



Professional Digital Battery Analyzer

DIGITAL BATTERY ANALYZER

The Professional Digital Battery Analyzer is a hand held diagnostic tool used to test 6 volt and 12 volt lead-acid type batteries from 50 to 2000 Cold Cranking Amps (CCA). Most automotive, lawn and garden, motorcycle, marine, heavy truck, and off road equipment batteries can be tested with this unit. The analyzer will test partially charged batteries provided enough battery charge exists to power the analyzer. The battery must be charged to 5.5 volts minimum for the analyzer to operate.

User prompts displayed on the LCD guide the testing process. Test results are clearly displayed on the LCD after testing is completed. Test results consist of the following: Battery voltage, available power in CCAs and battery condition indication. The battery may remain connected to the vehicle, as long as the vehicle electrical system does not interfere with testing. The power cable is detachable for easy storage or replacement.

An internal 9 volt battery supplies power to allow viewing of test results from memory or to enable the print function; an infrared printer interface sends test results to an available external printer for hard copy reports.

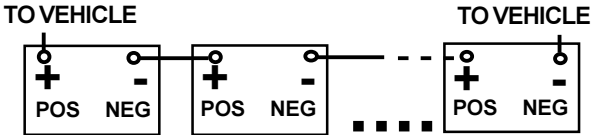
When the analyzer is using internal power, the following functions are available: View Test Results, Print Test Results, and Voltmeter.

The analyzer 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. Batteries connected in parallel must be disconnected. *Only* batteries in series may remain connected during testing, see diagram below:



Batteries in Series: All batteries are connected from the negative (-) terminal of one battery, to the positive (+) terminal of the other. Only the negative terminal of the first battery and the positive terminal of the last battery are to be connected to the vehicle. Any number of batteries may be connected in a series. However, each battery *must be tested separately*.

All other types of multiple connections must be disconnected from each other.

- If the battery is connected to the vehicle, *remove all electrical loads*.
- Battery connections must be clean and have good contact for proper test results.
- Install terminal stud adapters (not included) on side post batteries. Terminal stud adapters are available at most automotive parts stores.

HOOKUP

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

If the analyzer does not power up, check the power cable at the analyzer and the connections to the battery. Also, verify that the battery is charged to a *minimum* of 5.5 volts. If the battery is below 5.5 volts, disconnect the analyzer, and charge the battery.

Follow battery charger manufacturer's instructions for proper battery charging procedures.

Disconnect the charger, then hook up the analyzer. If the analyzer still does not power up, the battery is not taking a charge and should be replaced.

WARNING:

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

ANALYZER SETUP

1. **Select the language.**

The analyzer is factory set to the English language. To change languages (English, Spanish, French, German, Italian, Swedish, or Dutch), select Analyzer Setup and then Language from the menu. Use the UP/DOWN arrow keys to move the pointer next to the appropriate selection and press the * key.

2. **Select the battery CCA measurement standard.**

The battery analyzer is factory set to the SAE measurement standard that rates vehicle batteries sold in the U.S. To select another battery measurement standard (SAE, DIN, IEC, EN, or BCI), select Analyzer Setup and then CCA Standard from the menu. Use the UP/DOWN arrow keys to move the pointer next to the appropriate selection and press the * key to set the CCA standard of measure.

3. **Adjust the Display.**

To change the contrast of the LCD display, select Analyzer Setup and then Adjust Display from the menu. Use the UP/DOWN arrow keys to change the screen contrast and press the * key to set.

4. **Select °Celsius or °Fahrenheit.**

The analyzer is factory set to display temperature in degrees °F. To change temperature display, select Analyzer Setup and then choose °C/°F from the menu. Use the UP/DOWN arrow keys to move the pointer to the desired temperature units and press the * key to set.

BATTERY TESTING

1. Select Battery Test and press * key to begin testing.

The analyzer will check for bad cell(s), excess voltage, and sufficient charge to run an accurate test. If any of these checks fail, one of the following messages will be displayed and testing is stopped.

BAD CELL

Indicates that there is a shorted or defective cell in the battery and the battery needs to be replaced.

VOLTAGE TOO HI

Make sure:

- No battery chargers are hooked up.
- Engine is not running.
- You are testing a 6 or 12 volt battery.
- Two 12 volt batteries in series (24V) are being tested individually.

CHARGE & RETEST

Indicates the battery is too low to test and needs to be charged before it can be tested. If the battery has been charged and continues to give this result, it is BAD and needs to be replaced.

2. Enter the battery CCA rating.

Use the UP/DOWN arrow keys to change the CCA number of the battery to be tested. *Press and hold arrow key down for rapid scrolling.* Once the correct number is displayed, press the * key to continue.

NOTE: Do not be confused by CA rating. Use the CCA rating. To convert CA or MCA (Marine) to CCA, multiply CA or MCA by 0.8.

ENTER CCA:	600
Press *	To Cont.

3. Select test based on battery temperature.

Use the UP/DOWN arrow keys to move the pointer next to the appropriate selection. Press * key to make selection. Use **Batt Above 32°F** selection when the battery actual temperature is above 32°F (0°C). Use **Batt Below 32°F** selection when the battery's temperature is 32°F (0°C) or lower.

→ Batt Above	32°F
Batt Below	32°F

4. Testing process.

Once the temperature range has been selected, the remaining battery tests will be start automatically.

TESTING
**** Please Wait ****

After a short period, the analyzer displays the battery condition. After displaying the battery condition test results, the analyzer determines the battery state-of-charge. Below are the possible results and their meaning:

GOOD BATTERY

Indicates that the battery is good and ready to be returned to service.

GOOD-RECHARGE

Indicates that the battery is good but needs to be charged before returning it to service.

REPLACE BATTERY

Indicates the battery is bad and needs to be replaced. Before replacing the battery, check the following:

- Battery clamps had good connection on both sides of clamp during test. If not, correct connections and retest.
- If the battery was hooked up to the vehicle during testing perform the following steps:
 - Disconnect the vehicle from the battery.
 - Clean battery posts or terminals.
 - Reconnect analyzer and retest.
 - If you still get Replace Battery - the battery is bad and needs to be replaced.

CHARGE & RETEST

Indicates the battery is too low to test and needs to be charged before it can be retested. If the battery has been charged and continues to display "Charge/Retest", the battery is BAD and needs to be replaced.

SURFACE CHARGE

Indicates that a surface charge exists and should be removed before retesting the battery. Turn on the vehicle headlights for 60 seconds, then off. Wait 60 seconds for battery to stabilize (some batteries may require additional time). Hook up and retest.

BATTERY TESTING (Cont'd)

After all tests are complete the battery voltage and state-of-charge in CCA (Cold Cranking Amps) are displayed on the bottom line of the display as shown in the sample below. This is the battery available power at its present temperature and state of charge.

GOOD BATTERY	
12.60V	1025 CCA

NOTE: A flashing asterisk (*) next to CCA reading indicates that vehicle noise was detected during an in-vehicle battery test. The engine and all accessory loads must be turned off. If the problem remains, disconnect battery from the vehicle and retest.

If a CCA reading higher than 2000 (analyzer maximum limit) is measured, **2000** and **OVER** will alternate on the display. If a CCA reading lower than 50 (analyzer minimum limit) is measured, **50** and **UNDER** will alternate.

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.

INTERNAL BATTERY POWER

To power the analyzer from the internal 9V battery, press and hold the ON/OFF key until text is displayed, and release. If the analyzer does not power up, replace the 9V battery.

To replace the 9V battery, remove battery cover screw on the back of the analyzer and slide cover off.

When not in use, and left ON, the analyzer will shut off automatically.

NOTE: The display backlight will not come on when the analyzer is being powered by the internal 9V battery.

VIEW TEST RESULTS

Each time a test is performed, the previous test results are replaced with the new results. The analyzer is not required to be connected to an external battery. To view test results, press the ON/OFF key, select View Data from the menu and press the * key.

PRINT TEST RESULTS

The analyzer has an infrared data link output compatible with an available Hewlett-Packard model HP 82240B portable thermal printer. Test results stored in memory may be printed at any time. The analyzer is not required to be connected to an external battery. To print test results, press the ON/OFF key, select Print from the menu. Aim the infrared emitter located on the top of the analyzer at the printer infrared receptor, and press the * key.

VOLTMETER FUNCTION

When powering the analyzer from the vehicle battery, voltage can be read. Select Battery Voltage from the menu and press the * key.

To use the analyzer as a voltmeter when powering from the 9V battery, select Voltmeter from the menu and press the * key. The analyzer displays the voltage reading. For example, use the optional accessory probes to read voltage at starting/charging components.

CAUTION: DO NOT CONNECT THE ANALYZER TO VOLTAGE GREATER THAN 30 VDC OR THE ANALYZER MAY BE DAMAGED.

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.