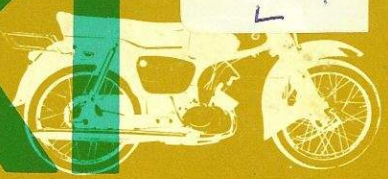
SUZUKI



50 MODEL M15 & M15D
SHOP MANUAL

SUZUKI 50
MODEL M15 & M15D
SHOP
MANUAL

CONTENTS

FOREWORD

The Suzuki 50 Models M15 & M15D are lightweight motorcycles of the heighest class manufactured with our advanced technical skill and modern production equipment. Tastefully designed from head to tail and attractively painted M15 & M15D are fraught with modernity and originality. These models are equipped with starter-dynamo or flywheel magneto, four-speed transmission, and 50cc engines. Though small the engine has so much power in low speeds that the motorcycle can start even in second gear and is capable of speeds up to 80 kilometers (50 miles) per hour in top gear. In addition to the starter-dynamo, M15D has a kick starting system to make doubly sure the easy starting the engine. An originally designed carburetor is another of the features of the Suzuki models. All of these plus oleo damper suspensions ensure superb riding comfort and easy maneuverability. Whether they are used for business or for pleasure riding, they are ideal motorcycles for the millions. In this shop manual, we attempt to describe the structures of the various components and their proper maintenance methods so that the Suzuki Models M15 & M-15D may be kept in the best condition at all times.

February 15, 1965

SUZUKI MOTOR CO., LTD.

MODEL M15

MODEL M15D

FEATURES OF MODELS M15 & M15D

° Easy and sure starting (Model M15)
The kick starter, together with an efficiency-designed magneto, ensures easy starting of the engine.

° Riding comfort and easy maneuverability
The front and rear oleo shock absorbers, well-proportioned saddle and handle bar, and the knee grips on both sides of the fuel tank, all combine to ensure riding comfort and easy maneuverability.

° Bright headlight
A 15W headlight, so uncommon for a motorcycle of 50cc class, is adopted, with current supplied by a highly efficient magneto. (Model M15)

° Push-button starting of the engine (Model M15D)
The engine can be easily started with a push of the starter button, or by the kick stater. The specially designed carburetor incorporating a "starter device" is the first of its kind ever mounted on a motorcycle. These three combine to ensure starting of the engine even in a cold region of 20 degrees C below zero.

° Efficient four-speed transmission and engine
The 50cc engine with a four-speed transmission is capable of speeds up to 80 km/h (50 m.p.h.) and can start the motorcycle even in second gear. Its pickup really magnificent.

° Fuel economy
Fuel economy is one of the outstanding features of the Suzuki 50 Models M15 & M15D. They can cover a distance of 65 kilometers with as little as one liter of fuel (184 mile/Imp. gallon or 154 mile/US gallon).

° Good design
The Suzuki 50 Models M15 & M15D are designed tastefully with color of the frame harmonizing with that of the fuel tank.

° Lightweight
The M15 & M15D are so lightweight that they can be carried and housed as a bicycle.

SPECIFICATIONS

NAME & MODEL	SUZUKI 50 MODELS M15 & M15D
Dimensions: Overall lengh	1815mm (71.5″)
Overall width	613mm (24.1″)
Overall height	930mm (36.6″)
Wheelbase	1150mm (45.3″)
Ground clearance	130mm (5.1″)
Tire size (front & rear)	2.25″-17″-4pr
Weight: Dry weight	58kg (127.6lbs) *60kg (133lbs)
Dry weight distribution	Front; 26kg (57.2lbs) *26.5kg (58.4lbs) Rear; 32kg (70.4lbs) *33.5kg (78lbs)
Weight with full equipment	64kg (140.8lbs) *66kg (145.4lbs)
Distribution of weight with full equipment	Front; 29kg (64.3lbs) *30kg (66.5lbs) Rear; 35kg (77.6lbs) *36kg (79.8lbs)
Weight with driver (60kg, 37.5lbs)	124kg (273.8lbs) *126kg (278.4lbs)
Distribution of weight with driver (60kg, 37.5lbs)	Front; 52kg (115.3lbs) *—do— Rear; 72kg (159.6lbs) *74kg (164.1lbs)
Performance: Maximum Speed	80km/h (50m.p.h.) (with forward-inclined posture on paved level road)
Fuel consumption	65km/liter (184 mile/Imp. gallon or 154 mile/US gallon) when running at 30km/h (18.7m.p.h.)
Braking distance	5m (16.5 fts.) at 25km/h (15m.p.h.) or 6.7m (22.1fts.) at 35km/h (21m.p.h.)
Climbing ability	14°30′
Minimum radius of gyration	1650mm (64.9″) to right or left
Engine: Type	Air-cooled, 2-stroke, gasoline engine
Dimensions (length×width×height)	325mm (12.8″)×314mm (12.3″)×262mm (10.3″)
Weight	13.5kg (29.9lbs) *14.5kg (32.1lbs)
Cylinder arrangement	35° forward-inclined, single cylinder
Total displacement	50cc
Bore and stroke	41mm (1.61″)×38mm (1.49″)
Theoretical compression ratio	9.4:1

NAME & MODEL	SUZUKI 50 MODELS M15 & M15D
Corrected Compression ratio	7 : 1
Compression pressure	7.5kg/cm² (106.5lb/inch²) (Measured by the kick with throttle opened all the way after engine warm-up)
Maximum output	4.2PS/8000r.p.m.
Maximum torque	0.38kg-m/7000r.p.m. (2.74lbs-ft/7000r.p.m.)
Starting system	Kick starter *starter-dynamo and kick starter
Fuel system: Carburetor	Amal VM-15SC
Air cleaner	Wire gauze type with silencer attached
Fuel tank capacity	6 liters (1.320 Imp. gallons or 1.575 US gallons) including reserve 1.0 liters (1.8 Imp. pint or 2.0 US pint) (Gasoline is mixed with oil at ratio of 15 to 1)
Lubrication: Crankshaft	Gasoline-oil mixture
Transmission	Spray-lubrication (Motor oil 550 cc)
Ignition: Plug	NGK B-6
Ignition	Flywheel magneto ignition *Battery ignition
Ignition timing	27° to top dead center
Electrical equipment (A): Generator	Flywheel magneto *Direct-drive starter dynamo
Battery	6V 4AH *12V 7AH
Fuse	15A
Transmission: Clutch	Wet multiple disc
Speed change gear	4-forward-speed constantmesh
Shifting	Left-foot operated, rotary type (or return shifting type)
Gear ratios	1st gear: 3.17 (34.3) 38/12
(Reduction ratios)	2nd gear: 1.94 (21.0) 33/17
	3rd gear: 1.43 (15.5) 30/21
	Top gear: 1.04 (11.3) 26/25
Primary reduction	Gear: 4.40 66/15
Secondary reduction	Chain: 2.46 (Chain #420 32/13)
Overall reduction ratio	11.3 (for Low speeds 13.3; 12.2) (for High speed 10.5)
Suspension system: Front wheel	Bottom link type oleo damper (stroke 40mm (1.57″) on suspension unit) (stroke 77.5mm (3.05″) on shaft)
Rear wheel	Pivot swing oleo damper (stroke 70mm (2.75″) on suspension unit) (stroke 73.9mm (3.18″) on shaft)
Steering system: Length of handle bar	580 mm (22.8″)
Maximum steering angle	45° to right or left
Trail	69.4 mm (2.88″)
Caster	63°
Brakes: Type (Front & rear brakes)	Internal expanding, mechanical, expanding angle 110° (Drum 110mm (4.33″); brake lining width 30mm (1.18″)
Operation	Front brake: by right hand
	Rear brake: by right foot
Electrical equipment (B): Headlight	6V 15W/15W *12V 25W/25W
Tail-stop lights	6V 5W/10W *12V 5W/10W
Winkers	6V 8W×2 *12V 10W×2
Flasher	Bimetal type, 6V 85±20 winks per minute *12V
Pilot lights	Neutral light; 6V 1.5W (green) *12V 2W
	*Charge light; 12V 2W (red)
Horn	6V 0.8±0.2A, 95—100 phons *12V
Meter: speedometer	Including integrating meter with light (Dial graduated up to 100km/h (60 m.p.h.))

Note: *Marks stand for the model M15D and the items without mark are common to the models M15 & 15D.

ENGINE STRUCTURE

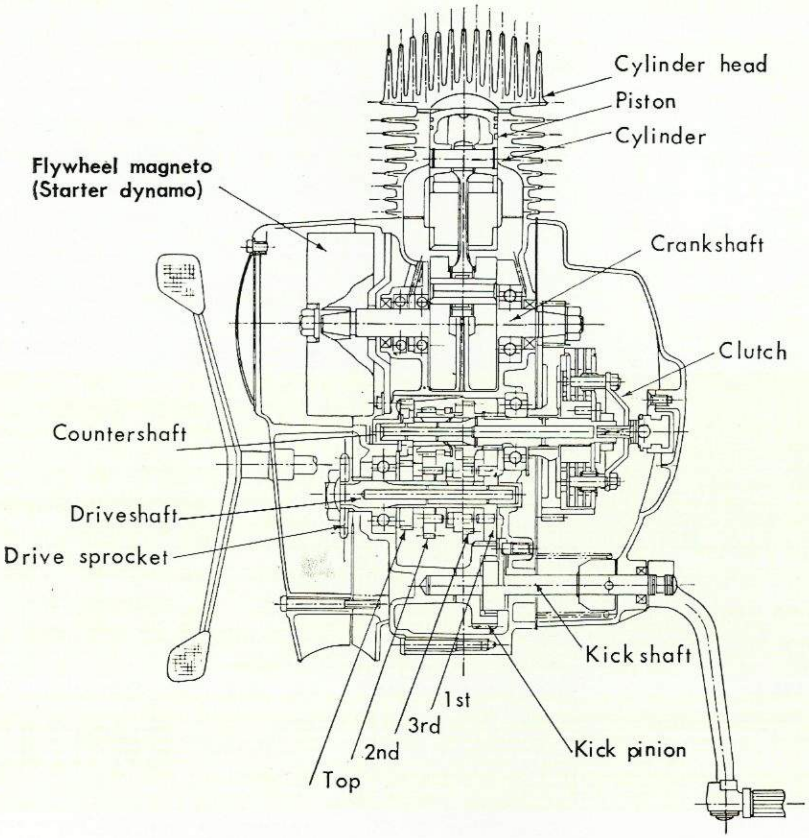


Fig. 1

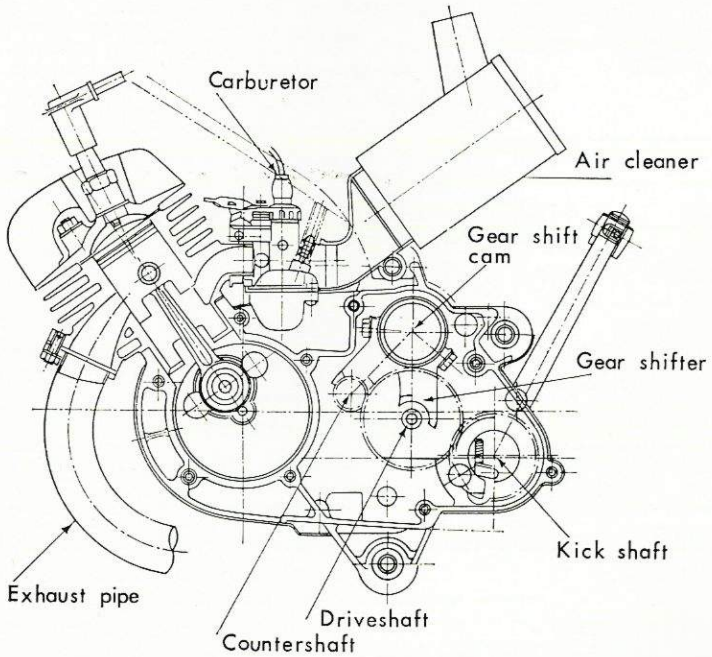


Fig. 2

PERFORMANCE CHARACTERISTICS

1. Engine performance

The engines mounted on the Suzuki Model M15 & M15D develop up to 4.2 PS at 8000 r.p.m. as shown in Fig. 5, while its torque is 0.31 kg-m at 4400 r.p.m, or 0.36 kg-m at 5000 r.p.m., its maximum being 0.38 kg-m at 7000° r.p.m. Its powerful pickup from the start is really grand. Since the engine's torque at low speeds is so high that the motorcycle can start even in second gear.

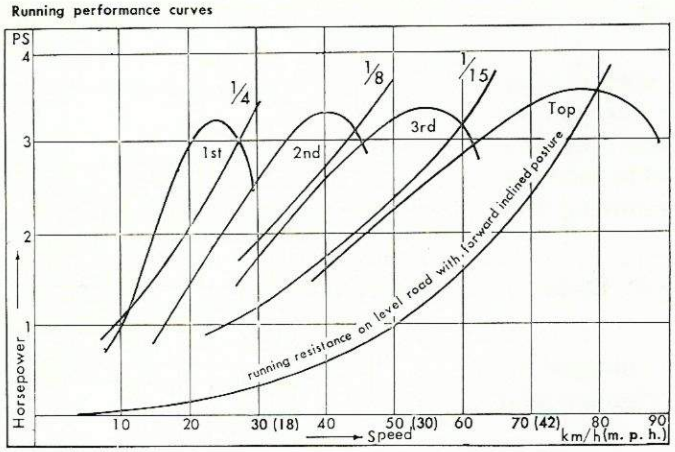
2. Motorcycle performance

Fig. 3 shows the running performance curves of the M15 & M15D. As the motorcycle makes a start, the engine's power drops about 20% from 4.2 PS to 3.36 PS, but with a forward-inclined posture the motorcycle can speed up to 80 kilometers per hour against running resistance. The running resistance on level road indicated in this figure represents the aggregate of all sorts of registance, e.g., wind resistance, which works against the movement of the motorcyce.

3. The engine's rpm and the speed of the motorcycle

Fig. 4 shows the graphic relation between the engine's r.p.m. and the speed of the motorcycle. It will be noted by seeing the two figures (Figs. 3 and 5) that it is very important to shift up the gear at proper speeds if the motorcycle is to be run in an ideal and efficient way. When additional acceleration is needed, shift up the gear as shown below:

1st gear 0km/h (0m.p.h.)–25km/h(15m.p.h.)
2nd gear 20km/h(12m.p.h.)–40km/h(24m.p.h.)
3rd gear 35km/h(21m.p.h.)–55km/h(33m.p.h.)
4th gear 50km/h(30m.p.h.) and over



Note :
The figures 1/4, 1/8 and 1/15 represent climbing resistances as encountered in running uphill.

Fig. 3

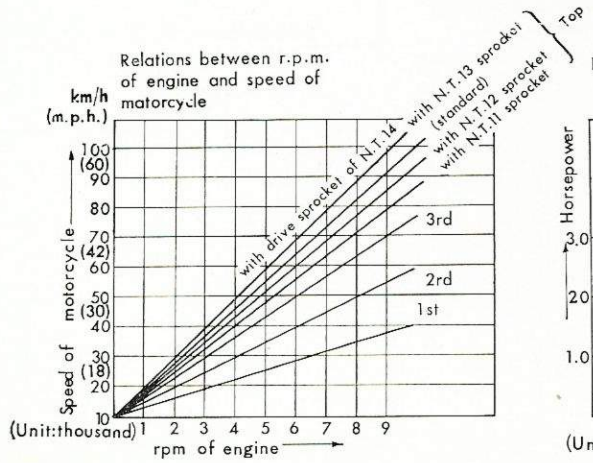


Fig. 4

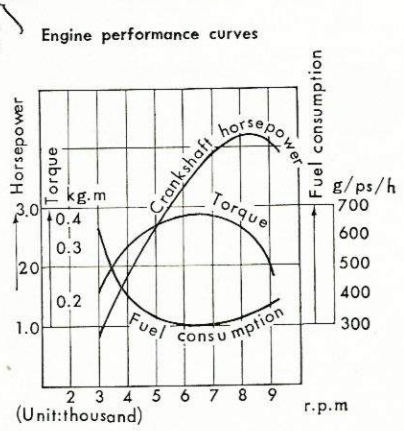


Fig. 5

DESIGN

1. Cylinder

a) Instead of the conventional sleeved cylinder, a solid cast cylinder has been employed for added durability and accuracy.

b) The port timing and the forms of the ports have been so determined as to obtain added torque at low speeds and better output at high speeds.

Port Timing

Exhaust	73.30°
Scavenging	60.50°
Suction	59.20°
Ignition timing	27° to top dead center; or 2.54mm from top in piston's downstroke

2. Piston

In place of the Lo-X piston, a special alloy piston, which is usually used for motorcycles of the 125 cc and 250 cc class, has been employed to prevent overheating and to increase durability. In addition, the following improvements have been made:

a) Lubricating holes have been made in the piston bosses.

b) The piston pin has been enlarged in diameter, with increased rigidity and durability.

c) New piston rings have been employed to reduce mechanical resistance.

3. Crankshaft (See Fig. 6)

a) The crankshaft and the crankwheel have been made into a unit to improve precision, which helps to prevent wear of the gear, helps to keep the correct ignition timing and minimizes noise.

b) A retainer has been fitted to the large end of the connecting rod to prevent shocks, overheating, etc. at high speeds. In addition to an oil hole, the small end of the connecting rod has an oil groove in the upper part of it to provide smooth lubrication for the bushing and the piston pin.

c) A total of 3 high-precision bearings has been fitted to the crankshaft (2 on the dynamo side, and 1 on the primary pinion side) to ensure vibration-free and durable operation of the crankshaft.

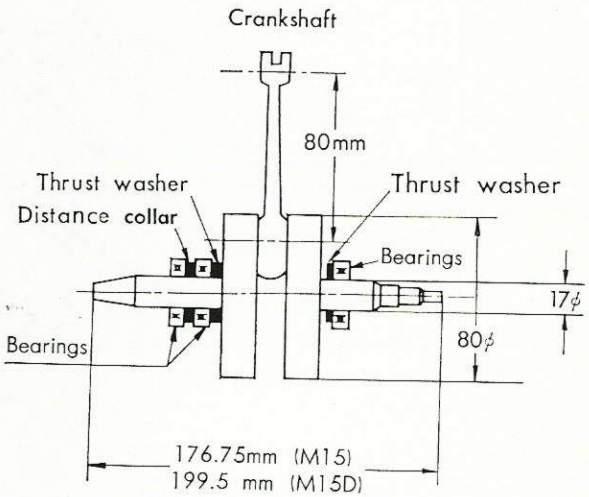


Fig. 6

4. Transmission and reduction ratios

Though small in size, the Suzuki 50 transmission has a 4-forward speed mechanism, whose gear engagement is as shown in Fig. 7.

Primary reduction ratio : $\frac{66}{15}=4.40$

Secondary reduction ratio : $\frac{32}{13}=2.46$

Gear ratios : Overall reduction ratio

1st gear	$\frac{38}{12}=3.17$	$\frac{66}{15}\times\frac{38}{12}\times\frac{32}{13}=34.3$
2nd gear	$\frac{33}{17}=1.94$	$\frac{66}{15}\times\frac{33}{17}\times\frac{32}{13}=21.0$
3rd gear	$\frac{30}{21}=1.43$	$\frac{66}{15}\times\frac{30}{21}\times\frac{32}{31}=15.5$
Top gear	$\frac{26}{25}=1.04$	$\frac{66}{15}\times\frac{26}{26}\times\frac{32}{13}=11.3$

Note: The standard sprocket has 13 teeth, whereas a 14-tooth sprocket is installed in place of the 13-tooth sprocket for the high-speed model. An 11-tooth or 12-tooth sprocket equipped transmission is also available where extra power is needed at low speeds.

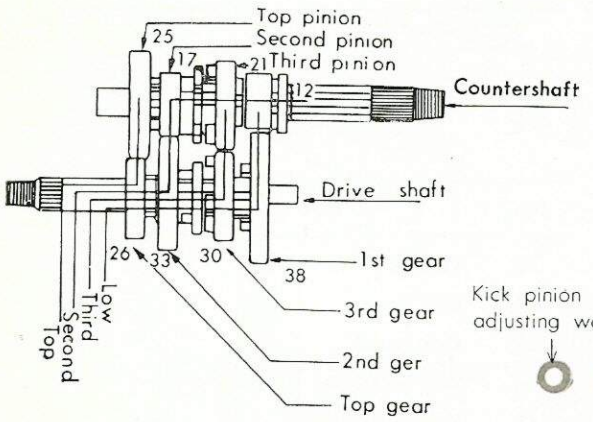


Fig. 7

5. Kick mechanism

Since the Suzuki 50 Model M15D is equipped with both a self-starter dynamo and a kick starter, there is no difficulty in starting the engine even in a cold region. Fig. 8 shows the kick starter mechanism connected to the gear shift mechanism, while Fig. 9 shows the kick starter mechanism taken apart. This kick starter can produce so great a torque that one kick of it will easily start the engine.

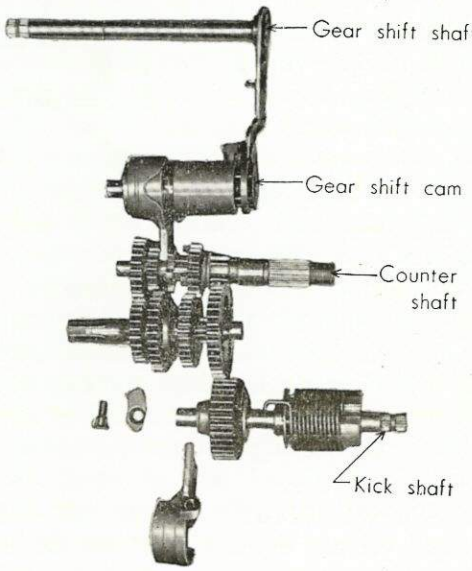


Fig. 8

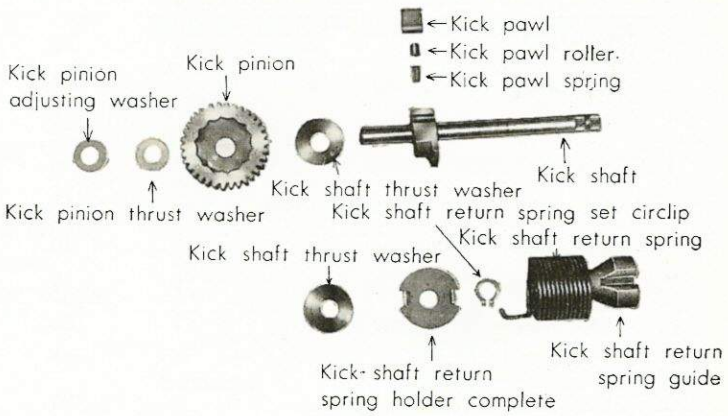


Fig. 9

Kick starter structure

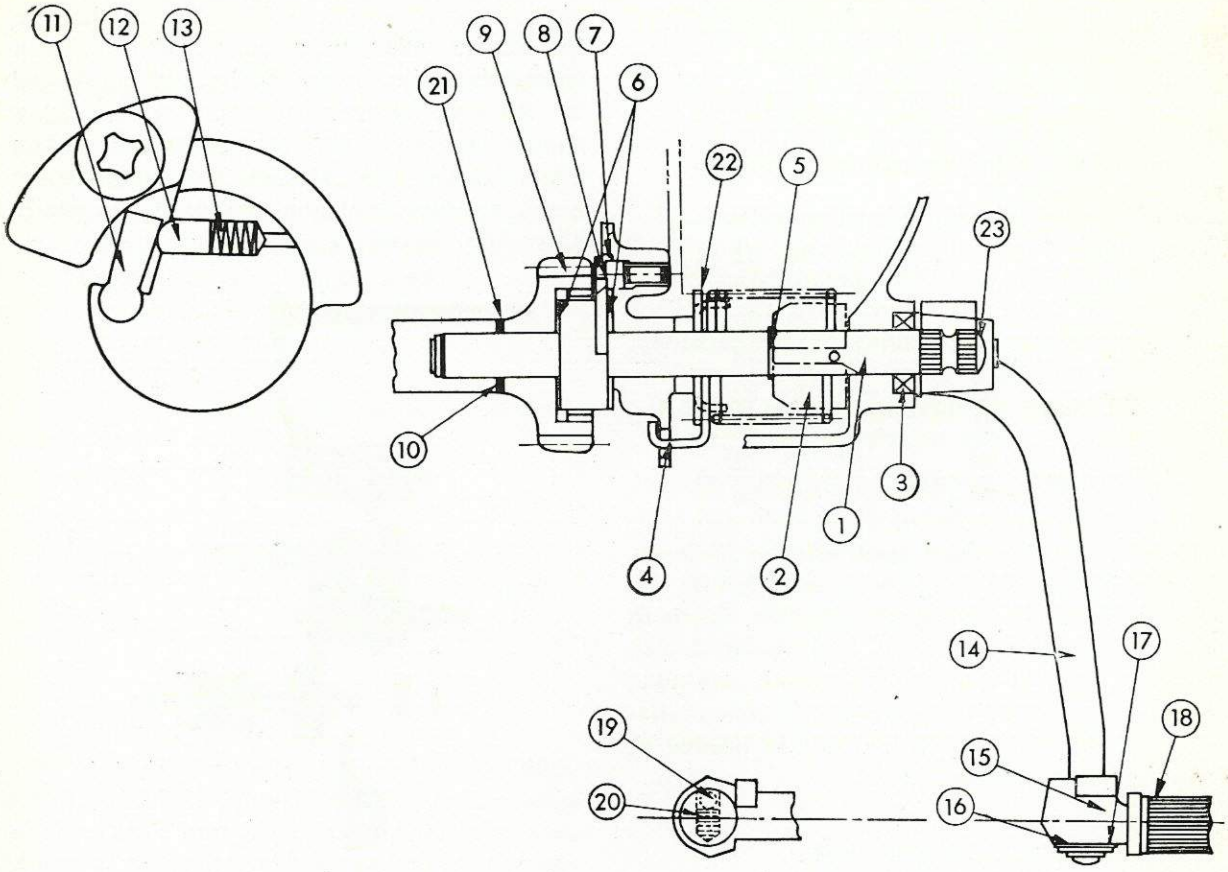


Fig. 10

No.	Name of part	No. of part
1.	Kick shaft	1
2.	Kick shaft return spring guide	1
3.	Kick shaft oil seal	1
4.	Kick shaft return spring	1
5.	Kick shaft return spring set circlip	1
6.	Kick shaft thrust washer	2
7.	Kick stopper	1
8.	Kick stopper set screw	1
9.	Kick pinion	1
10.	Kick pinion thrust washer	1
11.	Kick pawl	1
12.	Kick pawl roller	1

No.	Name of part	No. of part
13.	Kick pawl spring	1
14.	Kick lever	1
15.	Kick pedal	1
16.	Kick pedal set washer	1
17.	Kick pedal circlip	1
18.	Kick pedal rubber	1
19.	Kick pedal ball	1
20.	Kick pedal spring	1
21.	Kick pinion adjusting washer	1
22.	Kick shaft return spring holder complete	1
23.	Kick shaft cap	1

CARBURETOR

The Suzuki 50 M15 & M15D's carburetor is of the Amal VM-15 SC type and is equipped with a "starter device" to effect fuel economy, increased output and easier starting of the engine. It has the following features:

1. Features

a) The fuel level is kept practically the same even if the motorcycle runs aslant.

b) The float valve is little affected by vibration and so an overflow hardly occurs.

c) Made in compact size, the carburetor is easy to take apart, for repair to adjusting and to assemble again.

d) At the time of starting the engine, a required amount of fuel-air mixture is supplied from the starter device.

2. Specifications

Main jet	#75
Air jet	0.5
Needle jet	E-O
Jet needle	$15F_1$-3
Needle clip 3rd groove (from the top)	
Throttle valve cutaway	2.0
Pilot jet	2.0
Air screw opening	1¼

3. Structure of the carburetor

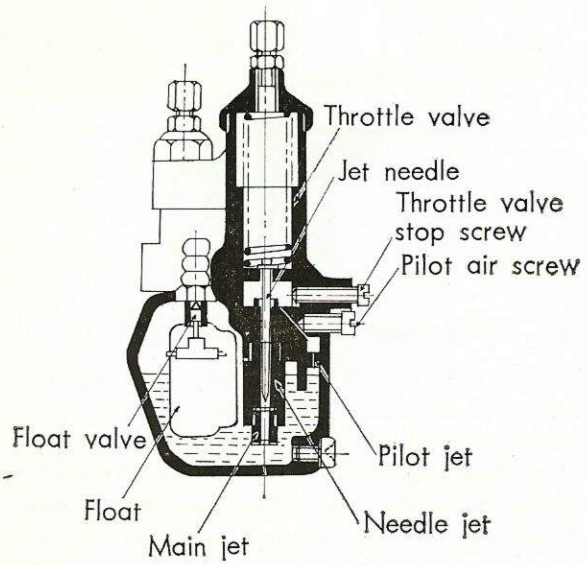


Fig. 11

4. Operation of the carburetor

A. Starter system

The conventional carburetor supplies the fuel-air mixture through its slow system when starting the engine, and as a means of facilitating the starting of the engine the tickler is pressed down to raise the fuel level or the choke is temporarily closed to enrich the fuel-air mixture. In the case of the conventional carburetor, the slow system must be adjusted in such a way that the engine is easily started, functions properly at idling, and it could be adjusted differently depending on whether emphasis is on easy starting of the engine or on proper idling after the starting of the engine. The Amal VM-15SC carburetor mounted on M15 & M15D, however, supplies an easily combustible fuel-air mixture to the cylinder through the starter system, which being independent of the main system receives fuel and air as indicated by arrows in Fig. 12. To mention the working of this carburetor more in detail, when the starter lever on the handle bar is pulled toward the driver, with the throttle valve closed all the way, and the starter button is pushed, or kick lever is stepped down, air is sucked in through the air intake B. As the air flows through the air intake, a negative pressure is produced at C. Since there is a passage leading to C from the starter jet D, which is fitted in the float chamber, the fuel is drawn up by the negative pressure.

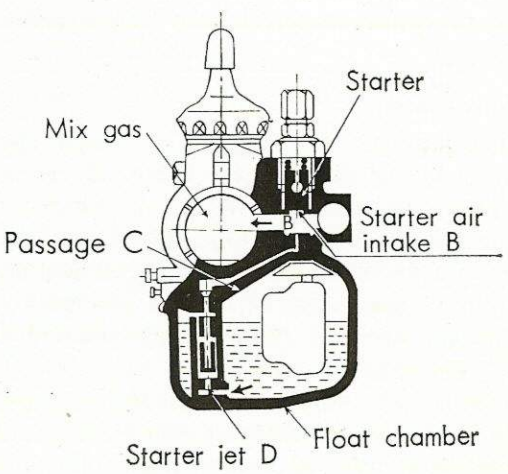


Fig. 12

The sucked up fuel mixes with air to comprise a rich fuel-air mixture, which is drawn into the cylinder to start the engine.

1) How to start the engine

When starting the engine, do not turn the grip to open the throttle valve. That is, leave the throttle grip in its closed position. (In this case, the throttle valve is slightly opened as controlled by the throttle stop screw)

a) Pull the starter lever toward the driver.
b) Start the engine by means of the starter button or the kick lever.
When the engine is started, release the button at once (in case of M15D) and let the engine warm up a little while.
c) Return the starter lever to the former position.
Thus the engine is started and is now idling. It is ready for drive.

Note: The above engine starting process applies to cold weather and regions. It is not necessary to operate the starter lever in the hot season or when the engine is warmed up.

B. Main system

The air coming in through the air cleaner passes through the air intake (1) and the throttle valve (2) to be drawn into the engine. By this air flow, negative pressure is produced around the jet needle (3) and the fuel in the float chamber is sucked up through the main jet (4). This sucked up fuel encounters the air flow about the needle jet (6) to be atomized into a fuel-air mixture, which is drawn into the cylinder. The amount of fuel jetted through the main system is of course controlled by the throttle valve.

C. Idle system

When starting the engine or when the engine is idling the throttle valve (2) is in the undermost position, which is fixed by the throttle stop screw (7) (See Fig. 11). So, when a negative pressure is produced on the engine side, air is drawn in mainly through the air hole (8), which is provided for idle adjustment.
The flow of air coming through the air hole (8) is controlled by the air screw (9) and the fuel is sucked up through the pilot jet (10), which is also provided for idle adjustment.
Thus, a rich fuel-air mixture is produced to be drawn into the engine through the outlet (11). In the idle system the fuel-air mixture ratio is controled by the air screw (9).

5. Cautions

The carburetor's stater device needs no adjustment by the user, but attention must be paid to the following:

1) Put the starter lever to the former position after the engine is started. If it remains pulled, fuel consumption increases when running at low speeds.

2) When cleaning the starter jet, never pass a wire through the hole.
The same applies when cleaning the other jets.

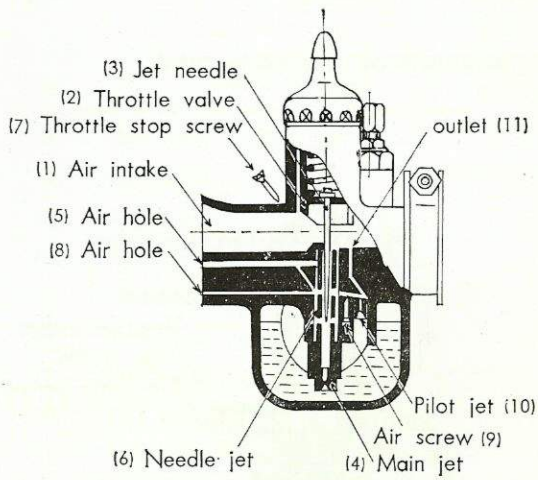


Fig. 13

As mentioned above, this carburetor is a highly efficient type incorporating an idle system, a main system and a starter system. However, it is practically the same as the conventional carburetor except for the start-

er system, and therefore its operation, handling, adjustment, etc. after the starting of the engine are the same as the conventional carburetor.

ELECTRICAL EQUIPMENT

1. Comparison of specifications between M15 and M15D

The major difference between Models M15 and M15D is that the M15 is equipped with a flywheel magneto while the M15D employs a starter dynamo. Therefore, all electrical parts of the M15 operate on 6V and are not interchangeable with those of the M15D.

NAME OF PARTS	M15	M15D
Starting system	Kick starter	Starter dynamo and kick starter
Charging system	Flywheel magneto	12V constant voltage
Rectifier	Selenium rectifier	
Ignition	Magneto ignition	Battery ignition
Battery	6V 4AH	12V 7AH
Flasher	6V 16W	12V 20W
Winker bulbs	6V 8W×2	12V 10W×2
Headlight bulb	6V 15/15W	12V 25/25W
Tail-stop light bulb	6V 5W/10W	12V 5W/10W
Pilot light bulbs	6V 1.5W×2	12V 2W×3
Horn	6V 0.8A ±0.2A, 95-100 phons	12V 0.8A ±0.2A, 95-100 phons

2. Flywheel magneto (for Model M15)

The flywheel magneto for Model M15 is simply constructed and easy to handle. Magneto ignition is absolutely dependable in starting the engine, and moreover the flywheel's moment of inertia is about 3 times as great as that of the dynamo so that its rotation at low speeds is more stable, which permits the motorcycle to run in top gear even at 10 kilometers per hour.

A magneto is usually fitted with 2 magnets if flywheel has 4 poles, but the magneto of the M15 is fitted with 4 magnets. This greatly improves ignition, lighting, and charging, and has made it possible to use a 15W headlight, which is never seen on any magneto-equipped 50cc motorcycle.

A. Specifications and characteristics

Make	OKUSKAN DENKI
Type	FA 85
Direction of rotation	Anticlockwise
Number of poles	4
Air gap	0.38 — 0.45 mm (0.015 — 0.018″)
Weight	1.6 kg (3.5 lbs)
Ignition timing	27° to top dead center
Contact point gap	0.3 — 0.4 mm (0.012 — 0.016″)
Breaker contact pressure	650 — 800 grams
Condenser capacity	0.27 μF
Revolutions per minute	500 — 10,000 r.p.m. (Maximun instantaneous r.p.m. 12000)

	Daytime		Nighttime		Remarks
R.p.m.	4000r.p.m. (Battery voltage assumed as 7.5V)	8000r.m.p. (Battery voltage assumed as 8.5V)	4000r.p.m. (Battery voltage assumed as 6.5V)	8000r.p.m. (Battery voltage assumed as 7.5V)	
Charging current	0.4A or over	0.3A or under		—	Daytime: No loads other than battery Nighttime: with headlight, tail-light, speedometer light and other lights on
Lighting voltage	—	—	6.0V or over	7.5V or under	With headlight, tail-light, speedometer light and battery switched on
Spark gap	6 mm or over at 500 — 8000 r.p.m. during day or night				Measure with needle shaped spark gap tester

Note: The figures shown in the above table apply when the the lights, battery, selenium rectifier, etc. of the following specifications are used.

Headlihgt:	6 — 8V	15/15W
Tail-stop light:	6 — 8V	5W/10W
Speedometer light:	6V	1.5W × 2
Battery:	Yuasa 6V 4AH	
Selenium rectifier:	Made by Fuji Denki, PH16 (33 × 50)	

In the following is shown a connection diagram when measuring the characteristics shown in the above table.

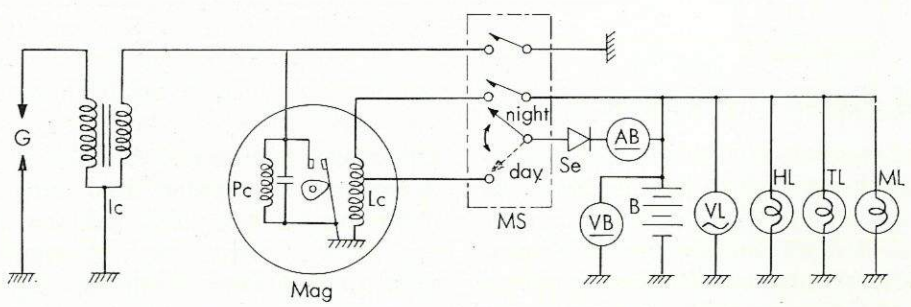


Fig. 14

SIGN	
AB	DC ammeter (to measure charging current)
VL	AC voltmeter (to measure lighting voltage)
VB	DC voltmeter (to measure battery voltage)
G	Triple-pole needle shaped electrode (to measure spark gap)
Mag	Magneto
I. c.	Ignition coil
Pc	Primary coil
L. c	Light coil
Se	Selenium rectifier
B	Battery
HL	Headlight
TL	Tail-light
ML	Meter-light
IG	Ignition switch

B. Structure and operations

The structure of the Suzuki 50 M15's flywheel magneto is as shown in Fig. 15. The stator is fitted with iron cores and coils, and a magnetic steel turns around it. There are 4 magnetic poles, which by turning induce electromotive force in the coils. These magnetic poles also function as a flywheel, so that the magneto of this type is called the flywheel magneto.

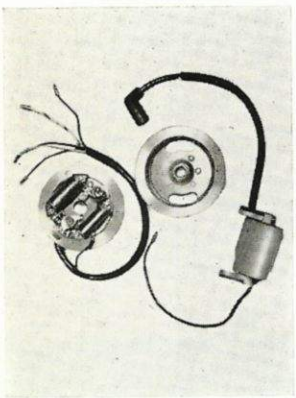


Fig. 15

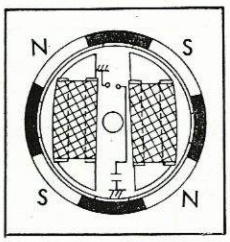


Fig. 16

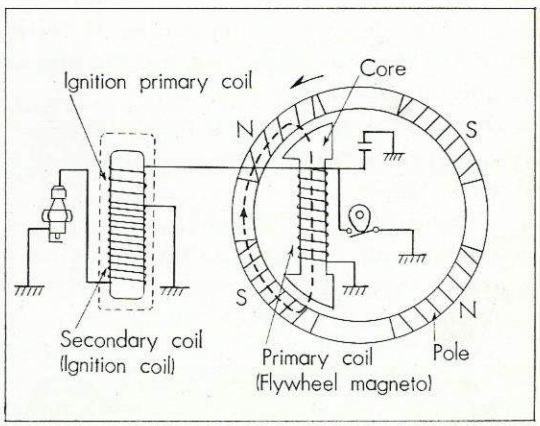


Fig. 17

The stator is fitted with 2 coils; one is a lighting coil and the other a primary coil. The lighting coil charges the battery in daytime, and in nighttime supplies current to the headlight and the tail light in addition to charging the battery.

Now, in the primary coil is produced a certain amount of current that is sent to the ignition coil fixed inside the frame of a motorcycle.

The primary coil consists of an iron core, an enameled copper wire about 0.5 mm in diameter, which is wound around the iron core approximately 200 turns. On the other hand the ignition coil has two kinds of coils, that is a ignition primary coil and a secondary coil. The former has 370 turns of 0.5 mm copper wire, and the latter 20,000 turns of 0.06 mm very thin wire.

As the magnetic poles revolve around the primary coil of the magneto, an alternating current is induced in it. Since the flywheel rotor has 4 magnetic poles, one turn of the flywheel rotor will produce 2 cycles of alternating current in the primary coil. However, since the current in the primary coil changes very slowly, the voltage induced in the secondary coil would be very low if no other means is used. Under this condition,

no sparks will be produced in the plug's spark gap which is exposed to the cylinder's high compression pressure.
To ignite a fuel-air mixture in the cylinder, a voltage high enough to produce a spark of more than 6 mm in the air is needed.
To obtain such a high voltage, the primary current must be more abruptly and instantaneously increased. For this porpose, a contact breaker is inserted in parallel in the primary circuit of the magneto, and so when the contact points are closed no current is sent to the ignition primary coil.
When the primary circuit is cut off by the contact breaker, a current is sent to the ignition primary coil and a high voltage is produced by self-induction of thc coil and sparks are produced between the points, burning the contact surfaces of the points. Such sparks will lower the ignition primary voltage. To prevent such sparks from being produced, a condenser is connected in parallel with the contact breaker, thus absorbing the current flowing to the points to form electric arcs. When the current is sent to the ignition primary coil by cutting off the contact breaker, a higher voltage is produced by mutual induction in the secondary coil and a strong spark is get at the electrode of a spark plug.

C. Measuring magneto performance

In measuring the performance of the magneto, it is necessary to use a tester to obtain correct data by which to determine the usablity of the magneto.
It involves danger to determine it without using a tester but with your guess,, and such should be absolutely avoided.
In the following is shown by drawings who the magneto's performance should be checked with tester.

1. Charging performance:
   Measuring charging current:
   Daytime—0.15A or over at 2000 r.p.m.;
   3.2A or under at 8000 r.p.m.
   Nighttime—0.1A or over at 2000 r.p.m.
2. Lighting performance:
   Measuring lighting voltage: The lighting voltage is measured with the headlight turned on.
   6.0V or over at 2000 r.p.m.
   9.0V or under at 8000 r.p.m.
3. Spark performance:
   Measuring spark gap (with needle shaped spark gap tester):
   Either in daytime or at night—6 mm (0.236″) or over at 500—8000 r.p.m.

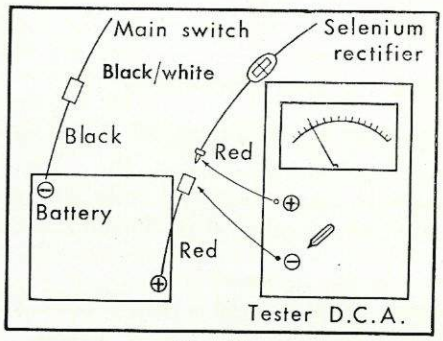


Fig. 18

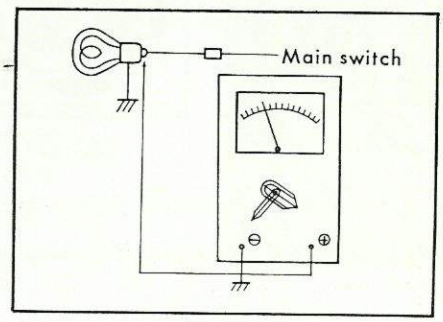


Fig. 19

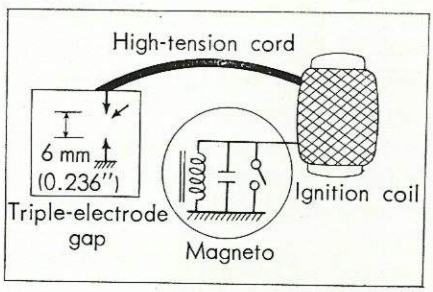


Fig. 20

D. Cautions in handling

1. Attention must be paid to the contact-point gap when adjusting the ignition timing of the magneto. Since the primary current is A.C., if the ignition timing (or the closing angle of the point) changes due to an improper point gap, the value of the primary current at interruption decreases to cause the secondary voltage to fall. This particularly affect adversely the ignition performance at low speeds (or starting the engine).
2. The contact surfaces of the breaker points should be checked periodically (at every 2000 (1250)—3000 km (1875 miles), and if found burnt, they must be polished by using an oilstone or emery cloth. A faulty contact by the burnt points reduces the flow of the primary current and makes the starting of the engine extremely difficult.
3. The charging circuit of the battery, i.e., the circuit formed by the coil, battery and ground, should be complete in connection. If the battery is disconnected or if it is improperly grounded, the voltage produced in the coil rises sharply to burn out light bulbs of small capacity, e.g., bulbs of the pilot lights. Therefore, when driving the motorcycle without the battery, be sure to disconnect the input wire (white-red) of the selenium rectifier properly.
4. Be sure to check all the bulbs, with particular attention to the bulbs of the head-light and tail-light, if they are of the specified capacities. If a bulb, with larger capacity than specified, is used, the light will be dimmer than normal, whereas if a bulb having a capacity smaller than specified is used, its filament will soon be burnt out.
5. The coils, contact breaker, condenser, etc. must be kept clean, because if they are left dirty with water, oil, or dust, their insulation is impaired and their efficiency is lowered.
6. When removing the flywheel be sure to use the flywheel puller and never pound it with a hammer.

E. Adjusting contact spacing and ignition timing

ADJUSTING THE CONTACT-SPACING:

1. Remove cap on left cover.
2. Loosen screw *a*.
3. Put a screw-driver into *b* and adjust the spacing, by using a thickness gauge, to 0.3 (0.012″)—0.4mm (0.016″), with points opened all the way.
4. After adjustment, tighten screw *a* securely.

ADJUSTING THE IGNITION TIMING:

1. Remove gear shift lever.
2. Remove left cover.
3. Remove magneto set nut by using a 14 mm box wrench.
4. Turn flywheel slowly by hand and stop it just where the contact of the points is to break, and see if Point A indicated by an arrow is in line with Line B (See Fig. 22). If Line B is off in the direction indicated by the dotted arrow, ignition occurs later than normal (less than 27°), whereas if Line B is off in the direction indicated by the solid arrow, ignition occurs sooner than normal (more than 27°).
5. After checking the ignition timing in

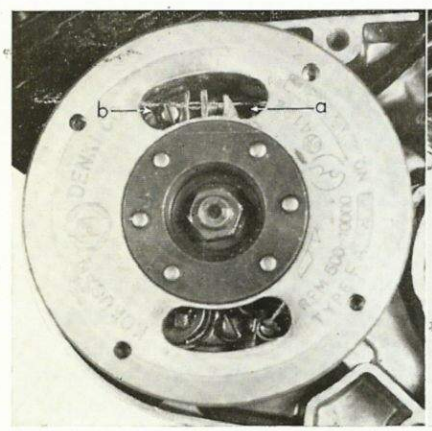


Fig. 21

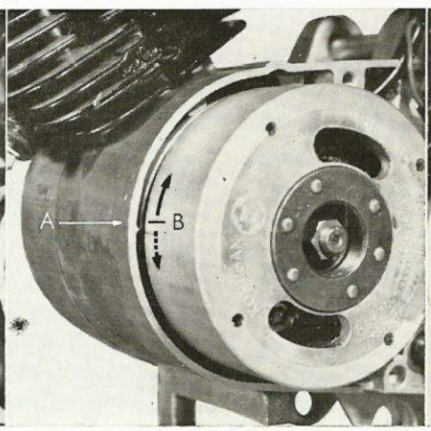


Fig. 22

Fig. 23

the manner described above, remove flywheel, loosen 3 ignition timing screws, and move stator in the direction of dotted arrow if ignition is too late, or in the direction of the solid arrow if it is too soon. After that, tighten the 3 screws.

6. After above adjustment is done, fit the flywheel back on (without putting on the flywheel set nut), and check if A is in line with B in the manner described in (4). If it is not, repeat the above adjustment process until correct alignment is obtained.

3. Starter dynamo (for Model M15D)

The Suzuki 50 Model M15D is equipped with a starter dynamo which can start the engine with one push of the starter button. The starter dynamo is a combination of a self-starter motor and a charging generator, and functions at first as the starter to start the engine and subsequently as the dynamo. It is fitted with 6 field coils to produce a large torque as the starter and to sufficiently charge the battery with the use of a regulator.

A. Specifications and characteristics

Make	NIPPON DENSO
Nominal starter output	0.19 KW
Nominal dynamo output	80 W
Direction of revolution	Anticlockwise
Number of poles	6
Length of brush	18 mm (0.63″)
Diameter of commutator	32 ϕ
Air gap	0.36–0.46 mm (0.014–0.018″)
Locked torque	0.65 kg-m (4.69 lb-ft)
Locked current	80 A
Locked Voltage	9 V
Rpm at normal temperature	1200 rpm
Current at normal temperature	15 A
Voltage at normal temperature	11.5 V
Rpm at low temperature	1100 rpm
How often starter button may be pushed at 5-second intervals	Over 100 times
Contact spacing	0.3–0.4 mm (0.012–0.016″)
Ignition timing	23 to top dead center

B. Structure

(See Fig. 24)

a) The starter dynamo can be roughly divided into two parts, i.e., the stator, which is fixed to the engine, and the armature, which is the rotating part of the dynamo.

b) As shown in Fig. 24, the stator is fitted with brushes, an oil felt, a contact breaker and a condenser.

c) Inside the stator there are 6 field coils, each of which consists of field coils for the dynamo and the starter.

d) The armature, which is the rotating part of the dynamo, is directly connected to the crankshaft by means of key and taper.

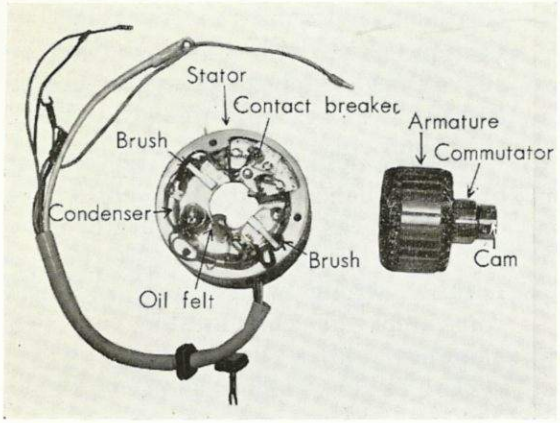


Fig. 24

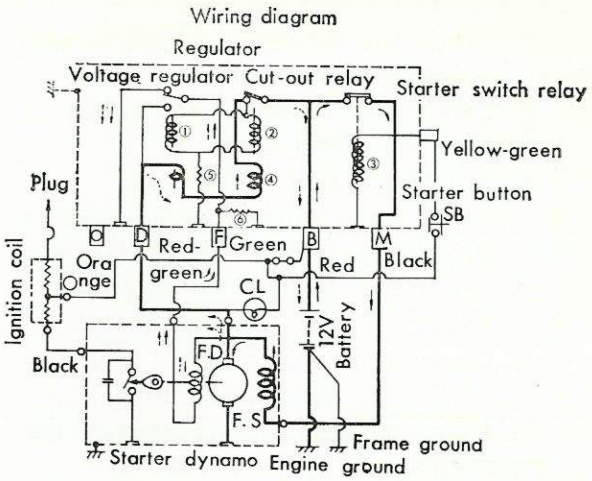


Fig. 25

C. Operation

(See Fig. 25)

Here is an explanation of the operation of the starter dynamo:

* When the starter button (SB) is pressed, with the main switch turned on, a current flows from the battery to the coil (3) of the starter switch to close the relay.

* When this starter switch relay closes, a large current flows from the battery to the starter field coil (FS) and the armature, as indicated by solid arrows, to produce a powerful revolution for starting the engine. At this instant, an exciting current flows to the dynamo field coil (FD) through the regulator.

* When the starter button is released after the engine is started, the starter switch relay opens.

* The current flowing from the battery to the dynamo field coil (FD) will then be flowing from the armature, as indicated by dotted arrows in Fig. 25.

* As the voltage produced by the dynamo rises, a larger current flows through terminal D and the coil (4) and the cutout relay's coil (2) is actuated to close the relay and begins to charge the battery. (The current also flows to the coil (1)).

* If the voltage produced rises too high, the coil (1) is actuated to lift the upper point of the voltage regulator to break the contact, and the field current is reduced, as it must pass the regulating resistance (6), thus lowering the produced voltage.

* If the voltage still rises when the contact is broken, the point comes in contact with the lower point to shortcircuit the dynamo field coil (FD), reducing the field current to zero and suspending generation.

* Thus the voltage is kept constant at all times.

* Even if the starter button is pressed on after the engine is started, no trouble will occur.

* When the main switch (MS) is thrown in before starting the engine, a circuit is formed linking Terminal B, the main switch, the charge light, the armature and ground to turn on the charge light (CL).

* If the produced voltage goes up too high to close the cut-out relay, the charge light is shortcircuited and turned off.

* If the charge light remains on after the engine is started, it indicates that no electricity is being generated.

D. Inspection and maintenance

To keep the starter dynamo to function properly in starting the engine or charging the battery, be sure to check and adjust it periodically as follows:

At every 500 kilometers (310 miles):

1) Check the battery's electrolyte and replenish it if necessary.
2) Check the regulator terminals if they are held secure.
3) Adjust the contact-point gap.

At every 3,000 kilometers (1,900 miles):

1) Check those points mentioned above.
2) Check the brushes if they aren't worn.
3) Clean the commutator and the brushes by compressed air.
4) Polish the contact surfaces of the points.

Note: Any oil on the surfaces of the commutator can be the biggest cause of dynamo troubles, so if it cannot be cleaned thoroughly of oil and carbon particles by compressed air, it is necessary to take out the starter dynamo and wipe it clean with a piece of cloth.

At every 5,000(3,200), 7,000(4,400) and 10,000 kilometers (6,000 miles):

1) Check those points mentioned above.
2) Clean the commutator by using alcohol or benzine.
3) Check the brushes and if found worn excessively, replace them with new ones.

After 10,000 kilometers (6,000 miles), check the starter dynamo at every 2000 (1,240)–3000 kilometers (1,900 miles) in the manner described above.

When the starter won't work or the battery won't charge, follow the instructions given below:

A. When the starter won't work:

a) Check the wiring: If the fuse is blown, check for any shortcircuiting before replacing the fuse with a new one.

b) Check the battery: Measure the specific gravity of the electrolyte and the battery voltage. If the battery is found discharged, charge it immediately. If the voltage or the specific gravity is particularly low, the battery needs complete repair.

c) Check the starter button and starter switch: Connect the battery's positive terminal to the regulator's M terminal. If the starter functions by this connection, either the starter button or the starter switch in the regulator has a fault.

d) Check the dynamo: Check the contact of the brushes, and then check the outer surfaces of the commutator if its grooves are free of carbon. If there is nothing wrong with them, the field coils and the commutator must be checked.

B. When the battery won't charge:

a) Check the wiring: Check for any disconnection of the wires. Check all terminals if they are held secure.

b) Check the regulator: Check the voltage regulation value of the regulator by employing wiring connections as shown in Fig. 26.

* Connect a DC voltmeter to the regulator.
* Put the two terminal cables disconnected from Terminal B to Terminal M to start the engine. (When the engine is started, get the two cables immediately out of contact with Terminal M).

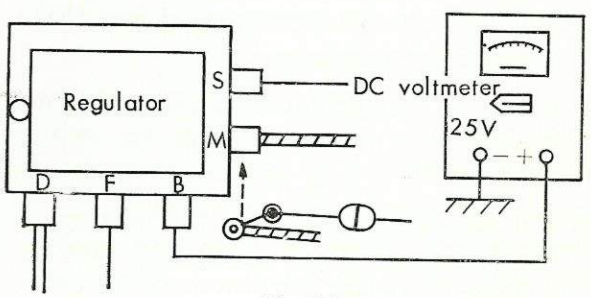


Fig. 26

* In case the voltmeter is not indicating 15.1–16.3 V when the engine's r.p.m. has stepped up to 2500–4500 r.p.m., there is something wrong with either the regulator or the dynamo.

C. Inspecting the dynamo:

Check the contact of the brushes, the field coils and the armature.

Ignition system (See Fig. 27)

Needless to mention, good sparks are vitally important for the gasoline engine. A good spark may be described as having sufficient spark energy to ignite the compressed fuel-air mixture in the cylinder at the right moment. A high-voltage spark is produced by the ignition coil. The ignition coil is a kind of transformer, and with the aid of a contact breaker and a condenser converts the battery voltage of 12 V to a high voltage of 10,000 V or over.

As the cam turns, a high voltage is produced in the secondary coil as follows:

a) When the points of the contact breaker close, the primary current flows as indicated by arrows in Fig. 27 to produce a magnetic flux in the iron core.

b) As the contact of the points is broken by the turning of the cam, the magnetic flux produced by the primary current becomes suddenly extinct.

c) This sudden change of magnetic flux affects the secondary coil, which has a larger number of turns than the primary coil, to produce a high voltage in the secondary coil.

d) The high voltage thus produced charges the secondary coil itself at first and as the voltage goes higher it charges the high-tension cable and plug.

e) When the voltage reaches a certain level, a spark is produced in the plug, and simultaneously the discharge voltage falls suddenly.

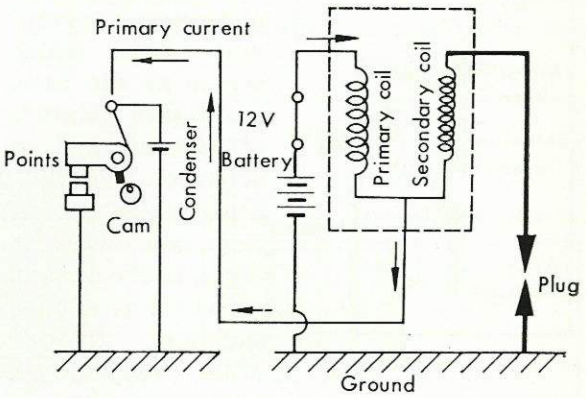


Fig. 27

E. Adjusting contact spacing and ignition timing

ADJUSTING THE CONTACT SPACING

1. Remove cap on left cover.
2. Rotate the engine anticlockwise until the spacing is widest apart, and stop it at this point.
3. Loosen the screw (d) and pry "e" with a screw driver untill the spacing becomes 0.3 (0.012)–0.4 mm (0.016″).
   The spacing can be easily measured by a thickness gauge provided in a tool bag.
4. Tighten the screw (d) firmly.

ADJUSTING THE IGNITION TIMING

1. Loosen "f" and"f′ ".
2. Put the screwdriver to "e′ " and adjust it so that the contact of the points begins to break just when the stator's notch (marked "a" in the Fig. 28) is in line with the notch of the cam (marked "b" in the Fig. 28)
3. If the point base is turned clockwise (i.e. in the direction indicated by the mark), the ignition timing is advanced, while if it is turned anticlockwise (i.e. in the direction indicated by the mark →), the ignition is retarded.
4. Tighten "f′ " firmly.

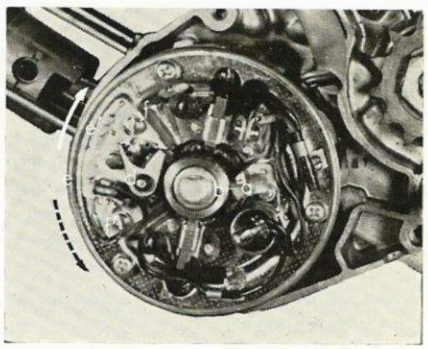


Fig. 28

4. Selenium rectifier (for Model M15)

The rectifier is a device for converting an alternating current to a direct current. The principle of the rectifier is that it utilises the characteristic of allowing a current to easily flow in one direction but not in the other. Rectifiers currently in wide use include a selenium rectifier, a copper suboxide rectifier and a germanium rectifier, but for motorcycles, the selenium rectifier is exclusively used. The structure of a selenium rectifying unit is as shown in Fig. 30. On a nickel-plated iron or aluminum plate, which serves as the base, is fused a mixture of selenium and an activator. It is then heat-treated to form a metalic selenium layer, to the surface of which is applied cadmium, tin or other easy-to-fuse alloy to comprise an electrode. The seleninum rectifier consists of a required number of such rectifying units (the number is determined by the voltage and current used) assembled in series or parallel, with terminal boards, spacers, etc. The assembly is then coated with water-proof paint for keeping off moisture and preventing rusting. For the Suzuki 50 Model M15, a rectifying unit is used. It functions, therefore, as a single-phase half-wave rectifier. Figures 32, 33 and 34 show the characteristic curves of the selenium rectifier used for the M15. When using the selenium rectifier, care must be taken about the following points.

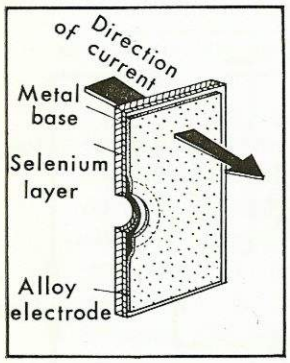


Fig. 30

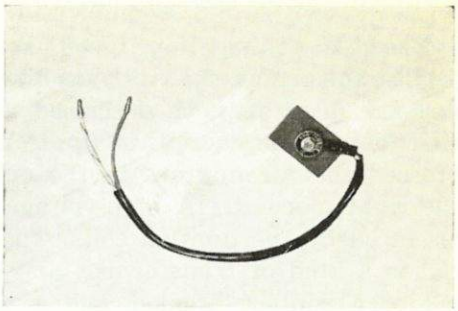


Fig. 29

1. Care must be taken not to connect the rectifier in the reverse way, because the voltage produced in the generating coil of the magneto rises sharply and is applied in the opposite direction to blow out and ruin the rectifying unit.
2. The selenium rectifying unit gradually deteriorates due to temperature rise and as a result its resistance increases. If the internal resistance of the rectifying unit increases, the output voltage falls and temperature rise is further accelerated. Care must be taken not to feed an overcurrent to the rectifier.

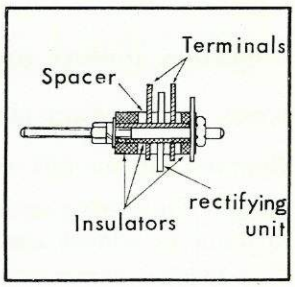


Fig. 31

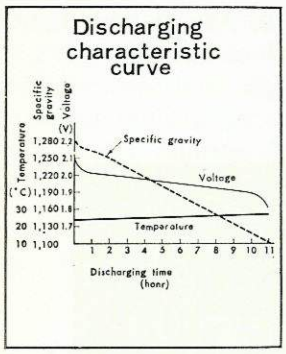


Fig. 32

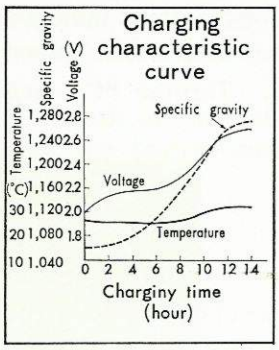


Fig. 33

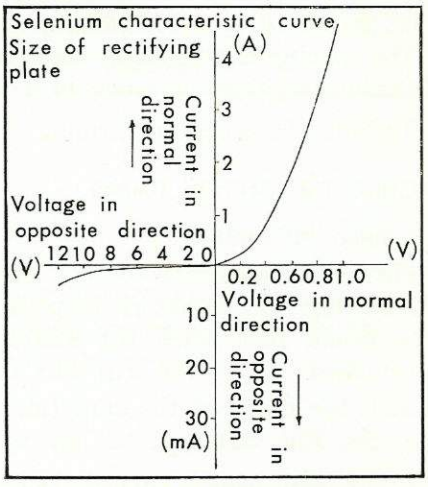


Fig. 34

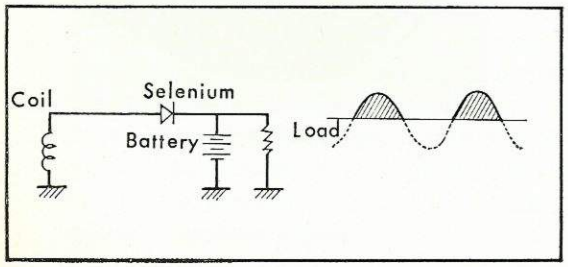


Fig. 35

5. Battery

Batteries currently in wide use include a lead battery and an alkaline battery, the former being used for automobiles.

A. STRUCTURE

As shown in Fig. 38, the battery consists of an assembly of positive and negative plates arranged alternately, with separators in between to prevent shortcircuiting and with glass fiber plates on both sides of the positive plates to prevent peeling-off. The materials which constitute the battery include lead dioxide (positive plates), spongy lead (negative plates), and dilute sulfuric acid (electrolyte). The one as shown in Fig. 38 is called a cell, and the electromotive force of a lead cell is 2.0—2.3V (2.5—2.8V when charged full). However, a 6V battery, which consists of 3 cells arranged in series, or a 12V battery, which consists of 6 cells arranged in series, is usually used. For motorcycles, 6V (M15) or 12V (M15D) batteries are predominantly used.

Fig. 36

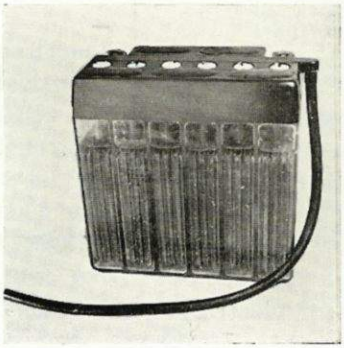


Fig. 37

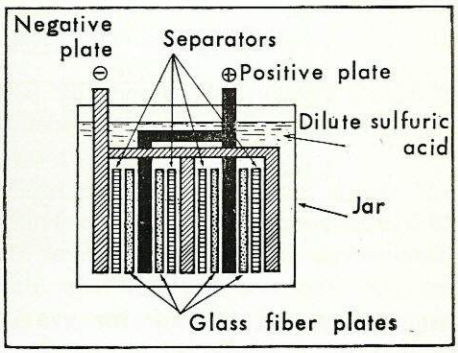


Fig. 38

B. OPERATION

The battery chemically changes as it charges or discharges, as shown in the following table:

Positive Plate	Electrolyte	Negative Plate	
Lead dioxide (PbO_2)	+ Dilute sulfuric acid ($2H_2SO_4$)	+ Lead (Pb)	Charging state ↑ / Discharging ↓
Lead sulfate ($PbSO_4$)	+ Water ($2H_2O$)	+ Lead sulfate ($PbSO_4$)	Charging ↑ / Discharging state ↓

Fig. 39

As shown above, PbO_2 changes to $PbSO_4$ in the positive plate, while Pb changes to $PbSO_4$ in the negative plate. The electrolyte changes to H_2O as H_2SO_4 is consumed. That is, $PbSO_4$ increases in the positive and negative plates, whereas the sulfuric acid content of the electrolyte decreases and water increases. As a result of these chemical changes, the specific gravity of the electrolyte decreases.

C. CAPACITY

The quantity of electricity that can be delivered from the battery from fully charged condition until the terminal voltage reaches a specified final discharge voltage is called "capacity", which can be calculated by the following equation:

Capacity (Ah) = Discharge current (A) × Discharge time (h).

Capacity is usually shown by Ah/10HR, which is based on a discharge time of 10 hours.

There are various ways to determine the capacity, or charged condition, of a battery, but it is usually determined by measuring the specific gravity of its electrolyte, which changes as the quantity of sulfuric acid (or the quantity of water) in the electrolyte changes according to discharge.

The relation between the specific gravity of the electrolyte and capacity is as shown in Fig. 40.

YUASA Battery

Specific gravity of electrolyte		Charged condition
12V	6V	
1.280	1.260	fully charged
1.250	1.230	75%
1.220	1.200	50%
1.190	1.170	25%
1.160	1.140	slightly charged
1.130	1.110	Completely discharged

Fig. 40

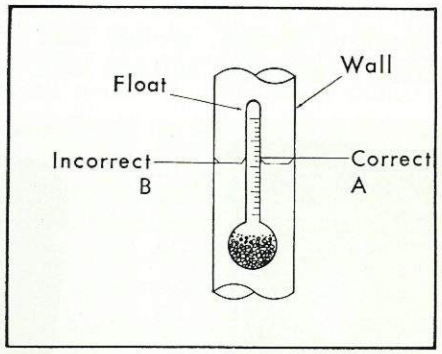


Fig. 41

When measuring the specific gravity of electrolyte, care must be taken about the following points:

1. Make sure that the float of the hydrometer is not in contact with its wall.
2. Be sure to read the hydrometer at level A, not B, as shown in Fig. 41.
3. The specific gravity of electrolyte varies with its temperature, so that the specific gravity measured must be calculated on the basis of the electrolyte temperature at the time (almost the same as atmospheric temperature if left unused for many hours) to obtain a corresponding specific gravity at 20°C.

TABLE: Relation between specific gravity and temperature

Temperature	−10°C	0°C	10°C	20°C	30°C	40°C
	1.321	1.314	1.307	1.300	1.293	1.286
	1.311	1.304	1.297	1.290	1.283	1 276
	1.301	1.294	1.287	1.280	1.273	1.266
	1.291	1.284	1.277	1.270	1.263	1.256
	1.281	1.274	1.267	1.260	1.253	1.246
Specific	1.271	1.264	1.257	1.250	1.243	1.236
gravity	1.261	1.254	1.247	1.240	1.233	1.226
	1.251	1.244	1.237	1.230	1.223	1.216
	1.241	1.234	1.227	1.220	1.213	1.206
	1.231	1.224	1.217	1.210	1.203	1.196
	1.221	1.214	1.207	1.200	1.193	1.186
	1.211	1.204	1.197	1.190	1.183	1.176
	1.201	1.194	1.187	1.180	1.173	1.166

The table for correction of specific gravity according to temperature

The figures in the above table were obtained by the following equation:

$S_{20}=St+0.0007\ (t-20)$,

in which S_{20} is specific gravity at 20°C;

St is specific gravity at the time of measuring; and

t is electrolyte temperature at the time of measuring.

For example, if the specific gravity is 1.301 when the electrolyte temperature is −10°C, these values are substituted in the above equation to obtain a corresponding specific gravity at 20°C, as follows:

$S_{20}=1.301+0.0007\ (-10-20)$

$=1.301-0.021$

$=1.28$

Thus, you will know a specific gravity of 1.301 at −10°C is equivalent to a specific gravity of 1.28 at 20°C.

D. CAUTIONS IN HANDLING

INITIAL CHARGING:

1. The specific gravity of electrolyte to be used should be 1.260 at 20°C.
2. Electrolyte must be cooled to 30°C or under and poured into the jar up to the maximum liquid level. When pouring it in the jar, be sure to cut off the sealed portion of the air outlet tube with scissors or a knife.
3. Initial charging should be made for 20 hours at 0.4A (in case of 12V battery for M15D, 0.7), and if the battery temperature rises above 45°C, suspend charging or reduce the current to 1/2 to lower temperature.
4. In the final stage of charging, regulate it so that the electrolyte's specific gravity is 1.260 (6V) or 1.280 (12V) at 20°C and continue charging for 2 or 3 more hours.
5. After the charging is done, clean the outer surfaces of the jar thoroughly of sulfuric acid and after it is dry, install it. This cleaning is necessary because electrolyte can corrode the motorcycle frame. It would be effective to prevent corrosion if some grease is applied to the battery terminals and that portion of the frame which comes in contact with the battery.
6. When using a battery, which has not been in use for more than 15 days after initial charging, be sure to re-charge it.

CAUTIONS WHILE IN USE:

1. The electrolyte level should be checked periodically every 1 or 2 weeks.
2. Pay particular attention to the electrolyte level, because exposure of the plates to air must be absolutely avoided.
3. If electrolyte has naturally decreased, add distilled water to it regardless of its specific gravity. If, in this case, dilute sulfuric acid is added to the electrolyte, its specific gravity rises to cause breaking of the plates, carbonization of the separators, or internal shortcircuiting. It must also be avoided to use water containing iron, copper, salt, or other organic substance because it will cause sulfation from self-discharge.
4. If the battery is overcharged, electrolyte temperature rises to cause the decrease of the electrolyte or deformation of the plates.
5. Care must be taken, also, not to use too large a charging current, because it can cause peeling-off of the effective matter of the positive plates.
6. If overdischarged, the plates will be sulfated, which reduces battery capacity. Be sure to maintain the electrolyte specific gravity at 1.200 or over to avoid overdischarge. Chargng or discharging with a specific gravity less than 1.200 will accelerate sulfation.

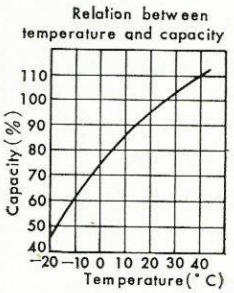


Fig. 42

7. Fg. 42 shows the

relation between temperature and capacity. As shown in the figure, the capacity of the battery is greatly affected by the temperature of electrolyte. That is, as the electrolyte temperature falls, the battery capacity drops likewise. Particular care must be taken not to overuse the battery when its capacity is low in the cold season.

E. TROUBLES AND THEIR CAUSES

	TROUBLE	CAUSE	SYMPTOM	HOW TO CORRECT
POSITIVE PLATES	Peeling off	*Excessive charging or discharging *Charging current too large *Sulfuric acid too thick	Capacity greatly drops, and at worse stage, short-circuit occurs at bottom of jar due to sediments.	No effective method to correct it; Check before it grows worse to prevent further peel-off.
	Curving	*Excessive discharge *Repeated charging or discharging with large current *High temperature	Battery capacity falls and shortcircuit may occur.	No method to correct it except by replacing plates
NEGATIVE PLATES	Sulfation	*Left discharging *Battery used when insufficiently charged *Exposure of plates to air *Electrolyte too thick *Foreign particles (iron, copper, salt or harmful organic matters)	*White spots occur on surfaces of plates *Specific gravity falls and capacity decreases *When charging, voltage rises and gas is produced quickly but specific gravity won't rise and battery won't charge.	If not serious, repeated charging with a very low current for many hours may help to some extent; but if seriously sulfated, no effective way to correct it.
	Shrinking	*Repeated discharges at high rate *Repeated charging with large current *Repeated overcharging	Charging is possible, but capacity sharply falls and voltage at final stage of discharge is high.	No effective way to correct it
SEPARATORS	Carbonization	*Temperature rise *Electrolyte specific gravity too high *Curved positive plates	Separators become brittle by carbonization	Replace battery

PLASTIC COMPONENTS

A. Hard polyethylene components

The Suzuki 50 Model M15 & M15D are equipped with various components made of hard polyethylene whose specific gravity is 0.96 and whose thickness is 2–3 mm. The use of such polyethylene components reduces the weight of the motorcycle. They are characteristically easy to color and hard to break due to plasticity, and they have many advantages.

a) Plastic components

Front fender; headlight holder; leg shields; tool box; battery box; front suspension unit spring case.

Note: Special washers are used where these components are held tight.

b) Features

* Hard to break due to high mechanical strength and plasticity. (Won't break even if bent 180°)
* Excellent heat resistance; can stand boiling. (Softening point is 127°)
* Can stand cold and retains plasticity at low temperatures. (Brittle temperature is −73°)
* Can withstand chemicals and oils without discoloring nor changing in quality.
* Easy to color; no post-molding finishing is necessary; finished products are uniform in shape and quality.
* Less vibration noise than components made of steel plates.

c) Cautions in handling

When fixing these plastic components using normal torque, be sure to use the specified special washers.

B. Hard vinyl chloride component

Although components made of hard polyethylene have a number of advantages, it is unavailable where transparency is required as in the wind-shield plate. For the M15 & M15D, a wind-shield plate made of hard vinyl chloride is available. Although it has a certain degree of brittleness, it has the following advantages:

a) Advantages

* Can withstand chemicals and corrosion.
* No rusting.
* Hard to burn.
* No corrosion or change in quality occurs due to water.

b) Cautions in handling

* When fitting the wind shield, make sure it is not fixed twistedly.
* Be careful in handling it because its surface hardness is low.

REPAIRS AND ADJUSTMENT

1. General discriptions

° The repair work of the engine can be divided into minor repairs and overhaul.

a) Minor repairs

The engine need not be dismounted from the frame:

* Repairs of attachments to the engine: Carburetor; starter dynamo; air cleaner
* Repairs of the cylinder, piston and related parts: Cylinder; piston; piston rings; piston pin; cylinder head; gasket
* Repairs of the clutch and related parts: Adjusting the clutch; primary transmission; clutch parts
* Replacing the drive sprocket, gear shift shaft complete, gear shift pawl return spring, gear shift shaft return spring, neutral switch, etc.

b) Overhaul

The engine must be dismounted from the frame:

* Replacing the crankshaft.
* Checking the bearings and oil seals in the crankcase.
* Checking the transmission gears.
* Checking the gear shift cam and gear shifter.

° Disassembling the engine
(Refer to item 3.)

° Assembling the engine

The engine should be assembled with particular attention to the following points. Before assembling it, check each part and component for any damage and clean it thoroughly of carbon, dust, etc. and wash the bearings. While assembling, apply sufficient oil to rotating or sliding parts.

a) Gear shift cam:

* When fitting the gear shifter to the gear shift cam, be sure to fit it in such a way that the gear shifter boss faces outward.
* After the gear shifter guide is fixed tight, be sure to bend the set washer.
* While assembling, check and make sure that the gear shifter operates smoothly.

b) Drive sprocket:

Be sure to bend one end of the set washer.

c) Starter dynamo:

* Be sure to insert the woodruff key.
* When fitting the stator, care must be taken not to damage the brushes by hitting them against the armature.
* After the stator is fitted on, restore the brush springs so that the brushes are in proper contact with the commutator.

d) Cylinder, cylinder head:

* The piston should be fitted in, with the arrow mark on its top directed forward.
* The cylinder head should be first tightened easily in a criss-cross order, and then tighten firmly with a torque of 100 kg-cm.

e) Neutral cable:

Be sure to connect the neutral cable (blue).

f) Ignition:

Check the ignition timing, spark gap, and the plug if they are in proper order.

2. How to dismount the engine from the frame

Engine Left

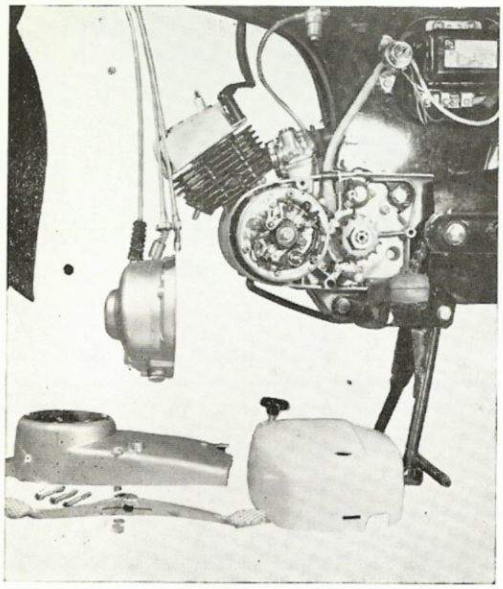


Fig. 43

Left side

1. Turn off the fuel cock.
2. Disconnect the fuel pipe, the throttle valve and starter system valve from the carburetor.
3. Disconnect the air cleaner suction pipe from the carburetor.
4. Remove the drain plug by using a 23 mm box wrench.
5. Remove the gear shift lever by using a 10 mm box wrench.
6. Remove the left cover by using a plus driver.
7. Remove the chain from the drive sprocket by using a pair of pliers.
8. Remove the tool box and disconnect the cables from the regulator's D, F, and M terminals.
9. Disconnect the cables in the frame:
   a) Neutral cable (blue)
   b) Ignition cable (black)

Engine Right

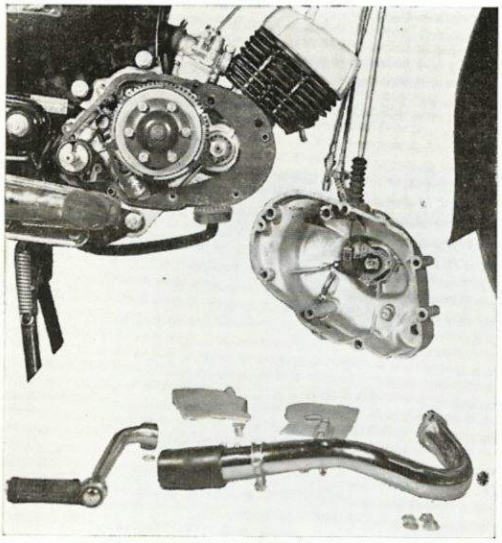


Fig. 44

Right side

1. Remove the kick lever by using a 10 mm wrench.
2. Remove the exhaust pipe from the cylinder by using a 10 mm box wrench.
3. Remove the right cover by using a plus driver.
4. Remove the electric box.
5. Remove the battery:
   a) Remove the battery set band.
   b) Disconnect the positive and negative cables.
   c) Remove the battery holder.
6. Remove the 3 engine set bolts by using a 14 mm box wrench.

3. How to disassemble the engine

1. Carburetor

Part No.	Part to be removed	Quantity	Tool used	Remarks
M10-1630K1TO3	Carburetor	1		AMAL VM15SC
M10-1630-16	Clip screw	1	Driver	

2. Cylinder

Part No.	Part to be removed	Quantity	Tool used	Remarks
SB 3210A	Plug (B-6)	1	21mm box wrench	NGK's make
M10-1111	Cylinder head	1		
SB 1191	Cylinder head set nut	4	10mm box wrench	Loosen them crisscross-wise
WM 061	6mm Flat washer	4		Check for compression leak
MA 1121	Cylinder head gasket	1		

3. Cylinder

Part No.	Part to be removed	Quantity	Tool used	Remarks
M10-1211	Cylinder	1		Check for wear; At cylinder skirt ring split must not be greater than 0.7 mm Replace with new one
MA 1221	Cylinder packing	1		Remove cylinder and invert. Then insert a piston ring into cylinder, and measure ring split at cylinder skirt with thickness gauge

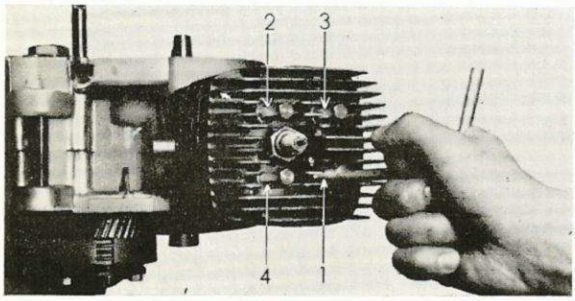


Fig. 45

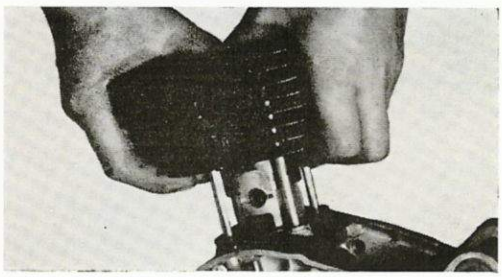


Fig. 46

4-1. Flywheel rotor (for Model M15)

Part No.	Part to be removed	Quantity	Tool used	Remarks
K10-3110K2B	Flywheel magneto assembly	1		Made by Kokusan Denki
K10-3110K2B-2	Flywheel rotor complete	1	Flywheel remover, 14mm box wrench	
NK 101	Magneto set nut	1	Piston holder (small) 14mm box wrench	Place piston holder under piston skirt
WK 10	Magneto set washer	1		
WS 10	Magneto set spring washer	1		

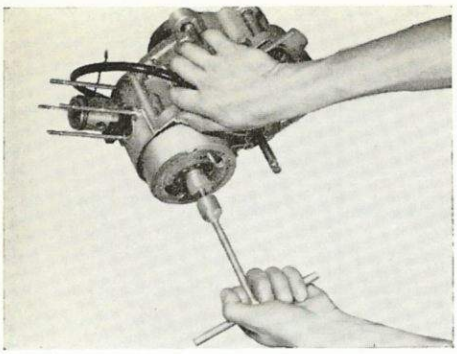


Fig. 47

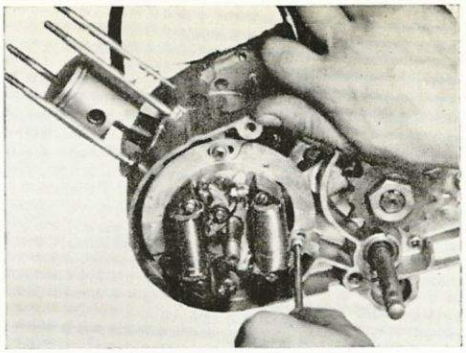


Fig. 48

4-2. Stator (for Model M15)

Part No.	Part to be removed	Quantity	Tool used	Remarks
	Lead cords from stator	4		Disconnect
K10-3110K2B-1	Stator assembly	1		First disconnect neutral switch cord
PNS 0516	Magneto base set screw	3	Plus driver	
WM 051	Magneto base set washer	3		

5-1. Stator (for Model M15D)

Part No.	Part to be removed	Quantity	Tool used	Remarks
MC 3110K1	Starter dynamo assembly	1		Made by Nihon Denso
MA 3111K1-31	Brush complete	2		Take care not to damage carbon brush
MA 3194	Rotor set bolt	1	Piston holder (small) 10mm box wrench	Place piston holder under piston skirt
MA 3191	Stator set screw	3	Plus driver	
WS 05	5mm spring washer	3	Plus driver	
MA 3111K1A	Stator assembly	1		First disconnect neutral switch cord

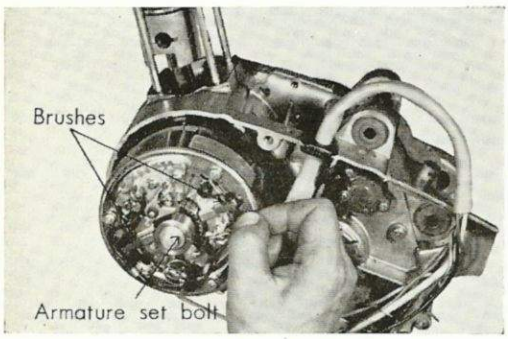


Fig. 49

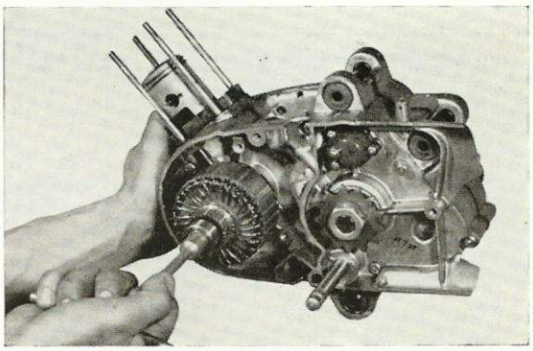


Fig. 50

5-2. Armature (for Model M15D)

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 3112K1	Armature complete	1	Piston holder (small); armature puller	Clean commutator and check for onesided wear
MA 3182	Cam woodruff key	1		

6-1. Neutral switch

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 3411	Neutral switch body	1		
PN 0305	3×5 pan-head screw	1	Plus driver	
PN 0416	4×16 pan-head screw	3	Plus driver	
MA 3412	Neutral switch packing	1		Replace with new one
PN 0610	6×10 pan-head screw	1	Plus driver	
WS 06	6mm spring washer	1		
MA 3414	Neutral switch contact spring	1		

6-2. Drive sprocket

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2511	Drive sprocket	1		#420 13NT
MA 2591	Drive sprocket set nut	1	Sprocket spanner 26mm box wrench	
MA 2592	Drive sprocket set washer	1	Hammer; chisel	Turn down bend beforehand
MA 2512	Drive sprocket distance collar	1		

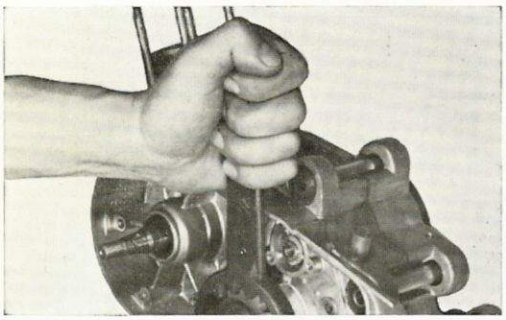


Fig. 51

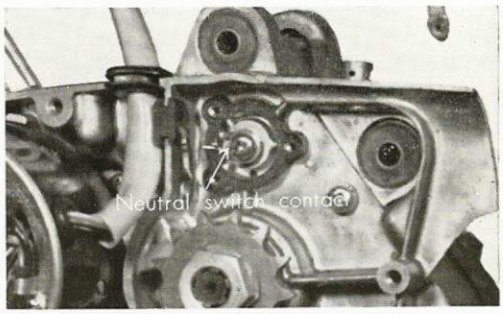


Fig. 52

7-1. Clutch

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2261	Clutch push piece	1		
MA 2262	Clutch push piece adjust shim	4		Increase or decrease shims as required
NG 051	5mm hexagon nut	6	9mm wrench; 17 mm box wrench; clutch spring set tool	Loosen them criss-cross-wise
WT 051	Clutch pressure plate washer	6		
MA 2245A	Clutch pressure plate	1		Check for tension fatigue
MA 2251A	Clutch spring	6		

7-2. Clutch

Part No.	Part to be removed	Quantity	Tool used	Remarks
AAM 1193	Clutch sleeve hub set nut	1	Clutch sleeve hub stopper. 21mm box wrench; hammer	
SB 2192	Clutch sleeve hub lock washer	1	Chisel; hammer	Turn down bend beforehand
MA 2241B	Clutch disc.	1		
MA 2244	Clutch facing	4		Check for wear
MA 2242	Clutch driven plate	3		
MA 2243B	Clutch outer plate complete	1		
MA 2231A	Clutch sleeve hub	1		
MA 2222	Clutch housing thrust washer	1		
MA 2223A	Clutch housing inner thrust washer	1		
MA 2221	Clutch housing collar	1		
MA 2131A	Primary gear	1		

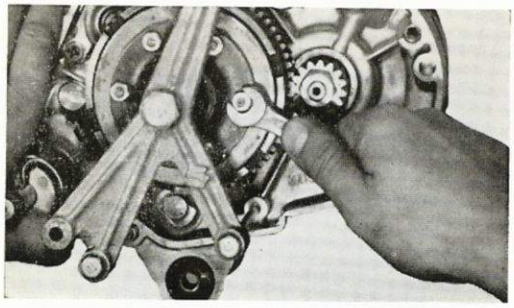


Fig. 53

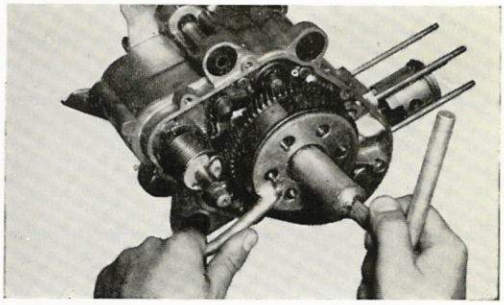


Fig. 54

8. Gear shift cam stopper

Part No.	Part to be removed	Quantiy	Tool used	Remarks
SB 2666	Gear shift shaft set circlip	1		
SB 2665	Gear shift shaft thrust washer	1		
MA 2641	Gear shift cam stopper complete	1		
MA 2642	Gear shift cam stopper set stud	1	10mm box	
MA 2643	Gear shift cam stopper spring	1		
MA 2644	Gear shift cam stopper arm distance collar	1		

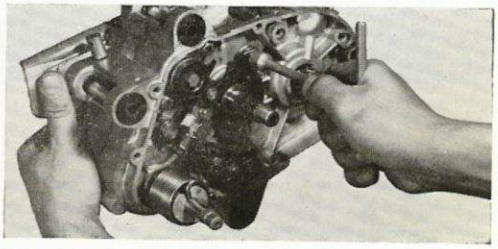


Fig. 55

9. Gear shift shaft

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2661A	Gear shift shaft complete	1		
MA 2662	Gear shift pawl return spring	1		
MA 2663	Gear shift shaft return spring	1		
MA 2691-3B	Gear shift pawl	1		

10-1. Primary pinion

Part No.	Part to be removed	Quantity	Tool used	Remarks
NG 101 MA 2192	10mm hexagonal nut Primary pinion set washer	1 1	17mm box wrench	

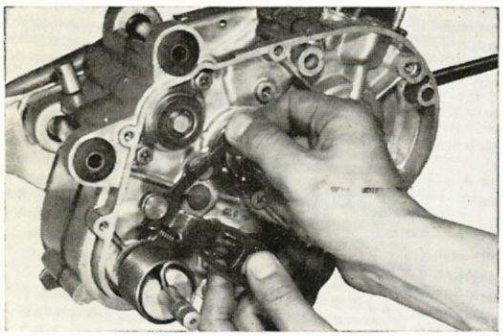


Fig. 56

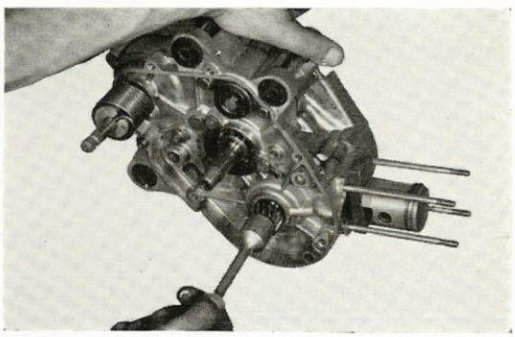


Fig. 57

10-2. Primary pinion

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2111	Primary pinion	1	Piston holder (small); Primary pinion puller	Take care not to damage gear teeth;

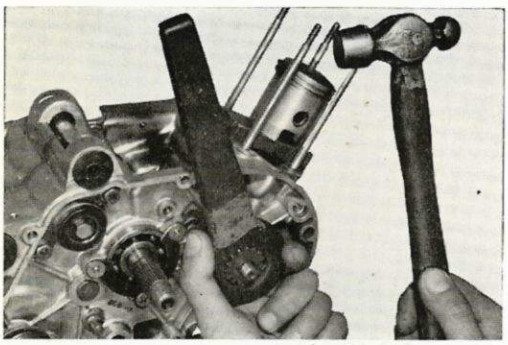


Fig. 58

11-1. Kick shaft return spring guide

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2754	Kick shaft return spring guide	1	Pliers	Pull it out straight

11-2, Kick shaft return spring

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2741	Kick shaft return spring	1	Pliers	Pull one end of spring straight up from hole in kick shaft; and remove the other end from case hole

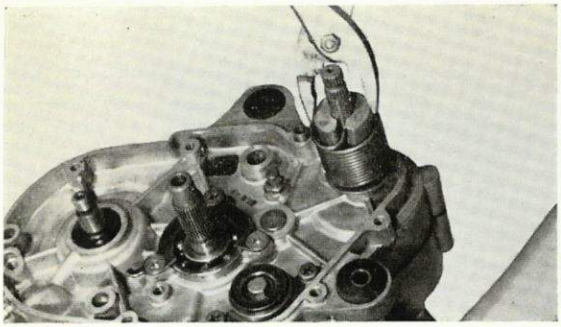


Fig. 59

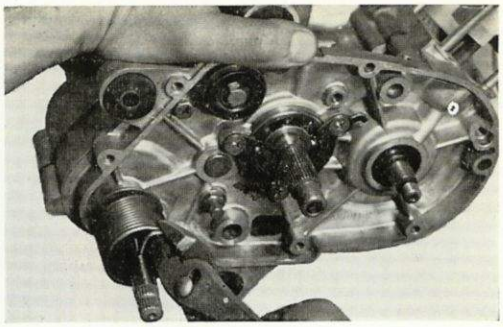


Fig. 60

11-3. Kick shaft return spring set circlip

Port No.	Part to be removed	Quantity	Tool used	Remarks
CS 12	Kick shaft return spring set circlip	1	Inverse pliers	
MA 2755	Kick shaft return spring holder	1		
MA 2782	Kick shaft thrust washer	1		

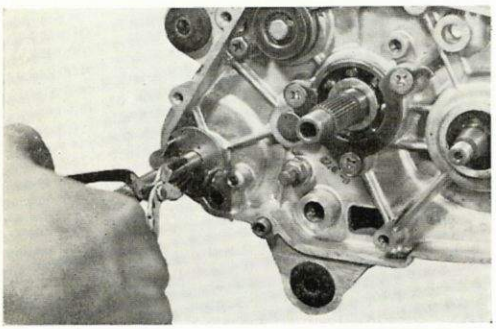


Fig. 61

12. Crankcase

Part No.	Part to be removed	Quantiy	Tool used	Remarks
MA 1510 E	Crankcase assembly	1		When taking it apart, tap crank-shaft & driveshaft lightly with mallet
PNS 0635	6×35 pan-head screw	4	Plus driver	
PNS 0645	6×45 pan-head screw	1	Plus driver	
PNS 0655	6×55 pan-head screw	2	Plus driver	
PNS 0665	6×65 pan-head screw	1	Plus driver	
MA 1822	Engine support distance collar	3		When refitting, inset driver
MA 1535 A	Crankcase packing	1		Replace with new one

13-1. Piston rings

Part No.	Part to be removed	Quantity	Tool used	Remapks
MA 1321	Piston ring (top)	1		Push it out using both thumbs
MA 1322	Piston ring (second)	1		Check for tension and wear

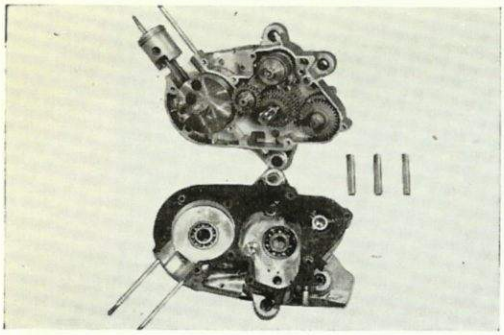


Fig. 62

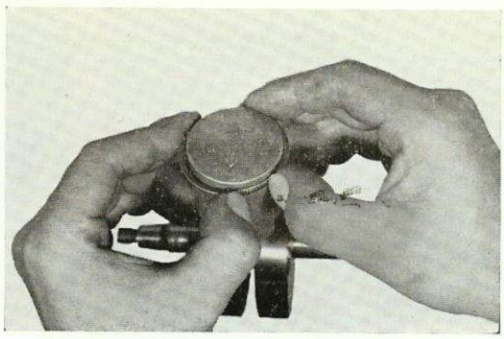


Fig. 63

13-2. Heating the piston

Part No.	Part to de removed	Quantity	Tool used	Remarks
MA 1311 Tol	Piston	1		Check for wear & burns when disassembled; heat it to 80°C when refitting

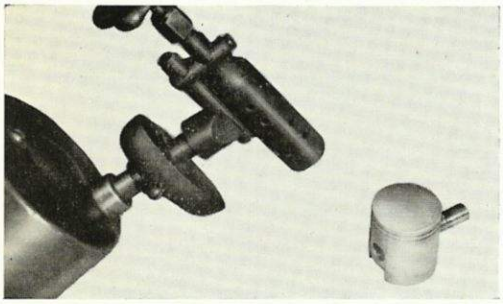


Fig. 64

13-3. Piston pin set ring

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 1332 A	Piston pin set ring	2	Pliers	

13-4. Pullig out the piston pin

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 1331	Piston pin	1	Metal rod; hammer (when removing). pliers (when refitting)	Piston pin should be refitted while piston is hot

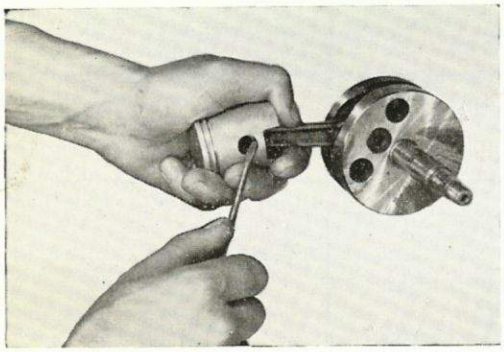


Fig. 65

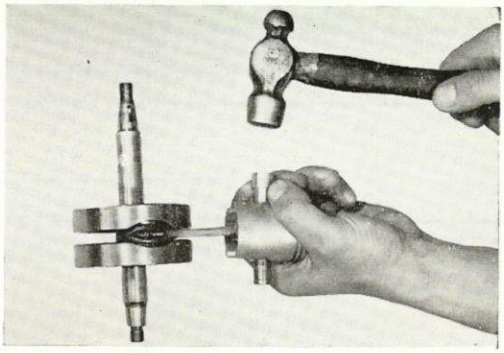


Fig. 66

13-5. Refitting the piston pin

14. Gear shift cam (Removing parts from right crankcase)

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2635	Gear shift cam guide set bolt	2	10mm box wrench	
MA 2636	Gear shift cam guide set washer	2	Chisel	
MA 2647 T63	Gear shift cam lock plate	1		
MA 2634	Gear shift cam guide	1		
MA 2621	Gear shifter guide	2	10mm box wrench	
MA 2622	Gear shifter guide set washer	2		
MA 2631 T63	Gear shift cam	1	Pliers	Pull it out on right side of right case
MA 2611 A	Gear shifter	1		

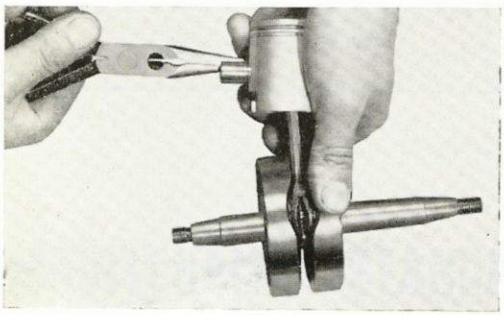


Fig. 67

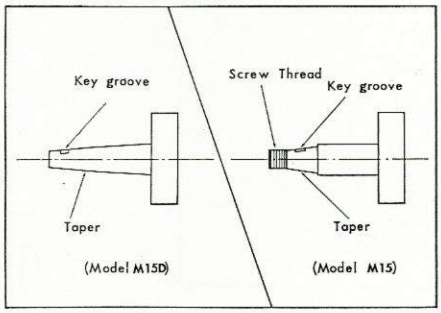


Fig. 68

15. Kick starter

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2751	Kick shaft	1		Parts outside right crankcase have been already removed; parts inside the case should be taken off kick shaft in the case
MA 2782	Kick shaft thrust washer	1		
MA 2711	Kick pawl	1		
MA 2712	Kick pawl roller	1		
MA 2713	Kick pawl spring	1		
MA 2721	Kick pinion	1		
MA 2781	Kick pinion thrust washer	1		

16. Gear shift mechanism

	Part No.	Part to be removed	Quantity	Tool used	Remarks
COUNTERSHAFT	MA 2411 A	Countershaft	1		
	MA 2464	Top pinion thrust washer	1		
	MA 2424 B	Top pinion	1		
	MA 2422 B	Second pinion	1		
	MA 2461	Set Circlip	1	Inverse pliers	
	MA 2423 A	Third pinion	1		
	MA 2462	Third pinion thrust washer	1		
DRIVESHAFT	MA 2431 A	Drive shaft	1		
	MA 2441 A	1st gear complete	1		
	MA 2443	Third gear	1		
	MA 2461	Set circlip	1	Inverse pliers	
	MA 2442 B	Second gear complete	1		
	MA 2463	Third gear distance collar	1		
	MA 2444	Top gear	1		

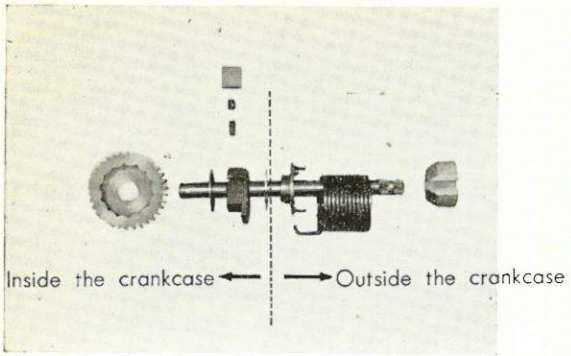


Fig. 69

(FITTING THE KICK LEVER)

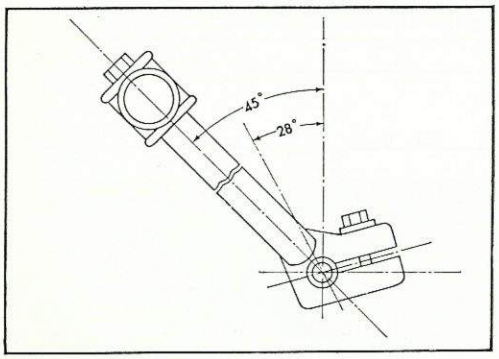


Fig. 71

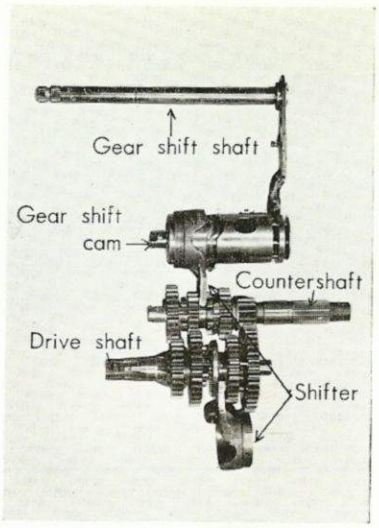


Fig. 70

17-1. Pulling out the oil seal

a. Left side

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 2471	Drive shaft oil seal	1	Oil seal puller	Check for fatigue and cracks
MA 1471	Crankshaft oil seal	1	〃	〃
	Gear shift oil seal	1	〃	〃

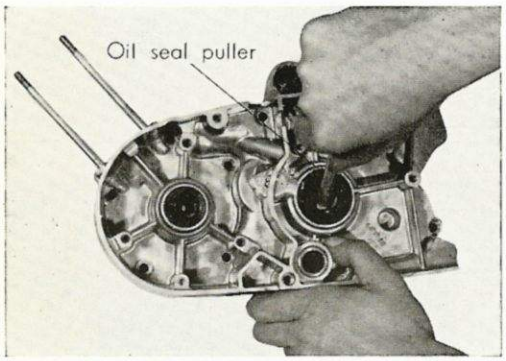


Fig. 72

b. Right side

Part No.	Part to be removed	Quantity	Tool used	Remarks
MA 1471	Crankshaft oil seal	1	Oil seal puller	Check for fatigue and cracks

17-2. Pulling out the bearing

a. Left side

Part No.	Part to be removed	Quantity	Tool used	Remarks
JK 16003	16003 Bearing	1	Bearing & oil seal replacer (big & small)	Heat case to 80°C when refitting Check for burn, play, noise, etc.
JK 6203 JK 6303	6203 Bearing 6303 Bearing	1		

b. Right side

Part No.	Part to be removed	Quantity	Tool used	Remarks
PSS 0614	6×14 Pan-head screw	3	Plus driver	
MA 2455	Counter shaft bearing set plate	1		
JK 6303	6303 Bearing	2	Bearing & oil seal replacer (big)	Heat case to 80°C when refitting Check for burn, play, noise, etc.

MAINTENANCE STANDARDS

General performance :

What to check	Standard	When to correct	How to correct	Remarks
Cylinder compression pressure	7.5 kg/cm² (106.5 lb/inch²)	When dropped to 4.88kg/cm² (69.16 lb/inch²) or less	Overhaul	
Fuel consumption	65 km/liter (184 mile/Imp. gallon)	If 45 km (28 miles) or less per liter	Overhaul	25 km/h (15.6 m.p.h.) on level road
Maximum speed	80 km/h (50 m.p.h)	If 52.5 km (33 miles) or less per hour	Overhaul	Forward-inclined posture

Cylinder :

What to check	Standard	When to correct	How to correct	Remarks
Inside diameter	41.00-41.02 mm (1.6113-1.6121″)	If 41.2 mm (1.6192″) or over	Boring	Measure at 4 points on top & bottom
Wall thickness	7 mm (0.2751″)	If 5.25 mm (0.2063″) or under	Replace	
Out of roundness	0.008 mm (0.000314″) or less	If 0.04 mm (0.001572″) or over	Boring	
Difference of inside diameter at top & bottom	0.008 mm (0.000314″) or less	If 0.04 mm (0.001572″) or over	Boring	
Roughness of inner wall surface	1.5 Sμ or less			After boring, hone it to 0.005 or less

Cylinder head :

What to check	Standard	When to correct	How to correct	Remarks
Height of combustion chamber	9.2 mm (0.36156″)			
Volume of combustion chamber	6.8-7.2 cc			When fitted with NGK Plug B-4
Thickness of gasket	2.0 mm (0.0786″)			1.6 mm (0.0628″) when tightened
Tightening torque of cylinder stud nuts	100 kg-cm (86.8 lb-inch)			

Clutch wet multiple disc type :

What to check		Standard	When to correct	How to correct	Remarks
Clutch housing:	O. D.	100 mm (3.39″)			Housing's number of teeth: 66
	Run-out	0.03 mm (0.001170″) or less	If over 0.03 mm (0.001170″)	Repair	Primary pinion's number of teeth: 15
Clutch disc:	Thickness	2.3 mm (0.09039″)	If 1.9 mm (0.07467″) or less	Replace	
	Strain	0.1 mm (0.00393″)	If over 0.1 mm (0.00393″)	Replace	Degree of planeness
Clutch driven plate:	Thickness	1.6 mm (0.06288″)		Replace	
	Strain	0.1 mm (0.00393″) or less	If over 0.1 mm (0.00393″)	Replace	
Clutch facing:	Thickness	2.8-3.2 mm (0.11004″-0.12576″)	If 2.5 mm (0.09825″) or less	Replace	
	Strain	0.1 mm (0.00393″) or less	If over 0.1 mm (0.00393″)	Replace	
Clutch spring:	Free length	19 mm (0.7467″)	If 18 mm (0.7074″) or less	Replace	
	Load	7.5-8.1 kg (16.5-17.9 lbs)	If 6.375 kg (14.057 lbs)	Replace	
	Length when fitted	12.5 mm (0.4912″)			

Transmission (4-speed constantmesh) :

What to check	Standard	When to correct	How to correct	Remarks
Outsidde diameter of drive shaft	15.956-15.974 mm (0.6270-0.6277″)	If 15 mm (0.589″) or less	Replace	
Clearance between drive shaft and second gear	0.034 mm (0.00133″)	If 0.5 mm (0.01965″) or over		
Play of drive shaft in axial direction	0.1-0.75 mm (0.00393-0.02947″)			
Play of 3rd gear in rotating direction (at spline)	0.034 mm (0.00133″)	If 0.5 mm (0.01965″) or over		When assembled
Pitch of drive sprocket	12.70 mm (1/2″)			
Outside diameter of countershaft	15.956-15.974 mm (0.6270-0.6277″)	If 15 mm (0.589″) or less	Replace	JK 6303
Play of drive shaft or countershaft in bearing's radial direction	0.011-0.013 mm (0.0004323-0.0005109″)	If 0.2 mm (0.00786″) or over	Replace	
Clearance between drive shaft (or countershaft) and bushing	0.016-0.052 mm (0.0006288-0.002044″)	If 0.3 mm (0.01179″) or over	Replace	

Crankshaft, piston, connecting rod, etc. :

Piston

What to check	Standard	When to correct	How to correct	Remarks
Diameter at top	40.830-40.845mm (1.6046-1.6052″)		Replace	Alsil (meterial)
Maximum diameter	40.960-40.975mm (1.6097-1.6103″)		Replace	
Depth of piston ring grooves	2.15mm (0.8449″)			
Width of top and 2nd ring grooves	1.810-1.825mm (0.07113-0.07172″)	If 1.907mm (0.07494″) or over	Replace	
Minimum clearance between piston and cylinder	0.023-0.048mm (0.000903-0.001886″)	If 0.15mm (0.00589″) or over	Replace	
Diameter of piston pin hole	11.986-11.996mm (0.47104-0.47144″)	If 12.03mm (0.47278″) or over	Replace	
Oversize pistons	Larger by 0.5mm (0.01965″), 1.0mm (0.0393″) & 1.5mm (0.05895″)			3 oversizes available

Piston rings

What to check	Standard	When to correct	How to correct	Remarks
Thickness of top and 2nd rings	1.77-1.79mm (0.06956-0.07034″)	If 1.61mm (0.06327″) or less	Replace	
Width of top and 2nd ring	1.9-2.1mm (0.07467-0.08253″)			
Tensile strength of top and 2nd rings	0.55-0.70kg (1.21-2.54lbs)	If 0.4kg (0.88lb) or less	Replace	Tangential tensile strength
Clearance of top and 2nd rings splits (when rings are in place)	0.1-0.2mm (0.00393-0.00786″)	If 0.7mm (0.02751″) or over	If clearance is too small, correct it; if too large replace	
Clearance between ring (top or 2nd) and groove	0.02-0.055mm (0.00786-0.00216″)	If 0.15mm (0.005895″) or over	Replace	
Oversize ring	Larger by 0.5mm & 1.0mm (0.01965″) (0.03937″)			2 oversizes available

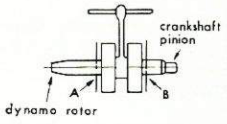
Piston pin

What to check	Standard	When to correct	How to correct	Remarks
Outside diameter	11.994-12.000mm (0.4714-0.4716″)		Replace	Material SCr21
Overall length	33.4-33.8mm (1.3126-1.3283″)			
Clearance between piston and piston pin	0.014-0.002mm (0.00055-0.000079″)			
Out of roundness	0.002mm (0.000079″) or less			

Connecting rod

What to check	Standard	When to correct	How to correct	Remarks
Inside diameter of small end of connecting rod	15.018-15.034mm (0.5902-0.5908″)			
Wabble at small end		If over 4.0mm (0.1572″)	Replace	$0.6 \times \frac{80(3.144'')}{\text{mm}} \left(\frac{\text{length from the center of small end to the center of large end}}{12\text{mm } (0.4716'') \text{ (width of large end)}}\right)$
Inside diameter of large end of connecting rod	18.215-18.225mm (0.7158-0.7162″)	If 18.26mm (0.7176″) or over	Replace	
Deviation from parallel between large & small ends	0.02mm (0.00078″) or less	If 0.1mm (0.00393″) or over	Replace	Measured at 40mm (1.572″) from center

Crankshaft

What to check	Standard	When to correct	How to correct	Remarks
Clearance between crank pin and large end of connecting rod	0.011-0.035mm (0.000432-0.00137″)	If 0.10mm (0.00393″) or over	Replace	Out of roundness 0.001mm (0.0000393″) or less
Play of crankshaft bearings in axial direction	R: 0.01-0.008mm (0.000393-0.000314″) L: 0.04-0.013mm (0.001572-0.0005109″)	If 0.1mm (0.00393″) or over	Replace	
Maximum play of crankshaft A:		If 0.100mm (0.00393″) or over		
(when supported at both centers of crankshaft ends) B:		If 0.100mm (0.00393″) or over		

Flywheel magneto: (for Model M15)

What to check	Standard	When to correct	How to correct	Remarks
Spring tension of breaker point	800-1000g (1.76-2.21lbs)	If 600g (1.32lbs) or less	Replace	
Contact spacing	0.3-0.4mm (0.012-0.016″)	If off standard spacing	Adjust	
Ignition timing	27° to top dead center	If not within ±3°		2.54mm (0.1″) to top dead center
Condenser capacity	0.24-0.30	If outside standard	Replace	Microfarad
Charging current	0.15A or over (day)			2000r.p.m.
	0.1A or over (night)			2000r.p.m.
	3.2A or under (day)			8000r.p.m.
Lighting voltage	6.0V or over			2000r.p.m.
Spark length	9.0V or under			8000r.p.m.
(Triple-electrode gap)	6mm (0.24″) or over	5mm (0.20″) or over		500-8000r.p.m.

Starter dynamo: (for Model M15D)

What to check	Standard	When to correct	How to correct	Remarks
Diameter of armature	76mm (2.9868″)	If 73mm (2.8689″) or less		
Gap of contact points	0.3-0.4mm (0.01179-0.01572″)	If off standard gap	Adjust	
Ignition timing	27° to top dead center	If not within ±3°		2.54mm (0.1″) to top dead center
Condenser capacity (Made by Nippon Denso)	0.20-0.24	If outside standard	Replace	Microfarad
Spark length (Triple-electrode gap)	8mm (0.3144″) or over at 300rpm; 6mm (0.2358″) or over at 9000rpm	If less than standard values	Replace	Battery voltage 12V
Clearance between armature & pole core	0.3mm (0.01179″)	If outside standard		Air gap (radius)
Dimensions of brushes (width × thickness × length)	8mm(0.313″) × 5mm(0.196″) × 18mm (0.707″)	If 12mm (0.4716″) or less	Replace	Replace if length decreases by 1/3
Spring tension for brushes	450-650 g	If 350g or less		
Initial charging voltage	12.0-13.5V at 2350rpm or less	If 12.0-13.5 V at over 2350rpm	Adjust	
Reverse current	7A or less		Adjust	
Starting current	70A		Check	
Regulating voltage	15.4-16.6V		Adjust	

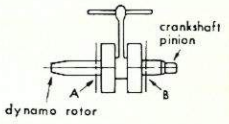
Kick starter:

What to check	Standard	When to correct	How to correct	Remarks
Normal torque of kick shaft return spring	10kg-cm (8.68lb-inch)			Free length 46 mm (1.808″)
Load on kick pawl spring	1.1 kg (2.43 lbs)			Free length 10.5 mm (0.413″)
Outside diameter of kick shaft	12.016-12.034 mm (0.4722-0.4729″)	If 11.424 mm (0.4489″) or less		
Clearance between kick shaft and kick gear	0.016-0.052 mm (0.000628-0.002043″)	If 0.185 mm (0.00727″) or over		
Clearance between kick shaft and case	0.171-0.227 mm (0.00672-0.00892″)			
Play of kick shaft in axial direction		If 0.5 mm (0.01965″) or less		Insert adjust washer

Connecting rod

What to check	Standard	When to correct	How to correct	Remarks
Inside diameter of small end of connecting rod	15.018-15.034mm (0.5902-0.5908″)			
Wabble at small end		If over 4.0mm (0.1572″)	Replace	$0.6 \times \frac{80(3.144'')}{\text{mm}} \left(\frac{\text{length from the center of small end to the center of large end}}{12\text{mm } (0.4716'') \text{ (width of large end)}}\right)$
Inside diameter of large end of connecting rod	18.215-18.225mm (0.7158-0.7162″)	If 18.26mm (0.7176″) or over	Replace	
Deviation from parallel between large & small ends	0.02mm (0.00078″) or less	If 0.1mm (0.00393″) or over	Replace	Measured at 40mm (1.572″) from center

Crankshaft

What to check	Standard	When to correct	How to correct	Remarks
Clearance between crank pin and large end of connecting rod	0.011-0.035mm (0.000432-0.00137″)	If 0.10mm (0.00393″) or over	Replace	Out of roundness 0.001mm (0.0000393″) or less
Play of crankshaft bearings in axial direction	R: 0.01-0.008mm (0.000393-0.000314″) L: 0.04-0.013mm (0.001572-0.0005109″)	If 0.1mm (0.00393″) or over	Replace	
Maximum play of crankshaft A:		If 0.100mm (0.00393″) or over		
(when supported at both centers of crankshaft ends) B:		If 0.100mm (0.00393″) or over		

Flywheel magneto: (for Model M15)

What to check	Standard	When to correct	How to correct	Remarks
Spring tension of breaker point	800-1000g (1.76-2.21lbs)	If 600g (1.32lbs) or less	Replace	
Contact spacing	0.3-0.4mm (0.012-0.016″)	If off standard spacing	Adjust	
Ignition timing	27° to top dead center	If not within ±3°		2.54mm (0.1″) to top dead center
Condenser capacity	0.24-0.30	If outside standard	Replace	Microfarad
Charging current	0.15A or over (day)			2000r.p.m.
	0.1A or over (night)			2000r.p.m.
	3.2A or under (day)			8000r.p.m.
Lighting voltage	6.0V or over			2000r.p.m.
Spark length	9.0V or under			8000r.p.m.
(Triple-electrode gap)	6mm (0.24″) or over	5mm (0.20″) or over		500-8000r.p.m.

Starter dynamo: (for Model M15D)

What to check	Standard	When to correct	How to correct	Remarks
Diameter of armature	76mm (2.9868″)	If 73mm (2.8689″) or less		
Gap of contact points	0.3-0.4mm (0.01179-0.01572″)	If off standard gap	Adjust	
Ignition timing	27° to top dead center	If not within ±3°		2.54mm (0.1″) to top dead center
Condenser capacity (Made by Nippon Denso)	0.20-0.24	If outside standard	Replace	Microfarad
Spark length (Triple-electrode gap)	8mm (0.3144″) or over at 300rpm; 6mm (0.2358″) or over at 9000rpm	If less than standard values	Replace	Battery voltage 12V
Clearance between armature & pole core	0.3mm (0.01179″)	If outside standard		Air gap (radius)
Dimensions of brushes (width × thickness × length)	8mm(0.313″) × 5mm(0.196″) × 18mm (0.707″)	If 12mm (0.4716″) or less	Replace	Replace if length decreases by 1/3
Spring tension for brushes	450-650 g	If 350g or less		
Initial charging voltage	12.0-13.5V at 2350rpm or less	If 12.0-13.5 V at over 2350rpm	Adjust	
Reverse current	7A or less		Adjust	
Starting current	70A		Check	
Regulating voltage	15.4-16.6V		Adjust	

Kick starter:

What to check	Standard	When to correct	How to correct	Remarks
Normal torque of kick shaft return spring	10kg-cm (8.68lb-inch)			Free length 46 mm (1.808″)
Load on kick pawl spring	1.1 kg (2.43 lbs)			Free length 10.5 mm (0.413″)
Outside diameter of kick shaft	12.016-12.034 mm (0.4722-0.4729″)	If 11.424 mm (0.4489″) or less		
Clearance between kick shaft and kick gear	0.016-0.052 mm (0.000628-0.002043″)	If 0.185 mm (0.00727″) or over		
Clearance between kick shaft and case	0.171-0.227 mm (0.00672-0.00892″)			
Play of kick shaft in axial direction		If 0.5 mm (0.01965″) or less		Insert adjust washer

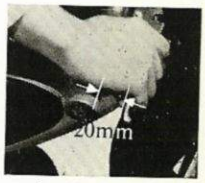
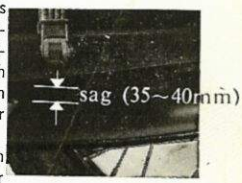
Carburetor (VM15SC):

What to check	Standard	When to check	How to correct	Remarks
Main jet (MJ)	#80			
Air jet (AJ)	0.5			
Jet needle (JN)	$14F_1$-3, 2nd-step (from the top)			To enrich gas: 4,5 To rarefy gas: 1,2
Needle jet (NJ)	E-0			
Cutaway (CA)	2.0			
Pilot jet (PJ)	2.0			
Pilot outlet (PO)	0.9			
Air screw (AS)	$1^3/_4$ turns open		Adjust	Turn clockwise to reduce air; turn anticlockwise to increase air
Valve seat diameter (VS)	1.2			
Starter jet (GS)	4.0			

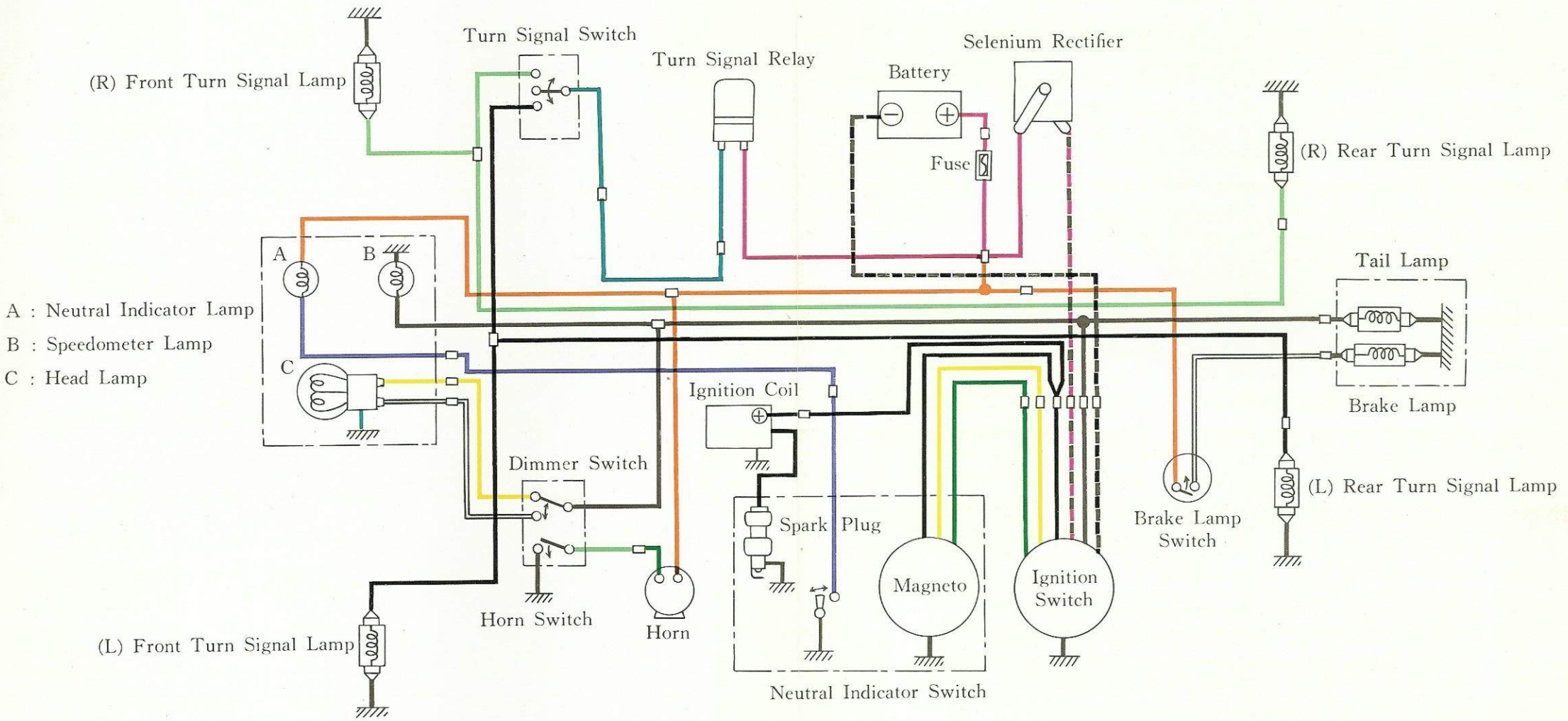
Air pressure of wheels:

What to check	Standard	When to check	How to correct	Remarks
Air pressure	1.7 kg-cm^2 (24lb-inch^2)			Front
	2.1～2.3 kg-cm^2 (30～32lb-inch^2)			Rear

THE TABLE FOR PERIODICAL CHECK-UP & MAINTENANCE

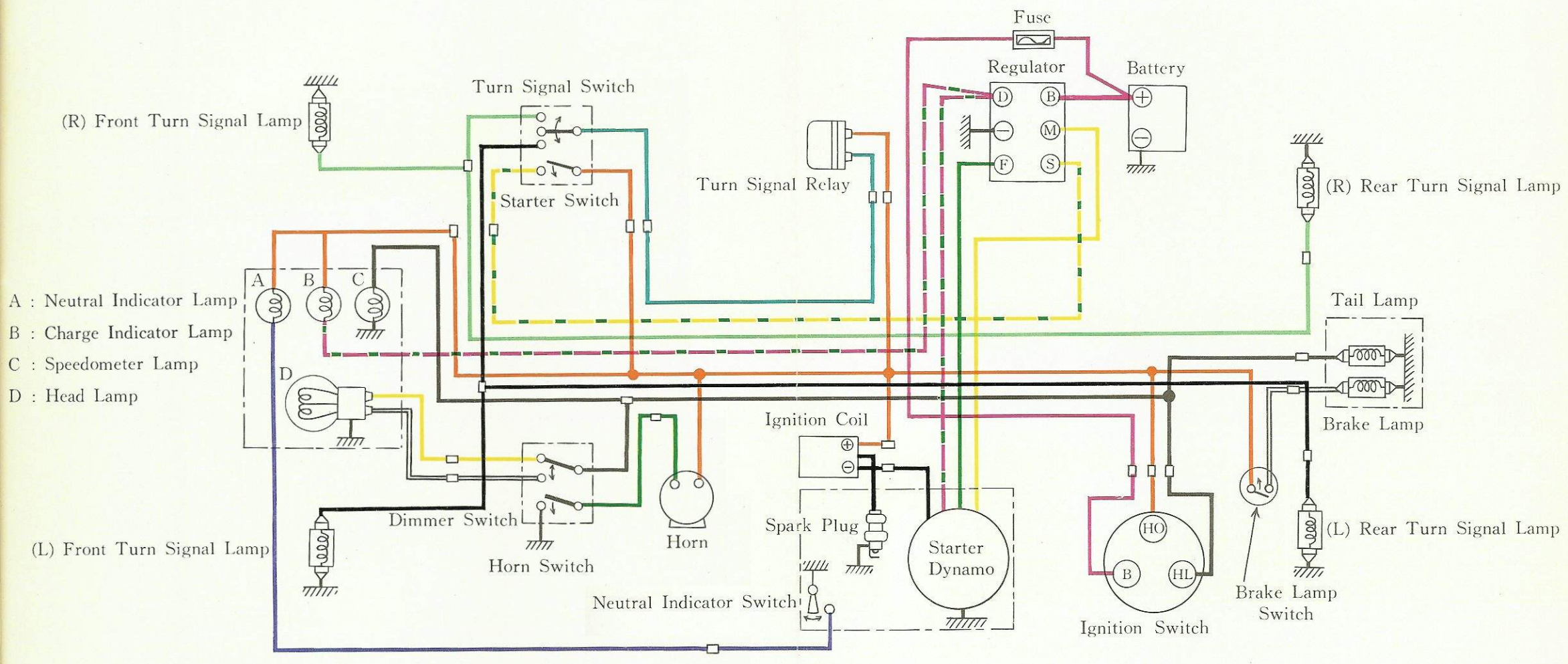
When to check / What to check	At 500km (310 miles)	At 3,000km (1,900 miles)	At 6,000km (3,700 miles)	Thereafter at every 3,000km (1,900 miles)	Remarks
Plug		○ Clean ○ Adjust the gap	○ Clean ○ Adjust the gap	○ Clean ○ Adjust the gap	○ Check and maintain at every 1,000km (620 miles). ○ The gap should be 0.5-0.7mm (0.0196-0.0275″)
Gear box oil	○ Change	○ Change	○ Change	○ Change	○ Use motor oil with SAE #10-40
Carburettor	○ Adjust the play of the wire ○ Adjust the idling	○ Adjust the play of the wire ○ Adjust the idling	○ Overhaul & clean ○ Adjust the play of the wire	○ Adjust the play of the wire ○ Adjust the idling	
Battery	○ Check & replenish electrolyte	○ Check & replenish electrolyte	○ Check & replenish electrolyte	○ Check & replenish electrolyte	○ The electrolyte must be kept above the lower level at all times ○ Be sure to check it every week in summer and every two weeks in winter ○ When replenishing it, be sure to use distilled water
Starter dynamo (Flywheel magneto)	○ Check & adjust the spacing & the ignition timing ○ Lubricate the oil felt	○ Check & adjust the spacing & the ignition timing ○ Lubricate the oil felt	○ Check & adjust the spacing & the ignition timing ○ Lubricate the oil felt	○ Check & adjust the spacing & the ignition timing ○ Lubricate the oil felt	○ The points gap should be 0.3-0.4 mm (0.0118-0.0157″) ○ If the points surfaces are dirty or oxidized, correct them
Clutch	○ Adjust the play	○ Adjust the play	○ Adjust the play	○ Adjust the play	○ The play should be 4mm (0.157″) at the clutch lever
Mechanical brake	○ Adjust the play	○ Adjust the play	○ Adjust the play	○ Aejust the play	 ○ The front brake should be adjusted so that it may be completely applied when the brake lever is squeezed about 20 mm (0.786″) from the throttle grip ○ The free travel of the pedal should be 20-30mm (0.786-1.179″)
Air cleaner		○ Clean	○ Clean	○ Clean	○ Remove dust with brush or compressed air
Cylinder & Cylinder head	○ Retighten	○ Retighten	○ Remove carbon	○ Retighten	○ Remove carbon at every 5,000-6,000 km (3,100-3,700 miles)
Muffler & Exhaust pipe			○ Remove carbon		○ Remove carbon at every 5,000-6,000km (3,100-3,700 miles)
Chain	○ Adjust the slackness	○ Adjust the slackness ○ Lubricate	○ Adjust the slackness ○ Lubricate	○ Adjust the slackness ○ Lubricate	 ○ The slackness should be 35-40mm (1.375-1.572″) with the cycle on the center stand ○ Lubricate with spindle oil or motor oil at every 1,000km (620 miles)
Wires & grease nipples	Lubricate	Lubricate	Lubricate	Lubricate	○ Lubricate at every 1,000km (620 miles)
Various bolts & nuts	Retighten	Retighten	Retighten	Retighten	

Wiring Diagram of Suzuki 50 Model M15



Head Lamp	6V	15/15W
Tail Lamp	6V	5W
Brake Lamp	6V	10W
Speedometer Lamp	6V	1.5W
Neutral Indicator Lamp	6V	1.5W
Turn Signal Lamps	6V	8W×2×2
Battery	6V	4 AH
Fuse		15A

Wiring Diagram of Suzuki 50 Model M15D



Head Lamp	12V	25/25W
Tail Lamp	12V	5W
Brake Lamp	12V	10W
Speedometer Lamp	12V	1.5W
Neutral Indicator Lamp	12V	1.5W
Charge Indicator Lamp	12V	1.5W
Turn Signal Lamps	12V	10W×2×2
Battery	12V	7 AH
Fuse		15A

White
Red with Green Tracer
Yellow with Green Tracer

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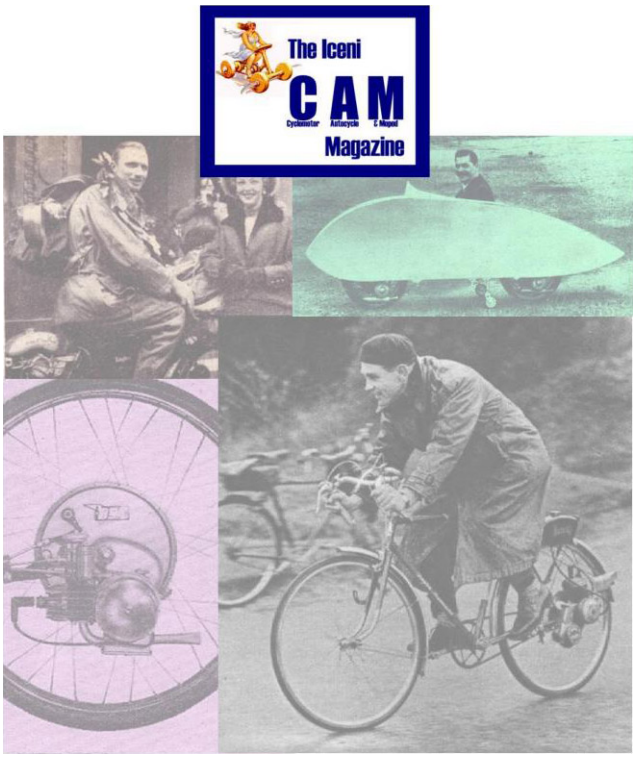

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