good for road riding. Two rim locks are provided to prevent tire slippage in the rim. The single leading shoe type brake is of the 150mm ×30mm. size. A labyrinth seal between the wheel hub and the brake plate is provided to prevent water and dust leakage. The brake tension bar is of link design to minimize the shifting of the brake cam lever position when the rear swing arm is moving up and down.

The rear fender is steel, and rubber mounted on the frame. It is also wide enough to protect the engine unit from dust and water.



1. Hub 2. Spoke set
3. Rim 4. Rear tire
5. Tube 6. Rim band
7. Bearing spacer
8. Spacer flange
19. Bearing
10. Oil seal
11. O ring
12. Clutch damper
13. Brake shoe plate
14. Shaft cam
15. Cam shaft shim
16. Shaft bushing
17. Brake shoe complete
18. Return apring
29. Cam shaft lever
20. Bolt 21. Grease nipple
22. Wheel shaft
23. Shaft collar
24. Chain puller
25. Wheel shaft coller
26. Plate dust cover
27. Sprocket shaft
28. Hub clutch
39. Sprocket wheel gear
30. Lock washer
31. Fitting bolt
32. Bearing 33. Circlip
34. Oil seal
35. Sprocket shaft collar
36. Dust cover
37. Sprocket shaft nut
38. Shaft nut
49. Chain puller bolt
40. Nut 41. Blind plug
42. Pan head screw
43. Spring washer
44. Tension bar
45. Tension bar bolt
46. Nut 47. Spring washer
48. Cotter pin
59. Tension bar clip
50. Clevis pin
51. Rod spring
52. Adjusting nut
53. Chain 54. Bead spacer

Rear wheel Constru ction Fig. V-2-1

A: Removal

1) Remove the tension bar and brake rod from the rear shoe plate.

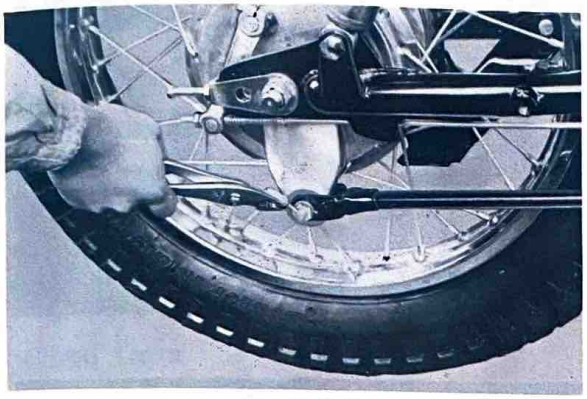


Fig. V-2-2

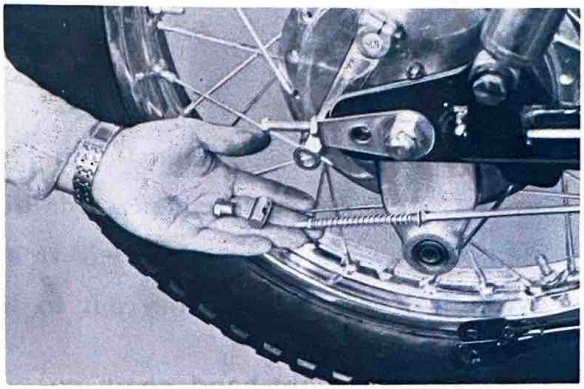


Fig. V-2-3

2) Disconnect the master link of the chain and remove the chain.

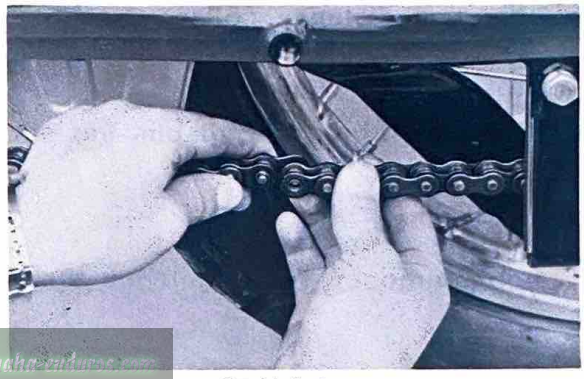


Fig. V-2-4

3) Loosen the chain tension adjusting nuts and bolts on both right and left sides.

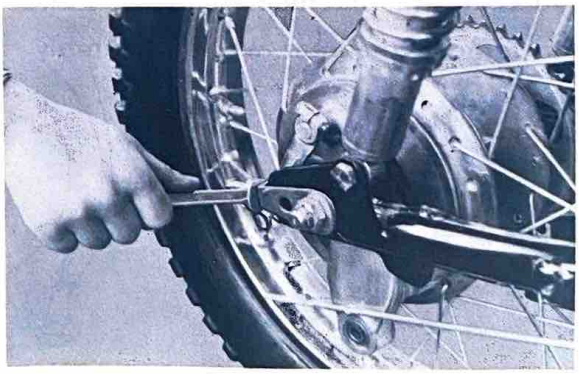


Fig. V-2-5

4) Remove the rear wheel shaft nut.

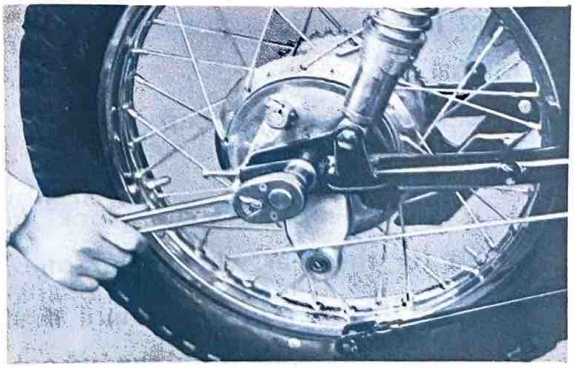


Fig. V-2-6

5) Pull out the rear wheel shaft by striking it with a plastic tip hammer.

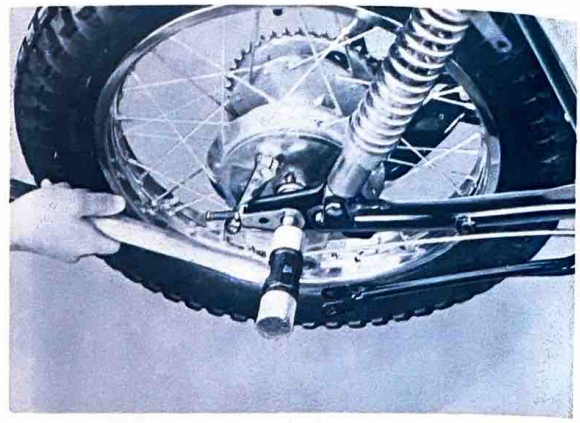


Fig. V-2-7

6) Remove the right-hand chain puller and distance collar.

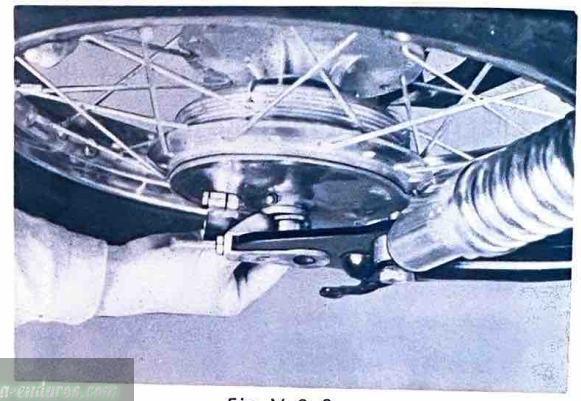


Fig. V-2-8

7) Lean the machine to the left and remove the rear wheel assembly.

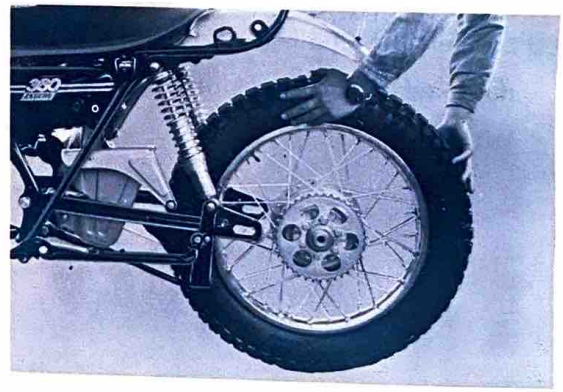


Fig. V-2-9

Replacing Tires

1) Removal

a. Remove the valve cap and lock nut (12 mm.) from the tire vale, and deflate the tire.

b. Loosen the bead spacer lock nut (10 mm). Two bead spacers are provided for the rear wheel, and one for the front wheel.

c. Twist the bead spacer until if slips off the edge of the wheel rim.

d. Remove the tire from the wheel rim by the use of two tire levers. (Exer-

cise care to avoid damaging the inner tube with the levers.)

It is noted that to remove the inner tube, one side of the tire should be pried out of the wheel rim.

2) Installation

a. Pull the bead spacer toward the wheel rim flange.

b. Replace the tube between the tire and the wheel rim, and half inflate the tube. Be sure that the valve stem is directed toward the wheel shaft. Install the tube in over the same side of the rim that the tube is removed from.

c. Mount the tire on the wheel rim by the use of tire levers. For this operation, it is advisable that the bead on one side of the tire be pushed in toward the rim flange.

d. To avoid pinching the tube between the tire and the rim, tap the tire with a hammer.

e. Tighten the bead spacer lock nut.

f. Tighten the tire valve lock nut, and inflate the tire to the recommended pressure, then install the valve cap.

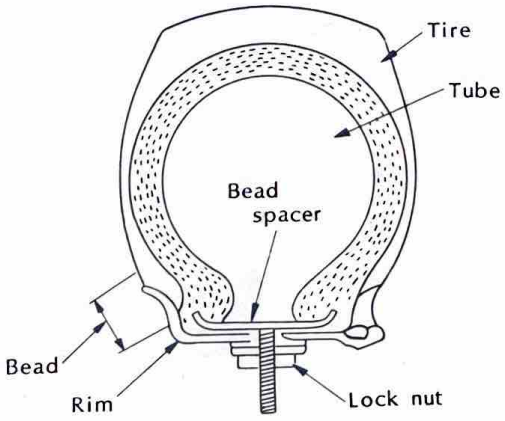


Fig. V-2-11

B: Inspection

1) Run out of the rim.

Check the rim for run out in the same way as the front wheel. Maximum limit of run out ..... 2 mm. (0.07 in.) or less.

2) Brake shoe

Check the brake shoe in the same way as the front wheel.

Minimum limit .....140 mm. (5.75 in.)

3) Brake drum

Check the brake drum in the same way as the front wheel.

4) The spokes are measured in the same way as the front wheel. A loose spoke should be tightened.

5) If the bearing has a excessive play or it does not turn smoothly, replace it.

6) If the tire or the pattern is worn out, replace the tire.

7) If the lip of the oil seal is damaged or warped, replace it.

V-3 Rear Wheel Sprocket

A: Removal

1) Removing the sprocket.

a. Bend the lock washer ears flat.

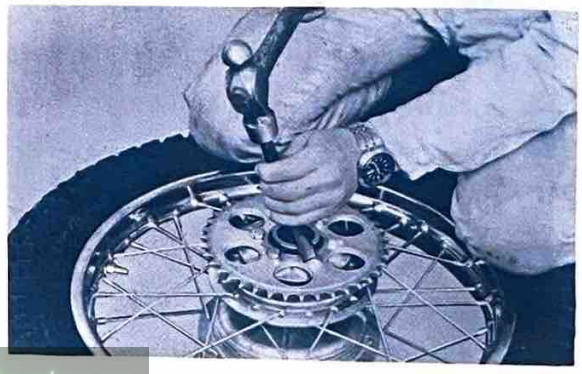


Fig. V-3-1

b. Remove the sprocket mounting bolts.

Fig. V-3-2

B: Checking

1) Checking

Check the lock washer and hexagonal bolt for breakage and damage. If the lock washer is not bent over the hexagon bolt head or broken, or if the bolt is loose, the sprocket can become loose.

Make sure that both lock washers and the mounting bolts are tight.

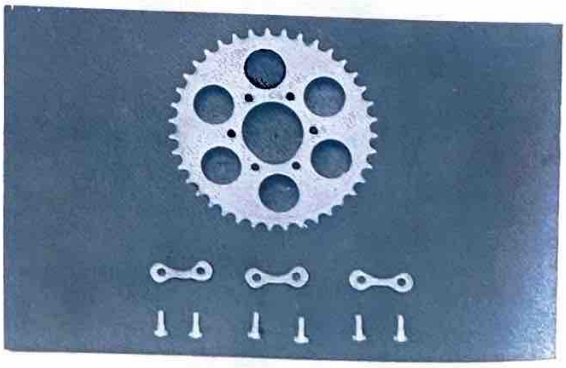


Fig. V-3-3

V-4 Tires and Tubes

1) Normal tire pressure.

Though tire pressure is the rider's choice, the standard tire pressure is as follows.

a. On-the-road riding

Front.....13 lbs./in^2. (0.9kg./cm^2.)

Rear.....16 lbs./in^2. (1.1kg./cm^2.)

b. Off-the-road riding

Front.....8.5 lbs./in^2. (0.6kg./cm^2.)

Rear.....10 lbs./in^2. (0.7kg./cm^2.)

V-5 Front Forks

The RTI is equipped with competition designed telescopic double dampening front forks. These specially designed front forks provide excellent riding comfort along with handling superiority. The maximum stroke travel is almost 7 inches (175mm.)

The combination of fork stability and long stroke travel provides safety and handling ease for the rider over even the roughest of terrain. This front fork design also reduces weight, eases maintenance, and gives functional and attractive appearance.

The simplicity and dependability of the front forks is provided by the installation of the fork spring inside of the fork tube.

The smoothness of the ride desired can be adjusted with the incorporation of the adjustable air valve on the fork cap bolt. Should a softer ride be desired, the cap bolt air pin should be pushed in and the forks compressed to let air out of the fork tubes. Should a stiffer ride be desired, the cap bolt air pin should be pressed in and the forks extended to their full length and then the air valve released.

A: Removal

1) Remove the front fender.

The light-weight aluminum front fender is rubber-mounted on the stay.

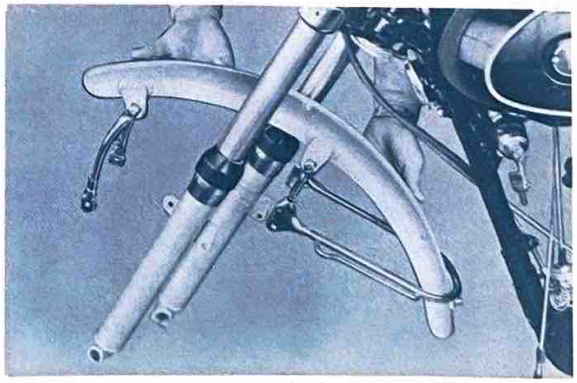


Fig. V-5-1

2) Remove the inner tube cap bolt. Loosening the arrow marked bolt will ease the cap bolt removal.

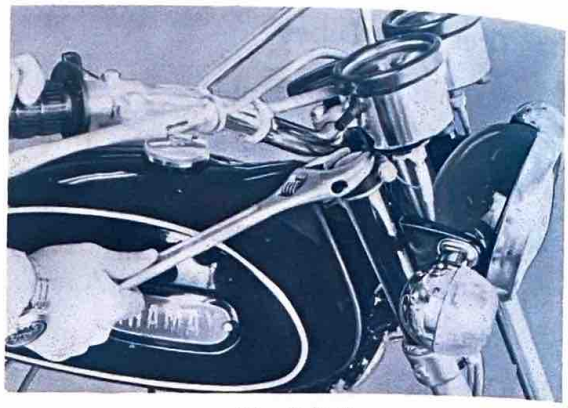


Fig. V-5-2

3) Loosen the inner tube pinch bolts on the underbracket.

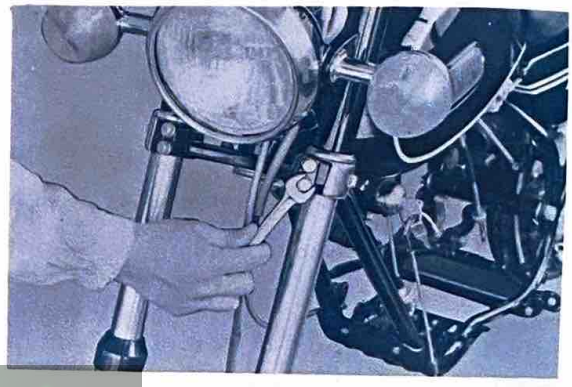


Fig. V-5-3

4) Pull the outer tube downward.

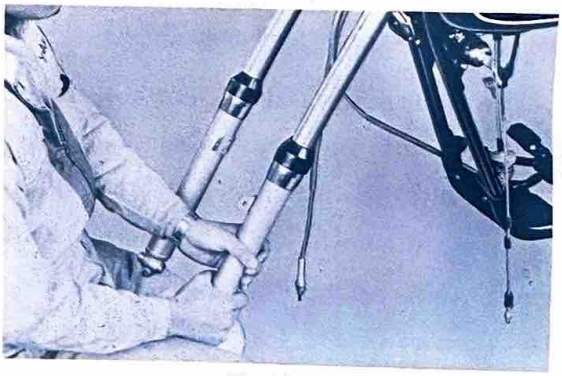


Fig. V-5-4

B. Disassembling the Inner and Outer Tubes

1) Drain the oil from the fork.

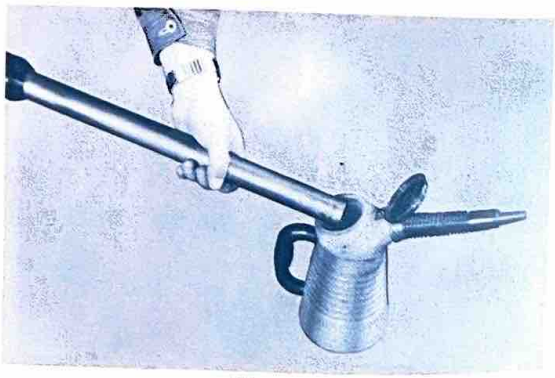


Fig. V-5-5

2) Remove the special bolt (arrow marked) from the bottom of the outer tubes.

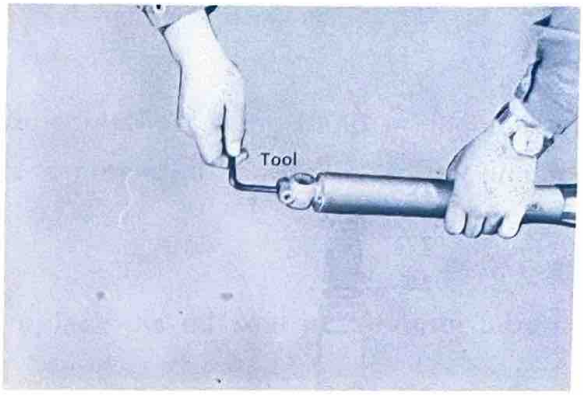


Fig. V-5-6

3) Place a rubber sheet or tire tube around the outer tube nut.

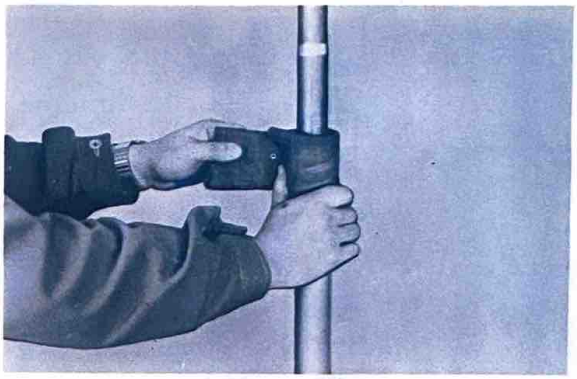


Fig. V-5-7

4) Squeeze the outer tube with a rope and handle, and turn it counterclockwise.
The inner tube can be separated from the outer.

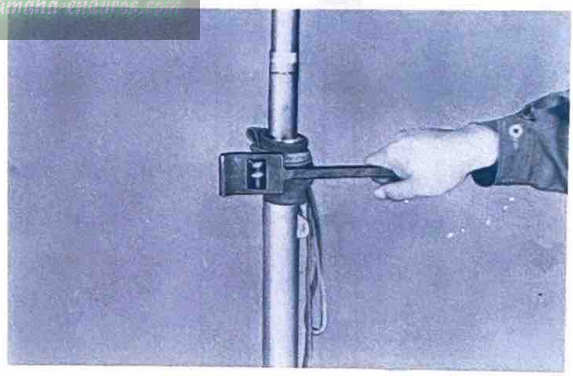
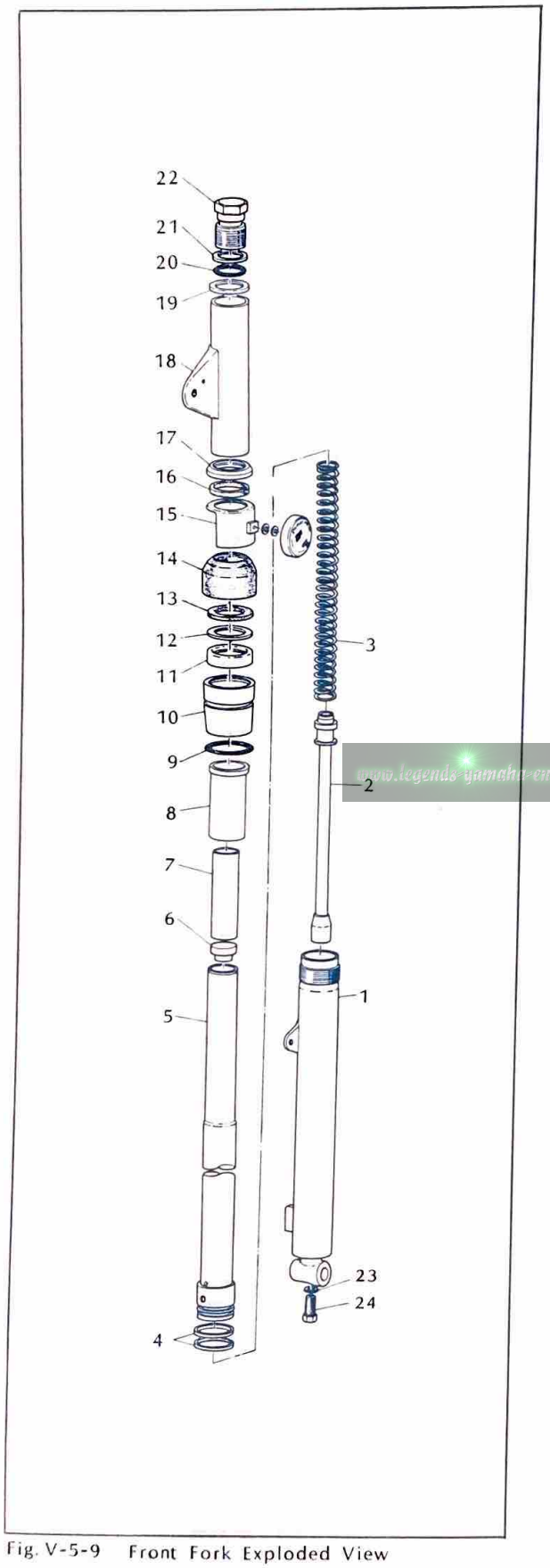


Fig. V-5-8



1. Outer tube
2. Cylinder complete
3. Fork spring
4. Piston ring
5. Inner tube
6. Spring upper seat
7. Spacer
8. Slide metal
9. O Ring
10. Outer nut
11. Oil seal
12. Oil seal washer
13. Oil seal clip
14. Dust seal
15. Outer cover
16. Packing (lamp stay)
17. Cover under guide
18. Upper cover
19. Cover upper guide
20. Packing (O-ring)
21. Cap washer
22. Cap bolt
23. Packing
24. Bolt

Fig. V-5-9 Front Fork Exploded View

C. Checking

1) Inner tube

Check the inner tube for bending or scratches. If the bend is slight, it can be corrected with a press. It is recommended, however, to replace the tube if possible.

2) Oil seal

When disassembling the front fork, replace the oil seal in the outer tube nut.

D. Assembling

1) For assembling the front fork, reverse the order of disassembling. Check if the inner tube slides in and out smoothly.

2) Installing the fronk on the frame.

a. Bring up the front fork to the correct position and tighten the under bracket mounting bolts.

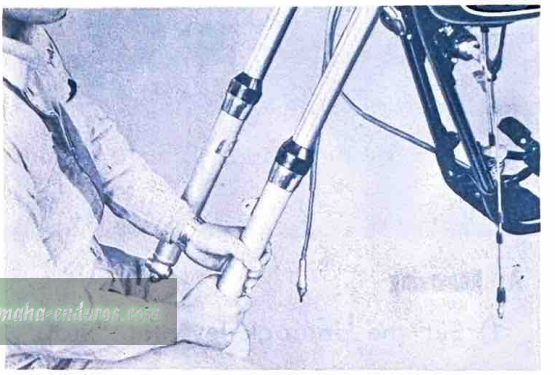


Fig. V-5-10

b. Pour oil into the inner tube through the upper end opening. Front fork oil : Motor oil SAE 10W/30 210c.c. (7.1oz.) per fork leg.

c. Install the cap bolt.

V-6 Rear Shocks

The rear shocks have a maximum stroke of 90mm. (3.54in.) The rear cushion features superb damping and 3-position adjustable springs, that allow the rider to adjust the rear shocks to suit any riding condition.

A: Checking the Condition of the Damping Units:

1) Remove the rear shock assembly.

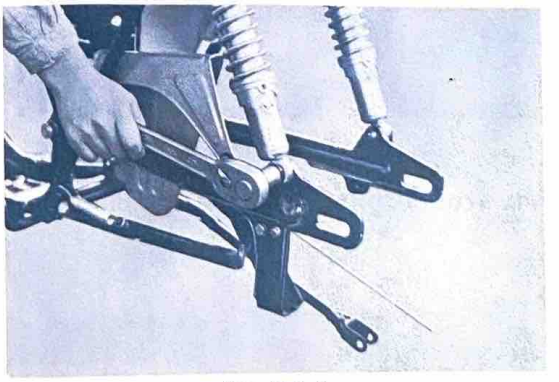


Fig. V-6-1

2) Compress the shocks by applying weight as shown in Fig. V-6-2, and release it.

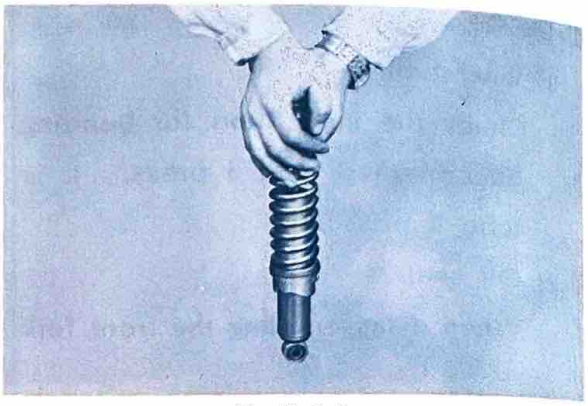


Fig. V-6-2

If the shock quickly restores halfway and then slowly returns to the original position after it reaches 10mm.(3/8in.) before the original position, the rear shocks are in good condition. But if the cushion returns quickly to the original position, check the cushion for oil leakage, and replace the assembly if the oil leaks.

V-7 Gas Tank

The gas tank has been shaped so that the rider can freely change his riding position. The front of the tank slips into the tank stay and the rear is held by rubber band. Tank capacity 9.5 litres (2.5 gals.)

A: Removing

1) Set the petcock lever at "Stop" position and disconnect the fuel line at the petcock.

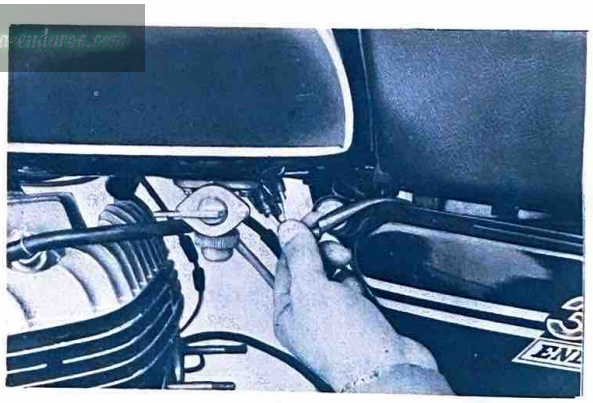


Fig. V-7-1

2) Open the seat. Remove the strap

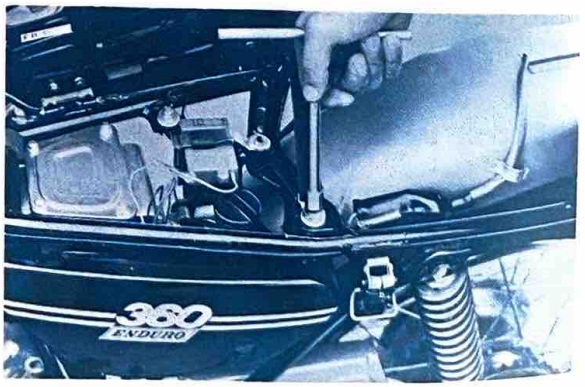


Fig. V-7-2

3) Remove the rubber band.

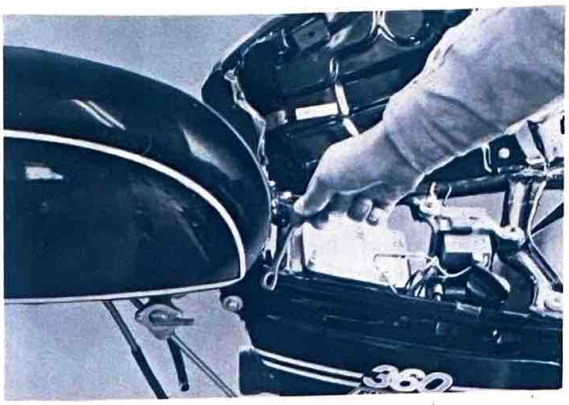


Fig. V-7-3

4) Remove the gas tank.

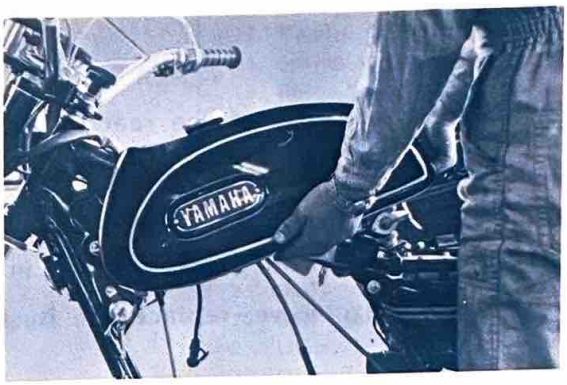


Fig. V-7-4

V-8 Rear Swing Arm

The rear swing arm is made of square steel tube that improves the strength and torsional rigidity. The pivot employs permanent lubrication bearings.

A: Removing

1) Remove the chain case mounting bolts.

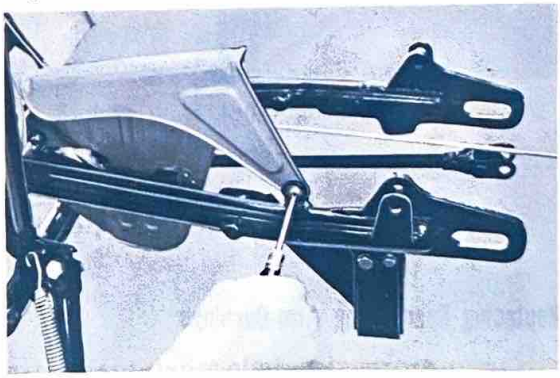


Fig. V-8-1

2) Remove the rear swing arm shaft nut, pull out the shaft, and remove the rear swing arm.

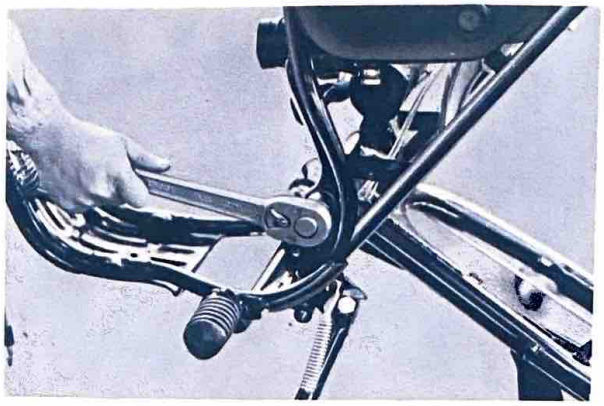


Fig. V-8-2

B: Checking

1) Check the play of the rear swing arm by shaking it from side to side. as shown in Fig. V-8-3, with the rear swing arm installed. If the play is excessive, replace the rear swing arm bushing or the rear swing arm shaft.
2) Insert the bushing as indicated in Fig. V-8-4, and check it for play. It the play is excessive, replace the bushing.

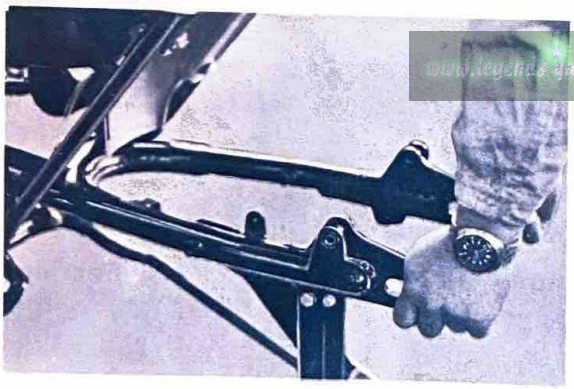


Fig. V-8-3

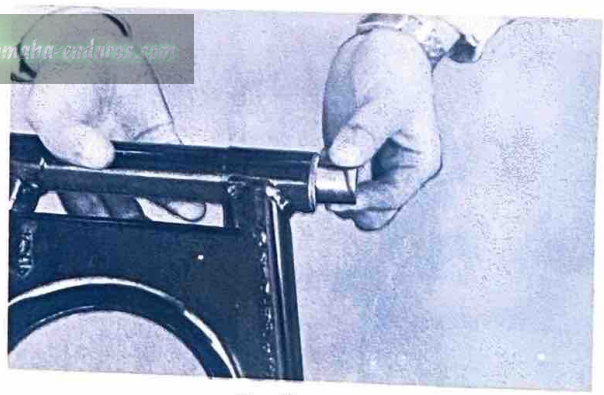


Fig. V-8-4

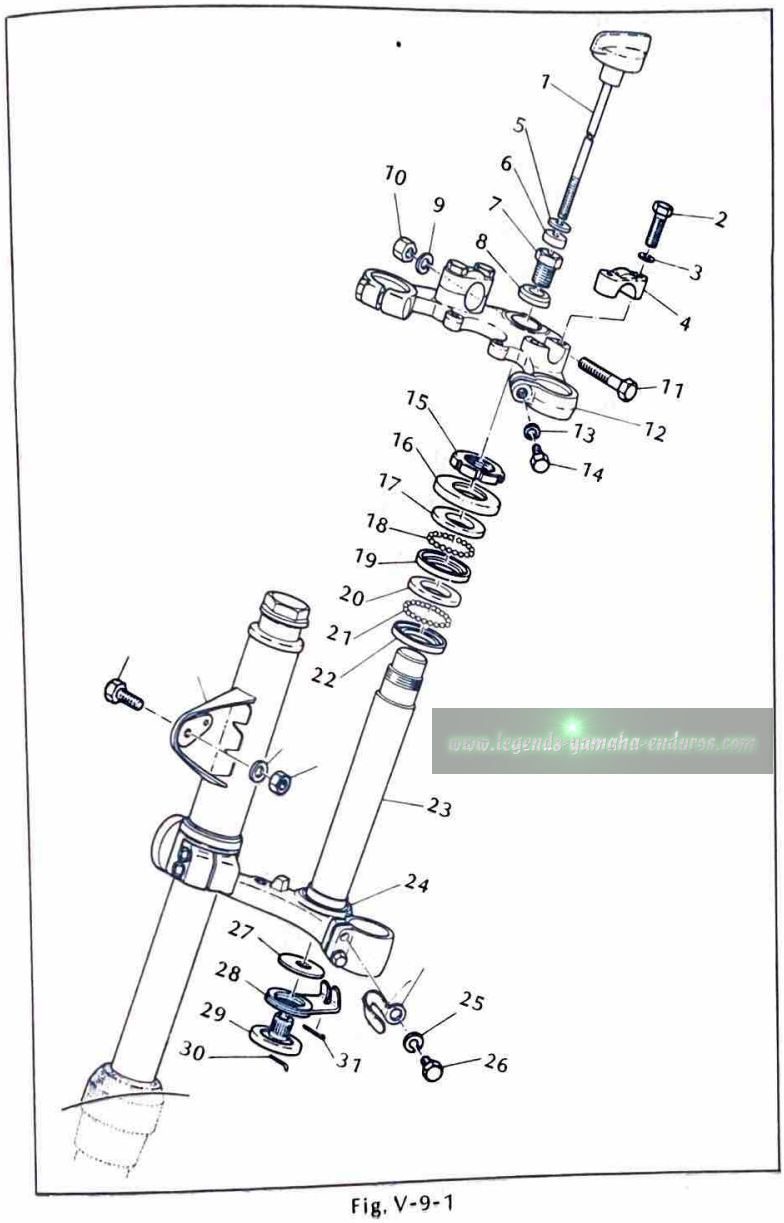
3) Grease the rear arm shaft periodically.

Replacing Rear Swing Arm Bushings

On motorcycles being habitually used for on-the-street riding, rear swing arm bushings should be replaced every 10,000km. (6,000miles). The same may not apply to those used for racing or rough riding. Replacement should be made according to machine condition such as excessive play of the rear swing arm, or hard steering (wander, shimmy or rear wheel hop,) or upon request of the customer.

V-9 Steering Head

A: Sectional View of the Steering Head



1. Damper shaft
2. Bolt
3. Spring washer
4. Handle upper holder
5. Special washer
6. Washer
7. Steering fitting bolt
8. Crown washer
9. Spring washer
10. crown nut
11. Bolt
12. Handle crown
13. Spring washer
14. Bolt
15. Fitting nut
16. Ball race cover
17. Ball race 2
18. Ball
19. Ball race 1
20. Ball race 2
21. Ball
22. Ball race 1
23. Under bracket complete
24. Dust seal
25. Spring washer
26. Under bracket bolt
27. Dumper plate
28. Damper plate (2)
29. Damper plate (1)
30. Clip
31. Cotter pin

Fig. V-9-1

B. Checking

1) Ball Races and Steel Balls.

Check the ball races and steel balls for pitting or wear. Check them very carefully if the machine has been in long use. If they are worn or cracked, replace all of them, because defective ball races or steel balls adversely affect the maneuverability of the machine.

Replace any ball race having scratches or streaks resulting from wear.

Clean and grease the balls periodically.

Note: Do not use a combination of new balls and used races or vice versa. If any of these are found defective, replace the whole ball and race assembly.

V-10 Oil Tank, Battery Box and Tool Box

The oil tank is located on the left side under the seat. It is designed to be as narrow as possible so that it will not contact the rider's lower limbs when he stands upright on the footrests. To fill the autolube oil tank, lift the seat and the tank cap will be exposed. Oil tank capacity....1.6 litres. (1.7 qte.)

The battery box and the air cleaner case is located right under the seat.

V-11 Frame

The double cradle-type frame is made of high tension steel tubes that provide strength, rigidity and light weight. Other dimensional features include higher ground clearance, narrower width, and longer wheelbase.

The engine is bolted to the frame at frame at four positions.

The caster is measured at 60. 50°.

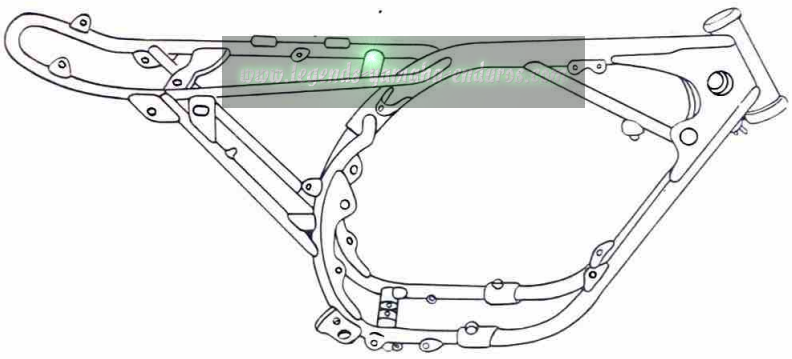


Fig. V-11-1

V-12 Handlebars

The upswept type longer handlebars are ideal for motocross events and are provided with deep-cut pattern grips to prevent hand slippage. The lever holder is provided with an adjusting screw for the play of clutch cable and brake cable.

The meter bracket is mounted on the ends of the handle crown, to carry the speedometer on its left side and the tachometer on its right side.

V-13 Miscellaneous

The footrest is made of a single steel tube extending under the lower part of the frame, and bolted to the frame. The engine guard is bolted to the frame to protect the entire crankcase...covering from the exhaust system to the drain plug.

Chapter VI Electrical System

VI-1 Description

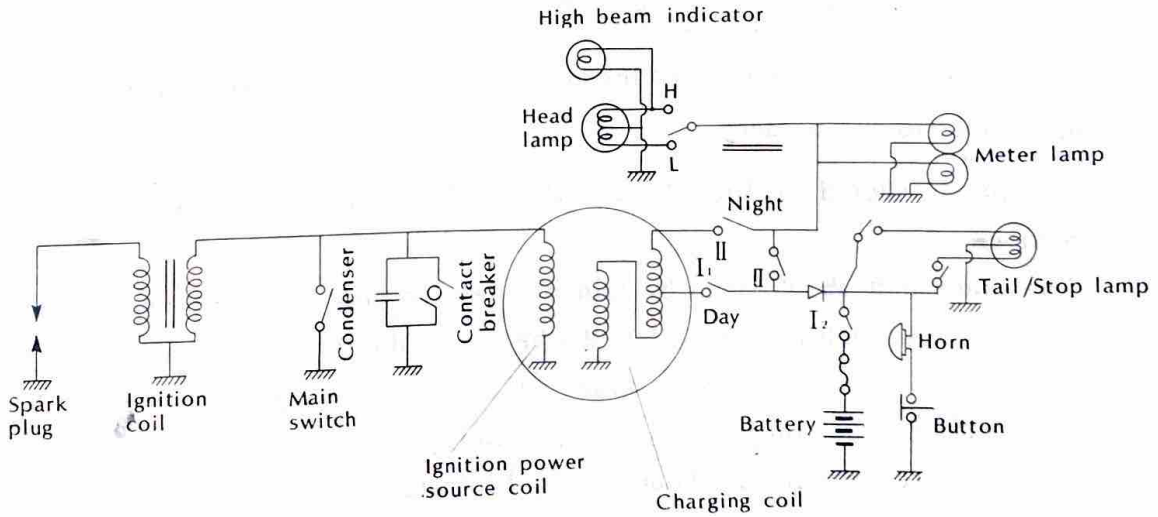
The Yamaha RT1 Electrical System is designed to facilitate lightweight, functional operation and simplicity.

Yet with these features, the Ignition System and Lighting Sysem facilitate dependable engine operation and all necessary lighting equipment. A 6 volt battery is used in conjunction with the flywheel magneto. All of the light bulbs have been increased in size to insure sufficient night riding visibility.

VI-2 Table of Component Parts

Parts	Manufacturer	Model & Type
Flywheel magneto	Mitsubishi Elec.	FZC-1AIL
Spark plug	NGK	B-9E
Headlight	Koito Mfg.	6V, 35W/35W
Speedometer	Nippon Seiki	
Tachometer	Nippon Seiki	
Main switch	Asahi Denso	ACS
Main switch	Asahi Denso	TIM
Ignition coil	Mitsubishi Elec.	HP-E
Horn	Nikko Kinzoku	MF-6
Battery	Nippon Battery	MV1-6D
Rectifier	Mitsubishi Elec.	DS10HJ1
Fuse	Osachi Mfg.	10A
Stop switch	Niles. Parts	SH40E
Taillight	Stanley Elec.	6V, 5.3W/17W

VI-3 Connection Diagram



VI-4 Ignition System—Function and Service

1: Function

The ignition system consists of the components as shown in Fig. VI-4-1. As the flywheel rotates, the contact breaker points begin to open and close, alternately. This make-and-break operation develops an electromotive force in the ignition power source coil, and produces a voltage in the primary coil.

The ignition coil is a kind of transformer, with a 1:50 turn ratio of the primary to the secondary winding. The voltage (150-300V) which is produced in the primary coil, is stepped up to 12,000—14,000 V by mutual-induction, and the electric spark jumps across the spark plug electrodes.

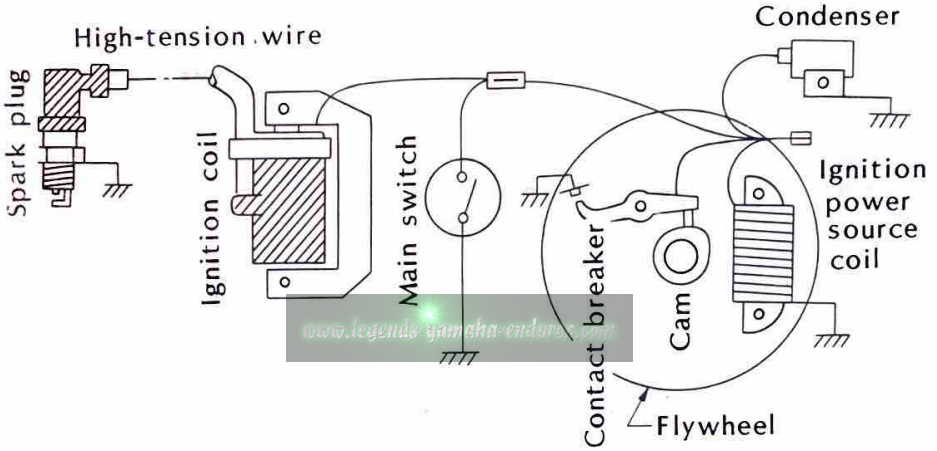


Fig. VI-4-1

VI-5 Ignition Timing

Remove the cylinder and attach the dial indicater holder. Next, insert the dial indicater in to the holder.

The piston should be brought to T.D.C. and the dial indicator set at this position.

The crankshaft should then be turned in reverse and the piston brought down below 3.4mm. below T.D.C. The flywheels should then be rotated forward until the piston reaches 3.4mm. Wadge the governor, fully open. below T.D.C. At this point the ignition points should just be opening. A low resistance point checker (100 Ohms or less) should be used to determine an opening and closing position of the ignition points.

Ignition Timing, 3.4 mm. B.T.D.C.

Maximum ignition point gap 0.3 to 0.4mm. (0.012"-0.015")

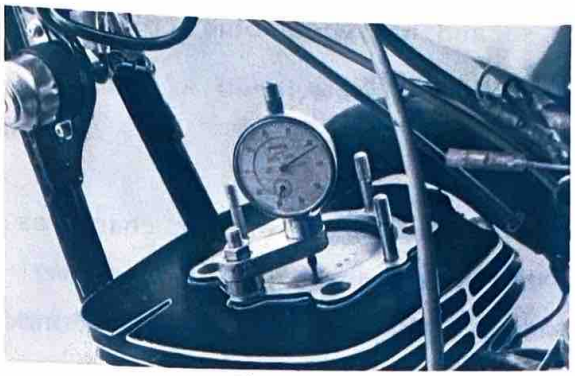


Fig. VI-5-1

VI-6 Ignition Coil

Primary coil resistance value..... 0.6 ± Ω 10% (20 °C or 68 °F)

Secondary coil resistance value.. 5.8K Ω ± 10% (20 °C or 68 °F)

(For measuring methods, refer to Fig. VI-6-1)

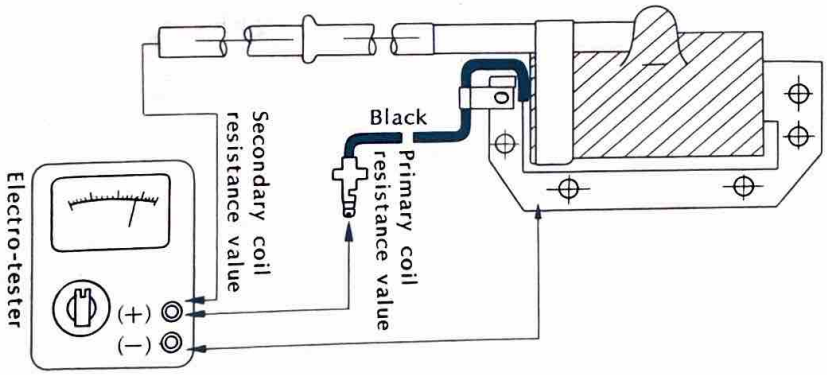


Fig. VI-6-1

Note: When measuring the secondary coil resistance value, disconnect the plug cap. Otherwise, the resistance of the 5K Ω noise suppressor incorporated in the plug will be added to the tester reading.

Spark Test:

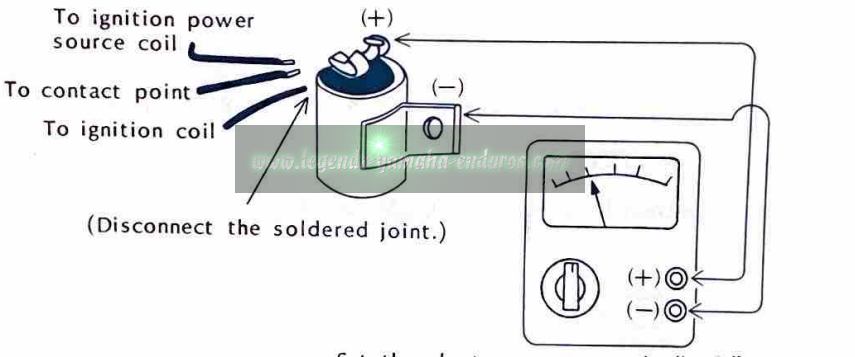
Remove spark plug from cylinder head and reconnect the high voltage lead. Then ground the spark plug and see if it sparks as you crank the kickstarter.

If it sparks 7 mm. or so and has white blue color, the ignition coil should be considered to be in good condition.

VI-7 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 electrical charge would arc across the separating contact points, causing them to burn. The condenser minimizes the burning of the contact points, greatly affecting the flow of current in the primary winding of the ignition coil.

If the contact points show excessive wear, or the spark is weak (the ignition coil is in good condition), check the condenser.



Set the electro-tester on the "MΩ" positon.

Fig. VI-7-1

Insulation resistance tests should be conducted by connecting the tester as shown in Fig. IV-7-1. If the pointer swings fully and the reading is more than 3MΩ, the insulation is in good condition. If the insulation is punctured, the pointer will stay pointing the uppermost reading.

Note: After this measurement, the condenser should be discharged by connecting the positive and negative sides with a thick lead wire.

Capacity tests can be performed by simply setting the tester to the condenser capacity. The tester should be connected with condenser in the same way as in the case of the insulation resistance test. Before this mesaurement, be sure to set the tester correctly.

If the reading is within 0.22μF ±10%, the condenser capacity is correct.

VI-8 Charging System

The charging system consists of the flywheel magneto (charging and lighting coils), rectifier, and battery.

1: Flywheel Magneto

As the flywheel rotates, an alternate current is generated in the charging and lighting coils and converted to a half-wave current by means of a silicon rectifier. This half-wave current charges the battery.

Charging Capacity (Daytime)

Green lead: Charging beings at 2,500 r.p.m.
at 8,000 r.p.m.

White lead: 0.15 A or more at 2,500 r.p.m.
4.0 A or less at 8,000 r.p.m.

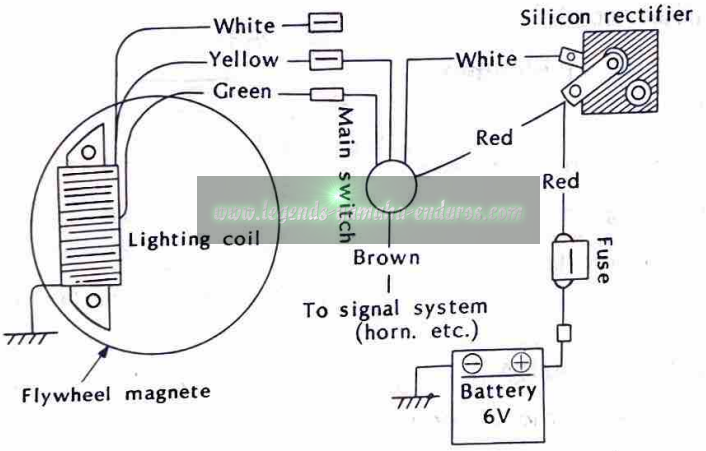


Fig. VI-8-1

Lighting Capacity (Night time)

(With normal loads and normal wiring.)

5.8V or more at 2,000 r.p.m.

8.5V or less at 8,000 r.p.m.

* The charging and lighting capacity is obtained when the battery is fully charged. If the battery is in a low state of charge and low in voltage, the charging rate will be not exactly the same as above. However, it is desirable that the figures are as close as possible.

How to Increase Charging Capacity

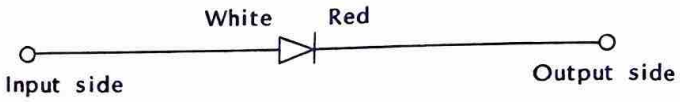
The flywheel magneto,s green lead wire is connected to the wire harness' green lead. But if the battery is continuously in a low state of charge connect the magneto's white lead to the wire harness' green lead. This will increase the charging rate.

2: Silicon Rectifier

The alternate current, which is generated by the flywheel magneto, is rectified and charged to the battery. For this rectification, a single-phase halfwave silicon rectifier is employed.

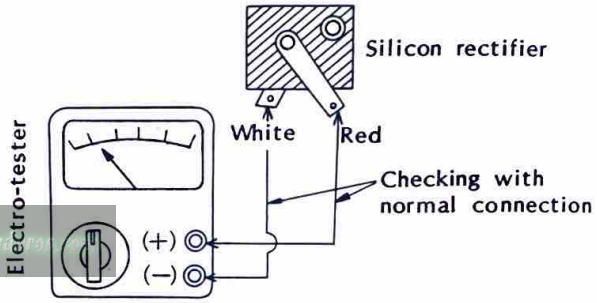
Characteristics: Rated output—4A,
Rated peak inverse voltage 400V

Polarity:



a: Checking the Silicon Rectifier

For measurements, an ohmmeter can be used.
However, this section discusses only the checking method by means of the ohmmeter.



(Set the tester on "Resistance.")

Checking with Reversed Connection

Connect the tester the other way araund.

Standard value: If the pointer will not swing, the rectifier is in good condition. If the pointer swings, the rectifiter is faulty.

Checking with Normal Connection

Connect the tester's red lead (+) to the silicon rectifier's red terminal, and connect the tester's black lead (—) to the rectifier's white terminal.

Standard value: 9—10Ω

If the tester's pointer will not swing back from the over scale, the rectifier is defective.

3. Operational Note

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

VI-9 Battery

The battery is a 6 volt—2 AH unit that is the power source for the horn taillight and stoplight. Because of the fluctuating charging rate due to the differences in engine R.P.M.s, the battery will lose its charge if the horn and stoplight are excessively used. The charging of the battery begins at about 2,500 R.P.M.

Therefore, it is recommended to sustain engine R.P.M.s at about 2,500 to 3,500 R.P.M. to keep the battery charged properly. If the horn and stoplight are used frequently the battery water should be checked regularly as the continuing charging will dissipate the water.

If the battery will not retain a charge (and the battery is in good condition) the white wire of the flywheel magneto can be connected to the green wire of the wiring harness. This will increase the charging rate but if the machine is ridden for long periods of time with this wiring connection, the battery can be overcharged and damaged.

1: Checking

1) If sulfation occurs on plates due to lack of the battery electrolyte, will show white accumulations, the battery should be repaced.
2) If the bottoms of the cells are filled with corrosive material falling off plates, the battery should be replaced.
3) If the battery shows the following defects, it should be replaced.
   - ○ The voltage will not rise to a specific value even after long hours charging.
   - ○ No gassing occurs in any cell.
   - ○ The 6 V battery requires a charging current of more than 8.4 volts in order to supply a current at a rate of lamp per hour for 10 hours.

2: Service Life

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

1) Negligence in re-filling the battery with electrolyte.
2) Battery being left discharged.
3) Over charging by rushing charge.
4) Freezing.
5) Filling with water or sulfuric acid containing impurities when re-filling the battery.

3: Storage

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

1) Recharge the battery.
2) Store the battery in a cool, dry place, and avoid temperatures below 0°C. (32°F)
3) Recharge the battery before mounting it on the motorcycle.

4: Service Standards

Battery: MV1-6D (Nippon Battery)

Battery Spec.	6V-2AH	
Electrolyte-Specific gravity and quantity	1.26-1.27, 110c.c.	At full charge
Initial charging current	0.2 A for 25 hours	Brand new motorcycle
Charging current	0.2 A for 13 hours (Charge until specific gravity reaches 1.26-1.27)	When discharged
Refilling of electrolyte	Distilled water up to the max. level line.	Once a month

VI-10 Checking the Main Switch (removed from the che chassis)

Key "O" position (Off)
Black ↔ Switch body
Key "I" position
(for day)
Green ↔ White
Red ↔ Brown
Key "II" position
(for night)
Yellow ↔ White
White ↔ Blue
Red ↔ Brown

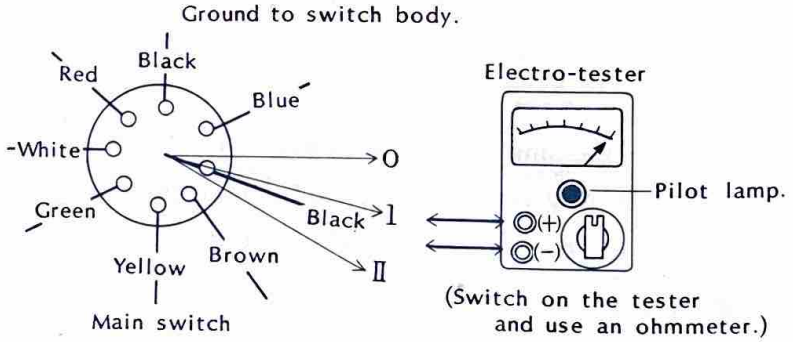


Fig. VI-10-1

If the readings or the above six meaurements are nearly 0 Ω, and no short-circuit is noticed between the terminals, as well as between the lead terminal and the switch body, the main switch is in good condition.

VI-11 Spark Plug

The life of a plug and its discoloring vary, according to the habits of the rider. At each periodic inspectiom, replace burned or fouled plugs with suitable ones according to the color and condition of the bad plugs.

One machine may be ridden only in urban areas at low speeds, whereas another may be ridden for hours at high speeds, so confirm what the present plugs indicate by asking the rider how long and how fast he rides, and recommend a hot, standard, or cold plug accordingly. It is actually economical to install new plugs every 3,000km (2,000miles) since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

1: How to "read" spark plug (condition)

a. Best....When the porcelain around the center electrode is a light tan color.

b. If the electrodes and porcelain are black and some what oily, replace the plug with a hoter-type for low speed riding.

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

2: Inspection

Instruct the rider to:

Inspect and clean the spark plug at least once a month or every 1,000km. (500miles) Clean the electrodes of carbon and adjust the electrode gap to 0.5—0.6mm. (0.023in.) Be sure to use standard B-9E plug as replacements to avoid any error in reach.

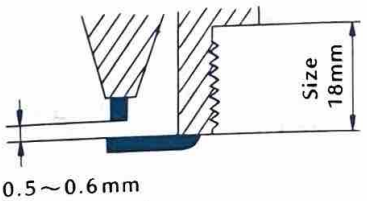


Fig. VI-11-1

VI-12 Lighting and Signal Systems

The lighting and signal systems consist of the horn and stoplight (power source-battery) and the headlight, taillight, meter lamps, high beam indicatot, speedo-meter and tachometer (power source-flywheel magneto).

1: Headlight

The headlight has two 6V, 35W bulbs, and a 6V, 1.5W high beam indicator on its top. A beam direction adjusting screw is fitted on the right side of the light rim so that the horizontal direction of the beam can be adjusted. (not vertical).

2: Taillight and Stoplight

A 6V. 5.3W taillight and a 6V, 17W stoplight are mounted. The lens of the tail light is provided with reflectors on its three sides-rear, right and left.

3: Horn

The horn is a 6V, flat type, and has a tone-volume adjusting nut on its back. After adjustment is made, apply paint or lacquer to the nut for water proofing purposes.

4: Speedometer

A circular type speedometer is rubber mounted on the bracket. It has a built-in trip meter and a odometer. For illumination, a 6V, 3W bulb is provided.

5: Tachometer

An independent tachometer is mounted separately from the speedometer. The revolutions perminute of the crankshaft are conveyed from the kick idler gear through the gear unit to the tachometer. The meter lamp is of the 6V, 3W type.

Note: Use bulbs of the correct capacity for the headlight, taillight, meter lamp and high-beam indicator which are directly connected to the flywheel magneto. If large capacity bulbs are used, the voltage will drop, giving a poor light. On the contrary, if smaller capacity bulbs are used, the voltage will rise, shortening the life of bulbs. Avoid the use of a 12V bulb, because shorter service life will result.

When the headlight beam switch is operated to change the beam from one to another, the headlight is designed to keep both bulbs burning. during the chenge-over. This is to protect other light bulbs, meter lamps, taillight, etc., from burning out as a result of turning off the headlight, though temporarily. If one of these light bulbs is burnt out while the machine is running, it will overload other bulbs and shorten their serrice life. reduce the engine speed and replace the burnt bulb as quickly as possible.

CONVERSION TABLES

LENGTHS

Multiply	By To Obtain	Multiply	By To Obtain
Millimeters (mm)	0.03937 Inches	Kilometers (km.)	0.6214 Miles
Inches (in.)	25.4 Millimeters	Miles (mi.)	1.609 Kilometers
Centimeters (cm.)	0.393707 Inches	Meters (m.)	3.281 Feet
Inches (in.)	2.54 Centimeters	Feet (ft.)	0.3048 Meters

WEIGHTS

Kilograms (kg.)	2.20462 Pounds	Grams (g.)	.03527 Ounces
Pounds (lbs.)	0.453592 Kilograms	Ounces (oz.)	28.35 Grams

VOLUMES

Cubic centimeters (c.c.)	.061 Cubic inches	Imperial gallons	277.274 cu. in.
Cubic inches (cu. in)	16.387 c.c.	Liters (1.)	1.057 Quarts
Liters (1.)	0.26418 Gallons	Quarts (qt.)	0.946 Liters
Gallons (gal.)	3.785 Liters	Cubic centimeters (c.c.)	0.0339 Fjuid ounces
U.S. gallons	1.2 Imperial gals.	Fluid ounces (fl.oz.)	29.57 c.c.
Imperial gallons	4.537 Liters		

OTHERS

Metric horsepower (ps.)	1.014 bhp.	Foot-pounds (ft-lbs)	.1383 kg-m
Brake horsepower (bhp.)	.9859 ps.	Kilometers per liter (km/1)	2.352 mpg
Kilogram-meter (kg-m)	7.235 Foot-pounds	Miles per gallon (mpg.)	.4252 km/1

GAS (FUEL) TO OIL RATIO CHART

Gas/Oil Ratio	12:1	16:1	20:1	24:1	28:1	32:1	36:1	40:1
Oil (qt.) per 1 Gal. Gas	0.33	0.25	0.2	0.17	0.14	0.13	0.11	0.1
Oil (oz.) per 1 Gal. Gas	10.7	8.0	6.4	5.3	4.6	4.3	3.6	3.2
Oil (qt.) per 5 Gal. Gas	1.66	1.25	1.0	0.84	0.72	0.67	0.55	0.5
Oil (oz.) per 5 Gal. Gas	53.5	40.0	32.0	26.6	22.8	21.32	17.8	16.0

(U.S. Gallons)

M E M O

MEMO

M E M O

MEMO

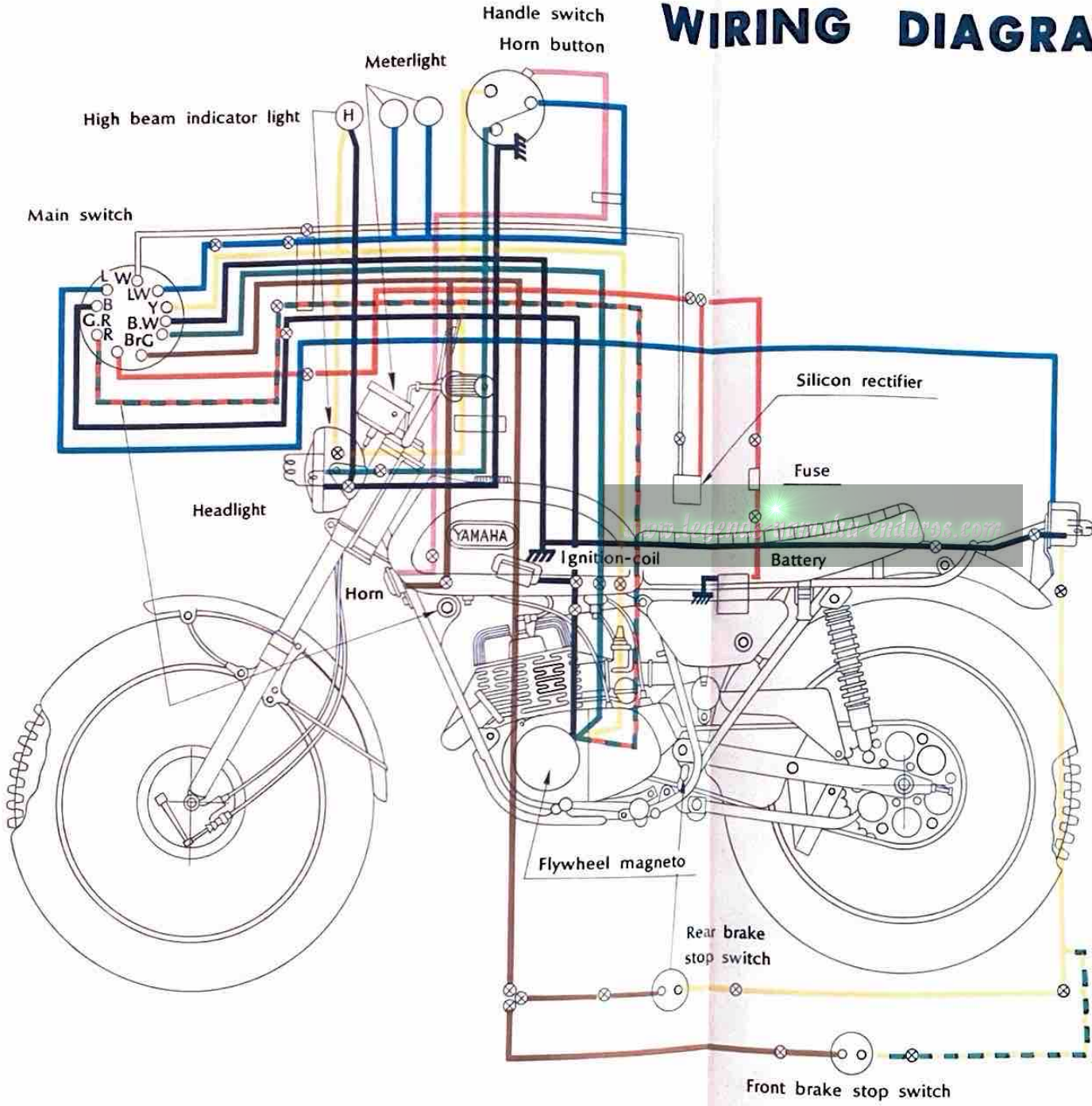
M E M O

M E M O

M E M O

M E M O

WIRING DIAGRAM



Color / Position	E	B	R	Br	L	G	W	GR	LW	Y
OFF	○—○									
I			○—○			○—○				
II			○—○	○—○			○—○		○—○	

Chart of wire colors

Daytime charging circuit	Green
Night time charging circuit	Green/Red
Battery (+) circuit	Red
Ground circuit	Black
Front brake stop light circuit	Green/Yellow
Rear brake stop light circuit	Yellow
Tail light circuit	Blue
Head/Meter light circuit	Blue(L.W)
Common circuit	Brown
Head light main circuit	Yellow
Head light sub circuit	Green
Horn circuit	Pink
Rectifier circuit	White