# SUZUKI
# SERVICE MANUAL

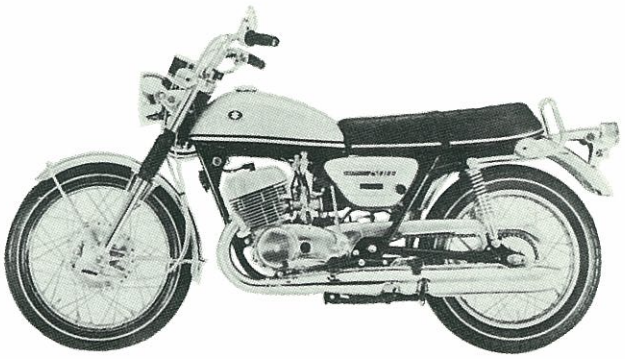
## T500-II

AND

# TECHNICAL BULLETIN

## GT500A

# SUZUKI
# T500-II
## SERVICE MANUAL



SUZUKI MOTOR CO., LTD.

## FOREWORD

This service manual explains the construction and operation of the Suzuki T500-II motorcycle and includes instructions for inspecting and making adjustments and the proper procedure for making repairs when they are needed.

Proper use of this manual by the mechanic will result in a saving of time, avoidance of unnecessary work and better maintenance of the motorcycle.

It can be said that the repairs are nearly completed when the trouble spot is pin-pointed accurately. A list of the most common troubles and their causes is included in this service manual. This manual is a compilation of the experience and recommendations of Suzuki designers, engineers, factory personnel and motorcycle dealers who have been servicing this model for some time.

For convenience, this manual is divided into several sections. It is better if the mechanic reads the entire section first before beginning work in order to avoid unnecessary disassembly, labor, etc.

The metric system of measurements is used in the Suzuki factory, and metric measurements are used in this manual. For the convenience of users overseas who may not be familiar with the metric system however, measurements in inches, etc., are included in brackets ( ). If there is any question about measurements, rely on the metric measurements as being absolutely correct.

May 10, 1969

SUZUKI MOTOR CO.,LTD.

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# 1. REVOLUTIONARY "SUZUKI POSI-FORCE LUBRICATION"

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

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

## 1-1. Explanation of mechanism

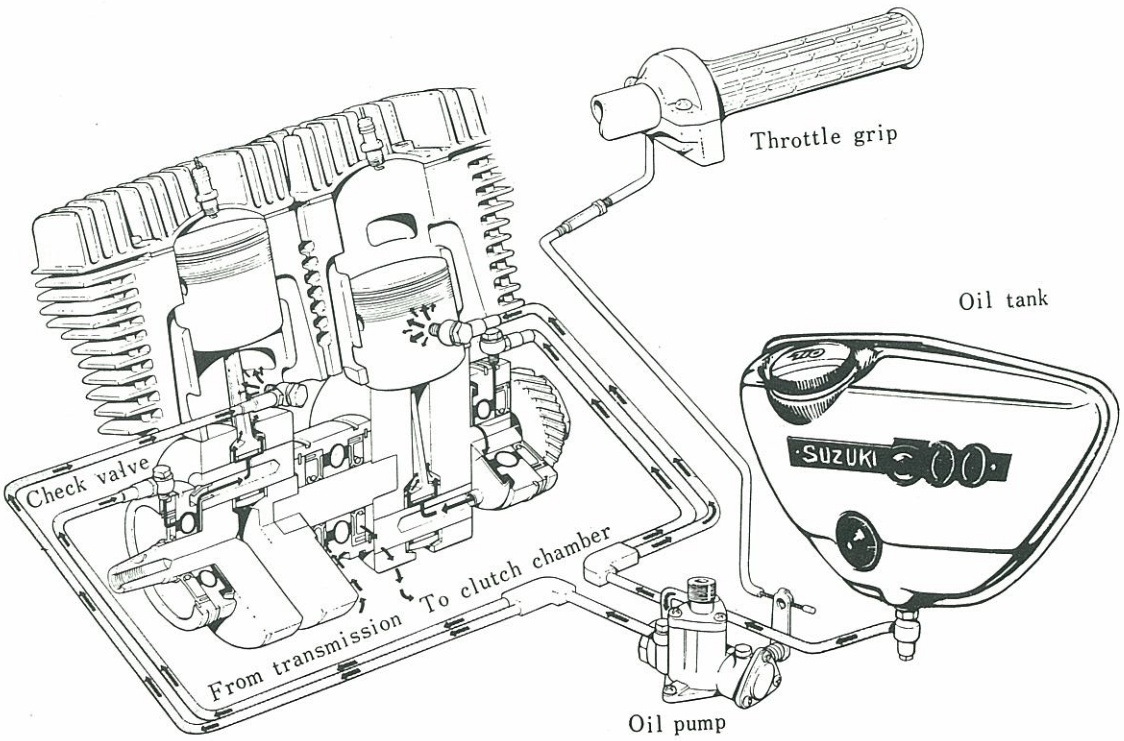



**Fig. 1-1-1 Suzuki Posi-Force Lubrication**

Lubrication oil is supplied under pressure through two oil pipes by an oil pump, and is completely separate from the gasoline supply. Each oil pipe is separated into two at a junction, one of which leads to the crankshaft, this oil lubricates the crankshaft side bearing. After lubricating it, the oil passes through a passage in the crankpin and lubricates the needle roller bearing in the connecting rod big end. The oil is then sprayed in to the crankcase by centrifugal force. The other oil channel supplies oil to the cylinder and lubricates the cylinder wall.

A part of the oil from this channel combines with oil sprayed from the connecting rod big end by centrifugal force and lubricates the connecting rod small end needle roller bearing, piston and cylinder wall. The middle crankshaft bearing is lubricated by oil circulating from the transmission gear box. Oil sprayed by the transmission gears enters an oil intake located in the crankcase wall and drops to the bottom of the engine, where foreign matter is precipitated, and clean oil is supplied to the middle crankshaft bearing at all times. Oil which has lubricated the middle bearing returns to the transmission gear box through an oil return hole. The middle bearing is lubricated by the gravity lubrication system.

The total amount of oil pumped is regulated by the oil pump control lever operated by the oil pump control cable, which is synchronized with the throttle cable and varies with the throttle opening. At the same time, the amount of oil supplied is also controlled by the engine speed so that the correct amount of oil, exactly the amount needed by the engine, is always supplied. Posi-Force lubrication is the most ideal lubrication system for the two-stroke engine.

## 1-2. Features of Suzuki Posi-Force Lubrication

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

## 2. RIGHT AND LEFT SIDE VIEWS

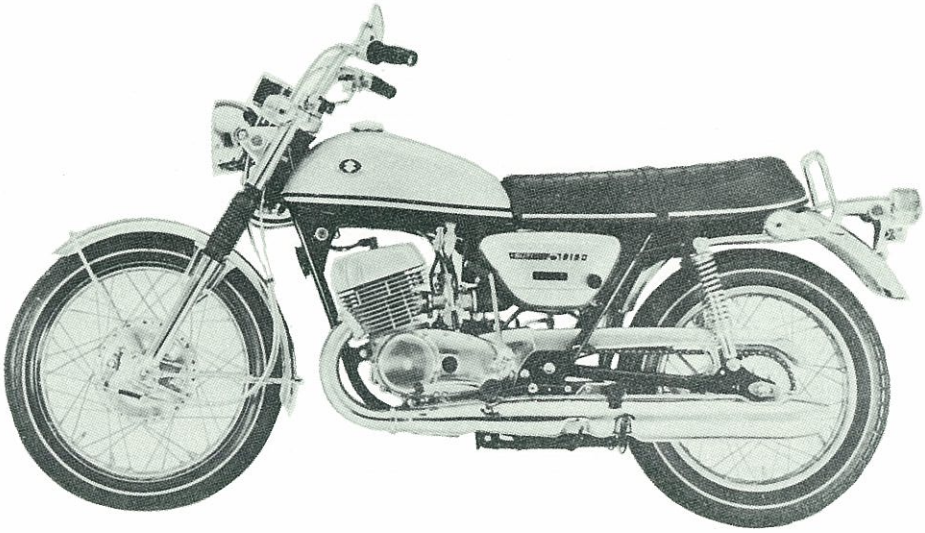


Fig. 2-1 Left side view

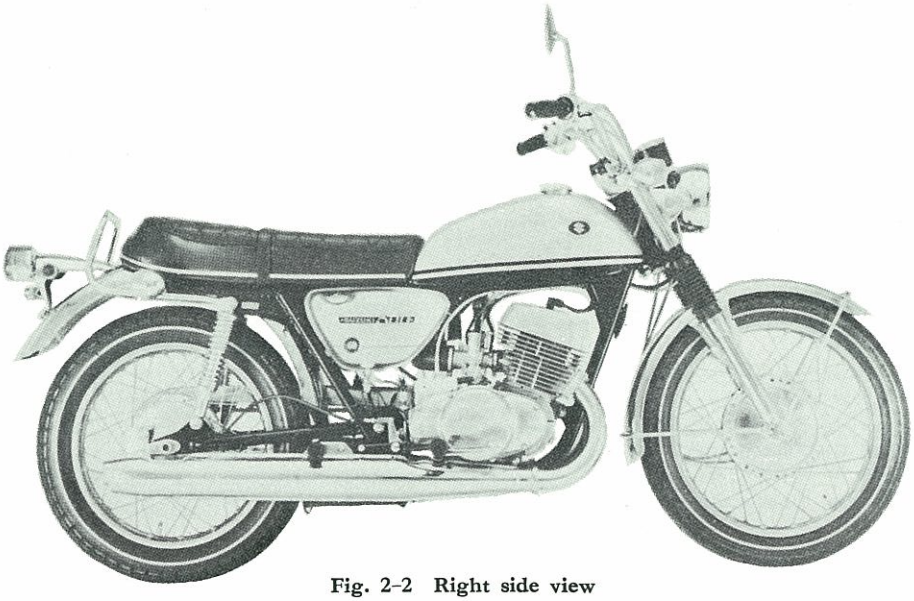


Fig. 2-2 Right side view

## 3. SPECIFICATIONS AND PERFORMANCE

| Name | Suzuki T500 – II |
|---|---|
| **Dimensions** | |
| Overall length | 2,172 mm (85.5 in) |
| Overall width | 835 mm (32.9 in) |
| Overall height | 1,125 mm (44.3 in) |
| Wheelbase | 1,452 mm (57.2 in) |
| Ground clearance | 160 mm ( 6.3 in) |
| Tires front | 3.25–19 in, 4 PR |
| rear | 4.00–18 in, 4 PR |
| **Weight** | |
| Dry weight | 187 kg (412 lb) |
| **Performance** | |
| Maximum speed | 176–192 km (110–120 mph) |
| Climbing ability | 25° ($\sin\theta = 0.423$) |
| Braking distance | 12 m (39.4 ft) @ 50kph (30mph) |
| **Engine** | |
| Type | 2-cycle, air cooled gasoline engine |
| Dimensions (L×W×H) | 482×428×436 mm (19×16.9×17.2 in) |
| Weight | 63 kg (139 lb) |
| Cylinder | Sleeved aluminum twin, forward inclined |
| Bore×Stroke | 70×64 mm (2.75×2.52 in) |
| Piston displacement | 492 cc (30.01 cu in) |
| Corrected compression ratio | 6.6 : 1 |
| Compression pressure | 8~9kg/cm² (114~128 lb /in²) @ 1,200 rpm) |
| Maximum horse power | 47 hp @ 7,000 rpm |
| Maximum torque | 5.30 kg-m (37.5 lb-ft) @ 6,000 rpm) |
| Starter | kick |

Fuel system

| | |
|---|---|
| Carburetor | TWO VM 32 SC |
| Air cleaner | Resin-processed fibrous tissue |
| Fuel tank capacity | 14 ltr (3.7/3.1 gal, US/Imp) including 2 ltr (4.2/3.6 pt, US/Imp) reserve |

Lubrication

| | |
|---|---|
| Engine | Special lubrication " Suzuki, Posi-Force " |
| Oil tank capacity | 1.8 ltr (1.9/1.6 qt, US/Imp) |
| Gear box | 1.2 ltr (1.3/1.1 qt, US/Imp) |

Ignition system

| | |
|---|---|
| Spark plug | NGK B-77 HC |
| Ignition | Battery |
| Ignition timing | 24° (3.4 mm) before top dead center |

Transmission system

| | | |
|---|---|---|
| Clutch | | Wet multi-disc |
| Speeds | | 5-speeds, constant-mesh |
| Gear shifting | | left foot, lever-operated return change |
| Gear ratios | low | 2.50 : 1 (30/12) |
| | second | 1.56 : 1 (25/16) |
| | third | 1.16 : 1 (22/19) |
| | fourth | 0.95 : 1 (21/22) |
| | top | 0.87 : 1 (20/23) |
| Primary reduction | | 2.50 : 1 (65/26) |
| Final reduction ratio | | 2.2 : 1 (33/15) |
| Overall reduction ratio in top gear | | 4.79 : 1 |

Suspension

| | |
|---|---|
| Front suspension | Hydraulically damped telescopic fork |
| Rear suspension | Hydraulically damped swinging arm |

Steering

| | |
|---|---|
| Steering angle | 40° (right & left) |
| Trail | 130.5 mm (5.14 in) |
| Caster | 61° |
| Turning radius | 2,300 mm (90.6 in) |

Brakes

| | |
|---|---|
| Front brake | Right hand, internal expanding double cam |
| Rear brake | Right foot, internal expanding |

Electrical equipment

| | |
|---|---|
| Generator | Internal rotating alternator |
| Battery | 12 V 7 AH |
| Fuse | 15 A |
| Head lamp | 12 V 35/25 W |
| Front parking lamp | 12 V 3 W |
| Tail / brake lamp | 12 V 4/32 CP (12V 7/23W) |
| Neutral indicator lamp | 12 V 3.4 W |
| Speedometer lamp | 12 V 3.4 W |
| High beam indicator lamp | 12 V 3.4 W |
| Turn signal lamp | 12V 32CP×4 (12V23W×4) |
| Turn signal indicator lamp | 12V 1.7W |

(Specifications subject to change without notice.)

# 4. PERFORMANCE CURVES

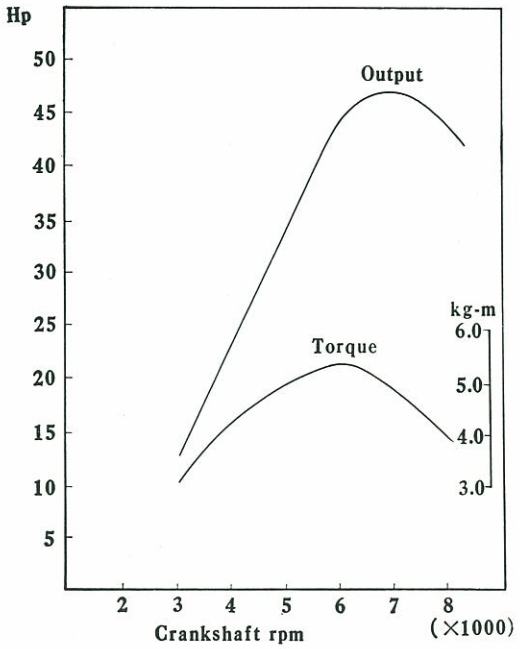



Fig. 4-1 Engine performance curves

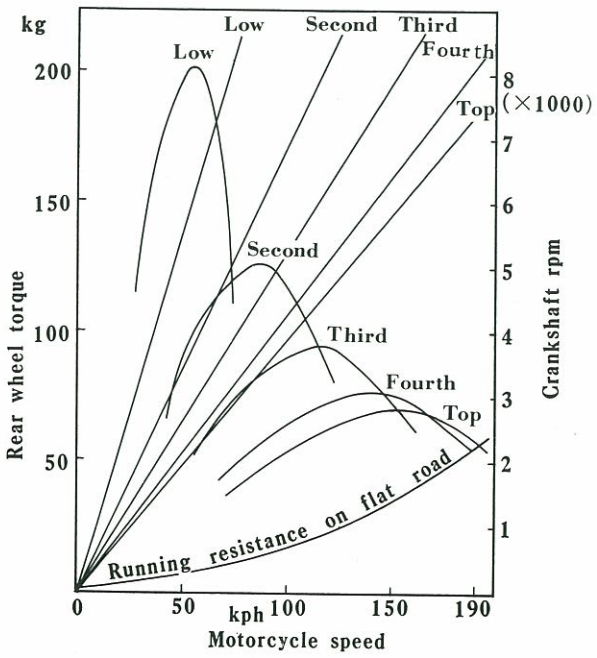



Fig. 4-2 Motorcycle performance curves

## 5. TIPS ON OPERATION

Please advise your customers to follow these tips to keep the motorcycle in peak condition and it will give top performance at all times.

### 5-1. Breaking in

The life of the motorcycle depends on the breaking-in of the engine and the way in which the motorcycle is treated.
Just as with a new-born baby, it must be given the best care possible.
It is extremely important, during the first 1,600 km (1,000 miles) to carefully observe the following limitations.

DURING THE FIRST 800 KM (500 MILES) MAXIMUM ENGINE SPEED SHOULD BE 4,000 RPM

DURING THE FIRST 800 KM (500 MILES) TO 1,600 KM (1,000 MILES), MAXIMUM ENGINE SPEED SHOULD BE 5,000 RPM

Always keep the engine rpm below 7,000, as overstraining the engine has a bad effect on it. Do not allow the pointer of the engine tachometer to stay in the red zone (7,000~9,000 rpm). The break-in indicator overlaying the tachometer face is meant to help the rider follow the above limitations: Please advise users to adhere to the rpm speeds as instructed. Additionally, do not overload or labor the engine on uphill grades or against headwinds. If engine response is poor in 4th or top gear, that is, if turning the throttle does not produce an immediate gain in speed, the rider is in too high a gear for engine power to be utilized efficiently. Downshift to 3rd or 4th gear.

### 5-2. Fuel

The T500-II engine requires no gas/oil mixture as fuel unlike conventional two-stroke engines. The engine parts such as crankshaft, crankshaft bearings, connecting rods, pistons and cylinder walls are positively lubricated by fresh oil which is separately pressure-delivered from the variable displacement of oil pump. This unique forced oiling system is called "Suzuki Posi-Force Lubrication." Put gasoline only in the fuel tank and lubrication oil in the oil tank. Recommended fuel for the T500—II, as for all Suzuki motor cycles, is a premium grade gasoline. This is to insure against over heating in demanding operation
Be sure to use one of these prescribed oils:

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

**SHELL SUPER TWO STROKE OIL**
**MOBIL SUPER MOTOR OIL**

**SHELL 2T TWO STROKE OIL**
**SUPER SHELL MOTOR OIL**

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

| | |
|---|---|
| SHELL 2T TWO STROKE OIL | SHELL SUPER TWO STROKE OIL |
| SHELL OUTBOARD ENGINE OIL | SUPER SHELL MOTOR OIL |
| MOBIL SUPER MOTOR OIL | MOBIL OUTBOARD OIL |
| ESSO OUTBOARD OIL | ESSO 2T MOTOR OIL |
| STANDARD OUTBOARD OIL | CALTEX 2T PLUS MOTOR OIL |
| TEXACO OUTBOARD OIL | UNION 76 OUTBOARD OIL |

## 5–3. Genuine Parts

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

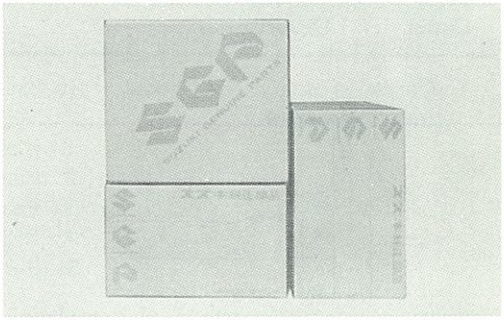


Fig. 5–3–1 Suzuki genuine parts

## 6. TROUBLE SHOOTING

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

### 6-1. If Engine Is Hard To Start

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

| Order | Description | Check Points | Action |
|---|---|---|---|
| 1. | Check to see that fuel flows into carburetor. | * If fuel does not enter into carburetor | |
| | | 1. Fuel strainer clogged | Remove and clean |
| | | 2. Fuel pipe clogged or damaged | Clean or replace |
| | | 3. Fuel clock clogged | Clean with a wire |
| | | 4. Boost tube clogged or damage | Clean or replace |
| | | 5. Fuel cock diaphragm damaged | Replace |
| 2. | Check to see that spark jumps in spark plug (turn engine with kick starter). | * If blue or hot spark jumps in the spark plug, check the following points. | |
| | | 1. Ignition timing | Adjust |
| | | 2. Fuel | Check mixture |
| | | 3. Carburetor float | Adjust or replace |
| | | 4. Engine compression | See specifications |
| | * If the spark is weak or red. | | |
| | | 1. Damage in spark plug | Replace |
| | | 2. Incorrect spark plug gap | Adjust |
| | | 3. Damage in spark plug cap | Replace |
| | | 4. Dirty contact breaker points | Clean and adjust |
| | | 5. Bad insulation in condenser | Replace |
| | | 6. Damage in ignition coil or primary coil | Replace |
| | * If there is no spark. | | |
| | | 1. Damage in spark plug | Replace |
| | | 2. Dirty or wet spark plug | Clean |
| | | 3. Incorrect spark plug gap | Adjust |
| | | 4. Dirty or incorrect contact breaker point gap | Clean and Adjust |
| | | 5. Bad insulation in condenser | Replace |
| | | 6. Damage in ignition coil or battery | Replace |
| | | 7. Damage in ignition switch | Replace |
| | | 8. Damage in wiring harnesses | Repair or replace |

| | | |
|---|---|---|
| 3. Check to see that engine compression is proper. (Turn engine with kick starter) | * If engine compression is improper. | |
| | 1. Worn cylinder and piston rings | Repair or replace |
| | 2. Stiff piston ring on piston | Repair or replace |
| | 3. Damaged cylinder head gasket | Replace |
| | 4. Damaged piston | Replace |
| | 5. Improperly tightened spark plug | Tighten securely |
| | 6. Improperly tightened cylinder head | Tighten securely |
| | 7. Gas leaks from crankcase joining surface | Repair or replace |
| | 8. Damaged cylinder or cylinder head | Replace |

These three things—fuel, spark and compression—are basic points for engine operation. To find troubles, first check these points.

## 6-2. If Engine Does Not Run Smoothly

| Order | Description | Check Points | Action |
|---|---|---|---|
| 1. | Turning throttle grip, check to see that engine rpm increases. | * Engine rpm increases, but motorcycle does not run fast. | |
| | | 1. Clutch slippage | Adjust or replace clutch discs |
| | | * If engine rpm does not increase. | |
| | | 1. Improperly adjusted carburetor | Adjust |
| | | 2. Dirty air cleaner | Clean |
| | | 3. Clogged fuel line | Clean |
| | | 4. Improperly adjusted ignition timing | Adjust |
| | | 5. Clogged exhaust pipe and muffler | Clean |
| 2. | Turning throttle grip, check to see that engine runs smoothly. | When rapidly accelerated, engine does not run smoothly. | |
| | | 1. Improper ignition timing | Adjust |
| | | 2. Improperly working contact breaker | Adjust |
| | | 3. Improperly adjusted carburetor | Adjust |
| | | 4. Dirty spark plug | Clean and adjust |
| | | * Engine does not run smoothly at low rpm | |
| | | 1. Too early ignition (Advanced) | Adjust |
| | | 2. Dirty contact breaker | Clean and adjust |
| | | 3. Dirty or improperly adjusted spark plug | Clean and adjust |
| | | 4. Improperly adjusted carburetor pilot air adjusting screw | Adjust |
| | | 5. Clogged or damaged fuel line | Clean or replace |
| | | 6. Improperly working contact breaker | Adjust |

| | | |
|---|---|---|
| | * Engine does not run smoothly at high rpm. | |
| | 1. Clogged or damaged fuel line | Clean or replace |
| | 2. Dirty or improperly adjusted spark plug | Clean and adjust |
| | 3. Improperly working contact breaker | Adjust |
| | 4. Too late ignition (Retarded) | Adjust |
| | 5. Improperly adjusted carburetor | Adjust |
| | 6. Dirty air cleaner | Clean |
| 3. Check to see that engine compression is proper. | See " If engine is hard to start " section. | |
| 4. If engine overheats. | | |
| | 1. Improperly adjusted oil pump control lever adjusting marks | Adjust |
| | 2. Air in oil lines | Remove air |
| | 3. Improper ignition timing | Adjust |
| | 4. Carbon deposit in combustion chamber | Clean |
| | 5. Carbon deposit in exhaust pipe and muffler | Clean |
| | 6. Incorrect spark plug heat range | Replace with colder plug |
| | 7. Low grade oil used | Replace with correct oil |
| | 8. Clutch slippage | Adjust or replace plates |
| | 9. Brake dragging | Adjust |
| | 10. Drive chain too tight | Adjust |

## 6-3. If Abnormal Noise is Heard in Engine

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

## 6-4. If Engine Overheats

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

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

## 6-5. If Engine Stops Abruptly During Running

If engine Stops during running, first check to see if there is fuel in tank, wiring harnesses are connected etc. and inspect the following points.

| Order | Description | Check Points | Action |
|---|---|---|---|
| 1. | If engine stops abruptly | 1. Seized piston<br>2. Seized crankshaft<br>3. Seized transmission gear<br>4. Spark plug bridged<br>5. Defective ignition coil<br>6. Troubles in ignition system<br>7. Clogged fuel line | Repair or replace<br>Repair or replace<br>Repair or replace<br>Clean<br>Replace<br>Diagnose<br>Clean |
| 2. | If engine stops gradually | 1. Loose spark plug<br>2. Loose cylinder head<br>3. Damaged cylinder head gasket<br>4. Clogged fuel line | Tighten securely<br>Tighten securely<br>Replace<br>Clean |

## 6-6. Deffective Brakes

First check the play in the front brake lever and the rear brake pedal. Inspect the following points.

| Order Description | Check Points | Action |
|---|---|---|
| 1. Insufficient braking | 1. Worn brake linings | Replace |
| | 2. Dirty brake linings | Clean |
| | 3. Brake drum worn or dirty with mud or water | Replace or clean |
| | 4. Worn brake cam | Replace |
| | 5. Improperly working brake wire | Adjust or replace |
| 2. Brake drags | 1. Rust in moving parts | Repair |
| | 2. Moving parts dirty with oil or insufficient lubricant | Clean and apply a proper amount of lubricant |
| 3. Abnormal noises are heard | 1. Worn brake linings | Replace |
| | 2. Foreign particeles on brake linings | Clean |
| | 3. Dirty brake drum | Clean |

## 6-7. Defective Clutch

| Order Description | Check Points | Action |
|---|---|---|
| 1. Clutch slippage | 1. Improperly adjusted clutch | Adjust |
| | 2. Worn clutch springs | Replace |
| | 3. Worn clutch plates | Replace |
| 2. If clutch drags | 1. Improper weight oil | Replace |
| | 2. Uneven clutch spring tension | Replace |
| | 3. Defective clutch plate operation | Repair or replace |

## 6-7. Gear Shiftings Troubles

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

| Order Description | Check Points | Action |
|---|---|---|
| 1. Gear engagement | * If gears do not engage, check for: | |
| | 1. Incorrectly set pawl holder | Adjust |
| | 2. Worn gear shifting pawl | Inspect and replace if necessary |
| | 3. Damaged cam groove | Replace change cam |
| | 4. Shifting forks not moving smoothly on cam | Repair scoring or burs |
| | 5. Damaged gear shifting fork | Replace |
| | 6. Seized gears | Replace |

| | | |
|---|---|---|
| 2. Gear shifting lever | *If gear shifting lever does not return to normal position, check for:<br>1. Damaged gear shifting shaft return spring | <br><br>Replace |
| 3. Jumping out of gear | * If the gears disengage while running, check for:<br>1. Bad operation gear shifting cam stopper<br>2. Worn or bent gear shifting fork<br>3. Worn gear or driven gear wheel dog teeth | <br><br>Inspect and replace if necessary<br>Replace<br>Replace gear or driven gear wheel |

## 6-8. Bad Stabilization and Steering

| Order | Description | Check Points | Action |
|---|---|---|---|
| 1. | Handlebar stiff | 1. Steering stem lock nut too tight<br>2. Bent steering stem<br>3. Damaged steel balls | Adjust<br>Repair or replace<br>Replace |
| 2. | Handlebar not stable | 1. Incorrect wheel alignment<br>2. Play in front wheel fitting<br>3. Damaged steel balls<br>4. Bent fork stem<br>5. Worn or damaged bearing races<br>6. Bent front forks<br>7. Bent swinging arm<br>8. Incorrect for oil level<br>9. Worn fork spring | Adjust<br>Repair<br>Replace<br>Repair or replace<br>Replace<br>Repair or replace<br>Repair<br>Correct<br>Replace |
| 3. | Wheel is not true | 1. Incorrect wheel balance<br>2. Up-and-down play in hub bearings<br>3. Deformed wheel rim<br>4. Loose sporkes<br>5. Chain too tight<br>6. Loose swinging arm fitting<br>7. Warped frame<br>8. Incorrect tire pressure | Adjust<br>Replace<br>Repair or replace<br>Repair<br>Adjust<br>Tighten<br>Replace<br>correct |

## 7. SPECIAL TOOLS

Special tools listed here are used to disassemble, assemble and perform other maintenance and services. These special tools make work easy which cannot be done simply with ordinary tools and also do not damage parts.

It is recommended to obtain these special tools as shop equipment.

| | | | |
|---|---|---|---|
| 1. 09900-15201 | T0B-001A | Special Tool box | |
| 2. 09913-50110 | T-006 | Oil seal remover | remove oil seal |
| 3. 09913-70122 | T-010 | Bearing & oil seal installing tool | installing bearing & oil seal |
| 4. 09910-70110 | T2-029 | Exhaust pipe cleaner | remove carbon |
| 5. 09913-80110 | T-619 | Oil seal installing tool | installing oil seal |
| 6. 09920-70110 | T-012A | Snap ring opener | fit & remove circlips |
| 7. 09910-20111 | T-020A | Piston holder | prevent crankshaft from turning |
| 8. 09921-10111 | T-027A | Engine sprocket holder | hold engine sprocket |
| 9. 09920-51510 | | Clutch sleeve hub holder | hold clutch sleeve hub |
| 10. 09920-60310 | T-054-2 | Clutch sleeve hub holder handle | hold clutch sleeve hub |
| 11. 09940-10121 | T-055A | Steering stem nut wrench | loosen & tighten nut |
| 12. 09940-20110 | T-056 | Steering stem lock nut wrench | loosen & tighten lock nut |
| 13. 09940-30110 | T-057 | Front fork assembling tool | pull up fork inner tubes |
| 14. 09940-40111 | T2-001 | Front fork oil level gauge | gauge oil level |
| 15. 09930-10111 | T2-006A | Spark plug wrench | loosen & tighten spark plugs |
| 16. 09930-31110 | T2-010 | Rotor remover | remove rotor |
| 17. 09913-61110 | T2-018 | Bearing puller | remove bearings |
| 18. 09940-60111 | T2-020A | Spoke nipple wrench | loosen & tighter spoke nipples |
| 19. 09941-00110 | T2-023 | Front fork outer tube nut wrench | loosen & tighten outer tube nut |
| 20. 09931-00110 | T2-024 | Timing gauge | Check ignition timing |
| 21. 09813-00012 | TA-9251K1 | Contact point wrench | Check contact point gap |

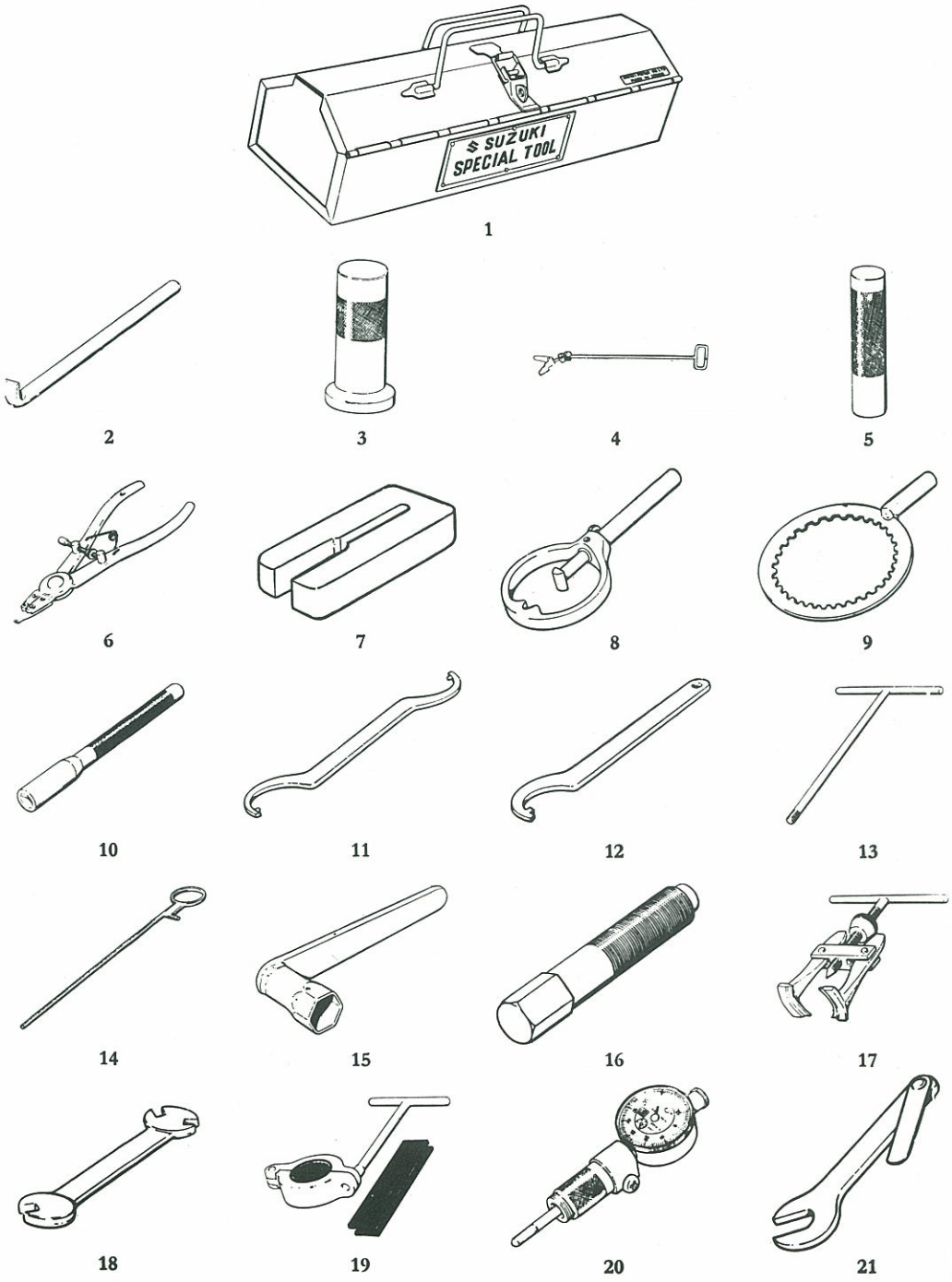



Fig. 7-1 Special tools

# 8. ENGINE

## CONTENTS

## 8. ENGINE

### 8-1. Work with Engine in Frame

These parts can be inspected, adjusted and replaced without removing the engine from the frame. When removing the crankcase cover for repairing clutch, gear shifting shaft, etc, first remove the two oil drain plugs located on the bottom of the engine to drain the oil from the gearbox and clutch chamber.

| | Parts | Operation |
|---|---|---|
| 1. | Spark Plugs | Retighten, inspect, adjust gap, remove carbon, replace; Inspect gaskets for flexibility, replace |
| 2. | Cylinder Heads | Retighten cylinder head bolts; Remove carbon, check for warpage, repair |
| 3. | Cylinder Head Gaskets | Inspect, replace |
| 4. | Cylinder | Remove carbon from ports; Check for burned spots and scoring, repair; Check for wear, rebore |
| 5. | Pistons | Remove carbon from heads and ring groves; Inspect for burned spots and scoring, repair or replace; Check piston pin holes and ring locating pins for wear, replace |
| 6. | Piston Rings | Inspect for wear and tension, replace |
| 7. | Piston Pins | Inspect for wear, replace |
| 8. | Piston Pin Circlips | Inspect for warpage and dropping out, replace or repair |
| 9. | Con-rod Small End Needle bearing | Inspect for wear, replace |
| 10. | AC Generator | Check contact point and ignition timing, adjust; Check point surface for pits, polish; Check condenser, replace |
| 11. | Neutral Indicator Switch | Inspect for wire break, repair or replace; Inspect gasket, replace |
| 12. | Engine Sprocket | Inspect for wear, replace |
| 13. | Clutch Release Device | Inspect for cracks and scratches, replace |
| 14. | Primary Pinion | Inspect for backlash, replace |
| 15. | Clutch | Inspect cork plates for wear, replace; Inspect springs for free length, repair or replace; Inspect sleeve hub for stepped splines, replace; Check housing for loose riveting and burrs on grooves, repair or replace, check gear backlash, replace |
| 16. | Gear Shifting Shaft | Inspect shaft return spring for tension, replace |
| 17. | Gear Shifting Pawls | Inspect pawl and pawl spring for wear and tension, replace |
| 18. | Oil Pump | Check control lever clearance, adjust; Check oil lines for air remove |
| 19. | Carburetors | Check play in throttle cables, adjust; check float level, check fuel mixture for various throttle openings, adjust; Clean |

## 8-2. Work with Engine Removed from Frame

Remove the engine from the frame and separate the crankcase into upper and lower halves for these jobs.

| | Parts | Operation |
|---|---|---|
| 1. | Crankshaft | Inspect for shake, repair or replace; Check bearings for wear, replace; Check oil seals for leakage, replace |
| 2. | Transmission System | Check gears and shafts, adjust or replace· Check bearings and bushing, replace |
| 3. | Gear shifting System | Inspect shifting cam groove for damage, repair or replace; Inspect shifting forks for burned spots and wear, repair or replace |
| 4. | Kick Starter System | Inspect pinion for worn ratchet, replace; Inspect pawl and pawl spring for wear and tension, replace; Inspect kick starter shaft return spring, replace |

## 8-3. Removing and Installing Engine in Frame

Before begining the removal operation, thoroughly clean the engine with a steam cleaner or cleaning solvent to remove road dirt.

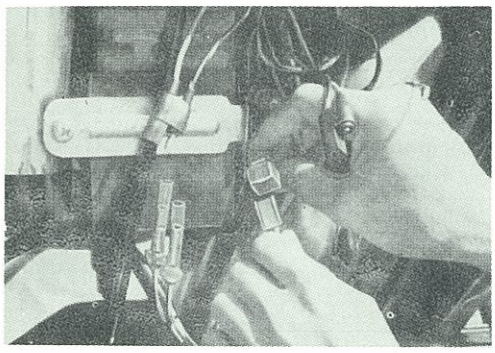


**Fig. 8-3-1 Disconnecting A. C. generator wires**

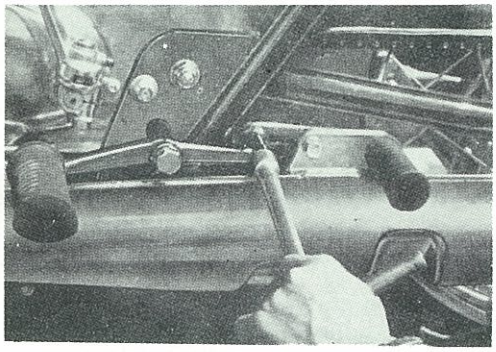


**Fig. 8-3-2 Removing the front footrest**

1. Remove spark plug caps from spark plugs.
2. Remove the frame left cover and disconnect the wires from the A.C. generator.
3. Remove the left and right front footrests with a 14 mm and a 19 mm wrench respectively.
4. Remove the left and right exhaust pipe clump fitting bolts with a 14 mm wrench.
5. Remove the left and right muffler fitting bolts and rear footrests and remove the exhaust pipe and muffler.
6. Remove the kick starter lever and gear shifting lever. Loosen 6 cross head screws with a screw driver and remove engine sprocket cover.
7. Turning rear wheel locate chain master link. Separate ends of chain by removing master link with pliers.
8. Remove the brake lamp switch with a 14 mm wrench and then remove brake pedal by hand.
9. Remove the tachometer cable from oil pump with a pliers.

10. Unscrewing union bolt with a 8 mm wrench disconnect oil line from oil tank outlet and insert a 6 mm bolt or screw into oil tank outlet to prevent oil leakage.

11. Remove oil pump cover by loosening two bolts with a 10 mm wrench and take off cover from crankcase.

12. Pull up the control lever of the oil pump and disconnect the cable terminal; then pull upward the control wire.

13. If intending to disassemble engine, drain oil from the gear box by loosening the two drain plugs with a 21 mm wrench.

14. Loosening carburetor tube front clamp screws with a cross head screw driver.

15. After loosening the swinging arm pivot shaft nut, unscrew nuts from 3 engine mounting bolts with a 14 mm and a 19 mm wrench respectively. Pull out the 3 engine mounting bolts with pliers.

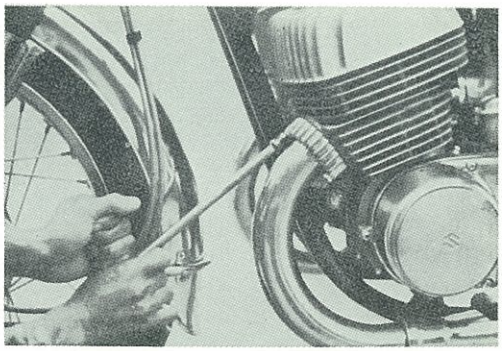


Fig. 8-3-3 Removing exhaust pipe clamp fitting bolts

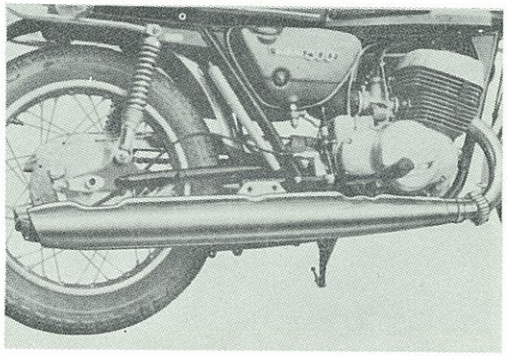


Fig. 8-3-4 Removing muffler

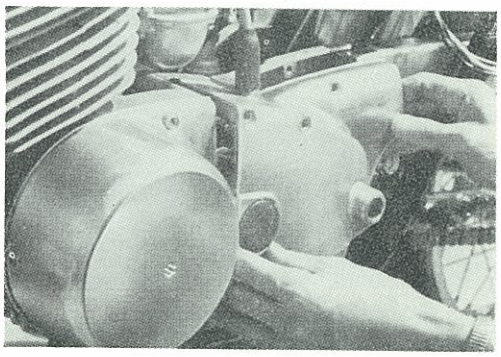


Fig. 8-3-5 Removing engine sprocket cover

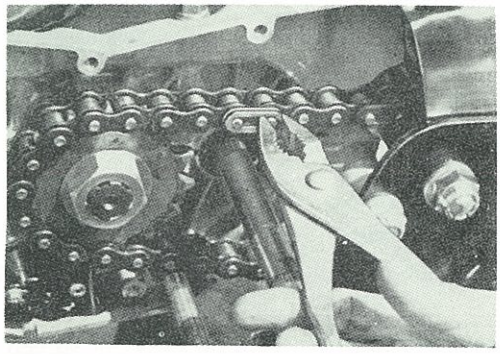


Fig. 8-3-6 Detaching chain joint clip

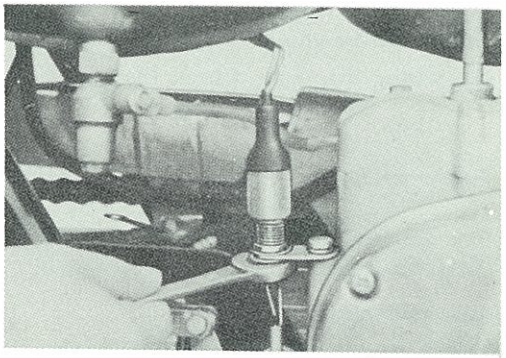


Fig. 8-3-7 Removing brake lamp switch

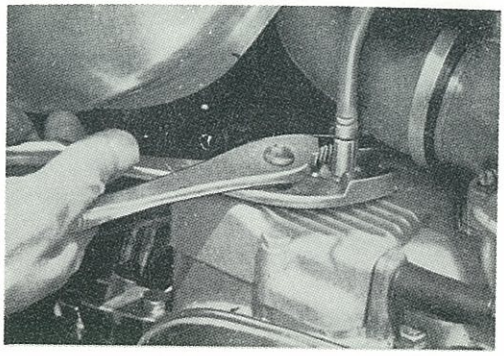


Fig. 8-3-8 Removing engine tachometer cable

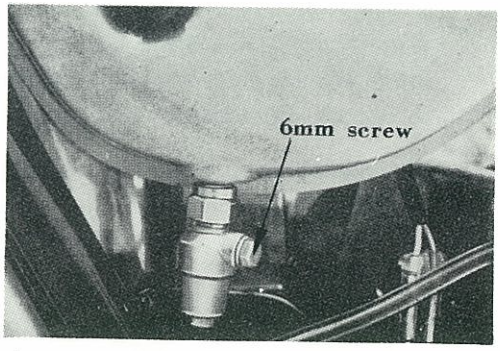



Fig. 8-3-9 Screwing 6 mm screw

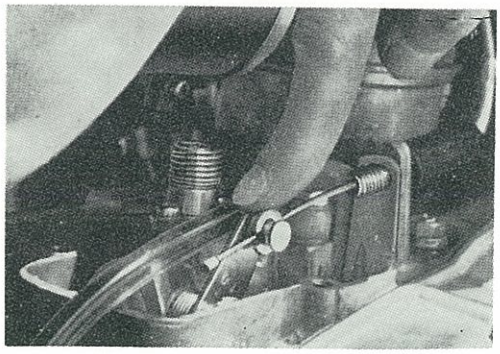


Fig. 8-3-10 Unhooking pump control cable

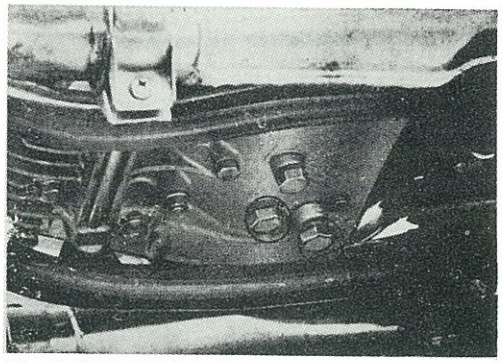


Fig. 8-3-11 Drain plugs

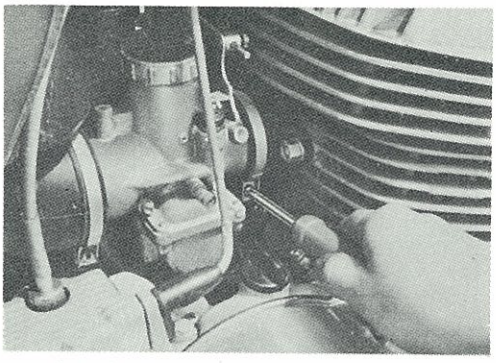


Fig. 8-3-12 Removing carburetor tube front clamp

To install the engine into the frame reverse the order of removal. Connect wires according to the wiring diagram. Check the oil pump control lever gap. Inspect the clutch operation.

## 8-4. Tips on Assembling and Disassembling Engine

The Engine is the heart of the motorcycle and consists of precisely manufactured parts, which must be handled and assembled most carefully. When working on the engine, keep your hands and tools clean at all times.

Before beginning work, prepare work benches, necessary tools, clean rags and cleaning solvent for washing parts.

## 8-5. Cylinder Heads

### 8-5-1. Removing

Remove 8 cylinder head nuts and bolts with a 14 mm wrench and take off the cylinder heads. When loosening cylinder head bolts and nuts, be sure to loosen them diagonally, not in sequence, to prevent the cylinder heads from warping.

### 8-5-2. Inspecting and servicing

A. Removing Carbon Deposits

Check to see if carbon has accumulated in the combustion chamber. Carbon doposits which are produced when fuel is burned in the combustion chamber do not transfer heat properly as well as increasing engine compression, thus causing engine overheating. Remove carbon deposits with a scraper or screw driver every 6,000 km (4,000 mi), taking care not to damage dome surface.

B. Removing Dirt Accumulation

Dirt accumulated between the cooling fins can cause engine overheating because it also decreases thermal radiation.

To clean the cylinder heads of dirt accumulation, use a screw driver and then brush with gasoline or cleaning solvent.

C. Checking Warpage

The cylinder heads are always exposed to extremely high pressure and temperature, so they can warp if used for a long time.

A cylinder head which is excessively warped can not fit the cylinder tightly even if cylinder head nuts are tightened firmly and not only leaks compression but also sucks in air with resultant decrease in power and increase in fuel consumption.

To repair a warped cylinder head, place it on a surface plate and grind the face flat on it with first #200 and then #400 emerypaper.

D. Checking Spark Plug Hole

If the spark plug hole threads are stripped, compression will leak. Replace with a new cylinder head if the threads are found stripped.

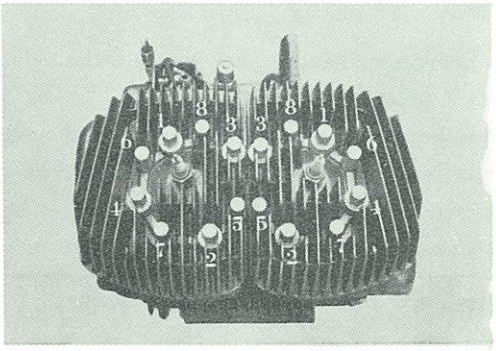


Fig. 8-5-1 Loosening order of cylinder head nuts

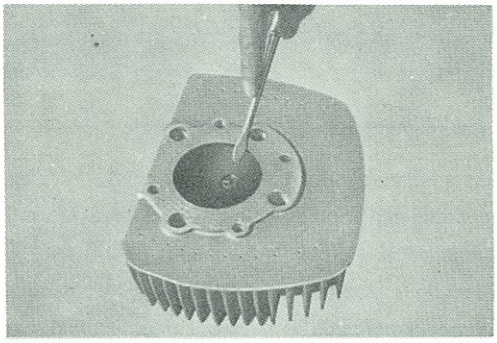


Fig. 8-5-2 Removing carbon

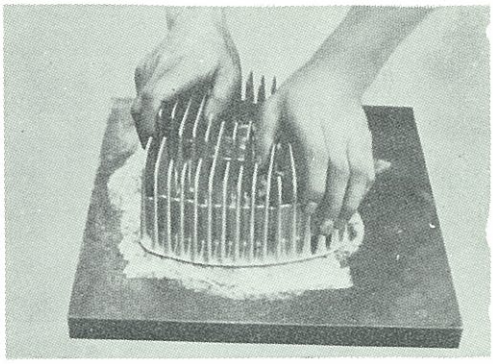


Fig. 8-5-3 Checking cylinder head warpage

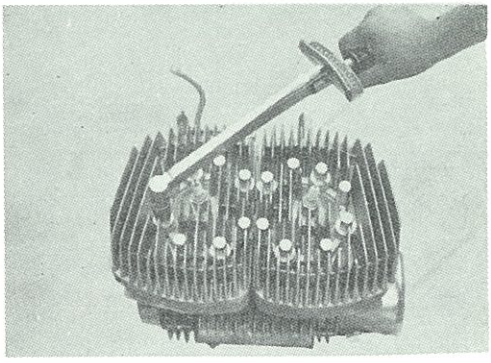


Fig. 8-5-4 Tightening cylider head nuts and bolts

### 8-5-3. Installing

Place cylinder head gasket between the cylinder heads and cylinders and fit the cylinder heads with 8 bolts and 8 nuts.

To tighten the cylinder head nuts and bolts, use a torque wrench so that they are tightened correctly and evenly, and gas leakage does not occur. Tighten nuts only when engine is cold. Tighten them diagonally just the same as when loosening.

Be sure to fit a lock washer under each cylinder head nut and bolt.

| | |
|---|---|
| Cylinder head nut tightening torque | 350 kg-cm (25 lb-ft) |
| Cylinder head bolt tightening torque | 200 kg-cm (14.4 lb-ft) |

The cylinder head nuts and bolts become loose from compression and vibrations during operation. Compression leakage decreases engine power.

Retighten the cylinder head nuts and bolts at first 1,000 km(750 mi) and every 3,000 km (2,000 mi) there-after. Tighten nuts only when engine is cold.

## 8-6. Cylinder Head Gaskets

The cylinder head gaskets are made of aluminum and installed between the cylinder heads and cylinders to prevent compressed fuel from leaking. The thickness is 0.5 mm (0.02 in). If worn or damaged gasket leaks compression, performance of the engine is badly affected.

Worn or damaged gasket must be replaced with new one.

It is good practice to throw away the old head gaskets and install new one each time the cylinder heads are removed from the cylinders even if it does not appear to be damaged or worn.

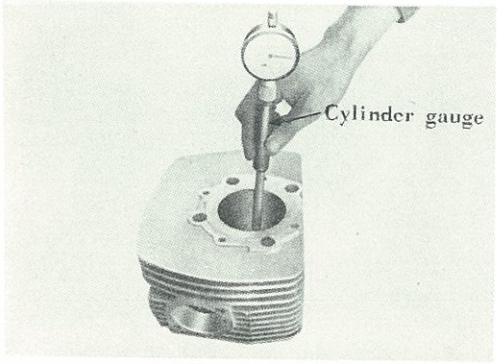



**Fig. 8-7-1 Measuring cylinder bore**

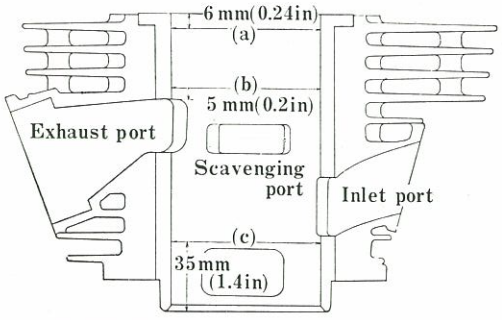



**Fig. 8-7-2 Points to be measured**

## 8-7. Cylinders

### 8-7-1. Removing

Clean the crankcase around the cylinder base to prevent dirt from entering into the crank chambers before removing the cylinders. The cylinders can be removed easily by lifting them off of 8 studs screwed into the crankcase upper half. When the cylinders are removed, cover the crankcase openings with clean rags to prevent dust from entering into the crank chambers.

### 8-7-2. Inspecting

Check the cylinder for wear. To determine the amount of wear, measure the cylinder bore with a cylinder gauge. Measure the cylinder bore from front to back and from side to side at three point, 6 mm (0.24 in) below the cylinder face (a), 5 mm (0.2 in) above the exhaust port (b), and 35 mm (1.4 in) from the cylinder bottom (c).

If the figure obtained by subtracting the smallest measurement from the largest one is over 0.05 mm (0.002 in), rebore the cylinder.

When refinishing the cylinder oversize, first add to the standard cylinder bore size the oversize step apparently required to clean up the bore. This gives the exact size to which the cylinder should be refinished. Check carefully with an accurate cylinder gauge to be sure of refinishing to this size. If this is accurately done, an oversize piston will fit with normal clearance.

Oversize pistons are provided in 0.5 mm (0.02 in) and 1.0 mm (0.04 in) sizes.

| | |
|---|---|
| Standard cylinder bore | 70.000–70.015 mm |

It must be noted that the edges of each port need to be rounded after reboring the cylinder. If they are not rounded, rapid wear of the piston rings and unpleasant cylinder noise will result. Round the edges with a hand grinder or file according to the dimensions prescribed in the illustration.

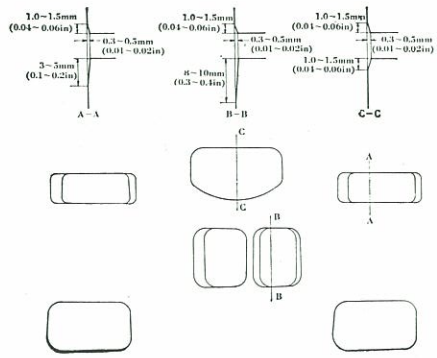



Fig. 8-7-3 Amount to be removed from port edges

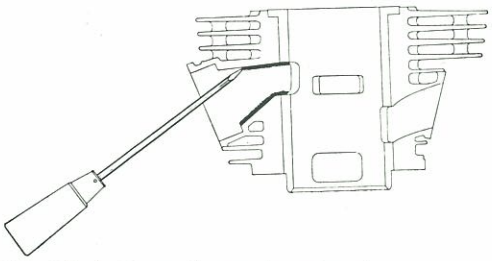


Fig. 8-7-4 Removing carbon deposit

## 8-7-3. Servicing

Carbon deposits accumulated around the exhaust port increase resistance to the passage of exhaust gas and cause loss of engine power and engine overheating. Remove carbon deposits every 6,000 km (4,000 mi) with a scraper or screw driver. Be careful not to scratch or score the cylinder wall or passage surface.

## 8-7-4. Installing

Place cylinder base gaskets between the crankcase and cylinders and install the cylinders over the pistons and eight stud bolts seeing that all the piston rings are in the right position. Application of motor oil over the piston rings will fit the cylinder over the piston easily. Use new cylinder base gaskets each time the cylinders are removed. Use the kick starter lever to check the piston movement after they are installed.

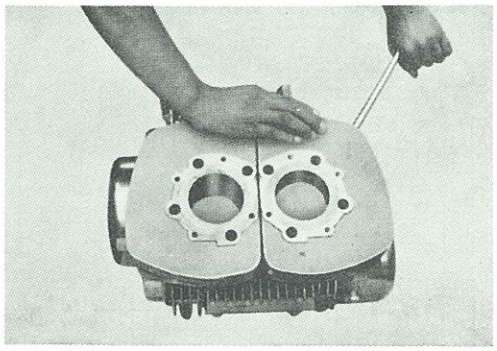


Fig. 8-7-5 Inspecting piston movement

## 8-8. Piston pins

## 8-8-1. Removing

Cover the crankcase openings with clean rags to prevent piston pin circlips from dropping into the crank chamber when removing it. Remove one piston pin circlip from each piston with a small screw driver

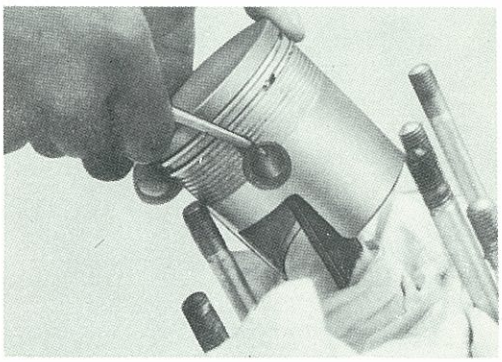


Fig. 8-8-1 Removing piston pin circlip

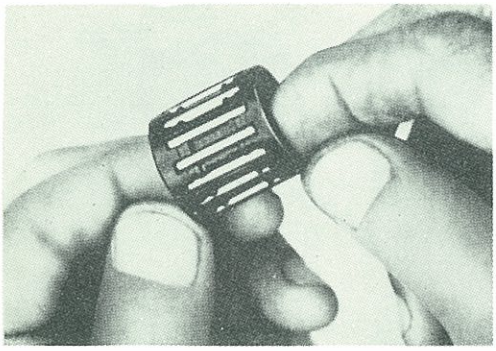


Fig. 8-9-1 Checking piston pin bearing for wear

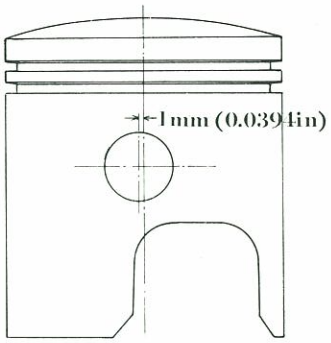



Fig. 8-10-1 Piston pin hole offset

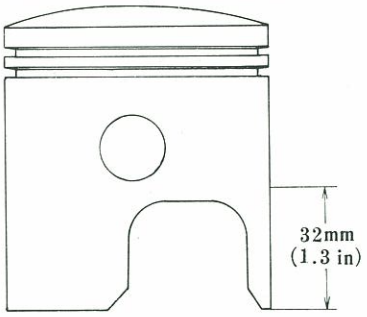



Fig. 8-10-2 Point to be measured

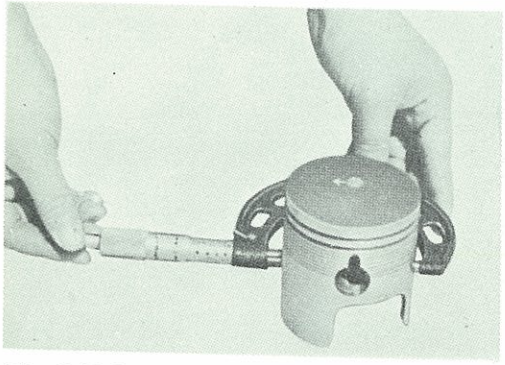


Fig. 8-10-3 Measuring piston diameter

or needle nose pliers.

Be careful not to lose piston pin circlip as sometimes it springs away. Now piston pins can be removed easily by pushing the other end of them with a rod. It is advised to hold the connecting rod from the opposite side when driving out the piston pin if it is very tight.

### 8-8-2. Inspecting

Check the piston pin for scratches, stepped wear etc. Replace if badly damaged or worn and repair minor defects with # 400 emery paper.

## 8-9. Piston Pin Bearings

### 8-9-1. Removing

The piston pin bearings are installed on the con-rod small end and its fit is loose, so it can be removed by hand.

### 8-9-2. Inspecting

To check the piston pin bearing for wear, fit the bearing into the small end of a new con-rod, insert a new piston pin into the bearing and move the piston pin up and down. Replace the piston pin bearing with a new one if the play is over 0,045 mm (0,00177 in).

## 8-10. Pistons

### 8-10-1. Inspecting

A. Piston-cylinder clearance:

The standard piston-cylinder clearance is 0.065~0.075 mm (0.0026~0.0030 in).

The clearance is determined by subtracting piston diameter from cylinder diameter. The cylinder measurement should be taken at 5 mm (0.2 in) above the exhaust port, and the piston measurement at 32 mm (1.3 in) above the piston skirt 90° from the piston pin holes.

Replace the piston with a new one when it has

worn to under 69. 85 mm (2.75in).

| | Standerd | Limit |
|---|---|---|
| Clearance | 0.065~0.075 mm (0.0026~0.0030in) | 0.25 mm (0.0098 in) |

B. Checking wear and damage :
Inspect the piston pin holes and piston ring locating pins for wear and the piston surface for burned spots, piston rings to turn in the grooves and possibly catch on the ports of the cylinder. If the piston has burned spots or scratches on its surface, cylinder noise is produced and engine rotation becomes unsmooth, resulting in loss of engine power. Further, the piston is apt to seize at these points. Replace if badly worn and repair burns or minor defects with #400 emery paper.

## 8-10-2. Servicing

Remove carbon deposits from the top and piston ring grooves with a knife or tip of an old piston ring. Carbon deposits on the top increase compression and cause engine overheating, and those in the piston ring grooves cause the piston rings to become stiff and seize, causing compression leakage.

It must be borne in mind that edges of the ports need to be rounded after reboring the cylinders. It they are not rounded, rapid wear of the piston rings and unpleasant cylinder noise will result. Round the top and bottom edges of the ports with a hand grinder or file accoring to the prescribed dimensions.

The scavenging ports of right and left cylinder are positioned unsymmetrically to the piston centers, so great care not to mistake the right piston for left one is required when installing.

The difference between right and left piston is show in Fig 8-10-6.

As the piston pin is off-center, the piston can be installed in only one direction. If it is installed backwards, the scavenging ports will not align with the slots on the piston skirt, piston rings will break and engine will be badly damaged. Install the piston with the arrow mark stamped on the piston head pointing toward the exhaust port.

Fig. 8-10-4 Polishing piston surface

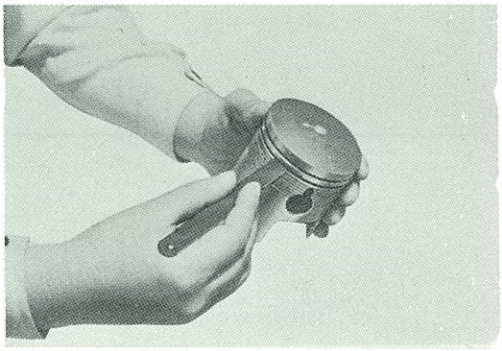


Fig. 8-10-5 Removing carbon from ring grooves

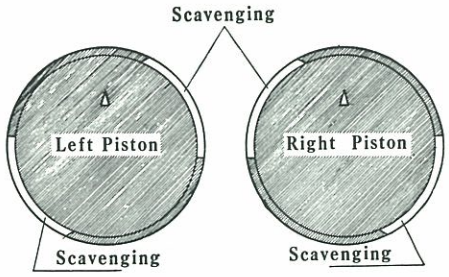



Fig. 8-10-6 Right & left pistons

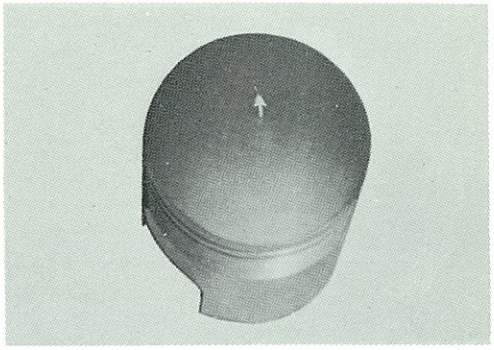


Fig. 8-10-7 Arrow mark

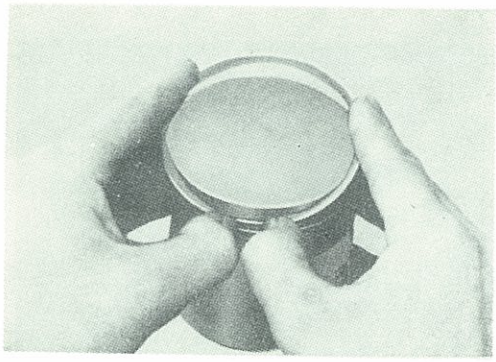


Fig. 8-11-1 Removing piston

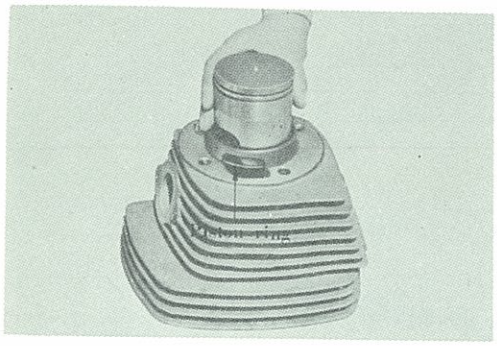


Fig. 8-11-2 Inserting piston ring into cylinder

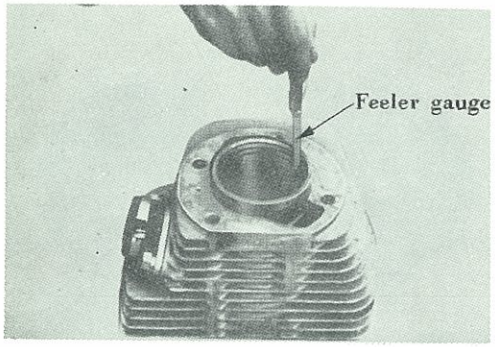



Fig. 8-11-3 Measuring end gap

Fig. 8-11-4 Checking side clearance

## 8-11. Piston Rings

The piston rings on this engine are of keystone type and tapered 7° on the upper surface. The most outstanding advantage of keystone type ring is to prevent carbon from accumulating on the upper and lower surfaces of the ring grooves of the piston and thus prevents ring sticking.

Both the top and second rings are chrome-plated for higher resistance to wear.

### 8-11-1. Removing

Expand the ends of the ring with thumb nails and remove the ring over the top of the piston frome the opposite side, taking care not to break or twist the ring or damage the piston surface.

### 8-11-2. Inspecting

Measure the end gap to check the the piston rings for wear. To measure the end gap, first insert the ring into the lower part of the cylinder, where wear is the smallest, and then put a feeler gauge in the end gap. Use a piston to insert the piston ring into the cylinder so that the ring is fitted square with the cylinder.

### 8-11-3. Installing

Before installing the piston rings, clear the ring grooves on the piston and piston rings of any foreign particles.

Fit the stamped mark side up. Be sure to turn the rings in the grooves after installing them.

If they do not turn smoothly, it indicates that foreign particles still exist.

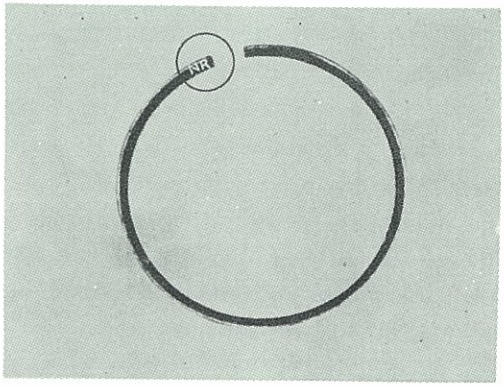


Fig. 8-11-6 stamped marks

Take the piston rings out of the grooves again and remove the foreign particles. Although the top and second rings are quite the same, be careful to fit them in the same groove as before in order to maintain mated condition in case used piston rings are reinstalled.

## 8-12. A.C. Generator

### 8-12-1. Removing

1. Disconnect the blue wire from the neutral indicator switch by looseing the fitting screw with a cross head screw driver.
2. Loosen the A.C. generator lead wire clamp fitting bolt with a 10 mm box wrench.
3. Remove the grommet screw with a cross head screw driver.
4. Loosen three cross head screws which fix the generator to the crankcase and remove the generator assembly, pulling the generator wiring harness out of the crankcase.
5. Hold the con-rod small end with a piston holder (special tool 09910-20111) to prevent the crankshaft from turning.
6. Loosen the rotor fitting bolt with a 14 mm wrench and take off the rotor fitting bolt and contact breaker cam.
7. Screw a rotor remover (special tool 09930-31110) clockwise into the center hole of the rotor with a 17 mm wrench. The rotor can be removed from the crankcase.

## 8-13. Neutral Indicator Switch

### 8-13-1. Removing

Unscrew two fitting screws with a cross head screw

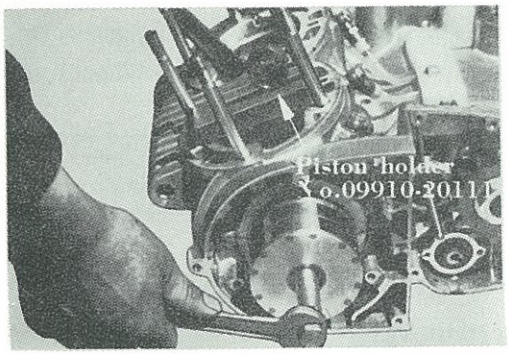



Fig. 8-12-3 Removing rotor

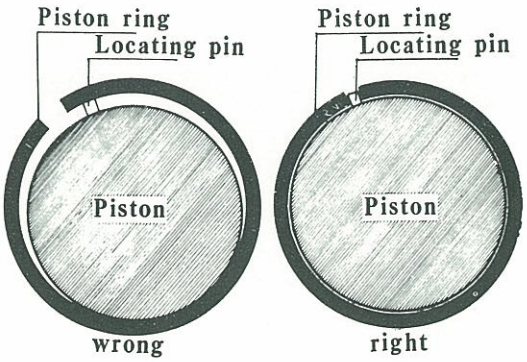



Fig. 8-11-7 Piston ring fitting

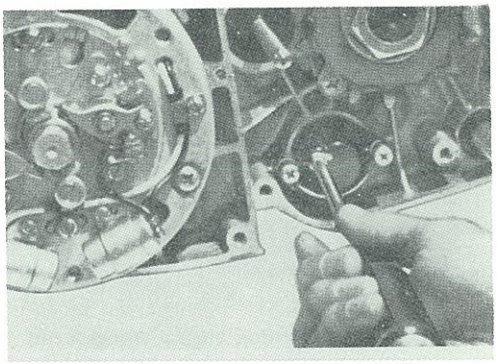


Fig. 8-12-1 Disconnecting neutral indicator switch wire

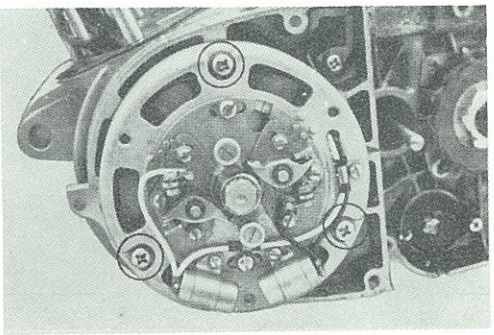


Fig. 8-12-2 A, C generator fitting screws

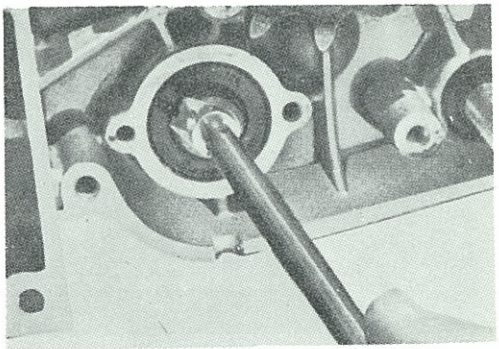


Fig. 8-13-1 Removing neutral indicator switch contact point

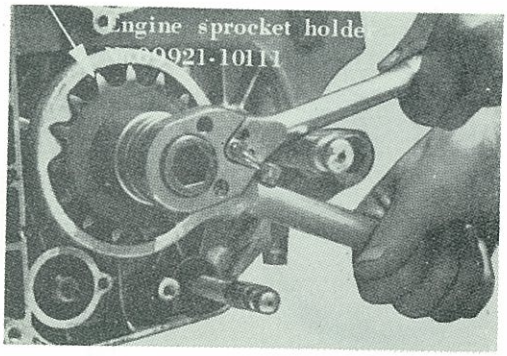



Fig. 8-14-1 Loosening engine sprocket nut

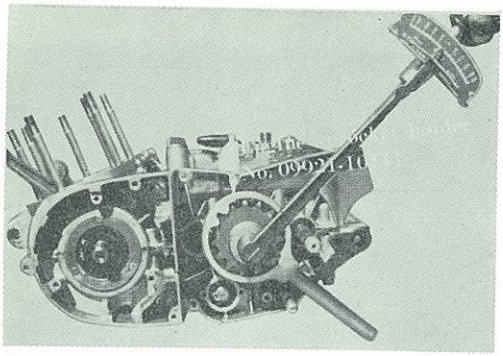


Fig. 8-14-2 Tightening engine sprocket nut

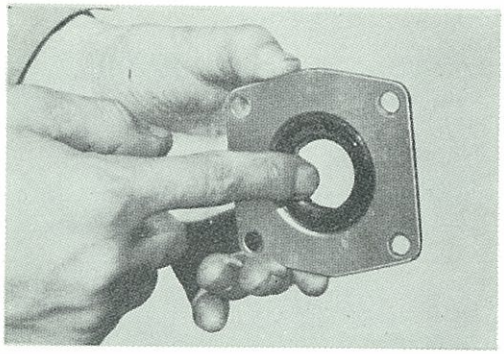


Fig. 8-15-1 Smearing grease

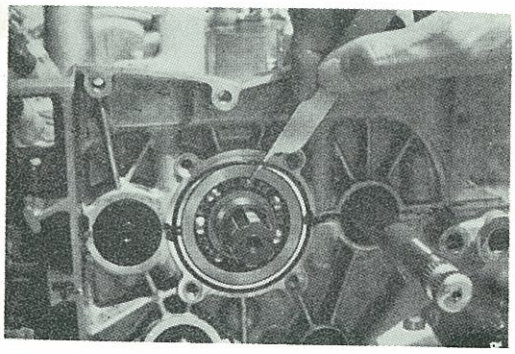


Fig. 8-15-2 Removing "O" ring

driver and remove the neutral indicator switch body and gasket. Remove the neutral indicator switch contact spring with a cross head screw driver.

## 8-14. Engine Sprocket

The engine sprocket is fitted to the engine drive shaft and transmits engine power to the rear wheel through the drive chain and rear wheel sprocket. A 15-tooth sprocket is standard, but 13-tooth and 14-tooth sprockets are also available for the selection of the best ratio according to various road conditions and rider use.

| Optional part No. | Part name | Remarks |
|---|---|---|
| 27511-15700 | Engine sprocket | 14-tooth |
| 27511-15710 | Engine sprocket | 13-tooth |

### 8-14-1. Removing

Straighten the engine sprocket washer with a chisel and hammer. Hold the sprocket with an engine sprocket holder (special tool 09921-10110) and loosen the nut with a 29 mm wrench.

### 8-14-2. Inspecting

Inspect the engine sprocket teeth for wear. An engine sprocket of which teeth are excessively worn and sharpened shortens the life of the drive chain. Replace the sprocket with a new one if excessively worn.

### 8-14-3. Installing

Fit the engine sprocket to the drive shaft after putting on the collar. Holding the engine sprocket with an engine sprocket holder, tighten the nut with a 29 mm wrench. Bend the washer up tightly against the nut with a chisel and hammer to keep the nut from becoming loose.

| | |
|---|---|
| Engine sprocket Nut tightening torque | 400 kg-cm (29 lb-ft) |

## 8-15. Drive Shaft Bearing Retainer

### 8-15-1. Removing

Loosening four screws with a cross head screw driver,

remove the drive shaft bearing retainer and "0" ring from the crankcase.

### 8-15-2. Inspecting

A. Drive shaft bearing retainer gasket

A rubber "0" ring is fitted in the crankcase to maintain the oil-tightness of the transmission chamber. A damaged "0" ring allows transmission oil to leak, resulting in engine power-drop and transmission seizure. Check the "0" ring for damage.

B. Drive shaft bearing oil seal

An oil seal whose lip is damaged or excessively worn causes transmission oil leakage. Be sure to examine the oil seal and replace with new ones if their lips are damaged or worn.

### 8-15-3. Installing

First fit an "0" ring into its groove at the left side of the crankcase.

Next set the driveshaft bearing retainer over the driveshaft after smearing grease to the lip of the oil seal inside the retainer. Finally tighten this retainer diagonally with 4 screws as shown in fig 8-15-3.

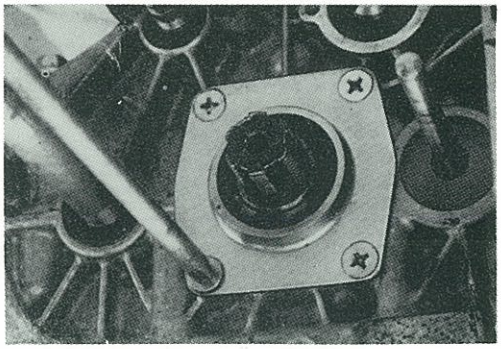
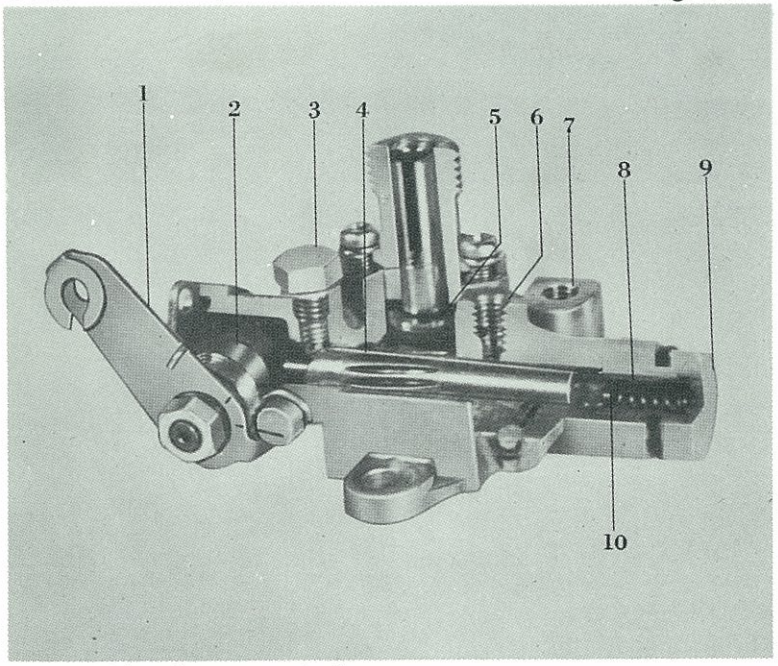


**Fig. 8-15-3 Tightening retainer**

## 8-16. Oil Pump



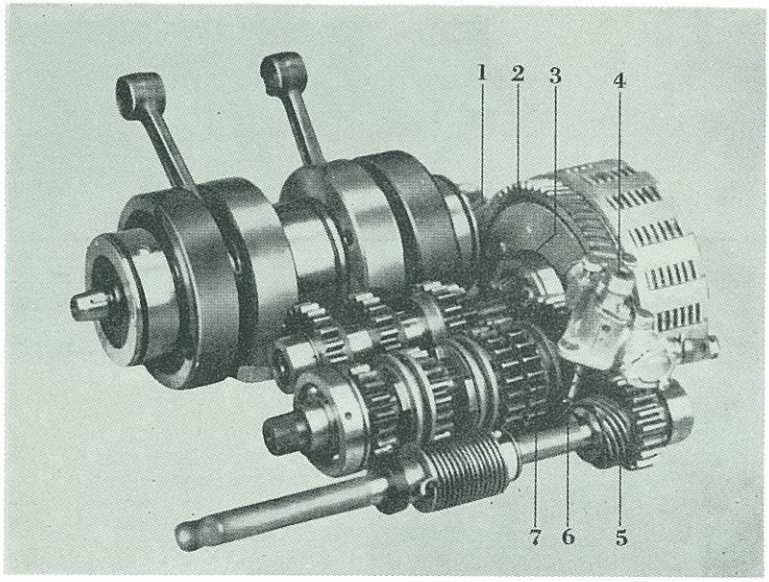

1 Control lever
2 Cam
3 Plunger guide
4 Plunger
5 Driving worm
6 Intake port
7 Discharge port
8 Plunger spring
9 Differential plunger housing
10 Differential plunger

**Fig. 8-16-1 Oil pump mechanism**

The plunger type oil pump is driven by the engine through the crankshaft and reduction gear. The construction of the oil pump is shown in Fig 8-16-1. When the pump driving worm is driven by the reduction gear, the plunger, engaged at a 90° angle with the worm, rotates.

The plunger rotates 1/14 turn to every turn of the driving worm so that its overall reduction ratio to the crankshaft is 1 to 58.38. A circular ramp is machined into the bottom of the plunger. This ramp section engages the plunger guide and the plunger moves up and down by utilizing the plunger rotating action.

The combination of rotation action and up and down movement opens and closes the intake port and discharge port, changes displacement in the oil pump cylinder and changes the pressure of oil. The oil pump control cable, which is synchronized with the throttle cable, is fitted to the oil pump control lever. The control lever is pulled in accordance with the throttle opening and turns a camshaft fitted to the lever. When the throttle is opened only slightly, the cam limits the length of the oil pump plunger stroke. When the throttle opening is increased, the cam turns and alows a longer plunger stroke, so that the amount of oil discharged increases.

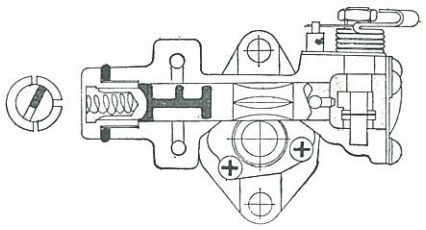



1 Primary pinion
2 Primary gear
3 Low pinion
4 Oil pump
5 Kick starter pinion comp
6 Tachometer worm gear
7 Top gear

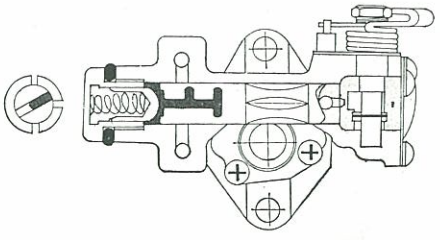
**Fig. 8-16-2 Oil pump driving mechanism**

## 8-16-1. Operation

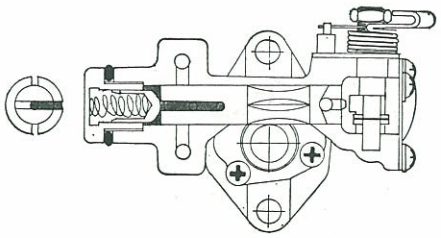
1. Oil discharging finishes and the plunger begins moving downward while rotating. Plunger operation enters the oil intake stage.



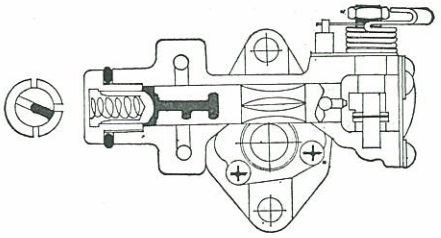
2. The plunger moves down more and a vacuum is created in the oil pump cylinder above the plunger.



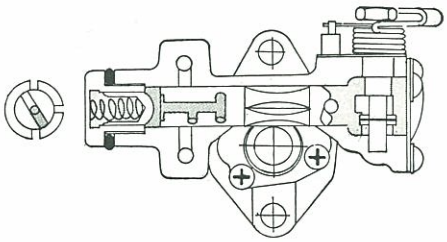
3. The plunger nears bottom dead center and one of the two plunger intake ports aligns with the cylinder by a vacuum created above the plunger.



4. Oil intake is finished and the plunger begins to move upward while rotating. Oil in the cylinder begins to be compressed.



5. The plunger moves up more and the oil is further compressed. The oil pressure causes the differential plunger to be pushed up and move away from the plunger. In this procedure, the oil in the cylinder is compressed by the differential pluger and oil is discharged smoothly.



6. When the plunger nears the top dead center position, the plunger discharge port aligns with one cylinder discharge port. The compressed oil is discharged.

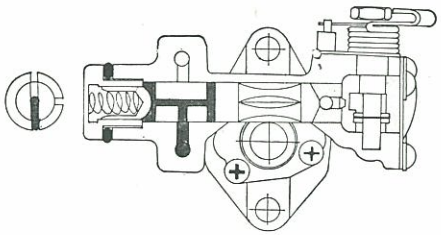


**Fig. 8-16-3 Operation of oil pump**

As shown in the illustration, the plunger rotates one half a turn with each stroke. The ramp is shaped so that the plunger strokes twice while making one full rotation. Two discharge ports are located on the cylinder so that oil is discharge twice and taken in twice when the plunger makes one full rotation, that is two strokes.

## 8-16-2. Controlling Discharge by Throttle Opening

The amount of oil pumped must vary in accordance with changes in the loads which the engine receives, as well as the engine rpm.

For instance when encountering an up-hill that is, when the load is large, the engine must be fed more oil than when running on a flat road with the same engine rpm.

To fulfil these reguirements of the engine, a camshaft, which synchronizes with the throttle, is provided below the plunger tip so that the plunger displacement varies with the throttle opening and the proper amount of oil is always supplied to the engine.

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

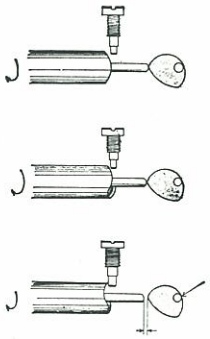


Fig. 8-16-4 Plunger stroke at minimum throttle opening

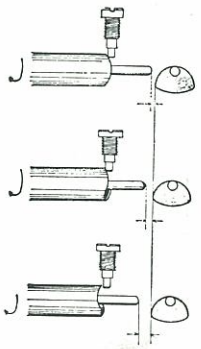


Fig. 8-16-5 Plunger stroke at maximum throttle opening

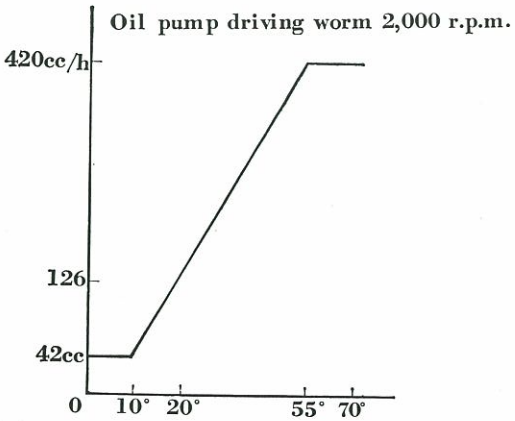



Fig. 8-16-6 Oil pump performance curve

## 8-16-3. Oil pump Performance Curve

Fig 8-16-6 shows the relation between control lever angle and amount of oil pumped when the driving worm speed is kept at 2,000 rpm.

## 8-16-4. Removing

1. Remove three union bolts with a 10 mm wrench, and disconnect the oil inlet and outlet lines from the oil pump.
2. Loosening two cross head screws which fix the oil pump to the crankcase, remove the pump in an assembly.

### 8-16-5. Installing

Fit the driving worm end into the dog of the oil pump worm gearshaft and then fix the oil pump with two cross head screws. Don't forget to place a gasket between the crankcase and oil pump to prevent oil leakage. Fit the oil lines to the inlet and outlet of the pump. Be sure to use a gasket on either side of the banjo connection as shown in Fig 8-16-8.
Be careful not to overtighten the union bolts as the gaskets or banjo connections could be damaged.

| | |
|---|---|
| Oil pump union bolt tightening torque | 50 kg-cm (3.6 lb.ft) |

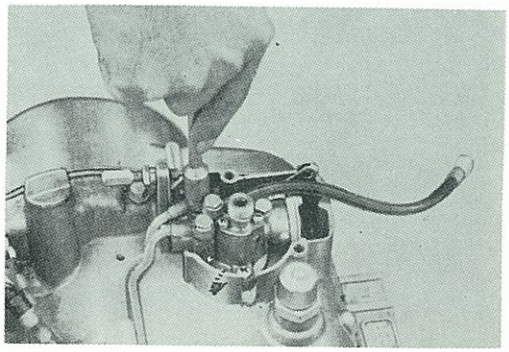


Fig. 8-16-7 Unscrewing oil pump union bolt

### 8-16-6. Inspecting and Serviring

**Do not disassemble the oil pump as it is precision-made and its pumping performance may change when reassembled.**

**A. Expelling**

If air is found in the oil line, bleed the air out of the oil line as follows:

**Inlet side:** Loosen the union bolt which fits the inlet line to the pump and let oil flow out of the line until all the air is removed.

**Outlet side:** Start the engine and leave it running at 1,500-2,000 rpm, with the oil pump control lever fully turned by hand, until all the air is gone. In case air is found for a distance of 10 mm (0,4 in) or more, loosen the oil line fitting at the check valve so that the line fitting is not air tight. Force a small amount of the specified oil into the oil line from the pump side with a squirt can until all the air has been forced out and tighten the oil line fitting. If continous bubbles are seen in the oil line when the engine is running, check these points:

1. Joints of inlet and outlet banjo connections.
2. Fitting of vinyl oil lines on inlet and outlet banjo connections.
3. Fitting of differential plunger housing to oil pump main body.

Fig. 8-16-8 Oil line gaskets

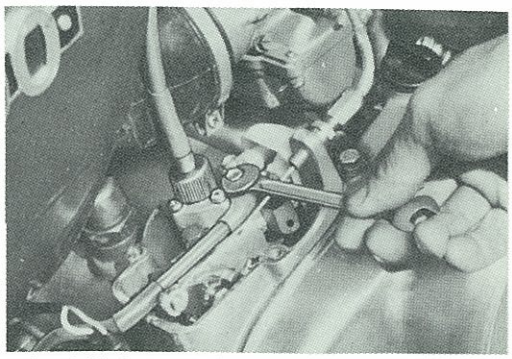


Fig. 8-16-9 Loosening inlet union bolt

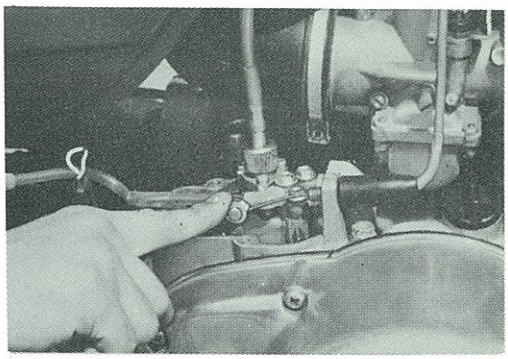


Fig. 8-16-10 Oil pump control lever fully opened by finger

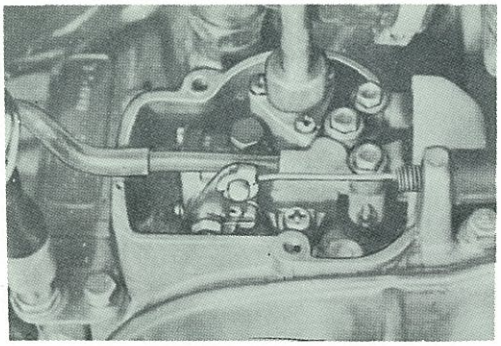


Fig. 8-16-11 Control lever adjusting marks

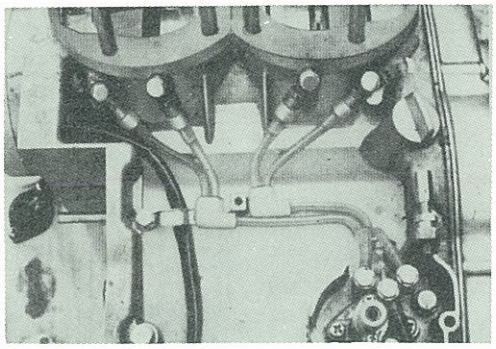


Fig. 8-17-1 Oil line assembly

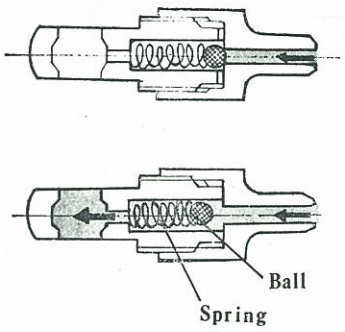



Fig. 8-17-2 Check valve operation

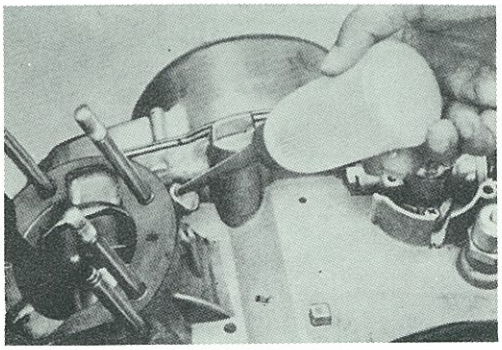


Fig. 8-17-3 Supplying oil

If bubbling stops when grease is applied to any of these three points, it indicates that air is being inhaled from these points. Retighten or repair the connections.

### 2. Adjusting oil pump control cable

Before adjusting the oil pump control cable check to see if the throttle valve opens fully when the throttle grip is turned all the way. The throttle cable play is known by the amount of movement of the throttle cable sheath just before the throttle valve begin to move when the cable sheath is pulled by hand. Adjust the play to 0.5-1.0mm (0.02-0.04in) by turning in or out the throttle cable adjuster provided on the top of the carburetor.

Adjust the oil pump with the oil pump control cable adjuster so that the marks shown in Fig. 8-16-11 may align when the throttle is twisted inward all the way.

## 8-17. Oil Outlet pipes

The oil line assembly consists of three lines, one junction where the lines are connected, three banjo connections, and two check valves.

### 8-17-1. Removing

Remove the oil pipe cover with a 10 mm wrench and a cross head screw driver.
Loosen the four union bolts from the crankcase with a 10 mm wrench.

### 8-17-2. Inspecting

Check the oil line for a leak, paying special attention to the connected parts. Replace the oil line assembly with a new one if a leak is found.

### 8-17-3. One-way valve mechanism

A one-way valve mechanism is contrived inside the union bolt at each of the four lines to check the oil from flowing automatically from gravity or flowing back into the pump from pressure in the crank chamber, after the oil has been discharged from the pump into the crank chamber. The check valve

consists of a steel ball and a coil spring which presses the ball tightly against its seat.

If pressure over 0.3 kg/sq cm² (4.3 lb/sq in) is exerted the steel ball is pushed down, leaving gap to permit the oil discharged from the pump the flow into the crank chamber.

Since this check valve is constructed to permit no disassembling and therefore once it is disassembled, it cannot be reassembled.

### 8-17-4. Tips on installing

Before installing the union bolts, pour about 10 cc (0,35 t oz) of a specified oil into the fitting holes on the crankcase upper half. Be sure to use a gasket on either side of to banjo connection.

Apply thread lock cement to the union bolts to prevent oil from oozing out.

Keep to the prescribed torque as follow:

| | |
|---|---|
| Union bolt tightening torque | 50 kg-cm (3.6 lb-ft) |

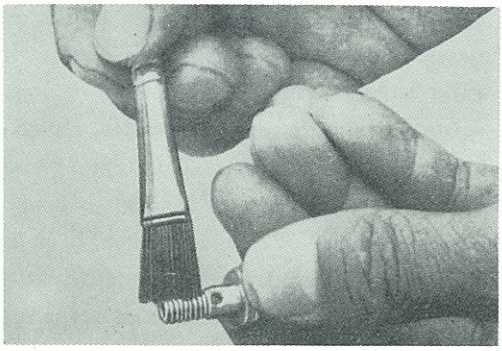


Fig. 8-17-4 Smearing thread lock cement

## 8-18. Clutch

1 Clutch Housing Ass'y
2 Clutch Sleeve Hub
3 Clutch Cork Plate
4 Clutch Steel Plate
5 Clutch Pressure Plate
6 Clutch Push Rod
7 Clutch Release Rod
8 Clutch Release Screw Ass'y
9 Hexagon Bolt
10 Cross Head Screw
11 Thrust Washer
12 Small Hexagon Nut
13 Clutch Adjusting Screw
14 Clutch Sleeve Hub Nut
15 Clutch Spring Washer
16 Clutch Sleeve Hub Washer
17 Clutch Housing Spacer
18 Release Rod Oil Seal
19 Push Rod Oil Seal
20 Clutch Spring
21 Release Arm Return Spring

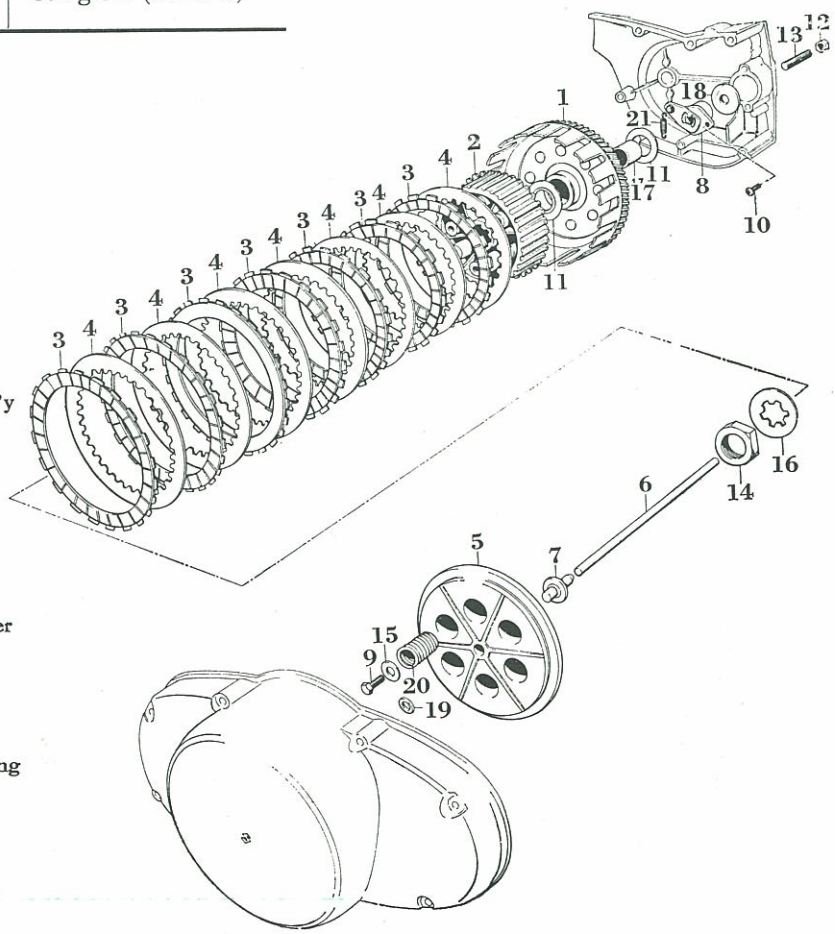


Fig. 8-18-1 Clutch system

The clutch is an important part of the engine, situated between the crankshaft and transmission gears. The clutch transmits or breaks transmission of the engine power to the gears. The clutch must have a long life and not slip or drag. The clutch mounted on this engine consists of sets of seven cork plates and steel plates, clutch housing and sleeve hub, and is submerged in motor oil in the clutch chamber. This type of clutch is called a wet, multi-plate clutch. As less pressure per unit is exerted and oil film is always formed between the plates, wear of the plates is held to a minimum. The clutch assmbly is installed on the right end of the countershaft and the clutch release mechanism is installed on the crankcase left cover.

The clutch cork and steel plates are retained in the clutch housing by the clutch pressure plate. The clutch pressure plate is fixed to the clutch housing by six springs and bolts.

These six clutch springs exert pressure on the pressure plate and thus hold the cork plates against the steel plates. The inside edges of the steel plates have teeth which engage with the outside splines of sleeve hub. The inside splines of the sleeve hub mesh with the splines on the countershaft so that the steel plates and sleeve hub turn with the countershaft. The outer edges of the cork plates have teeth which engage with the slots on the clutch housing. The clutch housing is installed over the countershaft but it is not held by the splines so that it can rotate freely.

## 8-18-2. Operation

When the clutch is engaded, the clutch springs (1) force the pressure plate (2) against the cork plates (3) and steel plates (4). The entire clutch is then held as a single unit by frictional force. The primary pinion installed on the right end of the crankshaft drive the primary gear (5) riveted to the clutch housing (6), thus rotating the clutch assembly.

The clutch assembly turns the transmission countershaft.

When the clutch lever (7) mounted on the handlebar is squeezed, the clutch wire (8) is pulled, turning the release screw (9) in the release screw guide (10) so that the push rod (11) installed in the countershaft is pushed against the release rod (12) by the adjusting screw (13) which moves the pressure plate (2) out so that the clutch disengages.

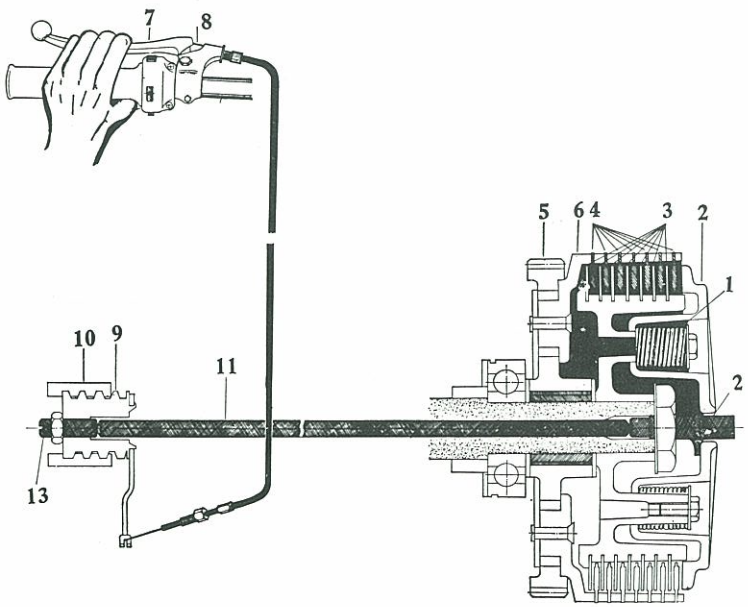



**Fig. 8-18-2 Clutch operation**

## 8-18-3. Removing and disassembling

1. Remove the nine crankcase right cover fitting screws with a cross head screw driver and take off the cover and gasket.
2. Using a piston holder (special tool 09910-20111) to prevent the crankshaft from turning, loosen the clutch spring fitting bolts with a 10 mm wrench.
3. Remove the pressure plate, the release rod and the cork and steel plates from the clutch housing by hand.
4. Flatten the clutch sleeve hub washer with a chisel and hammer and hold the clutch sleeve hub holder (special tool) to loosen the clutch sleeve hub nut with a 29 mm wrench.
5. Remove the clutch housing from the countershaft together with the clutch sleeve hub.
6. Turn back the tongue of the clutch release screw arm hook with a screw driver and slip off the clutch cable inner wire end.
7. Unhook the clutch release screw arm spring. Lossen clutch release screw guide fitting screws with a cross head screw driver and remove the clutch release screw assembly from the crankcase left cover.

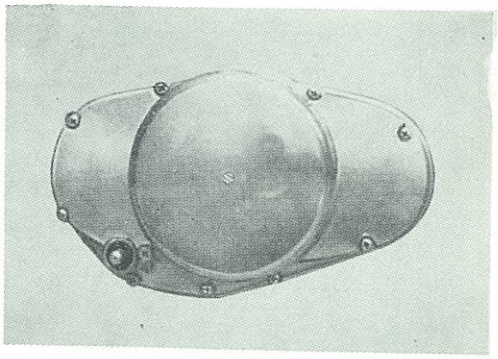


Fig. 8-18-3 Crankcase right cover fitting screws

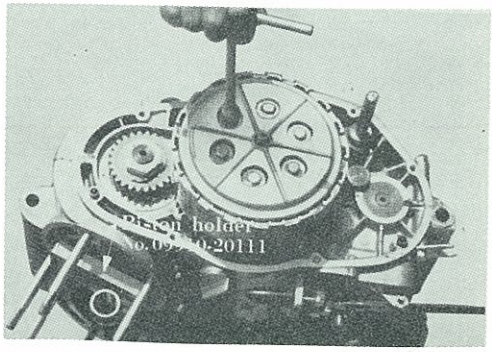


Fig. 8-18-4 Removing clutch fitting bolt

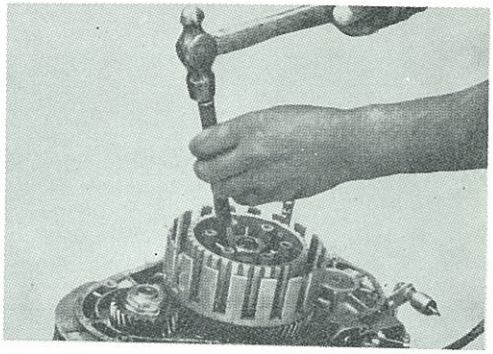


Fig. 8-18-5 Flattening clutch sleeve hab washer

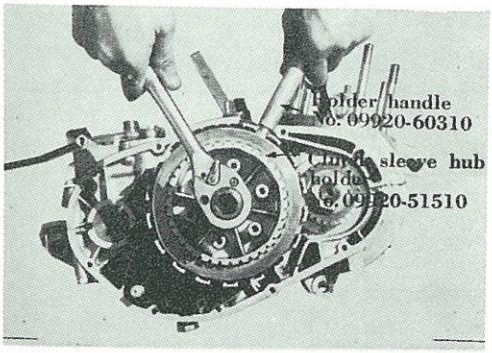



Fig. 8-18-6 Loosening clutch sleeve hub nut

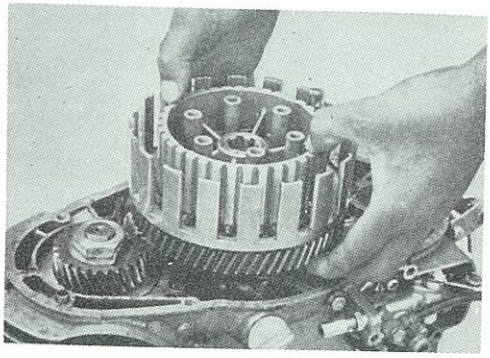


Fig. 8-18-7 Removing clutch housing

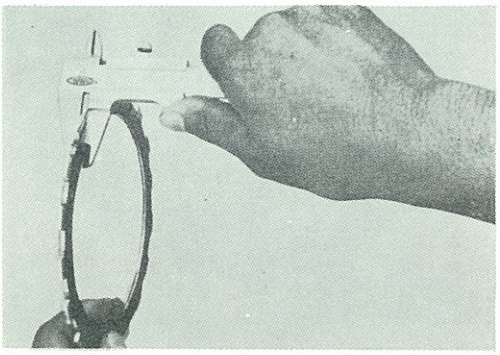


Fig. 8-18-8 Measuring cork plate thickness

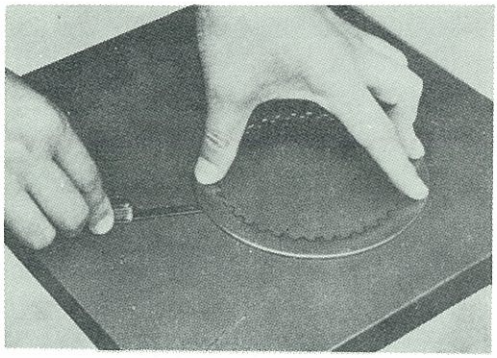


Fig. 8-18-9 Checking steel plate warpage

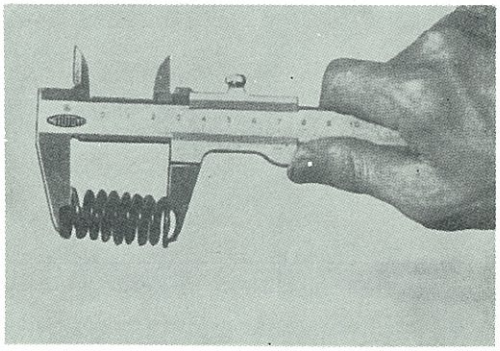


Fig. 8-18-10 measuring clutch spring free length

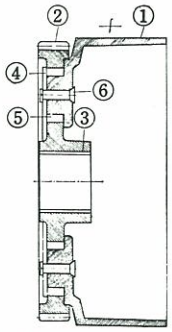



Fig. 8-18-11 Construction of clutch housing

## 8-18-4 Inspecting

A. Cork plates

As the clutch has seven cork plates and they are submerged in oil, wear is very small. After a long period, however, when the clutch plates become worn or warped, the clutch will slip even if the clutch adjustment is correct. Measure the thickness and warpage of each cork plate with calipers and feeler gauge.

| | Standard | Limit | Operation |
|---|---|---|---|
| Thickness | 3.5 mm (0.138 in) | 3.2 mm (0.126 in) | Replace |
| Warpage | under 0.4 mm (0.016 in) | 0.4 mm (0.016 in) | Replace |

B. Steel plates

Seven steel plates are used and they have knurls on their surfaces to prevent the clutch from dragging in cold weather.

Check the thickness and warpage of each steel plate with calipers and feeler gauge.

| | Standard | Limit | Operation |
|---|---|---|---|
| Thickness | 2 mm (0.08 in) | 1.85 mm (0.07 in) | Replace |
| Warpage | under 0.1 mm (0.004 in) | 0.1 mm (0.004 in) | Replace |

C. Clutch springs

The clutch spring which have lost their tension also cause clutch slipping, resulting in loss of power and rapid wear of the clutch plates.

Measure their free length with calipers.

| | Standard | Limit | Operation |
|---|---|---|---|
| Free length | 40.4 mm (1.58 in) | 39 mm (1.53 in) | Replace |

D. Clutch housing

1. Construction

The clutch housing complete consists of clutch housing (1), primary gear (2) primary gear housing (3) and primary gear fitting plate (4) into which dampers (5) are inserted and calked with rivets (6) as shown in fig 8-18-11.

2. Backlash between primary gear and primary pinion excessively large or small backlash between the primary gear and primary pinion causes abnormal noise. Measure the backlash with a dial gauge as shown in Fig 8-18-13. Be sure to set the feeler of the dial gauge along the tangential line and turn the clutch housing by hand.

There is another method to measure the backlash. Insert the end of a piece of fuse wire or a small piece of soft metal such as aluminum between the gear and pinion and turn the gear.

Measure the thickness of the pressed part with a micrometer.

When the backlash exceeds the limit, adjust the backlash to the standard by replacing the primary pinion or clutch housing complete.

| | Standard | Limit | Operation |
|---|---|---|---|
| Backlash | 0.025~0.065mm (0.0010~0.0026in) | 0.16mm (0.006in) | Replace pinion or gear |

3. Play in axial direction

If the play of the clutch housing in the axial direction becomes large, a rattling noise is produced. After placing a clutch housing thrust washer under the clutch housing on a surface plate and then measure the difference between the collor and housing by use a dial gauge as shown in Fig 8-18-15. If the play is found large, grind one end of the spacer on a hone. Do not remove too much, or clutch will not release.

| | Standard | Limit |
|---|---|---|
| Axial play | 0.05~0.20mm (0.002~0.0079 in) | 0.25 mm (0.01 in) |

4. Checking for loose rivet calking and scoring

When the rivets become loose and fitting of the primary gear to the clutch housing become loose, replace the clutch housing complete. If the

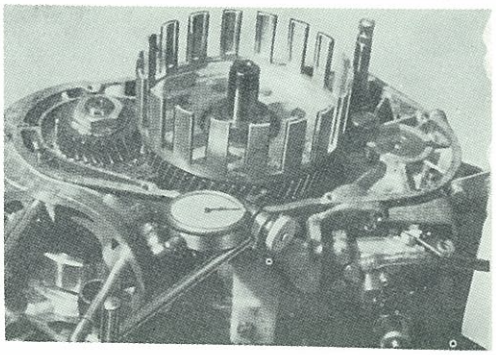


Fig. 8-18-12 Measuring backlash

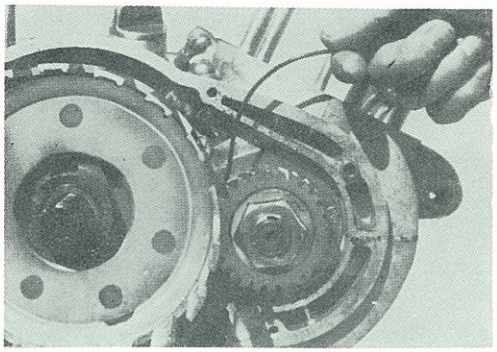


Fig. 8-18-13 Inserting fuse wire

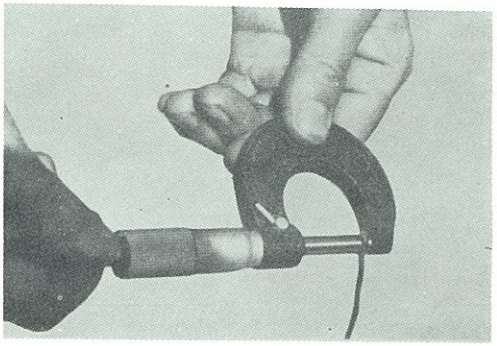


Fig. 8-18-14 Measuring pressed part of fuse wire

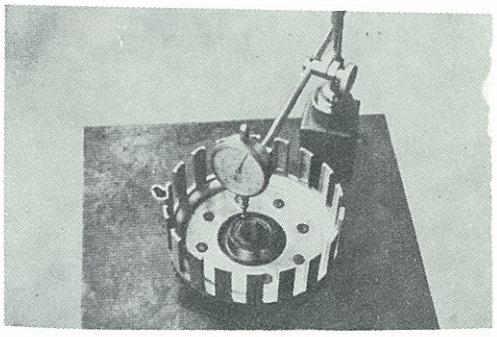


Fig. 8-18-15 Measuring axial play

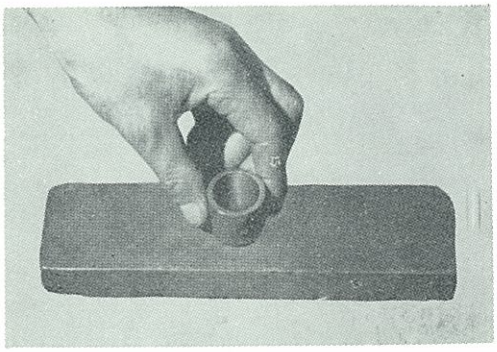


Fig. 8-18-16 Grinding clutch housing spacer

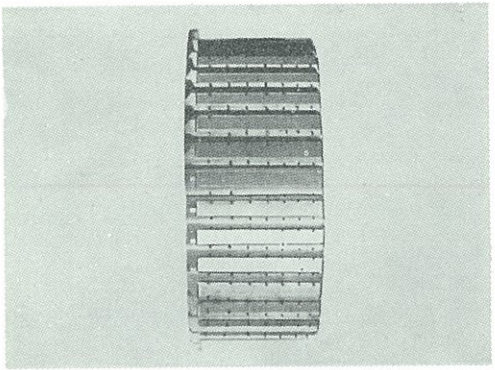


Fig. 8-18-17 Stepped clutch sleeve hub splines

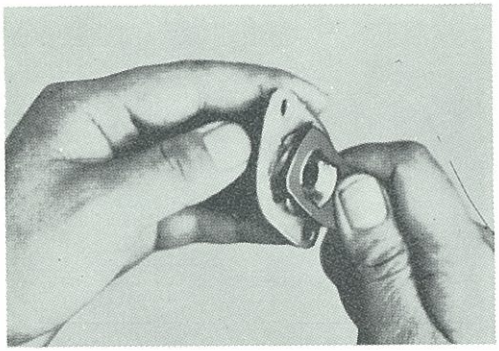


Fig. 8-18-18 Checking clutch release screw movement

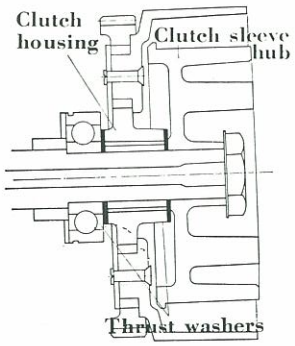



Fig. 8-18-19 Thrust washer location

clutch housing and primary gear are riveted with a chisel and hammer, the rivets are apt to become loose in a short time. Always use a clutch housing complete assembled in the Suzuki factory. Scores on the clutch housing slots catch the cork plates and prevent smooth clutch operation. Repair with emery paper.

E. Clutch sleeve hub
Check the clutch sleeve hub for stepped wear to the outside splines and replace with a new one if excessively stepped. Clutch operation becomes unsmooth if the splines are stepped.

F. Clutch release mechanism
Check the clutch release screw movement in the guide. If too much play, cracking or loose riveting is found, replace with a new one.

## 8-18-5. Assembling and instelling

1. Fit one thrust washer and the clutch housing spacer on the countershaft. If the washer is forgotten, the clutch housing touches the gear shifting shaft
2. Fit the clutch housing over the clutch housing spacer.
3. Be sure to insert another thrust washer and then fit the clutch sleeve hub. If the clutch sleeve hub is installed without placing the thrust washer beneath it, the rivets on the clutch housing will catch the sleeve hub, causing the clutch to drag.
4. Fit the clutch sleeve hub washer and screw on the clutch sleeve hub nut. Holding the clutch sleeve hub with a clutch sleeve hub holder (special tools 09920-60310, 09920-51510), tighten with a 29 mm wrench with tightening torque of 500 kg-cm (36 lb-ft). Bend the washer up tightly against the nut to lock the nut.
5. Fit the clutch steel plates and cork plates alternately. It is better if the rounder side of the steel plates faces upward. Fit steel plate first, cork plate next, etc., until all fourteen plates are

fitted with a cork plate on top.

6. Insert the clutch pushrod and clutch release rod into the center of the countershaft from the hub side.
7. Place a piston holder (special tool 09910-20111) between the connecting rod small end and the crank case to prevent the crankshaft from turning, and then set the clutch pressure plate on the clutch sleeve hub, and place the clutch springs in the hollows of the clutch pressure plate. By tightening the bolts for these springs, fix the clutch pressure plate firmly.
8. Insert the clutch release screw guide into its seat in the cranckcase left cover. Aligning holes, secure the clutch release screw guide with screws. Fit the clutch release screw into the guide after applying grease to it.
9. Insert the clutch cable inner wire end into the clutch release screw arm hook and secure by bending the tonque tightly against it with needle nose pliers.
10. Hook the clutch release screw arm spring with needle nose pliers in the hook on the crankcase left cover.
11. Place a new crankcase right cover gasket and fit the cover over the two dowel pins. Then secure the cover with cross head screws.

## 8-18-6. Servicing

The clutch inner wire stretches and the clutch plates wear as the motorcycle mileage increases, thus the clutch play changes. So the clutch should be checked and adjusted every 1,500 km (1,000 mi).

Adjust the clutch with both the clutch cable adjuster and release adjusting screw.

To adjust the clutch play, loosen the lock nut with a 12 mm wrench and screw the clutch cable adjuster all the way in temporarily. Check the play in the clutch cable, and loosen the clutch cable adjuster until there is no play left in the cable. Secure the clutch cable adjuster with the lock nut. Next, remove

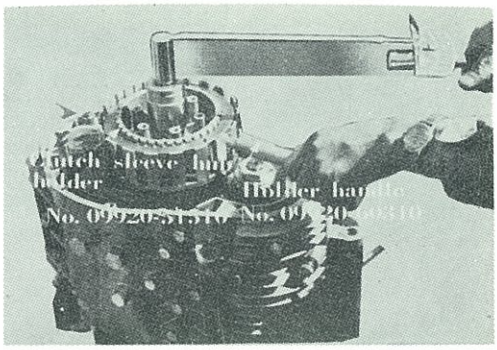


**Fig. 8-18-21 Tightening clutch sleeve hub nut**

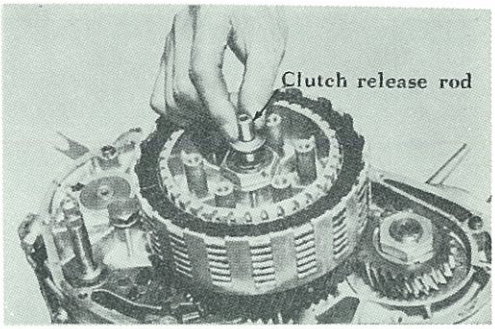



**Fig. 8-18-22 Putting the clutch release rod**

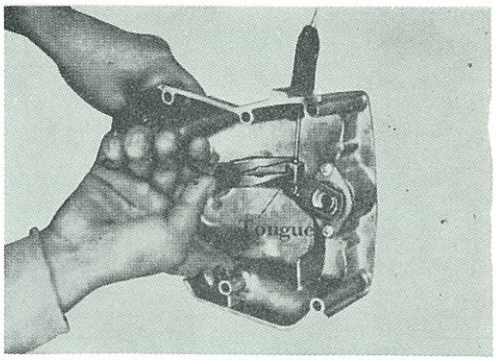


**Fig. 8-18-23 Securing clutch cable inner wire end**

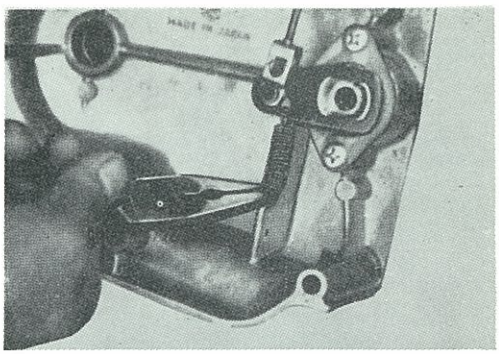


**Fig. 8-18-24 Hooking clutch release screw arm spring**

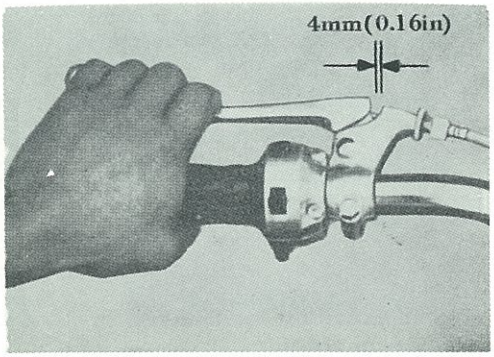



Fig. 8-18-25 Clutch lever play

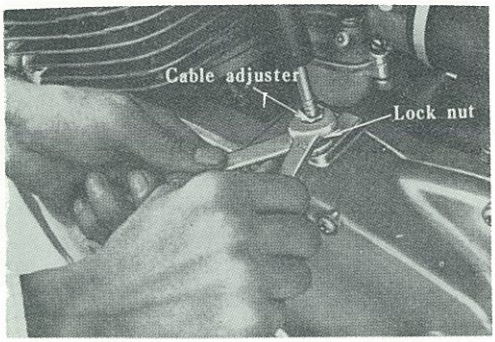



Fig. 8-18-26 Adjusting clutch cable play

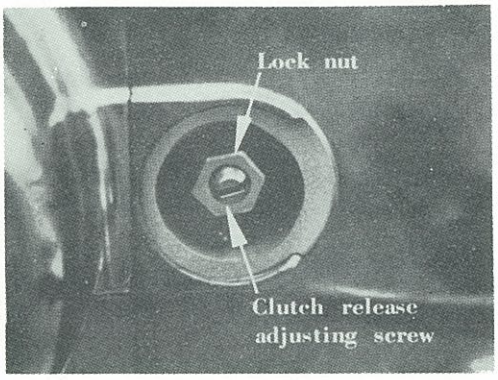



Fig. 8-18-27 Clutch release adjusting screw

the clutch release screw cap and then loosen the lock nut with a 10 mm wrench.

Turn the clutch adjusting screw in or out with a screw driver until the play measured at the clutch lever base in 4 mm (0,16 in). If the clutch adjusting screw is turned in, the play will decrease. If the screw is turned out, the play will increase.

Tighten the lock nut after the adjustment is completed. Make sure the clutch release screw is seated at the bottom of the guide by the clutch release screw arm spring when the clutch lever is let out. See Fig. 8-18-28.

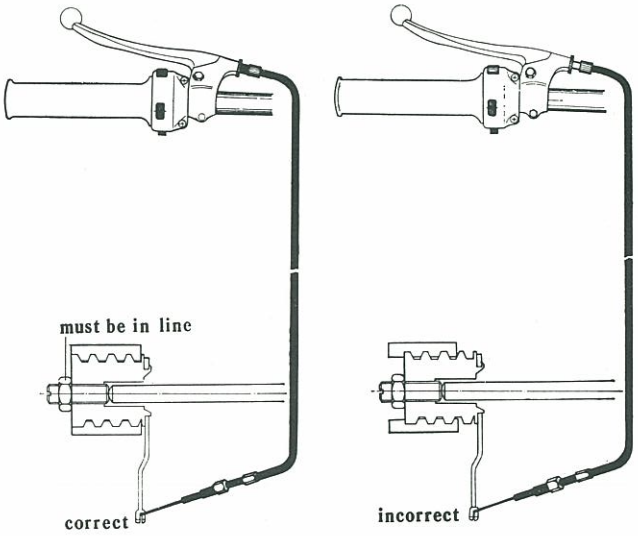



Fig. 8-18-28 Position of clutch release screw when off duty

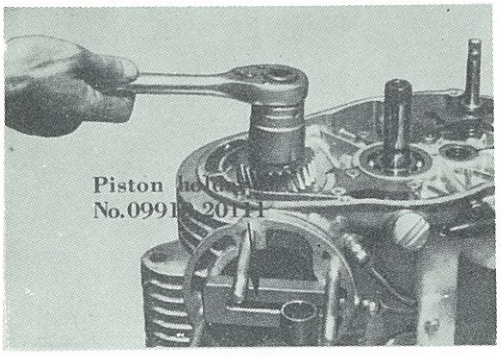



Fig. 8-19-1 Loosening primary pinion nut

## 8-19. Primary Pinion

### 8-19-1. Removing

Use a piston holder (special tool 09910-20111) to hold the connecting rod small end and prevent the crankshaft from turning. Straighten the primary pinion washer with a chisel and hammer. Loosen the nut with a 21 mm wrench. Remove the washer, pinion and spacer by hand.

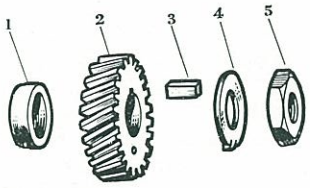
### 8-19-2. Inspecting

Check the backlash between the primary gear on the clutch housing and the primary pinon and replace the primary pinion with a new one if the backlash is over 0.16 mm (0.006 in).

### 8-9-13. Installing

First fit the spacer and then the pinion making sure a key on the crankshaft fits into the slot in the pinion. Aligning the tooth of the washer with the hole on the pinion, put on the washer and screw in the nut by hand. Place the piston holder (special tool 09910-20111) between connecting rod small end and the crankcase to prevent the crankshaft from turning, and then tighten the nut firmly with a 21 mm wrench. Bend the washer up tightly against the nut to prevent the nut from becoming loose.

| | |
|---|---|
| Primary pinion nut tightening torque | 500 kg-cm (36 lb-ft) |




1 Primary pinion spacer
2 Primary pinion
3 Primary pinion key
4 Primary pinion washer
5 Primary pinion nut

Fig. 8-19-2 Primary pinion and relatiue parts

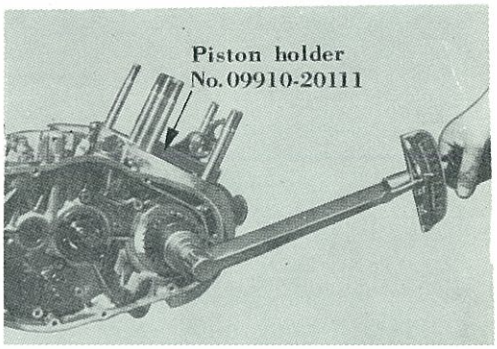



Fig. 8-19-3 Tightening primary pinion nut

### 8-20. Crankcase

The crankcase is made of aluminum alloy which is of high quality and light in weight.

The upper and lower halves of the crankcase are joined with two dowel pins and seventeen bolts, to form a case for the crank and transmission. Liquid gasket is applied on the joining surfaces and the two parts are held by so many bolts that there is no warpage or leakage problem. It is one of the most outstanding features of this engine that the crankcase can be separated into the upper and lower halves so that installing the crankshaft and transmission gears is easy.

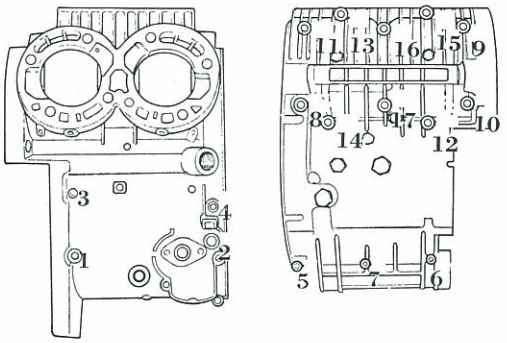



Fig. 8-20-1 crankcase

### 8-20-1. Disassembling

1. Loosen the 17 crankcase joining bolts with 10 mm and 12 mm socket wrenches in order of numbers on the crankcase shown in Fig 8-20-1.
2. Making sure the crankshaft and transmission gears ramain in the lower half of the case, gently strike the lugs of the upper half with a plastic mallet to separate the two parts of the crankcase. Never insert a screw driver between the crankcase halves to separate the crankcase as it

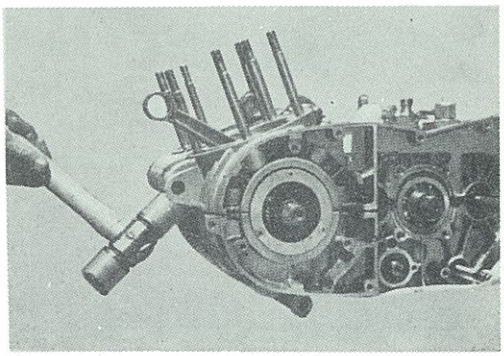


Fig. 8-20-2 Separating crankcase halves

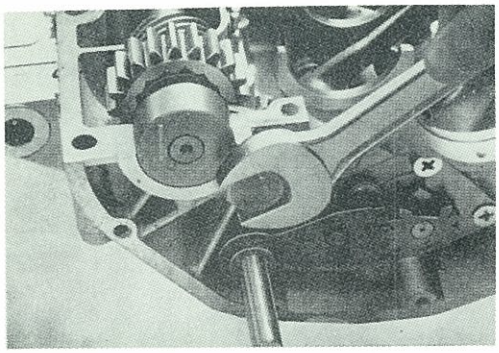


Fig. 8-20-3 Loosening kick stopper bolt

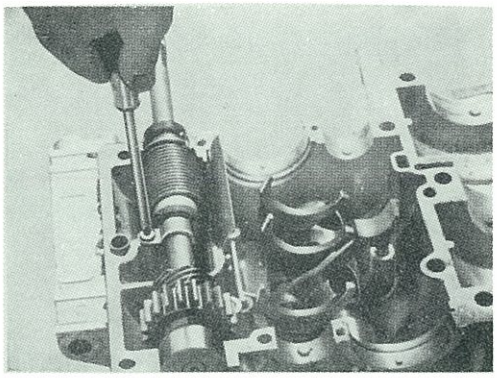


Fig. 8-20-4 Loosening kick shaft fitting bolt

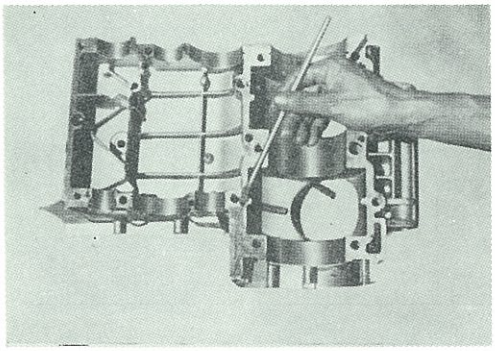


Fig. 8-20-5 Applying liquid gasket

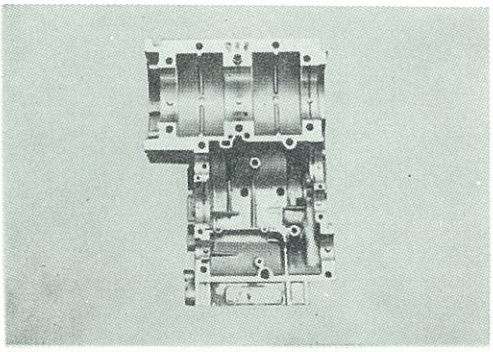


Fig. 8-20-6 Dowel pins and positioning pieces

damages the joining surfaces, causing compression and oil to leak.

3. Loosen the kick stopper bolt until it slips off of the kick shaft arm. After that, remove the kick shaft set plate by unscrewing the kick shaft plate fitting screw.

## 8-20-3. Assembling

1. Wipe the crankcase joining surface clean with a rag, and apply liquid gasket. Let it dry for about five minutes.
2. Fit the proper dowel pins and slotted bearing positioning piece on the lower half.
3. Install the crankshaft and gear box components in the lower half of the case.
4. After setting the kick shaft fitting plate to the crankcase with a screw, install the kick starter lever on the end of the kick shaft.
   Insert the plain screw driver between the kick starter pinion and crankcase to hold down the kick pawl and then turn the kick lever till the kick shaft stopper arm goes over the kick shaft stopper bolt. Finally tighten the kick stopper bolt firmly.
5. Check to see that the two dowel pins are properly located and that the kick starter shaft is installed with the finger on the larger section pointing toward the drive shaft so as not to hit the lower crankcase, fit the lower case over the upper one. Strike the kick part of the crankcase gently with a plastic mallet to make it fit firmly, if necessary.
6. After joining the case, turn the countershaft and drive shaft by hand and check to make sure the shafts turn smoothly.
   If they do not, the case is not joined properly, so disassemble and repeat the assembling procedure again.
7. Tighten the crankcase bolts in the order of the numbers on the crankcase.
   Be sure to fit a flat washer and lock washer one each bolt.

| | | |
|---|---|---|
| crankcase bolt tightening torque | 6 mm bolt | 8 mm bolt |
| | 100 kg-cm(7 lb-ft) | 200 kg-cm(14 lb-ft) |

8. After tightening the bolts, again check to make sure all shafts turn easily and smoothly by turning them by hand.

## 8-21. Crankshaft

### 8-21-1. Description

The crankshaft is held in three special ball bearings. Each bearing is located with a dowel pin so that bearing outer race creepage is prevented. Caged needle roller bearings are used for both the connecting rod small ends and big end, so the engine can be run for long and continuous operation at high speeds. Aluminum plugs are pressed into the crank wheel balance holes, so the engine delivers high output.

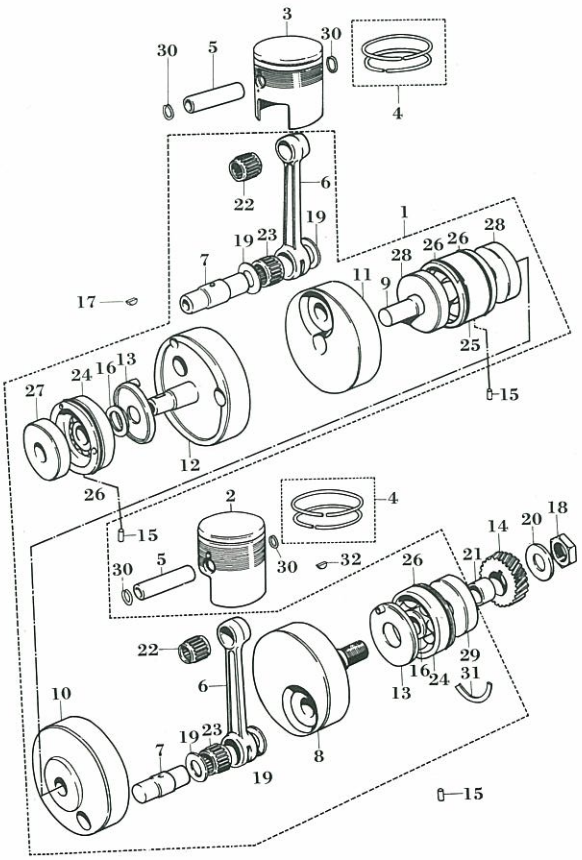



Fig. 8-21-1 Exploded view of crankshaft assembly

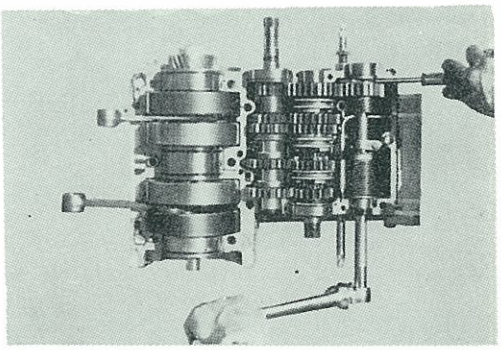


Fig. 8-20-7 Turning kick starter bolt

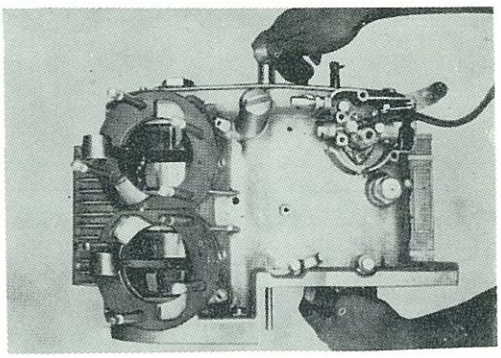


Fig. 8-20-9 Crankcase shaft turning

1 Crankshaft Ass'y
2 Right Piston
3 Left Piston
4 Piston Ring Set
5 Piston Pin
6 Connecting Rod
7 Crank Pin
8 Right Crankshaft
9 Center Crankshaft
10 Right Crank Wheel
11 Left Crank Wheel
12 Left Crankshaft
13 Oil Guide Plate
14 Primary Pinion
15 Dowel Pin
16 Thrust Washer
17 Key
18 Primary Pinion Nut
19 Connecting Rod Thrust Washer
20 Primary Pinion Washer
21 Primary Pinion Spacer
22 Piston Pin Bearing
23 Crank Pin Bearing
24 Crank Shaft Bearing
25 Center Crank Shaft Bearing
26 Crankshaft Housing "O' Ring
27 Left Crankshaft Oil Seal
28 Center Crankshaft Oil Seal
29 Right Crankshaft Oil Seal
30 Piston Pin Circlip
31 Crankshaft Oil Seal Positioning Piece
32 Key

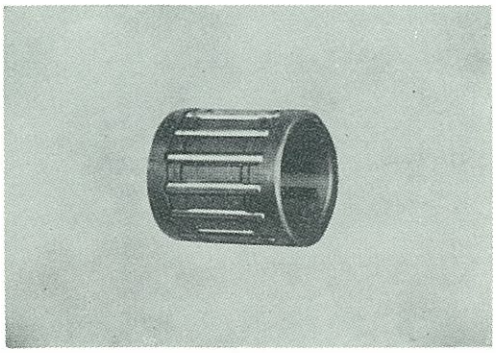


Fig. 8-21-2 Checking small end needle bearing

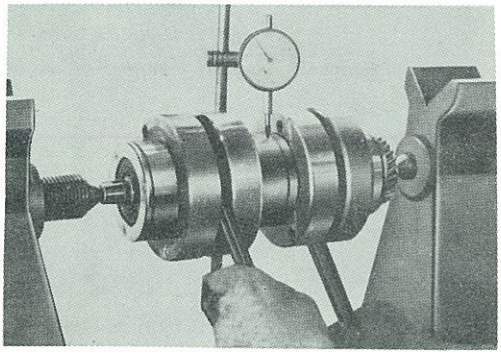


Fig. 8-21-3 Measuring crankshaft shake

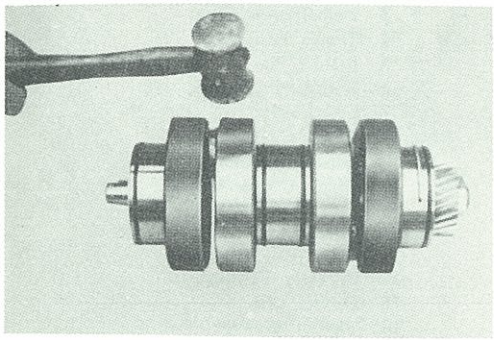


Fig. 8-21-4 Repairing crankshaft shake

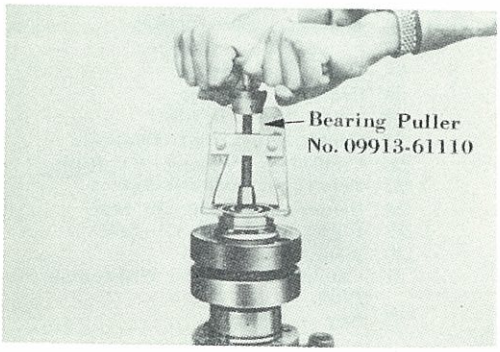



Fig. 8-21-5 Removing crankshaft bearing

## 8-21-2. Inspecting, adjusting and repairing

A. Small end needle bearings

Check the small end needle bearings for wear. If they are excessively worn and needle rollers slip out of the retainers, replace with new ones.

B. Crankshaft shake

If the crankshaft is not centered properly and shakes excessively, wear of the crankshaft bearings, pistons, cylinders and piston pins are hastened. Measure the crankshaft shake and adjust. To measure the crankshaft shake, place the crankshaft on a V-block or between the centers of a lathe or centering stand. The crankshaft shake should be measured with a dial gaug on right and left crankshaft journals and on the center crankshaft ball bearing. The crankshaft should be repaired if it is shakes over 0.06 mm (0.0023 in), when the crankshaft is turned slowly.

| | Standard | Limit |
|---|---|---|
| crankshaft shake | below 0.06 mm (0.0024 in) | 0.06 mm (0.0024 in) |

The reading obtained will show the direction in which the wheels are out of truth. Lay the crankshaft assembly on the V-block, and with a copper mallet give shaking wheels a light tap in the required direction. Again check the shake: continue this work until the reading of the dial gauge is below 0.06 mm (0.0024 in).

The crankshaft shake is caused by insufficient tightness between the crank pins, center crankshafr and crank wheels, worn bearings or by stress put on the crankshaft when assembling the crankcase.

When replacing the crankshaft bearings, use a bearing puller (special tool 09913-61110) and a bearing installing tool (special tool 09913-70122).

| | Standard |
|---|---|
| Crank pin/Crank wheel fit | 0.056T-0.081Tmm (0.0022T-0.0032T in) |
| Center Crankshaft/Crank wheel fit | 0.052T-0.078Tmm (0.00205T-0.00307 Tin) |

Excessively worn bearing can cause engine noise. Replace worn bearings.

C. Connecting rod small end shake

Rest the crankshaft assembly on the V-block and place one of the connecting rods at its top dead center position, where the crahkshaft shake is the largest. Place the feeler of the dial gauge against the small end. Incline the connecting rod to the left as far as it will go and then to the right and measure the connecting rod small end shake. Repeat the same procedure for the other connecting rod. If the reading abtained are over 3 mm (0.118in), repairing is required.

| | |
|---|---|
| Limit of small end shake | 3 mm (0.118 in) |

The connectsng rod shake is caused by worn large end eyes, crank pins, large end needle rollers, needle roller retainers, etc.

Disassemble the crankshaft by using disassembling jigs and a press and replace worn parts with new ones.

When the crankshaft is disassembled, it is better to replace the center crankshaft oil seal with a new one, even if it does not seem to be worn.

When reassembling the crankshaft, apply grease to all joining sections and use specially designed assembling jigs and press.

After reassembling the crankshaft, be sure to check the crankshaft shake and repair if necessary.

D. Oil seals

An oil seal whose lip is damaged or excessively worn causes compression leakage, resulting in hard starting of the engine and decrease in engine output. Be sure to examine the crankshaft oil seals and replace with new ones if their lips are damaged or worn.

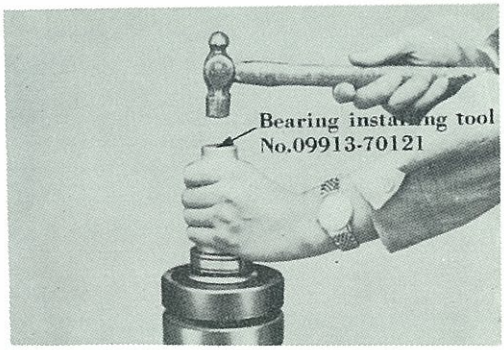



Fig. 8-21-6 Replacing crankshaft bearing

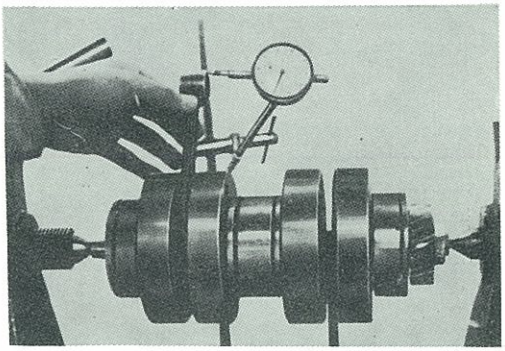


Fig. 8-21-7 Measuring connecting rod small end shake

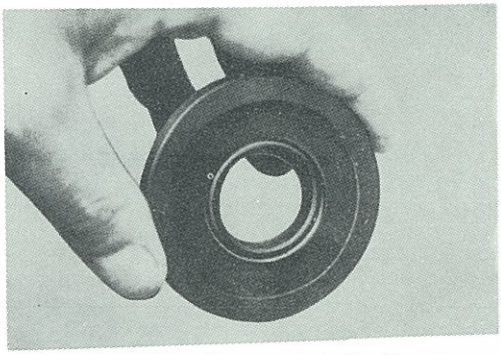


Fig. 8-21-8 Checking crankshaft oil seal

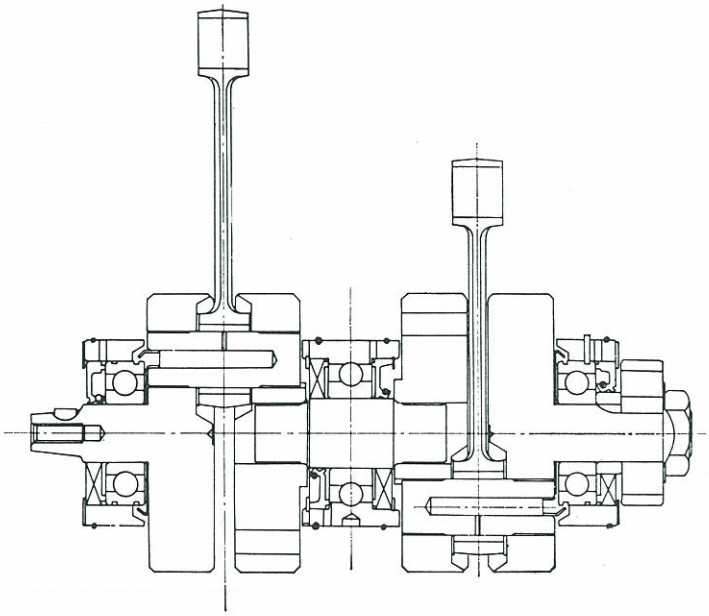


Fig. 8-21-9 Sectional view of crankshaft

## 8-22. Transmission

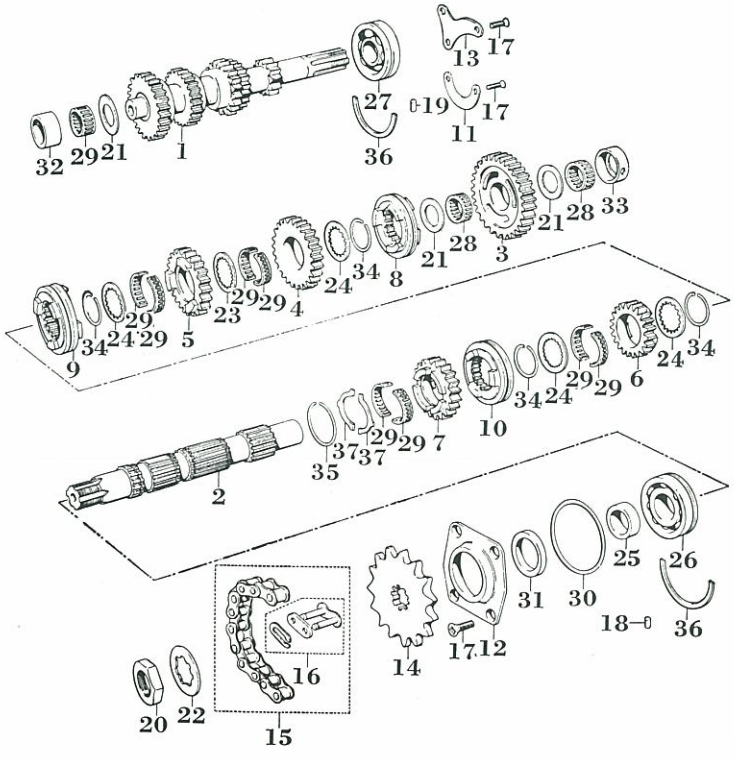



Fig. 8-22-1 Exploded view of transmission

The transmission is composed of countershaft, drive shaft, gears and drive gear wheels. The countershaft is unit-constructed with 3rd, 4th and top pinions. The drive shaft has gears supported with circlips and each gear holds either separable or inseparable needle rollers in its inside.

| | | |
|---|---|---|
| 1 | Countershaft | L.=238 (9.37) |
| 2 | Drive Shaft | L.=207 (8.15) |
| 3 | Low Gear | N.T.=30 |
| 4 | Second Gear | N.T.=25 |
| 5 | Third Gear | N.T.=22 |
| 6 | Fourth Gear | N.T.=21 |
| 7 | Top Gear | N.T.=20 |
| 8 | Low Gear Wheel | |
| 9 | Third Gear Wheel | |
| 10 | Top Gear Wheel | |
| 11 | Drive Shaft Bushing Retainer | T.=2.3 (0.09) |
| 12 | Drive Shaft Bushing Retainer | |
| 13 | Oil Reservoir Cap | T.=1.0 (0.04) |
| 14 | Engine Sprocket | N.T.=15 |
| | Engine Sprocket | N.T.=14, Optional |
| | Engine Sprocket | N.T.=13, Optional |
| 15 | Drive Chain Ass'y | #530HT×110L |
| 16 | Chain Joint Ass'y | #530HT |
| 17 | Cross Head Screw | |
| 18 | Dowel Pin | |
| 19 | Dowel Pin | |
| 20 | Engine Sprocket Nut | I.D.=22 screw |
| 21 | Top Gear Thrust Washer | O.D.=30.5 (1.20), I.D.=20 (0.79), T.=1.0 (0.04) |
| 22 | Engine Sprocket Washer | O.D.=38 (0.15), T.=1.2 (0.05) |
| 23 | Third Gear Washer | O.D.=36 (1.42), T.=1.0 (0.04) |
| 24 | Second Gear Washer | O.D.=36 (1.42), T.=2.0 (0.08) |
| 25 | Engine Sprocket Spacer | O.D.=27 (1.06), I.D.=22 (0.87), W.=10.7 (0.42) |
| 26 | Drive Shaft Bearing | O.D.=59 (2.32), I.D.=22 (0.87), W.16 (0.63) |
| 27 | Countershaft Bearing | O.D.=59 (2.32), I.D.=22 (0.87), W.=16 (0.63) |
| 28 | Transmission Shaft Needle | O.D.=26 (1.02), I.D.=20 (0.79), W.=12.8 (0.50) |
| 29 | Transmission Gear Needle Bearing | O.D.=30 (1.18), I.D.=26 (1.02), W.=9.8 (038) |
| 30 | Drive Shaft "O" Ring | I.D.=65 (2.56), W.=1.9 (0.07) |
| 31 | Drive Shaft Oil Seal | I.D.=42 (1.65), W.=7.0 (0.28) |
| 32 | Countershaft Bushing | O.D.=32 (1.26), W.=15 (0.59) |
| 33 | Drive Shaft Bushing | O.D.=32 (1.26), W-=15 (0.59), Marked "D" |
| 34 | Second Gear Circlip | O.D.=28.5 (1.12), W.=1.4 (0.06) |
| 35 | Top Gear Circlip | O.D.=38.7 (1.52), W.=1.6 (0.06) |
| 36 | Slotted Bearing Positioning Piece | T.=2.0 (0.08) |
| 37 | Top Gear Ring | T.=1.5 (0.06) |

## 8-22-1. Operation

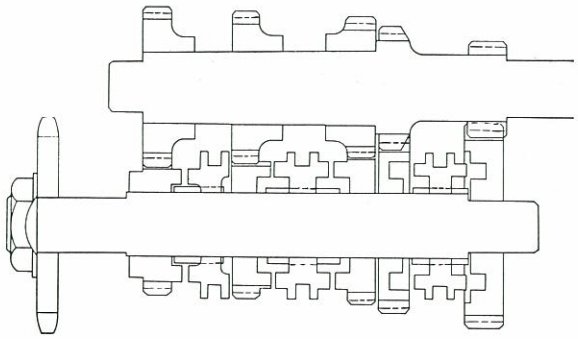


Fig. 8-22-2 Gear positions for neutral

Engine power is transmitted from the crankshaft to the primary gear on the clutch housing through the primary pinion.

When the clutch is engaged, the power is transferred through the clutch plates and sleeve hub to the countershaft.

The low gear is driven by the low pinion which is unit-constructed with the countershaft. In the neutral position, the low gear turns freely on the drive shaft so that engine power is not transmitted to the drive shaft.

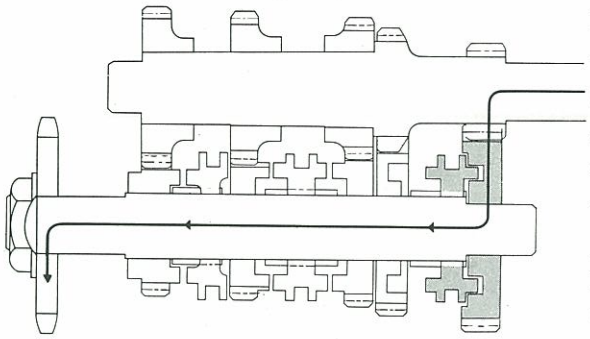


Fig. 8-22-3 Gear positions low speed

For low speed, the first driven gear wheel is slid to the right on the drive shaft by the gear shifting fork. Then dogs on the right side of the first driven gear wheel engage with holes on the low gear and rotational power is transmitted to the drive shaft through the combined low gear and first driven gear wheel.

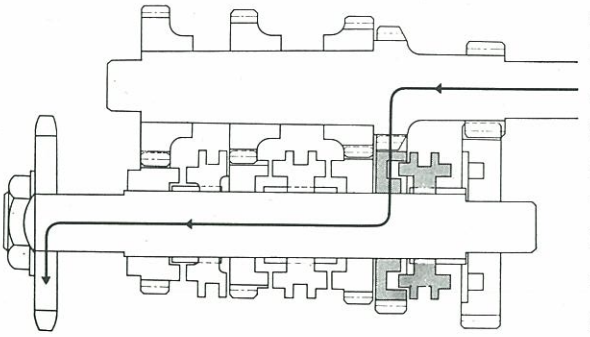


Fig. 8-22-4 Gear positions second speed

For second speed, the first driven gear wheel is slid to the left on the splines of the drive shaft by the gear shifting fork so that dogs on the left side of the first driven gear wheel engage with those of the second gear which turns freely on the drive shaft. Rotational power is then transmitted from the countershaft to the drive shaft trough the second pinion which is unit-constructen to the countershaft and the combined second gear and first driven gear wheel.

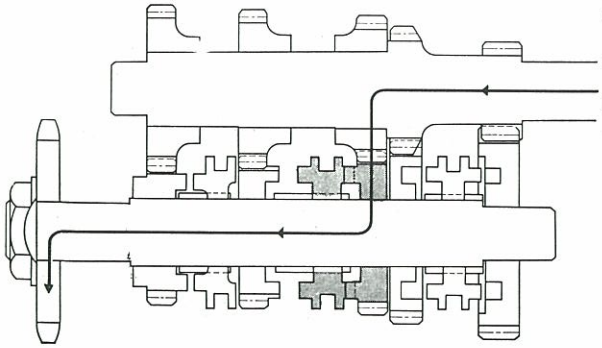


Fig. 8-22-5 Gear positions third speed

For third speed, the third drive gear wheel is slid to the right on the splines of the drive shaft by the gear shifting fork. Dogs on the right side of the third driven gear wheel then engage with those of the third gear which turns freely on the drive shaft. Thus the third driven gear wheel and third gear are combined and work as a single unit so that rotational power is transmitted from the countershaft to the drive shaft.

For fouth speed the third driven gear wheel is slid to the left on the splines of the drive shaft by the gear shifting fork. Dogs on the left side of the third driven gear wheel then engage with those of the fourth gear which turns freely on the drive shaft. Thus the fourth gear and third drive gear wheel are combined and work as a single unit so that rotational power is transmitted from the countershaft to the drive shaft.

For top speed the fifth driven gear wheel is slid to the left on the splines of the drive shaft by the gear shifting fork. Dogs on the left side of the fifth driven gear wheel then engage with those of the top gear which turns freely on the driveshaft. Thus the top gear and fifth drive gear wheel are combined and work as a single unit so that rotational power is transmitted from the countershaft to the drived shaft.

In the neutral position, none of the gears is engaged in an axial cirection so that no rotational power is transmitted to the engine sprocket.

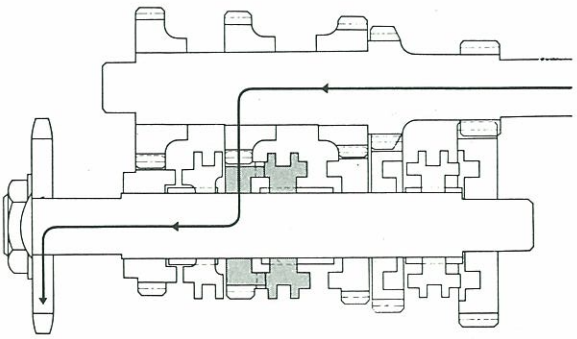


Fig. 8-22-6 Gear positions fou th speed

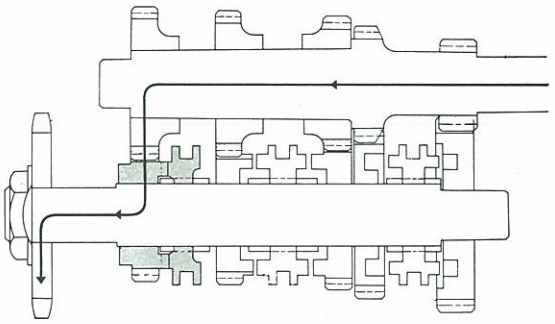


Fig. 8-22-7 Gear positions top speed

## 8-22-3. Inspecting and adjusting

A. Gears

Inspect the transmission gears for engagement, and wear and damage of dog teeth each time the engine is disassembled. If they are damaged excessively, replace with new parts.

B. Shifting fork grooves

The three driven gear wheels have grooves into which the gear shifting forks are placed. If the grooves are worn from friction with the forks, and the clearance becomes excessively large, travel of the first, third and fifth driven gear wheels decreases, so that they are difficult to engage with the adjacent gears and are easy to slip out of engagement. Measure the clearance between the gear shifting forks and grooves. Replace with new ones if it is over the limit.

| | Standard | Limit | Operation |
|---|---|---|---|
| Fork/groove | 0.4~0.6 mm (0.016~0.024in) | 0.8 mm (0.03in) | Replace |

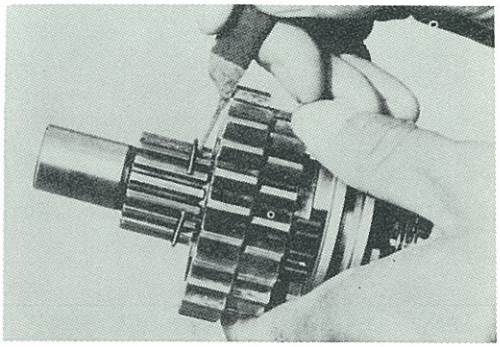


Fig. 8-22-8 Measuring fork/groove clearance

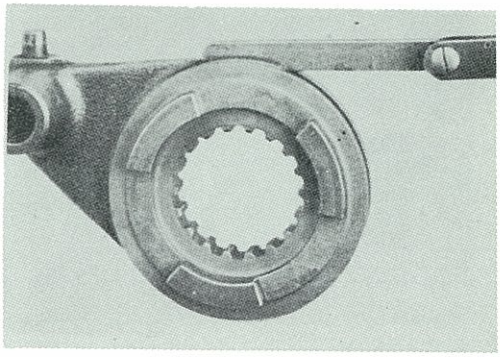


Fig. 8-22-9 Removing cirilip

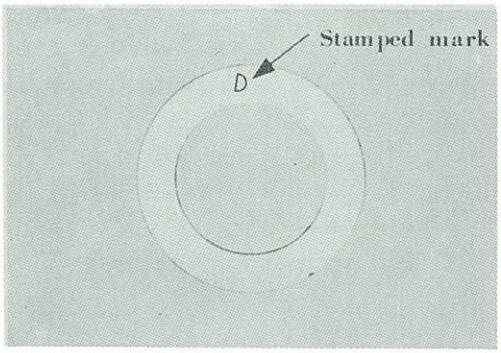



**Fig. 8-22-10 Drive shaft bushing**

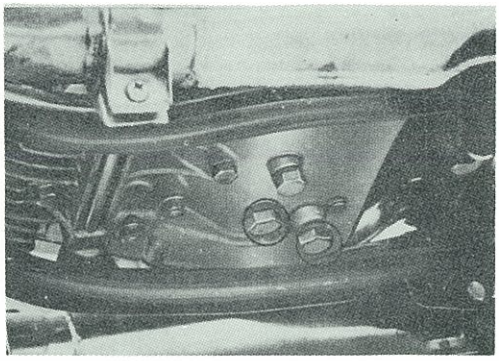


**Fig. 8-22-11 Oil drain plugs**

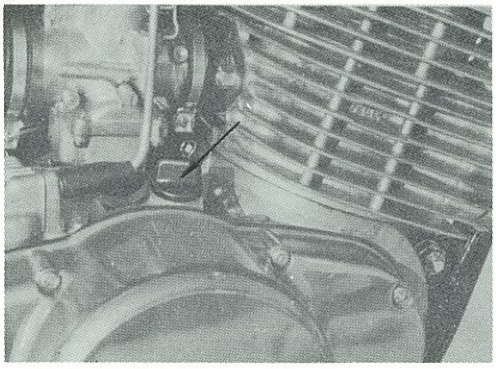


**Fig. 8-22-12 Oil filler plug**

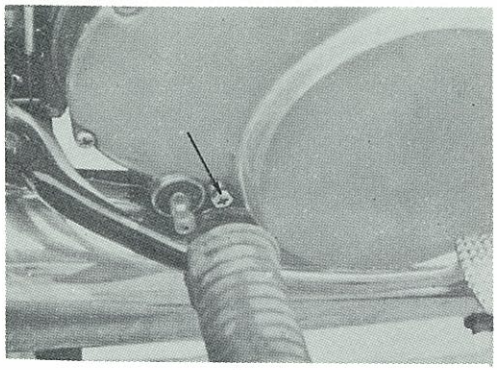


**Fig. 8-22-13 Oil level screw**

C. Ball bearings, bushing and oil seal

Check the ball bearings and bushings which hold the shafts to see if they are worn. If they are worn and play is found, replace with new ones, as this causes rapid wear in other transmission components.

The drive shaft and push rod oil seals prevent the oil from leaking. If they are worn and oil leakage is found, replace with new ones.

D. Transmission shaft needle bearings

Check the needle bearings for wear. If they are excessively worn and needle roller slip out of the retainers, replace with new ones.

## 8-22-4. Tips on assembling

The countershaft bushing and the drive shaft bushing resemble in both shape and size, but the latter alone has a stamped mark " D " as shown in Fig 8-22-10. When assembling do not mistake the former for the latter. The circlip should be replaced each time when disassembling.

## 8-22-5. Gear box oil

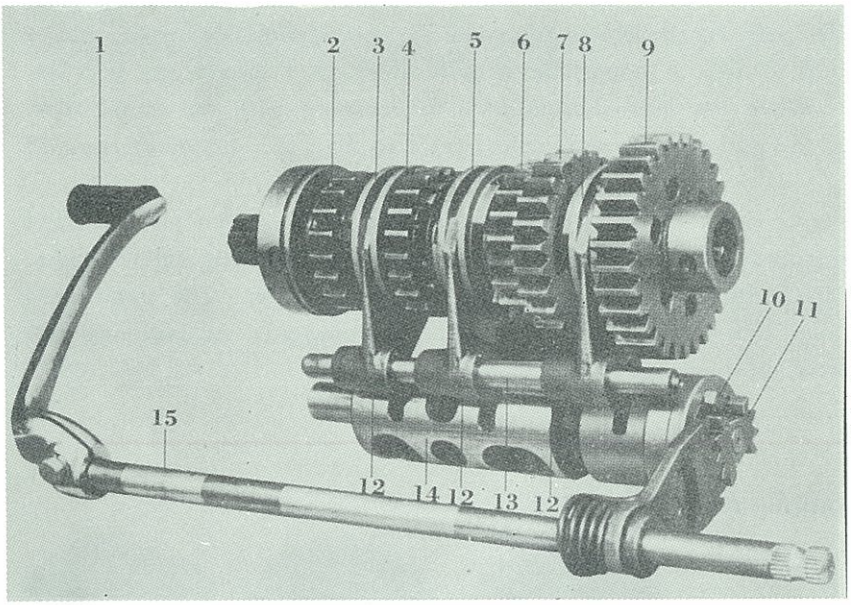
Oil in the gearbox lubricates and cools the transmission and clutch. High grade oil with excellent lubrication efficiency should be used, and the proper viscosity must be chosen. When too light oil used, the clutch becomes easy to disengage but gear noise increases and lubrication becomes incomplete.

When too heavy oil is used, gear noise decrease but the clutch drags in cold weather. Use high gear SAE 20W/40 multigrade oil. Oil deteriorates and its lubricating performance decreases if it is used for a long time, so change oil after the first 1,000 km (750 mi) and every 3,000 km (2,000 mi) after the first oil change.

To drain the used oil, remove the two oil drain plugs on the bottom of the engine. To expedite the job, drain the oil while the engine is warm and the oil viscosity is low. To fill the gearbox with oil, remove the filler plug and oil level screw. Pour oil through the oil filler hole until oil flows from the oil level screw hole.

The gearbox holds 1200 cc (1.3/1.1 qt, US/Imp) of oil.

## 8-23. Gear Shifting Mechanism




1 Gear shifting lever
2 Top gear
3 Fifth driven gear wheel
4 Fourth gear
5 Third driven gear wheel
6 Third gear
7 Second gear
8 First driven gear wheel
9 Low gear
10 Gear shifting pawl
11 Gear shifting pawl holder
12 Gear shifting fork
13 Gear shifting fork shaft
14 Gear shifting cam
15 Gear shifting shaft comp

**Fig. 8-23-1 Gear shifting mechanism**

As the gear shifting lever is depressed, the gear shifting arm rotates downward. The gear shifting pawl holder engaged with the sector gear of the gear shifting arm begins to turn down, too. The gear shifting pawl holder contains two gear shifting pawls inside of it which rotate the gear shifting cam by being engaged with the inside teeth of the cam in shifting up or down the gear shifting lever. Three gear shifting forks are fitted into the grooves on the shifting cam.
If the cam is rotated, the gear shifting forks and the drive gear wheels move in the axial direction.

A. Operating gear shifting lever

The model T500-II gear shifting system,ccording to the operation of the gear shifting lever, is illustrated in Fig 8-23-2.

To shift into low gear from neutral, depress the gear shifting lever. To shift from low to second, third, etc. . . . and top gear, lift the gear shifting lever. To shift down depress the gear shifting lever. When the gear shifting lever is pulled up the gears are shifting directly from low to second gear but when the gear shifting lever is depressed from second the gears are shifted into neutral. It is not possible to shift down directly from second to low gear.

To shift from second to low gear it is necessary

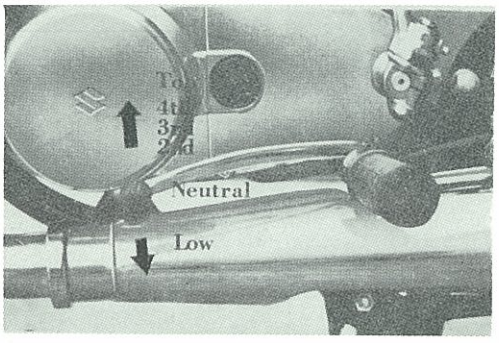



**Fig. 8-23-2 gear shifting operation**

to depress the gear shifting lever twice, the first time shifting from second to neutral and the second time from neutral to low gear.

B. Gear shifting system special mechanisms

The low gear, second gear and neutral incorporate a special mechanism to make shifting gears easier and positive so that gears can be shifted from low to second with one stroke, but a special mechanism operates to make it impossible to shift down from second gear into low gear with one stroke. When the gear shifting lever is depressed with the transmission engaged in second gear, the gear shifting pawl holder turns in the "A" section as show in Fig 8-23-3.

The shifting pawl, however, slips through the groove in the "A" section and the pawl cannot turn the shifting cam as the gear shifting lever moves down the first half a stroke. In the next half stroke the shifting pawl engages with the "B" section. The pawl turns the shifting cam and one full stroke is achieved. Neutral is engaged. An additional full stroke is necessary to shift into low-gear.

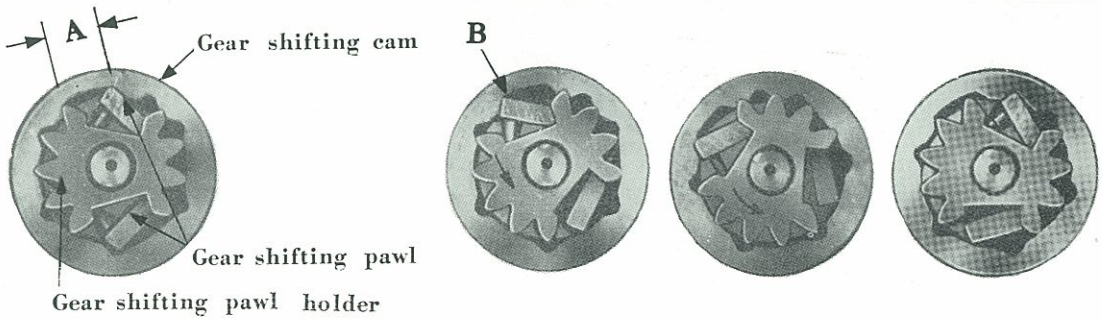



**Fig. 8-23-3 Gear shifting mechanism operation**

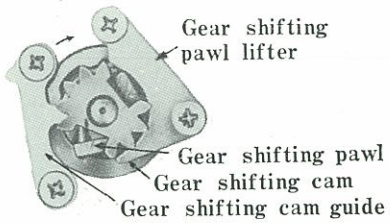



**Fig. 8-23-4 Positive shift feature**

C. Positive shift feature

When gears are shifted rapidly, the shifting cam drum tends to rotate beyond the desired position. To prevent the cam drum from turning too far a positive stop shifting device is incorporated, ensuring confident gear selection.

A stopper is included on the gear shifting cam drum guide as shown in Fig 8-23-4 so that the gear shifting pawl hits the stopper and the gear shifting cam drum cannot be turned too far even if the gear shifting lever is operated roughly. Gear shifting is always positive.

### 8-23-1. Removing

Pull out the gear shifting shaft and gear shifting shaft return spring. Remove the shifting cam guide and gear shifting stopper bolt. Remove the gear shifting pawl lifter and gear shifting cam guide by loosening 4 cross head screws with a screw driver. Remove the gear shifting pawl holder with two gear shifting pawl springs, two gear shifting pawl rollers and gear shifting pawls. Pull out the gear shifting fork shaft with pliers. Slip the gear shifting cam out of the right-hand side of the crankcase.

The cases must be split and the gear shifting fork guide pins removed.

### 8-23-2. Tips on installing

When installing the gear shifting shaft, align the center of sector located at the gear shifting shaft arm with the center of the five-tooth side of the gear shifting pawl holder regardless of the gear shifting cam position. Do not align it with the four-tooth side of the pawl holder.

If the components are installed in the wrong way, the gears cannot be shifted.

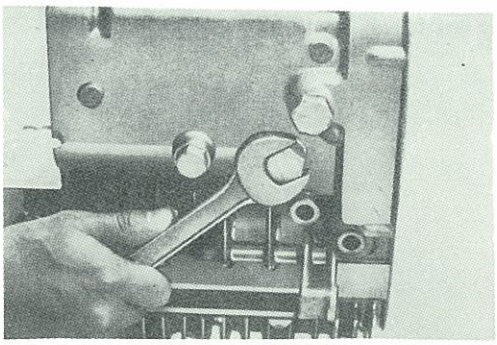


Fig. 8-23-5 Removing shifting cam guide

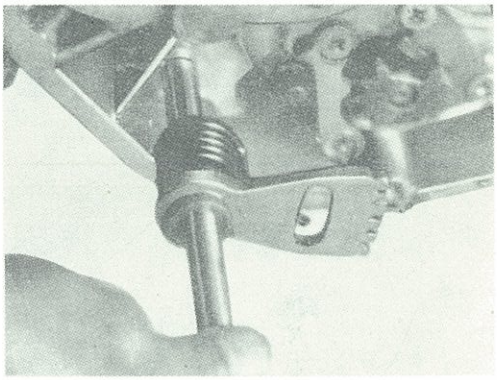


Fig. 8-23-6 Pulling out gear shifting shaft

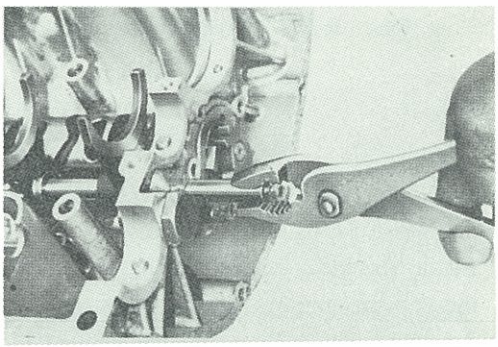


Fig. 8-23-7 Pulling out gear shifting fork shaft

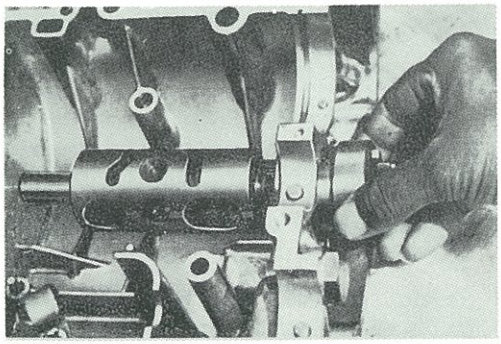


Fig. 8-23-8 Slipping gear shifting cam out of crankcase

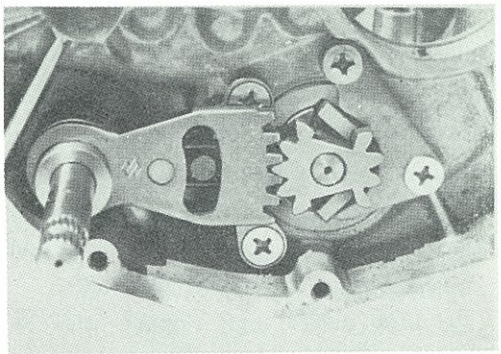


Fig. 8-23-9 Aligning center of sector with gear shifting pawl holder

## 8-24. Kick Starter Mechanism

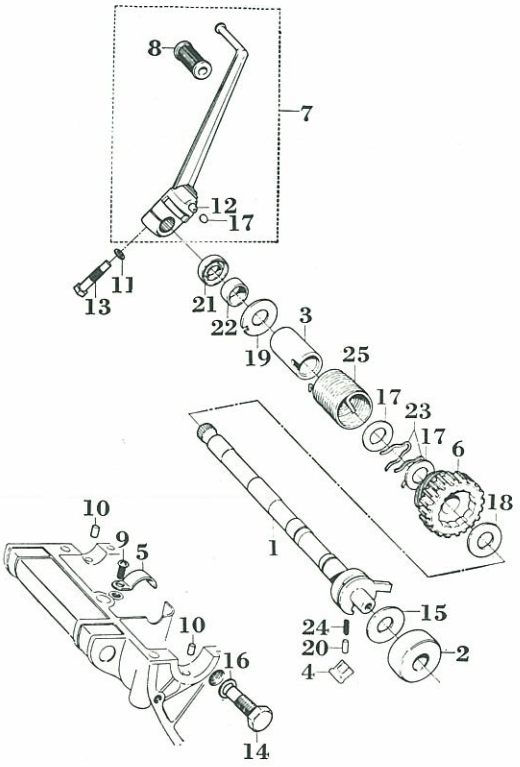



Fig. 8-24-1 Exploded view of kick starter part

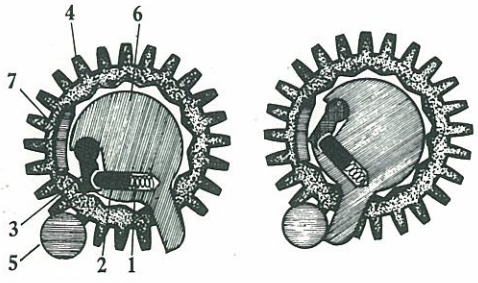
1 Kick Starter Shaft
2 Kick Starter Shaft Right Bushing
3 Kick Starter Shaft Return Spring Guide
4 Kick Starter Pawl
5 Kick Starter Shaft Clamp
6 Kick Starter Pinion
7 Kick Starter Lever Ass'y
8 Kick Starter Lever Rubber
9 Cross Head Screw
10 Dowel Pin
11 Lock Washer
12 Grease Nipple
13 Kick Starter Lever Bolt
14 Kick Starter Stopper Bolt
15 Kick Starter Shaft Right Thrust Washer
16 Kick Starter Stopper Washer
17 Tachometer Gear Thrust Washer
18 Kick Starter Pinion Thrust Washer
19 Kick Starter Shaft Return Spring Washer
20 Kick Starter Pawl Roller
21 Kick Starter Shaft Oil Seal
22 Kick Starter Shaft Left Bushing
23 Kick Starter Shaft Circlip
24 Kick Starter Pawl Spring
25 Kick Starter Shaft Return Spring

The kick starter shaft is held by the right and left bushings which are firmly positioned on the crankcase by means of dowel pins. The kick starter pinion is fixed on the shaft with a circlip. Inside the kick starter pinion are retained a pawl, pawl roller and pawl spring. The kick starter mechanism employs a kind of ratchet as shown in the illustration. When the kick starter lever is depressed, the kick starter shaft turns in a counterclockwise direction when seen from the kick starter lever end of the shaft. When the kick starter shaft turns counterclockwise, the kick starter pawl engages with the teeth on the inside of the kick starter pinion and the kick starter pinion turns, as the kick starter pawl moves at a right angle to it.

The kick starter pinion moves the low gear with which it is engaged and the crakshaft is turned in the order of low pinion, primary gear, primary pinion and crankshaft.

Once the engine is started and the kick starter lever is released, the kick starter shaft is returned to its original position by the kick starter shaft return spring and the pawl is pushed back out of the way by the finger of the kick starter shaft right bushing so that rorational power is not transmitted to the kick starter shaft.

The kick starter shaft stopper fitted to the lower half of the crankcase stops the kick starter shaft when it is returned by the return spring and prevents the pawl from going further than the finger of the right bushing and catching on it when the kick starter lever is depressed again.




When kick starter lever depressed

When kick starter lever released

(1) Kick starter pawl spring
(2) Kick starter pawl roller
(3) Kick starter pawl
(4) Kick starter pinion
(5) Kick starter shaft stopper
(6) Kick starter shaft
(7) Finger of kick starter shaft right bushing

Fig. 8-24-2 Kick starter mechanism

## 8-24-1. Inspection

A. Kick starter pinion & pawl

Inspect the internal teeth of the kick starter pinion for wear. If they are excessively worn, the pawl does not engage with them properly and slips when the kick starter lever is operated, causing rotational power not to be transmitted to the crankshaft.

An excessively worn kick starter pawl also causes the same kind of trouble. Replace with new ones if thay are worn.

B. Kick starter pawl roller & spring

Check the kick starter pawl roller by pushing it with a thumb to see if it operates properly in the hole on the kick starter shaft. If it does not operate smoothly due to foreign matter in the hole or a defective spring, it causes rapid wear of the kick starter pinion internal teeth and the pawl as well as kick starter slippage. Clean foreign matter from the hole and replace a defective spring with a new one.

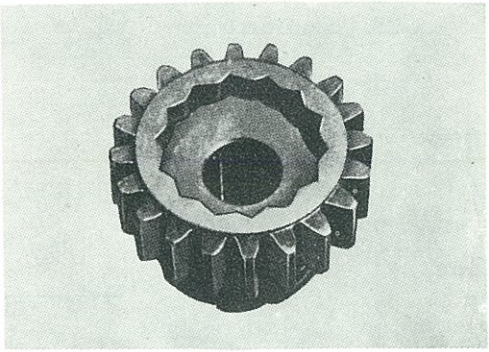


Fig. 8-24-3 Kick starter pinion

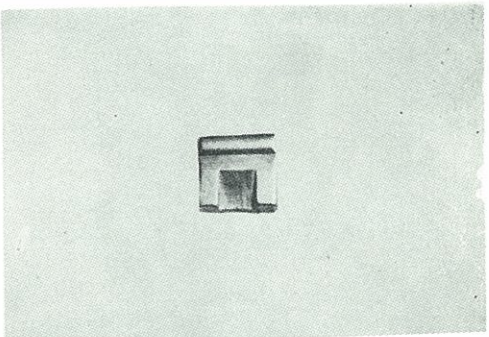


Fig. 8-24-4 Kick starter paw.

Fig. 8-24-5 Check kick starter pawl roller operation

## 8-24-2. Tips on Assembling

When assembling the kick starter shaft parts, be sure to fit washers in the right positions as shown in Fig 8-24-6.

When putting the roller into the hole on the large section of the shaft, be sure to fit with flat end facing inward.

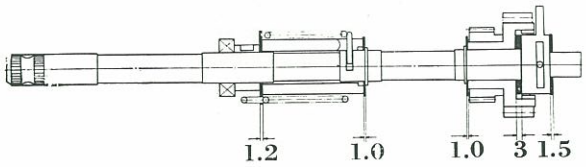



Fig.8-24-6 Washer position

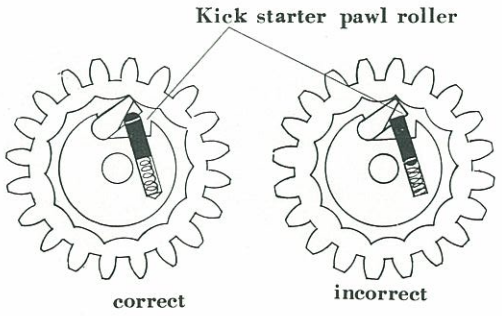



Fig. 8-24-7 Fitted direction of kick starter pawl roller

## 8-25. Carburetors

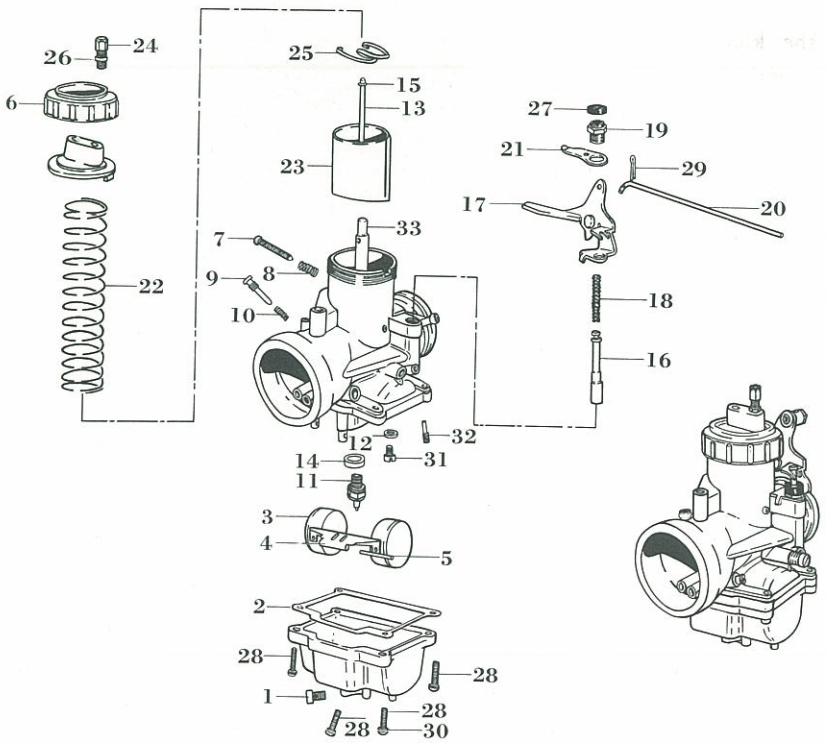



Fig. 8-25-1 Exploded view of carburetor

1 Carburetor Drain Plug
2 Float Chamber Gasket
3 Float
4 Float Arm
5 Carburetor Arm Pin
6 Mixing Chamber Cap
7 Throttle Stop Screw
8 Throttle Stop Screw Spring
9 Pilot Air Adjusting Screw
10 Pilot Screw Spring
11 Needle Valve
12 Needle Jet Stop Washer
13 Jet Needle
14 Needle Valve Seat Gasket
15 Needle Clip
16 Starter Plunger
17 Starter Lever
18 Starter Plunger Spring
19 Starter Plunger Cap
20 Starter Rod
21 Starter Lever Spring
22 Throttle Valve Spring
23 Throttle Valve
24 Cable Adjuster
25 Throttle Valve Spring Seat
26 Cable Adjusting Nut
27 Starter Rubber Cap
28 Cross Head Screw
29 Cotter Pin
30 Lock Washer
31 Main Jet
32 Pilot Jet
33 Needle Jet

A piece of new mechanism is ingeniously contrived into the T500－II carburetors.
With the high speed engine, carburetor settings are selected with the principal point put at high revs of the engine so that the mixture meterd at low revs below 4,000 rpm is inevitably on the rich side and engine response becomes poor when engine speed is out of the power range.
This type of engine will prove rather hard to handle in the stop-and go city traffic.
This disadvantage can't be overcome in the carburetor design so far in use.
With the T500-II carburetors, however, the problem has been successfully solved by doing away with the air vent in the mixing chamber and providing a special channel between the air funnel portion and float chamber, which produces negative pressure in the float chamber and makes it difficult for fuel to be primed up at low revs.
Difference in negative pressure between points Ⓐ and Ⓑ... or between points Ⓑ and Ⓒ is small when the engine speed is low and thereby the fuel in the float chamber is hard to be primed up resulting in no more over rich mixture. (With conventional carburetors, atmospheric pressure is always applied on the fuel in the float chamber, giving the fuel a boost.)
The difference becomes larger in accordance with increase in engine rpm because the velocity of air flow is different at points Ⓐ and Ⓑ and the negative pressure is proportional to the square of the velocity.
The larger the difference becomes, the larger amount of fuel is allowed to gush through the main jet.
Thus the carburetors always supply an ideal fuel/air mixture to the engine, widening the engine power range and marking the engine flexible. Carburetors of this type are called **homo-pressure** carburetors.

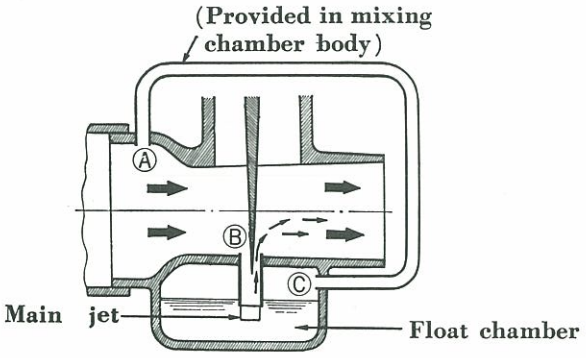



Fig. 8-25-2 Homo-pressure operation

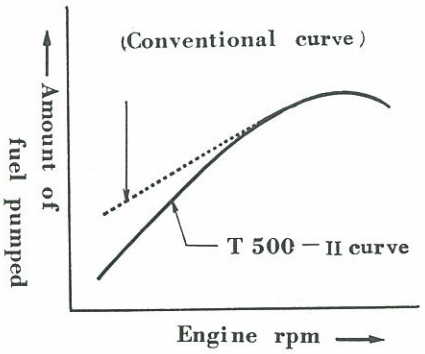



Fig. 8-25-3 Carburetor pumping performance

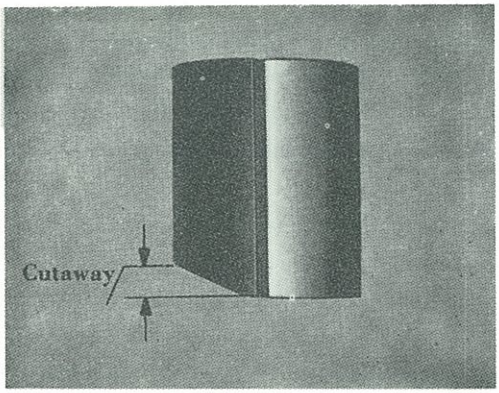



Fig. 8-25-4 Throttle valve

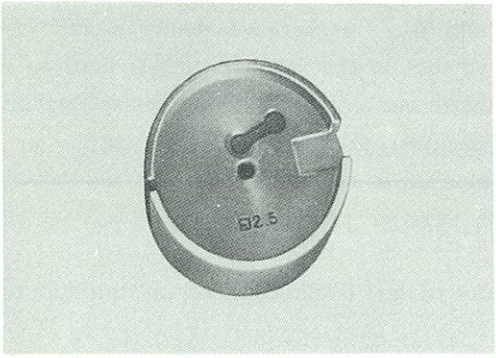



Fig. 8-25-5 Cutaway number

## 8-25-1. Function of main components

A. Throttle valve

The throttle valve determines the amount of air sucked into the engine through the main bore by changing the throat opening, thus controlling engine output.

As the valve is raised by turning the throttle grip inward, the throat opening becomes larger and larger, permitting a greater amount of air to flow under it and resultantly increasing engine output.

The throttle valve has a cutaway which determines the velocity of air flow and the amount of fuel to be primed up at medium speed from 1/4 to 3/4 throat opening.

The standard cutaway is 2.5/16 inch in size as indicated by the cutaway size number.

The number "1.0" means 1/16 inch "3.0" 3/16 inch, etc

A higher numbered throttle valve cutaway gives a leaner mixutre and a lower numbered a richer mixture.

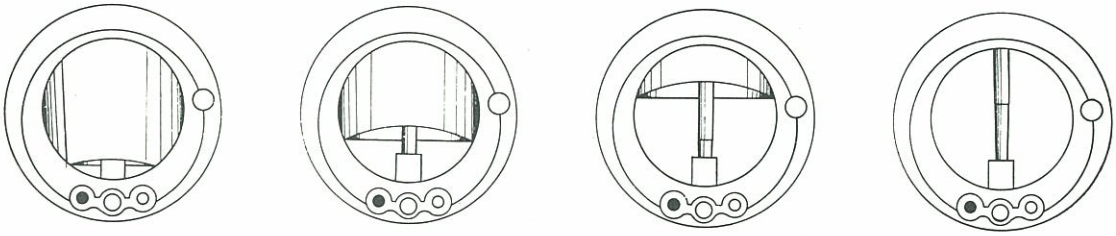



Fig. 8-25-6 Throttle valve operation controlling throat opening

B. Jet needle

The jet needle has five grooves at the upper part and is tapered at the lower end approximately from the center. It is clipped into the third groove from the top and is seated in the center of the throttle valve. The tapered end is inserted into the needle jet.

Engine output is regulated by the amount of air inhaled into the engine, as explained in paragraph A. When the amount of air inhaled into the engine is changed, the amount of fuel

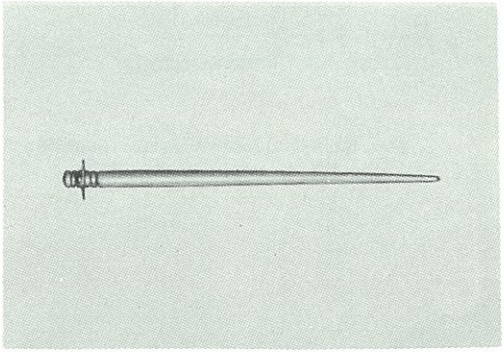


Fig. 8-25-7 Jet needle and clip

mixed with the air must be changed as well to keep the fuel/air mixture ratio proper at all times. The clearance between the jet needle and the needle jet determines the amount of fuel which is pumped up through the main jet from the float chamber at medium speed from 1/4 to 3/4 throat opening. As throttle valve is raised, the clearance increases.

C. Needle jet

The needle jet determines the amount of fuel together with the jet needle. At the upper end it has primary chamber where air entering from the air jet flows in at high speed and creates bubbles in the fuel sucked up through the main jet and helps to atomize it, and at the lower end threads for fitting the main jet.

D. Main jet

The main jet determines the amount of fuel at high speeds from 3/4 to fuel throat opening. The main jet number is stamped on the hexagonal end. Main jets are mubered according to the amount, measured in cubic centimeters, of fuel which can flow through it in one minute.

E. Pilot jet

The pilot jet determines the amount of fuel at low speeds from 0 to 1/4 throat opening. The pilot jet has eight bleed holes from which the air inhaled through the pilot air inlet is admitted and mixed with the sucked-up fuel and helps to atomize it before jetting from the pilot outlet. The pilot jet number is stamped near the holes. Pilot jet is also numbered according to the amount, measured in cubic centimeters, of fuel which can flow through it in one minute.

F. Pilot air adjusting screw

The pilot air adjusting screw determines the amount of air inhaled through the pilot air inlet and adjusts the fuel/air mixture ratio at low speed from 0 to 1/4 throat opening. It is tapered so that the open ng of the pilot air passage increases or decreases according to turning of it.

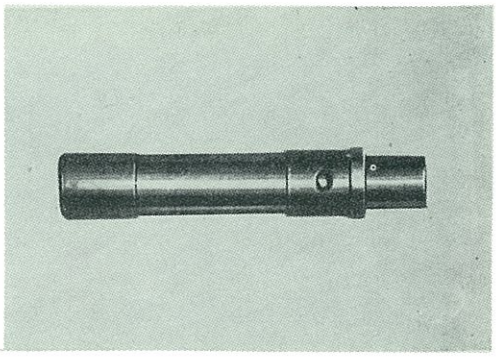


**Fig. 8-25-8 Needle jet**

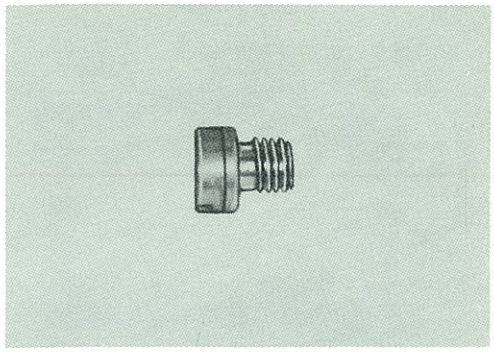


**Fig. 8-25-9 Main jet**

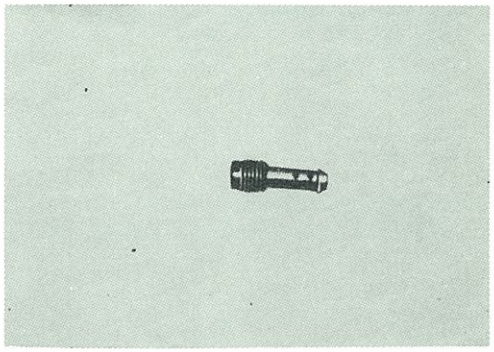


**Fig. 8-25-10 Pilot jet**

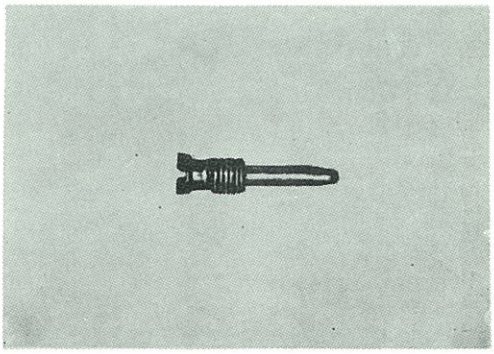


**Fig. 8-25-11 Pilot air adjusting screw**

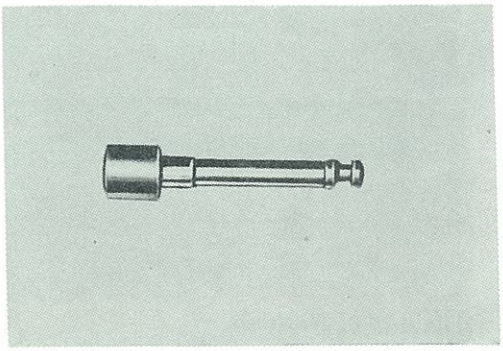


Fig. 8-25-12 Starter plunger

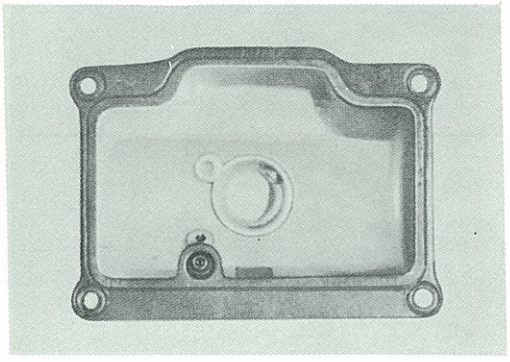


Fig. 8-25-13 Starter jet

G, Starter plunger

The starter plunger is a kind of valve which controls the starter systen. If it is raised the passages for air and fuel are opened and a rich fuel/air mixture enough to start the coldest engine is dispensed. If it is lowered to the bottom, the passages are clossed.

H. Starter jet

The starter jet, which is press-fitted to the float chamber bowl, determines the amount of fuel supplied to the starter system. Starter jet is also numbered according to the amount, measured in cubic centimeters, of fuel which can flow through it in one minute.

I. Air jet

The air jet meters the bleed air which flows into the primary chamber of the needle jet and atomizes the fuel sucked up through the main jet.

J. Throttle valve adjusting screw

The throttle valve adjusting screw determines the minimum opening of the throttle and regulates the rpm of the engine when it is idling. Turning the throttle valve adjusting screw in lowers the engine rpm, while turning it out raises the same.

## 8-25-2. Specifications

| | |
|---|---|
| Main jet | 150 |
| Air jet | ——— |
| Jet needle | 5FP8—3 |
| Needle jet | P-4 |
| Throttle valve cutaway | 2.5 |
| Pilot jet | 30 |
| By-pass | 1.4 |
| Pilot outlet | 0.6 |
| Pilot air adjusting screw | 1 1/4 |
| Valve seat | 2.5 |
| Starter jet | 70 |

## 8-25-3. Removing

1. Disconnect the plunger lever link from the left plunger lever by loosening a fitting screw with pliers.
2. Loosening carburetor front and rear clamp screws with a cross head screw driver, and pull the left carburetor toward you to remove it from left cylinder.
3. Remove the fuel line clips with nose pliers and take off the fuel lines and boost tube.
4. Loosen the mixing chamber caps with a screw driver and pull from the carburetors along with the throttle valves, jet needles and jet needle clips.

## 8-25-4. Disassembling

1. Remove four fitting screws with a cross head screw driver and separate the float chamber body from the mixing chamber body.
2. The float can be removed from the mixing chamber body.
   Be careful not to bend or raise the float tongue which contacts the needle valve and controls closing and opening of the fuel passage, as

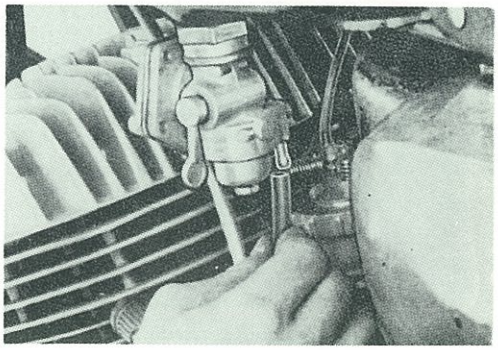


Fig. 8-25-14 Removing fuel line clip

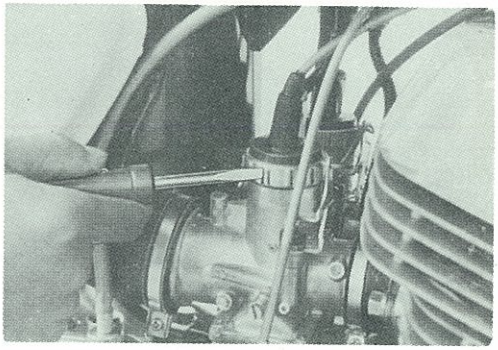


Fig. 8-25-15 Removing mixing chamber cap

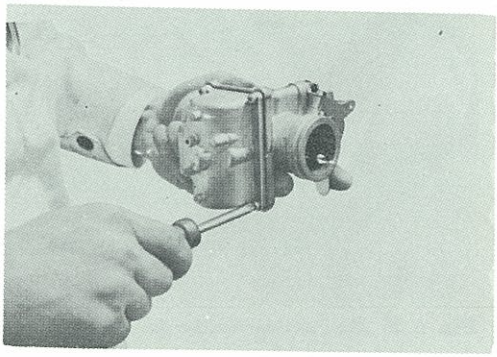


Fig. 8-25-16 Loosening four fitting screws

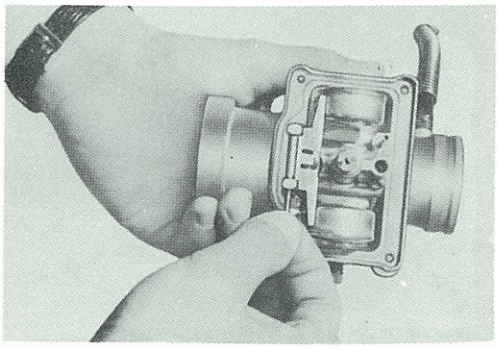


Fig. 8-25-17 Removing float pin

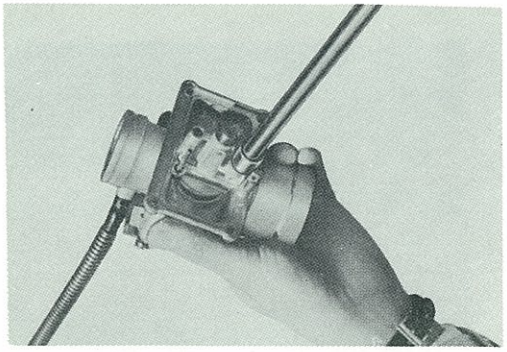


**Fig. 8-25-18 Removing needle valve seat**

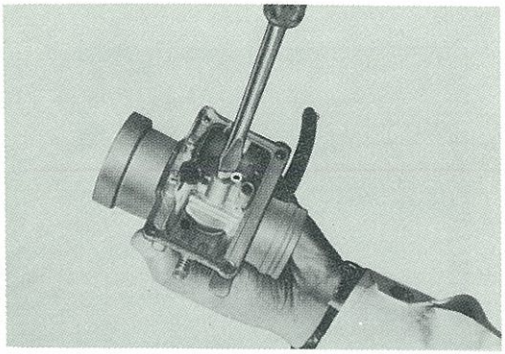


**Fig. 8-25-19 Removing main jet**

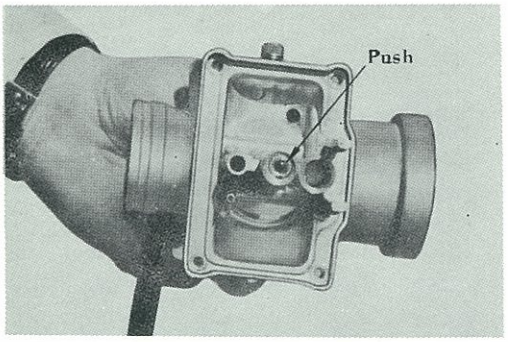



**Fig. 8-25-20 Pushing needle jet out of position**

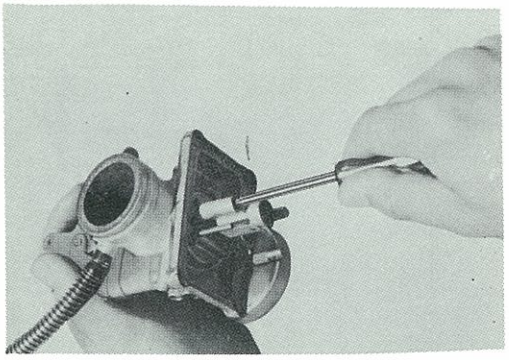


**Fig. 8-25-21 Removing pilot jet**

change in the float tongue angle causes an incorrect fuel level, resulting in maladjusted carburation.

Remove the needle valve by hand.

Remove the needle valve seat with a 10 mm wrench, and then remove the gasket.

Remove the main jet with a screw driver, and the needle jet stop washer.

5. Push the needle jet out of the top of the body.
6. Remove the pilot jet with a small screw driver.
7. Remove the pilot air adjusting screw and spring with a screw driver.

## 8-25-5. Inspecting and servicing

1. Wash all parts with cleaning solvent and dry.
2. Blow compressed air through all jets and passages to make sure they are not clogged.
   Do not use wire, etc. to clean them, as this can damage the parts.
3. Check the float chamber gasket for damage and wear, and replace if needed.
4. Insert the throttle valve in mixing chamber and check for play to see if the throttle valve is worn. Replace a worn, scored or scratched throttle valve.
5. Check the needle valve tapered end for wear. As the needle valve repeatedly contacts with the valve seat to keep the fuel level correct, the tapered end of the needle valve is apt to wear. If the needle valve is worn, there will be a gap between the valve seat and needle valve even when the float tongue pushes the needle valve. Fuel will flow into the carburetor continuously and overflow. Check to see if the needle valve contacts with the valve seat properly when disassembling the carburetor. Replace the needle valve if needed. To check, refit the valve seat, needle valve and float to the mixing chamber body, and then connect the fuel line to the fuel cock. Push the float with a finger until the tongue pushes the needle valve. Turn on the fuel cock. If fuel flows into the carburetor, the needle valve is worn. In most cases, however, fuel overflow is caused by a foreign matter caught between the valve seat and needle valve. Therefore the filter screen of the fuel cock must always be kept in good condition.
6. A damaged float also causes fuel overflow. Shake the float to see if there is fuel inside. If there is, the float leaks and must be replaced. Do not use compressed air for cleaning an assembled carburetor, because there is possibility of gollapsing the floats. This will result in a rich mixture.

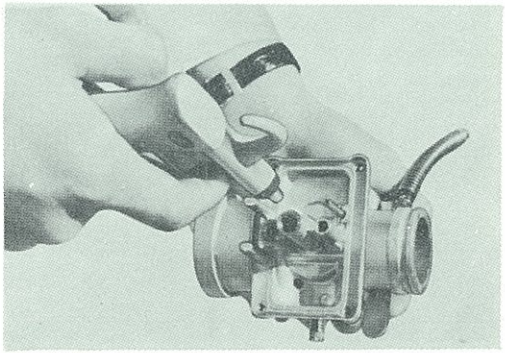


**Fig. 8-25-22 Blowing compressed air**

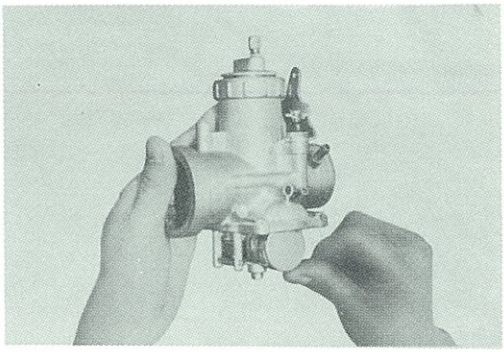


**Fig. 8-25-23 Checking needle operation**

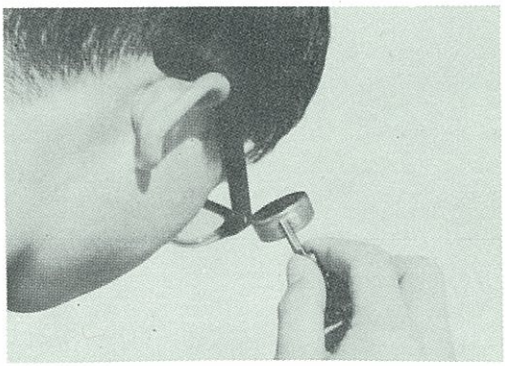


**Fig. 8-25-24 Checking float for leakage**

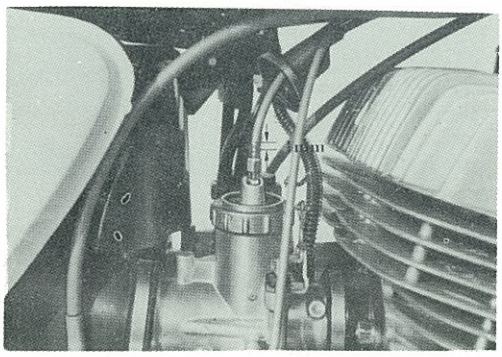


Fig. 8-25-25 Checking throttle cable play

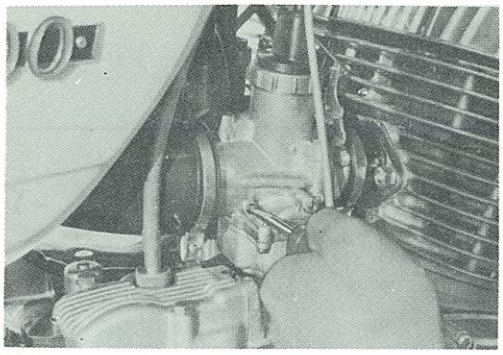


Fig. 8-25-26 Adjusting pilot air adjusting screw

## 8-25-6. Adjusting idling

A. Preparations

1. Make sure the jet needles are clipped into the third grove from the top.
2. At fuel throttle, adjust play in both the right and left throttle cables to 0.5~1.0 mm (0.02~0.04 in) with the throttle cable adjusters on the top of the carburetors. If the throttle cables are not adjusted equally, the engine rpm will differ when the throttle grip is moved slightly from the idling position.

   Further, if the play in the two cables differs considerably, the engine rpm at medium and high speeds will differ.
3. Warm the engine up for a few minutes.

B. Adjusting

1. Remove the spark plug cap on one cylinder.
2. Turn the pilot air adjusting screw on the other side down to the bottom, then turn it back out 1 1/4 turns.
3. Start the engine, which, of course, will fire on only one cylinder since the spark plug cap is off of the cylinder other than one being adjusted.
4. Adjust the throttle valve adjusting screw until the engine runs at its lowest rpm.
5. Turn the pilot air adjusting screw in and out within the range of 1/4 of a turn from the standard setting (**1 1/4 turns** out from the bottom). The engine rpm will increase and decrease in accordance with the turning of the screw. Find the position where the engine runs regularly and smoothly at the lowest rpm, and fix the screw there.
6. After adjusting the pilot air adjusting screw, adjust the throttle valve adjusting screw again and determine the engine idling speed while running on one cylinder.
7. When one cylinder has been adjusted, adjust the other cylinder in the same manner.
8. After adjusting the two carburetors separately, operate both cylinders at the same time.
   Idling rpm will be rather high. Turn both throttle valve adjusting screws in the same amount and adjust the idling rpm.

The engine idling speed should be as low as possible (about **1,500 rpm**).

C. Balancing right and left cylinders

The right and left carburetors can be adjusted by adjusting the throttle cables, pilot air adjusting screws and throttle valve adjusting screws, but if the density or amount of exhaust fumes from the two cylinders is not the same adjust the engine in the following manner:

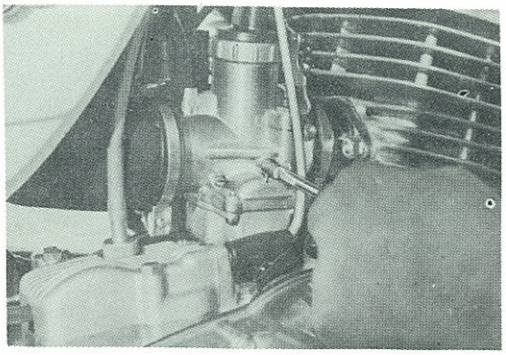


**Fig. 8-25-27 Adjusting throttle valve adjusting screw**

1. Gradually turn the pilot air adjusting screw out on the cylinder which exhaust richer fumes.
2. Turn the pilot air adjusting screw in gradually on the cylinder which exhausts leaner fumes.
3. The amount to turn each screw depends on the condition of the engine, but do not turn the screw in beyond the position where it is turned out 1 1/4 turns from the bottom and do not turn it out where it is more than 1 3/4 turns from the bottom.
4. Keep the difference between the position of the two screws to within one full turn.
   An excessive difference causes over-heating or increases fuel consumption.

## 8-25-7. Adjusting fuel/air mixture

A. Checking mixture

Too rich or too lean fuel adversely affects engine performance. The fuel/air mixture can be adjusted by adjusting carburetor settings. Check to see that the fuel and air is properly mixed.

1. Symptoms of too rich mixture.
   a. Exhaust fumes are dense and bluish white in color.
   b. The motorcycle feels sluggish when running.
   c. The spark plug is wet and dirty and becomes black in color. (The same condition is produced if too cold a plug is used or the motorcycle is always ridden at extremely low speeds. Replace with a NGK B-7HC plug.)
   d. The engine runs smoothly if the starter channel is opened.
2. Symptoms of too lean mixture
   a. The engine will not idle smoothly.
   b. Engine rpm fluctuates even if the throttle grip is held steady.
   c. The engine is apt to overheat.
   d. The spark plug becomes white in color. (The same condition is produced if too hot a plug is used or the motorcycle is always ridden at extremely high speeds. Replace with a NGK B-8HC plug.)
   e. The engine will run smoothly if the starter channel is opened.

B. Adjusting for various speeds

1. High speeds

   A clogged main jet or needle jet can cause too lean a mixture, while a clogged air jet or loose main jet too rich a mixture. Therefore, make sure they are in good condition before adjusting the main jet.

   From 3/4 to full throttle opening, the mixture ratio can be adjusted by the main jet.

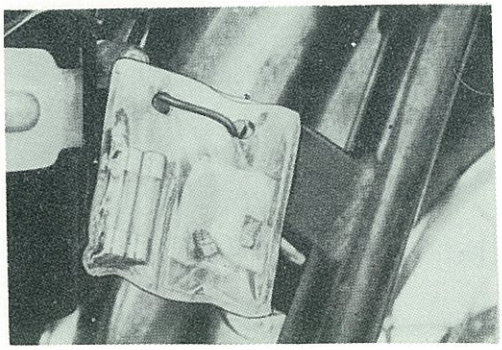


**Fig. 8-25-28 Main jet for adjustment**

When the throttle grip is turned back slightly from the full throttle position, if the engine rpm increases the fuel mixture is too lean and if it decreases the mixture is proper or too rich.

When the mixture is too lean, use a higher numbered main jet than the standard #150.

When the mixture is too rich, use a lower numbered main jet. Suzuki distributes two #147.5 main jets with every T500—II machine. They are provided in the fuse bag inside the frame right cover, and should be used in place of the standard-fitted main jets in case the mixtures is too rich.

Before distributing a motorcycle to a customer, be sure to check the mixture from 3/4 to full throttle opening and replace the main jets if needed.

2. Medium speeds

A clogged air jet, worn jet needle or needle jet, or loose main jet can cause too rich a mixture and a clogged main jet too lean a mixture. Make sure they are in good condition before adjusting the jet needle.

From 1/4 to 3/4 throttle opening, the mixture ratio can be adjusted by changing the position of the jet needle or by the throttle valve cutaway.

a. Adjusting with jet needle

There are five grooves at the upper part of the jet needle and they are counted from the top to the bottom, first, second, etc.

If the exhaust fumes are bluish white caused by a too rich fuel mixture, lower the jet needle one notch by fitting the clip in the top groove. The third groove is standard setting.

If the engine seems to be dragging when the motorcycle is accelerating or running, it indicates that the fuel mixture is too lean. Raise the jet needle by one notch.

b. Adjusting with throttle valve cutaway

A higher numbered throttle valve cutaway gives a leaner mixture and a lower numbered one a richer mixture. The standard throttle valves cutaway for the T500—II is #2.5.

A different size throttle valve cutaway, however, seriously affects engine operation below 1/4 throttle opening.

Do not change the throttle valve cutaway unless it is urgently necessary.

c. Low speeds

A clogged pilot air passage or clogged pilot jet bleed holes can cause too rich a mixture and a clogged pilot jet or pilot outlet too lean a mixture. Make sure they are not clogged.

From 1/8 to 1/4 throttle opening, the mixture ratio can be adjusted with the pilot air adjusting screw. Refer to the Adjusting idling section above.

| Throttle Opening | Too Rich Fuel | Too Lean Fuel |
|---|---|---|
| 0~1/8 | Turn pilot air adjusting screw out | Turn pilot air adjusting screw in |
| 1/8~1/4 | Use throttle valve with larger cutaway | Use throttle valve with smaller cut-away |
| 1/4~3/4 | Lower jet needle | Raise jet needle |
| 3/4~full | Use smaller numbered main jet | Use larger numbered main jet |

* **Refrain from replacing the throttle valve if possible and use other methods to adjust the carburetor.**

# 9 CHASSIS

CONTENTS

## 9-1 Fuel Tank

The fuel tank capacity is 14 liter (3.7/3.1 gal, Us/Imp) including a reserve supply of 2 liter (4.2/3.6 qt, Us/Imp)

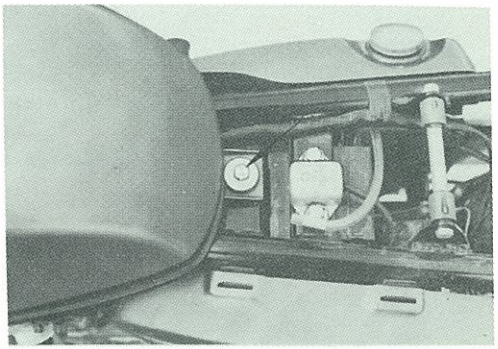


Fig. 9-1-1 Removing fuel tank

### 9-1-1 Removing and installing

1. In removing the fuel tank, dual seat set bolt shall be loosened by a wrench, 14 mm. After removing the seat, fuel lines shall be taken off the fuel cock. Fuel tank rear set bolt shall be unfastened by a 14 mm wrench, to extract the fuel tankward.
2. As for the front setting portion of the fuel tank, fuel tank shall be fitted over the mounting rubber on the boss of the frame.

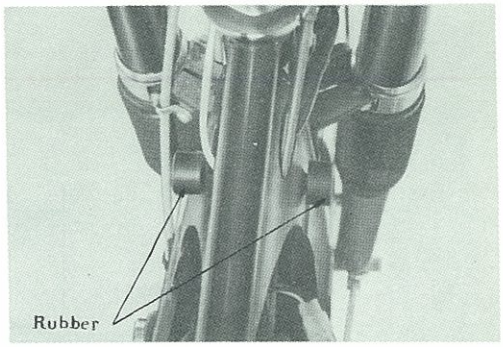



Fig. 9-1-2 Fuel tank mounting rubber

## 9-2 Fuel Cock

The T500 – II 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 ", " Reserve ", and " Priming ". 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.

The outstanding virtues of the diaphragm cock:

1. There is no need to close the fuel cock manually for prevention of overflow when parking the motorbike.
2. There is no danger of a fire in the event of a fall because the fuel tap is closed automatically.

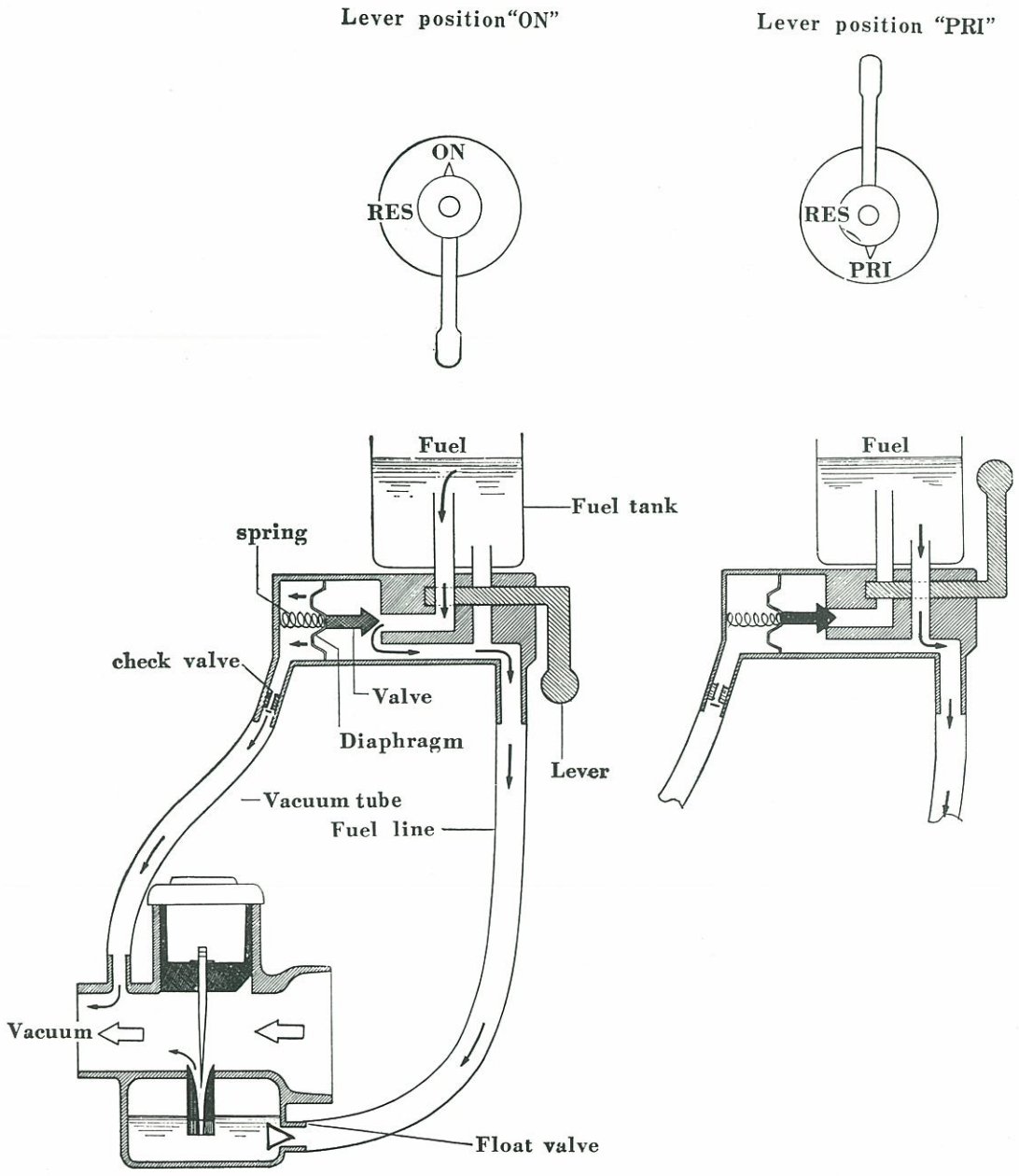



Fig.9-2-1 Fuel cock operation

Caution:

Don't disassemble the vacuum chamber, as the components thereof are precisely assembled and the diaphragm valve system may not work properly after they are reassembled.

Importance:

Don't allow the fuel cock to stay in the "priming" position for longer than one minute as the crankcase may fill with fuel. Damage to the engine connecting rod, piston, and seals can result from hydrostatic lock.

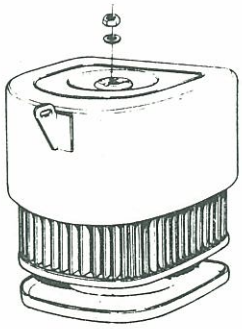


Fig.9-3-1 Sectional view of air cleaner

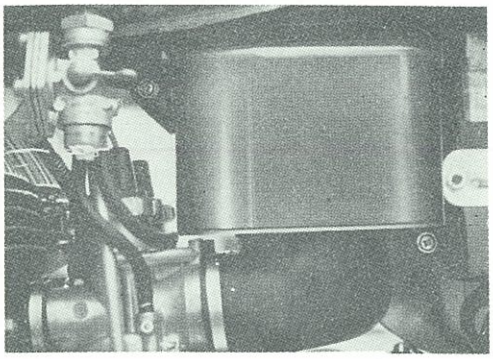


Fig. 9-3-2 Air cleaner fitting bolts

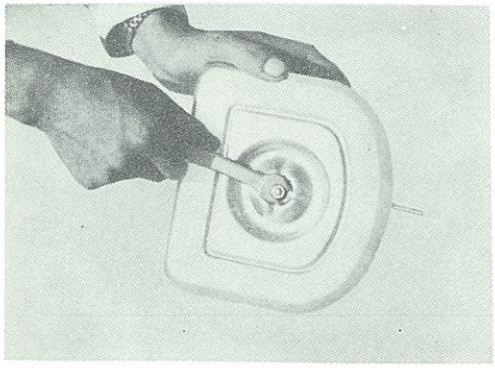


Fig. 9-3-3 Removing element

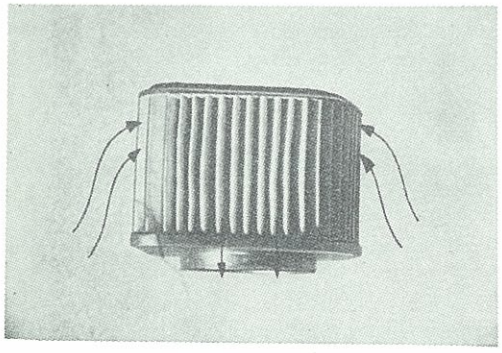


Fig. 9-3-4 Intake air in element

## 9-3 Air Cleanner

Air cleaner has an element, which inhales the air by means of the negative pressure of engine, and sends the filtered and cleaned air to the carburetor.

### 9-3-1 Removing

1. After removing the frame left cover, air cleaner front tube fitting screws shall be taken off by cross head screw driver, and two clamping bolts for the air cleaner shall be loosened by a 10 mm wrench.
2. Remove the air cleaner tube from the air cleaner by loosening the rubber tube clamp fitting screw with a cross head screw driver and then remove the air cleaner element by loosening the air cleaner center fitting bolt with a 10mm wrench.

### 9-3-2 Servicing

Dust and dirt collected on the outside of the air cleaner element increase resistance to air flow and decreases engine power.

1. Clean the air cleaner element every 3,000 km (2,000 mi) and more frequently when riding in dusty areas. Never run the motorcycle without the air cleaner mounted. To clean the element, blow out dirt and dust from inside and outside the element by using an air gun.
2. Do not wash the air cleaner with gasoline or water which clogs the element and ruins it.
3. When the air cleaner element is exceedingly dirty, replace it with a new one.

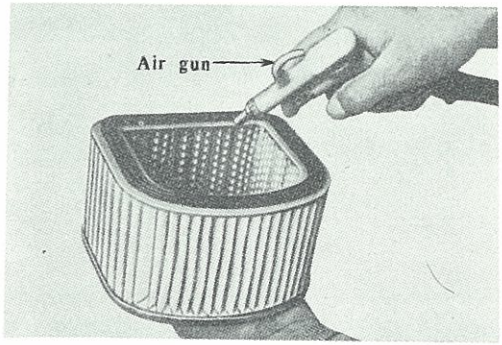



Fig. 9-3-5 Clean element

## 9-4 Oil Tank And Outlet

The capacity of the oil tank is 1.8 liter (1.9/1.6 qt, Us/Imp) and on the oil tank is fitted a small inspecting eye. A breather hose is installed to relieve vacuum.

At the bottom of the oil tank is installed an oil outlet. And the magnet piece in the strainer cup of the oil outlet attracts foreign matter from oil, resulting in sending pure oil to the oil pump.

Caution :

Don't pinch breather hose when servicing motorcycle. This hose insures free flow of oil from tank.

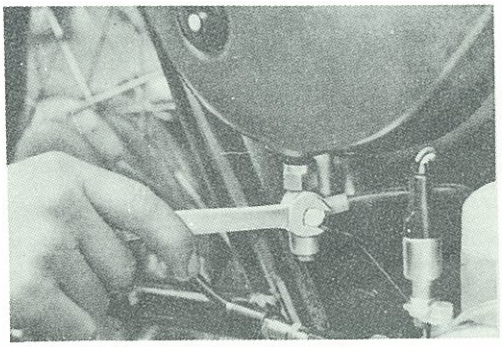


Fig. 9-4-1 Removing oil pipe

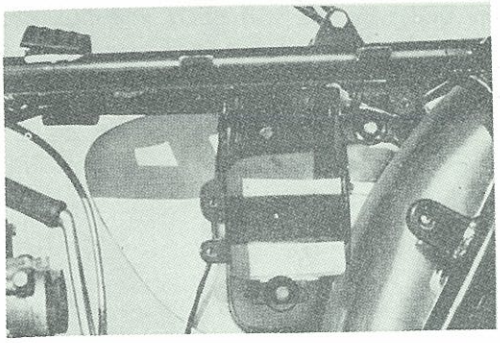


Fig. 9-4-2 Oil tank fitting bolts

### 9-4-1 Removing

1. Remove the oil pipe from the outlet with a 8 mm wrench and in case that oil is in the oil tank, fit a 6 mm screw or bolt into the oil outlet to prevent oil from flowing out.
2. To take off the oil tank remove the three bolts which are inside the frame with a 10 mm wrench.
3. Remove the oil outlet with a 17 mm wrench first and then remove the strainer cup from the oil outlet with a 10 mm wrench.

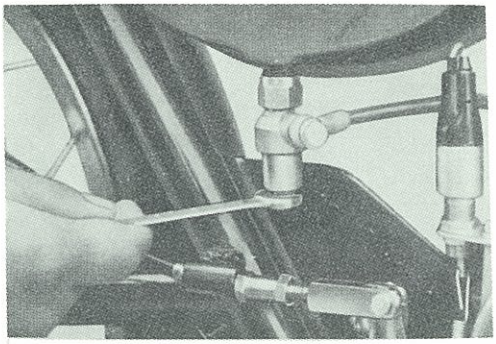


Fig. 9-4-3 Removing strainer cup

### 9-4-2 Servicing

1. Check to see that the breather pipe is not clogged. Because if the breather pipe of tank is clogged, it prevents oil from flowing smoothly.
2. A magnet is fitted in the oil tank outlet strainer cup to attract foreign matter in the oil tank. Remove foreign matter from the magnet every 3,000 km (2,000 mi) to clean the oil outlet strainer and oil strainer with compressed air or gasoline. with compressed air or gasoline.
3. After installing the oil tank, secure breather pipe with the fitting band above the battery so carefully as not to be bent.

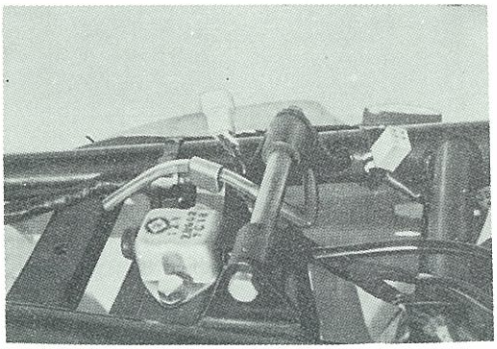


Fig. 9-4-4 Checking oil breather pipe

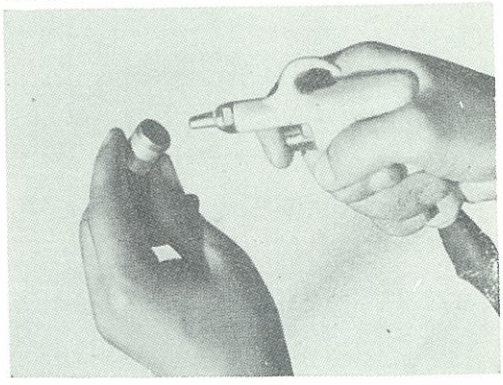


Fig. 9-4-5 Clean strainer

## 9–5 Steering Damper

The unit is equipped with the friction disc so that the handle may be turned easily or with difficulty to meet the road condition. By virtue of its frictional force, steerage can be stabilized.

When the knob on the steering is turned to the right, frictional force is increased to make it difficult to operate the handle. When it is turned to the left, meanwhile, the operation becomes easy.

### 9–5–1 Removing

First extract the steering damper pin below the steering under bracket with pliers, and then turn the damper knob to the left by hand until the threaded end of it is screwed out completely.

Finally pulling up the damper knob out of the frame neck, the steering damper components can be disassembled easily.

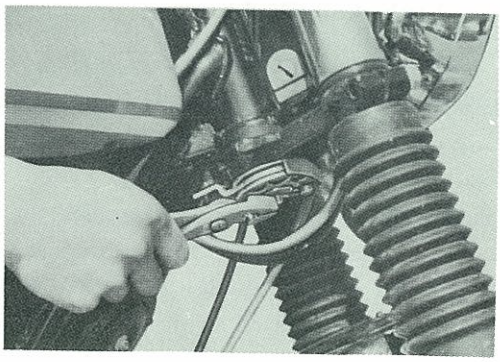
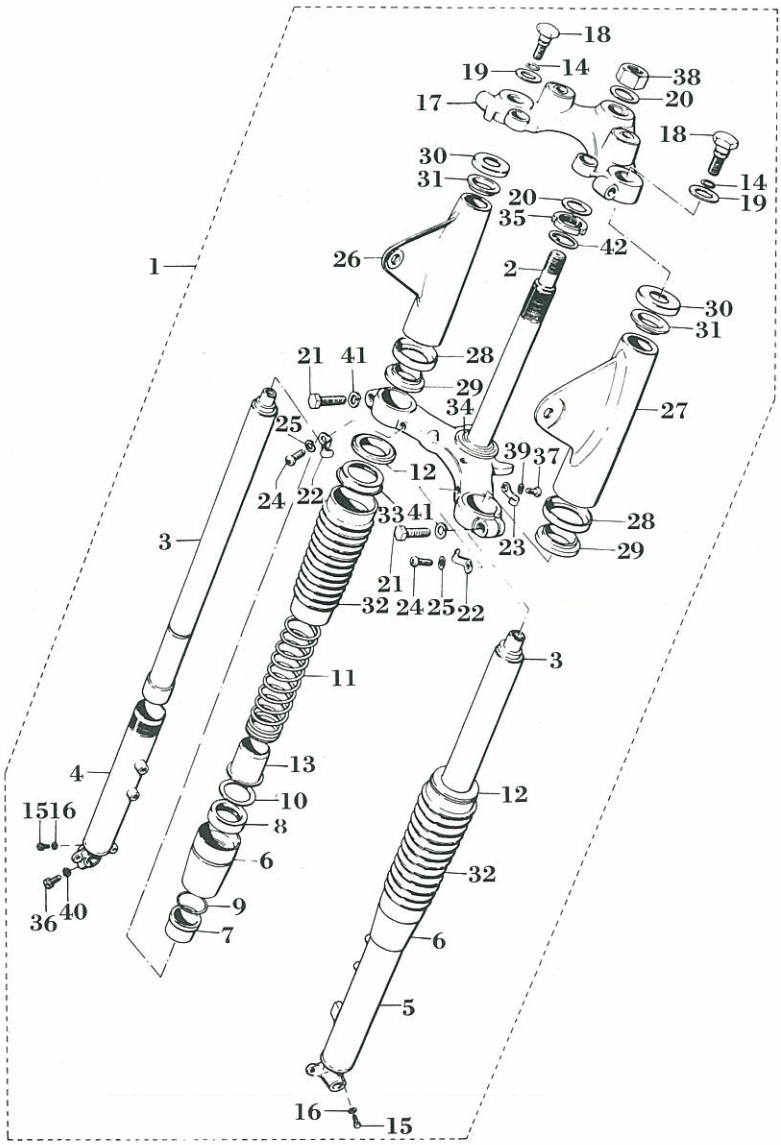


**Fig. 9–5–1 Removing damper pin**




1 Front Fork Ass'y
2 Steering Stem
3 Fork Inner Tube
4 Fork Right Outer Tube
5 Fork Left Outer Tube
6 Fork Outer Tube Nut
7 Fork Inner Tube Guide
8 Fork Oil Seal
9 Oil Seal Lower "O" Ring
10 Fork Spring Seat
11 Front Fork Spring
12 Fork Spring Spacer
13 Fork Dust Seal
14 Fork Fitting Bolt "O" Ring
15 Fork Oil Drain Plug
16 Fork Oil Drain Plug Gasket
17 Steering Stem Head
18 Fork Fitting Bolt
19 Fork Fitting Washer
20 Steering Stem Lower Washer
21 Fork Inner Tube Fitting Bolt
22 Speedometer Cable Clip
23 Brake Cable Clip
24 Cross Head Screw
25 Lock Washer
26 Head Lamp Right Bracket
27 Head Lamp Left Bracket
28 Head Lamp Bracket Seat
29 Head Lamp Bracket Shock Damper (A)
30 Head Lamp Bracket Cap
31 Head Lamp Bracket Shock Damper (B)
32 Fork Spring Cover Boot
33 Fork Spring Cover Boot Guide
34 Steering Outer Race
35 Steering Stem Lock Nut
36 Small Head Hexagon Bolt
37 Cross Head Screw
38 Small Hexagon Nut
39 Lock Washer
40 Lock Washer
41 Lock Washer
42 Steering Stem Lock Washer

Fig. 9-6-1 Exploded view of front fork

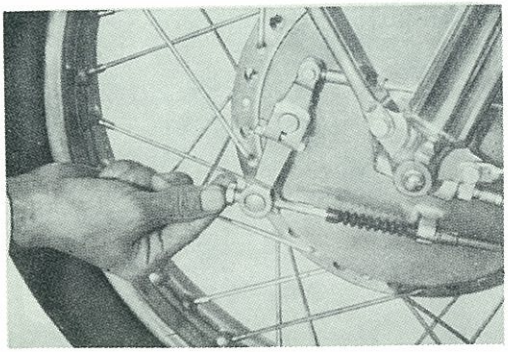


Fig. 9-6-2 Removing brake cable

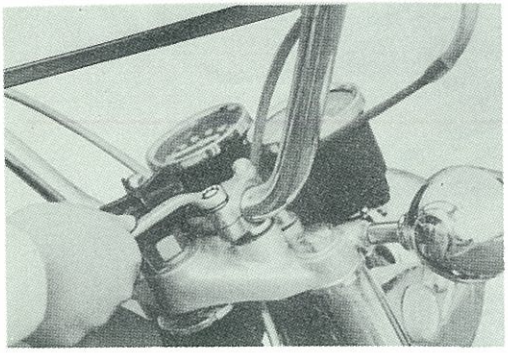


Fig. 9-6-3 Removing handlebar

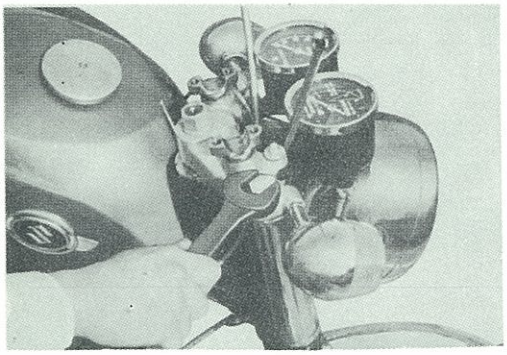


Fig. 9-6-4 Removing upper head

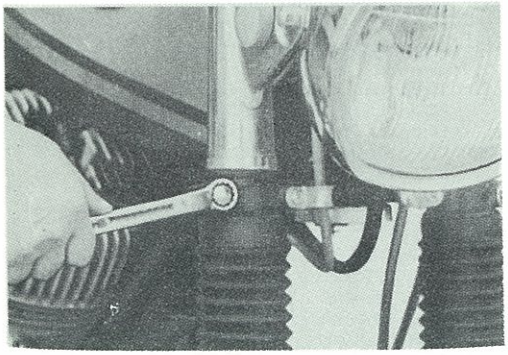


Fig. 9-6-5 Loosening inner tube fitting bolt

The front fork is constructed to support the front wheel and to absorb shock received by the front wheel to ensure safe steering during operation of the motorcycle.

The two legs which form the front fork are firmly fixed at three points, the steering stem head, steering stem and front axle.

### 9-6-1 Removing

1. After taking the front brake and speedometer cables off the front panel, the front fender shall be removed.
2. After taking the clutch, front brake and throttle cables off both handle ends, green and gray wires within the head lamp holder shall be disconnected. Four bolts of the handle holder shall be loosened by 12 mm wrench to remove the handlebar.
3. Steering head is equipped with the speedometer and tachometer. Therefore, their cables shall be taken off by pliers on the meter side.
   In order to remove the upper head, three bolts shall be loosened with 23 mm and 26 mm wrenches.
4. Two clamping bolts for the fork inner tube of steering stem shall be loosened with a 14 mm wrench to extract the outer tube downward.

### 9-6-2 Disassembling

1. Clamp the outer tube bracket in a vise and turn fork inner tube nut counterclockwise by using front fork inner tube nut special tool (09941-00110) and fork inner tube nut can be removed

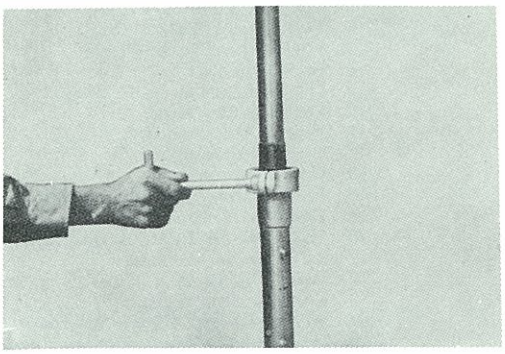


Fig. 9-6-6 Removing inner tube nut

together with oil seal from the outer tube.

2. If the oil seal is worn out or damaged, strike it out with a rod and a hammer and replace it with a new one.

### 9-6-3 Installing And Servicing

1. Screw the front fork assembling special tool (09940-30110) into the inner tube and pull it up tightly.

   Holding it pulled up tighten the fork inner tube fitting bolt firmly with a 14 mm wrench. Unscrew the special tool from the inner tube.

2. Motor oil, SAE #30, 220 cc. (0.462 US pint, 0.352 Imp. pint) shall be supplied from the top hole of each inner tube.

   When the front fork is filled with more or less oil than specified quantity, the function of the front fork may be lost. When the oil is too much, the stroke of the front fork is sometimes shortened and it becomes difficult to absorb external shocks. On the contrary, when the oil is too little, the front fork cannot stop stretching due to lack of oil, until the staged bottom end of the inner tube fits against the inner tube guide of the outer tube, causing a rattling noise.

   When no oil measuring cylinder is available, oil shall be gradually supplied to the guage level by using the oil level guage (09940-40111) as shown in Fig. 9-6-10. When the oil level is measured, on the main stand, motorcycle shall stand upright.

3. Front fork oil shall be fully drained by removing the drain plug and renewed at every 3,000 km (2,000 mi).

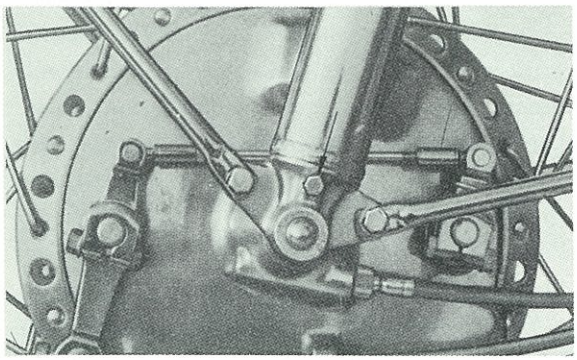


**Fig. 9-6-11 Fork oil drain plug**

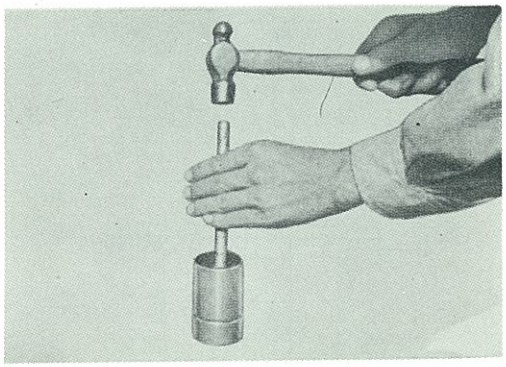


**Fig. 9-6-7 Removing oil seal**

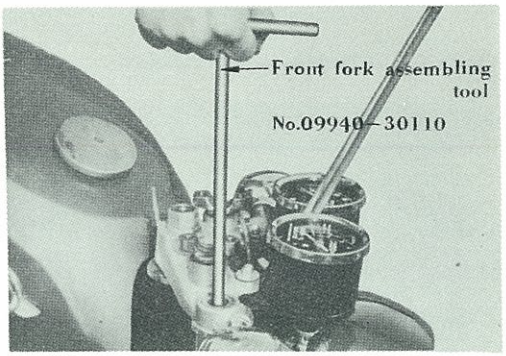



**Fig. 9-6-8 Pulling inner tube**

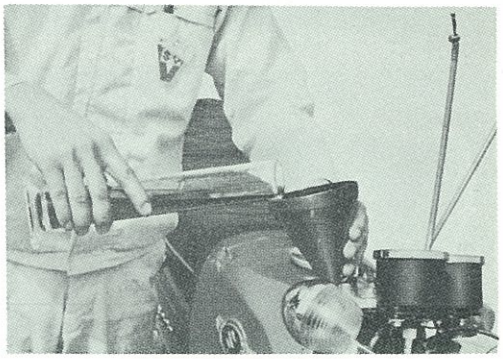
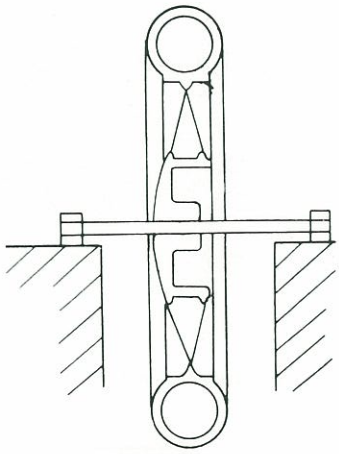


**Fig. 9-6-9 Pouring fork oil**


**Fig. 9-6-10 Measuring fork oil level**



Fig, 9-7-1 Checking wheel balanced

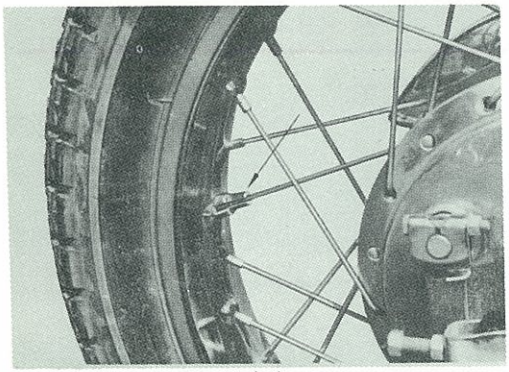


Fig. 9-7-2 Wheel balancer

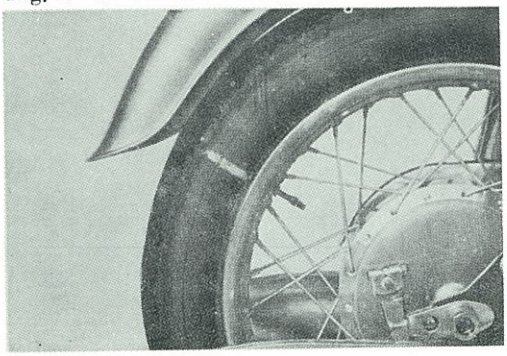


Fig. 9-7-3 Marking tire

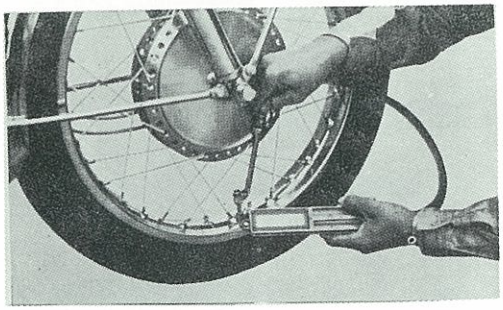


Fig. 9-7-4 Checking air pressure

## 9-7 Front and Rear Wheels

The front and rear wheels are balanced after the tires are fitted to ensure stability at high speeds.

### 9-7-1 Balancing wheel

Turn the wheel gently by hand and check the position where the wheel stops. Repeating this procedure several times, if the wheel always stops at the same position, fit a balance weight to the top of the wheel. Repeat until the wheel is balanced and does not stop at one position all the time. Balancing Weights of 20 grams and 30 grams are stocked as spare parts.

### 9-7-2 Caution

1. The inner tube valve side of the wheel is usually the heaviest, so balance weights must be fitted on the opposite side of it.
2. Remove the drive chain, before starting to balance the rear wheel.
3. Mark the tire at the position of the inner tube valve stem before replacing a puncture to prevent the wheel from becoming unbalanced. Align the mark with inner tube valve stem hole mounting the tire on the rim so the wheel remains balanced.

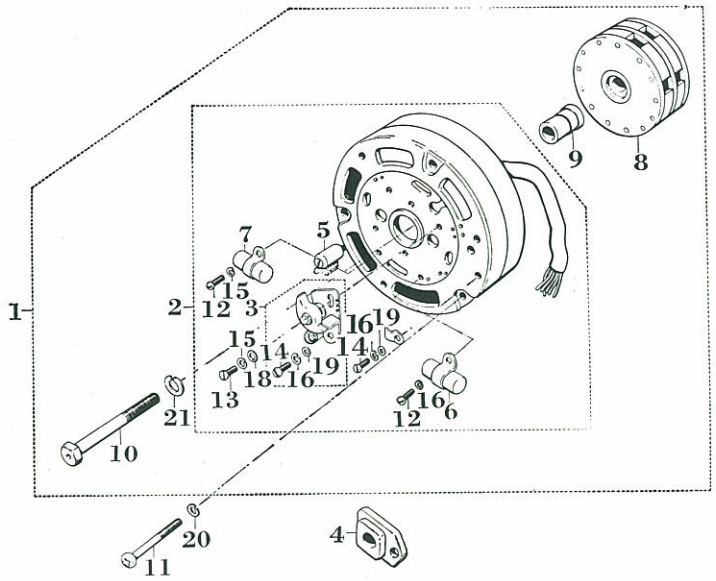
### 9-7-3 Air pressure

The tire size is 3.25-19 for the front, and 4.00-18 for the rear. Insufficient air presseure in the tires hastens tire wear and increases road resistance which increases fuel consumption and adversely affects the performance of the motorcycle. Soft tires also make smooth cornering difficult. Over-inflated tires decrease the areas of them in contact with the ground and cause skids when the brakes are applied as well as subjecting the tire to stress, which is bad for it. Hard tires also tend to throw the motorcycle into slides on corners. Be sure that tire pressure is correct at all time.

Front·····1.6 kg/sq cm (23 lb/sq in)
Rear·····solo riding·····1.9 kg/sq cm (27 lb/sq in)
dual riding·····2.3 kg/sq cm (33 lb/sq in)

# 10 ELECTRICAL EQUIPMENT

## 10-1 AC Generator

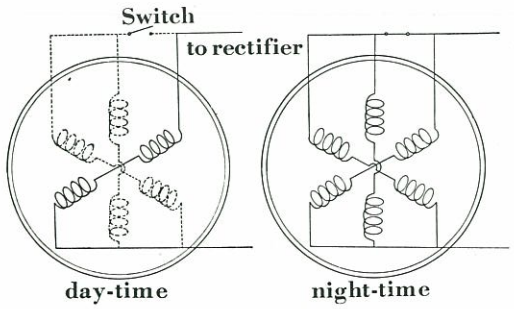



1 A.C.Generator Ass'y
2 Stator Ass'y
3 Contact Point Ass'y
4 A.C.Generator Wiring Harness Bushing
5 Cam Oil Felt Ass'y
6 Right Condenser
7 Left Condenser
8 Rotor
9 Contact Breaker Cam
10 Rotor Fitting Bolt
11 Strong Cross Head Screw
12 Slotted Pan Head Screw
13 Slotted Pan Head Screw
14 Slotted Pan Head Screw
15 Lock Washer
16 Lock Washer
17 Lock Washer
18 Lock Washer
19 Flat Washer
20 Lock Washer
21 Lock Washer

Fig. 10-1-1 Exploded view of generator

AC generator is featured by the followings: Its construction is so simple that it can be easily served. Its rotor is an inside running type, and generating coil can be laid outside. Therefore, the number of coils and turns can be increased, making the generating capacity larger.

As the generated current is alternating, battery cannot be directly charged. After being converted into direct current by rectifier, the current charges the battery, and is also supplied to the ignition system, head lamp, horn, etc.




A. day-time B. night-time

Fig. 10-1-2 A.C. generator wiring diagram

### 10-1-1 Construction

6-pole permanent magnet is pressed on the inside of rotor. Rotor is fitted on the tapered end of the crankshaft by means of the clamping bolt.

Six generating coils are incorporated into the stator in parallel, and produce electromotive force with the run of motor. When the ignition switch is placed on the daytime position, only two coils, $C_1$ and $C_2$ produce electromotive force as shown in the Fig.10-1-2 (A). When it is placed on the night position, however, switch " S " is closed (Fig.10-1-2 (B)), and all the coils, $C_1$-$C_6$ produce electromotive force to meet the electrical load, because the power is used for the head lamp and others.

### 10-1-3 Specification

| Manufacturer | Kokusan Denki |
|---|---|
| Type | EF 39 |
| Turning Direction | Counterclockwise |
| Air Gap | 0.5 mm (0.02 in) |
| Weight | 3 kg (6.6 lb) |
| Ignition Timing | 24°(3.4mm)before top dead center |
| Contact Point Gap | 0.3—0.4 (0.012—0.016 in) |
| Contact point pressure | 650—850 g (1.43—1.87 lb) |
| Condenser Capacity | 0.22—0.28 μF |
| Turning Speed | 500—8,000 rpm (momentary maximum rpm: 12,000) |

### 10-1-4 Inspection

1. Checking the broken coils
   Resistance between the yellow-green and red-green lead wires shall be checked by tester. When the resistance between the above both wires is approx. 0.6 Ω, it is normal. When it is more than the above value, coil is broken. Therefore, stator shall be replaced.
2. Checking the grounded coils.
   When there is no conductibility between the tester core and the stator coil lead wires colored with the yellow-green, red-green and green-white respectively, the coils are in normal condition. If any con ductibility is observed, coil is grounded. Therefore, coil shall be renewed.
3. As a magnet is pressed on the rotor inside, foreign matter would be often attracted to it. If the unit is used in such a status, foreign matter would fly out by virtue of centrifugal force to damage the rotor or disconnect the stator coil. Accordingly, surroundings and inside of the rotor shall be checked.

### 10-2 Ignition system

Power generated by the AC generator is stored in the battery. Power, which becomes high voltage by way of contact points, condenser and ignition coil, sets fire to the fuel mixture in the combustion chamber by means of spark plug, and becomes a source on the explosion stroke of the engine.

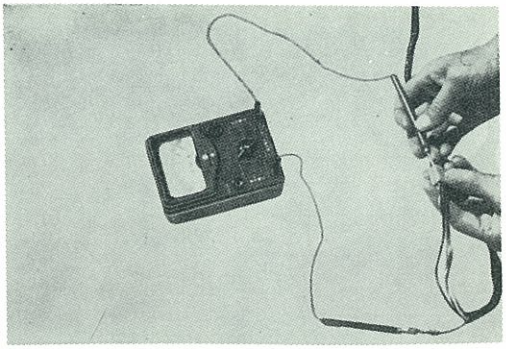


Fig. 10-1-3 Checking of stator coil

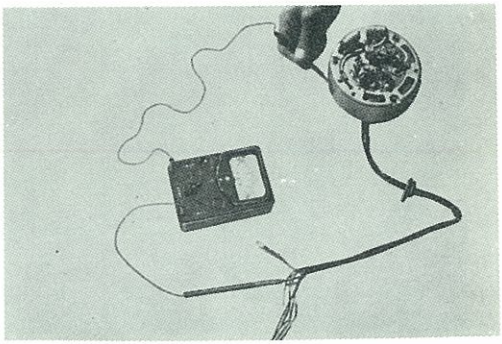


Fig. 10-1-4 Checking ground stator coil

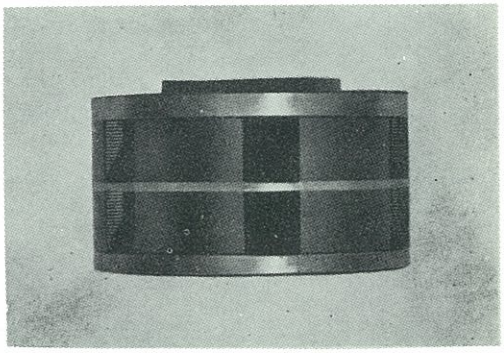


Fig. 10-1-5 Checking rotor

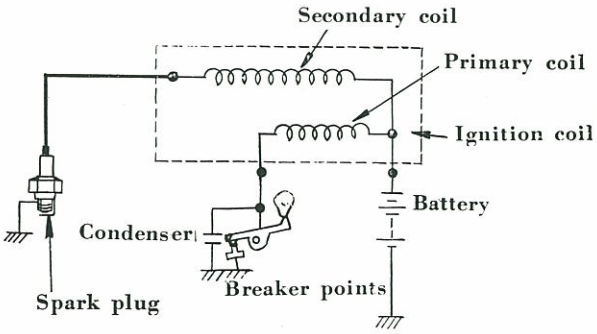



Fig. 10-2-1 Sectional view of ignition system

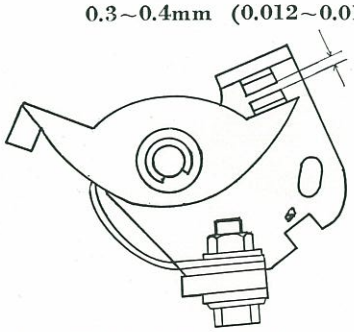



Fig. 10-2-2 Contact breaker

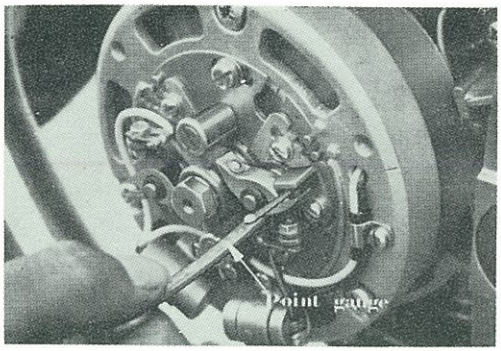



Fig. 10-2-3 Measuring point gap

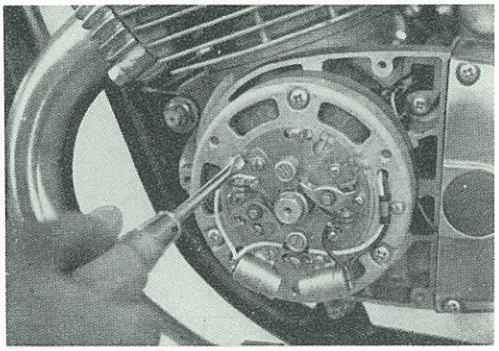


Fig. 10-2-4 Adjusting point gap

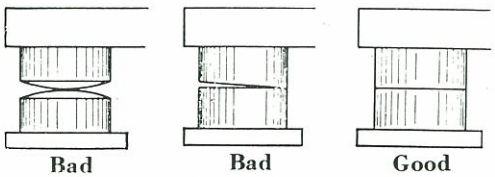



Fig. 10-2-5 Contact point

## 10-2-2 Contact breaker

The contact breaker installed on the stater is a kind of switch which cuts the primary current generated in the ignition primary coil by the action of a rotating cam outside on the rotor.

A. Point gap

To generate high voltage in the ignition coil, it is necessary to interrupt the flow of current in the ignition primary coil, and the flow of the current is interrupted when the contact points just open.

If the point gap is too small, the current is not interrupted completely because of the flying arc, and if too large, the absolute quantity of the primary current decreases.

In both cases high voltage cannot be produced. The standard contact point gap should be 0.3—0.4 mm (0.012—0.016 in). To measure the gap, use the thickness gauge.

If the contact point gap is larger than standard, first, loosen the screw (a), insert screw driver in slot (b) located on the contact base and then move the base to the right to adjust the gap to the standard. If the gap is smaller, move the base to the left.

B. Inspecting

After removing the moving point and the fixed point together and separating both contact points by removing the circlip on pivot, see if the point surfaces are burned or pitted. Polish them with an oil stone.

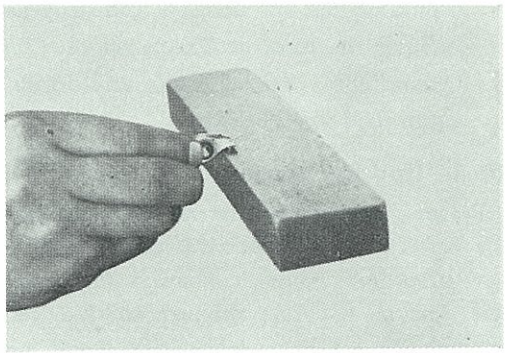


Fig. 10-2-6 Polishing points

### 10-2-3 Ignition coil

The ignition coils are installed under the fuel tank to obtain excellent cooling and increased insulation. Further, the arrangement of the parts leaves enough space so that the life of coils is prolonged.

A. Inspecting

1. Engine starts but does not run smoothly; check the performance of the ignition coil using an electro tester. Remove the spark plug cap (Right or left) from high tension cord. Connect the end of the high tension cord to the tester positive terminal and the spark plug to the tester negative terminal.

   Adjust the tester three prong gap until it reaches 6 mm (0.236 in). Check the spark for about five minutes. Open the gap to more than 6 mm. If the spark is still strong and blue, the ignition system is good.

   Note: 1. Use a new spark plug.
   2. Do not open the three prong gap over 8 mm (0.315 in), or coil damage will result.
   3. When starting the engine, set the three prong gap to zero.

2. Engine does not start

   In case the engine does not start despite of the correct gap of contact points, proper spark plugs and smooth flow of fuel to the carburetors, check the ignition coil as a unit by using a 12 volt battery as the electric source for the electro tester.

   a. Connect the ignition coil to be tested with the tester as shown in Fig. 10-2-9
   b. Turn up the spark test switch
   c. Turning the three prong gap dial, find the spark length of 6 mm to 8 mm which is most suitable for the test.

3. Don't run engine with coil high tension disconnected. Coil will be damaged.

### 10-2-4 Condenser

The condenser is necessary to prevent sparks from arcing in the contact points. A condenser is connected in parallel with the contact points to absorb electric energy and keep it from sparking in the contact breaker.

The condenser has a proper capacity to absorb

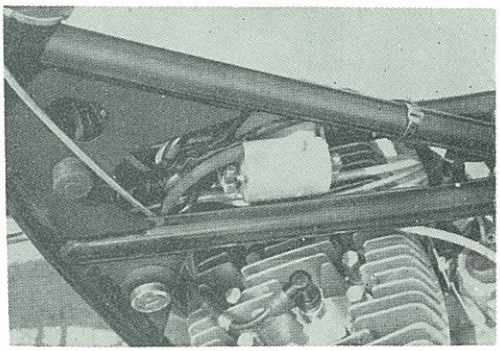


**Fig. 10-2-7 Position of ignition coil**

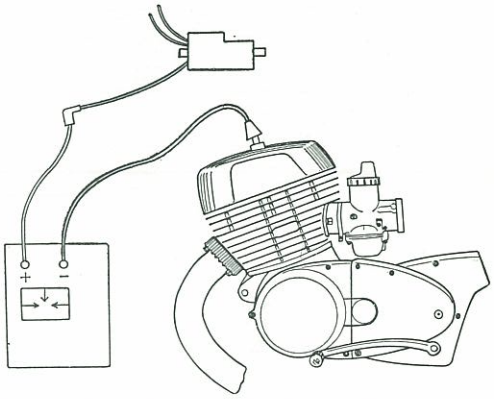



**Fig. 10-2-8 Checking ignition performance**

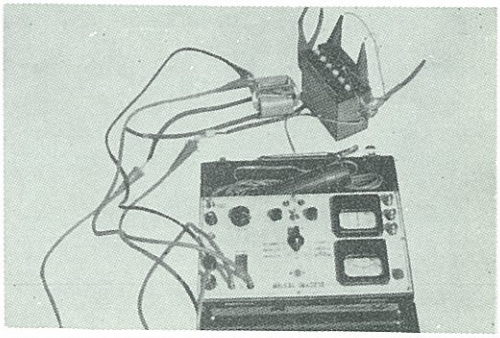


**Fig. 10-2-9 Testing ignition coil**

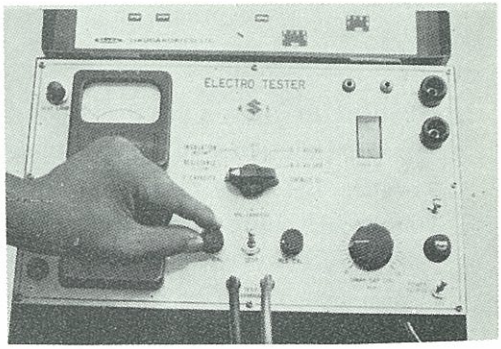



**Fig. 10-2-10 Adjusting capacity**

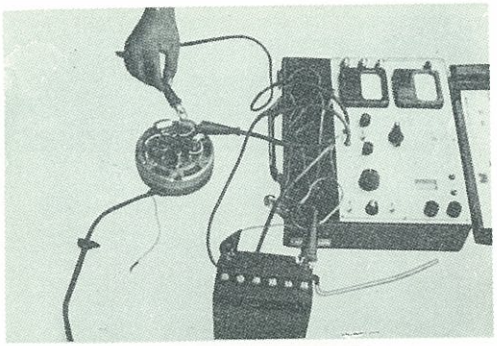


Fig. 10-2-11 Testing condenser capacity

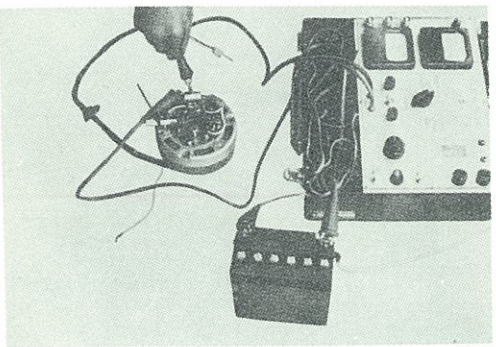


Fig. 10-2-12 Inspecting insulation resistance of condenser

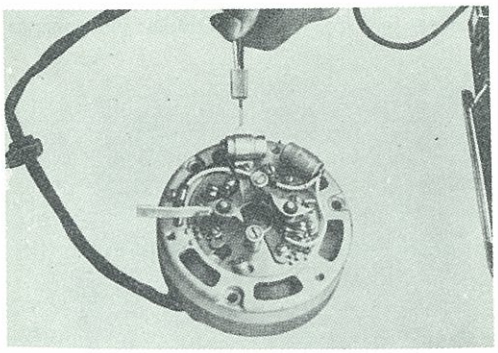


Fig. 10-2-13 Spark jumping of condenser

and charge electric energy. If the capacity is not sufficient, spark jumps between the contact points, burning them.

A condenser with too great capacity produces poor sparks in the spark plug.

The condenser must have a capacity of 0.22—0.28 $\mu$F.

A. Inspecting

Check the condenser performance as follows by using a 12 volt battery as the electric source for the electro tester.

° Measurement of capacity

1. Turn the selecter switch to " C Capacity " position.
2. Turn the tumbler switch (CAL-TEST) Up to " CAL " position, and turn the capacity adjustment knob (CAP-CAL) until the pointer of the meter comes to show the equivalent value to the capacity (inscribed in the name plate) of the standard condenser built in the electro tester.
3. Apply the test cords to the terminal marked " TEST-TERMINAL ", connect the condenser to be tested with the other ends of the cords, and turn the tumbler switch down, then the pointer will show the capacity of the condenser being tested.

| | |
|---|---|
| The capacity of the normal condenser | 0.22—0.28 $\mu$F |

° Measurement of insulation resistance

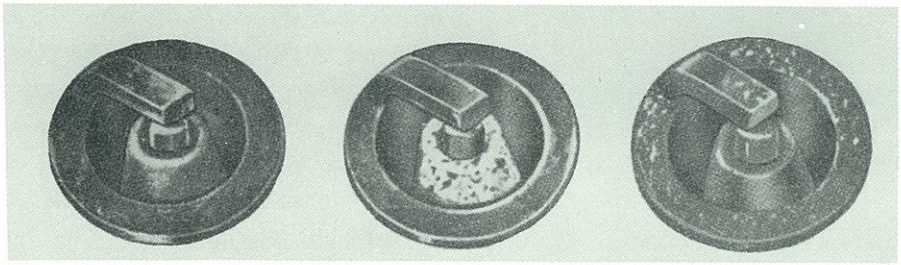
1. Turn the selector switch to " Insulation " (Meg-ohm).
2. Turn up the knob of the tumbler switch to " CAL " position and then turn the zero adjustment knob marked " RES. CAL " until the pointer of the meter comes to 0.
3. Be sure to insert a piece of paper between the contact points of the generator stator.
4. Connect the test-cord with the terminals mark " TEST TERMINAL ", turn down the tumbler switch, and apply the other ends of cord to the condenser to be tested. The pointer of the meter 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 insulation resistance of the normal condenser | Over the 10 Meg-ohm |

## 10-2-5 Spark plug

The standard spark plug for this engine is NGK B-77HC. If the spark plug is always wet with oil, use a hotter plug. If the spark plug is burned, use a colder plug. Check to see that the carburetor is working properly before changing spark plug. It is a very rare case when a hotter plug is required. Usually a wet spark plug is a sign of improper carburetion or ignition.



Good Burned Wet

**Fig. 10-2-14 Condition of spark plug**

| Hot type ←—— | Standard | ←—— Cold type |
|---|---|---|
| B-7HC | B-77HC | B-8HC |

A. Checking

Place the spark plug with cap connected on the cylinder head after removing from the spark plug hole.

Turn on the ignition switch and check to see that a strong blue spark jumps between the electrodes by turning the engine with the kick starter lever. In case no blue spark is produced, take the spark plug cap off of the high tension cord. Hold the end of the high tension cord about 4-5mm (0.16-0.20 in) away from a cylinder head, depress the kick starter lever smartly. If a spark jumps between the high tension cord and cylinder head, the plug is in bad condition. If not, the problem is in the preceding spots.

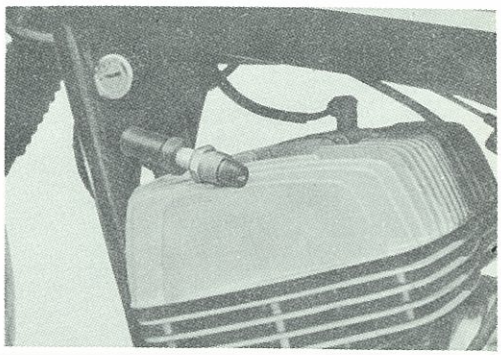


**Fig. 10-2-15 Checking ignition**

B. Servicing

1. Cleaning

Remove the spark plug from the cylinder head and clean off the carbon deposit. Use a spark plug cleaner, if available. If not, clean with a pin, wire, etc., but take care not to damage the insulator, clean any abrasive from the spark plug with solvent or gasoline.

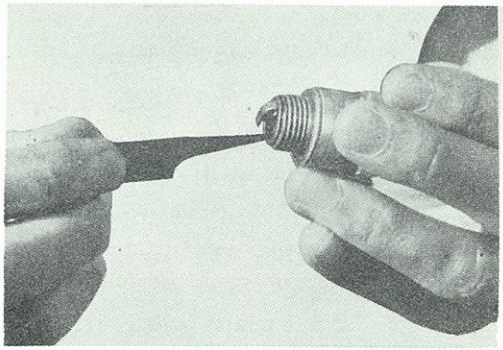


**Fig. 10-2-16 Removing carbon deposits**

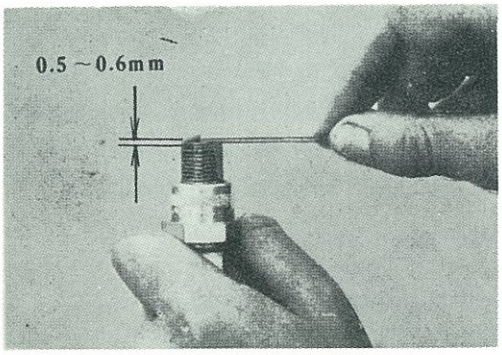



**Fig. 10-2-17 Checking spark plug gap**

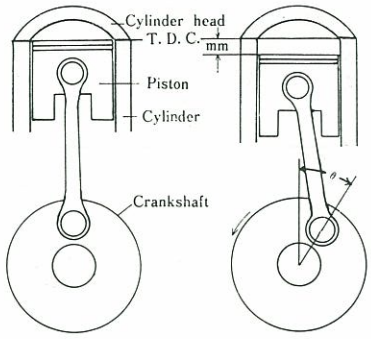



**Fig. 10-3-1 Ignition timing**

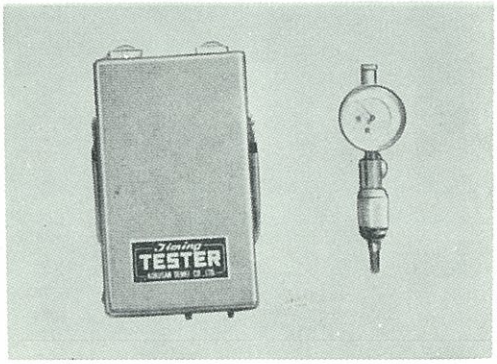



**Fig. 10-3-2 Checking tools of ignition timing**

2. Regapping

The gap between the center electrode and side electrode should be adjusted to 0.5 - 0.6 mm (0.020 - 0.024 in).

Electrodes wear during operation and the gap becomes larger. It is difficult for a spark to jump between the electrodes when the gap exceeds 0.6 mm (0.024 in) and engine performance decreases. If the center electrode is worn badly, replace the spark plug with a new one.

Adjust spark plug gap by bending the side electrode. Check and adjust spark plug gap every 1,000 km (600 mi).

## 10-3 Ignition Timing

Ignition timing is the most proper time to ignite the compressed gas in the compression process of the engine and is usually shown by the distance from T.D.C. down to the top of the piston when the contact point just begin to open. Improperly adjusted ignition timing not only causes decreased engine performance but also causes ahnormal noises in the engine and shortens the life of the engine. Adjust ignition timing carefully.

The relation between piston distance (mm) and crankshaft angle of T500 – II.

| Timing retards | | | Standard | Timing advance | |
|---|---|---|---|---|---|
| Piston distance (mm) | 2.86 | 3.13 | 3.40 | 3.67 | 3.95 |
| Crank angle | 22° | 23° | 24° | 25° | 26° |

### 10-3-1 Checking ignition timing

Before checking ignition timing, turn off the ignition switch and be sure that contact point gap is set at 0.35 mm.

A. Checking with timing gauge and timing tester

(1) Removing the spark plug from the left or right cylinder head, screw the timing gauge holder with the timing gauge inserted in it into the spark plug hole.

(2) Use the timing tester to find the moment the contact points begin opening.
Connect one of lead wires of a timing tester to the positive terminal of the black or white wire from contact points (right contact points for checking ignition timing of the right cylinder and left points for the left cylinder) and the other lead to somewhere on engine to ground it.

(3) Find out T.D.C. by turning the crankshaft slowly and adjust the dial gauge needle to "0" when the piston is at T.D.C.

(4) Turning slowly the crankhaft clockwise-in other words, in opposite direction of engine rotation, 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. If the reading is smaller than the 3.40 mm (standard), ignition timing is retarded and if larger, it is advanced. In either case, adjust it to the standard by moving the contact point base referring to paragraph 10-3-2, Adjusting.

B. Checking timing marks

1. Check with timing tester

Turn the crankshaft slowly to the left with 14 mm wrench. Use the timing tester to find the position that the contact points just begin to open. Check to see that at this position black and red timing marks on the rotor align perfectly with the timing mark on the stator. The ignition timing is correct if the maximum contact point gap is 0.35 mm (0.014 in).

Black mark: for right cylinder, right contact point

Red mark: for left cylinder, left contact point

2. Checking with timing lamp (Suzuki electro tester)

If the light of a timing lamp is thrown on the ignition timing marks with the engine running, the timing marks appear to stop at the position where the spark jumps in the spark plug.

Check to see that the marks on the rotor (Red and blue) align with the mark on the stator.

### 10-3-2 Adjusting

If the reading of the dial indicator in piston stroke is larger than 3.4 mm or timing mark B on the rotor is above pointer A on the stator the ignition timing is advanced.

If the reading is smaller than 3.4 mm or mark B is below A, the ignition timing is retarded. In either case, adjust the ignition timing to the standard.

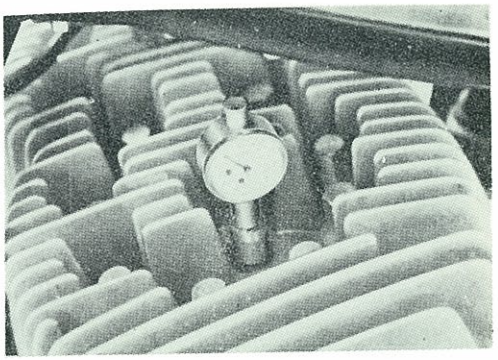


Fig. 10-3-3 Timing gauge

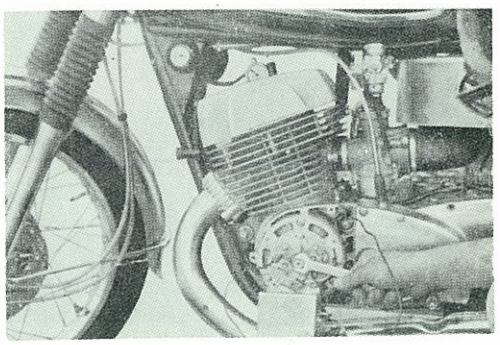


Fig. 10-3-4 Inspecting ignition timing

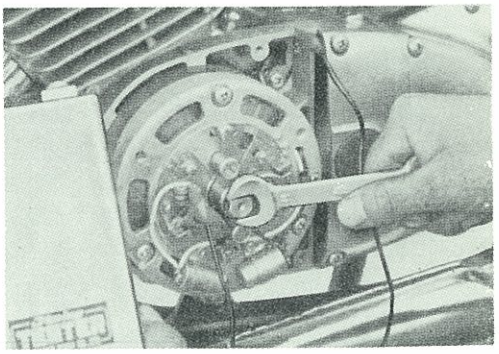


Fig. 10-3-5 Checking timing marks

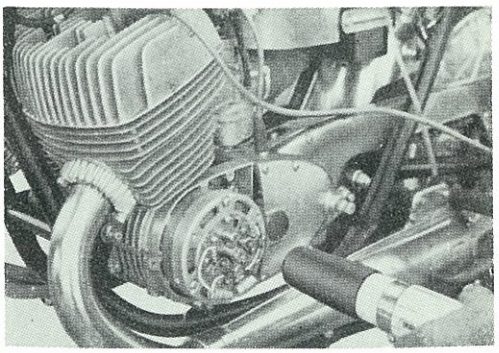


Fig. 10-3-6 Confirming ignition timing

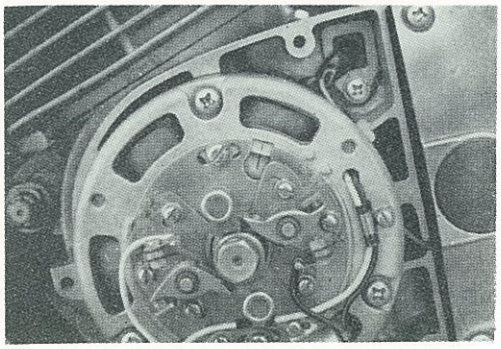


Fig. 10-3-7 Ignition timing marks

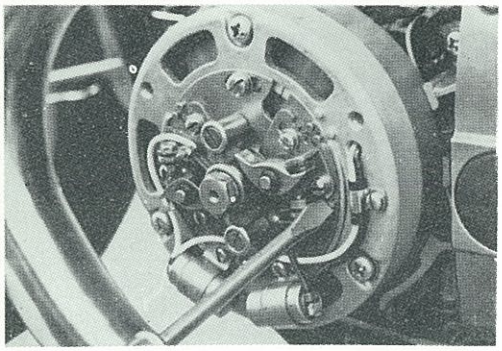


Fig. 10-3-8 Adjusting ignition timing

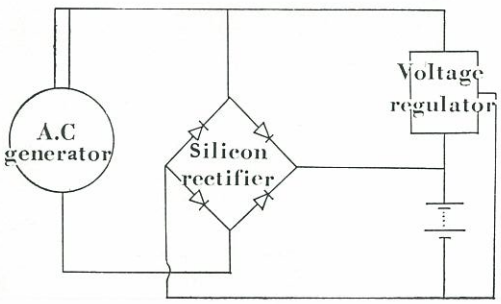



Fig. 10-4-1 Charging system wiring

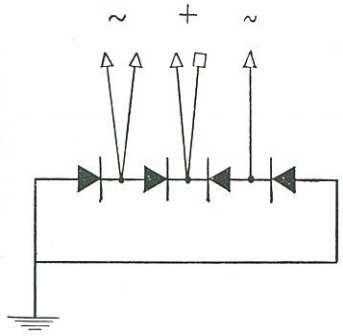



Fig. 10-4-2 Rectifier wiring

Loosen the screws (A, B) for adjustment of the ignition timing in the left cylinder or screws (C, D) for adjustment in the right cylinder. To adjust to the correct ignition timing, move the contact point bese to the right side with a screw driver when ignition timing is retarded and to the left side when ignition timing is advanced. Tighten the screws firmly after adjusting ignition timing.

## 10-4 Charging system

AC power generated in the generator is converted into the DC in the silicon rectifier, which is stored in the battery. It is then supplied to the ignition system, head lamp, etc. In order to prevent the overcharge of battery in case of the high-speed running, high-voltage current is adjusted to 15.8 - 16.6 volts in the voltage regulator. Thus the constantly stabilized current is fed to the battery.

### 10-4-1 Charging performance

Value in bracket ( ) shows that without voltage regulator connected.

| Item \ rpm | 1,500 | 8,000 |
|---|---|---|
| Charging current (day) | begin to charge | below 2A (below 3A) |
| Charging current (Night) when using head lamp beam (25w) | begin to charge | below 1.5A (below 3.7A) |

### 10-4-2 Silicon rectifier

A four diode silicon rectifier is installed, bridging the electrical circuit so that alternating current produced by the AC generator is rectified and direct current is supplied to the battery.

Electric current generated in the AC generator alternately change from positive to negative and from negative to positive, but this electric current is rectified by a full wave rectification to produce a direct current most effectually.

A. Inspecting

Connect the rectifier wire to a tester one by one. Check the conductivity in positive direction and negative direction in accordance with 1 to 4. If any of the four checks is not satisfactory, it indicates

that electric current is flowing in the reverse direction from what it should. Replace the rectifier with a new one as this indicates the rectifier is defective.

1. yellow/green red
2. ground red/green
3. red/green red
4. ground yellow/green

Example:

When conductivity from yellow/green to red is checked and red to yellow/green conductivity is found, the rectifier is defective.

## 10-5 Voltage regulator

Voltage regulator above the battery controls the voltage so that the constant-voltage current may be supplied to the electrical equipment. The specified voltage regulated is 15.8—16.6 volts. It is an electronic relay without any mechanically working mechanism, which utilizes the special property of semiconductor.

This regulator is characterized by its compactness and light weight, simple setting, stabilized value of the regulated voltage, and its semipermanent life.

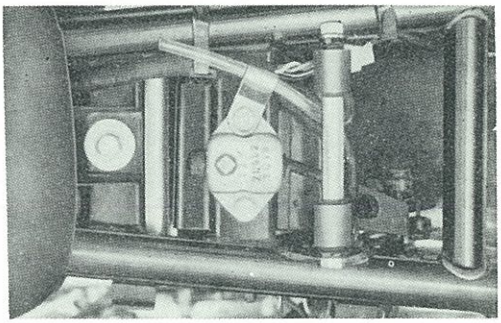


Fig. 10-5-1 Position of voltage regulator

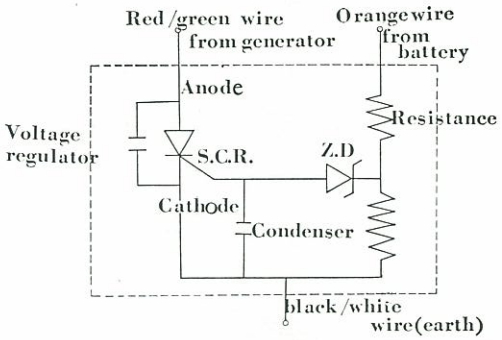



Fig. 10-5-2 Wiring of voltage regulator

### 10-5-1 Construction

When the battery is so fully charged as to increase its voltage, current flows in a direction reverse to the "ZD" (Fig. 10-5-2). When the reversely applied voltage exceeds the definite value, the "ZD" lets the current flow in an inverse direction, which flows to the gate of "S.C.R.". Current of the S.C.R. flows in the arrow-marked direction. Unless any current is given to the gate from outside, however, current does not flow in the arrow-marked direction, too.

When the current, which had flowed through the "ZD", is given to the gate of "S.C.R.', gate is opened, the current from the generator does not flow to the battery but is fed back to the generator. As the through the S.C.R. from the anodento the cathode causing battery voltage to decrease. When the battery voltage decreases, current does not flow to the gate, gate is closed, generated current does not flow through the voltage regulator, but directly to the battery to resume charge. When this operation is repeated, battery input voltage is controlled.

ZD : Zener Diode

S.C.R: Silicon Control Rectifier

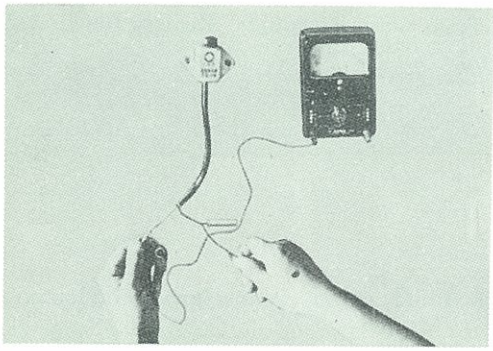
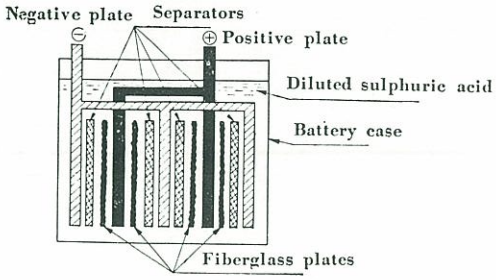


Fig. 10-5-3 Checking voltage regulator




Fg. 10-6-1 Battery construction

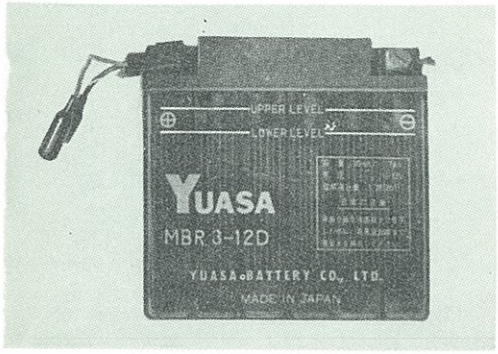



Fig. 10-6-2 Electrolyte solution level lines

### 10-5-2 Inspection

In case the battery charging voltage is higher than 15.8—16.6 v, i,e. the battery is somewhat overcharged, regulator small be checked.

1. Tester shall be connected between the orange-colored and black-white wires. If the resistance is approx. 1 K Ω, condition is good.
2. Tester shall be applied to the portions from the red-green to the black-white wires, and from the black-white to the red—green wires to check the conductibility.Condition is good if the tester shows no conductibility in both cases.
3. Cautions in handling

A. Rubber cap projecting on the outside of the voltage regulartor shall not be removed, because it prevents the short circuit.
Hexagonal nut in the rubber cap is used to connect the internal circuit. If it is loosened therefore, regulator would be out of order. Regulator would be connected in such a condition that the engine is not started.

B. A mistaken connection would damage the regulator and battery. Caution should be used for the connection.

## 10-6 Battery

The 12V 7AH battery is fitted into the center part of the frame left side together with the battery fitting plate with bolt.

The battery is constructed of alternating positive and negative plates with separators between them to prevent a short circuit. The positive plates have fiberglass fitted 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 cell are connected in series in the 12 volt battery.

### 10-6-1 Inspecting

1. Checking battery electrolyte solution
If the battery solution decreases and the level drops to the lower level line, add pure distilled water up to the upper level line. Do not use city water or well water, which damages the battery, and do not add diluted sulphuric acid.

2. Measuring specific gravity

Use a hydrometer to measure the status of the battery charge. Fill the battery to the upper level line before measuring the specific gravity of the solution with a hydrometer. If the specific gravity is below the standard, charge the battery.

| | Fully charged | Usable limit |
|---|---|---|
| Specific gravity | 1.23 | 1.23 |

The specific gravity varies according to the temperature of the solution so it is necessary to convert the reading into its equivalent at 20°C (68°F) by using the conversion chart.

| Temperature | -10°C (14°F) | 0°C (32°F) | 10°C (50°F) | 20°C (68°F) | 30°C (86°F) | 40°C (104°) |
|---|---|---|---|---|---|---|
| Specific gravity | 1,311<br>1,301<br>1,291 | 1,304<br>1,294<br>1,284 | 1,297<br>1,287<br>1,277 | 1,290<br>1,280<br>1,270 | 1,283<br>1,273<br>1,263 | 1,276<br>1,266<br>1,256 |

3. Sulfation and plate corroding

When sulfation occurs in the battery, white dots or clouding can be seen on the plates. Battery charging capacity decreases if sulfation is extreme, so the battery must be replaced with a new one. If plate material drops to the bottom of the case and much sediment accumulates on the bottom so it can be seen through the case, replace the battery with a new one.

## 10-6-2 Charging

1. Remove the 6 filler plugs. The battery could explode if charged with the plugs installed.
2. Check the solution level. Add pure distilled water to bring the solution up to the upper level line.
3. Do not charge near an open flame, as charging creates an explosive gas.
4. Charge the battery with 0.7 ampere current.

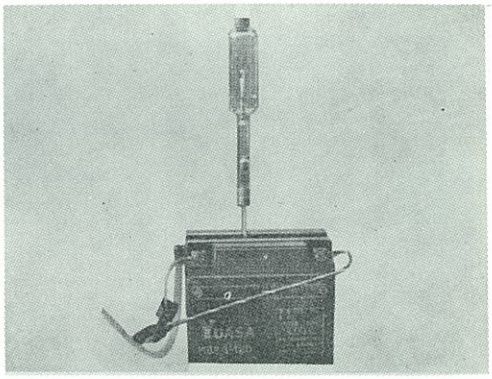



**Fig. 10-6-3 Checking specific gravity**

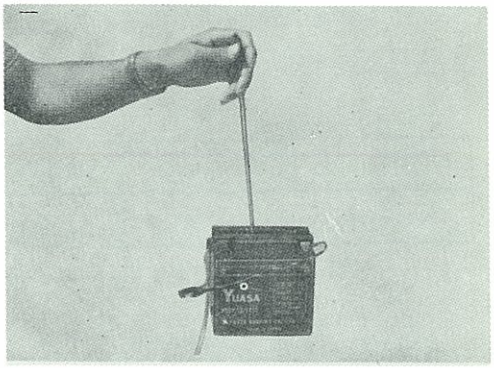



**Fig. 10-6-4 Measuring solution temperature**

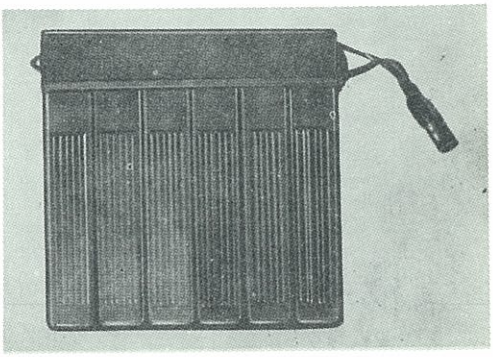


**Fig. 10-6-5 Sulfation**

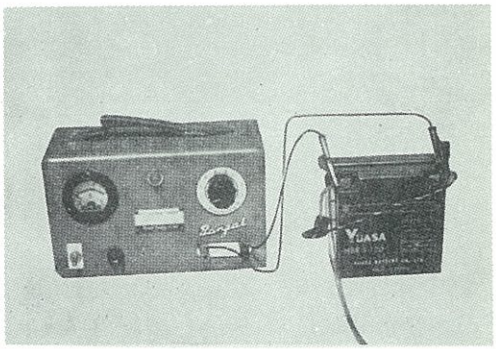



**Fig. 10-6-6 Charging battery**

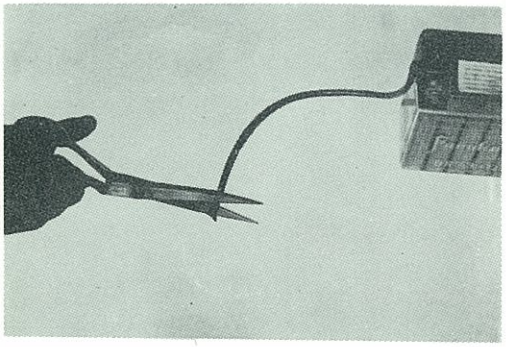


**Fig. 10-6-7 Cutting air vent pipe**

### 10-6-3 Initial charge

1. Use electrolyte solution with a specific gravity of 1.28 at 20°C (68°F). The temperature of the solution should be below 30°C (86°F) when it is poured into the battery. Fill up to the upper line printed on the outside of the battery. Cut off sealed end of air vent pipe at about 30 mm (1.2 in) from tip.
2. Charge the battery with 0.7 ampere current for initial charge.
   The charging time differs by the period after manufacturing of a battery, so charge it referring to the following.

| Months after manufacturing | Within 6 | Within 9 | Within 12 | Over 12 |
|---|---|---|---|---|
| Necessary charging hours | 20 | 30 | 40 | 60 |

This is the time in case filler plugs and seals are fixed right.

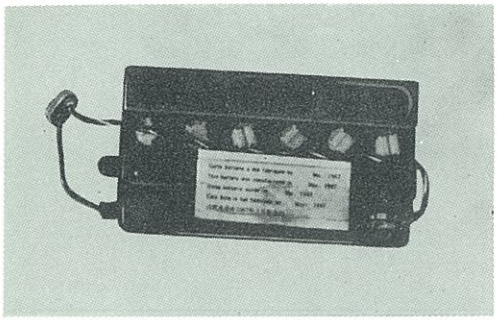


**Fig.10-6-8 Date of manufacture of battery**

3. Date of manufacture is printed on the tape, enclosed with filler plugs.

# 11. MAINTENANCE, INSPECTIONS AND ADJUSTMENTS

## 11--1. Explanation

This section includes instructions on adjusting the motorcycle after assembling, and daily maintenance, inspections, and adjustments. To have the motorcycle give good performance, it is necessary to take care of the machine properly as outlined here.

## 11—2. Servicing Spark Plugs

Check to see that the spark plugs are fitted into the cylinder heads tightly. Check to see if the spark plugs are burned. Clean off carbon deposits. Inspect and adjust the spark gap between the electrodes. (See section 10—2—5)

## 11—3. Adjusting Contact Breaker Points Gap and Ignition Timing

The contact breaker points gap and ignition timing greatly affect engine performance. Check and adjust and polish contact breaker point surfaces and points gap. Check and adjust igntion timing. (See section 10—3—1)

## 11—4. Cleaning Air Cleaner

Intake resistance increases and engine output decreases when the air cleaner is clogged. Clean the air cieaner with a brush or compressed air. (See section 9—3—2)

## 11—6 Adjusting Oil pump lever

With throttle grip fully open, adjust the oil pump control cable so that the gap between the oil pump lever and stop is 0.5 mm (00.2 in). (See section 8—16—6) Before adjusting, be sure th rottle cables are correctly adjusted. (See section 8—25—6)

## 11—7 Checking Fuel System

The air vents in the fuel tank cap must be open. Keep the inside of the fuel tank clean and free from lint and dirt.

Do not allow the fuel cock strainer net to become clogged with dirt and lint.

Do not leave the petcock in the "Priming" position for more than one minute.

## 11—8. Adjusting Carburetors

The carburetors should be adjusted correctly at all times. Engine revolutions at idle speed and the adjustment of the pilot air adjusting screws should be kept adjusted properly. (See section 8—25—7)

## 11—9. Cleaning Exhaust Pipes and Mufflers

Remove carbon accumulation from the exhaust pipes. Remove carbon and tar deposits from the muffler baffle pipes and mufflers.

## 11—9. Adjusting Chain Tension

See figure 11—10—1.

## 11—10. Adjustment of Wheel Alignment

The adjustment of wheel alignment is necessary not only to secure safe driving, but to prevent the one-sided wear of tyres while runming at high speed.

For adjusting wheel alignment, there are four alignment gauges of the same size The gap between the grooves on the gauge is 2.5 mm (0.1 in). See figure Fig 11—10—2

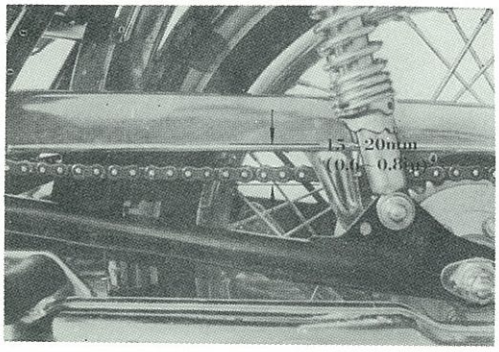
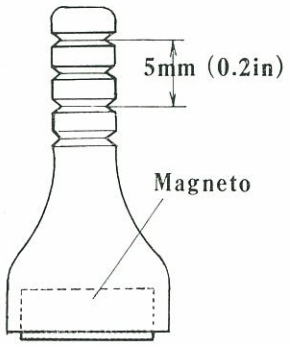



Fig. 11-10-1 Drive chain play




Part No.09827-00001

Fig. 11-10-2 wheel alignment gauge

Adjusting method of wheel alignment

1. Put motorcycle on center stand
2. After chain adjustment, clean the right side of the wheel rim with gasoline or other cleaning solvent and then fit the gauge on the wheel rim at about 20 cm (7.8 in) above the ground.
3. Fasten the end of a thread to a spoke of the rear wheel. Sitting at the right side of the front wheel, stretch the thread so that the thread as shown in the right figure may pass in the inner- most grooves of the two alignment gauges put on the rear rim.
4. Move to adjust the front wheel with hand so that it may be in parallel to the stretched thread. The front wheel rim is narrower than the rear wheel rim by 5 mm from the center in either side. If the thread passes in the second grooves of the gauges on the front wheel rim counting from the outside, both front and rear wheels are in line and wheel alignment is completely adjusted.

5. If the mis-alignment from the center is over 3.0 mm, adjust by the following procedure.

(1) In case that the thread position is mis-aligned over 30 mm outside from the second groove of the front wheel side gauge:

- Loosen the lock nuts (A & B) and chain adjuster lock nut of the left side and finally screw in the adjuster bolt.
- Leave the right side chain adjuster undone.
- Tighten the lock nuts (A & B) and check for mis-alignment in the afore-mentioned way.

If mis-alignment is found over 3.0 mm, readjustment is required.

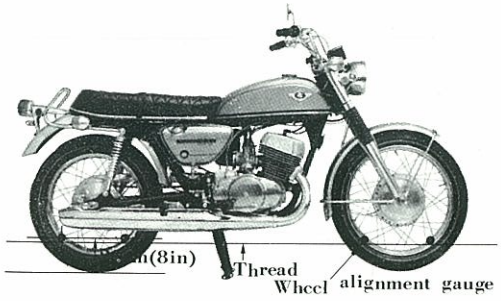



Fig. 11-10-3 Checking wheel alignment


Fig. 11-10-4 Wheel alignment (correct)

(II) In case that the thread position is mis-aligned over 3.0 mm inside from the second groove of the front wheel side gauge:

- Loosen the lock nuts (A & B) and chain adjuster lock nut of the right side and finally screw in the adjuster bolt.
  Leave the leftside chain adjuster undone.
  Tighten the lock nuts (A & B) and check for misalignment. If mis-alignment is found, adjust until it be comes below 3.0 mm.

Tyres

The T 500 — II such tyres especially excellent in stability running at high speeds or on corners. The riding stability of a motor cycle used mainly for high speeds is especially influenced by its tyres replacepment of. Never fail to use the INOUE tyres for standard equipment.

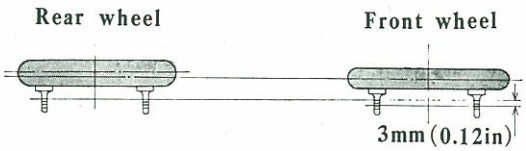



**Fig. 11-10-5 Wheel alignment (incorrect)**

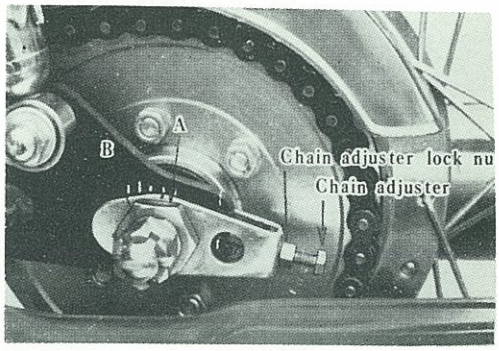



**Fig. 11-10-6 Chain adjuster**

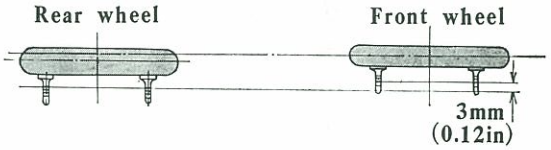



**Fig. 11-10-7 Wheel alignment (incorrect)**

## 11—11. Adjusting Brakes

a. Front Brake

The front brake should be adjusted by turning the adjusting nut and the cable adjuster so that it may begin to work when the clearance between the throttle grip and the front brake lever reaches 20 mm (0.8 in) as shown in Fig 11—12—1. Turning the nut in decreases play and turning it out increases play.

b. Rear Brake

There should be 20—30 mm (0.8—1.2 in) of free travel in the brake pedal as shown in Fig. 11-11-3.

The rear brake can be adjusted with the brake rod adjusting nut fitted on the brake rod as shown in Fig. 11-11-4.

Turning the nut in decreases travel and turning it out increases travel.

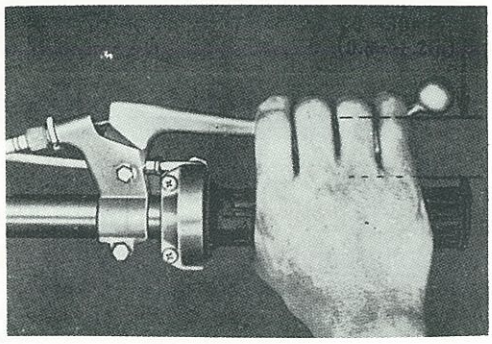


**Fig. 11-11-1 Front brake lever play**

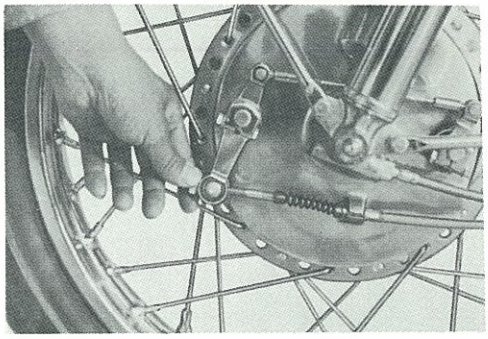


**Fig. 11-11-2 Adjusting front brake**

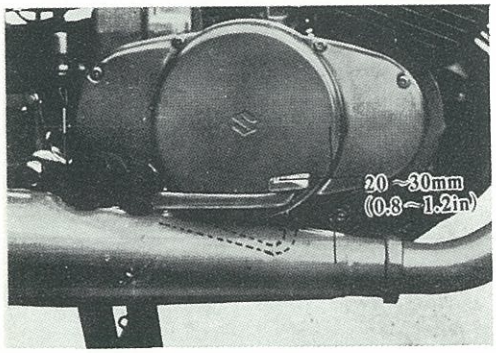



**Fig. 11-11-3 Brake pedal travel**

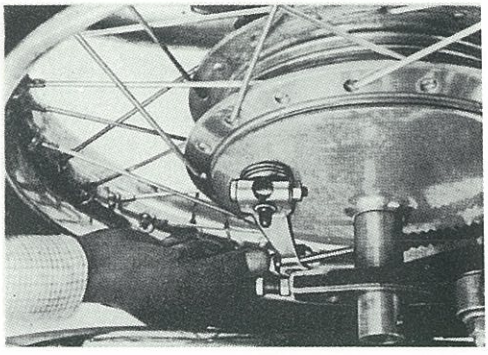


**Fig. 11-11-4 Adjusting rear brake**

## 11—12. Adjusting Clutch

The clutch inner wire stretches as the bike's mileages increages and the clutch plates also wear, with consequent increase of the amount of play in the clutch cable. Adjust the clutch with the clutch cable adjuster, cable adjuster and release adjusting screw. (See section 8—18—6)

## 11—13. Battery Maintenance

Check to see that the terminals are tightened firmly. Check the battery solution level. Visually check the condition of the battery plates. Check to see if battery solution has spilled.

## 11—14. Retightening Bolts, Nuts and Screws

Bolts, nuts and screws are apt to work loose during running. Check and retighten. (Fig. 11—14—1)

| No. | Part | Q'ty | Tightening Torque |
|---|---|---|---|
| ① | Front Axle Nut | 1 | 650 kg-cm (47 lb-ft) |
| ② | Fork Inner Tube Fitting Bolt | 2 | 200 kg-cm (14 lb-ft) |
| ③ | Steering Stem Head Fitting Bolt | 3 | 250 kg-cm (18 lb-ft) |
| ④ | Handlebar Clamp Bolt | 4 | 130 kg-cm (9.5 lb-ft) |
| ⑤ | Spark Plug | 2 | 200 kg-cm (14 lb-ft) |
| ⑥ | Cylinder Head Nut & Bolt | 16 | 350 kg-cm, 200 kg-cm |
| ⑦ | Kick Starter Fitting Bolt | 1 | 300 kg-cm (21 lb-ft) |
| ⑧ | Rear Shock Absorber Nut | 4 | 250 kg-cm (18 lb-ft) |
| ⑨ | Rear Axle Nut | 1 | 650 kg-cm (47 lb-ft) |
| ⑩ | Muffler Fitting Bolt | 4 | 300 kg-cm (21 lb-ft) |
| ⑪ | Rear Swinging Arm Pivot Shaft | 1 | 650 kg-cm (47 lb-ft) |
| ⑫ | Engine Mounting Bolt | 3 | 600 kg-cm (43 lb-ft) |
| ⑬ | Exhaust Pipe Fitting Bolt | 4 | 130 kg-cm (9.5 lb-ft) |
| ⑭ | Spoke Nipple | 72 | |

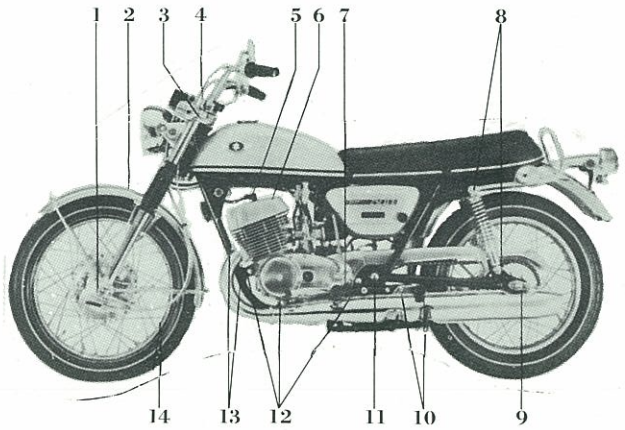



Fig. 11-14-1 Check and retighten

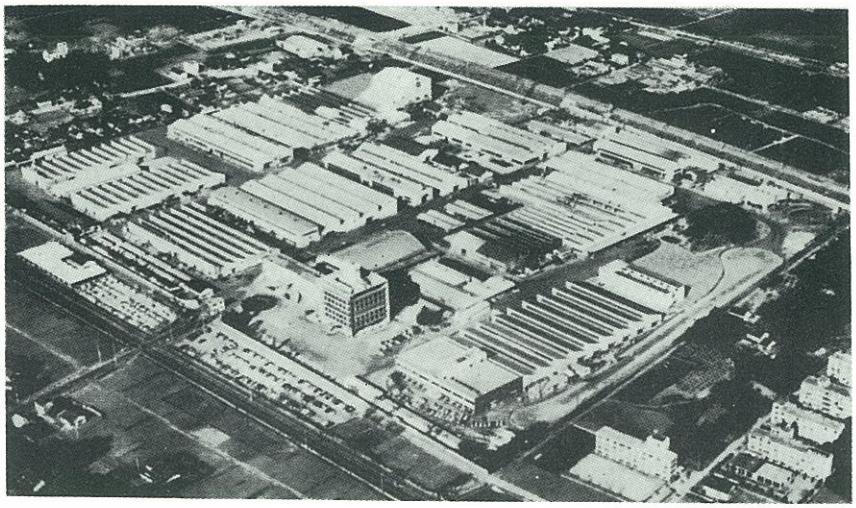
## 11—15. Checking Tire Air Pressure

Keep the tire pressure proper at all times to prolong the life of the tires and for safe and comfortable riding.

| | One person | Two persons |
|---|---|---|
| Front | 1.6 kg/sq cm (23 lb/sq in) | 1.6 kg/sq cm (23 lb/sq in) |
| Rear | 1.9 kg/sq cm (27 lb/sq in) | 2.3 kg/sq cm (33 lb/sq in) |

**SUZUKI MOTOR CO.,LTD.**

Head Office : P.O. Box 116, Hamamatsu, Japan



*Home of world-clamption motorcycle*

# NEW MODEL
# TECHNICAL BULLETIN

## SUZUKI

# GT500A

# INTRODUCTION

*Model GT500—the new 500-cc sport model already introduced in other SUZUKI publications—is described here in greater detail to emphasize its sales points to our SUZUKI salesmen.*

*The new GT500 has been developed by redesigning Model T500, the 500-cc machine that had thrilled and delighted thousands of speed enthusiasts all over the world, and now comes with improved features in its brakes, suspension, electrical equipment and body to repeat the success with which the old T500 model was met years ago when it made a debut.*

*Additional information is given in this booklet on interchangeability of parts between Model GT500 and Model T500 and also on maintenance of the new model. This booklet is thus intended not only for salesmen but also for those engaged in servicing work or in control of spare and replacement parts supply.*

**SUZUKI MOTOR CO., LTD.**

*Service Department*
*Overseas Marketing Division*

# NEW FEATURES ON MODEL GT500

*As contrasted to the predecessor Model T500, the new model has these new features:*

- DISC BRAKE – *Front wheel is equipped with a disc brake for improved braking performance.*

- NEWLY DESIGNED FRONT FORK – *Outer tubes of the front fork are made of a high-strength aluminum alloy for weight reduction and, hence, increased stability of steering control.*

- LARGE-CAPACITY FUEL TANK – *A 17-litre tank is fitted to Model GT500 to cover a greater mileage with a single filling than was possible with Model T500.*

- LARGE-SIZE TURN SIGNAL LAMPS – *To secure greater safety on the road.*

- SUZUKI "PEI" – *The conventional ignition system is supplanted by the SUZUKI "PEI" system to make available increased ignition energy to the spark plugs.*

# SPECIFICATIONS

## DIMENSIONS AND WEIGHT

| | |
|---|---|
| Overall length | 2,206 mm (86.9 in) |
| Overall width | 880 mm (34.6 in) |
| Overall height | 1,135 mm (44.7 in) |
| Wheelbase | 1,466 mm (57.7 in) |
| Ground clearance | 160 mm ( 6.3 in) |
| Dry weight | 179 kg (395lbs) |

## ENGINE

| | |
|---|---|
| Type | Two-stroke cycle, air-cooled gasoline engine |
| Intake system | Piston valve |
| Number of cylinders | 2 |
| Bore | 70.0 mm (2.76 in) |
| Stroke | 64.0 mm (2.52 in) |
| Piston displacement | 492 cc (30.0 cu in) |
| Corrected compression ratio | 6.6 : 1 |
| Carburetor | Two, MIKUNI VM32SS |
| Air cleaner | Wet polyurethane filter |
| Starter system | Kick |
| Lubrication system | SUZUKI "CCI" |

## TRANSMISSION SYSTEM

| | |
|---|---|
| Clutch | Wet multi-plate type |
| Transmission | 5-speed constant mesh |
| Gearshift pattern | 1-down 4-up |
| Primary reduction | 2.500 (65/26) |
| Final reduction | 2.200 (33/15) |
| Gear ratios, low | 2.500 (30/12) |
| 2nd | 1.563 (25/16) |
| 3rd | 1.158 (22/19) |
| 4th | 0.955 (21/22) |
| top | 0.870 (20/23) |
| Drive chain, size | DAIDO, #50HDS |
| number of links | 110 links |

## CHASSIS

| | |
|---|---|
| Front suspension | Telescopic fork with hydraulic damper |
| Rear suspension | Swinging arm with hydraulic damper, spring 5-way adjustable |
| Steering angle | 40° (right & left) |
| Caster | 61° |
| Trail | 121 mm (4.76 in) |
| Turning radius | 2.6 m (8.53 ft) |
| Front brake | Hydraulic operated, caliper disc |
| Rear brake | Mechanical, internal expanding |
| Front tire size | 3.25S19-4PR |
| Rear tire size | 4.00S18-4PR |

## ELECTRICAL

| | |
|---|---|
| Ignition type | SUZUKI "PEI" |
| Ignition timing | 24° B.T.D.C. |
| Battery | 12V 7AH |
| Generator | Flywheel magneto |

## CAPACITIES

| | |
|---|---|
| Fuel tank including reserve | 17 lit (4.5/3.7 US/Imp gal) |
| reserve | 3.5 lit (0.9/0.8 US/Imp gal) |
| Engine oil tank | 1.8 lit (3.8/3.2 US/Imp pt) |

* The specifications are subject to change without notice.

# DETAILS OF NEW FEATURES

Each new feature will be described in detail in contrast to its counterpart in the predecessor Model T500:

## CHASSIS

### Front Fork

Note the differences, in the illustrations below, between GT500 and T500 in terms of the front fork. Weight reduction is made in GT500 by using aluminum-alloy outer tubes in the fork in order to secure improved damper performance.

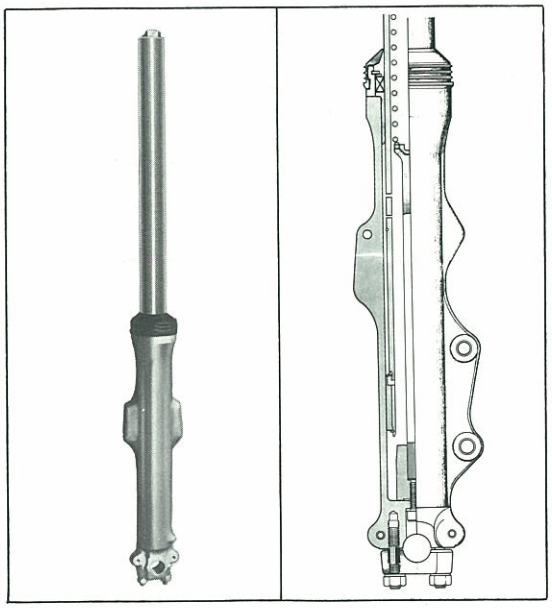


Fig. 1. GT500 Front Fork

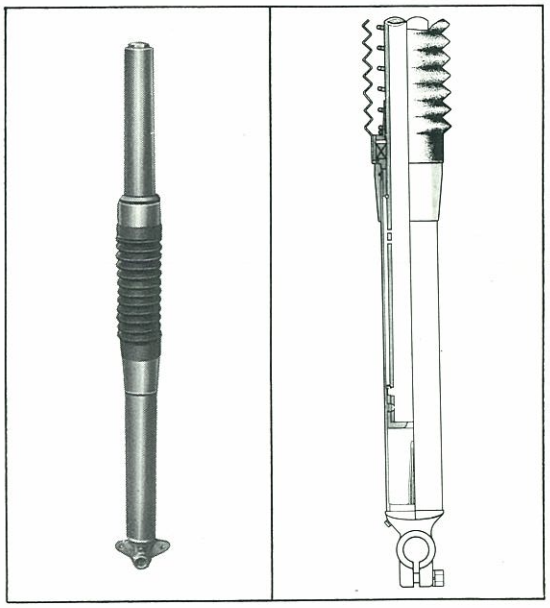


Fig. 2. T500 Front Fork

### Front Brake

The unmistakable mark of difference between GT500 and T500 that hits the eyes of the beholder is the front brake: a caliper-type disc brake is incorporated as the front brake in GT500 to provide a braking performance better suited to high-speed cruising.

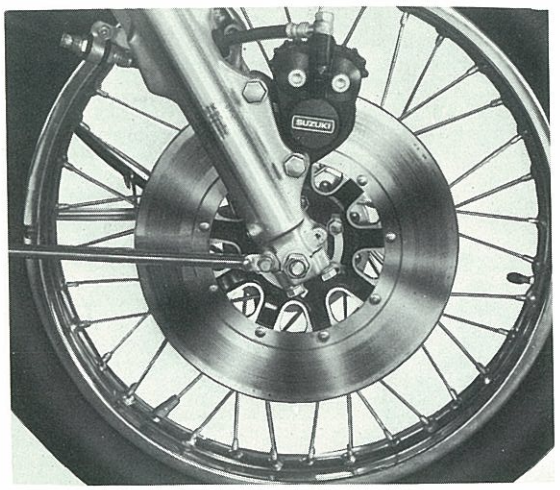



Fig. 3. GT500 Front Brake

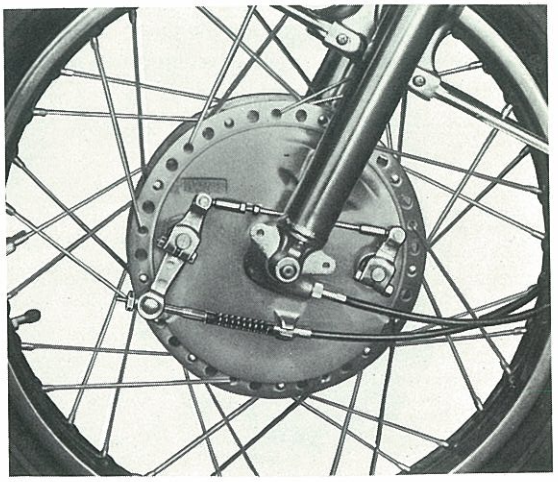


Fig. 4. T500 Front Brake

**Front Fender**

The brace staying the front fender in T500 is omitted in GT500; instead, the front fender of GT500 is stayed differently to present a sharp, sporty appearance at the front end.

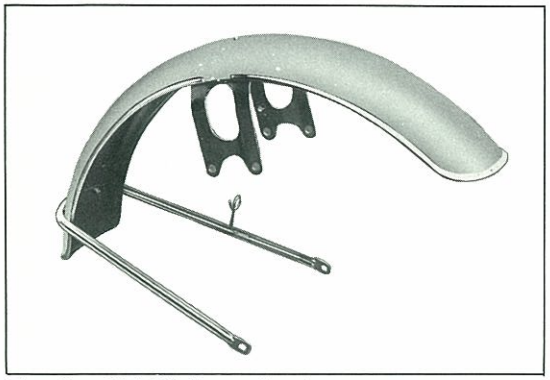


Fig. 5. GT500 Front Fender

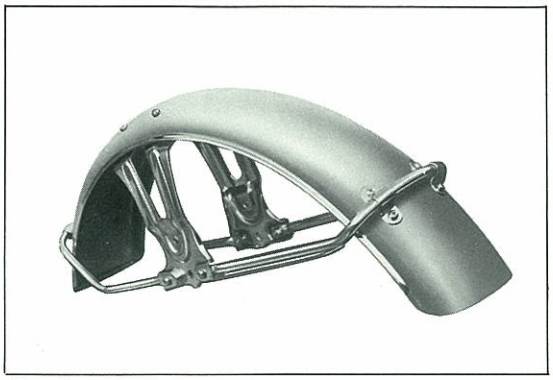


Fig. 6. T500 Front Fender

**Turn Signal Lamps**

The lamps of GT500 are larger so that they can be recognized at a much greater distance to add to the ability of this machine to avoid accidents.

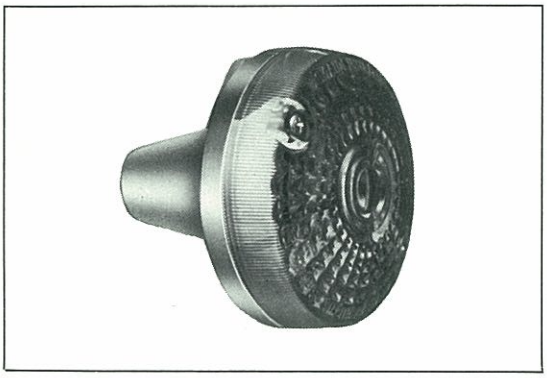


Fig. 7. GT500 Turn Signal Lamp

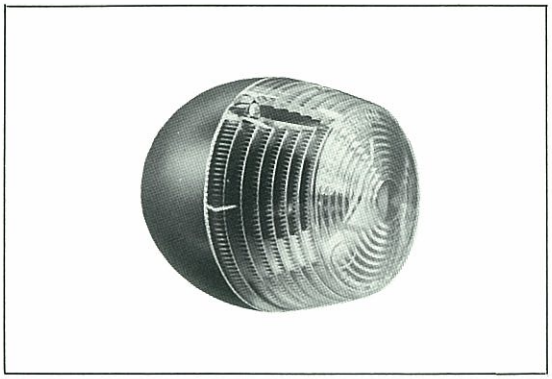


Fig. 8. T500 Turn Signal Lamp

**Meter Assembly and Ignition Switch**

Sun visors are added, and the ignition switch is relocated. Thus, the meters are easier to read, and the switch is easier to operate.

Fig. 9. Meters and Ignition Switch in GT500

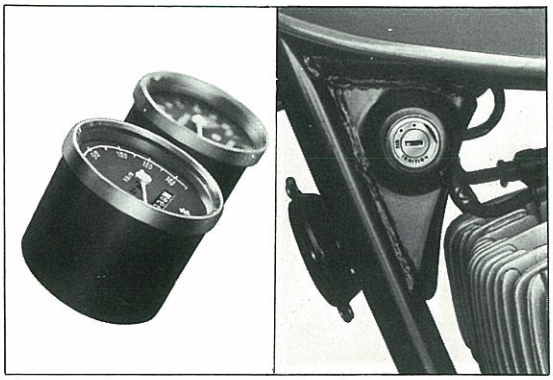


Fig. 10. Meters and Ignition Switch in T500

**Fuel Tank**

The fuel tank of GT500 holds 3 litres more fuel than that of T500. Note the difference in shape between the two tanks: one holds 14 litres while the other holds 17 litres.


Fig. 11. GT500 Fuel Tank
17 lit. (4.5/3.7 US/Imp gal)

Fig. 12. T500 Fuel Tank
14 lit. (3.7/3.1 US/Imp gal)

**Rider's Seat**

GT500 has a wider and softer seat.


Fig. 13. GT500 Seat


Fig. 14. T500 Seat

**Rear Shock Absorbers**

The cover is done away with in GT500 to make the absorber look simplistic and sporty.

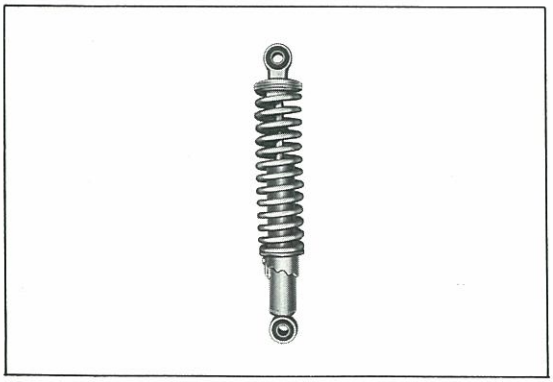


Fig. 15. GT500 Rear Shock Absorber

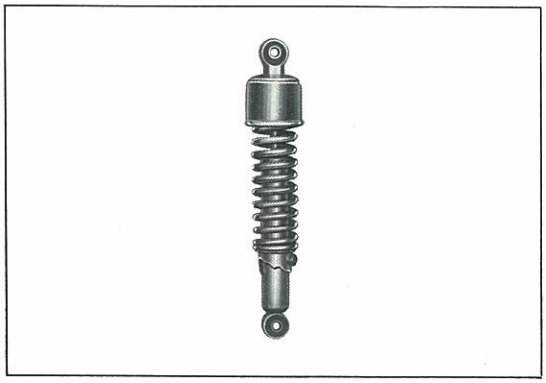


Fig. 16. T500 Rear Shock Absorber

## ELECTRICAL

### SUZUKI "PEI" System for Greater Ignition Energy

It will be recalled that, in Model T500, the spark plugs receive energy in the conventional manner, that is, through a contact breaker and an ignition coil. The "PEI" system (for Point-less Electronic Ignition system) used in GT500 is a radical departure not only because it replaces the conventional system but also because this "PEI" system includes innovations and thus differs from the "PEI" system that has long been applied to SUZUKI single-cylinder motorcycles.

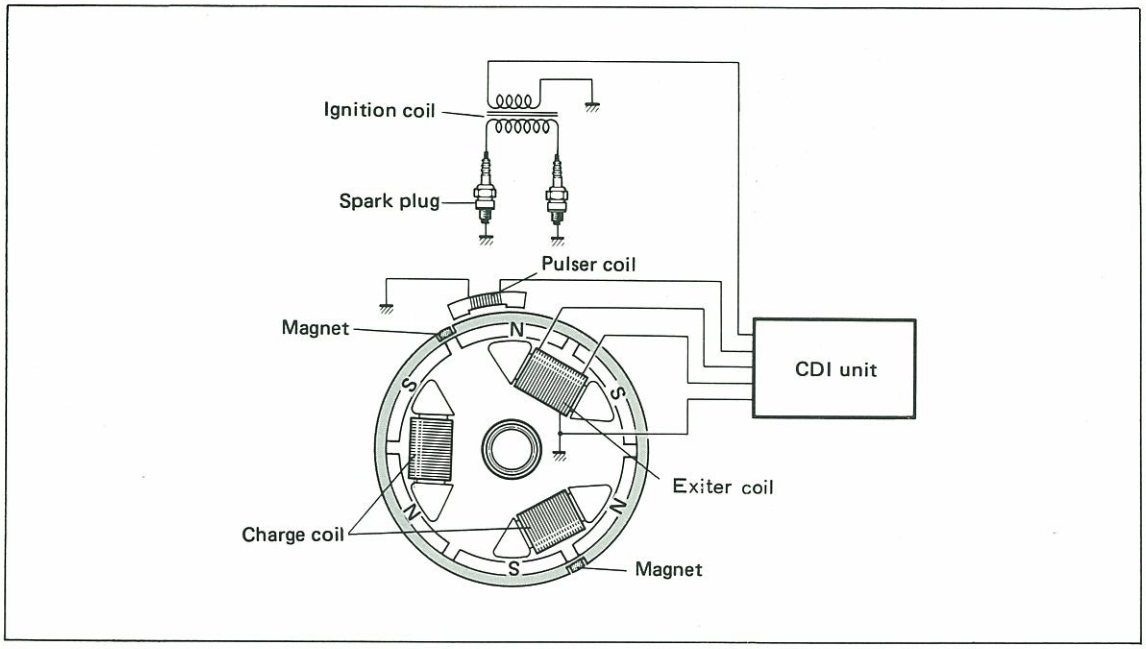



Fig. 17. Ignition System of GT500

Note that the new "PEI" differs from the old one in this regard: the pulser coil for producing signals to trigger the "CDI" unit is located close to the periphery of the flywheel, and is excited by a small magnet imbedded in the flywheel. In operation, as the magnet moves past the pulser coil, a trigger signal is induced in the coil: this intermittent induction corresponds to the contact points separated by the cam in the conventional contact breaker. Actually, there are two such magnets, 180° apart.

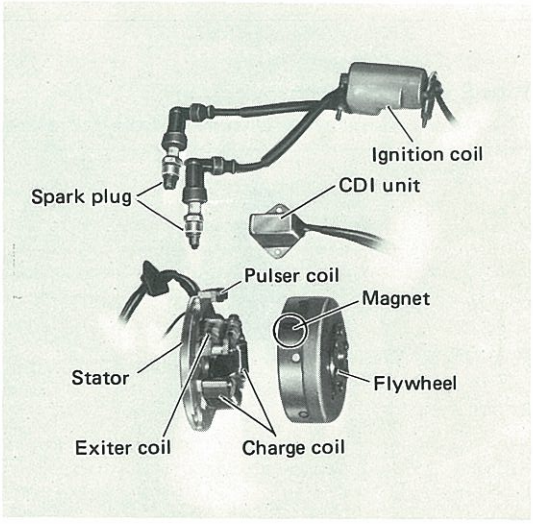



Fig. 18. Components of GT500 Ignition System

For one familiar with the SUZUKI "PEI" system hitherto used in other SUZUKI models, it is obvious that the excitation magnet—the small magnet carried by the flywheel—is discrete from the exciter coil and charge coils and thus represents a new feature of the GT500 "PEI" system. It follows from this feature that the signal-producing action of the pulser coil in terms of timing and signal intensity is not affected at all by the loaded condition of the three coils. Ignition is stable and reliable in Model GT500.

In the "PEI" system hitherto used, the pulser coil is continuously excited to deliver alternating current and its output voltage is devised to intermittently drive the "CDI" unit: in other words, the "CDI" unit is triggered when the pulser coil output voltage rises to a certain level. Although this method permits the ignition timing to be electronically varied for automatic advancing, the merit of the automatic advancing action is canceled off by the fact that the timing becomes disturbed when electrical load on the generator increases, as in night driving or battery charging, to affect the performance of the pulser coil.

The ignition coil used in the "PEI" system of GT500 is slightly different in that each end of its secondary winding is connected through a cord to the spark plug. Thus, the two plugs receive sparking energy at the same time.

# MAINTENANCE INFORMATION

Maintenance for GT500 is generally the same as for T500. There are minor differences, however, because of the new features given to GT500. Of those differences relative to inspection, checking and servicing, the ones meriting discussion will be taken up with a view to thoroughly acquainting the servicemen with Model GT500:

## Checking and Adjusting Ignition Timing

As long as the screws securing the stator are tight, the ignition timing initially set remains undisturbed to require no re-adjustment. Since engine disassembly involves the removal and installation of the stator, the methods of adjusting and checking the timing will be described:

### IGNITION TIMING ADJUSTMENT

Stator has a line mark (shown as "A") and, similarly, crankcase has a line mark (shown as "B"), as will be seen in Fig. 19. Align the two lines by adjusting the stator in place: this sets the timing to the specification. Secure the stator in that position by tightening the screws.

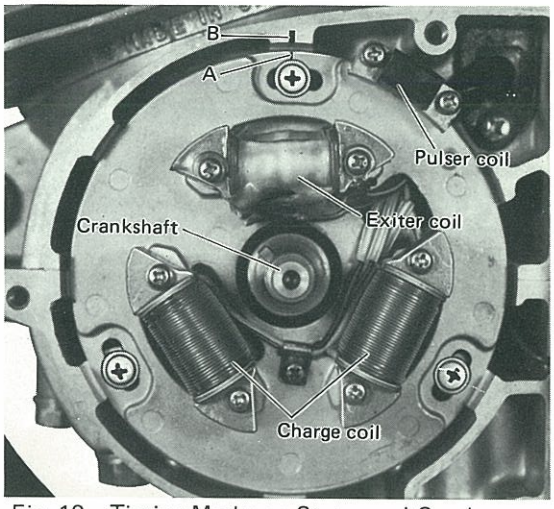



Fig. 19. Timing Marks on Stator and Crankcase

### CHECKING THE TIMING

All you have to do is this: check to be sure that lines "A" and "B", mentioned above, are aligned. Remove magneto cover (left cover) to take a look at these lines. There's no need of removing the flywheel.

You may use a timing lamp to check the timing. In this case, run the engine at about 3,000 rpm: if the line on crankcase appears aligned to the line on flywheel, then you may rest assured that ignition is timed correctly.

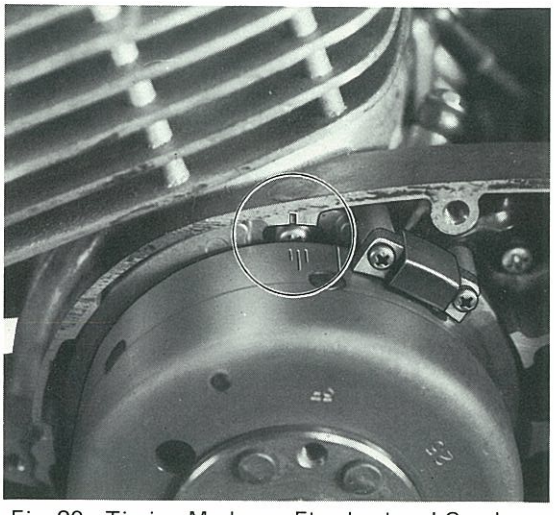


Fig. 20. Timing Marks on Flywheel and Crankcase

## Ignition Circuit and Battery Charging Circuit

To check the circuits for malcondition, refer to the circuit diagram, below, covering the ignition and charging circuits:

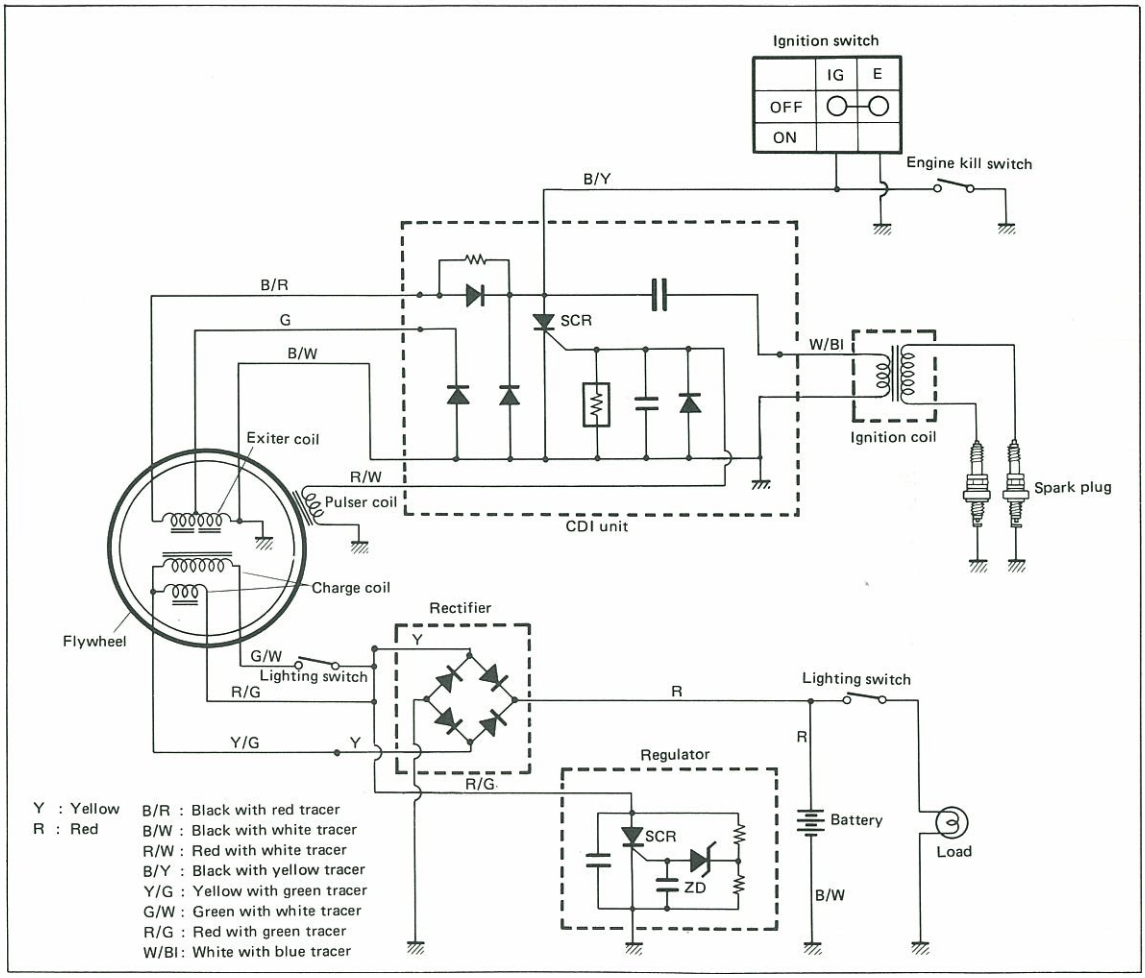



Fig. 21. GT500 Ignition and Charging Circuit

**Maintenance information on "CDI" unit, regulator and various coils follow:**

## CHECKING THE "CDI" UNIT

Use a SUZUKI pocket tester (Special Tool No. 09900-25001) in reference to the chart of Fig. 22, by adhering to these rules:

1) Before starting to check the "CDI" unit, be sure to have all lead-wire couplers unmade.
2) Just before putting your pocket tester to two "CDI" terminals, briefly shortcircuit them with a jumper.
3) Set the tester knob to "RX100" range.

| Put negative (—) pin of tester to: | Put positive (+) pin of tester to: | | | | | | |
|---|---|---|---|---|---|---|---|
| | | B/R | G | B/Y | R/W | W/BI | B/W |
| | B/R | | off | on | off | con | off |
| | G | off | | off | off | off | off |
| | B/Y | *off | off | | off | con | off |
| | R/W | *off | on | on | | con | on |
| | W/BI | con | off | con | off | | off |
| | B/W | *off | on | on | on | con | |

Fig. 22. "CDI" Checking Chart

B/R : Black with red tracer
B/Y : Black with yellow tracer
R/W : Red with white tracer
B/W : Black with white tracer
G : Green

This chart presupposes that the "CDI" unit is in sound condition; "on", "off" and "con" in the boxes of the chart refer to what your pocket tester will indicate when its positive and negative pins are put to the indicated terminals of a good "CDI" unit.

1) "on" — Tester should indicate continuity; it means that you are checking a diode for continuity in its normal (forward) direction.
2) "con" — This stands for a condenser. The indicating hand of your tester will momentarily deflect and settles back to indicate infinity, meaning that the condenser being checked is not ruptured.
3) "off" — Tester should indicate infinity, that is, its indicating hand should remain undeflected to mean that the circuit being checked has an infinitely large resistance or, possibly, off as it should be.
4) "*off" — The indicating hand should deflect just a little, indicating a resistance value close to infinity.

## CHECKING THE REGULATOR

The purpose of this check is to judge whether or not the charging system is working properly, and is accomplished by checking the battery terminal voltage while the charging system is in operation. Read the voltage at the battery under the conditions enumerated below; if the reading is off the specification, it means that the regulator or, less frequently, rectifier or magneto is in defective condition to demand closer investigation:

1) Run the engine at 4,000 rpm.
2) Make sure that the battery is in fully charged state.
3) Have lamps and other electrical loads turned off.

The specified terminal voltage is 14 ± 0.5 volts. If the reading is off this value, replace the existing regulator by a new one; if this replacement results in a reading of 14 ± 0.5 volts, it means that the existing regulator is out of order.

### CHECKING THE COILS

Various coils are used in the ignition and charging system. Using the tester, check each coil for continuity and for ohmic resistance in reference to this table:

| Coil | Check at: (Lead wire) | Standard Resistance |
|---|---|---|
| Exciter coil | G . . . . . GROUND | 185 ohms ±10% |
| Exciter coil | B/R . . . . . GROUND | 214 ohms ±10% |
| Pulser coil | R/W . . . . . GROUND | 67 ohms ±10% |
| Ignition coil, primary | W/B – B/W | 4 ohms ±10% |
| Ignition coil, secondary | Between plug cords | 12 kilohms ±10% |
| Charge coil | Y/G – R/G | 1 ohm ± 10% |
| Charge coil | Y/G – G/W | 1 ohm ±10% |

Fig. 23. Coils Checking Chart

B/R : Black with red tracer
R/W : Red with white tracer
W/B : White with black tracer
B/W : Black with white tracer
G : Green
Y/G : Yellow with green tracer
R/G : Red with green tracer
G/W : Green with white tracer

## Servicing Air Cleaner

At regular intervals, indicated below, clean the air cleaner element (which is a polyurethane element for GT500) in the following manner:

Fill a properly sized pan or pot with gasoline; immerse the element in the gasoline; and wash it gently while examining it for evidence of rupture or fissure. (A ruptured or otherwise damaged element must be replaced.)

After washing, squeeze gasoline off the element; and dry it completely.

Immerse the dried element in a pool of SUZUKI CCI oil or high-grade motor oil of SAE #30, and squeeze oil off the element to make it oil-wet without dripping.

**CAUTION:**

**Do not wring the element to squeeze liquid off. Wringing could damage the element.**

| Cleaning interval | 3,000 km (2,000 miles) |
|---|---|

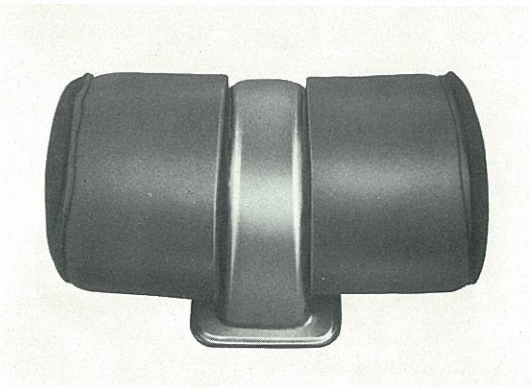


Fig. 24. Air Cleaner Element

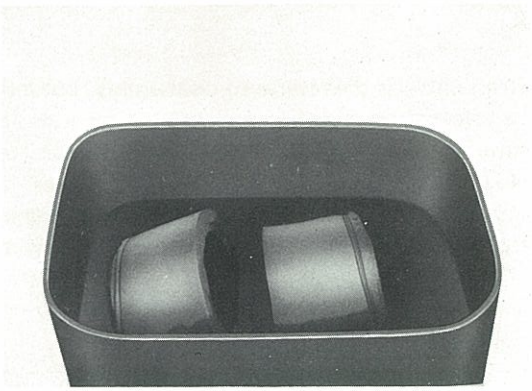


Fig. 25. Washing the Element

## Servicing the Front Fork

The front fork of GT500 differs in construction from that of T500, and must be taken care of as follows:

### OIL CHANGE

A drain plug is located at the lower section of each fork leg, as shown in Fig. 26. To drain out oil, remove this plug and also the cap bolt. To fill up the leg, pour oil through the hole for the cap bolt.

1) Oil specification: Use SAE 10W/20 motor oil, or automatic transmission fluid.
2) Oil capacity: Each leg needs 266 cc (9.0/9.4 US/Imp oz) of oil, in contrast to 220 cc (7.4/7.7 US/Imp oz) needed by the fork leg in T500.

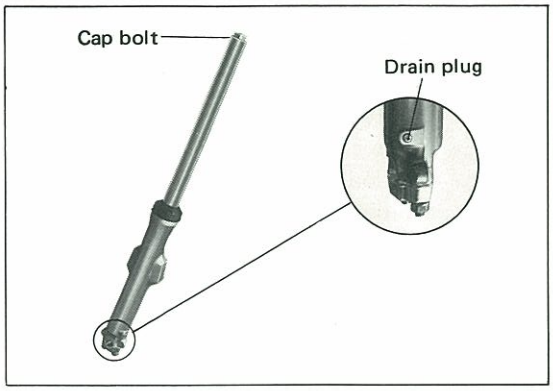



Fig. 26. Drain Plug and Cap Bolt

### DISASSEMBLY

First, remove the circlip on each leg. With the circlips removed, the front fork can be disassembled by removing its parts one after another.

Do not attempt to loosen the bolt securing the spring seat in the bottom section of the leg: the seat is centered inside the inner tube by this bolt. Loosening the bolt may result in a mispositioned seat and, hence, in chattering or rattle noise coming from the fork during operation. The front fork disassembly does not require the removal of these bolts.

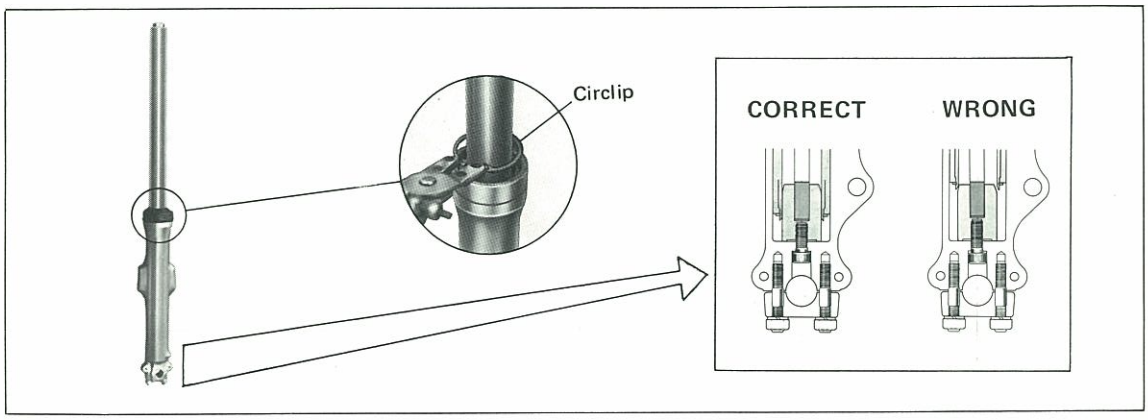



Fig. 27. Front Fork Details

Reassembly is the reverse of disassembly, but must be effected by installing replacement oil seals. Be sure to use the oil seal installing tool (Special Tool No. 09940-53110). Disassembly affords an opportunity for oil change: after reassembling the front fork, be sure to fill up its legs with new oil.


Fig. 28. Oil Seal Installing Tool and Oil Seal

## Checking the Disc Brake

### BRAKE FLUID

Check to be sure that the brake fluid is up to level between the two limits, UPPER and LOWER, both cast out on the reservoir, as shown. If the fluid in the reservoir is found to be prematurely low, check the brake for oil leakage.

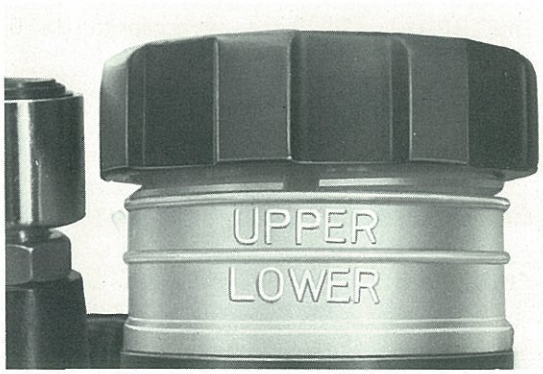



Fig. 29. Brake Fluid Level

Select one brand of brake fluid for GT500 as guided by this chart:

| Brake fluid specification | Where |
|---|---|
| DOT 3<br>DOT 4 | U.S.A. |
| SAE J 1703a<br>SAE J 1703b<br>SAE J 1703c<br>SAE 70 R 3 | Other countries |

Fig. 30. Brake Fluid Selection Guide

### PAD REPLACEMENT

Each pad has a red line on its periphery. This line is the limit of pad wear. Replace the pad when it is found to have worn down to this line.

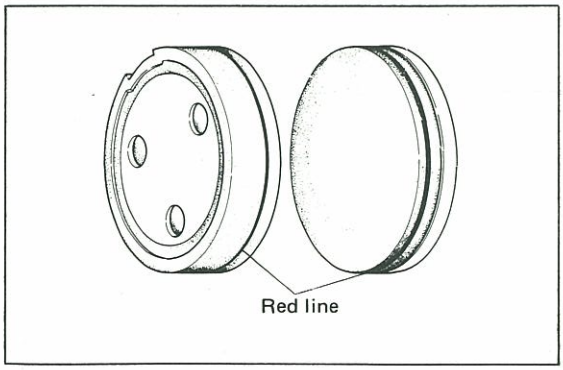



Fig. 31 Disc Brake Pads

### BRAKE DISC

The disc too is subject to wear, and needs to be replaced when its wear has progressed to reduce the disc thickness to 6 mm (0.236 in.). Disc thickness refers the middle portion of its friction face coming into contact with the pad; read the thickness there with calipers.

| | |
|---|---|
| Limit thickness of disc | 6 mm (0.236 in) |

# PARTS INTERCHANGEABILITY

Interchangeability of parts between GT500 and T500 concerning the major differences is as follows:

1) FRONT FORK – Not interchangeable.

2) DISC BRAKE – T500 does not accept the disc brake of GT500.

3) FRONT FENDER – Not interchangeable because of the difference in installing method.

4) TURN SIGNAL LAMPS – Interchangeable.

5) METER ASSEMBLY & IGNITION SWITCH – Not interchangeable.

6) FUEL TANK – Not interchangeable because the stays securing the tank to frame differ between the two models.

7) RIDER'S SEAT – The seat of GT500 is mountable on T500. With this seat mounted on T500, however, a clearance of about 3 cm occurs between seat and fuel tank.

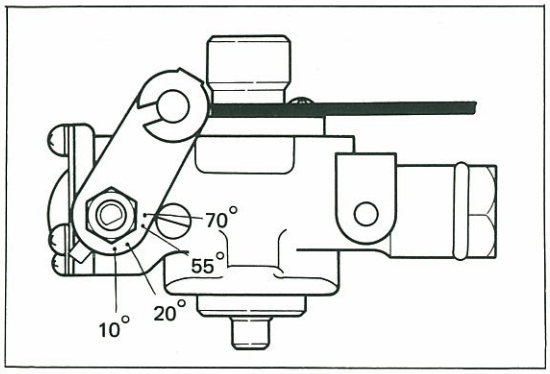
# SERVICE DATA

**Engine**

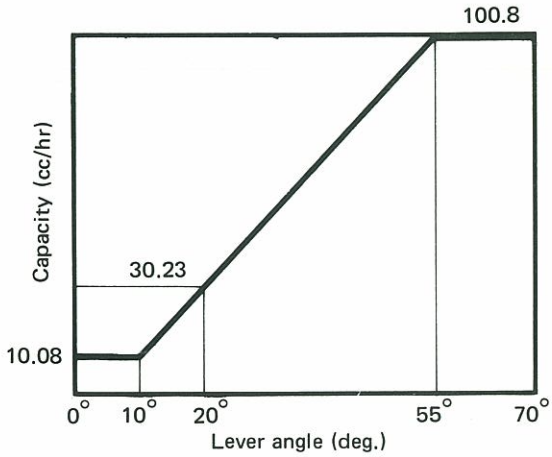
1) Piston-to-cylinder clearance: 0.065 ~ 0.075 mm (0.0026 ~ 0.0030 in), based on piston O.D. reading taken at 32 mm above skirt end.
2) Standard engine idling speed: 1,300 rpm
3) Carburetor jetting:

| | | | |
|---|---|---|---|
| Main jet | #97.5 | Pilot jet | #30 |
| Jet needle | 5FP17-3 | Air screw setting | 1½ turns backed |
| Needle jet | P-4 | Starter jet | #70 |
| Cut-away | 2.5 | Float level | 27.25 mm (1.073 in) |

4) Oil pump capacity at 1,000 engine rpm:



Oil pump lever angle




**Drive Train**

1) Transmission oil capacity: 1,400 cc (3.0/2.4 US/Imp pt), SAE 20W/40 motor oil.
2) Drive chain tension: 15 ~ 20 mm (0.6 ~ 0.8 in) as chain sag between two sprockets without the rider mounted on the machine.

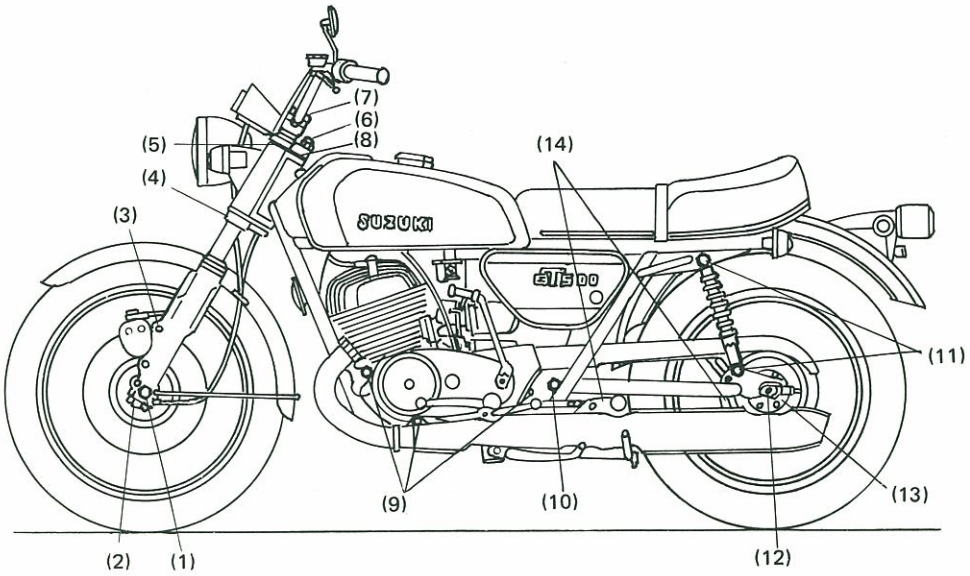
**Chassis**

1) Front fork oil: SAE 10W/20 motor oil or automatic transmission fluid, 266 cc (9.0/9.4 US/Imp oz) for each leg.
2) Wear limit on front brake disc: 6 mm (0.236 in)

**Electrical**

1) Standard spark plug: NGK B-7HS, or NIPPON DENSO W22FS
2) Spark plug gap: 0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
3) Battery electrolyte S.G. in fully charged state: 1.280 (as corrected to 20°C)

# TIGHTENING TORQUE




| | | Torque kg-cm | Torque lb-ft |
|---|---|---|---|
| (1) | Front axle nut | 360 - 520 | 27 - 37 |
| (2) | Front axle holder nut | 160 - 240 | 12 - 17 |
| (3) | Caliper bolt | 260 - 390 | 19 - 28 |
| (4) | Front fork lower bracket | 260 - 390 | 19 - 28 |
| (5) | Front fork upper bracket (right & left) | 200 - 300 | 15 - 21 |
| (6) | Front fork upper bracket (center) | 640 - 960 | 47 - 69 |
| (7) | Handlebar clamp bolt | 130 - 190 | 10 - 13 |
| (8) | Steering stem nut | 260 - 390 | 19 - 28 |
| (9) | Engine mounting nut | 260 - 390 | 19 - 28 |
| (10) | Rear swinging arm shaft nut | 500 - 750 | 37 - 54 |
| (11) | Rear shock absorber nut (upper & lower) | 200 - 300 | 15 - 21 |
| (12) | Rear axle nut | 520 - 780 | 38 - 56 |
| (13) | Rear brake cam lever bolt | 55 - 75 | 4 - 5 |
| (14) | Rear brake torque link nut (front & rear) | 200 - 300 | 15 - 21 |

# SPECIAL TOOLS

SUZUKI motorcycles are easy to service, repair or overhaul because a family of handtools tailored to respective needs are available and because each new model is accompanied by new tools, if necessary, for handling those jobs that cannot be coped with by the existing ones.
The special tools listed here for the new GT500 are among the family of already existing ones. Two tools, marked with asterisk (*), are needed by GT500 but not by T500.

| | | |
|---|---|---|
| 1. | 09910-10710 | 8 mm stud installing tool |
| 2. | 09910-11510 | 10 mm stud installing tool |
| 3. | 09910-20113 | Piston holder |
| *4. | 09911-71510 | 8 mm hexagon "L" type wrench |
| 5. | 09913-70122 | Bearing and oil seal installing tool (ID: 40.5 mm, OD: 50.0 mm) |
| 6. | 09913-80111 | Bearing and oil seal installing tool (ID: 25.2 mm, OD: 34.0 mm) |
| 7. | 09920-53710 | Clutch sleeve hub holder |
| *8 | 09920-73110 | Special circlip opener |
| 9. | 09930-30101 | Rotor remover shaft set |
| 10. | 09930-30190 | Rotor remover attachment |
| 11. | 09930-40113 | Engine sprocket and flywheel holder |
| 12. | 09940-10122 | Steering stem lock nut wrench |
| 13. | 09940-53111 | Front fork oil seal installing tool |
| 14. | 09940-60112 | Spoke nipple wrench |
| 15. | 09900-20804 | Thickness gauge |
| 16. | 09900-09002 | Shock driver set |
| 17. | 09900-21602 | Engine oil measuring tool |
| 18. | 09900-25001 | Pocket tester |
| 19. | 09900-28103 | Electro tester (Type SS-II) |

## 12. PERIODICAL INSPECTION CHART

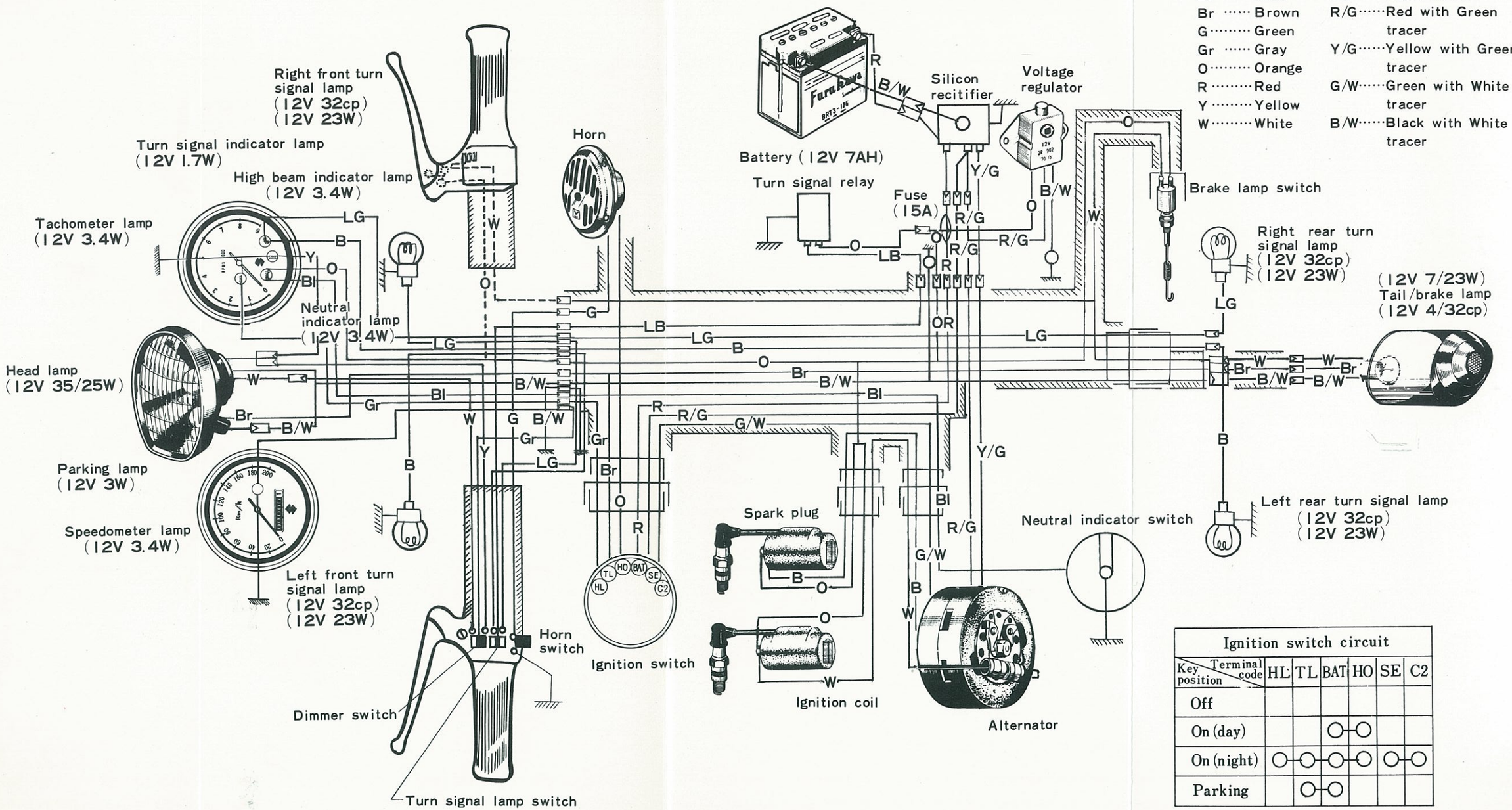
The chart below indicates time when inspections, adjustments and maintenance are required based on the distance the motorcycle runs, that is first 750mi(1,000 km), and every 2,000mi(3,000km), 4,000mi(6,000km) and 8,000mi(12,000km) thereafter. According to the chart advise, users to make the motorcyclechecked and serviced at your shop. See the appropriate section for instructions on making the inspection.

| Distance (mile) | 750 mi | Every 2,000 mi | Every 4,000 mi | Every 8,000 mi |
|---|---|---|---|---|
| Distance (km) / Service | 1,000 km | Every 3,000 km | Every 6,000 km | Every 12,000 km |
| **Oil Pump** | Check operation, adjust control lever adjusting marks | Check operation, adjust control lever adjusting marks | | |
| **Spark Plugs** | Clean | Clean and adjust gap | Replace | |
| **Gearbox Oil** | Change | Change | | |
| **Throttle, Brake and Clutch Cables** | Adjust play | Adjust play | Lubricate | |
| **Carburetors** | Adjust with throttle valve screw and pilot air screw | Adjust with throttle valve screw and pilot air screw | | Overhaul and clean |
| **A. C. Generator** | Check contact point gap and ignition timing | Check contact point gap and ignition timing, lubricate contact breaker cam oil felt | | Replace contact points |
| **Cylinder Heads and Cylinders** | Retighten cylinder head nuts and bolts | Retighten cylinder head nuts | Remove carbon | |
| **Battery** | Check and service electrolyte solution | Check and service electrolyte solution | | |
| **Fuel Cock** | Clean fuel strainer | | Clean fuel strainer | |
| **Drive Chain** | Adjust | Adjust and lubricate | Wash | |
| **Brakes** | Adjust play | Adjust play | | |
| **Air Cleaner** | | Clean | | |
| **Throttle Grip** | | | Put grease in throttle grip | |
| **Exhaust Pipes and Mufflers** | Retighten exhaust pipe fitting bolts | Retighten exhaust pipe fitting bolts | Remove carbon | |
| **Steering Stem** | Check play<br>Retighten stem nuts | | Check play<br>Retighten stem nuts | |
| **Bolts, Nuts and Spokes** | Retighten | | Retighten | |
| **Oil Outlet** | | | Clean outlet strainer cup | |
| **Clutch** | Adjust | Adjust | | |

# SUZUKI T500－Ⅱ WIRING DIAGRAM

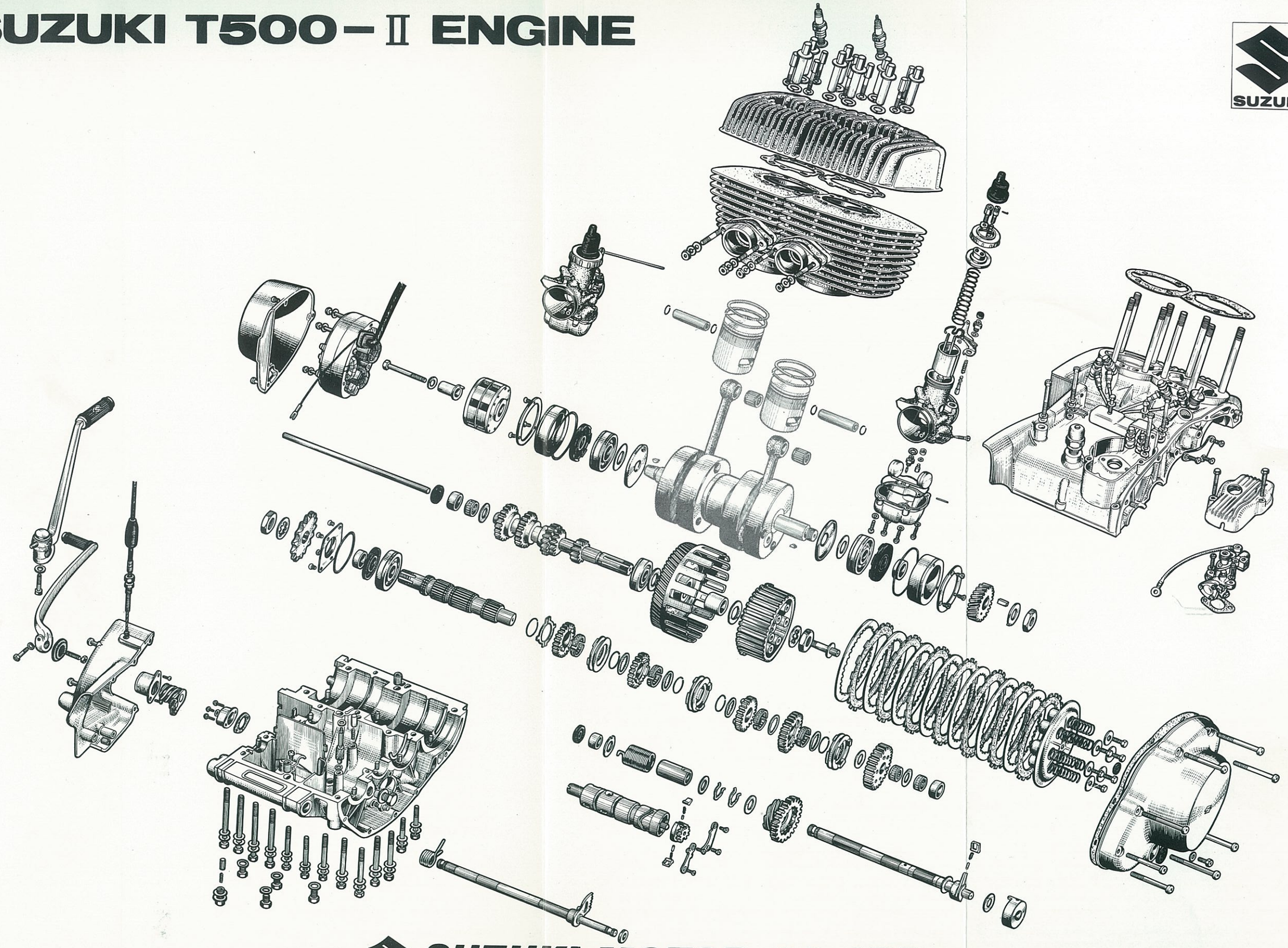
Dotted line shows special specification

B ····· Black
Bl ····· Blue
Br ····· Brown
G ····· Green
Gr ····· Gray
O ····· Orange
R ····· Red
Y ····· Yellow
W ····· White
LB ····· Light Blue
LG ····· Light Green
R/G ····· Red with Green tracer
Y/G ····· Yellow with Green tracer
G/W ····· Green with White tracer
B/W ····· Black with White tracer




| Ignition switch circuit | | | | | | |
|---|---|---|---|---|---|---|
| Key position \ Terminal code | HL | TL | BAT | HO | SE | C2 |
| Off | | | | | | |
| On (day) | | | ○ | ○ | | |
| On (night) | ○ | ○ | ○ | ○ | ○ | ○ |
| Parking | | ○ | ○ | | | |

# SUZUKI T500-II ENGINE



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