

**MIDTRONICS**

*Battery Management Innovation*



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## **Celltron<sup>®</sup> START<sup>™</sup>**

### **Standby Generator Battery Analyzer**

*For testing CCA-rated starting  
batteries in generator applications  
and 6- and 12-volt starting batteries in  
fleet truck applications*

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***INSTRUCTION MANUAL***

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## INTRODUCTION

The Celltron® START™ Standby Generator Battery Analyzer provides a complete analysis of CCA-rated starting batteries in generator applications and 6- and 12-volt starting batteries in fleet truck applications. The Celltron START digitally displays voltage, battery condition, and available power. With a menu of options, the analyzer can also function as a voltmeter and as quality control device capable of testing up to 200 batteries in succession.

The analyzer enables wireless printing to the Midtronics printer through a built-in IR communication port.

## SAFETY



**CAUTION:** Because of the possibility of personal injury, always use extreme caution when working with batteries. Follow all BCI (Battery Council International) safety recommendations.



**WARNING** (Required by California Prop. 65): Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. **Wash hands after handling.**

Inspect the battery for damages and check the electrolyte level. If the electrolyte level is too low, replenish it and fully charge the battery.

- Carefully read all operating and safety instructions before using the Celltron START analyzer.
- Wear eye protection and use caution when working around batteries.
- Do not smoke, strike a match, or cause a spark in the vicinity of the battery.
- Keep hair, hands, and clothing as well as analyzer cords and cables away from moving engine parts.

## DISPLAY AND KEYPAD

When you first connect the Celltron START analyzer to the battery, it will function as a voltmeter until you press the **ENTER** button.

The menu-driven display will then guide you step by step through the test process. Use the keypad buttons to scroll and select menu options.

**NOTE:** To conserve the internal 9-volt battery, the display will turn off (Sleep Mode) after 30 continuous seconds of voltage loss at the clamps.

The voltmeter display is visible when you first connect the analyzer to the battery.

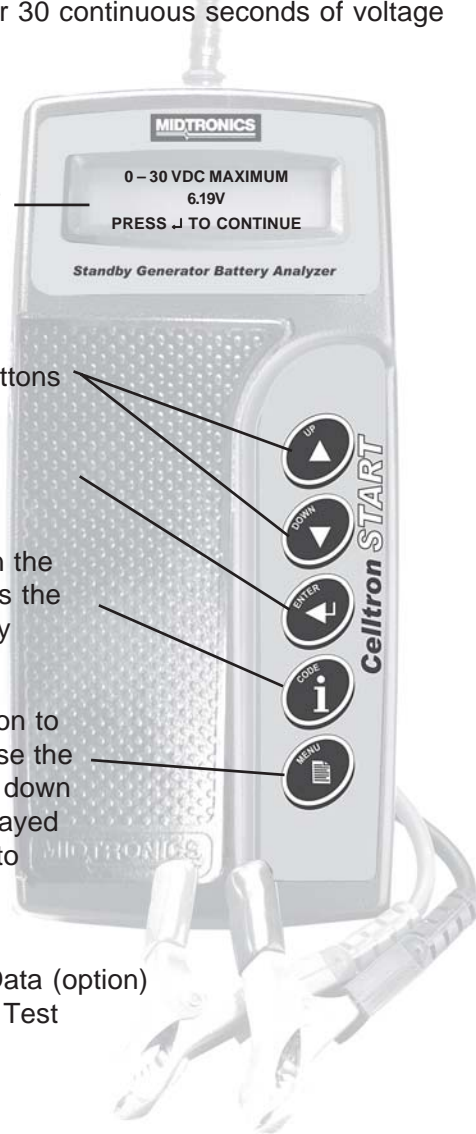
Use the **UP/DOWN ARROW** buttons to scroll to menu choices.

Use the **ENTER** button to make selections.

The **INFO** button is active when the test results are displayed. Press the **INFO** button to calculate battery charging time.

Press and hold the **MENU** button to display the following options. Use the **ARROW** buttons to scroll up or down through the list (3 options displayed per screen) and press **ENTER** to select:

- |                  |                         |
|------------------|-------------------------|
| 1) Print Results |                         |
| 2) View Results  | 5) Export Data (option) |
| 3) QC Mode       | 6) Perform Test         |
| 4) Voltmeter     | 7) Utilities            |



## BEFORE THE TEST

### Testing Out-of-Vehicle

Clean the battery terminals with a wire brush before testing.

For Group 31 or side-terminal batteries, install and tighten the lead terminal adapters provided with the analyzer.

**IMPORTANT:** Do not use steel bolts. Failure to properly install terminal adapters, or using adapters that are dirty or worn, may cause false test results.

### Testing In-Vehicle

The preferred test position is at the battery terminals. If the battery is not accessible, you may test at the jumper post; however, the available power value could be lower than the actual value. If you get a RETEST AT BATTERY POSTS result, disconnect the analyzer and retest at the posts. If testing a side-post battery, the analyzer may display instructions to CHECK FOR CORROSION, DISCONNECT & RETEST WITH ADAPTERS. Follow the instructions before discarding the battery.

At the start of the test, make sure all vehicle accessory loads are off and the ignition is in the off position.

## CONNECTING THE ANALYZER

**IMPORTANT:** When you start a new test (outside of QC mode) by connecting to the battery, the last test results in memory will be lost.

1. Connect the red clamp to the positive (+) terminal.
2. Connect the black clamp to the negative (–) terminal.
3. For a proper connection, rock the clamps back and forth. The analyzer requires that both sides of each clamp be firmly connected before testing. A poor connection will prevent testing and produce a CHECK CONNECTION (BLACK or RED CLAMP) message. If the message appears, clean the terminals and reconnect the clamps.

**NOTE:** Batteries connected in parallel must have the ground cable disconnected or false test readings may result.

If the clamps are connected in the wrong polarity (positive to negative or negative to positive), the analyzer will alert you with a REVERSE CONNECTION message. If any other messages appear when you connect the analyzer to the battery, refer to the section entitled "Error Messages."

## BATTERY TEST PROCEDURE

When you first connect the Celltron START to the battery, it will function as a voltmeter until you press the **ENTER** button to begin the battery test.

After you press **ENTER**, the Midtronics sign-on screen will appear for 3 seconds after which the analyzer will assist you in setting up your battery test parameters. (Scroll to each parameter using the **ARROW** buttons and press **ENTER** to continue.)

1. Test type: Select IN-VEHICLE or OUT-OF-VEHICLE.  
Test location: If the test is IN-VEHICLE, select BATTERY POST or JUMP START POST.  
POST TYPE: If the location is BATTERY POST, select TOP-POST or SIDE-POST.
2. Battery type: Select REGULAR lead-acid or AGM.  
AGM type: If the battery is AGM, select SPIRAL-wound plates or OTHER, such as flat-plate construction.
3. Battery rating system: Select a rating system to TEST BY: CCA, CA, MCA, DIN or JIS.
4. Battery rating: Select the rating (from 100 to 1200 or 2000 depending on the rating system).
5. Press **ENTER** to start the test.

### **Additional Test Parameters (if required)**

#### Before or After Charge Decision:

For a more decisive result, the analyzer will ask if you are testing the battery before or after charging. (If the vehicle has just been driven, select BEFORE CHARGE.) It will resume the test after you make your selection.

#### Temperature Compensation:

If the analyzer detects that the temperature of the battery may make a difference in the result, it will ask you to select if the battery temperature is above or below freezing. It will resume the test after you make your selection.

If the analyzer displays warning messages or other instructions after you press **ENTER** to start the test, refer to “Error Messages.”

## **BATTERY TEST RESULTS**

At the end of an out-of-vehicle test, the analyzer will display one of the following decisions together with the state of charge (SOC) value and the rated and actual CCA.

### **GOOD BATTERY**

Return to service.

### **GOOD-RECHARGE**

Fully charge the battery and return to service.

### **CHARGE & RETEST**

Fully charge the battery and retest. ***Failure to fully charge the battery before retesting may cause false readings.***

### **REPLACE BATTERY\***

Replace the battery and retest to perform a complete charging system analysis. A REPLACE BATTERY result may also mean a poor connection between the vehicle’s cables and the battery. After disconnecting the vehicle cables from the battery, retest the battery using the out-of-vehicle test before replacing.)

### **BAD CELL-REPLACE\***

Replace the battery and retest to perform a complete system analysis.

- \* When testing at **Jump-Start Post**, the analyzer may need to verify the result. The analyzer will prompt you to retest at the battery posts.
- \* When testing at **Side-Posts**, the analyzer may detect corrosion between the terminals and the side posts. The analyzer will prompt you to check for corrosion and retest with adapters.

Next, the analyzer will display for 3 seconds the percentage of state of health as a bar graph.

The analyzer will then display for 3 seconds the percentage of state of charge as a bar graph.

### **TIME-TO-CHARGE OPTION**

After the battery test results, press the **INFO** button for the option of calculating the charge time required to fully charge the battery (available only for batteries that produce a GOOD-RECHARGE or CHARGE & RETEST result). The **INFO** button remains active during the results for the battery, starting and charging systems tests.

Use the **UP/DOWN ARROW** buttons in the ADDITIONAL INFO screen to select TIME-TO-CHARGE and press **ENTER**.

1. Charge Rate (Amps): Use the **ARROW** buttons to select the charge rate and press **ENTER**.
2. When the analyzer completes the calculation, it will display CHARGE BATTERY with the time to charge in minutes at your selected amperage rates.
3. Press **ENTER** to return to the battery test results.

### **MENU OPTIONS**

To select the following options, which are also available in QC (Quality Control) mode, press and hold the **MENU** button.

The Menu options will be displayed three at a time. Use the **UP/DOWN ARROW** buttons to scroll through the options and press **ENTER** to select.

**IMPORTANT:** When you start a new test (outside of QC Mode) by connecting to the battery, the last test results in memory will be lost.

## 1. Print Results

**IMPORTANT:** If you will be using the Midtronics printer for the first time, charge the printer battery for 16 hours before beginning your test session. Refer to the printer manual for more information.

The Celltron START analyzer also has the ability to print the last test results or the entire data set in QC Mode by sending data from the analyzer's top-mounted IR transmitter to the printer's IR receiver (below the **MODE** button). To print, turn on the printer and align the IR transmitter with the receiver. Select 1. PRINT RESULTS from the Options menu.

## 2. View Results

The results available above are displayed on-screen. Press the **UP ARROW** button to scroll through the results and return to the Menu screen.

In QC Mode you can view the complete data set in the QC memory. Press the **UP ARROW** button to scroll from test to test. Press **ENTER** to view the limits set for that test. Press **ENTER** again to return to the test result.

## 3. QC Mode

Select QC Mode to set up the analyzer to act as a quality control device, which will enable you to test up to 200 batteries in succession without resetting test parameters. (You can change parameters at any time during QC testing. The results will be displayed or printed along with the new parameters.)

1. On/Off: If you turn on QC Mode, it will stay on until you turn it off. The analyzer will go into Sleep Mode to save the 9-volt battery power after 30 continuous seconds of voltage loss at the clamps. When voltage is restored, the analyzer will continue saving data in QC Mode to the next memory location.

2. Clear Memory, Yes/No: The analyzer's memory holds up to 200 test results in QC memory. Select YES to clear test results from memory or NO to continue storing results. When the memory is full, the analyzer will display the following warning before it starts to overwrite earlier test results:

MEMORY IS FULL / PRESS ↵ TO OVERWRITE NO. 1

If you want to export or print the stored results before clearing the memory, press **MENU** to exit.

3. Select Input/Test By: Select a rating system to TEST BY: CCA, CA, MCA, or DIN.
4. Set Minimum Amps: Select the CCA threshold for Pass/Fail.
5. Set Minimum Voltage: Select the voltage threshold for Pass/Fail.
6. To start QC Mode testing, connect the analyzer and test each battery until finished. Press the **MENU** button to return to the Options Menu.

#### **4. Voltmeter**

The analyzer will function as a voltmeter (with an operating range of 0 through 30 Vdc) when you first connect it to a battery.

You can turn this feature on or off, depending on your preference. Press the **MENU** button; then select the Voltmeter option. Press **ENTER**, then turn the voltmeter ON or OFF.

#### **5. Export Data (optional)**

An optional software/IR module package enables the analyzer to send data to a PC. If the analyzer is in QC Mode, it will send the complete data set in the QC memory.

#### **6. Perform Test**

Select this option to start a new test.

#### **7. Utilities**

The Utilities option enables you to configure the following features:

##### **A. Coupon Mode**

On: Select ON to print a coupon at the bottom of the printout.

Off: Select OFF to turn off the coupon feature.

Revise: Select REVISE to customize the coupon's nine lines of text by scrolling to the desired character and pressing **ENTER** until finished. To move back a space as you revise the text, press the **INFO** button. Exit by entering the last available character, or by pressing the **MENU** button.

### **B. Printer Type**

Select either the IRDA or HP 82240B printer. (IRDA is recommended for the Celltron START.).

### **C. Language**

To change the language used to display prompts and data, use the **ARROW** buttons to select English, French, or Spanish, and press **ENTER**.

### **D. Contrast**

Adjust the contrast on the display by using the **ARROW** buttons and press **ENTER**.

### **E. Date & Time**

Modify the date and time by scrolling to the correct character. Press **ENTER** to move to the next character.

### **F. Set Header**

You can create a header for your printed test results showing your store name, address, and phone number. Use the **ARROW** buttons to scroll to the desired character and press the **ENTER** button to select and move to the next space. Continue until you have entered all of the information. The **INFO** button will move the cursor back one space.

Exit by entering the last available character or by pressing the **MENU** button to return to the Menu screen.

### **G. Test Counter**

The analyzer automatically counts the total number of tests performed, the number of tests by type, and the number of results by type. Press the **ARROW** buttons to scroll through the 3 test counter screens: **Total Tests**, **Out-of-Vehicle**, and **In-Vehicle**.

Abbreviations: **G**: Good Battery, **G-R**: Good-Recharge (Battery), **C&R**: (Charge & Retest (Battery), **R**: Replace Battery, **FS**: Full System Test, **TT**: Total tests in screen category (Total Tests, Out-of-Vehicle, In-Vehicle).

Press **ENTER** to return to the UTILITIES menu.

#### **H. Config Printer**

This utility allows you to set the communication protocol in the Midtronics printer to enable communication between the printer and the MicroXL. You can also use the MicroXL Config Printer utility to set the printer's protocol for older model Micro analyzers.

1. Turn on the printer.
2. Select H. Config Printer.
3. Select IRDA or HP82240B. (IRDA is recommended for the MicroXL series analyzers.)
4. The printer will reset and print the protocol it will be using.

**NOTE:** Printing may take approximately 20 seconds. Be sure to keep the analyzer's IR transmitter aligned with the printer's receiver until the full configuration message prints.

#### **I. Main Menu**

Select this utility option to return to the first option, 1. PRINT RESULTS, in the Main menu.

## **ERROR MESSAGES**

### **SURFACE CHARGE DETECTED**

The battery will hold a surface charge if the engine has been running or after the battery has been charged. The analyzer may prompt you to remove the surface charge before it begins testing.

1. Follow the instructions on the display.
2. After detecting the removal of the surface charge, the tester will resume testing.

### **SYSTEM NOISE/CHECK LOADS**

The analyzer has detected computer or ignition noise and will attempt to retest. Make sure all vehicle loads are off and the ignition is in the off position. The analyzer will automatically retest when it no longer detects system noise.

- You may be testing too close to a noise source, i.e., a charger or other high-current device. If so, move away and retest.
- If no noise source is identified, fully charge the battery and retest. If the message appears after recharging, replace the battery.
- Disconnect the battery cables and retest.

### **UNSTABLE BATTERY**

A battery that is very weak or that has just been charged may retain enough electrical activity, which the analyzer has detected, to adversely affect the test results. A fully charged battery should stabilize quickly, after which the analyzer will automatically retest. Weak batteries should be charged and retested.

### **NON 12-VOLT BATTERY DETECTED**

You are attempting to test out-of-vehicle a non-12-volt battery or batteries connected in series.

### **24-VOLT SYSTEM DETECTED**

You are attempting to test in-vehicle both batteries in a 24-volt system. Disconnect the batteries and test them individually.

### **PROBLEMS WITH THE DISPLAY**

If the display does not turn on:

- Check the connection to the vehicle battery.
- The vehicle battery may be too low (below 1 volt) to power the analyzer. Fully charge the battery and retest.
- The analyzer's 9-volt battery may need to be replaced. Follow the directions in "Replacing the Analyzer Battery" and replace the 9-volt battery (alkaline recommended).

- If the analyzer does not power on when you press and hold the **MENU** button, replace the 9-volt battery.
- If troubleshooting does not solve the problem, call Midtronics, Inc. at 800-776-1995 to obtain service. See “Patents, Limited Warranty, Service” for more information.

## PRINTER PROBLEMS

### Status LED

When a printer fault occurs, the **STATUS LED** will flash. You can identify the fault by the number of sequential flashes:

Sequence	Condition	Solution
* * *	Paper out	Fit new paper
** ** **	Thermal head too hot	Allow head to cool
*** *** ***	Battery low	Recharge printer battery for 16 hours

### Solutions

- If the IR transmitter and receiver are not aligned, all the data may not print. The infrared ports on the top of the analyzer and on the bottom of the printer (below the **MODE** button) should be pointed directly at each other. The maximum distance for reliable transmission between the ports is 18 inches (45 cm).

To realign, press **MENU** to cancel the print job. Verify alignment between the analyzer and printer; then try to print the test results again.

- If the message PRINTING RESULTS appears on the screen, but no data are printing, press **MENU** to cancel the print. Turn off the printer and charge the printer battery for at least 15 minutes before attempting to print again. Align the analyzer and printer IR transmitters and print again.

- Make sure the printer is on. The printer shuts off after 2 minutes of inactivity to conserve the battery. To turn the printer on, briefly press the **MODE** button. The green **STATUS** light should turn on. Make sure you are using the Midtronics printer provided with the Celltron START. Other printers may not be compatible.
- Verify that the correct printer is selected in the analyzer. IRDA PRINTER is recommended for the Celltron START. See “B. Printer Type” in the “Menu Options” section.
- Verify that a compatible communications protocol is selected in the printer: IRDA Mode in the Midtronics printer setup (“IRDA Physical Layer” on the setup confirmation printout) corresponds to the analyzer’s IRDA PRINTER setting.. See “H. Config Printer” and the printer’s User Guide for more information.
- Direct sunlight interferes with infrared data transmission/receiving. If the printer is not receiving data, remove the printer and Celltron START from direct sunlight. If the characters are not clear or are partially missing, recharge the battery and reprint.
- If you are unable to print after ensuring the analyzer is functioning, the printer is on, the battery is good, and the IR transmitter and receiver are aligned, check the printer manual for further instructions or call Midtronics, Inc. at 800-776-1995 for service. See “Patents, Limited Warranty, Service” for more information.

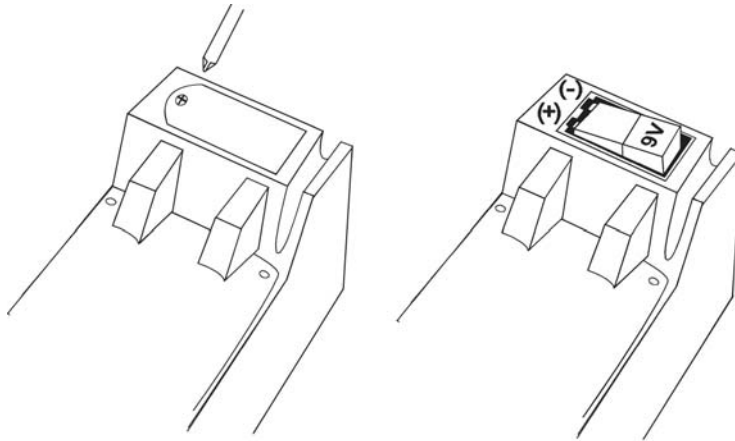
## **REPLACING THE ANALYZER BATTERY**

The Celltron START analyzer uses a 9-volt battery (alkaline recommended) to allow testing of batteries down to 1 volt as well as to supply power while the menu is active. The analyzer can test batteries down to 5.5 volts when the internal battery is not functioning.

If the battery needs replacement, the analyzer will display LOW INTERNAL BATTERY, PLEASE REPLACE. Change the battery as soon as possible.

1. Remove the cover to the battery compartment using a small screwdriver.
2. Insert a 9-volt battery (alkaline recommended) as shown. Make sure the positive and negative terminals are positioned correctly.

3. Replace the cover and tighten the screw.
4. Verify that the date and time are correct. Refer to “E. Date & Time” in the “Menu Options” section.



### PATENTS

The Celltron® START™ is made in the U.S.A. by Midtronics, Inc. and is protected by one or more of the following U.S. Patents: 6,445,158; 6,441,585; 6,417,669; 6,363,303; 6,369,441; 6,332,113; 6,323,650 B1; 6,316,914; 6,304,087; 6,249,124; 6,225,808; 6,163,156; 6,091,245; 6,051,976; 5,831,435; 5,821,756; 5,757,192; 5,592,093; 5,585,728; 5,572,136; 4,912,416; 4,881,038; 4,825,170; 4,816,768; 4,322,685. Canadian Patents: 1,295,680; 1,280,164. United Kingdom Patent: 0,672,248; 0,417,173. German Patent: 693 25 388.6; 689 23 281.0-08; 93 21 638.6. And other U.S. and Foreign patents issued and pending. This product may utilize technology exclusively licensed to Midtronics, Inc. by Johnson Controls, Inc. and/or Motorola, Inc.

### LIMITED WARRANTY

The Celltron START is warranted to be free of defects in materials and workmanship for a period of one year from date of purchase. Midtronics will, at our option, repair or replace the unit with a remanufactured unit. This limited warranty applies only to the Celltron START analyzer, and does not cover any other equipment, static damage, water damage, overvoltage damage, dropping the unit, or damage resulting from extraneous causes including owner misuse. Midtronics is not liable for any incidental or consequential damages for breach of this warranty. The warranty is void if owner attempts to disassemble the unit or to modify the cable assembly.

### SERVICE

To obtain service, purchaser should contact Midtronics for a Return Authorization number, and return the unit to Midtronics freight prepaid, Attention: RA# \_\_\_\_\_. Midtronics will service the analyzer and reship the next scheduled business day following receipt, using the same type carrier and service as received. If Midtronics determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, purchaser will be billed for the repaired product and it will be returned freight prepaid with freight charges added to the invoice. Battery analyzer beyond the warranty period are subject to the repair charges in effect at that time. Optional remanufacturing service is available to return the tester to like-new condition. Out-of-warranty repairs will carry a 3-month warranty. Remanufactured units purchased from Midtronics are covered by a 6-month warranty.

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