SUZUKI

SERVICE MANUAL

MODEL

GT750

ENGINE

FOREWORD

This service manual has been published as the guidance of Suzuki GT750 engine for proper service in the workshop.

This manual is constructed in sequence of Description, Specification, Operation, Trouble shooting, Removal, Inspection, Repair, Adjustment and Assembly for every chapter. In addition to these items, this manual also refers complementarily to a foundermental principle, reason for an adoption of the mechanism and its function as many as possible in order to have GT750 engine comprehended by all the mechanics.

Suzuki will be happy if this manual assists in providing prompt and well done repair work so that GT750 customers will receive reliable service.

Prepared by

SUZUKI MOTOR CO.,LTD.

Export Service Section

July, 1972

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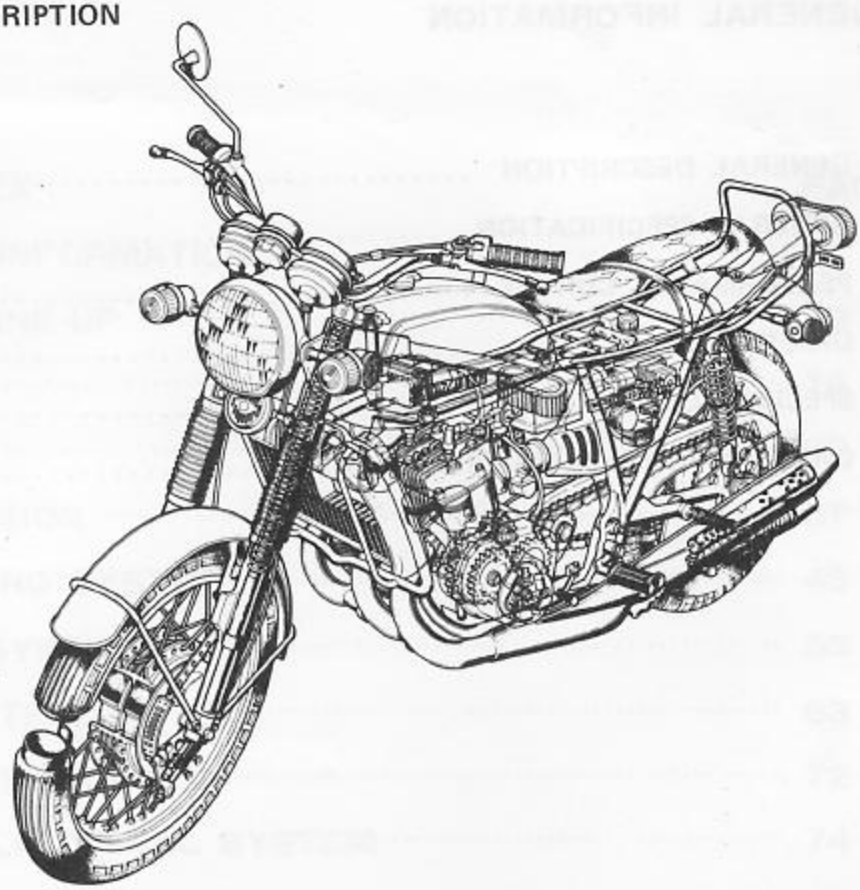
SECTION INDEX



SUZUKI GT750 is a high performance and large size sporty type motorcycle equipped with advanced new mechanisms which are to be described below.

This two-cycle engine has a three-cylinder construction of piston valve type having the total displacement of 738cm^3 (45.0 cu in). In order to improve the cooling efficiency and at the same time to display its full power, the engine adopts a water cooling system. On the other hand, to reduce the weight of engine for motorcycle application, the material for main components, such as cylinder block, cylinder head uses aluminum alloys.

A three big bore carburetor system (VM32 SC) is adopted, with each carburetor being used for each cylinder. This arrangement has made it possible to feed always an optimal mixture gas to combustion chambers over a wide range of engine speed, from low to high speed ranges. The exhaust pipe connects three exhaust mufflers with exhaust coupler tubes. Such a newly developed intake and exhaust gas system has given the engine a well balanced highly tuned performance.

The engine driven metering oil pump supplies oil to required locations of cylinders and crank shaft, as is so often the case as in SUZUKI CCI System. In the past, oil supplied returned to crank chamber was exhausting white smoke from exhaust muffler. To avoid this, a new mechanism called SRIS (SUZUKI Recycle Injection System) has been adopted in this machine.

An aluminum corrugated type radiator is adopted in the cooling system for weight reduction. The system is of the sealed pressure type. Combined with the use of "year's round anti-freeze & summer coolant", this system needs no additional supply of water except in the case of unusual leak. A motor driven cooling fan is installed, which operates whenever the water temperature rises due to unusually severe operation conditions of engine.

GENERAL SPECIFICATION

Dimensions and Weight	
Overall length	2215 mm (87.2 in)
Overall width	865 mm (34.0 in)
Overall height	1125 mm (44.3 in)
Wheelbase	1470 mm (57.8 in)
Ground clearance	140 mm (5.5 in)
Tires front	3.25–19 in 4PR
rear	4.00–18 in 4PR
Dry weight	214 kg (482 lb)
Performance	
Maximum speed	184–192 kph (115–120 mph)
Acceleration (0–400 m)	12.6 sec.
Braking distance	1.4 m (46.0 ft) @ 50 kph (30.0 mph)
Engine	
Type	2-cycle, water cooled, piston valve engine
Dimensions (L x W x H)	607 x 499 x 445 mm (26.3 x 19.7 x 17.5 in)
Weight	84 kg (38.2 lb)
Cylinder	Sleeved, aluminum, three
Bore x stroke	70 x 64 mm (2.76 x 2.52 in)
Piston displacement	738cc (45.0 cu-in)
Corrected compression ratio	6.7 : 1
Maximum horse power	67 hp/6,500 rpm
Maximum torque	7.7 kgm/(55.7 lb-ft)/5,500 rpm
Starter	Electric and kick
Cooling System	
Type	Water cooled, pressure forced circulation
Radiator	Corrugated fin and tube pressure type
Water pump	6 brade impeller centrifugal type
Thermostat	Wax pellet element type
Cooling solution capacity	4.5 ltr (1.2/1.0 gal, US/Imp)
Fuel System	
Carburetor	VM32SC, three
Air cleaner	Resin-processed, paper filter
Fuel tank capacity	17 ltr (4.5/3.7 gal, US/Imp)

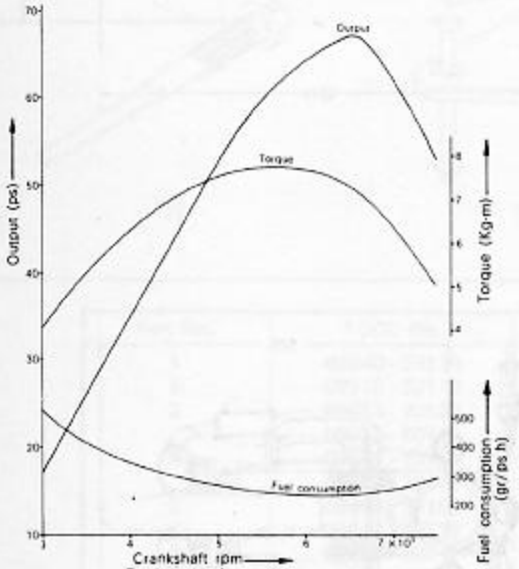
Lubrication System		
Engine		SUZUKI CCI
Gear box		Oil bath 2.2 ltr (4.7/3.9 pt, US/Imp)
Oil tank capacity		1.8 ltr (3.8/3.2 pt, US/Imp)
Ignition System		
Ignition system		Battery
Ignition timing		24° (R.L 3.63, C3.42 mm) B.T.D.C.
Spark plugs		NGK B-7ES or Nippon Denso W22ES
Transmission System		
Clutch		wet multi-disc
Gear box		5-speed constant mesh
Gear shifting		Left foot, lever operated return change
Primary reduction ratio (gear)		1.673 : 1 (82/49)
Final reduction ratio (chain)		3.133 : 1 (47/15)
Gear ratios	low	2.846 : 1 (37/13)
	second	1.736 : 1 (33/19)
	third	1.363 : 1 (30/22)
	fourth	1.125 : 1 (27/24)
	top	0.923 : 1 (24/26)
Overall reduction ratios		
	low	14.92 : 1
	second	9.09 : 1
	third	7.14 : 1
	fourth	5.89 : 1
	top	4.48 : 1
Suspension		
Front suspension		Telescopic fork with hydraulic damper
Rear suspension		Swinging arm with hydraulic damper
Steering		
Steering angle		40° (right & left)
Caster		63°
Trail		95 mm (3.74 in)
Turning radius		2.6 m (8.5 ft)
Brakes		
Front brake		Mechanical, 2 panel 4 leading shoes
Rear brake		Mechanical, leading trading shoes

Electrical Equipment	
Generator	Alternator 12V 280W
Starter	12V 500W
Cooling fan	12V 27.6W
Battery	12V 14AH
Head Lamp	12V 50/40W
Tail/brake lamp	12V 8/23W
Neutral indicator lamp	12V 1.5W
Turn signal indicator lamp	12V 1.5W
Speedometer lamp	12V 3W
Tachometer lamp	12V 3W
Turn signal lamp	12V 23W
Fuse	20A
Water temperature gauge	12V 2W

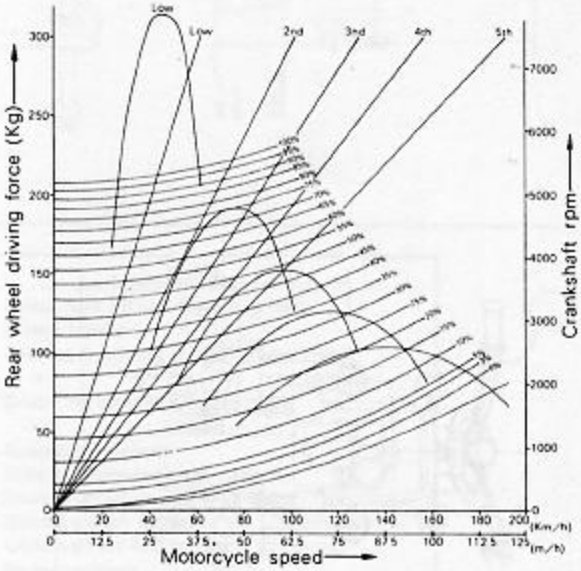
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

You may find some slight differences between your motorcycle and this service guide.
This is because of differences of traffic regulations in different countries.

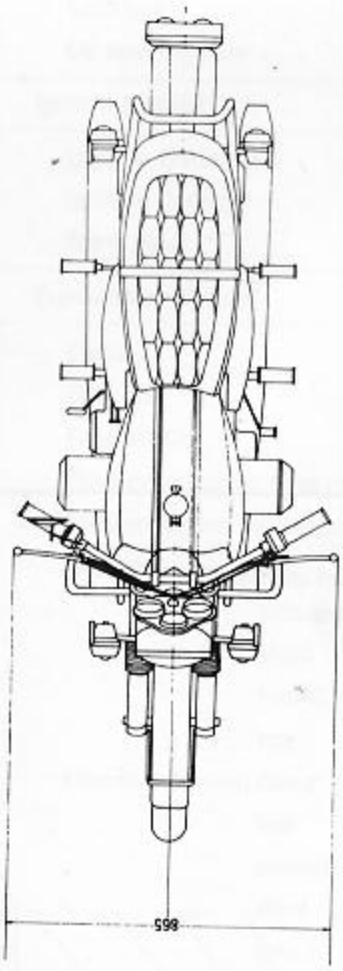
PERFORMANCE CURVES

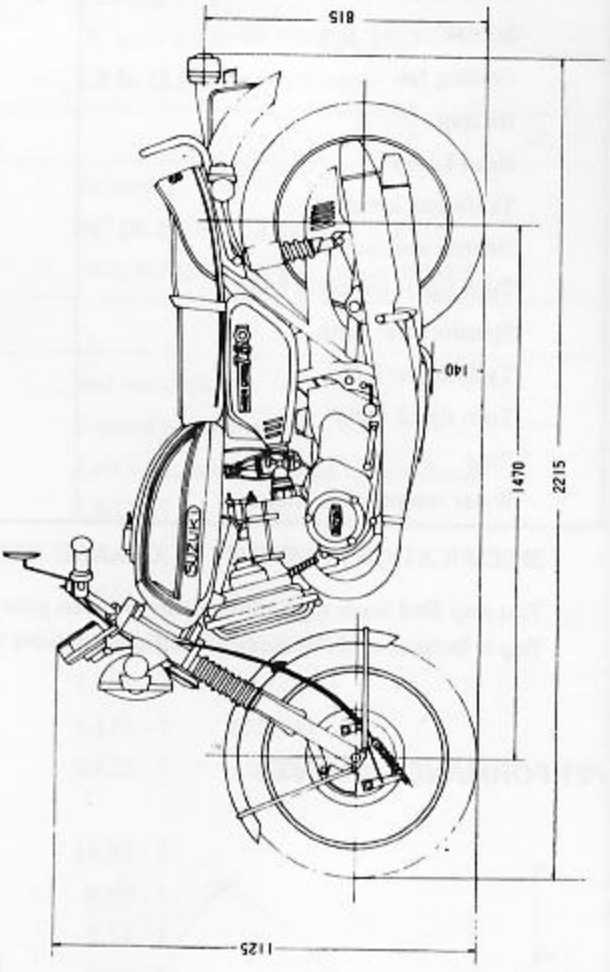


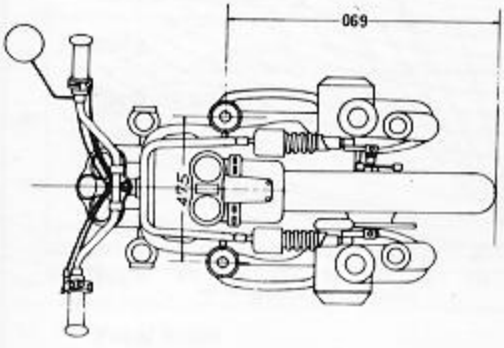
Engine performance curves

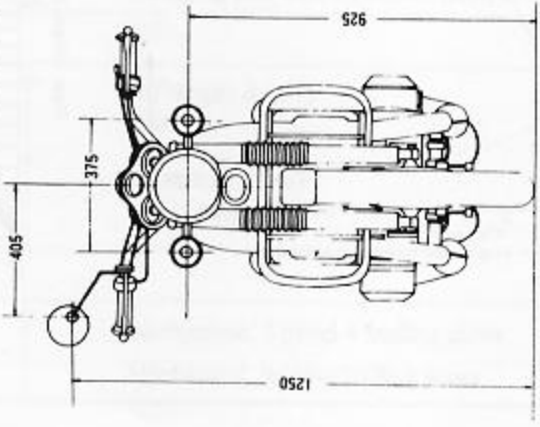


DIMENSIONS









SPECIAL TOOLS

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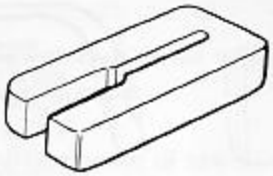

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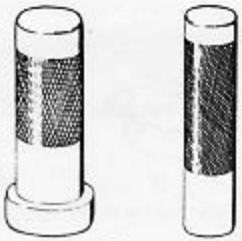

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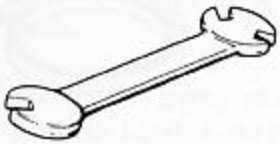

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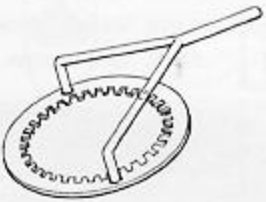

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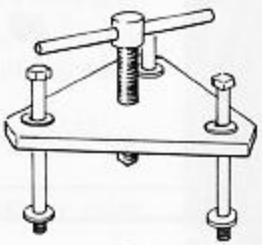

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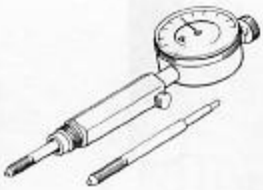
Ref. No.	TOOL No.	Name
1	09940 - 53110	Front fork oil seal installing tool
2	09910 - 20113	Piston holder
3	09913 - 70122	Bearing & oil seal installing tool (Big)
	09913 - 80110	" " " (Small)
4	09920 - 70111	Snap ring opener (Small)
	09920 - 70120	" " (Big)
5	09900 - 06103	Snap ring remover
6	09940 - 10122	Steering stem lock nut wrench
7	09940 - 60112	Spoke nipple wrench
8	09920 - 40111	Starter clutch holder
9	09920 - 53110	Clutch sleeve hub holder
10	09930 - 33110	Rotor remover
11	09920 - 13110	Starter clutch remover
12	09900 - 21802	Chain joint tool

GAUGE & SERVICE MATERIALS



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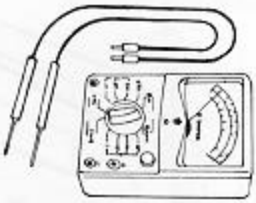

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Ref. No.	Part No.	Name	Applied for
1	09931 - 00111	Timing gauge	
2	09900 - 27002	Timing tester	
3	09900 - 25001	Pocket tester	
4	09900 - 28101	Electro tester	
5	99000 - 32040	Thread lock cement	1. Starter clutch hub set screw 2. Gear shifting cam guide set 3. Paul lifter set screw 4. Kick starter guide set screw 5. Gear shifting cam stopper plate set screw 6. Gear shifting arm stopper 7. Starter clutch nut
6	99000 - 32030	Suzuki lock super 103Q	Second drive gear
7	99000 - 25020	Suzuki super grease C	
8	14219 - 31000	Exhaust coupler seal	Exhaust coupler tube
9	99000 - 24130	Suzuki 7 on Bar's Leaks	Cooling system
10	99000 - 31030	Suzuki bond No.4	Crankcase

2. ENGINE TUNE-UP

Periodical inspection and maintenance are essential to maintain the best performance from engine as originally designed.

If any deficiency is encountered during operation of the motorcycle, it must be diagnosed immediately, and proper care should be taken by tuning up the engine.

The engine of GT750 incorporates a great number of new system and equipments which can only be taken care with special knowledge and proper care.
The procedures described in the following orders should be carefully studied to accomplish the correct engine tune-up.

Inspection & Adjustment

Battery

1. Check level of the electrolyte in the battery cells. The electrolyte should be at the level line on the battery case.
   If necessary, replenish the battery with distilled water.

2. The specific gravity of a full charged battery should be 1.260–1.280 at 20°C (68°F).
   When the battery specific gravity decreases less than 1.220, the battery should be changed. If the difference between each cell is more than 0.025 reading after fully charged, the battery should be inspected and replaced if necessary.

3. Check the battery terminals, clean and tighten if necessary.
   Check the battery case for cracks or other damages, and replace if necessary.

4. Check the battery breather pipe if its end is opened or clogged.

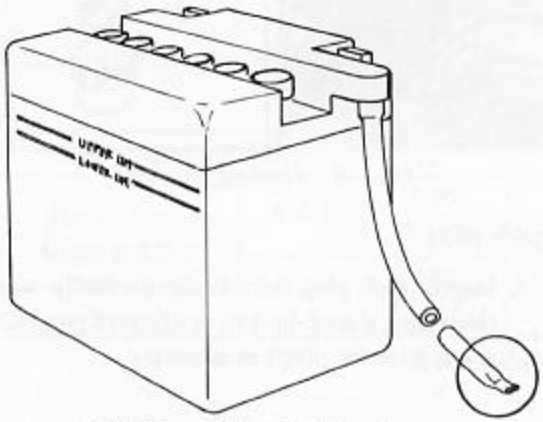


Fig. 2–1 Battery breather pipe

Engine oil (CCI oil) & Oil pump

1. Check the engine oil level in the oil tank. If the oil level is found below the oil level inspection eye, replenish SUZUKI CCI OIL or non-diluent (non-self mixing type) Two Stroke Oil with around SAE 30 wt.

Fig. 2–2 Oil level inspection eye

2. Check to see if air is present in the oil pump and pipe. Expel air if it is.
   For expelling air in the oil pump and pipe, refer to "Inspection & Repair" of OIL PUMP on page 50.

3. Adjust the oil pump lever ① with the cable adjuster ② so that the aligning marks ③ align when the punch mark ④ on the throttle valve comes on upper end of the hole on the carburetor body as the throttle grip gradually winds up. See Fig. 2–3.

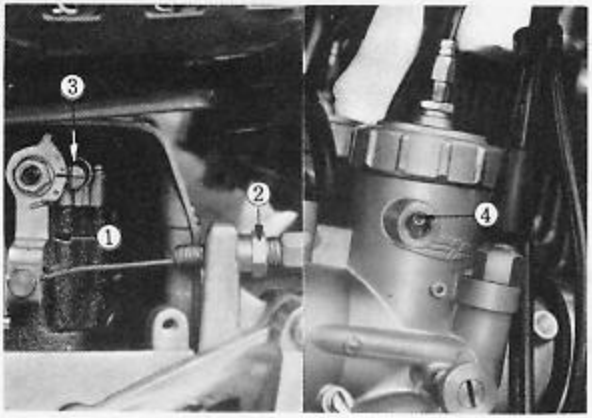


Fig. 2–3 Adjusting oil pump lever

Cooling System

1. Check the cooling system for leaks, weak hoses, loose hose clamps and correct coolant level. If the cooling solution level is under the level plate inside the inlet pipe when cool, replenish with distilled water.

2. Check the coolant for deterioration. Check if the transmission oil or gasoline is present in the coolant.

3. When refilling, use GOLDEN CRUISER 1200 Anti-freeze & Summer Coolant tested and guaranteed by Suzuki or equivalents in the market.
   GOLDEN CRUISER 1200 Anti-freeze & Summer Coolant is "year around" Ethylene-Glycol solution and serves approximately 2 years or 3,500 km (2,000 miles).
   See page 60 for details.

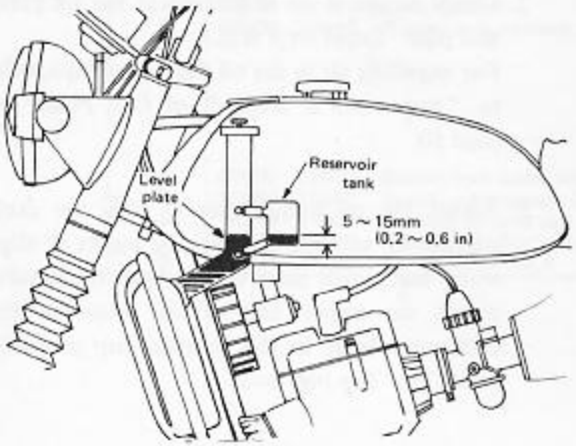


Fig. 2–4 Cooling solution level

Air cleaner

1. Clean the cleaner element with compressed air. Replace the element if damaged or excessively dirty.

2. Check to see if the cleaner is assembled properly after servicing.

Fig. 2–5 Cleaning air cleaner

Fuel cock

1. Check the fuel cock for clogging, and check to see if the diaphregm ① works properly.

2. Clean the fuel cock filter ②, and replace if necessary.

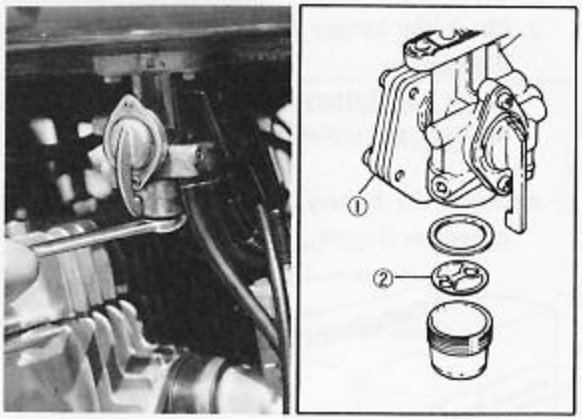


Fig. 2–6 Checking fuel cock

Spark plug

1. Inspect each plug individually for badly worn electrodes, glazed, broken or blistered porcelain, and replace the plug/s as necessary.

2. Clean the spark plugs throughly using a sand blast cleaner.

3. Inspect each plug for heat range. If excessive carbon deposits are observed on the insulator tip, replace with a hot range type spark plugs. If the plugs show burning white or rapid electrode wear, replace with a cold range type spark plugs.

4. Check the spark plug gap. The specified gap is 0.7–0.8 mm (0.027–0.031 in) for NGK and 0.6–0.7 mm (0.024–0.027 in) for ND makes.

Ignition timing

1. Adjust ignition timing with the timing gauge in accordance with the following table keeping in mind that the gauge stroke is not uniform because of the difference in inclination of spark plug hole at each cylinder.

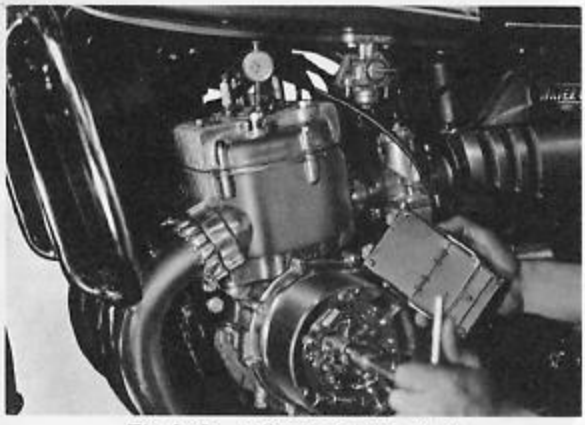


Fig. 2–7 Adjusting ignition timing

Standard ignition timing : 24°±2 (B T.D.C.)

2. Adjust also contact point gap to have 0.35 mm (0.014 in) at maximum opening.

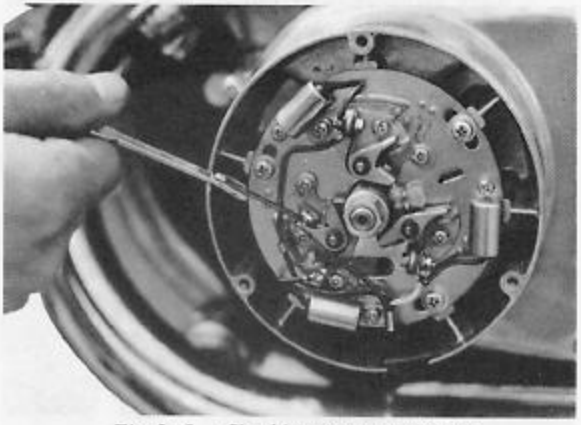


Fig. 2–8 Checking contact point gap

3. Check the contact points for wear or flatness of points surface.
   Check for defective condenser.

Carburetor

Adjust the carburetor in the following methods.

1. Turn the cable adjuster ① on the top of the carburetor to have a play of 2–3 mm (0.08–0.09 in) between the cable and cable adjuster.

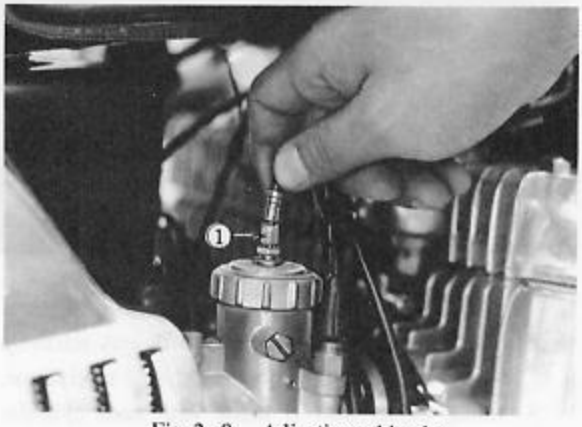


Fig. 2–9 Adjusting cable play

Crank angle (B.T.D.C.)		22°	23°	24°	25°	26°
Piston distance from B.T.D.C. mm (in)	R & L	3.20 (0.126)	3.35 (0.134)	3.64 (0.143)	3.94 (0.155)	4.25 (0.167)
	C	2.88 (0.113)	3.15 (0.124)	3.42 (0.136)	3.72 (0.146)	3.99 (0.157)

R & L : Right and left cylinder
C : Center cylinder

2. Removing aligning hole plug ① from mixing chamber body of each carburetor, then adjust three carburetors by turning the cable adjuster so that a punch mark ② on the side of throttle valve comes on upper surface of the hole with the throttle grip gradually wound up.

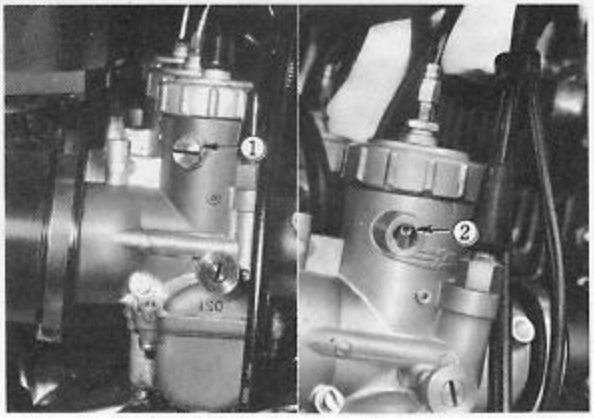


Fig. 2–10 Coordinating three carburetor

3. Screw pilot air adjusting screw of each carburetor all the way in and back it out 1½ turns.

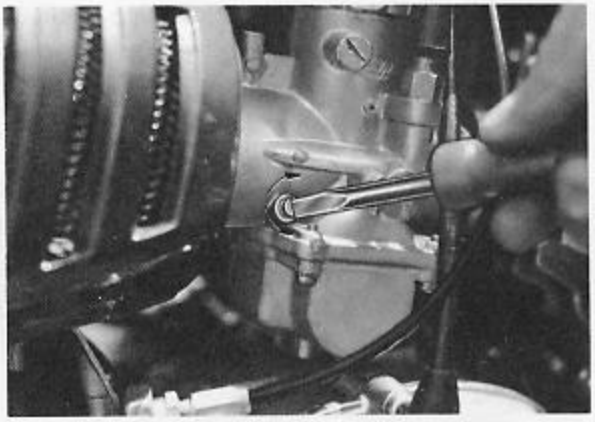


Fig. 2–11 Adjusting pilot air adjusting screw

4. Start the engine and after sufficient warm-up adjust idling speed with the throttle stop screw. Idling adjustment is made with each cylinder actuated one by one by so turning the related throttle valve stop screw as to have a tachometer reading of 1,000 rpm in each case.

Caution: In the case one cylinder firing, the related throttle valve stop screw should be screwed into a considerable extent to keep running.

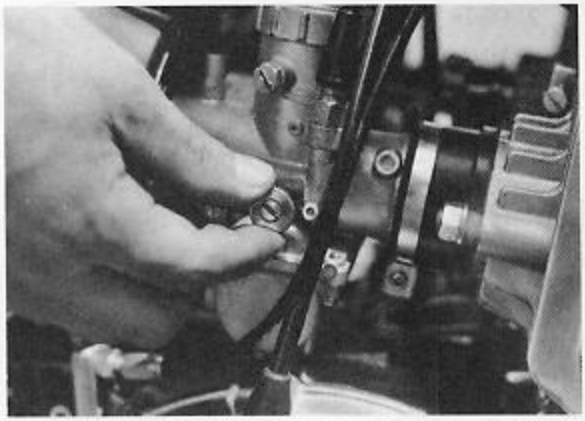


Fig. 2–12 Adjusting throttle valve stop screw

5. After adjusting the carburetor so that each cylinder has a speed of 1,000 rpm independently, equally turn the throttle stop screw of three carburetors backward to set an idling speed at 1,000 rpm with three cylinders firing.

6. Finally turn the throttle cable adjuster under throttle grip to have a play of 0.5–1 mm (0.02–0.04 in) on the throttle cable.

Transmission oil

1. Check for transmission oil level by removing the oil level screw ①.

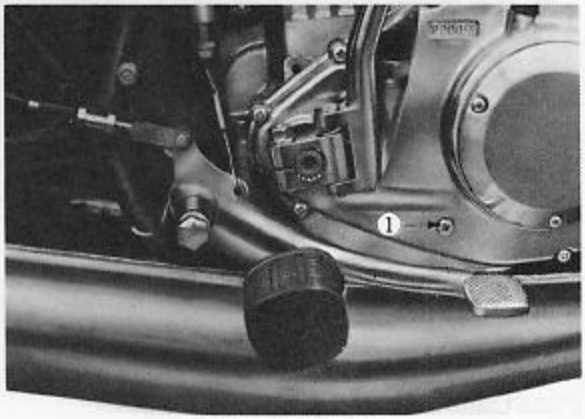


Fig. 2–13 Oil level screw

2. Replenish 20W/40 oil of superior quality if oil does not come out of the level screw hole when standing the motorcycle on its center stand.

3. Pour 2200 cc (0.58/0.48 gal US/Imp.) of transmission oil when changing oil.

Clutch

Check the clutch system for play by the following sequence.

1. Remove the clutch adjusting cap and the gasket from the clutch cover. Check for axial play of clutch release shaft ① when the release arm ② is at the lowest position, and adjust the play by loosening the release shaft double nuts ③ to be approximately 0.2 mm and tighten it again firmly.

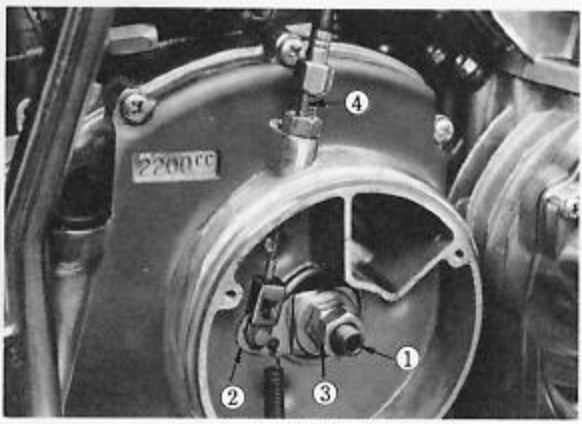


Fig. 2–14 Adjusting clutch

2. Adjust the clutch cable adjusters ④, ⑤ both at the clutch cover and the clutch lever to have ample play in the clutch cable.

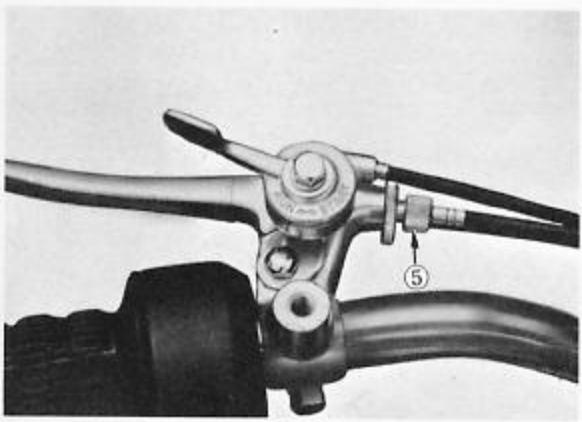


Fig. 2–15 Adjusting clutch cable adjuster

3. ENGINE

DESCRIPTION

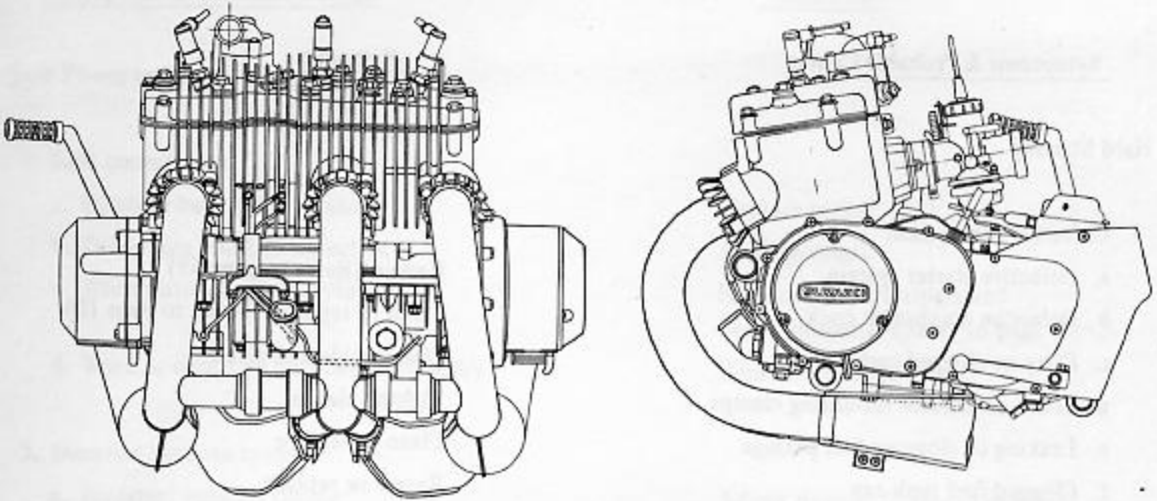


Fig. 3–1 Front and side view of GT750 engine

GT750 Engine is a water cooled, two cycle engine, and has a three-cylinder structure having piston valves. The cylinder head, made of aluminum alloy for weight reduction and high rate of heat radiation, has a dome type combustion chamber. The cylinder block is a one-piece cast structure with the coolant passages used for the cooling over the entire length of cylinder, and the block is made of an aluminum alloy with cast-in cylinder liners.

A fully counter-balanced 120° crankshaft is supported with four main bearings. Piston is also made of a light alloy and two keystone rings are fitted.

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedies
Hard Starting	
1. Defective fuel system	
a. Defective starter system	Repair (Refer to page 65)
b. Defective diaphragm cock	Clean or replace (Refer to page 10)
c. Dirty or clogged carburetor	Disassemble and clean
d. Loose carburetor mounting clamps	Tighten clamps
e. Leaking or clogging fuel passage	Clean or replace
f. Clogged fuel tank cap	Repair or replace
2. Incorrect ignition system	
a. Burnt contact point/s	Replace point/s
b. Incorrect point gap	Adjust gap (Refer to page 92)
c. Incorrect spark plug gap	Adjust gap (Refer to page 93)
d. Incorrect ignition timing	Adjust timing (Refer to page 94)
e. Loose or defective spark plug/s and high tension cord/s	Tighten or replace
f. Defective ignition coil	Replace coil
g. Defective condenser/s	Replace condenser/s
h. Wet spark plug/s	Clean or replace plug/s (Refer to page 93)
3. Engine	
a. Worn pistons, piston rings & cylinders	Replace pistons, piston rings, and bore cylinders (Refer to page 26)
b. Worn crankshaft oil seal	Replace oil seal
c. Loose cylinder head	Tighten nuts (Refer to page 32)
4. Defective electric system	
a. Defective starter motor	Repair (Refer to page 80)
b. Discharged battery	Charge battery
c. Defective battery	Replace
d. Defective starter clutch	Repair or replace (Refer to page 78)

Symptoms & Probable Causes	Remedies
Low Power or Loss of Power	
1. Low compression	
a. Cylinder head gasket leaking	Replace gasket
b. Piston ring stuck or defective	Replace ring/s
c. Worn piston ring/s or cylinder/s	Replace piston/s, ring/s and bore cylinder/s (Refer to page 26~29)
d. Worn or defective crankshaft oil seal/s	Replace oil seal/s
2. Incorrect ignition system	
a. Incorrect ignition timing	Adjust timing (Refer to page 94)
b. Defective spark plug/s	Clean or replace
c. Defective contact point/s	Repair or replace
d. Defective condenser/s	Replace condenser/s
3. Insufficient fuel	
a. Clogged or maladjusted carburetor	Disassemble, clean & adjust (Refer to page 68)
b. Clogged diaphragm cock	Repair or replace (Refer to page 71)
c. Clogged fuel pipe/s	Clean pipe/s
4. Insufficient air intake	
a. Restricted air cleaner	Clean or replace element (Refer to page 10)
5. Overheating	
a. Insufficient cooling solution	Replenish (Refer to page 61)
b. Defective thermostat	Replace thermostat (Refer to page 57)
c. Worn or damaged water pump	Replace pump
d. Clogged or leaky radiator	Flush, repair or replace (Refer to page 55)
e. Incorrect ignition timing	Adjust timing (Refer to page 94)
f. Faulty cooling fan	Repair or replace
g. Clogged cooling system passage	Clean
h. Low grade engine oil	Change with proper oil
i. Clogged or obstructed radiator fins	Clean

Symptoms & Probable Causes	Remedies
Popping, Spitting & Detonation	
1. Ignition system	
a. Incorrect ignition timing	Adjust timing (Refer to page 94)
b. Loose wire and high tension cord	Check connection
c. Defective spark plug	Clean or replace
d. Incorrect heat range spark plug	Clean or replace (Refer to page 95)
e. Defective ignition coil and condenser	Replace
f. Burnt contact points	Dress or replace (Refer to page 92)
2. Air-fuel mixture	
a. Lean mixture	Clean and adjust carburetor (Refer to page 68)
b. Dirty carburetor	Clean carburetor
c. Clogged fuel pipe and cock	Clean or replace
d. Incorrect float level	Adjust (Refer to page 70)
e. Water in carburetor	Clean and check fuel tank
f. Loose carburetor mounting nut	Tighten
3. Cylinder head	
a. Excessive carbon deposit	Remove carbon
b. Clogged water passage in cylinder head	Clean water passage
c. Defective cylinder head gasket	Replace gasket
Rough Engine Idling	
1. Fuel system	
a. Unbalanced carburetor idling adjustment	Adjust and synchronize each carburetor (Refer to page 69)
b. Incorrect float level	Adjust (Refer to page 70)
c. Incorrect throttle wire play	Adjust wire play (Refer to page 70)
2. Engine	
a. Worn crankshaft oil seal	Overhaul engine and replace
b. Incorrect ignition timing	Adjust (Refer to page 94)
c. Defective cylinder gasket	Replace
d. Wet spark plug	Clean or replace

Symptoms & Probable Causes	Remedies
Engine Misfires at Accelerating	
1. Fuel system	
a. Water in fuel or clogged carburetor jets	Disassemble and clean carburetor
b. Clogged fuel pipe or cock	Clean or replace
c. Defective fuel cock diaphragm	Replace fuel cock
2. Ignition system	
a. Defective spark plug & incorrect gap	Replace & adjust (Refer to page 93)
b. Defective high tension cord	Replace
c. Burnt or defective contact point & condenser	Replace
d. Defective ignition coil	Replace
e. Incorrect ignition timing	Adjust (Refer to page 94)
3. Engine	
a. Worn crankshaft oil seal	Overhaul engine and replace
b. Defective cylinder head gasket	Replace

Engine Noise

Tracing the noise source of engine is a very difficult matter even for a skilled engineer. Naturally it seems impossible to specify the procedure to trace the source of engine noise. The best way would be to rely upon the judgement of a skilled man.
In the following we will describe a tracing procedure through which you might be able to trace the noise source more systematically to some extent.

In case of glinding and dragging noise:

1. When the clutch is off, the character of noise changes.	
a. Defective clutch system or too much play in clutch system	Adjust or replace (Refer to page 36)
b. Defective transmission gear system	Check or replace
c. Defective transmission bearing	Check or replace

Symptoms & Probable Causes	Remedies
2. The character of noise never changes whether clutch is on and off.	
a. Defective crankshaft bearing	Replace
b. Defective pump system	Check or replace
c. Defective starter clutch	Check or replace
d. Faulty ignition system	Check or replace
e. Failure in power train except clutch system	Check and repair
In case of knocking or slopping noise:	
1. Noise is generated over all the speed range.	
a. Scored piston onto cylinder	Hone cylinder and replace piston
b. Worn piston pin	Replace
2. Noise is generated during the engine deceleration from high speed range.	
a. Excessively worn piston	Replace
b. Worn connecting rod bearing	Replace
In case of rustling noise during idling:	
1. Insufficient oil in transmission case	Check
2. Insufficient lubrication for contact breaker cam etc.	Check
3. Check if the noise comes from the water pump located under engine case.	
Irregular clicking noise:	
1. Markedly worn piston ring	Replace
2. Broken piston rings	Replace
3. Piston ring caught at cylinder port	Glind off edge of port
Excessive Oil Consumption	
1. Oil leak	
a. Loose oil pipe & connector	Repair or tight
b. Loose check valve gasket	Tight or replace
c. Loose oil pump fitting screw	Tight
2. Oil pump	
a. Incorrect oil pump adjustment	Adjust control lever
b. Clogged check valve	Replace

(Refer to page 10)

ON FRAME SERVICE

The following maintenance procedure can be performed without dismounting engine from the frame.

Cylinder Head

Removal

1. Drain cooling system by loosening the water drain plug ①.

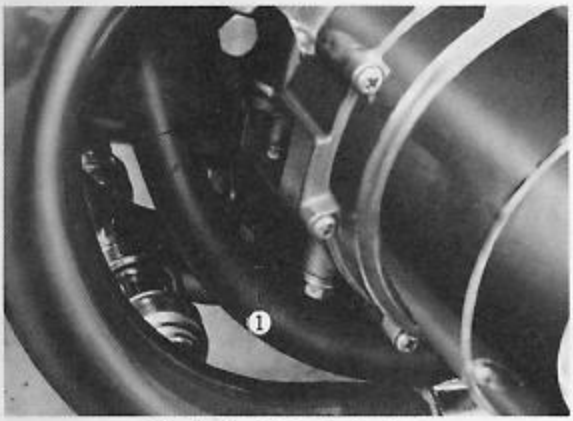


Fig. 3–2 Water drain plug

2. Disconnect fuel hose and fuel cock, and then fuel tank can be removed.

3. Disconnect radiator inlet hose.

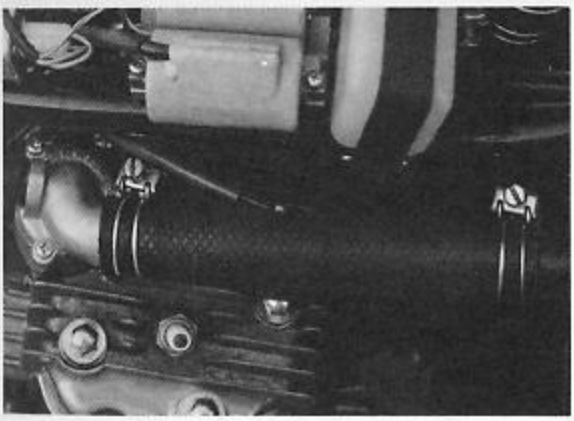


Fig. 3–3 Radiator inlet hose

4. Loosen water by-pass hose clamp.

5. Loosen cylinder head fitting bolts diagonally as shown in illustration to dismount the cylinder head.

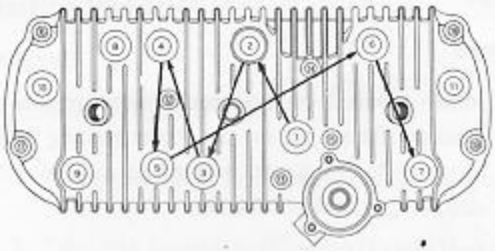


Fig. 3–4 Tightening order of cylinder head bolts

Cylinder

Removal

1. After removing cylinder head, loosen exhaust pipe clamps.

2. Loosen the carburetor fitting clamps and then remove carburetors.

3. Remove SRIS (SUZUKI Recycle Injection System) pipes ① from cylinder.

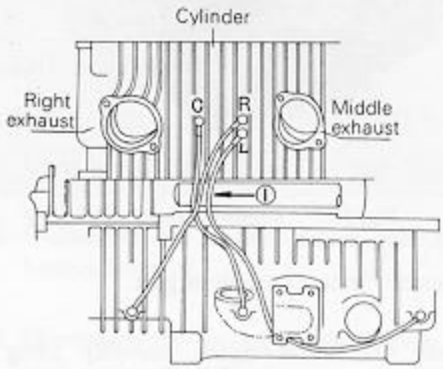


Fig. 3–5 SRIS pipes

4. Lift up cylinder after loosening cylinder set nut.

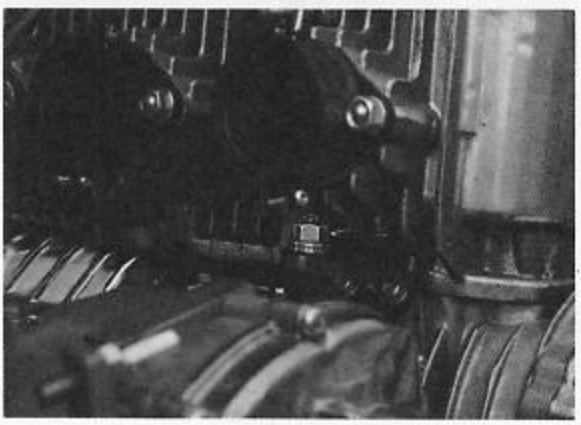


Fig. 3–6 Cylinder set nut

Piston

Removal

1. After removal of cylinder, remove piston pin circlips from piston pin hole placing waste cloth over crankcase preventing circlips from dropping into crankchamber.

2. Pull out piston pin, and then take off piston.

Starter Clutch

Removal

1. Remove starter clutch cover ①.

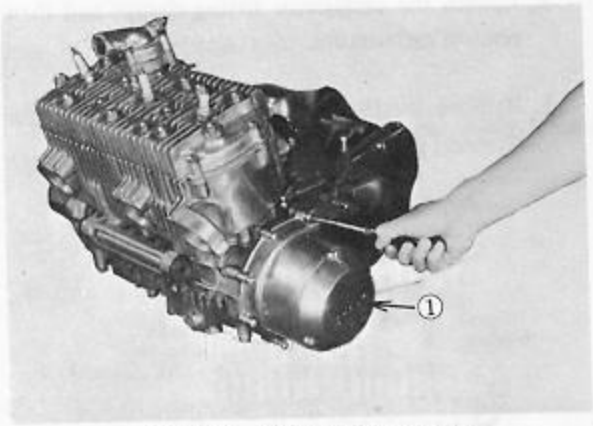


Fig. 3–7 Removing clutch cover

2. Remove water pump drive gear.

3. Take off starter clutch assembly using the Starter Clutch Remover ① (09920–53110) and Starter Clutch Holder ② (09920–40111).

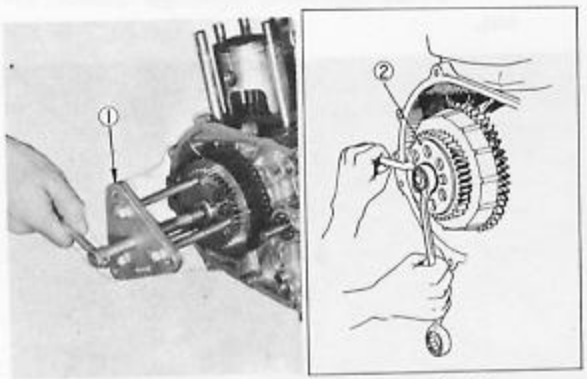


Fig. 3–8 Taking off starter clutch

Alternator

Removal

1. Remove alternator cover.

2. Take off brush holder ① holding it firmly with hands, keeping in mind that brushes may jump out of holder and accordingly wires may be cut off.

3. Remove starter ②.

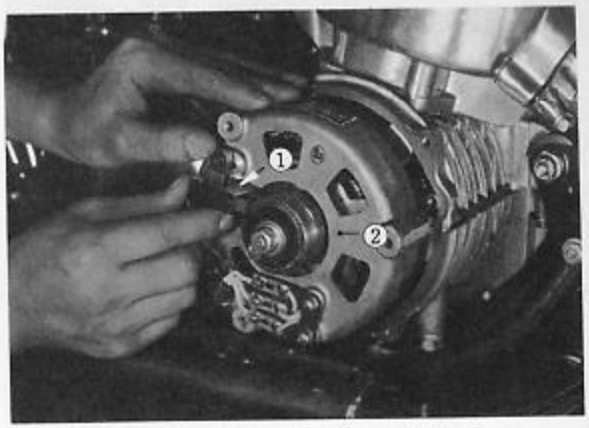


Fig. 3–9 Removing alternator brush

4. Remove rotor ① by using Rotor Remover ② (09930–33110).

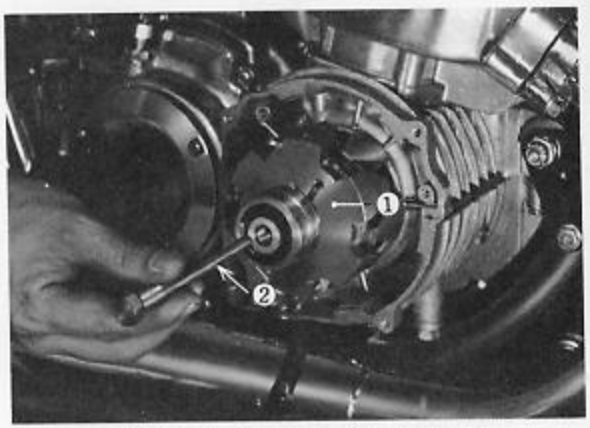


Fig. 3–10 Removing alternator rotor

Clutch

Removal

1. Remove clutch inspection cap and loosen clutch release shaft nuts ①, and then take off clutch lever ②.

2. Remove clutch cover ③.

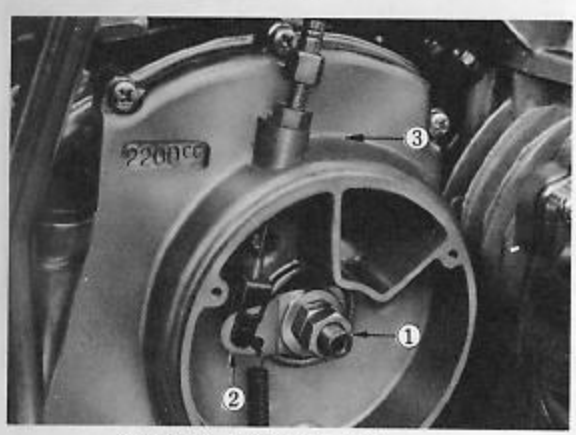


Fig. 3–11 Removing clutch cover

3. Remove clutch pressure disk ① and release shaft ②.

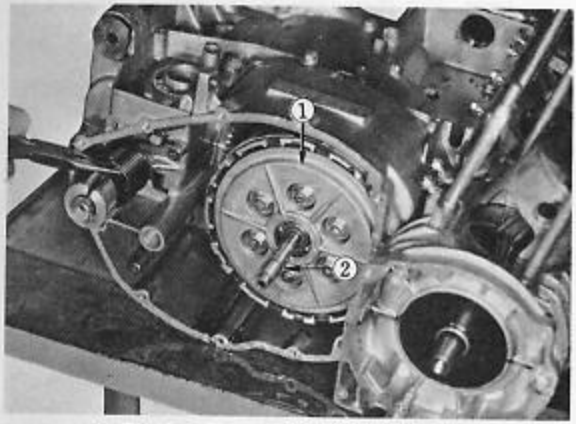


Fig. 3–12 Removing clutch disk

4. Remove clutch sleeve hub nut using Clutch Sleeve Hub Holder (09920–53110). Subsequent to the removal of clutch plates and sleeve hub, take off primary driven gear spacer ① and bushing ② by drawing with bolts ③, then remove the primary driven gear by sliding it backward.

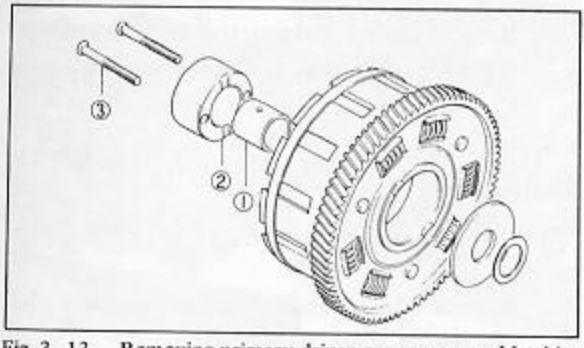


Fig. 3–13 Removing primary driven gear spacer and bushing

Starting Motor

Removal

1. Remove cylinder block.
2. Remove by-pass hose and starting motor cover.
3. Take off by-pass hose union ① and then draw starter motor backward.

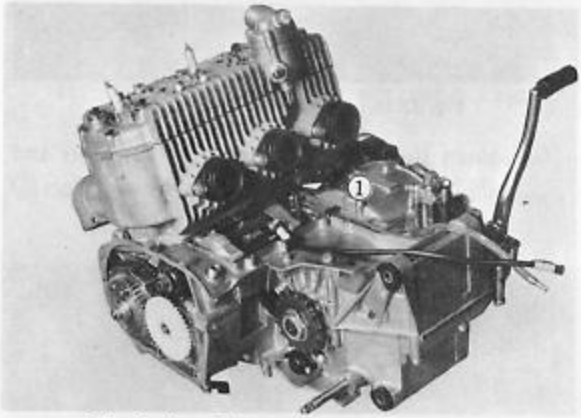


Fig. 3–14 Taking off by-pass hose union

MAJOR SERVICE

Removal

1. Drain the cooling system. See page 20.
2. Disconnect the starting motor wire from the battery terminal.
3. Disconnect the fuel pipes and unhook the fuel tank setting band ①, then remove the fuel tank by sliding it backward.

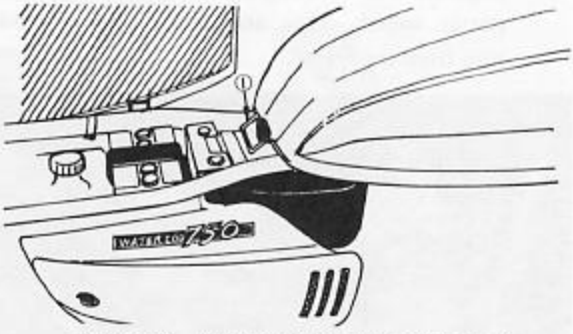


Fig. 3–15 Unhooking fuel tank setting band

4. Disconnect the radiator inlet hose. See Fig. 3–3.
5. Remove the cooling fan with its bracket.

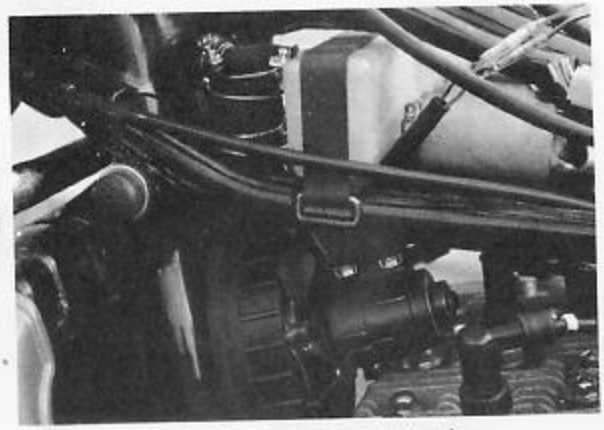


Fig. 3–16 Removing cooling fan

6. Loosen the exhaust pipe clamp set bolts and rear foot rests, then remove the mufflers ① and coupler tubes ②.

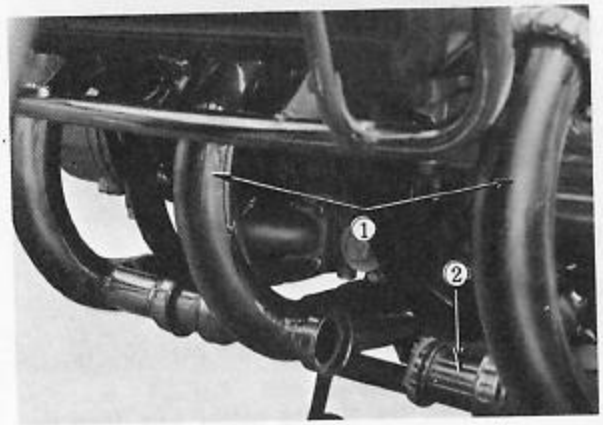


Fig. 3–17 Exhaust pipes & coupler tubes

7. Remove the frame left cover, and disconnect the alternator and the contact breaker couplers ①, ② from the coupler bracket, and also disconnect the starting motor lead ③ from the starter switch relay and the engine ground wire from the frame.

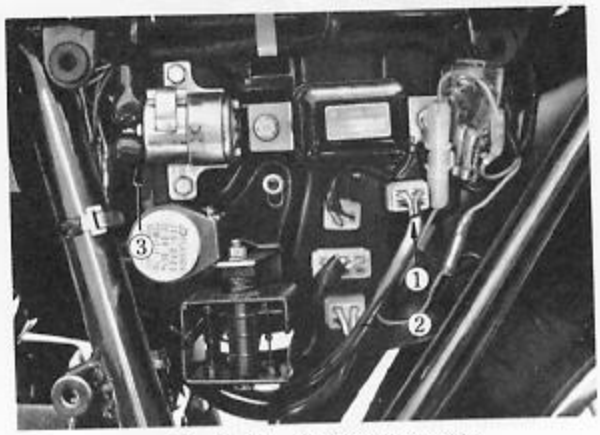


Fig. 3–18 Electric parts holder

8. Remove the air cleaner by loosening set bolts ① and carburetor clamps.

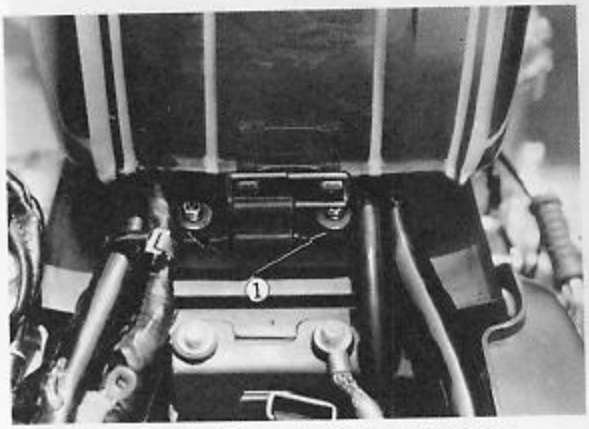


Fig. 3–19 Loosening air cleaner set bolts

9. Remove the left foot rest and gear shifting lever, and then remove the engine sprocket ① with the drive chain on it.

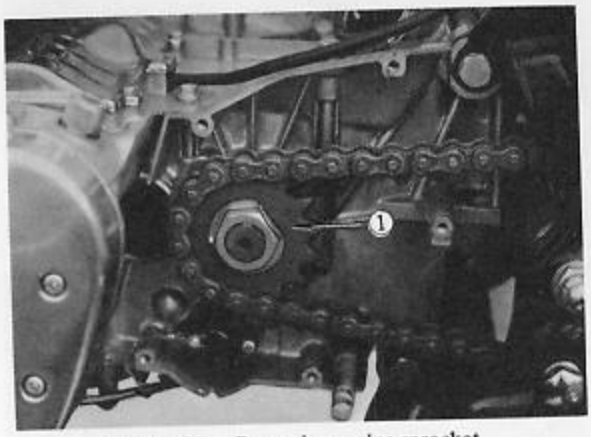


Fig. 3–20 Removing engine sprocket

10. Disconnect the clutch, oil pump, carburetor and tachometer cable.

11. Remove the right foot rest and brake pedal.

12. Remove the engine mounting bolts and mounting plates, then remove the engine from frame.

Disassembly

1. Drain the transmission oil.

2. Remove the contact breaker assembly by unscrewing three set screws.

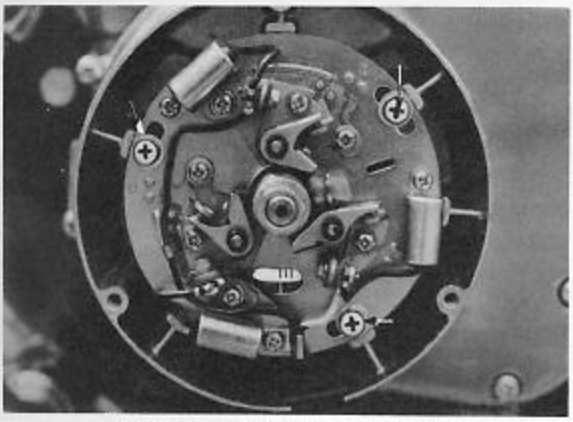


Fig. 3–21 Contact breaker assembly

3. Remove the starter clutch cover, and the water pump drive gear ① and starter idle gear ②, then remove the starter clutch with the Starter Clutch Remover (09920–53110). See page 21.

4. Extract the tachometer driven gear ③ with the sleeve on it, after loosening the set bolt ④.

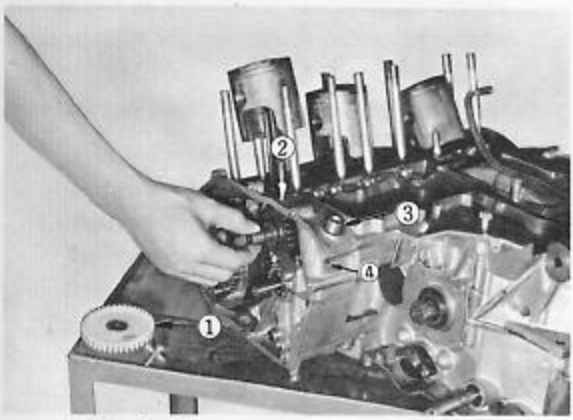


Fig. 3–22 Removing water pump driving parts

5. Remove the gear shifting switch ① and drive shaft oil seal retainer ②.

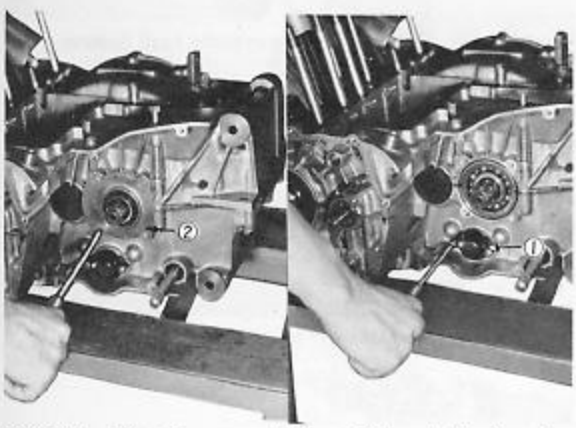


Fig. 3–23 Removing gear shifting switch and oil seal retainer

6. Remove the alternator housing assembly, and the rotor with the Rotor Remover (09930–33110). See Fig. 3–10.

7. Remove the by-pass hose from cylinder head, and loosen the cylinder head bolts in criss-cross style, and remove the cylinder head.
See page 20.

8. Remove the SRIS (SUZUKI Recycle Injection System) oil hoses from the cylinder and crankcase, and remove the cylinder by loosening the cylinder fitting nut at the lower part of cylinder block. See page 20.

9. Remove the piston pin circlips, and piston pins and remove pistons.

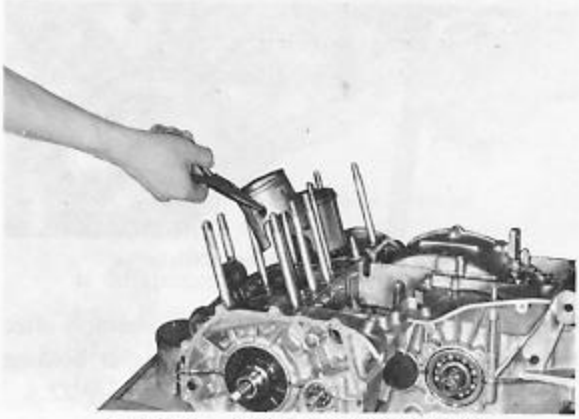


Fig. 3–24 Removing piston pin circlip

10. Remove the starting motor cover ①, and the water pump by-pass hose union (Fig.3–14), and slide the starting motor backwards to remove it.

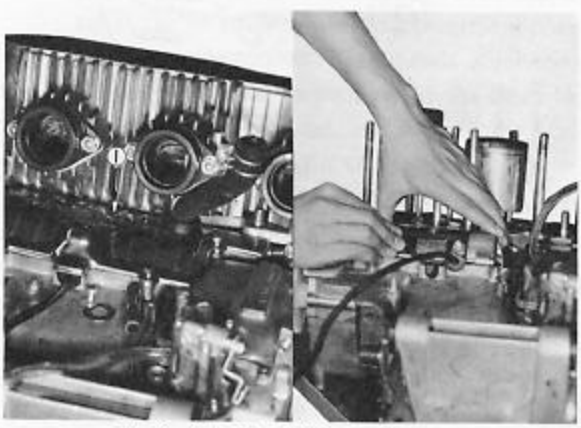


Fig. 3–25 Removing starting motor

11. Remove the oil pump cover, the oil pump and oil pipe comp..

12. Remove the clutch adjusting cap, then loosen and remove the clutch release shaft fitting nuts to take off the clutch release arm.
Remove the clutch cover, and the clutch pressure disk by removing six bolts, then take out the drive and driven plates.
Remove the clutch sleeve hub with the Clutch Sleeve Hub Holder (09920–53110).
See page 21.

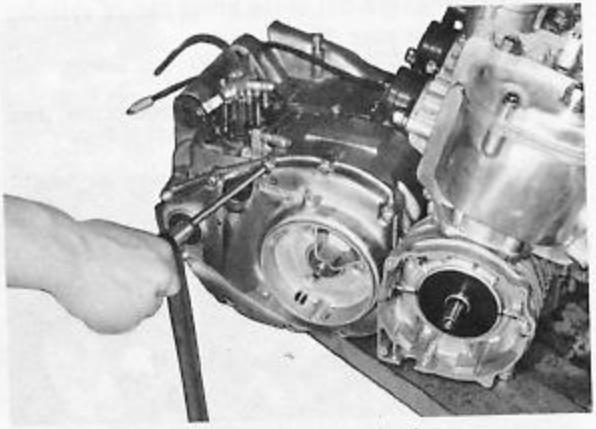


Fig. 3–26 Removing clutch cover

Remove the primary driven gear assembly after pulling out the primary driven gear bushing with two bolts screwed into it. See page 22.
Remove the transmission oil reservoir plate which is located on crankcase inside the clutch chamber.

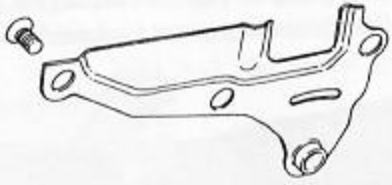


Fig. 3–27 Transmission oil reservoir

13. Remove the kick starter shaft spring guide, and the spring and its holder.

14. Loosen the crankcase fitting bolts in the reverse order of relieved (casted) numbers on the crankcase, and remove them all to open the crankcase.

15. Remove the shafts and gears.

Inspection & Repair

Clean out all disassembled engine parts completely, before starting the inspection and repair work. All locations with water leakage and defects should be checked carefully beforehand. Don't mix or change the originally mated parts of the pistons, piston rings and bearings.

Cylinder Head

1. Remove carbon deposists in combustion chamber with scraper or wire brush. Due care should be taken not to scratch the parting surface of cylinder head.

2. Check for any cracks in the head casting, also check for scratches or nicks on the parting surface. Replace the head, if necessary.

3. Check the flatness of parting surface using a feeler gauge ①. If warpage or distortion exceeding 0.04 mm (0.001") is found on the surface, repair the surface, or replace the cylinder head.

Note: When mesuring the flatness, mesure in six directions.

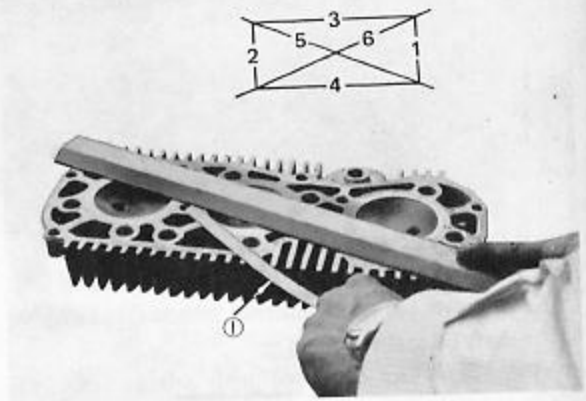


Fig. 3–28 Checking cylinder head flatness

Cylinder & Piston

1. Remove the carbon deposit in exhaust port, but ample care should be taken not to scratch the inner wall of cylinder.

2. Check any cracks in cylinder block, and then check any burrs and nicks on the parting gasket surface. Use special apparatus observe the minor defects, since they may not be found visually. The block should be pneumatically tested with the air pressure of 3 kg/cm^2, and it is acceptable if no leakage is found out.

3. Measure the cylinder block surface flatness on the gasket side in the same way as the cylinder head. If its warpage exceeds 0.05 mm (0.002") in magnitude, scrape off the surface or replace the block itself.

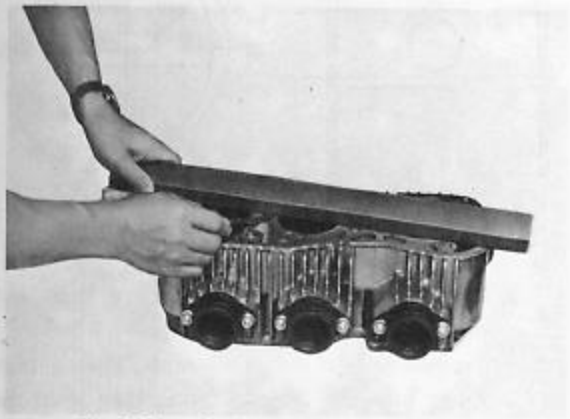


Fig. 3–29 Checking cylinder block flatness

4. Measure the out of roundness and taper wear of the cylinder bore with the cylinder gauge. Cylinder bore should be measured at upper, middle and lower points of the bore surface in both lateral and transverse directions with respect to the cylinder block center line as shown in the figure.

Fig. 3–30 Measuring cylinder bore for wear

Fig. 3–31 Directions to be measured

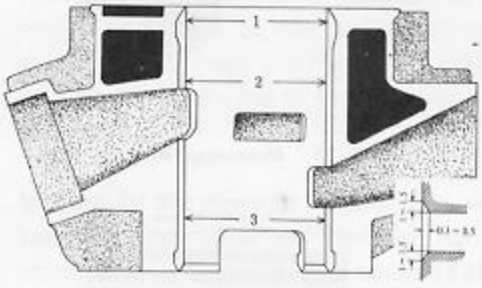


Fig. 3–32 Positions to be measured

If differences between the maximum and minimum bore diameters measured exceed 0.07 mm (0.0018"), rebore and polish off the cylinder by honing.

Cylinder bore (Standard):
70.000~70.015 mm (2.7559~2.7565")
Wear & taper limit: 0.07 mm (0.0018")

If reboring is needed, measure the bore diameter at the location of maximum wear, and then select oversize pistons. The amount of reboring needed should be determined by the diameter of oversize pistons used, and the cylinder bore clearance.

Piston diameter:
STD: 69.950~69.965 mm (2.7539~2.7545")
O/S 0.5:
70.450~70.465 mm (2.7736~2.7742")
O/S 1.0:
70.950~70.965 mm (2.7933~2.7939")
Piston bore clearance (Standard):
0.045~0.055 mm (0.0018~0.0022")

Note: When reboring, both intake and exhaust ports are to be chamfered as shown in Fig. 3–32.

Piston diameter should be measured always normal to the piston pin center line and at 32 mm (1.26") above the lowest end.

Fig. 3–33 Measuring piston diameter

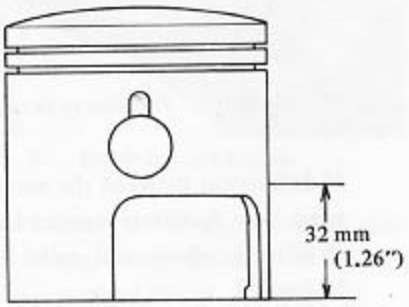


Fig. 3–34 Measuring point

*Necessity of determining measuring points of piston and cylinder bore diameters *

Reasons for having measuring points of both piston and cylinder bore diameters fixed are as follows:

(1) As shown in Fig. 3–32, the cylinder has inlet, scavenging, and exhaust ports bored on the cylinder surface. When a piston is subjected to reciprocating motion cylinder wall, amount of wear of cylinder is always larger in the neighborhood of the port, resulting in a kettle type elliptic shape when magnified. On the other hand, near the top position, the wall is exposed to higher temperatures and pressures from combustion gas which contribute to accelerated wear of the cylinder. Naturally, the roundness and cylindricalness of the cylinder become needed and are to be measured at the top, middle, and bottom positions in both parallel and normal directions to the cylinder axis. This is needed to represent the shape of piston cylinder correctly.

(2) As shown in Fig. 3–35, piston has a taper in longitudinal direction and has an elliptic cross section. During engine operation, the piston is heated and expands. As the wall thickness increases, so does the expansion rate of piston. This taper is needed to obtain a true cylindrical form with roundness during engine operation, by machining as shown in the drawing.

I: Distance from the skirt bottom 32 mm (1.26")
II: Diameter at 90 to the pin boss
III: Diameter parallel with pin boss

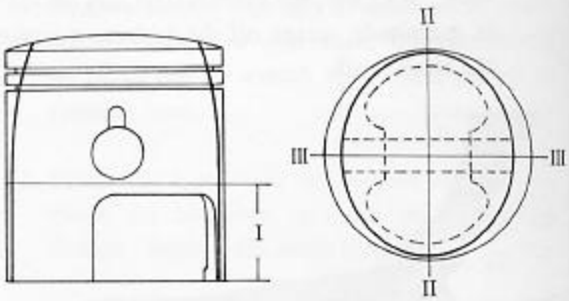


Fig. 3–35 Piston's out-of-round & tapering

5. Measure the clearance between cylinder and piston using piston feeler gauge.
To measure the piston clearance, insert a feeler gauge into the cylinder bore, then insert the piston top into the bore with the feeler gauge fixed at 90° to the piston pin axis. Then pull out the gauge: this can be done more accurately using a spring scale. The allowable limit of tension force should be between 1 and 2 kg (2.2~4.4 lb).

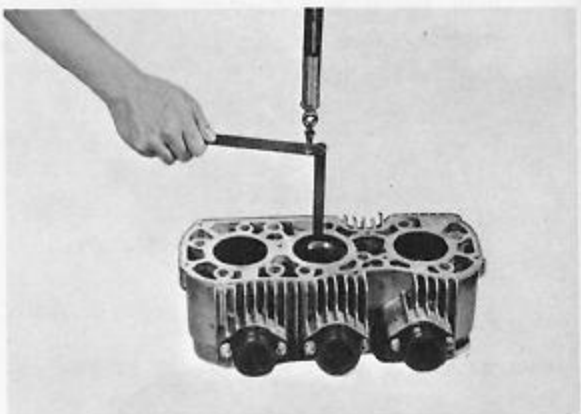


Fig. 3–36 Measuring cylinder clearance

If the piston clearance exceeds 0.070 mm (0.0018"), the cylinder should be rebored, or else the piston must be replaced.

Note: Two kinds of piston are available: Be carefull not to confuse each piston. (Refer to "Assembly" item.)

6. Examine piston pin boss and piston ring groove carefully for any abnormal wear, burrs or cracks. Check the piston side wall for any trace of sticking or scratches. If damaged excessively, replace the piston. If the damage is slight, polish it with #400 emery sand paper. As piston rings are paired with piston, replace both, if necessary.

Fig. 3–37 Polishing piston surface

Piston Ring

1. Check piston ring for any defects such as abnormal wear, etc.. To check the ring wear, insert piston ring into the cylinder bore from bottom to check the end gap of the ring. Replace the piston ring if the ring gap exceeds 0.7 mm (0.027").

Piston ring end gap (Standard):
0.15~0.35 mm (0.006~0.014")

Note: When checking the piston ring in the cylinder bore, insert it with the piston to settle it horizontally in the bore.

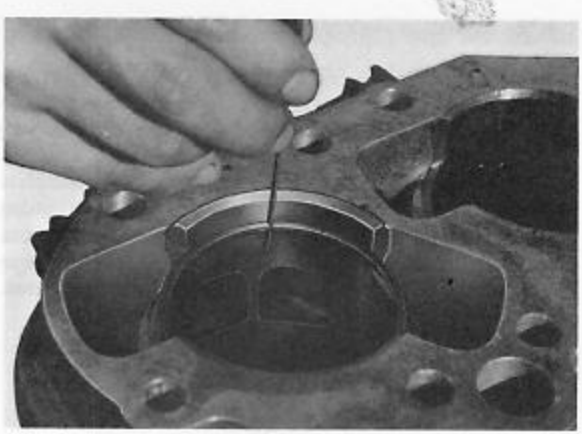


Fig. 3–38 Checking piston ring end gap

If only the rings are to be replaced without boring the cylinder, be sure to measure the ring end gap at the lower position of the cylinder bore where the amount of wear is expected to be a minimum.

2. Measure the side clearance of piston ring. Same key-stone type rings are used for top and second rings. Its periphery is machined like a barrel shape. Consequently, any piston ring trouble is quite rare. Piston groove wear may occur, which must be spotted.

Standard value of ring side clearance:
0.030~0.095 mm (0.001~0.004")

Fig. 3–39 Measuring piston ring side clearance

*The benefits of the key stone type rings *

The function of piston ring is to seal off the explosive gas preventing it blowing through cylinder and piston. To do this, the rings should be adhered onto the cylinder wall tightly, floating on the piston. But after long hours of operation, the carbon deposit as the product of incomplete combustion tends to accumulate in ring grooves, causing sticking of ring, resulting in poor sealing. The keystone ring in effect clears off the carbon deposit in grooves due to the tapered surface during reciprocating motion of piston.

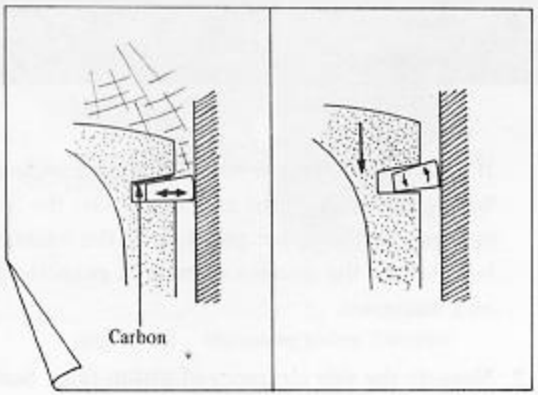


Fig. 3–40 Function of piston ring

The external barrel-like shape of the ring is effective for preventing the ring edge from contacting the cylinder wall or cylinder port edge, thus ring noise, oil film breakage, piston seizure, and excessive wear can be avoided. Very thin and wide rings are used, which is effective in reducing the tension. So it now becomes possible to prevent cylinder wall scuffing, and at the same time to reduce the friction power.

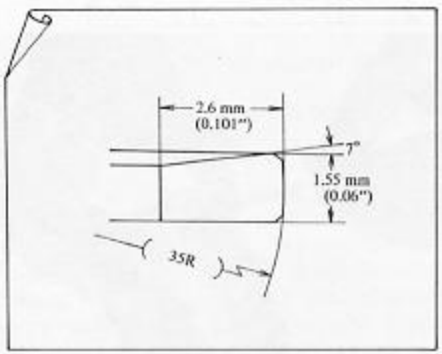


Fig. 3–41 Piston ring dimension

Crankshaft, Connecting Rod & Bearing

Crankshaft is assembled by press fitting. It is supported to crankcase by four main bearings. Both big and small end bearings in the connecting rod are of needle roller type having cages, resulting in extended engine life and reduced power loss.

1. Check the amount of bend and twist of connecting rod; the bent or twisted rod may cause abnormal wear in piston or cylinder or result in piston seizure.

2. Check the wear amount of small end bearing of connecting rod. Insert the bearing and piston pin in the small end and examine the play. If the play exceeds 0.05 mm (0.002"), replace the rod.

3. Check the amount of wear in connecting rod big end bearing. Measure the play at the end of connecting rod as shown in the figure. Replace the rod when the play exceed 3 mm (0.018"). Standard value of play at the end of connecting rod: 0.5~0.8 mm (0.02~0.03") Standard value of play for connecting rod big end thrust: 0.2~0.6 mm (0.008~0.023")

(Note) Check for abnormal wear or burn in connecting rod big end thrust washer.

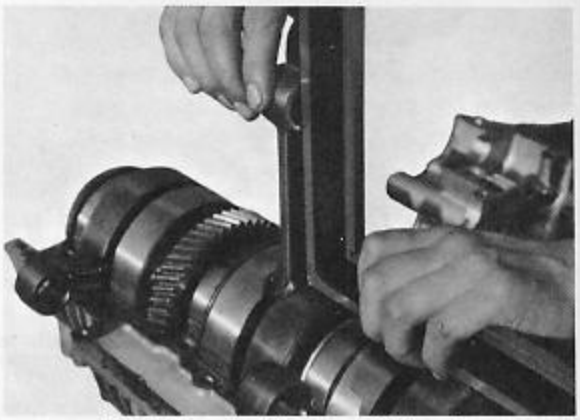


Fig. 3–42 Checking con-rod big end wear

4. Check for wear or creep of big end bearing. Turn bearing outer race, and check if the turning is smooth or if clicking noise is generated. Then check for the axial play of each bearing.

5. Check the bending of crankshaft. Mount crankshaft at both ends on V block, measure the run-out at crank web section or bearing with dial indicator. Half of this D.I.R. value is the bend of crankshaft. If the D.I.R. exceeds 0.08 mm (0.003"), replace or repair the shaft. Depending on the reading of indicator, correct the shaft hammering on the protruded side of the shaft to reduce the amount of bend using a copper hammer.

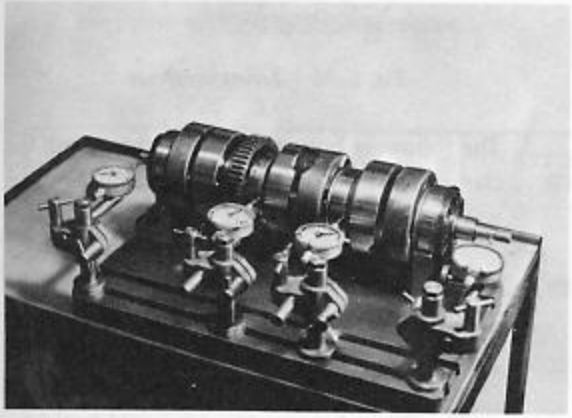


Fig. 3–43 Checking crankshaft bending

6. Check for the wear of oil seals and the damage of seal lips.
   If the sealing of oil lips is defective, fresh mixture may not be fully compressed resulting in hard starting and reduced power.

Note: Even when only one of the main bearing or oil seals is damaged, replace all of them as a set. Use always genuine parts, especially for bearings, because they are of special order-made.

Assembly

All rotating or sliding parts should be washed with solvent and then lubricated with engine oil before assembling. All gaskets, packings, oil seals, cottor pins and lock washers should be replaced upon assembly.
The special liquid gaskets and the adhesive cements are used to prevent the oil from leaking or to prevent the bolts and nuts from loosening.

1. Install the crankshaft assembly into the crankcase, with all the punch marks ① on the outside of crankshaft bearing aligning with the mating surface.

Note: Be careful that only the outermost right side bearing should be aligned at the backside of crankshaft, while others at the frontside.

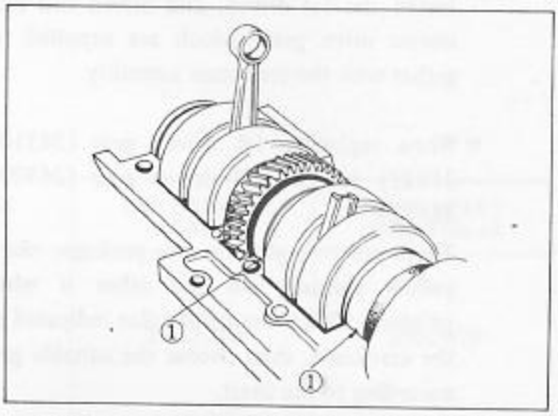


Fig. 3–44 Aligning mark on crankshaft bearing

2. Be sure to force the oil seals toward each bearing tightly except one placed between the primary gear and right crankshaft, so as not to come into contact with the crankshaft webs while running.

3. After installing the transmission gears, gear shifting mechanism and kick starter gear assembly into the lower crankcase, assemble the upper and lower crankcases with SUZUKI BOND No. 4 (99000–31030) applied on the upper mating surface.

Caution : The special attention should be paid to the following two points when assembling the crankcase.

a. Use exclusively the SUZUKI BOND No. 4 as a liquid gasket when reassembling in the market. Spread it on the upper surface thinly after cleaning the surface from dust, oil, water and other materials by swabbing with waste cloth. Wait at least 10 minutes before assembling.

b. The crankcase, 1st driven, 2nd driven and kick starter drive gears should be selection-assembled to get a optimum backlash for less noise from the transmission. Follow the instruction when replacing these parts.
Refer to chart at page 32.

* When replacing crankcase assembly (11304–31802)
  Install the 1st driven, 2nd driven and kick starter drive gears which are supplied together with the crankcase assembly.

* When replacing 1st driven gear (24310–31821) and/or 2nd driven gear (24320–31822)
  There are two gears in the package, one is yellow painted and the other is white painted. Check the paint color indicated on the crankcase, then choose the suitable gear according to the chart.

* When replacing kick starter drive gear (26240–31823)
  There are two gears in the package, one is brown painted and the other is yellow painted. Check the paint color indicated on the crankcase, then choose the suitable gear according to the chart.

4. Tighten the crankcase fitting bolts in the order casted upon the crankcase outside, with specified tightening torque.
   Standard specified tightening torque:
   6mm bolt 60~100 kg-cm(4.34~ 7.23 lb-ft)
   8mm bolt 130~230 kg-cm(9.38~16.65 lb-ft)
   10mm bolt 250~400 kg-cm(18.08~28.90 lb-ft)

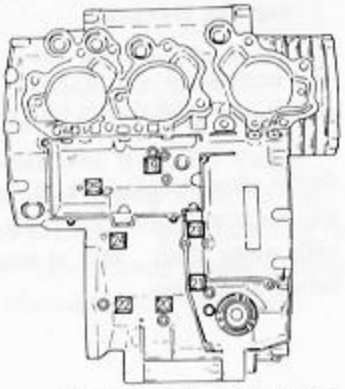


Fig. 3–45 Upper crankcase

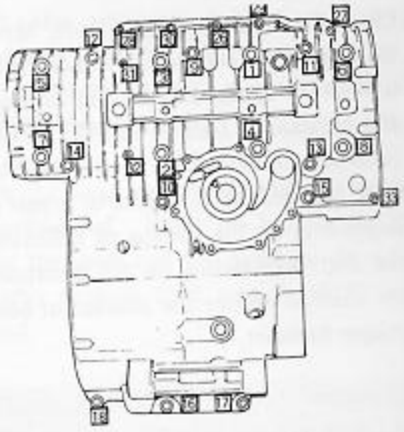


Fig. 3–46 Lower crankcase

5. The following bolts should be tighten with the clamps or special washers instead of the plane washers.

   * The fitting bolts for No. 8, 10, 14 should be tighten with the clamps for the alternator and contact breaker cords.

   * The fitting bolt for No. 13 should be tighten with the copper washer.

   * The fitting bolt for No. 22 should be tighten with the engine ground lead wire clamp.

   * The clamps connecting the alternator and contact breaker cords should be fixed with No. 6 bolt.

6. Assemble the pistons onto the connecting rod with the arrow marks on its head toward front.

Note: **There are two kinds of pistons marked "R" and "L" on the head, the piston with "R" is to be right, and that with "L" is to be left and center cylinders.**

7. Install the piston rings into the piston.

Caution: In case that the piston rings are not replaced with the new one when reassembling, install them in the same position as they were originally assembled.

8. Install three "0" rings in place on the front end of upper crankcase.

9. Place the new cylinder gasket on the upper crankcase, and install the cylinder block.

Caution: Make sure that the piston ring end gap has aligned with the knock pin on the piston groove.

10. Tighten the cylinder set nut.

11. Place the cylinder head on the cylinder block and tighten the bolts in the order illustrated in the figure with the specified torques.

Standard specified torque:

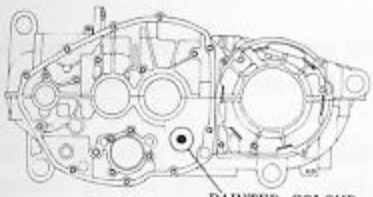
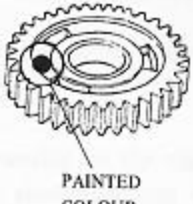
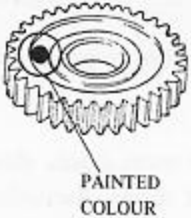
8 mm bolts and nuts

180~220 kg-cm (13.0~15.9 lb-ft)

10 mm bolt

300~400 kg-cm (21.7~29.0 lb-ft)

12. Connect the SRIS pipes to the check valves both on the crankcase and cylinder block.

CRANKCASE COLOUR	1ST DRIVEN GEAR	2ND DRIVEN GEAR	KICK START DRIVE GEAR
B R O W N B L A C K R E D Y E L L O W	YELLOW	YELLOW	BROWN
B L U E G R E E N W H I T E	WHITE	WHITE	YELLOW
			

4. CLUTCH

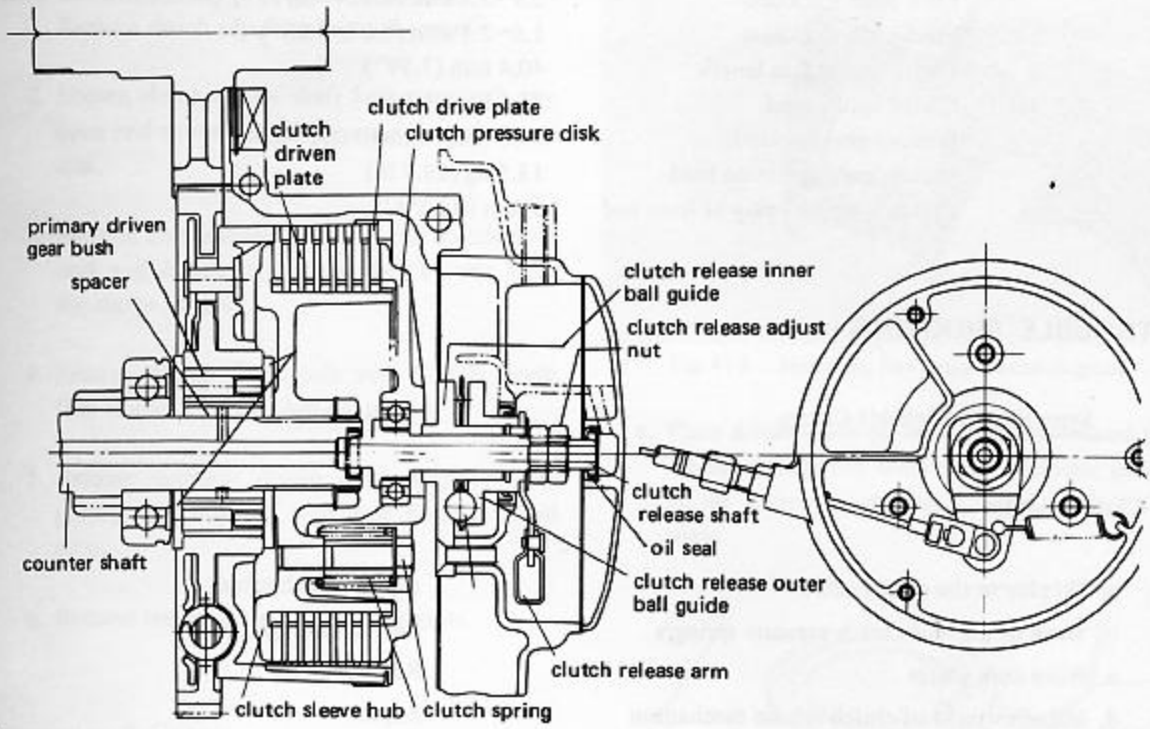


Fig. 4–1 Cross-sectional view of clutch

Large capacity multi plate wet type clutch is used in the vehicle consisting of eight large clutch cork plates, seven clutch steel plates, and six loading springs.

By operating clutch lever, clutch release mounting on the right side clutch cover moves release rod. Thus engagement or disengagement of cork with steel plate can be obtained, which lead to power on off to transmission. In the release mechanism, three balls are used to reduce the operating force of clutch lever.

The transmission oil splashed up by clutch, is sent to the inside of counter shaft through release rod, thus the lubrication of sleeve hub and bushings is attained.

Two kinds of clutch damper springs are installed in primary driven gear. They absorb abnormal driving shock torque and prevent damages of engine parts, leading to more comfortable drivability.

SPECIFICATIONS

Cork plate thickness	2.9~3.1 mm (0.114~0.122")
Steel plate thickness	1.9~2.1 mm (0.07~0.08")
Clutch spring free length	40.4 mm (1.59")
Clutch spring load	23.5 kg (51.7 lb)
Primary gear backlash	0.02~0.07 mm (0.001~0.003")
Clutch lever operation load	13.5 kg (29.7 lb)
Clutch lever free play at lever end	3 mm (0.12")

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedies
Clutch slippage	
a. No play in the clutch cable	Adjust clutch cable
b. Weak or unequal clutch pressure spring/s	Replace spring/s
c. Worn cork plates	Replace plates
d. Maladjustment of clutch release mechanism	Adjust
e. Warped cork or steel plates	Replace plates
Excessive noise	
a. Excessive primary gear backlash	Replace gear
b. Worn or defective dumper spring	Replace primary driven gear
c. Excessive play in countershaft	Repair or replace
Irregular operation	
a. Worn clutch sleeve hub	Repair or replace
b. Worn or oilless clutch wire/s	Lubricate or replace
c. Defective clutch release mechanism	Repair

Removal & Disassembly

Refer to "Disassembly of Engine" at page 25.

1. Remove clutch adjusting cap and gasket.
2. Loosen clutch release shaft lock nuts with two open end wrenches and remove nuts and release arm.
3. Remove clutch cover, and take out clutch drive cork and driven steel plates one by one from the clutch housing.
4. Remove clutch sleeve hub with Clutch Sleeve Hub Holder (09920–53110).
5. Remove primary driven gear assembly after pulling out bushing with two bolts installed on it.
6. Remove transmission oil reservoir plate.

Inspection & Repair

a. Measure the wear amount of clutch drive plate.
STD thickness: 2.9~3.1 mm (0.011~0.012")
Wear limit: 0.2 mm (0.008")

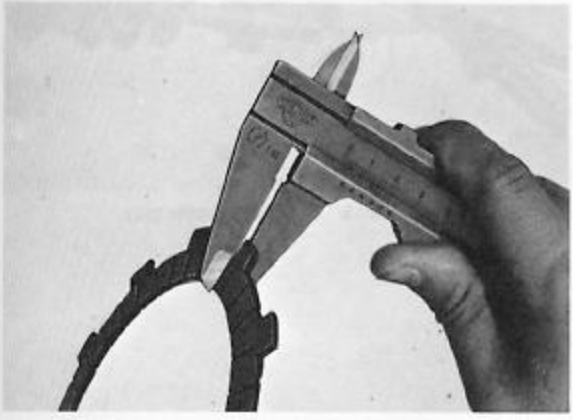


Fig. 4–2 Checking clutch drive plate for wear

b. Measure the free length of clutch spring.
STD length: 40.4 mm (1.59")
Spring setting limit: 1.4 mm (0.055")

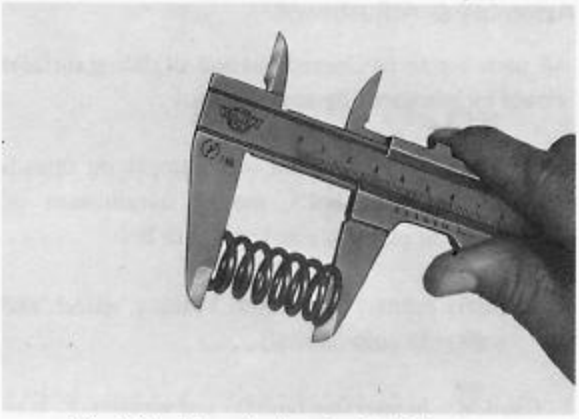


Fig. 4–3 Measuring free length of clutch spring

c. Place driven plate on surface plate, measure the clearance between them with thickness gauge. If the clearance exceeds 0.3 mm, replace the plate.

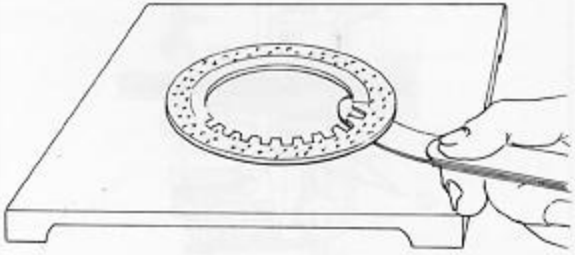


Fig. 4–4 Checking warpage of clutch driven plate

d. Check the tooth flank of sleeve hub for any crack, scratch, or uneven wear. If the amount of wear is small, repair it. If too large, replace it.

e. Check the wear amount of bearings installed in clutch pressure disk. Turn the bearing. If smooth rotation is not obtained, replace it, even if no noise is generated.

f. Check the outer and inner ball guide of clutch release mechanism for any crack or uneven wear, etc.

All parts are to be cleaned out and all sliding surfaces should be lubricated by applying oil.

a. After applying thread lock cement on threads of tightening bolts, mount transmission oil reservoir plate on crankcase with bolts.

b. Insert primary driven gear bushing, spacer, and washer to counter shaft.

Caution: In inserting bush ① and washers ②, take care in aligning their direction. Some motor oil is to be applied to the inside of bushing and the outside of spacer.

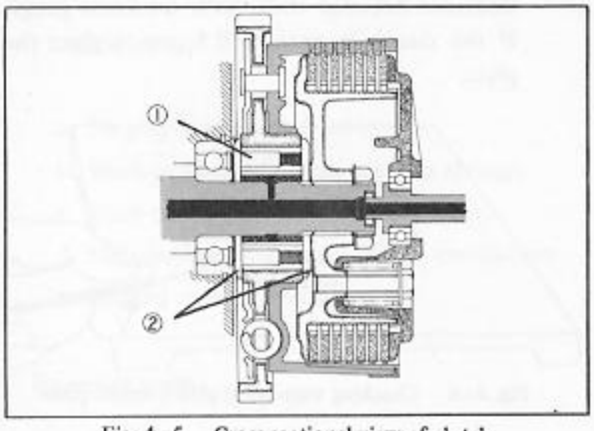


Fig. 4–5 Cross sectional view of clutch

c. Tighten clutch sleeve hub nut at specified torque of 400~550 Kg.-cm (29~40 lb.-ft).

d. Supply motor oil into the hole of clutch sleeve shaft.

e. To assemble clutch release ball guide, tighten set screw after setting the outer ball guide into the specified position as shown in Fig. 4–6.

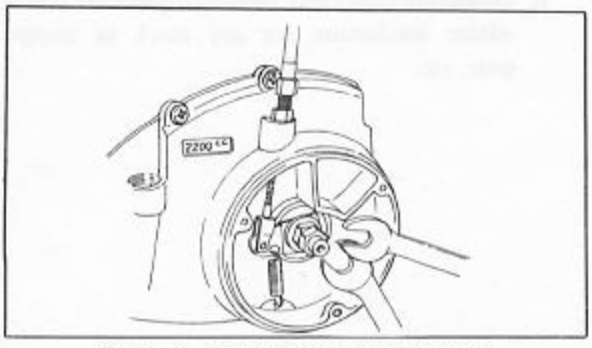


Fig. 4–6 Tightening release shaft nuts

f. Clutch should be adjusted as follows. Loosen cable adjuster Ⓐ until an ample play of clutch cable ① can be obtained. Tighten the double nuts ② by insuring an axial play of the release shaft ③ to be approximately 0.2 mm. Then, adjust the play of lever to be 3 mm at the root by adjusting the cable adjuster Ⓐ Ⓑ

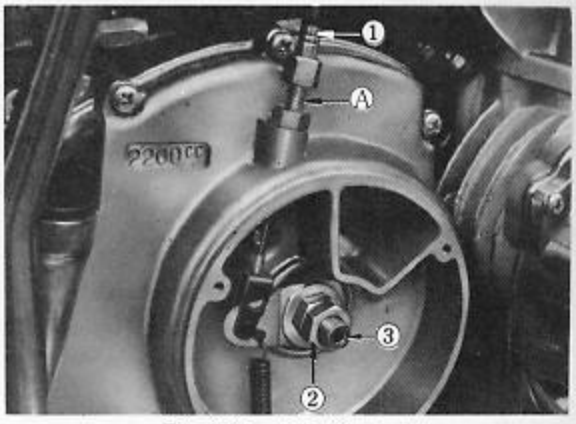


Fig. 4–7 Adjusting clutch

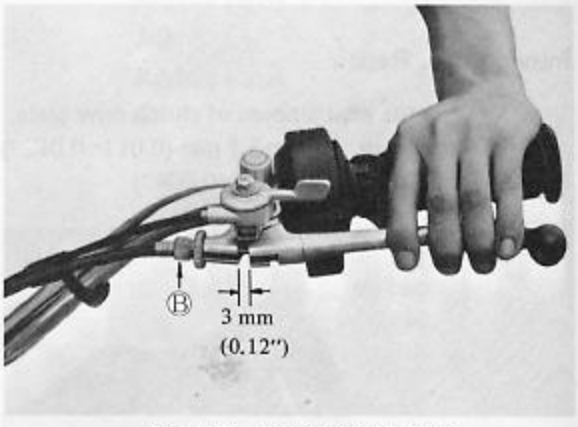


Fig. 4–8 Adjusting cable play

5. TRANSMISSION

DESCRIPTION

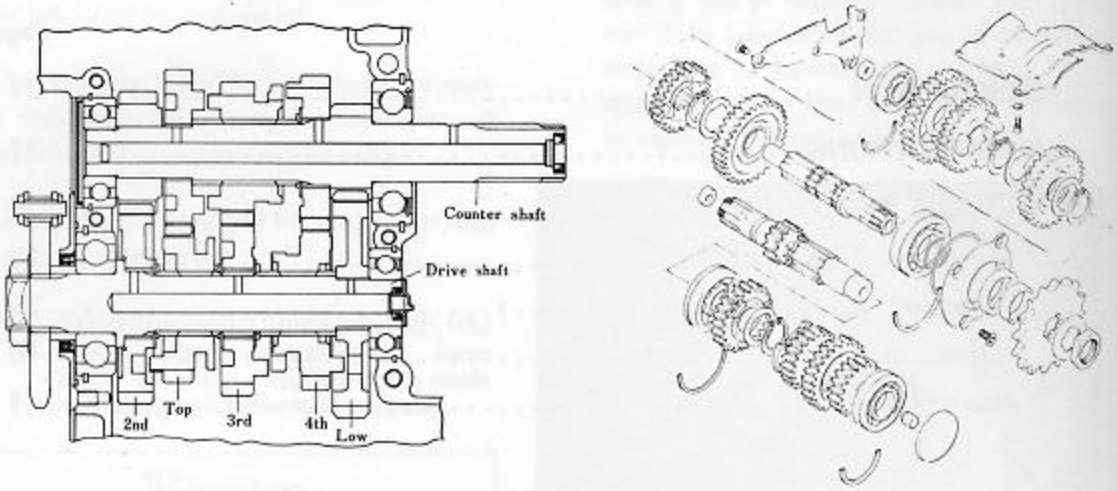


Fig. 5–1 GT750 Transmission gears

Five speed, constant mesh transmission is adopted. Gears can be shifted by select-fitting-gears through gear shifting cam and shifting fork fitted on it.

SPECIFICATIONS

Gear ratios		
	1st (low)	2.846 : 1 (37/13)
	2nd	1.736 : 1 (33/19)
	3rd	1.363 : 1 (30/20)
	4th	1.125 : 1 (27/24)
	5th (top)	0.923 : 1 (24/26)
Primary reduction ratio (gear)		1.673 : 1 (82/49)
Final reduction ratio (chain)		3.133 : 1 (47/15)
Overall reduction ratios		
	1st (low)	14.92 : 1
	2nd	9.09 : 1
	3rd	7.14 : 1
	4th	5.89 : 1
	5th (top)	4.48 : 1
Kick gear reduction ratio		4.24 : 1

Symptoms & Probable Causes	Remedies
Difficult gear shifting	
a. Improper clutch disengagement	Adjust clutch
b. Foreign objects on gear teeth	Repair
c. Defective or damaged gear/s	Replace gear/s
d. Inoperative gear shifting fork/s	Repair or replace
e. Improper operation of gear shifting mechanism	Repair
f. Excensive high oil viscocity	Change oil (Refer to page 12)
Gear slipping out	
a. Worn gear dog and dog hole	Replace
b. Worn yokes on gear shifting fork/s	Replace
c. Worn spline on shaft/s	Replace
Excessive gear noise	
a. Excessive gear backlash	Replace gear/s
b. Worn bearing/s	Replace bearing/s
c. Worn spline on shaft/s	Replace shaft/s
d. Improper gear oil	Change oil (Refer to page 12)

Removal & Disassembly

1. After opening crankcase, lift up both ends of counter shaft assembly and drive shaft assembly, which now enables us to remove the assembly from lower crankcase.

2. Disassembling gear shift mechanism: After pulling out gear shifting shaft ① from crankcase lower cover, remove shifting pawl lifter ② and cam guide ③. Remove shifting cam driven gear ④. Pull out neutral stopper spring holder ⑤ from the rear side of low crankcase. Take out shifting cam ⑥ and shifting fork shafts ⑦ from casing.

3. Disassembly of counter shaft: Pull out press fit 2nd driven gear by using an arbour press, then 4th driven gear can be pulled out after removal of circlip as shown in Fig.

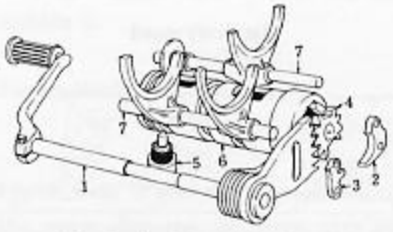


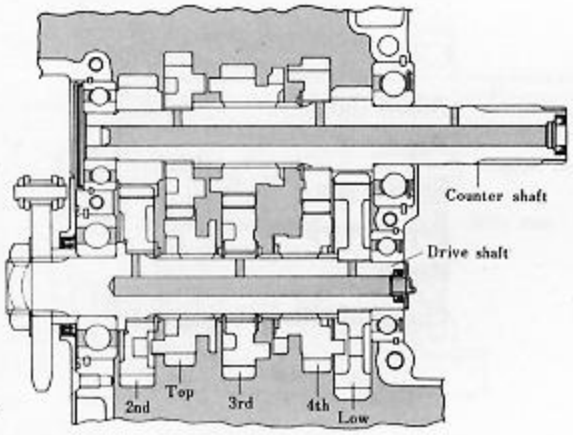
Fig. 5–2 Gear shifting mechanism

Caution: Replacement of 2nd gear is permitted only twice. After that, the counter shaft assembly is to be replaced. Otherwise, the tightening force of second gear deteriorates causing the gear to creep.

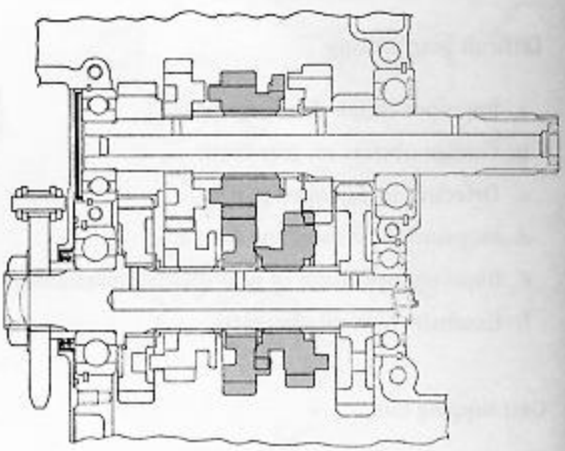
4. Drive shaft can be disassembled by removing the circlip as shown Fig.

Operation

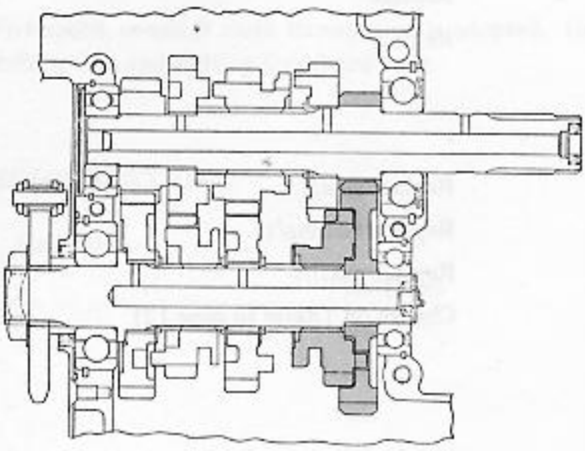
1. Engine power is transmitted by way of the clutch to the rear drive wheel using driving gears as shown under.



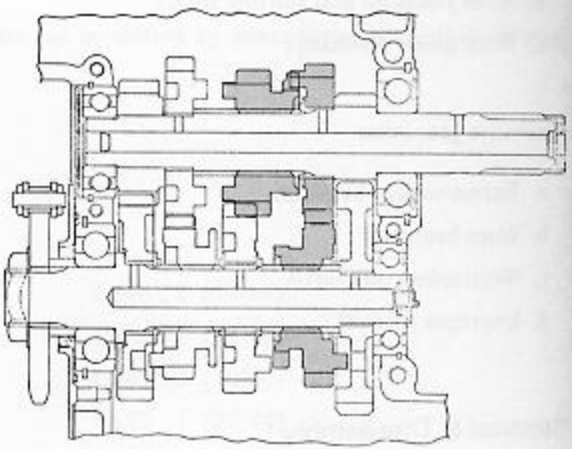
Neutral



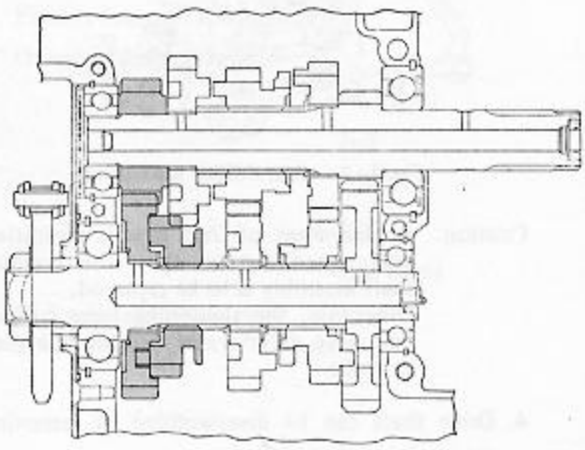
3rd speed



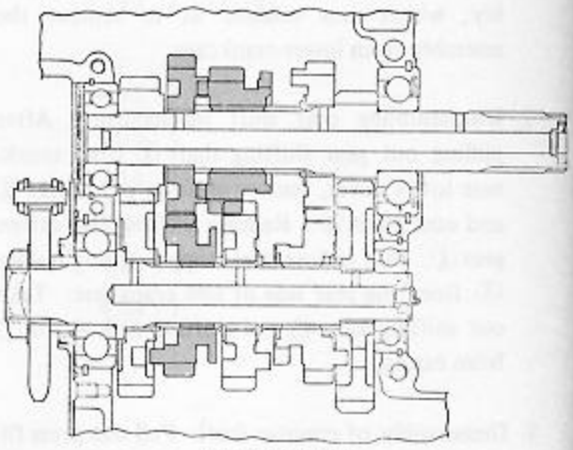
1st (low) speed



4th speed



2nd speed



5th (top) speed

Fig. 5–3 Gear positions

2. As the gear shifting mechanism is shown in Fig. 5–2, Gear shifting pawl and its holder can be actuated by moving the gear shift lever up and down. This turns gear shifting cam, then the shifting fork engaged with it slides laterally. A special device is built-in in this mechanism to ensure the correct gear shifting. When gears are shifted too rapidly, the shifting cam drum tends to rotate beyond the specified limit. A positive stop shifting device is provided for preventing the cam drum from turning too far for this purpose.

Inspection

All parts are to be thoroughly cleaned before inspection.

1. Check for any defect or abnormal wear on gear flanks. Wear of a gear can be obtained by measuring the backlash using a small dial gauge as in Fig. 5–4. First lock the driven gear, then measure play in the direction of the rotation by a dial gauge. If this play exceeds the below specified values, replace the gear.

   Standard backlash:
   for low, 2nd, 3rd and kick gears
   0~0.05 mm (0~0.002")
   for other gears
   0.05~0.1 mm (0.002"~0.004")

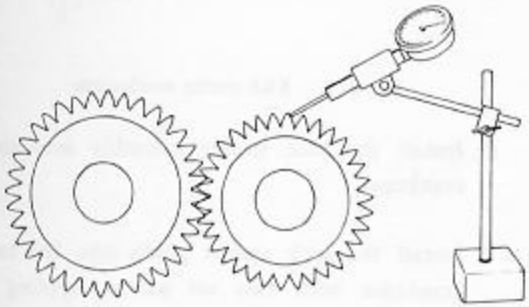


Fig. 5–4 Measuring gear backlash

2. Examine gear dog and dog hole for any defects or excessive wear. Replace it in the case of excessive wear or defects.

3. Check clearance between gear and shaft; if the excessibly worn, burnt or scored parts are found on the gear bore and the shaft, replace them with new ones.

4. Check counter, drive and kick shaft for bend, replace them with new ones if it is found to be bent.

5. Check the clearance between gear shifting fork and shift fork shaft. Check the bend of the shaft at the same time.

   Shifting fork to shaft clearance (standard):
   0.05~0.1 mm (0.002"~0.004")

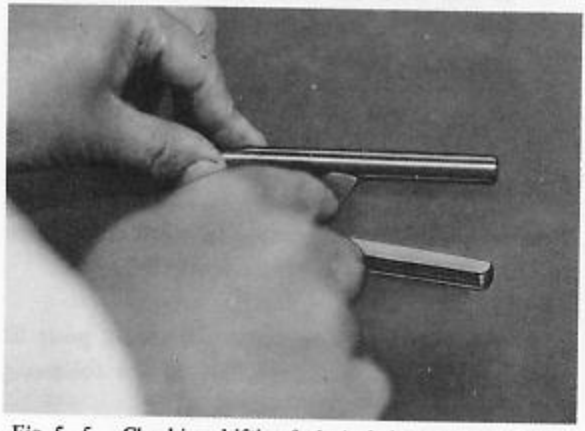


Fig. 5–5 Checking shifting fork shaft for wear and bend

6. Measure the thickness of gear shifting fork at its fingers. If it is less than 4.9 mm (0.19"), replace it.

   Finger thickness (standard):
   4.95~5.05 mm (0.195~0.198")

7. Check wear in gear shifting cam drum. Measure the outer diameter of drum with micrometer. Replace it when the diameter measured exceeds the limit of 44.70 mm (1.7598").

   Drum diameter (standard):
   44.900~44.975 mm (1.7677~1.7706")

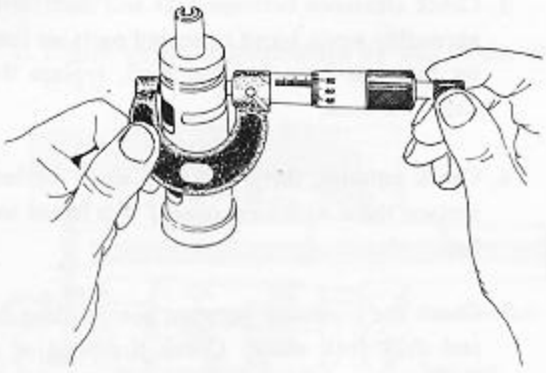


Fig. 5–6 Measuring shifting cam diameter

8. Check wear of bearings. Turn the outer race, as you hold the inner race. If some noise is generated or a smooth turning is not obtained, replace the bearing.

Assembly

Wash all the parts and components and clean them up using compressed air, before assembling.

1. Install 2nd gear to counter shaft by press fit using arbour press machine in the following manner:

   a) Apply Suzuki Super Lock 103Q (99000–32030) onto the bore surface of 2nd driven gear.

   Note: Care must be taken not to apply it on the counter shaft surface.

   b) Press fit the 2nd driven gear, so that the distance between the end of the gear and the end of 1st driven gear is within 109.4 and 109.5 mm (4.307~4.311").

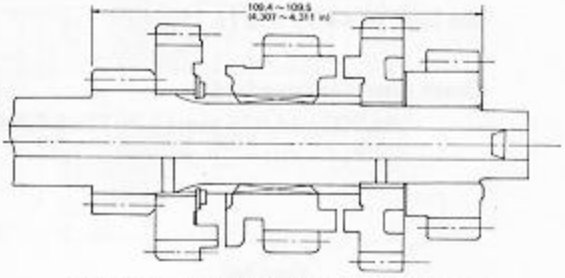


Fig. 5–7 Distance between both end gears

2. Install countershaft assembly, drive shaft assembly and gear shifting mechanism into the lower crankcase. Turn the shaft and check if a smooth turning of the shaft can be attained.

3. Please apply Thread Lock Cement (99000–32010) on all of the screws used for tightening gear shifting pawl, lifter fitting screws, cam guide fitting screws, oil reservoir plate fitting screw.

4. Gear shifting pawl is to be installed by taking due care in the direction of fitting.

5. Assemble kick starter mechanism, keeping it in mind that kick stater ① is installed into kick starter shaft ② with punch marks both on the flank of the kick starter shaft and the spline on the shaft aligned, and also oil guide hole ③ on the kick stater shaft is to face upward when the kick starter comes in contact with kick starter guide ④.

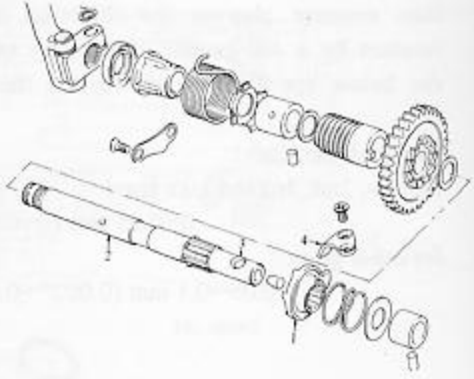


Fig. 5–8 Kick starter mechanism

6. Install the kick starter assembly into lower crankcase.

7. Install the kick starter guide into the lower crankcase with two set screws, appling the Thread Lock Cement on them.

8. Install the kick starter lever into the kick starter shaft so as to align the punch marks ① as shown in Fig. 5–9.

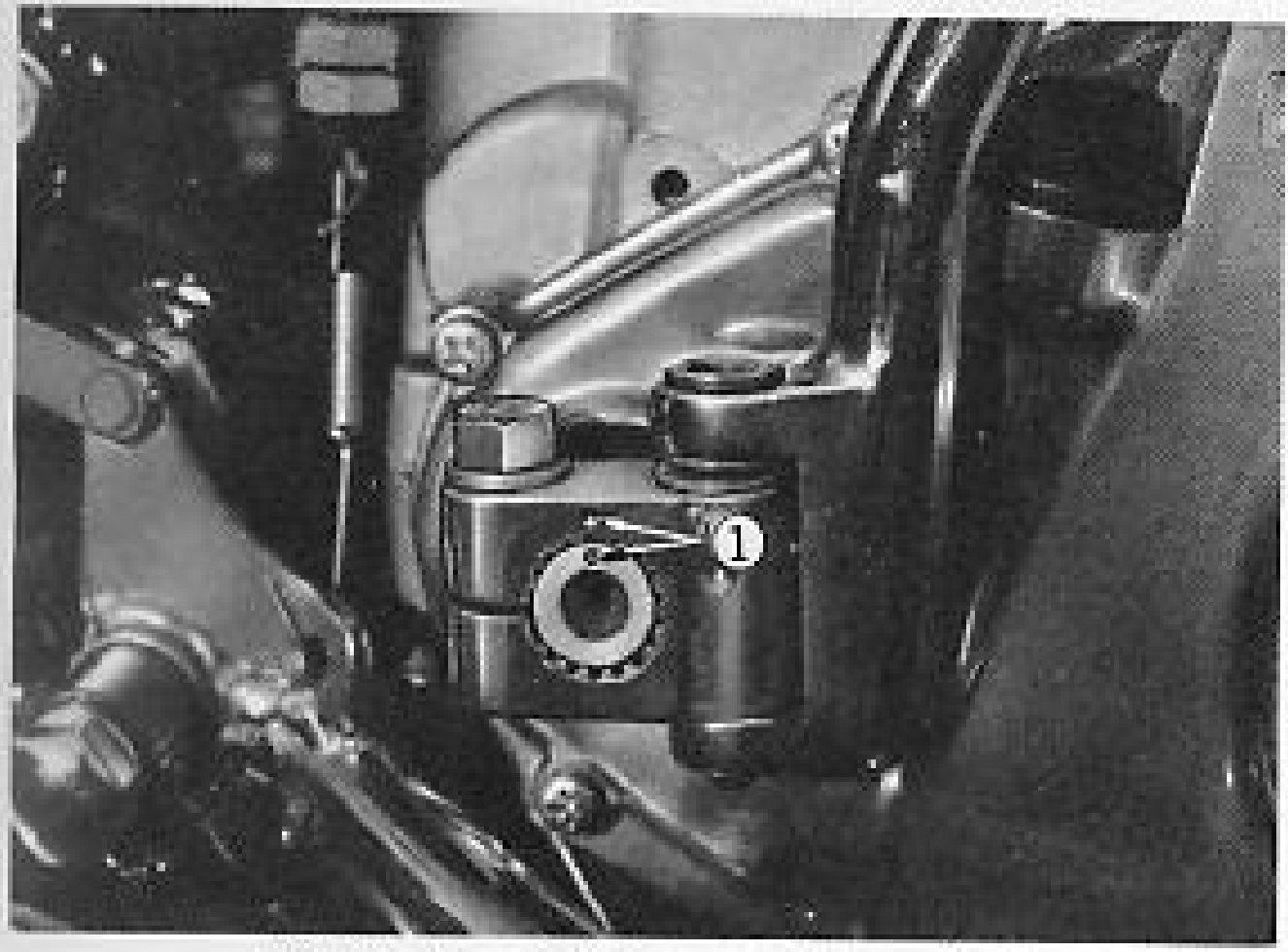


Fig. 5–9 Aligning punch marks

9. Supply transmission oil of 2,500 cc into the transmission case after assembling all parts.

Note: "2200 cc" is indicated on the clutch cover. This merely indicates the oil level needed in re-filling without overhauling engine. When oil is changed without disassembling, a certain amount (about 300 cc) of oil may possibly remain within the casing. That is why the filling capacity of 2200 cc is indicated.

6. LUBRICATING SYSTEM

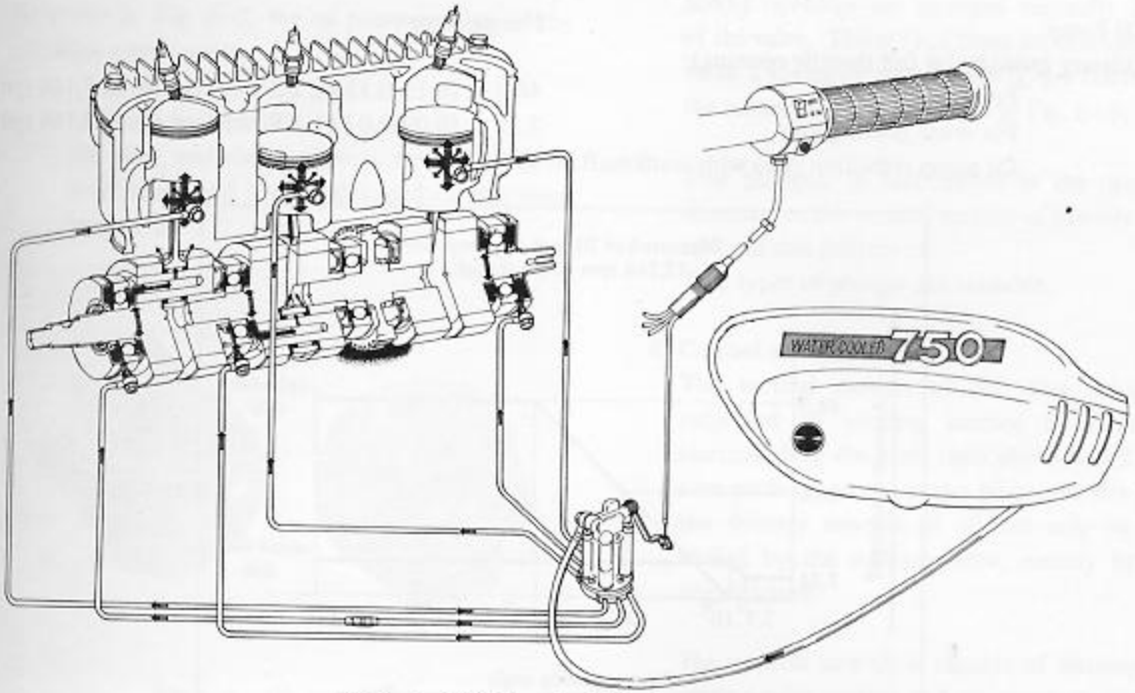


Fig. 6–1 GT750 engine lubricating system

The lubricating system of this engine uses "SUZUKI C.C.I (Cylinder & Crankshaft Injection) System", whereby a required amount of oil is pumped into both the seating or moving portions of each inner part and the stressed points by an oil pump direct from the reservoir of fresh oil with the regulation of this oil flow rate.

The oil pump is of a 6-outlet plunger type which is the original design of SUZUKI. Oil from the pump is distributed to cylinders and crankshaft, and all the inner parts such as a cylinder wall, a crank bearing and connecting rod bearings are equally lubricated.

Fresh oil is always supplied to each inner part without being diluted with gasoline. We see then that wearing of each part can be minimized and its durability is improved.

After lubricating the inside of the engine inside oil is drained into the crankcase. There a new system SRIS (Suzuki Recycle Injection System) is adopted for the recirculation of that oil. This new system has resolved a problem of smoky exhaust gases emission into atmosphere. This is usually due to incomplete combustion of oil in the crank chamber which leak suddenly into the combustion chamber during quick engine acceleration. We have now completed a two-cycle engine free from smoky exhaust gases.

SPECIFICATION

Oil Pump:	Plunger type
Delivery quantity (at full throttle opening):	
For cylinder side:	48.3 cc (0.13/0.11 pt. US/Imp) per Hr. at 2,166 rpm
For crank bearing side:	7.21 cc (0.09/0.07 pt. US/Imp) per Hr. at 2,166 rpm
Oil pump reduction ratio with crankshaft:	63.72 : 1

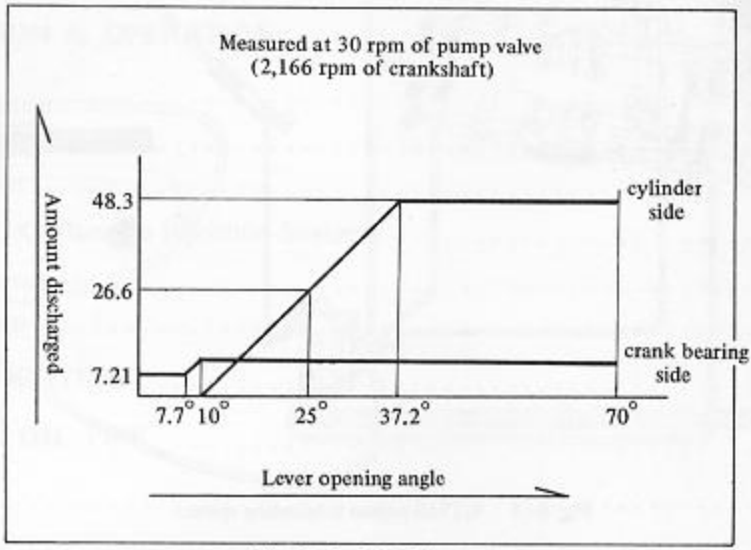


Fig. 6–2 Oil delivering curve

CONSTRUCTION & OPERATION

Oil Pump

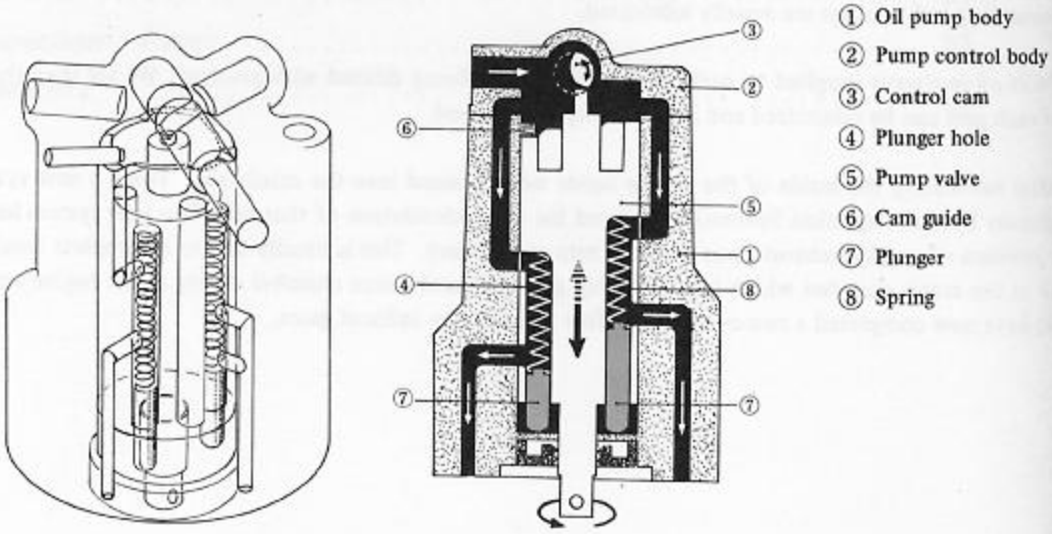


Fig. 6–3 Oil pump construction

Construction

As shown in Fig. 6–3, the oil pump consists of the following components:

1) Oil pump body:
Oil inlet and delivery ports are provided on both upper and lower sides, and on the inner bore parts.

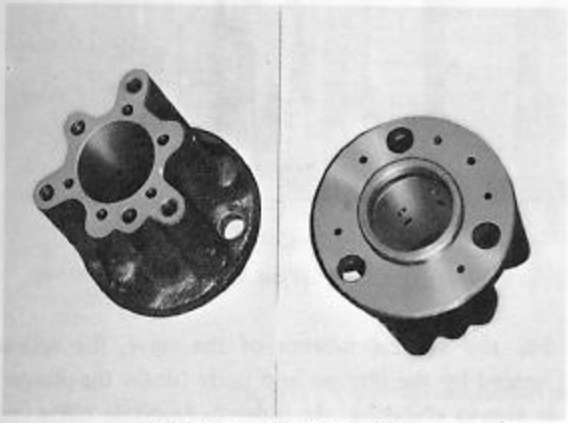


Fig. 6–4 Oil pump body

2) Oil pump valve:
Three(3) kinds of cam ① are provided on upper stems of valves symmetrical to the valve center, for the total of six(6) different elevations.

These cams are provided for three(3) different functions; first for oil suction, second for delivering oil to the cylinder and third for delivering oil to the crankshaft.

On the outer side of the valve, four ports ②, two each on the two row, are provided. The upper two ports are used for oil suction and the lower ones for oil delivery.

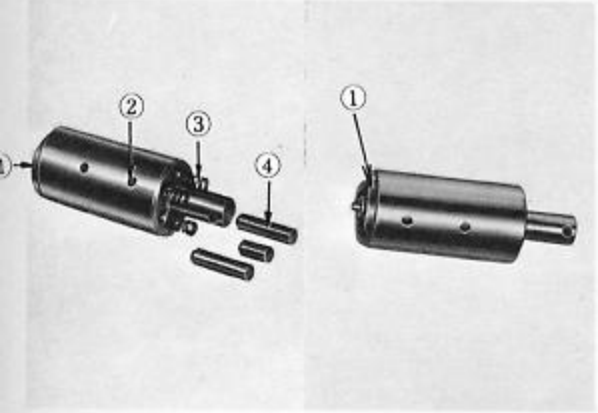


Fig. 6–5 Oil pump valve & plunger

3) Oil pump plunger:
Six(6) openings are arranged vertically inside of the valve. Three(3) of them are through-hole while a spring ③ and plunger ④ are inserted in the remaining three as shown in Fig. 6–5.

This plunger, in fact moves in the opposite direction to the vertical motion of the valve and sucks in and delivers oil.
Two types of plunger are available.

4) Control cam and shaft:
The vertical motion of the valve, which is subjected to rotating motion is effectively controlled by the cams right above it and by a cam guide ① on the pump body. In this case, the delivery amount of oil can only be controlled by the rotating valve, namely by the engine speed.

The control cam ② is capable of limiting the vertical valve motion and consequently changes the amount of oil delivery depending upon engine loads. This control cam is driven by a camshaft lever ③ connected to the carburetor throttle cable.

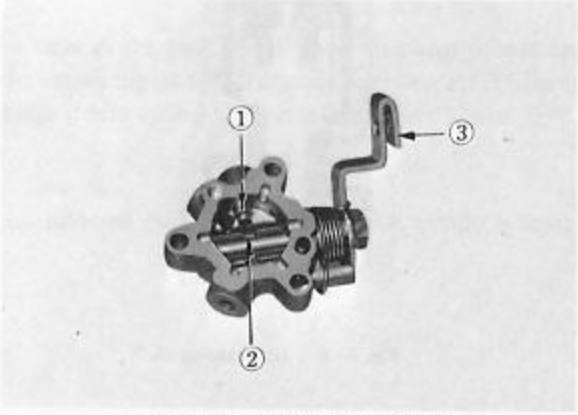


Fig. 6–6 Control cam & shaft

Operation

When the oil pump valve functions and moves upwards being regulated by the valve guide and the control cam, the plunger moves downwards relative to the valve. Oil is, therefore drawn into the valve, when a port on the valve side and the port on the pump body are matched.

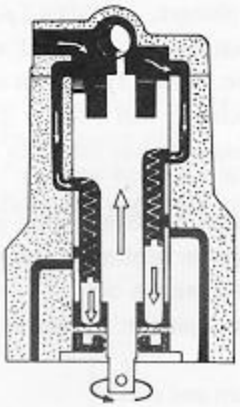


Fig. 6–7 Sucking oil

Then, during the downward strokes of the valve, the plunger moves upwards relative to the valve and oil already sucked into the plunger is discharged. It is to be noted, however, that the oil pump body has separate ports for oiling the cylinder and the crankshaft respectively to deliver the oil.

Oil quantity can be regulated by timing the overlapping period of the outlet ports of the valve and the pump body.

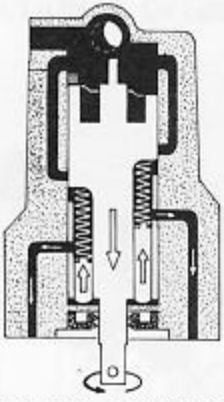


Fig. 6–8 Discharging oil

As mentioned above, four(4) ports two each for each of the two rows are provided on the valve. Corresponding ports are provided on the pump body for delivering oil to the cylinder and the crankshaft. Because it completes a return stroke twice during one rotation, eights discharges of oil will be obtained for with one(1) rotation of the valve. Actually, however, the total of six(6) oil discharges are required for the cylinder and the crankshaft lubrication because the engine has only three(3) cylinders. In order to meet this requirement, oil for each one delivery to the crankshaft and the cylinder is returned to the original place within one(1) rotation, and the total delivery time is kept at six(6). See Fig. 6–9.

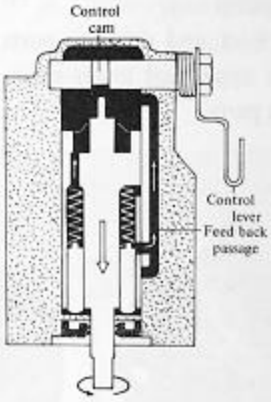


Fig. 6–9 Feed-back passage

For the vertical motion of the valve, the volume formed by the plunger and body (under the plunger) is always changing. In order to facilitate oiling into that portion, an oil circulating passage is provided on the valve body, as shown in Fig. 6–10.

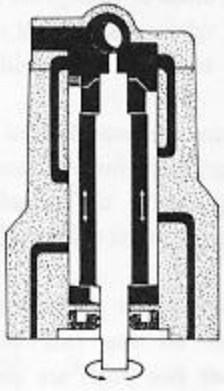


Fig. 6–10 Oil circulating passage

An overall construction and the arrangement under operating conditions are illustrated in the following diagram.

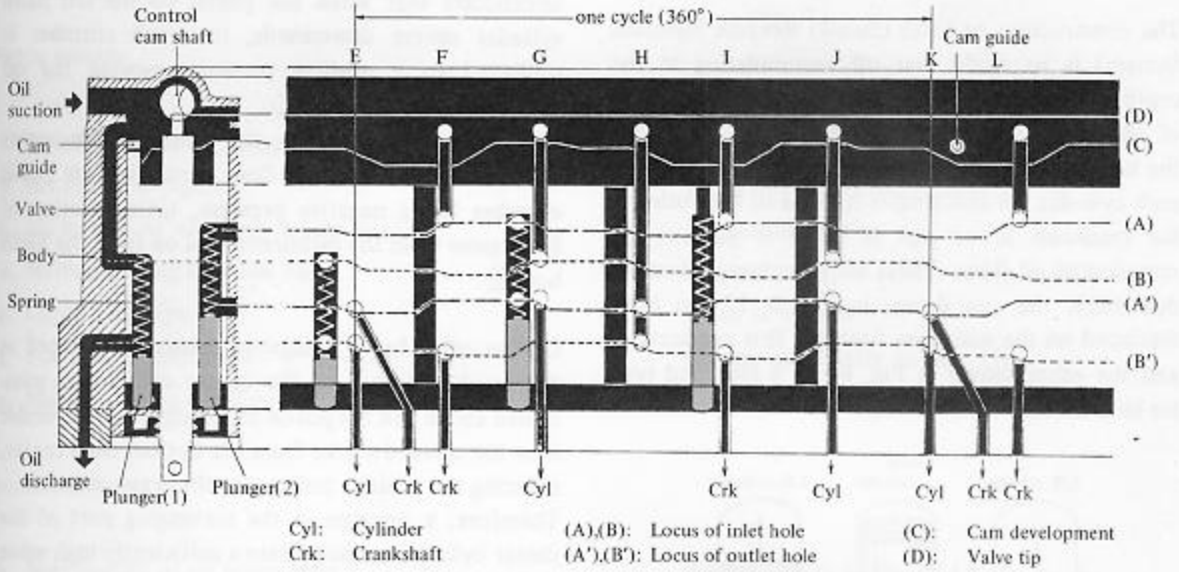


Fig. 6–11 Overall construction and arrangement under operating conditions

(A), (A'), (B) and (B') show the loci of each oil inlet and outlet on the outside of the valve traced when the valve moves up and down as rotating, with its cam traveled along the cam guide on the inside of the pump body.

These loci will be varied in accordance with the movement of the control cam shaft which is shown as a line(D) in the figure, because the reciprocating movement of the valve is regulated by both the control cam and the cam guide.

To take the plunger ② for example, oil is drawn into the valve at the position "F" and discharge it once to cylinder side to a certain extent at "G" and feed back the remaining oil to the control chamber at "H", then suck oil again from the control chamber at "I" and discharge it into cylinder and crankshaft (at "J" and "L") respectively.

Thus each plunger discharges the specified amount of oil into the cylinder and crankshaft totally 6 times within one cycle.

SRIS

Construction

The construction of SRIS (Suzuki Recycle Injection System) is so made that oil accumulating in the crankcase bottom is forced into the scavenging ports of adjacent cylinders through the rubber pipes with the help of positive and negative pressures induced by each cylinder. A check valve is fitted to the outlet of the crankcase lower part in order to prevent the reversion of oil flow. There are two piping forms for this SRIS, the one shown in Fig. 6–12 has been equipped on the machines from the first production, and the other shown in Fig. 6–13 is modified type for later model.

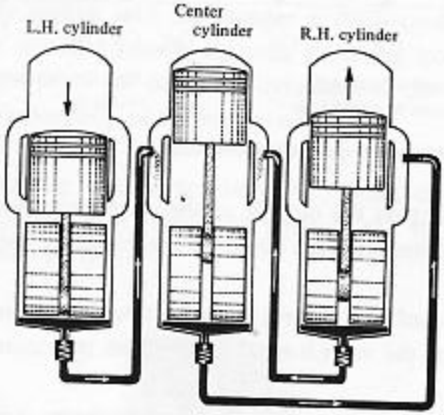


Fig. 6–12 SRIS type 1

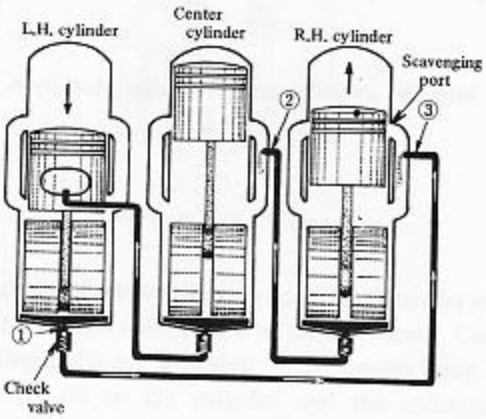


Fig. 6–13 SRIS type 2

Operation

To take the later type (Fig. 6–13) for example, it is understood that when the piston on the left hand cylinder moves downwards, its crank chamber is subjected to a positive pressure, moving the oil outside of its outlet port ①.
Simultaneously with that, the piston on the center cylinder is near the top dead center and its crank chamber has a negative pressure, taking suction of fresh gases from the carburetor and oil from the SRIS hose ②.

On the other hand, a negative pressure is induced in the crank chamber of the center cylinder as mentioned above and the piston of the right hand cylinder is in the upward stroke from the bottom dead center, reducing the positive pressure in the crank chamber. Therefore, a pressure at the scavenging port of the center cylinder cannot attain a sufficiently high value of pressure needed for drawing oil from SRIS hose and oil as stopped at the check valve does not enter into the SRIS hose.

In the cylinder on the left hand side, the crank chamber has a positive pressure, while fresh gases are still flowing into the crankcase of the cylinders on the right hand. Therefore, oil is drawn into the crank chamber from the SRIS hose ③ and though oil is being delivered as a whole, it will no longer be delivered if the pressure is changed from positive to negative as the piston moves upward.

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedies
Piston seizure	
a. Maladjusting of oil pump lever	Adjust (Refer to Fig. 6–19)
b. Air inside oil pipe/s	Expel air (Refer to Fig. 6–16)
c. Oil leakage of oil pipe/s & pipe joint/s	Replace or repair
d. Malfunctioning of check valve	Replace or repair (Refer to Fig. 6–20)
e. Clogged oil pipe/s	Clean or replace
f. Low quality motor oil	Change oil (Refer to page 51)
g. Malfunctioning of oil pump	Check and replace
Smokey exhaust gas	
a. Maladjusting of oil pump lever	Adjust (Refer to Fig. 6–19)
b. Clogged or pinched SRIS pipe	Clean or replace
c. Malfunctioning SRIS check valve	Repair or replace (Refer to Fig. 6–20)
d. Low quality motor oil	Replenish (Refer to page 9, 13)
Excessive oil consumption	
a. Maladjusted oil pump lever	Adjust (Refer to page 10)
b. Oil leakage	Trace leakage and repair

OIL PUMP & OIL PIPE

Removal

(1) Remove oil inlet pipe from oil tank.
(2) Remove oil pump cover.
(3) Remove oil pump.
(4) Remove starter motor cover fitting bolts and lift up the cover along the by-pass hose.
(5) Remove oil outlet pipe union bolts.

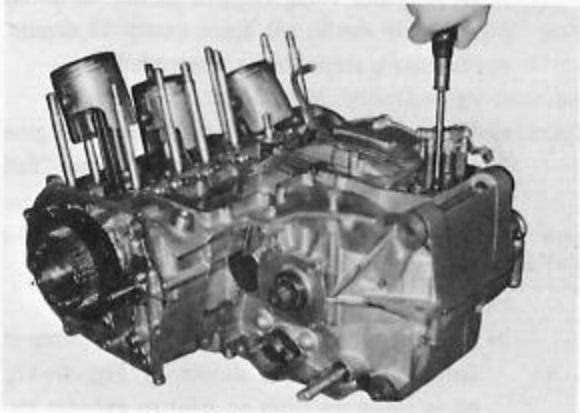


Fig. 6–14 Removing oil pump

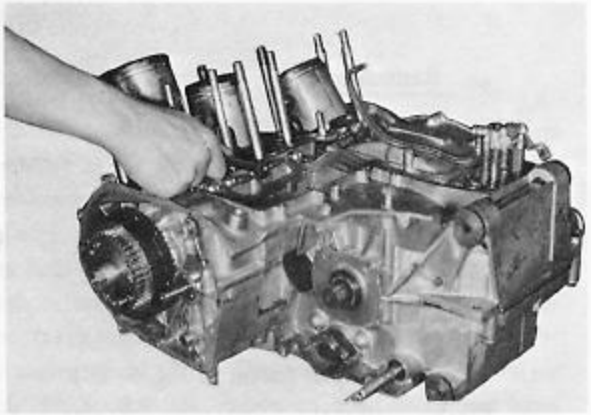


Fig. 6–15 Loosening oil pipe union bolts

Disassembly

The oil pump is manufactured with precision and its efficiency may be reduced once disassembled and is restored to the original, possibly leading to an engine trouble. It is constructed, therefore, as nondisassembly type, similar to the previous model. In this respect, it is difficult to accept any claim about an oil pump being reassembled. Also, it would be unacceptable to treat each oil pump inner part as a supply part for replacement. It is recommended that the whole of the oil pump assembly should be renewed, since any inner part is out of order.

Inspection & Repair

1. The oil pipe is checked to see if there is any trapped air inside. If there is any air found within the oil inlet pipe between the oil tank and the oil pump, the air expelling screw at the upper part of the pump is loosened to expell the air completely.
   If air is found being trapped in the oil outlet pipe which carries oil from pump to engine, the following steps are recommended:

   a) For a small amount of air; With the engine idling, the oil pump lever is set to "full open" position and this condition is maintained until all of the air is believed to be expelled completely.

   b) For a large amount of air; The oil pump is dismounted and as shown in Fig. 6–16, oil is filled up from an inlet to exhaust air. It is to be noted that a check valve is fitted to each pipe end to prevent the reversion of oil flow as indicated in the figure.

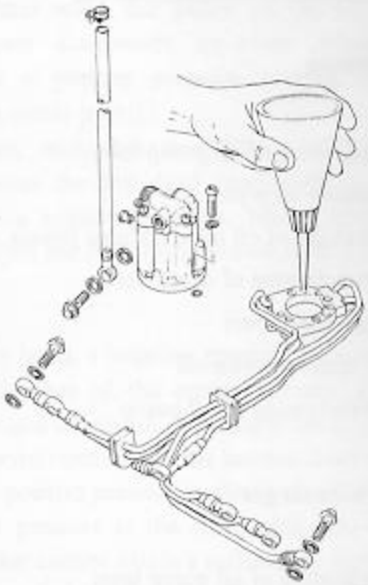


Fig. 6–16 Expelling air in oil pipes

2. Check the oil pump for any air trapped inside. As shown in Fig. 6–17, the expelling air screw is loosened and tightened after confirming the oil discharge.

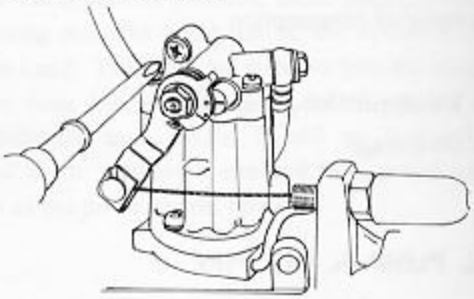


Fig. 6–17 Expelling air in oil pump

3. When an abnormal oil consumption is noted, it is first recommended to replace the oil pump. If the oil consumption does not improve with this, it is most probable that the pump unit has a leakage or the check valve is out of order. These points should therefore be checked.

4. When an engine trouble is caused apparently due to the improper function of the lubricating system and yet a cause of troubles cannot be traced exactly, please check the oil tank cap to see if it is well mounted. It is often seen that a breather hole on the tank cap is closed down due to the improper maintenance.

Assembly & Adjustment

1. Before mounting the oil pump and the oil pipe, oil should be supplied by forced lubrication to the CCI oil passage of the crankcase up to the full level, so as to expel air completely.

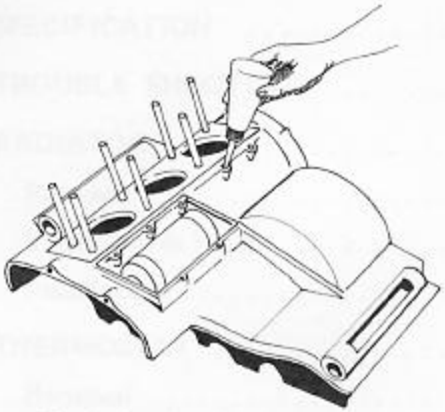


Fig. 6–18 Expelling air in oil passage

2. The oil pipe should also be filled with oil to expel air, as shown in Fig. 6–17.

3. In fitting the oil pump cover after mounting the oil pump, care should be taken not to pinch oil inlet hose between the case and the cover.

4. For the adjustment of oil pump, the throttle is opened gradually as shown in Fig. 6–19 and adjustment is made to align the aligning mark of the oil control lever with that of the stator, when the aligning mark of the throttle valve is on the top of an aligning hole on the side of the carburetor mixing chamber body.

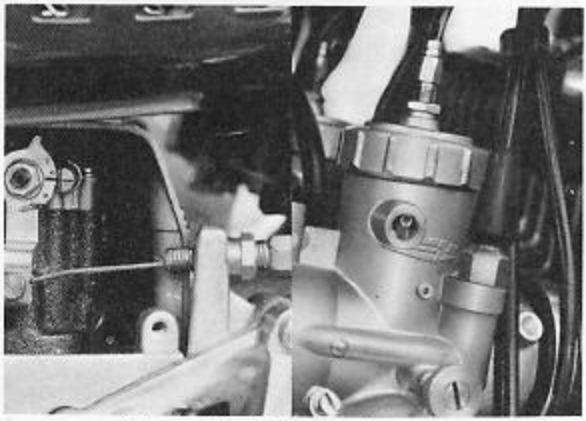


Fig. 6–19 Adjusting oil pump

5. It is recommended to use SUZUKI CCI oil or non-diluent (non-self mixing type) of high quality equivalent to SAE #30 wt.

SRIS (SUZUKI Recycle Injection System)

Removal

1. Remove the oil pipe guide plate from lower crankcase.

2. Disconnect the SRIS pipes at the crankcase lower side by removing the clips with a screw driver.

3. The check valve and union are press-fitted to each of the crankcase and the cylinder on the machine equipping the former SRIS type, while on the later type the check valve is screwed into the crankcase, so that it can be removed easily.

4. Piping from left hand cylinder to right hand cylinder on the later type is made between the left hand crankcase and the right carburetor inlet through the under crankcase fins and the starting motor case. Therefore, when overhauling the engine, be sure to disconnect the pipe ends both at the crankcase and at the carburetor inlet beforehand.

Inspection & Repair

1. Check the oil pipes for crack, bend or pinched part.

2. Check to see if the check valves operate properly by using an injector. If the check valve is found to be clogged with foreign materials, remove the check valve from the lower crankcase and wash it in a solvent.

Note: On the later type, the nylon mesh strainer is provided on the check valve end.

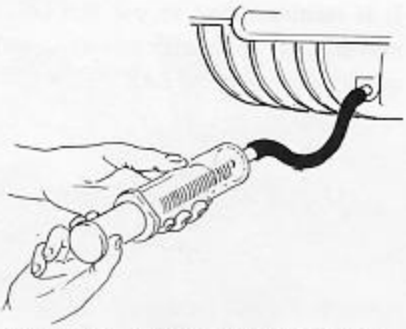


Fig. 6–20 Checking SRIS check valve

Assembly

1. The arrangement of oil pipes from the crankcase to the cylinder is as shown in the figures. Connect each end of the pipes to each union on the front side of the cylinder, where "R", "C" and "L" marks are relieved, so as to match the marks with the cylinder location.
   On the later type, the pipe from the right crankcase to the left cylinder is arranged as shown in Fig.

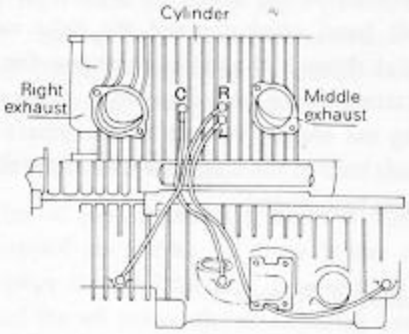


Fig. 6–21 SRIS piping

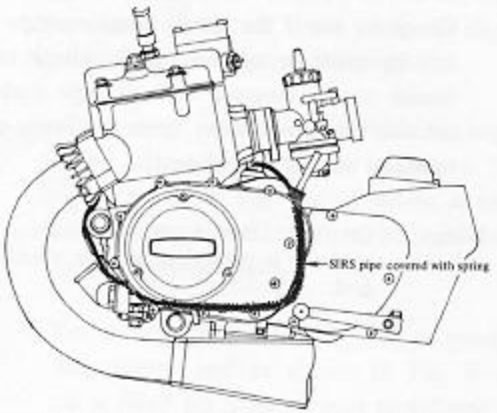


Fig. 6–22 SRIS piping for later model

7. COOLING SYSTEM

DESCRIPTION

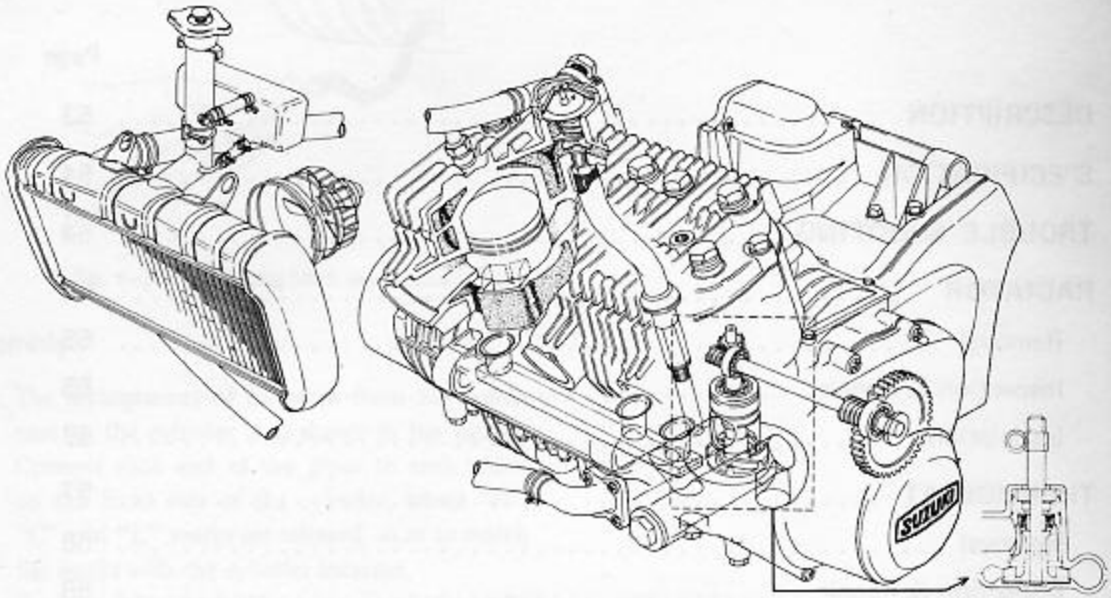


Fig. 7–1 GT750 engine cooling system

The cooling system of this engine uses a pressure forced circulation type and is designed to provide an excellent cooling effect under every imaginable running conditions.

The radiator has a corrugated fin and tube type construction of aluminum material. Therefore, it is characteristic in respect of light weight and heat radiator. Outside of the radiator is provided a reservoir tank as an escape space of the cooling solution due to the expansion from the heating. Expanded cooling solution due to a temperature rise enters into the reservoir tank thus preventing its escape into the atmosphere.

The water pump, with forced circulation of cooling solution among the radiator, the engine and the cylinder block, has centrifugal type construction and is fitted to the lower side of the engine. The pump is direct driven by the crankshaft through the starter clutch gear.

The pump takes in the cooling solution from the lower side of the radiator, by circulating it throughout the water jacket of the cylinder block, the cylinder head and the thermostat, and is finally returned to the ratiator. Cooling solution is circulated within a closed circuit as mentioned above. When the engine is still cold, however, cooling water circualtes through a bypass hose from the thermostat and is returned to the water pump directly.

The radiator cap is designed to maintain a pressure of about 1.9 kg/cm^2 (27.0 lb/in^2) in the cooling system and its reverse valve opens to release an excess portion of the pressure out, when applied to a pressure above the said valve.

The thermostat is wax pellet element type and is designed to maintain an optimal level of temperatures in the cooling water.

SPECIFICATION

Water pump specification	
Type	Six(6) - blade impeller centrifugal type
Delivery capacity	60 liters (15.8/13.2 gal US/Imp) per minute at 6,000 rpm at 20°C (68°F)
Revolution ratio with crankshaft	1.57 : 1
Water seal	Mechanical seal
Radiator specification	
Type	Pressure sealed cooling corrugated fin and tube type
Radiation capacity	200 Kcal/min
Opening pressure radiator cap valve	0.9 kg/cm² (12.78 lb/in²) ± 10%
Coolant capacity	about 1.4 liters (1.47/1.23 Qt. US/Imp)
Radiation area	664 cm² (102.92 in²)
Core dimension	Height 240 mm (9.45")
	Width 430 mm (17.0")
	Thickness 59 mm (2.32")
Thermostat specification	
Type	Wax pellet element type
Opening at	82°C (179.6°F)
Full opening at	95°C (197.6°F)
Stroke	8 mm (0.3")

Thermo switch and temperature gauge
Refer "Body Electrical System".

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedy
1. Overheating	
a. Insufficient coolant	Replenish, and check for leak/s
b. Thermostat remain closed by sticking	Replace thermostat
c. Water pump inoperative	Repair or replace
d. Cooling system passage blocked	Clean radiator and water passage
e. Incorrect ignition timing	Adjust ignition timing (Refer to page 11)
f. Brake dragging	Adjust brakes
g. Malfunctioning of cooling fan	Repair
2. Overcooling	
a. Thermostat remain opened by sticking	Check or replace thermostat
b. Extremely cold weather	Cover radiator

Symptoms & Probable Causes	Remedy
3. Loss of coolant	
a. Leaking radiator	Repair radiator
b. Loose or damaged hose connection	Tighten connection or replace hose
c. Leaking water pump cover	Repair or replace
d. Defective cylinder head gasket	Replace gasket
e. Improper tightening of cylinder head bolts	Tighten
f. Cracked cylinder head or block	Replace cylinder head or block
g. Defective radiator cap	Replace radiator cap
4. Noisy cooling system	
a. Defective water pump bearing	Replace water pump ass'y
b. Loose or bent water pump impeller	Replace impeller

RADIATOR

Removal

1. Cooling solution is drained out.
   Refer "Engine Disassembly" on page 22.
2. Remove the fuel tank.
3. Replace the radiator inlet and outlet hoses, the coolant inlet pipe, the radiator reservoir tank and its hose, etc. after loosening hose clamps.
4. The cooling fan and its shroud are removed.

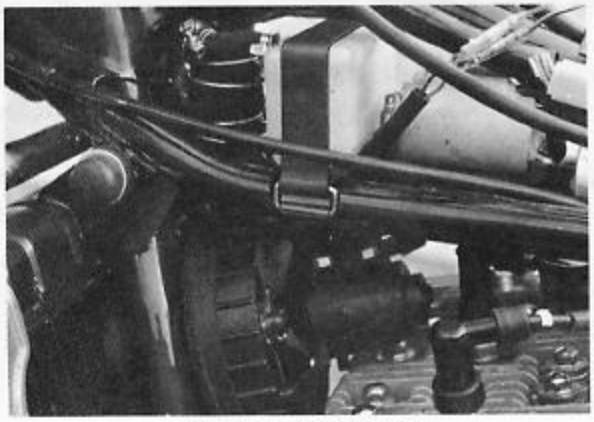


Fig. 7–2 Cooling fan

5. The radiator is dismounted after removing its bumper.

Inspection Repair

1. Check the radiator for any water leakage at its upper tank, lower tank and core. The radiator should be replaced if any water leakage is found.
   Water leakage in the cooling system including the radiator is sometimes caused often by deteriorated materials and fitting conditions with the elapse of time including the shrinking of gasket, bolt loosening and hose deterioration, in addition to a usual apparent cause such as an accident which may involve rolling over of vehicles. In colder areas, the cooling system may sometimes become out of order, due to freezing coolant.
   It is necessary, therefore, to mix cooling water with an antifreeze and summer coolant and an anti-leakage material. New models GT750 coming out of the line have such agents added in the cooling system.
   As to the cooling water, an anti-freeze and summer coolant and an anti-leakage material, please see page 60.
2. Check the core fin of the radiator for mud or other foreign substances which may block smooth air flow. Also, bent or damaged fins, if any, should be remedied immediately.

Note: When more than 20% of the total radiator core area is clogged, the cooling effect of the radiator will be completely lost and it is necessary to replace the radiator in this instance.

3. Check the reverse valve of the radiator cap for its condition. This should be checked using a pressure gauge as shown in Fig. 7–3. When no pressure gauge is available, add a weight of about 7 kg (15.4 lb) onto the cap valve. It should then open when kept in good condition.

Gauge pressure (standard)

0.9 ± 0.1 kg/cm^2 (12.78 ± 1.4 lb/in^2)

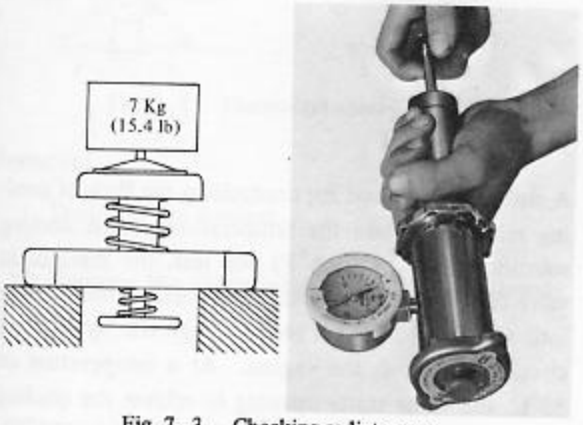


Fig. 7–3 Checking radiator cap

Note: In addition to the reverse valve, the radiator cap is fitted with two(2) other valve mechanisms. The knob(A) is installed for releasing the steam for some abnormal causes.
In this instance, the valve(B) opens, when the knob is pushed down before removing the radiator cap, and the steam within the radiator escapes into the bypass. Therefore, you do not have to worry about burning hands in removing the cap.

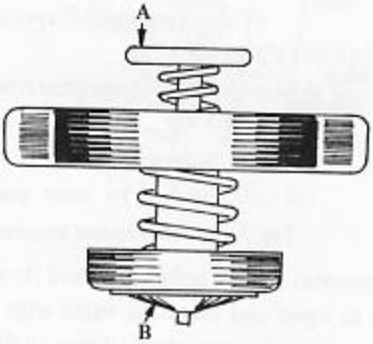


Fig. 7–4 Radiator cap

The valve(B) opens automatically, independent of the knob(A), when the pressure inside the radiator has dropped due to the temperature drop of the coolant and its subsequent contraction. Consequently possible damage on the radiator core due to a negative pressure can be avoided accordingly.

* Reason for adopting pressure-sealed cooling system. *

Pure water freezes at 0°C (32°F) and boils at 100°C (212°F). The use of this pure water as a coolant, however, would bring up many undesirable points. Usually, you may lower the freezing point and raise the boiling point using additives or by pressurizing the cooling system.
When pressurized pure water is heated, its boiling point rises in proportion to the pressure. Based on this principle, the tank cap is completely sealed. This is a pressure-sealed cooling system.

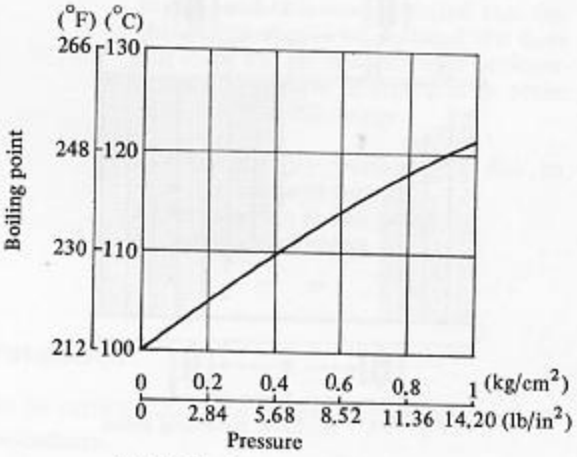


Fig. 7–5 Pressure-boiling point curve

As a coolant rises in temperature and expands, the pressure rises. When it reaches 1.9 kg/cm^2 (27.0 lbs/in^2), a gauge pressure of 0.9 kg/cm^2 (12.78 lbs/in^2), the valve of the radiator cap opens releasing the pressure and to prevent possible damage on the cooling system. As is seen from the above curve, a temperature in that instance is about 120°C (248°F). Actually, however, additives are added in the coolant. Then its boiling point rises further.

Note: A gauge pressure is difined as the difference between the inside pressure and the atmospheric pressure (about 1 kg/cm^2).
In the case of the radiator cap of GT750, the gauge pressure of 0.9 kg/cm^2 (12.8 lbs/in^2) is obtained as a balance between 1.9 kg/cm^2 (27.0 lbs/in^2) and 1 kg/cm^2 (14.2 lbs/in^2).

In replacing the radiator cap, it is required to use a new cap specially designed to a gauge pressure of 0.9 kg/cm^2 (12.8 lbs/in^2). The use of other caps would lead to overheating and a possible damage in radiator.

Installation

Installation is carried out in the reverse order of the removal procedure as mentioned hereinbefore and care should be taken on the following points:
There are three(3) kinds of radiator mounting washer of different thickness and these washers are used only for the intended purpose respectively. Be sure to use these washers in a right place in accordance with a white painted round mark on the mounting plate welded to the upper and lower tanks of the radiator. See Fig. 7–6.

Washer (A): 2.0 mm (0.079 in) thick
Washer (B): 1.6 mm (0.063 in) thick
Washer (C): 0.8 mm (0.031 in) thick

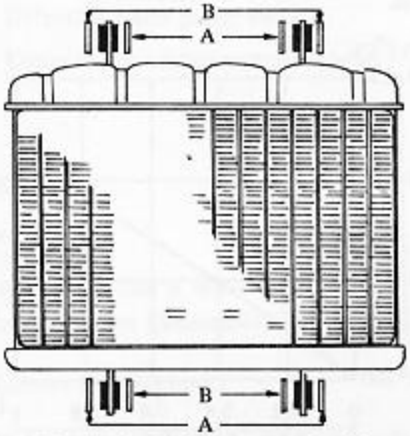


Fig. 7–6 Radiator mounting shims

(1) When marked by a white circle
a. Upper tank mounting plate:
The washer(A) is fitted to the plate inside and (B) to the outside.
b. Lower tank mounting plate:
The washer(A) is fitted to the plate outside and (B) to the inside.

(2) When unmarked by a white circle
Fit the washer(B) to both sides of upper and lower tank plates.

(3) When a white circle mark is painted on the surface of the upper tank only. the washers(A) and (B) are fitted only to the upper tank mounting plate in a similar manner to the above (1). The lower tank mounting plate is fitted with the washer(B) lony. In case only the lower tank is marked by painting, the procedures should be followed by the reversed order.

(4) In case that a slight gap is still there even though the proper washer has been selected, use the washer(C) to fill it up.

The radiator of GT750 is made of aluminum and attention should be paid to the fact that its improper installation would cause a stress concentration in the mounting plate, probably leading to a danger of cracks during the course of time.

Note: The radiator body and three(3) washers are available as spare parts in the form of a set and a suitable washer should be selected according to the above explanations.

THERMOSTAT

A thermostat is used for controlling the flow of cooling solution. When the temperature of the cooling solution is 82°C (179.6°F) and less, the thermostat valve closes thus preventing the coolant from flowing into the radiator. This runs through the bypass and circulates through the engine. At a temperature of 82°C, the value starts opening to release the cooling solution into the radiator as well. At 95°C (203°F), the valve is wide open and the bypass is closed to release all the coolant into the radiator for cooling.

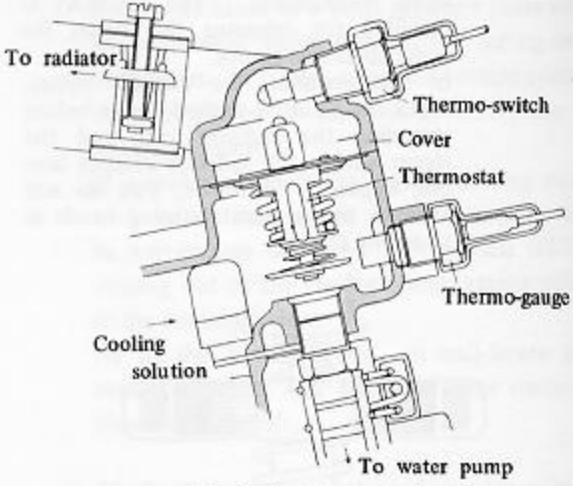


Fig. 7–7 Thermostat location

The thermostat is wax pellet type and its system is so made as to open and close the valve with the help of the expansion and contraction of wax in the pellet.

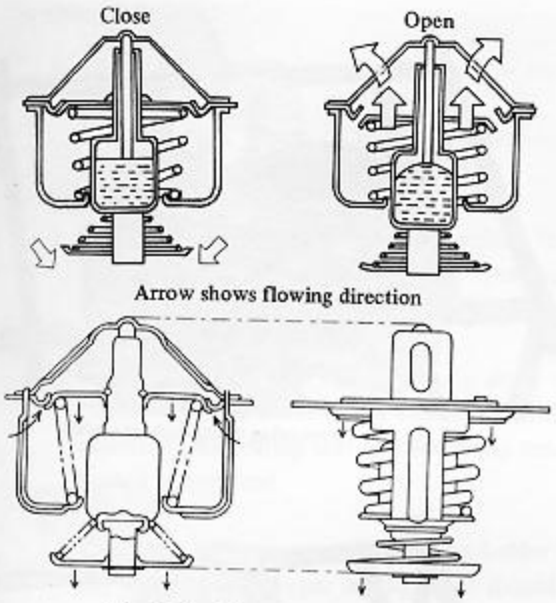


Fig. 7–8 Thermostat operation

Removal

1. Drain off the coolant.

2. Remove the thermostat cover and the thermostat.

Inspection & Repair

1. Check the pellet for any crack.

2. The function of the valve is tested. As shown in Fig. 7–9, both the thermostat and the thermometer are dipped into water within the vessel and water is heated by stirring to obtain a uniform temperature. Then, check the thermostat if it is normally operating at a prescribed temperature.

* Valve opening temperature T_2:
  82±1.5°C (179.6±34°F)
* Temperature when the valve is wide open T_2:
  95°C (203.0°F)
* Stroke at the full opening:
  8 mm (0.3 in)

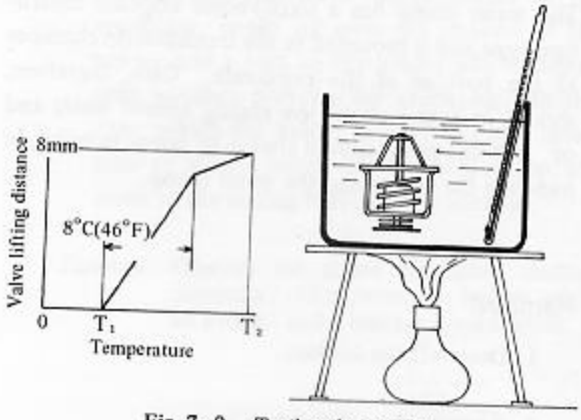


Fig. 7–9 Testing thermostat

Note: An improper thermostat may lead to the overheating and the overcooling of the engine, and it is recommended that the thermostat should be replaced if it does not show the above-mentioned performances. Defective thermostat is often caused by the followings:

a) Unsatisfactory performance due to water scale and rust
b) Wax leakage at wax pellet
c) Deteriorated spring

Installation

To be carried out in the reverse order of the removal procedures.

WATER PUMP

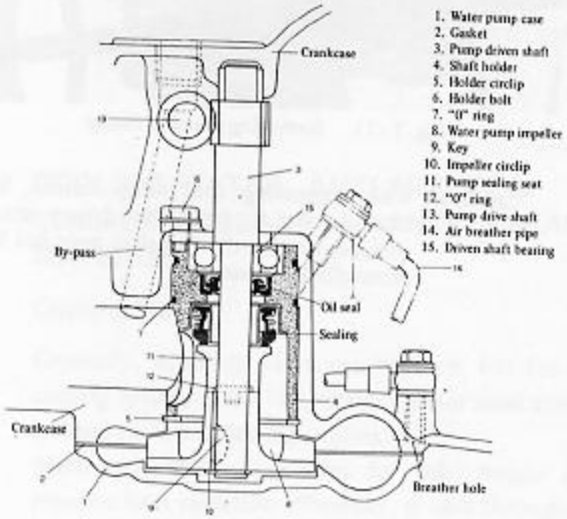


Fig. 7–10 Water pump

The water pump has a six(6)-blade impeller centrifugal type and is mounted in the transmission chamber at the bottom of the crankcase. Care, therefore, should be taken about the sealing against water and oil, and this point should always be borne in mind, in handling the engine and the water pump.

Removal

1. Drain off the coolant.
2. Remove the central muffler.
3. Remove the water pump cover with care so that its fitting surface may not be damaged.
4. Remove the impeller circlip and the impeller.
5. Remove the pump holder circlip and using a snap ring mover (09900–06103). Then, the water pump driven shaft is wrapped in cloth and drawn out downwards using the pliers.

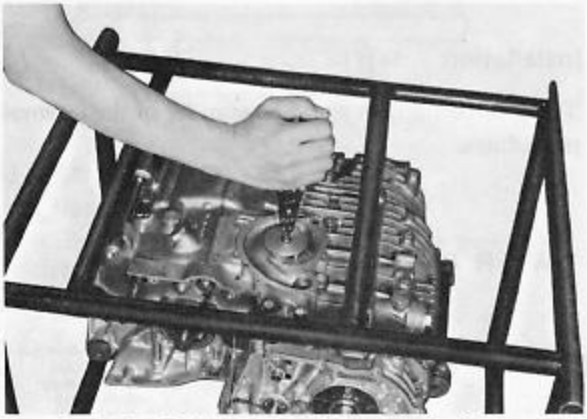


Fig. 7–11 Removing impeller circlip

Caution: When removing the pump holder, be careful not to hurt the driven shaft surface, or else the impeller may not be reinstalled on assembly.

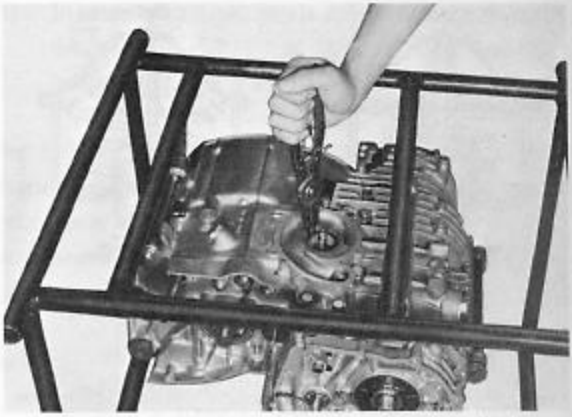


Fig. 7–12 Removing pump holder circlip

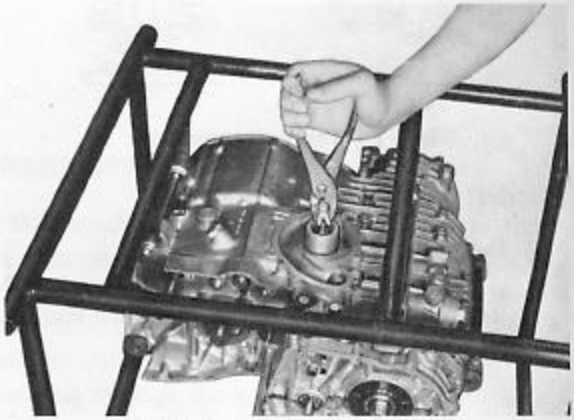


Fig. 7–13 Extracting pump holder

6. In overhauling the water pump driving mechanism, please see the item on the "starter clutch."

Disassembly

The water pump driven shaft and its bearing can be removed if drawn out in the reverse direction to the impeller after the pump holder is heated up to 75–85°C (167–185°C).

A water pump seal and an oil seal in the pump holder should not be removed, which otherwise would be damaged.

Note: Both the water pump seal and the oil seal in spare parts are treated as a complete set with the pump holder and these components may not be supplied separately.

Inspection

1. Check the bearing for rough surface or excessive end play.
   Scales or rust, if any, on the pump dirven shaft should be removed with emery cloth.

2. Check impeller blade for any deflection, bend or damage etc. The impeller should be replaced whenever such a defect is found.

3. Check to see if the sealing seat is worn out excessively and an effective sealing cannot be expected, the sealing seat and the pump holder should be replaced.

4. Check the "0" ring around the pump holder for any damage and proper sealing effect should be expected.

Note: The cooling solution and transmission oil are sealed in two(2) steps, as follows: The solution is first sealed with a pump seal, a sealing seat and an "O" ring installed inside of the sealing seat. Transmission oil is first sealed with an oil seal. Then, both solution and transmission oil are sealed with two(2) "O" rings outside of the pump holder. The system is so made that the solution or transmission oil, if leaking at the said sealing part, will be drained from the crankcase through a breather pipe.

5. Check water pump drive gears and their bearings for any abnormality.

6. Check the impeller if it is contacting the crankcase or the pump case. A contacting impeller with the crankcase indicates an improper coupling of the pump driven shaft with the bearing. The shaft should be removed for checking.

Standard gap between impeller and crankcase:
0.5–1.5 mm (0.02–0.59 in)

Assembly

The assembly is carried out in the reverse order of the disassembly procedure and care should be taken on the following points:

1. In inserting the water pump holder in the crankcase, apply oil over the outside of the holder and a port on the holder side is aligned with another port on the crankcase. In this case, rotate the holder slightly to either direction so that a notch on the holder top will come to the setting bolt of the crankcase.

Caution: Observe the above alignment method correctly. Otherwise, the holder might be broken and a leakage would occur.

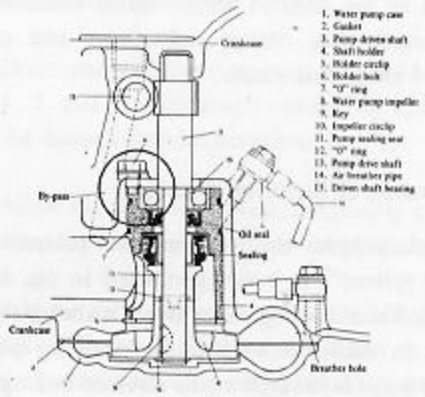


Fig. 7–14 Pump holder notch

2. The impeller is inserted into the pump driven shaft and is secured with a circlip. In this instance, it is necessary to make sure that a gap between the impeller and the crankcase is 1.5 mm (0.59 in). Without this gap, the pump driven shaft should be taken out for a gap adjustment.

3. Apply liquid gasket (99000–33010) on both sides of the waterpump case gasket before mounting the pump case.

COOLING WATER, ANTI-FREEZE & SUMMER COOLANT and ANTI-LEAKAGE MATERIAL

Cooling Water

Generally, drinking water can be used, but for the cooling system of GT750, distilled water must always be used for the following reasons:
Aluminum, which is known for light weight and superior heat radiation efficiency, is used throughout

the cooling system of GT750. This material is liable to rust, as compared with cast iron and bronze which are used generally for the cooling system. In addition to taking some precaution against possible clogging in the water passage, it is necessary to use as pure water as possible. This is to ensure the prevention of the accumulation of foreign substances in the system.
Some drinking water, however, is unsuitable for cooling water and it is usually difficult to judge the hardness of water, upon which the suitability of cooling water depends. In this respect, it is recommended to use distilled water, which contains most likely much less foreign substances and can be obtained with relative ease.

Anti-freeze & Summer Coolant

As explained in the section of "pressure-sealed cooling system", it is not permitted to use distilled water as it is as cooling water and it is always required to put in additives so that the freezing point of cooling water is lowered or the elevated boiling point. These additives are an anti-freeze & summer coolant, which effectively reduces the freezing point of cooling water or raise its boiling point.

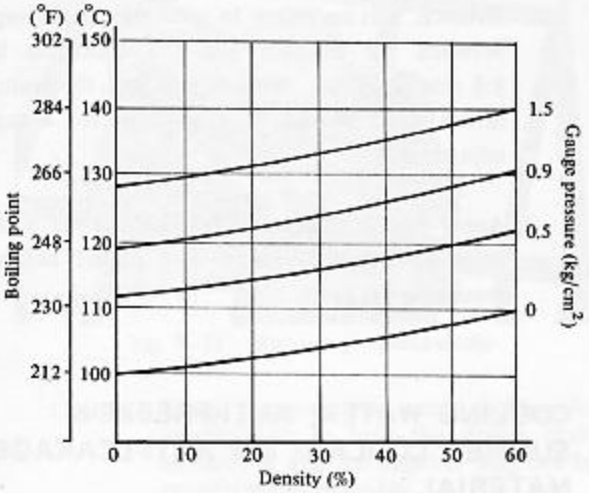


Fig. 7–15 Coolant density-boiling point curve

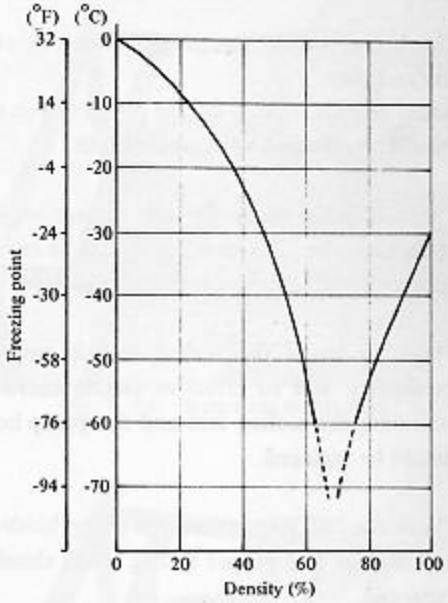


Fig. 7–16 Coolant density-freezing point curve

Note: To elevate a boiling point a most effective method use is pressurizing the system and the use of additives is not so important.

All models of GT750 coming from the production line are pre-filled with 50% of GOLDEN CRUISER 1200 anti-freeze and summer coolant in the cooling system. This material can be used for the motorcycle in colder regions where an atmospheric temperature drops to –31°C (–24°F). See Fig. 7–17.
For use in colder regions or storage in the motorcycle, this mixing ration should be increased up to 55% or 60% according to chart (Fig. 7–17).

Caution: Mixing of the anti-freeze & summer coolant is permitted up to 60%. Mixing beyond it would reduce its efficiency as shown in Fig. 7–16.

The above material is also used as rust-proof or corrosion proof material of the cooling system. It can be used. therefore, in summer or in tropical regions as well as in winter seasons and colder regions. We should also note that only those materials prepared for aluminum cylinders and radiators be sued.
As mentioned above, all new models from our line have GOLDEN CRUISER 1200 anti-freeze and summer coolant filled after being tested and guaranteed. In refilling, the same coolant or its equivalent should be used.

Caution: GOLDEN CRUISER is a year-round type coolant and should be able to retain its effectiveness for two(2) years or travelling distance of 35,000 km (20,000 miles). During that period, it is not necessary to exchange nor replenish the coolant except the case of leakage. Also, it is recommended to avoid mixing two(2) kinds of coolant of different brand.

Anti-leakage material

The anti-freeze is characterized by very high values of permeability and the leakage accident of the cooling system is highly likely. The anti-leakage substance is used to prevent such a possible leakage and every new model GT750 is filled with "Suzuki 7 on Bar's Leaks." The same material or its equivalent should be filled in the raidator when cooling water is changed. "Suzuki 7 on Bar's Leaks" is available as one of spare parts in solid form. A suitable amount for use is 1/2 oz (14 gr) per model and in the case of a liquid anti-leakage material available in the market, 70 cc (0.15/0.12 pt US/Imp) should be used.

Caution: Anti-leakage material should not be added except the time of the renewal of cooling water.

Cooling System Flushing

Every two years the cooling system should be serviced by flushing with plain water, then completely refilled with a fresh solution with spceified mixing ratio of distilled water and GOLDEN CRUISER 1200 anti-freeze and summer coolant, or a high-quality, inhibited (year-around type) glycol base coolant tested and guaranteed by SUZUKI. In addition, Cooling System Sealer (Suzuki 7 on Bar's Leaks) should be added.

1. Drain the coolant through the crankcase drain valve (refer to page 20).
2. Close the valve and add a sufficient amount of plain water to fill the system.
3. Run the engine until the normal operating temperature is reached.
4. Drain and refill the system, as described in steps 1, 2, and 3, a sufficient number of times until the drained liquid is colorless.
5. Allow the system to drain completely and then close the crankcase drain valve tightly.
6. Add the necessary amount of GOLDEN CRUISER 1200 and distilled water solution to provide the required freezing and corrosion protection.
7. Run the engine until normal operating temperature is reached.
8. Check and adjust level of coolant after the system has cooled sufficiently.

Temperature under which	°C	−10	−15	−20	−25	−31	−39
your motorcycle is used	°F	14	5	−4	−13	−24	−38
Mixing ratio of anti-freeze	%	30	35	40	45	50	55
Amount of anti-freeze	ltr	1.35/3.15	1.60/2.90	1.80/2.70	2.00/2.50	2.25/2.25	2.50/2.00
/distilled water	US.pt	1.40/3.30	1.70/3.10	1.90/2.90	2.10/2.60	2.40/2.40	2.60/2.10
for 4.5 ltr (4.75/3.95 qt, US/Imp) of cooling solution	Imp.pt	1.20/2.75	1.40/2.55	1.55/2.40	1.75/2.20	2.00/2.00	2.20/1.75

Note: This table applies to the use of GOLDEN CRUISER 1200 Coolant only.

Fig. 7–17 Required amount of anti-freeze coolant at each temperature

8. FUEL SYSTEM

DESCRIPTION

The fuel system consists of a fuel tank, a fuel cock, a carburetor, a fuel pipe, an accelerator cable and an air cleaner.

Three(3) "AMAL" types of carburetor having bore as large as 32 mm are fitted and a large-sized air cleaner suitable for the carburetor is used.

The fuel tank has a capacity of 17 liters (4.49/3.75 gal US/Imp) and fuel is supplied to the carburetor by way of a diaphragm fuel cock which can be automatically turned "on" and "off".

SPECIFICATION

Fuel tank capacity:	
Total capacity	17 ltr. (4.49/3.75 gal US/Imp)
Reserve capacity	3.5 ltr. (0.92/0.77 gal US/Imp)
Fuel cock operating pressure	0.35 kg/cm^2 (4.98 lb/in^2)

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedies
1. Overflowing	
a. Improper seating or damaged float needle valve and seat	Clean or replace needle valve, and seat (Refer to Fig. 8–5)
b. Incorrect fuel level	Adjust fuel level (Refer to page 70)
c. Foreign materials in needle valve	Clean (Refer to Fig. 8–11)
d. Defective fuel cock diaphragm	Replace fuel cock (Refer to page 71)
e. Defective float	Replace (Refer to page 70)
2. Hard starting	
a. Clogged starter system	Disassemble and clean (Refer to page 68)
b. Clogged or defective fuel cock	Clean or replace
c. Loose carburetor mounting clamp(s)	Tighten clamps
d. Air cleaner passage blocked	Clean cleaner element
3. Rough idling	
a. Incorrect idle adjustment	Adjust idling (Refer to page 68)
b. Clogged or loose slow system in carburetor	Clean and tighten
c. Incorrect fuel level	Adjust fuel level (Refer to page 70)
d. Improper starter system	Repair starter system
e. Improper air screw adjustment	Adjust opening of air screw (Refer to Fig. 8–8)

Symptoms & Probable Causes	Remedies
4. Excessive fuel consumption	
a. Incorrect fuel level	Adjust fuel level (Refer to page 70)
b. Improper starter system	Repair
c. Air cleaner passage blocked	Clean cleaner element
d. Loose jet and screw/s	Tighten
5. Poor acceleration	
a. Clogged fuel pipe	Clean pipe
b. Defective cock diaphragm	Repair
c. Improper air screw adjustment	Adjust air screw (Refer to Fig. 8–8)
6. Stalling at high speed	
a. Clogged loose main jet	Clean or tighten main jet
b. Incorrect float level	Adjust float level
c. Loose carburetor mounting clamp/s	Tighten
d. Improper fuel cock	Check, clean

CARBURETOR

Description

For model GT750, three(3) "AMAL" type carburetors VM32 SC are fitted with each carburetor having a different specification largely because of the fact that the muffler at the center cylinder is branched to both right and left sides, and hence the distance from the intake of air cleaner to each carburetor differs.

The starter system is operated by a starter cable fitted independently to each carburetor, with the starter lever being fitted to the handle.

To synchronize and balance three(3) carburetors an aligning mark hole is provided on the mixing chamber body of each carburetor to facilitate the adjustment of an unbalance among three(3) carburetors.

Carburetor Specification (Setting table)

Item	R.H. Carburetor	Center Carburetor	L.H. Carburetor
Type	VM 32Sc	〃	〃
Body mark	31010R	31010M	31010L
Main jet	102.5	100	102.5
Jet needle	5F16-3	〃	〃
Needle jet	P-4	P-3	P-4
Cutaway	2.5	〃	〃
Pilot jet	30	〃	〃
Bypass	1.4	〃	〃
Pilot outlet	0.6	〃	〃
Air screw opening	1-½ turns	〃	〃
Valve seat	2.5	〃	〃
Starter jet	50	〃	〃
Float level	26~28 mm (1.02~1.10 in)	〃	〃

Fig. 8–1 Carburetor setting table

Construction & Operation

The operation of carburetor is considered in the following four(4) stages of the system:

1. Starter system
2. Slow system
3. Main system
4. Float system

Explanations will follow this order, but please see SUZUKI's Service Manual "Carburetor and Carburetion" of 1971 for further details.

1. Starter System

To start a cold engine a specially rich mixture of air and gasoline is needed. The starter system is used for generating such gases which meet the purpose.

By operating the starter lever, the starter plunger ② opens with the throttle valve being at a closed position for starting the engine. Then, aspirated air into the engine passes through the air passage ① being branched from the main bore. At that time, a negative pressure is induced within the plunger chamber, which draws fuel from the starter jet ③. When the fuel passes through the emulsion tube ④, air entering through a small hole on the tube emulsifies the fuel. This fuel is further mixed with air within the plunger chamber and atomized, jetting into the main bore from the starter outlet ⑤ before reaching the engine.

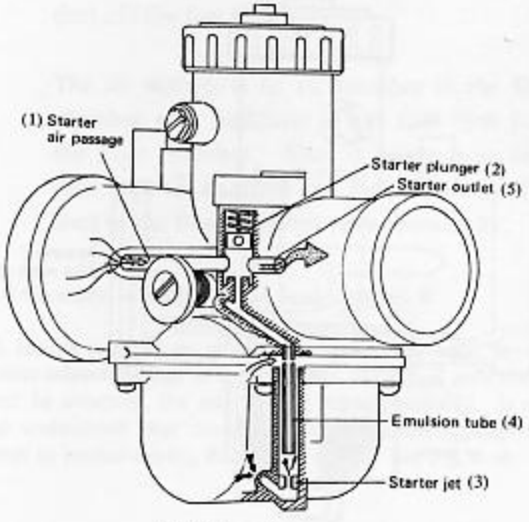


Fig. 8–2 Starter system

The starter cable for operating the plunger is fitted to each carburetor independently to ensure more reliable engine starting.

Note: Care should be taken not to open the throttle grip, when the starter is being used. Otherwise, gases would be diluted and the engine starting would be difficult.

2. Slow System

This system works over a range at a slightly larger opening than the closed position that is, the range is from idling to slow speed condition.

Aspirated air from the air inlet ① due to a negative pressure in the crankchamber can be regulated by the pilot air adjusting screw ② and reaches the pilot jet ③. Fuel is then drawn in and changes into a rich mixture. This mixture is jetted from the pilot outlet ④ and is diluted with air having passed a space between the main bore and the throttle valve. With that dilution, a suitable mixture is formed and supplied to the engine.

With further opening of the throttle valve, the engine speed increases requiring a larger amount of mixed gases, with the same mixed gases being supplied as a jet from the bypass ⑤ to supplying a necessary amount of fuel to the engine.

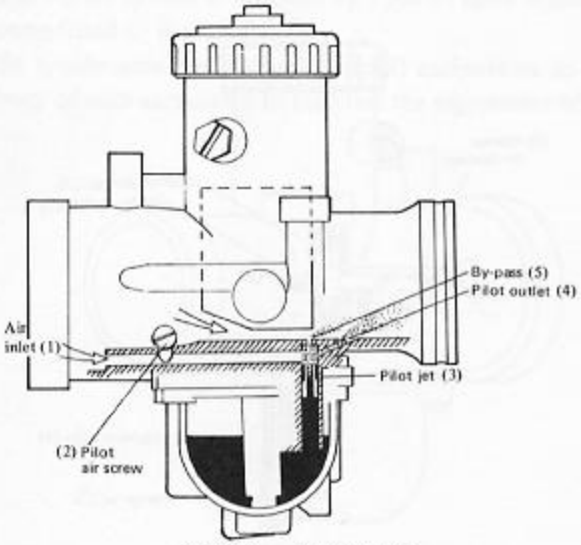


Fig. 8–3 Slow system

* This explains why fuel is drawn in from the pilot jet when air flows in the pilot air passageway. *

As shown in Fig. 8–4, when air drawn from the part A of a large cross-sectional area reaches the part B having a smaller cross section its velocity is accelerated thus reducing its pressure. (Theoretically, the pressure drop is in inverse proportion to the square of the velocity. A pipe having this effect is called "Venturi".)

This pressure drop induces a lifting force, equivalent to the pressure difference between its pressure and the atmospheric pressure, acting on the fuel. The fuel is carried away at high air speed and is well atomized in a jet from the nozzle.

The above principle applies to the carburetor. In the case of slow system, the part A corresponds to the air cleaner, a tube between the parts A and B correspond to the pilot air passageway and the fuel tube of the part B to the pilot jet for control of a fuel flow, respectively. Also, a pilot air adjusting screw is provided to control the air volume in the air passageway and the delivery of an air-fuel mixture is controlled as a whole. The part C corresponds to the pilot outlet.

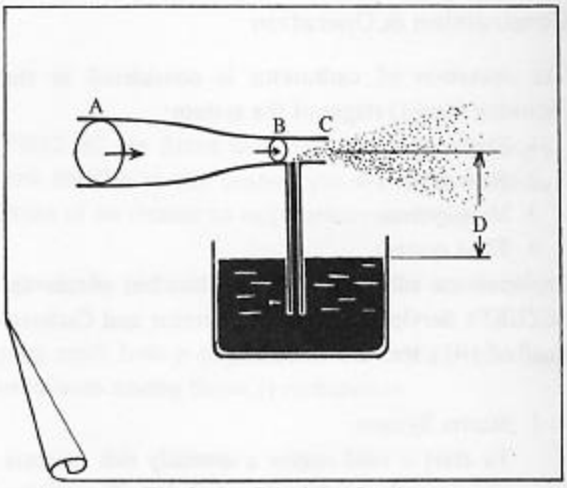


Fig. 8–4 Principle of carburetor

3. Main System

Engine speeds become higher with the throttle valve open, a large amount of air-fuel mixture is needed. Air as drawn does not pass the pilot channel with a large resistance, but flows through the main bore.

It is the main system which is effective in generating the mixture in this instance and the system works over medium and high speed ranges.

As shown in Fig. 8–5, when aspirated air from the air cleaner passes between the main bore and the throttle valve④, it draws in fuel from the main jet ① and a gap between the needle jet ② and the jet needle ③ by the above-mentioned venturi effect. It further atomizes the fuel before being supplied the engine.

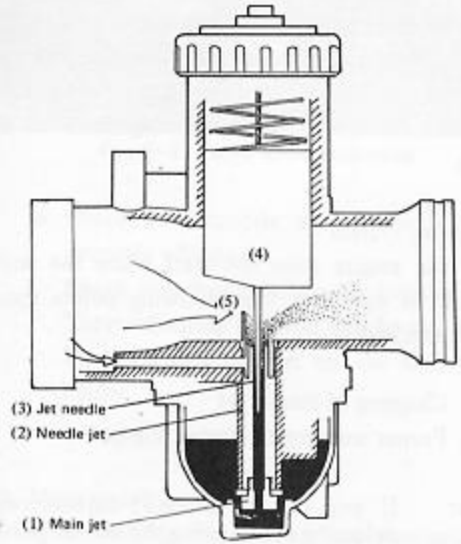


Fig. 8–5 Main system

At the same time, air is introduced from a small air passageway at the lower side of the main bore shown in Fig. 8–5, and passed into the needle jet to facilitate the atomization of the fuel. The screen⑤ fitted to the top of the needle jet blocks the air flow in the main bore generating a turbulent flow at its back which is needed to facilitate the atomization of the fuel. This is called a "primaty choke".

In the main system, air flow can be regulated at the throttle valve and a matched amount of fuel is regulated at the main jet. Fuel so drawn is further regulated depending upon the extent of the throttle valve opening, finally mixed with air and fed to the engine.

4. Float System (Fuel supplying system)

This system provides one of the most important mechanisms in supplying fuel to the carburetor and, as shown in Fig. 8–6, consists of a float①, a needle valve②, a needle valve seat③ and a valve seat gasket④. In addition to the function of a valve for adjusting the fuel flow, they play a very important role to keep a constant fuel level in the float chamber.

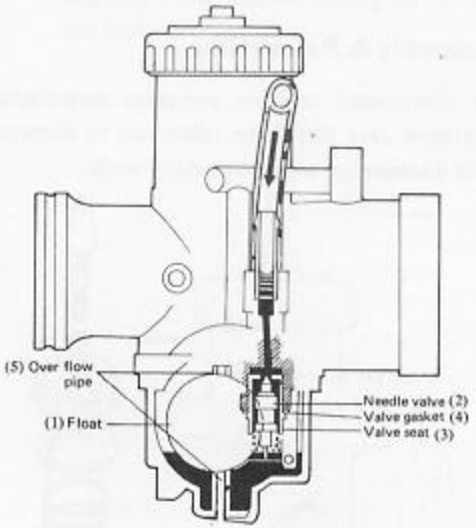


Fig. 8–6 Float system

When fuel in the chamber is below a certain prescribed level, the float① comes down and the needle valve also sinks correspondingly providing a gap at the valve seat. Then, fuel automatically flows in from the gap up to the preset level, moving the float and the needle valve upward and closing the gap to completely shut off the fuel flow.

The air vent⑤ is an air breather in the float chamber and facilitates a free fuel flow from the float chamber. Also, it works as an overflow pipe⑤ to drain the fuel, when the fuel level in the float chamber rises abnormally.

＊Necessity to keep the fuel level constant.＊

A mixing ratio of air and fuel is regulated by valve, jet and other related fittings of each system. If the fuel level should not be constant, the ratio would change markedly. It may be understood that the smaller the distance(D) from fuel level to venturi center, the more is drawn. See Fig. 8–4.

Removal

In dismounting the carburetor, clamps on cylinder and air cleaner rides are lossened first and, then, the carburetor is pushed toward the air cleaner. Each cable and tube should be disconnected on the carburetor side.

Disassembly & Reassembly

Each component requires precision manufacturing and utmost care should be taken not to damage the part in disassembly and re-assembly work.

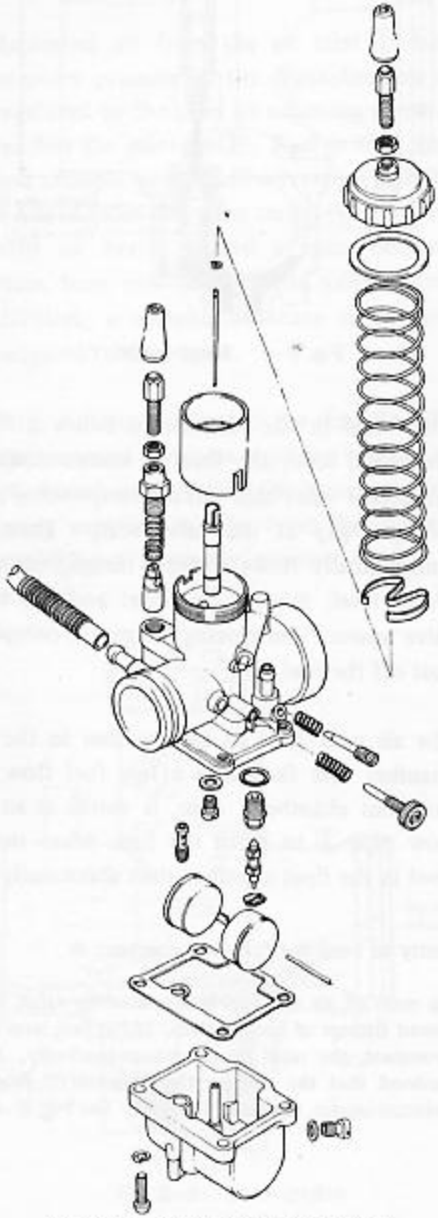


Fig. 8–7 Carburetor construction

Inspection & Adjustment

Before inspection and adjustment the carburetor should be dipped into clean gasoline for the cleaning. After the cleaning, each passageway of the carburetor is blown with the compressed air for removing dusts or other foreign substances.

It is to be noted that a trouble is sometimes caused due to the dusts or other foreign substances in gasoline at the fuel passage and the subsequent clogging of the passage. A wire or any other equivalent tool should not be used in the cleaning work in that instance.

1. Starter system
   If the engine does not start when the starter lever is operated, the following points should be checked:

   a. Clogging of starter jet
   b. Proper working of starter plunger

Note: If any one of three(3) carburetors is defective in actuating the starter plunger, that is, the plunger not returning to the original position, engine idling will be irregular and it is sometimes seen that the engine stops running immediately after the starting.

2. Slow system
   When the engine is subjected to irregular idling, with the engine speed not increasing smoothly or is subjected to jerking when the engine speed is being increased from the idling with an abnormal condition at low speed, careful inspection would be in order. Check as follows:

   a. Check pilot air adjusting screw ① for its functioning.
      A specified air adjusting screw opening is 1–1/2 for all of the three(3) carburetors. The screw should be tightened once and then lossened by 1–1/2 turns.

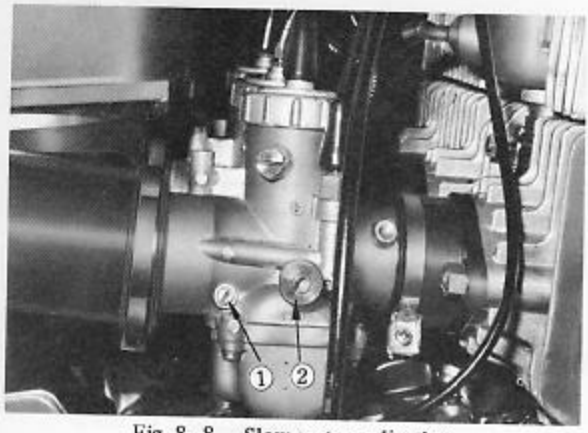


Fig. 8–8 Slow system adjusting

b. Check the throttle stop screw ② if it is properly adjusted.
Check also the throttle cable for idle portion. Their adjusting method will be explained in the following section on the main system below.

3. Main system
When jerking and stalling are encountered at medium and high speed ranges proceed the checking, as follows:

a. Check the main jet for its looseness. A loosen jet means an excess fuel being supplied to the engine and the rich gas condition would be given, deteriorating the engine performance.

b. An incorrect fuel level would lead to deterioration in engine performance. As to the fuel level adjustment, please see the section on the float system.

c. An expected engine performance cannot be attained, if the throttle valve cable is maladjusted and three(3) carburetors are not well synchronized. Adjustment can be made as follows:

(1) Adjust throttle cable adjuster of each carburetor and coordinate each throttle cable for an idling portion to allow a play of 2~3 mm (0.08~1.1").

(2) Remove the plug fitted to the mixing chamber body of each carburetor and operate the throttle grip. Then, it is possible to identify an aligning mark on the throttle valve side.
Therefore, the throttle cable adjuster is so adjusted that for each carburetor, the aligning mark will be on top of the aligning hole.

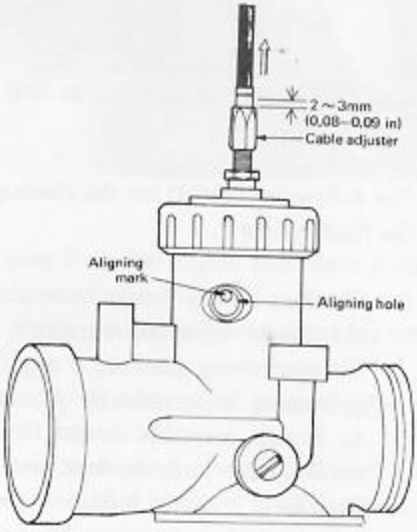


Fig. 8–9 Synchronizing carburetors

(3) The engine is started and warmed up sufficiently. Then adjust idling speed using a throttle stop screw. In adjusting the idling speed, two(2) spark plug caps are removed in turn so that only one(1) cylinder functions and the engine speed should be set to 1,000 rpm for each cylinder.

(4) When each cylinder is adjusted to the speed of 1,000 rpm independently from the adjustment of carburetors, the throttle stop screw of each carburetor is turned back uniformly so that an idling speed of 1,000 rpm can be obtained with the firing of three(3) cylinders.

(5) Finally, the throttle cable adjuster below the throttle grip is adjusted so that the throttle cable will have an idle portion of 0.5~1 mm (0.02~0.04") length.

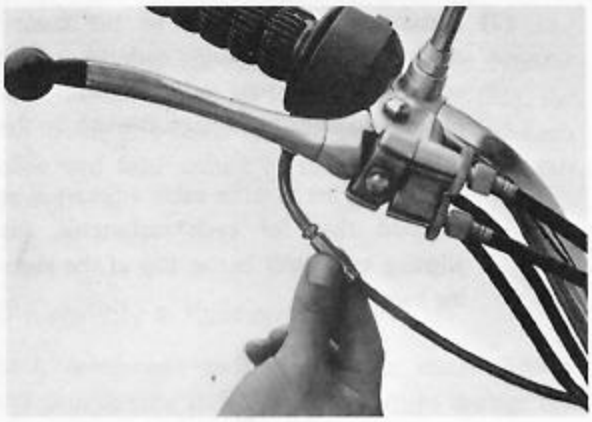


Fig. 8–10 Adjusting throttle cable

4. Float system

The following three(3) are the check points of the float system:

(a) Checking for any foreign materials between the needle valve and its seat.

An overflowing gasoline, if any, from the carburetor is attributable in most cases to foreign materials caught between the needle valve and its seat, as shwon in Fig. 8–11. Such foreign materials can be removed by tapping the carburetor lightly, but it is usually recommended that the needle valve should be drawn out for cleaning.

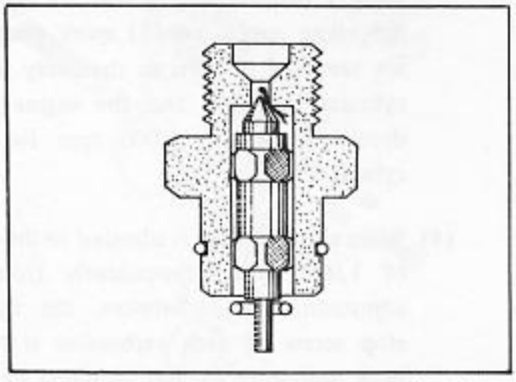


Fig. 8–11 Foreign material on needle valve

(b) The fuel level is adjusted correctly. This is one of the most important steps in the adjustment of the carburetor.

It is recommended that the fuel level should be periodically checked and the needle valve should be replaced if worn out.

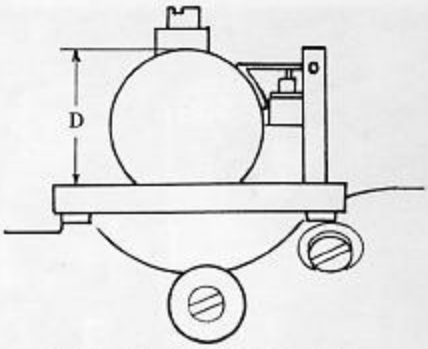


Fig. 8–12 Checking float level

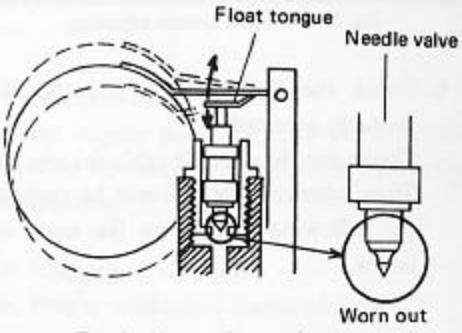


Fig. 8–13 Adjusting float level

For float level adjustment, the tongue of the float arm is bent and as shown in Fig. 8–13, the cap is reversed to give a specified float height.

Standard D = 27±1 mm (1.02~1.10")

(c) Checking if there is any damage on the float or for any water content inside of the float chamber.

FUEL COCK

Description

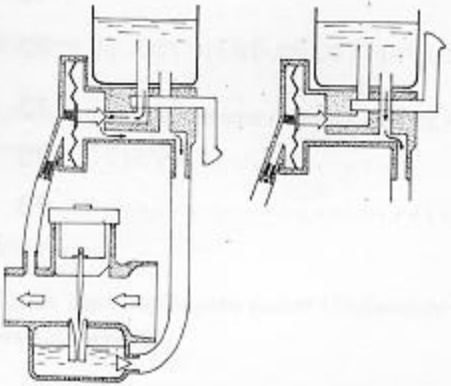


Fig. 8–14 Fuel cock construction

GT750 employs a diaphragm fuel cock which actuates on vacuum from the engine and opens a tap automatically when the engine starts.

The diaphragm chamber includes a diaphragm, valve and spring which presses the valve against the valve seat to close a fuel passage.

From the vacuum chamber to the left hand carburetor runs a strip of tube which transmits the vacuum generated in the carburetor to the cock.

Once the engine runs and vacuum is generated in the carburetor, the diaphragm together with the valve is pulled against the spring by the vacuum, leaving a gap between the valve and seat through which fuel is allowed to flow down to the carburetors.

This fuel cock has three positions, "ON", "RES", and "PRI". Turning the fuel cock lever to "Priming" position allows fuel to flow directly to the carburetor without passing through the diaphragm valve system. When starting the engine of a machine which has been left unused for a long time or the carburetors of which were overhauled, first supply fuel to the carburetor float chamber by turning the cock lever to "Priming" position.

Turn the lever again to "On" position when the engine has started in order to prevent running out of fuel on the way.

Inspection & Repair

1. Check for leakage from cock body or fuel pipe connections.

2. Remove the cock cap and inspect the filter and gasket for defects.

3. Inspect the function of diaphragm cock; take out a fuel and a vacuum pipe from carburetor and suck air from the vacuum pipe with the lever positioned on "ON" or "RES", then check to see if the gasoline flows out or not.

9. EXHAUST SYSTEM

DESCRIPTION

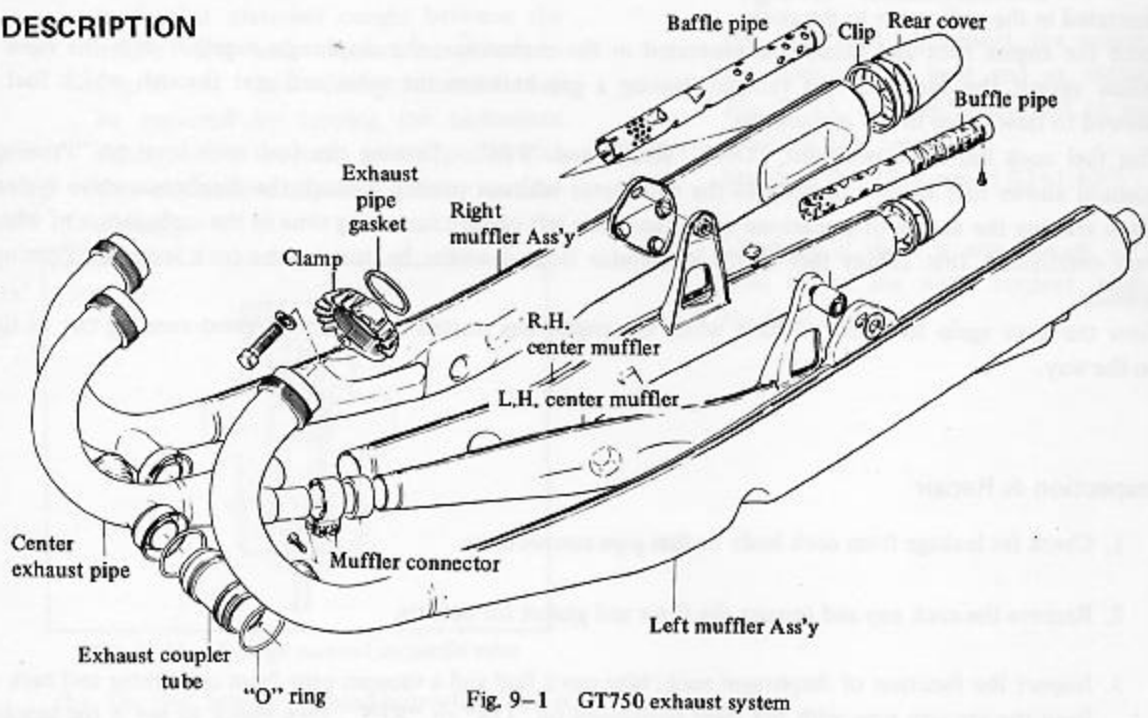


Fig. 9–1 GT750 exhaust system

Exhaust system of this engine consists of the right and left muffler assemblies integrally constructed with muffler and exhaust pipe, and the center exhaust pipe branched at the halfway in two pipes whereto the right and left mufflers are to be fixed.

All mufflers are connected with coupler tubes at the exhaust portion. Inside of each muffler rear body, baffle pipes are installed.

Removal

1. Remove the exhaust clamps of each cylinder by loosening the clamp bolts.

2. Remove the right and left pillion footrest.

3. Disconnect the exhaust coupler tubes, then remove mufflers.

Inspection

1. Check the coupler pipe gasket (Exhaust coupler seal) for leakage.

2. Check for any defect on the exhaust pipe gaskets and "0" rings.

3. Check for any cracks on the muffler body.

* Reason for adopting Exhaust coupler tubes *

The muffler on 2 cycle engine is not used only as a silencer, but as subsidiary equipment for increasing engine out-put. This is because that 2 cycle engine has no valves on the cylinder head controlling the flow of working gas like 4 cycle engine and accordingly have to make its muffler substitute for the valves on 4 cycle engine by utilizing the exhausted gas pulse.

The coupler tubes on GT750 are adopted to heighten further this effect than the ordinary muffler and also to improve the exhaust noise.

Assembly

1. Install the center exhaust pipe into the cylinder exhaust port.

2. Support the right and left muffler at the cylinder exhaust port flanges and the pillion footrests.

3. Install the coupler tubes into each flange on the exhaust pipes with the Exhaust coupler seal (99000–31020) applied on the outside of them.

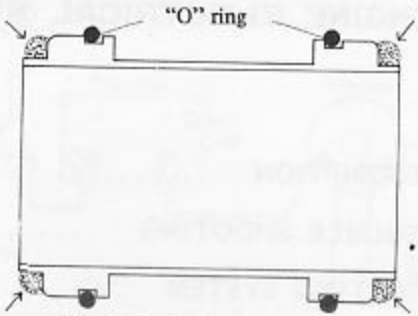


Fig. 9–2 Exhaust coupler tube

4. Tighten the exhaust clamps of right and left muffler firmly and then mount the R.H. and L.H. center muffler.

Caution: (1). The exhaust clamps should be fixed so as to be 1 mm (0.04") of gap between the flank of cramp and the cylinder.

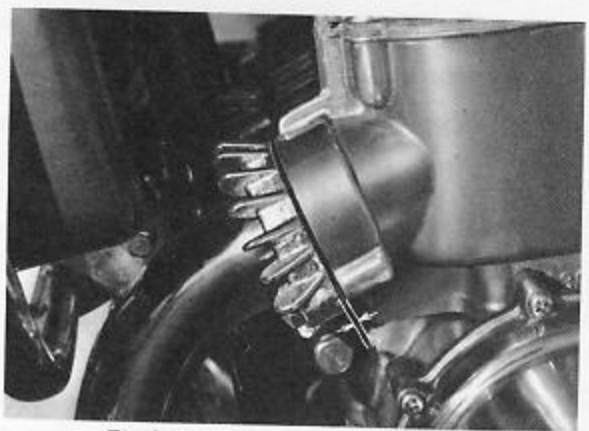


Fig. 9–3 Fixing exhaust pipe clamp

(2). It is recommended to replace Exhaust coupler seal at the time of an overhaul.
It will stop leaking from connecting parts after a while even after replacing.

10. ENGINE ELECTRICAL SYSTEM

DESCRIPTION

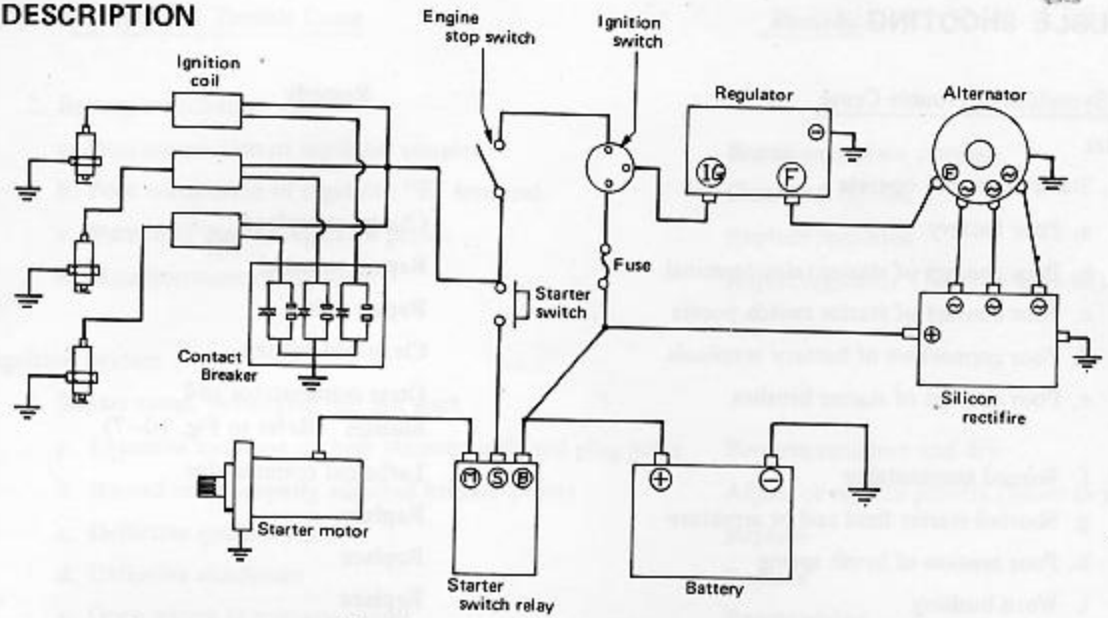


Fig. 10–1 GT750 engine electrical system

GT750 engine is equipped with a 12 volt electrical system, consisting of starting, charging and ignition systems.

Starting system:

The starting motor equipped in this engine is compact and light, and is a sealed type to prevent entry of dirt and dust. It is activated by the magnetic starter relay when the starter button is pushed with both the ignition and the engine stop switches on. The output is transmitted to the engine through the starter clutch which is of over-running type and its driven gear is constant-meshed to the starting motor pinion. The starter relay including the magnetic switch inside is designed to be extremely reduced the possibility of having short circuiting and poor insulation.

Charging system:

The charging system consists of alternator, regulator, silicon rectifier and battery. The alternator generates a high electric output even at low engine speed which enable to eliminate the discharge of the battery in the normal condition.

The function of the alternator regulator is to regulate the generator voltage to a pre-set value by controlling the rotor coil current.

Ignition system:

The ignition system consists of both three ignition coils and contact breaker points. When contact point is closed, the current flow from the battery through the ignition and engine stop switches to the primary windings of the ignition coil, then to ground through the closed breaker point. When the breaker point open, the high voltage current is produced in the secondary coil and led to the spark plug through the high tension cord to make a hot spark between the spark plug gap.

Battery:

The 12V 14AH battery is equipped on the center part of the frame under the seat. The battery is constructed of alternating positive and negative plates with separators between them to prevent a short circuit. The positive plates has fiberglass footed on both sides to prevent them from peeling off. The battery consists of lead peroxide positive plates and spongy lead negative plates and diluted sulfuric acid electrolyte. Six cells are connected in series in the 12 volt battery.

TROUBLE SHOOTING

Symptom & Trouble Cause	Remedy
Starter	
1. Starter does not operate	
a. Poor battery	Charge or replace
b. Poor contact of starter relay terminal	Repair terminal
c. Poor contact of starter switch points	Repair switch
d. Poor connection of battery terminals	Clean and tighten
e. Poor contact of starter brushes	Dress commutator and brushes (Refer to Fig. 10–7)
f. Burned commutator	Lathe cut commutator
g. Shorted starter field coil or armature	Replace
h. Poor tension of brush spring	Replace
i. Worn bushing	Replace
j. Defective starter relay	Replace
2. Starter turns, but crankshaft does not turn	
a. Starter clutch slips	Inspect and replace if inner parts are excessively worn out
b. Defective reduction gears	Replace
Alternator & Regulator & Battery	
1. Battery discharges	
a. Shorted or disconnected alternator stator coil	Repair or replace stator (Refer to page 86)
b. Disconnected alternator rotor coil	Replace rotor
c. Poor contact of brushes and spring/s	Clean or replace (Refer to page 87)
d. Defective rectifier/s	Replace rectifier/s
e. Maladjustment of regulator	Adjust regulator (Refer to page 88)
f. Burned or poor contact of regulator point/s	Dress points or replace regulator
g. Lack or insufficient electrolyte of battery	Replenish electrolyte or replace battery
h. Shorted battery plates	Replace battery
i. Poor connection of battery terminal/s	Clean and tighten
j. Open wiring between ignition switch and regulator "IG" terminal	Repair
k. Open wiring between regulator "F" terminal and alternator "F" terminal	Repair

Symptom & Trouble Cause	Remedy
2. Battery overcharge	
a. Poor connection of regulator coupler	Repair or replace coupler
b. Poor connection of regulator "E" terminal	Clean and tighten
c. Burned of melted regulator points	Replace regulator
d. Maladjustment of regulator	Adjust regulator (Refer to page 88)
Ignition System	
1. Starter turns, but engine will not start	
a. Excessive moisture on high tension cords and plug gap/s	Remove moisture and dry
b. Burned or improperly adjusted breaker points	Adjust or repalce point/s (Refer to page 92)
c. Defective ignition coil	Replace
d. Defective condenser	Replace
e. Open wiring in primary circuit	Repair wiring
f. Wet or dirty spark plugs	Replace
2. Hard starting	
a. Weak battery	Charge or replace battery
b. Defective spark plug/s	Replace plug/s
c. Defective breaker points	Replace points
d. Loose connection in primary circuit	Tighten or repair
e. Defective condenser/s	Replace condenser/s
f. Defective ignition coil/s	Replace coil/s
g. Maladjustment of ignition timing	Adjust timing (Refer to page 94)
2. Engine misses	
a. Dirty or defective spark plug/s	Clean or replace spark plug/s
b. Loose high tension cord/s or defective spark plug cap/s	Tighten, repair or replace cord/s, cop/s
c. Improper breaker point/s adjustment	Adjust point/s (Refer to page 92)

STARTING SYSTEM

Description

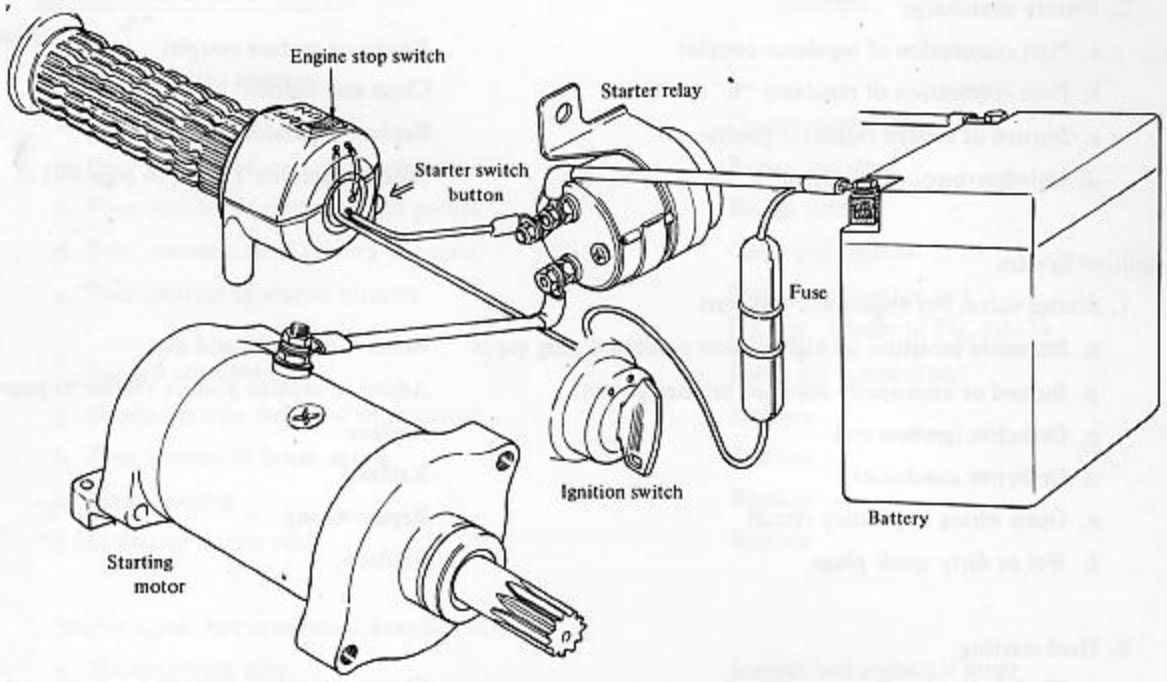


Fig. 10–2 Equipments for starting system

The starting system consists of battery, starter relay, starting motor and two switches as shown in above figure.

The starter relay having magnetic switch inside is provided to flow a large current directly from the battery to the starting motor at starting, since the starter button has no capacity enough to transmit such a large current as to activate the starting motor.
When the starter button is pushed with both the ignition and the engine stop switches on, the solenoid coil of the magnetic switch creates electro magnet with small current from battery and pulls the moving core to close the contacts which closes the circuit between the battery and the starting motor.

The engine stop switch is operated to stop the engine running suddenly in an emergency of the motorcycle being overturned or encountered with some big troubles. Therefore it does not set the starting motor in motion when it is applied even if the starter button is pushed.

The starting motor equipped on the upper crankcase is of cumulative compound type and drive the crankshaft through the starter clutch and its idle gear.

* The principal and operation of cumulative compound motor *

The cumulative compound motor has the wiring circuit comprising the shunt coil and series coil. In consequence of this wiring, it combines a virtue of series motor which induce a big torque at staritng engine with a shunt character of shunt motor to keep the speed constant at any time under normal condition.
The characteristic curve of the cumulative compound motor is shown in Fig. 10–3.

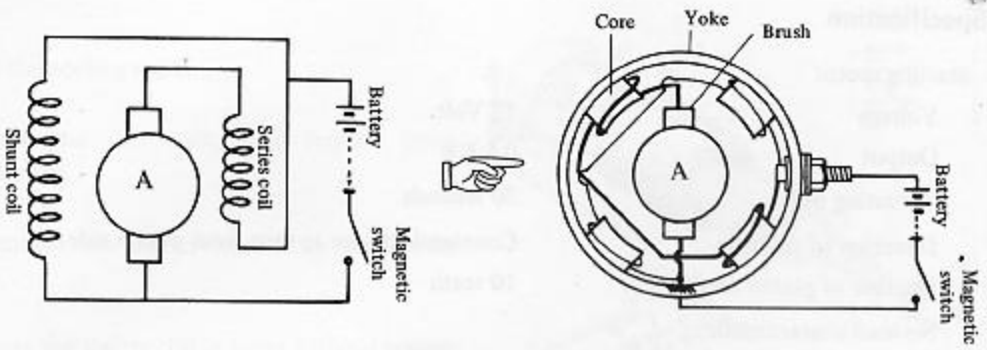


Fig. 10–3 Wiring of cumulative compound motor

The starter clutch equipped on this engine is of over-running type which transmit the starting motor output to the crankshaft and keep the crankshaft free from the starting motor once engine starts.

When the starter clutch gear is driven through idle gear in a direction of arrow as shown in figure, three rollers within the slots are moved to lock the clutch housing and ensuring the starter clutch to rotate.

Since the clutch housing is mounted on the left crankshaft with key, the crankshaft will rotate and ensure the engine to start. Once the engine starts and rotating speed exceeds that of the starter clutch gear, the rollers are moved toward wider section of the slots due to centrifugal force and the engine output is no longer transmitted to the starting motor.

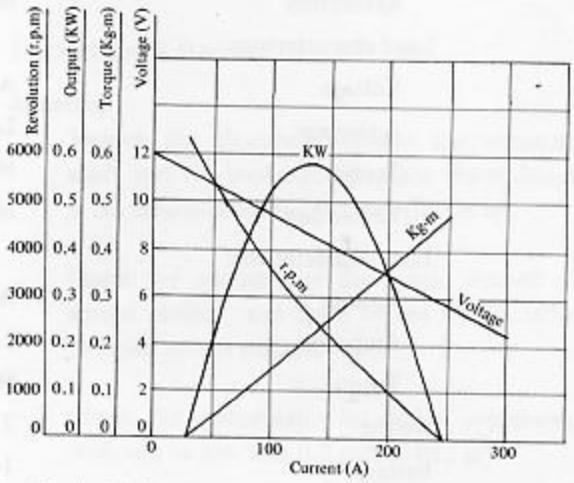
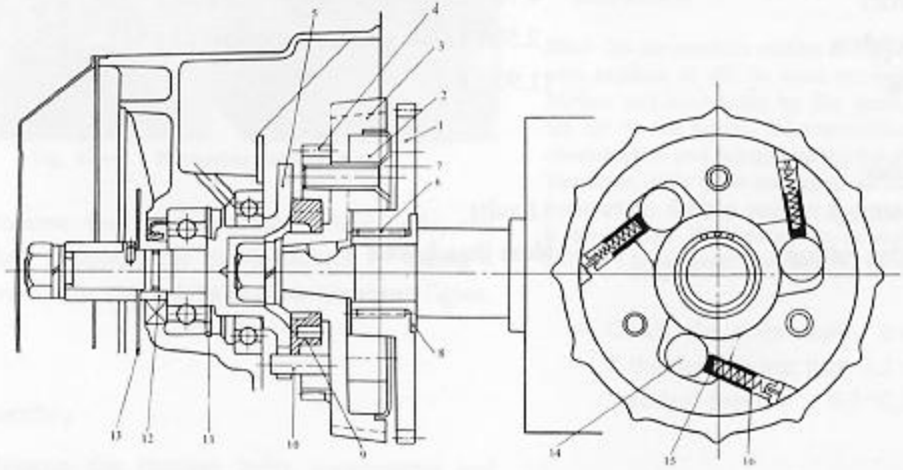


Fig. 10–4 Performance curves of cumulative compound motor



1. Starter clutch gear
2. Starter clutch hub
3. Starter clutch housing
4. Water pump drive gear
5. Breaker cam shaft
6. Needle bearing
7. Screw
8. Crankshaft left bushing
9. Breaker cam shaft dumper rubber
10. Breaker cam shaft drive pin
11. Circlip
12. Spacer
13. Ignition timing plate
14. Starter clutch roller
15. Roller push piece
16. Spring

Fig. 10–5 Starter clutch construction

Specification

Starting motor	
Voltage	12 Volt
Output	0.5 KW
Actuating time	30 seconds
Direction of rotation	Counterclockwise as seen from pinion side
Number of pinion teeth	10 teeth
No-load characteristic:	
Voltage	At 11 volts
Amperage	Less than 50 amperage
Revolution	More than 4,500 rpm
Load characteristic:	
Voltage	At 8.5 volts
Amperage	Less than 150 amperage
Torque	More than 0.2 kg-m (1.45 lb-ft)
Revolution	More than 1,800 rpm
Lock characteristic:	
Voltage	At 5.5 volts
Amperage	Less than 280 amperage
Torque	More than 0.35 kg-m (2.52 lb-ft)
Weight	2.4 kg (5.32 lb)
Battery	14 AH
Reduction ratios:	
Primary	4.78 : 1 (starter motor to idle gear 9 : 43)
Secondary	2.50 : 1 (idle gear to crankshaft 22 : 55)
Total	11.95 : 1
Starter Relay	
Rated voltage	12 volts
Actuating voltage	More than 8 volts

Removal

1. Drain the cooling system.
2. Remove the fuel tank, then remove three carburetors.
3. Disconnect the starter wire from the starter relay.
4. Remove the starter clutch cover without removing the contact breaker assembly and its related parts which are mounted on it.
5. Loosen the water by-pass hose clamp and then remove the by-pass hose from the thermostat case.
6. Take off the water by-pass hose union ① from the upper crankcase after removing the starting motor cover.

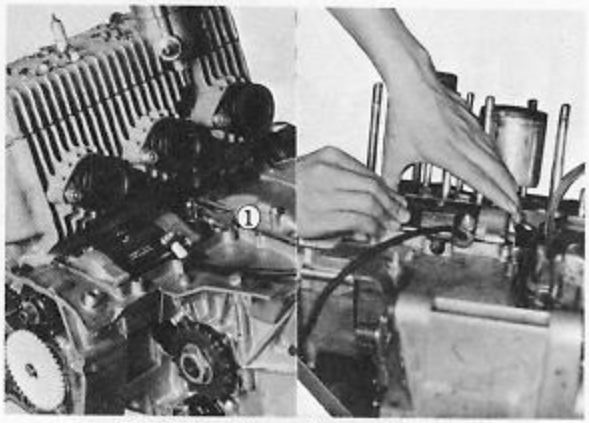


Fig. 10–6 Removing starting motor

7. Remove the starting motor fitting bolts, and then dismount the starting motor by sliding it toward the clutch side as shown in above figure.

Disassembly

1. Remove the through bolts, commutator end frame, brushes and washers.
2. Extract the bushes using press machine, if needed.

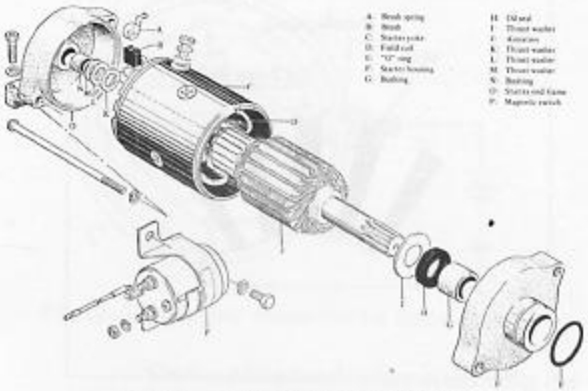


Fig. 10–7 Exploded view of starting motor

Inspection & Repair

Armature

1. Inspect the clearance between the armature shaft and the bushings. Replace the bushings if the clearance exceed 0.2 mm (0.008 in).
2. Check the commutator for rough, burned or scored surface, and dress or cut with a lathe to finish proper surface.
3. Check the commutator for out of roundness, it should be less than 0.3 mm (0.012 in).

* Necessity of measuring the commutator for out of roundness *

Since the commutator rotates at high speed always in contact with brushes, it will be worn out both mechanically by the friction and electrically by the spark, and also its segments are apt to rise against the commutator mica, decreasing the commutation and bringing about the abnormal wear.
Therefore, it is quite necessary to inspect and measure the commutator for the wear or eccentricity periodically. Cut it on a lathe if necessary so as not to exceed 26.5 mm (1.045") in diameter and chamfer the edge of each segment.

4. Check the mica depth, and file off the mica if the depth is less than 0.2 mm (0.008").
   Standard depth . . . 0.5~0.8 mm (0.02~0.03")

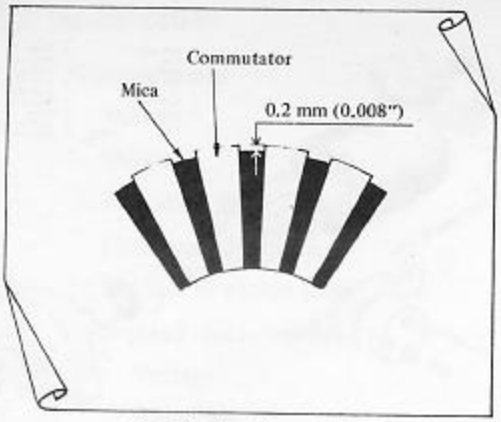


Fig. 10–8 Commutator

5. Check the commutator for ground. Connect one tester prod to commutator, and the other to armature core shaft.

   If the ohmmeter pointer moves or the test lamp on a Glowler tester lights, the commutator grounded.

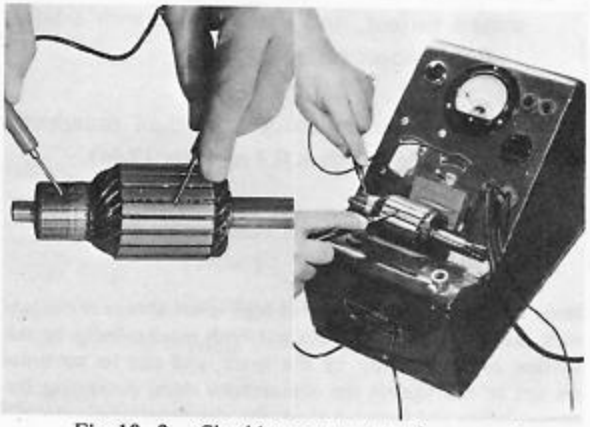


Fig. 10–9 Checking commutator for ground

6. Check the armature for short circuit by placing the armature on a Glowler tester and hold a hacksaw blade over the armature core while the armature is rotated. If the hacksaw blade is drawn and vibrates, the armature coil is shorted.

Fig. 10–10 Checking armature for short circuit

7. Check the armature coil for open circuit. Place the armature on a Glowler tester and check the reading on the meter with the tester prods connected to each two segments. If the reading is not uniformity, the armature has a open circuit.

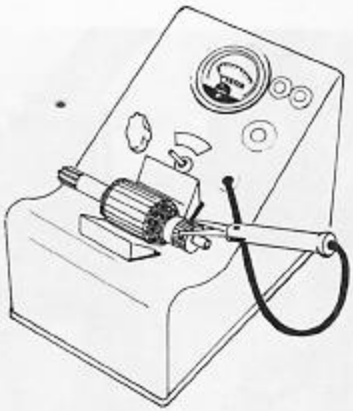


Fig. 10–11 Checking armature for open circuit

Field Coil

1. Check the field coil for open circuit by connecting the test prods to each terminal alternately. If the tester pointer does not move, the field coil has open circuit and should be replaced.

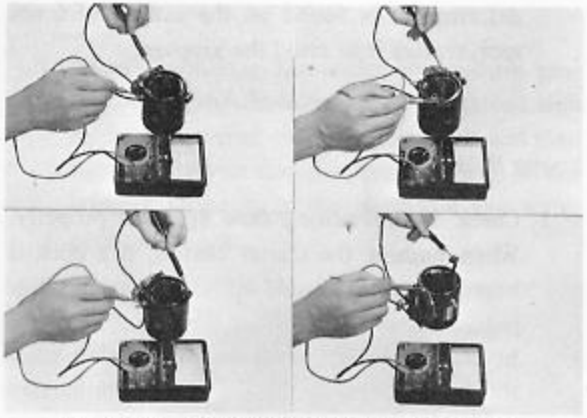


Fig. 10–12 Checking field coil for open circuit

It is also possible to check the field coil for open circuit by exciting the field coils. If the screw driver is not drawn to anywhere when it is inserted into the field yoke, the field coil has a open circuit.

Fig. 10–13 Checking field coil by exiting it

Caution : Be carefull of the following points when testing the fiels coil open circuit by exciting it.

Two kinds of field coils provided on this motor have each different resistance as follows.

Series coil . . . . . 0.02 ohms (Ω)
Shunt coil . . . . . 2.55 ohms (Ω)

When connecting the battery to the field coil as illustrated in Fig. 10–14, a current flow through only shunt coil and the screw driver is drawn toward "A" and "C" cores.

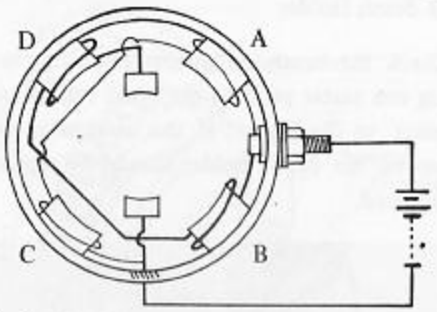


Fig. 10–14 Battery connection for field coil test

On the other hand, when connecting the battery as shown in Fig. 10–15, a current flow through each coil in the order of "D", "B", "A" and "C" in series. In this case, the current is mainly regulated by shunt coil resistance, so that the electromagnetic force is induced on "A" and "C" much more than "B" and "D" coils and accordingly the screw driver will be drawn toward shunt coils.

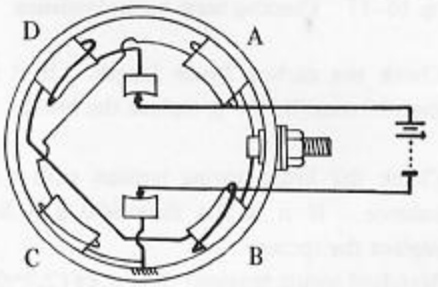


Fig. 10–15 Battery connection for field coil test

2. Check the field coil for ground by connecting one tester prod to the field coil junction on the yoke and the other to the core or yoke. If the ohmmeter pointer moves, the field coil has been grounded and should be replaced.

Fig. 10–16 Checking field coil for ground

Brush & Brush Holder

1. Check the brush holder insulation by connecting one tester prod to the brush holder and the other to the base. If the ohmmeter pointer moves, the brush holder should be repaired or replaced.

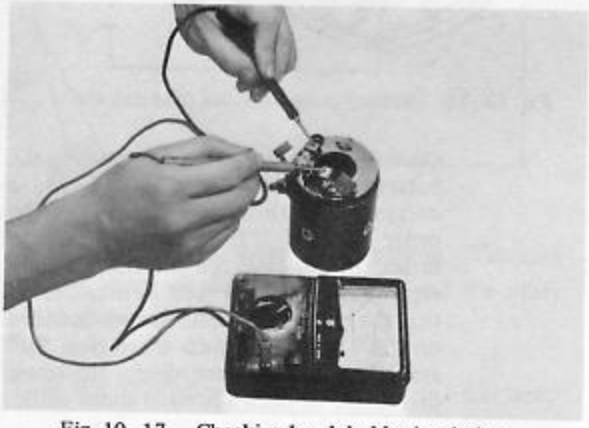


Fig. 10–17 Checking brush holder insulation

2. Check the carbon brush length. If it is less than 10 mm (0.394"), replace the brush.

3. Check the brush spring tension with a spring balance. If it is less than 600 g (0.84 lb), replace the spring.
Standard spring tension: 1~1.4 kg (2.2~3.1 lb)

Fig. 10–18 Checking brush spring tension

Starter Clutch

1. Check to see if the clutch rollers operate properly.

2. Check the clutch inner race press-fitted into the clutch gear for wear or deformation. If any deformation is found on the surface of inner race, replace it to avoid the slippage.

Starter Relay

1. Check if the moving core operates properly. When pushing the starter button, if a click is heard from the inside of starter relay, it is judged correct.
In case the relay has been dismounted from the frame, confirm the click with the battery connected between "S" terminal and mounting plate as illustrated in the figure.

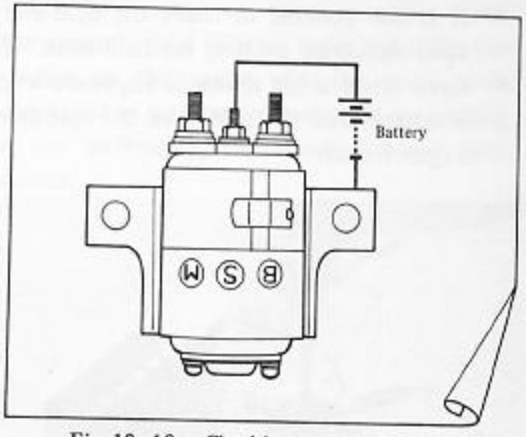


Fig. 10–19 Checking starter relay

2. Check to see if the switch contacts are burnt by opening the cover ①.
If the contact surfaces have been burnt, dress with a file or emery sand paper.

Assembly

Starting Motor

1. Before assembling the starting motor, apply the multipurpose grease on the armature shaft bushings.

2. Install the carbon brushes into brush holders after the armature is settled in the yoke.

3. Install the armature thrust washers, end frame and housing, then tighten them with the through bolts. Check if the armature shaft turns smoothly with hand.

1. When assembling the water pump drive gear onto the clutch housing, apply the thread lock cement on thread of each fitting bolt and then tighten firmly so that the punch mark ① on the housing aligns with the pin ② on the water pump drive gear.

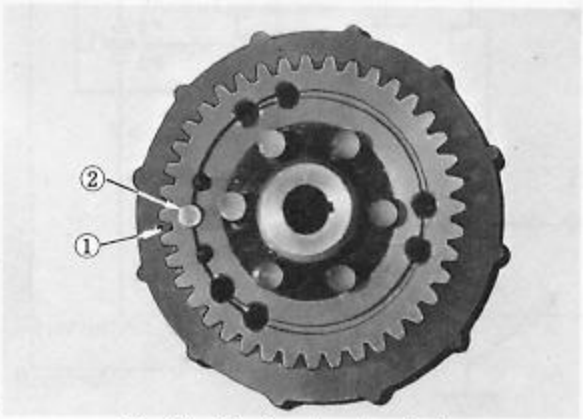


Fig. 10–20 Punch mark and pin

2. Mount the starter clutch assembly onto the crankshaft and tighten the set nut by 450~550 kg-cm (33~40 lb-ft) with the starter clutch holder (09920–40111).

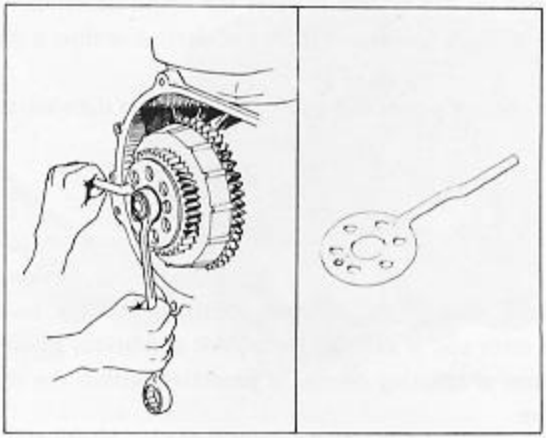


Fig. 10–21 Assembling starter clutch

3. When assembling the starter clutch cover onto the crankcase, turn the breaker cam shaft by hand so as to match the cut-away of breaker cam shaft with the pin on the water pump drive gear.

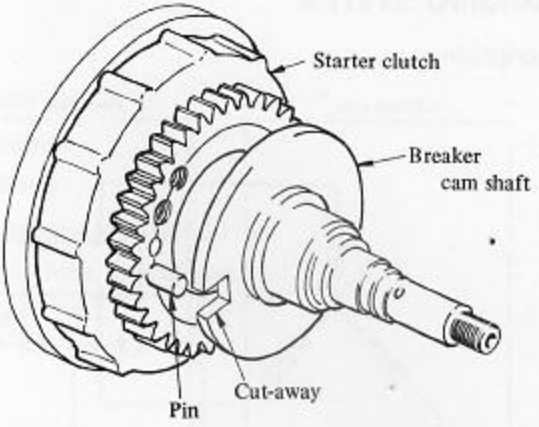


Fig. 10–22 Assembling breaker cam shaft

CHARGING SYSTEM

Description

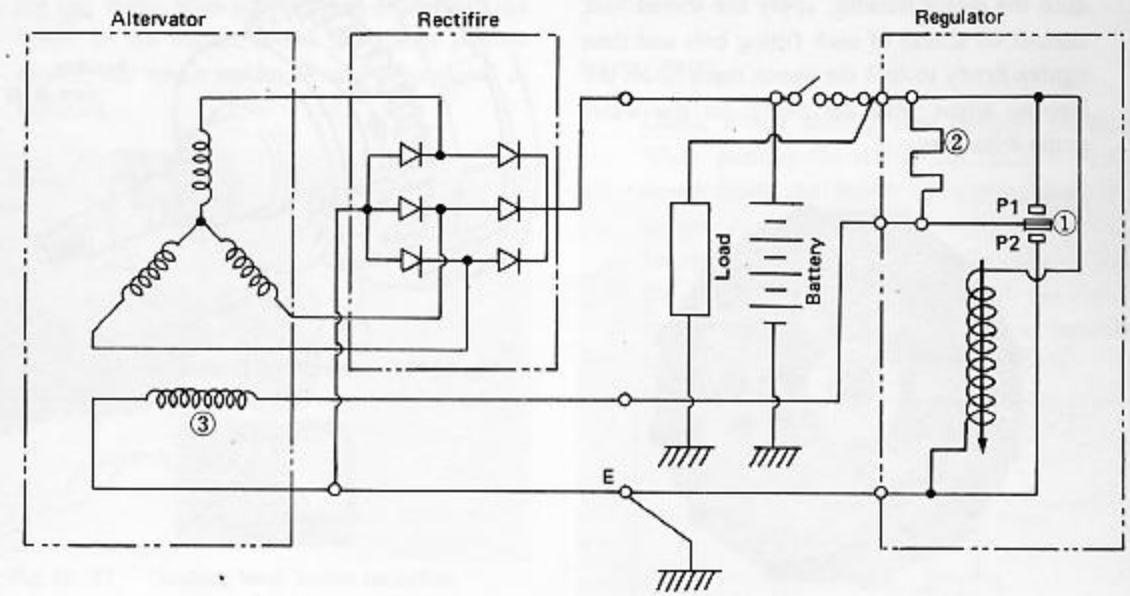


Fig. 10–23 Charging system wiring

The alternator induces a three phase alternating current within the stator coil in proportion to the engine speed, provided that the excitation current supplied from the battery to the rotor coil is constant.

In order to charge the battery, the output current from the alternator should be rectified to a direct current and regulated to a constant voltage (13.5~14.5 volts) in any engine speed.

The silicon rectifier and the voltage regulator are equipped on this system to meet the above demands. The rectifier which consists of six silicon diodes converts a alternating current from the alternator into a direct current.

The voltage regulator which comprises a control resister, contact points and pull-in coil controls the excitation current in the rotor coil.

Operation

When the engine switch is turned on, the current flows through the contact points ① and the control resistance ② in parallel and the rotor coil ③, and the rotor coil is exited. Under this condition, when the engine is started and the rotor is rotated, the three phase alternating current is generated within the stator coil and then rectified to the direct current by the rectifier.

As the charging in the battery is developed, the voltage at the battery terminal naturally becomes higher and also the voltage to the point "IG" increases. Therefore the pull-in force is increased and it pulls the point lever downward so as to open the points from the low speed side (P1). As the point opens, the current flows through the control resistance ② and the excitation current is decreased, resulting in decreasing also alternator output.

Under light load at high revolution, point contacts the high speed side (P2), and the current to the rotor coil is further decreased to control output voltage.

Thus the charging voltage is controled by regulating the excitation current with the control resistance and pull-in coil. On the other hand, stator coil has a self-limiting characteristic in limiting the current flow to the coil to press the value when the revolution increases.

Specification

Alternator:	
Voltage	12 volts
Max. output current	20 amperes
Max. output power	280 Watts
No-load revolution	14V, 0 Amp. @ 1050±150 rpm
Output revolution	14V, 20 Amp. @ 3000 rpm
Weight	3.4 kg (7.5 lb)
Voltage regulator:	
Regulated voltage	13.5~14.5 volts
Weight	0.22 kg (0.485 lb)

Alternator

Removal

1. Remove the generator cover.
2. Loosen the brush holder fitting screws while firmly pressing the brush holder and then remove, otherwise the brush would spring up and the wire comes off.

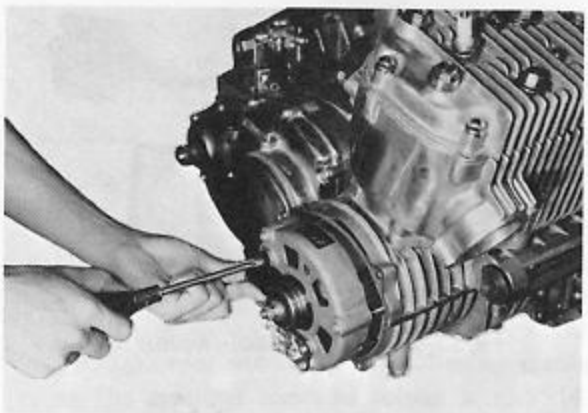


Fig. 10–24 Loosening brush holder fitting screw

3. Remove the alternator stator.
4. Pull out the rotor with the Rotor Remover (09930–33110).

Inspection & Repair

1. Check the rotor coil for open or short circuit by placing the tester prods on each slip ring, and then read the resistance. If the reading is less than the standard (around 10 ohms), the rotor coil has a short circuit or grounded.
   If the reading is much higher than the standard, the coil has a open circuit. Replace the rotor with new one if differences in the reading are found.

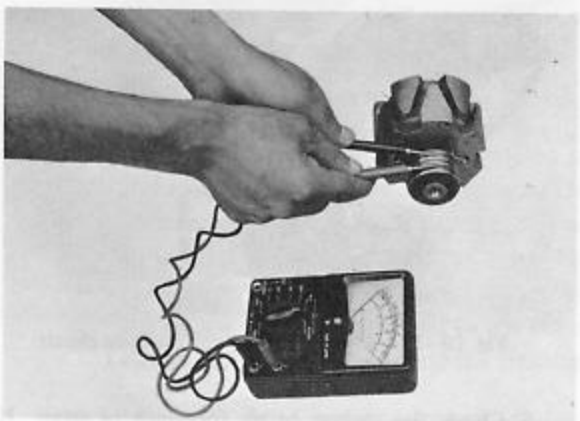


Fig. 10–25 Checking rotor coil for open and short circuit

2. Check the rotor coil for insulation by connecting one tester prod to either slip ring and the other to the rotor core finger. If the ohmmeter pointer moves, the rotor or slip ring is defective and the rotor assembly should be replaced.

3. Check the stator coil for insulation by connecting one tester prod to either stator coil terminal and the other to the stator core. If the ohmmeter pointer moves, the stator assembly should be replaced.

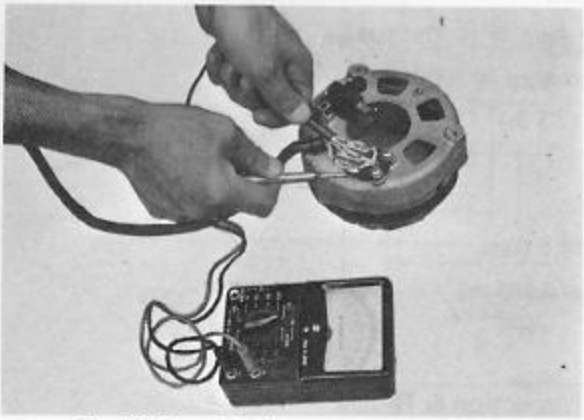


Fig. 10–26 Checking stator coil insulation

4. Check the stator coil for open circuit by placing the tester prods to each stator coil terminal alternately. If the ohmmeter pointer does not move, the stator coil has a open circuit and should be replaced.

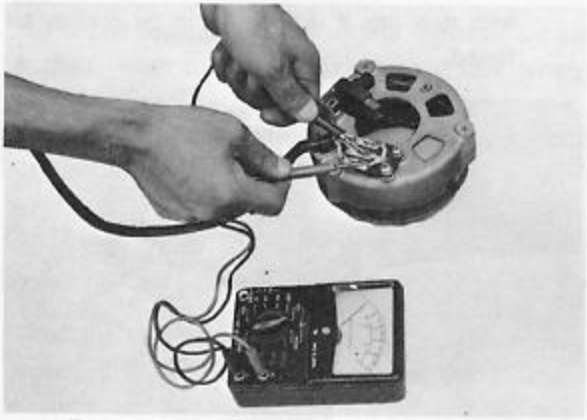


Fig. 10–27 Checking stator coil for open circuit

5. Check the carbon brush for clack or wear. If it is worn out beyond 5.5 mm (0.217″), replace the brushes. The overall length of brand-new brush is 12.5 mm (4.93″).

Note: When replacing the brushes, replace with the brush holder assembly which includes the brush, spring and holder.

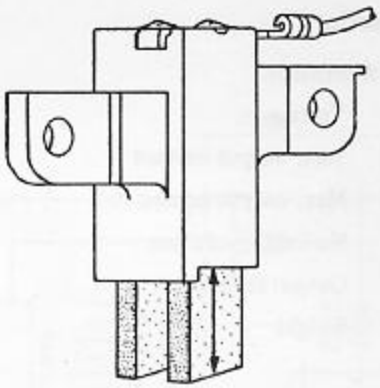


Fig. 10–28 Carbon brush length

6. Check the silicon rectifier for open. Measure the resistance between each terminal. If the silicon rectifier is in good condition, less resistance is measured in the normal direction (for example, Yellow→Red) and no current flows in the inverse direction.

Caution: The ordinal ohmmeter has an inverse polarity, so that a current flows from (−) lead to (+) lead.

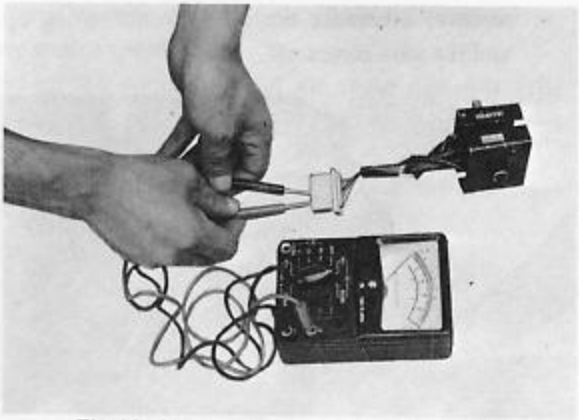


Fig. 10–29 Checking silicon rectifier for open

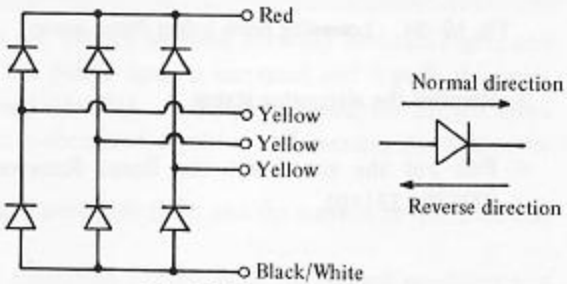


Fig. 10–30 Silicon rectifier

7. Measure the resistance between "IG" (orange lead) and "F" (green lead) terminals. The resistance should be none. If the resistance is there, the voltage regulator low speed point is defective. Open the cover and press the regualtor lever ① to open the points, then measure the resistance again. The specified resistance is 10 ohms.

   If the resistance is excessively higher than the specified value, the control resistor is defective.

Caution: The voltage regulator cover is sealed to keep the inside mechanism free from dust and moisture, and further-more the unnecessary adjustment at ordinal service.

In case it is adjusted from lack of replacement in market, open the cover and inspect it as follows, keeping in mind once it is serviced it will not be guaranteed.

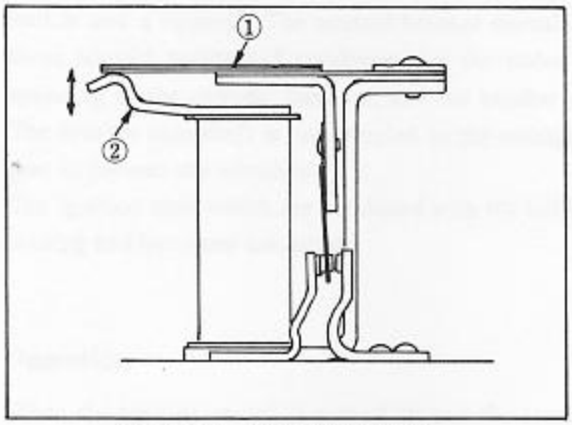


Fig. 10–31 Adjusting regulator

8. Measure the regulated voltage. Insert one tester prod into a cell of the coupler where the orange lead is connected and the other to the engine for grounding. Set the engine to run at 2,000~3,000 rpm and check the voltmeter reading. The specified regulated voltage is 13.5~14.5 volts.

   If the reading is excessively different from the above specified voltage, adjust the regulator by so bending the lever ② as to have a meter reading of 13.5~14.5 volts.

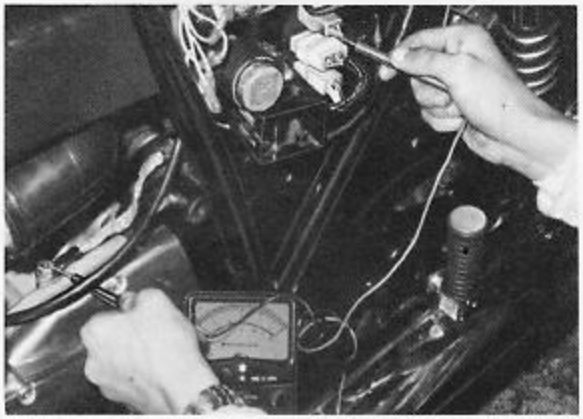


Fig. 10–32 Measuring alternator output

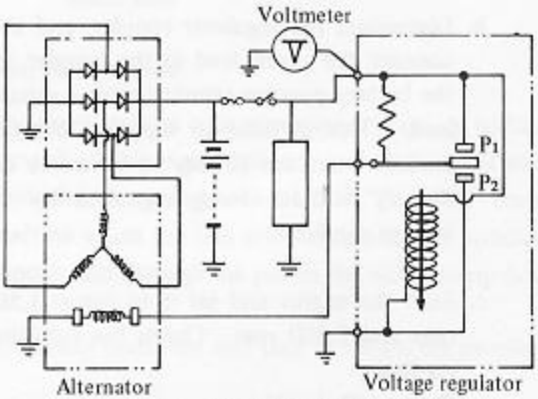


Fig. 10–33 Voltmeter connection

9. Check the alternator no-load performance according to the following procedures.

   a. Disconnect the starter switch relay lead which is colored red from the connector, and also the fuse lead at the connector side where the white tape is wound. Then connect the fuse lead with the relay lead connector, and the voltmeter between the red lead which was connected to the starter switch relay lead originally and the crankcase.

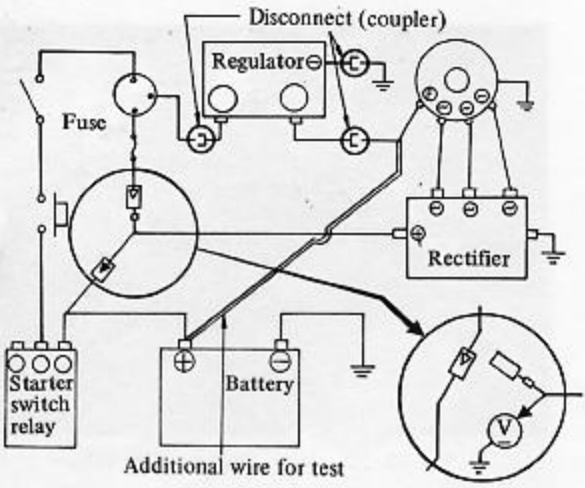


Fig. 10–34 Wiring for measuring output

b. Disconnect the regulator coupler, and then connect the green lead in the coupler and the battery positive terminal with a suitable lead. This is done to supply a constant current from the battery to the rotor coil directly without being regualted by the voltage regulator.

c. Start the engine and set it to run at 1,500 rpm and 2,500 rpm. Check the voltmeter reading.

The specified voltage:

1,500 rpm	More than 16 volts
2,500 rpm	More than 27 volts

In case that the no-load voltage is in good condition but the battery is discharged, check the voltage regulator or battery.

If the voltage reading is less than the specified value, the connection of coupler, silicon rectifier or alternator is defective. Repair or replace them.

IGNITION SYSTEM

Description

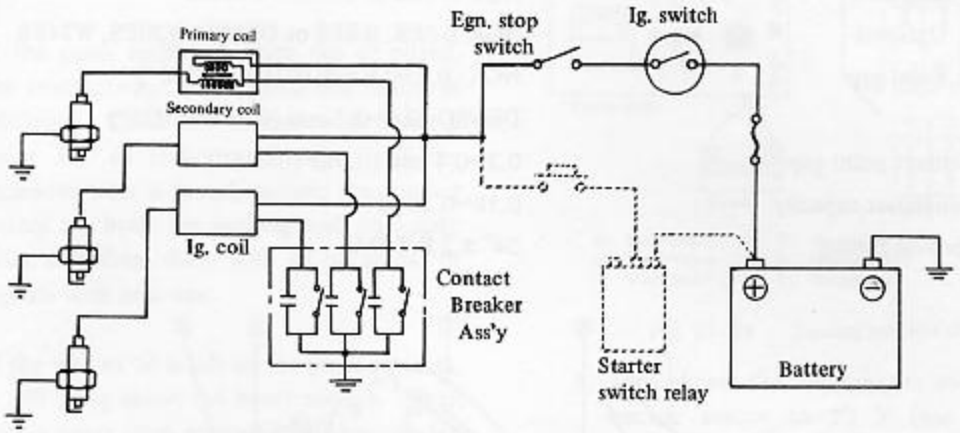


Fig. 10–35 GT750 ignition system wiring diagram

The ignition system consists of the contact breaker assembly, three ignition coils, three spark plugs, an ignition switch and a battery. The contact breaker assembly is located on the engine left side and made up of each three contact points and condensers on the stator base, which are marked with "L", "C" and "R" corresponding to the cylinder location, and the breaker cam shaft on which the cam and timing plate are installed. The breaker cam shaft is not coupled to the crankshaft directly, but through the pin on the water pump drive gear to prevent the vibration.

The ignition coils which are combined with the holder are installed under the fuel tank to obtain the excellent cooling and increased insulation.

Operation

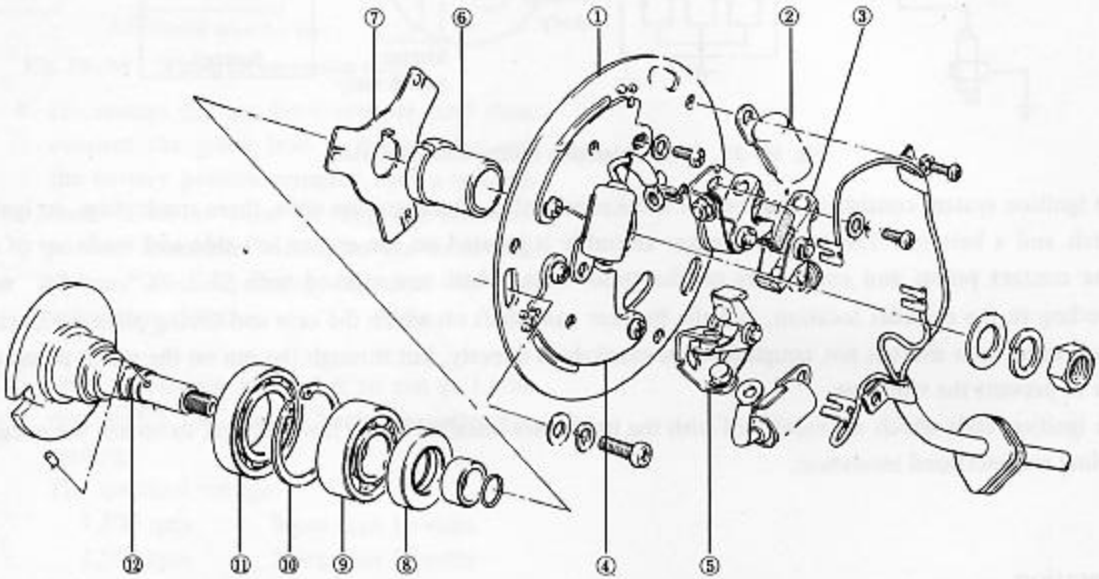
When the ignition switch is turned on and the crankshaft is rotated, a current from the battery flows through the primary coil windings of each ignition coil and contact points if they are closed.

At the time when the point is just opened, a counter electromotive force which is much higher voltage than before is induced within the primary coil by the self induction, and moreover it is stepped up to a high tension current within the secondary coil by the mutual induction so enough as to ignite the spark plug.

A condenser connected in parallel with the contact point is equipped to absorb the electric energy and keep it from sparking between the contact breaker points.

Specification

Spark plug	
Standard	NGK B-7ES or DENSO W22ES
Optional	NGK B-6ES, B-8ES or DENSO W20ES, W24ES
Point gap	NGK: 0.7~0.8 mm (0.028~0.032")
	DENSO: 0.6~0.7 mm (0.024~0.028")
Contact point gap	0.3~0.4 mm (0.012~0.016")
Condenser capacity	0.16~0.20 μF
Ignition timing	24° ± 2 B.T.D.C.



① Contact point base
② Condenser
③ Contact point assembly
④ Contact point set plate
⑤ Contact point shifting plate
⑥ Point breaker cam
⑦ Timing plate
⑧ Oil seal
⑨ Cam shaft inner bearing
⑩ Clamp
⑪ Cam shaft outer bearing
⑫ Cam shaft

Fig. 10–36 Exploded view of contact breaker assembly

Removal

1. Dismount the fuel tank from the frame, and remove the ignition coil assembly.
2. Remove the contact breaker cap, and the contact point base with the points and condensers on it after scriving a mark both on the base and the case near the fitting bolt in order to indicate the position of the base in the case of reassembling.
3. Disconnect the contact breaker lead coupler from the holder plate.

Disassembly

1. Dismount each contact point and condenser from the base by removing fitting screws.
2. Remove the breaker cam shaft nut and washers, then take off the breaker cam and timing plate from the shaft.
3. Extract the breaker cam shaft from the case.

Caution: When removing the breaker cam shaft inner bearing from the case, use the Snap ring opener (09920–70120).

1. Check the contact breaker point for wear, dirt or oil film.

   a. If the point surface is worn out or pitted, the conductivity is decreased and results in misfiring. Dress the surface with either a point file or emery sand paper. If the excessive wear is found, remove the contact points of both the moving and stationaly sides and dress them with an oil stone, or replace with new one.

   b. If the dirt or oil is left on the point surfaces, it will bring about the burnt surface. Clean with a waste cloth soaking a trichloroethylen.

   c. Check to see if the points are in perfect contact. Dress or replace the points if necessary.

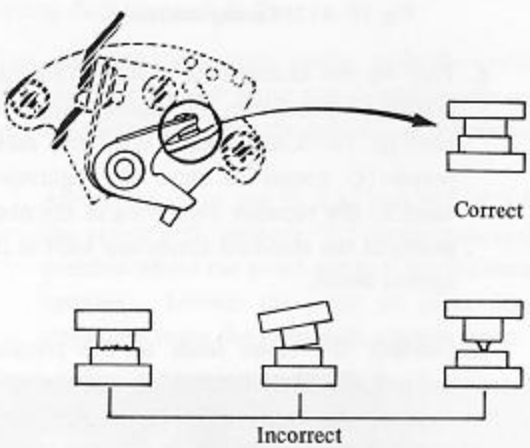


Fig. 10–37 Contact point

   d. Check to see if the point gap is between 0.3~0.4 mm (0.012~0.016") using the filler gauge, when the point gap is at maximum opening.

2. Check the ignition coils for defects using an electro tester.

   a. Connect the ignition coil to be tested with the tester as illustrated in the figure.

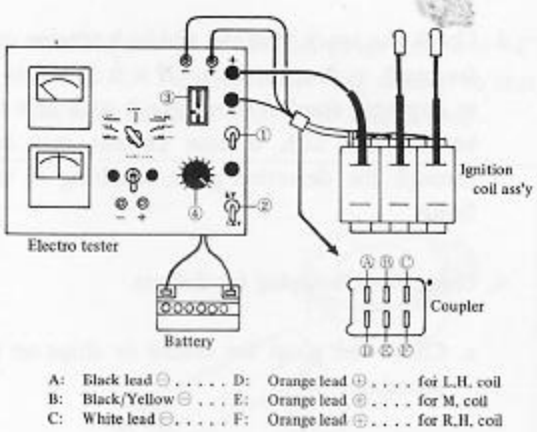


Fig. 10–38 Testing ignition coil

   b. Turn down the change-over switch ② for electric source to 12 V (use a 12 volt battery), and that ① for coil test to "COIL TEST". Then the spark will jumps between the three prong gap ③ if the coil has no defects.

   c. Adjust the tester three prong gap turning the dial ④ to have 6 mm (0.24") of distance. Check the spark for about 5 minutes.
   The coil is satisfactory if the gap is more than 6 mm and the spark is still strong and blue.

   d. When testing the ignition coil without removing from the frame, remove the spark plug cap and connect the positive tester lead to the high tension cord and the negative lead to the spark plug.

   e. Start the engine and check to see if the spark is maintained over 6 mm of distance.

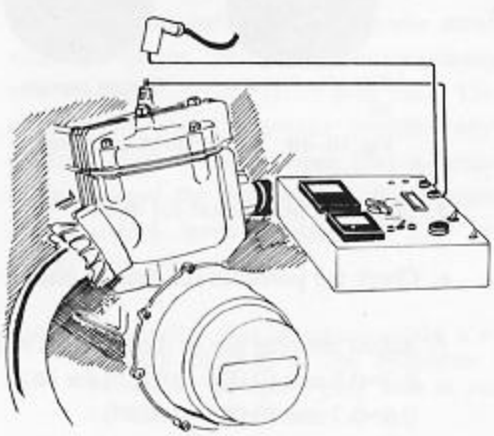


Fig. 10–39 Testing ignition system

3. Check the spark plug cap and high tension cord for crack or deterioration. If it is found to be in improper condition, replace it with new one because the high tension current may leak through the defective parts, resulting in misfiring.

4. Check the spark plug for defects.

   a. Check the plugs for cracks or chips on the porcelain.

   b. Check the electrodes for wear.

   c. Check for excessive carbon deposits. If carbon deposit is excessive, it indicates that the improper heat range spark plug has been used or a too rich fuel-air mixture has been supplied. Replace with a hot type plugs (B-6ES or W20ES) or adjust the carburetors. If the porcelain is excessively white-colored or the electrode is worned out, replace with a cold type plugs (B-8ES or W24ES). When NGK and DENSO plugs are not available, other corresponding plugs may be used in accordance with the conversion chart writen on page

Fig. 10–40 Condition of spark plug

   d. Check the plug gasket for defect.

   e. Check the porcelain for glaze or blister.

   f. Adjust the plug gap to the specified value:
   0.7~0.8 mm (0.028~0.032") for NGK make
   0.6~0.7 mm (0.024~0.028")
   for DENSO make

5. Check the condenser capacity using the electro tester.

   a. Connect a 12 V battery as the electric source for the electro tester.

   b. Position the selector knob ① to "C. Capacity".

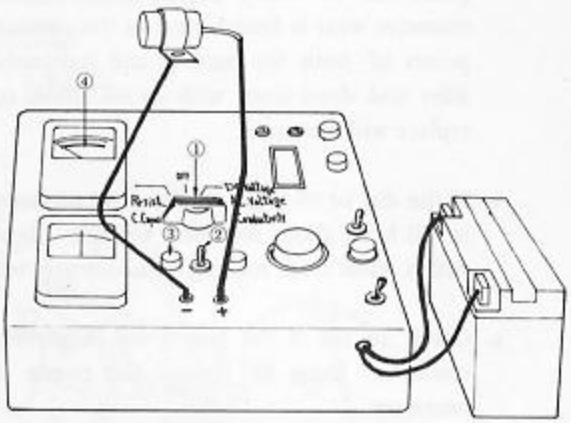


Fig. 10–41 Testing condenser

   c. Turn up the change-over switch ② for calibrating test, and turn the capacity adjusting knob ③ to "CAP. CAL." until the meter pointer ④ comes to show the equivalent value to the capacity (inscribed in the name plate) of the standard condenser built in the electro tester.

   d. Connect the tester leads to the terminal marked "TEST-TERMINAL", and the other ends of the lead to the condenser to be tested as illustrated in the figure.

   e. Turn down the change-over switch ②, then the pointer will show the capacity of the condenser to be tested.
   The specified condenser capacity is 0.16~0.20 μF.

6. Check the condenser insulation resistance using the electro tester.

   a. Position the selector knob to "Insulation" (Megohm).

b. Turn up the change-over switch to "CAL" position, and then turn the zero adjustment knob marked "RES. CAL." untill the meter pointer comes to 0.

c. Connect the tester leads to the terminals marked "TEST-TERMINAL", turn down the change-over switch, and apply the other ends of lead to the condenser to be tested. The pointer will move to the right and then quietly back to the left.
Keeping the connection till the pointer comes to stand still, read the pointer on the scale by Megohm. Bring the condenser wire near the body, so a spark will jump between the wire and the body.
The specified insulation resistance is over 10 Meg-ohm.

Timing Adjustment & Test

When adjusting the ignition timing, both the ignition timing and the breaker point gap should be adjusted. Start the adjustment from the cylinder at left always.

1. Adjust the point gap to 0.35 mm (0.014") for the points with marking "L" on the base at the position where the point gap is at the maximum opening. Loosen the point set plate fitting screw and move the plate with a screw driver.

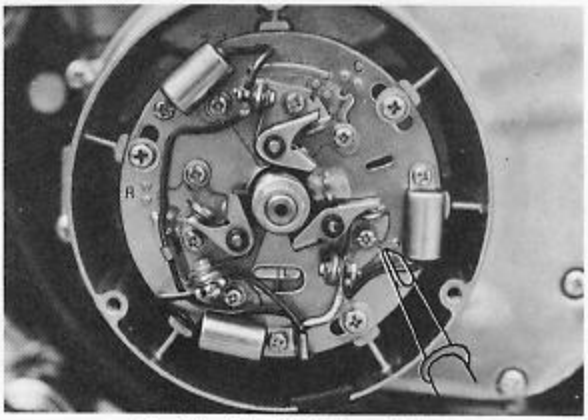


Fig. 10–42 Adjusting point gap

2. Remove the spark plug from left cylinder head, and install the timing dial gauge holder into the plug hole and set the gauge stem where the small needle ① of the dial gauge indicates "4" at T.D.C. Turn the outer ring scale ③ so that the large needle indicates "0" on the scale.

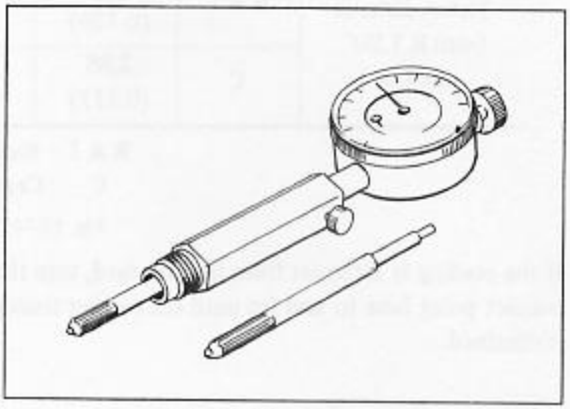


Fig. 10–43 Dial gauge

3. Connect one of the leads of timing tester to the positive terminal where a white and a black leads are connected, and the other to somewhere on the engine to ground it.

Fig. 10–44 Adjusting timing

4. Turn the crankshaft counterclockwise slowly, and tone of the timing tester buzzer changes and the lamp on the tester goes out. These changes tell you the precise position where contact points begin to open that is ignition timing. Read the dial gauge at this moment. The standard ignition timing is 3.64 mm (0.143") for left cylinder.

Caution: Be carefull that the gauge stroke is not uniform because of the difference in inclination of spark plug hole at each cylinder.

Standard ignition timing : 24° ± 2 (B.T.D.C.)

Crank angle (B.T.D.C.)		22°	23°	24°	25°	26°
Piston distance from B.T.D.C. mm (in)	R & L	3.20 (0.126)	3.35 (0.134)	3.64 (0.143)	3.94 (0.155)	4.25 (0.167)
	C	2.88 (0.113)	3.15 (0.124)	3.42 (0.136)	3.72 (0.146)	3.99 (0.157)

R & L : Right and left cylinder
C : Center cylinder

Fig. 10–45 Ignition timing table

If the reading is different from the standard, turn the contact point base to and fro until the correct timing is obtained.

5. Adjust the points with markings "R" and "C" in a similar manner as "L" after adjusting point gaps to 0.35 mm (0.014") by moving each point set plate ①.

Note: If the dial reading on the center and right cylinders is different from the standard, move the shifting plate ② by loosening two fitting screws.

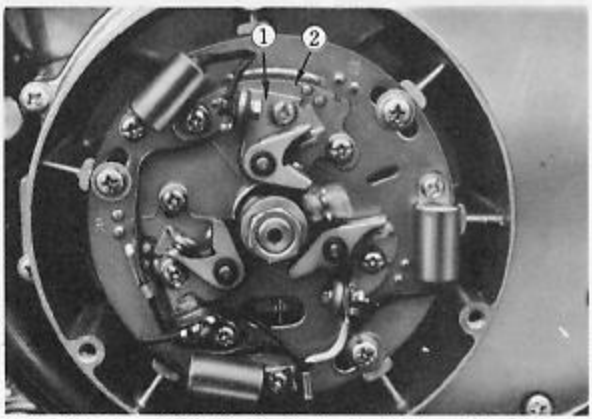


Fig. 10–46 Adjusting ig. timing for R.H. and L cylinders

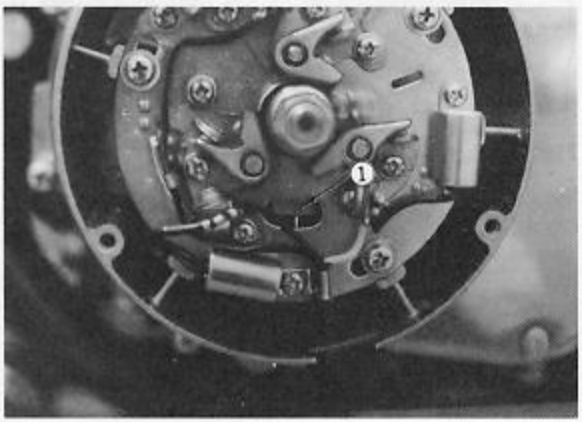


Fig. 10–47 Ignition timing marks

6. When adjusting the ignition timing with timing marks ① both on the timing plate and on the casing, rotate the crankshaft counterclockwise to check if the point opens when "L" marking line on the timing plate is in alignments with an aligning mark of the casing in the adjusting window. If it is out of order, turn the contact point base to and fro until the correct timing obtains.