SUZUKI

SERVICE MANUAL

SUZUKI

A100

AS100

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A100 & AS100
SERVICE MANUAL

SUZUKI MOTOR CO.,LTD.

P.O Box 116, Hamamatsu, Japan

FOREWARD

The outstanding new machanisms, POSI-FORCE lubrication, and rotary disc valve are incorporated in the SUZUKI A100 *and* AS100 *motorcycle.*

As a result, the troublesome and messy mixing of gasoline and oil by the rider is eliminated, the life of the engine is prolonged and durability is increased. And further greater performance and economy is possible.

The design of this motorcycle results in an especially excellent apperance which will be liked by all. This motorcycle completely fulfils all the requirement of this modern motorcycling age.

This Service Guide explains, mainly, the principles and constructions of these new mechanisms. The most important items, such as disassembling, assembling, tips on adjusting, maintenance standards and tips on handling are briefly but clearly described in this Guide.

By making a practice of using this Guide, it will assist you in performing perfect maintenance.

June, 1967

SUZUKI MOTOR CO.,LTD.

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1. REVOLUTIONARY "SUZUKI POSI-FORCE LUBRICATION"

1-1. Description

Of the various lubrication systems for two-stroke engines, Suzuki Posi-Force Lubrication developed by the Suzuki Motor Co., Ltd., the world's leading producer of two-stroke engines, is not only the newest but is quite the best by a large margin.

Posi-Force is an abbreviation of Positive, forced lubrication and this system supplies the correct amount of oil under pressure directly to the stressed points which need lubrication. This is the world's most advanced lubrication system because fresh oil, not old oil deteriorated after a long use of often seen in four-stroke engines, is always supplied not to the carburetor or cylinder inlet stub, either of which systems will halve oil's lubricating performance, as oil being thinned by gasoline, but directly to the very points needing lubrication.

1-2. Explanation of Mechanism

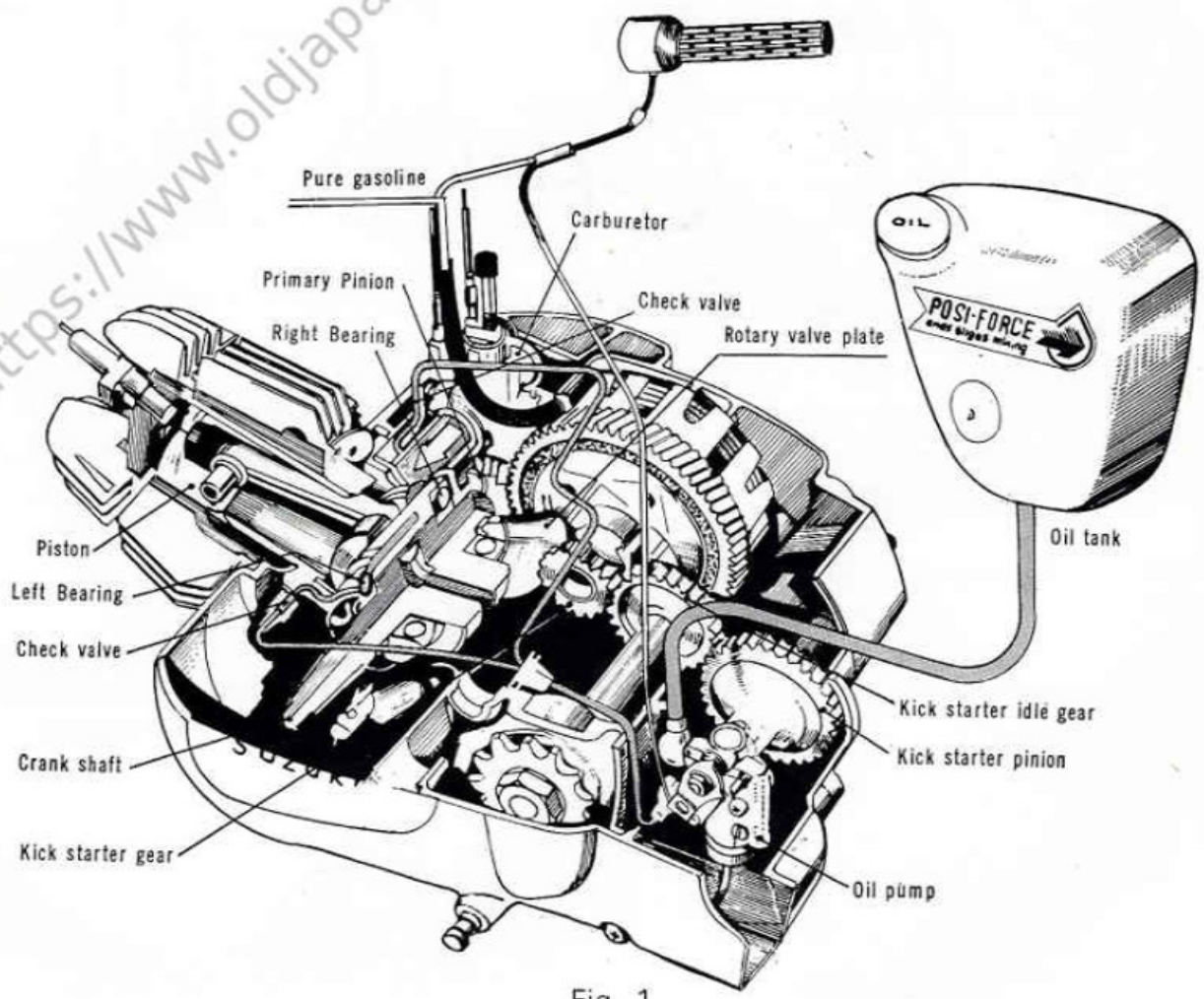


Fig. 1

Lubrication oil is supplied by an oil pump under pressure, and is completely separate from the gasoline supply. The oil system is divided at a junction. One channel supplies oil directly to the left crankshaft bearing. After lubricating it, the oil passes through a passage in the crankpin and lubricates the needle roller bearing in the connecting rod big end. The oil is then sprayed into the crankcase by centrifugal force. The other oil channel supplies oil to the rotary disc valve and lubricates the right crankshaft bearing. A part of the oil from this channel combines with oil sprayed from the connecting rod big end by centrifugal force and lubricates the connecting rod small end needle roller bearing, piston and cylinder wall.
Oil is metered by pressure so that the correct amount is fed to the left bearing and to the rotary valve and right bearing. Oil is distributed in the ratio of one to the left bearing side to two to the rotary valve side.
The total amount of oil pumped is regulated by the oil pump control lever operated by the oil pump control cable, which is synchronized with the throttle cable and varies with the throttle opening. At the same time, the amount of oil supplied is also controlled by the engine speed so that the correct amount of oil, exactly the amount needed by the engine, is always supplied. POSI-FORCE lubrication is the most ideal lubrication system for the two-stroke engine.

1-3. Features of Suzuki POSI-FORCE Lubrication

1. Mixing of gasoline and oil is eliminated.
2. Pure, fresh oil is supplied directly to the engine, so lubrication efficiency is excellent.
3. The amount of oil supplied is strictly in accordance with the engine needs, so it is economical.
4. "Two-stroke" exhaust smoke is eliminated.
5. Carbon accumulation is small.
6. The motorcycle is not dirtied with oil.

2. ROTARY DISC VALVE ENGINE

2-1. Description

The piston ported two-stroke engine has three types of ports in the cylinder, intake, scavenging and exhaust. The size of the ports and timing of the ports are very important factors which determine the performance of the engine.
The Suzuki A100 engine has a rotary disc intake valve and a third scavenging port, which result in ideal intake, scavenging and exhaust operations. These are the important factors which increase engine performance.

2-2. Explanation of Mechanism

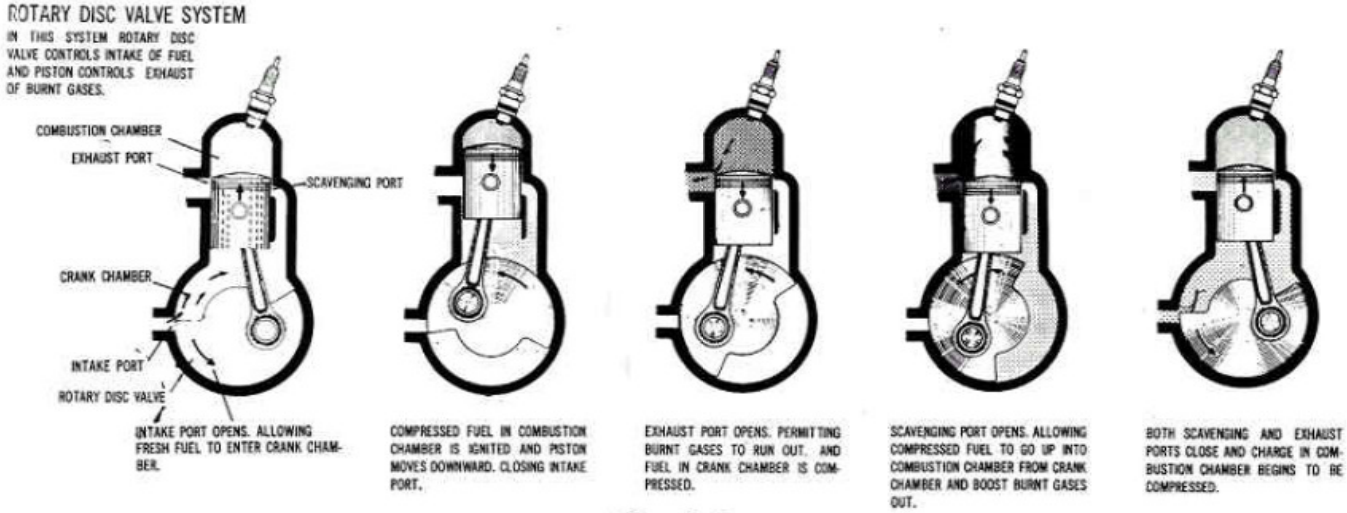


Fig. 2-1

As shown in Fig. 2-1, a notched disc is installed on the crankshaft and the intake port is located on the side of the crankcase so that it is opened and closed by the disc and gas enters the crankcase when the piston moves up. This is called a rotary disc valve intake system.

The most important factors deciding engine performance are the intake of as much fuel as possible into the limited displacement of the cylinder and the completeness of the burning of the fuel. Therefore, it is necessary to open the intake port early in the intake procedure and to close the intake port early to prevent fuel from passing out through it (blow-back) after the piston passes top dead center.

Fig. 2-2 compares intake port timings between piston valve and rotary disc valve engines. When the port timing of a piston valve engine is shown by a diagram, the angle between TDC and the closing of the intake port are the same.
This disadvantage cannot be overcome in piston valve design. If the port is opened early to increase fuel intake, it also closes later, thereby increasing the escape of fuel through blow-back.
With a rotary disc valve operated intake port, however, it is possible to vary the opening and closing of the port in relation to the piston TDC. In other words, the port can be opened earlier to induct more fuel and closed earlier to prevent blow-back with a rotary disc valve.

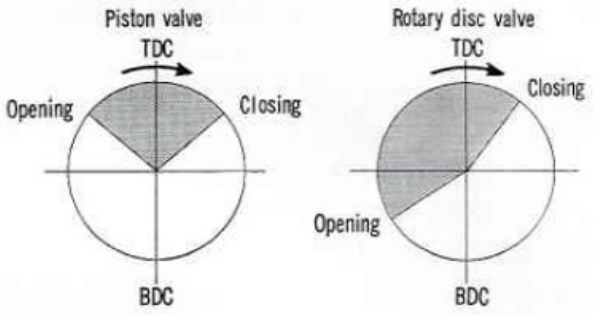


Fig. 2-2

2-3. Third Scavenging Port

In the conventional engine with both intake and exhaust ports in the cylinder wall, only two scavenging ports to transfer the fuel from the crankcase into the combustion chamber can be cut into the cylinder wall because of lack of space. Fuel rushing from the scavenging ports is directed to the wall of the cylinder opposite the exhaust port, where they combine into a scavenging stream to force burned gass out of the exhaust port. With the rotary disc valve system, as the intake port is in the crankcase rather than the cylinder wall, there is space for a third scavenging port in the cylinder wall, which increases positive scavenging of burned gases in the combustion chamber and can also increase the amount of fuel transferred from the crankcase to the space above the piston.

2-4. Outstanding Features of the Rotary Disc Valve

1. Fuel consumption is low.
2. Carburetor can be mounted inside crankcase cover, so the engine remains clean.
3. Intake port can be opened and closed at the optimum times in relation to piston movement so that high engine output is possible and both low and high speed efficiency is improved.

3. TIPS ON OPERATING NEW MOTORCYCLE

3-1. Breaking in

For the first 1,000 miles (1,600 km), the motorcycle must be ridden carefully until the engine is properly broken in. If moving parts of the engine are not broken in at low speeds and the engine is run at high revolutions, insufficient lubrication can result and cause serious damage to the engine. Please advise users to keep the following speed limits during the break-in period, 1,000 miles (1,600 km) :

low .....below 15 kph (10 mph)
second .....below 25 kph (16 mph)
third.....below 35 kph (22 mph)
top .....below 55 kph (35 mph)

The break-in indicator overlaying the speedometer face is meant to help the rider follow the above limitations; please advise users to adhere to the speeds as instructed.

3-2. Fuel

The A100 engine requires no gas/oil mixture as fuel unlike conventional 2-stroke engines. The engine's moving parts such as crankshaft, crankshaft bearings, con-rod, piston and cylinder wall are positively lubricated by fresh oil which is separately pressure-delivered from the variable displacement oil pump. This unique forced oiling system is called "Suzuki Posi-Force Lubrication". Put gasoline only in the fuel tank and lubrication oil in the oil tank. Recommended fuel for the A100, as for all Suzuki motorcycles, is a premium grade gasoline. Recommended oil for the "Posi-Force Lubrication" system is a quality grade 2-stroke oil.
Be sure to use one of these prescribed oils:
*If the temperature is below 10 °C (50 °F)

SHELL 2T TWO STROKE OIL
SUPER SHELL MOTOR OIL
MOBIL OIL SPECIAL

*If the temperature is above 10 °C (50 °F)

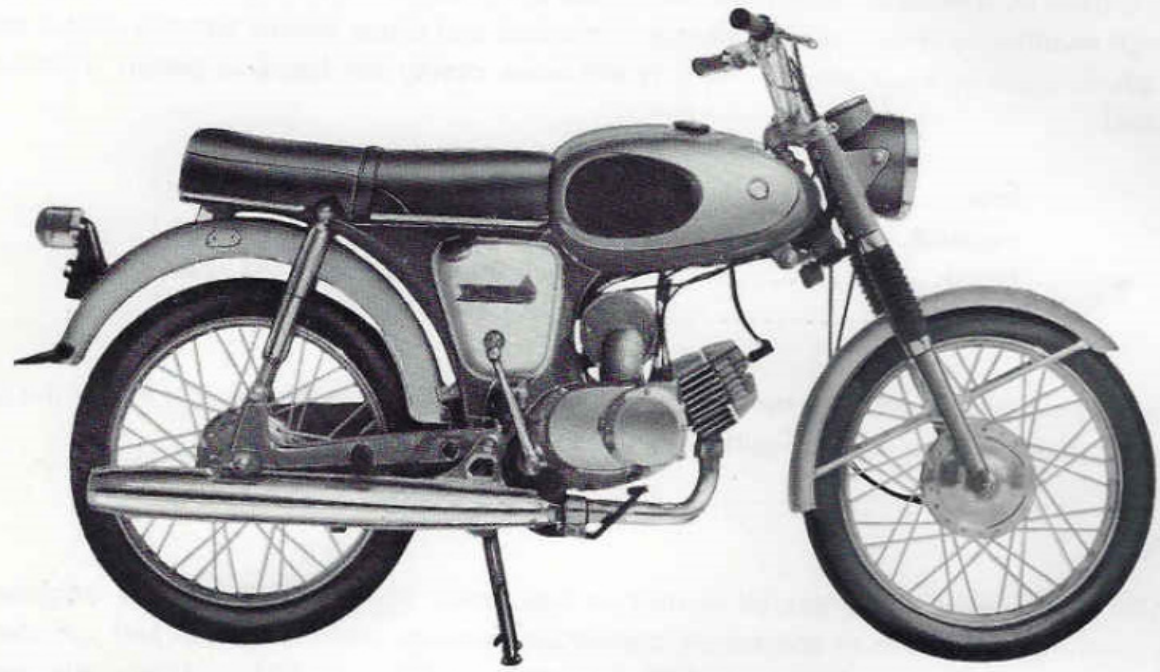
SHELL 2T TWO STROKE OIL
SUPER SHELL MOTOR OIL
MOBIL OIL SPECIAL
MOBIL OIL OUTBOARD
ESSO OUTBOARD OIL
STANDARD OUTBOARD OIL
TEXACO OUTBOARD OIL
SHELL OUTBOARD ENGINE OIL
MOBIL MIX TT
CALTEX 2T PLUS MOTOR OIL
UNION 76 OUTBOARD OIL

3-3. Genuine Parts

When replacing parts, always use genuine Suzuki parts, which are precision made under severe quality controls. If imitation parts (not genuine parts) are used, good performance cannot be expected from the motorcycle and in the worst case, they can cause a breakdown.

4. RIGHT AND LEFT SIDE VIEWS

A100



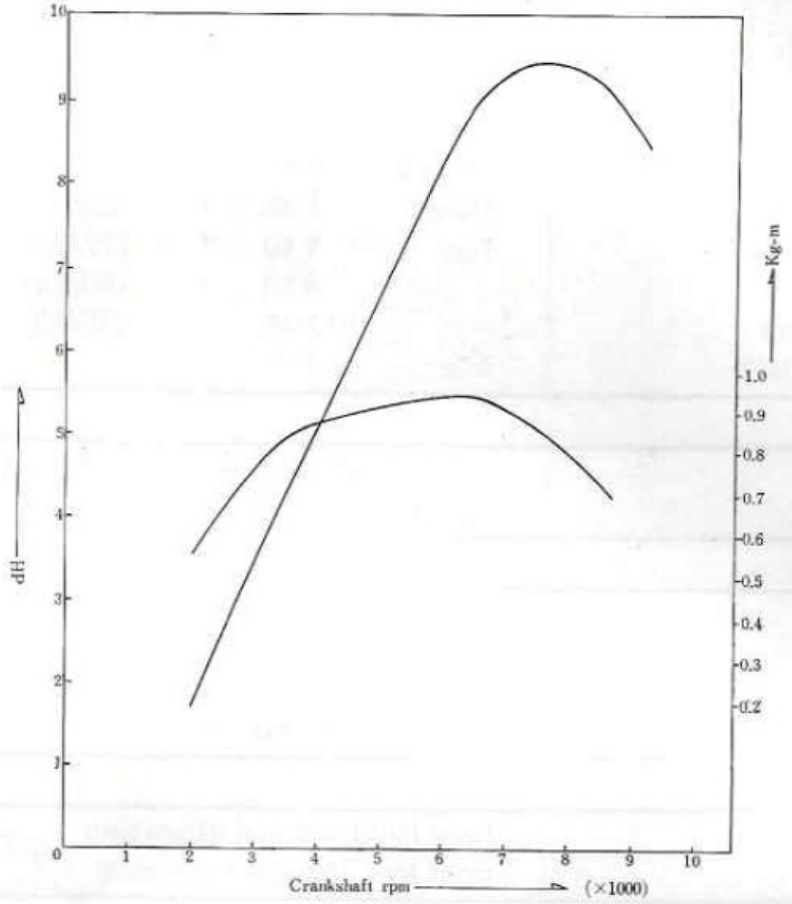
AS100

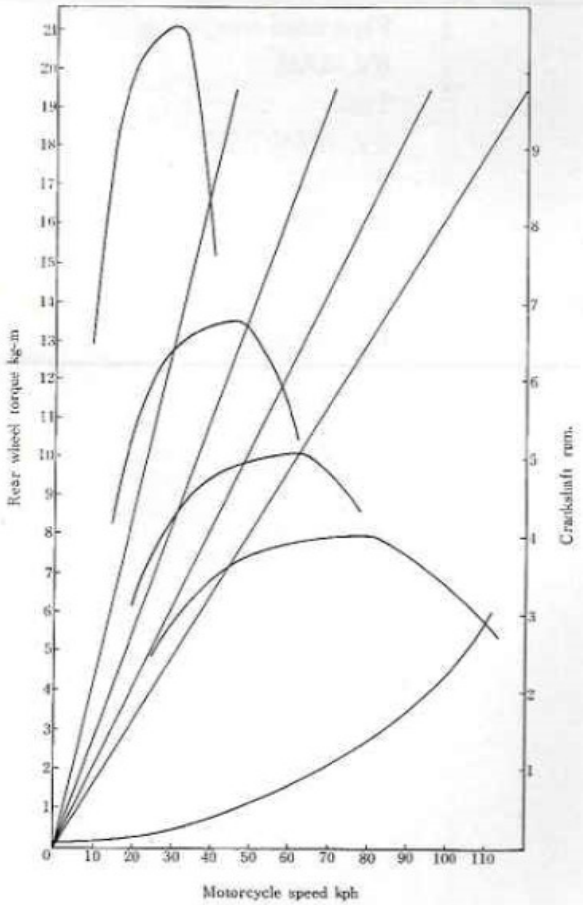
5. SPECIFICATIONS AND PERFORMANCE

Name	Suzuki A100 & AS100
Dimensions	
Overall length	1,820 mm (71.6 in)
Overall width	680 mm (26.7 in)
Overall height	960 mm (37.8 in)
Wheelbase	1,155 mm (45.6 in)
Ground clearance	135 mm (5.3 in)
Tires, front & rear	2.50—17 in, 4 PR
Weight	
Dry weight	80 KG (176 lb)
Distribution front	37.3 KG (82 lb)
rear	42.7 KG (94 lb)
Performance	
Maximum speed	110 Kph (69 mph)
Fuel consumption	70 Kpi (166/199 mpg US/Imp at 40 Kph (25 mph)
Climing ability	18°
Braking distance	7 m (23 ft)/35 Kph (22 mph)
Engine	
Type	2-cycle, air cooled gasoline engine
Dimensions (L ×W ×H)	443 ×331 ×341 mm (17.4 ×13.0 ×13.4 in)
Weight	22.5 KG (49.6 lb)
Cylinder	Sleeved alminum single, 63°30' forward inclined
Bore ×Stroke	50 ×50 mm (1.97 ×1.97 in)
Displacement	98 cc (5.9 cu in)
Corrected compression ratio	6.5 : 1
Compression pressure	8.5 KG/sq cm (120 lb/sq in) at 1000 rpm
Maximum horse power	9.5 hp at 7,500 rpm
Maximum torque	0.95 Kg-m (6.87 lb-ft) at 6,500 rpm
Starter	Kick
Fuel system	
Carburetor	Amal VM 20 SC
Air cleaner	Resin processed filter
Fuel tank capacity	7 lir (1.85/1.53 gal, US/Imp)
Lubrication	
Engine	"Suzuki Posi-Force Lubrication"
Oil tank capacity	1.2 ltr (1.27/1.05 qt, US/Imp)
Gear box	Oil bath, 0.75 ltr (0.8/0.7 qt, US/Imp)
Ignition system	
Spark plug	NGK B-77 HC
Ignition	Fly wheel magneto
Ignition timing	20° (1.86 mm) before top dead center

Transmission system			
Clutch	Wet multi-disc		
Speeds	4 speed, constant-mesh		
Gear shifting	Left foot, lever operated return change		
	Low	2.91 : 1	(32/11)
	Second	1.87 : 1	(28/15)
	Third	1.39 : 1	(25/18)
	Top	1.10 : 1	(22/20)
Primary reduction		3.13 : 1	(50/16)
Final reduction ratio		2.46 : 1	(32/13)
Overall reduction ratio	Top	8.46 : 1	
Suspension			
Front	Hydraulically damped telescopic fork		
Rear	Hydraulically damped swinging arm		
Steering			
Steering angle	45°		
Trail	67 mm (2.6 in)		
Castor	64°		
Turning radius	1,700 mm (67 in)		
Brake			
Front	right hand, internal expanding		
Rear	right foot, internal expanding		
Electrical equipment			
Generator	Flywheel magneto		
Battery	6V, 4AH		
Fuse	15A		
Head lamp	6V, 25W/25W		
Tail/brake lamp	6V, 3/21 CP		
Neutral indicator lamp	6V, 3W		
Speedometer lamp	6V, 3W		
High beam indicator lamp	6V, 1.5W		
Horn	6V, 0.8A		

6. PERFORMANCE CURVES





7. SPECIAL TOOLS

Special tools listed here are used to disassemble, assemble and perform other maintenance and services. These special tools make work easy which can not be done simply with ordinary tools and also do not damage parts.
It is recommended to provide these special tools as shop equipment.

No.	New Tool No.	Old Tool No.	Tool Name	Service
1	09900-15202	TOB-002A	Special tool box	
2	09910-60110	T-006	Oil seal remover	remove oil seal
3	09920-70111	T-012A	Snap ring opener	fit & remove circlip
4	09910-20111	T-020A	Piston holder	Prevent crankshaft from turning
5	09921-10111	T-027A	Engine sprocket holder	hold engine sprocket
6	09930-30111	T-032A	Flywheel rotor remover	remove flywheel rotor
7	09920-20310	T-042	Clutch spring hook	fit and remove clutch spring
8	09920-60310	T-054-2	Clutch sleeve hub holder handle	
9	09920-50310	T-054-3	Clutch sleeve hub holder	hold clutch sleeve hub
10	09940-20110	T-056	Steering stem lock nut wrench	loosen & tighten lock nut
11	09940-40111	T2-001A	Front fork oil level gauge	gauge oil level
12	09930-40111	T2-005A	Flywheel rotor holder	hold flywheel rotor
13	09930-10111	T2-006A	Spark plug wrench	loose & tighten spark plug
14	09913-50610	T2-007	Exhaust ring nut wrench	loosen & tighten exhaust ring nut
15	09940-51210	T2-011	Front fork oil seal installing tool	install front fork lower outer race
16	09910-10710	T2-012	8 mm stud installing tool	install 8 mm studs
17	09940-60111	T2-020A	Spoke nipple wrench	loosen & tighten spoke nipple
18	09941-10110	T2-023-1	Front fork outer tube nut tool	
19	09941-20110	T2-023-2	Outer tube nut tool attachement	loosen & tighten outer tube nut
20	09910-80111	T2-027A	Crankcase separating tool	separate crankcase

As regards the details, refer to the Suzuki Special Tool Manual.

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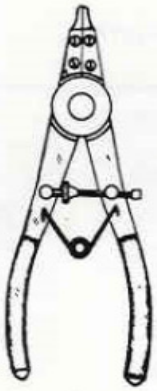

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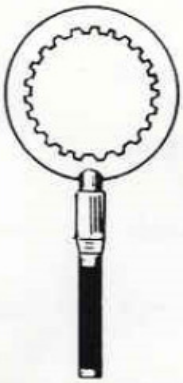

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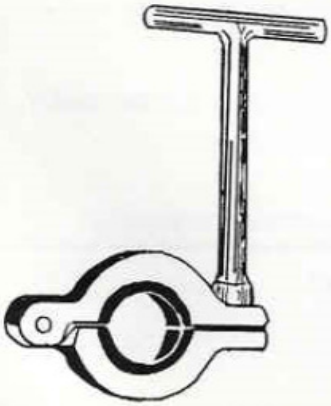

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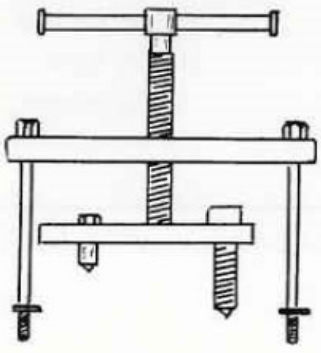

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8. ENGINE

8-1. Removing Engine from Frame

Before beginning the removal operation throughly clean the engine with a steam cleaner or cleaning solvent to remove road dirt.
The removal procedure is as follows.

1. Unscrew knob and remove **frame left cover.** Take out **battery** with battery rest by loosening 3 screws with cross driver, disconnect **battery negative and positive wires.**

2. Disconnect **four wires from flywheel magneto,** black, yellow, green and blue wires.

3. Remove **gear shifting lever** by loosening bolt with a 10 mm wrench. Loosen 5 cross head screws with a screw driver and remove **crankcase left cover** and **engine sprocket cover.** (Fig. 8-1-1)

4. Turning rear wheel, locate chain master link. Separate ends of **chain** by removing master link with pliers. Remove chain from engine sprocket. Be sure to connect ends of chain again with master link to prevent it from sliding back into chain case. (Fig. 8-1-2)

5. Unscrew a oil pump cover screw with a screw driver and remove **oil pump cover.**

6. Pull up oil pump control lever by hand. Release end of **oil pump control cable** from control lever. (Fig. 8-1-3)

7. Turn fuel cock lever to the position where it's tip points to 0 mark. Take off fuel line circlip. Pull **fuel line** from fuel cock. (Fig. 8-1-4)

Fig. 8-1-1

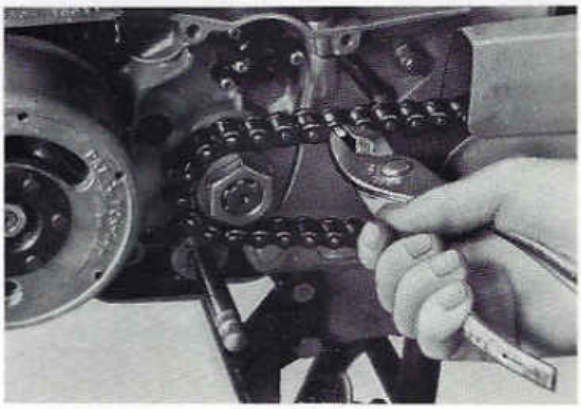


Fig. 8-1-2

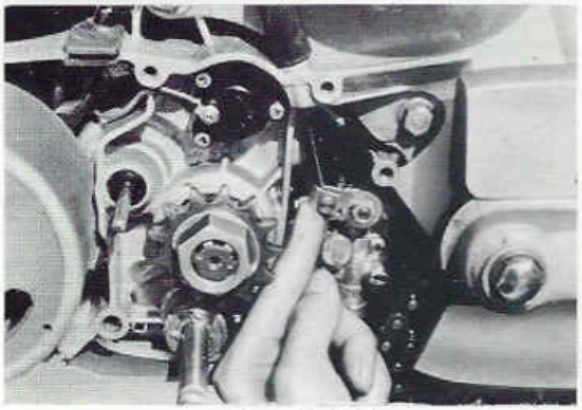


Fig. 8-1-3


Fig. 8-1-4

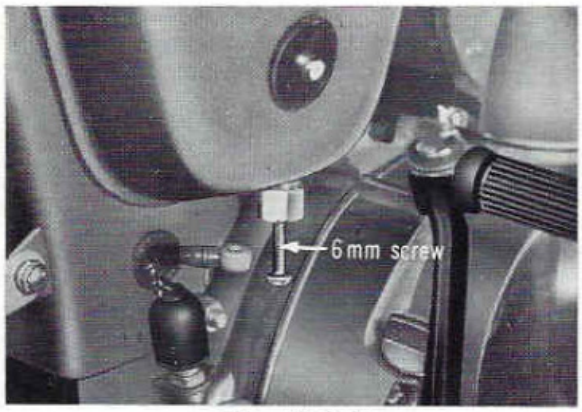


Fig. 8-1-5

8. Unscrewing union bolt with a 10 mm wrench, disconnect **oil line** from oil tank outlet and insert a 6 mm bolt or screw into oil tank outlet to prevent oil leakage. Push oil line through hole into flame. (Fig. 8-1-5)

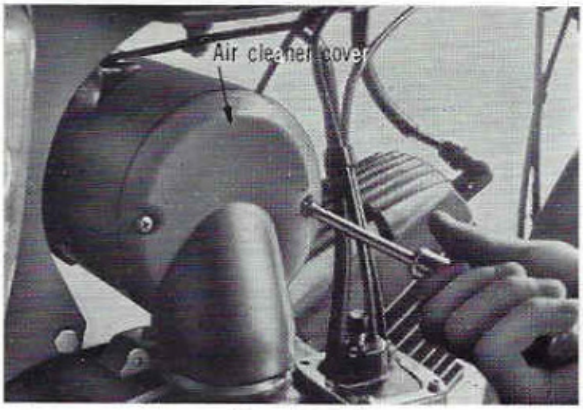


Fig. 8-1-6

9. Remove **air cleaner cover** by loosening 2 screws with cross. driver. (F8-1-6)

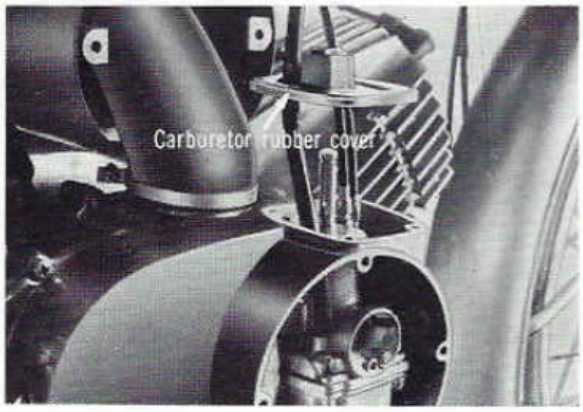


Fig. 8-1-7

10. Remove **carburetor cover** by loosening 4 screws with cross driver. Unscrew 4 carburetor rubber cover retaining plate screws and slip up **carburetor rubber cover** together with retaining plate along cables. Remove rubber plug from engine right cover and unscrew carburetor clip bolt with plain screw driver. Take out **carburetor** from engine right cover and then unscrew carburetor mixing chamber cap, loosen starter cable adjuster with 12 mm wrench, remove fuel line after sliding up a clip, remove 2 air vent pipes from carburetor and carburetor can be removed. At the same time remove overflow pipe from carburetor as well. (Fig. 8-1-7, 8)

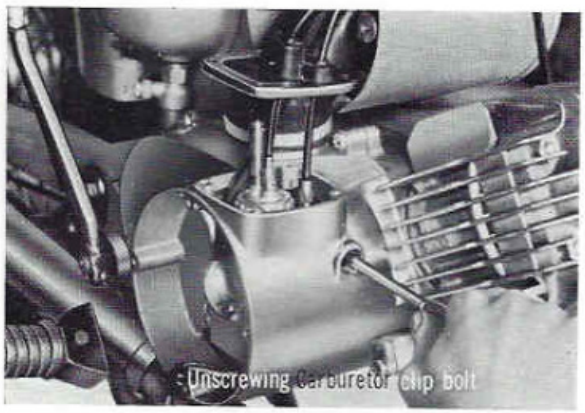


Fig. 8-1-8

11. Remove **spark plug cap** from spark plug.

12. Un screw **exhaust pipe ring nut** with exhaust pipe ring nut wrench (special tool 09913-50610). Loosen muffler connector band screw with cross head screw driver. Twist exhaust pipe down. (Fig. 8-1-9)

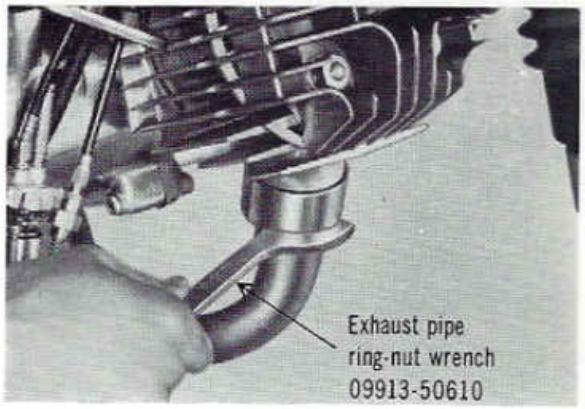


Fig. 8-1-9

13. Intending to disassemble engine, drain out **oil** from the gear box by loosening the drain plug with a 21 mm wrench. (Fig. 8-1-10)
Replace the plug after draining oil, making sure gaskets are placed between them.

14. Unscrew nuts from 3 **engine mounting bolts** with 12 mm wrench. After placing wooden box or block under engine to reduce lifting, pull out 3 engine mounting bolts with pliers. Remove engine from flame.

Fig. 8-1-10

8-2. Disassembling Engine

When disassembling engine, take the following steps.

1. Unscrew 4 cylinder head nuts with a 14 mm wrench and take off the **cylinder head** and **cylinder**.

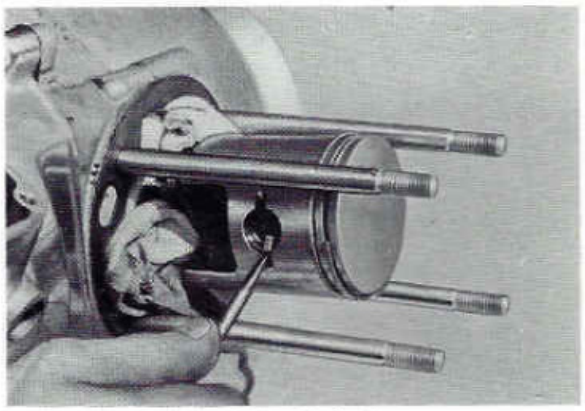


Fig. 8-2-1

2. Cover the crankcase opening with clean rags to prevent a piston pin circlip from dropping into the crank chamber when removing it. Remove one **piston pin circlip** from the piston with a small screw driver or nose plier. (Fig. 8-2-1) Be careful not to lose piston pin circlip as sometimes it springs away. Now **piston pin** can be removed easily by pushing the other end of it with a rod. (Fig. 8-2-2)

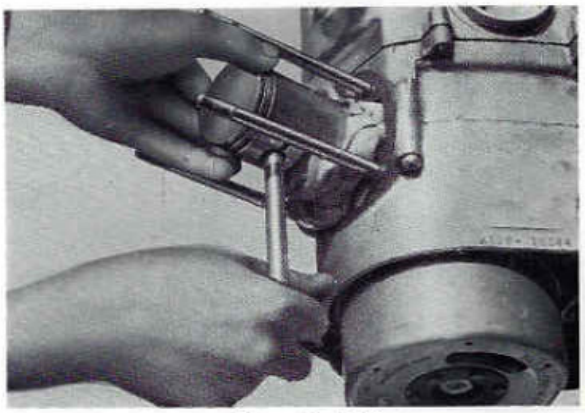


Fig. 8-2-2

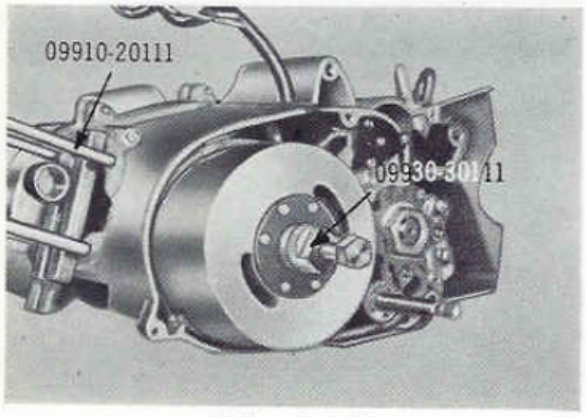


Fig. 8-2-3

3. Place a piston holder (special tool 09910-20111) between the con. Rod small end and the crankcase to prevent the crankshaft from turning, and then remove the flywheel rotor nut with a 17 mm wrench. (Fig. 8-2-3) To remove the **flywheel rotor** from the crankshaft, screw the flywheel rotor remover (special tool 09930-30111) counterclockwise into the center hole of the flywheel rotor. Next holding the flat part of the tool with a 17 mm wrench, turn the center bolt clockwise with a 17 mm wrench. (Fig. 8-2-4)

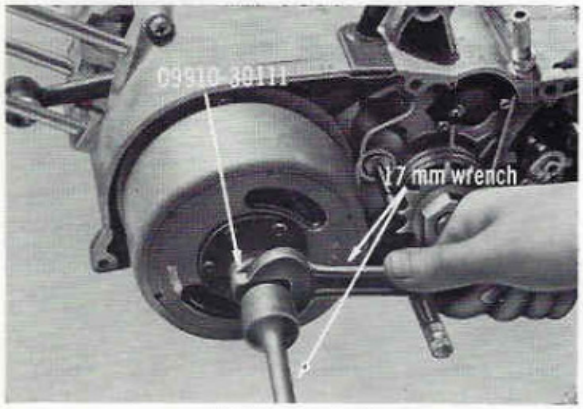


Fig. 8-2-4

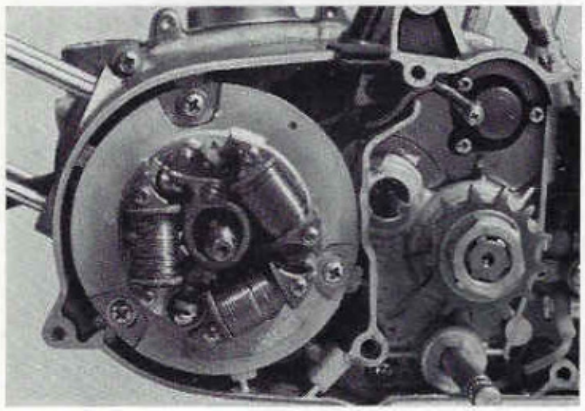


Fig. 8-2-5

4. Loosen the newtral indicator switch terminal screw with a cross head screw driver and then separate the **newtral switch wire** (blue) from the switch. (Fig. 8-2-5)
5. After loosening 3 flywheel stator fitting screws with a cross head screw driver, take off the **stator** from the crankcase.

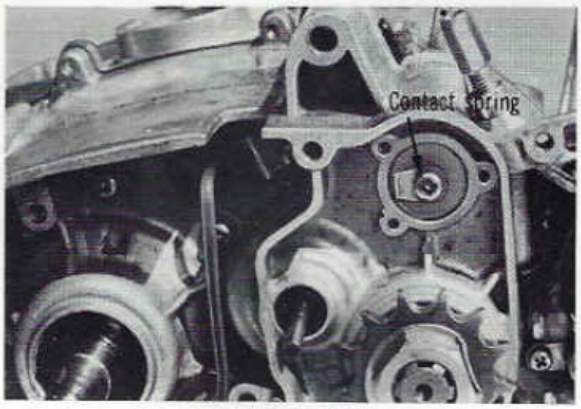


Fig. 8-2-6

6. Remove the **newtral switch body** by loosening 3 cross head screws and then remove the **newtral switch contact spring** by loosening a cross head screw. (Fig. 8-2-6)

7. Straighten the engine sprocket washer with a chisel and hammer. Hold the sprocket with an engine sprocket holder (special tool 09921-10111) and loosen the nut with a 29 mm wrench. (Fig. 8-2-7)
   Remove the **sprocket** and the spacer by hand.

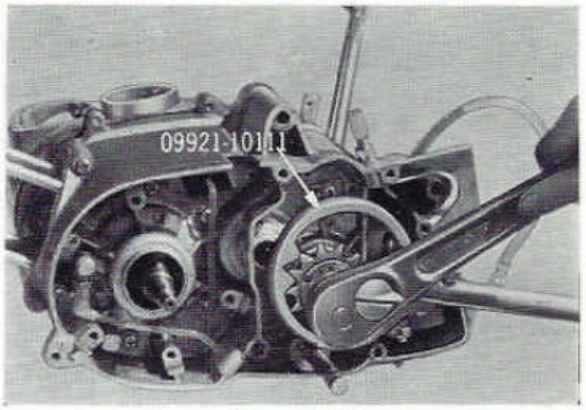


Fig. 8-2-7

8. For easier disassembling of the remaining parts of engine, remove the **gear shifting shaft circlip** with plain driver and take off the washer beforehand. (Fig. 8-2-8) Be careful not to lose the circlip as sometimes it springs away.

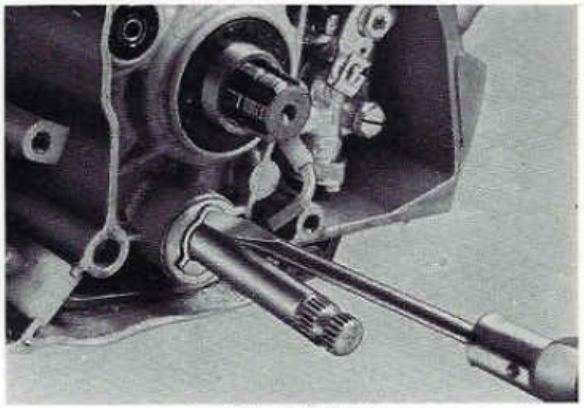


Fig. 8-2-8

9. After loosening 2 oil pump fitting screws with a cross head screw driver, take out the **oil pump** and then loosen 2 union bolts with a 12 mm wrench to disconnect the oil inlet and outlet lines from the oil pump. (Fig. 8-2-9)

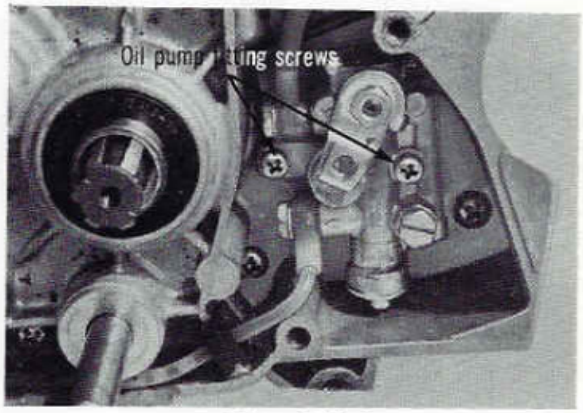


Fig. 8-2-9

10. Remove **a union bolt** on the left half of the crankcase with a 10 mm wrench and loosen the **oil line grummet** fitting screw with a cross head screw driver. (Fig. 8-2-10)
    Remove a **check valve** inside the crankcase right cover with a 14 mm wrench and the oil line can be pulled out of the crankcase. (Fig. 8-2-11)

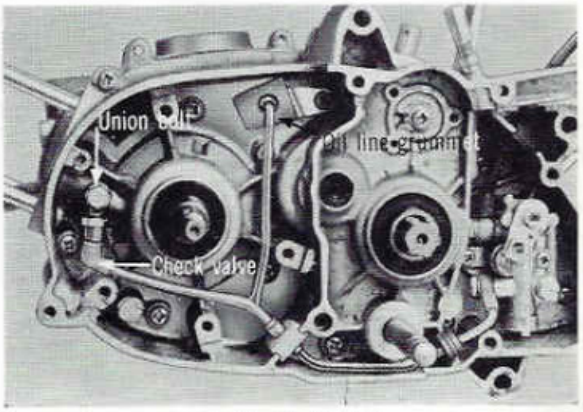


Fig. 8-2-10

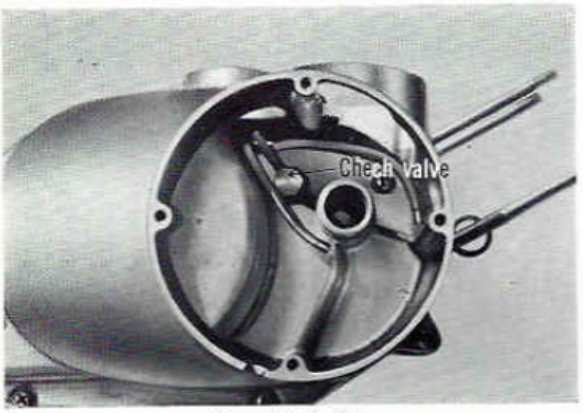


Fig. 8-2-11

11. Remove the **kick starter lever** fitting bolt with a 10 mm wrench and take off the lever.

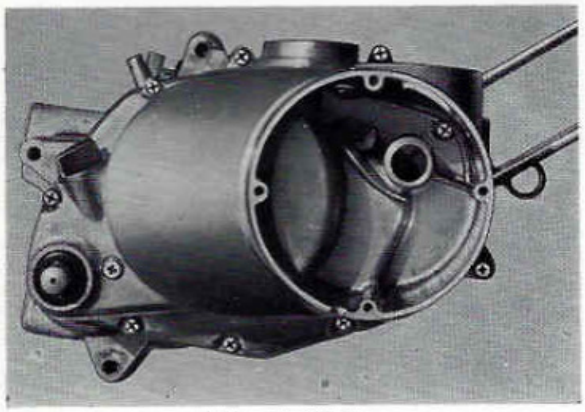


Fig. 8-2-12

12. Remove the **crankcase right cover** by loosening 9 cross head screws. Take off the outer valve sheet "O" ring from the outer valve sheet to keep it from being lost. (Fig. 8-2-12)

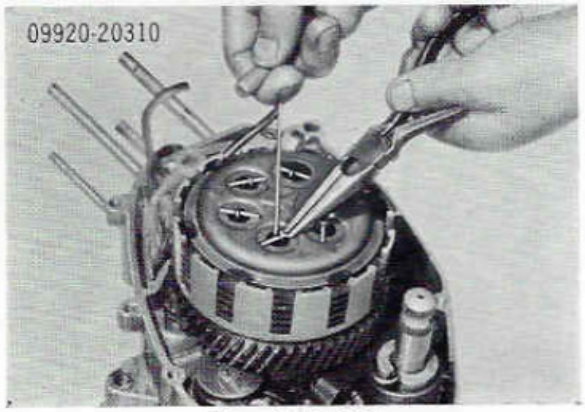


Fig. 8-2-13

13. Pulling the clutch springs with a clutch spring hook (special tool 09920-20310), take out the **clutch spring pins** with a nose pliers. (Fig. 8-2-13) Remove the clutch pressure plate, the release rod and the cork and steel plates from the clutch housing by hand. (Fig. 8-2-14)

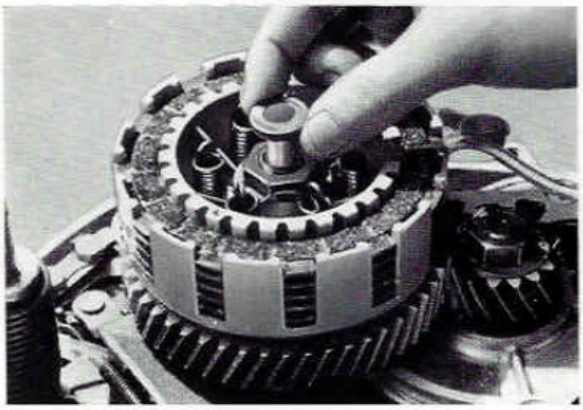


Fig. 8-2-14

14. Flatten the clutch sleeve hub washer with a chisel and hammer.
    Hold the clutch sleeve hub with a clutch sleeve hub holder (special tools 09920-60310 and 09920-50310) to loosen the **clutch sleeve hub nut** with a 23 mm wrench. (Fig. 8-2-15)

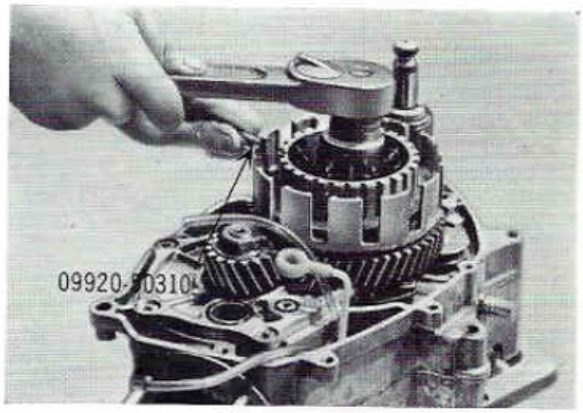


Fig. 8-2-15

15. Remove the **clutch housing** from the counter shaft together with the clutch sleeve hub and the clutch sleeve hub spacer.
16. Take the clutch housing collar out of the crankcase. (Fig. 8-2-16)

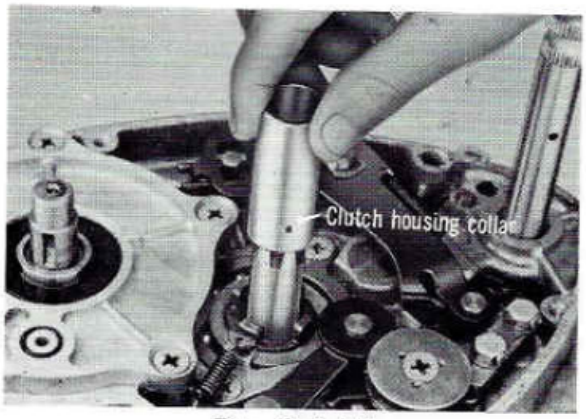


Fig. 8-2-16

17. Pushing up the clutch release screw lever by fingers, release the end of the **clutch cable inner** from the lever. (Fig. 8-2-17)

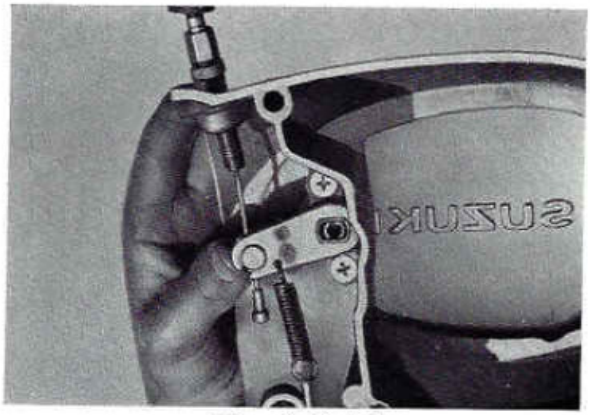


Fig. 8-2-17

18. Unhook the clutch release screw arm spring. Remove the **clutch release screw assembly** from the crankcase left cover by loosening 2 cross head screws with a screw driver. (Fig. 8-2-18)


Fig. 8-2-18

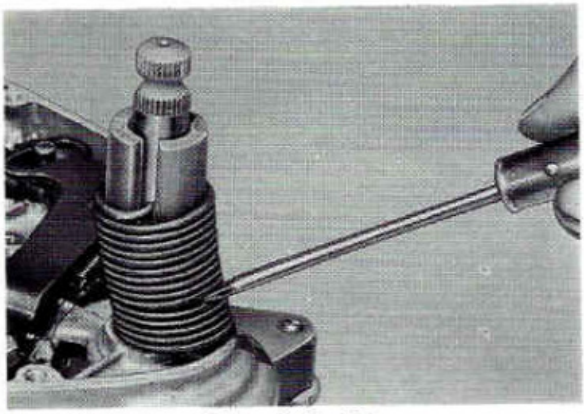


Fig. 8-2-19

19. Pry up and remove the **kick starter shaft return spring guide** with a plain driver. Next tap the spring out of the kick starter shaft hole with the handle of a hammer. (Fig. 8-2-19, 20)

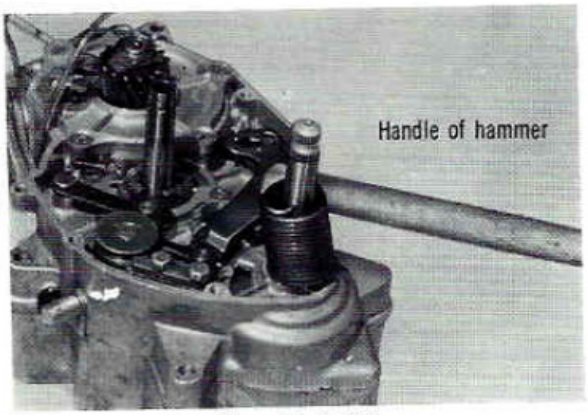


Fig. 8-2-20

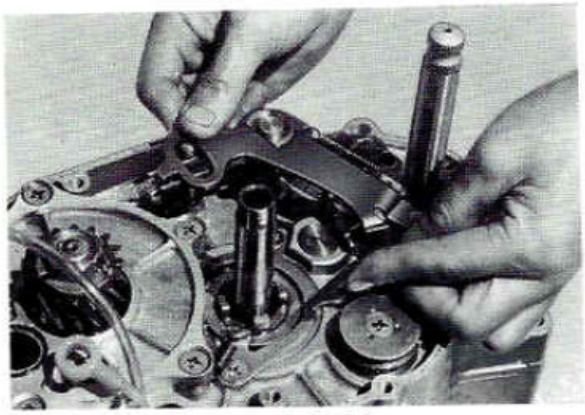


Fig. 8-2-21

20. Remove the **gear shifting cam stopper** by loosening the gear shifting cam stopper pivot with a 12 mm wrench.
21. While pressing down the gear shifting pawl with fingers, pull out the **gear shifting shaft** to the right by hand. (Fig. 8-2-21)

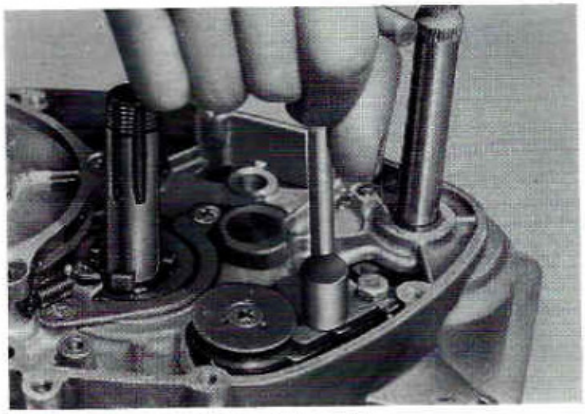


Fig. 8-2-22

22. Straighten the cam guide washer with a chisel and hammer. Loosening two bolts with 10 mm wrench, take off the **cam stop plate** and the **cam guide.** (Fig. 8-2-22)

23. After flattening the primary pinion lock washer with a chisel and hammer, place a piston holder (special tool 09910-20111) between the con. rod and the crankcase, and loosen the **primary pinion lock nut** with a 21 mm wrench. The primary pinion can be removed by hand. (Fig. 8-2-23)

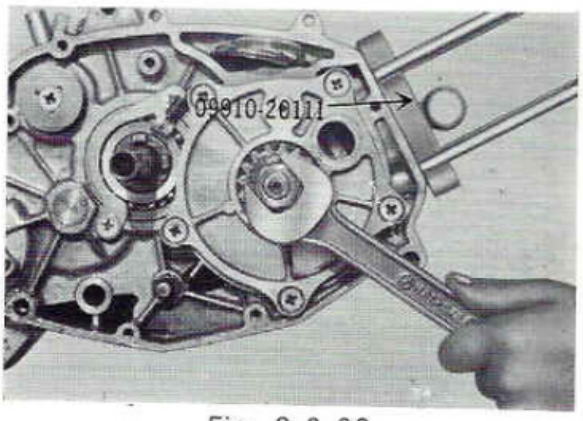


Fig. 8-2-23

24. Remove the **keys** from the crankshaft to prevent it from being lost.
25. Remove the **outer valve seat** by loosening 5 cross head screws with a screw driver. The primary pinion spacer and the right crankshaft oil seal can be removed usually together with the outer valve seat. (Fig. 8-2-24)

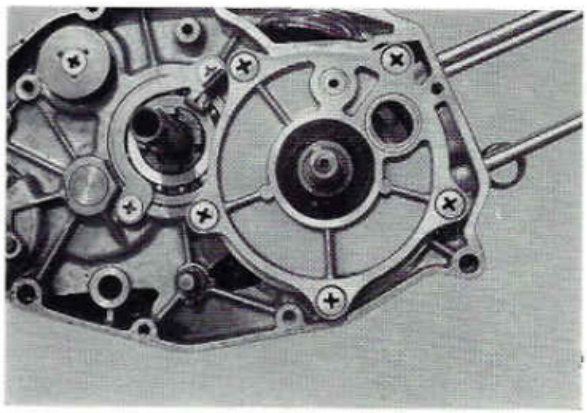


Fig. 8-2-24

26. Remove the **valve plate** and the **valve guide** by hand. (Fig. 8-2-25)

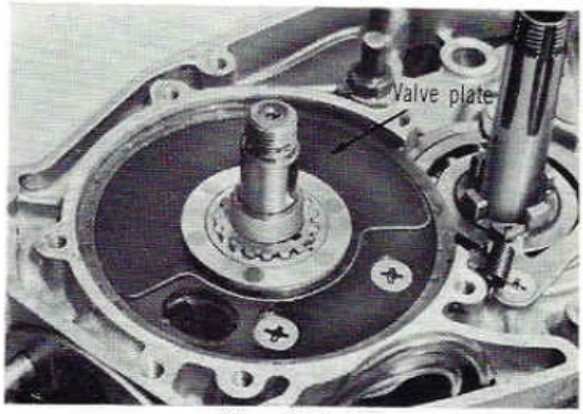


Fig. 8-2-25

27. The **inner valve seat** can be removed by loosening 6 cross head screws with a screw driver, but only for disassembling the crankcase it is not necessary to remove this inner valve seat. (Fig. 8-2-26)

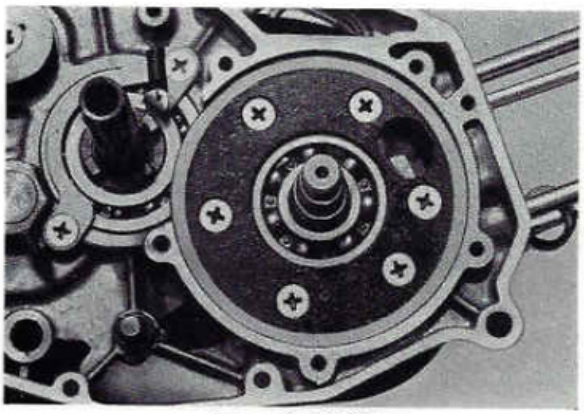


Fig. 8-2-26

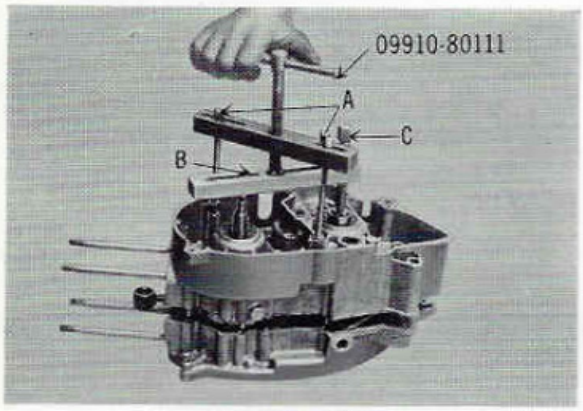


Fig. 8-2-27

28. Loosen 10 crankcase joining screws with a shock driver or a cross head screw driver. When removing, be careful to loose them diagonally, not in sequence, to prevent the crankcase from warping.
Making sure the crankshaft and transmission gears remain in the right half of the case, take off the left half with a crankcase separating tool (special tool 09910-80111) to separate the two parts of the **crankcase.** When using this tool, first screw the two bolts "A" by more than 6 mm (0.24 in) in the threaded holes on the crankcase left half, placing the rod "B" on the center of the crankshaft tip and the bolt "c" on the center of the drivershaft tip. Turn the handle clockwise after adjusting the tool to be horizontal by screwing the bolt "C" in or out, and the crankcase will be separated easily. (Fig. 8-2-27)

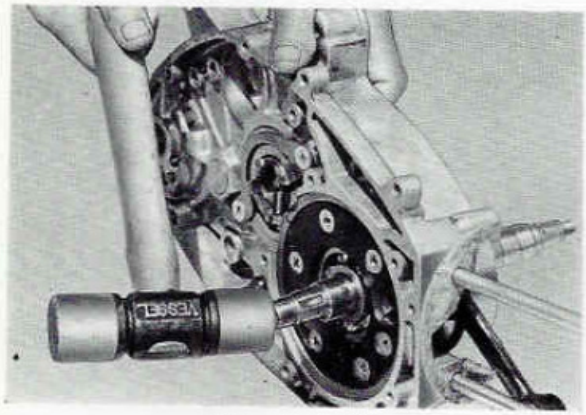


Fig. 8-2-28

29. Remove the **crankshaft** from the crankcase right half by striking the right end of the crankshaft with a plastic or wooden hammer. (Fig. 8-2-28)

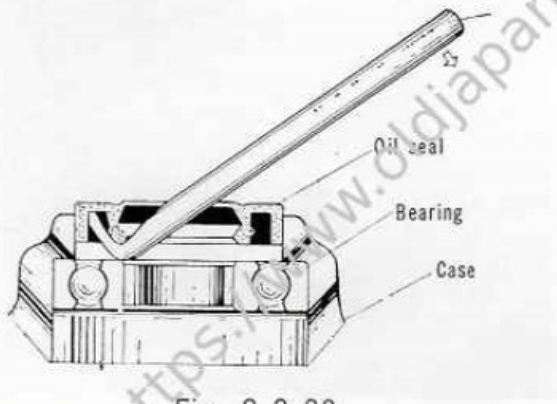


Fig. 8-2-29

30. Never fail to use a **oil seal** remover for removing oil seal from the cases. (Fig. 8-2-29) Be careful not to hold the blade against the oil seal lips in case the oil seal can stand further use, as this will damage the lips which are the most important part of the oil seal.

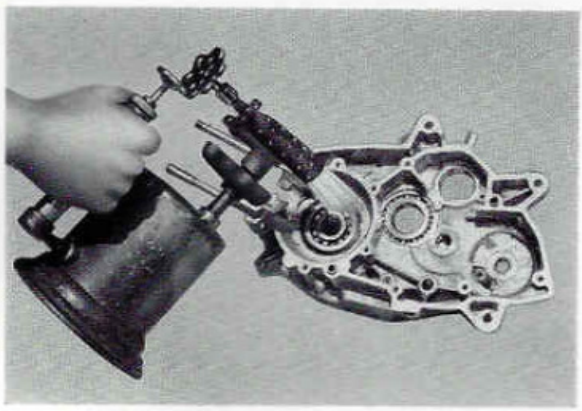


Fig. 8-2-30

31. Heat the crankcase round about the bearing holes with a burner until the **bearings** can be removed by hand as the bearings are shrink-fitted in the crankcase. (Fig. 8-2-30)

8-3. Assembling engine

For reassembling the engine after necessary inspections or repairs, follow the inverse procedures of disassembling. Special cautions and important matters for assembling are described in this section.

1. When fitting **bearings,** be sure to heat the crankcase round about the bearing holes with a burner until bearings can be installed by hand.
   A. Install the **right crankshaft bearing** with its stop ring facing inside the crankcase as far as the ring touches the crankcase wall. (Fig. 8-3-1)
   B. As for the **left crankshaft bearings,** first install the outer bearing, and then position the left crankshaft spacer with its notches toward the inside of the crankcase, and finally install the inner bearing so that its oil groove faces inside the crankcase. (Fig. 8-3-2)
   C. Install the **drive shaft bushing** with its holes facing upward so that they correspond with a notch of the transmission case. (Fig. 8-3-3)

Fig. 8-3-1

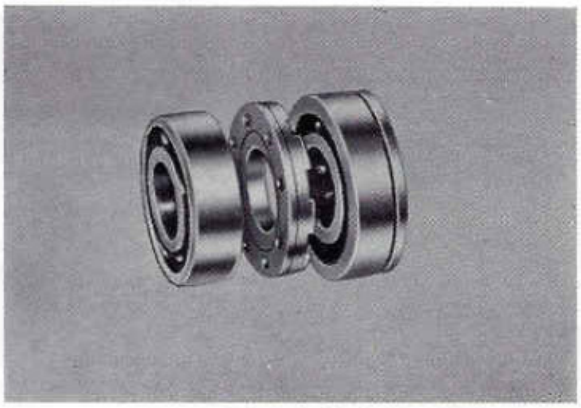


Fig. 8-3-2

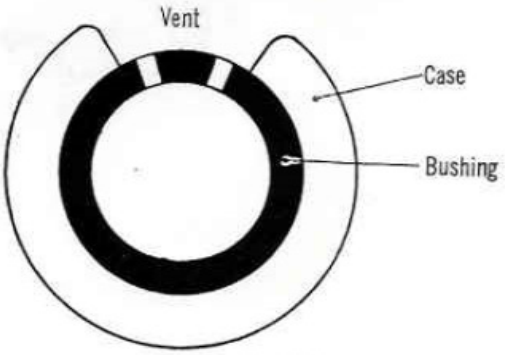
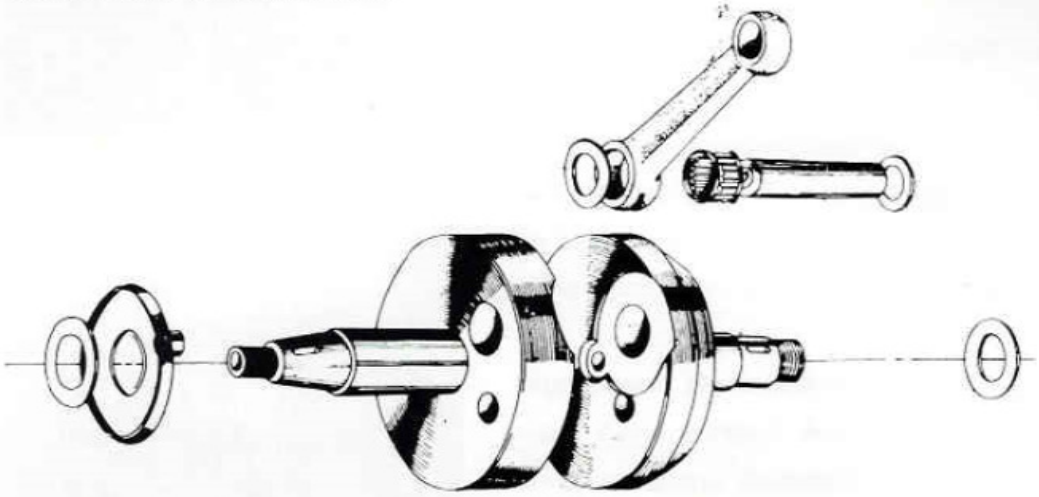


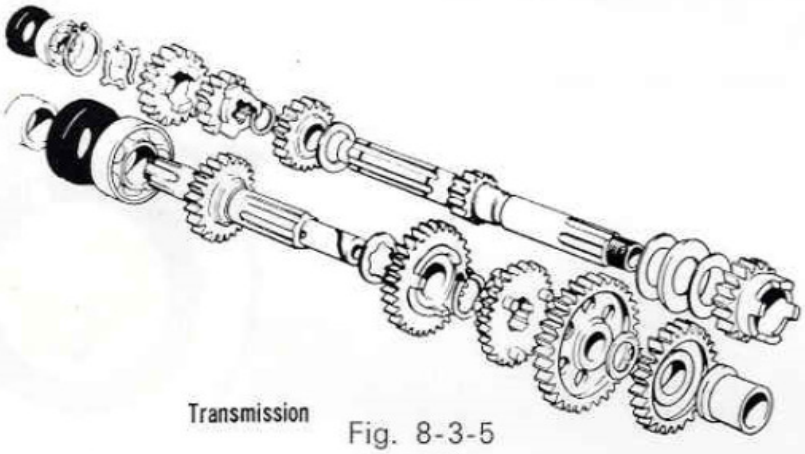
Fig. 8-3-3

2. Install the **crankshaft** and **gear box components** in order in the crankcase right half referring to the exproded fiews of the crankshaft, the transmission and the gear shifting parts. (Fig. 8-3-4, Fig. 8-3-5, Fig. 8-3-6, Fig. 8-3-7 and Fig. 8-3-7') When installing gear box components, take care of the following matters.
   A. Replace all circlips on the counter shaft and the driveshaft with new ones whenever the transmission is reassembled.



Crankshaft

Fig. 8-3-4

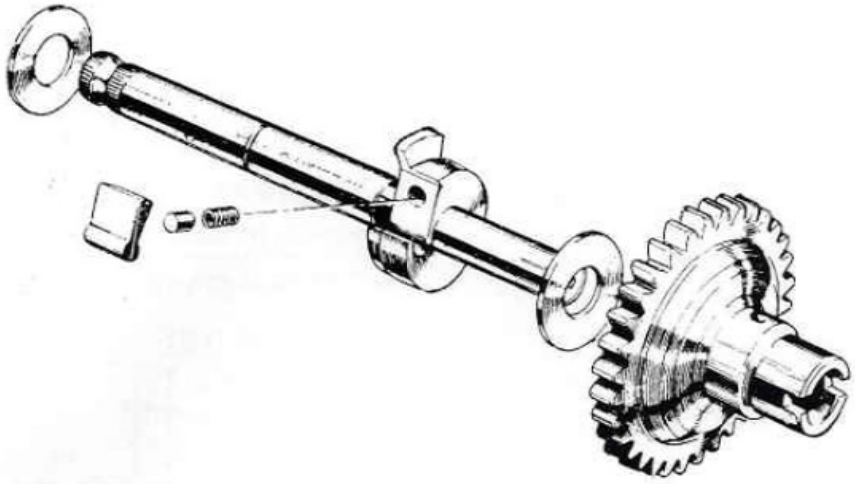


Transmission

Fig. 8-3-5

Gear shifting parts

Fig. 8-3-6



Kick shaft

Fig. 8-3-7

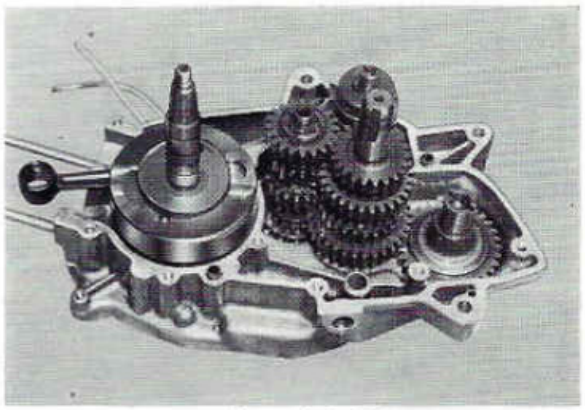


Fig. 8-3-7'

B. Install the **top pinion circlip** so that its open ends are off of the crossed groove cut in the top pinion, or the top pinion positioning pieces may slip out of the groove while running. (Fig. 8-3-8)

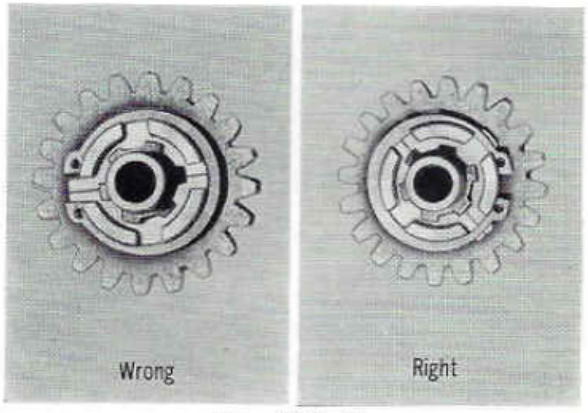


Fig. 8-3-8

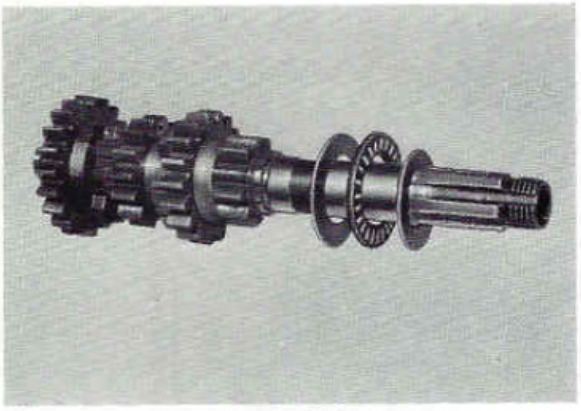


Fig. 8-3-9

C. The **thrust bearing** is placed between the kick starter gear and the low pinion united with the countershaft. On both sides of the thrust bearing, are set two different washers, smaller one against the kick starter gear and larger one against the low pinion. In addition, the radial rollers should be faced toward the clutch. (Fig. 8-3-9)

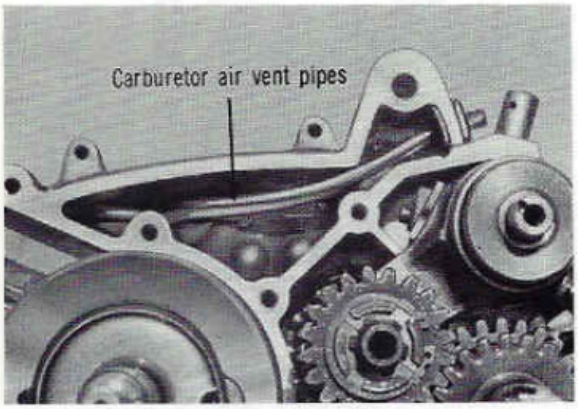


Fig. 8-3-10

3. Before starting to join the crankcase, never fail to install **2 carburetor air vent Pipe** in the crankcase right half, as it is very difficult to install them after the crankcase has been jointed. (Fig. 8-3-10)

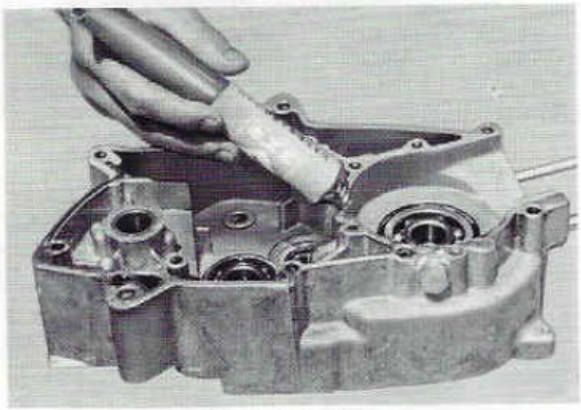


Fig. 8-3-11

4. Before joining the crankcase, apply **oil** to the connecting rod big end, 3 crankshaft bearings and other parts needing lubrication with a oiler.
5. When assembling the **crankcase,** remove oil and solidified remains of sealer from the joining surfaces with alcohol, coat evenly the joining surface of the crankcase left half with **sealer** and allow it to stand for about 2—3 minutes. (Fig. 8-3-11)

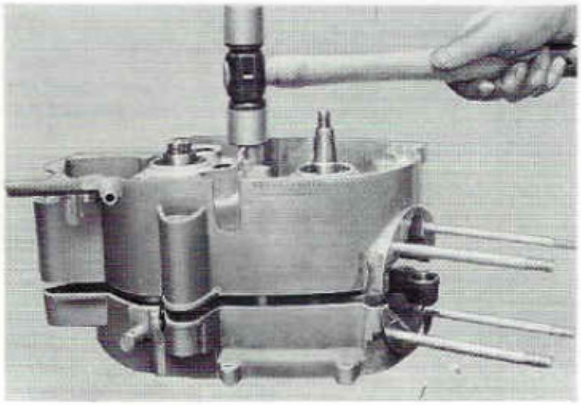


Fig. 8-3-12

Before the sealer dries, join the crankcase by striking the thick parts of the left half gently with a wooden or plastic hammer to make it fit firmly over the right half. (Fig. 8-3-12)

6. When installing the **oil seals,** be sure to apply grease all round the lips.

7. After joining the cases, turn the countershaft and driveshaft by hand and check to make sure the shafts turn smoothly. (Fig. 8-3-13)
8. When tightening crankcase 10 cross head nuts, tighten them in a criss-cross fashion to prevent the crankcase from warping and the crank chamber from compression leakage. After tightening the screws again check to make sure all shafts turn easily and smoothly by turning them by hand.

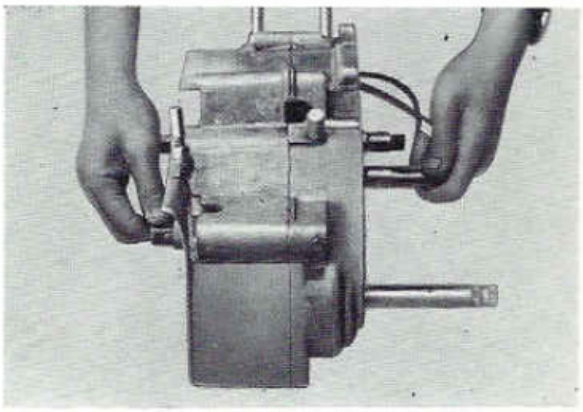


Fig. 8-3-13

9. When installing the **inner valve seat,** apply thread lock cement to the end of screws and tighten them firmly. If the thread lock cement climbs up thread and adheres to the surface of the inner valve seat, wipe it away. As the inner valve sheet fitting screws, be sure to use flat head countersunk screws with the whole length of 16 mm (0.63 in) to keep them from touching the crankwheel. (Fig. 8-3-14, 15)

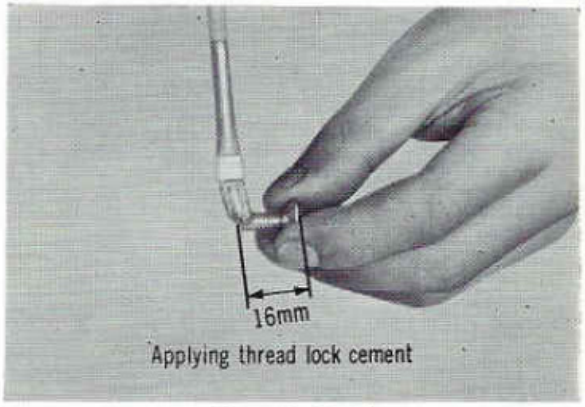


Fig. 8-3-14

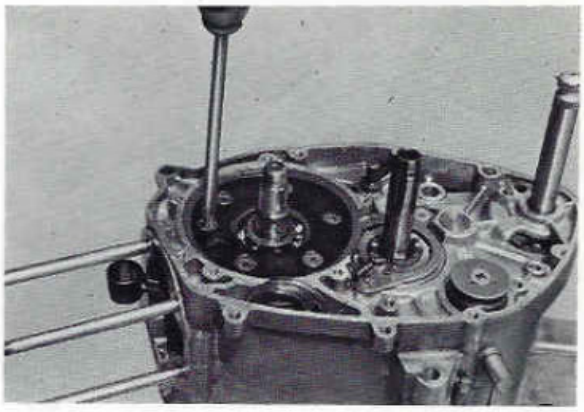


Fig. 8-3-15

10. Install the **valve plate** so that the timing mark punched on it faces outward and aligns with the valve guide pin set in the crankshaft. (Fig. 8-3-16)
    In addition, check to see if the valve plate slides lightly on its guide when pushing it by fingers. If it does'nt move lightly, repair the splines of the valve plate or the valve guide with an oil stone.

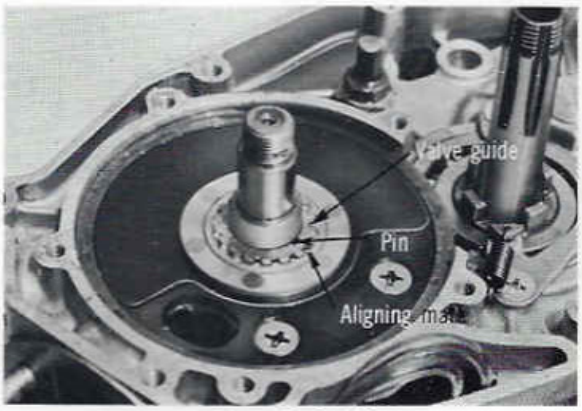


Fig. 8-3-16

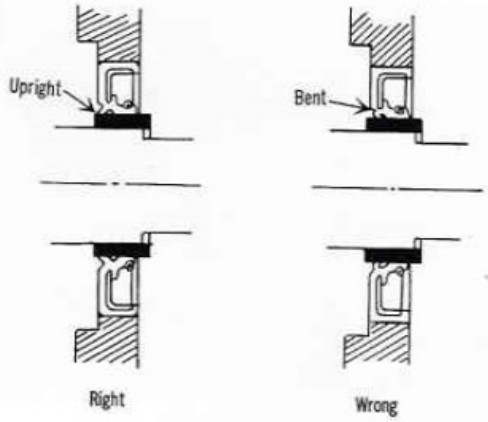


Fig. 3-8-17

11. Never fail to install **3 "0" rings** to the outer valve seat so as to prevent oil or fuel-air mixture from leaking, the largest one to the inner surface, the smallest one to the outer surface around the oil pass and the other to the outer surface around the intake port.

12. When installing the **outer valve seat,** first install the primary pinion spacer and then install the outer valve seat, or the oil seal lips will be bent resulting in the compression leakage from the crank chamber. (Fig. 8-3-17)

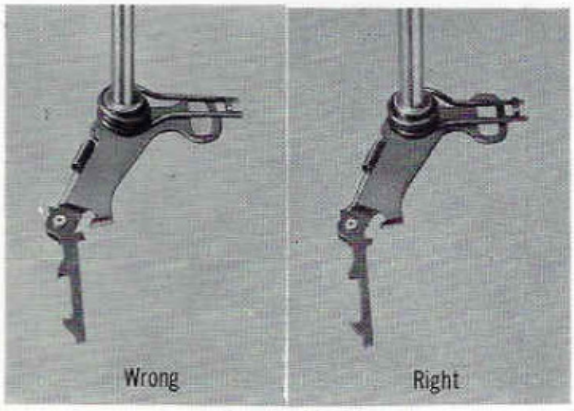


Fig. 8-3-18

13. Fit the **gear shifting shaft return spring,** with less-bent side down to the shaft. (Fig. 8-3-18)

14. Don't forget to place the **stopper washer** beneath the gear shifting cam stopper, as it is easy to overlook. Make sure the **stopper bolt** is inserted up to its head into the hole on the cam stopper. (Fig. 8-3-19)

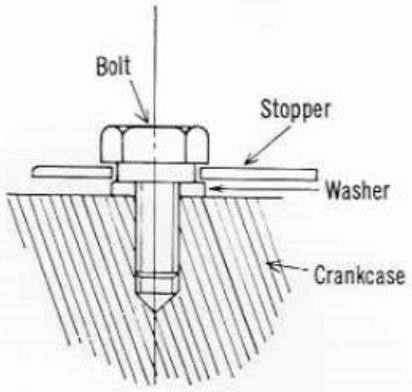


Fig. 8-3-19

15. When installing the **kick starter shaft return spring,** first rotate the kick starter shaft clockwise thoroughly to its stop position by hand, and then insert one end of the return spring into the hole on the crankcase and the other into the hole on the kick starter shaft by twisting, about half a turn with pliers. If it is inserted without twisting, the kick starter lever will not return to its normal position when it is released after being de pressed. Install **the guide** on the shaft with its tapered end pointing inward.

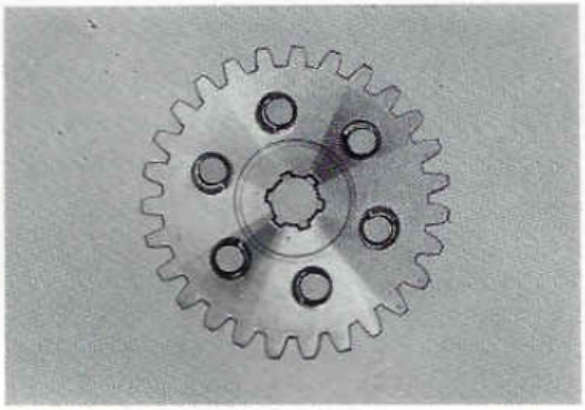


Fig. 8-3-20

16. When assembling the **clutch,** take care of the following matters.
    A. To set the **clutch springs** on the clutch sleeve hub, it is the best method to screw in the springs from the bottom side of the clutch sleeve hub so that the loop hooks of the springs may face toward the clutch pressure plate.
    In addition, make sure that the clutch spring bottom ends are kept in the same height with the bottom surface of the clutch sleeve hub and do not protrude. (Fig. 8-3-20)

B. When fitting the **clutch housing spacer,** first pour oil to both inside and outside of the spacer, and next fit the spacer with a small hole of it facing toward the gear box. (Fig. 8-3-21)

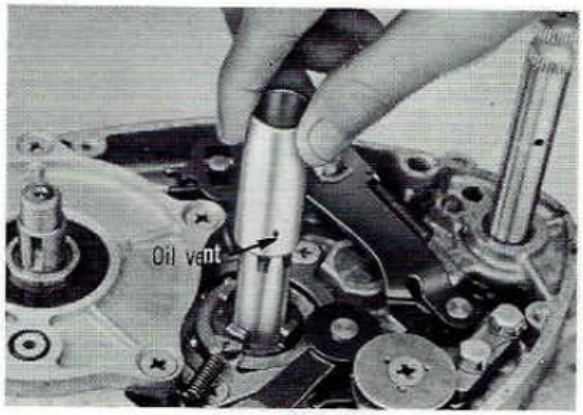


Fig. 8-3-21

C. Be sure to place the **clutch sleeve hub spacer** between the clutch housing and the clutch sleeve hub. (Fig. 8-3-22)

D. When installing the **clutch steel plates** and **cork plates,** fit the steel plate first, the cork plate next, etc., until all ten plates are fitted with a cork plates on top

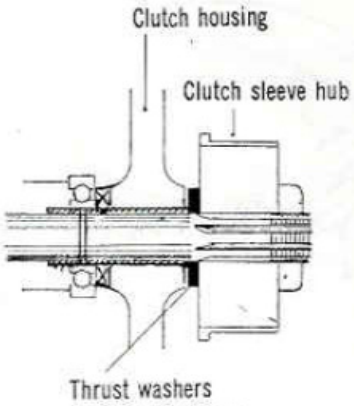


Fig. 8-3-22

E. Align the positioning mark on the **clutch pressure plate** with the mark on the edge of the clutch sleeve hub. (Fig. 8-3-23) If the pressure plate is installed without the alignment of the marks, such troubles as the dragging of the clutch and the wear of the clutch sleeve hub will be caused.

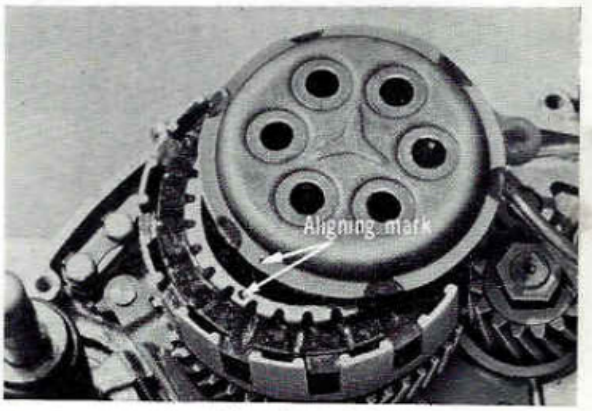


Fig. 8-3-23

17. When installing the **engine sprocket spacer** on the driveshaft, be careful not to bend the oil seal lips. (Fig. 8-3-24) In addition, install the spacer with its less chambered end facing inward

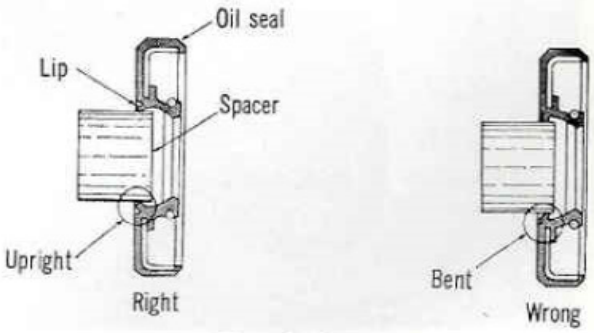


Fig. 8-3-24

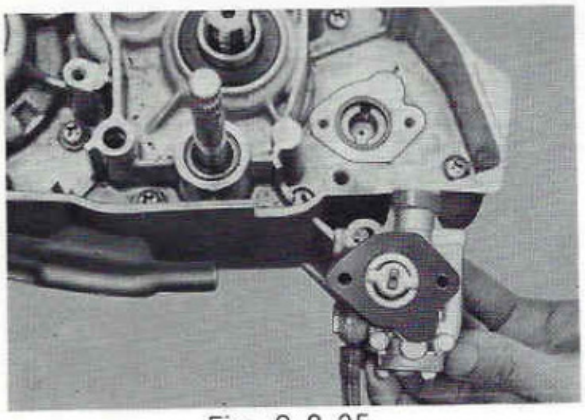


Fig. 8-3-25

18. When installing the **oil pump** on the crankcase, be sure to fit the **driving piece** on the oil pump driving worm first, and then install the oil pump. (Fig. 8-3-25)
    If the oil pump is installed without the driving piece, the oil pimp cannot operate.

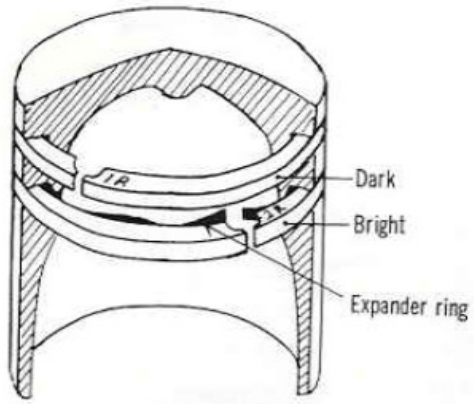


Fig. 8-3-26

19. When fitting the **piston rings** in the piston, take care of the following matters.
    A. Clean the piston and the piston rings throughly with a cleaning solvent.
    B. Install with the stamped marks facing upward. (Fig. 8-3-26)

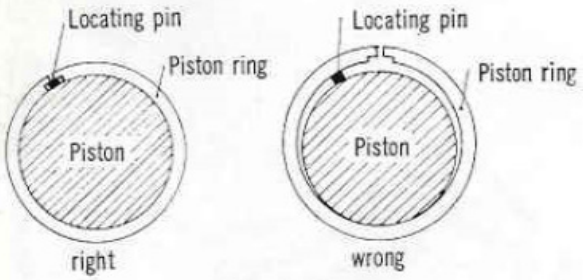


Fig. 8-3-27

    C. Align the piston ring open ends with the piston ring locating pin set in the piston ring groove. (Fig. 8-3-27)
    D. Install the dark ring with the stamped mark "1R" to the first groove and the bright ring with the stamped mark "2R" to the second groove after inserting the expander ring to the second groove.

Fig. 8-3-28

20. As the piston pin is off-center, the **piston** can be installed in only one direction. Install the piston with the arrow mark stamped on the piston head pointing toward the exhaust port, not toward the third scavenging ports. (Fig. 8-3-28)

21. When installing the **cylinder head,** tighten the 4 cylinder head nuts diagonally just the same as when loosening. (Fig. 8-3-29)

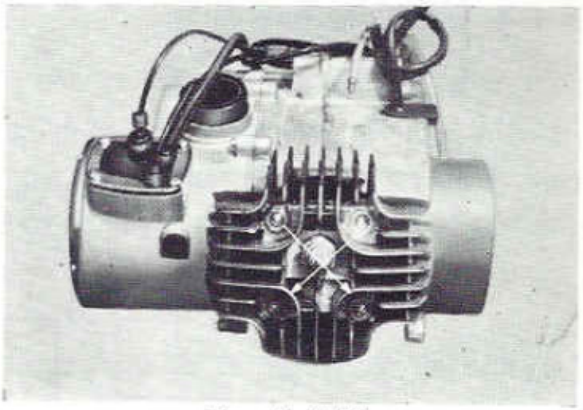


Fig. 8-3-29

8-4. Oil Pump

The oil pump driving mechanism, the oil pump operation and the oil pump performance are described below.

8-4-1. Oil pump driving mechanism

The oil pump driving force is transmitted from the crankshaft to the oil pump through the primary pinion, the primary gear, the kick gear, the kick idle gear, the kick pinion and the oil pump driving piece.

The number of teeth and the reduction ratio are as follows.

* Number of teeth ..... Primary pinion 16
  Primary gear 50
  Kick gear 17
  Kick pinion 32
* Reduction ratio ..... 50/16 × 32/17 = 5.88/1

By this driving mechanism, the oil pump will operate if the engine continues to rotate in spite of the disengagement of the clutch.

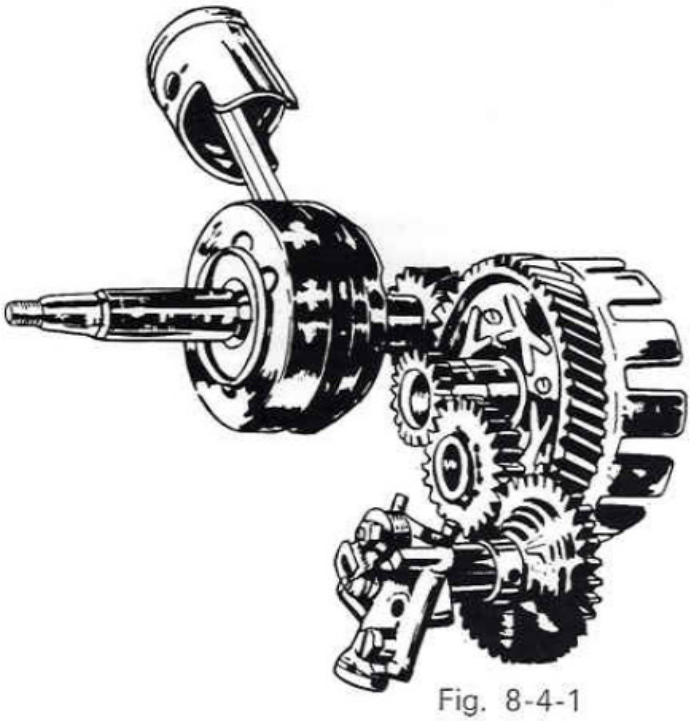


Fig. 8-4-1

8-4-2. Oil pump operation

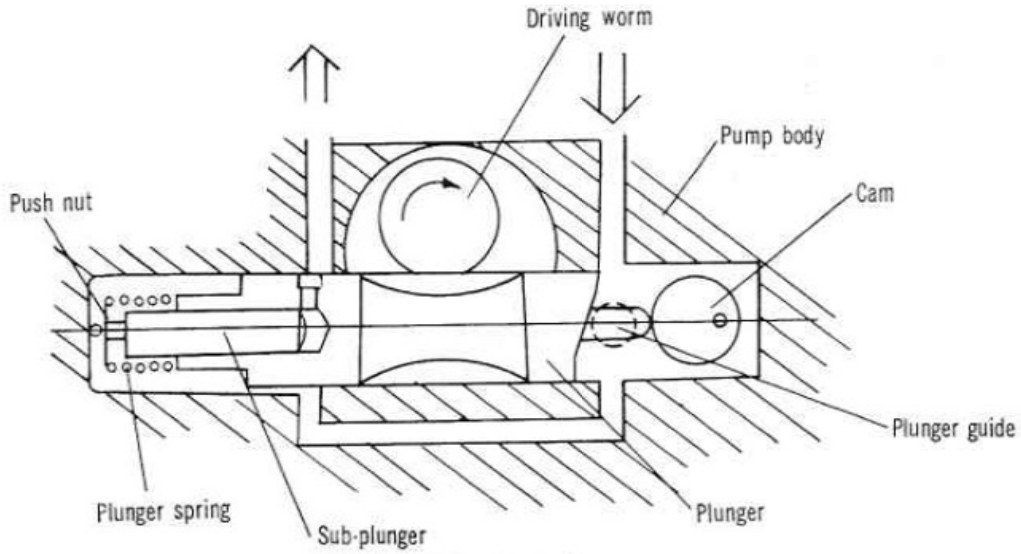


Fig. 8-4-2

The construction of the oil pump is shown in Fig. 8-4-2 The plunger rotates 1/22 turn to every one turn of the driving worm so that its overall reduction ratio to the crankshaft is 1 to 129.36. A circular ramp is machined into the bottom of the plunger. This ramp section engages the plunger guide and the plunger moves up and down by utilizing the plunger rotating action.

The combination of rotating action and up and down movement opens and closes the intake port and disacharge port, changes the volume between the plunger and the sub-plunger and changes the pressure of oil.

The control lever is pulled in accordance with throttle opening and turns a camshaft fitted to the lever. When the throttle is opened only slightly, the cam limits the oil pump plunger stroke. When the throttle opening is increased, the cam turns and allows a longer plunger stroke, so that the amount of oil discharged increases.

Every one turn of the plunger can be devided into four stages as follows.

1. When the plunger is on downstroke (90° by the plunger rotating angle), the volume between the plunger and the sub-plunger increases and the vacuum is created in its space.
2. In the next rotating angle of 90°, the intake port opens and oil is sucked into the plunger in which the vaccum was created in above process.
   During this intake stage, the plunger remains in the bottom dead center.
3. Oil intake is finished and the plunger begins to move upward. On upstroke of the plunger (90° by the rotating angle), the oil in the plunger is compressed.
4. In final stage (90° by the rotating angle), the discharging ports opens and the compressed oil is discharged.
   In this stage, the plunger remains in the top dead center.

8-4-3. Controlling discharge by throttle opening

The amount of oil pumped must vary in accordance with changes in the loads which the engine receives, as well as the engine rpm. To fulfil these requirements of the engine, a camshaft, which synchronizes with the throttle is provided below the plunger tip so that the plunger displacement varies with the throttle opening and the proper amount of oil always supplied to the engine.

1. At minimum throttle opening the stroke of the plunger is shortened by the cam so that a small amount of oil is charged.
2. At maximum throttle opening the cam does not restrict the plunger stroke so that the plunger makes a full stroke along the plunger guide and takes in and discharges more oil.

8-4-4. Oil pump performance curve

Fig. 8-4-3. shows the relation between control lever angle and amount of oil pumped when the driving worm speed is kept at 1,500 rpm.

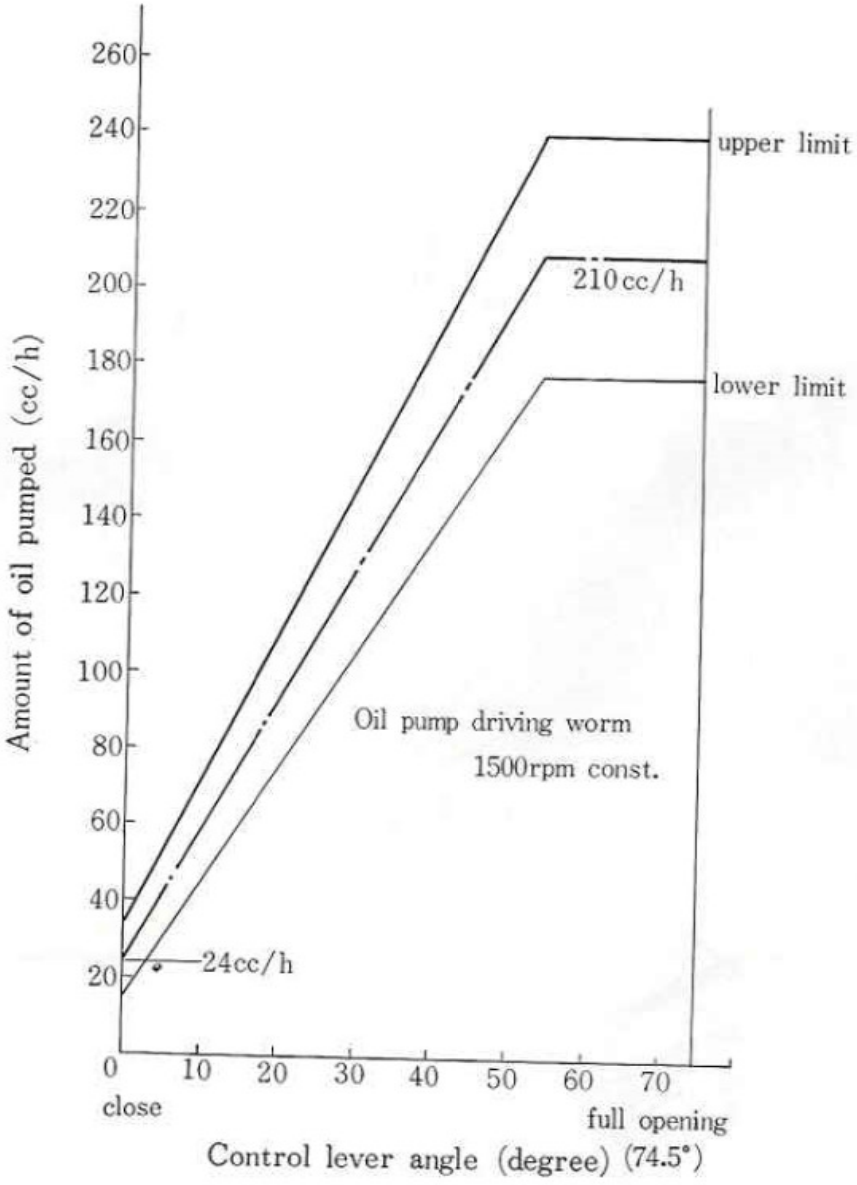


Fig. 8-4-3

8-5. Carburetor specifications

Main jet	#80
Primary outlet	0.6ϕ
Jet needle	5ES cliped into 2nd groove
Needle Jet	E-O
Throttle valve cutaway	#2.5
Pilot jet	#45
Pilot air adjusting screw	1-1/2 turns back
Needle valve seat	1.5ϕ
Starter jet	#60
By path	1.4ϕ
Power air jet	1.6ϕ
Power main jet	0.7ϕ
Power outlet	0.5ϕ

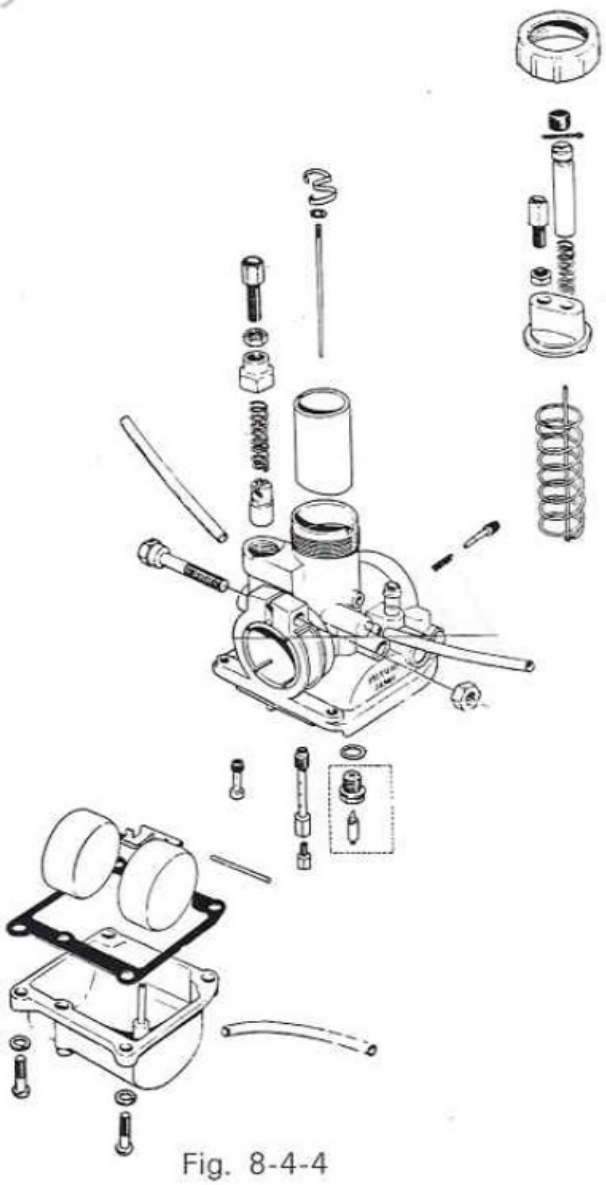


Fig. 8-4-4

9. SPECIFICATIONS FOR INSPECTION AND REPAIR

1. Engine

No.	Part	Item	Standard	Limit Operation	Remarks
1	Cylinder head	Warp on the joining surface	below 0.03mm (below 0.0012")	Repair	Check the warp by pressing and moving the cylinder on the thin coat of minium on the flat surface plate. Repair it by grinding the warped surface with #200 and #400 emery-paper. (Fig. 9-1, 9-2)
2	Cylinder	Wear		0.05 mm Rebore (0.0020")	Limit is obtained by subtracting the smallest dia. from the largest one.
		*Proper Cylinder-Piston Piston clearance	0.05mm-0.06mm (0.0020"-0.0024")	0.110mm (0.0043")	
		*Cylindrical and circular tolerance	0-0.01mm (0-0.0004")		

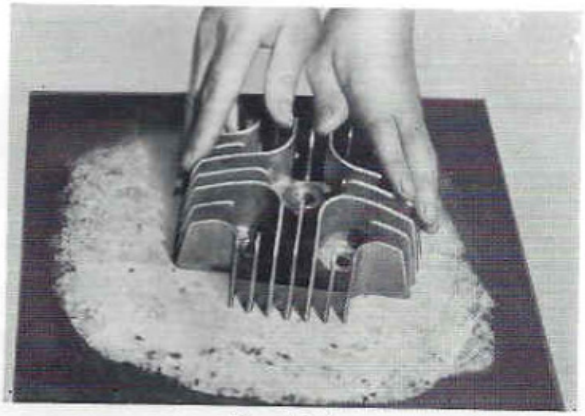


Fig. 9-1

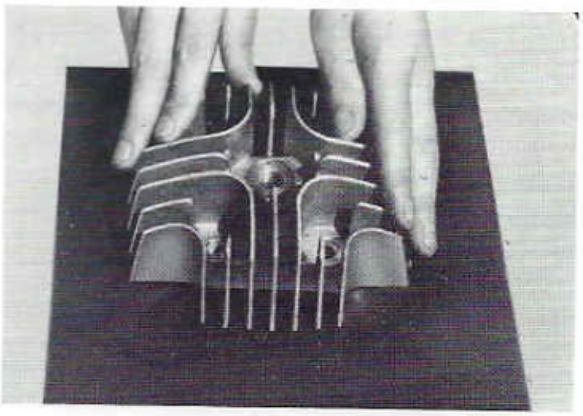


Fig. 9-2

No.	Part	Item	Standard	Limit Operation	Remaks
3	PistonPin	Wear		0.01mm (0.0004")	Limit is obtained by subtracting the smallest dia. from the largest one, when it is measured at several points.

No. Part	Item	Standard	Limit Operation	RemarKes
4 Piston ring	Wear (Width)	2.2mm-2.4mm (0.087"-0.095")	2.1mm Replace (0.083")	Measure the width with calipers.
	(Open end gap)	0.15mm-0.35mm (0.0059"-0.0138")	0.4mm Replace (0.0157")	Measure the open end gap with a feeler gauge when piston ring is inserted into the lower part of cylinder. (Fig. 9-3)

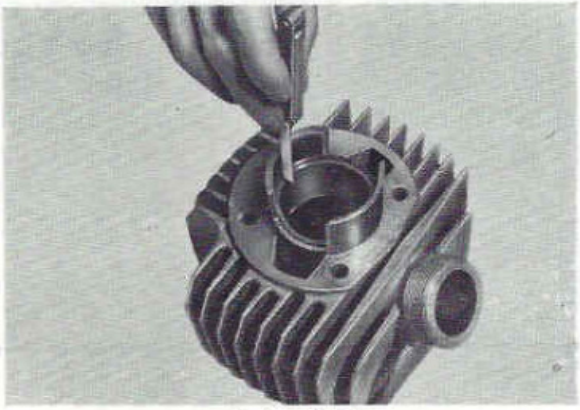


Fig. 9-3

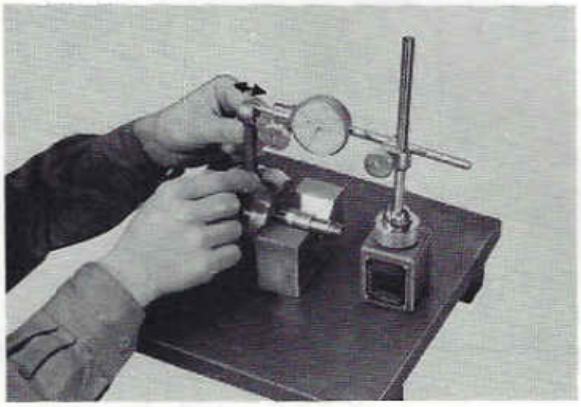


Fig. 9-4

No. Part	Item	Standard	Operation	Remarks
5 Piston	Diameter at 16mm above the bottom edge	50,000mm-50,015mm (1.9685"-1.9744")	Replace	Measure dia. at 90° from the piston pin hole with a micrometer. When the cylinder noise becomes large, replace the piston.
6 Crankshaft	*Con.rod small end shake	below 3mm (below 0.12")	Replace	Check the shake at top dead center with a dial gauge. (Fig. 9-4)

No. Part	Item	Standard	Limit, Operation	Remarks
6 Crankshaft	*Crankshaft shake	below 0.05mm (below 0.0020")	0.1mm (0.0039") Replace or Repair	Check the shake on the right and left crankshaft end with a dial gauge. (Fig. 9-5)
	*Side play in big end	0.185mm-0.575mm (0.0073"-0.0276")		
	*Up and down play in big end	0.005mm-0.022mm (0.0002"-0.0009")		
	*Crankpin/crankwheel fit	0.047mm-0.075mmT (0.0019"-0.0030"T)		
	*Oil guide plate/crankwheel fit	0.15mmT 0.15mmL (0.0059"T 0.0059"L)		
	*Width from wheel to wheel	49.985mm-50.015mm (1.9679"-1.9691")		
	*Right crankshaft bearing/crankshaft fit	0.005mmT 0.009mmL (0.0002"T 0.0003"L)		
	*Left crankshaft inner bearing/crankshaft fit	0.008mmT 0.005mmL (0.003"T 0.0002"L)		
	* Left crankshaft outer bearing/crankshaft fit	0.001mmT 0.018mmL (0.0003"T 0.0007"L)		

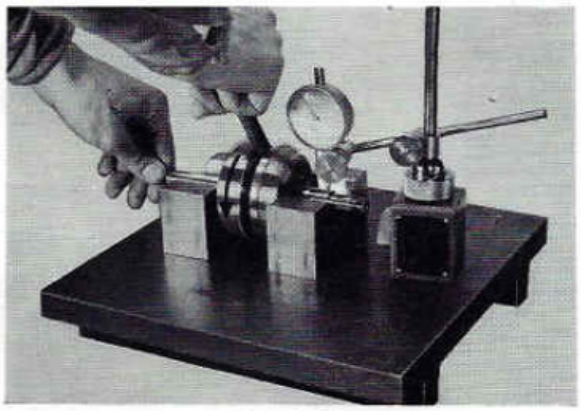


Fig. 9-5

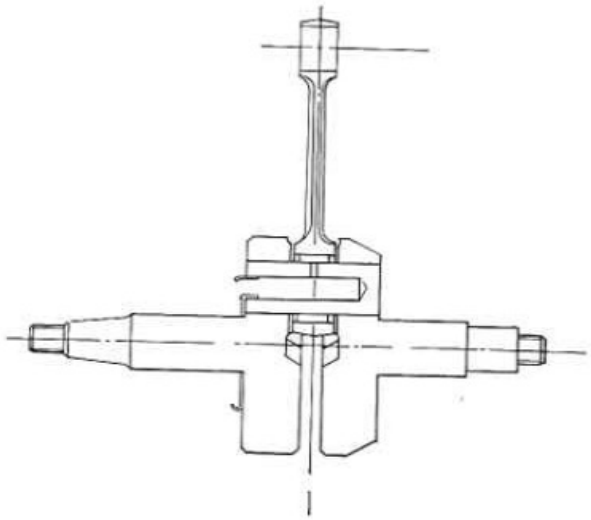


Fig. 9-6

No.	Part	Item	Standard	Limit Operation	Remarks
7	Clutch housing spacer	Wear	20.96mm — 20.98mm (0.8252"—0.8260")	20.8mm Rpelace (0.8190")	Check the dia.with a micrometer.
8	Clutch housing	Play in axial director	0.1—0.25mm (0.0039"—0.0098")	0.3mm Repair (0.0118")	After installing the clutch housing, spacers and hub, check the play by moving the housing in axial direction. If the play is found large, repair the clutch housing spacer by grinding one end of it on an oil stone.
9	Primary pinion and gear	Backlash	0.045mm (0.0018")	0.1mm Replace (0.0039")	Set the dial gauge with its feeler pointing to the tangential direction of the gear and measure the backlash by turning clutch housing by hand.
10	Clutch cork plate	*Wear	2.9mm—3.1mm (0.114"—0.122")	2.8mm Replace (0.110")	Check the thickness with calipers.
		*Warp	below 0.4mm (0.016")	Replace	Check the warp by placing the plate on the flat surface with a feeler gauge.
11	Clutch steel	*Warp	below 0.1mm (0.004")	Replace	Check the warp in the same way as mentioned above.
12	Clutch spring	Free length	32.9mm (1.295")	34.1mm Replace (1.343")	The free length shall be the length from end to end including wire dia. of the loop hook.
13	Gear shifting cam stopper spring	Free length	25.0mm (0.984")	26.5mm Replace (1.043")	The free length shall be the length from end to end excepting wire dia. of both loop hooks.

No.	Part	Item	Standard	Limit Operation	Remarks
14	Low gear bushing & kick starter idle gear bushing	Wear	15.00mm—15.02mm (0.5906"—0.5913")	15.06mm Replace (0.5929")	Measure the inside dia. with calipers. Replace the gear comp., if needed.
15	Kick starter gear bushing	Wear	21.00mm—21.02mm (0.8268"—0.8276")	21.06mm Replace (0.8291")	Measure the inside dia. with calipers. Replace the gear comp., if needed.
16	Low and high speed shifting forks	*Wear	5.3mm—5.4mm (0.209"—0.213")	4.5mm Replace (0.217")	Measure the thickness of the fork teeth.
		*Clearance between forks and gear grooves	0.2mm—0.4mm (0.0079"—0.0157")	0.8mm Replace (0.0315")	Check the clearance with a feeler gauge. Replace the shifting forks or gears, if needed.

2. Electrical Equinment

No.	Part	Item	Standard	Limit Operation	Remarks
1	Flywheel magneto	*Resistance of Primary coil	1.5 Ω	Replace	Measure the resistance between the black colored wire and the ground with a circuit tester by inserting a piece of paper to the contact points.
		*Resistance of lighting coil	0.25 Ω	Replace	Measure the resistance between the yellow colored wire and the ground.
		*Condenser capacity	0.3 μF	Replace	Check the capacity with a electrotester (Service apparatus 09900-28101).
		*Insulation resistance of condenser	10 MΩ	Replace	Check the resistance with a electrotester (Service apparatus 09900-28101).
		*Lighting capacity	over 6V at 1700 rpm below 8.5V at 8000 rpm		To check the lighting capacity, measure the voltage by inserting the positive lead of AC voltmeter to the connector of the magneto yellow colored wire and connecting the negative lead to somewhere on the engine, with ignition switch key in night time position.

No.	Part	Item	Standard	Limit Operation	Remarks
		*Charging capacity in day time	over 0.6A at 1500rpm below 3.2A at 800 rpm		Measure the charging current by DC ammeter with ignition switch key in day time position.
		*Charging capacity in night time	Starts to charge at 1500rpm over 0.5A at 8000rpm		Measure the charging current by DC ammeter with ignition switch key in night time position.
		*Spark gap	over 6mm (0.24 in) at 500rpm		Connect a electrotester in series with spark plug as illustrated below. (Fig. 9-7) When starting engine, set a three prong gap of electrotester to zelo.
		*Adjustable angle of spark timing	±5°		
		*Condenser Capacity	0.30F ±15%	Replace	
		*Contact point Pressure	700kg ±50 (1.54 lb ±0.11)	Replace	
		*Contact point gap	0.35mm ±0.05 (0.0138 in) ±0.0020		
2	Ignition coil	Resistance of primary coil	5.0Ω±10%	Replace	Measure the resistance by using a circuit tester.
3	Spark plug	Gap between center electrode and side electrode	0.5-0.6mm (0.020-0.024 in)	Repair	Measure the gap by a feeler gauge and if it is larger than the standard, adjust it by bending the side electrode.
4	Rectifier	Non conductivity in inverse direction		Replace	Check the resistance in inverse direction by a circuit tester.

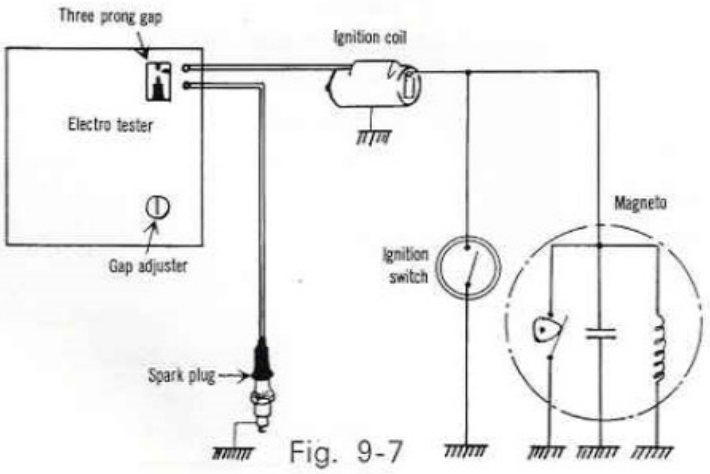


Fig. 9-7

10. ADJUSTMENTS

No.	Part	Adjusting Method
1.	Oil pump control cable	First remove the engine sprocket cover and the oil pump cover. Next adjust the oil pump control cable in the following procedure. 1. Loosen the control cable adjuster look nut. 2. Turn in the adjuster to such a extent that the cable inner becomes idle. 3. Turn the throttle inward all the way. 4. Align the stumped mark on the control lever with the stamped mark on the oil pump body by screwing out the cable adjuster. 5. Finally secure the adjustment with the cable adjuster look nut.

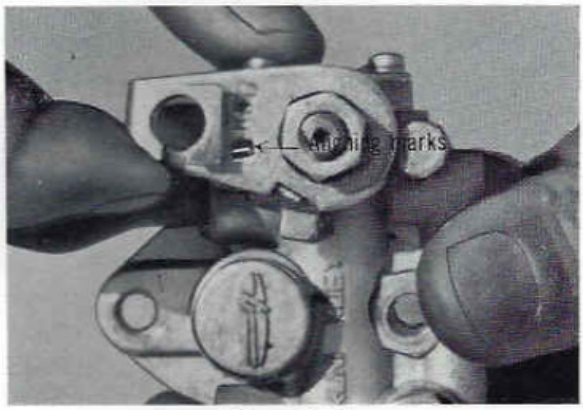


Fig. 10-1

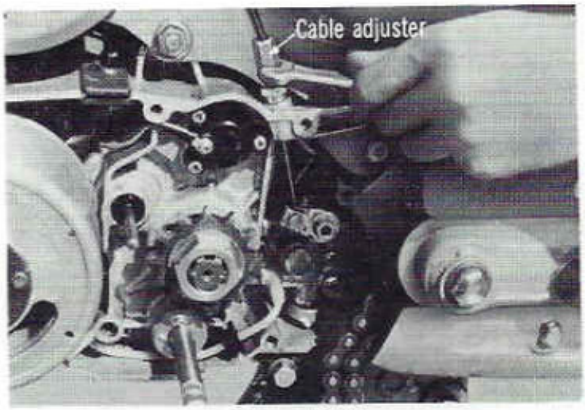


Fig. 10-2

No.	Part	Adjusting Method
2.	Carburetor	1. Adjusting idle circuit (Fig. 10-3) Before starting to adjust, make preparations as follows. * Adjust play in the throttle cable to 0.5—1.0mm (0.02—0.04 in) with the throttle cable adjuster under the right handle switch. * Warm the engine up for a few minutes. When above preparations are completed, begin adjusting idling.

No.	Part	Adjusting Method
		* Adjusting the throttle valve adjusting screw so that the engine keeps idling at lowest rpm, turn in the pilot air adjusting screw to the bottom. * As the engine revolution will increase or decrease in accordance with the turning of the pilot air adjusting screw, turn out the pilot air adjusting screw up to the position where the engine revolution is highest. * Finally, adjust the throttle valve adjusting screw again to obtain the proper engine idling.
		The standard setting—1½ turns out from the bottom

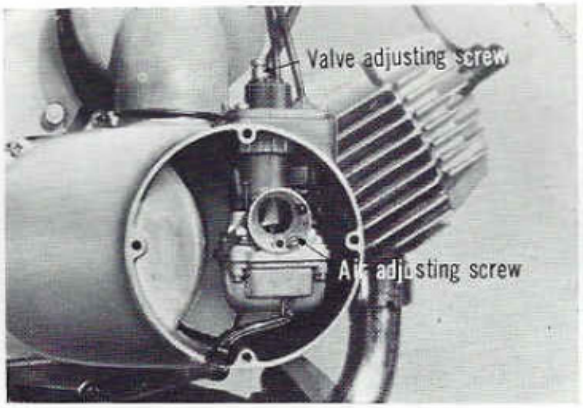


Fig. 10-3

No.	Part	Adjusting Method	
		2. Adjusting part-throttle circuit Most carburetor troubles are caused by too rich or too lean fuel/air mixture. These conditions can be seen from the following symptoms.	
		Too rich mixture	Too lean mixture
		* Exhaust fumes are dense and bluish white in color. * The motorcycle feels sluggish when running * The spark plug is wet and dirty and becomes black in color	* The engine will not idle smoothly. * Engine revolution fluctuates even if the throttle grip is held steady. * The engine is apt to over-heat.

No.	Part	Adjusting Method

* The engine runs smoothly if the air cleaner is removed.	* The engine will run smoothly if the starter channel is opened.

As normal operating speeds, it is most advisable to change first of all the main jet to cope with these troubles, and if the optimum engine performance cannot be obtained from the alteration of the main jet only, adjust with the other parts such as throttle valve and jet needle referring to the table described below.

Throttle Opening	Too Rich Mixture	Too lean Mixture
0—$\frac{1}{8}$	Turn pilot air adjusting screw out	Turn pilot air adjusting screw in
$\frac{1}{8}$—$\frac{1}{4}$	Use throttle valve with larger cutaway	Use throttle valve with smaller cutaway
$\frac{1}{4}$—$\frac{3}{4}$	Lower jet needle	Raise jet needle
$\frac{3}{4}$—full	Use smaller numbered main jet	Use larger numbered main jet

For the use in high altitudes, it is recommended to try a smaller main jet with decrescence of 5 per every 1000 meters (3300 ft.) of rise in the altitude, as a rule.

3. Adjusting fuel level (Fig. 10-4)

Remove the float chamber. Hold the carbutetor upside down with the float fitted to the mixing chamber body. Lower the float gradually and stop it when the float tongue touches the upper end of the needle valve. Measure the distance between the float chamber fitted surface and the bottom of the float with calipers. If the distance is less than 23 mm (0.91 in), the fuel level is too high and if more the fuel level is too low. Adjust the distance to 23 mm (0.91 in) by bending the float tongue with a plain screw driver.

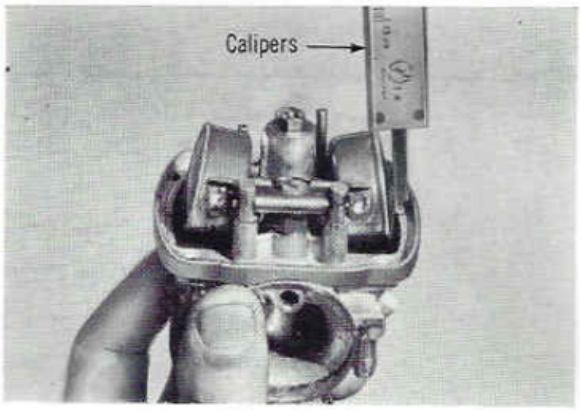


Fig. 10-4

No.	Part	Adjusting Method
3.	Flywheel Magneto	Adjusting ignition timing (Fig. 10-5, 6) Before adjusting ignition timing, be sure to adjust the contact point gap to 0.35 mm. As the adjusting method of the ignition timing, there are two ways : one way is by using a timing gauge and the other by the aligning marks on the flywheel rotor and the crankcase. Here, only the latter way will be described. * First remove the flywheel rotor. * Loosen 3 magneto stater fitting screws a little and turn the stater clockwise if the timing is retarded and counterclockwise if the timing is advanced. * Tighten the screws firmly after adjusting the timing * Refit the flywheel rotor, but do not tighten the fitting nut. Turn the flywheel rotor slowly by hand and check the alignment of the timing marks at the position where the contact points begin to open and tone of the timing buzzer changes. * If the timing marks are out of alignment, repeat the above adjusting procedures. The relation between piston distance and crankshaft angle is described below.

	Timing retard Standard						Timing advanced		
Piston distance	1.20	1.36	1.52	1.69	1.86	2.06	2.26	2.46	2.68
Crank angle(°)	16	17	18	19	20	21	22	23	24

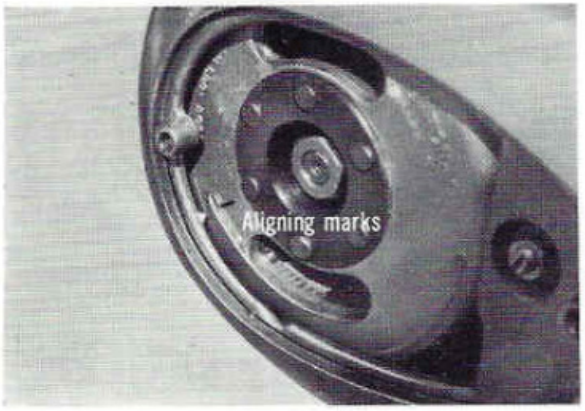


Fig. 10-5

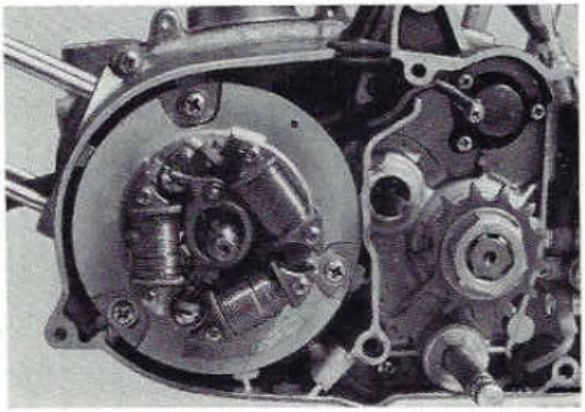


Fig. 10-6

No.	Part	Adjusting Method
4.	Hron	Adjusting volume (Fig. 10-7) The volume can be adjusted by turning the adjusting screw. If the screw is loosened or tightened excessively, however, the horn will not sound. When the adjusting screw is turned Clockwise—Volume increases. Counterclockwise—Volume decreases.
5.	Brake lamp switch	Adjusting lighting position (Fig. 10-8) Adjust the brake lamp switch by turning the adjusting nuts so that it turns on the brake lamp when the brake pedal is depressed about one-half of its travel.

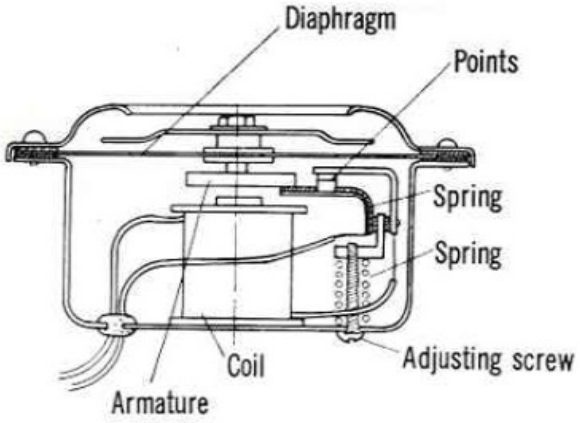


Fig. 10-7

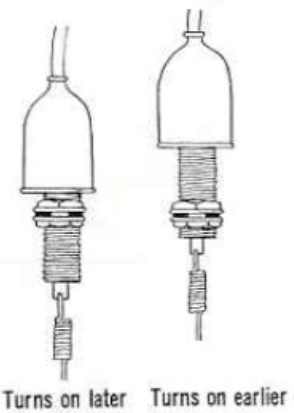


Fig. 10-8

No.	Part	Adjusting Method
6.	Drive chain	Adjusting tension (Fig. 10-9) After loosening the rear axle nut and the sprocket mounting drum nut, adjust the drive chain by turning the right and left chain adjuster bolts. The deflection of the chain should be adjusted to 15—20 mm (0.59—0.79 in) at the midpoint between the engine and rear sprockets when pushed up and down by fingers. Further, the marks on both chain adjuster must indicate the same position by checking the marks on the swinging arm.
7.	Brake	Adjusting front brake (Fg. 10-10) Adjust the brake cable adjusting nut so that the distance between the brake lever and the throttle grip is about 20 mm (0.79 in) when the brake engages. Adjusting rear brake (Fig. 10-11) Adjust the brake rod adjusting nut so that the brake pedal travel is 20—30mm (0.79—1.18 in) when the brake pedal is depressed.

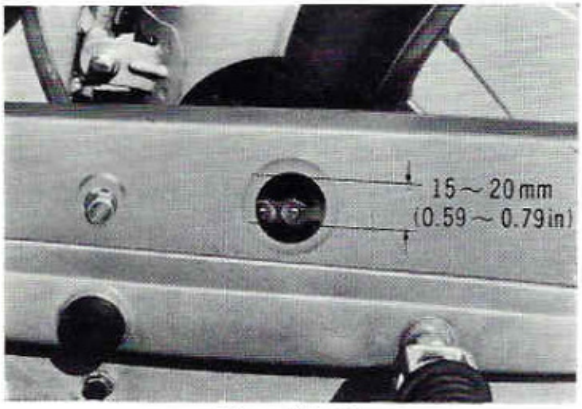


Fig. 10-9

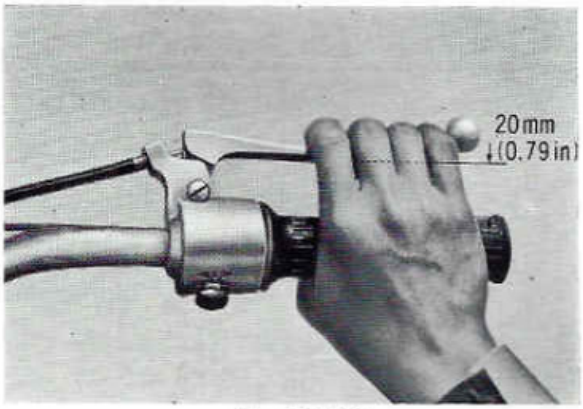


Fig.10-10

No.	Part	Adjusting Method
8.	Clutch	The clutch can be adjusted with both the clutch cable adjuster and the release adjusting screw. * Adjusting with release adjusting screw. (Fig. 10-12) After removing the flywheel magneto cover, Adjust the release screw as follows.

No.	Part	Adjusting Method
		1. Loosen the clutch release screw lock nut 2. Turn in the release adjusting screw until it seat the push lod and then back it out half a turn. 3. Finally secure the adjusting screw with lock nut. * Adjusting with clutch cable adjuster (Fig. 10-13, 14) Adjust the cable adjuster so that 3 mm (0.12 in) of play measured at the clutch lever base is left in the cable.

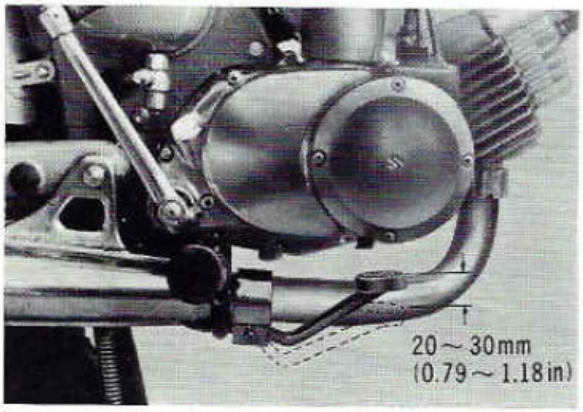


Fig. 10-11

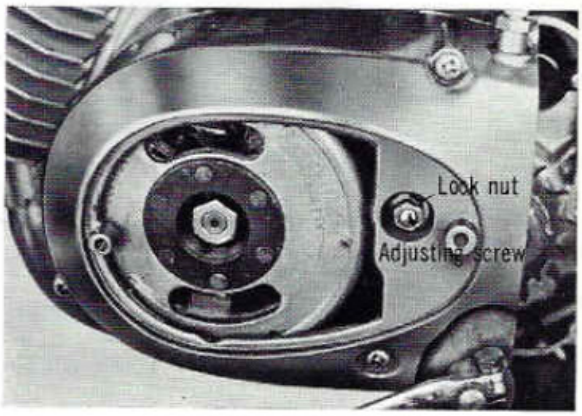


Fig. 10-12

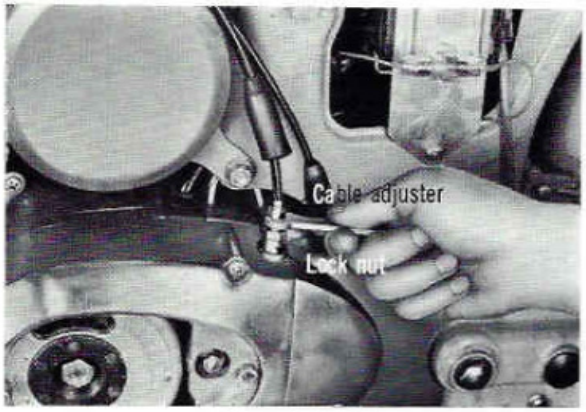


Fig. 10-13

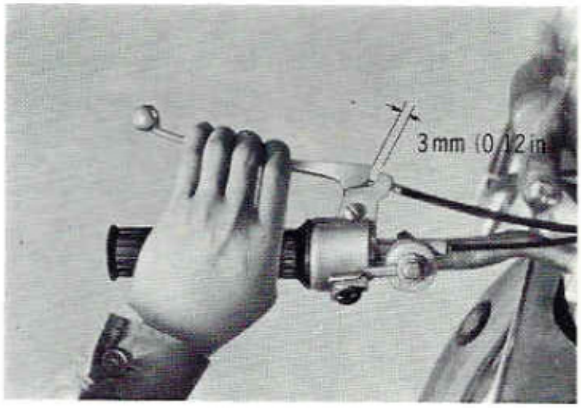


Fig. 10-14

No.	Part	Adjusting Method
9.	Tire	Adjusting pressure Adjust the tire pressure to the following specifications Front 1.5 kg/sq cm (22 lb/sq in) Rear solo riding ....2.0 kg/sq cm (29 lb/sq in) dual riding ....2.4 kg/sq cm (34 lb/sq in)

11. TIGHTENING TORQUE

Bolts, nuts and screws are apt to work loose during running. Check and retighten. (Fig. 11-1, 11-2)

No.	Part	Tightening torque	
		kg—cm	lb—ft
1	Spark plug	200—240	14—17
2	Cylinder head nuts	180—230	13—17
3	Oil pump union bolts	20—30	1.4—2.0
4	Steering stem head fitting bolt	180—280	13—20
5	Fork fitting bolts	180—280	13—20
6	Handle bar clamp bolts	60—90	4.0—6.5
7	Front axle nut	360—440	26—32
8	Rear axle nut	270—330	20—24
9	Rear shockabsorber upper bolts	180—280	13—20
10	Rear shockabsorber lower bolts	180—280	13—20
11	Rear swinging arm pivot shaft	180—280	13—20
12	Front fork inner tube fitting bolts	180—280	13—20
13	Rear sprocket mounting drum nuts	450—500	33—43
14	Engine mounting bolts	130—230	9.5—17
15	Check valve	30—50	2.0—3.6
16	Oil level inspection lens screw	16—20	1.2—1.5
17	Oil pump fitting screw	30—50	2.0—3.6
18	Magneto fitting nut	350—450	25—33

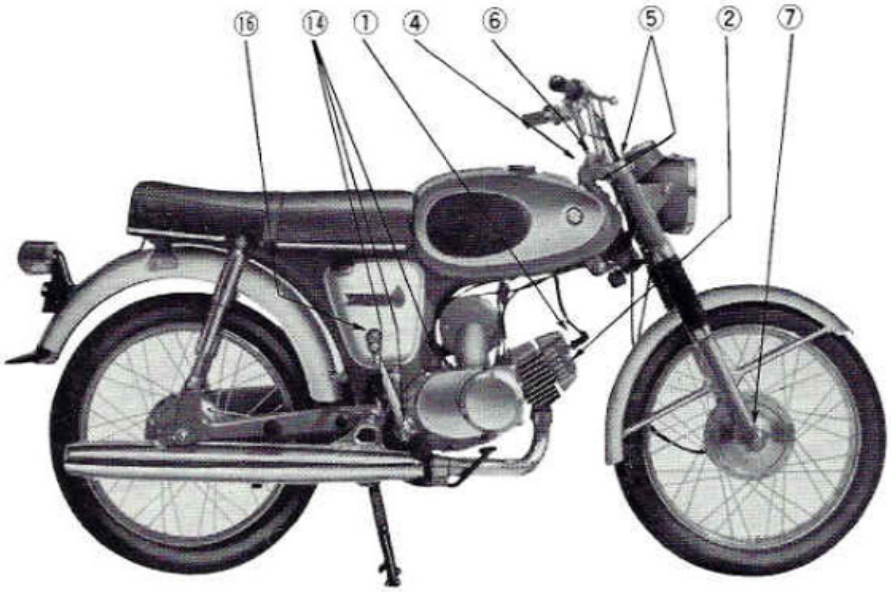


Fig. 11-1

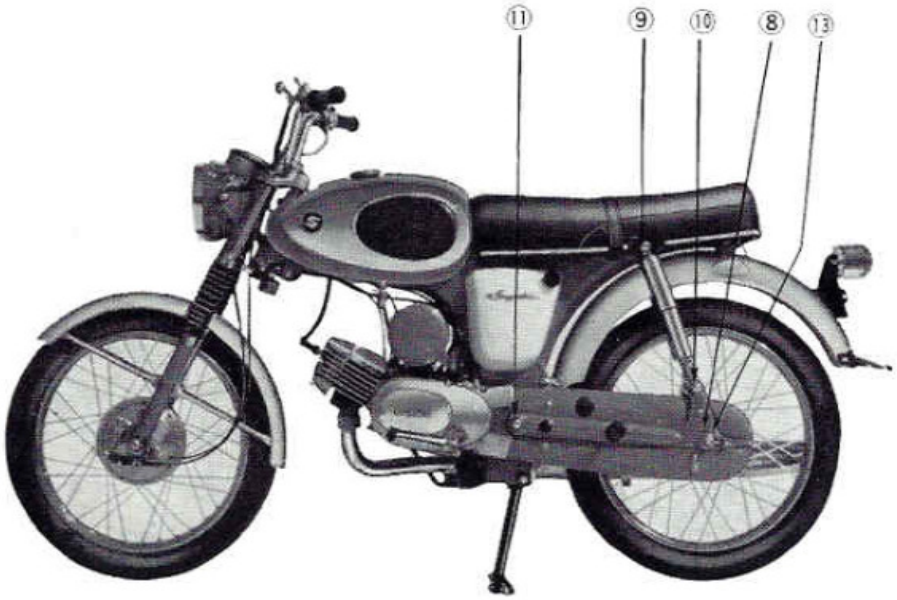


Fig. 11-2

12. TROUBLE SHOOTING

When trouble occurs with a motorcycle, it is important to find the source of the trouble as rapidly as postible. It is also necessary to perform only the work required to repair the machine and not bother with parts which are functioning correctly. The list of possible troubles and their causes given below should help the service man to repair motorcycles quick without loss of effort.

12-1. If Engine Is Hard To Start

Check fuel in the fuel tank first. When a proper amount of fuel is in the tank, check the following points.

Description	Check Points	Action
1. Check to see that fuel flows into carburetor.	* If fuel does not enter into carburetor	
	1. Fuel strainer clogged	Remove and clean
	2. Fuel pipe clogged or damaged	Clean or replace
	3. Tank cap air vent clogged	Clean with a wire
	4. Fuel cock clogged	Clean with a wire
2. Check to see that spark jumps in spark plug. (Turn engine with kick starter).	* If blue or hot spark jumps in the spark plug, check the following points.	
	1. Ignition timing	Adjust
	2. Fuel	Check carburetion
	3. Carburetor float	Adjust or replace
	4. Engine compression	See specifications and adjust
	* If the spark is weak.	
	1. Damage in spark plug	Replace
	2. Incorrect spark plug gap	Adjust
	3. Damage in spark plug cap	Replace
	4. Dirty contact points	Clean and adjust
	5. Bad insulation in condenser	Replace
	6. Damage in ignition coil or primary coil	Replace

	* If there is no spark	
	1. Damage in spark plug	Replace
	2. Dirty or wet spark plug	Clean
	3. Incorrect spark plug gap	Adjust
	4. Dirty or incorrect contact point gap	Clean and adjust
	5. Bad insulation in condenser	Replace
	6. Damage in ignition coil or primary coil	Replace
	7. Damage in ignition switch	Replace
	8. Damage in wiring harness	Repair or replace
	9. Incorrect spark plug heat range	Replace
3. Check to see that engine compression is proper. (Turn engine with kick starter)	* If engine compression is improper	
	1. Worn cylinder and piston rings	Repair or replace
	2. Stick pistion ring on piston	Repair or replace
	3. Damaged cylinder head gasket	Replace
	4. Damaged cylinder base gasket	Replace
	5. Damaged piston	Replace
	6. Improperly tightened spark plug	Tighten securely
	7. Faded spark plug gasket	Replace
	8. Improperly tightened cylinder head	Tighten securely
	9. Gas leaks from crankcase joining	Repair or replace
	10. Damaged cylinder or cylinder head	Replace
	11. Damaged oil seals	Replace

12-2. If Abnormal Noise is Heard In Engine

Description	Check Point	Action
	1. Too big clearance between piston and cylinder	Repair or replace
	2. Too big clearance between piston rings and grooves	Replace piston
	3. Piston rings stiff with carbon	Clean
	4. Worn con-rod big end	Replace
	5. Worn con-rod small end bearing	Replace
	6. Damaged piston rings	Replace
	7. Too early ignition timing	Adjust
	8. Defective primary pinion and gear	Replace
	9. Worn crankshaft bearings	Replace
	10. Defective transmission gear	Replace
	11. Defective transmission shaft bearings	Replace

12-3. If Engine Overheats

If engine overheats at high speed running after it is broken in, check to see if the oiling system is in good condition, the brake is dragging, or cylinder cooling fins are dirty. Inspect the following points.

Description	Check Point	Action
1. Check to see if oiling system	1. Improperly adjusted oil pump control lever	Adjust
	2. Air in oil lines	Remove air
	3. Choked oil tank breather pipe	Correct
	4. Incorrect oil used	Use prescribed oil
2. Check to see if engine compression is higher than standard	* Too high compression	
	1. Carbon deposits in combustion chamber	Remove carbon deposits
	2. Too thin cylinder head gasket	Replace
3. Check carbon deposits	* Check carbon deposits in muffler exhaust pipe, exhaust port and combustion chamber	Disassemble and remove carbon deposits
4. Check to see that piston rings move smoothly in grooves.	* Piston rings stiff from carbon deposits	Remove carbon deposits
5. Check to see that the clutch works properly	Clutch slippage causes overheating	Adjust
6. Check to see that the ignition timing is correct		Adjust
7. Drive chain too tight		Adjust
8. Incorrect spark plug heat range		Replace with colder plug
9. Too lean fuel mixture		Adjust carburetor

12-4. Defective Clutch

Description	Check Point	Action
1. Clutch slippage	1. Improperly adjusted clutch	Adjust
	2. Worn clutch springs	Replace
	3. Worn clutch plates	Replace
2. If clutch drags	1. Improper weight oil	Replace
	2. Uneven clutch spring tension	Replace

12-5. Gear Shifting Troubles

First check the clutch operation and amount of oil in the transmission chamber.
Inspect the following points.

Description	Check Point	Action
1. Gear engagement	* If gears do not engage, check for:	
	1. Damaged gear shifting cam groove	Replace shifting cam
	2. Gear shifting forks not moved smoothly on cam	Repair scoring or burrs with emery papcer
	3. Damaged gear shifting fork	Replace
	4. Seized gears	Replace
2. Gear shifting lever	* If gear shifting lever does not return to normal position, check for:	
	1. Damaged gear shifting shaft return spring	Replace
	2. Friction between gear shifting shaft and crankcase	Repair bent shaft or replace
3. Jumping out of gear	* If the gears disengage while running, check for:	
	1. Worn or bent gear shifting fork	Replace
	2. Worn gear dog teeth	Replace gear
	3. Worn or damaged gear shifting cam stopper spring	Replace spring

12-6. Bad Stabilization And Steering

Description	Check Point	Action
1. Handlebar stiff	1. Steering stem lock nut too tight	Adjust
	2. Bent steering stem	Repair or replace
	3. Damaged steel balls	front fork
2. Handlebar not stable	1. Incorrect wheel alignment	Replace
	2. Play in front wheel fitting	Repair
	3. Damaged steel balls	Replace
	4. Bent fork stem	Repair or replace
	5. Worn or damaged bearing races	Replace
	6. Bent front fork	Repair or replace
	7. Bent swinging arm	Repair
	8. Incorrect frok oil level	Repair or replace
	9. Worn fork spring	Replace

Order Description	Check Point	Action
3. Wheel is not true	1. Up-and-down play in hub bearings	Replace
	2. Deformed wheel rim	Repair or replace
	3. Loose spokes	Repair
	4. Chain too tight	Adjust
	5. Loose swinging arm fitting	Tighten
	6. Warped frame	Replace
	7. Incorrect tire pressure	Correct

Home of World Champion motorcycles

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PERIODICAL INSPECTION CHART

The chart below indicates time when inspections, adjustments and maintenance are required, based on the distance the motorcycle runs, that is first 500 mi (800 Km), every 1,000 mi (1,500 Km) and 4,000 mi (6,000 Km) thereafter. According to the chart advise user to make the motorcycle checked and serviced at your shop. See the appropriate section for instructions on making the inspection.

Distance (mile) / Distance (km) / Service	500 mi / 900 km	1,000 mi / 1,500 km	2,000 mi / 3,000 km	3,000 mi / 4,500 km	4,000 mi / 6,000 km	Remarks
Oil Pump	Check operation, adjust control lever	Check operation, adjust control lever	Check operation, adjust control lever	Check operation, adjust control lever	Check operation, adjust control lever	Check operation, adjust control lever every 1,000 mi (1,500 km) after the first 500 mi (800 km).
Spark Plug	Clean	Clean and adjust gap	Clean and adjust gap	Clean and adjust gap	Clean and adjust gap	Clean spark plug adjust gap if necessary every 1,000 mi (1,500 km) after the first 500 mi (800 km).
Gearbox Oil	Change	Check oil level	Check oil level	Check oil level	Change	Change gearbox oil every 4,000 mi (6,000 km) after the first 500 mi (800 km) change.
Throttle Cable	Adjust play	Adjust play	Adjust play	Adjust play	Adjust play	Adjust at the first 500 mi (800 km) and every 1,000 mi (1,500 km) thereafter.
Carburetor	Adjust with throttle valve screw and pilot air screw	Adjust with throttle valve screw and pilot air screw	Adjust with throttle valve screw and pilot air screw	Adjust with throttle valve screw and pilot air screw	Overhaul and clean	Adjust engine idling every 1,000 mi (1,500 km). Overhaul and clean carburetor every 4,000 mi (6,000 km).
Flywheel Magnet	Check contact point gap and ignition timing. Lubricate contact breaker cam oil felt	Check contact point gap and ignition timing. Lubricate contact breaker cam oil felt	Check contact point gap and ignition timing. Lubricate contact breaker cam oil felt	Check contact point gap and ignition timing. Lubricate contact breaker cam oil felt	Check contact point gap and ignition timing. Lubricate contact breaker cam oil felt	Check and adjust at the first 500 mi (800 km) and every 1,000 mi (1,500 km) thereafter.
Cylinder Head and Cylinder	Retighten cylinder head nuts and cylinder fitting nuts	Retighten cylinder head nuts and cylinder fitting nuts	Retighten cylinder head nuts and cylinder fitting nuts	Retighten cylinder head nuts and cylinder fitting nuts	Remove carbon from combustion chamber and exhaust port	Retighten cylinder head nuts and cylinder fitting nuts every 2,000 mi (3,000 km). Remove carbon every 4,000 mi (6,000 km).
Battery	Check and service electrolyte solution	Check and service electrolyte solution	Check and service electrolyte solution	Check and service electrolyte solution	Check and service electrolyte solution	Check and add distilled water if necessary every 1,000 mi (1,500 km).
Fuel Cock	Clean fuel strainer	Clean fuel strainer	Clean fuel strainer	Clean fuel strainer	Clean fuel strainer	Clean at first 500 mi (800 km) and every 1,000 mi (1,500 km).
Clutch	Adjust	Adjust	Adjust	Adjust	Adjust	Adjust at first 500 mi (800 km) and every 1,000 mi (1,500 km) thereafter.
Drive Chain	Adjust and lubricate	Adjust and lubricate	Adjust and lubricate	Adjust and lubricate	Wash and lubricate	Wash and lubricate every 4,000 mi (6,000 km).
Brakes	Adjust play	Adjust play	Adjust play	Adjust play	Adjust play	Adjust play every 1,000 mi (1,500 km).
Air Cleaner			Clean		Clean	Clean every 2,000 mi (3,000 km).
Exhaust Pipe and Muffler	Retighten exhaust pipe ring nut. Check play.	Retighten exhaust pipe ring nut	Retighten exhaust pipe ring nut	Retighten exhaust pipe ring nut	Remove carbon	Remove carbon from exhaust pipe and muffler baffle plate every 4,000 mi (6,000 km), and retighten exhaust pipe ring nut every 1,000 mi (1,500 km).
Steering Stem	Retighten stem nuts if necessary	Check play. Retighten stem nuts if necessary	Check play. Retighten stem nuts if necessary	Check play. Retighten stem nuts if necessary	Check play. Retighten stem nuts if necessary	Check and retighten at the first 500 mi (800 km) and every 1,000 mi (1,500 km) thereafter.
Throttle, Brake and Clutch Cables		Lubricate	Lubricate	Lubricate	Lubricate	Lubricate every 1,000 mi (1,500 km).
Throttle Grip					Put grease in throttle grip	Put grease in throttle grip every 4,000 mi (6,000 km).
Bolts, Nuts and Spokes	Retighten	Retighten	Retighten	Retighten	Retighten	Retighten every 1,000 mi (1,500 km).
Oil outlet			Clean outlet strainer cup		Clean outlet strainer cup	Clean strainer cup, magnet piece every 2,000 mi (3,000 Km).

SUZUKI A100 WIRING DIAGRAM