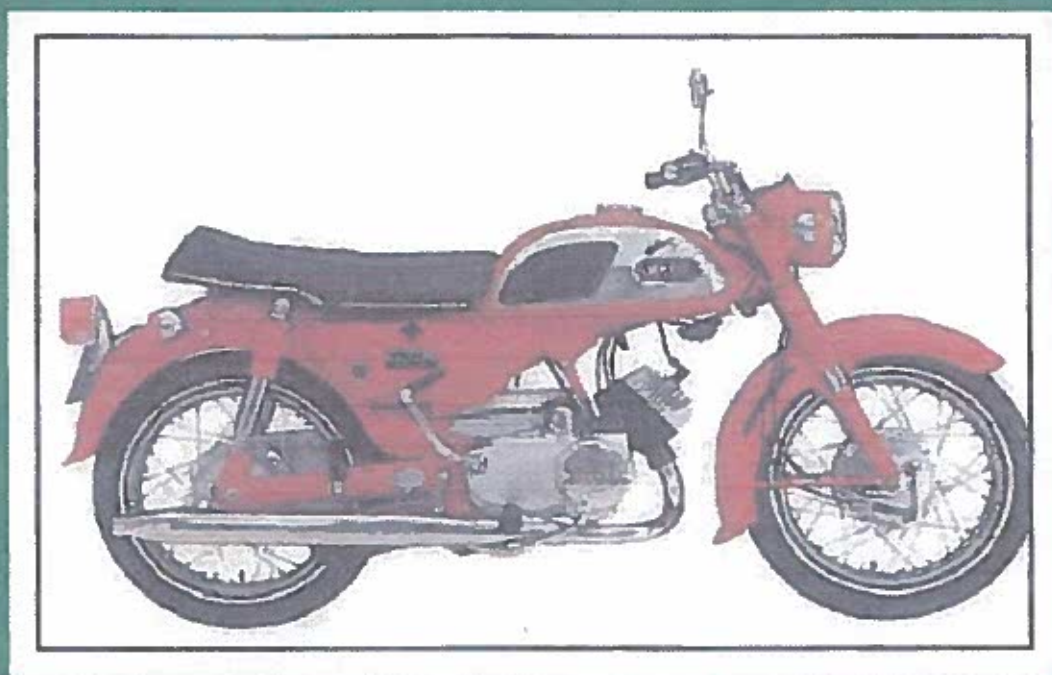


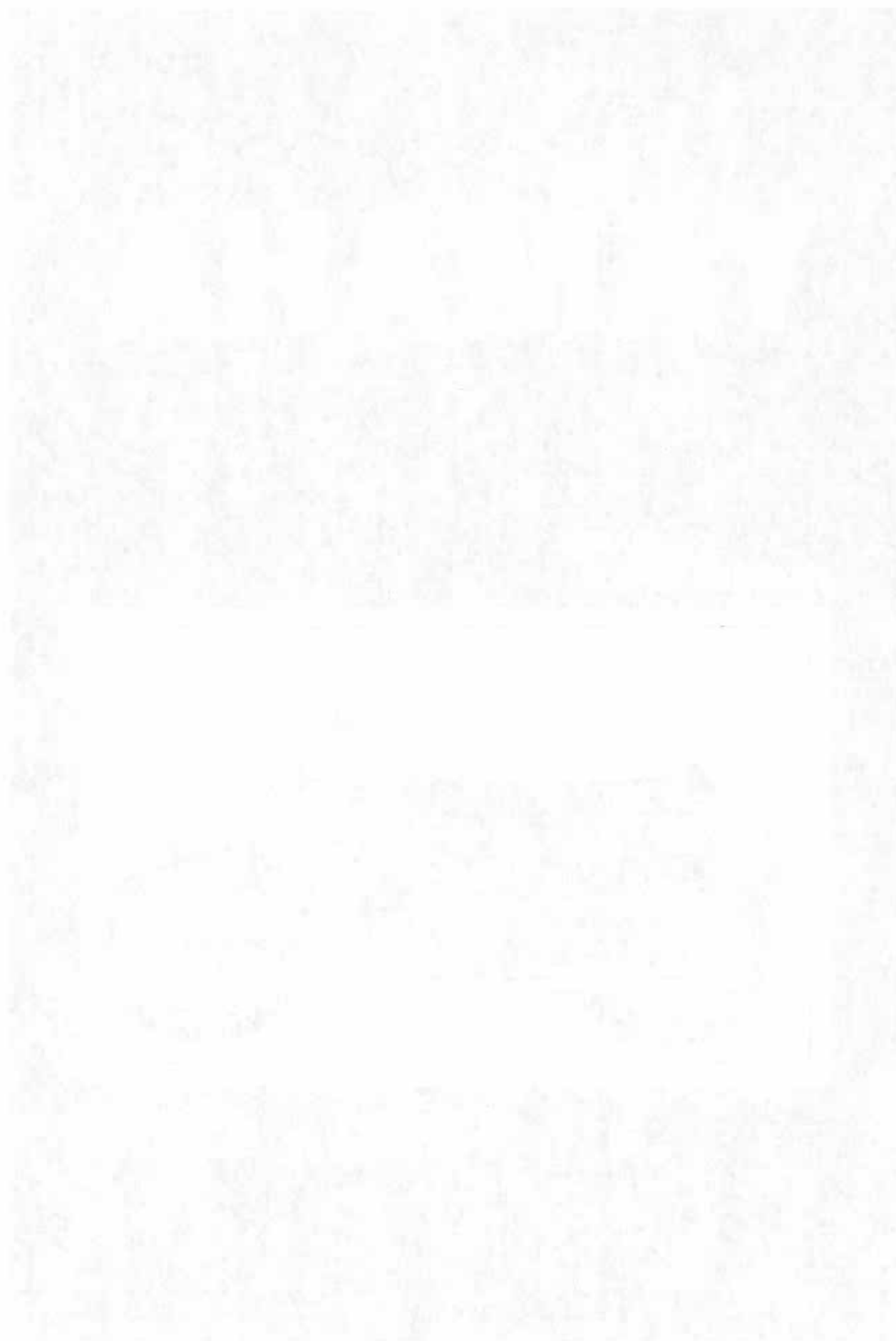
YAMAHA

SERVICE MANUAL

model **A7**



1964 - 1968



YAMAHA 125 A7

SERVICE MANUAL



The new Yamaha 125 A7 is an improved version of the renowned YA6 as a utility machine. Backed by the Autolube and rotary valve pioneered by Yamaha, the engine permits steady performance throughout the entire speed range—from low to high. Not only stability but easy maneuverability is also assured by the back-bone type steel plate frame with the endurance-proven monocoque construction.

This innovation in design, we are sure, will be welcome by all Yamaha fans in many countries. It is the most significant duty for all Yamaha dealers to maintain the machine in top operating condition. With this in mind, we have prepared this booklet in which the technical information and service instructions required for Yamaha dealers are contained. Your sincere assistance and cooperation will be highly appreciated.

YAMAHA MOTOR CO., LTD.

YAMAHA A7 SERVICE MANUAL

CONTENTS

CHAPTER 1	YAMAHA A7 FEATURES AND SPECIFICATIONS	1
1-1	A7 FEATURES	1
1-2	A7 SPECIFICATIONS	2
1-3	A7 PERFORMANCE CURVES	3
CHAPTER 2	YAMAHA AUTOLUBE	5
2-1	WHAT IS THE YAMAHA AUTOLUBE?	5
2-2	AUTOLUBE FEATURES	5
2-3	CONSTRUCTION	7
2-3-1	PUMP FEATURES	7
2-3-2	PUMP ASSEMBLY	7
2-4	PUMP MECHANISM	9
2-4-1	PUMP MECHANISM	9
2-4-2	MAIN PARTS AND THEIR FUNCTION	9
2-4-3	DISTRIBUTOR-PLUNGER MECHANISM	12
2-5	PERFORMANCE	13
2-5-1	CONTROL OF THE AMOUNT OF OIL	13
2-5-2	RELATION BETWEEN PLUNGER STROKE	13
2-5-3	OIL CONSUMPTION	14
2-5-4	GASOLINE-TO-OIL RATIO	15
2-6	INSPECTION AND MAINTENANCE	15
2-6-1	PUMP SETTING	16
2-6-2	LETTING AIR OUT OF THE PUMP	16
2-6-3	DISASSEMBLING AND ASSEMBLING	16
2-7	OIL FOR YAMAHA AUTOLUBE	18

CHAPTER 3	ENGINE	19
3-1	GENERAL DESCRIPTION	19
3-2	DISASSEMBLING AND ASSEMBLING THE ENGINE	19
3-2-1	DISASSEMBLING	19
3-2-2	ASSEMBLING	21
3-3	INSPECTION AND REPAIR OF THE	
	PART OF ENGINE	22
3-3-1	CYLINDER, PISTON AND PISTON HEAD	22
3-3-2	CRANK ASSEMBLY	24
3-3-3	ROTARY VALVE AND VALVE COVER	25
3-3-4	PRIMAARY REDUCTION AND CLUTCH	26
3-3-5	TRANSMISSION, SHIFTER AND KICK CRANK	28
3-3-6	CRANKCASE	32
3-3-7	AIR CLEANER AND CARBURETOR	33
CHAPTER 4	FRAME	36
4-1	A7 FRAME FEATURES	36
4-2	INSPECTION AND REPAIRING THE MAIN PARTS	36
4-2-1	FRAME	36
4-2-2	STEERING HANDLES AND WIRES	37
4-2-3	FRONT FORK	38
4-2-4	REAR CUSHION UNIT	39
4-2-5	FUEL TANK AND SADDLE	40
4-2-6	OTHER IMPROVEMENTS	40
CHAPTER 5	ELECTRICAL SYSTEM	41
5-1	ELECTRICAL PARTS	41
5-2	STARTER DYNAMO	42
5-3	REGULATOR	44
5-4	IGNITION COIL	45

5-5	SPARK PLUG	46
5-6	BATTERY	47
CHAPTER 6	INSPECTION AND MAINTENANCE	49
6-1	PERIODICAL INSPECTION.....	49
6-2	PERIODICAL INSPECTION CHART	49
6-3	INSPECTION AND MAINTENANCE OF THE MAIN PARTS.....	49
6-3-1	ENGINE	49
6-3-2	FRAME	51
6-3-3	ELECTRICAL SYSTEM	52
6-4	NECESSARY TOOLS AND TESTERS FOR INSPECTION AND MAINTENANCE	53

CHAPTER 1 YAMAHA A7 FEATURES AND SPECIFICATIONS

1-1 A7 FEATURES

(1) YAMAHA AUTOLUBE

The Auto-Lube, depending on the engine RPM and load, controls and forces the oil to the engine by means of the precision-machined pump. It has greatly improved the 2-cycle engine in performance.

(2) HIGH-PERFORMANCE ROTARY VALVE ENGINE

Yamaha's famous 2-cycle rotary valve engine develops more than 65 MPH with fast pick-up. In addition, it keeps RPM steady when going up hills or at slowest speed.

(3) 4-SPEED TRANSMISSION

Yamaha's 4-speed transmission always runs smoothly without any knock or noise at any speed.

(4) ELECTRIC-STARTER DYNAMO AND CARBURETOR WITH BUILT-IN STARTER

Yamaha's exclusive carburetor with built-in starter plus the powerful electric-starter dynamo start the engine easily in cold weather.

(5) RELIABLE BRAKES

The dust and water-proof brake drums proven on all Yamaha models assure you of having effectively working brakes even on rainy days or on dusty roads.

(6) FINE DRIVING COMFORT

The riding position based on years of scientific research keeps balance and steering perfect all the time, even on bad roads or sharp curves. Driving is always smooth and never tiring on rough roads.

The frame is of a pressed steel monocoque construction that excels in strength and rigidity.

(7) LARGE-SIZED, BRIGHT LIGHTS

The larger and brighter head light, tail light and flasher lights ensures additional safety for the rider when driving the night.

1-2 A7 SPECIFICATIONS

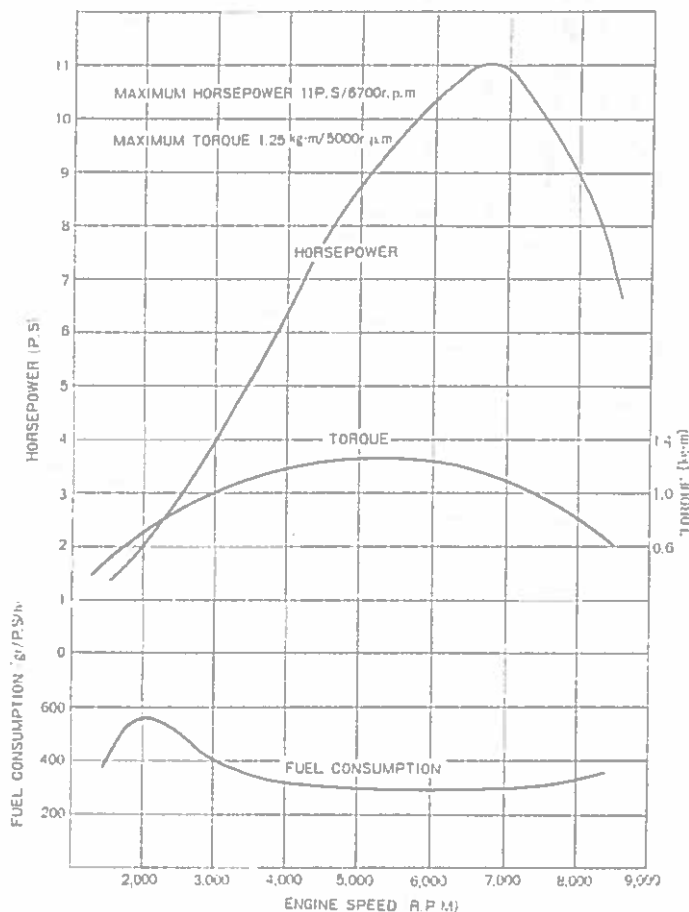
NAME		YAMAHA		
MODEL		A 7		
DIMENSIONS	Overall length	1880mm	(74in)	
	Overall width	745mm	(29.3in)	
	Overall height	1045mm	(41.1in)	
	Wheelbase	1240mm	(48.8in)	
	Minimum road clearance	135mm	(5.3in)	
WEIGHT	Weight net	110kg	(243 lbs)	
	Seating capacity	2 persons		
PERFORMANCE	Maximum speed range	100~110km/h (65~70mph)		
	Fuel consumption	65km/l at 40km/h		
	Climbing ability	20°		
	Braking distance	7.5m or less at 35km/h (23ft/22mph)		
	Minimum turning radius	1980mm	(78in)	
ENGINE	Model	2-cycle, gasoline		
	Lubricating system	Yamaha Auto Lube, automatic lubr.		
	Cooling system	Air-cooled		
	Number of cylinder	1		
	Displacement	123c.c.		
	Bore x stroke	56 x 50mm		
	Compression ratio	6.8:1		
	Maximum torque	1.25kg-m/5000rpm		
	Min. fuel consumption at full load	280g/ps/h/5750rpm		
	Starting system	Self-starter and kick starter		
IGNITION	Ignition system	Battery ignition		
	Igniting timing	2.0 ± 0.15mm before upper dead point		
	Starting system	Self-starter dynamo		
	Spark plug	NGK B-7HZ		
	Angular advance	19°		
Point gap	0.3 to 0.35mm			
STARTER DYNAMO	Manufacturer	Hitachi		
	Generator	DC shunt		
	Output	100W/14V at 1,750rpm		
	Model	GS 113-02		
	Voltage regulator	"Tirril" Type		
BATTERY	Manufacturer	Furukawa, or Nippon Denchi		
	Model	SPT-12, or MW3-12		
	Capacity	12V 10AH		
CARBURETOR	Manufacturer	Mikuni		
	Model	VM 22 SC		
AIR CLEANER	Drv. paper-filter			
TANK CAPACITY	Gasoline tank	9.0 liters	(2.4 gal)	
	Oil tank	1.7 liters	(1.8 us qt)	
CLUTCH	Type	Wet, multiple disk		
	Primary reduction	Helical gear		
	Primary reduc, ratio	3.833		
TRANSMISSION	Type	Constant, mesh, 4-speed		
	Gear ratio	Low	2.533	
		Second	1.524	
		Third	1.120	
		Top	0.828	
FINAL DRIVE	Type	Chain		
	Reduction ratio	2.600		
FRAME	Backbone type monocoque			
SUSPENSIONS	Front	Telescopic fork		
	Rear	Swinging arm		
SHOCK ABSORBER	Front	Coil spring & oil damper		
	Rear	Coil spring & oil damper		
STEERING & WHEEL	Steering angle	45° x 2		
	Caster	64°		
	Trail	85mm	(3.3in)	

TIRE SIZE	Front	3.00-16-4PR
	Rear	3.00-16-4PR
BRAKE	Type	Internal expanding
	Front	Hand operated wire
	Rear	Foot operated, rod.
BULBS	Headlight	35WD, 12 to 16V
	Taillight	8W
	Stop light	20W
	Direction signal	8W x 4
	Pilot lamp	3W

1-3 A7 PERFORMANCE CURVES

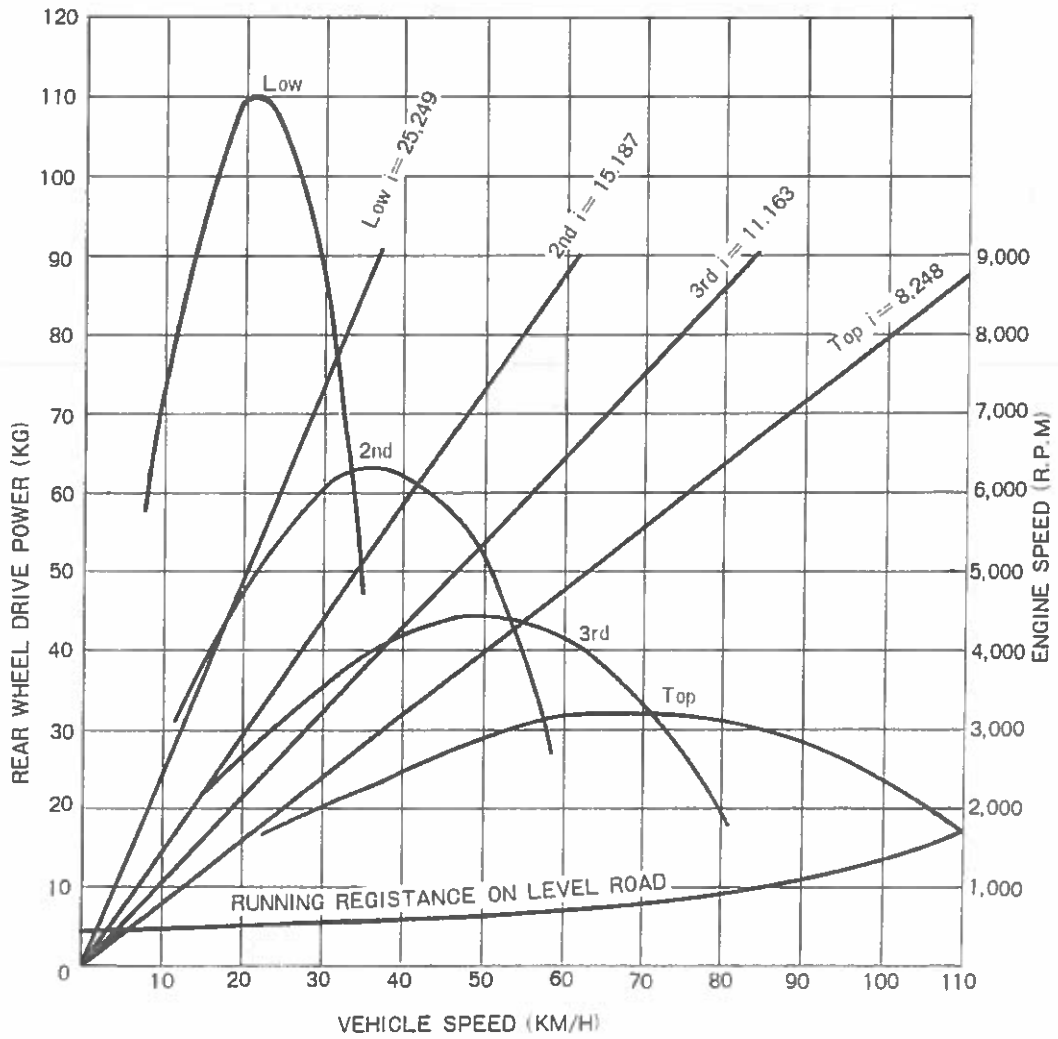
(1) ENGINE PERFORMANCE CURVES

125 A7 ENGINE PERFORMANCE CURVES



(2) DRIVING PERFORMANCE CURVES

125A7 DRIVING PERFORMANCE CURVES



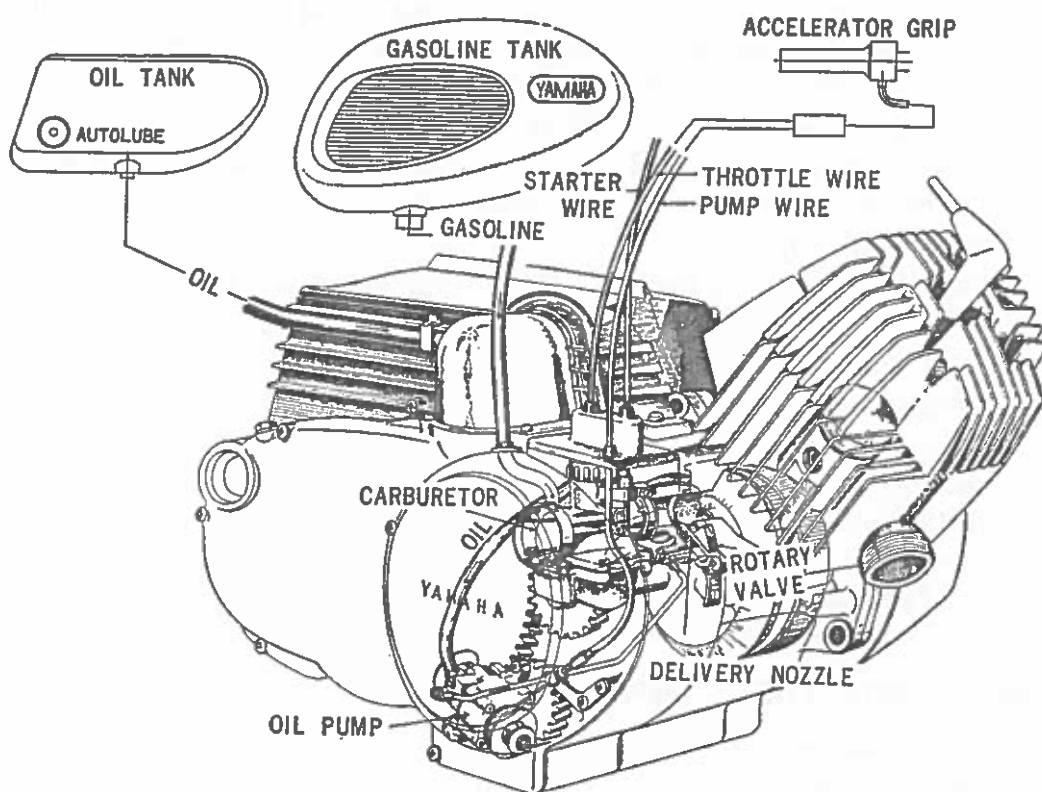
CHAPTER 2 YAMAHA AUTOLUBE

2-1 WHAT IS THE YAMAHA AUTOLUBE ?

Yamaha Auto-Lube is an automatic lubricating device for 2-cycle engines, developed by Yamaha Technical Research Institute.

It controls the amount of oil depending both on the engine RPM and on the load under any operating conditions and forces the proper amount of oil to the engine all the time by means of the precision-machined pump. As a result, the new Yamaha 2-cycle engine does not use the gasoline-oil mixture that other makers' engines must do. It is the first time in the world that such a device was applied to the production model of 2-cycle engine.

The Yamaha Auto-Lube is the best of the lubricating systems for 2-cycle engines.



2-2 AUTOLUBE FEATURES

The conventional lubricating system uses the gasoline-oil mixture in the fixed ratio of 20 : 1. This ratio was determined on the basis that it would not cause lack of oil at top speed and full throttle.

The operation test shows that the ratio of 60 : 1 to 80 : 1 is sufficient for

driving 40 to 60 km/h with the throttle in $\frac{1}{5}$ to $\frac{1}{4}$ open position and that even 120 : 1 is sufficient for idling at low RPM with throttle in $\frac{1}{8}$ open position or closed. Therefore, if the gasoline-oil mixture is used in the fixed ratio of 20 : 1 regardless of the speed and the throttle, it leads to excessive oiling except when driving at full throttle.

Since the Auto-Lube controls the amount of oil, according to engine need, the engine is freed from any troubles caused by excessive oiling.

In addition, it improves performance, because the new fresh oil is always applied to the lubrication surfaces.

It is superior to the circulating lubrication of 4-cycle engines.

FEATURES AND ADVANTAGES

(1) THE PROPER AMOUNT OF OIL IS ALWAYS APPLIED UNDER ANY OPERATING CONDITIONS

A EXCELLENT LUBRICATION

The fresh oil is always delivered from the oil tank to the engine (in 4-cycle engine, the oil is circulating) and there is less oil entering the combustion chamber because of larger particles.

B LESS CARBON ACCUMULATION

The spark plug, piston, cylinder, rings, muffler and other parts are coated with less carbon. The engine has been greatly improved in performance and durability.

C ECONOMY OF OIL

The Autolube gets about 2,000km (1,400 mile) per liter. The oil consumption is $\frac{1}{3}$ or less of the conventional lubricating system that uses the gasoline-oil mixture.

D LESS EXHAUST GAS

There is less oil entering the combustion chamber together with gasoline.

E IMPROVEMENT IN ENGINE PERFORMANCE

The combustion efficiency has been heightened and the engine has been greatly improved in steadiness at the slowest speed and pick up.

(2) SIMPLIFIED FUEL SUPPLY

It is not necessary to mix with gasoline. Just fill the fuel tank with gasoline only.

The tank and the carburetor have been freed from any troubles caused by the oil.

(3) DEPENDABLE LUBRICATION

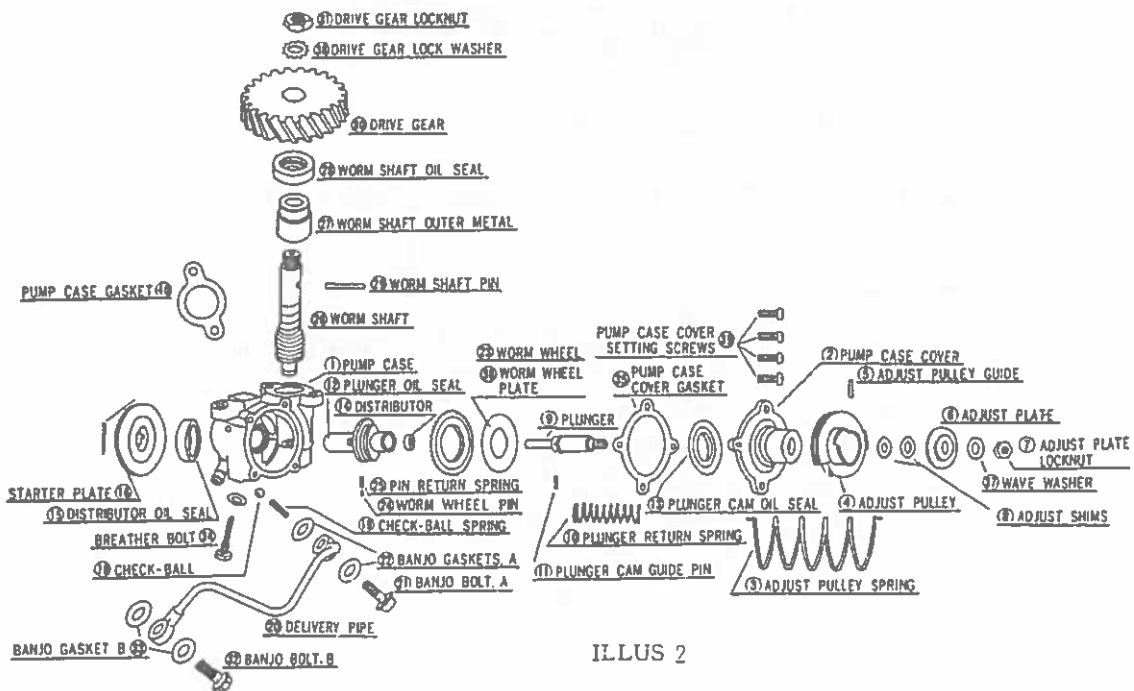
The user has no worry about the incorrect gasoline-to-oil ratio and the quality of oil.

2-3 CONSTRUCTION

2-3-1 PUMP FEATURES

The oil pump is a kind of engine-driven plunger pump used together with a cylindrical distributor.

- (1) The amount of oil to be delivered is controlled, depending on not only the engine RPM but also the carburetor throttle.
- (2) The amount of oil to be delivered is adjustable.
- (3) The pump can be operated by hand for adjustment purposes.
- (4) Air, if it enters the unit, can be completely removed.

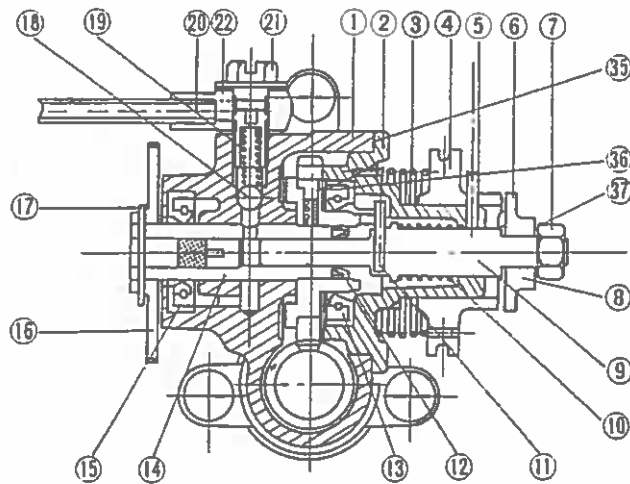


ILLUS 2

2-3-2

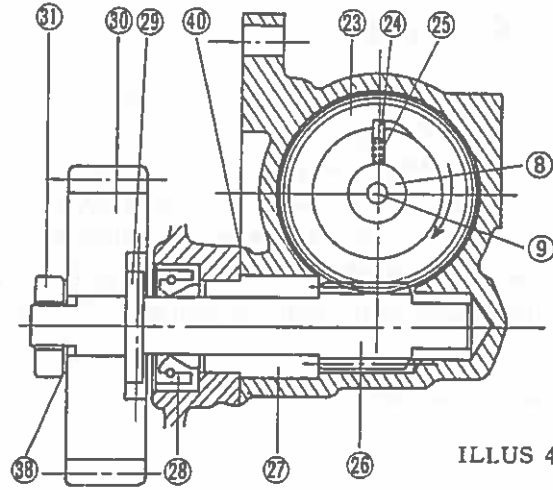
PUMP ASSEMBLY

- (1) EXPLODED VIEW OF AUTOLUBE PUMP
- (2) ASSEMBLY DRAWINGS
- 2a) SECTIONAL VIEW OF PUMP ASSEMBLY



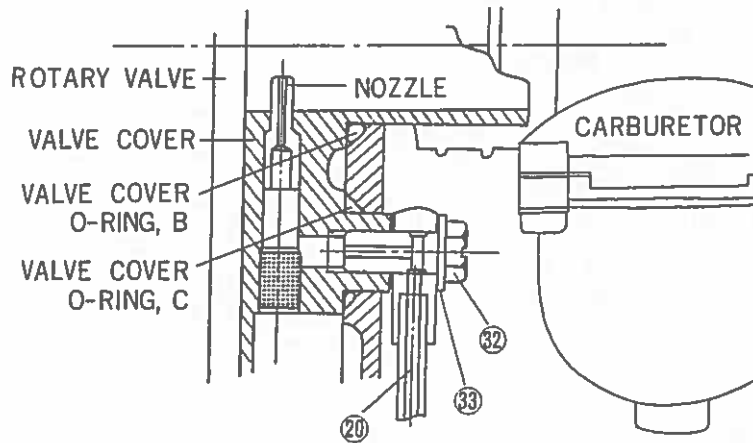
ILLUS 3

2b) SECTIONAL VIEW OF PUMP-DRIVING SECTION



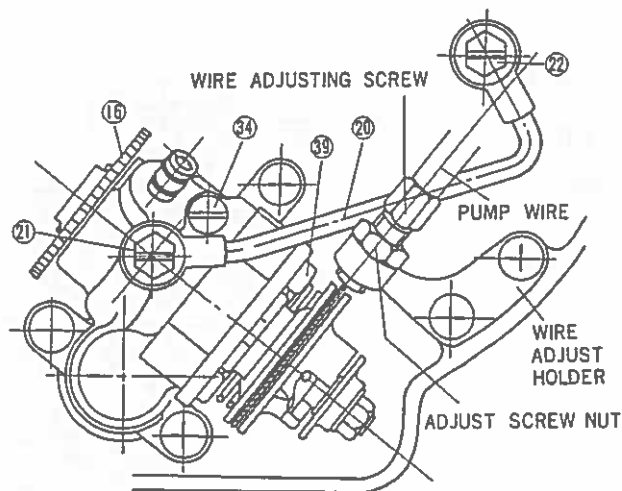
ILLUS 4

2c) SECTIONAL VIEW OF OIL-DELIVERING SECTION



ILLUS 5

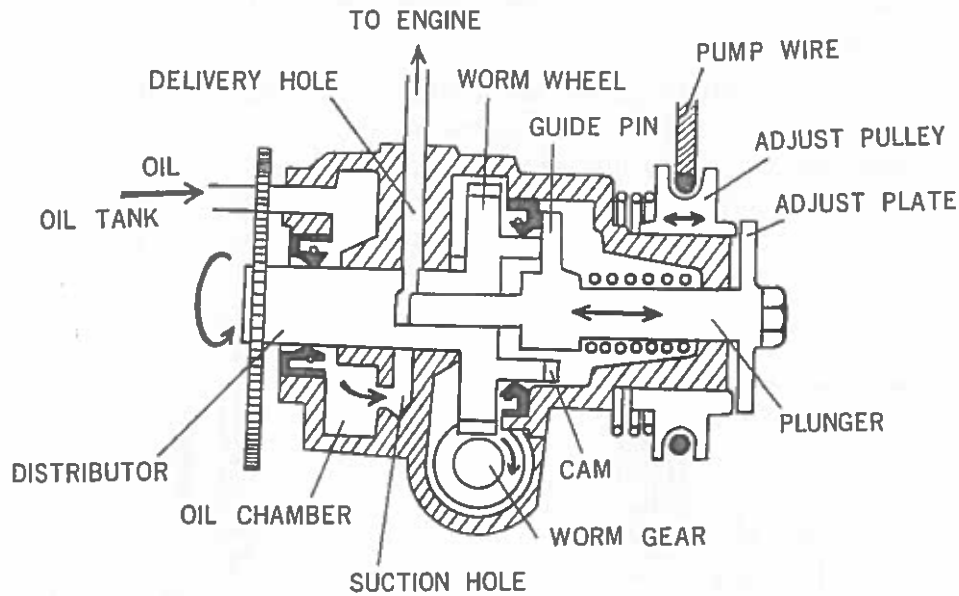
2d) PUMP FITTING



ILLUS 6

2-4 PUMP MECHANISM

2-4-1 PUMP MECHANISM



ILLUS 7

- (1) The motive force is transmitted through reduction gears from the crank shaft of the engine to the worm gear, which rotates the worm wheel and the distributor as a unit.

$$\text{RPM OF DISTRIBUTOR} = \frac{\text{REDUCTION GEAR (18)}}{\text{DRIVE GEAR (23)}} \times \frac{\text{WORM GEAR (1)}}{\text{WORM WHEEL (36)}} = \frac{1}{46}$$

- (2) An oil hole in the distributor opens and closes the suction hole, and the delivery hole alternately.
- (3) In order to let oil in or out, the plunger moves alternatively back and forth along the cylinder cam, while the distributor rotates.
- (4) The plunger stroke is regulated by means of the accelerator grip.

As described above the Auto-Lube functions depending not only on the RPM of the engine but also on the turning of the accelerator grip so the oil is always delivered properly under any operating conditions.

$$\text{DELIVERY OF OIL} = (\text{PLUNGER CAPACITY}) \times (\text{PUMP RPM}) \times (\text{PLUNGER STROKE})$$

$$Q = \frac{\pi d^2}{4} \times N \times \ell$$

2-4-2 MAIN PARTS AND THEIR FUNCTION

(1) OIL PASSAGE

An oil pipe carries oil from the oil tank into the oil chamber of the pump case and, by action of the plunger, the oil is drawn into the oil chamber of the distributor through the suction hole in the pump case.

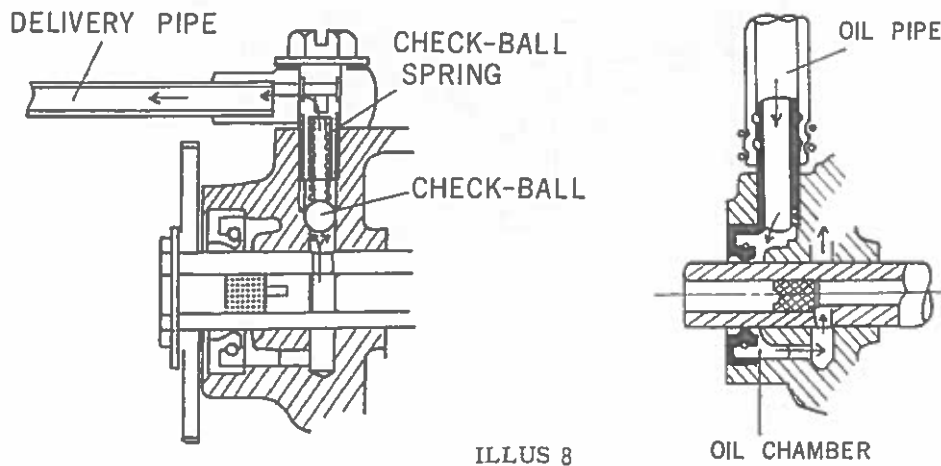
The oil, to which the pump pressure is applied, pushes up the check-ball and spring to enter the delivery pipe, which carries it to the nozzle in the rotary valve cover.

Lastly, it is delivered to the intake passage through the nozzle.

(2) CHECK-BALL

The check-ball keeps the pump delivery pressure constant, regardless of the fluctuation of pressure in the suction passage, and stabilizes the performance of the pump.

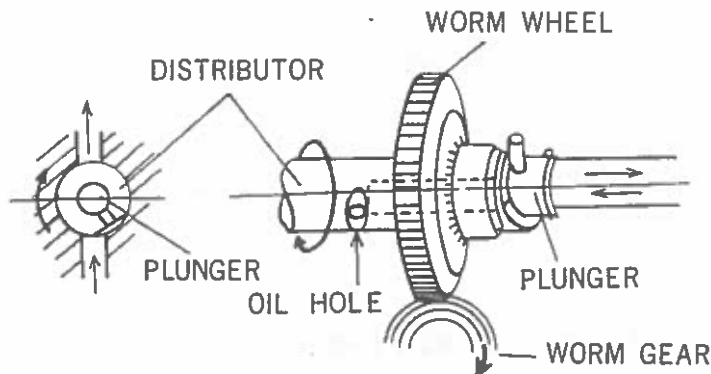
While the engine is not action, the check-ball prevents oil from leaking out of the clearance between the pump case and the distributor.



ILLUS 8

(3) DISTRIBUTER AND PLUNGER

The distributor is driven and rotated by the worm gear. As the distributor rotates, it alternately opens, then closes the suction and delivery holes.



ILLUS 9

The plunger, whose guide pin is pressed against the plunger cam by the plunger return spring, moves alternatively back and forth according to the shape of the cam, with which the distributor rotates as a unit.

(4) RELATION BETWEEN THE PLUNGER STROKE AND THE THROTTLE (ACCELERATOR WIRE)

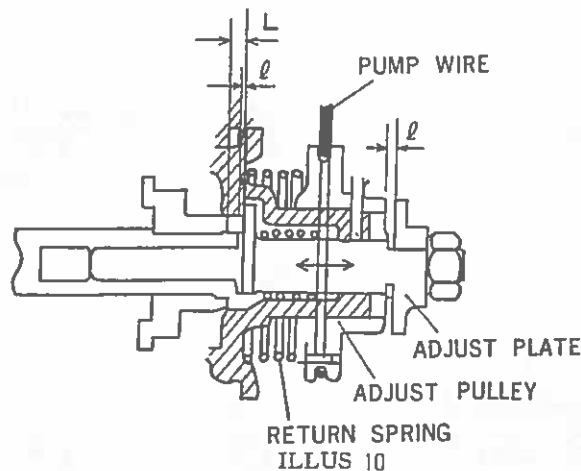
The amount of oil to be delivered is controlled in proportion to the engine RPM and, at the same time, the plunger stroke is regulated by turning the accelerator grip.

The plunger stroke is equal to the clearance between the adjusting plate on the right side of the plunger and the adjust pulley fitted around the pump case. The clearance is controlled by means of the accelerator grip as.

- a) The accelerator grip pulls the pump wire while turned;
- b) The pump wire rotates the adjust pulley;
- c) The plunger cam guide pin moves the pulley to the left by height of the plunger cam and the clearance is widened.

L, height of plunger cam. 2.0mm ($\ell = L = 2.0\text{mm}$ at max. stroke and full throttle)

ℓ , clearance between adjust plate and pulley; \textcircled{A} 0.20~0.25% at min. and less than $\frac{1}{5}$ throttle.



NOTE : The plunger cam guide pin is contact with the section ℓ but not with the section $L (L - \ell)$ of the plunger cam.

(5) BREATHER BOLT AND STARTER PLATE

The breather bolt (34) is used to let the air out of the pump. Remove the bolt and the oil flows from the oil chamber into the worm gear case through the oil hole at the top of the oil chamber and runs over through the breather bolt hole.

The starter plate (16) fitted around the distributor is used to drive the pump not by the engine but by hand.

Turn it in the specified direction by hand and the pump works.

2-4-3 DISTRIBUTOR-PLUNGER MECHANISM

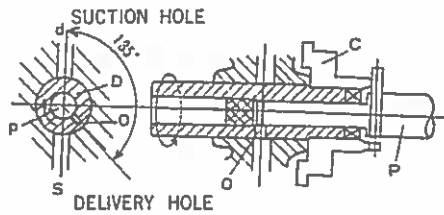
NOTATION : D : Distributor
O : Oil hole

P : Plunger
S : Suction hole

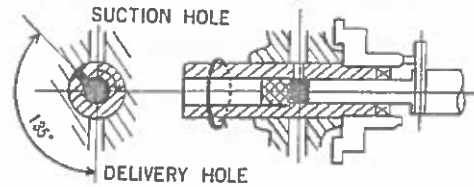
C : Cylindrical cam
D : Delivery hole

SUCTION STROKE

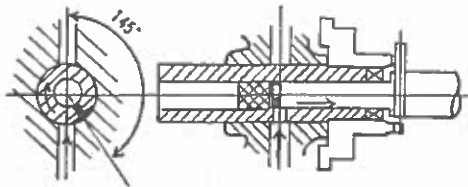
DELIVERY STROKE



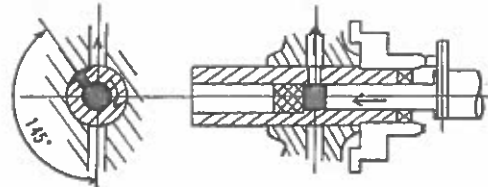
1 Plunger is not in action; Suction hole is going to be opened.



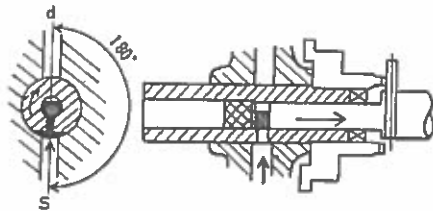
6 Plunger is not in action; Delivery hole is going to be opened.



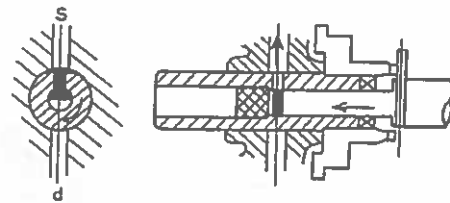
2 Plunger moves back or let oil in.



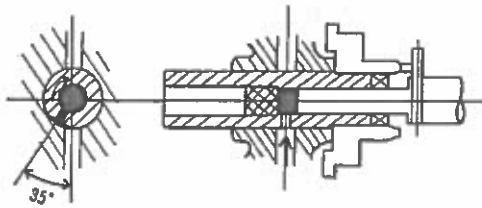
7 Plunger moves forth to let oil out.



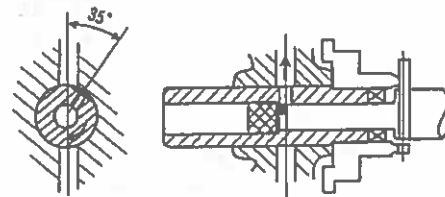
3 Plunger goes on moving back; Suction hole is fully opened.



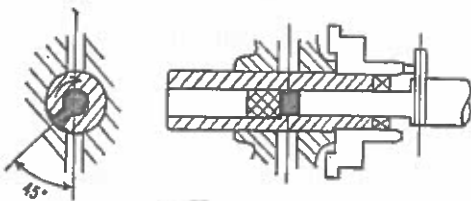
8 Plunger goes on moving forth.



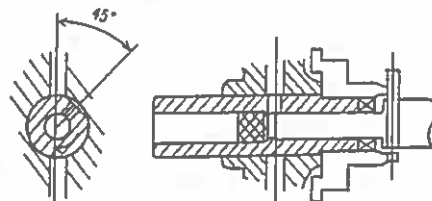
4 Plunger stops; Suction hole is still slightly opened



9 Plunger stops; Delivery hole is still slightly opened.



5 Plunger is not in action; Suction hole is closed.



10 Plunger is not in action; Delivery hole is closed.

2-5 PERFORMANCE

2-5-1 CONTROL OF THE AMOUNT OF OIL

If the plunger stroke is fixed, the amount of oil delivered is in proportion to engine RPM:

$$Q, \text{ cc/h} = \frac{\pi d^2}{4} N$$

Where d : diameter of plunger;
 N : engine RPM.

As described above, if the plunger stroke is fixed, the amount of oil depends only on the engine RPM or speed regardless of city driving, hill climbing and other various driving conditions.

If the amount of oil is fixed on the basis of high-speed running, it will turn excessive for driving at slow speed.

On the other hand, if it is fixed on the basis of low-speed running, it will lead to lack of oil or may cause the engine to scorch at top speed.

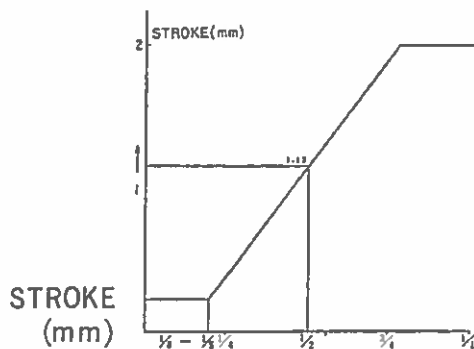
In order to prevent these troubles, the Auto-Lube has been designed to control the amount of oil depending not only on the engine RPM but also on the plunger stroke. According as the throttle is opened more widely, the plunger stroke becomes larger:

$$Q, \text{ cc/h} = \frac{\pi d^2}{4} N \times \ell \times \frac{60}{1,000} \quad (N = \frac{n}{i})$$

where ℓ : plunger stroke; n : crank RPM i : total reduction ratio = 46

2-5-2 RELATION BETWEEN PLUNGER STROKE & THROTTLE

The relation *between the throttle, speed, engine RPM and stroke is given below:



THROTTLE	SPEED, km/h	ENGINE RPM	STROKE, mm
1/6	52	3300	0.22
1/5	64	4300	0.22
1/4	47	5300	0.38
1/3	77	6100	0.64
1/2	88	7000	0.15
3/4	91	7200	1.94
1/2	93 or over	7400	2.00

* Driving on paved level road with normal riding position and gear in Top.

2-5-3 OIL CONSUMPTION

Fig. 3 is given by the expression $Q = \frac{\pi d^2}{4} N \times \ell \times \frac{60}{1000}$

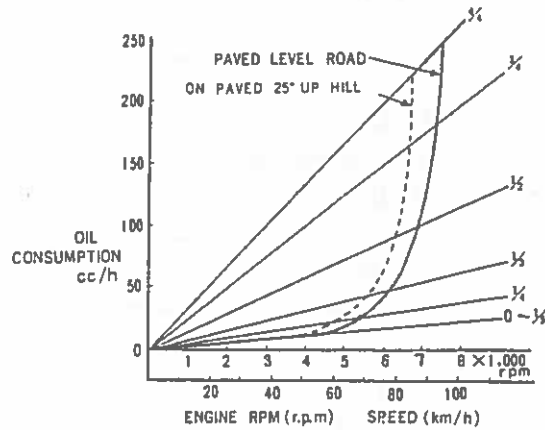


Fig 3

As shown in Fig. 3, the same speed does not always require the same amount of oil.

The oil consumption for climbing a hill is much more than that for driving on a paved level road because of more opened throttle.

Under the normal driving condition, the engine uses up 8 c.c./h at 40km/h.

If the throttle is opened 1/3 for pick-up, the oil consumption reaches about 25c.c./h at the moment.

Since the engine RPM increases with acceleration, further amount of oil is necessary.

Other factors which affect the oil consumption are the gear, load, riding position, road conditions, etc.

2-5-4 GASOLINE - TO - OIL RATIO

The gasoline-to-oil ratio for driving on a paved level road with the gear in top varies as shown in Fig. 4:

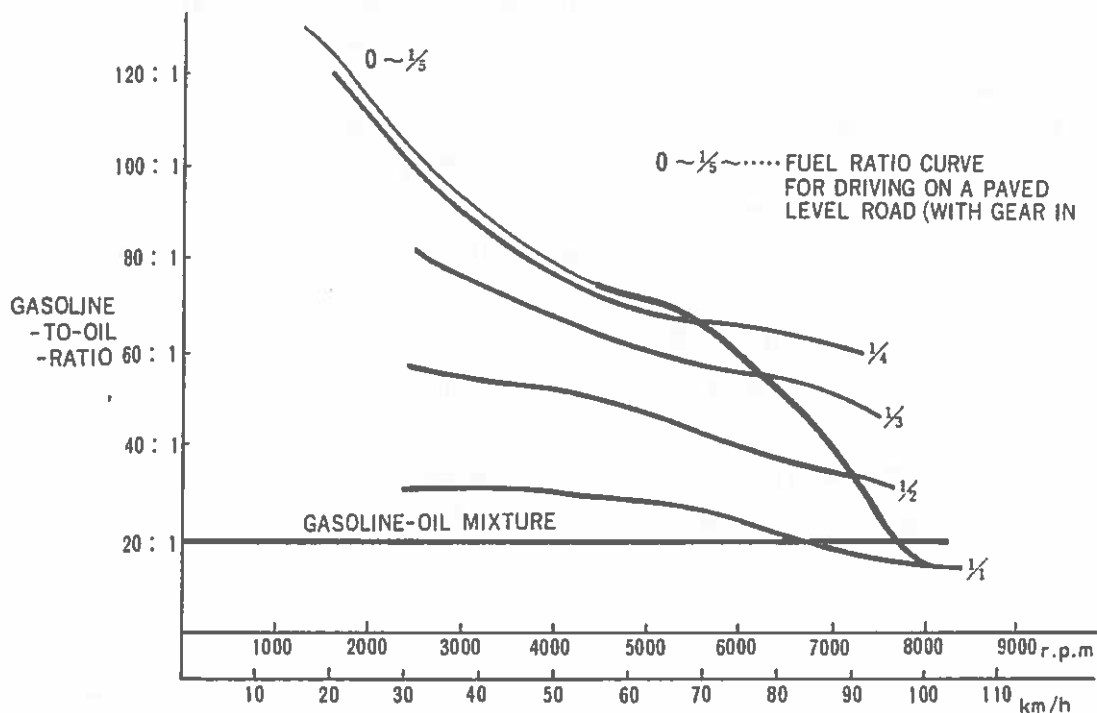


Fig 4

Fig. 4 shows that an excessive oil condition exists at low rpm when a constant 20:1 gas-oil ratio is used.

At top speed (more than 7700rpm), the fuel/oil ratio is about 18:1 (Fig. 4). This prevents the engine from overheating or scorching. At less than 1/5 throttle, the plunger stroke is fixed as shown in Fig. 2, even if the throttle is suddenly closed. This means there is no lack of oil, even if the engine is used as a brake for a long time.

2-6 INSPECTION AND MAINTENANCE

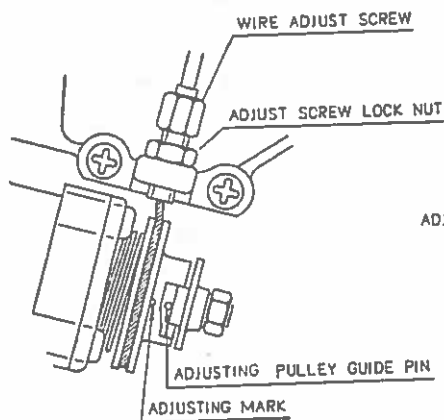
The oil pump is free from any troubles, if it is cared for properly. The unit should be removed, disassembled or assembled with special care, because it consists of a number of precision-machined parts. When mounting the engine, be sure to let air out of the pump and adjust the plunger strokes as described below:

2-6-1 PUMP SETTING

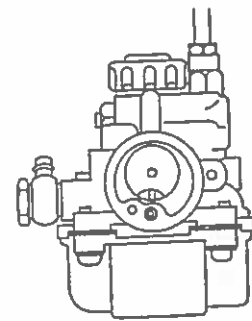
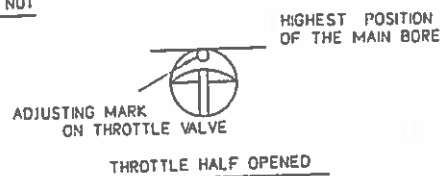
- (1) The correct plunger stroke is \textcircled{A} 0.20~0.25 when the engine is idling with the adjusting pulley in full open position.
After assembling, drive the pump by operating the starter plate by hand and adjust ℓ to be \textcircled{A} 0.20~0.25 by means of the adjusting shim.

NOTE: Every pump assembly has been adjusted at the Yamaha factory.

- (2) At $\frac{1}{2}$ throttle, a V-mark on the adjusting pulley should be aligned to the adjusting pulley guide pin as follows:
 - A) After mounting the pump on the engine, connect the pump wire;
 - B) As shown in the Illust. No. 12, set the adjusting mark on the thorttle valve to the highest position of the main bore of the carburetor.
Then the throttle is just half opened.
 - C) Make sure the plunger stroke is \textcircled{A} 1.15mm.



ILLUS 11



ILLUS 12

2-6-2 LETTING AIR OUT OF THE PUMP

To let air out of the pump, remove the breather bolt and then turn the starter plate clockwise until oil runs over through the breather bolt hole or start the engine and let it run idle.

2-6-3 WHEN DISASSEMBLING AND ASSEMBLING

- (1) When disassembling, be careful not to scratch the lip of each oil seal, case-to-distributor surfaces, distributor-to plunger surfaces, plunger cam guide pin and the groove in the pump case cover.

(2) When assembling:

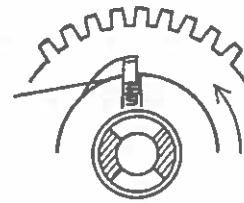
A) Be sure to apply grease to the lip of the oil seals.

Attach them correctly:

- 1 Distributor oil seal should not be out of the case end;
- 2 Plunger oil seal should be inserted more than 3.2mm from The plunger cam face;
- 3 Plunger cam oil seal should be out of the pump case cover end.

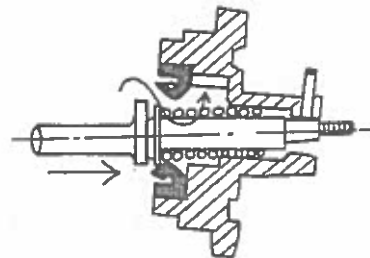
B) Apply the Auto-Lube oil between the distributor and the pump case. Make sure the distributor turns smoothly.

C) The wheel should be attached as illustrated right. Make sure the pin on it works normally.



D) The plunger cam guide pin should be well fitted into the guide groove in the pump case cover.

E) Be careful not to tighten the adjust plate locknut excessively. Stop tightening as soon as the wave of the lock washer is flat.



F) After oiling the distributor and the plunger, apply the Yamaha Bond #3 to the packing between the pump cases.

Tighten 4 bolts evenly.

G) Check, by turning the starter plate, whether the plunger stroke is correct. The correct stroke is 0.20~0.25.

H) Clean and then attach the delivery pipe, banjo bolt, banjo gasket, check-ball and spring.

(3) When mounting the pump on the engine

A) Apply grease to the worm shaft oil seal.

B) Be careful not to scratch the teeth of the drive gear.

C) Apply Yamaha Bond #2 or Three-Bond to the pump case and gasket and then tighten 2 bolts evenly.

D) After connecting the pump wire and the oil pipe, let air out of the pump by removing the breather bolt.

E) Adjust the plunger stroke (See-6-7-1 "PUMP SETTING")

-
- (4) After mounting, check the pump for oil leaks.

2-6-4 CHECK POINTS AFTER MOUNTING

After mounting the pump on the engine, start the engine and check as follows:

- (1) Check whether the starter plate rotates slowly and smoothly.
- (2) Check whether the adjusting plate moves back and forth by turning the accelerator grip.
- (3) Check whether the oil tank is filled with Auto Lube oil.
If the oil is below the level gauge, replenish with 1 liter oil. (0.2 gal.)

2-7 OIL FOR YAMAHA AUTOLUBE

The lubricating oil must have the properties as:

- 1 Strong oil film (excellent oiliness);
- 2 Less carbon accumulation;
- 3 Excellent purification.
- 4 Excellent flow in the lowest temperature.

Yamaha has examined various brands oil in the market and found "SHELL 2T" is one of the most suitable oil for Yamaha autolube.

NOTE: It is advisable to use motor oil of best brand in your market if "SHELL 2T" is not available. The average climates, SAE #30 motor oil is recommended. For operating conditions below 0°F, 10w-30w is recommended.

CHAPTER 3 ENGINE

3-1 GENERAL DESCRIPTION

The engine design is basically the same as the YA6, and as a result, almost all engine parts are similar in type to those for the YA6.

- Air Cleaner: Improvements have been introduced for easy removal and reinstallation and for better water-proofing.
- Clutch: Metal (bushing) bearings are employed for the primary driven gear shaft instead of ball-bearings (for the YA6), in order to reduce friction and noise.

3-2 DISASSEMBLING AND ASSEMBLING THE ENGINE

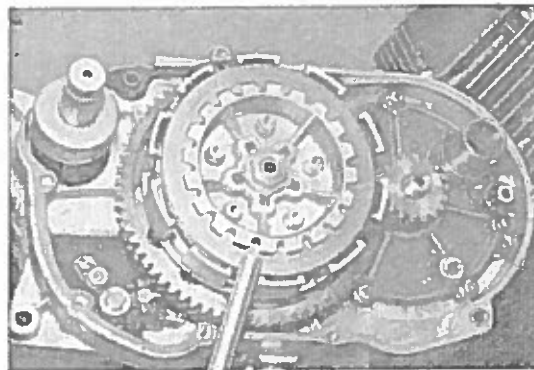
3-2-1 DISASSEMBLING

A REMOVING THE ENGINE

- (1) Removing the parts from the right side of the frame.
 - 1a) Remove the ring nut connecting the exhaust pipe with the cylinder by means of the ring nut turning tool.
 - 1b) Remove the foot rest fitting nut and then the foot rest.
 - 1c) Remove the carburetor cover, carburetor and pump wire. Prevent oil and gasoline from flowing out of the fuel pipe and oil pipe respectively.
 - (2) Removing the parts from the left side of the frame
 - 2a) Remove the shift pedal and then the left tankcase cover.
 - 2b) Disconnect the wire harness for starter dynamo.
Be sure to do the neutral switch wire. It is advisable to remove the dynamo and the armature at this time.
Use the armature puller.
 - 2c) Remove the chain case and then the chain. To make it easier to remove the transmission gear later on, remove the driving sprocket.
 - (3) Removing engine fitting parts.
 - 3a) Remove the air cleaner cover and then air cleaner.
 - 3b) Remove the engine fitting bolts (2 bolts) from the rear section of the engine and a bolt from the mount stay in the central section while holding the engine.
 - (4) Engine is removed from the frame. Be sure to drain the gear oil before removing the engine.
-

B REMOVING THE PARTS FROM THE RIGHT SIDE OF THE ENGINE

- (1) Remove the crank arm and the right crankcase cover.
- (2) Remove the oil pump and the banjo bolt from the delivery pipe. (or remove pump as a unit before removing the crankcase cover.)
- (3) Remove clutch assembly and the primary pinion.
- (4) Remove the valve unit, collar, rotary valve knock pin, and rotary valve.
- (5) Remove the shift lever, and the shifter ratchet wheel.
(See p. 28)



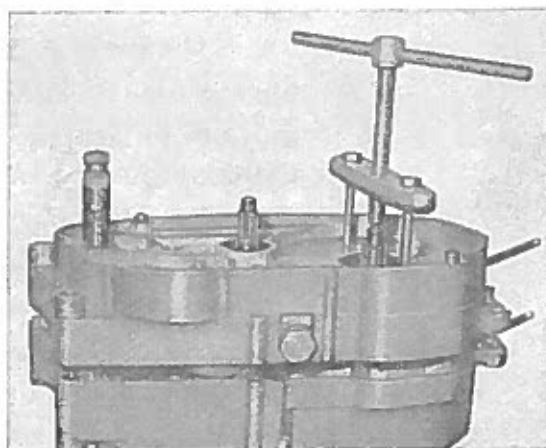
ILLUS 13

NOTE: The engine is disassembled with the kick cranking device left in place.
(See P. 29)

C REMOVE THE CYLINDER HEAD AND THEN CYLINDER PISTON

D DIVIDING THE CRANKCASE

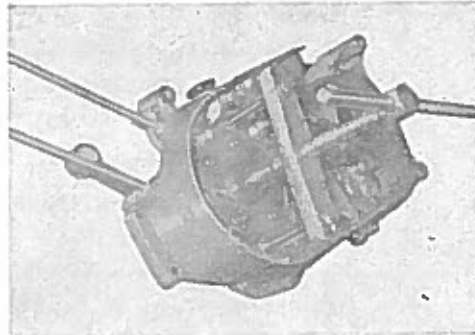
- (1) Remove the crankcase tightening bolts from the left side of the crankcase.
Be sure to loosen them alternatively in the crank section and the transmission section.
- (2) Divide the crankcase by using the crank case disassembling tool as shown in Illus. 14. Be sure to divide the crank section and the transmission section even with a hammer.



ILLUS 14

E REMOVING THE PARTS FROM THE LEFT CRANKCASE

- (1) Remove the transmission assembly (main axle and drive axle) and the shifter assembly at the same time. See p. 31
- (2) Remove the crank from the case by using the crankcase disassembling tool.



ILLUS 15

F REMOVE THE KICK-CRANKING DEVICE FROM THE RIGHT CASE.

3-2-2 ASSEMBLING

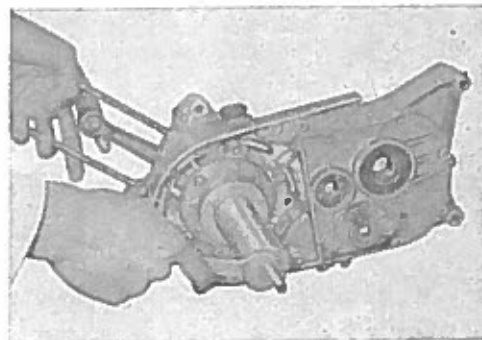
Assemble the engine in the reverse order of disassembling.

(1) NOTES ON ASSEMBLING

- 1a) Clean all the parts and check for wear.
- 1b) Especially check joint surfaces of the crankcase and the lip of each oil for wear or scratch with a special care.
- 1c) Apply grease to the lip of each oil seal; replace the O-ring, packings, gaskets etc.; and apply Yamaha Bond #5 to the joint surfaces of the crankcase and the O-rings and Yamaha Bond #5 to the joint surfaces of the crankcase and the O-ring and Yamaha Bond #2 to the packing.

(2) ASSEMBLING THE ENGINE

- 2a) Install the crank by using the crank fitting tool as shown in Illus. 16.
- 2b) Install the transmission assembly and the shifter assembly at the same time.
- 2c) Install the kick-cranking device.
- 2d) Joint the crankcases together. Apply Yamaha Bond #5 to the joint surfaces. After jointing, make sure the transmission, shifter, and crank function normally. Tighten the crankcase tightening bolts evenly and fully.
- 2e) Install the parts related to the valve, transmission, shifter and clutch on the outside of the right crankcase.
- 2f) Put the right crankcase cover on and install the pump.
- 2g) Install the piston, cylinder and cylinder head.
- 2h) Install the dynamo and adjust the ignition timing.



ILLUS 16

(3) MOUNTING THE ENGINE

Mount the engine on the body in the reverse order of removing. Before starting the engine, check and adjust the following points.

3a) Adjust the plunger stroke of the oil pump. (See p. 16)

3b) Let air out of the pump. (See p. 16)

3c) Adjust the clutch. (See p. 50)

3d) Apply gear oil to the transmission and the clutch
(See p. 33)

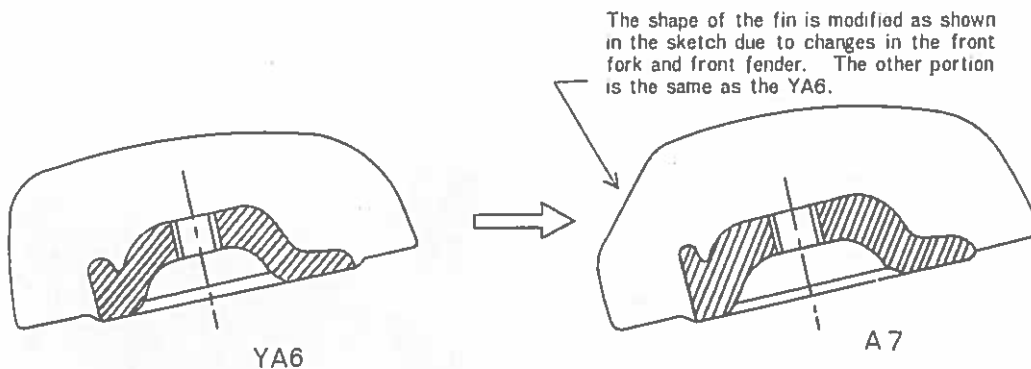
3e) Adjust the drive chain.

And then make a test run of the engine.

3-3 INSPECTION AND REPAIR OF THE PARTS OF ENGINE.

3-3-1 CYLINDER, CYLINDER HEAD, PISTON AND PISTON RING

The cylinder, piston and piston ring are similar in type to those for the YA6. The cylinder head is changed of the shape of the fin due to a change in the shape of the front fender, so that the cylinder head may be kept from contacting the front fender.



A INSPECTING AND REPAIRING

(1) INSPECTING AND REPAIRING THE CYLINDER

Check the cylinder for wear by measuring its inner diameter with an inside micrometer or a cylinder gauge at the measuring points as shown in Illus. 17.

1a) If there is a difference of more than 0.05 mm between the maximum and the minimum diameters, hone the cylinder.

1b) If there is a relatively big difference, rebore, and hone the cylinder.

1c) The finished size should be equal to the piston size (oversize) plus the clearance of 0.040 to 0.045 mm. (Asia.....0.030~0.035 mm)

1d) The allowable error in the finished diameter should be within 0.01mm at each measuring point.

1e) Be sure to round the corner of each port as shown in Illus. 18.

CAUTION: The original factory size of the cylinder bore should not be changed more than 0.5mm.

(2) The correct clearance between the piston and the cylinder wall is 0.040 to 0.045mm. (Asia 0.030~0.035mm)

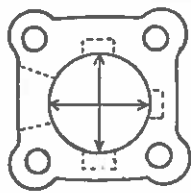
2a) To get a correct pair of the cylinder and the piston, measure the inner diameter of the cylinder at the measuring point D in Illus. 17 and the diameter of the piston 10 mm up from the bottom of the skirt.

NOTE: The size of the cylinder is marked on the skirt and the size of the piston is on the head.

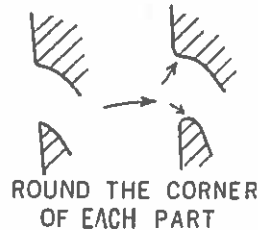
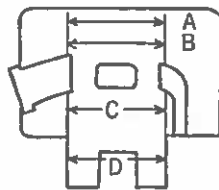
2) The pistons for replacement are:

Standard size 97, 98 and 99

Oversize 56.00, 56.25 and 56.50



ILLUS 17



ILLUS 18

(3) The correct piston ring clearance.

0.15 to 0.50 mm

3a) To measure the clearance, fit the ring into the skirt of the cylinder horizontally and use a thickness gauge.

3b) The piston rings for replacement are:

Standard size

Oversize 0.25 and 0.50

*First ring and second ring chrome-plated

B INSTALLING

(1) Install the second ring and then the first ring around the piston. Place the face marked with TP up.

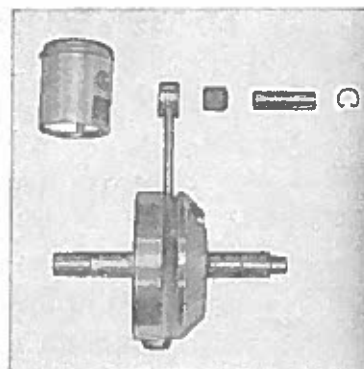
(2) Fit the piston onto the connecting rod with the arrow mark toward the front, and fit the pin and clip into the piston firmly.

(3) Make the knock pin and the ring clearance meet and install the cylinder.

3-3-2 CRANK ASSEMBLY

The crankshaft assembly is similar in type to that for the YA6. That is, both crankshaft and crank web are constructed into a one piece assembly. The crankshaft assembly consists of two crankshafts, right and left, connected with a crank pin, on which the connecting rod is mounted.

Needle bearings are used for both small and large ends of the connecting rod in order to improve the resistance to wear.



ILLUS 19

A INSPECTION AND REPAIR

(1) Connecting rod

1a) Check to see there is a proper play between the piston pin and the needle roller at the connecting rod small end.

If there is too much play, replace the needle roller and the piston pin.

1b) Check the connecting rod big end for wear by trying to sway the small end at the upper dead point.

If it moves more than 3 mm, replace the connecting rod, roller and crank pin. After replacement, there should be a sway of 0.8 to 1.0mm.

1c) The proper axial play of the connecting rod big end is 0.1 to 0.2mm.

(2) Crank assembly

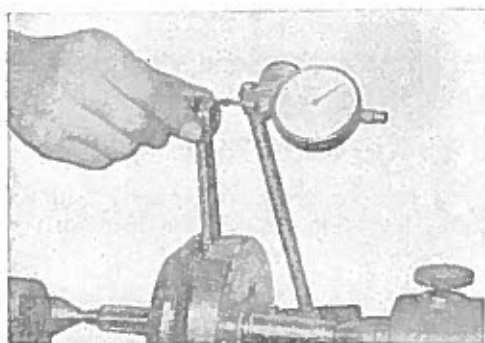
2a) Check the crank pin for wear. If the wear is more than 0.05 mm or there is any crack in the running surface of the roller, replace the crank pin and the roller.

Standard diameter : $24 \psi \begin{matrix} +0.004 \\ -0.005 \end{matrix}$

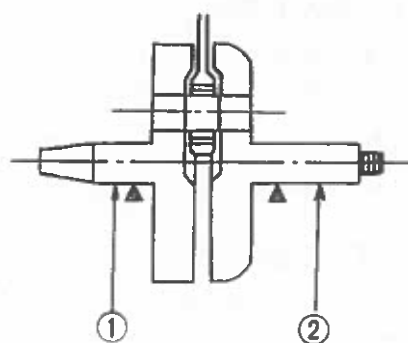
2b) Measure the crank assembly with a dial gauge:

Measuring Point	Reading, mm
1 *	0.05
2	0.05

* The figure is for the circled number in Illus. 21.

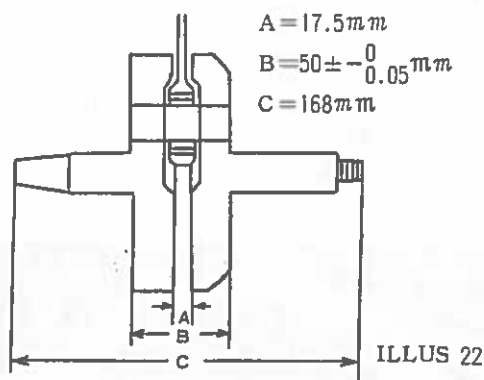


ILLUS 20



ILLUS 21

CRANK ASSEMBLY SPECIFICATIONS



ILLUS 22

B INSTALLING

After cleaning, install the crank as follows:

- (1) Attach one bearing cover around each of the right and left crank shafts to make a proper clearance of 0.15 to 0.2 mm between the crank and the crank case.

NOTE: Usually the bearing cover is not replaced. If the new one is necessary when the crank or the crankcase is replaced or reassembled its thickness should be determined by the expression:

$$\text{Thickness of bearing cover} = \frac{\text{Inner width of crankcase} - \text{width of crank assembly}}{2} - \text{Clearance (0.15 to 0.2mm)}$$

- (2) Install the crank to the left crankcase by using the crank fitting tool as shown in Illus. 16.
- (3) After installing make sure the crank turns smoothly.

3-3-3 ROTARY VALVE AND VALVE COVER

Both rotary valve and valve cover are similar in type to those for the YA6. Like other rotary valve engine models, the floating system is employed for the valve mechanism.

ROTARY VALVE

The rotary valve is made of asbestos cloth coated with phenolic resins to get freed from any troubles caused by heat and wear. It is rotated by means of the valve knock pin and the valve unit collar.

A INSPECTING

Place the valve on a flat plate and check it for bend, distortion, crack or wear. If there is any trouble in it, replace.

Thickness of valve : $4\text{mm} \begin{matrix} +0 \\ -0.05 \end{matrix}$; Repair limit : 0.4mm

CAUTION : Don't place the valve on a metal plate or in wet place, or it will be bent or distorted. After washing in gasoline, be sure to apply oil to it.

VALVE COVER

On the valve cover there is the inlet pipe connected directly with the carburetor. The delivery nozzle of the Auto Lube also is located here.

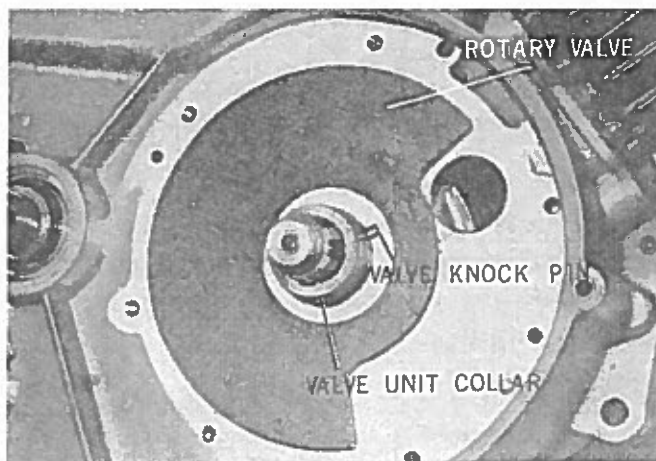
A INSPECTING AND INSTALLING

- (1) Insert the crank shaft O-ring between the valve unit collar and the crank shaft,

NOTE : Replace the O-ring whenever the valve unit is disassembled.

- (2) Check the valve cover O-ring for wear and defect. If it is faulty, replace.

- (3) To keep air tight, apply Yamaha Bond #5 to the O-ring before inserting.



ILLUS 23

3-3-4 PRIMARY REDUCTION AND CLUTCH

Like the YA6, the primary reduction employs a helical gear drive system. The clutch is similar in construction to that for the YA6, except for the main shaft bearings to which a slight modification is introduced.

CLUTCH ASSEMBLY

The clutch is of a multiple wet disc type. The clutch housing incorporates four molded cork friction plates and four clutch plates. Combined with the primary driven gear, it is held on the main shaft by means of the clutch boss.

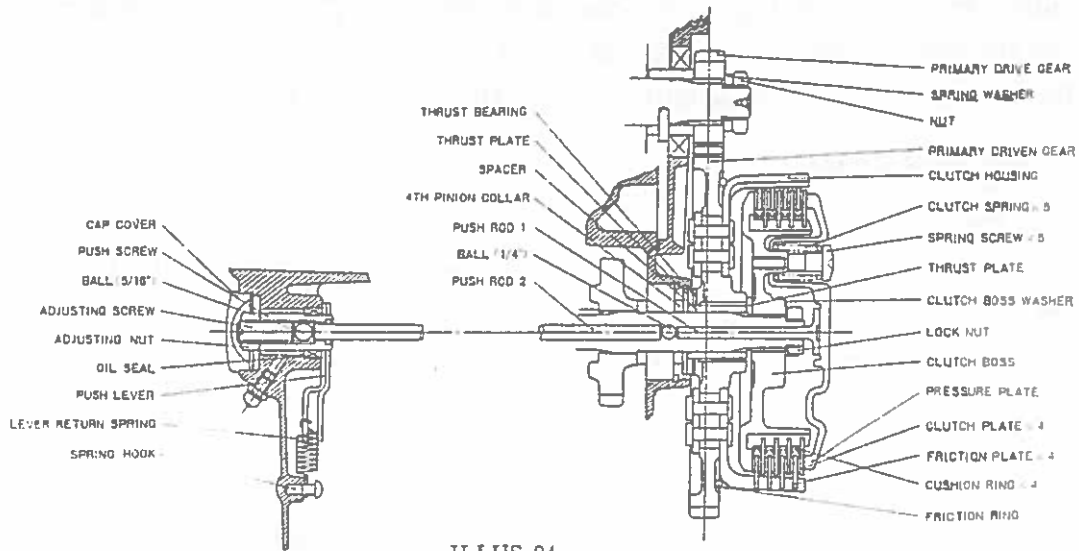
The clutch is disengaged by means of the inner push type push rod.

The difference in the clutch mechanism between the A7 and YA6 is the main shaft bearing system. It has been modified from the ball bearing type to the thrust bearing and metal (bushing) type in order to

reduce friction noise.

Accordingly, the related parts have changed in specifications, but the other parts are the same as before.

NOTE : For removal and reinstallation of the clutch, the clutch holding tool is used.



ILLUS 24

A ASSEMBLING

- (1) When securing the clutch boss, be sure to tighten the locknut bend a part of the clutch boss locknut washer and
- (2) Install the clutch plates and then the friction plates.
- (3) After inserting the push rod, cover it with the pressure plate.
- (4) Insert the 5 clutch springs and then tighten the spring hold screws with washers as shown in Illus. 24.

B INSPECTING AND REPAIRING

- (1) The correct thickness of the friction plate is 4.0 mm.
If it is reduced in thickness more than 0.3 mm, replace.



- (2) The correct free length of the clutch spring is 34 mm.
If it is reduced in length more than 3 mm, replace.



- (3) The correct clearance between the clutch housing and the friction plate is 0.2 mm.
If clearance is more than 0.4 mm, replace.



3-3-5 TRANSMISSION, SHIFTER AND KICK CRANK

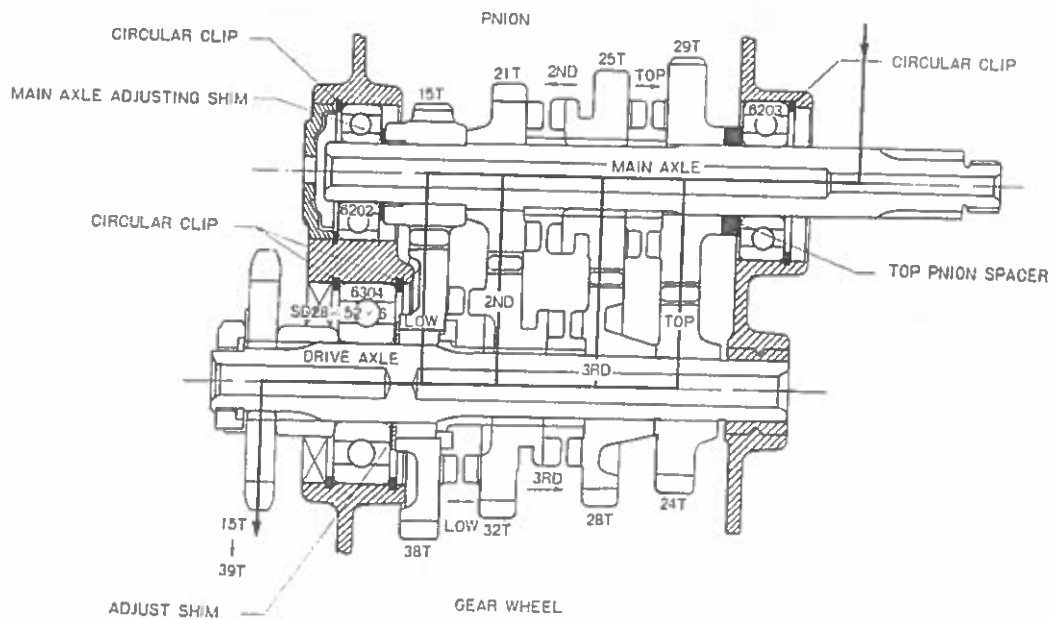
All these parts are similar in design to the YA6, except for some parts of the transmission. This is due to the disuse of the mainshaft spacer (collar) located right below the clutch housing. The spacer is inserted onto the main shaft in the case of the YA6.

The transmission is in constant mesh with four-speed forward.

TRANSMISSION

Since the primary reduction has been improved in driving system from the chain to the gear as described above, the drive sprocket of the transmission has been attached around the drive axle.

The clutch side of the main shaft is in the needle roller bearing.



ILLUS 25

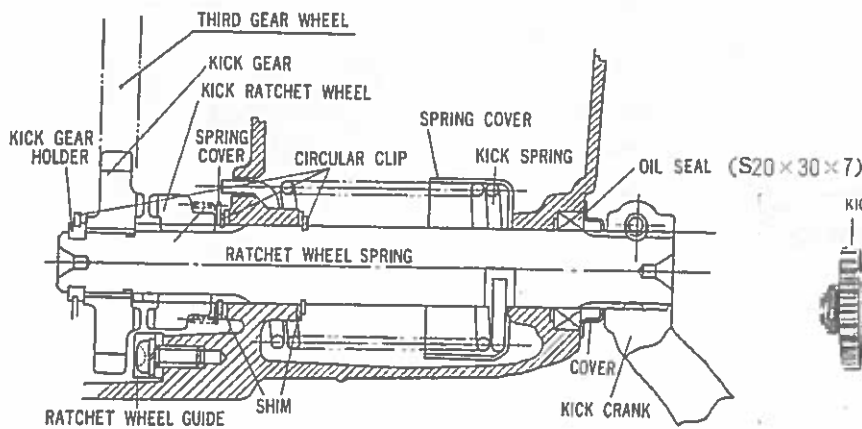
Gear	Total Reduction Ratio *
Low	$3.833 \times 2.533 \times 2.600 = 25.249$
Second	$3.833 \times 1.524 \times 2.600 = 15.187$
Third	$3.833 \times 1.120 \times 2.600 = 11.163$
Top	$3.833 \times 0.828 \times 2.600 = 8.248$

* Primary reduction \times Gear \times Secondary reduction

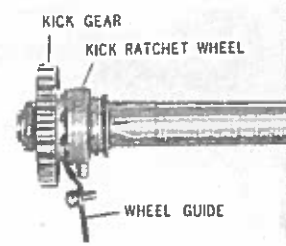
KICK - CRANKING DEVICE

- (1) The kick gear is always meshed with the third gear.
- (2) As soon as the kick shaft is turned, the kick ratchet wheel comes out of the wheel guide and engages with the kick gear under the pressure of the ratchet wheel spring.
- (3) The kick gear drives the third gear and the power is transmitted as follows:

Third gear → Third pinion → Main axle → Clutch → Primary gear → Primary pinion → Crank.



ILLUS 26



ILLUS 27

A DISASSEMBLING

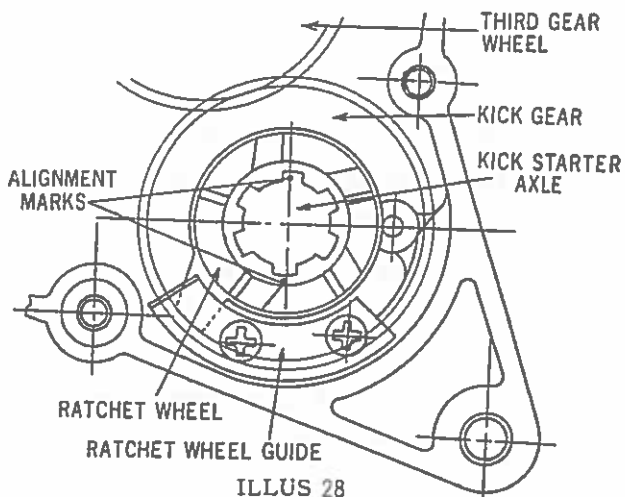
- (1) Remove the spring cover and pull out the kick spring.
- (2) Remove the circular clip from the starter axle and the starter axle can be removed.
- (3) Remove the circular clip from the kick gear and the kick gear can be removed.
- (4) Remove the circular clip from the kick ratchet wheel and the kick ratchet wheel can be removed.

NOTE : The crankcase is disassembled with the kick-cranking device left in place.

B ASSEMBLING

The kick-crank device is installed in the right crankcase.

- (1) To fit the ratchet wheel around the starter axle, make two marks meet as shown in Illus. 28.
- (2) Fix one end of the kick spring in the crankcase; turn it 140°, and fix another end

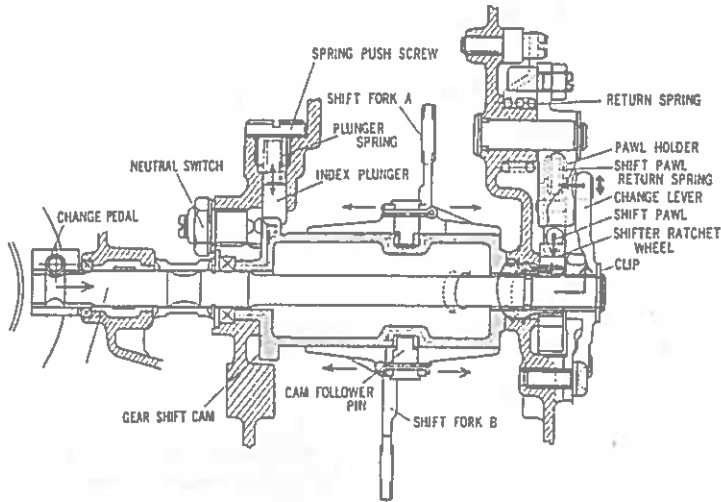


ILLUS 28

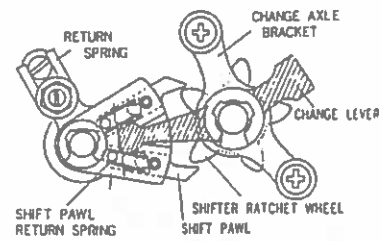
in the axle.

NOTE : When jointing the right and left crankcases together, interlock the kick gear with the third gear.

SHIFTER



ILLUS 29



ILLUS 30

A MECHANISM

The shifter mechanism consists of the gear shifter cam and the cam driving device.

(1) SHIFTER CAM DRIVING DEVICE

When the change pedal is stepped on, the change axle and the change lever function as a unit to transmit the power to the pawl holder, whose pawl pushes one of the teeth of the shifter ratchet wheel to rotate the gear shift cam.

(2) SHIFTER CAM

The shifter cam is for the purpose to drive the sliding gears (third pinion and second gear wheel) to shift gears.

2a) The rotary motion of the gear shift cam is changed to the axle motion of the shift fork through the cam follower pin.

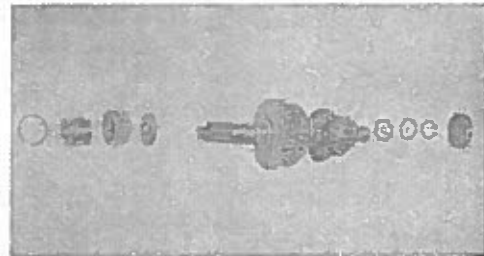
2b) The gear shift cam is given $\frac{1}{5}$ (72°) turn by the shifter ratchet wheel and the rotary motion of the cam is stopped exactly in the predetermined position by the index plunger (stopped pin).

B DISASSEMBLING AND ASSEMBLING THE TRANSMISSION AND THE SHIFTER

(1) DISASSEMBLING

Remove the transmission and the shifter at the same time.

- 1a) Remove the main axle bearing cover and then the main axle circular clip on the outside of the left crankcase.
- 1b) Remove the drive sprocket from the drive axle.
- 1c) Remove the spring push screw from the bottom of the left crankcase, and then pull out the spring and the index plunger (stopper pin).
- 1d) Remove the drive axle together with the shifter and the main axle by tapping the drive axle with a soft hammer.

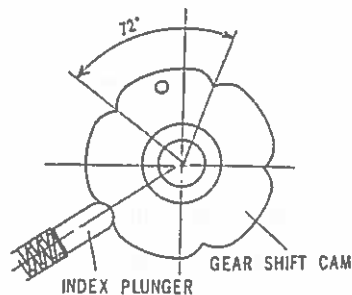


ILLUS 31

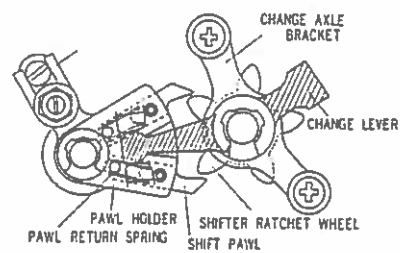
(2) ASSEMBLING

Install the main axle, drive axle and shifter assembly at the same time.

- 2a) Place the gear shift cam in neutral position and install the main axle, drive axle and shift fork into the left crankcase at the same time. Be sure to use the washer.
- 2b) After installing, attach the washer and clip around the main axle (left side) and put the rubber cap on.
- 2c) Install the stopper pin (index plunger and spring).
- 2d) Join the right and left crankcases together after interlocking with the kick gear, install the shifter cam driving device; and try to shift gears.



ILLUS 32



ILLUS 33

3-3-6 CRANKCASE

The crankcase is of die-cast aluminium alloy. The right and left crankcase are joined together by Yamaha Bond #5 and 14 bolts.

A ASSEMBLING

See p. 21.

- NOTES :
- 1) Be sure to apply gear oil to the bearings and grease to the lip of each oil seal before assembling.
 - 2) When replacing the bearing, heat the crankcase up to about 100°C and fit the bearing into it under pressure or hammer the bearing into it evenly by using a metal guide.

B BEARING AND OIL SEALS OF CRANK AND TRANSMISSION

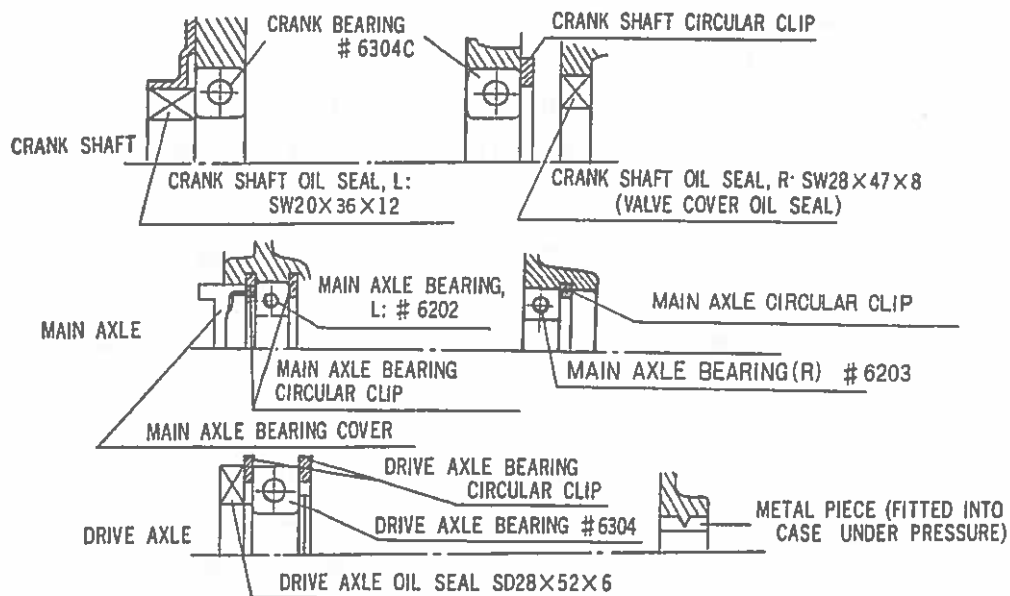


Fig 6

C APPLYING GEAR OIL

Be sure to apply the specified amount of oil to the transmission and the clutch through the correct oil hole, because the proper oil level in the gear box is different from that in the clutch housing.

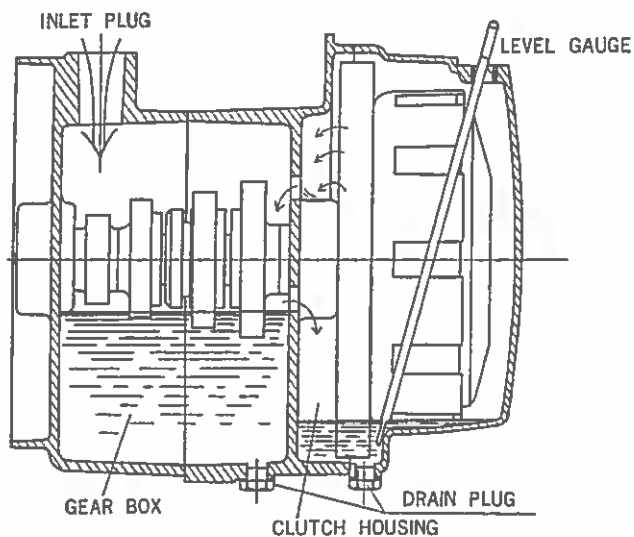
Use the level gauge as shown in ILLUS.34.

Remove the left air cleaner cover and then the inlet plug from the left crankcase. Pour oil through this hole as specified below.

Oil : SAE #10W/30 motor oil : 1300c.c. (1.3 liters)

D DRAIN GEAR OIL

To drain gear oil, remove two drain plugs from the bottom of the crankcase cover.



ILLUS 35



ILLUS 36

3-3-7 AIR CLEANER AND CARBURETOR

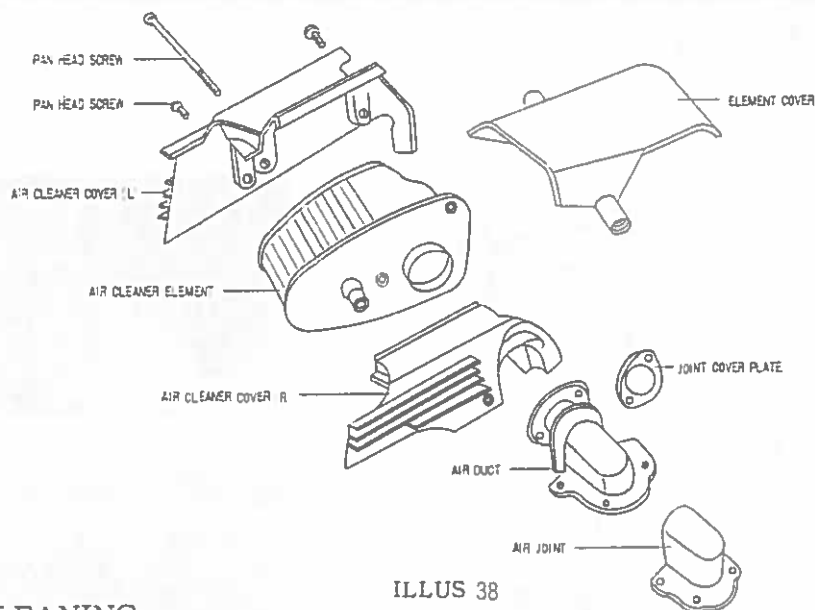
Both air cleaner and carburetor are the same in design as those for the YA6. That is, the air cleaner is incorporated in the air cleaner covers (right and left). The carburetor is in the carburetor casing located on the right of the crank case cover.

AIR CLEANER

The air cleaner is of a large-sized paper filter type. It appears the same as that for the YA6, but its removal and reinstallation are made much easier. In addition, a new rubber element cover is provided for better water-proofing.



ILLUS 37



ILLUS 38

A CLEANING

Blow air inside of the cleaner and remove dust by tapping carefully with fingers.

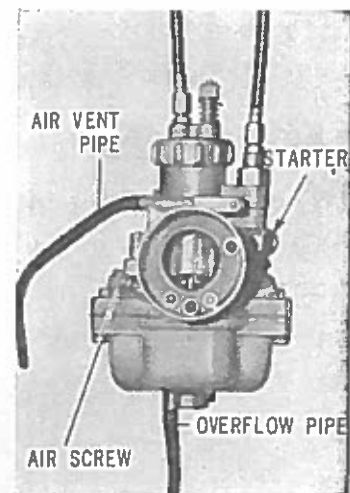
CARBURETOR

When the starter lever on the handlebar is used, the starter plunger of the carburetor moves up to make richer mixture gas for easier starting of the engine in cold weather.

CARBURETOR SETTING GUIDE - MODEL VM22SC

	Standard	Asia
Main jet	#140	#190
Air jet	2.0	2.0
Needle jet	0-0	0-0
Jet needle	4J6-2	4J6-2
Throttle valve cutaway	2.5	2.5
Pilot jet	#30	#30
Air screw loosening	1 3/4	1 3/4
Mark	227H2	227E2

CAUTION : Be sure to put one end of the air vent pipe out of the carburetor. The pipe is for the purpose to always keep the fuel level fixed regardless of the fluctuations of pressure in the carburetor.

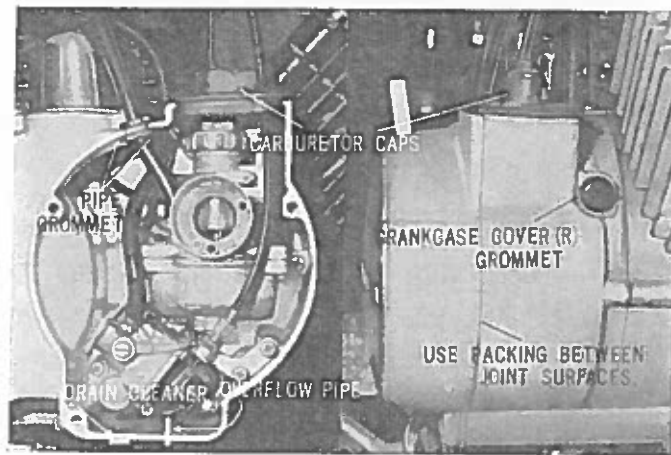


ILLUS 39

A INSTALLING

The carburetor should be kept airtight.

The pipes, grommets and gaskets related to the carburetor should be sealed with a special care.



ILLUS 40

When installing the carburetor, check the following points:

- (1) Put one end of the air vent pipe and the overflow pipe out of the carburetor.
- (2) Seal the grommets of the gasoline pipe, oil pipe and case cover
- (3) Seal the screwdriver hole for installing the carburetor.
- (4) Seal the carburetor cap.
- (5) And then install the carburetor cover.

NOTE : Wash the drain cleaner in gasoline from time to time.
After washing apply gear oil to it.

CHAPTER 4 FRAME

The frame is of a pressed steel monocoque construction, lightweight yet strong.

4-1 A7 FRAME FEATURES

The chassis design is essentially based on that of the YA6, but an extensive design modification has been introduced to the fuel tank, seat, side cover and oil tank, aiming at a fresh touch of design.

With emphasis on utility purposes, both front and rear fenders are designed to be ideal for driving on snow-covered or muddy roads.

(1) Front Fender

The front fender is longer, wider and deeper, and the space between the fender and the tire is also larger, so that it fends off dirt more effectively.

(2) Rear Fender

Like the front fender, the rear fender is also designed to effectively fend off dirt.

(3) Front fork

Following the change in the front fender, the front fork is also newly designed. Spring characteristics and cushion stroke are the same as in the case of the YA6.

* Cushion stroke 100 $\frac{m}{m}$

(4) Frame

Due to design changes in the fuel tank, seat, side covers and oil tank, the positions of the stays for these components and the hooks are also changed.

(5) Fuel tank

As a result of the design change, the tank body is provided with separate type chrome-plated side covers.

(6) Oil tank side covers

The oil tank is provided with completely new-design side covers.

(7) The rest of the component parts are similar in design to those for the YA6.

4-2 INSPECTING AND REPAIRING THE PARTS

4-2-1 FRAME

A INSPECTING

(1) Frame

The frame of the motorcycle that has a collision record should

be inspected for any crack from the head pipe to the rear fender at regular intervals. If a crack, is found, replace, weld or repair properly.

(2) Head pipe

The head pipe if distorted or eccentric, affects the steering and balance during the operation. If distorted remarkably, replace.

(3) Steel balls and races

Inspect the steel balls and races for wear and cracks, especially on the long used motorcycle, to keep the steering always in the best conditions. Even if one of them is defective, replace all. Removing, the race: Insert rod into the head pipe from the inside and tap around it.

Assembling: Never attempt to use the new balls together with the used balls with the new races. Even if one of them is defective, replace all. Before assembling, clean the races carefully and apply grease to them. Even a particle of dust or sand will damage them.

Part Name	Instructions	Description
Ball race A	Drive into frame head pipe.	Same as on YA5, YA6
Ball race B	Into handle crown under bracket section.	Same as on YA5, YA6
Balls. 6.35 ϕ ($\frac{1}{4}$ in)	19 balls each for races A and B	Same as on YA5, YA6

4-2-2 STEERING HANDLES AND CABLES

The handlebars are made of pipe. There are the throttle grip and the front brake lever on the right side of the handlebars and the clutch lever and the starter lever on the left side. The cables, except the throttle cable, are distributed on the outside of the pipe. It is possible to grease up the front brake and clutch cables. The wire harnesses of the right and left handle lever holders are distributed through the pipe.

To install the handlebars, use a damper rubber and tighten 4 bolts. The position of the handlebars is freely adjustable.

INSPECTING AND REPAIRING

- (1) If the insulator of the throttle cable, clutch cable, brake cable or starter is worn out or defective, repair with tape or replace.
- (2) If the bent or broken wire covering of the above wires causes its inner one to work improperly, replace the wire assembly.
- (3) Apply the sufficient amount of oil to the inner cables for smooth action.
- (4) When installing, apply grease to the accelerator shoe and grip

metal part.

4-2-3 FRONT FORK

The telescopic front fork consists of the coil spring and the oil damper. Same as on YA5, YA6.

A DISASSEMBLING

When disassembling, the front fork should be held straight to prevent oil from flowing out of the inner tube:

- (1) Remove the front wheel, front fender, headlamp and steering handle assembly.
- (2) Remove the handle crown and then the locknut. And remove the front fork as a unit. Be careful not to damage the ball races and fork covers.

To remove either of the inner tubes, remove the ornamental bolt from the handle crown, loosen the bolt holding the under bracket, and use the fork attaching and detaching tool.

- (3) Hold the axle fitting section of the tube with a vise and loosen the outer tube nut. The inner tube can be removed.

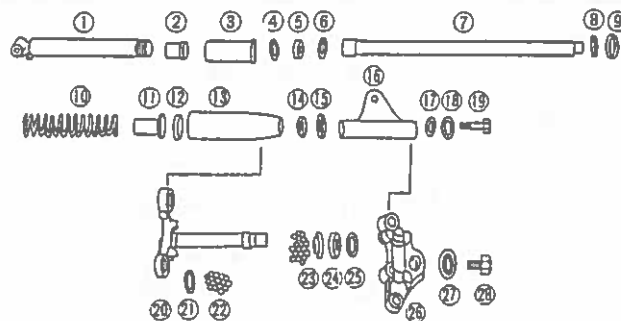
B ASSEMBLING

After cleaning, every part, assemble the front fork:

- (1) When inserting the oil seal, be careful not to damage its lip.
- (2) The damping oil should be used as specified below:

Oil	Mixture of motor oil #30 and spindle oil #60 in the ratio of 8:1 or motor oil #30
Amount of oil	165 to 175 CC each

- | | | |
|--------------------|----------------------|----------------------------|
| 1. Outer tube | 8. Dust seal | 15. Cover guide |
| 2. Slide metal | 9. Spring seat | 16. Fork cover, upper |
| 3. Outer tube nut | 10. Spring | 17. Packing |
| 4. Rolling packing | 11. Spring guide | 18. Washer |
| 5. Oil seal | 12. Forkcover, lower | 19. Ornamental bolt |
| 6. Plate | 13. Cover guide | 20. Under bracket assembly |
| 7. Inner tube | 14. Packing | 21. Ball race A |



- | | | |
|-------------------|-------------------|-------------------|
| 22. Balls | 25. Steering nut | 28. Steering bolt |
| 23. Ball race B | 26. Upset bracket | |
| 24. Bearing cover | 27. Washer | |

C INSPECTING AND CHANGE OF OIL

- (1) Inspect the outer tube nut and the drain plug for oil leaking.
Oil leaking causes the front fork to work improperly and make a noise.
- (2) Change the damping oil every 6,000km. (4,000mile) To remove the oil, remove the ornamental bolt of the handle crown.

4-2-4 REAR CUSHION UNIT

The rear cushion unit consists of the suspension spring and the shock absorber and is attached to the frame through the upper and lower rubber bushes that absorbs the slightest vibration from the ground which the shock absorber cannot do. The cushion rubber acts as a sub-spring when a big shock is given.

The shock absorber consists of the cylinder, piston, valve mechanism, piston rod, oil seal etc.

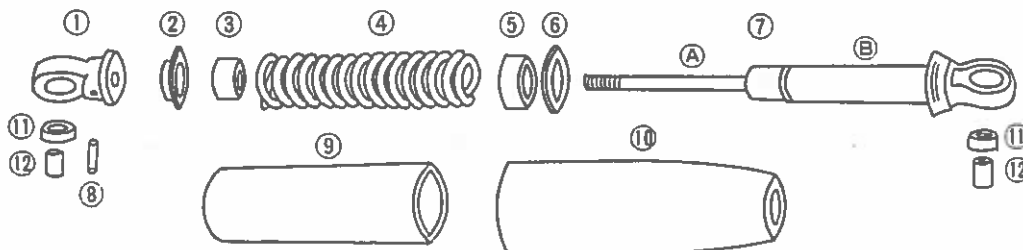
DISASSEMBLING AND ASSEMBLING

The rear cushion is a non-disassembled unit. However, if the inspection of the spring, cushion rubber etc. is necessary, do as follows:

- (1) Remove the roll pin.
- (2) Hold the under-cover with special care and remove the bracket by turning counterclock wise.
- (3) Hold the end of the piston rod and turn the lower cover counterclockwise. And the spring cushion rubber etc. will be removed.

CAUTION : Never attempt to disassemble the shock absorber including the piston rod and tube. Once disassembled, it will never be reassembled.

- (4) Assemble the rear cushion in the reverse order of disassembling.



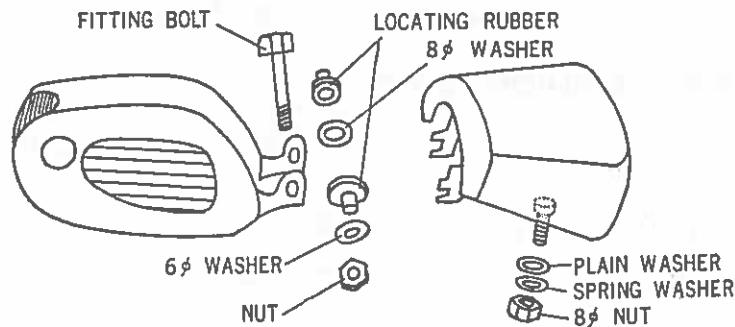
ILLUS 42

- | | | |
|-------------------|----------------|---------------------|
| 1. Under bracket | 5. Spacer | 9. Under cover |
| 2. Stopper | 6. Washer | 10. Upper cover |
| 3. Cushion rubber | 7. Oil damper: | 11. Rubber bush 2×2 |
| 4. Spring | 7A piston rod | 12. Bush collar. 2 |
| | 7B Cylinder | |
| | 8. Roll pin | |

4-2-5 FUEL TANK AND SADDLE

The way of fitting the fuel tank and the saddle has been improved: the damper rubber is placed between the fuel tank and the frame; and the rear of the tank is bolted to the saddle.

It is secured to the frame with a 8 ψ bolt.



ILLUS 43

4-2-6 OTHER IMPROVEMENTS

- (1) Rear arm:
 - 1a) The metal bush has been changed to a rubber bush in the bearing of the pivot shaft;
 - 1b) The chain adjuster has been changed from the push type to the puller type;
 - 1c) The stop switch has been newly installed.
- (2) Center stand
 - 2a) The center stand and the brake pedal have the same shaft.
 - 2b) The position of the center stand stopper rubber has been changed to the muffler side.
- (3) Drive chain:

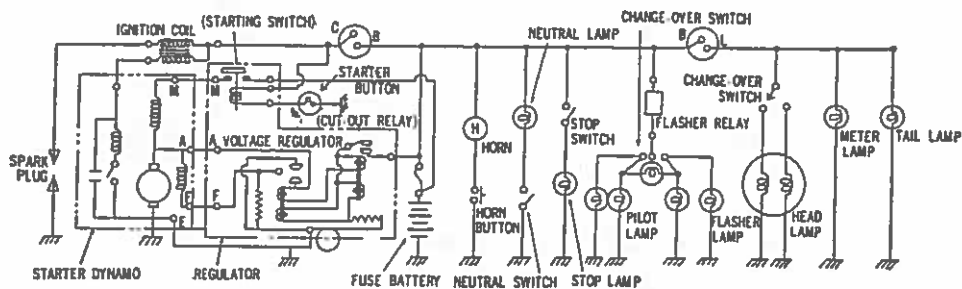
Model of Chain	D K 428
Num. of links	108

CHAPTER 5 ELECTRICAL SYSTEM

The electrical system has been improved on the basis of the precious data collected from the three-years road tests of the former model YA6.

5-1 ELECTRICAL PARTS:

Section	Part Name	Manufacturer	Model & Standard	Description
Engine	Starter dynamo	Hitachi	GS113, 14V 100W/1750rpm	Same as on YA6
	Neutral switch	Asahi	YNS 5	Same as on YA6
	Spark plug	NGK	B-7 HZ	
Frame	Battery	Furukawa	SPT-12, 12V10AH	Same as on YA6
		GS	MW3-12, 12V10AH	
	Regulator	Hitachi	T107-56	with built-in starter switch
	Ignition coil	Hitachi	CM11-50	
	Fuse holder	Taiko	20A × 2	Usable to all models
	Horn	Nikko	YP-12	
	Flasher relay	Showa		
Front	Speedometer	Nippon		
	Main switch	Asahi		
	Head lamp	Koito	Bulb 35/35W	
	Flasher relay	Asahi		
	Flasher lamp, front	Imasen	12V8W × 2	
Tail	Tail lamp,	Koito	12V20/8W	
	Flasher lamp, rear	Imasen	12V8W × 2	
Swinging arm	Stop switch	Asahi	YS 13	Same as on YA6



ILLUS 44

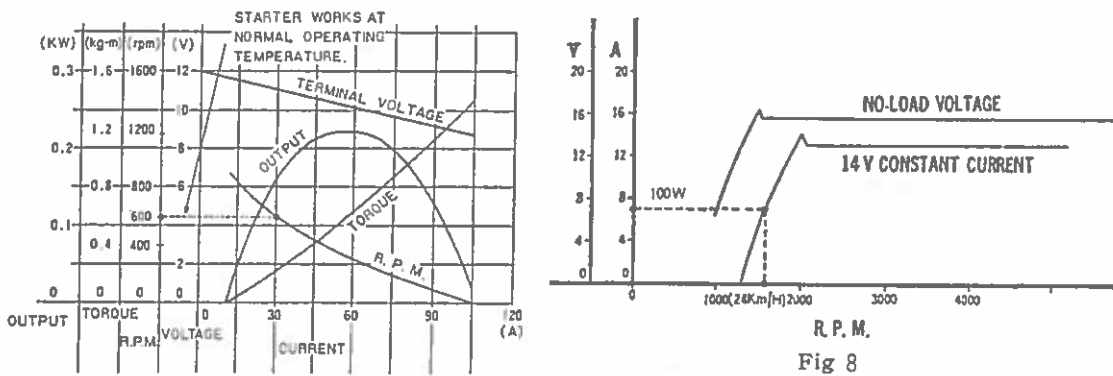
5-2 STARTER DYNAMO

The starter dynamo is the same as on YA6

1) PERFORMANCE OF THE STARTER DYNAMO

1a) At the compression pressure of 8kg/cm^2 , the crank RPM is about 600 and the current is about 30A.

1b) The rated output of 100W is produced at more than 1,750rpm or at 20km/h with gear in TOP.

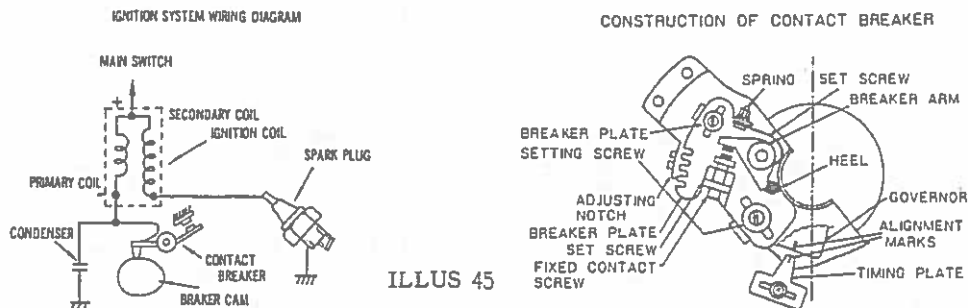


2) IGNITION CIRCUIT

The ignition circuit consists of the contact breaker, condenser, ignition coil and spark plug. Interrupting the flow of primary current causes a voltage surge to be generated in the secondary winding of the ignition coil. Each high-voltage surge jumps across the spark plug and ignites the compressed air-fuel mixture.

ADJUSTING IGNITION TIMING

(1) File the ignition points with sand paper or oil stone and clean.



- (2) Open the point gap fully by turning the cam and adjust it to 0.3 to 0.35mm with a point spanner.
- (3) Install a dial gauge* on the cylinder head and then a tester

(lamp)** for indicating the open and close of the points.

* Use a dial gauge holder.

** Use Yamaha Electro-tester.

- (4) With the governor in open position, move the piston down to $2.0 \pm 0.15\text{mm}$ before top dead center by means of the reading of the dial gauge.*

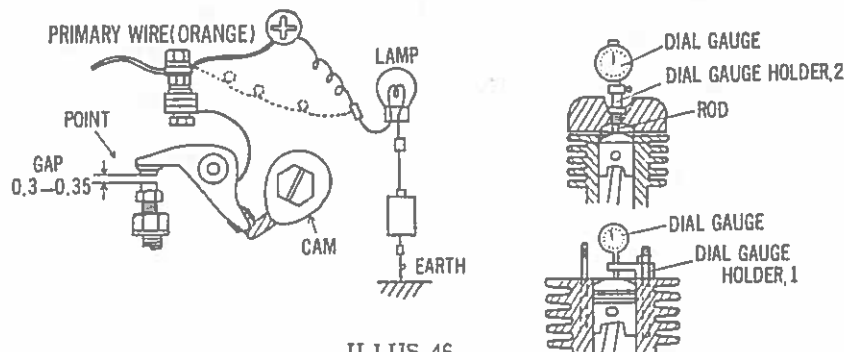
* Turn the crank in the reverse direction.

- (5) Adjust the breaker plate so the contact points are opened and closed at $2.0 \pm 0.15\text{mm}$.

NOTE: Without the dial gauge, adjust so the points open and close when the alignment marks are in a line.

INSPECTING

Start the engine and check the alignment marks by using a timing light.



ILLUS 46

STARTER DYNAMO ADJUSTING GUIDE

Item		Standard	Inspection
Field	Num. of pole	6	at abnormal voltage
	Resistance	shunt w. 6.8Ω (20°C) series w. 0.0145Ω (20°C)	
Brush	Length of Brush	20.5mm	after 6,000km of driving every 3,000km
	Allowable Min. Length	9mm	
	Force of Spring	400 to 560g	
	Materials	MH33	
	Num	4	
Commutator	Dia. of Comm-tator	37.5ϕ	every 3,000km
	Allowable Min. Dia.	35.5ϕ	
	Mica Cut	0.5 to 0.8mm	
	Allowable Mica Cut	0.2mm	
	Difference between Max. & Min. Diameters	0.05mm or less	
Breaker	Point gap	0.3 to 0.35mm	every 3,000km
	Point Pressure	500 to 700g	
	Condenser Capacity	$0.22\mu\text{F} \pm 10\%$	
	Angle of Advance	6° at 1600r.p.m 21° at 2000r.p.m	
	∕		
Others	Air gap	0.35	
	Armature taper	$20\phi \times \frac{1}{10}$	

5-3 REGULATOR

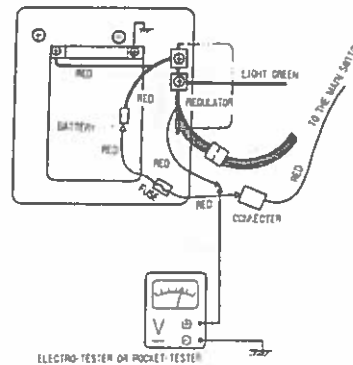
A cut-out relay and a starter switch have been built into the regulator. The flow of current in the shunt coil of the dynamo is controlled to keep the voltage constant by means of the constant-voltage relay of the regulator.

When the engine is not in motion or runs at low RPM, higher voltage in the battery causes reverse current. The cut-out relay prevents it.

The starter switch lets current flow from the battery directly to the starter coil as soon as the electric-starter button is pushed.

(1) MEASURING THE NO-LOAD VOLTAGE

- a) Disconnect the red lead wire (extending from the regulator) at the connector.
- b) Then connect the positive side of the d. c. volt-meter (with a full 20-V scale) with the connector.
- c) Ground the negative side of the voltmeter to the chassis.
- d) Start the engine, and read the voltage at a specified engine speed.



ILLUS 47

Normal value.....15.8 - 16.5 V/2,500 r.p.m.
16.9 V or less/5,000 r.p.m.

NOTE: If the machine is used for night driving only or if it runs little every day, for example, the voltage should be adjusted a little higher: 16.0 to 16.7v.

(2) ADJUSTING THE VOLTAGE

If the voltage is not within the range specified above or if the battery is too low or too high in charge, the voltage should be adjusted by means of the adjusting of plate of the voltage relay.

Voltage relay	Voltage coil resistance	11.8Ω at 20°C	Hold the unit horizontally. When battery is bad in charge.
	Field-coil resistance	10Ω at 20°C	
Charging relay	Cut-in voltage	12.5 to 13.5V	When battery is bad in charge.
	Voltage coil resistance	11.2Ω at 20°C	
	Compensation resistance	12.5Ω	
Starter switch Voltage-electro mag- netic coil	Point resistance	0.25V/100A or less	When engine does not start easily
	Coil resistance	4.66Ω at 20°C	

- 3) Remove the high tension wire plug cap, and connect the other terminal of the ohmmeter the high tension wire.

- 4) Then read the resistance.

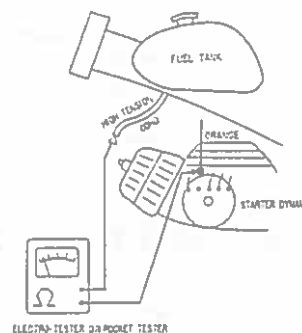
Normal value.....11 - 13 kΩ

- b) Measure the spark with the Yamaha electro-tester.

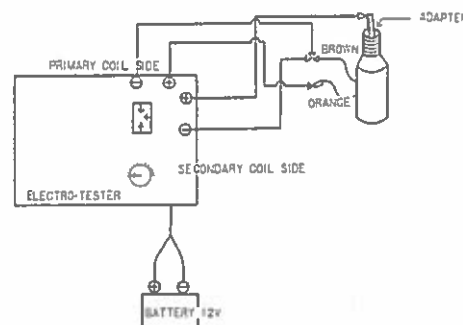
If the tester reads more than 6 mm spark the ignition is good.

- 1) Connect the primary winding (orange) of the ignition coil to the positive lead on the coil tester primary side, and then connect the brown lead to the positive side.

- 2) Connect the tester to secondary side of the coil tester.
- 3) The battery should be of 12-volt.



ILLUS 49



ILLUS 50

5-5. SPARK PLUG

Standard plug: NGK B-7HZ

The heat range of the plug is determined on the basis of the average driving conditions. Engines driven under severe operating conditions require cooler-running spark plug than the engines run at continuously low speeds. Every periodic inspection, check the spark plug as described below:

- (1) If the insulator is relatively clean and has a tan color, the heat range of the spark plug is correct.
- (2) If the plug soots up with oil and carbon, hotter-running plug should be used.
- (3) If the insulator is white and hot, the electrodes will be impaired in a relatively short time and cooler-running should be used.

- NOTES:
- 1) The engine driven in the city at continuously low speed requires the plug B - 7 H or B 6 H.
 - 2) Replacing the plug every 3,000 or 6,000km is rather economical than using it until it will be defective.

CLEANING AND ADJUSTING

Please tell the users that the spark plug should be cleaned every

1,000km (600 mile). Remove carbon from the electrodes and adjust the gap to 0.6 or 0.7mm.

5-6 BATTERY

The battery furnishes a current not only to the starting and ignition system but also to the lamp and horn system when the engine runs at low RPM, at the inter section for example.

Usually the dynamo charges the battery.

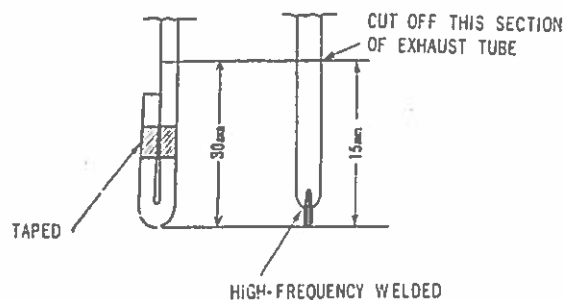
(1) INITIAL CHARGING

The new empty battery should be charged by the battery service station, if possible.

- 1a) Prepare about 700c.c. electrolyte that is a solution of sulfuric acid and water; the acid being 1.28 times heavier than an equal volume of water.
- 1b) Cut off the tip of the exhaust tube as illustrated below.
- 1c) Remove six filler plugs and fill the cells with the electrolyte up to the maximum level line.
- 1d) Charge the battery with about 1A current for about 20 to 25 hours.
- 1e) After charging, let gas out of the cells by shaking.
- 1f) Add the dilute sulfuric acid or distilled water up to the maximum level line so the specific gravity becomes 1.28.
- 1g) Tighten the six plugs firmly and then wash the outside of the battery with water to remove acid especially from the terminals.
- 1h) After installing and wiring, apply grease to the terminals.

(2) PERIODIC INSPECTION

Check the electrolyte level once a month. If the fluid level is below the middle of the maximum and the minimum level lines, add the distilled water.



(3) STORING

If the battery is not used for long time, in winter or for other reasons, take it to the battery service station or, if you have a charger, store it as described below:

3a) Recharge the battery directly after demounting.

3b) Apply grease to the terminals and place it in the place where the temperature is more than zero.

3c) Recharge the battery once a month.

3d) Recharge the battery before installing.

(4) MAINTENANCE GUIDE

Item	Instructions	Inspection
Electrolyte	Specific gravity: 1.28 at 20°C Amount of electrolyte: about 700cc	before first use //
Initial charging	Charge with 1A current for 25 h.	//
Replenishment	Add distilled water up to the max. level line.	every month
Recharging	1A. 13 hours	When engine does not start at all.
Greasing	Apply grease to terminals	every 6,000km
Dimensions	Height : 145mm (0.57 in.) Length : 135mm (0.53 in.) Width : 90mm (0.35 in.)	

CHAPTER 6 INSPECTION AND MAINTENANCE

6-1 PERIODIC INSPECTION

The regular inspection and maintenance always help to keep the machine in top condition. They are preventive measures against troubles and rather time-saving for both user and dealers.

6-2 PERIODIC INSPECTION CHART

Check Point	At first 300km of driving	At first 3000km of driving	At first 6000km of driving	Every 4000km
Adjustment of front & rear brakes	0	0	0	0
Adjustment of clutch	0	0	0	0
Change of gear oil	0	0	0	0
Greasing		0	0	0
Replenishment of battery fluid	0	0	0	0
Cleaning of spark plug	0	0	0	0
Adjustment of ignition timing		0	0	0
Adjustment of carburetor				
Cleaning of carburetor		0	0	0
Cleaning of air cleaner		0	0	0
Cleaning of cylinder head & piston		0	0	0
Cleaning of muffler		0	0	0
Bolts, nuts and screws	0	0	0	0
Adjustment of drive chain	0	0	0	0
Auto lube oil	See p. 16			
Auto lube pump				

6-3 INSPECTION AND MAINTENANCE OF THE MAIN PARTS

6-3-1 ENGINE

A) Removing carbon

The Yamaha Auto Lube engine features less carbon formation.

Check to remove carbon from the following parts every 3,000km:

- 1) Cylinder head;
- 2) Piston head;
- 3) Cylinder exhaust port;
- 4) Exhaust pipe;
- 5) Muffler inner tube.

If these parts are coated with much more carbon than usual, check the setting of the Autolube pump and the throttle

wire. Refer to p. 16.

B) Cleaning the air cleaner

The air cleaner is just like a flu mask for the engine.

The mask must be clean at all times. The dirty cleaner affects the life of the engine.

Demount the air cleaner; clear dust away with fingers; and blow air from the inside.

C) Carburetor

In addition to the periodical inspection, the carburetor should be disassembled and cleaned in case of hard starting, poor acceleration, excessive fuel consumption or other troubles.

After demounting the carburetor,

1) Wash in solvent or carburetor cleaner the float chamber, starter section,

throttle valve, jet needle, main jet, pilot jet etc.

and blow air into each nozzle, of the mixing body,

2) After assembling and installing, adjust the carburetor while the engine is idling. Loosen the air screw by the specified turns and do the idle adjustment. If it is still bad, adjust it within the range $\pm 1/4$.

3) Adjust the relation between the Autolube pump and the carburetor (See p. 16).

4) Clean the drain cleaner.

D) Spark plug

Check the electrodes for dirt and wear.

If the insulator has a tan color, the plug is correct.

If the insulator soots up with carbon and oil, use cooler-running plug:

Maker	Standard Plug	Cooler-running Plug
NGK	B - 7 HZ	B - 7 H

E) Clutch wire

Adjust, by turning the adjusting screw on the left crankcase cover, the clutch wire so that it has a play of 2 to 3mm.

F) Change of gear oil

Be sure to change the gear oil every 1,000km (600miles) at least. Use SAE # 10W/30 motor oil of 1,300c.c.

6-3-2 FRAME

A) Bolts, nuts and screws

Check the bolts, nuts and screws for looseness:

- (1) Front and rear axle nuts;
- (2) Swinging arm shaft nut;
- (3) Steering handle tightening nut;
- (4) Handle crown fitting bolt;
- (5) Foot rest tightening bolt;
- (6) Center stand tightening bolt;
- (7) Side stand tightening bolt;
- (8) Muffler fitting bolts and nuts;
- (9) Engine fitting bolts;
- (10) Other bolts, nuts and screws.

B) Front and rear brakes.

Check and, if necessary, adjust a play of the brake lever and the brake pedal.

Remove the wheels; clean the brake shoes; and apply grease the bearings every 6,000km (4,000 mile).

C) Drive chain

The drive chain is protected from dust under the chain case.

After driving for a long time, however, dust may cause lack of oil, or the loose chain may cause loss of power.

Check the chain for looseness and, if necessary, adjust a play of the chain at regular intervals.

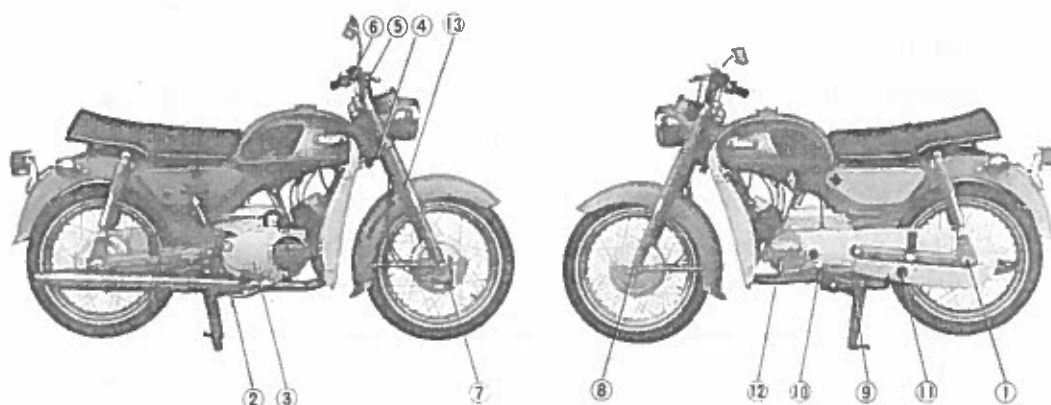
Lubricate the chain every 750km (500 miles).

Wash the chain in gasoline and apply oil to it every 3,000km (2,000 mile).

D) Oiling and greasing

No.*	Where oiled or greased	Distance for 1 st lubr, km	Lubrication interval, km	Type of lubricant
1	Rear wheel bearing	3,000	3,000	cup grease
2	Brake pedal shaft	1,500	3,000	"
3	Gear box	500	1,000	SAE 10w/30 motor oil
4	Steering head	6,000	6,000	fiber grease
5	Front brake wire	1,500	3,000	motor oil
6	Accelerator grip	1,500	3,000	cup grease
7	Meter gear unit	6,000	6,000	"
8	Front wheel bearing	3,000	3,000	"
9	Stand shaft	1,500	3,000	"
10	Shift pedal shaft	1,500	3,000	"
11	Drive chain	300	1,000	motor oil
12	Dynamo lubricator	6,000	6,000	Swallow M22
13	Front fork oil	10,000	10,000	Motor oil #30 170c.c.

No.* in this chart agrees with the circled number in the illustrations below.



6-3-3 ELECTRICAL SYSTEM

A) Ignition timing

The improper ignition timing causes poor performance, overheating, carbon accumulation, and other troubles.

Check the ignition timing with the timing light; clean the points; and check the point gap at regular intervals.

B) Battery

Check the electrolyte once a month at least. If the level is too low, add distilled water up to the maximum level line.

Never use city water, well water or dilute sulfuric acid.

The correct specific gravity of the electrolyte is 1.26 to 1.28.
If not, recharge the battery.

C) Carbon brush

The life of the carbon brush is equal to the driving distance of about 10,000km (6,000 mile). Check it, however, at about 6,000km (4,000 mile) of driving.

If the length of the brush is less than 10mm, realace it.

D) Regulator voltage

If the battery is discharged or the electrolyte level is reduced in shorter time than usual or if the bulb is burnt out, check the regulator voltage. If not within the specified range, take it to the nearest service station.

See p. 44.

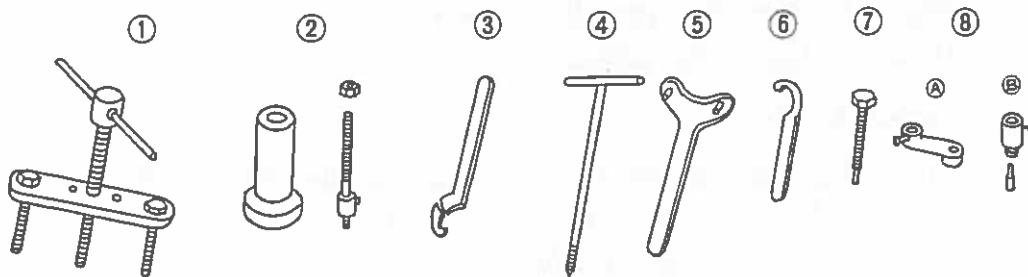
6-4 NECESSARY TOOLS AND TESTERS FOR INSPECTION AND MAINTENANCE

A) Tools for A7:

- (1) Pump setting tool.
- (2) Clutch holder.

B) Tools for A7 and other models:

No.	Tool Name	Model for which the tool is used.	Description
1	Crankcase disassembling tool	All models	Used for removing crank, too
2	Crank fitting tool	Fitting pipe: All models Nut : All models Bolt: Same as on YA6, YG1D, MF2, etc.	
3	Exhaust ring nut tool	All models	Used for turning muffler-exhaust pipe joint ring too.
4	Front fork mounting & dismounting tool	All models	Use attachments for YD2, YD3, YD51 or YD52.
5	Sprocket (flying wheel magneto) holder	All models	
6	Steering nut tightening tool	YG1, YA6, etc	10mm screw
7	Armature pulling bolt	All models with no fly-wheel magneto	
8	Dial gauge holder and 2	1 : All models 2 : All models except YA6.	

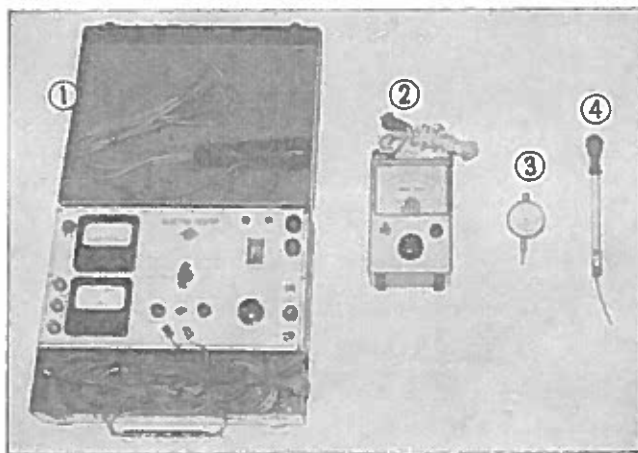


ILLUS 51

C) Testsr*s*

No.	Tester	Use
1	Electro-tester	All-round tester
2	Engine speed tester	Measurement of engine RPM
3	Dial gauge	Measurement of ignition timing, play of crank etc.
4	Hydrometer	Measurement of specific gravity of electrolyte

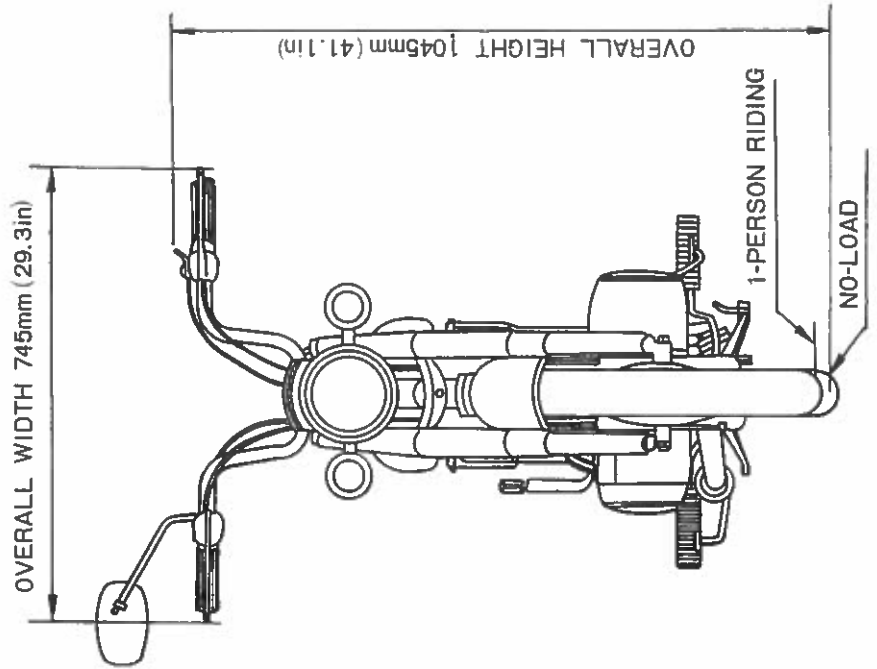
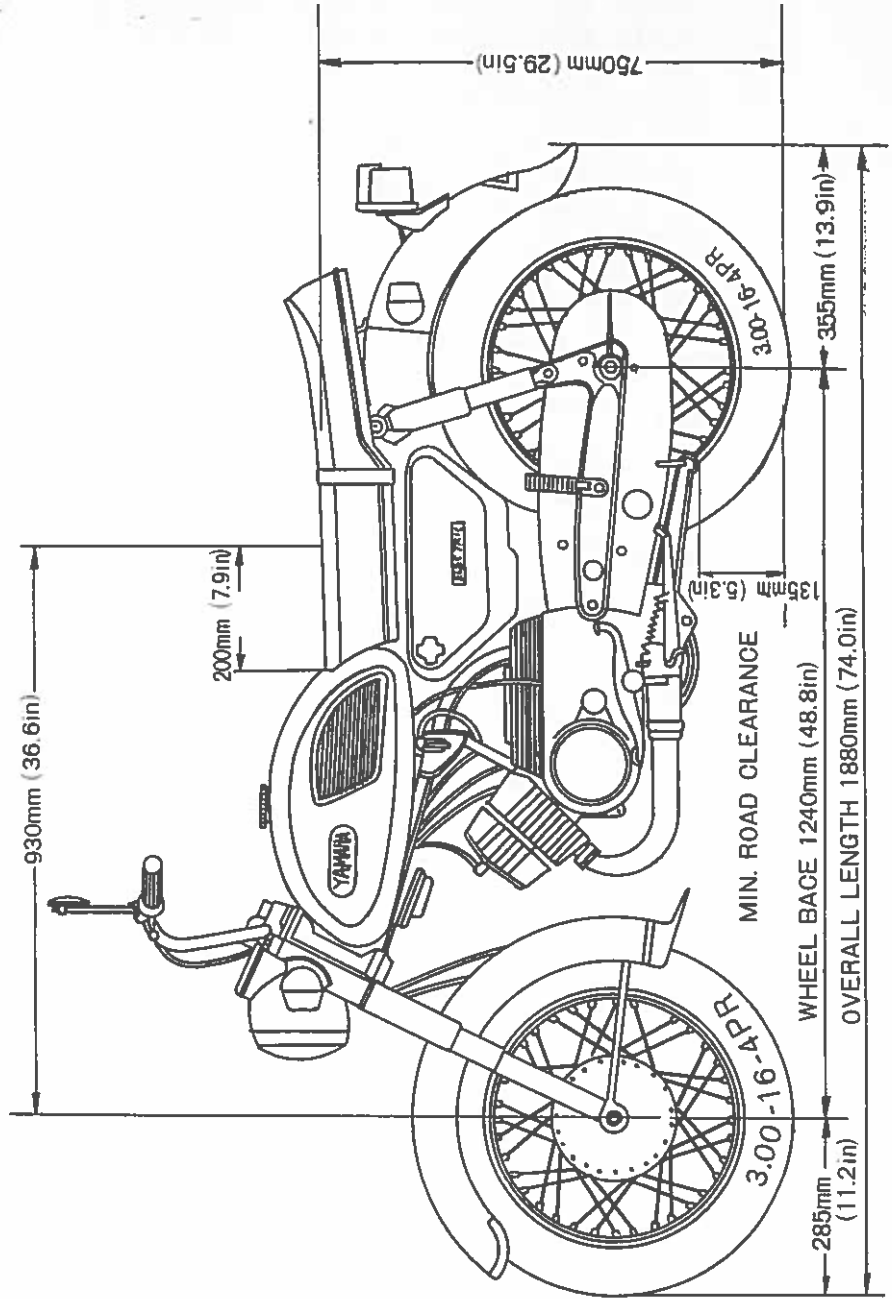
* Used for all models.



ILLUS 52

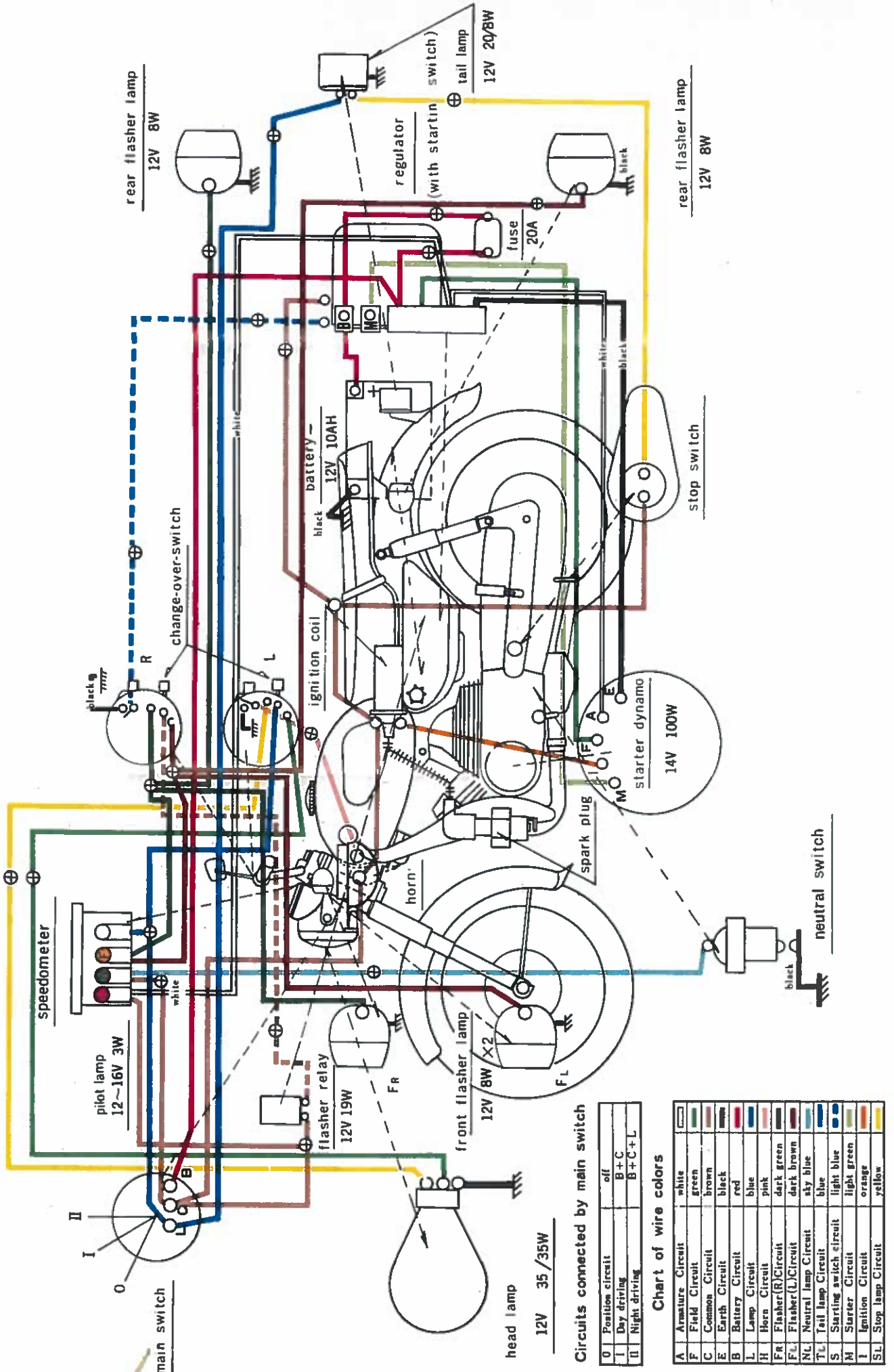
YAMAHA 125 A7

UNIT : %
SCALE : 1/6





YAMAHA 125 A 7 CIRCUIT DIAGRAM



head lamp
12V 35/35W

Circuits connected by main switch

0	Position circuit	off
I	Day driving	B+C
II	Night driving	B+C+L

Chart of wire colors

A	Armature Circuit	white
F	Field Circuit	green
C	Common Circuit	brown
E	Earth Circuit	black
B	Battery Circuit	red
L	Lamp Circuit	blue
H	Horn Circuit	pink
FR	Flasher(R) Circuit	dark green
FL	Flasher(L) Circuit	dark brown
NL	Neutral Lamp Circuit	sky blue
TL	Tail Lamp Circuit	blue
S	Starting switch circuit	light blue
M	Starter Circuit	light green
I	Ignition Circuit	orange
SL	Stop Lamp Circuit	yellow

