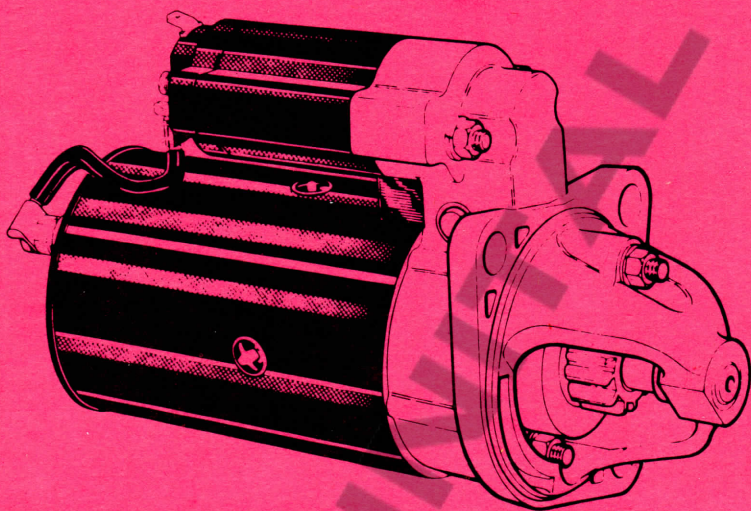


# 3

## Starting System



### STARTING SYSTEM

Recommended Test Equipment  
D.C. Moving Coil Voltmeter 0—20V  
Hydrometer

**NOTE:** During testing the engine should be cranked without starting.

Petrol Engine: Disconnect the L.T. lead from the coil to the distributor.

Diesel Engine: Operate the stop control.

It is essential that a battery in a known good condition is used when attempting to diagnose any electrical fault.

The battery and its storage area, particularly the top of the battery, must be kept clean and dry. Any acid spillage should be removed and the metal work repainted with acid resisting paint. The electrolyte level must be maintained at the correct height, normally level with the top of the separators.

Use distilled water to top up the electrolyte level. The battery must never be left in a discharged state. If the Hydrometer shows a specific gravity of less than 1.230, indicating that the battery is less than 70% charged, it must be recharged at the normal rate which is approximately 1/10 of the AMP/HOURS capacity of the battery.

Check all battery, starter solenoid and starter motor connections. They should all be clean and tight.

The battery posts should also be smeared with petroleum jelly.

**NOTE:** Never use force when removing the battery lugs.

If they cannot be removed easily, soak a cloth in hot water and apply it to the corroded lug.



## BATTERY VOLTAGE ON LOAD

Connect the voltmeter across the battery.

Operate the starter motor.

The voltmeter reading should not be less than

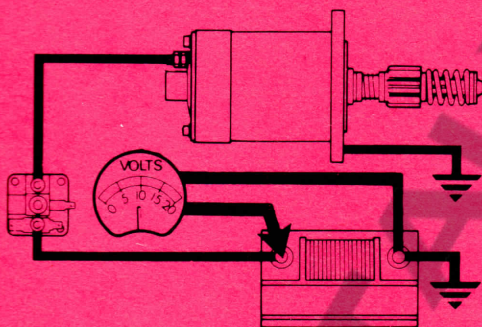
Inertia starter = 10.5 V

Pre-engaged starter = 10.0 V

Diesel engine with 12V system = 10.0 V

If the battery is discharged a low reading will be indicated.

If low readings are obtained with a well charged battery, ensure the engine is not tight, then replace starter motor. If high readings are obtained, further testing of the circuit is necessary.



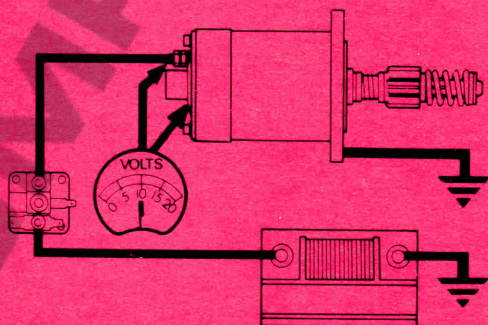
## VOLTAGE AT SOLENOID OPERATING TERMINAL

Connect the voltmeter to the ignition starter terminal and earth.

Operate the starter motor.

The voltmeter reading should be approximately 10.5 V with an inertia starter motor, 10.0 V with a pre-engaged starter motor.

If the voltage is lower, check the starter/ignition switch, and all related cables and connections.





### VOLTAGE AT STARTER LOAD

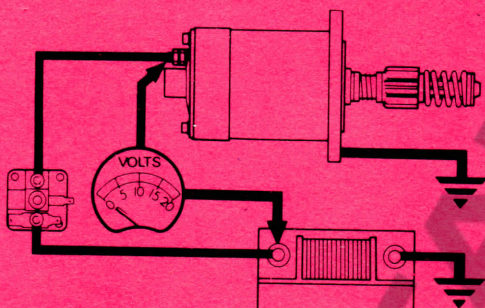
Connect voltmeter between starter main terminal and earth (Commutator end bracket)

Operate the starter motor.

The voltmeter reading should not be more than 0.5 volts below that recorded across the battery.

If the reading is within this limit the starter circuit is satisfactory.

If a low reading is recorded, proceed.



### VOLTAGE DROP ON THE INSULATED LINE

Connect the voltmeter between starter main terminal and battery insulated terminal.

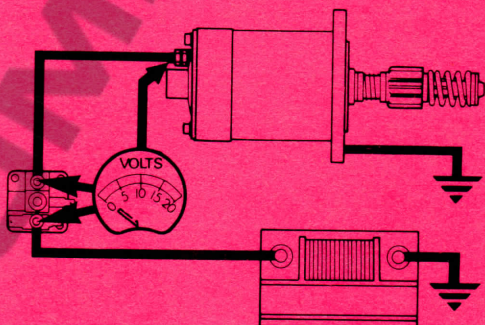
The voltmeter will indicate battery voltage.

Operate the starter motor.

The voltmeter reading should be practically zero.

A high reading indicates high resistance in the starter circuit.

All insulated connections at the battery, solenoid switch, and starter should be checked.





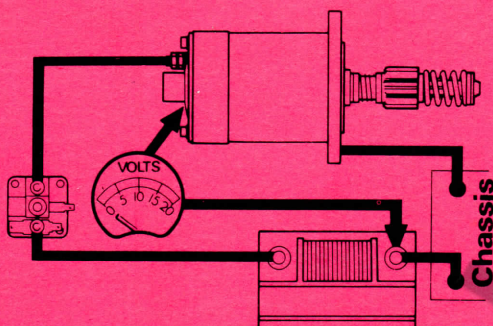
### VOLTAGE DROP ON SOLENOID CONTACTS

Connect the voltmeter to the battery and starter terminals on the solenoid switch.

Operate the starter motor.

The voltmeter reading should be zero.

If the reading is above 0.25 V replace the solenoid.



### VOLTAGE DROP ON EARTH LINE

Connect the voltmeter between the battery earth terminal and starter earth (commutator end bracket).

Operate the starter motor.

The voltmeter reading should be practically zero.

If the voltmeter reading is high, clean and refit all earth connections between the battery and starter, including the engine to chassis/body bonding strap.

