

5. Observe test result LEDs.

✓ **GREEN LED - GOOD BATTERY**

Indicates that battery is good and can be returned to service.

✗ **RED LED - BAD BATTERY**

Indicates the battery is bad and replacement is required. Before replacing the battery, check the following:

- Battery clamps make good contact on both sides of clamp during test. If not, reconnect tester and retest.
- If the battery was connected to the vehicle during test, perform the following steps:
 - Disconnect the battery from the vehicle.
 - Clean battery posts or terminals.
 - Reconnect tester and retest.
 - If battery still reads bad, replacement is required.

BORDERLINE (BOTH LEDs ON)

If both Green and Red LEDs are on or flashing, the battery is on the borderline of good/bad. The battery should be replaced soon. See Battery CCA Test below.

6. Release TEST (or COLD TEST) button when complete.

BATTERY CCA TEST

Relative Battery Condition: Checking battery CCA.

- Turn CCA rotary switch to the lowest value.
- Press and hold the TEST button and turn the CCA switch until "X" (Red) LED comes on and remains on. Note the switch position.

Refer to Table 1 for the CCA value of the battery under test.

NOTE: If the LED remains steady green at the upper limit of 950, the approximate battery CCA is greater than 808 CCA. If the LED remains steady red at the lower limit of 375, the approximate battery CCA is 319 or less. The tester cannot measure CCA beyond these limits.

NOTE: A new battery, when fully charged and at 70°F (21°C), will have a CCA rating that is greater than the CCA rating on the battery label.

TABLE 1 - CCA Conversion Chart

Switch Position	Approx. CCA	Switch Position	Approx. CCA
375	319	675	574
400	340	700	595
425	361	725	616
450	383	750	638
475	404	775	659
500	425	800	680
525	446	825	701
550	468	850	722
575	489	875	744
600	510	900	765
625	531	925	786
650	552	950	808



Digital Battery Tester

Safety Guidelines For Working on Vehicles

- Always wear approved eye protection.
- Always operate the vehicle in a well-ventilated area. **Do not inhale exhaust gases—they are very poisonous!**
- Always keep yourself, tools, and test equipment away from all moving or hot engine parts.
- Always make sure the vehicle is in **Park** (automatic transmission) or **Neutral** (manual transmission) and that the **parking brake** is firmly set. Block the drive wheels.
- Never lay tools on vehicle battery. You may short the terminals together, causing harm to yourself, the tools, or the battery.
- Never smoke or have open flames near vehicle. Vapors from gasoline and charging batteries are highly flammable and explosive.
- Never leave vehicle unattended while running tests.
- Always keep a fire extinguisher suitable for gasoline/electrical/chemical fires handy.
- Always turn ignition key OFF when connecting or disconnecting electrical components, unless otherwise instructed.
- Keep away from engine cooling fan. On some vehicles, the fan may start up unexpectedly.
- **Always** follow vehicle manufacturer's warnings, cautions, and service procedures.

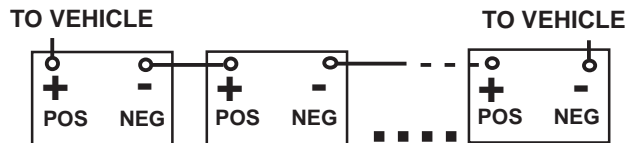
DIGITAL BATTERY TESTER

The Digital Battery Tester is a hand held, diagnostic tool used to test 12-volt lead-acid type batteries rated from 375 to 950 CCAs (Cold Cranking Amps). The tester will test partially charged batteries as long as enough battery charge is exists to power the tester. Test results are displayed by discrete LED indicators (ORANGE - Ready, GREEN - Good (Check mark symbol) , RED - Replace (X symbol)). The battery may remain connected to the vehicle, as long as the vehicle's electrical system does not interfere with testing. Maximum input voltage to the tester is 32 volts. The tester is protected from accidental reverse connection to the battery.

VEHICLE PREPARATION

BEFORE TESTING, READ ALL SAFETY GUIDELINES.

- **Key OFF, Engine OFF.**
- Disconnect all battery chargers! Battery cannot be tested while being charged.
- In all multiple battery systems, all batteries must be tested separately. *Only* batteries connected in series may remain connected during test. See diagram below:



Batteries in Series: All batteries are connected from negative (-) terminal of one to positive (+) terminal of the other, with only one battery's positive (+) and one other's negative (-) connected to the vehicle. Any number of batteries can be connected in series, but each battery **must** be tested separately.

All other types of multiple connections must be disconnected and isolated from the other.

- Remove **All** electrical loads if the battery is connected to the vehicle.
- Battery connections must be clean and must make good contact to give correct test results.

- Install terminal stud adapters (not included) on side post batteries. Terminal stud adapters are available at most automotive parts stores.

HOOKUP

Connect Tester to Battery.

- Connect the black clamp to the battery's negative (-) terminal.
- Connect the red clamp to the battery's positive (+) terminal.
- Make sure both sides of each clamp make good contact with the battery terminals. If needed, rock the clamps back and forth to improve the connection.

Make Sure Ready LED Comes ON.

- If the Ready LED is ON, then the battery is sufficiently charged to test.
- If ALL the LEDs are FLASHING, then either the battery needs to be charged or the battery connections are loose. If the connections are good, then the battery is discharged too low to test and must be charged.
 - Disconnect the tester, connect charger and charge battery. Follow battery charger manufacturer's instructions and safety precautions.

WARNING:

It is dangerous to attempt to charge a battery with a bad cell.

- Reconnect the tester. If the Ready LED is still not ON or ALL the LEDs are FLASHING, then the battery is not accepting a charge and should be replaced.
- If ALL the LEDs are OFF, then either the clamps are reversed, the clamps are not making good continuity, or the battery is discharged too low to power the battery tester. If the clamps are correct and the connections are good, then the battery must be charged.
 - Disconnect the tester, connect charger and charge battery. Follow battery charger manufacturer's instructions and safety precautions.
 - Reconnect the tester. If the LEDs do not turn ON or FLASH, then the battery is not accepting a charge and should be replaced.

Ready LED Should Remain ON.

The Ready LED should remain ON during test. If ALL the LEDs begin FLASHING or turn OFF, then the battery needs to be charged.

- Disconnect the tester, connect charger and charge battery. Follow battery charger manufacturer's instructions and safety precautions.
- Reconnect the tester. If ALL the LEDs begin FLASHING or turn OFF during test, then the battery is not accepting a charge and should be replaced.

BATTERY TEST

1. **Key OFF, Engine OFF.**
2. If Ready LED is ON, the battery is charged enough to be tested.
3. Set CCA rotary switch to battery CCA rating. If battery CCA rating is between switch positions, use the higher position. For example, if battery is rated 540 CCA, set switch to 550.

NOTE: Do not be confused by CA rating. Use the CCA rating.
4. Press and hold TEST button, for testing above 32°F (0°C), or COLD TEST button for testing at 32°F (0°C) or lower (actual battery temperature).