SCOOTER GENUINE COMPANY

SERVICE STATION MANUAL

Stella

FOREWORD

Genuine Scooter Company and LML Limited have joined forces to produce a world-class motor scooter specifically for the North American market. Genuine Scooter Company presents the STELLA scooter here with a thorough description and detailed manual suitable for use by any professional service facility within their dealer network.

STELLA is a wonderful combination of efforts, "designed in Italy by people who know great design, assembled and modified in Asia by expert manufacturers at LML, and marketed in North America by people who have built credibility in the scooter business for over 10 years."

We proudly introduce STELLA, and wish you many years of safe, fun, and economical scootering.

This manual will provide you with :

- General instructions on vehicle maintenance.
- General instructions for eliminating faults and irregularities.
- Illustration and instructions for dismantling, overhauling and reassembly.

This manual also describes in detail the various tools available through Genuine Scooter Company. We may, at a later date, introduce addendums or further updates to this useful manual.

Kindly address all your communications in this regard to the following address.

Customer Care
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GENERAL INFORMATION

VEHICLE IDENTIFICATION

The vehicle is identified by two numbers: One number is on the chassis and another is on the engine.
The **chassis** identification number is stamped on the right hand side of the rear portion of the chassis frame (Fig. 1): The first row of this number will begin MD7CG84A..., and the second row will have 8 characters.

Fig. 1
Chassis Identification Number

The **engine** number is stamped on the crankcase (Fig. 2), and will have the prefix E17...3 followed by 8 characters.

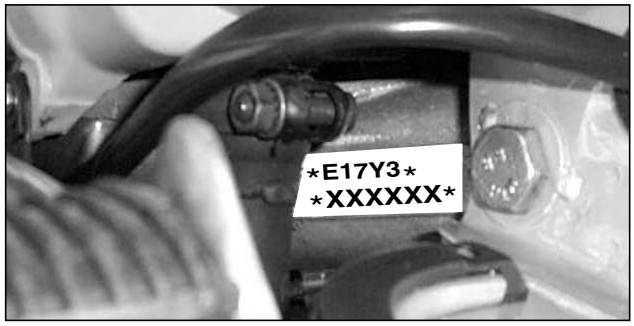


Fig. 2
Engine Identification Number

Each Stella scooter comes with one set of duplicate keys; both keys are stamped with an identification number. Remember where you place your duplicate key.

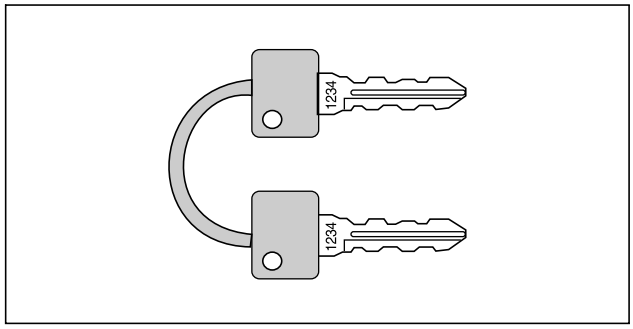


Fig. 3
Keys

TECHNICAL SPECIFICATIONS

DESCRIPTION		
DIMENSIONS		
Overall length	5.77 feet	1760 mm
Overall width	2.28 feet	695 mm
Wheel base	4.05 feet	1235 mm
Maximum road clearance	0.52 feet	160 mm
Seat height	2.69 feet	820 mm
WEIGHT		
Vehicle dry weight	240 lbs	109 kg
Maximum technically permissible mass	595 lbs	270 kg
ENGINE	Single cylinder, two stroke, forced air cooled with rotary distribution, 5 transfer ports and reed valve induction with catalytic converter.	
Displacement	149.56 cc	
Bore	2.27 feet	57.8 mm
Stroke	2.24 feet	57.0 mm
Compression ratio	9.0 ± 0.5 :1	
Maximum output/power	8 ± 0.3 bhp @ 5500 ± 200 RPM	
Ignition System	Capacitor Discharge Ignition (CDI) Electronic	
Ignition timing	20° ± 2° before TDC	
FUEL	Un-leaded 87 octane petrol with automatic mixing of Motorcycle-Formulated Two stroke oil	
Fuel tank capacity	2.11 gallon (inclusive of 0.26 gallon in reserve)	
Oil tank capacity	0.26 gallon	
Fuel Cock	Three way tap. Open (ON), Close (C), Reserve (R)	
CARBURETTOR	**SPACO** - 20 / 20D, Downdraft, 20 mm venturi	
SPARK PLUG	**RN9YC** - Champion, **B6ES** - NGK, **WR8DC** - Mico	
Spark plug gap	0.7 ~ 0.8 mm	
STARTING	Push button for autostart & kick pedal for manual start.	
CLUTCH	Multiplate, oil bath type.	

DESCRIPTION

TRANSMISSION	4 speed constant mesh
Over all gear ratio	
1st gear	15.38:1
2nd gear	10.46:1
3rd gear	7.24:1
4th gear	5.39:1
CHASSIS	Pressed steel sheet, monocoque structure.
Steering column	The steering column is connected at the front wheel swinging hub.
Suspension	Turbo Cushion front and rear suspension with helical spring and hydraulic dampers.
BRAKES	
Front brake	Hydraulic Disc brake.
Rear brake	Drum brake, mechanical expanding shoe type.
TYRE	
Front & Rear	3.5 x 10" (89 x 254mm) 4 Ply rating, interchangeable.
Tyre pressure	
Front	22 psi *
Rear	29 psi *
	* - Varies with temperature.
CONTROLS	
Steering	By Handle bar
Accelerator	Twist grip type on right side of handle bar
Gears	By hand on left side of the handle bar
Clutch	Lever operated on left side of the handle bar
Front brake	Lever operated by right hand
Rear brake	Pedal operated by right foot
ELECTRICALS	
Generator System	12 Volt 96 Watt flywheel Magneto
Head light bulb	12 Volt 35/35 Watt
Front position bulb	12 Volt 5 Watt
Tail light bulb	12 Volt 5 Watt
Stop light bulb	12 Volt 10 Watt
Speedo light bulb	12 Volt - 1.2 Watt x 2
Turn signal light bulb	12 Volt - 21 Watt x 4
Tell tale lamp bulb	12 Volt - 1.2 Watt x 6
Horn	12 Volt DC Horn
Battery	12 Volt 9 Ah
Fuse	8 Amp.
MAXIMUM SPEED	55 mph in 4th Gear

INTRODUCTION

Stella is powered by a revolutionary, new generation energy saving and fuel efficient, 150cc, 5-Port engine with Reed valve Induction, 'AOM' (Automatic oil mixture) and Catalytic converter. The 5 transfer port engine includes two auxiliary ports on each side of one booster port, and an exhaust port for emission.

A reed valve controls the entry of air fuel mixture into the combustion chamber. This maximizes the fuel flow in one direction, and results in optimum intake timing throughout operation range.

Advantage of 5 port engine with reed valve induction :

1. Improved recovery efficiency, resulting in better performance at any rpm.
2. Short circuit losses are minimized.
3. Reduced Carbon Monoxide & Hydrocarbon emission.
4. Improved pickup.

Reed valve :

Reed valve assy. is a long life component and does not require regular service. In case of a problem, check to see that the gasket between reed valve and the air cleaner box is intact, as well as the gasket between crankcase and reed valve. **Under no circumstances should the reed valve or its stopper plate screw be disturbed.** In order to separate the crankcase halves, or to replace the crankcase, the **Reed Valve** has to be removed and reinstalled.

Catalytic converter :

The catalytic converter is an emission control device converts toxic gases (Carbon Monoxide, Hydrocarbons and oxides of Nitrogen) into eco-friendly gases (Carbon dioxide, water vapour and Nitrogen) which reduces the air pollution from the exhaust gases. The catalytic converter has been installed inside the silencer assy.

To make Catalytic converter more effective for longer period:

1. Fill **only unleaded petrol** in the fuel tank.
2. Use only quality motorcycle formula two stroke oils.
3. Use only genuine and recommended spare parts.

To get best out of your vehicle fitted with Catalytic converter.

1. Keep the engine properly tuned.
2. Do not abruptly switch off the engine when the transmission is engaged, or vehicle is in motion.
3. Do not drive the vehicle with choke knob pulled.
4. Do not overload / over throttle the vehicle.
5. Never drive the vehicle down hill with ignition 'OFF'.
6. Do not idle the engine for a prolonged period.
7. Do not try to push start the vehicle.
8. Avoid misfiring the engine.
9. Ensure the "CO" level is within specified norms.

Precautions :

*Since the silencer fitted with Catalytic converter can be **extremely hot** during running of vehicle, **do not touch the silencer** to avoid serious burns.*

SAFETY FIRST!

Scooter mechanics are professionally trained to follow the safe working procedures. A moment's lack of attention or failure to observe certain elementry precautions can result in an accident.

WARNING

Fire : Remember that the petrol is highly in-flammable. Never smoke, or have any kind of naked flame in the workshop. Proper care has to be taken for electrical short circuiting as this can ignite petrol vapour.
Always disconnect the battery earth terminal before working on fuel and electrical system. Never risk spilling petrol on a hot engine or exhaust.
It is recommended that a suitable fire extinguisher for fuel and electrical fires is kept handy in the workshop. Never try to extinguish a fuel or electrical fire with water.

WARNING

Fumes : Certain fumes are highly toxic and can quickly cause unconsciousness and even death if inhaled.

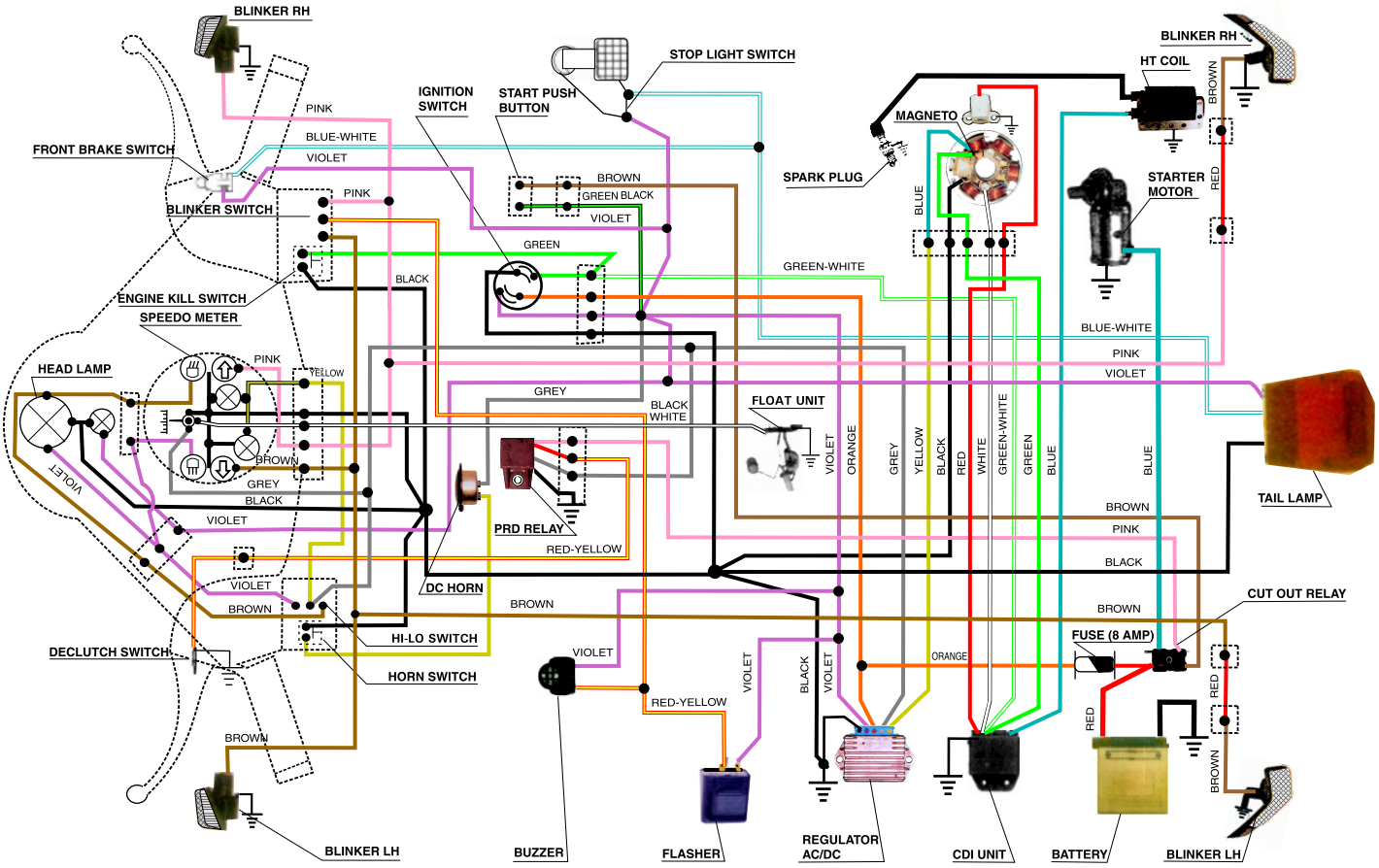
Never run the engine of a vehicle in a closed space as exhaust fumes contain carbon monoxide which is extremely poisonous. If you need to run the engine, always run the same in open air or at least the rear portion of the vehicle should be outside the work place.It is better allow an exit for exhaust smoke through a pipe and have air ventilation in the workshop.

WARNING

Battery : Take care while topping up the distilled water in the battery as the electrolyte is very corrosive.
The electrolyte should not come in the contact with eyes or skin.

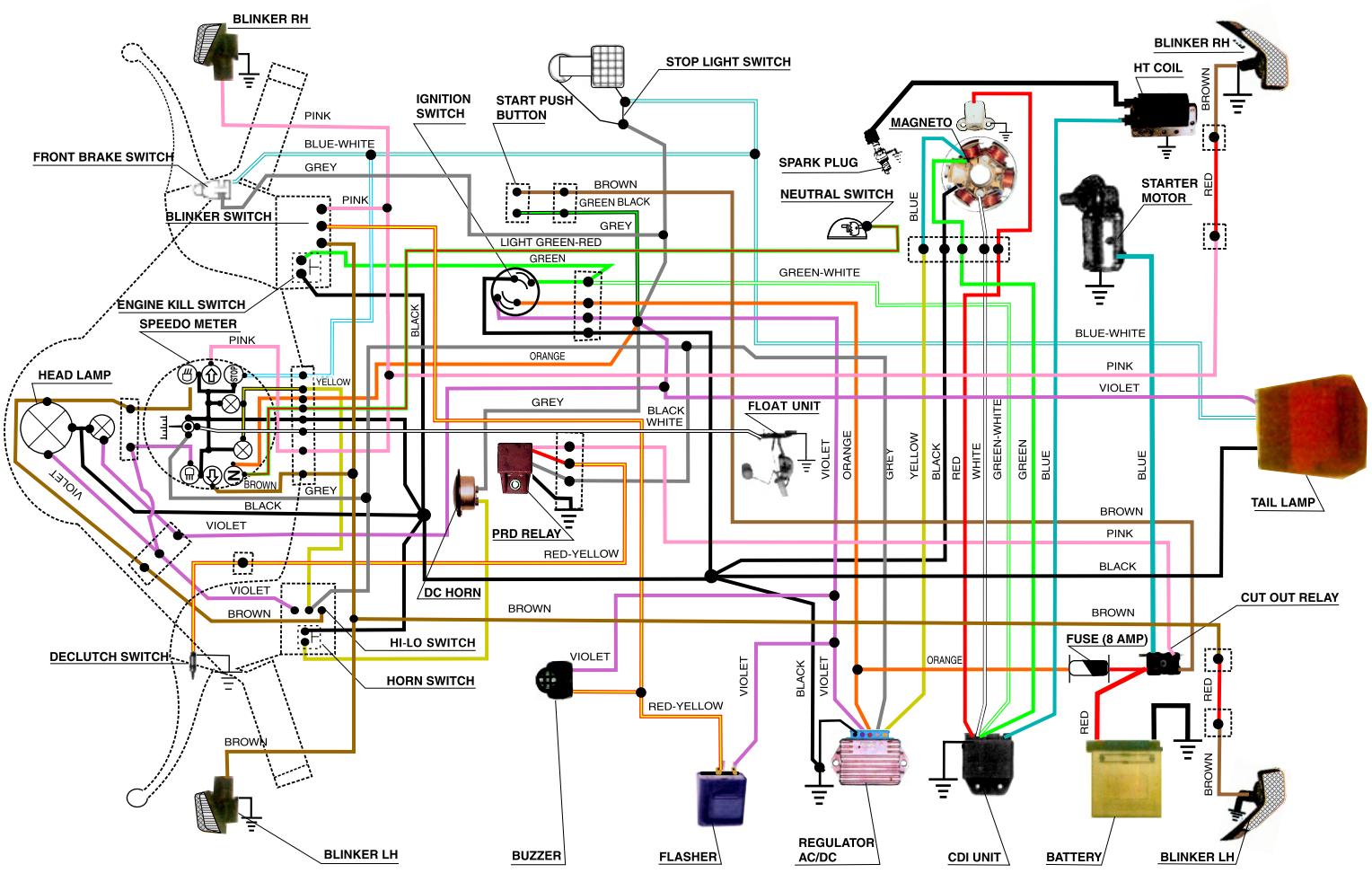
ELECTRICAL AND ELECTRONICS

WIRING DIAGRAM



WIRING DIAGRAM

(WITH NEUTRAL & STOP LIGHT)



ELECTRONIC IGNITION SYSTEM

An Electronic ignition device (CDI unit) feeds the current to a high voltage transformer (H T Coil) to generate the spark and is controlled by a key operated switch.

Advantages : When compared with a traditional /conventional ignition system both with magneto and with battery, the electronic ignition with 'discharge of condenser' is advantageous on electrical and mechanical nature. The principal advantages are as follows:

A. Electrical nature : The particular advantage of a H.T. discharge with electronic ignition viz-a-viz to conventional ignition is the 'Generation of A HIGH TENSION PEAK IN A VERY SHORT TIME WITH A Longer length of spark WHICH ENSURES better ignition.'

It facilitates :

1. Regular running of the engine.
2. Easier start for a cold engine.
3. Better life of spark plug because of lesser electrode wear.
4. Lesser possibility of bridge formation in between the main and ground electrode of spark plug.

B. Mechanical nature : No maintenance is required because of absence of moving parts exposed to wear & tear such as contact breaker point, cam unit etc.

It facilitates :

1. Unalterable ignition timing.
2. Insensitive to the atmospheric agents.
3. Regular engine running even at higher speeds.
4. Regular ignition even after long period of non use of vehicle.

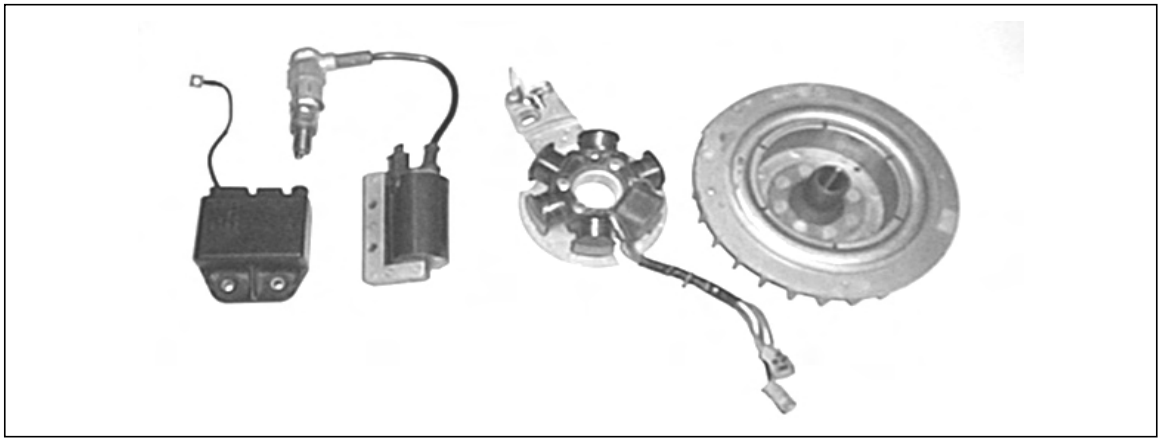


Fig. 4
(Components of Ignition system)

Principle of operation :

The fig.5 shows main components of magneto (Charging coil & Pickup coil), CDI & HT coil. (a) A 6 pole inductor rotor generates a voltage in charging coil which is fed to capacitor **'C'** through diode **'D1'**

(b) The diode D1 rectifies the AC current to DC and charges the capacitor.

(c) The pickup coil gives a signal at prefixed periodical instant (due to set ignition timing) and provides control signal at the gate of Silicon Controlled Rectfier (SCR).

(d) The SCR thus conducts and allows the capacitor to discharge, through primary winding of HT coil.

(e) HT coil secondary winding transforms the voltage to high tension and delivers to spark plug.

(f) A safety diode **'D2'** is provided across the out put to safeguard the SCR from damage by earthing the surge voltage through diode **'D2'**.

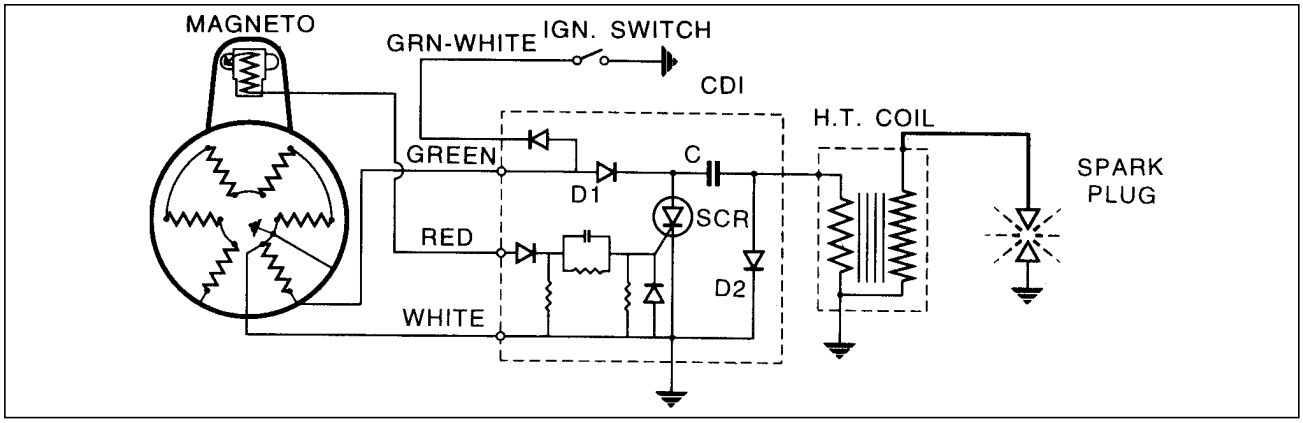


Fig.5 - Schematic Diagram

ELECTRONIC IGNITION UNITS TEST

C.D.I. (Capacitor Discharge Ignition) :

It consists of two diodes, capacitor and SCR. The current from charging coil charges the capacitor and discharges to the primary winding of High Tension coil through SCR on receiving the signal from pick up.

Test : For testing defective CDI, connect the same in place of a C.D.I. working on a running scooter. If the scooter starts easily, the unit is good. If it does not start, the unit is defective and needs to be replaced.

High Tension coil :

This is a step up transformer having primary and secondary windings on a laminated core. Primary winding receives a voltage and steps up on secondary winding upto 25 - 32 KV.

Test : For testing defective H.T. coil, connect the same in place of a H.T.coil already working on a running scooter. If the scooter starts, the unit is good. If it does not start, the unit is defective.

Check resistance at various points :

Disconnect the wires from the ignition coil and measure the primary coil resistance as shown in fig.8

Primary coil resistance : 0.4 to 0.5 Ω

Disconnect the H.T. lead from the spark plug. Measure the secondary coil resistance as shown in fig. 9.

Secondary coil resistance : 3.30 to 3.5 K Ω

Suppressor cap resistance : 5K $\pm$ 1.25 K Ω

☞ **IMPORTANT**

This is a sealed unit hence no repairs can be carried out and the unit has to be replaced if it is not functioning.

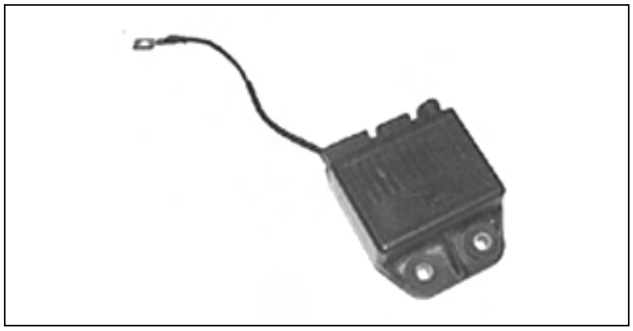


Fig. 6

Fig. 7

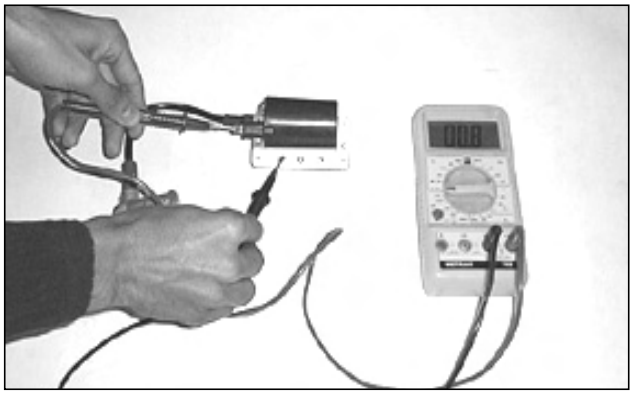


Fig. 8

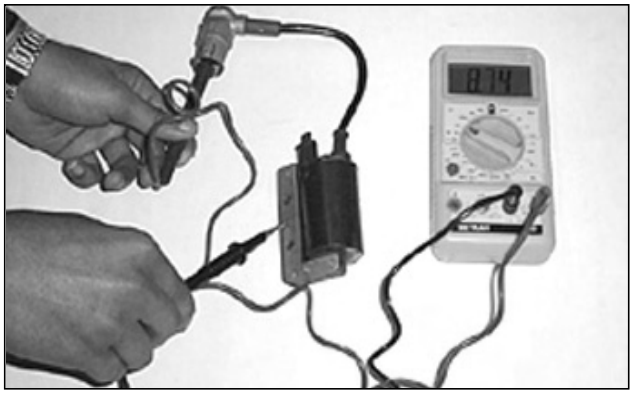


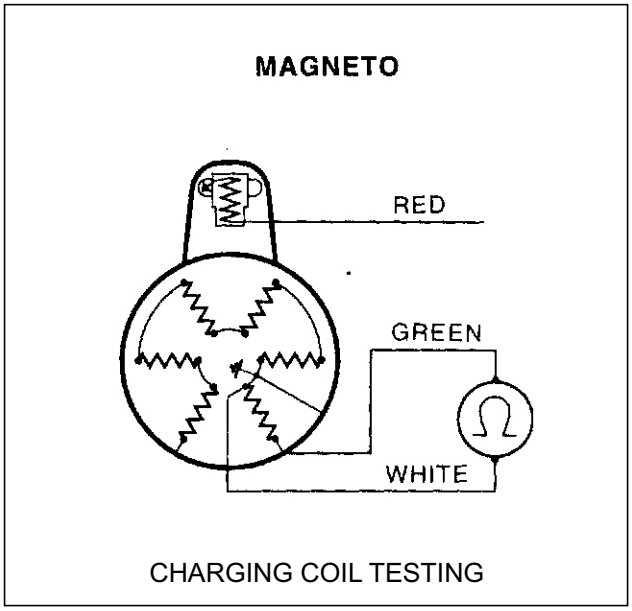
Fig. 9

Charging coil :

It is a coil wounded on a laminated core and generates a voltage of 200V–300 V A.C. for charging of condenser inside the CDI. The serviceability of charging coil can be checked by:

(i) Checking the ohmic value across Green and White wire which should be : 390 ± 20 Ω. (Fig. 10)

(ii) Connecting a Neon bulb of 220 V (in series with resistance) across Green and White wires. Kick the scooter to rotate magneto, the neon bulb should glow simultaneously.



CHARGING COIL TESTING

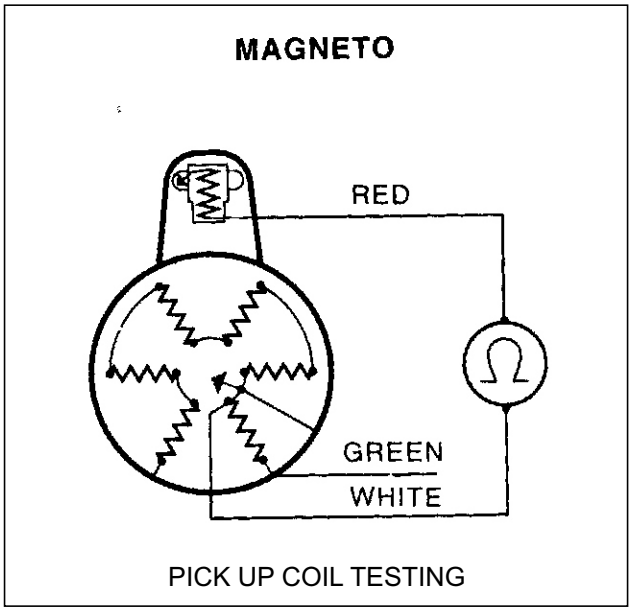
Fig. 10

Pick up coil :

It generates a signal impulse which is directed at the gate of SCR (Silicon Controlled Rectifier) and allows the charged capacitor to discharge through SCR when signal is received. The serviceability of pickup coil can be checked by :

1. Checking the ohmic value across the Red and White wires. It should be : 110 ± 15 Ω.

2. Connecting L.E.D. of 1.5 volt across Red and White wires, kick over the scooter, to rotate magneto. The L.E.D. should flash simultaneously.



PICK UP COIL TESTING

Fig. 11

IGNITION TIMING

Checking :

(a) Take out the right side cowl.

(b) Remove the H.T. lead from spark plug and connect it to one cable of the stroboscope (Timing light gun).

(c) Connect second cable of stroboscope to the spark plug.

(d) Start the scooter and focus the light of stroboscope on the timing mark of fan cover (fig. 12).

(e) Accelerate the RPM to approx. 3500 to 4000 and ensure that the pin 'P' mark on the rotor fan coincides with the 'IT' mark on the flywheel cover (fig. 13).

(f) If the marks do not coincide, correct by adjusting the stator plate assy.

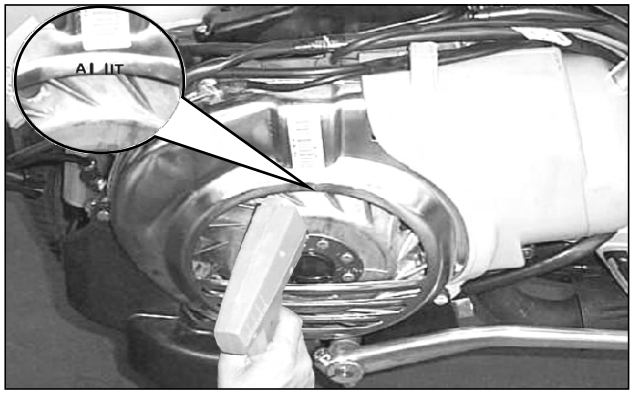


Fig.12 - Checking by Stroboscope

Fig.13 - Coinciding the marks P & IT

Setting :

(a) In the electronic ignition, no mechanical parts are exposed to wear, so the timing remains at all times practically unaltered.

(b) If the stator plate is removed for possible replacement then while re-assembling, it is important that the mark on the back plate is in line with the corresponding mark on the crank case (fig. 14).

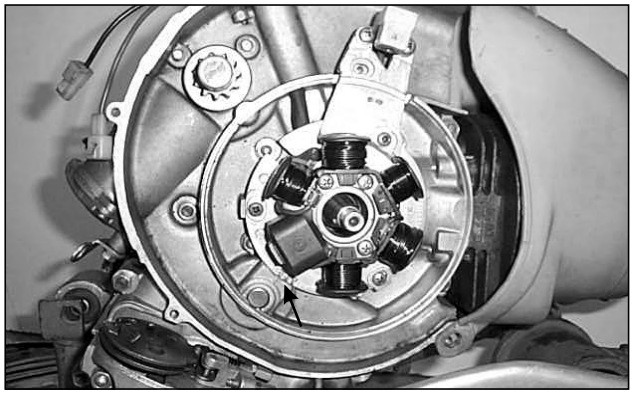


Fig.14 - Coinciding of Stator Plate & Crank Case marks

ELECTRONIC LIGHTING SYSTEM

Testing of fly wheel magneto :

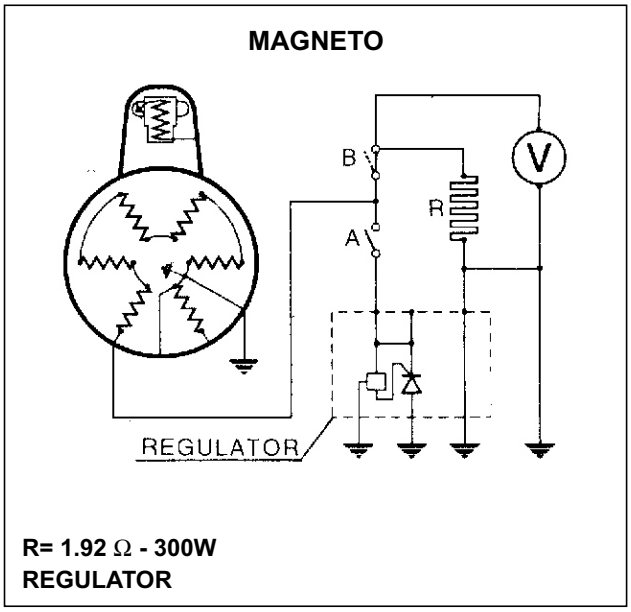
A.C. Section : (lighting coils)

The output voltage from magneto (lighting coils) is tested as under:

Connect the non inductive resistance of 1.92 Ω - 300W and a RMS voltmeter as per circuit diagrams (fig. 15).

The regulator is disconnected (contacts 'A' 'OFF' and 'B' 'ON') the voltage across the1.92 W - 300W non inductive resistance should measure as under :

Volts	R.P.M.
+ 1.5 - 0.0	1500
+ 0.5 **13.6** - 0.0	3000
+ 1.0 – 0.5	5000



R= 1.92 Ω - 300W
REGULATOR

Fig. 15

Testing of flywheel magneto(D.C. Section**):**

Measurement of charging current:

Connect D.C. voltmeter 'V' and D.C. Amp. meter 'A' as shown in fig.16. Start the engine with charged battery at constant voltage between 13 - 13.5 V.

The current generated by a magneto should be:

At 2000 r.p.m.	1-1.2 Amp.
At 5000 r.p.m.	2.0 - 2.2 Amp.*

(* Depending on the condition of the battery)

Measurement of regulated Voltage:

Connect D.C. voltmeter 'V' and D.C. Amp.meter 'A' as shown in fig.16 with a fully charged battery. At no load the voltage should be 14-14.3 V at 5000 r.p.m.

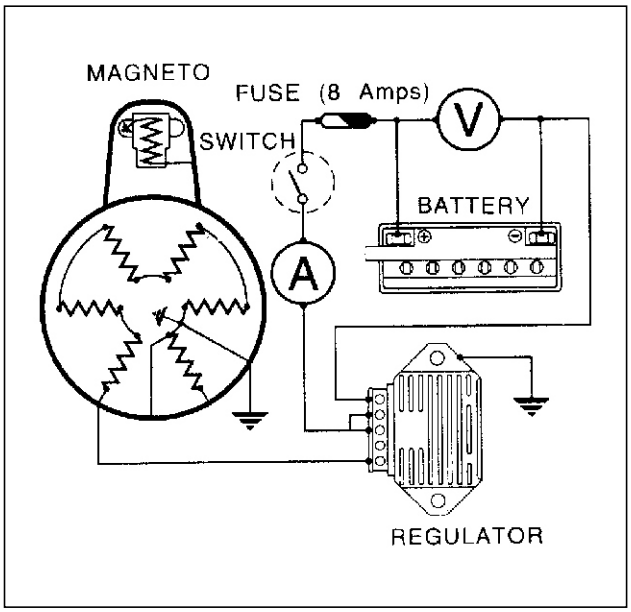


Fig. 16

Note :

The specification of voltmeter and Amp. meter are :
D.C. Amp. meter (min. full scale deflection 5 Amp.)
D.C. Voltmeter (min.full scale deflection 20 Volt class 1)

Testing of voltage regulator (A.C. section):

Check the regulator by connecting the same in a scooter whose electrical system is performing satisfactorily.

Following equipments are required for the test:

1. Voltmeter for measuring A.C.voltages at effective value (R.M.S.) with 25-30 volts.
2. 1.92 W - 300 W approx. non inductive resistance.
3. Tachometer.

Testing procedure:

(a) Remove regulator by replacing it with the one to be tested.

***Do not connect the terminal which joins GREY wire* to avoid burning of bulbs if regulator is defective.**

(b) Connect one end of the non inductive resistance 'R' (Ref. point 2 above) to earth,and the other end to regulator terminal where GREY wire has been disconnected.

(c) Connect voltmeter 'A' across the resistance and let the engine run at a minimum 5000 r.p.m. If voltage reading is between 12.5 to 15 volt, the regulator is in perfect condition.

Test results :

1. Low voltage, than the specified range, indicates that the regulator is defective (internal short circuit)
2. High voltage, than the Higher voltage range indicates that the regulator does not stabilize voltage. This is the cause of burning out of bulbs.

   In both cases the defective regulator has to be replaced with a new regulator.

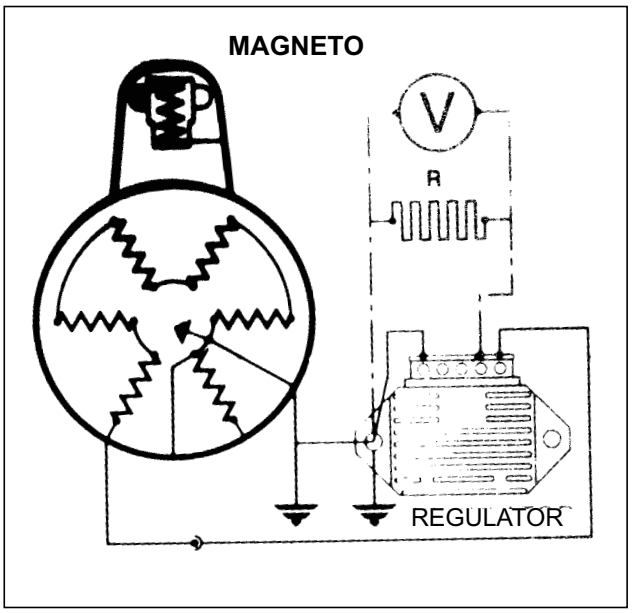


Fig. 17

Flasher unit (Thermal cut out):

This is an electronic flasher, which provides intermittent AC voltage to Turn signal lamp switch approx. 80 ± 20 times/min.and provides signal to the front and rear TSL bulbs. This is a sealed unit hence it can't be serviced. Replace in case of failure. To check the unit, connect 12 V DC supply as shown in fig.19 bulb should flash when the circuit is switched on.

Fig. 18

Buzzer:

This is connected to the circuit of the indicator and the beeping sound indicates that the turn signal light switch is in 'ON' position.

To check the buzzer, connect it directly to 12 V DC supply. It should produce a clear audible sound (fig. 19).

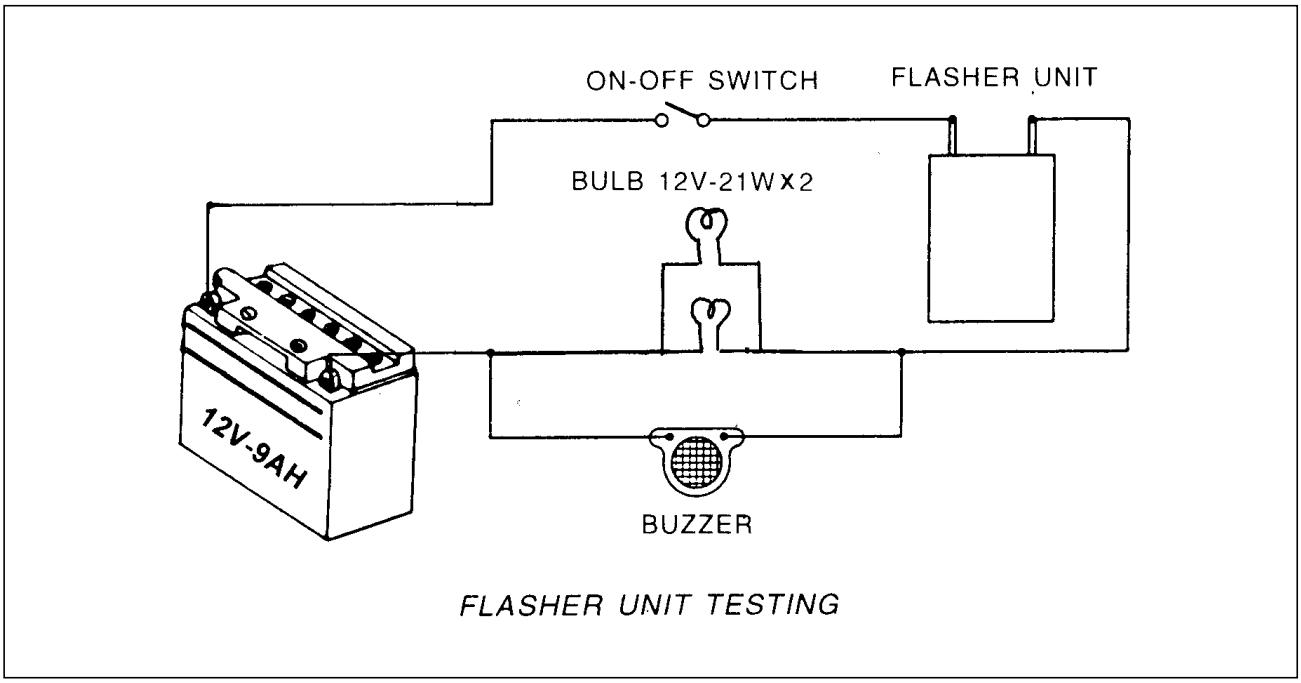


Fig. 19

ELECTRICAL UNITS TEST:

Horn (On Battery) **:**
This unit functions on 12volt DC supply from battery through horn switch to horn.
Check : Connect the input of 12 volt DC supply to horn. The horn should blow at its normal level of sound. In case of failure replace with a new horn.

Fuel Gauge

(a) The fuel gauge comprises of two separate units:
(1) Fuel Gauge unit is located in the speedometer.
(2) Float Unit is located under seat and inside the fuel tank.
(b) The gauge unit has two windings **'A'** & **'B'** placed at 90° from each other and are connected across the 12 volt rectified supply. One end of windings **'A'** is connected to earth; and the other with winding 'B' in series which leads upto Resistance **'R'** of the float unit.The reading on gauge unit scale depends on the current flowing through coil **'B'** or the resistance in circuit.The Resistance **'R'** varies and depends on the quantity of fuel in the tank which is controlled by float unit.

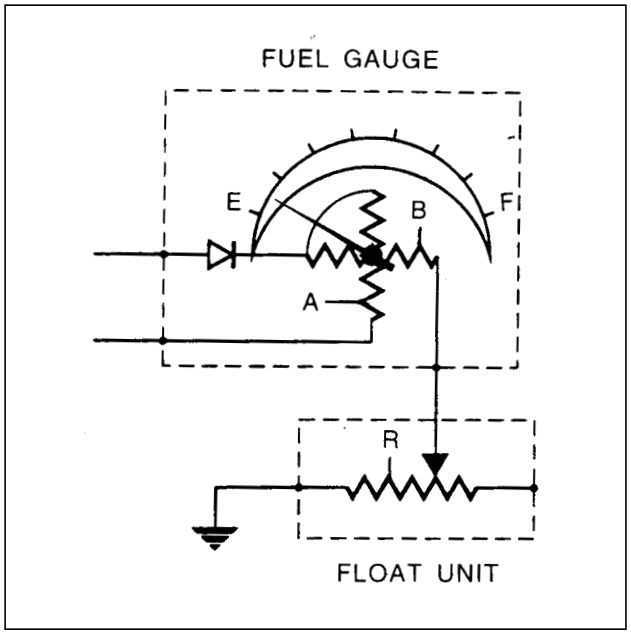


Fig.20
Fuel Gauge - Circuit Diagram

Testing :

Gauge unit -

(a) Connect the unit across the 12 volt A.C. supply (grey and black wire). (b) The gauge shows 'E' (Empty).
(c) Connect the third wire (white wire) to earth (black wire).
(d) If the unit shows 'F' (Full), it is in order.

Float unit:

(a) Remove the unit from the fuel tank and move the float up and down slowly.
(b) The fuel gauge needle should move freely. (c) If not, remove the white wire from float unit and connect it to earth.
(d) The fuel gauge should show full. This confirms that the float unit is not in order hence needs replacement with a new one.
(e) Preferably the resistance of float unit should be measured with an multimeter which should be 110 ± 10 Ω.

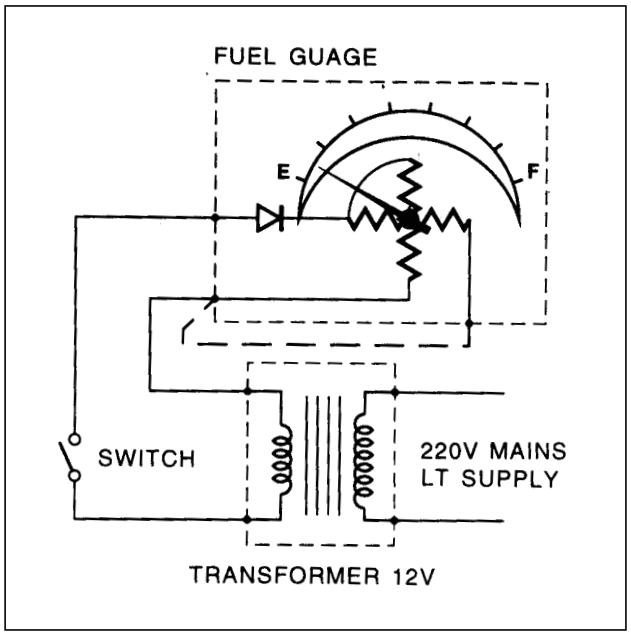


Fig.21
Gauge Unit - Circuit Diagram

INSTRUMENT PANEL

The instrument panel contains the followings:

1. Head Light High Beam Indicator
2. LH Turn Signal 'ON' Indicator
3. Neutral Indicator
4. Speed Indicator Needle
5. Odometer
6. Stop light indicator
7. RH Turn Signal 'ON' Indicator
8. Head Light Low Beam Indicator
9. Fuel gauge

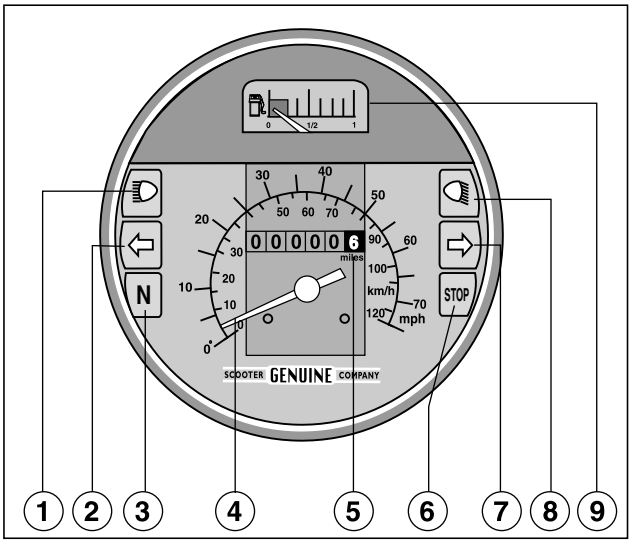


Fig.22

SELF STARTER (ELECTRIC START) SYSTEM

Main components in circuit:

1. Battery 12V 9Ah
2. Fuse 8 Amp.
3. Regulator cum charger
4. P.R.D.
5. Declutch switch
6. Push switch
7. Ignition switch (AC/DC type)
8. Cut-out relay
9. Starter motor

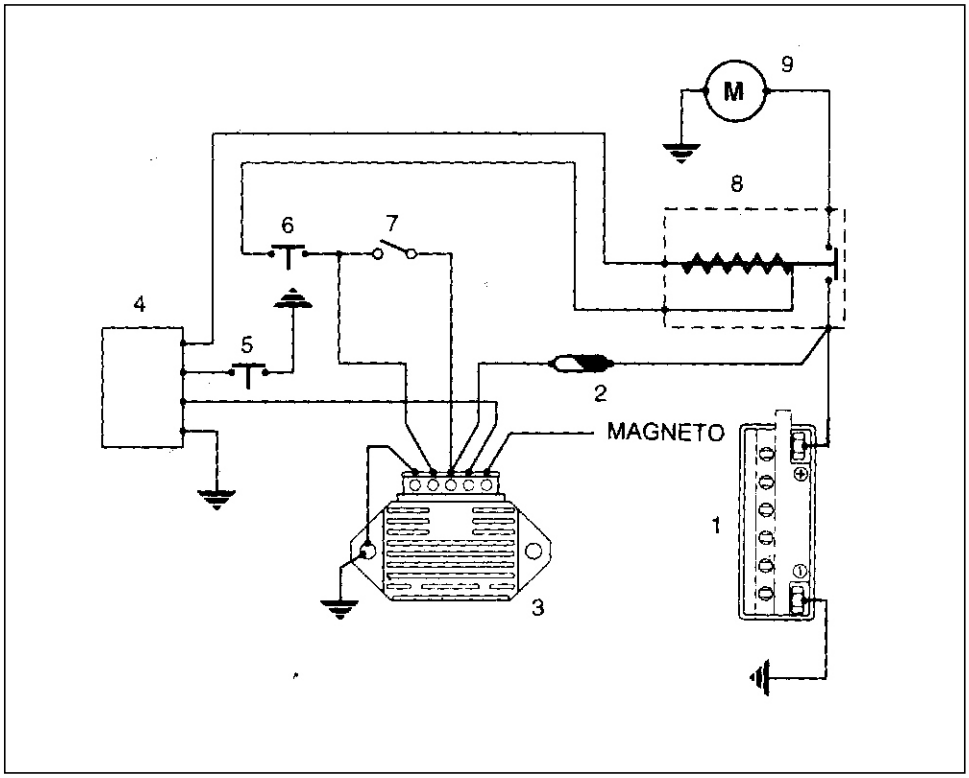


Fig.23

Circuit Diagram - Self Starter

Battery

Storage:

Batteries are supplied dry charged and should preferably be put to use within 12 months. It should be stored in a cool and dry place, in an uniform ambient temperature.

Inspection :

(a) Inspect the battery for any crack or damages before filling-in the electrolyte.

(b) Wash and clean with tap water.

(c) Remove adhesive tape, sealed tube from vent hole and fix bleeder tube of approximate 9" length with the vent hole.

Preparation of electrolyte :

(a) Take concentrated Sulphuric acid (laboratory reagent - 1.800 specific gravity) and one litre distilled water for preparing electrolyte.

(b) Add concentrated Sulphuric acid in distilled water and stir well, till the specific gravity reaches to 1.230 for Exide & 1.270 for Amco battery. (c) Allow the electrolyte to cool to room temperature (i.e.27°C). Again check.

(d) To correct specific gravity do as follows:

- Add distilled water, if the specific gravity is found more than 1.230.
- Add sulphuric acid, if the specific gravity is found less than 1.230

Caution :

Never add distilled water to concentrated Sulphuric acid. This can result in an explosion. Use apron and rubber hand gloves all times.

Filling of electrolyte:

(a) Remove the vent plug.

(b) Fill-up the battery with the electrolyte of recommended specific gravity upto maximum/upper level.

(c) Allow the battery to rest for approximate one hour for electrolyte to penetrate into the plates and separators.

(d) Top up each cell to maximum/upper level with electrolyte in case there is a drop in level due to soaking.

(e) Wash the top of the battery with tap water after the vent plugs are tightened in their position.

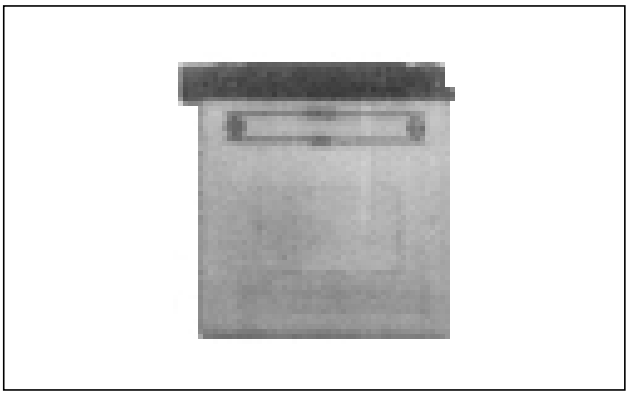


Fig. 24
Battery

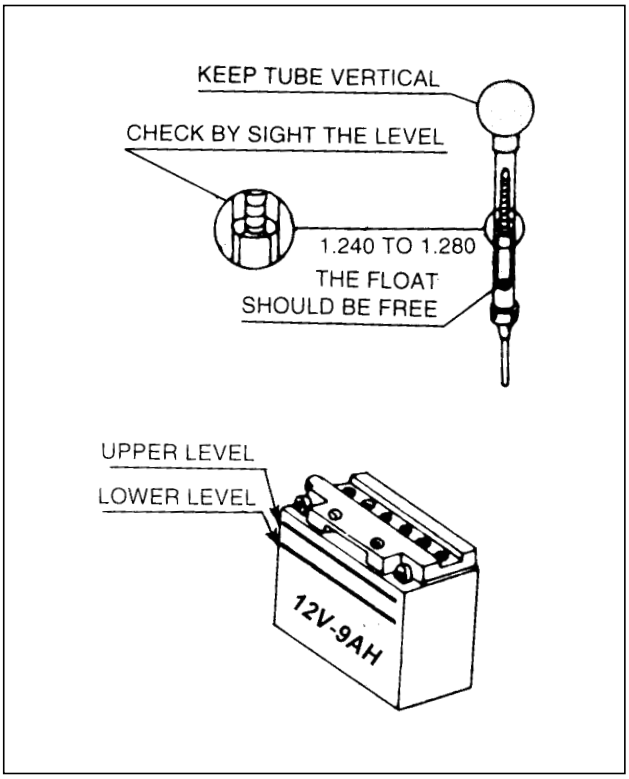


Fig. 25
Checking by Hydrometer

(f) Apply petroleum jelly on the terminals/cable clamps to avoid corrosion.

Initial Charging:

(a) Remove the vent plugs.

(b) Connect battery in parallel to charger, i.e., the +ve terminal of charger connected to the +ve terminal of battery and -ve terminal of charger connected to -ve terminal of battery.

(c) For more than one battery to be charged, batteries should be connected in series.

(d) Select proper voltage and current (0.9 A). (e) Continue charging at this recommended rate for 10-15 hours till the cells are gassing freely and the voltage remains same for 3 hourly readings at the top of-charge-voltage, i.e., 15.9 to 16.9 volt.

(f) On completion of charging, check the final specific gravity and level of electrolyte in each cell.

(g) Adjust level of specific gravity to the recommended specified gravity by adjusting the electrolyte with:

- Distilled water in case the specific gravity is higher.
- Dilute sulphuric acid of 1.400 specific gravity in case the specific gravity is lower.

Removal of battery :

(a) Turn the ignition key to “OFF” position.

(b) Remove the left hand cowl.

(c) Remove the screw securing earth cable (Black) connected to the negative of the battery terminal by using the correct screw driver.

(d) Remove the Red cable from the positive terminal of the battery.

(e) Remove the battery and bleeder tube.

(f) Detach the fastener belt and take out the battery.

Precaution:

Keep the battery and bleeder tube away from the scooter to avoid any damage to the painted surface due to leakage or slipage of electrolyte.

This operation should be done with the battery on charge to allow for proper mixing. Re-fit vent plugs, wash the top of battery with tap water and apply petroleum jelly on the terminals/cables clamps before installing the battery on the scooter.

Caution:

When more than one battery is to be charged, the batteries must be connected to each other in series, in order to ensure that same charging current can flow through each battery. While the charging is in process, if the temperature of electrolyte exceeds 50° C, stop charging to allow the battery to cool. Always keep the charger 'OFF' before connecting or removing the charger lead. Never use a charger without reading instructions. Batteries expel explosive gases, keep naked flame away.

Fig. 26
Battery

Installation of battery :

(a) Clean the battery box. (b) Clean the battery thoroughly from outside. (c) Put the battery on the battery box. (d) Connect the fastener belt first to the lower hook. (e) Hold the battery firmly with one hand. (f) Stretch the belt and fasten it to the upper hook (Fig.27). (g) Fix the battery bleeder tube and ensure it is routed properly through its clamp. (h) Connect (+ve) terminal first, then the (-ve) terminal. (i) Make sure the battery cable does not touch any metallic surface during fitment. (j) Apply petroleum jelly around the terminals to prevent corrosion.

Caution:

Always ensure that the bleeder tube is not clogged, crimped or bent. The tube should be of proper length i.e. 9". Replace the bleeder tube in case it is clogged or not of correct length.

Storage of battery while not in use.

(a) Keep the battery fully charged. (b) Maintain the electrolyte level at maximum/ “upper level”. (c) Take battery out of the vehicle and store in a cool dry place and at constant temperature. (d) Keep the battery away from rain, dew, high moisture and direct sun light. The battery should be charged once in a month, when the vehicle is not in use. (e) For initial charging the battery must be charged atleast for 10-15 hours.

Testing Procedure

(a) Remove the battery as explained above. (b)Connect the battery on load tester ensuring Red lead of tester to (+ve) and black lead to (-ve) terminal of battery.(c) Check the terminal voltage of battery. (d) It should be 12 - 14.5 volts. (e) Press the push button on the tester and watch the voltmeter reading on load. (f) If the battery voltage does not drop below 9 volts, this indicates that the battery can take the load of self starter motor.(g) Check the specific gravity of electrolyte in each cell. (h) The specific gravity of each cell should not be less than 1.230. (i) Put the battery on charge, if required and carry out load test. (j) Diagnose the nature of failure as under:

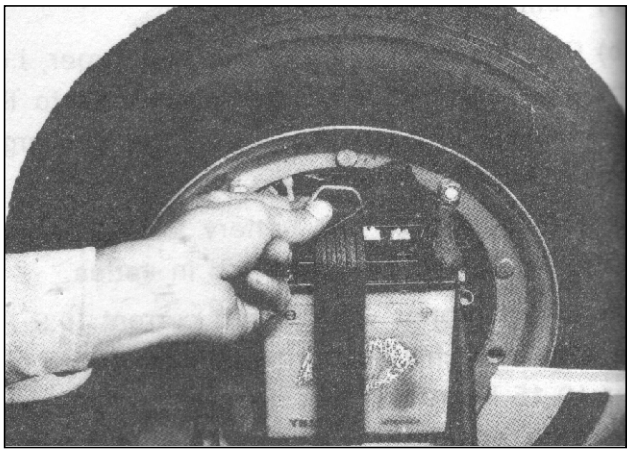


Fig. 27
Installation of Battery

Cell Dead : If on load the battery voltage is found less than 9.5 volt and one or more cell show specific gravity less than 1.230.

Cell boiling : Battery voltage on no load may be in between 12 - 9.5 volt. On load it will be around 4 volts and one or more cell start gasing (similar to boiling action).

Open circuit : During charging battery does not pick-up the charge.

In any of the above case, replace the battery.

Caution:

During inspection, if the battery is found defective, before placing a new battery, checking of the charger circuit of scooter is a must.

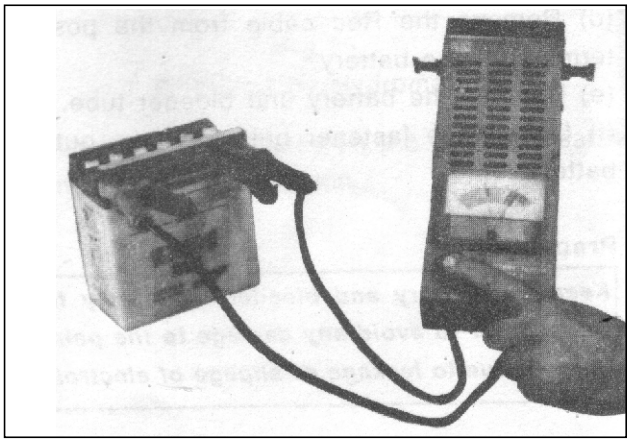


Fig. 28
Checking of Battery

P.R.D. (Preventive Restarting Device) :

This is an electronic cut off switch, which connects the circuit of cut-out relay while starting and cuts off after starting the engine. Thus engine can't be cranked in the running condition. It guards the teeth of starter motor and flywheel (Carona gear) from damage.

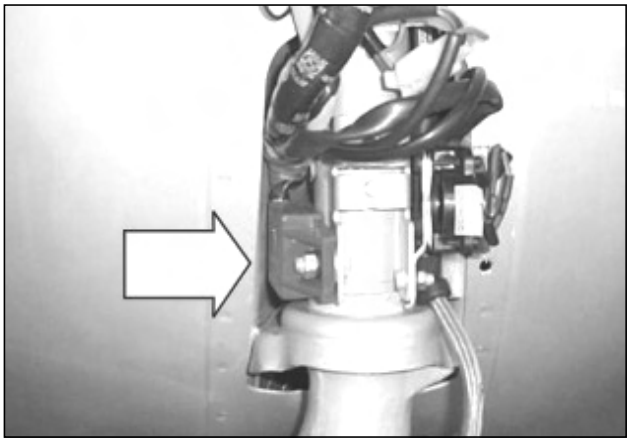


Fig. 29
PRD

The P.R.D. relay can be checked as follows:

(a) Connect the P.R.D., bulb (12V-10W), battery (12V), push switch, ON/OFF switch and 12 volt A.C. supply as shown in fig.30
(b) Switch 'OFF' the ON/OFF switch and press the push switch. The bulb should glow.
(c) Switch 'ON' the ON/OFF switch and again press the push switch. The bulb should not glow.

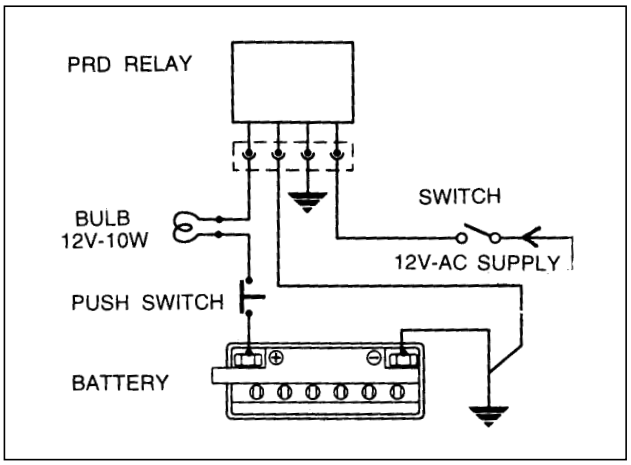


Fig. 30
Circuit Diagram -PRD Relay

Cut-out relay :

(a) Connect the cut-out relay as shown in fig.32 and press the button.
(b) Relay should operate with click noise and light should glow.
(c) If no noise is observed the relay is open circuited.
(d) If it fails to crank starter even after clicking, the contacts are dirty/pitted. Clean with fine emery paper and refit.

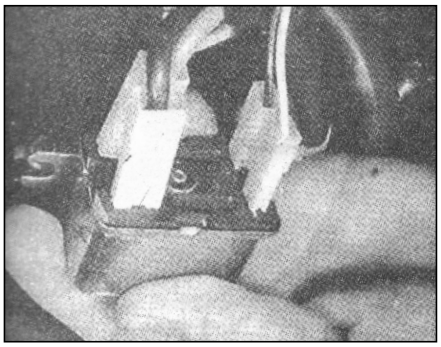


Fig. 31

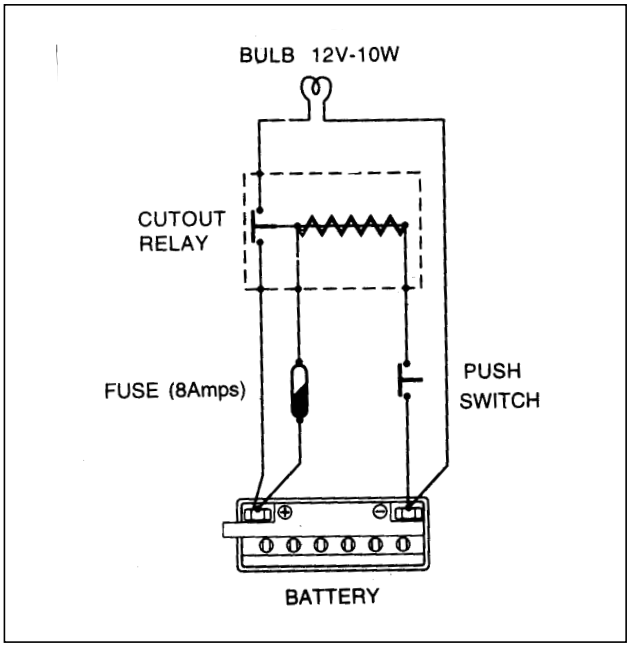


Fig. 32
Circuit Diagram - Cut Out Relay

STARTER MOTOR

Main features:

Rated voltage	12V
Rated output	0.35 KW
Direction of Rotation	Left hand (Anti clock wise)
Type of motor	DC series motor
Meshing	By pinion and crown gear on fly wheel
No load current	30 Amp.
On load current	60 Amp.
Jammed starter	200 Amp.

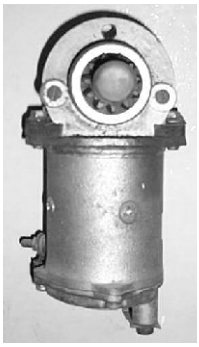


Fig. 33

Removal & re-fitting of starter motor :

(a) Remove the RH cowl and rear wheel.

(b) Remove the rear shock absorber bottom mounting bolt and take the shock absorber away from crank case shocker mounting.

(c) Remove fan cover by un-screwing the five screws (Fig.34).

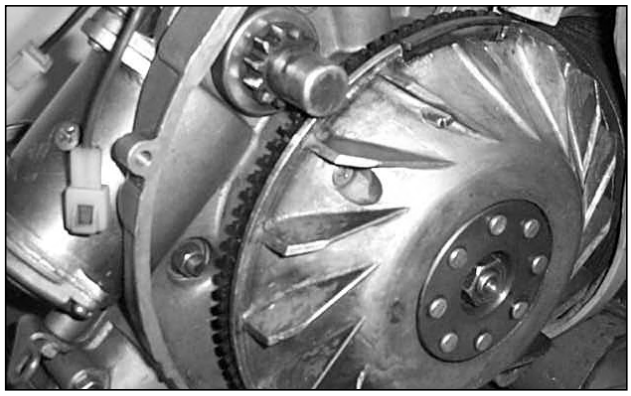


Fig. 34

(d) Pull back the insulating cap and remove the nut and washer from the starter motor lead terminal.

(e) Disconnect the blue lead from the terminal. Remove the three nuts **'A'** holding the motor **'C'** and take out washers. (Fig.35).

(g) Un-screw the bolt **'B'** from the lower bracket holding the motor.

(h) Remove the motor from the engine.

(i) Follow the reverse procedure for re-fitting.

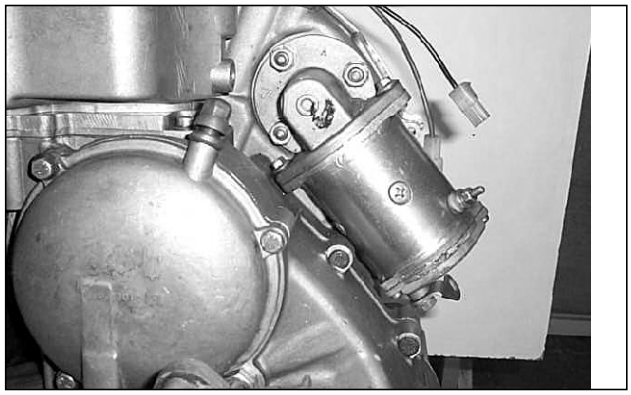


Fig. 35

STARTER MOTOR - EXPLODED VIEW

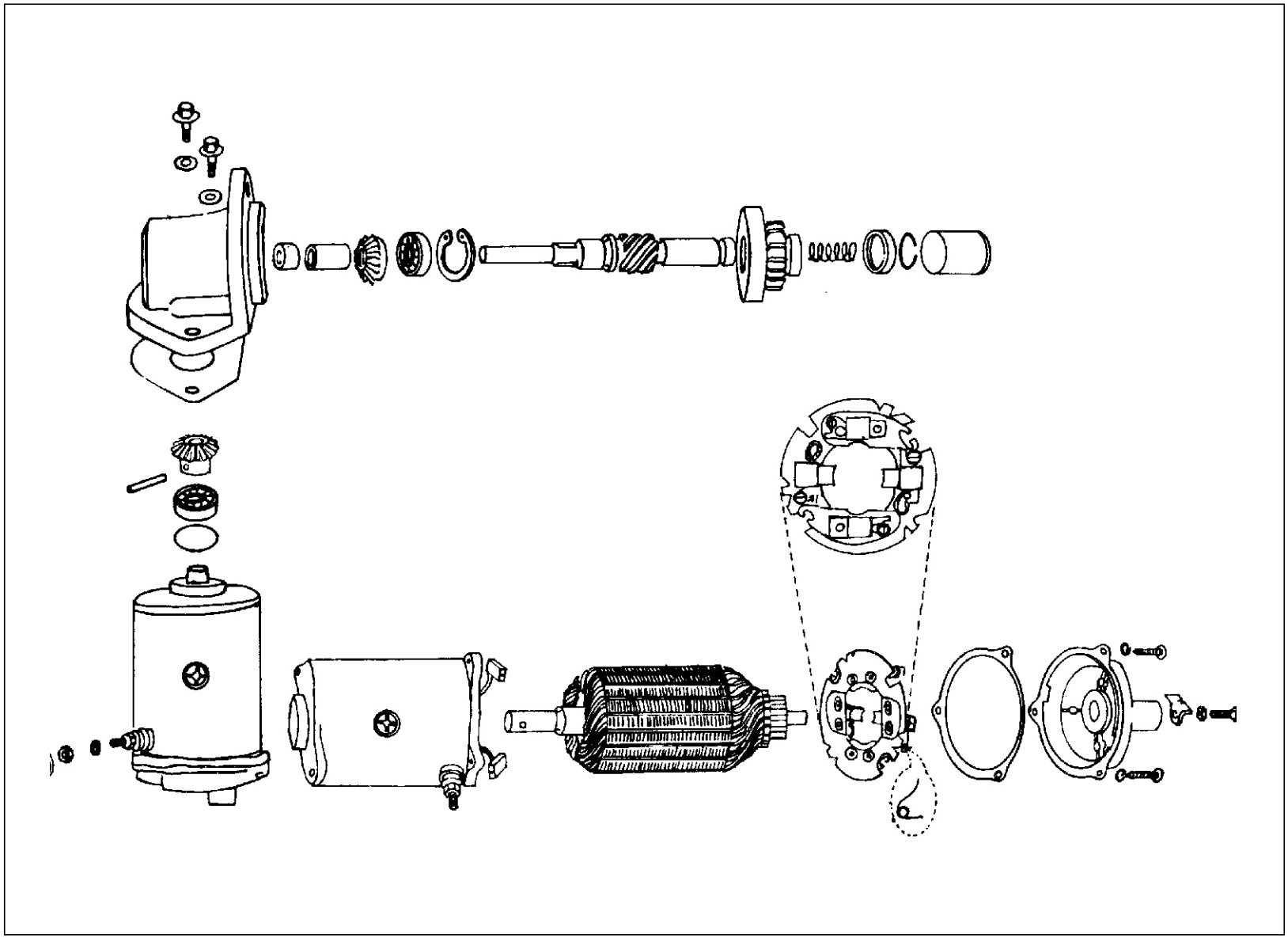


Fig. 36

LIGHT SWITCHES

Main Switch :

(a) Disconnect the plug-sockets connection from wiring harness and head lamp bulb holder.
(b) Check for continuity test with multimeter for each operation.
(c) If the continuity shows perfect then the switch is good.
(d) In case continuity does not show then the fault may be attended by giving proper connections.
(e) If still the continuity does not show then complete switch is to be replaced.

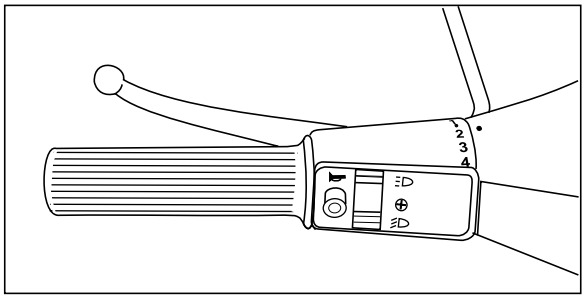


Fig. 37

Blinker Switch :

(a) The blinker switch is located on the right hand side of handle bar.
(b) By disconnecting the connection of switch contacts; the switch circuit can be checked for its continuity by multimeter.

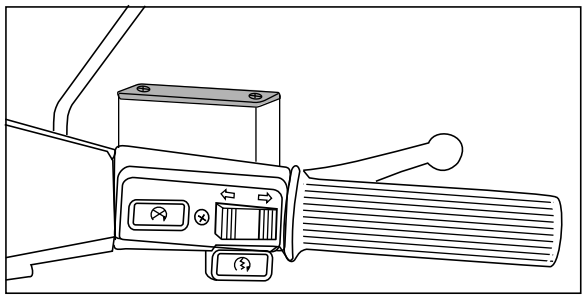


Fig. 38

Note:

Auto start push button switch is extra fitted at the bottom side of Blinker switch.

Engine Kill Switch :

The kill switch is located on the right hand side of handle bar.

Check : It can be checked for continuity by connecting with multimeter and pressing the push button.

Brake light switch:

(a) Rear brake light switch is fitted on the support bracket of rear brake pedal.
(b) One switch also fitted on front brake cable; which functions on operating the front brake lever.

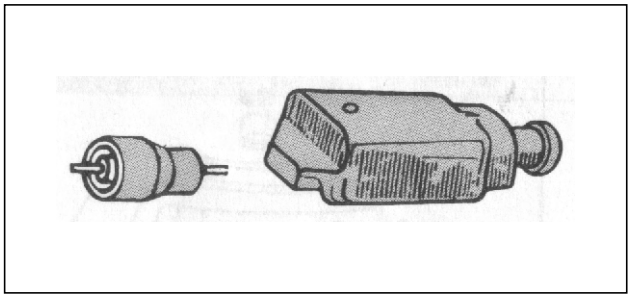


Fig. 39

AIR - FUEL SYSTEM

AIR-FUEL SYSTEM

Air-fuel flow diagram:

(a) Petrol is supplied from the fuel tank to carburettor inlet by gravity feed, controlled by a fuel cock.

(b) A fuel filter is provided in between for trapping any sediments in the fuel before atomisation of fuel in carburettor.

(c) Air cleaner directly connected on carburettor air inlet side, supplies clean air through cleaning process, by nylon netted cleaner, fitted in the air cleaner.

The fuel is atomised and mixed with clean air in the carburettor in proportionate quantities and supplied to the engine which is connected directly to crank case. The fuel gases are controlled with rotary distribution by crank web in the engine. The supply through 5 transfer ports to the combustion chamber is made through reed valve.

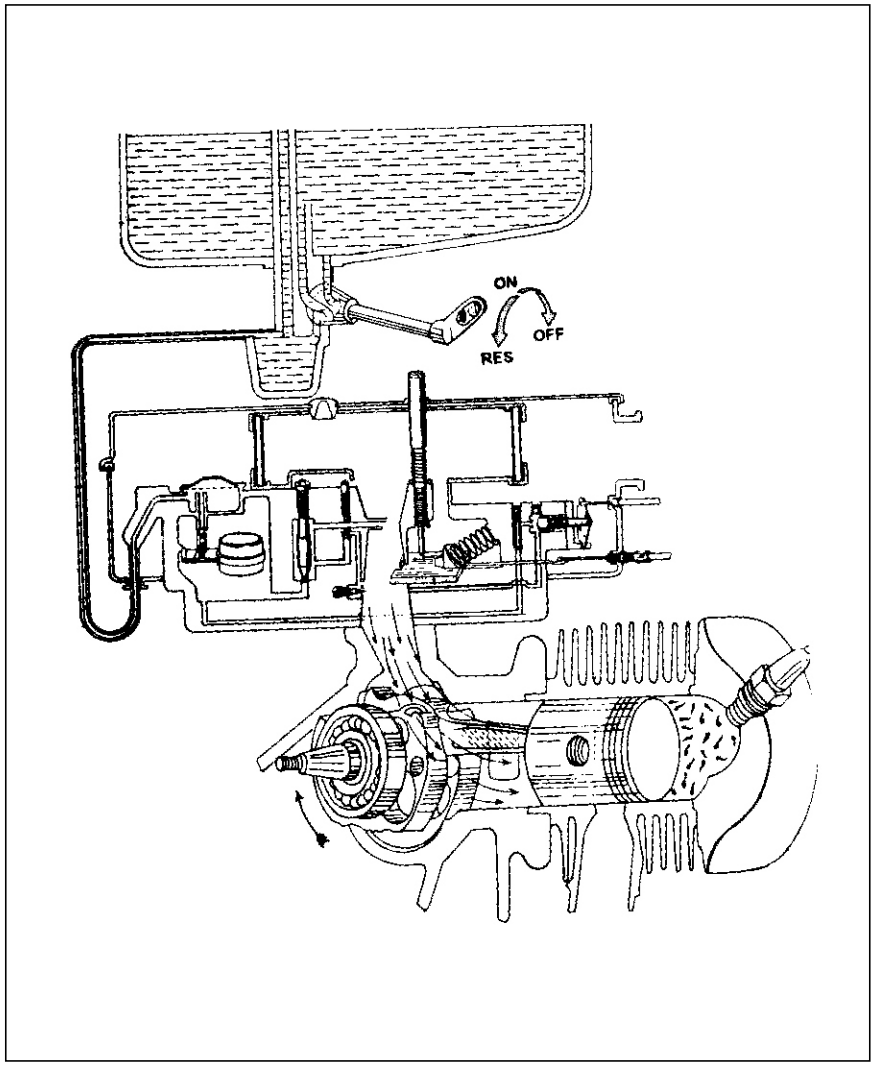


Fig.40
Air Fuel System

CARBURETTOR

Specifications:

Make	Spaco
Model/Type	20/20D, Down draft
Slow running jet	40/130
Starter jet	60
Air metering jet	140
Defuser	E-3
Main Jet	92
Slide	7.5 x 7.5 SCOOP
Mix.screw setting	Spaco ½ to 1½

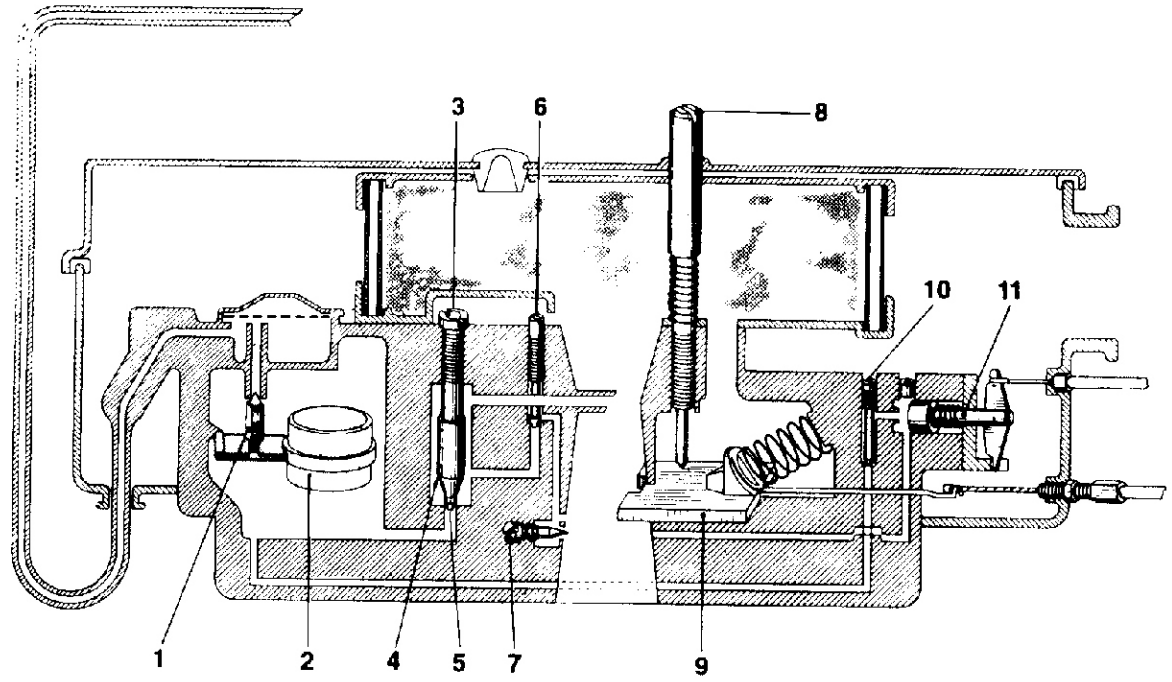


Fig.41 - Circuit Diagram of Carburettor

1.	Float needle	**7.**	Mixture adjusting screw
2.	Float	**8.**	Idling screw
3.	Air metering jet	**9.**	Throttle slide
4.	Defuser	**10.**	Starter jet
5.	Main jet	**11.**	Choke device
6.	Slow running jet		

Carburettor :

The carburettor is the heart of the scooter. It's function is to provide the correct air fuel mixure, in an atomised state to the engine. It also controls the speed of the engine.

Removal of carburettor:

(a) Remove right hand side cowl and take out the air cleaner box cover by un-screwing two screws.

(b) Remove air cleaner by unscrewing two screws.

(c) Un-hook choke cable and throttle cable from carburettor.

(d) Turn fuel cock to 'OFF' position.

(e) Take out clip and pull out fuel pipe from banjo pipe.

(f) Slacken and remove two sleaved nut by box spanner and take out the carburettor assembly and packing.

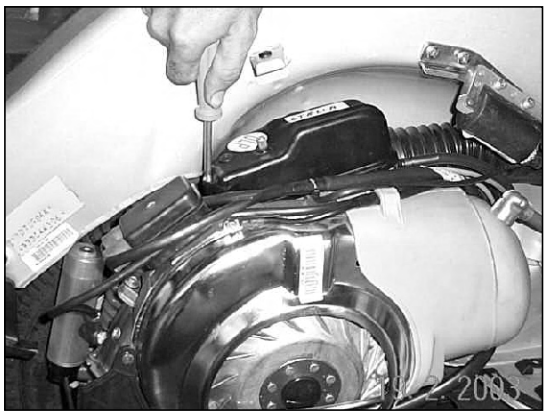


Fig. 42-Step 1

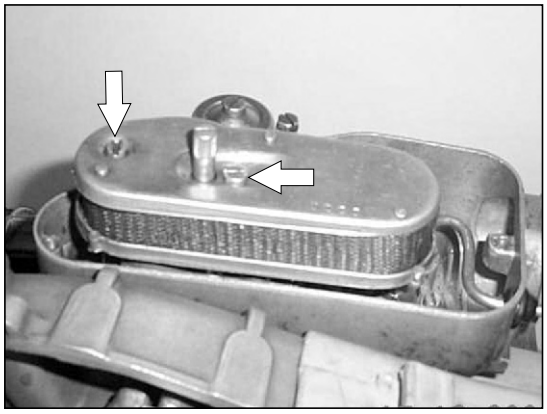


Fig. 43-Step 2

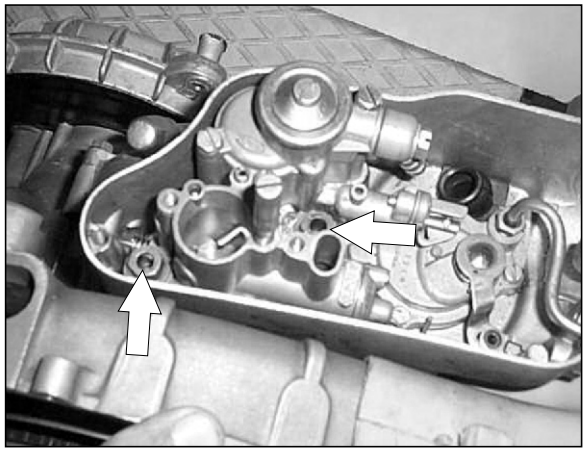


Fig. 44-Step 3

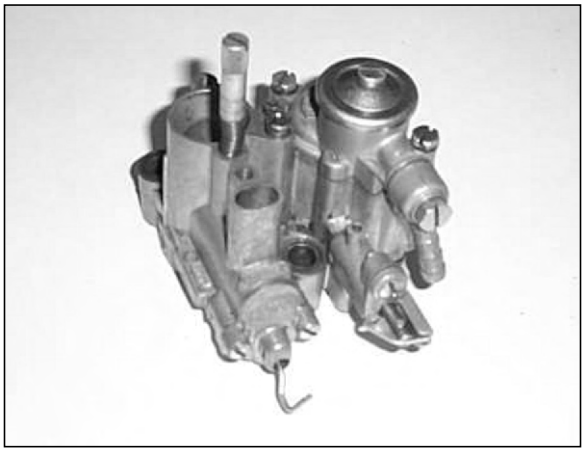


Fig. 45-Step 4

Dismantling, overhauling, re-assembly :

(a) Remove inlet nylon filter cover by a suitable open end spanner or screw driver and take out the filter and clean it.

(b) If there is any evidence of dust or water contamination, clean the fuel tank.

(c) Slacken two screws retaining float cup cover and remove it.

(d) Please ensure that the gasket is not damaged.

(e) Push the float pivot pin by a small screw driver and take out the float and needle.

(f) Take out the throttle slide by unscrewing two retaining screws on the side of carburettor.

(g) Remove the choke unit by slackning the retaining screw.

(h) Remove adjusting screw and slow running adjusting screw alongwith spring.

(i) Remove slow running jet, main jet assembly and starter jet from the housing with the help of screw driver.

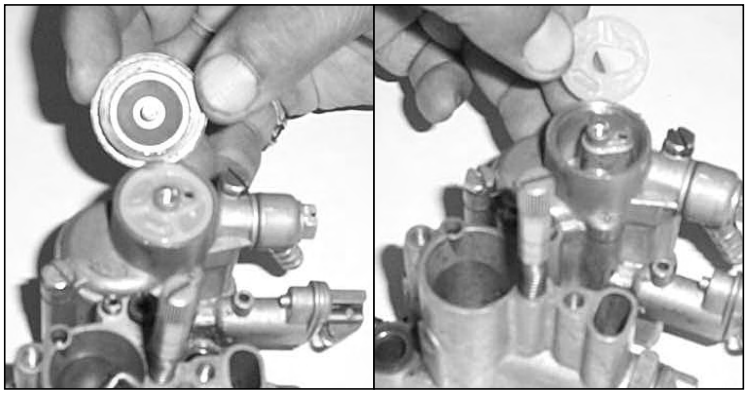


Fig. 46-Step 1

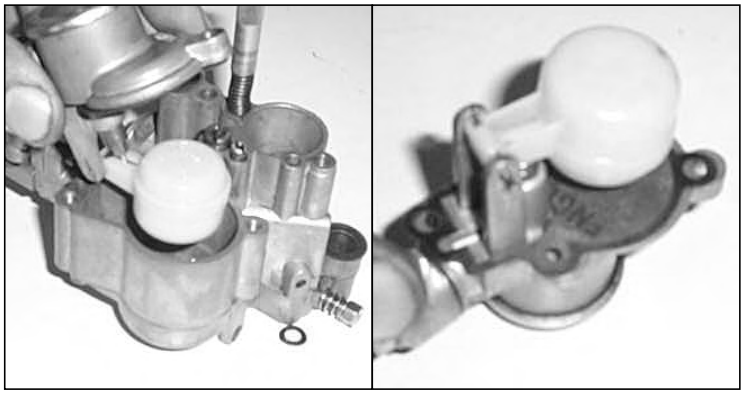


Fig. 47-Step 2

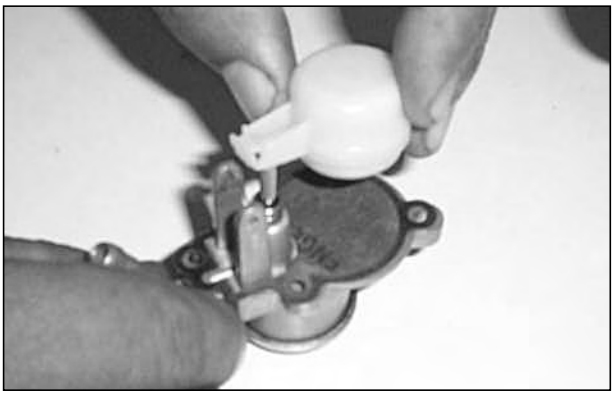


Fig. 48-Step 3

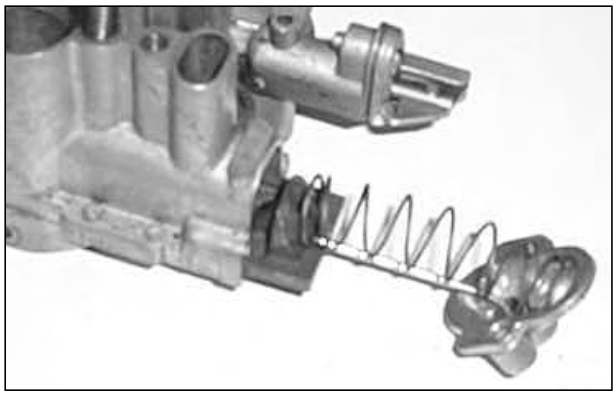


Fig. 49-Step 4

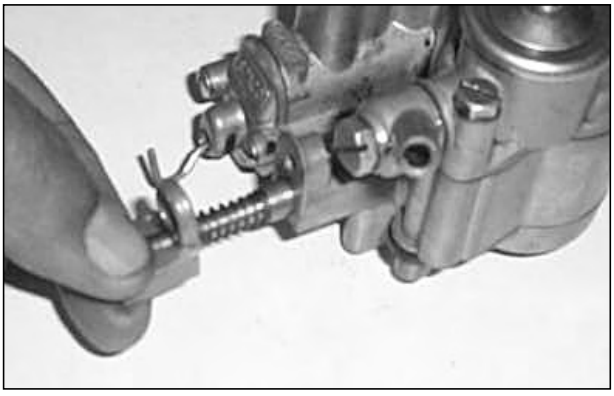


Fig .50-Step 5

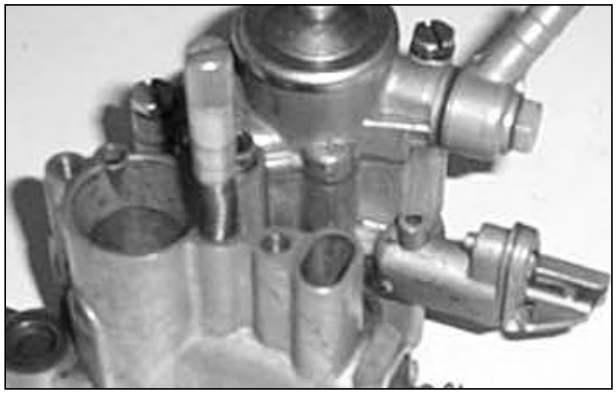


Fig. 51-Step 6

(j) Separate main jet, defuser (Automiser) and air gauge by pulling as these are press fitted to each other.

Care to be taken :

After dismantling all parts of carburettor place them in two different cleaning trays.

(1) Place all the jets, Float needle valve, float pin, float, slide, idling speed screw and mixture screw with spring in tray filled with 100ml of kerosene.

(2) Place all castings and other parts into tray filled with 200 ml. kerosene. Discard all gaskets.

Cleaning :

Clean each part thoroughly with the brush in each tray.

(a) Insert one hair of the paint brush and insert into all the holes of the main jet, slow running jet and starting jet.

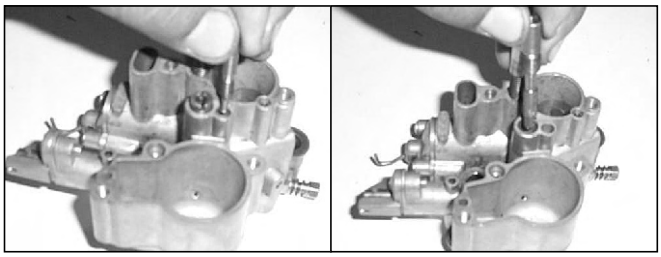
(b) Blow compressed air into all the holes of castings and all jets so as to remove any remaining dust particles from it.

(c) Air filter and fuel filters should be washed thoroughly in kerosene and blow dry.

(d) Inspect the float for any puncture and jets for any deformation.

(e) Clean all the jets and its parts in clean petrol and blow out by compressed air.

(f) Check the needle for any worn out mark on it's conical seat. If found, replace with new needle.



Slow Running Jet - Fig.52 - Main Jet

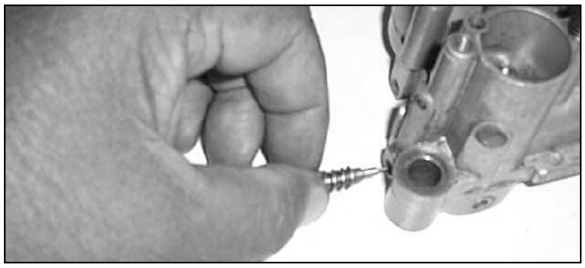


Fig. 53-Mixture Screw

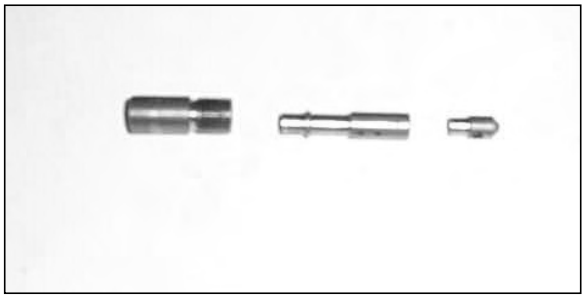


Fig. 54-Main Jet Assembly

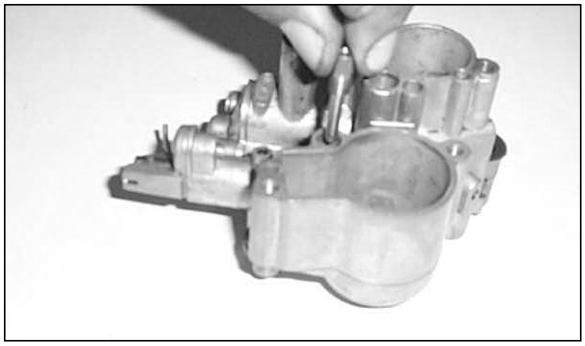


Fig. 55-Air Jet

Checks :

Check throttle slide: It should move freely and should not have any sign of wear, which may lead to improper idling adjustment. If the problem cannot be rectified by replacing the throttle slide, then change the carburettor body/ complete carburettor assembly.

Check choke piston : for any wear and leakage of gasket. Replace, if necessary.

Check jets : Inspect the holes of jets with a magnifying glass. If any hole is found enlarged, replace the jets as per table given on page no. 31.

Float needle valve :

(a) Inspect the conical rubber tip of the valve with a magnifying glass.
(b) If the surface of conical part is found worn out and is not perfect, then replace the valve.

Float : Hold the float exposed to SUN light or any brighter light of powerful bulb. If petrol is found inside the float, replace it.

Float pin :

(a) Check for any bend, wear, loosness and over tightness.
(b) Insert the pin in float hole and check for free movement.
(c) If any above problem is there, replace both the float and pin.

Re-assembly of carburettor : Follow the reverse procedure of dismantling.

Caution :

(1) Never over tighten the jets as it will lead to deformation of the orifice. (2) Never over tighten float cup cover screw and benjo bolt. This may damage the threads of carburettor body and may require replacement. (3) Always use jets, slide and air diffuser as per specifications. (4) Never clean the jets by steel wire, which may enlarge its size and will affect the fuel consumption of scooter.

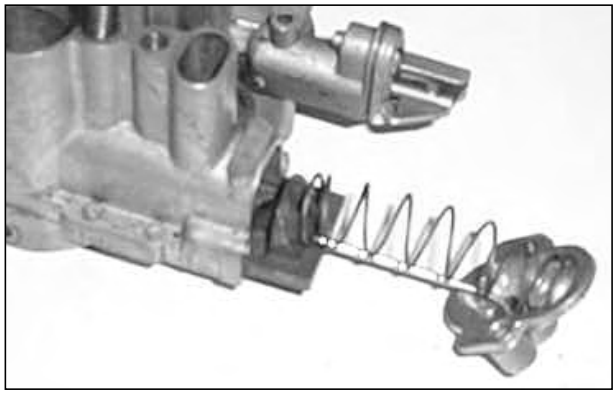


Fig. 56-Check throttle slide

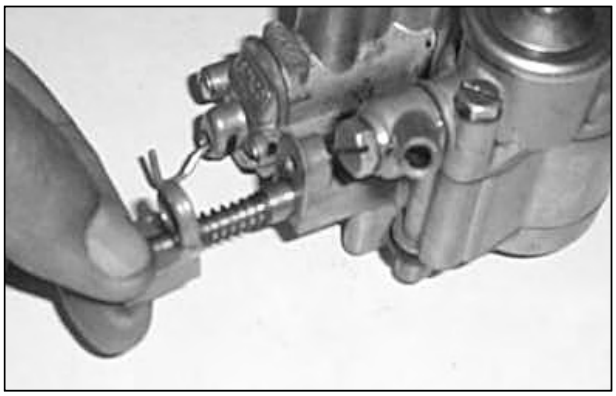


Fig. 57-Check choke piston

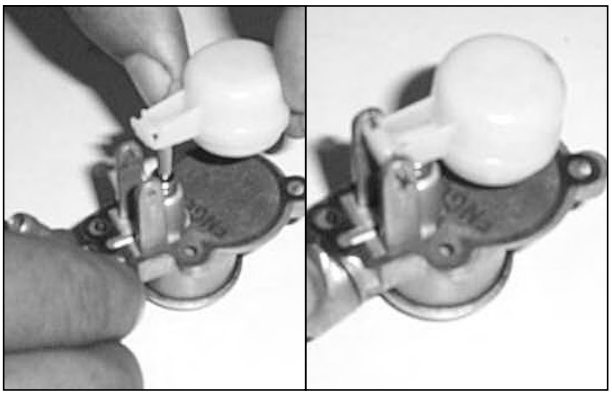


Fig. 58

Installation on Scooter :

(a) Place a new base gasket on the mounting face of engine.

(b) Open the mixture screw anticlockwise to 1½ turn for both and make of carburettors.

(c) Place the carburettor on the gasket inside the housing and gently tighten the bolts.

(d) Finally torque down the bolts to specified torque values (1.6 - 2 kgm) Bolts are tightened alternatively and progressively.

Carburettor tuning:

(a) Start the engine and warm up for 5 minutes.

(b) Close the mixture screw until lightly seated.

(c) Now open mixture screw by 1 turn with a screw driver.

(d) Start the engine and keep idle screw in such a position that engine should not stop.

(e) Observe the change in r.p.m. by turning mixture screw by 1/4 turn either clockwise or anticlowise.

(f) Engine r.p.m. gets increased at one stage.

(g) Hold the mixture screw and reduce the engine r.p.m. between 1000-1300 by idling screw adjustment.

(h) Observe any misfiring of a lean mixture at higher r.p.m. by accelerating engine to full throttle and gradually deaccelerating throttle.

(i) If problem is noticed then open mixture screw slowly.

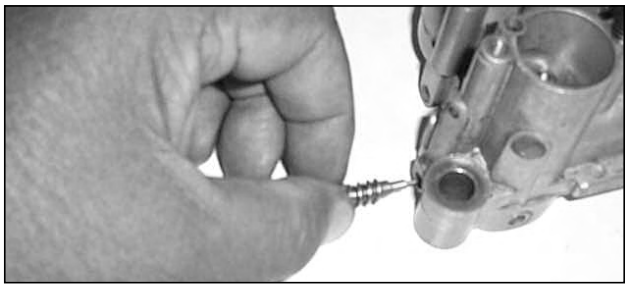


Fig. 59

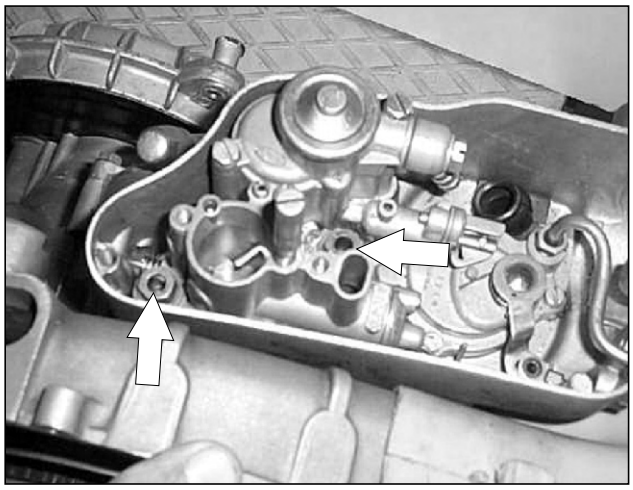


Fig. 60

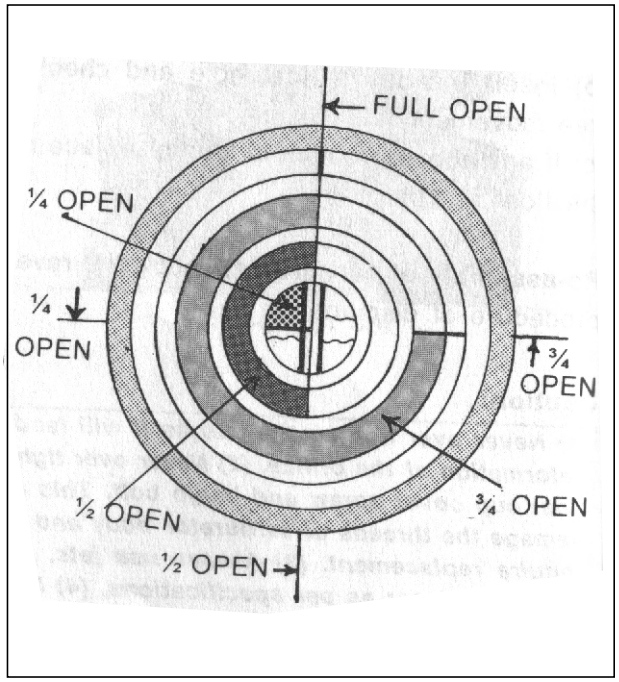


Fig. 61

Reed valve :

Reed valve assy. is a long life component and does not require regular service. In case of overhauling, ensure that the gasket between reed valve and the air cleaner box is intact, as well as the gasket between crankcase and reed valve. **Under no circumstances should the reed valve or its stopper plate screw be disturbed.** In order to separate the crankcase halves, or to replace the crankcase, the **Reed Valve** has to be removed and reinstalled.

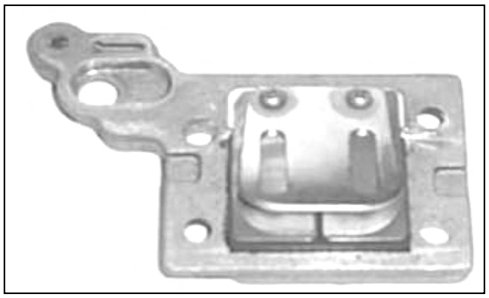


Fig. 62

Removal :

1. Remove the air cleaner cover, air cleaner, carburettor and air cleaner box from the engine.
2. Remove the gasket between reed valve and the air cleaner box.
3. Remove the **Reed Valve** by unscrewing two screws and curved washers which secure the reed valve to the crankcase (fig. 63).
4. Remove the gasket between crankcase and the reed valve

Fig. 63

Installation :

1. Clean the area on the crankcase where the Reed Valve will sit.
2. Apply a thin layer of **RTV Silicon sealent** on both sides of a new gasket, put it on the crankcase face, and place the Reed Valve in its position.
3. Replace and tighten the two screws and curved washers to secure the Reed valve.
4. Again apply a thin layer of **sealent** to a new gasket, and place it in its position on the surface of Reed valve.
5. Replace the air cleaner box, carburettor, air cleaner and air cleaner cover.
6. Start the vehicle and check the performance.

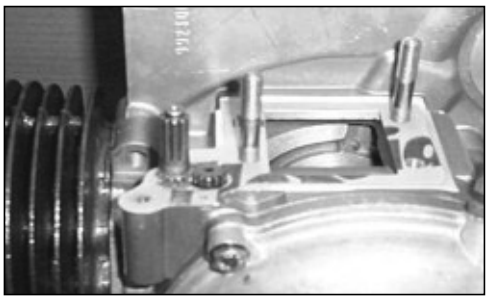


Fig. 64

Caution :

1. *Parts should be clean and free from dust, grease or oil before application of sealent.*
2. *Ensure that only thin layer of sealent to be used and it should not spill out in the cavity of reed valve.*
3. *Under no circumstances any resetting or adjustment of any sort is to be carried out on reed valve stopper plate or its two no, screws which are locked with application of 'Loctite'.*

Air cleaner:

(a) Take out air cleaner **'A'** by unscrewing two screws **'B'**. (fig.65).

(b) Blow dry with compressed air.

(c) Clean the air filter throughly with Kerosene in a clean tray.

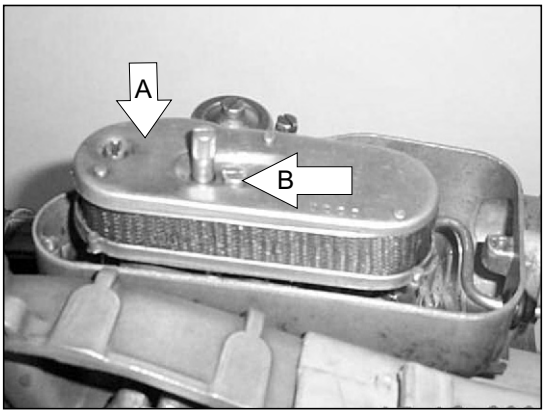


Fig. 65

Air filter :

Air filter is fitted over air intake hole on the chassis below the dual seat. Cleaning is required during each periodical service. Cleaning of airfilter is frequently required if the scooter riding is done in dusty areas.

Procedure for cleaning:

- Lift the seat and take out the air filter by unscrewing it from the support plate.
- Rinse the filter in **kerosene or petrol only** till it is fully cleaned.
- Blow dry the filter with low air pressure.
- Refit the filter ensuring proper positioning of its gasket.

Fig. 66

Fig. 67

'AOM" (AUTOMATIC OIL MIXER) DEVICE

Description:

Stella scooters are fitted with Automatic Oil Mixer device for lubrication of engine. A separate oil tank No.**2** for Two stroke oil has been provided in scooter fitted with "AOM" device and the existing fuel tank No.**1** is used only for filling **pure petrol**. The "AOM" device is fitted inside the air cleaner box and connected with throttle control for its operation.

The oil is supplied to the engine through its ventury tube in exact quantity with correct ratio by a piston pump **'P'.** Pump is controlled by gear transmission, which is attached with crank shaft as shown in fig.69. The carburettor receives petrol through a normal gravity feed system.

The oil tank No.**2** is fitted with a transparent cup No.**3** for checking oil level, (fig.69), positioned near the fuel cock lever.

When the oil level is low then top up Two stroke oil immediately to avoid air bubbles and maintenance work.

Note:

Ensure that the oil inlet pipe 'T' from tank to 'AOM' is completely full. If air bubbles are present then take out the pipe 'T' from 'AOM' side and bleed the air so that the bubbles are completely eliminated. Reconnect the pipe. (fig.70)

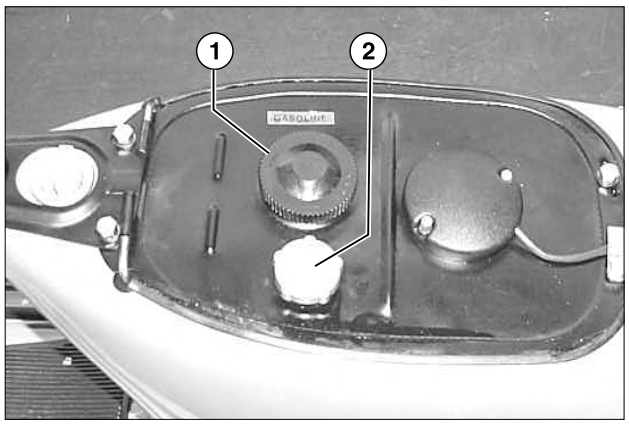


Fig. 68

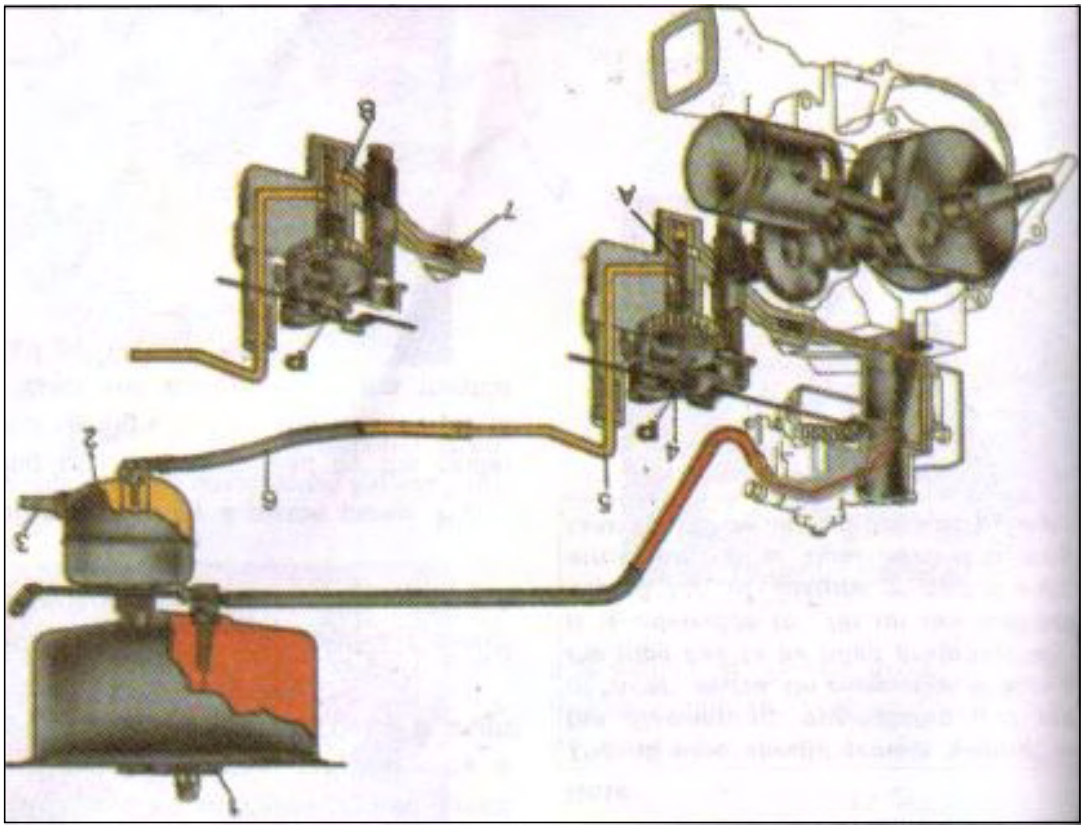


Fig. 69

1. Petrol tank cap, **2.** Oil tank cap, **3.** Sight glass level of oil, **4.** Fixed case of "AOM" device, **5.** Oil inlet pipe, **6.** Oil supply pipe, **7.** Oil supply valve **A.** Suction period, **B.** Delivery period.

Advantages:

(a) The automatic oil mixer device is designed to ensure the perfect lubrication of two stroke engine at various speeds and load conditions.

(b) With "AOM" device, the oil quantity varies with respect to engine r.p.m. This reduces the carbon deposits at spark plug, cylinder piston unit and silencer neck. It will ultimately reduce the expenditure on decarbonising of these items.

(c) The chances of filling incorrect quantity, type and substandard quality of oil are completely eliminated by using an 'AOM' device.

Functions:(How the device works)

The complete ''AOM'' device system is shown in fig. 69

(a) Tank No.**1** is filled with pure petrol, which is directly connected to the carburettor by a connecting fuel pipe and supplies petrol through a normal gravity feed system.

(b) The oil tank No.**2** is filled with **2-T** motor oil and is connected by a separate oil tube No.**5**

(c) The oil is sucked by a piston pump **'P'.**

(d) Running of pump is guided by the radial position of a sliding block, on the inclined plane of piston itself and controlled by the throttle cable linked by a lever.

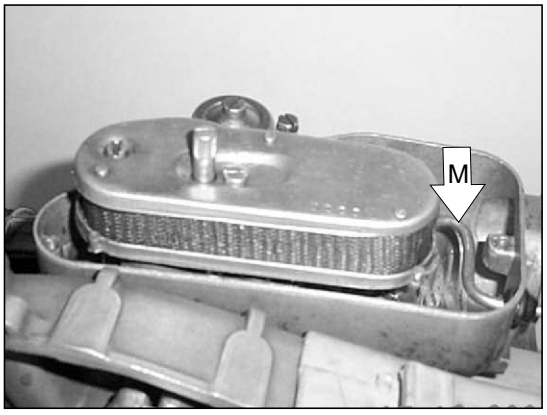


Fig. 70

(e) By each position of throttle twist grip, the sliding block comes to specific positions of opening gap due to the piston run (suction period **'A'** and delivery period **'B'**). Therefore the quantity of sucked oil changes according to the throttle opening and engine r.p.m.

Note:

The oil pipe should remain without oil during the dismantling, overhauling and reassembly of "AOM" device. On completion of above process, the pipe has to be filled progressively with oil, it is advisable to fill up the fuel tank (No.1) with 3 Ltr. of mixture of petrol and 2% Two stroke oil. After this, next refuelling of fuel tank should be carried out with pure petrol only.

DISMANTLING, OVERHAULING & RE-ASSEMBLY

Dismantling:

(a) In order to overhaul the ‘‘AOM’’ device for its proper functioning, dismantle the device from engine.

(b) Close the fuel cock and burn out fuel (by running engine) in pipeline **'A'** and of carburettor.
Disconnect oil inlet pipe **'B'** from carburettor side.(fig.71)

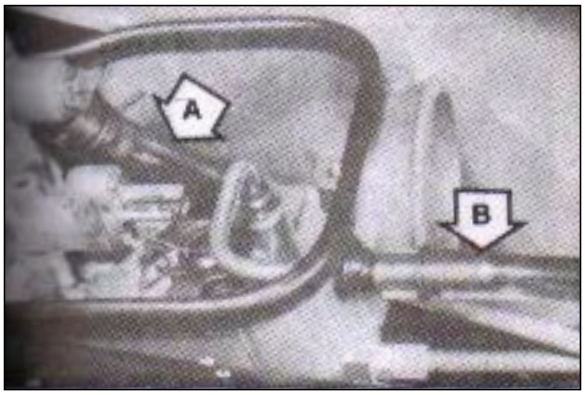


Fig. 71

(c) Remove the air cleaner box cover, air cleaner and carburettor assy. by disconnecting throttle **'A'** and choke control **'B'** cables and fuel pipe. (fig.72)

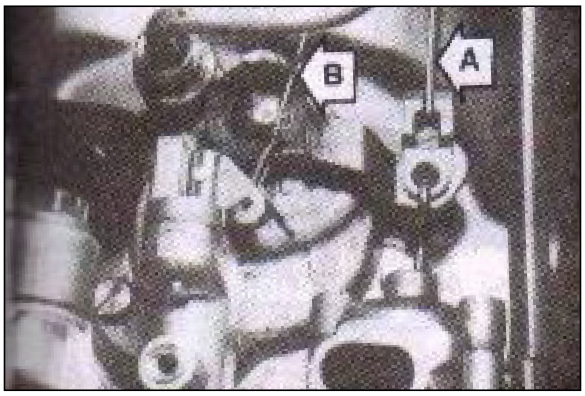


Fig. 72

(d) Remove oil tube **'M'** with nozzle from oil pump cover. (see fig. 73)

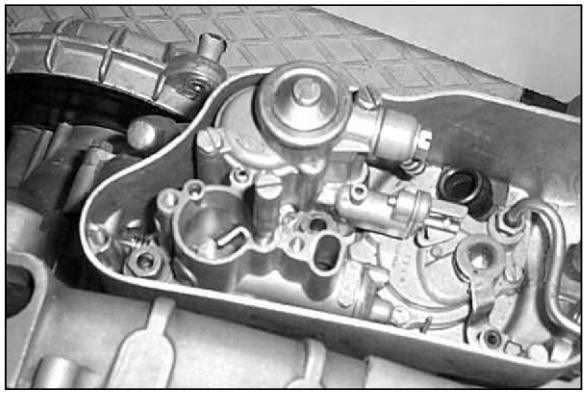


Fig. 73

(f) Take out the metering cover assy. by unscrewing the 3 screws.(fig.74)

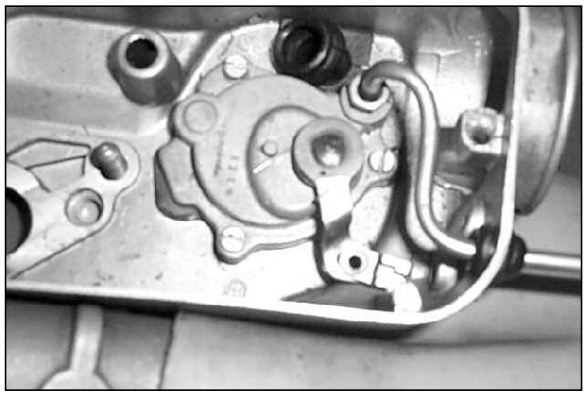


Fig. 74

(g) Take out piston pump gear alongwith connected parts (washer and spring) fig.75

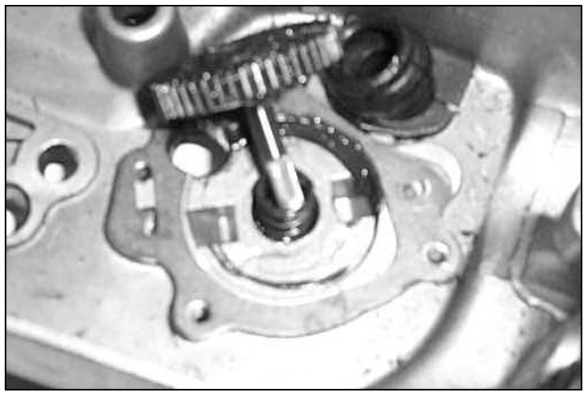


Fig. 75

(h) Remove clutch cover and take out clutch unit.

(i) Remove woodruff key from Crank shaft and take out drive gear from crank shaft.

(j) Remove read valve & small drive shaft.

(k) Take out the metering device shaft by unlocking the circlip lock.

(l) Tap the driver gear slowly. Now take out the driven gear along with washers.

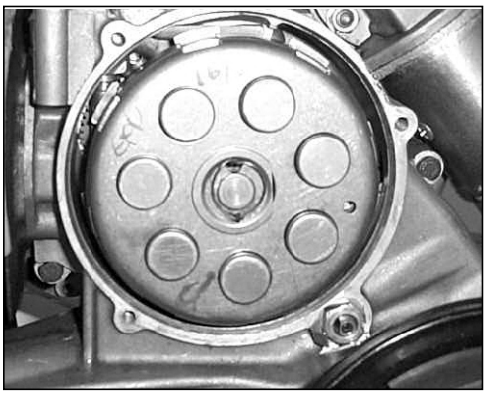
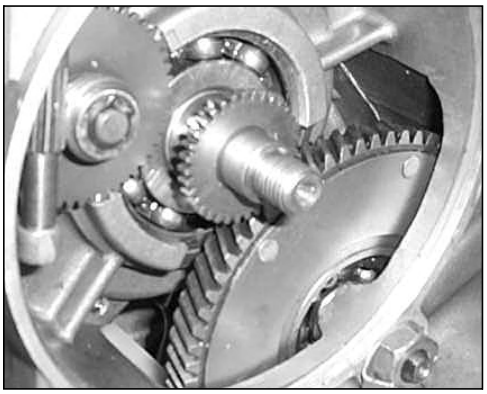
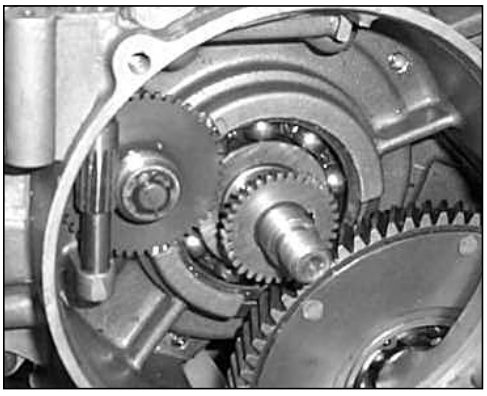


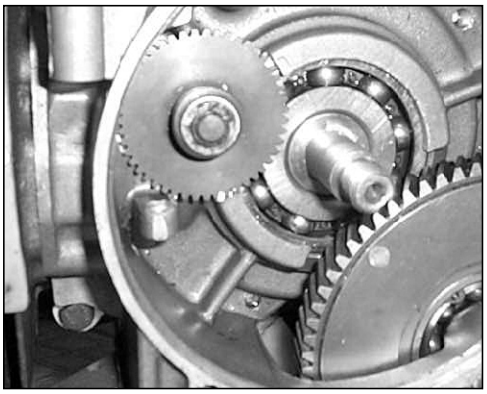
Fig. 76 : A.- Remove clutch unit



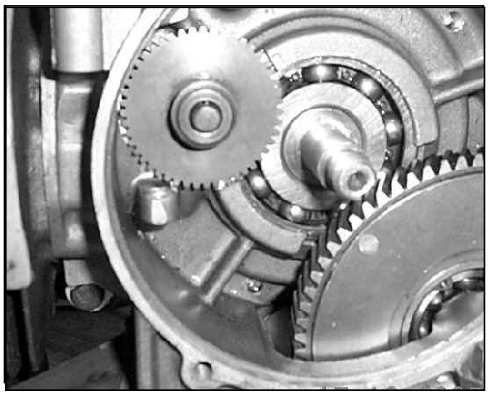
B.- Remove drive gear from crank shaft



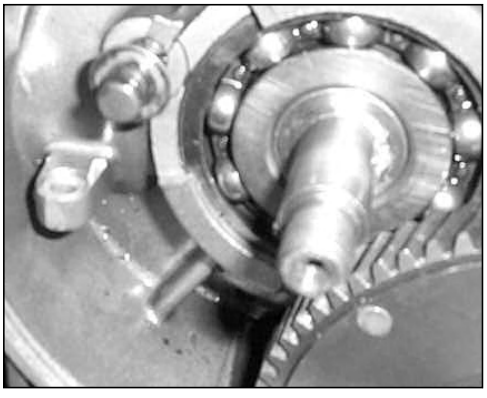
C.- Take out metering device shaft



D.- Unlock the circlip and take out with washer



E.- Remove driven gear



F.- Take out plain washer

Overhauling:

Inspection:

(a) Clean and wash the dismantled parts thoroughly and blow dry.

(b) Check all parts for any wear or damages.

(c) Replace with new parts, if required.

Re-assembly:

Re-assemble the 'AOM' device in reverse order of dismantling.

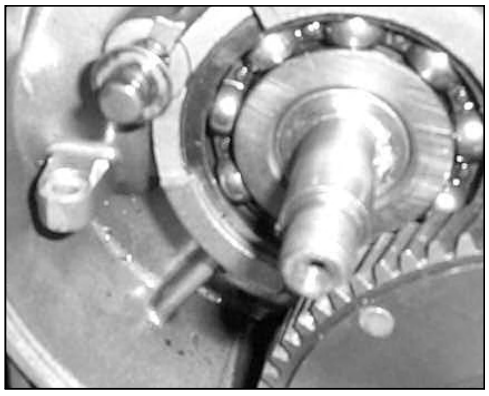
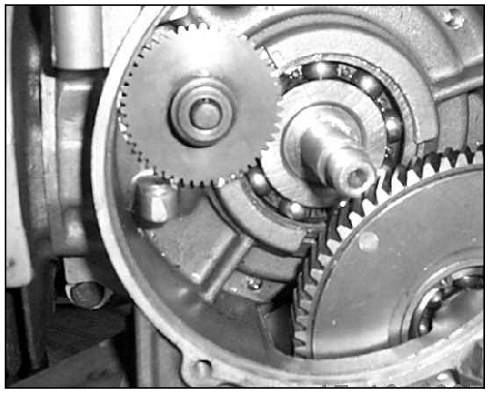
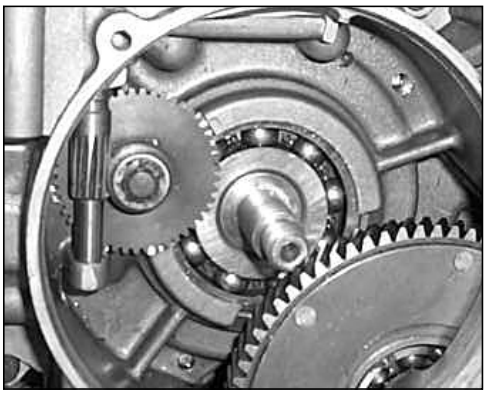


Fig. 77 : A.- Place the plain washer

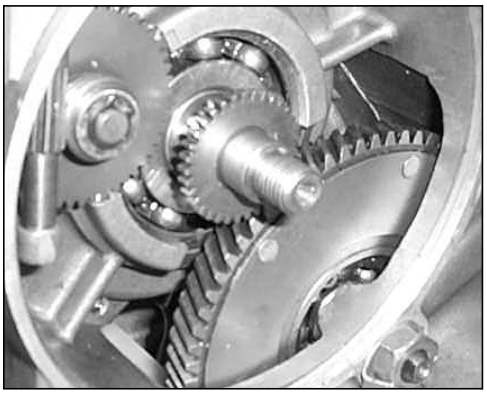


B.- Fit the driven gear

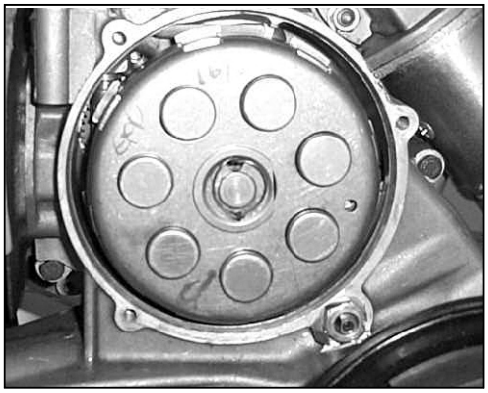
C.- Place plain washer and lock with circlip



D- Fit the metering device shaft



E.- Fit the drive gear and woodruff key



F.- Assemble the clutch unit and cover

Removal and fitment of oil tank:

(a) LML Scooters are equipped with two separate tanks: No.**1** for petrol and No.**2** for oil.(fig.78).

(b) Disconnect fuel level indicator cables from petrol tank top.Remove packing for fuel cock rod from frame. Unscrew mtg. bolts and remove them alongwith spring washer

(c) The oil tank No.**2** will come out alongwith petrol tank No.**1**. It is fitted to the bottom end of tube with ring nut. The oil level gauge is directly fitted with the oil tank. (see fig.79)

(d) Remove the oil tank cap No.**2.**(see fig.80)

(e) Introduce T handle box spanner (17mm size) through the tube in order to remove the nut connecting the oil tank to the outlet pipe.

(f) Unlock ring **'B'**, and separate oil tank from petrol tank.

(g) For reassembly follow the reverse order of dismantling.

Note:

While refitting the oil tank, ensure that the oil outlet pipe position is in the same direction that of oil gauge cup.

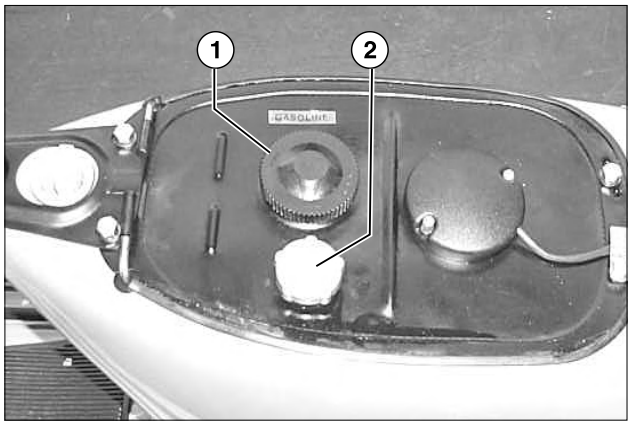


Fig. 78-Location of petrol tank & oil tank caps

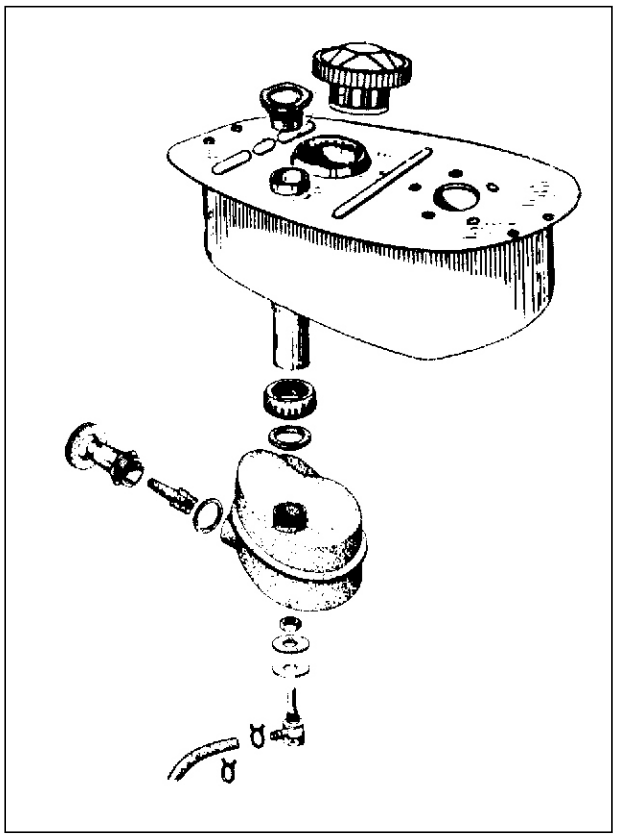


Fig.79

Schematic diagram showing the positioning of various components of Oil tank assembly.

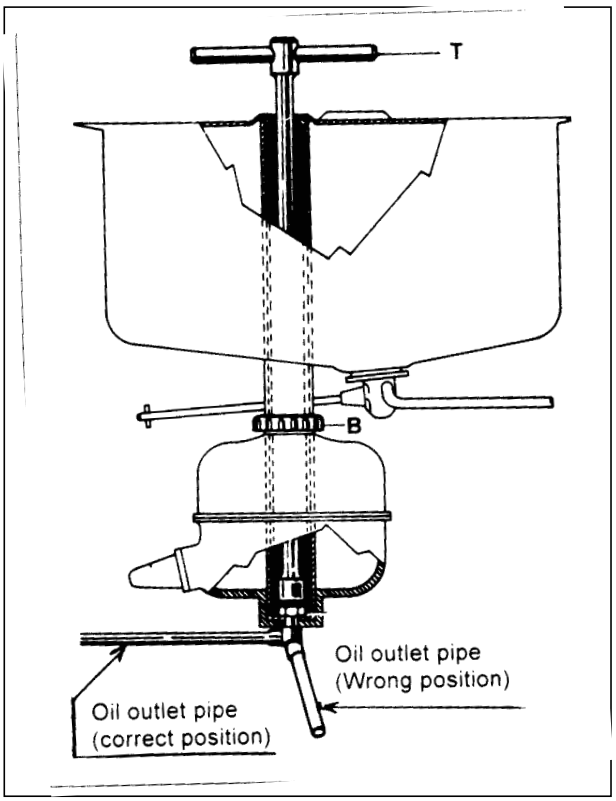


Fig.80

Schematic diagram showing the correct position of oil outlet pipe

CARE AND MAINTENANCE

SERVICE RULES :

1. Use only genuine spares and recommended lubricants at specified parts and points.
2. Use right / proper (general and special) tools at right place.
3. Use only Metric nuts and bolts (MKS system).
4. Usage of incorrect tools and hardwares may damage parts of scooter.
5. Install new gaskets, 'O' rings, oil seals, clips, split pins and so on, while reassembling.
6. Clean parts before measurement and get rid of oil, if any. Lubricate working parts lightly by oil while assembling.
7. When engine and transmission components are dismantled and kept for a longer period, coat the mating surface with a lubricant to prevent rusting and cover them, to avoid dust.
8. After reassembling, check all nuts & bolts for proper tightening by torque wrench, check free operation and also movement of the moving components.
9. Control cables and wiring harnesses are to be routed properly. Always keep the cables away from sharp edges and corners where they may get cut by coming between the moving parts.
10. Loose cables or wiring harness may be unsafe. Ensure proper clamping of each cable and harness in their respective positions.
11. Protect the wires and harness with proper sleeve and insulation. Check and clean the surface of wire before applying insulation tape.
12. Keep away wires and harness from exhaust tube and other hot spots.
13. Wiring harness routed through the handle bar and steering column chassis portion should not be pulled tight. It should have sufficient slackness to avoid damages to wires/harness during steering movement.

PERIODIC MAINTENANCE

In order to optimize ***Stella's*** performance, it is important to carry out periodic maintenance. Refer to the following table for suggested action and scheduling for different maintenance matters.

Code of suggested action is :

C - Check
T - Check and top up, if necessary.
L - Lubricate.
F - Drain & refill with fresh oil.
I - Inspect, check and adjust.
D - Carry out.

S. No.	ITEM	2500 Miles	5000 Miles
1.	Washing and cleaning	D	
2.	Gear oil	F	
3.	Tightening of all external nuts & bolts (also cylinder head)	D	D
4.	Spark plug	I	
5.	Air cleaner (clean & washing in fuel oil-mixture)	D	
6.	Air filter (outer)* washing in kerosene or petrol only	D	
7.	Carburettor tuning	I	
8.	Carburettor cleaning	D	
9.	De-coke of Engine and Silencer neck		D
10.	Ignition timing		C
11.	Functioning of electrical electronic systems	C	
12.	Battery (Top up, check Sp. gravity and bleeder tube)	D	D
13.	Control cable adjustment	I	I
14.	Brake service: Disc brake fluid**/ Brake shoes, Pads wear/ Brake system	I	I
15.	Clutch	C	
16.	Front and Rear suspension	C	
17.	Tyre rotation	D	
18	Lubricate:		
	Gear control assembly	L	L
	Speedo drive gear	L	
	Front wheel bearing	L	
	Steering column bearing		L

Caution : * - Clean Air Filter (located below saddle) more frequently when riding in dusty area for better performance and longer life of engine. Replace the filter after 6250 miles or earlier, if required.

** - Under normal condition change brake fluid every 10,000 miles or every 2 years.

Washing and Cleaning :

(a) Frequent and thorough cleaning of scooter will further enhance its appearance and extend its life.

(b) The scooter should be cleaned at ambient temperature i.e., not immediately after use or when parked in hot sun.

(c) Use a low pressure water hose for cleaning the vehicle.

(d) Wipe, clean and dry with soft cloth.

(e) Do not use detergents or powders which are likely to leave scratches on the surface. They may also cause fading of colour.

(f) Always use a normal car polish and rub with a soft cloth.

Gear box oil

Checking oil level:

(a) Park the vehicle on a levelled surface.

(b) Remove the right hand side cowl.

(c) To check the oil level, unscrew plug(1) shown in (fig.81). Oil should be at level with the bottomost portion of the hole.

(d) Top up the oil to the specified level, if it is less.

(e) Screw back the plug. After replacing the packing.

Change of gear box oil:

(a) Gear box oil should be changed after every 2500 miles run.

(b) Draining: Remove drain plug (2) as shown in (fig.81) after warming up of the engine.

(c) Drain the oil completely.

(d) Replace the plug.

(e) Flushing: Fill 100 ml. fresh oil; start engine and run for 5 minutes. Drain out the oil.

(f) Refilling: Fill the oil 20w - 40 multigrade Qty. 250 +0/ -5 ml. through filling hole (1) to the level (see fig.83)

(g) Wipe off any excess oil which may have been spilled.

(h) Refit the cowl.

Note:

To avoid leakage of oil from gear box, all the packings of bolt & filling holes must be replaced.

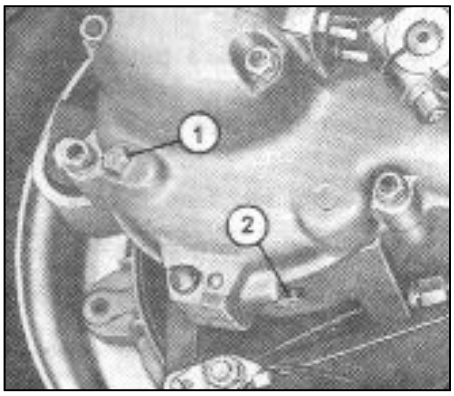


Fig. 81-Oil level Plug (1) & Drain Plug (2)

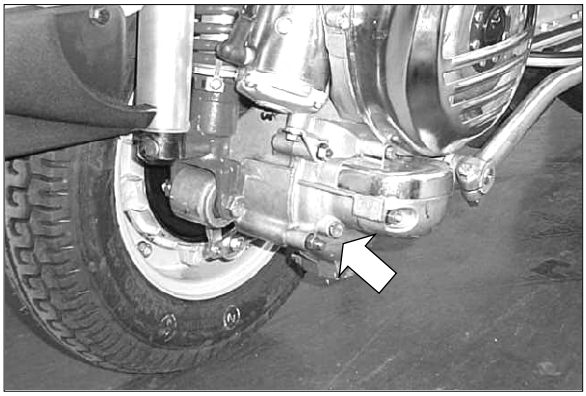


Fig. 82-Location of engine oil filling point

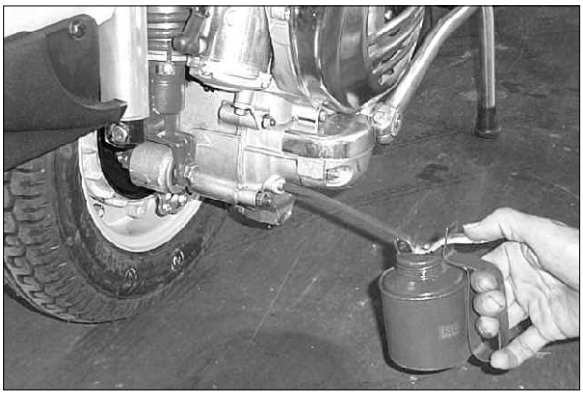


Fig. 83-Filling of engine oil

Engine compression pressure:

Check compression pressure of engine with a compression pressure gauge.(fig.84)

Compression pressure : 140 + 20 P.S.I.

(a) Close the fuel cock and burn out complete fuel in the line and carburettor. (b) Remove the spark plug. (c) Fit the compression pressure gauge in the place of spark plug. (d) Keep the throttle valve open and kick the pedal 3-4 times successively. (e) See the dial gauge for the built in pressure. It should be equivalent to the recommended pressure. (f) If the pressure is more than recommended, it means the exhaust port or silencer are clogged with carbon. Inspect and decarbonise. (g) If the pressure is less than recomended, it means that there is a leakage from cylinder piston or piston rings are worn out. (h) Action to be taken accordingly.

Tightening of cylinder head: (a) Check all four nuts for tightness. (b) If required, tighten the nuts diagonally with a torque wrench up to the specified torque value ranging **from 1.3 to 1.8 kgm** (fig. 85).

Spark plug:

(a) Remove the right hand side cowl.(b) Disconnect the HT lead cable after removing rubber cap from spark plug.(c) Wipe and clean the area around the spark plug base and unscrew the spark plug. (d) Clean out any excessive carbon deposits.(e) Visually inspect the spark plug electrodes for any wear. (f) The centre electrode should have square edges and the side electrode should not be eroded. (g) Discard the spark plug if there is an apparent wear, & if the insulator is cracked/chipped.(h) Check the spark plug gap between the electrodes with the help of feeler gauge. (i) This gap should be between **0.7 to 0.8 mm** (fig.86).(j) Resetting of the gap shall be done only by carefully bending the side electrode (fig.87). (k) Ensure that the plug washer is in a good condition. (l) Refit the spark plug alongwith washer.(m) First few threads should be tightened only with the hands in order to prevent cross threading.

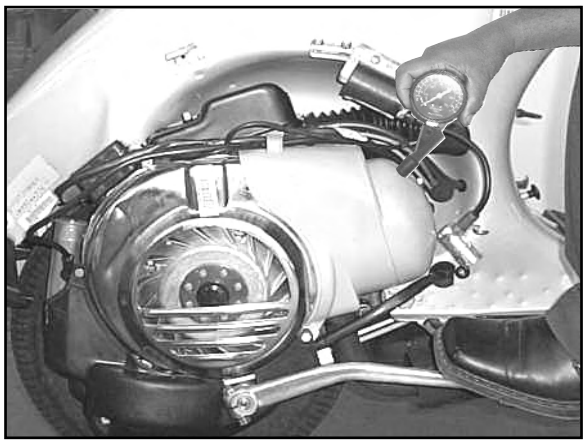


Fig. 84-Checking the compression pressure

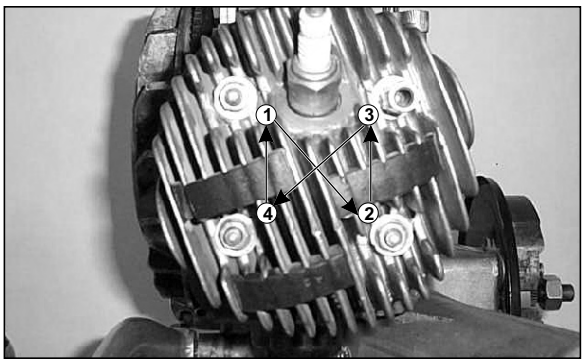


Fig. 85-Sequence for tightening cylinder head bolts

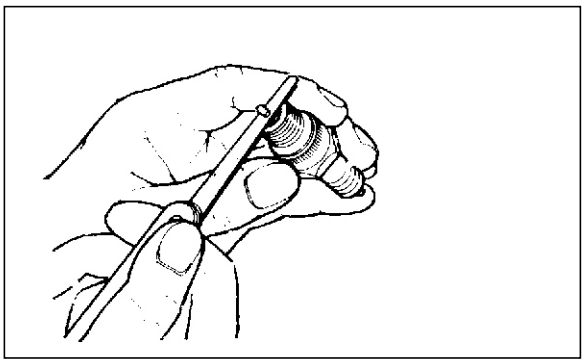


Fig. 86-Checking the spark plug gap

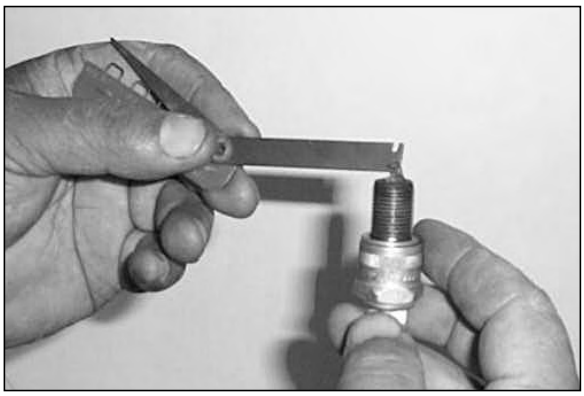


Fig. 87-Resetting the spark plug gap

Condition of spark plug :

The Condition of spark plug is an indicator of the performance of the engine. Needful corrective action can be taken as per the following:

1. Normal condition : If the insulation tip is greyish-light brown, it indicates,(fig.88)

- correct running of engine.
- Plug is perfectly suited for optimum engine performance.

2. Fouled with soot : Dull black, velvety carbon deposits on plug face indicates, (fig.89)

- Fuel air mixture is too rich
- Spark plug gap is more
- Cold plug
- Air cleaner clogged
- Weak compression
- Weak spark
- Low speed

Corrective action : Check and correct the defect or fit a plug of higher heat range as an interim step.

3. Fouled with oil : Shining black 'wet' carbon deposits on spark plug indicates, (fig.90)

- Too much oil in the fuel mixture

Corrective action : Check and correct the defect or fit a plug of higher heat range as an interim step.

4. Over heated : Metal particles on insulator tip, eroded electrodes, insulator burnt white or with pearly deposits of metallic enamel beads indicates, (fig.91)

- Over heating or too lean mixture.
- Loose spark plug or wrongly screwed.
- The Plug is too hot.

Corrective action : Rectify the defects or fit a plug with a lower heat range as an interim step.

(a) Tighten the plug 1/8 to 1/4 turn with box spanner after seating it fully.

(b) In case of new spark plug tighten the plug 1 turn with box spanner to compress the washer.

(c) Tightening torque is **2.0 kgm.**

Fig. 88-Spark plug in normal condition

Fig. 89-Spark plug fouled with soot

Fig. 90-Spark plug fouled with oil

Fig. 91-Over heated spark plug

Important:

Do not over tighten or cross thread the spark plug. This avoids damage to the threads of aluminium cylinder head.

Do not allow any foreign particles to enter the engine through the spark plug hole, while the plug is being removed. Ensure the hole is coverd properly when the plug is removed. Use only recommended spark plug to ensure perfect engine performance.

Spark plug cleaning and testing by machine:

Cleaning of Spark Plug :

(a) Scrape the carbon deposits before sand blasting in order to protect the sand from contamination. (b) Wash the insulator in petrol if it is oily and blow dry. (c) Ensure that the air pressure in the machine is more than 5kg/cm². (d) Turn the protective shield and press the spark plug into the hole of rubber adaptor. (e) Press the double action valve to the "abrassive blast" position and sand blast for 15 to 20 Sec. (f) At the same time rotate the spark plug in a complete circle for better cleaning.(g) Press the double action valve to "air blast" position and blast air for 10 to 15 sec. to remove any sand particles.(h) Check the insulator of the plug for cleanliness.(i) If still not found clean, repeat the cleaning cycle. Set a min. of 0.7 mm electrode gap with the help of feeler gauge.

Testing of Spark Plug :

(a) Screw the spark plug on the suitable adaptor in the pressure pocket and tighten it.(b) Tighten the blind plug with pressure bleed screw. (c) Clamp the H.T. wire to spark plug and cover it with the guard. (d) Set the indicator dial to align the arrow against the required gap setting mark on the indicator dial.(e) There are three ranges indicated on indicator dial, Green - Good,Yellow - Fair, Red - Poor.(f) Open the air screw and set the pressure so that the needle of pressure gauge is in the "Green Range" of the indicator dial during the setting of pressure. (g) The pressure bleed screw can be used to reduce the pressure if required.

(h) After ensuring that the needle of pressure gauge is on the Green range of the indicator dial, press the operating button on the top of the service unit housing and observe the spark in the mirror. (i) If no spark is observed, the pressure is slowly reduced by means of a pressure bleed screw and every time the electrical test is carried out.(j) If the spark appears in the "Green" range then the spark plug is "good". If the spark appears in the "Yellow" range then the spark plug is "Fair" and can be used for some time if the spark appears in the "Red" range then the spark plug is "Poor" and spark plug needs to be replaced.

If sparking does not occur at all, then this indicates a cracked insulator inside the plug cell.

Note:

The sparking surfaces of the plug electrode should be cleaned with emery paper to form smooth, flat and clean surfaces prior to testing.

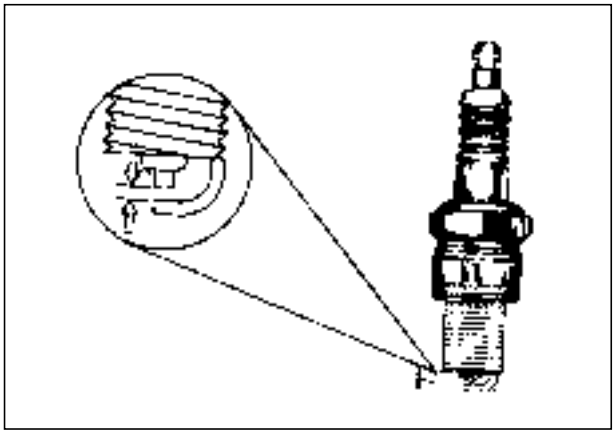


Fig. 92
Spark Plug Gap

Fig. 93
Spark Plug Testing Machine

De-coke of engine :

(a) Remove the cylinder head by acting four nuts (to be opened diagonally).

(b) Remove the silencer.

(c) Scrap the carbon from the piston crown, cylinder head and exhaust port, gently with the help of blunt scraper.

(d) Make sure that, there is on scoring mark on piston as aluminium alloy is a soft metal.

Note:

Open cylinder head for de-coke of head and piston crown.

Head light setting :

(a) Place the unloaded vehicle on a levelled floor at a distance of 10 metre from a twilight white screen and ensure that the vehicle axis is perpendicular to the screen.

(b) Draw a horizontal line 'b-b' at a height of 'B' from the ground corresponding to 0.9xC (C= height from the ground to headlight centre.)

(c) With the headlamp switched 'ON' the low beam position, the horizontal line of demarcation between the dark zone and the lighted one should be on the horizontal line 'b-b'.

(d) If the demarcation line between the dark zone and the lighted one is not on the horizontal line 'b-b' then loosen the headlight setting screw located at the bottom of handle bar's lower part and set it by swinging the headlight.

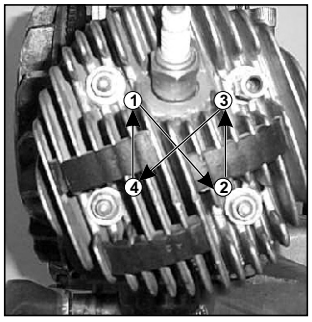


Fig. 94-Cylinder Head Nuts Removal

(e) After obtaining the correct position, tighten the headlight adjusting screw.

B = C x 0.9, C = Height from the ground to headlight centre.

B = C x 0.95, when the setting of the headlamp is carried out with the vehicle at 5 meters from the screen.

Note :

The headlamp setting can be carried out also by the driver sitting on the scooter. In this case, of course, the beam alignment should be altered wherever scooter is being driven by both driver and pillion rider.

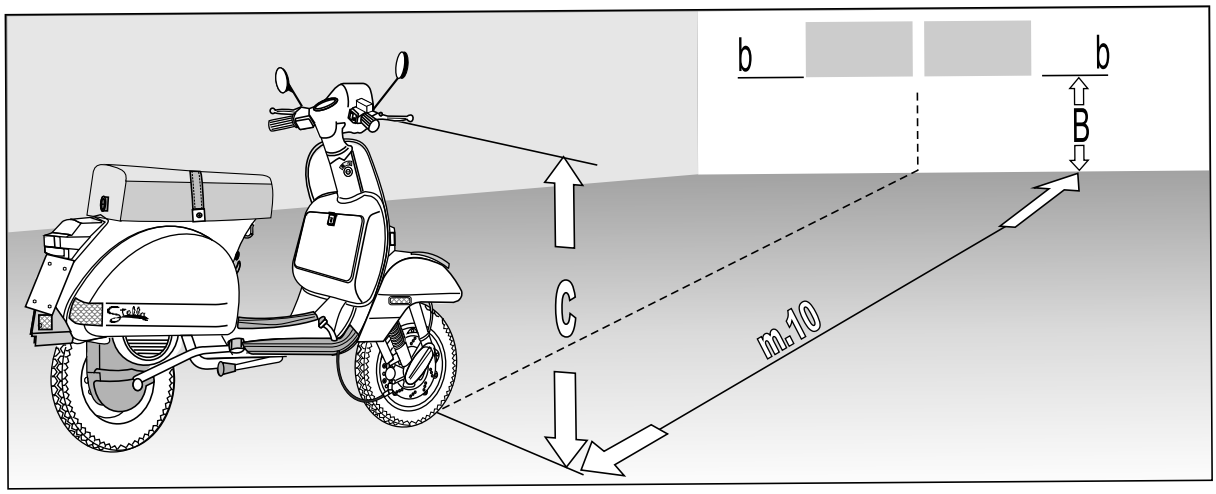


Fig. 95 Head Light Setting

Testing & tuning of horn

(a) Remove steering column cover. (b) Unscrew the horn mounting screw and take it out. (c) Hold horn bracket. (d) Start the scooter and check the intensity of horn sound. (e) If it is found irregular,adjust the screw by tightening or lossening the horn adjusting screw which is located at backside of horn till a sharp noise level is obtained. (f) By doing the above exercise, if the horn is not found satisfactory replace with a new one.(g) Mount the horn. Fit the steering column cover.

Fig. 96-Testing & Tuning of horn

Battery :

Specification

Battery - 12V 9 AH

Specific gravity of electrolyte at 27° C.

Initial filling-in specific gravity - 1.230 (Exide)
(1.270 for Amco)

Final specific gravity (fully charged battery) - 1.230 for Exide (1.270 for Amco)

Battery charger - Elak make (C1/48)

Battery tester - Elak make B C T - 7

Hydrometer - Thimson - 108

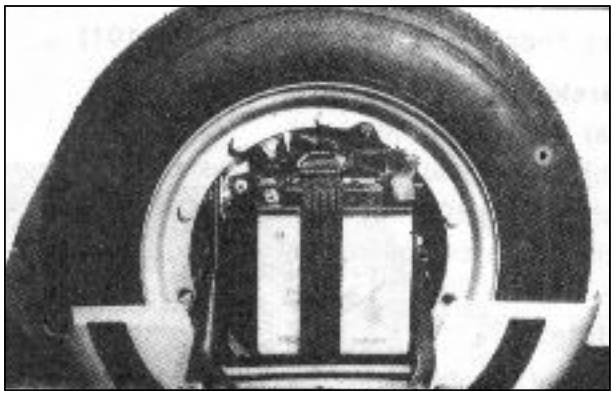


Fig. 97-Battery

Level of electrolyte:

(a) The level of electrolyte must always be in between the upper and lower level marked on the battery. (b) Normally, a constant level in the specified range is maintained for about two months or approximately 1250 miles. (fig. 98). (c) The level of liquid should be checked once in a month. (d) In case of a normal decrease (0.5cm), fill the distilled water so as to reach the upper level indicated on the battery.(e) In case of a marked level decrease by 1 cm or more, check the battery thoroughly and also the specific gravity by using hydrometer.

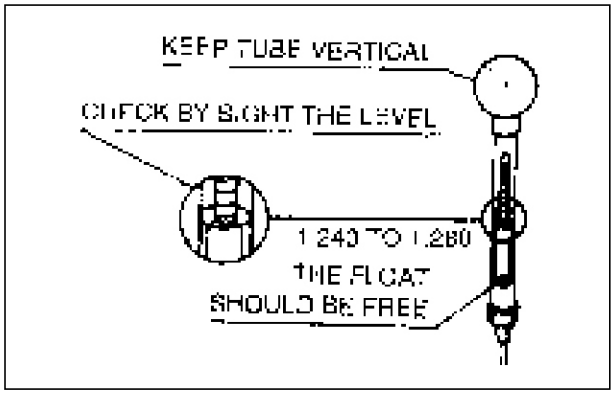


Fig. 98-Hydrometer

Caution:

Battery should be removed, if the vehicle is to be washed.

Use only 8 Amp fuse to prevent serious damage to the battery. Ignition switch should be in 'OFF' position while replacing fuse.

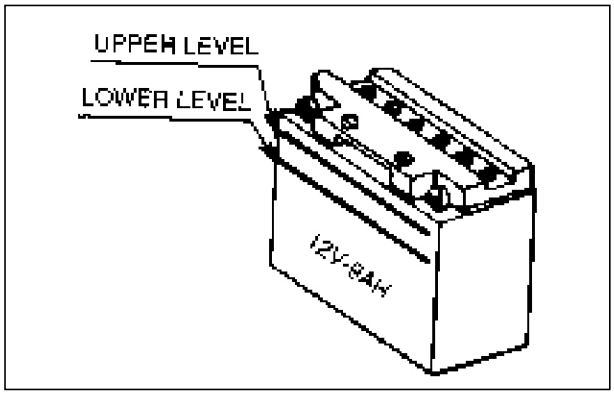


Fig. 99-Electrolyte level

Control cables adjustments:

Throttle adjustment:

(a) Loose the lock nut **'A'**.

(b) Adjust the free play of 2 mm. at throttle twistgrip by turning cable adjuster **'B'** clockwise or anticlockwise fitted on air cleaner box. (fig.100)

Clutch cable adjustment:

(a) Loosen the lock nut.

(b) Adjust the free play of 2 mm on Clutch control lever by turning cable adjuster **'A'** clockwise or anticlockwise.

(c) Then tighten the lock nut. (fig.101)

Brake adjustment (Front and Rear):

(a) Loosen the lock nut.

(b) Adjust cable free play to 5 mm. for rear brake (fig.102) by turning cable adjuster **'A'** clockwise or anticlockwise.

Note:

Wheel should rotate freely when the brake pedal is in resting position.

Gear control cable adjustment:

(a) The gears are controlled by two control cables.

(b) Loosen lock nuts of gear control assembly. (c) Adjust the play by turning the cable adjusting screw clockwise or anticlockwise.

(d) Both cables are to be adjusted till required setting is obtained.

Note:

Check shifter play, if found, then change gear control assembly.

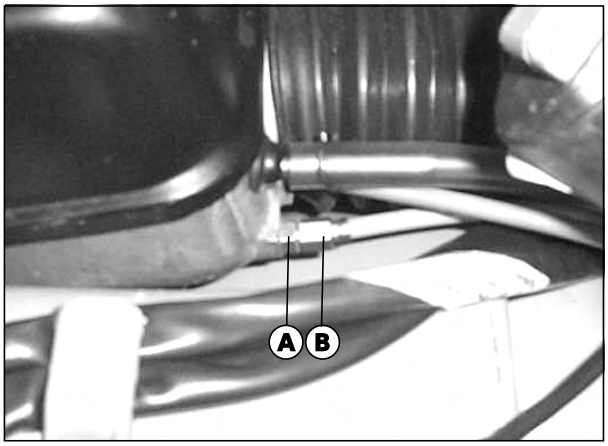


Fig. 100-Throttle adjustment

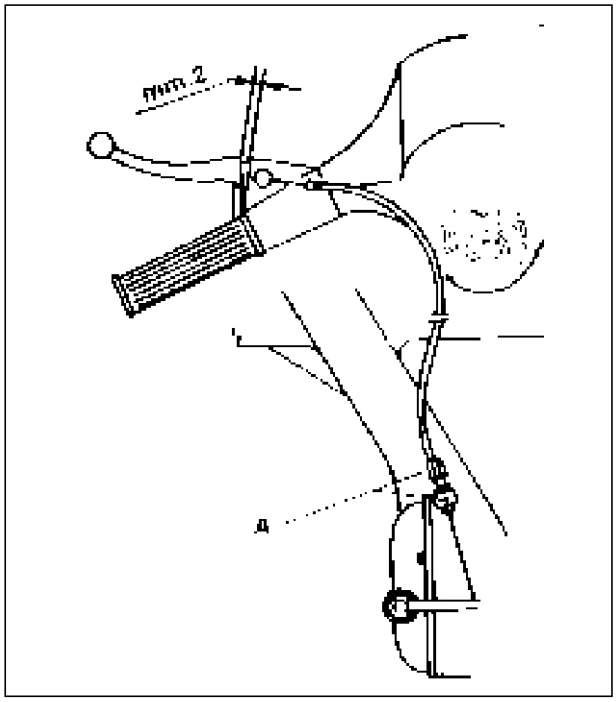


Fig.101-Gear control cable

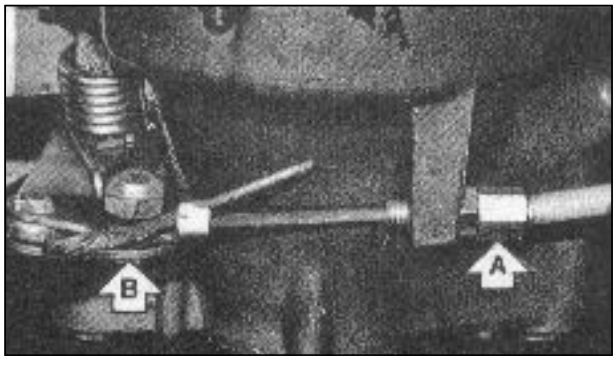


Fig. 102-Lock nut A & Cable adjuster B

BRAKE SERVICE

Rear brake :

(a) Remove rear brake drum by unlocking the nut and cap.

(b) Check brake shoes/liners for wear, hardeness or oily surface.

(c) Clean the oily surface by washing in kerosene and blow dry with compressed air.

(d) If the liners are worn out, replace with new one.

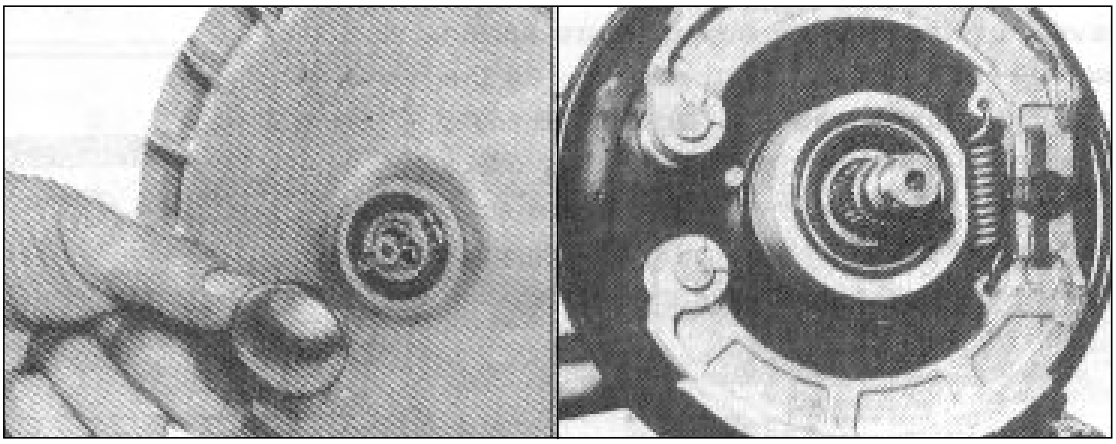
(e) Check brake drum at liners contact surface.

(f) In case surface is found smooth then rub the face with emery paper of 80/100 grade. (g) If deep cuts are found on the surface, replace with new one.

(h) Remove brake shoe by taking out locking circlips.

(i) Remove brake flange by opening 3 screws. (j) Remove shaft for brake lever and seal rings from crank case.

(k) Replace new seal rings.



Wheel Cap - Fig.103 - Brake Drum

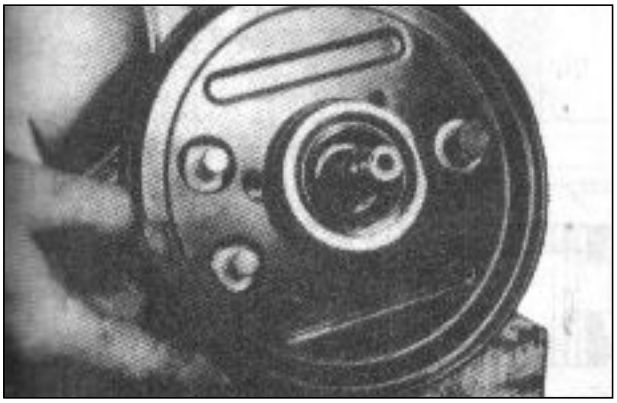


Fig. 104

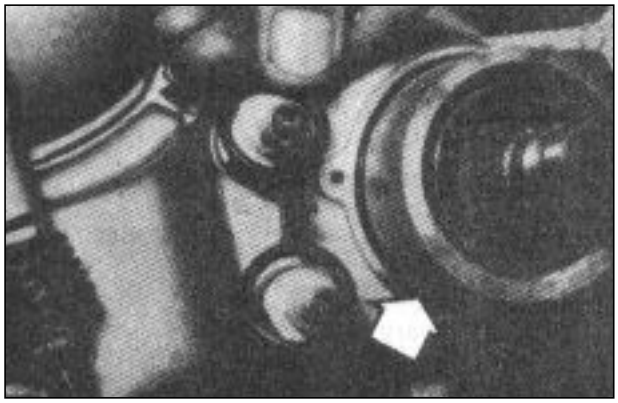


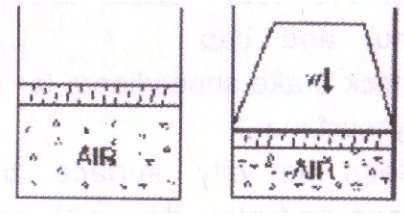
Fig. 105

FRONT DISC BRAKE (HYDRAULIC)

Hydraulic brakes operate on the principle - that the liquid is not compressible, so the force and motion can be transmitted through a liquid media.

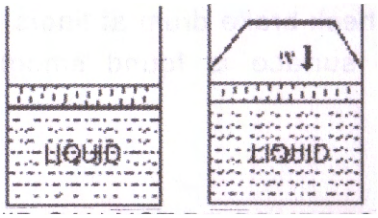
A. MASTER CYLINDER (WITH RESERVOIR) :

As the brake lever is pressed, the master cylinder piston moves forward, as it crosses the inlet port the piston starts pressurising the brake fluid in the master cylinder. This pressurised brake fluid gets transferred to the caliper through the brake hose.



AIR CAN BE COMPRESSED

Fig. 106



LIQUID CAN NOT BE COMPRESSED

Fig. 107

As the brake lever is released, the piston return spring forces the piston to return to its original position. As the brake fluid from caliper returns slowly, a negative pressure is being created between the secondary and primary brake seals. This causes the collapse of the primary brake seal, which in turns allows brake fluid to flow to reservoir/master cylinder through compensating port to counter the negative pressure.

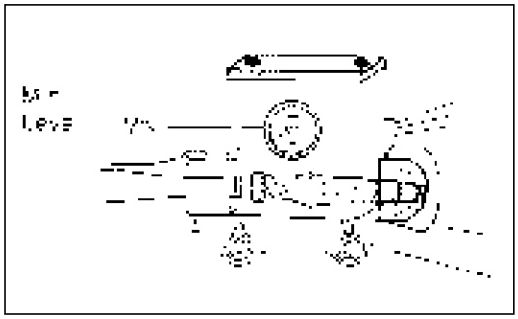


Fig. 108

As the brake fluid returns from the caliper, the excess amount of brake fluid drawn from reservoir returns back through the inlet port.

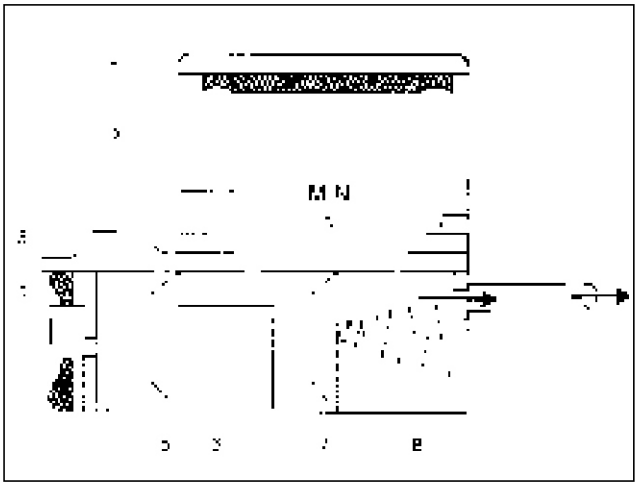


Fig. 109

1. Cap
2. Reservior
3. Master Cylinder Body
4. Dust Boot
5. Secondary Seal
6. Piston
7. Primary Seal
8. Return Spring

B. CALIPER

The type of Disc brake caliper assembly used in Stella Scooters is called **"FIXED CALIPER - DOUBLE PISTON".** The disc brake caliper is mounted on front suspension swinging arm with the help of caliper holder. When brakes are applied the pressurised brake fluid flows from master cylinder to Caliper cylinder and pushes out the pistons. These pistons will force out the disc pads against the steel disc. As the disc pads come in contact with the steel disc, a resistance is offered for its further rotation. This movement brings both the pads in tight contact with steel disc from both the sides. This creats friction with the disc and speed is reduced. Hence braking takes place.

After release of brake lever, the piston retracts due to the elastic property of the caliper piston seal, and as wheel starts to rotate, the disc hits both the disc pads, which places them to their original position.

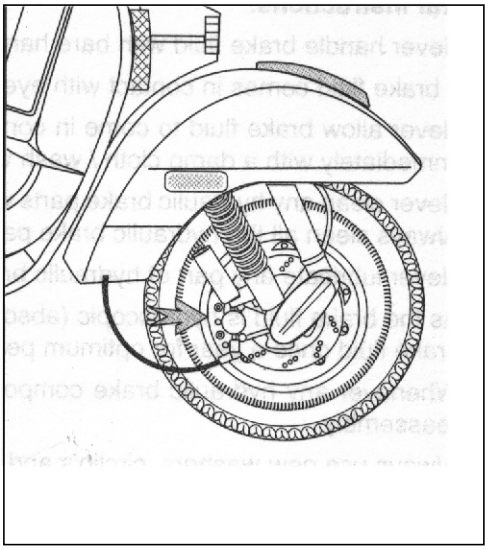


Fig. 110

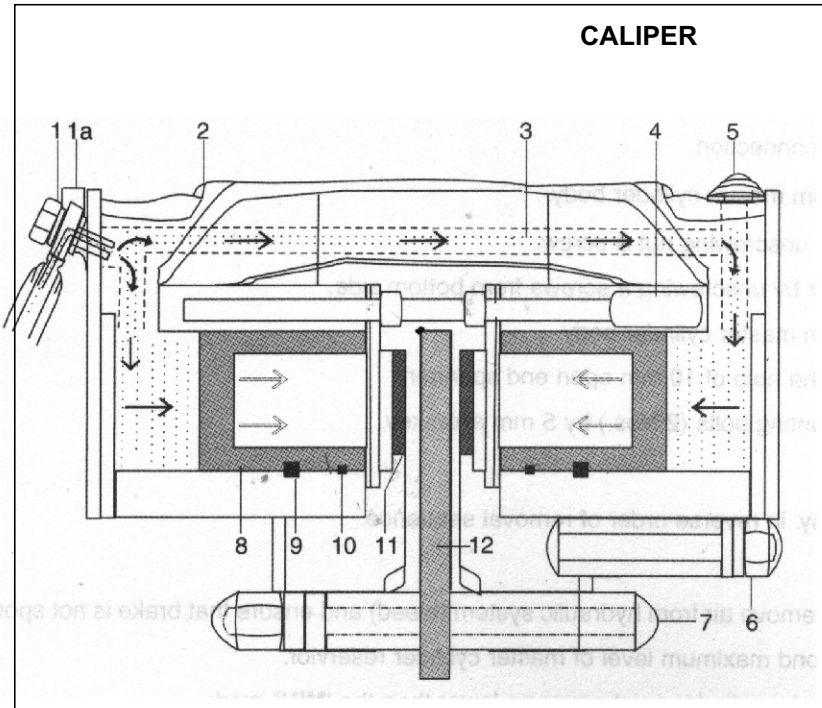


Fig. 111

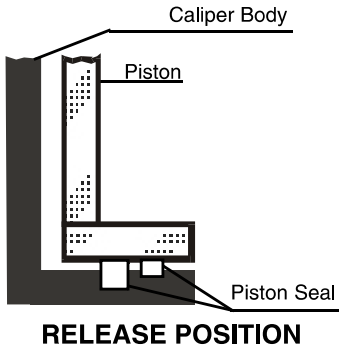


Fig. 112

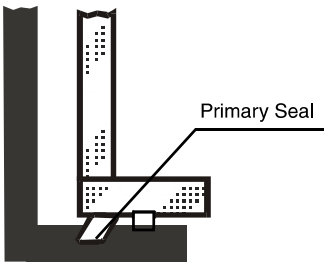


Fig. 113

Brake overhaul

General instructions :

1. Never handle brake fluid by bare hands for a longer time since it may result skin disease.
2. If brake fluid comes in contact with eyes, wash eyes with cold water and consult a doctor immediately.
3. Never allow brake fluid to come in contact with any painted parts as it peels off paint. If it happens, wipe immediately with a damp cloth / wash with water.
4. Never clean any hydraulic brake parts with any mineral oil based cleaner i.e. kerosene, petrol, or diesel etc. Always clean all the hydraulic brake parts only with fresh brake fluid.
5. Never lubricate any part of hydraulic brake system with mineral base oil or grease.
6. As the brake fluid is hygroscopic (absorbs moisture from atmosphere) by nature, it is better to replace the brake fluid once in a year (after monsoon), for optimum performace.
7. Whenever any hydraulic brake components are disconnected, perform bleeding operation thoroughly at reassembly.
8. Always use new washers & circlip also fresh brake fluid.

MASTER CYLINDER

REMOVAL : Before removal of master cylinder, remove cap & take out brake fluid by syrenge or syphon & follow the following steps.

1. Disconnect front stop switch connection.
2. Remove front stop switch from Master cylinder body.
3. Remove front brake lever by unscrewing nut & screw.
4. Remove handle bar top cover by unscrewing 4 Nos. screws from bottom side.
5. Slip out rubber grommet from Master cylinder body.
6. Disconnect brake hose with the help of 10 mm open end spanner.
7. Remove master cylinder mounting bolts (2 Nos.) by 5 mm Allen Key.

INSTALLATION :

Assemble the master cylinder assy. in reverse order of removal sequence.

Note :

(i) After top up brake fluid remove air from hydraulic system (bleed) and ensure that brake should not be spongy.

(ii) Never top up brake fluid beyond maximum level of Master cylinder reservior.

(iii) Level of brake fluid in the Master cylinder must never be lower than the '**MIN**" mark.

BRAKE HOSE

REMOVAL : Before removal of Brake Hose, remove cap & take out brake fluid by syrenge or syphon & follow the following steps.

1. Remove handle bar top cover by unscrewing 4 Nos. screws from bottom side.
2. Slip out rubber grommet from Master cylinder body.
3.. Disconnect flexible Brake Hose with the help of 10 mm open end spanner from metal brake pipe.
4. Disconnect flexible Brake Hose from caliper assy. by removing banjo bolt with the help of 14 mm spanner.
5. Pull out the flexible Brake Hose from bottom side after removing it from the clamp mounted on mudguard.

INSTALLATION :

1. Remove steering column cover first by unscrewing screws.
2. Insert Brake Hose from bottom side through the wire clamp welded on mudguard inner side then pass through the hole on top and fix it in clamp mounted on mudguard then rout it through chasis from the right side of steering pipe, chasis terminal and handle bar lower part and handle bar cage.
3. Reconnect Brake Hose same in the reverse order of removal.

Note :

(i) Ensure that there is no bend or friction in the movement of Brake Hose and steering.

CALIPER ASSY.

REMOVAL:

1. Disconnect Brake Hose and collect brake fluid in a seprate pan.
2. Remove front wheel by opining 5 nuts and washers.
3. Remove two mouting bolts from caliper bracket and take out caliper assy.

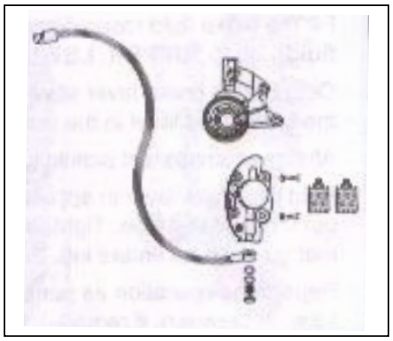


Fig. 114

INSTALLATION :

Follow reverse order of the removal.

NOTE:

(i) After toping up brake fluid bleed hydraulic system to take out air.

(ii) Ensure that while applying brake, operation should be hard.

(iii) Before remvoing brake caliper, first remove front brake lever then start the job.

BRAKE PADS

REMOVAL:

1. Remove front wheel by opining 5 nuts and washers.
2. Remove two mouting bolts from caliper bracket and take out calpier assy. (Do not disconnect Brake Hose).
3. Remove 'E' type circlip from pad hanger pin and pull out then take out both the brake pads from caliper assy.
4. Inspect for any wear and tear on pads or glossy / burnt.

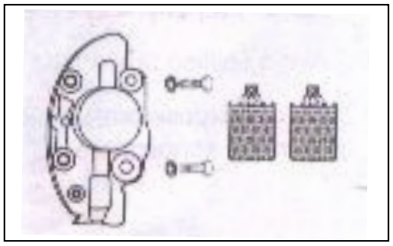


Fig. 115

INSTALLATION :

Follow the reverse order or removal.

NOTE :

(i) Do not use sand paper for polishing the pads.

(ii) Do not use the brake pads after wear indicator limit.

(iii) Recommended thickness (Lining + Plate) STD 5.9 mm Service Limit 3.6 mm.

Fig. 116

STEEL DISC

REMOVAL :

1. Remove two mouting bolts from caliper bracket and take out calpier assy. (Do not disconnect Brake Hose). Then Remove the plastic cap from hub and take out split pin with the help of plier, then remove metal cap from nut.
2. Remove the nut from axle for hub mounting with the help of 22 mm box spanner and take out the hub along with steel disc.
3. Unscrew 5 Nos. of Allen key bolts (4 mm) along with washer from steel disc which are mounted on hub.

INSTALLATION : Follow reverse order of the removal.

Note :

(i) Keep arrow mark on the disc (if marked on disc) towards the direction of wheel rotation.

(ii) Never use sand paper for polishing the disc as hard particles will scratch / damage the disc surface.

(iii) Check for run out of disc, if found beyond limit, replace the disc.

(iv) Recomended thickness of steel disc STD. 4 mm.

(v) Do not keep the steel disc side face of the wheel on the floor otherwise disc may get damaged or scratched.

BLEEDING OPERATION

1. Fill the brake fluid reservoir, with fresh recommended brake fluid (**DOT -4 Mobile Super Heavy Duty brake fluid)**) up to **"UPPER LEVEL".**
2. Operate the brake lever several times to build the hydraulic pressure in the brake system, keep a watch on the brake fluid level in the reservoir.
3. Attach a transparent plastic tube (Poly vinayal) to the bleeder valve.
4. Hold the brake lever in applied position, and loosen the bleeder valve, along with brake fluid air bubbles will come out through the tube. Tighten the bleeder valve and then release the brake lever. This sequence ensures that no fresh air enters into the system.
5. Repeat the operation as per above step, till the clear flow of brake fluid comes out through the transparent tube. In between, if required, fill the reservoir with brake fluid up to **"MAX. LEVEL"** eye glass again.

PRECAUTIONS

- Do not allow brake fluid to come in contact with eyes. In case of contact, flush throughly with water and consult a doctor immediately.
- Do not let the brake fluid come in direct contact with hands for longer time. In case of contact, clean hands properly with water.
- Avoid spilling of brake fluid on the vehicle as it damages painted, plastic & rubber components.
- Do not expose brake fluid directly to atmosphere as its characteristics detoriate by absorbing humidity from the atmosphere.

Front and rear suspension :

(a) Check for the damping conditions of both shock absorbers. If there are sudden jerks or only the spring is working or oil is found leaking then replace the shock absorber.
(b) Check the top buffers of front shock absorber, if found worn out or compressed, replace with a new one.
(c) Check mounting buffers of rear shock absorber, if damaged or compressed, replace with new one.

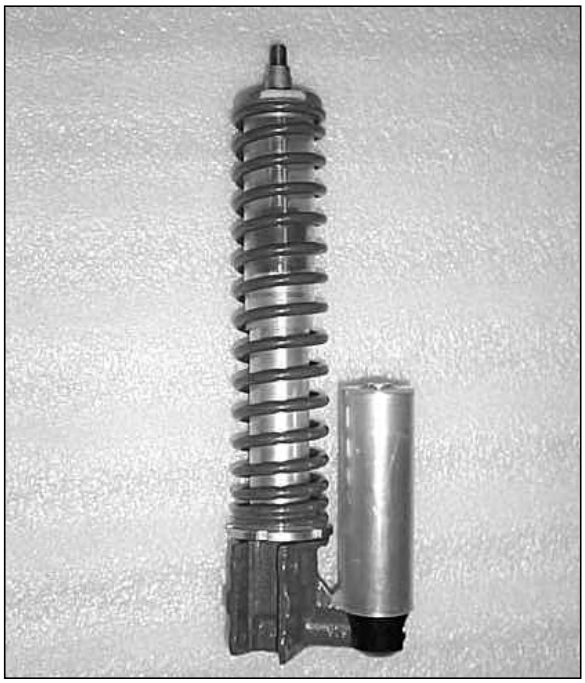


Fig. 117-Front Suspension

Tyre rotation :

(a) All the three wheels of scooter are interchangeable with each other.
(b) However, the air pressure in the tyre will depend on whether it is fitted on the front or rear position.
(c) To ensure even wearing of tyre tread, it is necessary to rotate the tyres and change the face of the tyre (with respect to wheel rim) after every 3750 miles.
(d) Follow the sequence for tyre rotation as explained in fig.118

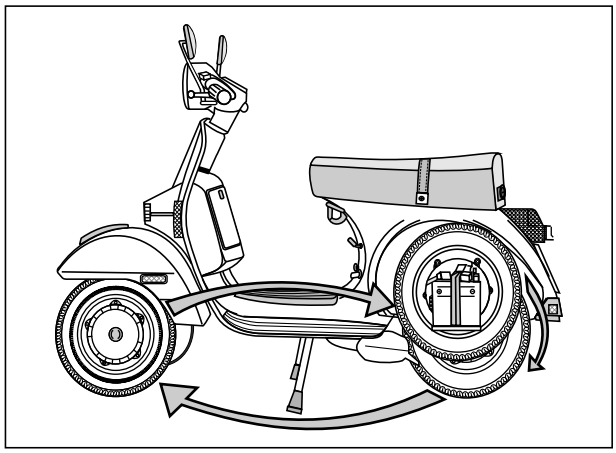


Fig.118-Tyre rotation

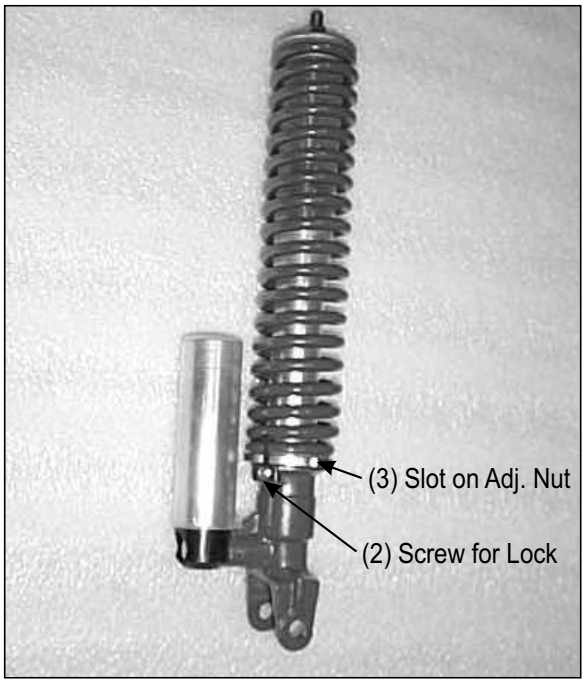


Fig. 119-Rear Suspension

Steering column:

Check steering column for tightness/looseness, if found improper then proceed as follows:

(a) Remove handle bar top cover. Disconnect all control cables and electrical connections.
(b) Unscrew handle bar bolt and lift the handle bar. (c) Unscrew the upper ring nut **'D'** and extract the lock washer **'C'**.
(d) Adjust the steering column by loosening or tightening the bearing cone **'B'**. (fig.120).
(e) For greasing of bearings, unscrew the bearing cone **'B'** and remove the ball cage **'A'**.
(f) Apply the recommended grease on cage **'A'**. and replace it in its position.
(g) Screw the bearing cone **'B'** by hand so as to bring it in contact with the balls.
(h) Tighten it to locking torque of 5-6 kgm.
(i) Now rotate anticlock wise, the bearing cone **'B'** to 90º or ¼ turn approximately, then place the lock washer **'C'** and screw the ring nut **'D'** with a locking torque from 3 to 4 kgm. (Ref. Page no. 85)

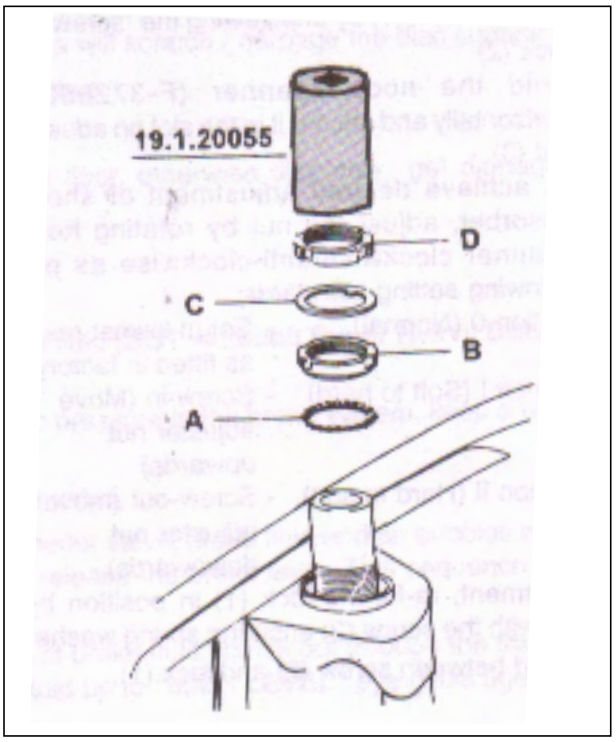


Fig. 120-Steering Column

Note:

The steering column should rotate freely without any play, under its own weight.

Lubrication

Gear control assy.:

(a) Remove gear control assembly cover.
(b) Wash the assembly gently with kerosene. (c) Pressure wash and blow dry with compressed air.
(d) Apply recommended grease and refix cover.

Front wheel bearing and speedo drive gear:

(a) Remove front wheel with hub .
(b) Apply recommended grease on front wheel bearings and speedo drive gear.
(c) Refit front wheel.

Front brake caliper holding bracket assy.:

(a) Remove circlip lock.
(b) Unscrew bolts of shock absorber and take out front brake caliper holding bracket assy.
(c) Clean the bearings and shaft, then apply recommended grease.
(d) Refit the caliper holding bracket in its place and fit the circlip.

Rear brake pedal and central stand:

(a) Clean rear brake pedal link area and central stand hinge brackets with kerosene and then pressure wash.
(b) Blow dry with compressed air.
(c) Lubricate brake pedal pin and central stand brackets for smooth operations.

RECOMMENDED OILS AND LUBRICANTS

S.No.	DESCRIPTION OF PARTS	APPLICABLE LUBRICANTS	RECOMMENDED BRAND OF LUBRICANTS
1.	Clutch lever	Grease	Automotive / Bearing Grease
2.	Steering Column Bearing	"	"
3.	Front Wheel Bearings	"	"
4.	Speedo Drive Gear	"	"
5.	Front Suspension	"	"
6.	Control Cables	"	"
7.	Gear Control assy.	"	"
8.	Disc Brake	Brake Fluid	DOT 4, Mobil Super Heavy Duty
9.	**Gear Box***	Oil	SAE 30 Engine oil
	Flushing of Gear Box is must at initial 500 kms.		**Procedure for flushing-**After the gear oil is drained off, fill 100 ml Engine Oil run the engine at idle speed for few minutes and then drain the oil. Fill the recommended quantity of fresh Engine oil.
9.	Petrol oil mixture	Oil	Motorcycle - Formulated Two Stroke Oil

*** - Recommended quantity of oil to be filled in gear Box is 250 ml + 0 ml.**

-- 5 ml.

CHANGING OIL IN GEAR BOX:

First take out engine protection cover.

(a) Drain off the oil crank case by unscrewing the drain plug **'2'** (fig.121).

(b) Introduce a small quantity of flushing oil, run the engine for few minutes and drain off again.

(c) Refill gear box with about 250 ml. of new oil (up to the level of filling hole by removing level plug **'1')** (fig. 121).

(d) This operation of changing oil should be carried out with warm engine.

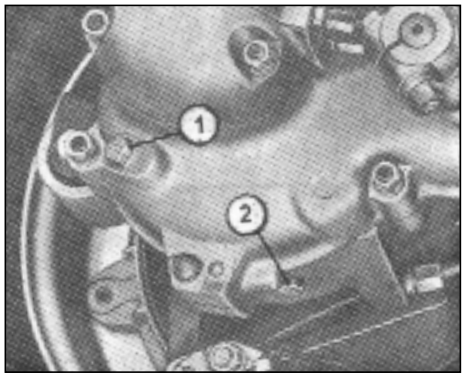
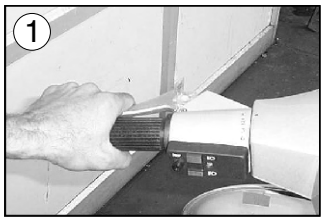
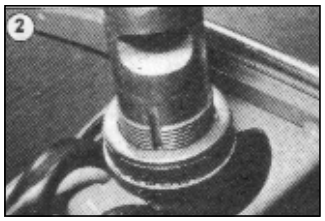


Fig. 121

LUBRICATION POINTS



GREASE



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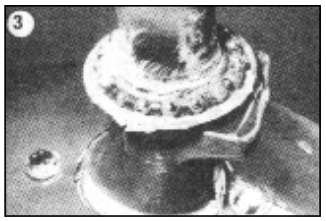

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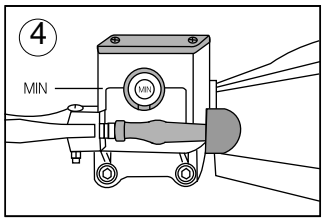
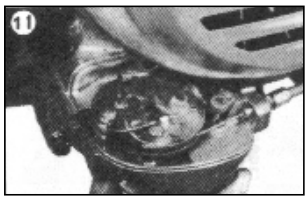


OIL



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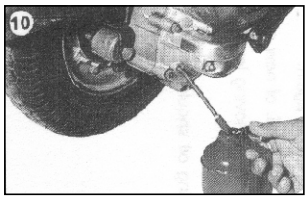

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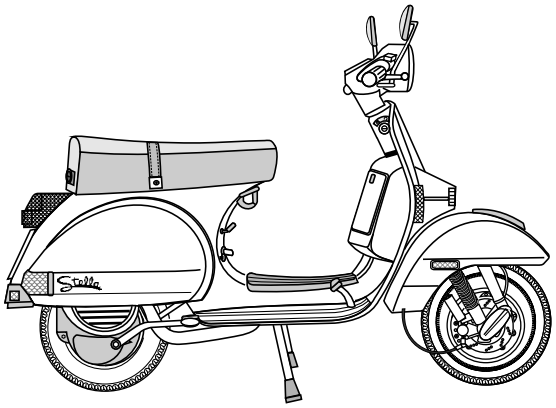

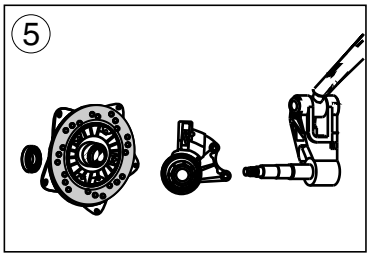

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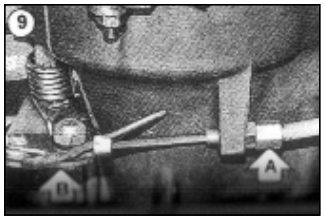

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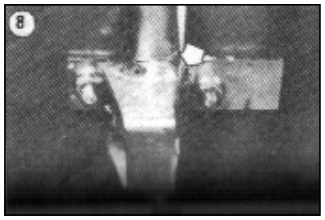

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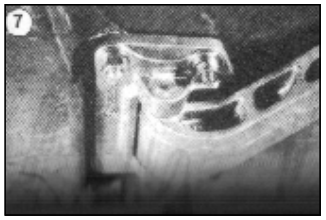

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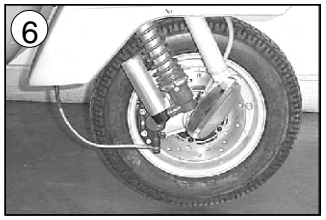
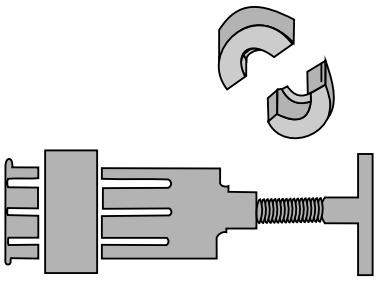
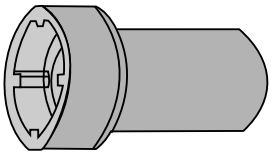
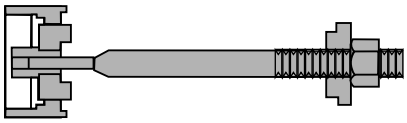
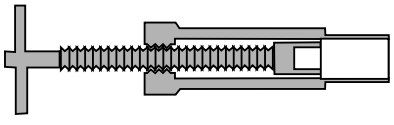
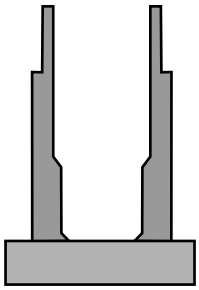
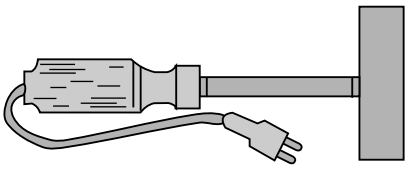


GREASE

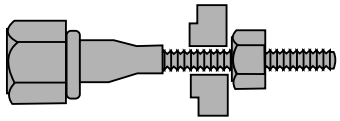
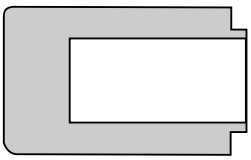
SPECIAL SERVICE TOOLS

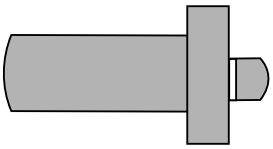
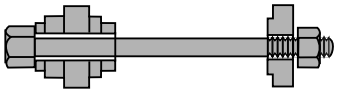
TOOL	Illustrated on page
 **19.1.14499** Bearing extractor	79
 **19.1.20055/C** Tool for track and ring nut	62&95
 **T-0016029** Punch for assy. of lower track of lower bearing	96

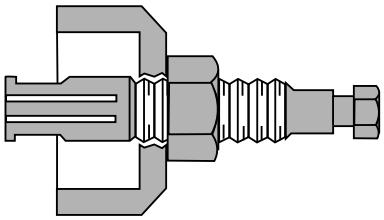
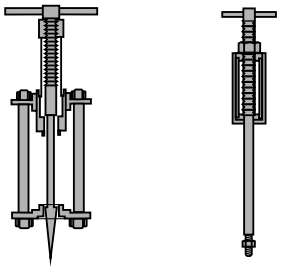
TOOL	Illustrated on page
 **T-0016561** Extractor for lower track of lower bearing	96
 **T-0017820** Punch for dismantling wrist pin	75
 **F-2306849** Tool for assy. drive shaft & crank shaft	88

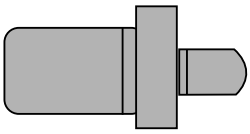
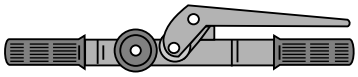
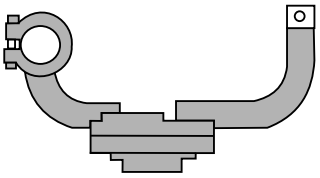
TOOL	Illustrated on page
	
T-0019559/C Jig for crankshaft alignment	80
	
19.1.20017 Electric heater for heating crankcase bearing zone	87
	
19.1.20036 Punch for assy. roller bearing in Caliper holding plate from outside	99

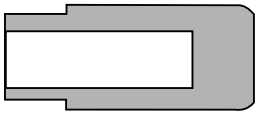
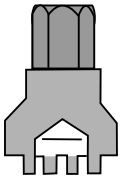
TOOL	Illustrated on page
	
19.1.20037 Punch for assy. roller bearing in Caliper holding plate from inside	99
	
19.1.20038 Punch for assy. roller bearing in front wheel hub	99
	
19.1.20004 Punch for dismantling upper track of lower bearing of steering cloumn	96

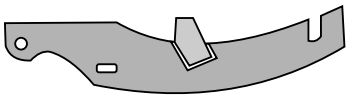
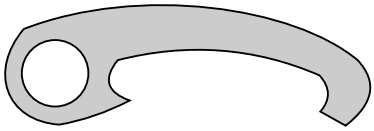
TOOL	Illustrated on page
 **T-0020322** Tool for assy. & dismantling clutch	79
 **T-0020781** Punch for assy. ball bearing & oil seal in crank case	88
 **T-0020837** Punch for extracting drive shaft	78

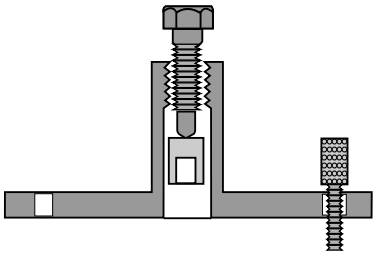
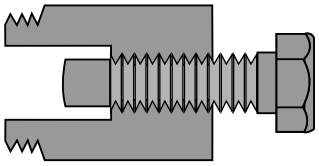
TOOL	Illustrated on page
 **T-0020842** Punch for dismantling lower track of upper bearing of steering colume	96
 **T-0021071** Punch for assy. crank shaft roller bearing	87
 **T-0021330** Fixture for assy. of lower track of upper bearing & upper track of lower bearing of steering column	97

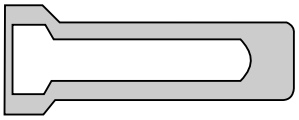
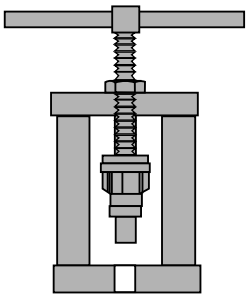
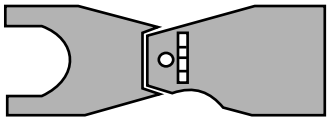
TOOL	Illustrated on page
 T-0021467 Bearing extractor with collet & spacer	77
 T-0022480 Punch for expelling bearing from crank case	78
 F-0709756 (with attachments A,B & C) Fixture for engine foundation buffers & tube	92

TOOL	Illustrated on page
 T 0023589 Punch for oil seal and main ball bearing	87
 T 0023590 Tool for fitting windshield beading	102
 T-0025095 Engine base plate stand	75

TOOL	Illustrated on page
 T-0025127 Wedge	80
 T-0027338 Punch for assy. oil seal flywheel side	89
 T-0030627 Wrench for clutch nut	76

TOOL	Illustrated on page
 19.1.20095 Locking tool for flywheel	76
 T-0031729 Wrench for securing clutch	76
 RS-00231 Tool for fuel cock	95

TOOL	Illustrated on page
	
T-0033971 Punch for fitting roller bearing of drive shaft	87
	
T-0038886 Tool for separating crank case and expelling crankshaft	77
	
T-0048564 Flywheel extractor	76

TOOL	Illustrated on page
	
F-3115576 Punch for assy. bearing cone on crank shaft	80
	
19.1.20021 Fixture for overhauling front suspension with attatchment	100
	
G-2107025 Feeler gauge for checking axial play of gears	82
	
F-3720808 Hook spanner for Bitubo Shock absorber	61

DISMANTLING, OVERHAULING, RE-ASSEMBLY

DESCRIPTION **PAGE NO.**

ENGINE

Notes on dismantling process:

(a) In this chapter, the directions for complete dismantling of scooter are given, through illustrations and with the use of required special tools. Special tools which are used in different operational sequences are shown along with their Part Nos. The general tools etc. are not described due to their simple operational use but have been mentioned the same through the entire operational sequence.

(b) Avoid use of temporary or emergency tools. The parts should be preserved properly and separately to avoid mix up with the other parts of engine.

(c) Small parts have not been described anywhere in the chapter or figures therefore to avoid confusion at the time of re-assembly. It is advisable to keep washers, bolts, nuts etc. together with respective components. For better performance of scooter, change lock washers and spring washers at each dismantling or overhauling of engine.

(d) All packings/gaskets, oil seals, split pins and 'O' rings must be replaced with new one for each overhauling of engine.

Parts must be wiped to absolute dry condition by clean and quality rags or be blow dried, if due to any reasons the re-assembly is postponed then protect the components/parts from atmospheric factors viz oxidation, rusting etc.

Removal of engine from the vehicle:

(a) Drain out gear box oil completely.

(b) Disconnect all electrical connections.

(c) Disconnect all control cables at engine side i.e. gear cables, clutch cable, and rear brake cable.

(d) Choke cable and throttle / acceleration cable from carburettor are to be removed after removal of air cleaner cover and air cleaner.

(e) Close fuel tap then remove fuel pipe from carburettor and take it out from air cleaner box and disconnect oil pipe and plug the pipe hole.

(f) Unscrew the rear shock absorber mounting bolt and nut and take it out.

(g) Separate shock absorber from engine mounting.

(h) Unscrew foundation bolt and nut. Take out the bolt and remove engine from chassis.

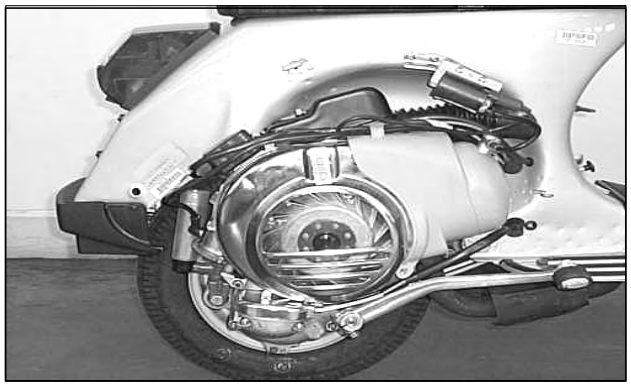


Fig. 122

Fig. 123-Rr. shockabsorber mounting bolt & nut

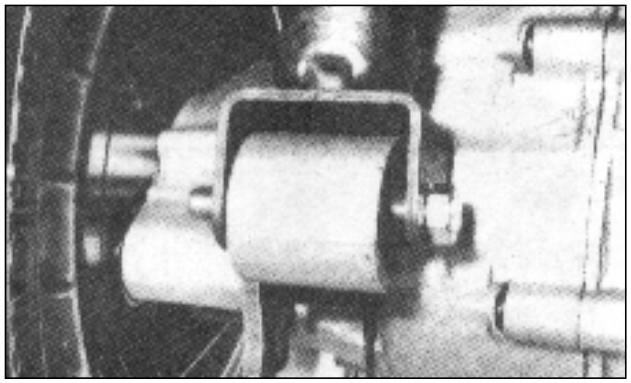
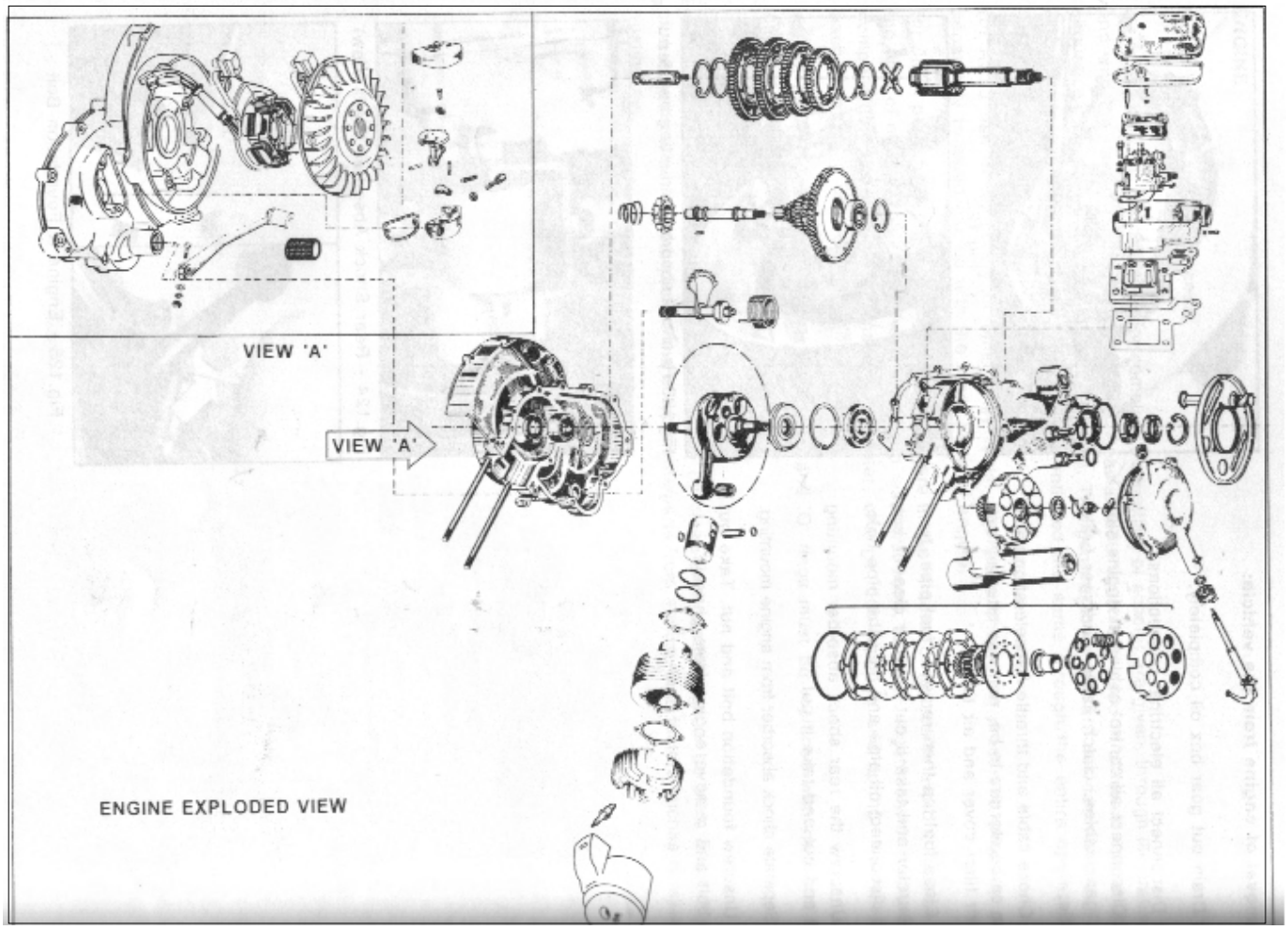


Fig. 124 - Rear Shock Absorber (Rear View)

Fig. 125 - Engine & Foundation Bolt



ENGINE EXPLODED VIEW

ENGINE DISMANTLING :

T-0025095
Fixture for engine with bolt and 'U' clamp.
Remove: Silencer and rear brake drum.
Operation: Mount engine on fixture T-0025095 (Fig.126).
Dismantle: Take out cooling hood, carburettor, air cleaner, A.C. box and reed valve carefully from engine.

Cylinder head and cylinder:

Unscrew 4 nuts diagonally and evenly. (Fig.128)
Take out cylinder head and block.

Caution:

Do not try to take out cylinder head when the engine is hot.

Piston assy. and wrist pin:

T-0017820
Punch for dismantling wrist pin.
Remove: Circlips from both sides of piston wrist pin.
Operation: Punch out wrist pin with tool T-0017820. (Fig.130)
Dismantle: Take out piston and roller cage.

Caution:

Tie the connecting rod to cylinder stud to avoid hitting the crank case.

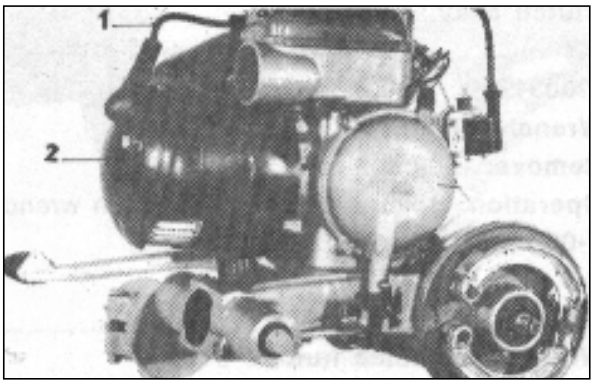


Fig. 126-Engine Mounting on fixture

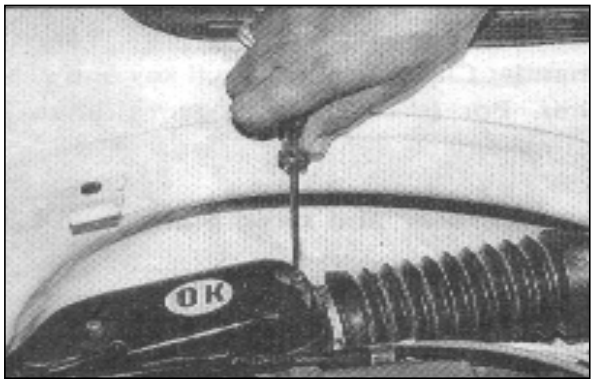


Fig. 127-Carburettor Cover Removal

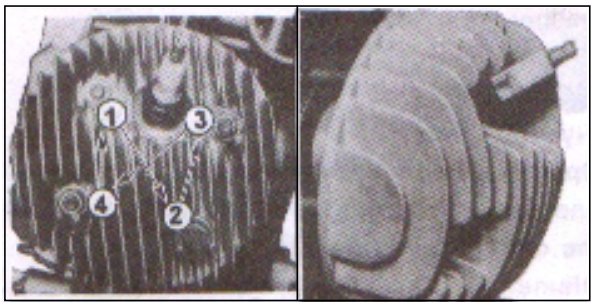


Fig. 128-Cylinder Head Removal

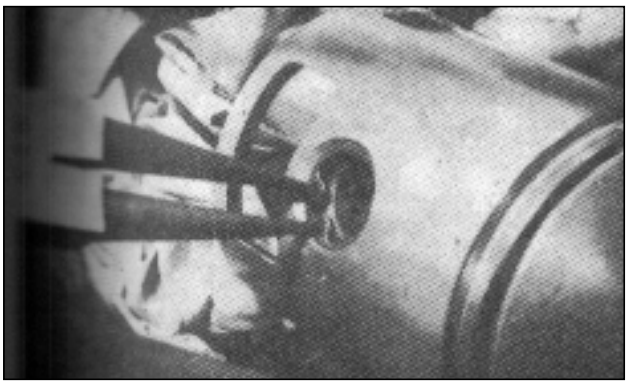


Fig. 129-Circlip removal

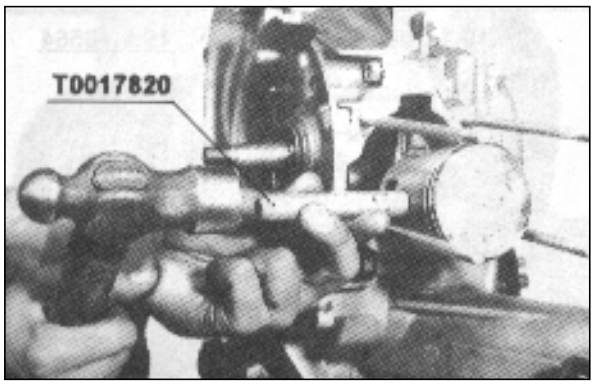


Fig. 130-Dismantling Wrist Pin

Clutch assy.:

T-0031729
Wrench for blocking clutch assy.:
Remove: Clutch cover.
Operation: Secure the clutch unit with wrench T-0031729. (Fig.132)

T-0030627
Wrench for clutch nut:
Remove: pressure plate and straighten nut lock washer.
Operation: Apply wrench T-0030627 and open clutch nut. (Fig.132)
Dismantle: Clutch unit, woodruff key and shoulder washer.For removal of Oil pump drive gear, metering device shaft ref. page 42.

Fly wheel rotor and back plate:

19.1.20095
Locking tool for flywheel.
Remove: Flywheel cover.
Operation: Secure flywheel with tool No. 19.1.20095. Open the magneto nut and take out alongwith washer. (Fig.133)

T-0048564
Flywheel extractor:
Operation: Secure the rotor unit with tool 19.1.20095 and screw in the extractor T-0048564. Tighten the central bolt. (Fig.134)
Dismantle: Take out flywheel rotor. Unscrew 4 screws to take out back plate assy. along with wiring harness.

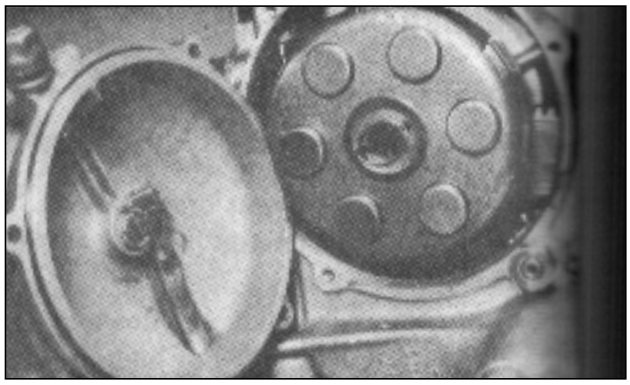


Fig. 131-Clutch Cover Removal

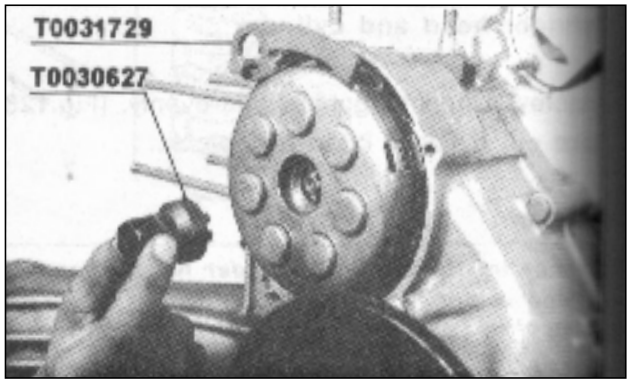


Fig. 132-Clutch Nut Removal

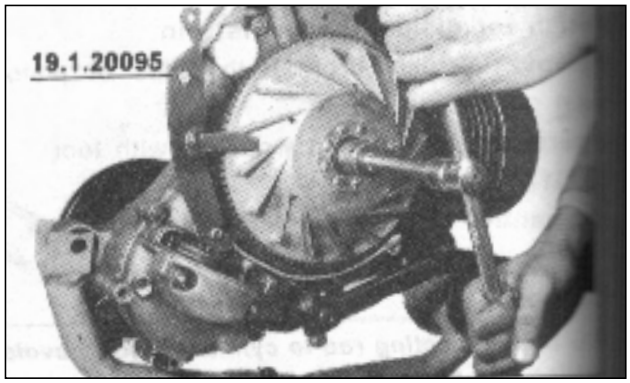


Fig. 133-Magnetic Nut Removal

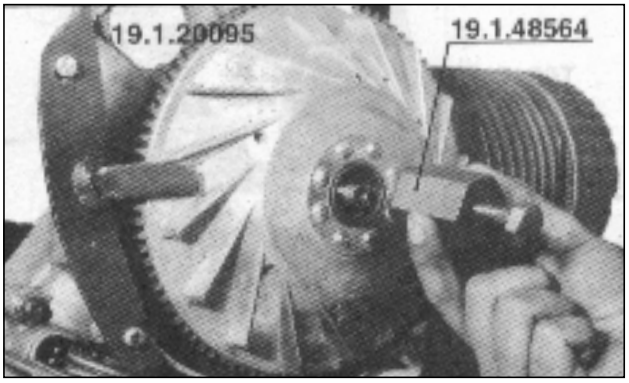


Fig. 134-Flywheel Removal

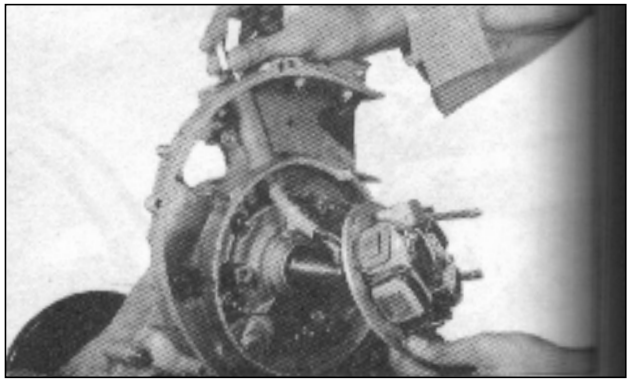


Fig. 135-Back Plate Assy. Removal

Crank case halves separation:

Remove: Gear shifter box.
(a) Take out kick lever.
(b) Unscrew all crank case nuts diagonally and evenly.
(c) Take out magneto side crank case half.

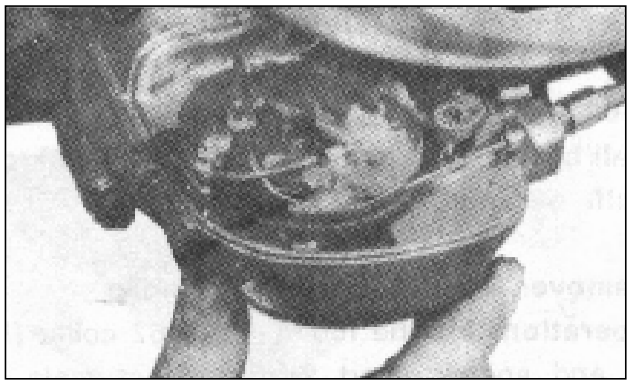


Fig. 136-Gear shifter box

Crank shaft:

T-0038886
Tool for expelling crank shaft.
Operation: Fix the tool T-0038886 on crank case half (clutch side) cover holes. (Fig.138)
Screw in centre bolt until crank shaft is removed from crank case.

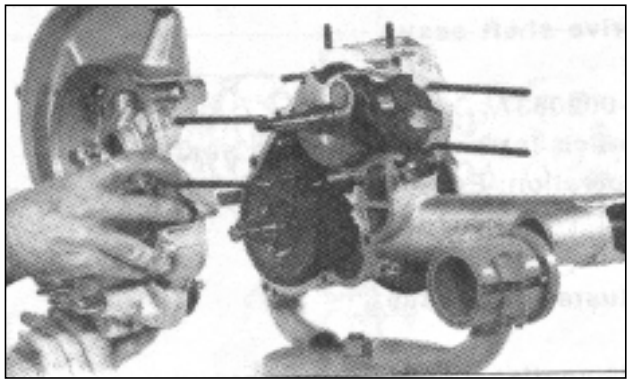


Fig. 137-Magneto side crank case half removal

Caution:

Support crank shaft to avoid misalignment due to falling.

Crank case half flywheel side:

T-0021467/2, 9, 16 and 18
Roller bearings extractor flywheel side crank case half.
Remove: Starter sector gear shaft, kick return spring, oil seal and kick buffers.

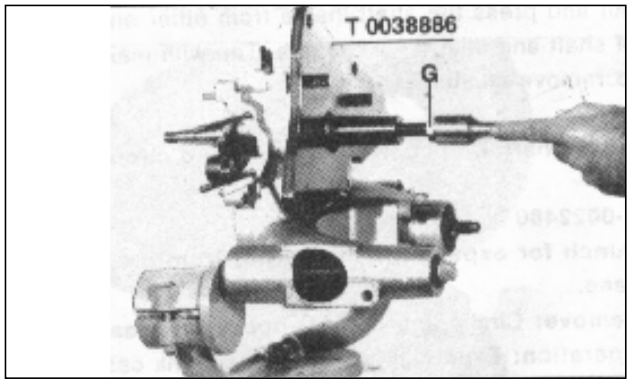


Fig. 138-Crank Shaft Removal

Main roller bearing:
Operation (I): Fix the tool T-0021467 collet (Part 18) and spacer (Part 2). (Fig.139)
Extract bearing outer race with rollers from crank case half.

Drive shaft roller bearing:

Operation (II): Fix the tool T-0021467 collet (Part 16) and spacer (Part 9). (Fig.139)

Extract roller bearing from crank case half.

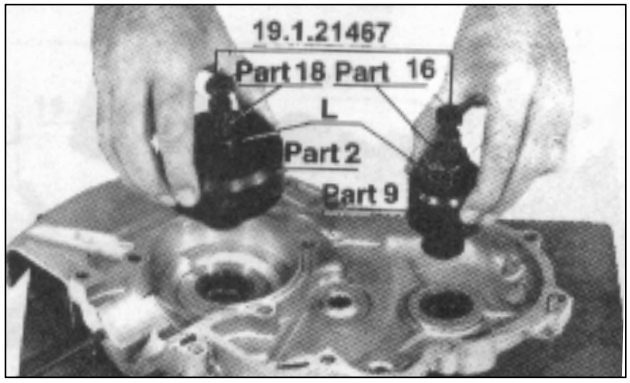


Fig. 139-Bearing Removal

Crank case half (clutch side):

T-0021467/1&2
Ball bearing extractor, clutch side crank case half.

Remove: Main oil seal, inner circlip.
Operation: Fix the tool T-0021467 collet (Part 1) and spacer (Part 2) to extract main ball bearing from crank case clutch side. (Fig.140)

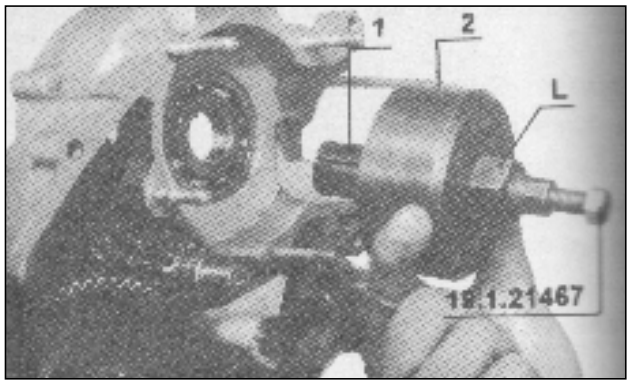


Fig. 140-Extracting ball bearing

Drive shaft assy.:

T-0020837
Punch for extracting drive shaft.
Operation: Extract dirve shaft assy. by using punch tool T-0020837.(Fig.141)

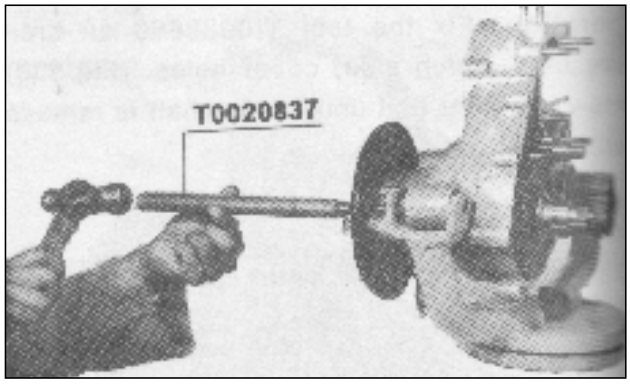


Fig. 141-Extracting drive shaft

Cluster gear assy.

Dismantle:
Lift the lock (Tab washer) from nut. Open the nut and press the shaft inside from other ends of shaft and take out 21 rollers. Tap with mallet to remove cluster gear assy.

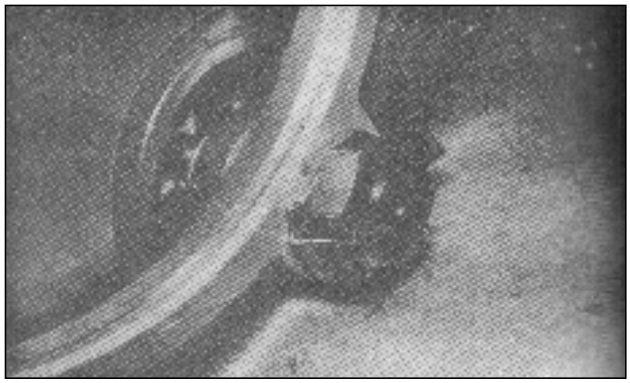


Fig. 142-Cluster gear assy. removal

Drive shaft, ball bearing, oil seal and circlip:

T-0022480
Punch for expelling ball bearing from crank case.
Remove: Circlip and oil seal from crank case.
Operation: Expel ball bearing from crank case by using punch T-0022480 from inside.(Fig.144)

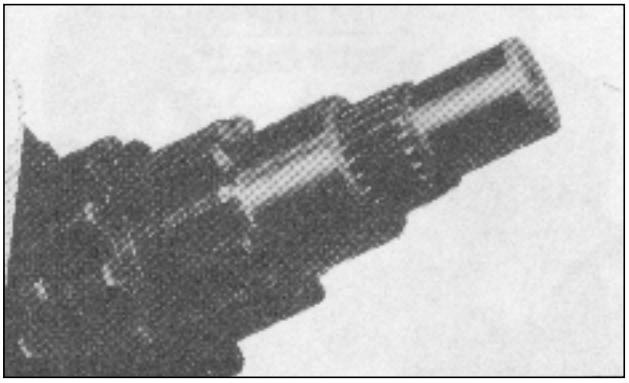


Fig. 143-Cluster gear assy.

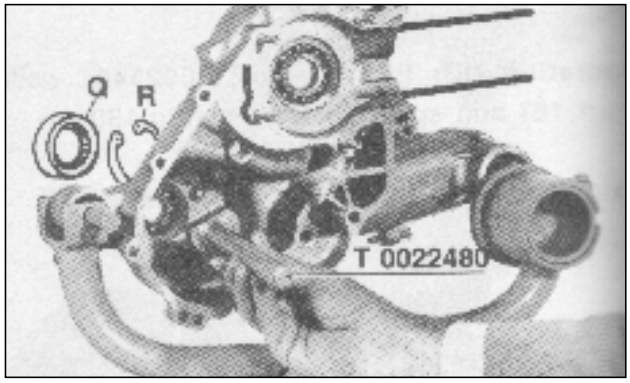


Fig. 144-Expelling ball bearing

Clutch unit overhauling:

T-0020322
Tool for clutch unit dismantling & assembling.

Dismantling:

Operation:
(a) Fix the tool T-0020322 to clutch unit and compress by tightening nut 'C'. (Fig.145)
(b) Take out circlip by lifting one end 'D' first.
(c) Release the tool and take out springs and clutch plates.

Reassembly:

Operation:
(a) Fix the tool T-0020322 and compress the springs between outer case and gear plate assy. by tightening the nut 'C'.
(b) Place the plates in reverse sequence order of dismantling proces.
(c) Fix the circlip in outer case (clutch bell) groove.

Caution:

Both ends of circlip must be fixed between the groove of clutch bell.

Crank Shaft Main roller bearing inner cone:

19.1.14499
Bearing extractor (inner cone) from crank shaft.

Dismantling:
Operation:
(a) Place adaptor halves (part 23) on inner cone. (Fig.148)
(b) Fit the bearing extractor 19.1.14499 collet over the adaptor halves to clamp firmly and extract inner cone.

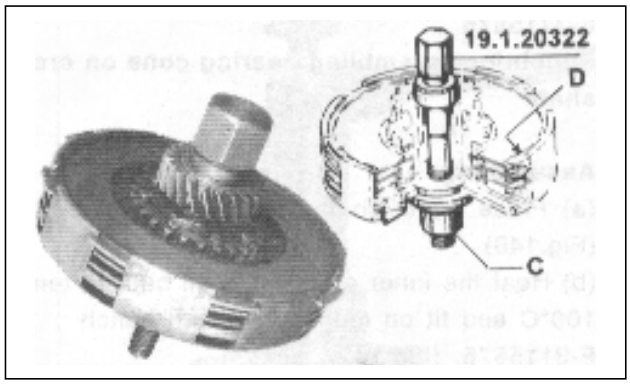


Fig. 145-Clutch unit

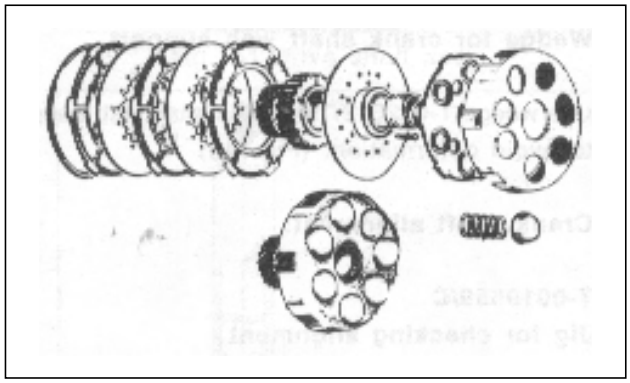


Fig. 146-Clutch unit - exploded view

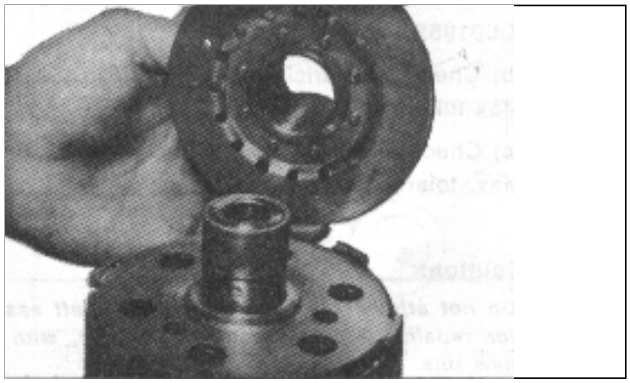


Fig. 147-Removing Clutch plates

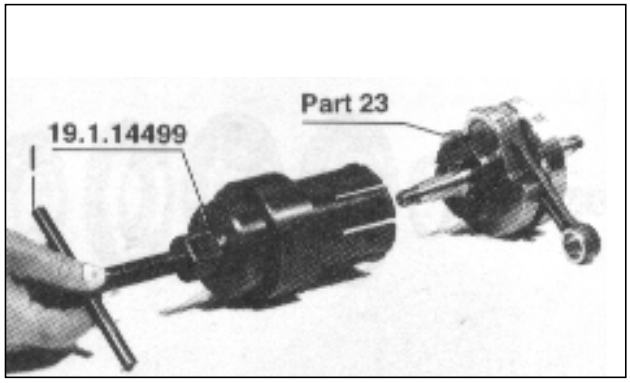


Fig. 148-Extracting bearing inner cone

F-3115576
Punch for assembling bearing cone on crank shaft

Assembling:
(a) Place crank shaft on a suitable block 'D'. (Fig.149)
(b) Heat the inner cone 'C' in oil bath to temp. 100°C and fit on crank shaft with punch
F-3115576. (Fig.149)

T-0025127
Wedge for crank shaft web support

Use wedge T-0025127 for crank shaft web support to avoid deformation. (Fig.149)

Crank shaft alignment:

T-0019559/C
Jig for checking alignment
Operation:
(a) Place crank shaft assy. on jig T-0019559/C. (Fig.150)
(b) Check eccentricity of dia 'C'. (Fig.150) Max tolerance 0.02 mm.
(c) Check eccentricity of surfaces dia 'A' & 'B' Max. tolerance 0.03 mm.

Caution:

Do not attempt to dismantle crank shaft assy. for repairs. Replace crank shaft assy. with a new one.

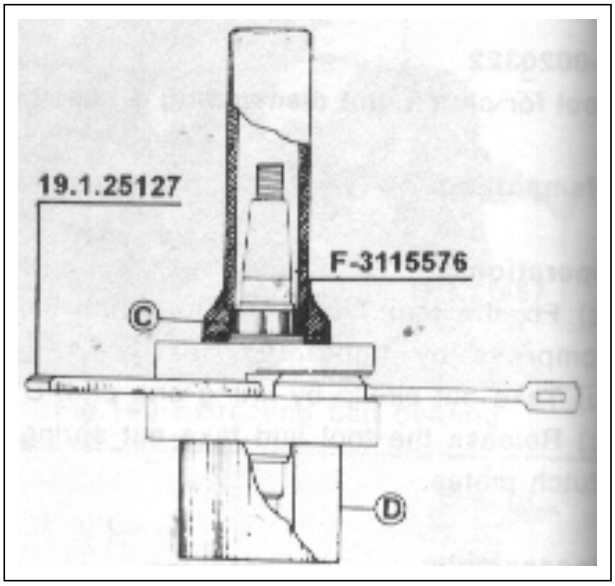


Fig. 149-Assembling bearing cone

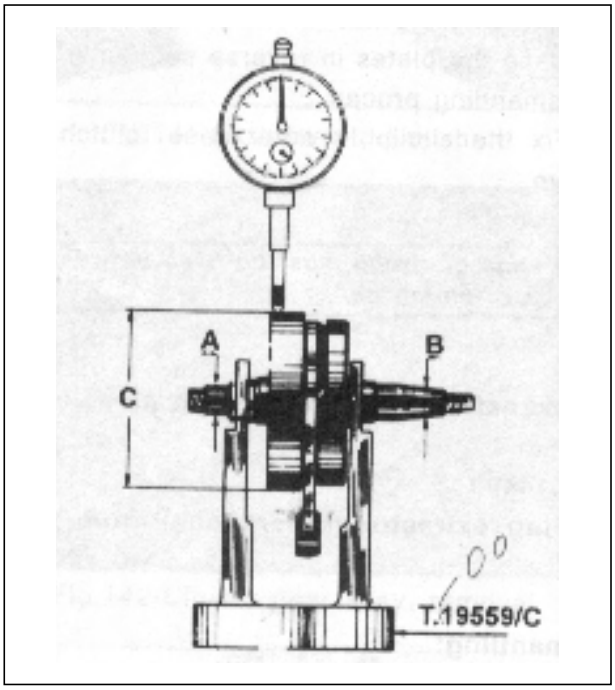


Fig. 150-Jig for checking alignment

Drive shaft assy.

Remove: Circlip, shoulder washer and take off 4 gears in a sequence.

Dismantle:

(a) Unscrew gear control rod by turning clockwise (left thread) from selector spider.
(b) Take out selector spider.

Assembly:

(a) Insert selector spider 'A' in drive shaft.
(b) Screw tight the rod 'B' (left thread) anticlock wise to torque 1.5 - 1.8 kgm.
(c) Control rod to be caulked as shown in fig.151

Selector spider and gear control rod: (Fig.152)

1. Insert the selector spider **'A'** in the drive shaft, screw tight the rod **'B'** (left hand thread) with a 1.5-1.8 Kgm. locking torque.
2. Cut a conic appendix **'C'** as illustrated in fig.152 in a flat bar **'D'** (thickness 5 mm) and insert the flat bar in a spline of the gear shaft until the appendix **'C'** coincides with the end **'F'** of the gear control rod to be caulked.
3. Clamp in a vice the flat **'D'** bar, (the rod above), as illustrated in fig.152, then tap with a hammer on a tube (inner Ø17.5 mm) put on the rod edge **'B'** to caulk the threaded rod end **'F'** on the selector spider **'A'**.

Caution:

Please note the spider has left hand thread.

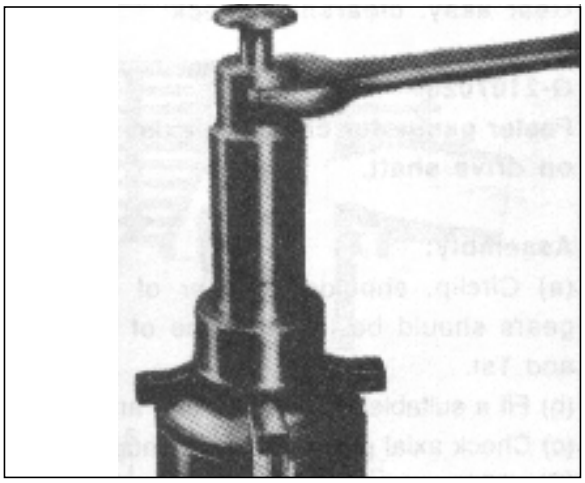


Fig. 151-Drive shaft assy.

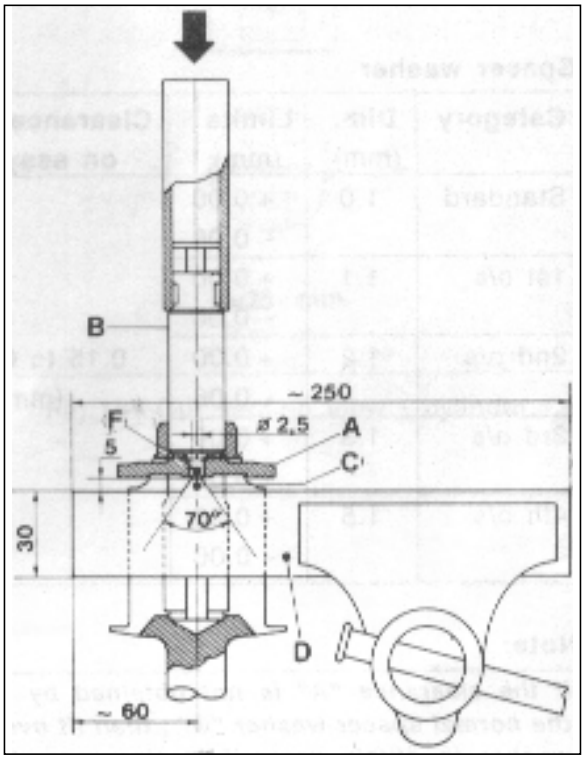


Fig. 152-Side view - drive shaft assy.

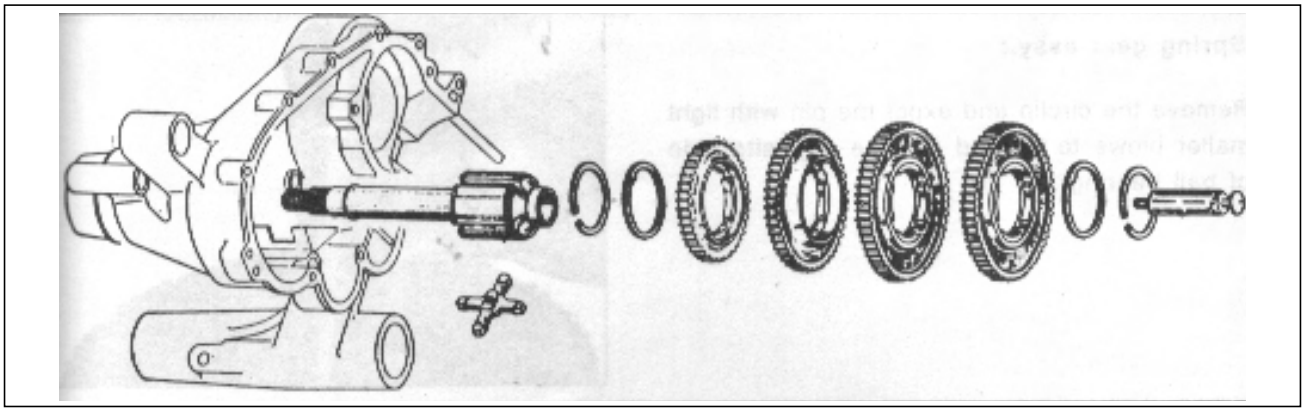


Fig. 153-Exploded view - drive shaft assy.

Gear assy. clearance check:

G-2107025
Feeler gauge for checking axial play of gears on drive shaft.

Assembly:

(a) Circlip, shoulder washer of 1 mm and 4 gears should be in sequence of 4th, 3rd, 2nd and 1st.
(b) Fit a suitable shoulder washer and outer circlip.
(c) Check axial play with feeler gauge G-2107025. (Fig.154)
(d) Clearance 'A' should be between 0.15-0.40mm.

Spacer washer

Category	Dim. (mm)	Limits (mm)	Clearance 'A' on assy
Standard	1.0	+ 0.00 - 0.06	
1st o/s	1.1	+ 0.00 - 0.06	
2nd o/s	1.2	+ 0.00 - 0.06	0.15 to 0.40 (mm)
3rd o/s	1.3	+ 0.00 - 0.06	
4th o/s	1.5	+ 0.00 - 0.06	

Note:

If the clearance "A" is not obtained by using the normal spacer washer "B" , then fit oversize washer to obtain prescribed clearance. Use a feeler gauge (e.g. G-2107025, for inspection Fig.155).

Spring gear assy.:

Remove the circlip and expel the pin by light mallet blows on its end (on the opposite side of ball bearing).

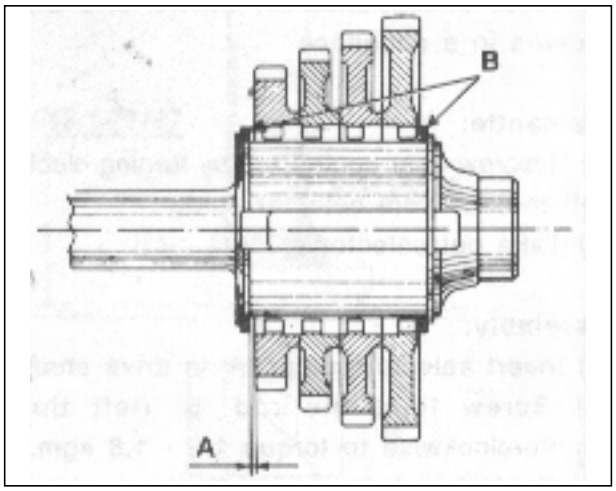


Fig. 154-Gear assy. - cut section view

Fig. 155-Checking clearance

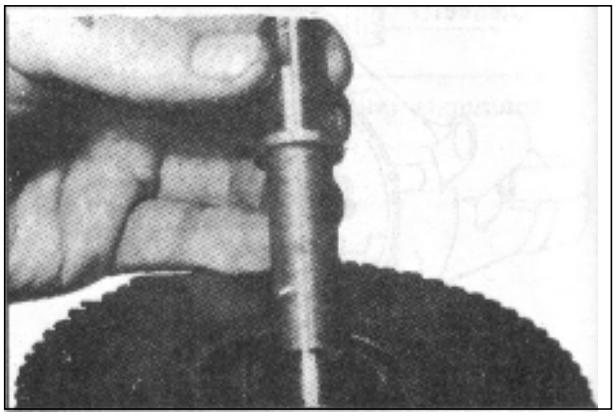


Fig. 156-Pin removal

Assembly clearances, tolerances and limits:

In case of a rebored cylinder, the dimension **'E'** (fig.157) should exceed the dimension **'C'** on the piston to be fitted (marked on the piston itself), by the value indicated (Clearance on assembly)

Cylinder - Piston

Part name	Size	Limits
Cylinder Standard	E = 57.80	+ 0.025 - 0.005
Piston Standard	C = 57.585	± 0.015
Cylinder 1st o/s	E = 58	- 0.000 + 0.020
Piston 1st o/s	C = 57.785	± 0.010
Cylinder 2nd o/s	E = 58.2	- 0.000 + 0.020
Piston 2nd o/s	C = 57.985	± 0.010
Cylinder 3rd o/s	E = 58.4	- 0.000 + 0.020
Piston 3rd o/s	C=58.185	± 0.010

Clearance on assy. = 0.225 mm.

Note:

Ensure that the arrow marked on the piston crown is facing towards the exhaust port side at the time of cylinder piston assembly.

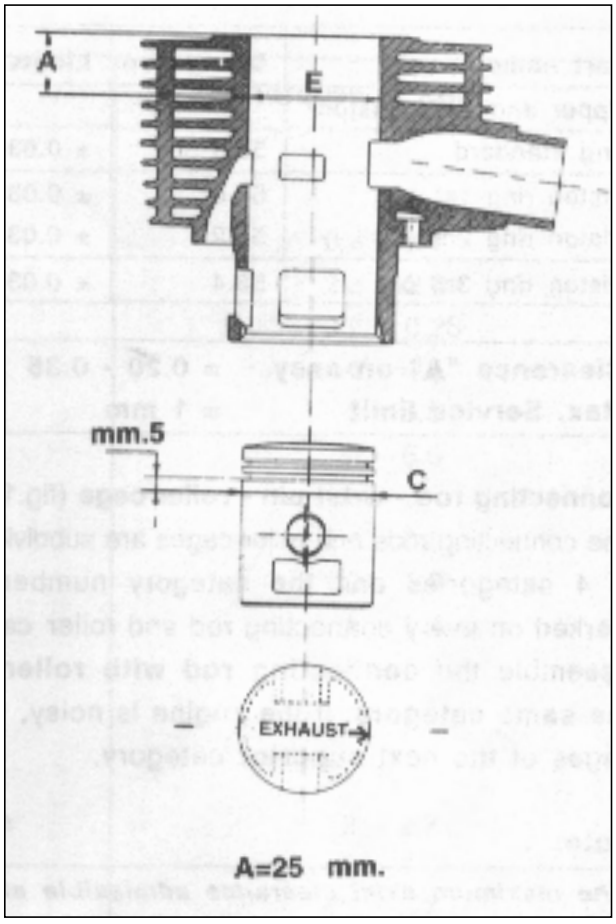


Fig. 157-Cut section view - cylinder

Piston rings - (fig.158)

Part name	Dimension	Limits
Upper and lower piston ring standard	57.8	± 0.03
Piston ring 1st o/s	58.0	± 0.03
Piston ring 2nd o/s	58.2	± 0.03
Piston ring 3rd o/s	58.4	± 0.03

Clearance "A" on assy.	**= 0.20 - 0.35**
Max. Service limit	**= 1 mm**

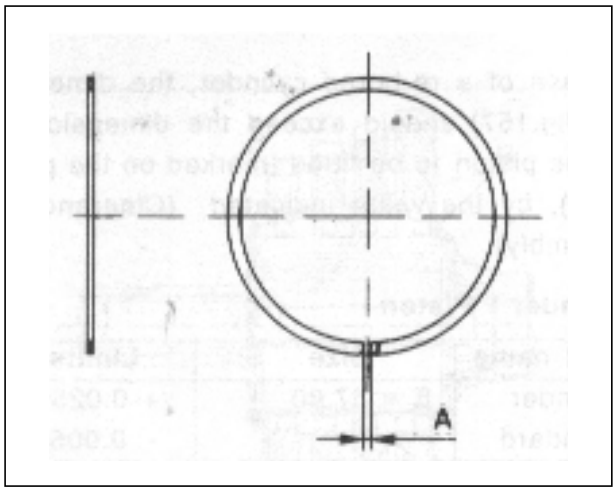


Fig. 158-Piston ring

Connecting rod - wrist pin - roller cage (fig.159)
The connecting rods and roller cages are subdivided in 4 categories and the category number is marked on every connecting rod and roller cage.
Assemble the **connecting rod with roller of the same category,** if the engine is noisy, use cages of the next **superior** category.

Note:

The maximum axial clearance admissible after use of the connecting rod (longitudnal run of crank pin) is of 0.7 m m.

For the wrist pin, that is coupled with a '0' (Zero) clearance on assembly the maximum permissible clearance for wrist pin after use is 0.02 mm.

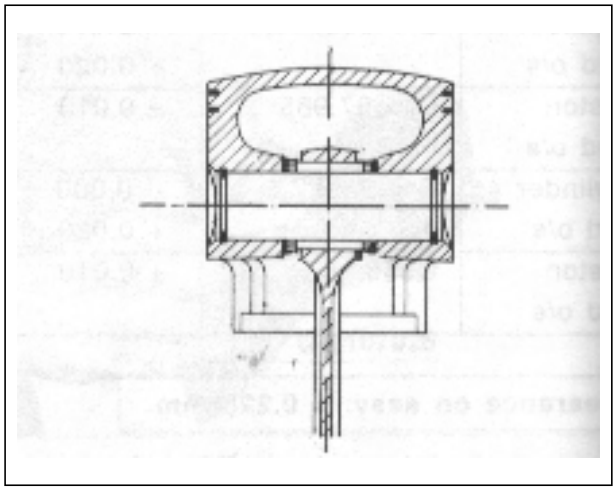


Fig. 159-Cut section showing wrist pin & connecting rod

IMPORTANT TIGHTENING TORQUES

Part	Torques in Kgm
Engine unit	
Backplate securing screw	0.3 -0.4
Starter lever securing nut	2.3 - 2.6
Pick up securing screw	0.2 - 0.25
Clutch unit securing nut	4 - 4.5
Gear cluster pin securing nut	3 - 3.5
Flywheel magneto securing nut	6 - 6.5
Carburettor securing bolts	1.6 - 2
Clutch cover bolts	0.6 - 0.8
Cylinder head securing nuts	1.3 - 1.8
Nuts (No 3) securing starting motor to crankcase	1 - 1.5
Lower bolt securing starting motor	0.6 - 0.8
Front suspension unit	
Nuts for securing damper plate to steering column	2 - 2.7
Damper upper retaining nut	3 - 4
Damper lower retaining nuts	2 - 2.7
Bolt for jaw self-adjusting plate	0.7 - 1
Brake pin lever securing nut	0.7 - 1
Steering unit	
Steering column upper bearing	5 - 6*
Steering column upper bearing ring nut	3 - 4
Handlebar securing screw	3 - 4.4
Rear suspension unit	
Bolt for securing engine to chassis	6 - 7.5
Damper lower part. securing nut	1.6 - 2.5
Wheel unit	
Rear wheel shaft securing nuts	9 - 10
Nut for securing front and rear wheel	2 - 2.7
Rims to the drum	
Front wheel axle securing nut	7.5 - 9

*** - When locking of 5 - 6 Kgm is reached, unscrew for 1/4 of turn.**

Checks before reassembly:

Following points should be strictly adhered to before reassembly of engine. Carefully examine the condition of each and every individual parts.

Crank cases:

It should not be cracked or deformed and the bearing seats should not be damaged or worn.

Ball bearings:

(a) Check the bearings and ensure that the axial play should not be more.
(b) Check their smoothness by wheeling them by hand.

Roller cages :

(a) For each re-assembling operation use new cage, by observing following rules;
(b) Wash the new cage in pure petrol or in paraffin in order to eliminate the slush.
(c) After greasing, place the roller cage with stamped side facing outwards, which is fitted as indicated in the respective fig. of the present chapter, by using the proper tooling.

Shafts and axles:

(a) Bearing and sliding surfaces should not present indentation and abrasions so that a good running is compromised.
(b) They should be suitably lubricated. If required, change with new one.

Starter gear/Sector gear :

Check that the teeth of the coupling are not excessively worn out and the engagement with starter gear is correctly carried out.

Clutch:

Check the wearing on the plates, couplings on plates and toothing of the gear. If wearing is found then replace the damaged parts.

Gears:

Check the condition of the toothing, if it presents some spalling or an excessive wear, then replace with new one.

Always use new gaskets, oil seals and split pins.

Re-assembly of engine.

19.1.20017
Electric heater for heating crank case bearing zone.

Operation: Heat the crank case bearing zone with heater 19.1.20017 up to a temp. of approx. 80ºC before fitting the bearing in the crank case. (fig.160)

Crank case half (Fly wheel side):
T-0021071
Punch for assembling crank shaft roller bearing.

Operation: Fit the main roller bearing 'A' by using the punch T-0021071 in crank case. (fig.161)

T-0033971
Punch for drive shaft DC roller bearing. (fig.161)

Operation: Fit the drive shaft D C roller bearing 'B' by using the punch T-0033971 in crank case.

Crank case half (clutch side):

T 0023589
Punch for main ball bearing and oil seal.

Main ball bearing, circlip and oil seal:

Fix the crank case on fixtrue T-0025095 and heat the bearing zone.

Operation: Fit main ball bearing 'E' by using the punch T 0023589. (Fig.162)

Assemble: Place the inner circlip 'F'.
Fit the oil seal 'G' by punch T 0023589. (Fig.163)

Caution:

Ensure that oil seal is fitted with flat face towards the bearing.

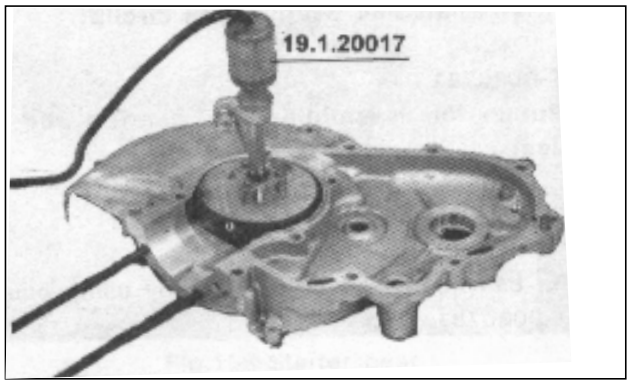


Fig. 160-Electric heater heating the crank case

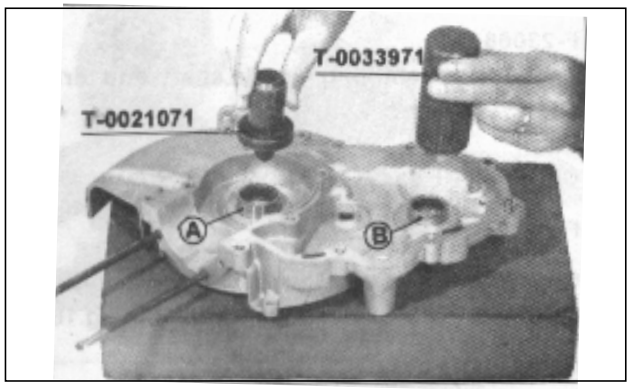


Fig. 161-Assembling crank shaft roller bearing

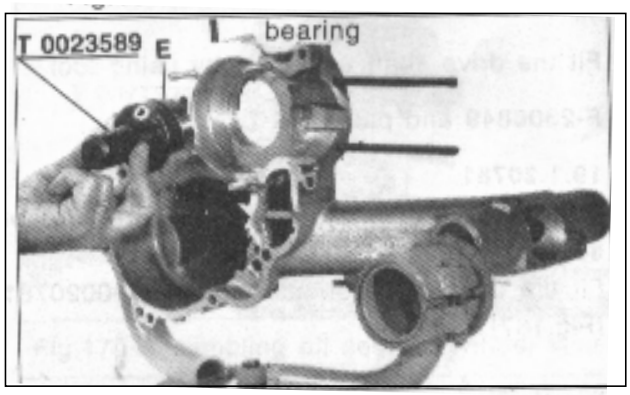


Fig. 162-Main ball bearing fitment

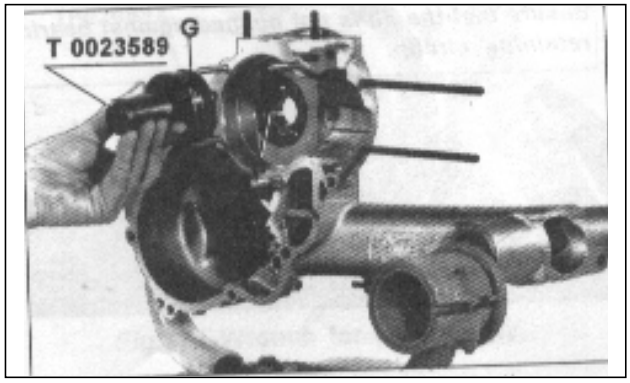


Fig. 163-Affixing the inner circlip

Drive shaft ball bearing and circlip:

T-0020781
Punch for assembling ball bearing and oil seal.

Operation: heat the bearing zone.

Fit ball bearing in crank case by using punch T-0020781. (Fig.164)

Fit the retaining circlip 'I'.

F-2306849
Tool for assembling crank shaft and drive shaft.

Crank shaft assy:
F-2306849/1&2
Operation: Fit the crank shaft assembly by using tool F-2306849 and parts 1 & 2. (Fig.165)
Drive shaft assy.:
F-2306849/1&6
Fit the drive shaft assembly by using tool F-2306849 and parts 1 & 6.(Fig.166)
19.1.20781
Punch for assembling ball bearing and oil seal.
Fit the oil seal 'G' by using punch T-0020781. (Fig.167)

Caution:

Ensure that the oil seal should not be pushed against bearing retaining circlip.

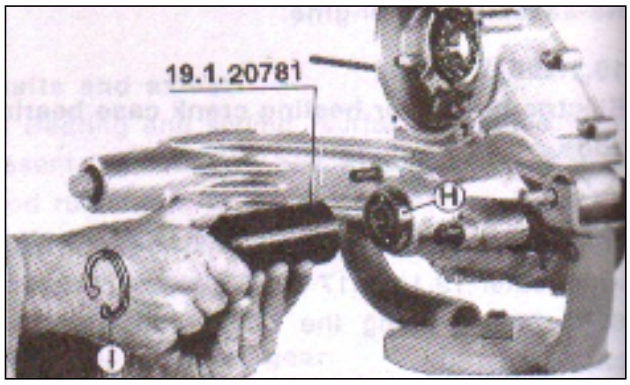


Fig. 164-Assembly ball bearing & circlip

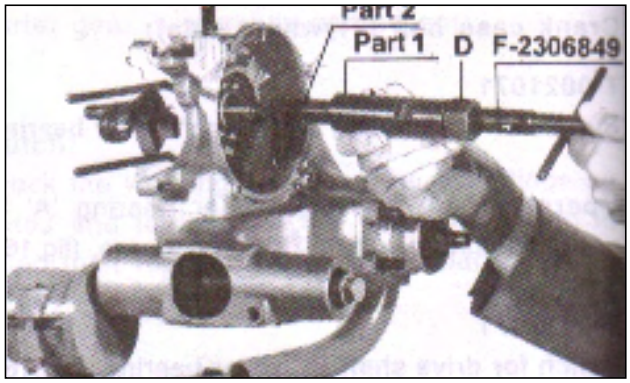


Fig. 165-Assembling crank shaft

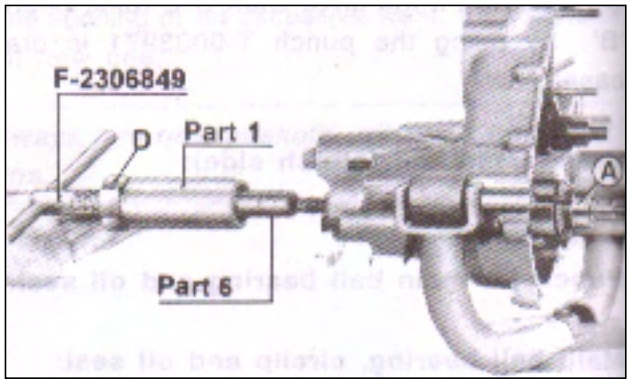


Fig. 166-Assembling drive shaft

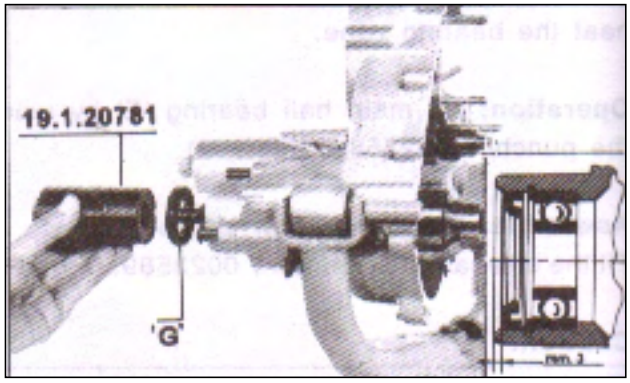


Fig. 167-Punching oil seal

Kick starter assembly & starter gear:

(a) Fix both 'O' rings in crank case half (flywheel side) and apply small qty. of grease between 'O' rings.
(b) Fit sector gear shaft and kick return spring.
(c) Fit the kick pedal.
(d) Replace stop buffers of starter sector gear.
(e) Fix oil conveyer rib.
(f) Place starter gear on cluster gear, ensure rachet teeths are meshed.
(g) Place starter gear tension spring properly.

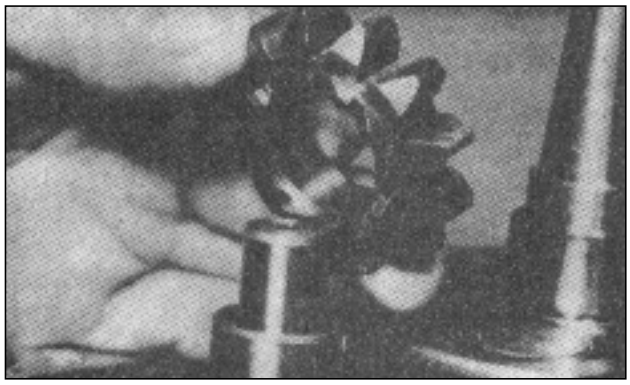


Fig. 168-Starter gear

Crank case halves coupling:

(a) Smear grease on gasket surface of both the crank case halves.
(b) Place gasket (on flywheel side crank case).
(c) Join the both crank case halves.

Fig. 169-Crank case halve

Caution:

Fix 4 nuts and tight them diagonally and evenly to specified torque. Crank shaft should not be acted on, for easing the free rotation. Tighten remaining 8 nuts to specified torque values.

T-0027338
Punch for assembling oil seal flywheel side:

Operation:

(a) Place the oil seal 'A' on seat of the punch T-0027338.
(b) Push oil seal in seat. (Fig.170)

Fig. 170-Assembling oil seal - flywheel side

Clutch assembly

T-0030627
Wrench for clutch assy.:

Assembly:

(a) Fix woodruff 'key' and shoulder washer in position. Mount clutch unit. Place the lock washer and ring nut.
(b) Secure clutch unit by using tool T-0031729
(c) Tighten ring nut with wrench T-0030627 to torque 4.0 - 4.5 kgm. (fig.171).
(d) Fold lock washer over ring nut slot.
(e) Fit the pressure plate in position.

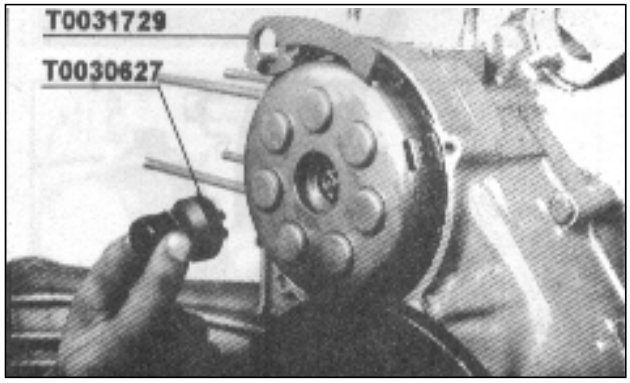


Fig. 171-Wrench for clutch assy.

(f) Mount clutch cover and secure with bolts.
(g) Tighten the cluster gear securing nut and bend the lock washer open nut.

Gear control box:

Locating the lever in gear control rod and press the gear control box in position.

Flywheel magneto assy.:

Mount stator plate by coinciding the ignition timing marks.

(a) Mount flywheel rotor on crank shaft after locating the woodruff key in position.
(b) Lock flywheel with tool 19.1.20095 and tight en the nut to torque 6 - 6.5 kgm. (Fig.175)

Piston, rings, cylinder and cylinder head:

(a) Place the needle cage in small and connecting rod.
(b) Fit the piston assembly by pressing wrist pin into connecting rod with a punch tool T-0017820. (Fig.176)
(c) Lock the wrist pin on both ends with a circlip.
(d) Place the piston rings into a groove.
(e) Fit the cylinder block.
(f) Place the cylinder head and tighten 4 nuts diagonally and evenly to torque values of 1.3-1.8 kgm.

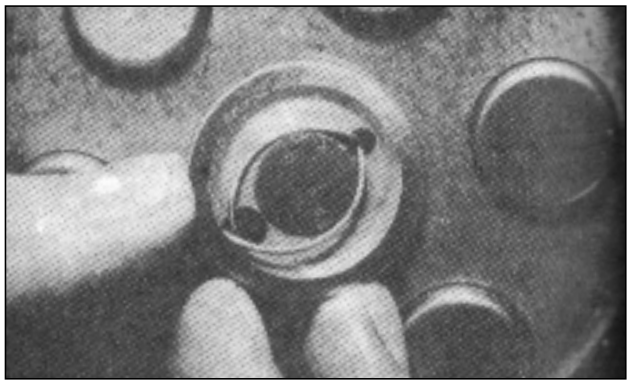


Fig. 172-Bending lock washer open nut

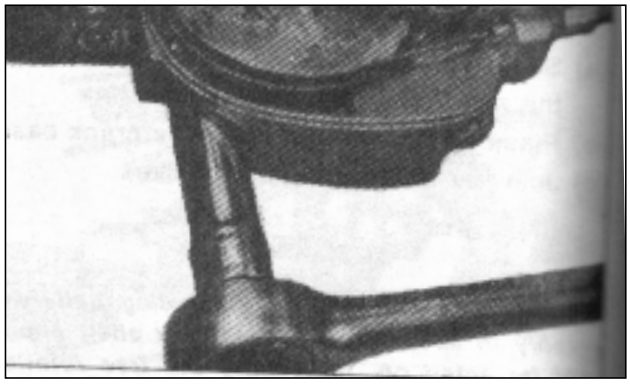


Fig. 173-Gear control rod

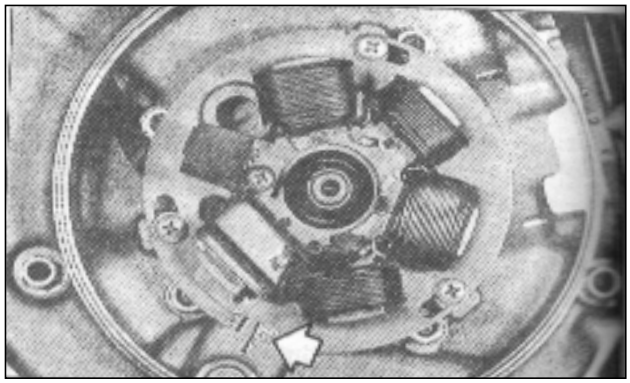


Fig. 174-Flywheel magneto assy.

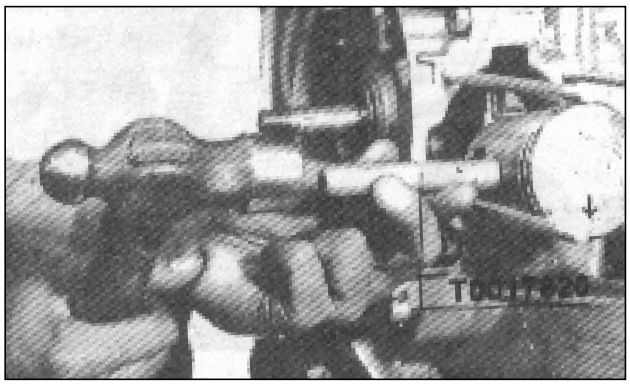


Fig. 176-Assembling piston

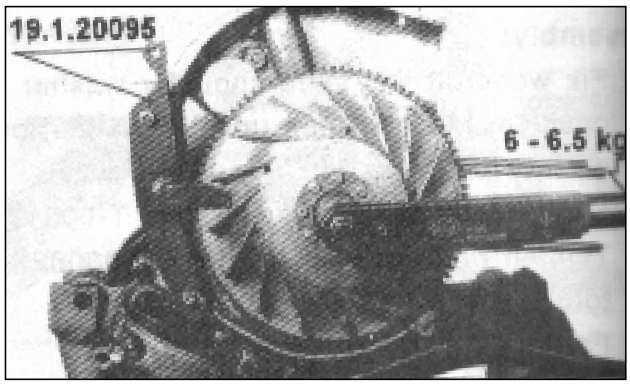


Fig. 175-Locking the flywheel with tool

Reed Valve :
Mount Reed valve with new gaskets in position.

Air cleaner case:
Mount air cleaner case with packing in position.

Carburettor:
Mount carburettor assembly with packing in its position.

Air cleaner, cover and cooling hood:
Fit air cleaner on the carburettor.
Fix air cleaner cover and cooling hood.

Silencer and brake drum:
Assemble silencer assembly and rear brake drum to the specified torque values as mentioned on page 85.


Fig. 177-Mounting the air cleaner case

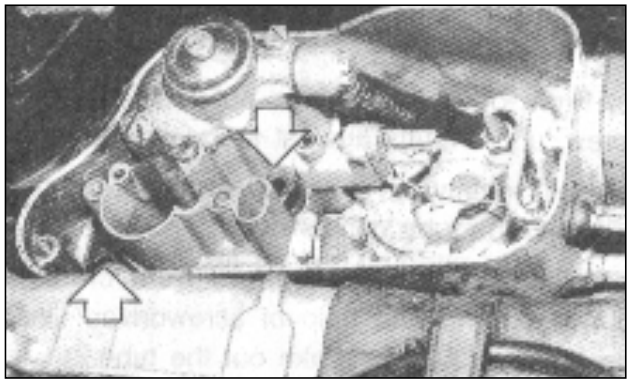


Fig. 178-Mounting the carburettor

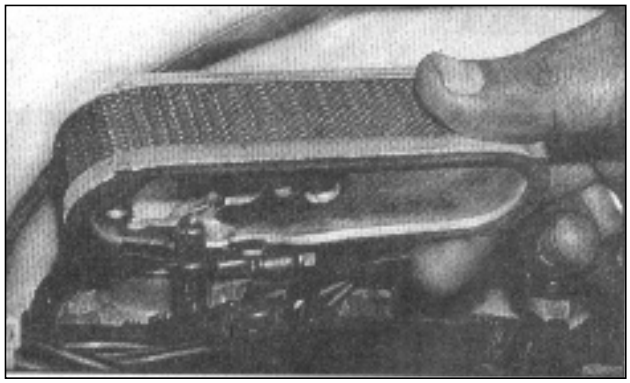


Fig. 179-Mounting the air cleaner

Engine foundation buffers & TUBE

Remove: engine from chassis and take out silencer, cooling hood and kick lever. Release both the spacers after grinding on their faces and take out with the help of a screw driver.

F-0709756 with attachments (A, B & C)

Fixture for extracting & fitting of engine foundation buffers and tube:

Dismantling of foundation tube: (Fig. 180)

F-0709756/C

Tool for dismantling tube:

Operation:

(a) Insert lead screw (part 2C) alongwith support tube (part 1C) and Hex. nut (part 3C) into foundation tube from clutch side.

(b) From other end fix the nut (part 4C) on lead screw, till it butts against foundation tube.

(c) Hold tommy bar (part 5C) and tight nut (part 3C) till the tube comes out.

(d) Remove both the buffers from crank case foundation with the help of screw driver. Unscrew the nut (part 4C) and take out the tube.

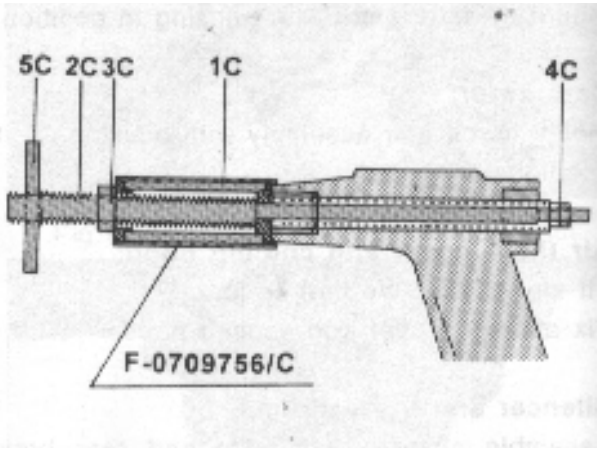


Fig. 180-Fixture of extracting & fitting of engine foundation buffers and tube

Assembling buffers. (Fig. 181)

F-0709756/A

Tool for assembling buffers:

(a) Insert stop washer in crank case foundation from clutch side.

(b) Apply liquid soap on outer surface of small buffer and press fit by thumb in crank case foundation from clutch side. Ensure that tapered side of buffer faces crank case.

(c) Insert the tie rod (part 2A) alongwith locator (part1A) and nut (part 3A) into foundation through buffer hole from clutch side. Flat face of locator should be outward.

(d) From other end place the locator (part 6A) on crank case foundation.

(e) Place big buffer duly dipped in liquid soap inside the locator (part 6A) with tapered portion facing inwards.

(f) Insert pushing pad (part 4A) into locator (part 6A) above the buffer with tapered portion facing inwards and screw the special nut (part 5A) on tie rod.

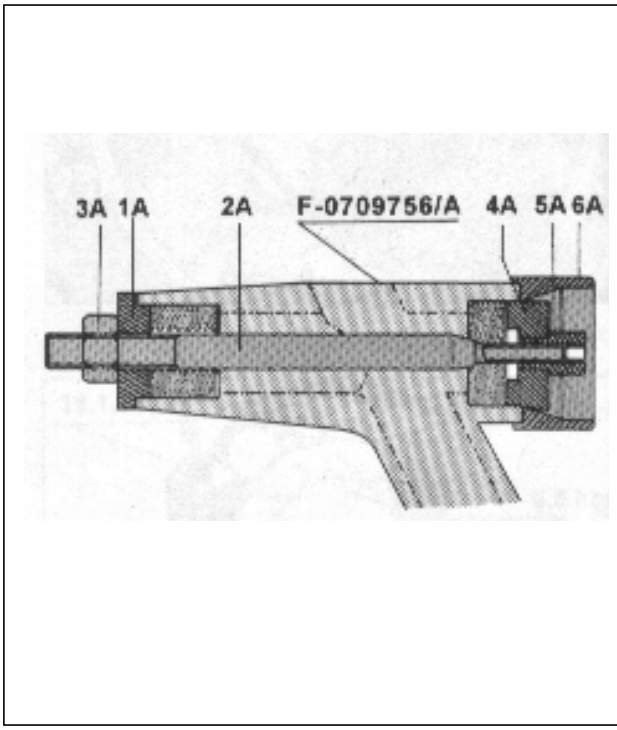


Fig. 181-Tool for assembling buffers

(g) Tighten the special nut slowly and progressively (part 5A) and tighten nut (part 3A) till big buffer retains its position in the crank case foundation. Unscrew special nut (part 5A) and take out tie rod alongwith locators.

Assembly of tube: (Fig. 182)

F-0709756/B

Tool for assembling tube:

(a) Place fixture (part 9B) on crank case foundation from magneto side.

(b) Fix the flange [(part 7B) (alongwith part 5B, 6B and 8B)] on fixture from clutch side and fix two nuts (part 11B)

(c) Insert guide pin (part 3B) into foundaiton tube and tighten with nut (part 4B).

(d) Insert pointed end of guide pin (part 3B) through flange (part 7B) into crank case buffer and press gently by hand.

Note:

Before inserting, ensure guide pin conical surface and inner surface of buffers hole are applied with liquid soap.

(e) Keep the lead screw open, screw-in outer tube (part 2B) alongwith lead screw (part 1B), into flange (part 7B).

(f) Tighten the lead screw (part 1B) slowly and progressively, until foundation tube retains its position in crank case.

(g) Loosen the lead screw (part 1B), remove outer tube (part 2B) and unscrew nut from guide pin (part 3B) and take it out.

(g) Unscrew nuts (part 11B), take out flange (part 7B) with fixture.

(i) Fit the spacers on both sides of tube (small size spacer on clutch side and big size on magneto side) and caulk the tube on both sides at four places to hold spacers at both ends.

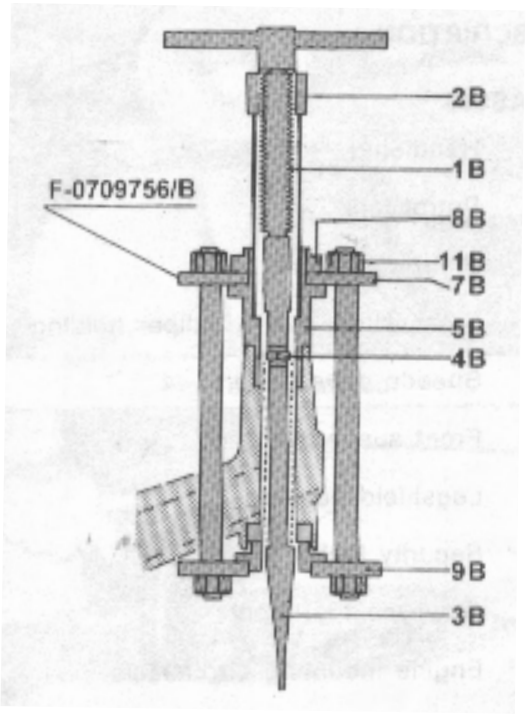


Fig. 182-Tool for assembling tube

CHASSIS

Handle bar:

(a) Remove 4 screws from handlebar bottom.
(b) Lift upward speedo cable & disconnect from speedometer.
(c) Disconnect electrical connections from socket.
(d) Remove Head Lamp assembly by unscrewing 2 crews from sides and 1 from bottom.
(e) Disconnect cables, (Accelerator, Gears, Clutch)
(f) Unscrew the handlebar clamp bolt and take it out.
(g) Lift the handlebar bottom.

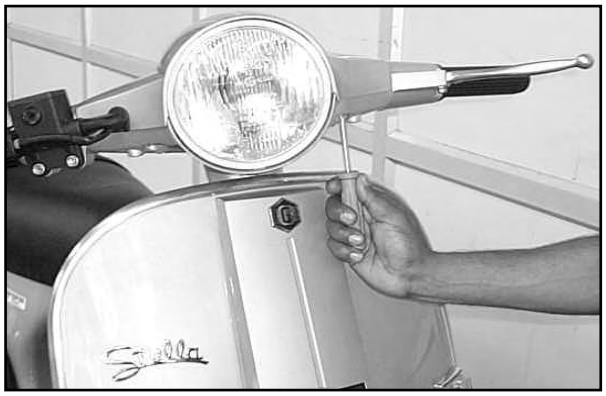


Fig. 183-Handlebar

Dismantling and assembling :

Petrol tank:

(a) Disconnect fuel level indicator cables from petrol tank top.
(b) Remove packing for fuel cock rod from frame.
(c) Now act on both securing bolts **'B'** with spanner and remove them alongwith spring washer (fig.184). Now lift the tank out from the frame. For oil tank removal ref. page 44.

For assembling follow the reverse operation as above.

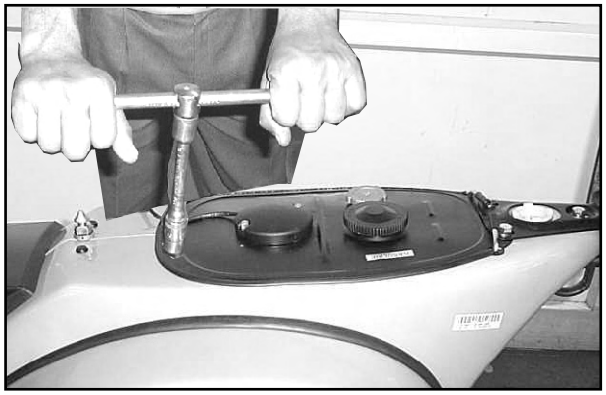


Fig. 184-Loosening securing bolts of petrol tank


Fig. 185-Lifting out the tank from frame

Petrol tank & fuel cock:

RS-00231

Wrench for fuelcock dismantling and assembling:

Dismantling:

Remove fuel gauge float unit.

Operation:

(a) Insert wrench RS-00231 in tank.
(b) Open the nut 'D'.
(c) Take out fuel cock. (fig.186)

Assembly: Follow reverse order of dismantling with tool RS-00231.

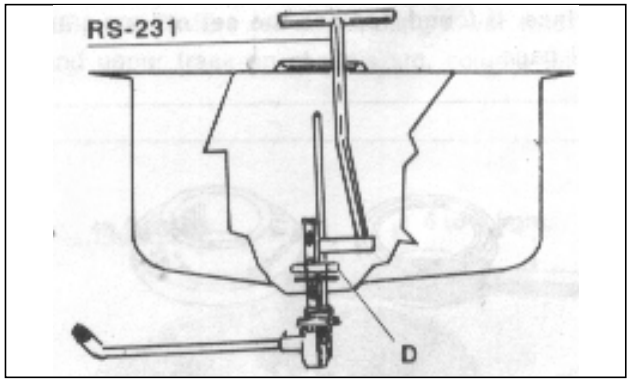


Fig. 186 - Tool for dismantling fuel cock

Steering column:

19.1.20055

Tool for track and ring nut (Stg.col.)

Remove: Handle bar. Push down control cables.

Operation:

(a) Place tool 19.1.20055 on the ring nut and open. (fig.206).

(b) Again with the same tool open the upper track.

Caution:

Hold steering column while opening the track to avoid damage to threads.

T-0020842

Punch for lower track removal.

Remove: Steering column from chassis frame.

Operation: Insert the punch T-0020842 from lower end and punch out the lower track from the chassis steering column tube. (fig.188)

19.1.20004

Punch for upper track removal.

Operation: Insert the punch 19.1.20004 from top side of chassis steering column tube and punch out the upper track of lower bearing. (fig.189)

T-0016561

Extractor for lower track from steering column.

Operation: Assemble the tool T-0016561 on steering column and extract lower race. (fig.190)

Inspection:

Check all tracks for any pitting or dents on the surface. If found, replace the set of tracks and ball cage.

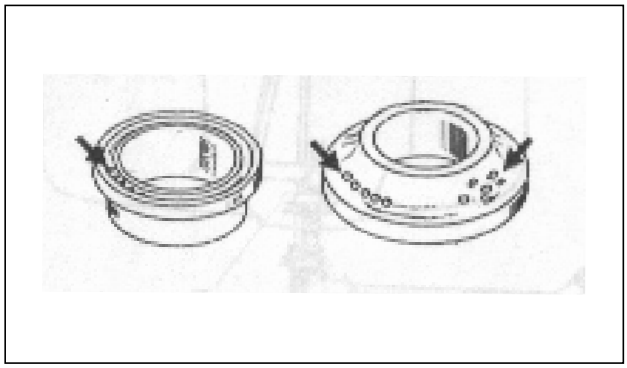


Fig. 191-Tracks and Ball cage

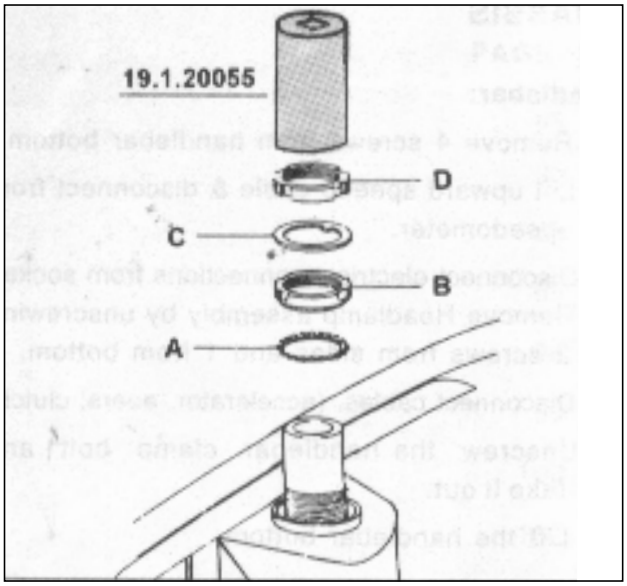


Fig. 187-Exploded view - steering column

Fig. 188

Fig. 189

Punch for lower track & upper track removal

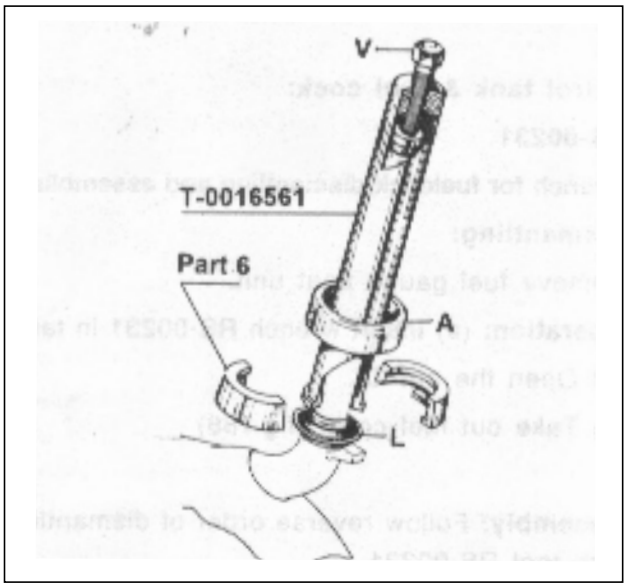


Fig. 190-Extractor for lower track from steering column

Re-assembly:

T-0016029

Punch for assembling lower track on steering column.

Lower track of lower bearing:

Operation:

Punch lower track 'S' with dust cover 'P' on steering column with punch T-0016029. (fig.192)

Upper track and lower track on chassis steering column tube:

T-0021330

Fixture for assembling lower track and upper track on chassis steering column tube.

Operation:

Fit the tool T-0021330 alongwith upper track 'A' and lower track 'B' in respective positions on the chassis tube and tighten the nut 'D' (fig.193)

Steering column assembly on chassis:

Assembly:

(a) Insert steering column assembly with lower ball cage duly greased into the chassis from lower side.

(b) Place small ball cage 'A' duly greased and screw upper track 'B' from top side.

19.1.20055/C

Tool for track & ring nut.

Operation:

(a) Tighten the upper track with tool 19.1.20055/C up to torque 5-6 kgm. (fig.194)

(b) Loosen the track by turning ¼ turn open (90°) (fig.195)

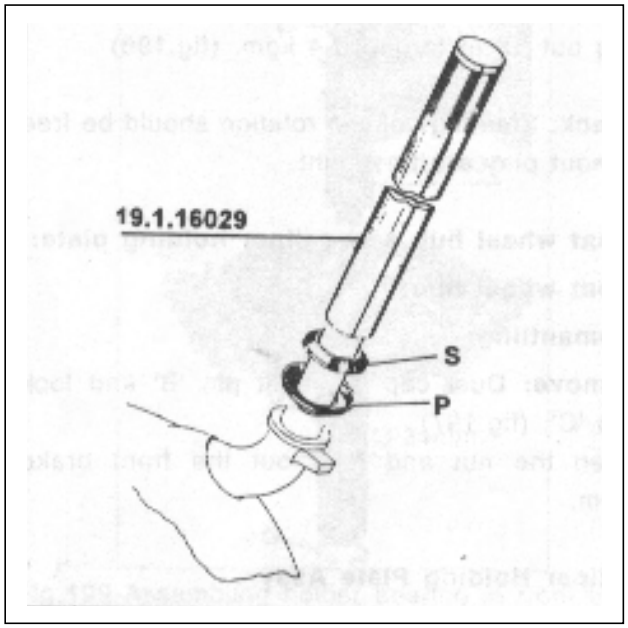


Fig. 192-Punch for assembling lower track on steering column

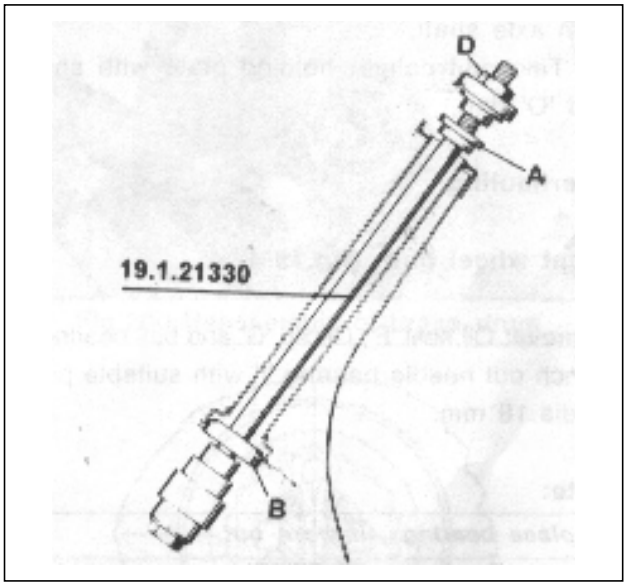


Fig. 193-Fixture for assembling lower track and upper track on chassis stg. column tube

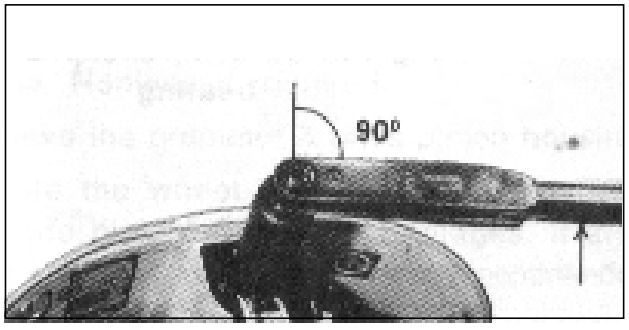


Fig. 195-Loosening the track by 90°

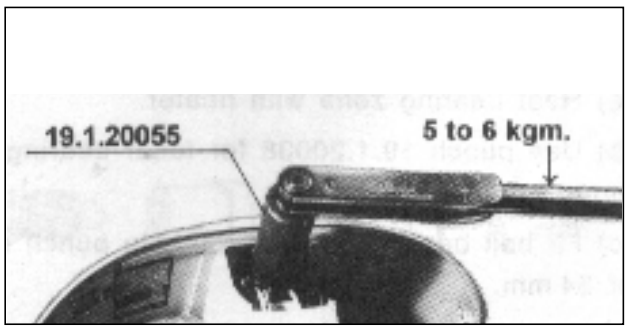


Fig. 194-Tightening of upper track

(c) Place spacer washer 'C' and tighten top ring nut 'D' to torque 3-4 kgm. (fig.196)

Check: Steering column rotation should be free without play on its weight.

Front wheel hub and Caliper holding plate:
Front wheel Hub:
Dismantling:
Remove: Dust cap 'A', split pin 'B' and lock cap 'C'. (fig.197)
Open the nut and take out the front brake drum.

Caliper Holding Plate Assy.

Remove:
(a) Shock absorber bolts, Caliper assy. and speedo cable,Circlip lock and spacer washer from axle shaft.
(b) Take out Caliper holding plate with spacer and 'O' ring.

Overhauling

Front wheel hub: (fig.198)

Remove: Oil seal 'F', Circlip 'G' and ball bearing 'H'.
Punch out needle bearing 'I' with suitable punch of dia.18 mm.

Note:
Replace bearings, if worn out.

19.1.20038
Punch for assembling roller bearing in front wheel hub.
Assembly : (fig.199)
(a) Heat bearing zone with heater.
(b) Use punch 19.1.20038 for roller bearing 'I' fitment.
(c) Fit ball bearing 'H' with suitable punch dia of 34 mm.
(d) Lock with circlip 'G' and fix new oil seal 'F'.

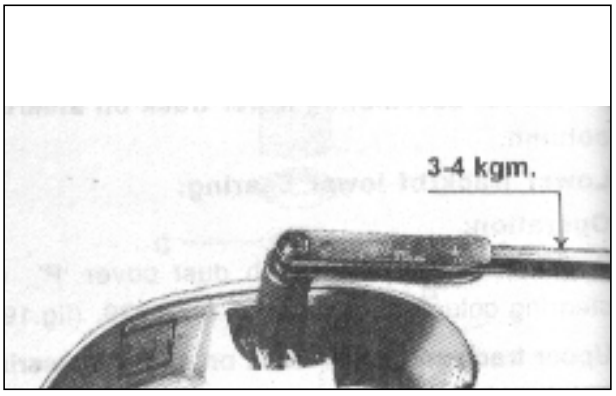


Fig. 196-Tightening of top ring nut

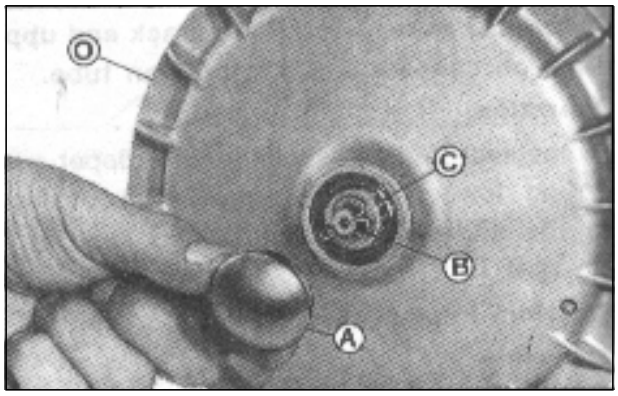


Fig. 197-Removal of Dust cap

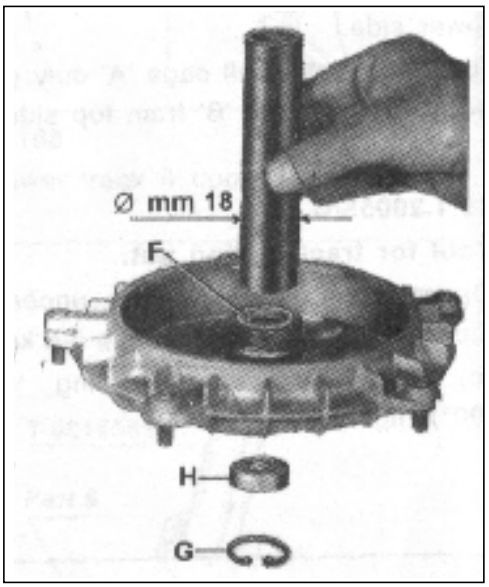


Fig. 198-Oil seal, Circlip & Ball bearing

Caliper holding plate assembly:

(a) Remove: Oil seals.

(b) Two needle bearings by suitable punch dia of 27 mm.

19.1.20036 and 19.1.20037

Punch for Caliper holding plate needle bearings assembly from out side and inside.

Assembly:

(a) Heat the bearing zone of holding plate.

(b) Punch needle bearings with punch 19.1.20036 from outside and 19.1.20037 from inside respectively.

(c) Slide on 'O' Ring on holding plate.

(d) Fit small oil seal from out side and big oil seal from inside. Apply grease to holding plate bearings.

Reassembly of Caliper holding plate and Front wheel hub assembly:

(a) Place shim washer on axle shaft.

(b) Fit the brake jaw flange assy. Place shoulder washer on the axle shaft and lock by circlip 'D'.

(c) Slip the seal ring into the gap of Caliper holding plate and Link.

(d) Fit the **front wheel hub** and tighten the nut to the specified torque value of 7.5 to 9 kgm.

(e) Place lock cap 'C' and lock with split pin (f) 'B'. Fix dust cap 'A'. (fig.200)

(g) Refix the Caliper assy. on Caliper Holding Plate

Note:

Ensure correct locking with split pin as shown in fig. 201.

Speedo drive pinion Overhauling:

(a) Unscrew the bolt for fixing the plate from Caliper holding plate and take out the cable fixing plate alongwith the speedo cable. (fig.202)

(b) Check the speedometer inner cable for any breakage. Replace if required.

(c) Remove the grommet & drive pinion housing.

(d) Rotate the wheel anticlockwise to remove the speedo pinion. Check for damages, if any. Replace if required, duly smeared with recommended grease.

(e) Assemble the same in reverse order.

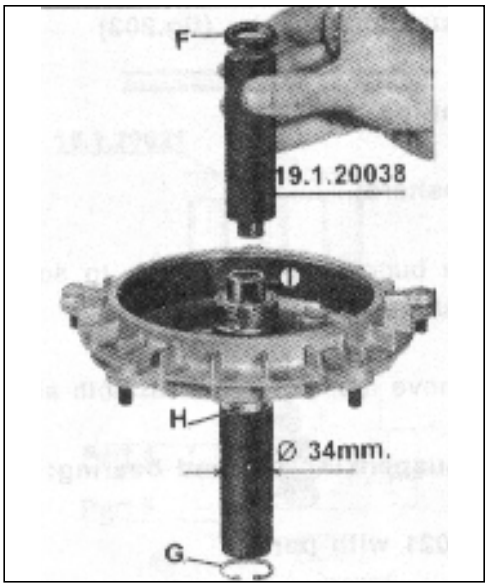


Fig. 199-Assembling holder bearing in front hub

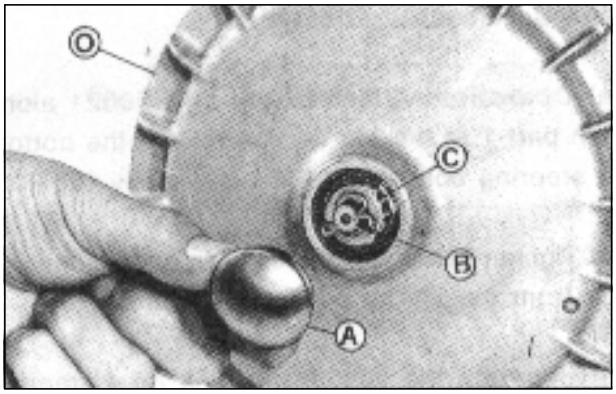


Fig. 200-Reassembly of brake drum

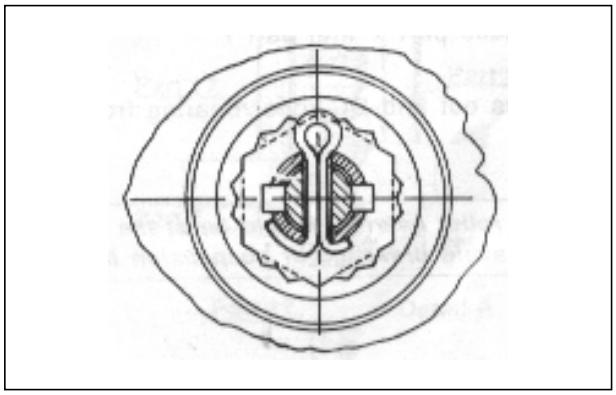


Fig. 201-Correct split pin locking

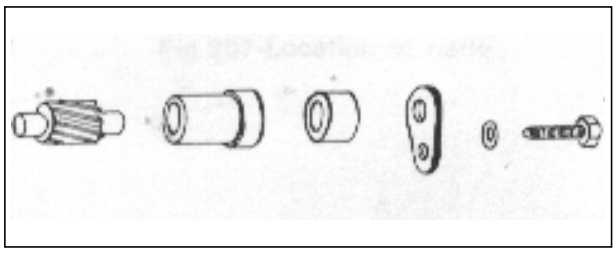


Fig. 202-Speedo Drive Pinion

Front suspension pin: (fig.203)

Dismantling:

Tab washers:

(a) Use punch dia of 12 mm. to squash the tab washers. (fig.204)

(b) Remove tab washers from both sides.

Front suspension pin and bearing:

19.1.20021 with parts.

Fixture for overhauling front suspension link with serviceable attachments.

(a) Operation: Attach fixture 19.1.20021 alongwith part 1 at the top and part 18 at the bottom to steering column and link assembly (fig.205)

(b) Tighten handle screw to press out suspension pin from the link and steering column.

(c) Separate the suspension link from steering column

(d) Replace part 1 with part 2.

(d) Press out 2nd DC roller bearing from link

Note:

2nd DC roller bearing should be at the bottom side to avoid breakage of suspension link.

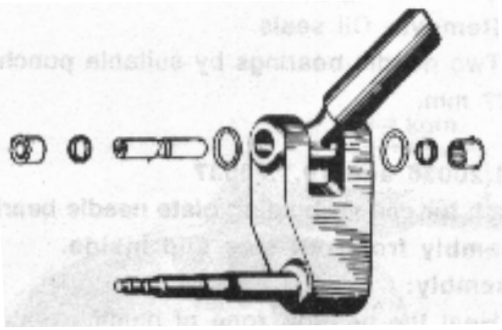


Fig. 203-Front suspension pin

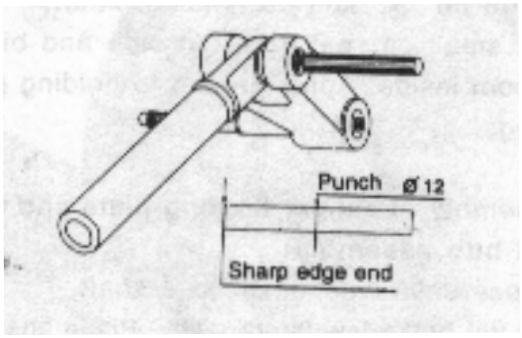


Fig. 204-Punch dia to squash tab washers

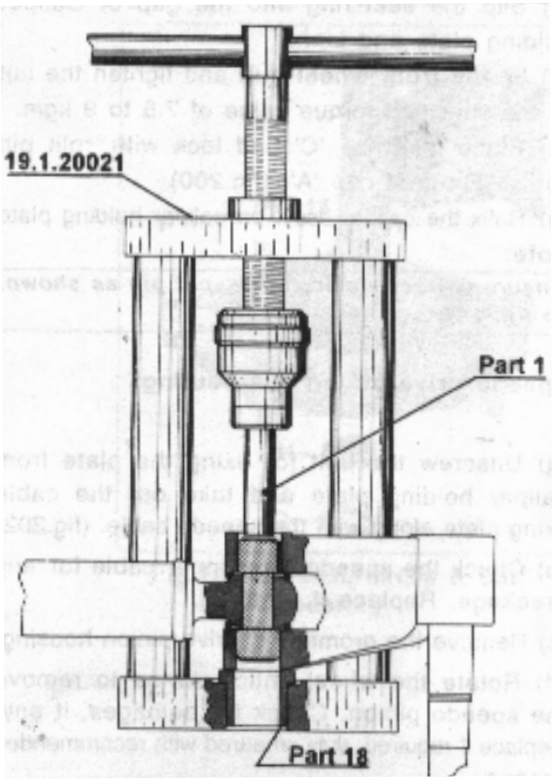


Fig. 205-Fixture for overhauling front suspension link with serviceable attachments.

Assembly:

Operation: Connect swing hub to steering column with pin (part 5) (fig.206)

Note:

Insert the 'O' Rings 'C' on link as detail 'A'.

(a) Place tool 19.1.20021 with part 3 and new suspension pin at the top and part 4 at the bottom.

(b) Ensure that the suspension pin is lubricated.

(c) Rotate screw handle till butts the face of part 3 with swing hub.

(d) Place (2) two spacers part 17 between hub and steering column end.

(e) Replace part 3 at the top by part 16 and retain part 4 at the bottom. (fig.207)

(f) Place oil seal , DC roller bearing on suspension pin duly lubricated alongwith tab washer.

(g) Rotate screw handle till part 16 butts the face of swing hub.

(h) Reverse the position for 2nd bearing fitment.

(i) Replace bottom part 4 with part 22 retaining part 17 in position.

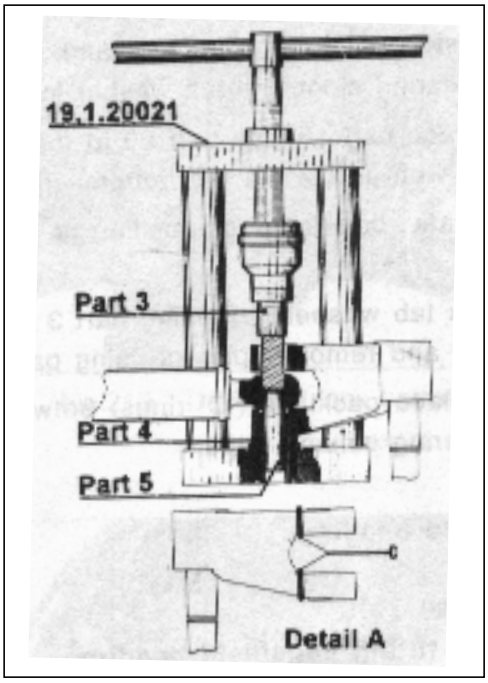


Fig. 206 - Connecting swing hub to steering column

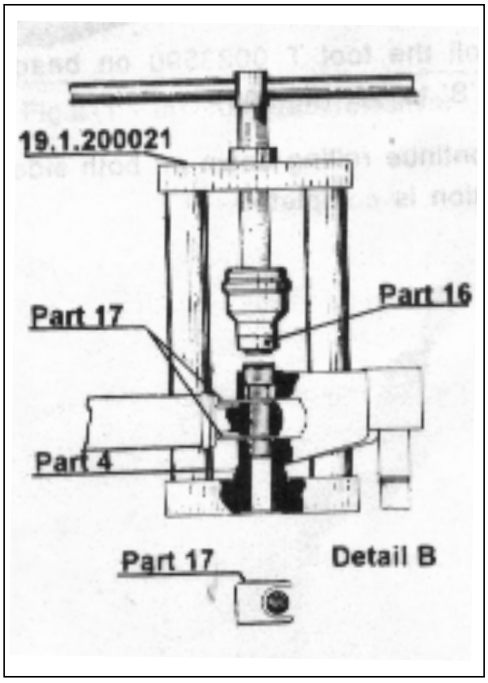


Fig. 207-Location of parts

(k) Place the oil seal and DC roller bearing on suspension pin duly lubricated and press DC roller bearing alongwith tab washer in position.

(l) Replace part 16 with part 20 at the top and part 22 with part 21 at the bottom. (fig.208)

(m) Rotate handle and position of DC roller bearing.

(n) Lock tab washers by using part 3 and part 4 finally and remove spacers using part 17.

(o) Displace packings ('O' rings) between link and steering column gaps.

Wind shield beading:

T 0023590

Tool for fitting wind shield beading.

(a) Slide the beading on wind shield with proper profile matching by rubber mallet.

(b) Use rubber band to hold beading in position.

(c) Roll the tool T 0023590 on beading from point 'B' to 'A'. (fig.209)

(d) Continue rolling down on both sides till the operation is completed.

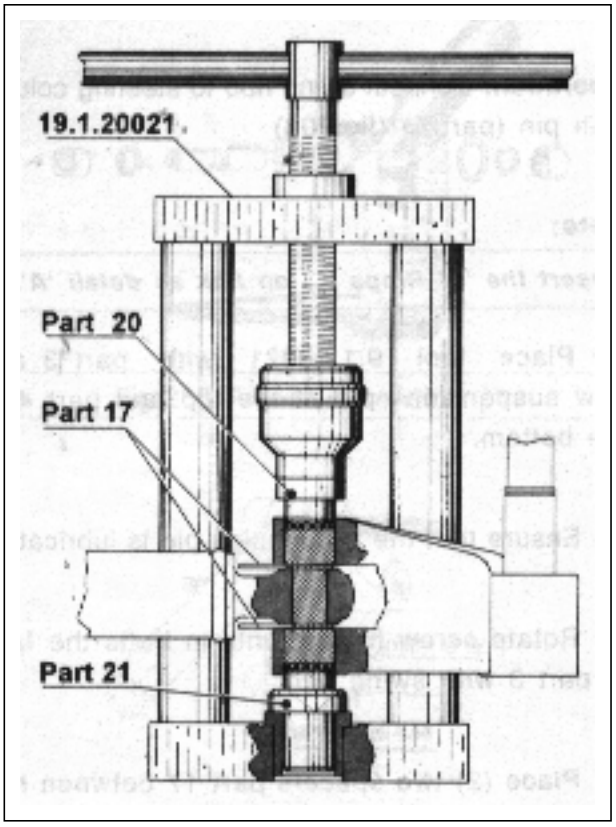


Fig. 208-Location of parts

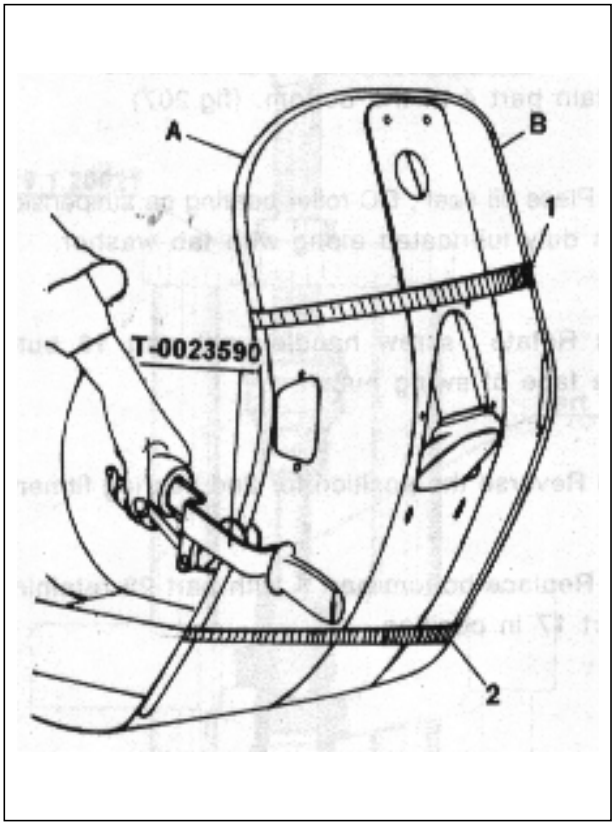


Fig. 209-Fitting of wind shield beading

Replacement of security lock barrel:

When it is necessary to replace the security lock barrel (because of mislay of keys or standardization of the locks) then follow these instructions:

Barrel removal:

(a) In case of key mislay when the security lock is in the "LOCK" position (locked steering column) then it is **necessary to drill the barrel** with a drill of Æ 8 mm. for a depth of about 30 mm. In this way, we release or destroy the securing internal device of the barrel to the external body of the lock so that the extraction of lock body and drilling of barrel is possible.

(b) In order to make use again of lock body during reassembling, clean the body out from swarf of the drilled barrel.

(c) When the security device is in the "OFF" position (steering column not locked and engine ignition grounded) the dismantling will be carried out as follows:

(i) Unscrew the three screws securing the steering column cover, and remove it.

(ii) Insert a small screwdriver into the hole as indicated with arrow in fig.211, the hole is on the lower side of the lock's outer body.

(iii) Push the screwdriver top against the tang and extract the lock body and barrel.

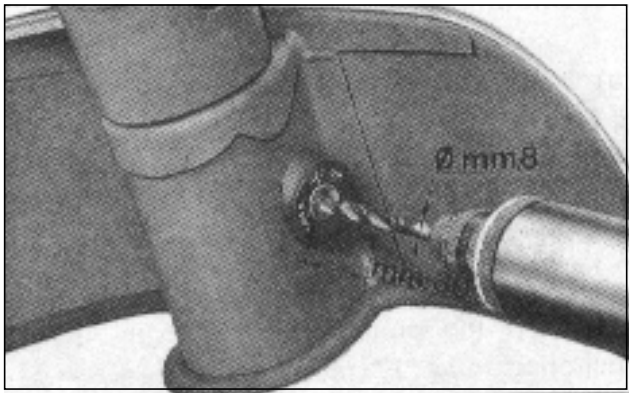


Fig. 210 - Drilling of lock barrel

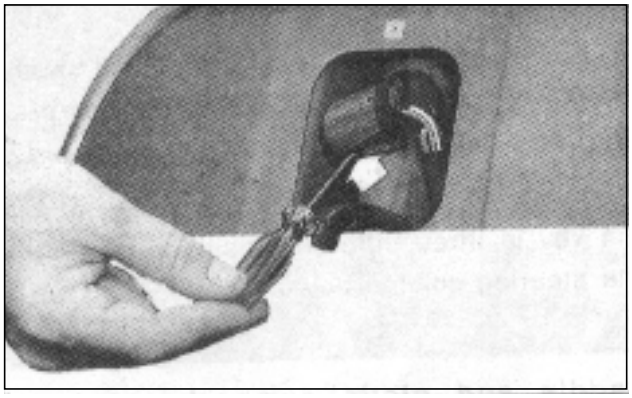


Fig. 211 - Inserting a screw driver

Assembling:

(a) Carefully clean the lock body out from swarfs (if the barrel has been drilled) with compressed air.

(b) Fit, after having mounted the securing spring plate **'E'** as indicated in fig.212, the lock body in its seat.

(c) Insert the complete barrel with key and anchoring tang **"F"** facing downwards into the lock body till half portion is inserted.

(d) Insert the key facing **"ON"** position as this position allows only the barrel to be inserted into the lock body.

(e) Now rotate the key anticlockwise towards the **'OFF'** position and at the same time press the barrel till gets inside completely.

(f) Check the operation of the device by rotating the key in three different positions and mount the steering column cover.

Saddle and glove compartment barrel replacement:

(a) For replacing these parts act as we have described in fig. 210. First dismantle barrel in case of key mislay when the security lock is in the 'LOCK' position. (by drilling barrel).

(b) In case of key mislay, when the security lock is in the open position, take off the pushing up to the end lever **'F'** as shown in fig.211 and fit a new barrel, after cleaning the housing.

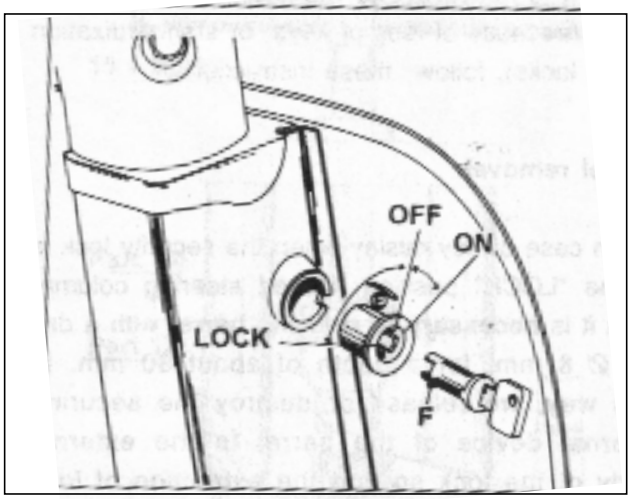


Fig. 212
Mounting the Lock Barrel

Lock barrel refitting:

(a) Insert the barrel in lock housing and position the stopper in the champhered spline groove.

(b) Push barrel partially and rotate by 90º clockwise, so that stopper takes its position in RH slot.

(c) Refit the lever and clamp by following the removal procedure in reverse order.

Note:

While refitting the barrel, it is not to be rotated anticlockwise to avoid any damage to moulded stopper/splines.

Mounting of engine on chassis :

(a) Place the engine in position with body.

(b) Insert mounting bolt and rear shock absorber bolt in respective places and tight the bolts with nuts.

(c) Connect the all electrical connections and other points.

(d) Assemble carburettor, Reed valve and air filter.

(e) Connect fuel pipe to carburettor banjo and oil pipe to 'AOM' device.

(f) Check and adjust spark plug gap, fit and connect with H T Lead.

(g) Fill 250 + 0 / – 5 ml. oil in gear box.

(h) All control cables are to be connected in their respective positions as explained in cables fitment procedure.

(i) Start and tune the engine. Take a trial run of scooter.

(j) Check running of engine and do the final setting of engine tune-up.

(k) Make adjustment of lights, brakes and other controls.

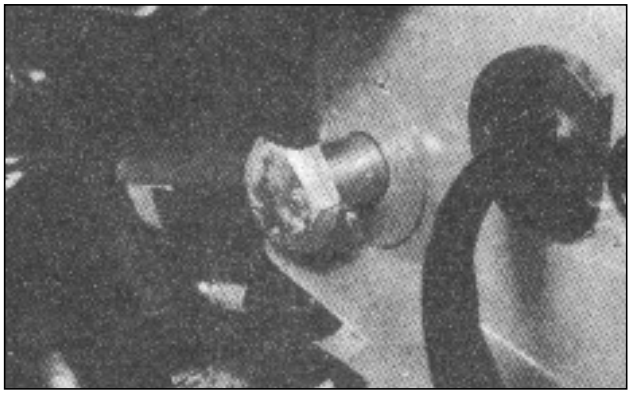


Fig. 213
Engine Mounting Bolt

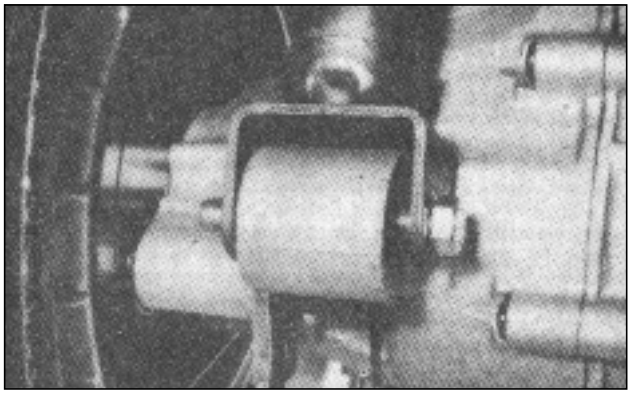


Fig. 214
Rear Shock Absorber Bolt

Control cables fitment:

Connect respective transmission controls (gear cable, clutch cable, speedo cable, brake cable front and rear and choke cable).

a) Clutch cable :

(a) Ensure a free play of 2 mm on clutch lever with the sleeve (fig.216). (b) For setting clutch lever,(2mm gap), insert a feeler gauge of 2 mm thickness between clutch control lever and sleeve. (c) Lock cable at tail end with terminal on outer lever.(d) Adjust clutch cable till it is in tension and check kick slippage. (e) Remove feeler gauge at this stage. (f) Vehicle should not move in first gear when clutch lever is fully pressed, if required, adjust to have sufficient free play at clutch control lever.

b) Gear cable

Gear cables are to be adjusted with adjuster screws fitted with each gear cable on gear shifter box.

c) Throttle cable :

Assemble the cable to the throttle valve rod, passing through air cleaner box. Adjust free play of 2mm approx.

d) Choke lever and cable assembly :

(a) Remove carburettor cover and air filter element to gain access to rear end of the cable, which can be unhooked and pulled out of the casing.(b) Remove the fuel tank to get access to the front of the cable.

e) Rear brake cable :

(a) Free rear end of the cable by releasing the nut and retainer plate which secures it to the brake arm and unscrew the cable adjuster.

(b) Adjust the cable to give minimum free play required to prevent the brake from dragging.

Cable routing :

Control cable replacement :

(a) In the event of one of the control cables breaking, it should be noted that as a rule, the inner cable should be replaced separately.

(b) Exceptions to these are the choke, and throttle control cables, because of their design. These are to be replaced completely.

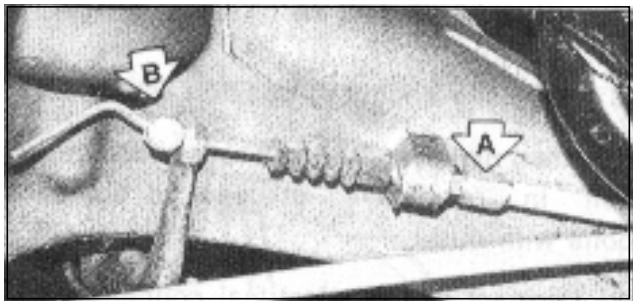


Fig. 215 - Gear Cable

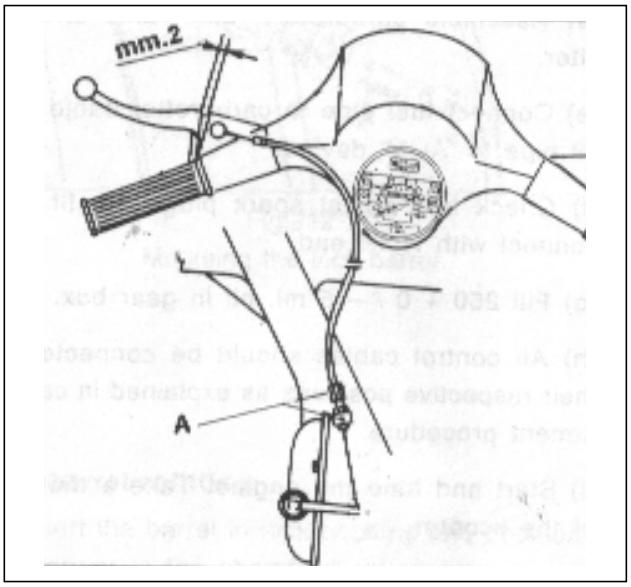


Fig. 216 - Clutch Cable

(c) In all the cases where the complete cable is to be replaced, note that the damaged cable must be left in position (passing through chassis) to provide a method of drawing the new cable into place.

(d) Using strong PVC tape, bind the lower end of the new cable outer to the upper end of the old cable. Care should be taken to leave loose ends, which might snag as the cables are pulled through the body.

(e) The new cable can now be drawn into position pulling the old one out.

Note:

All cables in handle bar passing through body are to be replaced by above process, except for rear brake cable and choke cable.

Overhauling of rear brake pedal:

Dismantling :

(a) Disconnect the rear brake cable by looseing the link nut and take it out.
(b) Remove the brake pedal rubber.
(c) Remove brake pedal bracket nuts and take it out.
(d) Remove the return spring.
(e) Remove the split pin **'A'** and take out the rear brake cable.
(f) Remove the brake switch by unscrewing the bolt **'B'** and disconnect the electrical connections.
(g) Remove the brake pedal from bracket by taking out the pin with the help of arbour press.
(h) Clean all the parts in kerosene.
(i) Inspect all the moving parts for wear and tear and corrosion.
(j) Replace, if required.

Assembly :

(a) Assemble the brake pedal to the bracket by inserting the pin duly greased.
(b) Press with an arbour press.
(c) Fit the return spring.
(d) Insert the rear brake cable through the hole provided on the bracket and pull it out.
(e) Connect the rear brake cable to brake pedal by inserting the pin and secure it by a new split pin.
(f) Connect the electrical connections to the rear brake light switch and secure it with the bracket.

Note :

Any loose contact will create problems.

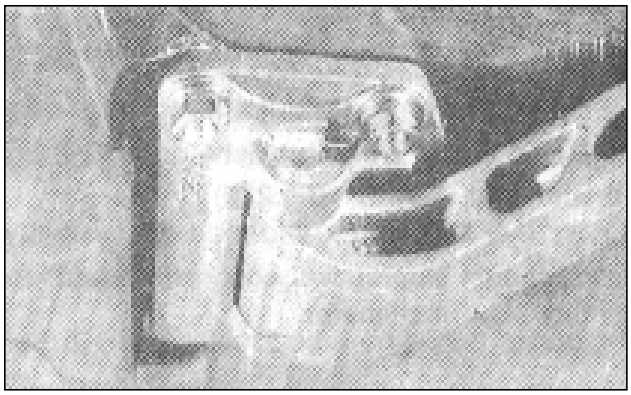


Fig. 217 - Brake Pedal - view from underneath

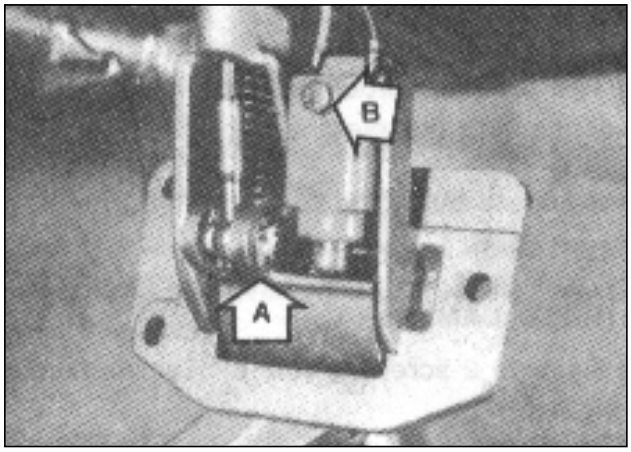


Fig. 218-Split pin 'A' and bolt 'B'

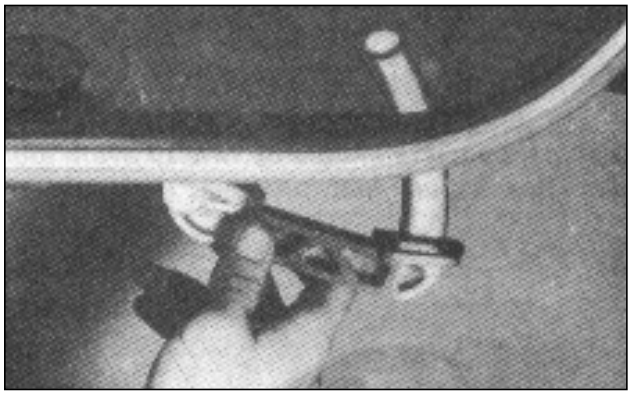


Fig. 219-Brake pedal - view from side

Ignition Switch :

(a) Remove steering column cover.

(b) Ignition switch is located on the lock body fixed with grub screw. (fig.220).

(c) Disconnect plug socket connection and check continuity by multimeter.

TAIL LAMP ASSY.

(a) Remove two screws and remove tail lamp cover.

(b) The reflector is to be taken out after disconnecting the electric cable terminals.

(c) Separate bulbs for tail lamp and brake light are provided.

BLINKER LAMPS

(a) Remove 2 screws of the blinker lamp cover.

(b) The reflector will come out from the body.

(c) Cable terminals can be taken out for checking and rectifying the problem, if any.

Note :

Terminal contacts should be firm to avoid loose contact and bulb fuse problem.

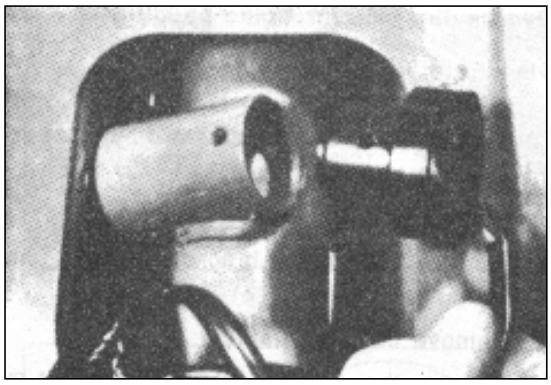


Fig. 220 - Ignition switch on lock body

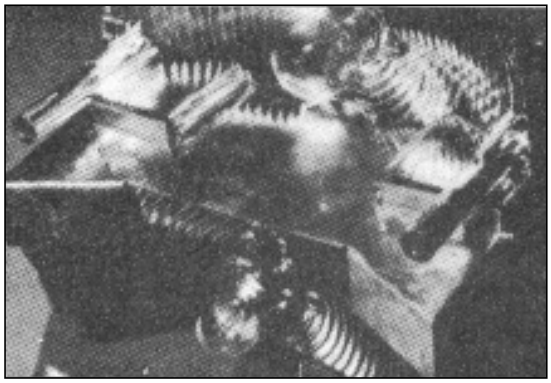


Fig. 221 - Tail lamp assembly

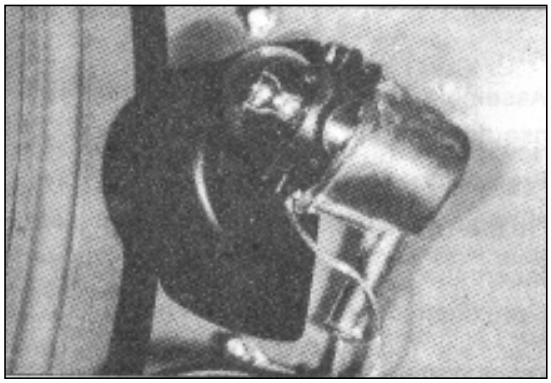


Fig. 222 - Blinker lamp

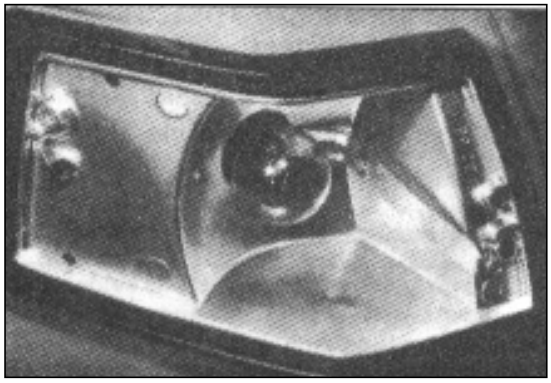


Fig. 223 - Bulb

OPERATIONS AND CHECKS BEFORE OPERATING

AFTER COMPLETION OF OVERHAULING OF THE ENGINE OR ANY UNIT OF VEHICLE, THE FOLLOWING OPERATION SHOULD BE CARRIED OUT BEFORE CONSIGNING THE VEHICLE TO THE OWNER:

1. Check nuts and bolts for tightness, particularly the wheel and brake drum securing nuts.
2. Top up oil in the gear box; with the vehicle standing in a vertical position. The oil should be levelled with the opposite filler hole.
3. Check efficiency of dampers.
4. Check for absence of oil and fuel losses.
5. Check tyre pressure (see specifications on page 7).
6. Check efficiency of electrical equipment.
7. Check the carburation.
8. Check brake efficiency and brake fluid level.
9. Adjust clutch and gear change controls.
10. Check steering by riding without holiding the handle.
11. Check functionality of steering lock. Under no conditions the said device should be oiled.
12. **Cleaning down vehicle** :

(a) For external engine surfaces use paraffin.

(b) For the paintwork use water and chamois leather.

(c) When cleaning the headlight reflector use a very soft feather (avoid finger contact).

Care of vehicle when not in use for long periods:

If the vehicle is not going to be used for more than two months then it should be stored properly as per the following instructions:

(a) Syphon out the petrol from the fuel tank with the help of a pipe.

(b) Start the engine for some time and exhaust the petrol in the carburettor.

(c) Remove the spark plug and put a few drops of 2T oil in the spark plug hole. Press the kick lever 4-5 times and then refix the spark plug.

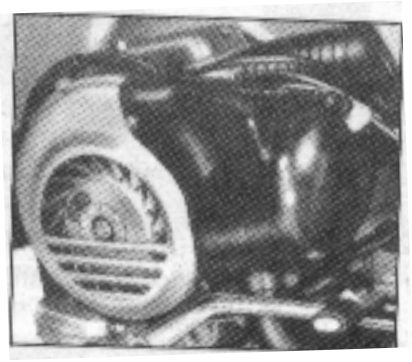
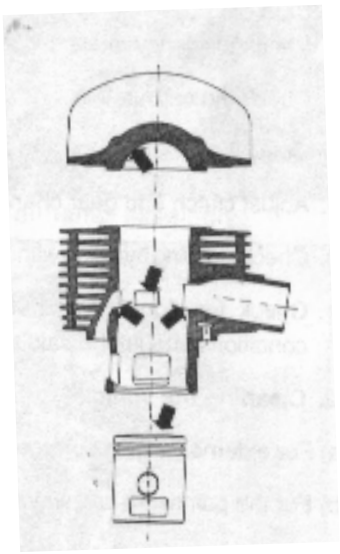
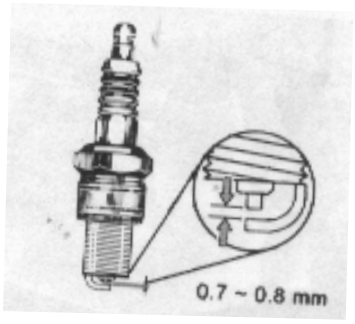
(d) Clean the vehicle thoroughly and apply antirust grease on all the unpainted metallic parts.

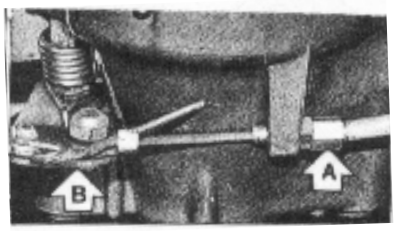
(e) For auto start models, remove battery by following the guidelines given on page 24.

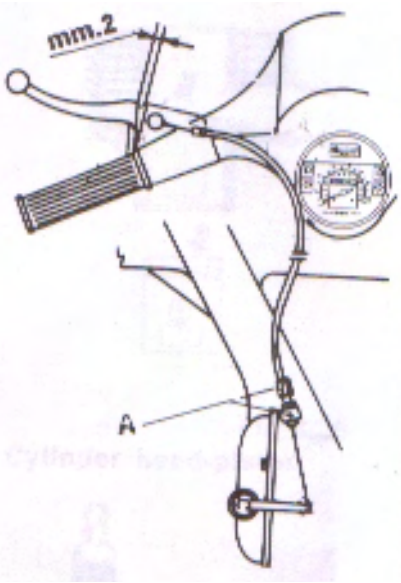
(f) Raise the wheels off from the ground by placing wooden planks and deflate the tyres so that they do not touch the floor.

(g) Cover the scooter.

FAULT FINDING AND REMEDIES

FAULT FINDING	REMEDIES	NOTE
ENGINE **Lack of power** **Lack of compression** **Leakage** Loosening of screws and nuts of the different machine members.	Tighten nuts and bolts of the engine interested parts (fig.224) carburettor, cylinder head, silencer coupling at the torques carried out on the table of page 85.	 Fig. 224 **Engine unit**
Hard starting Carburettor jets and fuel cock clogged or dirty Engine flooding	Remove, wash in petrol and blow dry. Close the fuel tap, open completelyThrottle twist grip and kick over the engine several times until it starts. If the engine does not start, attempt “push starting” or remove the sparkplug, clean or replace it; before reassembling the spark plug, kick over the engine in order to ejecte excess fuel.	
Tendency of the engine to stop when the throttle is full open Jet dirty, weak mixture	Clean the jet in net gasoline (petrol) and blow dry. Clean the carburettor (if dirty) in net gasoline (petrol) and blow dry. Replace gaskets If damaged.	
Exhaust noise grows weak Excess of carbon on cylinder ports Silencer clogged	Decoke (see fig. 225) De-coke.Clean using a hooked wire or by blowing through compressed air from the inlet end.	Fig. 225 **Cylinder head-piston**
Irregular engine exhaust : crocklings when the vehicle is running up hill or picking-up Air filter dirty Defective spark plug	Clean or replace Decoke, adjust the electrodes gap (see fig. 226) or replace by using recommended spark plug on page 6.	 Fig. 226 **Spark plug**

FAULT FINDING	REMEDIES	NOTE
		N.B. Note that many troubles to the engine are provoked by the use of a unsuitable spark plug or mixture composed with a improper oil.
CARBURETTOR Flooded for impurities in the fuel	Dismantle and clean in pure (petrol) gasoline; and blow dry with air jet.	
High fuel consumption Air filter clogged or dirty	Clean in pure gasoline (petrol) and blow dry with air jet.	
Starter control (Choke) set in closed position or locked	Free off starter device (Choke) lever and lubricate.	
Brakes Poor braking	Brakes adjusting is carried out by means of adjusting screw indicated by arrows in fig. 227. Keep in mind that when the brake lever or pedal are in their resting position the wheel should rotate freely. Front Disc brake not required any adjustments.	**Disc brake :**Ensure correct level of brake fluid in master cylinder.
	If with the common adjustings on the transmissions it is not possible to eliminate the eventual inconvenients, check the jaws possible to eliminate the eventual inconvenients, check the jaws and the drums. In case of excessive wears or scratches replace.If brake jaws are oil imbued, for example for oil seal leaks, before replacing them, try to make them efficient by washing in gasoline (petrol), then let air dry.	 Fig. 227 **Rear brake adjust.**
Cables rusted in their sheaths	Lubricate or if necessary replace.	**N.B.** - The braking action should begin immediately on operating the respective control. For Disc brake do not operate front brake lever while front wheel is taken out. Ensure proper seating of steel Disc between brake pads while refitting of wheel.

FAULT FINDING	REMEDIES	NOTE
Suspensions and steering controls		
Steering proves hard	Check upper ring nut tightening : if after this adjustment the steering rotation is still irregular,check ball races and replace them if pitted.	
Excessive play	If front suspension is noisy, check what follows and replace possible damaged parts : 1) Front damper efficiency. 2) Wheel hub nut locking 3) Ball bearing and d.c. roller bearings conditions (see on this subject on page 98 front suspension overhauling). Analogously act for rear suspension.	
CLUTCH		
Slipping or fierce action	Check springs, plates and oil level in gear box. The handlebars lever should have 2 mm. play as in. fig.228 before acting on the lever to the transmission end. Lack of the mentioned play can be the cause of clutch damages. The adjusting is carried out by acting on adjuster “A” in order to pull out or release transmission cable.	 Fig. 228 **Clutch adjustment.**

Note : Should faults occur, which are not listed in the table (e.g. : abnormal noise, failure or excessive wear of mechanical parts etc. one must locate the fault and if necessary proceed to replace or repair the parts concerned. Ensure that joints, coupling of main components (piston to cylinder, piston ring, etc. must operate with clearances specified on charts page 83&84).

SUITABLE RECOMMENDATIONS

Do's	Don'ts
Always use Geniune spare parts.	Don't use non-genuine spare parts.
ENGINE GROUP	
A. Air filter (outer)	
1. Ensure proper fitment and sealing of air cleaner on the carburettor.	—
2. Ensure no entry of air & dust through the beading of air cleaner cover. If required, replace the beading.	—
3. Clean the air cleaner with clean fuel. Follow service manual instructions.	—
B. Carburettor	
1. Ensure proper mounting of air cleaner box.	Don't use dirty hands, dirty cleaning liquid or linen while servicing the carburettor.
2. Ensure proper fitment of carburettor.	Don't over tight jets as this will lead to seat deformation.
3. Clean the jets by compressed air or by a hair of the brush	Don't over tight float cup cover screw and banjo bolt. This may spoil the threads of carburettor body which can result into replacement of carburettor.
4.Ensure proper fitment of Reed valve and gaskets.	Don't clean the jets by steel wire as the hole may be enlarged.
C. 'AOM' Device	—
1. Check air bubbles in the oil pipe. If found, remove them by flowing down oil from pipe connected to the pump.	
2. Use only geniune carburettor gaskets.	
D. Gear	
1. Ensure proper positioning of speed gears on the drive shaft. Standard washers should be placed below the first gear and suitable shims should be used after the fourth gear.	Don't assemble any speed gear in opposite direction to avoid improper shifting.

Do's	Don'ts
2. While assembling the gear cross on the drive shaft, make sure that the movement of gear cross inside the speed gear is smooth. The gears should be free in nuetral position.	—
3. Oil should be used in gear box strictly as per the recommended grade and quantity.	—
4. Flush gear box with fresh oil for first 500 kms. or 1st service and at every replacement.	—
E. Clutch	
1. Check movement of clutch plates insi de the clutch bell. It should be free.	Don't use screw driver or hammer on clutch case.
2. Check for excessive play in bush and engine gear.	Don't use excessive force (using hammer) on clutch case outer in order to protect lock seating.
3. Check if pressure plate seating is free and full inside the clutch.	Don't use excessive force for bending lock washer.
4. Clutch adjustment should be made in such a way that the kick is free and the vehicle does not move in first gear when the clutch lever is fully pressed. Ensure a free play of 2 mm on the lever with the sleeve.	—
5. Always use the recommended tools.	—
6. Always replace the lock & spacer washer for the clutch unit whenever the unit is re-fitted.	—
7. Soak the cork faced plates in oil before assembly.	—
	—

Do's	Don'ts
G. Engine	
—	Don’t over tight or wrong thread the spark plug. This will avoid thread damages in aluminium cylinder head.
—	Don't try to remove cylinder head when engine is hot.
—	Don't attempt to dismantle crank shaft assembly for repairs.
—	Don't act on crank shaft for easing the rotation during assembly of crank cases.

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