SUZUKI

A50/AS50

SERVICE MANUAL

99500-10000-01E
(英)

FOREWORD

The newly born SUZUKI A50 & AS50 are perfecf sport models as seen from their fine outlookings.

Their performances are excellent and drawn out from the outstanding mechanisms such as POSI-FORCE lubrication, rotary disc valve and 5 speeds transmission.

In this service guide, the engine overhaul is mainly described, but the inspections and adjustment are briefly done. POSI-FORCE lubrication and rotary disc valve are not explained.

As for the omitted items, it is recommended for you to refer to A70 or A100 service mannal.

SUZUKI MOTOR CO., LTD.

Administration Department
Overseas Service Division

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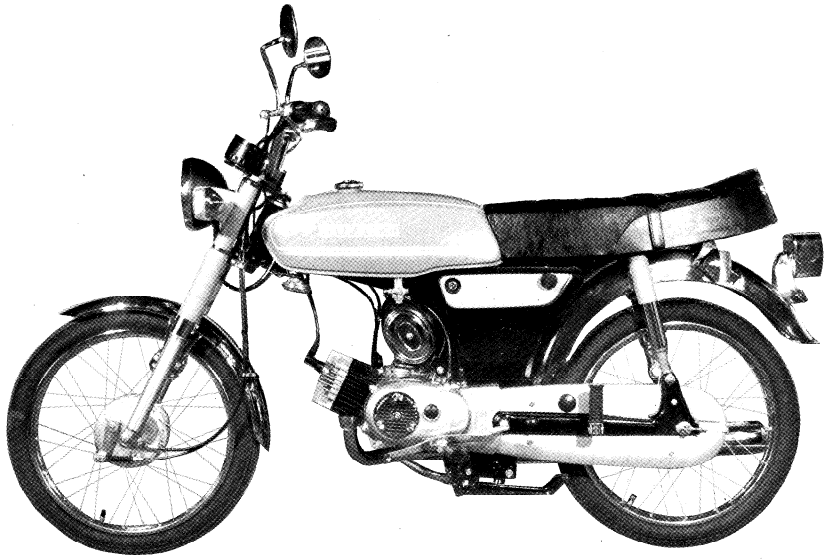
1. Right and Left Side Views



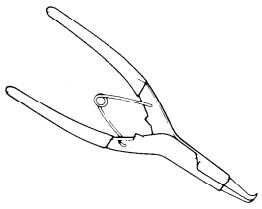
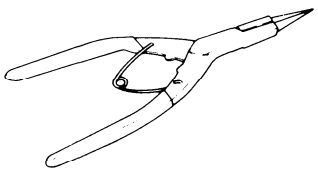
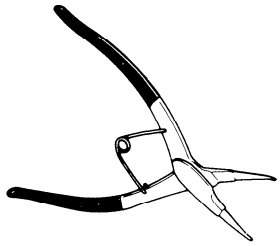
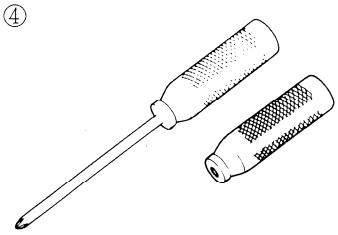
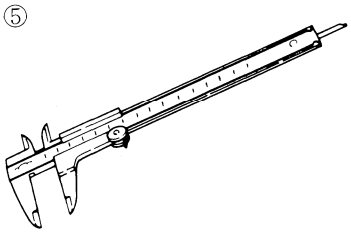
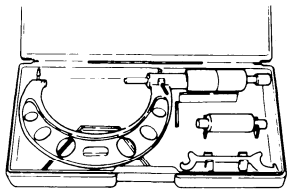
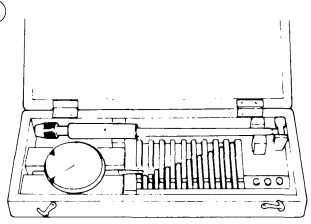
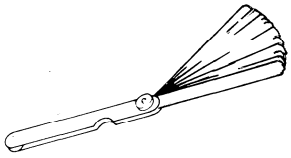
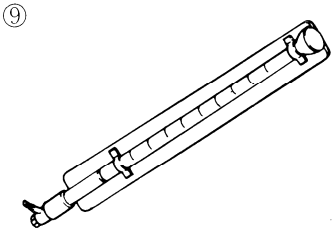
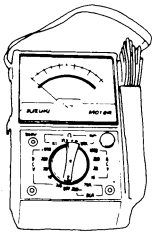
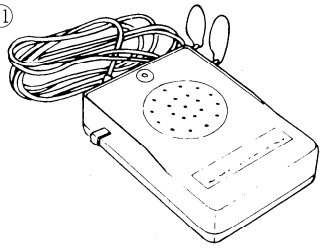
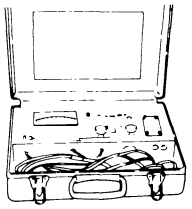
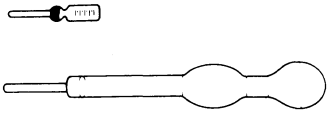
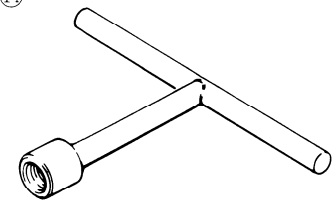
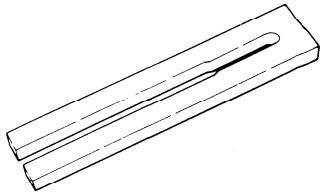
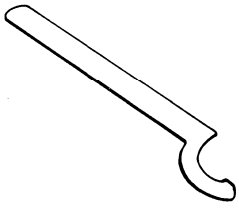
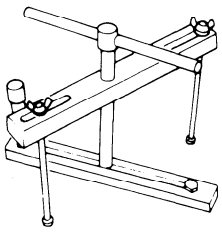
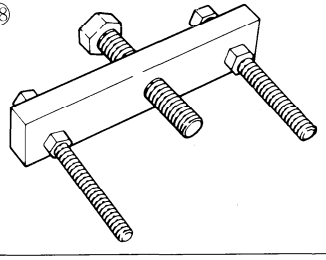
2. Specifications

	Model Name	Suzuki AS50/A50 (※)
Dimensions	Overall length	1,785mm (70.3 in)
	Overall width	630mm (24.8 in)
	Overall height	895mm (35.3 in)
	Wheel base	1,160mm (45.7 in)
	Ground clearance	150mm (5.9 in)
	Tires, front & rear	2.25-17 in, 4PR
Weight	Dry weight	73kg (160 lb) ※72kg (158 lb)
Engine	Type	2-cycle, air cooled gasoline engine
	Dimensions (L×W×H)	428×309×343mm (16.8×12.1×13.5 in)
	Weight	19.5kg (43 lb)
	Cylinder	Single, forward inclined
	Piston displacement	49 cc (2.99 cu in)
	Bore x stroke	41×37.8mm (1.62×1.49 in)
	Corrected compression ratio	6.7 : 1
	Compression pressure	7.5 kg/cm² (107 lb/in²) /1,000 rpm
	Maximun horsepower	(4.9 ds/8,500 rpm)
	Maximun torque	0.43 kg-m (3.11 lb-ft) /8,000 rpm
	Starter	Kick
Fuel System	Carburetor	VM 16 sc
	Air cleaner	resin-processed paper filter
	Fuel tank capacity	6.5 ltr (1.73/1.43 gal, US/Imp) including 1 ltr (2.1/1.8 pt, US/Imp) reserve
Lubrication System	Engine	Special lubrication "Suzuki posi-force"
	Gearbox	Oil bath 0.55 ltr (1.2/1.0 pt US/Imp)
	Oil tank capacity	1.6 ltr (3.36/2.72 pt, US/Imp)
Ignition system	Ignition	Flywheel magneto
	Ignition timing	24~27° (2.01~2.52mm) before top dead center
	Spark plug	NGK B77HC
Transmission System	Clutch	Wet Multi-disc
	Gear box	5-speed, constant-mesh
	Gear shifting	Left foot, lever-operated return change
	Primary reduction ratio (herical gears)	3.84 :1 (73/19)

	Final reduction ratio	2.66 : 1 (32/12)
	(drive chain)	※2.46 : 1 (32/13)
Gear ratios	Low	3.75 : 1 (45/12)
	Second	2.16 : 1 (39/18)
	Third	1.59 : 1 (35/22)
	Forth	1.28 : 1 (32/25)
	Top	1.07 : 1 (30/28)
Overall reduction ratios		
	Low	38.21 : 1 ※35.67 : 1
	Second	22.08 : 1 ※20.39 : 1
	Third	16.21 : 1 ※15.01 : 1
	Forth	13.05 : 1※ 12.05 : 1
	Top	10.91 : 1 ※10.10 : 1
Suspension System		
	Front suspension	Hydraulically damped telescopic fork
	Roar suspension	Hydraulically damped swinging arm
Steering system	Steering angle, right & left	45°
	Castor	63°
	Trail	69 mm (2.8 in)
	Turning radius	1,700 mm (67 in)
Brakes	Front brake	right hand, internal expanding
	Rear brake	right foot, internal expanding
Electrical Equipment		
	Generator	Flywheel magneto
	Battery	6V, 4AH
	Fuse	15A
	Head lamp	6V, 15/15W
	Tail/brake lamp	6V, 3/10W
	Neutral indidator lamp	6V, 1.5W
	Turn signal indicator lamp	6V, 1.5W
	Speedometer lamps	6V, 1.5W
	Turn signal lamps	6V, 8W

3. Special Tools

	Tool No.	Tool Name
1	09900-06104	Snap ring pliers (opening type)
2	09900-06107	Snap ring pliers (opening type)
3	09900-06108	Snap ring pliers (closing type)
4	09900-09003	Impact driver set
5	09900-20101	Vernier calipers
6	09900-20202	Micrometer
7	09900-20508	Cylinder gauge set
8	09900-20804	Thickness gauge
9	09900-21602	CCI oil gauge
10	09900-25002	Pocket tester
11	09900-27003	Timing tester
12	09900-28106	Electro tester
13	09900-28403	Hydrometer
14	09910-10110	Stud bolt installer
15	09910-20115	Con-rod holder
16	09910-60610	Exhaust pipe clamp wrench
17	09910-80115	Crankcase separating tool
18	09913-20611	Valve seat remover
19	09913-50121	Oil seal remover
20	09913-70122	Bearing installer
21	09913-80112	Drive pinion race installer
22	09920-20310	Clutch spring hook
23	09920-53710	Clutch sleeve hub holder
24	09930-10111	Spark plug wrench
25	09930-30113	Flywheel rotor remover
26	09930-30133	Rotor remover set
27	09930-40113	Rotor holder
28	09931-00112	Timing gauge
29	09940-10122	Steering stem nut wrench
30	09940-34512	Front fork assembling tool
31	09940-50112	Front fork oil seal installer
32	09940-60113	Spoke nipple wrench
33	09941-34511	Steering race and swing arm bearing installer
34	09943-74111	Front fork oil level gauge
35	96200-41330	Tire pressure gauge

① 	② 	③ 
④ 	⑤ 	⑥ 
⑦ 	⑧ 	⑨ 
⑩ 	⑪ 	⑫ 
⑬ 	⑭ 	⑮ 
⑯ 	⑰ 	⑱ 

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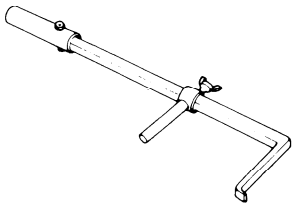

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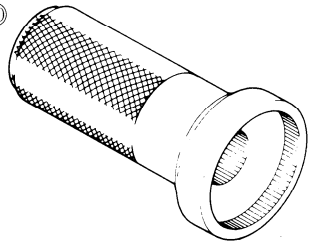

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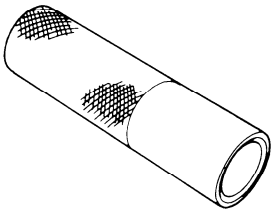

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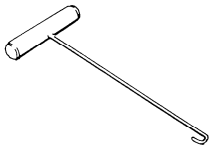

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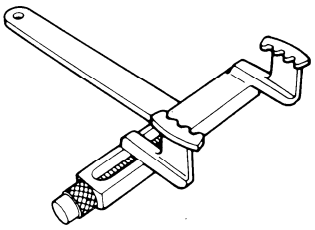

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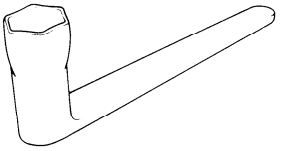

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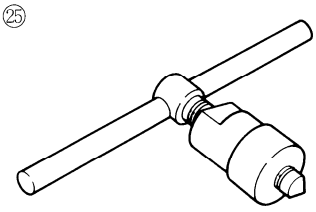

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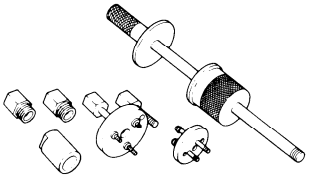

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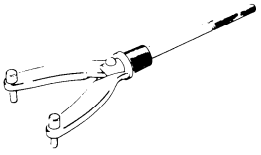

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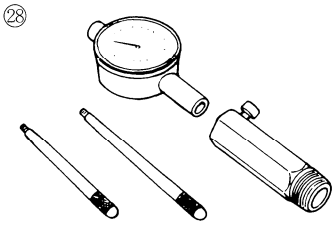

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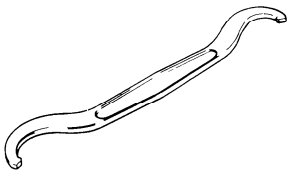

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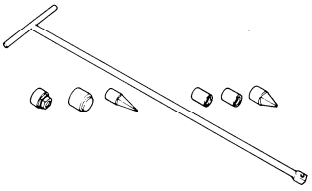

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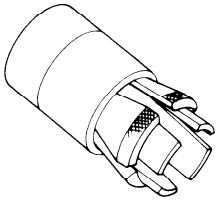

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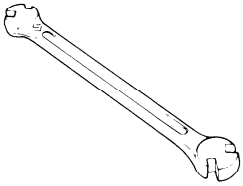

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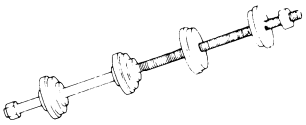

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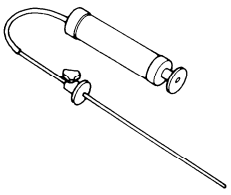

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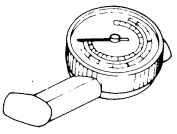


4. Tips on Operating New Motorcycle

4-1. Breaking in

For the first 1,000 miles (1,600km), 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 (1,600km):

low	below 15kph (10mph)
second	below 30kph (19mph)
third	below 40kph (25mph)
fourth	below 50kph (30mph)
top	below 55kph (35mph)

Please advise users to adhere to the speeds as instructed.

4-2. Fuel

The A50 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 A50, 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 SUPER MOTOR OIL	SHELL SUPER TWO STROKE OIL

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

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

4-3. 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.

5. Engine

5-1. Work with Engine in Frame

These parts can be inspected. adjusted. repaired and replaced without removing the engine from the frame when removing the crankcase right cover for repairing clutch, some parts of kick starter system, gear shifting shaft, etc. First disconnect the oil lines from the oil pump and then remove the oil drain plug located on the bottom of the engine to drain the oil from the gear box and clutch chamber.

Part	Operation
1. Spark Plug	Retighten, inspect, adjust gap, remove carbon, replace, inspect gasket for flexibility, replace
2. Cylinder Head	Retighten cylinder head nuts; remove carbon, check for warp. repair
3. Cylinder Head Gasket	Inspect, replace
4. Cylinder	Remove carbon from ports; check for burned spots and scoring, repair; check for wear, robore
5. Piston	Remove carbon from head and ring grooves; inspect for burned spots and scoring, repair or replace; check piston pin hole and ring locating pins for wear, replace
6. Piston Rings	Inspect for wear and tension, replace
7. Piston Pin	Inspect for wear, replace
8. Piston Pin Circlips	Inspect for warp and dropping out, replace
9. Con-rod Small End Needle Bearing	Inspect for wear, replace
10. Flywheel Magneto	Check contact point gap and ignition timing, adjust; check point surfaces for pits, polish; Check condenser, replace, check primary and lamp coil, replace
11. Neutral Indicator Switch	Inspect for wire break, repair or replace; inspect gasket, replace
12. Engine Sprocket	Inspect for wear, replace
13. Oil Pump	Check control lever clearance, adjust; Check oil lines for air, remove
14. Clutch Release Device	Inspect for cracks and scratches, replace
15. Primary Pinion	Inspect for backlash, replace
16. Clutch	Inspect cork plates for wear, replace; inspect springs for free length, repair or replace; inspect sleeve hub for stepped splines, replace; check housing for loose riveting and burrs on grooves, repair or replace; check gear backlash, replace
17. Gear Shifting Shaft	Inspect, replace; inspect gear shifting pawl return spring and shaft return spring for tension, replace
18. Gear Shifting Cam Stopper	Check operation, replace spring
19. Kick Starter Shaft Return Spring	Inspect, replace

20. Carburetor	Check play in throttle cable, adjust; check fuel mixture for various throttle opening, adjust; clean
21. Rotary disc Valve	Inspect for warp, replace

5-2. Work With Engine Removed From Frame

Remove the engine from the frame and separate the crankcase into two halves for these jobs

Part	Operation
1. Crankshaft	Inspect for shake, repair or replace. check bearings for wear, replace: check oil seals for leakage, replace
2. Transmission System	Check gears and shafts, adjust or replace: check bearings and bushings, replace
3. Gear Shifting	Inspect shifting cam groove for damage, replace: inspect shifting forks for burned spots and wear, repair or replace
4. Kick Starter System	Inspect pinion for worn ratchet, replace; inspect pawl and pawl spring for wear and tension, replace

5-3. Removing Engine from Frame

Before beginning the romoval operation, throughly clean the engine with a steam cleaner or cleaning solvent to remove road dirt.

Work according to the order of following figures.

Fig. 5-3-1 Fuel cock lever to "O" position

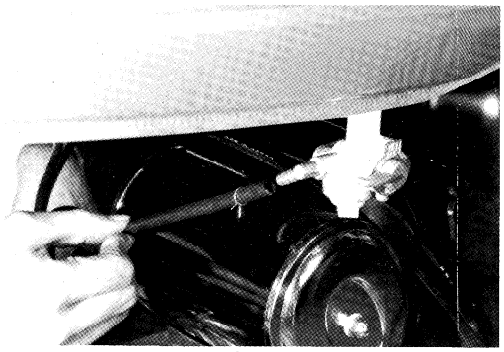


Fig. 5-3-2 Pulling fuel line from fuel cock

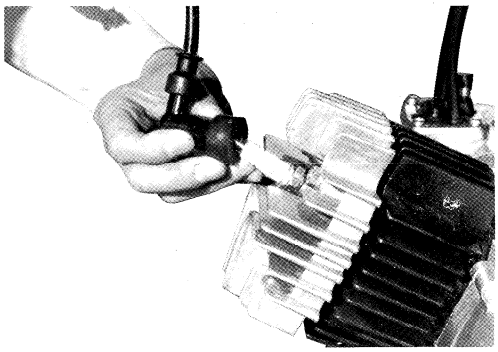


Fig. 5-3-3 Removing spark plug cap from spark plug

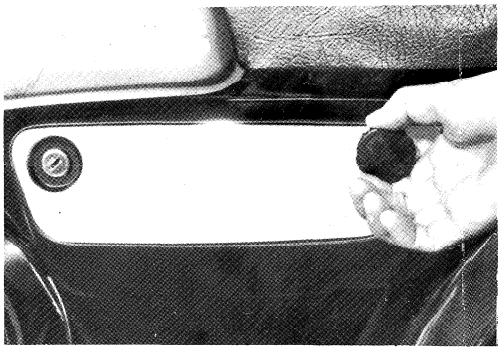


Fig. 5-3-4 Removing left cover

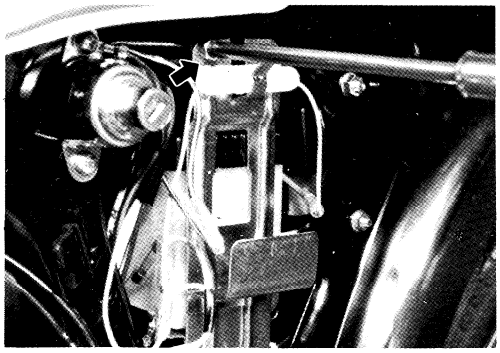


Fig. 5-3-5 Removing battery holder

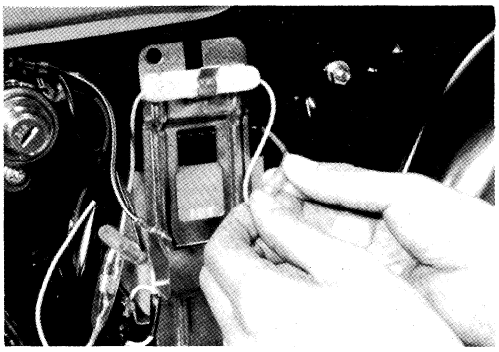


Fig. 5-3-6 Taking out battery

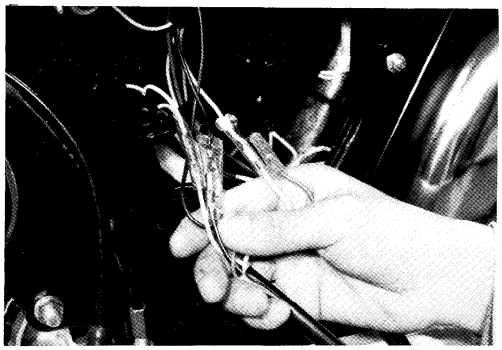


Fig. 5-3-7 Disconnecting magneto wires

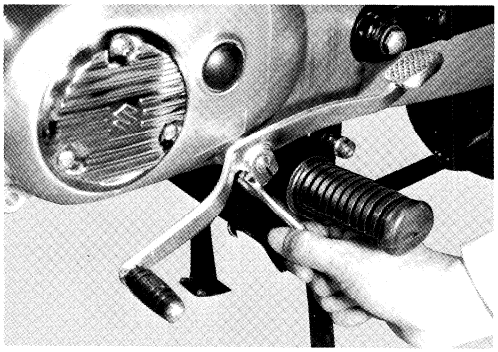


Fig. 5-3-8 Removing gear shifting lever

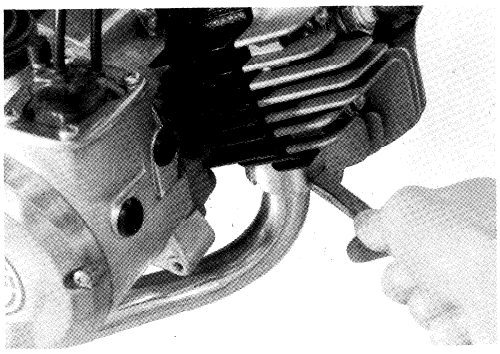


Fig. 5-3-9 Loosening exhaust pipe ring nut

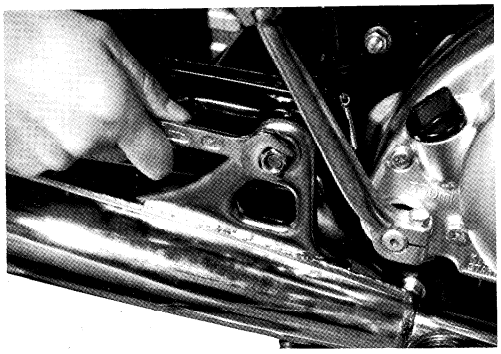


Fig. 5-3-10 Loosening muffler fitting nut

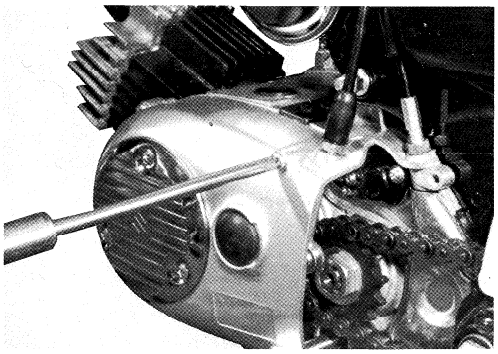


Fig. 5-3-10 Removing engine left cover

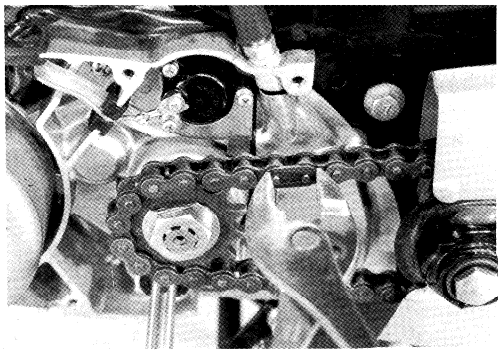


Fig. 5-3-12 Disconnecting drive chain

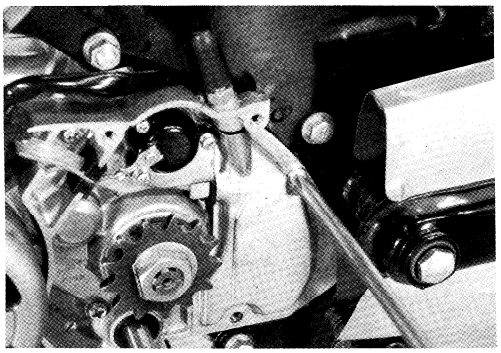


Fig. 5-3-13 Removing oil pump cover

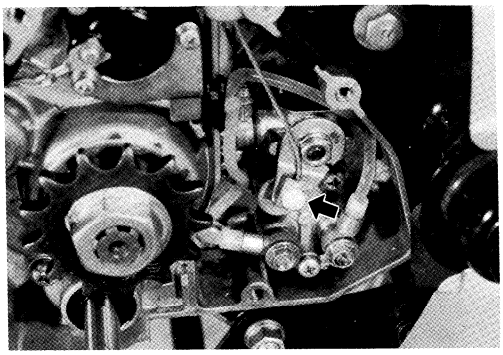


Fig. 5-3-14 Releasing oil pump control cable inner

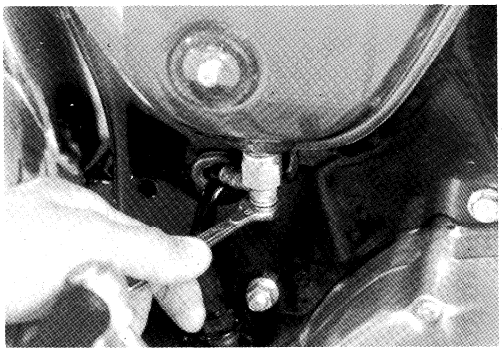


Fig. 5-3-15 Disconnecting oil line from oil tank outlet

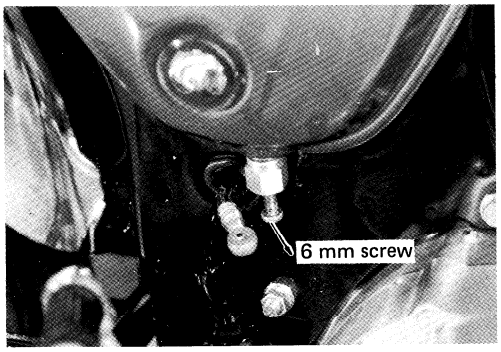


Fig. 5-3-16 Screwing 6 mm screw into outlet

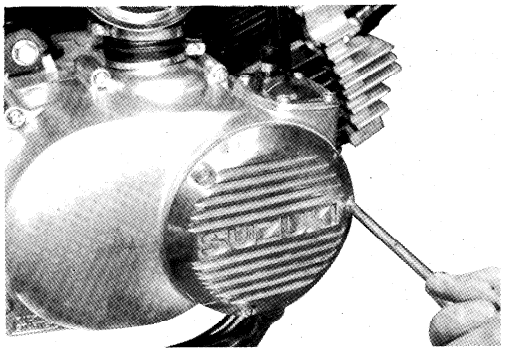


Fig. 5-3-17 Removing carb. cover

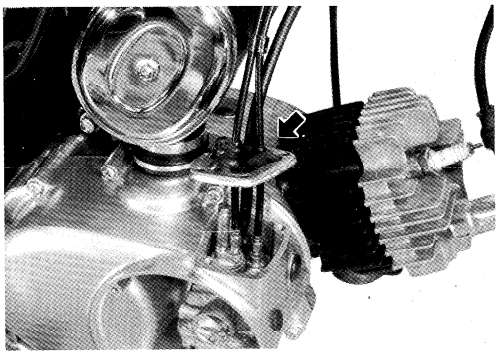


Fig. 5-3-18 Slipping up carb. top cover

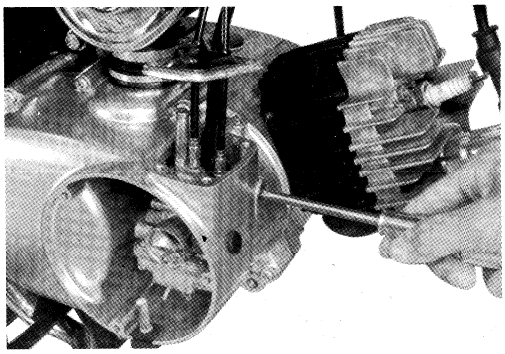


Fig. 5-3-19 Loosening carb. clip bolt

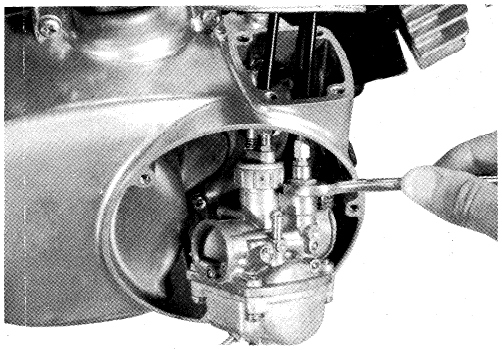


Fig. 5-3-20 Loosening starter cable adjuster

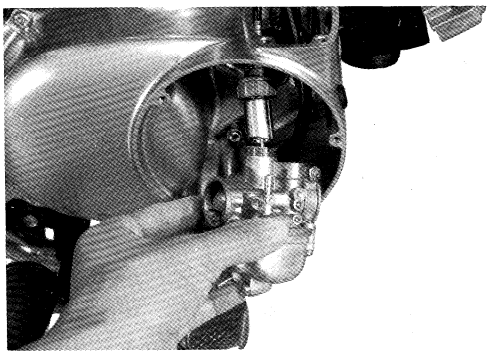


Fig. 5-3-21 Removing throttle valve

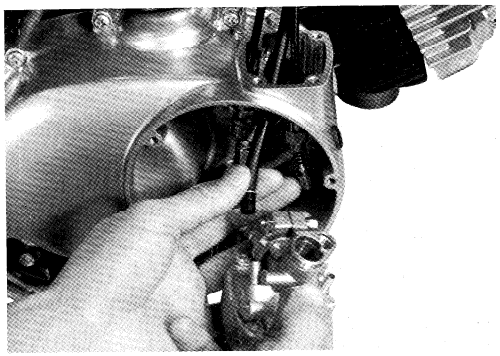


Fig. 5-3-22 Pulling off fuel line

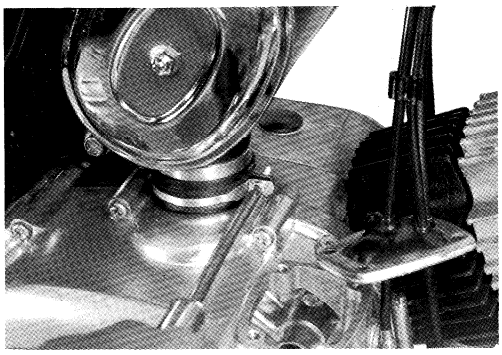


Fig. 5-3-23 Loosening air cleaner clamp fitting bolt

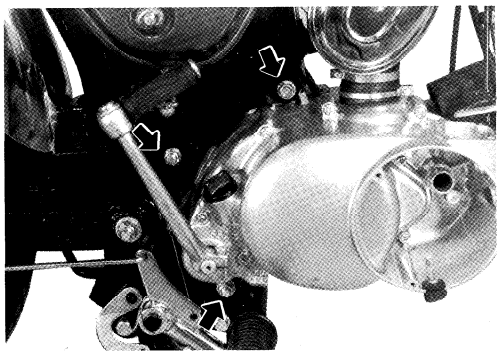


Fig. 5-3-24 Engine mounting bolts

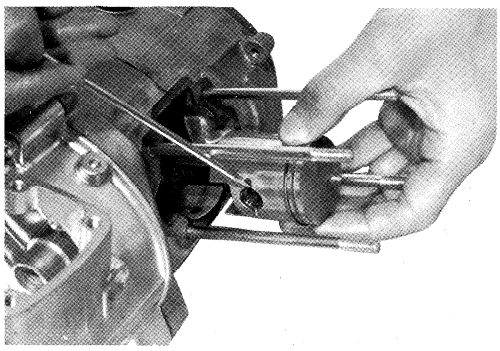


Fig. 5-4-1

5-4. Disassembling Engine

When disassembling engine, take the following steps.

1. Unscrew 4 cylinder head nuts with a 10 mm wrench and take off the **cylinder head** and **cylinder.**

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 pliers. (Fig. 5-4-1) Be careful not to lose piston pin circlip as some times it springs away. Now **piston pin** can be removed easily by pushing the other end of it with a rod. (Fig. 5-4-2)

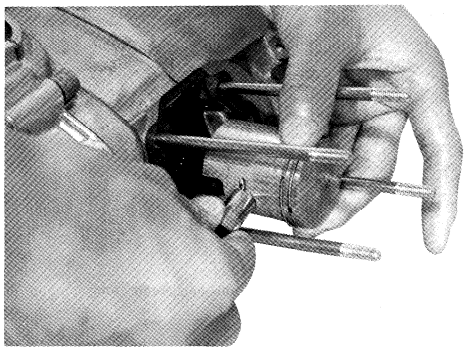


Fig. 5-4-2

3. Place a piston holder (special tool 09910-20115) 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.
To remove the flywheel rotor from the crankshaft, screw the flywheel rotor remover (special tool 09930-30113) 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. 5-4-3)

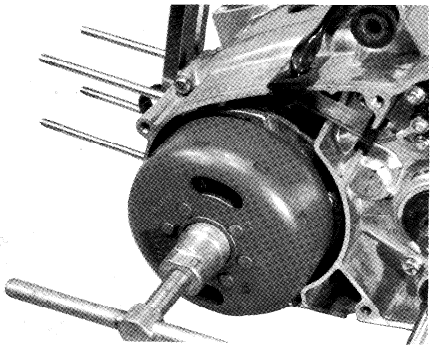


Fig. 5-4-3

4. Loosen the neutral indicator switch terminal screw with a cross head screw driver and then separate the **neutral switch wire** (blue) from the switch. (Fig. 5-4-4)

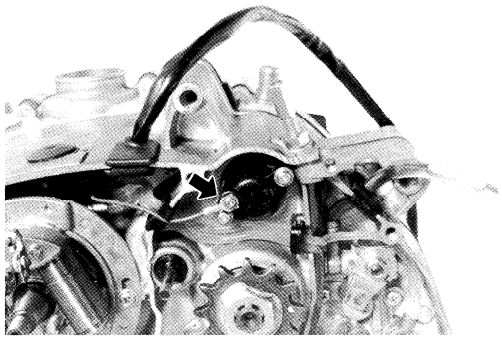


Fig. 5-4-4

5. After loosening 3 flywheel stator fitting screws with a cross head screw driver, take off the **stator** from the crankcase.

6. Remove the **neutral switch body** by loosening 2 cross head screws and then remove the **neutral switch contact spring** by loosening a cross head screw. (Fig. 5-4-5)

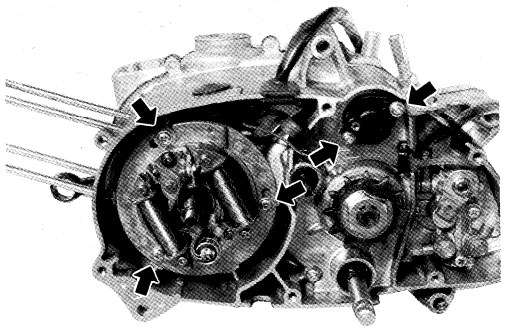


Fig. 5-4-5

7. Straighten the engine sprocket washer with a chisel and hammer. Hold the sprocket with an engine sprocket holder (special tool 09930-40113) and loosen the nut with a 24 mm wrench. (Fig. 5-4-6)

Remove the **sprocket** and the spacer by hand.

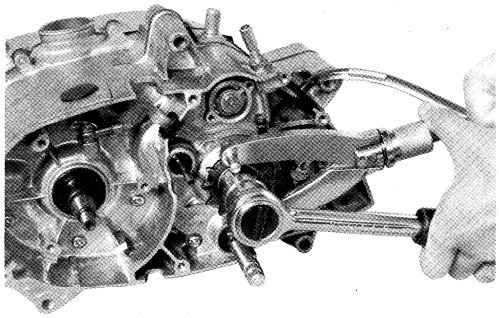


Fig. 5-4-6

8. 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 8 mm wrench to disconnect the oil inlet and outlet lines from the oil pump. (Fig. 5-4-7)

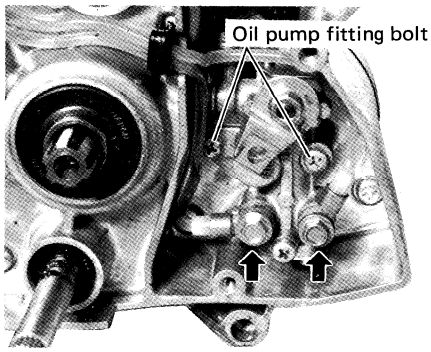


Fig. 5-4-7

9. 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. 5-4-8)

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. 5-4-9)

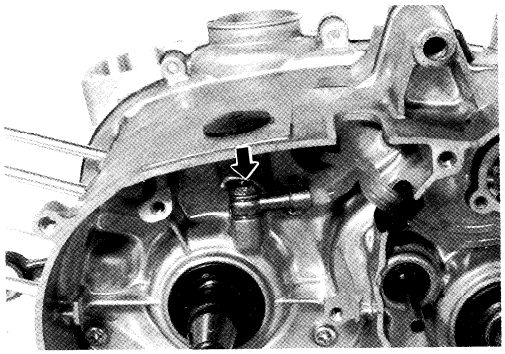


Fig. 5-4-8

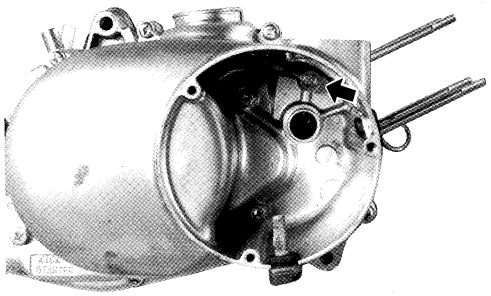


Fig. 5-4-9

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

11. 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 5-4-10)

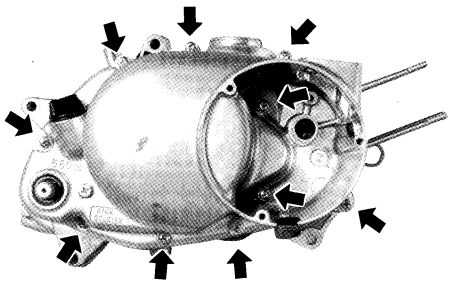


Fig. 5-4-10

12. Pulling the clutch springs with a clutch spring hook (special tool 09920-20310), take out the **clutch spring pins** with a nose pliers. (Fig. 5-4-11) Remove the clutch pressure plate, the release rod and the cork and steel plates from the clutch housing by hand. (Fig. 5-4-12)

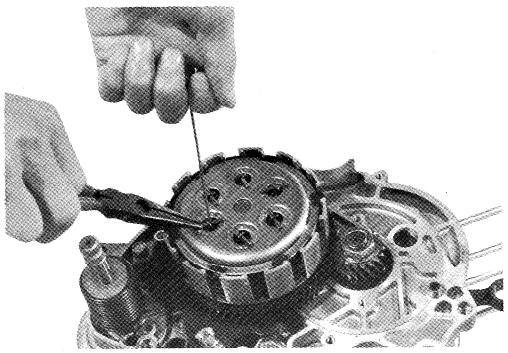


Fig. 5-4-11

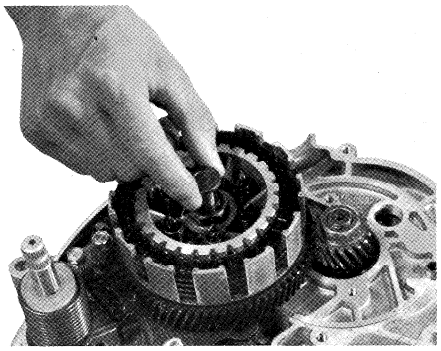


Fig. 5-4-12

13. Flatten the clutch sleeve hub washer with a chisel and hammer.

Hold the clutch sleeve hub with a clutch sleeve hub holder (special tools 09920-53710) to loosen the clutch sleeve hub nut with a 22 mm wrench. (Fig. 5-4-13)

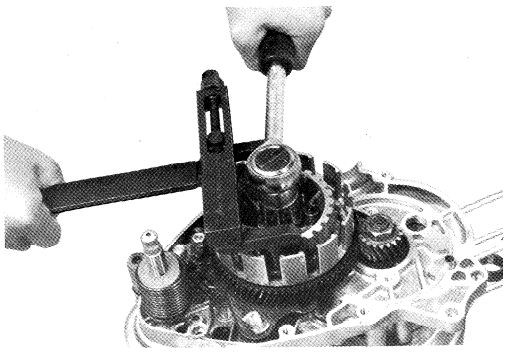


Fig. 5-4-13

14. Remove the **clutch housing** from the counter shaft together with the clutch sleeve hub and the clutch sleeve hub spacer.

15. Take the clutch housing collar out of the crankcase. (Fig. 5-4-14)

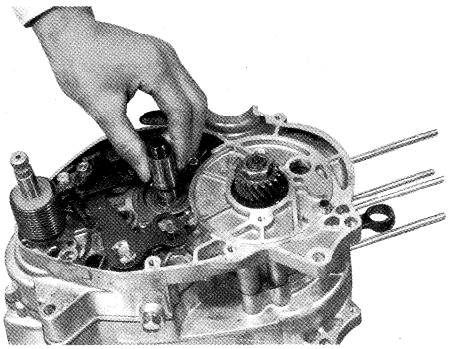


Fig. 5-4-14

16. Remove the **clutch release screw assembly** by loasening 2 cross head screws with a cross drivers. (Fig. 5-4-15)

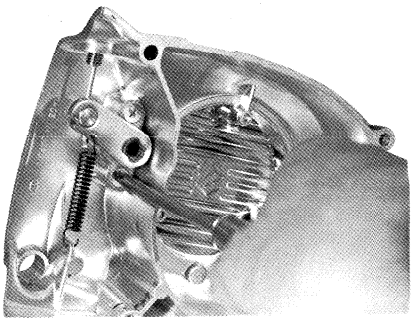


Fig. 5-4-15

17. Unhook the clutch release screw arm spring, and then release the end of the clutch cable inner from the clutch release screw lever. (Fig. 5-4-16)

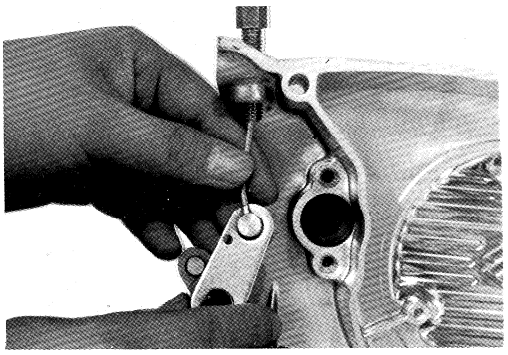


Fig. 5-4-16

18. 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. 5-4-17, 18)

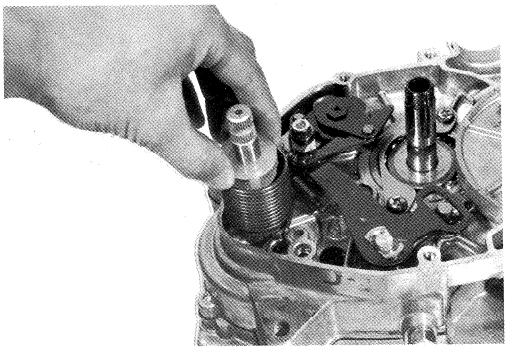


Fig. 5-4-17

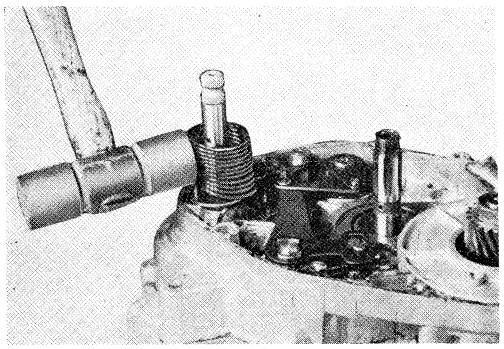


Fig. 5-4-18

19. Remove the **gear shifting cam stopper** by loosening the gear shifting cam stopper pivot nut with a 10 mm wrench. (Fig. 5-4-19)

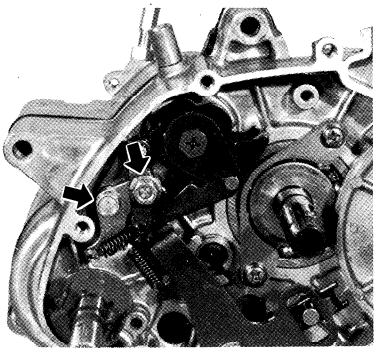


Fig. 5-4-19

20. After removing the **gear shifting cam retainer bolt** with a cross driver, Pull up the **gear shifting shaft** by hand while pressing back the gear shifting pawl with fingers. (Fig. 5-4-20, 21)

Next, take off gear shifting cam stopper plate and cam pin.

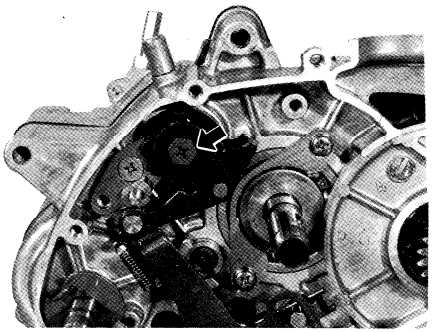


Fig. 5-4-20

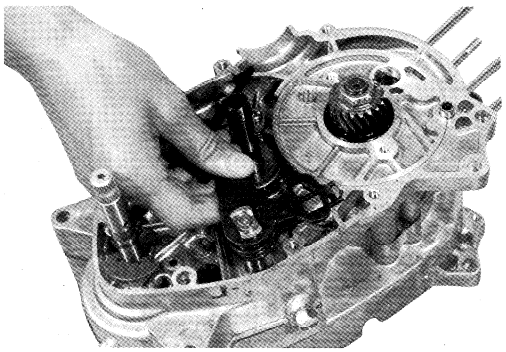


Fig. 5-4-21

21. Loosen the **gear shifting cam stopper spring holder bolt** with 10 mm wrench, and then remove the **geare shifting cam guide** by looseing the cross head screw with a driver. (Fig. 5-4-22)

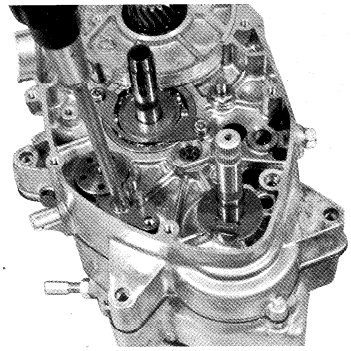


Fig. 5-4-22

22. After flattening the primary pinion lock washer with a chisel and hammer, place a piston holder (special tool 09910-20115) 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. 5-4-23)

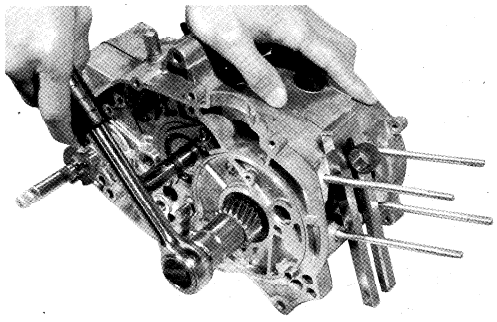


Fig. 5-4-23

23. Remove the **keys** from the crankshaft to prevent it from being lost.

24. Remove **outer valve seat** from crankcase with an outer valve seat remover (special tool 09913-20611). Fit the tool screws into the screw holes on the outer valve seat and turn the tool bolt with a 14 mm wrench. The primary pinion spacer and the right crankshaft oil seal can be removed usually together with the outer valve seat. (Fig. 5-4-24)

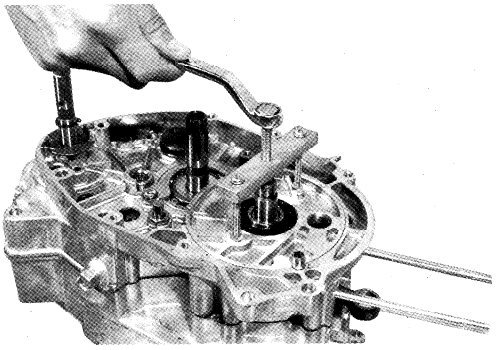


Fig. 5-4-24

25. Remove the **valve plate** and the **valve guide** by hand. (Fig. 5-4-25)

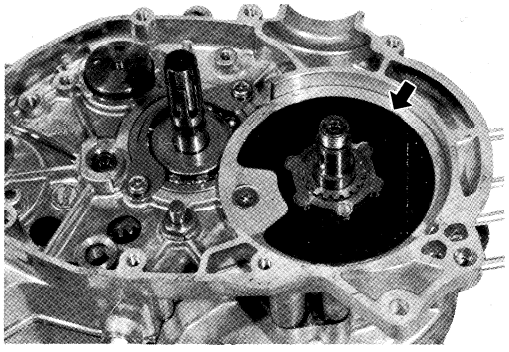


Fig. 5-4-25

26. The **inner valve seat** can be removed by loosening 5 cross head screws with a screw driver, but only for disassembling the crankcase it is not necessary to remove this inner valve seat. (Fig. 5-4-26)

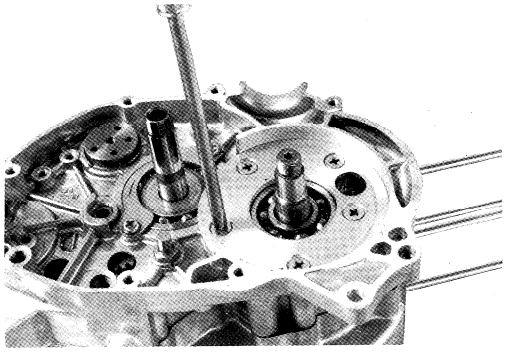


Fig. 5-4-26

27. 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 09910-80115) to separate the two parts of the **crankcase.** When using this tool, first screw the two bolts "A" by more than 6mm (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. 5-4-27)

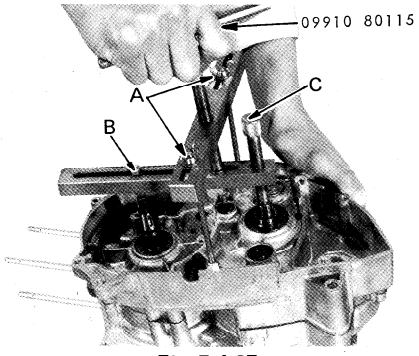


Fig. 5-4-27

28. Remove the **crankshaft** from the crankcase right half by striking the right end of the crank-shaft with a plastic or wooden hammer. (Fig. 5-4-28)

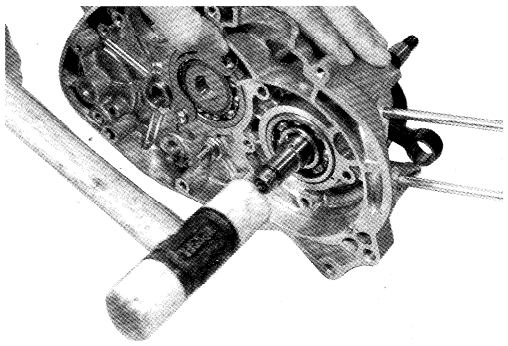


Fig. 5-4-28

29. Never fail to use a **oil seal** remover for removing oil seal from the cases, (Fig. 5-4-29) 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.

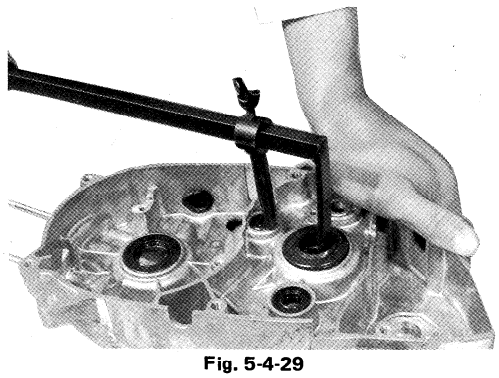


Fig. 5-4-29

30. 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. 5-4-30)

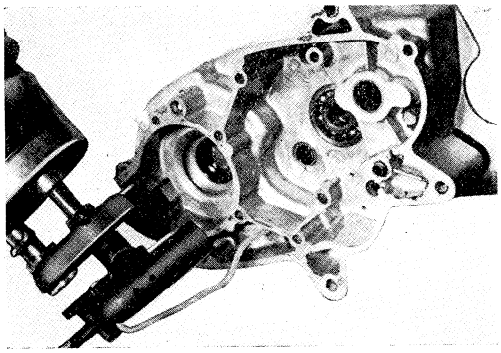


Fig. 5-4-30

5-5. 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 of crankcase with a burner until bearings can be installed by hand.

A. Install the **crankshaft right bearing** with its stop ring facing inside the crankcase as far as the ring touches the crankcase wall. (Fig. 5-5-1)

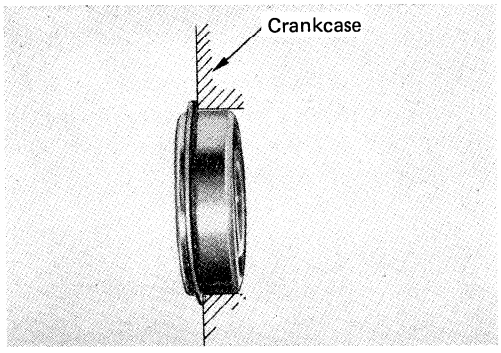


Fig. 5-5-1

B. when fitting the **crankshaft left bearing,** use the bearing installing tool (special tool No. 09913-70122) so as not to damage the oil guide ring clinched to the bearing. (Fig. 5-5-2)

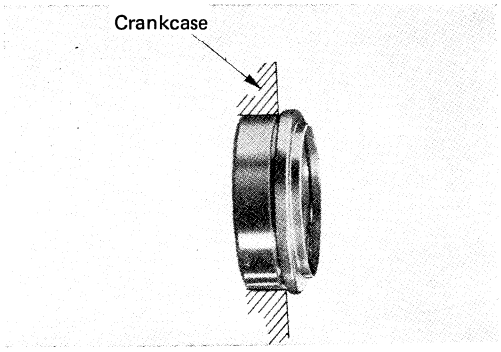


Fig. 5-5-2

2. Install the crankshaft and gear box components in order in the crankcase right half referring to the exploded views of the crankshaft, the transmission and the gear shifting parts, etc. (Fig. 5-5-3, Fig. 5-5-4, Fig. 5-5-5, Fig. 5-5-6 and Fig. 5-5-7)

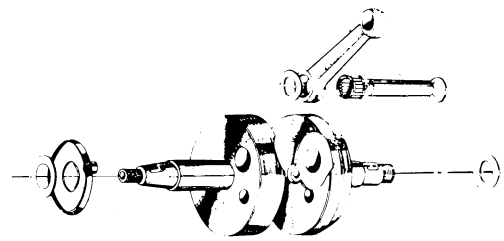


Fig. 5-5-3

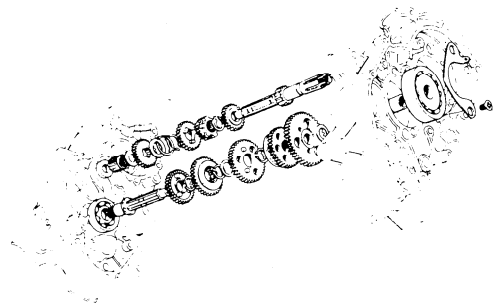


Fig. 5-5-4

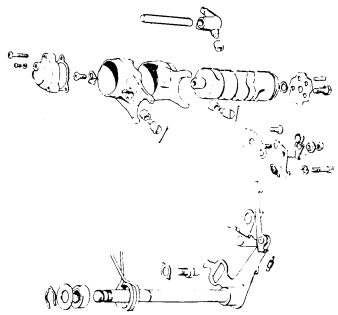


Fig. 5-5-5

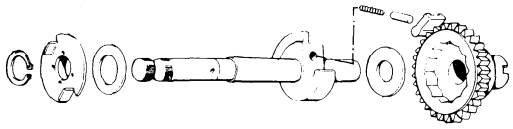


Fig. 5-5-6

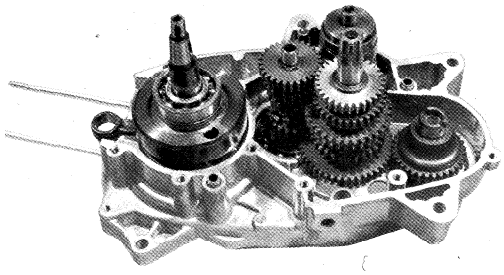


Fig. 5-5-7

A. Replace all circlips on the counter shaft and the driveshaft with new ones whenever the transmission is reassembled.

B. Install the **fourth pinion circlip** so that its open ends are off of the crossed groove cut in the fourth pinion, or the fourth pinion positioning pieces may slip out of the groove while running. (Fig. 5-5-8)

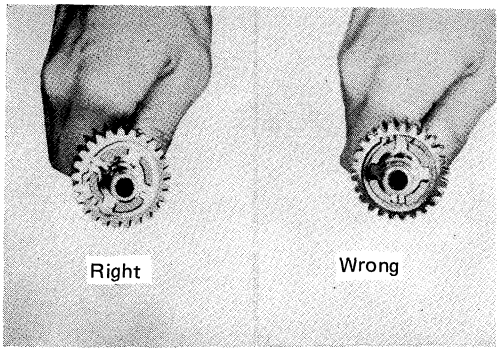


Fig. 5-5-8

C. Three **thrust washers** with the same inside and outside diameters, but with the different thickness each are fitted on the counter shaft inside and outside the crankcase.

One with 1mm thickness is used between the counter shaft right bearing and the clutch housing spacer, and the others with 1.5mm thickness are used between the clutch housing and the clutch sleeve hub and between the counter shaft left bearing and the top pinion respectively.

3. Before starting to join the crankcase, never fail to pass one branch of **oil line** through the crankcase right half, because it is very difficult to install it after the crankcase has been jointed.

4. Before joining the crankcase, apply **oil** to the connecting rod big end, crankshaft bearings on both sides and other parts needing lubrication with an oiler. (Fig. 5-5-9)

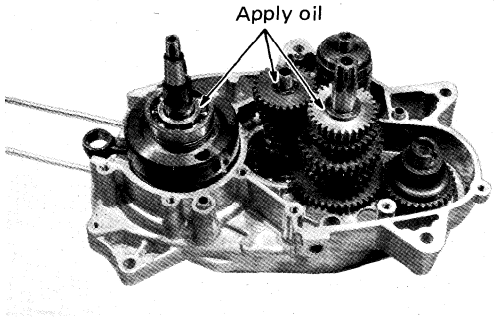


Fig. 5-5-9

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. 5-5-10)

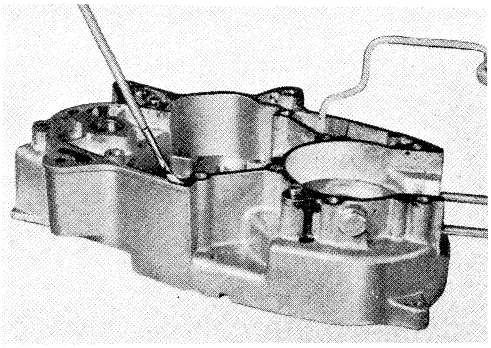


Fig. 5-5-10

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. 5-5-11)

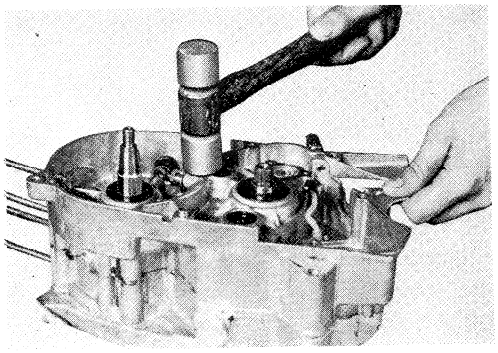


Fig. 5-5-11

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. 5-5-12)

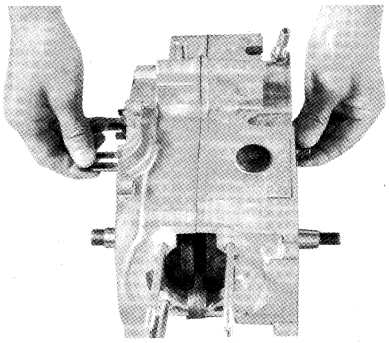


Fig. 5-5-12

8. When tightening crankcase 10 cross head screws tighten them in a criss-cross fashion to prevent the crankcase from warping and the crankchamber from compression leakage. After tightening the screws again check to make sure all shafts turn easily and smoothly by turning them by hand.

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 16mm (0.63 in) to keep them from touching the crankwheel. (Fig. 5-5-13, 14)

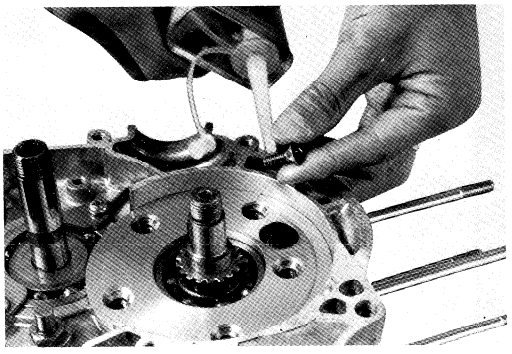


Fig. 5-5-13

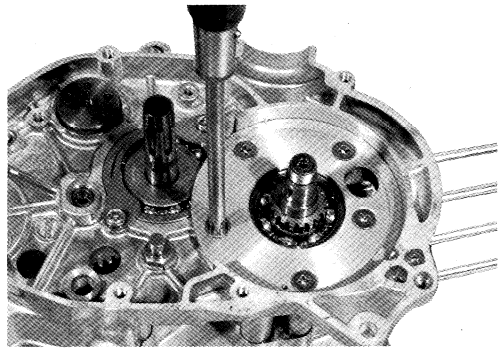


Fig. 5-5-14

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. 5-5-15)

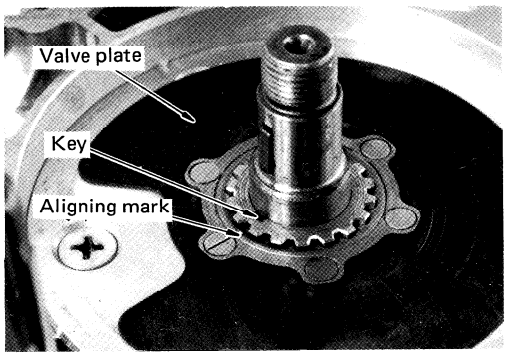


Fig. 5-5-15

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.

11. Never fail to install an "O" ring to the inner surface of the outer valve seat so as to prevent oil or fuel-air mixture from leaking.

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 lockage from the crank chamber. (Fig. 5-5-16)

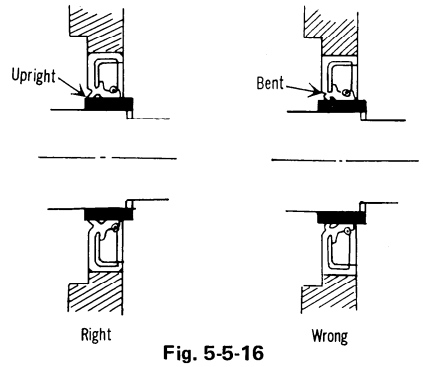


Fig. 5-5-16

13. Fit the **gear shifting shaft return spring** with less bent side down to the shaft. (Fig. 5-5-17)

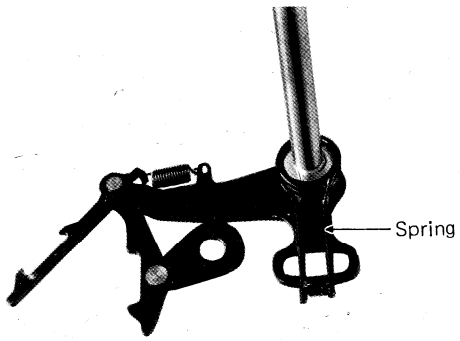


Fig. 5-5-17

14. 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 afte being depressed. Install the **guide** on the shaft with its tapered end pointing inward.

15. 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. 5-5-18)

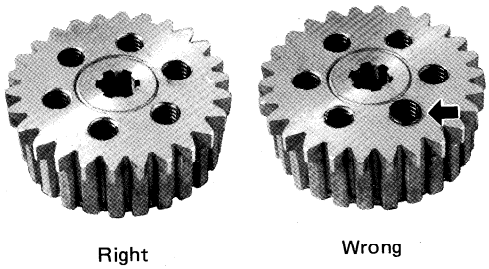


Fig. 5-5-18

B. Install the clutch **housing,** the clutch **sleeve hub** and the **thrust washers** on the counter shaft referring to the illustration. (Fig. 5-5-19)

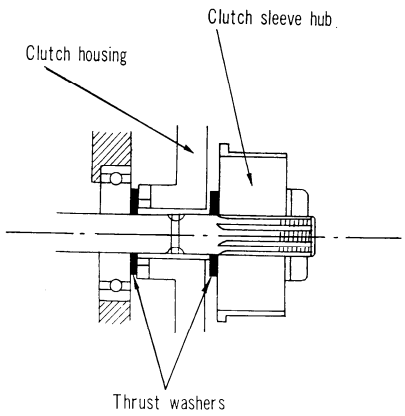


Fig. 5-5-19

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

D. Align the positioning mark on the **clutch pressure plate** with the mark on the edge of the clutch sleeve hub, (Fig. 5-5-20)

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.

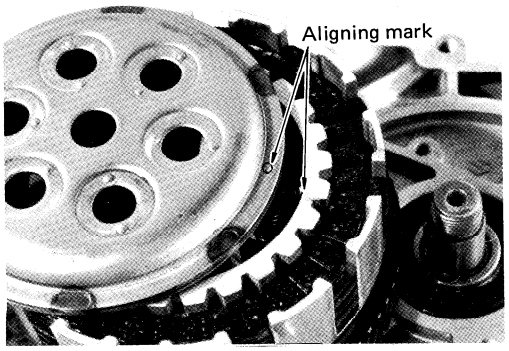


Fig. 5-5-20

16. When installing the **engine sprocket spacer** on the driveshaft, be careful not to bend the oil seal lips. (Fig. 5-5-21) In addition, install the spacer with its less chamfered end facing inward

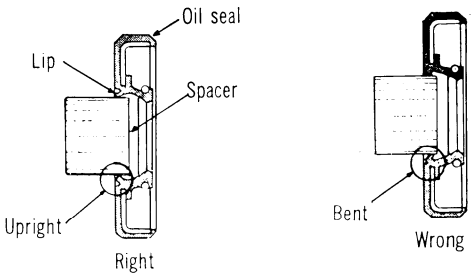


Fig. 5-5-21

17. When installing the **oil pump** on the crankcase, be sure to fit the **driving piece** on the kick starter pinion first, and then install the oil pump. (Fig. 5-5-22)

If the oil pump is installed without the driving piece, the oil pump cannot operate.

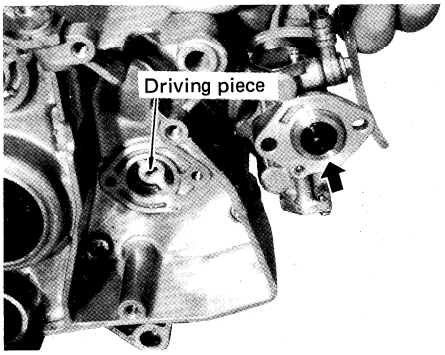


Fig. 5-5-22

18. 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 mark facing upward.

C. Align the piston ring open ends with the piston ring locating pin set in the piston ring groove. (Fig. 5-5-23)

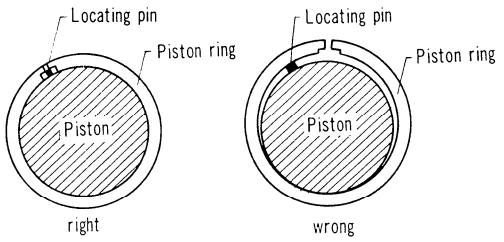


Fig. 5-5-23

19. 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. 5-5-24)

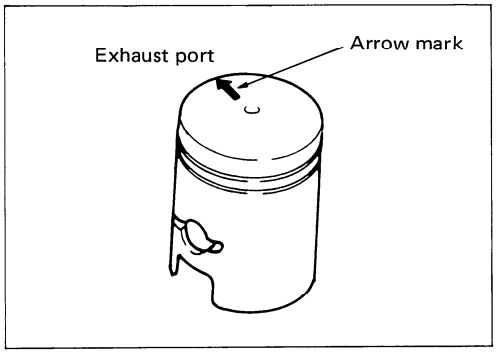


Fig. 5-5-24

20. When installing the **cylinder head,** tighten the 4 cylinder head nuts diagonally just the same as when loosening. (Fig. 5-5-25)

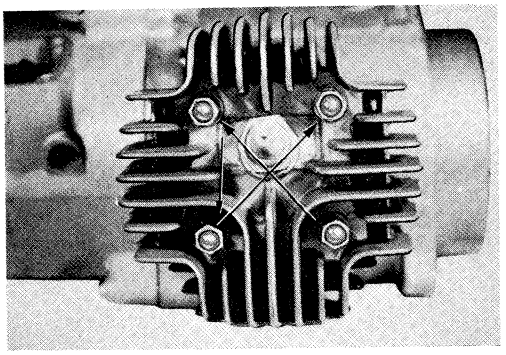


Fig. 5-5-25

5-6. Oil Pump

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

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 counter shaft, the low gear,the kick starter pinion and the oil pump driving piece.

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

☆ Number of teeth····Primary pinion··19
····Primary gear ··73
····Counter shaft ··12
····Kickstarter Pinion··32

☆ Reduction ratio·····
73/19×32/12=10.24/1

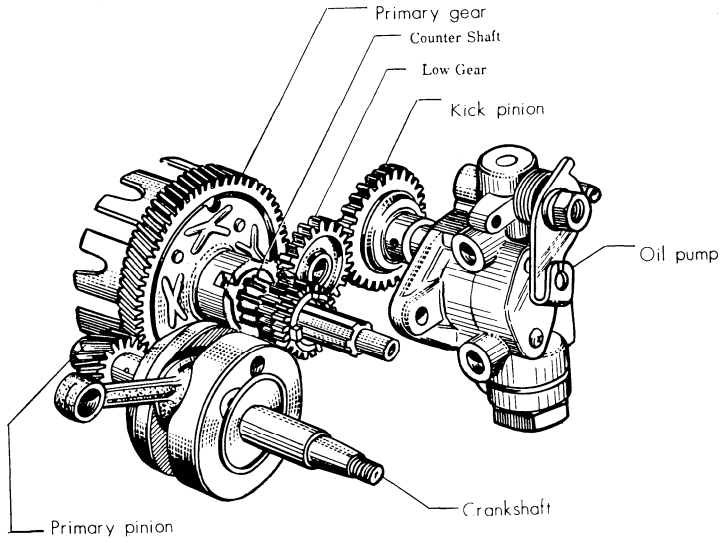


Fig. 5-6-1

2. Oil pump operation

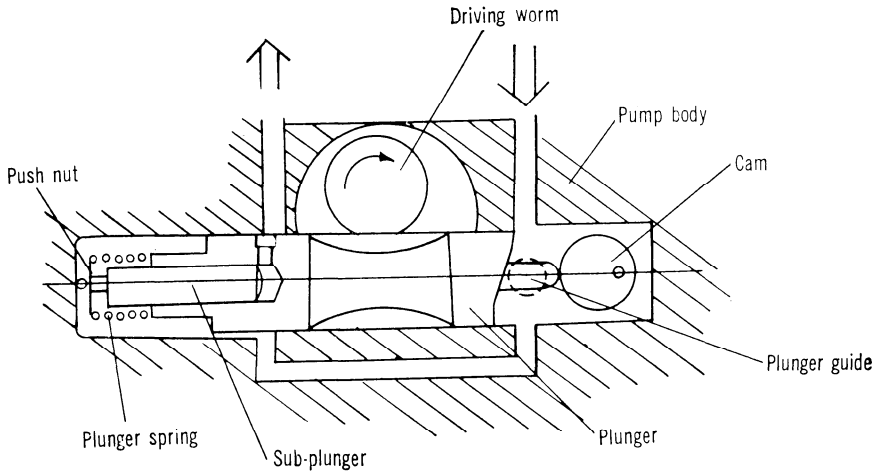


Fig. 5-6-2

The constructon of the oil pump is shown in Fig. 6-6-2. The plunger rotates 1/11 turn to every one turn of the driving worm so that its overall reduction ratio to the crankshaft is 1 to 112.64. 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 discharge port, changes the voulme 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 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 vacuum was cerated 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 port opens and the compressed oil is discharged. In this stage, the plunger remains in the top dead center.

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.

4. Oil pump performance curve

Fig. 7-6-3 shows the relation between control lever angle and amount of oil pumped when the driving worm speed is kept at 1,500 rpm.

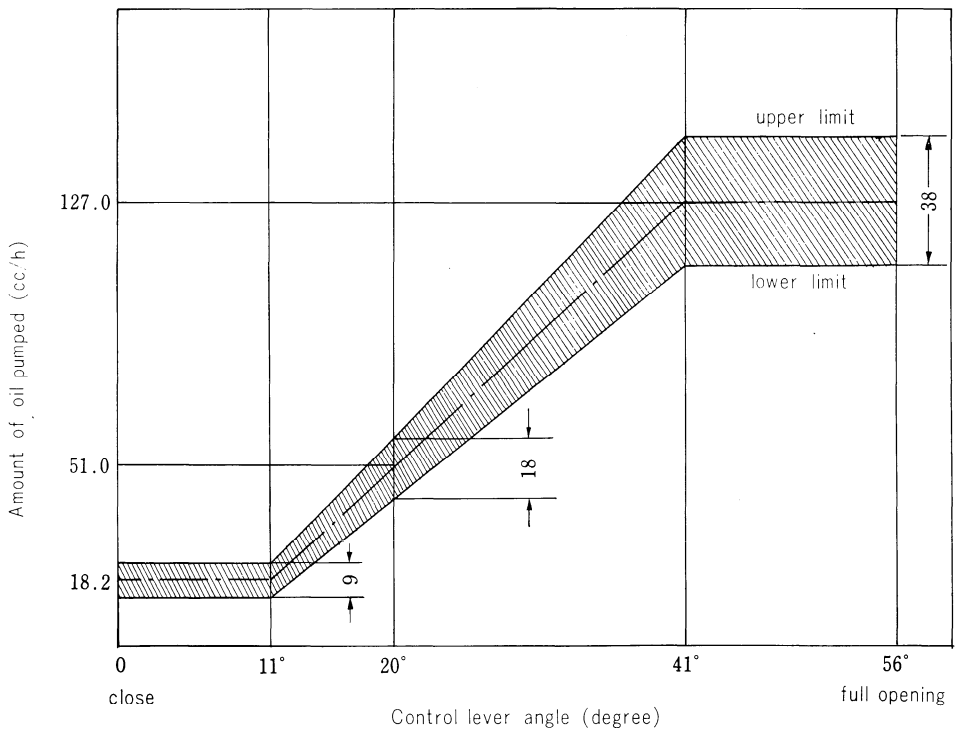


Fig. 5-6-3

5-7. Carburetor Specifications

☆ AS50

Main jet	#70
Jet needle	3G1-2
Needle jet	E-2
Throttle valve cutaway	#2.0
Pilot jet	#20
Pilot outlet	0.9φ
Pilot air adjusting screw	2 turns back
Needlevalve seat	1.2φ
Starter jet	#40

☆ A50

Main jet	#67.5 (#65 in South East asia)
Jet needle	3G1-2
Needle jet	E-2
Throttle valve cutaway	#2.0
Pilot jet	#20 (#17.5 in South Eastasia)
Pilot outlet	0.9φ
Pilot air adjusting screw	1-$\frac{1}{8}$ turns back
Needle valve seat	1.2φ
Starter jet	#40

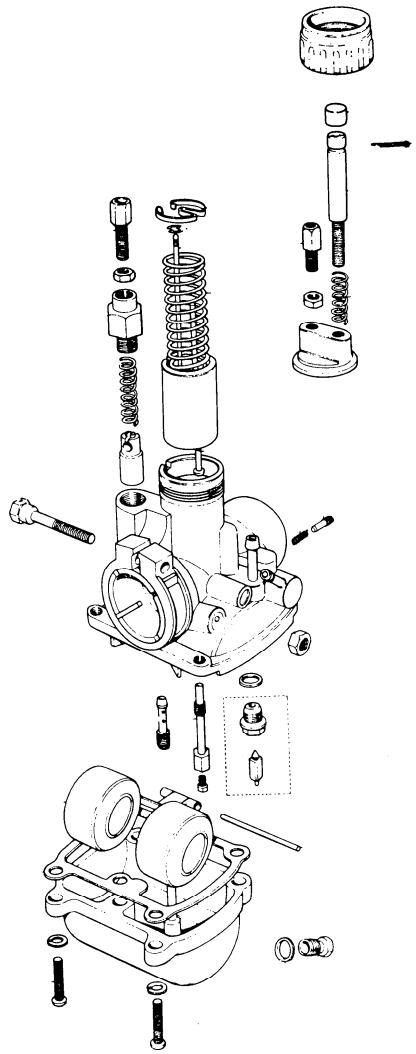


Fig. 5-7-1

5-8. Transmission

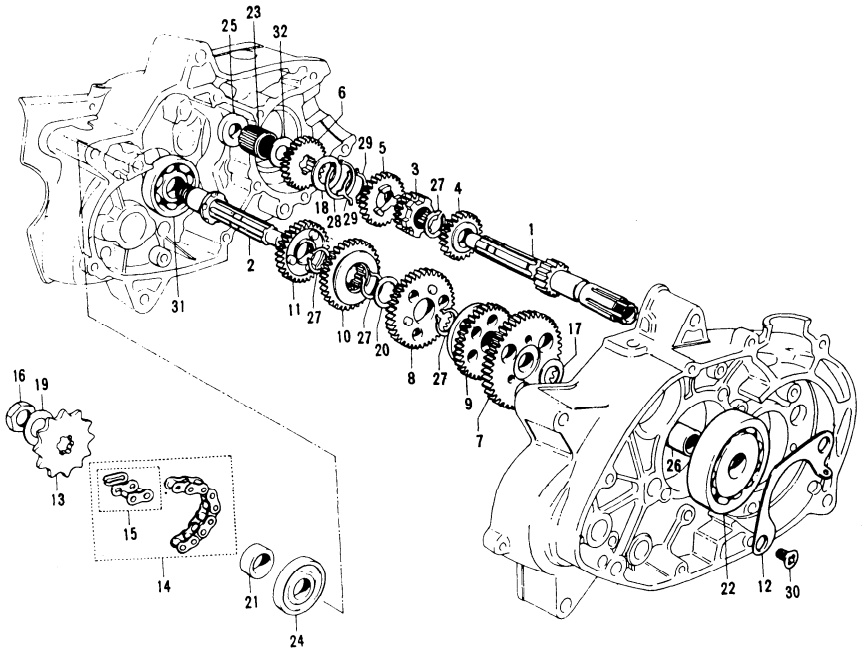


Fig. 5-8-1

1	Counter Shaft	N.T.=12	17	Thrust Washer	O.D.=24 (0.94), I.D.=12(0.47) T=1.5 (0.06)
2	Drive Shaft		18	Thrust Washer	O.D.=29 (1.14), I.D.=17(0.67) T=1.5 (0.06)
3	Second Pinion	N.T.=18	19	Engine Sprocket Washer	
4	Third Pinion	N.T.=22	20	Thrust Washer	
5	Fourth Pinion	N.T.=25	21	Engine Sprocket Spacer	O.D.=21(0.83), I.D.=17(0.67) W=13 (0.51)
6	Top Pinion	N.T.=23	22	Counter Shaft Right Bearing	O.D.=62(2.44), I.D.=17(0.67) W=10 (0.39)
7	Low Gear	N.T.=45	23	Counter Shaft Left Bearing	O.D.=19(0.75), I.D.=12(0.47) W=12 (0.47)
8	Second Gear	N.T.=39	24	Drive Shaft Oil Seal	O.D.=40(1.57), I.D.=21(0.83) W=7 (0.28)
9	Third Gear	N.T.=35	25	Push Rod Oil Seal	O.D.=16(0.63), I.D.=42(0.17) W=8 (0.31)
10	Fourth Gear	N.T.=32	26	Drive Shaft Bushing	O.D.=19(0.75), I.D.=12(0.47) W=12 (0.47)
11	Top Gear	N.T.=30	27	Circlip	
12	Counter Shaft Bearing Petainer		28	Circlip	
13	Engine Sprocket	N.T.=12	29	Knock Ring	
14	Drive Chain Ass'y	⇆120×102L	30	Cross Head Serew	
15	Drive Chain Joint Ass'y		31	Ball Bearing	
16	Engine Sprocket Nut		32	Thrust Washer	

A constant-mesh five speed transmission is mounted on this motorcycle to enable the rider to select the correct gear according to running speed.

The engagement of the pinion and the gear at each speed is described in this paragraph.

(1) Neutral

In the neutral position, the low gear turns freely on the drive shaft so that engine power is not transmitted to the drive shaft. (Fig. 5-8-2)

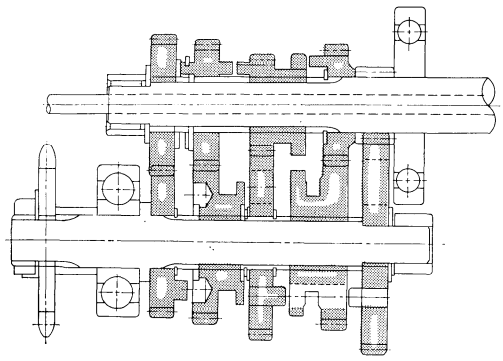


Fig. 5-8-2

(2) Low speed

The third gear is slid to the right on the splines of the drive shaft by the gear shifting fork. Then holes on the right side of the third gear engage with dogs on the low gear and rotational power is transmitted on the drive shaft through the combined low and third gears. (Fig. 5-8-3)

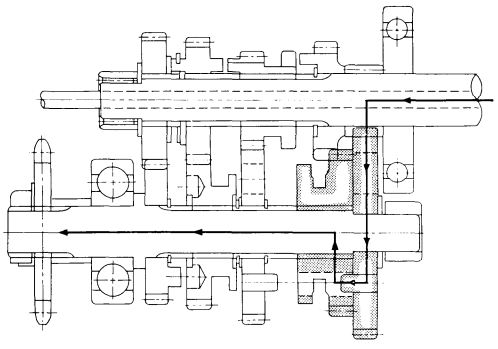


Fig. 5-8-3

(3) Second speed

The third gear is slid to the left on the splines of the drive shaft by the gear shifting fork so that holes on the left side of the third gear engage with dogs of the second gear which turns freely on the drive shaft.

Rotational power is then transmitted from the counter shaft to the drive shaft through the second pinion which is spline-fitted to the counter shaft, and the combined second and third gears. (Fig. 5-8-4)

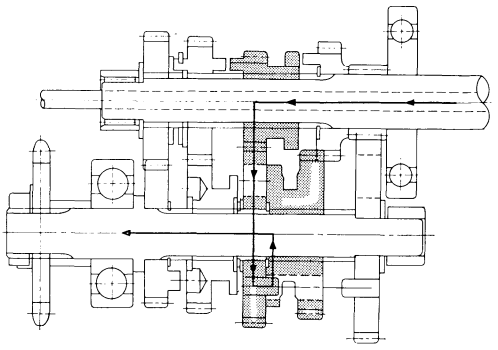


Fig. 5-8-4

(4) Third speed

The second pinion is slid to the right on the splines of the countershaft by the gear shifting fork. Dogs on the right side of the second pinion then engage with those of third pinion which turns freely on the counter shaft. Thus the second pinion and third pinion are combined and work as a single unit so that rotational power is transmitted from the counter shaft to the drive shaft. (Fig. 5-8-5)

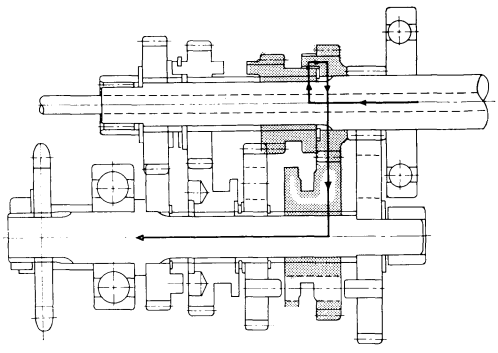


Fig. 5-8-5

(5) Fourth speed

The second pinion is slid to the left and engaged with the fourth pinion which turns

freely on the counter shaft.

Rotational power is then transmitted from the counter shaft to the drive shaft through the combined second and fourth pinions and the fourth gear which is spline-fitted to the drive shaft. (Fig. 5-8-6)

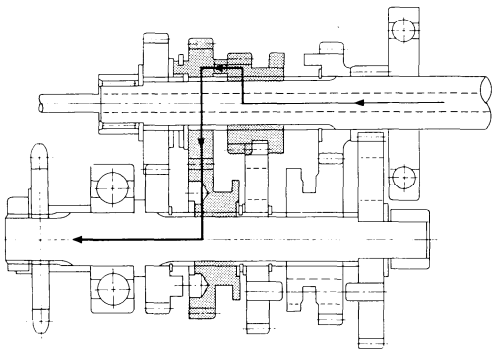


Fig. 5-8-6

(6) Top speed

The fourth gear is slid to the left on the splines of the drive shaft by the gear shifting fork. Dogs of the top gear engage with holes of the fourth gear.

Rotational power is then transmitted from the counter shaft to the drive shaft through the top pinion which is spline-fitted on the countershaft and the combined top and fourth gears. (Fig. 5-8-7)

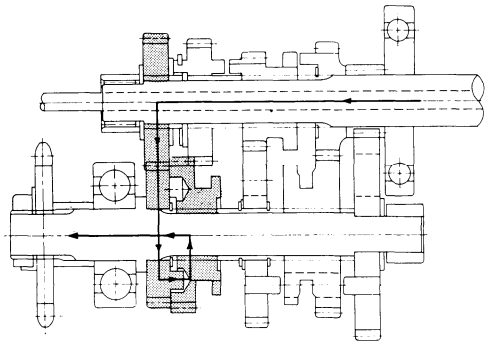


Fig. 5-8-7

5-9. Gear Shifting Mechanism

An unigue gear shifting mechanism is incorporatad in the A50 transmission to insure performance of the five speed transmission gear box.

5-9-1 Operating gear shifting lever

The A50 gear shifting system, according to the operation of the gear shifting lever, is illustrated in Fig. 5-9-1.

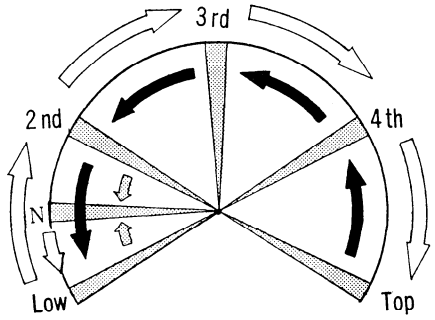


Fig. 5-9-1

To shift into low gear from neutral, depress the gear shifting lever. To shift from low to second or second to low, it is not necessary to kick up or dawn the gear shifting lever twice It is possible to shift the gear directly in bath direction from low to second and second to low beyond neutral.

To shift from second to third, third to fourth etc., lift the gear shifting lever only once.

When neutral is wanted, depress or raise the lever half a stroke from second or low respectively.

5-9-2 Gear shifting cam

Three grooves are carved on the gear shifting cam for this model to fit the cam for five speed transmission.

Fig. 5-9-2 is the flat lag-out of cam.

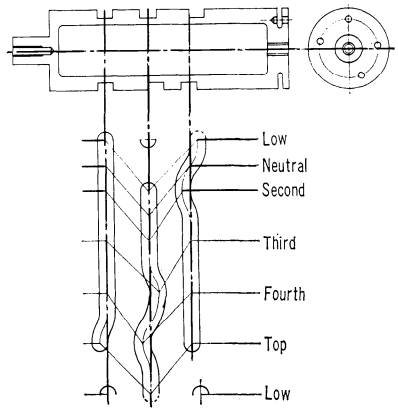


Fig. 5-9-2

5-9-3 Gear shifting shaft comp.

The model A50 is equipped with a special type gear shifting shaft different from those for other models.

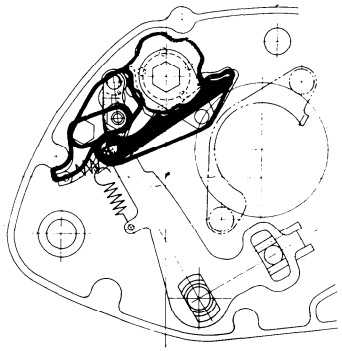


Fig. 5-9-3

When the gear shifting lever is operated, the gear shifting pawl on the gear shifting shaft pushes or pulls the gear shifting cam pin, turning the gear shifting cam.

When gears are shifted rapidly the shifting cam tends to rotate beyond its proper position.

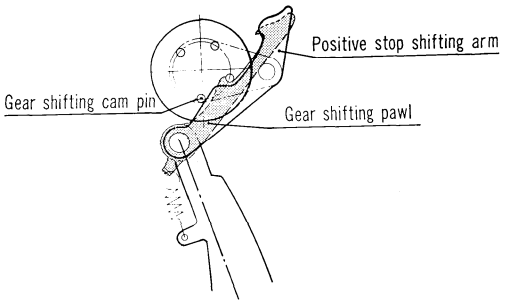


Fig. 5-9-4

The positive stop shifting arm incorporated in the gear shifting shaft moves synchronously with the pawl and prevent the rotation by stopping the cam pin next to one hooked by the pawl.

6. Specifications for Inspection and Repair

6-1. 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. 6-1, Fig. 6-2)
2	Cylinder	* Wear		0.05mm (0.0020″)	Rebore	Limit is obtained by subtracting the smallest dia. from the largest one.
		* Cylinder-piston clearance	0.065mm～0.075mm (0.0026″～0.0027″)	0.125mm (0.0049″)		
		* Cylindrical and circular tolerance	0～0.01mm (0～0.0004″)			

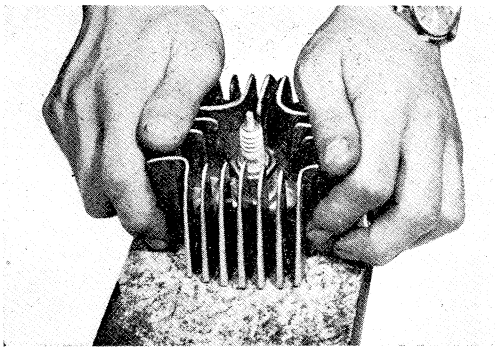


Fig. 6-1

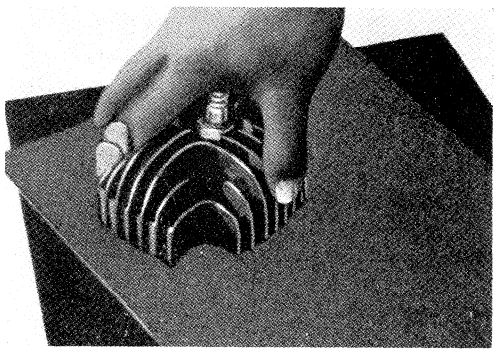


Fig. 6-2

No.	Part	Item	Standard	Limit	Operation	Remarks
3	Piston pin	Wear		0.01mm (0.0004″)	Replace	Limit is obtained by subtracting the smallest dia. from the largest one, when it is measured at several points.
4	Piston ring	* Width	1.9mm～2.1mm (0.0748″～0.0826″)			Measure the width with calipers.
		* Wear in width		0.1mm (0.0004″)	Replace	
		* Open end gap	0.1mm～0.3mm (0,0040″～0.0118″)			Measure the open end gap with a feeler gauge, when piston ring is inserted into the lower part of cylinder. (Fig. 6-3)

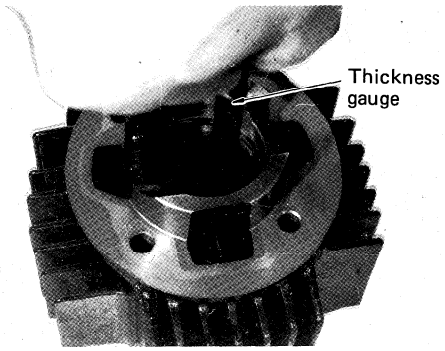


Fig. 6-3

No.	Part	Item	Standard	Limit	Operation	Remarks
5	Piston	Diameter at 23 mm above the bottom.	40.930mm～40.945mm (1.6114″～1.6120″)		Replace	Measure dia. at 90° from the piston pin hole. when the cylinder noise becomes large, replace the piston.
6	Crank shaft	* Con.rod small end shake	below 3mm (below 0.12″)		Replace	Check the shake at top dead center with a dial gauge. (Fig. 6-4)
		* 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. 6-5)

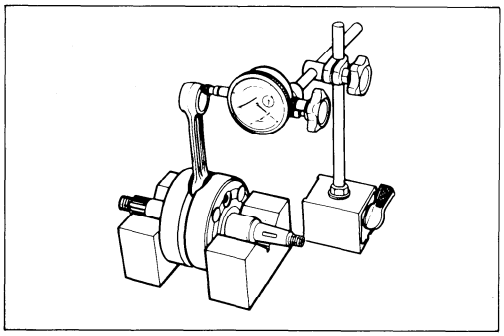


Fig. 6-4

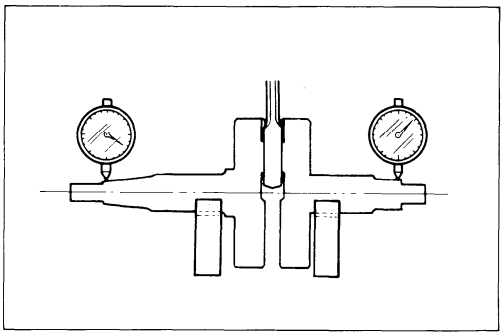


Fig. 6-5

No.	Part	Item	Standard	Limit	Operation	Remarks
7	Clutch housing spacer	Outside diameter	20.96mm～20.98mm (0.8252″～0.8260″)	20.8mm (0.8190″)	Replace	Check the dia. with a micrometer.
8	Clutch housing	Play in axial direction	0.01mm～0.25mm (0.0004″～0.0098″)	0.3mm (0.0118″)	Repair	After installing the clutch housing, spacer and hub, check the play in axial direction. If the play is found larger than limit, repair the clutch housing spacer by grinding one end of it on an oil stone.

No.	Part	Item	Standard	Limit	Operation	Remarks
9	Primary-pinion and gear	Backlash	0.01mm～0.08mm (0.0004″～0.0032″)	0.15mm (0.0059″)	Replace	Set the feeler of a dial gauge along the tangential line of primary gear, and turn the gear by hand slowly, until the gear drives the primary pinion. (Fig. 6-6)

No.	Part	Item	Standard	Limit	Operation	Remarks
10	Clutch cork plate	* Thickness	2.9mm～3.1mm (0.114″～0.122″)	2.8mm (0.110″)	Replace	Check thethickness with calipers.
		* Warp	below 0.4mm (0.016″)		Replace	Check the warp with a feeler gauge by placing the plate on the flat surface with a feeler gauge.
11	Clutch steel plate	Warp	below 0.1mm (below 0.004″)		Replace	Check the warp in the same way as the cork plate is done
12	Intake valve plate	Warp	below 0.3mm (below 0.0118″)	0.5mm (0.020″)	Replace	Check the warp in the same way as the clutch cork and steel plate is done.
13	Clutch spring	Free length	32.9mm (1.295″)	34.1mm (1.343″)	Replace	Measure the length from end to end including wire dia. of the loop hook.

No.	Part	Item	Standard	Limit	Operation	Remarks
14	Gear shifting pawl return spring	Free length	24.3mm (0.957″)	27mm (1.063″)	Replace	Measure the length from hook to hook except the wire dia. of loop hook.
15	Gear shifting cam stopper spring	Free length	17.0mm (0.669″)	20mm (0.787″)	Replace	Measure the length from hook to hook except the wire dia. of loop hook.
16	Drive shaft bushing	Inside diameter	12.00mm～12.02mm (0.4724″～0.4732″)	12.06mm (0.4748″)	Replace	Measure the inside dia. with calipers.

6-2. Electrical Equipment

No.	Part	Item	Standard	Limit	Operation	Remarks
1	Flywheel magneto	* Resistance of primary coil	1.9～2.0Ω		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	0.53～0.63Ω		Replace	Measure the resistance between the yellow colored wire and the ground.
		* Condenser capacity	0.26～0.34μF		Replace	Check the capacity with a electrotester. (Service apparatus 099 00-28101)
		* Insulation resistance of condenser	10MΩ		Replace	Check the resistance with a electrotester. (Service apparatus 099 00-28101)

* Lighting capacity	over 6V at 2000 rpm, below 9.0V 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.
* Charging capacity in day time	over 0.15A at 2000rpm, below 3.2A at 8000rpm	Measure the charging current by DC ammeter with the ignition switch key in day time position.
* Charging capacity in night time	over 0.1A at 2500rpm	Measure the charging current by DC ammeter with ignition switch key in night time position.
* Ignition performance	over 6mm (0.24″) at 500rpm	Connect a electrotester in series with spark plug as shown in Fig. 6-6. When starting engine, set a three prong gap of electrotester to zero.
* Adjustable angle of spark timing	+6°～−3°	
* Contact point gap	0.30mm～0.40mm (0.0136″～0.0140″)	

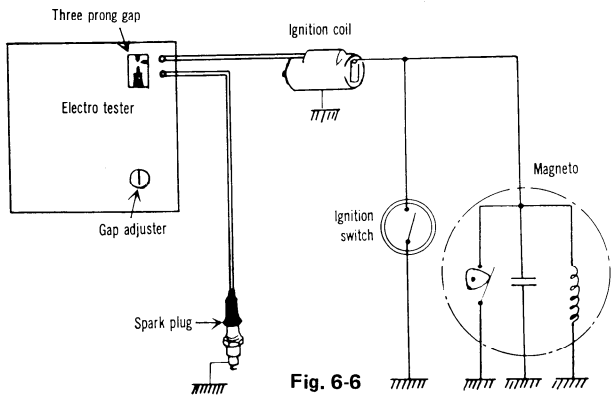


Fig. 6-6

No.	Part	Item	Standard	Limit	Operation	Remarks
2	Ignition coil	Resistance of primary coil	1.9～2.1 Ω		Replace	Measure the resistance with a circuit tester.
3	Spark plug	Gap between center electrode and side electrode	0.5mm～0.6mm (0.020″～0.024″)		Repair or Replace	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 conductivity with a circuit testor. If the rectifier is conductive in one direction and not in another rectifier is good.

7. 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 an extent that the cable inner becomes idle. 3. Turn the throttle inward all the way. 4. Align the stamped mark on the control lever with the stamped mark on the oil pump body by screwing out the cable adjuster. (Fig. 7-1, 2) 5. Finally secure the adjustment with the cable adjuster look nut.

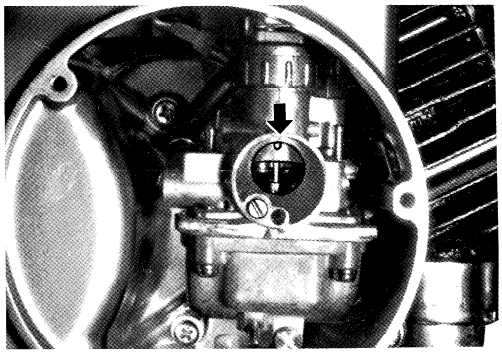


Fig. 7-1

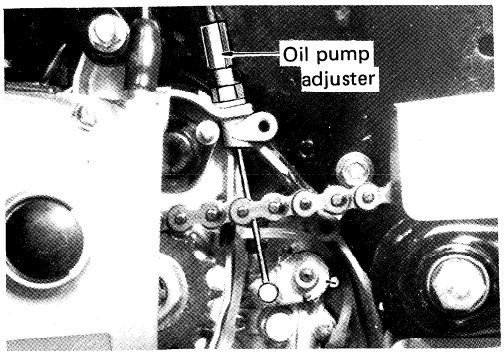


Fig. 7-2

No.	Part	Adjusting Method
2	Carburetor	1. Adjusting idle circuit (Fig. 7-3) 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. * 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 for A50—1½ turns out from the bottom
		The standard setting for A550—2 turns out from the bottom.

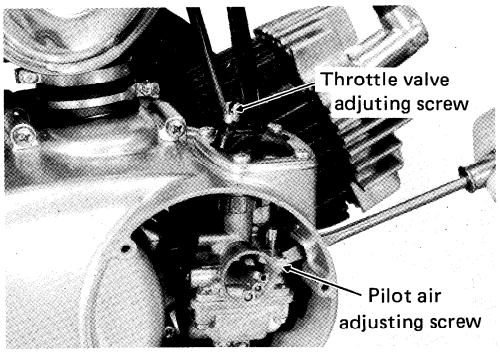


Fig. 7-3

No.	Part	Adjusting Method
		2. Adjusting part-throttle circuits 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.

* 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. 7-4)

   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 20.5 mm (0.81 in), the fuel level is too high and if more the fuel level is too low. Adjust the distance to 20.5 mm (0.81 in) by bending the float tongue with a plain screw driver.

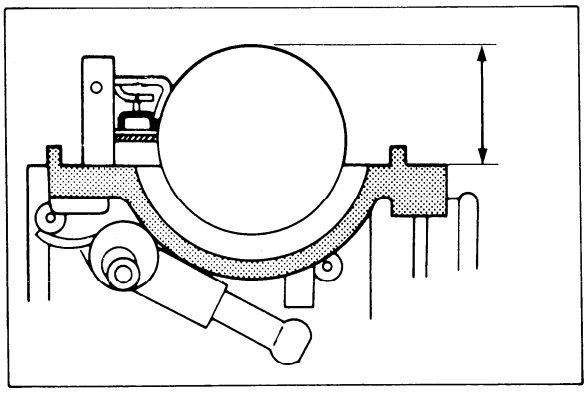


Fig. 7-4

No.	Part	Adjusting Method
3	Flywheel Magneto	Adjusting ignition timing (Fig. 7-5, 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				Advance		
Crank angle (°)	20	22	23	24	25	26	27	28	30	32
Piston distance (mm)	1.40	1.69	1.84	2.00	2.16	2.34	2.52	2.70	3.09	3.50

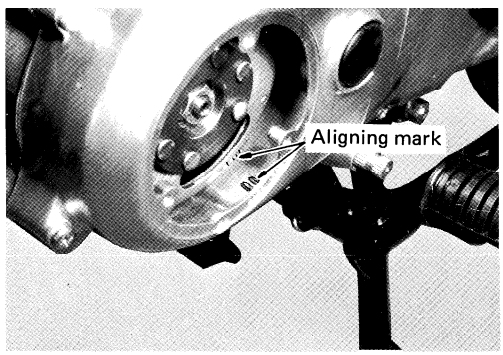


Fig. 7-5

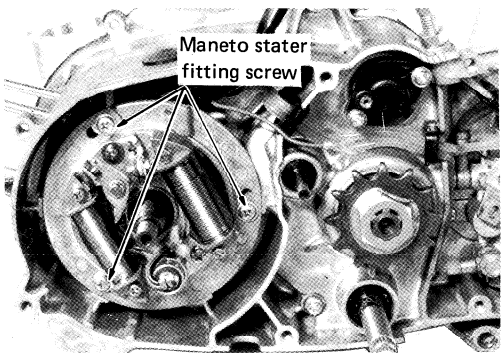


Fig. 7-6

No.	Part	Adjusting Method
4	Hron	Adjusting volume (Fig. 7-7) 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. 7-8) Adjust the brake lamp switch by turning the adjusting nuts so that it turns on the brake lamp when the brake pedal is depressd about one-half of its travel.

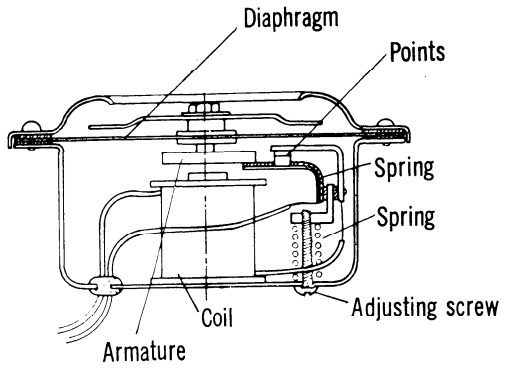


Fig. 7-7

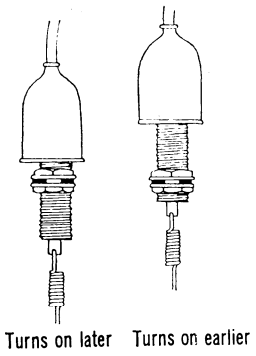


Fig. 7-8

No.	Part	Adjusting Mathod
6	Drive chain	Adjusting tension (Fig. 7-9) 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 dfelection 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 (Fig. 7-10) 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. 7-11) 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.

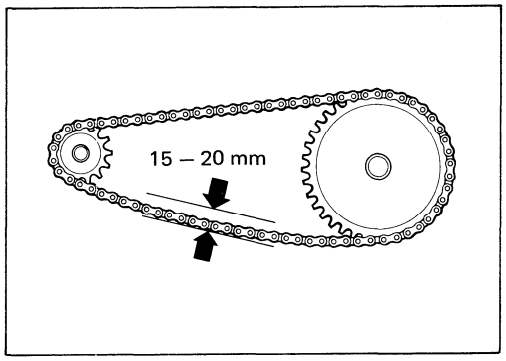


Fig. 7-9

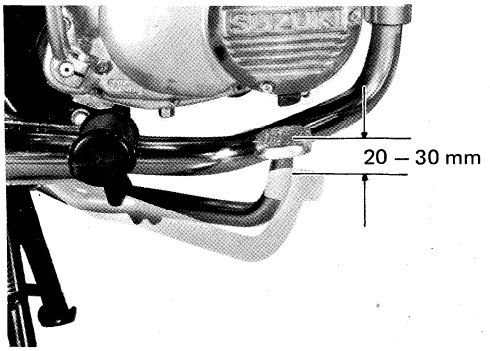


Fig. 7-10

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. 7-12) After removing the clutch release adjusting hole cap Adjust the release screw as follows. 1. Loosen the clutch release screw lock nut 2. Turn in the release adjusting screw until it touches 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. 7-13, 14) Adjust the cable adjuster so that 4 mm (0.16 in) of play measured at the clutch lever base is left in the cable.

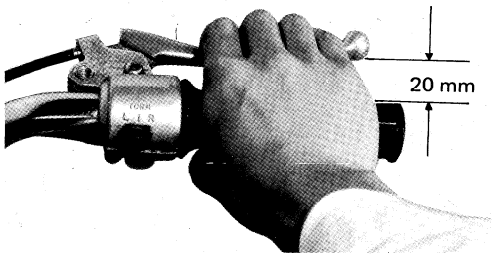


Fig. 7-11

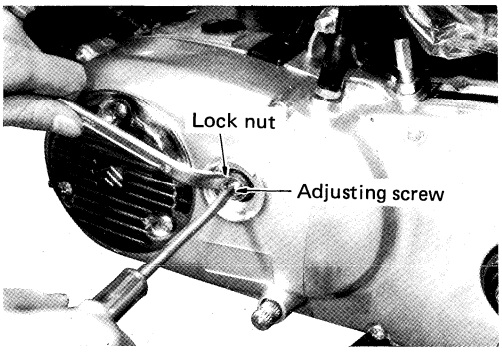


Fig. 7-12

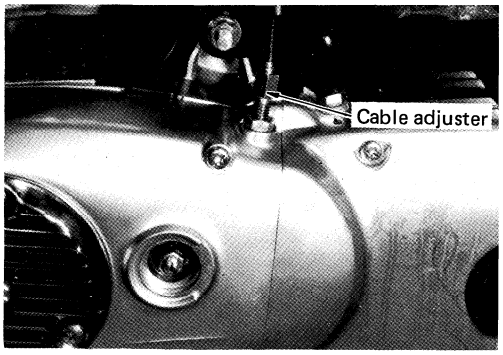


Fig. 7-13

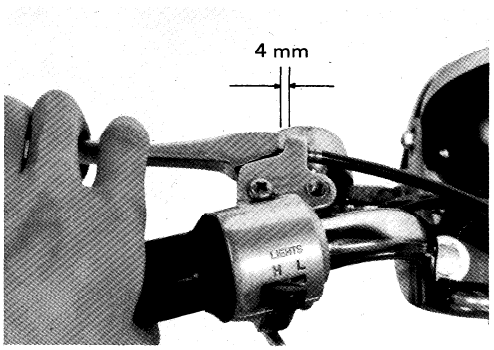


Fig. 7-14

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)

8. Tightening Torque

Bolts, nuts and screws are apt to work loose during running. Check and retighten. (Fig. 8-1, 8-2)

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

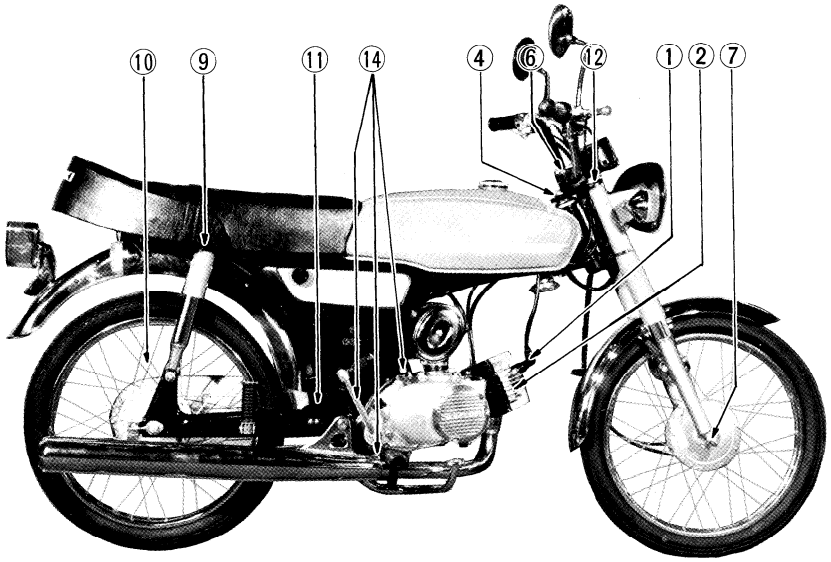


Fig. 8-1

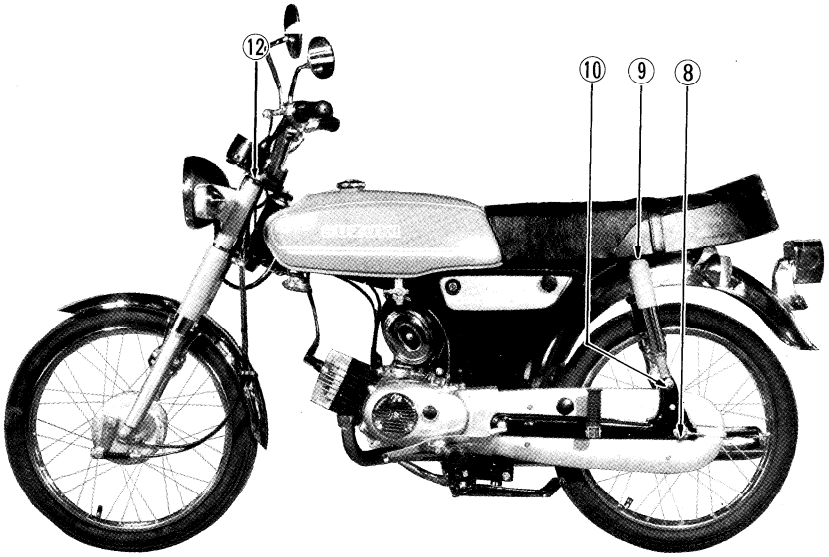


Fig. 8-2

9. Trouble Shooting

When trouble occurs with a motorcycle, it is important to find the source of the trouble as rapidly as possible 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.

9-1. 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 egnine 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 ngine compression is improper	
	1. Worn cylinder and piston rings	Repair or replace
	2. Sticked 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

9-2. 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

9-3. 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 2. Too thin cylinder head gasket	 Remove carbon deposits 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

9-4. Detective 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

9-5. 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. Jumpingout of gear	* If the gears disengage while running, check for :	
	1. Worn or bent gear shiftingfork	Replace
	2. Worn gear dog teeth	Replace gear
	3. Worn or damaged gear shifting cam stopper spring	Replace spring

9-6. 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. Inco rrect frok oil level	Repair or replace
	9. Worn fork spring	Replace
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

10. Periodic Maintenance Schedule

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Traveling distances are expressed in terms of kilometers and miles.

NOTE:
More frequent servicing may be performed on motorcycles that are used under extreme severe conditions.

PERIODIC MAINTENANCE CHART

ENGINE

Interval / Item	Initial 1,000 km (600 mi)	Every 3,000 km (2,000 mi)	Every 6,000 km (4,000 mi)	Every 12,000 km (8,000 mi)
Battery	Inspect	Inspect	–	–
Engine bolts and nuts	Inspect	Inspect	–	–
Cylinder head, cylinder and muffler	–	–	Remove carbon	–
Air cleaner element	–	Clean	–	Replace
Spark plug	Inspect	Inspect	Replace	–
Contact points and ignition timing	Inspect	Inspect	–	Replace contact points
Carburetor	Inspect	Inspect	–	Overhaul
Oil pump	Inspect	Inspect	–	–
Fuel hose	Replace every 2 years.			
Fuel strainer	Clean	–	Clean	–
Clutch	Inspect	Inspect	–	–
Transmission oil	Change	–	Change	–

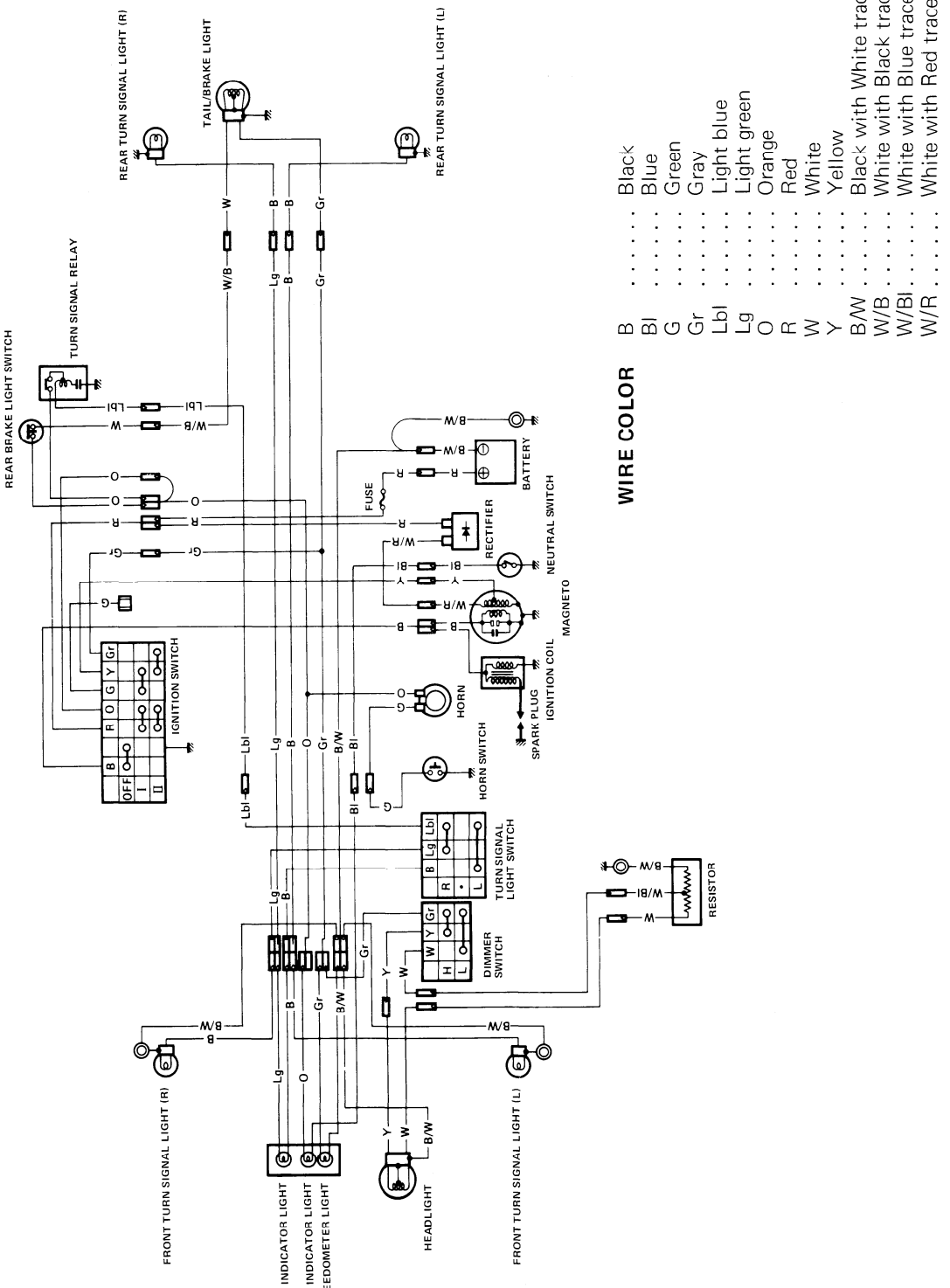
CHASSIS

Interval / Item	Initial 1,000 km (600 mi)	Every 3,000 km (2,000 mi)	Every 12,000 km (8,000 mi)
Drive chain	Inspect and clean every 1,000 km (600 mi)		
Brake	Inspect	Inspect	–
Tire	Inspect	Inspect	–
Steering	Inspect	Inspect	–
Front fork oil	Change	–	Change
Chassis bolts and nuts	Inspect	Inspect	–

LUBRICATION CHART

Item \ Interval	Initial and every 6,000 km (4000 mi)	Every 12,000 km (8,000 mi)
Contact breaker	Grease	–
Throttle cable	Motor oil	–
Throttle grip	–	Grease
Choke cable	Motor oil	–
Brake cable	Motor oil	–
Clutch cable	Motor oil	–
Speedometer cable	–	Grease
Speedometer gear box	–	Grease
Drive chain	Motor oil every 1,000 km (600 mi)	
Brake pedal	Grease or oil	–
Brake cam shaft	–	Grease
Steering stem bearings	Grease every 2 years or 20,000 km (12,000 mi)	

11. Wiring Diagram



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