

TESTING (Continued)

To Check for Electronic Drains Which Shut Off When the Battery Cable is Disconnected

1. Repeat Steps 1 through 5 of the Voltmeter Drain Test.
2. Without starting engine, turn ignition switch to the RUN position for a moment and then OFF. If applicable, wait one minute for the illuminated entry lamps to turn off.
3. Connect voltmeter and read voltage.

Test Conclusion

The current reading (current drain) should be less than 0.05 amp. If it exceeds 0.05 after a few minutes, and if this drain did not show in previous tests, the drain is most likely caused by a malfunctioning electronic component. As in previous tests, remove fuses in power distribution box one at a time to locate the problem circuit.

Battery Charging

Before recharging a discharged battery, inspect and service the following conditions, if they exist:

1. Loose generator belt.
2. Pinched or grounded generator / voltage regulator wiring harness.
3. Loose harness connections at the generator and/or voltage regulator.
4. Loose or corroded connections at battery and/or engine ground.
5. Excessive battery drain due to:
 - a. Hood, luggage compartment, glove compartment and courtesy lamps remaining energized (damaged or misadjusted switch, glove compartment left open, etc).
 - b. Luggage compartment solenoid continuously energized on vehicles equipped with keyless entry system.
 - c. Inoperative autolamp module causing approximately 2 amp drain with ignition switch in the OFF position and autolamp off.

Maintenance-Free and Low-Maintenance Batteries

Cold batteries will not readily accept a charge. Therefore, batteries should be allowed to warm up to approximately 5°C (41°F) before charging. This may require four to eight hours at room temperature depending on the initial temperature and battery size.

A battery which has been completely discharged may be slow to accept a charge initially, and in some cases may not accept a charge at the normal charger setting. When batteries are in this condition, charging can be started by use of the dead battery switch on chargers so equipped.

Completely discharged batteries, which have been discharged for a prolonged period of time (over one month) or which have an open circuit voltage of less than two volts, may show no indication of accepting a charge even when the battery switch is used. The initial charge rate accepted by batteries in this condition is so low that the ammeter on some chargers will not show any indication of charge for up to 10 minutes.

To determine whether a battery is accepting a charge follow the charger manufacturer's instructions for use of dead battery switch. If dead battery switch is the spring-loaded type, it should be held in the ON position for up to three minutes.

After releasing dead battery switch and with charger still on, measure battery voltage. If it shows 12 volts or higher, the battery is accepting a charge and is capable of being recharged. However, it may require up to two hours of charging with batteries colder than 5°C (41°F) before the charge rate is high enough to show on the charger ammeter. It has been found that all non-damaged batteries can be charged by this procedure. If a battery cannot be charged by this procedure, it should be replaced.

Once it has been determined that the battery has begun to accept a charge, it can be charged to a serviceable state or a full state of charge by one of two methods:

- The **first method** is to use the AUTOMATIC setting on chargers so equipped. This setting maintains the charging rate within safe limits by adjusting voltage and current to prevent excessive gassing and spewing of electrolyte. Approximately two to four hours will be required to charge a completely discharged battery to a serviceable state. If a full state of charge is desired, the charge can be completed by a low current rate of 3-5 amps for several hours.
- The **second method** is to use the MANUAL or constant current setting on the charger. Initially set the charging rate for 30-40 amps and maintain this setting for approximately 30 minutes or as long as there is no excessive gassing and electrolyte spewing. If gassing results, the charge rate must be reduced to a level where gassing will stop. This is particularly true for maintenance-free batteries where excessive gassing will result in non-replaceable loss of electrolyte, thus shortening battery life.

The total charge required will vary with battery size and its initial state of charge. In general, to bring a discharged battery to a serviceable state of charge, current-time input should equal the battery amp-hour capacity. For example: a 45 AH battery will require 15 amps of charge for three hours, or 9 amps of charge for five hours. If a full state of charge is desired, the charge can be completed by a low constant current of 3 to 5 amps for several hours.

If the battery has failed, or is low in charge, it may be necessary to refer to Diagnosis, Section 14-00.