YAMAHA SPORT YDS3
SERVICE MANUAL

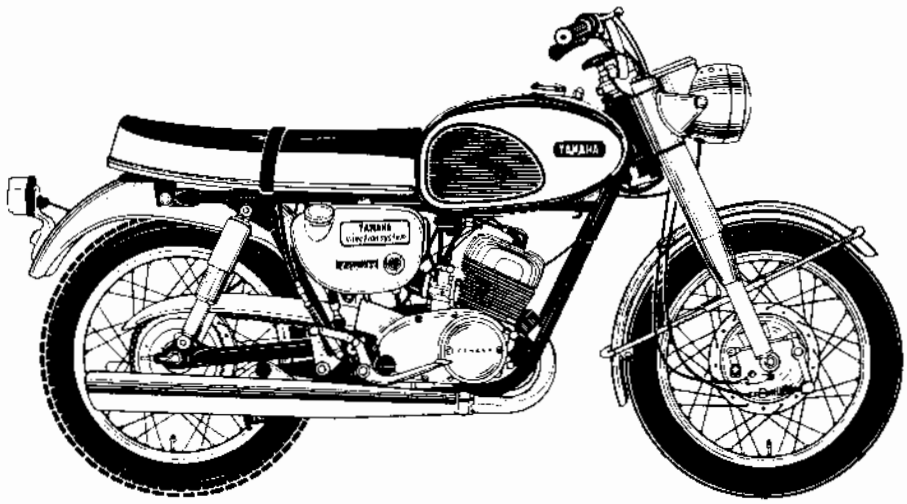
Introduction

"Yamaha Auto Lube (automatic oiling system)", a brilliant product of Yamaha's excellent techiques, has already been adopted in YA6 and YG1k, and is enjoying a good reputation among users. This time, it has been installed on a 2-cycle engine motorcycle, which has made its debut as Yamaha Sports YDS3, the super high-speed motorcycle of its kind.

This Yamaha YDS3, designed to pursue high speed, agility, and functional beauty which feature a 2-wheeled sports motorcycle, and to eliminate the multipurpose nature of the former Yamaha series, with main attention to standard touring models and with emphasis on operation, stability, and durablity in high-speed running, is a pat and precise vehicle to meet the needs of the highway driving era.

In order that this super high-speed 2-cycle engine motorcycle, Yamaha Sports YDS3, may enjoy enduring and satisfactory use among our customers, we must have cooperation in the area of after-sales service from you, the selling agents.

We have prepared this manual in the hope that you, who are in charge of this important task, will obtain as much knowledge as possible about YDS3 and will enable you to render better service activities.



YAMAHA SPORTS YDS3 SERVICE MANUAL

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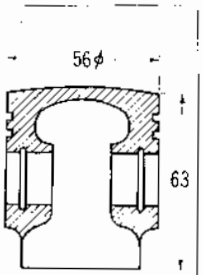
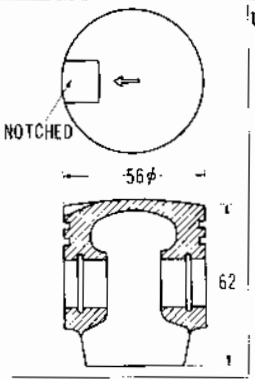
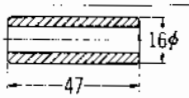
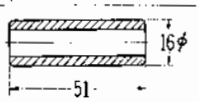
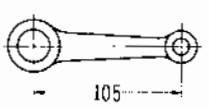
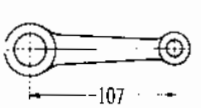
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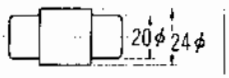
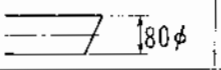
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MAIN DIFFERENCE BETWEEN YDS3, YD3C YDS3C KIT PARTS & YM1

Main parts in comparison with YDS3.

Name of Part	YDS3	YDS3C	YDS3C Kit Parts	YM1
(1) Cylinder head	The mark "D9" is impressed on the outside of the cylinder by casting process. Combustion chamber capacity is 14.3cc.	Mark "D1OC" Capacity 12.2cc	Mark "D1OB" Capacity 10.4cc	Outward-opening fins Capacity 19.3cc
(2) Cylinder	Bore 56φ Cylindrical carburetor fitting.	Usable for YDS3.	Bore 56φ Flanger type carburetor fitting.	Bore 60φ
(3) Cylinder head gasket	Bore 58φ 2 gaskets in use.	Usable for YDS3.	Usable for YDS3. 1 gasket in use.	Bore 62φ 2 gaskets in use
(4) Cylinder gasket	Bore 63φ	Usable for YDS3.	Usable for YDS3.	Bore 66φ
(5) Piston			Usable for YDS3.	Outer diameter 60φ
(6) Piston ring	Thickness t=1.5mm	Usable for YDS3.	Usable for YDS3.	Thickness t=2.0mm
(7) Piston		Usable for YDS3.	Usable for YDS3.	
(8) Connecting rod		Usable for YDS3.	Usable for YDS3.	
(9) Piston bearing	Nsedle bearing 16×20×19.2 Radial play 5-15u	Usable for YDS3.	Usable for YDS3.	Usable for YD. S3.

(10)Crank pin		Usable for YDS3.	Usable for YDS3	Usable for YDS3.
(11)Crank pin beaing	Needle bearing (Thomson) 24 × p30 × 15 Redial play 13 – 21μ	Usable for YDS3.	Usable for YDS3.	Usable for YDS3.
(12)Crank shaft assembly	Refer to the Crank Section (P. 21) of YDS3 Service Manual.	Usable for YDS3.	Usable for YDS3.	Only parts of the crank differs from YDS3, but mounting pimensions are the same as YDS3
(13)Filler metal	Cylinder escape is not machined. (32R)	Usable for YDS3.	Usable for YDS3.	Cylinder escape is machined. (33R)
(14)Air cleaner	Square-type filter paper	Usable for YDS3.	Round-type filter paper	Usable for YDS3.
(15)Expansion pipe assembly	Tail-shaped 	Semi-up type	Moocross type	Tail-shaped
(16)Clutch assembly	Friction plate (5 corks) Clutch spring in yellow color' Refer to P. 25 of YDS3 Service Manual.	Usable for YDS3.	Usable for YDS3.	Assemblies for U. S. A. are usalbe for YDS3. Usable for YDS1.
(17)Main axle	Former model (M=2.0, Z=14) New model is nsable for YM1. (M=2.5 Z=11) Refer to P. 27 of YDS3 Service Manual.	Former model is common in shape with YDS3, but its material is changed. New model is usable for YM1.	Usable for YDS3C.	Exclusively for YM1.
(18)Drive axle	Exclusively for YDS3. Refer to P. 27 of the Manual.	Usable for YDS3.	Usable for YDS3.	Usable for YDS3.
(19)Low gear wheel	Former model (M=2.0, Z=35) New model (M=2.5, Z=28) Usable for YM1. Refer to P. 27 or YDS3 Service Manual.	Former model is usable for YDS3. New model is usable for YM1.	Former model is usable for YDS3. New model is nsable for YM1.	Exclusively for YM1.
(20)2nd pinion	Former model (M=2.0, Z=15) New model usable for YM1. (M=25, Z=15) Refer to P. 27 of YDS3 Service Manual.	Former model is the same in shape as YDS3, but differs in material. New model is usable for YM1.	Usable for YDS3C.	Exclusively for YM1.
(21)2nd gear wheel	Former model (M=20, Z=30) New model is usable for YM1. (M=2.5, Z=23) Refer to P. 27 of the Manual.	Former model Usable for YDS3. New model Usable for YM1.	Usable for YDS3C.	Exclusively for YM1.

(22)3rd top pinion	Former model (M=2.0, 3rd 22Z, Top 28Z) New model Usable for YM1. (M=25, 3rd18Z, Top 22Z) Refer to P.27 of the Manual.	Former model (M=2 0, 3rd 22Z, Top 20Z) New model Usable for YM1	Usable for YDS3C.	Exelusively for YM1.
(23)3rd gear wheel	Former model (M=2.0, Z=27) New model Usable for YM1. (M=2.5, Z=21) Refer to P.27 of the Manual.	Former model Usable for YDS3. New model Usable for YM1.	Usable for YDS3C.	Exclusively for YM1.
(24)4th pinion	Former model (M=2.0, Z=25) New model Usable for YM1. (M=2.5, Z=20) Refer to P.27 of the Manual.	Former model (M=2.0, Z=24) New model (M=2.5, Z=20)	Usable for YDS3C.	Exclusively for YM1.
(25)4th gear wheel	Former model (M=2.0, Z=24) New model Usable for YM1. (M=2.5, Z=19) Refer to P.27 of the Manual.	Former model (M=2.0, Z=25) New model (M=2.5, Z=19)	Usable for YDS3C.	Exclusively for YM1.
(26)Top gear wheel	Former model (M=2.0, Z=21) New model Usable for YM1. (M=2.5, Z=17) Refer to P.27 of the Manual.	Former model (M=2.0, Z=24) New model (M=2.5, Z=17)	Usable for YDS3C.	Exclusivcly for YM1.
(27)Gear unit primary gear	Former model (M=2.0, Z=14) New model Usable for YM1. (M=2.5, Z=11) *Self-control type gear.	Former model Usable for YDS3. New mobel Usable for YM1.	Usable for YDS3C.	Exclusively for YM1.
(28)Wheel pump as sembly	Refer to P.6 of the Manual. Seal is white for discrimination from that of YM1.	Usable for YDS3.	No pump installed.	Refer to P.6 of the Manual. Seal is red.
(29)Crankcase	Cylinder fitting hole-62ϕ Cylinder width-65mm	Usable for YDS3.	Usable for YDS3.	Cylinder fitting hole-68ϕ Cylinder width-8mm
(30)Crankcase cover-L	Exclusivly for YDS3.	Drain hole under clutch honsing.		Usable for YDS3.
(31)Crankcase cover-R	Exclusively for YDS3.	Usable for YDS3.	Dynamo covered.	Usable for YDS3.
(32)Drive sprocket	15J	15J		17J

(33)Rear wheel sprocket	40J	40J		40J
(34)Spark plug	B-8HC	B-8HC	B-10EN	B-8HC
(35)Starter dynamo	Ignition timing T. D. C. -1. 8mm	Usable for YDS3.	Flywheel magneto	Usable for YDS3. Ignition timing T. D. C. -1. 9 to 2. 0mm

Note : Some minor changes have been made on parts of engines, chassises, and electrical equipment, but they are not so essential as to efect the basic change to these parts. Therefore, those explantions are omitted. (For details of parts, please refer to the parts lists of YDS3, YDS3C, YM1 and YDS3CM).

Comparison of Transmission Gear Ratio and Reduction Gear Ratio YDS3. YDS3C and YM1

(Export Specifications)

YDS3

Primary 65/20=3.250

Secondary 39/15=2.667

Transmission	Former	New	Overall Reduction Gear Ratio	
			Former	New
Low	35/14=2.500	28/11=2.545	19.805	22.042
2nd	30/18=1.667	23/15=1.533	13.203	13.287
3rd	27/22=1.227	21/18=1.166	9.722	10.116
4th	24/25=0.660	19/20=0.950	7.605	8.234
Top	21/28=0.750	17/22=0.773	5.941	6.700

YDS3C

Primary 65/20=3.250

Secondary 41/15=2.667

Transmission	Former	New	Overall Reduction Gear Ratio	
			Former	New
Low	35/14 2.500	28/11=2.545	20.820	22.042
2nd	30/18=1.667	23/15=1.533	13.880	13.287
3rd	27/22=1.227	21/18=1.166	10.221	10.116
4th	25/24=1.042	19/20=0.950	8.675	8.234
Top	24/26=0.923	17/22=0.773	7.688	6.700

YM1

Primary 65:20=3.250

Secondary 40/17=2.353

Transmission		Overall Reduction Gear Ratio
Low	28/11=2.545	19.465
2nd	23/15=1.533	11.722
3rb	21/18=1.166	8.925
4th	19/20=0.950	7.265
Top	17/22=0.773	5.909

Maintenance Standards

1. Carburetor Setting

	M. J.	N. J.	J. N.	C. A.	P. J.	A. S.	G. S.
YDS3 YM1	# 130	0-0	4D4 2-speed	# 20	# 20	1½	# 40
YDS3C	# 130	0-0	4D4 3-speed	# 20	# 20	1½	# 40
YDS3 for Europe	# 90	0-0	4D4 2-speed	# 20	# 20	1¾	# 40

2. Piston clearance

(1) YDS3 and YDS3C ..... 50—55 μ

(2) YDS3C kit parts ..... 55—60 μ

(3) YM1 ..... 53—57 μ

3. Ignition timing

(1) YDS3 and YDS3C (dynamo) B. T. D. C. 1.8±0.01mm

(2) YDS3C kit parts (magneto) B. T. D. C. 2.0±0.03mm

(3) YM1 (dynamo) B. T. D. C. 1.9—2.0mm

4. Transmission oil amount

YDS3, YDS3C and YM1 1,400cc Motor oil 10W/30

5. Front fork oil amount

YDS3, YDS3C and YM1 200cc Right and Left or Left side each

Comparison of Clutch Assembly Parts of YDS3 Series

(Model) No. Name of part	YDS3	YDS3C	YDS3C Kit parts	YM1
1. Primary drive gear	Exclusively for YDS3.	Usable for YDS3.	Usable for YDS3.	Usable for YDS3.
2. Clutch boss	Exclusively for YDS3.	Usable for YDS3.	Usable for YDS3.	Usable for YDS3.
3. Clutch pressure plate	Usable for YD3.	Usable for YD3.	Usable for YD3.	Usable for YD3.
4. Clutch plate	Exclusively for YDS3. 4 Plates	Usable for YDS3. 4 Plates	Usable for YDS3. 4 Plates	Usable for YDS3. 4 Plates
5. Clutch friction plate	Usable for YM1.	Usable for YM1.	Usable for YM1.	Exclusively for YM1. 5 Plates
6. Clutch spring	Exclusively for YDS3.	Usable for YDS3.	Usable for YDS3.	Usable for YDS3.

Chapter II General Description

I. Features of Yamaha Sports YDS3.

1) High-power engine adopting Yamaha Auto Lube.

The ideal lubrication system Yamaha Auto Lube, installed on a powerful 2-cycle twin-cylinder engine, has further improved the acceleration and high-speed running capabilities which are the lie and soul of sports cars.

2) Well-balanced 5-speed transmission.

The 5-speed transmission with rational reduction gear ratios permits efficient gear shifting under any conditions in urban areas or on mountain paths or bumpy roads.

3) Carburetor built-in starter, easy to start.

The starter mechanism, to get into motion with just one kick at any time, assures effective starting of the engine particularly in cold, freezing weather.

4) Powerful brakes.

A 2-leading shoe type is adopted for front braking mechanism which is important in high-speed driving. The large-sized water and dust proof brake drums always provide a stabilized and effective braking effect.

5) Cushions suitable for highway driving.

The cushions are of a new type designed for highway running, and the car body, especially in cornering, gives a comfortable road holding which can be expected in no cars but YDS3. Also, the rear cushion, a 3-stage adjustable type, assures increased driving stability by varying the strength of the springs accodings to the user's choice or the running conditions.

6) Large-sized speedometer easy to read.

The new type meter set, a combination of speedometer and tachometer, has new additional attachments, a neutral lamp and high beam indicator lamp, which permit easier handling.

7) Easy riding position and excellent running comfort.

The newly designed double cradle type pipe frame, coupled with the tank, seat, handle, foot rest, etc., provides an easy-to-drive riding position, which always harmonizes maneuverability with stability and permits long time driving without fear of fatigue.

2. Specifications data of YDS3

Name of the car		Yamaha	
Model		YDS3	
Dimensions	Overall length	(79.0in)	2,005 mm
	Overall width	(31.2in)	780 mm
	Overall height	(42.0in)	1,050 mm
	Wheel base	(51.9in)	1,287 mm
	Minimum road clearance	(5.8in)	150 mm
Weight	Weight of the vehicle		159 kg
	Passenger capacity		22
	Overall weight of the vehicle		69 kg
	Weight distribution of empty car.	Front	71 kg
		Rear	88 kg
	Weight distribution of loaded car.	Front	92 kg
		Rear	177 kg
Performance	Maximum speed	(95-100mph) 150km/H	
	Fuel consumption (on paved level road)	45 km/l (40km/h)	
	Climbing capacity	23 degrees	
	Braking distance	12m or under(50km/h) (40ft-32w:/h)	
	Minimum turning radius	2,200 mm	
Engine model & classification		Yamaha D9, 2-cycle gasoline	
Lubrication system		Yamaha Auto Lube (automatic lubrication system)	
Cooling system		Air-cooled	
Number & arrangement of cylinders		2cylinders, parallel	
Total displacement		246 cc	
Bore & stroke		56 × 50 mm	
Compression ratio		7.5:1	
Maximum output		28PS/8,000 r.p.m.	
Maximum torque		2.50kg-m/7,500r.p.m.	
Minimum fuel consumption at full load		270gr/PS-H/ 7,500 r.p.m.	
Engine weight		53 kg (including the exhaust pipe aud muffler)	
Length		541 mm	
Width		503.5 mm	
Height		357 mm	

Starting system			Kick starter
Ignition system	Ignition system		Battery ignition
	Ignition timing		1.8mm before B.D.C.
	Model of ignition plug		B-8HC
	Angle of lead mechanism		none
	Point gap		0.3~0.35 mm
Generator	Manufacturer & model		Mitsubishi DV65/6DIL
	Generation system		Direct current shunt
	Output		7V66W/1,800r.p.m.
Voltage adjustment			Tirril regulator
Storage battery	Manufacturer		Furukawa, Yuasa
	Model		BMLT4-6, MBF4-6A
	Capacity		6V 7HA
Carburetor	Manufacturer & Pattern		Mikuni, Amaru
	Model		VM 24SC × 2
Model of air cleaner			Dry filter paper type
Fuel tank capacity			(3.6gal) 14 l
Oil tank capacity			(2.0qts) 1.9 l
Clutch	Model		Wet multiple disc
	Primary reduction system		Gear
	Primary reduction ratio		3.25
Transmission	Model		Constant mesh 5 forward speeds
	Gear ratio	Low	2.545 (22.042)
		Second	1.533 (13.287)
		Third	1.166 (10.116)
		Fourth	0.950 (8.234)
		Top	0.773 (6.700)
Final driving	Model		Chain
	Reduction ratio		(40/15)
Body composition	Frame model		Y 23
	Type		Double cradle
	Suspension	Front	Telescopic
		Rear	Swinging arm
	Damper	Front	Coil spring oil damper

		Rear	Coil spring oil damper (3-stage changeover)	Lighting: Headlight	6V35WD
Steering mechanism	Steering angle		38degrees (right, left)	Tail light	6V 5W
	Castor		65 degrees	Stop light	6V20W
	Trail		76mm.	Pilot light	6V 3W
Tire size		Front	3.00-18-4 PR	High beam indicator	6V 3W
		Rear	3.25-18-4 PR		
Braking	Model of brake		Internal expanding		
	Brake opertion	Front	Right hand, wire		
		Rear	Right foot, wire		

3. YDS3 Performance Curve

Engine Performance Curve

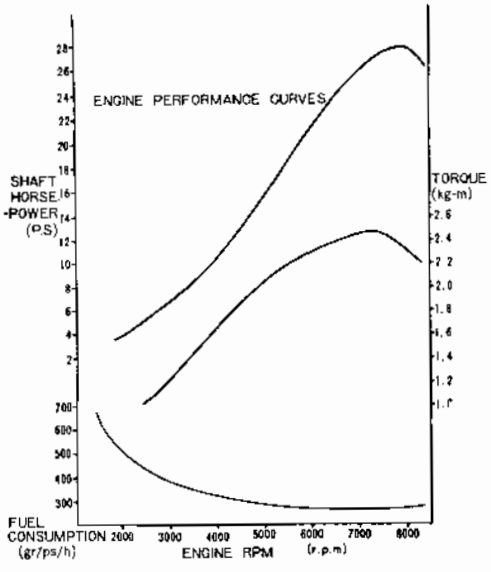


Fig. 1-1

Running Performance Curve

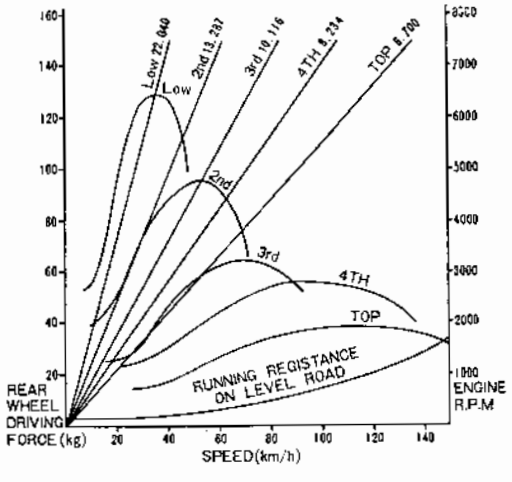
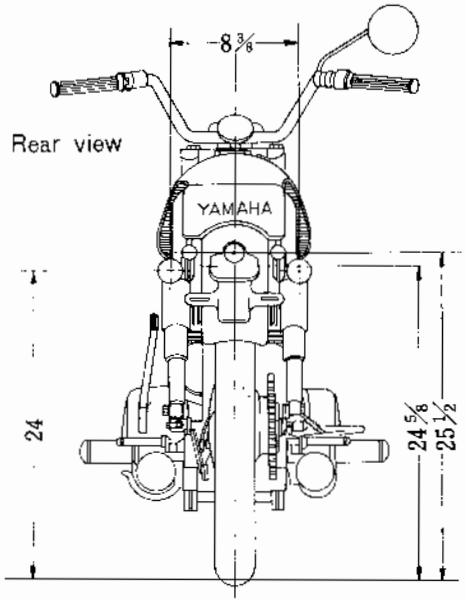


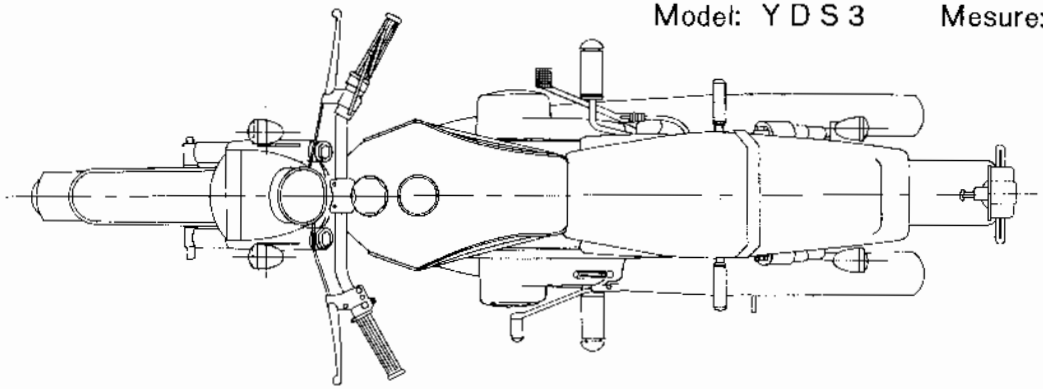
Fig. 1-2

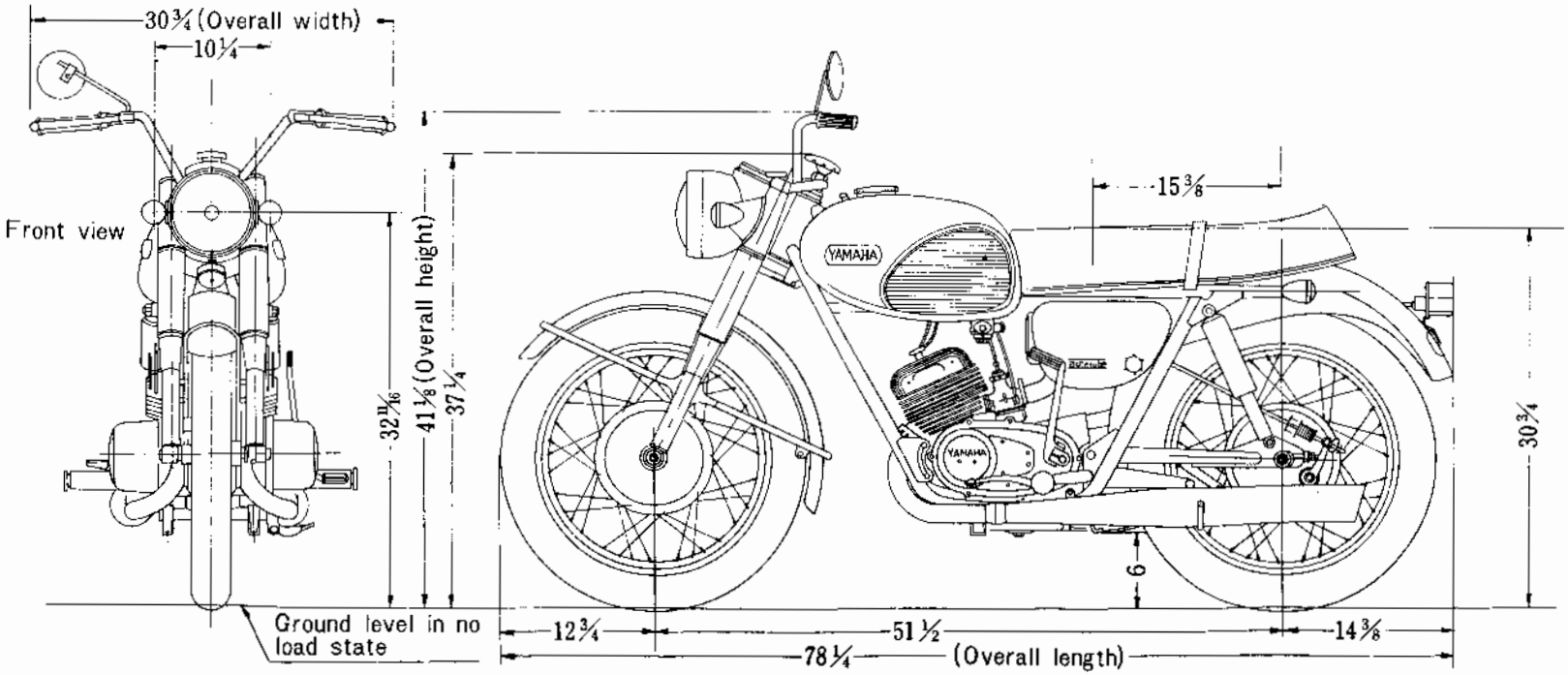
View from Four Sides

Name: Yamaha
Model: Y D S 3

Unit: inch
Mesure: 1/10







Chapter II Yamaha Auto Lube (automatic oiling system)

1. What is Yamaha Auto Lube?

Two-cycle engines usually employ a mixed lubrication system which mixes lubricating oil with gasoline, the fuel, but Yamaha Auto Lube is an automatic separate lubrication system which "stores lubricating oil in an oil tank separate from gaso line and supplies the oil to the engine with its amount automatically adjusted by the pump".

2. Features of Yamaha Auto Lube

○The oil pump is driven by decelerating the engine revolution, and also works in synchronization with the carburetor throttle (accelertor grip).

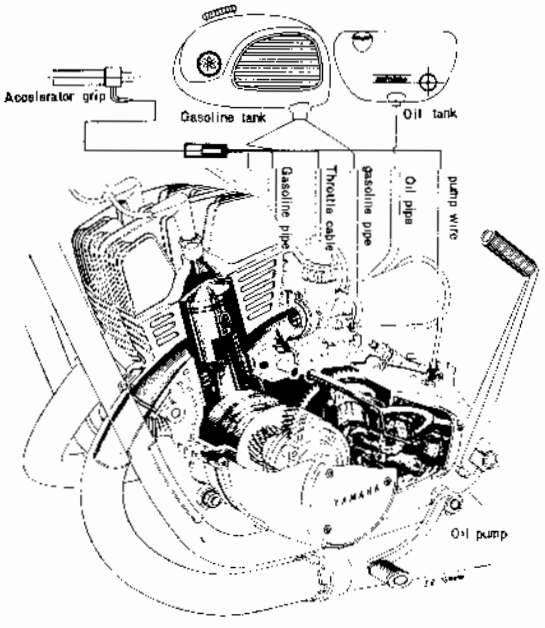
○Lubricating oil, by the work of an oil pump, is "supplied to the engine, being controlled always to the optimum amount for driving conditions according to variationsin the engine revolution and the throttle opening".

○The Yamaha Auto Lube system has eliminated the drawbacks which the conventional mixed lubrication system often causes to 2-cycle engine.

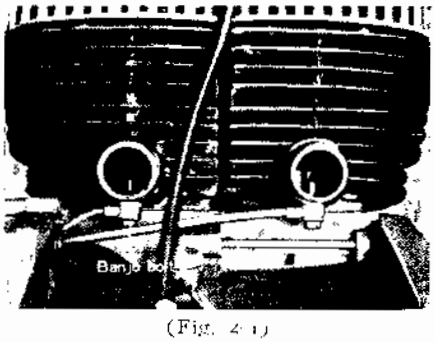
1. **Supplies optimum amounts of oil for various driving conditions.**

○Reduced oil consumption ○Decreased carbon depositing

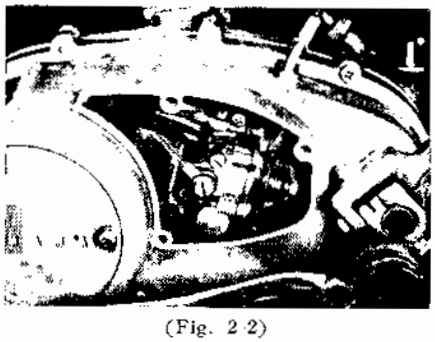
○Decreased exhaust fume ○Improved lubrication



(Fig. 2-3)



(Fig. 2-1)



(Fig. 2-2)

2. Fuel supply facilitated.

○Resupply gasoline only ○Decreased dirting

3. Reliablication

○No need to worry about the quality and mixing ratio of oil.

○Use of Yamaha Auto Lube Oil (Shell 2T, for example) assures the high performance and durability of the engine.

3. Handling the oil pump

The oil pump is of highly precise and accurate, so don't disassemble it. When the pump is taken off, pay attention to dirt iucluding dust and waste, draw out air surely after fixing to the engine, carry out setting properly, etc.

Only if it is handed correctly, there will be no trouble.

note : Check setting periodically.

3-1. Drawing out the air

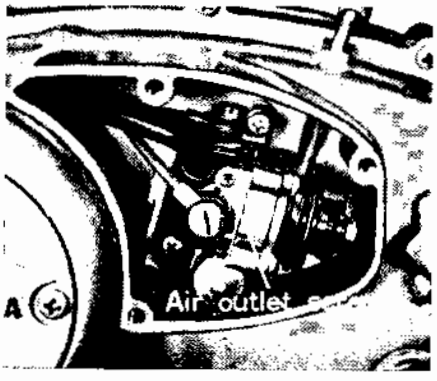
When the pump is taken off, when the oil pipe is taken off, or when there is no oil in the oil tank (when the car is new), air will enter the pumpe case and the flow of oil will become inaccurate, therefore, draw out the air.

○Take off the breather bolt of the pump, turn the starter plate (hand feed device) toward you, and work the pump to send the oil. (In this case, keep the adjust pulley in full operation so the plunger may have maximum stroke).

Oil will flow out of the breather bolt, and when foam ceases coming out, tighten the bolt.

○When the pump is taken off, it is necessary to feed a large amount of oil, so you may start the engine after setting and idle it. In this case, too, pull the pump wire so that the plunger may have maximum stroke. (This will take one to two minutes).

note: Observe well the flow of oil in the delivery pipe. When white air part disappears, drawing out the air is finished completely.



(Fig. 2-4)

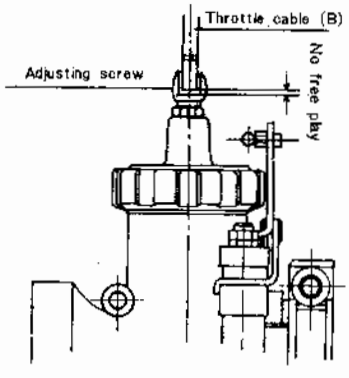
3-2. Method of setting

(Reference) when setting the pump

Adjust by the adjust shim so that the plunger stroke at full closing of the adjust pulley may be 0.18~0.2mm.

1. Start the engine and adjust idling

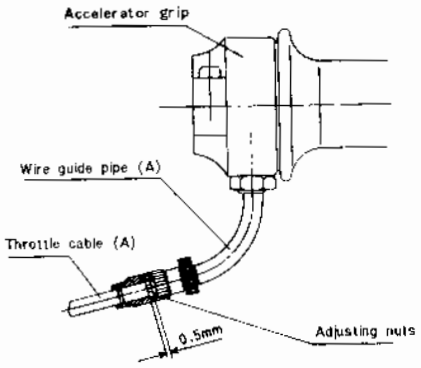
○Adjust by throttle stop screw so that idling may keep 1000 r.p.m.



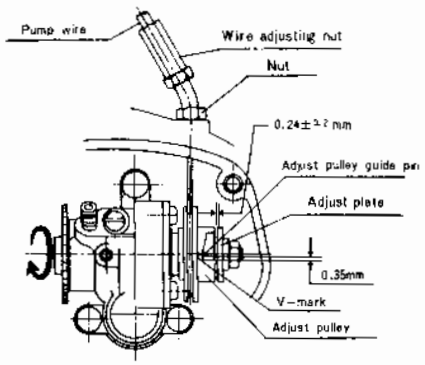
(Fig. 2-5)

○Explosion at right and left should be even. (Judge by the exhaust sound).

2. Be same play of throttle cable B so that the right and left throttle valves may work simultaneasly.
   note: To facilitate aligning the right and left, make the play of throttle wire (B) zero. (Fig. 2-4)
   ○Pull the onter of throttle cable (B) and adjust it by the adjust screw.
3. Make a play of 0.5~1mm at the adjust screw part of acclerator cable(A). (Fig. 2-5)
   ○Turn the accelerator grip while pulling the outer of accelerator cable A and check the play.
4. Adjust the pump cable so that the fitting mark on the pump adjust pulley and the guide pin may agree or the clearance between the end surface of the adjust pulley and the guide pin may be 0.35mm. (Fig. 2-6)
   ○In this case, keep the accelerator grip free instead of working it.



(Fig. 2-6)



(Fig. 2-7)

4. Main differences from the oil pump of YA6 and YG1K.

a. The pump is driven by worm shaft connected directly to main axle.
   (Same setting as the tachometer gear unit of YDS2).
   Reduction ratio = primary reduction × secondary reduction.

$$\frac{20\,(\text{small reduction gear})}{65\,(\text{large reduction gear})} \times \frac{3\,(\text{work shaft})}{40\,(\text{work wheel})} = \frac{1}{43.3}$$

   ○Worm wheel M (module) = 0.8 Z (number of teeth) = 40 (two pin nails)
   ○Worm shaft Three-thread screw

b. Two strokes of the plunger in one turn of the distributor. Two intake holes admit once each and two discharge holes emit once each.
   ○The pump case has two intake and discharge holes each.
   ○The plunger cam pressing in the distributor with two threads.
   ○Two delivery (discharge) pipes.

c. Maximum stroke of the pump……2.2 mm.
   ○Height of the plunger can……2.2 mm.

d. Turn of the adjust pulley, same direction as starter plate.
   ○Shape and direction change of the cam (height of cam thread 2.0 mm.)
   ○Adjust pulley return spring, right coil.
   note: For details of the structure, working, and performance of Yamaha Auto Lube device, see the separate "Yamaha Auto Lube" pamphlet and illustrations. They are omitted in this manual.

Chapter III Engine

1. Outline of YDS3 Engine

On the basis of the powerful 2-cycle twin engne of YDS2 which enjoyed an established reputation as Yamaha Sports, and of the valuable data obtained from past racing experiences, the section of motor and transmission has been improved drastically, and "Yamaha Auto Lube", the best lubrication system for 2-cycle engines, has been adopted to further increase reliability in performance and durability.

Main differences (features) from YDS2.

a. Adoption of Yamaha Auto Lube.
b. Improved performance and durability of the engine.
c. Improved strength and rigidity of the crankshaft section.
d. Improved strength and durability of the transmission and clutch.

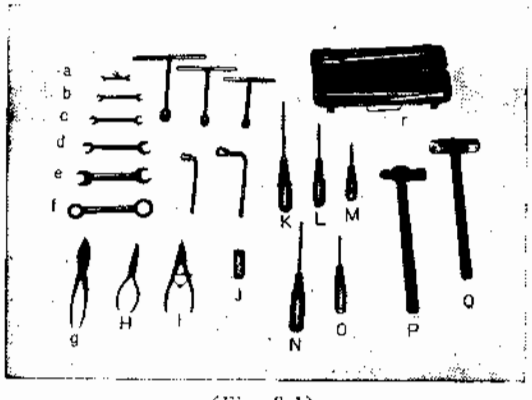
2. Disassembling and assembling the engine

Disassembly and assembly of the YDS3 engine can be done by quite the same rules as in the case of YDS2, except the addition of new work concerned with Auto Lube pump installation.

1. Fixtures necessary to engine disassembly and assembly.

1—1 General tools.

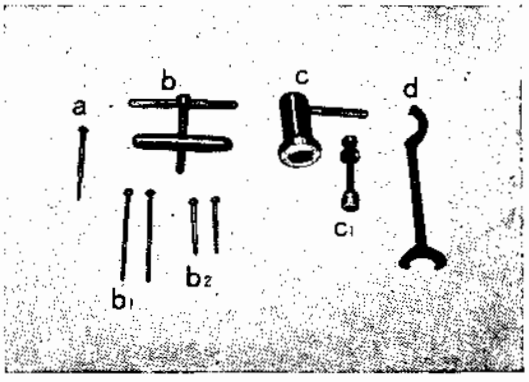
a. Point spanner
b. Spanner 9×10
c. Spanner 10×12
d. Spanner 14×17
e. Spanner 19×21
f. Ring
g. Plier
h. Nose plier
i. Clip plier
j. Plug box
k. Driver ⊕ large
l. Driver ⊖ medium
m. Driver ⊕ with 17 spanner hold
n. Driver ⊖ medium
o. Driver small
p. Steel hammer
q. Soft hammer
r. Box wrench set



(Fig. 3-1)

1—2 Special tools, instruments

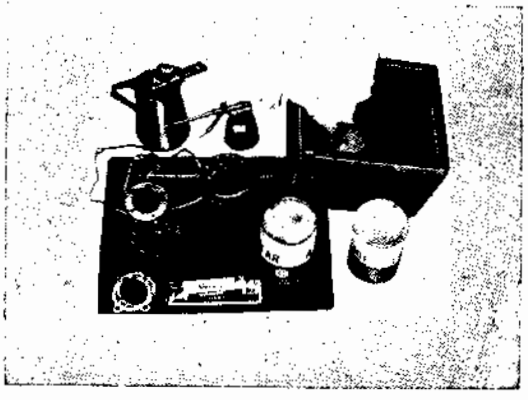
a. Armature removal bolt (manufactured by Mitsubishi)
b. Tool proper for crankcace disassembly
b_1. Bolt (long)
b_2. Bolt (short)
c. Tool proper for crank fitting in the crank (for YDS3)
c_1. Bolt (for YDS3)
d. Tool for fixing and removing the ring nut



(Fig. 3-2)

1—3 Other service equipment

a. Parts receiver
b. Oil receiver
c. Oil jug
d. Waste cloth
e. Oil feeder
f. Gear oil
g. Grease
h. Sand paper
i. Engine disassembly and assembly stand


(Fig. 3-3)

note: When disassembling and assembling the engine, work will be facilitated if a wooden box such as shown in the picture is used and the engine is put on it. Besides, it is necessary to prepare some parts easy to damage (screws, etc) and easy to expend (packing etc.)

2. Engine disassembly:

Engine disassembly must be carried out in a proper order and by a method which will make the subsequent work easy to do. Here we shall explain with example.

2—1 In disassembling the engine keep in mind the following:

a. Mud and dust around the cylinder-head, cylinder, crank-cace, etc., must be removed completely.

b. Tools must always be kept clean and must be used properly, so tat engine parts will not be damaged.

c. The parts detached from the engine must be collected on their respective saucers so that they will not be lost.

2—2 Removal of the engine (the work of detaching the engine from the body of the vehicle:

a. Detach the clutch cable from the handle lever.

b. Loosen the joint band of the air cleaner, unfasten the cleaner case screw and take out the cleaner assembly. (Fig. 3-4).

c. Detach the fuel pipe from the carburetor and remove the throttle wire fromthe throttle valve.

d. Detach the pump wire from the adjust pulley in the oil pump cover and detach the wire adjuster. (Fig. 3-47) (page:20)

e. Pull the oil pipe out of the union collar of the oil tank. (Fig. 3-5)
(Oil flow plug is fixed.)

f. Detach the tachometer cable from the gear unit setup.

g. Remove the crankcase cover (R) and detach the wiring connectors of the wire harness dynamo and of the neutral switch. (Fig. 3-46.)

h. Detach the exhaust pipe ring nut. (Fig. 3-6)

i. Detach the chain.

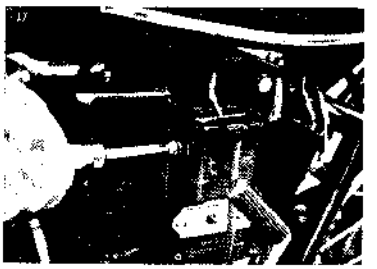
j. Draw out gear oil. (Fig. 3-27)

k. Pull off the four-point supporting bolt attached to the engine. (Detach the nut on the left side of the engine and, raising the engine slghtly, pull the boltt oward the right side).

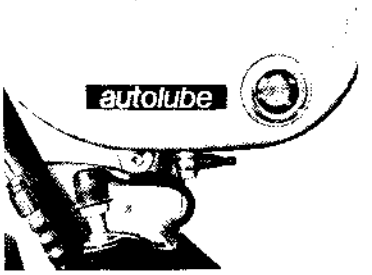
l. Detach the footrest (L).
With this, preparations are complete for detaching the engine from the vehicle.

Key points to be kept in mind in detaching the engine. (Fig. 3-8)

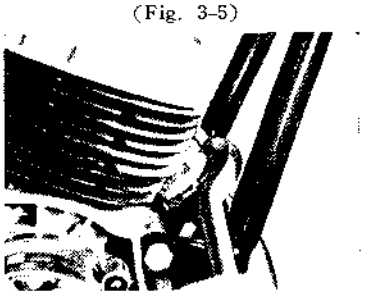
Ride over the body of the vehicle, place the



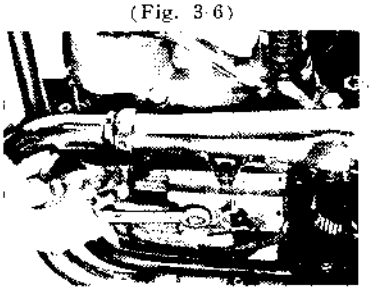
(Fig. 3-4)



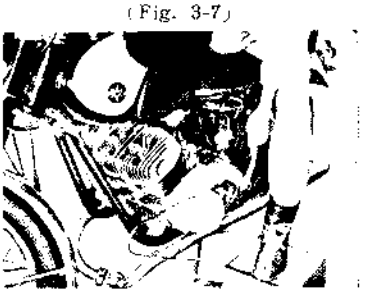
(Fig. 3-5)



(Fig. 3-6)



(Fig. 3-7)



(Fig. 3-8)

right hand under the cylinder fin and put the left hand on the kick pedal. Then, raising the two ends of the engine simultaneously, slide them backward and move them to the left. (Fig. 3-8)

2—3 Dynamo and its adjuncts, drive sprocket.

a. Unfasten the cam bolt and detach the cam.

b. Detach the yoke assembly.
(Detach the brush spring from the brush and hold back the brush).

c. Detach the armature with the bolt.

d. Remove the crankshaft key. (Fig. 3-9)

e. Detach the drive sprocket (right screw)
(Shifting the change, level the folding part of the turn stop washer and loosen the locknut with a special spanner 32 mm. by a shock from the iron hammer. (Fig. 3-10).
((The process of 2-3 may take place prior to the removal of the engine)).

2 –4 Carburetor and oil pump

a. Detach the starter lever connecting rod, loosen the clamp screw of the carburetor and detach the carburetor.

b. Detach the banjo bolt B (oil discharge nozzle) at the lower part of the cylinder manifold. (Fig. 3-11)

c. Detach the three screws of the oil pump.

d. Pull the oil pipe forward and, after detaching the oil grommet (Fig. 3-44), pull forth the pump assembly slowly (Fig. 3-12)

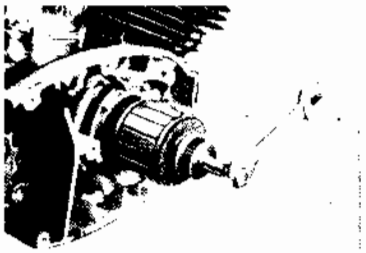
e. Pull out the worm shaft.

2 -5 Crankcase cover (L), first reduction of speed.

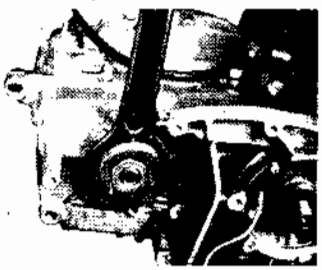
a. Detach the kick change arm.

b. Detach the eight case cover clamp bolts and take off the case cover. (Detach the joint by knocking it slightly with a soft hammer).

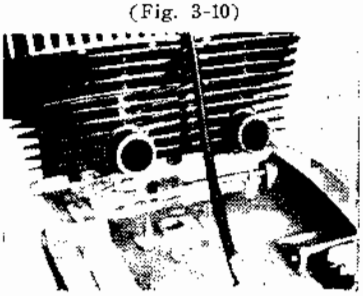
c. Detach the clutch push crown and level the bending parts of clutch lock washers and primary driven gear. (Fig. 3-13)



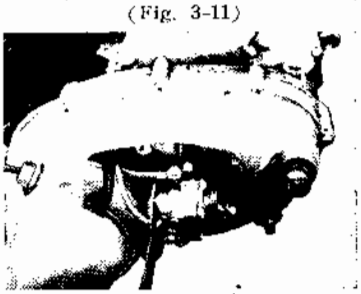
(Fig. 3-9)



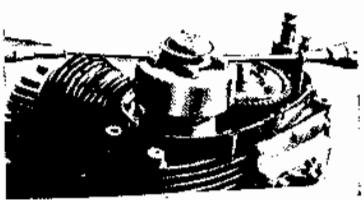
(Fig. 3-10)



(Fig. 3-11)



(Fig. 3-12)



(Fig. 3 13)

d. Detach the clutch lock nut (right screw) and the primary driven gear lock nut (right screw). (Fig. 3-14 and 3-42). ((Loosen both the clutch side (26mm). and the driven gear side (29mm). simultaneously by use of an iron hammer)). The cylinder piston is not detached beforehand so that the nut can be loosened easily by compression pressure.



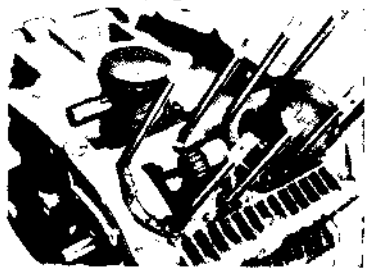
(Fig. 3-14)

2—6 Cylinder head, cylinder and piston

a. Detach the cylinder head.

b. Detach the cylinder.

c. Detach the piston pin clip, pull off the piston pin and detach the piston. At the same time, take off the small end bearing. (Fig. 3-15).



(Fig. 3-15)

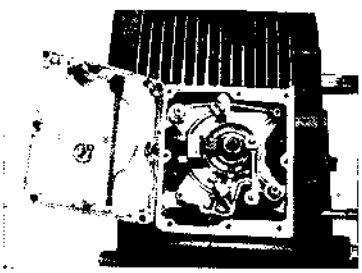
2—7 Shifter

a. Remove the shifter cover. (Fig. 3-16)

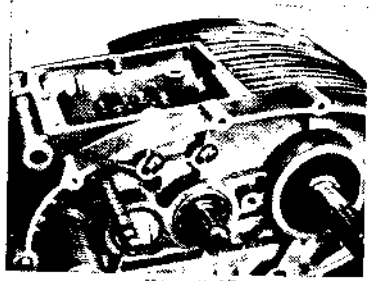
b. Disconnect the change link and the change lever.

c. Disconnect the shifter cam assembly.

d. Take off the shifter shaft clip, pull out the shifter shaft and detach the shift fork.
(in taking off the shifter shaft clip, detach the outer side of the case first: then push back the shaft a little and take off the clip inside the case). (Fig. 3-17, 3-38, 3-37).



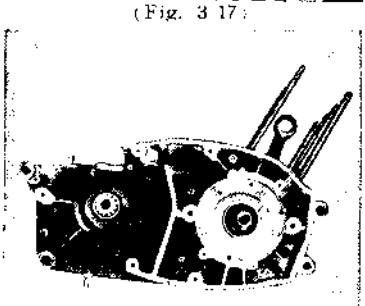
(Fig. 3-16)



(Fig. 3-17)

2—8 Separation of the crankcase.

a. Detach the clamp bolts (12 in all) of the crankcase (R).
(loosen the crank side and the transmission side alternately). (Fig. 3-18)



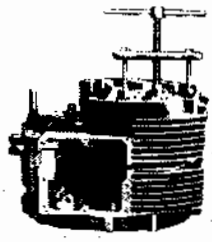
(Fig. 3-18)

b. Separate Case R from Case L, with use of the crankcase disassembly tools. (Fig. 3-9)

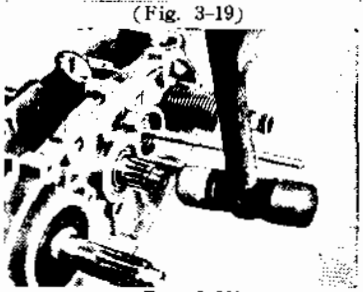
○the bolts of the special tools must be fastened up and the body of the tools must be kept horizontally.

○turn the handle of the tool, while keeping the connecting rod in the top dead center so that it will nottouch the case.

○In this case, the crank side will split first and the case will incline. The crank side and the drive shaft, therefore, must be knocked with the soft hammer so that the crank case will split between right and left evenly.



(Fig. 3-19)

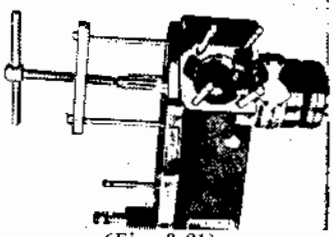


(Fig. 3 20)

2—9 Crank transmission

a. Detach the oil bucket from the driving axle, apply a metal pad to the driving axle, and detach the transmission assembly, while knocking the driving axle and the main axle alternately with a soft hammer. (Fig. 3-20).

b. Push out the crank assembly with use of crankcase disassembly tool (with long bolts). (Fig. 3-21). Turn the handle of the tool, while keeping the connecting rod in the top dead center, so that it will not touch the case.



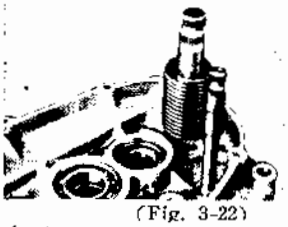
(Fig. 3-21)

With the above work, disassembly of the major parts is completed. Now, we have only to detach the fittings of crankcase L and crankcase R.

2 10 Parts of Crankcase L.

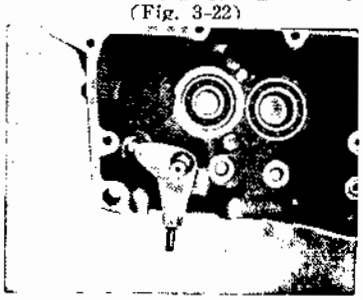
a. Detach the gear unit assembly.

b. Detach the kick shaft assembly (Fig. 3-22); detach the kick spring junction and pull out the kick spring by taking off the cover of the kick shaft hole; the kick shaft assembly will come out into the inner side of the case if the kick shaft clip is removed.



(Fig. 3-22)

c. Detach the change shaft assembly (Fig. 3-23); the change shaft can be pulled out if the change lever clip is taken off.



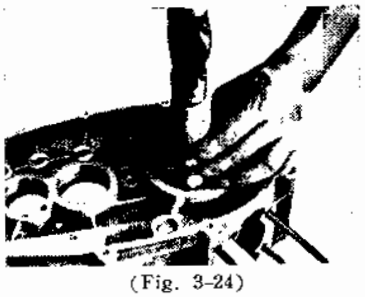
(Fig. 3-23)

2—11 Removal of the bearing, oil seal and the clips from crankcases L and R.

a. Take off the oil seal (with the driver). In this process, the lip is easy to damage, and in *taking off* you must be careful if you will use it again.

b. Remove the clip. The bearing must be moved from the outside to the inside of the case. The bearings set in double row must be pressed out to both sides respectively or must be knocked out by an iron hammer with use of a pad. (Fig, 3-24.)

This work must be done on a plane stand so that the surface of the case will not be damaged.



(Fig. 3-24)

3. Assembling

Assembling of the engine is done in reverse order to that for disassembling.

3—1 Keep in mind the following in assembling the engine.

a. All parts must be washed well, and check the abrasion or damage points. Bad parts must be corrected or replaced. (See 32P for the checkup of the bearing, oilseal and the clip).

b. Check for flaws on the surfaces of crankcases L and R and that of case R and case R, at the bottom of cases L and R and on the surface of the *shifter* cover. Correction must be made by joint use of the fixed board and the compound.

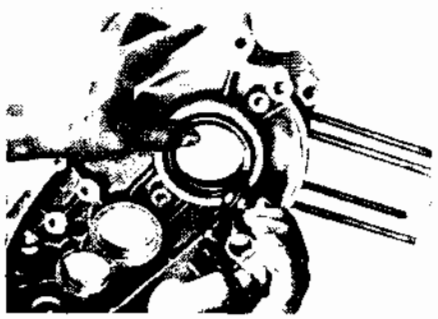
c. The packing, gasket and O ring to be used for assembling must be new. Packing ointment (Yamaha Bond No. 5) must be applied to them so that the seal will be complete.

3-2 Assembling of crankcases L and R.

a. Installation of the bearings, oil seals and clips.

If is desirable to press the bearing into the engine, after heating the crankcase to 100 to 120 degrees centigrade.

(When the crank case cannot be heated, it must be inserted by an iron hammer with use of a press or pad tube, while keeping the bearing from inclining.)



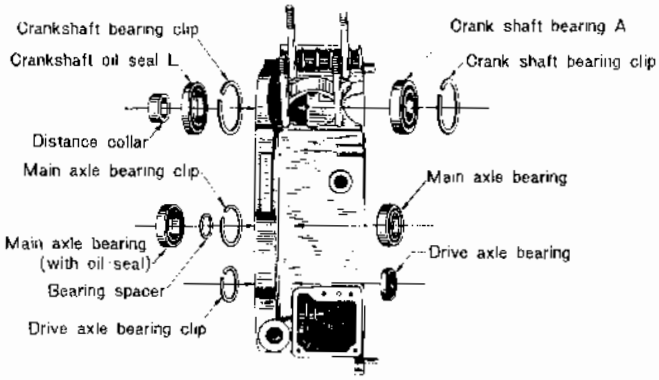
(Fig. 3-25)



(Fig. 3-26)

Crankcase L:

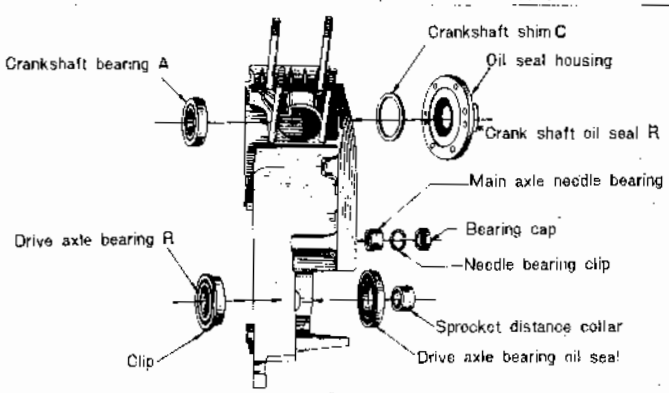
Points for insertion	Name	Standard	Remarks
Crankshaft	Crankshaft bearing (A)	6305C3	Keeping the marked surface insidethe case, insert till the clip is reached.
	Crankshaft oilseal (L)	SW35-62-8	Keeping the marked surface outside, insert till the clip is reached.
Main axle	Main axle bearing	6005	Keeping the marked surface inside, push to the clip in the center.
		6005Z	Putting on the outer side of the oil seal, push to the clip in the center,
Driving axle	Driving axle bearing (L)	6203	With the marked surface turned inside, insert till the clip on the outer side is reached.



(Fig. 3-27)

Crankshaft R:

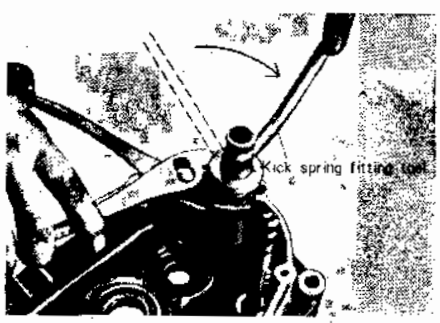
Points for insertion	Name	Standard	Remarks
Crankshaft	Crankshaft bearing (A)	$6305C_3$	Putting marked surface inside, insert till the inner side of the crankcase becomes parallel
	Crankshaft oil seal (R)	SW20-36-10	Insert till the inner side of oil seal housing becomes parallel, and attach to the case together with crankshaft Shim C
Main axle	Main axle needle bearing	NK17/16	Insert from inside the case till the clip is reached.
Driving axle	Driving axle bearing (R)	6305NR	Insert till the clip touches the case
	Driving axle bearing oil seal	SD30-62-8	Insert till the bearing is reached, keeping the marked surface on the outer side.



(Fig. 3-28)

b. Fill the lip of the oil seal with grease and applya small quantity of motor oil to the crankcase bearing.

c. Fix the kick shaft and change shaft to the crankcase (L).
Install the kick shaft assembly(with kick gear) and fix it with a clip.
Insert the kick spring, turn it with the "tool for the kickspring" and engage it into the groove of the kick shaft.
Install the kick spring junk.



(Fig. 3-29)

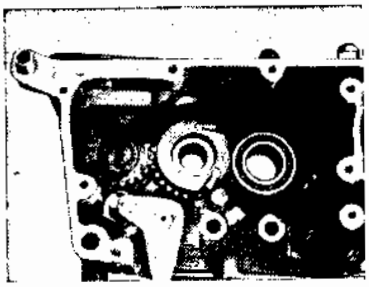
Insert the change shaft from outside the case, install the return spring change lever and fix it with a clip.

3—3 Installation of the transmission assembly and the crankshaft assembly.

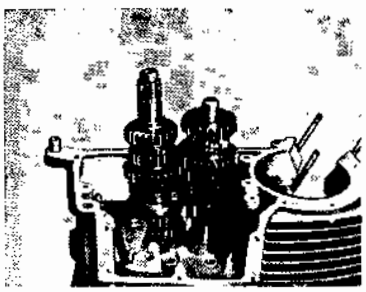
a. Installation of the transmission assembly: Be sure to insert and arrange the washers correctly. Interlock the kick pinion with the kick gear. Drive in the main axle assembly.

Lock the driving axle assembly with each gear of the main axle.

Knock alternately with soft hammer and drive in the transmission assembly, keeping the gears in harmony softly.



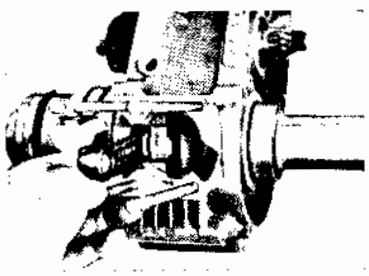
(Fig. 3-30)



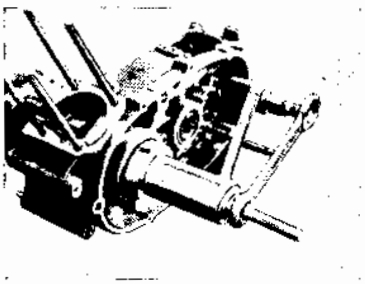
(Fig. 3-31)

b. Installation of the crank assembly: Insert the crank assembly from inside the case and fix the crank fit-in tool at the outside (do not forget the use of crankshaft shim A and B).

Turn the fit-in tool nut and pull in the crankshaft (keep the connecting rod at the upper dead point when it is brought into the case; also the crank chamber filler metal must be brought in, keeping it right upward and immovable). (Fig. 3-32). Yamaha Bond No. 5 must be applied to the filler metal gasket of the crank cover. When the crank is inserted completely, the spanner ceases turning due to pressure. At this point, loosen the nut and take off the tool.



(Fig. 3-32)



(Fig. 3-33)

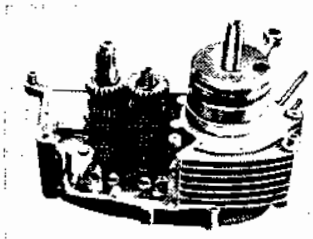
3—4 Combining crankcase L and crankcase R.

a. Apply Yamaha Bond No. 5 to the surface of crankcase L and the filler melta gasket of the crank cover.

b. Apply Yamaha Bond No. 5 to the surface of crankcase R. (Spread Yamaha Bond No. 5 evenly all over the surface.

c. Put crankcase R over crankcase L and combine the two while striking them with a soft hammer. (Strike the crank side and the transmission side alternately with soft hammer so that they will become parallel with each other. Make sure that the filler metal gasket will not stick out).

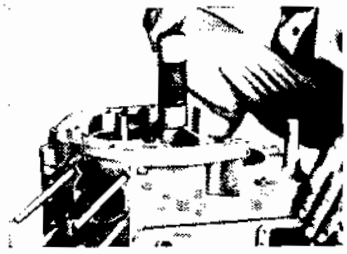
d. Fasten the two crankcases tightly with the 12 clamping bolts.
(After fastening the whole lightly, fasten further the upper and lower, right and left parts of the chank chamber and the transmission chamber alternately.)



(Fig. 3-34)



(Fig. 3-35)



(Fig. 3-36)

3—5 Installation of the shifters

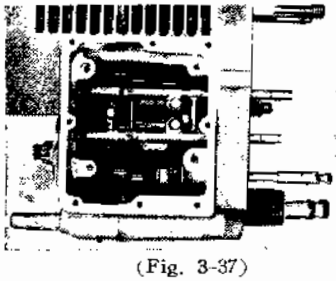
a. Fit the three shift forks into each shift gear of the transmission, thrust them with shifter shaft, and fix them with clips from the inside to the outside. (Fig. 3-38 and 3-17).

b. Move each shift fork and set the transmission in "neutral".

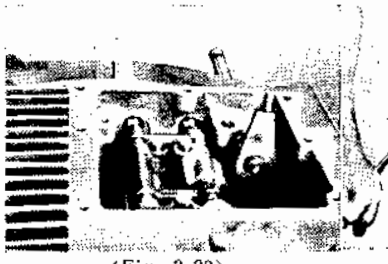
c. Install the shifter cam assembly.

d. Install the change link and check up the movement of the change.
Install the change pedal and, turning the driving axle, test the movement of the change. In the case of underslide or overslide, adjust with the stopper adjustment bolt. (See P. 31)

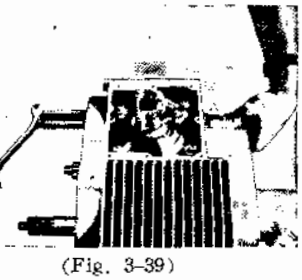
e.



(Fig. 3-37)



(Fig. 3-38)



(Fig. 3-39)

3—6 Installation of the piston, cylinder, and cylinder head.

a. Attach the needle bearing to the small end of the connecting rod, fix the piston with the same by piston pin, and fasten it with piston pin clip. Take care not to drop the piston pin into the crank chamber. Install the cylinder packing.

b. Insert the cylinder. Set the seam of the piston ring to the ring check pin and insert the cylinder while holding the ring. (This is a very delicate process). (and when you are careless, the ring may be broken.) Install the cylinder head gasket.



(Fig. 3-40)

c. Install the cylinder head. Fasten each nut evenly. Install plug beforehand.

The piston, cylinder, and cylinder head are installed prior to the parts necessary for the first reduction of speed so that fastening may be facilitated with the help of compression pressure.

3—7 Installation of the parts for the first reduction of speed and crankcase cover L.

a. Fit the main axle, with thep rimary driven gear.

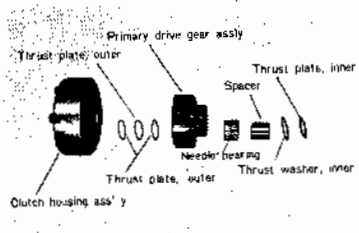
b. Fit the crankshaft with the thrust plate (inner), spacer and the thrkst washer (inner) and insert the needle bearing.

c. Combine the clutch housing assembly and the primary drive gear assembly through the thrust plate (outer) and the thrust washer outer in the center, and fix them to the crankshaft.

d. Fix the check washer and fasten it with nuts. After knocking the spanner with iron hammer for fastening tightly, raise the lock washer.

e. Drive in the clutch push crown. Keep the lever stopper of the push crown turned upward.

f. Fix case cover L to the case with the aid of packing and fasten it with bolts.



(Fig. 3-41)



(Fig. 3-42)



(Fig. 3-43)

3—8 Installation of the oil pump.

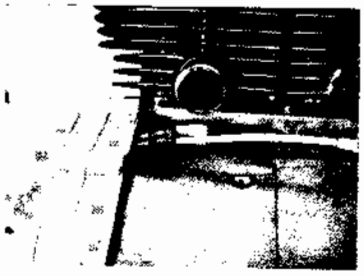
a. Install the worm shaft.

b. Apply packing ointment to the pump gasket and fix it to the pump assembly. Apply packing ointment also to the surface which will contact the case cover.

c. Putting the delivery pipe through the hole of the case, install the pipe assembly. Fig. (8-12).

d. Insert the oil pipe into the hole, pull the two delivery pipes and the oil pipe fully and fix them with grommet. (Fig. 3-44).

e. Fit the cylinder with the delivery pipe through the banjo gasket B, by using the banjo bolt (oil discharging nozzle). (Fig. 3-11).



(Fig. 3-44)

3-9 Installation of the carburetor, and dynamo.

a. Connect the carburetors L and R with the starter lever.

b. Install the drive sprocket with felt inside and fix it by lock washers and lock nuts. (Fig. 3-10).

Put in the change and tighten it securely by special spanner and iron hammer, utilizing the compression of the engine.

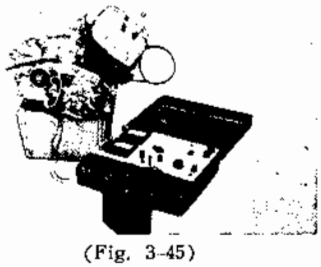
c. Install the dynamo assembly.

Insert the crankshaft key and attach the armature.

Fix the yoke assembly with fitting bolts.

Install the cam and fix it with 7ϕ bolts.

Fix the brush spring to the brush and take down the brush.



(Fig. 3-45)

d. Set the time for ignition. (See 44P).

Upper dead center 1.8 mm.

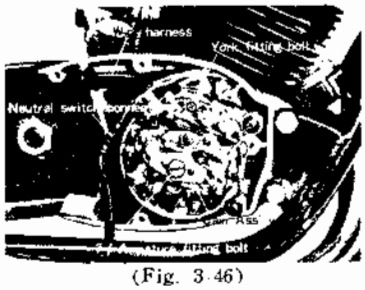
(The process of work under 3-9 may take place after the engine is installed on the body of the vehicle).

3-10 Installation of the engine and other apparatuses.

a. The roter in which to install the engine over the body of the vehicle is reverse to that for the removal of the engine from the vehicle.

Fit the engine with kick arm and put the engine on the left side of the body.

Ride over the body of the vehicle, raise the engine and move it backward; simultaneously, move it toward the right and move the engine forward at the central position and then lower it.



(Fig. 3-46)

Fix the engine by the four engine fitting bolts.

b. Fasten the ring nut to the exhaust pipe, with gasket in the middle.

c. Install the chain. Adjust the stretch of the chain.

d. Install the wiring of the dynamo. Insert the neutral wiring connector.

e. Insert the oil pipe into the union bolt of the oil tank.

f. Connect the tachometer cable with the gear unit.

g. Insert the fuel pipe into the carburetor and fit the throttle valve with throttle Wire B and fit it into the carburetor.

h. Pass the pump wire into the case cover and fit it into the adjust pulley (Fig. 3-47.)

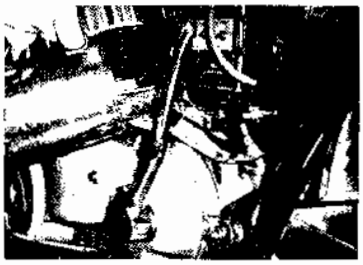
i. Install the air cleaner assembly.

j. Fit the handle lever with clutch wire.
Adjust the play of the clutch wire by adjusting screw. (P 26).


(Fig. 3-47)

k. Pour gear oil (1,400cc of Yamaha Gear Oil) into the engine (Fig. 3-48).

Lastly, draw air out of the oil pipe. (See the paragraph concerned in P5). After starting the engine, adjust idling (1000 rpm). Then, carry out warm-up for about three minutes at 2000 to 3000 rpm. In the meantime, check the operation of the oil pump and the clutch change, and also pay attention to "sound".


(Fig. 3-48)

Here, check the operation of the throttle cable and the pump cable. Make sure that throttle valves right apd left and the adjust pulley operate simultaneously. (See the section of pump setting in P5).

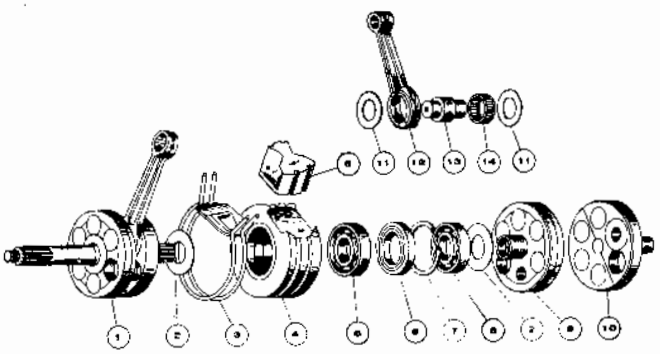
note:
Yamaha gear oil→Motor oil 10W/30
1400 cc→1½ quart

3. Description of the structure

1. Crankshaft

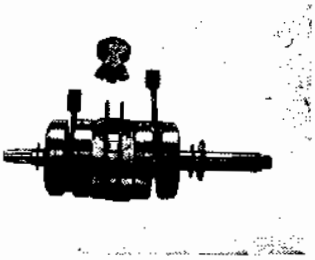
The crankshaft is a part which requires highest precision and morever, contains expendable elmentis. It must be handled with carc.

1 -1 Components of the crankshaft.



1 Crank (L) Assembly
2 Crank shaft shim D (30-44-0.5)
3 Filler meta gasket
4 Crank cover
5 Filer metal
6 Crank shaft bearing B (6206)
7 Crank shaft bearing cup
8 Crank Shaft labyrinth seal
9 Crank shaft (L)
10 Crank shaft (R)
11 Crank pin shim
12 Connecting rod
13 Crank pin
14 Connecting rod large end bearing

(Fig. 3-50)

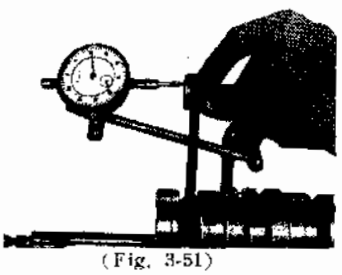


(Fig. 3-49)

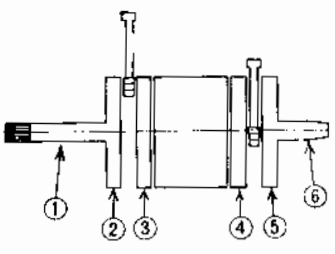
1—2 Checkup and adjustment.

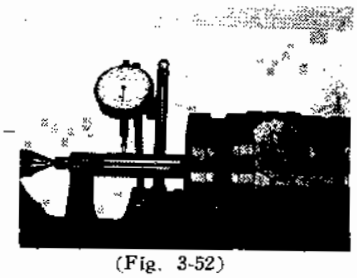
a. Checkup of the crankshaft componets.

Fitting of piston pin bearing with piston pin.	To the extent where the piston pin can be pushed into softly.	Replaee the needle roller piston pin when the fitting is too loose.
Axial deflection of the small end of the connecting rod(this shows the extent of attrition of the large end of the connecting rod, crank pin, and bearing).	Deflection should be less than 2 mm. it is measured with dial gauge, by keeping the connecting rod at the top dead center).	If the deflection is more than 2 mm. ,the crank must be broken up: the deflection after the replacement and correction of connecting, crank pin and bearing must be 0.8 to 1.0mm.
Checkup of the axial clearance of large end of the connecting rod.	Clearance should be less than0.1 to 0.3mm. it is measured by thickness gauge by bringing connecting rod to one side,	When clearance is too large, crank should be broken up and the Worn-out part should be replaced.
Precision of the crank assembly (check up the eccentricity of each part of the crankshaft).	At each point, the dial gauge must read within the following limis: (1)0.03; (2)0.06; (3)0.06; (4) 0.0; (5)0.06;(6)0.03.	Crrection should be made by knocking fly-wheel of the crank with special copper hammer and metal pad.



(Fig. 3-51)





(Fig. 3-52)

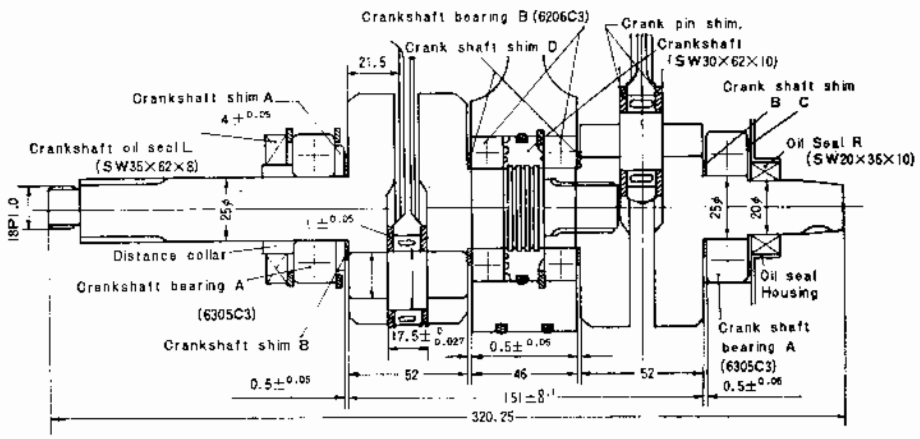
b. Checkup when disassembing the crankshaft.

Crank pin must be replaced in the following cases: when there is a flaw on the surface on which the roller moves; and when the wear and tear is more than 0.05 mm. the standard diameter is $24\phi^{0}_{-0.013}$)

The great end of the conrod must be replaced in the following cases: when there is a flaw on the surface on which the roller moves; and when the wear and tear is more than 0.05. (the standard diameter is $30\phi^{+0.013}_{0}$).

※In case the crank is recomposed, after measuring the deflection at the small end of the connecting rod and clearance at the large end, due to such reasons as great mileage and noise, it is desirable to replace the crankpin, connecting rod needle bearing, and crankpin shim simultaneously.

c. Specifications of the crank assembly.



(Fig 3-.53)

1—3 Major differences from the YDS2 Crank (YDS2→YDS3)

Changes in the structure due to increased strength and durabillty.

- ○ Diameter of the axis: 20φ (25φ 25φ→30φ at the central fitted part)
- ○ Clutch fixing screw: 12mm P (pitch) 1.25→18 mm P 1.0
- ○ Interval of the cylinders: 95→99 mm.
- ○ Internal diameter of the small end of the connecting rod: 19φ→20φ
- ○ Crankpin: Overall length, 49.5→51.5.
- ○ Crank cover: Overall width, 44→46 mm.
- ○ Small-end bearing: 15×19×19.2—16×20×19.2

Besides, there are changes in the bearing, oil seal, clip, washers, and crankshaft, diameter.

Common parts:	Crankpin shim	YDS2
	Crankpin bearing (24×30×15)	YDS2
	Filler metal gasket	YD3, YDS2

2. Cylinder, piston and piston ring:

Like the crank, these parts require precision and contain wear and tear elements, so that they must be handled with cere.

2—1 Checkup and adjustment:

Checkup and adjustment should be made as follows whnn output decline and engine noise occur due to wear and tear caused by long-term use.

(Adjustment or correction is made at different times, depending on the quality of fuel and oil and the conditions of use, such as speed and road condition. Wear and tear is reduced and long-term use is made possible if, above all, the removal of carbon and the cleaning of the air cleaner are conducted periodically).

a. Correction of the cylinder:

Wear and tear on the cylinder is measured, by bore micrometer or cylinder gauge, at four points as shown in the illustration below.

Honing is necessary when the difference between the maximum and minimum bores exceeds 0.05 mm.

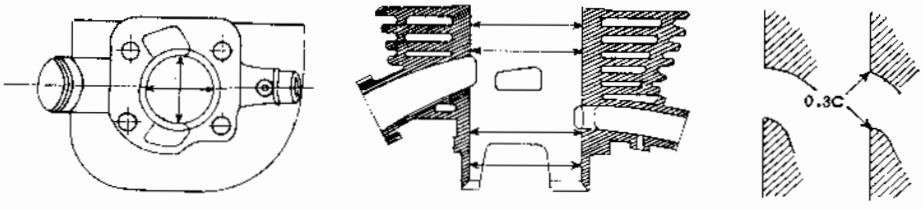
When deformation due to wear and tear is great or when there is a flaw on the wall, boring is conducted to complete honing.

note: This correction is made according to the size of a substitute piston (oversize), with the addition of a clearance of 0.050 to 0.055 mm.

Each bore error after correction should be less than 0.01 mm.

Lastly, each port is molded.

Dimensions are shown in the skirt of the standards size cylinder for produced vehicle and parts.



(Fig. 3 54)

b. Piston

Standard sizes for the piston: 55.96, 55.97, 55.98, 55.99

Oversizes for the piston: 56.00, 56.25, 56.50

(The piston head is marked with the size).

note: The piston is measured by microp meter, at a point 10 mm from the lower part of the piston skirt.

c. Piston ring:

In case the cylinder is corrected and the piston is replaced by an oversize one, the piston ring, too, should be replaced by a new or oversize one after the following checkup.

Clearance at the seam of the piston ring:

First ring 0.15→0.3mm.

Second ring 0.10→0.2mm.

Fix the ring on the cylinder horizontally and measure the seam clearance by thickness gauge.

Sizes for the piston ring:

Besides the standard sizes (for the standard piston, there are oversizes of 0.25 and 0.5.

First ring—is coated with chrome.

Second ring— is treated with parkerizing.



(Fig. 3-55)

2—2 Fitting.

Fit the second ring and then the first ring onto the piston. (The side bearing the mark of the ring manufacturer is kept above).

Fit the piston pin clip into one side of the piston pin hole of the piston, connect it to the connecting rod together withthe piston pin bearing and piston pin, and fasten then with a piston pin clip.

Install with the arrow mark of the piston turned forward.

Hold the piston ring by hand, setting the ring seam to the fixing knockpin, and insert the cylinder, keeping the ring from contacting the cylinder. (Fig. 3-40)

2—3 Major differences from YDS2

(Changes in structure due to improved performance and the application of Yamaha Auto-Lube).

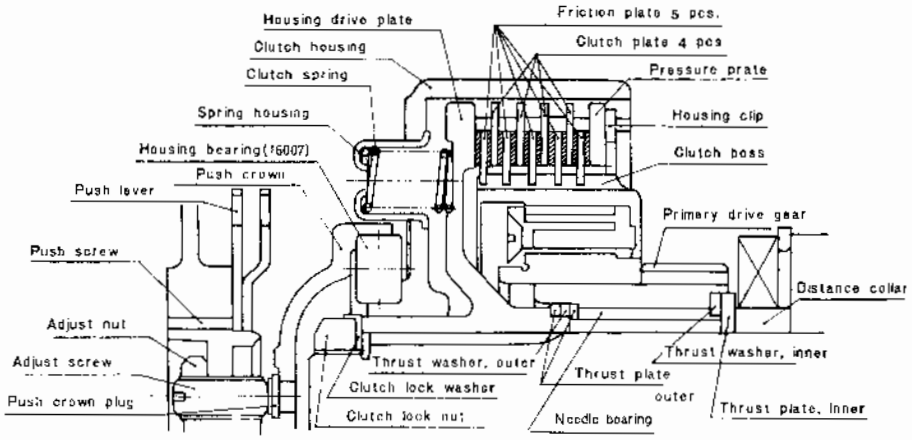
Cylinder - change in the carburetor fixing part and the form of inlet port; internal diameter of the oil discharging nozzle fixing port 22ϕ (YDS2) →24ϕ, VM24 carburetor installed.

Piston - Width of the piston ring, 2.0 mm (YDS2) → 1.5 mm; diameter of the piston pin →15ϕ (YDS2) →16ϕ (common to YA 6).

Other — change in the arrangement of the cylinder stud bolts.

3. Clutch

3—1 The structure of the lutch, clike that of YDS2&YD3, is of outerpush type and wet multiple-disk system.



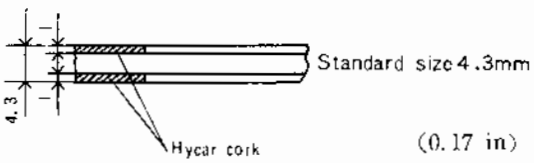
(Fig. 3-56)

Transmission of power: Clutch housing is rotated by the clutch drive plate splined into the crankshaft. Power is transmitted to the friction plate and then conveyed to clutch boss through the clutch plate and the pressure plate, fitted into clutch housing, by the force of pressure from the clutch spring. The primary driving gear, inseparably connected with the clutch boss, reduces the speed and conveys it to the primary driven gear and then to the main axle.

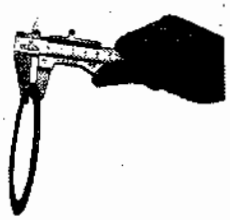
Operation to disengage the clutch: When the handle lever is grasped, the clutch push lever is worked by the clutch cable. The push screw, which is connected with the clutch push lever, goes into motion accordingly, and the adjust screw pushes clutch housing through the push crown bearing. This loosens the pressure of the clutch plate and friction plate and, interrupts the transmission of power.

3- 2 Checkup and adjustment

a. Checkup of the wear and tear of the friction plate: The friction plate is an abrasion part. It should be replaced when the wear and tear exceeds 0.3 mm. as compared with the standard size. (The standard size is 4.3 mm).

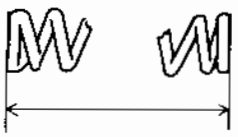


(0.17 in)



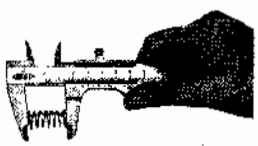
(Fig. 3-57)

b. Wear and tear of the clutch spring: When the free length of the clutch spring is less than the standard size by 2 mm. or more, the spring should be replaced. (The standard size is 25.5).



Standard size
25.5mm

(1.0in)



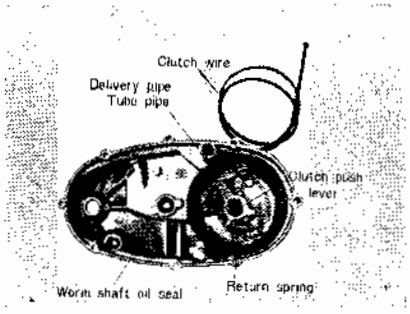
(Fig. 3-58)

3—3 Installation of the clutch push lever

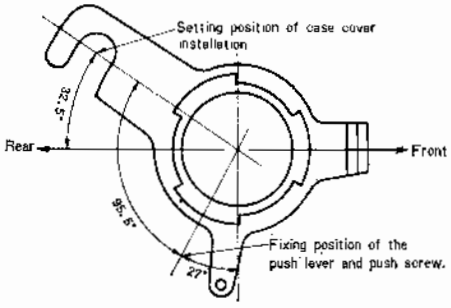
The clutch push lever, which is calked with the push screw, should be installed or removed together with the push screw.

a. The clutch lever can be removed by detaching the clutch cable and the lever return spring and by turning the lever to the right.

b. In installing it, take care to follow the proper setting position.



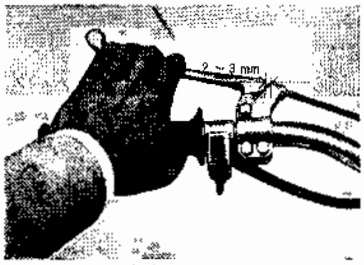
(Fig. 3-59)



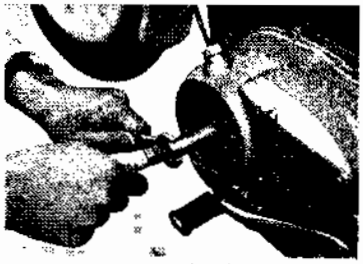
(Fig. 3-60)

3—4 Adjustment of the tension to the clutch cable

Adjustment must be made by loosening the lock nut and turning the adjusting screw, so that the play of the handle lever will be 2 to 3 mm. After adjustment, the lock nut is fast enedtightly. The play will be decreased by tnring the screw to the ight.



(Fig. 3-61)



(Fig. 3-62)

3—5 Major differencer from YDS2

(Changes in the related parts following the change in the diameter of the crankshaft). Strength and durability are improved by increasing the capacity of the clutch). Changes in the related parts such as clutch housing, housing drive plate, clutch boss (primary drive gear) assembly, and push crown:

Friction plate → 3 to 4 [Improved 4 to 5]
Clutch plate → 2 to 3 [YDS3 3 to 4]

Clutch spring → some parts are the same as those for YDS2 and YDT1 but are different in setting size. (spring constant → 2.14kg/mm → 2.12kg/mm).

Common parts: (YD3, YDS2)

Pressure plate

Friction plate

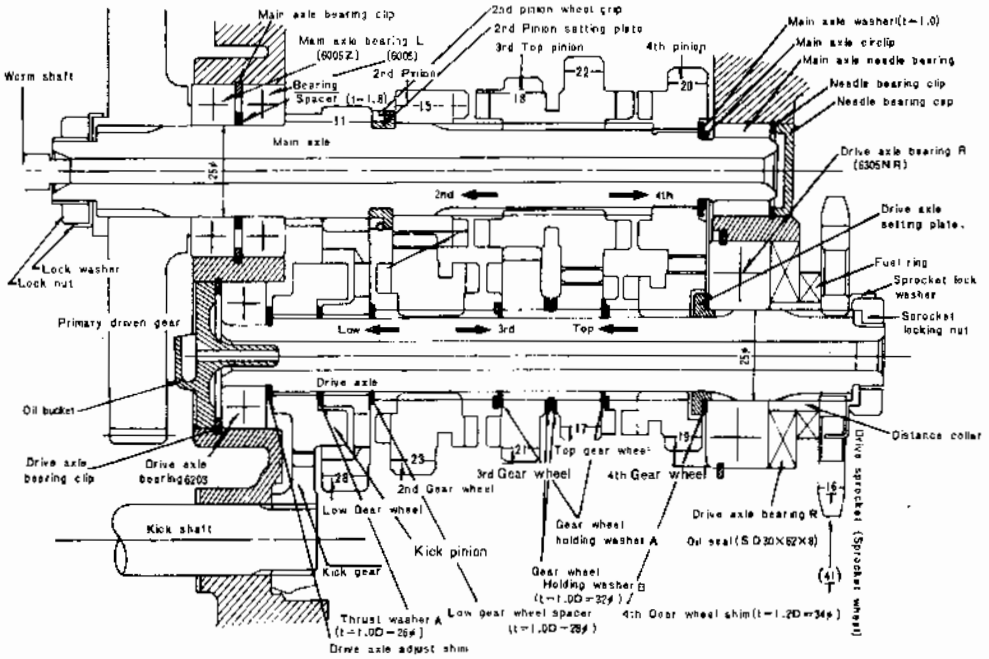
Push screw

Adjusting screw, adjusting nut

4. Transmission, kick

4 -1 Structure and arrangement of the transmission:

Constant mesh, 5 forward speed transmission of the YDS series, with the same first reduction and transmission speed change ratios as in the case of YDS2.



(Fig. 3-63)

First reduction ratio: primary driven gear/primary drive gear 65/20=3,250.

Second reduction ratio: sprocket wheel/drive sprocket 40/15=2,667.

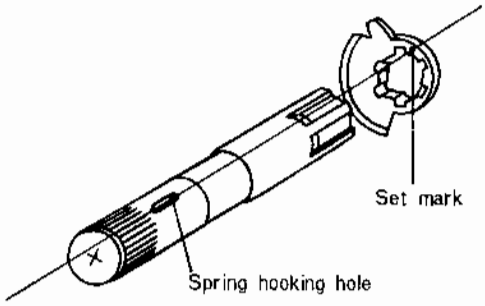
Gearshift ratio		Total reduction ratio
Low	28/11=2,545	22,042
Second	23/15=1,533	13,287
Third	21/18=1,167	10,116
Fourth	19/20=0.950	8,234
Top	17/22=0.773	6,700

(Total reduction ratio=Primary reduct ratio×gear shift ratio×second reduction ratio).

4-2 Kick apparatus

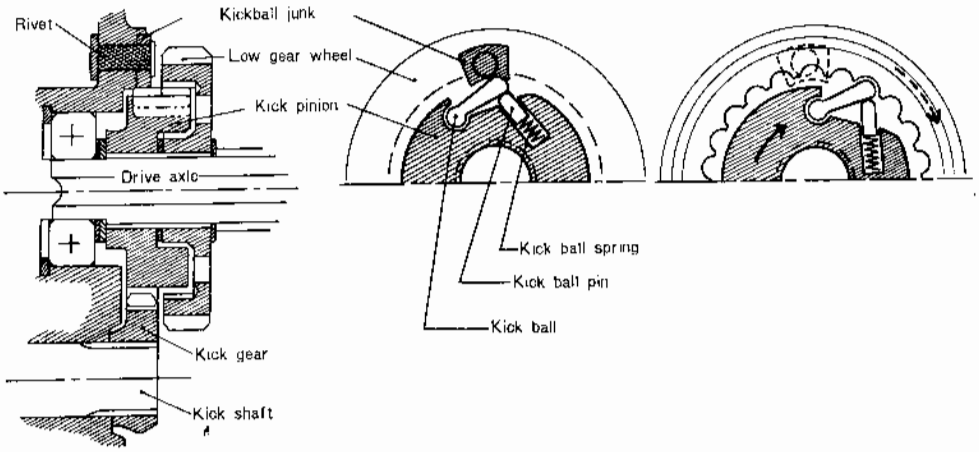
a. Assembling of the kick shaft and the kick gear. The kick shaft and the kick gear are fitted into position by shrinkage as shown in the illustration.

b. Installation of the kick shaft. Insert the kick shaft from inside the case and fasten the outside by clip; insert the kick spring into the fixed hole of the case, fit the other end into the spring hole of the kick shaft, after turning it by 120 degrees with the spring hooking tool; insert the shaft to the innermost part by plier and iron hammer; drive in the spring junk to fix the shaft.



(Fig. 3-64)

c. Operation of the kick apparatus. The kick gear is in constant mesh with the kick pinion kept the low gear wheel; in a free state, the claw (kick pole), built into the kick pinion, is checked at the head by the click hold (kick pole junk), rivetted to the case; if the kick gear turns the kick pinion while the kick is in motion, the kick pole will fall off from the kick pole junk and, due to pressure from the kick pole spring, the head of the pole will touch the drill work groove of the low gear wheel and rotate the low gear whel transmits power to the main axle and thence to the clutch, primary gear and the crank in this order.



(Fig. 3-65)

4—3 Major differences from YDS2

(Improved strength and durability)

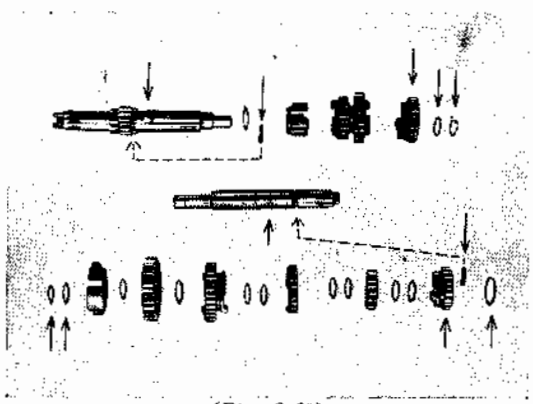
Main axle: primary driven gear fitting part 20ϕ→25.
main axle bearing R—6203 ball bearing→needle bearing.
main axle bearing L—6004, two6005, 6005Z.

Drive axle: drive sprocket fitting part—20ϕ→25ϕ.
drive axle bearing R—6304→6305 NR.

Others: Due to change in the diameter of the axis, such parts as primary driven gear, four-speed pinion, four-speed gear wheel, drive sprocket, bearing, oil seal and washer have been changed.

Common parts: kick shaft, kick gear assembly, kick pinion and related items, pinions (low, second, third and top), gear wheel and others.

(Note) Changes are limited to those made after YDS2, No. 9630.
Parts exclusively for YDS3 are shown by an arrow mark: other parts common with those for YDS2.



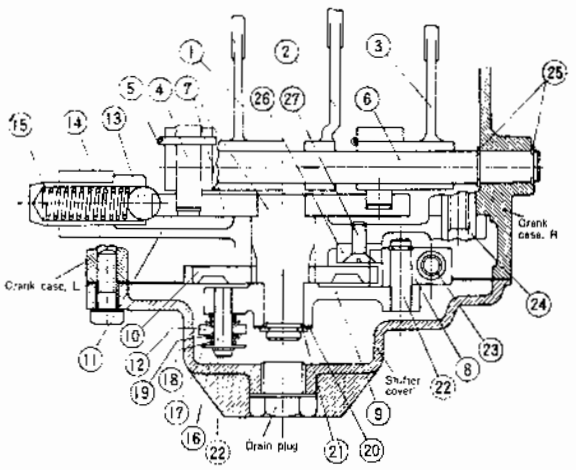
(Fig. 3-66)

5. Shifter change

5—1 Structure and operation of the shifter

a. Structure

Shifter assembly



(Fig. 3-67)

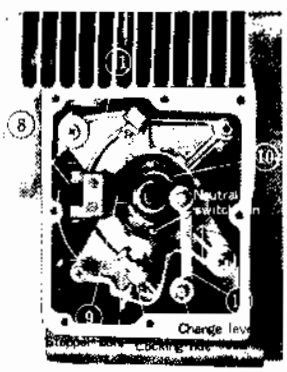
No.	Name of the parts	No.	Name of the parts	No.	Neme of the parts
1.	Second gear wheel shift fork	10.	Shifter working plate	19.	Change link ball washer
2.	Third top pinion shift fork	11.	Shift cam sem setting plate	20.	Shaft cam shim
3.	Fourth gear wheel shift fork	12.	Change link	21.	Shift cam clip
4.	Shifter rotor	13.	Cam stopper ball	22.	Shifter pole shaft
5.	Rotor stopper pin	14.	Cam stopper spring	23.	Shifter pole spring
6.	Shifter shaft	15.	Cam stopper bush	24.	Shift cam setting plate pipe knock
7.	Gear shift cam	16.	Shifter pole shaft clip	25.	Shifter shaft clip
8.	Shifter pole	17.	Change link plane washer	26.	Shifter pole free plate
9.	Shifter pole holder	18.	Change link spring	27.	Free plate set screw

b. Operation

The movement of the change arm is conveyed to the change lever through the change shaft, and to the shifter pole holder (9) from the change link (12).

The shifter pole holder is fitted with shifter pole (8), with the shifter pole shaft (22) pressured into it. It gives rotary motion to the shifter working plate (10).

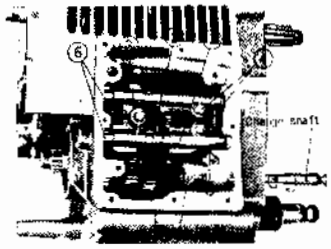
The working plate, which is splined into the gear shift cam (7), rotates the gear shift cam simultaneously.



(Fig. 3-68)

The gear shift cam groove which operates the shifter rotor (4) connected with the shift forks (1, 2 and 3). Rotation of the shift cam gives right and left linear motion to the shift forks, through the shifter shaft.

The shift forks change the mesh of each shift gear and gives six speed shifts including neutral.



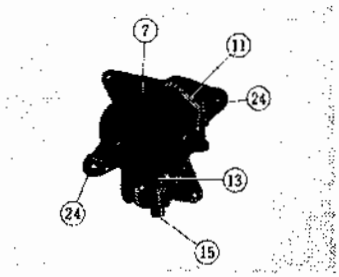
(Fig. 3-69)

5-2 Checkup and adjustment of the change operation

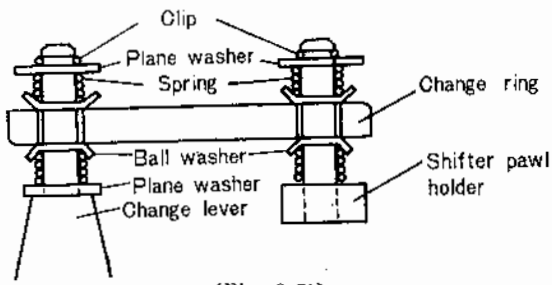
a. Keep in mind the followings:

Spline fitting of the gear shift cam and the shifter woking plate should conform to the marked position.

Whether there is any unusual wear and tear on the shift fork should be examined. (After checking up the change after assembling, examine whether the transmission is operating smoothly).



(Fig. 3-70)



(Fig. 3-71)

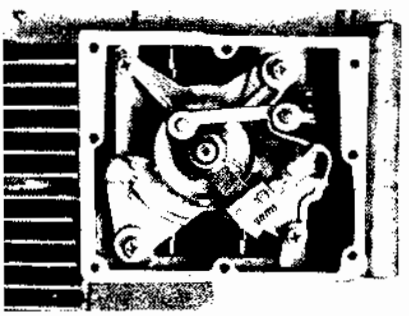
When assembling, set each shift fork in the neutral position. (This must be confirmed by driving the main axle). Also using the stopper of the shifter cam to the neutral position.

Installation of the change link part.

b. Checkup:

After installation of the shifter assembly and before installation of the shifter cover, fit the change shaft with the change arm, and check the change operation while operating the main axle or the drive axle,

Stopper balls must fit surely into the stopper grooves of the shift cam and the dock of the transmission, too, must be geared



(Fig. 3-72)

accurately. It may sometimes occur that the engine cannot be installed due to insufficient delivery or passes over the proper place due to excessive delivery. The shifter pole (pole holder) must be returned surely to the center of the working plate.

Change in operation must be smooth at each stage. Operation of the transmission, too, must be smooth.

c. Adjustment

Adjustment is made by working strokes of the shifter pole (shifter pole holder) which rotates the shifter working plate. Adjustment must be made by the stopper bolt so that the clearance between the click of the shifter working plate and the shifter pole will become about 1 mm., at the position shifted surely by one stage (when the stopper ball fits into the stopper groove of the cam).

5—3 Major differences from YDS2:

Following changes have done due to the addition of a neutral lamp:

Fitting of the shifter working plate with neutral switch pin;

Fitting of the shifter cover with neutral switch:

Others: changes in the shifter setting plate and the shifter pole holder:

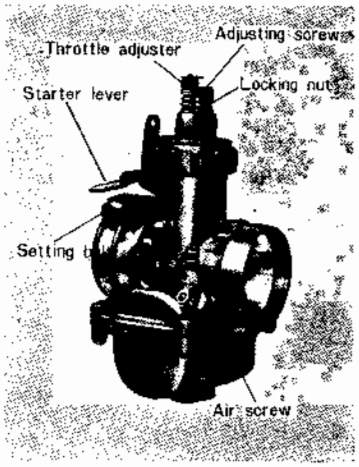
others are the same as those for YDS2 (after No. 9630).

6. Carburetor

VM24SC, a carburetor fitted with a starter similar to YDS2 and with a greater main bore, has been adopted. Also the manifold of the cylinder has been changed due to the adoption of Auto-Lube. Accordingly, the surface joint method for carburetor installation has been changed to the insertion system, making installation and removal of the carburetor easier than before.

6—1 Setting

Form	VM24SC
M. J. (Main jet)	# 120
N. J. (Needle jet)	0-0
J. N. (Jet needle)	4D4-2 Stages
C. A. (Throttle valve cut)	2.0
P. J. (Pilot jet)	# 20
A. S. (Air screw return)	1½ turn ± ¼
G. S. (Starter jet)	# 40



(Fig. 3-73)

6—2 Adjustment of idling

Adjust the throttlecable an d pump cable. (See 5p) Tighten the air screw completely and the return it by 1.5 turns.

Start the engine, and warm it up for one to two minutes at the rate of about 2000 r. p. m.

Close the axle grip completely and adjust it by throttle adjuster so that rotation of the engine may be stabilized at about 1000r. p. m.
(Operation of the egine is slowed down by fastening the adjuster).
Make sure that explosions on the left and right sides are regular and alternate.
(This can be ascertained by the exhaust sound at the top of the muffler).

7. Others

7—1 Checkup of the bearing, oil seal and clip

These parts suffer wear or damage from long-term use. Continuing use of worn-out or damaged parts may impair the primary functions of these parts and exert adverse effects upon other parts or damage them. Checkup, therefore, must be conducted carefully, and even slightly damaged parts must be replaced.

a. Bearing

Bearings must be replaced when loose due to wear and tear, producing strange sounds has a flawed surface, or does not operate smoothely. In assembling the engine, apply oil to bearings which are used again.

※A new bearing must not be washed because it is wet with special oil.

Assembling must be made by using a metal pad which contacts the outer and inner races simultaneously, for the prevention of inclination. (Or press must be used to glve pessure).

b. Oil seal

Oil seals must be replacred in the following cases.

When rubber at the fitted part (outer periphery) has become worn out or deformed; where is a flaw on the lip; when there is wear and tear on the lip (the edge is dull in this case).

Keep in mind the followings:

Apply a small quantity of oil to the lip of the oil seal and the fitting surface; (apply grease to the inside of the W lip); apply oil also to the outer periphery of oil seal to facilitate fittng; pay attention to the surface and the spline groove of the axis in assembling, so that the lip will not be damaged; knock the oil seal lightly in parallel, by using the tube pad.

c. Clips

Clips must be replaced in the following cases:

Where there is a crack or crevice; when tension (flexibility) is lost; when there is a flaw.

Bear in mind the followings in removing or putting in clips:

Clip pliers and screw driyers must be used correctly so that no damage will occur.

In fittig clips into the grooves, make sure again that they are not hitched halfway, and are inserted fully.

Chapter 4 Body

1. Outline of the body system

As mentioned in "Preface," the body of YDS3 has been newly designed with stress on touring standard models, especially on balanced stable driving, durability, and riding comfort in both high-speed and low-speed driving.

1 -1 Main features

a. Frame

As in the case of YDS2, rigidity is fully assured by use of a double cradle-type pipe frame, which constitutes the foundation for a stable and comfortable riding position.

b. Suspension mechanism

Rigidity of the front fork has been increased and a three-stage shift formula adopted for the rear suspension spring, so that much higher efficiency is secured in high-speed cornering, and road holding on uneven ground.

c. Prevention of vibration

The engine mount has been changed from the conventional three-point support to four-point support, with a view to reducing vibration in high-speed runs. Also, the fuel tank mount made of rubber is a used for less vibration.

d. Service, easier operation, and simplified appearance

The air cleaner, service tools, batteries, etc.,
are housed in the side cover at the central part of the frame to maintain balance with the oil tank on the right side and to make smart the appearance.

1—2 Main differences from YDS2

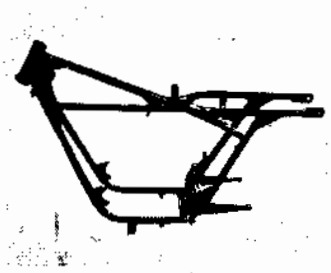
Name of parts	Reasons for change	Contents of change
Frame and rear arm	To improve driving stability	Increased bank angle Increased overall torsion rigidity Improvement of antivibration effects by changing engine support from 3 points to 4 points
Front fork	To improve driving stabilty To strengthen durability	Improvement of spring charactaristics Increased rigidity of underbracket Improvement of inner tube screwing formula New installation of dust seal and change in O ring position
Rear cushion	To improve driving stability To increase riding comfort	Improvement of spring characteristics and adoption of 3-stage shift formula Improvement of road holding by change in damping characteristics

Fuel tank	To improve antivibration effects	Adoption of rubber mount for the tank
Oil tank	To adopt autolube mechanism	Installation of the tank on the left side of the central part of frame
Side cover (battery and tool boxes)	To secure better appearance and facilitate overhaul and maintenane	Keeping battery ard tool box as one unit in the central part of frame
Front tire	To improve road holding and strengthen durability	Enlargement of tire size from 2.75-18 to 3.00-18 for expanding its surface of contact with the ground
Brake pedal	To secure smooth wire operation	Combined use of link mechanism
Seat	To increase riding comfort	Increased cushion stroke
	To strengthen durability	Change in the fixing of spring

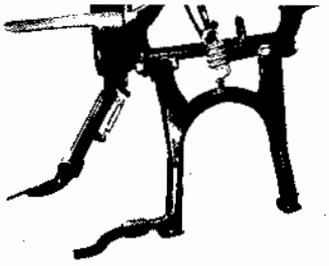
2. Assembly of the body

The particular differences from YDS2 and the YDS3 in the structure and function of the body are as mentioned above. As for the rules of assembling, however, we will explain them briefly because they are almost the same.

1. Frame system and under-carriage system
   - **a.** Press in the steering ball race.
   - **b.** Install the main stand and the side stand.
   - *c.* Install the right footrest, brake link equipment.

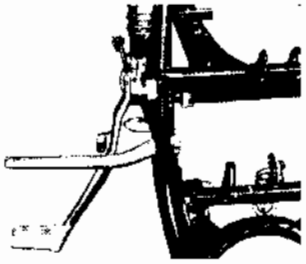


(Fig. 4-1)



(Fig. 4-2)

2. Rear arm
   - **a.** Build in rear arm bushes A and B and the distance collar.
   - **b.** Attach the arm to the frame through the thrust cover with the rear arm shaft.

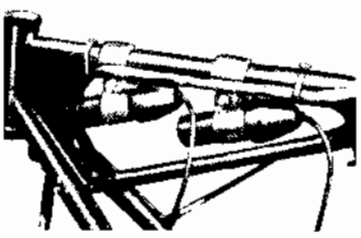


(Fig. 4-3)



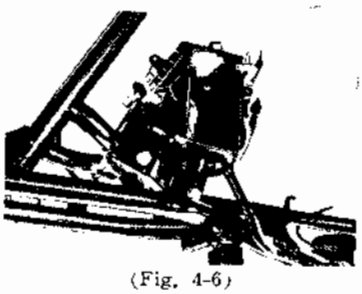
(Fig. 4-4)

3. Wire harness, ignition coils
   a. Attach the wire harness to the frame with wire harness band.
   b. Attach the ignition coils.



(Fig. 4-5)

4. Battery box
   a. Attach the battery box.
   b. Attach the regulator and horn and connect wire harness wiring.



(Fig. 4-6)

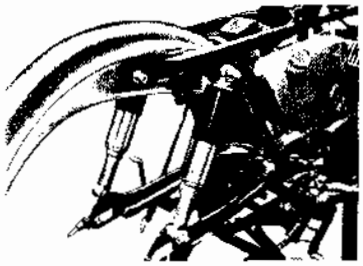
5. Oil tank
   Attach by two stays on the right side of the frame and by one stay at the lower part of the battery box.

6. Place the rear fear fender in position.
   Connect the tail light wiring.



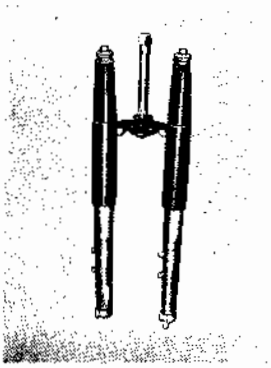
(Fig. 4-7)

7. Place the rear cushion and chain case in position.
8. Installation of the rear wheel assembly.
   Place the tension bar and rear brake cable in position.

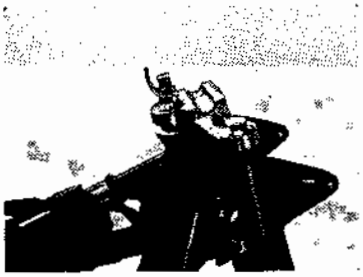


(Fig. 4-8)

9. Installation of the front fork assembly
   a. Install the front fork assembly on and under the steering head through the balls and the ball race.
   b. Fasten by handle brackets and steering shaft lock nuts.

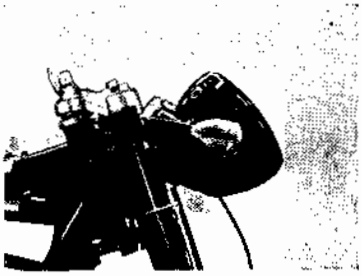


(Fig. 4-9)



(Fig. 4-10)

10. Installation of the headlight unit assembly.
    a. Install on the front fork cover together with the flasher lamp.
11. Installation of the handle assembly and handle damper.
    a. Fasten by the handle holder.
    b. Place the handle damper in position.
12. Connection of each wire harness, main switch, and meter cable in the headlight unit.
13. Installation of the front fender.
14. Installation of the front wheel assembly
    Connect the brake wire and meter cable.



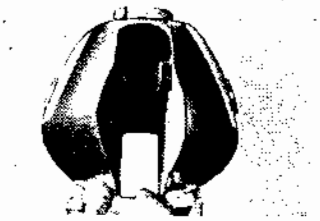
(Fig. 4-11)



(Fig. 4-12)

15. Installation of the fuel tank.

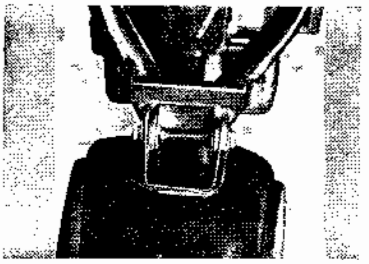
Insert the front part into the frame.
Attach the rear part by bolts to the bracket in the center of frame.



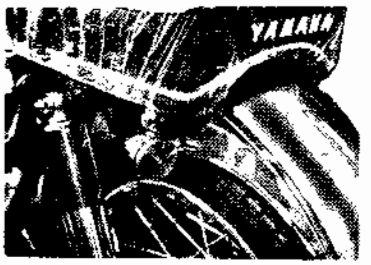
(Fig. 4-13)

16. Installation of the seat.

Fasten the front part of the seat on the frame hooks and clamp the rear part together by sheet fitting bolts with the rear fender.
Attach the rear flasher lamp by sheet fitting bolts.



(Fig. 4-14)



(Fig. 4-15)

3. Checkup and maintenance of the main mechanism

1. Frame

a. Checkup of welded parts

Particularly strict check up of the frame is recommended in the case of motorcycles which have experienced collision and overturn accidents. Check up for cracks, dislocations, and defects in welded parts. Take measures including rewelding and repairs accrding to the degree of damage.

b. Checkup of torsion and eccentricity

Particularly, torsion and eccentricity in the head pipe damages driving stability. Replace damaged parts which are difficult to correct.

c. Ball races and steel balls

Note that, if handle operation is not smooth it is due to the wear and tear of ball races and steel balls.

In the case of replacing, replace all the balls and ball races.

Avoid mixing old ball races with new ones.

Before placing in position, wash them thoroughly and grease them fully.

Drive ball race (A) in the upper and lower parts of the frame head pipe.

Drive ball race (B) in the lower part of the handle crown and in the upper part of the underbracket.

The total number of 6.35ø balls is 38, nemely, 19 each on the upper and lower sides.

2. Rear arm (swing arm)

(Checkup)

Check abrasion of the rear arm bushes.

Detach the rear wheel assembly and the rear cushion.

Move the rear arm in the direction of the axle, forward and backward. When it does not move smoothly, it means that bushes A and B are worn out. In this case, replace the bushes.

(Disassembling)

Pull out the rear arm shaft after removing the double nuts.

Take off rear arm bushes A and B from the rear arm shaft pole.

Frease them fully when they are assembled.

3. Front fork

(Disassembling)

a. Removal of the front fork assembly

Detach the front wheel, front fender, head lamp, and handle assembly.

By detaching the handle crown and the steering lock nuts, the front fork can

be pulled out downward. In this case, take care not to lose the balls in the ball races.

b. Removal of the inner tube assembly

Loosen the handle holder fitting bolts and turn the handle forward.

Loosen the underbracket clamp bolts.

Remove the cap nuts on the handle crown.

Insert the front fork service tool into the inner tube and pull the front fork downward by tapping it lightly.

(In this case, the fork cover and undercover will be left together with the underbracket, and the spring and the inner and outer tube assembly can be detached.)

c. Breaking up the inner and outertube assembly

Press down the shaft hole of the outer tube with a vice and unscrew the outer tube nuts. (It will be effective to twine the tire tube around the outer tube nuts.)

The assembly falls into the inner tube, outer tube nuts, and outer tube.

(**Assembly**)

a. Wash each part well.

Check damage and abrasion on the oil seals and O rings and replace them if damaged.

b. Put slide metal and O ring in the inner tube and put them in the outer tube.

c. Insert outer tube nut and drive oil seal into the outer tube nut.

(In inserting oil seal, take care not to cut the lip.)

d. Place the dust seal and spring seat on the oil seal and mount the spring.

e. Pass the inner and outer assembly through the undercover and pull up the inner tube from upside with a front fork lifting bar.

f. Pour 200 cc of Kayaba Oil No. 4 (or Motor Oil #30 and Spindle Oil # 60 mixed at the rate of 8 to 2), through cap nut screw hole at the top of the inner tube.

(**Checkup**)

Check whether there is oil leakage from the upper and lower parts of the outer tube nut. The main cause of oil leakage is the wear of oil seals and O rings.

In such cases, replace them.

Check whether cushioning gives unusal sound.

Replace oil periodically (every 6000 km 4000mi) (See P. 57)

Chapter 5 Electrical equipment

1. Outline of the electric equipment for YDS3

The electrical equipment system installed on YDS3 is of the 6V type, and generally, there are no particular points of difference from the YDS2 in functions and performance, etc. From a qualitative standpoint, however, the points of defect are rectified and durability has been strengthened, on the basis of precious data obtained over a period of two years in connection with YDS2. Particularly conspcious changes include the installation of a new-type speedometer, the new provision of a neutral lamp and a high beam indicator lamp and changed fitting position of the battery, regulator, etc., for the purpose of securing better appearance. Thus, the motorcycle has been made "de luxe."

2. Main component parts

2—1 Composition of the electrical equipment

The electrical equipment may be divided into the following three main groups:

I. Ignition system

This system has the function of running the engine normally by igniting and exploding mixed gas compressed in the cylinder with ignition plugs emitting sparks. Main parts belonging to this system are the contact braker (attached to the dynamo), condenser (attached to the dynamo), cam, ignition coils, spark high-tension cord, and battery as the source of primary electric current.

II. Charging system

The function of this system is to charge the battery, the source of primary electric current required for starting the engine and to supply power to all loaded units (lighting and signal systems) in running. Main parts belonging to this system are the dynamo (yoke, armature, brush), regulator (equipped with cut out relay), fuse, and battety which is the source of power.

III. Lighting and signal system

The system gives signals (signs) to other running vehicles and provides various measuring instruments, switches, and lamps, which are necessary for driving and operation, and lighting equipment (lighting system) which is necessary for night time running.

The signal system contains the horn, flash (lamp flasher relay,) charge lamp, stop lamp, speedometer, neutral lamp, and switches.

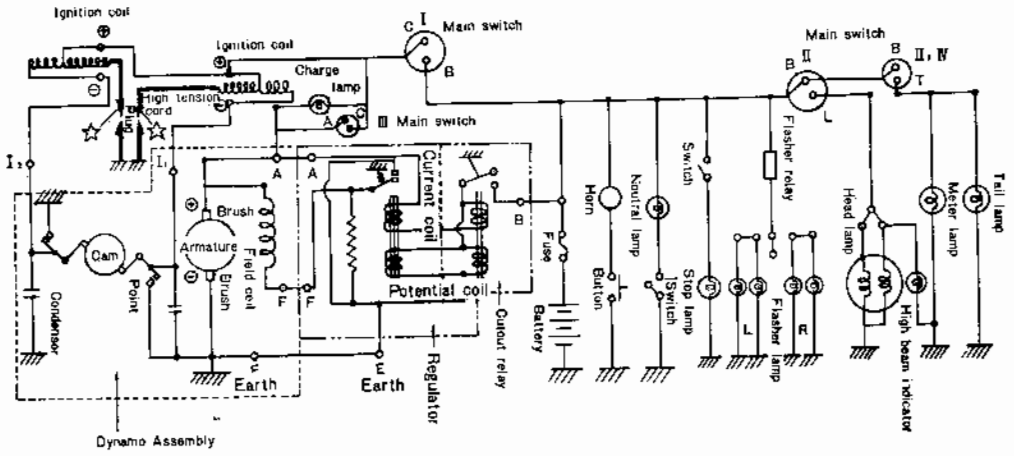
The lighting system has the head lamp, meter lamp, and tail lamp.

2—2 List of main component parts

	Names of parts	Name of makers	Types Specifications	Remarks
Engine part	Ignition dynamo	Mitsubishi Denki	DV65/6D1L Regular output: 7V65W/1,500rpm	Usable also in YDS2 and YDS1
	Neutral switch	Asahi Denso	YN6	Strengthened durability
	Spark plug	NGK	B-8HN or B-77HC	Newly installed at the bottom of shifter cover
Central Part of Framing	Regulator	Mitsubishi Denki	RN6225K	Common Part with YDS1 and YDS2 Installed in the lower part of seat.
	Ignition coil	Diamond Denki	TS-23	Common part with YDS1 and YDS2
	Horn	Mitsuba Denki	US-1	Common part with YDS2
	Stop switch	Asahi Denso	YS15	New type
	Battery	Nihon Denchi	MZ3-6A	Usable jointly with YDS2
		Furukawa Denchi	BMLT4-6 6V7.5AH	Change in length of exhaust tube
		Yuasa Denchi	MBF4-6A	
	Fuse box	Taiko Works	10×3pieces	Common with YDS1 and YDS2
Front Part Lamp Unit	Speedometer	Yazaki Keiki		New type
			Pilot lamps Charge lamp, Meter lamp, Neutral lamp, High beam indicator lamp } 6V3W	
	Main switch	Asahi Denso	YDS3	Common with YDS1 and YDS2
	※Flasher relay	Showa Denki Seiki	B-1 6V20W	Newly installed
	Head lamp	Koito Works	YHA-1 6V35WD	Common with YDS2
	※Front flasher lamp	Imasen Denki	6V10W×2	Newly installed, common to right and left
	Handle switch	Asahi Denso	YCS (switch to light, flasher lamp, and horn button)	Newly installed
Rear Part	Tail lamp	Koito Works	6V (tail) 5W/20W (stop)	Common with YDS1 and YDS2
	※Rear flasher lamp L. P.	Imasen Denki	6V10W×2	Newly installed

The above-mentioned parts are connected by wire harness (see Wiring Diagram).
※Installation available.

2—3 Connecting diagram



(Fig. 5-1)

3. Descriptions of the electric equipment

1. Dynamo

The dynamo assembly is composed of three units, that is the yoke assembly (field coil, contact breaker, condenser, brush, etc.), the armature assembly (armature coil and commutator), and the cam assembly (cam and timing plate).
It forms the source for the ignition and charge systems.

1—1 Ignition system

The ignition system consists of a contact breaker, condenser, and cam. It intermits the current (battery) flowing in the primary ignition coil and induces a high voltage current in the secondary coil.

a. Contact breaker assembly (checking and adjustment of ignition time)

If the ignition time is wrong, the engine will not start sat is factorily nor will it run smoothly. This will bring about undesirable conditions such as knocking, vibration, decrease of engine output, and overheating. It will also shorten the life of the engine. Be sure to check this point in all periodic checkups.

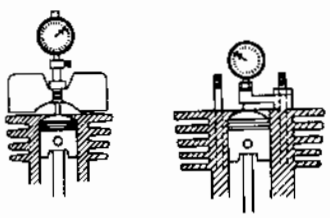
(Adjustment)

Following are the tools and instruments necessary for adjustment:

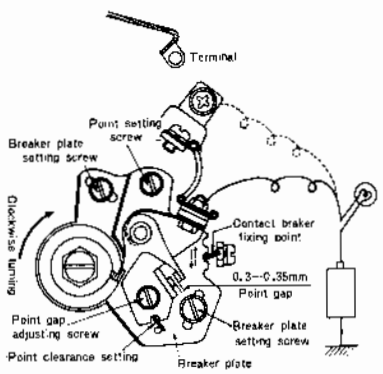
- Dial gauge
- Dial gauge mount
- Coutinuity test lamp
  - or
- Yamaha Electrotester

Point spanner
(−)driver
12mm spanner

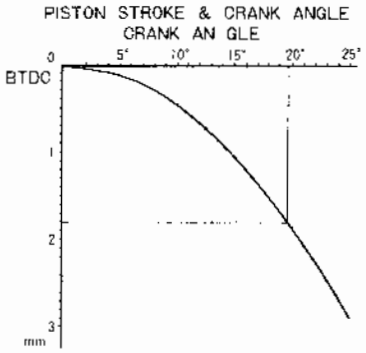
1. Fit the dial gauge and gauge mount into the plug hole of the cylinder head. Set 0 scale on the dial gauge to the top dead center of the piston. (Fig. 5-2)
2. Smooth rough point surface and wipe off oil matter (use sandpaper when burnt white and use oilstone when there is big roughness.
3. Set the point clearance at 0.3 to 0.35mm (turn the cam by spanner or driver and measure and adjust by thickness gauge in a position where the point is widest open. (Fig. 5-3)
4. Connect the continuity test lamp (Yamaha Electrotester) and make sure that it goes on and off. (Fig. 5-4)
5. Turn the crank in the opposite direction (counterclockwise) and make adjustment so that the point will close (lighting of the lamp) at 1.8 mm ± 0.03 (dial gauge leading) before the top dead center, the specified value.
   When the lamp lights before the specified value is reached, ignition is too late.
   When the lamp does not light even after the specified value has been reached, ignition is too early.
   For adjustment, loosen the breaker plate fitting screw and turn it by a screw driver in the opposite direction when it is too late and in the correct direction when it is too early, find the position where the lamp blinks, and fix the plate there.
   (The breaker plate, when screwed up, will somewhat move so make adjustment by keeping it temporarily tightened. (Fig . 5-5)
6. Do the above for both the right and the left. Keep the error on both sides within $\frac{3}{100}$ 0.03mm).
7. When the engine is mounted on the body, and wire harness is connected, detach the wiring of I_1, (grey2 and I_2, (orange) connected



(Fig. 5-2)



(Fig. 5-3)



(Fig. 5-4)

(Checkup)

When there is no spark conduct a continuity test of the contact braker unit.

(Check the plugs and ignition coils first,)

Points of checkup	Note	Contents of trouble	Countermeasure
①Movable point yoke (or I terminal)	Iusert a piece of paper between points or keep them open.	It is good if there is no continuity. When there is continuity, conduct the following checknp	
②Condenser yoke	Remove the lead wire between movable point and condenser.	It is good if there is no continuity. When there is continuity it means that condenser has been punctured.	Replace condenser.
③Movable point yoke	Detach the lead wire from movable point. condenser, and I terminal.	It is good if there is no continuity. When there is continuity, it means defective insulation in the point support shaft, lead wire, or terminals.	Correct short circuited parts.





(Fig. 5 5)

b. Condenser

(**Functions**)

The condenser stores static electricity the moment electric pressure is applied on its terminal and dischages is the moment its terminals are contacted. It also serves to curb a temporary increase in voltage when the conact breaker point opens (when the primary current is broken), to minimize burning damage by preventing between-point spark discharge, and to bring about a greater change in the primary ignition coil current.

(**Checkup**)

Continuity test. When there is continuity between the condenser lead wire and the earth, the condenser is punctured.

Precision test. In insulation test, insulation resistance should be 3 MΩ or more, and in capacity test, 0.22μF ± 10 % or less.

1—2 Charge system

The dynamo charge system is composed of a field coil and brush in the yoke assembly and the armature assembly (commutator). Alternating current is generated (induced voltage) when running of the engine causes the armature coil to cut off the magnetic force line of the field coil. This is induced as direct current fed from the commutator through the brush. The induced voltage is kept at a fjxed level by the work of the regulator, and the induced direct current is fed to all loaded units (ignition lighting, and signal systems and source of battery).

(**Chekup**)

In case there is defective generating or undercharge, check the dynamo if it is judged that nothing is wrong with the regulator.

a. Checking of dynamo

Disconnect the wire harness wiring from both terminals A and B of the dynamo. Next, ground the F terminal and put voltameter between the A terminal and the ground. In this connection, start the engine and keep it at 1400rpm.

(Note: Increased revolution of the engine will heighten voltage very much and will sometimes damage the coil and lead wire).

If voltage in this case is 5V or over, it is all right.

b. Checking of the yoke assembly (yoke unit test)

(Before checking, clean the assembly by carefully wiping off dust, oil, brush powder, etc.) Conduct continuity test on all parts and check whether disconnection and insulation are defective.

Places for checking	Note	Contents of trouble	Countermeasures
1 Brush holder-yoke		When there is continuity, it is thought that the brush holder, field coil, and both terminals are short-circuited. (cf. 3)	Repair shortcircuited parts.

2 Terminal A- Terminal F		If there is no continuity, it means that the field coil is disconnected. Even when there is continuity, check as set forth in 3.	Correct when there are disconnections outside the coil and replace with assembly when there are disconnections inside the coil.
3 Terminal F-yoke	Connections are made to A terminal.	When there is continuity field coil is short-circuited.	Repair short-circuited part
Terminal A	Disconnect lead wire from field coil.	The terminal part is shortcircuited.	





(Fig. 5-6)

c. Checking of the armature assembly

Checking of the commutator surface

Completely wipe off oil and dust from the surface of the commutator.

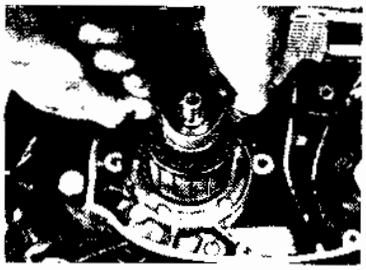
When the suface is rongh or staineed dark by brush powder, rub it softly with close-grained sandpaper (Fig. 5-7)

Wipe off brush power from the mica undercut groove by knife or wire.

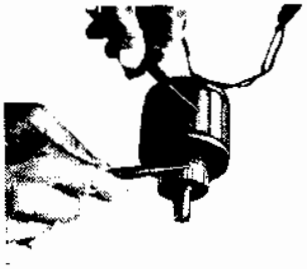
Continuity test, betwen the commutator and shaft (Fig. 5-8)

When there is continuity, it means that the armature coil is short-circuited. In this case, replace the armature coil,

Checking of the armature coil



(Fig. 5-7)



(Fig. 5-8)

Intra-coil defects cannot be checked except by special purpose test paper, so ask designated service agents for such checking.

d. Dynamo maintenance standards (DV65/6DL Type)

Places	Items	Maintenance Standards	Checking km
Field	Resistance value (20°C)	4.20Ω/20C°	At the time of abnormal voltage
Brush	Width × thickness × length	9×5×17mm	lst time, 6,000km
	Limit length for use	12mm	After that, every 4,000km
	Spring pressure	600g±15%	
Commutator	Commutator diameter	35φ	lst time, 6,000km
	Limit dia meter of abrasion	34φ	After that, every 4,000km
	Mica undercut	0.5to0.8mm	
	Mica undercut limit	0.2mm	
	Difference between maximum and minimnm diameters	Less than 0.05mm	
Breaker	Contact gap	0.3 to 0.4mm	Every 3,000km
	Cotact pressure	700g±10%	(At the time of unsatisfabtory high-speed revolution)
	Condenser capacity	0.22μF±10%	
	Ignition time	B+DC19.50 (1.8mm)	(At the time of unsatisfactory ignition)
Others	Dynamo outside diameter	103φ	
	Dynamo inaside diameter	97φ	
	Number of slectrodes	4	
	Core gap	0.4mm	
	Armature temper	19.8φ⅛	

2. Regulator

2—1 Functions of the regulator

The voltage of electricity generated by dynamo is unstable because it differs according to the number of engine revolutions. It is the regulator which serves to keep the voltage at a fined level; it curbs the flow of current to the field coil and keep the gencrated electricity at a certain voltage (this is also called voltage relay).

The regulator also contains a cutout relay, which connects a fixed electricity generated by the dynamo to a circuit for charging the battery and which prevents reverse current from the battery by disconnecting the battery circuit when the engine is not running or when the voltage of electricity generated by the dynamo is lower than that of the battery with the engine running at a low speed (this is also called charge relay).

2—2 Checking and adjustment

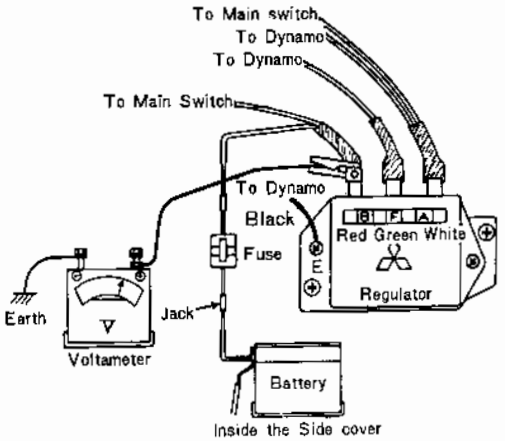
If the voltage adjusting function of the regulator goes wrong or stops, it will cause undercharge or overcharge of the battery and also burning damage to each electric equipment part. Therefore, use proper testers in checking and adjustment. (Adjustment requires a very high degree of precision, so master it, for example, through technical training courses.) In this respect, utilize the nearest designated electric equipment and service agencies.

a. Ignition load voltage

Connect a tester (direct current voltameter) as shown in (Fig. 5-9)

Start the engine and keep it at 3000 rpm. Next, remove the fuse connector and disconnect current from the battery. It is all right if voltage value in this case is 6.9V to 7.5V.

When it differs from the specified value, remove the regulator cover and adjust by bending the spring hook upward and downward by pliers. (Fig. 5-10)



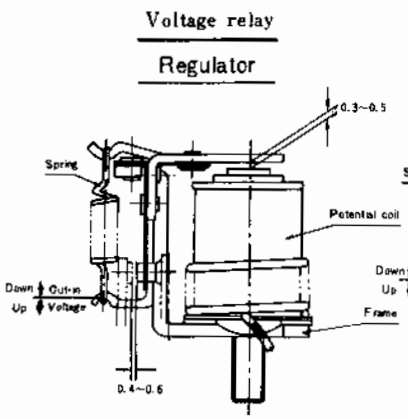
(Fig. 5-9)

b. Cut in voltage of the cutout relay.

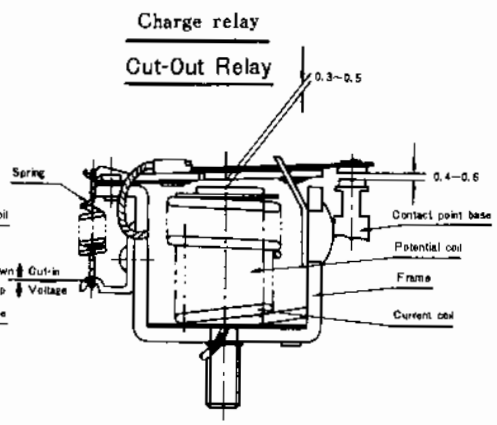
Connect the same way as in the case of ignition load voltage.

Start the engine and gradually quicken the speed. It is all right if the contact point closes with voltage standing at 6.5 to 7.0V (about 1500 rpm). When it is different from the specified value, adjust by bending the spring hook. (Fig. 5-11)

Note: There is little need to adjust the cutout relay in many cases.



(Fig. 5-10)



(Fig. 5-11)

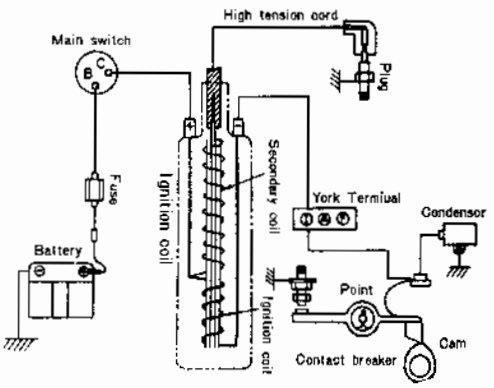
2—3 Maintenance standard

	Items	Maintenance standards	Checking km
Voltage ralay	Uuloaded voltage adjustment value	7.9±0.2V/3,000r. p. m 8.3V/5,000r. p. m	At the time of unsatisfactory charge
	Ignition coil load voltage	6.9-7.5V/3,000r. p. m	
	Voltage coil resistance value	2.26Ω/20°C	6,000km
	Field coil aeries resistance	10Ω	
	Each gap	cf. Fig.	
Charge relay (Cutout relay)	Cut-in voltage	6.5-7.0V	
	Cut-off voltage	3.7-4.3V	
	Voltage coil resitaace value	32.8Ω/10°C	
	Each gap	cf. Fig. Separate	

3. Ignition coil

3—1 Functions of the ignition coil

The ignition coil is a sort of a transformer in which the coil ratio of primary coil and secondary coil is about 50 times. When the current (primary current from the battery) flowing in the primary coil is cut off by the contact breaker, the primary coil will generate 150/300V voltage by self-induction. This voltage will be increased to 7,000/10,000V or more by the mutual induction of the secondary coil, thus emitting sparks on the plug.



(Fig. 5-12)

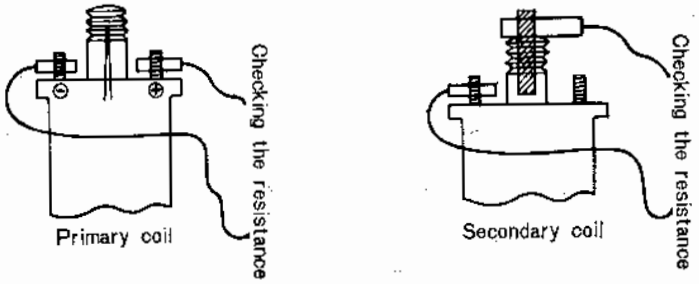
3—2 Checking

When there are no sparks on the plug or when the sparks are weak, check together with the contact breaker.

a. Continuity and resistance tests of the primary and secondary coils

Check whether there is disconnection or not.

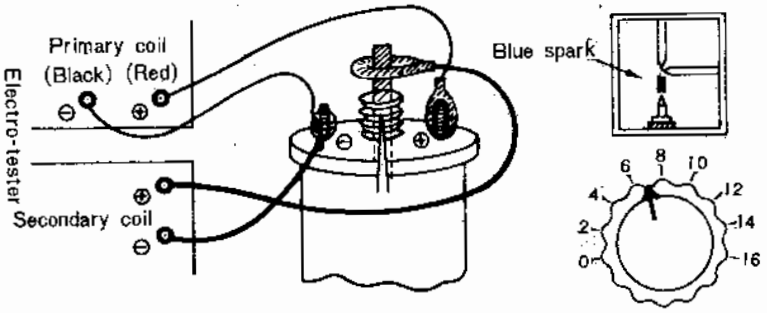
Replace the coils when there is no continuity.



(Fig. 5-13)

b. Spark performance tests

Measure the coil unit or by starting the engine. It is all right if sparks fly 6 mm or more in the tester scale.



(Fig. 5-14)

3—3 Maintenance standard

Items	Maintenance Standards	Checking km
Primary resistance	1.6Ω/20°C	At the time of unsatisfactory ignition
Secondary resistance	KΩ/20°C	〃
Spark performance	6V7mm or more/tester	〃

4. Spark plug

4—1 Selection of plugs

a. YDS3 specified standard plugs B-8HN and B-8HC

The burnt state and life of plugs differ depending on how the motorcycle is used. In carrying out periodic checkups, therefore, select and use the most suitable plug after judging the burnt state. This is important particularly in the case of use (running in urban areas constantly at a rather low speed or long runs constantly at a high speed). From the standpoint of engine work, performance, and fuel consumption, it is more economical to replace the plug at the end of about 3,000km, because its life is regarded as reaching the limit by that time.

b. Judgment of burnt state

If the ignition part is burnt lightly and brown, it means that the plug is in the best condition.

When the ignition part is rather smoked, black, and moist, replace the plug with a single-stage hot type (for low-speed run).

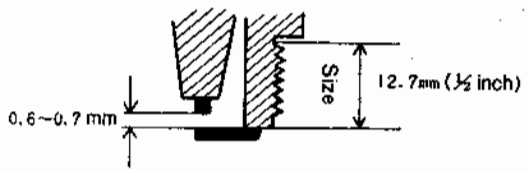
When the ignition part is burnt white and when the loss or the electrode is quick, replace the plug with a single-stage cold type (for high-speed run).

Use B-7HZ for constant low-speed runs or for constent runs in urban areas.

Use B-8HC for constant high-speed runs or for long distance driving.

4—2 Checking

It is hoped that you will advise your customers to check and clean the plugs at least once a month or affer every 1,000km run. Remove carbon from the electrode and set the electrode gap at 0.6/0.7 mm.



Be sure to use only the secified plug.

5. Battery

5—1 Functions of the battery

The battery is the source of power sent to all electric devices. It supplies power to the ignition and signal systems in place of the dynamo when the engine starts or when the engine runs at a low and dynamo generation is small, While the motorcycle is on a run, the remainder of power, fed into each system, is charged by the dynamo.

5—2 Handling of the battery

a. In first use pay attention to the following

Leave the job of first charging to specialized battery service sheps as far as possible. If you do the job by yourself, follow the directions given below.

Methods for first charging.

First, cut off the end of the exhaust tube projecting on the side of the battery.

Next, prepare about 300cc of dilute sulphuric acid (specific gravity, 1.26 for areometer) and pour it into each tank to the highest liquid level.

Make the first charge at 0.8A for 13 hours.

After charging, incline the battery to the right and the left and take out bubble from it. Next, supply again dilute sulphuric acid or distilled water to

the highest liquid level so that specific gravity will stand at 1.26. After this, turn off the liquid each stopcock tight.

Wash off dilute sulphuric acid from the battery with water and install it in the body after drying it completely.

b. Periodic checkup and recharging

Check the liquid level every two months and resupply distilled water if the level is below the middle of the indicated line (user guidance.)

When battery capacity tends to fall, recharge it at 0.8A for about 13 hours.

Repair and improve the battery after finding the cause of capacity decline.

c. Custody methods

When the motorcycle is not used for a long time, remove the battery from the body and have it kept by a battery service shop.

It is hoped that shops which have a charger will follow the directions given below.

Recharge the removed battery.

Keep the battery in a cool, dark, dry place (but never lower the temperature below zero).

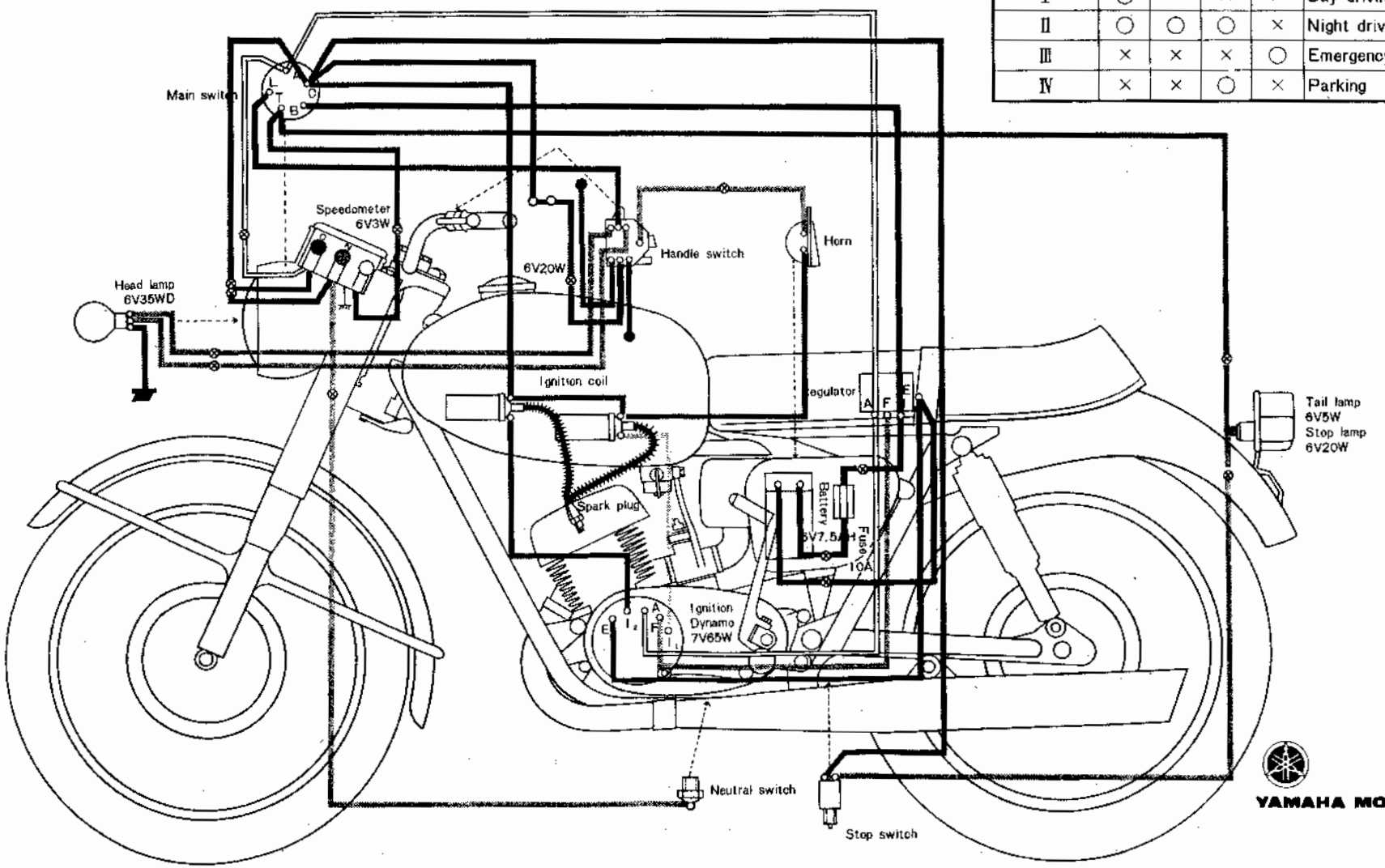
5-3 Maintenance standards table

Item	Maintenance standards	Checking km (mile)
Electrolyte (Dilute sulphuric acid) First charging	Specific gravity: 1.26 (20°C) Total liquid quantity: 260cc For 13 hours at 0.8A	When installed on new motorcycle
Recharging	For 13 hours at 0.8A	At the time of capacity shortage
Liquid relenishment	Distilled water supply to highest liquid level	Every 3 months or 3,000km (2,000mile)
Exhaust tube	Length: 420mm	
Outer dimension	Height 123 × length 116 × width 60	

Circuit

Main switch connecting

Key position	B-C	B-L	B-T	A-C	
0	×	×	×	×	Stop
I	○	×	×	×	Day driving
II	○	○	○	×	Night driving
III	×	×	×	○	Emergency starting
IV	×	×	○	×	Parking



YAMAHA MOTOR CO., LTD.

Chapter 6. Checkup and Adjustment

I. Periodic Checkup and Adjustment

1. Significance of the periodic system checkup:

The periodic checkup system aims at preventing accidents and enabling the users to keep their vehicles comfortable to ride in at all times.

Also the prompt steps, which will be taken under this system, will mitigate the burdens of the users and sales agents in the field of service and there by prevent claims for compensation from the users.

All users of motorcycle are obligated to have their motorcycle checked and adjusted periodically according to the provisions of the "Road Transportation Vehicles Law".

We hope you will guide your customers to have their motorcycle checked periodically according to their periodic checkup cards and also to check their vehicles every day when they begin riding.

2. The time and items for periodic checkup:

	Check point	300km 200mile	3000km 2,000mile	6000km 4,000mile	every 4000km
1	Adjustment of front & rear brakes	○	○	○	○
2	Adjustment of clutch	○	○	○	○
3	Change of gear oil	○	○	○	○
4	Greasing		○	○	○
5	Replenishment of battery fluid	○	○	○	○
6	Cleaning & Inspection of spark plug		○	○	○
7	Inspection of the ignition timing		○	○	○
8	Adjustment of carburetor		○	○	○
9	Cleaning of the carburetor (inside)			○	○
10	Cleaning of air cleaner		○	○	○
11	Cleaning of cylinder head & piston		○	○	○
12	Cleaning of muffler & exhaust pipe		○	○	○
13	Adjustment of drive chain & greasing		○	○	○
14	Fastening the bolts, nuts & screws		○	○	○
15	Inspection of Auto-lube pump.	○	○	○	○

3. Major points of checkup and adjustment:

3—1 Engine.

a. Removal of carbon:

As the engine is equipped with Yamaha Auto-Lube, the accumulation of carbon is relatively small. Every time the car has run 3,000 kilometers, (2,000 miles) however, carbon must be removed from the following points, to prevent the engine output from decreasing:

Cylinder head, piston bead, and ring grooves;

Cylinder exhaust pipe;

Exhaust pipe and muffler tube.

b. Cleaning of the air cleaner:

The air cleaner is a mask for the engine. When it is too dirty, it produces wear and tear on the cylinder and the piston, shortens their life and causes the engine output to decrease.

Especially tn ihe case of a car which often runs on dusty roads, the air cleaner must be cleaned every time the car has run 1,000 kilometers or even less.

For cleaning, the body of the cleaner must be detached and the cleaner element must be taken out. The dust will fall off if they are knocked lightly. Then they will be cleaned by compressor air.

c. Checkup and cleaning of the carburetor:

The carburetor must be overhauled and cleaned in such events as unsatisfactory starting and acceleration, idling disorder, and overfloating.

The float chamber and the float must be detached from the mixing body, and all parts must be washed with gasoline.

Then air must be blown into the pilot jet, main jet and each bypass hole of the mixing body, to remove the dust blocking them.

After cleaning, the parts must be assembled into the correct setting and must be attached to the engine. Then cable and idling must be adjusted.

In this case, the setting of the oil pump, too. must be examined. (See P.5)

d. Adjustment of the clutch

Examine the play of the clutch cable. If the play, in regard to the stretch of the cable and others, is found to be too large, adjust by the clutch adjusting screw from time to time. (See P.26)

e. Replacement of gear oil:

Gear oil must be replaced before it becomes too dirty. It must be replaced every time thecar has traveled 1,500 kilometers (1,000miles).

Oil—Yamaha Gear Oil (Motor Oil 10w/30)

Quantity of oil—1,400 to 1,450cc (1.5quarts)

3—2 Body of the car.

a. Checkup of the front and rear brakes:

The play of the brake wire and the brake pedal must be adjusted.

Every time the car has traveled 6,000 kilometers, detach the wheels, dust the drum, and apply grease to the bearings.

b. Adjustment and lubrication of the chain

Because the chain is bare, it becomes short of lubricant due to dust. In that event, the stretch of the chain and fhe sprocket become worn-out, and the power of the rear wheel will decrease.

The stretch of the chain must be adjusted and lubricated periodically.

Every time the car has traveled 3,000 kilometers, (2,000 miles) the chain must be disconnected, washed and lubricated.

c. Replacement of front fork oil;

Like gear oil. front fork oil becomes dirty. It must be replaced every 6,000 kilometers. (4,000 miles)

Oil will flow out if the screw of the oil plug under the front fork innertube is taken off. The screw must be taken off completely by cushioning.

Oil is poured in by removing the cap nut attached to the handle crown.

Oil—Kayaba No. 4 Oil (or 30 Motor Oil mixed with 60 Spindle Oil at the ratio of 8 to 2)

Quantity of oil—200cc (one side)

d. Checkup of relaxation and the tightening of each bolt nut of the body:

Following parts must be tightened periodically (every three months or every 3,000 kilometers).

Front and rear wheel axles, nuts, swing arm axis, steering parts of the nuts and the fastening nuts;

foot rest, brake pedal, main stand and side stand;

sprocket wheel fitting bolts;

muffler setup and engine setup;

spokes of the front rear wheel.

e. Lubrication of each part:

Grease must be applied periodically, to make less the friction of each driving and sliding parts and cool the heat.

3—3 Electrical apparatuses:

a. Checkup of the burnt condition of the plug;

removal of carbon; adjustment of the clearance between electrodes. (See P.52)

b. Checkup of ignition time:

Any mistake in determining the time for ignition leads to a decline in the

engine power and moreover, to overheating and knocking which may cause a serious accidents.

You must therefore check the time for ignition periodically (with timing light or other tools,) clean the point, and examine the gap. (See. P.52)

c. Checkup of the quantity of battery liquid:

The battery must be handled carefully because it constitutes the electric source for all electrical apparatuses. Its life will be shortened if handled carelessly. Battery liquid must be checked and resupplied once a month in summer and once in two months in winter. (See P.44)

d. Checkup of the carbon brush:

The carbon brush becomes more and more worn-out as the car's mileage increases. Generally speaking, it must be checked carefully every 6,000kilometers (4,000 miles). It must be replaced when its full length is less than 10mm.

e. Cleaning of the armature commutato:

If the commutatator becomes dirty, the rrectifyng function will be damaged and electricity cannot be charged sufficiently. Also the brush powder will fill the undercut made of mica. You must therefore clean the surface of the commutator with paper and remove the powder with a knife or other tools.

f. Checkup of the regulator voltage (in abnormal casses alone):

The voltage of the regulator is examined only when the dynamo or the regulator is considered the source of trouble for exhaustion or overcharging of the battery. (See P. 48)

3—4 Auto Lube Oil pump

a. Inspection and repairing of Pump cable.

- ○ Inspection of the pump cable & throttle cabler
- ○ Inspection of the wire cylinder. Check if the cable is out of the cylinder.
- ○ Inspection of the returning action of the adjust pulley
- ○ Check if the throttle valve moves smoothly.

b. Inspection of the Pump Setting

Checking of the carburetor and pump setting. (See page 5.)

c. Inspection of the Pump Stroke

Measure the plunger stroke with thickness gauge when the throttle cable is shut completely.

- ○ If the stroke is under 0.15mm, insert the adjusting washer 0.1mm under the adjust plate, (See the picture)
- ○ Adjust the stroke between 0.20~0.25mm

d. Inspection of the fitting bolts & nuts.

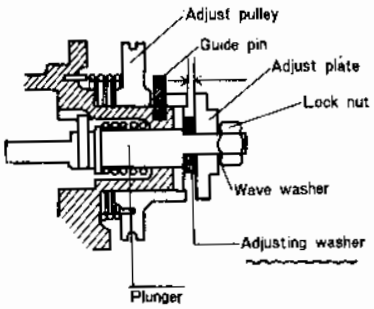
Check the following points:

Pump fitting bolts, banjo bolts, delivery pipe fitting, breather bolt, oil pipe

fitting and union bolt.

○ Fasten the each bolt again if loosened.

○ Check if there is any oil leakage, and repalce the packing, delivery pipe and oil pump if you find them deamaged or and oil leakage.



M E M O